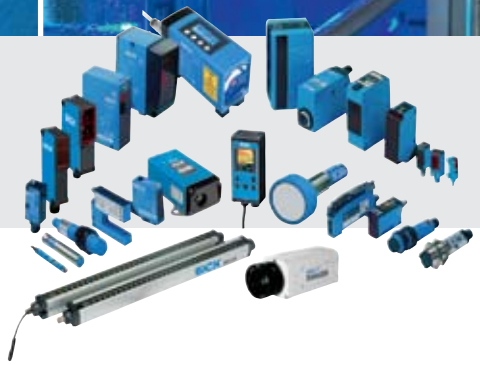
CATALOG







Industrial Sensors



SICK

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A Technology Leader in Factory and Logistics Automation

SICK is one of the world's leading manufacturers of sensors, safety systems and automatic identification solutions. Our high quality products range from simple sensors and laser-based bar code scanners… to machine vision and safety laser scanners… to complex camera arrays.

Our superior technological expertise, broad product line, and vast application experience enables us to continually find new and better ways to help our customers achieve their goals.

What Does SICK Stand For?

- Innovation
- Leadership
- Expertise
- Independence
- Experience

60 Years of Innovation

SICK has been a technology leader for more than 60 years. Founded in Germany by Dr. Erwin Sick in 1946, the company has pioneered a long line of industry firsts – such as the first registration control device, the first safety light curtain, the first color sensor, the first bar code reader with integrated auto focus, and many more. These innovations provide solutions for factory and logistics automation applications around the world. But SICK offers more than just innovative components. We provide complete automation solutions… and are committed to meeting your specific needs.

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Since its humble beginning, SICK has made research and development a priority and central strategic component -- spending nine percent of revenue on R&D. More than 450 people at SICK are dedicated to R&D, constantly creating new ways to solve customers' applications.

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- Airports/Airlines
- Automotive
- Consumer Goods
- Courier, Express, Parcel
- Food and Beverage
- Machine Tools
- Mobile Vehicles
- Packaging
- Ports and Harbors
- Postal
- Retail Distribution
- Robotics

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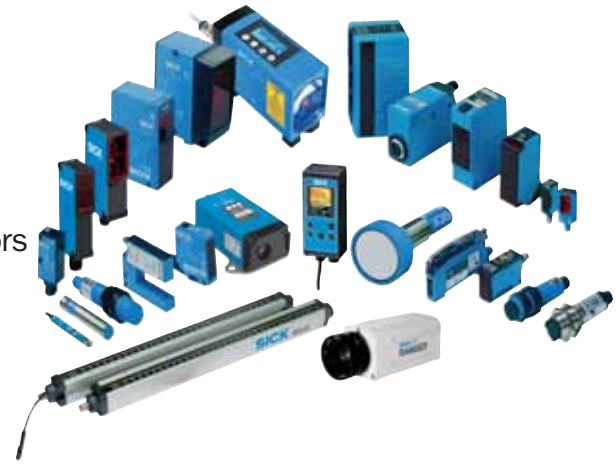




Wide Range of Products

Industrial Sensors

- Capacitive Sensors
- Color, Contrast, & Luminescence Sensors
- Conveyor Sensors
- Distance Measurement Sensors
- Encoders
- Inductive Sensors
- Machine Vision
- Magnetic Cylinder & Proximity Sensors
- Measuring Light Grids
- Optical Displacement Sensors
- Photoelectric Sensors
- Positioning Drives
- Ultrasonic Sensors



Safety Systems

- Electromechanical Safety Switches
- Non-Contact Safety Switches
- Perimeter Guards
- Safety Camera Systems
- Safety Laser Scanners
- Safety Light Curtains & Safety Light Grids
- Safety Relays, Controllers & Safe Fieldbus Solutions
- Single-Beam Photoelectric Safety Switches



Automatic Identification Solutions

- Bar Code Scanners
- Fixed Position 2D Imagers
- Hand-Held Scanners
- Laser Measurement Systems
- Omni Directional Systems
- Dimensioning Systems
- Luggage & Identification Systems
- High-End Camera Tunnels



Family Overviews - Standard Sensors








Inductive Proximity Sensors

	IME	IMF	INOX	IM	IH	IQ
Housing	8, 12, 18, 30	12, 18	12, 18, 30	4, 5, 8, 12, 18, 30	4, 5, 6, 20, 34	5, 8, 10, 12, 40, 80
Style	threaded barrel	threaded barrel	threaded barrel	threaded barrel	smooth barrel	rectangular
	1.5...20 mm	2...8 mm		0.6...15 mm	0.6...30 mm	15...60 mm
	2...20 mm	4...12 mm		2...20 mm	2...4 mm	
			6...40 mm	3..40 mm		




Capacitive Proximity Sensors

	CM	CQ
Housing	18, 30	28, 35
Style	threaded barrel	rectangular
	8...25 mm	10...25 mm




Magnetic Proximity Sensors

	MM	MQ
Housing	8, 12, 18	10
Style	threaded barrel	rectangular
	60...120 mm*	60 mm*

*Note: Sensing range is based on M4.0 magnet.

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Family Overviews - Standard Sensors








Magnetic Cylinder Sensors

	C-Slot	T-Slot	Tie-Rod	Integrated Profile	Round Bodied	Dovetail
Sensor	N1, MZ2Q-C	T1, T6, MZ2Q, MZU2, MZF1	T1, T6, MZ2Q, MZU2, MZZ1	T1, T6, MZ2Q, MZU2, MZP3, MZP4	T1, T6, MZ2Q, MZU2, MZR1, MZR2	T1, T6, MZ2Q, MZK1, MZK2

Family Overviews - Standard Sensors








Photoelectric Sensors

	W2	W4-3	W4-3 TEFLON	W150	W9-2	W9L
	1.2 in (30 mm)	7.1 in (180 mm)	4.7 in (120 mm)	3.9 in (100 mm)	9.8 in (250 mm)	5.9 in (150 mm)
	4.5 in (115 mm)			0.4 in (250 mm)	59 in (1500 mm)	
	0.7 in (18 mm)	1.2 in (50 mm)			0.8 in (20 mm)	
	2.6 ft (0.8 m)	16.4 ft (5 m)		7.9 ft (2.4 m)	13.1 ft (4 m)	39.4 ft (12 m)
		16.4 ft (5 m)		2.2 ft (0.7 m)		
	47.2 in (1.2 m)	18 ft (5.5 m)	9.8 ft (3 m)	14.4 ft (4.4 m)	22.9 ft (7 m)	164 ft (50 m)









Photoelectric Sensors

	W100L	W140-2	W1000	W160	W160T	W170
		19.7 in (500 mm)	2.0 in (100 mm)	2.2 in (55 mm)	5.9 in (150 mm)	
	17.7 in (450 mm)	39.4 in (900 mm)	19.7 in (500 mm)	34.5 in (900 mm)	3.3 ft (1 m)	21.7 in (550 mm)
				4.1 in (105 mm)	0.4 in (10 mm)	3.9 in (100 mm)
	39.4 ft (12 m)	19.7 ft (6.0 m)	13.8 ft (4.2 m)	19.7 ft (6 m)	4.9 ft (1.5 m)	13.3 ft (4 m)
						2.6 ft (0.8 m)
	114.8 ft (35 m)	49.2 ft (15 m)	16.4 ft (5 m)	45.9 ft (14 m)		27.9 ft (8.5 m)

Family Overviews - Standard Sensors








Photoelectric Sensors

	W190	W190 T	W190 L	W11	W12-3	W12 L-2
	11.8 in (300 mm)	11.8 in (300 mm)	11.8 in (300 mm)	9.8 in (250 mm)	23.6 in (600 mm)	7.9 in (200 mm)
				39.8 in (1000 mm)		
		18.0 ft (5.5 m)	18 ft (5.5 m)	23 ft (7 m)	23 ft (7 m)	59.0 ft (18 m)
					6.6 ft (2m)	
			164 ft (5.0 m)		65.6 ft (20 m)	262.5 ft (80 m)








Photoelectric Sensors

	W14-2	W18-3	W23-2	W24-2	W34	W250
	19.7 in (500 mm)	39.4 in (1000 mm)	39.4 in (1000 mm)	98.4 in (2500 mm)	98.4 in (2500 m)	23.6 in (1100 mm)
	59.1 in (1500 mm)		90.6 in (2300 mm)			
	19.7 ft (6 m)	23 ft (7 m)	32.8 ft (10 m)	72.2 ft (22 m)	72.2 ft (22 m)	44.3 ft (13.5 m)
	49.2 ft (15 m)	65.6 ft (20 m)		196.9 ft (60 m)	196.9 ft (60 m)	82 ft (25 m)

Family Overviews - Standard Sensors








Photoelectric Sensors

	W260	W27-3	W27 L-2	W2000	W45	ELF
	126 in (3200 mm)	63 in (1600 mm)	31.5 in (800 m)		78.7 in (2000 mm)	2 in (50 mm)
	11.5 ft (3500 mm)			11.5 ft (3.5 m)		3.9 in (100 mm)
	49.2 ft (15 m)	49.2 ft (15 m)		49 ft (15 m)	180.4 ft (55 m)	13.1 ft (4 m)
	147.6 ft (45 m)	114.8 ft (35 m)		164 ft (50 m)	1148.3 ft (350 m)	








Photoelectric Sensors

	MH 1	MH15	V12-2	V18	V18-2	V180
	2 in (50 mm)					
	3.9 in (100 mm)	13.8 in (350 mm)	13.4 in (340 mm)	31.5 in (800 mm)	15.8 in (400 mm)	15.8 in (400 mm)
	13.1 ft (4 m)	16.4 ft (5 m)	11.5 ft (2.8 m)	16.4 (5 m)	11.5 ft (3.5 m)	18 ft (5.5 m)
		16.4 ft (5 m)	16.4 ft (0...5 m)	196.9 ft (60 m)	72.2 ft (22 mm)	75 .5 ft (23 m)

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Family Overviews - Standard Sensors



Photoelectric Sensors

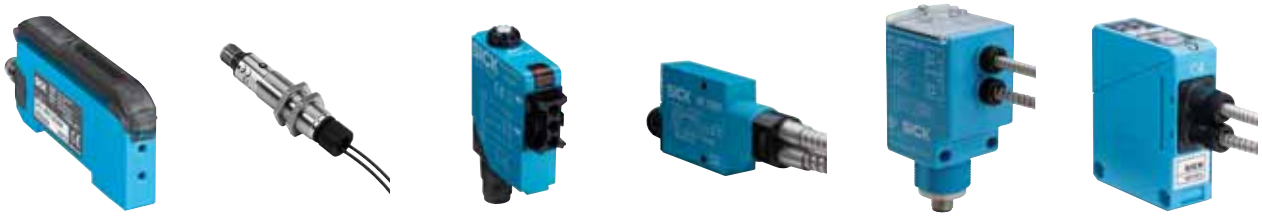
	W130	S130
	47.2 in (1200 mm)	7.9 in (200 mm)
		1.2 in (30 mm)
	32.8 ft (10 m)	
	11.5 ft (3.5 m)	7.2 ft (2.2 m)



Fiber-Optic Sensors

	WLL160	WLL170
	0...500 mm	0...3,500 mm
	0...70 mm	0...160 mm

Note: Fiber-optic sensors' sensing range may change based on the fiber-optic cable being used.



Fiber-Optic Sensors

	WLL190	VLL18	WLL12	WLL1000	WLL2000	WLL260
	0...4000 mm	0...1000 mm	0...550 mm	0...1000 mm	0...800 mm	0...800 mm
	0...480 mm	0...50 mm	0...50 mm	0...230 mm	0...260 mm	0...110 mm

Note: Fiber-optic sensors' sensing range may change based on the fiber-optic cable being used.

Family Overviews - Standard Sensors







ZoneControl Sensors				
ZLM 1	**WTR1**	**WTR2**	**WLR2100**	**ZIM**
	0.1...0.9 m	0.1...0.9 m		
			0...9 m	





Fork/Slot Sensors			
	WF3T/5T	**WF Next**	**UF3**
	Through-beam	Through-beam	Through-beam
Technology	IR LED	IR LED	Ultrasonic
Slot Width	3, 5 mm	2, 5, 15, 30, 50, 80, 120 mm	3 mm
Slot Depth	60 mm	40, 60, 95 mm	69 mm
Switch. Freq.	10 kHz	10 kHz	1.7 kHz

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Family Overviews - High Performance Sensors








Ultrasonic Sensors

	UM18	UM18 Double Sheet Detection	UM30-11... UM30-12... UM30-13...	UM30-14...	UM30-15...	UC4/UC12
	30...250 mm	40 mm	30...1300 mm	800...3400 mm	800...6000 mm	13...250 mm
Output	1 x PNP 2 x PNP Analog	2 x PNP	1 x PNP 2 x PNP Analog	1 x PNP 2 x PNP Analog	1 x PNP 2 x PNP Analog	1 x PNP/NPN







Contrast Sensors

	KT3	KT5	KT8L	KT10W	KTL
	12.5 mm	10, 20, 40 mm	40...800 mm	10 mm	Dependent on fiber
Switch. Freq.	10 kHz	10 kHz	17 kHz	25 kHz	10 kHz
LEDs	Green or RGB	Green or RGB	Red, laser	Red, green & blue	Green or RGB
Housing	Plastic	Metal	Metal	Metal	Metal

Family Overviews - High Performance Sensors





Color Sensors

	CSM1	CS8	CSL1
	12.5 mm	12.5/60 mm	Dependent on fiber
Switch. Freq.	1.5 kHz	5 kHz	1 kHz
# Teach-in col.	1	1/4	1
Housing	Plastic	Metal	Metal






Luminescence Sensors

	LUT2	LUT3	LUT1-4	LUT1-5
	12.5 mm	10, 20, 50, 90 mm	Depends on lens, up to 300 mm	Depends on lens, up to 140 mm
Switch. Freq.	2 kHz	1.5 kHz	5 kHz	250 kHz
Housing	Plastic	Metal	Metal	Metal

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Family Overviews - High Performance Sensors







Light Grid Sensors

	PLG	WLG	HLG	MLG	ELG
			2.0 m	8.5 m	12 m
	2.0 m	1.5 m			
Resolution	30 mm	6 mm	2 mm	10 mm	10 mm
Output	Switching	Switching, Position	Switching	Switching, Position	Switching





Optical Displacement Sensors

OD	OD-Hi	OD-MAX
30 mm ± 4 mm	30 mm ± 4 mm	30 mm ± 5 mm
50 mm ± 10 mm	50 mm ± 10 mm	85 mm ± 20
100 mm ± 35 mm	80 mm ± 15 mm	350 mm ± 180 mm
130 mm ± 50 mm	100 mm ± 40 mm	25 mm ± 1 [transparent]
250 ± 150 mm	250 mm ± 150 mm	

Family Overviews - High Performance Sensors








Distance Measurement Sensors

	DT2	DT10	DT20	DT20HI	DS30	DT/DL60
	300 mm	500 mm	1.0 m	600 mm	2.0 m	5.3 m
						24 m
Resolution	1.0 mm	1.5 mm	1.0 mm	0.1 mm		1.5 mm
Repeatability	3 mm	3 mm	±1.5 mm	±0.2 mm		±8 mm Prox, ±7 mm Reflex
Output	Analog	Analog switching	Analog, Switching	Analog, Switching	Switching	Analog, Switching








Distance Measurement Sensors

	DS60	DT/DS500	DT200 DME2000	DME3000	DME5000	DMT/DML
	6 m	70 m	2 m	8 m		155 m
	20 m		130 m	500 m	300 m	1,200 m
Resolution		0.1 mm	1.0 mm	0.125 mm	0.05 mm	1.0 mm
Repeatability		1.0 mm	1.0 mm	0.5 mm	0.5 mm	7.0 mm Prox, 6.0 mm Reflex
Output	Switching x 2	Analog, CAN, Switching x 2	Analog, Serial	Serial, Bus, Switching x 2	Serial, Bus, Switching x 2	Analog, Serial, Bus, Switching x 2

Family Overviews - High Performance Sensors





Infrared Data Transmission Sensors

	ISD230	ISD260/280	ISD300
	200m	180m	200m
Output	Analog, Serial	Serial, Bus	Serial, Bus








Machine Vision Sensors

CVS	ICS ADG/DCI	IVC-2D	IVC-3D	Ruler E	Ranger C/D/E
Vision sensor	**Vision sensor**	**Smart camera**	**Smart 3D camera**	**Streaming 3D camera**	**Streaming 3D camera**
Color verification	Pixel count	Locate: • presence • position	Locate: • presence • position	Gigabit Ethernet	Gigabit Ethernet
Color sorting	Pattern matching	Inspect: • shape	Inspect: • shape	FOV: 450x820... 1000x1550 (mm)	Up to 35,000 profiles per second
Color matching	Gloss detection	Identify: • bar codes • OCR/OCV	Measure: • length/width/ht • volume	Calibrated real world data	FOV C mount optics
OCR/OCV • date code • lot codes	Date code inspection	Measure: • length/width • area	FOV: 30x60...440x1480 (mm)	Up to 10,000 profiles per second	MultiScan: • 3D height • gray • intensity • patented laser scatter technology
		FOV: • C/CS mount optics	Calibrated real world data	Up to 0.2 mm resolution for ht (z)	
			Up to 15 µm resolution for ht (z)		



Single
sensing range



Double
sensing range



Triple
sensing range

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IM08	118
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IQ40	204
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Theory of Operation...Inductive Proximity Sensors

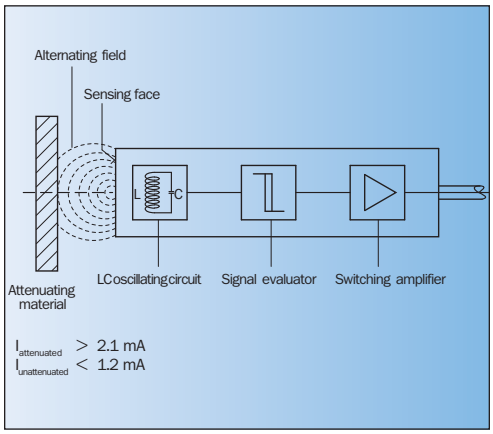


Fig. 1 Inductive proximity sensor makeup

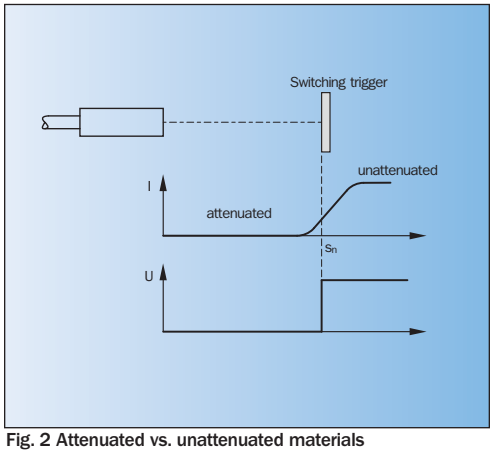


Fig. 2 Attenuated vs. unattenuated materials

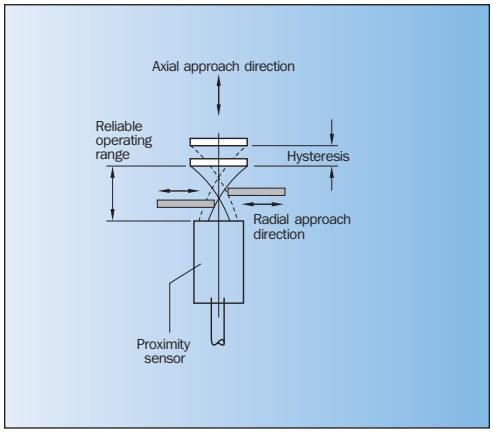


Fig. 3 Response curve for inductive sensors

About inductive sensors

Inductive sensors play an important role in automation due to their non-contact mode of operation, their robust industry-compatible construction and the resulting high degree of reliability as well as for economic reasons. Their non-contact mode of operation means that no actuation forces are required and direct contact with the object is avoided. The completely electronic design (no moving parts or contacts) functions without wear. The electronics are encapsulated and provide a high degree of protection against vibration and shock stress as well as dirt, dust and humidity. As a result, the majority of these sensors can also be used in extreme conditions.

About inductive proximity sensors

An inductive proximity sensor comprises an LC oscillating circuit, a signal evaluator and a switching amplifier (See Fig. 1).

The coil of this oscillating circuit generates a high-frequency electromagnetic alternating field. This field is emitted at the sensing face of the sensor.

If attenuating material nears the sensing face, eddy currents are generated in the case of non-ferrite metals. In the case of ferromagentic metals, hysteresis and eddy current loss also occur. These losses draw energy from the oscillating circuit and reduce oscillation. The signal evaluator detects this reduction and converts it into a switching signal (see Fig. 2).

The terms "attenuated" and "unattenuated" are used to describe the two switching states of inductive proximity sensors.

Response curve for inductive proximity sensors

The specified sensing ranges are determined in the case of axial approach along the reference axis of the sensor. (See Fig. 3)

Radial approach results in a reduction of the sensing range. The edge of the switching trigger has only a small surface area. As a result, less eddy-current losses occur. The sensor only reacts if the switching trigger laterally enters the alternating field relatively close to the sensing face. In the case of axial approach, the full surface of the switching trigger is exposed to the scattered electromagnetic field. Axial alignment, therefore, provides the maximum sensing range.

Inductive Proximity Sensors...Type Code

Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Character
	I	**M**	**1**	**2**	**-**	**0**	**2**	**B**	**P**	**S**	**-**	**Z**	**U**	**0**	

1 **Sensor technology**
- I Inductive

2 **Design**
- H Barrel
- M Cylinder with thread
- Q Rectangular

3/4 **Housing shape**
- 03
- 04
- 05
- 06
- 08
- 10
- 12 Diameter
- 18 or
- 20 edge length of
- 30 sensing face
- 34
- 40
- 80

6/7/8 **Sensing range/ installation**
- B Flush
- N Non-flush
- 02B 2 mm; flush
- 04N 4 mm; non-flush
- 1B5 1.5 mm; flush
- 2N5 2.5 mm; non-flush

other codes 14
- K Short body housing

Connection 13
- W Cable, PVC
- U Cable, PUR-PVC
- P Cable with connector, M8x1
- T Connector, M8x1
- C Connector, M12x1
- K Terminals

Housing material 12
- Z Ms, nickel-plated
- V Stainless steel
- K Plastic

Output 10
- S NO
- O NC
- P Programmable/complementary
- N NAMUR

Interface 9
- P DC (3/4-wire) PNP
- N DC (3/4-wire) NPN
- C DC (4-wire) PNP or NPN
- D DC (2-wire)
- A AC 2-wire
- U AC/DC 2-wire
- - NAMUR

*Note
IME example:
IME12-04BPSZW2K
- Economical Efficient Engineered
- cable length

IMF
- IM Food

Selection Table...Inductive Proximity Sensors

Inductive Proximity Sensors

Sensor Type	Housing			Sensing Range s_n in mm		Switching Output		
	Design	Size in mm	Material	Shielded	Unshielded	PNP	NPN	NAMUR
IME08 Standard, Shielded	Barrel, threaded	M8	Nickel plated, brass	1.5				
IME08 Standard, Unshielded	Barrel, threaded	M8	Nickel plated, brass		2.5			
IME08 Short, Shielded	Barrel, threaded	M8	Nickel plated, brass	1.5				
IME08 Short, Unshielded	Barrel, threaded	M8	Nickel plated, brass		2.5			
IME08 Advanced, Shielded	Barrel, threaded	M8	Nickel plated, brass	2				
IME08 Advanced, Unshielded	Barrel, threaded	M8	Nickel plated, brass		4			
IME08 Advanced Short, Shielded	Barrel, threaded	M8	Nickel plated, brass	2				
IME08 Advanced Short, Unshielded	Barrel, threaded	M8	Nickel plated, brass		4			
IME12 Standard, Shielded	Barrel, threaded	M12	Nickel plated, brass	2				
IME12 Standard, Unshielded	Barrel, threaded	M12	Nickel plated, brass		4			
IME12 Short, Shielded	Barrel, threaded	M12	Nickel plated, brass	2				
IME12 Short, Unshielded	Barrel, threaded	M12	Nickel plated, brass		4			
IME12 Advanced, Shielded	Barrel, threaded	M12	Nickel plated, brass	4				
IME12 Advanced, Unshielded	Barrel, threaded	M12	Nickel plated, brass		8			
IME12 Advanced Short, Shielded	Barrel, threaded	M12	Nickel plated, brass	4				
IME12 Advanced Short, Unshielded	Barrel, threaded	M12	Nickel plated, brass		8			
IME18 Standard, Shielded	Barrel, threaded	M18	Nickel plated, brass	5				
IME18 Standard, Unshielded	Barrel, threaded	M18	Nickel plated, brass		8			
IME18 Short, Shielded	Barrel, threaded	M18	Nickel plated, brass	5				
IME18 Short, Unshielded	Barrel, threaded	M18	Nickel plated, brass		8			
IME18 Advanced, Shielded	Barrel, threaded	M18	Nickel plated, brass	8				
IME18 Advanced, Unshielded	Barrel, threaded	M18	Nickel plated, brass		12			
IME18 Advanced Short, Shielded	Barrel, threaded	M18	Nickel plated, brass	8				
IME18 Advanced Short, Unshielded	Barrel, threaded	M18	Nickel plated, brass		12			
IME30 Standard, Shielded	Barrel, threaded	M30	Nickel plated, brass	10				
IME30 Standard, Unshielded	Barrel, threaded	M30	Nickel plated, brass		15			
IME30 Short, Shielded	Barrel, threaded	M30	Nickel plated, brass	10				
IME30 Short, Unshielded	Barrel, threaded	M30	Nickel plated, brass		15			
IME30 Advanced, Shielded	Barrel, threaded	M30	Nickel plated, brass	15				
IME30 Advanced, Unshielded	Barrel, threaded	M30	Nickel plated, brass		20			
IME30 Advanced Short, Shielded	Barrel, threaded	M30	Nickel plated, brass	15				
IME30 Advanced Short, Unshielded	Barrel, threaded	M30	Nickel plated, brass		20			
IMF12 Standard, Shielded	Barrel, threaded	M12	Stainless steel	2				
IMF12 Standard, Unshielded	Barrel, threaded	M12	Stainless steel		4			
IMF12 Advanced, Shielded	Barrel, threaded	M12	Stainless steel	4				
IMF12 Advanced, Unshielded	Barrel, threaded	M12	Stainless steel		8			
IMF18 Standard, Shielded	Barrel, threaded	M18	Stainless steel	5				
IMF18 Standard, Unshielded	Barrel, threaded	M18	Stainless steel		8			
IMF18 Advanced, Shielded	Barrel, threaded	M18	Stainless steel	8				
IMF18 Advanced, Unshielded	Barrel, threaded	M18	Stainless steel		12			
IM12 INOX	Barrel, threaded	M12	Stainless steel	6	10			
IM18 INOX	Barrel, threaded	M18	Stainless steel	10	20			
IM30 INOX	Barrel, threaded	M30	Stainless steel	20	40			

Selection Table...Inductive Proximity Sensors

Inductive Proximity Sensors

Sensor Type	Output Function				Connection Type			Electrical Configuration	Enclosure Rating	Page
	NO	NC	NO/NC	NAMUR	Cable	Connector	Terminals			
IME08	■	■			■	■		DC 3-wire	IP 67	28
IME08	■	■			■	■		DC 3-Wire	IP 67	30
IME08	■	■			■	■		DC 3-Wire	IP 67	32
IME08	■	■			■	■		DC 3-Wire	IP 67	34
IME08	■	■			■	■		DC 3-Wire	IP 67	36
IME08	■	■			■	■		DC 3-Wire	IP 67	38
IME08	■	■			■	■		DC 3-Wire	IP 67	40
IME08	■	■			■	■		DC 3-Wire	IP 67	42
IME12	■	■			■	■		DC 3-Wire	IP 67	44
IME12	■	■			■	■		DC 3-Wire	IP 67	46
IME12	■	■			■	■		DC 3-Wire	IP 67	48
IME12	■	■			■	■		DC 3-Wire	IP 67	50
IME12	■	■			■	■		DC 3-Wire	IP 67	52
IME12	■	■			■	■		DC 3-Wire	IP 67	54
IME12	■	■			■	■		DC 3-Wire	IP 67	56
IME12	■	■			■	■		DC 3-Wire	IP 67	58
IME18	■	■			■	■		DC 3-Wire	IP 67	60
IME18	■	■			■	■		DC 3-Wire	IP 67	62
IME18	■	■			■	■		DC 3-Wire	IP 67	64
IME18	■	■			■	■		DC 3-Wire	IP 67	66
IME18	■	■			■	■		DC 3-Wire	IP 67	68
IME18	■	■			■	■		DC 3-Wire	IP 67	70
IME18	■	■			■	■		DC 3-Wire	IP 67	72
IME18	■	■			■	■		DC 3-Wire	IP 67	74
IME30	■	■			■	■		DC 3-Wire	IP 67	76
IME30	■	■			■	■		DC 3-Wire	IP 67	78
IME30	■	■			■	■		DC 3-Wire	IP 67	80
IME30	■	■			■	■		DC 3-Wire	IP 67	82
IME30	■	■			■	■		DC 3-Wire	IP 67	24
IME30	■	■			■	■		DC 3-Wire	IP 67	86
IME30	■	■			■	■		DC 3-Wire	IP 67	88
IME30	■	■			■	■		DC 3-Wire	IP 67	90
IMF12	■	■	■			■		DC 3-Wire	IP 69K, IP 68	92
IMF12	■	■	■			■		DC 3-Wire	IP 69K, IP 68	94
IMF12	■	■	■			■		DC 3-Wire	IP 69K, IP 68	96
IMF12	■	■	■			■		DC 3-Wire	IP 69K, IP 68	98
IMF18	■	■	■			■		DC 3-Wire	IP 69K, IP 68	100
IMF18	■	■	■			■		DC 3-Wire	IP 69K, IP 68	102
IMF18	■	■	■			■		DC 3-Wire	IP 69K, IP 68	104
IMF18	■	■	■			■		DC 3-Wire	IP 69K, IP 68	106
IM12 INOX	■	■				■		DC 3-Wire	IP 69K, IP 68	108
IM18 INOX	■	■				■		DC 3-Wire	IP 69K, IP 68	110
IM30 INOX	■					■		DC 3-Wire	IP 69K, IP 68	112

Please note:
NO = normally open
NC = normally closed
NO/NC = complementary

Selection Table...Inductive Proximity Sensors

Inductive proximity sensors

Sensor Type	Housing			Sensing Range s_n in mm		Switching Output					
	Design	Size in mm	Material	Shielded	Unshielded	PNP	NPN	NAMUR	DC	AC	UC
IM 04 Miniature	Barrel, threaded	M4	Nickel plated, brass	0.6		■	■				
IM 05 Miniature	Barrel, threaded	M5	Nickel plated, brass	0.8		■	■				
IM 08 Standard	Barrel, threaded	M8	Nickel plated, brass	1.5	2.5	■	■				
IM 08 Short	Barrel, threaded	M8	Nickel plated, brass	1.5		■	■				
IM 08 Advanced	Barrel, threaded	M8	Nickel plated, brass	2	4	■	■				
IM 08 Advanced Short	Barrel, threaded	M8	Nickel plated, brass	2	4	■	■				
IM 08 Triple Sensing Range	Barrel, threaded	M8	Nickel plated, brass	3	6	■	■				
IM 08 NAMUR	Barrel, threaded	M8	Nickel plated, brass	1				■			
IM 12 Standard	Barrel, threaded	M12	Nickel plated, brass	2	4	■	■				
IM 12 Short	Barrel, threaded	M12	Nickel plated, brass	2	4	■	■				
IM 12 DC 2-wire	Barrel, threaded	M12	Nickel plated, brass	2	4				■		
IM 12 Advanced	Barrel, threaded	M12	Nickel plated, brass	4	8	■	■				
IM 12 Advanced Short	Barrel, threaded	M12	Nickel plated, brass	4	8	■	■				
IM 12 Triple Sensing Range	Barrel, threaded	M12	Nickel plated, brass	6	10	■	■				
IM 12 Harsh Environment	Barrel, threaded	M12	Nickel plated, brass	2	4	■	■				
IM 12 QuadProx	Barrel, threaded	M12	Nickel plated, brass	2	4	■	■				
IM 12 AC	Barrel, threaded	M12	Nickel plated, brass	2	4					■	
IM 12 NAMUR	Barrel, threaded	M12	Nickel plated, brass	2	4			■			
IM 18 Standard	Barrel, threaded	M18	Nickel plated, brass	5	8	■	■				
IM 18 Short	Barrel, threaded	M18	Nickel plated, brass	5	8	■	■				
IM 18 DC 2-wire	Barrel, threaded	M18	Nickel plated, brass	5	8				■		
IM 18 Advanced	Barrel, threaded	M18	Nickel plated, brass	8	12	■	■				
IM 18 Triple Sensing Range	Barrel, threaded	M8	Nickel plated, brass	12	20	■	■				
IM 18 Harsh Environment	Barrel, threaded	M18	Nickel plated, brass	5	8	■	■				
IM 18 QuadProx	Barrel, threaded	M18	Nickel plated, brass	5	8	■	■				
IM 18 Universal	Barrel, threaded	M18	Nickel plated, brass	5	8						■
IM 18 NAMUR	Barrel, threaded	M18	Nickel plated, brass	5	8			■			
IM 30 Standard	Barrel, threaded	M30	Nickel plated, brass	10	15	■	■				
IM 30 Short	Barrel, threaded	M30	Nickel plated, brass	10	15	■	■				
IM 30 DC 2-wire	Barrel, threaded	M30	Nickel plated, brass	10	15				■		
IM 30 Advanced	Barrel, threaded	M30	Nickel plated, brass	15	20	■	■				
IM 30 Triple Sensing Range	Barrel, threaded	M30	Nickel plated, brass	22	40	■	■				
IM 30 Universal	Barrel, threaded	M30	Nickel plated, brass	10	15						■
IM 30 NAMUR	Barrel, threaded	M30	Nickel plated, brass	10	15			■			
IH 03 Miniature	Barrel, smooth	3 mm	Stainless Steel	0.6		■	■				
IH 04 Miniature	Barrel, smooth	4 mm	Stainless Steel	0.8		■	■				
IH 06 Short	Barrel, smooth	6.5 mm	Stainless Steel	1.5		■	■				
IH 06 Advanced	Barrel, smooth	6.5 mm	Stainless Steel	2	4	■	■				
IH 06 Advanced Short	Barrel, smooth	6.5 mm	Stainless Steel	2	4	■	■				
IH 20 Universal	Barrel, smooth	20 mm	Plastic		10						■
IH 34 Universal	Barrel, smooth	34 mm	Plastic		30						■
IQ 05 Miniature	Rectangular		Nickel-plated brass	0.8		■	■				
IQ 08 Standard	Rectangular		Plastic	2	4	■	■				
IQ 10 Standard	Rectangular		Plastic	3	6	■	■				
IQ 12 Standard	Rectangular		Plastic	3	6	■	■				
IQ 40 Short	Rectangular		Plastic	15, 20	35	■					
IQ 40 Short (Mag. Field Immune)	Rectangular		Plastic		35	■					
IQ 40 Standard (Long)	Rectangular		Plastic	15	20	■					
IQ 40 Standard	Rectangular		Plastic	15	20	■					
IQ 40 DC 2-wire	Rectangular		Plastic	15					■		
IQ 40 AC 2-wire	Rectangular		Plastic	15						■	
IQ 40 Universal (Long)	Rectangular		Plastic	15	20						■
IQ 80 Standard	Rectangular		Plastic		60	■					■
IQ 80 Universal	Rectangular		Plastic		60						■
IQ 80 M12	Rectangular		Plastic	44.5	50	■					

Selection Table...Inductive Proximity Sensors

Inductive proximity sensors

Sensor Type	Output Function				Connection Type			Electrical Configuration	Enclosure Rating	Page
	NO	NC	NO/NC	NAMUR	Cable	Connector	Terminals			
IM 04 Miniature	■				■			DC 3-wire	IP 67	114
IM 05 Miniature	■				■	■		DC 3-Wire	IP 67	116
IM 08 Standard	■	■			■	■		DC 3-Wire	IP 67	118
IM 08 Short	■				■	■		DC 3-Wire	IP 67	120
IM 08 Advanced	■	■			■	■		DC 3-Wire	IP 67	122
IM 08 Advanced Short	■	■			■	■		DC 3-Wire	IP 67	124
IM 08 Triple Sensing Range	■				■	■		DC 3-Wire	IP 67	126
IM 08 NAMUR				■	■			DC 2-Wire	IP 67	128
IM 12 Standard	■	■			■	■		DC 3-Wire	IP 67	130
IM 12 Short	■	■			■	■		DC 3-Wire	IP 67	132
IM 12 DC 2-wire	■				■	■		DC 2-Wire	IP 67	134
IM 12 Advanced	■	■			■	■		DC 3-Wire	IP 67	136
IM 12 Advanced Short	■	■			■	■		DC 3-Wire	IP 67	138
IM 12 Triple Sensing Range	■	■			■	■		DC 3-Wire	IP 67	140
IM 12 Harsh Environment			■			■		DC 4-Wire	IP 67	142
IM 12 QuadProx			■		■	■		DC 4-Wire	IP 68	144
IM 12 AC	■	■			■	■		AC 2-Wire	IP 67	146
IM 12 NAMUR				■	■			DC 2-Wire	IP 67	148
IM 18 Standard	■	■			■	■		DC 3-Wire	IP 67	150
IM 18 Short	■				■	■		DC 3-Wire	IP 67	152
IM 18 DC 2-wire	■				■	■		DC 2-Wire	IP 67	154
IM 18 Advanced	■	■			■	■		DC 3-Wire	IP 67	156
IM 18 Triple Sensing Range	■				■	■		DC 3-Wire	IP 67	158
IM 18 Harsh Environment			■			■		DC 4-Wire	IP 68	160
IM 18 QuadProx			■		■	■		DC 4-Wire	IP 67	162
IM 18 Universal	■	■			■	■		AC/DC 2-Wire	IP 67	164
IM 18 NAMUR				■	■			DC 2-Wire	IP 67	166
IM 30 Standard	■	■			■	■		DC 3-Wire	IP 67	168
IM 30 Short	■				■	■		DC 3-Wire	IP 67	170
IM 30 DC 2-wire	■				■	■		DC 2-Wire	IP 67	172
IM 30 Advanced	■	■			■	■		DC 3-Wire	IP 67	174
IM 30 Triple Sensing Range	■				■	■		DC 3-Wire	IP 67	176
IM 30 Universal	■	■			■			AC/DC 2-Wire	IP 67	178
IM 30 NAMUR				■	■			DC 2-Wire	IP 67	180
IH 03 Miniature	■	■			■			DC 3-Wire	IP 67	182
IH 04 Miniature	■				■	■		DC 3-Wire	IP 67	184
IH 06 Short	■	■			■	■		DC 3-Wire	IP 67	186
IH 06 Advanced	■				■	■		DC 3-Wire	IP 67	188
IH 06 Advanced Short	■	■			■	■		DC 3-Wire	IP 67	190
IH 20 Universal	■				■			AC/DC 2-Wire	IP 67	192
IH 34 Universal	■	■			■			AC/DC 2-Wire	IP 67	194
IQ 05 Miniature	■	■			■			DC 3-Wire	IP 67	196
IQ 08 Standard	■				■	■		DC 3-Wire	IP 67	198
IQ 10 Standard	■				■	■		DC 3-Wire	IP 67	200
IQ 12 Standard	■				■	■		DC 3-Wire	IP 67	202
IQ 40 Short	■		■			■		DC 3-Wire	IP 67	204
IQ 40 Short (Mag. Field Immune)			■		■	■		DC 3-Wire	IP 67	206
IQ 40 Standard (Long)			■					DC 3-Wire	IP 65	208
IQ 40 Standard			■				■	DC 3-Wire	IP 68	210
IQ 40 DC 2-wire			■				■	DC 2-Wire	IP 68	212
IQ 40 AC 2-wire			■				■	AC 2-Wire	IP 68	214
IQ 40 Universal (Long)			■				■	AC/DC 2-Wire	IP 65	216
IQ 80 Standard			■				■	DC 3-Wire	IP 65	218
IQ 80 Universal			■				■	AC/DC 2-Wire	IP 65	220
IQ 80 M12			■			■		DC 3-Wire	IP 67	222

IME08 Standard, Shielded

Inductive Proximity Sensors

0.06 in (1.5 mm)
sensing distance

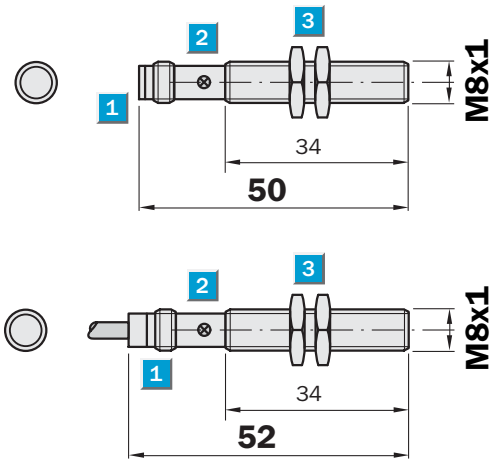
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M8 x 1 mm
- IP 67 enclosure rating
- Shielded installation
- DC 3-wire

IME08



Dimensional drawing



dimensions in mm

1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 13, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information	
Type	**Part no.**
IME08-1B5N0ZT0S	1 040 850
IME08-1B5N0ZW2S	1 040 852
IME08-1B5NSZT0S	1 040 846
IME08-1B5NSZW2S	1 040 848
IME08-1B5P0ZT0S	1 040 842
IME08-1B5P0ZW2S	1 040 844
IME08-1B5PSZT0S	1 040 838
IME08-1B5PSZW2S	1 040 840

Technical data	IME08-	1B5N0 ZT0S	1B5N0 ZW2S	1B5NS ZT0S	1B5NS ZW2S	1B5P0 ZT0S	1B5P0 ZW2S	1B5PS ZT0S	1B5PS ZW2S
Sensing distance S_n	0.06 in (1.5 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Shielded	■	■	■	■	■	■	■	■
Connection type	Connector, M8, 3-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.14 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	500 Hz	■	■	■	■	■	■	■	■
Dimensions	M8 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	6 Nm	■	■	■	■	■	■	■	■

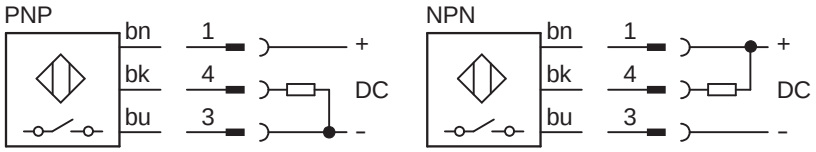
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

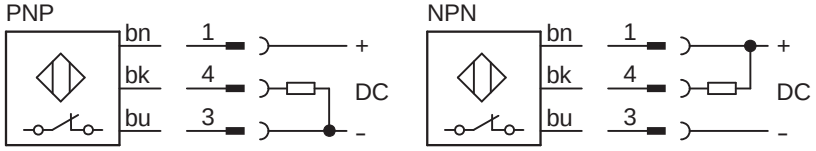
Reduction factor R_M

The following are reference values, which may vary from type to type:

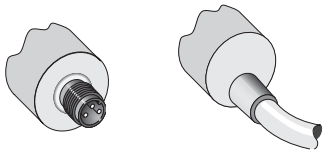
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

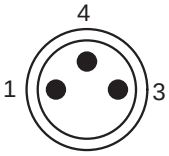




IME08-1B5N0ZT0S	IME08-1B5N0ZW2S
IME08-1B5NSZT0S	IME08-1B5NSZW2S
IME08-1B5P0ZT0S	IME08-1B5P0ZW2S
IME08-1B5PSZT0S	IME08-1B5PSZW2S



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO/NC
bu	blue	3	- V DC



IME08 Standard, Unshielded

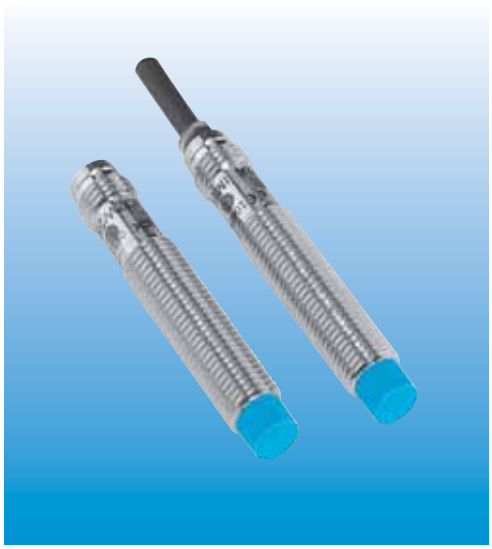
Inductive Proximity Sensors

0.1 in (2.5 mm)
sensing distance

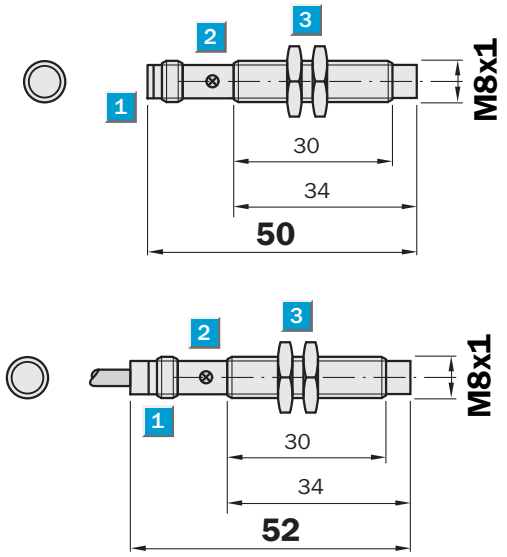
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M8 x 1 mm
- IP 67 enclosure rating
- Unshielded installation
- DC 3-wire

IME08



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 13, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME08-2N5N0ZT0S	1 040 866
IME08-2N5NZ0W2S	1 040 868
IME08-2N5NSZT0S	1 040 862
IME08-2N5NSZW2S	1 040 864
IME08-2N5P0ZT0S	1 040 858
IME08-2N5P0ZW2S	1 040 860
IME08-2N5PSZT0S	1 040 854
IME08-2N5PSZW2S	1 040 856

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Technical data	IME08-	2N5NO ZT0S	2N5NO ZW2S	2N5NS ZT0S	2N5NS ZW2S	2N5PO ZT0S	2N5PO ZW2S	2N5PS ZT0S	2N5PS ZW2S
Sensing distance S_n	0.1 in (2.5 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Unshielded	■	■	■	■	■	■	■	■
Connection type	Connector, M8, 3-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.14 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	500 Hz	■	■	■	■	■	■	■	■
Dimensions	M8 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	6 Nm	■	■	■	■	■	■	■	■

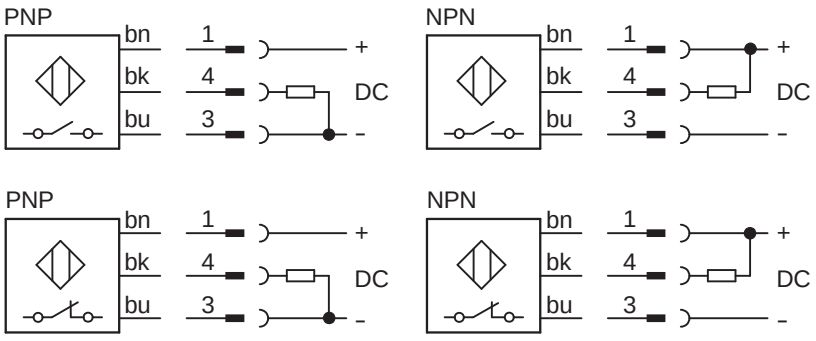
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

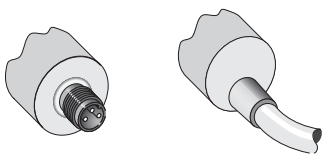
The following are reference values, which may vary from type to type:

St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

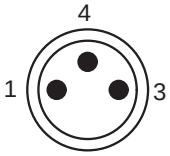
Connection diagram



IME08-2N5NOZT0S	IME08-2N5NOZW2S
IME08-2N5NSZT0S	IME08-2N5NSZW2S
IME08-2N5P0ZT0S	IME08-2N5P0ZW2S
IME08-2N5PSZT0S	IME08-2N5PSZW2S



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO/NC
bu	blue	3	- V DC



IME08 Short, Shielded

Inductive Proximity Sensors

0.06 in (1.5 mm)
sensing distance

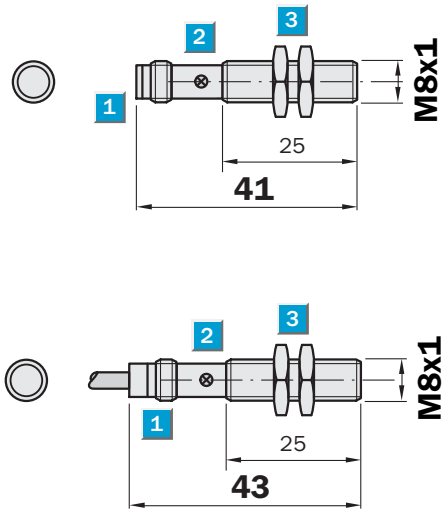
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M8 x 1 mm
- IP 67 enclosure rating
- Shielded installation
- DC 3-wire

IME08



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 13, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME08-1B5N0ZT0K	1 040 849
IME08-1B5N0ZW2K	1 040 851
IME08-1B5NSZT0K	1 040 845
IME08-1B5NSZW2K	1 040 847
IME08-1B5P0ZT0K	1 040 841
IME08-1B5P0ZW2K	1 040 843
IME08-1B5PSZT0K	1 040 837
IME08-1B5PSZW2K	1 040 839

Technical data	IME08-	1B5NO ZT0K	1B5NO ZW2K	1B5NS ZT0K	1B5NS ZW2K	1B5PO ZT0K	1B5PO ZW2K	1B5PS ZT0K	1B5PS ZW2K
Sensing distance S_n	0.06 in (1.5 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Shielded	■	■	■	■	■	■	■	■
Connection type	Connector, M8, 3-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.14 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	500 Hz	■	■	■	■	■	■	■	■
Dimensions	M8 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	6 Nm	■	■	■	■	■	■	■	■

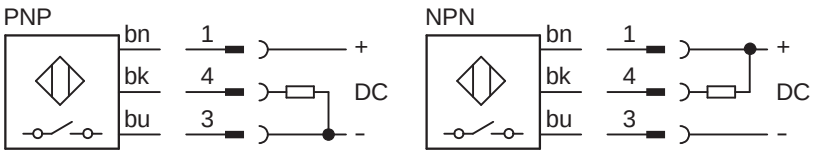
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

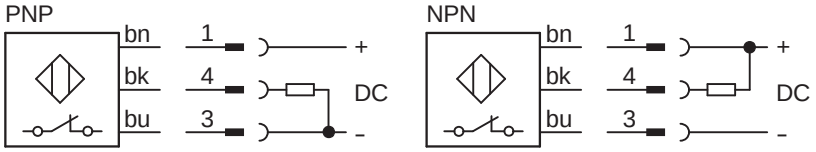
Reduction factor R_M

The following are reference values, which may vary from type to type:

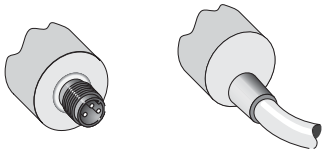
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

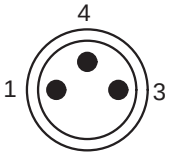




IME08-1B5NOZT0K	IME08-1B5NOZW2K
IME08-1B5NSZT0K	IME08-1B5NSZW2K
IME08-1B5POZT0K	IME08-1B5POZW2K
IME08-1B5PSZT0K	IME08-1B5PSZW2K



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO/NC
bu	blue	3	- V DC



IME08 Short, Unshielded

Inductive Proximity Sensors

0.1 in (2.5 mm)
sensing distance

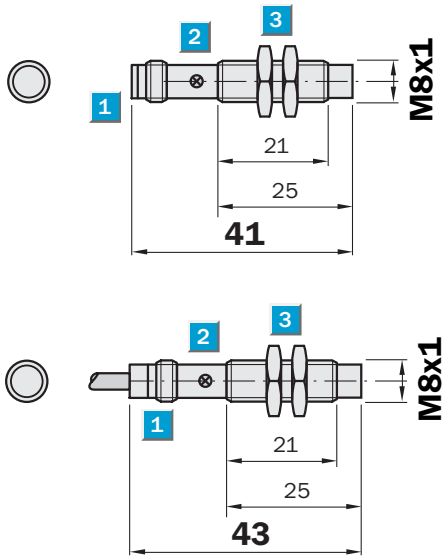
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M8 x 1 mm
- IP 67 enclosure rating
- Unshielded installation
- DC 3-wire

IME08



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 13, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME08-2N5N0ZT0K	1 040 865
IME08-2N5N0ZW2K	1 040 867
IME08-2N5NSZT0K	1 040 861
IME08-2N5NSZW2K	1 040 863
IME08-2N5P0ZT0K	1 040 857
IME08-2N5P0ZW2K	1 040 859
IME08-2N5PSZT0K	1 040 853
IME08-2N5PSZW2K	1 040 855

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Technical data	IME08-	2N5NO ZT0K	2N5NO ZW2K	2N5NS ZT0K	2N5NS ZW2K	2N5PO ZT0K	2N5PO ZW2K	2N5PS ZT0K	2N5PS ZW2K
Sensing distance S_n	0.1 in (2.5 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Unshielded	■	■	■	■	■	■	■	■
Connection type	Connector, M8, 3-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.14 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	500 Hz	■	■	■	■	■	■	■	■
Dimensions	M8 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	6 Nm	■	■	■	■	■	■	■	■

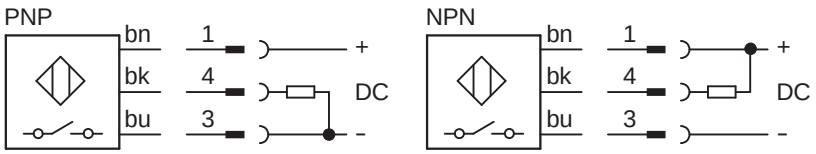
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

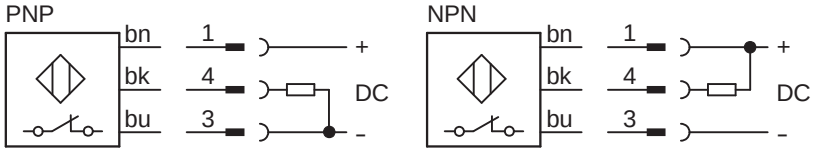
Reduction factor R_M

The following are reference values, which may vary from type to type:

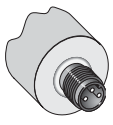
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram



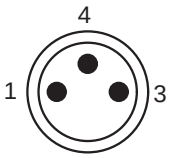


IME08-2N5NOZT0K	IME08-2N5NOZW2K
IME08-2N5NSZT0K	IME08-2N5NSZW2K
IME08-2N5POZT0K	IME08-2N5POZW2K
IME08-2N5PSZT0K	IME08-2N5PSZW2K





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO/NC
bu	blue	3	- V DC



IME08 Advanced, Shielded

Inductive Proximity Sensors





CE

0.08 in (2 mm)
sensing distance

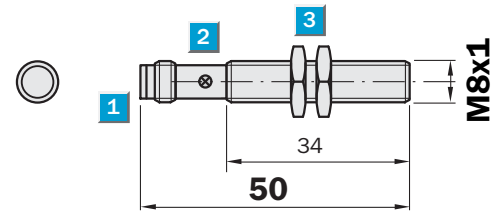
Highlights

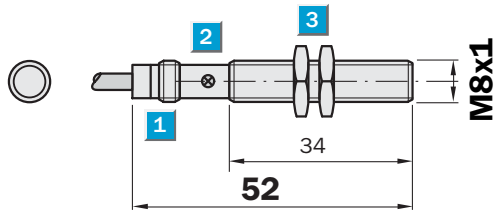
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M8 x 1 mm
- IP 67 enclosure rating
- Quasi-flush installation
- DC 3-wire

IME08



Dimensional drawing





1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 13, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME08-02BN0ZT0S	1 040 882
IME08-02BN0ZW2S	1 040 884
IME08-02BNSZT0S	1 040 878
IME08-02BNSZW2S	1 040 880
IME08-02BP0ZT0S	1 040 874
IME08-02BP0ZW2S	1 040 876
IME08-02BPSZT0S	1 040 870
IME08-02BPSZW2S	1 040 872

Technical data	IME08-	02BNO ZT0S	02BNO ZW2S	02BNS ZT0S	02BNS ZW2S	02BPO ZT0S	02BPO ZW2S	02BPS ZT0S	02BPS ZW2S
Sensing distance S_n	0.08 in (2 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Quasi-flush	■	■	■	■	■	■	■	■
Connection type	Connector, M8, 3-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.14 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	500 Hz	■	■	■	■	■	■	■	■
Dimensions	M8 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	6 Nm	■	■	■	■	■	■	■	■

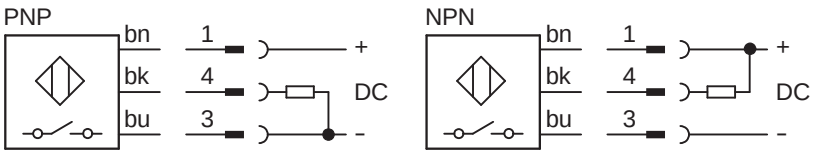
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

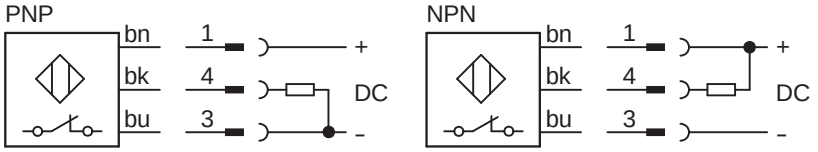
Reduction factor R_M

The following are reference values, which may vary from type to type:

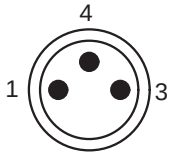
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

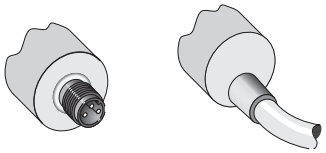




Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO/NC
bu	blue	3	- V DC



IME08-02BN0ZT0S	IME08-02BN0ZW2S
IME08-02BNSZT0S	IME08-02BNSZW2S
IME08-02BP0ZT0S	IME08-02BP0ZW2S
IME08-02BPSZT0S	IME08-02BPSZW2S



IME08 Advanced, Unshielded

Inductive Proximity Sensors





CE

0.2 in (4 mm)
sensing distance

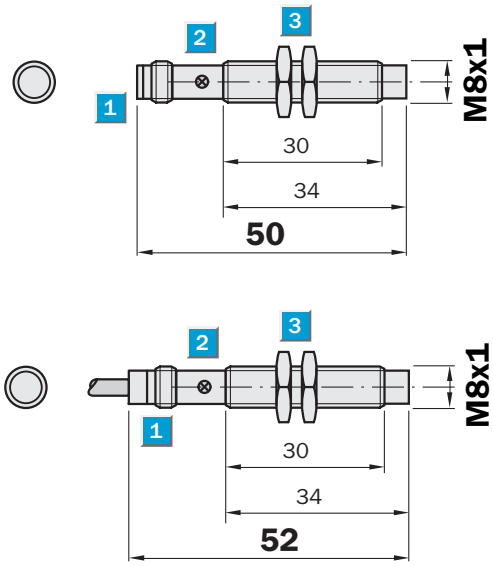
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M8 x 1 mm
- IP 67 enclosure rating
- Unshielded installation
- DC 3-wire

IME08



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 13, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME08-04NN0ZT0S	1 040 898
IME08-04NN0ZW2S	1 040 900
IME08-04NNSZT0S	1 040 894
IME08-04NNSZW2S	1 040 896
IME08-04NP0ZT0S	1 040 890
IME08-04NP0ZW2S	1 040 892
IME08-04NPSZT0S	1 040 886
IME08-04NPSZW2S	1 040 888

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Technical data	IME08-	04NNO ZT0S	04NNO ZW2S	04NNS ZT0S	04NNS ZW2S	04NPO ZT0S	04NPO ZW2S	04NPS ZT0S	04NPS ZW2S
Sensing distance S_n	0.2 in (4 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Quasi-flush	■	■	■	■	■	■	■	■
Connection type	Connector, M8, 3-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.14 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	500 Hz	■	■	■	■	■	■	■	■
Dimensions	M8 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	6 Nm	■	■	■	■	■	■	■	■

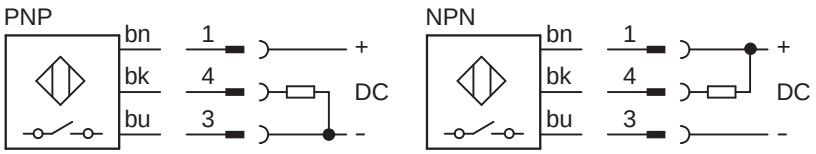
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

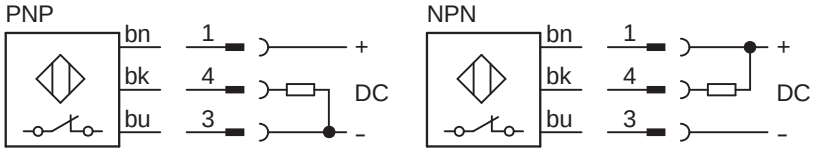
Reduction factor R_M

The following are reference values, which may vary from type to type:

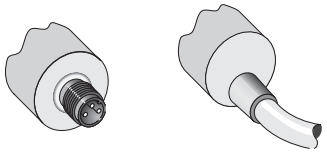
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

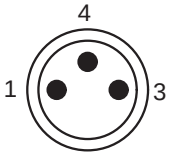




IME08-04NN0ZT0S	IME08-04NN0ZW2S
IME08-04NNSZT0S	IME08-04NNSZW2S
IME08-04NP0ZT0S	IME08-04NP0ZW2S
IME08-04NPSZT0S	IME08-04NPSZW2S



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO/NC
bu	blue	3	- V DC



IME08 Advanced Short, Shielded

Inductive Proximity Sensors

0.08 in (2 mm)
sensing distance

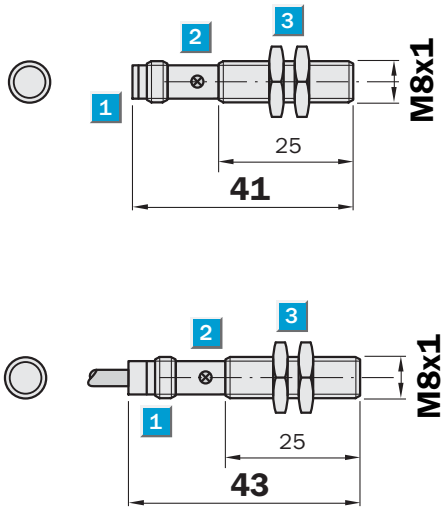
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M8 x 1 mm
- IP 67 enclosure rating
- Quasi-flush installation
- DC 3-wire

IME08



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 13, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME08-02BN0ZT0K	1 040 881
IME08-02BN0ZW2K	1 040 883
IME08-02BNSZT0K	1 040 877
IME08-02BNSZW2K	1 040 879
IME08-02BP0ZT0K	1 040 873
IME08-02BP0ZW2K	1 040 875
IME08-02BPSZT0K	1 040 869
IME08-02BPSZW2K	1 040 871

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Technical data	IME08-	02BNO ZT0K	02BNO ZW2K	02BNS ZT0K	02BNS ZW2K	02BPO ZT0K	02BPO ZW2K	02BPS ZT0K	02BPS ZW2K
Sensing distance S_n	0.08 in (2 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Quasi-flush	■	■	■	■	■	■	■	■
Connection type	Connector, M8, 3-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.14 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	500 Hz	■	■	■	■	■	■	■	■
Dimensions	M8 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	6 Nm	■	■	■	■	■	■	■	■

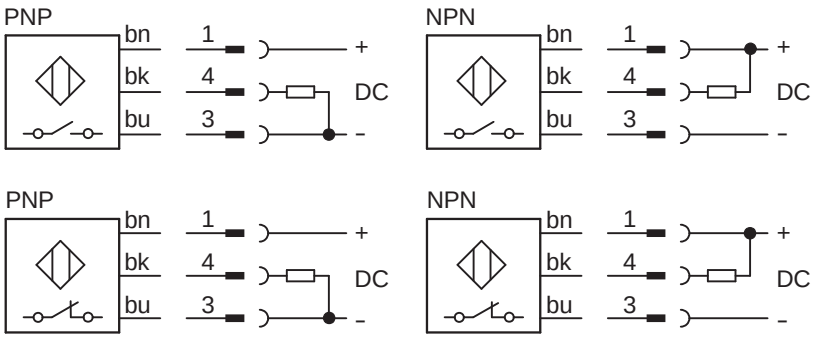
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

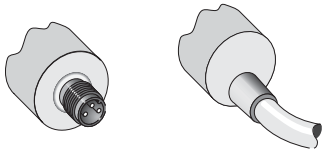
The following are reference values, which may vary from type to type:

St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

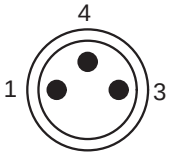
Connection diagram



IME08-02BNOZT0K	IME08-02BNOZW2K
IME08-02BNSZT0K	IME08-02BNSZW2K
IME08-02BPOZT0K	IME08-02BPOZW2K
IME08-02BPSZT0K	IME08-02BPSZW2K



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO/NC
bu	blue	3	- V DC



IME08 Advanced Short, Unshielded

Inductive Proximity Sensors

0.2 in (4 mm)
sensing distance

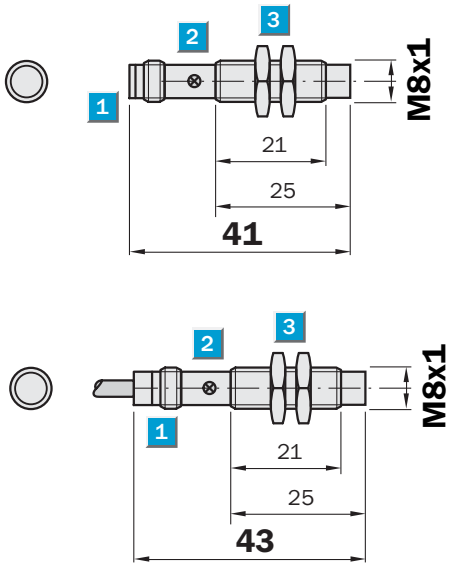
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M8 x 1 mm
- IP 67 enclosure rating
- Unshielded installation
- DC 3-wire

IME08



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 13, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME08-04NN0ZT0K	1 040 897
IME08-04NN0ZW2K	1 040 899
IME08-04NNSZT0K	1 040 893
IME08-04NNSZW2K	1 040 895
IME08-04NP0ZT0K	1 040 889
IME08-04NP0ZW2K	1 040 891
IME08-04NPSZT0K	1 040 885
IME08-04NPSZW2K	1 040 887

Technical data	IME08-	04NNO ZT0K	04NNO ZW2K	04NNS ZT0K	04NNS ZW2K	04NPO ZT0K	04NPO ZW2K	024NP SZT0K	04NPS ZW2K
Sensing distance S_n	0.2 in (4 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Unshielded	■	■	■	■	■	■	■	■
Connection type	Connector, M8, 3-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.14 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	500 Hz	■	■	■	■	■	■	■	■
Dimensions	M8 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	6 Nm	■	■	■	■	■	■	■	■

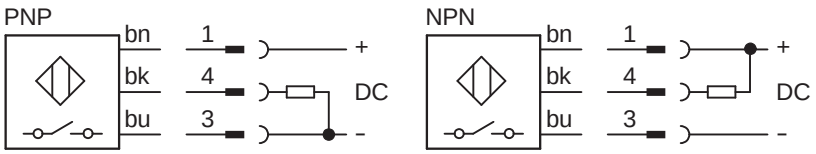
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

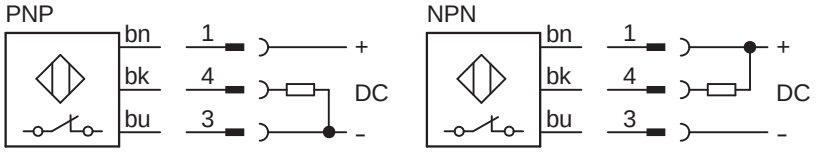
Reduction factor R_M

The following are reference values, which may vary from type to type:

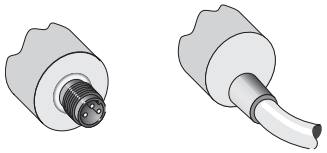
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

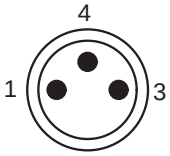




IME08-04NNOZT0K	IME08-04NNOZW2K
IME08-04NNSZT0K	IME08-04NNSZW2K
IME08-04NPOZT0K	IME08-04NPOZW2K
IME08-04NPSZT0K	IME08-04NPSZW2K



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO/NC
bu	blue	3	- V DC



IME12 Standard, Shielded

Inductive Proximity Sensors

0.08 in (2 mm)
sensing distance

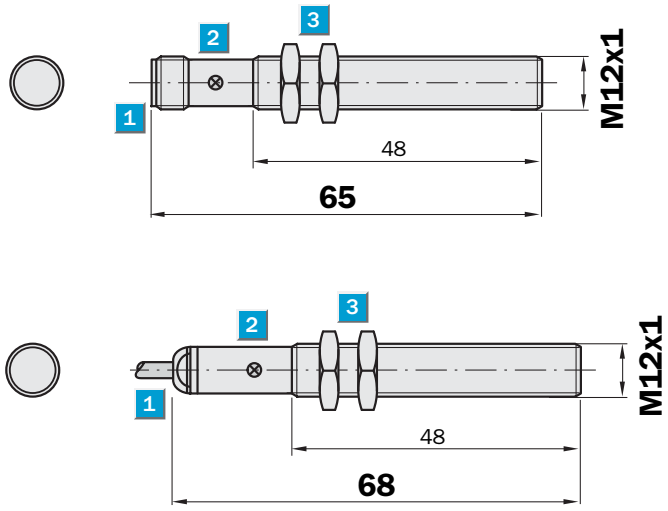
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- IP 67 enclosure rating
- Shielded installation
- DC 3-wire

IME12



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME12-02BN0ZC0S	1 040 743
IME12-02BN0ZW2S	1 040 746
IME12-02BNSZC0S	1 040 740
IME12-02BNSZW2S	1 040 742
IME12-02BP0ZC0S	1 040 736
IME12-02BP0ZW2S	1 040 738
IME12-02BPSZC0S	1 040 732
IME12-02BPSZW2S	1 040 734

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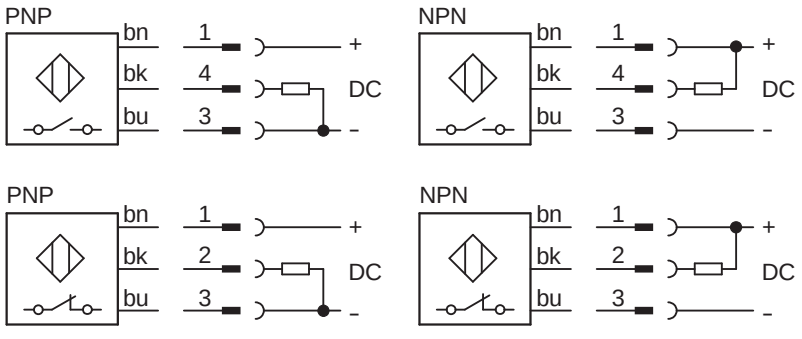
Technical data	IME12-	02BN0 ZC0S	02BN0 ZW2S	02BNS ZC0S	02BNS ZW2S	02BP0 ZC0S	02BP0 ZW2S	02BPS ZC0S	02BPS ZW2S
Sensing distance S_n	0.08 in (2 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Shielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.25 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	500 Hz	■	■	■	■	■	■	■	■
Dimensions	M12 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	13 Nm	■	■	■	■	■	■	■	■

1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

The following are reference values, which may vary from type to type:	
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

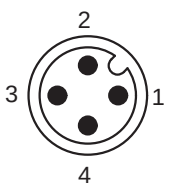
Connection diagram



IME12-02BNSZC0S
IME12-02BPSZC0S
IME12-02BN0ZW2S
IME12-02BNSZW2S
IME12-02BP0ZW2S
IME12-02BPSZW2S
IME12-02BN0ZC0S
IME12-02BP0ZC0S



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME12 Standard, Unshielded

Inductive Proximity Sensors





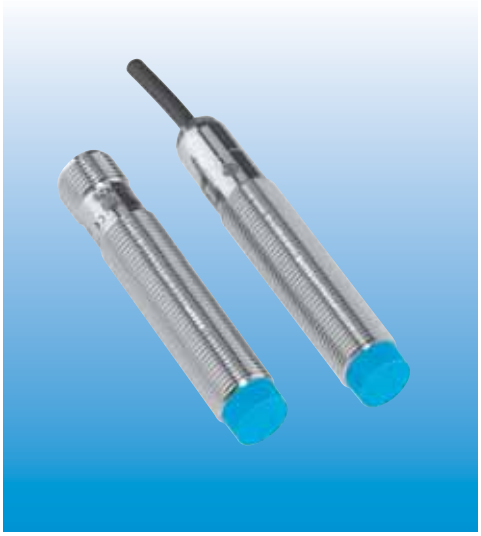
CE

0.2 in (4 mm)
sensing distance

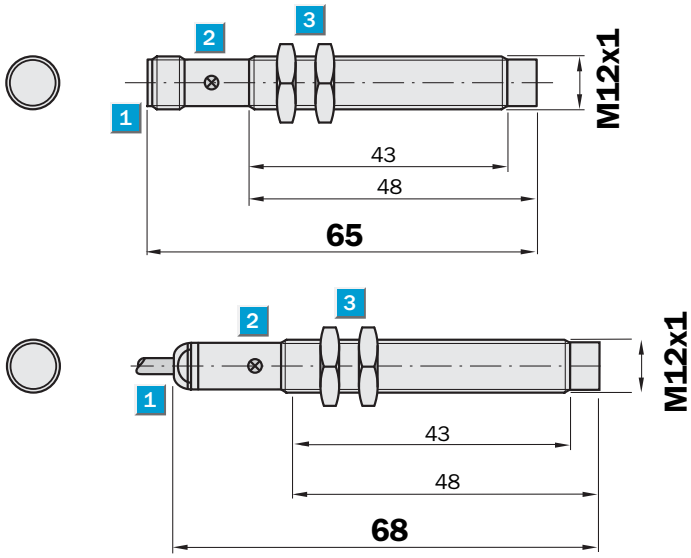
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- IP 67 enclosure rating
- Unshielded installation
- DC 3-wire

IME12



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME12-04NN0ZC0S	1 040 760
IME12-04NN0ZW2S	1 040 762
IME12-04NNSZC0S	1 040 756
IME12-04NNSZW2S	1 040 757
IME12-04NP0ZC0S	1 040 752
IME12-04NP0ZW2S	1 040 754
IME12-04NPSZC0S	1 040 748
IME12-04NPSZW2S	1 040 750

Technical data	IME12-	04NN0 ZC0S	04NN0 ZW2S	04NNS ZC0S	04NNS ZW2S	04NP0 ZC0S	04NP0 ZW2S	04NPS ZC0S	04NPS ZW2S
Sensing distance S_n	0.2 in (4 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Unshielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.25 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	500 Hz	■	■	■	■	■	■	■	■
Dimensions	M12 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	13 Nm	■	■	■	■	■	■	■	■

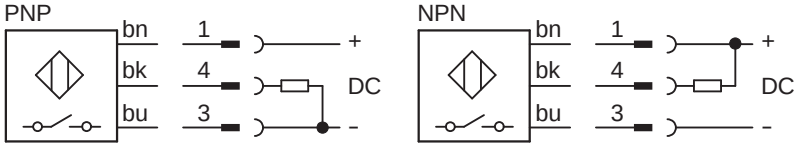
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

The following are reference values, which may vary from type to type:

St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

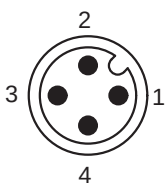
Connection diagram



IME12-04NNSZC0S
IME12-04NPSZC0S
IME12-04NN0ZW2S
IME12-04NNSZW2S
IME12-04NP0ZW2S
IME12-04NPSZW2S
IME12-04NN0ZC0S
IME12-04NP0ZC0S



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME12 Short, Shielded

Inductive Proximity Sensors





CE

0.08 in (2 mm)
sensing distance

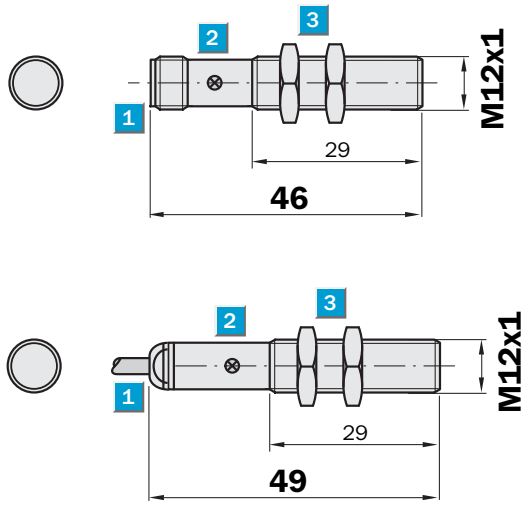
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- IP 67 enclosure rating
- Shielded installation
- DC 3-wire

IME12



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME12-02BN0ZC0K	1 040 744
IME12-02BN0ZW2K	1 040 745
IME12-02BNSZC0K	1 040 739
IME12-02BNSZW2K	1 040 741
IME12-02BP0ZC0K	1 040 735
IME12-02BP0ZW2K	1 040 737
IME12-02BPSZC0K	1 040 731
IME12-02BPSZW2K	1 040 733

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Technical data	IME12-	02BN0 ZC0K	02BN0 ZW2K	02BNS ZC0K	02BNS ZW2K	02BP0 ZC0K	02BP0 ZW2K	02BPS ZC0K	02BPS ZW2K
Sensing distance S_n	0.08 in (2 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Shielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.25 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	500 Hz	■	■	■	■	■	■	■	■
Dimensions	M12 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√[6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	13 Nm	■	■	■	■	■	■	■	■

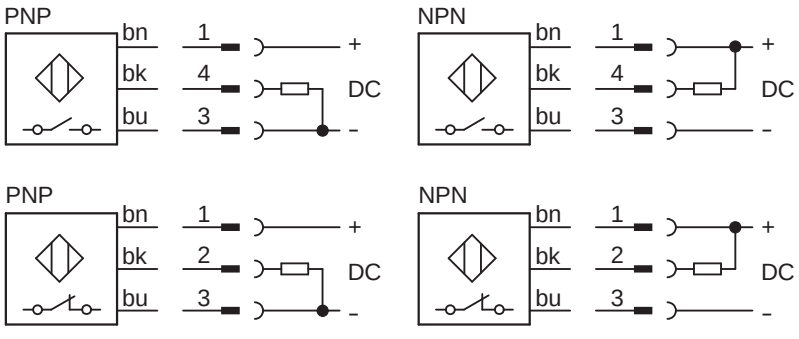
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

The following are reference values, which may vary from type to type:

St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

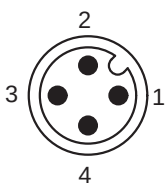


Connection diagram

IME12-02BNSZC0K	IME12-02BN0ZW2K	IME12-02BN0ZC0K
IME12-02BPSZC0K	IME12-02BNSZW2K	IME12-02BP0ZC0K
	IME12-02BP0ZW2K	
	IME12-02BPSZW2K	



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME12 Short, Unshielded

Inductive Proximity Sensors





CE

0.2 in (4 mm)
sensing distance

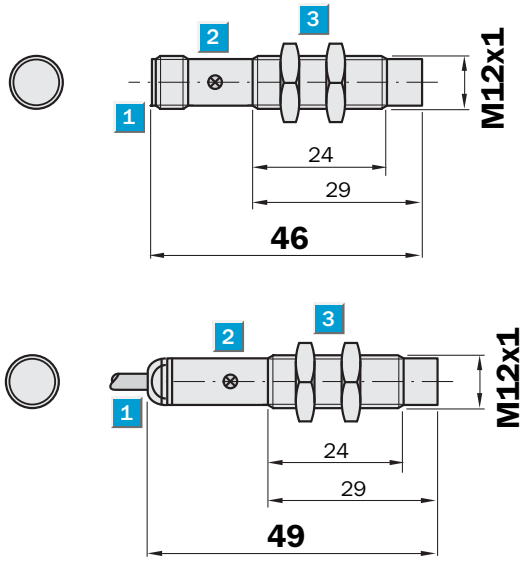
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- IP 67 enclosure rating
- Unshielded installation
- DC 3-wire

IME12



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME12-04NN0ZC0K	1 040 759
IME12-04NN0ZW2K	1 040 761
IME12-04NNSZC0K	1 040 755
IME12-04NNSZW2K	1 040 758
IME12-04NP0ZC0K	1 040 751
IME12-04NP0ZW2K	1 040 753
IME12-04NPSZC0K	1 040 747
IME12-04NPSZW2K	1 040 749

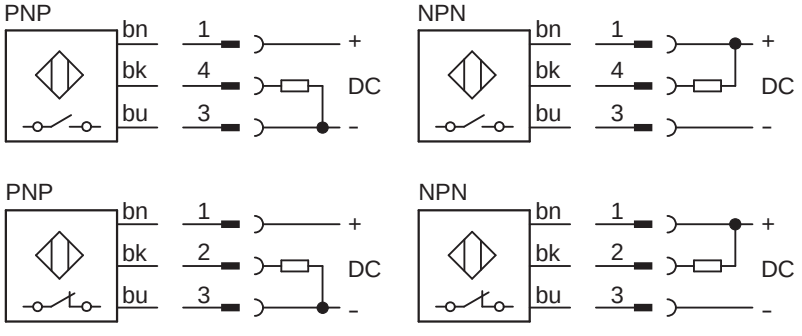
Technical data	IME12-	04NN0 ZC0K	04NN0 ZW2K	04NNS ZC0K	04NNS ZW2K	04NP0 ZC0K	04NP0 ZW2K	04NPS ZC0K	04NPS ZW2K
Sensing distance S_n	0.2 in (4 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Unshielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.25 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	500 Hz	■	■	■	■	■	■	■	■
Dimensions	M12 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	13 Nm	■	■	■	■	■	■	■	■

1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

The following are reference values, which may vary from type to type:	
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

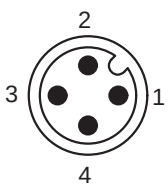
Connection diagram



IME12-04NNSZC0K
IME12-04NPSZC0K
IME12-04NN0ZW2K
IME12-04NNSZW2K
IME12-04NP0ZW2K
IME12-04NPSZW2K
IME12-04NN0ZC0K
IME12-04NP0ZC0K



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME12 Advanced, Shielded

Inductive Proximity Sensors





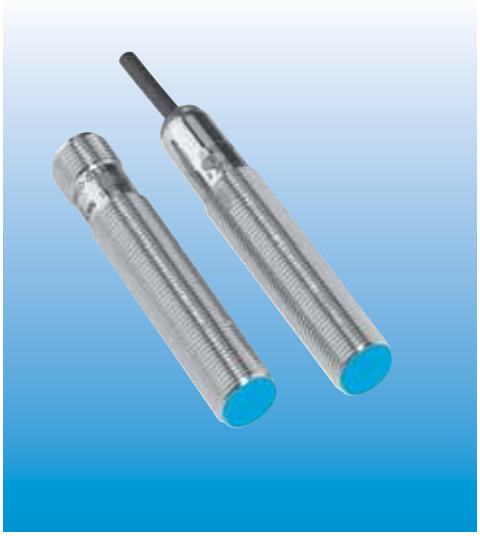
CE

0.2 in (4 mm)
sensing distance

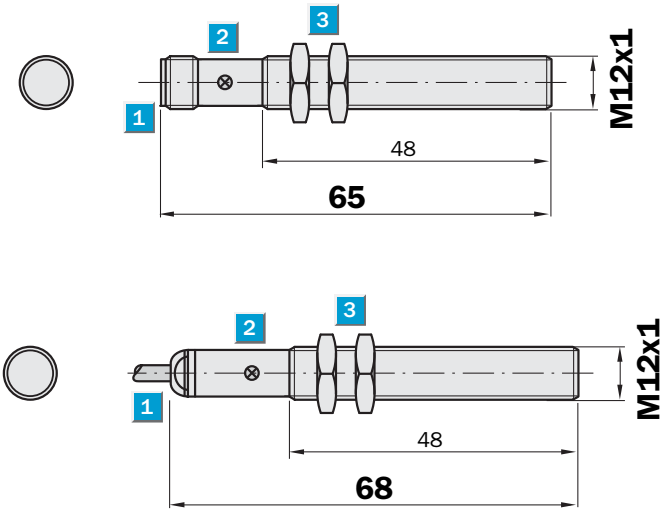
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- IP 67 enclosure rating
- Quasi-flush installation
- DC 3-wire
- Enhanced sensing range

IME12



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME12-04BN0ZC0S	1 040 776
IME12-04BN0ZW2S	1 040 778
IME12-04BNSZC0S	1 040 772
IME12-04BNSZW2S	1 040 774
IME12-04BP0ZC0S	1 040 768
IME12-04BP0ZW2S	1 040 770
IME12-04BPSZC0S	1 040 764
IME12-04BPSZW2S	1 040 766

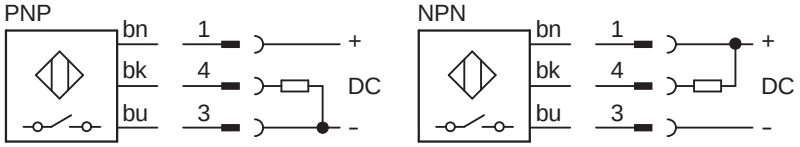
Technical data	IME12-	04BN0 ZC0S	04BN0 ZW2S	04BNS ZC0S	04BNS ZW2S	04BP0 ZC0S	04BP0 ZW2S	04BPS ZC0S	04BPS ZW2S
Sensing distance S_n	0.2 in (4 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Quasi-flush	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.25 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	500 Hz	■	■	■	■	■	■	■	■
Dimensions	M12 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√[6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	13 Nm	■	■	■	■	■	■	■	■

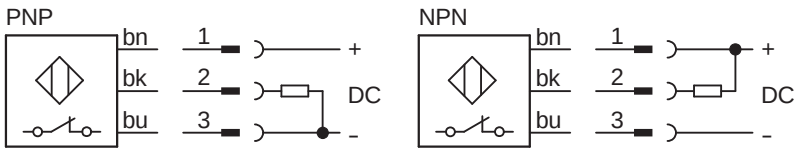
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

The following are reference values, which may vary from type to type:	
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram





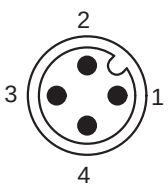
IME12-04BNSZC0S
IME12-04BPSZC0S

IME12-04BN0ZW2S
IME12-04BNSZW2S
IME12-04BP0ZW2S
IME12-04BPSZW2S

IME12-04BN0ZC0S
IME12-04BP0ZC0S



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME12 Advanced, Unshielded

Inductive Proximity Sensors

0.3 in (8 mm)
sensing distance

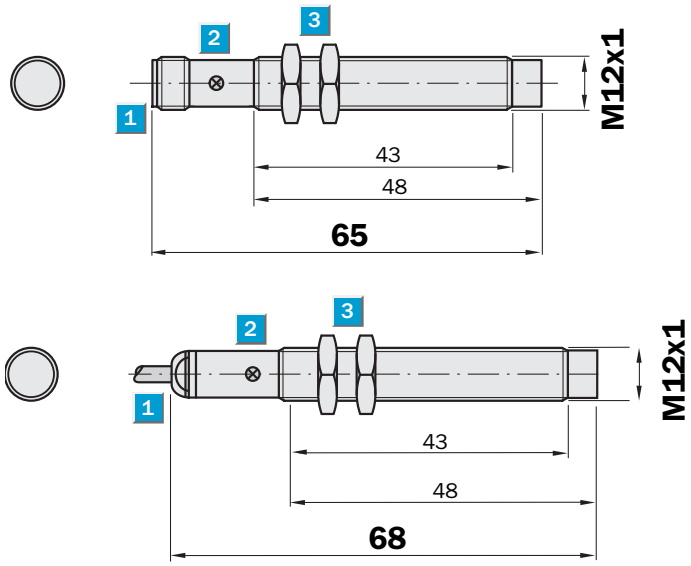
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- IP 67 enclosure rating
- Unshielded installation
- DC 3-wire
- Enhanced sensing range

IME12



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME12-08NN0ZC0S	1 040 826
IME12-08NN0ZW2S	1 040 793
IME12-08NNSZC0S	1 040 788
IME12-08NNSZW2S	1 040 790
IME12-08NP0ZC0S	1 040 784
IME12-08NP0ZW2S	1 040 786
IME12-08NPSZC0S	1 040 780
IME12-08NPSZW2S	1 040 782

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Technical data	IME12-	08NN0 ZC0S	08NN0 ZW2S	08NNS ZC0S	08NNS ZW2S	08NP0 ZC0S	08NP0 ZW2S	08NPS ZC0S	08NPS ZW2S
Sensing distance S_n	0.3 in (8 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Unshielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.25 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	500 Hz	■	■	■	■	■	■	■	■
Dimensions	M12 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	13 Nm	■	■	■	■	■	■	■	■

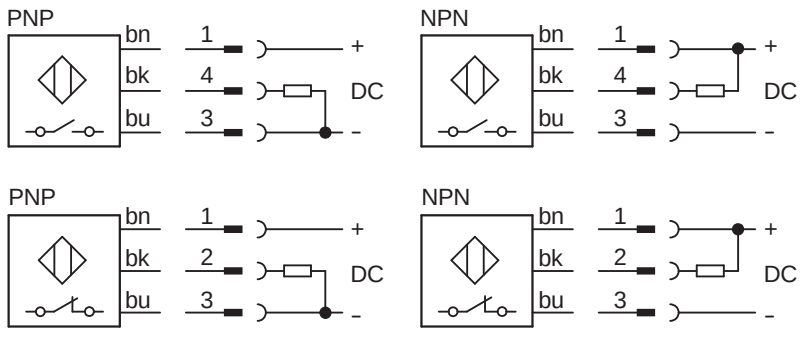
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

The following are reference values, which may vary from type to type:

St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

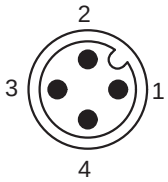
Connection diagram



IME12-08NNSZC0S
IME12-08NPSZC0S
IME12-08NN0ZW2S
IME12-08NNSZW2S
IME12-08NP0ZW2S
IME12-08NPSZW2S
IME12-08NN0ZC0S
IME12-08NP0ZC0S



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME12 Advanced Short, Shielded

Inductive Proximity Sensors

0.2 in (4 mm)
sensing distance

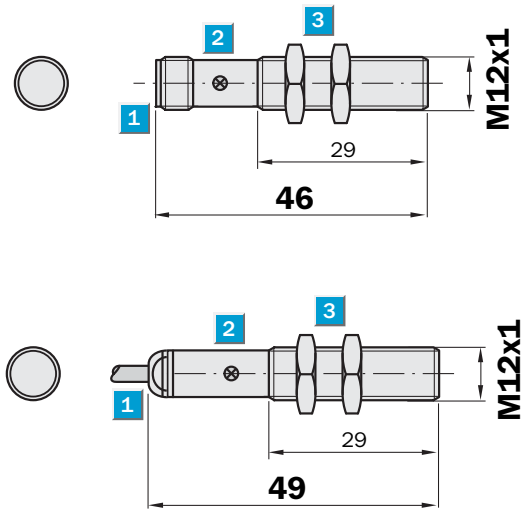
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- IP 67 enclosure rating
- Quasi-flush installation
- DC 3-wire
- Enhanced sensing range

IME12



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME12-04BN0ZC0K	1 040 775
IME12-04BN0ZW2K	1 040 777
IME12-04BNSZC0K	1 040 771
IME12-04BNSZW2K	1 040 773
IME12-04BP0ZC0K	1 040 767
IME12-04BP0ZW2K	1 040 769
IME12-04BPSZC0K	1 040 763
IME12-04BPSZW2K	1 040 765

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Technical data	IME12-	04BN0 ZC0K	04BN0 ZW2K	04BNS ZC0K	04BNS ZW2K	04BP0 ZC0K	04BP0 ZW2K	04BPS ZC0K	04BPS ZW2K
Sensing distance S_n	0.2 in (4 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Quasi-flush	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.25 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	500 Hz	■	■	■	■	■	■	■	■
Dimensions	M12 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	13 Nm	■	■	■	■	■	■	■	■

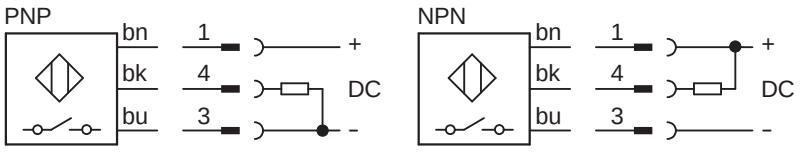
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

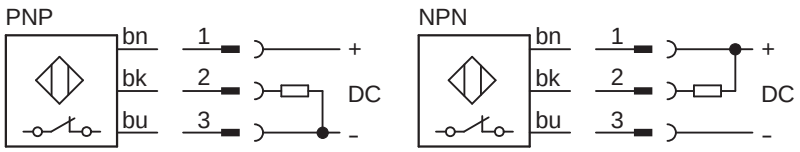
Reduction factor R_M

The following are reference values, which may vary from type to type:

St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram





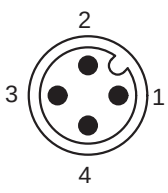
IME12-04BNSZC0K
IME12-04BPSZC0K

IME12-04BN0ZW2K
IME12-04BNSZW2K
IME12-04BP0ZW2K
IME12-04BPSZW2K

IME12-04BN0ZC0K
IME12-04BP0ZC0K



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME12 Advanced Short, Unshielded

Inductive Proximity Sensors

0.3 in (8 mm)
sensing distance

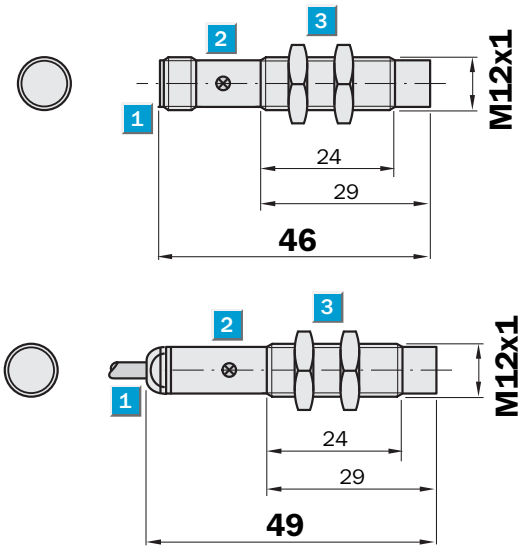
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- IP 67 enclosure rating
- Unshielded installation
- DC 3-wire
- Enhanced sensing range

IME12



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME12-08NN0ZC0K	1 040 791
IME12-08NN0ZW2K	1 040 792
IME12-08NNSZC0K	1 040 787
IME12-08NNSZW2K	1 040 789
IME12-08NP0ZC0K	1 040 783
IME12-08NP0ZW2K	1 040 785
IME12-08NPSZC0K	1 040 779
IME12-08NPSZW2K	1 040 781

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Technical data	IME12-	08NN0 ZC0K	08NN0 ZW2K	08NNS ZC0K	08NNS ZW2K	08NP0 ZC0K	08NP0 ZW2K	08NPS ZC0K	08NPS ZW2K
Sensing distance S_n	0.3 in (8 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Unshielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.25 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	500 Hz	■	■	■	■	■	■	■	■
Dimensions	M12 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	13 Nm	■	■	■	■	■	■	■	■

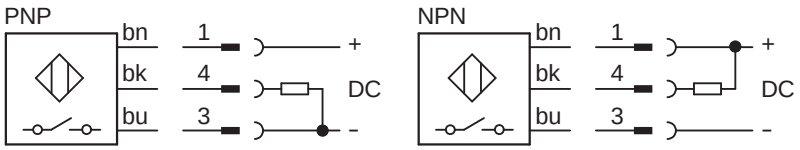
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

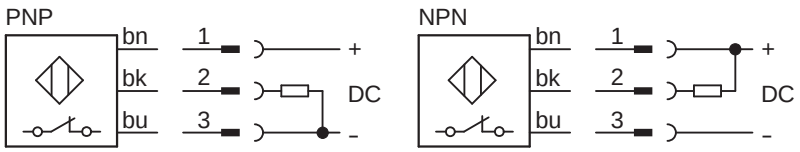
Reduction factor R_M

The following are reference values, which may vary from type to type:

St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

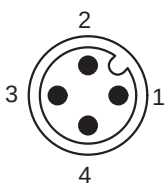




IME12-08NNSZC0K
IME12-08NPSZC0K
IME12-08NN0ZW2K
IME12-08NNSZW2K
IME12-08NP0ZW2K
IME12-08NPSZW2K
IME12-08NN0ZC0K
IME12-08NP0ZC0K



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME18 Standard, Shielded

Inductive Proximity Sensors





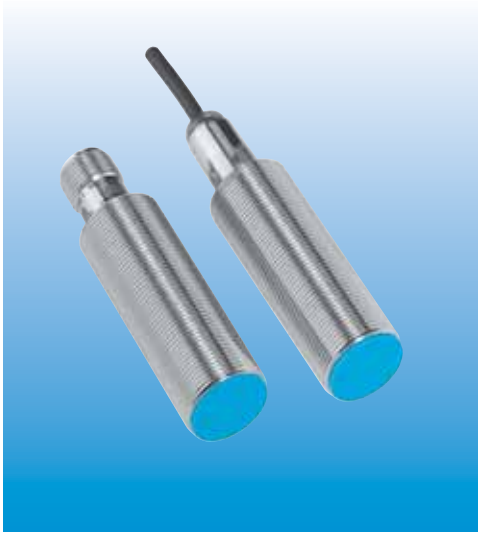
CE

0.2 in (5 mm)
sensing distance

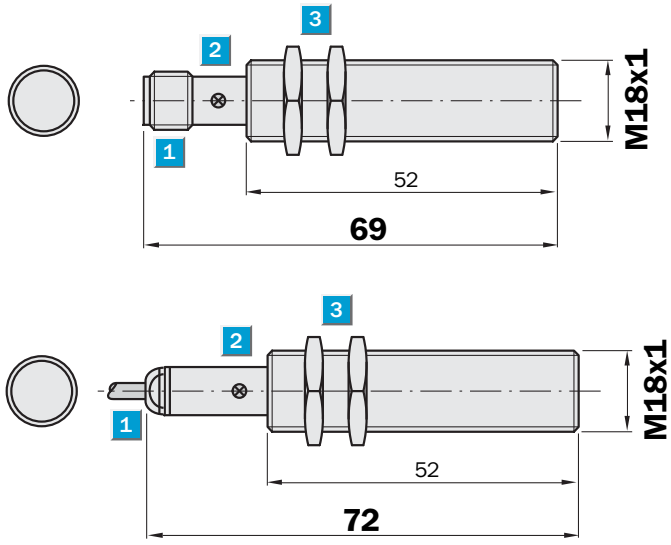
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- IP 67 enclosure rating
- Shielded installation
- DC 3-wire

IME18



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME18-05BN0ZC0S	1 040 946
IME18-05BN0ZW2S	1 040 948
IME18-05BNSZC0S	1 040 942
IME18-05BNSZW2S	1 040 944
IME18-05BP0ZC0S	1 040 938
IME18-05BP0ZW2S	1 040 940
IME18-05BPSZC0S	1 040 934
IME18-05BPSZW2S	1 040 936

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Technical data	IME18-	05BN0 ZC0S	05BN0 ZW2S	05BNS ZC0S	05BNS ZW2S	05BP0 ZC0S	05BP0 ZW2S	05BPS ZC0S	05BPS ZW2S
Sensing distance S_n	0.2 in (5 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Nominal voltage V_n	DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Shielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.25 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	300 Hz	■	■	■	■	■	■	■	■
Dimensions	M18 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	40 Nm	■	■	■	■	■	■	■	■

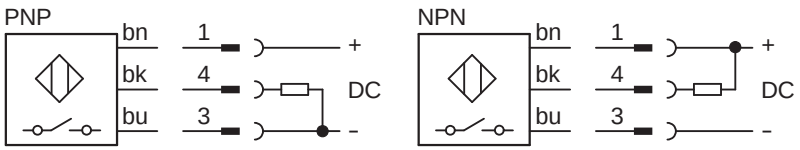
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

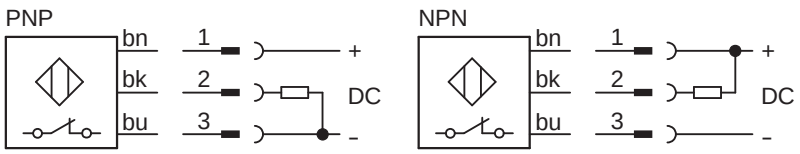
Reduction factor R_M

The following are reference values, which may vary from type to type:

St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

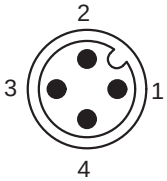




IME18-05BN0ZC0S
IME18-05BPSZC0S
IME18-05BN0ZW2S
IME18-05BNSZW2S
IME18-05BP0ZW2S
IME18-05BPSZW2S
IME18-05BNSZC0S
IME18-05BPSZC0S



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME18 Standard, Unshielded

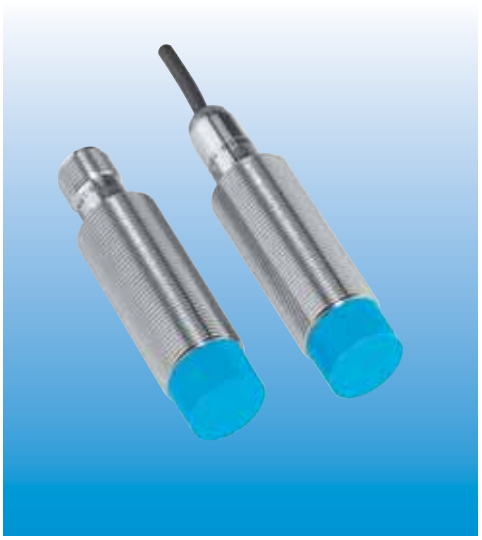
Inductive Proximity Sensors

0.3 in (8 mm)
sensing distance

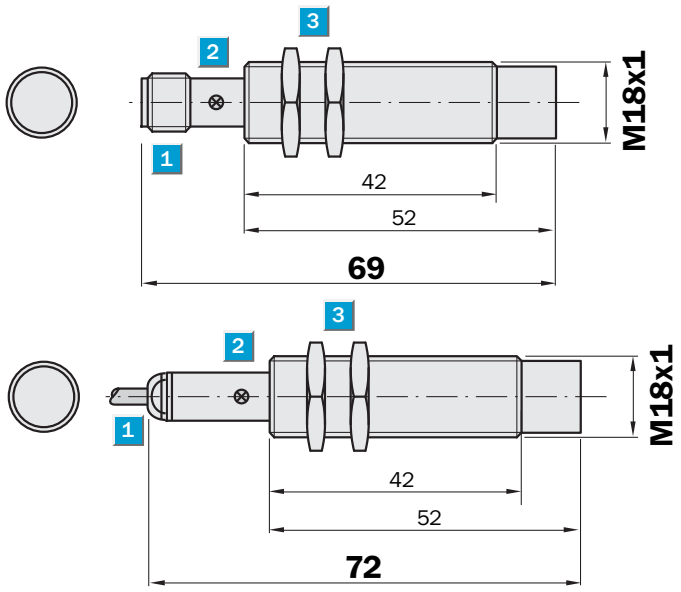
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- IP 67 enclosure rating
- Unshielded installation
- DC 3-wire

IME18



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME18-08NN0ZC0S	1 040 962
IME18-08NN0ZW2S	1 040 964
IME18-08NNSZC0S	1 040 958
IME18-08NNSZW2S	1 040 960
IME18-08NP0ZC0S	1 040 954
IME18-08NP0ZW2S	1 040 956
IME18-08NPSZC0S	1 040 950
IME18-08NPSZW2S	1 040 952

Technical data	IME18-	08NN0 ZC0S	08NN0 ZW2S	08NNS ZC0S	08NNS ZW2S	08NP0 ZC0S	08NP0 ZW2S	08NPS ZC0S	08NPS ZW2S
Sensing distance S_n	0.3 in (8 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Nominal voltage V_n	DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Unshielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.25 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	300 Hz	■	■	■	■	■	■	■	■
Dimensions	M18 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	40 Nm	■	■	■	■	■	■	■	■

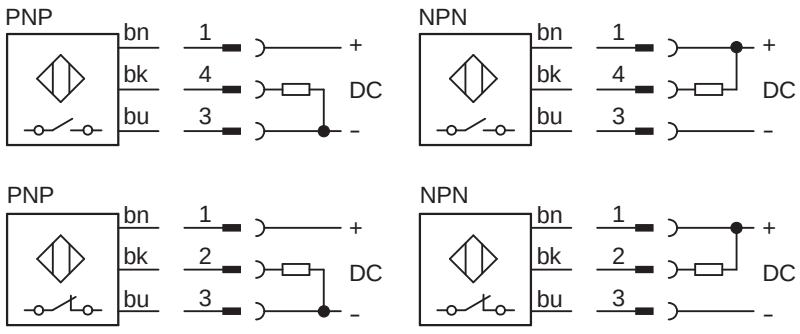
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

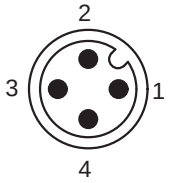
The following are reference values, which may vary from type to type:

St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



Connection diagram

IME18-08NN0ZC0S	IME18-08NN0ZW2S	IME18-08NNSZC0S
IME18-08NP0ZC0S	IME18-08NNSZW2S	IME18-08NPSZC0S
	IME18-08NP0ZW2S	
	IME18-08NPSZW2S	



IME18 Short, Shielded

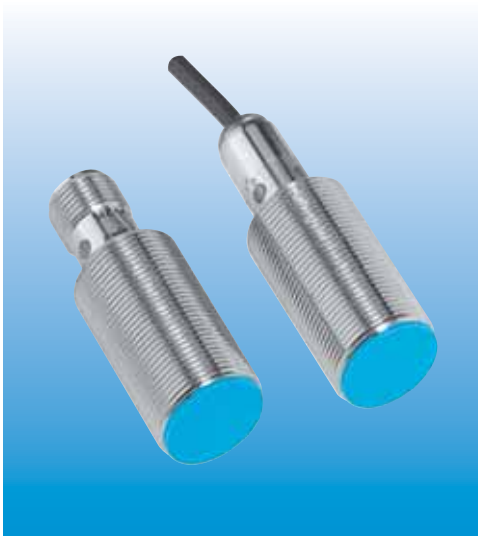
Inductive Proximity Sensors

0.2 in (5 mm)
sensing distance

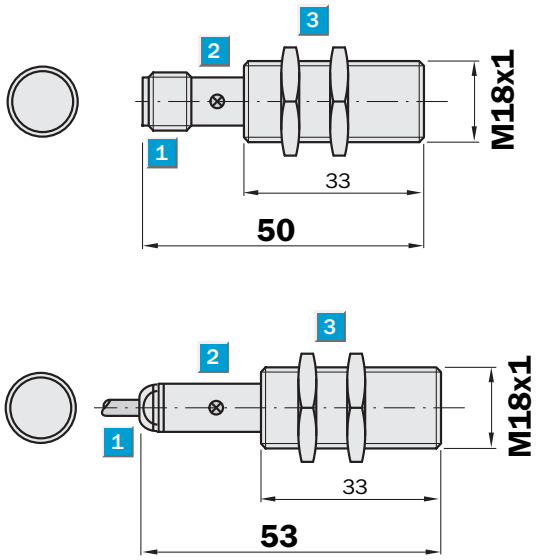
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- IP 67 enclosure rating
- Shielded installation
- DC 3-wire

IME18



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME18-05BN0ZC0K	1 040 945
IME18-05BN0ZW2K	1 040 947
IME18-05BNSZC0K	1 040 941
IME18-05BNSZW2K	1 040 943
IME18-05BP0ZC0K	1 040 937
IME18-05BP0ZW2K	1 040 939
IME18-05BPSZC0K	1 040 933
IME18-05BPSZW2K	1 040 935

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Technical data	IME18-	05BN0 ZC0K	05BN0 ZW2K	05BNS ZC0K	05BNS ZW2K	05BP0 ZC0K	05BP0 ZW2K	05BPS ZC0K	05BPS ZW2K
Sensing distance S_n	0.2 in (5 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Nominal voltage V_n	DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Shielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.25 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	300 Hz	■	■	■	■	■	■	■	■
Dimensions	M18 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	40 Nm	■	■	■	■	■	■	■	■

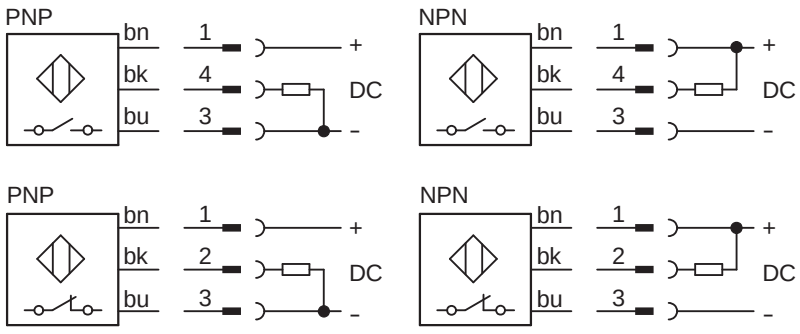
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

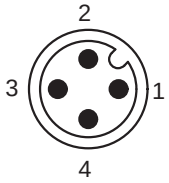
The following are reference values, which may vary from type to type:

St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



Connection diagram

IME18-05BN0ZC0K	IME18-05BN0ZW2K	IME18-05BNSZC0K
IME18-05BP0ZC0K	IME18-05BNSZW2K	IME18-05BPSZC0K
	IME18-05BP0ZW2K	
	IME18-05BPSZW2K	



IME18 Short, Unshielded

Inductive Proximity Sensors

0.3 in (8 mm)
sensing distance

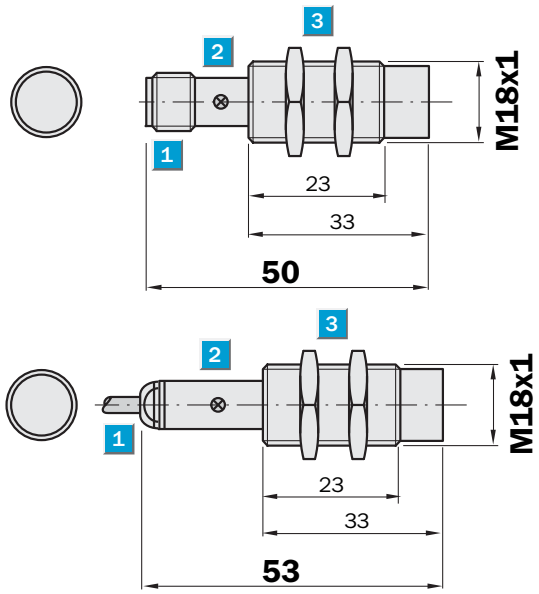
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- IP 67 enclosure rating
- Unshielded installation
- DC 3-wire

IME18



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME18-08NN0ZC0K	1 040 961
IME18-08NN0ZW2K	1 040 963
IME18-08NNSZC0K	1 040 957
IME18-08NNSZW2K	1 040 959
IME18-08NP0ZC0K	1 040 953
IME18-08NP0SZW2K	1 040 955
IME18-08NPSZC0K	1 040 949
IME18-08NPSZW2K	1 040 951

Technical data	IME18-	08NN0 ZC0K	08NN0 ZW2K	08NNS ZC0K	08NNS ZW2K	08NP0 ZC0K	08NP0 ZW2K	08NPS ZC0K	08NPS ZW2K
Sensing distance S_n	0.3 in (8 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Nominal voltage V_n	DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Unshielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.25 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	300 Hz	■	■	■	■	■	■	■	■
Dimensions	M18 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	40 Nm	■	■	■	■	■	■	■	■

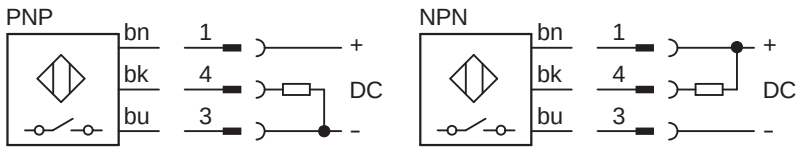
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

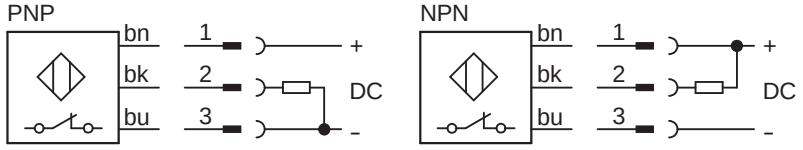
Reduction factor R_M

The following are reference values, which may vary from type to type:

St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

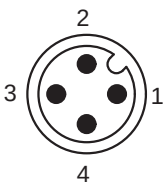




IME18-08NN0ZC0K
IME18-08NP0ZC0K
IME18-08NN0ZW2K
IME18-08NNSZW2K
IME18-08NP0SZW2K
IME18-08NPSZW2K
IME18-08NNSZC0K
IME18-08NPSZC0K



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME18 Advanced, Shielded

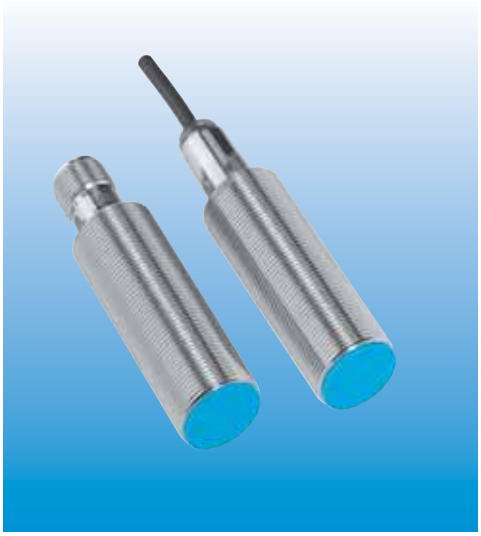
Inductive Proximity Sensors

0.3 in (8 mm)
sensing distance

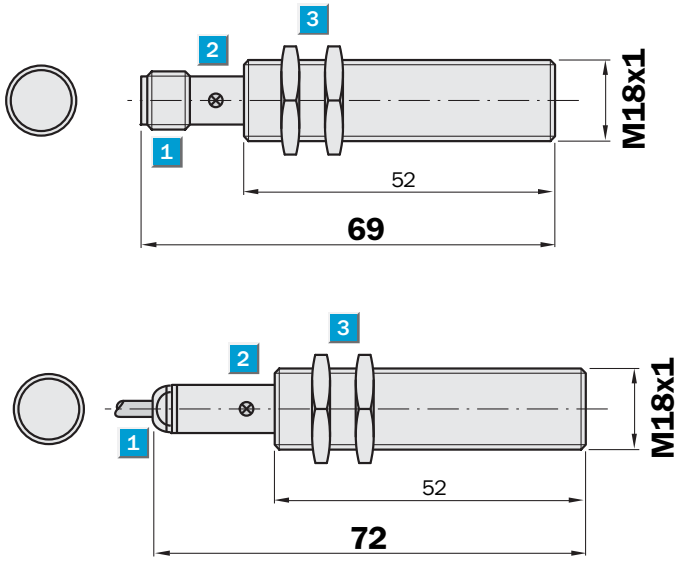
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- IP 67 enclosure rating
- Quasi-flush installation
- DC 3-wire
- Enhanced sensing range

IME18



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME18-08BN0ZC0S	1 040 978
IME18-08BN0ZW2S	1 040 980
IME18-08BNSZC0S	1 040 974
IME18-08BNSZW2S	1 040 976
IME18-08BP0ZC0S	1 040 970
IME18-08BP0ZW2S	1 040 972
IME18-08BPSZC0S	1 040 966
IME18-08BPSZW2S	1 040 968

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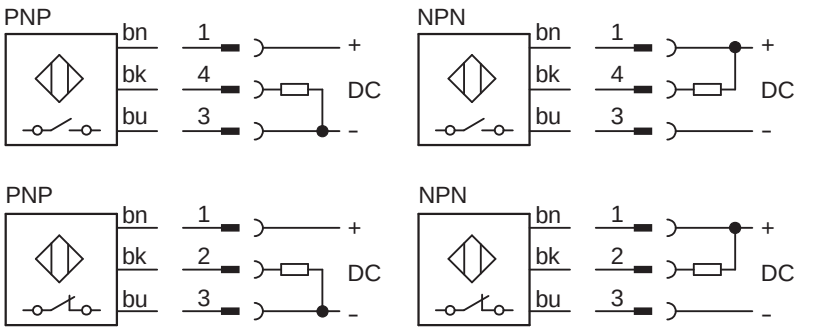
Technical data	IME18-	08BN0 ZC0S	08BN0 ZW2S	08BNS ZC0S	08BNS ZW2S	08BP0 ZC0S	08BP0 ZW2S	08BPS ZC0S	08BPS ZW2S
Sensing distance S_n	0.3 in (8 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Nominal voltage V_n	DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Quasi-flush	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.25 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	300 Hz	■	■	■	■	■	■	■	■
Dimensions	M18 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	40 Nm	■	■	■	■	■	■	■	■

1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

The following are reference values, which may vary from type to type:	
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

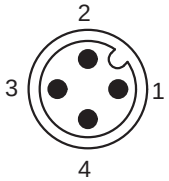
Connection diagram



IME18-BN0ZC0S
IME18-08BP0ZC0S
IME18-08BN0ZW2S
IME18-08BNSZW2S
IME18-08BP0ZW2S
IME18-08BPSZW2S
IME18-08BNSZC0S
IME18-08BPSZC0S



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME18 Advanced, Unshielded

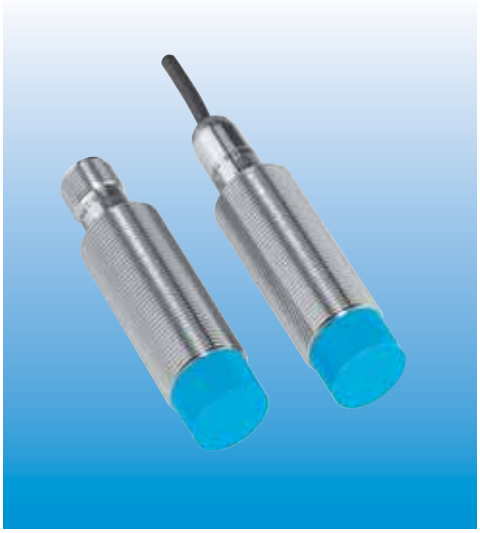
Inductive Proximity Sensors

0.5 in (12 mm)
sensing distance

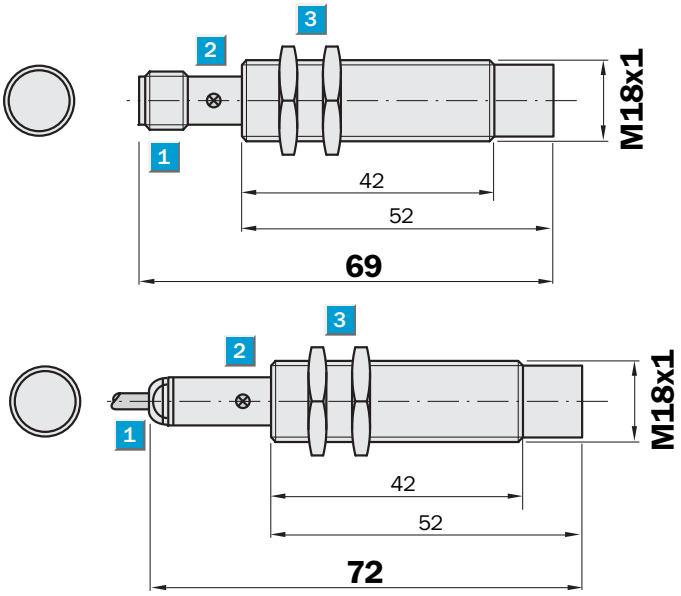
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- IP 67 enclosure rating
- Unshielded installation
- DC 3-wire

IME18



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME18-12NN0ZC0S	1 040 994
IME18-12NN0ZW2S	1 040 996
IME18-12NNSZC0S	1 040 990
IME18-12NNSZW2S	1 040 992
IME18-12NP0ZC0S	1 040 986
IME18-12NP0ZW2S	1 040 988
IME18-12NPSZC0S	1 040 982
IME18-12NPSZW2S	1 040 984

Technical data	IME18-	12NN0 ZC0S	12NN0 ZW2S	12NNS ZC0S	12NNS ZW2S	12NP0 ZC0S	12NP0 ZW2S	12NPS ZC0S	12NPS ZW2S
Sensing distance S_n	0.5 in (12 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Nominal voltage V_n	DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Unshielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.25 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	300 Hz	■	■	■	■	■	■	■	■
Dimensions	M18 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√[6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	40 Nm	■	■	■	■	■	■	■	■

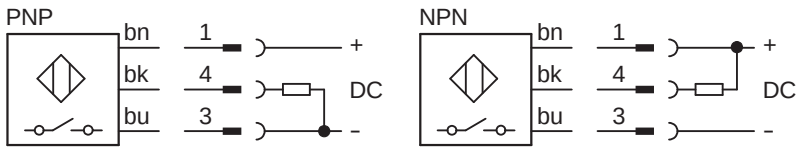
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

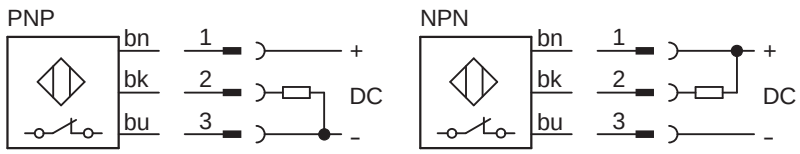
Reduction factor R_M

The following are reference values, which may vary from type to type:

St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

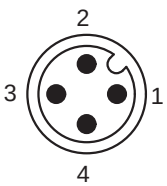




IME18-12NN0ZC0S
IME18-12NP0ZC0S
IME18-12NN0ZW2S
IME18-12NNSZW2S
IME18-12NP0ZW2S
IME18-12NPSZW2S
IME18-12NNSZC0S
IME18-12NPSZC0S



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME18 Advanced Short, Shielded

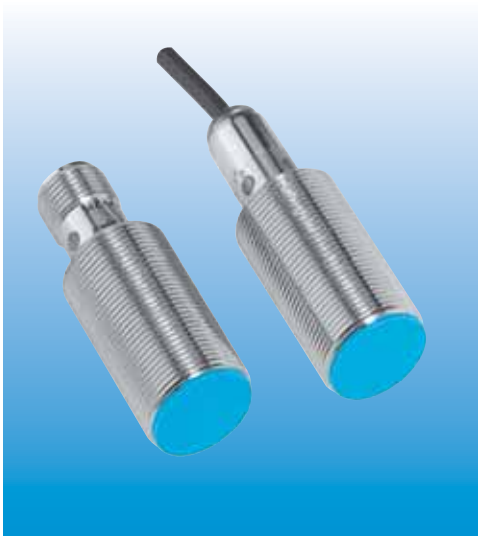
Inductive Proximity Sensors

0.3 in (8 mm)
sensing distance

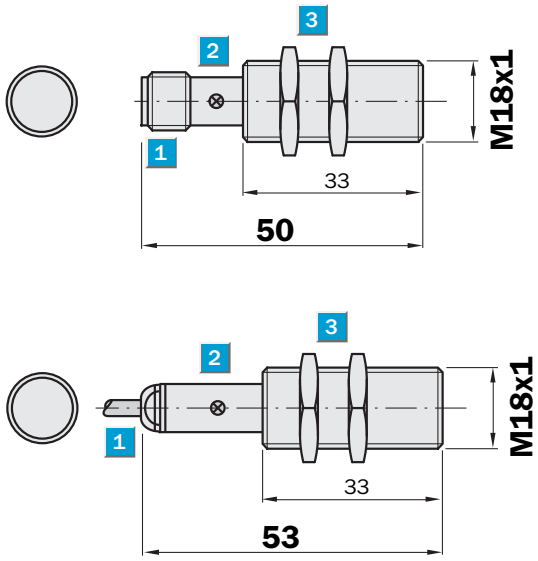
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- IP 67 enclosure rating
- Quasi-flush installation
- DC 3-wire
- Enhanced sensing range

IME18



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME18-08BN0ZC0K	1 040 977
IME18-08BN0ZW2K	1 040 979
IME18-08BNSZC0K	1 040 973
IME18-08BNSZW2K	1 040 975
IME18-08BP0ZC0K	1 040 969
IME18-08BP0ZW2K	1 040 971
IME18-08BPSZC0K	1 040 965
IME18-08BPSZW2K	1 040 967

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Technical data	IME18-	08BN0 ZC0K	08BN0 ZW2K	08BNS ZC0K	08BNS ZW2K	08BP0 ZC0K	08BP0 ZW2K	08BPS ZC0K	08BPS ZW2K
Sensing distance S_n	0.3 in (8 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Nominal voltage V_n	DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Quasi-flush	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.25 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	300 Hz	■	■	■	■	■	■	■	■
Dimensions	M18 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	40 Nm	■	■	■	■	■	■	■	■

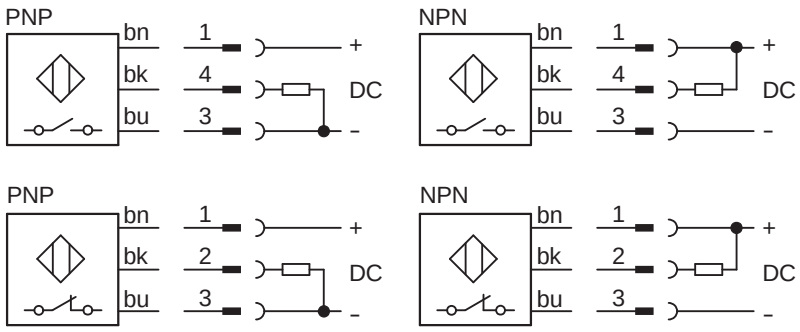
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

The following are reference values, which may vary from type to type:

St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

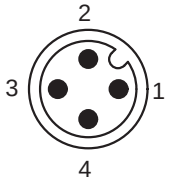
Connection diagram



IME18-08BN0ZC0K
IME18-08BP0ZC0K
IME18-08BN0ZW2K
IME18-08BNSZW2K
IME18-08BP0ZW2K
IME18-08BPSZW2K
IME18-08BNSZC0K
IME18-08BPSZC0K



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME18 Advanced Short, Unshielded

Inductive Proximity Sensors





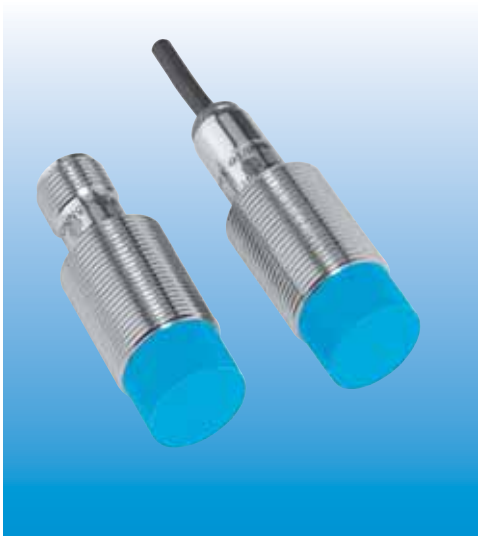
CE

0.5 in (12 mm)
sensing distance

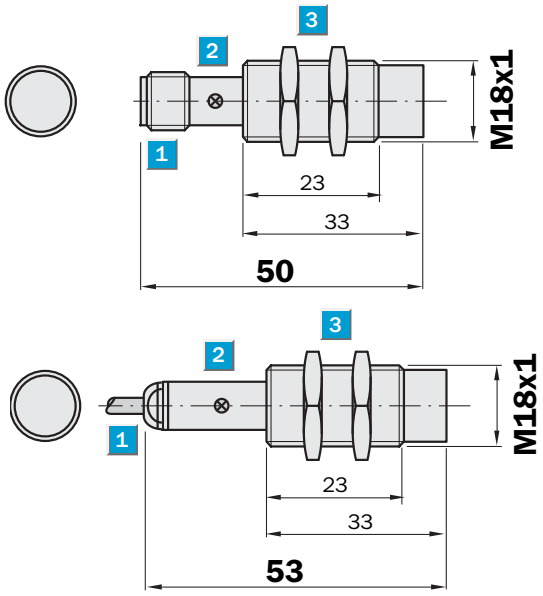
Highlights

- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- IP 67 enclosure rating
- Unshielded installation
- DC 3-wire

IME18



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME18-12NN0ZC0K	1 040 993
IME18-12NN0ZW2K	1 040 995
IME18-12NNSZC0K	1 040 989
IME18-12NNSZW2K	1 040 991
IME18-12NP0ZC0K	1 040 985
IME18-12NP0ZW2K	1 040 987
IME18-12NPSZC0K	1 040 981
IME18-12NPSZW2K	1 040 983

Technical data	IME18-	12NN0 ZC0K	12NN0 ZW2K	12NNS ZC0K	12NNS ZW2K	12NP0 ZC0K	12NP0 ZW2K	12NPS ZC0K	12NPS ZW2K
Sensing distance S_n	0.5 in (12 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Nominal voltage V_n	DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 100 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Unshielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.25 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	300 Hz	■	■	■	■	■	■	■	■
Dimensions	M18 x 1[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	40 Nm	■	■	■	■	■	■	■	■

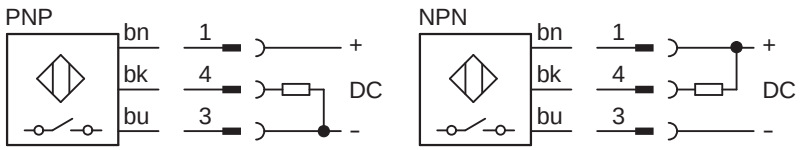
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

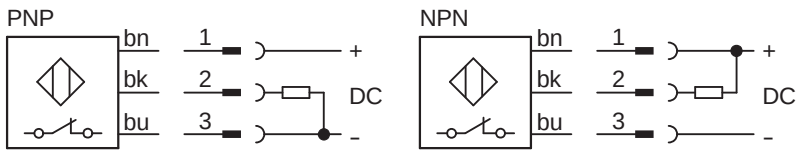
Reduction factor R_M

The following are reference values, which may vary from type to type:

St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

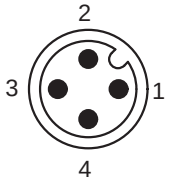




IME18-12NN0ZC0K
IME18-12NP0ZC0K
IME18-12NN0ZW2K
IME18-12NNSZW2K
IME18-12NP0ZW2K
IME18-12NPSZW2K
IME18-12NNSZC0K
IME18-12NPSZC0K



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME30 Standard, Shielded

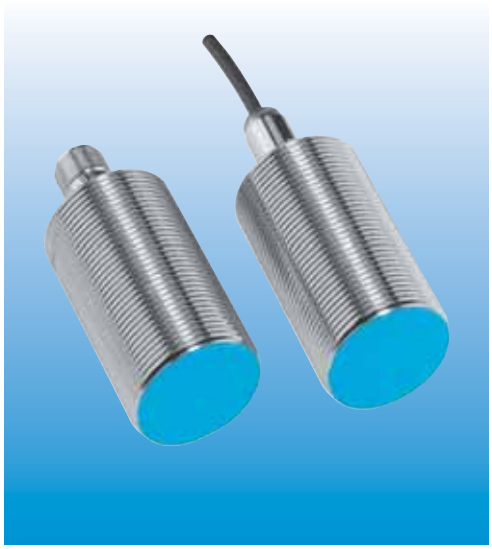
Inductive Proximity Sensors

0.4 in (10 mm)
sensing distance

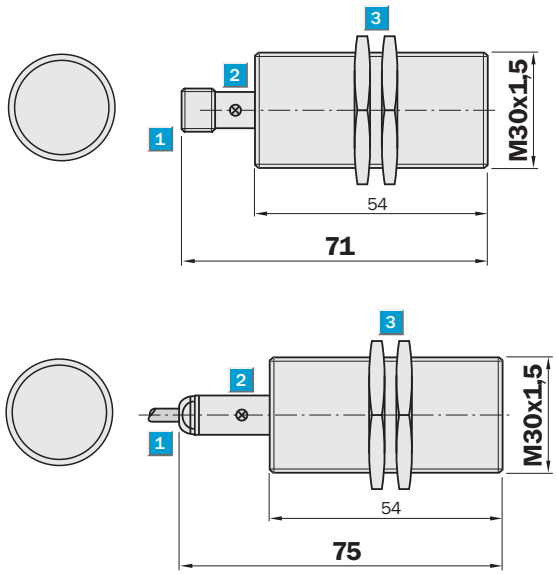
Highlights

- Short-circuit protected (pulsed)
- Robust brass housing, nickel-plated with fine thread M30 x 1.5 mm
- IP 67 enclosure rating
- Shielded installation
- DC 3-wire

IME30



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 36, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME30-10BN0ZC0K	1 041 010
IME30-10BN0ZW2S	1 041 012
IME30-10BNSZC0S	1 041 006
IME30-10BNSZW2S	1 041 008
IME30-10BP0ZC0S	1 041 002
IME30-10BP0ZW2S	1 041 004
IME30-10BPSZC0S	1 040 998
IME30-10BPSZW2S	1 041 000

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Technical data	IME30	10BN0 ZC0K	10BN0 ZW2S	10BNS ZC0S	10BNS ZW2S	10BP0 ZC0S	10BP0 ZW2S	10BPS ZC0S	10BPS ZW2S
Sensing distance S_n	0.4 in (10 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Nominal voltage V_n	DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 125 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Shielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.5 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	100 Hz	■	■	■	■	■	■	■	■
Dimensions	M30 x 1.5[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	100 Nm	■	■	■	■	■	■	■	■

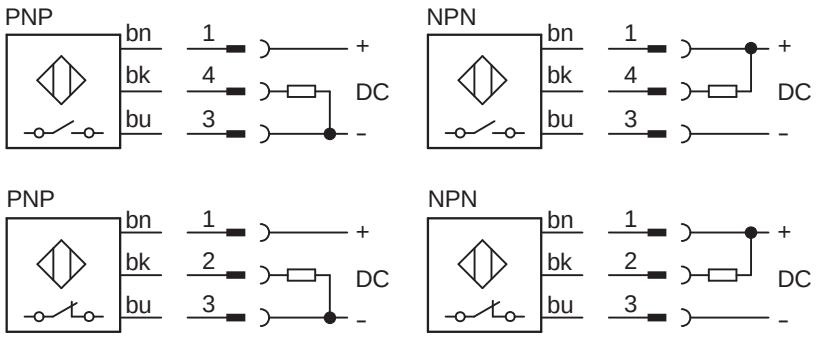
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

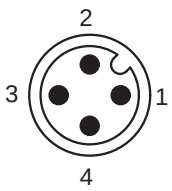
The following are reference values, which may vary from type to type:

St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

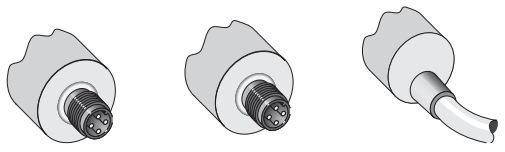


Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



Connection diagram

IME30-10BNSZC0S	IME30-10BN0ZC0K	IME30-10BN0ZW2S
IME30-10BPSZC0S	IME30-10BP0ZC0S	IME30-10BNSZW2S
		IME30-10BP0ZW2S
		IME30-10BPSZW2S



IME30 Standard, Unshielded

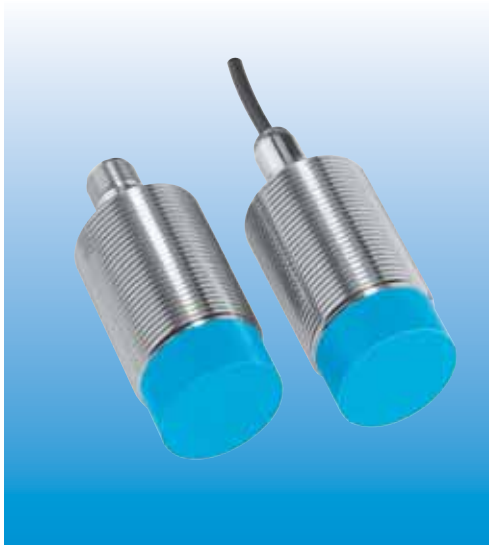
Inductive Proximity Sensors

0.6 in (15 mm)
sensing distance

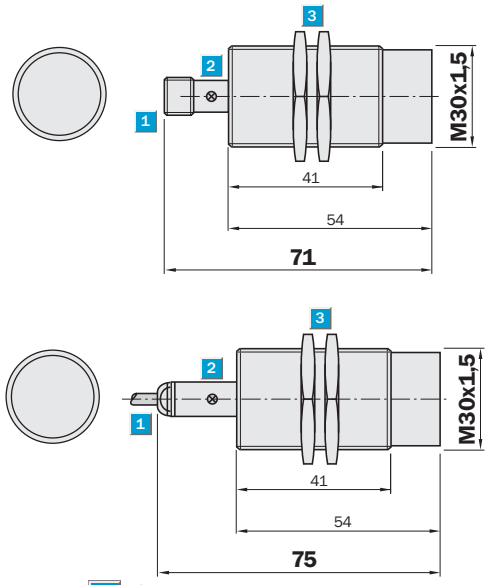
Highlights

- Short-circuit protected (pulsed)
- Robust brass housing, nickel-plated with fine thread M30 x 1.5 mm
- IP 67 enclosure rating
- Unshielded installation
- DC 3-wire

IME30



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 36, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME30-15NN0ZC0S	1 041 026
IME30-15NN0ZW2S	1 041 028
IME30-15NNSZC0S	1 041 022
IME30-15NNSZW2S	1 041 024
IME30-15NP0ZC0S	1 041 018
IME30-15NP0ZW2S	1 041 020
IME30-15NPSZC0S	1 041 014
IME30-15NPSZW2S	1 041 016

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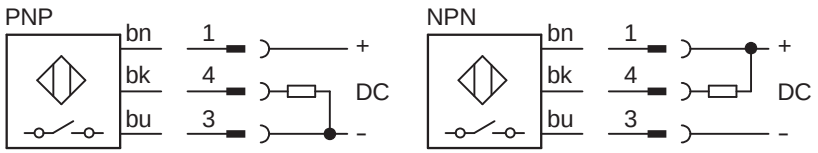
Technical data	IME30 -	15NN0 ZC0S	15NN0 ZW2S	15NBN SZC0S	15NNS ZW2S	15NP0 ZC0S	15NP0 ZW2S	15NPS ZC0S	15NPS ZW2S
Sensing distance S_n	0.6 in (15 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Nominal voltage V_n	DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 125 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Unshielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.5 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	100 Hz	■	■	■	■	■	■	■	■
Dimensions	M30 x 1.5[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	100 Nm	■	■	■	■	■	■	■	■

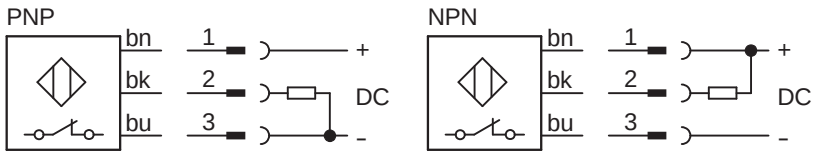
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

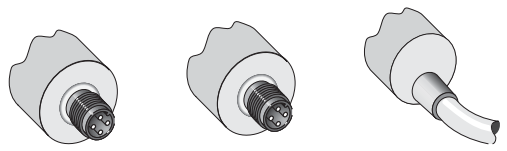
The following are reference values, which may vary from type to type:	
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

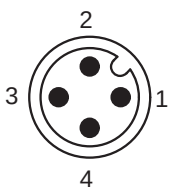




IME30-15NNSZC0S
IME30-15NPSZC0S
IME30-15NN0ZC0S
IME30-15NP0ZC0S
IME30-15NN0ZW2S
IME30-15NNSZW2S
IME30-15NP0ZW2S
IME30-15NPSZW2S



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME30 Short, Shielded

Inductive Proximity Sensors

0.4 in (10 mm)
sensing distance

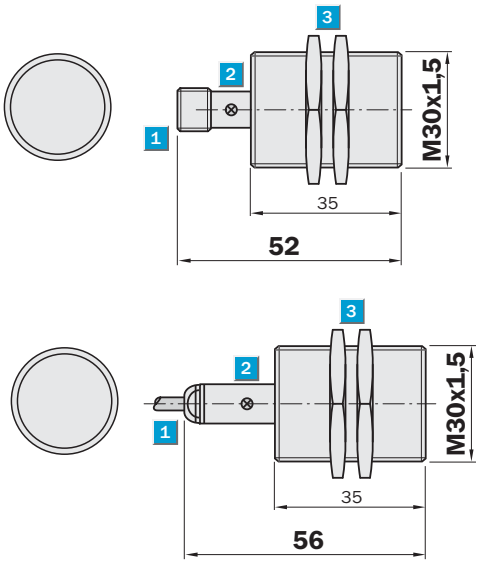
Highlights

- Short-circuit protected (pulsed)
- Robust brass housing, nickel-plated with fine thread M30 x 1.5 mm
- IP 67 enclosure rating
- Shielded installation
- DC 3-wire

IME30



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 36, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME30-10BN0ZC0S	1 041 009
IME30-10BN0ZW2K	1 041 011
IME30-10BNSZC0K	1 041 005
IME30-10BNSZW2K	1 041 007
IME30-10BP0ZC0K	1 041 001
IME30-10BP0ZW2K	1 041 003
IME30-10BPSZC0K	1 040 997
IME30-10BPSZW2K	1 040 999

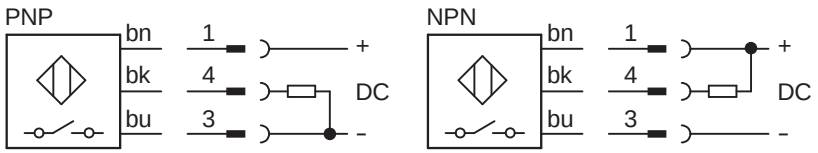
Technical data	IME30 -	10BN0 ZC0S	10BN0 ZW2K	10BNS ZC0K	10BNS ZW2K	10BP0 ZC0K	10BP0 ZW2K	10BPS ZC0K	10BPS ZW2K
Sensing distance S_n	0.4 in (10 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Nominal voltage V_n	DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 125 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Shielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.5 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	100 Hz	■	■	■	■	■	■	■	■
Dimensions	M30 x 1.5[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	100 Nm	■	■	■	■	■	■	■	■

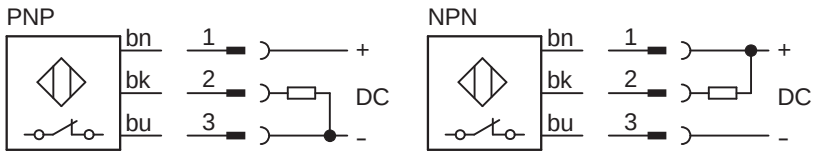
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

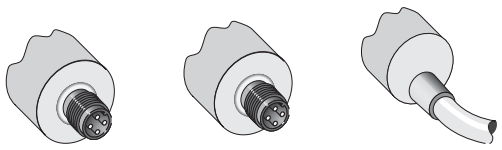
The following are reference values, which may vary from type to type:	
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

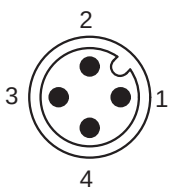




IME30-10BNSZC0K
IME30-10BN0ZC0S
IME30-10BN0ZW2K
IME30-10BPSZC0K
IME30-10BP0ZC0K
IME30-10BNSZW2K
IME30-10BP0ZW2K
IME30-10BPSZW2K



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME30 Short, Unshielded

Inductive Proximity Sensors

0.6 in (15 mm)
sensing distance

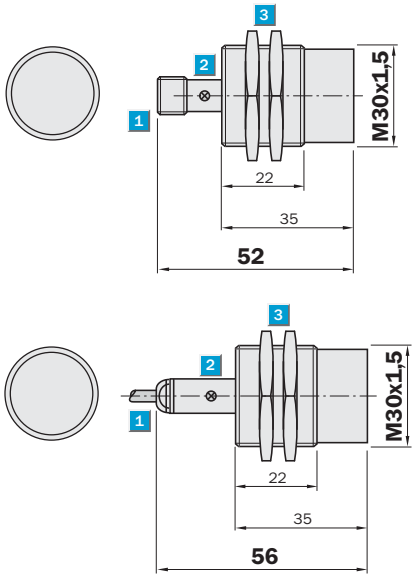
Highlights

- Short-circuit protected (pulsed)
- Robust brass housing, nickel-plated with fine thread M30 x 1.5 mm
- IP 67 enclosure rating
- Unshielded installation
- DC 3-wire

IME30



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 36, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME30-15NN0ZC0K	1 041 025
IME30-15NN0ZW2K	1 041 027
IME30-15NNSZC0K	1 041 021
IME30-15NNSZW2K	1 041 023
IME30-15NP0ZC0K	1 041 017
IME30-15NP0ZW2K	1 041 019
IME30-15NPSZC0K	1 041 013
IME30-15NPSZW2K	1 041 015

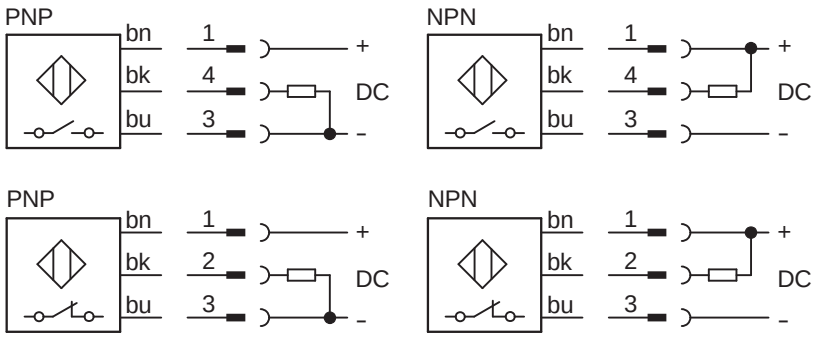
Technical data	IME30 -	15NN0 ZC0K	15NN0 ZW2K	15NNS ZC0K	15NNS ZW2K	15NP0 ZC0K	15NP0 ZW2K	15NPS ZC0K	15NPS ZW2K
Sensing distance S_n	0.6 in (15 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Nominal voltage V_n	DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 125 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Unshielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.5 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	100 Hz	■	■	■	■	■	■	■	■
Dimensions	M30 x 1.5[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	100 Nm	■	■	■	■	■	■	■	■

1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

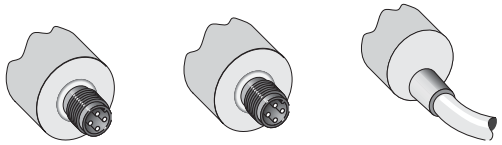
Reduction factor R_M

The following are reference values, which may vary from type to type:	
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

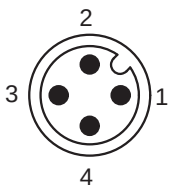
Connection diagram



IME30-15NNSZC0K
IME30-15NN0ZC0K
IME30-15NN0ZW2K
IME30-15NPSZC0K
IME30-15NP0ZC0K
IME30-15NNSZW2K
IME30-15NP0ZW2K
IME30-15NPSZW2K



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME30 Advanced, Shielded

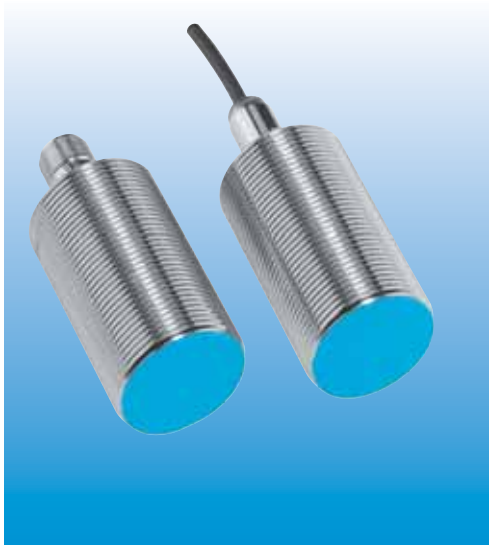
Inductive Proximity Sensors

0.6 in (15 mm)
sensing distance

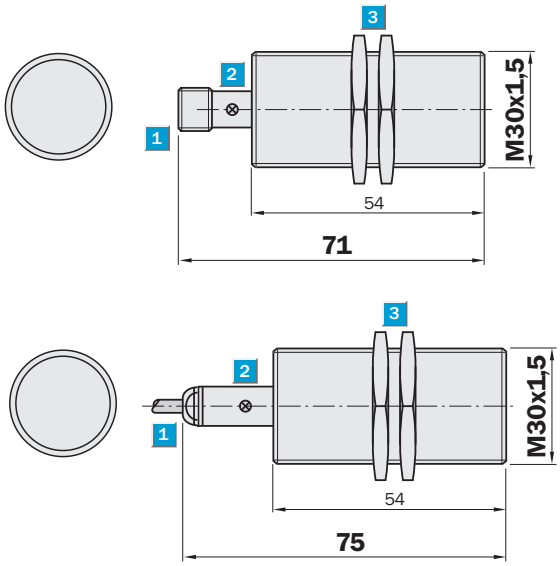
Highlights

- Short-circuit protected (pulsed)
- Robust brass housing, nickel-plated with fine thread M30 x 1.5 mm
- IP 67 enclosure rating
- Quasi-flush installation
- DC 3-wire
- Enhanced sensing range

IME30



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 36, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME30-15BN0ZC0S	1 041 042
IME30-15BN0ZW2S	1 041 044
IME30-15BNSZC0S	1 041 038
IME30-15BNSZW2S	1 041 040
IME30-15BP0ZC0S	1 041 034
IME30-15BP0ZW2S	1 041 036
IME30-15BPSZC0S	1 041 030
IME30-15BPSZW2S	1 041 032

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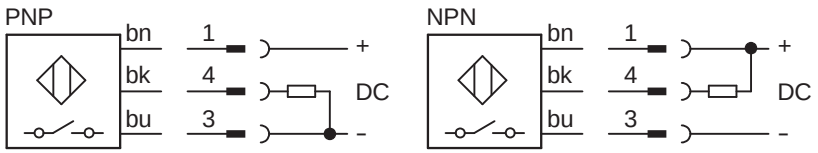
Technical data	IME30 -	15BN0 ZC0S	15BN0 ZW2S	15BNS ZC0S	15BNS ZW2S	15BP0 ZC0S	15BP0 ZW2S	15BPS ZC0S	15BPS ZW2S
Sensing distance S_n	0.6 in (15 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Nominal voltage V_n	DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 125 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Quasi-flush	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.5 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	100 Hz	■	■	■	■	■	■	■	■
Dimensions	M30 x 1.5[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	100 Nm	■	■	■	■	■	■	■	■

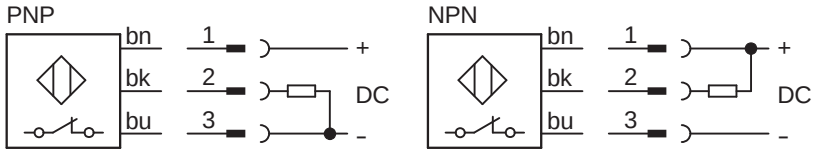
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

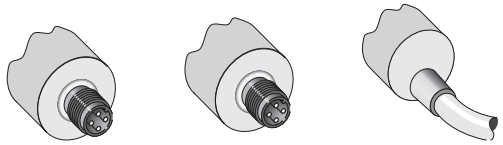
The following are reference values, which may vary from type to type:	
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

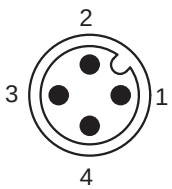




IME30-15BNSZC0S
IME30-15BN0ZC0S
IME30-15BN0ZW2S
IME30-15BPSZC0S
IME30-15BP0ZC0S
IME30-15BNSZW2S
IME30-15BP0ZW2S
IME30-15BPSZW2S



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME30 Advanced, Unshielded

Inductive Proximity Sensors

0.8 in (20 mm)
sensing distance

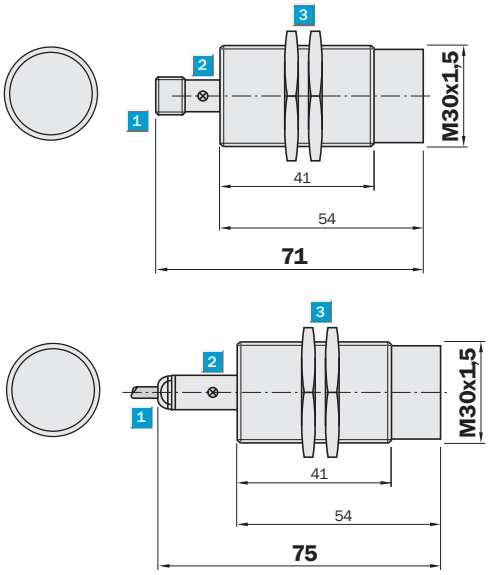
Highlights

- Short-circuit protected (pulsed)
- Robust brass housing, nickel-plated with fine thread M30 x 1.5 mm
- IP 67 enclosure rating
- Unshielded installation
- DC 3-wire
- Enhanced sensing range

IME30



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 36, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME30-20NN0ZC0S	1 041 058
IME30-20NN0ZW2S	1 041 060
IME30-20NNSZC0S	1 041 054
IME30-20NNSZW2S	1 041 056
IME30-20NP0ZC0S	1 041 050
IME30-20NP0ZW2S	1 041 052
IME30-20NPSZC0S	1 041 046
IME30-20NPSZW2S	1 041 048

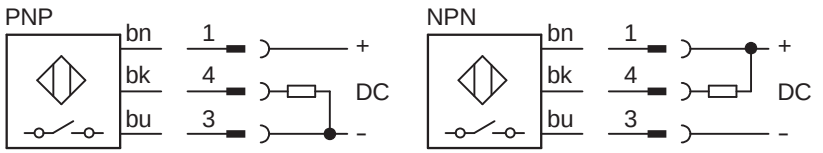
Technical data	IME30	20NN0 ZC0S	20NN0 ZW2S	20NNS ZC0S	20NNS ZW2S	20NP0 ZC0S	20NP0 ZW2S	20NPS ZC0S	20NNP SZW2S
Sensing distance S_n	0.8 in (20 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Nominal voltage V_n	DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 125 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Unshielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.5 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	100 Hz	■	■	■	■	■	■	■	■
Dimensions	M30 x 1.5[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	100 Nm	■	■	■	■	■	■	■	■

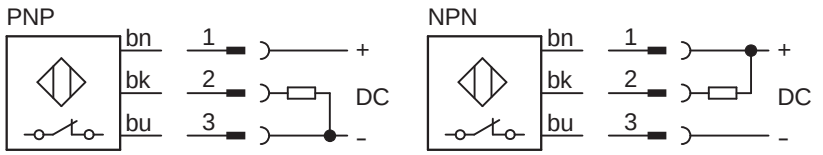
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

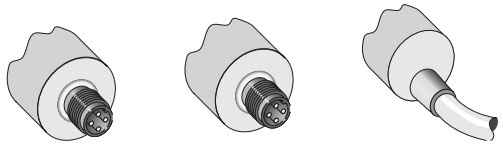
The following are reference values, which may vary from type to type:	
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

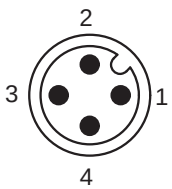




IME30-20NNSZC0S
IME30-20NN0ZC0S
IME30-20NN0ZW2S
IME30-20NPSZC0S
IME30-20NP0ZC0S
IME30-20NNSZW2S
IME30-20NP0ZW2S
IME30-20NPSZW2S



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME30 Advanced Short, Shielded

Inductive Proximity Sensors

0.6 in (15 mm)
sensing distance

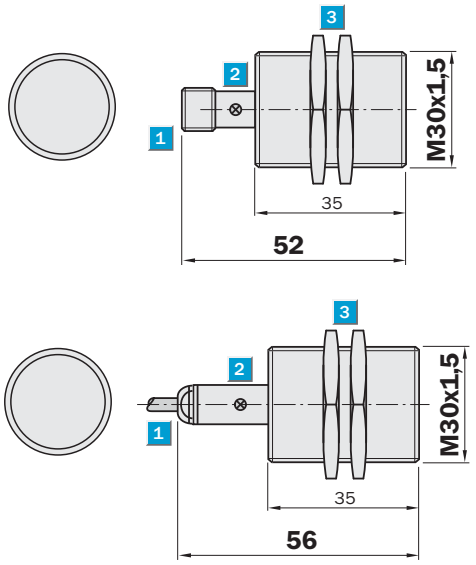
Highlights

- Short-circuit protected (pulsed)
- Robust brass housing, nickel-plated with fine thread M30 x 1.5 mm
- IP 67 enclosure rating
- Quasi-flush installation
- DC 3-wire
- Enhanced sensing range

IME30



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 36, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME30-15BN0ZC0K	1 041 041
IME30-15BN0ZW2K	1 041 043
IME30-15BNSZC0K	1 041 037
IME30-15BNSZW2K	1 041 039
IME30-15BP0ZC0K	1 041 033
IME30-15BP0ZW2K	1 041 035
IME30-15BPSZC0K	1 041 029
IME30-15BPSZW2K	1 041 031

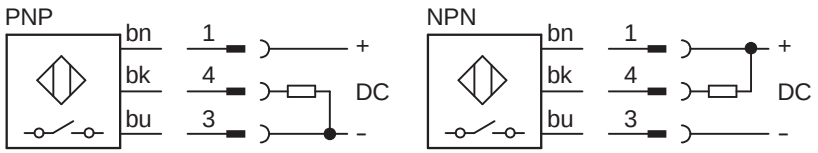
Technical data	IME30	15BN0 ZC0K	15BN0 ZW2K	15BNS ZC0K	15BNS ZW2K	15BP0 ZC0K	15BP0 ZW2K	15BPS ZC0K	15BPS ZW2K
Sensing distance S_n	0.6 in (15 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Nominal voltage V_n	DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 125 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Quasi-flush	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.5 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	100 Hz	■	■	■	■	■	■	■	■
Dimensions	M30 x 1.5[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	100 Nm	■	■	■	■	■	■	■	■

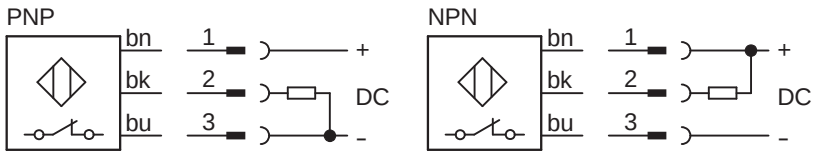
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Reduction factor R_M

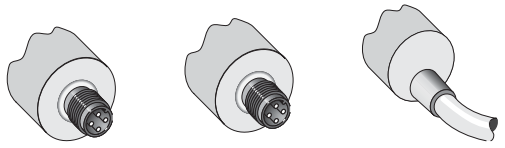
The following are reference values, which may vary from type to type:	
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

Connection diagram

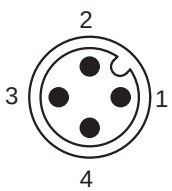




IME30-15BNSZC0K
IME30-15BN0ZC0K
IME30-15BN0ZW2K
IME30-15BPSZC0K
IME30-15BP0ZC0K
IME30-15BNSZW2K
IME30-15BP0ZW2K
IME30-15BPSZW2K



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IME30 Advanced Short, Unshielded

Inductive Proximity Sensors

0.8 in (20 mm)
sensing distance

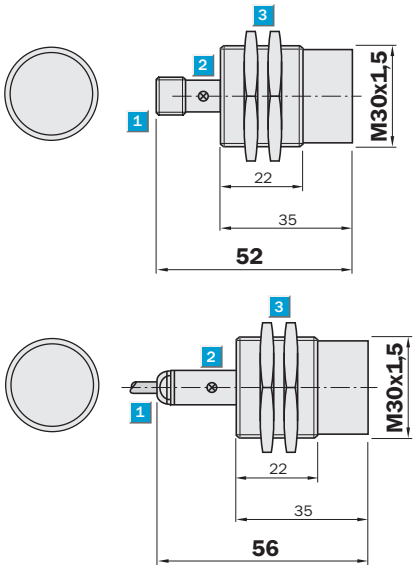
Highlights

- Short-circuit protected (pulsed)
- Robust brass housing, nickel-plated with fine thread M30 x 1.5 mm
- IP 67 enclosure rating
- Unshielded installation
- DC 3-wire
- Enhanced sensing range

IME30



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 36, metal

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IME30-20NN0ZC0K	1 041 057
IME30-20NN0ZW2K	1 041 059
IME30-20NNSZC0K	1 041 053
IME30-20NNSZW2K	1 041 055
IME30-20NP0ZC0K	1 041 049
IME30-20NP0ZW2K	1 041 051
IME30-20NPSZC0K	1 041 045
IME30-20NPSZW2K	1 041 047

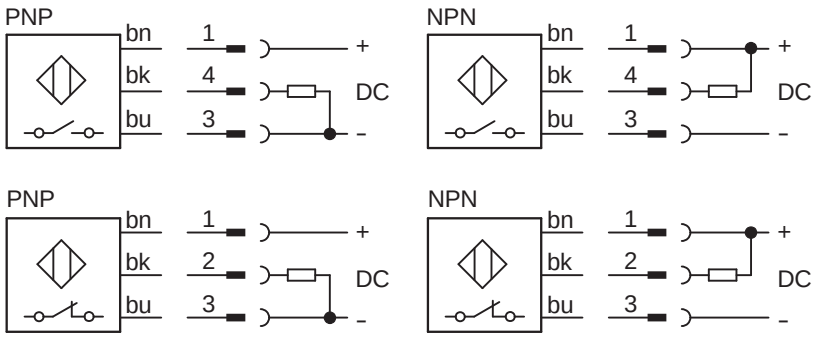
Technical data	IME30 -	20NN0 ZC0K	20NN0 ZW2K	20NNS ZC0K	20NNS ZW2K	20NP0 ZC0K	20NP0 ZW2K	20NPS ZC0K	20NPS ZW2K
Sensing distance S_n	0.8 in (20 mm)	■	■	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■	■
Nominal voltage V_n	DC	■	■	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■	■	■
Current consumption[2]	≤ 10 mA	■	■	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■	■	■
Time delay before availability t_v	≤ 125 ms	■	■	■	■	■	■	■	■
Hysteresis H, of S_r	5…15%	■	■	■	■	■	■	■	■
Repeatability R	≤ 2% (U_b and T_a constant)[3]	■	■	■	■	■	■	■	■
Temperature drift, of S_r	± 10%	■	■	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■				
	PNP					■	■	■	■
Output function	Normally closed	■	■			■	■		
	Normally open			■	■			■	■
Installation	Unshielded	■	■	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin	■		■		■		■	
	Cable, PVC, 2 m, 3 x 0.5 mm²		■		■		■		■
Enclosure rating	IP 67[4]	■	■	■	■	■	■	■	■
Max switching frequency	100 Hz	■	■	■	■	■	■	■	■
Dimensions	M30 x 1.5[5]	■	■	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■	■	■	■	■	■	■
Ambient temperature T_a	-4…149° F (-20…65° C)	■	■	■	■	■	■	■	■
Housing material	Brass nickel-plated, plastic	■	■	■	■	■	■	■	■
Tightening torque	100 Nm	■	■	■	■	■	■	■	■

1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

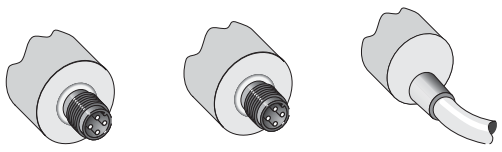
Reduction factor R_M

The following are reference values, which may vary from type to type:	
St37 (Fe)	1
Stainless steel (V2A)	Approx. 0.8
Aluminum (solid)	Approx. 0.45
Copper (Cu)	Approx. 0.4

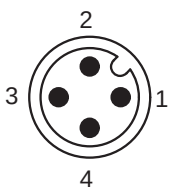
Connection diagram



IME30-20NNSZC0K | IME30-20NN0ZC0K | IME30-20NN0ZW2K
IME30-20NPSZC0K | IME30-20NP0ZC0K | IME30-20NNSZW2K
IME30-20NP0ZW2K
IME30-20NPSZW2K



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IMF12 Standard, Shielded

Inductive Proximity Sensors

0.1 in (2 mm)
sensing distance

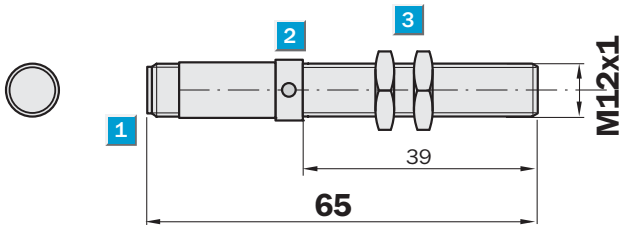
Highlights

- Robust stainless steel housing 316L/1.4404
- IP 69K and IP 68 enclosure ratings
- Extended temperature range -40…80° C (100° C for 15 minutes)

IMF12 Standard, Shielded



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, stainless steel (316L/1.4404)

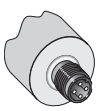
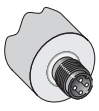
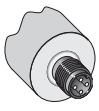
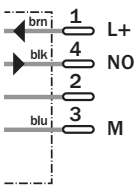
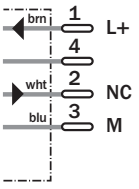
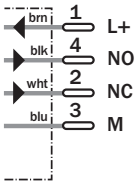
dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IMF12-02BPSVC0S	6 035 452
IMF12-02BNSVC0S	6 035 453
IMF12-02BPOVC0S	6 035 454
IMF12-02BNOVC0S	6 035 455
IMF12-02BPPVC0S	6 035 215
IMF12-02BNPVC0S	6 035 216

Connection diagram (see also next page)

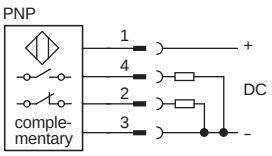
IMF12-02BNSVC0S IMF12-02BPSVC0S	IMF12-02BNOVC0S IMF12-02BPOVC0S	IMF12-02BNPVC0S IMF12-02BPPVC0S
		
M12, 4-pin	M12, 4-pin	M12, 4-pin
		

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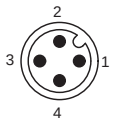
Technical data	IMF12-	02BPS VC0S	02BNS VC0S	02BPO VC0S	02BNO VC0S	02BPP VC0S	02BNP VC0S
Sensing distance S_n	0.1 in (2 mm)	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■		
	DC 4-wire					■	■
	10…30 V DC	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■
Current consumption[2]	≤ 15 mA	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■
Time delay before availability t_v	50 ms	■	■	■	■	■	■
Hysteresis H, of S_r	1…20%	■	■	■	■	■	■
Repeatability R	5% (U_b and T_a constant)[3]	■	■	■	■	■	■
Temperature drift, of S_r	10%	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■
Switching outputs	PNP	■		■		■	
	NPN		■		■		■
Output function	Normally open	■	■				
	Normally closed			■	■		
	Complementary					■	■
Installation	Shielded	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin, gold-plated	■	■	■	■	■	■
Enclosure rating	IP 68, IP 69K[4]	■	■	■	■	■	■
Max switching frequency	2000 Hz	■	■	■	■	■	■
Dimensions	M12 x 1[5]	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz	■	■	■	■	■	■
Ambient temperature T_a	-40…176° F (-40…80° C)	■	■	■	■	■	■
	212° F (100° C) for 15 minutes	■	■	■	■	■	■
Housing material	Stainless steel 316L/1.4404, PPS (FDA certified)	■	■	■	■	■	■
Tightening torque	20 Nm	■	■	■	■	■	■

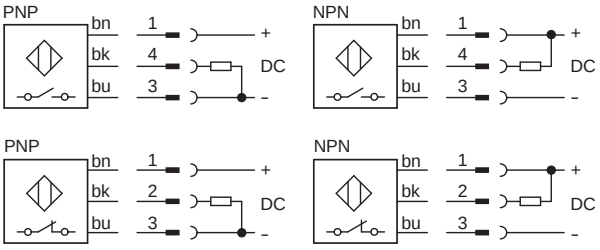
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Connection diagram

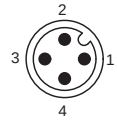


Wire color		Contact	Assignment
bn	brown	1	+ V DC
wh	white	2	NC
bu	blue	3	- V DC
bk	black	4	NO





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IMF12 Standard, Unshielded

Inductive Proximity Sensors

0.2 in (4 mm)
sensing distance

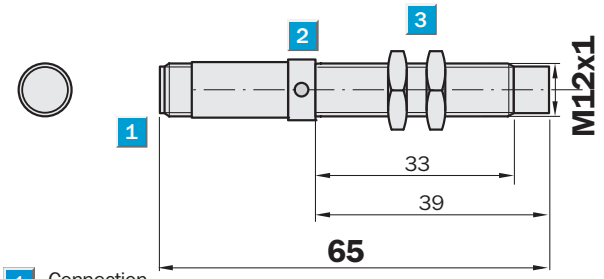
Highlights

- Robust stainless steel housing 316L/1.4404
- IP 69K and IP 68 enclosure ratings
- Extended temperature range -40…80° C (100° C for 15 minutes)

IMF12 Standard, Unshielded



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, stainless steel (316L/1.4404)

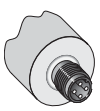
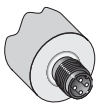
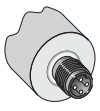
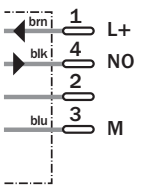
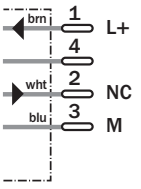
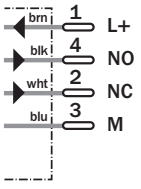
dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IMF12-04NPSVC0S	6 035 456
IMF12-04NNSVC0S	6 035 457
IMF12-04NPOVC0S	6 035 458
IMF12-04NNOVC0S	6 035 459
IMF12-04NPPVC0S	6 035 217
IMF12-04NNPVC0S	6 035 218

Connection diagram (see also next page)

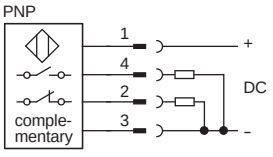
IMF12-04NNSVC0S IMF12-04NPSVC0S	IMF12-04NNOVC0S IMF12-04NPOVC0S	IMF12-04NNPVC0S IMF12-04NPPVC0S
		
M12, 4-pin	M12, 4-pin	M12, 4-pin
		

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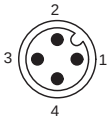
Technical data	IMF12-	04NPS VC0S	04NNS VC0S	04NPO VC0S	04NNO VC0S	04NPP VC0S	04NNP VC0S
Sensing distance S_n	0.2 in (4 mm)	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■		
	DC 4-wire					■	■
	10…30 V DC	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■
Current consumption[2]	≤ 15 mA	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■
Time delay before availability t_v	50 ms	■	■	■	■	■	■
Hysteresis H, of S_r	1…20%	■	■	■	■	■	■
Repeatability R	5% (U_b and T_a constant)[3]	■	■	■	■	■	■
Temperature drift, of S_r	10%	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■
Switching outputs	PNP	■		■		■	
	NPN		■		■		■
Output function	Normally open	■	■				
	Normally closed			■	■		
	Complementary					■	■
Installation	Unshielded	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin, gold-plated	■	■	■	■	■	■
Enclosure rating	IP 68, IP 69K[4]	■	■	■	■	■	■
Max switching frequency	2000 Hz	■	■	■	■	■	■
Dimensions	M12 x 1[5]	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz	■	■	■	■	■	■
Ambient temperature T_a	-40…176° F (-40…80° C)	■	■	■	■	■	■
	212° F (100° C) for 15 minutes	■	■	■	■	■	■
Housing material	Stainless steel 316L/1.4404, PPS (FDA certified)	■	■	■	■	■	■
Tightening torque	20 Nm	■	■	■	■	■	■

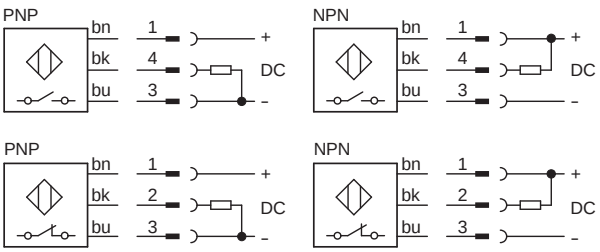
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Connection diagram

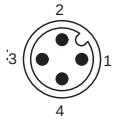


Wire color		Contact	Assignment
bn	brown	1	+ V DC
wh	white	2	NC
bu	blue	3	- V DC
bk	black	4	NO





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IMF12 Advanced, Shielded

Inductive Proximity Sensors

0.2 in (4 mm)
sensing distance

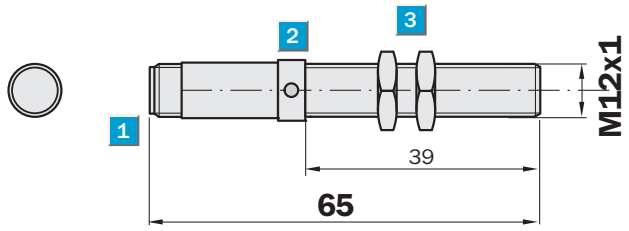
Highlights

- Robust stainless steel housing 316L/1.4404
- IP 69K and IP 68 enclosure ratings
- Extended temperature range -40…80° C (100° C for 15 minutes)

IMF12 Advanced, Shielded



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, stainless steel (316L/1.4404)

dimensions in mm

Accessories	page
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Mounting systems	1234

Order information

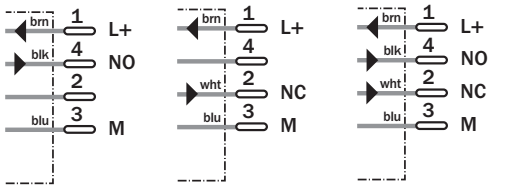
Type	Part no.
IMF12-04BPSVC0S	6 035 460
IMF12-04BNSVC0S	6 035 461
IMF12-04BPOVC0S	6 035 462
IMF12-04BNOVC0S	6 035 463
IMF12-04BPPVC0S	6 035 219
IMF12-04BNPVC0S	6 035 220

Connection diagram (see also next page)

IMF12-04BNSVC0S	IMF12-04BNOVC0S	IMF12-04BNPVC0S
IMF12-04BPSVC0S	IMF12-04BPOVC0S	IMF12-04BPPVC0S



M12, 4-pin	M12, 4-pin	M12, 4-pin

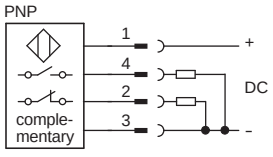


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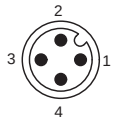
Technical data	IMF12-	04BPS VC0S	04BNS VC0S	04BPO VC0S	04BNO VC0S	04BPP VC0S	04BNP VC0S			
Sensing distance S_n	0.2 in (4 mm)	■	■	■	■	■	■			
Electrical configuration	DC 3-wire	■	■	■	■					
	DC 4-wire					■	■			
	10…30 V DC	■	■	■	■	■	■			
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■			
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■			
Current consumption[2]	≤ 15 mA	■	■	■	■	■	■			
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■			
Time delay before availability t_v	50 ms	■	■	■	■	■	■			
Hysteresis H, of S_r	1…20%	■	■	■	■	■	■			
Repeatability R	5% (U_b and T_a constant)[3]	■	■	■	■	■	■			
Temperature drift, of S_r	10%	■	■	■	■	■	■			
EMC	According to EN 60947-5-2	■	■	■	■	■	■			
Switching outputs	PNP	■		■		■				
	NPN		■		■		■			
Output function	Normally open	■	■							
	Normally closed			■	■					
	Complementary					■	■			
Installation	Shielded	■	■	■	■	■	■			
Connection type	Connector, M12, 4-pin, gold-plated	■	■	■	■	■	■			
Enclosure rating	IP 68, IP 69K[4]	■	■	■	■	■	■			
Max switching frequency	2000 Hz	■	■	■	■	■	■			
Dimensions	M12 x 1[5]	■	■	■	■	■	■			
Short-circuit protection	√[6]	■	■	■	■	■	■			
Reverse polarity protection	√	■	■	■	■	■	■			
Power-up pulse suppression	√	■	■	■	■	■	■			
Shock/vibration stress	30 g, 11 ms/10…55 Hz	■	■	■	■	■	■			
Ambient temperature T_a	-40…176° F (-40…80° C)	■	■	■	■	■	■			
	212° F (100° C) for 15 minutes	■	■	■	■	■	■			
Housing material	Stainless steel 316L/1.4404, PPS (FDA certified)	■	■	■	■	■	■			
Tightening torque	20 Nm	■	■	■	■	■	■			

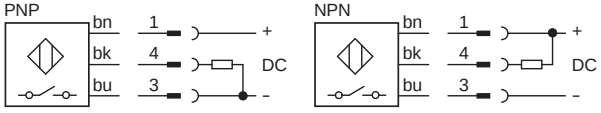
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Connection diagram

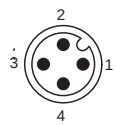


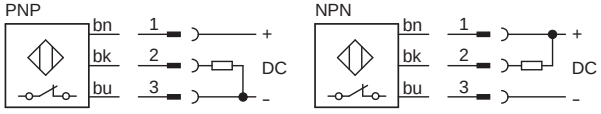
Wire color		Contact	Assignment
bn	brown	1	+ V DC
wh	white	2	NC
bu	blue	3	- V DC
bk	black	4	NO





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC





IMF12 Advanced, Unshielded

Inductive Proximity Sensors

0.3 in (8 mm)
sensing distance

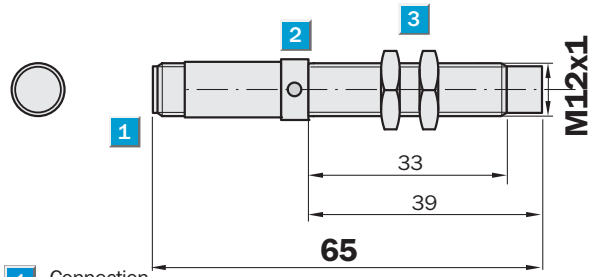
Highlights

- Robust stainless steel housing 316L/1.4404
- IP 69K and IP 68 enclosure ratings
- Extended temperature range -40…80° C (100° C for 15 minutes)

IMF12 Advanced, Unshielded



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, stainless steel (316L/1.4404)

dimensions in mm

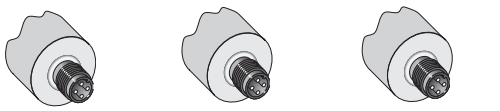
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

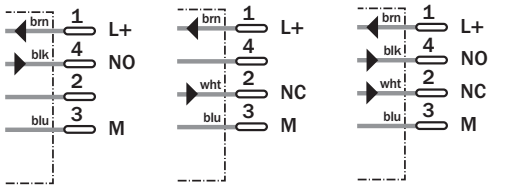
Type	Part no.
IMF12-08NPSVC0S	6 035 464
IMF12-08NNSVC0S	6 035 465
IMF12-08NPOVC0S	6 035 466
IMF12-08NNOVC0S	6 035 467
IMF12-08NPPVC0S	6 035 221
IMF12-08NNPVC0S	6 035 222

Connection diagram (see also next page)

IMF12-08NNSVC0S	IMF12-08NNOVC0S	IMF12-08NNPVC0S
IMF12-08NPSVC0S	IMF12-08NPOVC0S	IMF12-08NPPVC0S



M12, 4-pin	M12, 4-pin	M12, 4-pin

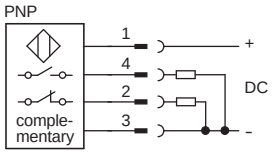


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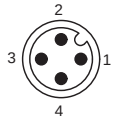
Technical data	IMF12-	08NPS VC0S	08NNS VC0S	08NPO VC0S	08NNO VC0S	08NPP VC0S	08NNP VC0S
Sensing distance S_n	0.3 in (8 mm)	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■		
	DC 4-wire					■	■
	10…30 V DC	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■
Current consumption[2]	≤ 15 mA	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■
Time delay before availability t_v	50 ms	■	■	■	■	■	■
Hysteresis H, of S_r	1…20%	■	■	■	■	■	■
Repeatability R	5% (U_b and T_a constant)[3]	■	■	■	■	■	■
Temperature drift, of S_r	10%	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■
Switching outputs	PNP	■		■		■	
	NPN		■		■		■
Output function	Normally open	■	■				
	Normally closed			■	■		
	Complementary					■	■
Installation	Unshielded	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin, gold-plated	■	■	■	■	■	■
Enclosure rating	IP 68, IP 69K[4]	■	■	■	■	■	■
Max switching frequency	2000 Hz	■	■	■	■	■	■
Dimensions	M12 x 1[5]	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz	■	■	■	■	■	■
Ambient temperature T_a	-40…176° F (-40…80° C)	■	■	■	■	■	■
	212° F (100° C) for 15 minutes	■	■	■	■	■	■
Housing material	Stainless steel 316L/1.4404, PPS (FDA certified)	■	■	■	■	■	■
Tightening torque	20 Nm	■	■	■	■	■	■

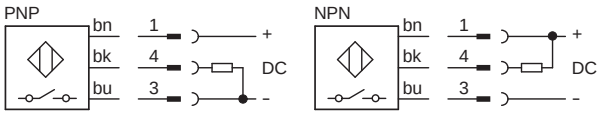
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Connection diagram

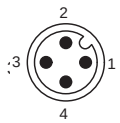


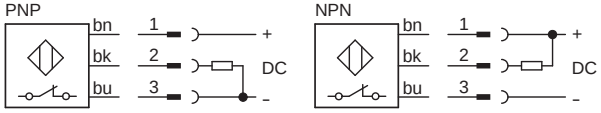
Wire color		Contact	Assignment
bn	brown	1	+ V DC
wh	white	2	NC
bu	blue	3	- V DC
bk	black	4	NO





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC





IMF18 Standard, Shielded

Inductive Proximity Sensors

0.2 in (5 mm)
sensing distance

ECOLAB
JohnsonDiversey

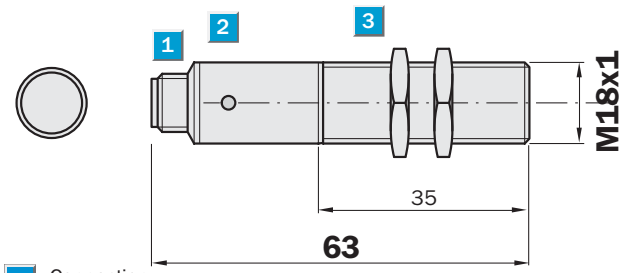
Highlights

- Robust stainless steel housing 316L/1.4404
- IP 69K and IP 68 enclosure ratings
- Extended temperature range -40…80° C (100° C for 15 minutes)

IMF18 Standard, Shielded



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, stainless steel (316L/1.4404)

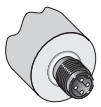
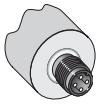
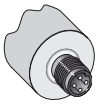
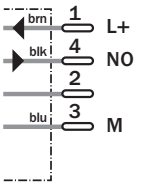
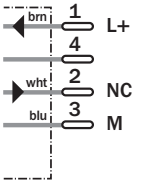
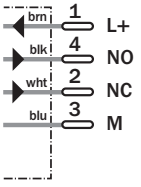
dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IMF18-05BPSVC0S	6 035 468
IMF18-05BNSVC0S	6 035 469
IMF18-05BPOVC0S	6 035 470
IMF18-05BNOVC0S	6 035 471
IMF18-05BPPVC0S	6 035 223
IMF18-05BNPVC0S	6 035 224

Connection diagram (see also next page)

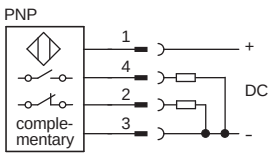
IMF18-05BNSVC0S IMF18-05BPSVC0S	IMF18-05BNOVC0S IMF18-05BPOVC0S	IMF18-05BNPVC0S IMF18-05BPPVC0S
		
M12, 4-pin	M12, 4-pin	M12, 4-pin
		

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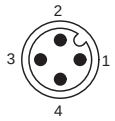
Technical data	IMF18-	05BPS VC0S	05BNS VC0S	05BPO VC0S	05BNO VC0S	05BPP VC0S	05BNP VC0S
Sensing distance S_n	0.2 in (5 mm)	■	■	■	■	■	■
Electrical configuration	DC 3-wire	■	■	■	■		
	DC 4-wire					■	■
	10…30 V DC	■	■	■	■	■	■
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■
Current consumption[2]	≤ 15 mA	■	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■
Time delay before availability t_v	50 ms	■	■	■	■	■	■
Hysteresis H, of S_r	1…20%	■	■	■	■	■	■
Repeatability R	5% (U_b and T_a constant)[3]	■	■	■	■	■	■
Temperature drift, of S_r	10%	■	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	■	■
Switching outputs	PNP	■		■		■	
	NPN		■		■		■
Output function	Normally open	■	■				
	Normally closed			■	■		
	Complementary					■	■
Installation	Shielded	■	■	■	■	■	■
Connection type	Connector, M12, 4-pin, gold-plated	■	■	■	■	■	■
Enclosure rating	IP 68, IP 69K[4]	■	■	■	■	■	■
Max switching frequency	2000 Hz	■	■	■	■	■	■
Dimensions	M18 x 1[5]	■	■	■	■	■	■
Short-circuit protection	√ [6]	■	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz	■	■	■	■	■	■
Ambient temperature T_a	-40…176° F (-40…80° C)	■	■	■	■	■	■
	212° F (100° C) for 15 minutes	■	■	■	■	■	■
Housing material	Stainless steel 316L/1.4404, PPS (FDA certified)	■	■	■	■	■	■
Tightening torque	50 Nm	■	■	■	■	■	■

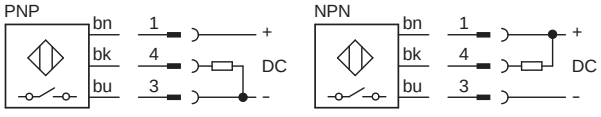
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Connection diagram

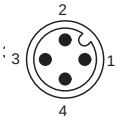


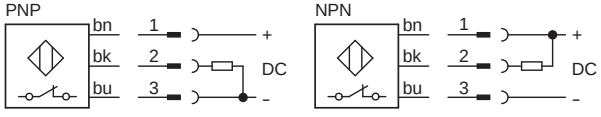
Wire color		Contact	Assignment
bn	brown	1	+ V DC
wh	white	2	NC
bu	blue	3	- V DC
bk	black	4	NO





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC





IMF18 Standard, Unshielded

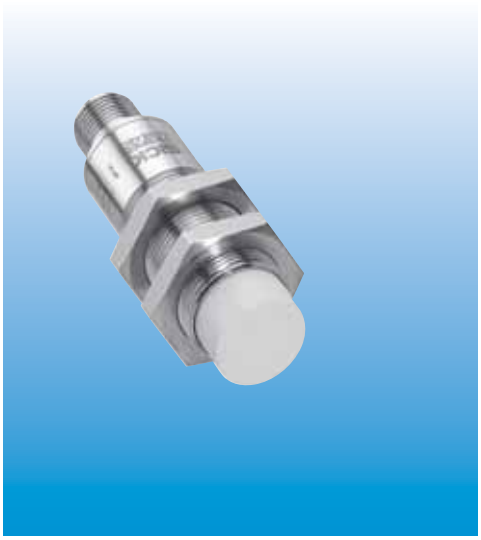
Inductive Proximity Sensors

0.3 in (8 mm)
sensing distance

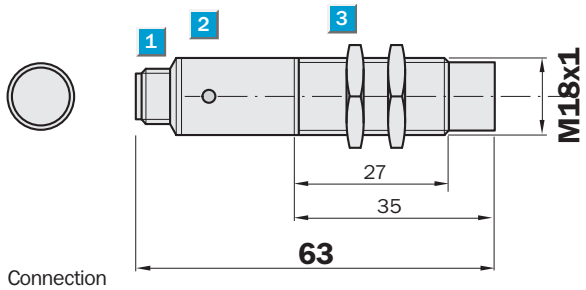
Highlights

- Robust stainless steel housing 316L/1.4404
- IP 69K and IP 68 enclosure ratings
- Extended temperature range -40…80° C (100° C for 15 minutes)

IMF18 Standard, Unshielded



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, stainless steel (316L/1.4404)

dimensions in mm

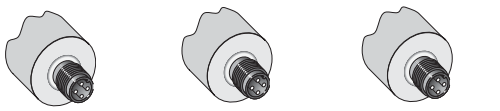
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

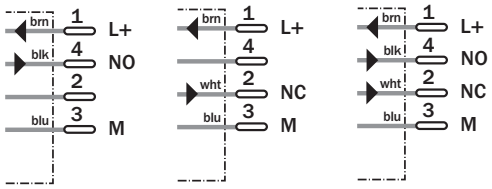
Type	Part no.
IMF18-08NPSVC0S	6 035 472
IMF18-08NNSVC0S	6 035 473
IMF18-08NPOVC0S	6 035 474
IMF18-08NNOVC0S	6 035 475
IMF18-08NPPVC0S	6 035 225
IMF18-08NNPVC0S	6 035 226

Connection diagram (see also next page)

IMF18-08NNSVC0S	IMF18-08NNOVC0S	IMF18-08NNPVC0S
IMF18-08NPSVC0S	IMF18-08NPOVC0S	IMF18-08NPPVC0S



M12, 4-pin	M12, 4-pin	M12, 4-pin

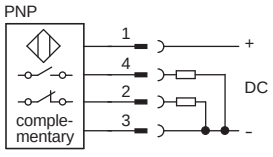


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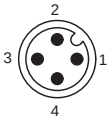
Technical data	IMF18-	08NPS VC0S	08NNS VC0S	08NPO VC0S	08NNO VC0S	08NPP VC0S	08NNP VC0S			
Sensing distance S_n	0.3 in (8 mm)	■	■	■	■	■	■			
Electrical configuration	DC 3-wire	■	■	■	■					
	DC 4-wire					■	■			
	10…30 V DC	■	■	■	■	■	■			
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■			
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■			
Current consumption[2]	≤ 15 mA	■	■	■	■	■	■			
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■			
Time delay before availability t_v	50 ms	■	■	■	■	■	■			
Hysteresis H, of S_r	1…20%	■	■	■	■	■	■			
Repeatability R	5% (U_b and T_a constant)[3]	■	■	■	■	■	■			
Temperature drift, of S_r	10%	■	■	■	■	■	■			
EMC	According to EN 60947-5-2	■	■	■	■	■	■			
Switching outputs	PNP	■		■		■				
	NPN		■		■		■			
Output function	Normally open	■	■							
	Normally closed			■	■					
	Complementary					■	■			
Installation	Unshielded	■	■	■	■	■	■			
Connection type	Connector, M12, 4-pin, gold-plated	■	■	■	■	■	■			
Enclosure rating	IP 68, IP 69K[4]	■	■	■	■	■	■			
Max switching frequency	2000 Hz	■	■	■	■	■	■			
Dimensions	M18 x 1[5]	■	■	■	■	■	■			
Short-circuit protection	√ [6]	■	■	■	■	■	■			
Reverse polarity protection	√	■	■	■	■	■	■			
Power-up pulse suppression	√	■	■	■	■	■	■			
Shock/vibration stress	30 g, 11 ms/10…55 Hz	■	■	■	■	■	■			
Ambient temperature T_a	-40…176° F (-40…80° C)	■	■	■	■	■	■			
	212° F (100° C) for 15 minutes	■	■	■	■	■	■			
Housing material	Stainless steel 316L/1.4404, PPS (FDA certified)	■	■	■	■	■	■			
Tightening torque	50 Nm	■	■	■	■	■	■			

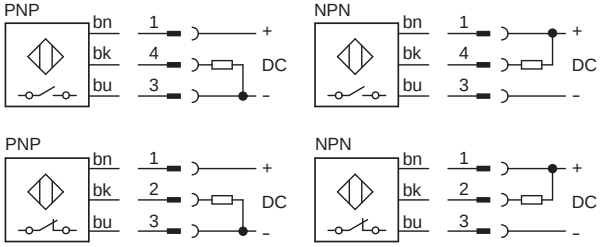
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Connection diagram

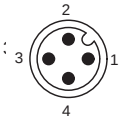


Wire color		Contact	Assignment
bn	brown	1	+ V DC
wh	white	2	NC
bu	blue	3	- V DC
bk	black	4	NO





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IMF18 Advanced, Shielded

Inductive Proximity Sensors

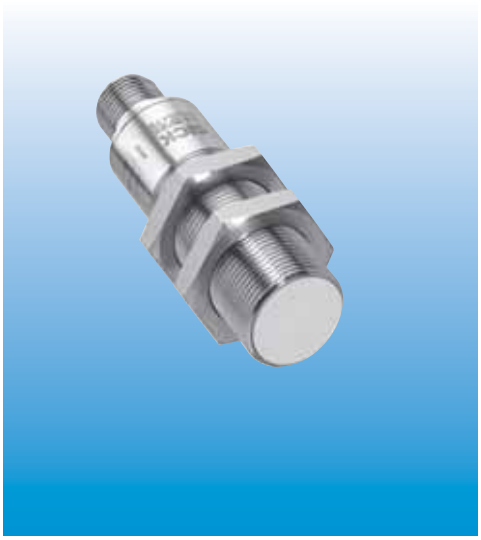
0.3 in (8 mm)
sensing distance

ECOLAB
JohnsonDiversey

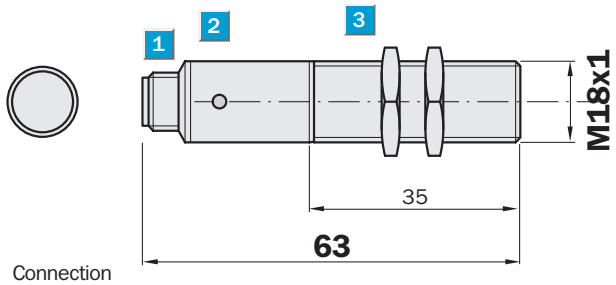
Highlights

- Robust stainless steel housing 316L/1.4404
- IP 69K and IP 68 enclosure ratings
- Extended temperature range -40…80° C (100° C for 15 minutes)

IMF18 Advanced, Shielded



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, stainless steel (316L/1.4404)

dimensions in mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

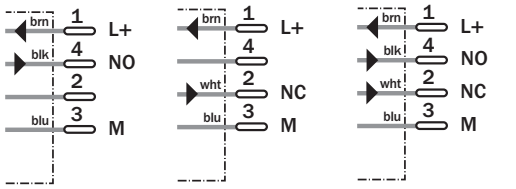
Type	Part no.
IMF18-08BPSVC0S	6 035 476
IMF18-08BNSVC0S	6 035 477
IMF18-08BPOVC0S	6 035 478
IMF18-08BNOVC0S	6 035 479
IMF18-08BPPVC0S	6 035 227
IMF18-08BNPVC0S	6 035 228

Connection diagram (see also next page)

IMF18-08BNSVC0S	IMF18-08BNOVC0S	IMF18-08BNPVC0S
IMF18-08BPSVC0S	IMF18-08BPOVC0S	IMF18-08BPPVC0S



M12, 4-pin	M12, 4-pin	M12, 4-pin

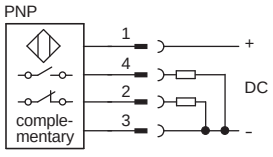


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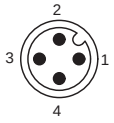
Technical data	IMF18-	08BPS VC0S	08BNS VC0S	08BPO VC0S	08BNO VC0S	08BPP VC0S	08BNP VC0S			
Sensing distance S_n	0.3 in (8 mm)	■	■	■	■	■	■			
Electrical configuration	DC 3-wire	■	■	■	■					
	DC 4-wire					■	■			
	10…30 V DC	■	■	■	■	■	■			
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■			
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■			
Current consumption[2]	≤ 15 mA	■	■	■	■	■	■			
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■			
Time delay before availability t_v	50 ms	■	■	■	■	■	■			
Hysteresis H, of S_r	1…20%	■	■	■	■	■	■			
Repeatability R	5% (U_b and T_a constant)[3]	■	■	■	■	■	■			
Temperature drift, of S_r	10%	■	■	■	■	■	■			
EMC	According to EN 60947-5-2	■	■	■	■	■	■			
Switching outputs	PNP	■		■		■				
	NPN		■		■		■			
Output function	Normally open	■	■							
	Normally closed			■	■					
	Complementary					■	■			
Installation	Shielded	■	■	■	■	■	■			
Connection type	Connector, M12, 4-pin, gold-plated	■	■	■	■	■	■			
Enclosure rating	IP 68, IP 69K[4]	■	■	■	■	■	■			
Max switching frequency	2000 Hz	■	■	■	■	■	■			
Dimensions	M18 x 1[5]	■	■	■	■	■	■			
Short-circuit protection	√[6]	■	■	■	■	■	■			
Reverse polarity protection	√	■	■	■	■	■	■			
Power-up pulse suppression	√	■	■	■	■	■	■			
Shock/vibration stress	30 g, 11 ms/10…55 Hz	■	■	■	■	■	■			
Ambient temperature T_a	-40…176° F (-40…80° C)	■	■	■	■	■	■			
	212° F (100° C) for 15 minutes	■	■	■	■	■	■			
Housing material	Stainless steel 316L/1.4404, PPS (FDA certified)	■	■	■	■	■	■			
Tightening torque	50 Nm	■	■	■	■	■	■			

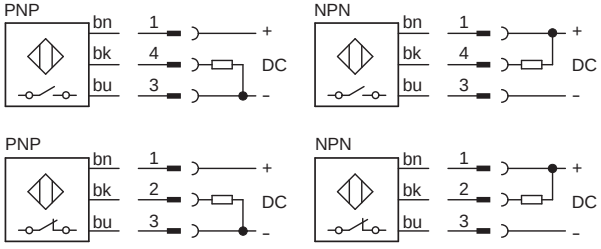
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Connection diagram

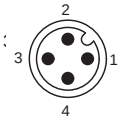


Wire color		Contact	Assignment
bn	brown	1	+ V DC
wh	white	2	NC
bu	blue	3	- V DC
bk	black	4	NO





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IMF18 Advanced, Unshielded

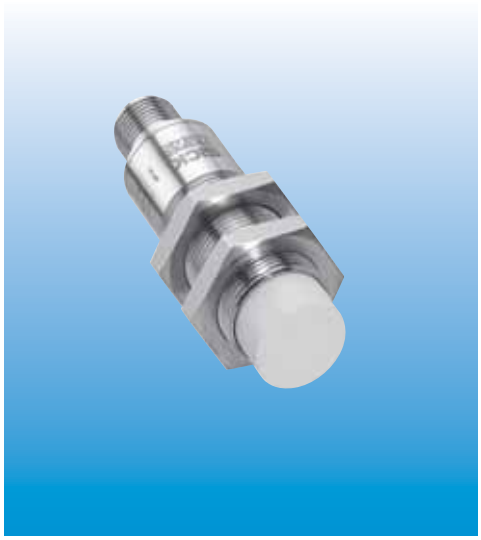
Inductive Proximity Sensors

0.5 in (12 mm)
sensing distance

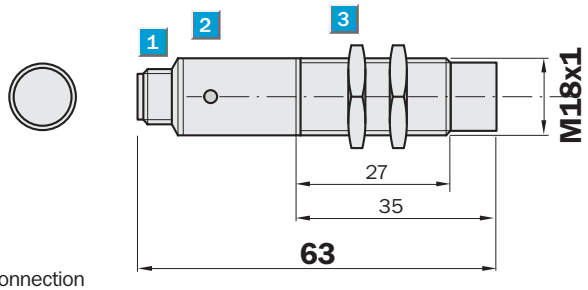
Highlights

- Robust stainless steel housing 316L/1.4404
- IP 69K and IP 68 enclosure ratings
- Extended temperature range -40…80° C (100° C for 15 minutes)

IMF18 Advanced, Unshielded



Dimensional drawing



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, stainless steel (316L/1.4404)

dimensions in mm

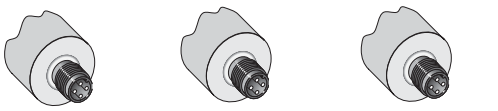
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

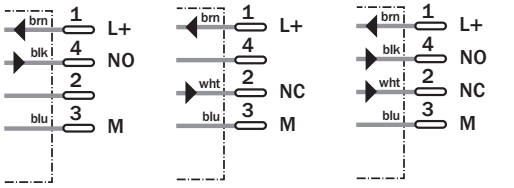
Type	Part no.
IMF18-12NPSVC0S	6 035 480
IMF18-12NNSVC0S	6 035 481
IMF18-12NPOVC0S	6 035 482
IMF18-12NNOVC0S	6 035 483
IMF18-12NPPVC0S	6 035 229
IMF18-12NNPVC0S	6 035 230

Connection diagram (see also next page)

IMF18-12NNSVC0S	IMF18-12NNOVC0S	IMF18-12NNPVC0S
IMF18-12NPSVC0S	IMF18-12NPOVC0S	IMF18-12NPPVC0S



M12, 4-pin	M12, 4-pin	M12, 4-pin

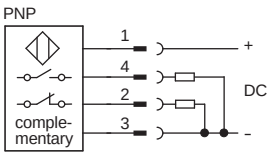


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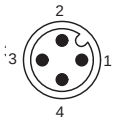
Technical data	IMF18-	12NPS VC0S	12NNS VC0S	12NPO VC0S	12NNO VC0S	12NPP VC0S	12NNP VC0S			
Sensing distance S_n	0.5 in (12 mm)	■	■	■	■	■	■			
Electrical configuration	DC 3-wire	■	■	■	■					
	DC 4-wire					■	■			
	10…30 V DC	■	■	■	■	■	■			
Ripple U_{pp}	≤ 10%	■	■	■	■	■	■			
Voltage drop U_d	≤ 2 V[1]	■	■	■	■	■	■			
Current consumption[2]	≤ 15 mA	■	■	■	■	■	■			
Continuous current I_a	≤ 200 mA	■	■	■	■	■	■			
Time delay before availability t_v	50 ms	■	■	■	■	■	■			
Hysteresis H, of S_r	1…20%	■	■	■	■	■	■			
Repeatability R	5% (U_b and T_a constant)[3]	■	■	■	■	■	■			
Temperature drift, of S_r	10%	■	■	■	■	■	■			
EMC	According to EN 60947-5-2	■	■	■	■	■	■			
Switching outputs	PNP	■		■		■				
	NPN		■		■		■			
Output function	Normally open	■	■							
	Normally closed			■	■					
	Complementary					■	■			
Installation	Unshielded	■	■	■	■	■	■			
Connection type	Connector, M12, 4-pin, gold-plated	■	■	■	■	■	■			
Enclosure rating	IP 68, IP 69K[4]	■	■	■	■	■	■			
Max switching frequency	2000 Hz	■	■	■	■	■	■			
Dimensions	M18 x 1[5]	■	■	■	■	■	■			
Short-circuit protection	√ [6]	■	■	■	■	■	■			
Reverse polarity protection	√	■	■	■	■	■	■			
Power-up pulse suppression	√	■	■	■	■	■	■			
Shock/vibration stress	30 g, 11 ms/10…55 Hz	■	■	■	■	■	■			
Ambient temperature T_a	-40…176° F (-40…80° C)	■	■	■	■	■	■			
	212° F (100° C) for 15 minutes	■	■	■	■	■	■			
Housing material	Stainless steel 316L/1.4404, PPS (FDA certified)	■	■	■	■	■	■			
Tightening torque	50 Nm	■	■	■	■	■	■			

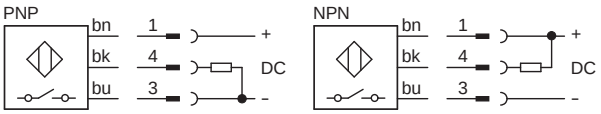
1) At I_a max
2) Without load
3) Of S_r
4) According to EN 60529
5) Thread diameter x pitch (mm)
6) Pulsed

Connection diagram

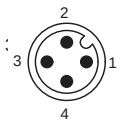


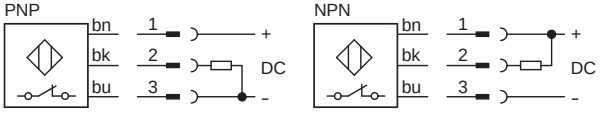
Wire color		Contact	Assignment
bn	brown	1	+ V DC
wh	white	2	NC
bu	blue	3	- V DC
bk	black	4	NO





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC





IM 12 INOX

Inductive Proximity Sensors

0.2/0.4 in (6/10 mm)
sensing distance

Highlights

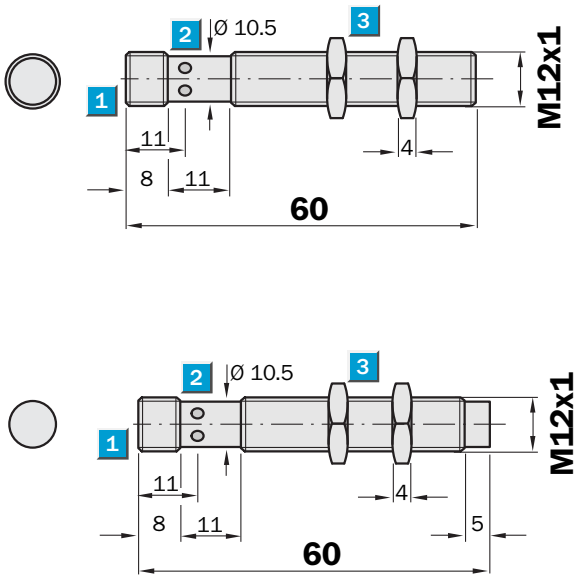
- Triple sensing range
- Robust stainless steel V4A, 316L one-piece housing, with fine thread M12 x 1 mm
- IP 69K and IP 68 enclosure ratings
- Ideal for use in the food and beverage industry
- Visual installation support

IM 12 INOX



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2x); width across 17, stainless steel V4A, 316L

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IM12-06BPO-NC1	6 027 573
IM12-06BNS-NC1	6 027 574
IM12-06BPS-NC1	6 027 572
IM12-10NNS-NC1	6 027 576
IM12-10NPS-NC1	6 027 575

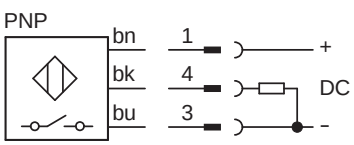
Technical data	IM12 INOX	06BNS NC1	06BPO NC1	06BPS NC1	10NNS NC1	10NPS NC1
Sensing distance S_n	0.2 in (6 mm)	■	■	■		
	0.4 in (10 mm)				■	■
Electrical configuration	DC 3-wire	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■
Ripple U_{pp}	≤ 20%[1]	■	■	■	■	■
Voltage drop U_d	≤ 2 V[2]	■	■	■	■	■
Current consumption[3]	≤ 12 mA	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■
Time delay before availability t_v	≤ 300 ms	■	■	■	■	■
Hysteresis H, of S_r	1…15%	■	■	■	■	■
Repeatability R	≤ 5% (U_b and T_a constant)[4]	■	■	■	■	■
Temperature drift, of S_r	≤ 10%	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	
Switching outputs	NPN	■			■	
	PNP		■	■		■
Output function	Normally open[5]	■		■	■	■
	Normally closed[5]		■			
Installation	shielded	■	■	■		
	unshielded[6]				■	■
Connection type	Connector, M12, 4-pin	■	■	■	■	■
Enclosure rating	IP 68, IP 69K[7]	■	■	■	■	■
Max switching frequency	400 Hz	■	■	■	■	■
Dimensions	M12 x 1[8]	■	■	■	■	■
Short-circuit protection	√ [9]	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm[10]	■	■	■	■	■
Ambient temperature T_a	-13…185° F (-25…85° C)	■	■	■	■	■
Housing material	Stainless steel V4A 1.4404, 316L	■	■	■	■	■
Tightening torque	10 Nm	■	■	■	■	■

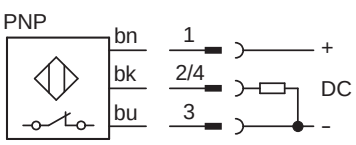
1) Of U_b
2) At I_a max
3) Without load
4) Of S_r
5) Other output function available upon request
6) See installation notes
7) According to EN 60529
8) Thread diameter x pitch (mm)
9) Pulsed
10) According to IEC 60 947-5-2/7.4

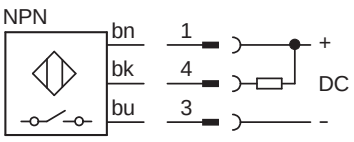
Correction factors

	Shielded installation	Unshielded installation
Steel (St37)	1.0	1.0
Copper	0.85	0.8
Aluminium	1.0	1.0
Brass	1.3	1.3
Stainless steel 1 mm/2 mm thick	0.45/0.9	0.5/0.9

Connection diagram

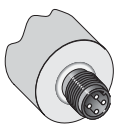


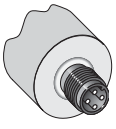




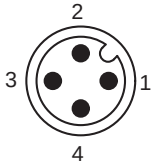
IM12-06BPO-NC1

IM12-06BNS-NC1
IM12-06BPS-NC1
IM12-10NNS-NC1
IM12-10NPS-NC1





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



IM 18 INOX

Inductive Proximity Sensors

0.4/0.8 in (10/20mm)
sensing distance

IM 12 INOX

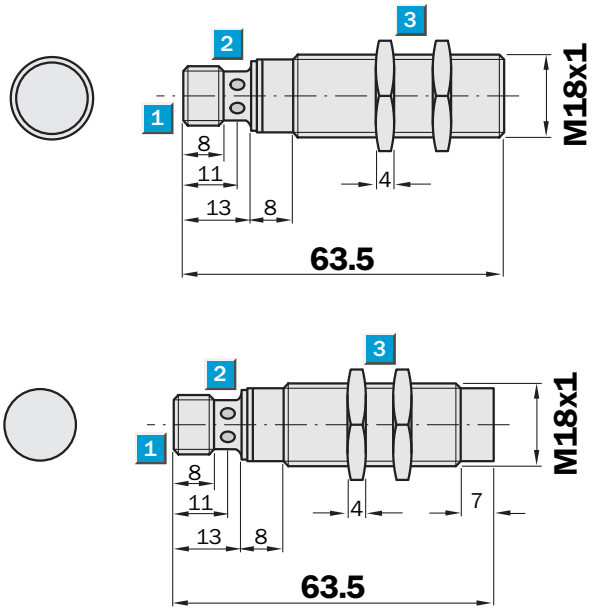


Highlights

- Triple sensing range
- Robust stainless steel V4A, 316L one-piece housing, with fine thread M18 x 1 mm
- IP 69K and IP 68 enclosure ratings
- Ideal for use in the food and beverage industry
- Visual installation support

Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2x); width across 24, stainless steel V4A, 316L

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information	
Type	**Part no.**
IM18-10BNS-NC1	6 027 578
IM18-10BPO-NC1	6 027 579
IM18-10BPS-NC1	6 027 577
IM18-20NNS-NC1	6 027 581
IM18-20NPS-NC1	6 027 580

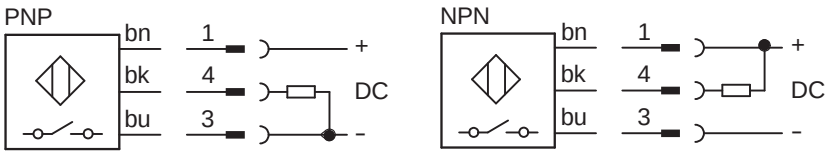
Technical data	IM18 INOX	10BNS NC1	10BPO NC1	10BPS NC1	20NNS NC1	20NPS NC1
Sensing distance S_n	0.4 in (10 mm)	■	■	■		
	0.8 in (20 mm)				■	■
Electrical configuration	DC 3-wire	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■
Ripple U_{pp}	≤ 20%[1]	■	■	■	■	■
Voltage drop U_d	≤ 2 V[2]	■	■	■	■	■
Current consumption[3]	≤ 12 mA	■	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■	■
Time delay before availability t_v	≤ 300 ms	■	■	■	■	■
Hysteresis H, of S_r	1…15%	■	■	■	■	■
Repeatability R	≤ 5% (U_b and T_a constant)[4]	■	■	■	■	■
Temperature drift, of S_r	≤ 10%	■	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■	
Switching outputs	NPN	■			■	
	PNP		■	■		■
Output function	Normally open[5]	■		■	■	■
	Normally closed[5]		■			
Installation	shielded	■	■	■		
	unshielded[6]				■	■
Connection type	Connector, M12, 4-pin	■	■	■	■	■
Enclosure rating	IP 68, IP 69K[7]	■	■	■	■	■
Max switching frequency	200 Hz	■	■	■	■	■
Dimensions	M18 x 1[8]	■	■	■	■	■
Short-circuit protection	√ [9]	■	■	■	■	■
Reverse polarity protection	√	■	■	■	■	■
Power-up pulse suppression	√	■	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm[10]	■	■	■	■	■
Ambient temperature T_a	-13…185° F (-25…85° C)	■	■	■	■	■
Housing material	Stainless steel V4A 1.4404, 316L	■	■	■	■	■
Tightening torque	50 Nm	■	■	■	■	■

1) Of U_b
2) At I_a max
3) Without load
4) Of S_r
5) Other output function available upon request
6) See installation notes
7) According to EN 60529
8) Thread diameter x pitch (mm)
9) Pulsed
10) According to IEC 60 947-5-2/7.4

Correction factors

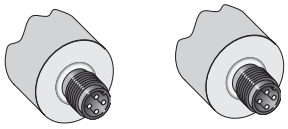
	Shielded installation	Unshielded installation
Steel (St37)	1.0	1.0
Copper	0.85	0.85
Aluminium	1.0	1.0
Brass	1.3	1.3
Stainless steel 1 mm/2 mm thick	0.4/0.8	0.4/0.8

Connection diagram

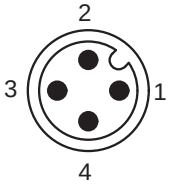


IM18-10BPO-NC1

IM18-10BNS-NC1
IM18-10BPS-NC1
IM18-20NNS-NC1
IM18-20NPS-NC1



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



IM 30 INOX

Inductive Proximity Sensors

0.8/1.6 in (20/40 mm)
sensing distance

Highlights

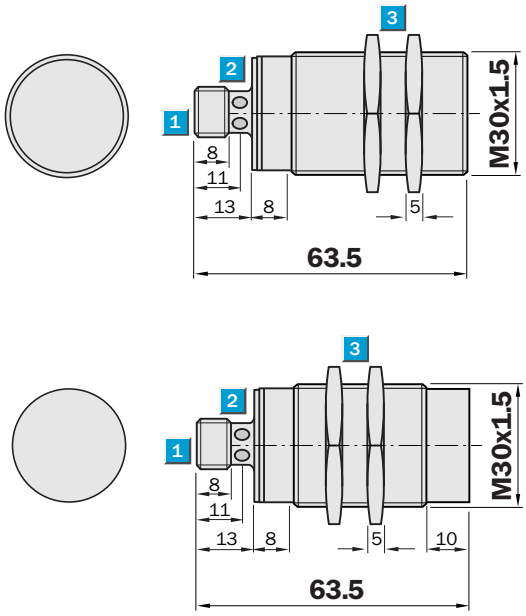
- Triple sensing range
- Robust stainless steel V4A, 316L one-piece housing, with fine thread M18 x 1 mm
- IP 69K and IP 68 enclosure ratings
- Ideal for use in the food and beverage industry
- Visual installation support

IM 12 INOX



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2x); width across 36, stainless steel V4A, 316L

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
IM30-20BNS-NC1	6 027 583
IM30-20BPS-NC1	6 027 582
IM30-40NNS-NC1	6 027 585
IM30-40NPS-NC1	6 027 584

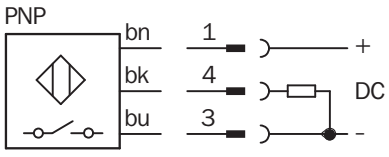
IM30 INOX		20BNS NC1	20BPS NC1	40NNS NC1	40NPS NC1
Sensing distance S_n	0.8 in (20 mm)	■	■		
	1.6 in (40 mm)			■	■
Electrical configuration	DC 3-wire	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■
Ripple U_{pp}	≤ 20%[1]	■	■	■	■
Voltage drop U_d	≤ 2 V[2]	■	■	■	■
Current consumption[3]	≤ 12 mA	■	■	■	■
Continuous current I_a	≤ 200 mA	■	■	■	■
Time delay before availability t_v	≤ 300 ms	■	■	■	■
Hysteresis H, of S_r	1…15%	■	■	■	■
Repeatability R	≤ 5% (U_b and T_a constant)[4]	■	■	■	■
Temperature drift, of S_r	≤ 10%	■	■	■	■
EMC	According to EN 60947-5-2	■	■	■	■
Switching outputs	NPN	■		■	
	PNP		■		■
Output function	Normally open[5]	■	■	■	■
Installation	shielded	■	■		
	unshielded[6]			■	■
Connection type	Connector, M12, 4-pin	■	■	■	■
Enclosure rating	IP 68, IP 69K[7]	■	■	■	■
Max switching frequency	100 Hz	■	■	■	■
Dimensions	M30 x 1.5[8]	■	■	■	■
Short-circuit protection	√ [9]	■	■	■	■
Reverse polarity protection	√	■	■	■	■
Power-up pulse suppression	√	■	■	■	■
Shock/vibration stress	30 g, 11 ms/10…55 Hz, 1 mm[10]	■	■	■	■
Ambient temperature T_a	-13…185° F (-25…85° C)	■	■	■	■
Housing material	Stainless steel V4A 1.4404, 316L	■	■	■	■
Tightening torque	150 Nm	■	■	■	■

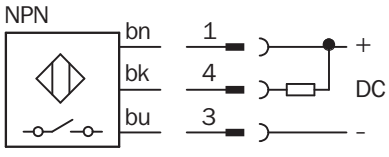
1) Of U_b
2) At I_a max
3) Without load
4) Of S_r
5) Other output function available upon request
6) See installation notes
7) According to EN 60529
8) Thread diameter x pitch (mm)
9) Pulsed
10) According to IEC 60 947-5-2/7.4

Correction factors

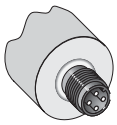
	Shielded installation	Unshielded installation
Steel (St37)	1.0	1.0
Copper	0.9	0.9
Aluminium	1.0	1.0
Brass	1.2	1.2
Stainless steel 1 mm/2 mm thick	0.5/0.9	-/0.5

Connection diagram

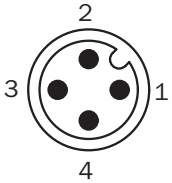




IM30-20BNS-NC1
IM30-20BPS-NC1
IM30-40NNS-NC1
IM30-40NPS-NC1



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



IM 04 Miniature

Inductive Proximity Sensors

Highlights

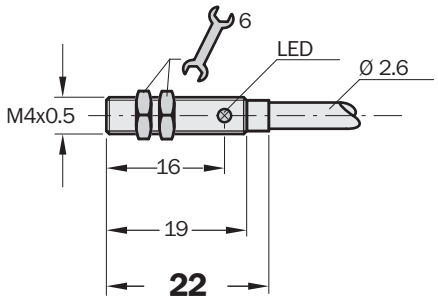
- Shielded
- PNP or NPN output
- Normally open/normally closed function
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M4 x 0.5 mm
- Cable
- IP 67 enclosure rating
- LED status indicator

IM 04 Miniature



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

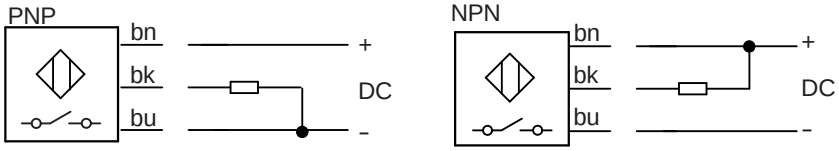
Electrical and mechanical data

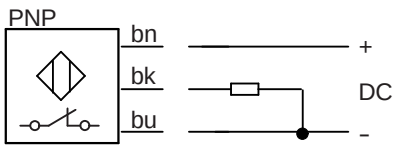
Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 20% of U_b
Voltage drop U_b	≤ 0.6 V max. at I_a = 50 mA
Power consumption (without load)	10 mA
Continuous current I_a	≤ 100 mA
Time delay before availability t_v	≤ 10 ms
Hysteresis H typ.	10% of s_r
Repeatability R (U_b and T_a constant)	≤ 2%
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	0.8 Nm
Connection cable	PUR, 3 x 0.055 mm^2

Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.02 (0.6)		PNP		2000	Cable 2 m	IM04-0B6PS-ZU1	6 020 145
0.02 (0.6)		NPN		2000	Cable 2 m	IM04-0B6NS-ZU1	6 020 146
0.02 (0.6)		PNP		2000	Cable 2 m	IM04-0B6PO-ZU1	6 020 147
0.02 (0.6)		PNP		2000	Cable 5 m	IM04-0B6PS-ZU5	6 020 610

Connection diagram





Wire color		Assignment
bn	brown	+ V DC
bk	black	NO/NC
bu	blue	- V DC

IM 05 Miniature

Inductive Proximity Sensors

Highlights

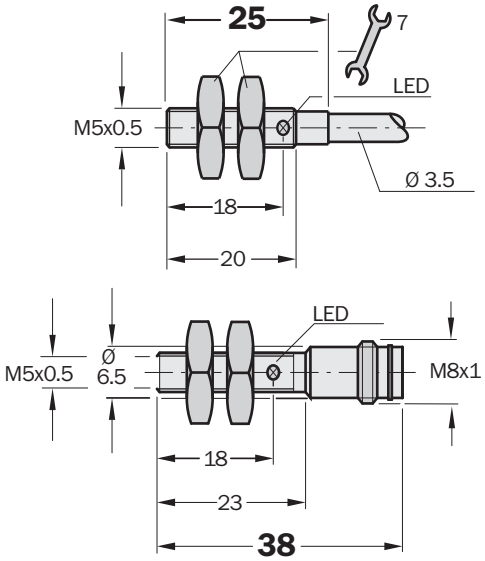
- Shielded
- PNP or NPN output
- Normally open/normally closed function
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M5 x 0.5 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 05 Miniature



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

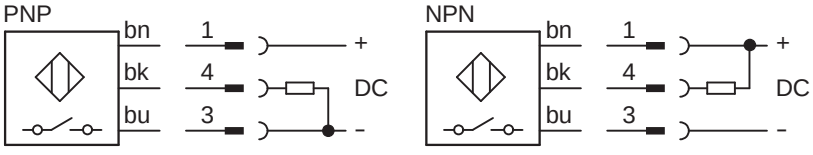
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 20% of U_b
Voltage drop U_b	≤ 2.0 V max. at I_a = 200 mA
Power consumption (without load)	10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 10 ms
Hysteresis H	10% of s_r
Repeatability R (U_b and T_a constant)	≤ 1.5%
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	1.5 Nm
Connection cable	PVC, 3 x 0.14 mm²

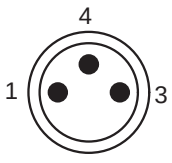
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.02 (0.8)	=	PNP		5000	Cable 2 m	IM05-0B8PS-ZW1	6 011 591
0.02 (0.8)	=	NPN		5000	Cable 2 m	IM05-0B8NS-ZW1	6 020 155
0.02 (0.8)	=	NPN		5000	Cable 2 m	IM05-0B8NO-ZW1	6 020 157
0.02 (0.8)	=	PNP		5000	Connector M8 x 1 mm	IM05-0B8PS-ZT1	6 020 110
0.02 (0.8)	=	NPN		5000	Connector M8 x 1 mm	IM05-0B8NS-ZT1	6 020 158
0.02 (0.8)	=	PNP		5000	Connector M8 x 1 mm	IM05-0B8PO-ZT1	6 020 159

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO/NC
bu	blue	3	- V DC



IM 08 Standard

Inductive Proximity Sensors

Highlights

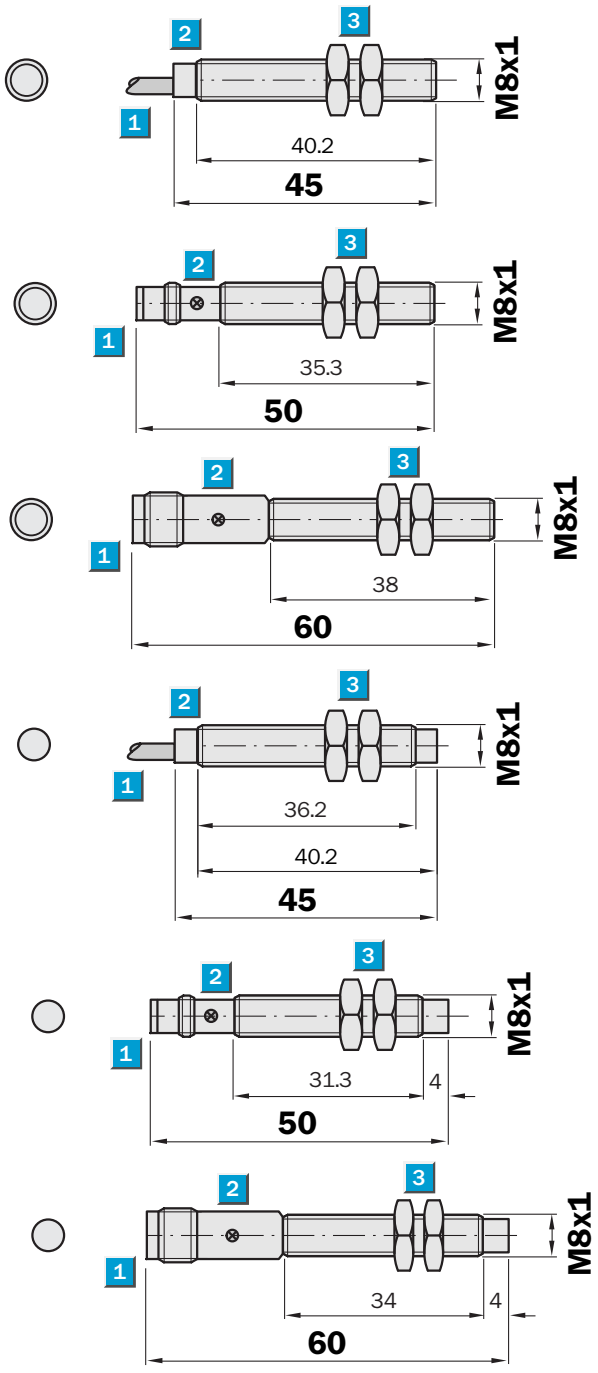
- Shielded or unshielded
- PNP or NPN output
- Normally open/normally closed function
- High switching frequency
- LED status indicator
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M8 x 1 mm
- Cable or connector
- IP 67 enclosure rating

IM 08 Standard



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 13, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

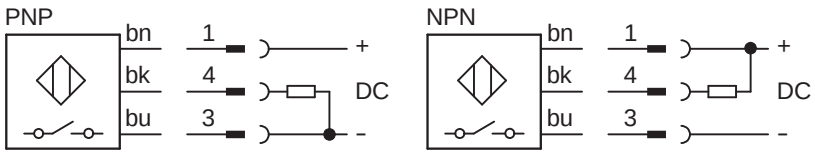
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_b	≤ 1.2 V at I_a max.
Power consumption (without load)	≤ 20 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 100 ms
Hysteresis H	2% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 2% of s_r
Temperature drift	±10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	4 Nm
Connection cable	PVC, 3 x 0.14 mm²

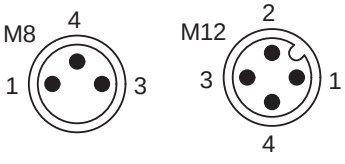
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.06 (1.5)		PNP		3000	Cable 2 m	IM08-01B5PS-ZW1	6 020 215
0.06 (1.5)		NPN		3000	Cable 2 m	IM08-01B5NS-ZW1	6 020 216
0.06 (1.5)		PNP		3000	Cable 2 m	IM08-01B5PO-ZW1	6 020 217
0.06 (1.5)		NPN		3000	Cable 2 m	IM08-01B5NO-ZW1	6 020 218
0.06 (1.5)		PNP		3000	Connector M8 x 1 mm	IM08-01B5PS-ZT1	6 020 219
0.06 (1.5)		NPN		3000	Connector M8 x 1 mm	IM08-01B5NS-ZT1	6 020 220
0.06 (1.5)		PNP		3000	Connector M8 x 1 mm	IM08-01B5PO-ZT1	6 020 221
0.06 (1.5)		PNP		3000	Connector M12 x 1 mm	IM08-01B5PS-ZC1	6 020 223
0.06 (1.5)		NPN		3000	Connector M12 x 1 mm	IM08-01B5NS-ZC1	6 020 224
0.1 (2.5)		PNP		2500	Cable 2 m	IM08-02N5PS-ZW1	6 020 227
0.1 (2.5)		NPN		2500	Cable 2 m	IM08-02N5NS-ZW1	6 020 228
0.1 (2.5)		PNP		2500	Connector M8 x 1 mm	IM08-02N5PS-ZT1	6 020 231
0.1 (2.5)		NPN		2500	Connector M8 x 1 mm	IM08-02N5NS-ZT1	6 020 232
0.1 (2.5)		PNP		2500	Connector M12 x 1 mm	IM08-02N5PS-ZC1	6 020 235
0.1 (2.5)		NPN		2500	Connector M12 x 1 mm	IM08-02N5NS-ZC1	6 020 236

Connection diagram



Wire color		Contact M8	Contact M12	Assignment
bn	brown	1	1	+ V DC
bk	black	4	2/4	NO/NC
bu	blue	3	3	- V DC



IM 08 Short

Inductive Proximity Sensors

Highlights

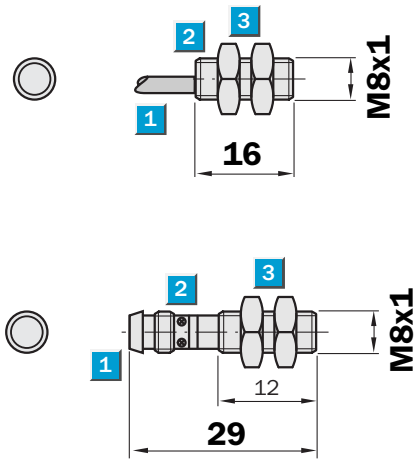
- Shielded
- PNP or NPN output
- Normally open/normally closed function
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M8 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 08 Short



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 13, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

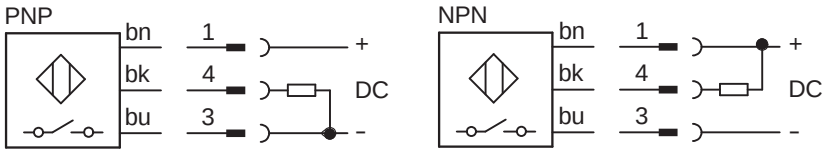
Electrical and mechanical data

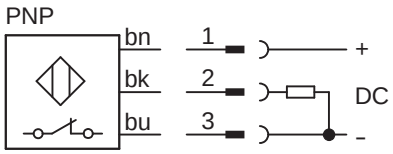
Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 20% of U_b
Voltage drop U_b	≤ 2.0 V max. at I_a = 200 mA
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 10 ms
Hysteresis H	10% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	4 Nm
Connection cable	PVC, 3 x 0.14 mm²

Selection table

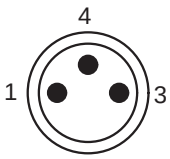
Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.06 (1.5)		PNP		5000	Cable 2 m	IM08-1B5PS-ZWK	6 020 111
0.06 (1.5)		NPN		5000	Cable 2 m	IM08-1B5NS-ZWK	6 020 173
0.06 (1.5)		PNP		5000	Connector M8 x 1 mm	IM08-1B5PS-ZTK	6 020 112
0.06 (1.5)		NPN		5000	Connector M8 x 1 mm	IM08-1B5NS-ZTK	6 020 176
0.06 (1.5)		PNP		5000	Connector M8 x 1 mm	IM08-1B5PO-ZTK	6 020 177

Connection diagram





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO/NC
bu	blue	3	- V DC



IM 08 Advanced

Inductive Proximity Sensors





CE



Highlights

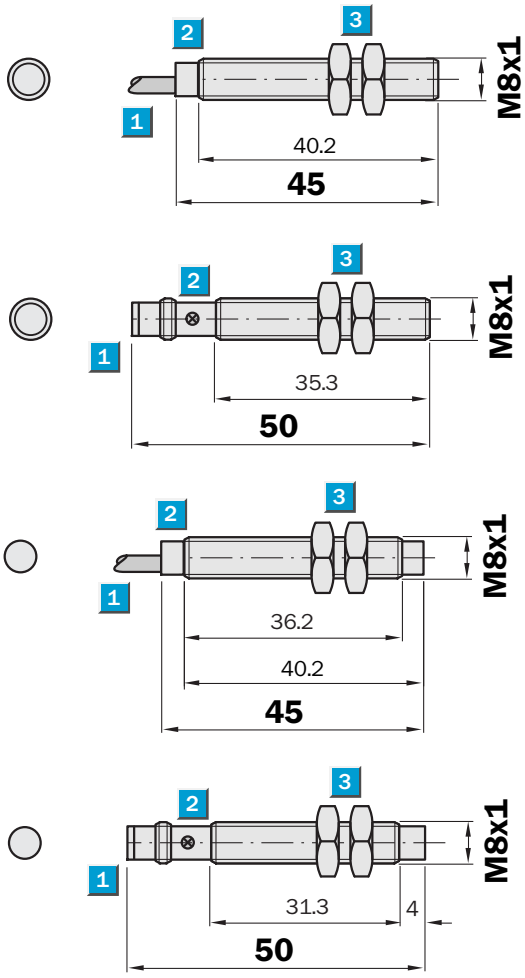
- Enhanced sensing range
- Shielded or unshielded
- PNP or NPN output
- Normally open/normally closed function
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M8 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 08 Advanced



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 13, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

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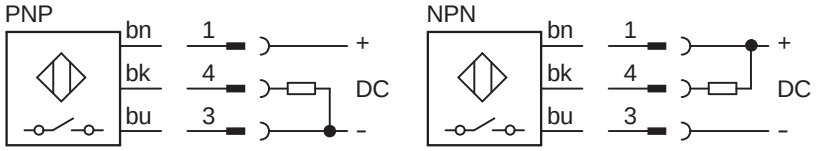
Electrical and mechanical data

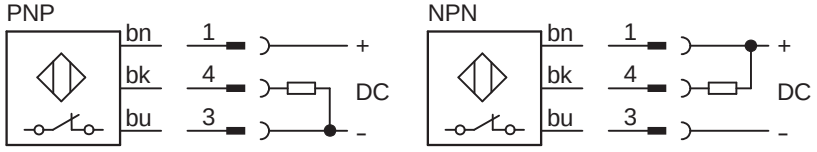
Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 1.2 V at I_a max.
Power consumption (without load)	≤ 20 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 100 ms
Hysteresis H	2% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	4 Nm
Connection cable	PVC, 3 x 0.14 mm²

Selection table

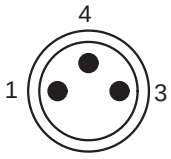
Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.08 (2)		PNP		3000	Cable 2 m	IM08-02BPS-ZW1	7 900 001
0.08 (2)		NPN		3000	Cable 2 m	IM08-02BNS-ZW1	7 900 002
0.08 (2)		PNP		3000	Cable 2 m	IM08-02BPO-ZW1	7 900 003
0.08 (2)		PNP		3000	Connector M8 x 1 mm	IM08-02BPS-ZT1	7 900 005
0.08 (2)		NPN		3000	Connector M8 x 1 mm	IM08-02BNS-ZT1	7 900 006
0.08 (2)		PNP		3000	Connector M8 x 1 mm	IM08-02BPO-ZT1	7 900 007
0.08 (2)		NPN		3000	Connector M8 x 1 mm	IM08-02BNO-ZT1	7 900 008
0.2 (4)		PNP		3000	Cable 2 m	IM08-04NPS-ZW1	7 900 009
0.2 (4)		NPN		3000	Cable 2 m	IM08-04NNS-ZW1	7 900 010
0.2 (4)		PNP		3000	Cable 2 m	IM08-04NPO-ZW1	7 900 011
0.2 (4)		PNP		3000	Connector M8 x 1 mm	IM08-04NPS-ZT1	7 900 013
0.2 (4)		NPN		3000	Connector M8 x 1 mm	IM08-04NNS-ZT1	7 900 014
0.2 (4)		PNP		3000	Connector M8 x 1 mm	IM08-04NPO-ZT1	7 900 015
0.2 (4)		NPN		3000	Connector M8 x 1 mm	IM08-04NNO-ZT1	7 900 016

Connection diagram





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO/NC
bu	blue	3	- V DC



IM 08 Advanced Short

Inductive Proximity Sensors

Highlights

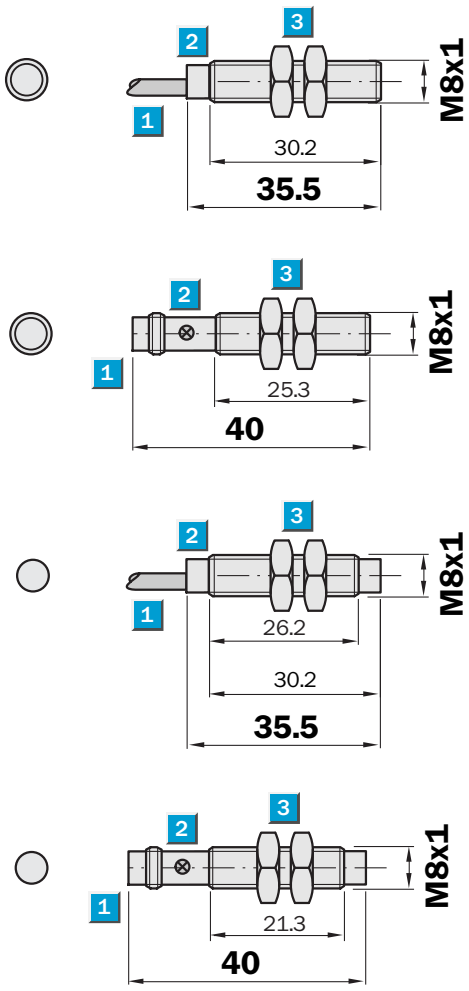
- Enhanced sensing range
- Shielded or unshielded
- PNP or NPN output
- Normally open/normally closed function
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M8 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 08 Advanced Short



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 13, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

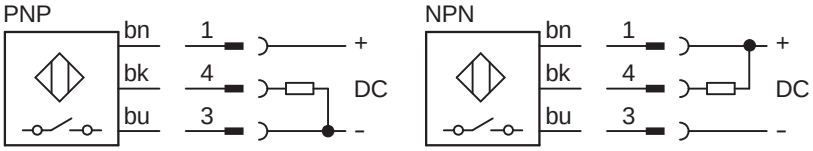
Electrical and mechanical data

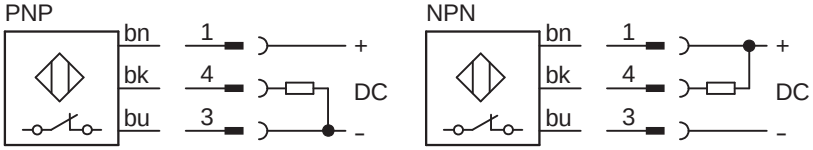
Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 1.2 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 5 ms
Hysteresis H	1% - 20% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	4 Nm
Connection cable	PVC, 3 x 0.14 mm²

Selection table

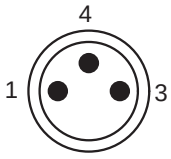
Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.08 (2)		PNP		3000	Cable 2 m	IM08-02BPS-ZWK	6 025 861
0.08 (2)		NPN		3000	Cable 2 m	IM08-02BNS-ZWK	6 025 862
0.08 (2)		PNP		3000	Connector M8 x 1 mm	IM08-02BPS-ZTK	6 025 863
0.08 (2)		NPN		3000	Connector M8 x 1 mm	IM08-02BNS-ZTK	6 025 864
0.08 (2)		PNP		3000	Connector M8 x 1 mm	IM08-02BPO-ZTK	6 025 865
0.08 (2)		NPN		3000	Connector M8 x 1 mm	IM08-02BNO-ZTK	6 025 866
0.2 (4)		PNP		2500	Cable 2 m	IM08-04NPS-ZWK	6 025 867
0.2 (4)		NPN		2500	Cable 2 m	IM08-04NNS-ZWK	6 025 868
0.2 (4)		PNP		2500	Connector M8 x 1 mm	IM08-04NPS-ZTK	6 025 869
0.2 (4)		NPN		2500	Connector M8 x 1 mm	IM08-04NNS-ZTK	6 025 870
0.2 (4)		PNP		2500	Connector M8 x 1 mm	IM08-04NPO-ZTK	6 025 871
0.2 (4)		NPN		2500	Connector M8 x 1 mm	IM08-04NNO-ZTK	6 025 872

Connection diagram





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO/NC
bu	blue	3	- V DC



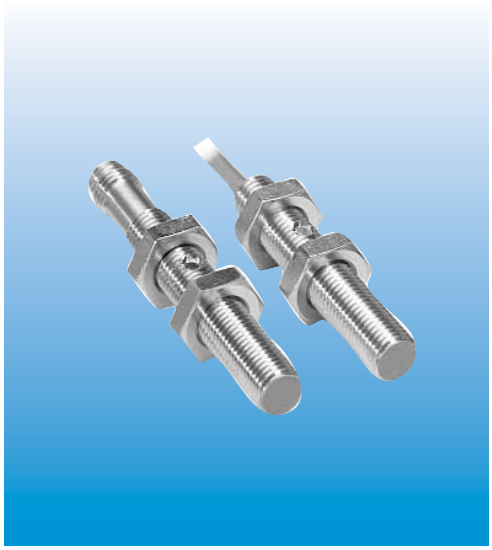
IM 08 Triple Sensing Range

Inductive Proximity Sensors

Highlights

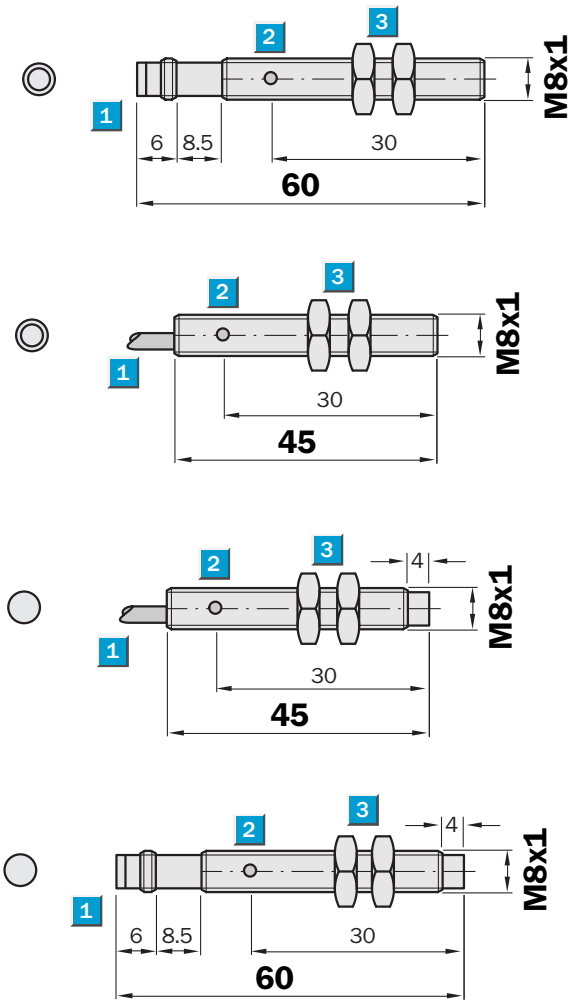
- Triple sensing range
- Installation quasi-flush or non-flush in metal
- Normally open function
- PNP or NPN output
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M8 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 08 Triple Sensing Range



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 13, metal

Electrical and mechanical data

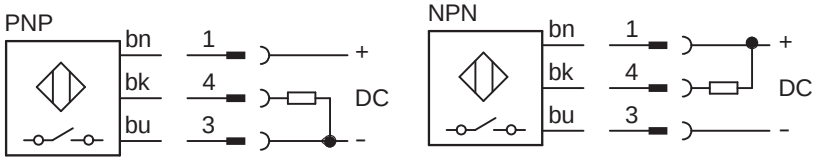
Operating voltage U_b	10...30 V DC
Ripple U_{ss}	≤ 20% of U_b
Voltage drop U_d (at I_a max.)	≤ 2 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability T_v	≤ 100 ms
Hysteresis H	1% - 5% of s_r (5% typ.)
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, chrome-plated, plastic
Tightening torque	4 Nm
Connection cable	PVC, 3 x 0.14 mm²

Selection table

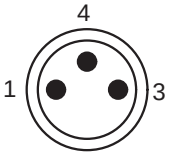
Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.12 (3)	*	PNP		1000	Cable 2 m	IM 08-03BPS-ZW1	6 027 505
0.12 (3)	*	PNP		1000	Connector M8 x 1 mm	IM08-03BPS-ZTI	6 025 574
0.24 (6)		PNP		500	Cable 2 m	IM08-06NPS-ZW1	6 027 506
0.24 (6)		NPN		500	Cable 2 m	IM08-06NNS-ZW1	6 027 507
0.24 (6)		PNP		500	Connector M8 x 1 mm	IM08-06NPS-ZT1	6 027 508

* Installation notes "quasi flush"
When mounting in conductible materials the sensors have to be installed with a distance A to the surface.
A Steel, metal = 1 mm / **A** Stainless steel = 0 mm

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



IM 08 NAMUR

Inductive Proximity Sensors

Highlights

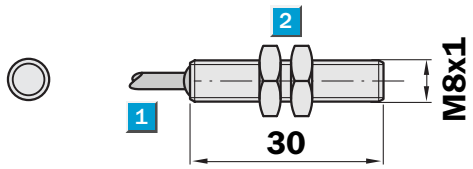
- NAMUR to DIN 19 234
- High switching frequency
- Robust brass housing with nickel-plated fine thread M8 x 1
- IP 67 enclosure rating
- LED status indicator

IM 08 NAMUR



Dimensional drawing

dimensions in mm



1 Connection
2 Fastening nuts (2 x); width across 13, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

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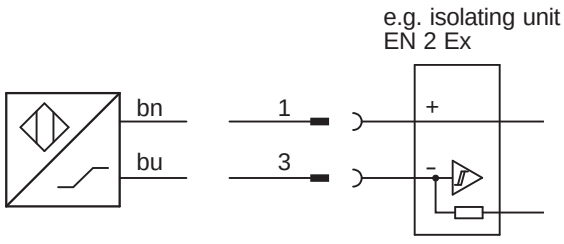
Electrical and mechanical data

Operating voltage U_b	5...25 V DC
Nominal voltage U_n	8.2 V DC
Power consumption, attenuated	≤ 1.0 mA
Power consumption, unattenuated	≥ 2.2 mA
Internal capacitance	≤ 80 nF
Internal inductance	≤ 110 µH
Cable resistance	≤ 50 Ω
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	2.5 Nm
Connection cable	PVC, 2 x 0.14 mm², blue
Max. data for connecting isolating unit EN 2	
EX or other approved isolating amplifier:	
Short-circuit current I_K max	50 mA
No load voltage U_O	15 V
Power loss Pmax	180 mW

Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.04 (1)		NAMUR		2000	Cable 2 m	IM08-01B-N-ZW0	6 021 123

Connection diagram



Wire color			Assignment
bn	braun	brown	+ V DC
bu	blau	blue	- V DC

IM 12 Standard

Inductive Proximity Sensors

Highlights

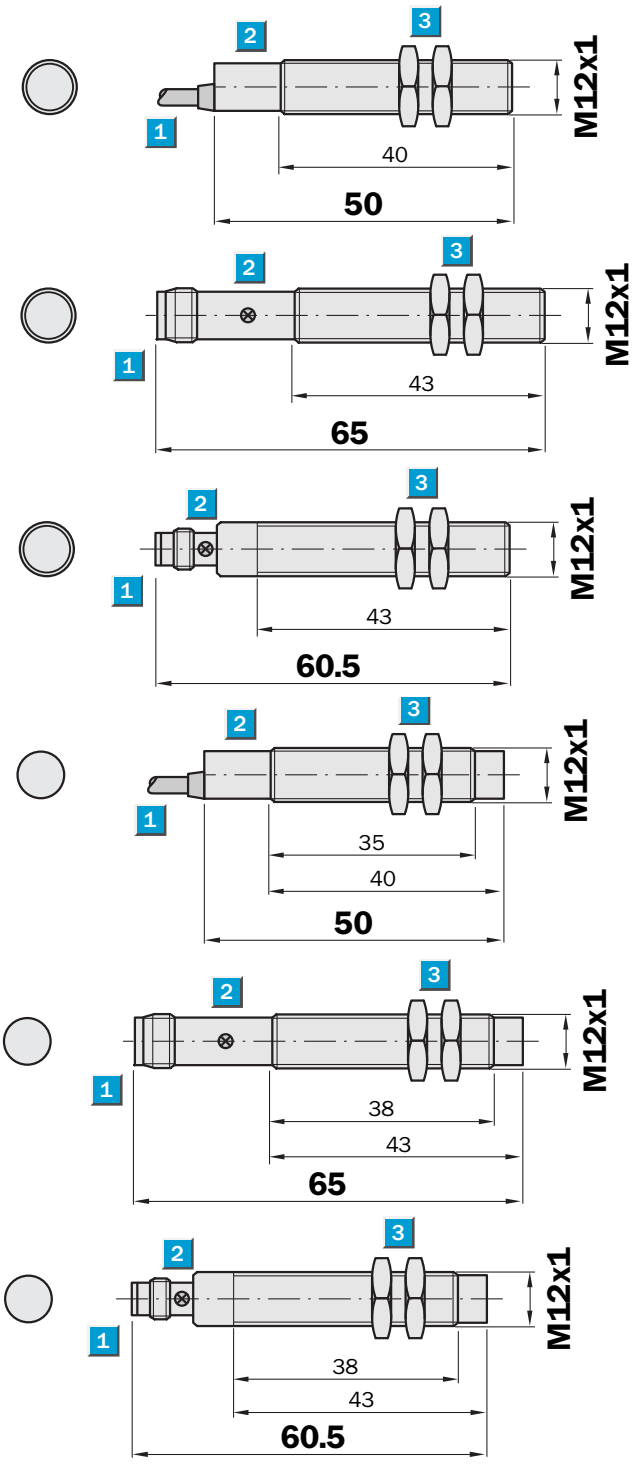
- Shielded or unshielded
- PNP or NPN output
- Normally open/normally closed function
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 12 Standard



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

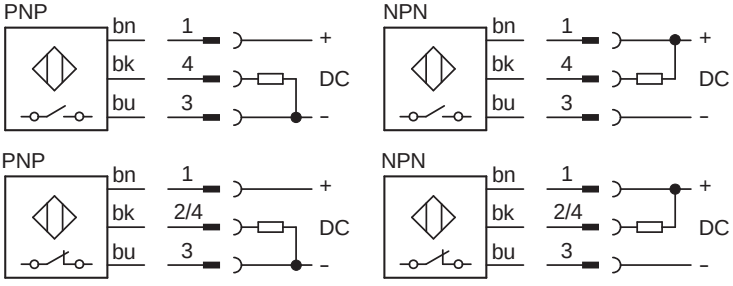
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_b	≤ 1.2 V at I_a max.
Power consumption (without load)	≤ 20 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 100 ms
Hysteresis H	2% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 2% of s_r
Temperature drift	±10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158°F (-25...70°C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	10 Nm
Connection cable	PVC, 3 x 0.22 mm²

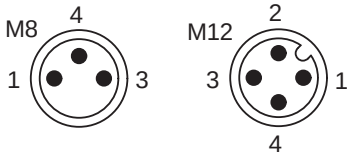
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.08 (2)		PNP		2000	Cable 2 m	IM12-02BPS-ZW1	6 011 963
0.08 (2)		NPN		2000	Cable 2 m	IM12-02BNS-ZW1	6 011 964
0.08 (2)		PNP		2000	Cable 2 m	IM12-02BPO-ZW1	6 011 965
0.08 (2)		NPN		2000	Cable 2 m	IM12-02BNO-ZW1	6 011 966
0.08 (2)		PNP		2000	Connector M8 x 1 mm	IM12-02BPS-ZT1	6 011 967
0.08 (2)		NPN		2000	Connector M8 x 1 mm	IM12-02BNS-ZT1	6 011 968
0.08 (2)		PNP		2000	Connector M12 x 1 mm	IM12-02BPS-ZC1	6 011 971
0.08 (2)		NPN		2000	Connector M12 x 1 mm	IM12-02BNS-ZC1	6 011 972
0.08 (2)		PNP		2000	Connector M12 x 1 mm	IM12-02BPO-ZC1	6 011 973
0.08 (2)		NPN		2000	Connector M12 x 1 mm	IM12-02BNO-ZC1	6 011 974
0.2 (4)		PNP		2000	Cable 2 m	IM12-04NPS-ZW1	6 011 975
0.2 (4)		NPN		2000	Cable 2 m	IM12-04NNS-ZW1	6 011 976
0.2 (4)		PNP		2000	Cable 2 m	IM12-04NPO-ZW1	6 011 977
0.2 (4)		PNP		2000	Connector M8 x 1 mm	IM12-04NPS-ZT1	6 011 979
0.2 (4)		NPN		2000	Connector M8 x 1 mm	IM12-04NNS-ZT1	6 011 980
0.2 (4)		PNP		2000	Connector M12 x 1 mm	IM12-04NPS-ZC1	6 011 983
0.2 (4)		NPN		2000	Connector M12 x 1 mm	IM12-04NNS-ZC1	6 011 984
0.2 (4)		PNP		2000	Connector M12 x 1 mm	IM12-04NPO-ZC1	6 011 985

Connection diagram



Wire color		Contact M8	Contact M12	Assignment
bn	brown	1	1	+ V DC
bk	black	4	2/4	NO/NC
bu	blue	3	3	- V DC



IM 12 Short

Inductive Proximity Sensors

Highlights

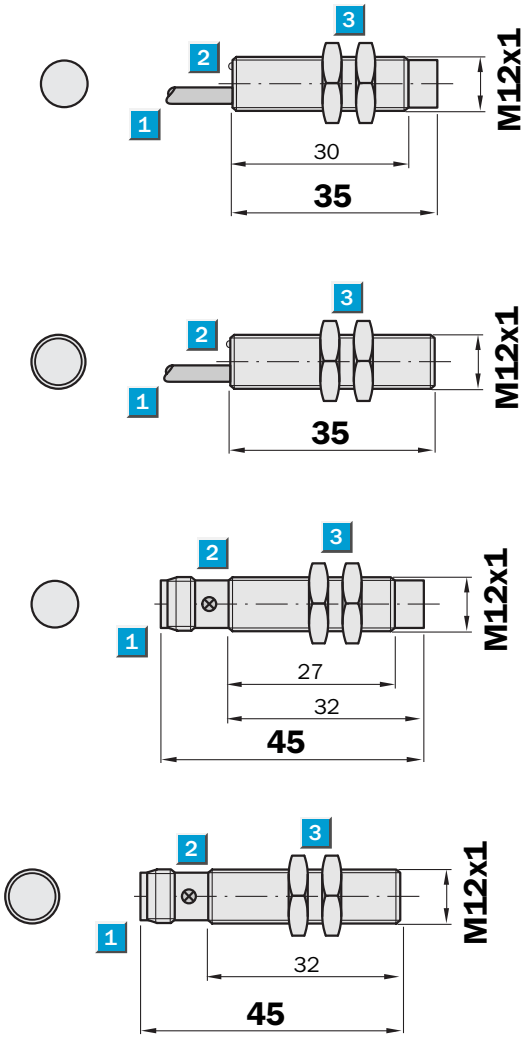
- Shielded or unshielded
- PNP or NPN output
- Normally open function
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing,nickel-plated with fine thread M12 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 12 Short



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

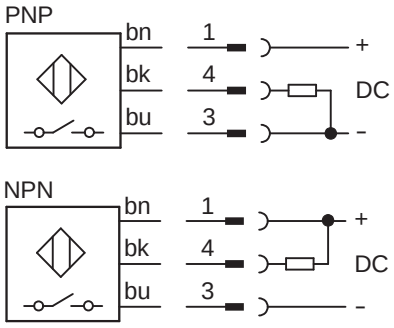
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 1.5 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 300 mA
Time delay before availability t_v	≤ 2 ms
Hysteresis H	1% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 1% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	7.0 Nm
Connection cable	PUR-PVC, 3 x 0.25 mm²

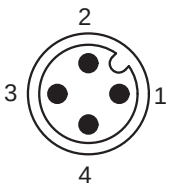
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.08 (2)		PNP		3000	Cable 2 m	IM12-02BPS-ZUK	1 017 426
0.08 (2)		NPN		3000	Cable 2 m	IM12-02BNS-ZUK	1 017 438
0.08 (2)		PNP		3000	Connector M12 x 1 mm	IM12-02BPS-ZCK	1 017 428
0.08 (2)		NPN		3000	Connector M12 x 1 mm	IM12-02BNS-ZCK	1 017 440
0.2 (4)		PNP		3000	Cable 2 m	IM12-02NPS-ZUK	1 017 427
0.2 (4)		NPN		3000	Cable 2 m	IM12-02NNS-ZUK	1 017 439
0.2 (4)		PNP		3000	Connector M12 x 1 mm	IM12-02NPS-ZCK	1 017 429
0.2 (4)		NPN		3000	Connector M12 x 1 mm	IM12-02NNS-ZCK	1 017 441

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



IM 12 2-wire

Inductive Proximity Sensors

Highlights

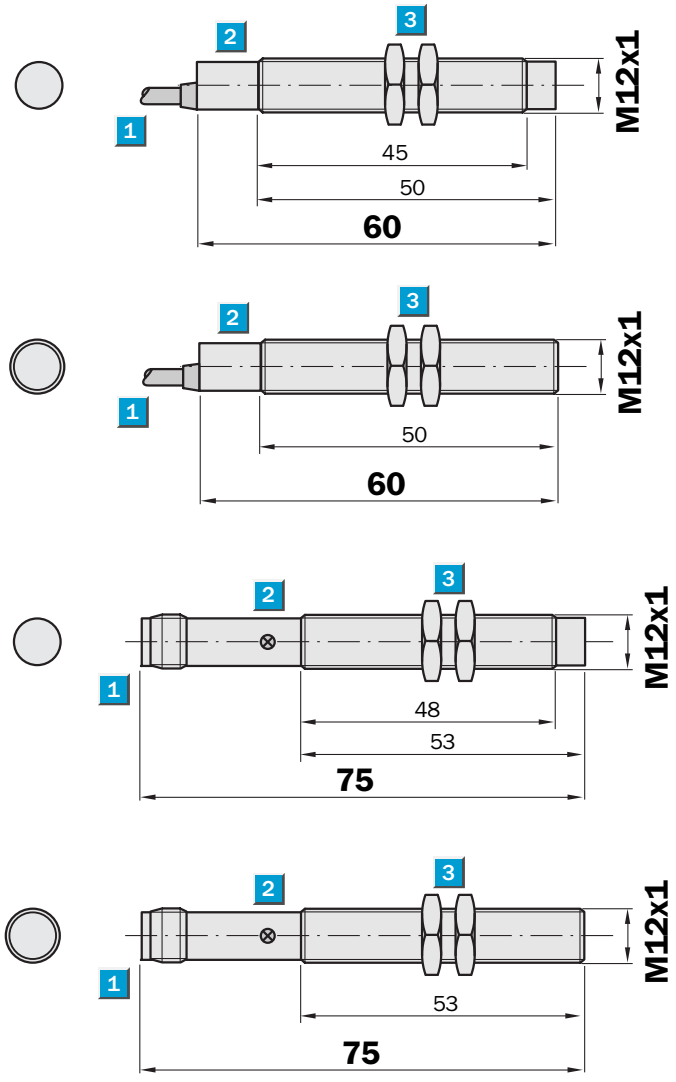
- Shielded or unshielded
- Normally open function
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 12 2-wire



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

Accessories	page
Mounting systems	1234

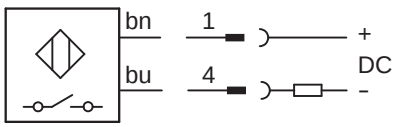
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_b	≤ 2.8 V at I_a max.
Power consumption (without load)	≥ 3 mA
Continuous current I_a	≤ 100 mA
Time delay before availability t_v	≤ 0.8 mA
Hysteresis H	≤ 50 ms
Repeatability R (U_b and T_a constant)	2% - 10% of s_r
Temperature drift	≤ 5% of s_r
EMC	± 10% of s_r
Short-circuit protection (pulsed)	to EN 60 947-5-2
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	10 Nm
Connection cable	PVC, 2 x 0.22 mm^2

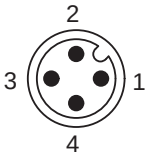
Selection table

Sensing range S_n in (mm)	Installation in metal	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.08 (2)			1500	Cable 2 m	IM12-02BDS-ZW1	6 020 310
0.08 (2)			1500	Connector M12 x 1 mm	IM12-02BDS-ZC1	6 020 312
0.2 (4)			1500	Cable 2 m	IM12-04NDS-ZW1	6 020 314
0.2 (4)			1500	Connector M12 x 1 mm	IM12-04NDS-ZC1	6 020 316

Connection diagram



Wire color	Contact	Assignment
bn brown	1	+ V DC
bu blue	4	– V DC



IM 12 Advanced

Inductive Proximity Sensors

Highlights

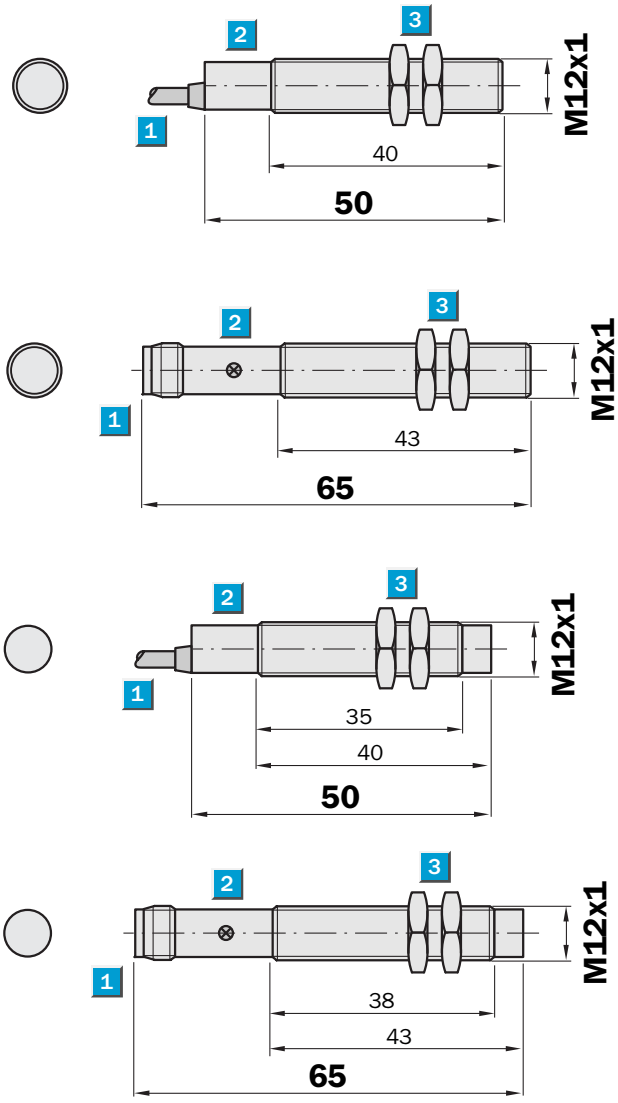
- Enhanced sensing range
- Shielded or unshielded
- PNP or NPN output
- Normally open/normally closed function
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 12 Advanced



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

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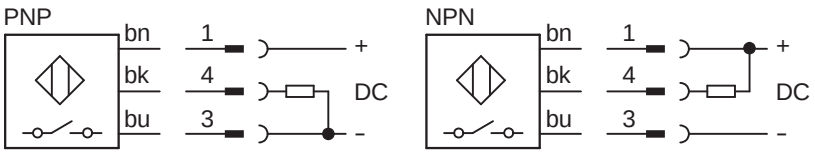
Electrical and mechanical data

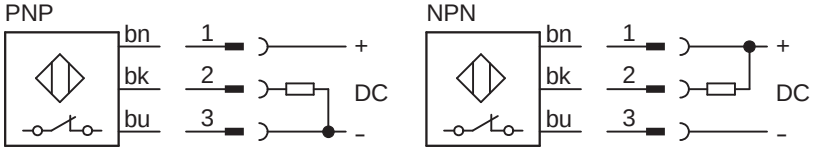
Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 1.2 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 100 ms
Hysteresis H	1% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	10 Nm
Connection cable	PVC, 3 x 0.22 mm²

Selection table

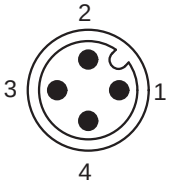
Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.2 (4)	=	PNP		1000	Cable 2 m	IM12-04BPS-ZW1	7 900 033
0.2 (4)	=	NPN		1000	Cable 2 m	IM12-04BNS-ZW1	7 900 034
0.2 (4)	=	PNP		1000	Cable 2 m	IM12-04BPO-ZW1	7 900 035
0.2 (4)	=	PNP		1000	Connector M12 x 1 mm	IM12-04BPS-ZC1	7 900 037
0.2 (4)	=	NPN		1000	Connector M12 x 1 mm	IM12-04BNS-ZC1	7 900 038
0.2 (4)	=	PNP		1000	Connector M12 x 1 mm	IM12-04BPO-ZC1	7 900 039
0.3 (8)	=	PNP		1000	Cable 2 m	IM12-08NPS-ZW1	7 900 041
0.3 (8)	=	NPN		1000	Cable 2 m	IM12-08NNS-ZW1	7 900 042
0.3 (8)	=	PNP		1000	Cable 2 m	IM12-08NPO-ZW1	7 900 043
0.3 (8)	=	NPN		1000	Cable 2 m	IM12-08NNO-ZW1	7 900 044
0.3 (8)	=	PNP		1000	Connector M12 x 1 mm	IM12-08NPS-ZC1	7 900 045
0.3 (8)	=	NPN		1000	Connector M12 x 1 mm	IM12-08NNS-ZC1	7 900 046
0.3 (8)	=	PNP		1000	Connector M12 x 1 mm	IM12-08NPO-ZC1	7 900 047

Connection diagram





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IM 12 Advanced Short

Inductive Proximity Sensors

Highlights

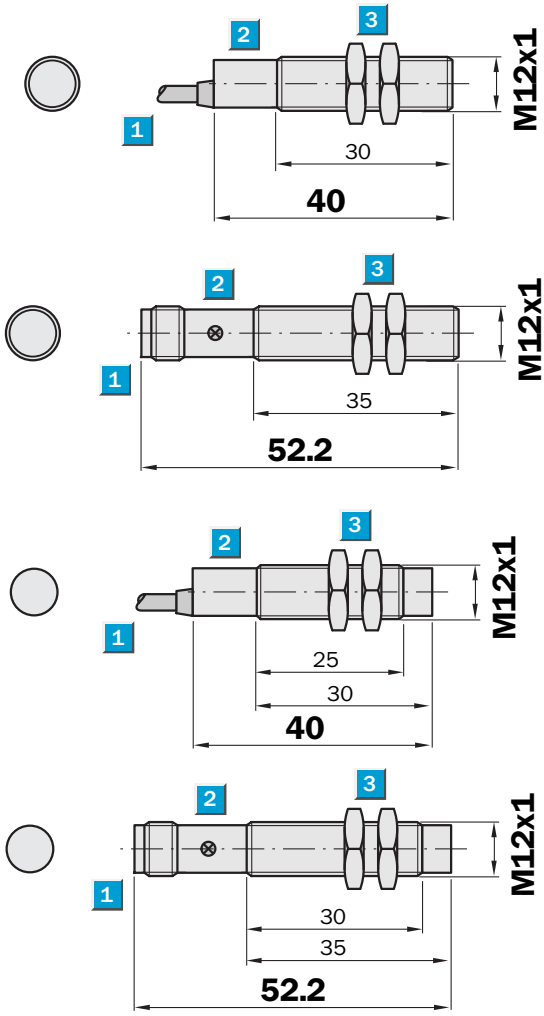
- Enhanced sensing range
- Shielded or unshielded
- PNP or NPN output
- Normally open/normally closed function
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 08 Advanced Short



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

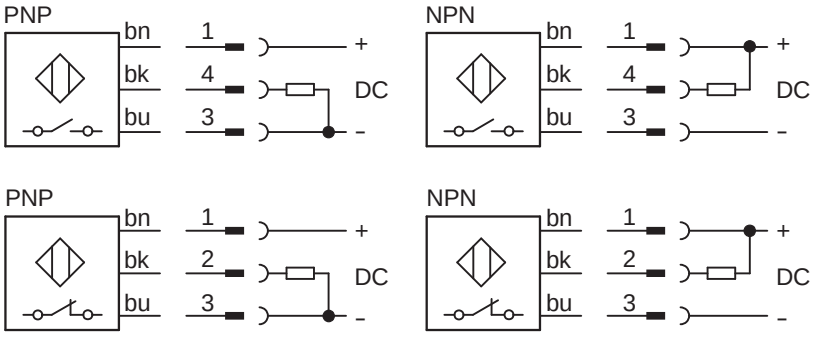
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 1.5 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 300 mA
Time delay before availability t_v	≤ 100 ms
Hysteresis H	1% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...168° F (-25...75° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	7 Nm
Connection cable	PVC, 3 x 0.22 mm²

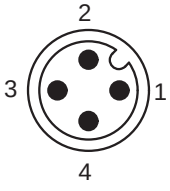
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.2 (4)		PNP		2000	Cable 2 m	IM12-04BPS-ZWK	6 025 682
0.2 (4)		NPN		2000	Cable 2 m	IM12-04BNS-ZWK	6 025 683
0.2 (4)		PNP		2000	Connector M12 x 1 mm	IM12-04BPS-ZCK	6 025 679
0.2 (4)		NPN		2000	Connector M12 x 1 mm	IM12-04BNS-ZCK	6 025 681
0.2 (4)		PNP		2000	Connector M12 x 1 mm	IM12-04BPO-ZCK	6 025 680
0.2 (4)		NPN		2000	Connector M12 x 1 mm	IM12-04BNO-ZCK	6 025 859
0.3 (8)		PNP		2000	Cable 2 m	IM12-08NPS-ZWK	6 025 684
0.3 (8)		NPN		2000	Cable 2 m	IM12-08NNS-ZWK	6 025 685
0.3 (8)		PNP		2000	Connector M12 x 1 mm	IM12-08NPS-ZCK	6 025 686
0.3 (8)		NPN		2000	Connector M12 x 1 mm	IM12-08NNS-ZCK	6 025 687
0.3 (8)		PNP		2000	Connector M12 x 1 mm	IM12-08NPO-ZCK	6 025 688
0.3 (8)		NPN		2000	Connector M12 x 1 mm	IM12-08NNO-ZCK	6 025 860

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IM 12 Triple Sensing Range

Inductive Proximity Sensors





CE

Highlights

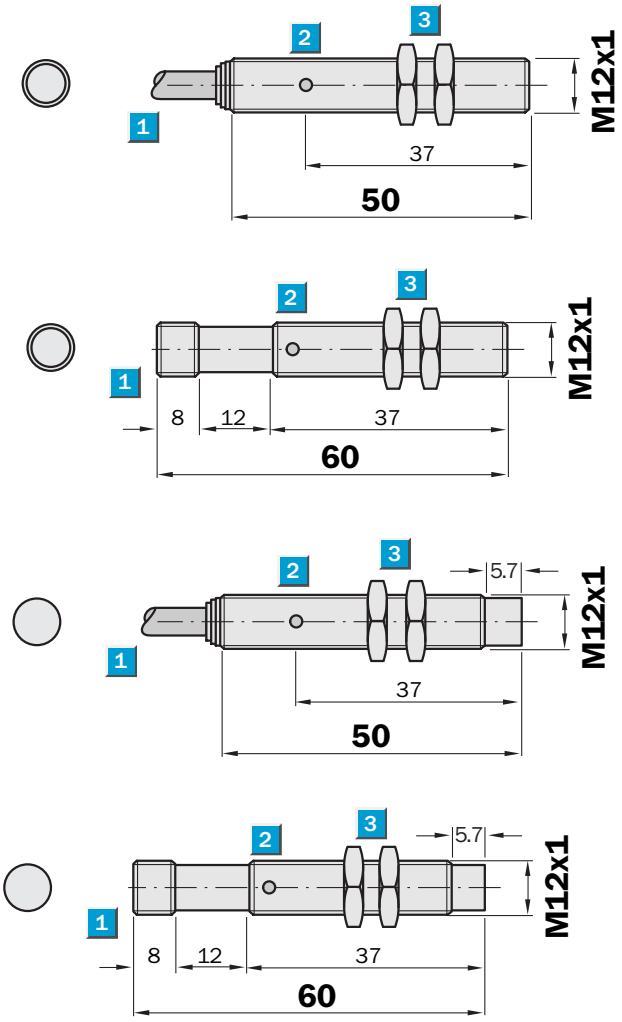
- Triple sensing range
- Installation quasi or non-flush in metal
- Normally open function/normally closed function
- PNP or NPN output
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M8 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 12 Triple Sensing Range



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

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Electrical and mechanical data

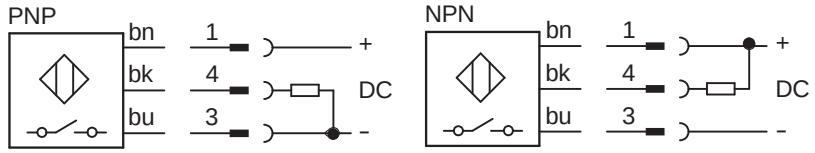
Operating voltage U_b	10...30 V DC
Ripple U_{ss}	≤ 20% of U_b
Voltage drop U_d (at I_a max.)	≤ 2 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability T_v	≤ 100 ms
Hysteresis H	1% - 5% of s_r (5% typ.)
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, chrome-plated, plastic
Tightening torque	10 Nm
Connection cable	PVC, 3 x 0.34 mm²

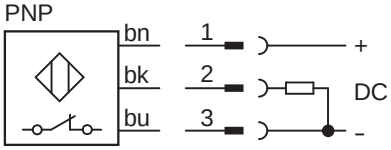
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.24 (6)	*	PNP		800	Cable 2 m	IM 12-06BPS-ZW1	6 027 509
0.24 (6)	*	PNP		800	Cable 2 m	IM12-06BPO-ZW1	6 027 510
0.24 (6)	*	PNP		800	Connector M12 x 1 mm	IM12-06BPS-ZC1	6 027 511
0.4 (10)		PNP		400	Cable 2 m	IM12-10NPS-ZW1	6 027 512
0.4 (10)		NPN		400	Cable 2 m	IM12-10NNS-ZW1	6 027 513
0.4 (10)		PNP		400	Connector M12 x 1 mm	IM12-10NPS-ZC1	6 027 514

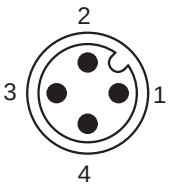
* Installation notes "quasi flush"
When mounting in conductible materials the sensors have to be installed with a distance A to the surface.
A Steel, metal = 2 mm / **A** Stainless steel = 1 mm

Connection diagram





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NC/NO
bu	blue	3	- V DC



IM 12 Harsh Environment

Inductive Proximity Sensors

Highlights

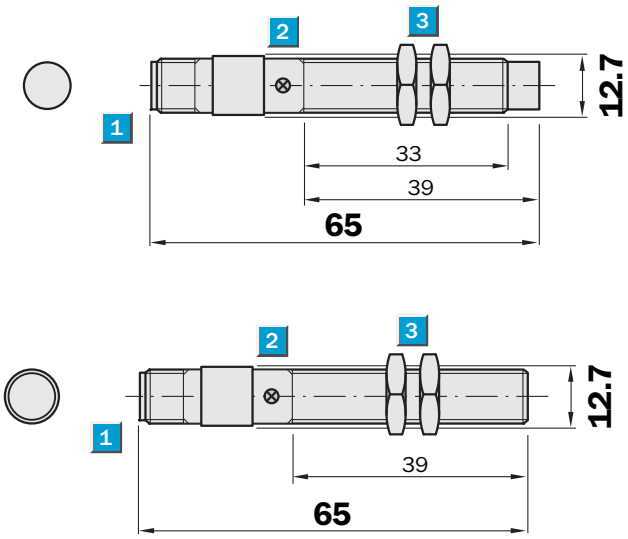
- For harsh environments, resistant to most cutting oils
- IP 68 enclosure rating
- Shielded or unshielded
- PNP or NPN output
- Complementary output function
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- Internal enclosure housing in technopolymer
- LED status indicator (NO function)

IM 12 Harsh Environment



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

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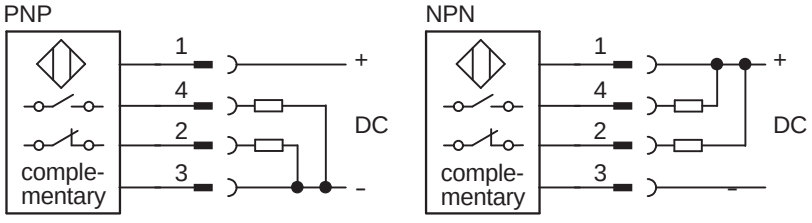
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_b	≤ 1.2 V at I_a max.
Power consumption (without load)	≤ 20 mA
Continuous current I_a	≤ 100 mA
Time delay before availability t_v	≤ 100 ms
Hysteresis H	2% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating	IP 68
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	10 Nm

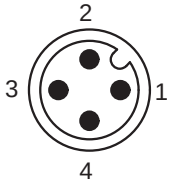
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.08 (2)		PNP	 complementary	2000	Connector M12 x 1 mm	IM12-02BPP-ZC1	7 902 923
0.08 (2)		NPN	 complementary	2000	Connector M12 x 1 mm	IM12-02BNP-ZC1	7 902 924
0.2 (4)		PNP	 complementary	2000	Connector M12 x 1 mm	IM12-04NPP-ZC1	7 902 925
0.2 (4)		NPN	 complementary	2000	Connector M12 x 1 mm	IM12-04NNP-ZC1	7 902 926

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
wh	white	2	NC
bu	blue	3	- V DC
bk	black	4	NO



IM 12 QuadProx

Inductive Proximity Sensors

Highlights

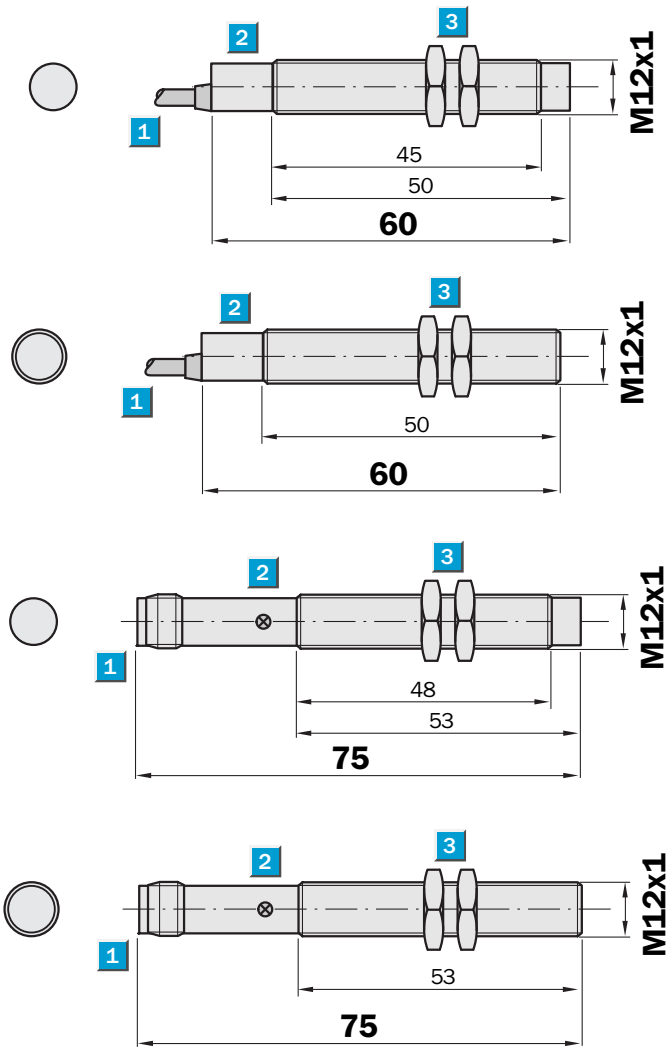
- Programmable output functions in one sensor: PNP/NO, PNP/NC, NPN/NO, NPN/NC
- Shielded or unshielded
- Short-circuit protection
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator (NO function)

IM 12 QuadProx



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

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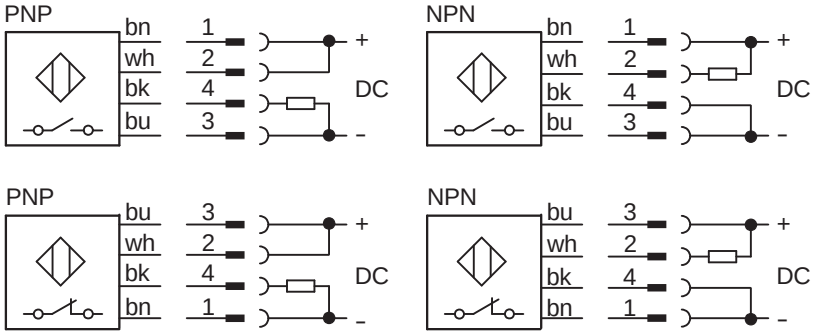
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_b	≤ 1.2 V at I_a max.
Power consumption (without load)	≤ 30 mA
Continuous current I_a	≤ 100 mA
Time delay before availability t_v	≤ 250 ms
Hysteresis H	2% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	15 Nm
Connection cable	PVC, 4 x 0.22 mm²

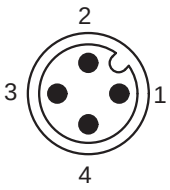
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.08 (2)		PNP/NPN config.	 config.	1000	Cable 2 m	IM12-02BCP-ZW1	7 902 927
0.08 (2)		PNP/NPN config.	 config..	1000	Connector M12 x 1 mm	IM12-02BCP-ZC1	7 902 928
0.2 (4)		PNP/NPN config.	 config..	1000	Cable 2 m	IM12-04NCP-ZW1	7 902 929
0.2 (4)		PNP/NPN config.	 config.	1000	Connector M12 x 1 mm	IM12-04NCP-ZC1	7 902 930

Connection diagram



Wire color		Contact	Configurable output function PNP		NPN	
bn	brown	1	+V DC	-V DC	+V DC	-V DC
wh	white	2	+V DC	+V DC	NO	NC
bu	blue	3	- V DC	+V DC	-V DC	+V DC
bk	black	4	NO	NC	-V DC	-V DC



IM 12 AC

Inductive Proximity Sensors

Highlights

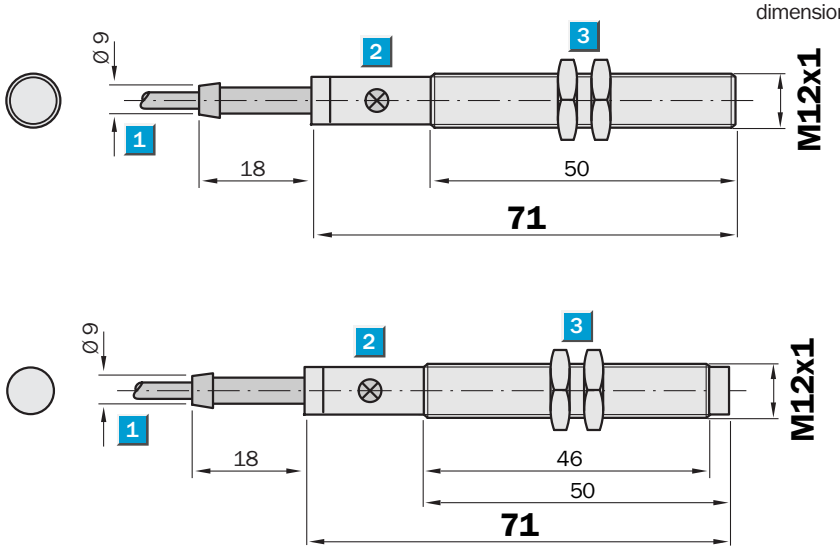
- Shielded or unshielded
- Normally open/normally closed function
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- IP 67 enclosure rating
- LED status indicator

IM 12



Dimensional drawing

dimensions in mm



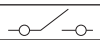
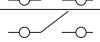
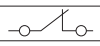
1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

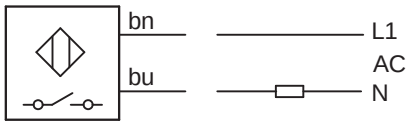
Electrical and mechanical data

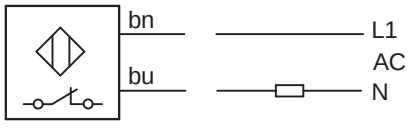
Operating voltage U_b	90...250 V AC
Voltage drop U_b	≤ 8.5 V AC at I_a max.
Continuous current I_a	≤ 250 mA AC (... + 50° C), ≤ 200 mA AC (... + 80° C)
Peak current I_k	0.9 A (20 ms/0.5 Hz)
Min. load current	8 mA
Residual current	≤ 3 mA (250 V AC), ≤ 1.5 mA (120 V AC)
Time delay before availability t_v	approx.10 ms
Hysteresis H	1% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 10% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	-
Short-circuit protection (pulsed)	-
Reverse polarity protection	-
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Protection class	⧈
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	13...176° F (-25...80° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	7 Nm
Connection cable	PUR-PVC, 2 x 0.5 mm^2

Selection table

Sensing range S_n in (mm)	Installation in metal	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.08 (2)			25	Cable 2 m	IM12-02BAS-ZU0	7 902 118
0.08 (2)			25	Cable 2 m	IM12-02BAO-ZU0	7 902 119
0.2 (4)			25	Cable 2 m	IM12-04NAS-ZU0	7 902 120
0.2 (4)			25	Cable 2 m	IM12-04NAO-ZU0	7 902 121

Connection diagram





IM 12 NAMUR

Inductive Proximity Sensors

Highlights

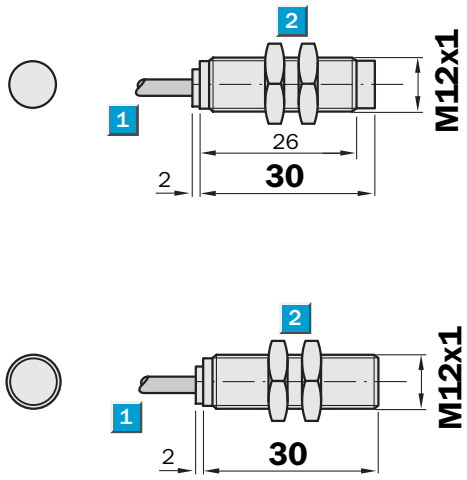
- Shielded or unshielded
- NAMUR to DIN 19 234
- High switching frequency
- Robust brass housing with nickel-plated fine thread M8 x 1
- IP 67 enclosure rating
- LED status indicator

IM 12 NAMUR



Dimensional drawing

dimensions in mm



1 Connection
2 Fastening nuts (2 x); width across 17, metal

Accessories	page
Mounting systems	1234
Special Accessories	1314

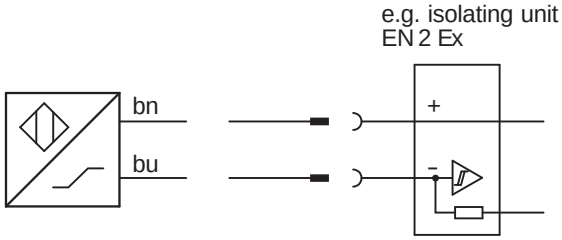
Electrical and mechanical data

Operating voltage U_b	5...25 V DC
Nominal voltage U_n	8.2 V DC
Power consumption, attenuated	≤ 1.0 mA
Power consumption, unattenuated	≥ 2.2 mA
Internal capacitance	≤ 230 nF
Internal inductance	≤ 380 µH
Cable resistance	≤ 50 Ω
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protected	Yes
Reverse polarity protected	Yes
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	7.0 Nm
Connection cable	PVC, 2 x 0.34 mm^2, blue
Max. data for connecting isolating unit EN 2	
EX or other approved isolating amplifier:	
Short-circuit current I_K max	50 mA
No load voltage U_O	15 V
Power loss Pmax	180 mW

Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.08 (2)		NAMUR		1200	Cable 2 m	IM12-02B-N-ZW0	6 021 124
0.2 (4)		NAMUR		1500	Cable 2 m	IM12-04N-N-ZW0	6 021 125

Connection diagram



Wire color			Assignment
bn	braun	brown	+ V DC
bu	blau	blue	- V DC

IM 18 Standard

Inductive Proximity Sensors

Highlights

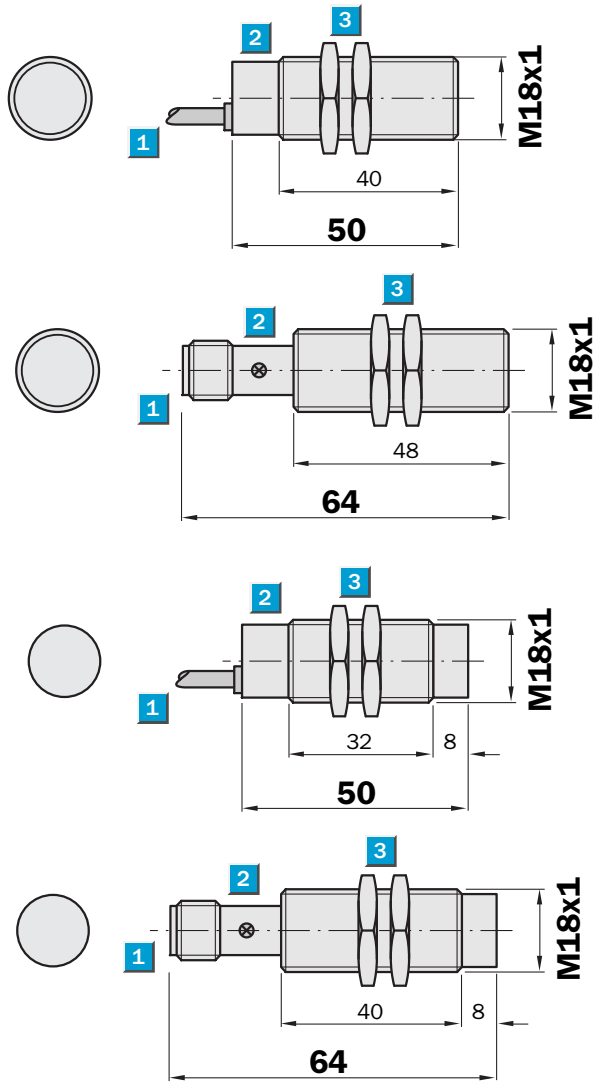
- Shielded or unshielded
- PNP or NPN output
- Normally open/normally closed function
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 18 Standard



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

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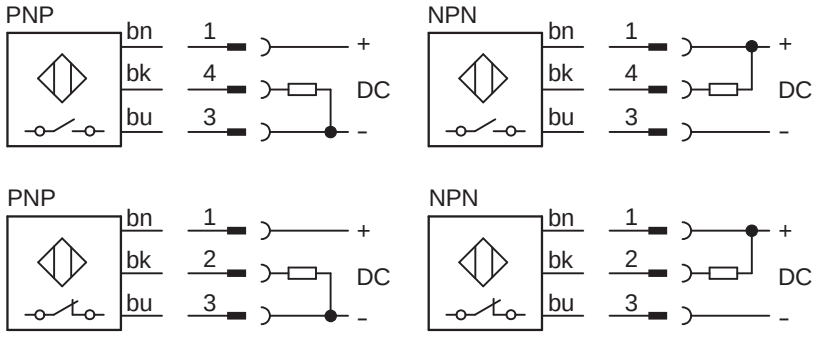
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_b	≤ 1 V at I_a max.
Power consumption (without load)	≤ 20 mA
Continuous current I_a	≤ 400 mA
Time delay before availability t_v	≤ 100 ms
Hysteresis H	2% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 2% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	30 Nm
Connection cable	PVC, 3 x 0.34 mm²

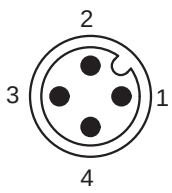
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.2 (5)		PNP		600	Cable 2 m	IM18-05BPS-ZW1	6 011 987
0.2 (5)		NPN		600	Cable 2 m	IM18-05BNS-ZW1	6 011 988
0.2 (5)		PNP		600	Connector M12 x 1 mm	IM18-05BPS-ZC1	6 011 991
0.2 (5)		NPN		600	Connector M12 x 1 mm	IM18-05BNS-ZC1	6 011 992
0.2 (5)		PNP		600	Connector M12 x 1 mm	IM18-05BPO-ZC1	6 011 993
0.3 (8)		PNP		600	Cable 2 m	IM18-08NPS-ZW1	6 011 995
0.3 (8)		NPN		600	Cable 2 m	IM18-08NNS-ZW1	6 011 996
0.3 (8)		NPN		600	Cable 2 m	IM18-08NNO-ZW1	6 011 998
0.3 (8)		PNP		600	Connector M12 x 1 mm	IM18-08NPS-ZC1	6 011 999
0.3 (8)		NPN		600	Connector M12 x 1 mm	IM18-08NNS-ZC1	6 012 000
0.3 (8)		PNP		600	Connector M12 x 1 mm	IM18-08NPO-ZC1	6 012 001

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IM 18 Short

Inductive Proximity Sensors

Highlights

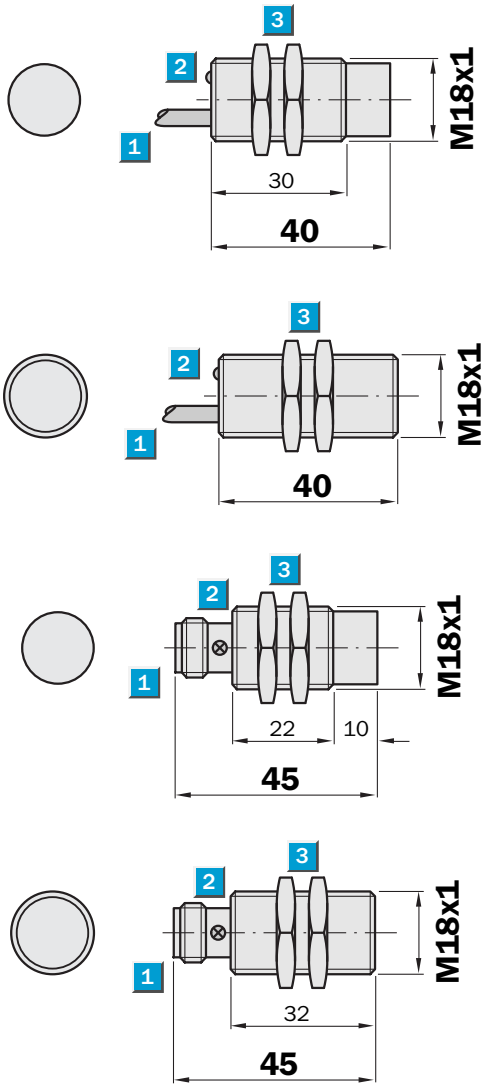
- Shielded or unshielded
- PNP or NPN output
- Normally open function
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 18 Short



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

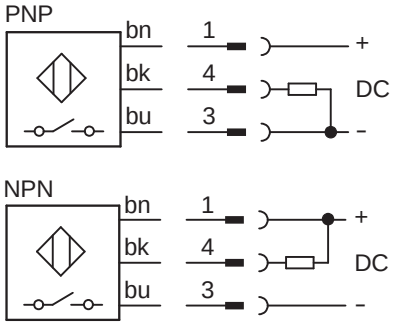
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 1.5 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 300 mA
Time delay before availability t_v	≤ 10 ms
Hysteresis H	1% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 1% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	25 Nm
Connection cable	PUR-PVC, 3 x 0.25 mm²

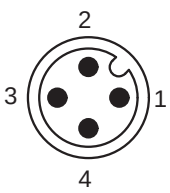
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.2 (5)		PNP		2000	Cable 2 m	IM18-05BPS-ZUK	1 017 430
0.2 (5)		NPN		2000	Cable 2 m	IM18-05BNS-ZUK	1 017 442
0.2 (5)		PNP		2000	Connector M12 x 1 mm	IM18-05BPS-ZCK	1 017 432
0.2 (5)		NPN		2000	Connector M12 x 1 mm	IM18-05BNS-ZCK	1 017 444
0.3 (8)		PNP		2000	Cable 2 m	IM18-08NPS-ZUK	1 017 431
0.3 (8)		NPN		2000	Cable 2 m	IM18-08NNS-ZUK	1 017 443
0.3 (8)		PNP		2000	Connector M12 x 1 mm	IM18-08NPS-ZCK	1 017 433
0.3 (8)		NPN		2000	Connector M12 x 1 mm	IM18-08NNS-ZCK	1 017 445

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



IM 18 2-wire

Inductive Proximity Sensors

Highlights

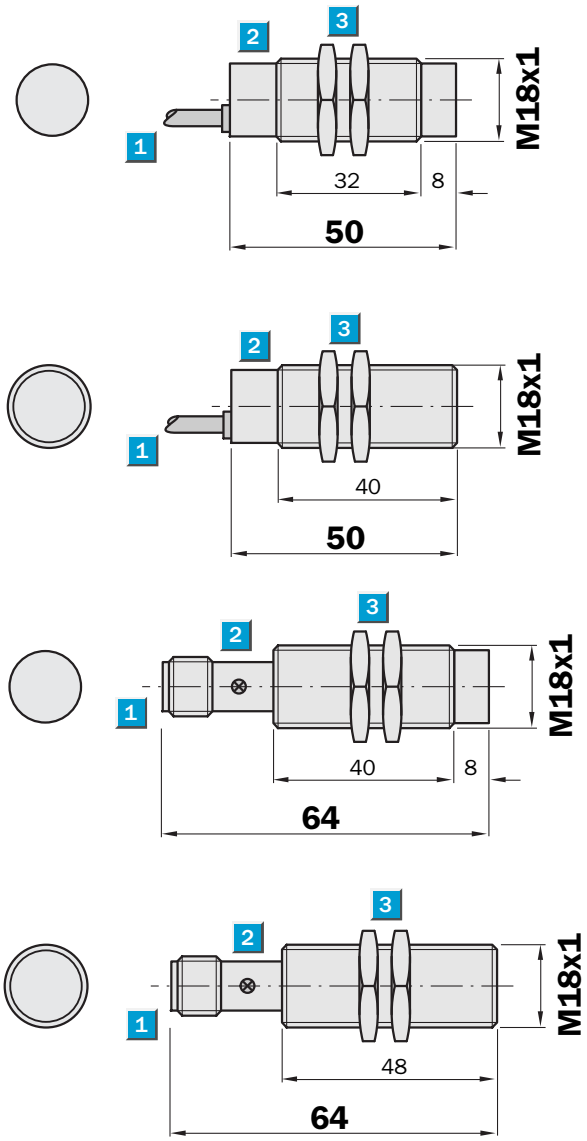
- Shielded or unshielded
- Normally open function
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 18



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

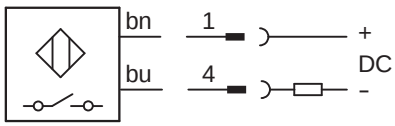
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_b	≤ 2.8 V at I_a max.
Load current	≥ 3 mA
Continuous current I_a	≤ 100 mA
Off-state current	≤ 0.8 mA
Time delay before availability t_v	≤ 50 ms
Hysteresis H	2% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 2% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	30 Nm
Connection cable	PVC, 2 x 0.34 mm^2

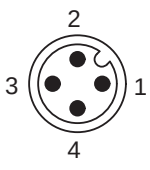
Selection table

Sensing range S_n in (mm)	Installation in metal	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.2 (5)			300	Cable 2 m	IM18-05BDS-ZW1	6 020 318
0.2 (5)			300	Connector M12 x 1 mm	IM18-05BDS-ZC1	6 020 320
0.3 (8)			300	Cable 2 m	IM18-08NDS-ZW1	6 020 322
0.3 (8)			300	Connector M12 x 1 mm	IM18-08NDS-ZC1	6 020 324

Connection diagram



Wire color	Contact	Assignment
bn brown	1	+ V DC
bu blue	2/4	– V DC



IM 18 Advanced

Inductive Proximity Sensors

Highlights

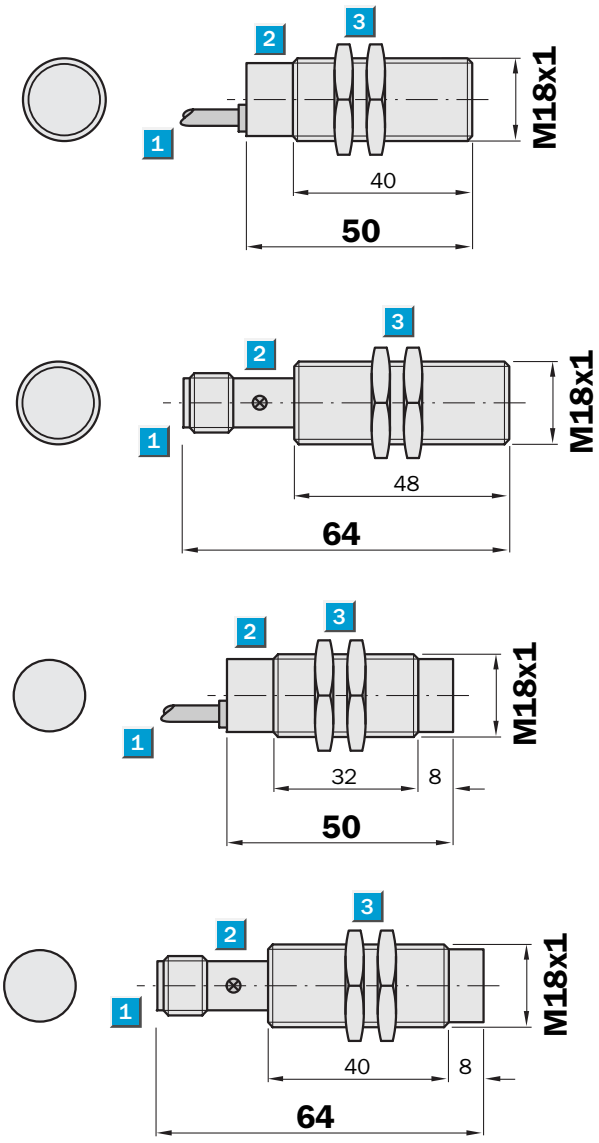
- Enhanced sensing range
- Shielded or unshielded
- PNP or NPN output
- High switching frequency
- Normally open/normally closed function
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- Cable and connector
- LED status indicator

IM 18 Advanced



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

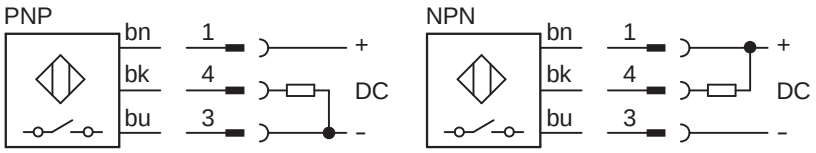
Electrical and mechanical data

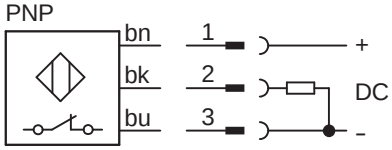
Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 1 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 400 mA
Time delay before availability t_v	≤ 100 ms
Hysteresis H	2% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	30 Nm
Connection cable	PVC, 3 x 0.25 mm²

Selection table

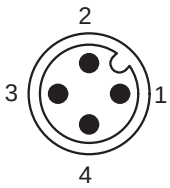
Sensing range S_n in mm	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
8		PNP		300	Cable 2 m	IM18-08BPS-ZW1	7 900 081
8		NPN		300	Cable 2 m	IM18-08BNS-ZW1	7 900 082
8		PNP		300	Cable 2 m	IM18-08BPO-ZW1	7 900 083
8		PNP		300	Connector M12 x 1 mm	IM18-08BPS-ZC1	7 900 085
8		NPN		300	Connector M12 x 1 mm	IM18-08BNS-ZC1	7 900 086
8		PNP		300	Connector M12 x 1 mm	IM18-08BPO-ZC1	7 900 087
12		PNP		300	Cable 2 m	IM18-12NPS-ZW1	7 900 093
12		NPN		300	Cable 2 m	IM18-12NNS-ZW1	7 900 094
12		PNP		300	Cable 2 m	IM18-12NPO-ZW1	7 900 095
12		PNP		300	Connector M12 x 1 mm	IM18-12NPS-ZC1	7 900 097
12		NPN		300	Connector M12 x 1 mm	IM18-12NNS-ZC1	7 900 098
12		PNP		300	Connector M12 x 1 mm	IM18-12NPO-ZC1	7 900 099

Connection diagram





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IM 18 Triple Sensing Range

Inductive Proximity Sensors

Highlights

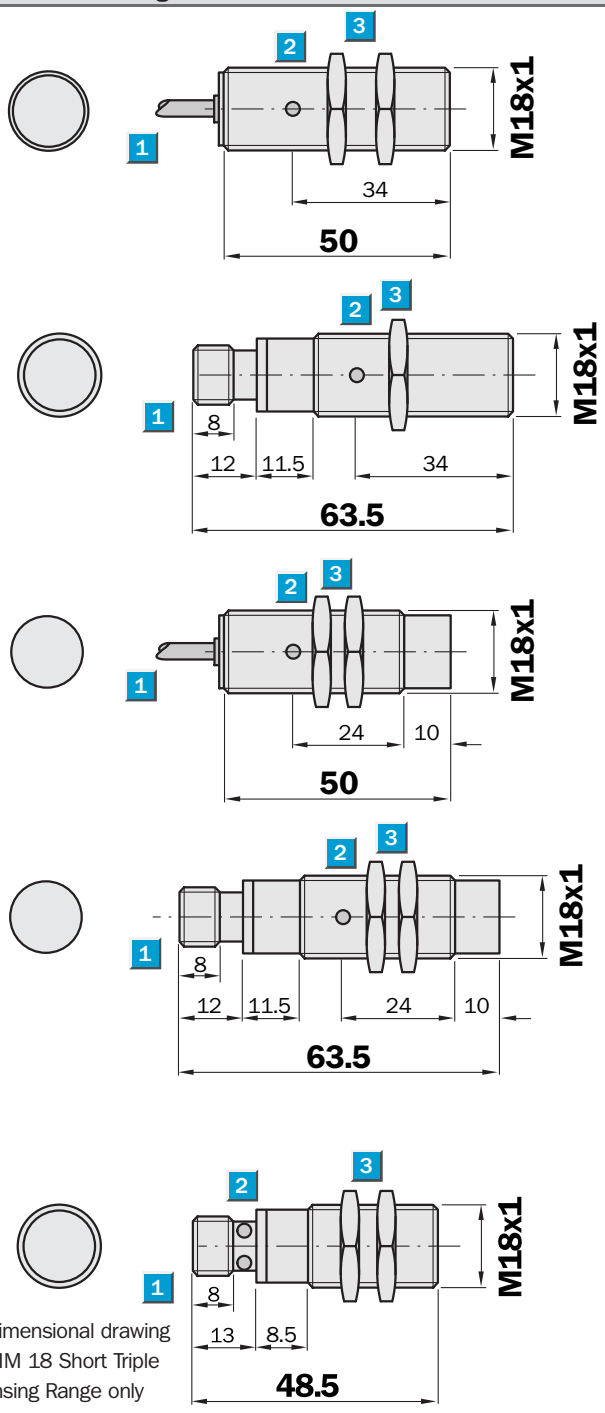
- Triple sensing range
- Installation quasi flush or non-flush in metal
- Normally open function
- PNP or NPN output
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 18 Triple Sensing Range



Dimensional drawing

dimensions in mm



* Dimensional drawing for IM 18 Short Triple Sensing Range only

1	Connection
2	Display LED
3	Fastening nuts (2 x); width across 24, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

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Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{ss}	≤ 20% of U_b[1]
Voltage drop U_d (at I_a max.)	≤ 2 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability T_v	≤ 100 ms
Hysteresis H	1% - 5% of s_r (5% typ.)
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, chrome-plated, plastic
Tightening torque	30 Nm
Connection cable	PVC, 3 x 0.34 mm²

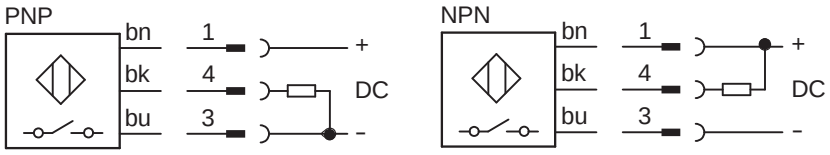
1) ≤ 10% for IM 18 Short Triple Sensing Range

Selection table

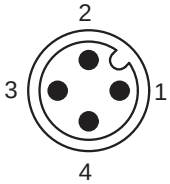
Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.5 (12)	*	PNP		500	Cable 2 m	IM 18-12BPS-ZW1	6 027 515
0.5 (12)	*	NPN		500	Cable 2 m	IM18-12BNS-ZW1	6 027 516
0.5 (12)	*	PNP		500	Connector M12 x 1 mm	IM18-12BPS-ZC1	6 027 517
0.5 (12)	*	PNP		500	Connector M12 x 1 mm	IM18-12BPS-ZCK	6 025 569
0.8 (20)		PNP		200	Cable 2 m	IM18-20NPS-ZW1	6 027 518
0.8 (20)		PNP		200	Connector M12 x 1 mm	IM18-20NPS-ZC1	6 027 519

* Installation notes “quasi flush”
When mounting in conductible materials the sensors have to be installed with a distance A to the surface.
A Steel, metal = 4 mm / **A** Stainless steel = 1.5 mm

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



IM 18 Harsh Environment

Inductive Proximity Sensors

Highlights

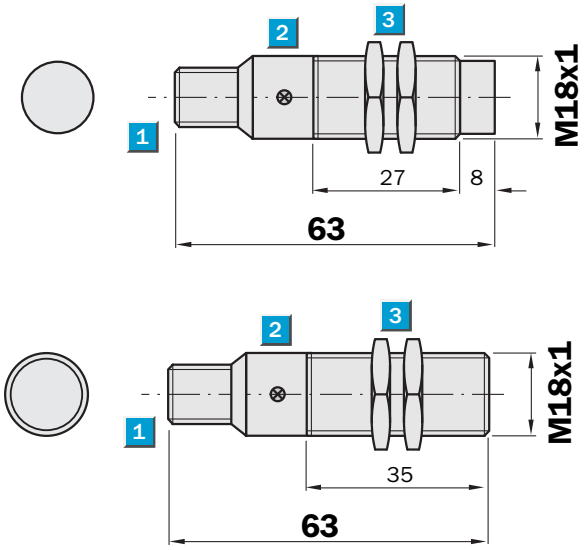
- For harsh environments, resistant to most cutting oils
- IP 68 enclosure rating
- Shielded or unshielded
- PNP or NPN output
- Complementary output function
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- Internal enclosure housing in technopolymer
- LED status indicator (NO function)

IM 18 Harsh Environment



Dimensional drawing

dimensions in mm



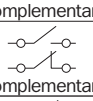
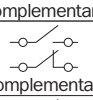
1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

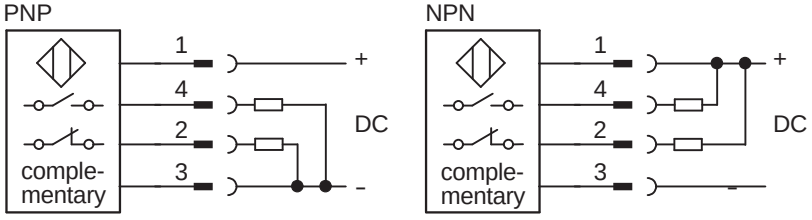
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_b	≤ 0.8 V at I_a max.
Power consumption (without load)	≤ 20 mA
Continuous current I_a	≤ 400 mA
Time delay before availability t_v	≤ 100 ms
Hysteresis H	2% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating	IP 68
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	40 Nm

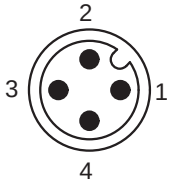
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.2 (5)		PNP	 complementary	1000	Connector M12 x 1 mm	IM18-05BPP-ZC1	7 902 931
0.2 (5)		NPN	 complementary	1000	Connector M12 x 1 mm	IM18-05BNP-ZC1	7 902 932
0.3 (8)		PNP	 complementary	1000	Connector M12 x 1 mm	IM18-08NPP-ZC1	7 902 933
0.3 (8)		NPN	 complementary	1000	Connector M12 x 1 mm	IM18-08NNP-ZC1	7 902 934

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
wh	white	2	NC
bu	blue	3	- V DC
bk	black	4	NO



IM 18 QuadProx

Inductive Proximity Sensors

Highlights

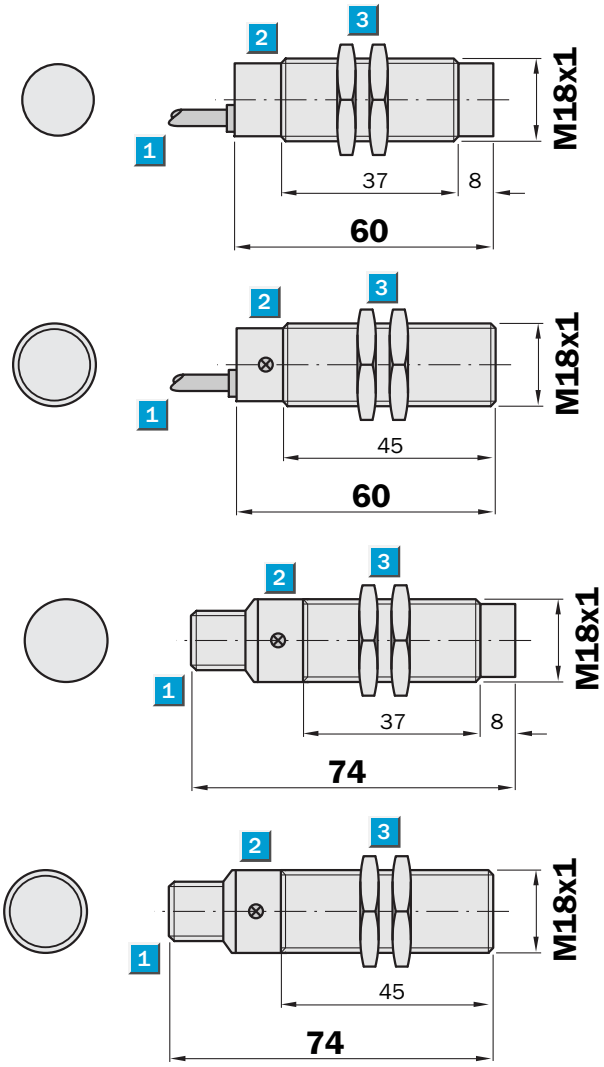
- Programmable output functions in one sensor: PNP/NO, PNP/NC, NPN/NO, NPN/NC
- Shielded or unshielded
- Short-circuit protection
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator (NO function)

IM 18 QuadProx



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

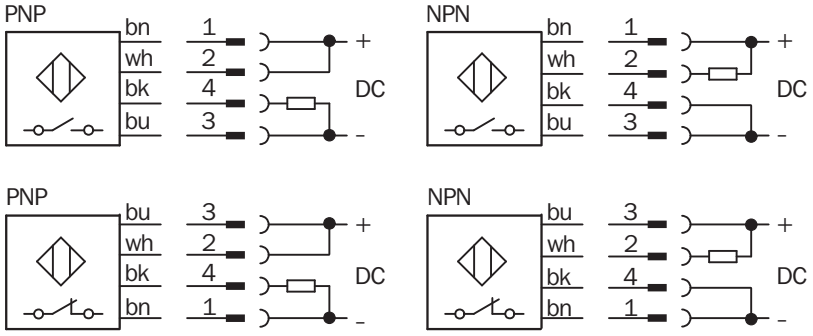
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_b	≤ 1.2 V at I_a max.
Power consumption (without load)	≤ 30 mA
Continuous current I_a	≤ 100 mA
Time delay before availability t_v	≤ 200 ms
Hysteresis H	2% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	40 Nm
Connection cable	PVC, 4 x 0.34 mm²

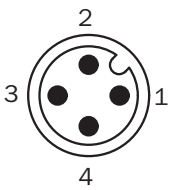
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.2 (5)		PNP/NPN config.	config.	300	Cable 2 m	IM18-05BCP-ZW1	7 902 935
0.2 (5)		PNP/NPN config.	config.	300	Connector M12 x 1 mm	IM18-05BCP-ZC1	7 902 936
0.3 (8)		PNP/NPN config.	config.	300	Cable 2 m	IM18-08NCP-ZW1	7 902 937
0.3 (8)		PNP/NPN config.	config.	300	Connector M12 x 1 mm	IM18-08NCP-ZC1	7 902 938

Connection diagram



Wire color		Contact	Configurable output function PNP		NPN	
bn	brown	1	+V DC	-V DC	+V DC	-V DC
wh	white	2	+V DC	+V DC	NO	NC
bu	blue	3	- V DC	+V DC	-V DC	+V DC
bk	black	4	NO	NC	-V DC	-V DC



IM 18 Universal

Inductive Proximity Sensors

Highlights

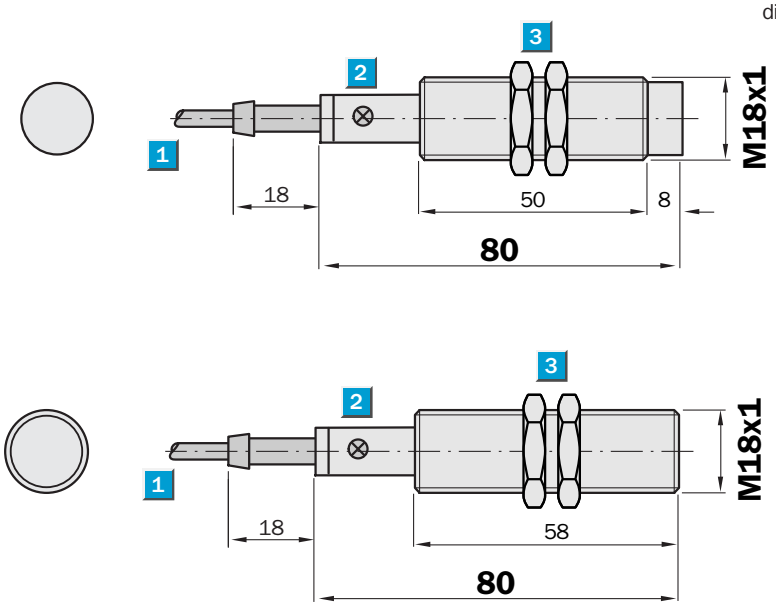
- Shielded or unshielded
- Broad operating voltage range in AC and DC
- Normally open/normally closed function
- High switching frequency
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- IP 67 enclosure rating
- LED status indicator

IM 18 Universal



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 24, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

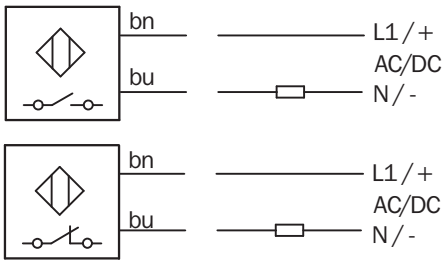
Electrical and mechanical data

Operating voltage U_b	20...250 V AC / DC
Voltage drop U_b	≤ 6.5 V AC / ≤ 6 V DC at I_a max.
Continuous current I_a	≤ 350 mA AC (...+50° C), ≤ 250 mA AC (...+80° C), ≤ 100 mA DC
Peak current I_k	2.2 A (20ms/0.5 Hz)
Min. load current	5 mA
Residual current	≤ 2.5 mA (250 V AC), ≤ 1.3 mA (110 V AC), ≤ 0.8 mA (24 V DC)
Time delay before availability t_v	approx. 8 ms
Hysteresis H	1% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 10% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	-
Short-circuit protection (pulsed)	-
Reverse polarity protection	-
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Protection class	⧈
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	13...176° F (-25...80° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	35 Nm
Connection cable	PUR-PVC, 2 x 0.5 mm^2

Selection table

Sensing range S_n in (mm)	Installation in metal	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.2 (5)			25 (AC) / 100 (DC)	Cable 2 m	IM18-05BUS-ZU0	7 902 122
0.2 (5)			25 (AC) / 100 (DC)	Cable 2 m	IM18-05BUO-ZU0	7 902 123
0.3 (8)			25 (AC) / 100 (DC)	Cable 2 m	IM18-08NUS-ZU0	7 902 124
0.3 (8)			25 (AC) / 100 (DC)	Cable 2 m	IM18-08NUO-ZU0	7 902 125

Connection diagram



Wire color		Assignment
bn	brown	L1 / +
bu	blue	N / -

IM 18 NAMUR

Inductive Proximity Sensors

Highlights

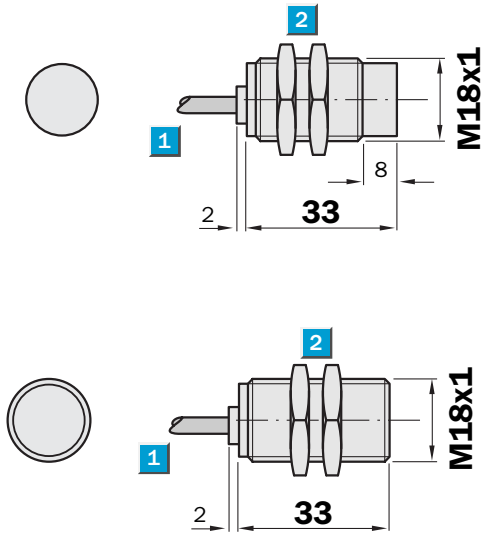
- NAMUR to DIN 19 234
- Shielded or unshielded
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- High switching frequency
- IP 67 enclosure rating
- LED status indicator (NO function)

IM 18 NAMUR



Dimensional drawing

dimensions in mm



1 Connection
2 Fastening nuts (2 x); width across 24, metal

Accessories	page
Mounting systems	1234
Special accessories	1314

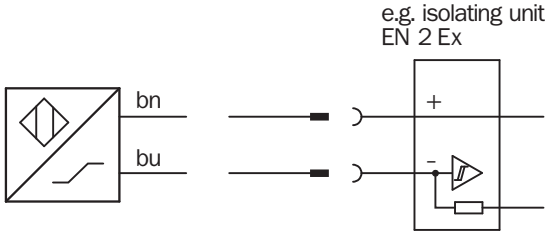
Electrical and mechanical data

Operating voltage U_b	5...25 V DC
Nominal voltage U_n	8.2 V DC
Power consumption, attenuated	≤ 1.0 mA
Power consumption, unattenuated	≥ 2.2 mA
Internal capacitance	≤ 230 nF (flush) ≤ 240 nF (non-flush)
Internal inductance	≤ 60 µH
Cable resistance	≤ 50 Ω
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protected	Yes
Reverse polarity protected	Yes
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	35 Nm
Connection cable	PVC, 2 x 0.34 mm^2, blue
Max. data for connecting isolating unit EN 2	
EX or other approved isolating amplifier:	
Short-circuit current I_K max	50 mA
No load voltage U_O	15 V
Power loss Pmax	180 mW

Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.2 (5)		NAMUR		720	Cable 2 m	IM18-05B-N-ZW0	6 021 126
0.3 (8)		NAMUR		300	Cable 2 m	IM18-08N-N-ZW0	6 021 127

Connection diagram



Wire color			Assignment
bn	braun	brown	+ V DC
bu	blau	blue	- V DC

IM 30 Standard

Inductive Proximity Sensors

Highlights

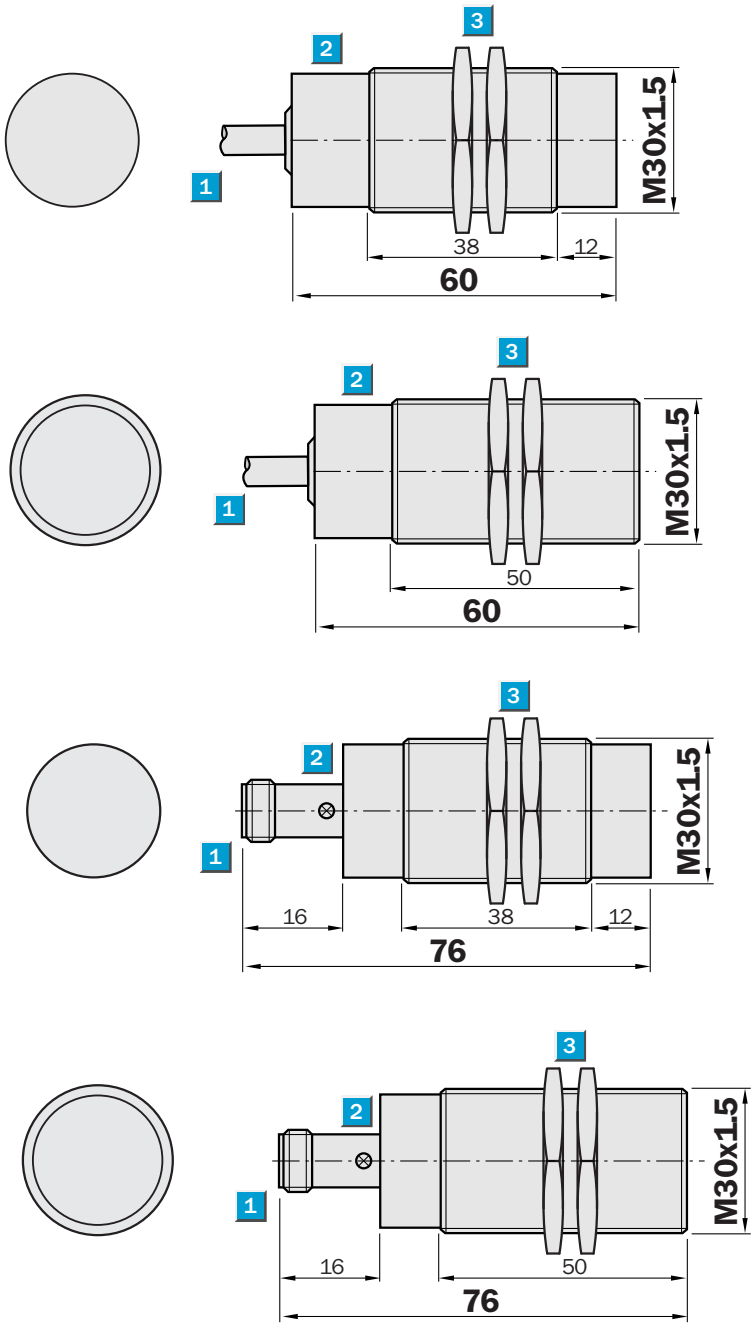
- Shielded or unshielded
- PNP or NPN output
- Normally open/normally closed function
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M30 x 1.5 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 30 Standard



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 36, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

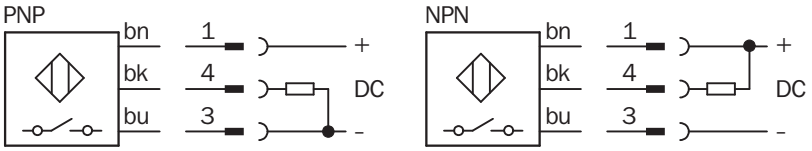
Electrical and mechanical data

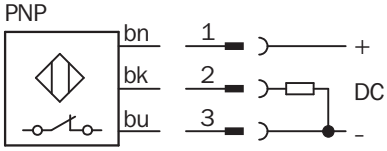
Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_b	≤ 1 V at I_a max.
Power consumption (without load)	≤ 20 mA
Continuous current I_a	≤ 400 mA
Time delay before availability t_v	≤ 100 ms
Hysteresis H typ.	2% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 2% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	60 Nm
Connection cable	PUR-PVC, 3 x 0.5 mm²

Selection table

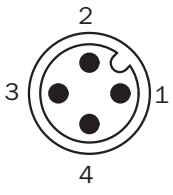
Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.4 (10)		PNP		200	Cable 2 m	IM30-10BPS-ZW1	6 020 274
0.4 (10)		NPN		200	Cable 2 m	IM30-10BNS-ZW1	6 020 275
0.4 (10)		PNP		200	Connector M12 x 1 mm	IM30-10BPS-ZC1	6 020 278
0.4 (10)		NPN		200	Connector M12 x 1 mm	IM30-10BNS-ZC1	6 020 279
0.4 (10)		PNP		200	Connector M12 x 1 mm	IM30-10BPO-ZC1	6 020 280
0.6 (15)		PNP		200	Cable 2 m	IM30-15NPS-ZW1	6 020 282
0.6 (15)		NPN		200	Cable 2 m	IM30-15NNS-ZW1	6 020 283
0.6 (15)		PNP		200	Cable 2 m	IM30-15NPO-ZW1	6 020 284
0.6 (15)		PNP		200	Connector M12 x 1 mm	IM30-15NPS-ZC1	6 020 286
0.6 (15)		NPN		200	Connector M12 x 1 mm	IM30-15NNS-ZC1	6 020 287

Connection diagram





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IM 30 Short

Inductive Proximity Sensors

Highlights

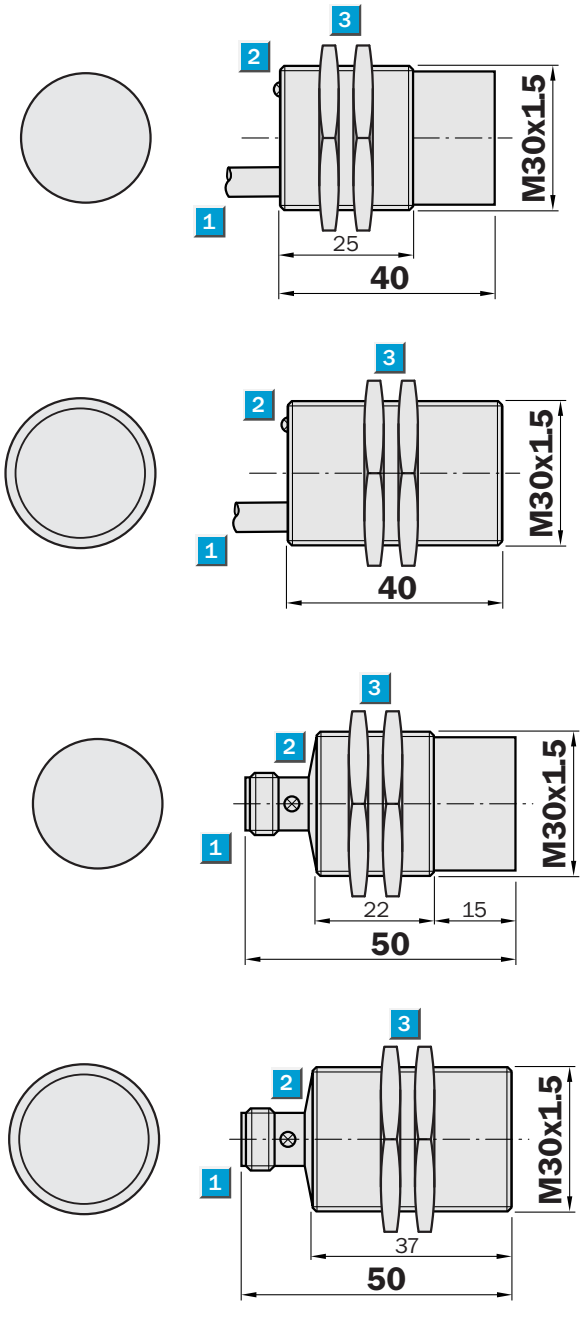
- Shielded or unshielded
- PNP or NPN output
- Normally open function
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M30 x 1.5 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 30 Short



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 36, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

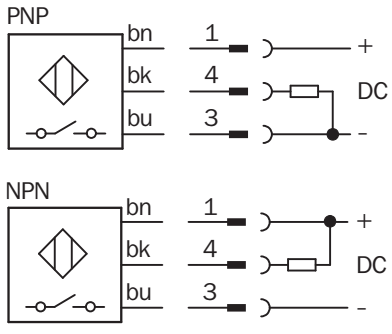
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 1.5 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 300 mA
Time delay before availability t_v	≤ 10 ms
Hysteresis H	1% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 1% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	50 Nm
Connection cable	PUR-PVC, 3 x 0.5 mm²

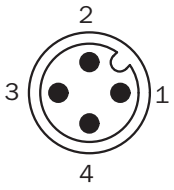
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.4 (10)		PNP		500	Cable 2 m	IM30-10BPS-ZUK	1 017434
0.4 (10)		NPN		500	Cable 2 m	IM30-10BNS-ZUK	1 017 446
0.4 (10)		PNP		500	Connector M12 x 1 mm	IM30-10BPS-ZCK	1 017 436
0.6 (15)		PNP		500	Cable 2 m	IM30-15NPS-ZUK	1 017 435
0.6 (15)		NPN		500	Cable 2 m	IM30-15NNS-ZUK	1 017 447
0.6 (15)		PNP		500	Connector M12 x 1 mm	IM30-15NPS-ZCK	1 017 437

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



IM 30 2-wire

Inductive Proximity Sensors

Highlights

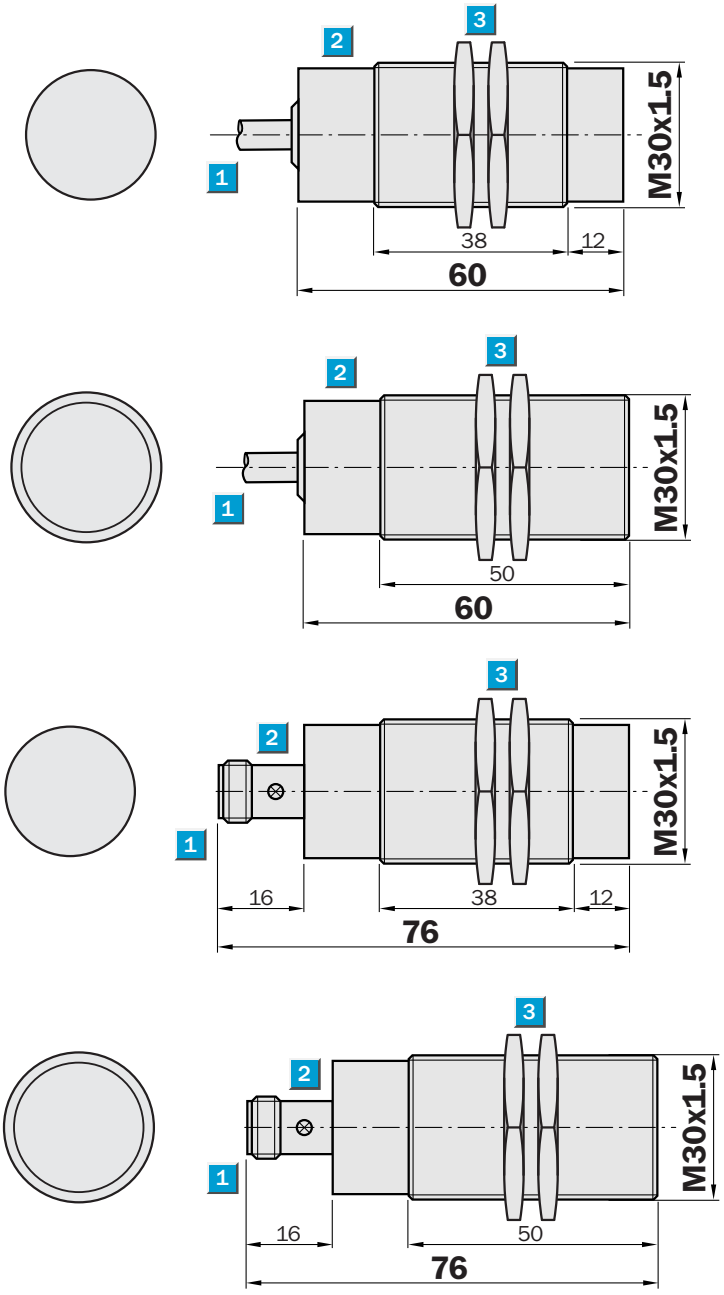
- Shielded or unshielded
- Normally open/normally closed function
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plating with fine thread M30 x 1.5 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 30 2-wire



Dimensional drawing

dimensions in mm



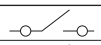
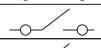
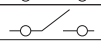
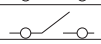
1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 36, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

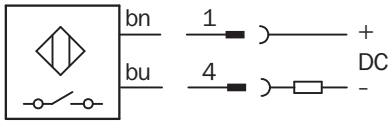
Electrical and mechanical data

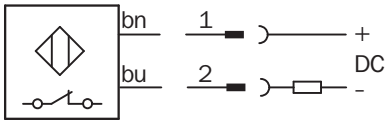
Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_b	≤ 2.8 V at I_a max.
Load current	≥ 3 mA
Continuous current I_a	≤ 100 mA
OFF state current	≤ 0.8 mA
Time delay before availability t_v	≤ 50 ms
Hysteresis H	2% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 2% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to EN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 bis 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass nickel-plated, plastic
Tightening torque	30 Nm
Connection cable	PVC, 2 x 0.5 mm²

Selection table

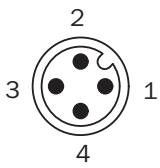
Sensing range S_n in (mm)	Installation in metal	Output function	Switching frequency f in Hz	Connection	Type	Part no.
0.4 (10)			200	Cable 2 m	IM30-10BDS-ZW1	6 020 326
0.4 (10)			200	Connector M12 x 1 mm	IM30-10BDS-ZC1	6 020 328
0.6 (15)			200	Cable 2 m	IM30-15NDS-ZW1	6 020 330
0.6 (15)			200	Connector M12 x 1 mm	IM30-15NDS-ZC1	6 020 332

Connection diagram





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bu	blue	2/4	- V DC



IM 30 Advanced

Inductive Proximity Sensors

Highlights

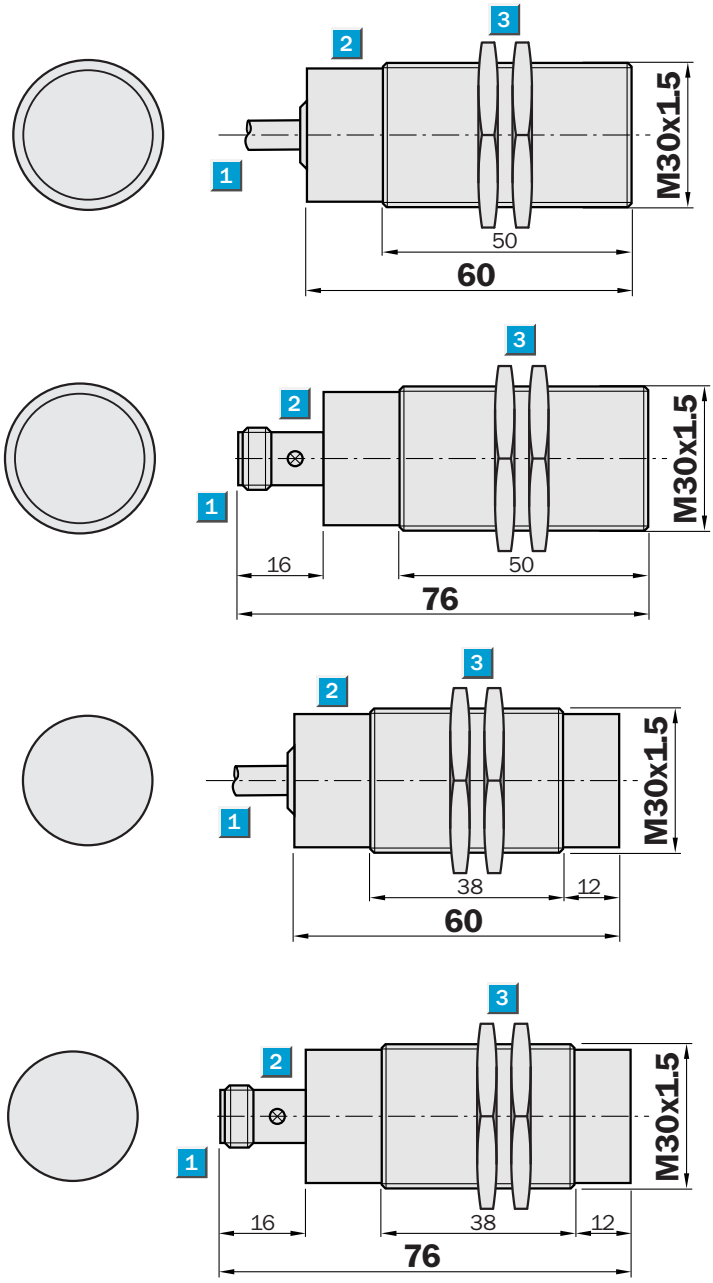
- Enhanced sensing range
- Shielded or unshielded
- PNP or NPN output
- Normally open/normally closed function
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M30 x 1.5 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 30 Advanced



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 36, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

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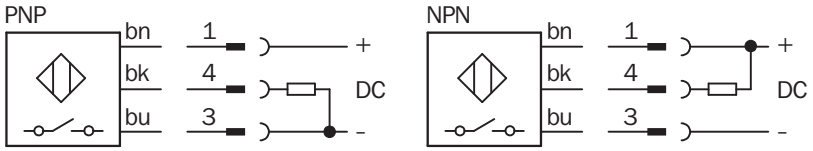
Electrical and mechanical data

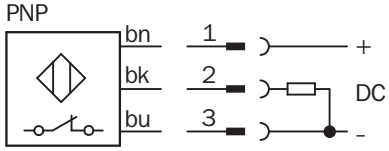
Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 1 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 400 mA
Time delay before availability t_v	≤ 100 ms
Hysteresis H	2% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	60 Nm
Connection cable	PVC, 3 x 0.5 mm²

Selection table

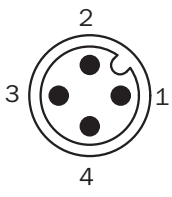
Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.6 (15)		PNP		150	Cable 2 m	IM30-15BPS-ZW1	7 900 141
0.6 (15)		NPN		150	Cable 2 m	IM30-15BNS-ZW1	7 900 142
0.6 (15)		PNP		150	Cable 2 m	IM30-15BPO-ZW1	7 900 143
0.6 (15)		PNP		150	Connector M12 x 1 mm	IM30-15BPS-ZC1	7 900 145
0.6 (15)		NPN		150	Connector M12 x 1 mm	IM30-15BNS-ZC1	7 900 146
0.6 (15)		PNP		150	Connector M12 x 1 mm	IM30-15BPO-ZC1	7 900 147
0.8 (20)		PNP		150	Cable 2 m	IM30-20NPS-ZW1	7 900 153
0.8 (20)		NPN		150	Cable 2 m	IM30-20NNS-ZW1	7 900 154
0.8 (20)		PNP		150	Cable 2 m	IM30-20NPO-ZW1	7 900 155
0.8 (20)		PNP		150	Connector M12 x 1 mm	IM30-20NPS-ZC1	7 900 157
0.8 (20)		NPN		150	Connector M12 x 1 mm	IM30-20NNS-ZC1	7 900158
0.8 (20)		PNP		150	Connector M12 x 1 mm	IM30-20NPO-ZC1	7 900 159

Connection diagram





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	2/4	NO/NC
bu	blue	3	- V DC



IM 30 Triple Sensing Range

Inductive Proximity Sensors





CE

Highlights

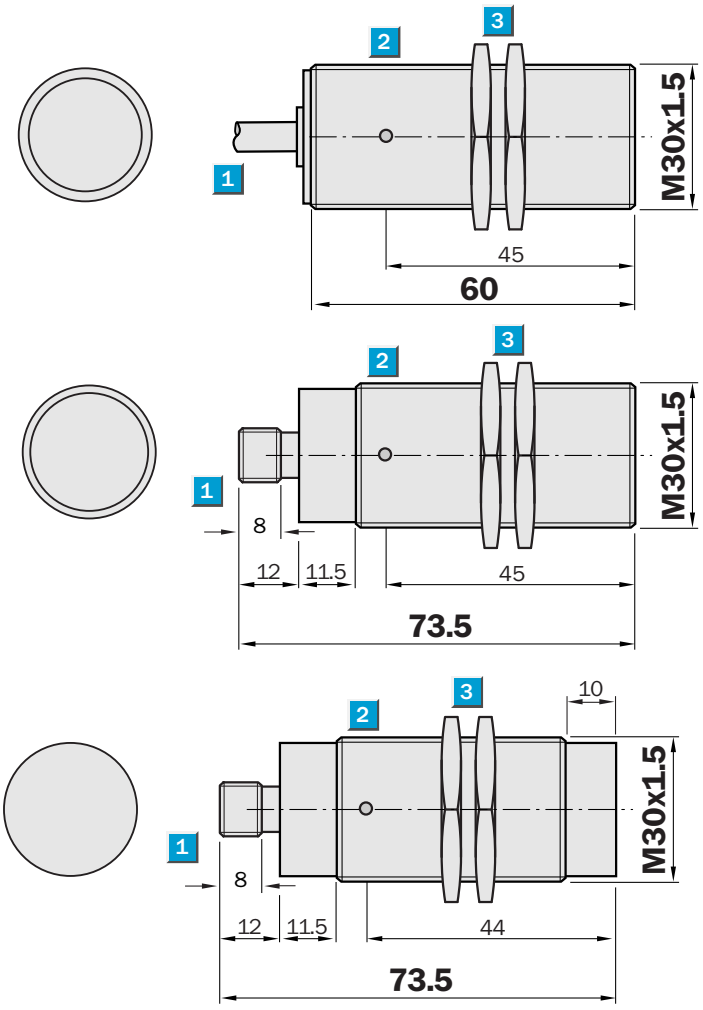
- Triple sensing range
- Installation quasi flush or non-flush in metal
- Normally open function
- PNP or NPN output
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M30 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IM 30 Triple Sensing Range



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 36, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Electrical and mechanical data

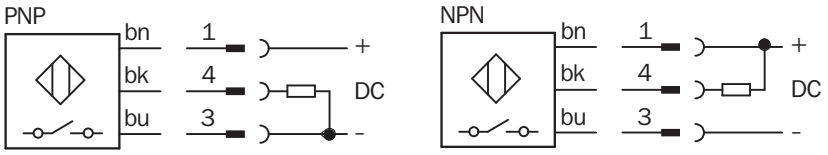
Operating voltage U_b	10...30 V DC
Ripple U_{ss}	≤ 20% of U_b
Voltage drop U_d (at I_a max.)	≤ 2 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability T_v	≤ 100 ms
Hysteresis H	1% - 5% of s_r (5% typ.)
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, chrome-plated, plastic
Tightening torque	60 Nm
Connection cable	PVC, 3 x 0.34 mm^2

Selection table

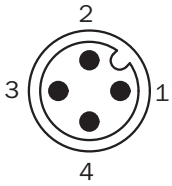
Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.9 (22)	*	NPN		200	Cable 2 m	IM 30-22BNS-ZW1	6 027 520
0.9 (22)	*	PNP		200	Connector M12 x 1 mm	IM30-22BPS-ZC1	6 027 521
1.6 (40)		PNP		100	Connector M12 x 1 mm	IM30-40NPS-ZC1	6 027 522
0.9 (22)	*	PNP		200	Connector M12 x 1 mm	IM30-22BPO-ZCK	6 025 568
0.9 (22)	*	PNP		200	Connector M12 x 1 mm	IM30-22BPS-ZCK	6 025 566

* Installation notes “quasi flush”
When mounting in conductible materials the sensors have to be installed with a distance A to the surface.
A Steel, metal = 6 mm / **A** Stainless steel = 2 mm

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



IM 30 Universal

Inductive Proximity Sensors

Highlights

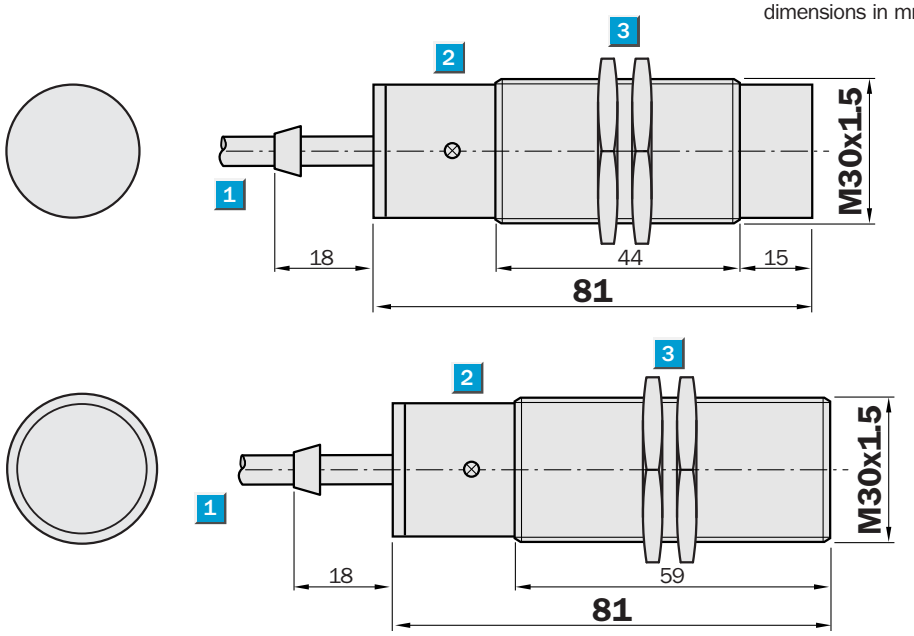
- Shielded or unshielded
- Broad operating voltage range in AC and DC
- Normally open/normally closed function
- Robust brass housing, nickel-plated with fine thread M30 x 1.5 mm
- IP 67 enclosure rating
- LED status indicator

IM 30 Universal



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 36, metal

Accessories	page
Mounting systems	1234

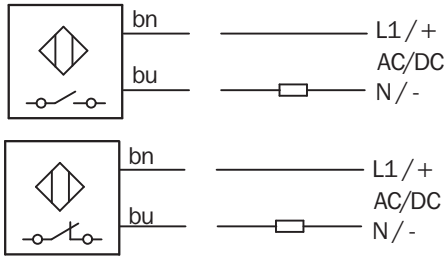
Electrical and mechanical data

Operating voltage U_b	2...250 V AC / DC
Voltage drop U_b	≤ 6.5 V AC / ≤ 6 V DC at I_a max.
Continuous current I_a	≤ 350 mA AC (...+50° C), ≤ 250 mA AC (...+80° C), ≤ 100 mA DC
Peak current I_k	2.2 A (20ms/0.5 Hz)
Min. load current	5 mA
Residual current	≤ 2.5 mA (250 V AC), ≤ 1.3 mA (110 V AC), ≤ 0.8 mA (24 V DC)
Time delay before availability t_v	approx. 8 ms
Hysteresis H	1% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 10% of s_r
Temperature drift	±10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	-
Short-circuit protection (pulsed)	-
Reverse polarity protection	-
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Protection class	□
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	13...176° F (-25...80° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	50 Nm
Connection cable	PUR-PVC, 2 x 0.5 mm^2

Selection table

Sensing range S_n in (mm)	Installation in metal	Output function	Switching frequency f in Hz	Connection	Type	Part no.
0.4 (10)			25 (AC) / 30 (DC)	Cable 2 m	IM30-10BUS-ZU0	7 902 126
0.4 (10)			25 (AC) / 30 (DC)	Cable 2 m	IM30-10BUO-ZU0	7 902 127
0.6 (15)			25 (AC) / 30 (DC)	Cable 2 m	IM30-15NUS-ZU0	7 902 128

Connection diagram



Wire color		Assignment
bn	brown	L1 / +
bu	blue	N / -

IM 30 NAMUR

Inductive Proximity Sensors

Highlights

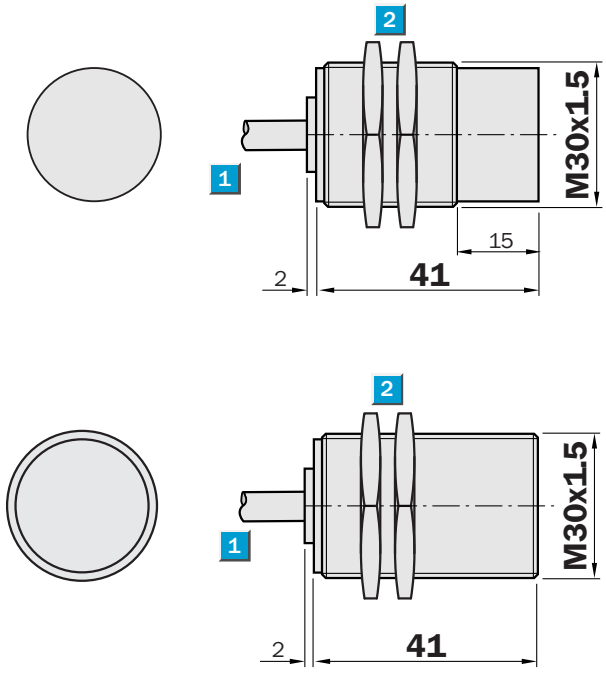
- Shielded or unshielded
- High switching frequency
- Short-circuit protection (pulsed)
- Solid stainless steel housing
- Cable
- IP 67 enclosure rating
- LED status indicator
- NAMUR to EN 60947-5-6

IM 30 NAMUR



Dimensional drawing

dimensions in mm



1 Connection
2 Fastening nuts (2 x); width across 36, metal

Accessories	page
Mounting systems	1234
Special accessories	1314

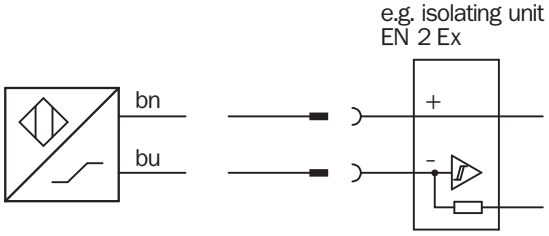
Electrical and mechanical data

Operating voltage U_b	5...25 V DC
Rated voltage U_n	8.2 V DC
Power consumption, attenuated	≤ 1.0 mA
Power consumption, unattenuated	≥ 2.2 mA
Internal capacitance	≤ 230 nF (flush) ≤ 240 nF (non-flush)
Internal inductance	≤ 130 µH (flush) ≤ 100 µH (non-flush)
Cable resistance	≤ 50 Ω
Time delay before availability t_v	≤ 2 ms
Hysteresis H	1% - 10% of s_r
Repeatability R (U_b and T_a constant)	10% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protected	Yes
Reverse polarity protected	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	50 Nm
Connection cable	PUR-PVC, 3 x 0.055 mm², blue
Max. data for connecting isolating unit EN 2	
EX or other approved isolating amplifier:	
Short-circuit current I_K max	50 mA
No load voltage U_O	15 V
Power loss Pmax	180 mW

Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.4 (10)	=	NAMUR		450	Cable 2 m	IM30-10B-N-ZW0	6 021 128
0.6 (15)	=	NAMUR		200	Cable 2 m	IM30-15N-N-ZW0	6 021 129

Connection diagram



Wire color			Assignment
bn	braun	brown	+ V DC
bu	blau	blue	- V DC

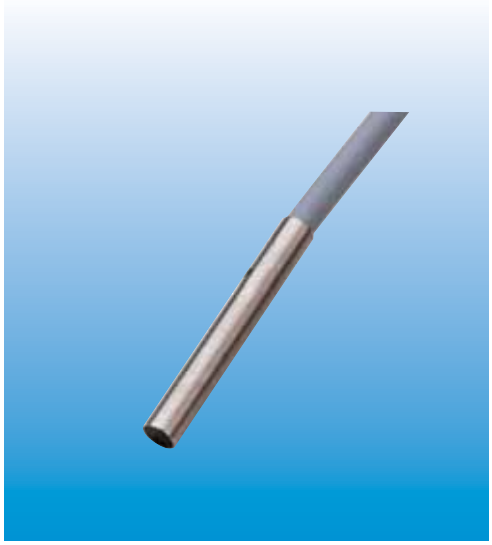
IH 03 Miniature

Inductive Proximity Sensors

Highlights

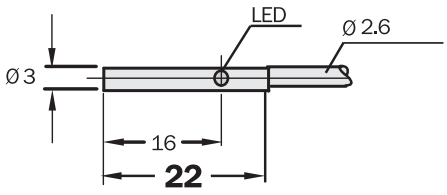
- Shielded
- PNP or NPN output
- Normally open function
- High switching frequency
- Short-circuit protection (pulsed)
- Solid stainless steel housing
- Cable
- IP 67 enclosure rating
- LED status indicator

IH 03 Miniature



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

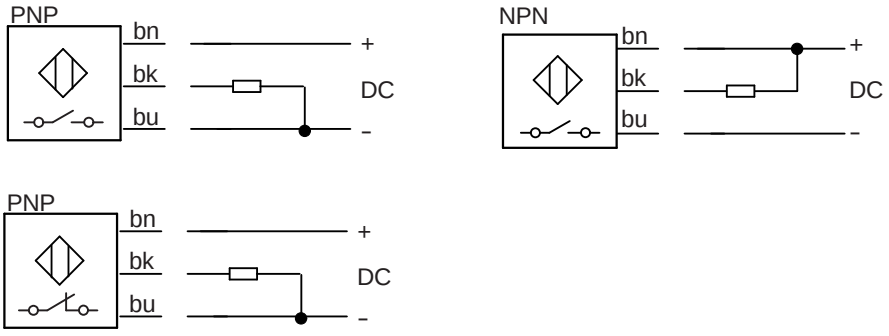
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 20% of U_b
Voltage drop U_b	≤ 0.6 V max. at I_a max.
Power consumption (without load)	10 mA
Continuous current I_a	≤ 100 mA
Time delay before availability t_v	≤ 10 ms
Hysteresis H	10% of s_r
Repeatability R (U_b and T_a constant)	≤ 2%
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Stainless steel, plastic
Connection cable	PUR-PVC, 3 x 0.055 mm²

Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.02 (0.6)		PNP		2000	Cable 2 m	IH03-0B6PS-VU1	6 020 141
0.02 (0.6)		NPN		2000	Cable 2 m	IH03-0B6NS-VU1	6 020 142
0.02 (0.6)		PNP		2000	Cable 2 m	IH03-0B6PO-VU1	6 020 143

Connection diagram



Wire color		Assignment
bn	brown	+ V DC
bk	black	NO/NC
bu	blue	- V DC

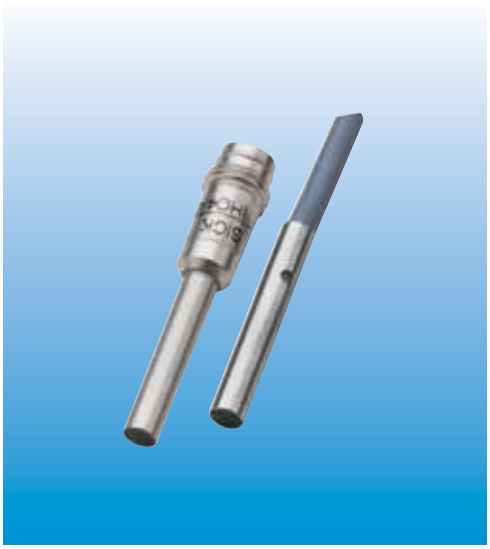
IH 04 Miniature

Inductive Proximity Sensors

Highlights

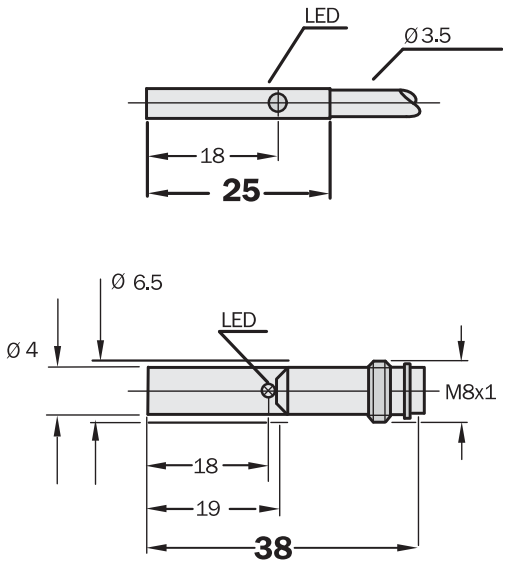
- Shielded
- PNP or NPN output
- Normally open function
- High switching frequency
- Short-circuit protection (pulsed)
- Solid stainless steel housing
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IH 04 Miniature



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

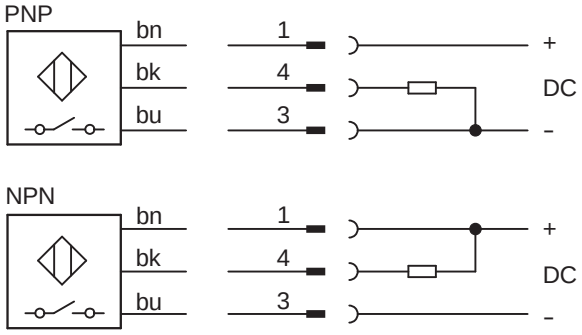
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 20% of U_b
Voltage drop U_b	≤ 2.0 V max. at I_a max.
Power consumption (without load)	10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 10 ms
Hysteresis H	10% of s_r
Repeatability R (U_b and T_a constant)	≤ 1.5%
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Stainless steel, plastic
Connection cable	PUR-PVC, 3 x 0.14 mm²

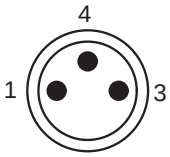
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.03 (0.8)		PNP		5000	Cable 2 m	IH04-0B8PS-VW1	6 020 113
0.03 (0.8)		NPN		5000	Cable 2 m	IH04-0B8NS-VW1	6 020 149
0.03 (0.8)		PNP		5000	Connector M8 x 1 mm	IH04-0B8PS-VT1	6 020 114
0.03 (0.8)		NPN		5000	Connector M8 x 1 mm	IH04-0B8NS-VT1	6 020 152

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



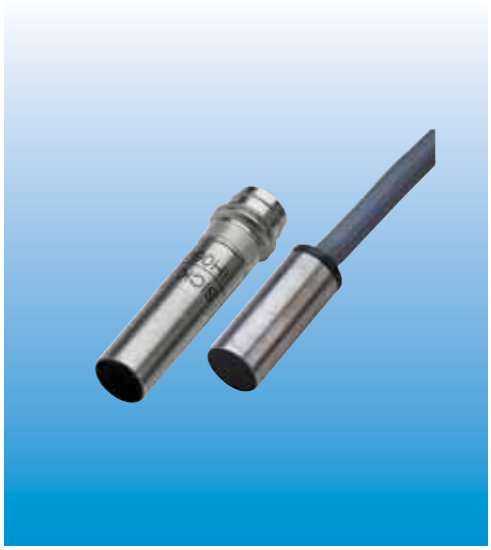
IH 06 Short

Inductive Proximity Sensors

Highlights

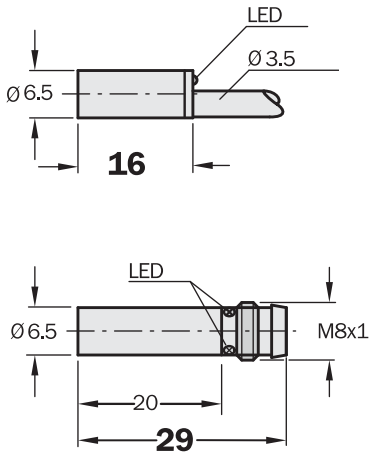
- Shielded
- PNP or NPN output
- Normally open function
- High switching frequency
- Short-circuit protection (pulsed)
- Solid stainless steel housing
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IH 06 Short



Dimensional drawing

dimensions in mm



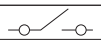
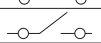
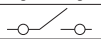
Accessories	page
Cables and connectors	1180
Mounting systems	1234

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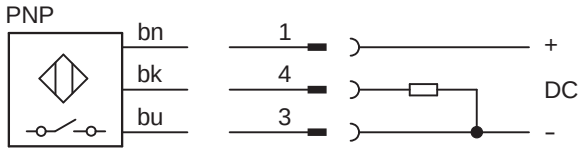
Electrical and mechanical data

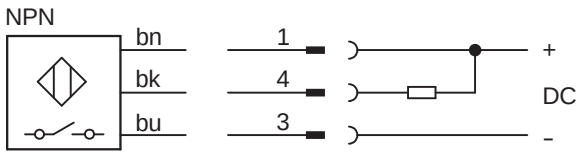
Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 20% of U_b
Voltage drop U_b	≤ 2.0 V max. at I_a max.
Power consumption (without load)	10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 10 ms
Hysteresis H	10% of s_r
Repeatability R (U_b and T_a constant)	≤ 5%
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Stainless steel, plastic
Connection cable	PVC, 3 x 0.14 mm²

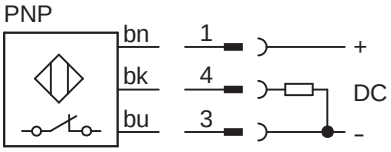
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.6 (1.5)		PNP		5000	Cable 2 m	IH06-1B5PS-VWK	6 020 165
0.6 (1.5)		NPN		5000	Cable 2 m	IH06-1B5NS-VWK	6 020 166
0.6 (1.5)		PNP		5000	Cable 2 m	IH06-1B5PO-VWK	6 020 167
0.6 (1.5)		PNP		5000	Connector M8 x 1 mm	IH06-1B5PS-VTK	6 020 169
0.6 (1.5)		NPN		5000	Connector M8 x 1 mm	IH06-1B5NS-VTK	6 020 170
0.6 (1.5)		PNP		5000	Connector M8 x 1 mm	IH06-1B5PO-VTK	6 020 171

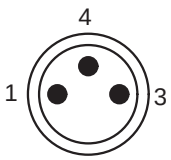
Connection diagram







Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO/NC
bu	blue	3	- V DC



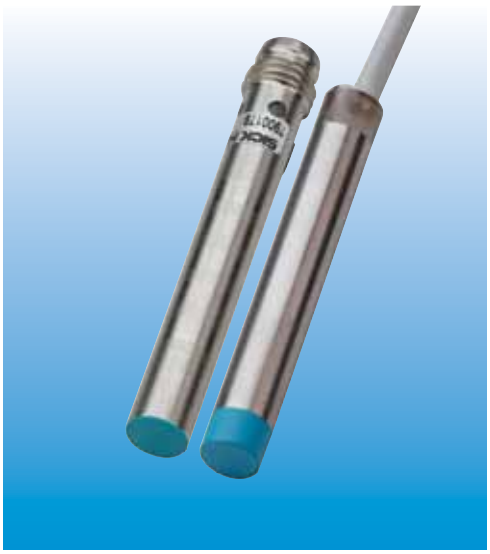
IH 06 Advanced

Inductive Proximity Sensors

Highlights

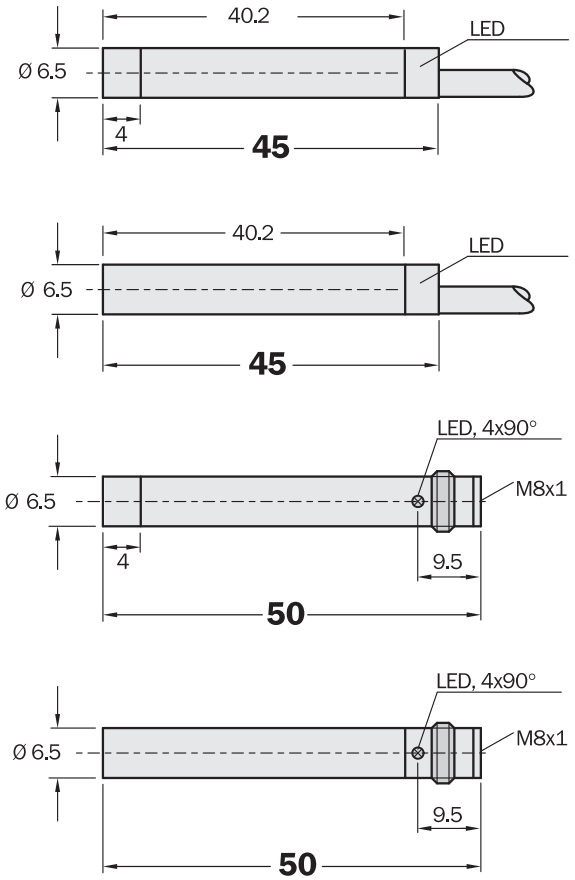
- Enhanced sensing range
- Shielded or unshielded
- PNP or NPN output
- High switching frequency
- Short-circuit protection (pulsed)
- Solid stainless steel housing
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IH 06 Advanced



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

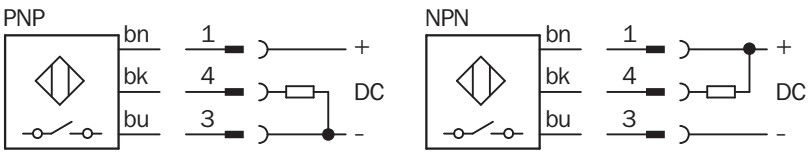
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 1.2 V at I_a max.
Power consumption (without load)	≤ 20 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 100 ms
Hysteresis H	2% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)
Housing material	Stainless steel, plastic
Connection cable	PVC, 3 x 0.14 mm²

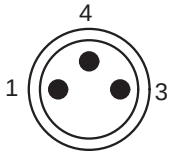
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.08 (2)		PNP		3000	Cable 2 m	IH06-02BPS-VW1	7 900 177
0.08 (2)		NPN		3000	Cable 2 m	IH06-02BNS-VW1	7 900 178
0.08 (2)		PNP		3000	Connector M8 x 1 mm	IH06-02BPS-VT1	7 900 179
0.08 (2)		NPN		3000	Connector M8 x 1 mm	IH06-02BNS-VT1	7 900 180
0.2 (4)		PNP		3000	Cable 2 m	IH06-04NPS-VW1	7 900181
0.2 (4)		NPN		3000	Cable 2 m	IH06-04NNS-VW1	7 900 182
0.2 (4)		PNP		3000	Connector M8 x 1 mm	IH06-04NPS-VT1	7 900 183

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO/NC
bu	blue	3	- V DC



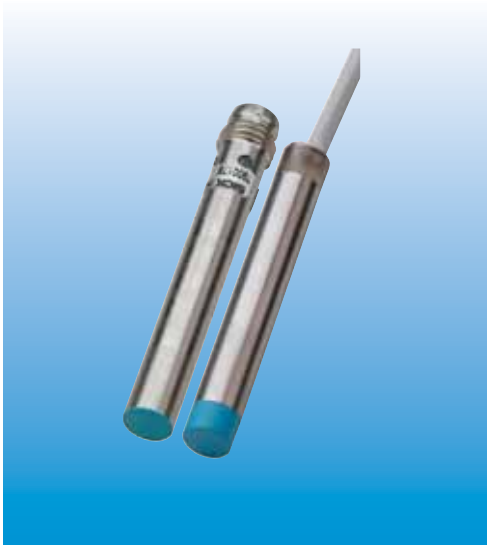
IH 06 Advanced Short

Inductive Proximity Sensors

Highlights

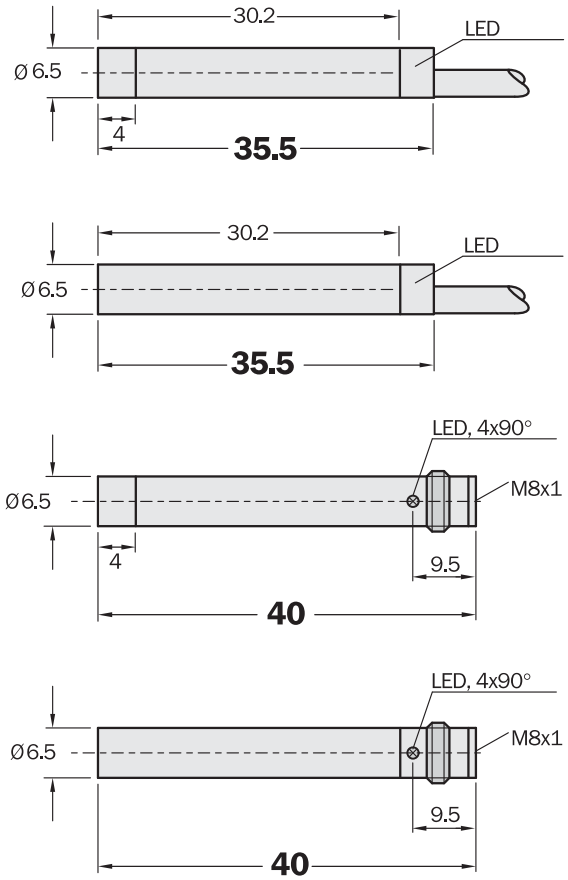
- Enhanced sensing range
- Shielded or unshielded
- PNP or NPN output
- High switching frequency
- Short-circuit protection (pulsed)
- Solid stainless steel housing
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IH 06 Advanced Short



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

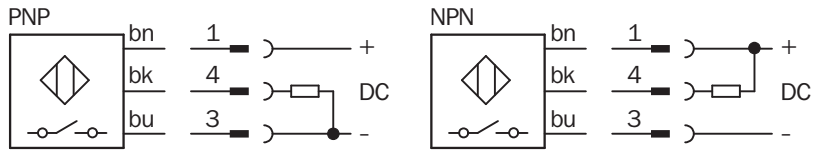
Electrical and mechanical data

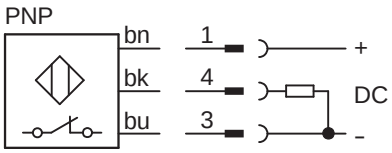
Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 1.2 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 5 ms
Hysteresis H	1% - 20% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...160° F (-25...70° C)
Housing material	Stainless steel, plastic
Connection cable	PVC, 3 x 0.14 mm²

Selection table

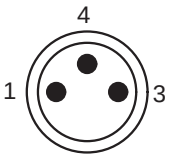
Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.08 (2)		PNP		3000	Cable 2 m	IH06-02BPS-VWK	6 025 874
0.08 (2)		NPN		3000	Cable 2 m	IH06-02BNS-VWK	6 025 875
0.08 (2)		PNP		3000	Connector M8 x 1 mm	IH06-02BPS-VTK	6 025 877
0.08 (2)		NPN		3000	Connector M8 x 1 mm	IH06-02BNS-VTK	6 025 878
0.08 (2)		PNP		3000	Connector M8 x 1 mm	IH06-02BPO-VTK	6 025 879
0.2 (4)		PNP		2500	Cable 2 m	IH06-04NPS-VWK	6 025 880
0.2 (4)		NPN		2500	Cable 2 m	IH06-04NNS-VWK	6 025 881
0.2 (4)		PNP		2500	Connector M8 x 1 mm	IH06-04NPS-VTK	6 025 882
0.2 (4)		NPN		2500	Connector M8 x 1 mm	IH06-04NNS-VTK	6 025 883
0.2 (4)		PNP		2500	Connector M8 x 1 mm	IH06-04NPO-VTK	6 025 884

Connection diagram





Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO/NC
bu	blue	3	- V DC



IH 20 Universal

Inductive Proximity Sensors

Highlights

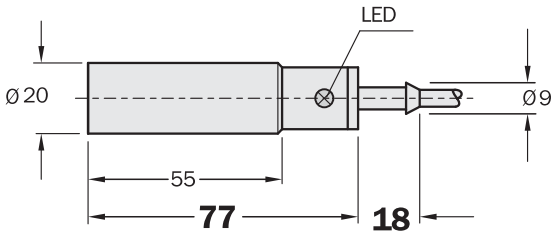
- Unshielded
- Broad operating voltage range in AC and DC
- Short-circuit protection (pulsed)
- Plastic housing
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IH 20 Universal



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

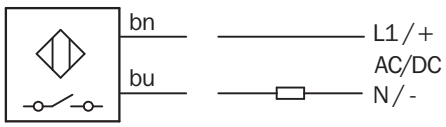
Electrical and mechanical data

Operating voltage U_b	20...250 V AC / DC
Voltage drop U_d (at I_a max.)	≤ 6.5 V AC / ≤ 6 V DC
Continuous current I_a	≤ 350 mA AC (... 50° C), ≤ 250 mA AC (...80° C), ≤ 100 mA DC
Peak current I_k	2.2 A (20 ms / 0.5 Hz)
Min. load current	5 mA
Residual current	≤ 2.5 mA (250 V AC), ≤ 1.3 mA (110 V AC), ≤ 0.8 mA (24 V DC)
Time delay before availability t_v	approx. 45 ms
Hysteresis H	1% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 10% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	-
Short-circuit protection (pulsed)	-
Reverse polarity protection	-
Power-up pulse suppression	Yes
Enclosure rating to EN 60529	IP 67
Protection class	□
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...176° F (-25...80° C)
Housing material	Plastic
Connection cable	PUR-PVC, 2 x 0.5 mm²

Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.4 (10)	⫢	PNP	⏦	25 (AC) / 70 (DC)	Cable 2 m	IH20-10NUS-KU0	7 902 130

Connection diagram



Wire color		Assignment
bn	brown	L1 / +
bu	blue	N / -

IH 34 Universal

Inductive Proximity Sensors

Highlights

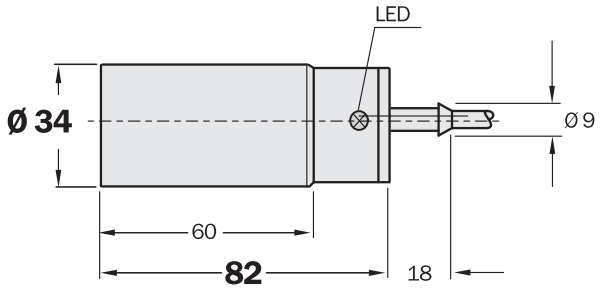
- Enhanced sensing range
- Unshielded
- Broad operating voltage range in AC or DC
- Plastic housing
- IP 67 enclosure rating
- LED status indicator

IH 34 Universal



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

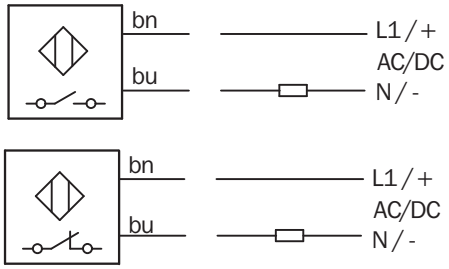
Electrical and mechanical data

Operating voltage U_b	20...250 V AC / DC
Voltage drop U_d (at I_a max.)	≤ 6.5 V AC / ≤ 6 V DC
Continuous current I_a	≤ 350 mA AC (... 50° C), ≤ 250 mA AC (...80° C), ≤ 100 mA DC
Peak current I_k	2.2 A (20 ms / 0.5 Hz)
Min. load current	5 mA
Residual current	≤ 2.5 mA (250 V AC), ≤ 1.3 mA (110 V AC), ≤ 0.8 mA (24 V DC)
Time delay before availability t_v	approx. 8 / 50 ms
Hysteresis H	1% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 10% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	-
Short-circuit protection (pulsed)	-
Reverse polarity protection	-
Power-up pulse suppression	Yes
Enclosure rating to EN 60529	IP 67
Protection class	□
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...176° F (-25...80° C)
Housing material	Plastic
Connection cable	PUR-PVC, 2 x 0.5 mm²

Selection table

Sensing range S_n in (mm)	Installation in metal	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
1.2 (30)	=		7	Cable 2 m	IH34-30NUS-KU0	7 902 134
1.2 (30)	=		7	Cable 2 m	IH34-30NUO-KU0	7 902 135

Connection diagram



Wire color		Assignment
bn	brown	L1 / +
bu	blue	N / -

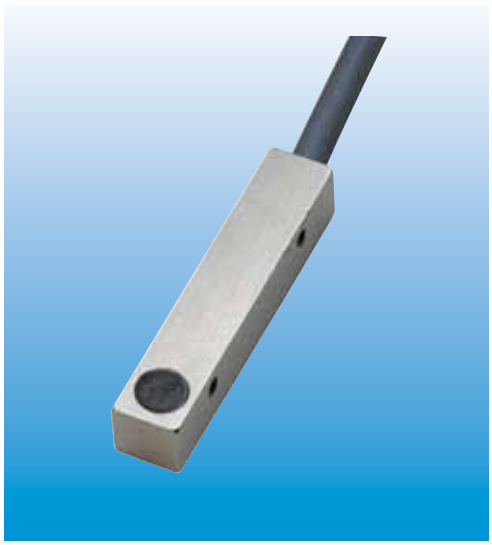
IQ 05 Miniature

Inductive Proximity Sensors

Highlights

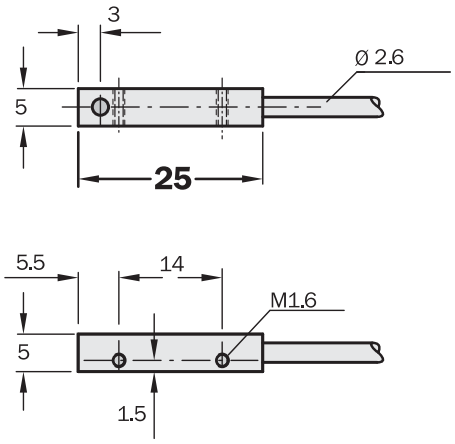
- Shielded
- PNP or NPN output
- Normally open function
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing,nickel-plated
- Cable
- IP 67 enclosure rating
- LED status indicator

IQ 05 Miniature



Dimensional drawing

dimensions in mm

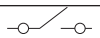
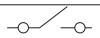
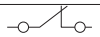
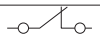


Accessories	page
Cables and connectors	1180
Mounting systems	1234

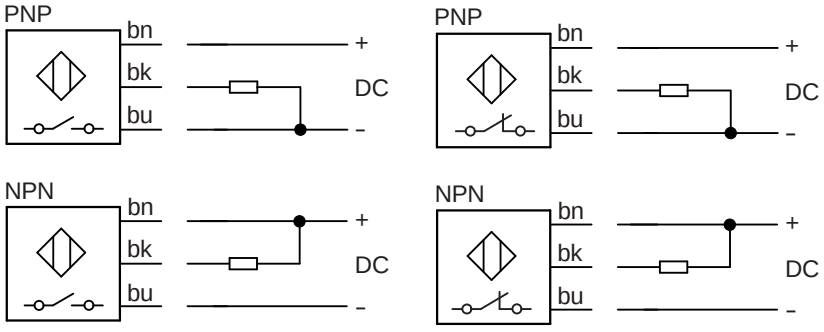
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 20% of U_b
Voltage drop U_b	≤ 2.0 V max. at I_a = 200 mA
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 10 ms
Hysteresis H	10% of sr
Repeatability R (U_b and T_a constant)	≤ 1.5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated,plastic
Connection cable	PUR, 3 x 0.055 mm^2

Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.03 (0.8)		PNP		5000	Cable 2 m	IQ05-0B8PS-ZU1	6 020 161
0.03 (0.8)		NPN		5000	Cable 2 m	IQ05-0B8NS-ZU1	6 020 162
0.03 (0.8)		PNP		5000	Cable 2 m	IQ05-0B8PO-ZU1	6 020 163
0.03 (0.8)		NPN		5000	Cable 2 m	IQ05-0B8NO-ZU1	6 020 164

Connection diagram



Wire color		Assignment
bn	brown	+ V DC
bk	black	NO
bu	blue	- V DC

IQ 08 Standard

Inductive Proximity Sensors

Highlights

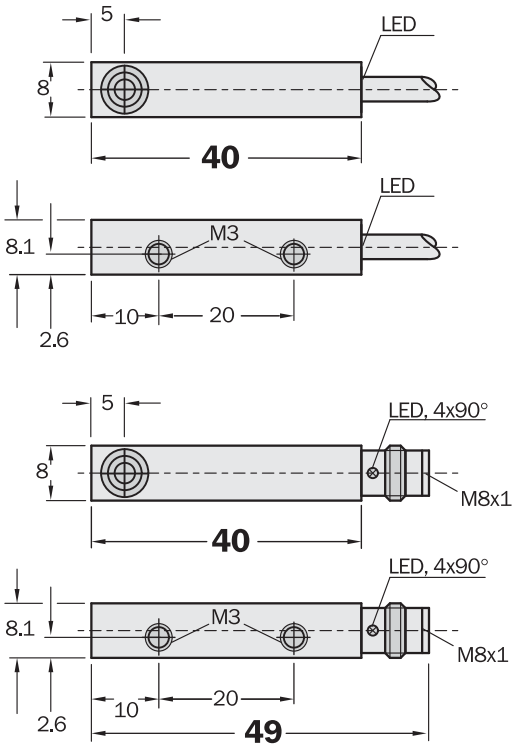
- Shielded or unshielded
- PNP or NPN output
- High switching frequency
- Short-circuit protection (pulsed)
- Small plastic housing
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IQ 08 Advanced



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

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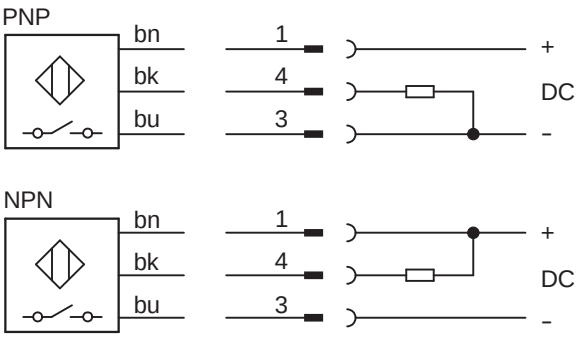
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 1.5 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 300 mA
Time delay before availability t_v	≤ 2 ms
Hysteresis H	1% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 1% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)
Housing material	Plastic
Connection cable	PVC, 3 x 0.25 mm²

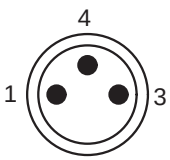
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.08 (2)		PNP		5000	Cable 2 m	IQ08-02BPS-KU0	7 900 195
0.08 (2)		NPN		5000	Cable 2 m	IQ08-02BNS-KU0	7 900 196
0.08 (2)		PNP		5000	Connector M8 x 1 mm	IQ08-02BPS-KT0	7 900 197
0.08 (2)		NPN		5000	Connector M8 x 1 mm	IQ08-02BNS-KT0	7 900 198
0.2 (4)		PNP		5000	Cable 2 m	IQ08-04NPS-KU0	7 900 199
0.2 (4)		PNP		5000	Connector M8 x 1 mm	IQ08-04NPS-KT0	7 900 201

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



IQ 10 Standard

Inductive Proximity Sensors





CE

Highlights

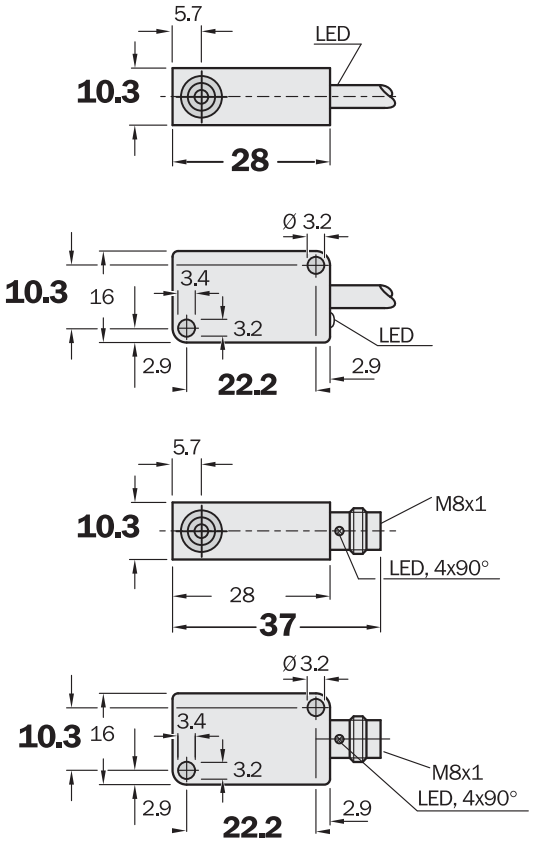
- Shielded or unshielded
- PNP or NPN output
- High switching frequency
- Short-circuit protection (pulsed)
- Plastic housing
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IQ 10 Advanced



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

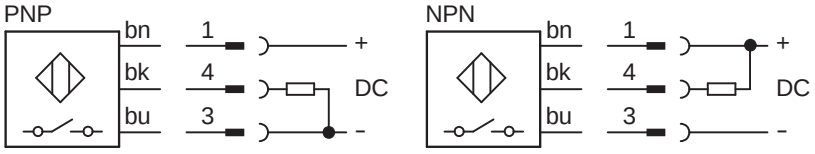
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 1.5 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 300 mA
Time delay before availability t_v	≤ 2 ms
Hysteresis H	1% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 1% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)
Housing material	Plastic
Connection cable	PVC, 3 x 0.25 mm²

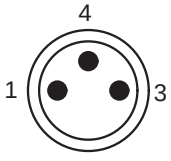
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.1 (3)		PNP		3000	Cable 2 m	IQ10-03BPS-KU0	7 900 203
0.1 (3)		NPN		3000	Cable 2 m	IQ10-03BNS-KU0	7 900 204
0.1 (3)		PNP		3000	Connector M8 x 1 mm	IQ10-03BPS-KT0	7 900 205
0.1 (3)		NPN		3000	Connector M8 x 1 mm	IQ10-03BNS-KT0	7 900 206
0.2 (6)		PNP		3000	Cable 2 m	IQ10-06NPS-KU0	7 900 207
0.2 (6)		NPN		3000	Cable 2 m	IQ10-06NNS-KU0	7 900 208
0.2 (6)		PNP		3000	Connector M8 x 1 mm	IQ10-06NPS-KT0	7 900 209
0.2 (6)		NPN		3000	Connector M8 x 1 mm	IQ10-06NNS-KT0	7 900 210

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



IQ 12 Standard

Inductive Proximity Sensors

Highlights

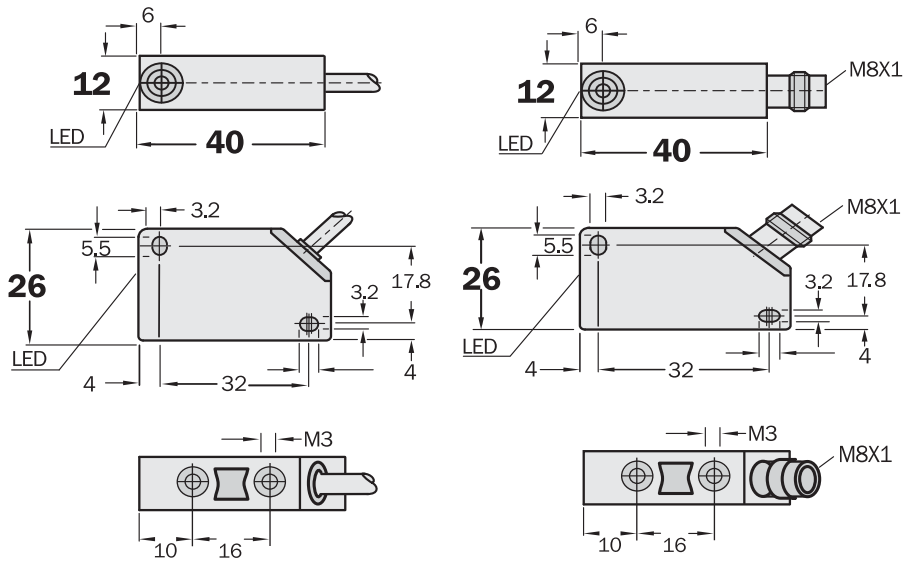
- Shielded or unshielded
- PNP or NPN output
- High switching frequency
- Short-circuit protection (pulsed)
- Plastic housing
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

IQ 12 Advanced



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

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Electrical and mechanical data

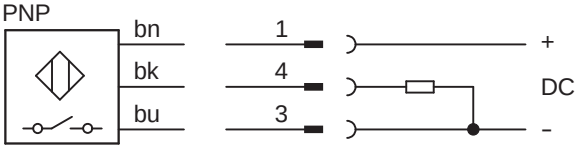
Operating voltage U_b	6...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 1.5 V at I_a max.
Power consumption (without load)	≤ 5 mA
Continuous current I_a	≤ 300 mA
Time delay before availability t_v	≤ 10 ms
Hysteresis H	1% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 1% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)
Housing material	Plastic
Connection cable	PVC, 3 x 0.25 mm²

Selection table

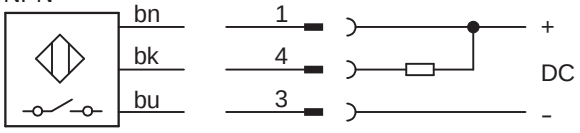
Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.1 (3)		PNP		3000	Cable 2 m	IQ12-03BPS-KW1	1 016 275
0.1 (3)		NPN		3000	Cable 2 m	IQ12-03BNS-KW1	1 016 299
0.1 (3)		PNP		3000	Connector M8 x 1 mm	IQ12-03BPS-KT1	1 016 276
0.1 (3)		NPN		3000	Connector M8 x 1 mm	IQ12-03BNS-KT1	1 016 461
0.2 (6)		PNP		1000	Cable 2 m	IQ12-06NPS-KW1	1 016 463
0.2 (6)		PNP		1000	Connector M8 x 1 mm	IQ12-06NPS-KT1	1 016 467

Connection diagram

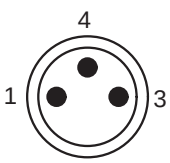
PNP



NPN



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



IQ 40 Short

Inductive Proximity Sensors





Highlights

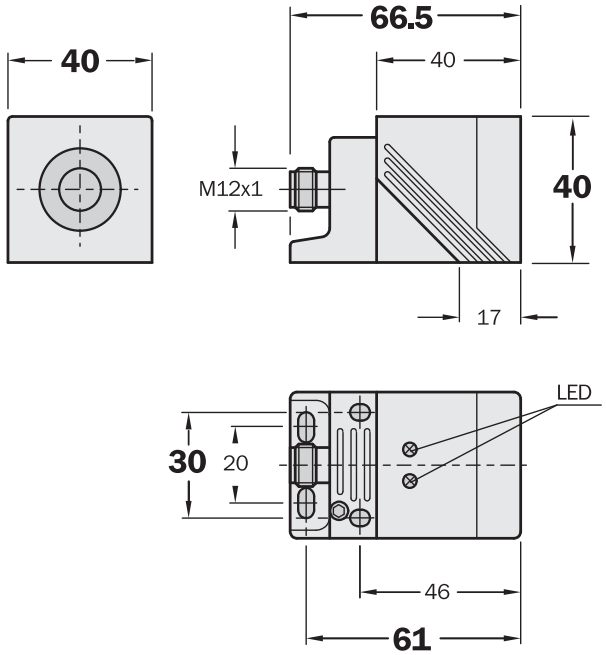
- Shielded or unshielded
- User-selectable sensing position, adjusts to 5 sensing directions
- PNP output
- NO and complementary output function
- Short-circuit protection (pulsed)
- Plastic housing
- Connector
- IP 67 enclosure rating
- LED status indicator and LED function indicator

IQ 40 Short



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

Electrical and mechanical data

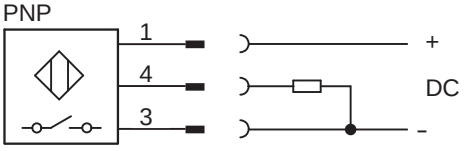
Operating voltage U_b	10...36 V DC
Voltage drop U_b	≤ 2.5 V at I_a max. and U_b 24 V
Power consumption (without load)	≤ 15 mA
Continuous current I_a	≤ 250 mA
Time delay before availability t_v	approx. 4 ms
Hysteresis H	1% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 10% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Protection class	□
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Plastic

Selection table

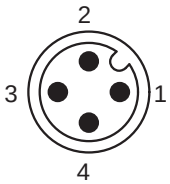
Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.6 (15)		PNP		200	Connector M12 x 1 mm	IQ40-15BPS-KC0	7 900 223
0.8 (20)		PNP	programmable	300	Connector M12 x 1 mm	IQ40-20BPP-KCK	6 012 014
1.4 (35)		PNP		100	Connector M12 x 1 mm	IQ40-35NPS-KC0	7 900 224
1.4 (35)		PNP	programmable	100	Connector M12 x 1 mm	IQ40-35NPP-KCK	6 012 015

Connection diagram

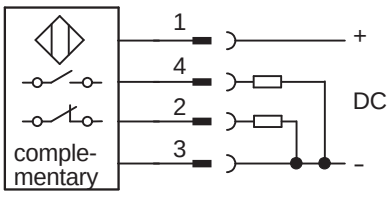
PNP



Contact	Assignment
1	+ V DC
4	NO
3	- V DC
2	free



PNP



Contact	Assignment
1	+ V DC
2	NC
3	- V DC
4	NO

IQ 40 Short, Magnetic Field Immune

Inductive Proximity Sensors



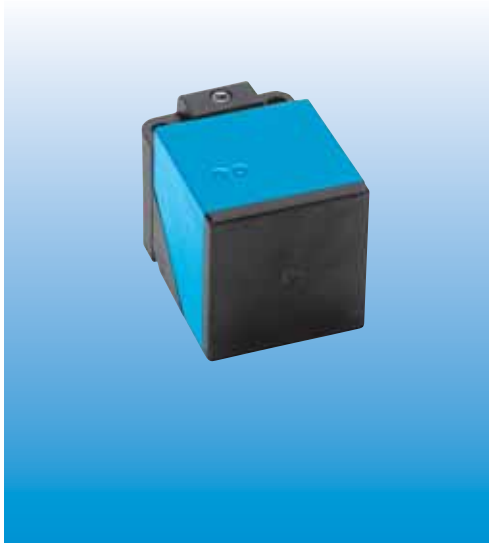


CE

Highlights

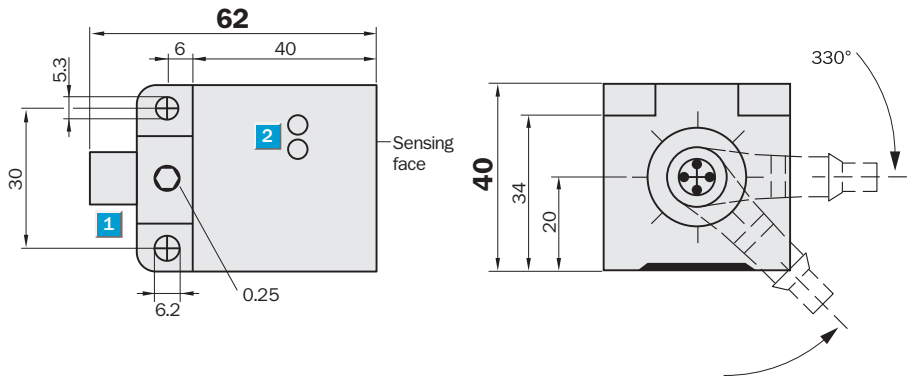
- Variable switching zone
- Complementary output function
- Connector, 330° rotatable
- IP 67 enclosure rating
- Factor 1 for all metals
- Magnetic field immune (weld field immune)

IQ 40 Short



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information	
Type	**Part no.**
IQ40-35NPP-KCM	6 025 813
Teflon cap	7 029 877

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Electrical and mechanical data

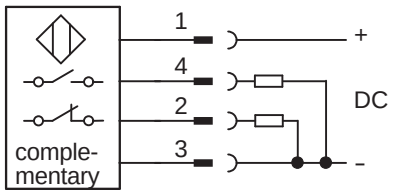
Electrical configuration	DC 4-wire
Supply voltage V_S	10…30 V DC
Voltage drop U_d	≤ 2.5 V at I_a max and U_b 24 V
Current consumption (without load)	≤ 15 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 30 ms
Hysteresis H	1…15% of S_r
Repeatability R (U_b and T_a constant)	≤ 5% of S_r
Temperature drift	± 10%
EMC	According to EN 60947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Protection class	□
Dimensions	40 x 40 x 62 mm
Factor 1 for all metals	Yes
Magnetic field immune	Yes
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10…55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)
Housing material	Plastic

Selection table

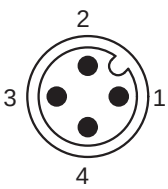
Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
1.4 (35)		PNP	 complementary	200	Connector M12 x 1 mm	IQ40-35NPP-KCM	6 025 813

Connection diagram

PNP



Contact	Assignment
1	+ V DC
2	NC
3	- V DC
4	NO



IQ 40 Standard (Long)

Inductive Proximity Sensors

Highlights

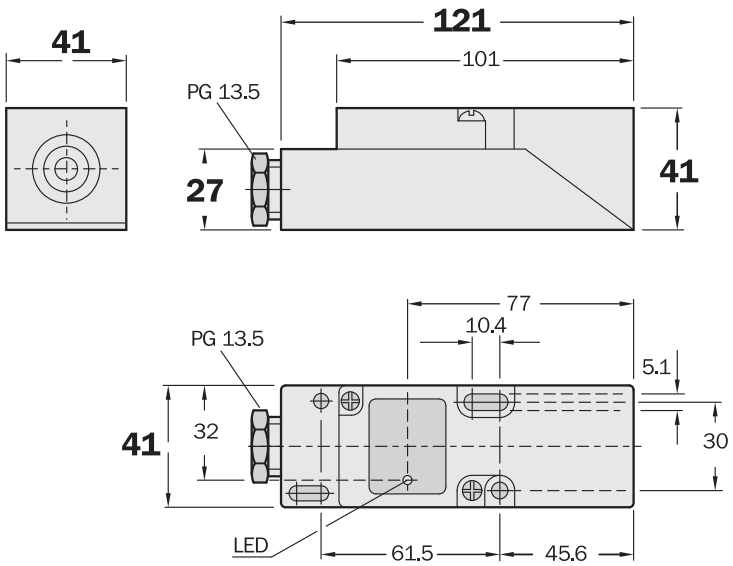
- Shielded or unshielded
- User-selectable sensing position, adjusts to 5 sensing directions
- DC 3-wire
- Programmable NO/NC function
- Short-circuit protection (pulsed)
- Plastic housing
- Terminal connection
- IP 65 enclosure rating
- LED status indicator

IQ 40 Standard



Dimensional drawing

dimensions in mm

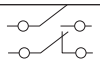


Accessories	page
Cables and connectors	1180
Mounting systems	1234

Electrical and mechanical data

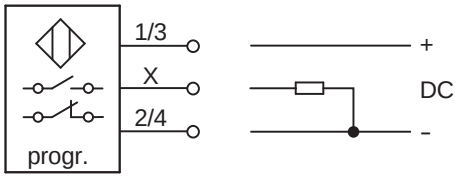
Operating voltage U_b	10...36 V DC
Voltage drop U_b	≤ 2.5 V at I_a max. and U_b 24 V
Power consumption (without load)	≤ 15 mA
Continuous current I_a	≤ 250 mA
Time delay before availability t_v	approx. 4 ms
Hysteresis H	1% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 10% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 65
Protection class	□
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	13...176° F (-25...80° C)
Housing material	Plastic

Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.6 (15)		PNP	 programmable	300	Terminal up to 2.5 mm²	IQ40-15BPP-KK0	7 900 219
0.8 (20)		PNP	 programmable	300	Terminal up to 2.5 mm²	IQ40-20NPP-KK0	7 900 221

Connection diagram

PNP



Programming with wirelinks
Link closed: NO
Link open: NC

Terminal	Assignment
1/3	+ V DC
X	NO/NC
2/4	- V DC

IQ 40 Standard

Inductive Proximity Sensors

Highlights

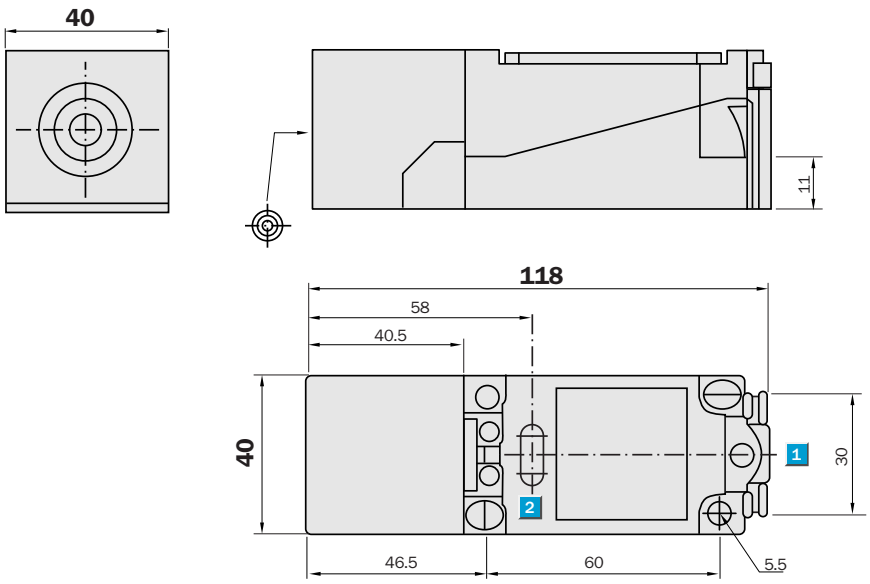
- Terminal connection
- User-selectable sensing position, adjusts to 5 sensing directions
- DC 4-wire
- IP 68 enclosure rating
- Short-circuit protection (pulsed)
- Switching status LED, yellow
- Operating voltage status LED, green

IQ 40 Standard



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Electrical and mechanical data

Electrical configuration	DC 4-wire
Operating voltage U_b	10...60 V DC
Voltage drop U_b	≤ 2.8 V at I_a max. and U_b 60 V
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Temperature drift	± 10% of S_r
EMC	to EN 60947-5-2
Enclosure rating to EN 60529	IP 68
Dimensions	40 x 40 x 118 mm
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Protection class	□
Shock and vibration stress	30 g, 11 ms, 10…55 Hz, 1 mm
Ambient temperature T_a	13...158° F (-25...70° C)
Housing material	Plastic, PBT

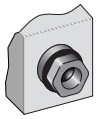
Selection table

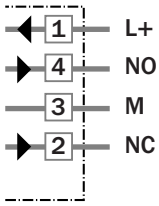
Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.6 (15)		PNP	 complementary	150	Cable gland, Terminal	IQ40-15BPP-KK1	6 025 814
0.8 (20)		PNP	 complementary	150	Cable gland, Terminal	IQ40-20NPP-KK1	6 025 815

Connection diagram

IQ40-15BPP-KK1

IQ40-20NPP-KK1





IQ 40 DC 2-wire

Inductive Proximity Sensors

Highlights

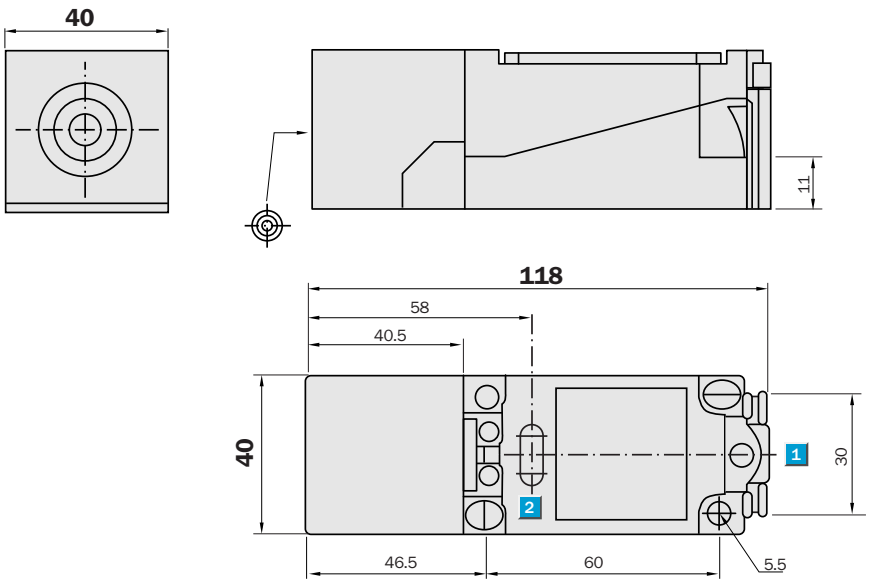
- Terminal connection
- User-selectable sensing position, adjusts to 5 sensing directions
- DC 2-wire
- IP 68 enclosure rating
- Switching output: NO/NC
- Broad supply voltage range in DC

IQ 40 Standard



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED

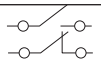
Accessories	page
Cables and connectors	1180
Mounting systems	1234

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Electrical and mechanical data

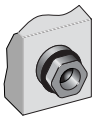
Electrical configuration	DC 2-wire
Operating voltage U_b	5...60 V DC
Voltage drop U_b	≤ 5 V at I_a max. and U_b 60 V
Continuous current I_a	≤ 200 mA
Residual current	≤ 1 mA
Temperature drift	± 10% of S_r
EMC	to EN 60947-5-2
Enclosure rating to EN 60529	IP 68
Dimensions	40 x 40 x 118 mm
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Protection class	□
Shock and vibration stress	30 g, 11 ms, 10…55 Hz, 1 mm
Ambient temperature T_a	13...158° F (-25...70° C)
Housing material	Plastic, PBT

Selection table

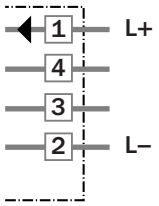
Sensing range S_n in (mm)	Installation in metal	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.6 (15)		 programmable	400	Cable gland, Terminal	IQ40-15BDP-KK1	6 025 817

Connection diagram

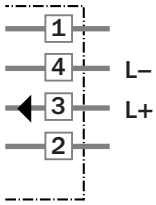
IQ40-15BDP-KK1



NC



NO



IQ 40 AC 2-wire

Inductive Proximity Sensors

Highlights

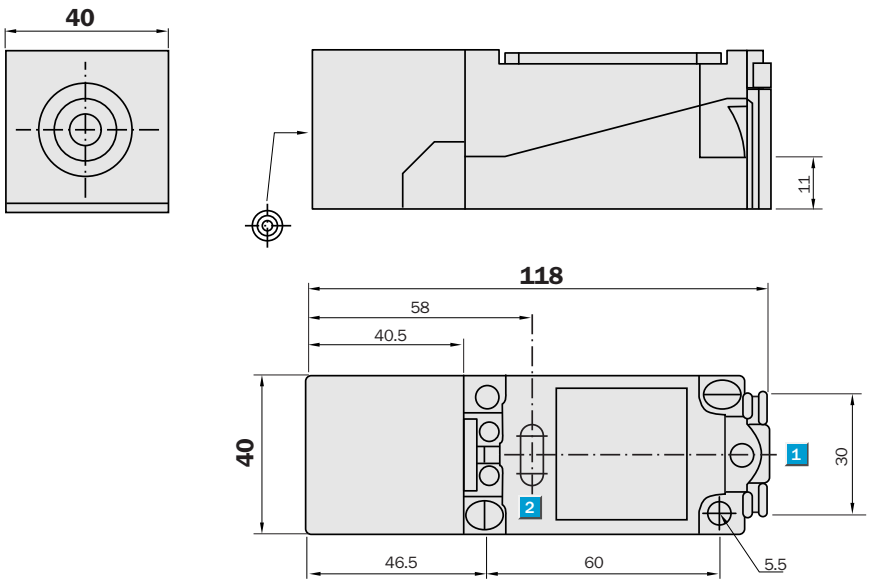
- Terminal connection
- User-selectable sensing position, adjusts to 5 sensing directions
- AC 2-wire
- IP 68 enclosure rating
- Switching output: NO/NC
- Broad supply voltage range in AC

IQ 40 Standard



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED

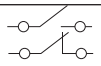
Accessories	page
Cables and connectors	1180
Mounting systems	1234

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Electrical and mechanical data

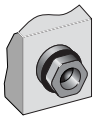
Electrical configuration	AC 2-wire
Operating voltage U_b	20...253 V AC
Voltage drop U_b	≤ 12 V
Continuous current I_a	≤ 500 mA
Intermittent current I_k	3 A (20 ms/0.1 Hz)
Residual current	≤ 1.95 mA
Temperature drift	± 10% of S_r
EMC	to EN 60947-5-2
Enclosure rating to EN 60529	IP 68
Dimensions	40 x 40 x 118 mm
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Protection class	□
Shock and vibration stress	30 g, 11 ms, 10…55 Hz, 1 mm
Ambient temperature T_a	13...158° F (-25...70° C)
Housing material	Plastic, PBT

Selection table

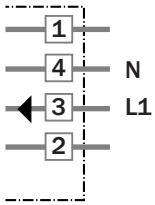
Sensing range S_n in (mm)	Installation in metal	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.6 (15)		 programmable	20	Cable gland, Terminal	IQ40-15BAP-KK1	6 025 816

Connection diagram

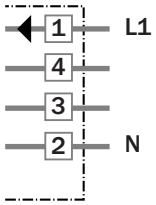
IQ40-15BAP-KK1



NC



NO



IQ 40 Universal (Long)

Inductive Proximity Sensors

Highlights

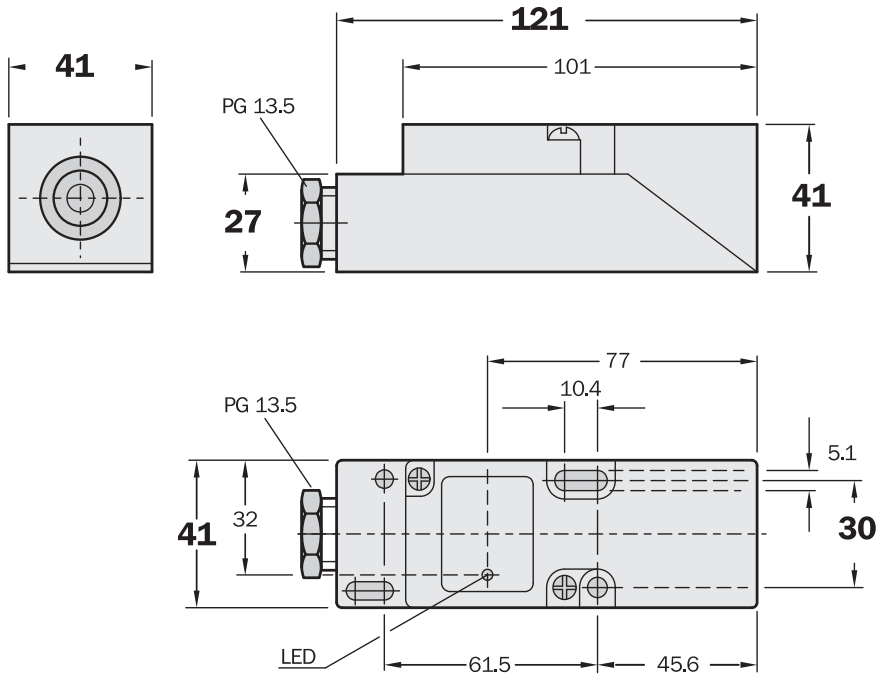
- Shielded or unshielded
- User-selectable sensing position, adjusts to 5 sensing directions
- Broad operating voltage range in AC and DC
- Programmable switching output: NO or NC
- Plastic housing
- IP 65 enclosure rating
- Terminal connection
- LED status indicator

IQ 40 Universal



Dimensional drawing

dimensions in mm

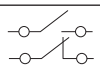


Accessories	page
Cables and connectors	1180
Mounting systems	1234

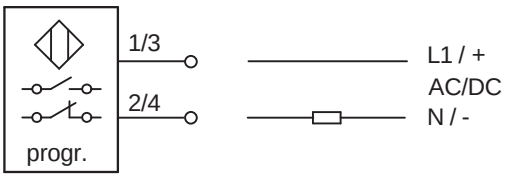
Electrical and mechanical data

Operating voltage U_b	20...250 V AC / DC
Voltage drop U_b	≤ 6.5 V AC / ≤ 6 V DC with I_a max.
Continuous current I_a	≤ 350 mA AC (...+50° C), ≤ 250 mA AC (...+80° C), ≤ 100 mA DC
Peak current I_k	2.2 A (20 ms / 0.5 Hz)
Min. load current	5 mA
Residual current	≤ 2.5 mA (250 V AC), ≤ 1.3 mA (110 V AC), ≤ 0.8 mA (24 V DC)
Time delay before availability t_v	approx. 8 ms
Hysteresis H	1% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 10% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	-
Short-circuit protection (pulsed)	-
Reverse polarity protection	-
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 65
Protection class	□
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	13...176° F (-25...80° C)
Housing material	Plastic

Selection table

Sensing range S_n in (mm)	Installation in metal	Output function	Switching frequency f in Hz	Connection	Type	Part no.
0.6 (15)		 programmable	20 (AC) / 55 (DC)	Terminal up to 2.5mm²	IQ40-15BUP-KK0	7 902 136
0.8 (20)		 programmable	20 (AC) / 55 (DC)	Terminal up to 2.5mm²	IQ40-20NUP-KK0	7 902 137

Connection diagram



Programming with wire links
Link closed: NO
Link open: NC

Terminal	Assignment
1/3	L1 / +
2/4	N / -

IQ 80 Standard

Inductive Proximity Sensors





CE

Highlights

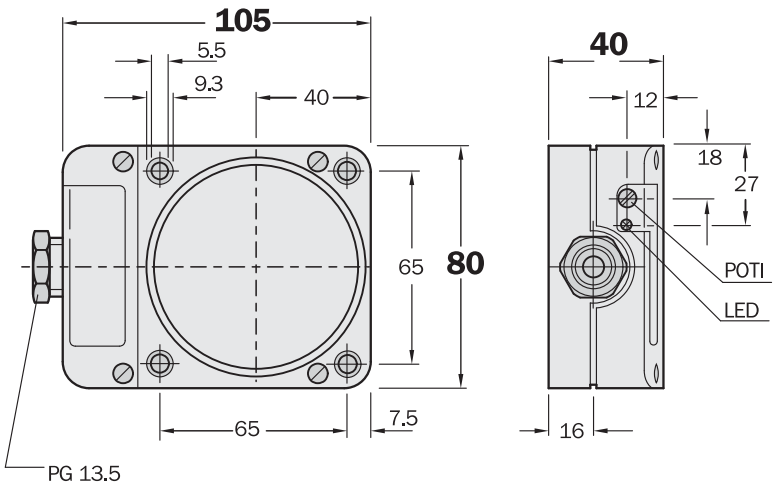
- Unshielded
- Adjustable sensing distance from 20 to 60 mm
- PNP output
- Programmable NO/NC function
- Short-circuit protection (pulsed)
- Robust plastic housing
- Terminal connection
- IP 65 enclosure rating
- LED status indicator

IQ 80 Advanced



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

Electrical and mechanical data

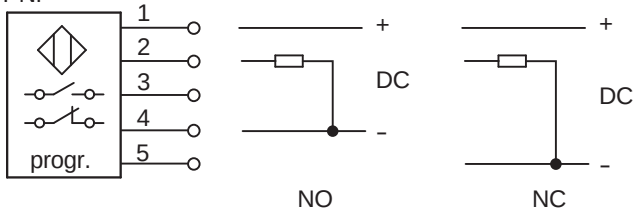
Operating voltage U_b	10...36 V DC
Voltage drop U_b	≤ 2.5 V at I_a max. and U_b 24 V
Power consumption (without load)	≤ 15 mA
Continuous current I_a	≤ 250 mA
Time delay before availability t_v	approx. 250 ms
Hysteresis H	1% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 10% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 65
Protection class	□
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	13...176° F (-25...80° C)
Housing material	Plastic

Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
2.4 (60)	⊟	PNP	programmable	4	Terminal up to 2.5 mm²	IQ80-60NPP-KK0	7 900 227

Connection diagram

PNP



Terminal	Assignment
1	+ V DC
2	Output
3	free
4	- V DC/ NO
5	- V DC/ NC

IQ 80 Universal

Inductive Proximity Sensors

Highlights

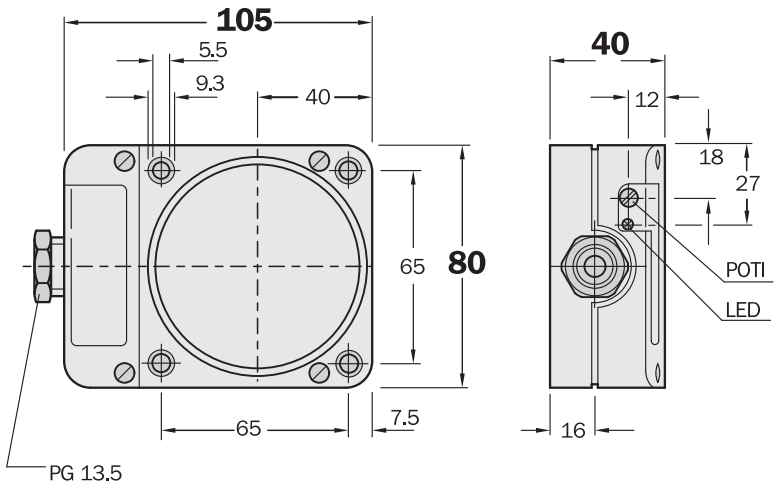
- Unshielded
- Adjustable sensing distance from 20 to 60 mm
- Broad operating voltage range in AC and DC
- Robust plastic housing
- Programmable switching output: NO or NC
- IP 65 enclosure rating
- Terminal connection
- LED status indicator

IQ 80 Universal



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Mounting systems	1234

Electrical and mechanical data

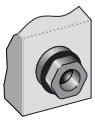
Switching output	PNP/NPN
Electrical configuration	AC/DC 2-wire
Operating voltage U_b	20...250 V AC / DC
Voltage drop U_b	≤ 6.5 V AC / ≤ 6 V DC with I_a max.
Continuous current I_a	≤ 350 mA AC (...+50° C), ≤ 250 mA AC (...+80° C), ≤ 100 mA DC
Peak current I_k	2.2 A (20 ms / 0.5 Hz)
Min. load current	5 mA
Residual current	≤ 2.5 mA (250 V AC), ≤ 1 mA (24 V DC)
Time delay before availability t_v	approx. 8 ms
Hysteresis H	1% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 10% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 65
Protection class	□
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	13...176° F (-25...80° C)
Housing material	Plastic

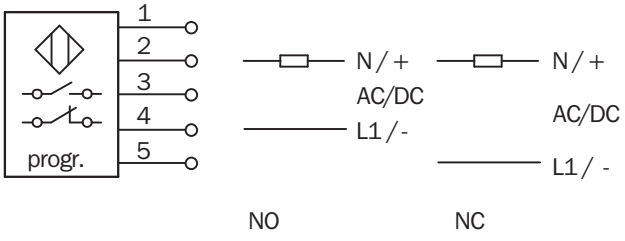
Selection table

Sensing range S_n in (mm)	Installation in metal	Output function	Switching frequency f in Hz	Connection	Type	Part no.
2.4 (60)		 programmable	4	Terminal up to 2.5 mm²	IQ80-60NUP-KK0	7 902 138

Connection diagram

IQ80-60NUP-KK0





Terminal	Assignment
1	free
2	N/+
3	free
4	L1/- (NO)
5	L1/- (NC)

IQ 80 DC M12

Inductive Proximity Sensors

Highlights

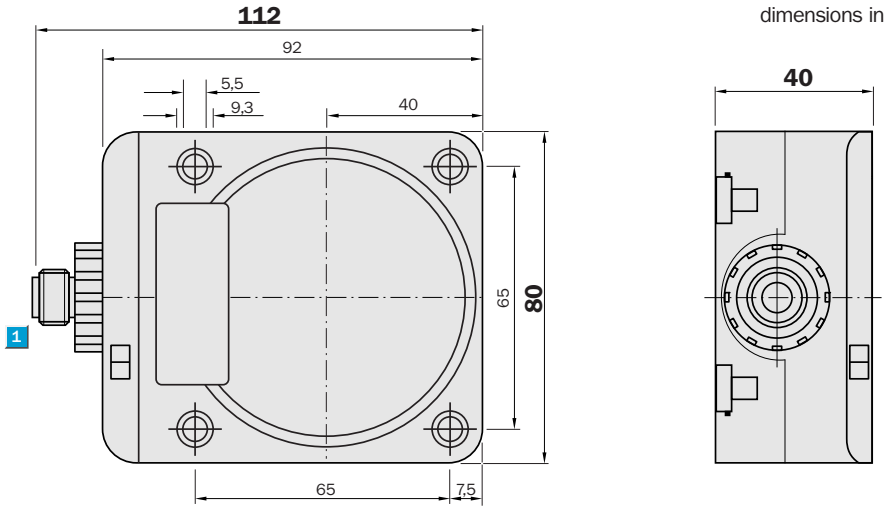
- Can be installed shielded, unshielded, or over-flush in metal
- Switching distance 50 mm (flush or over-flush installation), switching distance max. 5.5 mm reduced (unshielded installation)
- Antivalent output functions
- Connector M12 (rotatable 45° steps)
- Switching mode, yellow

IQ 80 M12



Dimensional drawing

dimensions in mm



1 Connection

Accessories	page
Cables and connectors	1180
Mounting systems	1234

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Electrical and mechanical data

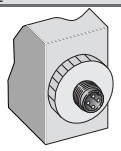
Switching output	PNP
Electrical configuration	DC 4-wire
Operating voltage U_b	10…36 V DC
Voltage drop U_d at I_a max and U_b 24 V	≤ 2.5 V
Current consumption without load	≤ 20 mA
Continuous current I_a	≤ 250 mA
Hysteresis H	1…15% of s_r
Repeatability R (U_b and T_a constant)	≤ 10% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protected	Yes
Reverse-polarity protected	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 60529	□
Dimensions	3.1 x 1.6 x 4.4 in(80 x 40 x 112 mm)
Protection class	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	13...158° F (-25...70° C)
Housing material	PPE, zinc die-cast, nickel special coated

Selection table

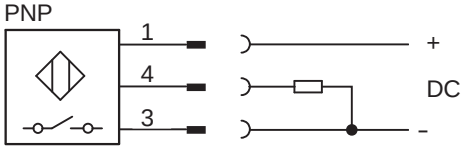
Sensing range S_n in (mm)	Installation in metal	Output function	Switching frequency f in Hz	Connection	Type	Part no.
1.8/2/2 44.5/50/50		 complementary	70	M12 plug, 4-pin	IQ80-50BPP-KC0	6 026 473

Connection diagram

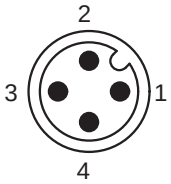
IQ80-50BPP-KC0



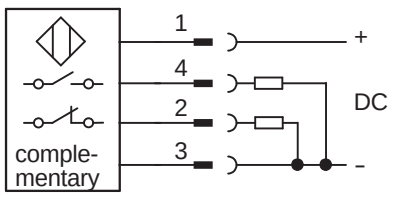
PNP



Contact	Assignment
1	+ V DC
4	NO
3	- V DC
2	free



PNP



Contact	Assignment
1	+ V DC
2	NC
3	- V DC
4	NO



Capacitive proximity sensors

- High level of temperature stability
- Enhanced sensing ranges for functional reserve
- High level of immunity against:
  - Electrostatic discharge, e.g. in plastic or wood production
  - Electromagnetic interference, e.g. caused by radio transceivers and mobile telephones
  - Interference surge voltage caused by switching devices or solenoid valves
  - Conducted high frequency, e.g. frequency converters or switched-mode power supplies

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CM Series	
CM18	230
CM30	234

CQ series	
CQ28	238
CQ35	240

Theory of Operation...Capacitive Proximity Sensors

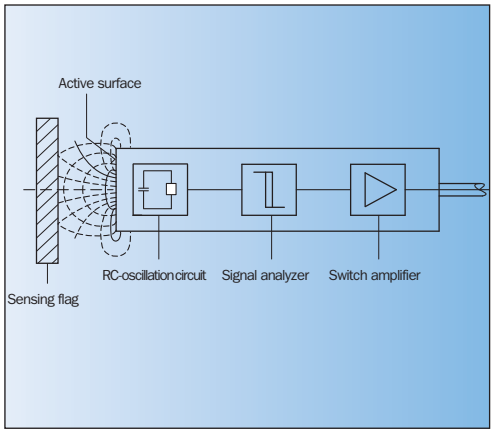


Fig. 1 Capacitive proximity sensor makeup

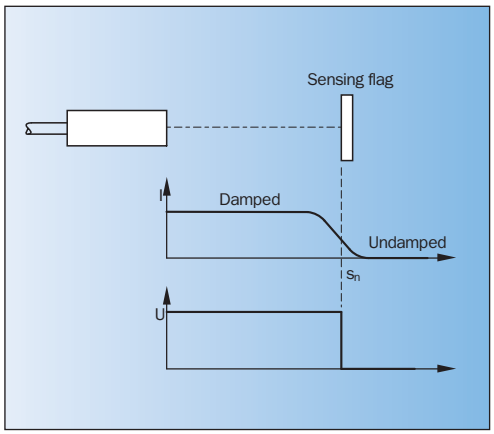


Fig. 2 Damped vs. undamped materials

The most important reduction factors for capacitive proximity sensors are:

iron, earthed	1.0
water	1.0
(corn)	0.3...0.6
(moisture content 12%)	
wood	0.2...0.9
glass	0.3...0.7
oil	0.2
PVC	0.4
PE	0.37
ceramic material	0.3

The reduction factor depends on the water content of the material.

Fig. 3 Reduction factors for capacitive proximity sensors

About Capacitive Proximity Sensors

The active element of a capacitive proximity sensor is formed by two metallic electrodes positioned much like an "opened" capacitor (see Fig. 1). Electrodes A and B are placed in the feedback loop of a high frequency oscillator. When no target is present, the sensor's capacitance is low, therefore the oscillation amplitude is small. When a target approaches the face of the sensor, it increases the capacitance of the capacitor. This increase, in return, increases the amplitude of oscillation. The amplitude of oscillation is measured by an evaluating circuit that generates a signal to turn the output ON or OFF.

Capacitance (C) is a function of the surface area of either electrode (A), the distance between the electrodes (d), and the dielectric constant of the material (e) between the electrodes.

When a conductive target enters the sensor's field, it forms a counter electrode to the active face of the sensor, thus decreasing the distance between the electrodes (d), and increasing the average surface area (A) of the electrodes. The capacitance with a metal target present is always greater than the capacitance of the circuit in the absence of the target. Reduction factors for different metals are not a consideration when using capacitive sensors (see Fig. 3).

When a non-conductive target enters the sensor's field, it acts as an electrical insulator between electrodes. The dielectric constant of the material (e symbol) is a measure of its insulation properties. All liquids and solids have a greater dielectric constant than air (e symbol = 1). Therefore, the capacitance with a non-metallic target present is always greater than the capacitance of the circuit in the absence of the target. This change is nevertheless very small, so only a short sensing range can be achieved.

The nominal sensing ranges refer, as with inductive sensors, to a metal target (mild steel). On different materials, different sensing ranges apply.

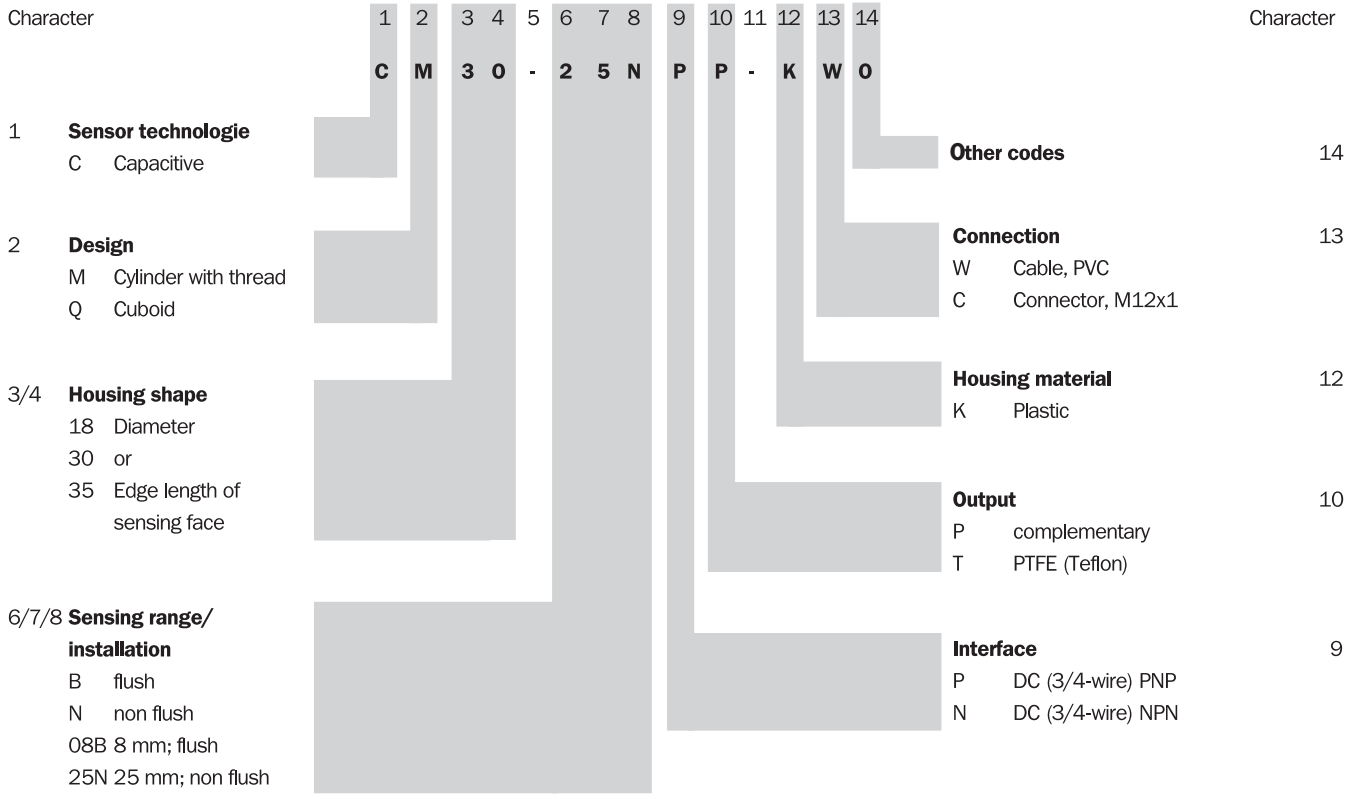
EMC-overview

Test	Standard	Product Standard EN 60947-5-2	Generic Standard EN 50082-2	SICK Capacitive Sensors
Electrostatic Discharge ESD	EN 61000-4-2 (IEC 1000-4-2)	4 kV cd / 8 kV ad*	4 kV cd78 kV ad*	17 kV cd/ad*
HF radiated	EN 61000-4-3 (IEC 1000-4-3)	3 V/m 80 ... 1000 MHz	10 V/m 80 ... 1000 MHz	< 15 V/m 80 ... 1000 MHz
HF wire conducted	EN 61000-4-6 (IEC 1000-4-6)	–	10 V 0,15 ... 80 MHz	> 10 V
Burst	EN 61000-4-4 (IEC 1000-4-4)	1 kV	2 kV	4 kV
Surge	IEC 255-5	1 kV, 500 Ohm	–	2.5 kV, 500 Ohm

*cd = contact discharge ad = air discharge

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Capacitive Proximity Sensors...Type Code



Selection Table...Capacitive Proximity Sensors

Capacitive Proximity Sensors

Sensor Type	Housing			Sensing Range s_n in mm		Switching Output		2-Wire
	Design	Size in mm	Material	Shielded	Unshielded	PNP	NPN	AC
CM 18 Capacitive	Barrel, threaded	M18	Plastic	8	12	■	■	
CM 18-PTFE Capacitive	Barrel, threaded	M18	PTFE	8		■	■	
CM 30 Capacitive	Barrel, threaded	M30	Plastic	16	25	■	■	
CM 30 Capacitive AC	Barrel, threaded	M30	Plastic	16	25			■
CQ 28 Capacitive	Rectangular, flat		Plastic	10		■	■	
CQ 35 Capacitive	Rectangular		Plastic		25	■	■	

Capacitive Proximity Sensors							
Sensor Type	**Output Function**			**Connection Type**		**Enclosure Rating**	**Page**
	NO	NC	NO/NC	Cable	Connector		
CM 18 Capacitive			■	■	■	IP 67	228
CM 18-PTFE Capacitive			■	■	■	IP 67	230
CM 30 Capacitive			■	■	■	IP 67	234
CM 30 Capacitive AC			■	■		IP 67	236
CQ 28 Capacitive			■	■		IP 68	238
CQ 35 Capacitive			■	■	■	IP 67	240

Please note:
NO = normally open
NC = normally closed
NO/NC = complementary

CM 18 Capacitive

Capacitive Proximity Sensors

Highlights

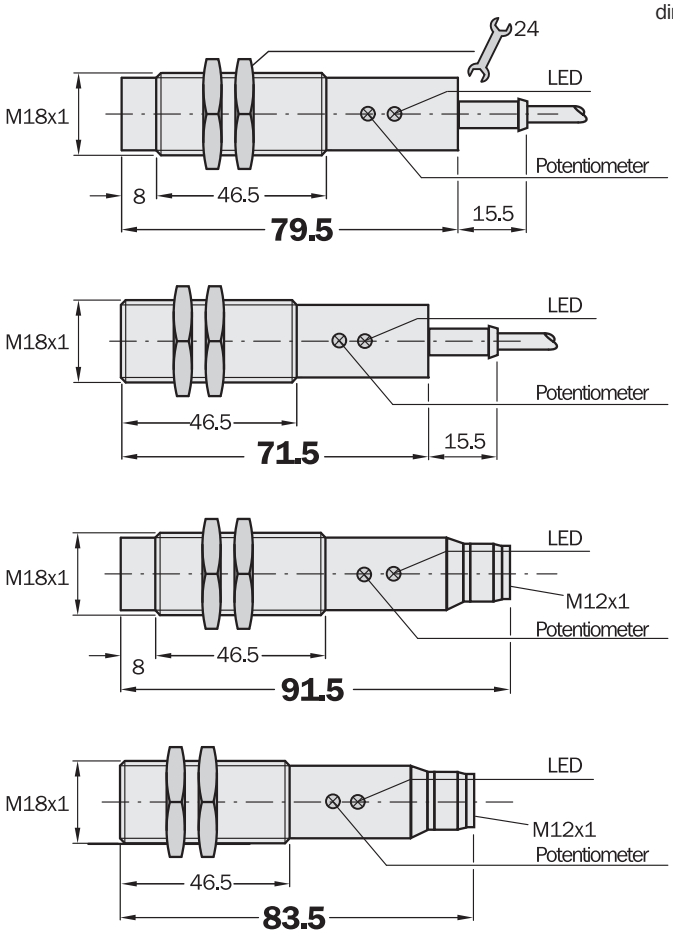
- High EMC-immunity
- Shielded or unshielded
- PNP or NPN output
- Adjustable sensing range
- Complementary output function
- Short-circuit protection (pulsed)
- Plastic housing with fine thread M18 x 1 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

CM 18 Capacitive



Dimensional drawing

dimensions in mm

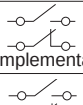


Accessories	page
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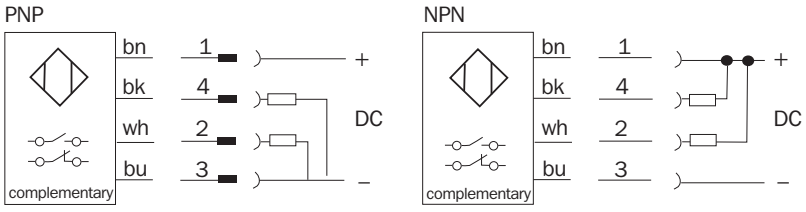
Electrical and mechanical data

Operating voltage U_b	10...40 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 2.5 V
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 100 ms
Hysteresis H	4% - 20% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	13...176° F (-25...80° C)
Housing material	Plastic
Tightening torque	2.6 Nm
Connection cable	PVC, 4 x 0.34 mm^2

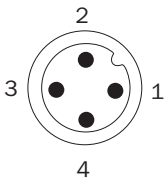
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.3 (8)		PNP	 complementary	30	Cable 2 m	CM18-08BPP-KW1	6 020 136
0.3 (8)		PNP	 complementary	30	Connector M12 x 1 mm	CM18-08BPP-KC1	6 020 388
0.3 (8)		NPN	 complementary	30	Cable 2 m	CM18-08BNP-KW1	6 021 455
0.3 (8)		NPN	 complementary	30	Connector M12 x 1 mm	CM18-08BNP-KC1	6 020 410
0.5 (12)		PNP	 complementary	30	Cable 2 m	CM18-12NPP-KW1	6 020 389
0.5 (12)		PNP	 complementary	30	Connector M12 x 1 mm	CM18-12NPP-KC1	6 021 456
0.5 (12)		NPN	 complementary	30	Cable 2 m	CM18-12NNP-KW1	6 021 457
0.5 (12)		NPN	 complementary	30	Connector M12 x 1 mm	CM18-12NNP-KC1	6 021 458

Connection diagram



Wire Color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
wh	white	2	NC
bu	blue	3	- V DC



CM 18-PTFE Capacitive

Capacitive Proximity Sensors

Highlights

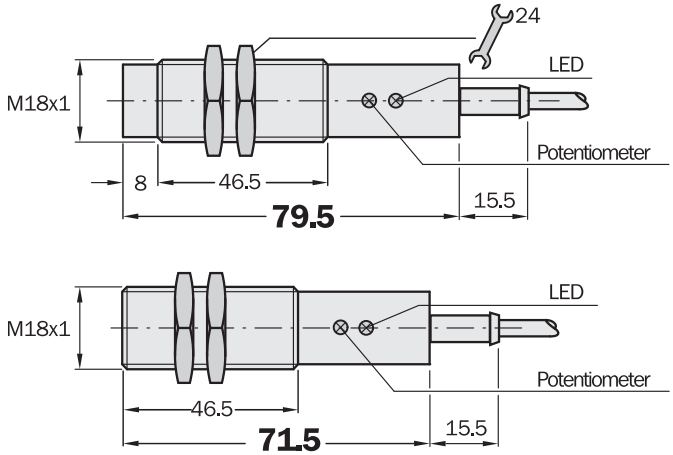
- High EMC-immunity
- Shielded
- PNP or NPN output
- Adjustable sensing range
- Complementary output function
- Short-circuit protection (pulsed)
- PTFE housing with fine thread M18 x 1 mm, PVC cable
- IP 67 enclosure rating
- LED status indicator

CM 18 Capacitive



Dimensional drawing

dimensions in mm



Accessories	page
Mounting systems	1234

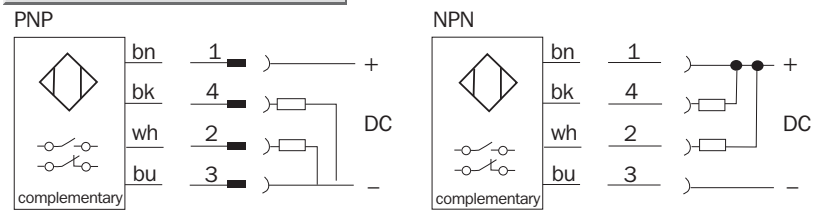
Electrical and mechanical data

Operating voltage U_b	10...40 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 2.5 V
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 100 ms
Hysteresis H	4% - 20% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	13...140° F (-25...60° C)
Housing material	PTFE
Tightening torque	2.6 Nm
Connection cable	PVC, 4 x 0.34 mm^2

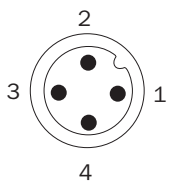
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.3 (8)		PNP	 complementary	30	Cable 2 m	CM18-08BPP-TWO	6 026 195
0.3 (8)		NPN	 complementary	30	Cable 2 m	CM18-08BNP-TWO	6 026 194

Connection diagram



Wire Color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
wh	white	2	NC
bu	blue	3	- V DC



CM 30 Capacitive

Capacitive Proximity Sensors

Highlights

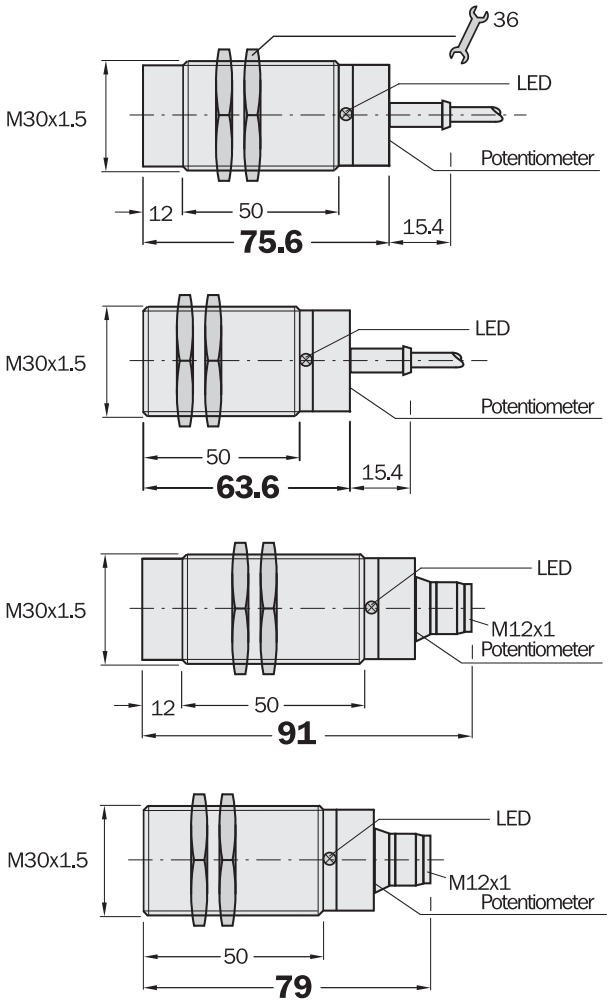
- High EMC-immunity
- Shielded or unshielded
- PNP output
- Adjustable sensing range
- Complementary output function
- Short-circuit protection (pulsed)
- Plastic housing with fine thread M30 x 1.5 mm
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

CM 30 Capacitive



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
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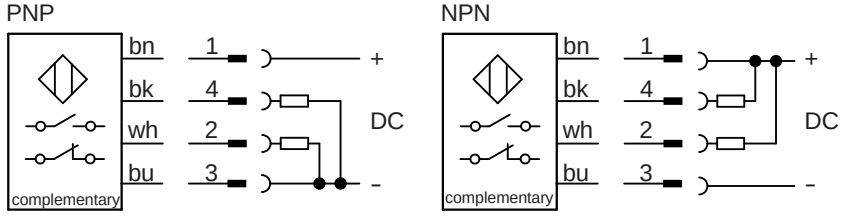
Electrical and mechanical data

Operating voltage U_b	10...40 V DC
Ripple U_{pp}	≤ 10% U_b
Voltage drop U_b	≤ 2.5 V
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 100 ms
Hysteresis H	4% - 20% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	13...176° F (-25...80° C)
Housing material	Plastic
Tightening torque	7.5 Nm
Connection cable	PVC, 4 x 0.34 mm^2

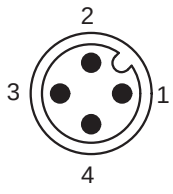
Selection table

Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.6 (16)		PNP	complementary	50	Cable 2 m	CM30-16BPP-KW1	6 020 473
0.6 (16)		PNP	complementary	50	Connector M12 x 1 mm	CM30-16BPP-KC1	6 020 475
0.6 (16)		NPN	complementary	50	Cable 2 m	CM30-16BNP-KW1	6 021 459
0.6 (16)		NPN	complementary	50	Connector M12 x 1 mm	CM30-16BNP-KC1	6 021 460
1.0 (25)		PNP	complementary	50	Cable 2 m	CM30-25NPP-KW1	6 020 476
1.0 (25)		PNP	complementary	50	Connector M12 x 1 mm	CM30-25NPP-KC1	6 020 477
1.0 (25)		NPN	complementary	50	Cable 2 m	CM30-25NNP-KW1	6 021 461
1.0 (25)		NPN	complementary	50	Connector M12 x 1 mm	CM30-25NNP-KC1	6 021 462

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
wh	white	2	NC
bu	blue	3	- V DC



CM 30 Capacitive AC

Capacitive Proximity Sensors

0.08...0.6 in (2...16 mm)
0.16...1.0 in (4...25 mm)
sensing range

Highlights

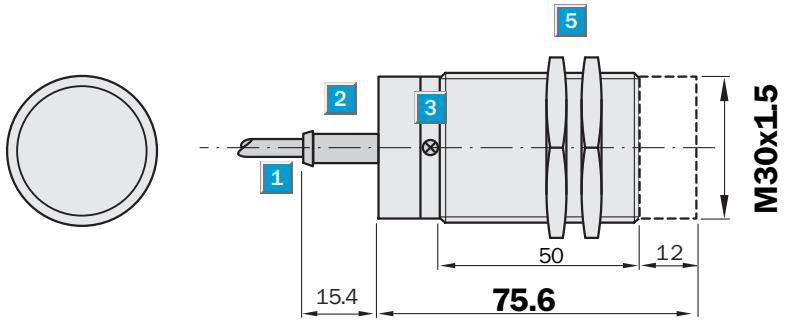
- 2-wire, 250 V AC
- High EMC immunity
- Complementary output function
- IP 67 enclosure rating
- LED status indicator, yellow

CM 30 AC



Dimensional drawing

dimensions in mm



1 Cable, 2 m
2 Potentiometer
3 Switch NO/NC
4 Display LED
5 Fastening nuts (2 x); width across 36 mm, plastic

Accessories	page
Mounting systems	1234

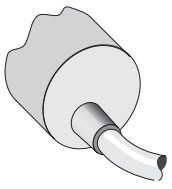
Order information	
Type	**Part no.**
CM30-16BAP-KW1	6 028 411
CM30-25NAP-KW1	6 028 413

Electrical and mechanical data	CM30-	16BAP -KW1	25NAP -KW1
Sensing range S_n	0.6 in (16 mm)	■	
	1.0 in (25 mm)		■
Operating voltage U_b	20…265 V AC	■	■
Ripple U_{pp}	≤ 10% U_b	■	■
Voltage drop U_b [1]	≤ 10 V AC (at load ≥ 20 mA)	■	■
Off state current [2]	≤ 10 mA	■	■
Continuous current I_a	≤ 500 mA	■	■
Time delay before availability t_v	≤ 100 ms	■	■
Hysteresis H	4…20% of s_r	■	■
Repeatability R [3]	≤ 5% of s_r	■	■
Temperature drift	± 10% of s_r	■	■
EMC	To EN 60 947-5-2	■	■
Output function	NO	■	■
	NC	■	■
	Complementary	■	■
Installation type	Flush	■	
	Non-flush		■
Connection type	Cable, 2 m, PVC, 2 x 0.5 mm², oil resistant	■	■
Enclosure rating [4]	IP 67	■	■
Switching frequency f	Max. 10/s	■	■
Dimensions [5]	M30 x 1.5	■	■
Reverse polarity protection	Yes	■	■
Power-up pulse suppression	Yes	■	■
Shock and vibration stress	30 g, 11 ms/10…55 Hz, 1 mm	■	■
Ambient temperature T_a	-13…176° F (-25…80° C)	■	■
Housing material	Polyester	■	■
Tightening torque	7.5 Nm	■	■

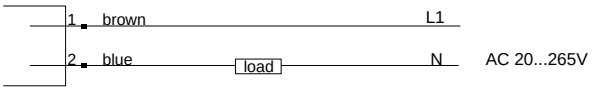
1) At I_a max.
2) Without load
3) U_b and T_a constant
4) To EN 60529
5) Thread diameter x pitch (mm)

Connection diagram

CM30-16BAP-KW1
CM30-25NAP-KW1



2 x 0.5 mm²



wire colors refer to standard cable, not included with quick disconnect models.

CQ28 Capacitive

Capacitive Proximity Sensors

Highlights

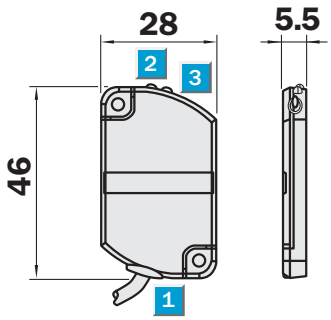
- Thin profile: 28 x 46 x 5.5 mm (w x h x d)
- Adjustable sensing range: 1…10 mm, non-flush
- Short-circuit and reverse polarity protection
- Teach-in via button or COM-input
- High EMC-immunity
- PNP or NPN output
- IP 68 enclosure rating

CQ28 Capacitive



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Potentiometer

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Electrical and mechanical data	CQ28	10NNP-KW1	10NPP-KW1
Electrical configuration	DC 4-wire	■	■
Operating voltage U_b	10…30 V DC	■	■
Ripple U_{pp}	≤ 10%	■	■
Voltage drop U_b at I_a max	≤ 2.5 V	■	■
Power consumption (without load)	≤ 12 mA	■	■
Continuous current I_a (max)	≤ 200 mA	■	■
Time delay before availability t_v	300 ms	■	■
Hysteresis H	Depending on teach adjustment of s_r	■	■
Repeatability R (U_b and T_a constant)	≤ 5% of s_r	■	■
Temperature drift	± 10% of s_r	■	■
EMC	to EN 60 947-5-2	■	■
Switching output	NPN	■	
	PNP		■
Output function Installation	Programmable (NO, NC)Non-flush	■	■
Short-circuit protection	Yes	■	■
Reverse polarity protection	Yes	■	■
Enclosure rating to EN 60529	IP 68	■	■
Dimensions (w x h x d)	28 x 46 x 5.5 mm	■	■
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm	■	■
Ambient temperature operation	-4…185° F (-20…+85° C)	■	■
Ambient temperature storage	-40…185° F (-40…+85° C)	■	■
Housing material	Plastic, PBT	■	■
Connection type	Cable, PVC, 2 m	■	■

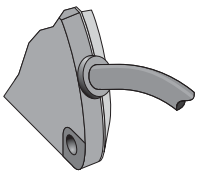
Selection table

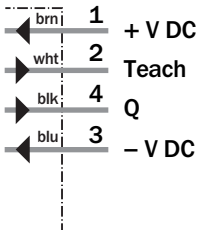
Sensing range S_n in (mm)	Switching output	Output function	Switching frequency in Hz	Connection type	Type	Part no.
0.4 (10)	PNP	 complementary	10	Cable 2 m	CQ28-10NPP-KW1	6 030 132
0.4 (10)	NPN	 complementary	10	Cable 2 m	CQ28-10NNP-KW1	6 030 133

Connection diagram (4 x 0.14 mm²)

CQ28-10NNP-KW1

CQ28-10NPP-KW1





CQ 35 Capacitive

Capacitive Proximity Sensors

Highlights

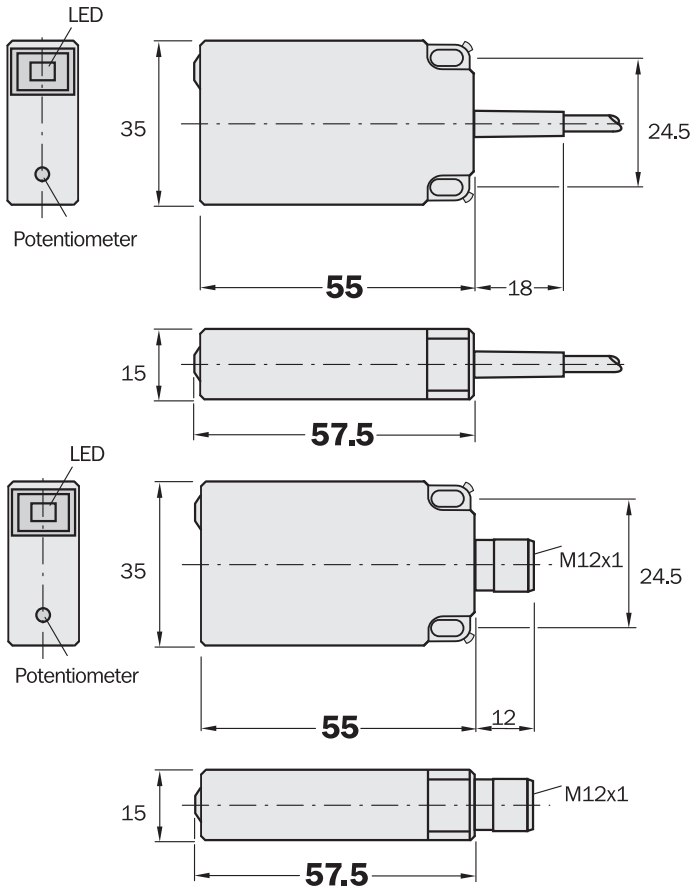
- High EMC-immunity
- Shielded or unshielded
- PNP or NPN output
- Adjustable sensing range
- Device can be flush mounted, sensing range: 16 mm
- Complementary output function
- Short-circuit protection (pulsed)
- Plastic housing
- Cable or connector
- IP 67 enclosure rating
- LED status indicator

CQ 35 Capacitive



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180

Electrical and mechanical data

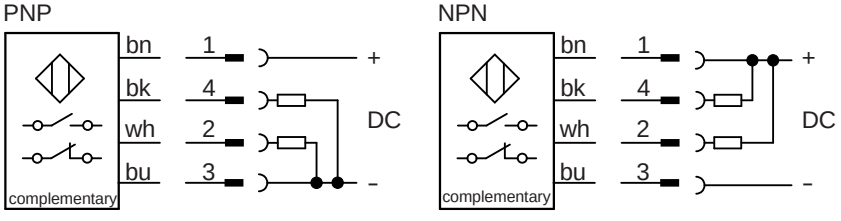
Operating voltage U_b	10...40 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 2.5 V
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 100 ms
Hysteresis H	4% - 20% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)
Housing material	Plastic
Connection cable	PVC, 4 x 0.34 mm²

Selection table

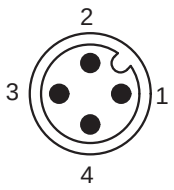
Sensing range S_n in (mm)	Installation in metal	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
1.0 (25)	*	PNP	complementary	50	Cable 2 m	CQ35-25NPP-KW1	6 020 478
1.0 (25)	*	PNP	complementary	50	Connector M12 x 1 mm	CQ35-25NPP-KC1	6 020 479
1.0 (25)	*	NPN	complementary	50	Cable 2 m	CQ35-25NNP-KW1	6 021 463
1.0 (25)	*	NPN	complementary	50	Connector M12 x 1 mm	CQ35-25NNP-KC1	6 021 464

*Can be installed flush by reducing sensitivity with potentiometer

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
wh	white	2	NC
bu	blue	3	- V DC



Magnetic Proximity Sensors



Magnetic proximity sensors

- Detection of magnetic objects, usually permanent magnets
- Large sensing ranges despite compact designs
- Objects can be detected through non-magnetic materials

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MM Series

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MM12 250

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MQ series

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Magnets 264

Theory of Operation...Magnetic Proximity Sensors

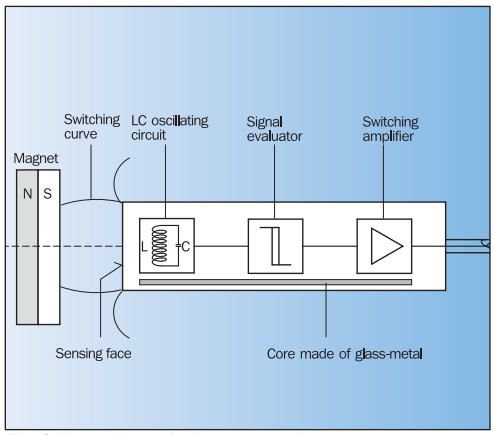


Fig. 1 Magnetic proximity sensor makeup

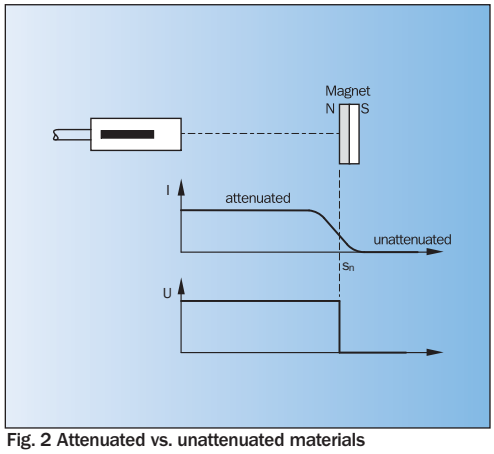


Fig. 2 Attenuated vs. unattenuated materials

About Magnetic Proximity Sensors

Magnetic proximity sensors are used to detect magnets. They are particularly suitable for use in harsh environments and for detection through non-magnetizable materials. They are mainly used wherever inductive sensors reach their technological limits, for example when long switching distances are involved.

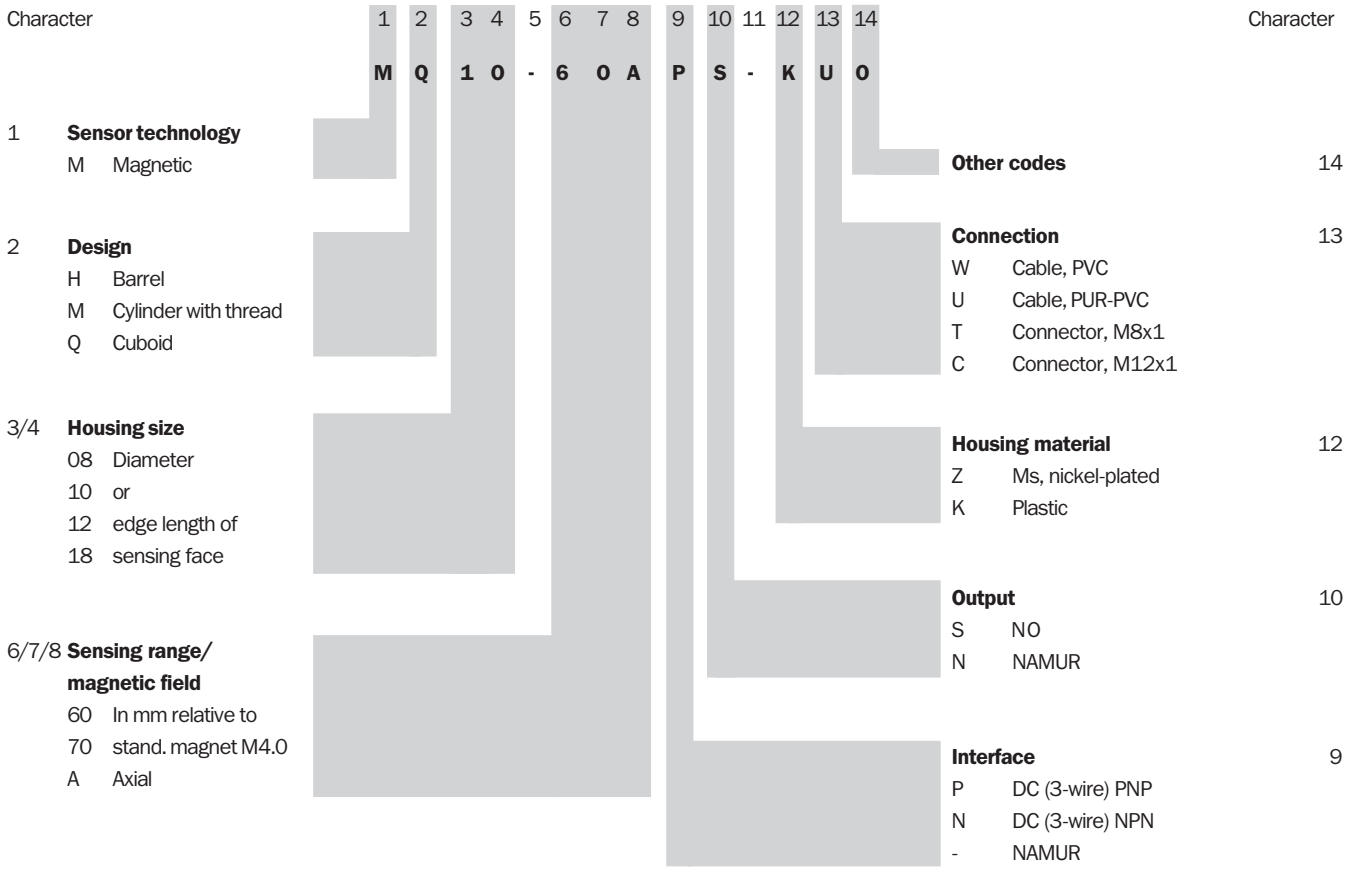
The new magnetic proximity sensors in space-saving short housings offer numerous added or improved possibilities. Further highlights include enhanced electromagnetic compatibility (EMC) and the possibility of implementing customer-specific needs by adapting the pulse length, switching point and hysteresis.
Based on a new chip platform for non-optical sensors, sleeve lengths of just 46 mm and 50 mm have been achieved for the magnetic proximity sensors in short housings. With M8, M12 and M18 diameters they correspond to the usual industrial mounting standard.

This series has a considerably improved switching distance compared to conventional magnetic proximity sensors. Because of the corresponding reduction in hysteresis, magnets can now also be detected with unparalleled precision wherever maximum switching point accuracy is required.

As with inductive proximity sensors, magnetic proximity sensors have an LC oscillating circuit, a signal strength indicator and a switching amplifier. They also have a core (strip) made of amorphous, highly permeable and magnetically soft glass-metal.

This strip attenuates the oscillating circuit using eddy-current losses. The core quickly becomes magnetically saturated very quickly if a magnetic field is applied, e.g., if a magnet is brought closer. The eddy-current losses attenuating the oscillating circuit are reduced and the oscillating de-attenuates. The power consumption of a magnetic proximity sensor therefore increases as a magnet is brought closer, in contrast to inductive proximity sensors where the power consumption reduces as the switching trigger is brought closer. A major advantage of this technology is that large sensing ranges are possible even with small sensor types.

Permanent magnets are usually used to trigger magnetic proximity sensors. They comprise magnetically hard substances, such as steel alloyed with other metals such as aluminum, cobalt and nickel. Magnetically hard ferrite with similar properties can also be produced from sintered compounds containing iron oxide and other metal oxides.



Mounting on magnetizable material

If the magnets are mounted on magnetizable material, the sensing range increases to the values printed in bold in the table below:

	Actuating magnets S_n (mm)				
Series	**MAG-1003-S (M1.0)**	**MAG-0625-A (M2.0)**	**MAG-2006-B (M3.0)**	**MAG-3010-B (M4.0)**	**MAG-3015-B (M5.0)**
MM08-60A-…	23	24	36	60	68
	36	**32**	**45**	**67**	**73**
MM12-60A-…	23	24	36	60	68
	36	32	45	67	73
MM18-70A-…	24	25	38	70	85
	38	**35**	**50**	**82**	**95**
MQ10-60A-…	23	24	36	60	68
	36	**32**	**45**	**67**	**73**

Selection table

Series	**Housing**	**Sensing range S_n in mm**	**Switching output**		**Output function**	**Connection**		**Electr. config.**
	Design, size in mm, material		P[1]	N[2]	NO	C[3]	Co[4]	
	Cylinder with thread							
MM 08	M8, brass	60	■	■	■	■	■	DC 3-wire
MM12	M12, brass	60	■	■	■	■	■	DC 3-wire
MM18	M18, brass	70	■	■	■	■	■	DC 3-wire
	Cuboid							
MQ10	10x28/37x16, plastic	60	■	■	■	■	■	DC 3-wire
	Cylinder with thread							
MM12	M12, brass	60						NAMUR
MM18	M18, brass	70						NAMUR

1) P = PNP
2) N = NPN
3) C = Cable
4) Co = Connector

Selection Table...Magnetic Proximity Sensors

Magnetic proximity sensors

Sensor Type	Housing			Sensing Range* s_n in mm	Switching Output		
	Design	Size in mm	Material	Shielded	PNP	NPN	NAMUR
MM 08 Short	Barrel, threaded	M8	Nickel-plated brass	60	■		
MM 12 Short	Barrel, threaded	M12	Nickel-plated brass	60	■		
MM 12 Advanced	Barrel, threaded	M12	Nickel-plated brass	90	■	■	
MM 12 NAMUR & Short	Barrel, threaded	M12	Nickel-plated brass	60	■		■
MM 18 Short	Barrel, threaded	M18	Nickel-plated brass	70	■		
MM 18 Advanced	Barrel, threaded	M18	Nickel-plated brass	120	■	■	
MM 18 NAMUR	Barrel, threaded	M18	Nickel-plated brass	70	■		■
MQ 10 Advanced	Rectangular	–	Nickel-plated brass	60	■	■	

* Magnetic sensor sensing range depends on the target magnet size. These numbers refer to the sensing range with M4.0 magnet installation in non-magnetizable material.

Magnetic proximity sensors								
Sensor Type	**Output Function**				**Connection Type**		**Enclosure Rating**	**Page**
	NO	NC	NO/NC	NAMUR	Cable	Connector	Terminals	
MM 08 Short	■				■	■	IP 67	248
MM 12 Short	■				■	■	IP 67	250
MM 12 Advanced	■	■			■	■	IP 67	252
MM 12 NAMUR				■	■	■	IP 67	254
MM 18 Short	■				■	■	IP 67	256
MM 18 Advanced	■	■			■	■	IP 67	258
MM 18 NAMUR				■	■	■	IP 67	260
MQ 10 Advanced	■				■	■	IP 67	262

Please note:
NO = normally open
NC = normally closed
NO/NC = complementary

MM 08 Short

Magnetic Proximity Sensors

Highlights

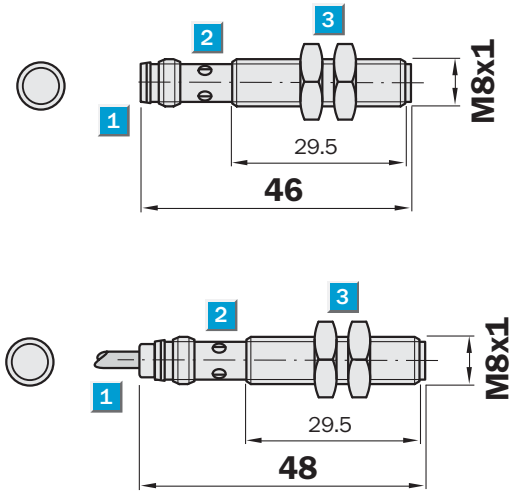
- Sensing range up to 60 mm
- PNP or NPN output
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M8 x 1 mm
- Cable or connector
- Enclosure rating IP 67
- LED status indicator

MM 08 Short



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 13, plastic

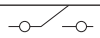
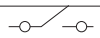
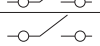
Accessories	page
Cables and connectors	1180
Magnets	264

7028071 - © 2008 SICK, Inc.

Technical data

Electrical configuration	DC 3-wire
Supply voltage V_s	10...30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_d	≤ 2 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 20 ms
Hysteresis H	5% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Dimensions (Thread diameter x pitch)	M8 x 1
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10…55 Hz, 1 mm
Ambient temperature T_a	-13…167° F (-25…75° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	6.0 Nm

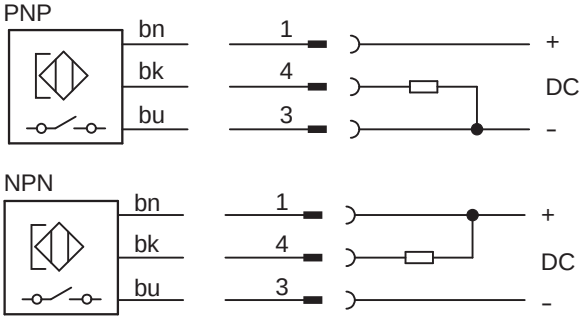
Selection table

Sensing range S_n in (mm)	Magnetic alignment	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
2.4 (60)	Axial	NPN		1000	Connector M8 x 1 mm	MM08-60ANS-ZTK	1 040 068
2.4 (60)	Axial	NPN		1000	Cable, 2 m	MM08-60ANS-ZUK	1 040 066
2.4 (60)	Axial	PNP		1000	Connector M8 x 1 mm	MM08-60APS-ZTK	1 040 067
2.4 (60)	Axial	PNP		1000	Cable, 2 m	MM08-60APS-ZUK	1 040 027

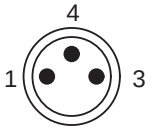
Sensing ranges

Magnet type	Sensing range s_n Any installation type (flush or non-flush) in a non-magnetizable material	Sensing range s_n Flush installation in a magnetizable material (e.g. iron)
MAG-1003-S (M 1.0)	0.9 in (23 mm)	0.9 in (22 mm)
MAG-0625-A (M 2.0)	0.9 in (24 mm)	0.4 in (10 mm)
MAG-2006-B (M 3.0)	1.4 in (36 mm)	0.6 in (15 mm)
MAG-3010-B (M 4.0)	2.4 in (60 mm)	0.8 in (20 mm)
MAG-3015-B (M 5.0/5.1)	2.7 in (68 mm)	1.0 in (25 mm)

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



MM 12 Short

Magnetic Proximity Sensors

Highlights

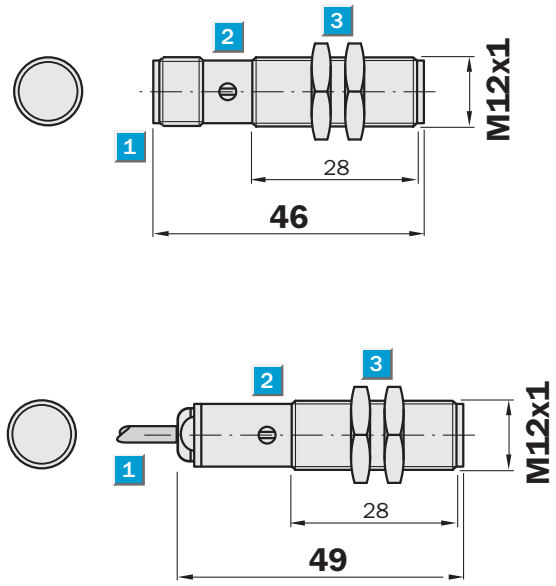
- Sensing range up to 60 mm
- PNP or NPN output
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- Enclosure rating IP 67

MM 12 Short



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Magnets	264

Technical data

Electrical configuration	DC 3-wire
Supply voltage V_s	10...30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_d	≤ 2 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 20 ms
Hysteresis H	5% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Dimensions (Thread diameter x pitch)	M12 x 1
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10…55 Hz, 1 mm
Ambient temperature T_a	-13…167° F (-25…75° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	15 Nm

Selection table

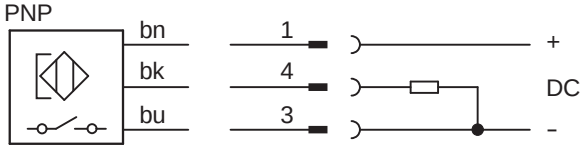
Sensing range S_n in (mm)	Magnetic alignment	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
2.4 (60)	Axial	NPN		1000	Connector M12 x 1 mm	MM12-60ANS-ZCK	1 040 071
2.4 (60)	Axial	NPN		1000	Cable, 2 m	MM12-60ANS-ZUK	1 040 026
2.4 (60)	Axial	PNP		1000	Cable, 2 m	MM12-60APO-ZUK	1 040 065
2.4 (60)	Axial	PNP		1000	Connector M12 x 1 mm	MM12-60APS-ZCK	1 040 070
2.4 (60)	Axial	PNP		1000	Cable, 2 m	MM12-60APS-ZUK	1 040 069

Sensing ranges

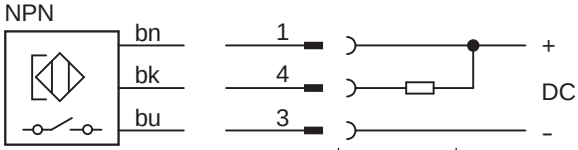
Magnet type	Sensing range s_n Any installation type (flush or non-flush) in a non-magnetizable material	Sensing range s_n Flush installation in a magnetizable material (e.g. iron)
MAG-1003-S (M 1.0)	0.9 in (23 mm)	0.7 in (17 mm)
MAG-0625-A (M 2.0)	0.9 in (24 mm)	0.6 in (14 mm)
MAG-2006-B (M 3.0)	1.4 in (36 mm)	0.9 in (23 mm)
MAG-3010-B (M 4.0)	2.4 in (60 mm)	1.5 in (37 mm)
MAG-3015-B (M 5.0/5.1)	2.7 in (68 mm)	1.7 in (44 mm)

Connection diagram

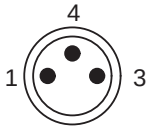
PNP



NPN



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



MM 12 Advanced

Magnetic Proximity Sensors

Highlights

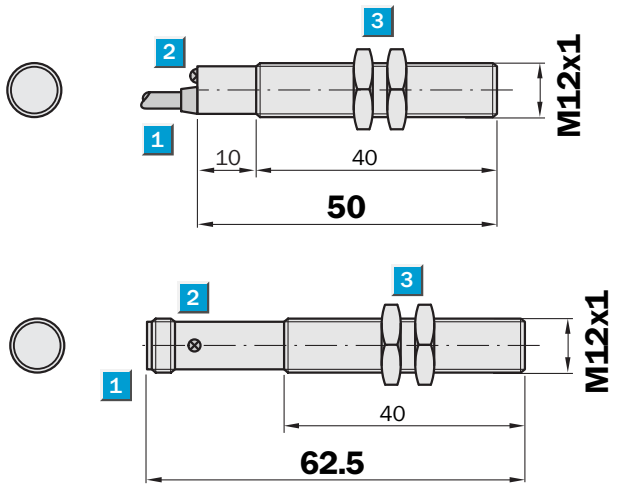
- Sensing range up to 90 mm
- PNP output
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- Cable or connector
- Enclosure rating IP 67
- LED status indicator

MM 12 Advanced



Dimensional drawing

dimensions in mm



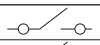
1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Magnets	264

Electrical and mechanical data

Electrical configuration	DC 3-wire
Supply voltage V_S	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_d	≤ 1.5 V with Ia max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 300 mA
Time delay before availability t_v	≤ 2 ms
Hysteresis H	1% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 1% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Dimensions (thread diameter x pitch)	M12 x 1
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to EN 60529	IP 67
Shock and vibration stress	30 g, 11 ms, 10…55 Hz, 1 mm
Ambient temperature T_a	-13…167° F (-25…75° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	7.0 Nm

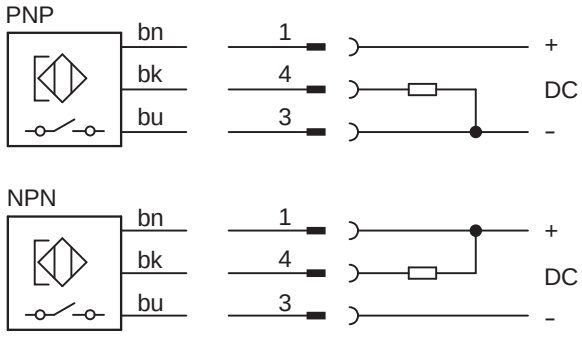
Selection table

Sensing range S_n in (mm)	Magnetic alignment	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.2…3.5 (5…90)	Axial	PNP		5000	Connector M12 x 1 mm	MM12-90APS-ZC0	1 029 950
0.2…3.5 (5…90)	Axial	PNP		5000	Cable 2 m	MM12-90APS-ZU0	1 029 951

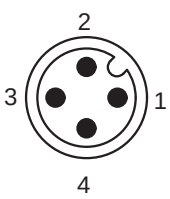
Sensing ranges

Magnet type	Sensing range s_n Any installation type (flush or non-flush) in a non-magnetizable material
MAG-1003-S (M 1.0)	1.2 in (30 mm)
MAG-0625-A (M 2.0)	1.4 in (35 mm)
MAG-2006-B (M 3.0)	2.0 in (50 mm)
MAG-3010-B (M 4.0)	3.5 in (90 mm)
MAG-3015-B (M 5.0/5.1)	3.9 in (100 mm)

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC
		2	free



MM 12 NAMUR and NAMUR Short

Magnetic Proximity Sensors

Highlights

- Sensing range up to 60 mm
- High switching frequency
- NAMUR to EN 50 227, NAMUR Short to EN 60 947-5-6
- Shielded or unshielded
- LED status indicator
- Robust brass housing, nickel-plated with fine thread M12 x 1 mm
- Cable or connector
- Enclosure rating IP 67

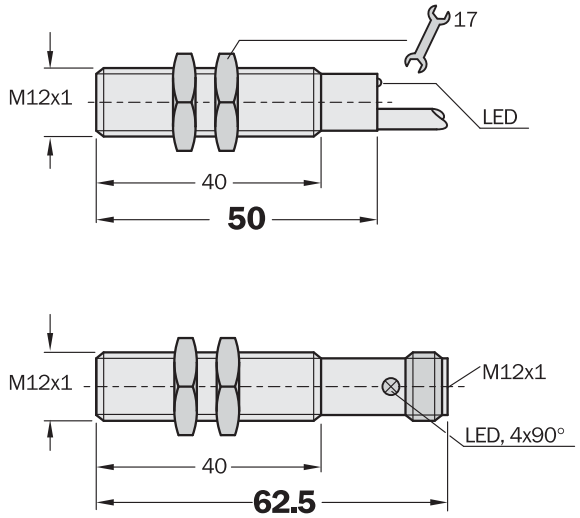
MM 12 NAMUR



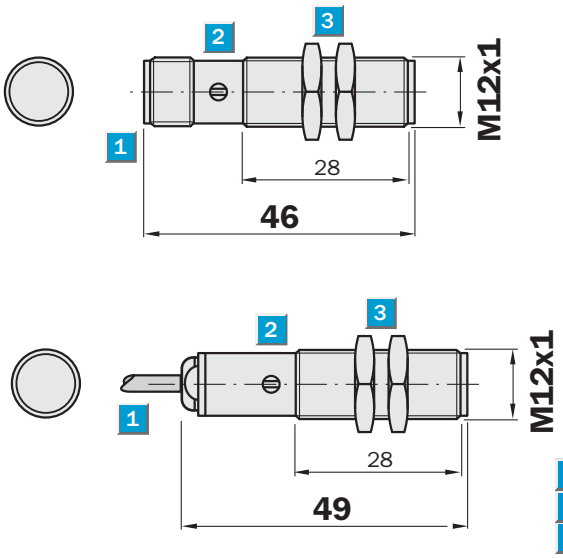
Dimensional drawing

MM 12 NAMUR

dimensions in mm



MM 12 NAMUR Short



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314
Magnets	264

Electrical and mechanical data

	MM12 NAMUR	MM12 NAMUR Short
Operating voltage U_b	5...25 V DC	5...25 V DC
Nominal voltage U_n	8.2 V DC	8.2 V DC
Ripple U_{pp}	≤ 5% of U_b	≤ 5%
Power consumption, attenuated	≥ 2.5 mA	≥ 2.5 mA
Power consumption, unattenuated	≤ 1.0 mA	≤ 1.0 mA
Internal capacitance	≤ 15 nF	≤ 320 nF
Internal inductance	≤ 25 µH	≤ 35 µH
Cable resistance	≤ 50 w	≤ 50 Ohm
Time delay before availability t_v	≤ 2 ms	≤ 20 ms
Hysteresis H	1% - 10% of s_r	5% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 1% of s_r	≤ 5% of s_r
Temperature drift	± 10% of s_r	± 10% of s_r
EMC	to EN 60 947-5-2	to EN 60 947-5-2, class TUV 99 ATEX 1398
		Ex II 2G EEx ib IIC T6
Short-circuit protection (pulsed)	Yes	Yes
Reverse polarity protection	Yes	Yes
Enclosure rating to EN 60529	IP 67	IP 67
Shock and vibration stress	30 g, 11 ms, 10…55 Hz, 1 mm	30 g, 11 ms, 10…55 Hz, 1 mm
Ambient temperature T_a	-13...158° F (-25...70° C)	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic	Brass, nickel-plated, plastic
Tightening torque	7.0 Nm	15 Nm
Connection cable	PUR-PVC, 3 x 0.25 mm²	PVC, 3 x 0.25 mm²
Max. data for connecting isolating unit EN 2		
EX or other approved isolating amplifier:		
Short-circuit current I_k max	30 mA	30 mA
No load voltage U_o	16 V	16 V
Power loss Pmax	75 mW	75 mW

Selection table

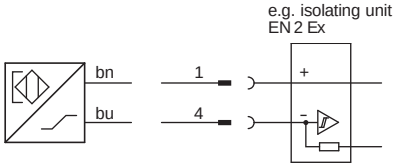
Sensing range S_n* in (mm)	Magnetic alignment	Version	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
2.4 (60)	Axial	NAMUR		5000	Cable 2 m	MM12-60A-N-ZW0	7 900 286
2.4 (60)	Axial	NAMUR		5000	Connector M12 x 1 mm	MM12-60A-N-ZC0	7 900 287
2.4 (60)	Axial	NAMUR		5000	Connector M12 x 1 mm	MM12-60A-N-ZCK	1 040 075
2.4 (60)	Axial	NAMUR		5000	Cable 2 m	MM12-60A-N-ZWK	1 040 074

* Sensing range s_n based on installation in non-magnetizable material using magnet M 4.0.

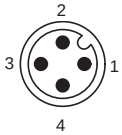
Sensing ranges

Magnet type	Sensing range s_n Any installation type (flush or non-flush) in a non-magnetizable material	Sensing range s_n Flush installation in a magnetizable material (e.g. iron)M
MAG-1003-S (M 1.0)	0.9 in (23 mm)	0.7 in (17 mm)
MAG-0625-A (M 2.0)	0.9 in (24 mm)	0.6 in (14 mm)
MAG-2006-B (M 3.0)	1.4 in (36 mm)	0.9 in (23 mm)
MAG-3010-B (M 4.0)	2.4 in (60 mm)	1.5 in (37 mm)
MAG-3015-B (M 5.0/5.1)	2.7 in (68 mm)	1.7 in (44 mm)

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bu	blue	4	- V DC
		3	free
		2	free



MM 18 Short

Magnetic Proximity Sensors

Highlights

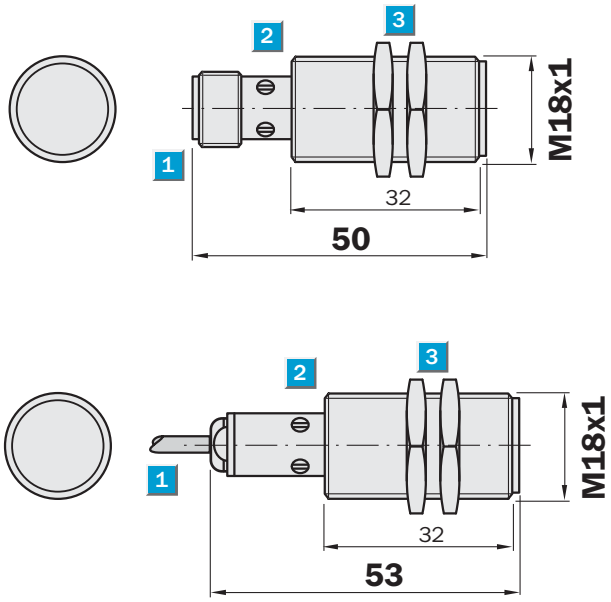
- Sensing range up to 70 mm
- PNP or NPN output
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- Cable or connector
- Enclosure rating IP 67
- LED status indicator

MM 18 Short



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Magnets	264

Electrical and mechanical data

Electrical configuration	DC 3-wire
Supply voltage Vs	10...30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_d	≤ 2 V with Ia max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 200 mA
Time delay before availability t_v	≤ 20 ms
Hysteresis H	5% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 5% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Dimensions (thread diameter x pitch)	M18 x 1
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10…55 Hz, 1 mm
Ambient temperature T_a	-13…167° F (-25…75° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	40 Nm

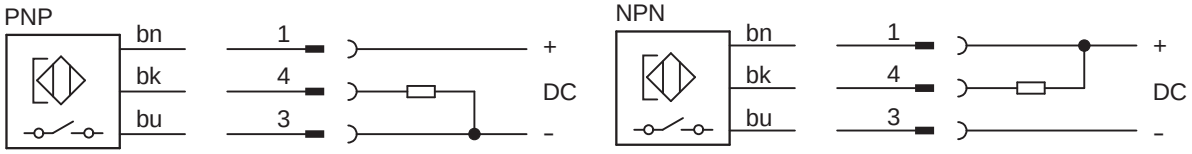
Selection table

Sensing range S_n in (mm)	Magnetic alignment	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
2.8 (70)	Axial	NPN		1000	Connector M12 x 1 mm	MM18-70ANS-ZCK	1 040 073
2.8 (70)	Axial	NPN		1000	Cable 2 m	MM18-70ANS-ZUK	1 040 085
2.8 (70)	Axial	PNP		1000	Connector M12 x 1 mm	MM18-70APS-ZCK	1 040 072
2.8 (70)	Axial	PNP		1000	Cable 2 m	MM18-70APS-ZUK	1 040 029

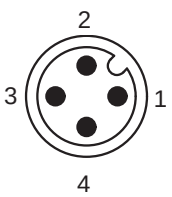
Sensing ranges

Magnet type	Sensing range s_n Any installation type (flush or non-flush) in a non-magnetizable material	Sensing range s_n Flush installation in a magnetizable material (e.g. iron)
MAG-1003-S (M 1.0)	0.9 in (24 mm)	0.6 in (16 mm)
MAG-0625-A (M 2.0)	1.0 in (25 mm)	0.7 in (17 mm)
MAG-2006-B (M 3.0)	1.5 in (38 mm)	1.3 in (32 mm)
MAG-3010-B (M 4.0)	2.8 in (70 mm)	2.2 in (55 mm)
MAG-3015-B (M 5.0/5.1)	3.3 in (85 mm)	2.4 in (60 mm)

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC
		2	free



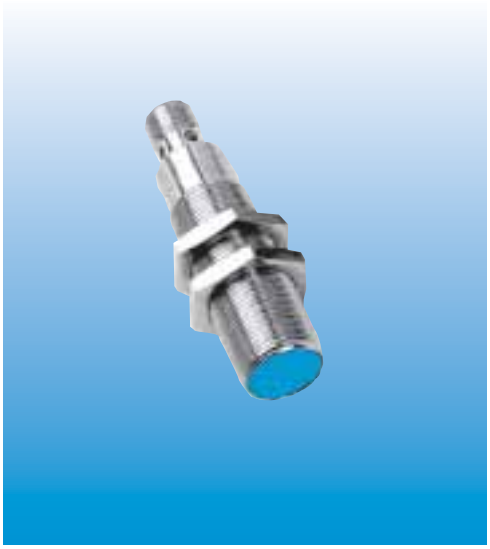
MM 18 Advanced

Magnetic Proximity Sensors

Highlights

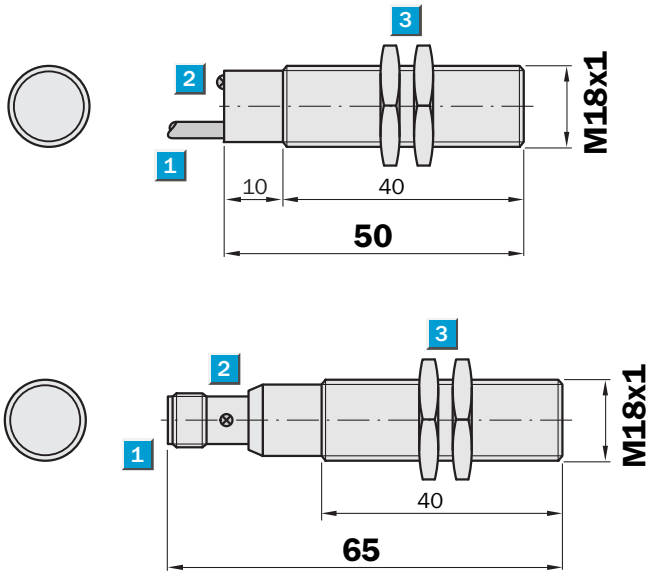
- Sensing range up to 120 mm
- PNP output
- High switching frequency
- Short-circuit protection (pulsed)
- Robust brass housing, nickel-plated with fine thread M18 x 1 mm
- Cable or connector
- Enclosure rating IP 67
- LED status indicator

MM 18 Advanced



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Magnets	264

Electrical and mechanical data

Electrical configuration	DC 3-wire
Supply voltage V_S	10...30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_d	≤ 1.5 V with I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 300 mA
Time delay before availability t_v	≤ 2 ms
Hysteresis H	1% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 1% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Dimensions (thread diameter x pitch)	M18 x 1
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10…55 Hz, 1 mm
Ambient temperature T_a	-13…167° F (-25…75° C)
Housing material	Brass, nickel-plated, plastic
Tightening torque	25 Nm

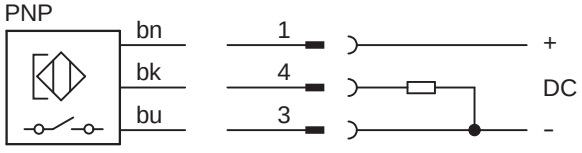
Selection table

Sensing range S_n in (mm)	Magnetic alignment	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
0.2…4.7 (5…120)	Axial	PNP		5000	Connector M12 x 1 mm	MM18-00APS-ZC0	1 029 861
0.2…4.7 (5…120)	Axial	PNP		5000	Cable 2 m	MM18-00APS-ZU0	1 029 952

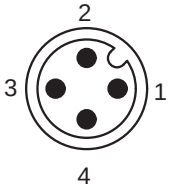
Sensing ranges

Magnet type	Sensing range s_n Any installation type (flush or non-flush) in a non-magnetizable material
MAG-1003-S (M 1.0)	1.8 in (45 mm)
MAG-0625-A (M 2.0)	2.0 in (50 mm)
MAG-2006-B (M 3.0)	2.8 in (70 mm)
MAG-3010-B (M 4.0)	4.7 in (120 mm)
MAG-3015-B (M 5.0/5.1)	5.1 in (130 mm)

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC
		2	free



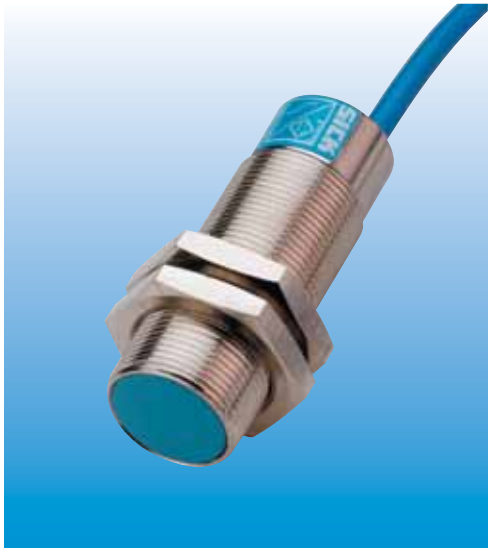
MM 18 NAMUR and NAMUR Short

Magnetic Proximity Sensors

Highlights

- Sensing range up to 70 mm
- High switching frequency
- NAMUR to EN 50 227, NAMUR Short to EN 60 947-5-6
- Shielded or unshielded
- Enclosure rating IP 67
- Robust brass housing, nickel-plated with fine thread (M12 x 1 mm for NAMUR and M18 x 1 mm for NAMUR Short)
- Cable or connector

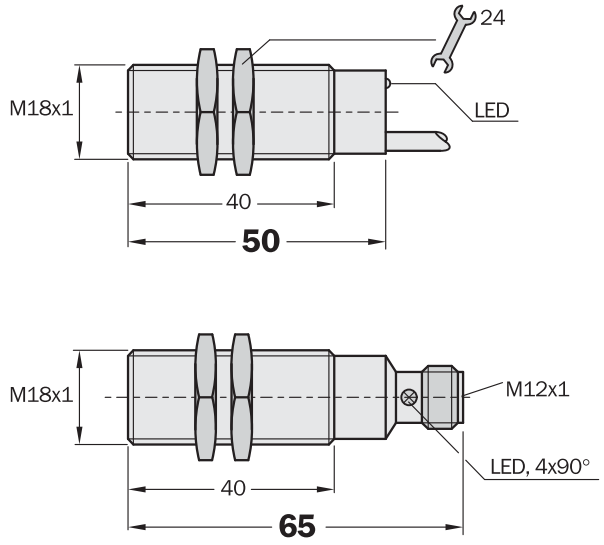
MM 18 NAMUR



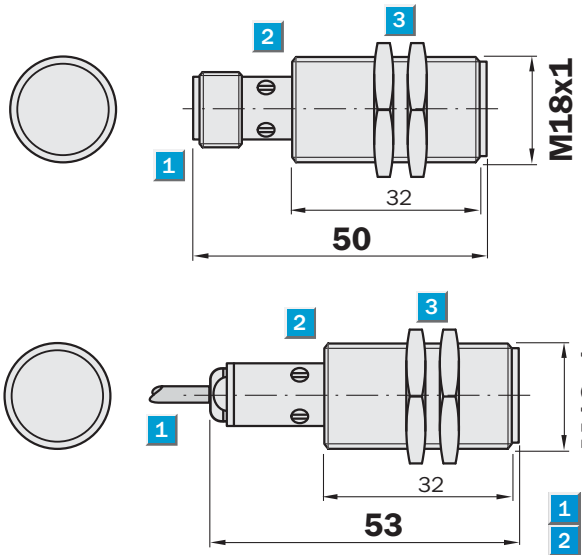
Dimensional drawing

MM 18 NAMUR

dimensions in mm



MM 18 NAMUR Short



1 Connection
2 Display LED
3 Fastening nuts (2 x); width across 17, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314
Magnets	264

Electrical and mechanical data

	MM18 NAMUR	MM18 NAMUR Short
Operating voltage U_b	5...25 V DC	5...25 V DC
Rated voltage U_n	8.2 V DC	8.2 V DC
Ripple U_{pp}	≤ 5% of U_b	≤ 5%
Power consumption, attenuated	≥ 2.5 mA	≥ 2.5 mA
Power consumption, unattenuated	≤ 1.0 mA	≤ 1.0 mA
Internal capacitance	≤ 15 nF	≤ 15 nF
Internal inductance	≤ 25 µH	≤ 35 µH
Cable resistance	≤ 50 w	≤ 50 Ohm
Time delay before availability t_v	≤ 2 ms	≤ 20 ms
Hysteresis H	1% - 10% of s_r	5% - 15% of s_r
Repeatability R (U_b and T_a constant)	≤ 1% of s_r	≤ 5% of s_r
Temperature drift	± 10% of s_r	± 10% of s_r
EMC	to EN 60 947-5-2	to EN 60 947-5-2, class TUV 99 ATEX 1398
		Ex II 2G EEx ib IIC T6
Short-circuit protection (pulsed)	Yes	Yes
Reverse polarity protection	Yes	Yes
Enclosure rating to EN 60529	IP 67	IP 67
Shock and vibration stress	30 g, 11 ms, 10…55 Hz, 1 mm	
Ambient temperature T_a	-13...158° F (-25...70° C)	-13...158° F (-25...70° C)
Housing material	Brass, nickel-plated, plastic	Brass, nickel-plated, plastic
Tightening torque	25 Nm	40 Nm
Connection cable	PVC, 2 x 0.34 mm^2	PVC, 2 x 0.34 mm^2
Max. data for connecting isolating unit EN 2		
EX or other approved isolating amplifier:		
Short-circuit current I_k max	30 mA	30 mA
No load voltage U_o	16 V	16 V
Power loss Pmax	75 mW	75 mW

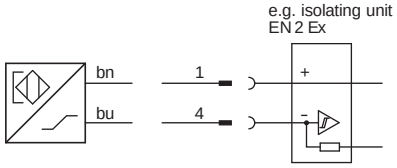
Selection table

Sensing range S_n* in (mm)	Magnetic alignment	Version	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
2.8 (70)	Axial	NAMUR		5000	Cable 2 m	MM18-70A-N-ZW0	7 900 288
2.8 (70)	Axial	NAMUR		5000	Connector M12 x 1 mm	MM18-70A-N-ZC0	7 900 289
2.8 (70)	Axial	NAMUR		5000	Connector M12 x 1 mm	MM18-70A-N-ZCK	1 040 077
2.8 (70)	Axial	NAMUR		5000	Cable 2 m	MM18-70A-N-ZWK	1 040 076

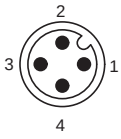
Sensing ranges

Magnet type	Sensing range s_n Any installation type (flush or non-flush) in a non-magnetizable material	Sensing range s_n Flush installation in a magnetizable material (e.g. iron)M
MAG-1003-S (M 1.0)	0.9 in (24 mm)	0.6 in (16 mm)
MAG-0625-A (M 2.0)	1.0 in (25 mm)	0.7 in (17 mm)
MAG-2006-B (M 3.0)	1.5 in (38 mm)	1.3 in (32 mm)
MAG-3010-B (M 4.0)	2.8 in (70 mm)	2.2 in (55 mm)
MAG-3315-B (M 5.0/5.1)	3.3 in (85 mm)	2.4 in (60 mm)

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bu	blue	4	- V DC
		3	free
		2	free



MQ 10 Advanced

Magnetic Proximity Sensors

Highlights

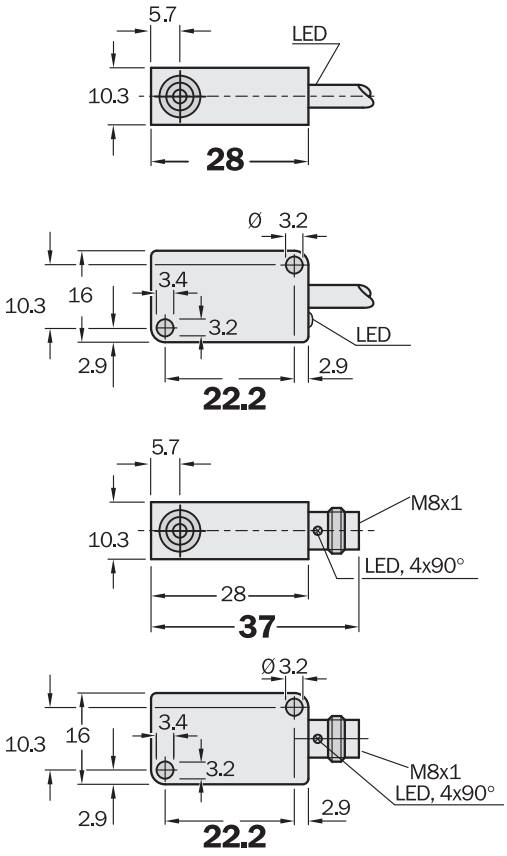
- Sensing range up to 60 mm
- PNP or NPN output
- High switching frequency
- Short-circuit protection (pulsed)
- Plastic housing
- Cable or connector
- Enclosure rating IP 67
- LED status indicator

MQ 10 Advanced



Dimensional drawing

dimensions in mm

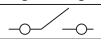
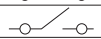


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Electrical and mechanical data

Operating voltage U_b	10…30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 2 V with Ia max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 300 mA
Time delay before availability t_v	≤ 2 ms
Hysteresis H	1% - 10% of s_r
Repeatability R (U_b and T_a constant)	≤ 1% of s_r
Temperature drift	± 10% of s_r
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13…167° F (-25…75° C)
Housing material	Plastic
Connection cable	PUR-PVC, 3 x 0.25 mm²

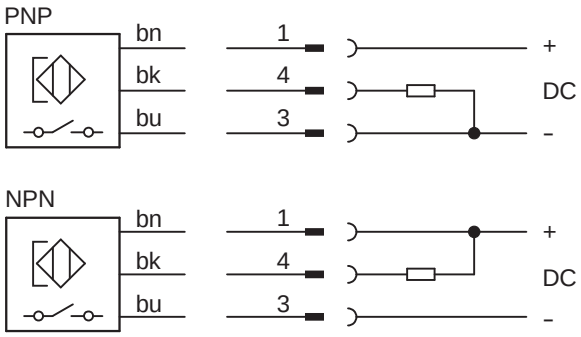
Selection table

Sensing range S_n in (mm)	Magnetic alignment	Switching output	Output function	Switching frequency f in Hz	Connection type	Type	Part no.
2.4 (60)	Axial	PNP		5000	Cable 2 m	MQ10-60APS-KU0	7 900 278
2.4 (60)	Axial	NPN		5000	Cable 2 m	MQ10-60ANS-KU0	7 900 279
2.4 (60)	Axial	PNP		5000	Connector M8 x 1 mm	MQ10-60APS-KT0	7 900 280
2.4 (60)	Axial	NPN		5000	Connector M8 x 1 mm	MQ10-60ANS-KT0	7 900 281

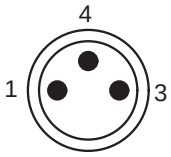
Sensing ranges

Magnet type	Sensing range s_n Any installation type (flush or non-flush) in a non-magnetizable material	Sensing range s_n Flush installation in a magnetizable material (e.g. iron)
MAG-1003-S (M 1.0)	0.9 in (23 mm)	0.5 in (12 mm)
MAG-0625-A (M 2.0)	0.9 in (24 mm)	0.4 in (10 mm)
MAG-2006-B (M 3.0)	1.4 in (36 mm)	0.6 in (15 mm)
MAG-3010-B (M 4.0)	2.4 in (60 mm)	0.8 in (20 mm)
MAG-3015-B (M 5.0/5.1)	2.7 in (68 mm)	1.0 in (25 mm)

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



Magnet Accessories

Magnetic Proximity Sensors

Highlights

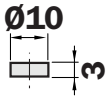
- Magnets for magnetic proximity sensors
- Wide variety of magnet options are available for high volume applications

Magnets

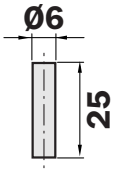


Dimensional drawing

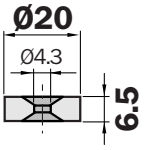
MAG-1003-S (M1.0)



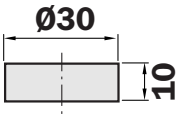
MAG-0625-A (M2.0)



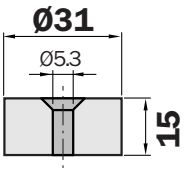
MAG-2006-B (M3.0)



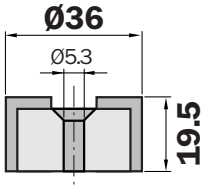
MAG-3010-B (M4.0)



MAG-3015-B (M5.0)



MAG-3515-B (M5.1)



Technical data		1003-S (M1.0)	0625-A (M2.0)	2006-B (M3.0)	3010-B (M4.0)	3015-B (M5.0)	3515-B (M5.1)			
Magnet material	Samarium Cobalt SM2C017	■								
	AlNiCo		■							
	Barium ferrite			■	■	■	■			
Sheath material	Polyamide PA6.6						■			
Ambient temperature T_A	-148...842° F (-100...450° C)		■							
	-58...356° F (-50...180° C)	■								
	-13...266° F (-25...130° C)			■	■	■				
	-13...167° F (-25...75° C)						■			

Order information

Type	Part no.
MAG-1003-S (M1.0)	7 901 782
MAG-0625-A (M2.0)	7 901 783
MAG-2006-B (M3.0)	7 901 784
MAG-3010-B (M4.0)	7 901 785
MAG-3015-B (M5.0)	7 901 786
MAG-3515-B (M5.1)	7 902 086

* For high volume applications, SICK can design a custom magnet to meet your needs.



Magnetic cylinder sensors

SICK offers a wide range of special magnetic cylinder sensors, which are used for detecting the position of pistons in pneumatic cylinders. They are attached directly to the cylinder body. The sensors reliably detect a magnetic ring on the piston through the housing wall (made of aluminium, brass or stainless steel) and trigger a switching signal.

- Weld immune
  Strong magnetic fields capable of impairing the functioning of the sensors are produced during welding. The MZU2 magnetic cylinder sensors from SICK can be used under these difficult conditions.

- Easy mounting
  The magnetic cylinder sensors for profile cylinders with a T-slot can be inserted from above into all standard T-slots. This makes additional assembly work unnecessary and also allows the sensors to be used for aplications where space is restricted.

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MZR2 NAMUR for Round-Body Cylinders	304

Theory of Operation...Magnetic Cylinder Sensors



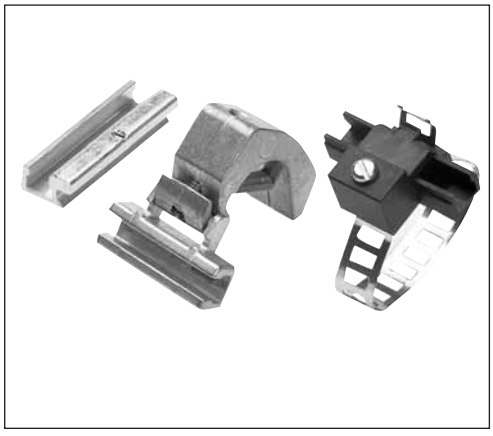
Fig. 1 Magnetic cylinder sensors family



MZN1



MZT6



Mounting adapter

Simple handling, universal applicable, highly reliable

Innovative, high-quality magnetic cylinder sensors can detect the exact position and movements of pneumatic cylinders. With appropriate mounting technology, these sensors provide users with considerable handling, cost and productivity advantages.

Rapid mounting, great strength, reliable switching

Magnetic cylinder sensors from SICK can be inserted from above into the T-slots of all common pneumatic cylinders (e.g. Festo, SMC). This allows you to keep all automation applications reliably under control – even in tight spaces.

Take advantage of many years of application experience

Comprehensive expertise is built into MZT6/RZT6 and MZN1/RZN1 cylinder sensors. Opt for high response sensitivity, high switching point accuracy and a newly developed flexible mounting technology for all common pneumatic cylinders.

Less is more. With fewer type and product variants, flexible mounting adapters from SICK simplify replacement and mounting, and considerably reduce storage costs.

Trail-blazing: mounting adapters for all cylinder types

This sensor offers universal mounting for different cylinder types.

- Universal applicability – increased flexibilty
- Optimized storage costs
- Simple mounting saves time and money

The new generation of T-slot sensors from SICK

Solutions with a technnological edge are more important than ever for your continued competitiveness. The new generation of T-slot sensors from SICK offers you a wealth of opportunities for achieving an optimum mix of benefits and costs for your automation application.

Simple mounting

The sensor is attached using a combination screw (slit/allen screw) and can be mounted easily with standard tools. In addition, the sensor accommodates a robust plastic housing with a metal sleeve.

Reliable switching

The mounting screw firmly presses the sensor onto the bottom of the slot and thus maintains a defined distance to the piston/magnets and provides reliable switching.

MZT 6/RZT 6

System advantages

- Can simply be inserted into the slot from above
- For all common T-slot cylinders such as Festo, SMC, etc.
- Great reliabilty – cannot be pulled out
- Space saving – sensor is flush
- Available in different versions: MZT 6 electronic version and RZT 6 3-wire reed version
- Virtually trouble-free connection due to 2 m PUR cable M8 x 1 plug with knurled screw



Powerful solutions for cylinders with C-slots

MZN1/RZN1 magnetic cylinder sensors have been specially developed for cylinders with C-slots. Their technical concept and simple handling have made them indispensable in the world of automation.

MZN1/RZN1 sensors

- Provide simple mounting: inserted into the C-slot from above, ideal for tight spaces
- Fit into all common C-slots such as Festo, SMC, etc. and thus reduce storage costs
- Can be completely countersunk, flush fitting possible
- Clamped along entire sensor length, cannot be pulled out
- Pressed onto bottom of slot by slotted screw, providing reliable switching
- Variety of electrical designs



Perfect function for weld field immune

- Operates with high reliability even under extreme conditions
- Weld-proof in all welding environments: AC (50 Hz), DC, medium frequency (1000 Hz)
- With sollid zinc die-cast housing, optionally with Teflon coating
- With flexible installation solutions (pull-rod, profile and T-slot cylinders)
- Equipped with 2 LEDs, status and function indicators



Mounting Systems for Pneumatic Cylinder
BEF-KHZ-PT1/ST1/RT1 Series

Less is more

Now you can optimize storage costs by using SICK's innovative mounting systems with MZT6/RZT6 or MZT1/RZT1 sensors. The patented drop-in sensors from SICK can be mounted from above onto the mounting rails.

Fewer type and product variants based on the standard flexible mounting adapters from SICK simplify replacement and mounting, and reduce storage costs.

Universal applicability

This concept offers universal mounting for different cylinder types. Optimized storage costs and simple mounting saves time and money. The universal mounting systems provide solutions for integrated profile, tie-rod, round-body and dovetail cylinders. Increased flexibility provides important application ease. The mounting systems and innovative magnetic cylinder sensors from SICK provide an excellent sensing solution for pneumatic cylinder users.

Features

- BEF-KHZ-PT1
  - Adaptable to integrated profile cylinders (pistons 32…100 mm; profile rods 5… 18 mm)
  - Adaptable to tie-rod cylinders (pistons 32…160 mm; tension rods 5…18 mm)
  - Fits tightly on profile rods/tension rod cylinders
- BEF-KHZ-RT1
  - Adaptable to round body cylinders with piston diameters from 8 to 130 mm
  - Fits tightly on round body cylinders
- BEF-KHZ-ST1
  - Stable aluminum profile
  - Fits tightly on dovetail groove



The BEF-KHZ-PT1 bracket makes installation of magnetic cylinder sensors possible on integrated profile and tie-rod cylinders. For MZ T6/RZ T6 and MZ T1/RZ T1.



The BEF-KHZ-RT1 bracket makes installation of magnetic cylinder sensors possible on round-body cylinders. For MZ T6/RZ T6 and MZ T1/RZ T1.



The BEF-KHZ-PT1 bracket makes installation of magnetic cylinder sensors possible on integrated profile and tie-rod cylinders. For MZ T6/RZ T6 and MZ T1/RZ T1.

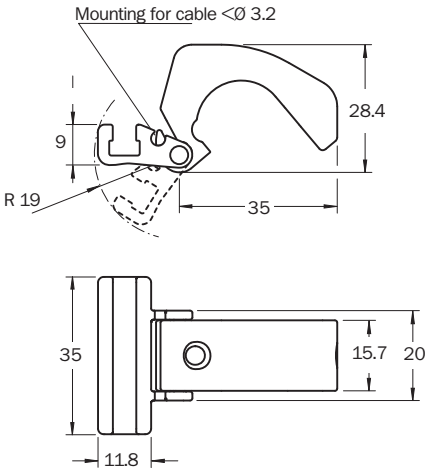


The BEF-KHZ-RT1 bracket makes installation of magnetic cylinder sensors possible on cylinders with a dovetail groove. For MZ T6/RZ T6 and MZ T1/RZ T1.

BEF-KHZ-PT1/Integrated profile and tie-rod cylinders

Using the BEF-KHZ-PT1 mounting system together with the MZ T6/RZ T6 magnetic cylinder sensors, the following magnetic cylinder sensors can be replaced for profile rod/tension rod cylinders: MZ Z1, MZ Z2, MZ P3, MZ P4.

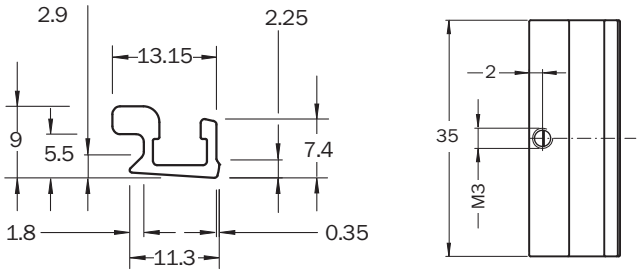
BEF-KHZ-PT1



BEF-KHZ-ST1/Pneumatic cylinder with dovetail groove

The profile dimensions of the BEF-KHZ-ST1 mounting system correspond to the groove dimensions of the MZ K1, MZ K3, RZ K1 and RZ K3 magnetic cylinder sensors. Compare the dimensions of the groove with the dimensions of the mounting rails.

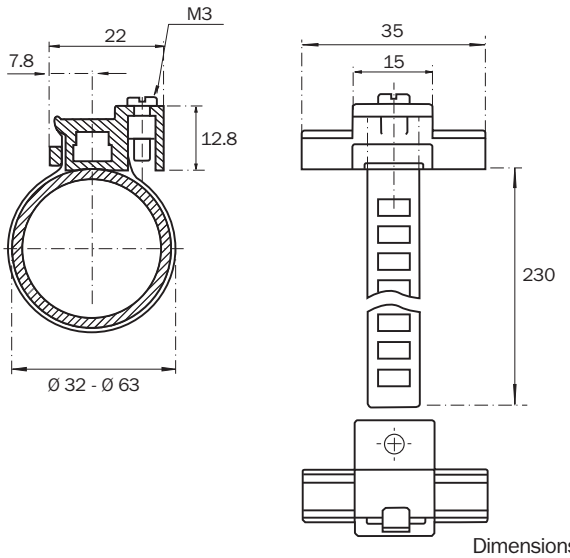
BEF-KHZ-ST1



BEF-KHZ-RT1/Round body cylinder

Using the BEF-KHZ-RT1 mounting system together with the MZ T6/RZ T6 magnetic cylinder sensors, the following magnetic cylinder sensors can be replaced for profile rod/tension rod cylinders: MZ R1, RZ R1, MZ R2, RZ R2.

BEF-KHZ-RT1



Dimensions in mm

Order Information

Type	Part number	Material	Description
BEF-KHZ-PT1	2 022 702	Zinc die cast (GD-ZnA15Cu1)	For integrated profile and tie-rod cylinders
BEF-KHZ-ST1	2 022 703	Aluminum alloy	For dovetail cylinders
BEF-KHZ-RT1-25	5 311 171	Plastic/stainless steel	For round body cylinder Ø 8…25 mm
BEF-KHZ-RT1-63	5 311 172	Plastic/stainless steel	For round body cylinder Ø 32…63 mm
BEF-KHZ-RT1-130	5 311 506	Plastic/stainless steel	For round body cylinder Ø 80…130 mm

Magnetic Cylinder Sensors...Type Code

Sensor technology	MZ	R1	03V	P	S	A	U	O	Additional marking
Magnetic	M								Resistant to humidity
Reed contact	R							M	**Cables and connectors**
Design							W		Cable, PVC
Cylinder sensor	Z						U		Cable, PUR-PVC
Application							P		Cable with plug, M8 x 1
Round body cylinder		R1					Q		Cable with plug, M12 x 1
Round body cylinder		R2					T		Plug, M8 x 1
Tie-rod type cylinder		Z1					C		Plug, M12 x 1
Tie-rod type cylinder		Z2							**Housing material**
Profile rod type cylinder		P3				A			Aluminium
Profile rod type cylinder		P4				K			Plastic
Short-stroke cylinder		K1				D			Zinc die-cast
Short-stroke cylinder		K3				T			Zinc die-cast with Teflon coating
"T" slot		U2							**Output**
Universal		F1			S				Closed
"T" slot		T1			N				NAMUR
"T" slot		T6							**Interface**
"C" slot		N1		P					DC (3 core conductor) PNP
Response sensitivity/sensor position				N					DC (3 core conductor) NPN
In mT			02	U					AC/DC (2 core conductor)
In mT			03	R					Reed (3 core)
Sensor, front			V	–					NAMUR
Sensor, centered			Z						



The complete series – versatile throughout.

For a specific task, but for the most diversified types of application. Pneumatic cylinders and magnetic cylinder sensors together do not simply resolve functional problems: they enable simple handling and quick installation, are very reliable, enabling positive switching operations to be accomplished. They also are highly robust and have a variety of uses.

Magnetic Cylinder Sensors...Highlights



MZN1/RZN1
For mounting in C-slot cylinders



BEF-KHZ-PT1
Mounting adapter
For mounting of MZT6/RZT6 and MZT1/RZT1 on tie-rod and integrated profile cylinders



MZT6/RZT6
For mounting in T-slot cylinders



BEF-KHZ-RT1
Mounting adapter
For mounting of MZT6/RZT6 and MZT1/RZT1 on round-body cylinders



MZT1/RZT1
For mounting in T-slot cylinders



BEF-KHZ-ST1
Mounting adapter
For mounting of MZT6/RZT6 and MZT1/RZT1 on profile cylinders with dovetail groove



MZ2Q and MZ2Q-C
Programmable sensor for T-slot and C-slot cylinders



MZU2 Weld Immune Sensor
For mounting onto different types of cylinders with mounting adapters. Also available in optional Teflon coating.

Selection Table...Magnetic Cylinder Sensors

Magnetic cylinder sensors

Sensor Type	Housing		Relative Sensitivity in mT (Gauss)**	Switching Output				
	Mounting	Material		PNP	NPN	Reed	NAMUR	Programmable for 2 switching outputs
MZ N1	C-slot cylinders	Plastic		■	■			
RZ N1 Reed	C-slot cylinders	Plastic	3 (30)			■		
MZ U2 Weld Immune	T-slot, tie-rod, int. profile	Metal	3 (30)	■				
MZ2Q*	T-slot cylinders	Plastic	Programmable	■				■
MZ2Q-C	C-slot cylinders	Plastic	Programmable	■				■
MZ T6*	T-slot cylinders	Plastic	2.8 (28)	■	■			
RZ T6 Reed*	T-slot cylinders	Plastic	3 (30)	■	■	■		
MZ T1*	T-slot cylinders	Plastic	2.8 (28)	■	■			
RZ T1 Reed*	T-slot cylinders	Plastic	3 (30)			■		
MZ F1	T-slot cylinders	Plastic	3 (30)	■				
MZ Z1 NAMUR	Tie-rod cylinder	Metal	3 (30)				■	
MZ P3 NAMUR	Integrated profile cylinder	Metal	3 (30)				■	
MZ P4 NAMUR	Integrated profile cylinder	Metal	3 (30)				■	
MZ R2 NAMUR	Round body cylinder	Metal	3 (30)				■	

* This sensor can be used with integrated profile, round, dove-tail, and tie-rod cylinders with BEF-KHZ-… mounting brackets

** Magnetic field that is required at the sensing point to trigger the sensor

The sensors below are not presented in this catalog. You can find detailed technical information for these sensors at www.sickusa.com.

Magnetic cylinder sensors

Sensor Type	Housing		Relative Sensitivity in mT (Gauss)**	Switching Output				
	Mounting	Material		PNP	NPN	Reed	NAMUR	Programmable for 2 switching outputs
MZ Z1	Tie-rod	Metal	3 (30)	■				
MZ P3	Integrated profile cylinder	Metal	3 (30)	■				
MZ P4	Integrated profile cylinder	Metal	3 (30)	■				
MZ R1	Round body cylinder	Metal	3 (30)	■				
MZ R2	Round body cylinder	Metal	3 (30)	■				
MZ K1	Dove-tail cylinder	Metal	2 (20)	■				
MZ K2	Dove-tail cylinder	Metal	2 (20)	■				

Selection Table...Magnetic Cylinder Sensors

Magnetic cylinder sensors									
Sensor Type	**Output Function**				**Connection Type**			**Enclosure Rating**	**Page**
	NO	NC	NO/NC	NAMUR	Cable	M8	M12		
MZ N1	■				■	■		IP 67	276
RZ N1 Reed	■				■	■		IP 67	278
MZ U2 Weld Immune	■				■	■	■	IP 67	280
MZ2Q	■				■	■	■	IP 67	282
MZ2Q-C	■				■	■	■	IP 67	284
MZ T6	■				■	■	■	IP 69K, IP 68	288
RZ T6 Reed	■				■	■	■	IP 68	290
MZ T1	■	■			■	■		IP 67	292
RZ T1 Reed	■	■			■	■		IP 67	294
MZ F1*	■				■	■	■	IP 67	296
MZ Z1 NAMUR	■			■	■			IP 67	298
MZ P3 NAMUR	■			■	■			IP 67	300
MZ P4 NAMUR	■			■	■			IP 67	302
MZ R2 NAMUR	■			■	■			IP 67	304

Magnetic cylinder sensors								
Sensor Type	**Output Function**				**Connection Type**			**Enclosure Rating**
	NO	NC	NO/NC	NAMUR	Cable	M8	M12	
MZ Z1	■						■	IP 67
MZ P3	■						■	IP 67
MZ P4	■						■	IP 67
MZ R1	■						■	IP 67
MZ R2	■						■	IP 67
MZ K1	■						■	IP 67
MZ K2	■						■	IP 67

Please note:
NO = normally open
NC = normally closed
NO/NC = complementary

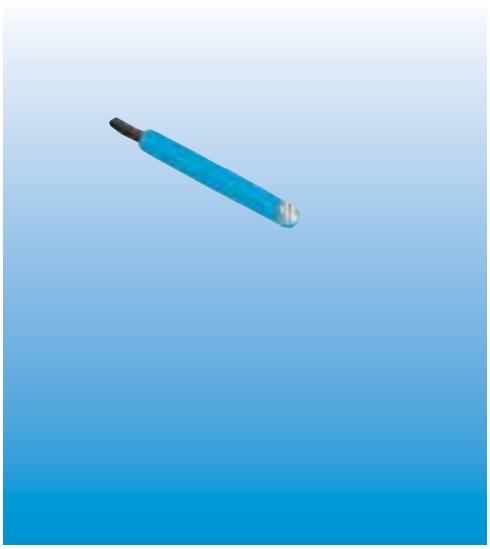
MZ N1 for C-Slot Cylinders

Magnetic Cylinder Sensors

Highlights

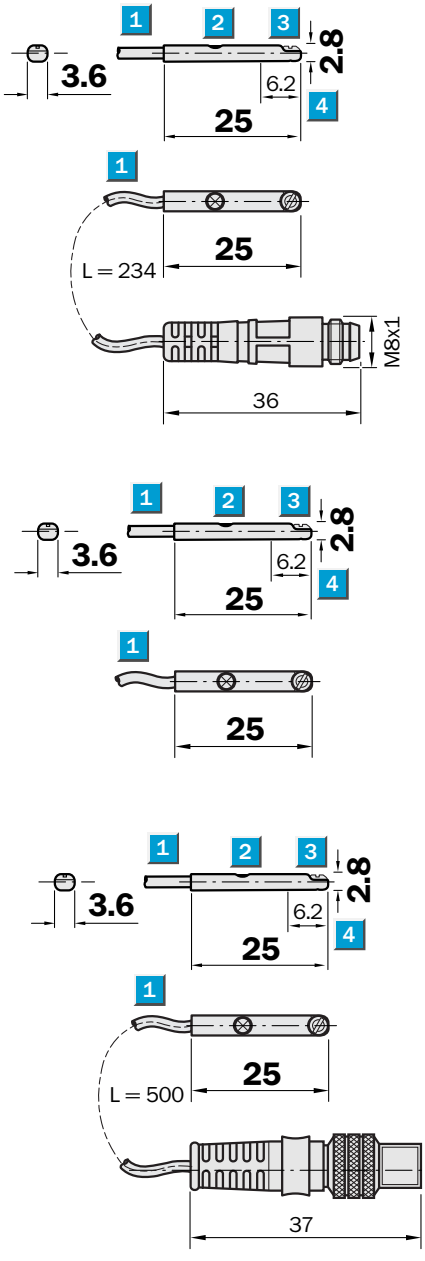
- Non-contact determination of piston position in pneumatic cylinders
- Drop-in mounting
- IP 67 enclosure rating
- Plastic housing with clamping screw
- LED status indicator
- For all commonly used C-slot (round slot) cylinders e.g. Festo, SMC
- Connection cable or connector on cable

MZ N1



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180

1 Connection
2 Display LED
3 Mounting screw
4 Position sensor element

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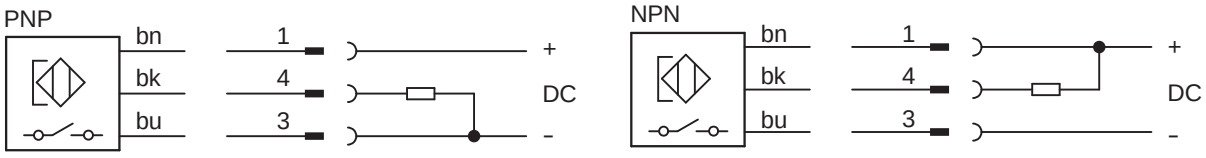
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_d	≤ 2.5 V DC
Power consumption (without load)	≤ 8 mA
Load current I_a	≤ 70 mA
Switching delay	≤ 0.1 ms
Hysteresis H	≤ 1.5 mT (15 gauss)
Repeatability R (U_b and T_a constant)	≤ ± 0.1 mm
EMC	to EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)
Housing material	Plastic
Connection cable 2 m	PUR, 3 x 0.09 mm^2
Connection cable with M8 x 1 mm	PUR

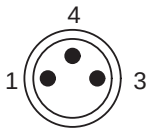
Selection table

Sensing face	Switching output	Output function	Switching frequency f in Hz	Connection	Type	Part no.
	PNP		1000	Cable 2 m	MZN1-05VPS-KU0	1 022 053
	PNP		1000	Cable w. M8 x 1 mm	MZN1-05VPS-KP0	1 022 054
	PNP		1000	Cable w. M8 knurled screw	MZN1-06VPS-KRD	1 023 985
	NPN		1000	Cable 2 m	MZN1-06VNS-KU0	1 029 904
	NPN		1000	Cable w. M8 x 1 mm	MZN1-06VNS-KP0	1 029 903

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



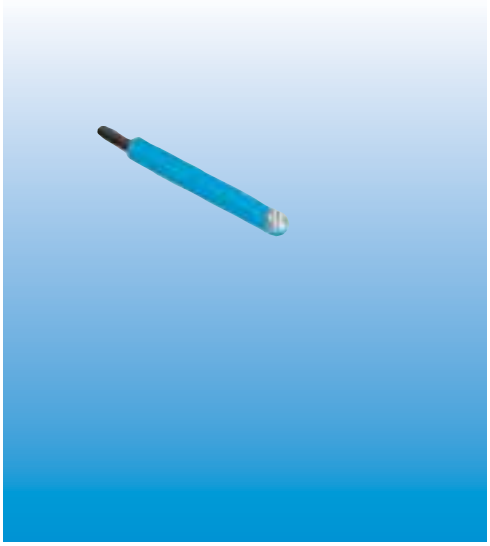
RZ N1 Reed for C-Slot Cylinders

Magnetic Cylinder Sensors

Highlights

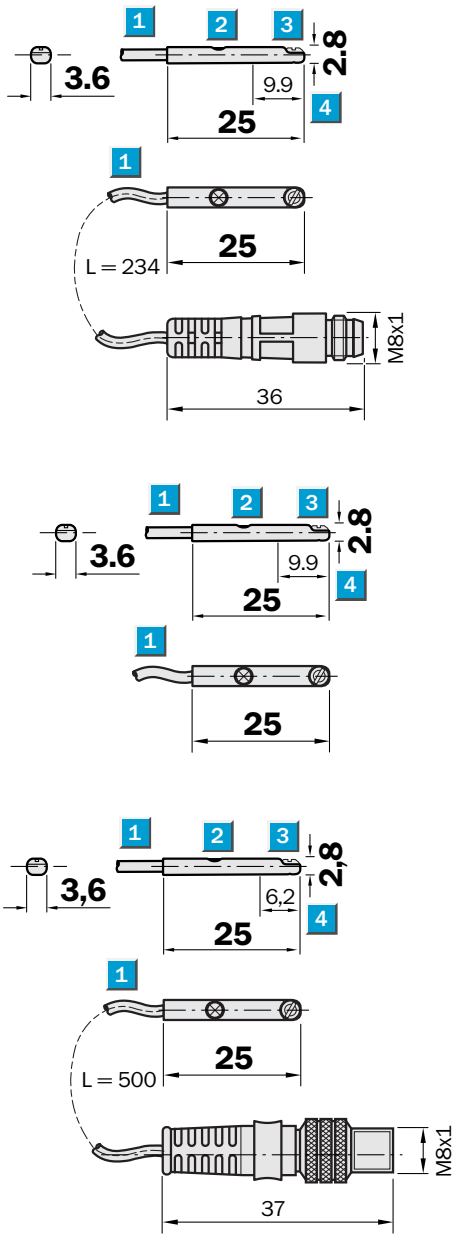
- Non-contact determination of piston position in pneumatic cylinders
- Drop-in mounting
- IP 67 enclosure rating
- Plastic housing with clamping screw
- LED status indicator
- For all commonly used C-slot (round slot) cylinders e.g. Festo, SMC
- Connection cable or connector on cable

RZ N1



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Mounting screw
4 Position sensor element

Accessories	page
Cables and connectors	1180

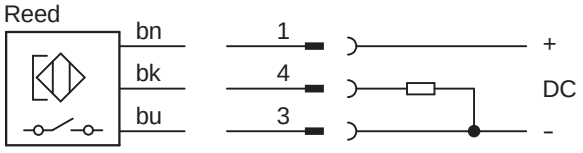
Electrical and mechanical data

Operating voltage U_b	10...30 V AC/DC
Max. switching power	10 W / VA
Continuous current I_a	≤ 500 mA DC / ≤ 300 mA AC
Switching delay **ON**	app. 1.0 ms
OUT	app. 0.5 ms
Hysteresis H	≤ 0.7 mT (70 gauss)
Repeatability R (U_b and T_a constant)	≤ 0.1 mm
EMC	to EN 60 947-5-2
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)
Housing material	PA 12
Connection cable 2 m	PUR, 3 x 0.09 mm^2
Connection cable with M8 x 1 mm	PUR

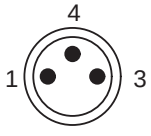
Selection table

Sensing face	Switching output	Output function	Switching frequency f in Hz	Connection	Type	Part no.
	Reed		500	Cable 2 m	RZN1-05ZRS-KU0	1 022 055
	Reed		500	Cable w. M8 x 1 mm	RZN1-05ZRS-KP0	1 022 056

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



MZ U2 Weld Immune

Magnetic Cylinder Sensors

Highlights

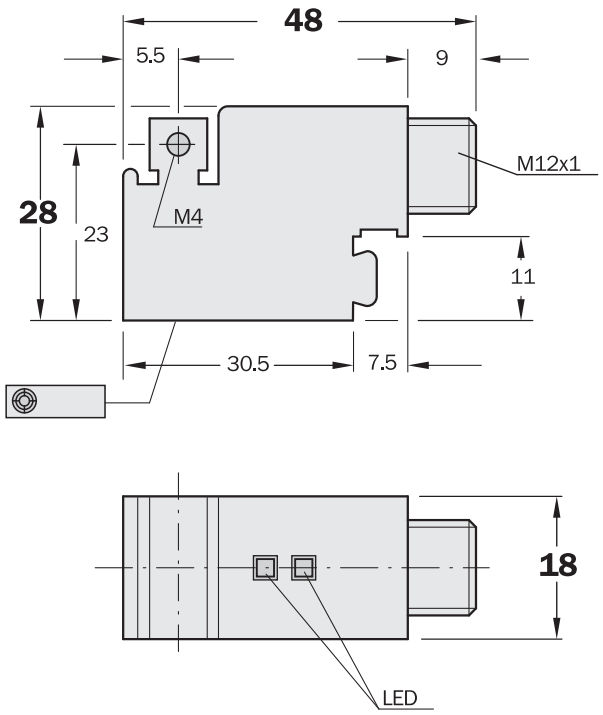
- Non-contact detection of piston position in pneumatic cylinders in weld field environments
- Weld immune in all welding applications (AC, DC and medium frequency)
- Response sensitivity of interference field detector ≥ 2 mT
- During the welding process, the sensor updates the output accordingly
- Flexible mounting technique for different cylinder styles
- Solid metal housing in die cast zinc, optional with teflon coating

MZ U2 Weld Immune



Dimensional drawing

dimensions in mm

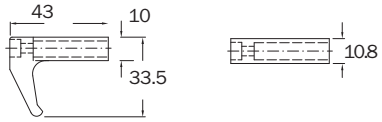


Accessories

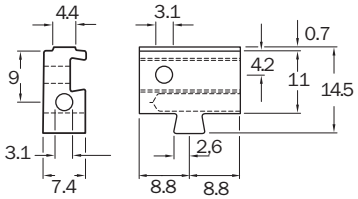
Mounting clamps for pneumatic cylinder sensor MZ U2 for tie-rod cylinders

Mounting clamp: BEF-KS-U2-S1
Material: Die cast zinc
Part no.: 7 030 922

Mounting clamp: BEF-KS-U2-S1T
Material: Die cast zinc with Teflon coating
Part no.: 7 031 632
Tie rod cylinder Ø4...20 mm

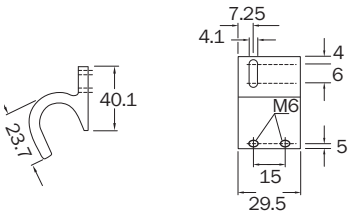


Mounting clamp: BEF-KS-U2-T1
Material: Aluminum
Part no.: 2 019 822
For cylinder with T-slot

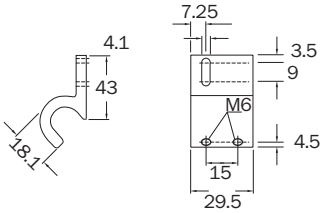


Mounting clamps for pneumatic cylinder sensor MZ U2
For integrated profile cylinder with max. rod diameter of 18 mm

Mounting clamp: BEF-KS-U2-P2
Material: Aluminum
Part no.: 2 019 823



Mounting clamp: BEF-KS-U2-P1
Material: Aluminum
Part no.: 2 019 824
For integrated profile cylinder with max. rod diameter of 13 mm



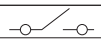
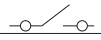
Accessories	page
Cables and connectors	1180
Mounting systems	1234

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Electrical and mechanical data

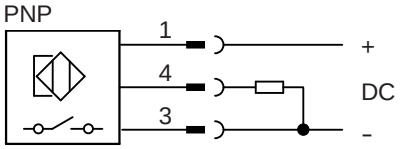
Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 2.0 V at I_a max.
Power consumption (without load)	≤ 18 mA (unattenuated), ≤ 32 mA (attenuated)
Continuous current I_a	≤ 300 mA
Time delay before availability t_v	≤ 20 ms
Hysteresis H	≤ 1.5 mm
Repeatability R (U_b and T_a constant)	≤ 0.1 mm
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)
Housing material	Die cast zinc, optional with teflon coating

Selection table

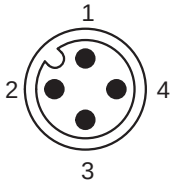
Response sensitivity in mT (gauss)	Sensing face	Switching output	Output function	Switching frequency f in Hz	Connection	Type	Part no.
3 (30)		PNP		40	Connector M12 x 1 mm	MZU2-03VPS-DCM	1 017 450
3 (30)		PNP		40	Connector M12 x 1 mm	MZU2-03VPS-TCM*	1 017 451

*with Teflon coating

Connection diagram



Contact	Assignment
1	+ V DC
4	NO
3	- V DC
2	free



MZ2Q

Magnetic Cylinder Sensors

Highlights

- Compact housing, simple drop-in mounting from above
- Simple 2-point teach-in
- Reduction in cable cost and installation time
- Only one slot is occupied
- Wide variety of applications defining end positions on short lifting cylinders or detecting intermediate poisitions
- Designed to fit common t-slot cylinders
- Can be used with round, tie rod, integrated profile and dove tail cylinders with brackets

MZ2Q



Accessories

MZ T6/RZ T6 and MZ T1/RZ T1 sensors provide a perfect sensing solution for round-body, tie-rod, integrated profile and dovetail pneumatic cylinders with the help of SICK mounting systems.

BEF-KHZ-PT1/Integrated profile and tie-rod cylinders
Using the BEF-KHZ-PT1 mounting system together with the MZ T6/RZ T6 magnetic cylinder sensors, the following magnetic cylinder sensors can be replaced for profile rod/tension rod cylinders: MZ Z1, MZ Z2, MZ P3, MZ P4.

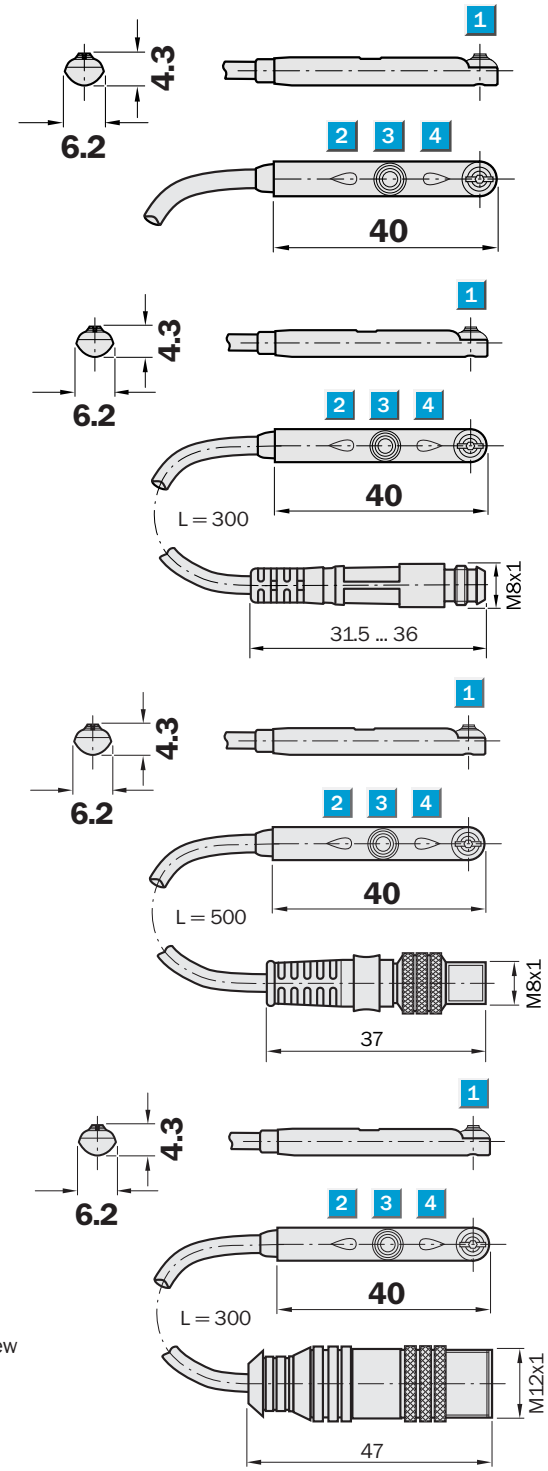
BEF-KHZ-ST1/Pneumatic cylinder with dovetail groove
The profile dimensions of the BEF-KHZ-ST1 mounting system correspond to the groove dimensions of the MZ K1, MZ K3, RZ K1 and RZ K3 magnetic cylinder sensors.
Compare the dimensions of the groove with the dimensions of the mounting rails.

BEF-KHZ-RT1/Round-body cylinder
Using the BEF-KHZ-RT1 mounting system together with the MZ T6/RZ T6 magnetic cylinder sensors, the following magnetic cylinder sensors can be replaced for profile rod/tension rod cylinders: MZ R1, RZ R1, MZ R2, RZ R2.

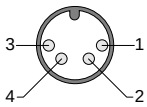
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Dimensional drawing

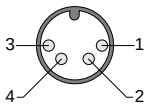
dimensions in mm



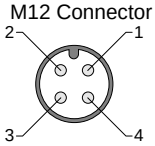
M8 Connector



M8 Connector



M12 Connector



1	Mounting screw
2	LED indicator
3	Teach button
4	LED indicator

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Electrical and mechanical data

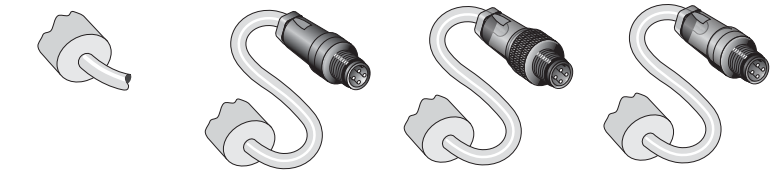
Electrical configuration	DC 4-wire
Supply voltage V_S	12…30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_d	≤ 2.2 V
Power consumption (without load)	≤ 15 mA
Continuous current I_a	≤ 100 mA
Time delay before availability t_v	≤ 20 ms
Hysteresis H	≤ 4 mm
Repeatability R (U_b and T_a constant)	≤ 0.1 mT (1 Gauss)
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10…55 Hz, 1 mm
Ambient temperature T_a	-4…167° F (-20…75° C)
Housing material	Plastic

Selection table

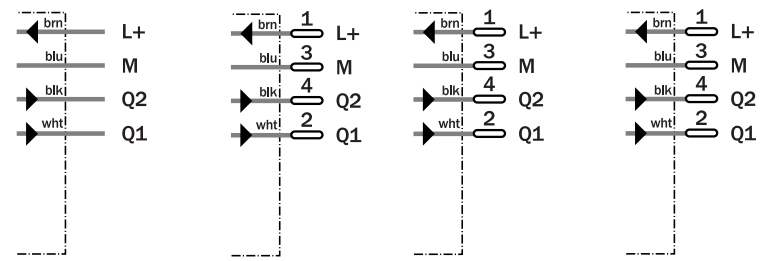
Detection area from…to	Switching output	Output function	Connection	Type	Part no.
0…50	PNP		2 m cable	MZ2Q-FTZPS-KU0	1 029 845
0…50	PNP		Cable w. M8 x 1 mm	MZ2Q-FTZPS-KP0	1 029 846
0…50	PNP		Cable w. M8 knurled screw	MZ2Q-FTZPS-KR0	1 041 322
0…50	PNP		Cable w. M12 x 1 mm	MZ2Q-FTZPS-KQ0	1 041 323

Connection diagram

MZ2Q-FTZPS-KU0 | MZ2Q-FTZPS-KP0 | MZ2Q-FTZPS-KR0 | MZ2Q-FTZPS-KQ0



4 x 0.14 mm² | M8, 4-pin | M8, 4-pin, w. kn. scr. | M12, 4-pin



MZ2Q-C for C-Slot Cylinders

Programmable Magnetic Cylinder Sensors

Highlights

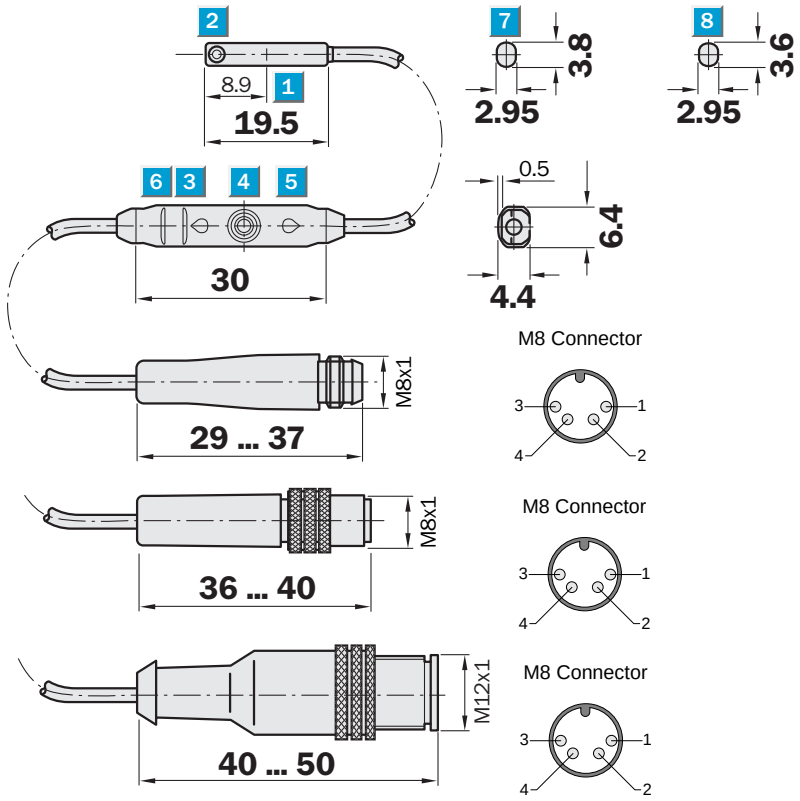
- Compact housing, simple mounting from above
- Simple 2-point teach-in
- Reduction in cable cost and installation time
- Only one slot is occupied
- Wide variety of applications defining end positions on short lifting cylinders or detecting intermediate poisitions

MZ2Q-C



Dimensional drawing

dimensions in mm



1	Center of sensor element
2	Mounting screw
3	LED indicator
4	Teach button
5	LED indicator
6	Fixing for cable binding
7	For SMC/Bimba cylinder
8	For Festo cylinder

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

Electrical and mechanical data

Electrical configuration	DC 4-wire
For SMC cylinder	Yes
For Festo cylinder	Yes
Supply voltage V_S	12…30 V DC
Ripple U_{pp}	≤ 10%
Voltage drop U_d	≤ 2.2 V
Power consumption (without load)	≤ 15 mA
Continuous current I_a	≤ 100 mA
Hysteresis H	1 mT (10 Gauss)
Repeatability R (U_b and T_a constant)	≤ 0.1 mT (1 Gauss)
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10…55 Hz, 1 mm
Ambient temperature T_a	-4…167° F (-20…75° C)
Housing material	Plastic

Selection table

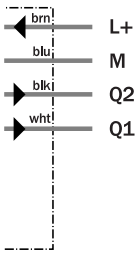
Detection area from…to	Switching output	Output function	Connection	Type	Part no.
0…50	PNP		Cable w. M8 x 1 mm	MZ2Q-CFSPSKP0	1 042 242
0…50	PNP		Cable w. M12 x 1 mm	MZ2Q-CFSPSKQ0	1 042 244
0…50	PNP		Cable w. M8 x 1 mm knurled	MZ2Q-CFSPSKR0	1 042 243
0…50	PNP		2 m cable	MZ2Q-CFSPSKU0	1 042 241
0…50	PNP		Cable w. M8 x 1 mm	MZ2Q-CSSPSKP0	1 042 238
0…50	PNP		Cable w. M12 x 1 mm	MZ2Q-CSSPSKQ0	1 042 240
0…50	PNP		Cable w. M8 x 1 mm knurled	MZ2Q-CSSPSKR0	1 042 239
0…50	PNP		2 m cable	MZ2Q-CSSPSKU0	1 042 237

Connection diagram

MZ2Q-CFSPSKU0
MZ2Q-CSSPSKU0



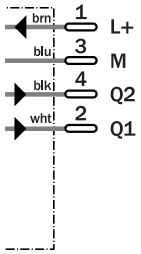
4 x 0.08 mm²



MZ2Q-CFSPSKP0
MZ2Q-CSSPSKP0



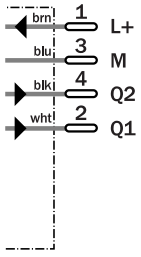
M8, 4-pin



MZ2Q-CFSPSKR0
MZ2Q-CSSPSKR0



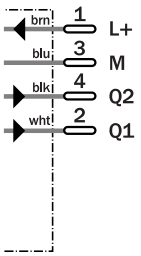
M8, 4-pin, w. kn. scr.



MZ2Q-CFSPSKQ0
MZ2Q-CSSPSKQ0



M12, 4-pin



Magnetic Cylinder Sensors for T-Slot Cylinders

Magnetic Cylinder Sensors for T-slot Cylinders



The MZ T1/RZ T1 and MZ T6/RZ T6 magnetic cylinder sensors are designed to provide a sensing solution for most common T-slot cylinders. MZ T1/RZ T1 and MZ T6/RZ T6 can also provide sensing solutions for integrated profile, tie-rod, round-body and dovetail cylinders with the use of the appropriate mounting systems.

Highlights

- Drop-in mounting
- Fits all conventional slots of pneumatic cylinders
- Easy mounting using standard tools



Highlights

- Time-saving due to easy mounting
- Optimization of storage costs
- A sensor for different pneumatic cylinder types

T1, T6 and MZ2Q Sensors



Various cylinders. A single sensor.

Pneumatic cylinders basically all carry out the same function, but they are not all identical. There are round-body cylinders, or cylinders with a profile, tie-rod type cylinders or profile tie-rod type cylinders, in short and long options. If a suitable adapter is used, a single sensor can be used for all types of profiles. This eliminates the need for differing options, time and expenditure in selection, storage and installation.



T6: Take advantage of many years of application experience.

Comprehensive expertise is built into T6 cylinder sensors. SICK features high-response sensitivity, high switching point accuracy and flexible mounting technology for all common pneumatic cylinders. The sensor is attached using a combination screw (slot and/or allen screw) and can be mounted easily with standard tools. The sensor is housed in robust plastic with a threaded metal sleeve. When mounted on a pneumatic cylinder, the new mounting method allows the entire length of the sensor to be pressed against the cylinder along the floor of the mounting slot for reliable switching. This results in a firm, stationary placement at an optimum distance from the piston to be detected, and prevents the sensor from being pulled out by its cable.

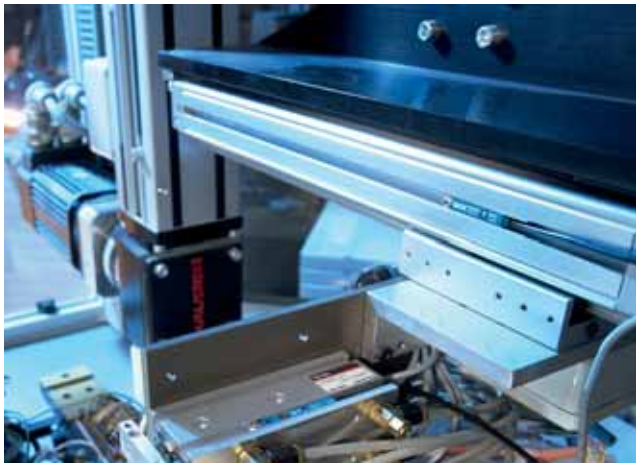




T1: Classic design with life-long operation.

The magnetic MZT1 and RZT1 cylinder sensors were the first sensors that could be easily installed into a slot from above and be fixed securely by their thread – a fixing method which since has become a recognized standard. The robust, classic MZT1 and RZT1 are now availble in a new design, which in standard applications fulfills aesthetic and technical requirements. With universal adapters, they are suitable for numerous cylinder profiles.

MZT6 & MZ2Q (Programmable)



T6 Sensor



MZ T6 for T-Slot Cylinders

Magnetic Cylinder Sensors

Highlights

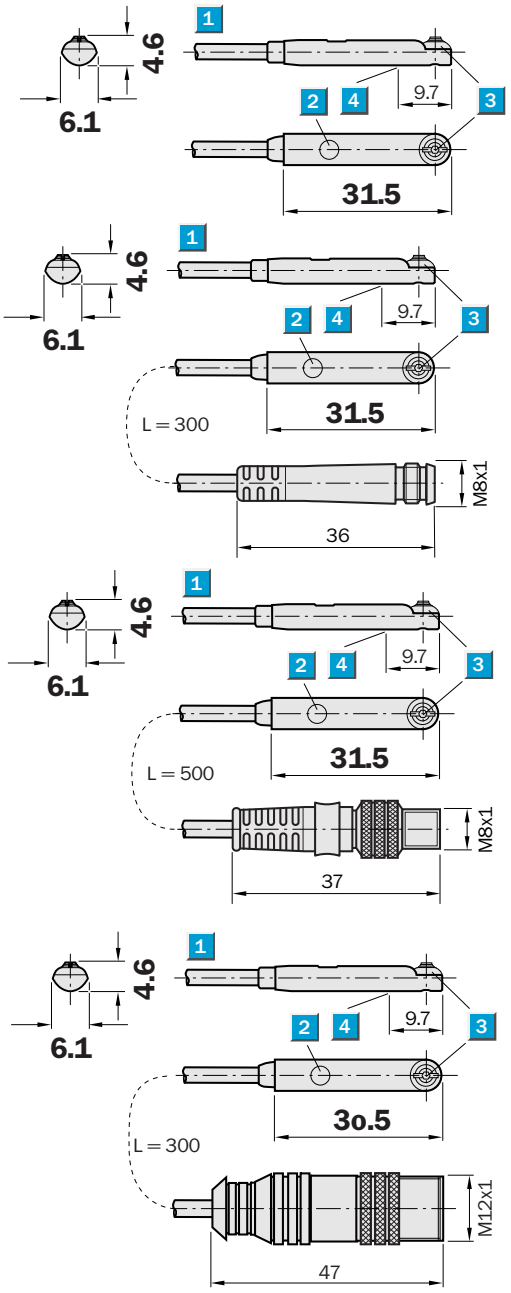
- Non-contact detection of piston position in pneumatic cylinders
- Drop-in mounting
- For all commonly used T-slot cylinders e.g. Festo, SMC
- Enclosure rating IP 68, IP 69K
- LED function indicator
- Magneto-resistive element (MZT6 only)
- Adjustable with allen wrench or screwdriver

MZ T6



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Mounting screw
4 Position sensor element

Accessories

MZ T6/RZ T6 and MZ T1/RZ T1 sensors provide a perfect sensing solution for round-body, tie-rod, integrated profile and dovetail pneumatic cylinders with the help of SICK mounting systems.

BEF-KHZ-PT1/Integrated profile and tie-rod cylinders
Using the BEF-KHZ-PT1 mounting system together with the MZ T6/RZ T6 magnetic cylinder sensors, the following magnetic cylinder sensors can be replaced for profile rod/tension rod cylinders: MZ Z1, MZ Z2, MZ P3, MZ P4.

BEF-KHZ-ST1/Pneumatic cylinder with dovetail groove
The profile dimensions of the BEF-KHZ-ST1 mounting system correspond to the groove dimensions of the MZ K1, MZ K3, RZ K1 and RZ K3 magnetic cylinder sensors. Compare the dimensions of the groove with the dimensions of the mounting rails.

BEF-KHZ-RT1/Round-body cylinder
Using the BEF-KHZ-RT1 mounting system together with the MZ T6/RZ T6 magnetic cylinder sensors, the following magnetic cylinder sensors can be replaced for profile rod/tension rod cylinders: MZ R1, RZ R1, MZ R2, RZ R2.

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part number	Material	Description
BEF-KHZ-PT1	2 022 702	Zinc die cast (GD-ZnA15Cu1)	For integrated profile and tie-rod cylinders
BEF-KHZ-ST1	2 022 703	Aluminum alloy	For dovetail cylinders
BEF-KHZ-RT1-25	5 311 171	Plastic/stainless steel	For round-body cylinder Ø 8…25 mm
BEF-KHZ-RT1-63	5 311 172	Plastic/stainless steel	For round-body cylinder Ø 32…63 mm
BEF-KHZ-RT1-130	5 311 506	Plastic/stainless steel	For round-body cylinder Ø 80…130 mm

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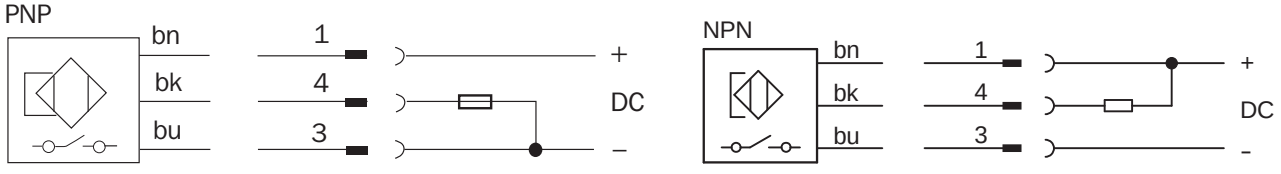
Electrical and mechanical data

		MZT6-03VPS-KWX	MZT6-03VPS-KQX
Operating voltage U_b	10...30 V DC	18...30 V DC	18...30 V DC
Ripple U_{pp}	≤ 10% of U_b	≤ 10% of U_b	≤ 10% of U_b
Voltage drop U_d	≤ 2.5 V DC	≤ 2.5 V DC	≤ 2.5 V DC
Power consumption (without load)	≤ 10 mA	≤ 10 mA	≤ 10 mA
Continuous current I_a	≤ 100 mA	≤ 70 mA	≤ 70 mA
Response sensitivity	2.8 mT ± 25%	2.8 mT ± 25%	2.8 mT ± 25%
Hysteresis H	≤ 0.85 mT (8.5 gauss)	≤ 0.85 mT (8.5 gauss)	≤ 0.85 mT (8.5 gauss)
Repeatability R (U_b and T_a constant)	≤ ± 0.1 mT (1 gauss)	≤ ± 0.1 mT (1 gauss)	≤ ± 0.1 mT (1 gauss)
EMC	to EN 60 947-5-2	to EN 60 947-5-2	to EN 60 947-5-2
Wire break protection	Yes	Yes	Yes
Short-circuit protection (pulsed)	Yes	Yes	Yes
Reverse polarity protection	Yes	Yes	Yes
Power-up pulse suppression	Yes	Yes	Yes
Enclosure rating to DIN 40050	IP 67, IP 68, IP 69K	IP 67, IP 68, IP 69K	IP 67, IP 68, IP 69K
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm	30 g, 11 ms, 10 to 55 Hz, 1 mm	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)	-4...113° F (-20...45° C)	-4...113° F (-20...45° C)
Housing material	Plastic	Plastic	Plastic
Connection cable 2 m	PVC, 3 x 0.14 mm²	PVC, 3 x 0.14 mm²	PVC, 3 x 0.14 mm²
Connection cable with M8 x 1 mm	PUR		
Connection cable with M12 x 1 mm		PUR	
Approval for ATEX		3D/3G	3D/3G

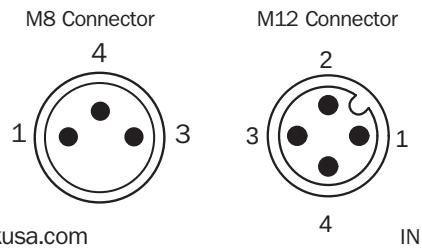
Selection table

Response sensitivity in mT (gauss)	Sensing face	Switching output	Output function	Switching frequency f in Hz	Connection	Type	Part no.
2.8 (28)		PNP		5000	Cable 2 m	MZT6-03VPS-KW0	1 023 970
2.8 (28)		PNP		5000	Cable with M8 x 1 mm	MZT6-03VPS-KP0	1 023 971
2.8 (28)		PNP		5000	Cable with M8 x 1 mm w. knurled screw	MZT6-03VPS-KR0	1 023 972
2.8 (28)		PNP		5000	Cable with M12 x 1 mm	MZT6-03VPS-KQ0	1 025 550
2.8 (28)		PNP		5000	2 m cable	MZT6-03VPS-KWX	1 025 827
2.8 (28)		PNP		5000	5 m cable with M8 knurled screw	MZT6-03VPS-KRB	1 027 089
2.8 (28)		PNP		5000	750 m cable with m8 x 1 mm	MZT6-03VPS-KPD	1 025 642
2.8 (28)		PNP		5000	Cable with M12 x 1 mm	MZT6-03VPS-KQX	1 029 161
2.8 (28)		PNP		5000	5 m cable	MZT6-03VPS-KWB	1 025 809
2.8 (28)		PNP		5000	Cable with M8 x 1 mm	MZT6-03VPS-KP0	1 028 741
2.8 (28)		NPN		5000	Cable with M8 x 1 mm	MZT6-03VNS-KP0	1 029 402
2.8 (28)		NPN		5000	2 m cable	MZT6-03VNS-KW0	1 029 401
2.8 (28)		PNP		5000	10 m cable	MZT6-03VPS-KWD	1 026 246
2.8 (28)		PNP		5000	10 m cable	MZT6-03VPO-KWD	1 029 639
2.8 (28)		PNP		5000	Cable with M8 x 1 mm	MZT6-03VPS-KPS	1 028 629

Connection diagram



Wire Color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



RZ T6 for T-Slot Cylinders

Magnetic Cylinder Sensors

Highlights

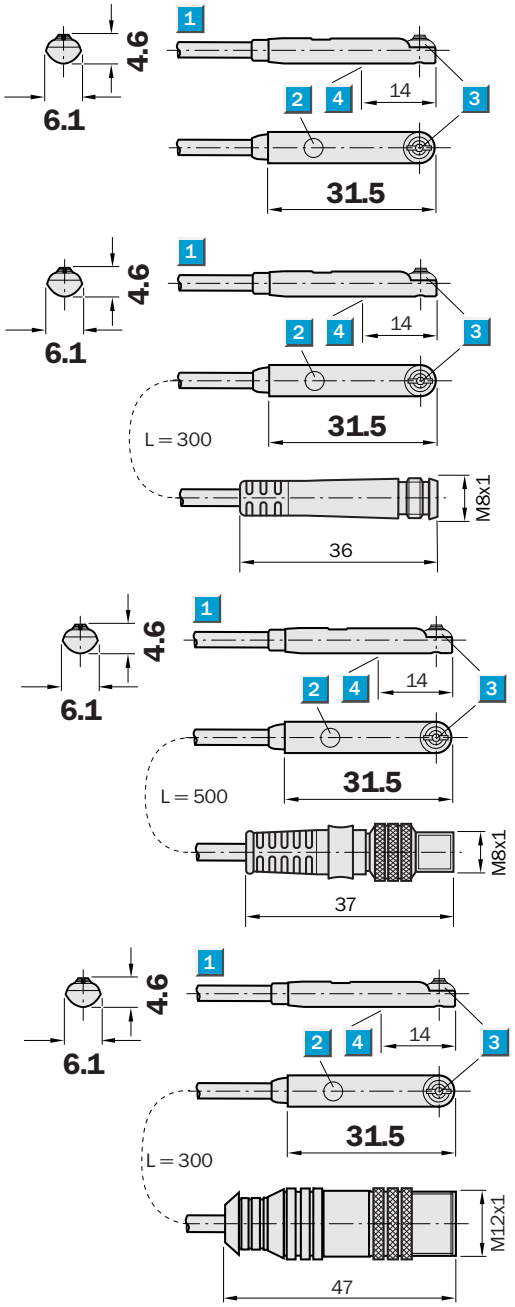
- Non-contact detection of piston position in pneumatic cylinders
- Mountable from the top
- For all commonly used T-slot cylinders e.g. Festo, SMC
- Plastic housing with nickel; silver
- Connection cable or connector on cable
- Enclosure rating IP 67
- LED function indicator
- Adjustable with allen wrench or screwdriver

RZ T6



Dimensional drawing

dimensions in mm



Accessories

MZ T6/RZ T6 and MZ T1/RZ T1 sensors provide a perfect sensing solution for round-body, tie-rod, integrated profile and dovetail pneumatic cylinders with the help of SICK mounting systems.

BEF-KHZ-PT1/Integrated profile and tie-rod cylinders
Using the BEF-KHZ-PT1 mounting system together with the MZ T6/RZ T6 magnetic cylinder sensors, the following magnetic cylinder sensors can be replaced for profile rod/tension rod cylinders: MZ Z1, MZ Z2, MZ P3, MZ P4.

BEF-KHZ-ST1/Pneumatic cylinder with dovetail groove
The profile dimensions of the BEF-KHZ-ST1 mounting system correspond to the groove dimensions of the MZ K1, MZ K3, RZ K1 and RZ K3 magnetic cylinder sensors. Compare the dimensions of the groove with the dimensions of the mounting rails.

BEF-KHZ-RT1/Round-body cylinder
Using the BEF-KHZ-RT1 mounting system together with the MZ T6/RZ T6 magnetic cylinder sensors, the following magnetic cylinder sensors can be replaced for profile rod/tension rod cylinders: MZ R1, RZ R1, MZ R2, RZ R2.

Accessories	page
Cables and connectors	1180
Mounting systems	1234

1 Connection
2 Display LED
3 Mounting screw
4 Position sensor element

Order Information

Type	Part number	Material	Description
BEF-KHZ-PT1	2 022 702	Zinc die cast (GD-ZnA15Cu1)	For integrated profile and tie-rod cylinders
BEF-KHZ-ST1	2 022 703	Aluminum alloy	For dovetail cylinders
BEF-KHZ-RT1-25	5 311 171	Plastic/stainless steel	For round-body cylinder Ø 8…25 mm
BEF-KHZ-RT1-63	5 311 172	Plastic/stainless steel	For round-body cylinder Ø 32…63 mm
BEF-KHZ-RT1-130	5 311 506	Plastic/stainless steel	For round-body cylinder Ø 80…130 mm

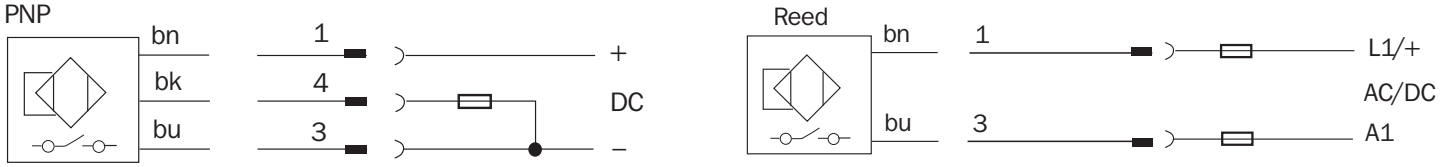
Electrical and mechanical data

	RZ T6 (3-wire)	RZ T6 (2-wire)
Operating voltage U_b	10...30 V DC	10...120 V AC/DC
Max. switching power	6 W/ VA	3 W/6 W peak
Continuous current I_a	≤ 500 mA	100 mA
Switching delay	app. 1.5 ms (on), app. 0.5 ms (off)	app. 1.5 ms (on), app. 0.5 ms (off)
Response sensitivity	2.8 mT ±25%	2.8 mT ±25%
Hysteresis H	≤ 0.9 mT (5 gauss)	≤ 0.9 mT (5 gauss)
Repeatability R (U_b and T_a constant)	≤ ± 0.1 mT (1 gauss)	≤ ± 0.1 mT (1 gauss)
EMC	to EN 60 947-5-2	to EN 60 947-5-2
Enclosure rating to DIN 40050	IP 67	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)	-13...167° F (-25...75° C)
Housing material	Plastic	Plastic
Connection cable 2 m	PVC, 3 x 0.14 mm²	PVC, 2 x 0.12 mm²
Connection cable with M8 x 1 mm	PUR	PUR

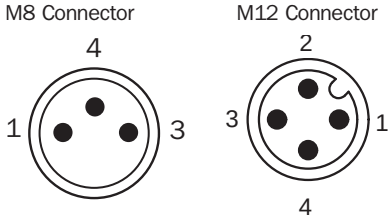
Selection table

Response sensitivity in mT (gauss)	Sensing face	Switching output	Output function	Switching frequency f in Hz	Connection	Type	Part no.
3 (30)		Reed		400	Cable 2 m	RZT6-03ZRS-KWO	1 023 974
3 (30)		Reed		400	Cable with M8 x 1 mm	RZT6-03ZRS-KPO	1 023 973
3 (30)		Reed		400	Cable with M8 x 1 mm	RZT6-03ZRS-KRO	1 023 975
3 (30)		Reed		400	Cable with M12 x 1 mm	RZT6-03ZRS-KQO	1 025 549
3 (30)		Reed		400	4 m cable with M8 x 1 knurled screw	RZT6-03ZRS-KRD	1 028 403
3 (30)		Reed		400	10 m PVC cable	RZT6-03ZRS-KWD	1 026 752
3 (30)		Reed		400	2-wire, cable 2 m	RZT6-03ZUS-KWO	1 025 522

Connection diagram



Wire Color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



MZ T1 for T-Slot Cylinders

Magnetic Cylinder Sensors

Highlights

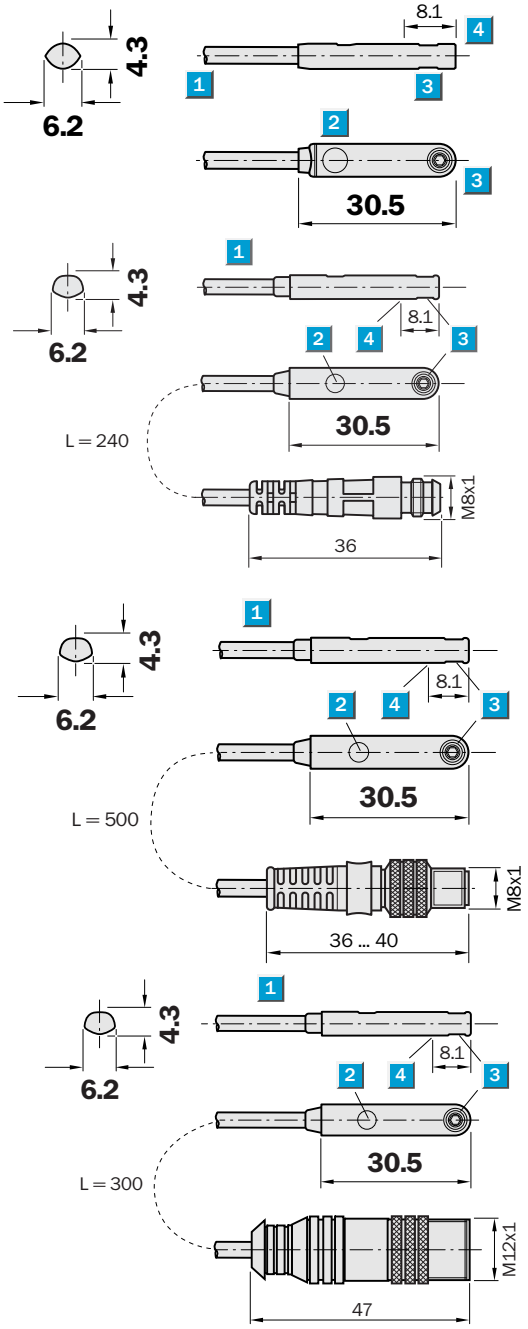
- Non-contact determination of piston position in pneumatic cylinders
- High response sensitivity ≥ 3 mT
- Frontal sensing face
- No secondary switching ranges
- Actuating speed ≤ 5 m/s
- LED status indicator
- Magneto-resistive element
- For all commonly used T-slot cylinders e.g. Festo, SMC

MZ T1



Dimensional drawing

dimensions in mm



Accessories

MZ T6/RZ T6 and MZ T1/RZ T1 sensors provide a perfect sensing solution for round-body, tie-rod, integrated profile and dovetail pneumatic cylinders with the help of SICK mounting systems.

BEF-KHZ-PT1/Integrated profile and tie-rod cylinders
Using the BEF-KHZ-PT1 mounting system together with the MZ T6/RZ T6 magnetic cylinder sensors, the following magnetic cylinder sensors can be replaced for profile rod/tension rod cylinders: MZ Z1, MZ Z2, MZ P3, MZ P4.

BEF-KHZ-ST1/Pneumatic cylinder with dovetail groove
The profile dimensions of the BEF-KHZ-ST1 mounting system correspond to the groove dimensions of the MZ K1, MZ K3, RZ K1 and RZ K3 magnetic cylinder sensors. Compare the dimensions of the groove with the dimensions of the mounting rails.

BEF-KHZ-RT1/Round-body cylinder
Using the BEF-KHZ-RT1 mounting system together with the MZ T6/RZ T6 magnetic cylinder sensors, the following magnetic cylinder sensors can be replaced for profile rod/tension rod cylinders: MZ R1, RZ R1, MZ R2, RZ R2.

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part number	Material	Description
BEF-KHZ-PT1	2 022 702	Zinc die cast (GD-ZnA15Cu1)	For integrated profile and tie-rod cylinders
BEF-KHZ-ST1	2 022 703	Aluminum alloy	For dovetail cylinders
BEF-KHZ-RT1-25	5 311 171	Plastic/stainless steel	For round-body cylinder Ø 8…25 mm
BEF-KHZ-RT1-63	5 311 172	Plastic/stainless steel	For round-body cylinder Ø 32…63 mm
BEF-KHZ-RT1-130	5 311 506	Plastic/stainless steel	For round-body cylinder Ø 80…130 mm

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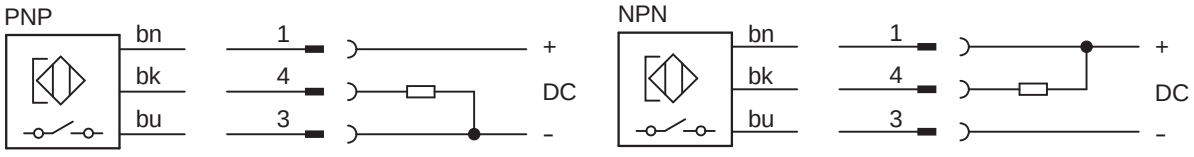
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 2 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 150 mA
Time delay before availability t_v	≤ 2 ms
Hysteresis H	≤ 1.5 mm
Repeatability R (U_b and T_a constant)	≤ 0.2 mm
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)
Housing material	Plastic
Connection cable 2 m	PUR-PVC, 3 x 0.25 mm²
Connection cable with M8 x 1 mm	PUR, 3 x 0.25 mm²

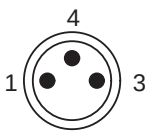
Selection table

Response sensitivity in mT (gauss)	Sensing face	Switching output	Output function	Switching frequency f in Hz	Connection	Type	Part no.
3 (30)		PNP		5000	Cable 2 m	MZT1-03VPS-KW0	1 016 809
3 (30)		PNP		5000	Cable w. M8 x 1 mm	MZT1-03VPS-KP0	1 016 910
3 (30)		PNP		5000	Cable w. M12 x 1 mm	MZT1-03VPS-KQ0	1 022 188
3 (30)		NPN		5000	5 m cable	MZT1-03VPS-KUB	1 018 999
3 (30)		NPN		5000	Cable w. M8 x 1 mm knurled screw	MZT1-03VNS-KR0	1 019 005
3 (30)		NPN		5000	Cable w. M8 x 1 mm	MZT1-03VNS-KP0	1 017 851
3 (30)		NPN		5000	2 m PUR cable	MZT1-03VNS-KU0	1 013 009

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC



RZ T1 Reed for T-Slot Cylinders

Magnetic Cylinder Sensors

Highlights

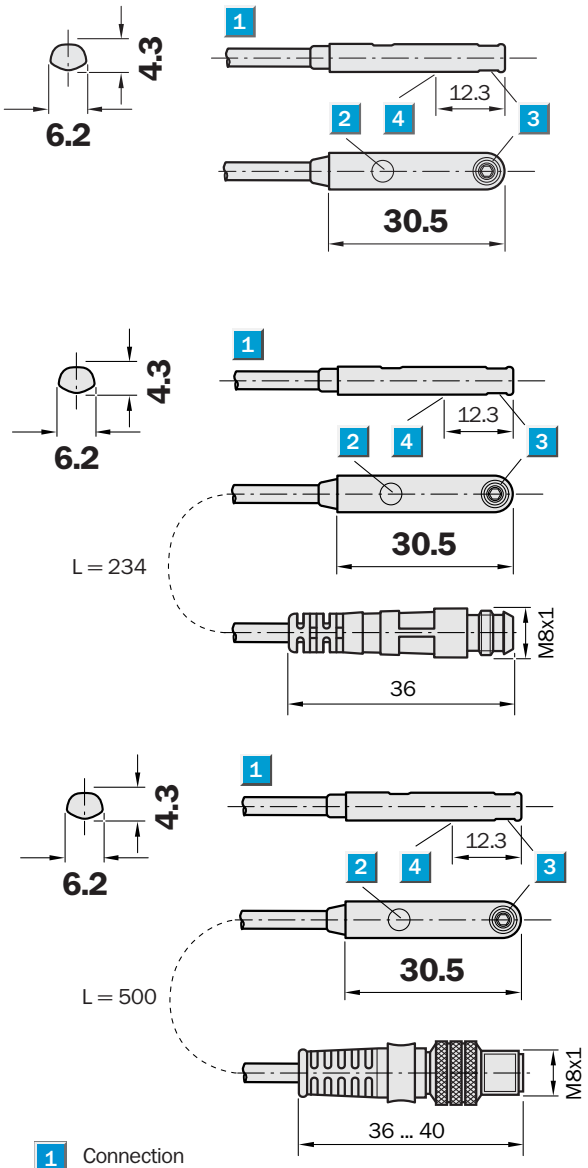
- Non-contact determination of piston position in pneumatic cylinders
- High response sensitivity ≥ 3 mT
- Mountable from the top
- No secondary switching ranges
- IP 67 enclosure rating
- LED status indicator
- For all commonly used T-slot cylinders e.g. Festo, SMC

RZ T1 Reed



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED
3 Mounting screw
4 Position sensor element

Accessories

MZ T6/RZ T6 and MZ T1/RZ T1 sensors provide a perfect sensing solution for round-body, tie-rod, integrated profile and dovetail pneumatic cylinders with the help of SICK mounting systems.

BEF-KHZ-PT1/Integrated profile and tie-rod cylinders
Using the BEF-KHZ-PT1 mounting system together with the MZ T6/RZ T6 magnetic cylinder sensors, the following magnetic cylinder sensors can be replaced for profile rod/tension rod cylinders: MZ Z1, MZ Z2, MZ P3, MZ P4.

BEF-KHZ-ST1/Pneumatic cylinder with dovetail groove
The profile dimensions of the BEF-KHZ-ST1 mounting system correspond to the groove dimensions of the MZ K1, MZ K3, RZ K1 and RZ K3 magnetic cylinder sensors. Compare the dimensions of the groove with the dimensions of the mounting rails.

BEF-KHZ-RT1/Round-body cylinder
Using the BEF-KHZ-RT1 mounting system together with the MZ T6/RZ T6 magnetic cylinder sensors, the following magnetic cylinder sensors can be replaced for profile rod/tension rod cylinders: MZ R1, RZ R1, MZ R2, RZ R2.

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part number	Material	Description
BEF-KHZ-PT1	2 022 702	Zinc die cast (GD-ZnA15Cu1)	For integrated profile and tie-rod cylinders
BEF-KHZ-ST1	2 022 703	Aluminum alloy	For dovetail cylinders
BEF-KHZ-RT1-25	5 311 171	Plastic/stainless steel	For round-body cylinder Ø 8…25 mm
BEF-KHZ-RT1-63	5 311 172	Plastic/stainless steel	For round-body cylinder Ø 32…63 mm
BEF-KHZ-RT1-130	5 311 506	Plastic/stainless steel	For round-body cylinder Ø 80…130 mm

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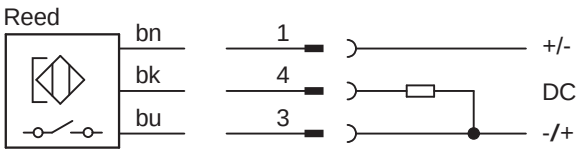
Electrical and mechanical data

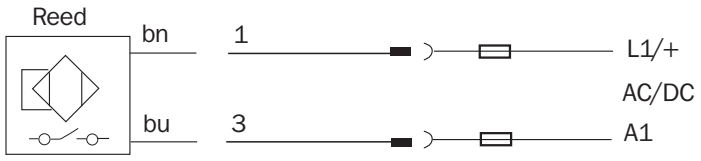
	RZT1 3-Wire	RZT1 2-Wire
Operating voltage U_b	10...30 V AC/DC	10...120 V AC/DC
Max. switching power	6 W/VA	3 W/6 WA
Continuous current I_a	≤ 500 mA	100 mA
Switching delay	app. 1.5 ms (ON), app. 0.5 ms (OUT)	app. 1.5 ms (ON), app. 0.5 ms (OUT)
Hysteresis H	≤ 1.5 mm	≤ 1.5 mm
Repeatability R (U_b and T_a constant)	≤ 0.2 mm	≤ 0.2 mm
EMC	to EN 60 947-5-2	to EN 60 947-5-2
Enclosure rating to DIN 40050	IP 67	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)	-13...167° F (-25...75° C)
Housing material	Plastic	Plastic
Connection cable 2 m	PUR-PVC, 3 x 0.25 mm²	PVC, 2 x 0.12 mm²
Connection cable with M8 x 1 mm	PUR, 3 x 0.25 mm²	PUR, 3 x 0.25 mm²

Selection table

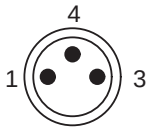
Response sensitivity in mT (gauss)	Sensing face	Switching output	Output function	Switching frequency f in Hz	Connection	Type	Part no.
3 (30)		Reed		400	2 m cable	RZT1-03ZRS-KW0	1 016 911
3 (30)		Reed		400	5 m cable	RZT1-03ZRS-KWB	1 018 579
3 (30)		Reed		400	Cable w. M8 x 1 mm	RZT1-03ZRS-KP0	1 016 912
3 (30)		Reed		400	10 m cable	RZT1-03ZRS-KWD	1 022 786
3 (30)		Reed		400	5 m cable	RZT1-03ZUS-KWB	1 029 602
3 (30)		Reed		400	2 m cable	RZT1-03ZRU-KWD	1 026 469

Connection diagram





Wire color		Contact	Assignment
bn	brown	1	+ (-)
bk	black	4	NO
bu	blue	3	- (+)



MZ F1 for T-Slot Cylinders

Magnetic Cylinder Sensors

Highlights

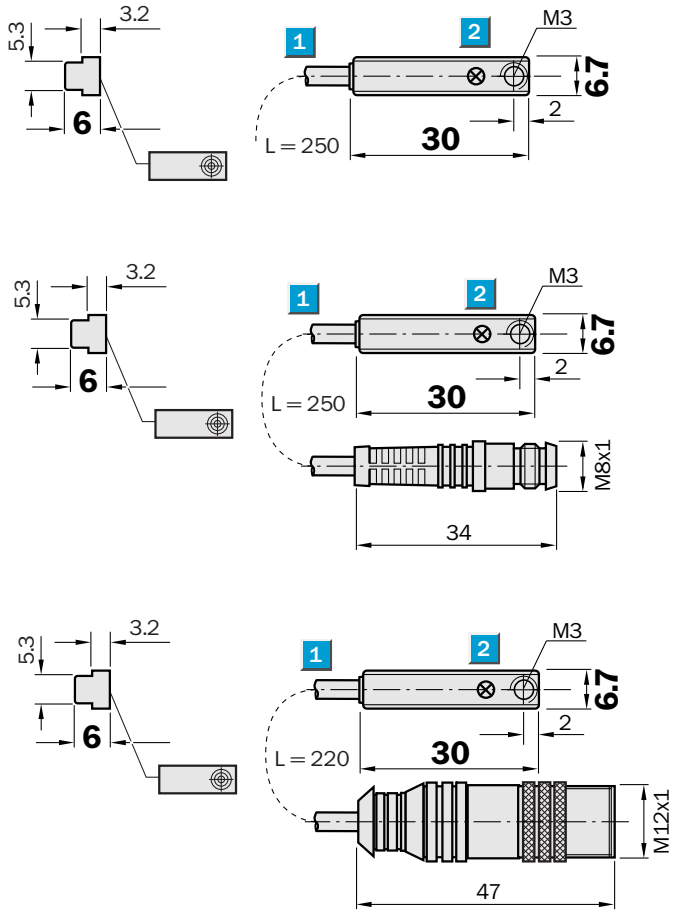
- Non-contact determination of piston position in pneumatic cylinders
- Slide-in mounting
- Simple mounting on short-stroke cylinders
- High response sensitivity ≥ 2 mT
- Frontal sensing face
- No secondary switching ranges
- High repeat accuracy
- Actuating speed ≤ 5 m/s
- LED status indicator

MZ F1



Dimensional drawing

dimensions in mm



1 Connection
2 Display LED

Accessories	page
Cables and connectors	1180

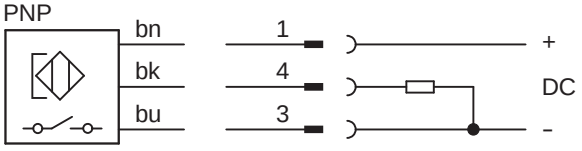
Electrical and mechanical data

Operating voltage U_b	10...30 V DC
Ripple U_{pp}	≤ 10% of U_b
Voltage drop U_b	≤ 1.5 V at I_a max.
Power consumption (without load)	≤ 10 mA
Continuous current I_a	≤ 300 mA
Time delay before availability t_v	≤ 2 ms
Hysteresis H	≤ 1.0 mm
Repeatability R (U_b and T_a constant)	≤ 0.1 mm
EMC	to EN 60 947-5-2
Wire-break protection	Yes
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Power-up pulse suppression	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...167° F (-25...75° C)
Housing material	Aluminum, plastic
Connection cable	PUR-PVC, 3 x 0.25 mm²

Selection table

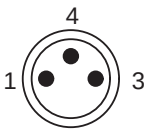
Response sensitivity in mT (gauss)	Sensing face	Switching output	Output function	Switching frequency f in Hz	Connection	Type	Part no.
3 (30)		PNP		5000	Cable 2 m	MZF1-03VPS-KU0	7 900 596
3 (30)		PNP		5000	Cable with M8 x 1 mm	MZF1-03VPS-KP0	7 900 597
3 (30)		PNP		5000	Cable with M12 x 1 mm	MZF1-03VPS-KQ0	1 016 406

Connection diagram

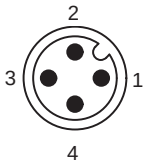


Wire color		Contact	Assignment
bn	brown	1	+ V DC
bk	black	4	NO
bu	blue	3	- V DC

M8 Connector



M12 Connector



MZ Z1 NAMUR for Tie-Rod Cylinders

Magnetic Cylinder Sensors

Highlights

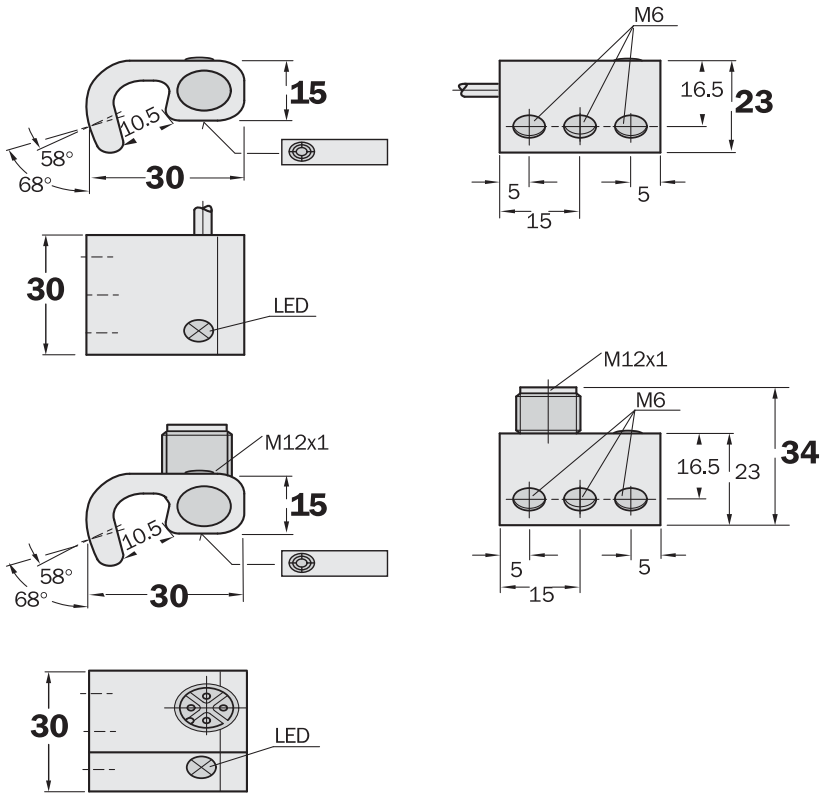
- Non-contact determination of piston position in pneumatic cylinders
- Tie-rod mounting for max. rod diameter of 10 mm
- High response sensitivity ≥ 3 mT
- Frontal sensing face
- High repeat accuracy
- Actuating speed ≤ 5 m/s
- LED status indicator
- Solid aluminum housing with integrated mounting clamp
- NAMUR to EN50 227

MZ Z1 NAMUR



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Special accessories	1314

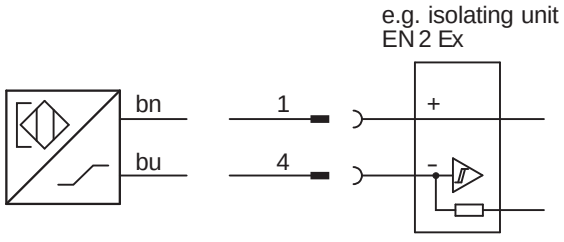
Electrical and mechanical data

Operating voltage U_b	5...25 V DC
Rated voltage U_n	8.2 V DC
Ripple U_{pp}	≤ 5% of U_b
Power consumption, attenuated	≥ 2.5 mA
Power consumption, unattenuated	≤ 1.0 mA
Internal capacitance	≤ 45 nF
Internal inductance	≤ 30 µH
Cable resistance	≤ 50 W
Time delay before availability t_v	≤ 2 ms
Hysteresis H	≤ 1.0 mm
Repeatability R (U_b and T_a constant)	≤ 0.1 mm
Temperature drift	± 0.005 mm / ° C
EMC	of EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...160° F (-25...70° C)
Housing material	Aluminum, plastic
Connection cable	PVC, 2 x 0.34 mm² blue

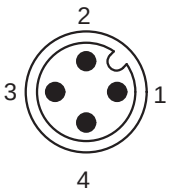
Selection table

Response sensitivity in mT (gauss)	Sensing face	Version	Output function	Switching frequency f in Hz	Connection	Type	Part no.
3 (30)		NAMUR		5000	Cable 2 m	MZZ1-03V-N-AW0	7 901 323
3 (30)		NAMUR		5000	Connector M12 x 1 mm	MZZ1-03V-N-AC0	7 901 324

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bu	blue	4	- V DC
		3	free
		2	free



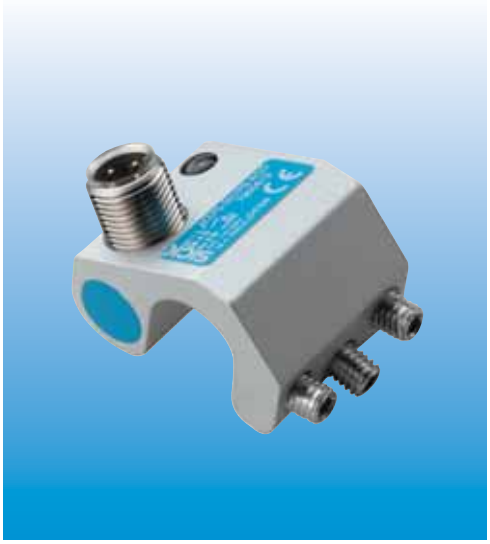
MZ P3 NAMUR for Integrated Profile Cylinders

Magnetic Cylinder Sensors

Highlights

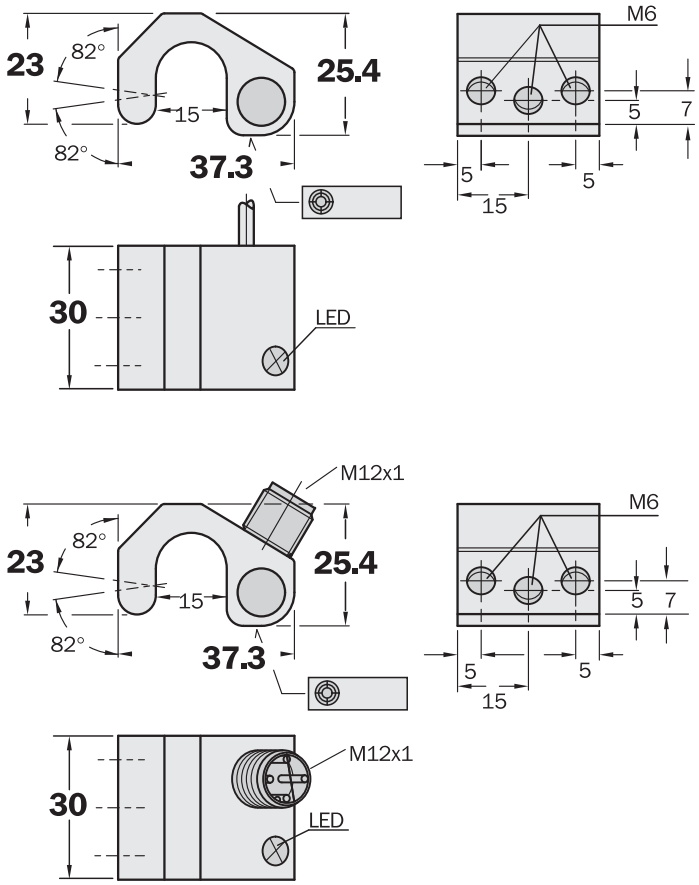
- Non-contact determination of piston position in pneumatic cylinders
- Mounting on integrated profile with max. width of 14 mm
- High response sensitivity ≥ 3 mT
- Frontal sensing face
- No secondary switching ranges
- High repeat accuracy
- Actuating speed ≤ 5 m/s
- LED status indicator
- NAMUR to EN 50 227

MZ P3 NAMUR



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Special accessories	1314

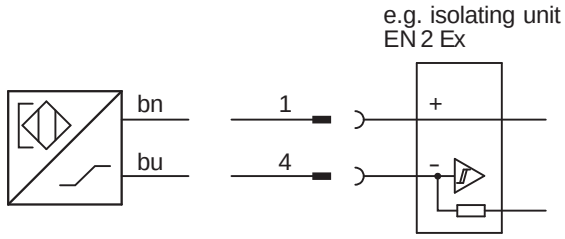
Electrical and mechanical data

Operating voltage U_b	5...25 V DC
Rated voltage U_n	8.2 V DC
Ripple U_{pp}	≤ 5% of U_b
Power consumption, attenuated	≥ 2.5 mA
Power consumption, unattenuated	≤ 1.0 mA
Internal capacitance	≤ 45 nF
Internal inductance	≤ 30 µH
Cable resistance	≤ 50 W
Time delay before availability t_v	≤ 2 ms
Hysteresis H	≤ 1.0 mm
Repeatability R (U_b and T_a constant)	≤ 0.1 mm
Temperature drift	± 0.005 mm / ° C
EMC	of EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...160° F (-25...70° C)
Housing material	Aluminum, plastic
Connection cable	PVC, 2 x 0.34 mm² blue

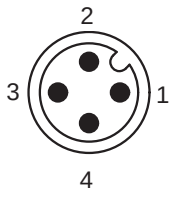
Selection table

Response sensitivity in mT (gauss)	Sensing face	Version	Output function	Switching frequency f in Hz	Connection	Type	Part no.
3 (30)		NAMUR		5000	Cable 2 m	MZP3-03V-N-AW0	7 901 440
3 (30)		NAMUR		5000	Connector M12 x 1 mm	MZP3-03V-N-AC0	7 901 441

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bu	blue	4	- V DC
		3	free
		2	free



MZ P4 NAMUR for Integrated Profile Cylinders

Magnetic Cylinder Sensors

Highlights

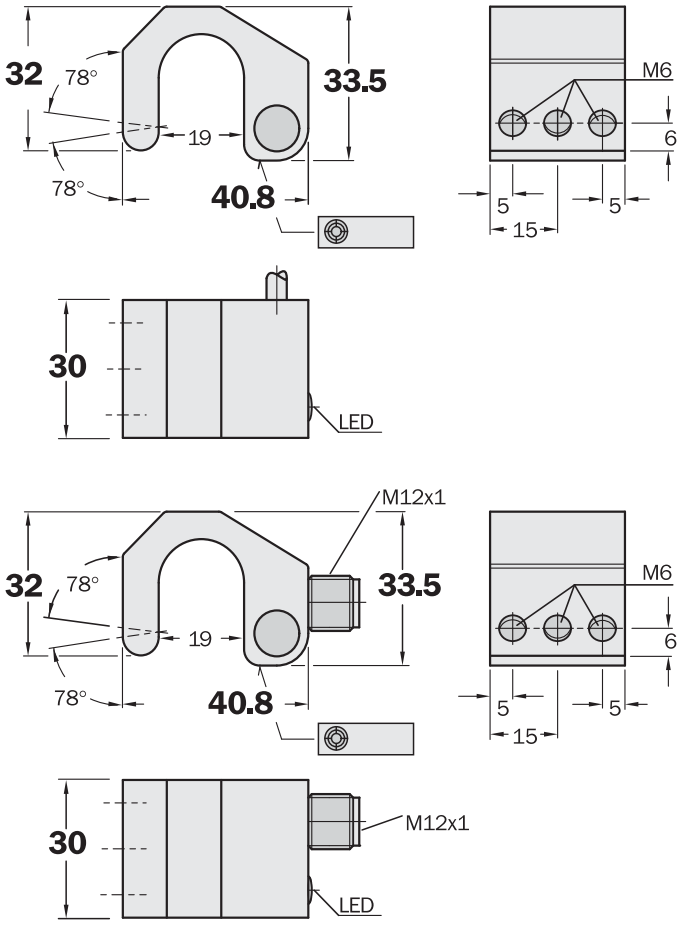
- Non-contact determination of piston position in pneumatic cylinders
- Mounting on integrated profile with max. width of 18 mm
- High response sensitivity ≥ 3 mT
- NAMUR to DIN19234
- High repeat accuracy
- Actuating speed ≤ 5 m/s
- LED status indicator
- Solid aluminum housing with integrated mounting clamp

MZ P4



Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Special accessories	1314

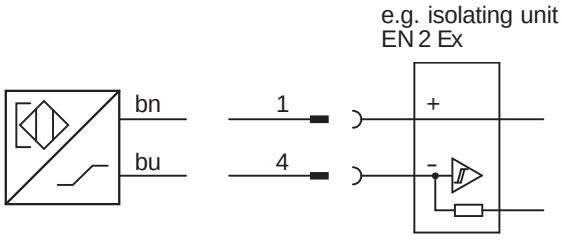
Electrical and mechanical data

Operating voltage U_b	5...25 V DC
Rated voltage U_n	8.2 V DC
Ripple U_{pp}	≤ 5% of U_b
Power consumption, attenuated	≥ 2.5 mA
Power consumption, unattenuated	≤ 1.0 mA
Internal capacitance	≤ 45 nF
Internal inductance	≤ 30 µH
Cable resistance	≤ 50 W
Time delay before availability t_v	≤ 2 ms
Hysteresis H	≤ 1.0 mm
Repeatability R (U_b and T_a constant)	≤ 0.1 mm
Temperature drift	± 0.005 mm / ° C
EMC	of EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...160° F (-25...70° C)
Housing material	Aluminum, plastic
Connection cable	PVC, 2 x 0.34 mm² blue

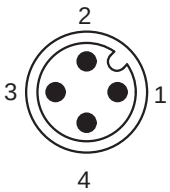
Selection table

Response sensitivity in mT (gauss)	Sensing face	Version	Output function	Switching frequency f in Hz	Connection	Type	Part no.
3 (30)		NAMUR		5000	Cable 2 m	MZP4-03V-N-AW0	7 901 329
3 (30)		NAMUR		5000	Connector M12 x 1 mm	MZP4-03V-N-AC0	7 901 330

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bu	blue	4	- V DC
		3	free
		2	free



MZ R2 NAMUR for Round-Body Cylinders

Magnetic Cylinder Sensors

Highlights

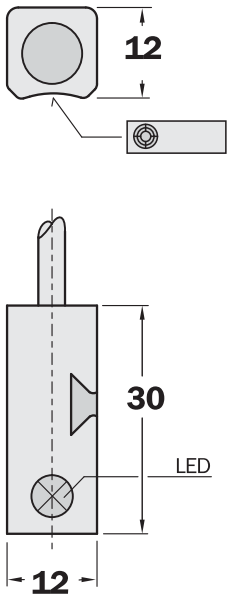
- Non-contact determination of piston position in pneumatic cylinders
- Universal mounting using clamping band for max. cylinder diameter of 100 mm
- High response sensitivity ≥ 3 mT
- Frontal sensing face
- No secondary switching ranges
- High repeat accuracy
- Actuating speed ≤ 5 m/s
- NAMUR to EN 50 227

MZ R2 NAMUR



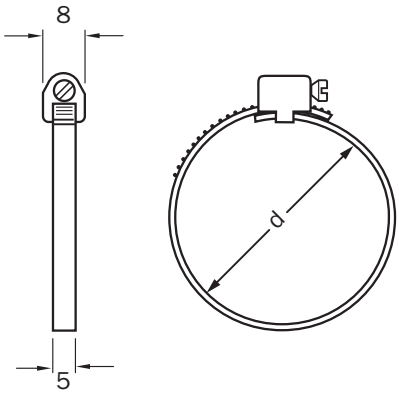
Dimensional drawing

dimensions in mm



Accessories	page
Cables and connectors	1180
Special accessories	1314

Accessories



Clamping band
stainless steel
for magnetic cylinder sensor R2

For cylinder range with piston diameter	Clamping range d in mm	Type	Order no.
8 ... 16 mm	18 - 29	BEF-S-R2-16	7901762
20/25 mm	28 - 39	BEF-S-R2-25	7901763
32 mm	38 - 49	BEF-S-R2-30	7901764
40 mm	48 - 59	BEF-S-R2-40	7901765
50 mm	58 - 69	BEF-S-R2-50	7901766
63 mm	68 - 79	BEF-S-R2-63	7901767
80 mm	88 - 99	BEF-S-R2-80	7901768
100 mm	98 - 109	BEF-S-R2-100	7901769

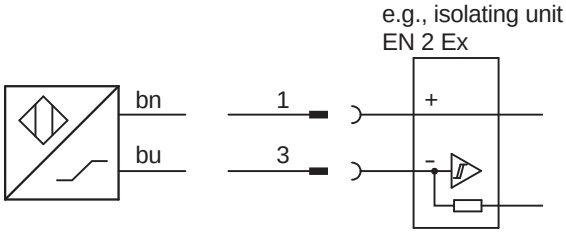
Electrical and mechanical data

Operating voltage U_b	5...25 V DC
Rated voltage U_n	8.2 V DC
Ripple U_{pp}	≤ 5% of U_b
Power consumption, attenuated	≥ 2.5 mA
Power consumption, unattenuated	≤ 1.0 mA
Internal capacitance	≤ 45 nF
Internal inductance	≤ 30 µH
Cable resistance	≤ 50 W
Time delay before availability t_v	≤ 2 ms
Hysteresis H	≤ 1.0 mm
Repeatability R (U_b and T_a constant)	≤ 0.1 mm
Temperature drift	± 0.005 mm / ° C
EMC	of EN 60 947-5-2
Short-circuit protection (pulsed)	Yes
Reverse polarity protection	Yes
Enclosure rating to DIN 40050	IP 67
Shock and vibration stress	30 g, 11 ms, 10 to 55 Hz, 1 mm
Ambient temperature T_a	-13...160° F (-25...70° C)
Housing material	Aluminum, plastic
Connection cable	PVC, 2 x 0.34 mm² blue

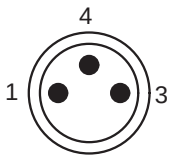
Selection table

Response sensitivity in mT (gauss)	Sensing face	Version	Output function	Switching frequency f in Hz	Connection	Type	Part no.
3 (30)		NAMUR		5000	Cable 2 m	MZR2-03V-N-AW0	7 901 321

Connection diagram



Wire color		Contact	Assignment
bn	brown	1	+ V DC
bu	blue	3	- V DC
		4	free





Photoelectric proximity sensors

- Sender and receiver in one housing
- No reflector required
- Reacts to light reflected off object to be detected

Photoelectric proximity sensors, energetic

- Sensing range/switching point can be set by adjusting sensitivity



Photoelectric proximity sensors with foreground suppression (FGS)

- Detection of low objects, e.g. on conveyor belt. Objects, which reduce distance from sensing plane to sensor, are detected.



Photoelectric proximity sensors with background suppression (BGS)

- Detection of objects within a defined sensing range.
- Objects beyond this range are not detected.



Photoelectric reflex sensors

- Sender and receiver in one housing
- Different reflector sizes for different ranges and object sizes
- Large sensing ranges
- Polarization filters also allow reflective objects to be detected
- Automatic sensitivity adjustment with “teach-in” sensors



Through-beam photoelectric sensors

- Separate sender and receiver (2 devices)
- Very large sensing ranges
- High operating reserves
- Reliable detection of both transparent and reflective objects

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W24-2	590
W34	606
W250	622
W260	642
W27-3, W27-2	666
W27L-2	692
W2000	696
W45	712
ELF	724
MH1	738
MH15, MH15V	744
V12-2	768
V18, V18L, V18V	776
V180	808
W130L	818
S130	830

Theory of Operation...Proximity/Diffuse Sensors

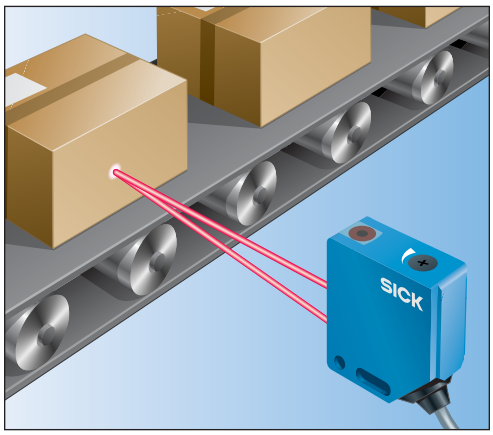


Fig. 1 Photoelectric proximity sensor application example

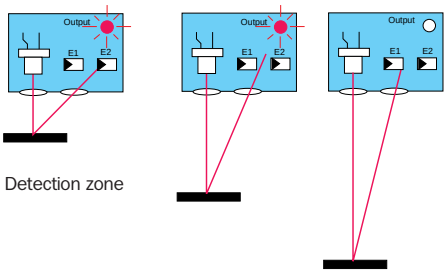


Fig. 2 Background suppression principle

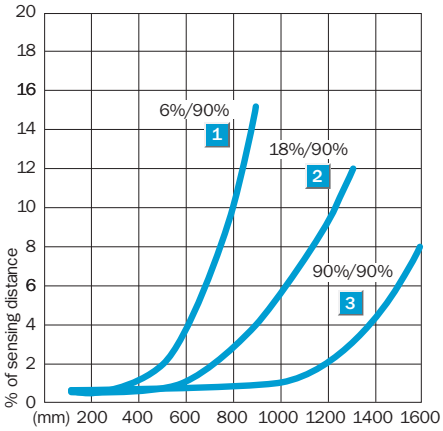


Fig. 3 Example WTB27-3 with black (6%) and gray (18%) object on white background

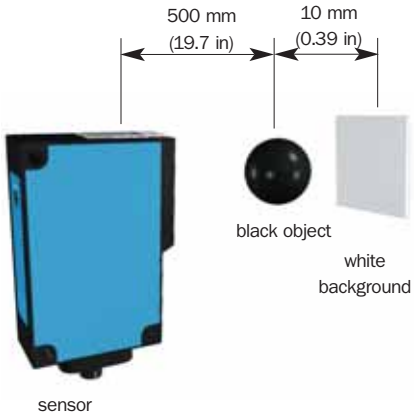


Fig. 4 At 300 mm, a white background must be 9 mm behind a black object



About Photoelectric Proximity/Diffuse Sensors

Proximity sensors (designated by a "T," as in WT 2000) receive light reflected back by the target object itself (Fig. 1, 2). There are several types of proximity sensors, like energetic, fixed focus, foreground suppression and background suppression. SICK's wide range of proximity sensors are detailed in the following sections.

Background Suppression

While through-beam and reflex sensors detect objects that block the light path, the various types of photoelectric proximity sensors detect objects by the light they reflect back to the sensor. Proximity sensors with SICK's patented adjustable background suppression use triangulation to limit the distance to which the sensor can "see" and keep objects in the background from interfering with the sensor.

True background suppression is accomplished by means of light triangulation (Fig. 2) in which a focal distance is defined by mechanical or electronic adjustment of the sensor. This focal distance defines a plane beyond which the sensor is not capable of detecting objects, hence the name "background suppression." Multiple receivers are used to define this plane. When a background suppression sensor is adjusted, the focal plane is moved but the sensitivity of the sensor is not changed as it is with energetic or fixed-focus proximity sensors. This has the advantage of making the background suppression sensor much less susceptible to environmental changes or dirt build-up on the optics.

All background suppression sensors have a special set of curves that show their capabilities. These curves show the background suppression as a percentage of the sensing distance for different color objects on a white (90% reflectance) background.

In the curve at left (Fig. 3), taken from the WTB27-3, the worst case is a black (6% reflectance) object on a white (90% reflectance) background. At a distance of 500 mm (19.7 in) the curve shows a background suppression of about 3%. This means that at 500 mm the white background must be at least 2% of 500 mm, or 10 mm (0.39 in), behind a black object (Fig.4).



Foreground Suppression

Photoelectric proximity sensors, even those with true background suppression, can have difficulty detecting objects with shiny or irregular surfaces. These types of objects can reflect the light emitted from the sensor in many different directions. This can cause false readings. The sensor with "foreground suppression," a SICK exclusive, solves this problem by not detecting the object directly. Instead, the sensor detects the object by the lack of light being reflected by the background.

The same multiple receiver system used in background suppression is used in foreground suppression (Fig. 1, 2). The difference is that the sensor is set so that it can "see" the background, but an object close to the sensor is not detected. The background is used as a reflector by the sensor and anything that passes between sensor and background is detected because it blocks the reflection from the background. This means that even objects, which are shiny or have irregular surfaces, can be reliably detected in cases where an actual reflector cannot be used.

Sensors with foreground suppression also have graphed curves to detail their capabilities. In the curve shown in Fig. 3, taken from the WTF12-3, the worst case is a white (90% reflectance) object on a black (6% reflectance) background. At a distance of 50 mm (1.97 in) the curve shows a foreground suppression of about -2%. This means that at 50 mm the black background must be at least 2% of 50 mm, or 1 mm (0.039 in) behind the white object (Fig. 4).

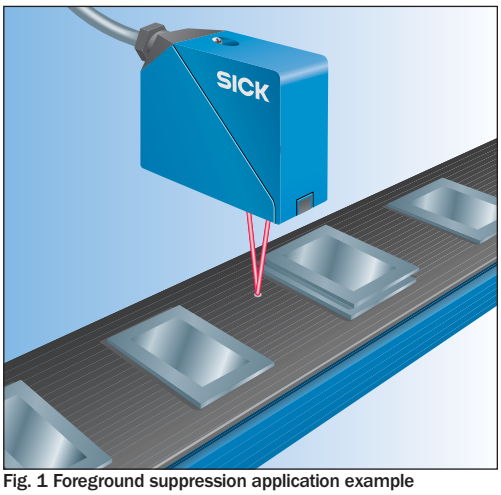


Fig. 1 Foreground suppression application example

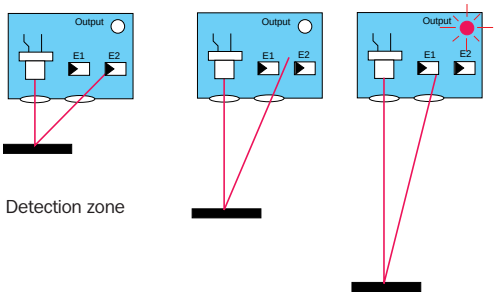


Fig. 2 Foreground suppression principle

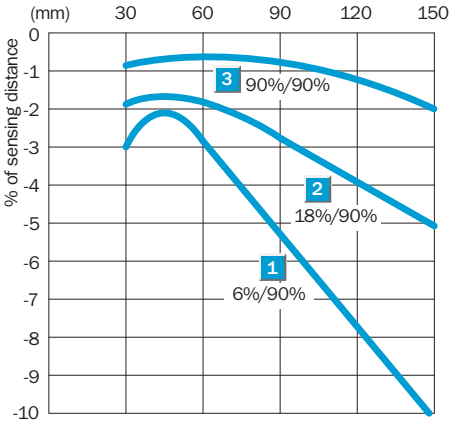


Fig. 3 Example WTF12-3 with black (6%) and white (90%) object on a black background

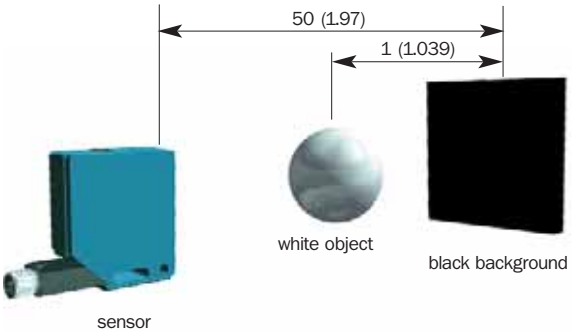


Fig. 4 At 50 mm an object must be 1 mm in front of the black background

Theory of Operation...Proximity/Diffuse Sensors

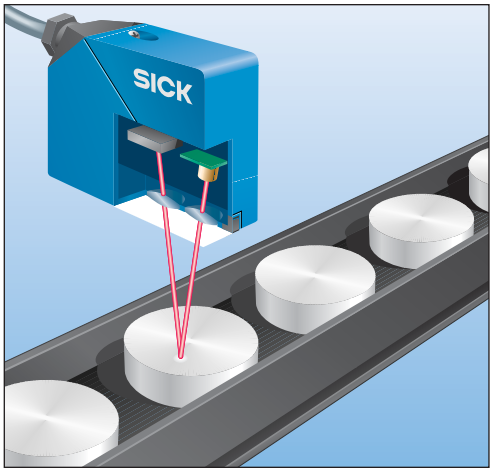


Fig. 1 Background rejection sensor application example



Background Rejection

Background rejection is an ultra-precise form of background suppression. Background rejection sensors can detect the slightest difference from the object to the background. It can be achieved either electronically or optically.

Optically, the angle between the sender and the receiver's light beam is altered while setting the sensing distance. Objects are detected at the point where the emitted beam is reflected back to the receiver element. Anything below this point is cut out as no light or not enough light, reaches the receiver element.

The electronic method uses Position Sensitive Devices (PSD). The emitted light beam is reflected by the object and hits the PSD receiver. Depending on the location of the incoming light beam, the signal is recognized as a background signal and electronically cut out.

Background rejection sensors can be prone to false readings from shiny objects in the background. Screening off or tilting the device can solve this problem however.



Fixed Focus Proximity

A fixed focus, triangulation type photoelectric device has optics set up to see at angles. The fixed focus has a type of limited background suppression. Where the angle of acceptance and the angle of divergence cross, this is the only area where detection of an object can take place.

This detection area would also be affected by the color of the object, so there may still be some difficulty with a dark object that is very close to a light-colored background.

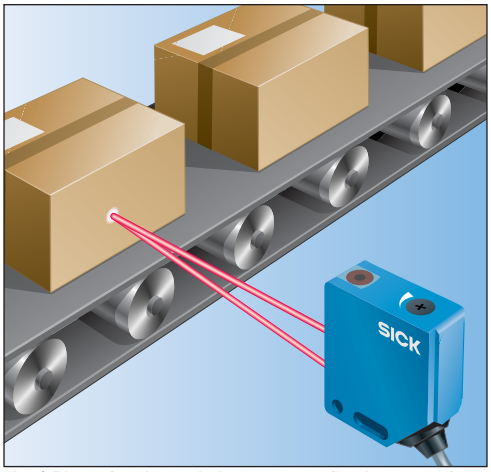


Fig. 1 Photoelectric proximity sensor application example

Energetic Proximity

Energetic proximity sensors send light out in an infinite focus concentrated beam. Energetic type sensors typically have a longer range and a medium sized light spot. It has to be pointed directly at the object it wants to see and that range is dependent on the color of the object being detected.

In the case where the object to be detected is close to that of some "background" object, such as a conveyor belt being detected from above, an energetic proximity sensor may have difficulty (object and background reflecting at the same or similar level). This is especially true if the object to be detected is darker than the background (background having more reflectivity than the object).

Theory of Operation...Reflex/Retro-Reflective Sensors

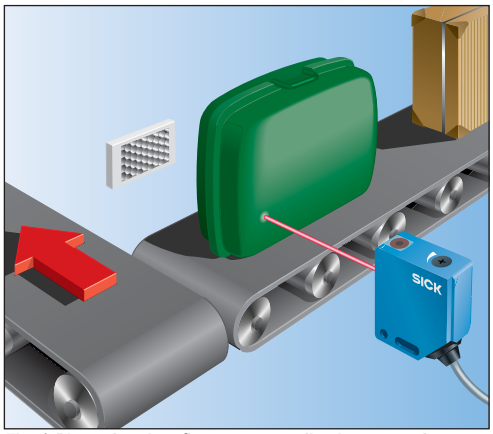


Fig. 1 Photoelectric reflex sensor application example

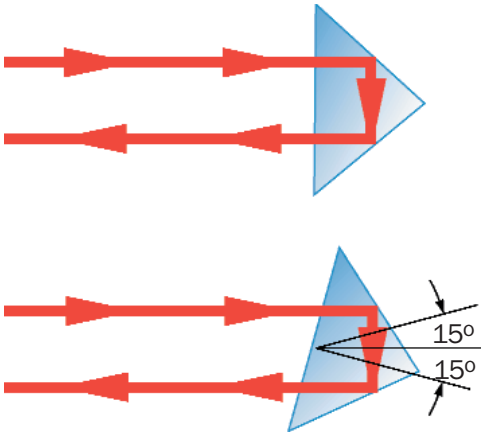


Fig. 2 Corner cube elements within a reflector

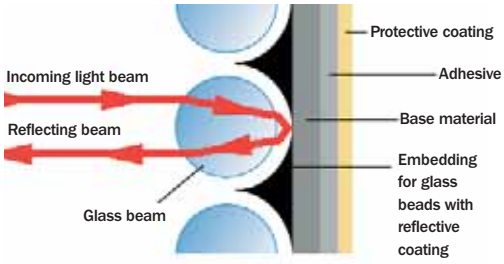


Fig. 3 Glass or plastic bead type reflector

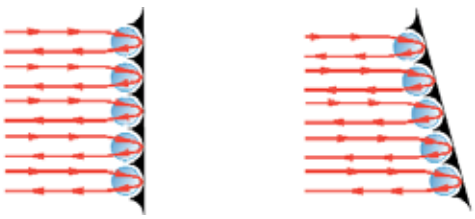


Fig. 4 Glass or plastic bead type reflector

About Photoelectric Reflex Sensors

Photoelectric reflex switches (designated by an "L," as in the WL 2000) contain both the sender and receiver in a single housing. The emitted light is returned by the corner cube reflector and evaluated by the sensor (Fig. 1). With the corner cube reflector, this becomes a two-part device that requires wiring on only one side, making it more economical than a through-beam sensor.

Polarizing filters (see next page for more information) prevent false readings on reflective objects. There are many different types of reflectors, from the very simple to the specialized, and each will provide a different sensing distance.

Corner cube reflectors are most common in opto-electronics. They can absorb deviations in alignment of up to ± 15 degrees. This parallel reflection of light, (Fig. 2), allows higher tolerances in alignment of reflex photoelectric switches, as opposed to mirrors which require perfect alignment and might fail from external influences (vibration, etc.). SICK 2000X tape uses microcorner cube technology.

Some retro-reflective tape consists of small glass or plastic beads of approximately 0.1 mm (0.004 in) diameter, which are embedded side-by-side on a tape with an adhesive backing (Fig. 3, 4). This relatively low-cost reflector is used for temporarily marking cartons and similar applications. Retro-reflective tapes have a reflectivity, which can vary with quality – from 200 to 2000 times greater than a 90% reflective test card.

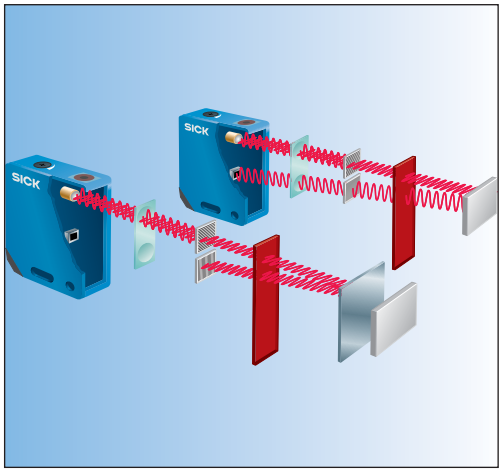


Fig. 1 Polarization filters

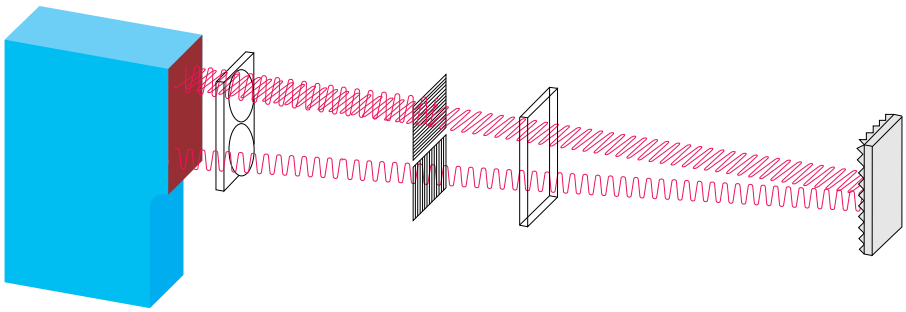
Polarizing Filters

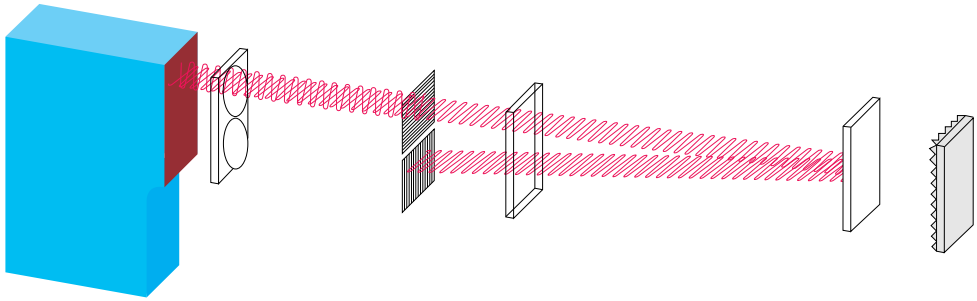
A reflex sensor detects objects when its reflector does not return the beam of emitted light. When the objects to be detected are themselves reflective, the sensor may falsely register that there is no object present.

Using a polarizing filter can eliminate these false readings. A polarizing filter has two parts; the sender filter is "striped" horizontally, and the receiver filter is "striped" vertically. The sensor emits light that oscillates on an arbitrary plane, but the sender filter will only allow horizontally oscillating light to pass through it. If no object is present, the beam of light will strike the reflector. The reflectors we recommend are "optically active;" when the beam strikes the reflector it rotates the light 90°. When the light returns to the receiver it has been vertically aligned and can pass through the receiver filter (Fig. 2). A reflective object will still reflect the beam, but without rotating it. The light will not be able to pass through the receiver filter and the sensor will register an object as being present (Fig. 3).

The possible exception to this is with materials such as plastic wraps, films, and coatings. As the light passes through this material, it is turned 45°. The beam then hits the reverse side of the material and is directed back to the sensor; however, as it passes back through the material it is turned another 45°. The light is then able to pass through the receiver filter, and the sensor reacts as if no object were present.

This type of false reflection is generally less intense than a reflection from the reflector, and the problem can be solved by adjusting the optical alignment or sensitivity control. In extreme cases it may be necessary to use a clear material sensor.


Fig. 2 When the light beam is reflected by the reflector, it can pass through the filter.


Fig. 3 When the light beam is reflected by the object, it cannot pass through the filter.

Theory of Operation...Clear Material Sensors

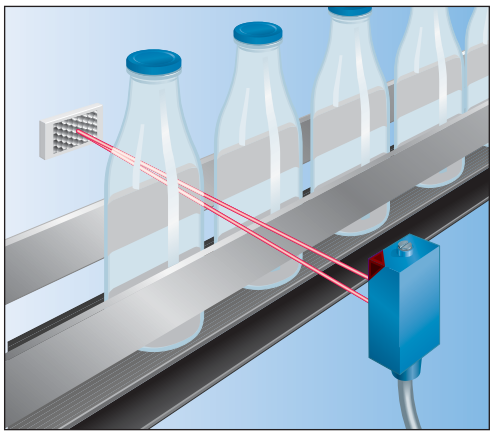
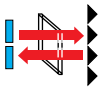


Fig. 1 Clear material sensing









About Clear Material Sensors

Clear material sensors require only a small amount of the light beam to be broken. The design of the device has a stabilized and constant light output and a stabilized receiving and switching threshold element. In addition to clear objects, this type of device can be used to detect small objects, including objects smaller than the effective light beam.

In the past, steady contamination of the sensors caused by leaked products, dust, mist or splash-water had a major detrimental effect on the reliability of detection because the reflector signal, attenuated by the dirt deposits, increasingly approximated the switching threshold which often very quickly led to sensor failure. In contrast, the "glass detection method," employed in the WL 12 G, provides an extremely high degree of detection and switching reliability. This method basically involves maintaining the difference in level between the reflector and switching signal. The switching threshold is adjusted to the unbroken light beam between the sensor and reflector. Various operating modes can be selected, depending on the anticipated signal attenuation.

The switching threshold is evaluated by a microprocessor and continually adapted to any contamination, whereby the difference between the reflector signal and switching threshold is maintained electronically. There is, therefore, no dilution of the difference between the reflector signal (weakened by contamination) and the previously taught-in switching threshold, thus preventing detection problems.

Consequently, the device only requires maintenance in the case of severe contamination resulting in the system limit of the sensor being reached. This is considerably later than with conventional sensors. After cleaning, the original signal level and threshold value are automatically restored.

Clear material sensors can be used for filling systems, presence verification, jam detection, monitoring the flow of bottles and bottle counting. They are reliable, easy-to-install, low-maintenance sensors that stand up to use in washdown conditions.

Theory of Operation...Through-Beam Sensors

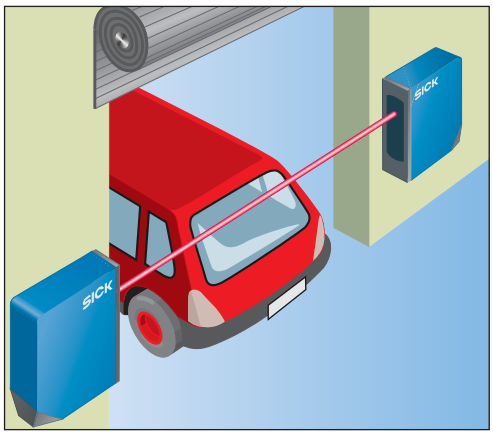


Fig. 1 Photoelectric through-beam sensor application example

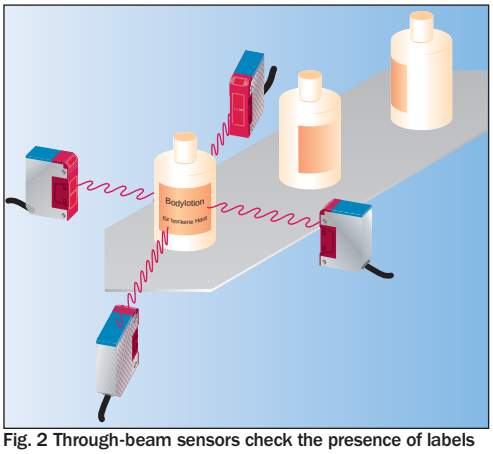


Fig. 2 Through-beam sensors check the presence of labels on transparent objects

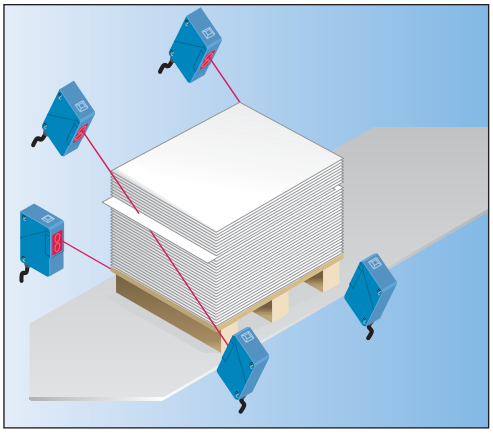


Fig. 3 Monitoring contours in palletization systems

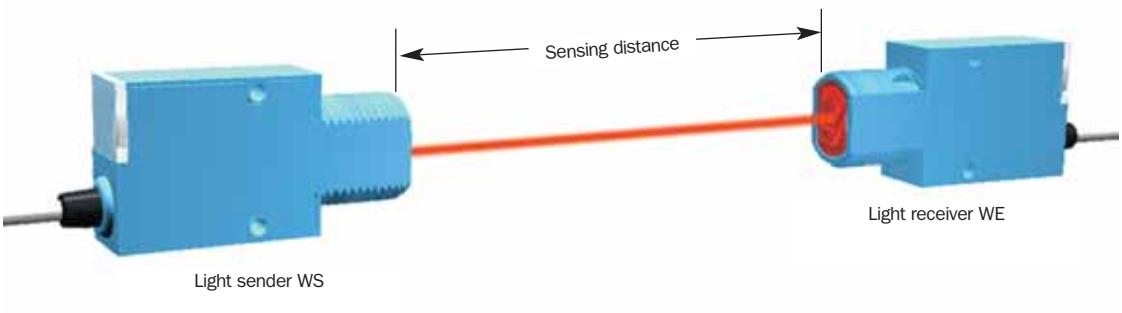


Fig. 4 Photoelectric through-beam sensor

About Through-Beam Sensors

Each photoelectric through-beam sensor consists of two devices: a light sender (designated by an "S," as in the WS 1000) and light receiver (designated by an "E," as in the WE 1000), and switches when an object passes through the light beam (Fig. 1, 4).

Because the sender and receiver are separate, through-beam sensors allow for large sensing distances or high excess gain while maintaining a high resolution. The focus ranges can be set very precisely. They are ideal for use in harsh application environments. Through-beam sensors are the best choice to sense reflective objects.

Fig. 11 Fill level control/verification

Selection Table...Proximity/Diffuse Sensors

Proximity/diffuse sensors

Background suppression

Sensor Type	Sensing Range mm	3000	6000	Light Source Red	IR	Laser	Features Test	Delay	Alarm	Enclosure Rating
WT 2S	30			■						IP 67, IP 69K
WTB 4S-3	120			■						IP 66, IP 67
WTB 4S-3	180			■						IP 66, IP 67
WTB 4-3	150			■						IP 66, IP 67
WTV 4-3	50			■						IP 66, IP 67
WTB 4-3 LINE	150			■						IP 66, IP 67
WTB 4-3 Teflon	120			■						IP 68, IP 69K
WT 150	100			■						IP 67
WT 9-2	250			■						IP 67
WT 9L	150					■				IP 67
WTB 140	500			■						IP 67
WT 1000	50				■					IP 67
WT 1000	100				■					IP 67
WT 160	55			■						IP 67
WTB 160T	50			■						IP 67
WTB 160T	150			■						IP 67
WT 190	100			■						IP 67
WT 190	300			■						IP 67
WTB 190T	300			■				■		IP 67
WTB 190T	100			■				■		IP 67
WTB 190L	300					■				IP 67
WTB 190L	100					■				IP 67
WT 11	250			■						IP 65
WTB 12-3	350			■						IP 67, IP 66, IP 69K
WTB 12-3	600				■					IP 67, IP 66, IP 69K
WT 12L-2	200					■				IP 67
WT 14-2	500				■					IP 65
WT 14-2	250			■						IP 65
WTV 18-2	200				■					IP 67
WT 18-3	600			■						IP 67
WT 18-3	700				■					IP 67
WT 18-3	1000				■					IP 67
WT 23-2	800			■						IP 65
WT 23-2	1000				■					IP 65
WT 24-2	1200			■			■	■	■	IP 67
WT 24-2	2500				■		■	■	■	IP 67
WT 34	1200			■			■	■	■	IP 67
WT 34	2500				■		■	■	■	IP 67
WT 250	310			■						IP 67
WT 250	600			■						IP 67
WT 250	1100			■						IP 67
WT 260	380				■		■	■	■	IP 67
WT 260T	2100				■					IP 67
WT 260T	3200				■					IP 67
WTB 27-3	1100			■			■	■		IP 67, IP 66, IP 65
WTB 27-3	1600				■		■	■		IP 67, IP 66, IP 65
WT 27 L-2	800					■				IP 67
WT 45	2000				■		■	■		IP 67
ET 1	50				■					IP 54
MHT 1	50				■					IP 40
VT 18-2	105				■					IP 67

Proximity/diffuse Sensors

Background suppression

Sensor Type	Voltage		Output					Connection Type							Page
	DC	AC	PNP	NPN	Namur	Relay	Triac	M8	M12	Mini	Micro	Cable	Terminal	Square	
WT 2S	■		■	■				■				■			332
WTB 4S-3	■		■	■				■				■			342
WTB 4S-3	■		■	■				■				■			340
WTB 4-3	■		■	■				■				■			346
WTV 4-3	■		■	■				■	■			■			352
WTB 4-3 LINE	■		■	■				■				■			354
WTB 4-3 Teflon	■		■	■								■			376
WT 150	■		■	■				■				■			380
WT 9-2	■		■	■				■	■			■			392
WT 9L	■		■	■				■	■						406
WTB 140	■		■	■				■				■			424
WT 1000	■	■	■	■			■		■		■	■			426
WT 1000	■		■	■			■		■		■	■			428
WT 160	■		■	■				■				■			444
WTB 160T	■		■	■				■				■			454
WTB 160T	■		■	■				■				■			456
WT 190	■		■	■				■				■			478
WT 190	■		■	■				■				■			480
WTB 190T	■		■	■				■				■			486
WTB 190T	■		■	■				■				■			488
WTB 190L	■		■	■				■				■			490
WTB 190L	■		■	■				■				■			492
WT 11	■		■	■					■			■			504
WTB 12-3	■		■	■					■			■			522
WTB 12-3	■		■	■					■			■			526
WT 12L-2	■		■	■					■			■			544
WT 14-2	■		■	■					■			■			550
WT 14-2	■		■	■					■			■			552
WTV 18-2	■		■						■						570
WT 18-3	■		■	■					■			■			560
WT 18-3	■		■	■					■			■		■	564
WT 18-3	■		■						■			■			568
WT 23-2	■		■						■						578
WT 23-2	■	■	■	■		■			■			■			580
WT 24-2	■	■	■	■		■			■	■	■		■		590
WT 24-2	■	■	■	■		■			■	■	■		■		592
WT 34	■	■	■	■		■			■				■		606
WT 34	■	■	■	■		■			■				■		608
WT 250	■	■	■	■		■			■			■			622
WT 250	■	■	■	■		■			■			■			624
WT 250	■	■	■	■		■			■			■			626
WT 260	■	■	■	■		■			■				■	■	642
WT 260T	■	■	■	■					■				■		656
WT 260T	■		■	■					■				■		648
WTB 27-3	■	■	■	■		■			■			■		■	666
WTB 27-3	■	■	■	■		■			■			■		■	670
WT 27 L-2	■	■	■			■			■	■	■				692
WT 45	■	■	■	■		■							■		712
ET 1	■		■	■				■	■			■			724
MHT 1	■		■	■								■			738
VT 18-2	■		■	■					■			■			802

Selection Table...Proximity/Diffuse Sensors

Proximity/diffuse Sensors

Energetic

Sensor Type	Sensing Range mm	1750	3500	Light Source: Red	IR	Laser	Features: Test	Delay	Alarm	Enclosure Rating
WT 2F	100			■						IP 67
WT 2F	30			■						IP 67
WT 2S	55			■						IP 67, IP 69K
WT 150	250			■						IP 67
WT 9-2	450			■						IP 67
WT 9-2	1500				■					IP 67
WT 100L	450					■				IP 65
WTE 140-2	900			■						IP 67
WT 1000	500				■					IP 67
WT 160	900			■			■		■	IP 67
WTE 160T	700			■						IP 67
WTE 160T	1000				■					IP 67
WT 170	550			■						IP 67
WT 11	1000			■						IP 67
WT 14-2	1500				■					IP 65
WTE 23-2	2300				■					IP 65
WT 260	1500			■			■			IP 67
WT 260	3500				■		■			IP 67
WT 2000	3500				■			■	■	IP 67
ET 1	100				■					IP 54
MHT 1	100				■					IP 40
MHT 15	350				■					IP 67
MHT 15	250				■					IP 67
MHT 15	100				■					IP 67
MHT 15	90				■					IP 67
MHT 15V	350				■					IP 67, IP 68, IP 69K
MHT 15V	100				■					IP 67, IP 68, IP 69K
VT 12T-2	115				■					IP 67
VT 12T-2	210				■					IP 67
VTE 18	800				■					IP 67
VTE 18L	250					■				IP 67
VTE 18L	400					■				IP 67
VTF 18V	110			■						IP 67, IP 68, IP 69K
VTE 18V	1000				■					IP 67, IP 68, IP 69K
VTE 18V	440				■					IP 67, IP 68, IP 69K
VT 18-2	110				■					IP 67
VT 180	110				■					IP 66
VT 180 Long Range	400				■					IP 66
WT 130L	1200					■		■		IP 67
ST 130	60			■						IP 66
ST 130	200			■						IP 65

Proximity/diffuse Sensors

Energetic

Sensor Type	Voltage		Output					Connection Type						Page
	DC	AC	PNP	NPN	FET	Relay	Triac	M8	M12	Mini	Micro	Cable	Terminal	
WT 2F	■		■	■				■				■		328
WT 2F	■		■	■				■				■		328
WT 2S	■		■	■				■				■		334
WT 150	■		■	■				■				■		382
WT 9-2	■		■	■				■	■			■		394
WT 9-2	■		■	■					■			■		396
WT 100L	■		■	■				■				■		412
WTE 140-2	■		■	■				■				■		418
WT 1000	■		■	■					■			■		430
WT 160	■		■	■				■				■		444
WTE 160T	■		■	■				■				■		460
WTE 160T	■		■	■				■				■		462
WT 170	■		■	■				■				■		470
WT 11	■		■	■					■			■		506
WT 14-2	■		■	■					■			■		554
WTE 23-2	■		■	■					■					584
WT 260	■	■	■	■					■				■	644
WT 260	■	■	■	■					■				■	654
WT 2000	■	■	■	■	■	■			■	■	■	■		696
ET 1	■		■	■				■	■			■		726
MHT 1	■		■	■								■		740
MHT 15	■		■	■					■			■		744
MHT 15	■		■	■					■			■		746
MHT 15	■		■	■					■			■		748
MHT 15	■		■	■					■			■		750
MHT 15V	■		■	■					■					752
MHT 15V	■		■	■					■					754
VT 12T-2	■		■	■					■			■		768
VT 12T-2	■		■	■					■			■		770
VTE 18	■		■	■					■			■		778
VTE 18L	■		■	■					■					780
VTE 18L	■		■	■					■					780
VTF 18V	■		■	■					■					782
VTE 18V	■		■	■					■					782
VTE 18V	■		■	■					■					782
VT 18-2		■					■		■			■		804
VT 180	■		■	■					■			■		808
VT 180	■		■	■					■			■		810
WT 130L	■		■	■				■				■		818
ST 130	■		■	■								■		832
ST 130	■		■	■				■				■		834

Selection Table...Proximity/Diffuse Sensors

Proximity/diffuse sensors

Fixed focus

Sensor Type	Sensing Range mm	250	500	Light Source: Red	IR	Laser	Features: Test	Delay	Alarm	Enclosure Rating
WT 2F	15			■						IP 67
WT 2F	8			■						IP 67
WT 9-2	20			■						IP 67
WTF 160T	100			■						IP 67
WTM 160T	10									IP 67
WT 170	100			■						IP 67
VTF 18	100				■					IP 67
ST 130	30			■				■		IP 65

Proximity/diffuse sensors

Divergent

Sensor Type	Sensing Range mm	250	500	Light Source: Red	IR	Laser	Features: Test	Delay	Alarm	Enclosure Rating
WT 160	105				■		■		■	IP 67

Proximity/diffuse sensors

Foreground suppression

Sensor Type	Sensing Range mm	3000	6000	Light Source: Red	IR	Laser	Features: Test	Delay	Alarm	Enclosure Rating
WTV 190T	100			■				■		IP 67
WTV 190T	300			■				■		IP 67
WT 11	100			■						IP 65
WTF 12-3	150			■						IP 66, IP 67, IP 69K
WTF 12-3	800			■						IP 66, IP 67, IP 69K

Selection Table...Proximity/Diffuse Sensors

Proximity/diffuse Sensors

Fixed focus

Sensor Type	Voltage		Output					Connection Type						Page
	DC	AC	PNP	NPN	Namur	Relay	Triac	M8	M12	Mini	Micro	Cable	Terminal	
WT 2F	■		■	■				■				■		326
WT 2F	■		■	■				■				■		326
WT 9-2	■		■	■				■	■			■		390
WTF 160T	■		■	■				■				■		458
WTM 160T	■		■	■				■				■		466
WT 170	■		■	■				■				■		468
VTF 18	■		■	■					■			■		776
ST 130	■		■	■								■		830

Proximity/diffuse sensors

Divergent

Sensor Type	Voltage		Output					Connection Type						Page
	DC	AC	PNP	NPN	Namur	Relay	Triac	M8	M12	Mini	Micro	Cable	Terminal	
WT 160	■		■	■				■				■		446

Proximity/diffuse sensors

Foreground Suppression

Sensor Type	Voltage		Output					Connection Type						Page
	DC	AC	PNP	NPN	Namur	Relay	Triac	M8	M12	Mini	Micro	Cable	Terminal	
WTV 190T	■		■	■				■				■		484
WTV 190T	■		■	■				■				■		482
WT 11	■		■						■			■		502
WTF 12-3	■		■	■					■			■		514
WTF 12-3	■		■	■					■			■		518

Selection Table...Reflex/Retro-Reflective Sensors

Reflex/retro-reflective sensors

Sensor Type	Sensing Range m	Light Source			Features			Enclosure Rating
		Red	IR	Laser	Test	Delay	Alarm	
WL 2S	0.8	■						IP 67, IP 69K
WL 4-3	4	■						IP 66, IP 67
WL 4S-3	5	■					■	IP 66, IP 67
WL 150	2.4	■						IP 67
WL 9-2	0.4	■						IP 67
WL 9-2	4	■						IP 67
WL 9-2	4	■						IP 67
WL 9L	12			■				IP 67
WL 100L	12			■				IP 65
WL 140-2	6	■						IP 67
WL 1000	4.2	■						IP 67
WL 160	6	■			■		■	IP 67
WL 160T	1.5	■						IP 67
WL 170	4	■						IP 67
WL 190L	5.5			■				IP 67
WL 11	7	■						IP 65
WL 12-3	2	■						IP 66, IP 67, IP 69K
WL 12-3	7	■						IP 66, IP 67, IP 69K
WL 12G-3	4	■						IP 66, IP 67, IP 69K
WL 12L-2	18			■				IP 67
WL 14-2	6	■						IP 65
WL 18-3	7	■			■			IP 67
WL 23-2	10	■						IP 65
WL 24-2	22	■			■	■	■	IP 67
WL 34	22	■			■	■	■	IP 67
WL 250	13.5	■						IP 65
WL 260	15	■			■			IP 67
WL 27-3	15	■			■	■		IP 66, IP 67
WL 2000	15	■				■	■	IP 67
WL 45	55	■			■	■	■	IP 67
EL 1	4	■					■	IP 54
MHL 1	4	■					■	IP 40
MHL 15	4.5	■						IP 67
MHL 15	5	■						IP 67
MHL 15V	5	■						IP 67, IP 68, IP 69K
VL 12-2 Non-polarized	3.5		■					IP 67
VL 18-3/4	3.7	■						IP 67
VL 18	5	■	■					IP 67
VL 18 L	35			■				IP 67
VL 18V	5	■						IP 67, IP 68, IP 69K
VL 18V	1	■						IP 67, IP 68, IP 69K
VL 180 Non-polarized	5.5		■					IP 66
VL 180	2.2	■						IP 66
WL 130L	10			■		■		IP 67

Selection Table...Reflex/Retro-Reflective Sensors

Reflex/retro-reflective sensors

Sensor Type	Voltage		Output						Connection Type							Page
	DC	AC	PNP	NPN	Namur	Relay	Triac	Other	M8	M12	Mini	Micro	Cable	Terminal	Square	
WL 2S	■		■	■					■				■			336
WL 4-3	■		■	■					■				■			360
WL 4S-3	■		■	■					■				■			356
WL 150	■		■	■					■				■			384
WL 9-2	■		■	■					■	■			■			398
WL 9-2	■		■	■					■	■			■			400
WL 9-2	■		■	■					■	■			■			402
WL 9L	■		■	■					■	■						408
WL 100L	■		■	■					■				■			414
WL 140	■		■	■					■				■			420
WL 1000	■	■	■	■			■			■		■	■			436
WL 160	■		■	■					■				■			450
WL 160T	■		■	■					■				■			464
WL 170	■		■	■					■				■			472
WL 190L	■		■	■					■				■			494
WL 11	■	■	■	■		■				■			■			508
WL 12-3	■		■	■						■			■			534
WL 12-3	■		■	■						■			■			530
WL 12G-3	■		■	■						■						540
WL 12L-2	■		■	■						■						546
WL 14-2	■		■	■						■			■			556
WL 18-3	■		■	■						■			■		■	572
WL 23-2	■	■	■	■		■				■			■		■	586
WL 24-2	■	■	■	■		■				■	■			■		598
WL 34	■	■	■	■		■				■				■		614
WL 250	■	■	■	■		■				■			■			634
WL 260	■	■	■	■		■				■	■		■	■	■	658
WL 27-3	■	■	■	■		■				■			■		■	680
WL 2000	■	■	■	■		■		FET		■	■	■	■			704
WL 45	■	■	■	■		■								■		716
EL 1	■		■	■					■	■			■			728
MHL 1	■		■	■									■			742
MHL 15	■		■	■						■			■			758
MHL 15	■		■	■						■			■			756
MHL 15V	■		■	■						■						760
VL 12-2 Non-polarized	■		■							■			■			772
VL 18-3/4		■					■			■			■			806
VL 18	■		■	■												786
VL 18 L	■		■	■						■			■			788
VL 18V	■		■	■						■						790
VL 18V	■		■	■						■						792
VL 180 Non-polarized	■		■	■						■			■			814
VL 180	■		■	■						■			■			812
WL 130L	■		■	■					■							820

Selection Table...Clear Material and Through-Beam Sensors

Clear material sensors

Sensor Type	Sensing Range mm	5500	Light Source: Red	IR	Laser	Features: Test	Delay	Alarm	Enclosure Rating
WLG 4-3	4000		■						IP 67
WLG 4-3	1600		■						IP 67
WLG4S-3	5000		■					■	IP 67
WL 150	700		■						IP 67
WL 170	800		■						IP 67
WLG 190T	5500				■		■		IP 67
WL 11	4000		■						IP 65
WL 12G-3	4000		■						IP 66, IP 67, IP 69K
WL 12G	2000		■						IP 67

Selection Table

Through-beam sensors

Sensor Type	Sensing Range m	175	350	Light Source: Red	IR	Laser	Features: Test	Delay	Alarm	Enclosure Rating
WS/WE 2S	1.2			■						IP 67, IP 69K
WS/WE 2F	0.5			■						IP 67
WS/WE 4-3 Teflon	3			■			■			IP 68, IP 69K
WS/WE 4-3	5.5			■			■			IP 66, IP 67
WSE 4S-3	5			■			■			IP 66, IP 67
WS/WE 150	4.4			■						IP 67
WS/WE 9-2	7			■						IP 67
WS/WE 9L	50			■		■				IP 67
WS/WE 100L	35					■				IP 65
WS/WE 140-2	15			■						IP 67
WS/WE 1000	5			■	■					IP 67
WS/WE 160	14				■					IP 67
WS/WE 170	8.5			■			■			IP 67
WS/WE 190L	50					■				IP 67
WSE 12-3	20			■			■			IP 66, IP 67, IP 69K
WS/WE 12L-2	80			■		■	■			IP 67
WS/WE 14-2	15			■			■			IP 65
WS/WE 18-3	20			■			■			IP 67
WS/WE 24-2	60			■			■		■	IP 67
WS/WE 34	60			■			■		■	IP 67
WS/WE 250	25			■			■			IP 67
WS/WE 260	45				■		■			IP 67
WSE 27-3	35			■			■	■	■	IP 66, IP 67
WS/WE 2000	50				■		■	■	■	IP 67
WS/WE 45	350				■		■	■	■	IP 67
MHSE 15	4			■						IP 67
MHSE 15	5			■						IP 67
MHSE 15V	5			■			■			IP 67, IP 68, IP 69K
VS/VE 12-2	5				■					IP 67
VS/VE 18	20				■					IP 67
VS/VE 18	22				■					IP 67
VS/VE 18 L	60			■		■				IP 67
VS/VE 18V	25				■		■			IP 67, IP 68, IP 69K
VS/VE 180	23				■					IP 66
WS/WE 130L	3.5					■		■		IP 67
SS/SE 130	0.35			■						IP 66
SS/SE 130	2.2			■						IP 66

Selection Table...Clear Material and Through-Beam Sensors

Clear material sensors

Sensor Type	Voltage		Output						Connection Type							Page
	DC	AC	PNP	NPN	Namur	Relay	Triac	Other	M8	M12	Mini	Micro	Cable	Terminal	Square	
WLG 4-3	■		■	■					■				■			372
WLG 4-3	■		■	■					■				■			374
WLG 4S-3	■		■	■					■				■			370
WL 150	■		■	■					■				■			386
WL 170	■		■	■					■				■			474
WLG 190T	■		■	■					■				■			798
WL 11	■		■	■						■						510
WL 12G-3	■		■	■						■						
WL 12G	■							■		■			■			540

Through-beam sensors

Sensor Type	Voltage		Output						Connection Type							Page
	DC	AC	PNP	NPN	Namur	Relay	Triac	Other	M8	M12	Mini	Micro	Cable	Terminal	Square	
WS/WE 2S	■		■	■					■				■			338
WS/WE 2F	■		■	■					■				■			330
WS/WE 4-3 Teflon	■		■	■									■			378
WS/WE 4-3	■		■	■					■				■			366
WSE 4S-3	■		■	■					■				■			364
WS/WE 150	■		■	■					■				■			388
WS/WE 9-2	■		■	■					■	■			■			404
WS/WE 9L	■		■	■					■	■						410
WS/WE 100L	■		■	■					■				■			416
WS/WE 140-2	■		■	■					■				■			422
WS/WE 1000	■	■	■	■			■			■		■	■			440
WS/WE 160	■		■	■					■				■			452
WS/WE 170	■		■	■					■				■			476
WS/WE 190L	■		■	■					■				■			496
WSE 12-3	■		■	■						■			■			542
WS/WE 12L-2	■		■	■						■			■			548
WS/WE 14-2	■		■	■						■			■			558
WS/WE 18-3	■		■	■						■			■		■	576
WS/WE 24-2	■	■	■	■		■				■				■	■	602
WS/WE 34	■	■	■	■		■				■				■		618
WS/WE 250	■	■	■	■		■				■			■			638
WS/WE 260	■	■	■	■		■				■			■	■		662
WSE 27-3	■	■	■	■		■				■					■	686
WS/WE 2000	■	■	■	■		■				■	■		■			708
WS/WE 45	■	■	■	■		■								■		720
MHSE 15	■		■	■						■			■			764
MHSE 15	■		■	■						■						762
MHSE 15V	■		■	■						■						766
VS/VE 12-2	■		■	■						■			■			774
VS/VE 18	■		■	■						■			■			794
VS/VE 18	■								■			■				796
VS/VE 18 L	■		■	■						■			■			798
VS/VE 18V	■		■	■						■						800
VS/VE 180	■		■	■						■			■			816
WS/WE 130L	■		■	■					■				■			822
SS/SE 130	■		■	■									■			836
SS/SE 130	■		■	■									■			838

WT 2F

Proximity/Diffuse Sensors - V Optic



0.04...0.4 in (1...9 mm)
0.08...0.7 in (2...18 mm)

sensing range

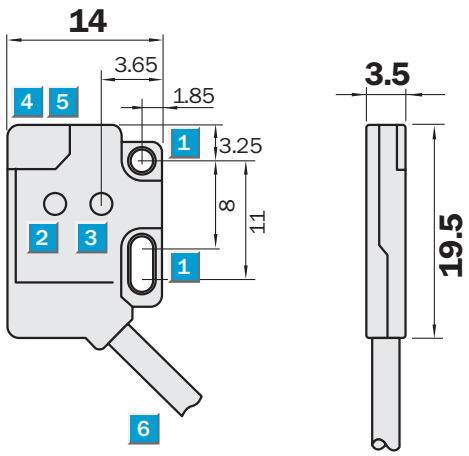
Highlights

- Detection of transparent and reflective objects
- Robust housing with metal-reinforced fixing holes
- Simple adjustment – connect, align, ready
- No external amplifier required. Can be directly connected to the machine control system

WT 2F



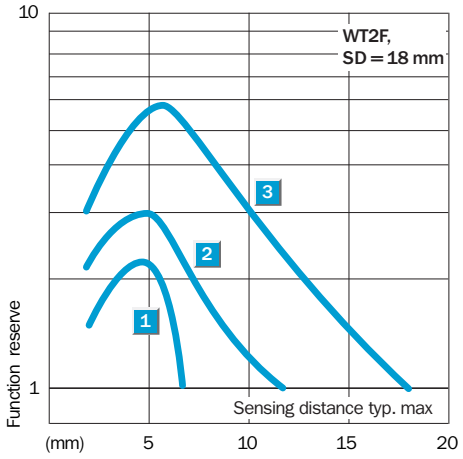
Dimensional drawing

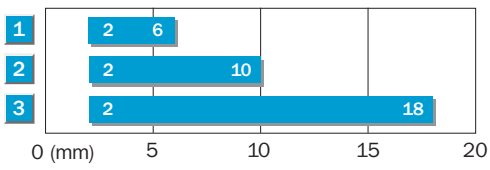


dimensions in mm

1 Mounting hole Ø 2.1 mm
2 Optical axis, sender
3 Optical axis, receiver
4 LED indicator orange; output active
5 LED indicator green; strength indicator
6 Connection

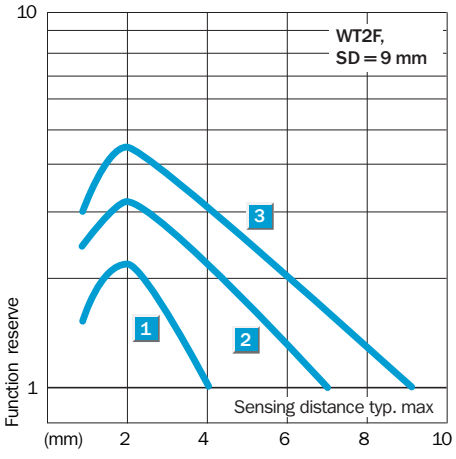
Excess gain, 0.08...0.7 in (30...18 mm)

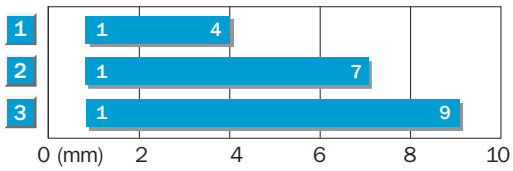




1 Sensing range on black, 6% remission
2 Sensing range on gray, 18% remission
3 Sensing range on white, 90% remission

Excess gain, 0.04...0.4 in (1...9 mm)





1 Sensing range on black, 6% remission
2 Sensing range on grey, 18% remission
3 Sensing range on white, 90% remission

Accessories	page
Cables and connectors	1180

Order information

Type	Part no.
WT2F-N140	6 030 583
WT2F-N170	6 030 587
WT2F-P140	6 030 584
WT2F-P170	6 030 588
WT2F-P240	6 030 585
WT2F-P270	6 030 589
WT2F-P440	6 030 586
WT2F-P470	6 030 590

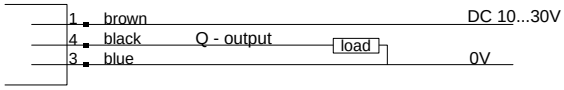
7028071 - © 2008 SICK, Inc.

Technical data	WT 2F-	N140	N170	P140	P170	P240	P270	P440	P470
Sensing range (fix), typ.	0.08...0.7 in (2...18 mm)[1]	■		■		■		■	
	0.04...0.35 in (1...9 mm)[1]		■		■		■		■
Operating distance	0.08...0.6 in (2...15 mm)[1]	■		■		■		■	
	0.04...0.3 in (1...8 mm)[1]		■		■		■		■
Light source[2], light type	Pin-point LED, red light, 660 nm	■	■	■	■	■	■	■	■
Supply voltage V_S	12...24 V DC [3]	■	■	■	■	■	■	■	■
Ripple[4]	≤ 5 V_{PP}	■	■	■	■	■	■	■	■
Current consumption[5]	≤ 20 mA	■	■	■	■	■	■	■	■
Switching outputs	PNP, Q, open collector			■	■	■	■	■	■
	NPN, Q, open collector	■	■						
Switching mode	Light switching	■	■	■	■	■	■	■	■
Signal voltage PNP HIGH/LOW	V_S - 1.8 V/approx. 0 V			■	■	■	■	■	■
Signal voltage NPN HIGH/LOW	Approx. V_S/ < 1.8 V	■	■						
Output current I_A max.	≤ 50 mA	■	■	■	■	■	■	■	■
Response time[6]	≤ 0.5 ms	■	■	■	■	■	■	■	■
Max. switching frequency[7]	1,000 Hz	■	■	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[8]	■	■	■	■				
	Plug, M8 3-pin, with cable, PVC, 200 mm[8]					■	■		
	Plug, M8 4-pin, with cable, PVC, 200 mm[8]							■	■
VDE protection class	⧫	■	■	■	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■
Ambient temperature	Operation -4...122° F (-20...50° C)	■	■	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■	■	■
Approximate weight	0.7 oz (20 g)	■	■	■	■	■	■	■	■
Housing material	PC/PBT, PC	■	■	■	■	■	■	■	■

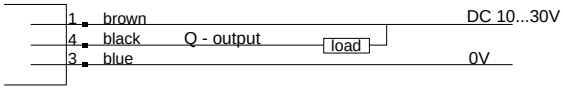
1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at $T_A = +25°$ C
3) ±10%
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 32° F (0° C)
9) A = V_S-connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Outputs overcurrent and short-circuit protected

Connection diagram

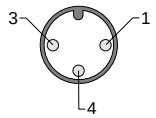
PNP Models



NPN Models

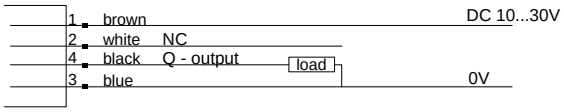


M8 Connector

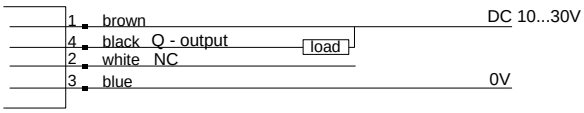


wire colors refer to standard cable, not included with quick disconnect models.

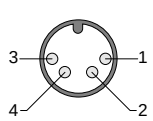
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WT 2F

Proximity/Diffuse Sensors - Energetic



0.1...1.3 in (2...34 mm)
0.2...4.5 in (4...115 mm)
sensing range

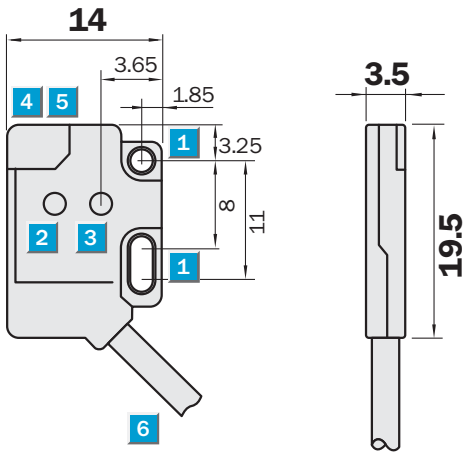
Highlights

- Robust housing with metal-reinforced fixing holes
- Simple adjustment – connect, align, ready
- No external amplifier required. Can be directly connected to the machine control system

WT 2F



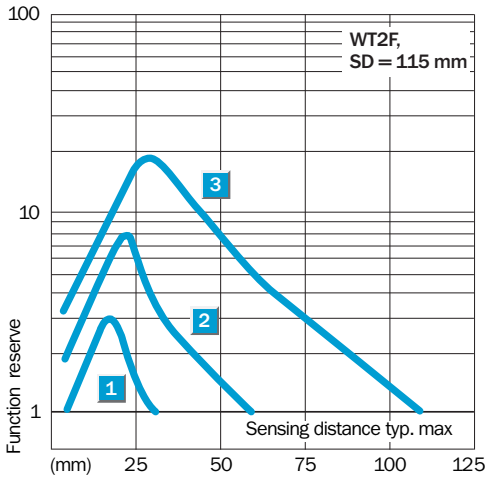
Dimensional drawing

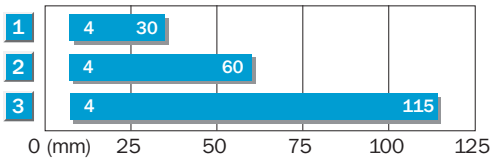


dimensions in mm

1	Mounting hole Ø 2.1 mm
2	Optical axis, sender
3	Optical axis, receiver
4	LED indicator orange; output active
5	LED indicator green; strength indicator
6	Connection

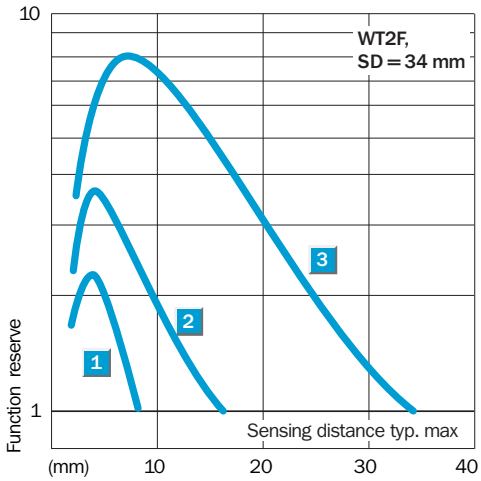
Excess gain 0.2...4.5 in (4...115 mm)

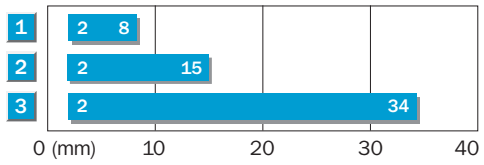




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Excess gain 0.1...1.3 in (2...34 mm)





1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Accessories	page
Cables and connectors	1180

Order information

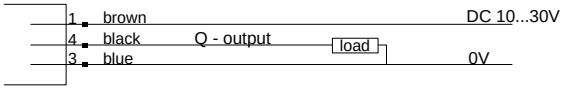
Type	Part no.
WT2F-N150	6 030 576
WT2F-N180	6 030 572
WT2F-P150	6 030 580
WT2F-P180	6 030 573
WT2F-P250	6 030 581
WT2F-P280	6 030 574
WT2F-P450	6 030 582
WT2F-P480	6 030 575

Technical data	WT 2F-	N150	N180	P150	P180	P250	P280	P450	P480
Sensing range (fix), typ.	0.08...1.3 in (2...34 mm)[1]	■		■		■		■	
	0.16...4.5 in (4...115 mm)[1]		■		■		■		■
Operating distance	0.08...1.2 in (2...30 mm)[1]	■		■		■		■	
	0.16...3.9 in (4...100 mm)[1]		■		■		■		■
Light source[2], light type	Pin-point LED, red light, 660 nm	■	■	■	■	■	■	■	■
Supply voltage V_S	12...24 V DC [3]	■	■	■	■	■	■	■	■
Ripple[4]	≤ 5 V_{PP}	■	■	■	■	■	■	■	■
Current consumption[5]	≤ 20 mA	■	■	■	■	■	■	■	■
Switching outputs	PNP, Q, open collector			■	■	■	■	■	■
	NPN, Q, open collector	■	■						
Switching mode	Light switching	■	■	■	■	■	■	■	■
Signal voltage PNP HIGH/LOW	V_S - 1.8 V/approx. 0 V			■	■	■	■	■	■
Signal voltage NPN HIGH/LOW	Approx. V_S/ < 1.8 V	■	■						
Output current I_A max.	≤ 50 mA	■	■	■	■	■	■	■	■
Response time[6]	≤ 0.5 ms	■	■	■	■	■	■	■	■
Max. switching frequency[7]	1,000 Hz	■	■	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[8]	■	■	■	■				
	Plug, M8 3-pin, with cable, PVC, 200 mm[8]					■	■		
	Plug, M8 4-pin, with cable, PVC, 200 mm[8]							■	■
VDE protection class	⧫	■	■	■	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■
Ambient temperature	Operation -4...122° F (-20...50° C)	■	■	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■	■	■
Approximate weight	0.7 oz (20 g)	■	■	■	■	■	■	■	■
Housing material	PC/PBT, PC	■	■	■	■	■	■	■	■

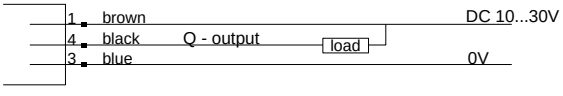
1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = + 25° C
3) ±10%
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 32° F (0° C)
9) A = V_S-connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Outputs overcurrent and short-circuit protected

Connection diagram

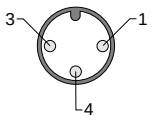
PNP Models



NPN Models

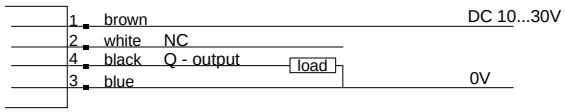


M8 Connector

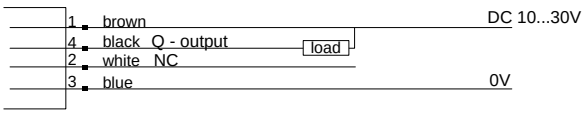


wire colors refer to standard cable, not included with quick disconnect models.

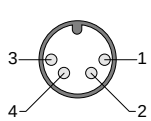
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WS/WE 2F

Through-Beam Sensors



0...1.6 ft (0....0.5 m)
sensing range

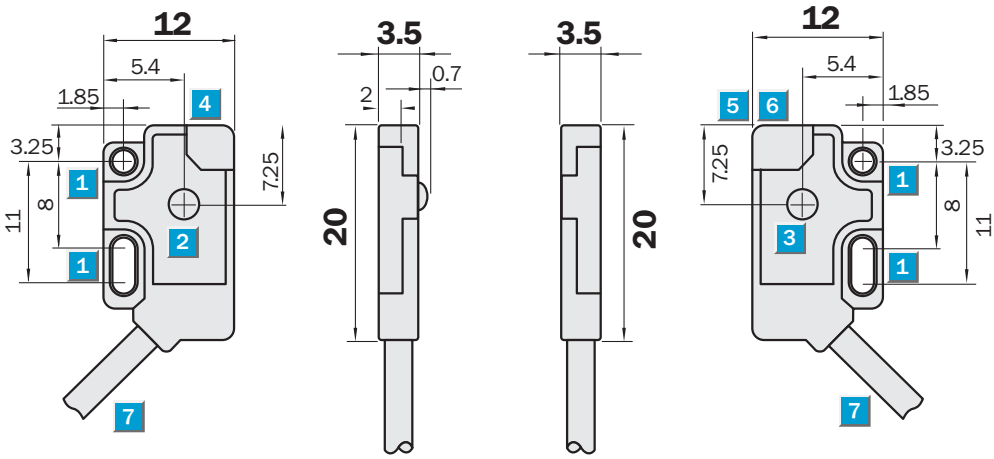
Highlights

- Robust housing with metal-reinforced fixing holes
- Simple adjustment – connect, align, ready
- No external amplifier required. Can be directly connected to the machine control system.

WS/WE 2S



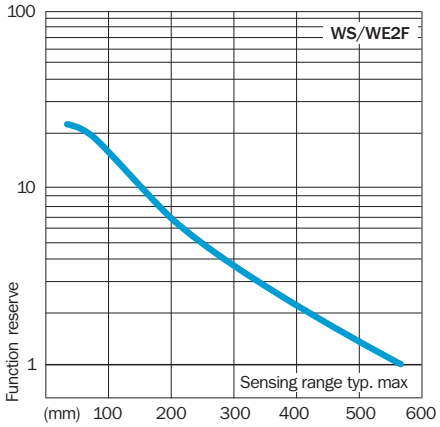
Dimensional drawing

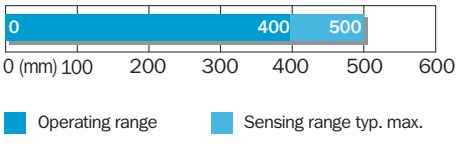


dimensions in mm

1 Mounting hole Ø 2.1 mm
2 Optical axis, receiver
3 Optical axis, sender
4 LED indicator green; supply voltage
5 LED indicator orange; output active
6 LED indicator green; strength indicator
7 Connection

Excess gain





Accessories	page
Cables and connectors	1180

Order information

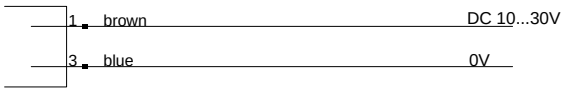
Type	Part no.
WS/WE2F-E110	6 030 554
WS/WE2F-F110	6 030 569
WS/WE2F-F210	6 030 570
WS/WE2F-F410	6 030 571
WS/WE2F-N110	6 030 540
WS/WE2F-P210	6 030 566

Technical data	WS/WE2F-	E110	F110	F210	F410	N110	P210
Sensing range (fix), typ.	0...19.7 in (0...0.5 m)	■	■	■	■	■	■
Sensing range, recommended	0...15.7 in (0...0.4 m)	■	■	■	■	■	■
Light source[1], light type	Pin-point LED, red light, 660 nm	■	■	■	■	■	■
Supply voltage V_S	12...24 V DC[2]	■	■	■	■	■	■
Ripple[3]	≤ 5 V_{PP}	■	■	■	■	■	■
Current consumption, sender[4]	≤ 10 mA	■	■	■	■	■	■
Current consumption, receiver[4]	≤ 15 mA	■	■	■	■	■	■
Switching outputs	PNP, Q, open collector		■	■	■		■
	NPN, Q, open collector	■				■	
Switching mode	Dark switching	■	■	■	■		
	Light switching					■	■
Signal voltage PNP HIGH/LOW	V_S - 1.8 V/approx. 0 V		■	■	■		■
Signal voltage NPN HIGH/LOW	Approx. V_S/<1.8 V	■				■	
Output current I_A max.	≤ 50 mA	■	■	■	■	■	■
Response time[5]	≤ 0.5 ms	■	■	■	■	■	■
Max. switching frequency[6]	1,000 Hz	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[7]	■	■			■	
	Plug, M8 3-pin, with cable, PVC, 200 mm[7]			■			■
	Plug, M8 4-pin, with cable, PVC, 200 mm[7]				■		
VDE protection class	⏀	■	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
Ambient temperature	Operation -4...122° F (-20...50° C)	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■
Approximate weight	1.2 oz (35 g)	■				■	
	0.7 oz (20 g)		■	■	■		■
Housing material	PC/PBT, PC	■	■	■	■	■	■

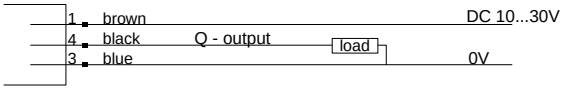
1) Average service life 100,000 h at T_A = + 25° C
2) ±10%
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 32° F (0° C)
8) A = V_S-connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Outputs overcurrent and short-circuit protected

Connection diagram

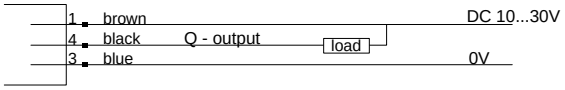
Sender



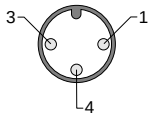
PNP Models



NPN Models

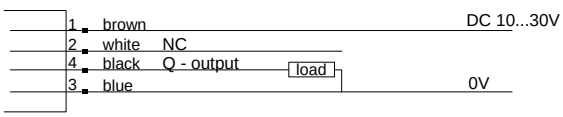


M8 Connector

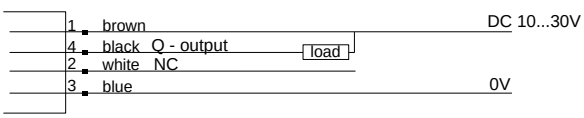


wire colors refer to standard cable, not included with quick disconnect models.

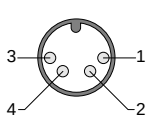
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WT 2S

Proximity/Diffuse Sensors - Background Suppression



0.04...0.6 in (1...15 mm)
0.04...1.2 in (1...30 mm)
sensing range

ECOLAB

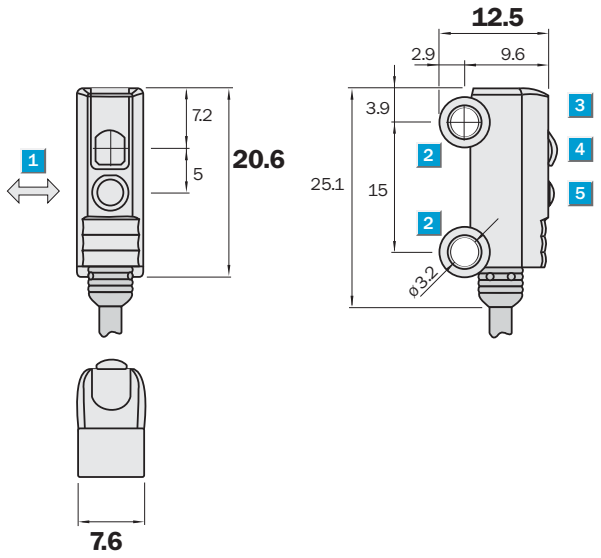
Highlights

- Focused laser-like light spot makes the most precise detection jobs possible
- Insensitive to interference from critical backgrounds
- Sturdy housing with metal sleeves for M3 bolts

WT 2S



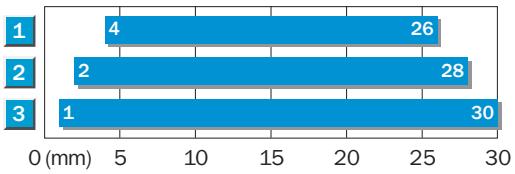
Dimensional drawing



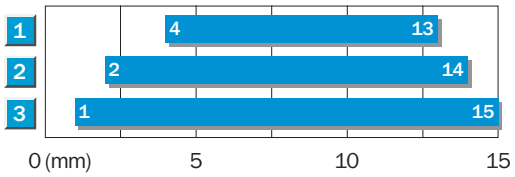
dimensions in mm

1 Standard direction of material being sensed
2 Mounting hole Ø 3.2 mm
3 LED signal strength indicator
4 Optical axis, receiver
5 Optical axis, sender

Sensing range, 30 mm background suppression



Sensing range, 15 mm background suppression



1 Sensing range on black, 6% remission
2 Sensing range on gray, 18% remission
3 Sensing range on white, 90% remission

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

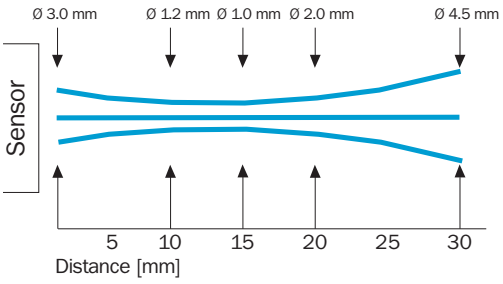
Type	Part no.
WT2S-E111	1 026 684
WT2S-F131	1 025 682
WT2S-F211	1 024 171
WT2S-F231	1 041 690
WT2S-N111	1 022 662
WT2S-N131	1 022 663
WT2S-N231	1 029 900
WT2S-P111	1 022 660
WT2S-P131	1 022 661
WT2S-P211	1 022 658
WT2S-P231	1 022 659
WT2S-P411	1 023 631
WT2S-P431	1 023 632

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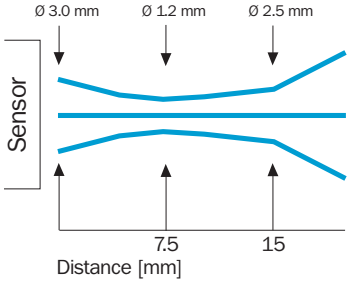
Technical data	WT 2S-	E111	F131	F211	N111	N131	P111	P131	P211	P231	F231	P411	P431	N231
Sensing range (fix), typ.	0.04...0.6 in (1...15 mm)[1]	■		■	■		■		■			■		
	0.04...1.2 in (1...30 mm)[1]		■			■		■		■	■		■	■
Light source[2], light type	Pin-point LED, red light	■	■	■	■	■	■	■	■	■	■	■	■	■
Light spot diameter	Approx. 0.04 in at 0.6 in (1.0 mm at 15 mm)		■			■		■		■	■		■	■
	Approx. 0.05 in at 0.3 in (1.2 mm at 8 mm)			■										
	Approx. 0.1 in at 0.6 in (2.5 mm at 15 mm)	■			■		■		■			■		
Supply voltage V_S	10...30 V DC [3]	■	■	■	■	■	■	■	■	■	■	■	■	■
	Ripple[4] < 5 V_{PP}	■	■	■	■	■	■	■	■	■	■	■	■	■
Current consumption[5]	< 20 mA	■	■	■	■	■	■	■	■	■	■	■	■	■
Switching outputs	PNP, Q		■	■			■	■	■	■	■	■	■	
	NPN, Q	■			■	■								■
Switching mode	Light switching				■	■	■	■	■	■		■	■	■
	Dark switching	■	■	■							■			
Output current I_A max.	< 50 mA	■	■	■	■	■	■	■	■	■	■	■	■	■
Response time[6]	< 0.6 ms	■	■	■	■	■	■	■	■	■	■	■	■	■
Max. switching frequency[7]	800 Hz	■	■	■	■	■	■	■	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[8]	■	■		■	■	■	■						
	Plug, M8 3-pin, with cable, PVC, 200 mm[8]			■					■	■	■			■
	Plug, M8 4-pin, with cable, PVC, 200 mm[8]											■	■	
VDE protection class	⧫	■	■	■	■	■	■	■	■	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 67, IP 69K	■	■	■	■	■	■	■	■	■	■	■	■	■
Ambient temperature	Operation -4...122° F (-20...50° C)	■	■	■	■	■	■	■	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■	■	■	■	■	■	■	■
Approximate weight	0.6 oz (18 g)	■	■		■	■	■	■						
	0.7 oz (20 g)			■					■	■	■	■	■	■
Housing material	ABS, PMMA	■	■	■	■	■	■	■	■	■	■	■	■	■

1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 75,000 h at T_A = + 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 32° F (0° C)
9) A = V_S-connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Light spot diameter WT 2S 30 mm BGS

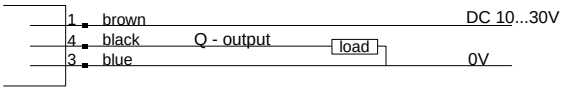


Light spot diameter WT 2S 15 mm BGS

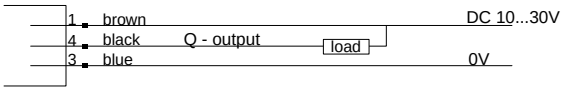


Connection diagram

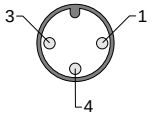
PNP Models



NPN Models

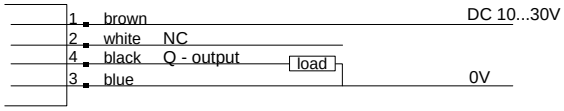


M8 Connector

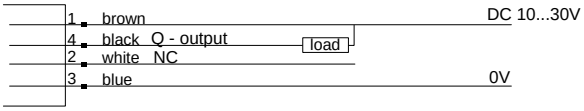


wire colors refer to standard cable, not included with quick disconnect models.

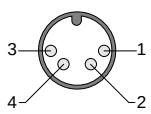
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WT 2S

Proximity/Diffuse Sensors - Energetic



0.04...2.2 in (1...55 mm)

sensing range

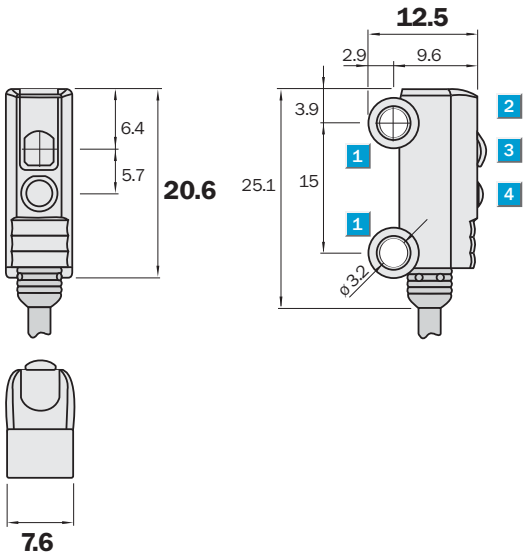
Highlights

- Precise, small light spot
- Extremely good size/performance ratio
- Sturdy housing with metal sleeves for M3 bolts

WT 2S



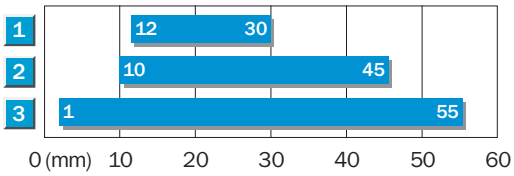
Dimensional drawing



dimensions in mm

1 Mounting hole Ø 3.2 mm
2 LED signal strength indicator
3 Optical axis, receiver
4 Optical axis, sender

Sensing range, 55 mm energetic



1 Sensing range on black, 6% remission
2 Sensing range on gray, 18% remission
3 Sensing range on white, 90% remission

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

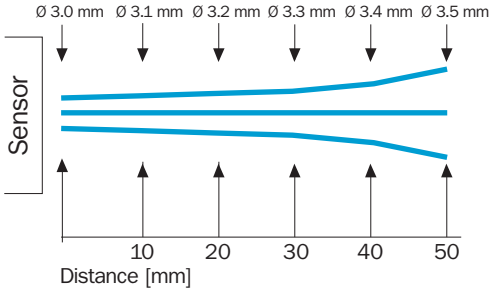
Type	Part no.
WT2S-N161	1 022 665
WT2S-P161	1 022 664
WT2S-P261	1 023 640
WT2S-P461	1 023 641

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Technical data	WT 2S-	N161	P161	P261	P461
Sensing range (fix), typ.	0.04...2.2 in (1...55 mm)[1]	■	■	■	■
Light source[2], light type	Pin-point LED, red light	■	■	■	■
Light spot diameter	Approx. 0.12 in at 1.2 in (3.5 mm at 50 mm)	■	■	■	■
Supply voltage V_S	10...30 V DC[3]	■	■	■	■
Ripple[4]	< 5 V_{PP}	■	■	■	■
Current consumption[5]	< 20 mA	■	■	■	■
Switching outputs	PNP, Q		■	■	■
	NPN, Q	■			
Switching mode	Light switching	■	■	■	■
Output current I_A max.	< 50 mA	■	■	■	■
Response time[6]	< 0.6 ms	■	■	■	■
Max. switching frequency[7]	800 Hz	■	■	■	■
Connection types	Cable, PVC, 2 m[8]	■	■		
	Plug, M8 3-pin, with cable, PVC, 200 mm[8]			■	
	Plug, M8 4-pin, with cable, PVC, 200 mm[8]				■
VDE protection class	⧫	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■
Enclosure rating	IP 67, IP 69K	■	■	■	■
Ambient temperature	Operation -4...122° F (-20...50° C)	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■
Approximate weight	0.6 oz (18 g)	■	■		
	0.7 oz (20 g)			■	■
Housing material	ABS, PMMA	■	■	■	■

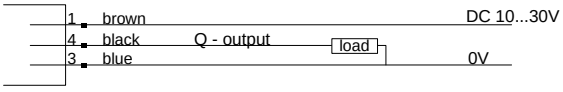
1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 75,000 h at $T_A = +25°$ C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 32° F (0° C)
9) A = V_S-connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Light spot diameter WT 2S 55 mm energetic



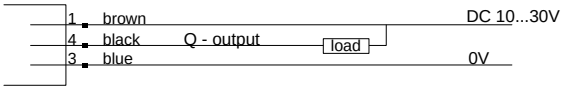
Connection diagram

PNP Models

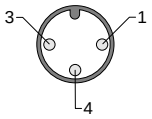


wire colors refer to standard cable, not included with quick disconnect models.

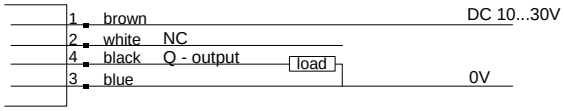
NPN Models



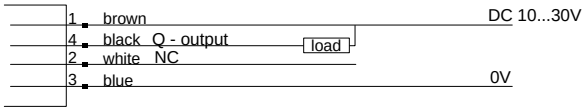
M8 Connector



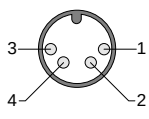
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WL 2S

Reflex/Retro-reflective

0.1...2.6 ft (0.04....0.8 m)
sensing range

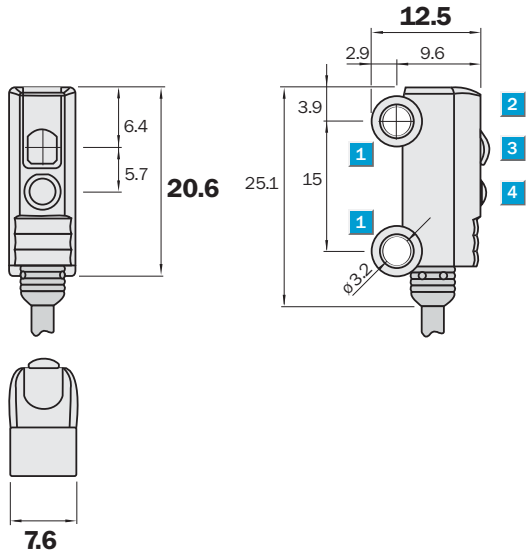
Highlights

- Extremely good size/performance ratio
- Easy and fast alignment using ball joint bracket
- Sturdy housing with metal sleeves for M3 bolts

WL 2S



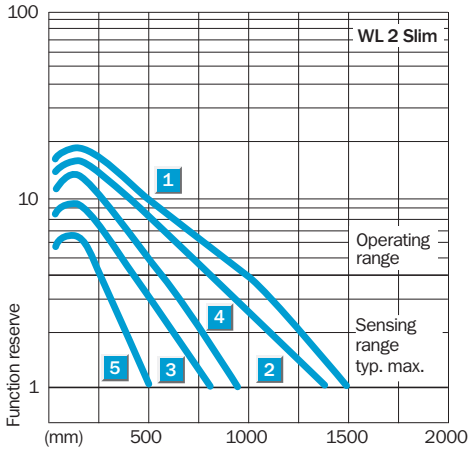
Dimensional drawing

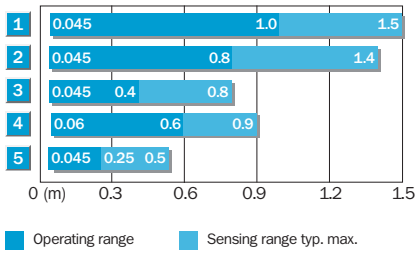


dimensions in mm

1 Mounting hole Ø 3.2 mm
2 LED signal strength indicator
3 Optical axis, receiver
4 Optical axis, sender

Excess gain





	Reflector type	Operating range
1	PL 40 A	0.045 ... 1.0 m
2	PL 30 A	0.045 ... 0.8 m
3	PL 20 A	0.045 ... 0.4 m
4	PL 22	0.06 ... 0.6 m
5	PL 10 F *)	0.045 ... 0.25 m

*) With reflector arrangement along the sensor axis

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

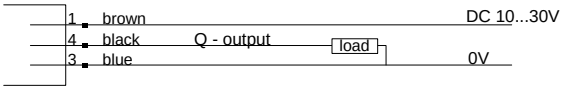
Order information	
Type	**Part no.**
WL2S-E111	1 022 667
WL2S-F111	1 022 666
WL2S-F211	1 023 868
WL2S-F411	1 023 644
WL2S-N111	1 023 870
WL2S-P111	1 023 869
WL2S-P211	1 024 249

Technical data	WL 2S-	E111	F111	F211	F411	N111	P111	P211			
Sensing range (fix), typ.	1.6...31.5 in (0.04...0.8 m)	■	■	■	■	■	■	■			
Sensing range, recommended	1.6...15.7 in (0.04...0.4 m)	■	■	■	■	■	■	■			
Relating to	Reflector PL 20 A	■	■	■	■	■	■	■			
Light source[1], light type	Pin-point LED, red light	■	■	■	■	■	■	■			
Light spot diameter	Approx. 0.4 in at 3.9 in (10 mm at 100 mm)	■	■	■	■	■	■	■			
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■	■	■			
Ripple[3]	< 5 V_{PP}	■	■	■	■	■	■	■			
Current consumption[4]	< 20 mA	■	■	■	■	■	■	■			
Switching outputs	PNP, Q		■	■	■		■	■			
	NPN, Q	■				■					
Switching mode	Light switching					■	■	■			
	Dark switching	■	■	■	■						
Output current I_A max.	< 50 mA	■	■	■	■	■	■	■			
Response time[5]	< 0.6 ms	■	■	■	■	■	■	■			
Max. switching frequency[6]	800 Hz	■	■	■	■	■	■	■			
Connection types	Cable, PVC, 2 m[7]	■	■			■	■				
	Plug, M8 3-pin, with cable, PVC, 200 mm[7]			■				■			
	Plug, M8 4-pin, with cable, PVC, 2 m[7]				■						
VDE protection class[8]	⧫	■	■	■	■	■	■	■			
Circuit protection[9]	A, B, C	■	■	■	■	■	■	■			
Enclosure rating	IP 67, IP 69K	■	■	■	■	■	■	■			
Ambient temperature	Operation -4...122° F (-20...50° C)	■	■	■	■	■	■	■			
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■	■			
Approximate weight	0.6 oz (18 g)	■	■			■	■				
	0.7 oz (20 g)			■	■			■			
Housing material	ABS, PMMA	■	■	■	■	■	■	■			

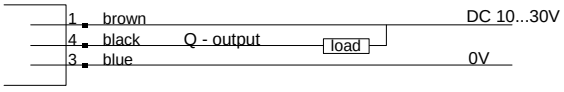
1) Average service life 75,000 h at $T_A = +25°$ C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 32° F (0° C)
9) A = V_S-connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

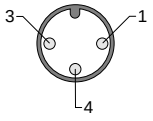
PNP Models



NPN Models

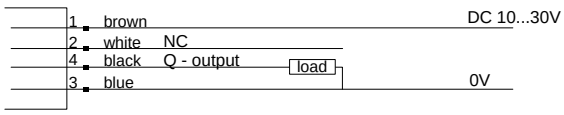


M8 Connector

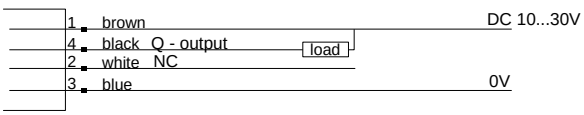


wire colors refer to standard cable, not included with quick disconnect models.

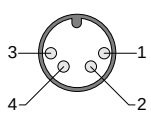
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WS/WE 2S

Through-Beam Sensors



0...47.2 in (0....1.2 m)

sensing range

ECOLAB

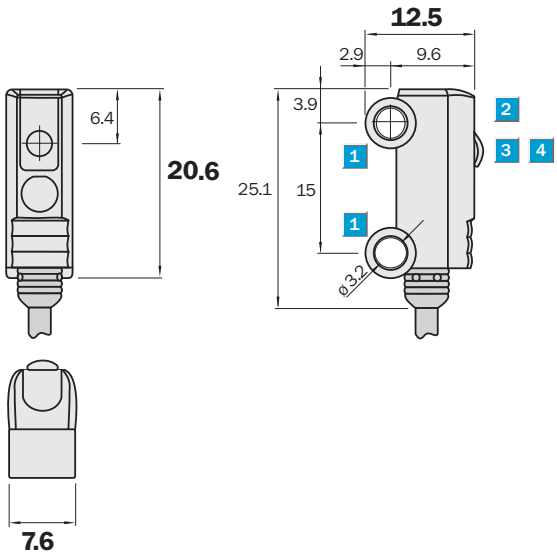
Highlights

- Excellent size/performance ratio
- Sturdy housing with metal sleeves for M3 bolts

WS/WE 2S



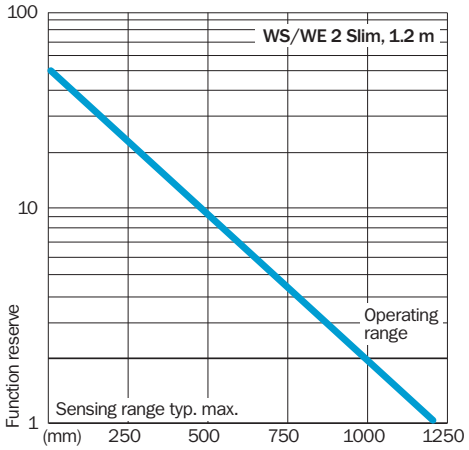
Dimensional drawing

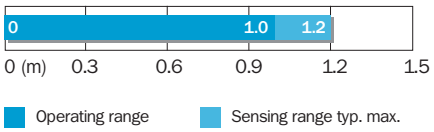


dimensions in mm

1 Mounting hole Ø 3.2 mm
2 LED signal strength indicator
3 Optical axis, receiver
4 Optical axis, sender

Excess gain





Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

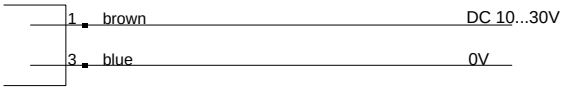
Type	Part no.
WS/WE2S-E113	1 022 669
WS/WE2S-F113	1 022 668
WS/WE2S-F213	1 023 650
WS/WE2S-N113	1 025 829
WS/WE2S-P113	1 028 550

Technical data	WS/WE2S-	E113	F113	F213	N113	P113					
Sensing range (fix), typ.	0...47.2 in (0...1.2 m)	■	■	■	■	■					
Sensing range, recommended	0...39.4 in (0...1 m)	■	■	■	■	■					
Light source[1], light type	Pin-point LED, red light	■	■	■	■	■					
Light spot diameter	Approx. 0.4 in at 3.9 in (10 mm at 100 mm)	■	■	■	■	■					
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■					
Ripple[3]	< 5 V_{PP}	■	■	■	■	■					
Current consumption, sender[4]	< 20 mA	■	■	■	■	■					
Current consumption, receiver[4]	< 10 mA	■	■	■	■	■					
Switching outputs	PNP, Q		■	■		■					
	NPN, Q	■			■						
Switching mode	Dark switching	■	■	■							
	Light switching				■	■					
Output current I_A max.	< 50 mA	■	■	■	■	■					
Response time[5]	< 2.5 ms	■	■	■	■	■					
Max. switching frequency[6]	200 Hz	■	■	■	■	■					
Connection types	Cable, PVC, 2 m[7]	■	■		■	■					
	Plug, M8 3-pin, with cable, PVC, 200 mm[7]			■							
VDE protection class	⧫	■	■	■	■	■					
Circuit protection[9]	A, B, C	■	■	■	■	■					
Enclosure rating	IP 67, IP 69K	■	■	■	■	■					
Ambient temperature	Operation -4...122° F (-20...50° C)	■	■	■	■	■					
	Storage -40...167° F (-40...75° C)	■	■	■	■	■					
Approximate weight	1.3 oz (36 g)	■	■		■	■					
	1.4 oz (40 g)			■							
Housing material	ABS, PMMA	■	■	■	■	■					

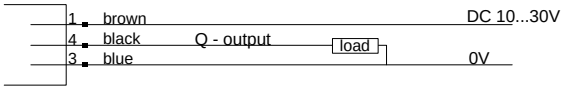
1) Average service life 75,000 h at $T_A = +25°$ C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 32° F (0° C)
9) A = V_S-connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

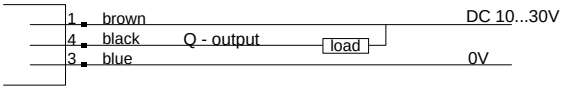
Sender



PNP Models

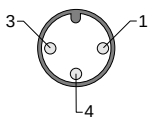


NPN Models



wire colors refer to standard cable, not included with quick disconnect models.

M8 Connector



WTB4S-3

Proximity/Diffuse Sensors - Background suppression

0.2...7.1 in (4...180 mm)
sensing range

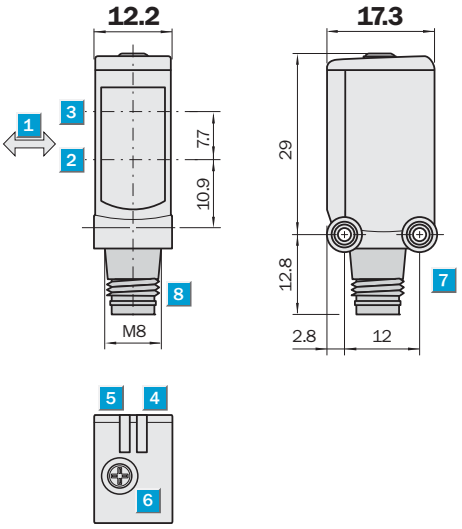
Highlights

- Highly accurate adjustment of the sensing distance with 5-turn potentiometer
- Outstanding visibility and tightly defined light spot
- Robust mounting due to M3 metal threads

WTB4S-3

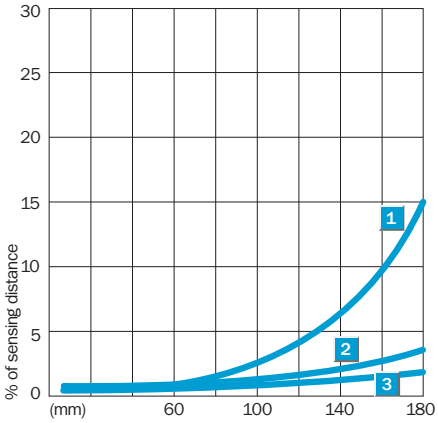


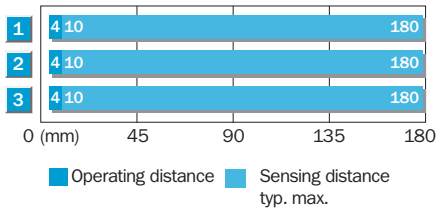
Dimensional drawing



dimensions in mm

Background suppression





1	Sensing distance on black, 6 % remission
2	Sensing distance on gray, 18 % remission
3	Sensing distance on white, 90 % remission

Adjustments

All types



1	Standard direction of the material being sensed
2	Optical axis, receiver
3	Optical axis, sender
4	LED indicator yellow, status of received light beam
5	LED indicator green, power on
6	Potentiometer
7	M3 mounting hole
8	Connector

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

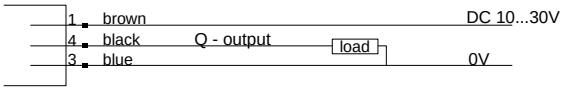
Type	Part no.
WTB4S-3E1361	1 042 047
WTB4S-3F2161	1 042 044
WTB4S-3N1361	1 042 046
WTB4S-3N2161	1 042 045
WTB4S-3P1361	1 042 043
WTB4S-3P2161	1 042 040
WTB4S-3P2261	1 042 041
WTB4S-3P3161	1 042 042

Technical data	WTB4S-3-	E1361	F2161	N1361	N2161	P1361	P2161	P2261	P3161
Sensing range, typ. max.	0.2...7.1 in (4…180 mm)	■	■	■	■	■	■	■	■
Operating distance	04...7.1 in (10...180 mm)	■	■	■	■	■	■	■	■
Adjustment of operating distance	Potentiometer, 5 revolutions	■	■	■	■	■	■	■	■
Light source[1], light type	Pin-point LED, red light, 650 nm	■	■	■	■	■	■	■	■
Light spot diameter	0.3 in at 2.8 in (6.5 mm at 70 mm)	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■	■	■
Ripple[3]	< 5 V_{SS}	■	■	■	■	■	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■	■	■	■	■	■
Switching outputs	NPN, Q	■		■	■				
	PNP, Q		■			■	■	■	■
	PNP, $\overline{Q}$							■	
Switching mode	Dark switching	■	■						
	Light switching			■	■	■	■		■
	Complementary							■	
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■	■	■
Response time	< 0.5 s[5]	■	■	■	■	■	■	■	■
Switching frequency	1,000 Hz[6]	■	■	■	■	■	■	■	■
Connection types	Cable with plug, PVC, 2 m[7]	■		■		■			
	Connector, M8 3-pin		■		■		■		
	Connector, M8 4-pin							■	
	Plug, M8 3-pin, with cable, PVC, 100 mm[7]								■
VDE protection class	⧫	■	■	■	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■	■	■	■
Enclosure rating	IP 66/IP 67	■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40…60° C)	■	■	■	■	■	■	■	■
	Storage -40...167° F (-40…75° C)	■	■	■	■	■	■	■	■
Approximate weight	0.7 oz (20 g)	■	■	■	■	■	■	■	■
Housing material	Bayblend, PMMA	■	■	■	■	■	■	■	■

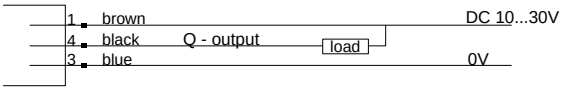
1) Average service life 100,000 h where T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

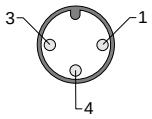
PNP Models



NPN Models

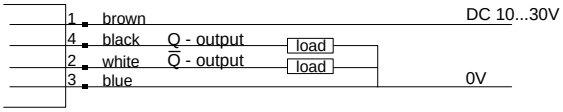


M8 Connector

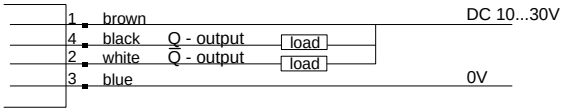


wire colors refer to standard cable, not included with quick disconnect models.

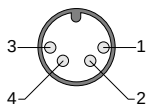
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WTB4S-3

Proximity/Diffuse Sensors - Background suppression

0.2...4.7 in (4...120 mm)
sensing range

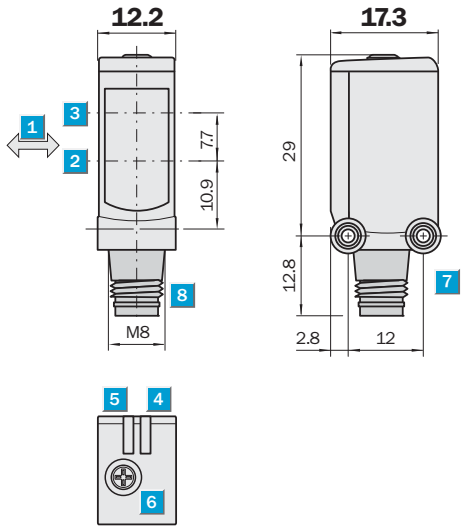
Highlights

- Highly accurate adjustment of the sensing distance with 5-turn potentiometer
- Easily visible laser-type light spot
- Robust mounting due to M3 metal threads

WTB4S-3

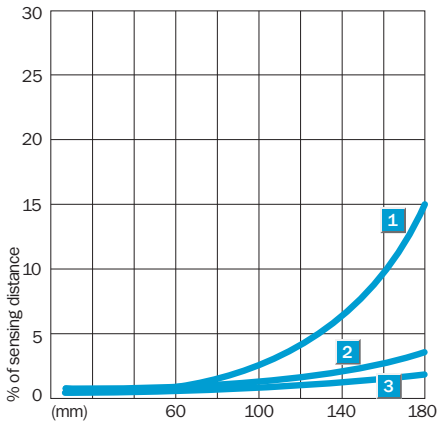


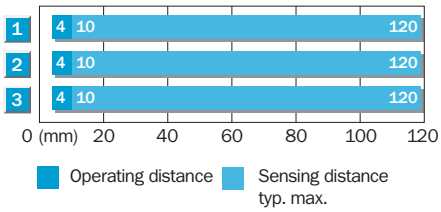
Dimensional drawing



dimensions in mm

Background suppression





1	Sensing distance on black, 6 % remission
2	Sensing distance on gray, 18 % remission
3	Sensing distance on white, 90 % remission

Adjustments

All types



1	Standard direction of the material being sensed
2	Optical axis, receiver
3	Optical axis, sender
4	LED indicator yellow, status of received light beam
5	LED indicator green, power on
6	Potentiometer
7	M3 mounting hole
8	Connector

Accessories	page
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Order information

Type	Part no.
WTB4S-3E1331	1 042 064
WTB4S-3F2131	1 042 060
WTB4S-3N1131	1 042 063
WTB4S-3N1331	1 042 062
WTB4S-3N2131	1 042 061
WTB4S-3P1331	1 042 059
WTB4S-3P2131	1 042 056
WTB4S-3P2231	1 042 057
WTB4S-3P3131	1 042 058

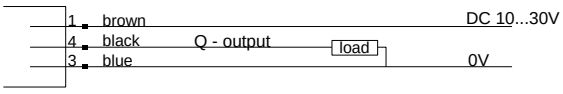
7028071 - © 2008 SICK, Inc.

Technical data	WTB4S-3-	E1331	F2131	N1131	N1331	N2131	P1331	P2131	P2231	P3131
Sensing range, typ. max.	0.2...4.7 in (4…120 mm)	■	■	■	■	■	■	■	■	■
Operating distance	04...4.7 in (10...120 mm)	■	■	■	■	■	■	■	■	■
Adjustment of operating distance	Potentiometer, 5 revolutions	■	■	■	■	■	■	■	■	■
Light source[1], **light type**	Pin-point LED, red light, 650 nm	■	■	■	■	■	■	■	■	■
Light spot diameter	0.1 in at 2.8 in (2.5 mm at 70 mm)	■	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■	■	■	■
Ripple[3]	< 5 V_{SS}	■	■	■	■	■	■	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■	■	■	■	■	■	■
Switching outputs	NPN, Q	■		■	■	■				
	PNP, Q		■				■	■	■	■
	NPN, $\overline{Q}$			■						
	PNP, $\overline{Q}$								■	
Switching mode	Dark switching	■	■							
	Complementary			■					■	
	Light switching				■	■	■	■		■
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■	■	■	■
Response time	< 0.5 s[5]	■	■	■	■	■	■	■	■	■
Switching frequency	1,000 Hz[6]	■	■	■	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[7]	■		■	■		■			
	Connector, M8 3-pin		■			■		■		
	Connector, M8 4-pin								■	
	Plug with cable, M8 3-pin, PVC, 100 mm[7]									■
VDE protection class	⧫III⧫	■	■	■	■	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 66/IP 67	■	■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40…60° C)	■	■	■	■	■	■	■	■	■
	Storage -40...167° F (-40…75° C)	■	■	■	■	■	■	■	■	■
Approximate weight	0.7 oz (20 g)	■	■	■	■	■	■	■	■	■
Housing material	Bayblend, PMMA	■	■	■	■	■	■	■	■	■

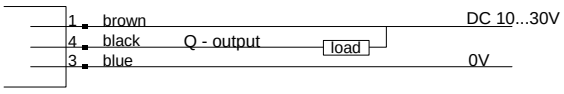
1) Average service life 100,000 h where T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

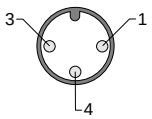
PNP Models



NPN Models

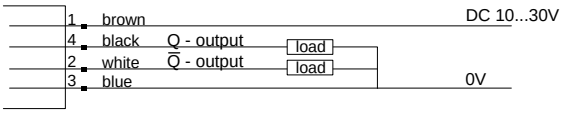


M8 Connector

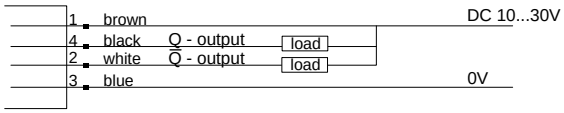


wire colors refer to standard cable, not included with quick disconnect models.

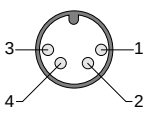
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WTB4S-3

Proximity/Diffuse Sensors - Background suppression



0.2...4.7 in (4...120 mm)
sensing range

ECOLAB

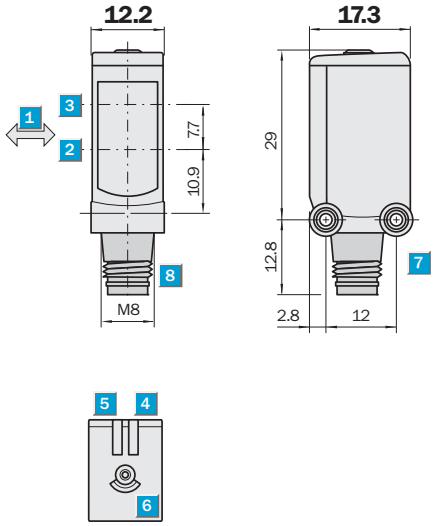
Highlights

- Easy commissioning through teach-in function
- Easily visible laser-type light spot
- Robust mounting due to M3 metal threads

WTB4S-3

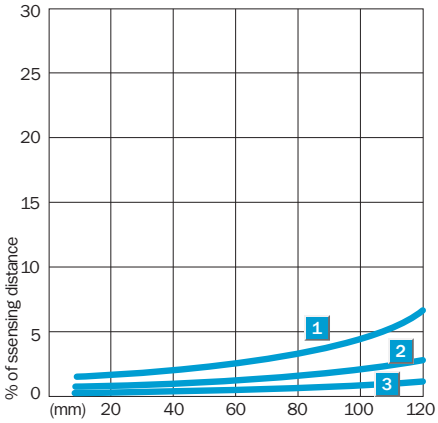


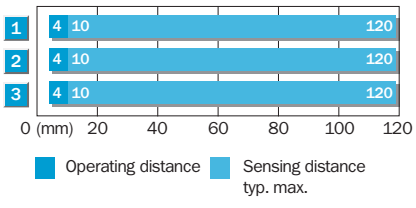
Dimensional drawing



dimensions in mm

Background suppression

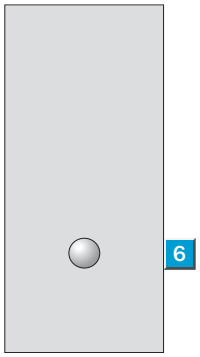




1	Sensing distance on black, 6 % remission
2	Sensing distance on gray, 18 % remission
3	Sensing distance on white, 90 % remission

Adjustments

All types



1	Standard direction of the material being sensed
2	Optical axis, receiver
3	Optical axis, sender
4	LED indicator yellow, status of received light beam
5	LED indicator green, power on
6	Teach-in button
7	M3 mounting hole
8	Connector

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WTB4S-3N1134	1 042 052
WTB4S-3N1332	1 042 055
WTB4S-3P2132	1 042 053
WTB4S-3P2234	1 042 050
WTB4S-3P3132	1 042 054

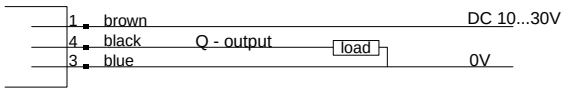
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Technical data	WTB4S-3-	N1134	N1332	P2132	P2234	P3132
Sensing range, typ. max.	0.2…4.7 in (4…120 mm)	■	■	■	■	■
Operating distance	0.4…4.7 in (10…120 mm)	■	■	■	■	■
Adjustment of operating distance	Teach-in: single-teach button & cable[1]	■			■	
	Teach-in: single-teach button		■	■		■
Light source[2], light type	Pin-point LED, red light, 650 nm	■	■	■	■	■
Light spot diameter	0.1 in at 2.8 in (2.5 mm at 70 mm)	■	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■	■
Ripple[4]	< 5 V_{SS}	■	■	■	■	■
Current consumption[5]	≤ 30 mA	■	■	■	■	■
Switching outputs	NPN, Q	■	■			
	PNP, Q			■	■	■
Switching mode	Light switching	■	■	■	■	■
Output current I_A max.	≤ 100 mA	■	■	■	■	■
Response time	< 0.5 s[6]	■	■	■	■	■
Switching frequency	1,000 Hz[7]	■	■	■	■	■
Connection types	Cable, PVC, 2 m[8]	■	■			
	Connector, M8 3-pin			■		
	Connector, M8 4-pin				■	
	Plug, M8 3-pin, PVC, 100 mm[7]					■
VDE protection class	⧫	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■
Enclosure rating	IP 66/IP 67	■	■	■	■	■
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■	■
Approximate weight	0.7 oz (20 g)	■	■	■	■	■
Housing material	Bayblend, PMMA	■	■	■	■	■

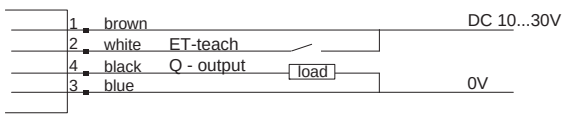
1) External teach-in: impulse > 2 s with voltage Vs for PNP or M for NPN
2) Average service life 100,000 h where T_A = 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) A = V_S connections reverse-polarity protected
B = Output Q and $\bar{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

PNP Models

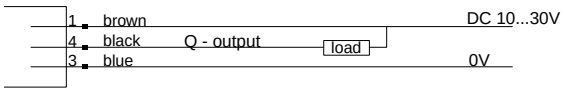


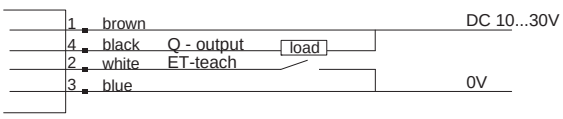
wire colors refer to standard cable, not included with quick disconnect models.



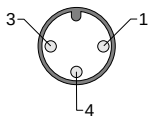
wire colors refer to standard cable, not included with quick disconnect models

NPN Models

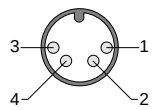




M8 Connector



M8 Connector



WTB 4-3

Proximity/Diffuse Sensors - Background suppression

0.2...5.9 in (4...150 mm)
sensing range

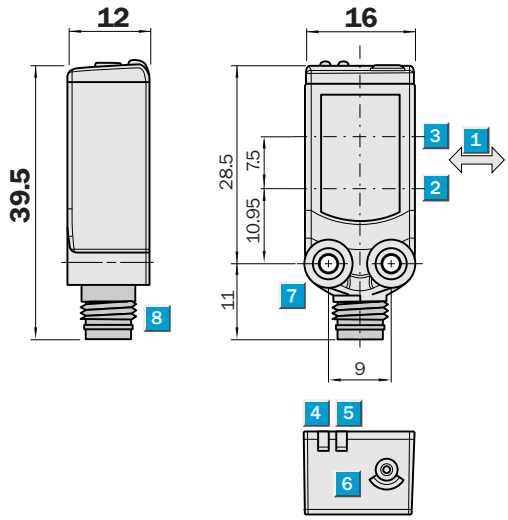
Highlights

- Commissioning by simple teach-in function
- Object detection almost irrespective of color and background consistency
- Secure function when mounted opposite other sensors

WTB 4-3

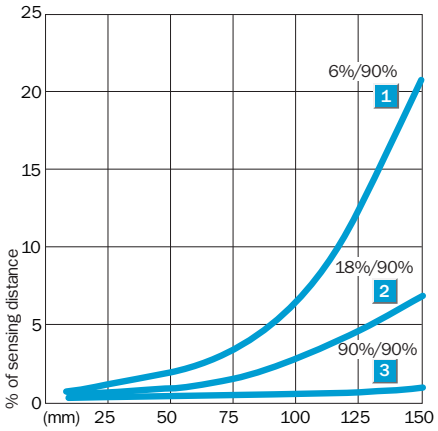


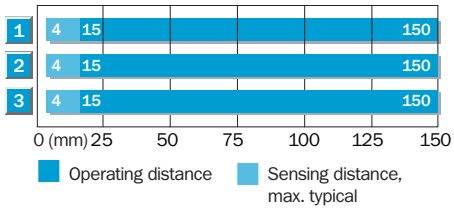
Dimensional drawing



dimensions in mm

Background suppression

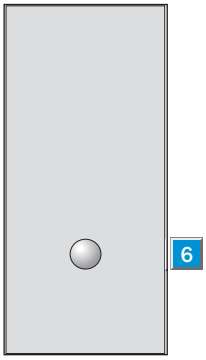




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Standard direction of the material being sensed
2	Optical axis, sender
3	Optical axis, receiver
4	LED indicator yellow, status of received light beam
5	LED indicator green, power on
6	Teach button
7	M3 mounting hole
8	Connector

Accessories	page
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Order Information

Type	Part no.
WTB4-3N1164	1 028 090
WTB4-3N1362	1 028 087
WTB4-3N2162	1 028 088
WTB4-3N3162	1 028 089
WTB4-3P1362	1 028 081
WTB4-3P2162	1 028 084
WTB4-3P2262	1 028 085
WTB4-3P2264	1 028 086
WTB4-3P3162	1 028 082

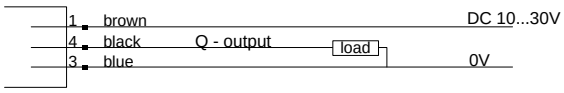
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Technical data	WTB 4-3-	N1164	N1362	N2162	N3162	P1362	P2162	P2262	P2264	P3162
Sensing range, adjustable	0.2...5.9 in (4…150 mm)	■	■	■	■	■	■	■	■	■
Operating distance	0.6...5.9 in (15...150 mm)	■	■	■	■	■	■	■	■	■
Adjustment of operating distance	Teach-in: single teach button & cable[1]	■							■	
	Teach-in: single teach button		■	■	■	■	■	■		■
Light source[2], light type	Pin-point LED, red light, 650 nm	■	■	■	■	■	■	■	■	■
Light spot diameter	0.3 in at 2.0 in (7 mm at 50 mm)	■	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■	■	■	■	■	■
Ripple[4]	5 V_{SS}	■	■	■	■	■	■	■	■	■
Current consumption[5]	≤ 30 mA	■	■	■	■	■	■	■	■	■
Switching outputs	NPN, Q	■	■	■	■					
	PNP, Q					■	■	■	■	■
	PNP, $\overline{Q}$							■		
Switching mode	Light switching	■	■	■	■	■	■	■	■	■
	Dark switching							■		
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■	■	■	■
Response time	< 0.5 ms[6]	■	■	■	■	■	■	■	■	■
Switching frequency	1,000 Hz[7]	■	■	■	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[8]	■	■			■				
	Connector, M8 3-pin			■			■			
	Plug, M8 3-pin, with cable, PVC, 100 mm[8]				■					■
	Connector, M8 4-pin							■	■	
VDE protection class	⧫III	■	■	■	■	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 66/IP 67	■	■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40…60° C)	■	■	■	■	■	■	■	■	■
	Storage -40...167° F (-40…75° C)	■	■	■	■	■	■	■	■	■
Approximate weight	0.7 oz (20 g)	■	■	■	■	■	■	■	■	■
Housing material	Bayblend, PMMA	■	■	■	■	■	■	■	■	■

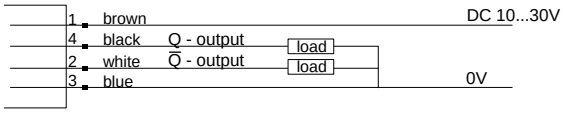
1) Extern teach-in: impulse > 2s with voltage V_S for PNP or 0V for NPN
2) Average service life 100,000 h where T_A = 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

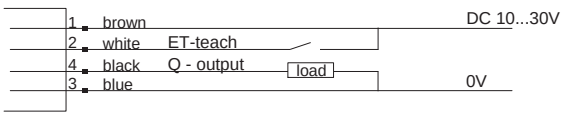
PNP Models



wire colors refer to standard cable, not included with quick disconnect models.

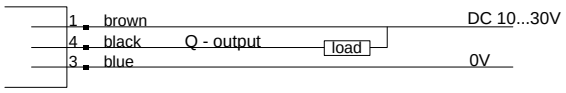


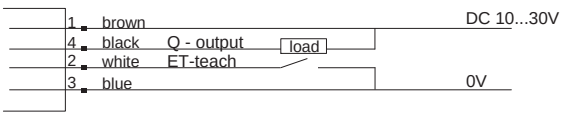
wire colors refer to standard cable, not included with quick disconnect models



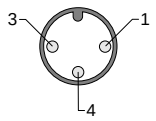
wire colors refer to standard cable, not included with quick disconnect models

NPN Models

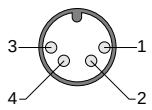




M8 Connector



M8 Connector



WTB 4-3

Proximity/Diffuse Sensors - Background suppression

0.2...5.9 in (4...150 mm)
sensing range

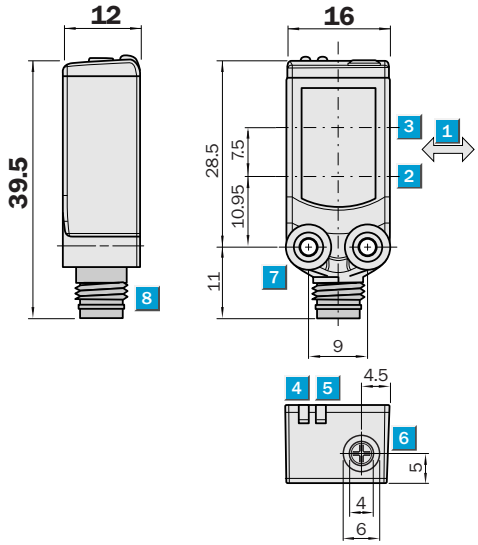
Highlights

- High-precision setting of sensing distance due to 5-turn potentiometer
- Object detection almost irrespective of color and background consistency
- Secure function when mounted opposite other sensors

WTB 4-3

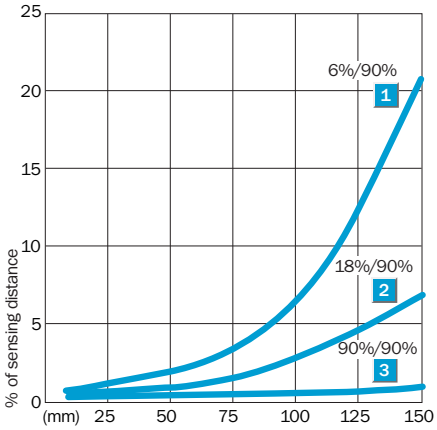


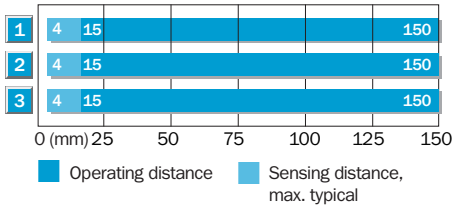
Dimensional drawing



dimensions in mm

Background suppression





1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Standard direction of the material being sensed
2	Optical axis, sender
3	Optical axis, receiver
4	LED indicator yellow, status of received light beam
5	LED indicator green, power on
6	Potentiometer
7	M3 mounting hole
8	Connector

Accessories	page
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Order information

Type	Part no.
WTB4-3N1161	1 028 102
WTB4-3N1361	1 028 101
WTB4-3N2161	1 028 104
WTB4-3N3161	1 028 103
WTB4-3P1161	1 028 096
WTB4-3P1361	1 028 094
WTB4-3P2161	1 028 099
WTB4-3P2261	1 028 100
WTB4-3P3161	1 028 097
WTB4-3P3261	1 028 098

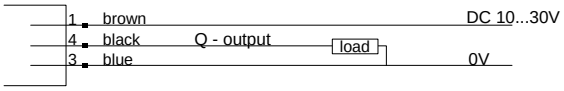
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Technical data	WTB 4-3-	N1161	N1361	N2161	N3161	P1161	P1361	P2161	P2261	P3161	P3261
Sensing range, adjustable	0.2...5.9 in (4…150 mm)	■	■	■	■	■	■	■	■	■	■
Operating distance	0.6...5.9 in (15...150 mm)	■	■	■	■	■	■	■	■	■	■
Adjustment of operating distance	Potentiometer, 5 revolutions	■	■	■	■	■	■	■	■	■	■
Light source[1], light type	Pin-point LED, red light, 650 nm	■	■	■	■	■	■	■	■	■	■
Light spot diameter	0.3 in at 2.0 in (7 mm at 50 mm)	■	■	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■	■	■	■	■
Ripple[3]	< 5 V_{SS}	■	■	■	■	■	■	■	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■	■	■	■	■	■	■	■
Switching outputs	NPN, $\overline{Q}$	■									
	NPN Q	■	■	■	■						
	PNP, $\overline{Q}$					■			■		■
	PNP, Q					■	■	■	■	■	■
Switching mode	Dark switching	■				■			■		■
	Light switching	■	■	■	■	■	■	■	■	■	■
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■	■	■	■	■
Response time	< 0.5 ms[5]	■	■	■	■	■	■	■	■	■	■
Switching frequency	1,000 Hz[6]	■	■	■	■	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[7]	■	■			■	■				
	Connector, M8 3-pin			■				■			
	Plug, M8 3-pin, with cable, PVC, 100 mm[7]				■					■	
	Connector, M8 4-pin								■		
	Plug, M8 4-pin, with cable, PVC, 100 mm										■
VDE protection class	⧫	■	■	■	■	■	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 66/IP 67	■	■	■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40…60° C)	■	■	■	■	■	■	■	■	■	■
	Storage -40...167° F (-40…75° C)	■	■	■	■	■	■	■	■	■	■
Approximate weight	0.7 oz (20 g)	■	■	■	■	■	■	■	■	■	■
Housing material	Bayblend, PMMA	■	■	■	■	■	■	■	■	■	■

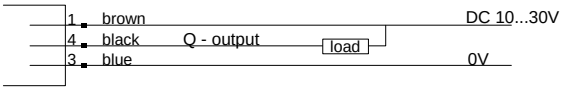
1) Average service life 100,000 h where T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

PNP Models

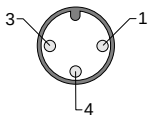


NPN Models

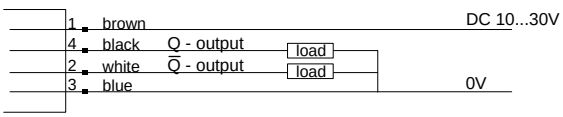


wire colors refer to standard cable, not included with quick disconnect models.

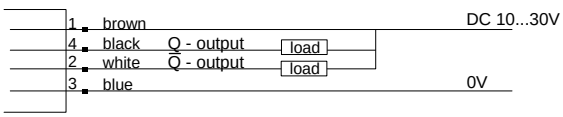
M8 Connector



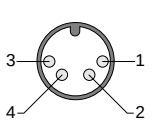
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WTB 4-3

Proximity/Diffuse Sensors - Background suppression

0.2...5.9 in (4...150 mm)
sensing range

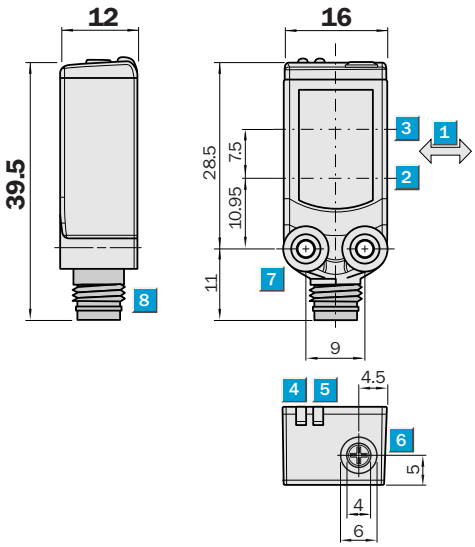
Highlights

- High-precision setting of sensing distance due to 5-turn potentiometer
- Object detection almost irrespective of color and background consistency
- Secure function when mounted opposite other sensors

WTB 4-3

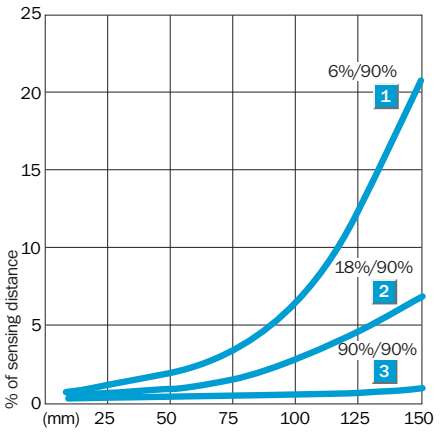


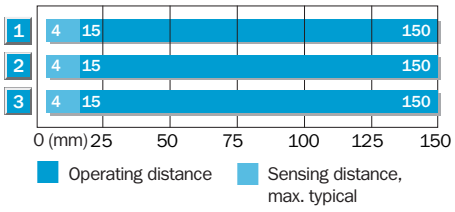
Dimensional drawing



dimensions in mm

Background suppression





1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Standard direction of the material being sensed
2	Optical axis, sender
3	Optical axis, receiver
4	LED indicator yellow, status of received light beam
5	LED indicator green, power on
6	Potentiometer
7	M3 mounting hole
8	Connector

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

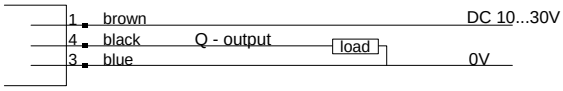
Type	Part no.
WTB4-3E1361	1 028 108
WTB4-3E2161	1 028 110
WTB4-3E3161	1 028 109
WTB4-3F1361	1 028 105
WTB4-3F2161	1 028 107
WTB4-3F3161	1 028 106

Technical data	WTB 4-3-	E1361	E2161	E3161	F1361	F2161	F3161
Sensing range, adjustable	0.2...5.9 in (4…150 mm)	■	■	■	■	■	■
Operating distance	0.6...5.9 in (15...150 mm)	■	■	■	■	■	■
Adjustment of operating distance	Potentiometer, 5 revolutions	■	■	■	■	■	■
Light source[1], **light type**	Pin-point LED, red light, 650 nm	■	■	■	■	■	■
Light spot diameter	0.3 in at 2.0 in (7 mm at 50 mm)	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■
Ripple[3]	5 V_{SS}	■	■	■	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■	■	■	■
Switching outputs	NPN, Q	■	■	■			
	PNP, Q				■	■	■
Switching mode	Dark switching	■	■	■	■	■	■
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■
Response time	< 0.5 ms[5]	■	■	■	■	■	■
Switching frequency	1,000 Hz[6]	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[7]	■			■		
	Connector, M8 3-pin		■			■	
	Plug, M8 3-pin, with cable, PVC, 100 mm[7]			■			■
VDE protection class	⧫	■	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 66/IP 67	■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40…60° C)	■	■	■	■	■	■
	Storage -40...167° F (-40…75° C)	■	■	■	■	■	■
Approximate weight	0.7 oz (20 g)	■	■	■	■	■	■
Housing material	Bayblend, PMMA	■	■	■	■	■	■

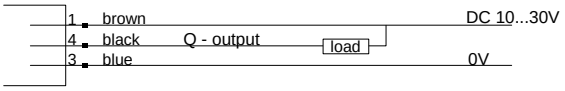
1) Average service life 100,000 h where T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

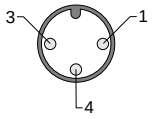
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models.

WTV 4-3

Proximity/Diffuse Sensors - V Optic

0.2...1.2 in (4...50 mm)
sensing range

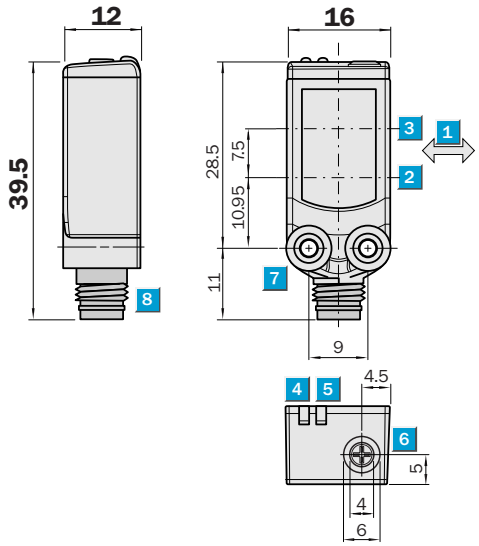
Highlights

- Reliable detection of highly transparent and shiny objects at a distance of 20…25 mm
- High-precision setting of sensing distance due to 5-turn potentiometer
- Large, homogeneous light spot

WTV 4-3

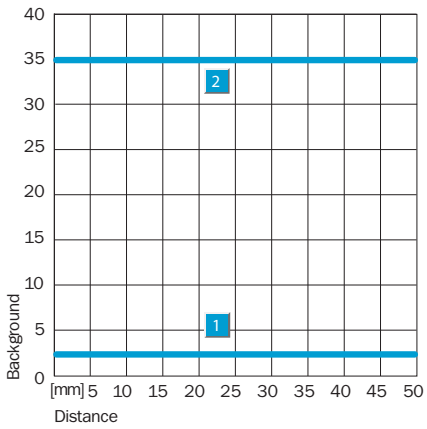


Dimensional drawing



dimensions in mm

Black-white shift/distance to background



1 Black-white shift 90%/6%
2 Distance to background detecting transparent objects

Adjustments

All types



1 Standard direction of the material being sensed
2 Optical axis, sender
3 Optical axis, receiver
4 LED indicator yellow, status of received light beam
5 LED indicator green, power on
6 Potentiometer
7 M3 mounting hole
8 Connector

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

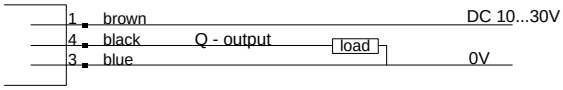
Type	Part no.
WTV4-3N1341	1 028 115
WTV4-3N2181	1 028 116
WTV4-3P1341	1 028 111
WTV4-3P2181	1 028 113
WTV4-3P2241	1 028 114
WTV4-3P3441	1 029 582

Technical data	WTV 4-3-	N1341	N2181	P1341	P2181	P2241	P3441
Sensing range typ. max	0.2...1.2 in (4…50 mm)	■	■	■	■	■	■
Operating distance	0.6...1.2 in (15...50 mm)	■	■	■	■	■	■
Adjustment of operating distance	Potentiometer, 5 revolutions	■	■	■	■	■	■
Light source[1], light type	Pin-point LED, red light, 650 nm	■	■	■	■	■	■
Light spot diameter	0.4 in at 1.6 in (10 mm at 40 mm)	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■
Ripple[3]	< 5 V_{SS}	■	■	■	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■	■	■	■
Switching outputs	NPN, Q	■	■				
	PNP, Q			■	■	■	■
	PNP, $\overline{Q}$					■	■
Switching mode	Light switching	■	■	■	■	■	■
	Dark switching					■	■
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■
Response time	< 0.5 ms[5]	■	■	■	■	■	■
Switching frequency	1,000 Hz[6]	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[7]	■		■			
	Connector, M8 3-pin		■		■		
	Connector, M8 4-pin					■	
	Plug, M12 4-pin, with cable, PVC, 150 mm[7]						■
VDE protection class	⧫	■	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 66/IP 67	■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40…60° C)	■	■	■	■	■	■
	Storage -40...167° F (-40…75° C)	■	■	■	■	■	■
Approximate weight	0.7 oz (20 g)	■	■	■	■	■	■
Housing material	Bayblend, PMMA	■	■	■	■	■	■

1) Average service life 100,000 h where T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

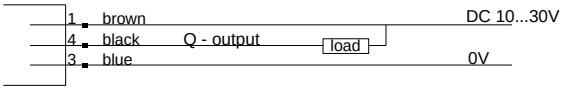
Connection diagram

PNP Models

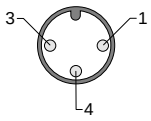


wire colors refer to standard cable, not included with quick disconnect models.

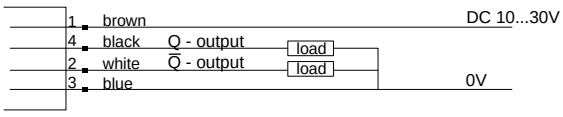
NPN Models



M8 Connector

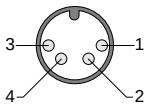


PNP Models

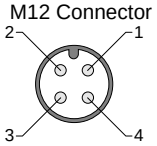


wire colors refer to standard cable, not included with quick disconnect models

M8 Connector



M12 Connector



WTB4-3

Proximity/Diffuse Sensors - Background suppression

0.2...5.9 in (4...150 mm)
sensing range

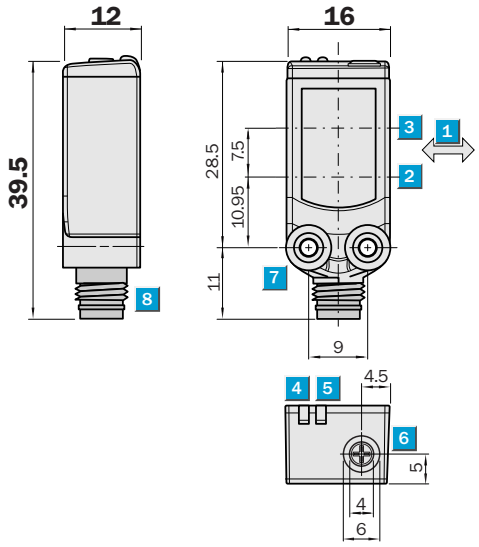
Highlights

- Wide-angle light spot with an aperture of 30° – “line”
- Reliable detection of objects with slots and holes
- Reliable detection of grid structures

WTB 4-3

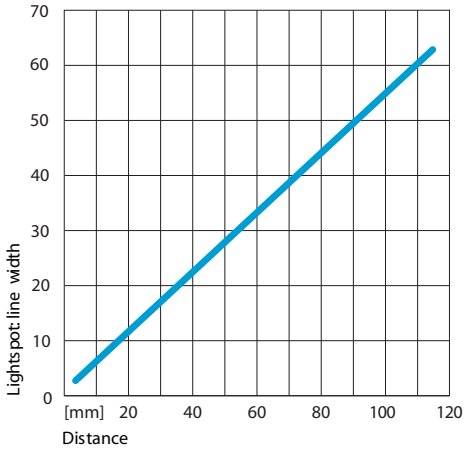


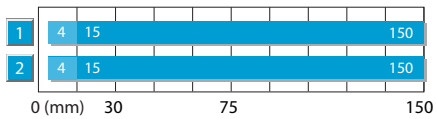
Dimensional drawing



dimensions in mm

Sensing distance and light spot width





1	Sensing range on white, 90% reflectance
2	Sensing range on black, 6% reflectance

Adjustments

All types



1	Direction of the sender light line
2	Optical axis, sender
3	Optical axis, receiver
4	LED indicator yellow, status of received light beam
5	LED indicator green, power on
6	Potentiometer
7	M3 mounting hole
8	Connector

Accessories	page
Cables and connectors	1180
Mounting systems	1234

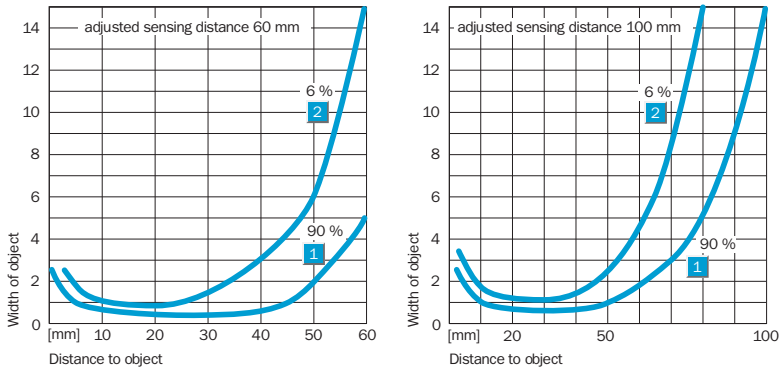
Order information

Type	Part no.
WTB4-3N1371	1 028 125
WTB4-3P1371	1 028 121
WTB4-3N2171	1 028 126
WTB4-3P2171	1 028 123
WTB4-3P3171	1 028 122

Technical data	WTB 4-3-	N1371	P1371	N2171	P2171	P3171
Sensing range typ. max	0.2...5.9 in (4…150 mm)	■	■	■	■	■
Operating distance	0.6...5.9 in (15...150 mm)	■	■	■	■	■
Adjustment of operating distance	Potentiometer, 5 revolutions	■	■	■	■	■
Light source[1], light type	Pin-point LED, red light, 650 nm	■	■	■	■	■
Light spot diameter	0.2 x 1.1 at 1.2 in (5 x 28 mm at 50 mm)	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■
Ripple[3]	< 5 V_{SS}	■	■	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■	■	■
Switching outputs	NPN, Q	■		■		
	PNP, Q		■		■	■
Switching mode	Light switching	■	■	■	■	■
Output current I_A max.	≤ 100 mA	■	■	■	■	■
Response time	< 0.5 ms[5]	■	■	■	■	■
Switching frequency	1,000 Hz[6]	■	■	■	■	■
Connection types	Cable, PVC, 2 m[7]	■	■			
	Connector, M8 3-pin			■	■	
	Plug, M8 3-pin, with cable, PVC, 100 mm[7]					■
VDE protection class	⧫	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■
Enclosure rating	IP 66/IP 67	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40…60° C)	■	■	■	■	■
	Storage -40...167° F (-40…75° C)	■	■	■	■	■
Approximate weight	0.7 oz (20 g)	■	■	■	■	■
Housing material	Bayblend, PMMA	■	■	■	■	■

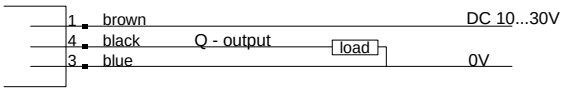
1) Average service life 100,000 h where T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Minimum detectable object

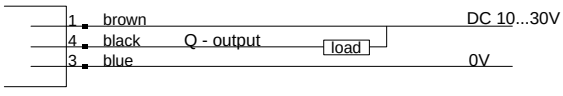


Connection diagram

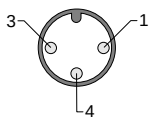
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models.

WL4S-3

Reflex/Retro-reflective Sensors



0...16.4 ft (0...5 m)
sensing range

ECOLAB

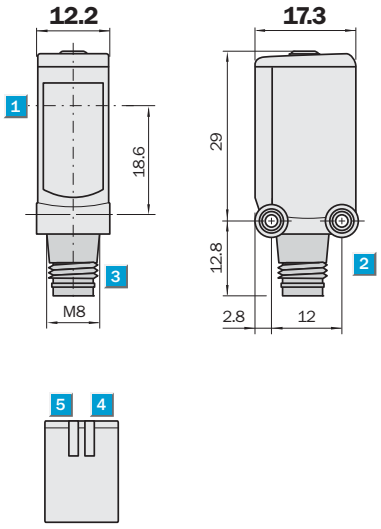
Highlights

- Reliable function in restricted spaces due to autocollimation
- Small, easily visible, tightly defined light spot
- Robust mounting due to M3 metal threads

WL4S-3



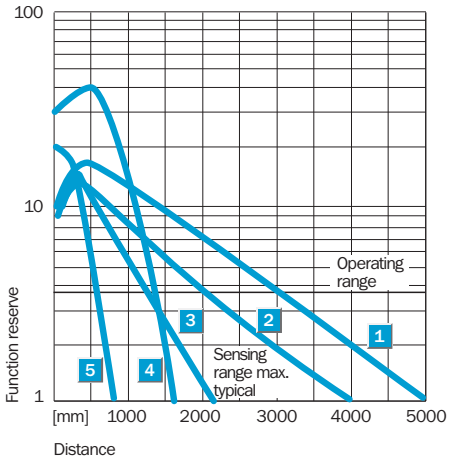
Dimensional drawing

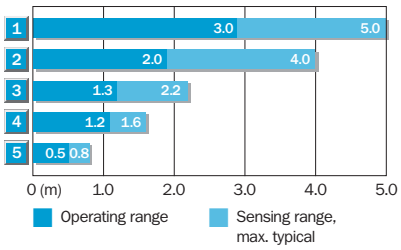


dimensions in mm

1 Optical axis
2 M3 mounting hole
3 Connector
4 LED signal strength indicator green: power on
5 LED signal strength indicator orange: status of received light beam

Sensing range and operating reserve





Reflector type	Operating range
1 PL80A	0 ... 3.0 m
2 PL40A	0 ... 2.0 m
3 PL20A	0 ... 1.3 m
4 PL10F	0 ... 1.2 m
5 REF-IRF-56	0 ... 0.5 m

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

Type	Part no.
WL4S-3E1330	1 042 072
WL4S-3E2130	1 042 071
WL4S-3F2130	1 042 065
WL4S-3F3130	1 042 067
WL4S-3N1330	1 042 073
WL4S-3P1330	1 042 068
WL4S-3P2130	1 042 069
WL4S-3P2230	1 042 066
WL4S-3P3130	1 042 070

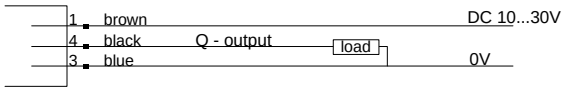
7028071 - © 2008 SICK, Inc.

Technical data	WL4S-3-	E1330	E2130	F2130	F3130	N1330	P1330	P2130	P2230	P3130
Sensing range typ. max	0…16.4 ft (0…5 m)	■	■	■	■	■	■	■	■	■
Sensing range, recommended	0…9.8 ft (0...3 m)	■	■	■	■	■	■	■	■	■
Relating to	Reflector PL80A	■	■	■	■	■	■	■	■	■
Light source[1], **light type**	Pin-point LED, red light, 650 nm	■	■	■	■	■	■	■	■	■
Light spot diameter	1.8 in at 4.9 ft (45 mm at 1.5 m)	■	■	■	■	■	■	■	■	■
Polarization filter	✓	■	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■	■	■	■
Ripple[3]	≤ 5 V_{SS}	■	■	■	■	■	■	■	■	■
Current consumption[4]	≤ 20 mA	■	■	■	■	■	■	■	■	■
Switching outputs	NPN, Q	■	■			■				
	PNP, Q			■	■		■	■	■	■
	PNP, $\overline{Q}$								■	
Switching mode	Dark switching	■	■	■	■					
	Light switching					■	■	■		■
	Complementary								■	
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■	■	■	■
Response time	< 0.5 ms[5]	■	■	■	■	■	■	■	■	■
Switching frequency	1,000 Hz[6]	■	■	■	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[7]	■				■	■			
	Connector, M8 3-pin		■	■				■		
	Plug, M8 3-pin, with cable, PVC, 100 mm[7]				■					■
	Connector, M8 4-pin								■	
Circuit protection[8]	A, B, C	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 66/IP 67	■	■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■	■	■	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■	■	■	■	■	■
Approximate weight	1.1 oz (30 g)	■	■	■	■	■	■	■	■	■
Housing material	Bayblend, PMMA	■	■	■	■	■	■	■	■	■

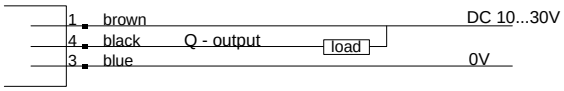
1) Average service life 100,000 h where T_A = 25° C
2) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

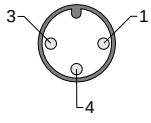
PNP Models



NPN Models

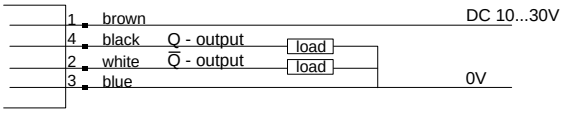


M8 Connector

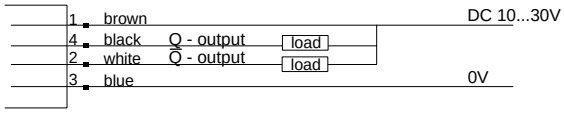


wire colors refer to standard cable, not included with quick disconnect models.

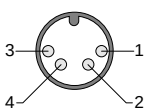
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WL4S-3

Reflex/Retro-reflective Sensors



0...16.4 ft (0...5 m)
sensing range

ECOLAB

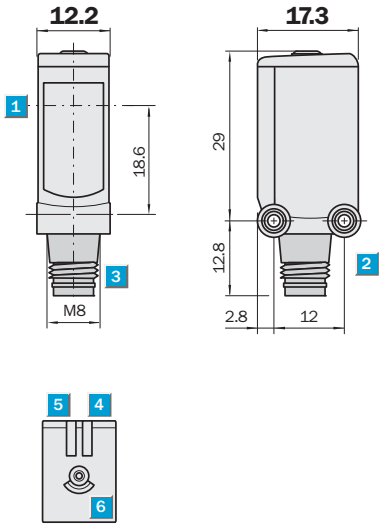
Highlights

- Reliable function in restricted spaces due to autocollimation
- Small, easily visible, tightly defined light spot
- Quick and easy commissioning through teach-in function
- Robust mounting due to M3 metal threads

WL4S-3



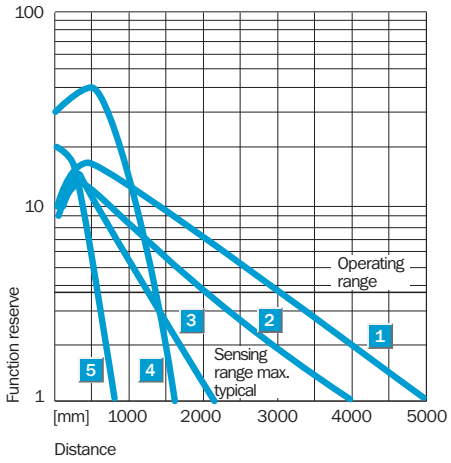
Dimensional drawing

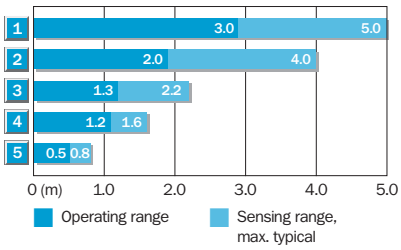


dimensions in mm

1 Standard direction of the material being sensed
2 Optical axis, receiver
3 Optical axis, sender
4 LED indicator yellow, status of received light beam
5 LED indicator green, power on
6 Teach button
7 M3 mounting hole
8 Connector

Sensing range and operating reserve





Reflector type	Operating range
1 PL80A	0 ... 3.0 m
2 PL40A	0 ... 2.0 m
3 PL20A	0 ... 1.3 m
4 PL10F	0 ... 1.2 m
5 REF-IRF-56	0 ... 0.5 m

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

Type	Part no.
WL4S-3E1332	1 042 081
WL4S-3E2132	1 042 080
WL4S-3F1332	1 042 076
WL4S-3F2132	1 042 074
WL4S-3F3132	1 042 075
WL4S-3N1332	1 042 082
WL4S-3P2132	1 042 077
WL4S-3P2232	1 042 078
WL4S-3V2232	1 042 079
WL4S-3W1132	1 042 083

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Technical data	WL4S-3-	E1332	E2132	F1332	F2132	F3132	N1332	P2132	P2232	V2232	W1132
Sensing range typ. max	0…16.4 ft (0…5 m)	■	■	■	■	■	■	■	■	■	■
Sensing range, recommended	0…9.8 ft (0...3 m)	■	■	■	■	■	■	■	■	■	■
Relating to	Reflector PL80A	■	■	■	■	■	■	■	■	■	■
Light source[1], light type	Pin-point LED, red light, 650 nm	■	■	■	■	■	■	■	■	■	■
Light spot diameter	1.8 in at 4.9 ft (45 mm at 1.5 m)	■	■	■	■	■	■	■	■	■	■
Polarization filter	✓	■	■	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■	■	■	■	■
Ripple[3]	≤ 5 V_{SS}	■	■	■	■	■	■	■	■	■	■
Current consumption[4]	≤ 20 mA	■	■	■	■	■	■	■	■	■	■
Switching outputs	NPN, Q	■	■				■				
	PNP, Q			■	■	■		■	■		
	PNP, $\overline{Q}$								■		
	PNP, Q and alarm									■	
	NPN, Q and alarm										■
Switching mode	Dark switching	■	■	■	■	■				■	■
	Light switching						■	■			
	Complementary								■		
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■	■	■	■	■
Response time	< 0.5 ms[5]	■	■	■	■	■	■	■	■	■	■
Switching frequency	1,000 Hz[6]	■	■	■	■	■	■	■	■	■	■
Alarm output	Pre-failure signalling output									■	■
Connection types	Cable, PVC, 2 m[7]	■		■			■				■
	Connector, M8 3-pin		■		■			■			
	Plug, M8 3-pin, with cable, PVC, 100 mm[7]					■					
	Connector, M8 4-pin								■	■	
Circuit protection[8]	A, B, C	■	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 66/IP 67	■	■	■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■	■	■	■	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■	■	■	■	■	■	■
Approximate weight	1.1 oz (30 g)	■	■	■	■	■	■	■	■	■	■
Housing material	Bayblend, PMMA	■	■	■	■	■	■	■	■	■	■

1) Average service life 100,000 h where T_A = 25° C
2) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

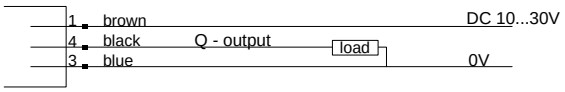
Teach-in function

Programming via teach-in button
Simple programming:
Position reflector in the beam path, press button, ready: LED confirms teach-in operation

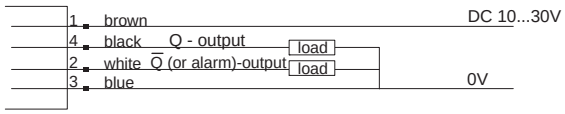
Two operating modes:
Standard setting: short teach-in time (< 8 s); for standard applications; approx. double reserve via switching threshold.
Fine adjustment: long teach-in time (> 8 s); for precise applications; small switching hysteresis.

Connection diagram

PNP Models

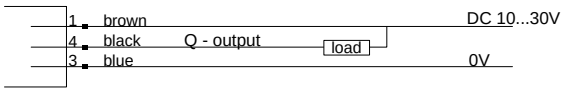


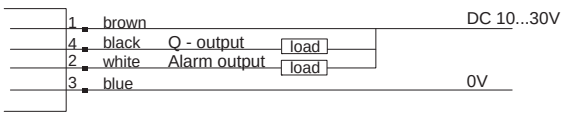
wire colors refer to standard cable, not included with quick disconnect models.



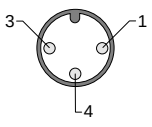
wire colors refer to standard cable, not included with quick disconnect models

NPN Models

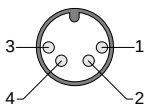




M8 Connector



M8 Connector



WL 4-3

Reflex/Retro-reflective Sensors

0.03...13.1 ft (0.01...4 m)
sensing range

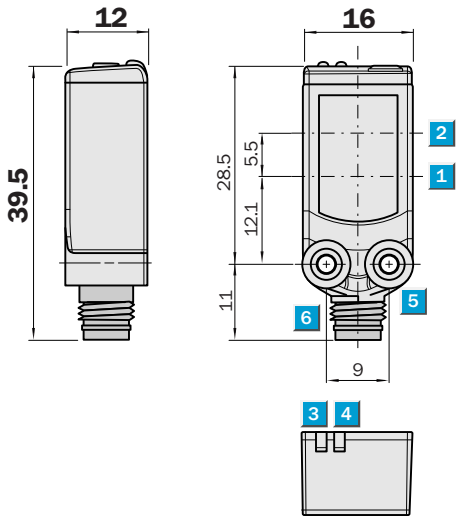
Highlights

- Fast and safe alignment through high visibility light spot
- Fast commissioning. Connect, align, ready.
- Easy assembly in slots and guide rails

WL 4-3



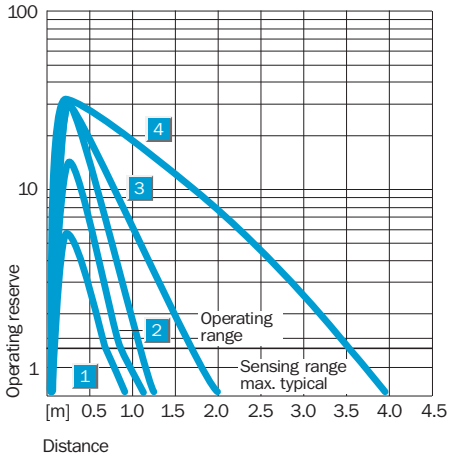
Dimensional drawing

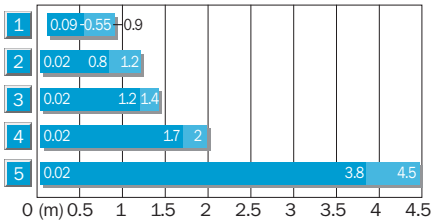


dimensions in mm

1 Center of optical axis, sender
2 Center of optical axis, receiver
3 LED signal strength indicator orange: status of received light beam
4 LED signal strength indicator green: power on
5 M3 mounting hole
6 Connector

Sensing range and operating reserve





Reflector type	Operating range
1 REF-IRF-56	0.09 ... 0.55 m
2 PL10F	0.02 ... 0.8 m
3 PL20A	0.02 ... 1.2 m
4 PL40A	0.02 ... 1.7 m
5 PL80A	0.02 ... 3.8 m

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

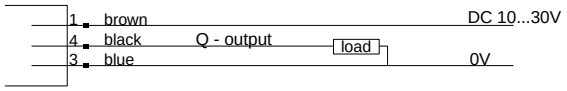
Type	Part no.
WL4-3N1330	1 028 148
WL4-3N2130	1 028 151
WL4-3N3130	1 028 150
WL4-3P1330	1 028 143
WL4-3P2130	1 028 146
WL4-3P2230	1 028 147
WL4-3P3130	1 028 144

Technical data	WL 4-3-	N1330	N2130	N3130	P1330	P2130	P2230	P3130
Sensing range typ. max	0.03…13.1 ft (0.01…4 m)	■	■	■	■	■	■	■
Sensing range, recommended	2…11.5 ft (0.02…3.5 m)	■	■	■	■	■	■	■
Relating to	Reflector PL80A	■	■	■	■	■	■	■
Light source[1], **light type**	pin-point LED, Red light, 650 nm	■	■	■	■	■	■	■
Polarization filter	✓	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■	■
Ripple[3]	≤ 5 V_{SS}	■	■	■	■	■	■	■
Current consumption[4]	≤ 20 mA	■	■	■	■	■	■	■
Switching outputs	NPN, Q	■	■	■				
	PNP, Q				■	■	■	■
	PNP, $\overline{Q}$						■	
Switching mode	Light switching	■	■	■	■	■	■	■
	Dark switching						■	
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■	■
Response time	< 0.5 ms[5]	■	■	■	■	■	■	■
Switching frequency	1,000 Hz[6]	■	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[7]	■			■			
	Connector, M8 3-pin		■			■		
	Plug, M8 3-pin, with cable, 100 mm[7]			■				■
	Connector, M8 4-pin						■	
Circuit protection[8]	A, B, C	■	■	■	■	■	■	■
Enclosure rating	IP 66/IP 67	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■	■	■	■
Approximate weight	1.1 oz (30 g)	■	■	■	■	■	■	■
Housing material	Bayblend, PMMA	■	■	■	■	■	■	■

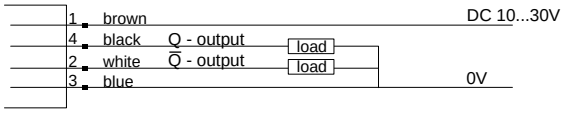
1) Average service life 100,000 h where T_A = 25° C
2) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

PNP Models

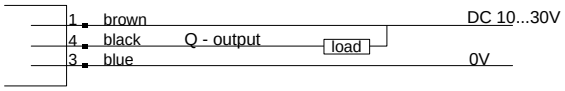


wire colors refer to standard cable, not included with quick disconnect models.

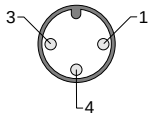


wire colors refer to standard cable, not included with quick disconnect models

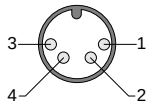
NPN Models



M8 Connector



M8 Connector



WL 4-3

Reflex/Retro-reflective Sensors

0.03...13.1 ft (0.01...4 m)
sensing range

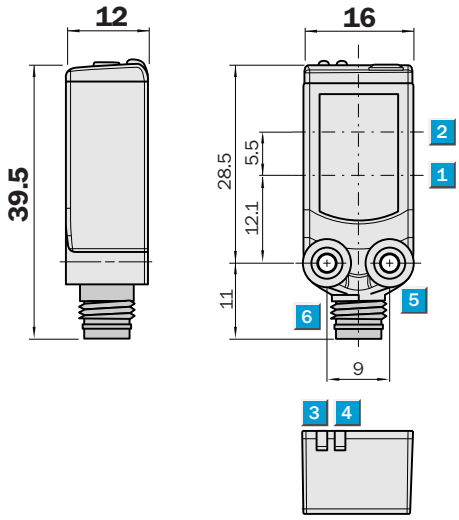
Highlights

- Fast and safe alignment through high visibility light spot
- Fast commissioning. Connect, align, ready.
- Easy assembly in slots and guide rails

WL 4-3



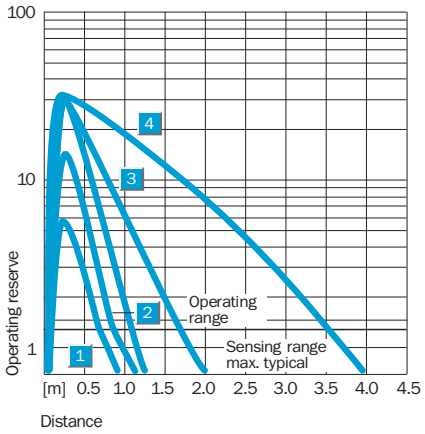
Dimensional drawing

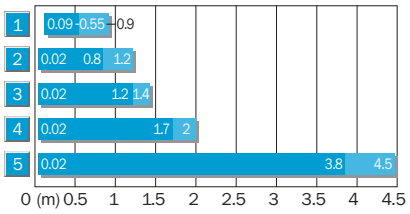


dimensions in mm

1 Center of optical axis, sender
2 Center of optical axis, receiver
3 LED signal strength indicator orange: status of received light beam
4 LED signal strength indicator green: power on
5 M3 mounting hole
6 Connector

Excess gain





	Reflector type	Operating range
1	REF-IRF-56	0.09 ... 0.55 m
2	PL10F	0.02 ... 0.8 m
3	PL20A	0.02 ... 1.2 m
4	PL40A	0.02 ... 1.7 m
5	PL80A	0.02 ... 3.8 m

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WL4-3E1330	1 028 156
WL4-3E2130	1 028 158
WL4-3E3130	1 028 157
WL4-3F1330	1 028 152
WL4-3F2130	1 028 155
WL4-3F3130	1 028 153

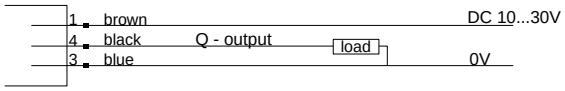
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Technical data	WL 4-3-	E1330	E2130	E3130	F1330	F2130	F3130
Sensing range typ. max	0.03…13.1 ft (0.01…4 m)						
Sensing range, recommended	2…11.5 ft (0.02…3.5 m)						
Relating to	Reflector PL80A						
Light source[1], **light type**	pin-point LED, Red light, 650 nm						
Polarization filter	✓						
Supply voltage V_S	10…30 V DC[2]						
Ripple[3]	5 V_{SS}						
Current consumption[4]	≤ 20 mA						
Switching outputs	NPN, Q						
	PNP, Q						
Switching mode	Dark switching						
Output current I_A max.	≤ 100 mA						
Response time	< 0.5 ms[5]						
Switching frequency	1,000 Hz[6]						
Connection types	Cable, PVC, 2 m[7]						
	Connector, M8 3-pin						
	Plug, M8 3-pin, with cable, PVC, 100 mm[7]						
Circuit protection[8]	A, B, C						
Enclosure rating	IP 66/IP 67						
Ambient temperature T_A	Operation -40…140° F (-40…60° C)						
	Storage -40…167° F (-40…75° C)						
Approximate weight	1.1 oz (30 g)						
Housing material	Bayblend, PMMA						

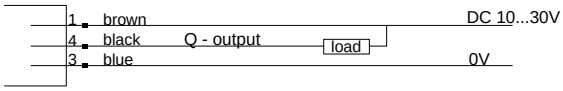
1) Average service life 100,000 h where T_A = 25° C
2) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

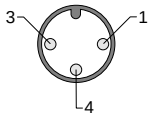
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models.

WSE4S-3

Through-Beam Sensors



0...18.0 ft (0...5.5 m)
sensing range

ECOLAB

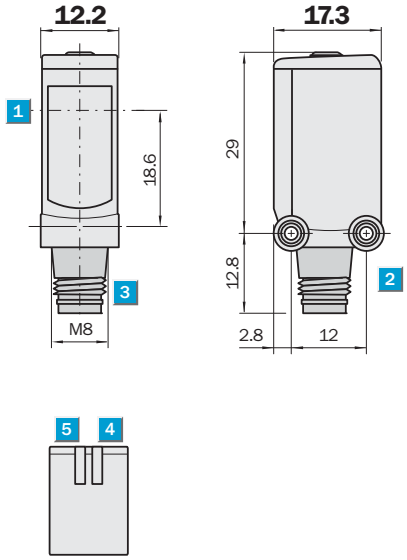
Highlights

- Fast and reliable alignment through brilliant light spot
- Assembly of several pairs in tight environments due to a tightly defined small light spot
- Robust mounting due to M3 metal threads

WSE4S-3



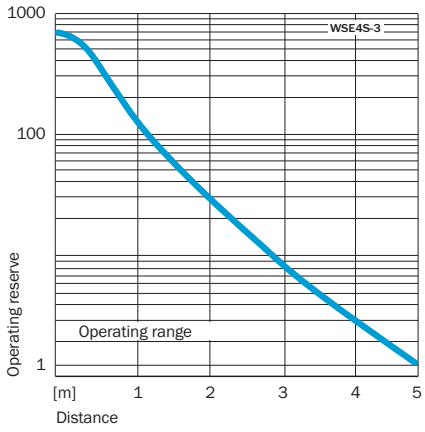
Dimensional drawing

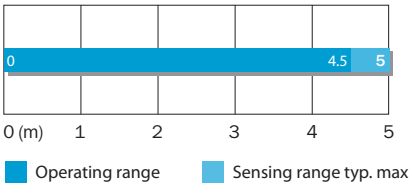


dimensions in mm

1 Center of optical axis
2 LED signal strength indicator orange: status of received light beam
3 LED signal strength indicator green: power on
4 M3 mounting hole
5 Connector

Sensing range and operating reserve





Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

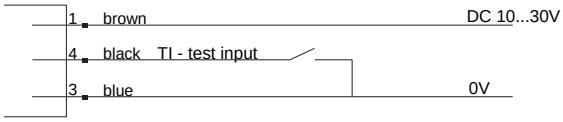
Type	Part no.
WSE4S-3E1330	1 042 093
WSE4S-3E2130	1 042 092
WSE4S-3F1330	1 042 090
WSE4S-3F2130	1 042 088
WSE4S-3F3130	1 042 089
WSE4S-3N1330	1 042 094
WSE4S-3P2130	1 042 091

Technical data	WSE4S-3	E1330	E2130	F1330	F2130	F3130	N1330	P2130			
Sensing range typ. max	0…16.4 ft (0…5 m)										
Sensing range, recommended	0…14.8 ft (0…4.5 m)										
Light source[1], **light type**	Pin-point LED, red light, 650 nm										
Light spot diameter	5.1 in at 6.6 ft (130 mm at 2 m)										
Supply voltage V_S	10…30 V DC[2]										
Ripple[3]	5 V_{SS}										
Current consumption, sender	≤ 20 mA										
Current consumption, receiver	≤ 20 mA										
Switching outputs	NPN, Q										
	PNP, Q										
Switching mode	Dark switching										
	Light switching										
Output current I_A max.	≤ 100 mA										
Response time	< 2.5 ms[4]										
Switching frequency	200 Hz[5]										
Test input sender off	TE to 0 V										
Connection types	Cable, PVC, 2 m[6]										
	Connector, M8 3-pin										
	Connector, M8 4-pin										
	Plug, M8 3-pin, with cable, PVC, 100 mm[6]										
Circuit protection[8]	A, B, C										
Enclosure rating	IP 66/IP 67										
Ambient temperature T_A	Operation -40…140° F (-40…60° C)										
	Storage -40…158° F (-40…70° C)										
Approximate weight	1.4 oz (40 g)										
Housing material	Bayblend, PMMA										

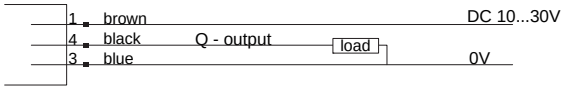
1) Average service life 100,000 h where T_A = 25° C
2) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Do not bend below 0° C
7) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

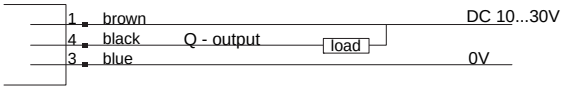
Sender, All Models



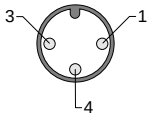
PNP Models



NPN Models



M8 Connector



Wire colors refer to standard cable, not included with quick disconnect models.

WSE 4-3

Through-Beam Sensors



0...18.0 ft (0...5.5 m)

sensing range

ECOLAB

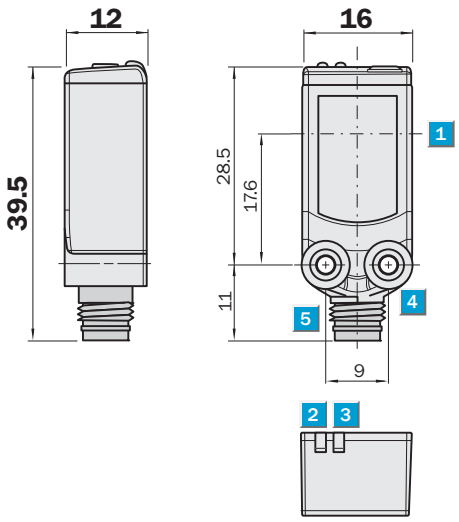
Highlights

- Fast and safe alignment through high visibility light spot
- Fast commissioning. Connect, align, ready.
- Easy assembly in slots and guide rails

WSE 4-3



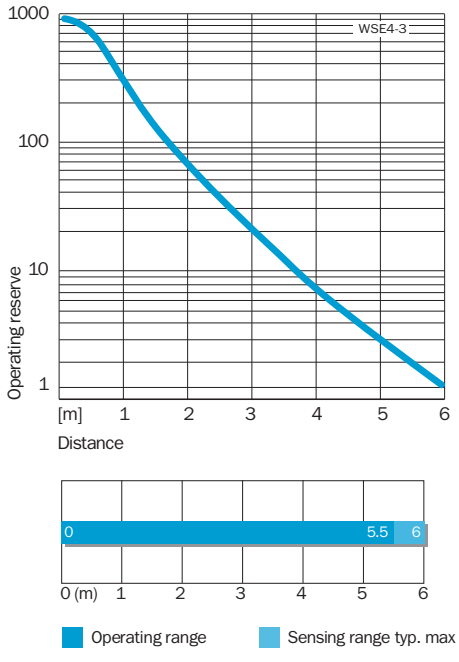
Dimensional drawing



dimensions in mm

1 Center of optical axis
2 LED signal strength indicator orange: status of received light beam
3 LED signal strength indicator green: power on
4 M3 Mounting hole
5 Connector

Excess gain



Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

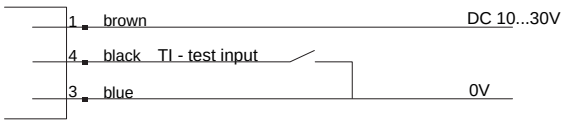
Type	Part no.
WSE4-3N1330	1 028 164
WSE4-3N2130	1 028 167
WSE4-3P1330	1 028 159
WSE4-3P1430	1 029 645
WSE4-3P2130	1 028 163
WSE4-3P2230	1 028 160
WSE4-3P3130	1 028 161

Technical data	WSE 4-3	N1330	N2130	P1330	P1430	P2130	P2230	P3130
Sensing range typ. max	0...18.1 ft (0…5.5 m)	■	■	■	■	■	■	■
Sensing range, recommended	0...19.7 ft (0...6 m)	■	■	■	■	■	■	■
Light source[1], **light type**	pin-point LED, Red light, 650 nm	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■	■
Ripple[3]	5 V_{SS}	■	■	■	■	■	■	■
Current consumption, sender	≤ 20 mA	■	■	■	■	■	■	■
Current consumption, receiver	≤ 20 mA	■	■	■	■	■	■	■
Switching outputs	NPN, Q	■	■					
	PNP, Q			■	■	■	■	■
	PNP, Q/$\overline{Q}$						■	
Switching mode	Light switching	■	■	■	■	■	■	■
	Dark switching						■	
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■	■
Response time	< 0.5 ms[4]	■	■	■	■	■	■	■
Switching frequency	1,000 Hz[5]	■	■	■	■	■	■	■
Connection types	Cable, 2 m[6]	■		■				
	Connector, M8 3-pin		■			■		
	Cable, 5 m[6]				■			
	Connector, M8 4-pin						■	
	Plug, M8 3-pin, with cable, 100 mm[6]							■
Circuit protection[8]	A, B, C	■	■	■	■	■	■	■
Enclosure rating	IP 66/IP 67	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40…60° C)	■	■	■	■	■	■	■
	Storage -40...158° F (-40…70° C)	■	■	■	■	■	■	■
Approximate weight	1.4 oz (40 g)	■	■	■	■	■	■	■
Housing material	Bayblend, PMMA	■	■	■	■	■	■	■

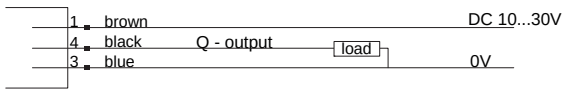
1) Average service life 100,000 h where T_A = 25° C
2) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Do not bend below 0° C
7) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

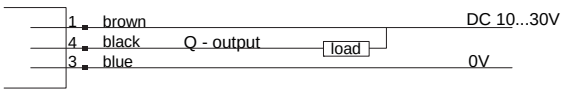
Sender, All Models



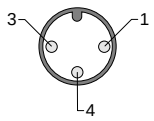
PNP Models

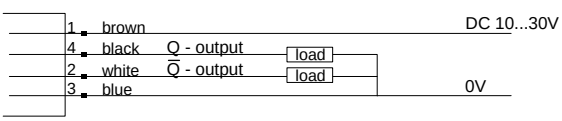


NPN Models



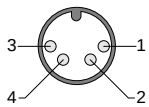
M8 Connector





wire colors refer to standard cable, not included with quick disconnect models

M8 Connector



WSE 4-3

Through-Beam Sensors

0...18.0 ft (0...5.5 m)

sensing range

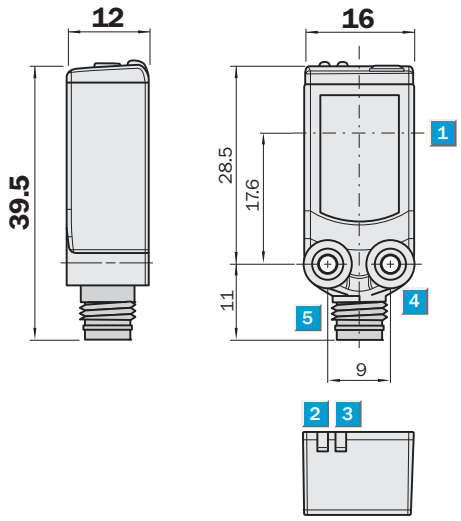
Highlights

- Fast and safe alignment through high visibility light spot
- Fast commissioning. Connect, align, ready.
- Easy assembly in slots and guide rails

WLG 4-3



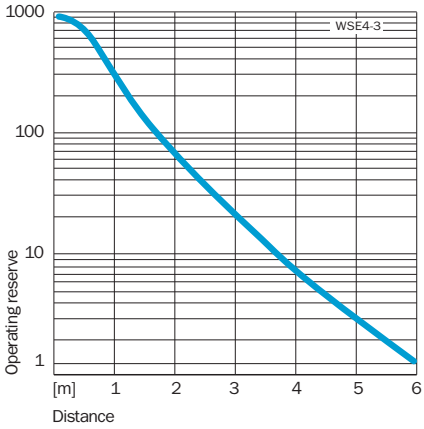
Dimensional drawing

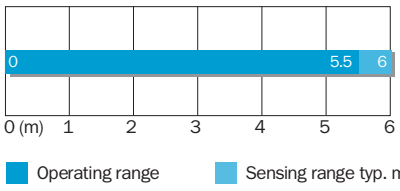


dimensions in mm

1 Center of optical axis
2 LED signal strength indicator orange: status of received light beam
3 LED signal strength indicator green: power on
4 M3 mounting hole
5 Connector

Excess gain





Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WSE4-3E1330	1 028 172
WSE4-3E2130	1 028 175
WSE4-3E3130	1 028 174
WSE4-3F1330	1 028 168
WSE4-3F2130	1 028 171
WSE4-3F3130	1 028 170

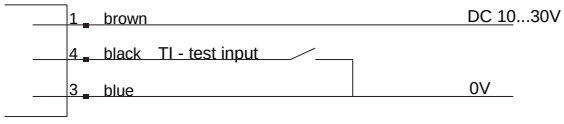
7028071 - © 2008 SICK, Inc.

Technical data	WSE 4-3	E1330	E2130	E3130	F1330	F2130	F3130
Sensing range typ. max	0…18.1 ft (0…5.5 m)	■	■	■	■	■	■
Sensing range, recommended	0…19.7 ft (0…6 m)	■	■	■	■	■	■
Light source[1], light type	Pin-point LED, red light, 650 nm	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■
Ripple[3]	5 V_{SS}	■	■	■	■	■	■
Current consumption, sender	≤ 20 mA	■	■	■	■	■	■
Current consumption, receiver	≤ 20 mA	■	■	■	■	■	■
Switching outputs	NPN, Q	■	■	■			
	PNP, Q				■	■	■
Switching mode	Dark switching	■	■	■	■	■	■
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■
Response time	> 0.5 ms[4]	■	■	■	■	■	■
Switching frequency	1,000 Hz[5]	■	■	■	■	■	■
Connection types	Cable, 2 m[6]	■			■		
	Connector, M8 3-pin		■			■	
	Plug, M8 3-pin, with cable, 100 mm[6]			■			■
Circuit protection[8]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 66/IP 67	■	■	■	■	■	■
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■
Approximate weight	1.4 oz (40 g)	■	■	■	■	■	■
Housing material	Bayblend, PMMA	■	■	■	■	■	■

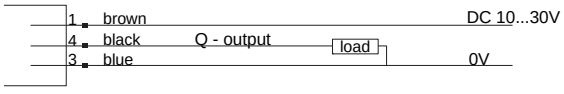
1) Average service life 100,000 h where $T_A = 25°C$
2) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Do not bend below 0°C
7) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

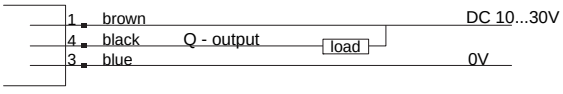
Sender, All Models



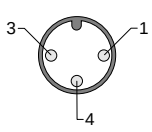
PNP Models



NPN Models



M8 Connector



Wire colors refer to standard cable, not included with quick disconnect models.

WLG4S-3

Reflex/Retro-reflective Sensors - Clear Material Sensors

0...16.4 ft (0...5 m)

sensing range

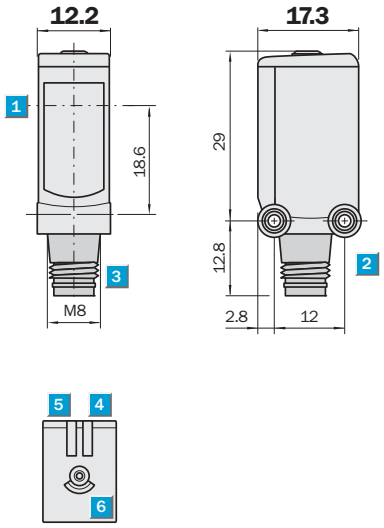
Highlights

- Continuous adaptation of the switching threshold in case of lens contamination
- Stable operation due to temperature compensation
- Small, easily visible, tightly defined light spot
- Quick and easy commissioning through teach-in function
- Detection of glass objects with an attenuation of > 8%

WLG4S-3

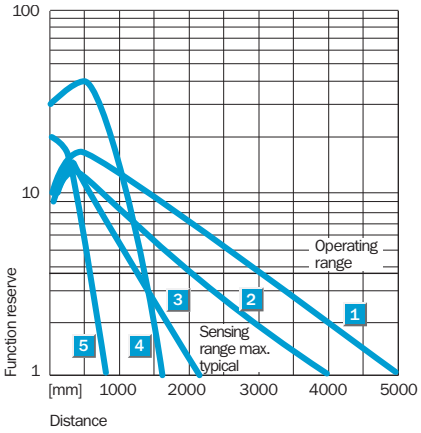


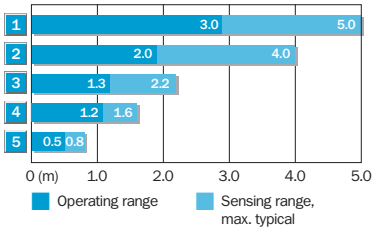
Dimensional drawing



dimensions in mm

Sensing range and operating reserve

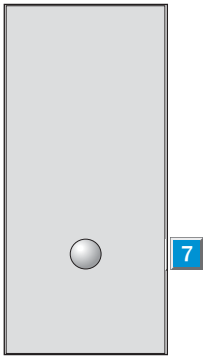




Reflector type		Operating range
1	PL80A	0 ... 3.0 m
2	PL40A	0 ... 2.0 m
3	PL20A	0 ... 1.3 m
4	PL10F	0 ... 1.2 m
5	REF-IRF-56	0 ... 0.5 m

Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 LED signal strength indicator orange: status of received light beam
4 LED signal strength indicator green: power on
5 M3 mounting hole
6 Connector
7 Teach button

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

Type	Part no.
WLG4S-3E1134	1 042 085
WLG4S-3F2234	1 042 084
WLG4S-3V2232	1 042 087
WLG4S-3W1132	1 042 086

Technical data	WLG4S-3-	E1134	F2234	V2232	W1132
Detection of transparent objects	✓				
Attenuation along light beam	> 8%				
Sensing range typ. max	0…16.4 ft (0…5 m)				
Sensing range, recommended	0…9.8 ft (0…3 m)				
Relating to	Reflector PL80A				
Sensitivity adjustment	Teach-in: single teach button				
	Teach-in: single teach button & cable				
Light source[1], light type	Pin-point LED, red light, 650 nm				
Light spot diameter	1.8 in at 4.9 ft (45 mm at 1.5 m)				
Polarization filter	✓				
Supply voltage V_S	10…30 V DC[2]				
Ripple[3]	≤ 5 V_{SS}				
Current consumption[4]	≤ 20 mA				
Switching outputs	NPN, Q				
	PNP, Q				
Switching mode	Dark switching				
Output current I_A max.	≤ 100 mA				
Response time	< 0.5 ms[5]				
Switching frequency	1,000 Hz[6]				
Alarm output	Pre-failure signalling output				
Connection types	Cable, PVC, 2 m[7]				
	Connector, M8 4-pin				
Circuit protection[8]	A, B, C				
Enclosure rating	IP 66/IP 67				
Ambient temperature T_A	Operation -40…140° F (-40…60° C)				
	Storage -40…167° F (-40…75° C)				
Approximate weight	1.1 oz (30 g)				
Housing material	Bayblend, PMMA				

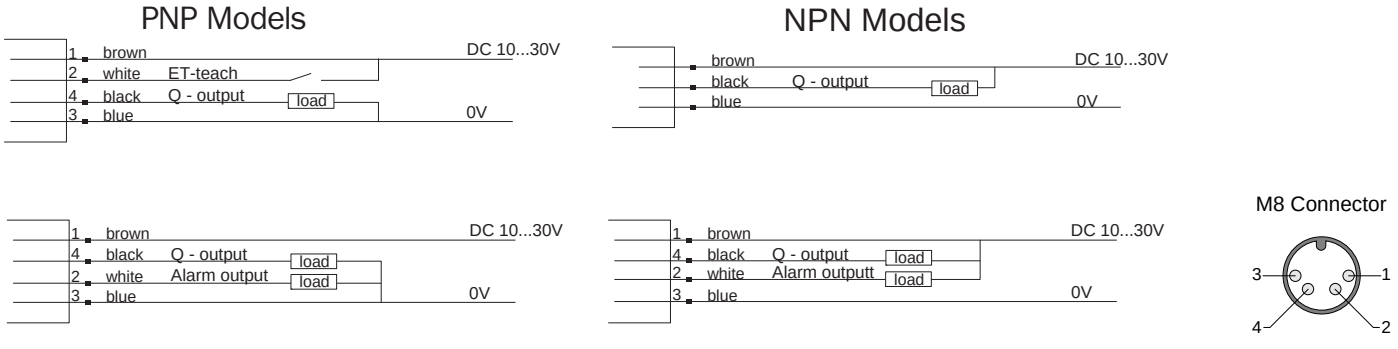
1) Average service life 100,000 h where T_A = 25° C
2) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Teach-in function

Programming via teach-in button
Standard mode (switching threshold adaptation): sensor adjusts the switching threshold to the ambient conditions. Sensor has clear sight of the reflector. No object in the beam path: press teach-in button for > 2 s until yellow LED indicator lights up again. Sensor is ready to operate.

Switch off switching threshold adaptation: sensor works statically with a switching threshold of 50%. Sensor has clear sight of the reflector. No object in the beam path: press teach-in button for > 8 s until yellow LED indicator flashes twice. Sensor is ready to operate.

Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WLG 4-3

Reflex/Retro-reflective Sensors - Clear Material Sensors

0.03...13.1 ft (0.01...4 m)
sensing range

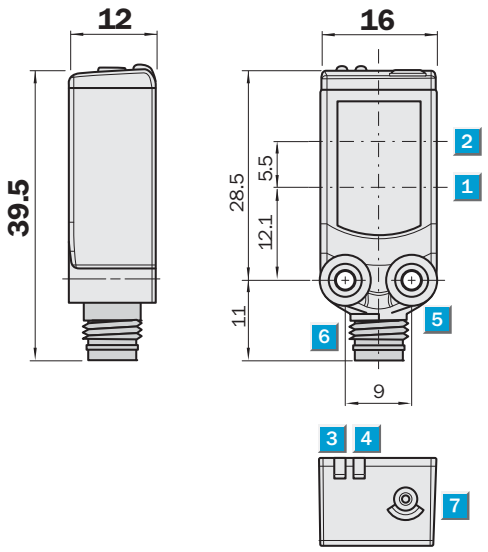
Highlights

- Fast and safe alignment through high visibility light spot
- Detection of glass objects with an attenuation of > 8%
- Sensitivity setting via wire

WLG 4-3

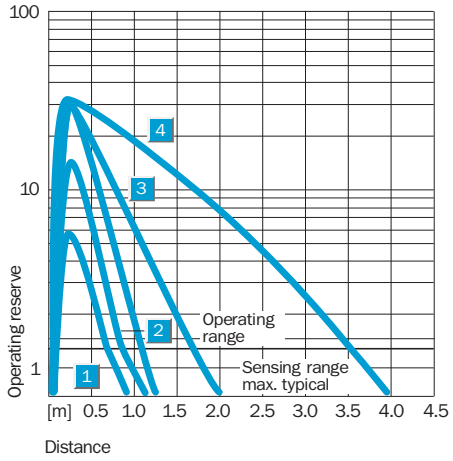


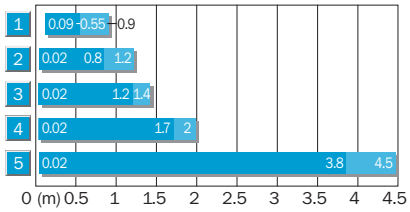
Dimensional drawing



dimensions in mm

Excess gain





	Reflector typ e	Operating range
1	REF-IRF-56	0.09 ... 0.55 m
2	PL10F	0.02 ... 0.8 m
3	PL20A	0.02 ... 1.2 m
4	PL40A	0.02 ... 1.7 m
5	PL80A	0.02 ... 3.8 m

Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 LED signal strength indicator orange: status of received light beam
4 LED signal strength indicator green: power on
5 M3 mounting hole
6 Connector
7 Teach button

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

Type	Part no.
WLG4-3E1134	1 028 133
WLG4-3E1332	1 028 131
WLG4-3E2132	1 028 132
WLG4-3F2132	1 028 127
WLG4-3F2234	1 028 130
WLG4-3F3132	1 028 128
WLG4-3P2132	1 029 567

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Technical data	WLG 4-3-	E1134	E1332	E2132	F2132	F2234	F3132	P2132
Sensing range typ. max	0.03...13.1 ft (0.01...4 m)	■	■	■	■	■	■	■
Sensing range, recommended	2...11.5 ft (0.02...3.5 m)	■	■	■	■	■	■	■
Relating to	Reflector PL80A	■	■	■	■	■	■	■
Sensitivity adjustment	Teach-in: single teach button & cable	■				■		
	Teach-in: single teach button		■	■	■		■	■
Light source[1], light type	Pin-point LED, red light, 650 nm	■	■	■	■	■	■	■
Polarization filter	✓	■	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■	■	■
Ripple[3]	5 V_{SS}	■	■	■	■	■	■	■
Current consumption[4]	≤ 20 mA	■	■	■	■	■	■	■
Switching outputs	NPN, Q	■	■	■				
	PNP, Q				■	■	■	■
Switching mode	Dark switching	■	■	■	■	■	■	
	Light switching							■
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■	■
Response time	< 0.5 ms[5]	■	■	■	■	■	■	■
Switching frequency	1,000 Hz[6]	■	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[7]	■	■					
	Connector, M8 3-pin			■	■			■
	Connector, M8 4-pin					■		
	Plug, M8 3-pin, with cable, PVC, 100 mm[7]						■	
Circuit protection[8]	A, B, C	■	■	■	■	■	■	■
Enclosure rating	IP 66/IP 67	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140°F (-40...60° C)	■	■	■	■	■	■	■
	Storage -40...167°F (-40...75° C)	■	■	■	■	■	■	■
Approximate weight	1.1 oz (30 g)	■	■	■	■	■	■	■
Housing material	Bayblend, PMMA	■	■	■	■	■	■	■

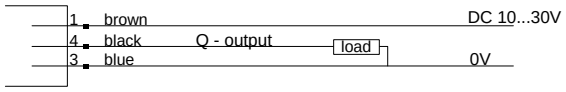
1) Average service life 100,000 h where T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Teach-in function

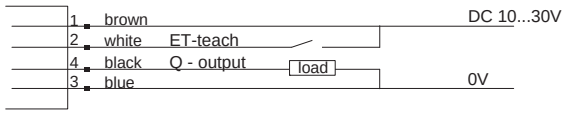
- **Programming via teach-in button**
- **Simple programming:**
  Position object in the beam and push the button, finished: LED confirms the teach-in procedure
- **Teach-in values can be stored.**
- **Two operating modes:**
  Default setting: short teach-in time (< 8 s); for standard applications; approx. double reserve via switching threshold; LED lights continuously.
  Precise setting: long teach-in time (> 8 s); for precise applications; small switching hysteresis; LED blinks.

Connection diagram

PNP Models

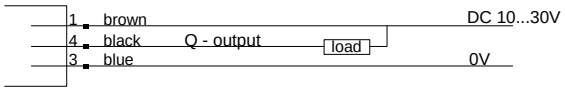


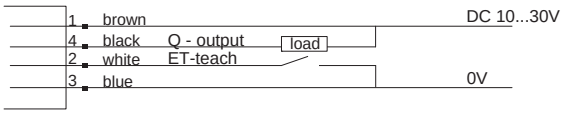
wire colors refer to standard cable, not included with quick disconnect models.



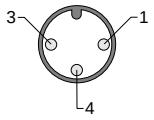
wire colors refer to standard cable, not included with quick disconnect models

NPN Models

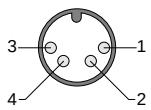




M8 Connector



M8 Connector



WLG 4-3

Reflex/Retro-reflective Sensors - Clear Material Sensors

0.03...5.2 ft (0.01...1.6 m)
sensing range

ECOLAB

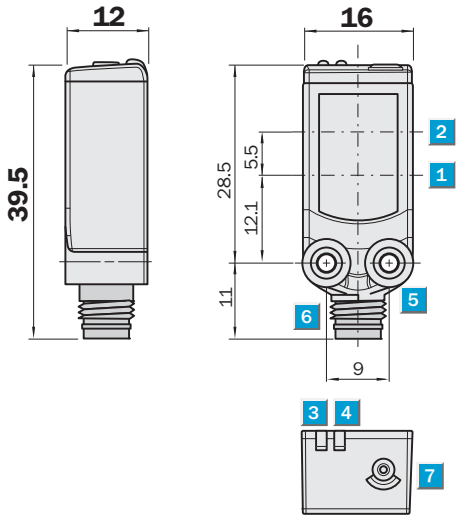
Highlights

- Fast and safe alignment through high visibility light spot
- Detection of PET bottles and foils with an attenuation of > 8%
- Sensitivity setting via wire
- Without polarization filter

WLG 4-3

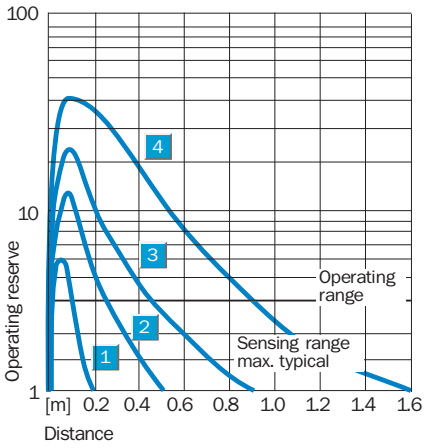


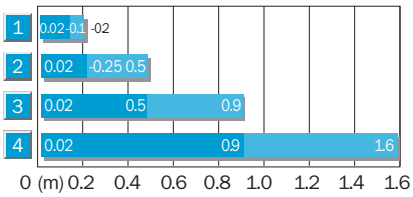
Dimensional drawing



dimensions in mm

Excess gain

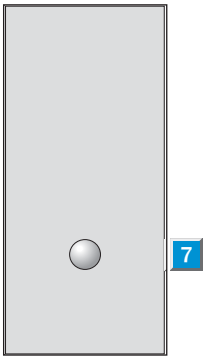




	Reflector typ e	Operating range
1	PL10F	0.02...0.1 m
2	PL20A	0.02 ... 0.25 m
3	PL40A	0.02 ... 0.5 m
4	PL80A	0.02 ... 0.9 m

Adjustments

All types



1. Center of optical axis, sender
2. Center of optical axis, receiver
3. LED signal strength indicator orange: status of received light beam
4. LED signal strength indicator green: power on
5. M3 mounting hole
6. Connector
7. Teach button

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

Type	Part no.
WLG4-3E1184	1 028 140
WLG4-3E1382	1 028 138
WLG4-3F2182	1 028 134
WLG4-3F2284	1 028 137

Technical data	WLG 4-3-	E1184	E1382	F2182	F2284
Sensing range typ. max	0.03…5.2 ft (0.01…1.6 m)	■	■	■	■
Sensing range, recommended	2…3 ft (0.02…0.9 m)	■	■	■	■
Relating to	Reflector PL80A	■	■	■	■
Sensitivity adjustment	Teach-in: single teach button & cable	■			■
	Teach-in: single teach button		■	■	
Light source[1], **light type**	pin-point LED, Red light, 650 nm	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■
Ripple[3]	5 V_{SS}	■	■	■	■
Current consumption[4]	≤ 20 mA	■	■	■	■
Switching outputs	NPN, Q	■	■		
	PNP, Q			■	■
Switching mode	Dark switching	■	■	■	■
Output current I_A max.	≤ 100 mA	■	■	■	■
Response time	< 0.5 ms[5]	■	■	■	■
Switching frequency	1,000 Hz[6]	■	■	■	■
Connection types	Cable, PVC, 2 m[7]	■	■		
	Connector, M8 3-pin			■	
	Connector, M8 4-pin				■
Circuit protection[8]	A, B, C	■	■	■	■
Enclosure rating	IP 66/IP 67	■	■	■	■
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■
Approximate weight	1.1 oz (30 g)	■	■	■	■
Housing material	Bayblend, PMMA	■	■	■	■

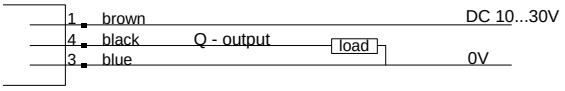
1) Average service life 100,000 h where T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Teach-in function

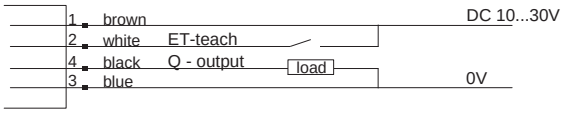
- **Programming via teach-in button**
- **Simple programming:**
  Position object in the beam and push the button, finished: LED confirms the teach-in procedure
- **Teach-in values can be stored.**
- **Two operating modes:**
  Default setting: short teach-in time (< 8 s); for standard applications; approx. double reserve via switching threshold; LED lights continuously.
  Precise setting: long teach-in time (>8 s); for precise applications; small switching hysteresis; LED blinks.

Connection diagram

PNP Models

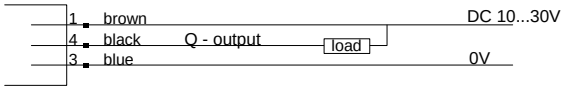


wire colors refer to standard cable, not included with quick disconnect models.

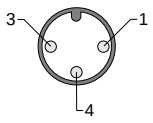


wire colors refer to standard cable, not included with quick disconnect models

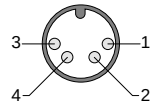
NPN Models



M8 Connector



M8 Connector



WTB 4-3 Teflon®

Proximity/Diffuse Sensors

0.2...4.7 in (4...120 mm)

sensing range

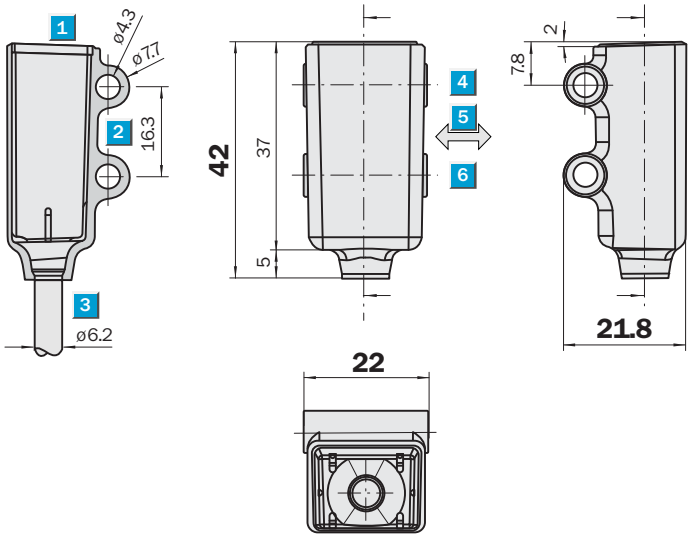
Highlights

- Robust Teflon housing for use in wet and aggresive environments
- Suitable for food applications
- Sensing distance set via teach-in wire

WTB 4-3



Dimensional drawing



dimensions in mm

1 LED signal
2 Mounting hole ø 4.3 mm
3 Cable 5 m, ø 3.4 mm, 2 m Teflon coated, ø 6.2 mm
4 Optical axis, receiver
5 Standard direction of the material being scanned
6 Optical axis, sender

Accessories	page
Mounting systems	1234

Order Information

Type	Part no.
WTB4T-3P1264	1 028 091
WTB4T-3N1264	1 028 092

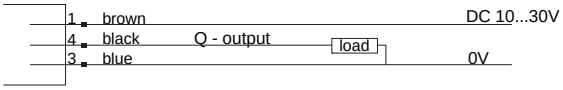
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Technical data	WTB4T-3-	P1264	N1264							
Sensing range, adjustable	0.2...4.7 in (4…120 mm)									
Operating distance	0.6...4.7 in (15...120 mm)									
Adjustment of operating distance	Teach-in: external									
Liglht source[1], light type	Pin-point LED, red light, 650 nm									
Light spot diameter	0.3 in at 2.0 in (7 mm at 50 mm)									
Supply voltage V_S	10…30 V DC[2]									
Ripple[3]	< 5 V_{SS}									
Current consumption[4]	≤ 30 mA									
Switching outputs	PNP, Q									
	NPN, Q									
Switching mode	Light switching									
Output current I_A max.	≤ 100 mA									
Response time	< 0.5 ms[5]									
Switching frequency	1,000 Hz[6]									
Connection types	Cable, PVC, 5 m[7]									
VDE protection class	III									
Circuit protection[8]	A, B, C									
Enclosure rating	IP 68/IP 69K									
Ambient temperature T_A	Operation -40...140° F (-40…60° C)									
	Storage -40...167° F (-40…75° C)									
Approximate weight	1.8 oz (50 g)									
Housing material	PTFE/teflon, PMMA									

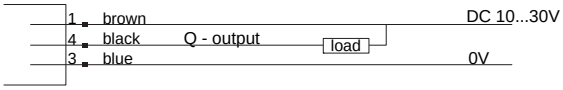
1) Average service life 100,000 h where T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

PNP Models



NPN Models



Wire colors refer to standard cable, not included with quick disconnect models.

WSE 4-3 Teflon®

Through-Beam Sensors

0...9.8 ft (0...3 m)

sensing range

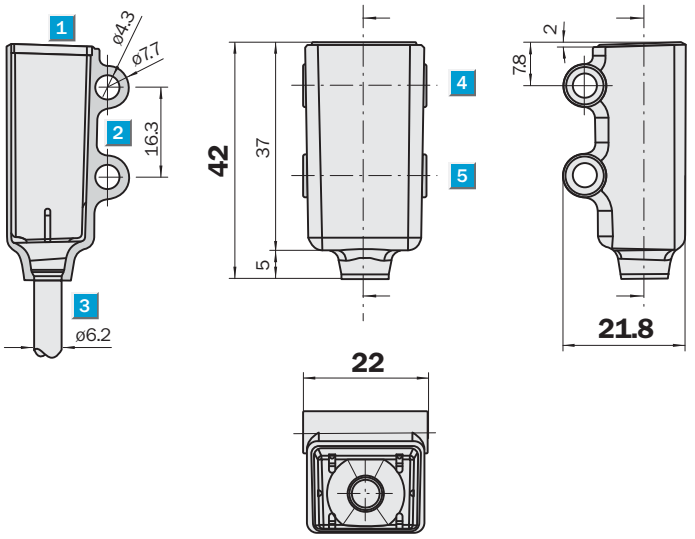
Highlights

- Robust Teflon housing for use in wet and aggresive environments
- Suitable for food applications
- Test input

WSE 4-3 Teflon



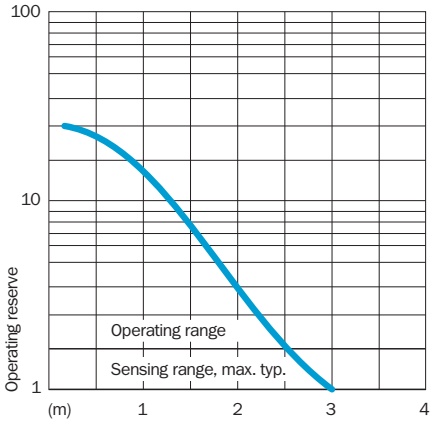
Dimensional drawing

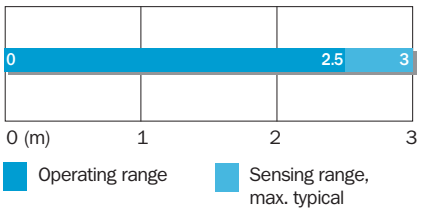


dimensions in mm

1 LED signal
2 Mounting hole ø 4.3 mm
3 Cable 5 m, ø 3.4 mm, 2 m Teflon coated, ø 6.2 mm
4 Optical axis, receiver
5 Optical axis, sender

Excess gain





Accessories	page
Mounting systems	1234

Order information

Type	Part no.
WSE4T-3E1430	1 029 648
WSE4T-3F1430	1 029 647
WSE4T-3P1430	1 029 646

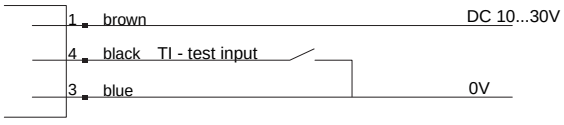
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Technical data	WSE4T-3-	E1430	F1430	P1430						
Sensing range, adjustable	0…9.8 ft (0…3 m)	■	■	■						
Operating distance	0…8.2 in (0…2.5 m)	■	■	■						
Light source[1], light type	Pin-point LED, red light, 650 nm	■	■	■						
Supply voltage V_S	10…30 V DC[2]	■	■	■						
Ripple[3]	≤ 5 V_{SS}	■	■	■						
Current consumption, sender	≤ 20 mA	■	■	■						
Current consumption, receiver	≤ 20 mA	■	■	■						
Switching outputs	NPN, Q	■								
	PNP, Q		■	■						
Switching mode	Dark switching	■	■							
	Light switching			■						
Output current I_A max.	≤ 100 mA	■	■	■						
Response time	> 0.5 ms[4]	■	■	■						
Switching frequency	1,000 Hz[5]	■	■	■						
Connection types	Cable, 5 m[6]	■	■	■						
Circuit protection[7]	A, B, C	■	■	■						
Enclosure rating	IP 68/IP 69K	■	■	■						
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■						
	Storage -40…158° F (-40…70° C)	■	■	■						
Approximate weight	2.1 oz (60 g)	■	■	■						
Housing material	Bayblend, PMMA	■	■	■						

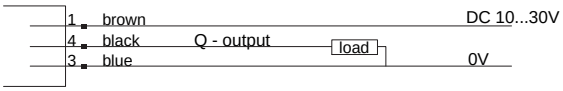
1) Average service life 100,000 h where $T_A = 25°$ C
2) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Do not bend below 0° C
7) A = V_S connections reverse-polarity protected
B = Output Q and $\bar{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

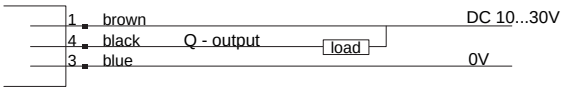
Sender, All Models



PNP Models



NPN Models



Wire colors refer to standard cable, not included with quick disconnect models.

WT 150

Proximity/Diffuse Sensors - Background Suppression



0.08...3.9 in (2...100 mm)
sensing range

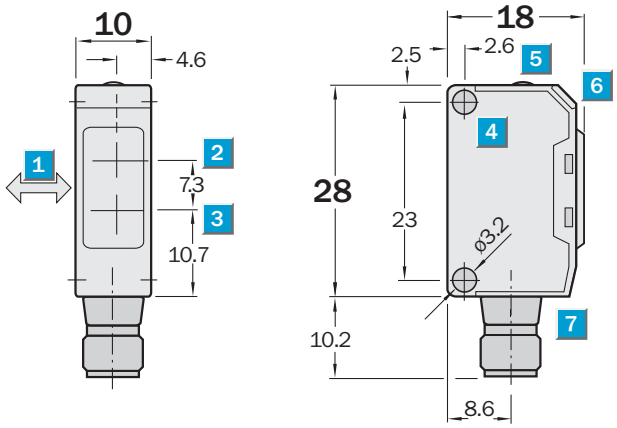
Highlights

- Adjustable background suppression for reliable detection of dark objects, even in front of light backgrounds
- High switching frequency
- Signal strength indicator
- Adjustable sensing range using 5-turn adjustment screw
- Easy mounting with included bracket
- Cable or M8 quick disconnect versions

WT 150

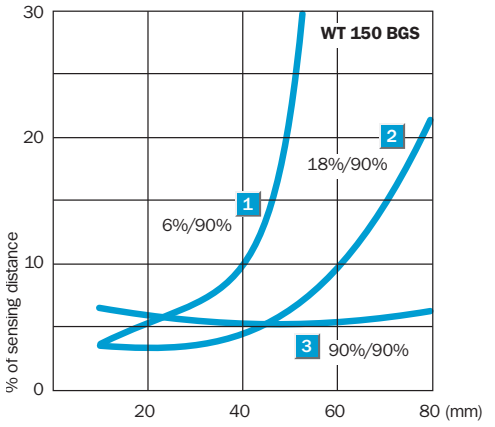


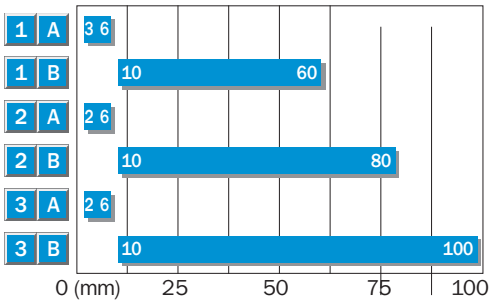
Dimensional drawing



dimensions in mm

Background suppression



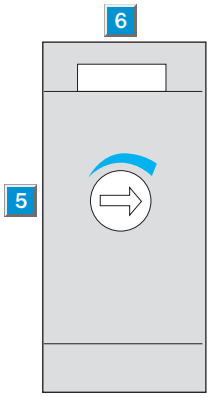


1	Sensing distance on black[12]/white background
2	Sensing distance on gray[12]/white background
3	Sensing distance on white[12]/white background
A	Sensing distance control set to MIN
B	Sensing distance control set to MAX

see footnote 12 on the next page

Adjustments

All types



1	Standard direction of the material being sensed
2	Center of optical axis, receiver
3	Center of optical axis, sender
4	Mounting holes Ø 3.2 mm
5	Sensing range adjustment (5 rev.)
6	LED indicator, red light received ≥ switching threshold
7	M8 4-pin plug or cable

Order information

Type	Part no.
WT 150-P162	6 011 048
WT 150-P460	6 011 050
WT 150-N162	6 011 045
WT 150-N460	6 011 047

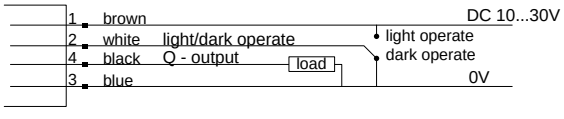
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Technical data	WT 150-	P162	P460	N162	N460
Sensing range, adjustable	0.08…3.9 in (2…100 mm)[1], adjustable	■	■	■	■
Background suppression	0.4…3.9 in (10…100 mm)	■	■	■	■
Background suppression capability	% of set sensing distance (see previous pg)	■	■	■	■
	Potentiometer, 5 revolutions	■	■	■	■
Light source[2], light type	LED, visible red light	■	■	■	■
Light spot diameter	Approx. 0.2 in at 1.6 in (4 mm at 40 mm)	■	■	■	■
Angle of divergence	Approx. 5°	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■
Ripple[4]	± 10%	■	■	■	■
Current consumption[5]	20 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Max. output current I_A	100 mA	■	■	■	■
Switching mode[6]	Light or dark switching selectable via control wire L/D	■	■	■	■
	+ V_S = light switching	■	■	■	■
	0 V = dark switching	■	■	■	■
Response time[7]	0.5 ms	■	■	■	■
Max. switching frequency[8]	1000 Hz	■	■	■	■
Connection types	Cable, PVC, 2 m[9]; 4 x 0.18 mm², Ø 3.5 mm	■		■	
	Plug, M8 4-pin		■		■
VDE protection class[10]	⧈	■	■	■	■
Circuit protection[11]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13...131°F (-25...55°C)	■	■	■	■
	Storage -40...167°F (-40…75°C)	■	■	■	■
Approximate weight	1.6 oz (44 g)	■		■	
	0.3 oz (7 g)		■		■
Housing material	Glass fiber reinforced ABS	■	■	■	■

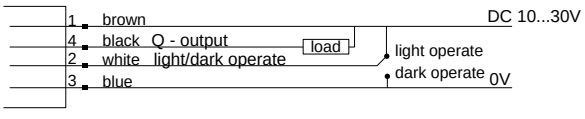
1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h where T_A = 25°C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Control cable open:
NPN: light-switching
PNP: dark-switching
7) Signal transit time with resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0°C
10) Reference voltage 50 V DC
11) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected
12) Black = 6% remission
Gray = 18% remission
White = 90% remission

Connection diagram

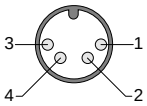
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WT 150

Proximity/Diffuse Sensors - Energetic



0.4...9.8 in (10...250 mm)
sensing range

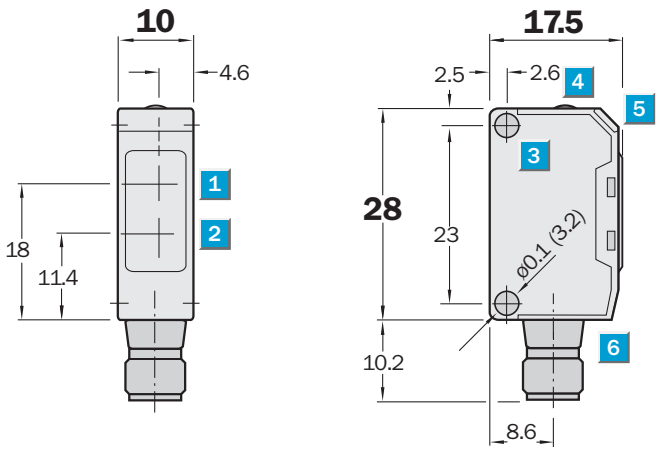
Highlights

- Rugged plastic housing
- Signal strength indicator
- Switching point adjustable with sensitivity potentiometer
- Red light for easy alignment
- Easy mounting with included bracket
- Cable or M8 quick disconnect versions

WT 150

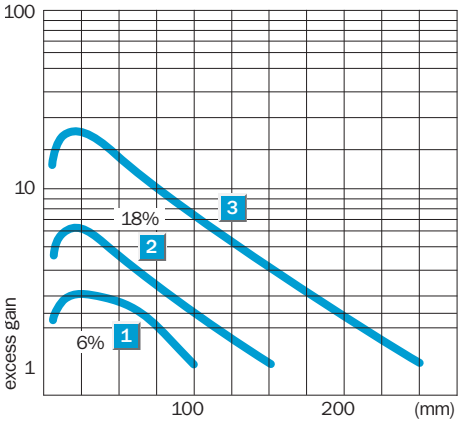


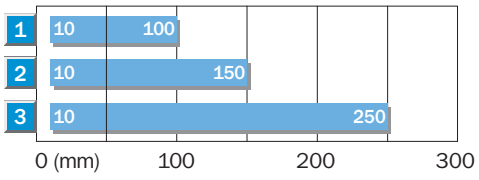
Dimensional drawing



dimensions in mm

Excess gain

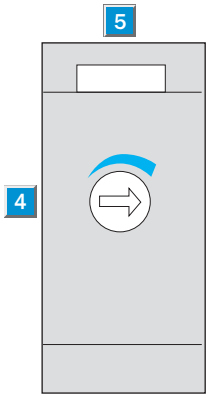




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Center of optical axis, receiver
2	Center of optical axis, sender
3	Mounting holes Ø 3.2 mm
4	Sensitivity adjustment 270°
5	LED signal strength indicator Light received ≥ switching threshold
6	M8 plug

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WT 150-P132	6 011 042
WT 150-N132	6 011 044
WT 150-P430	6 011 039
WT 150-N430	6 011 041

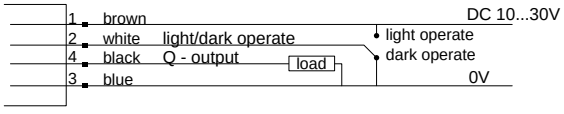
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Technical data	WT 150-	P132	P430	N132	N430
Sensing range	0.4…9.8 in (10…250 mm)[1]	■	■	■	■
Sensitivity, adjustable	Potentiometer, 270°	■	■	■	■
Light source[2], light type	LED, red light	■	■	■	■
Light spot diameter	Approx. 0.8 in at 7.9 in (20 mm at 200 mm)	■	■	■	■
Angle of divergence	Approx. 6°	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■
Ripple[4]	± 10%	■	■	■	■
Current consumption[5]	≤ 20 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Max. output current I_A	100 mA	■	■	■	■
Operation mode[6]	Light/dark switching via control wire	■	■	■	■
	+ V_S = light switching				
	0 V = dark switching	■	■	■	■
Response time[7]	≤ 0.5 ms	■	■	■	■
Max. switching frequency[8]	1000 Hz	■	■	■	■
Connection types	Cable, PVC, 2 m[9]; 4 x 0.18 mm², Ø 3.5 mm	■		■	
	Plug, M8 4-pin		■		■
VDE protection class[10]	□	■	■	■	■
Circuit protection[11]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■
Approximate weight	1.6 oz (44 g)	■		■	
	0.3 oz (7 g)		■		■
Housing material	Glass fiber reinforced ABS	■	■	■	■

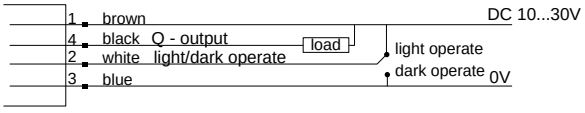
1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h where T_A = 25°C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Control cable open:
NPN: light-switching
PNP: dark-switching
7) Signal transit time with resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0°C
10) Reference voltage 50 V DC
11) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

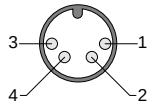
PNP Models



NPN Models



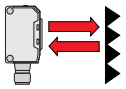
M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WL 150

Reflex/Retro-Reflective Sensors






0.02...7.9 ft (0.005...2.4 m)
sensing range

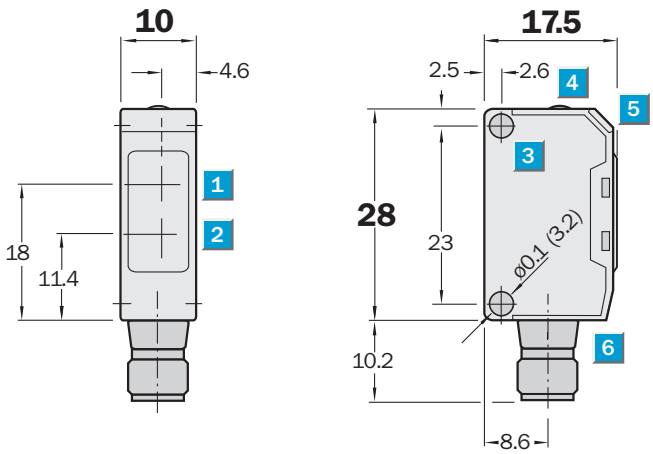
Highlights

- Rugged plastic housing
- Polarizing filter prevents false readings on reflective surfaces
- Also suitable for diamond grade reflective tape
- Sensitivity adjustment
- Red light for easy alignment
- Signal strength indicator
- Cable or M8 quick disconnect versions

WL 150

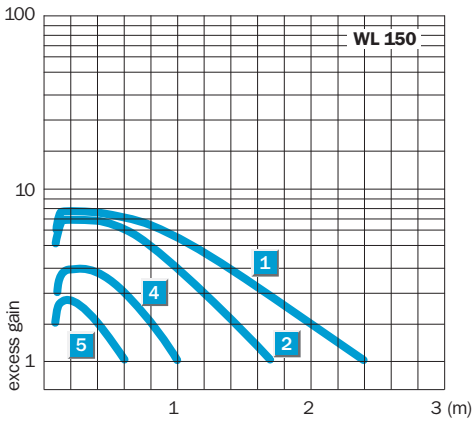


Dimensional drawing



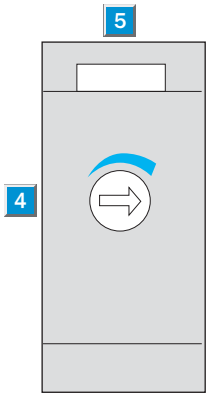
dimensions in mm

Excess gain



Adjustments

All types



1 Center of optical axis, receiver
2 Center of optical axis, sender
3 Mounting hole Ø 3.2 mm
4 Sensitivity adjustment 270°
5 LED indicator, red:
Light received ≥ switching threshold
6 Plug, M8 4-pin or cable

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Reflector type		Sensing range
1	PL 80 A	0.01…2.4 m
2	P 250	0.01…1.7 m
3	PL 50 A or PL 40 A	0.01…1.7 m
4	PL 30 A or PL 31 A	0.01…1.5 m
5	PL 20 A	0.01…1.0 m
6	Reflect. tape diamond grade	0.01…0.6 m

Order information

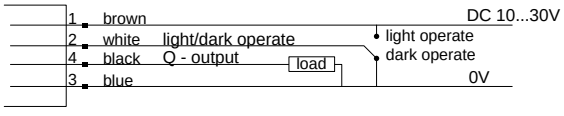
Type	Part no.
WL 150-P132	6 011 036
WL 150-P430	6 011 038
WL 150-N132	6 011 033
WL 150-N430	6 011 035

Technical data	WL 150-	P132	P430	N132	N430
Sensing range	00.02…3.3 ft (0.005…1.0 m)/PL 20 A (included)	■	■	■	■
	00.02…7.9 ft (0.005…2.4 m)/PL 80 A	■	■	■	■
Sensitivity, adjustable	Potentiometer 270°	■	■	■	■
Light source[1], light type	LED, visible red light, polarized	■	■	■	■
Light spot diameter	Approx. 5.9 in at 4.9 ft (150 mm at 1.5 m)	■	■	■	■
Angle of divergence	Approx. 6°	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■
Ripple[3]	± 10%	■	■	■	■
Current consumption[4]	≤ 20 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Max. output current I_A	100 mA	■	■	■	■
Operation mode[5]	Light/dark switching via control wire L/D	■	■	■	■
	+ V_S = light switching	■	■	■	■
	0 V = dark switching	■	■	■	■
Response time[6]	≤ 0.5 ms	■	■	■	■
Max. switching frequency[7]	1000 Hz	■	■	■	■
Connection types	Cable, PVC, 2 m[8]; 4 x 0.18 mm², Ø 3.5 mm	■		■	
	Plug, M8 4-pin		■		■
VDE protection class[9]	□	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■
Approximate weight	1.6 oz (44 g)	■		■	
	0.3 oz (7 g)		■		■
Housing material	Glass fiber reinforced ABS	■	■	■	■

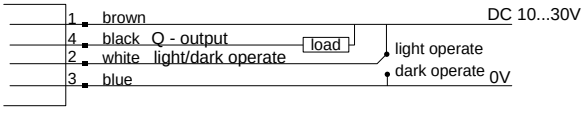
1) Average service life 100,000 h where T_A = 25°C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Control cable open:
NPN: light-switching
PNP: dark-switching
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0°C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

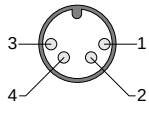
PNP Models



NPN Models



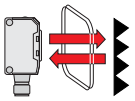
M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WL 150

Clear Material Sensors






0.3...2.2 ft (0.01...0.7 m)
sensing range

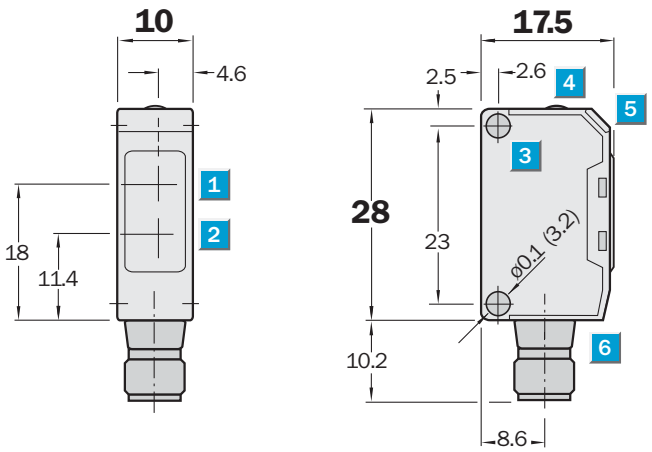
Highlights

- Rugged plastic housing
- Signal strength indicator
- Sensitivity adjustment
- Ideal for detecting glass, transparent films or small parts
- Cable or M8 quick disconnect versions available

WL 150

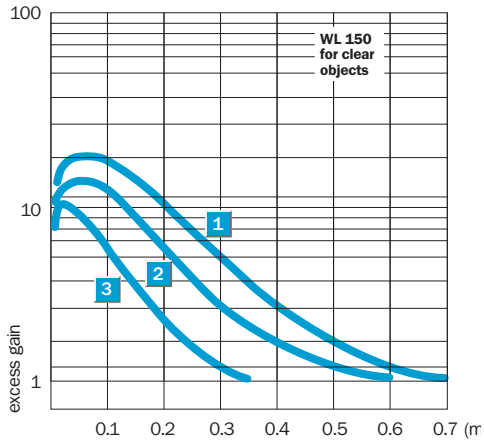


Dimensional drawing



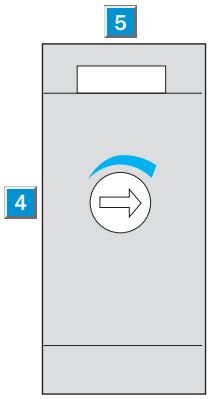
dimensions in mm

Excess gain



Adjustments

All types



1	Center of optical axis, receiver
2	Center of optical axis, sender
3	Mounting hole Ø 3.2 mm
4	Sensitivity adjustment 270°
5	LED indicator, red
6	M8 plug or cable

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Reflector type		Sensing range
1	PL 80 A	0.01...0.7 m
2	P 250	0.01...0.6 m
3	PL 20 A	0.01...0.35 m

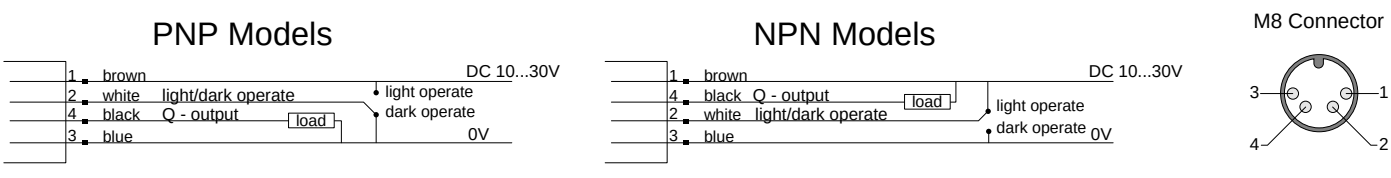
Order information	
Type	**Part no.**
WL 150-P122	6 020 686
WL 150-P420	6 020 688
WL 150-N122	6 020 683
WL 150-N420	6 020 685

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Technical data		WL 150-	P122	P420	N122	N420
Detection of transparent objects			■	■	■	■
Attenuation along light beam	min. 20%		■	■	■	■
Attenuation difference along light beam	min. 15%		■	■	■	■
Attenuation difference of object	min. 7.5%		■	■	■	■
Sensitivity, adjustable	Potentiometer, 270°		■	■	■	■
Sensing range	0.3...1.1 ft (0.01...0.35 m)/PL 20 A (included)		■	■	■	■
	0.3...2.2 ft (0.01...0.7 m)/PL 80 A		■	■	■	■
	Reflective tape: not suitable					
Light source[1], **light type**	LED, red light, polarized		■	■	■	■
Light spot diameter	Approx. 1.6 in at 11.8 ft (40 mm at 300 mm)		■	■	■	■
Angle of divergence	Approx. 7.5°		■	■	■	■
Supply voltage V_S	10…30 V DC[2]		■	■	■	■
Ripple[3]	± 10%		■	■	■	■
Current consumption[4]	≤ 30 mA		■	■	■	■
Switching outputs	PNP, open collector: Q		■	■		
	NPN, open collector: Q				■	■
Max. output current I_A	100 mA		■	■	■	■
Operation mode[5]	Light/dark switching via control wire		■	■	■	■
	+ V_S = light switching		■	■	■	■
	0 V = dark switching		■	■	■	■
Response time[6]	≤ 0.5 ms		■	■	■	■
Max. switching frequency[7]	1000 Hz		■	■	■	■
Connection types	Cable, PVC, 2 m[8]; 4 x 0.18 mm², Ø 3.5 mm		■		■	
	Plug, M8 4-pin			■		■
VDE protection class[9]	⊡		■	■	■	■
Circuit protection[10]	A, B, C, D		■	■	■	■
Enclosure rating	IP 67/NEMA 6		■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)		■	■	■	■
	Storage -40...167° F (-40...75° C)		■		■	
Approximate weight	1.6 oz (44 g)			■		■
	0.3 oz (7 g)		■		■	
Housing material	Glass fiber reinforced ABS		■	■	■	■

1) Average service life 100,000 h at T_A = 25°C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Control cable open:
NPN: light-switching
PNP: dark-switching
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0°C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference impulse suppression
D = Outputs overcurrent and short-circuit protected

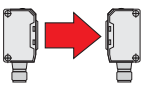
Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WS/WE 150

Through-beam Sensors






0...14.4 ft (0...4.4 m)
sensing range

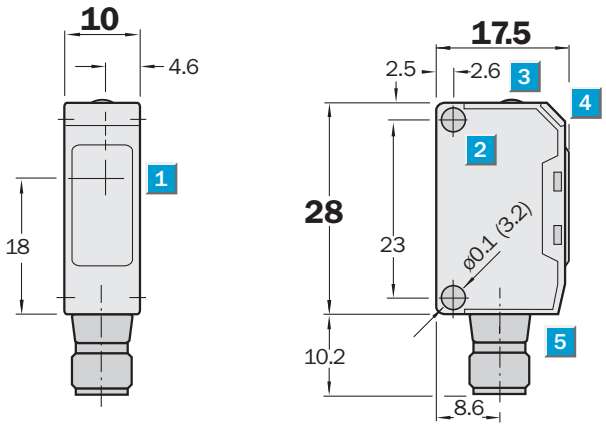
Highlights

- Rugged plastic housing
- Sensitivity adjustment
- Signal strength indicator
- Red light for easy alignment
- Cable or M8 quick disconnect versions
- Easy mounting with included bracket
- Optional slotted masks available

WS/WE 150

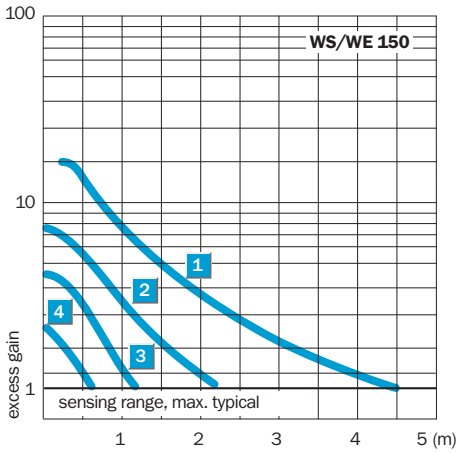


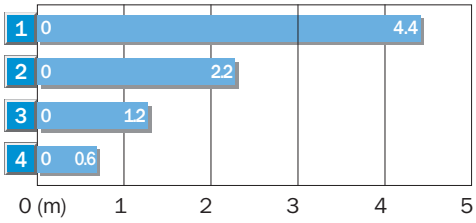
Dimensional drawing



dimensions in mm

Excess gain



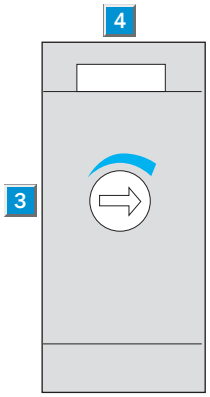


Reduction in sensing range with slotted masks

1	Without slotted mask
2	Mask aperture width 2.0 mm
3	Mask aperture width 1.0 mm
4	Mask aperture width 0.5 mm

Adjustments

All types



1 Center of optical axis, sender (WS)
Center of optical axis, receiver (WE)
2 Mounting holes Ø 3.2 mm
3 Sensitivity adjustment 270° (WE only)
4 LED indicator, red (WE only)
5 M8 plug or cable

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

Order information

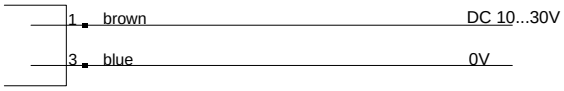
Type	Part no.[11]
WS/WE 150-P132	6 011 030
WS/WE 150-P430	6 011 032
WS/WE 150-N132	6 011 027
WS/WE 150-N430	6 011 029

Technical data		WS/WE 150-	P132	P430	N132	N430
Sensing range		0...14.4 ft (0...4.4 m)	■	■	■	■
Operating range with mask,						
Aperture width 0.08 in (2.0 mm)		6.6 ft (2.0 m)	■	■	■	■
Aperture width 0.04 in (1.0 mm)		3.3 ft (1.0 m)	■	■	■	■
Aperture width 0.02 in (0.5 mm)		1.6 ft (0.5 m)	■	■	■	■
Sensitivity, adjustable		Potentiometer, 270°	■	■	■	■
Light source[1], light type		LED, red light	■	■	■	■
Light spot diameter		Approx. 15.7 in at 13.1 ft (400 mm at 4 mm)	■	■	■	■
Angle of divergence		Approx. 6°	■	■	■	■
Angle of reception		Approx. 15°	■	■	■	■
Supply voltage V_A		10...30 V DC[2]	■	■	■	■
Ripple[3]		± 10%	■	■	■	■
Current consumption[4]	sender	≤ 15 mA	■	■	■	■
	receiver	≤ 20 mA	■	■	■	■
Switching outputs		PNP, open collector: Q	■	■		
		NPN, open collector: Q			■	■
Max. output current I_A		100 mA	■	■	■	■
Operation mode[5]		Light/dark switching via control wire	■	■	■	■
		+ V_S = light switching	■	■	■	■
		0 V = dark switching	■	■	■	■
Response time[6]		≤ 0.5 ms	■	■	■	■
Max. switching frequency[7]		1000 Hz	■	■	■	■
Connection types		Cable, PVC, 2 m[8]	■		■	
		Sender WS, 2 x 0.18 mm², Ø 3.5 mm	■		■	
		Receiver WE, 4 x 0.18 mm², Ø 3.5 mm	■		■	
		Plug, M8 4-pin		■		■
VDE protection class[9]		⧈	■	■	■	■
Circuit protection[10]						
	sender	A, B	■	■	■	■
	receiver	A, B, C, D	■	■	■	■
Enclosure rating		IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A		Operation -13...131° F (-25...55° C)	■	■	■	■
		Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight		Sender: 1.6 oz (44 g), receiver: 1.6 oz (44 g)	■		■	
		Sender: 0.3 oz (7 g), receiver: 0.3 oz (7 g)		■		■
Housing material		Glass fiber reinforced ABS	■	■	■	■

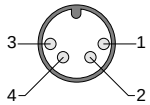
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Control cable open:
NPN: light-switching
PNP: dark-switching
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference impulse suppression
D = Outputs overcurrent and short-circuit protected
11) Part no. includes both sender and receiver

Connection diagram

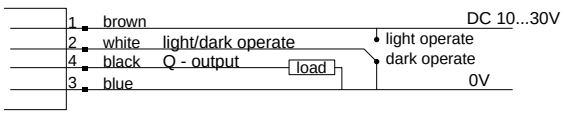
Sender



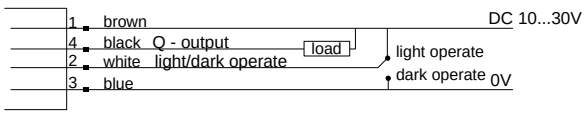
M8 Connector



Receiver, PNP Models



Receiver, NPN Models



wire colors refer to standard cable, not included with quick disconnect models

WT 9-2

Proximity/Diffuse Sensors - Fixed Focus



0.4...0.8 in (10...20 mm)
sensing range

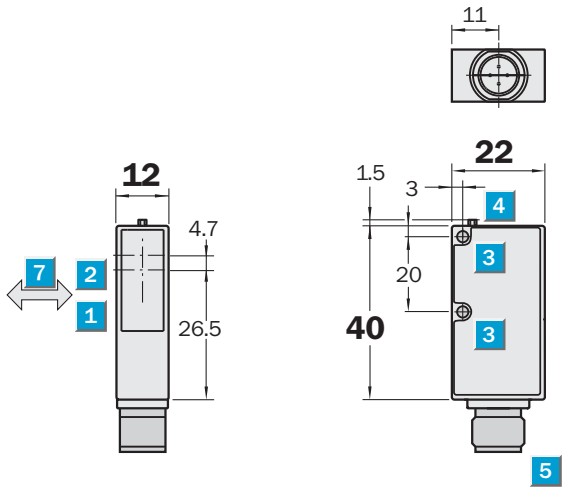
Highlights

- Rugged plastic housing
- Red light for easy alignment
- Adjustable sensing range
- Short-circuit protected outputs
- Small, compact housing
- Sensitivity adjustment using the teach-in procedure
- Cable, M8 or M12 quick disconnect versions

WT 9-2

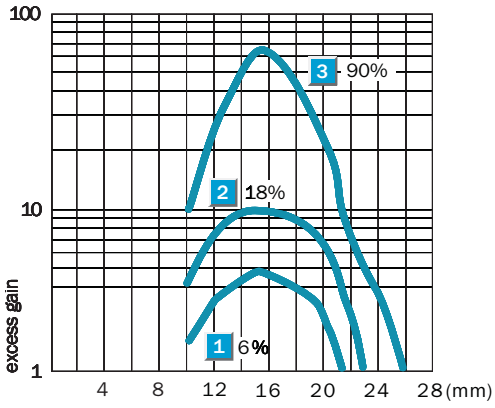


Dimensional drawing



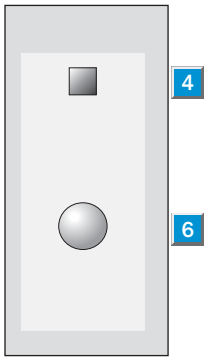
dimensions in mm

Excess gain



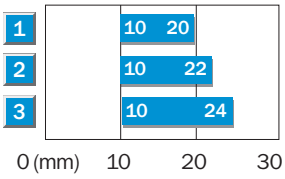
Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 Mounting hole Ø 3.2 mm
4 LED signal strength indicator
5 Plug, M12 or M8, 4-pin,
Cable, 2 m or
Cable, 120 mm with plug, M12 4-pin
6 Teach-in button
7 Standard direction of material being sensed

Accessories	page
Cables and connectors	1180
Mounting systems	1234



1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Order information

Type	Part no.
WT 9-2P141	1 018 301
WT 9-2P441	1 018 303
WT 9-2N141	1 018 302
WT 9-2N441	1 018 304
WT 9-2P341	1 019 274
WT 9-2P641	1 019 275

Technical data	WT 9-2-	P141	P441	N141	N441	P341	P641
Sensing range[1]	0.4...0.8 in (10...20 mm)	■	■	■	■	■	■
Supply voltage V_S[2]	10...30 V DC	■	■	■	■	■	■
Ripple[3]	≤ 5 V_{PP}	■	■	■	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■	■	■	■
Light source	LED, visible red light[5]	■	■	■	■	■	■
Light spot size	0.1 in at 19.7 in (3 mm at 20 mm)	■	■	■	■	■	■
Switching outputs Q and $\overline{Q}$	PNP	■	■			■	■
	NPN			■	■		
Signal voltage HIGH	V_S – 2.9 V	■	■			■	■
	V_S			■	■		
Signal voltage LOW[6]	Approx. 0 V	■	■			■	■
	≤ 2.9 V			■	■		
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■
Response time[7]	≤ 625 µs	■	■	■	■	■	■
Switching frequency max.[8]	800 Hz	■	■	■	■	■	■
Connection types	Cable, 2 m	■		■			
	Plug, M12 4-pin, with cable, 120 mm						■
	Plug, M12 4-pin		■		■		
	Plug, M8 4-pin					■	
VDE protection class[9]	⧈	■	■	■	■		■
	⧫					■	
Enclosure rating	IP 67	■	■	■	■	■	■
Circuit protection[10]	A, B, C	■	■	■	■	■	■
Ambient temperature T_A[11]	Operation -40...140° F (-40...60° C)	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■
Approximate weight	2.8 oz (80 g)	■		■			■
	0.7 oz (20 g)		■		■	■	
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■

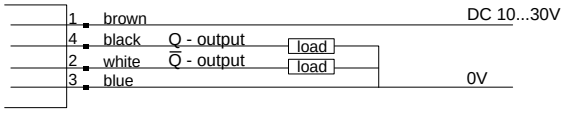
1) Object with 90% remission (referred to standard white DIN 5033)
2) Limit values
3) Must be within V_S tolerances
4) Without load
5) Average service life at room temperature 50,000 h at T_A = 25° C
6) At T_A = 25° C and 100 mA output current
7) With resistive load
8) With light/dark ratio 1:1
9) Reference voltage 50 V
10) A = supply connections reverse-polarity protected
B = outputs short-circuit protected
C = interference suppression
11) Do not bend below 0°C

Teach-in function

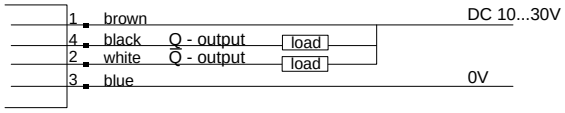
- **Programming via teach-in button.**
- **Simple programming:**
  Position object in the beam and push the button:
  finished;
  LED confirms the teach-in procedure.
- **Teach-in values can be stored.**
- **Two operating modes:**
  Default setting: short teach-in time (< 8 s);
  for standard applications;
  approx. double reserve via switching threshold;
  LED lights continuously.
  Precise setting: long teach-in time (> 8 s);
  for precise applications;
  small switching hysteresis;
  LED blinks.

Connection diagram

PNP Models

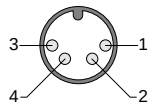


NPN Models

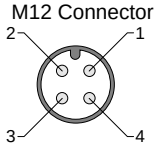


wire colors refer to standard cable, not included with quick disconnect models

M8 Connector



M12 Connector



WT 9-2

Proximity/Diffuse Sensors - Background Suppression



0.2...9.8 in (5...250 mm)
sensing range

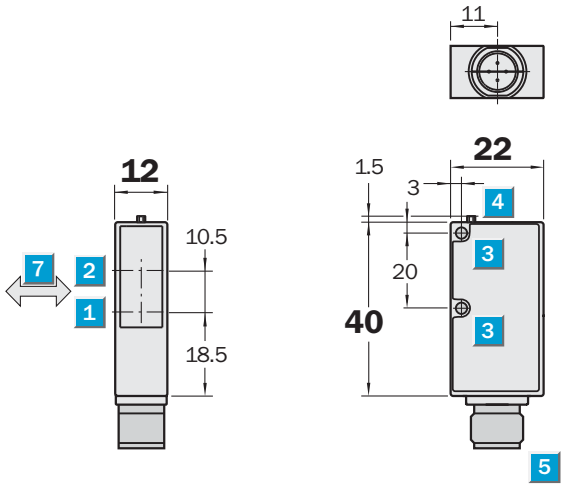
Highlights

- Rugged plastic housing
- Red light for easy alignment
- Adjustable background suppression
- Adjustable sensing range
- Small, compact housing
- Cable, M8 or M12 quick disconnect versions
- Short-circuit protected outputs

WT 9-2

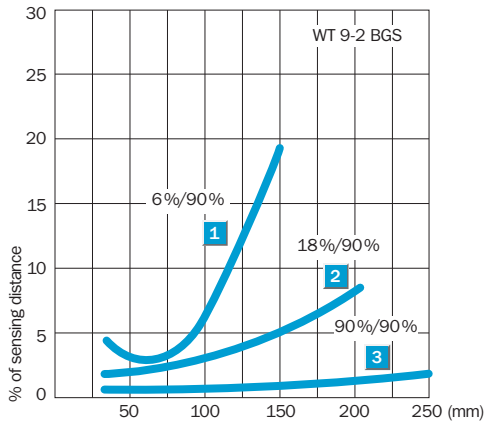


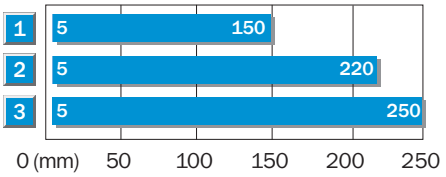
Dimensional drawing



dimensions in mm

Background suppression

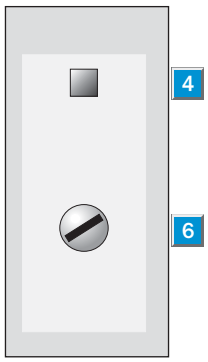




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Center of optical axis, sender
2	Center of optical axis, receiver
3	Mounting hole Ø 3.2 mm
4	LED signal strength indicator
5	Plug, M12 or M8 4-pin, Cable, 2 m or Plug, M12, 4-pin with cable, 120 mm
6	Sensing range adjustment
7	Standard direction of the material to be sensed

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

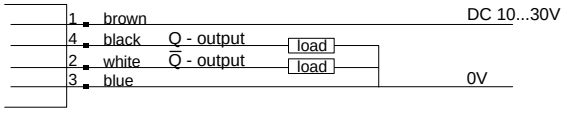
Type	Part no.
WT 9-2P130	1 018 293
WT 9-2P330	1 019 026
WT 9-2P430	1 018 295
WT 9-2P630	1 019 272
WT 9-2N130	1 018 294
WT 9-2N430	1 018 296

Technical data	WT 9-2-	P130	P330	P430	P630	N130	N430
Sensing range, adjustable[1]	0.2...9.8 in (5...250 mm)	■	■	■	■	■	■
Background suppression	1.2...9.8 in (30...250 mm)	■	■	■	■	■	■
Background suppression capability	% of set sensing distance (see previous pg)	■	■	■	■	■	■
Supply voltage V_S[2]	10...30 V DC	■	■	■	■	■	■
Ripple[3]	≤ 5 V_{PP}	■	■	■	■	■	■
Current consumption[4]	≤ 40 mA	■	■	■	■	■	■
Light source	LED, visible red light[5]	■	■	■	■	■	■
Light spot size	0.6 x 0.6 in at 7.9 in (15 x 15 mm at 200 mm)	■	■	■	■	■	■
Switching outputs Q and $\overline{Q}$	PNP	■	■	■	■		
	NPN					■	■
Signal voltage HIGH	V_S – 2.9 V	■	■	■	■		
	V_S					■	■
Signal voltage LOW[6]	Approx. 0 V	■	■	■	■		
	≤ 1.5 V					■	■
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■
Response time[7]	≤ 333 µs	■	■	■	■	■	■
Switching frequency max.[8]	1.5 kHz	■	■	■	■	■	■
Connection types	Cable, 2 m	■				■	
	Plug, M12 4-pin with cable, 120 mm				■		
	Plug, M12 4-pin			■			■
	Plug, M8 4-pin		■				
VDE protection class[9]	⧈	■		■	■	■	■
	⧫		■				
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Circuit protection[10]	A, B, C	■	■	■	■	■	■
Ambient temperature T_A[11]	Operation -40...140° F (-40...60° C)	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■
Approximate weight	2.8 oz (80 g)	■	■	■	■	■	■
	1.4 oz (20 g)	■	■	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■

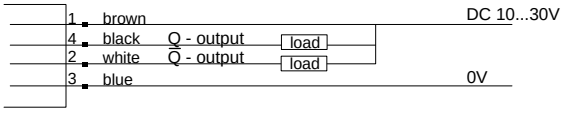
1) Object with 90% remission (referred to standard white DIN 5033)
2) Limit values
3) Must be within V_S tolerances
4) Without load
5) Average service life at room temperature 100,000 h at T_A = 25° C
6) At T_A = 25° C and 100 mA output current
7) With resistive load
8) With light/dark ratio 1:1
9) Reference voltage 50 V
10) A = supply connections reverse polarity protected
B = outputs short-circuit protected
C = interference suppression
11) Do not bend below 0° C

Connection diagram

PNP Models

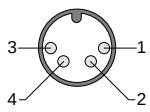


NPN Models

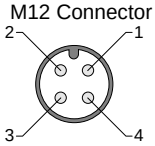


wire colors refer to standard cable, not included with quick disconnect models

M8 Connector



M12 Connector



WT 9-2

Proximity/Diffuse Sensors - Energetic



0.4...17.7 in (10...450 mm)
sensing range

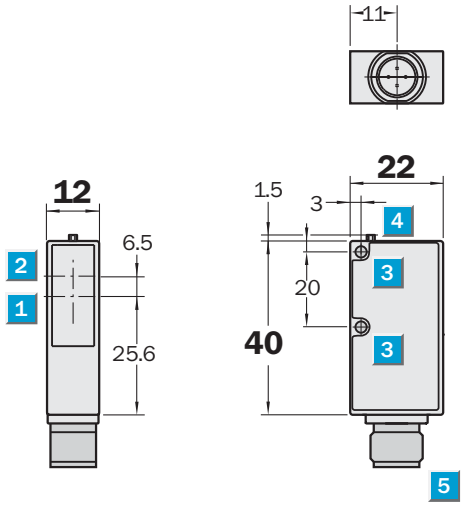
Highlights

- Rugged plastic housing
- Red light for easy alignment
- Short-circuit outputs and over current protected
- Energetic proximity sensor with teach-in feature
- Two teach-in modes for easy detection of any target
- Cable or quick disconnect versions available

WT 9-2

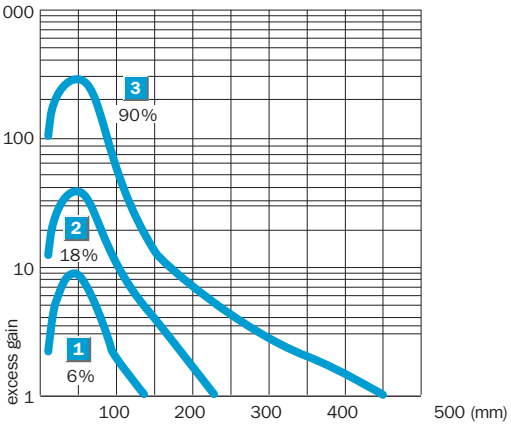


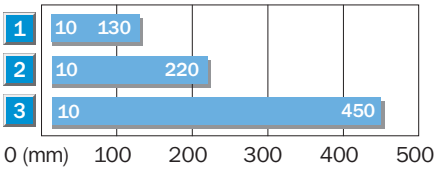
Dimensional drawing



dimensions in mm

Excess gain

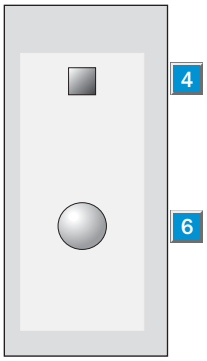




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Center of optical axis, receiver
2	Center of optical axis, sender
3	Mounting hole Ø 3.2 mm
4	LED signal strength indicator
5	Plug, M12 or M 8, 4-pin, 2 m connection cable or 120 mm cable with plug, M12, 4-pin
6	Sensing range adjustment with teach-in

Order information

Type	Part no.
WT 9-2-P151	1 018 297
WT 9-2-P351	1 019 027
WT 9-2-P451	1 018 299
WT 9-2-P651	1 019 273
WT 9-2-N151	1 018 298
WT 9-2-N451	1 018 300

Accessories	page
Cables and connectors	1180
Mounting systems	1234

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Technical data	WT 9-2-	P151	P351	P451	P651	N151	N451
Sensing range, adjustable[1]	0.4...17.7 in (10...450 mm)	■	■	■	■	■	■
Supply voltage V_S[2]	10...30 V DC	■	■	■	■	■	■
Ripple[3]	≤ 5 V_{PP}	■	■	■	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■	■	■	■
Light source	LED, visible red light[5]	■	■	■	■	■	■
Light spot size	3.1 x 3.1 in at 19.7 in (80 x 80 mm at 500 mm)	■	■	■	■	■	■
Switching outputs Q and $\overline{Q}$	PNP	■	■	■	■		
	NPN					■	■
Signal voltage HIGH	V_S – 2.9 V	■	■	■	■		
	V_S					■	■
Signal voltage LOW[6]	Approx. 0 V	■	■	■	■		
	≤ 2.9 V					■	■
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■
Response time[7]	≤ 625 µs	■	■	■	■	■	■
Switching frequency max.[8]	800 Hz	■	■	■	■	■	■
Connection types	Cable, 2 m	■				■	
	Plug, M12 4-pin, with cable, 120 mm				■		
	Plug, M12 4-pin			■			■
	Plug, M8 4-pin		■				
VDE protection class[9]	□	■		■	■	■	■
	⏚		■				
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Circuit protection[10]	A, B, C	■	■	■	■	■	■
Ambient temperature T_A[11]	Operation -40...140° F (-40...60° C)	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■
Approximate weight	2.8 oz (80 g)	■			■	■	
	0.7 oz (20 g)		■	■			■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■

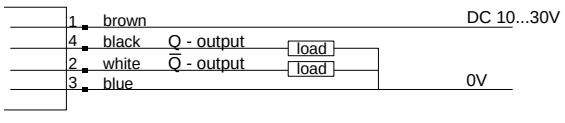
1) Object with 90% remission (referred to standard white DIN 5033)
2) Limit values
3) Must be within V_S tolerances
4) Without load
5) Average service life at room temperature 50,000 h at T_A = 25° C
6) At T_A = 25° C and 100 mA output current
7) With resistive load
8) With light/dark ratio 1:1
9) Reference voltage 50 V
10) A = supply connections reverse-polarity protected
B = outputs short-circuit protected
C = interference suppression
11) Do not bend below 0° C

Teach-in function

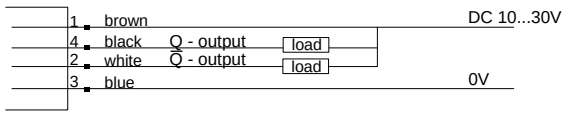
- **Programming via teach-in button.**
- **Simple programming:**
  Position object in the beam and push the button:
  finished;
  LED confirms the teach-in procedure.
- **Teach-in values can be stored.**
- **Two operating modes:**
  Default setting: short teach-in time (< 8 s);
  for standard applications;
  approx. double reserve via switching threshold;
  LED lights continuously.
  Precise setting: long teach-in time (> 8 s);
  for precise applications;
  small switching hysteresis;
  LED blinks.

Connection diagram

PNP Models

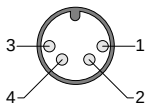


NPN Models

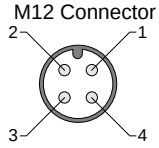


wire colors refer to standard cable, not included with quick disconnect models

M8 Connector



M12 Connector



WT 9-2

Proximity/Diffuse Sensors - Energetic



2.0...59.0 in (50...1500 mm)
sensing range

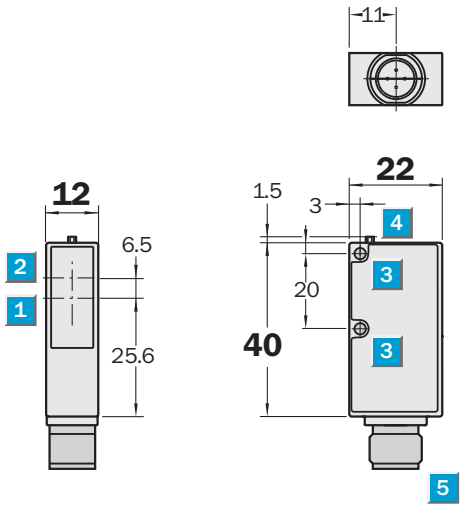
Highlights

- Rugged plastic housing
- Infrared light source with LED
- Short-circuit outputs and over current protected
- Energetic proximity sensor
- Switching frequency of 500/s
- Cable or quick disconnect versions available

WT 9-2

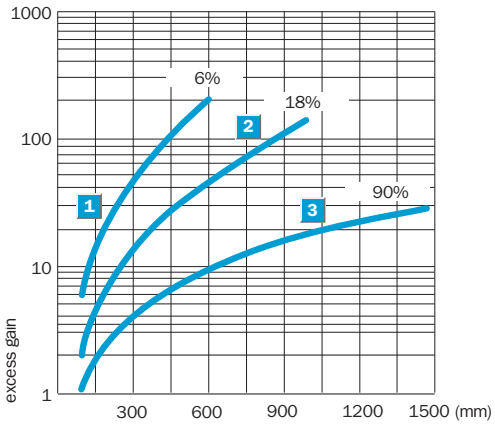


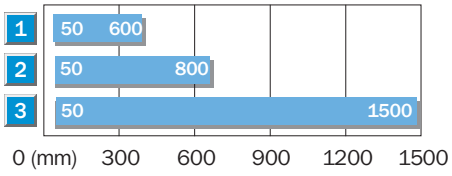
Dimensional drawing



dimensions in mm

Excess gain

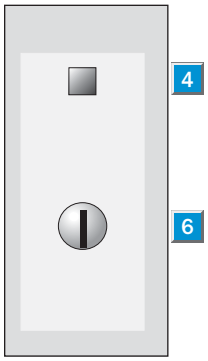




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Center of optical axis, receiver
2	Center of optical axis, sender
3	Mounting hole Ø 3.2 mm
4	LED signal strength indicator
5	Plug, M12, 4-pin or 2 m connection cable
6	Sensing range adjustment

Order information

Type	Part no.
WT 9-2-P160	1 019 097
WT 9-2-P460	1 019 098
WT 9-2-N160	1 019 342

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Technical data	WT 9-2-	P160	P460	N160
Sensing range, adjustable[1]	2.0...59.0 in (50...1500 mm)	■	■	■
Supply voltage V_S[2]	10...30 V DC	■	■	■
Ripple[3]	≤ 5 V_{PP}	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■
Light source	LED, infrared light[5]	■	■	■
Light spot size	23.6 in at 59.0 in (600 mm at 1500 mm)	■	■	■
Switching outputs Q and $\overline{Q}$	PNP	■	■	
	NPN			■
Signal voltage HIGH	V_S – 2.9 V	■	■	
	V_S			■
Signal voltage LOW[6]	Approx. 0 V	■	■	
	≤ 2.9 V			■
Output current I_A max.	≤ 100 mA	■	■	■
Response time[7]	≤ 1000 µs	■	■	■
Switching frequency max.[8]	500 Hz	■	■	■
Connection types	Cable, 2 m	■		■
	Plug, M12 4-pin		■	
VDE protection class[9]	⧈	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■
Circuit protection[10]	A, B, C	■	■	■
Ambient temperature T_A[11]	Operation -40...140° F (-40...60° C)	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■
Approximate weight	2.8 oz (80 g)	■		■
	0.7 oz (20 g)		■	
Housing material	Glass fiber reinforced ABS	■	■	■

1) Object with 90% remission (referred to standard white DIN 5033)
2) Limit values
3) Must be within V_S tolerances
4) Without load
5) Average service life at room temperature 100,000 h at T_U = 25° C
6) At T_U = 25° C and 100 mA output current
7) With resistive load
8) With light/dark ratio 1:1
9) Reference voltage 50 V
10) A = supply connections reverse-polarity protected
B = outputs short-circuit protected
C = interference suppression
11) Do not bend below 0° C

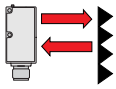
Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WL 9-2 Small Parts

Reflex/Retro-Reflective Sensors






0...1.3 ft (0...0.4 m)
sensing range

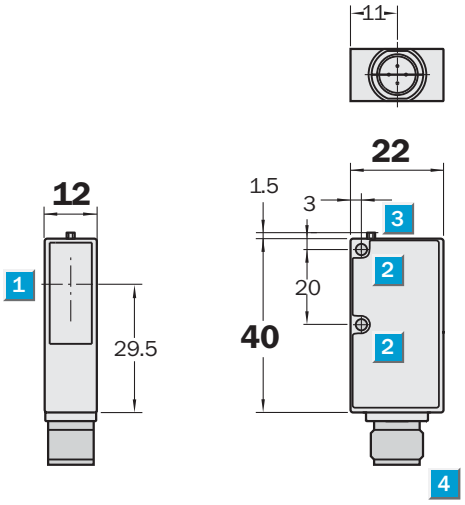
Highlights

- Rugged plastic housing
- Red light for easy alignment
- Short-circuit protected outputs
- Cable, M8 or M12 quick disconnect versions available
- Push button teach-in

WL 9-2

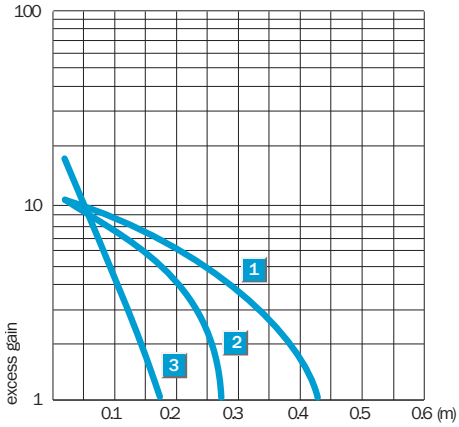


Dimensional drawing



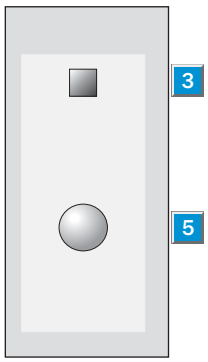
dimensions in mm

Excess gain



Adjustments

All types



1 Center of optical axis
2 Mounting hole Ø 3.2 mm
3 LED signal strength indicator
4 Plug, M12 or M8 4-pin,
2 m connection cable or
120 mm cable with plug M12 4-pin
5 Teach-in button

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Reflector type	Sensing range
1 PL 80 A	0...0.4 m
2 PL 40 A	0...0.3 m
3 Reflective tape diamond grade*	0...0.2 m

* 100 x 100 mm²

Order information

Type	Part no.
WL 9-2P121	1 018 289
WL 9-2P421	1 018 291
WL 9-2N121	1 018 290
WL 9-2N421	1 018 292
WL 9-2P321	1 019 270
WL 9-2P621	1 019 271

Technical data	WL 9-2	P121	P421	N121	N421	P321	P621
Sensing range	0…1.3 ft (0…0.4 m)/PL 80 A	■	■	■	■	■	■
Supply voltage V_S[1]	10…30 V DC	■	■	■	■	■	■
Ripple[2]	≤ 5 V_{PP}	■	■	■	■	■	■
Current consumption[3]	≤ 30 mA	■	■	■	■	■	■
Light source	LED, red light, polarized[4]	■	■	■	■	■	■
Light spot size	0.06 x 0.06 in at 1.4 in (1.5 x 1.5 mm at 35 mm)	■	■	■	■	■	■
Switching outputs Q and $\overline{Q}$	PNP	■	■			■	■
	NPN			■	■		
Signal voltage HIGH	V_S – 2.9 V	■	■			■	■
	V_S			■	■		
Signal voltage LOW[5]	Approx. 0 V	■	■			■	■
	≤ 2.9 V			■	■		
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■
Response time[6]	≤ 625 µs	■	■	■	■	■	■
Max. switching frequency[7]	800 Hz	■	■	■	■	■	■
Connection types	Cable, 2 m	■		■			
	Plug, M12 4-pin, cable, 120 mm						■
	Plug, M12 4-pin		■		■		
	Plug, M8 4-pin					■	
VDE protection class[8]	□	■	■	■	■		■
	⏚					■	
Enclosure rating	IP 67	■	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■	■
Ambient temperature T_A[10]	Operation -40…140° F (-40…60° C)	■	■	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■	■	■
Approximate weight	2.8 oz (80 g)	■		■			■
	0.7 oz (20 g)		■		■	■	
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■

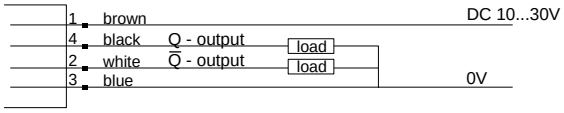
1) Limit values
2) Must be within V_S tolerances
3) Without load
4) Average service life at room temperature 100,000 h at T_A = 25° C
5) At T_A = 25° C and 100 mA output current
6) With resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V
9) A = supply connections reverse-polarity protected
B = outputs short-circuit protected
C = interference suppression
10) Do not bend below 0° C

Teach-in function

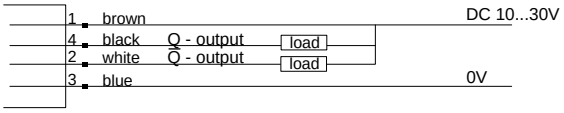
- **Programming via teach-in button.**
- **Simple programming:**
  Position reflector in the beam and push the button: finished;
  LED confirms the teach-in procedure.
- **Teach-in values can be stored.**
- **Two operating modes:**
  Default setting: short teach-in time (< 8 s);
  for standard applications;
  approx. double reserve via switching threshold;
  LED lights continuously.
  Precise setting: long teach-in time (> 8 s);
  for precise applications;
  small switching hysteresis;
  LED blinks.

Connection diagram

PNP Models

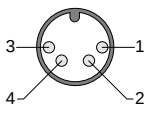


NPN Models

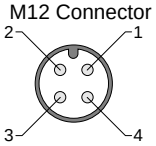


wire colors refer to standard cable, not included with quick disconnect models

M8 Connector

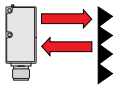


M12 Connector



WL 9-2

Reflex/Retro-Reflective Sensors






0...13.1 ft (0...4 m)
sensing range

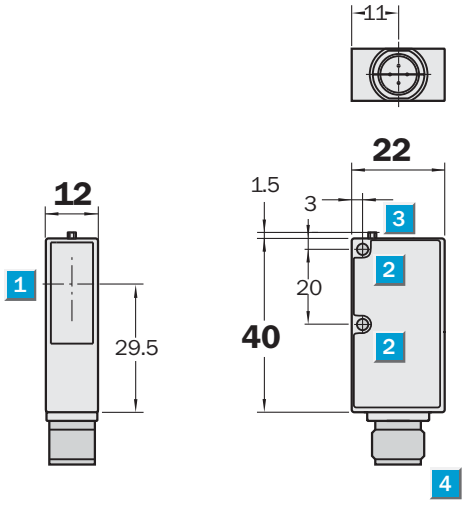
Highlights

- Rugged plastic housing
- Red light for easy alignment
- Short-circuit protected outputs
- Cable, M8 or M12 quick disconnect versions available

WL 9-2

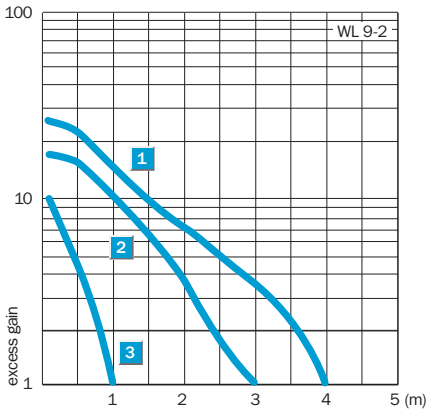


Dimensional drawing



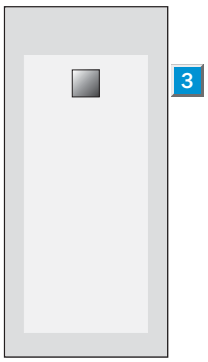
dimensions in mm

Excess gain



Adjustments

All types



1 Center of optical axis
2 Mounting hole Ø 3.2 mm
3 LED signal strength indicator
4 Plug, M12 or M8 4-pin,
2 m connection cable or
120 mm cable with plug M12 4-pin

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Reflector type	Sensing range
1 PL 80 A	0...3.0 m
2 PL 40 A	0...2.0 m
3 Reflective tape diamond grade*	0...0.6 m

* 100 x 100 mm²

Order information

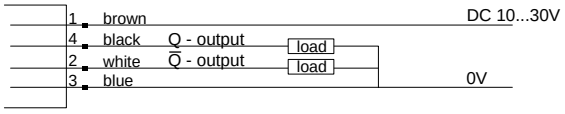
Type	Part no.
WL 9-2P130	1 018 281
WL 9-2P430	1 018 283
WL 9-2N130	1 018 282
WL 9-2N430	1 018 284
WL 9-2P330	1 019 024
WL 9-2P630	1 019 268
WL 9-2N330	1 019 511

Technical data	WL 9-2-	P130	P430	N130	N430	P330	P630	N330
Sensing range	0…13.1 ft (0…4 m)/PL 80 A	■	■	■	■	■	■	■
Supply voltage V_S[1]	10…30 V DC	■	■	■	■	■	■	■
Ripple[2]	≤ 5 V_{PP}	■	■	■	■	■	■	■
Current consumption[3]	≤ 30 mA	■	■	■	■	■	■	■
Light source	LED, red light, polarized[4]	■	■	■	■	■	■	■
Angle of divergence	2.5°	■	■	■	■	■	■	■
Light spot size	4.7 x 4.7 in at 9.8 ft (120 x 120 mm at 3 m)	■	■	■	■	■	■	■
Switching outputs Q and $\overline{Q}$	PNP	■	■			■	■	
	NPN			■	■			■
Signal voltage HIGH	V_S – 2.9 V	■	■			■	■	
	V_S			■	■			■
Signal voltage LOW[5]	Approx. 0 V	■	■			■	■	
	≤ 2.9 V			■	■			■
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■	■
Response time[6]	≤ 625 µs	■	■	■	■	■	■	■
Max. switching frequency[7]	800 Hz	■	■	■	■	■	■	■
Connection types	Cable, 2 m	■		■				
	Plug, M12 4-pin, cable, 120 mm						■	
	Plug, M12 4-pin		■		■			
	Plug, M8 4-pin					■		■
VDE protection class[8]	□	■	■	■	■		■	
	⏚					■		■
Enclosure rating	IP 67	■	■	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■	■	■
Ambient temperature T_A[10]	Operation -40…140° F (-40…60° C)	■	■	■	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■	■	■	■
Approximate weight	2.8 oz (80 g)	■		■		■	■	
	0.7 oz (20 g)		■		■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■	■

1) Limit values
2) Must be within V_S tolerances
3) Without load
4) Average service life at room temperature 100,000 h at T_A = 25° C
5) At T_A = 25° C and 100 mA output current
6) With resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V
9) A = supply connections reverse-polarity protected
B = outputs short-circuit protected
C = interference suppression
10) Do not bend below 0° C

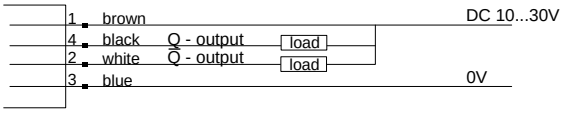
Connection diagram

PNP Models

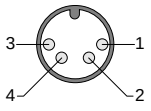


wire colors refer to standard cable, not included with quick disconnect models

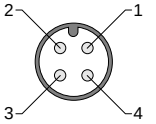
NPN Models



M8 Connector



M12 Connector



WL 9-2 Teach

Reflex/Retro-Reflective Sensors



0...13.1 ft (0...4 m)
sensing range

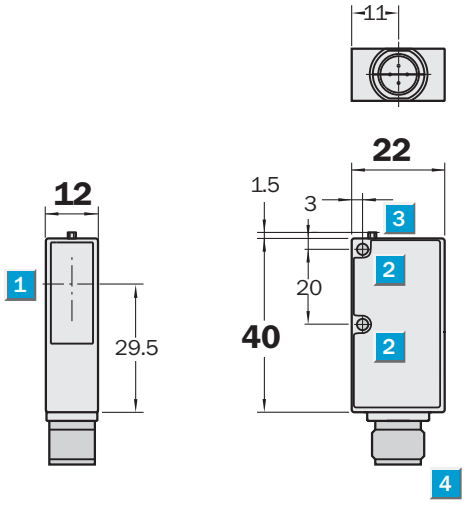
Highlights

- Rugged plastic housing
- Red light for easy alignment
- Short-circuit protected outputs
- Push button teach-in
- Cable, M8 or M12 quick disconnect versions available
- Polarizing filters prevent false readings on shiny surfaces

WL 9

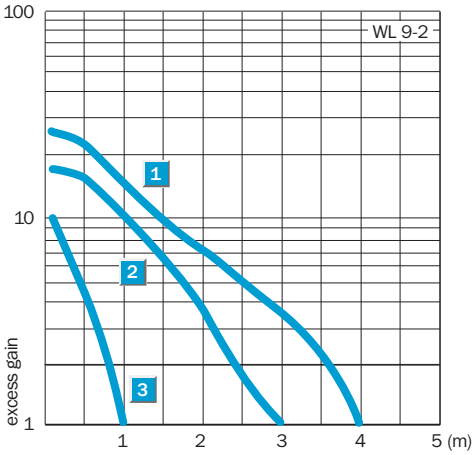


Dimensional drawing



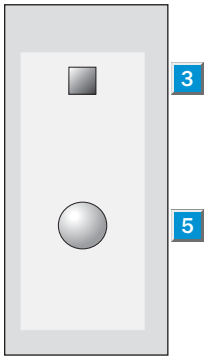
dimensions in mm

Excess gain



Adjustments

All types



1 Center of optical axis
2 Mounting hole Ø 3.2 mm
3 LED signal strength indicator
4 Plug, M12 or M8 4-pin,
2 m connection cable or
120 mm cable with plug M12 4-pin
5 Sensitivity adjustment with teach-in

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Reflector type		Sensing range
1	PL 80 A	0...4.0 m
2	PL 50 A	0...3.0 m
3	Reflective tape diamond grade*	0...1.0 m

* 100 x 100 mm²

Order information

Type	Part no.
WL 9-2P131	1 018 285
WL 9-2P331	1 019 025
WL 9-2P431	1 018 287
WL 9-2P631	1 019 269
WL 9-2N131	1 018 286
WL 9-2N431	1 018 288

Technical data	WL 9-2-	P131	P331	P431	P631	N131	N431
Sensing range	0…13.1 ft (0…4 m)/PL 80 A	■	■	■	■	■	■
Supply voltage V_S[1]	10…30 V DC	■	■	■	■	■	■
Ripple[2]	≤ 5 V_{PP}	■	■	■	■	■	■
Current consumption[3]	≤ 30 mA	■	■	■	■	■	■
Light source	LED, red light, polarized[4]	■	■	■	■	■	■
Angle of divergence	2.5°	■	■	■	■	■	■
Light spot size	4.7 x 4.7 in at 9.8 ft (120 x 120 mm at 3 m)	■	■	■	■	■	■
Switching outputs Q and $\overline{Q}$	PNP	■	■	■	■		
	NPN					■	■
Signal voltage HIGH	V_S – 2.9 V	■	■	■	■		
	V_S					■	■
Signal voltage LOW[5]	Approx. 0 V	■	■	■	■		
	≤ 2.9 V					■	■
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■
Response time[6]	≤ 625 µs	■	■	■	■	■	■
Max. switching frequency[7]	800 Hz	■	■	■	■	■	■
Connection types	Cable, 2 m	■				■	
	Plug, M12 4-pin, cable, 120 mm				■		
	Plug, M12 4-pin			■			■
	Plug, M8 4-pin		■				
VDE protection class[8]	□	■		■	■	■	■
	⏚		■				
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■	■
Ambient temperature T_A[10]	Operation -40…140° F (-40…60° C)	■	■	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■	■	■
Approximate weight	2.8 oz (80 g)	■			■	■	
	0.7 oz (20 g)		■	■			■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■

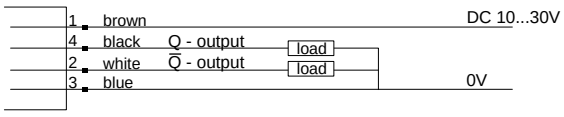
1) Limit values
2) Must be within V_S tolerances
3) Without load
4) Average service life at room temperature 100,000 h at T_A = 25° C
5) At T_A = 25° C and 100 mA output current
6) With resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V
9) A = supply connections reverse-polarity protected
B = outputs short-circuit protected
C = interference suppression
10) Do not bend below 0° C

Teach-in function

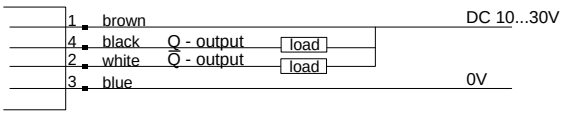
- **Programming via teach-in button.**
- **Simple programming:**
  Position reflector in the beam and push the button: finished;
  LED confirms the teach-in procedure.
- **Teach-in values can be stored.**
- **Two operating modes:**
  Default setting: short teach-in time (< 8 s);
  for standard applications;
  approx. double reserve via switching threshold;
  LED lights continuously.
  Precise setting: long teach-in time (> 8 s);
  for precise applications;
  small switching hysteresis;
  LED blinks.

Connection diagram

PNP Models

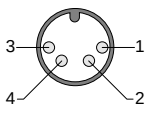


NPN Models

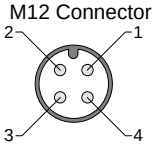


wire colors refer to standard cable, not included with quick disconnect models

M8 Connector

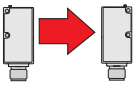


M12 Connector



WS/WE 9-2

Through-beam Sensors






0...22.9 ft (0...7 m)
sensing range

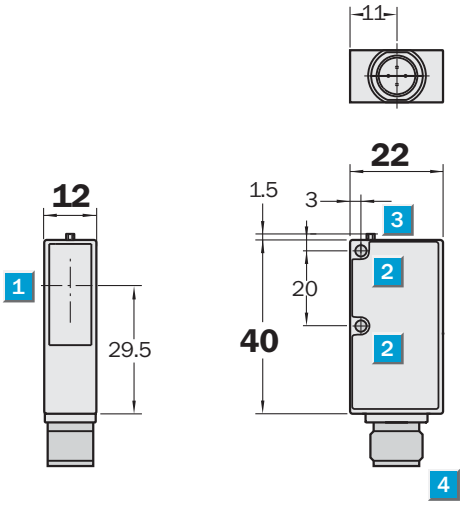
Highlights

- Rugged plastic housing
- Red light for easy alignment
- High switching frequency
- Short-circuit protected outputs
- Small, compact housing
- Cable, M8 or M12 quick disconnect versions

WS/WE 9-2

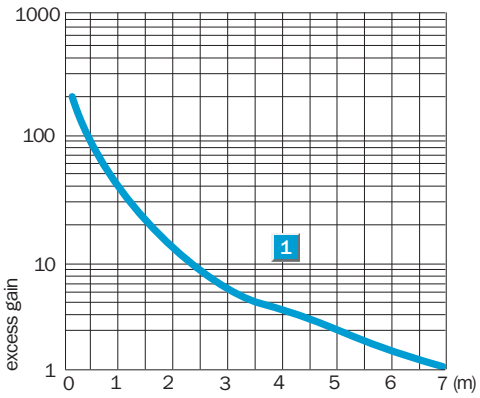


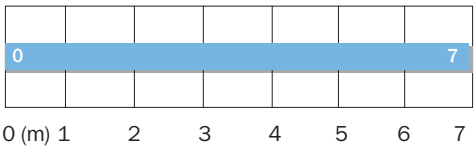
Dimensional drawing



dimensions in mm

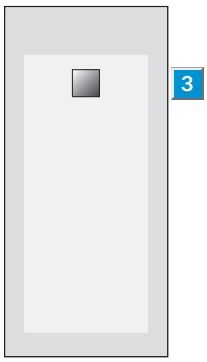
Excess gain





Adjustments

All types



1 Center of optical axis
2 Mounting hole Ø 3.2 mm
3 LED signal strength indicator
4 Plug, M12 or M8 4-pin,
2 m cable or
120 mm cable with M12 4-pin plug

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

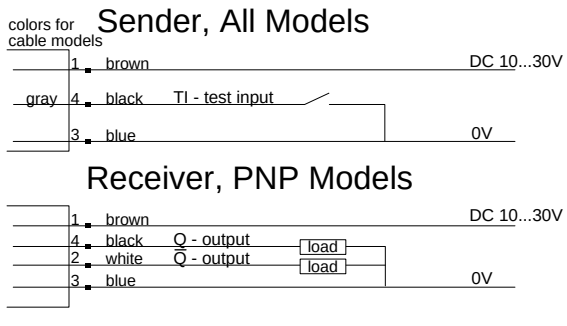
Order information

Type	Part no.
WS/WE9-2P130	1 019 259
WS/WE9-2P430	1 019 261
WS/WE9-2N130	1 019 260
WS/WE9-2N430	1 019 262
WS/WE9-2P330	1 019 383
WS/WE9-2P630	1 019 382

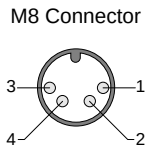
Technical data	WS/WE 9-2-	P130	P430	N130	N430	P330	P630
Sensing range	0...22.9 ft (0...7 m)	■	■	■	■	■	■
Supply voltage V_S[1]	10...30 V DC	■	■	■	■	■	■
Ripple[2]	≤ 5 V_{PP}	■	■	■	■	■	■
Current consumption[3]	≤ 15 mA (WE); ≤ 60 mA (WS);	■	■	■	■	■	■
Light source	LED, visible red light[4]	■	■	■	■	■	■
Angle of dispersion	15°	■	■	■	■	■	■
Angle of reception	6°	■	■	■	■	■	■
Light spot diameter	39.4 in at 16.4 ft (1000 mm at 5 m)	■	■	■	■	■	■
Switching outputs Q and $\overline{Q}$	PNP	■	■			■	■
	NPN			■	■		
Signal voltage HIGH	V_S – 2.9 V	■	■			■	■
	V_S			■	■		
Signal voltage LOW[5]	Approx. 0 V	■	■			■	■
	≤ 2.9 V			■	■		
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■
Response time[6]	≤ 2.5 µs	■	■	■	■	■	■
Switching frequency max.[7]	200 Hz	■	■	■	■	■	■
Test input TE	V_S or unswitched, sender active	■	■	■	■	■	■
	0 V, sender inactive	■	■	■	■	■	■
Connection types	Cable, 2 m	■		■			
	Plug, M12 4-pin, with cable, 120 mm						■
	Plug, M12 4-pin		■		■		
	Plug, M8 4-pin					■	
VDE protection class[8]	□	■	■	■	■		■
	⏚					■	
Enclosure rating	IP 67	■	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■	■
Ambient temperature T_A[10]	Operation -40...140° F (-40...60° C)	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■
Approximate weight	2.8 oz (80 g)	■		■			■
	1.4 oz (20 g)		■		■	■	
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■

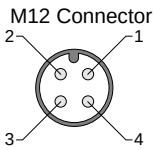
1) Limit values
2) Must be within V_S tolerances
3) Without load
4) Average service life at room temperature 100,000 h at T_A = 25° C
5) At T_A = 25° C and 100 mA output current
6) With resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V
9) A = supply connections reverse polarity protected
B = outputs short-circuit protected
C = interference suppression
10) Do not bend below 0° C

Connection diagram



wire colors refer to standard cable, not included with quick disconnect models





WT 9L

Proximity/Diffuse Sensors - Background suppression



1.2...5.9 in (30...150 mm)
sensing range

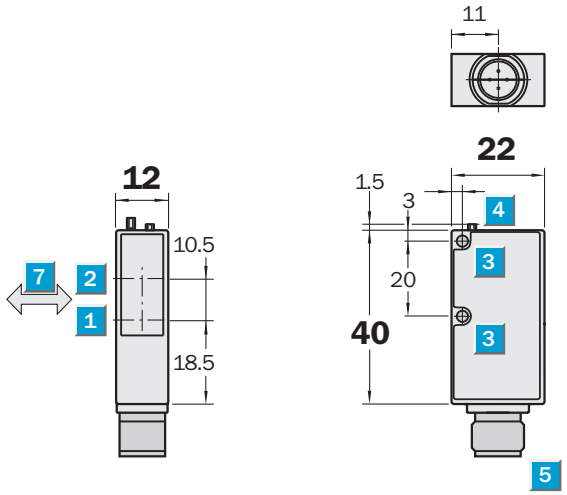
Highlights

- Class 2 laser, red light
- Adjustable background suppression
- 1000 hz switching frequency
- Compact ABS plastic housing

WT 9L

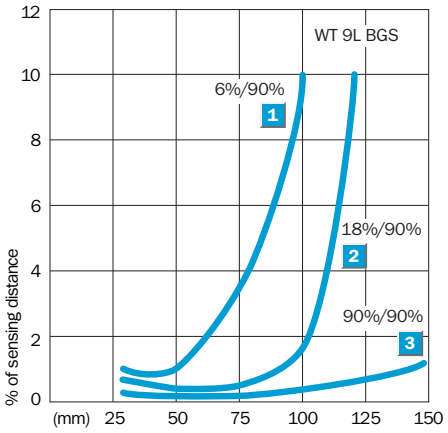


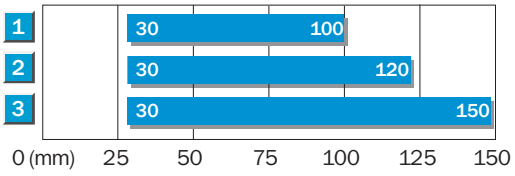
Dimensional drawing



dimensions in mm

Background suppression

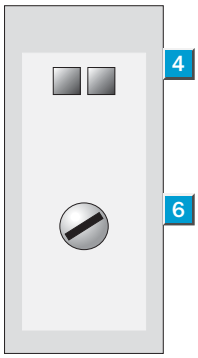




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Center of optical axis, sender
2	Center of optical axis, receiver
3	Mounting hole Ø 3.2 mm
4	Power indicator green; LED signal strength indicator yellow
5	Plug, M12 or M8 4-pin,
6	Sensing range adjustment
7	Standard direction of the material to be sensed

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WT 9L-P330	1 023 977
WT 9L-P430	1 023 959
WT 9L-N330	1 023 991
WT 9L-N430	1 023 990

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Technical data	WT 9L-	P330	P430	N330	N430
Sensing range, adjustable[1]	1.2...5.9 in (30...150 mm)	■	■	■	■
Supply voltage V_S	10...30 V DC [2]	■	■	■	■
Ripple[3]	< 5 V_{PP}	■	■	■	■
Current consumption[4]	< 35 mA	■	■	■	■
Light source[5], **light type**	Laser, red light; Class 2	■	■	■	■
Light spot size	< 0.019 in at 2.4 in (< 0.5 mm at 60 mm)	■	■	■	■
Switching outputs Q and $\bar{Q}$	PNP	■	■		
	NPN			■	■
PNP; signal voltage HIGH	V_S – 2 V	■	■		
PNP; signal voltage LOW	Approx. 0 V	■	■		
NPN; signal voltage HIGH	V_S			■	■
NPN; signal voltage LOW[6]	V_S < 2 V			■	■
Output current I_A max.	< 100 mA	■	■	■	■
Response time[7]	< 0.6 ms	■	■	■	■
Max. switching frequency[8]	1000/s	■	■	■	■
Connection types	Plug, M12 4-pin		■		■
	Plug, M8 4-pin	■		■	
VDE protection class[9]	⊡ (plug M12)		■		■
	⋔ (plug M8)	■		■	
Enclosure rating	IP 67	■	■	■	■
Circuit protection[10]	A, B, C	■	■	■	■
Ambient temperature T_A[11]	Operation 14...122° F (-10...50° C)	■	■	■	■
	Storage -13...158° F (-25...70° C)	■	■	■	■
Approximate weight	0.7 oz (20 g)	■	■	■	■
Housing material	ABS plastic	■	■	■	■

1) Object with 90 % remission (based on standard white DIN 5033)
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Average service life 50,000 h at T_A = 25° C
6) At T_A = 25° C and 100 mA output current
7) Signal transit time with resistive load
8) With light/dark ratio 1:1
9) Reference voltage 50 V
10) A = V_S connections reverse-polarity protected
B = Outputs reverse-polarity protected
C = Interference pulse suppression
11) Do not stack devices

Laser protection

EN 60825-1, Class 2
Conforms to 21 CFR 1040

Beam attenuator

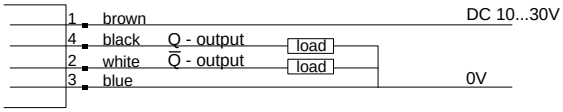
The WT 9L is equipped with an M8 or M12 style quick disconnect. This cable can be quickly and easily be removed in the event that personnel require access to the area where the sensor is mounted.



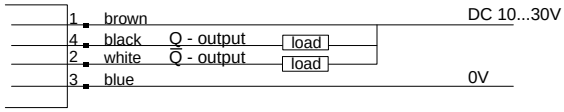
SICK AG
D-79183 Waldkirch
Sebastian - Kneipp - Str. 1
April 2003 / 7279

Connection diagram

PNP Models

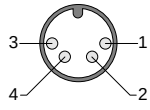


NPN Models

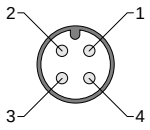


wire colors refer to standard cable, not included with quick disconnect models

M8 Connector



M12 Connector



WL 9L

Reflex/Retro-Reflective Sensors



0.3...39.4 ft (0.1...12 m)
sensing range

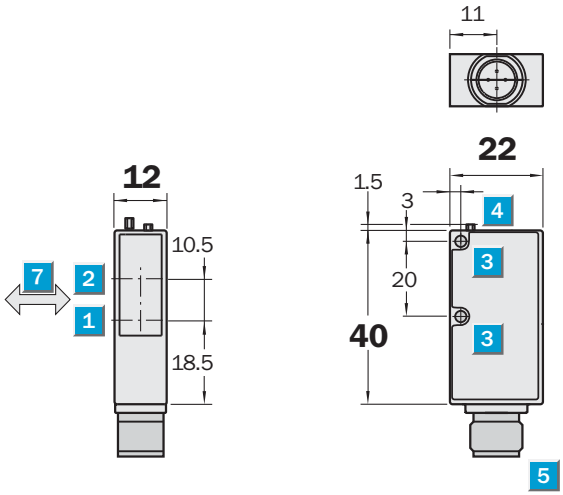
Highlights

- Class 2 laser, red light
- Teach-in sensitivity adjustment
- 1000 hz switching frequency
- Polarizing filter prevents false readings on shiny objects
- Compact ABS plastic housing

WL 9L

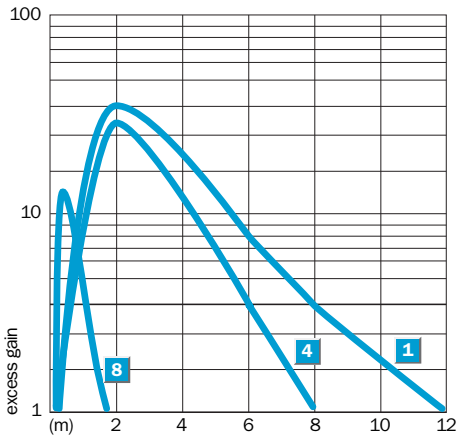


Dimensional drawing



dimensions in mm

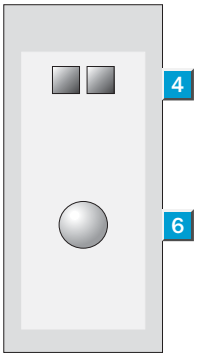
Excess gain



	Reflector type	Sensing range
1	PL 80 A	0 – 8.0 m
2	PL 250 F	0 – 7.0 m
3	PL 50 A	0 – 6.0 m
4	PL 40 A	0 – 6.0 m
5	PL 30 A	0 – 5.0 m
6	PL 20 A	0 – 4.0 m
7	PL 20 F	0 – 4.0 m
8	Reflective tape	0 – 1.2 m

Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 Mounting hole Ø 3.2 mm
4 Power indicator green;
LED signal strength indicator yellow
5 Plug, M12 or M8 4-pin
6 Teach-in button
7 Standard direction of the material to be sensed

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

Type	Part no.
WL 9L-P330	1 023 976
WL 9L-P430	1 023 958
WL 9L-N330	1 023 989
WL 9L-N430	1 023 988

Technical data	WL 9L-	P330	P430	N330	N430
Sensing range	0.3...39.4 ft (0.1...12 m)/PL 80 A	■	■	■	■
Supply voltage V_S	10...30 V DC[1]	■	■	■	■
Ripple[2]	< 5 V_{PP}	■	■	■	■
Current consumption[3]	< 35 mA	■	■	■	■
Light source[4], light type	Laser, red light, Class 2, polarized	■	■	■	■
Light spot size	< 0.019 in at 3.9 in (< 0.5 mm at 100 mm)	■	■	■	■
Switching outputs Q and $\overline{Q}$	PNP	■	■		
	NPN			■	■
PNP; signal voltage HIGH	V_S – 2 V	■	■		
PNP; signal voltage LOW	Approx. 0 V	■	■		
NPN; signal voltage HIGH	V_S			■	■
NPN; signal voltage LOW[5]	V_S – 2 V			■	■
Output current I_A max.	< 100 mA	■	■	■	■
Response time[6]	< 0.6 ms	■	■	■	■
Max. switching frequency[7]	1000/s	■	■	■	■
Connection types	Plug, M12 4-pin		■		■
	Plug, M8 4-pin	■		■	
VDE protection class[8]	□ (plug M12)		■		■
	⏀ (plug M8)	■		■	
Enclosure rating	IP 67	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■
Ambient temperature T_A[10]	Operation 14...122° F (-10...50° C)	■	■	■	■
	Storage -13...158° F (-25...75° C)	■	■	■	■
Approximate weight	0.7 oz (20 g)	■	■	■	■
Housing material	ABS plastic	■	■	■	■

1) Limit values
2) May not exceed or fall short of V_S tolerances
3) Without load
4) Average service life 50,000 h at T_A = 25° C
5) At T_A = 25° C and 100 mA output current
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V
9) A = V_S connections reverse-polarity protected
B = Outputs reverse-polarity protected
C = Interference pulse suppression
10) Do not stack devices

Teach-in function

Standard

1. Align the sensor with the reflector. Yellow and green LEDs are on.
2. Press teach-in button for > 2 sec. Green LED momentarily turns off. Teach-in is initiated. Yellow and green LEDs both flash.
3. The reference level is stored permanently when the button is released. Switching threshold is set to standard sensitivity.

Precise

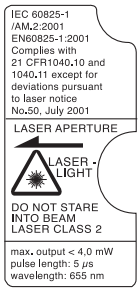
1. Align the sensor with the reflector. Yellow and green LEDs are on.
2. Press teach-in button for > 5 sec. Green LED momentarily turns off. Teach-in is initiated. Yellow and green LEDs both flash.
3. The reference level is stored permanently when the button is released. Switching threshold is set to precise sensitivity with a lower switching hysteresis, making detection of transparent objects possible.

Laser protection

EN 60825-1, Class 2
Conforms to 21 CFR 1040

Beam attenuator

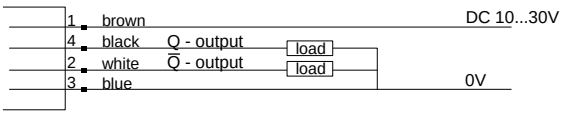
The WL 9L is equipped with an M8 or M12 style quick disconnect. This cable can be quickly and easily be removed in the event that personnel require access to the area where the sensor is mounted.



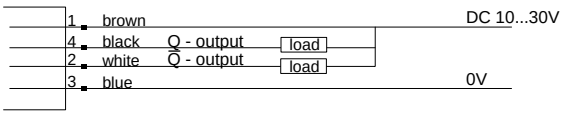
SICK AG
D-79183 Waldkirch
Sebastian - Kneipp - Str. 1
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Connection diagram

PNP Models

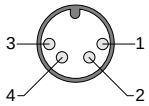


NPN Models

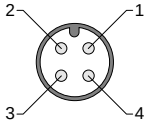


wire colors refer to standard cable, not included with quick disconnect models

M8 Connector

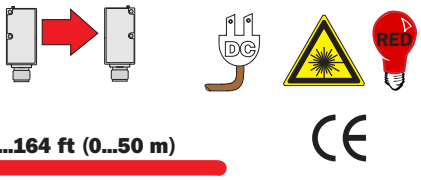


M12 Connector



WS/WE 9L

Through-beam Sensors



0...164 ft (0...50 m)
sensing range

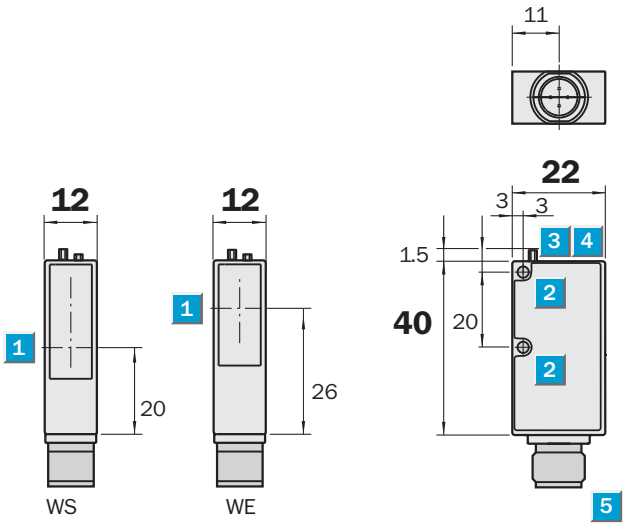
Highlights

- Class 2 laser, red light
- Teach-in sensitivity adjustment
- 1000 Hz switching frequency
- Compact ABS plastic housing
- Fast response time
- Small light spot for precise switching

WS/WE 9L

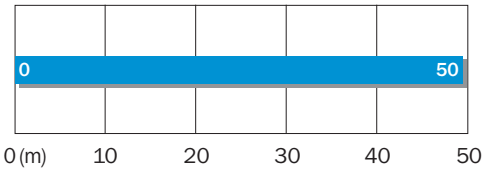


Dimensional drawing



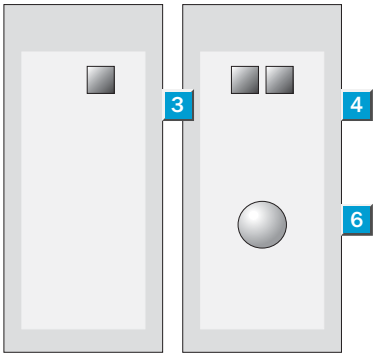
dimensions in mm

Sensing range



Adjustments

All types



Sender WS | Receiver WE

1 Center of optical axis
2 Mounting hole Ø 3.2 mm
3 Power indicator green, WS in operation
4 LED signal strength indicator yellow
5 Plug, M12 or M8 4-pin
6 Teach-in button

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WS/WE 9L-P330	1 023 993
WS/WE 9L-P430	1 023 992
WS/WE 9L-N330	1 023 995
WS/WE 9L-N430	1 023 994

Technical data	WS/WE 9L-	P330	P430	N330	N430
Sensing range, max. typ.	0...164 ft (0...50 m)	■	■	■	■
Supply voltage V_S	10...30 V DC[1]	■	■	■	■
Ripple[2]	< 5 V_{PP}	■	■	■	■
Current consumption[3]	< 25 mA (WE), < 35 mA (WS)	■	■	■	■
Light source[4], light type	Laser, red light, Class 2	■	■	■	■
Light spot size	< 0.019 in at 19.7 in (< 0.5 mm at 500 mm)	■	■	■	■
Switching outputs Q and $\bar{Q}$	PNP	■	■		
	NPN			■	■
PNP; signal voltage HIGH	V_S – 2 V	■	■		
PNP; signal voltage LOW	Approx. 0 V	■	■		
NPN; signal voltage HIGH	V_S			■	■
NPN; signal voltage LOW[5]	V_S – 2 V			■	■
Output current I_A max.	< 100 mA	■	■	■	■
Response time[6]	< 0.6 ms	■	■	■	■
Max. switching frequency[7]	1000/s	■	■	■	■
Connection types	Plug, M12 4-pin		■		■
	Plug, M8 4-pin	■		■	
VDE protection class[8]	⊡ (plug M12)		■		■
	⌖ (plug M8)	■		■	
Enclosure rating	IP 67	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■
Ambient temperature T_A[10]	Operation 14...122° F (-10...50° C)	■	■	■	■
	Storage -13...158° F (-25...70° C)	■	■	■	■
Approximate weight	0.7 oz (20 g)	■	■	■	■
Housing material	ABS plastic	■	■	■	■

1) Limit values
2) May not exceed or fall short of V_S tolerances
3) Without load
4) Average service life 50,000 h at T_A = 25° C
5) At T_A = 25° C and 100 mA output current
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V
9) A = V_S connections reverse-polarity protected
B = Outputs reverse-polarity protected
C = Interference pulse suppression
10) Do not stack devices

Teach-in function

Standard

1. Align the sender and receiver with each other. Yellow and green LEDs are on.
2. Press Teach-in button for > 2 sec. Green LED momentarily turns off. Teach-in is initiated. Yellow and green LEDs both flash.
3. The reference level is stored permanently when the button is released. Switching threshold is set to standard sensitivity.

Precise

1. Align the sender and receiver with each other. Yellow and green LEDs are on.
2. Press Teach-in button for > 5 sec. Green LED momentarily turns off. Teach-in is initiated. Yellow and green LEDs both flash.
3. The reference level is stored permanently when the button is released. Switching threshold is set to precise sensitivity with a lower switching hysteresis, making detection of transparent objects possible.

Laser protection

EN 60825-1, Class 2
Conforms to 21 CFR 1040

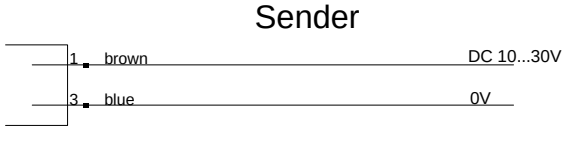


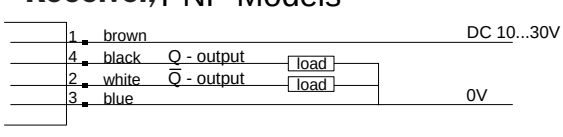
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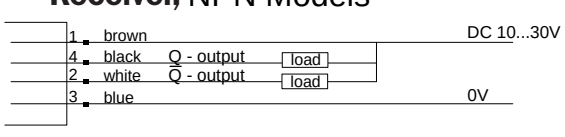
Beam attenuator

The WS 9L is equipped with an M8 or M12 style quick disconnect. This cable can be quickly and easily be removed in the event that personnel require access to the area where the sensor is mounted.

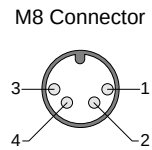
Connection diagram

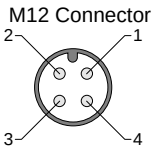






wire colors refer to standard cable, not included with quick disconnect models





WT100 L

Proximity/Diffuse Sensors-Energetic

0...17.7 in (0...450 mm)
sensing range

CDRH

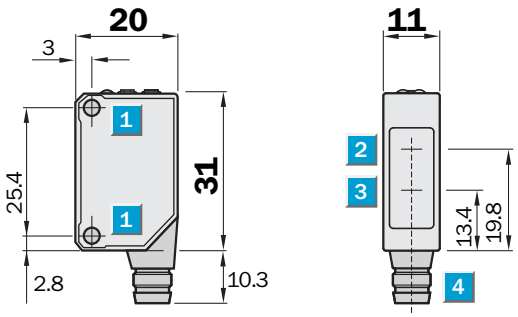
Highlights

- Laser sensor in mini-format
- Easy alignment by Class 2 red light laser
- Switching frequency 2000 Hz

WT100 L

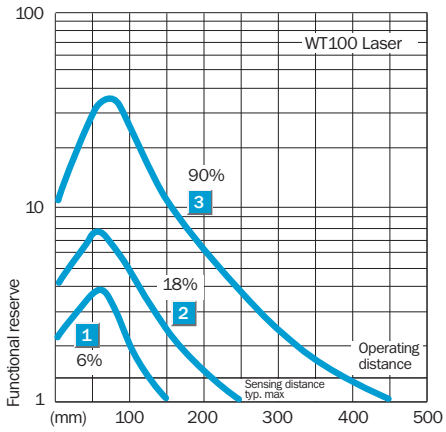


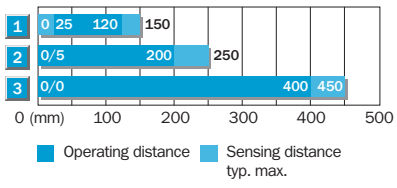
Dimensional drawing



dimensions in mm

Excess gain

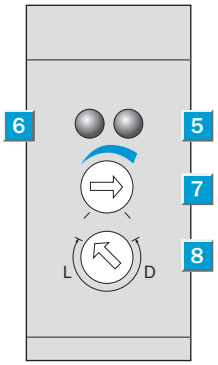




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	M3 mounting hole
2	Center of optical axis, receiver
3	Center of optical axis, sender
4	Connector
5	LED signal strength indicator orange: switching output active
6	LED signal strength indicator green: power on
7	Sensitivity adjustment (270°)
8	Light/dark rotary switch: L = light switching, D = dark switching

Accessories	page
Cables and connectors	1180
Mounting systems	1234

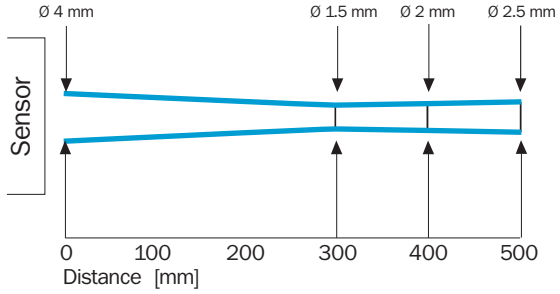
Order information

Type	Part no.
WT100L-E1141	6 030 705
WT100L-E2141	6 030 706
WT100L-E2241	6 030 707
WT100L-F1141	6 030 702
WT100L-F2141	6 030 703
WT100L-F2241	6 030 704

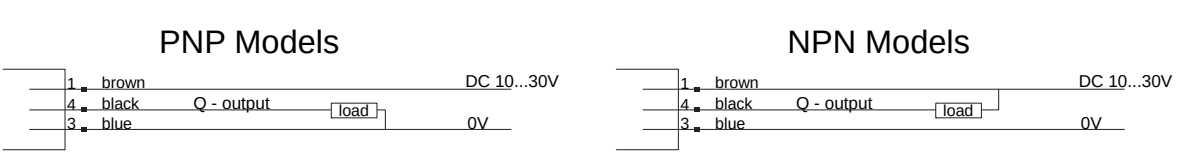
Technical data	WT100 L–	E1141	E2141	E2241	F1141	F2141	F2241
Sensing distance	0…17.7 in (0…450 mm)[1]	■	■	■	■	■	■
Operating distance	0…15.7 (0…400 mm)[1]	■	■	■	■	■	■
Adjustable sensitivity	Potentiometer	■	■	■	■	■	■
Light source[2], light type	Laser diode, Laser, 650 nm[2]	■	■	■	■	■	■
Laser protection class	2 (IEC 60 825-1/C.D.R.H)	■	■	■	■	■	■
Light spot diameter	2 mm at 400 mm	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[3]	■	■	■	■	■	■
Ripple[4]	± 10%	■	■	■	■	■	■
Current consumption[5]	≤ 30 mA	■	■	■	■	■	■
Switching outputs	NPN, Q	■	■	■			
	PNP, Q				■	■	■
Switching mode	Light/dark switching via rotary switch	■	■	■	■	■	■
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■
Response time[6]	< 0.25 ms	■	■	■	■	■	■
Switching frequency	2,000 Hz[7]	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[8]	■			■		
	Connector, M8 3-pin		■			■	
	Connector, M8 4-pin			■			■
Circuit protection[9]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 65	■	■	■	■	■	■
Ambient temperature T_A	Operation 14…122° F (-10…50° C)	■	■	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■
Approximate weight	1.8 oz (50 g)	■			■		
	0.4 oz (10 g)		■	■		■	■
Housing material	ABS, PMMA	■	■	■	■	■	■
Included with delivery	Mounting bracket	■	■	■	■	■	■

1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 50,000 h at T_A = 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) A = V_S connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Outputs overload and short-circuit protected

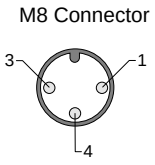
Light spot diameter

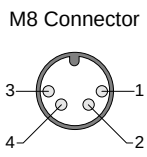


Connection diagram



Wire colors refer to standard cable, not included with quick disconnect models.





WL100 L

Reflex/Retro-Reflective



0.03...39.4 ft (0.08...12 m)
sensing range

CDRH

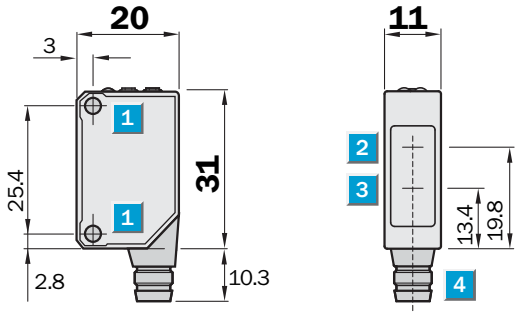
Highlights

- Laser sensor in mini-format
- Easy alignment by Class 2 red light laser
- Switching frequency 2000 Hz
- Polarization filter for secure detection of reflective objects

WL100 L

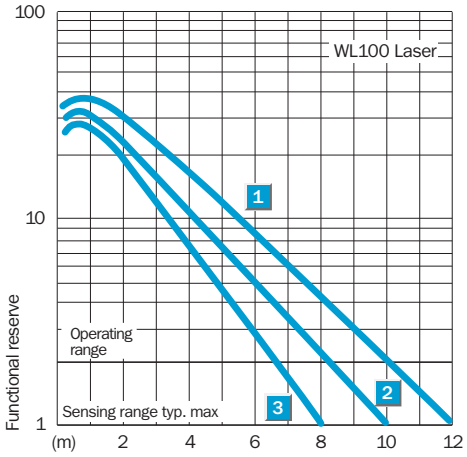


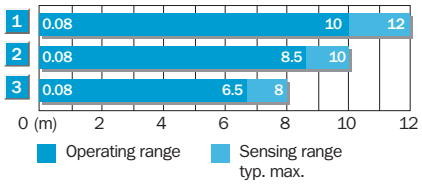
Dimensional drawing



dimensions in mm

Excess gain

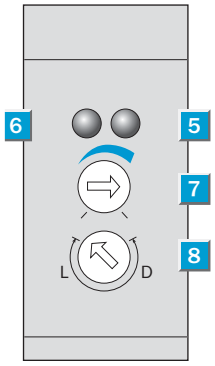




	Reflector type	Operating range
1	P250F	0.01 ... 10 m
2	PL20F	0.01 ... 8.5 m
3	PL10F	0.01 ... 6.5 m

Adjustments

All types



1 M3 Mounting hole
2 Center of optical axis, receiver
3 Center of optical axis, sender
4 Connector
5 LED signal strength indicator orange: switching output active
6 LED signal strength indicator green: power on
7 Sensitivity adjustment (270°)
8 Light/dark rotary switch:
L = light switching, D = dark switching

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

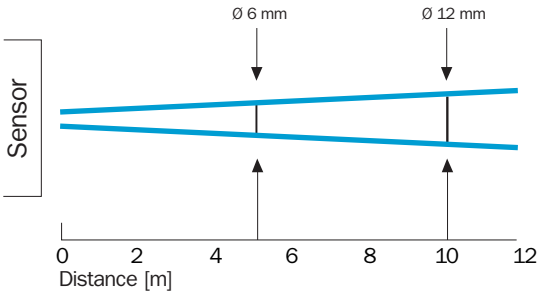
Type	Part no.
WL100L-E1131	6 030 711
WL100L-E2131	6 030 712
WL100L-E2231	6 030 713
WL100L-F1131	6 030 708
WL100L-F2131	6 030 709
WL100L-F2231	6 030 710

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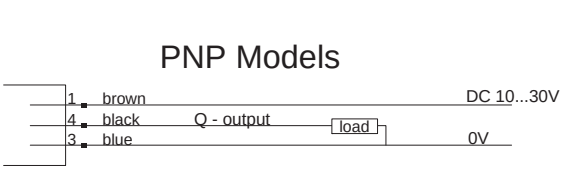
Technical data	WL100 L–	E1131	E2131	E2231	F1131	F2131	F2231
Sensing distance	0.3…39.4 ft (0.08…12 m)	■	■	■	■	■	■
Operating distance	0.3…32.8 (0.08…10 m)	■	■	■	■	■	■
Relating to	Reflector P250 F	■	■	■	■	■	■
Sensitivity adjustment	Potentiometer	■	■	■	■	■	■
Light source, light type	Laser diode, Laser, 650 nm[1]	■	■	■	■	■	■
Laser protection class	2 (IEC 60 825-1/C.D.R.H)	■	■	■	■	■	■
Light spot diameter	12 mm at 10 m	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■	■
Ripple[3]	± 10%	■	■	■	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■	■	■	■
Switching outputs	NPN, Q	■	■	■			
	PNP, Q				■	■	■
Switching mode	Light/dark switching via rotary switch	■	■	■	■	■	■
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■
Response time[5]	< 0.25 ms	■	■	■	■	■	■
Switching frequency	2,000 Hz[6]	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[7]	■			■		
	Connector, M8 3-pin		■			■	
	Connector, M8 4-pin			■			■
Circuit protection[8]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 65	■	■	■	■	■	■
Ambient temperature T_A	Operation 14...122° F (-10...50° C)	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■
Approximate weight	1.8 oz (50 g)	■			■		
	0.4 oz (10 g)		■	■		■	■
Housing material	ABS, PMMA	■	■	■	■	■	■
Included with delivery	Reflector P250F + mounting brackets	■	■	■	■	■	■

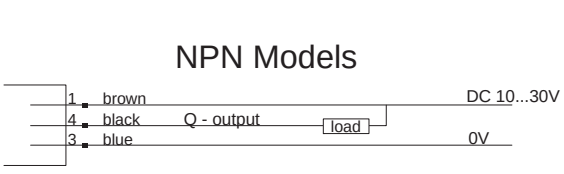
1) Average service life 50,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) A = V_S connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Outputs overload and short-circuit protected

Light spot diameter



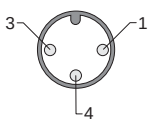
Connection diagram



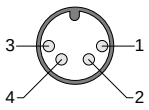


wire colors refer to standard cable, not included with quick disconnect models.

M8 Connector

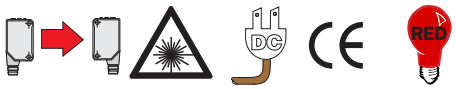


M8 Connector



WS/WE100 L

Through-beam Sensors



0...114.8 ft (0...35 m)
sensing range

CDRH

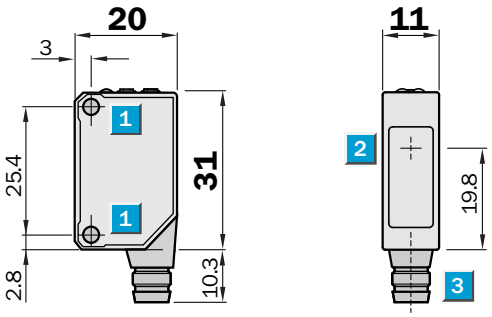
Highlights

- Laser sensor in mini-format
- High degree of eye protection by Class 1 red light laser
- Switching frequency 2000 Hz

WS/WE100 L

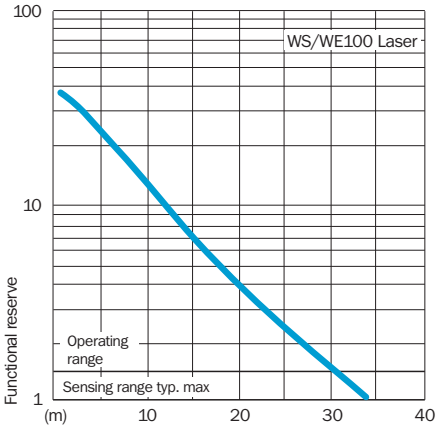


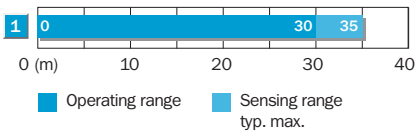
Dimensional drawing



dimensions in mm

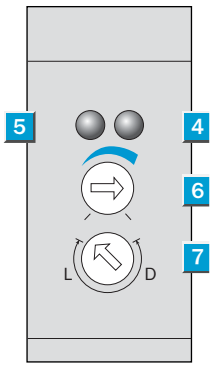
Excess gain





Adjustments

All types



1 M3 mounting hole
2 Center of optical axis
3 Connector
4 LED signal strength indicator orange: switching output active
5 LED signal strength indicator green: power on
6 Sensitivity adjustment (270°)
7 Light/dark rotary switch:
L = light switching, D = dark switching

Accessories	page
Cables and connectors	1180
Mounting systems	1234

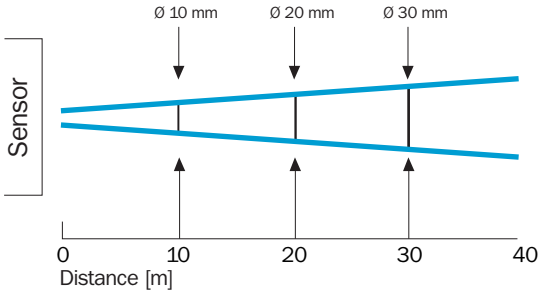
Order information

Type	Part no.
WS/WE100L-E1131	6 030 717
WS/WE100L-E2131	6 030 718
WS/WE100L-E2231	6 030 719
WS/WE100L-F1131	6 030 714
WS/WE100L-F2131	6 030 715
WS/WE100L-F2231	6 030 716

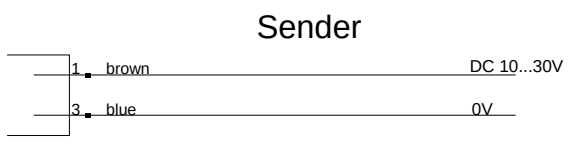
Technical data	WS/WE100 L--	E1131	E2131	E2231	F1131	F2131	F2231
Sensing distance	0…114.8 ft (0…35 m)	■	■	■	■	■	■
Operating distance	0…98.4 ft (0…30 m)	■	■	■	■	■	■
Sensitivity adjustment	Potentiometer	■	■	■	■	■	■
Light source, light type	Laser diode, Laser, 650 nm[1]	■	■	■	■	■	■
Laser protection class	1 (IEC 60 825-1)	■	■	■	■	■	■
Light spot diameter	30 mm at 30 m	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■	■
Ripple[3]	± 10%	■	■	■	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■	■	■	■
Switching outputs	NPN, Q	■	■	■			
	PNP, Q				■	■	■
Switching mode	Light/dark switching via rotary switch	■	■	■	■	■	■
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■
Response time[5]	< 0.25 ms	■	■	■	■	■	■
Switching frequency	2,000 Hz[6]	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[7]	■			■		
	Connector, M8 3-pin		■			■	
	Connector, M8 4-pin			■			■
Circuit protection[8]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 65	■	■	■	■	■	■
Ambient temperature T_A	Operation 14…122° F (-10…50° C)	■	■	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■
Approximate weight	1.8 oz (50 g)	■			■		■
	0.4 oz (10 g)		■	■		■	
Housing material	ABS, PMMA	■	■	■	■	■	■
Included with delivery	Mounting bracket	■	■	■	■	■	■

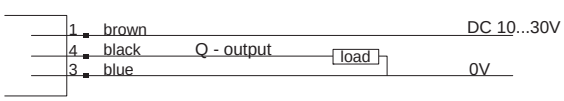
1) Average service life 50,000 h at T_A = 25°C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0°C
8) A = V_S connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Outputs overload and short-circuit protected

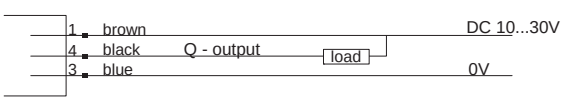
Light spot diameter



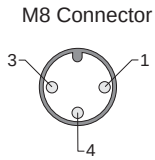
Connection diagram

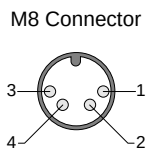






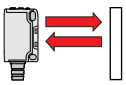
Wire colors refer to standard cable, not included with quick disconnect models.





WTE 140-2

Proximity/Diffuse Sensors - Energetic






0...35.4 in (0...900 mm)
sensing range

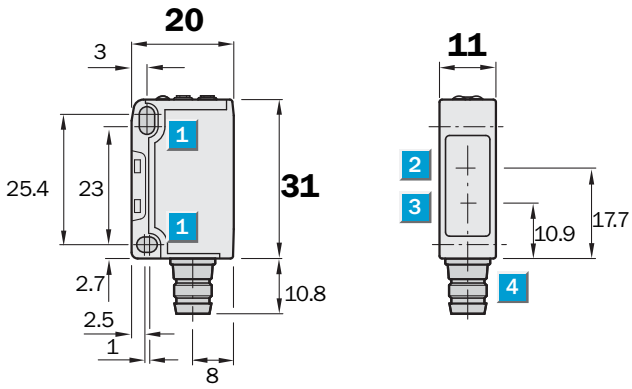
Highlights

- Signal strength indicator
- Cable or quick disconnect versions available
- Small, compact housing
- Adjustable sensing range

WTE 140

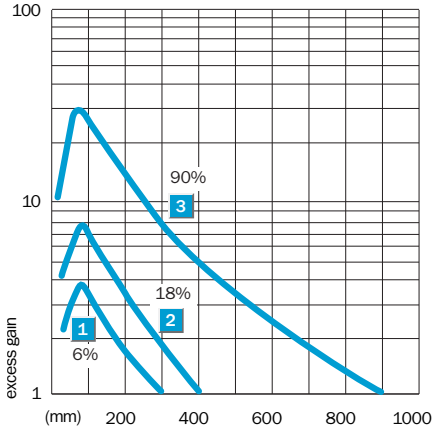


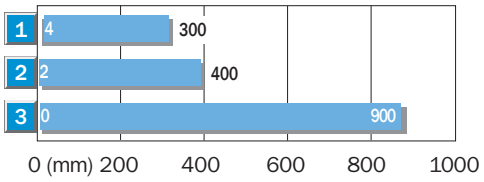
Dimensional drawing



dimensions in mm

Excess gain

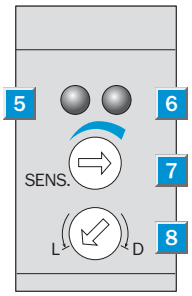




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Mounting hole Ø 3.2 mm for M3
2	Center of optical axis, receiver
3	Center of optical axis, sender
4	Plug, M8 3-/4-pin or connection cable
5	Signal strength indicator, green
6	Output indicator, orange
7	Sensitivity setting (270°)
8	Light/dark rotary switch: L = light switching, D = dark switching

Accessories	page
Cables and connectors	1180
Mounting systems	1234

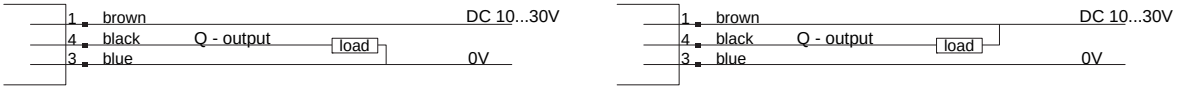
Order information

Type	Part no.
WTE 140-2P132	6 024 804
WTE 140-2P330	6 024 806
WTE 140-2P430	6 024 807
WTE 140-2N132	6 024 800
WTE 140-2N330	6 024 802
WTE 140-2N430	6 024 803

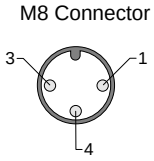
Technical data	WTE 140-2-	P132	P330	P430	N132	N330	N430
Sensing range, adjustable	0...35.4 in (0...900 mm)[1]	■	■	■	■	■	■
Sensitivity, adjustable	Potentiometer, 270°	■	■	■	■	■	■
Light source[2]	LED, visible red light	■	■	■	■	■	■
Light spot diameter	2 in at 11.8 in (50 mm at 300 mm)	■	■	■	■	■	■
Angle of divergence	Approx. 4.8°	■	■	■	■	■	■
Supply voltage V_S[3]	10...30 V DC	■	■	■	■	■	■
Ripple[4]	± 10%	■	■	■	■	■	■
Current consumption[5]	≤ 30 mA	■	■	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■	■			
	NPN, open collector: Q				■	■	■
Switching type, adjustable	Light/dark switching via switch[6]	■	■	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■
Response time[7]	≤ 0.5 ms	■	■	■	■	■	■
Max. switching frequency[8]	1000 Hz	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[9]; 3 x 0.18 mm², Ø 4.0 mm	■			■		
	Plug, M8 3-pin		■			■	
	Plug, M8 4-pin			■			■
VDE protection class[10]	□	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
Circuit protection[11]	A, B, C, D	■	■	■	■	■	■
Ambient temperature	Operation -13...131° F (-25 ... 55° C)	■	■	■	■	■	■
	Storage -40...158° F (-40 ... 70° C)	■	■	■	■	■	■
Approximate weight	1.9 oz (53 g)	■			■		
	0.3 oz (9 g)		■	■		■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■

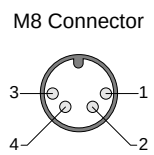
1) Object with 90% reflectance (with reference to standard white according to DIN 5033)
2) Average service life 100,000 h at T_U = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) L = light switching, D = dark switching
7) With resistive load
8) With light/dark ratio 1:1
9) Do not bend cable below 0° C
10) Rated voltage 50 V DC
11) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram



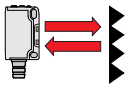
Wire colors refer to standard cable, not included with quick disconnect models.





WL 140-2

Reflex/Retro-Reflective Sensors






0.03...19.7 ft (0.01...6.0 m)
sensing range

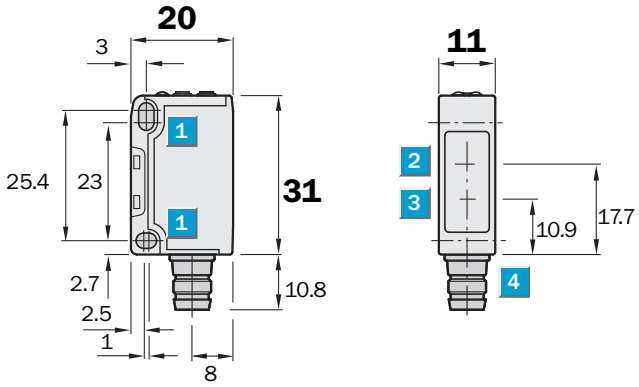
Highlights

- Small, compact housing
- Signal strength indicator
- Cable or quick disconnect versions available
- Adjustable sensitivity

WL 140

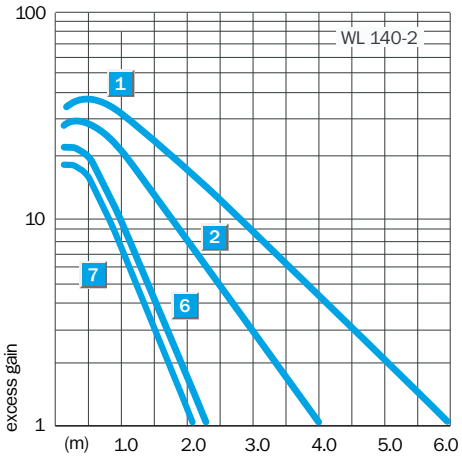


Dimensional drawing



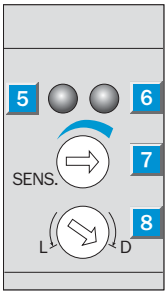
dimensions in mm

Excess gain



Adjustments

All types



1 Mounting hole Ø 3.2 mm for M3
2 Center of optical axis, receiver
3 Center of optical axis, sender
4 Plug, M8 3-/4-pin or connection cable
5 Signal strength indicator, green
6 Output indicator, orange
7 Sensitivity setting (270°)
8 Light/dark rotary switch:
L = light switching, D = dark switching

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Reflector type		Sensing range
1	PL 80 A	0.01...5.0 m
2	PL 250	0.01...3.5 m
3	PL 50 A/40 A	0.01...3.8 m
4	PL 30 A/31 A	0.01...3.0 m
5	PL 20 A	0.01...2.2 m
6	PL 45	0.01...1.7 m
7	Reflective tape diamond grade	0.01...2.0 m

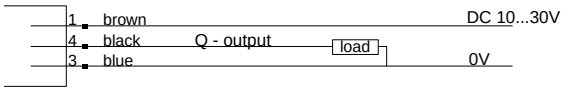
Order information	
Type	**Part no.**
WL 140-2P132	6 024 796
WL 140-2P330	6 024 798
WL 140-2P430	6 024 799
WL 140-2N132	6 024 792
WL 140-2N330	6 024 794
WL 140-2N430	6 024 795

Technical data	WL 140-2-	P132	P330	P430	N132	N330	N430
Sensing range	0.03...19.7 ft (0.01...6.0 m)/PL 80 A	■	■	■	■	■	■
	0.03...7.2 ft (0.01...2.2 m)/P 45[1]	■	■	■	■	■	■
Sensitivity, adjustable	Potentiometer, (270°)	■	■	■	■	■	■
Light source[2]	LED, visible red light, polarized	■	■	■	■	■	■
Light spot diameter	5.9 in at 8.2 ft (150 mm at 2.5 m)	■	■	■	■	■	■
Angle of divergence	Approx. 3.5°	■	■	■	■	■	■
Supply voltage V_S[3]	10...30 V DC	■	■	■	■	■	■
Ripple[4]	± 10%	■	■	■	■	■	■
Current consumption[5]	≤ 30 mA	■	■	■			
Switching outputs	PNP, open collector: Q				■	■	■
	NPN, open collector: Q	■	■	■	■	■	■
Switching type, adjustable	Light/dark switching via switch[6]	■	■	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■
Response time[7]	≤ 0.5 ms	■	■	■	■	■	■
Max. switching frequency[8]	1000 Hz	■			■		
Connection type	Cable, PVC, 2 m[9]; 3 x 0.18 mm², Ø 4.0 mm		■			■	
	Plug, M8 3-pin			■			■
	Plug, M8 4-pin	■	■	■	■	■	■
VDE protection class[10]	□	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
Circuit protection[11]	A, B, C, D	■	■	■	■	■	■
Ambient temperature	Operation -13...131° F (-25 ... 55° C)	■	■	■	■	■	■
	Storage -40...158° F (-40... 70° C)	■			■		
Approximate weight	1.9 oz (53 g)		■	■		■	■
	0.3 oz (9 g)	■	■	■	■	■	■
Housing material	Glass fiber reinforced ABS						

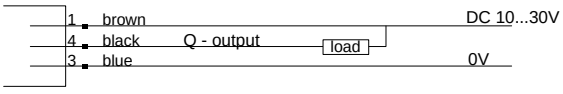
1) Reflector P 45 supplied with equipment
2) Average service life 100.000 h at T_U = 25°C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) L = light switching, D = dark switching
7) With resistive load
8) With light/dark ratio 1 : 1
9) Do not bend cable below 0° C
10) Rated voltage 50 V DC
11) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

PNP Models

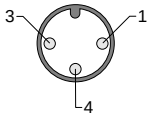


NPN Models

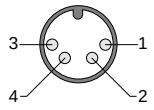


wire colors refer to standard cable, not included with quick disconnect models.

M8 Connector

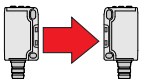


M8 Connector



WS/WE 140-2

Through-beam Sensors






0...49.2 ft (0...15 m)
sensing range

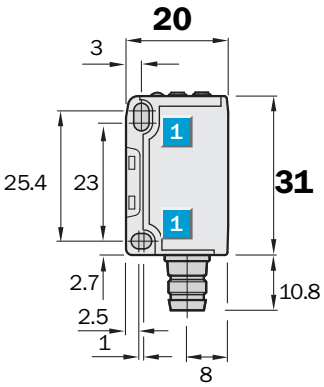
Highlights

- Small, compact housing
- Slotted masks for detecting small parts or for positioning jobs
- Adjustable sensitivity
- Signal strength indicator
- Cable or quick disconnect versions available
- Polarizing filters provide crosstalk immunity

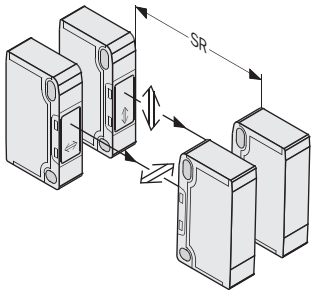
WS/WE 140



Dimensional drawing

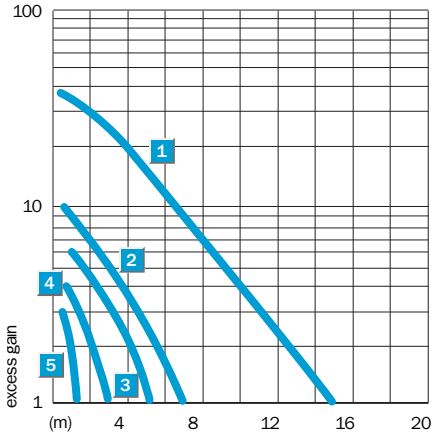


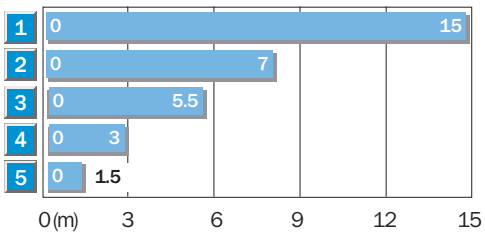
WS/WE 140 mounting in pairs
No mutual interference due to use of polarizing filter tip adapters BL-140-POLF
e.g., Pair 1: BL-140-POLF with polarizing level
Pair 2: BL-140-POLF with polarizing level



dimensions in mm

Excess gain



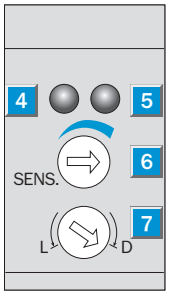


Sensing range reduction with slotted masks

1	Without masks/polarizing filter
2	With polarizing filter tip adapter
3	With slotted mask, width 2.0 mm
4	With slotted mask, width 1.0 mm
5	With slotted mask, width 0.5 mm

Adjustments

All types



1	Mounting hole Ø 3.2 mm for M3
2	Optics center – WS 140 sender Optics center – WE 140 receiver
3	M8 plug, 3-/4-pin or connection cable
4	Green LED indicator:light reception with operating reserve > 1.1 (WE 140) and < 1.0
5	Orange LED indicator:switching output active
6	Sensitivity setting (270°, WE 140)
7	Light/dark rotary switch: L = light switching, D = dark switching (WE 140)

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

Order information

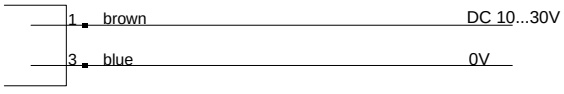
Type	Part no.[11]
WS/WE 140-2P132	6 024 788
WS/WE 140-2P330	6 024 790
WS/WE 140-2P430	6 024 791
WS/WE 140-2N132	6 024 784
WS/WE 140-2N330	6 024 786
WS/WE 140-2N430	6 024 787

Technical data		WS/WE 140-2-	P132	P330	P430	N132	N330	N430
Sensing range		0...49.2 ft (0...15 m)	■	■	■	■	■	■
Range with polarizing filter		16.4 ft (5.0 m)	■	■	■	■	■	■
Range with mask 0.08 in (2.0 mm)		13.1 ft (4.0 m)	■	■	■	■	■	■
Range with mask 0.04 in (1.0 mm)		6.6 ft (2.0 m)	■	■	■	■	■	■
Range with mask 0.02 in (0.5 mm)		3.2 ft (1.0 m)	■	■	■	■	■	■
Sensitivity, adjustable		Potentiometer, 270°	■	■	■	■	■	■
Light source[1]		LED, visible red light	■	■	■	■	■	■
Light spot diameter		25.6 in at 39.4 ft (650 mm at 12 m)	■	■	■	■	■	■
Angle of divergence, sender		Approx. 3.1°	■	■	■	■	■	■
Angle of reception, receiver		Approx. 15°	■	■	■	■	■	■
Supply voltage V_S[2]		10...30 V DC	■	■	■	■	■	■
Ripple[3]		± 10%	■	■	■	■	■	■
Current consumption[4] Transm./receiv.		≤ 15 mA/≤ 20 mA	■	■	■	■	■	■
Switching outputs		PNP, open collector: Q	■	■	■			
		NPN, open collector: Q				■	■	■
Switching type, (WE 140)		Light/dark switching per rotary switch[5]	■	■	■	■	■	■
Output current I_A max.		100 mA	■	■	■	■	■	■
Response time[6]		≤ 0.5 ms	■	■	■	■	■	■
Max. switching frequency[7]		1000 Hz	■	■	■	■	■	■
Connection type	WS 140	Cable, PVC, 2 m[8]; 2 x 0.18 mm², Ø 4..0 mm	■			■		
	WE 140	Cable, PVC, 2 m[8]; 3 x 0.18 mm², Ø 4.0 mm	■			■		
		Plug, M8 3-pin		■			■	
		Plug, M8 4-pin			■			■
VDE protection class[9]		⧈	■	■	■	■	■	■
Enclosure rating		IP 67	■	■	■	■	■	■
Circuit protection[10]		WS 140 A	■	■	■	■	■	■
		WE 140 A, B, C, D	■	■	■	■	■	■
Ambient temperature		Operation -13...131° F (-25...55° C)	■	■	■	■	■	■
		Storage -40...158° F (-40... 70° C)	■	■	■	■	■	■
Approximate weight		Sender: 1.9 oz (53 g), receiver: 1.9 oz (53 g)	■			■		
		Sender: 0.3 oz (9 g), receiver: 0.3 oz (9 g)		■	■		■	■
Housing material		Glass fiber reinforced ABS	■	■	■	■	■	■

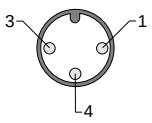
1) Average service life 100,000 h at T_U = 25° C
2) Limit values
3) Must be within V_S tolerances
4) Without load
5) L = light switching, D = dark switching
6) With resistive load
7) With light/dark ratio 1:1
8) Do not bend cable below 0° C
9) Rated voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected
11) The order no. includes transmitter and receiver

Connection diagram

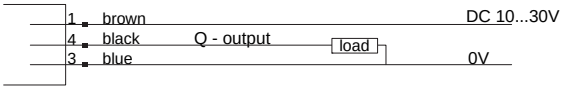
Sender



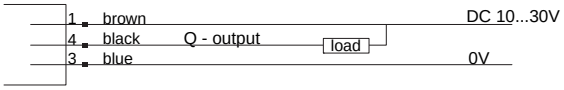
M8 Connector



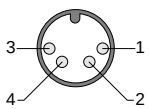
PNP Models



NPN Models



M8 Connector



Wire colors refer to standard cable, not included with quick disconnect models.

WTB 140

Proximity/Diffuse Sensors - Background Suppression



0.08...19.7 in (2...500 mm)

sensing range

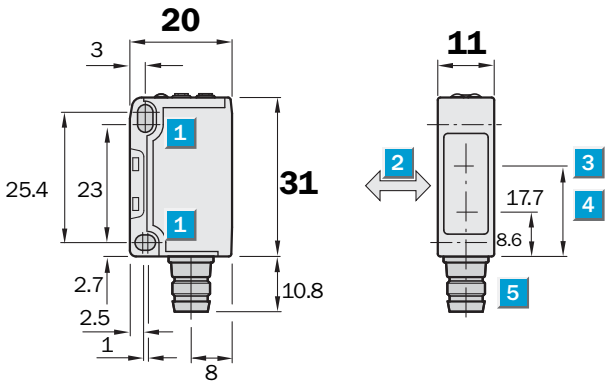
Highlights

- Small, compact housing
- Adjustable background suppression
- Optional OFF delay
- Switching point independent of object color or surface
- Cable or quick disconnect versions available

WTB 140

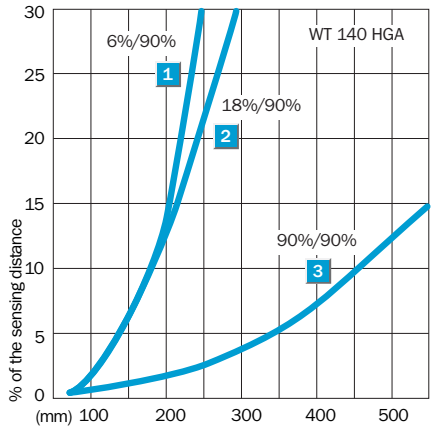


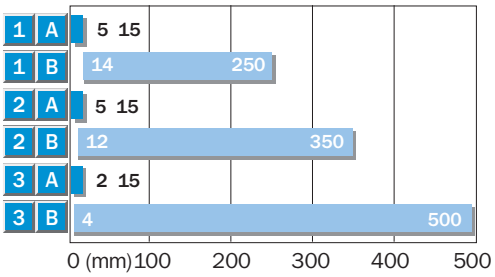
Dimensional drawing



dimensions in mm

Background suppression



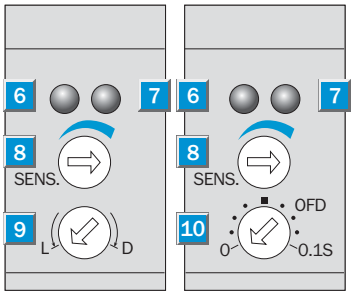


1	Sensing range on black[15], white background
2	Sensing range on gray[15], white background
3	Sensing range on white[15], white background
A	Sensing range control set to MIN
B	Sensing range control set to MAX

(see footnotes on next page)

Adjustments

WTB 140-P132	WTB 140-P122
WTB 140-N132	WTB 140-N122
WTB 140-P330	WTB 140-P420
WTB 140-N330	WTB 140-N420
WTB 140-P430	
WTB 140-N430	



1	Mounting hole Ø 3.2 mm for M3
2	Standard direction of the material to be sensed
3	Center of optical axis, receiver
4	Center of optical axis, sender
5	Plug, M8 3-/4-pin or connection cable
6	Signal strength indicator, green
7	Output indicator, orange
8	Sensing range control (5 turns)
9	Light/dark rotary switch: L = light switching, D = dark switching
10	OFF delay selector switch (switch-off delay) t_{OFF}; t = 0 s (OFF) ... 0.1 s

Order information

Type	Order no.
WTB 140-P132	6 012 640
WTB 140-P330	6 012 642
WTB 140-P430	6 012 643
WTB 140-N132	6 012 636
WTB 140-N330	6 012 638
WTB 140-N430	6 012 639
WTB 140-P122	6 012 632
WTB 140-P420	6 012 635
WTB 140-N122	6 012 628
WTB 140-N420	6 012 631

Accessories	page
Cables and connectors	1180
Mounting systems	1234

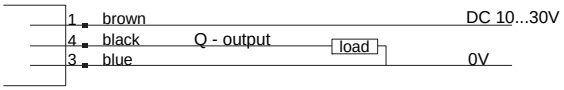
7028071 - © 2008 SICK, Inc.

Technical data	WTB 140-	P132	P330	P430	N132	N330	N430	P122	P420	N122	N420
Sensing range[1], adjustable	0.08...19.7 in (2...500 mm)	■	■	■	■	■	■	■	■	■	■
Background suppression	0.6...19.7 in (15...500 mm)	■	■	■	■	■	■	■	■	■	■
Background suppression capability	% of set sensing distance[2]	■	■	■	■	■	■	■	■	■	■
Light source[3]	LED, visible red light	■	■	■	■	■	■	■	■	■	■
Light spot diameter	0.6 in at 7.9 in (15 mm at 200 mm)	■	■	■	■	■	■	■	■	■	■
Angle of divergence	Approx. 4.3°	■	■	■	■	■	■	■	■	■	■
Supply voltage V_S[4]	10...30 V DC	■	■	■	■	■	■	■	■	■	■
Ripple[5]	± 10%	■	■	■	■	■	■	■	■	■	■
Current consumption[6]	≤ 30 mA	■	■	■	■	■	■	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■	■				■	■		
	NPN, open collector: Q				■	■	■			■	■
Switching mode[7]	Light/dark switching via switch[8]	■	■	■	■	■	■				
	per control wire L/D[9]							■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■	■	■	■	■
Response time[10]	≤ 0.5 ms	■	■	■	■	■	■	■	■	■	■
Max. switching frequency[11]	1000 Hz	■	■	■	■	■	■	■	■	■	■
Timing options	Adjust 0 ... 100 ms; (OFF delay)							■	■	■	■
	270° Potentiometer							■	■	■	■
Connection types	Cable, PVC, 2 m[12]; 3 x 0.18 mm², Ø 4.0 mm	■			■						
	Cable, PVC, 2 m[12]; 4 x 0.18 mm², Ø 4.0 mm							■		■	
	Plug, M8 3-pin		■			■					
	Plug, M8 4-pin			■			■		■		■
VDE protection class[13]	⧈	■	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■	■	■
Circuit protection[14]	A, B, C, D	■	■	■	■	■	■	■	■	■	■
Ambient temperature	Operation -13...131° F (-25...55° C)	■	■	■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■	■	■	■	■
Approximate weight	1.9 oz (53 g)	■			■			■		■	
	0.3 oz (9 g)		■	■		■	■		■		■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■	■	■	■	■

1) Object with 90% reflectance (with reference to standard white according to DIN 5033)
2) See characteristic curve
3) Average service life 100,000 h at T_U = 25° C
4) Limit values
5) Must be within V_S tolerances
6) Without load
7) Adjustable
8) L = light switching, D = dark switching
9) + V_S = light switching
0 V = dark switching
10) With resistive load
11) With light/dark ratio 1 : 1
12) Do not bend cable below 0° C
13) Rated voltage 50 V DC
14) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected
15) Black = 6% reflectance
Gray = 18% reflectance
White = 90% reflectance

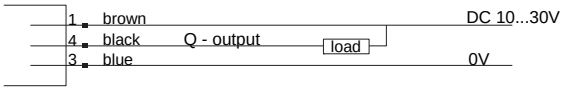
Connection diagram

PNP Models

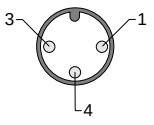


Wire colors refer to standard cable, not included with quick disconnect models.

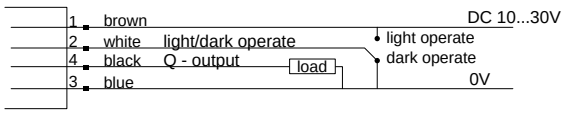
NPN Models



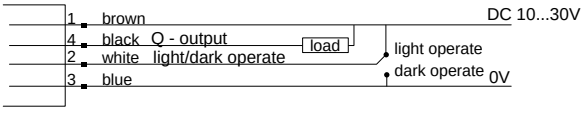
M8 Connector



PNP Models

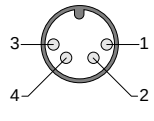


NPN Models



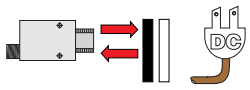
wire colors refer to standard cable, not included with quick disconnect models

M8 Connector



WT 1000 50 mm

Proximity/Diffuse Sensors - Background Suppression





2.0 ±0.39 in (50 ±10 mm)
sensing range

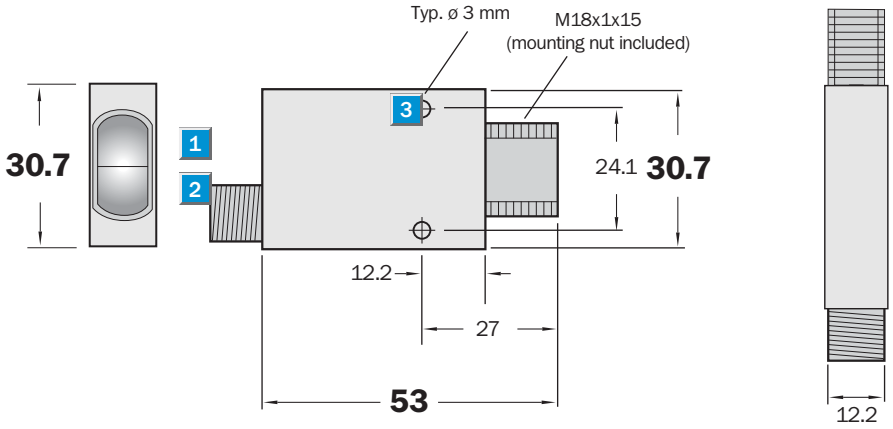
Highlights

- Fixed background suppression provides superior performance to focused sensors
- Excels at sensing dark objects on light colored backgrounds
- Signal strength indicator
- Digital signal evaluation provides exceptional ambient light immunity
- Plastic housing is ultrasonically welded for outstanding durability
- Cable or quick disconnect versions available

WT 1000 50

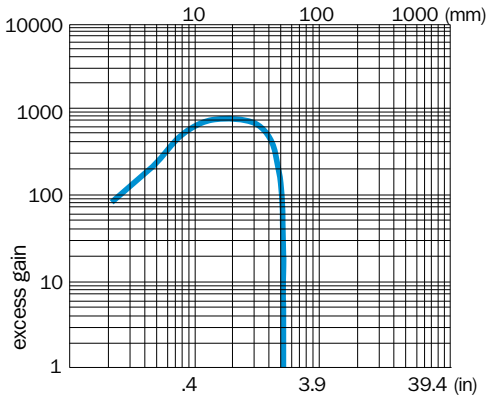


Dimensional drawing



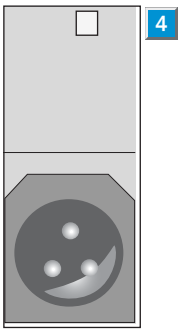
dimensions in mm

Excess gain



Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 3 mm through hole for mounting
4 LED output indicator, yellow

Accessories	page
Cables and connectors	1180
Mounting systems	1234

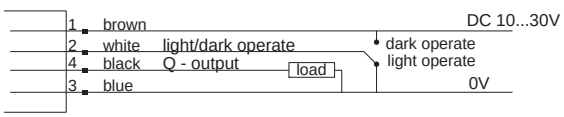
Order information

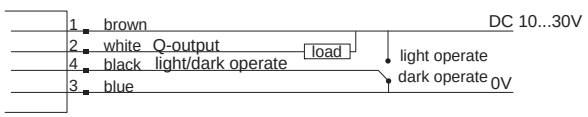
Type	Part no.
WT 1000-P152	7 023 817
WT 1000-P450	7 023 818
WT 1000-P451	7 024 615
WT 1000-N152	7 023 819
WT 1000-N450	7 023 820
WT 1000-N451	7 024 616

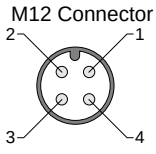
Technical data	WT 1000-	P152	P450	P451	N152	N450	N451
Sensing range, fixed	2.0 ±0.39 in (50 ±10 mm)	■	■	■	■	■	■
Background suppression	6%/90%: ≤ 5% 0.09 in at 2 in (2.5 mm at 50 mm)	■	■	■	■	■	■
Background suppression capability	% of set sensing distance (see previous pg)	■	■	■	■	■	■
Light source[1], light type	LED, infrared (880 nm)	■	■	■	■	■	■
Light spot diameter	Approx. 0.36 in at 2 in (9.2 mm at 50 mm)	■	■	■	■	■	■
Angle of divergence	Approx. 3.5°	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC	■	■	■	■	■	■
Ripple[2]	≤ 5 V peak to peak	■	■	■	■	■	■
Current consumption[3]	≤ 50 mA	■	■	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■	■			
	NPN, open collector: Q				■	■	■
Max. output current I_A	100 mA	■	■	■	■	■	■
Switching mode[6]	Light or dark switching selectable via control wire L/D	■	■	■	■	■	■
Response time[4]	600 µs	■	■	■	■	■	■
Max. switching frequency[5]	840 Hz	■	■	■	■	■	■
Connection types	Cable, 2 m	■			■		
	Plug, M12 4-pin		■			■	
	Plug, M12 4-pin, with cable, 150 m			■			■
VDE protection class[6]	□	■	■	■	■	■	■
Circuit protection[7]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■
Approximate weight	3.5 oz (100 g)	■		■	■		■
	1.1 oz (30 g)		■			■	
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■

1) Average service life 100,000 h where T_A = 25° C
2) May not exceed or fall short of V_S tolerances
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Reference voltage 50 V DC
7) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression

Connection diagram

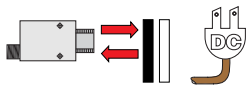






WT 1000 100 mm

Proximity/Diffuse Sensors - Background Suppression





4 in ±0.9 in (100 ±22 mm)
sensing range

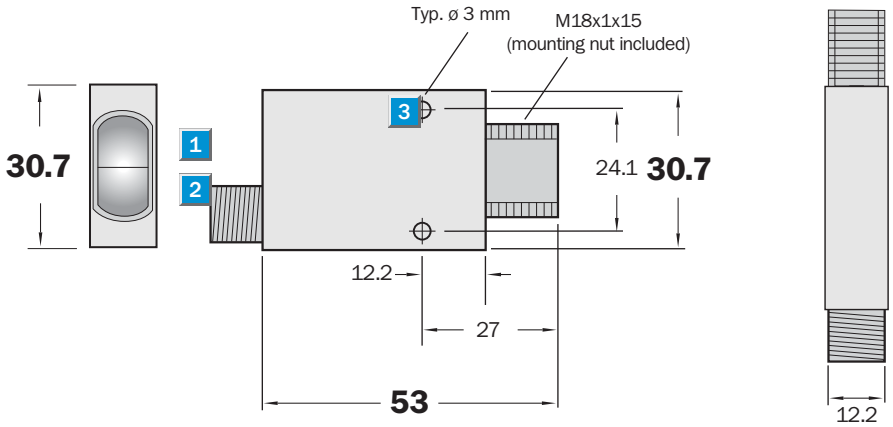
Highlights

- Fixed background suppression provides superior performance to focused sensors
- Excels at sensing dark objects on light colored backgrounds
- Signal strength indicator
- Digital signal evaluation provides exceptional ambient light immunity
- Plastic housing is ultrasonically welded for outstanding durability
- Cable or quick disconnect versions available

WT 1000

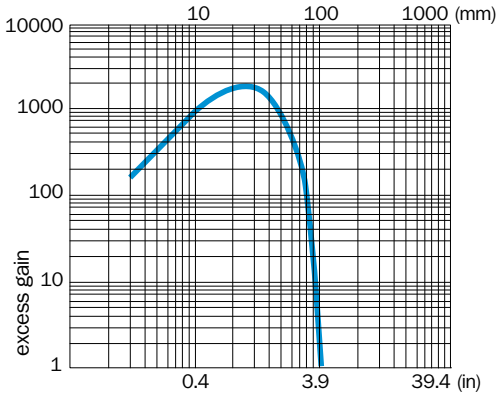


Dimensional drawing



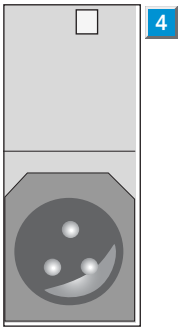
dimensions in mm

Excess gain



Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 3 mm through hole for mounting
4 LED output indicator, yellow

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

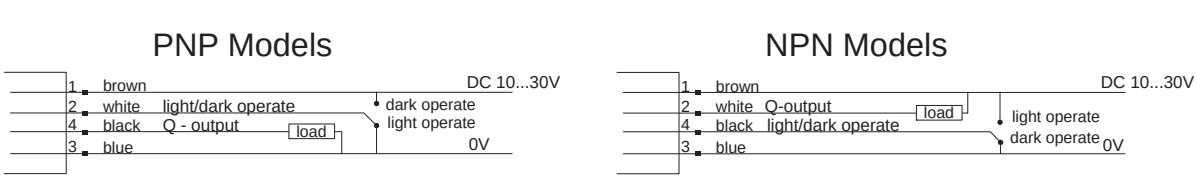
Type	Part no.
WT 1000-P162	7 023 823
WT 1000-P460	7 023 824
WT 1000-P461	7 024 617
WT 1000-N162	7 023 825
WT 1000-N460	7 023 826
WT 1000-N461	7 024 618

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Technical data	WT 1000-	P162	P460	P461	N162	N460	N461
Sensing range, fixed	4.0 ±0.9 in (100 ±22 mm)	■	■	■	■	■	■
Background suppression	6%/90%: ≤5% 0.4 in at 4 in (10 mm at 100 mm)	■	■	■	■	■	■
Background suppression capability	% of set sensing distance (see previous pg)	■	■	■	■	■	■
Light source[1], **light type**	LED, infrared light, 880 nm	■	■	■	■	■	■
Light spot diameter	Approx. 0.47 in at 3.9 in (12 mm at 100 mm)	■	■	■	■	■	■
Angle of divergence	Approx. 3.5°	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC	■	■	■	■	■	■
Ripple[2]	≤ 5 V peak to peak	■	■	■	■	■	■
Current consumption[3]	≤ 50 mA	■	■	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■	■			
	NPN, open collector: Q				■	■	■
Max. output current I_A	100 mA	■	■	■	■	■	■
Switching mode[6]	Light or dark switching selectable via control wire L/D	■	■	■	■	■	■
Response time[4]	600 µs	■	■	■	■	■	■
Max. switching frequency[5]	840 Hz	■	■	■	■	■	■
Connection types	Cable, 2 m	■			■		
	Plug, M12 4-pin		■			■	
	Plug, M12 4-pin, with cable, 150 m			■			■
VDE protection class[6]	□	■	■	■	■	■	■
Circuit protection[7]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■
Approximate weight	3.5 oz (100 g)	■		■	■		■
	1.1 oz (30 g)		■			■	
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■

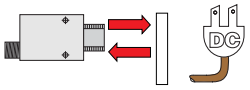
1) Average service life 100,000 h where $T_A = 25°$ C
2) May not exceed or fall short of V_S tolerances
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Reference voltage 50 V DC
7) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression

Connection diagram



WT 1000

Proximity/Diffuse Sensors - Energetic





0.4...19.7 in (10...500 mm)

sensing range

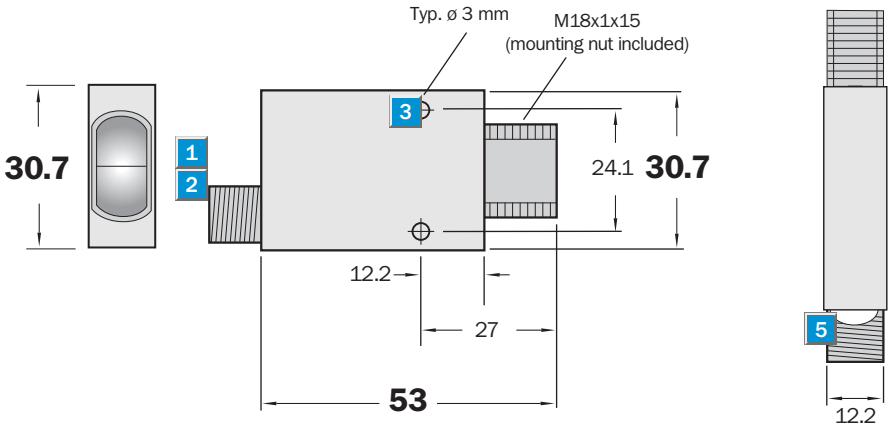
Highlights

- Energetic proximity sensor with “one touch” teach-in feature
- Two teach-in modes for easy detection of any object
- Superior sensing range of 500 mm
- Signal strength indicator
- Digital signal evaluation provides exceptional ambient light immunity
- Plastic housing is ultrasonically welded for outstanding durability
- Cable or quick disconnect versions available

WT 1000

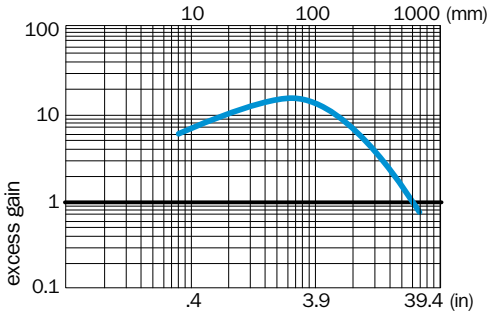


Dimensional drawing



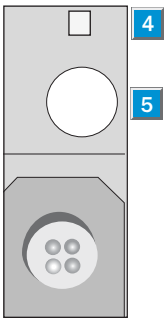
dimensions in mm

Excess gain



Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 3 mm through hole for mounting
4 LED output indicator, yellow
5 Teach-in button

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WT 1000-P112	7 023 811
WT 1000-P410	7 023 812
WT 1000-P411	7 024 613
WT 1000-N112	7 023 813
WT 1000-N410	7 023 814
WT 1000-N411	7 024 614

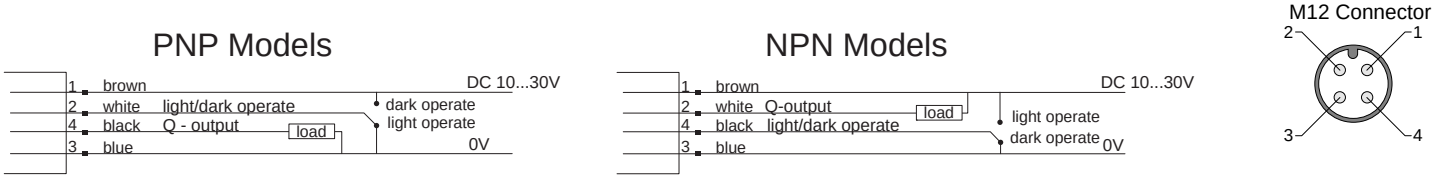
Technical data	WT 1000-	P112	P410	P411	N112	N410	N411
Sensing range, adjustable	0.4...19.7 in (10...500 mm)	■	■	■	■	■	■
Light source[1], **light type**	LED, infrared light, 880 nm	■	■	■	■	■	■
Light spot diameter	Approx. 2.8 in at 15 in (70 mm at 380 mm)	■	■	■	■	■	■
Angle of divergence	Approx. 10.5°	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC	■	■	■	■	■	■
Ripple[2]	≤ 5 V peak to peak	■	■	■	■	■	■
Current consumption[3]	≤ 50 mA	■	■	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■	■			
	NPN, open collector: Q				■	■	■
Max. output current I_A	100 mA	■	■	■	■	■	■
Switching mode[6]	Light or dark switching selectable via control wire L/D	■	■	■	■	■	■
Response time[4]	600 µs	■	■	■	■	■	■
Max. switching frequency[5]	840 Hz	■	■	■	■	■	■
Connection types	Cable, 2 m	■			■		
	Plug, M12 4-pin		■			■	
	Plug, M12 4-pin, with cable, 150 m			■			■
VDE protection class[6]	□	■	■	■	■	■	■
Circuit protection[7]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■
Approximate weight	3.5 oz (100 g)	■		■	■		■
	1.1 oz (30 g)		■			■	
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■

1) Average service life 50,000 h where T_A = 25° C
2) May not exceed or fall short of V_S tolerances
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Reference voltage 50 V DC
7) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression

Teach-in function

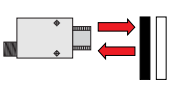
- **Programming via teach-in button.**
- **Simple programming:**
  Position object in the beam and push the button:
  finished;
  LED confirms the teach-in procedure.
- **Teach-in values can be stored.**
- **Two operating modes:**
  Default setting: short teach-in time (< 8 s);
  for standard applications;
  approx. double reserve via switching threshold;
  LED lights continuously.
  Precise setting: long teach-in time (> 8 s);
  for precise applications;
  small switching hysteresis;
  LED blinks.

Connection diagram



WT 1000 50 mm

Proximity/Diffuse Sensors-Background Suppression







2.0 ±0.4 in (50 ±10 mm)
sensing range

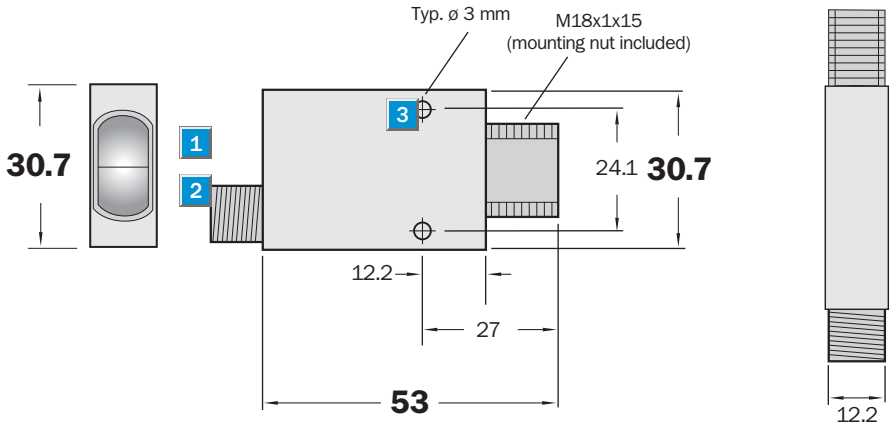
Highlights

- Fixed background suppression provides superior performance to focused sensors
- Excels at sensing dark objects on light colored backgrounds
- Signal strength indicator
- Digital signal evaluation provides exceptional ambient light immunity
- Plastic housing is ultrasonically welded for outstanding durability
- Cable or quick disconnect versions available

WT 1000 50

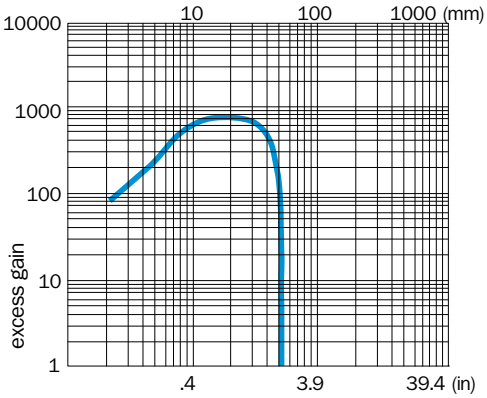


Dimensional drawing



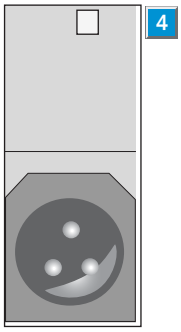
dimensions in mm

Excess gain



Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 3 mm through hole for mounting
4 LED output indicator, yellow

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

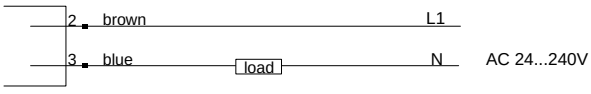
Type	Part no.
WT 1000-S152	7 025 947
WT 1000-S350	7 025 951
WT 1000-S351	7 025 952
WT 1000-T152	7 023 821
WT 1000-T350	7 023 822
WT 1000-T351	7 025 957

Technical data	WT 1000-	S152	S350	S351	T152	T350	T351			
Sensing range, fixed	2.0 ±0.39 in (50 ±10 mm)	■	■	■	■	■	■			
Background suppression	6%/90%: ≤ 3% 0.06 in at 2 in (1.5 mm at 50 mm)	■	■	■	■	■	■			
Background suppression capability	% of set sensing distance (see previous pg)	■	■	■	■	■	■			
Light source[1], light type	LED, infrared light, 880 nm	■	■	■	■	■	■			
Light spot diameter	Approx. 0.36 in at 2 in (9.2 mm at 50 mm)	■	■	■	■	■	■			
Angle of divergence	Approx. 10.5°	■	■	■	■	■	■			
Supply voltage V_S	24...240 V AC	■	■	■	■	■	■			
Leakage current, max.	1.7 mA (OFF state)	■	■	■	■	■	■			
Switching outputs	Triac	■	■	■	■	■	■			
Max. output current I_A	5...100 mA (5...300 mm at ≤50° C)	■	■	■	■	■	■			
Switching mode	Light switching				■	■	■			
	Dark switching	■	■	■						
Response time[2]	8.3 µs	■	■	■	■	■	■			
Max. switching frequency[3]	60 Hz	■	■	■	■	■	■			
Connection types	Cable, 2 m	■			■					
	Plug, micro 3-pin		■			■				
	Plug, micro 3-pin, with cable 150 mm			■			■			
VDE protection class[4]	□	■	■	■	■	■	■			
Circuit protection	Interference pulse suppression	■	■	■	■	■	■			
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■			
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■	■	■	■			
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■			
Approximate weight	3.5 oz (100 g)		■			■				
	1.1 oz (30 g)	■		■	■		■			
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■			

1) Average service life 50,000 h where T_A = 25° C

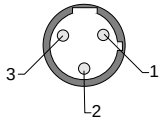
2) Signal transit time with resistive load
3) With light/dark ratio 1:1
4) Reference voltage 250 V AC

Connection diagram



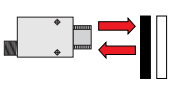
wire colors refer to standard cable, not included with quick disconnect models.

Micro Connector



WT 1000 100 mm

Proximity/Diffuse Sensors-Background Suppression





4.0 ±0.8 in (100 ±20 mm)
sensing range

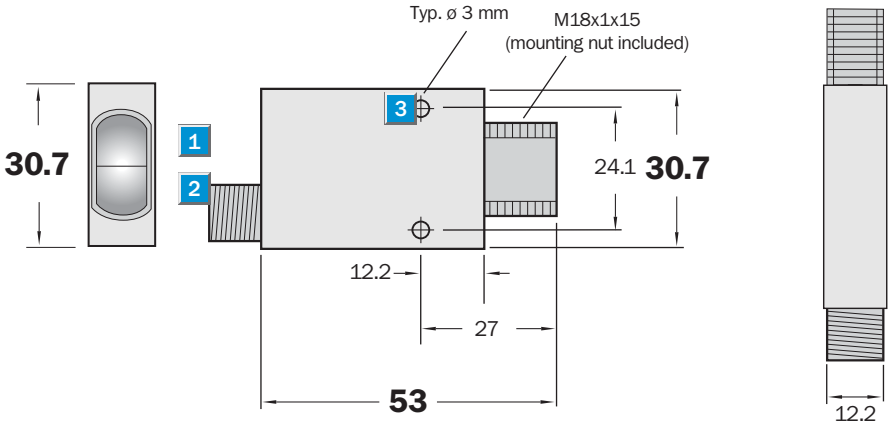
Highlights

- Fixed background suppression provides superior performance to focused sensors
- Excels at sensing dark objects on light colored backgrounds
- Signal strength indicator
- Digital signal evaluation provides exceptional ambient light immunity
- Plastic housing is ultrasonically welded for outstanding durability
- Cable or quick disconnect versions available

WT 1000 100

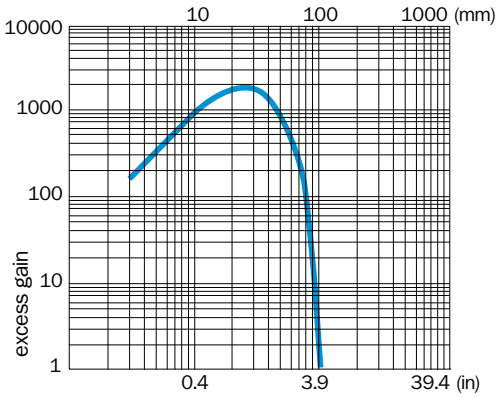


Dimensional drawing



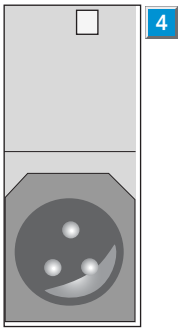
dimensions in mm

Excess gain



Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 3 mm through hole for mounting
4 LED output indicator, yellow

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WT 1000-S162	7 025 949
WT 1000-S360	7 025 953
WT 1000-S361	7 025 954
WT 1000-T162	7 023 827
WT 1000-T360	7 023 828
WT 1000-T361	7 025 958

Technical data	WT 1000-	S162	S360	S361	T162	T360	T361
Sensing range, fixed	4.0 ±0.8 in (100 ±20 mm)	■	■	■	■	■	■
Background suppression	6%/90%: ≤ 5% 0.2 in at 4 in (5 mm at 100 mm)	■	■	■	■	■	■
Background suppression capability	% of set sensing distance (see previous pg)	■	■	■	■	■	■
Light source[1], light type	LED, infrared light, 880 nm	■	■	■	■	■	■
Light spot diameter	Approx. 0.7 in at 4 in (18.4 mm at 100 mm)	■	■	■	■	■	■
Angle of divergence	Approx. 10.5°	■	■	■	■	■	■
Supply voltage V_S	24...240 V AC	■	■	■	■	■	■
Leakage current, max.	1.7 mA (OFF state)	■	■	■	■	■	■
Switching outputs	Triac	■	■	■	■	■	■
Max. output current I_A	5...100 mA (5...300 mm at ≤50° C)	■	■	■	■	■	■
Switching mode	Light switching				■	■	■
	Dark switching	■	■	■			
Response time[2]	8.3 µs	■	■	■	■	■	■
Max. switching frequency[3]	60 Hz	■	■	■	■	■	■
Connection types	Cable, 2 m	■			■		
	Plug, micro, 3-pin		■			■	
	Plug, micro, 3-pin, with cable 150 mm			■			■
VDE protection class[4]	□	■	■	■	■	■	■
Circuit protection	Interference pulse suppression	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■
Approximate weight	3.5 oz (100 g)		■			■	
	1.1 oz (30 g)	■		■	■		■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■

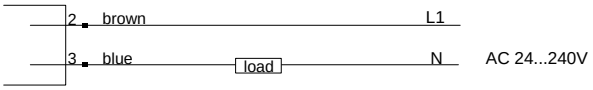
1) Average service life 50,000 h where T_A = 25° C

2) Signal transit time with resistive load

3) With light/dark ratio 1:1

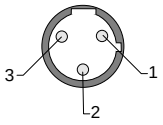
4) Reference voltage 250 V AC

Connection diagram



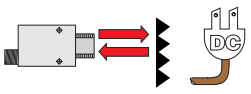
wire colors refer to standard cable, not included with quick disconnect models.

Micro Connector



WL 1000

Reflex/Retro-Reflective Sensors





0...13.8 ft (0...4.2 m)
sensing range

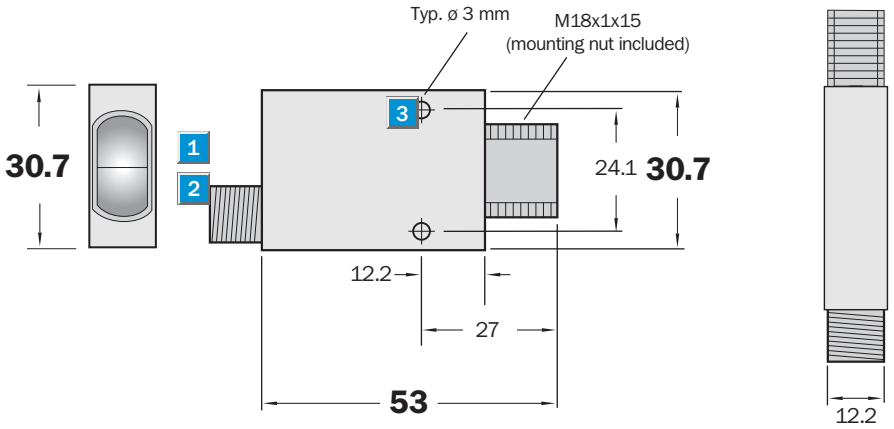
Highlights

- Polarized reflex sensor
- Stress-free molded lens for more efficient polarization and superior error rejection
- Signal strength indicator
- Digital signal evaluation provides exceptional ambient light immunity
- Plastic housing is ultrasonically welded for outstanding durability
- Cable or quick disconnect versions available

WL 1000

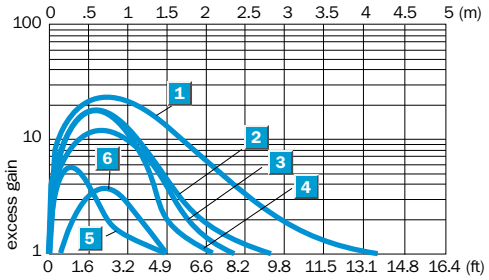


Dimensional drawing



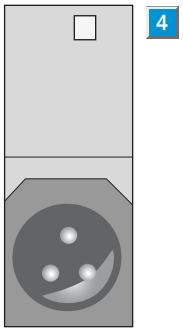
dimensions in mm

Excess gain



Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 3 mm through hole for mounting
4 LED output indicator, yellow

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Reflector type	Sensing range
1 PL 80 A	0...4.2 m
2 PL 50 A	0...2.7 m
3 PL 40 A	0...2.4 m
4 PL 30 A	0...2.0 m
5 PL 20 A	0...1.5 m
6 Reflective tape diamond grade	0...1.5 m

Order information

Type	Part no.
WL 1000-P132	7 023 829
WL 1000-P430	7 023 830
WL 1000-P431	7 024 619
WL 1000-N132	7 023 831
WL 1000-N430	7 023 832
WL 1000-N431	7 024 620

Technical data	WL 1000-	P132	P430	P431	N132	N430	N431
Sensing range[1]	0...13.8 ft (0...4.2 m)	■	■	■	■	■	■
Light source[2], **light type**	LED, red light, 660 nm, polarized	■	■	■	■	■	■
Light spot diameter	Approx. 4.5 in at 9.8 ft (115 mm at 3 m)	■	■	■	■	■	■
Angle of divergence	Approx. 2.5°	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC	■	■	■	■	■	■
Ripple[3]	≤ 5 V peak to peak	■	■	■	■	■	■
Current consumption[4]	≤ 50 mA	■	■	■	■	■	■
Switching outputs	PNP	■	■	■			
	NPN				■	■	■
Max. output current I_A	100 mA	■	■	■	■	■	■
Switching mode	Light or dark switching selectable via control wire L/D	■	■	■	■	■	■
Response time[5]	600 µs	■	■	■	■	■	■
Max. switching frequency[6]	840 Hz	■	■	■	■	■	■
Connection types	Cable, 2 m	■			■		
	Plug, M12 4-pin		■			■	
	Plug, M12 4-pin, cable, 150 mm			■			■
VDE protection class[7]	□	■	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■
Approximate weight	3.5 oz (100 g)	■		■	■		■
	1.1 oz (30 g)		■			■	
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■

1) Sensing range with:
PL80A 13.8 ft (4.2 m)
PL50A 8.9 ft (2.7 m)
PL40A 8.5 ft (2.6 m)
P975 8.2 ft (2.5 m)
PL30A 7.5 ft (2.3 m)
PL20A 4.6 ft (1.4 m)
2000X tape 4.6 ft (1.4 m)

2) Average service life 50,000 h where $T_A = 25°$ C

3) May not exceed or fall short of V_S tolerances

4) Without load

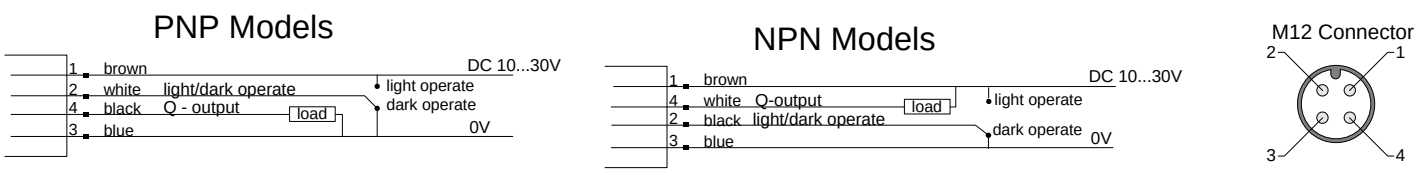
5) Signal transit time with resistive load

6) With light/dark ratio 1:1

7) Reference voltage 50 V DC

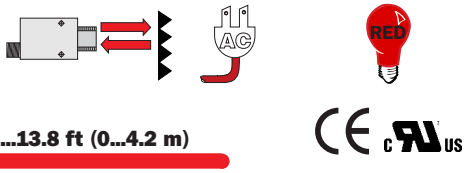
8) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression

Connection diagram



WL 1000

Reflex/Retro-Reflective Sensors



0...13.8 ft (0...4.2 m)
sensing range

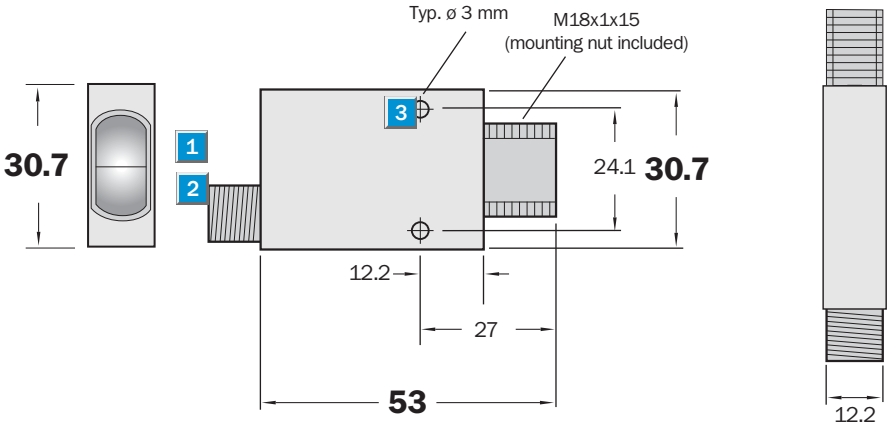
Highlights

- Polarized reflex sensor
- Stress-free molded lens for more efficient polarization and superior error rejection
- Signal strength indicator
- Digital signal evaluation provides exceptional ambient light immunity
- Plastic housing is ultrasonically welded for outstanding durability
- Cable or quick disconnect versions available

WL 1000

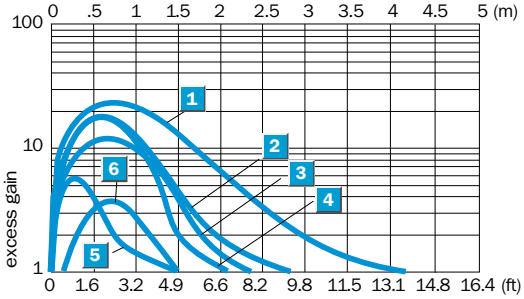


Dimensional drawing



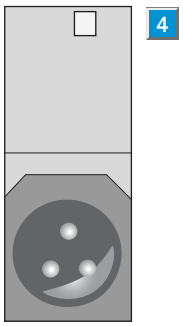
dimensions in mm

Excess gain



Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 3 mm through hole for mounting
4 LED output indicator, yellow

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Reflector type		Sensing range
1	PL 80 A	0.01...4.2 m
2	PL 50 A	0.01...2.7 m
3	PL 40 A	0.01...2.6 m
4	P 975	0.01...2.5 m
5	PL 30 A	0.01...2.3 m
6	PL 20 A	0.01...1.4 m
7	Reflective tape diamond grade	0.01...1.4 m

Order information	
Type	**Part no.**
WL 1000-S132	7 025 935
WL 1000-S330	7 025 937
WL 1000-S331	7 025 938
WL 1000-T132	7 023 833
WL 1000-T330	7 023 834
WL 1000-T331	7 025 940

Technical data	WL 1000-	S132	S330	S331	T132	T330	T331
Sensing range[1]	0...13.8 ft (0...4.2 m)	■	■	■	■	■	■
Light source[2], **light type**	LED, red light, 660 nm, polarized	■	■	■	■	■	■
Light spot diameter	Approx. 4.5 in at 9.8 ft (115 mm at 3 m)	■	■	■	■	■	■
Angle of divergence	Approx. 2.5°	■	■	■	■	■	■
Supply voltage V_S	24...240 V AC	■	■	■	■	■	■
Leakage current, max.	1.7 mA (OFF state)	■	■	■	■	■	■
Switching outputs	Triac	■	■	■	■	■	■
Max. output current I_A	5...100 mA (5...300 mA at ≤50° C)	■	■	■	■	■	■
Switching mode	Light operate				■	■	■
	Dark operate	■	■	■			
Response time[3]	8.3 µs	■	■	■	■	■	■
Max. switching frequency[4]	60 Hz	■	■	■	■	■	■
Connection types	Cable, 2 m	■			■		
	Plug, micro 3-pin		■			■	
	Plug, micro 3-pin, cable, 150 mm			■			■
VDE protection class[5]	□	■	■	■	■	■	■
Circuit protection	Interference pulse suppression	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■
Approximate weight	3.5 oz (100 g)	■		■	■		■
	1.1 oz (30 g)		■			■	
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■

1) Sensing range with:
PL80A 13.8 ft (4.2 m)
PL50A 8.9 ft (2.7 m)
PL40A 8.5 ft (2.6 m)
P975 8.2 ft (2.5 m)
PL30A 7.5 ft (2.3 m)
PL20A 4.6 ft (1.4 m)
Diamond grade tape 4.6 ft (1.4 m)

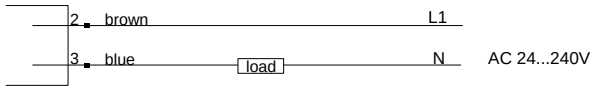
2) Average service life 50,000 h where T_A = 25° C

3) Signal transit time with resistive load

4) With light/dark ratio 1:1

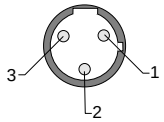
5) Reference voltage 250 V AC

Connection diagram



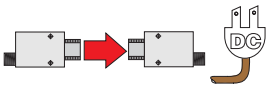
wire colors refer to standard cable, not included with quick disconnect models.

Micro Connector



WS/WE 1000

Through-beam Sensors





0...16.4 ft (0...5 m)
sensing range

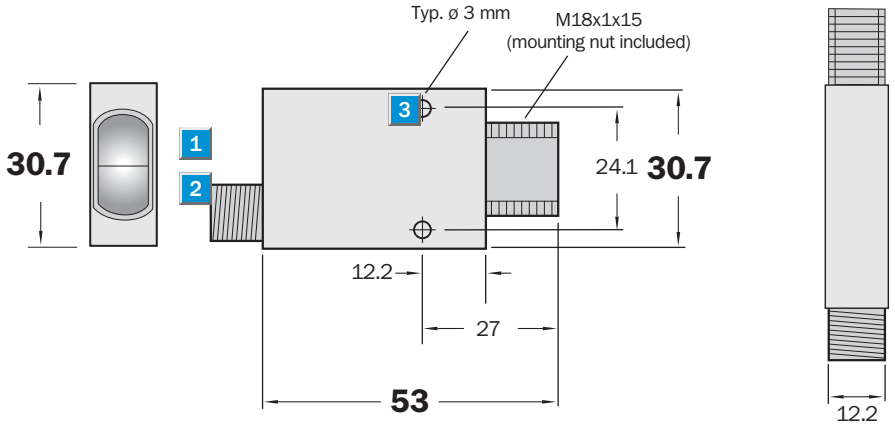
Highlights

- Signal strength indicator
- Digital signal evaluation provides exceptional ambient light immunity
- Plastic housing is ultrasonically welded for outstanding durability
- Cable or quick disconnect versions available

WS/WE 1000



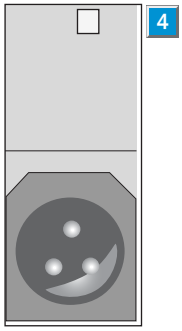
Dimensional drawing



dimensions in mm

Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 3 mm through hole for mounting
4 LED output indicator, yellow

Accessories	page
Cables and connectors	1180
Mounting systems	1234

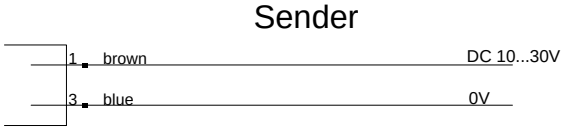
Order information

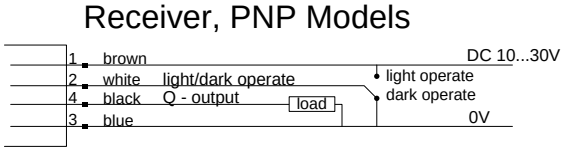
Type	Part no.
WS/WE 1000-P112	7 025 972
WS/WE 1000-P410	7 025 974
WS/WE 1000-P411	7 025 975
WS/WE 1000-N112	7 025 976
WS/WE 1000-N410	7 025 978
WS/WE 1000-N411	7 025 979

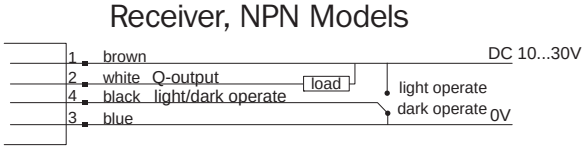
Technical data	WS/WE 1000-	P112	P410	P411	N112	N410	N411			
Sensing range, max.	0...16.4 ft (0...5 m)	■	■	■	■	■	■			
Light source[1], light type	LED, infrared light, 880 nm	■	■	■	■	■	■			
Light spot diameter	Approx. 15.8 ft at 16.4 ft (0.4 m at 5 m)	■	■	■	■	■	■			
Angle of divergence	Approx. 10.5°	■	■	■	■	■	■			
Sensitivity adjustable (optional)		■	■	■	■	■	■			
Supply voltage V_S	10...30 V DC	■	■	■	■	■	■			
Ripple[2]	≤ 5 V peak to peak	■	■	■	■	■	■			
Current consumption[3]	Sender ≤ 50 mA	■	■	■	■	■	■			
	Receiver ≤ 50 mA	■	■	■	■	■	■			
Switching outputs	PNP	■	■	■						
	NPN				■	■	■			
Max. output current I_A	100 mA	■	■	■	■	■	■			
Switching mode[6]	Light or dark switching selectable via control wire L/D	■	■	■	■	■	■			
Response time[4]	830 µs	■	■	■	■	■	■			
Max. switching frequency[5]	600 Hz	■	■	■	■	■	■			
Connection types	Cable, 2 m	■			■					
	Plug, M12 4-pin		■			■				
	Plug, M12 4-pin, with cable, 150 mm			■			■			
VDE protection class[6]	□	■	■	■	■	■	■			
Circuit protection[7]	A, B, C	■	■	■	■	■	■			
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■			
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■	■	■	■			
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■			
Approximate weight	3.5 oz (100 g)	■		■	■		■			
	1.1 oz (30 g)		■			■				
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■			

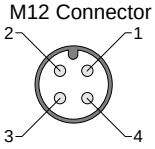
1) Average service life 50,000 h where $T_A = 25°$ C
2) May not exceed or fall short of V_S tolerances
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Reference voltage 50 V DC
7) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression

Connection diagram





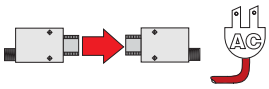




wire colors refer to standard cable, not included with quick disconnect models

WS/WE 1000

Through-beam Sensors





0...16.4 ft (0...5 m)
sensing range

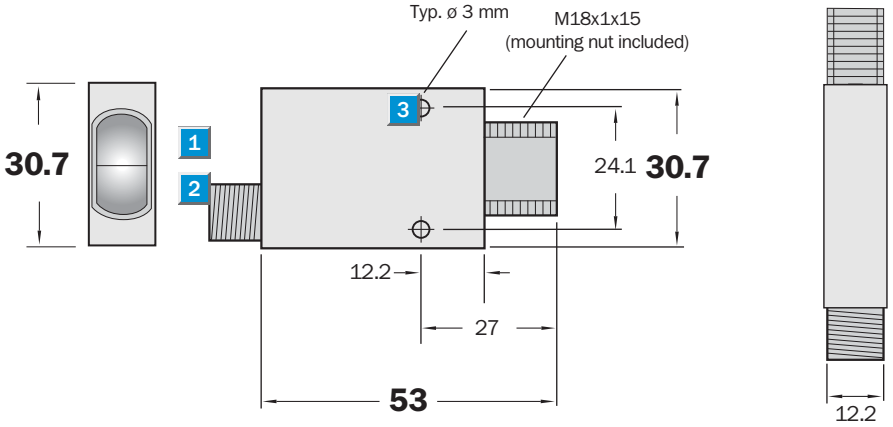
Highlights

- Signal strength indicator
- Digital signal evaluation provides exceptional ambient light immunity
- Plastic housing is ultrasonically welded for outstanding durability
- Cable or quick disconnect versions available

WS/WE 1000



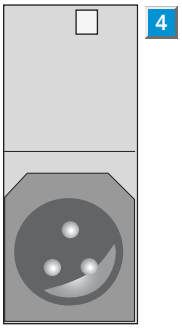
Dimensional drawing



dimensions in mm

Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 3 mm through hole for mounting
4 LED output indicator, yellow

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WS/WE 1000-S112	7 023 855
WS/WE 1000-S310	7 023 856
WS/WE 1000-S311	7 025 944
WS/WE 1000-T112	7 025 983
WS/WE 1000-T310	7 025 984
WS/WE 1000-T311	7 025 946

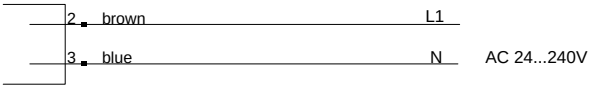
7028071 - © 2008 SICK, Inc.

Technical data	WS/WE 1000-	S112	S310	S311	T112	T310	T311			
Sensing range, max.	0...16.4 ft (0...5 m)	■	■	■	■	■	■			
Light source[1]**, light type**	LED, infrared light, 880 nm	■	■	■	■	■	■			
Light spot diameter	Approx. 15.8 in at 16.4 ft (401 mm at 5 m)	■	■	■	■	■	■			
Angle of divergence	Approx. 10.5°	■	■	■	■	■	■			
Supply voltage V_S	24...240 V AC	■	■	■	■	■	■			
Current consumption[2]	Sender ≤ 4.5 mA	■	■	■	■	■	■			
	Receiver ≤ 1.7 mA	■	■	■	■	■	■			
Switching outputs	Triac	■	■	■	■	■	■			
Max. output current I_A receiver	5...100 mA (5...300 mA at <50° C)	■	■	■	■	■	■			
Operation mode	Light switching				■	■	■			
	Dark switching	■	■	■						
Response time[3]	8.3 ms	■	■	■	■	■	■			
Max. switching frequency[4]	60 Hz	■	■	■	■	■	■			
Connection types	Cable, 2 m	■			■					
	Plug, micro 3-pin		■			■				
	Plug, micro 3-pin, with cable 150 mm			■			■			
VDE protection class[5]	□	■	■	■	■	■	■			
Circuit protection	Interference suppression	■	■	■	■	■	■			
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■			
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■	■	■	■			
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■			
Approximate weight	3.5 oz (100 g)	■		■	■		■			
	1.1 oz (30 g)		■			■				
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■			

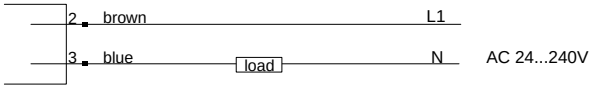
1) Average service life 50,000 h where $T_A = 25°$ C
2) OFF state (leakage current)
3) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Reference voltage 200 V

Connection diagram

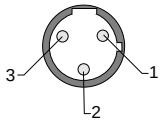
Sender



Receiver



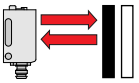
Micro Connector



wire colors refer to standard cable, not included with quick disconnect models.

WT 160

Proximity/Diffuse Sensors-Background Suppression






0.2...2.2 in (4...55 mm)
sensing range

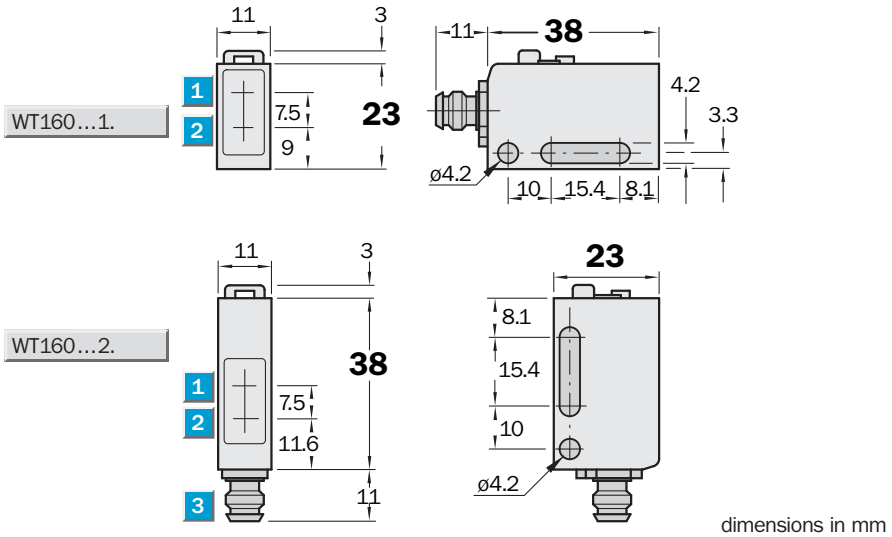
Highlights

- Horizontal or vertical housing
- Rugged plastic housing
- Focused optics provide adjustable background suppression
- Red light for easy alignment
- Signal strength indicator
- Easy mounting with included bracket
- Cable or M8 quick disconnect versions

WT 160

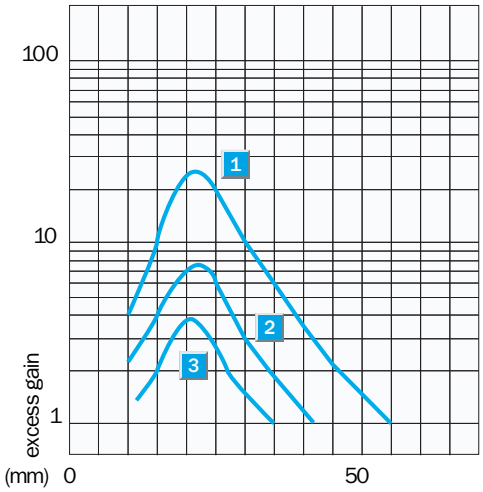


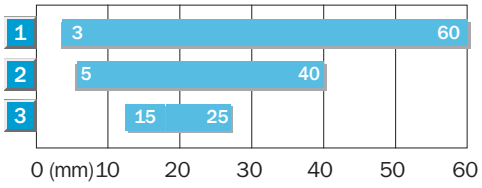
Dimensional drawing



dimensions in mm

Excess gain





1	Sensing range on white, 90% remission
2	Sensing range on gray, 18% remission
3	Sensing range on black, 6% remission

Adjustments

All types



1	Center of optical axis, receiver
2	Center of optical axis, sender
3	Plug, M8 4-pin or connection cable
4	Sensitivity adjustment
5	Light/dark rotary switch: L = light switching D = dark switching
6	Orange LED indicator (Status output)
7	Green LED signal strength indicator

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WT 160-F112	6 022 783
WT 160-F410	6 022 788
WT 160-E112	6 022 775
WT 160-E410	6 022 780
WT 160-F122	6 022 785
WT 160-F420	6 022 790
WT 160-E122	6 022 777
WT 160-E420	6 022 782

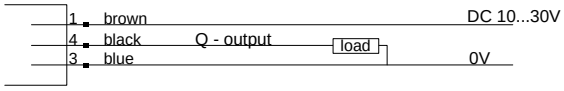
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Technical data		WT 160-	F112	F410	E112	E410	F122	F420	E122	E420
Housing design	Horizontal		■	■	■	■				
	Vertical						■	■	■	■
Sensing range, adjustable	0.2...2.2 in (4...55 mm)[1]		■	■	■	■	■	■	■	■
Background suppression	From approx. 3.9 in (100 mm)		■	■	■	■	■	■	■	■
	(background 90% remission)[2]									
Adjustable sensitivity	Potentiometer, 2 turns with scaling 270°		■	■	■	■	■	■	■	■
Light source[2], light type	LED, red light		■	■	■	■	■	■	■	■
Light spot diameter	Approx. 0.1 in at 1 in (3 mm at 25 mm)		■	■	■	■	■	■	■	■
Angle of divergence, sender	Focused, focus 1 in (25 mm)		■	■	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[4]		■	■	■	■	■	■	■	■
Ripple[5]	± 10%		■	■	■	■	■	■	■	■
Current consumption[6]	≤ 25 mA		■	■	■	■	■	■	■	■
Switching outputs	PNP, open collector: Q		■	■			■	■		
	NPN, open collector: Q				■	■			■	■
Output current I_A max.	100 mA		■	■	■	■	■	■	■	■
Operation mode	Light/dark switching via switch		■	■	■	■	■	■	■	■
Response time[7]/max. switching freq.[8]	≤ 0.5 ms / 1000 Hz		■	■	■	■	■	■	■	■
Alarm output (VMA)	100 mA, static		■	■	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[10]; 5 x 0.2 mm², Ø 4.2 mm		■		■		■		■	
	Plug, M8 4-pin			■		■		■		■
	Available in Plug, M8 3-pin upon request									
VDE protection class[11]	□		■	■	■	■	■	■	■	■
Circuit protection[12]	A, B, C, D		■	■	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6		■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)		■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)		■	■	■	■	■	■	■	■
Approximate weight	2.1 oz (60 g)		■		■		■		■	
	0.7 oz (20 g)			■		■		■		■
Housing material	Glass fiber reinforced ABS		■	■	■	■	■	■	■	■

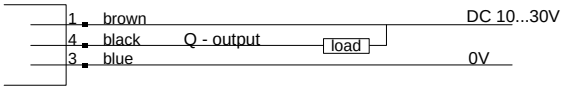
1) Sensed material with 90% remission (based on standard white according to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Background 90% remission
4) Limit values
5) May not exceed or fall short of V_S tolerances
6) Without load
7) Signal transit time with resistive load
8) With light/dark ratio 1:1
9) TE not with plug model
10) Do not bend below 0° C
11) Reference voltage 50 V DC
12) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

Connection diagram

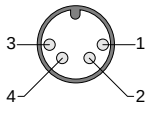
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models.

WT 160

Proximity/Diffuse Sensors-Divergent






0...4.1 in (0...105 mm)
sensing range

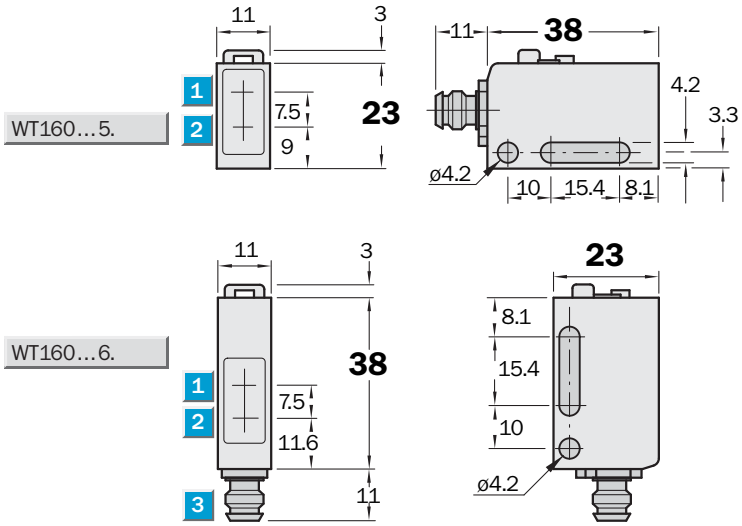
Highlights

- Horizontal or vertical housing
- Rugged plastic housing
- Divergent beam sensor
- Adjustable sensing range
- Signal strength indicator
- Cable or M8 quick disconnect versions
- Easy mounting with included bracket

WT 160

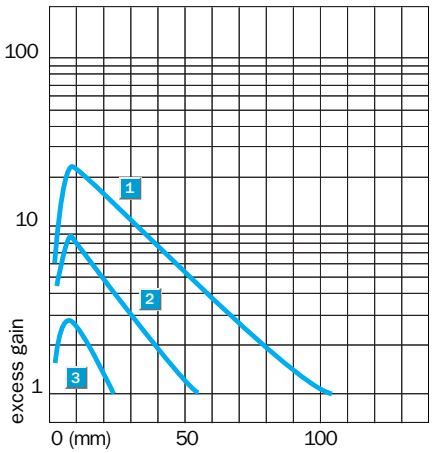


Dimensional drawing



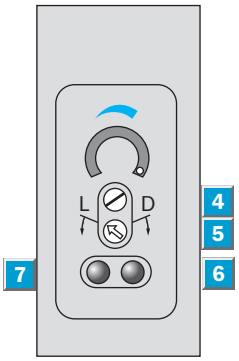
dimensions in mm

Excess gain



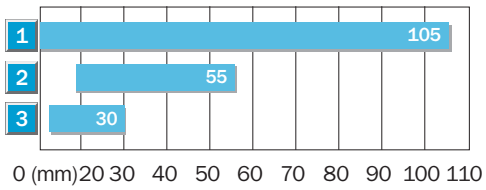
Adjustments

All types



1 Center of optical axis, receiver
2 Center of optical axis, sender
3 Plug, M8 4-pin or connection cable
4 Sensitivity adjustment
5 Light/dark rotary switch:
L = light switching
D = dark switching
6 Orange LED indicator (Status output)
7 Green LED signal strength indicator

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1 Sensing range on white, 90% remission
2 Sensing range on gray, 18% remission
3 Sensing range on black, 6% remission

Order information

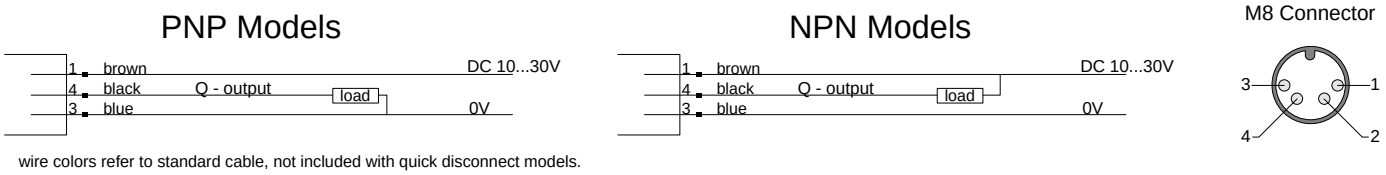
Type	Part no.
WT 160-F152	6 022 799
WT 160-F450	6 022 804
WT 160-E152	6 022 791
WT 160-E450	6 022 796
WT 160-F162	6 022 801
WT 160-F460	6 022 806
WT 160-E162	6 022 793
WT 160-E460	6 022 798

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Technical data		WT 160-	F152	F450	E152	E450	F162	F460	E162	E460
Housing design	Horizontal		■	■	■	■				
	Vertical						■	■	■	■
Sensing range, adjustable	0...4.1 in (0...105 mm)[1)2)]		■	■	■	■	■	■	■	■
Adjustable sensitivity	Potentiometer, 2 turns with scaling 270°		■	■	■	■	■	■	■	■
Light source[3)], light type	LED, infrared light		■	■	■	■	■	■	■	■
Light spot diameter	Approx. 3.9 in at 3.9 in (100 mm at 100 mm)		■	■	■	■	■	■	■	■
Angle of divergence, sender	Approx. 40°		■	■	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[4)]		■	■	■	■	■	■	■	■
Ripple[5)]	± 10%		■	■	■	■	■	■	■	■
Current consumption[6)]	≤ 25 mA		■	■	■	■	■	■	■	■
Switching outputs	PNP, open collector: Q		■	■			■	■		
	NPN, open collector: Q				■	■			■	■
Output current I_A max.	100 mA		■	■	■	■	■	■	■	■
Operation mode	Light/dark switching via rotary switch		■	■	■	■	■	■	■	■
Response time[7)]/max. switching freq.[8)]	≤ 0.5 ms/1000 Hz		■	■	■	■	■	■	■	■
			■	■	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[10)]; 5 x 0.2 mm², Ø 4.2 mm		■		■		■		■	
	Plug, M8 4-pin			■		■		■		■
	Available in Plug, M8 3-pin upon request									
VDE protection class[11)]	⧈		■	■	■	■	■	■	■	■
Circuit protection[12)]	A, B, C, D		■	■	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6		■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)		■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)		■	■	■	■	■	■	■	■
Approximate weight	2.1 oz (60 g)		■		■		■		■	
	0.7 oz (20 g)			■		■		■		■
Housing material	Glass fiber reinforced ABS		■	■	■	■	■	■	■	■

1) Sensed material with 90% remission (based on standard white according to DIN 5033)
2) Object size 30 x 30 mm
3) Average service life 100,000 h at T_A = 25° C
4) Limit values
5) May not exceed or fall short of V_S tolerances
6) Without load
7) Signal transit time with resistive load
8) With light/dark ratio 1:1
9) TE not with plug model
10) Do not bend below 0° C
11) Reference voltage 50 V DC
12) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

Connection diagram



wire colors refer to standard cable, not included with quick disconnect models.

WT 160

Proximity/Diffuse Sensors-Energetic






0...35.4 in (0...900 mm)
sensing range

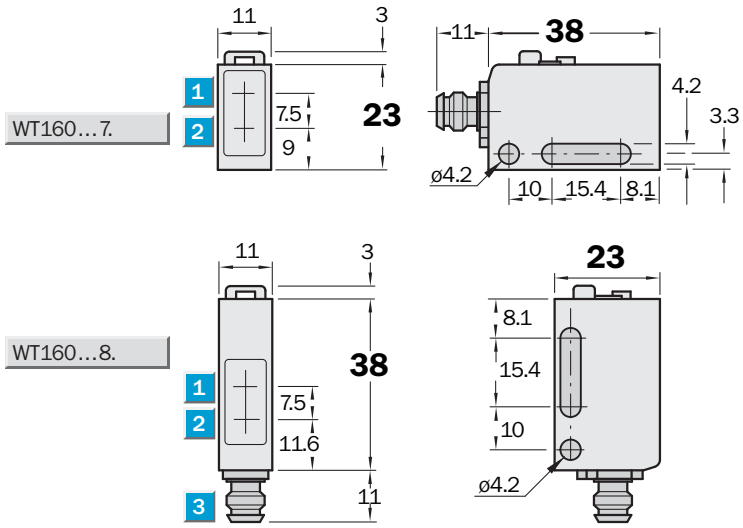
Highlights

- Horizontal or vertical housing
- Rugged plastic housing
- Alarm output and test input
- Adjustable sensing range
- Flashing LED signal strength indicator
- Cable or M8 quick disconnect versions
- Easy mounting with included bracket

WT 160

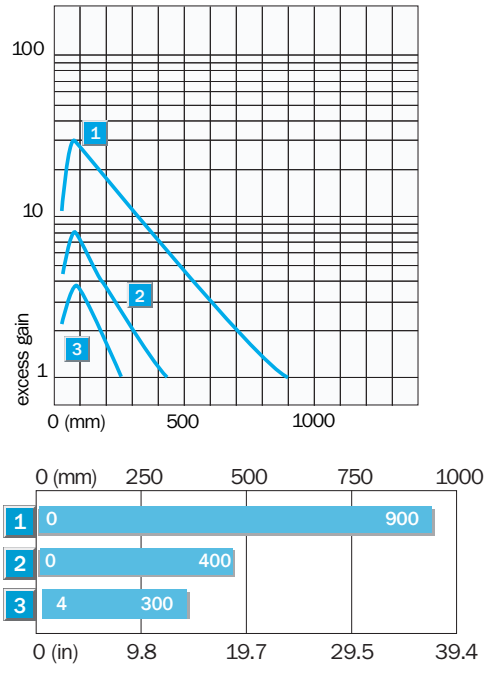


Dimensional drawing



dimensions in mm

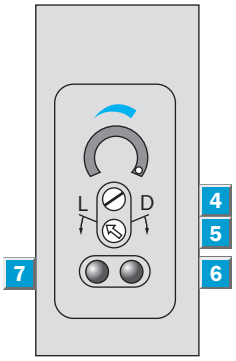
Excess gain



1	Sensing range on white, 90% remission
2	Sensing range on gray, 18% remission
3	Sensing range on black, 6% remission

Adjustments

All types



1	Center of optical axis, receiver
2	Center of optical axis, sender
3	Plug, M8 4-pin or connection cable
4	Sensitivity adjustment
5	Light/dark rotary switch: L = light switching D = dark switching
6	Orange LED indicator (status output)
7	Green LED signal strength indicator

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Order information

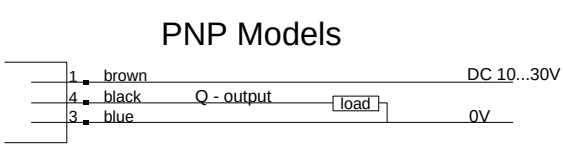
Type	Part no.
WT 160-F172	6 022 815
WT 160-F470	6 022 820
WT 160-E172	6 022 807
WT 160-E470	6 022 812
WT 160-F182	6 022 817
WT 160-F480	6 022 822
WT 160-E182	6 022 809
WT 160-E480	6 022 814

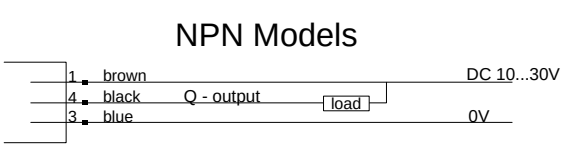
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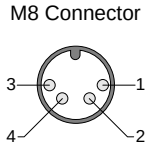
Technical data	WT 160-	F172	F470	E172	E470	F182	F480	E182	E480
Housing design	Horizontal	■	■	■	■				
	Vertical					■	■	■	■
Sensing range	0...35.4 in (0...900 mm)[1]	■	■	■	■	■	■	■	■
Adjustable sensitivity	Potentiometer, 2 turns with scaling 270°	■	■	■	■	■	■	■	■
Light source[2], light type	LED, red light	■	■	■	■	■	■	■	■
Light spot diameter	Approx. 3.5 in at 19.7 in (90 mm at 500 mm)	■	■	■	■	■	■	■	■
Angle of divergence	Approx. 4.8°	■	■	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[3]	■	■	■	■	■	■	■	■
Ripple[4]	± 10%	■	■	■	■	■	■	■	■
Current consumption[5]	≤ 25 mA	■	■	■	■	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■			■	■		
	NPN, open collector: Q			■	■			■	■
Output current I_A max.	100 mA	■	■	■	■	■	■	■	■
Operation mode	Light/dark switching via wire	■	■	■	■	■	■	■	■
Response time[6] / Max. switching freq.[7]	≤ 0.5 ms / 1000 Hz	■	■	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[9]; 5 x 0.2 mm², Ø 4.2 mm	■		■		■		■	
	Plug, M8 4-pin		■		■		■		■
	Available in Plug, M8 3-pin upon request	■	■	■	■	■	■	■	■
VDE protection class[10]	□	■	■	■	■	■	■	■	■
Circuit protection[11]	A, B, C, D	■	■	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6								
		■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■		■		■		■	
Approximate weight	2.1 oz (60 g)		■		■		■		■
	0.7 oz (20 g)	■	■	■	■	■	■	■	■
Housing material	Glass fiber reinforced ABS								

1) Sensed material with 90% remission (based on standard white according to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) TE not with plug model
9) Do not bend below 0° C
10) Reference voltage 50 V DC
11) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

Connection diagram



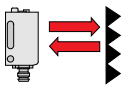




wire colors refer to standard cable, not included with quick disconnect models.

WL 160

Reflex/Retro-Reflective Sensors






0.03...19.7 ft (0.01...6 m)
sensing range

Highlights

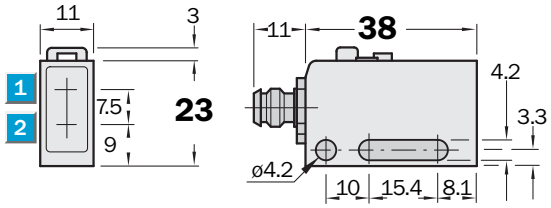
- Rugged plastic housing
- Horizontal or vertical housing
- Red light for easy alignment
- Polarizing filters prevent false readings on reflective surfaces
- Test input and alarm output
- Reflector included
- Cable or M8 quick disconnect versions

WL 160

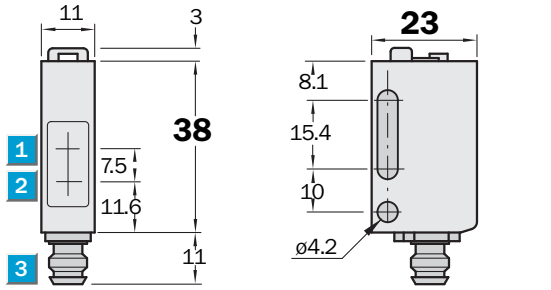


Dimensional drawing

WL160...3

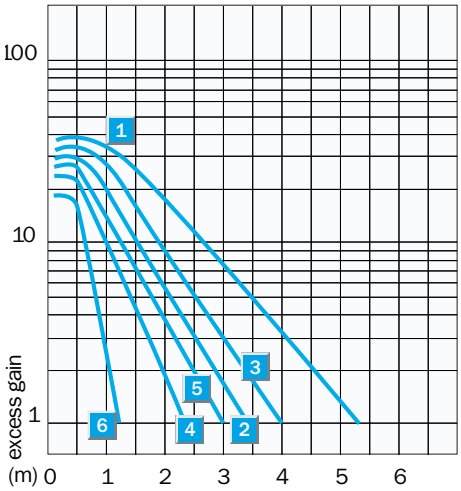


WL160...4



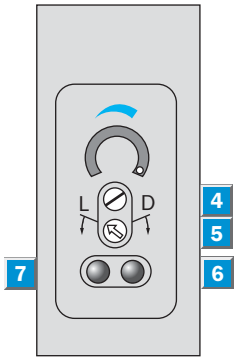
dimensions in mm

Excess gain



Adjustments

All types



1 Center of optical axis, receiver
2 Center of optical axis, sender
3 Plug, M8 4-pin or connection cable
4 Sensitivity adjustment
5 Light/dark rotary switch:
L = light switching
D = dark switching
6 Red LED signal strength indicator
7 Green LED signal strength indicator

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	Reflector type	Sensing range
1	PL 80 A	0.01...4.0 m
2	P 250	0.01...3.0 m
3	PL 50 A/PL 40 A	0.01...3.5 m
4	PL 30 A/PL 31 A	0.01...2.5 m
5	PL 20 A	0.01...2.0 m
6	Reflective tape diamond grade	0.01...1.8 m

Order information

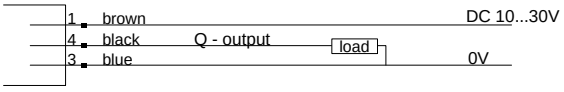
Type	Part no.
WL 160-F132	6 022 767
WL 160-F430	6 022 772
WL 160-F142	6 022 769
WL 160-F440	6 022 774
WL 160-E132	6 022 759
WL 160-E430	6 022 764
WL 160-E142	6 022 761
WL 160-E440	6 022 766

Technical data	WL 160-	F132	F430	E132	E430	F142	F440	E142	E440
Housing design	Horizontal	■	■	■	■				
	Vertical					■	■	■	■
Sensing range	0.03...19.7 ft (0.01...6 m)/PL 80 A	■	■	■	■	■	■	■	■
	0.02...13.1 ft (0.005...4 m)/P250 (included)	■	■	■	■	■	■	■	■
Adjustable sensitivity	Potentiometer, 2 turns with scaling 270°	■	■	■	■	■	■	■	■
Light source[1], light type	LED, red light with polarizing filter	■	■	■	■	■	■	■	■
Light spot diameter	Approx. 11.8 in at 9.8 ft (300 mm at 3 m)	■	■	■	■	■	■	■	■
Angle of divergence	Approx. 4.5°	■	■	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■	■	■	■
Ripple[3]	± 10%	■	■	■	■	■	■	■	■
Current consumption[4]	≤ 25 mA	■	■	■	■	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■			■	■		
	NPN, open collector: Q			■	■			■	■
Output current I_A max.	100 mA	■	■	■	■	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■	■	■	■	■
Response time[6]/max. switching freq.[6]	≤ 0.5 ms / 1000 Hz	■	■	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[7]; 3 x 0.2 mm², Ø 4.2 mm	■		■		■		■	
	Plug, M8 4-pin		■		■		■		■
	Available in Plug, M8 3-pin upon request								
VDE protection class[8]	⧈	■	■	■	■	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■	■	■
Approximate weight	2.1 oz (60 g)	■		■		■		■	
	0.7 oz (20 g)		■		■		■		■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■	■	■

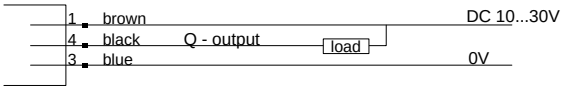
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

Connection diagram

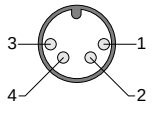
PNP Models



NPN Models



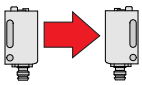
M8 Connector



wire colors refer to standard cable, not included with quick disconnect models.

WS/WE 160

Through-beam Sensors







0...45.9 ft (0...14 m)
sensing range

Highlights

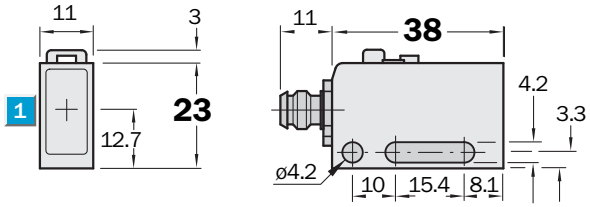
- Rugged plastic housing
- Horizontal or vertical housing
- Signal strength indicator
- Sensitivity adjustment
- Easy mounting with included bracket
- Cable or M8 quick disconnect versions

WS/WE 160

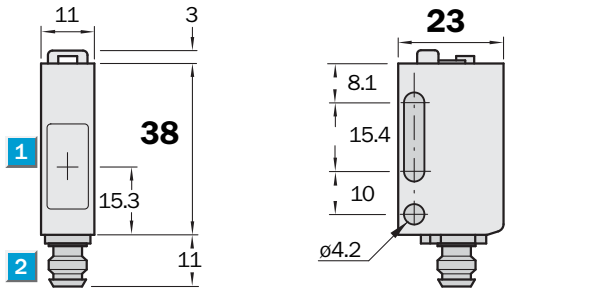


Dimensional drawing

WS/WE 160...3

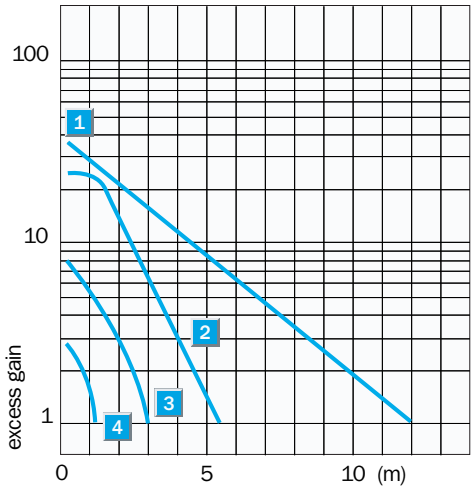


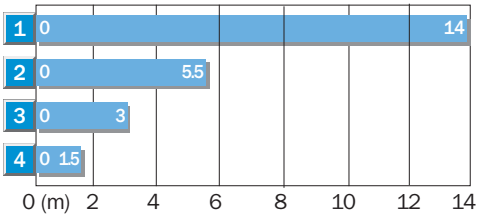
WS/WE 160...4



dimensions in inches (mm)

Excess gain

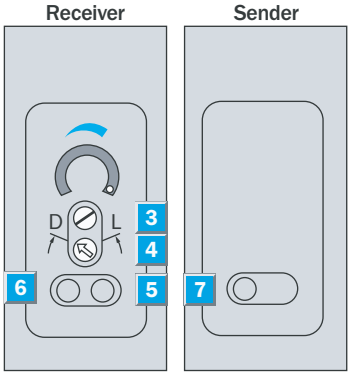




1	Without slotted mask
2	With slotted mask 2 mm, BL-160-SK
3	With slotted mask 1 mm, BL-160-SK
4	With slotted mask 0.5 mm, BL-160-SK

Adjustments

All types



1	Center of optical axis sender/receiver
2	Plug, M8 4-pin or connection cable
3	Sensitivity adjustment
4	Light/dark rotary switch: L = light switching D = dark switching
5	Orange LED indicator (status output)
6	Green LED signal strength indicator (excess gain)
7	Output indicator, red (sender active)

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

Order information

Type	Part no.[11]
WS/WE160-F132	6 022 751
WS/WE160-F430	6 022 756
WS/WE160-F142	6 022 753
WS/WE160-F440	6 022 758
WS/WE160-E132	6 022 743
WS/WE160-E430	6 022 748
WS/WE160-E142	6 022 745
WS/WE160-E440	6 022 750

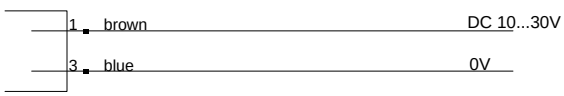
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Technical data	WS/WE 160-	F132	F430	E132	E430	F142	F440	E142	E440
Housing design	Horizontal	■	■	■	■				
	Vertical					■	■	■	■
Sensing range	0...45.9 ft (0...14 m)	■	■	■	■	■	■	■	■
Adjustable sensitivity	Potentiometer, 2 turns with scaling 270°	■	■	■	■	■	■	■	■
Light source[1], **light type**	LED, infrared light	■	■	■	■	■	■	■	■
Light spot diameter	Approx. 59 in at 32.8 ft (1500 mm at 10 m)	■	■	■	■	■	■	■	■
Angle of divergence, sender	Approx. 3.3°	■	■	■	■	■	■	■	■
Angle of reception, receiver	Approx. 15°	■	■	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■	■	■	■
Ripple[3]	± 10%	■	■	■	■	■	■	■	■
Current consumption[4]	Sender ≤ 20 mA	■	■	■	■	■	■	■	■
	Receiver ≤ 20 mA	■	■	■	■	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■			■	■		
	NPN, open collector: Q			■	■			■	■
Output current I_A max.	100 mA	■	■	■	■	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■	■	■	■	■
Response time[5]/max. switching freq.[6]	≤ 0.5 ms / 1000 Hz	■	■	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[8]	■		■		■		■	
	Sender WS, 2 x 0.2 mm², Ø 4.2 mm	■		■		■		■	
	Receiver WE, 3 x 0.2 mm², Ø 4.2 mm	■		■		■		■	
	Plug, M8 4-pin		■		■		■		■
	Available in Plug, M8 4-pin upon request	■	■	■	■	■	■	■	■
VDE protection class[9]	□	■	■	■	■	■	■	■	■
Circuit protection[10]		■	■	■	■	■	■	■	■
sender WS	A, B	■	■	■	■	■	■	■	■
receiver WE	A, B, C, D	■	■	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■	■	■
Approximate weight	Sender/receiver each 2.1 oz (60 g)	■		■		■		■	
	Sender/receiver each 0.7 oz (20 g)		■		■		■		■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■	■	■

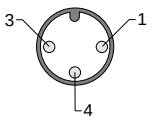
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) TE not with plug model
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected
11) Part no. includes transmitter and receiver

Connection diagram

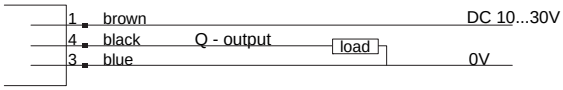
Sender



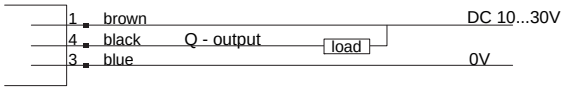
M8 Connector



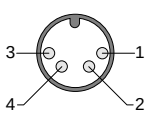
PNP Models



NPN Models



M8 Connector



Wire colors refer to standard cable, not included with quick disconnect models.

WTB 160T 50 mm

Proximity/Diffuse Sensors-Background Suppression



0.6...2.0 in (15...50 mm)
sensing range

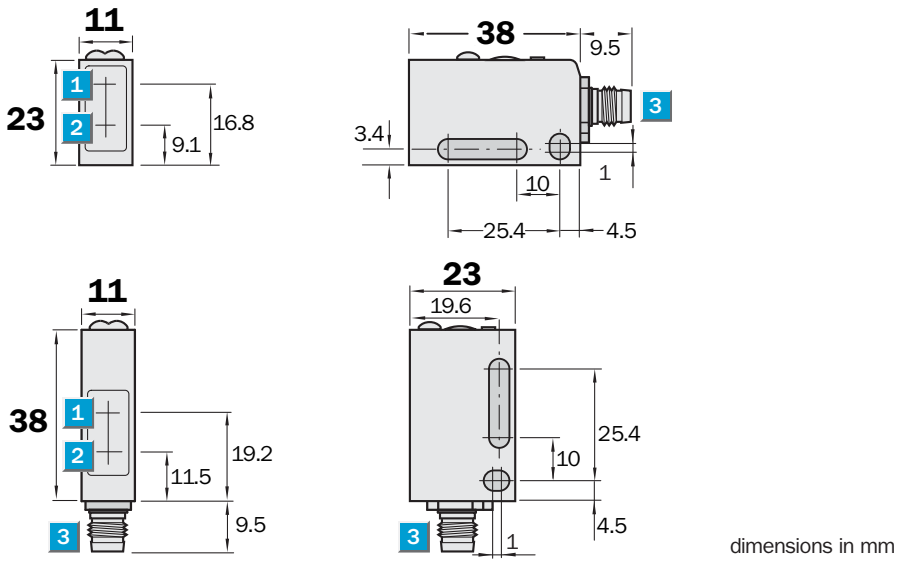
Highlights

- Additional teach-in mode for shiny and structured surfaces
- Small, compact housing
- Signal strength indicator
- Easy mounting with included bracket
- Cable or quick disconnect versions available

WTB 160T

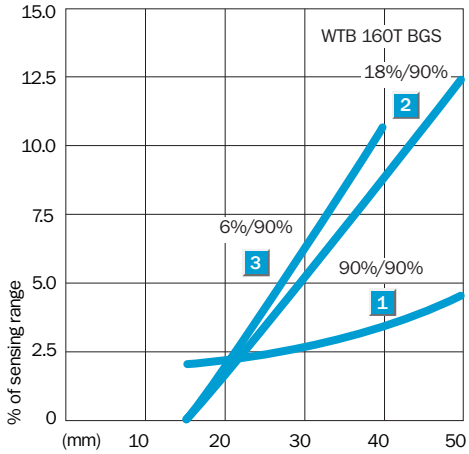


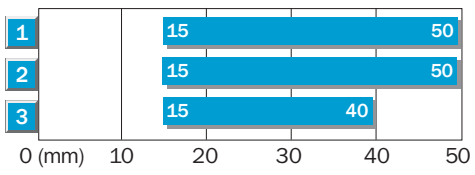
Dimensional drawing



dimensions in mm

Background suppression

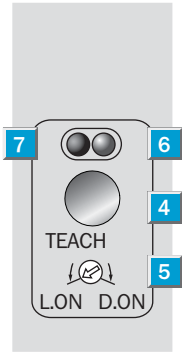




1	Sensing range on white, 90% reflectance
2	Sensing range on gray, 18% reflectance
3	Sensing range on black, 6% reflectance

Adjustments

All types



1	Center of optical axis, receiver
2	Center of optical axis, sender
3	Plug, M8 3-pin/4-pin or connection cable
4	Teach-in button
5	Light/dark rotary switch: L = light switching, D = dark switching
6	Output indicator, orange
7	Signal strength indicator, green

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

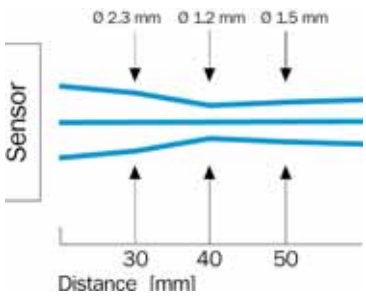
Type	Order no.
WTB 160T-P212	6 020 895
WTB 160T-P311	6 021 318
WTB 160T-P412	6 020 991
WTB 160T-N212	6 020 894
WTB 160T-N311	6 021 319
WTB 160T-N412	6 020 947
WTB 160T-F212	6 020 952
WTB 160T-F311	6 021 316
WTB 160T-F412	6 021 158
WTB 160T-E212	6 020 951
WTB 160T-E311	6 021 317
WTB 160T-E412	6 021 157

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Technical data	WTB 160T-	P[1]/F[2] 212	P[1]/F[2] 311	P[1]/F[2] 412	N[1]/E[2] 212	N[1]/E[2] 311	N[1]/E[2] 412
Sensing range	0.6...2.0 in (15...50 mm)[3]	■	■	■	■	■	■
Sensitivity control	External Teach (ET)	■		■	■		■
Light source[4]	LED, red light	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[5]	■	■	■	■	■	■
Ripple[6]	± 10 %	■	■	■	■	■	■
Current consumption[7]	≤ 40 mA	■	■	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■	■			
	NPN, open collector: Q				■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■
Switching mode	Light/dark switching via switch	■	■	■	■	■	■
Response time[8]/switching freq. max.[9]	≤ 0.7 ms / 550 Hz	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[10]; 4 x 0.2 mm², Ø 4.2 mm	■			■		
	Plug, M8 3-pin		■			■	
	Plug, M8 4-pin			■			■
VDE protection class	⧫	■	■	■	■	■	■
Circuit protection[11]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
Ambient temperature	Operation -13...131° F (-25...55° C)	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■
Approximate weight	2.1 oz (60 g)	■			■		
	0.7 oz (20 g)		■	■		■	■
Housing material	PBT	■	■	■	■	■	■

1) Housing form: horizontal
2) Housing form: vertical
3) Object with 90% reflectance (with reference to standard white according to DIN 5033)
4) Average service life 100,000 h at T_U = 25° C
5) Limit values
6) Must be within V_S tolerances
7) Without load
8) With resistive load
9) With light/dark ratio 1:1
10) 5 m are available on request, do not bend cable below 0° C
11) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Light spot diameter WTB 160T



Teach-in

A) 1-Point teach-in: This method allows the target to activate the sensor from the minimum sensing range to the the background, but excludes the background. Activate teach-in via the teach-in button or the control wire (ET) until the yellow and green LEDs light once. Teach-in without background: sensor has maximum sensitivity.

B) 2-Point teach-in: This method allows an object to activate the sensor within a targeted sensing location. Position the object. Activate teach-in via the teach-in button or the control wire (ET) until the yellow and green LEDs light twice and immediately release. Move the object toward the background. Activate teach-in via the teach-in button or control wire (ET) by depressing and releasing until the yellow and green LEDs light twice. The sensitivity is aligned in the center of the two teach-in points.

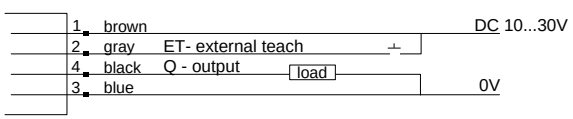
C) 3-Point teach-in: (Position teach-in) This method allows the object to activate the sensor from the minimum sensing range to the background and allows visual monitoring of the product via the green LED on the sensor. Position the object. Activate teach-in via the teach-in button or the control wire (ET) until the yellow and green LEDs light three times.

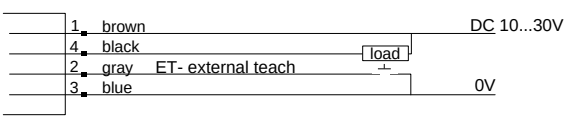
WTB 160T-xxx3x models only:

D) 4-point teach-In: (FGS teach-in) This method allows the object to activate the sensor from the minimum sensing range to a close proximity of the background, based on the product sensitivity (see sensing distance curves) and allows visual monitoring of the product via the green LED on the sensor. Activate teach-in via the teach-in button or control wire (ET) until the yellow and green LEDs light four times.

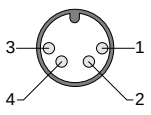
Ref. 3 & 4 point teach-in: Monitoring object detection: place object in the light beam; the signal strength indicator (green LED) must light. If it does not light, readjust and/or clean the sensor and repeat the teach-in procedure. It must switch off again after the object has been removed. If this does not occur, repeat the teach-in procedure until the switching threshold is set correctly.

Connection diagram



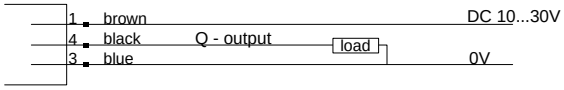


M8 Connector

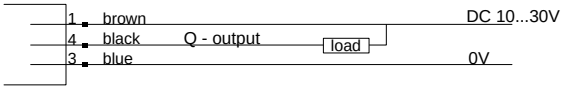


wire colors refer to standard cable, not included with quick disconnect models

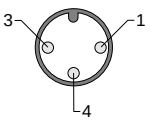
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models.

WTB 160T 150 mm

Proximity/Diffuse Sensors-Background Suppression



2.0...5.9 in (50...150 mm)
sensing range

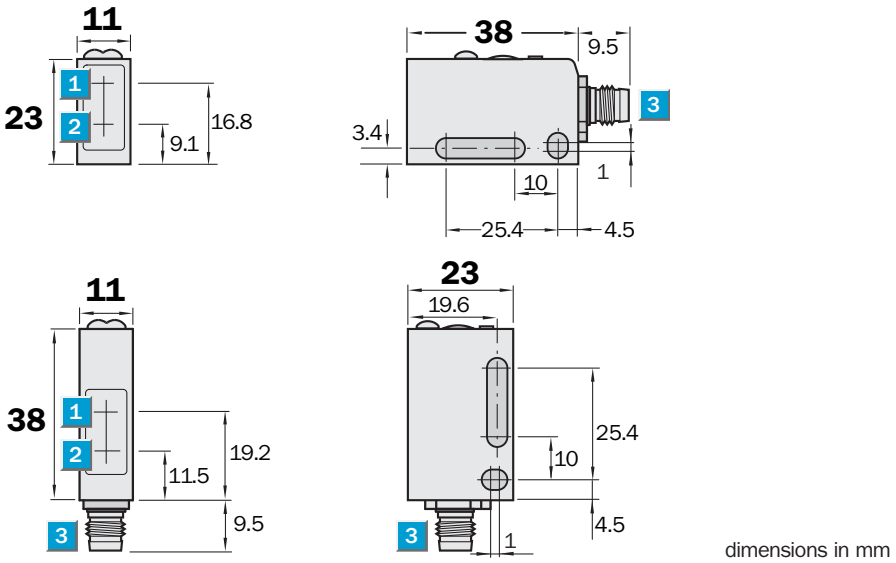
Highlights

- Large sensing range (150 mm)
- Additional teach-in mode for shiny and structured surfaces
- LED indicator: function reserve
- Small compact housing
- Signal strength indicator
- Cable or quick disconnect versions available
- Easy mounting with included bracket

WTB 160T

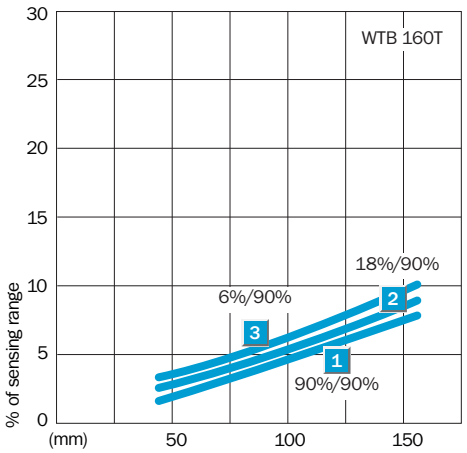


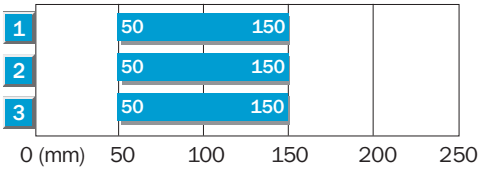
Dimensional drawing



dimensions in mm

Background suppression

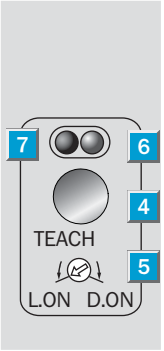




1	Sensing range on white, 6% reflectance
2	Sensing range on gray, 18% reflectance
3	Sensing range on black, 90% reflectance

Adjustments

All types



1	Center of optical axis, receiver
2	Center of optical axis, sender
3	Plug, M8 3-pin/4-pin or cable
4	Teach-in button
5	Light/dark rotary switch: L = light switching, D = dark switching
6	Output indicator, orange
7	Signal strength indicator, green

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

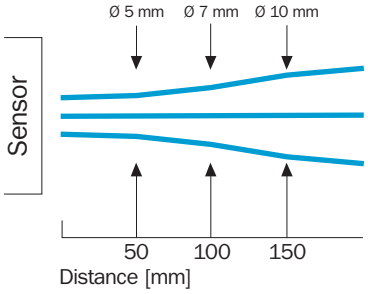
Type	Part no.
WTB 160T-P232	6 021 868
WTB 160T-P331	6 021 867
WTB 160T-P432	6 021 870
WTB 160T-N232	6 021 872
WTB 160T-N331	6 021 871
WTB 160T-N432	6 021 874
WTB 160T-F232	6 021 860
WTB 160T-F331	6 021 859
WTB 160T-F432	6 021 862
WTB 160T-E232	6 021 864
WTB 160T-E331	6 021 863
WTB 160T-E432	6 021 866

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Technical data	WTB 160T-	P[1]/F[2] 232	P[1]/F[2] 331	P[1]/F[2] 432	N[1]/E[2] 232	N[1]/E[2] 331	N[1]/E[2] 432
Sensing range	2.0…5.9 in (50 …150 mm)[3]	■	■	■	■	■	■
Sensitivity control	External Teach (ET)	■		■	■		■
Light source[4]	LED, red light	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[5]	■	■	■	■	■	■
Ripple[6]	± 10%	■	■	■	■	■	■
Current consumption[7]	≤ 45 mA	■	■	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■	■			
	NPN, open collector: Q				■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■
Switching mode	Light/dark switching via switch	■	■	■	■	■	■
Response time[8]/switching freq. max.[9]	≤ 2.5 ms / 200 Hz	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[10]; 4 x 0.2 mm², Ø 4.2 mm	■			■		
	Plug, M8 3-pin		■			■	
	Plug, M8 4-pin			■			■
VDE protection class	⧫	■	■	■	■	■	■
Circuit protection[11]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
Ambient temperature	Operation -13…131° F (-25…55° C)	■	■	■	■	■	■
	Storage -40…158° F (-40 …70° C)	■	■	■	■	■	■
Approximate weight	21 oz (60 g)	■			■		
	0.7 oz (20 g)		■	■		■	■
Housing material	PBT	■	■	■	■	■	■

1) Housing form: horizontal
2) Housing form: vertical
3) Object with 90% reflectance (with reference to standard white according to DIN 5033)
4) Average service life 100,000 h at T_U = +25° C
5) Limit values
6) Must be within V_S tolerances
7) Without load
8) With resistive load
9) With light/dark ratio 1:1
10) 5 m are available on request, do not bend cable below 0° C
11) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Light spot diameter WTB 160T



Teach-in

A) 1-Point teach-in: This method allows the target to activate the sensor from the minimum sensing range to the the background, but excludes the background. Activate teach-in via the teach-in button or the control wire (ET) until the yellow and green LEDs light once. Teach-in without background: sensor has maximum sensitivity.

B) 2-Point teach-in: This method allows an object to activate the sensor within a targeted sensing location. Position the object. Activate teach-in via the teach-in button or the control wire (ET) until the yellow and green LEDs light twice and immediately release. Move the object toward the background. Activate teach-in via the teach-in button or control wire (ET) by depressing and releasing until the yellow and green LEDs light twice. The sensitivity is aligned in the center of the two teach-in points.

C) 3-Point teach-in: (Position teach-in) This method allows the object to activate the sensor from the minimum sensing range to the background and allows visual monitoring of the product via the green LED on the sensor. Position the object. Activate teach-in via the teach-in button or the control wire (ET) until the yellow and green LEDs light three times.

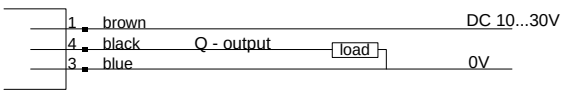
WTB 160T-xxx3x models only:

D) 4-point teach-In: (FGS teach-in) This method allows the object to activate the sensor from the minimum sensing range to a close proximity of the background, based on the product sensitivity (see sensing distance curves) and allows visual monitoring of the product via the green LED on the sensor. Activate teach-in via the teach-in button or control wire (ET) until the yellow and green LEDs light four times.

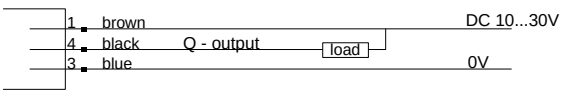
Ref. 3 & 4 point teach-in: Monitoring object detection: place object in the light beam; the signal strength indicator (green LED) must light. If it does not light, readjust and/or clean the sensor and repeat the teach-in procedure. It must switch off again after the object has been removed. If this does not occur, repeat the teach-in procedure until the switching threshold is set correctly.

Connection diagram

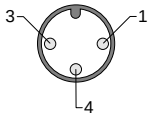
PNP Models



NPN Models

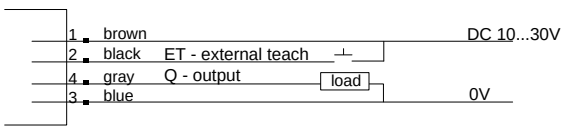


M8 Connector

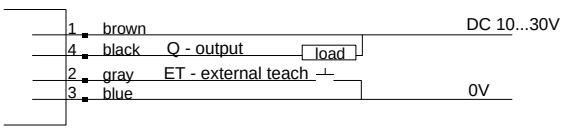


wire colors refer to standard cable, not included with quick disconnect models.

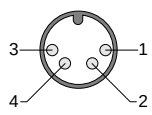
PNP Models



NPN Models



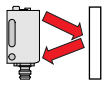
M8 Connector



wire colors refer to standard cable, not included

WTF 160T

Proximity/Diffuse Sensors-Fixed Focus






0.2...3.9 in (5...100 mm)
sensing range

CE
c UL us

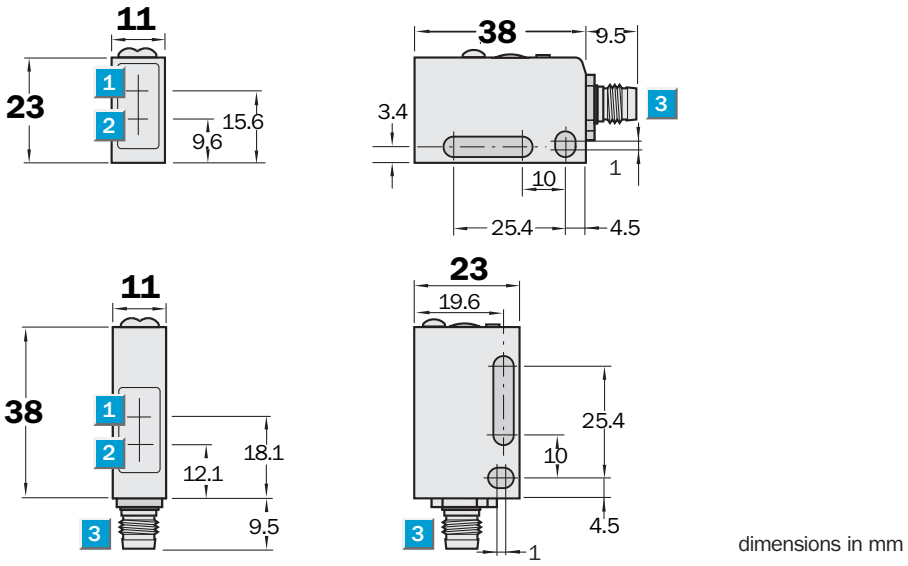
Highlights

- Detects small objects and contrast differences at a long range (100 mm)
- Signal strength indicator
- Small, compact housing
- Easy mounting with included brackets

WTF 160T

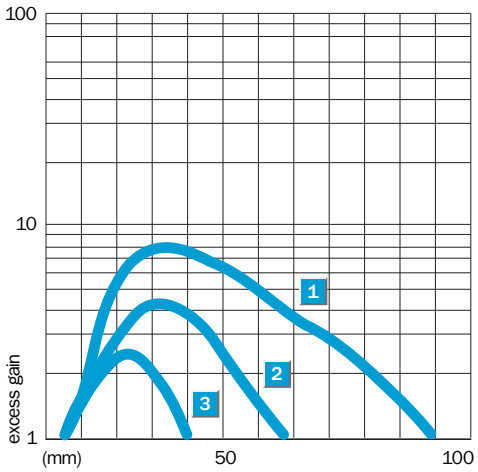


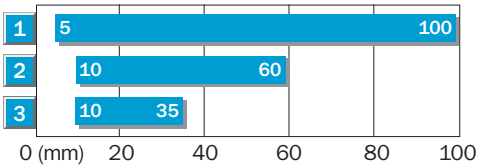
Dimensional drawing



dimensions in mm

Excess gain

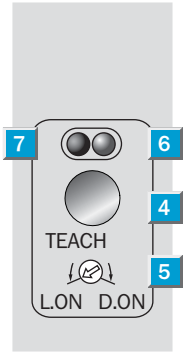




1	Sensing range on white, 90% reflectance
2	Sensing range on gray, 18% reflectance
3	Sensing range on black, 6% reflectance

Adjustments

All types



1	Center optical axis, receiver
2	Center optical axis, sender
3	Plug, M8 3-pin/4-pin or cable
4	Teach-in button
5	Light/dark rotary switch: L = light switching, D = dark switching
6	Output indicator, orange
7	Signal strength indicator, green

Accessories	page
Cables and connectors	1180
Mounting systems	1234

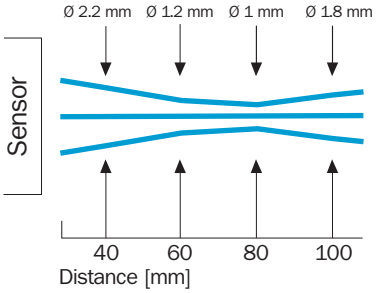
Order information

Type	Order no.
WTF 160T-P212	6 021 135
WTF 160T-P311	6 020 942
WTF 160T-P412	6 021 237
WTF 160T-N212	6 021 286
WTF 160T-N311	6 021 272
WTF 160T-N412	6 021 290
WTF 160T-F212	6 021 708
WTF 160T-F311	6 021 700
WTF 160T-F412	6 021 722
WTF 160T-E212	6 020 411
WTF 160T-E311	6 020 391
WTF 160T-E412	6 020 934

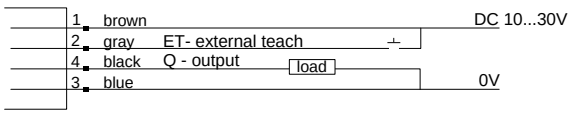
Technical data	WTF 160T-	P[1]/F[2] 212	P[1]/F[2] 311	P[1]/F[2] 412	N[1]/E[2] 212	N[1]/E[2] 311	N[1]/E[2] 412
Sensing range	0.2...3.9 in (5...100 mm)[3]	■	■	■	■	■	■
Sensitivity control	External Teach (ET)	■		■	■		■
Light source[4]	LED, red light	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[5]	■	■	■	■	■	■
Ripple[6]	± 10%	■	■	■	■	■	■
Current consumption[7]	≤ 40 mA	■	■	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■	■			
	NPN, open collector: Q				■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■
Switching mode	Light/dark switching via switch	■	■	■	■	■	■
Response time[8]/switching freq. max.[9]	≤ 0.5 ms / 1000 Hz	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[10]; 4 x 0.2 mm², Ø 4.2 mm	■			■		
	Plug, M8 3-pin		■			■	
	Plug, M8 4-pin			■			■
VDE protection class	⧫	■	■	■	■	■	■
Circuit protection[11]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
Ambient temperature	Operation -13...131° F (-25...55° C)	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■
Approximate weight	2.1 oz (60 g)	■			■		
	0.7 oz (20 g)		■	■		■	■
Housing material	PBT	■	■	■	■	■	■

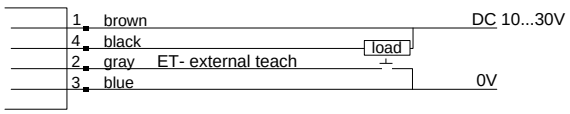
1) Housing form: horizontal
2) Housing form: vertical
3) Object with 90% reflectance (with reference to standard white according to DIN 5033)
4) Average service life 100,000 h at T_U = 25° C
5) Limit values
6) Must be within V_S tolerances
7) Without load
8) With resistive load
9) With light/dark ratio 1:1
10) 5 m are available on request, do not bend cable below 0° C
11) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Light spot diameter WTF 160T

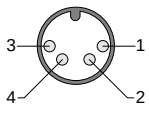


Connection diagram



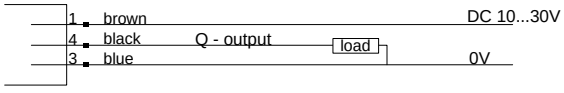


M8 Connector

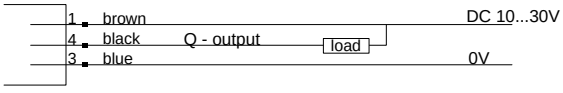


wire colors refer to standard cable, not included with quick disconnect models

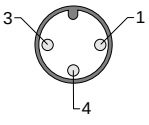
PNP Models



NPN Models



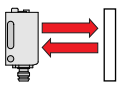
M8 Connector



wire colors refer to standard cable, not included with quick disconnect models.

WTE 160T Red

Proximity/Diffuse Sensors-Energetic






0...27.6 in (0...700 mm)

sensing range

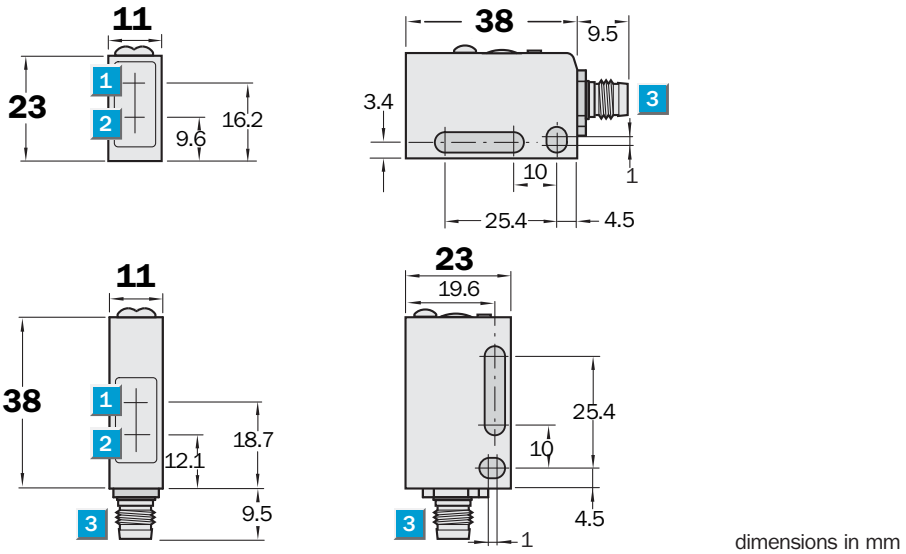
Highlights

- Small, compact housing
- Signal strength indicator
- Cable or quick disconnect versions available
- Easy mounting with included bracket

WTE 160T

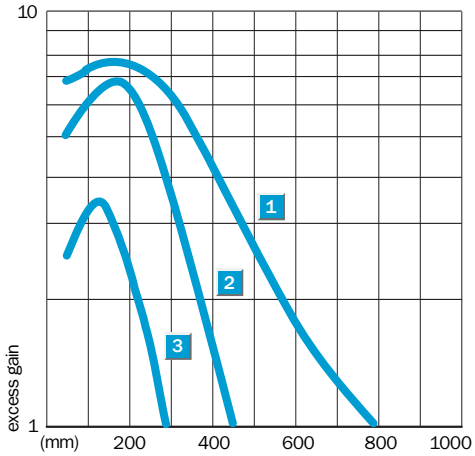


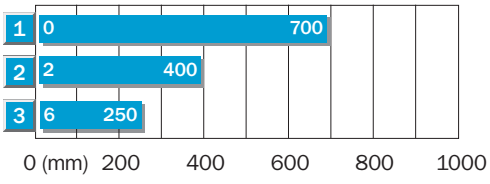
Dimensional drawing



dimensions in mm

Excess gain

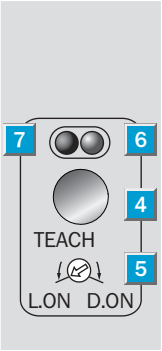




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Center of optical axis, receiver
2	Center of optical axis, sender
3	Plug, M8 3-pin/4-pin or cable
4	Teach-in button
5	Light/dark rotary switch: L = light switching, D = dark switching
6	Output indicator, orange
7	Signal strength indicator, green

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

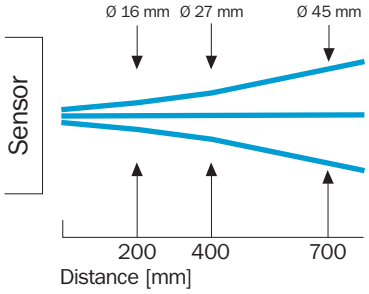
Type	Part no.
WTE 160T-P232	6 021 884
WTE 160T-P331	6 021 883
WTE 160T-P432	6 021 886
WTE 160T-N232	6 021 888
WTE 160T-N331	6 021 887
WTE 160T-N432	6 021 890
WTE 160T-F232	6 021 876
WTE 160T-F331	6 021 875
WTE 160T-F432	6 021 878
WTE 160T-E232	6 021 880
WTE 160T-E331	6 021 879
WTE 160T-E432	6 021 882

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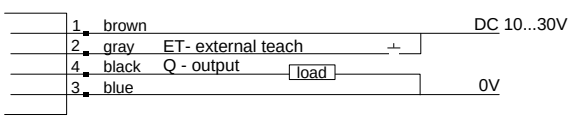
Technical data	WTE 160T-	P[1]/F[2] 232	P[1]/F[2] 331	P[1]/F[2] 432	N[1]/E[2] 232	N[1]/E[2] 331	N[1]/E[2] 432
Sensing range	0...27.6 in (0...700 mm)[3]	■	■	■	■	■	■
Sensitivity control	External Teach (ET)	■		■	■		■
Light source[4]	LED, red light	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[5]	■	■	■	■	■	■
Ripple[6]	± 10%	■	■	■	■	■	■
Current consumption[7]	≤ 40 mA	■	■	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■	■			
	NPN, open collector: Q				■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■
Switching mode	Light/dark switching via switch	■	■	■	■	■	■
Response time[8]/switching freq. max.[9]	≤ 0.5 ms / 1000 Hz	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[10]; 4 x 0.2 mm², Ø 4.2 mm	■			■		
	Plug, M8 3-pin		■			■	
	Plug, M8 4-pin			■			■
VDE protection class	⧫	■	■	■	■	■	■
Circuit protection[11]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
Ambient temperature	Operation -13...131° F (-25...55° C)	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■
Approximate weight	2.1 oz (60 g)	■			■		
	0.7 oz (20 g)		■	■		■	■
Housing material	PBT	■	■	■	■	■	■

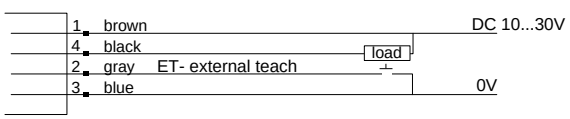
1) Housing form: horizontal
2) Housing form: vertical
3) Object with 90% reflectance (with reference to standard white according to DIN 5033)
4) Average service life 100,000 h at T_U = 25° C
5) Limit values
6) Must be within V_S tolerances
7) Without load
8) With resistive load
9) With light/dark ratio 1:1
10) 5 m are available on request, do not bend cable below 0° C
11) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Light spot diameter WTE 160T R

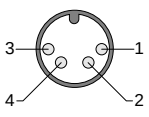


Connection diagram



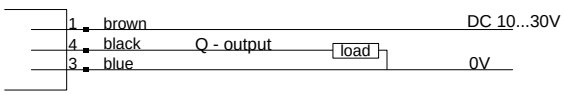


M8 Connector

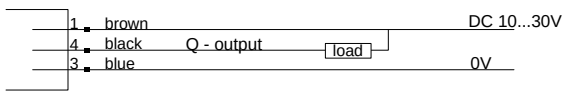


wire colors refer to standard cable, not included with quick disconnect models

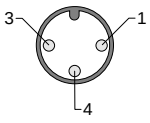
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models.

WTE 160T IR

Proximity/Diffuse Sensors-Energetic



0...3.3 ft (0...1 m)
sensing range

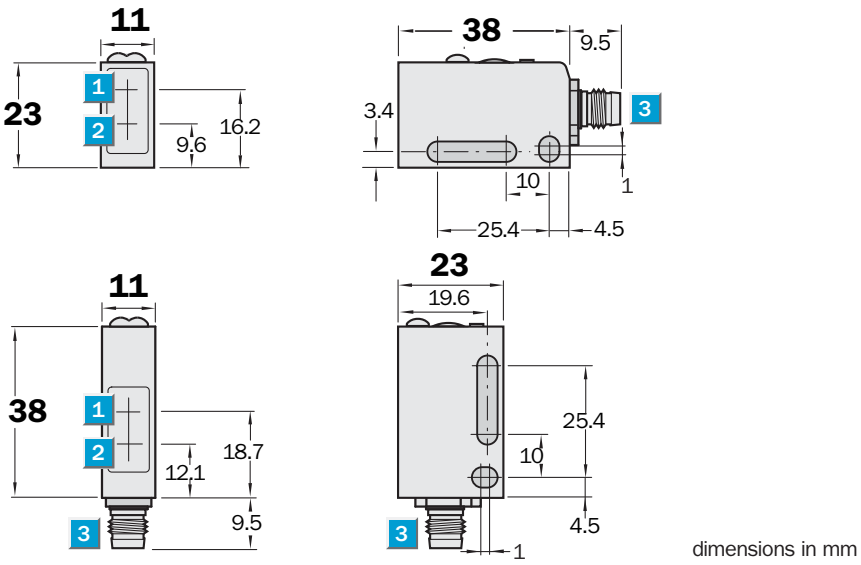
Highlights

- Small, compact housing
- Signal strength indicator
- Cable or quick disconnect versions available
- Easy mounting with included brackets

WTE 160T

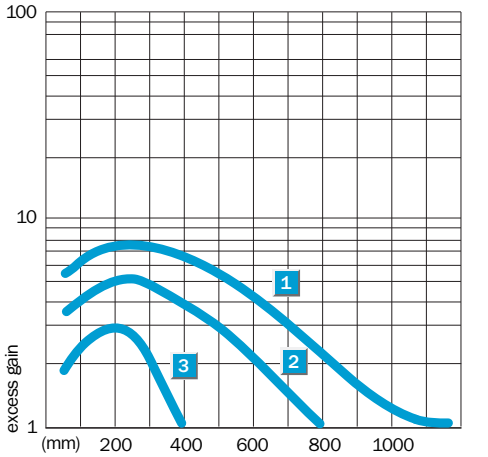


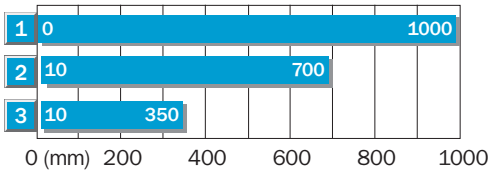
Dimensional drawing



dimensions in mm

Excess gain

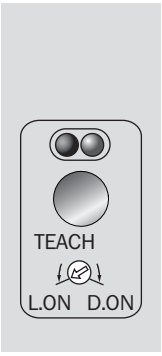




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Center of optical axis, receiver
2	Center of optical axis, sender
3	Plug, M8 3-pin/4-pin or cable
4	Teach-in button
5	Light/dark rotary switch: L = light switching, D = dark switching
6	Output indicator, orange
7	Signal strength indicator, green

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

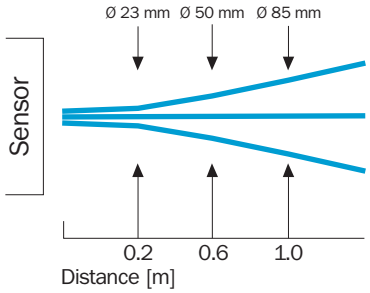
Type	Part no.
WTE 160T-P262	6 021 900
WTE 160T-P361	6 021 899
WTE 160T-P462	6 021 902
WTE 160T-N262	6 021 904
WTE 160T-N361	6 021 903
WTE 160T-N462	6 021 906
WTE 160T-F262	6 021 892
WTE 160T-F361	6 021 891
WTE 160T-F462	6 021 894
WTE 160T-E262	6 021 896
WTE 160T-E361	6 021 895
WTE 160T-E462	6 021 898

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Technical data	WTE 160T-	P[1]/F[2] 262	P[1]/F[2] 361	P[1]/F[2] 462	N[1]/E[2] 262	N[1]/E[2] 361	N[1]/E[2] 462
Sensing range	0...3.3 ft (0...1 m)[3]	■	■	■	■	■	■
Sensitivity control	External Teach (ET)	■		■	■		■
Light source[4], light type	LED, infrared light	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[5]	■	■	■	■	■	■
Ripple[6]	± 10%	■	■	■	■	■	■
Current consumption[7]	≤ 40 mA	■	■	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■	■			
	NPN, open collector: Q				■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■
Switching mode	Light/dark switching via switch	■	■	■	■	■	■
Response time[8]/switching freq. max.[9]	≤ 0.5 ms / 1000 Hz	■	■	■	■	■	■
Connection types	Cable, PVC, 2 m[10]; 4 x 0.2 mm², Ø 4.2 mm	■			■		
	Plug, M8 3-pin		■			■	
	Plug, M8 4-pin			■			■
VDE protection class	⧫	■	■	■	■	■	■
Circuit protection[11]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
Ambient temperature	Operation -13...131° F (-25...55° C)	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■
Approximate weight	2.1 oz (60 g)	■			■		
	0.7 oz (20 g)		■	■		■	■
Housing material	PBT	■	■	■	■	■	■

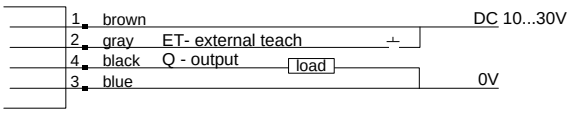
1) Housing form: horizontal
2) Housing form: vertical
3) Object with 90% reflectance (with reference to standard white according to DIN 5033)
4) Average service life 100,000 h at T_U = 25° C
5) Limit values
6) Must be within V_S tolerances
7) Without load
8) With resistive load
9) With light/dark ratio 1:1
10) 5 m are available on request, do not bend cable below 0° C
11) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Light spot diameter WTE 160T IR

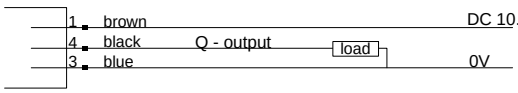


Connection diagram

PNP Models

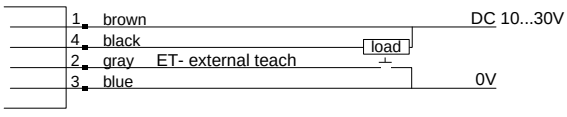


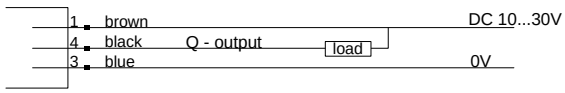
wire colors refer to standard cable, not included with quick disconnect models



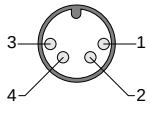
wire colors refer to standard cable, not included with quick disconnect models.

NPN Models

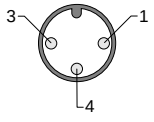




M8 Connector

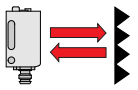


M8 Connector



WL 160T

Reflex/Retro-Reflective Sensors






0.03...4.9 ft (0.01...1.5 m)
sensing range

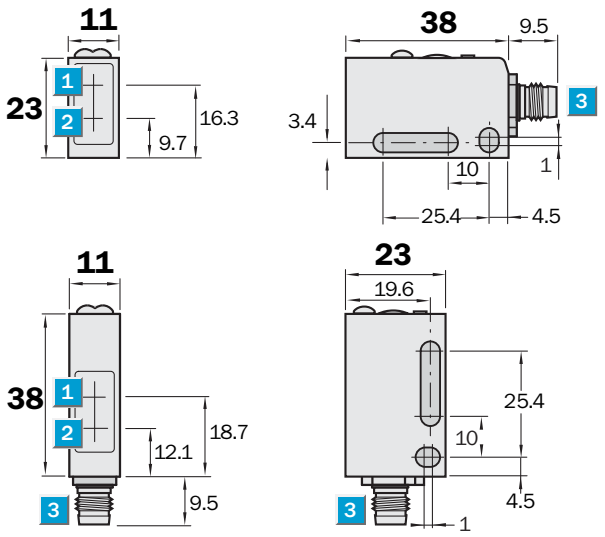
Highlights

- Small light spot
- Detects (semi-)transparent objects
- Signal strength indicator
- Excellent for detection of small objects
- Cable or quick disconnect models

WL 160T

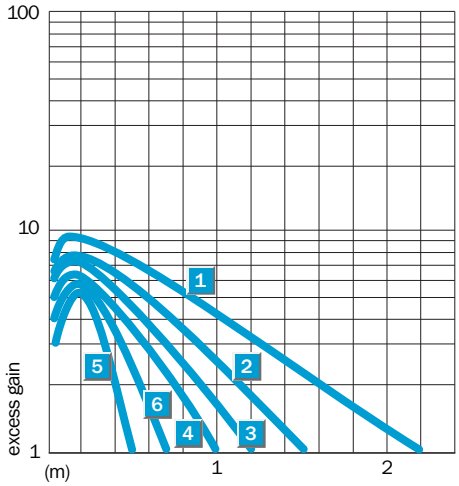


Dimensional drawing



dimensions in mm

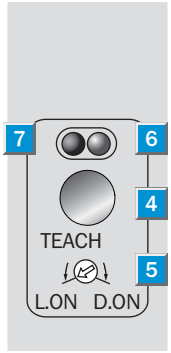
Excess gain



	Reflector type	Sensing range
1	PL 80 A	0.01...1.5 m
2	PL 250/40/50A	0.01...1.0 m
3	PL 30 A/31 A	0.01...0.8 m
4	PL 20 A	0.01...0.7 m
5	PL 45	0.01...0.4 m
6	Reflective tape diamond grade	0.01...0.5 m

Adjustments

All types



1 Center of optical axis, receiver
2 Center of optical axis, sender
3 Plug, M8 3-pin/4-pin or cable
4 Teach-in button
5 Light/dark rotary switch:
L = light switching , D = dark switching
6 Output indicator, orange
7 Signal strength indicator, green

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

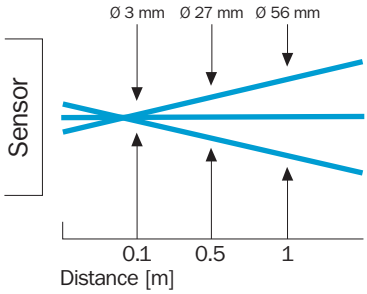
Order information

Type	Part no.
WL 160T-P212	6 020 481
WL 160T-P311	6 021 479
WL 160T-P412	6 020 483
WL 160T-N212	6 020 480
WL 160T-N311	6 021 515
WL 160T-N412	6 020 482
WL 160T-F212	6 020 487
WL 160T-F311	6 021 387
WL 160T-F412	6 020 489
WL 160T-E212	6 020 486
WL 160T-E311	6 021 438
WL 160T-E412	6 020 488

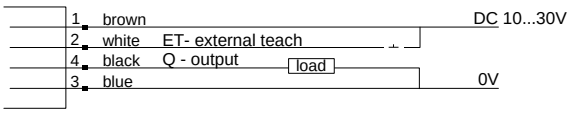
Technical data	WL-160T-	P[1]/F[2] 212	P[1]/F[2] 311	P[1]/F[2] 412	N[1]/E[2] 212	N[1]/E[2] 311	N[1]/E[2] 412			
Sensing range	0.03...3.3 ft (0.01...1.0 m)/P 250 (included)	■	■	■	■	■	■			
	0.03...4.9 ft (0.01...1.5 m)/P 80 A	■	■	■	■	■	■			
Sensitivity control	External Teach (ET)	■		■	■		■			
Light source[3]	LED, red light with polarizing filter	■	■	■	■	■	■			
Supply voltage V_S	10...30 V DC[4]	■	■	■	■	■	■			
Ripple[5]	± 10%	■	■	■	■	■	■			
Current consumption[6]	≤ 40 mA	■	■	■	■	■	■			
Switching outputs	PNP, open collector: Q	■	■	■						
	NPN, open collector: Q				■	■	■			
Output current I_A max.	100 mA	■	■	■	■	■	■			
Switching mode	Light/dark switching via switch	■	■	■	■	■	■			
Response time[7]/switching freq. max.[8]	≤ 0.2 ms / 2.5 kHz	■	■	■	■	■	■			
Connection types	Cable, PVC, 2 m[9]; 5 x 0.2 mm², Ø 4.2 mm	■			■					
	Plug, M8 3-pin		■			■				
	Plug, M8 4-pin			■			■			
VDE protection class	⧫	■	■	■	■	■	■			
Circuit protection[10]	A, B, C, D	■	■	■	■	■	■			
Enclosure rating	IP 67	■	■	■	■	■	■			
Ambient temperature	Operation -13...131° F (-25...+ 55° C)	■	■	■	■	■	■			
	Storage -40...158° F (-40...+ 70° C)	■	■	■	■	■	■			
Approximate weight	2.1 oz (60 g)	■			■					
	0.7 oz (20 g)		■	■		■	■			
Housing material	PBT	■	■	■	■	■	■			

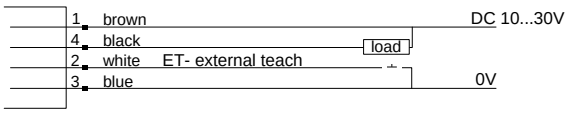
1) Housing form: horizontal
2) Housing form: vertical
3) Average service life 100,000 h at T_U = +25° C
4) Limit values
5) Must be within V_S tolerances
6) Without load
7) With resistive load
8) With light/dark ratio 1:1
9) 5 m are available on request, do not bend cable below 0° C
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Light spot diameter WL 160T



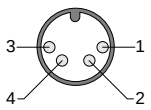
Connection diagram



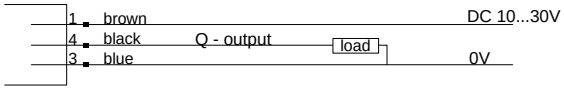


wire colors refer to standard cable, not included with quick disconnect models

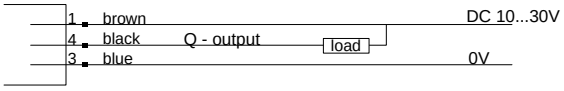
M8 Connector



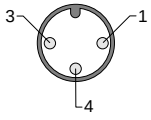
PNP Models



NPN Models



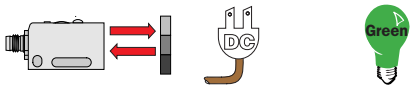
M8 Connector



wire colors refer to standard cable, not included with quick disconnect models.

WTM 160T

Contrast Sensor



0.4 in (10 mm)
sensing distance

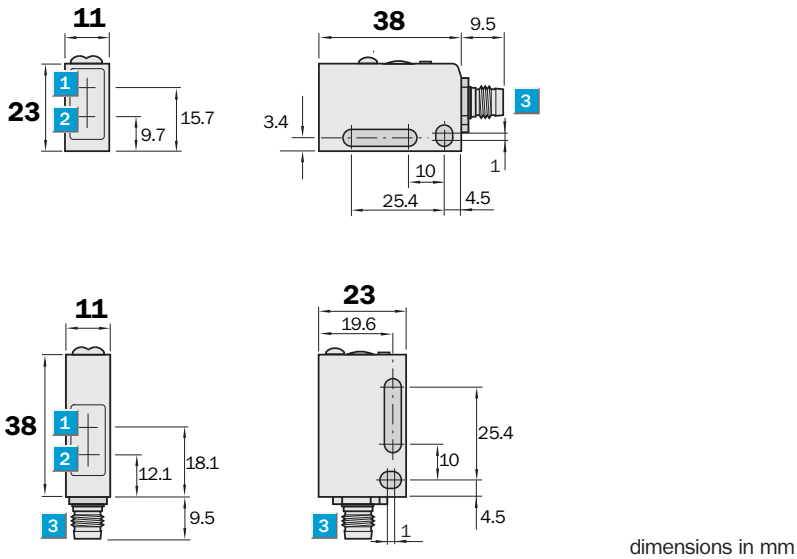
Highlights

- Contrast sensor in a small, compact housing
- Signal strength indicator
- Easy mounting with included brackets
- Cable or quick disconnect versions

WTM 160T

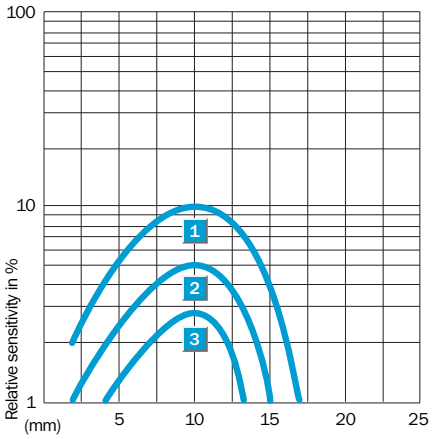


Dimensional drawing



dimensions in mm

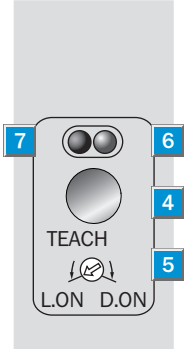
Relative sensitivity



1	Sensing distance on white, 90% reflectance
2	Sensing distance on gray, 18% reflectance
3	Sensing distance on black, 6% reflectance

Adjustments

All types



1	Center of optical axis, receiver
2	Center of optical axis, sender
3	Plug, 3-pin/4-pin, M8 or cable
4	Teach-in button
5	Light/dark rotary switch: L = light switching, D = dark switching
6	Output indicator, orange
7	Signal strength indicator, green

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

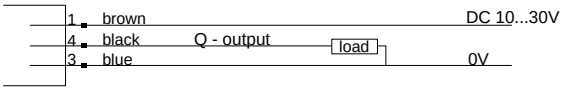
Type	Part no.
WTM 160T-P292	6 020 493
WTM 160T-P391	6 021 506
WTM 160T-P492	6 020 495
WTM 160T-N292	6 020 492
WTM 160T-N391	6 021 382
WTM 160T-N492	6 020 494
WTM 160T-F292	6 020 671
WTM 160T-F391	6 021 351
WTM 160T-F492	6 020 785
WTM 160T-E292	6 020 667
WTM 160T-391	6 021 505
WTM 160T-E492	6 020 695

Technical data	WTM 160T-	P[1]/F[2] 292	P[1]/F[2] 391	P[1]/F[2] 492	N[1]/E[2] 292	N[1]/E[2] 391	N[1]/E[2] 492
Sensing distance	0.4 in ± 0.08 in (10 mm ± 2 mm)	■	■	■	■	■	■
Sensitivity control	External Teach (ET)	■		■	■		■
Light source[3]	LED, green light	■	■	■	■	■	■
Light spot diameter	Approx. 0.08 x 0.2 in at 0.4 in (2 x 5 mm at 10 mm)	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[4]	■	■	■	■	■	■
Ripple[5]	± 10%	■	■	■	■	■	■
Current consumption[6]	≤ 40 mA	■	■	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■	■			
	NPN, open collector: Q				■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■
Switching mode	Light/dark switching via switch	■	■	■	■	■	■
Response time[7]/switching freq. max.[8]	≤ 0.2 ms / 2.5 kHz	■	■	■	■	■	■
Connection type:	Cable, PVC, 2 m[9]; 4 x 0.2 mm², I 4.2 mm	■			■		
	Plug, M8 3-pin		■			■	
	Plug, M8 4-pin			■			■
VDE protection class	⧫	■	■	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
Ambient temperature	Operation -13…131° F (-25…55° C)	■	■	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■
Approximate weight	2.1 oz (60 g)	■			■		
	0.7 oz (20 g)		■	■		■	■
Housing material	PBT	■	■	■	■	■	■

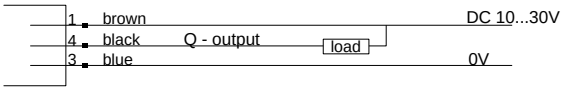
1) Housing form: horizontal
2) Housing form: vertical
3) Average service life 100,000 h at T_U = 25° C
4) Limit values
5) Must be within V_S tolerances
6) Without load
7) With resistive load
8) With light/dark ratio 1:1
9) 5 m are available on request, do not bend cable below 0° C
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

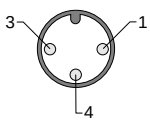
PNP Models



NPN Models

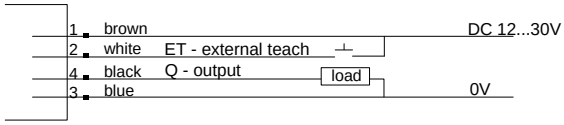


M8 Connector

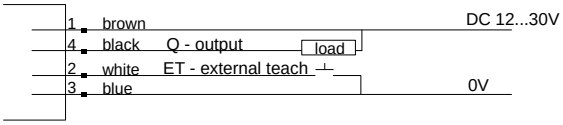


wire colors refer to standard cable, not included with quick disconnect models.

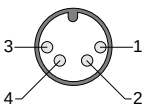
PNP



NPN



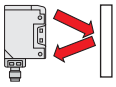
M8 Connector



wire colors refer to standard cable, not included

WT 170

Proximity/Diffuse Sensors-Fixed Focus






0.4...3.9 in (10...100 mm)
sensing range

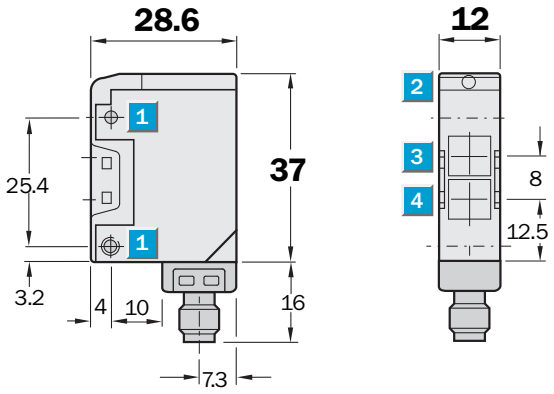
Highlights

- Rugged stainless steel/plastic housing
- Signal strength indicator
- Visible red light for easy alignment
- Adjustable sensing range
- Crosstalk immunity
- Easy mounting with included bracket
- Cable or M8 quick disconnect versions

WT 170

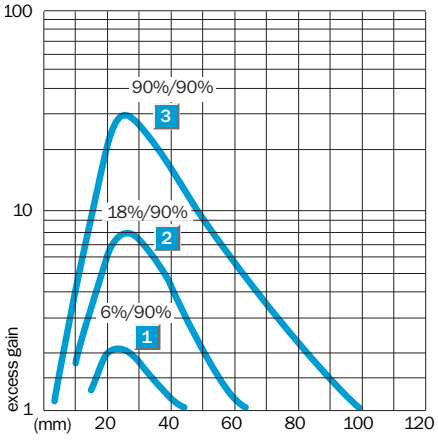


Dimensional drawing



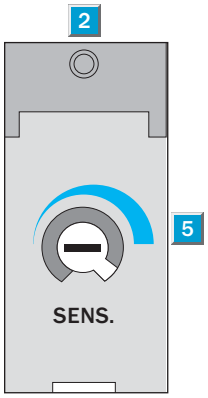
dimensions in mm

Excess gain



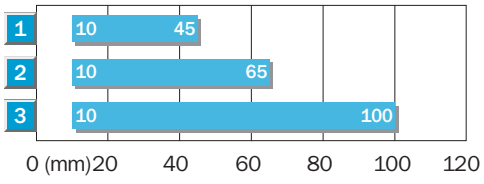
Adjustments

All types



1 Mounting holes Ø 3 mm M3 thread
2 LED signal strength indicator, red:
light received ≥ switching threshold
3 Center of optical axis, receiver
4 Center of optical axis, sender
5 Sensitivity control (potentiometer, 270°)

Accessories	page
Cables and connectors	1180
Mounting systems	1234



Order information

Type	Part no.
WT 170-P112	6 010 193
WT 170-P410	6 010 194
WT 170-N112	6 010 195
WT 170-N410	6 010 196

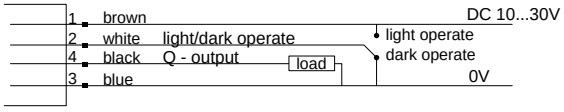
1 Sensing range on black, 6% remission
2 Sensing range on gray, 18% remission
3 Sensing range on white, 90% remission

Technical data	WT 170-	P112	P410	N112	N410
Sensing range, adjustable	0.4...3.9 in (10...100 mm)[1]	■	■	■	■
Background suppression	From approx. 4.7 in (120 mm),	■	■	■	■
	Background, 90% remission				
Sensitivity	Potentiometer, 270° (adjustable)	■	■	■	■
Light source[2], light type	LED, visible red light	■	■	■	■
Light spot size	Approx. 0.1 in at 1.6 in (3.5 mm at 40 mm)	■	■	■	■
Angle of divergence, sender	Focused, focal point 1.6 in (40 mm)	■	■	■	■
Supply voltage V_S	10...30 V DC[3]	■	■	■	■
Ripple[4]	± 10%	■	■	■	■
Current consumption[5]	≤ 30 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Output current I_A max.	100 mA	■	■	■	■
Operation mode	Light/dark switch. via L/D control cable	■	■	■	■
	+ V_S = light switching	■	■	■	■
	0 V = dark switching	■	■	■	■
Response time[6]	≤ 0.7 ms	■	■	■	■
Max. switching frequency[7]	700 Hz	■	■	■	■
Connection types	Cable, PVC, 2 m[8]; 4 x 0.18 mm², Ø 3.8 mm	■		■	
	Plug, M8 4-pin		■		■
VDE protection class[9]	□	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight	0.9 oz (25 g)	■		■	
	2.3 oz (66 g)		■		■
Housing material	Stainless steel/glass fiber reinforced ABS	■	■	■	■

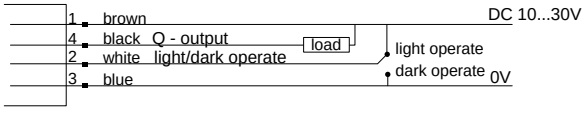
1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

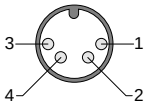
PNP Models



NPN Models



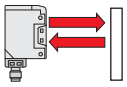
M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WT 170

Proximity/Diffuse Sensors-Energetic






0.4...21.7 in (10...550 mm)
sensing range

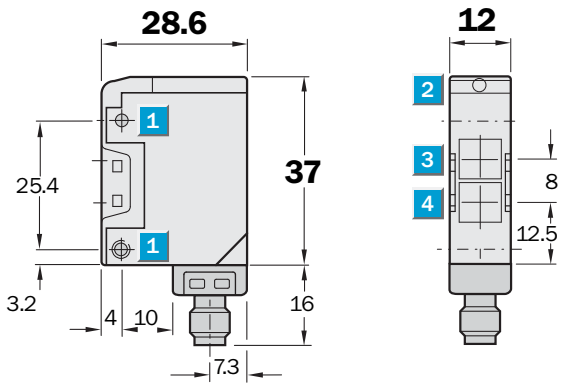
Highlights

- Rugged stainless steel/plastic housing
- Adjustable sensitivity
- Red light for easy alignment
- Cable or M8 quick disconnect versions
- Easy mounting with included bracket

WT 170

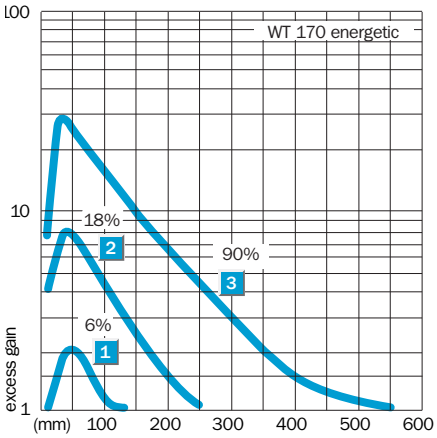


Dimensional drawing



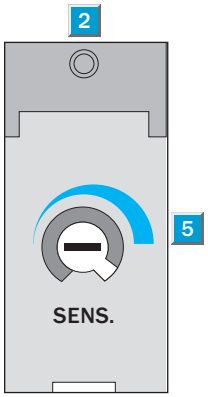
dimensions in mm

Excess gain



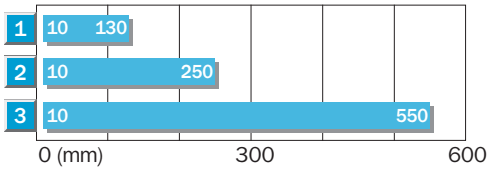
Adjustments

All types



1 Mounting holes Ø 3 mm with integrated M3 thread
2 LED signal strength indicator:
light received ≥ switching threshold
3 Center of optical axis, receiver
4 Center of optical axis, sender
5 Sensitivity control (potentiometer, 270°)

Accessories	page
Cables and connectors	1180
Mounting systems	1234



1 Sensing range on black, 6% remission
2 Sensing range on gray, 18% remission
3 Sensing range on white, 90% remission

Order information

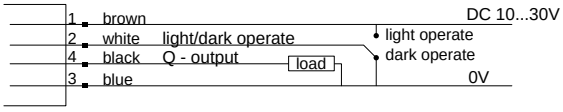
Type	Part no.
WT 170-P132	6 010 197
WT 170-P430	6 010 198
WT 170-N132	6 010 199
WT 170-N430	6 010 200

Technical data	WT 170-	P132	P430	N132	N430
Sensing range	0.4...21.7 in (10...550 mm)[1]	■	■	■	■
Sensitivity	Adjustable, 2 turns with scaling 270°	■	■	■	■
Light source[2], light type	LED, visible red light	■	■	■	■
Light spot size	Approx. 1.6 in at 15.7 in (40 mm at 400 mm)	■	■	■	■
Angle of divergence	Approx. 5°	■	■	■	■
Supply voltage V_S	10...30 V DC[3]	■	■	■	■
Ripple[4]	± 10%	■	■	■	■
Current consumption[5]	≤ 30 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Output current I_A max.	100 mA	■	■	■	■
Operation mode	Light/dark switching via wire	■	■	■	■
	+ V_S = light switching	■	■	■	■
	0 V = dark switching	■	■	■	■
Response time[6]	≤ 0.7 ms	■	■	■	■
Max. switching frequency[7]	700 Hz	■	■	■	■
Connection types	Cable, PVC, 2 m[8]; 4 x 0.18 mm², Ø 3.8 mm	■		■	
	Plug, M8 4-pin		■		■
VDE protection class[9]	⧈	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67 /NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight	0.7 oz (25 g)	■		■	
	2.3 oz (66 g)		■		■
Housing material	Stainless steel/glass fiber reinforced ABS;	■	■	■	■

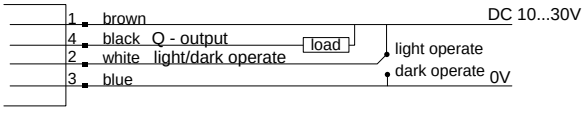
1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

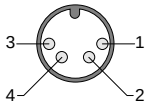
PNP Models



NPN Models



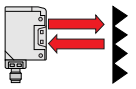
M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WL 170

Reflex/Retro-Reflective Sensors






0.03...13.1 ft (0.01...4 m)
sensing range

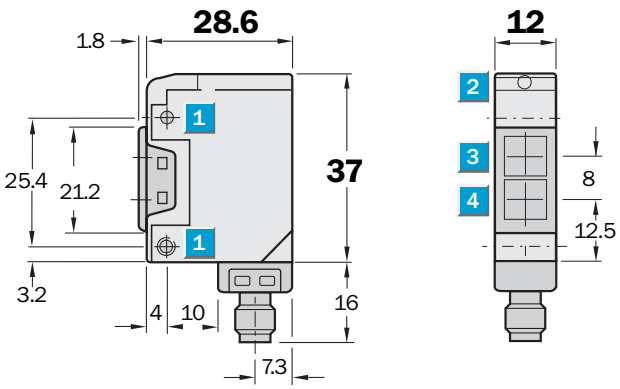
Highlights

- Rugged stainless steel/plastic housing
- Visible red light LED transmitter for easy alignment
- Reflector included
- Easy mounting with included nuts
- Polarizing filters prevent false readings on shiny objects
- Cable or M8 quick disconnect versions

WL 170



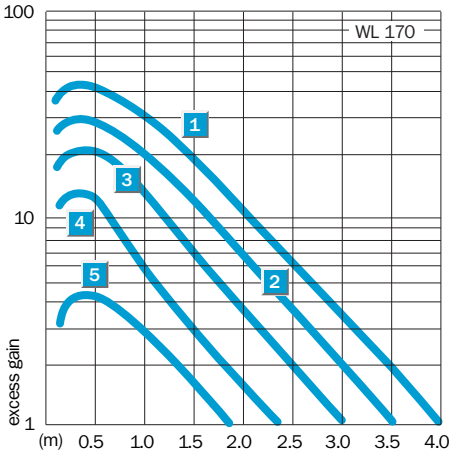
Dimensional drawing



dimensions in mm

1 Mounting holes Ø 3 mm with integrated 3 thread
2 LED signal strength indicator, red:
3 Center of optical axis, receiver
4 Center of optical axis, sender

Excess gain



Reflector type		Sensing range
1	PL 80 A	0.01 – 4.0 m
2	PL 50 A, PL 40 A	0.01 – 3.5 m
3	P 250, PL 30 A, PL 31	0.01 – 3.0 m
4	PL 20	0.01 – 2.3 m
5	Reflective tape diamond grade» 90 x 90 mm	0.01 – 1.8 m

Accessories	page
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Mounting systems	1234
Reflectors	1256

Order information

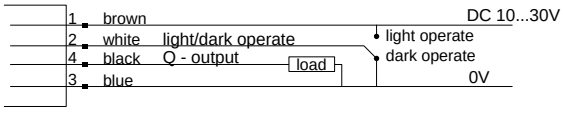
Type	Part no.
WL 170-P132	6 010 189
WL 170-P430	6 010 190
WL 170-N132	6 010 191
WL 170-N430	6 010 192

Technical data	WL 170-	P132	P430	N132	N430
Sensing range	0.03...9.8 ft (0.01...3 m)/P 250 (included)	■	■	■	■
	0.03...13.1 ft (0.01...4 m)/PL 80 A	■	■	■	■
Light source[1], **light type**	LED, visible red light, polarized	■	■	■	■
Light spot size	Approx. 7.9 in at 8.2 ft (200 mm at 2.5 m)	■	■	■	■
Angle of divergence	Approx. 2.7°	■	■	■	■
Supply voltage V_S	10...30 V DC[3]	■	■	■	■
Ripple[3]	± 10%	■	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Output current I_A max.	100 mA	■	■	■	■
Operation mode	Light/dark switching via wire	■	■	■	■
	+ V_S = light switching	■	■	■	■
	0 V = dark switching	■	■	■	■
Response time[5]	≤ 0.7 ms	■	■	■	■
Max. switching frequency[6]	700 Hz	■	■	■	■
Connection types	Cable, PVC, 2 m[7]; 4 x 0.18 mm², Ø 3.8 mm	■		■	
	Plug, M8 4-pin		■		■
VDE protection class[8]	□	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight	0.9 oz (25 g)	■		■	
	2.3 (66 g)		■		■
Housing material	Stainless steel/glass fiber reinforced ABS	■	■	■	■

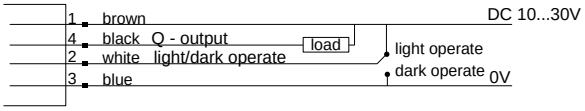
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

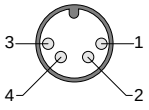
PNP Models



NPN Models



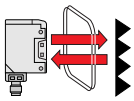
M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WL 170

Clear Material Sensors






0.3...2.6 ft (0.1...0.8 m)
sensing range

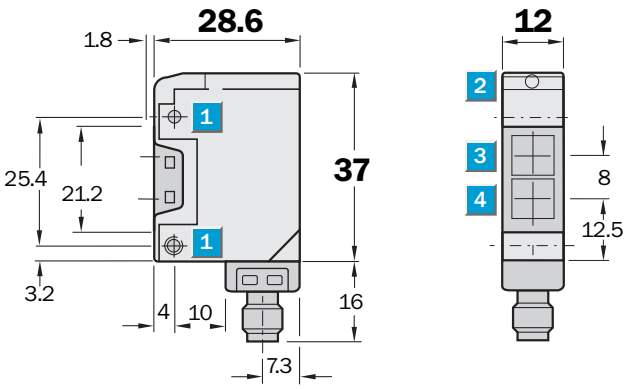
Highlights

- Rugged stainless steel/plastic housing
- Sensitivity adjustment
- Red light for easy alignment
- Ultra sensitivity for detection of glass, transparent objects or small parts
- Easy mounting with included brackets

WL 170

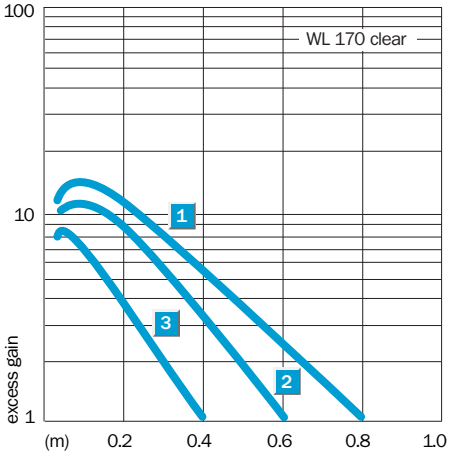


Dimensional drawing



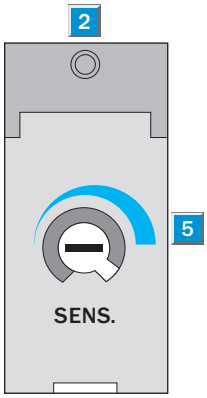
dimensions in mm

Excess gain



Adjustments

All types



1 Mounting holes Ø 3 mm with integrated M3 thread
2 LED signal strength indicator, red
3 Center of optical axis, receiver
4 Center of optical axis, sender
5 Sensitivity control (potentiometer, 270°)

Accessories	page
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Reflector type		Sensing range
1	PL 80 A	0.1...0.8 m
2	P 250	0.1...0.6 m
3	PL 20 A	0.1...0.4 m

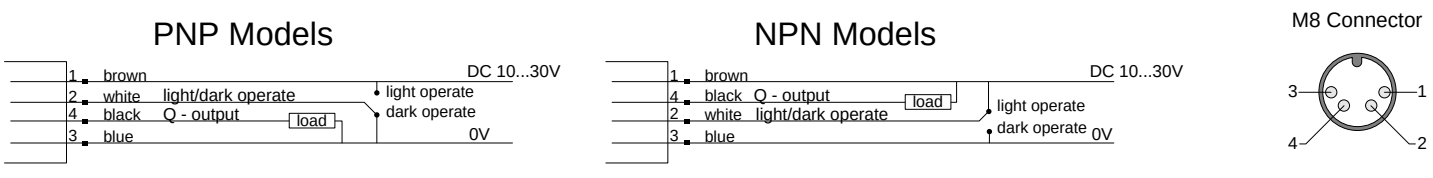
Order information

Type	Part no.
WL 170-P122	6 010 185
WL 170-P420	6 010 186
WL 170-N122	6 010 187
WL 170-N420	6 010 188

Technical data	WL 170-	P122	P420	N122	N420
Detection of transparent objects		■	■	■	■
Attenuation along light beam	min. 20%	■	■	■	■
Attenuation difference	min. 15%	■	■	■	■
Sensitivity	Potentiometer, 270° (adjustable)	■	■	■	■
Sensing range	0.3...2.0 ft (0.1...0.6 m)/P 250 (included)	■	■	■	■
	0.3...2.6 ft (0.1...0.8 m)/PL 80 A	■	■	■	■
	Reflective tape: not suitable				
Light source[1], **light type**	LED, red light, polarized	■	■	■	■
Light spot size	Approx. 1.2 in at 1.6 ft (30 mm at 0.5 m)	■	■	■	■
Angle of divergence	Focused: Ø approx. 0.2 in (5 mm)	■	■	■	■
	where SR = 3.5 in (90 mm)				
Supply voltage V_S	10...30 V DC[3]	■	■	■	■
Ripple[3]	± 10%	■	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Output current I_A max.	100 mA	■	■	■	■
Operation mode	Light/dark switch. via control wire	■	■	■	■
	+ V_S = light switching	■	■	■	■
	0 V = dark switching	■	■	■	■
Response time[5]	≤ 0.7 ms	■	■	■	■
Max. switching frequency[6]	700 Hz	■	■	■	■
Connection types	Cable, PVC, 2 m[7]; 4 x 0.18 mm², Ø 3.8 mm	■		■	
	Plug, M8 4-pin		■		■
VDE protection class[8]	□	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight	0.9 oz (25 g)	■		■	
	2.3 oz (66 g)		■		■
Housing material	Stainless steel/ABS	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

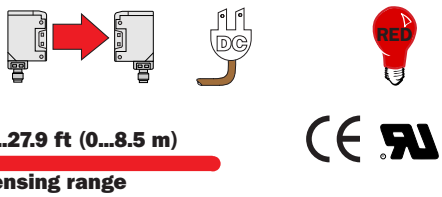
Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WS/WE 170

Through-beam Sensors



0...27.9 ft (0...8.5 m)
sensing range

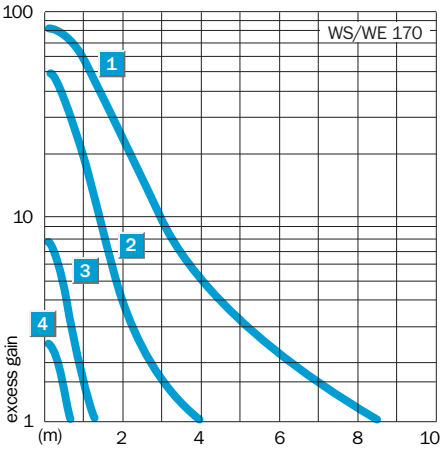
Highlights

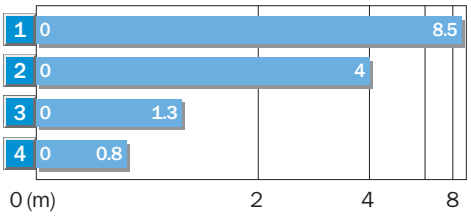
- Rugged stainless steel/plastic housing
- Test input
- Red light for easy alignment
- Optional slotted masks
- Optional polarizing filter
- Cable or M8 quick disconnect versions

WS/WE 170



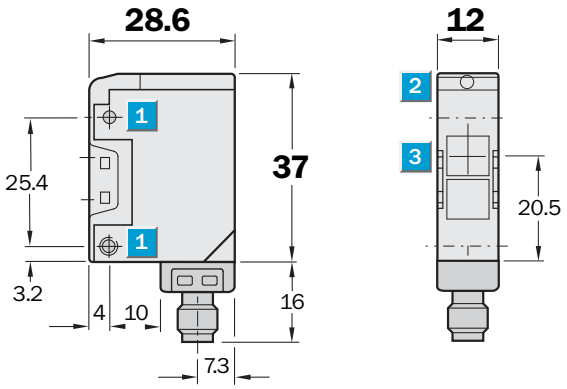
Excess gain





1	Without attachments
2	With polarizing filter attachment
3	With slotted mask, 1 mm
4	With polarizing filter and slotted mask, 1 mm

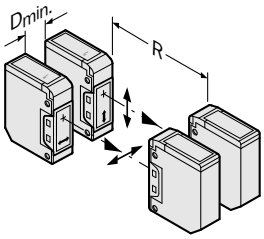
Dimensional drawing

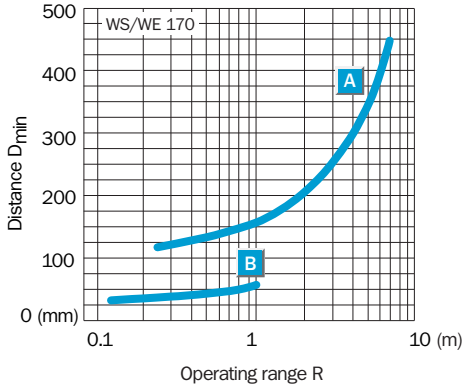


1	Mounting holes Ø 3 mm with integrated M3 thread
2	LED signal strength indicator
3	Center of optical axis, sender (WS) and receiver (WE)

dimensions in mm

Minimum distance $D_{min.}$ between sides of two WS/WE 170 units





Prevention of interference with two WS/WE 170 units

Minimum distance $D_{min.}$ observed for:

A	R 0.25 m... 7 m: without optical attachments
B	R 0.15 m... 1 m: with slotted masks BL170-10

No mutual interference if polarizing filters are used

C	Polarizing filter attachments BL170-POLF up to R ≤ 3 m only
D	Polarizing filter BL170-POLF and slotted masks BL170-10 up to R ≤ 0.5 m

Order information

Type	Part no.*
WS/WE170-P132	6 010 181
WS/WE170-N132	6 010 183
WS/WE170-P430	6 010 182
WS/WE170-N430	6 010 184

* Part no. includes sender and receiver

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

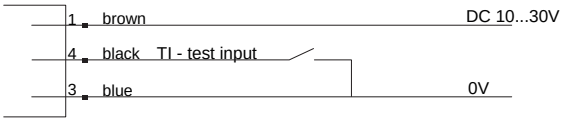
7028071 - © 2008 SICK, Inc.

Technical data	WS/WE 170-	P132	P430	N132	N430
Sensing range	0...27.9 ft (0...8.5 m)	■	■	■	■
Light source[1], **light type**	LED, red light	■	■	■	■
Light spot size	Approx. 33.5 in at 23 ft (850 mm at 7 m)	■	■	■	■
Angle of divergence, sender	Approx. 7°	■	■	■	■
Angle of reception, receiver	Approx. 20°	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■
Ripple[3]	± 10%	■	■	■	■
Current consumption[4] sender	≤ 20 mA	■	■	■	■
receiver	≤ 30 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Output current I_A max.	100 mA	■	■	■	■
Operation mode	Light/dark switching via control wire	■	■	■	■
	+ V_S = light switching	■	■	■	■
	0 V = dark switching	■	■	■	■
Response time[5]	≤ 1.0 ms	■	■	■	■
Max. switching frequency[6]	500 Hz	■	■	■	■
Test input "TE" sender OFF	PNP, NPN: TE to 0 V	■	■	■	■
Connection types	Cable, PVC, 2 m[7]	■		■	
	Sender WS, 3 x 0.18 mm², Ø 3.8 mm	■		■	
	Receiver WE, 4 x 0.18 mm², Ø 3.8 mm	■		■	
	Plug, M8 4-pin		■		■
VDE protection class[8]	□	■	■	■	■
Circuit protection[9]					
sender	A, B	■	■	■	■
receiver	A, B, C, D	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight	Sender: 2.3 oz (66 g)	■		■	
	Receiver: 2.3 oz (66 g)	■		■	
	Sender: 0.9 oz (25 g)		■		■
	Receiver: 0.9 oz (25 g)		■		■
Housing material	Stainless steel/glass fiber reinforced ABS	■	■	■	■

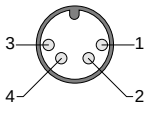
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

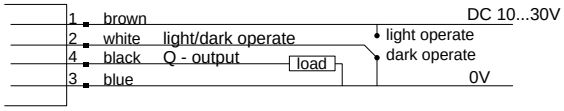
Sender, All Models



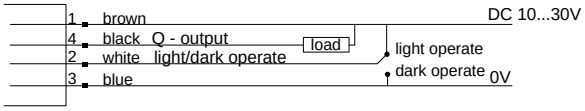
M8 Connector



Receiver, PNP Models



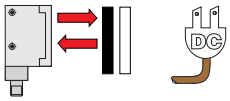
Receiver, NPN Models



wire colors refer to standard cable, not included with quick disconnect models

WT 190

Proximity/Diffuse Sensors - Background Suppression





1.6...3.9 in (40...100 mm)
sensing range

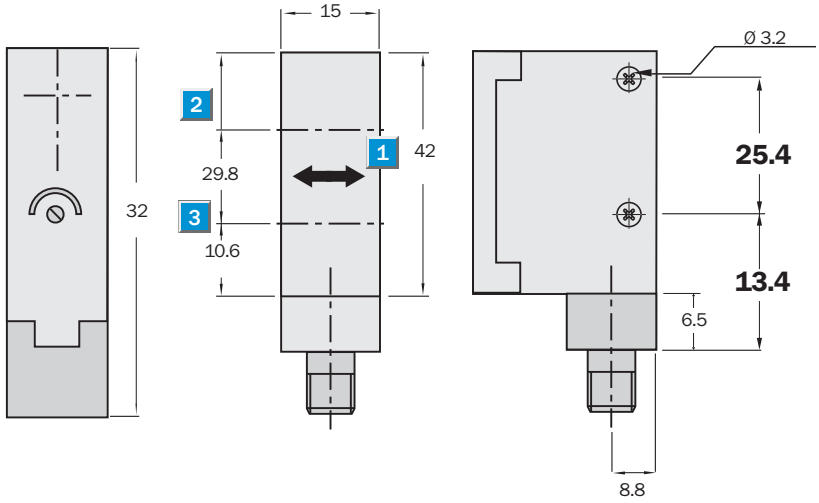
Highlights

- Rugged plastic housing
- Adjustable background suppression
- Adjustable sensing range
- Red light for easy alignment
- Cable or M8 quick disconnect versions

WT 190

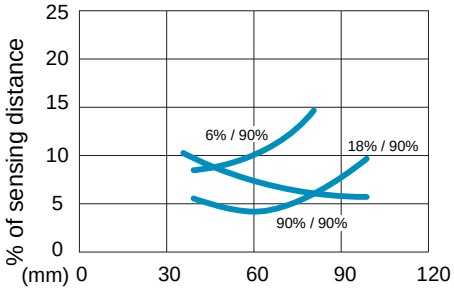


Dimensional drawing



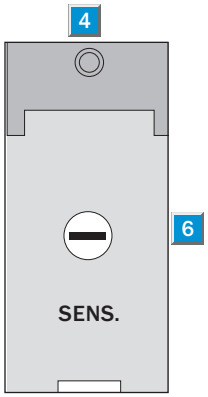
dimensions in mm

Background suppression



Adjustments

All types



1 Standard direction of the material to be sensed
2 Transmission axis
3 Reception axis
4 Red LED signal strength indicator
5 Through bore hole Ø 3.2 mm
6 Sensing distance adjustment (2 turns), over-turn protected

Accessories	page
Cables and connectors	1180
Mounting systems	1234

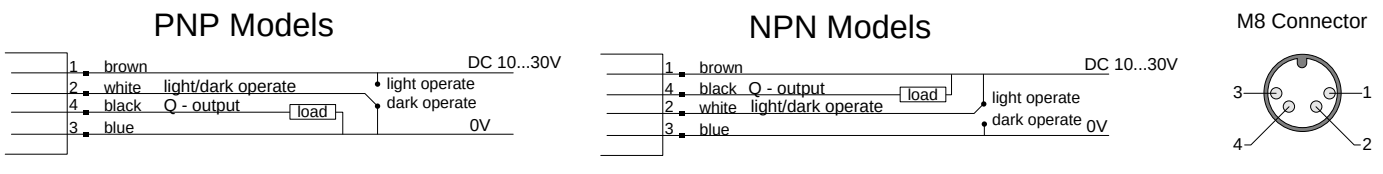
Order information

Type	Part no.
WT 190-N142	6 009 951
WT 190-N440	6 009 953
WT 190-P142	6 009 954
WT 190-P440	6 009 956

Technical data	WT 190-	P142	N142	P440	N440
Sensing range, adjustable[1]	1.6...3.9 in (40...100 mm)	■	■	■	■
Sensitivity	Adjustable, potentiometer 270°	■	■	■	■
Background suppression capability	% of set sensing distance (see previous pg)	■	■	■	■
Light source[2], **light type**	LED, red light	■	■	■	■
Light spot diameter	Approx. 0.4 in at 3.9 in (10 mm at 100 mm)	■	■	■	■
Angle of divergence	Approx. 4°	■	■	■	■
Supply voltage V_S	10...30 V DC	■	■	■	■
Ripple[4]	6 V peak to peak	■	■	■	■
Current consumption[5]	≤ 35 mA	■	■	■	■
Switching outputs	PNP; open collector: Q	■		■	
	NPN; open collector: Q		■		■
Max. output current I_A	100 mA	■	■	■	■
Switching mode[6]	Light or dark switching selectable via wire	■	■	■	■
Response time[7]	2 ms	■	■	■	■
Max. switching frequency[8]	250 Hz	■	■	■	■
Connection types	Cable	■	■		
	Plug, M8 4-pin			■	■
VDE protection class[10]	⧫	■	■	■	■
Circuit protection[11]	V_S	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight	0.8 oz (23 g)	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■

1) Object with 90% remission (based on standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) With resistive load
7) With light/dark ratio 1:1
8) Operating reserve < 50 %
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Inputs/outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected
11) Black = 6% remission
Gray = 18% remission
White = 90% remission

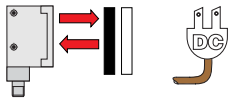
Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WT 190 Long

Proximity/Diffuse Sensors - Background Suppression



3.9...11.8 in (100...300 mm)
sensing range

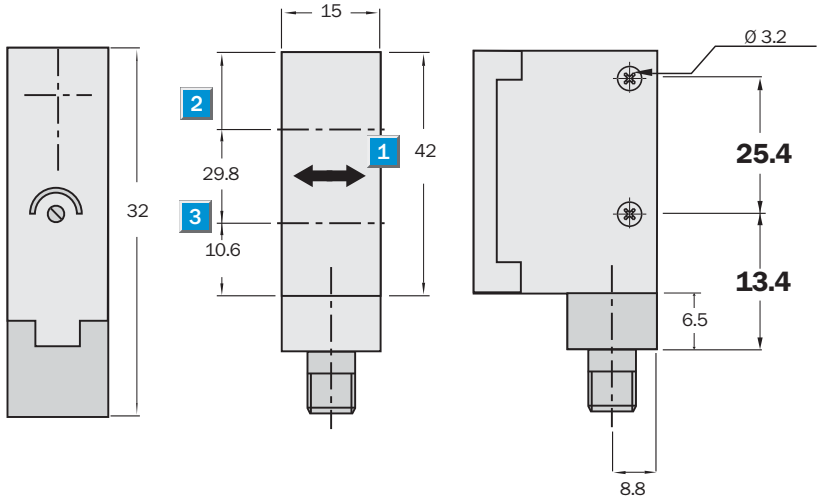
Highlights

- Rugged plastic housing
- Adjustable background suppression
- Adjustable sensing range
- Red light for easy alignment
- Cable or M8 quick disconnect versions

WT 190

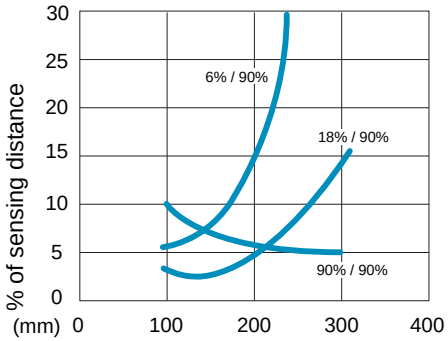


Dimensional drawing



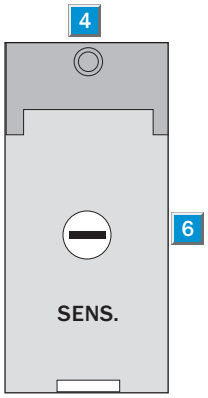
dimensions in mm

Background suppression



Adjustments

All types



1 Standard direction of the material to be sensed
2 Transmission axis
3 Reception axis
4 Red LED signal strength indicator
5 Through bore hole Ø 3.2 mm
6 Sensing distance adjustment (2 turns), over-turn protected

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

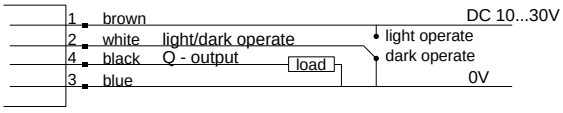
Type	Part no.
WT 190-N162	6 009 960
WT 190-N460	6 010 577
WT 190-P162	6 010 578
WT 190-P460	6 010 580

Technical data	WT 190-	P162	N162	P460	N460
Sensing range, adjustable[1]	3.9...11.8 in (100...300 mm)	■	■	■	■
Sensitivity	Adjustable, potentiometer 270°	■	■	■	■
Background suppression capability	% of set sensing distance (see previous pg)	■	■	■	■
Light source[2], **light type**	LED, red light	■	■	■	■
Light spot diameter	Approx. 1.2 in at 11.8 in (30 mm at 300 mm)	■	■	■	■
Angle of divergence	Approx. 4.3°	■	■	■	■
Supply voltage V_S	10...30 V DC	■	■	■	■
Ripple[4]	6 V peak to peak	■	■	■	■
Current consumption[5]	≤ 35 mA	■	■	■	■
Switching outputs	PNP; open collector: Q	■		■	
	NPN; open collector: Q		■		■
Max. output current I_A	100 mA	■	■	■	■
Switching mode[6]	Light or dark switching selectable via wire	■	■	■	■
Response time[7]	2 ms	■	■	■	■
Max. switching frequency[8]	250 Hz	■	■	■	■
Connection types	Cable	■	■		
	Plug, M8 4-pin			■	■
VDE protection class[10]	⧫	■	■	■	■
Circuit protection[11]	V_S	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight	0.8 oz (23 g)	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■

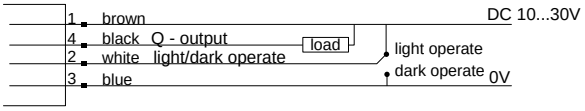
1) Object with 90% remission (based on standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) With resistive load
7) With light/dark ratio 1:1
8) Operating reserve < 50 %
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Inputs/outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected
11) Black = 6% remission
Gray = 18% remission
White = 90% remission

Connection diagram

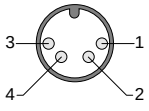
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WTV190T

Proximity/Diffuse Sensors - Foreground Suppression

3.1...11.8 in (80...300 mm)
sensing range

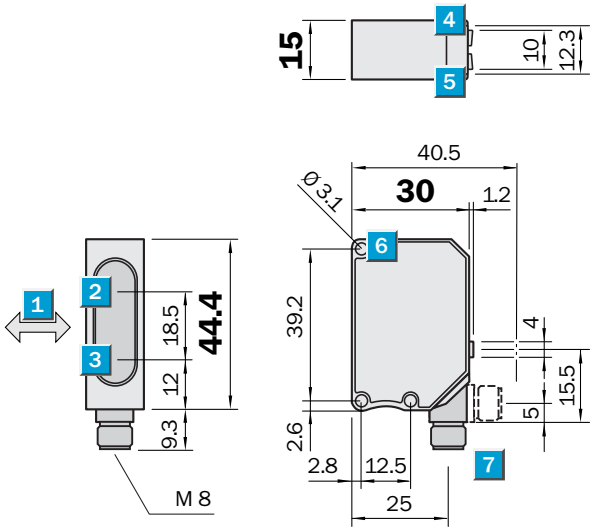
Highlights

- Precise foreground suppression
- Small light spot enabling fast and precise alignment
- Sensing range setting via teach-in procedure
- Easily readable display with menu navigation enables convenient programming and parameterization

WTV190T

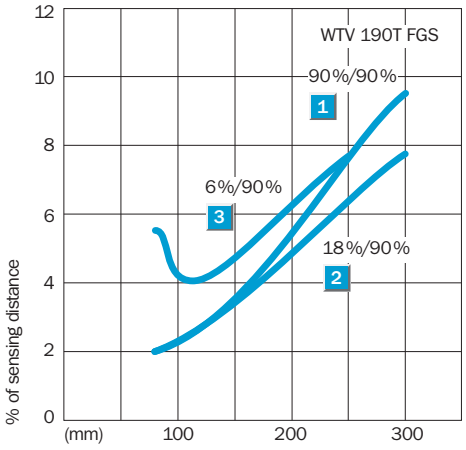


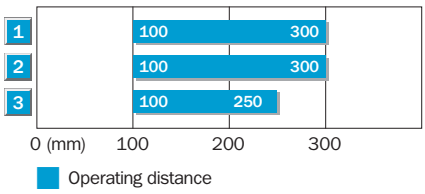
Dimensional drawing



dimensions in mm

Foreground suppression

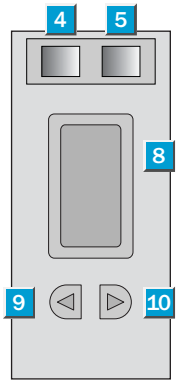




1	Sensing range on white, 90% remission
2	Sensing range on gray, 18% remission
3	Sensing range on black, 6% remission

Adjustments

- WTV190T-N162
- WTV190T-N460
- WTV190T-P162
- WTV190T-P460



1	Standard direction of the material being sensed
2	Center of optical axis, receiver
3	Center of optical axis, sender
4	LED indicator green: output active
5	LED indicator orange: light reception with operating reserve > 1.1 or without light reception
6	Mounting holes, ø approx. 3.1 mm
7	Connection
8	Numerical display
9	Select mode button
10	Teach-in button

External teach-in

Time	Teach Mode
1.5 s - 3.8 s	1-point teach-in
4 s - 6.3 s	2-point teach-in

Order information

Type	Part no.
WTV190T-N162	6 022 855
WTV190T-N460	6 022 858
WTV190T-P162	6 022 859
WTV190T-P460	6 022 862

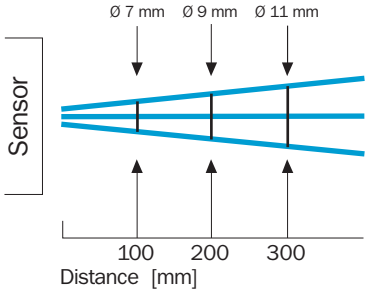
Accessories	page
Cables and connectors	1180
Mounting systems	1234

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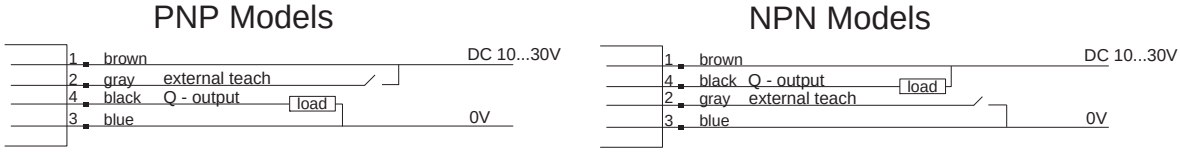
Technical data	WTV190T	N162	N460	P162	P460
Sensing distance typ. max	3.1…11.8 in (80…300 mm)[1]	■	■	■	■
Operating distance	3.9…11.8 in (100…300 mm)[1]	■	■	■	■
Adjustment of operating distance	Teach-in: teach button & cable (ET)[2]	■	■	■	■
Light source, light type	LED, Red light, 680 nm[3]	■	■	■	■
Light spot diameter	0.4 in at 11.8 in (11 mm at 300 mm)	■	■	■	■
Supply voltage V_S	10…30 V DC[4]	■	■	■	■
Ripple[5]	± 10%	■	■	■	■
Current consumption[6]	60 mA	■	■	■	■
Switching outputs	NPN: open collector: Q	■	■		
	PNP: open collector: Q			■	■
Switching mode	Light/dark switching, programmable	■	■	■	■
Signal voltage PNP HIGH/LOW	V_S - 1.8 V/approx. 0 V			■	■
Signal voltage NPN HIGH/LOW	Approx. V_S/< 1.8 V	■	■		
Output current I_a max	100 mA	■	■	■	■
Response time	2.5 ms[7]	■	■	■	■
Max. switching frequency[8]	200 Hz	■	■	■	■
Time step	0…10 s, programmable	■	■	■	■
Time type	Nor: normal Mode	■	■	■	■
	Ond: ON Delay Mode	■	■	■	■
	OFd: OFF Delay Mode	■	■	■	■
Connection types[9]	Cable, PVC, 1 m	■		■	
	Connector, M8, 4-pin		■		■
VDE protection class	⧫	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■
Approximate weight	2.3 oz (66 g)	■		■	
	0.6 oz (18 g)		■		■
Housing material	ABS, PMMA	■	■	■	■

1) Object with 90% reflectance (with reference to standard white according to DIN 5033)
2) PNP: control wire > 7 V
NPN: control wire < 1.5 V
3) Average service life 100,000 h at T_A = 25° C
4) Limit values, operation in short-circuit protected network max. 8 A
5) May not exceed or fall short of V_S tolerances
6) Without load
7) Signal transit time with resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0° C
10) A = Vs connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

Light spot diameter



Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WTV190T

Proximity/Diffuse Sensors - Foreground Suppression

1.2...3.9 in (30...100 mm)
sensing range

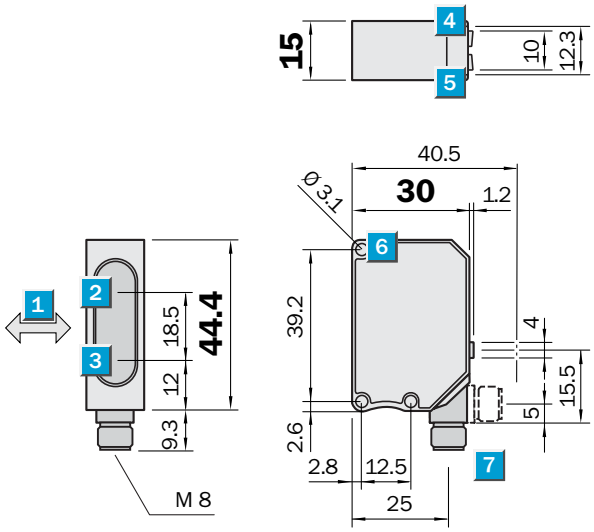
Highlights

- Precise foreground suppression
- Small light spot enabling fast and precise alignment
- Sensing range setting via teach-in procedure
- Easily readable display with menu navigation enables convenient programming and parameterization

WTV190T

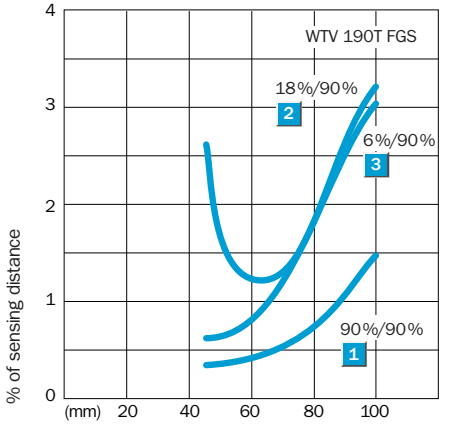


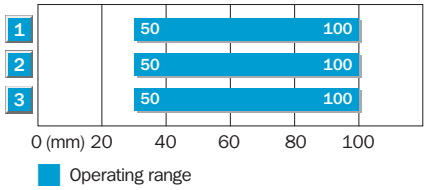
Dimensional drawing



dimensions in mm

Foreground suppression

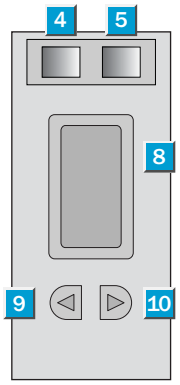




1	Sensing range on white, 90% remission
2	Sensing range on gray, 18% remission
3	Sensing range on black, 6% remission

Adjustments

WTV190T-N132
WTV190T-N430
WTV190T-N132
WTV190T-P430



1	Standard direction of the material being sensed
2	Center of optical axis, receiver
3	Center of optical axis, sender
4	LED indicator green: output active
5	LED indicator orange: light reception with operating reserve > 1.1 or without light reception
6	Mounting holes, ø approx. 3.1 mm
7	Connection
8	Numerical display
9	Select mode button
10	Teach-in button

External teach-in

Time	Teach Mode
1.5 s - 3.8 s	1-point teach-in
4 s - 6.3 s	2-point teach-in

Order information

Type	Part no.
WTV190T-N132	6 022 847
WTV190T-N430	6 022 850
WTV190T-P132	6 022 851
WTV190T-P430	6 022 854

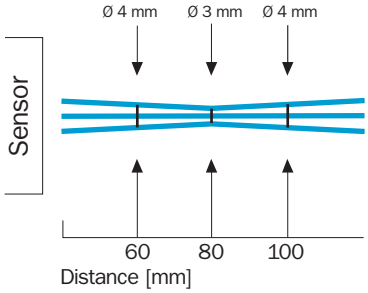
Accessories	page
Cables and connectors	1180
Mounting systems	1234

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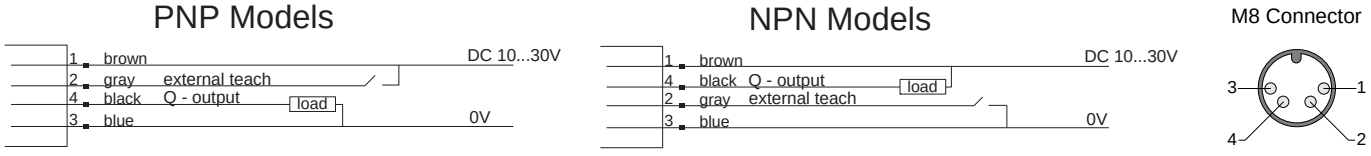
Technical data	WTV190T	N132	N430	P132	P430
Sensing distance typ. max	1.2…3.9 in (30…100 mm)[1]	■	■	■	■
Operating distance	2.0…3.9 in (50…100 mm)[1]	■	■	■	■
Adjustment of operating distance	Teach-in: teach button & cable (ET)[2]	■	■	■	■
Light source, light type	LED, Red light, 680 nm[3]	■	■	■	■
Light spot diameter	0.2 in at 3.9 in (4 mm at 100 mm)	■	■	■	■
Supply voltage V_S	10…30 V DC[4]	■	■	■	■
Ripple[5]	± 10%	■	■	■	■
Current consumption[6]	60 mA	■	■	■	■
Switching outputs	NPN: open collector: Q	■	■		
	PNP: open collector: Q			■	■
Switching mode	Light/dark switching, programmable	■	■	■	■
Signal voltage PNP HIGH/LOW	V_S - 1.8 V/approx. 0 V			■	■
Signal voltage NPN HIGH/LOW	Approx. V_S/< 1.8 V	■	■		
Output current I_a max	100 mA	■	■	■	■
Response time	2.5 ms[7]	■	■	■	■
Max. switching frequency[8]	200 Hz	■	■	■	■
Time step	0…10 s, programmable	■	■	■	■
Time type	Nor: normal Mode	■	■	■	■
	Ond: ON Delay Mode	■	■	■	■
	OFd: OFF Delay Mode	■	■	■	■
Connection types[9]	Cable, PVC, 2 m	■		■	
	Connector, M8, 4-pin		■		■
VDE protection class	⧫	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■
Approximate weight	2.3 oz (66 g)	■		■	
	0.6 oz (18 g)		■		■
Housing material	ABS, PMMA	■	■	■	■

1) Object with 90% reflectance (with reference to standard white according to DIN 5033)
2) PNP: control wire > 7 V
NPN: control wire < 1.5 V
3) Average service life 100,000 h at T_A = 25° C
4) Limit values, operation in short-circuit protected network max. 8 A
5) May not exceed or fall short of V_S tolerances
6) Without load
7) Signal transit time with resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0° C
10) A = Vs connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

Light spot diameter



Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WTB190T

Proximity/Diffuse Sensors - Background Suppression

3.1...11.8 in (80...300 mm)
sensing range

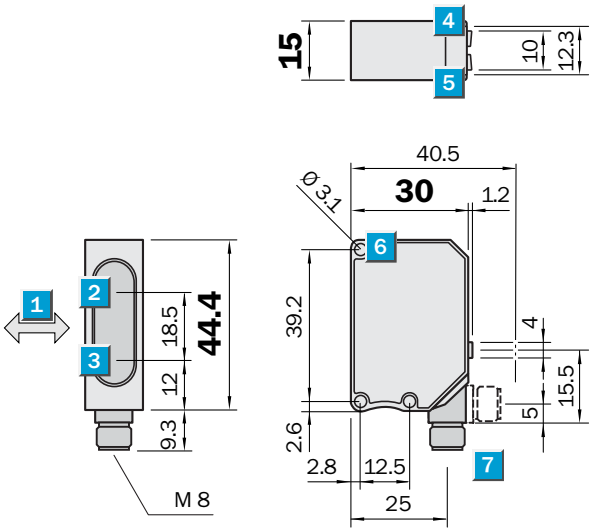
Highlights

- Precise background suppression
- Small light spot enabling fast and precise alignment
- Sensing range setting via teach-in procedure
- Easily readable display with menu navigation enables convenient programming and parameterization

WTB190T

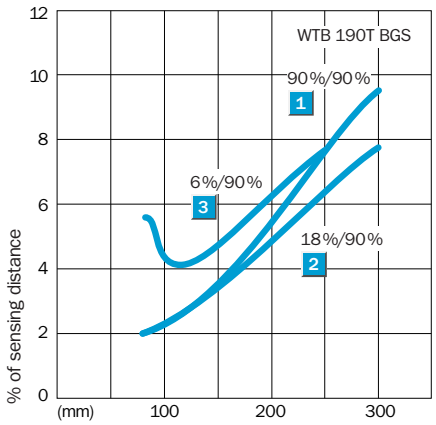


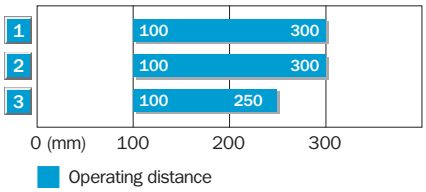
Dimensional drawing



dimensions in mm

Background suppression

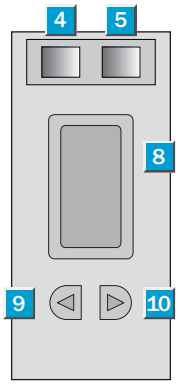




1	Sensing range on white, 90% remission
2	Sensing range on gray, 18% remission
3	Sensing range on black, 6% remission

Adjustments

WTB190T-N162
WTB190T-N460
WTB190T-N162
WTB190T-P460



1	Standard direction of the material being sensed
2	Center of optical axis, receiver
3	Center of optical axis, sender
4	LED indicator green: output active
5	LED indicator orange: light reception with operating reserve > 1.1 or without light reception
6	Mounting holes, ø approx. 3.1 mm
7	Connection
8	Numerical display
9	Select mode button
10	Teach-in button

External teach-in

Time	Teach Mode
1.5 s - 3.8 s	1-point teach-in
4 s - 6.1 s	2-point teach-in
> 6.3 s	Position teach-in

Order information

Type	Part no.
WTB190T-N162	6 022 839
WTB190T-N460	6 022 842
WTB190T-P162	6 022 843
WTB190T-P460	6 022 846

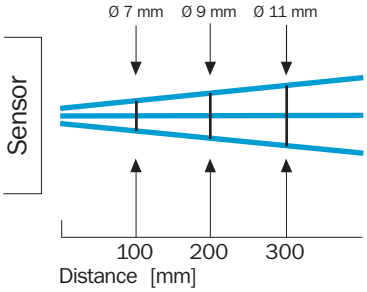
Accessories	page
Cables and connectors	1180
Mounting systems	1234

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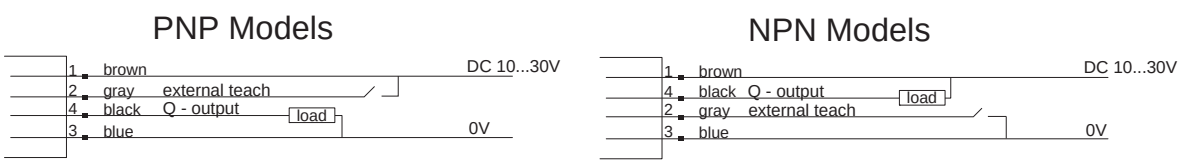
Technical data	WTB190T	N162	N460	P162	P460
Sensing distance typ. max	3.1…11.8 in (80…300 mm)[1]	■	■	■	■
Operating distance	3.9…11.8 in (100…300 mm)[1]	■	■	■	■
Adjustment of operating distance	Teach-in: teach button & cable (ET)[2]	■	■	■	■
Light source, light type	LED, Red light, 680 nm[3]	■	■	■	■
Light spot diameter	0.4 in at 11.8 in (11 mm at 300 mm)	■	■	■	■
Supply voltage V_S	10…30 V DC[4]	■	■	■	■
Ripple[5]	± 10%	■	■	■	■
Current consumption[6]	≤ 60 mA	■	■	■	■
Switching outputs	NPN: open collector: Q	■	■		
	PNP: open collector: Q			■	■
Switching mode	Light/dark switching, programmable	■	■	■	■
Signal voltage PNP HIGH/LOW	V_S - 1.8 V/approx. 0 V			■	■
Signal voltage NPN HIGH/LOW	Approx. V_S/< 1.8 V	■	■		
Output current I_a max	100 mA	■	■	■	■
Response time	2.5 ms[7]	■	■	■	■
Max. switching frequency[8]	200 Hz	■	■	■	■
Time step	0…10 s, programmable	■	■	■	■
Time type	Nor: normal Mode	■	■	■	■
	Ond: ON Delay Mode	■	■	■	■
	OFd: OFF Delay Mode	■	■	■	■
Connection types[9]	Cable, PVC, 2 m	■		■	
	Connector, M8, 4-pin		■		■
VDE protection class	⏀	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A	Operation -13… 131° F (-25…55° C)	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■
Approximate weight	2.3 oz (66 g)	■		■	
	0.6 oz (18 g)		■		■
Housing material	ABS, PMMA	■	■	■	■

1) Object with 90% reflectance (with reference to standard white according to DIN 5033)
2) PNP: control wire > 7 V
NPN: control wire < 1.5 V
3) Average service life 100,000 h at T_A = 25° C
4) Limit values, operation in short-circuit protected network max. 8 A
5) May not exceed or fall short of V_S tolerances
6) Without load
7) Signal transit time with resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0° C
10) A = Vs connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

Light spot diameter



Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WTB190T

Proximity/Diffuse Sensors - Background Suppression

1.2...3.9 in (30...100 mm)
sensing range

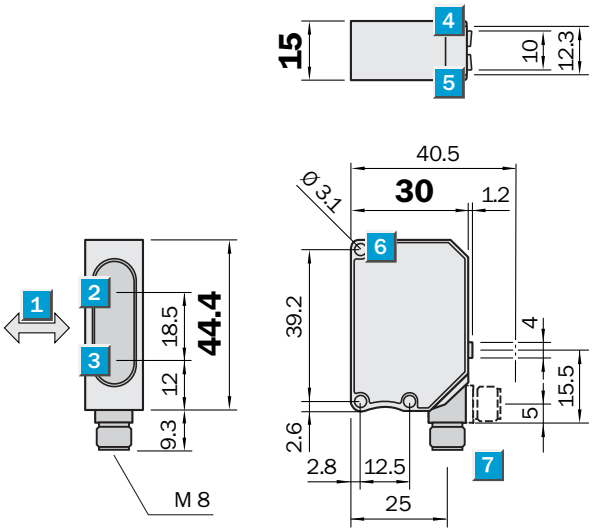
Highlights

- Precise background suppression
- Small light spot enabling fast and precise alignment
- Sensing range setting via teach-in procedure
- Easily readable display with menu navigation enables convenient programming and parameterization

WTB190T

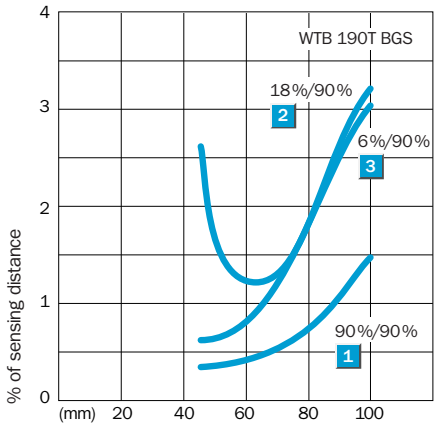


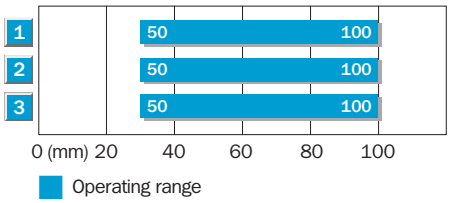
Dimensional drawing



dimensions in mm

Background suppression

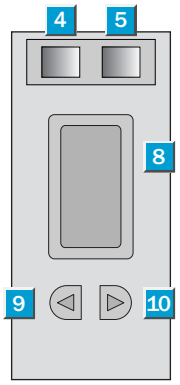




1	Sensing range on white, 90% remission
2	Sensing range on gray, 18% remission
3	Sensing range on black, 6% remission

Adjustments

WTB190T-N132
WTB190T-N430
WTB190T-P132
WTB190T-P430



1	Standard direction of the material being sensed
2	Center of optical axis, receiver
3	Center of optical axis, sender
4	LED indicator green: output active
5	LED indicator orange: light reception with operating reserve > 1.1 or without light reception
6	Mounting holes, ø approx. 3.1 mm
7	Connection
8	Numerical display
9	Select mode button
10	Teach-in button

External teach-in

Time	Teach Mode
1.5 s - 3.8 s	1-point teach-in
4 s - 6.1 s	2-point teach-in
> 6.3 s	Position teach-in

Order information

Type	Part no.
WTB190T-N132	6 022 831
WTB190T-N430	6 022 834
WTB190T-P132	6 022 835
WTB190T-P430	6 022 838

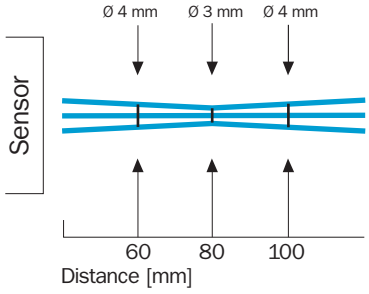
Accessories	page
Cables and connectors	1180
Mounting systems	1234

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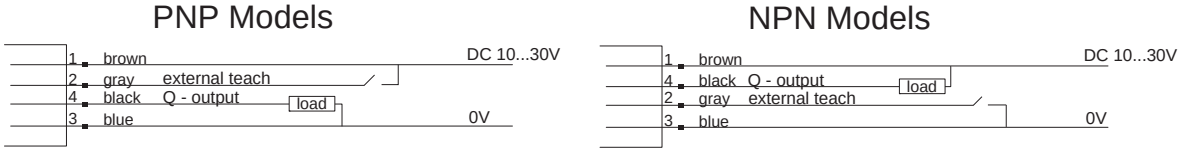
Technical data	WTB190T	N132	N430	P132	P430
Sensing distance typ. max	1.2…3.9 in (30…100 mm)[1]	■	■	■	■
Operating distance	2.0…3.9 in (50…100 mm)[1]	■	■	■	■
Adjustment of operating distance	Teach-in: teach button & cable (ET)[2]	■	■	■	■
Light source, light type	LED, Red light, 680 nm[3]	■	■	■	■
Light spot diameter	0.2 in at 3.9 in (4 mm at 100 mm)	■	■	■	■
Supply voltage V_S	10…30 V DC[4]	■	■	■	■
Ripple[5]	± 10%	■	■	■	■
Current consumption[6]	60 mA	■	■	■	■
Switching outputs	NPN: open collector: Q	■	■		
	PNP: open collector: Q			■	■
Switching mode	Light/dark switching, programmable	■	■	■	■
Signal voltage PNP HIGH/LOW	V_S - 1.8 V/approx. 0 V			■	■
Signal voltage NPN HIGH/LOW	Approx. V_S/< 1.8 V	■	■		
Output current I_a max	100 mA	■	■	■	■
Response time	2.5 ms[7]	■	■	■	■
Max. switching frequency[8]	200 Hz	■	■	■	■
Time step	0…10 s, programmable	■	■	■	■
Time type	Nor: normal Mode	■	■	■	■
	Ond: ON Delay Mode	■	■	■	■
	OFd: OFF Delay Mode	■	■	■	■
Connection types[9]	Cable, PVC, 2 m	■		■	
	Connector, M8, 4-pin		■		■
VDE protection class	⏀	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■
Approximate weight	2.3 oz (66 g)	■		■	
	0.6 oz (18 g)		■		■
Housing material	ABS, PMMA	■	■	■	■

1) Object with 90% reflectance (with reference to standard white according to DIN 5033)
2) PNP: control wire > 7 V
NPN: control wire < 1.5 V
3) Average service life 100,000 h at T_A = 25° C
4) Limit values, operation in short-circuit protected network max. 8 A
5) May not exceed or fall short of V_S tolerances
6) Without load
7) Signal transit time with resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0° C
10) A = Vs connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

Light spot diameter



Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WTB 190 L

Proximity/Diffuse Sensors - Background suppression



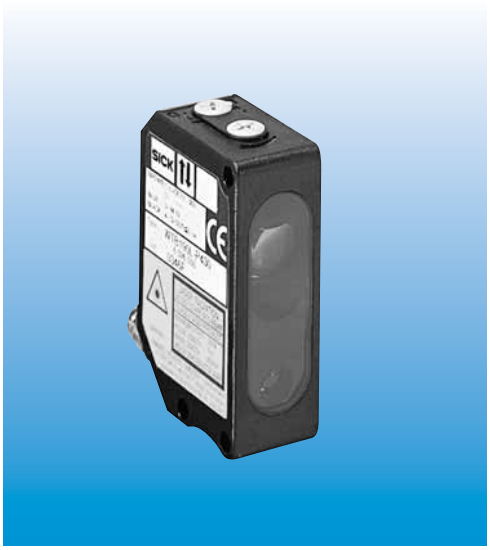
3.9...11.8 in (100...300 mm)
sensing range

CDRH

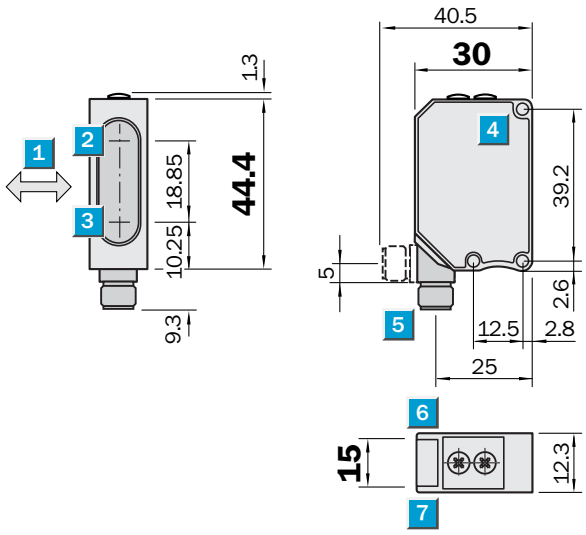
Highlights

- Laser LED, visible red light, Class 2
- User-friendly sensor, easily aligned and set up
- Precise background suppression
- Set via rotary switch
- Selectable output: Light/dark switching

WTB 190 L

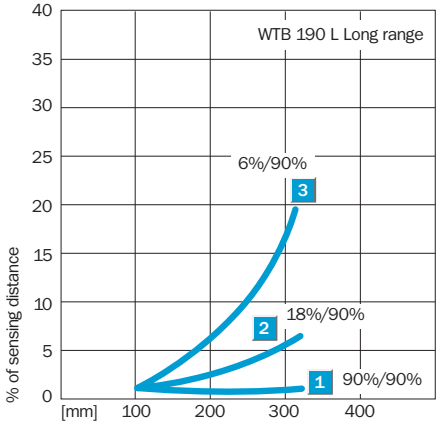


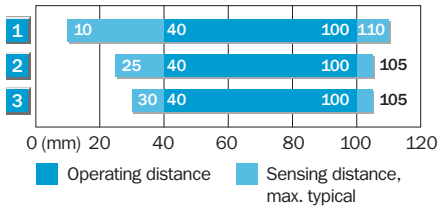
Dimensional drawing



dimensions in mm

Background suppression

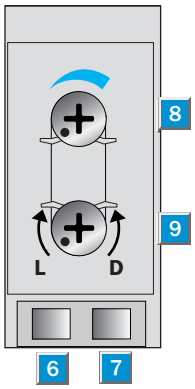




1	Sensing range on white, 90% remission
2	Sensing range on gray, 18% remission
3	Sensing range on black, 6% remission

Adjustments

All types



1	Standard direction of the material being sensed
2	Center of optical axis, sender
3	Center of optical axis, receiver
4	Mounting holes, ø approx. 3.1 mm
5	Plug 4-pin, M8, 90° rotatable or cable 2 m, 3-wire
6	Status indicator LED, yellow: Output active
7	Status indicator LED, green: Laser on
8	Scanning range adjustment
9	L.ON/D.ON selection switch

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

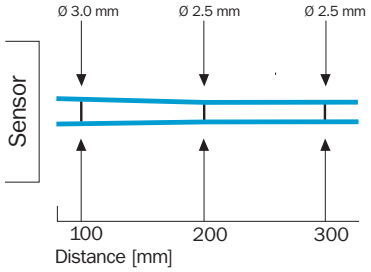
Type	Part no.
WTB190L-P162	6 026 553
WTB190L-P460	6 026 554
WTB190L-N162	6 026 551
WTB190L-N460	6 026 552

* Equipment model with 5 m PVC cable or M8 plug, 3-pin on request

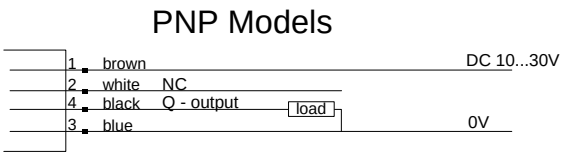
Technical data	WTB 190 L-	P162	P460	N162	N460
Sensing range, adjustable	3.9...11.8 in (100...300 mm)[1]	■	■	■	■
Adjustment	Potentiometer, 4 turn	■	■	■	■
Light source[2], light type	Laser, red light; Class 2	■	■	■	■
Light spot diameter	0.1 in at 7.9 in (2.5 mm at 200 mm)	■	■	■	■
Supply voltage V_S	10...30 V DC[3]	■	■	■	■
Ripple[4]	± 10%	■	■	■	■
Current consumption[5]	Max. 40 mA	■	■	■	■
Switching outputs	PNP	■	■		
	NPN			■	■
Output current I_A max.	< 100 mA	■	■	■	■
Switching mode	Light/dark mode[6], selectable	■	■	■	■
Response time[7]	0.7 ms	■	■	■	■
Max. switching frequency[8]	700/s	■	■	■	■
Connection types	Cable[9], 3-wire	■		■	
	Plug, 4-pin, M8		■		■
VDE protection class[10]	⧫	■	■	■	■
Circuit protection[11]	A, B	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A	Operation 14...104° F (-10...40° C)	■	■	■	■
	Storage -4...140° F (-20...60° C)	■	■	■	■
Approximate weight	with cable 2 m, approx. 7.0 oz (200 g)	■		■	
	with plug, approx. 4.2 oz (120 g)		■		■
Housing material	Housing: ABS; optic: PMMA	■	■	■	■

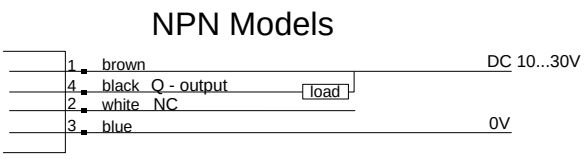
1) Object with 90% reflectance (with reference to standard white, according to DIN 5033)
2) Average service life 50,000 h at T_A = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) Via potentiometer
7) With resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0° C
10) Reference voltage 50 V DC
11) A = Vs connections reverse-polarity protected
B = Output Q short-circuit protected

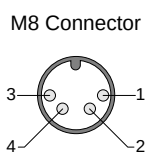
Light spot diameter



Connection diagram



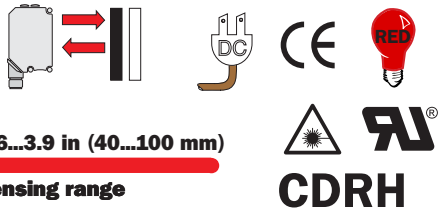




wire colors refer to standard cable, not included with quick disconnect models

WTB 190 L

Proximity/Diffuse Sensors - Background suppression

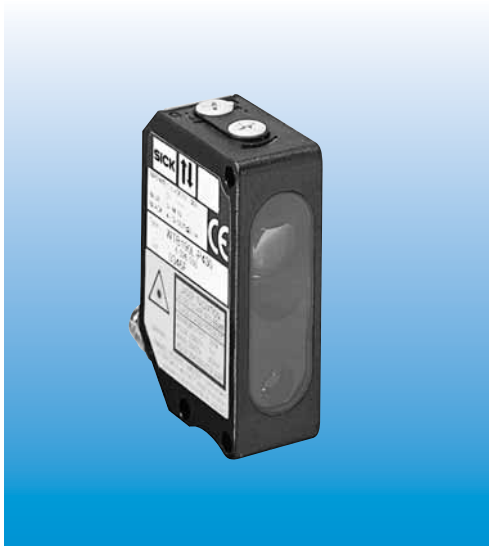


1.6...3.9 in (40...100 mm)
sensing range

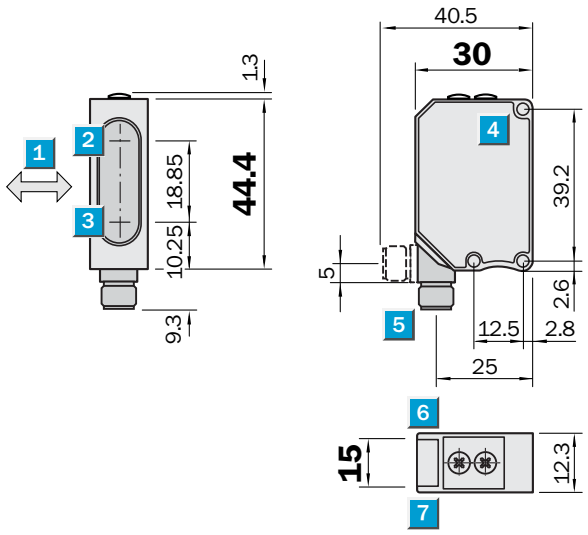
Highlights

- Laser LED, visible red light, Class 2
- User-friendly sensor, easily aligned and set up
- Precise background suppression
- Set via rotary switch
- Selectable output: Light/dark switching

WTB 190 L

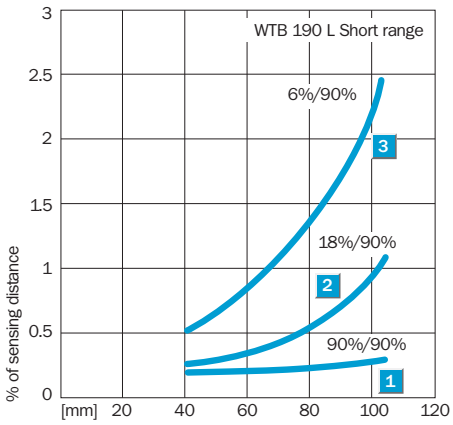


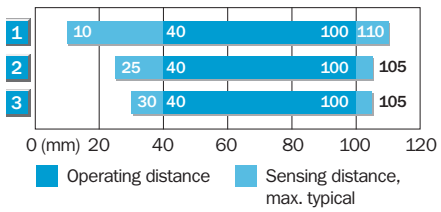
Dimensional drawing



dimensions in mm

Background suppression

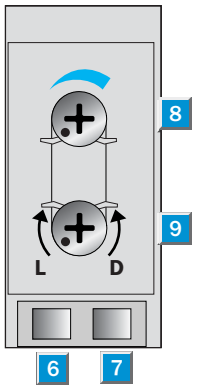




1	Sensing range on white, 90% remission
2	Sensing range on gray, 18% remission
3	Sensing range on black, 6% remission

Adjustments

All types



1	Standard direction of the material being sensed
2	Center of optical axis, sender
3	Center of optical axis, receiver
4	Mounting holes, ø approx. 3.1 mm
5	Plug 4-pin, M8, 90° rotatable or cable 2 m, 3-wire
6	Status indicator LED, yellow: Output active
7	Status indicator LED, green: Laser on
8	Scanning range adjustment
9	L.ON/D.ON selection switch

Accessories	page
Cables and connectors	1180
Mounting systems	1234

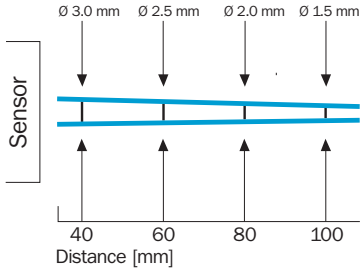
Order information

Type	Part no.
WTB190L-P132	6 026 549
WTB190L-P430	6 026 550
WTB190L-N132	6 026 547
WTB190L-N430	6 026 548

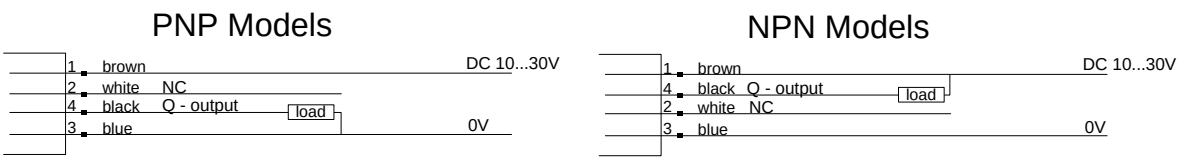
Technical data	WTB 190 L-	P132	P430	N132	N430
Sensing range, adjustable	1.6…3.9 in (40…100 mm)[1]	■	■	■	■
Adjustment	Potentiometer, 4 turn	■	■	■	■
Light source[2], light type	Laser, red light; Class 2	■	■	■	■
Light spot diameter	0.8 in at 3.1 in (2 mm at 80 mm)	■	■	■	■
Supply voltage V_S	10;30 V DC[3]	■	■	■	■
Ripple[4]	± 10%	■	■	■	■
Current consumption[5]	Max. 40 mA	■	■	■	■
Switching outputs	PNP	■	■		
	NPN			■	■
Output current I_A max.	< 100 mA	■	■	■	■
Switching mode	Light/dark mode[6], selectable	■	■	■	■
Response time[7]	0.7 ms	■	■	■	■
Max. switching frequency[8]	700/s	■	■	■	■
Connection types	Cable[9], 3-wire	■		■	
	Plug, 4-pin, M8		■		■
VDE protection class[10]	⏀	■	■	■	■
Circuit protection[11]	A, B	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A	Operation 14…104° F (-10…40° C)	■	■	■	■
	Storage -4…140° F (-20…60° C)	■	■	■	■
Approximate weight	with cable 2 m, approx. 7.0 oz (200 g)	■		■	
	with plug, approx. 4.2 oz (120 g)		■		■
Housing material	Housing: ABS; optic: PMMA	■	■	■	■

1) Object with 90% reflectance (with reference to standard white, according to DIN 5033)
2) Average service life 50,000 h at T_A = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) Via potentiometer
7) With resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0° C
10) Reference voltage 50 V DC
11) A = Vs connections reverse-polarity protected
B = Output Q short-circuit protected

Light spot diameter



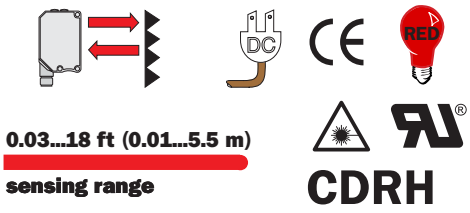
Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WL 190 L

Reflex/Retro-Reflective

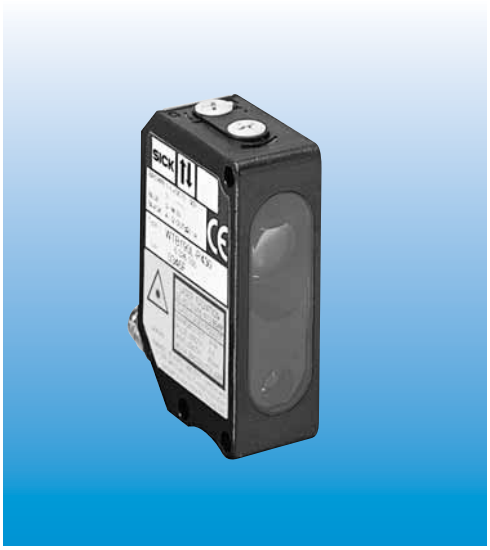


0.03...18 ft (0.01...5.5 m)
sensing range

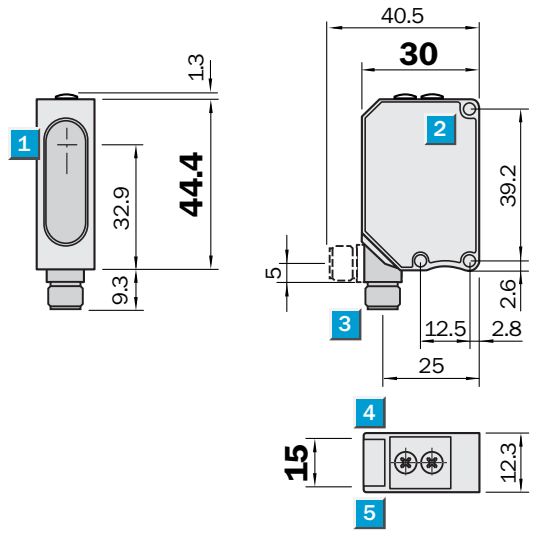
Highlights

- Laser LED, visible red light, Class 2
- User-friendly sensor, easily aligned and set up
- Precision auto-collimated optics
- Sensitivity setting via rotary switch
- Selectable output: Light/dark switching

WL 190 L

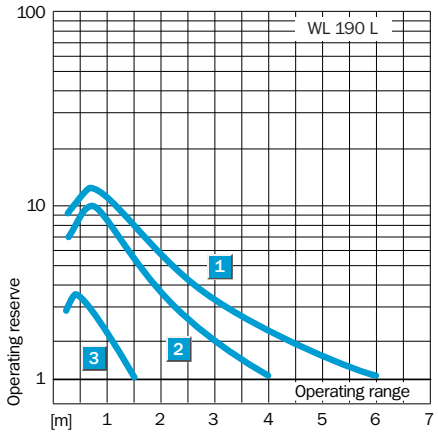


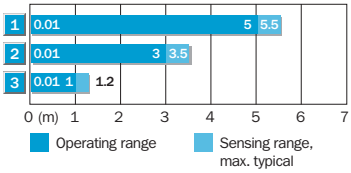
Dimensional drawing



dimensions in mm

Background suppression

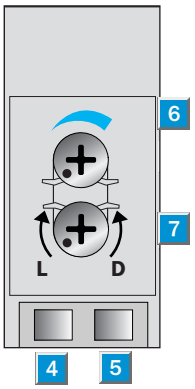




Reflector type		Operating range
1	P 250 F	0.01 ... 5 m
2	PL 20 F	0.01 ... 3 m
3	PL 10 F	0.01 ... 1 m

Adjustments

All types



1 Center of optical axis
2 Mounting holes, ø approx. 3.1 mm
3 Plug 4-pin, M8, 90° rotatable or cable 2 m, 3-wire
4 Status indicator LED, yellow: Output active
5 Status indicator LED, green: Laser on
6 Sensitivity control
7 L.ON/D.ON selection switch

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

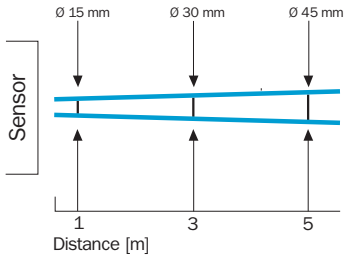
Order information

Type	Part no.
WL190L-P132	6 026 557
WL190L-P430	6 026 558
WL190L-N132	6 026 555
WL190L-N430	6 026 556

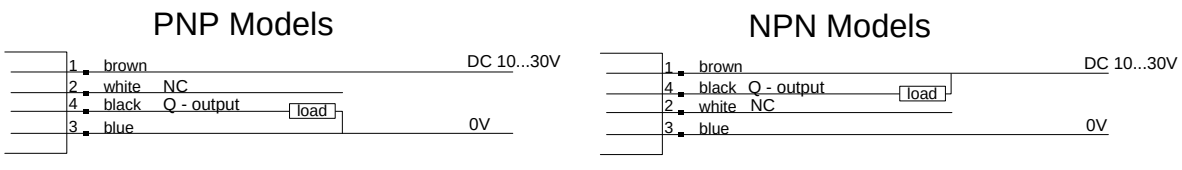
Technical data	WL 190 L-	P132	P430	N132	N430
Sensing range, max. typical/on refl.[1]	0.03…18 ft (0.01…5.5 mm)/P 250 F	■	■	■	■
Adjustment	Potentiometer, 1 turn	■	■	■	■
Light source[2], light type	Laser, red light; Class 2	■	■	■	■
Light spot diameter	1.8 in at 16.4 ft (45 mm at 5 m)	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■
Ripple[4]	± 10%	■	■	■	■
Current consumption[5]	Max. 40 mA	■	■	■	■
Switching outputs	PNP	■	■		
	NPN			■	■
Output current I_A max.	< 100 mA	■	■	■	■
Switching mode	Light/dark mode[6], selectable	■	■	■	■
Response time[7]	0.5 ms	■	■	■	■
Max. switching frequency[8]	1000/s	■	■	■	■
Connection types	Cable[9], 3-wire	■		■	
	Plug, 4-pin, M8		■		■
VDE protection class[10]	⏀	■	■	■	■
Circuit protection[11]	A, B	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A	Operation 14…104° F (-10…40° C)	■	■	■	■
	Storage -4…140° F (-20…60° C)	■	■	■	■
Approximate weight	with cable 2 m, approx. 7.0 oz (200 g)	■		■	
	with plug, approx. 4.2 oz (120 g)		■		■
Housing material	Housing: ABS; optic: PMMA	■	■	■	■

1) Reflector P 250 F included with delivery
2) Average service life 50,000 h at T_A = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) Via potentiometer
7) With resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0° C
10) Reference voltage 50 V DC
11) A = Vs connections reverse-polarity protected
B = Output Q short-circuit protected

Light spot diameter



Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WS/WE 190 L

Through-beam Sensors

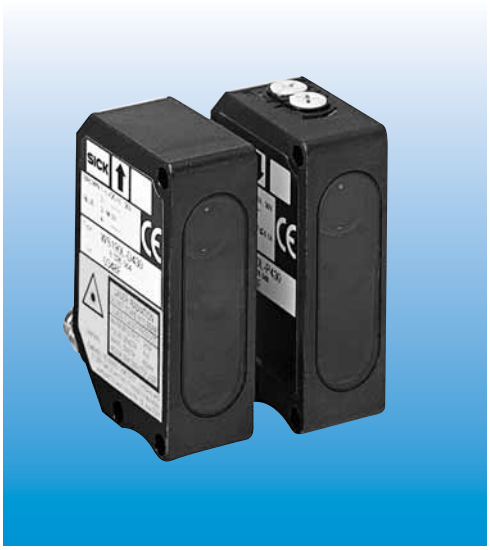
0...164 ft (0...50 m)
sensing range

CDRH

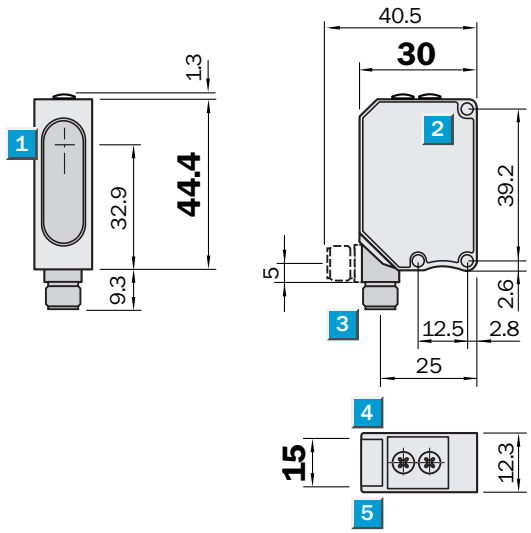
Highlights

- Laser LED, visible red light, Class 2
- User-friendly sensor, easily aligned and set up
- Precision auto-collimated optics
- Sensitivity setting via rotary switch
- Selectable output: Light/dark switching

WL 190 L

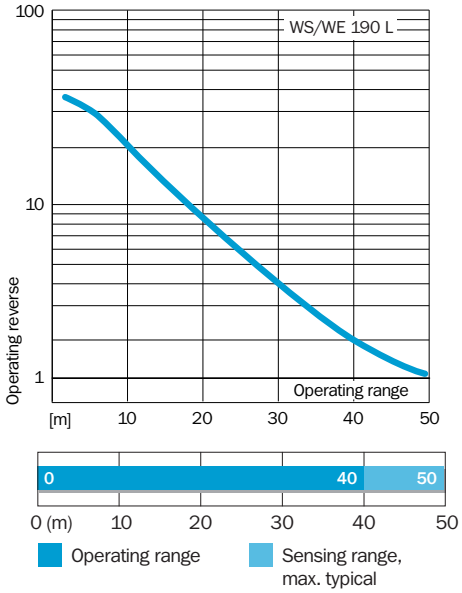


Dimensional drawing



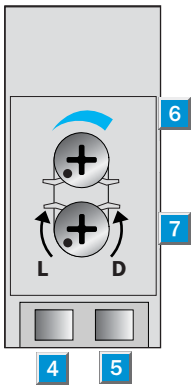
dimensions in mm

Background suppression



Adjustments

All types



1 Center of optical axis
2 Mounting holes, ø approx. 3.1 mm
3 Plug 4-pin, M8, 90° rotatable or cable 2 m, 3-wire
4 Status indicator LED, yellow: Output active
5 Status indicator LED, green: Laser on
6 Sensitivity control
7 L.ON/D.ON selection switch

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

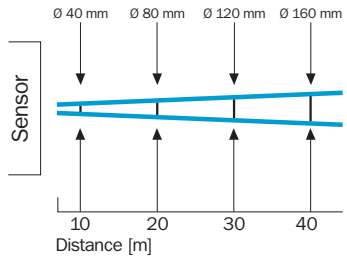
Type	Part no.
WS/WE190L-P132	6 026 561
WS/WE190L-P430	6 026 562
WS/WE190L-N132	6 026 559
WS/WE190L-N430	6 026 560

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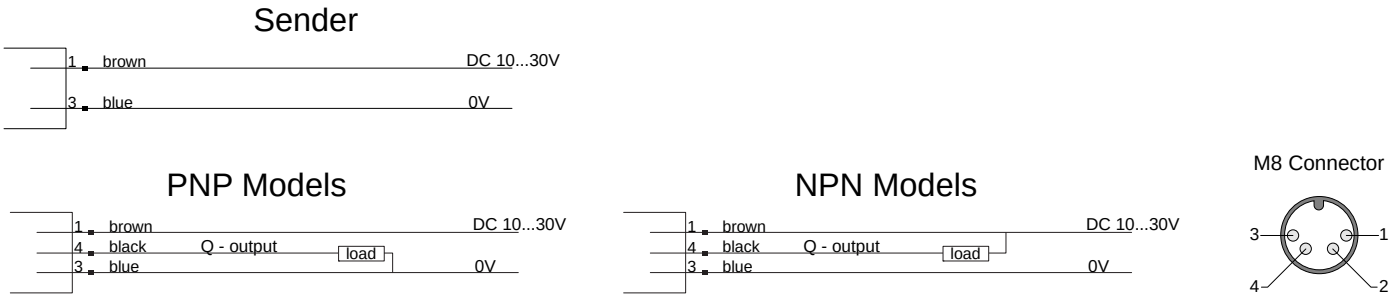
Technical data	WS/WE 190L-	P132	P430	N132	N430					
Sensing range, max. typical	164 ft (50 m) adjustable	■	■	■	■					
Adjustment	Potentiometer, 1 turn	■	■	■	■					
Light source[1], **light type**	Laser, red light; Class 2	■	■	■	■					
Light spot diameter	1.6 in at 32.8 ft (40 mm at 10 m)	■	■	■	■					
Supply voltage V_S	10 … 30 V DC[2]	■	■	■	■					
Ripple[3]	± 10%	■	■	■	■					
Current consumption[4]	Max. 40 mA	■	■	■	■					
Switching outputs	PNP	■	■							
	NPN			■	■					
Output current I_A max.	< 100 mA	■	■	■	■					
Switching mode	Light/dark mode[5], selectable	■	■	■	■					
Response time[6]	< 0.5 ms	■	■	■	■					
Max. switching frequency[7]	1000/s	■	■	■	■					
Connection types	Cable[8], 3-wire	■		■						
	Plug, 4-pin, M8		■		■					
VDE protection class[9]	⧫	■	■	■	■					
Circuit protection[10]	A, B	■	■	■	■					
Enclosure rating	IP 67	■	■	■	■					
Ambient temperature T_A	Operation 14…104° F (-10… 40° C)	■	■	■	■					
	Storage -4…140° F (-20… 60° C)	■	■	■	■					
Approximate weight	with cable 2 m, approx. 7.0 oz (200 g)	■		■						
	with plug, approx. 4.2 oz (120 g)		■		■					
Housing material	Housing: ABS; optic: PMMA	■	■	■	■					

1) Average service life 50,000 h at T_A = 25° C
2) Limit values
3) Must be within V_S tolerances
4) Without load
5) Via potentiometer
6) With resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = Vs connections reverse-polarity protected
B = Output Q short-circuit protected

Light spot diameter



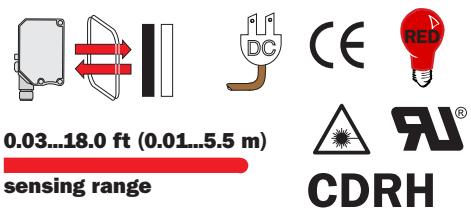
Connection diagram



Wire colors refer to standard cable, not included with quick disconnect models.

WLG 190T

Clear Material Sensors

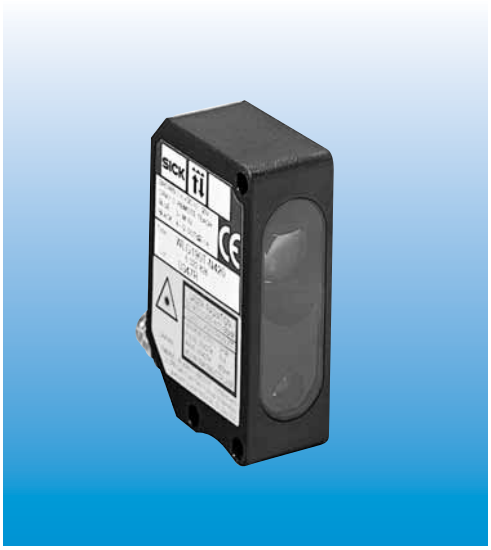


0.03...18.0 ft (0.01...5.5 m)
sensing range

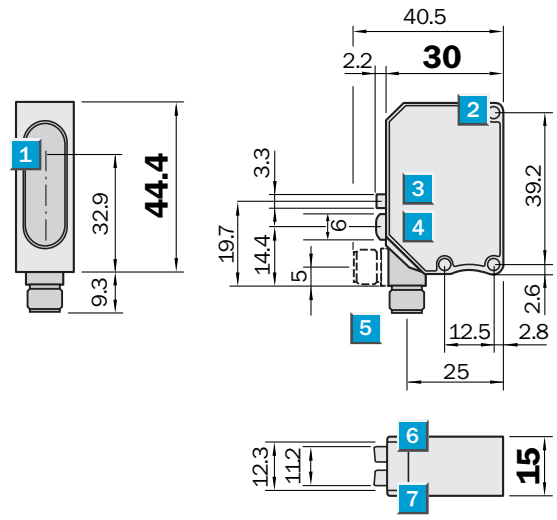
Highlights

- Laser LED, visible red light, Class 2
- Sensitivity setting by teach-in
- Precision auto-collimated optics
- Numeric display with menu prompts
- Programmable output: Light/dark switching

WLG 190T

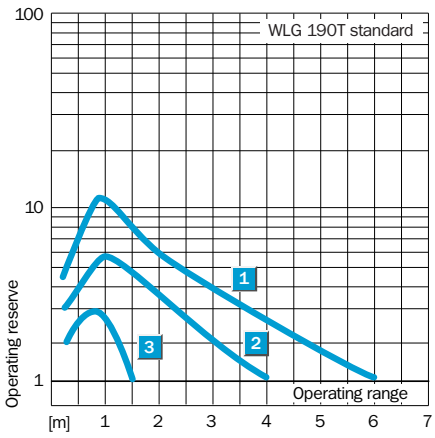


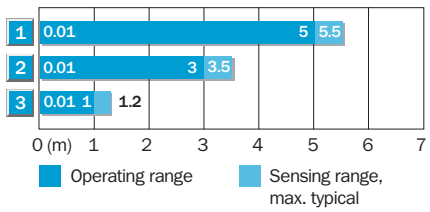
Dimensional drawing



dimensions in mm

Background suppression

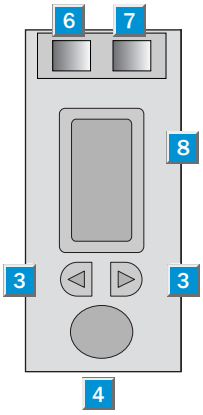




Reflector type		Operating range
1	P 250 F	0.01 ... 5 m
2	PL 20 F	0.01 ... 3 m
3	PL 10 F	0.01 ... 1 m

Adjustments

All types



1 Center of optical axis
2 Mounting holes, ø approx. 3.1 mm
3 +/– button; select mode button
4 Teach-in button
5 Plug 4-pin, M8, 90° rotatable or cable 2 m, 3-wire
6 Status indicator LED, green: Laser on
7 Status indicator LED, yellow: Output active
8 Numerical display

Order information

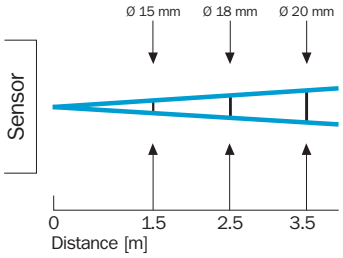
Type	Part no.
WLG190T-P112	6 026 537
WLG190T-P410	6 026 538
WLG190T-N112	6 026 535
WLG190T-N410	6 026 536

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Technical data	WLG 190T-	P112	P410	N112	N410					
Sensing range, max. typ. on reflector[1]	0.3…18 ft (0.01…5.5 m)/P 250 F, adjustable	■	■	■	■					
Sensitivity control	Teach-in, External Teach (ET)	■	■	■	■					
	Teach-in via button, menu guided	■	■	■	■					
Fine adjustment	Manually adjustable	■	■	■	■					
Light source[2], light type	Laser, red light; Class 2	■	■	■	■					
Light spot diameter	0.6 in at 3.3 ft (15 mm at 1 m)	■	■	■	■					
Supply voltage V_S	10…30 V DC[3]	■	■	■	■					
Ripple[4]	± 10%	■	■	■	■					
Current consumption[5]	Max. 40 mA	■	■	■	■					
Switching outputs	PNP	■	■							
	NPN			■	■					
Output current I_A max.	< 100 mA	■	■	■	■					
Switching mode	Light/dark mode, programmable	■	■	■	■					
Response time[6]	0.7; 2; 5 ms, programmable	■	■	■	■					
Max. switching frequency[7]	700; 200; 100/s, programmable	■	■	■	■					
Timer mode (dLY)	0…10 s, programmable	■	■	■	■					
Timer function	Nor: Normal Mode	■	■	■	■					
	Ond: On Delay Mode, on delay	■	■	■	■					
	OFd: Off Delay Mode, off delay	■	■	■	■					
	OnE: One Shot Mode, one shot	■	■	■	■					
Numerical display monitoring	Transmission, remission,	■	■	■	■					
	threshold, distance, mode selection	■	■	■	■					
Connection types	Cable, 4-wire[8]	■		■						
	Plug, 4-pin, M8		■		■					
VDE protection class[9]	⏚	■	■	■	■					
Circuit protection[10]	A, B	■	■	■	■					
Enclosure rating	IP 67	■	■	■	■					
Ambient temperature T_A	Operation 14…104° F (-10…40° C)	■	■	■	■					
	Storage -4…140° F (-20…60° C)	■	■	■	■					
Approximate weight	with cable 2 m, approx. 7.0 oz (200 g)	■		■						
	with plug, approx. 4.2 oz (120 g)		■		■					
Housing material	Housing: ABS; optic: PMMA	■	■	■	■					

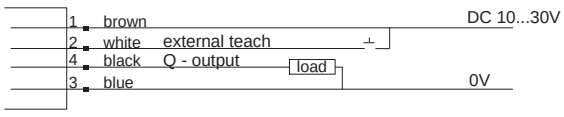
1) Reflector P 250 F included with delivery
2) Average service life 50,000 h at T_A = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) With resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = Vs connections reverse-polarity protected
B = Output Q short-circuit protected

Light spot diameter

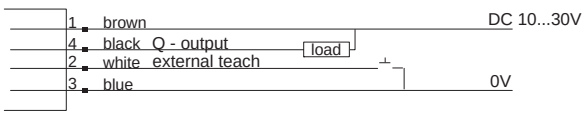


Connection diagram

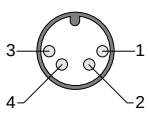
PNP Models



NPN Models



M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WLG 190T

Clear Material Sensors

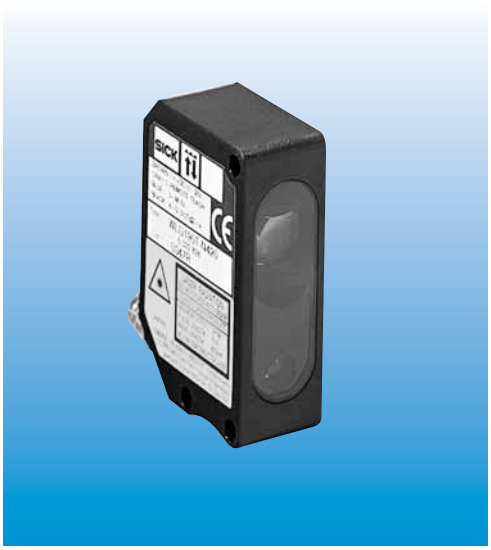
0.03...5.9 ft (0.01...1.8 m)
sensing range

CDRH

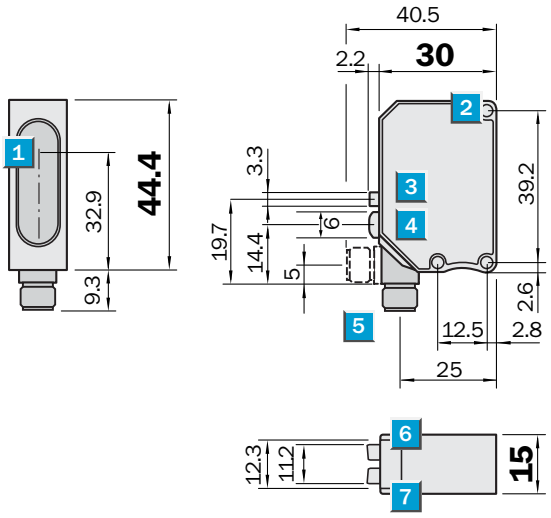
Highlights

- Laser LED, visible red light, Class 2
- Sensitivity setting by teach-in
- Precision auto-collimated optics
- Numeric display with menu prompts
- Programmable output: Light/dark switching

WLG 190T

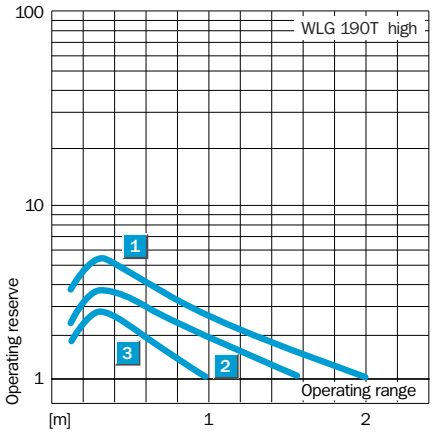


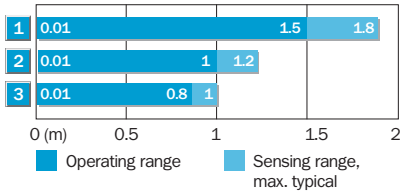
Dimensional drawing



dimensions in mm

Background suppression

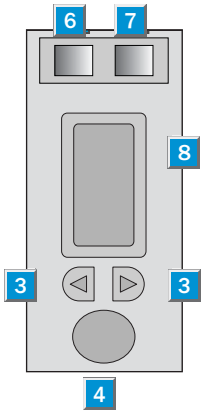




Reflector type		Operating range
1	PL 80 A	0.01 ... 1.5 m
2	P 250/PL 40 A/PL 50 A	0.01 ... 1 m
3	PL 30 A/PL 31 A	0.01 ... 0.8 m

Adjustments

All types



1 Center of optical axis
2 Mounting holes, ø approx. 3.1 mm
3 +/– button; select mode button
4 Teach-in button
5 Plug 4-pin, M8, 90° rotatable or cable 2 m, 3-wire
6 Status indicator LED, green: Laser on
7 Status indicator LED, yellow: Output active
8 Numerical display

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

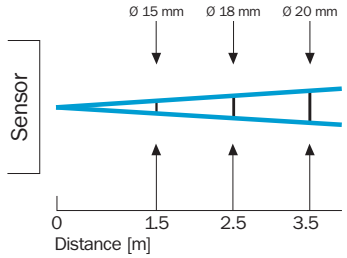
Type	Part no.
WLG190T-P122	6 022 827
WLG190T-P420	6 022 830
WLG190T-N122	6 022 823
WLG190T-N420	6 022 826

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Technical data	WLG 190T-	P112	P420	N112	N420
Sensing range, max. typ. on reflector[1]	0.3…5.9 ft (0.01…1.8 m)/PL 80 A, adjustable	■	■	■	■
Sensing range, max. typ. on reflector	0.3…3.9 ft (0.01…1.2 m)/P 250, adjustable	■	■	■	■
Sensitivity control	Teach-in, External Teach (ET)	■	■	■	■
	Teach-in via button, menu guided	■	■	■	■
Fine adjustment	Manually adjustable	■	■	■	■
Light source[2], **light type**	Laser, red light; Class 2	■	■	■	■
Light spot diameter	0.6 in at 3.3 ft (15 mm at 1 m)	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■
Ripple[4]	± 10%	■	■	■	■
Current consumption[5]	Max. 40 mA	■	■	■	■
Switching outputs	PNP	■	■		
	NPN			■	■
Output current I_A max.	< 100 mA	■	■	■	■
Switching mode	Light/dark mode, programmable	■	■	■	■
Response time[6]	0.7; 2; 5 ms, programmable	■	■	■	■
Max. switching frequency[7]	700; 200; 100/s, programmable	■	■	■	■
Timer mode (dLY)	0…10 s, programmable	■	■	■	■
Timer function	Nor: normal Mode	■	■	■	■
	Ond: On Delay Mode, on delay	■	■	■	■
	OFd: Off Delay Mode, off delay	■	■	■	■
	OnE: One Shot Mode, one shot	■	■	■	■
Numerical display monitoring	Transmission, remission,	■	■	■	■
	threshold, distance, mode selection	■	■	■	■
Connection types	Cable, 4-wire[8]	■		■	
	Plug, 4-pin, M8		■		■
VDE protection class[9]	⧫	■	■	■	■
Circuit protection[10]	A, B	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A	Operation 14…104° F (-10…40° C)	■	■	■	■
	Storage -4…140° F (-20…60° C)	■	■	■	■
Approximate weight	with cable 2 m, approx. 7.0 oz (200 g)	■		■	
	with plug, approx. 4.2 oz (120 g)		■		■
Housing material	Housing: ABS; optic: PMMA	■	■	■	■

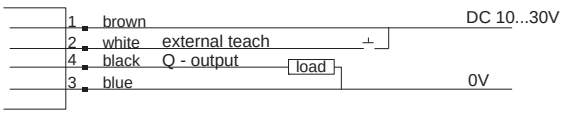
1) Reflector P 250 included with delivery
2) Average service life 50,000 h at T_A = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) With resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = Vs connections reverse-polarity protected
B = Output Q short-circuit protected

Light spot diameter

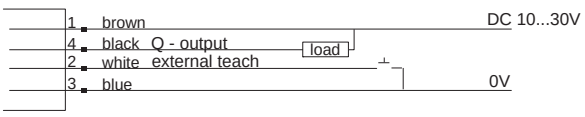


Connection diagram

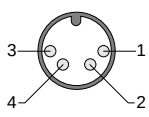
PNP Models



NPN Models



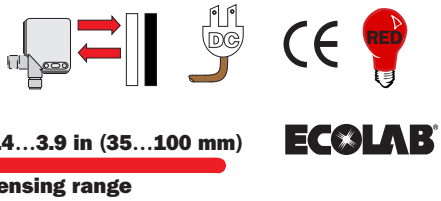
M8 Connector



wire colors refer to standard cable, not included with quick disconnect models

WT11

Proximity/Diffuse Sensors-Foreground suppression



1.4...3.9 in (35...100 mm)
sensing range

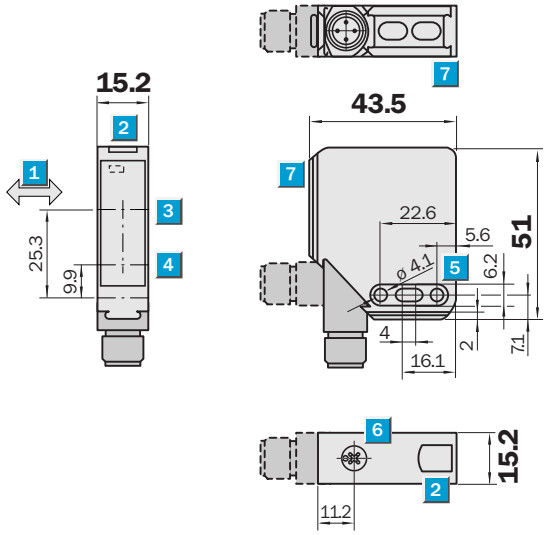
Highlights

- Red light
- Insensitive to ambient light sources
- M12 plug rotatable by 90° or 2 m cable
- Adjustable foreground suppression
- ECOLAB material resistance tests

WT11

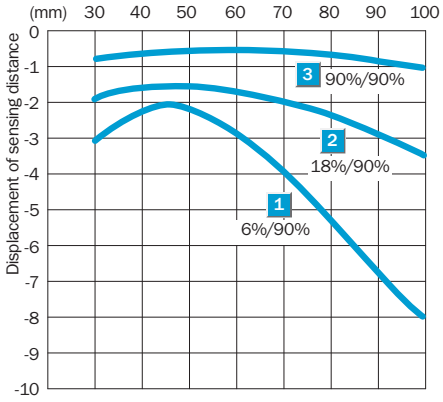


Dimensional drawing

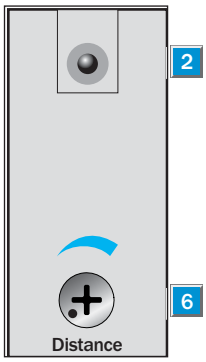


dimensions in mm

Sensing distance



Adjustments



1 Standard direction of the material being sensed
2 LED signal strength indicator
3 Optical axis sender
4 Optical axis receiver
5 Mounting holes Ø 4.1 mm
6 Sensing distance adjuster
7 Dovetail

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WT11-P440	1 022 049

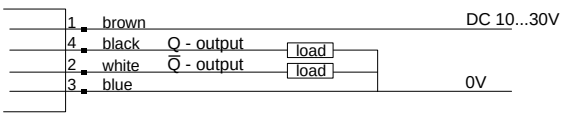
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Technical data		WT11-	P440
Operating distance		1.4…3.9 in (35…100 mm)	
Adjustment of operating distance		Potentiometer	
Light source[2], light type		LED, red light	
Supply voltage V_S		10...30 V DC[3]	
Ripple[4]		≤ 5 V_{SS}	
Current consumption[5]		≤ 30 mA	
Switching outputs		PNP antivalent	
Output current Ia max		< 100 mA	
Response time		≤ 625 µs[6]	
Switching frequency		800 Hz[7]	
Connection type		Connector, M12, 4-pin	
VDE protection class[7]		□	
Circuit protection[8]		A, B, C	
Enclosure rating		IP 65	
Ambient temperature	operation	-4…140° F (-20…60° C)	
	storage	-4…167° F (-20…75° C)	
Housing material		ABS	

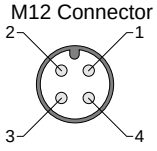
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Ouput Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

PNP Models

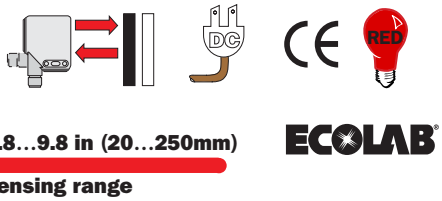


wire colors refer to standard cable, not included with quick disconnect models



WT11

Proximity/Diffuse Sensors-Background suppression



0.8...9.8 in (20...250mm)
sensing range

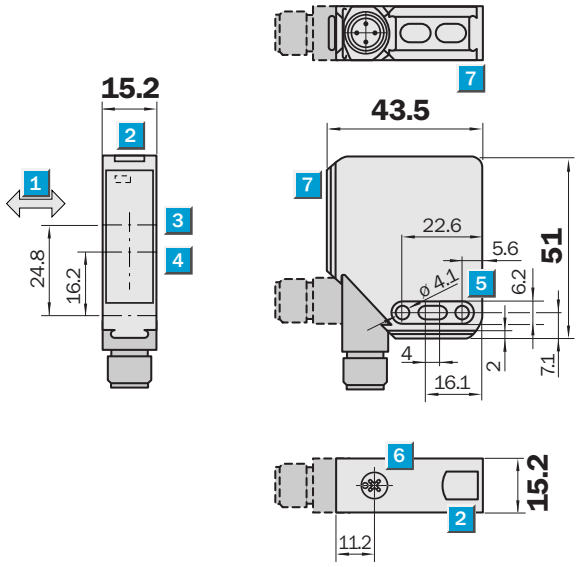
Highlights

- Red light
- Insensitive to ambient light sources
- M12 plug rotatable by 90° or 2 m cable
- Adjustable background suppression
- ECOLAB material resistance tests

WT11

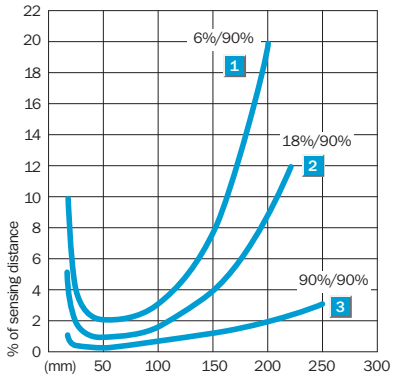


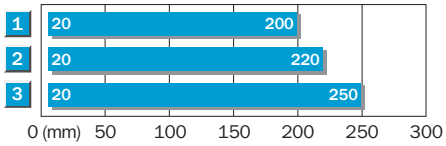
Dimensional drawing



dimensions in mm

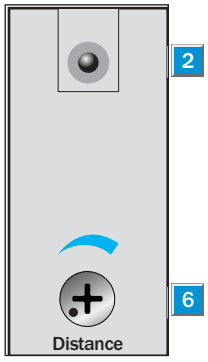
Sensing distance





1	Sensing range on black, 6 % remission
2	Sensing range on gray, 18 % remission
3	Sensing range on white, 90 % remission

Adjustments



1	Standard direction of the material being sensed
2	LED signal strength indicator
3	Optical axis sender
4	Optical axis receiver
5	Mounting holes Ø 4.1 mm
6	Sensing distance adjuster
7	Dovetail

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

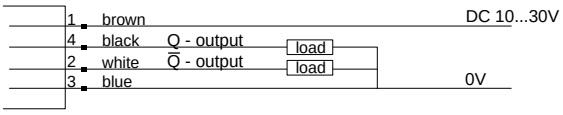
Type	Part no.
WT11-N130	1 018 684
WT11-N430	1 018 685
WT11-P130	1 018 683
WT11-P430	1 018 511

Technical data		WT11-	N130	N430	P130	P430					
Operating distance		0.8…9.8 in (20…250 mm)	■	■	■	■					
Adjustment of operating distance		Potentiometer	■	■	■	■					
Light source[2], light type		LED, red light	■	■	■	■					
Light spot diameter		Approx. 0.4 at 7.9 in (10 mm at 200 mm)	■	■	■	■					
Supply voltage V_S		10...30 V DC[3]	■	■	■	■					
Ripple[4]		≤ 5 V_{SS}	■	■	■	■					
Current consumption[5]		≤ 40 mA	■	■							
		≤ 30 mA			■	■					
Switching outputs		NPN antivalent	■	■							
		PNP antivalent			■	■					
Output current I_a max		< 100 mA	■	■	■	■					
Response time		≤ 625 µs[6]	■	■	■	■					
Switching frequency		800 Hz[7]	■	■	■	■					
Connection type		Cable, PVC, 2 m[8]	■		■						
		Connector, M12, 4-pin		■		■					
VDE protection class[8]		□	■	■	■	■					
Circuit protection[9]		A, B, C	■	■	■	■					
Enclosure rating		IP 65	■	■	■	■					
Ambient temperature	operation	-4…140° F (-20…60° C)	■	■	■	■					
	storage	-4…167° F (-20…75° C)	■	■	■	■					
Approx. weight		7.1 oz (200 g)	■		■						
		4.2 oz (120 g)		■		■					
Housing material		ABS	■	■	■	■					

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Ouput Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

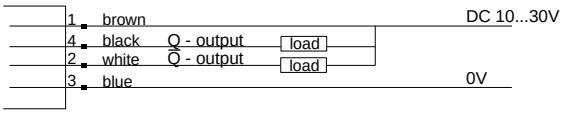
Connection diagram

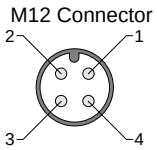
PNP Models



wire colors refer to standard cable, not included with quick disconnect models

NPN Models





WT11

Proximity/Diffuse Sensors-Energetic



0.4...39.8 in (10...1000 mm)
sensing range

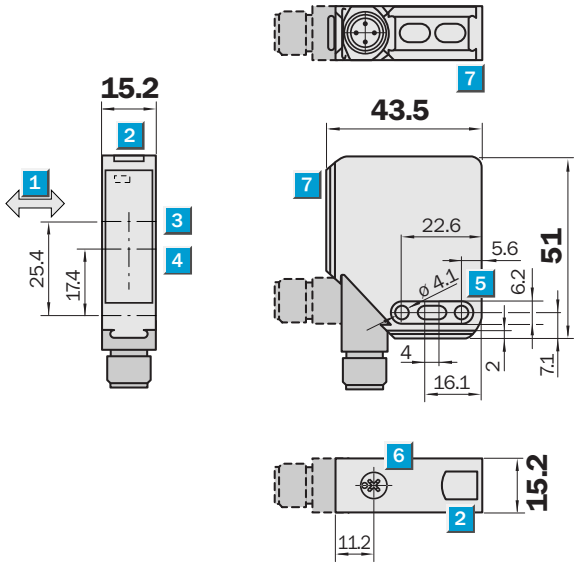
Highlights

- Red light
- Insensitive to ambient light sources
- M12 plug rotatable by 90° or 2 m cable
- Adjustable background suppression
- ECOLAB material resistance tests
- Energetic proximity switch, adjustable

WT11

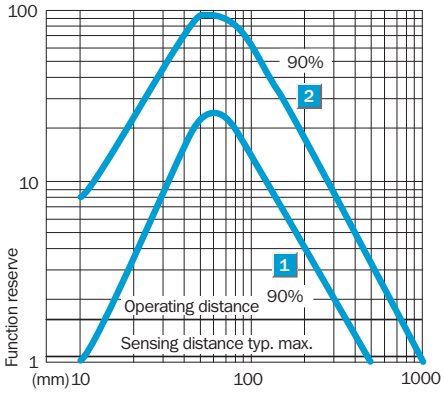


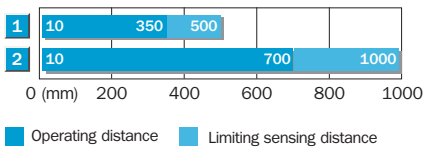
Dimensional drawing



dimensions in mm

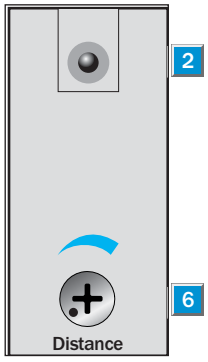
Sensing distance





1	Sensing range on gray, 18 % remission
2	Sensing range on white, 90 % remission

Adjustments



1	Standard direction of the material being sensed
2	LED signal strength indicator
3	Optical axis sender
4	Optical axis receiver
5	Mounting holes Ø 4.1 mm
6	Sensing distance adjuster
7	Dovetail

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

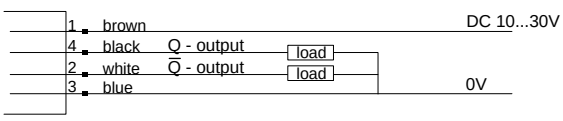
Type	Part no.
WT11-N150	1 018 688
WT11-N450	1 018 689
WT11-P150	1 018 686
WT11-P450	1 018 687

Technical data		WT11-	N150	N450	P150	P450					
Sensing distance typ. max		0.4…39.8 in (10…1000 mm)									
Operating distance		3.1…27.6 in (80…700 mm)									
Adjustment of operating distance		Potentiometer									
Light source[2], **light type**		LED, red light									
Light spot diameter		Approx. 1.2 at 23.6 in (30 mm at 600 mm)									
Supply voltage V_S		10...30 V DC[3]									
Ripple[4]		≤ 5 V_{SS}									
Current consumption[5]		≤ 40 mA									
		≤ 30 mA									
Switching outputs		NPN antivalent									
		PNP antivalent									
Output current I_a max		≤ 100 mA									
Response time		≤ 625 µs[6]									
Switching frequency		800 Hz[7]									
Connection type		Cable, PVC, 2 m[8]									
		Connector, M12, 4-pin									
VDE protection class[8]		□									
Circuit protection[9]		A, B, C									
Enclosure rating		IP 65									
Ambient temperature	operation	-4…140° F (-20…60° C)									
	storage	-4…167° F (-20…75° C)									
Approx. weight		7.1 oz (200 g)									
		4.2 oz (120 g)									

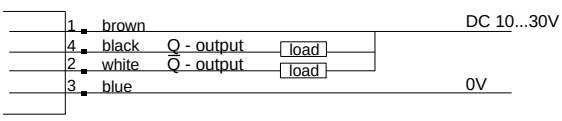
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Ouput Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

PNP Models

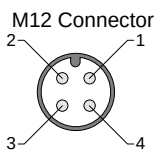


NPN Models



wire colors refer to standard cable, not included with quick disconnect models

M12 Connector



WL11

Reflex/Retro-Reflective



0...23 ft (0...7 m)
sensing range

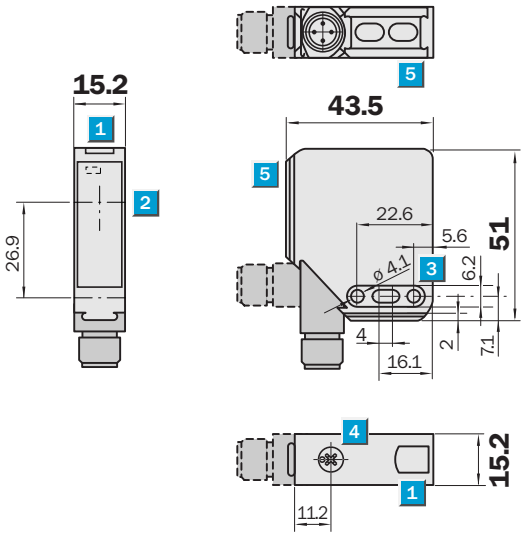
Highlights

- Red light
- Insensitive to ambient light sources
- M12 plug rotatable by 90° or 2 m cable
- Adjustable background suppression
- ECOLAB material resistance tests
- Adjustable sensitivity

WL11

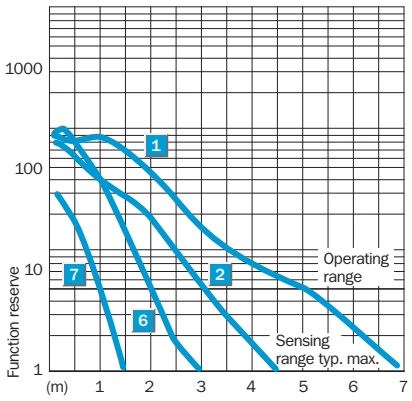


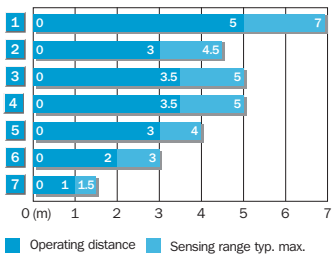
Dimensional drawing



dimensions in mm

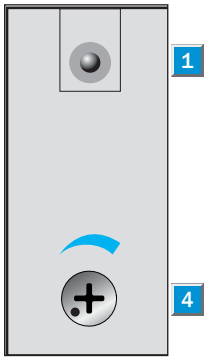
Sensing distance





	Reflector type	Operating range
1	PL 80 A	0 – 5.0 m
2	P975	0 – 3.0 m
3	PL 50 A	0 – 3.5 m
4	PL 40 A	0 – 3.5 m
5	PL 30 A	0 – 3.0 m
6	PL 20 A	0 – 2.0 m
7	Reflective tape	0 – 1.0 m

Adjustments



1 LED signal strength indicator
2 Middle of optical axis
3 Mounting holes Ø 4.1 mm
4 Sensitivity control
5 Dovetail

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

Type	Part no.
WL11-N130	1 018 681
WL11-N430	1 018 682
WL11-P130	1 018 680
WL11-P430	1 018 510

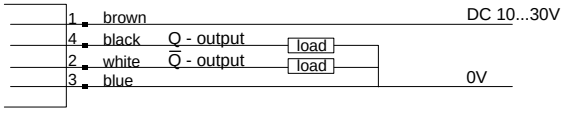
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Technical data		WL11-	N130	N430	P130	P430					
Sensing distance typ. max		0…23 ft (0…7 m)									
Operating distance		0…16.4 ft (0…5 m)									
Relating to		Reflector PL80A									
Sensitivity adjustment		Potentiometer									
Light source[2], **light type**		LED, red light									
Light spot diameter		Approx. 3.1 in at 9.8 ft (80 mm at 3 m)									
Supply voltage V_S		10...30 V DC[3]									
Ripple[4]		≤ 5 V_{SS}									
Current consumption[5]		≤ 40 mA									
		≤ 30 mA									
Switching outputs		NPN antivalent									
		PNP antivalent									
Output current I_a max		≤ 100 mA									
Response time		≤ 625 µs[6]									
Switching frequency		800 Hz[7]									
Connection type		Cable, PVC, 2 m[8]									
		Connector, M12, 4-pin									
VDE protection class[8]		□									
Circuit protection[9]		A, B, C									
Enclosure rating		IP 65									
Ambient temperature	operation	-4…140° F (-20…60° C)									
	storage	-4…167° F (-20…75° C)									
Approx. weight		7.1 oz (200 g)									
		4.2 oz (120 g)									
Housing material		ABS									

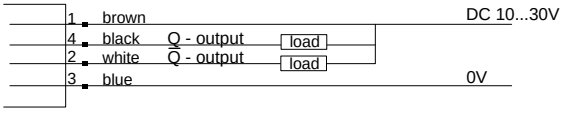
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Ouput Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

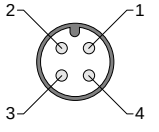
PNP Models



NPN Models



M12 Connector



wire colors refer to standard cable, not included with quick disconnect models

WL11

Reflex/Retro-Reflective



0...13.1 ft (0...4 m)
sensing range

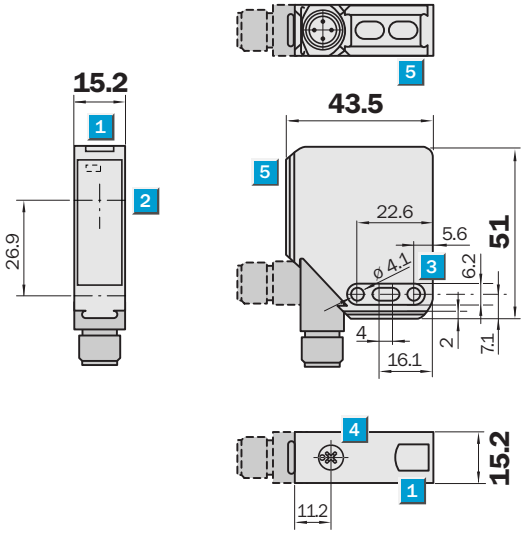
Highlights

- Red light
- Insensitive to ambient light sources
- Detection of glass and transparent films
- ECOLAB material resistance tests
- Adjustable sensitivity

WL11

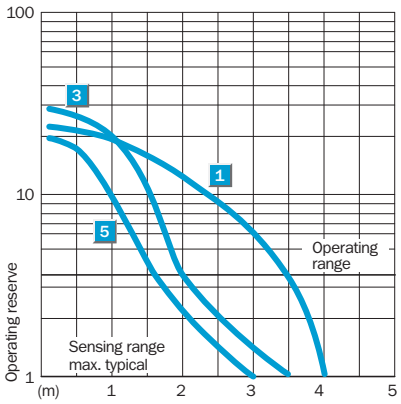


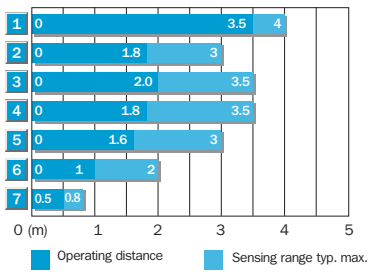
Dimensional drawing



dimensions in mm

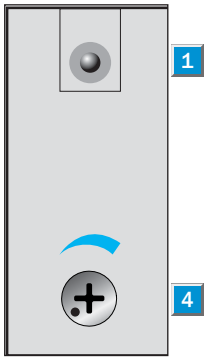
Sensing distance





Reflector type		Operating range
1	PL80A	0 ... 3.5 m
2	P975	0 ... 1.8 m
3	PL50A	0 ... 2.0 m
4	PL40A	0 ... 1.8 m
5	PL30A	0 ... 1.6 m
6	PL20A	0 ... 1.0 m
7	Reflective tape	0 ... 0.5 m

Adjustments



1. LED signal strength indicator
2. Middle of optical axis
3. Mounting holes Ø 4.1 mm
4. Sensitivity control
5. Dovetail

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

Type	Part no.
WL11-B560	1 019 704

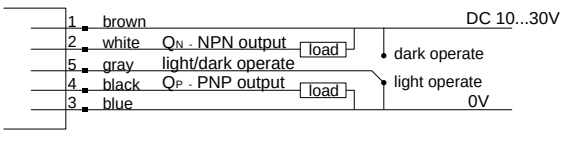
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Technical data		WL11-	B560								
Sensing distance typ. max		0…13.1 ft (0…4 m)									
Sensing range, recommended		0…11.5 ft (0…3.5 m)									
Relating to		Reflector PL80A									
Sensitivity adjustment		Potentiometer									
Light source[1], **light type**		LED, red light									
Light spot diameter		Approx. 1.2 in at 59.1 ft (30 mm at 1.5 m)									
Supply voltage V_S		10...30 V DC[2]									
Ripple[3]		≤ 5 V_{SS}									
Current consumption[4]		≤ 30 mA									
Switching outputs		Transistor outputs Q_p and Q_n									
Switching mode		Light/dark switching, switchable									
Output current I_a max		100 mA									
Response time		< 625 µs[5]									
Switching frequency		800 Hz[6]									
Connection type		Cable, PVC, 2 m									
		Connector, M12, 5-pin									
VDE protection class[7]		⧈									
Circuit protection[8]		A, B, C									
Enclosure rating		IP 65									
Ambient temperature	operation	-4…140° F (-20…60° C)									
	storage	-4…167° F (-20…75° C)									
Housing material		ABS									

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Ouput Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

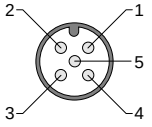
Connection diagram

All Models



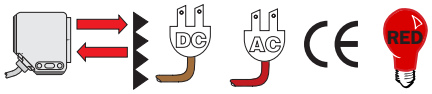
wire colors refer to standard cable, not included

M12 Connector



WL11

Reflex/Retro-Reflective



0.3...23 ft (0.1...7 m)
sensing range

ECOLAB

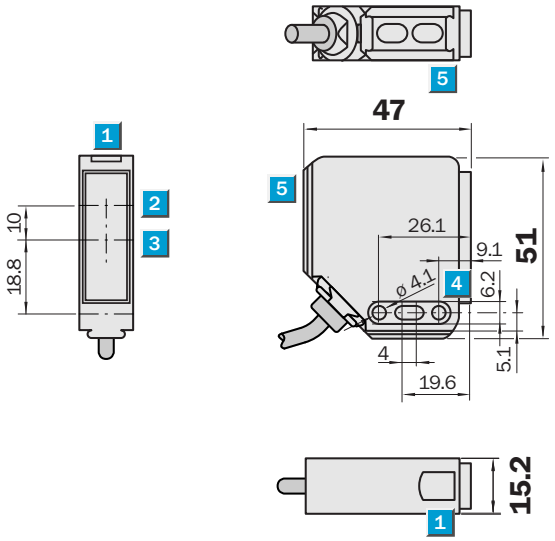
Highlights

- Red light
- Polarization filter allowing detection of objects with reflective surfaces
- CE-emitted interference EN 61000-6-3 (“Residential and Industrial Areas”)
- ECOLAB material resistance tests

WL11

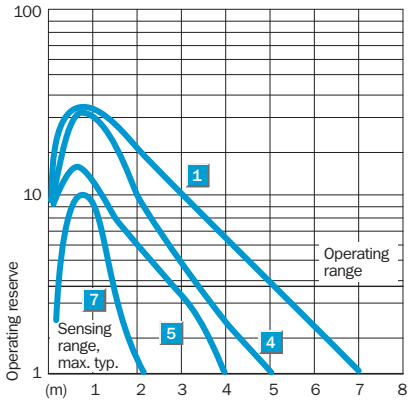


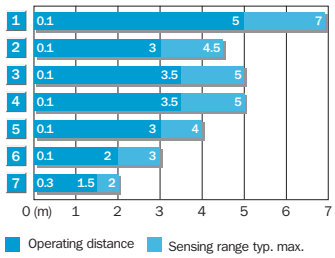
Dimensional drawing



dimensions in mm

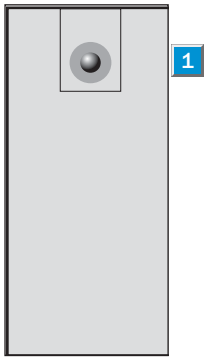
Sensing distance





	Reflector type	Operating range
1	PL 80 A	0.1 – 5.0 m
2	P975	0.1 – 3.0 m
3	PL 50 A	0.1 – 3.5 m
4	PL 40 A	0.1 – 3.5 m
5	PL 30 A	0.1 – 3.0 m
6	PL 20 A	0.1 – 2.0 m
7	Reflective tape	0.3 – 1.5 m

Adjustments



1. LED signal strength indicator
2. Middle of optical axis
3. Mounting holes Ø 4.1 mm
4. Sensitivity control
5. Dovetail

Accessories	page
Mounting systems	1234
Reflectors	1256

Order information

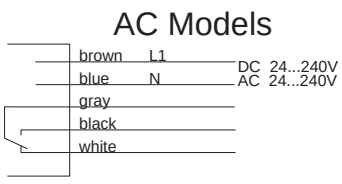
Type	Part no.
WL11-R130	1 026 232

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Technical data		WL11-	R130								
Sensing distance typ. max		0.3…23 ft (0.1…7 m)									
Sensing range, recommended		0.3…16.4 ft (0.1…5 m)									
Relating to		Reflector PL80A									
Light source[1], **light type**		LED, red light									
Light spot diameter		Approx. 3.1 in at 9.8 ft (80 mm at 3 m)									
Angle of dispersion		2°									
Polarization filter		√									
Supply voltage V_S[2]		24…240 V DC/24…240 V AC									
Switching outputs		Relay 1 x c/o, electrically isolated									
Max. switching voltage		AC 250 V AC/ 120 V DC									
Switching current max.		3 A/ 250 V AC; 3 A/30 V DC[3]									
Max. switching power		750 VA AC/30 V DC									
Response time		< 25 ms[4]									
Switching frequency		20 Hz[5]									
Connection type		Cable, 2 m[6]									
		Connector, M12, 5-pin									
VDE protection class[7]		⧈									
Circuit protection[8]		A, B									
Enclosure rating		IP 65									
Ambient temperature	operation	-13…131° F (-25…55° C)									
	storage	-40…158° F (-40…70° C)									
Approx. weight		7.1 oz (200 g)									
Housing material		ABS									

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) A = V_S connections reverse-polarity protected
B = Ouput Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram



WTF12-3

Proximity/Diffuse Sensors - Foreground suppression

1.2…5.9 in (30…150 mm)
sensing range

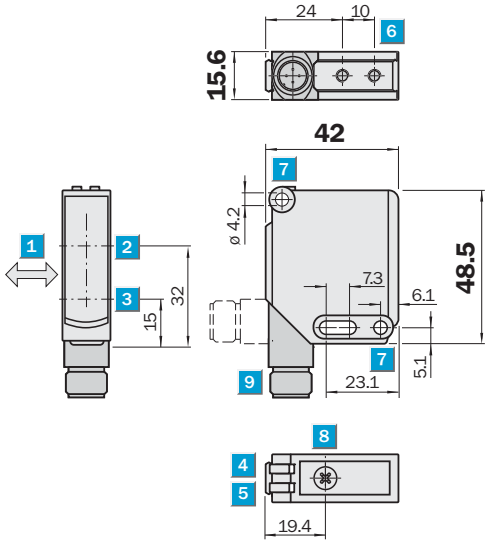
Highlights

- Robust metal housing with dovetail mounting clamps
- High device availability in industrial environments; in case of ambient light, optical reflections and devices mounted opposite one another
- Ranges between -40…60° C

WTF12-3

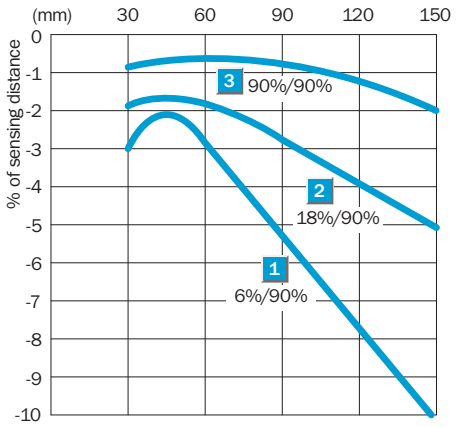


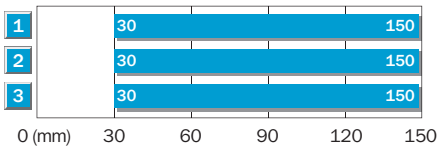
Dimensional drawing



dimensions in mm

Sensing distance





1	Sensing distance on black, 6 % remission
2	Sensing distance on gray, 18 % remission
3	Sensing distance on white, 90 % remission

Adjustments



1	Preferred direction of the objects to be detected
2	Optical axis, receiver
3	Optical axis, sender
4	LED indicator green, supply voltage active
5	LED indicator yellow, status: light reception
6	Mounting thread M4 – 4 mm deep
7	Mounting hole, Ø 4.2 mm
8	Sensing distance adjuster, potentiometer
9	Connection

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WTF12-3N1131	1 041 410
WTF12-3N2431	1 041 408
WTF12-3P1131	1 041 406
WTF12-3P2431	1 041 404

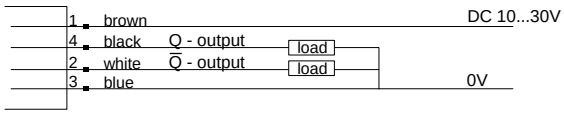
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Technical data	WTF12-3-	N1131	N2431	P1131	P2431					
Sensing range, typ. max.	1.2…5.9 in (30…150 mm)[1]	■	■	■	■					
Operating distance	1.2…5.9 in (30…150 mm)[1]	■	■	■	■					
Adjustment of operating distance	Potentiometer	■	■	■	■					
Light source[2], light type	LED, red light, 640 nm	■	■	■	■					
Light spot diameter	Ø 0.1 in at 2.4 in (Ø 2.0 mm at 60 mm)	■	■	■	■					
Supply voltage V_S	10...30 V DC[3]	■	■	■	■					
Ripple[4]	≤ 5 V_{SS}	■	■	■	■					
Current consumption[5]	≤ 45 mA	■	■	■	■					
Switching outputs	NPN, Q/$\overline{Q}$	■	■							
	PNP, Q/$\overline{Q}$			■	■					
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V			■	■					
Signal voltage NPN HIGH/LOW	Approx. Vs/< 2.5 V	■	■							
Max. output current I_a	100 mA	■	■	■	■					
Response time[6]	≤ 330 µs	■	■	■	■					
Max. switching frequency[7]	1,500 Hz	■	■	■	■					
Connection type	Cable, PVC, 2 m[8]	■		■						
	Connector, M12 4-pin		■		■					
VDE protection class[9]	□	■	■	■	■					
Circuit protection[10]	A, B, C	■	■	■	■					
Enclosure rating	IP 66/IP 67/ IP 69K	■	■	■	■					
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■	■					
	Storage -40...167° F (-40...75° C)	■	■	■	■					
Approximate weight	7.0 oz (200 g)	■		■						
	4.2 oz (120 g)		■		■					
Housing material	Die cast zinc[11]	■	■	■	■					

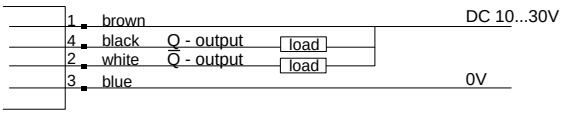
1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression
11) Teflon-coated housing available upon request

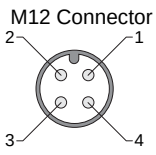
Connection diagram

PNP Models



NPN Models





wire colors refer to standard cable, not included with quick disconnect models

WTF12-3

Proximity/Diffuse Sensors - Foreground suppression

1.2…5.9 in (30…150 mm)
sensing range

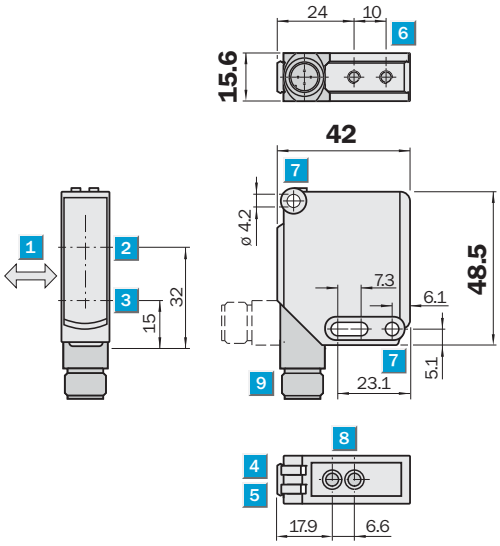
Highlights

- Robust metal housing with dovetail mounting clamps
- High device availability in industrial environments; in case of ambient light, optical reflections and devices mounted opposite one another
- Ranges between -40…60° C

WTF12-3

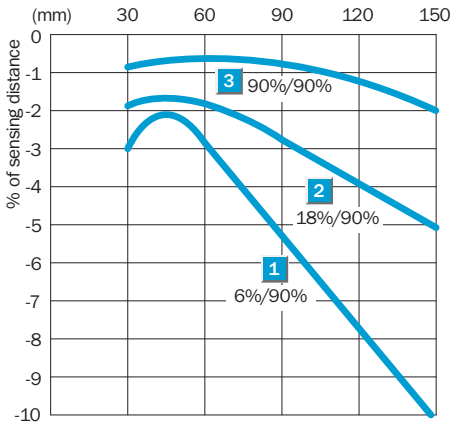


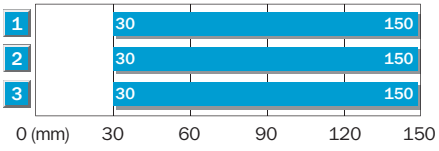
Dimensional drawing



dimensions in mm

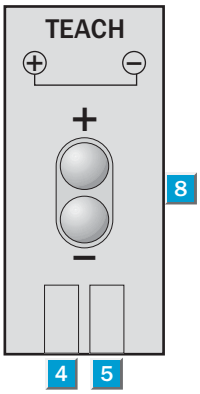
Sensing distance





1	Sensing distance on black, 6 % remission
2	Sensing distance on gray, 18 % remission
3	Sensing distance on white, 90 % remission

Adjustments



1	Preferred direction of the objects to be detected
2	Optical axis, receiver
3	Optical axis, sender
4	LED indicator green, supply voltage active
5	LED indicator yellow, status: light reception
6	Mounting thread M4 – 4 mm deep
7	Mounting hole, Ø 4.2 mm
8	Sensing distance adjuster, teach-in double-teach button
9	Connection

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WTF12-3N2433	1 041 409
WTF12-3P2433	1 041 405

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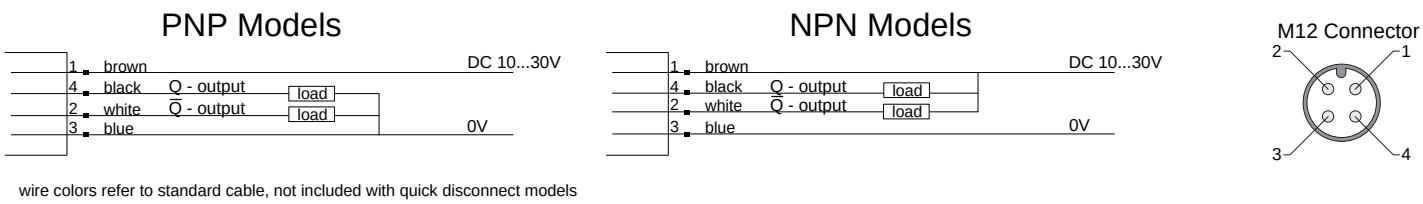
Technical data	WTF12-3-	N2433	P2433
Sensing range, typ. max.	1.2…5.9 in (30…150 mm)[1]	■	■
Operating distance	1.2…5.9 in (30…150 mm)[1]	■	■
Adjustment of operating distance	Teach-in: double-teach button	■	■
Light source[2], light type	LED, red light, 640 nm	■	■
Light spot diameter	Ø 0.1 in at 2.4 in (Ø 2.0 mm at 60 mm)	■	■
Supply voltage V_S	10...30 V DC[3]	■	■
Ripple[4]	≤ 5 V_{SS}	■	■
Current consumption[5]	≤ 45 mA	■	■
Switching outputs	NPN, Q/$\overline{Q}$	■	
	PNP, Q/$\overline{Q}$		■
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V		■
Signal voltage NPN HIGH/LOW	Approx. Vs/< 2.5 V	■	
Max. output current I_a	100 mA	■	■
Response time[6]	≤ 330 µs	■	■
Max. switching frequency[7]	1,500 Hz	■	■
Connection type	Connector, M12 4-pin	■	■
VDE protection class[8]	⧈	■	■
Circuit protection[9]	A, B, C	■	■
Enclosure rating	IP 66/IP 67	■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■
	Storage -40...167° F (-40...75° C)	■	■
Approximate weight	4.2 oz (120 g)	■	■
Housing material	Die cast zinc[10]	■	■

1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression
10) Teflon-coated housing available upon request

Teach-in procedure via double-teach button

1. Position the object in the path of the beam.
2. Press both buttons simultaneously (for approx. 2 seconds) until the yellow LED flashes = object in focus. In the event of button activation of less than 2 seconds, the teach command is not effective, therefore providing no protection against further unwanted manipulation.
3. Release buttons; yellow LED illuminates continuously = object is positively detected.
4. Fine adjustments can be made to the sensing distance, when required by the application: Pressing the "+" button (approx. 0.5 sec) = sensing distance will be increased. Pressing the "–" button (approx. 0.5 sec) = sensing distance will be decreased. In the event of button activation less than 0.5 sec, no change to the sensing distance will be made. Upon activation of the button, the yellow LED flashes.
5. The teach-in sensing distance is stored in the memory.

Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WTF12-3

Proximity/Diffuse Sensors - Foreground suppression

2.0…31.5 in (50…800 mm)
sensing range

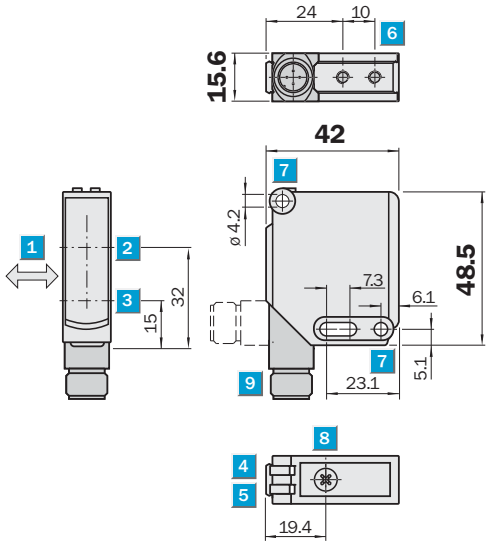
Highlights

- Robust metal housing with dovetail mounting clamps
- High device availability in industrial environments; in case of ambient light, optical reflections and devices mounted opposite one another
- Ranges between -40…60° C

WTF12-3

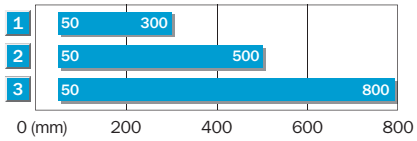


Dimensional drawing



dimensions in mm

Sensing distance



1	Sensing distance on black, 6 % remission
2	Sensing distance on gray, 18 % remission
3	Sensing on white, 90 % remission

Adjustments



1	Preferred direction of the objects to be detected
2	Optical axis, receiver
3	Optical axis, sender
4	LED indicator green, supply voltage active
5	LED indicator yellow, status: light reception
6	Mounting thread M4 – 4 mm deep
7	Mounting hole, Ø 4.2 mm
8	Sensing distance adjuster, potentiometer
9	Connection

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WTF12-3N2441	1 041 403
WTF12-3P1141	1 041 402
WTF12-3P2441	1 041 400

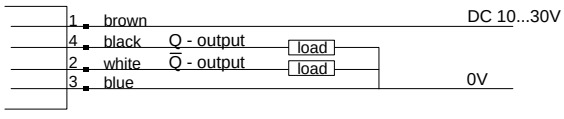
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Technical data	WTF12-3-	N2441	P1141	P2441
Sensing range, typ. max.	2.0…31.5 in (50…800 mm)[1]	■	■	■
Operating distance	2.0…31.5 in (50…800 mm)[1]	■	■	■
Adjustment of operating distance	Potentiometer	■	■	■
Light source[2], light type	LED, red light, 640 nm	■	■	■
Light spot diameter	Ø 0.3 in at 11.8 in (Ø 8.0 mm at 300 mm)	■	■	■
Supply voltage V_S	10...30 V DC[3]	■	■	■
Ripple[4]	≤ 5 V_{SS}	■	■	■
Current consumption[5]	≤ 45 mA	■	■	■
Switching outputs	NPN, Q/$\overline{Q}$	■		
	PNP, Q/$\overline{Q}$		■	■
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V		■	■
Signal voltage NPN HIGH/LOW	Approx. Vs/< 2.5 V	■		
Max. output current I_a	100 mA	■	■	■
Response time[6]	≤ 330 µs	■	■	■
Max. switching frequency[7]	1,500 Hz	■	■	■
Connection type	Connector, M12 4-pin	■		■
	Cable, PVC, 2 m[8]		■	
VDE protection class[9]	□	■	■	■
Circuit protection[10]	A, B, C	■	■	■
Enclosure rating	IP 66/IP67/IP 69K	■	■	■
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■
Approximate weight	4.2 oz (120 g)	■		■
	7.0 oz (200 g)		■	
Housing material	Die cast zinc[11]	■	■	■

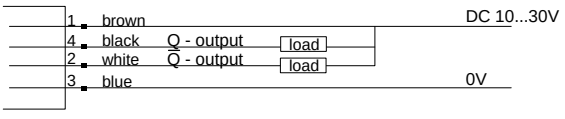
1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression
11) Teflon-coated housing available upon request

Connection diagram

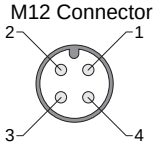
PNP Models



NPN Models



M12 Connector



wire colors refer to standard cable, not included with quick disconnect models

WTF12-3

Proximity/Diffuse Sensors - Foreground suppression

2.0…31.5 in (50…800 mm)
sensing range

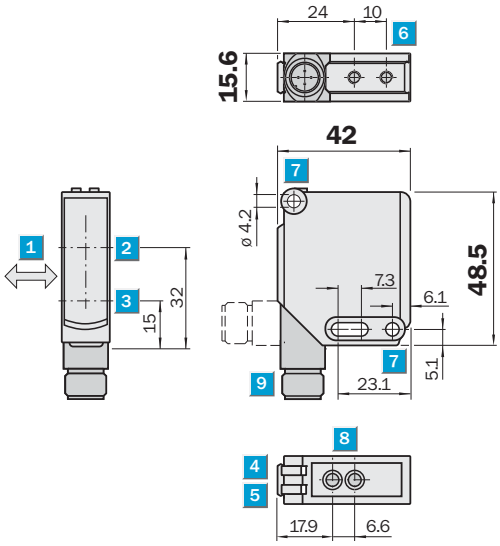
Highlights

- Robust metal housing with dovetail mounting clamps
- High device availability in industrial environments; in case of ambient light, optical reflections and devices mounted opposite one another
- Ranges between -40…60° C

WTF12-3

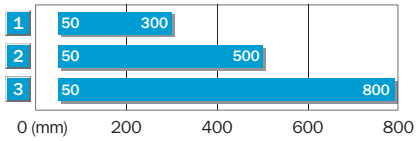


Dimensional drawing



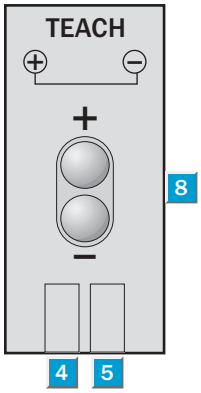
dimensions in mm

Sensing distance



1	Sensing distance on black, 6 % remission
2	Sensing distance on gray, 18 % remission
3	Sensing on white, 90 % remission

Adjustments



1	Preferred direction of the objects to be detected
2	Optical axis, receiver
3	Optical axis, sender
4	LED indicator green, supply voltage active
5	LED indicator yellow, status: light reception
6	Mounting thread M4 – 4 mm deep
7	Mounting hole, Ø 4.2 mm
8	Sensing distance adjuster, teach-in: double-teach button
9	Connection

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WTF12-3P2443	1 041 401

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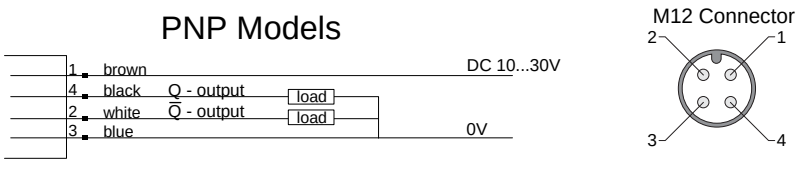
Technical data	WTF12-3-	P2443
Sensing range, typ. max.	2.0…31.5 in (50…800 mm)[1]	
Operating distance	2.0…31.5 in (50…800 mm)[1]	
Adjustment of operating distance	Teach-in: double-teach button	
Light source[2], light type	LED, red light, 640 nm	
Light spot diameter	Ø 0.3 in at 11.8 in (Ø 8.0 mm at 300 mm)	
Supply voltage V_S	10…30 V DC[3]	
Ripple[4]	≤ 5 V_{SS}	
Current consumption[5]	≤ 45 mA	
Switching outputs	PNP, Q/$\overline{Q}$	
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V	
Max. output current I_a	100 mA	
Response time[6]	≤ 330 µs	
Max. switching frequency[7]	1,500 Hz	
Connection type	Connector, M12 4-pin	
VDE protection class[8]	□	
Circuit protection[9]	A, B, C	
Enclosure rating	IP 66/IP 67	
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	
	Storage -40…167° F (-40…75° C)	
Approximate weight	4.2 oz (120 g)	
Housing material	Die cast zinc[10]	

1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression
10) Teflon-coated housing available upon request

Teach-in procedure via double-teach button

1. Position the object in the path of the beam.
2. Press both buttons simultaneously (for approx. 2 seconds) until the yellow LED flashes = object in focus. In the event of button activation of less than 2 seconds, the teach command is not effective, therefore providing no protection against further unwanted manipulation.
3. Release buttons; yellow LED illuminates continuously = object is positively detected.
4. Fine adjustments can be made to the sensing distance, when required by the application: Pressing the "+" button (approx. 0.5 sec) = sensing distance will be increased. Pressing the "–" button (approx. 0.5 sec) = sensing distance will be decreased. In the event of button activation less than 0.5 sec, no change to the sensing distance will be made. Upon activation of the button, the yellow LED flashes.
5. The teach-in sensing distance is stored in the memory.

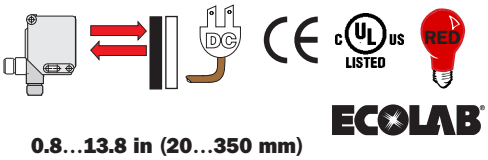
Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WTB12-3

Proximity/Diffuse Sensors - Background suppression



0.8…13.8 in (20…350 mm)

sensing range

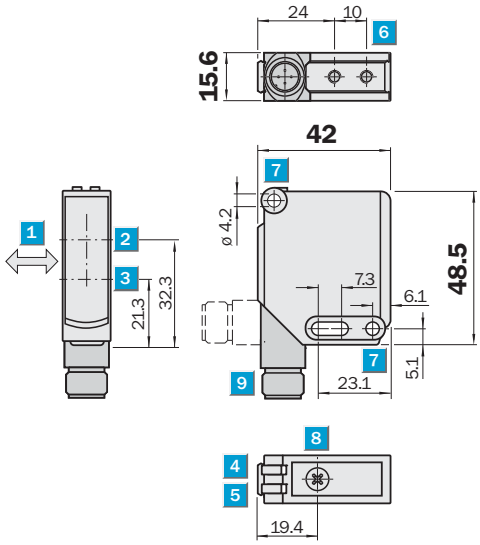
Highlights

- Robust metal housing with dovetail mounting clamps
- High device availability in industrial environments; in case of ambient light, optical reflections and devices mounted opposite one another
- Ranges between -40…60° C

WTB12-3

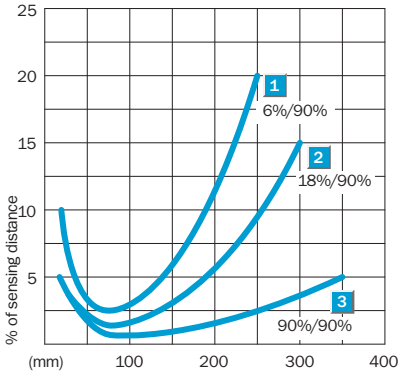


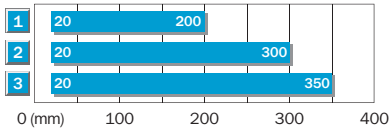
Dimensional drawing



dimensions in mm

Sensing distance





1	Sensing distance on black, 6 % remission
2	Sensing distance on gray, 18 % remission
3	Sensing on white, 90 % remission

Adjustments



1	Preferred direction of the objects to be detected
2	Optical axis, receiver
3	Optical axis, sender
4	LED indicator green, supply voltage active
5	LED indicator yellow, status: light reception
6	Mounting thread M4 – 4 mm deep
7	Mounting hole, Ø 4.2 mm
8	Sensing distance adjuster, potentiometer
9	Connection

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WTB12-3N1131	1 041 418
WTB12-3N1231	1 041 419
WTB12-3N2431	1 041 416
WTB12-3P1131	1 041 413
WTB12-3P1231	1 041 415
WTB12-3P2431	1 041 411

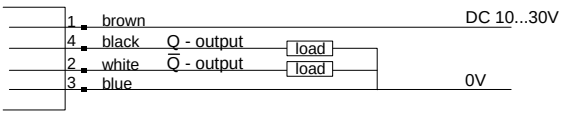
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Technical data	WTB12-3-	N1131	N1231	N2431	P1131	P1231	P2431			
Sensing range, typ. max.	0.8…13.8 in (20…350 mm)[1]	■	■	■	■	■	■			
Operating distance	0.8…13.8 in (20…350 mm)[1]	■	■	■	■	■	■			
Adjustment of operating distance	Potentiometer	■	■	■	■	■	■			
Light source[2], light type	LED, red light, 640 nm	■	■	■	■	■	■			
Light spot diameter	Ø 0.2 in at 7.9 in (Ø 6.0 mm at 200 mm)	■	■	■	■	■	■			
Supply voltage V_S	10...30 V DC[3]	■	■	■	■	■	■			
Ripple[4]	≤ 5 V_{SS}	■	■	■	■	■	■			
Current consumption[5]	≤ 45 mA	■	■	■	■	■	■			
Switching outputs	NPN, Q/$\overline{Q}$	■	■	■						
	PNP, Q/$\overline{Q}$				■	■	■			
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V				■	■	■			
Signal voltage NPN HIGH/LOW	Approx. Vs/ < 2.5 V	■	■	■						
Max. output current I_a	100 mA	■	■	■	■	■	■			
Response time[6]	≤ 330 µs	■	■	■	■	■	■			
Max. switching frequency[7]	1,500 Hz	■	■	■	■	■	■			
Connection type	Cable, PVC, 2 m[8]	■			■					
	Cable, PVC, 5 m[8]		■			■				
	Connector, M12 4-pin			■			■			
VDE protection class[9]	□	■	■	■	■	■	■			
Circuit protection[10]	A, B, C	■	■	■	■	■	■			
Enclosure rating	IP 66/IP 67/IP 69K	■	■	■	■	■	■			
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■	■	■	■			
	Storage -40…167° F (-40…75° C)	■	■	■	■	■	■			
Approximate weight	7.0 oz (200 g)	■			■					
	9.8 oz (280 g)		■			■				
	4.2 oz (120 g)			■			■			
Housing material	Die cast zinc[11]	■	■	■	■	■	■			

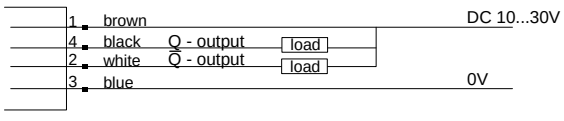
1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression
11) Teflon-coated housing available upon request

Connection diagram

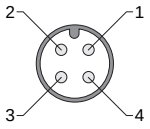
PNP Models



NPN Models



M12 Connector



wire colors refer to standard cable, not included with quick disconnect models

WTB12-3

Proximity/Diffuse Sensors - Background suppression

0.8…13.8 in (20…350 mm)
sensing range

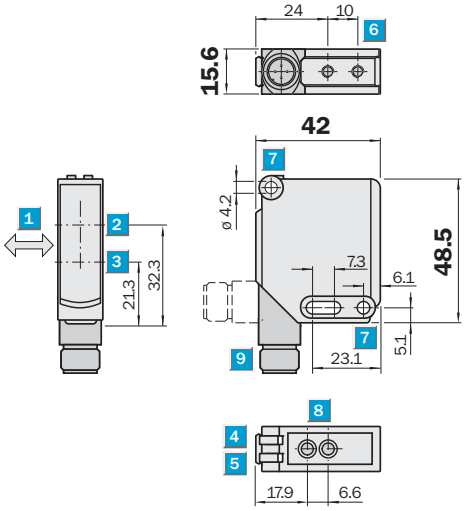
Highlights

- Robust metal housing with dovetail mounting clamps
- High device availability in industrial environments; in case of ambient light, optical reflections and devices mounted opposite one another
- Ranges between -40…60° C

WTB12-3

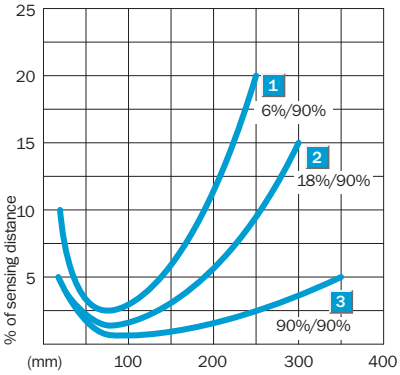


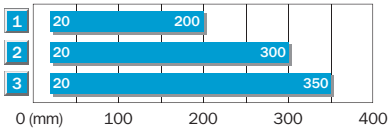
Dimensional drawing



dimensions in mm

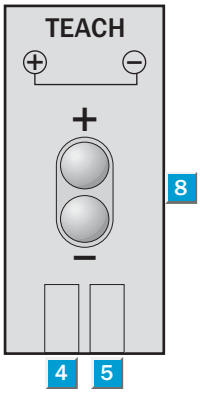
Sensing distance





1	Sensing distance on black, 6 % remission
2	Sensing distance on gray, 18 % remission
3	Sensing on white, 90 % remission

Adjustments



1	Preferred direction of the objects to be detected
2	Optical axis, receiver
3	Optical axis, sender
4	LED indicator green, supply voltage active
5	LED indicator yellow, status: light reception
6	Mounting thread M4 – 4 mm deep
7	Mounting hole, Ø 4.2 mm
8	Sensing distance adjuster, teach-in: double-teach button
9	Connection

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WTB12-3N2433	1 041 417
WTB12-3P2433	1 041 412

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Technical data	WTB12-3-	N2433	P2433
Sensing range, typ. max.	0.8…13.8 in (20…350 mm)[1]		
Operating distance	0.8…13.8 in (20…350 mm)[1]		
Adjustment of operating distance	Teach-in: double-teach button		
Light source[2], light type	LED, red light, 640 nm		
Light spot diameter	Ø 0.2 in at 7.9 in (Ø 6.0 mm at 200 mm)		
Supply voltage V_S	10…30 V DC[3]		
Ripple[4]	≤ 5 V_{SS}		
Current consumption[5]	≤ 45 mA		
Switching outputs	NPN, Q/$\overline{Q}$		
	PNP, Q/$\overline{Q}$		
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V		
Signal voltage NPN HIGH/LOW	Approx. Vs/ < 2.5 V		
Max. output current I_a	100 mA		
Response time[6]	≤ 330 µs		
Max. switching frequency[7]	1,500 Hz		
Connection type	Connector, M12 4-pin		
VDE protection class[8]	⧈		
Circuit protection[9]	A, B, C		
Enclosure rating	IP 66/IP67		
Ambient temperature T_A	Operation -40…140° F (-40…60° C)		
	Storage -40…167° F (-40…75° C)		
Approximate weight	4.2 oz (120 g)		
Housing material	Die cast zinc[10]		

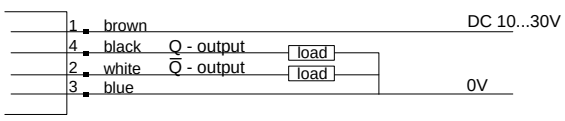
1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression
10) Teflon-coated housing available upon request

Teach-in procedure via double-teach button

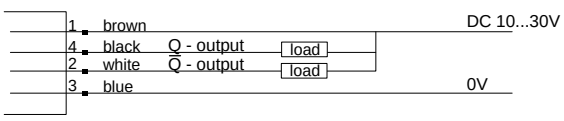
1. Position the object in the path of the beam.
2. Press both buttons simultaneously (for approx. 2 seconds) until the yellow LED flashes = object in focus. In the event of button activation of less than 2 seconds, the teach command is not effective, therefore providing no protection against further unwanted manipulation.
3. Release buttons; yellow LED illuminates continuously = object is positively detected.
4. Fine adjustments can be made to the sensing distance, when required by the application: Pressing the "+" button (approx. 0.5 sec) = sensing distance will be increased. Pressing the "–" button (approx. 0.5 sec) = sensing distance will be decreased. In the event of button activation less than 0.5 sec, no change to the sensing distance will be made. Upon activation of the button, the yellow LED flashes.
5. The teach-in sensing distance is stored in the memory.

Connection diagram

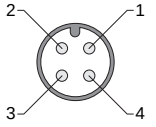
PNP Models



NPN Models



M12 Connector



wire colors refer to standard cable, not included with quick disconnect models

WTB12-3

Proximity/Diffuse Sensors - Background suppression

0.8…23.6 in (20…600 mm)
sensing range

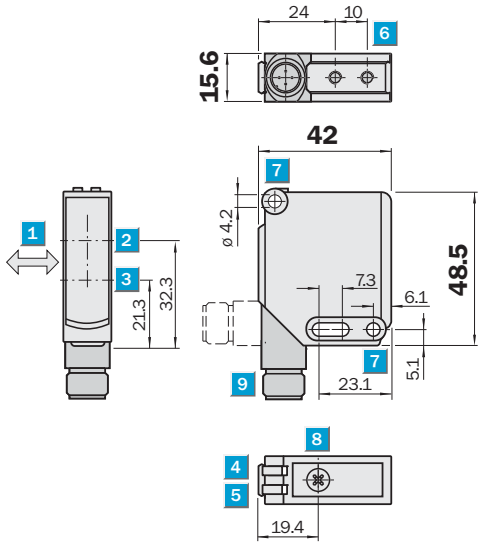
Highlights

- Robust metal housing with dovetail mounting clamps
- High device availability in industrial environments; in case of ambient light, optical reflections and devices mounted opposite one another
- Ranges between -40…60° C

WTB12-3

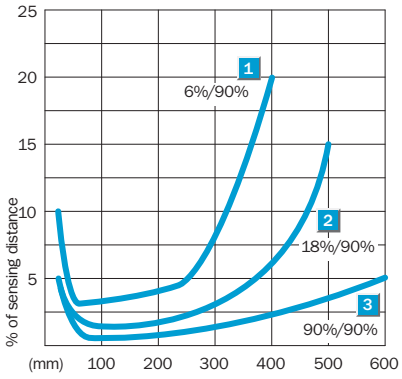


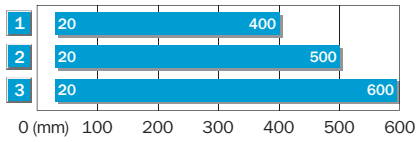
Dimensional drawing



dimensions in mm

Sensing distance





1	Sensing distance on black, 6% remission
2	Sensing distance on gray, 18% remission
3	Sensing on white, 90% remission

Adjustments



1	Preferred direction of the objects to be detected
2	Optical axis, receiver
3	Optical axis, sender
4	LED indicator green, supply voltage active
5	LED indicator yellow, status: light reception
6	Mounting thread M4 – 4 mm deep
7	Mounting hole, Ø 4.2 mm
8	Sensing distance adjuster, potentiometer
9	Connection

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

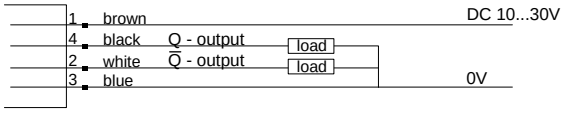
Type	Part no.
WTB12-3N1711	1 041 430
WTB12-3N1111	1 041 429
WTB12-3N2411	1 041 427
WTB12-3P1711	1 041 426
WTB12-3P1111	1 041 424
WTB12-3P2411	1 041 422

Technical data	WTB12-3-	N1711	N1111	N2411	P1711	P1111	P2411
Sensing range, typ. max.	0.8…23.6 in (20…600 mm)[1]	■	■	■	■	■	■
Operating distance	0.8…23.6 in (20…600 mm)[1]	■	■	■	■	■	■
Adjustment of operating distance	Potentiometer	■	■	■	■	■	■
Light source[2], light type	LED, IR light, 850 nm	■	■	■	■	■	■
Light spot diameter	0.6 x 0.6 in at 7.9 in (15 x 15 mm at 200 mm)	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■	■	■
Ripple[4]	≤ 5 V_{SS}	■	■	■	■	■	■
Current consumption[5]	≤ 55 mA	■	■	■	■	■	■
Switching outputs	NPN, Q/$\overline{Q}$	■	■	■			
	PNP, Q/$\overline{Q}$				■	■	■
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V				■	■	■
Signal voltage NPN HIGH/LOW	Approx. Vs/< 2.5 V	■	■	■			
Max. output current I_a	100 mA	■	■	■	■	■	■
Response time[6]	≤ 330 µs	■	■	■	■	■	■
Max. switching frequency[7]	1,500 Hz	■	■	■	■	■	■
Connection type	Cable, PVC, 5 m[8]	■			■		
	Cable, PVC, 2 m[8]		■			■	
	Connector, M12 4-pin			■			■
VDE protection class[9]	⊡	■	■	■	■	■	■
Circuit protection[10]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 66/IP 67/IP 69K	■	■	■	■	■	■
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■	■	■
Approximate weight	9.8 oz (250 g)	■			■		
	7.0 oz (200 g)		■			■	
	4.2 oz (120 g)			■			■
Housing material	Die cast zinc[11]	■	■	■	■	■	■

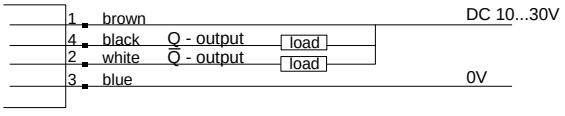
1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression
11) Teflon-coated housing available on request

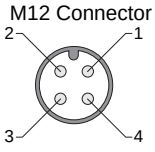
Connection diagram

PNP Models



NPN Models





wire colors refer to standard cable, not included with quick disconnect models

WTB12-3

Proximity/Diffuse Sensors - Background suppression

0.8…23.6 in (20…600 mm)
sensing range

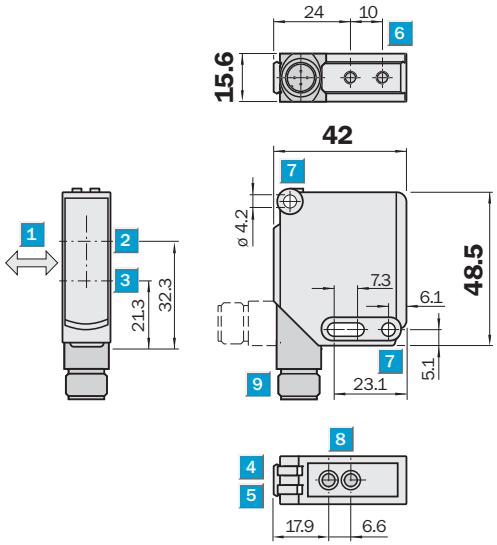
Highlights

- Robust metal housing with dovetail mounting clamps
- High device availability in industrial environments; in case of ambient light, optical reflections and devices mounted opposite one another
- Ranges between -40…60° C

WTB12-3

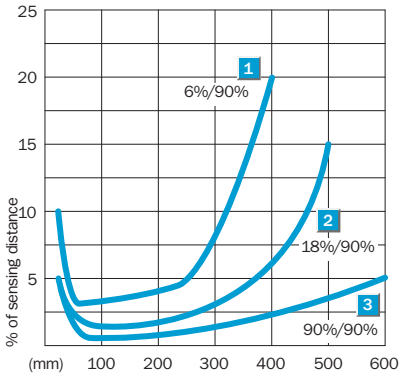


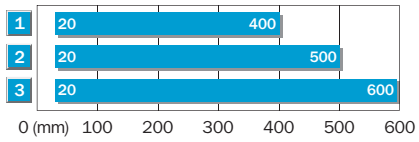
Dimensional drawing



dimensions in mm

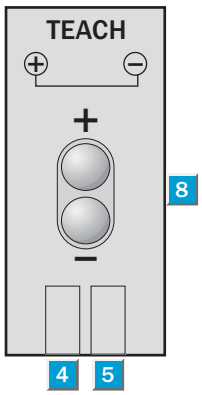
Sensing distance





1	Sensing distance on black, 6% remission
2	Sensing distance on gray, 18% remission
3	Sensing on white, 90% remission

Adjustments



1	Preferred direction of the objects to be detected
2	Optical axis, receiver
3	Optical axis, sender
4	LED indicator green, supply voltage active
5	LED indicator yellow, status: light reception
6	Mounting thread M4 – 4 mm deep
7	Mounting hole, Ø 4.2 mm
8	Sensing distance adjuster, teach-in: double-teach button
9	Connection

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WTB12-3N2413	1 041 428
WTB12-3P2413	1 041 423

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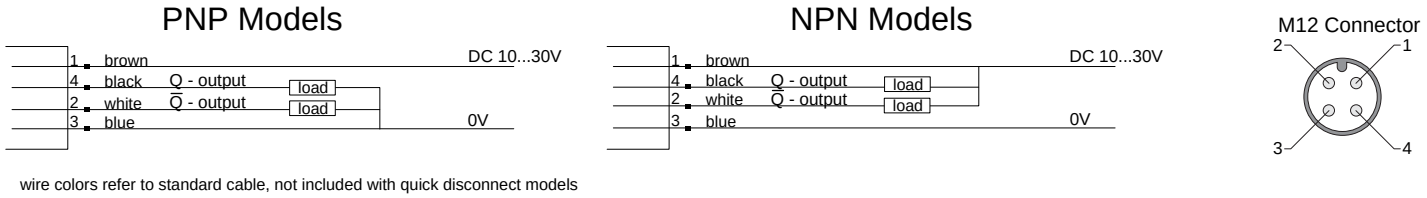
Technical data	WTB12-3-	N2413	P2413
Sensing range, typ. max.	0.8…23.6 in (20…600 mm)[1]		
Operating distance	0.8…23.6 in (20…600 mm)[1]		
Adjustment of operating distance	Teach-in: double-teach button		
Light source[2], light type	LED, IR light, 850 nm		
Light spot diameter	0.6 x 0.6 in at 7.9 in (15 x 15 mm at 200 mm)		
Supply voltage V_S	10…30 V DC[3]		
Ripple[4]	≤ 5 V_{SS}		
Current consumption[5]	≤ 55 mA		
Switching outputs	NPN, Q/$\overline{Q}$		
	PNP, Q/$\overline{Q}$		
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V		
Signal voltage NPN HIGH/LOW	Approx. Vs/< 2.5 V		
Max. output current I_a	100 mA		
Response time[6]	≤ 330 µs		
Max. switching frequency[7]	1,500 Hz		
Connection type	Connector, M12 4-pin		
VDE protection class[8]	□		
Circuit protection[9]	A, B, C		
Enclosure rating	IP 66/IP 67		
Ambient temperature T_A	Operation -40…140° F (-40…60° C)		
	Storage -40…167° F (-40…75° C)		
Approximate weight	4.2 oz (120 g)		
Housing material	Die cast zinc[10]		

1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression
10) Teflon-coated housing available on request

Teach-in procedure via double-teach button

1. Position the object in the path of the beam.
2. Press both buttons simultaneously (for approx. 2 seconds) until the yellow LED flashes = object in focus. In the event of button activation of less than 2 seconds, the teach command is not effective, therefore providing no protection against further unwanted manipulation.
3. Release buttons; yellow LED illuminates continuously = object is positively detected.
4. Fine adjustments can be made to the sensing distance, when required by the application: Pressing the "+" button (approx. 0.5 sec) = sensing distance will be increased. Pressing the "–" button (approx. 0.5 sec) = sensing distance will be decreased. In the event of button activation less than 0.5 sec, no change to the sensing distance will be made. Upon activation of the button, the yellow LED flashes.
5. The teach-in sensing distance is stored in the memory.

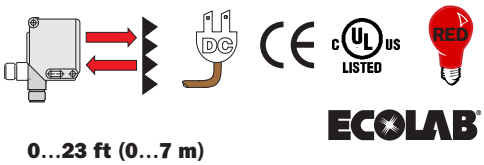
Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WL12-3

Reflex/Retro-reflective Sensors



0...23 ft (0...7 m)
sensing range

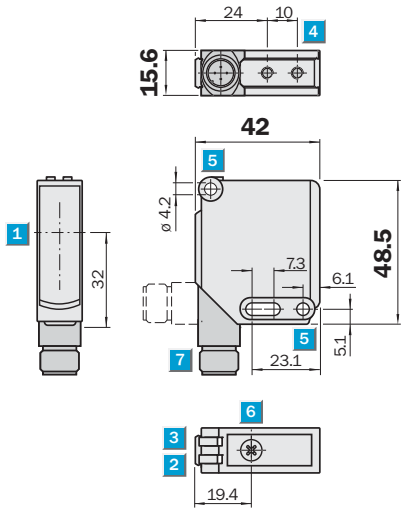
Highlights

- Robust metal housing with dovetail mounting clamps
- High device availability in industrial environments; in case of ambient light, optical reflections and devices mounted opposite one another
- Ranges between -40...60° C

WL12-3

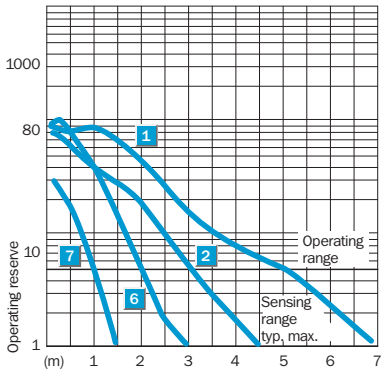


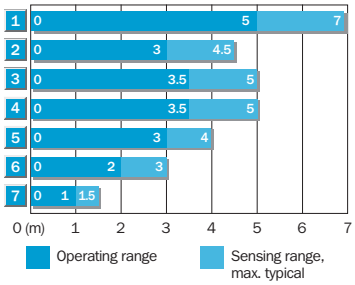
Dimensional drawing



dimensions in mm

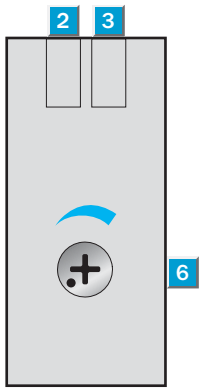
Sensing distance and operating reserve





Reflector type		Operating range
1	PL 80 A	0 ... 5.0 m
2	P975	0 ... 3.0 m
3	PL 50 A	0 ... 3.5 m
4	PL 40 A	0 ... 3.5 m
5	PL 30 A	0 ... 3.0 m
6	PL 20 A	0 ... 2.0 m
7	Reflective tape	0 ... 1.0 m

Adjustments



1 Optical axis
2 LED indicator yellow, status: light reception
3 LED indicator green, supply voltage active
4 Mounting thread M4 – 4 mm deep
5 Mounting hole, Ø 4.2 mm
6 Sensitivity adjustment, potentiometer
7 Connection

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

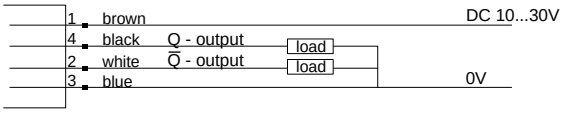
Type	Part no.
WL12-3N1131	1 041 441
WL12-3N1731	1 041 442
WL12-3N2431	1 041 440
WL12-3P1131	1 041 437
WL12-3P1731	1 041 438
WL12-3P2431	1 041 436

Technical data	WL12-3-	N1131	N1731	N2431	P1131	P1731	P2431
Sensing range, typ. max.	0…23 ft (0…7 m)	■	■	■	■	■	■
Operating distance	0…16.4 ft (0…5 m)	■	■	■	■	■	■
Relating to	Reflector PL80A	■	■	■	■	■	■
Sensitivity adjustment	Potentiometer	■	■	■	■	■	■
Light source[1], light type	LED, red light, 640 nm	■	■	■	■	■	■
Light spot diameter	3.1 in at 9.8 ft (80 mm at 3 m)	■	■	■	■	■	■
Angle of dispersion	Approx. 1.5°	■	■	■	■	■	■
Polarization filter	√	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■	■
Ripple[3]	≤ 5 V_{SS}	■	■	■	■	■	■
Current consumption[4]	≤ 40 mA	■	■	■			
	≤ 30 mA				■	■	■
Switching outputs	NPN, Q/$\overline{Q}$	■	■	■			
	PNP, Q/$\overline{Q}$				■	■	■
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V				■	■	■
Signal voltage NPN HIGH/LOW	Approx. Vs/< 2.5 V	■	■	■			
Max. output current I_a	100 mA	■	■	■	■	■	■
Response time[5]	≤ 330 µs	■	■	■	■	■	■
Max. switching frequency[6]	1,500 Hz	■	■	■	■	■	■
Connection type	Cable, PVC, 2 m[7]	■			■		
	Cable, PVC 3 m[7]		■			■	
	Connector, M12 4-pin			■			■
VDE protection class[8]	⊡	■	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 66/IP 67/IP 69K	■	■	■	■	■	■
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■	■	■
Approximate weight	7.0 oz (200 g)	■			■		
	9.8 oz (250 g)		■			■	
	4.2 oz (120 g)			■			■
Housing material	Die cast zinc[10]	■	■	■	■	■	■

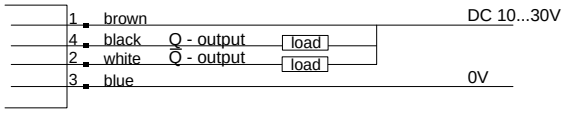
1) Average service life 100,000 h at T_A = 25° C
2) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression
10) Teflon-coated housing available upon request

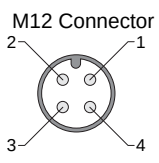
Connection diagram

PNP Models



NPN Models

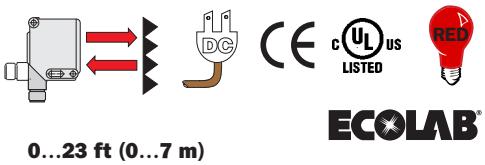




wire colors refer to standard cable, not included with quick disconnect models

WL12-3

Reflex/Retro-reflective Sensors



0...23 ft (0...7 m)
sensing range

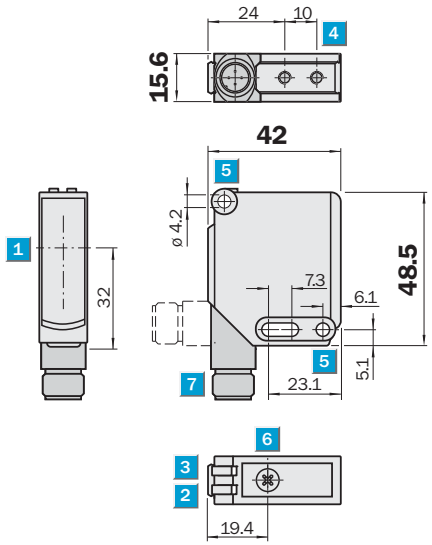
Highlights

- Robust metal housing with dovetail mounting clamps
- High device availability in industrial environments; in case of ambient light, optical reflections and devices mounted opposite one another
- Ranges between -40...60° C

WL12-3

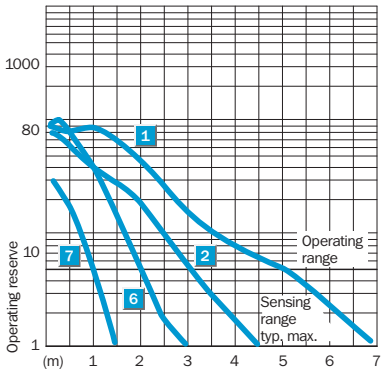


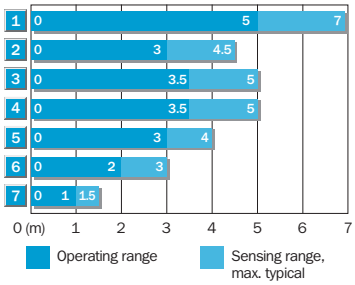
Dimensional drawing



dimensions in mm

Sensing distance and operating reserve





Reflector type		Operating range
1	PL 80 A	0 ... 5.0 m
2	P975	0 ... 3.0 m
3	PL 50 A	0 ... 3.5 m
4	PL 40 A	0 ... 3.5 m
5	PL 30 A	0 ... 3.0 m
6	PL 20 A	0 ... 2.0 m
7	Reflective tape	0 ... 1.0 m

Adjustments



1 Optical axis
2 LED indicator yellow, status: light reception
3 LED indicator green, supply voltage active
4 Mounting thread M4 – 4 mm deep
5 Mounting hole, Ø 4.2 mm
6 Sensitivity adjustment, potentiometer
7 Connection

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

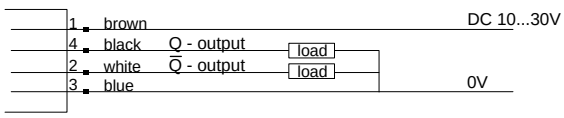
Type	Part no.
WL12-3N1141	1 041 447
WL12-3N2441	1 041 446
WL12-3P1141	1 041 445
WL12-3P2441	1 041 444

Technical data	WL12-3-	N1141	N2441	P1141	P2441					
Sensing range, typ. max.	0…23 ft (0…7 m)	■	■	■	■					
Operating distance	0…16.4 ft (0…5 m)	■	■	■	■					
Relating to	Reflector PL80A	■	■	■	■					
Sensitivity adjustment	Potentiometer	■	■	■	■					
Light source[1], light type	LED, red light, 640 nm	■	■	■	■					
Light spot diameter	3.1 in at 9.8 ft (80 mm at 3 m)	■	■	■	■					
Angle of dispersion	Approx. 1.5°	■	■	■	■					
Supply voltage V_S	10…30 V DC[2]	■	■	■	■					
Ripple[3]	≤ 5 V_{SS}	■	■	■	■					
Current consumption[4]	≤ 50 mA	■	■							
	≤ 40 mA			■	■					
Switching outputs	NPN, Q/$\overline{Q}$	■	■							
	PNP, Q/$\overline{Q}$			■	■					
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V			■	■					
Signal voltage NPN HIGH/LOW	Approx. Vs/< 2.5 V	■	■							
Max. output current I_a	100 mA	■	■	■	■					
Response time[5]	≤ 330 µs	■	■	■	■					
Max. switching frequency[6]	1,500 Hz	■	■	■	■					
Connection type	Cable, PVC, 2 m[7]	■		■						
	Connector, M12 4-pin		■		■					
VDE protection class[8]	□	■	■	■	■					
Circuit protection[9]	A, B, C	■	■	■	■					
Enclosure rating	IP 66/IP 67/IP 69K	■	■	■	■					
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■	■					
	Storage -40…167° F (-40…75° C)	■	■	■	■					
Approximate weight	7.0 oz (200 g)	■		■						
	4.2 oz (120 g)		■		■					
Housing material	Die cast zinc[10]	■	■	■	■					

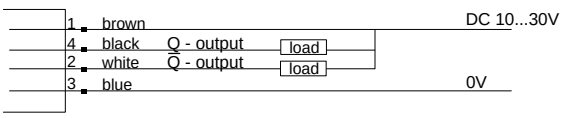
1) Average service life 100,000 h at T_A = 25° C
2) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression
10) Teflon-coated housing available upon request

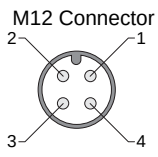
Connection diagram

PNP Models



NPN Models

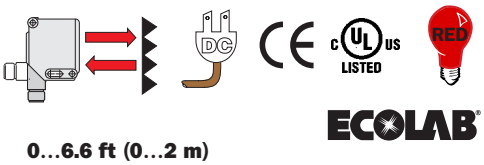




wire colors refer to standard cable, not included with quick disconnect models

WL12-3

Reflex/Retro-reflective Sensors



0...6.6 ft (0...2 m)
sensing range

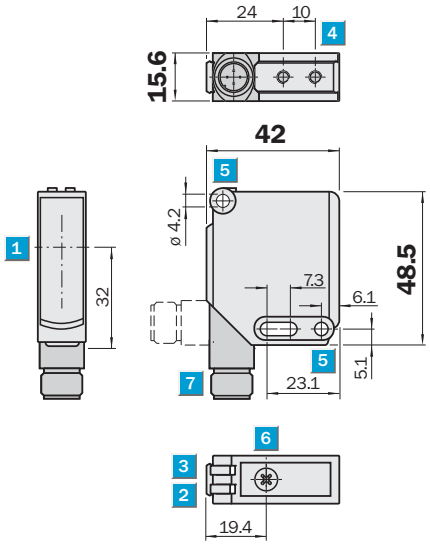
Highlights

- Robust metal housing with dovetail mounting clamps
- High device availability in industrial environments; in case of ambient light, optical reflections and devices mounted opposite one another
- Ranges between -40...60° C

WL12-3



Dimensional drawing



dimensions in mm

Adjustments



1 Optical axis
2 LED indicator yellow, status: light reception
3 LED indicator green, supply voltage active
4 Mounting thread M4 – 4 mm deep
5 Mounting hole, Ø 4.2 mm
6 Sensitivity adjustment, potentiometer
7 Connection

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

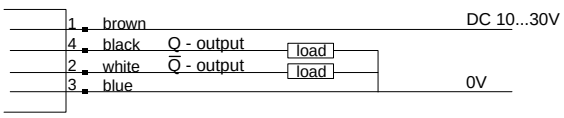
Type	Part no.
WL12-3N1151	1 041 451
WL12-3N2451	1 041 450
WL12-3P1151	1 041 449
WL12-3P2451	1 041 448

Technical data	WL12-3-	N1151	N2451	P1151	P2451					
Sensing range, typ. max.	0…6.6 ft (0…2 m)	■	■	■	■					
Operating distance	0…3.3 ft (0…1 m)	■	■	■	■					
Relating to	Reflector PL80A	■	■	■	■					
Sensitivity adjustment	Potentiometer	■	■	■	■					
Light source[1], light type	LED, red light, 640 nm	■	■	■	■					
Light spot diameter	0.1 in at 3.5 in (2 mm at 90 mm)	■	■	■	■					
Angle of dispersion	Approx. 5°	■	■	■	■					
Polarization filter	√	■	■	■	■					
Supply voltage V_S	10…30 V DC[2]	■	■	■	■					
Ripple[3]	≤ 5 V_{SS}	■	■	■	■					
Current consumption[4]	≤ 50 mA	■	■							
	≤ 40 mA			■	■					
Switching outputs	NPN, Q/$\overline{Q}$	■	■							
	PNP, Q/$\overline{Q}$			■	■					
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V			■	■					
Signal voltage NPN HIGH/LOW	Approx. Vs/< 2.5 V	■	■							
Max. output current I_a	100 mA	■	■	■	■					
Response time[5]	≤ 330 µs	■	■	■	■					
Max. switching frequency[6]	1,500 Hz	■	■	■	■					
Connection type	Cable, PVC, 2 m[7]	■		■						
	Connector, M12 4-pin		■		■					
VDE protection class[8]	□	■	■	■	■					
Circuit protection[9]	A, B, C	■	■	■	■					
Enclosure rating	IP 66/IP 67/IP 69K	■	■	■	■					
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■	■					
	Storage -40…167° F (-40…75° C)	■	■	■	■					
Approximate weight	7.0 oz (200 g)	■		■						
	4.2 oz (120 g)		■		■					
Housing material	Die cast zinc[10]	■	■	■	■					

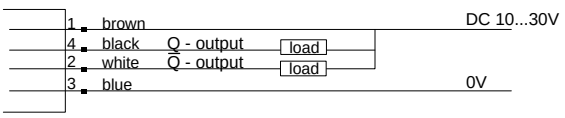
1) Average service life 100,000 h at T_A = 25° C
2) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression
10) Teflon-coated housing available upon request

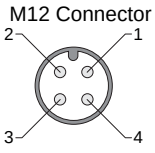
Connection diagram

PNP Models



NPN Models

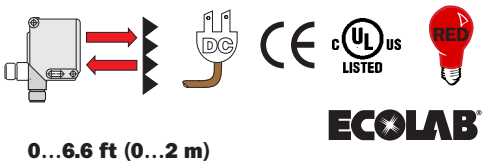




wire colors refer to standard cable, not included with quick disconnect models

WL12-3

Reflex/Retro-reflective Sensors



0...6.6 ft (0...2 m)
sensing range

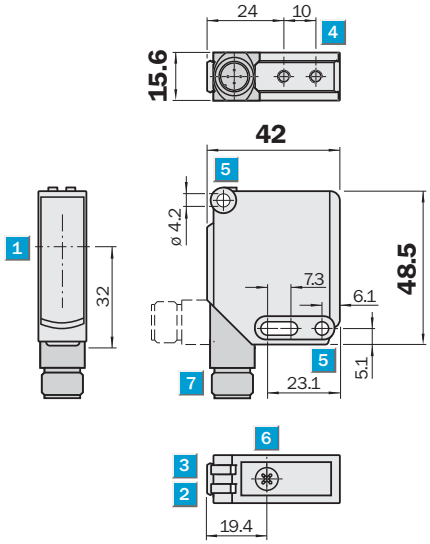
Highlights

- Robust metal housing with dovetail mounting clamps
- High device availability in industrial environments; in case of ambient light, optical reflections and devices mounted opposite one another
- Ranges between -40...60° C

WL12-3

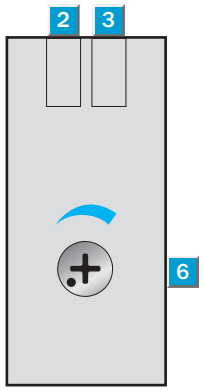


Dimensional drawing



dimensions in mm

Adjustments



1 Optical axis
2 LED indicator yellow, status: light reception
3 LED indicator green, supply voltage active
4 Mounting thread M4 – 4 mm deep
5 Mounting hole Ø 4.2 mm
6 Sensitivity adjustment, potentiometer
7 Connection

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

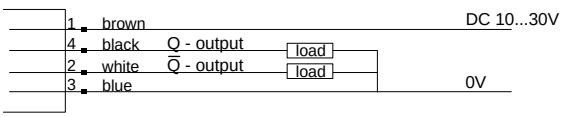
Type	Part no.
WL12-3N1161	1 041 455
WL12-3N2461	1 041 454
WL12-3P1161	1 041 453
WL12-3P2461	1 041 452

Technical data	WL12-3-	N1161	N2461	P1161	P2461
Sensing range, typ. max.	0…6.6 ft (0…2 m)	■	■	■	■
Operating distance	0…3.3 ft (0…1 m)	■	■	■	■
Relating to	Reflector PL80A	■	■	■	■
Sensitivity adjustment	Potentiometer	■	■	■	■
Light source[1], light type	LED, red light, 640 nm	■	■	■	■
Light spot diameter	0.1 in at 3.5 in (2 mm at 90 mm)	■	■	■	■
Angle of dispersion	Approx. 5°	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■
Ripple[3]	≤ 5 V_{SS}	■	■	■	■
Current consumption[4]	≤ 50 mA	■	■		
	≤ 40 mA			■	■
Switching outputs	NPN, Q/$\overline{Q}$	■	■		
	PNP, Q/$\overline{Q}$			■	■
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V			■	■
Signal voltage NPN HIGH/LOW	Approx. Vs/< 2.5 V	■	■		
Max. output current I_a	100 mA	■	■	■	■
Response time[5]	≤ 330 µs	■	■	■	■
Max. switching frequency[6]	1,500 Hz	■	■	■	■
Connection type	Cable, PVC, 2 m[7]	■		■	
	Connector, M12 4-pin		■		■
VDE protection class[8]	⊡	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■
Enclosure rating	IP 66/IP 67/IP 69K	■	■	■	■
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■
Approximate weight	7.0 oz (200 g)	■		■	
	4.2 oz (120 g)		■		■
Housing material	Die cast zinc[10]	■	■	■	■

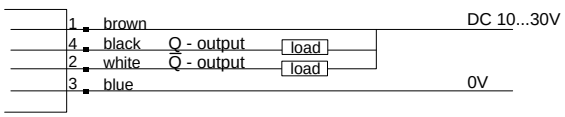
1) Average service life 100,000 h at T_A = 25° C
2) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression
10) Teflon-coated housing available upon request

Connection diagram

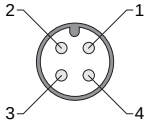
PNP Models



NPN Models



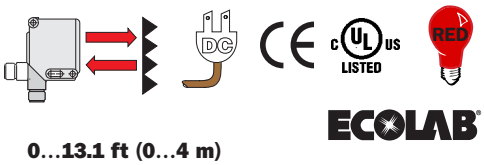
M12 Connector



wire colors refer to standard cable, not included with quick disconnect models

WL12G-3

Reflex/Retro-reflective Sensors



0...13.1 ft (0...4 m)
sensing range

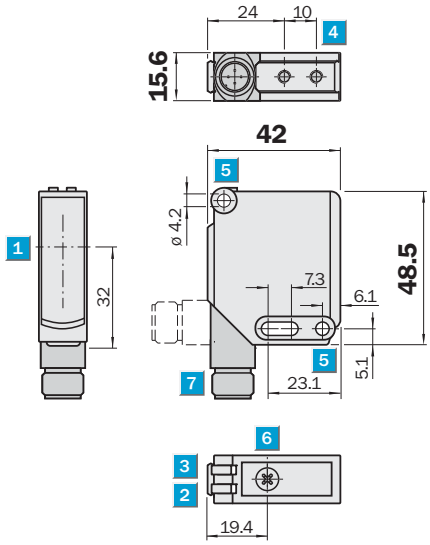
Highlights

- Robust metal housing with dovetail mounting clamps
- Reliable detection of glass and transparent films
- Adjustable sensitivity
- High device availability in industrial environments
- Ranges between -40...60° C

WL12G-3

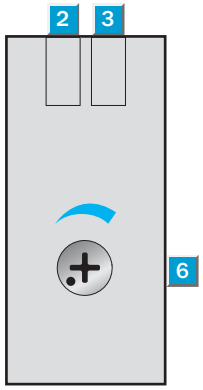


Dimensional drawing



dimensions in mm

Adjustments



1 Optical axis
2 LED indicator yellow, status: light reception
3 LED indicator green, supply voltage active
4 Mounting thread M4 – 4 mm deep
5 Mounting hole, Ø 4.2 mm
6 Sensitivity adjustment, potentiometer
7 Connection

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

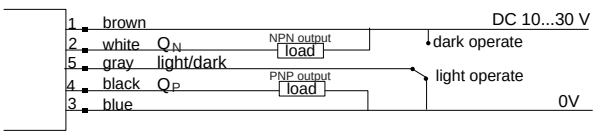
Type	Part no.
WL12G-3B2531	1 041 456
WL12G-3P2431	1 041 457

Technical data	WL12G-3-	B2531	P2431
Sensing range, typ. max.	0…13.1 ft (0…4 m)	■	■
Operating distance	0…11.5 ft (0…3.5 m)	■	■
Relating to	Reflector PL80A	■	■
Sensitivity adjustment	Potentiometer	■	■
Light source[1], light type	LED, red light, 640 nm	■	■
Light spot diameter	1 in at 4.9 ft (25 mm at 1.5 m)	■	■
Angle of dispersion	Approx. 1.5°	■	■
Polarization filter	√	■	■
Supply voltage V_S	10…30 V DC[2]	■	■
Ripple[3]	≤ 5 V_{SS}	■	■
Current consumption[4]	≤ 30 mA	■	■
Switching outputs	PNP and NPN	■	
	PNP		■
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V		■
Switching mode	Light/dark switching, switchable[5]	■	■
Max. output current I_a	100 mA	■	■
Response time[6]	≤ 330 µs	■	■
Max. switching frequency[7]	1,500 Hz	■	■
Connection type	Connector, M12 5-pin	■	
	Connector, M12 4-pin		■
VDE protection class[8]	□	■	■
Circuit protection[9]	A, B, C	■	■
Enclosure rating	IP 66/IP 67/IP 69K	■	■
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■
	Storage -40…167° F (-40…75° C)	■	■
Approximate weight	4.2 oz (120 g)	■	■
Housing material	Die cast zinc[10]	■	■

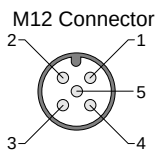
1) Average service life 100,000 h at T_A = 25° C
2) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Control cable 0 V or open-circuited = light switching. Control cable Vs = dark switching
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
   B = All outputs short-circuit protected
   C = Interference pulse suppression
10) Teflon-coated housing available upon request

Connection diagram

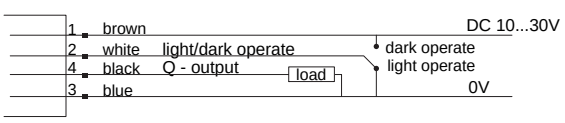
B2531

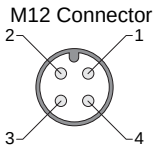


wire colors refer to standard cable, not included



P2431

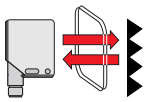




wire colors refer to standard cable, not included with quick disconnect models

WL 12G

Clear Material Sensors







0...6.6 ft (0...2 m)
sensing range

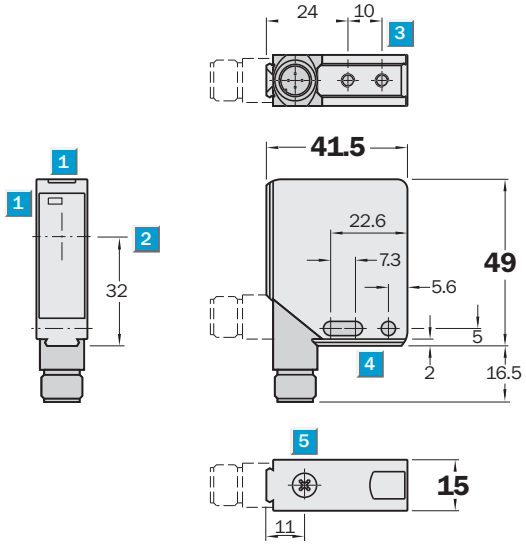
Highlights

- Rugged die cast metal housing
- Ultra-sensitivity for detection of glass, transparent or small parts
- Red light for easy alignment
- Plausibility output
- Automatic sensitivity adjustment for changing conditions
- Immune to ambient light
- Crosstalk suppression

WL 12G

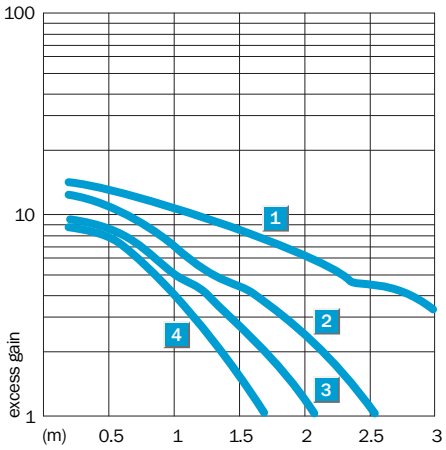


Dimensional drawing



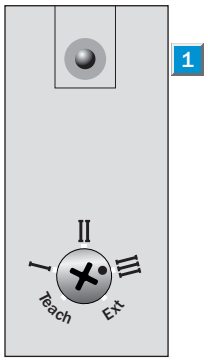
dimensions in mm

Excess gain



Adjustments

All types



1 LED signal strength indicator
2 Center of optical axis
3 M4 threaded mounting hole – 4 mm deep
4 Mounting holes Ø 4.2 mm
5 Function selector

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

	Reflector type	Sensing range
1	PL 80 A	0...3.0 m
2	PL 40 A	0...2.5 m
3	PL 30 A	0...2.1 m
4	PL 20 A	0...1.6 m

Order information	
Type	**Part no.**
WL 12G-P530	1 016 289
WL 12G-N530	1 016 309
WL 12G-V530	1 016 310
WL 12G-W530	1 016 311

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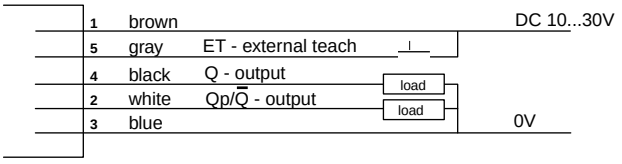
Technical data	WL 12G-	P530	N530	V530	W530
Sensing range	0...6.6 ft (0...2 m)/PL 80 A	■	■	■	■
Sensitivity	Adjustable	■	■	■	■
Light source[1], light type	LED, red light, polarized	■	■	■	■
Light spot size	Approx. 0.3x0.5 in at 7.9 in (8x13 mm at 200 mm)	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■
Ripple[3]	≤ 5 V_{SS}	■	■	■	■
Current consumption[4]	≤ 65 mA	■	■	■	■
Transistor switching outputs	PNP, Q and $\overline{Q}$	■			
	NPN, Q and $\overline{Q}$		■		
	PNP, Q and plausibility output			■	
	NPN, Q and plausibility output				■
Output current I_A max.	100 mA	■	■	■	■
Resp. time[5]/max. switching freq.[6]	≤ 0.5 ms/1000 Hz	■	■	■	■
Operating mode	Light or dark switching via complementary outputs	■	■		
	Light switching			■	■
Plausibility output Q_P				■	■
Reliable detection	Approx. 0 V			■	
	Approx. + V_S				■
incorrect setting	V_S – 2.9 V			■	
or severe pollution	Approx. 1.8 V				■
Teach input ET		■	■	■	■
Teach-in	≥ 10 V to + V_S	■	■	■	■
Normal operation	< 2 V or open input	■	■	■	■
Connection type	Plug, M12 5-pin	■	■	■	■
VDE protection class[7]	⧈	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13...140° F (-25...60° C)	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■
Approximate weight	4.2 oz (120 g)	■	■	■	■
Polarizing filter		■	■	■	■
Housing material	Die cast zinc	■	■	■	■

Operating range setting		Set via rotary switch on device or via ET cable (+V_S to ET)
Mode I : 50 ms[9]	**Mode II : 150 ms[9]**	**Mode III : 250 ms[9]**
Switches at signal attenuation > 10%	Switches at signal attenuation > 18%	Switches at signal attenuation > 40%
Clean PET bottles	Clear-glass bottles	Colored glass or non-transparent objects

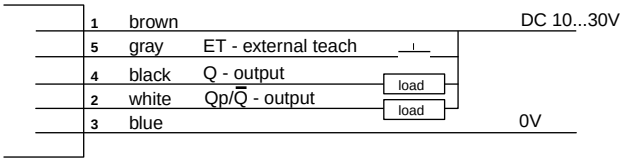
1) Average service life 100,000 h at T_A =25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression
9) Pulse duration via ET (control cable), duration set via rotary switch approx. 2 s

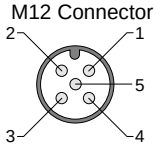
Connection diagram

PNP Models



NPN Models





wire colors refer to standard cable, not included with quick disconnect models
*Qp plausability output ON V/W models, Q output on P/N models

WSE12-3

Reflex/Retro-reflective Sensors

0...65.6 ft (0...20 m)
sensing range

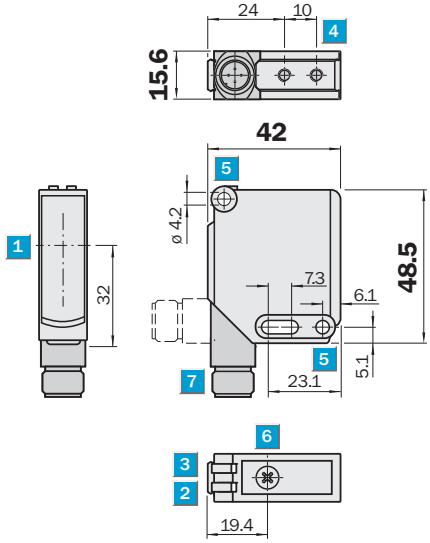
Highlights

- Robust metal housing with dovetail mounting clamps
- High device availability in industrial environments; in case of ambient light, optical reflections and devices mounted opposite one another
- Ranges between -40...60° C

WSE12-3

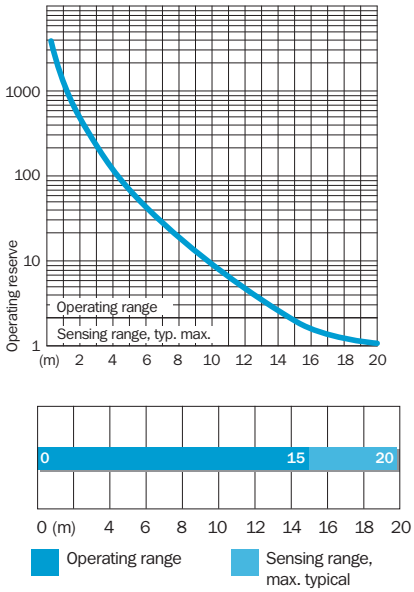


Dimensional drawing



dimensions in mm

Sensing distance and operating reserve



Adjustments



1 Optical axis
2 LED indicator yellow, status: light reception
3 LED indicator green, supply voltage active
4 Mounting thread M4 - 4 mm deep
5 Mounting hole, Ø 4.2 mm
6 Sensitivity adjustment, potentiometer
7 Connection

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

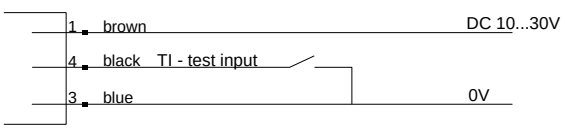
Type	Part no.
WSE12-3N1131	1 041 463
WSE12-3N2431	1 041 462
WSE12-3P1131	1 041 460
WSE12-3P2431	1 041 459

Technical data	WSE12-3-	N1131	N2431	P1131	P2431					
Sensing range, typ. max.	0…65.6 ft (0…20 m)	■	■	■	■					
Operating distance	0…49.2 ft (0…15 m)	■	■	■	■					
Sensitivity adjustment	Potentiometer	■	■	■	■					
Light source[1], **light type**	LED, red light, 640 nm	■	■	■	■					
Light spot diameter	29.5 in at 49.2 ft (750 mm at 15 m)	■	■	■	■					
Angle of dispersion	Approx. 1.5°	■	■	■	■					
Supply voltage V_S	10…30 V DC[2]	■	■	■	■					
Ripple[3]	≤ 5 V_{SS}	■	■	■	■					
Current consumption, sender[4]	≤ 30 mA	■	■	■	■					
Current consumption, receiver	≤ 25 mA	■	■							
	≤ 15 mA			■	■					
Switching outputs	NPN, Q/$\overline{Q}$	■	■							
	PNP, Q/$\overline{Q}$			■	■					
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V			■	■					
Signal voltage NPN HIGH/LOW	Approx. Vs/< 2.5 V	■	■							
Max. output current I_a	100 mA	■	■	■	■					
Response time[5]	≤ 330 µs	■	■	■	■					
Max. switching frequency[6]	1,500 Hz	■	■	■	■					
Test input sender off	TE to 0 V	■	■	■	■					
Connection type	Cable, PVC, 2 m[7]	■		■						
	Connector, M12 4-pin		■		■					
VDE protection class[8]	□	■	■	■	■					
Circuit protection[9]	A, B, C	■	■	■	■					
Enclosure rating	IP 66/IP 67/IP 69K	■	■	■	■					
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■	■					
	Storage -40…167° F (-40…75° C)	■	■	■	■					
Approximate weight	7.0 oz (200 g)	■		■						
	4.2 oz (120 g)		■		■					
Housing material	Die cast zinc[10]	■	■	■	■					

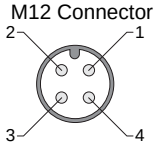
1) Average service life 100,000 h at T_A = 25° C
2) Limit values, reverse-polarity protected operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression
10) Teflon-coated housing available upon request

Connection diagram

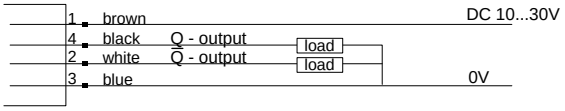
Sender, All Models



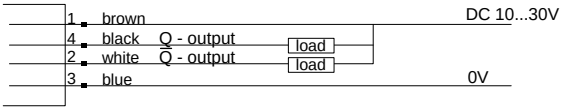
M12 Connector



Receiver, PNP Models



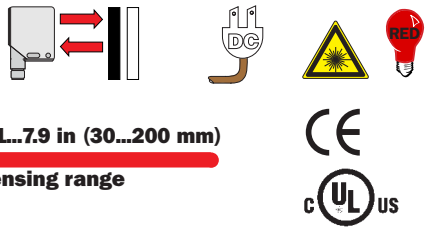
Receiver, NPN Models



wire colors refer to standard cable, not included with quick disconnect models

WT 12L-2

Proximity/Diffuse Sensors - Background suppression



1.1...7.9 in (30...200 mm)
sensing range

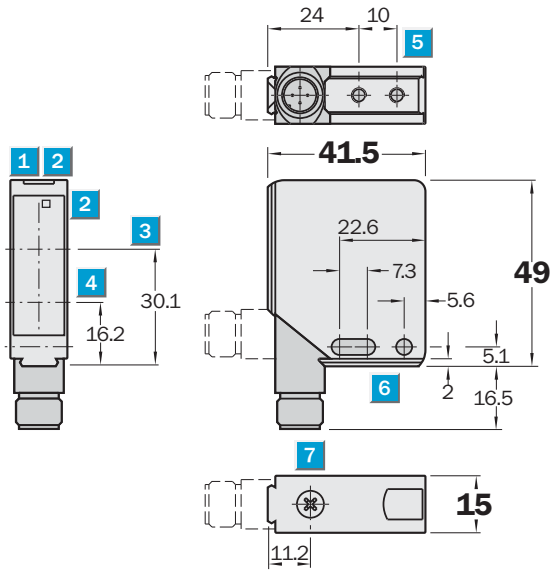
Highlights

- Class 2 laser light for ultra-small light spot
- M12 plug connections swivel 90° for easy installation
- Adjustable and fixed background suppression
- Rugged die cast metal housing
- PNP and NPN in the same switch

WT 12L-2

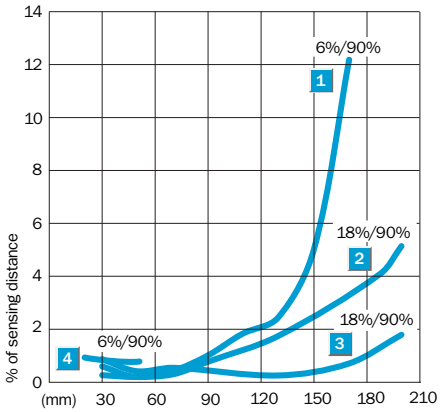


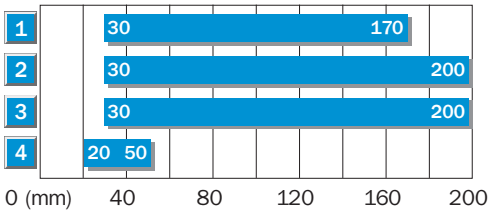
Dimensional drawing



dimensions in mm

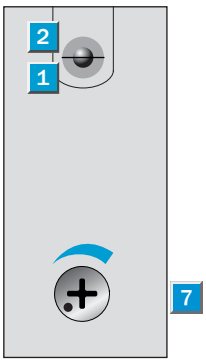
Background suppression





1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission
4	Sensing range on black, 6% remission, fixed

Adjustments
WT 12L-2B530A01
WT 12L-2B540A01
WT 12L-2B550A01



1	LED power indicator, green
2	LED output indicator, yellow
3	Optical axis, receiver
4	Optical axis, sender
5	M4 threaded mounting hole – 4 mm deep
6	Mounting hole Ø 4.2 mm
7	Sensing range adjustment
	* (not for fixed sensing ranges)

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

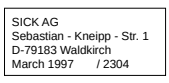
Type	Part no.
WT 12L-2B510A01	1 018 472
WT 12L-2B530A01	1 018 553
WT 12L-2B540A01	1 018 474
WT 12L-2B550A01	1 018 473

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Technical data	WT 12L-2-	B510 A01	B530 A01	B540 A01	B550 A01					
Sensing range, adjustable	1.1...7.9 in (30...200 mm), 18% remission		■	■	■					
	Focus 1.7 in (45 mm)		■							
	Focus 3.1 in (80 mm)			■						
	Focus 3.9 in (100 mm)				■					
Background suppression	1.1...7.9 in (30...200 mm)		■	■	■					
Sensing range, fixed, 6% remission	0.8...2.0 in, focus 1.8 in (20...50 mm, 45 mm)	■								
Light source[1]	Laser, 650 nm, pulsed	■	■	■	■					
Light spot diameter at focal point	0.004 in (0.1 mm)	■	■							
	0.008 in (0.2 mm)			■	■					
Supply voltage V_S	10...30 V DC[2]	■	■	■	■					
Ripple[3]	≤ 5 V_{SS}	■	■	■	■					
Current consumption[4]	≤ 55 mA	■	■	■	■					
Switching output Q_N and Q_P	PNP, NPN	■	■	■	■					
Signal voltage HIGH	V_S – < 2 V, V_S	■	■	■	■					
Signal voltage LOW[5]	0 V, ≤ 1.5 V	■	■	■	■					
Output current I_A max.	100 mA	■	■	■	■					
Operating mode	Light/dark switching[6] via control wire	■	■	■	■					
Control input L/D	0 V or open, light switching	■	■	■	■					
Control input L/D	V_S, dark switching	■	■	■	■					
Response time max. [7]	≤ 200 µs	■	■	■	■					
Max. switching frequency[8]	2.5 kHz	■	■	■	■					
Laser class	2 (IEC 825-1; EN 60825-1:97)	■	■	■	■					
VDE protection class[9]	□	■	■	■	■					
Enclosure rating	IP 67/NEMA 6	■	■	■	■					
Circuit protection[10]	A, B, C	■	■	■	■					
Ambient temperature T_A	Operation 14...122° F (-10 ...50° C)	■	■	■	■					
	Storage -13...167° F (-25...75° C)	■	■	■	■					
Connection type	Plug, M12 5-pin	■	■	■	■					
Approximate weight	4.6 oz (130 g)	■	■	■	■					
Housing material	Die cast zinc	■	■	■	■					

1) Average service life 50,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) At T_A = 25° C and 100 mA output current
6) Reversible via control input L/D
7) Signal transit time with resistive load
8) At light/dark ratio 1:1
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Outputs protected against short-circuiting
C = Interference pulse suppression



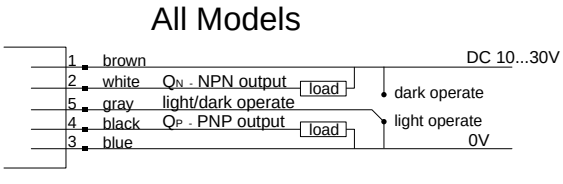




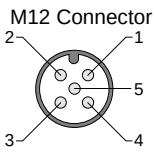
Beam Attenuator

The WT 12L -2 sensor is equipped with an M12 style quick disconnect. The cable can quickly and easily be removed in the event that personnel require access to the area where the sensor is mounted.

Connection diagram



wire colors refer to standard cable, not included



WL 12L-2

Reflex/Retro-Reflective Sensors



0...59.0 ft (0...18 m)
sensing range

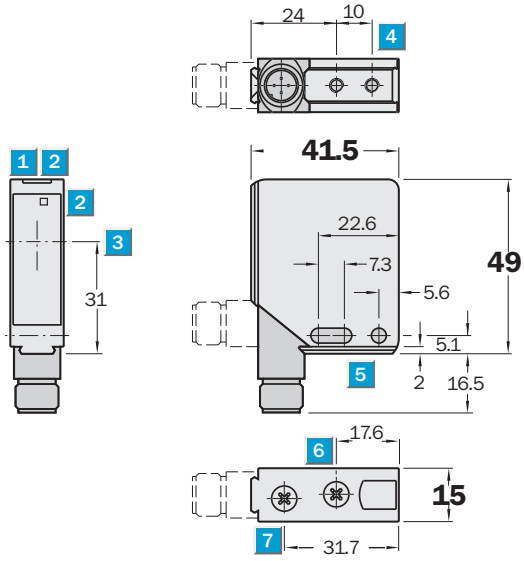
Highlights

- Rugged die cast metal housing
- Class 2 laser
- Light spot can be focused for maximum excess gain
- Cable connections swivel 90° for easy installation
- Polarizing filters prevent false readings on shiny objects

WL 12L-2

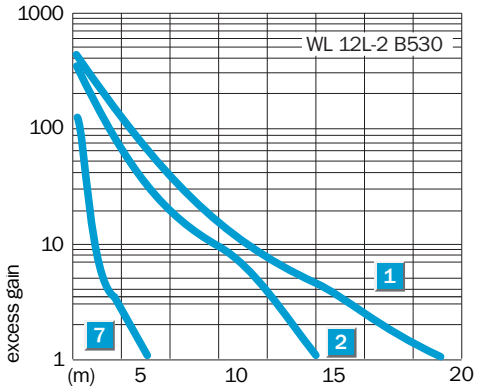


Dimensional drawing



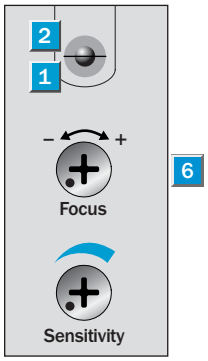
dimensions in mm

Excess gain



Adjustments

WL 12L-2B530A01



1	LED operating indicator, green
2	LED output indicator, yellow
3	Center of optical axis
4	M4 threaded mounting hole – 4 mm deep
5	Mounting hole Ø 4.2 mm
6	Focal adjustment
7	Sensitivity adjustment

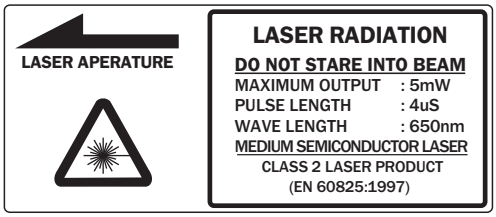
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Reflector type		Sensing range
1	PL 80 A	0...18.0 m
2	PL 50 A	0...12.0 m
3	PL 40 A	0...12.0 m
4	P 250	0...12.0 m
5	PL 30 A	0...10.0 m
6	PL 20 A	0...7.5 m
7	Reflective tape diamond grade	0...2.0 m

Order information	
Type	**Part no.**
WL 12L-2B530A01	1 018 479

Technical data	WL 12L-2-	B530 A01
Sensing range	0…59 ft (0…18 m)/PL 80 A	
Light source[1]	Laser, red light, 650 nm, pulsed, polarized	
Light spot diameter	min. 0.03 in (0.8 mm)	
in focal range	11.8 in (300 mm) to ∞	
Supply voltage V_S	10...30 V DC[2]	
Ripple[3]	≤ 5 V_{SS}	
Current consumption[4]	≤ 55 mA	
Switching output Q_N and Q_P	PNP, NPN	
Signal voltage HIGH	V_S – < 2.9 V, V_S	
Signal voltage LOW[5]	0 V, ≤ 1.5 V	
Output current I_A max.	100 mA	
Operating mode	Light or dark switching[6]	
Control input L/D	0 V or open, light switching	
Control input L/D	V_S, dark switching	
Response time max.[7]	Typ. 200 µs	
Max. switching frequency[8]	2.5 kHz	
Laser class	2 (IEC 825-1; EN 60825-1:97)	
VDE protection class[9]	□	
Enclosure rating	IP 67/NEMA 6	
Circuit protection[10]	A, B, C	
Ambient temperature T_A	Operation -14…122° F (-10…50° C)	
	Storage -13…167° F (-25…75° C)	
Connection type	Plug, M12 5-pin	
Approximate weight	4.6 oz (130 g)	
Housing material	Die cast zinc	

1) Average service life 50,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) At T_A = 25° C and 100 mA output current
6) Reversible via control input L/D
7) Signal transit time with resistive load
8) At light/dark ratio 1:1
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Outputs protected against short-circuiting
C = Interference pulse suppression



Emission Indicator

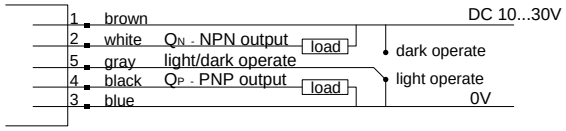
In order to meet the safety requirements for Class II laser products, a visible emission indicator must be located within 2 meters (6.7 ft) of the sensor. We suggest using a switching amplifier with a power-ON indicator (the EN2 or EN3, for example) or a connector cable with a power-ON LED located on the connector.

Beam Attenuator

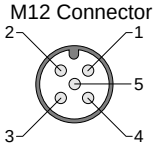
The WL 12L sensor is equipped with an M12 style quick disconnect. The cable can quickly and easily be removed in the event that personnel require access to the area where the sensor is mounted.

Connection diagram

All Models



wire colors refer to standard cable, not included



WS/WE 12L-2

Through-beam Sensors



0...262.5 ft (0...80 m)
sensing range

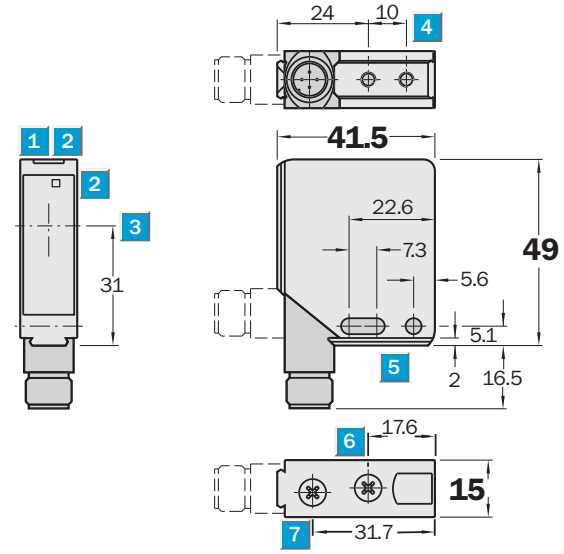
Highlights

- Rugged die cast metal housing
- Long range Class 2 laser for ultra long range
- Adjustable focus and sensitivity
- 90° rotatable M12 plug
- Test input
- Signal strength indicator
- Red light for easy alignment

WS/WE 12L-2



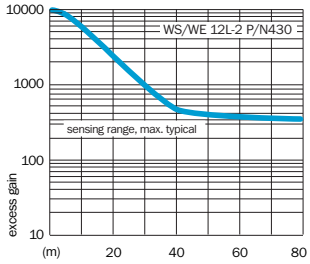
Dimensional drawing

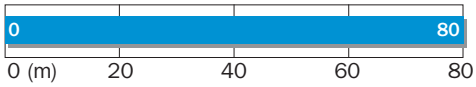


dimensions in mm

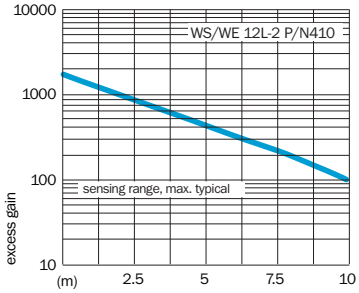
Excess gain

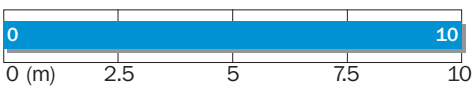
430 Models





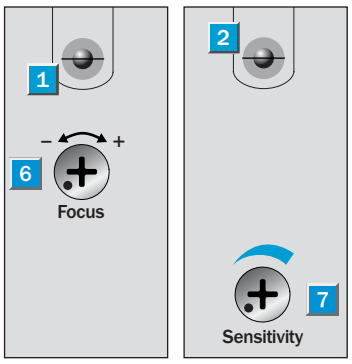
410 Models





Adjustments

All types



1 LED operating indicator (WS above only)
2 LED output indicator (WE)
3 Center of optical axis
4 M4 threaded mounting hole – 4 mm deep
5 Mounting drill hole Ø 4.2 mm
6 Focal adjustment (WS)
7 Sensitivity adjustment (WE)

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

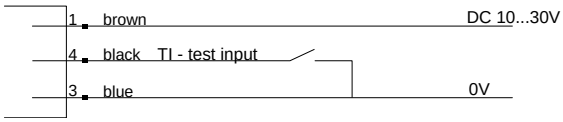
Type	Part no.
WS/WE 12L-2P430A01	1 018 476
WS/WE 12L-2N430A01	1 018 478
WS/WE 12L-2P410A03	1 023 059
WS/WE 12L-2N410A04	1 023 060

Technical data	WS/WE 12L-2-	P430 A01	N430 A01	P410 A03	N410 A04					
Sensing range	0...262.5 ft (0...80 m)	■	■							
	0...32.8 ft (0...10 m)			■	■					
Focus adjustable	11.8 in ...∞ (300 mm...∞)	■	■							
	Fixed parallel light beam			■	■					
Light source[1]	Laser, 650 nm, pulsed	■	■							
Light spot diameter	5.9 in at 197 ft (150 mm at 60 m)	■	■							
	0.04 in at 3.3 ft (1.0 mm at 1 m)			■	■					
Supply voltage V_S	10...30 V DC[2]	■	■	■	■					
Ripple[3]	≤ 5 V_{SS}	■	■	■	■					
Current consumption[4]	WS ≤ 45 mA, WE ≤ 15 mA	■	■	■	■					
Switching outputs Q and $\overline{Q}$	PNP	■		■						
	NPN		■		■					
Signal voltage HIGH	V_S – < 2.9 V, V_S	■	■	■	■					
Signal voltage LOW[5]	Approx. 0 V, ≤ 1.5 V	■	■	■	■					
Output current I_A max.	100 mA	■	■	■	■					
Response time max.[6]	Typ. 200 µs	■	■	■	■					
Max. switching frequency[7]	2.5 kHz	■	■	■	■					
Input "TE" system test	V_S or open: sender active	■	■	■	■					
	0 V: sender inactive	■	■	■	■					
VDE protection class[8]	□	■	■	■	■					
Laser class	2 (IEC 825-1; EN 60825-1:97)	■	■	■	■					
Enclosure rating	IP 67/NEMA 6	■	■	■	■					
Circuit protection[9]	A, B, C	■	■	■	■					
Ambient temperature T_A	Operation 14...104° F (-10...50° C)	■	■	■	■					
	Storage -13...167° F (-25...75° C)	■	■	■	■					
Connection type	Plug, M12 4-pin	■	■	■	■					
Approximate weight (WS + WE)	9.2 oz (260 g)	■	■	■	■					
Housing material	Die cast zinc	■	■	■	■					

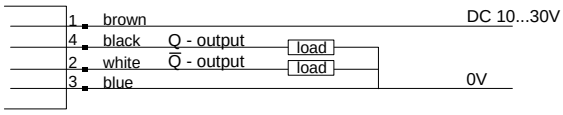
1) Average service life 50,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) At T_A = 25° C and 100 mA output current
6) Signal transit time with resistive load
7) At light/dark ratio 1:1
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Outputs protected against short-circuiting
C = Interference pulse suppression

Connection diagram

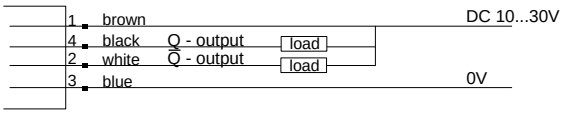
Sender, All Models



PNP Models



NPN Models



wire colors refer to standard cable, not included with quick disconnect models

WT 14-2

Proximity/Diffuse Sensors - Background Blanking



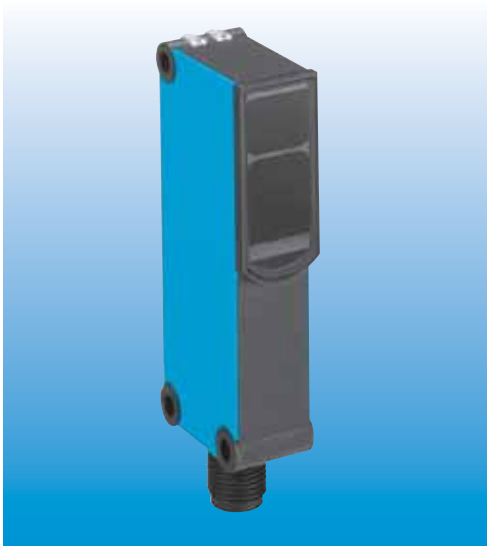



3.1...19.7 (80...500 mm)
sensing distance

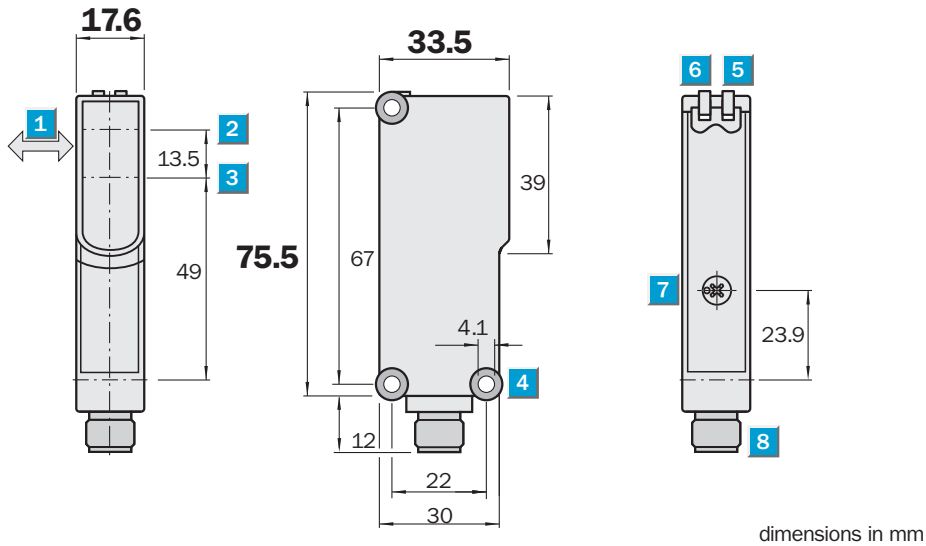
Highlights

- Infrared light
- Background blanking, adjustable
- Sturdy plastic housing

WT 14-2

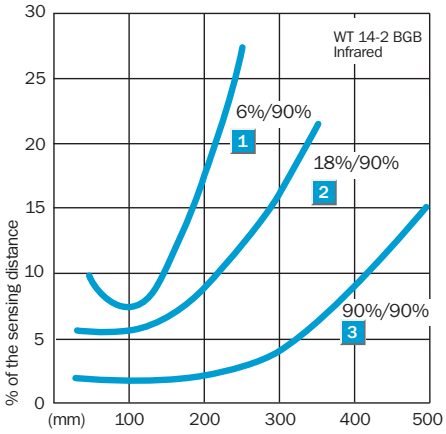


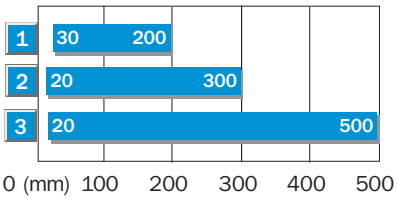
Dimensional drawing



dimensions in mm

Sensing distance





1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Standard direction of the material being sensed
2	Optical axis, sender
3	Optical axis, receiver
4	Mounting hole Ø 4.1 mm
5	LED, yellow: signal strength indicator
6	LED, green: power on
7	Sensing range adjustment
8	M12 Plug, 4-pin or 2 m cable

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WT14-2P122	1 026 051
WT14-2P422	1 026 052
WT14-2N122	1 026 053
WT14-2N422	1 026 054

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Technical data	WT 14-2	P122	P422	N122	N422
Sensing range, typ. max. adjust.[1]	3.2…19.7 in (80…500 mm), 90% remission	■	■	■	■
Adjustment	Potentiometer, 4-turn	■	■	■	■
Light source[2]**, light type**	LED, infrared light	■	■	■	■
Light spot diameter	0.5 in at 11.8 in (14 mm at 300 mm)	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■
Residual ripple[4]	< 5 V_{PP}	■	■	■	■
Current consumption[5]	< 30 mA	■	■	■	■
Output current I_A max.	< 100 mA	■	■	■	■
Switching outputs	PNP, complementary	■	■		
	NPN, complementary			■	■
Response time[6]	< 2.5 ms	■	■	■	■
Max. switching frequency[7]	200/s	■	■	■	■
Connection type	Cable[8] PVC, 2 m, 4-wire	■		■	
	M12 plug, 4-pin		■		■
VDE protection class cable[9]	□	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 65	■	■	■	■
Ambient temperature	Operation -13…140° F (-25…60° C)	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■
Weight	With cable, approx 0.24 lb. (120 g)	■		■	
	With plug, approx. 0.1 lb. (40 g)		■		■
Housing material	ABS	■	■	■	■

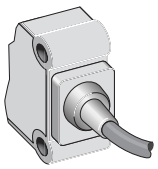
1) Object with 90% remission (according to standard white DIN 5033)
2) Average service life 100,000 h at T_A=77° F (25° C)
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 32° F (0° C)
9) Reference voltage 50 V DC
10) A = V_S connection reverse-polarity protected
B = Outputs Q and $\overline{Q}$ short circuit protected
C = Interference pulse suppression
D = Operation in short-circuit protected network max. 8 A

Adjustment via potentiometer

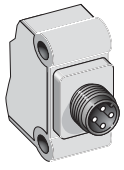
1) Position the object in the path of the beam.
2) By rotating the potentiometer to the right until the yellow LED illuminates continuously = object is positively detected.
3) If necessary, fine adjustments to the sensing distance can be made to suit the conditions of the application:
minimal rotation of the potentiometer to the right = sensing distance will be increased,
minimal rotation of the potentiometer to the left = sensing distance will be decreased.

Connection diagram

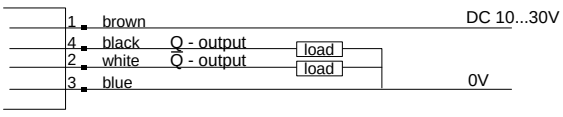
WT14-2P122
WT14-2N122



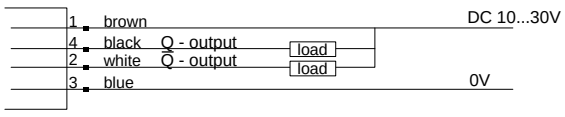
WT14-2P422
WT14-2N422

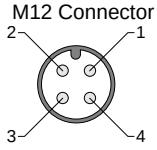


PNP Models



NPN Models

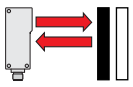




wire colors refer to standard cable, not included with quick disconnect models

WT 14-2

Proximity/Diffuse Sensors - Background Blanking






1.9...9.8 (50...250 mm)
sensing distance

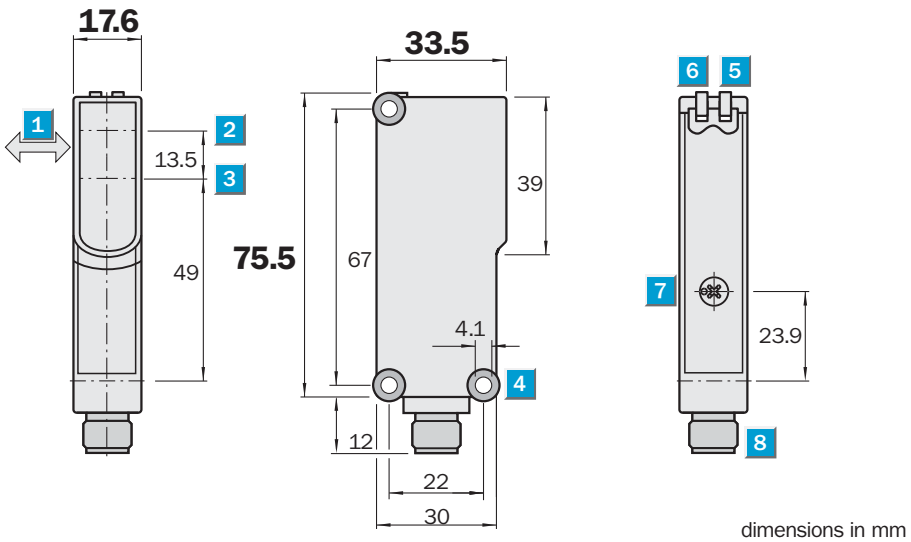
Highlights

- Red light
- Background blanking, adjustable
- Sturdy plastic housing

WT 14-2

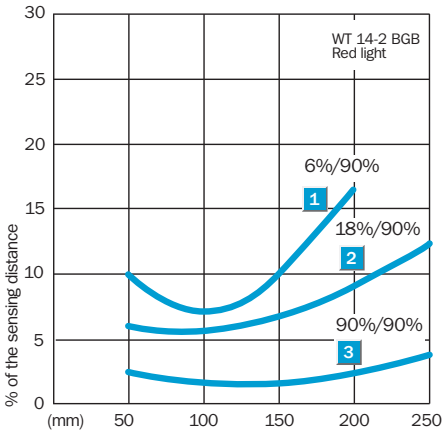


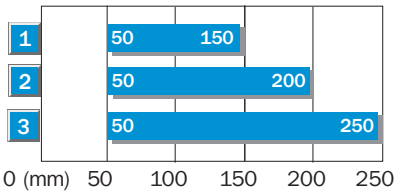
Dimensional drawing



dimensions in mm

Sensing distance





1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Standard direction of the material being sensed
2	Optical axis, sender
3	Optical axis, receiver
4	Mounting hole Ø 4.1 mm
5	LED, yellow: signal strength indicator
6	LED, green: power on
7	Sensing range adjustment
8	M12 Plug, 4-pin or 2 m cable

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WT14-2P132	1 026 055
WT14-2P432	1 026 056
WT14-2N132	1 026 072
WT14-2N432	1 026 057

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Technical data	WT 14-2	P132	P432	N132	N432
Sensing distance, typ. max. adjust.[1]	1.9…9.8 in (50…250 mm), 90% remission	■	■	■	■
Adjustment	Potentiometer, 4-turn	■	■	■	■
Light source[2]**, light type**	LED, red light	■	■	■	■
Light spot diameter	0.4 in at 9.8 in (10 mm at 250 mm)	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■
Residual ripple[4]	< 5 V_{PP}	■	■	■	■
Current consumption[5]	< 25 mA	■	■	■	■
Output current I_A max.	< 100 mA	■	■	■	■
Switching outputs	PNP, complementary	■	■		
	NPN, complementary			■	■
Response time[6]	< 2.5 ms	■	■	■	■
Max. switching frequency[7]	200/s	■	■	■	■
Connection type	Cable[8] PVC, 2 m, 4-wire	■		■	
	M12 plug, 4-pin		■		■
VDE protection class cable[9]	□	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 65	■	■	■	■
Ambient temperature	Operation -13…140° F (-25…60° C)	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■
Weight	With cable, approx 0.24 lb. (120 g)	■		■	
	With plug, approx. 0.1 lb. (40 g)		■		■
Housing material	ABS	■	■	■	■

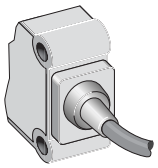
1) Object with 90% remission (according to standard white DIN 5033)
2) Average service life 100,000 h at T_A=77° F (25° C)
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 32° F (0° C)
9) Reference voltage 50 V DC
10) A = V_S connection reverse-polarity protected
B = Outputs Q and $\overline{Q}$ short circuit protected
C = Interference pulse suppression
D = Operation in short-circuit protected network max. 8 A

Adjustment via potentiometer

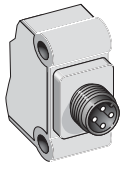
1) Position the object in the path of the beam.
2) By rotating the potentiometer to the right until the yellow LED illuminates continuously = object is positively detected.
3) If necessary, fine adjustments to the sensing distance can be made to suit the conditions of the application:
minimal rotation of the potentiometer to the right = sensing distance will be increased,
minimal rotation of the potentiometer to the left = sensing distance will be decreased.

Connection diagram

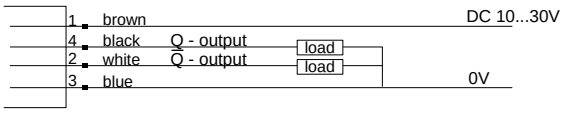
WT14-2P132
WT14-2N132



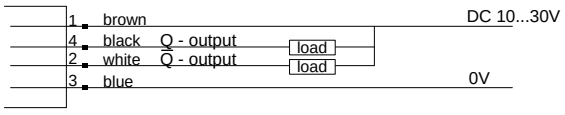
WT14-2P432
WT14-2N432



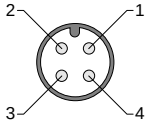
PNP Models



NPN Models



M12 Connector



wire colors refer to standard cable, not included with quick disconnect models

WT 14-2

Proximity/Diffuse Sensors - Energetic

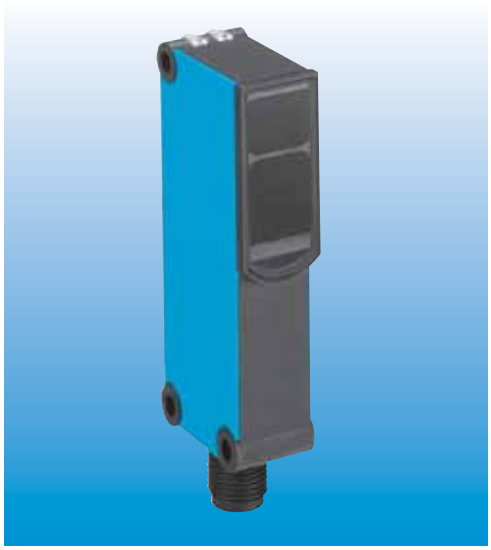


11.8…59.1 (300…1500 mm)
sensing distance

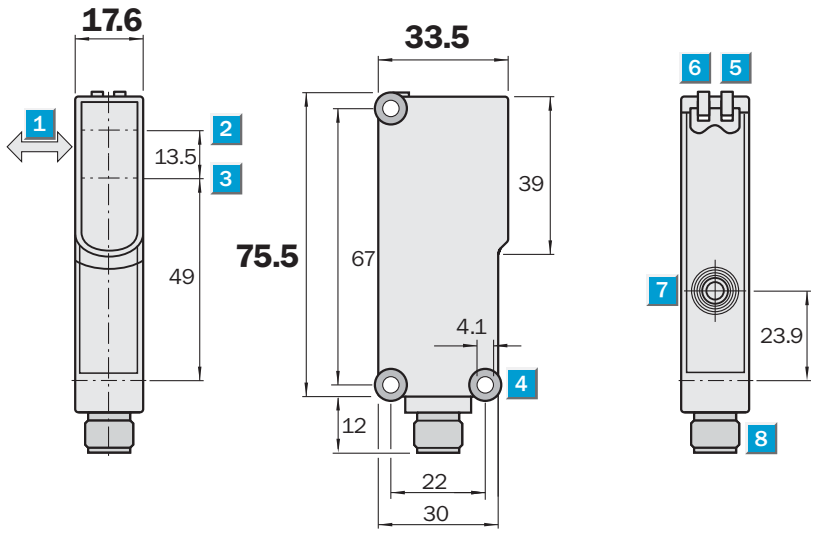
Highlights

- Infrared light
- Energetic proximity switch
- Teach-in function
- Sturdy plastic housing

WT 14-2

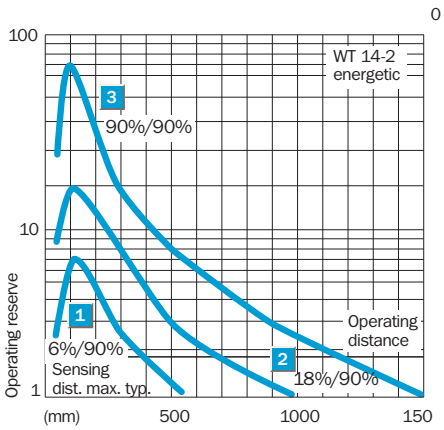


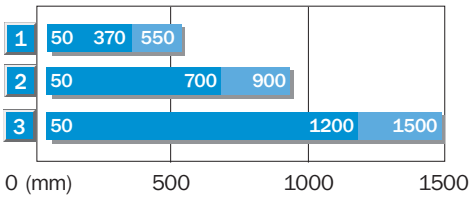
Dimensional drawing



dimensions in mm

Sensing distance

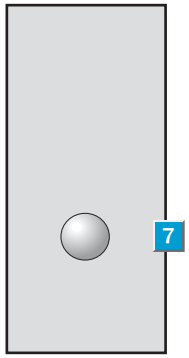




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Standard direction of the material being sensed
2	Optical axis, sender
3	Optical axis, receiver
4	Mounting hole Ø 4.1 mm
5	LED, yellow: signal strength indicator
6	LED, green: power on
7	Teach-in button
8	M12 Plug, 4-pin or 2 m cable

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WT14-2P111	1 026 058
WT14-2P411	1 026 059
WT14-2N111	1 026 060
WT14-2N411	1 026 062

Technical data	WT 14-2	P111	P411	N111	N411
Sensing distance, adjustable[1]	11.8…59.1 in (300…1500 mm), 90% remission	■	■	■	■
Adjustment	Teach-in button	■	■	■	■
Light source[2]**, light type**	LED, infrared light	■	■	■	■
Light spot diameter	2.2 in at 39.4 in (56 mm at 1000 mm)	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■
Residual ripple[4]	< 5 V_{PP}	■	■	■	■
Current consumption[5]	≤ 55 mA	■	■	■	■
Output current I_A max.	< 100 mA	■	■	■	■
Switching outputs	PNP, complementary	■	■		
	NPN, complementary			■	■
Response time[6]	≤ 2.5 ms	■	■	■	■
Max. switching frequency[7]	200/s	■	■	■	■
Connection type	Cable[8] PVC, 2 m, 4-wire	■		■	
	M12 plug, 4-pin		■		■
VDE protection class cable[9]	□	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 65	■	■	■	■
Ambient temperature	Operation -13…140° F (-25…60° C)	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■
Weight	With cable, approx 0.24 lb. (120 g)	■		■	
	With plug, approx. 0.1 lb. (40 g)		■		■
Housing material	ABS	■	■	■	■

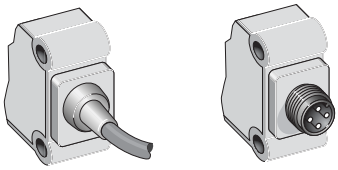
1) Object with 90% remission (according to standard white DIN 5033)
2) Average service life 100,000 h at T_A=77° F (25° C)
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 32° F (0° C)
9) Reference voltage 50 V DC
10) A = V_S connection reverse-polarity protected
B = Outputs Q and $\overline{Q}$ short circuit protected
C = Interference pulse suppression
D = Operation in short-circuit protected network max. 8 A

Teach-in function

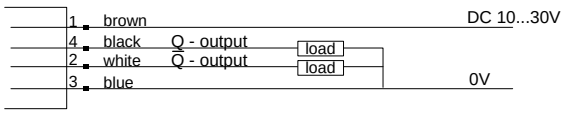
- **Programming via teach-in button.**
- **Simple programming:**
  Position object in light beam, press button, finished;
  LED confirms the successful Teach-in procedure.
- **Teach-in value is stored.**
- **Two operating modes:**
  Default setting: Short teach-in time (< 6 s), for standard applications;
  Approx. double reserve via switching threshold; LED lights.
  Precise setting: Long teach-in time (> 8 s); For precise applications; Slight reserve via switching threshold; LED blinks when operating reserve > 2.

Connection diagram

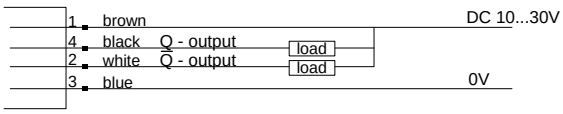
WT14-2P111 WT14-2P411
WT14-2N111 WT14-2N411



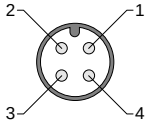
PNP Models



NPN Models



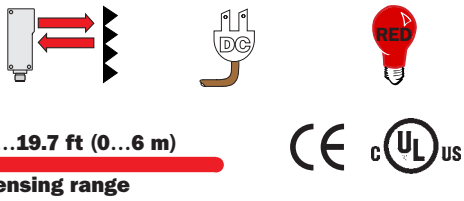
M12 Connector



wire colors refer to standard cable, not included with quick disconnect models

WL 14-2

Reflex/Retro-Reflective Sensors

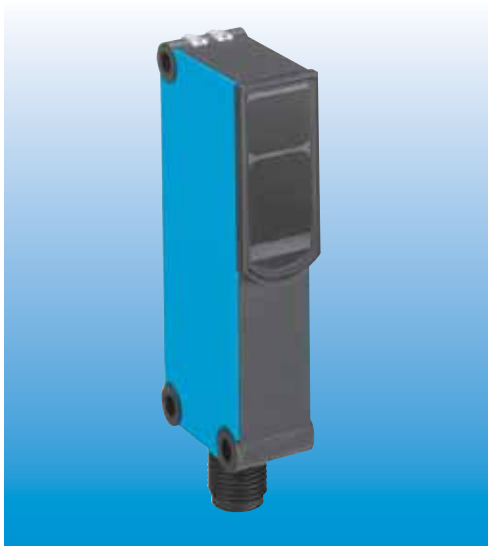


0...19.7 ft (0...6 m)
sensing range

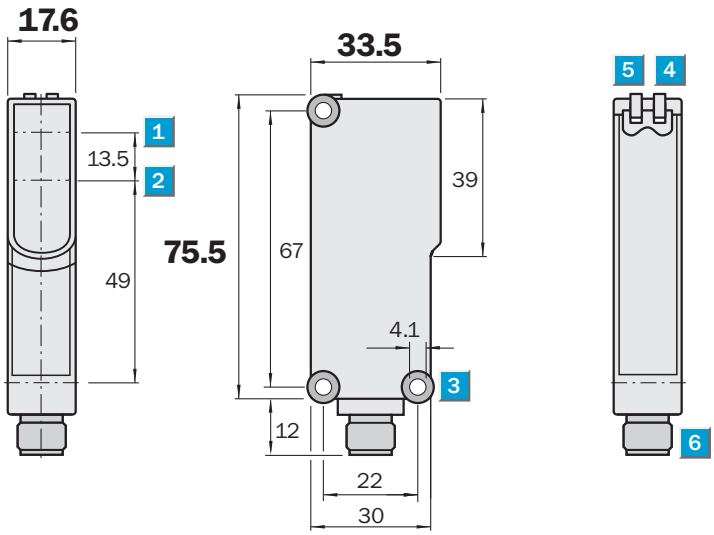
Highlights

- Red light
- Polarization filter for reliable detection of shiny or irregular objects
- Sturdy plastic housing

WT 14-2



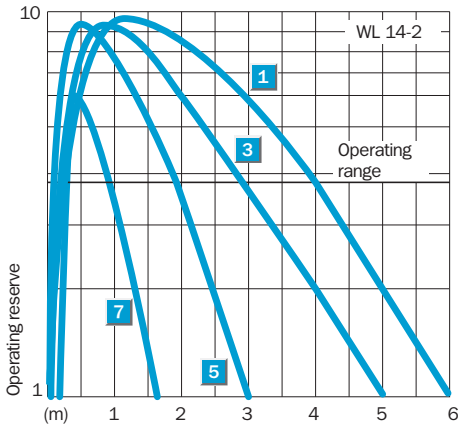
Dimensional drawing

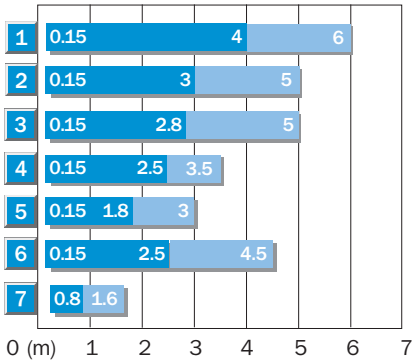


dimensions in mm

1 Optical axis, sender
2 Optical axis, receiver
3 Mounting hole Ø 4.1 mm
4 LED, yellow: signal strength indicator
5 LED, green: power on
6 M12 Plug, 4-pin or 2 m cable

Sensing distance





	Reflector type	Operating range
1	PL 80 A	0.15...4 m
2	PL 50 A	0.15...3 m
3	PL 40 A	0.15...2.8 m
4	PL 30 A	0.15...2.5 m
5	PL 20 A	0.15...1.8 m
6	P 975	0.15...2.5 m
7	Reflective tape Diamond Grade	0.3...0.8 m

Order information

Type	Part no.
WL14-2P130	1 026 050
WL14-2P430	1 026 049
WL14-2N130	1 026 047
WT14-2N430	1 026 048

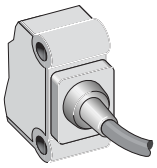
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

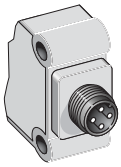
Technical data	WL 14-2	P130	P430	N130	N430
Sensing range, typ max/on reflector	19.7 ft (6 m)/PL 80 A	■	■	■	■
Light source[1], light type	LED, red light	■	■	■	■
Opening angle	2°	■	■	■	■
Light spot diameter	5.5 in at 13.1 ft (140 mm at 4 m)	■	■	■	■
Polarizing filter	Yes	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■
Residual ripple[3]	≤ 5 V_{PP}	■	■	■	■
Current consumption[4]	≤ 35 mA	■	■	■	■
Output current I_A max.	< 100 mA	■	■	■	■
Switching outputs	PNP, complementary	■	■		
	NPN, complementary			■	■
Response time[5]	≤ 2.5 ms	■	■	■	■
Max. switching frequency[6]	200/s	■	■	■	■
Connection type	Cable[7] PVC, 2 m, 4-wire	■		■	
	M12 plug, 4-pin		■		■
VDE protection class cable[8]	□	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■
Enclosure rating	IP 65	■	■	■	■
Ambient temperature	Operation -13…140° F (-25…60° C)	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■
Weight	With cable, approx 0.24 lb. (120 g)	■		■	
	With plug, approx. 0.1 lb. (40 g)		■		■
Housing material	ABS	■	■	■	■

1) Average service life 100,000 h at T_A=77° F (25° C)
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 32° F (0° C)
8) Reference voltage 50 V DC
9) A = V_S connection reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression
D = Operation in short-circuit protected network max. 8 A

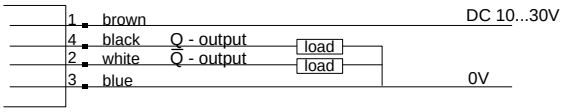
Connection diagram

WL14-2P130 | WL14-2P430
WL14-2N130 | WL14-2N430

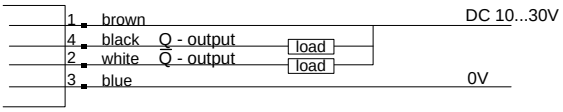




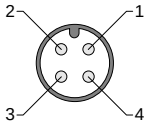
PNP Models



NPN Models



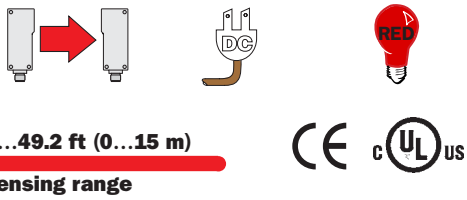
M12 Connector



wire colors refer to standard cable, not included with quick disconnect models

WS/WE 14-2

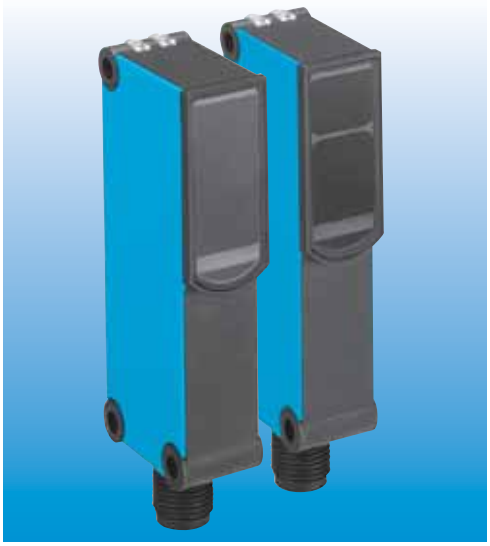
Through-beam Sensors



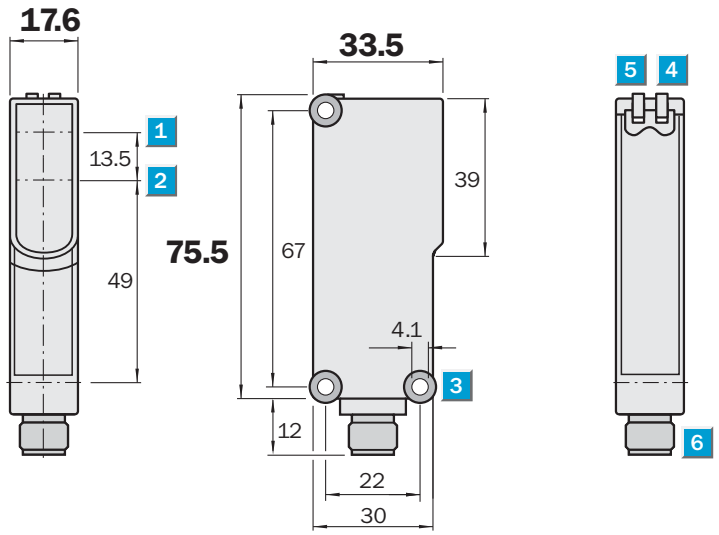
Highlights

- Red light
- Test input for system diagnostics
- Sturdy plastic housing

WS/WE 14-2



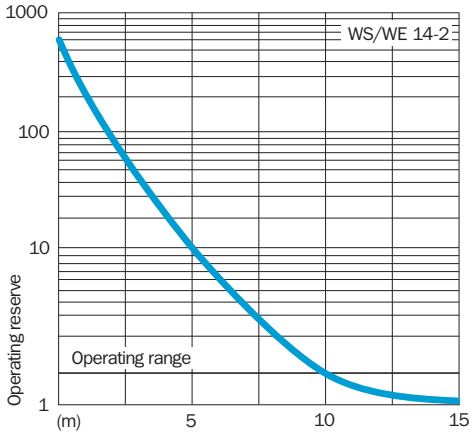
Dimensional drawing

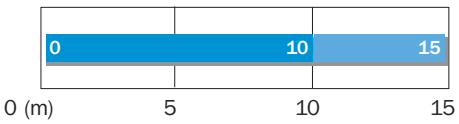


dimensions in mm

1 Optical axis, sender (only WS)
2 Optical axis, receiver (only WE)
3 Mounting hole Ø 4.1 mm
4 LED, yellow: signal strength indicator
5 LED, green: power on
6 M12 Plug, 4-pin or 2 m cable

Sensing distance





Order information	
Type	**Part no.**
WS/WE14-2P130	1 026 430
WS/WE14-2P430	1 026 431
WS/WE14-2N130	1 026 432
WS/WE14-2N430	1 026 433

Accessories	page
Cables and connectors	1180
Mounting systems	1234

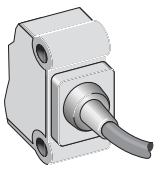
7028071 - © 2008 SICK, Inc.

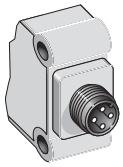
Technical data	WS/WE 14-2	P130	P430	N130	N430
Sensing range, typ. max.	0…48.2 ft (0…15 m)	■	■	■	■
Light source[1], light type	LED, red light	■	■	■	■
Light spot diameter	11.8 in at 32.8 ft (300 mm at 10 m)	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■
Residual ripple[3]	≤ 5 V_{PP}	■	■	■	■
Current consumption[4]	≤ 60 mA	■	■	■	■
Sender	≤ 35 mA	■	■	■	■
Receiver	≤ 25 mA	■	■	■	■
Output current V_S	< 100 mA	■	■	■	■
Switching outputs	PNP, complementary	■	■		
	NPN, complementary			■	■
Response time[5]	≤ 2.5 ms	■	■	■	■
Max. switching frequency[6]	200/s	■	■	■	■
Test »TE« sender off	TE to 0 V	■	■	■	■
Connection type	Cable[7] PVC, 2 m, 3-/4-wire	■		■	
	M12 plug, 4-pin		■		■
VDE protection class cable[8]	□	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■
Enclosure rating	IP 65	■	■	■	■
Ambient temperature	Operation -13…140° F (-25…60° C)	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■
Weight	With cable, approx 0.24 lb. (120 g), each piece		■		■
	With plug, approx. 0.1 lb. (40 g), each piece	■		■	
Housing material	ABS	■	■	■	■

1) Average service life 100,000 h at T_A=77° F (25° C)
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 32° F (0° C)
8) Reference voltage 50 V DC
9) A = V_S connection reverse-polarity protected
B = Outputs Q and $\overline{Q}$ short circuit protected
C = Interference pulse suppression
D = Operation in short-circuit protected network max. 8 A

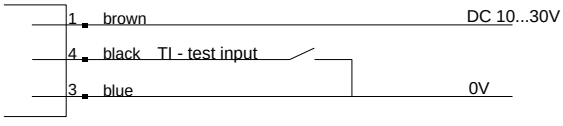
Connection diagram

WS/WE 14-2 P130 | WS/WE 14-2 P430
WS/WE 14-2 N130 | WS/WE 14-2 N430

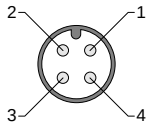




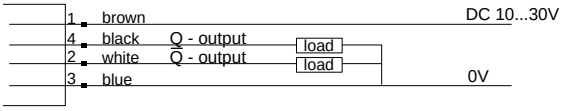
Sender, All Models



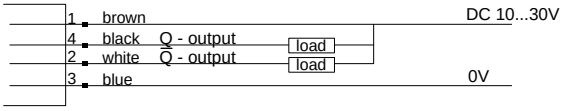
M12 Connector



Receiver, PNP Models



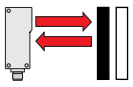
Receiver, NPN Models



wire colors refer to standard cable, not included with quick disconnect models

WT 18-3

Proximity/Diffuse Sensors-Background Suppression



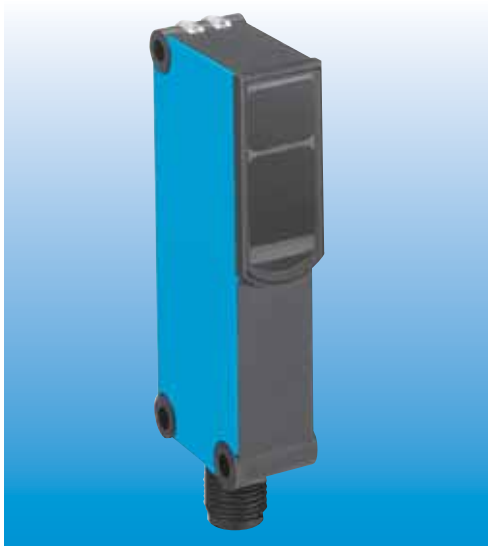



1.9…23.6 in (50…600 mm)
sensing distance

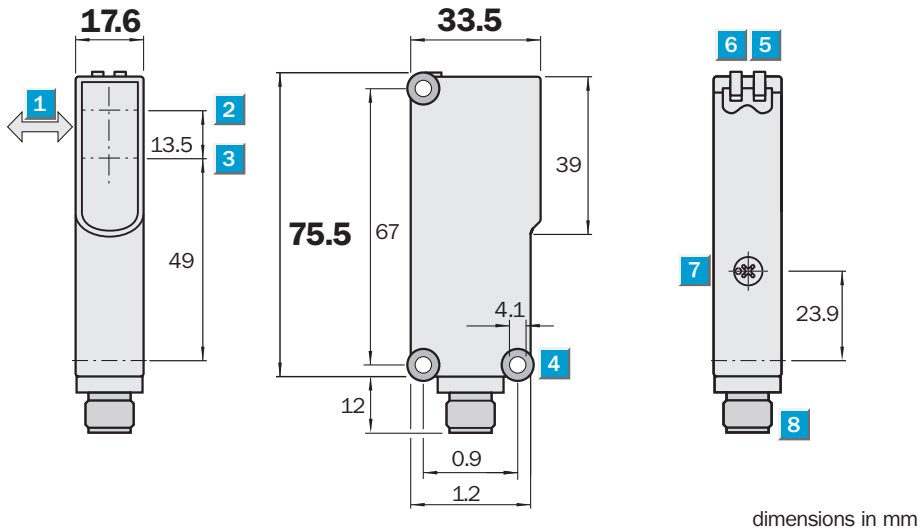
Highlights

- Precise background suppression; suitable for demanding applications
- Sensing range adjustable via potentiometer
- Insensitive to external light sources (HF lamps)
- Crosstalk immunity
- Operating temperature range -40…140° F (-40…60° C)

WT 18-3

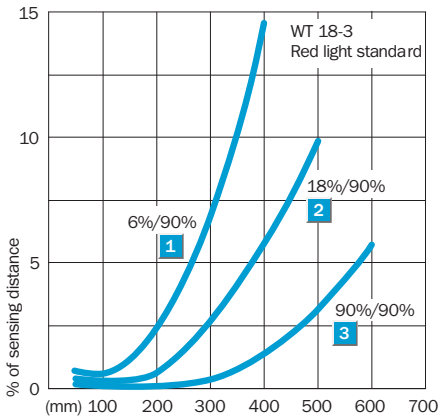


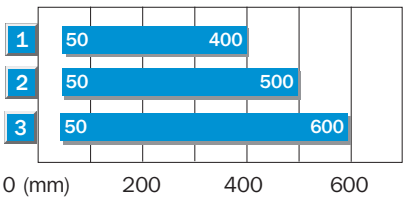
Dimensional drawing



dimensions in mm

Sensing distance





1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Standard direction of the material being sensed
2	Optical axis, sender
3	Optical axis, receiver
4	Mounting hole Ø 4.1 mm
5	LED, yellow; signal strength indicator
6	LED, green; power on indicator
7	Sensing range adjustment
8	M12 Plug, 4-pin or 2 m cable

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WT18-3P130	1 025 895
WT18-3P430	1 025 896
WT18-3N130	1 025 897
WT18-3N430	1 025 898

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Technical data	WT 18-3	P130	P430	N130	N430
Sensing distance, adjustable[1]	1.9…23.6 in (50…600 mm), 90% remission	■	■	■	■
Visible range [1]	0.4…23.6 in (10…600 mm)	■	■	■	■
Adjustment	Potentiometer, 4-turn	■	■	■	■
Light source[2], **light type**	LED, visible red light	■	■	■	■
Light spot diameter	0.6 in at 11.8 in (15 mm at 300 mm)	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■
Residual ripple[4]	< 5 V_{PP}	■	■	■	■
Current consumption[5]	< 40 mA	■	■	■	■
Output current I_A max.	< 100 mA	■	■	■	■
Switching outputs	PNP, complementary	■	■		
	NPN, complementary			■	■
Response time[6]	< 700 µs	■	■	■	■
Switching frequency max.[7]	700/s	■	■	■	■
Connection types	Cable [8], 2 m, 4-wire	■		■	
	M12 plug, 4-pin		■		■
VDE protection class cable[9]	□	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature	Operation -40…140° F (-40…60° C)	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■
Weight	With cable, 2 m, approx. 0.3 lb. (120 g)	■		■	
	With M12 plug, approx. 0.1 lb. (40 g)		■		■
Housing material	ABS	■	■	■	■

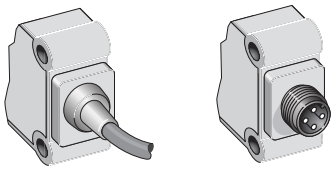
1) Object with 90% remission (according to standard white DIN 5033)
2) Average service life 100,000 h at T_A=77° F (25° C)
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 32° F (0° C)
9) Reference voltage 50 V DC
10) A = V_S connection reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression
D = Operation in short-circuit protected network max. 8 A

Adjustment via potentiometer

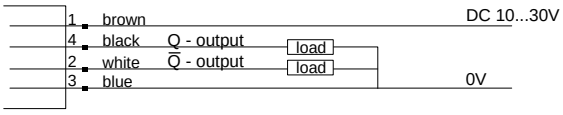
1) Position the object in the path of the beam.
2) By rotating the potentiometer to the right until the yellow LED illuminates continuously = object is positively detected.
3) If necessary, fine adjustments to the sensing distance can be made to suit the conditions of the application:
minimal rotation of the potentiometer to the right = sensing distance will be increased,
minimal rotation of the potentiometer to the left = sensing distance will be decreased.

Connection diagram

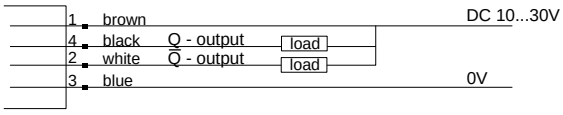
WT18-3P130 | WT18-3P430
WT18-3N130 | WT18-3N430

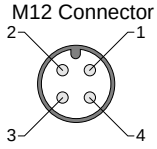


PNP Models



NPN Models





wire colors refer to standard cable, not included with quick disconnect models

WT 18-3

Proximity/Diffuse Sensors-Background Suppression

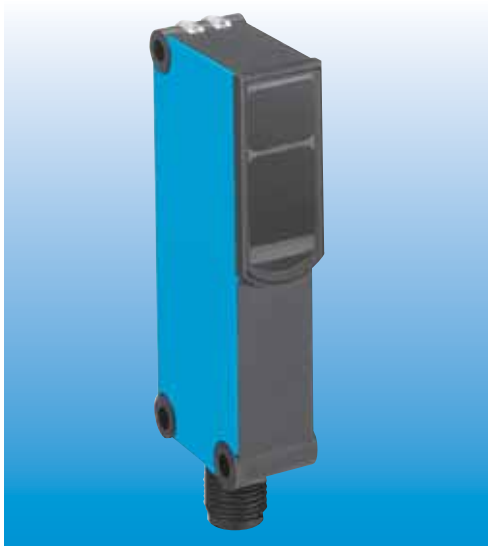


1.9…23.6 in (50…600 mm)
sensing distance

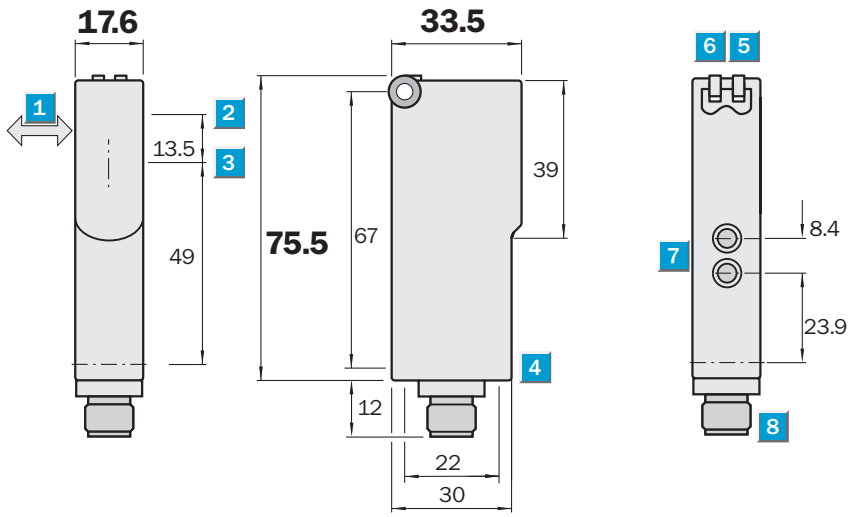
Highlights

- Precise background suppression; suitable for demanding applications
- Sensing range adjustable by teach-in using double teach buttons.
- Insensitive to external light sources (HF lamps)
- Crosstalk immunity
- Operating temperature range -40…140° F (-40…60° C)

WT 18-3

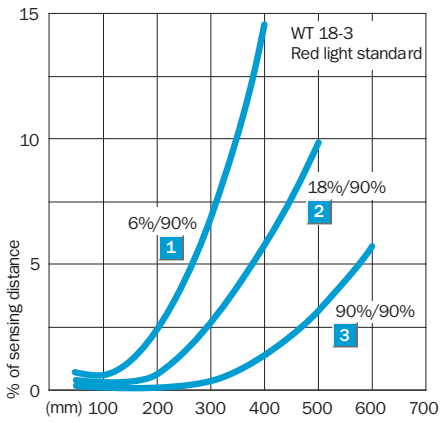


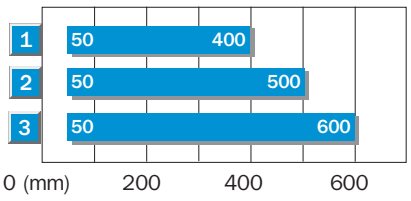
Dimensional drawing



dimensions in mm

Sensing distance

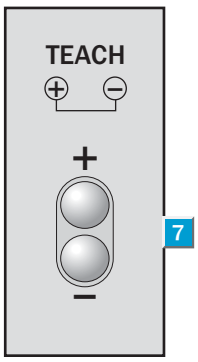




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range distance on white, 90% remission

Adjustments

All types



1	Standard direction of the material being sensed
2	Optical axis, sender
3	Optical axis, receiver
4	Mounting hole Ø 4.1 mm
5	LED, yellow; signal strength indicator
6	LED indicator, green; power on indicator
7	Sensing range adjustment, double Teach button
8	M12 Plug, 4-pin or 2 m cable

Accessories	page
Cables and connectors	1180
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Order information

Type	Part no.
WT18-3P131	1 026 034
WT18-3P431	1 026 032
WT18-3N431	1 026 035
WT18-3N131	1 028 040

Technical data	WT 18-3	P131	P431	N131	N431
Sensing distance, adjustable[1]	1.9…23.6 in (50…600 mm), 90% remission	■	■	■	■
Visible range [1]	0.4…23.6 in (10…600 mm)	■	■	■	■
Adjustment	Teach-in, via double teach buttons	■	■	■	■
Light source[2], **light type**	LED, visible red light	■	■	■	■
Light spot diameter	0.6 in at 11.8 in (15 mm at 300 mm)	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■
Residual ripple[4]	< 5 V_{PP}	■	■	■	■
Current consumption[5]	< 40 mA	■	■	■	■
Output current I_A max.	< 100 mA	■	■	■	■
Switching outputs	PNP, complementary	■	■		
	NPN, complementary			■	■
Response time[6]	< 700 µs	■	■	■	■
Switching frequency max.[7]	700/s	■	■	■	■
Connection types	Cable [8], 2 m, 4-wire	■		■	
	M12 plug, 4-pin		■		■
VDE protection class cable[9]	□	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature	Operation -40…140° F (-40…60° C)	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■
Weight	With cable, 2 m, approx. 0.3 lb. (120 g)	■		■	
	With M12 plug, approx. 0.1 lb. (40 g)		■		■
Housing material	ABS	■	■	■	■

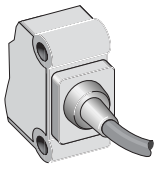
1) Object with 90% remission (according to standard white DIN 5033)
2) Average service life 100,000 h at T_A=77° F (25° C)
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 32° F (0° C)
9) Reference voltage 50 V DC
10) A = V_S connection reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression
D = Operation in short-circuit protected network max. 8 A

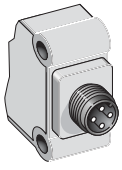
Teach-in procedure via the double teach buttons

1) Position the object in the path of the beam.
2) Press both buttons simultaneously **(for approx. 2 seconds)** until the yellow LED flashes = object in focus. In the event of button activation of less than 2 seconds, the Teach command is not effective, therefore providing no protection against further unwanted manipulation.
3) Release buttons; yellow LED illuminates continuously = object is positively detected.
4) Fine adjustments can be made to the sensing distance, when required by the application:
Pressing the "+" button **(approx. 0.5 sec)** = sensing distance will be increased.
Pressing the "-" button **(approx. 0.5 sec)** = sensing distance will be decreased.
In the event of button activation less than 0.5 sec, no change to the sensing distance is made.
Upon activation of the button, the yellow LED flashes.
5) The Teach-in sensing distance is stored in the memory.

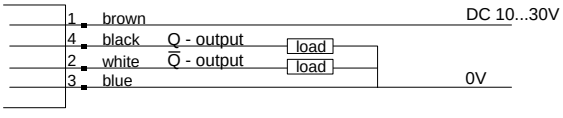
Connection diagram

WT18-3P131 | WT18-3P431 | WT18-3N431

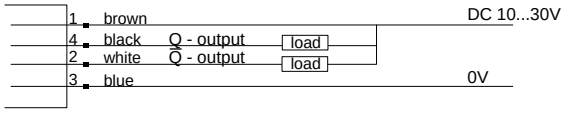


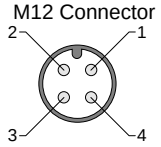


PNP Models



NPN Models





wire colors refer to standard cable, not included with quick disconnect models

WT 18-3

Proximity/Diffuse Sensors-Background Suppression

1.9…27.6 in (50…700 mm)
sensing distance

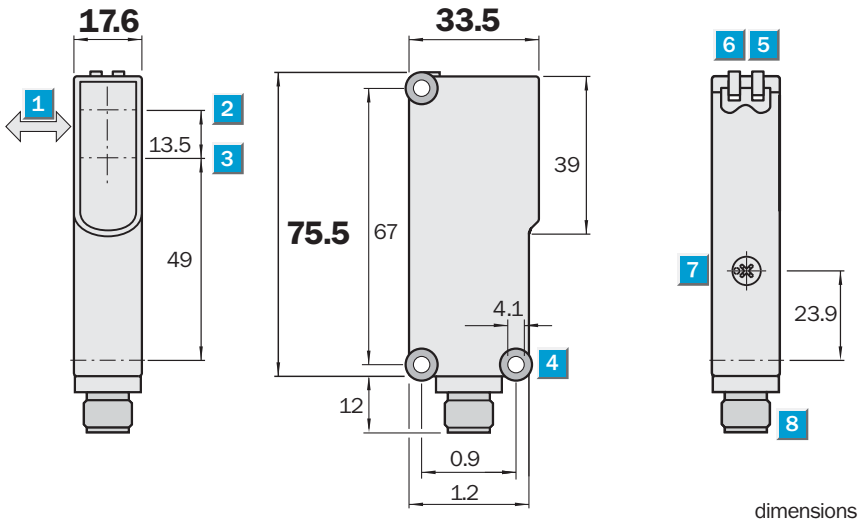
Highlights

- Precise background suppression; suitable for demanding applications
- Sensing range adjustable via potentiometer
- Insensitive to external light sources (HF lamps)
- Crosstalk immunity
- Operating temperature range -40…140° F (-40…60° C)

WT 18-3

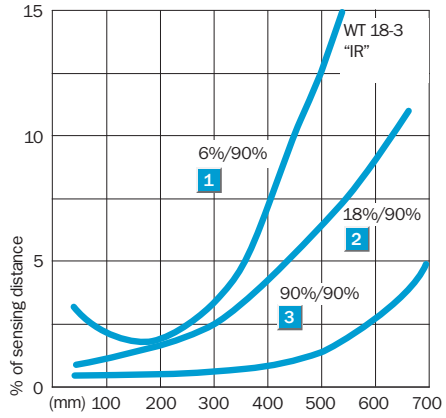


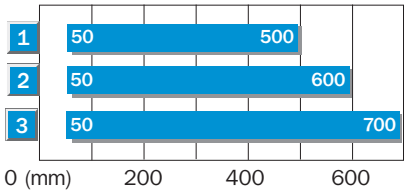
Dimensional drawing



dimensions in mm

Sensing distance





1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Standard direction of the material being sensed
2	Optical axis, sender
3	Optical axis, receiver
4	Mounting hole Ø 4.1 mm
5	LED, yellow; signal strength indicator
6	LED, green; power on indicator
7	Sensing distance adjustment
8	M12 Plug, 4-pin or 2 m cable or square plug, 6-pin

Accessories	page
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Order information

Type	Part no.
WT18-3P110	1 025 887
WT18-3P410	1 025 889
WT18-3P610	1 025 890
WT18-3N110	1 025 891
WT18-3N410	1 025 893
WT18-3N610	1 025 894

Technical data	WT 18-3	P110	P410	P610	N110	N410	N610
Sensing distance, adjustable[1]	1.9…27.6 in (50…700 mm), 90% remission	■	■	■	■	■	■
Visible range [1]	0.4…27.6 in (10…700 mm)	■	■	■	■	■	■
Adjustment	Potentiometer, 4-turn	■	■	■	■	■	■
Light source[2], **light type**	LED, infrared light	■	■	■	■	■	■
Light spot diameter	0.8 in at 15.7 in (20 mm at 400 mm)	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■	■	■
Residual ripple[4]	< 5 V_{PP}	■	■	■	■	■	■
Current consumption[5]	< 55 mA	■	■	■	■	■	■
Output current I_A max.	< 100 mA	■	■	■	■	■	■
Switching outputs	PNP, complementary	■	■	■			
	NPN, complementary				■	■	■
Response time[6]	< 700 µs	■	■	■	■	■	■
Switching frequency max.[7]	700/s	■	■	■	■	■	■
Connection types	Cable [8], 2 m, 4-wire	■			■		
	M12 plug, 4-pin		■			■	
	Square plug, 6-pin			■			■
VDE protection class cable[9]	□	■	■	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
Ambient temperature	Operation -40…140° F (-40…60° C)	■	■	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■	■	■
Weight	With cable, 2 m, approx. 0.3 lb. (120 g)	■			■		
	With M12 plug, approx. 0.1 lb. (40 g)		■			■	
	With square plug, approx. 0.1 lb (40 g)			■			■
Housing material	ABS	■	■	■	■	■	■

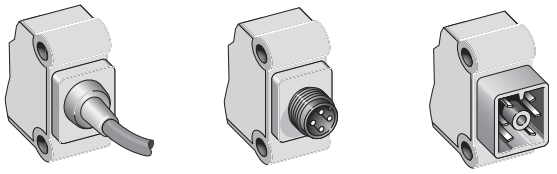
1) Object with 90% remission (according to standard white DIN 5033)
2) Average service life 100,000 h at T_A=77° F (25° C)
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 32° F (0° C)
9) Reference voltage 50 V DC
10) A = V_S connection reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression
D = Operation in short-circuit protected network max. 8 A

Adjustment via potentiometer

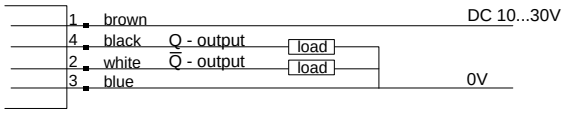
1) Position the object in the path of the beam.
2) By rotating the potentiometer to the right until the yellow LED illuminates continuously = object is positively detected.
3) If necessary, fine adjustments to the sensing distance can be made to suit the conditions of the application:
minimal rotation of the potentiometer to the right = sensing distance will be increased,
minimal rotation of the potentiometer to the left = sensing distance will be decreased.

Connection types

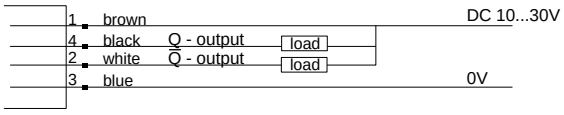
WT18-3P110 | WT18-3P410 | WT18-3P610
WT18-3N110 | WT18-3N410 | WT18-3N610



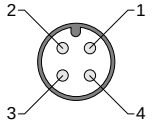
PNP Models



NPN Models

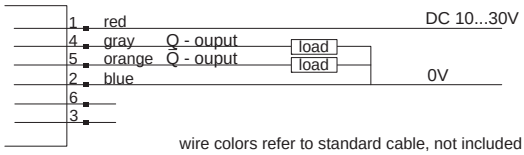


M12 Connector



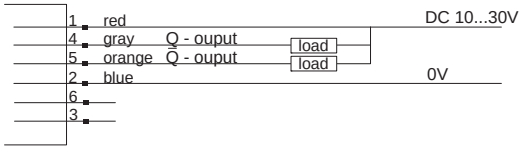
wire colors refer to standard cable, not included with quick disconnect models

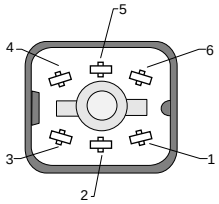
PNP



wire colors refer to standard cable, not included

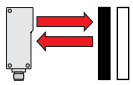
NPN





WT 18-3

Proximity/Diffuse Sensors-Background Suppression





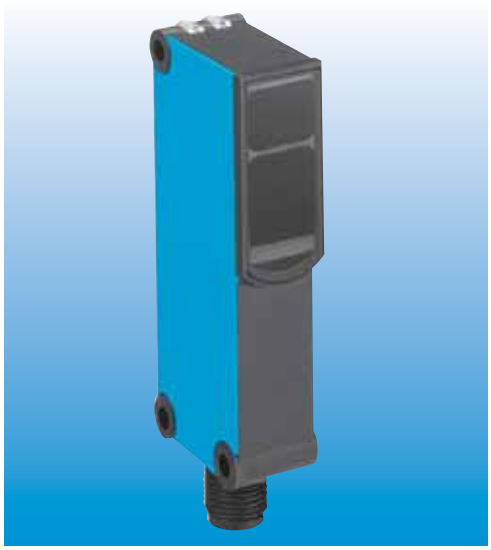


1.9…27.6 in (50…700 mm)
sensing distance

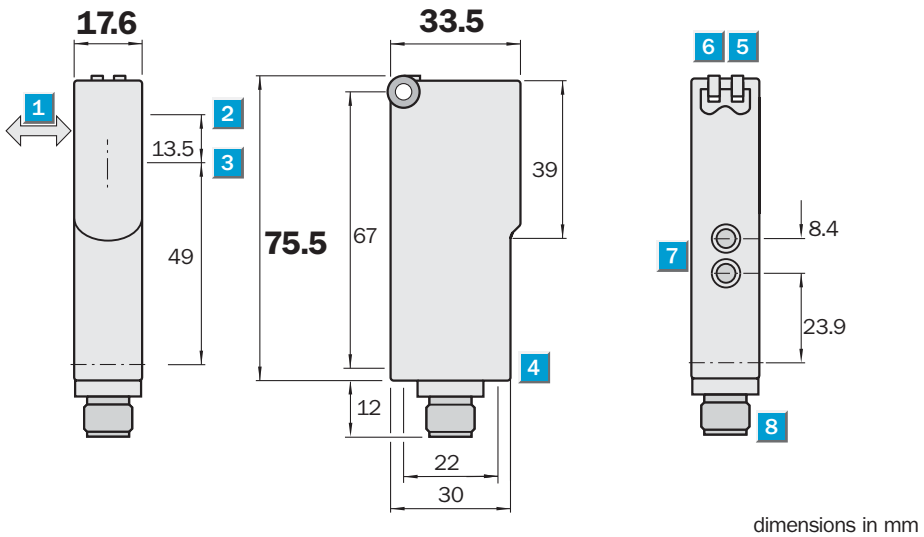
Highlights

- Precise background suppression; suitable for demanding applications
- Sensing range adjustable by teach-in using double teach buttons
- Insensitive to external light sources (HF lamps)
- Crosstalk immunity
- Operating temperature range -40…140° F (-40…60° C)

WT 18-3

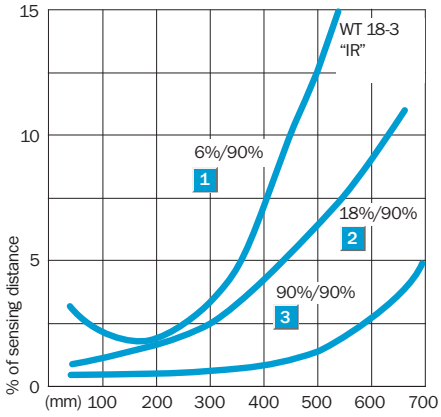


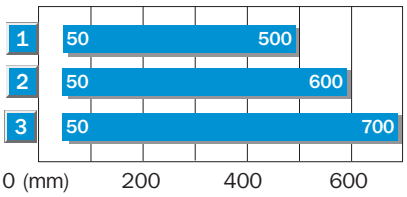
Dimensional drawing



dimensions in mm

Sensing distance

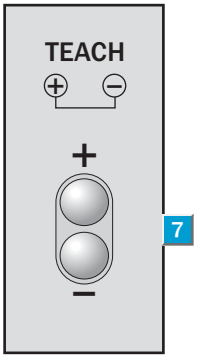




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Standard direction of the material being sensed
2	Optical axis, sender
3	Optical axis, receiver
4	Mounting hole Ø 4.1 mm
5	LED, yellow; signal strength indicator
6	LED, green; power on indicator
7	Sensing range adjustment, double teach button
8	M12 Plug, 4-pin or 2 m cable

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WT18-3P111	1 026 033
WT18-3P411	1 026 031

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Technical data	WT 18-3	P111	P411
Sensing distance, adjustable[1]	1.9…27.6 in (50…700 mm), 90% remission	■	■
Visible range [1]	0.4…27.6 in (10…700 mm)	■	■
Adjustment	Teach-in, via double teach buttons	■	■
Fine Adjustment	Manual via “+” and “-” button	■	■
Light source[2], **light type**	LED, infrared light	■	■
Light spot diameter	0.8 in at 15.7 in (20 mm at 400 mm)	■	■
Supply voltage V_S	10…30 V DC[3]	■	■
Residual ripple[4]	< 5 V_{PP}	■	■
Current consumption[5]	< 55 mA	■	■
Output current I_A max.	< 100 mA	■	■
Switching outputs	PNP, complementary	■	■
Response time[6]	< 700 µs	■	■
Switching frequency max.[7]	700/s	■	■
Connection types	Cable [8], 2 m, 4-wire	■	
	M12 plug, 4-pin		■
VDE protection class cable[9]	□	■	■
Circuit protection[10]	A, B, C, D	■	■
Enclosure rating	IP 67	■	■
Ambient temperature	Operation -40…140° F (-40…60° C)	■	■
	Storage -40…167° F (-40…75° C)	■	■
Weight	With cable, 2 m, approx. 0.3 lb. (120 g)	■	
	With M12 plug, approx. 0.1 lb. (40 g)		■
Housing material	ABS	■	■

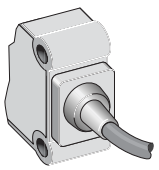
1) Object with 90% remission (according to standard white DIN 5033)
2) Average service life 100,000 h at T_A=77° F (25° C)
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 32° F (0° C)
9) Reference voltage 50 V DC
10) A = V_S connection reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression
D = Operation in short-circuit protected network max. 8 A

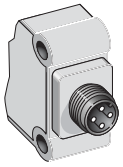
Teach-in procedure via the double teach buttons

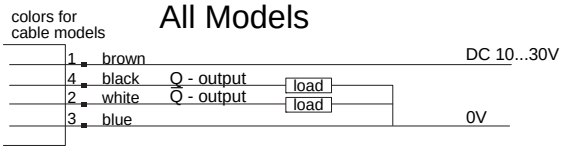
1) Position the object in the path of the beam.
2) Press both buttons simultaneously **(for approx. 2 seconds)** until the yellow LED flashes = object in focus. In the event of button activation of less than 2 seconds, the Teach command is not effective, therefore providing no protection against further unwanted manipulation.
3) Release buttons; yellow LED illuminates continuously = object is positively detected.
4) Fine adjustments can be made to the sensing distance, when required by the application:
Pressing the “+” button **(approx. 0.5 sec)** = sensing distance will be increased.
Pressing the “-” button **(approx. 0.5 sec)** = sensing distance will be decreased.
In the event of button activation less than 0.5 sec, no change to the sensing distance is made.
Upon activation of the button, the yellow LED flashes.
5) The Teach-in sensing distance is stored in the memory.

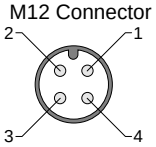
Connection diagram

WT18-3P111 WT18-3P411





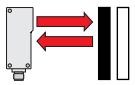




wire colors refer to standard cable, not included with quick disconnect models

WT 18-3

Proximity/Diffuse Sensors-Background Suppression



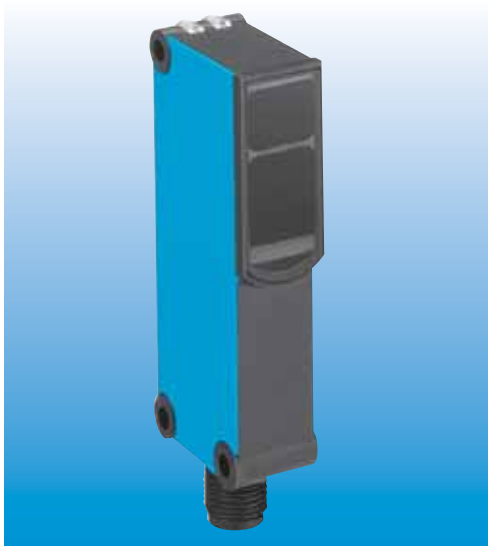



1.9…39.4 in (50…1000 mm)
sensing distance

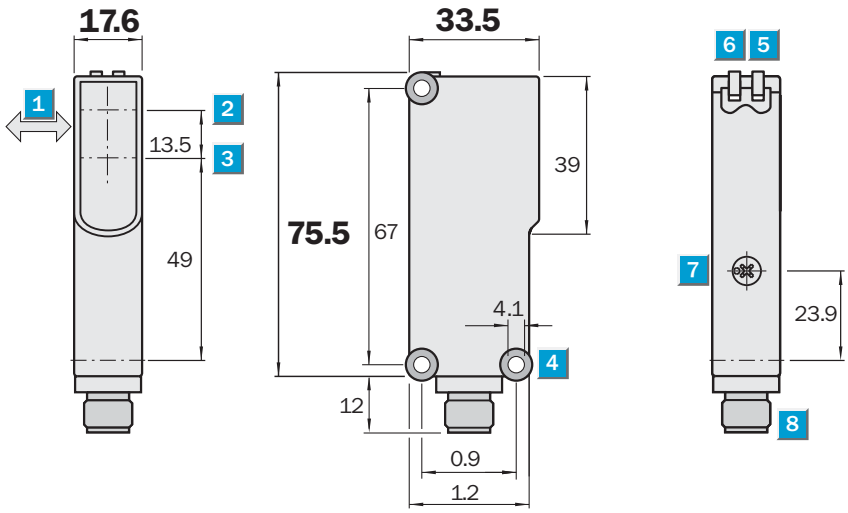
Highlights

- Precise background suppression; suitable for demanding applications
- Sensing range adjustable via potentiometer
- Insensitive to external light sources (HF lamps)
- Crosstalk immunity
- Operating temperature range -40…140° F (-40…60° C)

WT 18-3

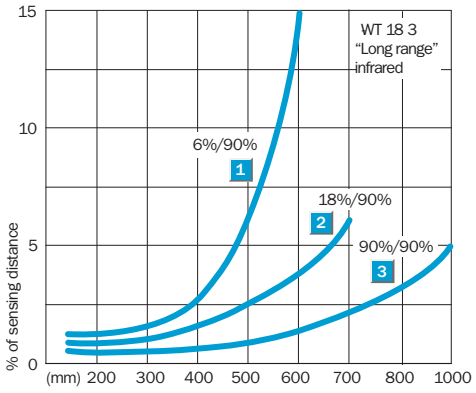


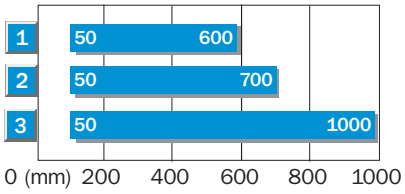
Dimensional drawing



dimensions in mm

Sensing distance





1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Standard direction of the material being sensed
2	Optical axis, sender
3	Optical axis, receiver
4	Mounting hole Ø 4.1 mm
5	LED, yellow; signal strength indicator
6	LED, green; power on indicator
7	Sensing range adjustment
8	M12 Plug, 4-pin or 2 m cable

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WT18-3P120	1 025 904
WT18-3P420	1 025 905

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Technical data	WT 18-3	P120	P420
Sensing distance, adjustable[1]	1.9…39.4 in (50…1000 mm), 90% remission	■	■
Visible range [1]	0.4…39.4 in (10…1000 mm)	■	■
Adjustment	Potentiometer, 4-turn	■	■
Light source[2], **light type**	LED, infrared light	■	■
Light spot diameter	1.2 in at 23.6 in (30 mm at 600 mm)	■	■
Supply voltage V_S	10…30 V DC[3]	■	■
Residual ripple[4]	< 5 V_{PP}	■	■
Current consumption[5]	< 55 mA	■	■
Output current I_A max.	< 100 mA	■	■
Switching outputs	PNP, complementary	■	■
Response time[6]	< 700 µs	■	■
Switching frequency max.[7]	700/s	■	■
Connection types	Cable [8], 2 m, 4-wire	■	
	M12 plug, 4-pin		■
VDE protection class cable[9]	□	■	■
Circuit protection[10]	A, B, C, D	■	■
Enclosure rating	IP 67	■	■
Ambient temperature	Operation -40…140° F (-40…60° C)	■	■
	Storage -40…167° F (-40…75° C)	■	■
Weight	With cable, 2 m, approx. 0.3 lb. (120 g)	■	
	With M12 plug, approx. 0.1 lb. (40 g)		■
Housing material	ABS	■	■

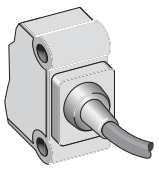
1) Object with 90% remission (according to standard white DIN 5033)
2) Average service life 100,000 h at T_A=77° F (25° C)
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 32° F (0° C)
9) Reference voltage 50 V DC
10) A = V_S connection reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression
D = Operation in short-circuit protected network max. 8 A

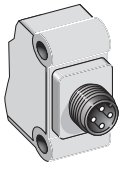
Adjustment via potentiometer

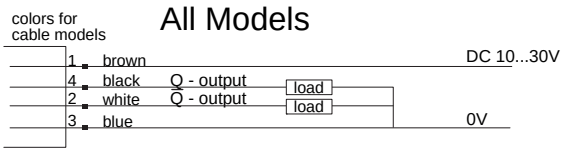
1) Position the object in the path of the beam.
2) By rotating the potentiometer to the right until the yellow LED illuminates continuously = object is positively detected.
3) If necessary, fine adjustments to the sensing distance can be made to suit the conditions of the application:
minimal rotation of the potentiometer to the right = sensing distance will be increased,
minimal rotation of the potentiometer to the left = sensing distance will be decreased.

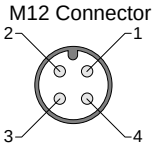
Connection diagram

WT18-3P120 | WT18-3P420









wire colors refer to standard cable, not included with quick disconnect models

WTV 18-2

Proximity/Diffuse Sensors-Background Rejection



2.4...7.9 in (60...200 mm)
sensing range

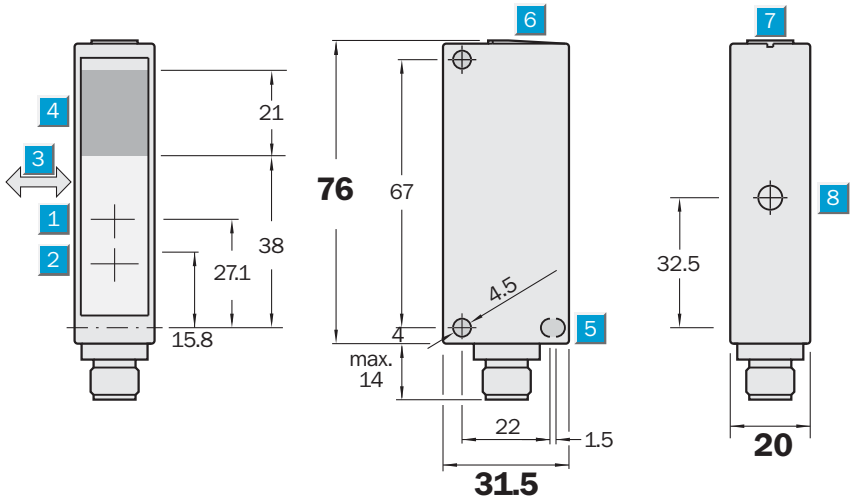
Highlights

- Rugged plastic housing
- Immune to ambient light
- Ultra-precise background suppression for demanding applications
- Signal strength indicator
- Special optics means no false readings on shiny objects
- Crosstalk immunity

WTV 18-2

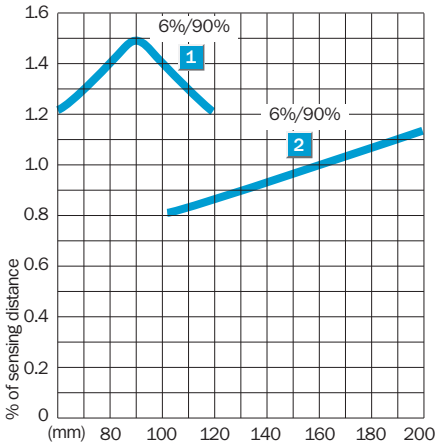


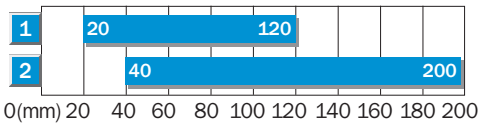
Dimensional drawing



dimensions in mm

Background suppression

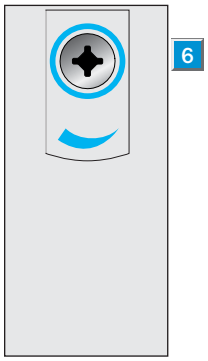




1	Sensing range on black, 6% remission with P 410
2	Sensing range on black, 6% remission with P 420

Adjustments

All types



1	Center of optical axis, sender, WTV 18-2P 410
2	Center of optical axis, sender, WTV 18-2P 420
3	Standard direction of the material being sensed
4	Receiving range
5	Mounting hole Ø 4.5 mm
6	Sensing range adjustment
7	Alignment sight
8	Status indicator

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WTV 18-2P410	1 016 198
WTV 18-2P420	1 016 243

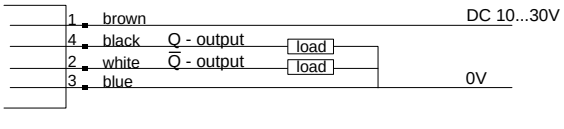
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Technical data	WTV 18-2-	P410	P420							
Sensing range, adjustable	2.4...4.7 in (60...120 mm)	■								
	3.9...7.9 in (100...200 mm)		■							
Light source[1], **light type**	LED, infrared light	■	■							
Light spot diameter	0.3 in at 4.7 in (8 mm at 120 mm)	■								
	0.3 in at 7.9 in (8 mm at 200 mm)		■							
Angle of divergence	Approx. 3.8°	■	■							
Supply voltage V_S	10...30 V DC[2]	■	■							
Ripple[3]	≤ 5 V_{SS}	■	■							
Current consumption[4]	< 30 mA	■	■							
Switching outputs	PNP, Q and $\overline{Q}$	■	■							
Output current I_A max.	100 mA	■	■							
PNP; signal voltage HIGH	V_S – (< 1.5 V)	■	■							
PNP; signal voltage LOW	Approx. 0 V	■	■							
Response time[5]	2 ms	■	■							
Max. switching frequency[6]	250 Hz	■	■							
Connection type	Plug, M12 4-pin	■	■							
VDE protection class[7]	□	■	■							
Circuit protection[8]	A, B, C	■	■							
Enclosure rating	IP 67/NEMA 6	■	■							
Ambient temperature T_A	Operation -13...140° F (-25...60° C)	■	■							
	Storage -13...167° F (-25...75° C)	■	■							
Approximate weight	3.5 oz (100 g)	■	■							
Housing material	Glass fiber reinforced ABS	■	■							

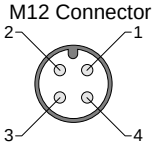
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

All Models

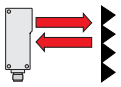


wire colors refer to standard cable, not included with quick disconnect models



WL 18-3

Reflex/Retro-Reflective Sensors



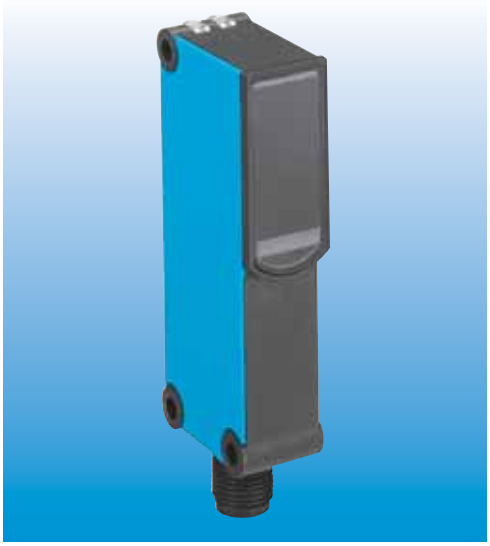



0...23 ft (0...7 m)
sensing range

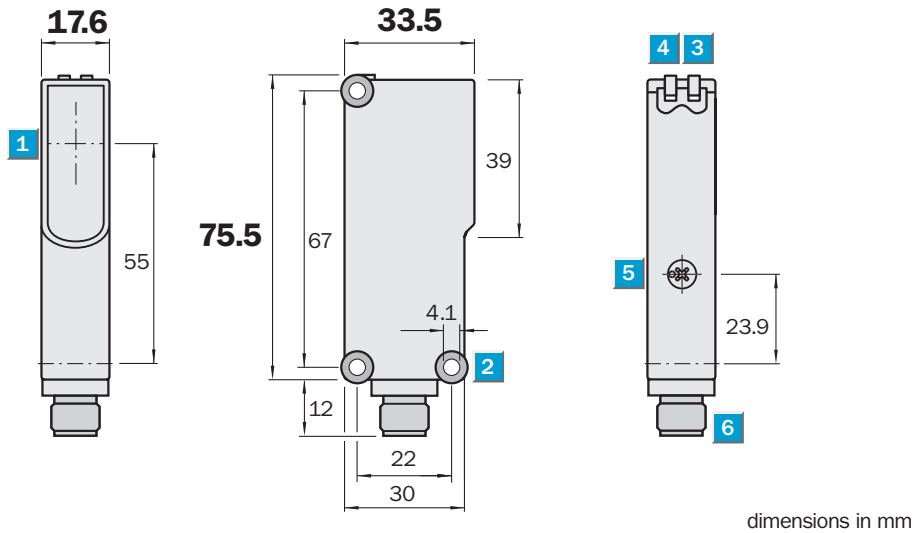
Highlights

- Autocollimation optics; reliable target detection
- Insensitive to external light sources (HF lamps)
- Crosstalk immunity
- Operating temperature range -40...140° F (-40...60° C)
- Test input for system diagnosis (optional)

WL 18-3

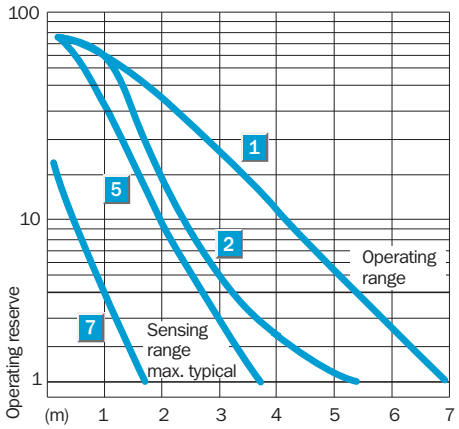


Dimensional drawing



dimensions in mm

Sensing distance



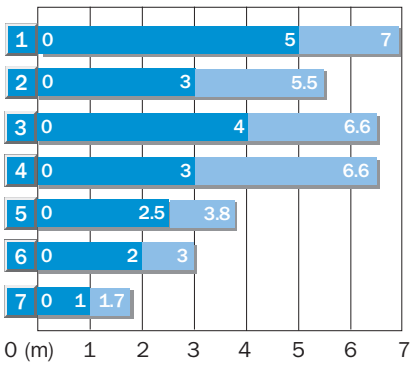
Adjustments

All types



1	Middle of optical axis
2	Mounting holes Ø 4.1 mm
3	LED yellow; signal strength indicator
4	LED green; power on indicator
5	Sensitivity control; Potentiometer 270°
6	M12 Plug, 4-pin or cable 2 m or square plug 6-pin

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256



	Reflector type	Operating range
1	PL 80 A	0...5.0 m
2	P 975	0...3.0 m
3	PL 50 A	0...4.0 m
4	PL 40 A	0...3.0 m
5	PL 30 A	0...2.5 m
6	PL 20 A	0...2.0 m
7	Reflective tape Diamond Grade	0...1.0 m

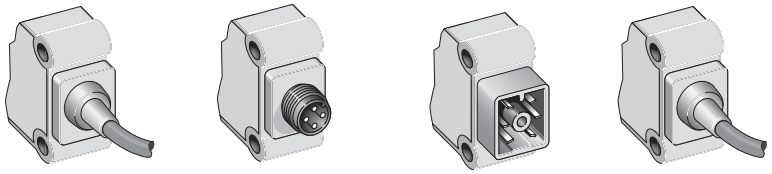
Order information	
Type	**Part no.**
WL18-3P130	1 025 909
WL18-3P430	1 025 911
WL18-3P630	1 025 912
WL18-3P730	1 026 029
WL18-3N130	1 025 913
WL18-3N430	1 025 915
WL18-3N630	1 025 916
WL18-3N730	1 026 030

Technical data	WT 18-3	P130	P430	P630	P730	N130	N430	N630	N730
Sensing range, max. typ./on reflector	23 ft (7 m)/PL 80 A	■	■	■	■	■	■	■	■
Sensitivity	Adjustable, via potentiometer	■	■	■	■	■	■	■	■
Light source[1], light type	LED, visible red light	■	■	■	■	■	■	■	■
Angle of dispersion	4°	■	■	■	■	■	■	■	■
Light spot diameter	1.6 in at 6.6 ft (40 mm at 2m)	■	■	■	■	■	■	■	■
Polarizing filter	Yes	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■	■	■
Residual ripple[4]	< 5 V_{PP}	■	■	■	■	■	■	■	■
Current consumption[5]	< 40 mA	■	■	■	■	■	■	■	■
Output current I_A max.	< 100 mA	■	■	■	■	■	■	■	■
Switching outputs	PNP, complementary	■	■	■	■				
	NPN, complementary					■	■	■	■
Response time[5]	< 500 µs	■	■	■	■	■	■	■	■
Switching frequency max.[6]	1000/s	■	■	■	■	■	■	■	■
Test Input »TE«	PNP: Sender off; TE to 0 V			■	■				
	NPN: Sender off; TE to V+							■	■
Connection types	Cable[7], 2 m, 4-wire	■				■			
	M12 plug, 4-pin		■				■		
	Square plug, 6-pin			■				■	
	Cable, 2 m, 5-wire				■				■
VDE protection class cable[8]	□	■	■	■	■	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■
Ambient temperature	Operation -40…140° F (-40…60° C)	■	■	■	■	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■	■	■	■	■
Weight	With cable, 2 m, approx. 0.3 lb. (120 g)	■			■	■			■
	With M12 plug, approx. 0.1 lb. (40 g)		■				■		
	With square plug, approx. 0.1 lb (40 g)			■				■	
Housing material	ABS	■	■	■	■	■	■	■	■

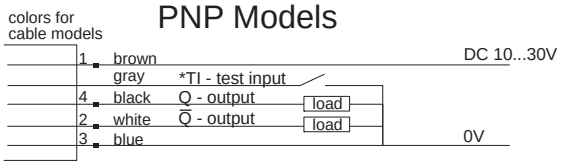
1) Average service life 100,000 h at T_A=77° F (25° C)
2) Limit values
3) Must be within V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 32° F (0° C)
8) Reference voltage 50 V DC
9) A = V_S connection reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression
D = Operation in short-circuit protected network max. 8 A

Connection diagram

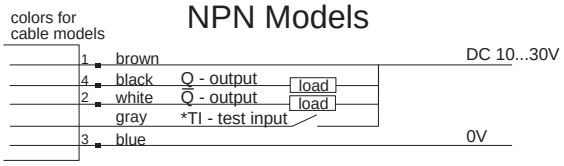
WL18-3P130 | WL18-3N130 | WL18-3P430 | WL18-3N430 | WL18-3P630 | WL18-3N630 | WL18-3P730 | WL18-3N730

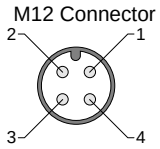


PNP Models



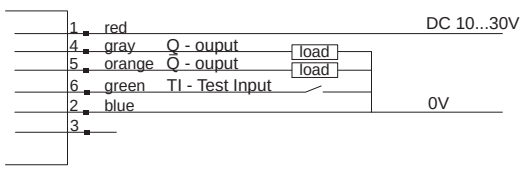
NPN Models



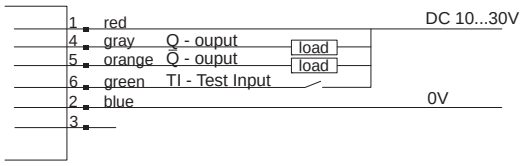


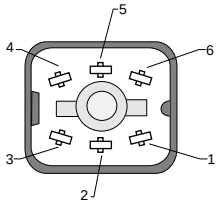
*test input not available on M12 connector models
wire colors refer to standard cable, not included with quick disconnect models

PNP



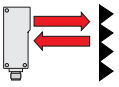
NPN





WL 18-3

Reflex/Retro-Reflective Sensors






0...23 ft (0...7 m)
sensing range

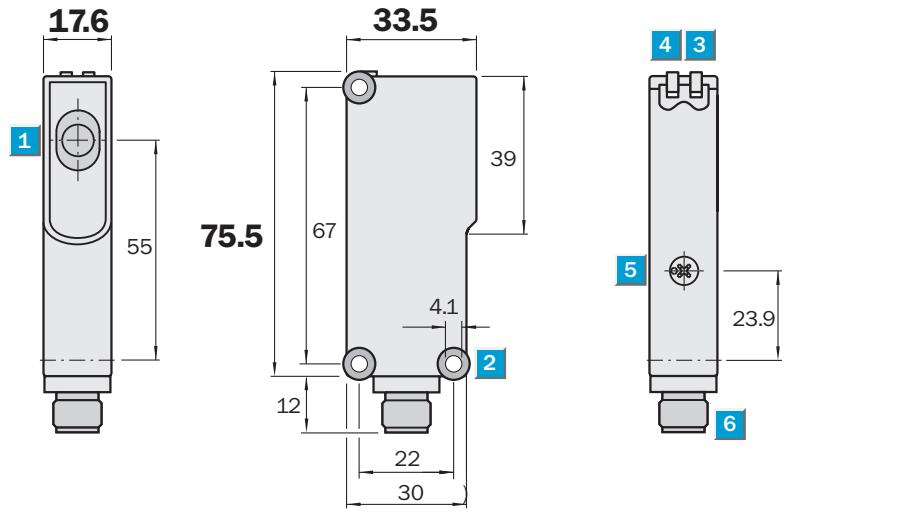
Highlights

- Autocollimation optics; reliable target detection
- Insensitive to external light sources (HF lamps)
- Crosstalk immunity
- Operating temperature range -40...140° F (-40...60° C)
- Non-polarized

WL 18-3

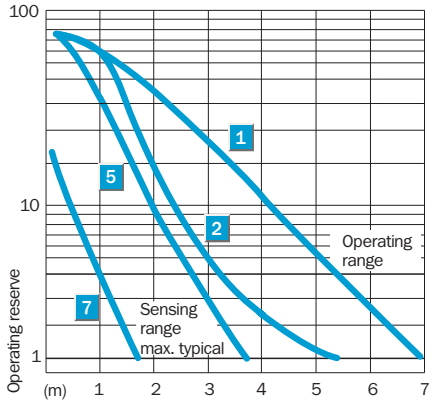


Dimensional drawing



dimensions in mm

Sensing distance



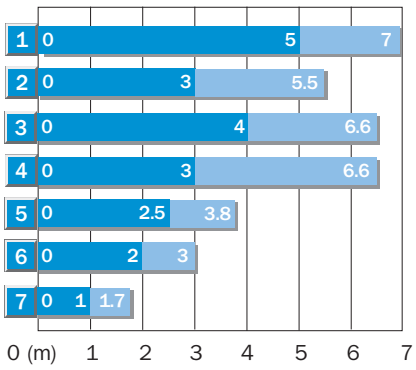
Adjustments

All types



1	Middle of optical axis
2	Mounting holes Ø 4.1 mm
3	LED yellow; signal strength indicator
4	LED green; power on indicator
5	Sensitivity control; Potentiometer 270°
6	M12 Plug, 4-pin or cable 2 m or square plug 6-pin

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256



	Reflector type	Operating range
1	PL 80 A	0...5.0 m
2	P 975	0...3.0 m
3	PL 50 A	0...4.0 m
4	PL 40 A	0...3.0 m
5	PL 30 A	0...2.5 m
6	PL 20 A	0...2.0 m
7	Reflective tape Diamond Grade	0...1.0 m

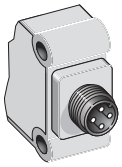
Order information	
Type	**Part no.**
WL18-3P480	1 025 917
WL18-3P680	1 025 918

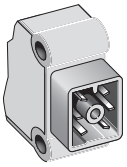
Technical data	WL 18-3	P480	P680
Sensing range, max. typ./on reflector	23 ft (7 m)/PL 80 A	■	■
Sensitivity	Adjustable, via potentiometer	■	■
Light source[1], light type	LED, visible red light	■	■
Angle of dispersion	4°	■	■
Light spot diameter	1.6 in @ 6.6 ft (40 mm @ 2 m)	■	■
Polarizing filter	No	■	■
Supply voltage V_S	10…30 V DC[2]	■	■
Residual ripple[3]	< 5 V_{PP}	■	■
Current consumption[4]	< 40 mA	■	■
Output current I_A max.	< 100 mA	■	■
Switching outputs	PNP, complementary	■	■
Response time[5]	< 500 µs	■	■
Switching frequency max.[6]	1000/s	■	■
Test Input »TE«	PNP: Sender off; TE to 0 V		■
Connection types	M12 plug, 4-pin	■	
	Square plug, 6-pin		■
VDE protection class cable[7]	□	■	■
Circuit protection[8]	A, B, C, D	■	■
Enclosure rating	IP 67	■	■
Ambient temperature	Operation -40…140° F (-40…60° C)	■	■
	Storage -40…167° F (-40…75° C)	■	■
Weight	With M12 plug, approx. 0.1 lb. (40 g)	■	
	With square plug, approx. 0.1 lb (40 g)		■
Housing material	ABS	■	■

1) Average service life 100,000 h at T_A=77° F (25° C)
2) Limit values
3) Must be within V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connection reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression
D = Operation in short-circuit protected network max. 8 A

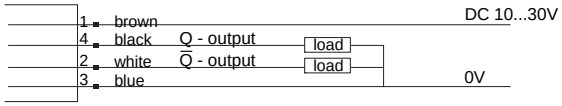
Connection types

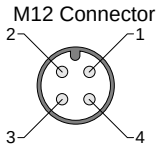
WL18-3P480 | WL18-3P680





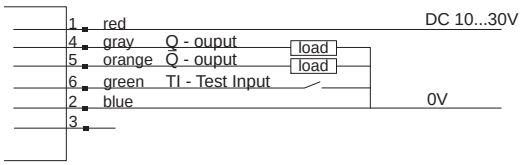
PNP Models

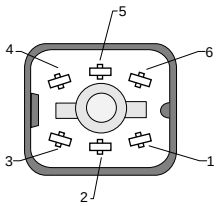




*test input available on cable models only
wire colors refer to standard cable, not included with quick disconnect models

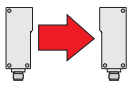
PNP





WS/WE 18-3

Through-Beam Sensors







65.6 ft (20 m)
sensing range

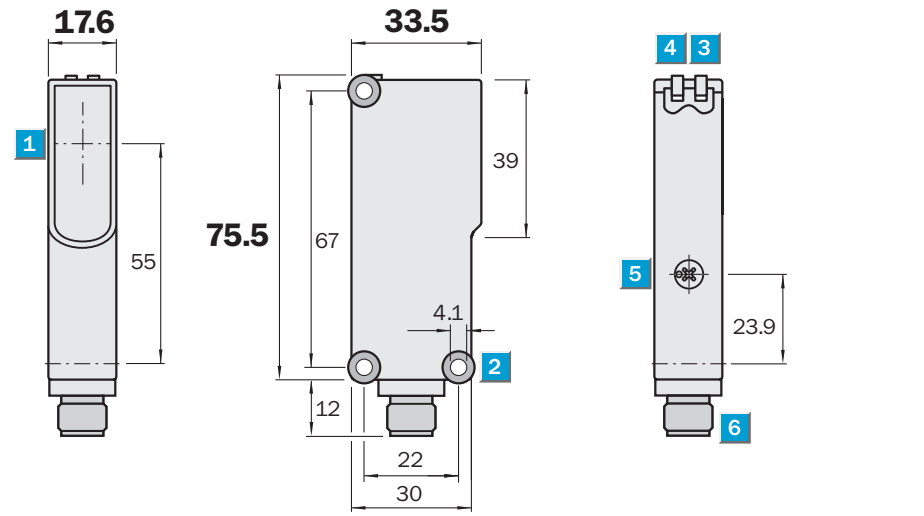
Highlights

- Insensitive to external light sources (HF lamps)
- Operating temperature range -40…140° F (-40…60° C)
- Test input for system diagnosis
- Rugged plastic housing

WS/WE 18-3

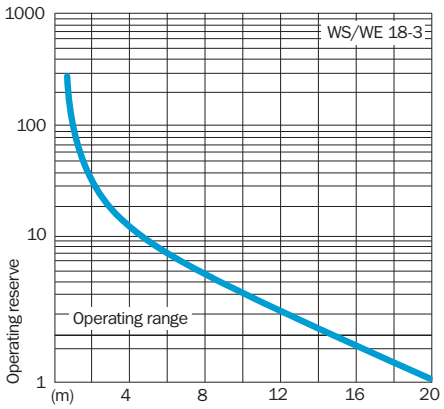


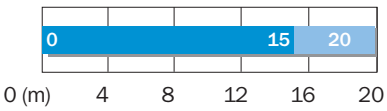
Dimensional drawing



dimensions in mm

Sensing distance





Adjustments

All types



1 Middle of optical axis
2 Mounting holes Ø 4.1 mm
3 LED yellow; signal strength indicator
4 LED green; power on indicator
5 Sensitivity control; Potentiometer 270°
6 M12 Plug, 4-pin or cable 2 m
or square plug 6-pin

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

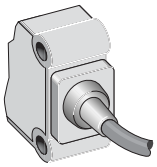
Type	Part no.
WS/WE18-3P130	1 025 922
WS/WE18-3P430	1 025 923
WS/WE18-3P630	1 025 924
WS/WE18-3N130	1 025 925
WS/WE18-3N630	1 025 926

Technical data	WS/WE 18-3	P130	P430	P630	N130	N360
Sensing range, max. typ.	0…65.6 ft (0…20 m)	■	■	■	■	■
Sensitivity	Adjustable, via Potentiometer 270°	■	■	■	■	■
Light source[1], **light type**	LED, visible red light	■	■	■	■	■
Light spot diameter	17.7 in at 49.2 ft (450 mm at 15 m)	■	■	■	■	■
Angle of dispersion	Approx. 1.5°	■	■	■	■	■
Angle of reception	Approx. 2°	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■
Residual ripple[3]	< 5 V_{PP}	■	■	■	■	■
Current consumption[4]	Sender < 45 mA	■	■	■	■	■
	Receiver < 35 mA	■	■	■	■	■
Output current I_A max.	< 100 mA	■	■	■	■	■
Switching outputs	PNP, complementary	■	■	■		
	NPN, complementary				■	■
Response time[5]	<500 µs	■	■	■	■	■
Switching frequency max.[6]	1000/s	■	■	■	■	■
Test Input »TE« Sender off	TE to 0 V (WS)	■	■	■	■	■
Connection types	Cable[7], 2 m, 4-wire	■			■	
	M12 plug, 4-pin		■			
	Square plug, 6-pin			■		■
VDE protection class cable[8]	□	■	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■
Ambient temperature	Operation -40…140° F (-40…60° C)	■	■	■	■	■
	Storage -40…167° F (-40…75° C)	■	■	■	■	■
Weight	With cable, 2 m, approx 0.24 lb. (120 g)	■			■	
	With M12 plug, approx. 0.1 lb. (40 g)		■			
	With square plug, approx. 0.1 lb (40 g)			■		■
Housing material	ABS	■	■	■	■	■

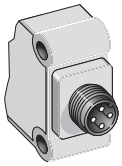
1) Average service life 100,000 h at T_A=77° F (25° C)
2) Limit values
3) Must be within V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 32° F (0° C)
8) Reference voltage 50 V DC
9) A = V_S connection reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression
D = Operation in short-circuit protected network max. 8 A

Connection diagram

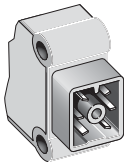
WS/WE18-3P130
WS/WE18-3N130

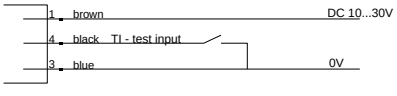


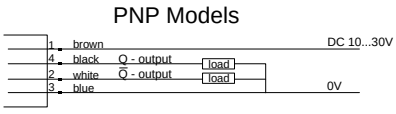
WS/WE18-3P430

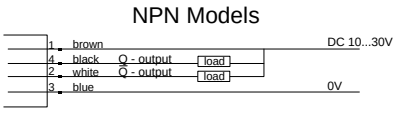


WS/WE18-3P630
WS/WE18-3N630

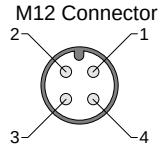


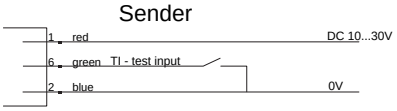


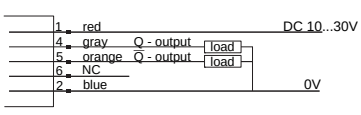


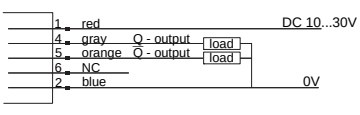


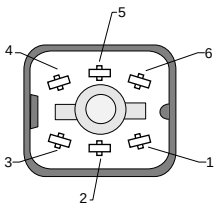
wire colors refer to standard cable, not included with quick disconnect models











WT23-2

Proximity/Diffuse Sensors- Background blanking



2.0...31.5 in (50...800 mm)
sensing range

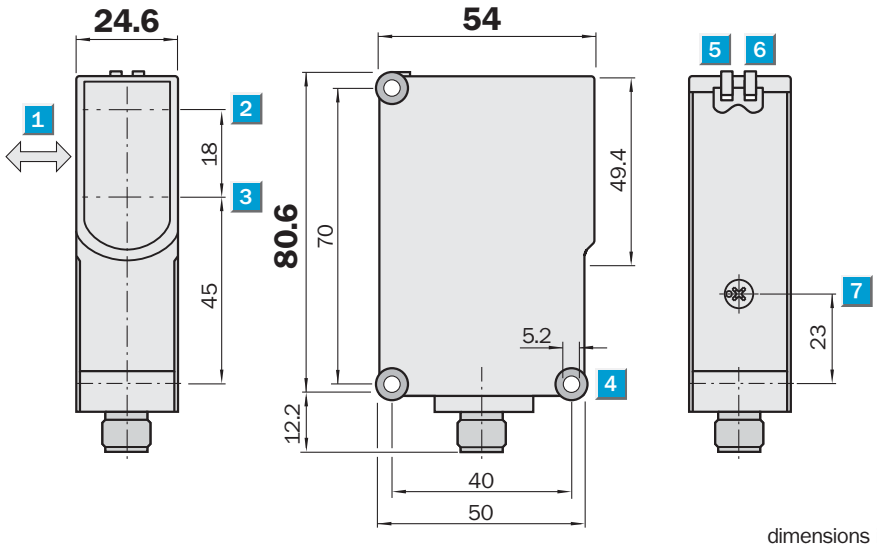
Highlights

- Red light, easier alignment
- 360° visibility on indicator LEDs, for faster monitoring

WT23-2

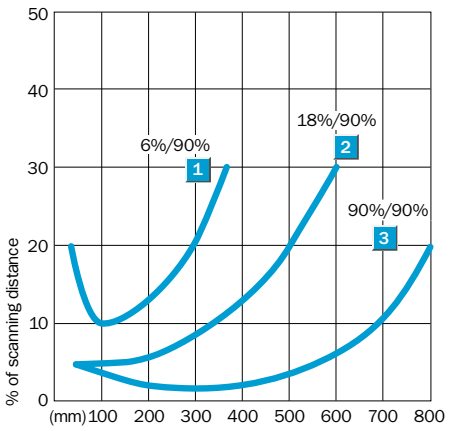


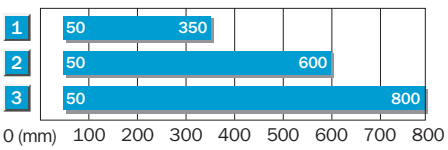
Dimensional drawing



dimensions in mm

Background blanking





1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

WT23-2P2441
WT23-2P3441



1	Standard direction of the material being sensed
2	Optical axis sender
3	Optical axis receiver
4	Mounting hole Ø 5.2 mm
5	LED indicator green; power on
6	LED indicator yellow; status of received light beam
7	Sensing distance adjustment

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

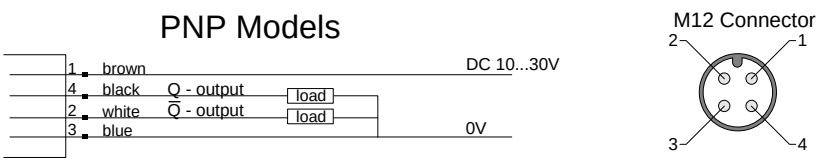
Type	Part no.
WT23-2P2441	1 027 779
WT23-2P3441	1 028 066

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Technical data	WT23-2	P2441	P3441
Sensing range, adjustable	2.0...31.5 in (50...800 mm)[1]	■	■
Operating distance	3.9...31.5 in (100...800 mm)[1]	■	■
Adjustment of operating distance	Potentiometer	■	■
Light source[2], light type	LED, Red light, 660 nm	■	■
Light spot diameter	Approx. 30 mm at 800 mm	■	■
Supply voltage V_S	10...30 V DC[3]	■	■
Ripple[4]	≤ 5 V_{pp}	■	■
Current consumption[5]	≤ 30 mA	■	■
Switching outputs	PNP, Q/$\overline{Q}$	■	■
Signal voltage PNP HIGH/LOW	>V_S-2.5 V/approx. 0 V	■	■
Output current I_A max.	≤ 100 mA	■	■
Response time[6]	≤ 2.5 ms	■	■
Max. switching frequency[7]	200 Hz	■	■
Connection type	Connector, M12 4-pin	■	
	Plug M12 4-pin, cable, PVC, 270 mm[8]		■
VDE protection class[9]	□	■	■
Circuit protection[10]	A, B, C	■	■
Enclosure rating	IP 65	■	■
Ambient temperature T_A	Operation -13...140°F (-25...60° C)	■	■
	Storage -40...158°F (-40...70° C)	■	■
Approximate weight	3.5 oz (100 g)	■	
	4.2 oz (120 g)		■
Housing material	ABS, PMMA	■	■

1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25°C
3) Limit values, operation in short-circuit protected network max. 8 A
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression

Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WT23-2

Proximity/Diffuse Sensors- Background blanking



2.0...39.4 in (50...1000 mm)
sensing range

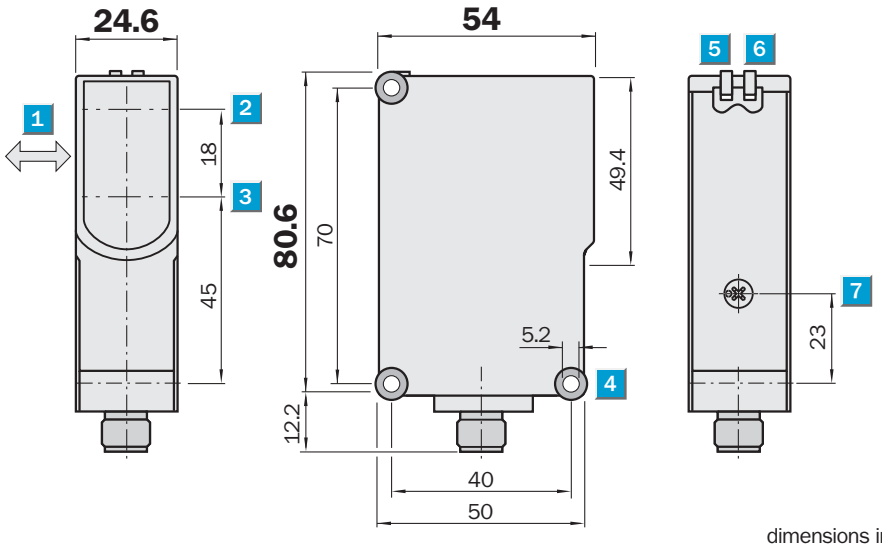
Highlights

- Infrared light, long sensing distance
- 360° visibility on indicator LEDs, for faster monitoring

WT23-2

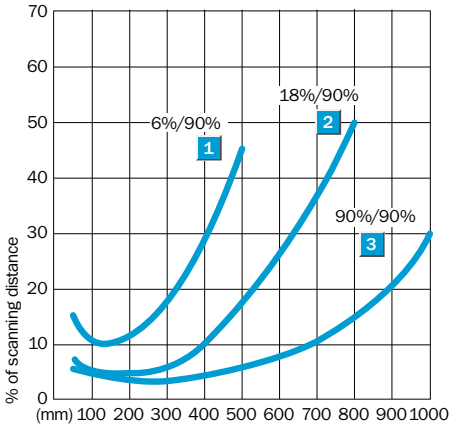


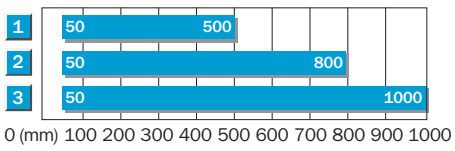
Dimensional drawing



dimensions in mm

Background blanking





1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

WT23-2N2421
WT23-2P2421



1	Standard direction of the material being sensed
2	Optical axis sender
3	Optical axis receiver
4	Mounting hole Ø 5.2 mm
5	LED indicator green; power on
6	LED indicator yellow; status of received light beam
7	Sensing distance adjustment: Poti

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

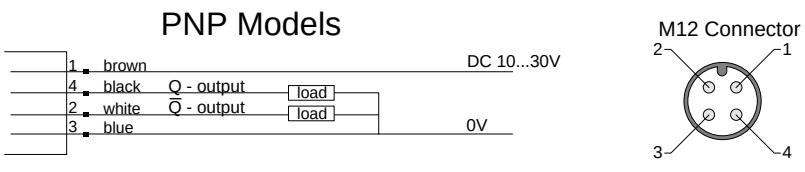
Type	Part no.
WT23-2N2421	1 028 073
WT23-2P2421	1 027 778

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Technical data	WT23-2	N2421	P2421
Sensing range, typ. max.	2.0...39.4 ft (50...1000 mm)[1]		
Operating distance	3.9...39.4 ft (100...1000 mm)[1]		
Adjustment of operating distance	Potentiometer		
Light source[2], light type	LED, Infrared light, 880 nm		
Light spot diameter	Approx. 50 mm at 800 mm		
Supply voltage V_S	10...30 V DC[3]		
Ripple[4]	≤ 5 V_{pp}		
Current consumption[5]	≤ 35 mA		
Switching outputs	NPN, Q/ $\overline{Q}$		
	PNP, Q/$\overline{Q}$		
Signal voltage PNP HIGH/LOW	> V_S-2.5 V/approx. 0 V		
Signal voltage NPN HIGH/LOW	Approx. V_S/< 2.5 V		
Output current I_A max.	≤ 100 mA		
Response time	≤ 2.5 ms[6]		
Switching frequency	200 Hz[7]		
Connection type	Connector, M12 4-pin		
VDE protection class[8]	□		
Circuit protection[9]	A, B, C		
Enclosure rating	IP 65		
Ambient temperature T_A	Operation -13...140°F (-25...60° C)		
	Storage -40...158°F (-40...70° C)		
Approximate weight	3.5 oz (100 g)		
Housing material	ABS, PMMA		

1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25°C
3) Limit values, operation in short-circuit protected network max. 8 A
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression

Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WT23-2

Proximity/Diffuse Sensors- Background blanking

2.0...39.4 in (50...1000 mm)
sensing range

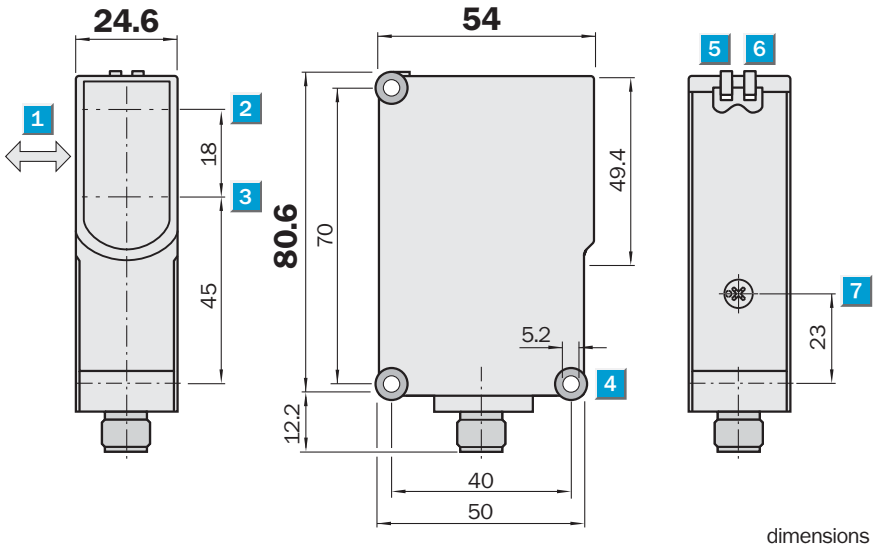
Highlights

- Infrared light, long sensing distance
- 360° visibility on indicator LEDs, for faster monitoring

WT23-2

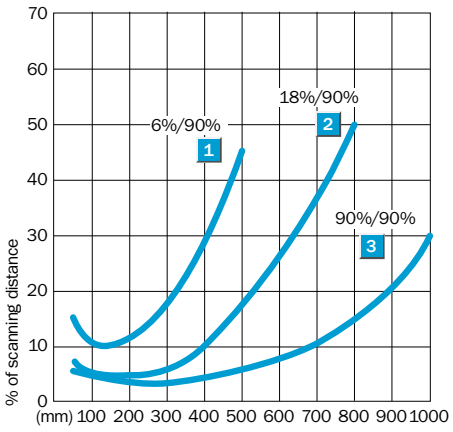


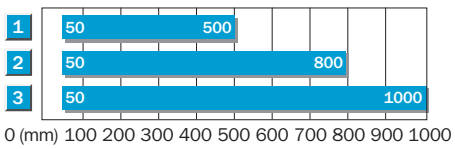
Dimensional drawing



dimensions in mm

Background blanking





1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

WT23-2S1521



1	Standard direction of the material being sensed
2	Optical axis sender
3	Optical axis receiver
4	Mounting hole Ø 5.2 mm
5	LED indicator green; power on
6	LED indicator yellow; status of received light beam
7	Sensing distance adjustment

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

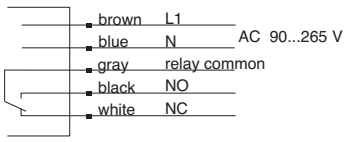
Type	Part no.
WT23-2S1521	1 027 780

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Technical data	WT23-2	S1521
Sensing range, typ. max.	2.0...39.4 ft (50...1000 mm)[1]	
Operating distance	3.9...39.4 ft (100...1000 mm)[1]	
Adjustment of operating distance	Potentiometer	
Light source[2], light type	LED, Infrared light, 880 nm	
Light spot diameter	Approx. 50 mm at 800 mm	
Supply voltage V_S	90...265 V AC[3]	
Switching outputs	Relay 1 x c/o, electrically isolated[4]	
Switching mode	Light switching	
Current consumption	≤ 2.5 VA	
Max. switching voltage	250 V AC/150 V DC (max. 0.11 A)	
Switching current max.	3 A @ 250 V AC or 24 V DC[5]	
Max. switching power	750 W AC/72 W DC	
Response time	≤ 10 ms	
Switching frequency	10 Hz[6]	
Connection type	Cable, PVC, 2 m[7]	
VDE protection class[8]	□	
Circuit protection[9]	A, B	
Enclosure rating	IP 65	
Ambient temperature T_A	Operation -13...140°F (-25...60° C[10]	
	Storage -40...158°F (-40...70° C)	
Approximate weight	7.0 oz (200 g)	
Housing material	ABS, PMMA	

1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25°C
3) Limit values
4) Provide suitable spark suppression for inductive or capacitive loads
5) Usage category to EN 60947-1, AC-15, DC-13
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 250 V AC
9) A = V_S connections reverse-polarity protected
B = Interference pulse suppression
10) UL: 0° C…60° C

Connection diagram



WTE23-2

Proximity/Diffuse Sensors- Energetic

2.0...90.6 in (50...2300 mm)
sensing range

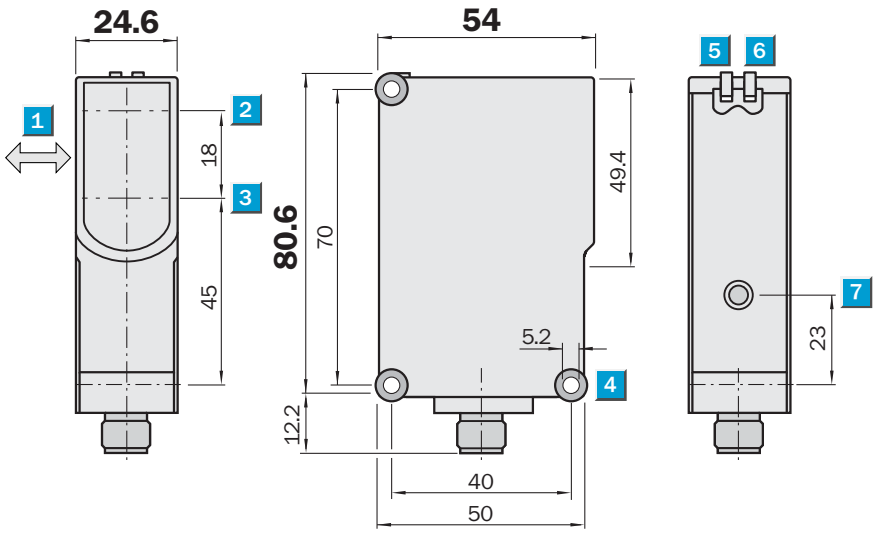
Highlights

- Easy teach-in, ready to operate in less time
- Infrared light, long sensing distance
- 360° visiblity on indicator LEDs, for faster monitoring

WTE23-2

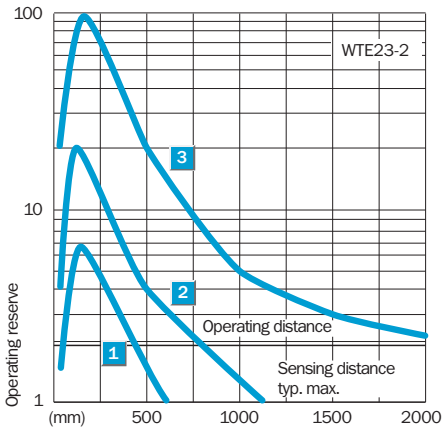


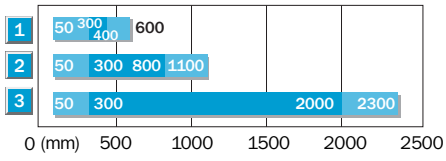
Dimensional drawing



dimensions in mm

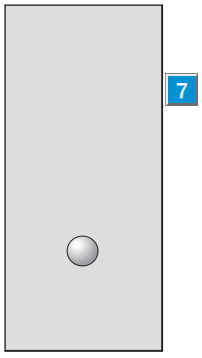
Excess gain





1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments



1	Standard direction of the material being sensed
2	Optical axis sender
3	Optical axis receiver
4	Mounting hole Ø 5.2 mm
5	LED indicator green; power on
6	LED indicator yellow; status of received light beam
7	Sensing adjustment: single teach button

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WTE23-2N2412	1 027 782
WTE23-2P2412	1 027 781

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Technical data	WTE23-2	N2421	P2421
Sensing range, adjustable	2.0...90.6 in (50...2300 mm)[1]		
Operating distance	11.8...78.7 in (300...2000 mm)[1]		
Adjustment of operating distance	Teach-in: single teach button		
Light source[2], light type	LED, Infrared light, 880 nm		
Light spot diameter	Approx. 160 mm at 2000 mm		
Supply voltage V_S	10...30 V DC[3]		
Ripple	≤ 5 V_{pp}[4]		
Current consumption	≤ 35 mA[5]		
Switching outputs	NPN, Q/$\overline{Q}$		
	PNP, Q/$\overline{Q}$		
Signal voltage PNP HIGH/LOW	> V_S-2.5 V/approx. 0 V		
Signal voltage NPN HIGH/LOW	Approx. V_S/< 2.5 V		
Output current I_A max.	≤ 100 mA		
Response time	≤ 2.5 ms[6]		
Switching frequency	200 Hz[7]		
Connection type	Connector, M12 4-pin		
VDE protection class[8]	□		
Circuit protection[9]	A, B, C		
Enclosure rating	IP 65		
Ambient temperature T_A	Operation -13...140°F (-25...60° C)[10]		
	Storage -40...158°F (-40...70° C)		
Approximate weight	3.5 oz (100 g)		
Housing material	ABS, PMMA		

1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values, operation in short-circuit protected network max. 8 A
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V AC
9) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
c = Interference pulse suppression

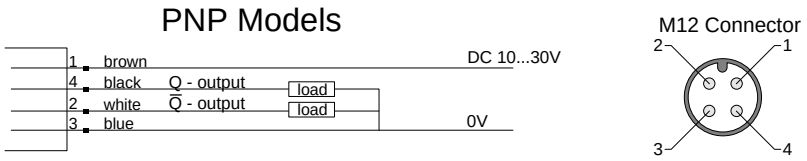
Teach-in function

Programming via Teach-in button

Position object in the light beam and push the teach-in button (< 4s), (approx. double reserve over switching threshold); adjustment is completed.

Yellow LED light and Teach-in value is stored.

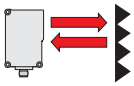
Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WL23-2

Reflex/Retro-Reflective Sensors






0.3...32.8 ft (0.1...10 m)
sensing range

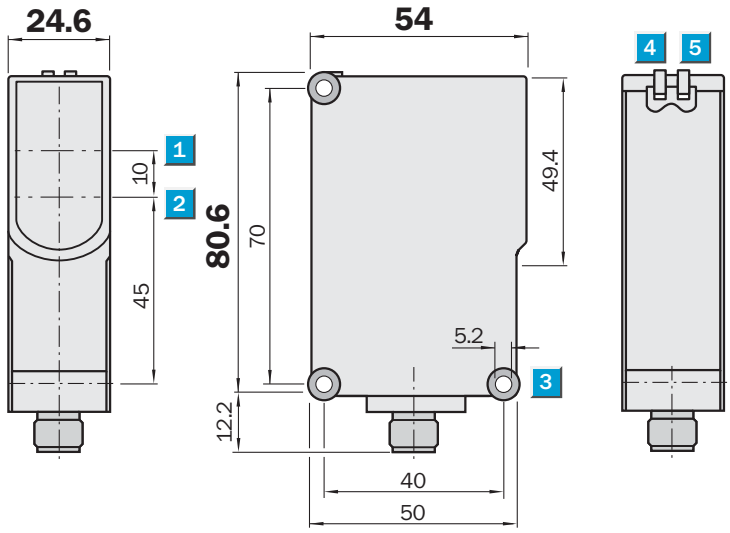
Highlights

- Plug & Play, ready to operate in less time
- Excellent alignment to reflector
- Polarization filter, safe detection even with shiny surfaces

WTE23-2



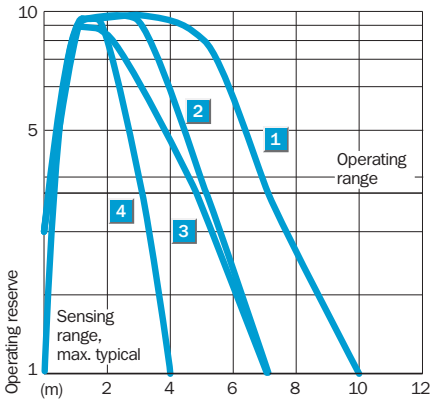
Dimensional drawing

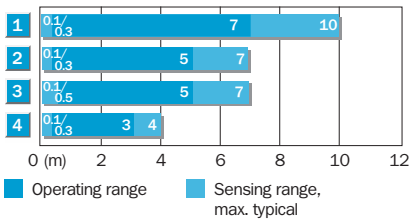


dimensions in mm

1 Optical axis sender
2 Optical axis receiver
3 Mounting hole Ø 5.2 mm
4 LED indicator green; power on
5 LED indicator yellow; status of received light beam

Excess gain





	Reflector type	Operating range
1	PL 80 A	0.3 ... 7.0 m
2	PL 40 A	0.3 ... 5.0 m
3	P975	0.5 ... 5.0 m
4	PL 20 A	0.3 ... 3.0 m

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

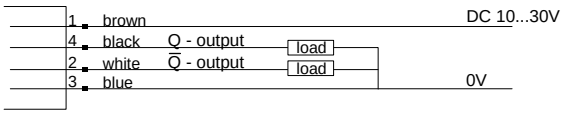
Type	Part no.
WL23-2N2430	1 027 787
WL23-2P1130	1 027 784
WL23-2P2430	1 027 785
WL23-2P3430	1 027 786

Technical data	WL23-2	N2430	P1130	P2430	P3430
Sensing range, typ. max.	0.3...32.8 ft (0.1...10 m)	■	■	■	■
Sensing range, recommended	1.0...23.0 ft (0.3...7 m)	■	■	■	■
Relating to	Reflector PL80 A	■	■	■	■
Light source[1], **light type**	LED, red light, 660 nm	■	■	■	■
Light spot diameter	Approx. 45 mm at 2.7 m	■	■	■	■
Angle of dispersion	Approx. 1.5°	■	■	■	■
Polarization filter	√	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■
Ripple	≤ 5 V_{pp}[3]	■	■	■	■
Current consumption	≤ 35 mA[4]	■	■	■	■
Switching outputs	NPN, Q/$\overline{Q}$	■			
	PNP, Q/$\overline{Q}$		■	■	■
Signal voltage PNP HIGH/LOW	> V_S-2.5 V/approx. 0 V		■	■	■
Signal voltage NPN HIGH/LOW	Approx. V_S/< 2.5 V	■			
Output current I_A max.	≤ 100 mA	■	■	■	■
Response time	≤ 2.5 ms[5]	■	■	■	■
Switching frequency	200 Hz[6]	■	■	■	■
Connection type	Connector, M12 4-pin	■		■	
	Cable, PVC, 2 m[7]		■		
	Cable with plug, M12 4-pin, PVC, 270 mm[7]				■
VDE protection class[8]	□	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■
Enclosure rating	IP 65	■	■	■	■
Ambient temperature T_A	Operation -13...140°F (-25...60° C)[10]	■	■	■	■
	Storage -40...158°F (-40...70° C)	■	■	■	■
Approximate weight	3.5 oz (100 g)	■		■	
	6.3 oz (180 g)		■		
	4.2 oz (120 g)				■
Housing material	ABS, PMMA	■	■	■	■

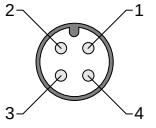
1) Average service life 100,000 h at T_A = 25°C
2) Limit values, operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
c = Interference pulse suppression

Connection diagram

PNP Models



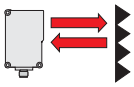
M12 Connector



wire colors refer to standard cable, not included with quick disconnect models

WL23-2

Reflex/Retro-Reflective Sensors




0.3...32.8 ft (0.1...10 m)
sensing range

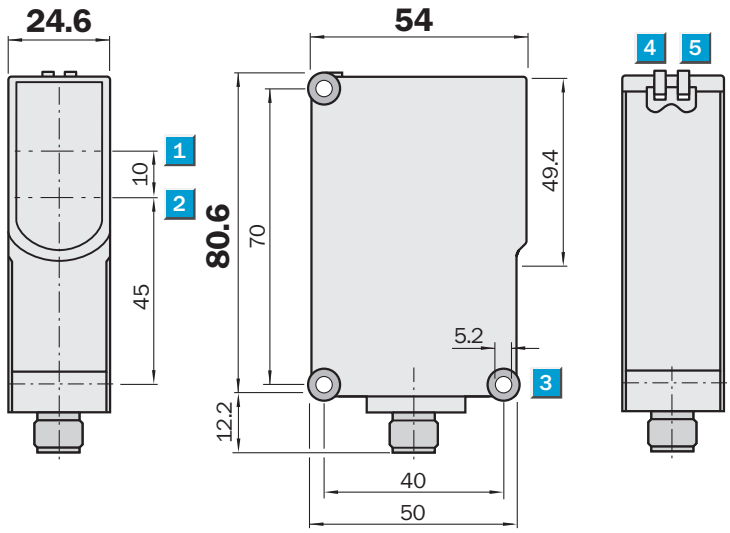
Highlights

- Plug & Play, AC version (240 V)
- Excellent alignment to reflector
- Polarization filter, safe detection even with shiny surfaces

WL23-2



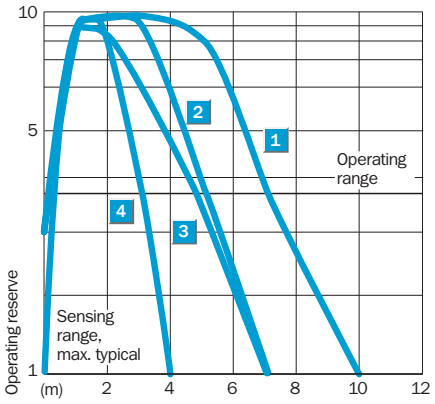
Dimensional drawing

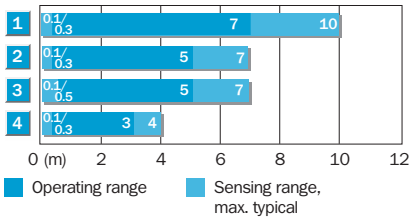


dimensions in mm

1 Optical axis sender
2 Optical axis receiver
3 Mounting hole Ø 5.2 mm
4 LED indicator green; power on
5 LED indicator yellow; status of received light beam

Excess gain





	Reflector type	Operating range
1	PL 80 A	0.3 ... 7.0 m
2	PL 40 A	0.3 ... 5.0 m
3	P975	0.5 ... 5.0 m
4	PL 20 A	0.3 ... 3.0 m

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

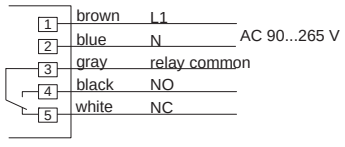
Order information

Type	Part no.
WL23-2S1530	1 027 788
WL23-2S3730	1 027 789

Technical data	WL23-2	S1530	S3730							
Sensing range, typ. max.	0.3...32.8 ft (0.1...10 m)	■	■							
Sensing range, recommended	1.0...23.0 ft (0.3...7 m)	■	■							
Relating to	Reflector PL80 A	■	■							
Light source[1], **light type**	LED, red light, 660 nm	■	■							
Light spot diameter	Approx. 45 mm at 2.7 m	■	■							
Angle of dispersion	Approx. 1.5°	■	■							
Polarization filter	√	■	■							
Supply voltage V_S	90...265 V AC[2]	■	■							
Switching outputs	Relay 1 x c/o, electrically isolated[3]	■	■							
Switching mode	Light switching	■	■							
Current consumption	≤ 2.5 VA	■	■							
Max. switching voltage	250 V AC/250 V DC (max 0.11A)	■	■							
Switching current max.	3 A @ 250 V AC or 24 V DC[4]	■	■							
Max. switching power	750 W AC/72 W DC	■	■							
Response time	≤ 10 ms	■	■							
Switching frequency	10 Hz[5]	■	■							
Connection type	Cable, PVC, 2 m[6]	■								
	Cable with plug, Q7 7-pin, AC/UC, PVC, 150 mm[6]		■							
VDE protection class[7]	□	■	■							
Circuit protection[8]	A, B	■	■							
Enclosure rating	IP 65	■	■							
Ambient temperature T_A	Operation -13...140°F (-25...60° C)[9]	■	■							
	Storage -40...158°F (-40...70° C)	■	■							
Approximate weight	7.0 oz (200 g)	■								
	4.9 oz (140 g)		■							
Housing material	ABS, PMMA	■	■							

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) Provide suitable spark suppression for inductive or capacitive loads
4) Usage category to EN 60947-1, AC-15, DC-13
5) With light/dark ratio 1:1
6) Do not bend below 0° C
7) Reference voltage 250 V AC
8) A = V_S connections reverse-polarity protection, B = Interference pulse suppression
9) UL: 0° C…60° C

Connection diagram



* Pins 6 and 7 – No connection

WT 24-2 Red

Proximity/Diffuse Sensors-Background Suppression



2.0...47.2 in (50...1200 mm)
sensing range

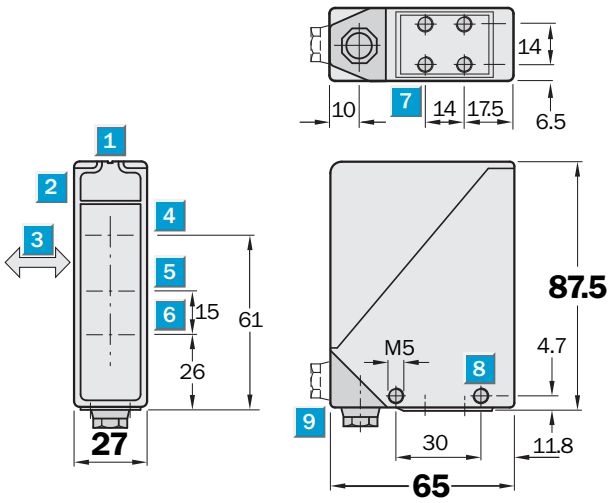
Highlights

- Robust metal housing
- Red light for easy alignment
- Adjustable background suppression
- Alarm output and test input
- Selectable time delays
- Crosstalk immunity
- Models available with integrated lens heater
- Optional dust shield, snow shield and cooling plates available

WT 24-2

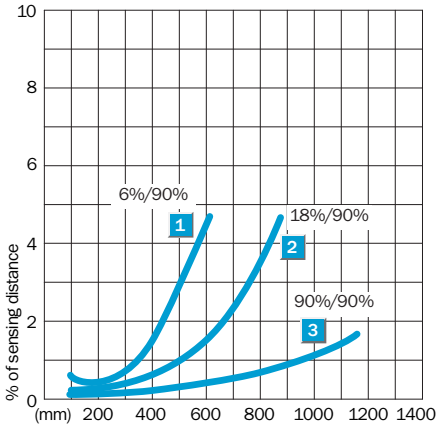


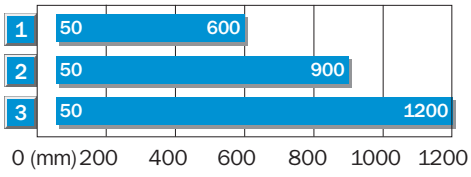
Dimensional drawing



dimensions in mm

Background suppression



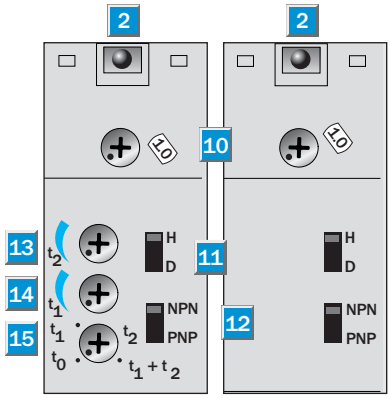


1	Sensing range on black[9]
2	Sensing range on gray[9]
3	Sensing range on white[9]

(see footnotes on next page)

Adjustments

WT 24-2B 250	WT 24-2B 240
WT 24-2V 250	WT 24-2B 440
	WT 24-2V 540



1	Alignment sight
2	LED signal strength indicator
3	Standard direction of the material being sensed
4	Center of optical axis, sender
5	Center of optical axis, receiver (close range)
6	Center of optical axis, receiver (far range)
7	M5 threaded mounting hole, 6 mm deep
8	M5 threaded mounting hole, through-hole
9	PG screw fixing and plug rotatable by 90°
10	Sensing range adjustment
11	Light/dark selector
12	NPN/PNP selector
13	Time control t_2 = OFF-delay
14	Time control t_1 = ON-delay
15	Time delay selector switch

Order information

Type	Part no.
WT 24-2 B 240	1 017 813
WT 24-2 B 250	1 017 883
WT 24-2 B 440	1 016 934
WT 24-2 V 250	1 017 887
WT 24-2 V 540	1 017 888

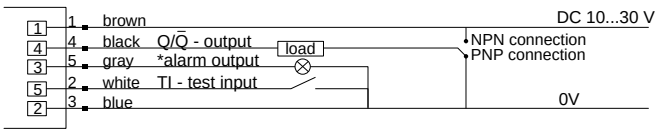
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

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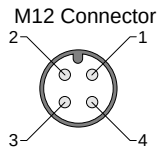
Technical data	WT 24-2-	B240	B250	B440	V250	V540
Sensing range, adjustable	2.0...47.2 in (50...1200 mm)	■	■	■	■	■
Background suppression	3.9...47.2 in (100...1200 mm)	■	■	■	■	■
Background suppression capability	% of set sensing distance (see previous page)	■	■	■	■	■
Light source[1], **light type**	LED, red light	■	■	■	■	■
Light spot diameter	Approx. 1.5 in at 47.2 in (40 mm at 1200 mm)	■	■	■	■	■
Angle of divergence	Approx 2°	■	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■
Ripple[3]	< 5 V_{SS}	■	■	■	■	■
Current consumption[4]	≤ 50 mA	■		■		■
	≤ 70 mA, front lens heating		■		■	
Switching outputs	PNP or NPN, Q or $\overline{Q}$	■	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■
Response time[5]	≤ 500 µs	■	■	■	■	■
Max. switching frequency[6]	1 kHz	■	■	■	■	■
Alarm output	PNP				■	■
Time delay	Adjustable, 0.5...10 sec		■		■	
Test input "TE"	Sender switched off	■	■	■	■	■
Sender OFF	PNP or NPN: TE to 0 V	■	■	■	■	■
Connection types	PG 9 terminal chamber	■	■		■	
	Plug, M12 4-pin			■		
	Plug, M12 5-pin					■
VDE protection class[7]	□	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■
Approximate weight	11.6 oz (330 g)	■	■	■	■	■
Front lens heating			■		■	
Housing material	Die cast zinc	■	■	■	■	■

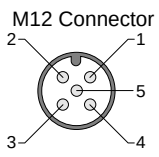
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression
9) Black = 6% remission
Gray = 18% remission
White = 90% remission

Connection diagram



wire colors refer to standard cable, not included
* alarm output available on special models only





WT 24-2 IR

Proximity/Diffuse Sensors-Background Suppression



1.2...98.4 in (30...2500 mm)
sensing range

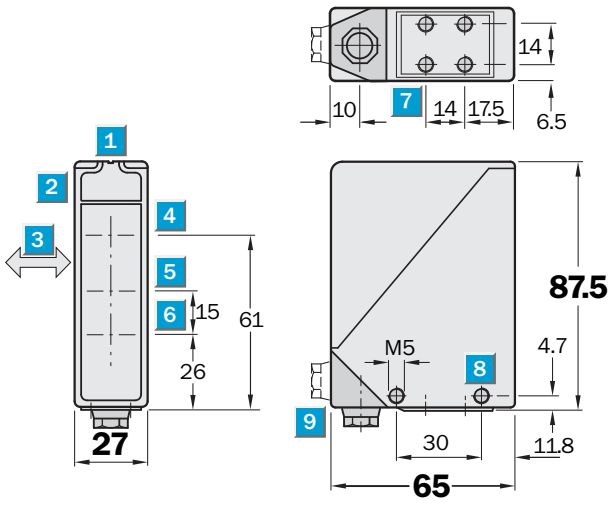
Highlights

- Robust metal housing
- Adjustable background suppression
- PNP and NPN in the same switch
- Alarm output and test input
- Crosstalk immunity
- Selectable time delays
- Models available with integrated lens heater
- Optional dust shield, snow shield and cooling plates available

WT 24-2

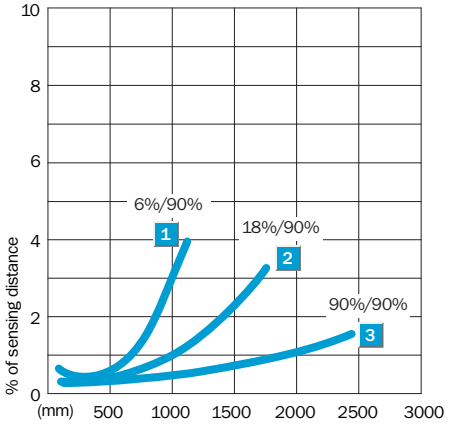


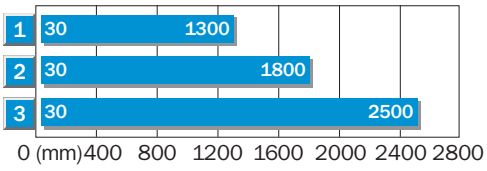
Dimensional drawing



dimensions in mm

Background suppression



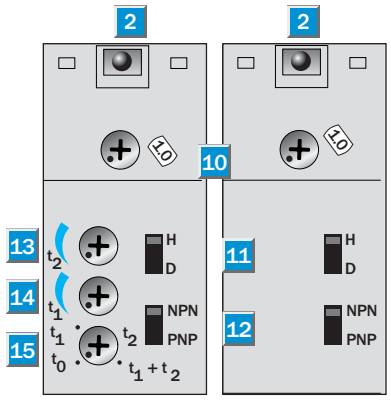


1	Sensing range on black[9]
2	Sensing range on gray[9]
3	Sensing range on white[9]

(see footnotes on next page)

Adjustments

WT 24-2B220	WT 24-2B210
WT 24-2B420	WT 24-2B410
WT 24-2V220	WT 24-2V510



1	Alignment sight
2	LED signal strength indicator
3	Standard direction of the material being sensed
4	Center of optical axis, sender
5	Center of optical axis, receiver (close range)
6	Center of optical axis, receiver (far range)
7	M5 threaded mounting hole, 6 mm deep
8	M5 threaded mounting hole, through-hole
9	PG screw fixing or plug rotatable by 90°
10	Sensing range adjustment
11	Light/dark selector
12	NPN/PNP selector
13	Time control t_2 = OFF-delay
14	Time control t_1 = ON-delay
15	Time delay selector switch

Order information

Type	Part no.
WT 24-2B210	1 016 931
WT 24-2B220	1 017 882
WT 24-2B410	1 016 933
WT 24-2B420	1 017 885
WT 24-2V220	1 017 886
WT 24-2V510	1 017 855

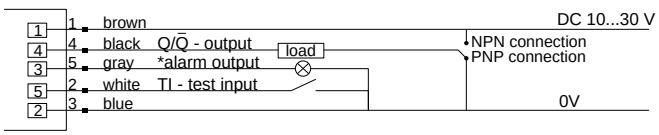
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

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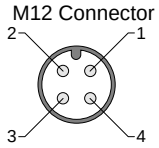
Technical data	WT 24-2-	B210	B220	B410	B420	V220	V510
Sensing range, adjustable	1.2...98.4 in (30...2500 mm)	■	■	■	■	■	■
Background suppression	3.9...98.4 in (100...2500 mm)	■	■	■	■	■	■
Background suppression capability	% of set sensing distance (see previous page)	■	■	■	■	■	■
Light source[1], **light type**	LED, infrared light	■	■	■	■	■	■
Light spot diameter	Approx. 3.2 in at 98.4 in (80 mm at 2500 mm)	■	■	■	■	■	■
Angle of divergence	Approx 1.8°	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■	■
Ripple[3]	< 5 V_{SS}	■	■	■	■	■	■
Current consumption[4]	≤ 50 mA	■		■			■
	≤ 70 mA, front lens heating		■		■	■	
Switching outputs	PNP or NPN, Q or $\overline{Q}$	■	■	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■
Response time[5]	≤ 500 µs	■	■	■	■	■	■
Max. switching frequency[6]	1 kHz	■	■	■	■	■	■
Alarm output	PNP					■	■
Time delay	Adjustable, 0.5…10 sec		■		■	■	
Test input "TE"	Sender switched off	■	■	■	■	■	■
Sender OFF	PNP or NPN: TE to 0 V	■	■	■	■	■	■
Connection types	PG 9 terminal chamber	■	■			■	
	Plug, M12 4-pin			■	■		
	Plug, M12 5-pin						■
VDE protection class[7]	⧈	■	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■
Approximate weight	11.6 oz (330 g)	■	■	■	■	■	■
Front lens heating			■		■	■	
Housing material	Die cast zinc	■	■	■	■	■	■

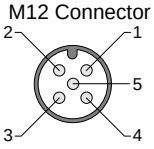
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression
9) Black = 6% remission
Gray = 18% remission
White = 90% remission

Connection diagram



wire colors refer to standard cable, not included
* alarm output available on special models only





WT 24-2

Proximity/Diffuse Sensors-Background Suppression



2.0...47.2 in (50...1200 mm)
sensing range

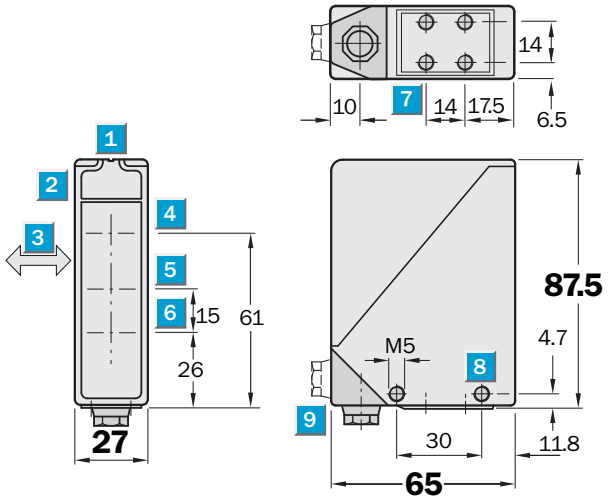
Highlights

- Robust metal housing
- Adjustable background suppression
- Crosstalk immunity
- Signal strength indicator
- Selectable time delays
- Cable connections swivel 90° for easy installation
- Models available with integrated lens heater
- Optional dust shield, snow shield and cooling plates available

WT 24-2

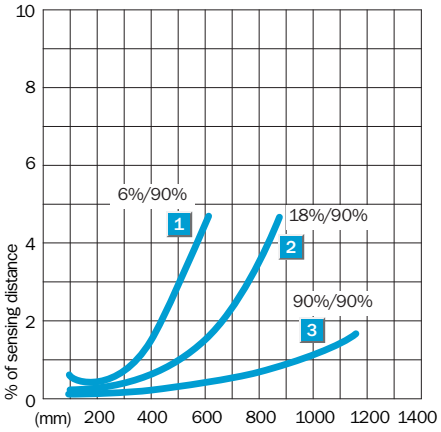


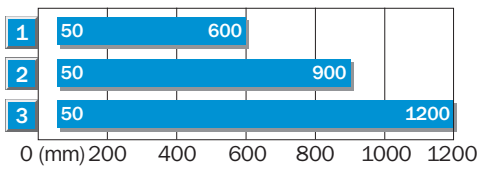
Dimensional drawing



dimensions in mm

Background suppression



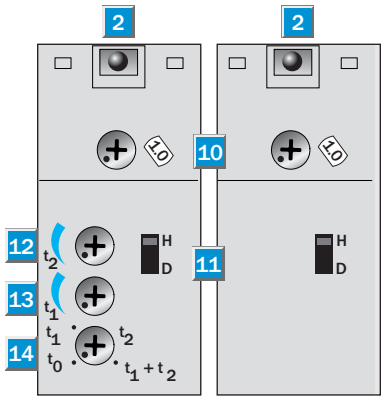


1	Sensing range on black[8)]
2	Sensing range on gray[8)]
3	Sensing range on white[8)]

(see footnotes on next page)

Adjustments

WT 24-2R250 | WT 24-2R240



1	Alignment sight
2	LED signal strength indicator
3	Standard direction of the material being sensed
4	Center of optical axis, sender
5	Center of optical axis, receiver (close range)
6	Center of optical axis, receiver (far range)
7	M5 threaded mounting hole, 6 mm deep
8	M5 threaded mounting hole, through-hole
9	PG screw fixing rotatable by 90°
10	Sensing range adjustment
11	Light/dark selector
12	Time control t_2 = OFF-delay
13	Time control t_1 = ON-delay
14	Time delay selector switch

Order information

Type	Part no.	
WT 24-2R240	1 017 854	
WT 24-2R250	1 016 820	
WT 24-2R548	1 018 318	*
WT 24-2R549	1 018 316	*

* wet contact

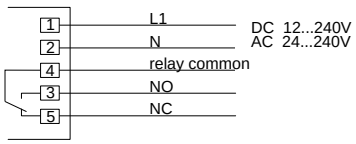
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

Technical data		WT 24-2-	R240	R250	R548*	R549*
Sensing range, adjustable	2.0...47.2 in (50...1200 mm)		■	■	■	■
Background suppression	3.9...47.2 in (100...1200 mm)		■	■	■	■
Background suppression capability	% of set sensing distance (see previous page)		■	■	■	■
Light source[1], **light type**	LED, red light		■	■	■	■
Light spot diameter	Approx. 1.6 in at 47.2 in (40 mm at 1200 mm)		■	■	■	■
Angle of divergence	Approx. 1.8°		■	■	■	■
Supply voltage V_S	12...240 V DC[2], 24...240 V AC[3]		■	■	■	■
Power consumption without heating	< 2 VA		■			
Power consumption with heating	< 3 VA			■		
Switching output	Relay, SPDT, isolated[4]		■	■	■	■
Max. switching voltage	250 V AC/120 V DC		■	■	■	■
Max. switching current	4 A/240 V AC, 4 A/24 V DC		■	■	■	■
Max. switching capacity	AC: 1000 VA/DC: 100 W		■	■	■	■
Response time	≤ 10 ms		■	■	■	■
Max. switching frequency[5]	10 Hz		■	■	■	■
Time delay	Adjustable, 0.5...10 sec			■		
Connection types	PG 9 terminal chamber		■	■		
	Plug, micro 5-pin					■
	Plug, mini 5-pin				■	
VDE protection class[6]	⧈		■	■	■	■
Circuit protection[7]	A, C		■	■	■	■
Enclosure rating	IP 67/NEMA 6		■	■	■	■
Ambient temperature T_A	Operation	-40...140° F (-40...60° C)	■	■	■	■
	Storage	-40...167° F (-40...75° C)	■	■	■	■
Approximate weight	11.6 oz (330 g)		■	■	■	■
Front lens heating				■		
Housing material	Die cast zinc		■	■	■	■

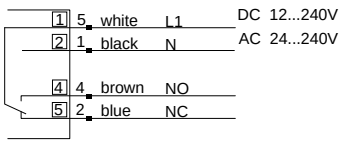
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) ± 10%
4) Provide suitable spark suppression for inductive or capacitive loads
5) With light/dark ratio 1:1
6) Reference voltage 250 V AC/DC
7) A = V_S connections reverse-polarity protected
C = Interference pulse suppression
8) Black = 6% remission
Gray = 18% remission
White = 90% remission

* wet contact

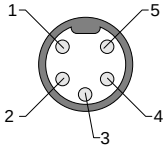
Connection diagram



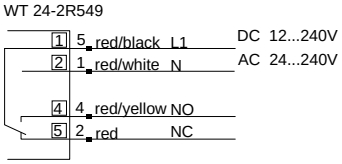
WT 24-2R548



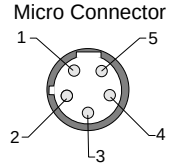
Mini Connector



WT 24-2R549



Micro Connector



wire colors refer to standard cable, not included

WT 24-2

Proximity/Diffuse Sensors-Background Suppression



1.2...98.4 in (30...2500 mm)
sensing range

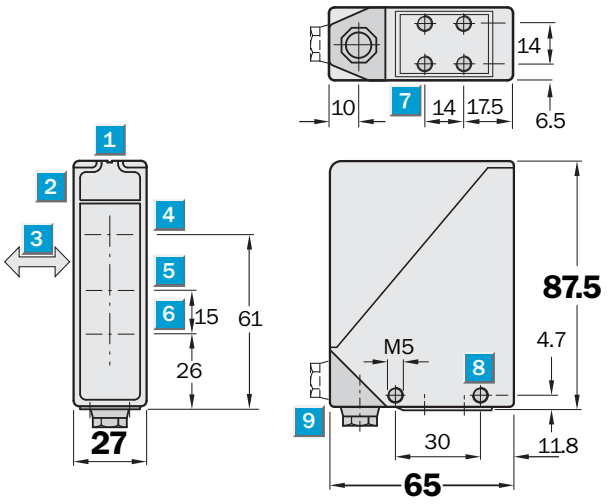
Highlights

- Robust metal housing
- Adjustable background suppression and selectable time delays
- Cable connections swivel 90° for easy installation
- Signal strength indicator
- Wide range supply voltage
- Crosstalk immunity
- Models available with integrated lens heater
- Optional dust shield, snow shield and cooling plates available

WT 24-2

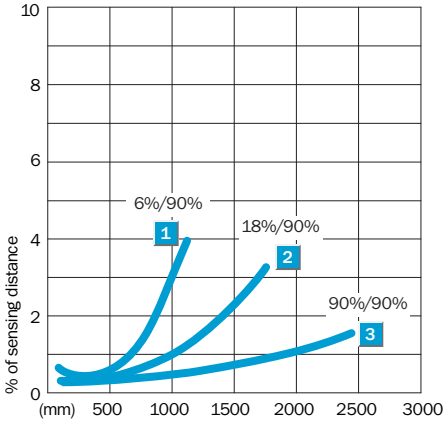


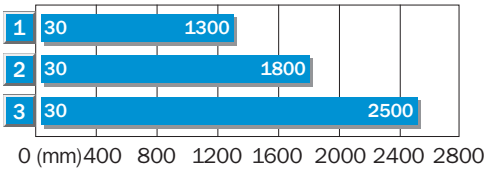
Dimensional drawing



dimensions in mm

Background suppression



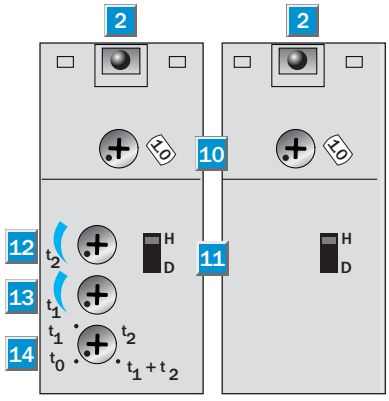


1	Sensing range on black[8)]
2	Sensing range on gray[8)]
3	Sensing range on white[8)]

(see footnotes on next page)

Adjustments

WT 24-2R220	WT 24-2R210
	WT 24-2R518
	WT 24-2R519



1	Alignment sight
2	LED signal strength indicator
3	Standard direction of the material being sensed
4	Center of optical axis, sender
5	Center of optical axis, receiver (close range)
6	Center of optical axis, receiver (far range)
7	M5 threaded mounting hole, 6 mm deep
8	M5 threaded mounting hole, through-hole
9	PG 9 screw fixing rotatable by 90°
10	Sensing range adjustment
11	Light/dark selector
12	Time control t_2 = OFF-delay
13	Time control t_1 = ON-delay
14	Time delay selector switch

Order information

Type	Part no.
WT 24-2R210	1 016 932
WT 24-2R220	1 016 854
WT 24-2R518	1 018 317
WT 24-2R519	1 018 315

Accessories

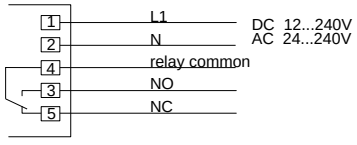
	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

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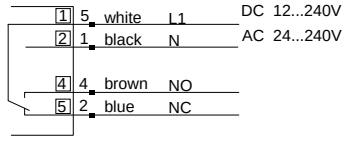
Technical data	WT 24-2-	R210	R220	R518	R519
Sensing range, adjustable	1.2...98.4 in (30...2500 mm)	■	■	■	■
Background suppression	3.9...98.4 in (100...2500 mm)	■	■	■	■
Background suppression capability	% of set sensing distance (see previous page)	■	■	■	■
Light source[1], light type	LED, infrared light	■	■	■	■
Light spot diameter	Approx. 3.2 in at 98.4 in (80 mm at 2500 mm)	■	■	■	■
Angle of divergence	Approx. 1.8°	■	■	■	■
Supply voltage V_S	12...240 V DC[2], 24...240 V AC[3]	■	■	■	■
Power consumption without heating	< 2 VA	■		■	■
Power consumption with heating	< 3 VA		■		
Switching output	Relay, SPDT, isolated[4]	■	■	■	■
Max. switching voltage	250 V AC/120 V DC	■	■	■	■
Max. switching current	4 A/240 V AC, 4 A/24 V DC	■	■	■	■
Max. switching capacity	AC: 1000 VA/DC: 100 W	■	■	■	■
Response time	≤ 10 ms	■	■	■	■
Max. switching frequency[5]	10 Hz	■	■	■	■
Time delay	Adjustable, 0.5...10 sec		■		
Connection types	Plug, micro 5-pin				■
	PG 9 terminal chamber	■	■		
	Plug, mini 5-pin			■	
VDE protection class[6]	□	■	■	■	■
Circuit protection[7]	A, C	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■
Approximate weight	11.6 oz (330 g)	■	■	■	■
Front lens heating			■		
Housing material	Die cast zinc	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) ± %
4) Provide suitable spark suppression for inductive or capacitive loads
5) With light/dark ratio 1:1
6) Reference voltage 250 V AC/DC
7) A = V_S connections reverse-polarity protected
C = Interference pulse suppression
8) Black = 6% remission
Gray = 18% remission
White = 90% remission

Connection diagram

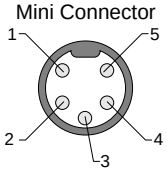


WT 24-2R548

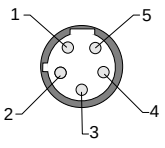




Mini Connector



Micro Connector



wire colors refer to standard cable, not included

WL 24-2

Reflex/Retro-Reflective Sensors



0...27 ft (0...22 m)
sensing range

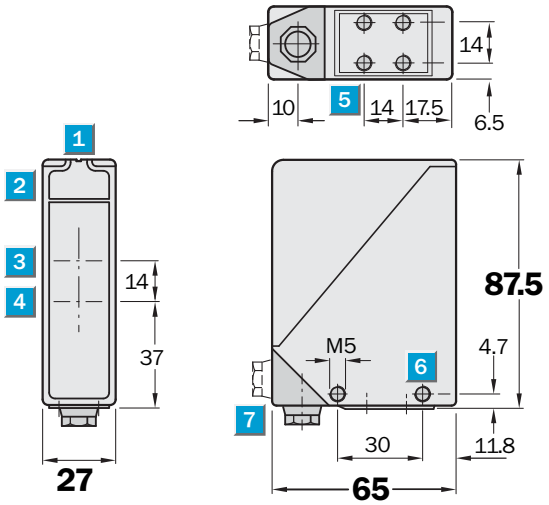
Highlights

- Rugged metal housing
- Signal strength indicator
- Adjustable sensing range
- Optional dust shield, snow shield and cooling plates available
- Cable connections swivel 90° for easy installation
- Models available with integrated lens heater
- Alarm output and test input

WL 24-2

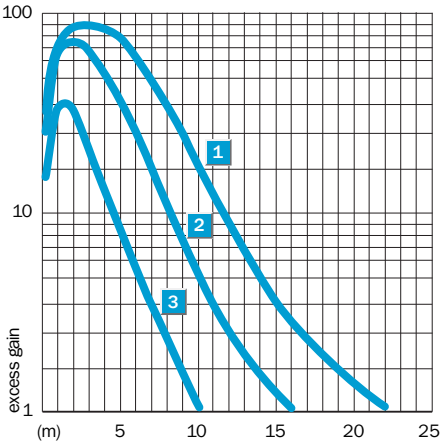


Dimensional drawing



dimensions in mm

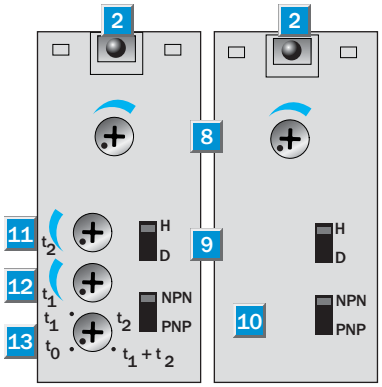
Excess gain



Reflector type	Sensing range
1 PL 80 A	0...22.0 m
2 PL 50 A, PL 40 A	0...16.0 m
3 PL 30 A, PL 20 A	0...10.0 m

Adjustments

WL 24-2B240	WL 24-2B230
WL 24-2B440	WL 24-2B430
	WL 24-2V230
	WL 24-2V530



1	Alignment sight
2	LED signal strength indicator
3	Center of optical axis, sender
4	Center of optical axis, receiver
5	M5 threaded mounting hole, 6 mm deep
6	M5 threaded mounting hole, through-hole
7	PG screw fixing or plug rotatable by 90°
8	Sensitivity adjustment
9	Light/dark selector
10	NPN/PNP selector
11	Time control t_2 = OFF-delay
12	Time control t_1 = ON-delay
13	Time delay selector switch

Order information

Type	Part no.
WL 24-2B230	1 015 852
WL 24-2B240	1 017 859
WL 24-2B430	1 017 860
WL 24-2B440	1 017 879
WL 24-2V230	1 017 880
WL 24-2V530	1 017 881

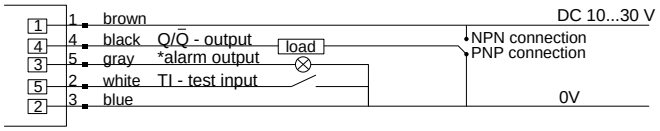
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256
Special Accessories	1314

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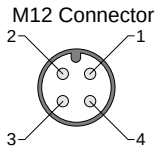
Technical data	WL 24-2-	B230	B240	B430	B440	V230	V530
Sensing range	0...72.2 ft (0...22 m)/on PL 80 A	■	■	■	■	■	■
Sensitivity	Adjustable	■	■	■	■	■	■
Light source[1], light type	LED, red light, polarized	■	■	■	■	■	■
Light spot diameter	Approx. 9.8 in at 49.2 ft (250 mm at 15 m)	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■	■
Ripple[3]	< 5 V_{SS}	■	■	■	■	■	■
Current consumption[4]	≤ 50 mA	■		■		■	■
	≤ 70 mA, front lens heating		■		■		
Switching outputs	PNP or NPN, Q or $\overline{Q}$	■	■	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■
Response time[5]	≤ 500 µs	■	■	■	■	■	■
Max. switching frequency[6]	1000 Hz	■	■	■	■	■	■
Alarm output	PNP					■	■
Time delay	Adjustable, 0.5...10 sec		■		■		
Test input "TE"	Sender switched off	■	■	■	■	■	■
Sender OFF	PNP or NPN: TE to 0 V	■	■	■	■	■	■
Connection types	PG 9 terminal chamber	■	■			■	
	Plug, M12 4-pin			■	■		
	Plug, M12 5-pin						■
VDE protection class[7]	□	■	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (40...60° C)	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■
Approximate weight	11.6 oz (330 g)	■	■	■	■	■	■
Front lens heating			■		■		
Polarizing filter		■	■	■	■	■	■
Housing material	Die cast zinc	■	■	■	■	■	■

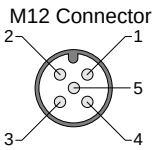
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram



wire colors refer to standard cable, not included
* alarm output available on special models only





WL 24-2

Reflex/Retro-Reflective Sensors



0...72.2 ft (0...22 m)
sensing range

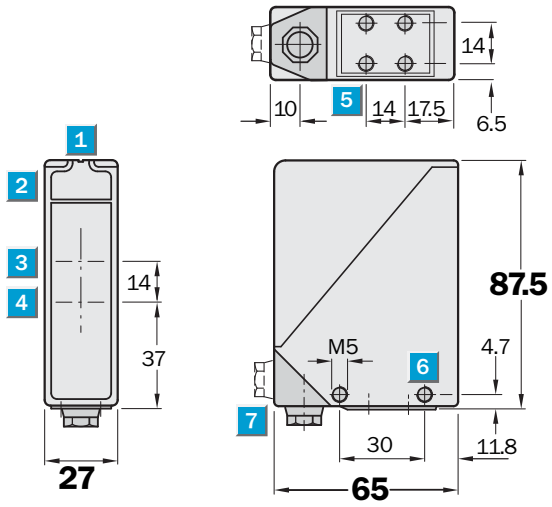
Highlights

- Rugged die cast metal housing
- Red light for easy alignment
- Cable connections swivel 90° for easy installation
- Adjustable sensing range
- Wide range supply voltage
- Crosstalk immunity
- Models available with integrated lens heater
- Optional dust shield, snow shield and cooling plates available

WL 24-2

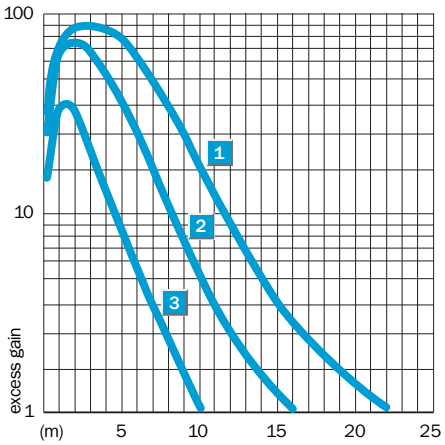


Dimensional drawing



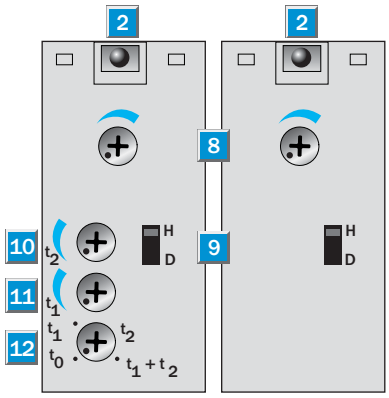
dimensions in mm

Excess gain



Adjustments

WL 24-2R240 | WL 24-2R230
WL 24-2R538



1	Alignment sight
2	LED signal strength indicator
3	Center of optical axis, sender
4	Center of optical axis, receiver
5	M5 threaded mounting hole, 6 mm deep
6	M5 threaded mounting hole, through-hole
7	PG terminal chamber rotatable by 90°
8	Sensitivity adjustment
9	Light/dark selector
10	Time control t_2 = OFF-delay
11	Time control t_1 = ON-delay
12	Time delay selector switch

Reflector type		Sensing range
1	PL 80 A	0...22.0 m
2	PL 50 A	0...16.0 m
3	PL 40 A	0...16.0 m
4	PL 30 A	0...10.0 m
5	PL 20 A	0...10.0 m

Order information	
WL 24-2R230	1 017 858
WL 24-2R240	1 017 857
WL 24-2R538	1 018 313

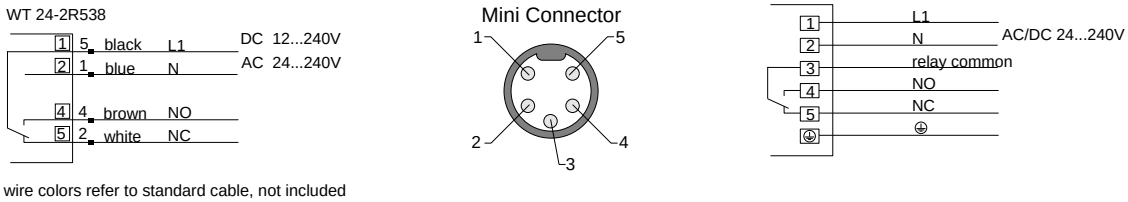
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256
Special Accessories	1314

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Technical data	WL 24-2-	R230	R240	R538
Sensing range	0...72.2 ft (0...22 m)/on PL 80 A	■	■	■
Sensitivity	Adjustable	■	■	■
Light source[1], **light type**	LED, red light, polarized	■	■	■
Light spot diameter	Approx. 9.8 in at 49.2 ft (250 mm at 15 m)	■	■	■
Supply voltage V_S	12...240 V DC[2], 24...240 V AC[3]	■	■	■
Power consumption without heating	< 2 VA	■		■
Power consumption with heating	< 3 VA		■	
Switching output	Relay, SPDT, electrically isolated[4]	■	■	■
Wet contact	Relay, SPDT			■
Max. switching voltage	250 V AC/120 V DC	■	■	■
Max. switching current	4 A/240 V AC, 4 A/24 V DC	■	■	■
Max. switching capacity	AC: 1000 VA/DC: 100 W	■	■	■
Response time[5]	≤ 10 ms	■	■	■
Max. switching frequency[6]	10 Hz	■	■	■
Time delay	Adjustable, 0.5…10 sec		■	
Connection types	PG 9 terminal chamber	■	■	
	Plug, mini 5-pin			■
VDE protection class[7]	⧈	■	■	■
Circuit protection[8]	A, C	■	■	■
Enclosure rating	IP 67	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■
Approximate weight	11.6 oz (330 g)	■	■	■
Front lens heating			■	
Polarizing filter		■	■	■
Housing material	Die cast zinc	■	■	■

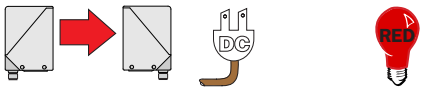
1) Average service life 100,000 h at T_U = 25° C
2) Limit values
3) ± 10%
4) Provide suitable spark suppression for inductive or capacitive loads
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 250 V UC
8) A = V_S connections reverse-polarity protected
C = Interference pulse suppression

Connection diagram



WS/WE 24-2

Through-beam Sensors



0...196.9 ft (0...60 m)
sensing range

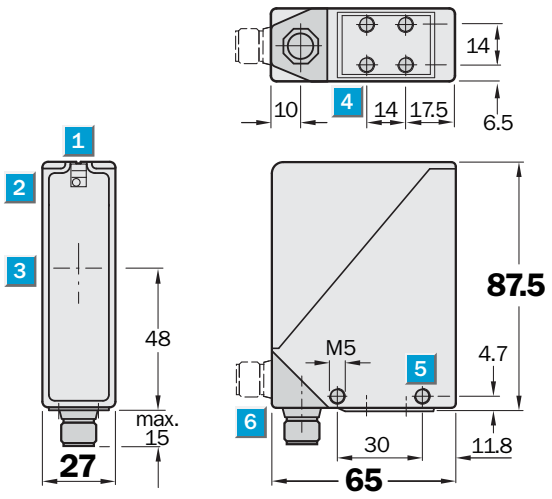
Highlights

- Rugged die cast metal housing
- Adjustable sensing range
- Signal strength indicator
- Alarm output and test input
- Red light for easy alignment
- Optional dust shield, snow shield or cooling plates available
- Models available with integrated lens heater

WS/WE 24-2

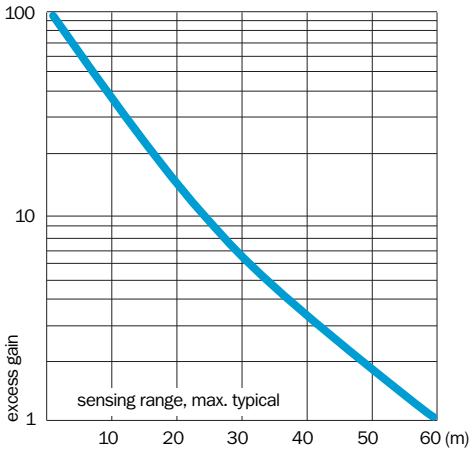


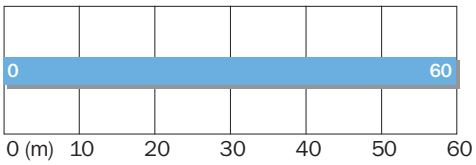
Dimensional drawing



dimensions in mm

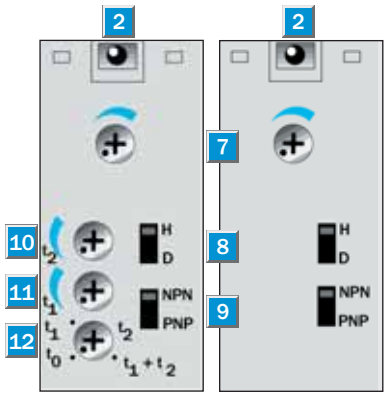
Excess gain





Adjustments

WS/WE 24-2B440	WS/WE 24-2B230
WS/WE 24-2B240	WS/WE 24-2B430
	WS/WE 24-2V530



1	Alignment sight
2	LED signal strength indicator
3	Center of optical axis
4	M5 threaded mounting hole, 6 mm deep
5	M5 threaded mounting hole, through-hole
6	PG cable gland and plug rotatable by 90°
7	Sensitivity adjustment
8	Light/dark selector
9	NPN/PNP selector
10	Time control t_2 = OFF-delay
11	Time control t_1 = ON-delay
12	Time delay selector switch

Order information

Type	Part no.
WS/WE 24-2B230	1 017 861
WS/WE 24-2B240	1 017 862
WS/WE 24-2B430	1 017 853
WS/WE 24-2B440	1 017 875
WS/WE 24-2V530	1 017 877

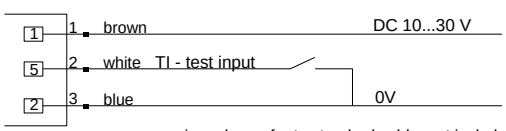
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

Technical data	WS/WE 24-2-	B230	B240	B430	B440	V530
Sensing range	0...196.9 ft (0...60 m)	■	■	■	■	■
Sensitivity	Adjustable	■	■	■	■	■
Light source[1], **light type**	LED, red light	■	■	■	■	■
Light spot diameter	27.6 in at 164 ft (700 mm at 50 m)	■	■	■	■	■
Angle of divergence/reception	1°/2.5°	■	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■
Ripple[3]	< 5 V_{SS}	■	■	■	■	■
Current consumption[4]						
Sender without heating	≤ 50 mA	■		■		■
Sender with heating	≤ 70 mA		■		■	
Receiver without heating	≤ 40 mA	■		■		■
Receiver with heating	≤ 60 mA		■		■	
Switching outputs	PNP or NPN, Q or $\overline{Q}$	■	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■
Response time[5]	≤ 500 µs	■	■	■	■	■
Max. switching frequency[6]	1000/s	■	■	■	■	■
Alarm output	Alarm, PNP					■
Time delay	Adjustable, 0.5...10 sec		■		■	
Test input "TE"	Sender switched off	■	■	■	■	■
Sender OFF	PNP or NPN: test input to 0 V	■	■	■	■	■
Connection types	Plug, M12 4-pin			■	■	
	Plug, M12 5-pin					■
	PG 9 terminal chamber	■	■			
VDE protection class[7]	□	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■
Approximate weight	11.6 oz (330 g)	■	■	■	■	■
Front lens heating			■		■	
Housing material	Die cast zinc	■	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Same values for WS and WE, without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

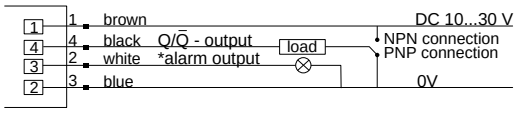
Connection diagram

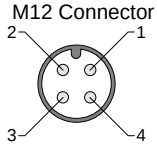
Sender

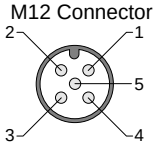


wire colors refer to standard cable, not included
* alarm output available on special models only

Receiver







WS/WE 24-2

Through-beam Sensors



0...196.9 ft (0...60 m)
sensing range

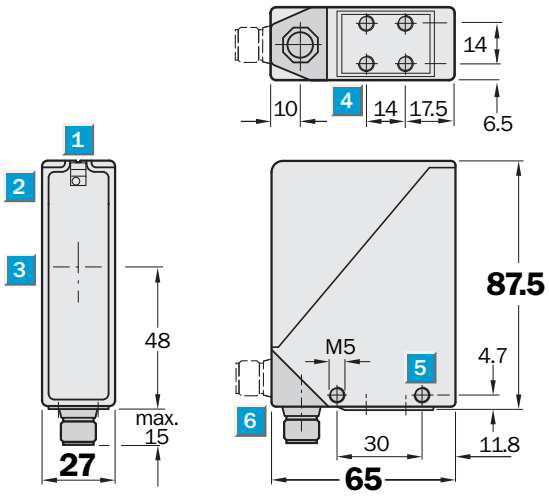
Highlights

- Rugged metal housing
- Adjustable sensing range
- Wide range supply voltage
- Signal strength indicator
- Red light for easy alignment
- Selectable time delays
- Terminal chamber for connection flexibility

WS/WE 24-2

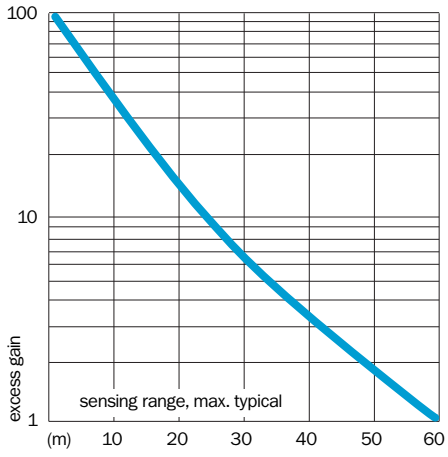


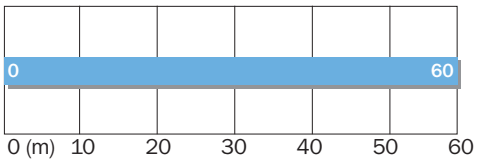
Dimensional drawing



dimensions in mm

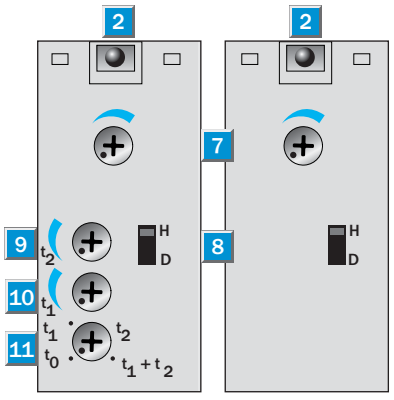
Excess gain





Adjustments

WS/WE 24-2R240 | WS/WE 24-2R230



1 Alignment sight
2 LED signal strength indicator
3 Center of optical axis
4 M5 threaded mounting hole, 6 mm deep
5 M5 threaded mounting hole, through-hole
6 PG cable gland rotatable by 90°
7 Sensitivity adjustment
8 Light/dark selector
9 Time control t_2 = OFF-delay
10 Time control t_1 = ON-delay
11 Time delay selector switch

Accessories	page
Mounting systems	1234
Special Accessories	1314

Order information

Type	Part no.
WS/WE 24-2R230	1 017 863
WS/WE 24-2R240	1 017 864

Technical data	WS/WE 24-2-	R230	R240
Sensing range	0...196.9 ft (0...60 m)	■	■
Sensitivity	Adjustable	■	■
Light source[1], **light type**	LED, red light	■	■
Light spot diameter	23.6 in at 164 ft (600 mm at 50 m)	■	■
Angle of divergence/reception	Approx. 1°/2.5°	■	■
Supply voltage V_S	12...240 V DC[2], 24...240 V AC[3]	■	■
Power consumption without heating	< 2 VA	■	
Power consumption with heating	< 3 VA		■
Switching output	Relay, SPDT, electrically isolated[4]	■	■
Max. switching voltage	250 V AC/120 V DC	■	■
Max. switching current	4 A/240 V AC, 4 A/24 V DC[5]	■	■
Max. switching capacity	AC: 1000 VA/DC: 100 W	■	■
Response time	≤ 10 ms	■	■
Max. switching frequency[6]	10 Hz	■	■
Time delay	Adjustable, 0.5...10 sec		■
Connection type	PG 9 terminal chamber	■	■
VDE protection class[7]	□	■	■
Circuit protection[8]	A, C	■	■
Enclosure rating	IP 67	■	■
		■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■
	Storage -40...167° F (-40...75° C)	■	■
Approximate weight	11.6 oz (330 g)	■	■
Front lens heating			■
Housing material	Die cast zinc	■	■

1) Average service life 100,000 h at T_U = 25° C
2) Limit values
3) ± 10%
4) Provide suitable spark suppression for inductive or capacitive loads
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 250 V UC
8) A = V_S connections reverse-polarity protected
C = Interference pulse suppression

Connection diagram



WT 34 Red

Proximity/Diffuse Sensors - Background Suppression



2.0 ... 47.2 in (50...1200 mm)
sensing range

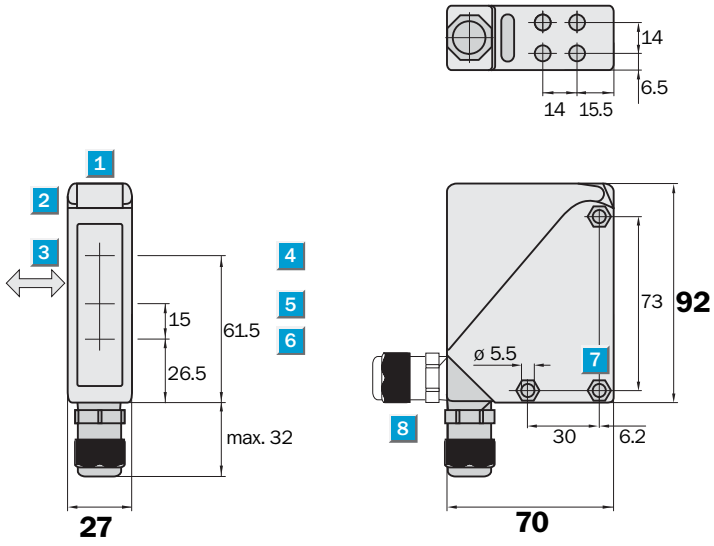
Highlights

- Sturdy plastic housing
- Red light for easy alignment
- Adjustable background suppression
- Signal strength indicator
- Selectable time delays
- Terminal chamber for connection flexibility
- Cable connections swivel 90° for easy installation
- Alarm output and test input

WT 34

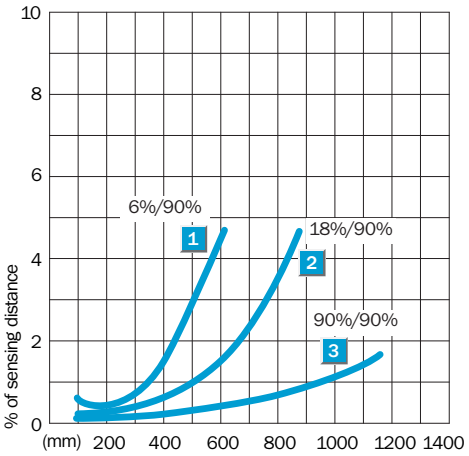


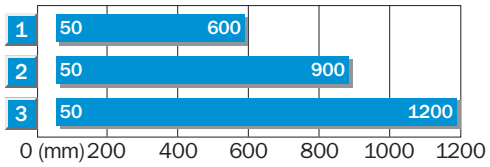
Dimensional drawing



dimensions in mm

Background suppression



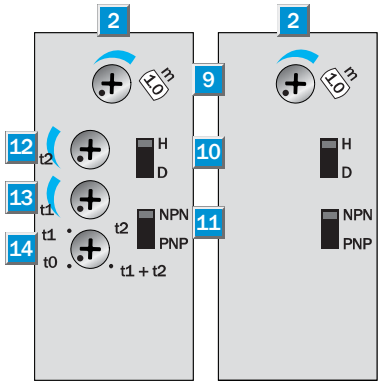


1	Sensing range on black[9]
2	Sensing range on gray[9]
3	Sensing range on white[9]

(see footnotes on next page)

Adjustments

WT 34-V250	WT 34-V240
WT 34-B450	WT 34-B440
	WT 34-V540



1	Alignment sight
2	LED signal strength indicator
3	Standard direction of material being sensed
4	Center of optical axis, sender
5	Center of optical axis, receiver at close range
6	Center of optical axis, receiver at long range
7	Mounting hole Ø 5.5 mm, for M5 hexagon nuts on both sides
8	M16 screw fixing or plug rotatable by 90°
9	Sensing range adjustment
10	Light/dark selector
11	NPN/PNP selector
12	Time control t_2 = OFF-delay
13	Time control t_1 = ON-delay
14	Time delay selector switch

Order Information

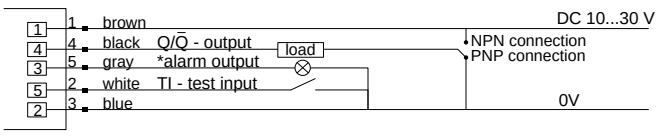
Type	Part no.
WT 34-V240	1 019 227
WT 34-V250	1 019 236
WT 34-B440	1 109 237
WT 34-B450	1 019 234
WT 34-V540	1 019 238

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Cables and connectors	1180
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Special Accessories	1314

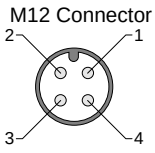
Technical data	WT 34-	V240	V250	B440	B450	V540
Sensing range, adjustable	2.0...47.2 in (50...1200 mm)	■	■	■	■	■
Background suppression	3.9...47.2 in (100...1200 mm)	■	■	■	■	■
Light source[1], light type	LED, red light	■	■	■	■	■
Light spot diameter	Approx. 1.6 in at 47.2 in (40 mm at 1200 mm)	■	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■
Ripple[3]	< 5 V_{PP}	■	■	■	■	■
Current consumption[4]	≤ 50 mA	■	■	■	■	■
Switching outputs	PNP or NPN, Q or $\overline{Q}$	■	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■
Response time[5]	≤ 500 µs	■	■	■	■	■
Max. switching frequency[6]	1000 Hz	■	■	■	■	■
Alarm output	PNP	■	■			■
Time delay	Adjustable, 0.5 to 10 s		■		■	
Test input "TE"	Sender switched off	■	■	■	■	■
Sender off	PNP or NPN: TE to 0 V	■	■	■	■	■
Connection types	M16 terminal chamber	■	■			
	Plug, M12 4-pin			■	■	
	Plug, M12 5-pin					■
VDE protection class[7]	□	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■
Ambient temperature	Operation -40...140° F (-40...60° C)	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■
Approximate weight	4.9 oz (140 g)	■	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■

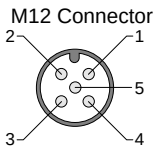
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal flight time with ohmic load
6) With light/dark ratio 1:1
7) Withstand voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Outputs Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression
9) Black = 6% remission
Gray = 18% remission
White = 90% remission

Connection diagram



Wire colors refer to standard cable, not included
*alarm output available on special models only





WT 34 IR

Proximity/Diffuse Sensors - Background Suppression



1.2...98.4 in (30...2500 mm)
sensing range

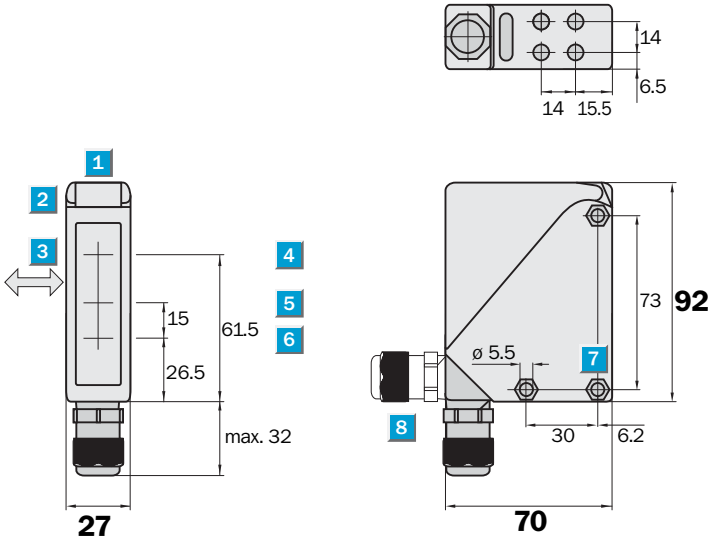
Highlights

- Sturdy plastic housing
- Adjustable background suppression
- Signal strength indicator
- Alarm output and test input
- Selectable time delays
- Terminal chamber for connection flexibility
- Cable connections swivel 90° for easy installation

WT 34

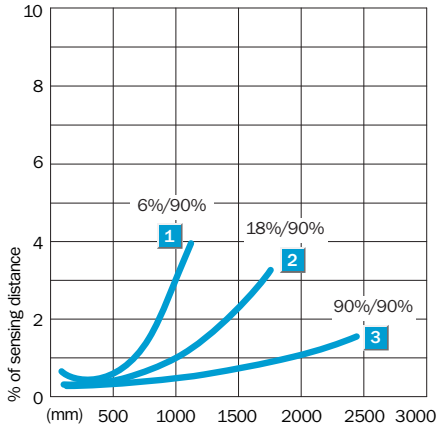


Dimensional drawing

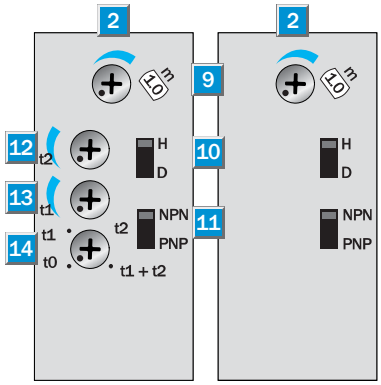


dimensions in mm

Background suppression

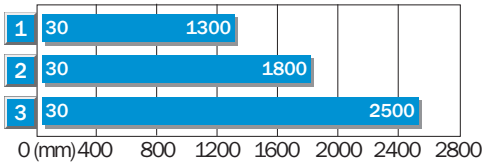


Adjustments



WT 34-B420	WT 34-B410
WT 34-V220	WT 34-V210
	WT 34-V510

1 Alignment sight
2 LED signal strength indicator
3 Standard direction of material being sensed
4 Center of optical axis, sender
5 Center of optical axis, receiver at close range
6 Center of optical axis, receiver at long range
7 Mounting hole Ø 5.5 mm, for M5 hexagon nuts on both sides
8 M16 screw fixing or plug rotatable by 90°
9 Sensing range adjustment
10 Light/dark selector
11 NPN/PNP selector
12 Time control t_2 = OFF-delay
13 Time control t_1 = ON-delay
14 Time delay selector switch



1 Sensing range on black[9)]
2 Sensing range on gray[9)]
3 Sensing range on white[9)]

(see footnotes on next page)

Order Information

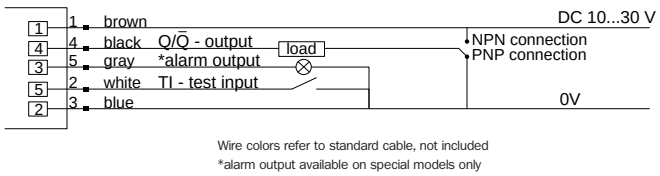
Type	Part no.
WT 34-V210	1 019 280
WT 34-V220	1 019 228
WT 34-B410	1 109 229
WT 34-B420	1 019 230
WT 34-V510	1 019 231

Accessories	page
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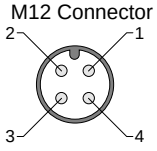
Technical data	WT 34-	V210	V220	B410	B420	V510
Sensing range, adjustable	1.2....98.4 in (30...2500 mm)	■	■	■	■	■
Background suppression	3.9...98.4 in (100...2500 mm)	■	■	■	■	■
Light source[1], light type	LED, infrared light	■	■	■	■	■
Light spot diameter	Approx. 3.1 in at 98.4 in (80 mm at 2500 mm)	■	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■
Ripple[3]	< 5 V_{PP}	■	■	■	■	■
Current consumption[4]	≤ 50 mA	■	■	■	■	■
Switching outputs	PNP or NPN, Q or $\overline{Q}$	■	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■
Response time[5]	≤ 500 µs	■	■	■	■	■
Max. switching frequency[6]	1000 Hz	■	■	■	■	■
Alarm output	Alarm, PNP	■	■			■
Time delay	Adjustable, 0.5 to 10 s		■		■	
Test input "TE"	Sender switched off	■	■	■	■	■
Sender off	PNP or NPN: TE to 0 V	■	■	■	■	■
Connection types	M16 terminal chamber	■	■			
	Plug, M12 4-pin			■	■	
	Plug, M12 5-pin					■
VDE protection class[7]	□	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■
Ambient temperature	Operation -40...140° F (-40...60° C)	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■
Approximate weight	4.9 oz (140 g)	■	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■

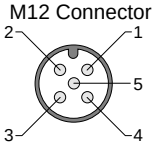
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal flight time with ohmic load
6) With light/dark ratio 1:1
7) Withstand voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Outputs Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression
9) Black = 6% remission
Gray = 18% remission
White = 90% remission

Connection diagram



Wire colors refer to standard cable, not included
*alarm output available on special models only





WT 34 Red

Proximity/Diffuse Sensors - Background Suppression



2.0...47.2 in (50...1200 mm)
sensing range

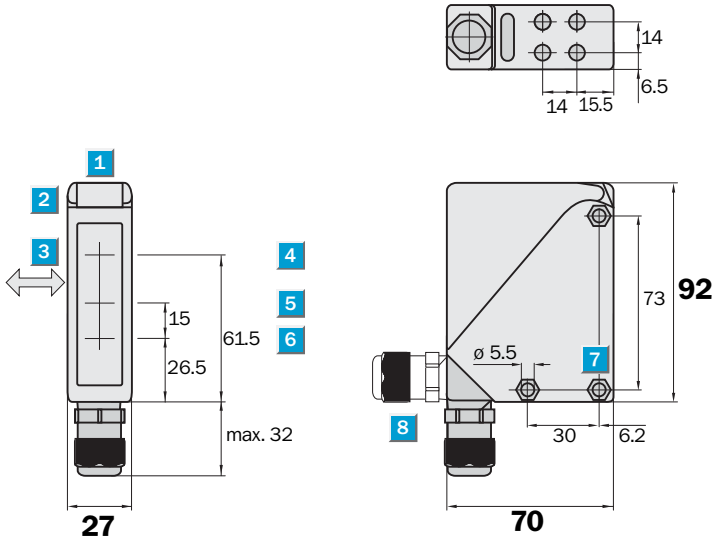
Highlights

- Sturdy plastic housing
- Red light for easy alignment
- Adjustable background suppression
- Selectable time delays
- Cable connections swivel 90° for easy installation
- Terminal chamber for connection flexibility

WT 34

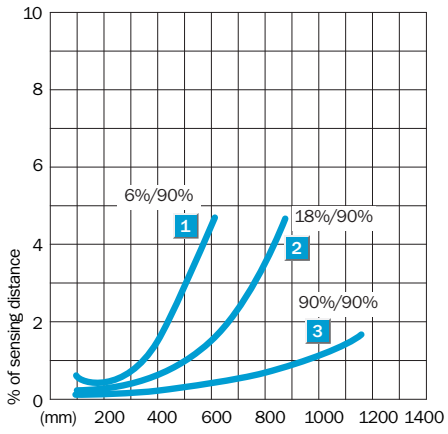


Dimensional drawing



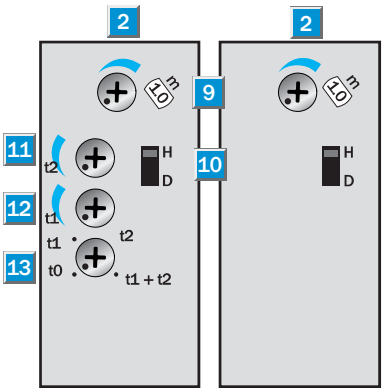
dimensions in mm

Background suppression

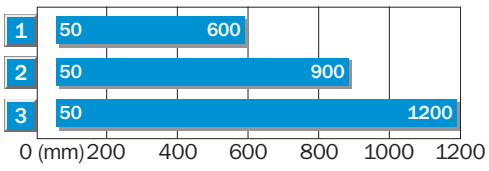


Adjustments

WT 34-R250 | WT 34-R240



1	Alignment sight
2	LED signal strength indicator
3	Standard direction of the material being sensed
4	Center of optical axis, sender
5	Center of optical axis, receiver at close range
6	Center of optical axis, receiver at long range
7	Mounting hole Ø 5.5 mm, for M5 hexagon nuts on both sides
8	M16 screw fixing rotatable by 90°
9	Sensing range adjustment
10	Light/dark selector
11	Time control t_2 = OFF-delay
12	Time control t_1 = ON-delay
13	Time delay selector switch



1	Sensing range on black[9)]
2	Sensing range on gray[9)]
3	Sensing range on white[9)]

(see footnotes on next page)

Order information

Type	Part no.
WT 34-R240	1 019 239
WT 34-R250	1 019 240

Accessories

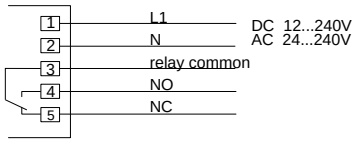
	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

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Technical data		WT 34-	R240	R250								
Sensing range, adjustable	2.0...47.2 in (50...1200 mm)		■	■								
Background suppression	3.9...47.2 in (100...1200 mm)		■	■								
Light source[1], light type	LED, red light		■	■								
Light spot diameter	Approx. 1.6 in at 47.2 in (40 mm at 1200 mm)		■	■								
Supply voltage V_S	12...240 V DC[2], 24...240 V AC[3]		■	■								
Power consumption	< 2 VA		■	■								
Switching output	Relay, SPDT, isolated[4]		■	■								
Max. switching voltage	250 V AC/120 V DC		■	■								
Max. switching current	4 A/240 V AC, 4 A/24 V DC		■	■								
Max. switching capacity	1000 VA AC/100 W DC		■	■								
Response time	≤ 10 ms		■	■								
Max. switching frequency[5]	10 Hz		■	■								
Time delay	Adjustable, 0.5 to 10 s			■								
Connection type	M16 terminal chamber		■	■								
VDE protection class[6]	□		■	■								
Circuit protection[7]	A, C		■	■								
Enclosure rating	IP 67		■	■								
Ambient temperature	Operation -40...140° F (-40...60° C)		■	■								
	Storage -40...167° F (-40...75° C)		■	■								
Approximate weight	4.9 oz (140 g)		■	■								
Housing material	Glass fiber reinforced ABS		■	■								

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) ± 10%
4) Provide suitable spark suppression for inductive or capacitive loads
5) With light/dark ratio 1:1
6) Withstand voltage 250 V AC/DC
7) A = V_S connections reverse-polarity protected
C = Interference pulse suppression
8) Black = 6% remission
Gray = 18% remission
White = 90% remission

Connection diagram



WT 34 IR

Proximity/Diffuse Sensors - Background Suppression



1.2...98.4 in (30...2500 mm)
sensing range

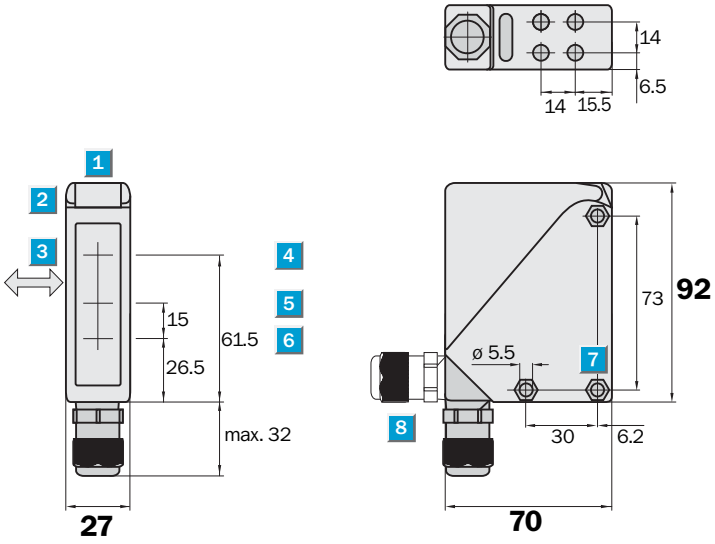
Highlights

- Sturdy plastic housing
- Infrared light
- Adjustable background suppression
- Signal strength indicator
- Selectable time delays
- Wide range supply voltage
- Terminal chamber for connection flexibility

WT 34

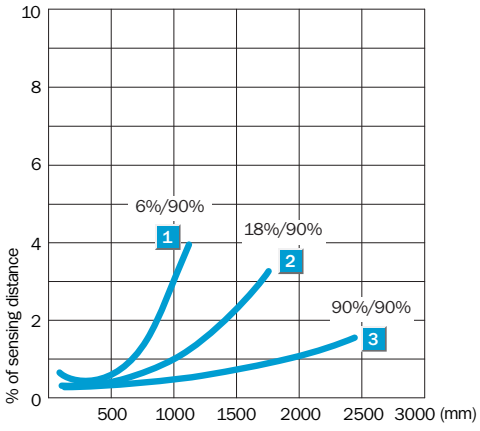


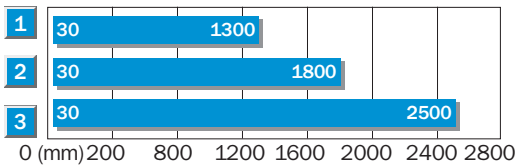
Dimensional drawing



dimensions in mm

Background suppression



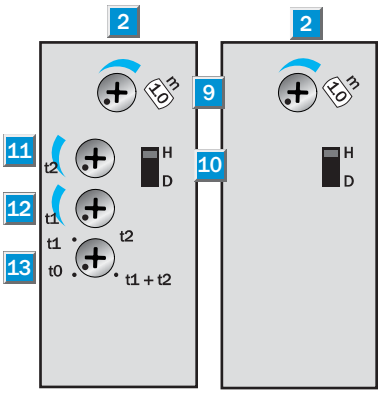


1	Sensing range on black[9]
2	Sensing range on gray[9]
3	Sensing range on white[9]

(see footnotes on next page)

Adjustments

WT 34-R220 | WT 34-R210



1	Alignment sight
2	LED signal strength indicator
3	Standard direction of the material being sensed
4	Center of optical axis, sender
5	Center of optical axis, receiver at close range
6	Center of optical axis, receiver at long range
7	Mounting hole Ø 5.5 mm, for M5 hexagon nuts on both sides
8	M16 screw fixing rotatable by 90°
9	Sensing range adjustment
10	Light/dark selector
11	Time control t_2 = OFF-delay
12	Time control t_1 = ON-delay
13	Time delay selector switch

Order information

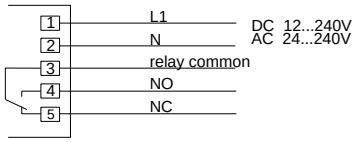
Type	Part no.
WT 34-R210	1 019 232
WT 34-R220	1 019 223

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

Technical data	WT 34-	R210	R220							
Sensing range, adjustable	1.2...98.4 in (30...2500 mm)	■	■							
Background suppression	3.9...98.4 in (100...2500 mm)	■	■							
Light source[1], light type	LED, infrared light	■	■							
Light spot diameter	Approx. 3.2 in at 98.4 in (80 mm at 2500 mm)	■	■							
Supply voltage V_S	12...240 V DC[2], 24...240 V AC[3]	■	■							
Power consumption	< 2 VA	■	■							
Switching output	Relay, SPDT, isolated[4]	■	■							
Max. switching voltage	250 V AC/120 V DC	■	■							
Max. switching current	4 A/240 V AC, 4 A/24 V DC	■	■							
Max. switching capacity	1000 VA AC/100 W DC	■	■							
Response time	≤ 10 ms	■	■							
Max. switching frequency[5]	10 Hz	■	■							
Time delay	Adjustable, 0.5 to 10 s		■							
Connection type	M16 terminal chamber	■	■							
VDE protection class[6]	□	■	■							
Circuit protection[7]	A, C	■	■							
Enclosure rating	IP 67	■	■							
Ambient temperature	Operation -40...140° F (-40...60° C)	■	■							
	Storage -40...167° F (-40...75° C)	■	■							
Approximate weight	4.9 oz (140 g)	■	■							
Housing material	Glass fiber reinforced ABS	■	■							

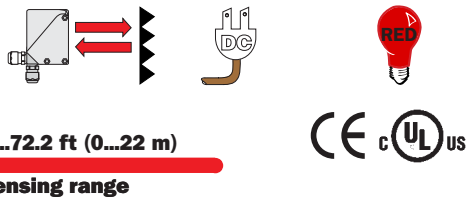
1) Average service life 100,000 h at $T_A = 25°$ C
2) Limit values
3) ± 10%
4) Provide suitable spark suppression for inductive or capacitive loads
5) With light/dark ratio 1:1
6) Withstand voltage 250 V AC/DC
7) A = V_S connections reverse-polarity protected
C = Interference pulse suppression
8) Black = 6% remission
Gray = 18% remission
White = 90% remission

Connection diagram



WL 34

Reflex/Retro-Reflective Sensors



0...72.2 ft (0...22 m)
sensing range

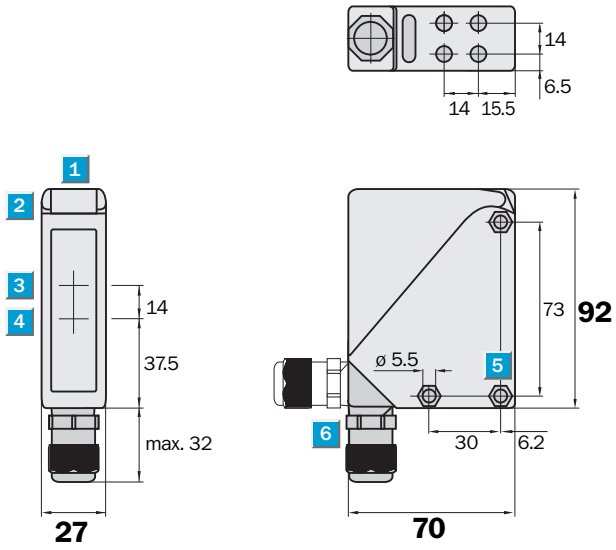
Highlights

- Sturdy plastic housing
- Red light for easy alignment
- Selectable time delays
- Signal strength indicator
- Alarm output and test input
- Cable connections swivel 90° for easy installation

WL 34

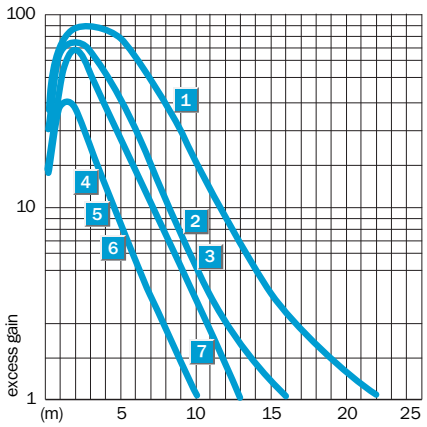


Dimensional drawing



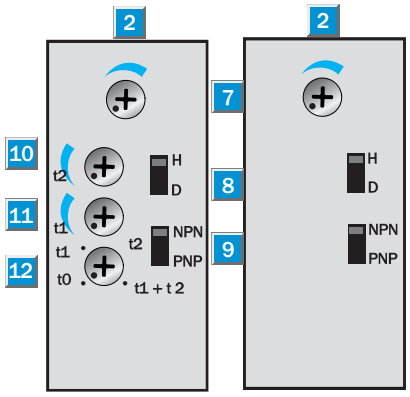
dimensions in mm

Excess gain



Adjustments

WL 34-B440	WL 34-B430
WL 34-V240	WL 34-V230
WL 34-V540	WL 34-V530



1 Alignment sight
2 LED signal strength indicator
3 Center of optical axis, sender
4 Center of optical axis, receiver
5 Mounting hole Ø 5.5 mm, for M5 hexagon nuts on both sides
6 M16 screw fixing or plug rotatable by 90°
7 Sensitivity control
8 Light/dark selector
9 NPN/PNP selector
10 Time control t_2 = OFF-delay
11 Time control t_1 = ON-delay
12 Time delay selector switch

Reflector type	Sensing range
1 PL 80 A	1...22.0 m
2 PL 50 A	0...16.0 m
3 PL 40 A	0...16.0 m
4 PL 30 A	0...10.0 m
5 PL 20 A	0...10.0 m
6 Reflective tape diamond grade	0...10.0 m

Order information

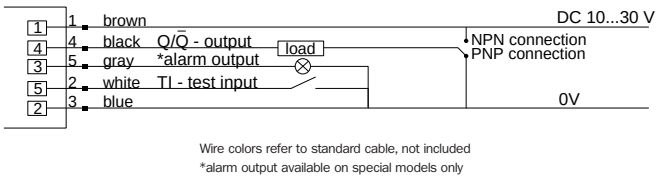
Type	Part no.
WL 34-V230	1 019 243
WL 34-V240	1 019 244
WL 34-B430	1 019 245
WL 34-B440	1 019 246
WL 34-V530	1 019 247
WL 34-V540	1 019 248

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256
Special Accessories	1314

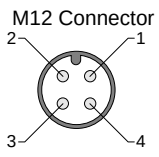
Technical data	WL 34-	V230	V240	B430	B440	V530	V540			
Sensing range	0...72.2 ft (0...22 m)/on PL 80 A	■	■	■	■	■	■			
Sensitivity	Adjustable	■	■	■	■	■	■			
Light source[1], light type	LED, red light, polarized	■	■	■	■	■	■			
Light spot diameter	Approx. 9.8 in at 49.2 ft (250 mm at 15 m)	■	■	■	■	■	■			
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■	■			
Ripple[3]	< 5 V_{PP}	■	■	■	■	■	■			
Current consumption[4]	≤ 50 mA	■	■	■	■	■	■			
Switching outputs	PNP or NPN, Q or $\overline{Q}$	■	■	■	■	■	■			
Output current I_A max.	100 mA	■	■	■	■	■	■			
Response time[5]	≤ 500 µs	■	■	■	■	■	■			
Max. switching frequency[6]	1000 Hz	■	■	■	■	■	■			
Alarm output	PNP	■	■			■	■			
Time delay	Adjustable, 0.5 to 10 s		■		■		■			
Test input "TE"	Sender switched off	■	■	■	■	■	■			
Sender off	PNP or NPN: TE to 0 V	■	■	■	■	■	■			
Connection type	M16 terminal chamber	■	■							
	Plug, M12 4-pin			■	■					
	Plug, M12 5-pin					■	■			
VDE protection class[7]	□	■	■	■	■	■	■			
Circuit protection[8]	A, B, C	■	■	■	■	■	■			
Enclosure rating	IP 67	■	■	■	■	■	■			
Ambient temperature	Operation -40...140° F (-40...60° C)	■	■	■	■	■	■			
	Storage -40...167° F (-40....75° C)	■	■	■	■	■	■			
Approximate weight	4.9 oz (140 g)	■	■	■	■	■	■			
Polarizing filter		■	■	■	■	■	■			
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■			

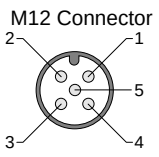
1) Average service life 100,000 h at $T_A = 25°$ C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal flight time with ohmic load
6) With light/dark ratio 1:1
7) Withstand voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Outputs Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram



Wire colors refer to standard cable, not included
*alarm output available on special models only





WL 34

Reflex/Retro-Reflective Sensors



0...72.2 ft (0...22 m)
sensing range

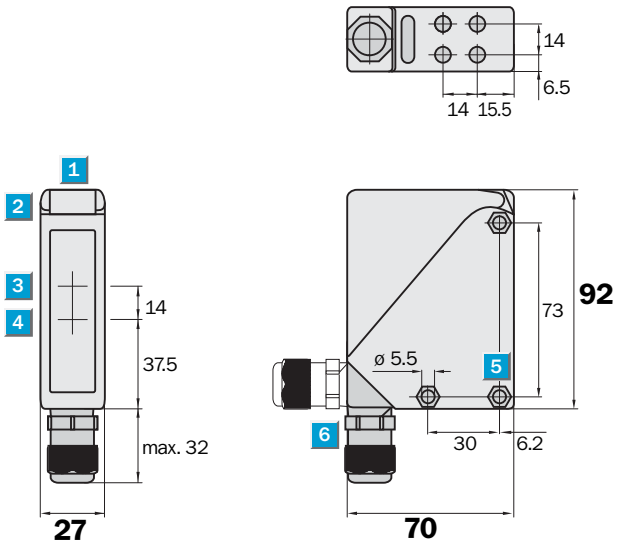
Highlights

- Sturdy plastic housing
- Signal strength indicator
- Selectable time delays
- Wide range supply voltage
- Red light for easy alignment
- Terminal chamber for connection flexibility
- Cable connections swivel 90° for easy installation

WL 34

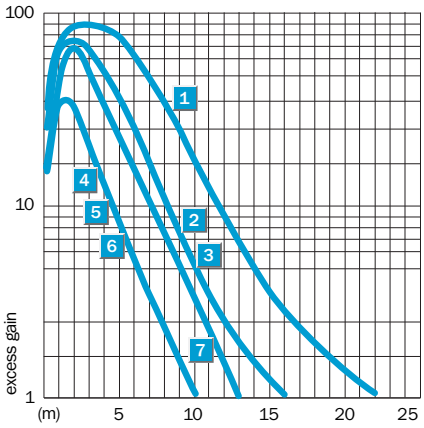


Dimensional drawing



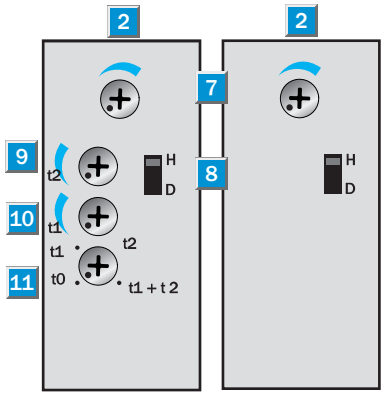
dimensions in mm

Excess gain



Adjustments

WL 34-R240 | WL 34-R230



1 Alignment sight
2 LED signal strength indicator
3 Center of optical axis, sender
4 Center of optical axis, receiver
5 Mounting hole Ø 5.5 mm, for M5 hexagon nuts on both sides
6 M16 screw fixing rotatable by 90°
7 Sensitivity control
8 Light/dark selector
9 Time control t_2 = OFF-delay
10 Time control t_1 = ON-delay
11 Time delay selector switch

Reflector type		Sensing range
1	PL 80 A	1...22.0 m
2	PL 50 A	0...16.0 m
3	PL 40 A	0...16.0 m
4	PL 30 A	0...10.0 m
5	PL 20 A	0...10.0 m
6	Reflective tape diamond grade	0...10.0 m

Order information	
Type	**Part no.**
WL 34-R230	1 019 249
WL 34-R240	1 019 250

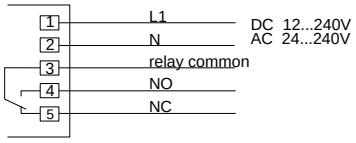
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256
Special Accessories	1314

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Technical data	WL 34-	R230	R240							
Sensing range	0...72.2 ft (0...22 m)/on PL 80 A	■	■							
Sensitivity	Adjustable	■	■							
Light source[1], light type	LED, red light, polarized	■	■							
Light spot diameter	Approx. 9.8 in at 49.2 ft (250 mm at 15 m)	■	■							
Supply voltage V_S	12...240 V DC[2], 24...240 V AC[3]	■	■							
Power consumption	< 2 VA	■	■							
Switching output	Relay, SPDT, electrically isolated[4]	■	■							
Max. switching voltage	250 V AC/120 V DC	■	■							
Max. switching current	4 A/240 V AC, 4 A/100 VA DC	■	■							
Max. switching capacity	1000 VA AC/100 W DC	■	■							
Response time[5]	≤ 10 ms	■	■							
Max. switching frequency[6]	10 Hz	■	■							
Time delay	Adjustable, 0.5 to 10 s		■							
Connection type	M16 terminal chamber	■	■							
VDE protection class[7]	□	■	■							
Circuit protection[8]	A, C	■	■							
Enclosure rating	IP 67	■	■							
Ambient temperature	Operation -40...140° F (-40...60° C)	■	■							
	Storage -40...167° F (-40...75° C)	■	■							
Approximate weight	4.9 oz (140 g)	■	■							
Polarizing filter		■	■							
Housing material	Glass fiber reinforced ABS	■	■							

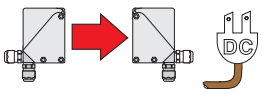
1) Average service life 100,000 h at $T_A = 25°$ C
2) Limit values
3) ± 10%
4) Provide suitable spark suppression for inductive or capacitive loads
5) Signal flight time for ohmic loads
6) With light/dark ratio 1:1
7) Withstand voltage 250 V UC
8) A = V_S connections reverse-polarity protected
C = Interference pulse suppression

Connection diagram



WS/WE 34

Through-beam Sensors





0...196.9 ft (0...60 m)
sensing range

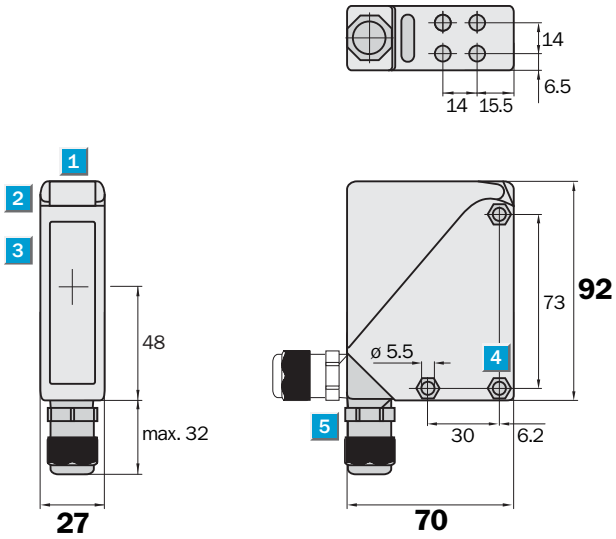
Highlights

- Sturdy plastic housing
- Signal strength indicator
- Red light for easy alignment
- Selectable time delays
- Alarm output and test input
- Terminal chamber for connection flexibility

WS/WE 34

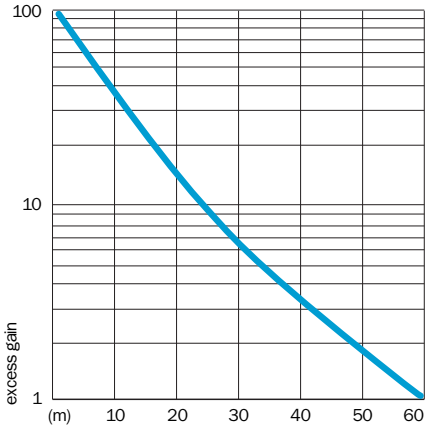


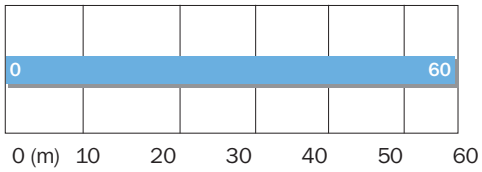
Dimensional drawing



dimensions in mm

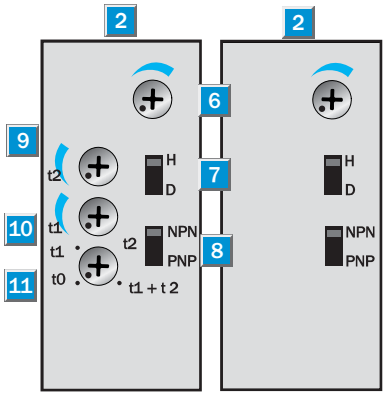
Excess gain





Adjustments

WS/WE 34B440	WS/WE 34-B430
WS/WE 34-V240	WS/WE 34-V230
WS/WE 34-V540	WS/WE 34-V530



1 Alignment sight
2 LED signal strength indicator
3 Center of optical axis
4 Mounting hole Ø 5.5 mm, for M5 hexagon nuts on both sides
5 M16 screw fixing or plug rotatable by 90°
6 Sensitivity control
7 Light/dark selector
8 NPN/PNP selector
9 Time control t_2 = OFF-delay
10 Time control t_1 = ON-delay
11 Time delay selector switch

Order information

Type	Part no.
WS/WE 34-V230	1 019 253
WS/WE 34-V240	1 019 251
WS/WE 34-B430	1 019 254
WS/WE 34-B440	1 019 255
WS/WE 34-V530	1 019 256
WS/WE 34-V540	1 019 252

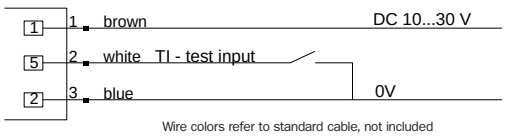
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

Technical data	WS/WE 34-	V230	V240	B430	B440	V530	V540
Sensing range	0...196.9 ft (0...60 m)	■	■	■	■	■	■
Sensitivity	Adjustable	■	■	■	■	■	■
Light source[1], light type	LED, red light	■	■	■	■	■	■
Light spot diameter	Approx. 27.6 in at 164 ft (700 mm at 50 m)	■	■	■	■	■	■
Angle of divergence/reception	1°/2.5°	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■	■
Ripple[3]	< 5 V_{PP}	■	■	■	■	■	■
Current consumption[4]		■	■	■	■	■	■
Sender	≤ 50 mA	■	■	■	■	■	■
Receiver	≤ 40 mA	■	■	■	■	■	■
Switching output	PNP or NPN, Q or $\overline{Q}$	■	■	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■
Response time[5]	≤ 500 µs	■	■	■	■	■	■
Max. switching frequency[6]	1000 Hz	■	■	■	■	■	■
Alarm output	PNP	■	■			■	■
Time delay	Adjustable, 0.5...10 s		■		■		■
Test input "TE"	Sender switched off	■	■	■	■	■	■
Sender off	PNP or NPN: TE to 0 V	■	■	■	■	■	■
Connection types	M16 terminal chamber	■	■				
	Plug, M12 4-pin			■	■		
	Plug, M12 5-pin					■	■
VDE protection class[7]	□	■	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
Ambient temperature	Operation -40...140° F (-40...60° C)	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■
Approximate weight	4.9 oz (140 g)	■	■	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■

1) Average service life 100,000 h at $T_A = 25°$ C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal flight time for ohmic loads
6) With light/dark ratio 1:1
7) Withstand voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Outputs Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

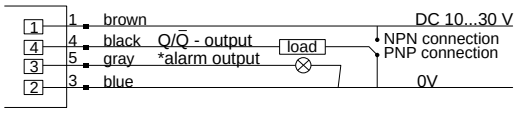
Connection diagram

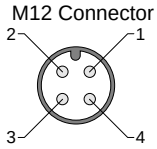
Sender

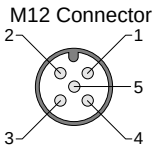


Wire colors refer to standard cable, not included
*alarm output available on special models only

Receiver

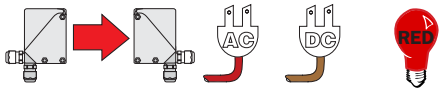






WS/WE 34

Through-beam Sensors



0...196.9 ft (0...60 m)
sensing range

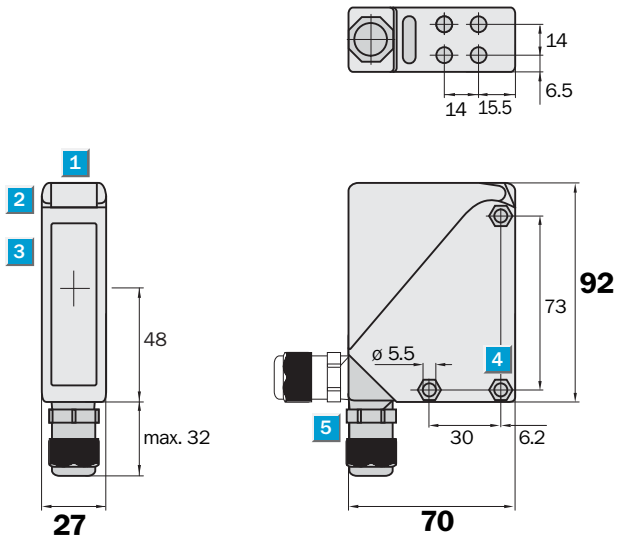
Highlights

- Sturdy plastic housing
- Red light for easy alignment
- Selectable time delays
- Wide range supply voltage
- Signal strength indicator
- Terminal chamber for connection flexibility
- Cable connections swivel 90° for easy installation

WS/WE 34

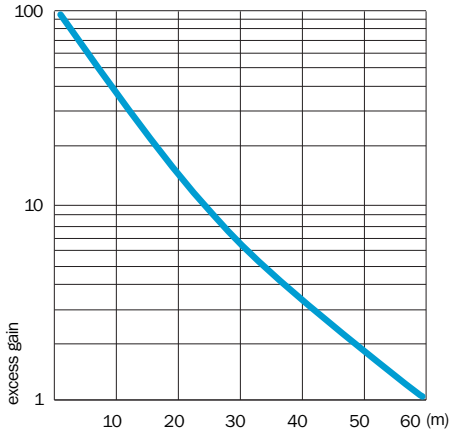


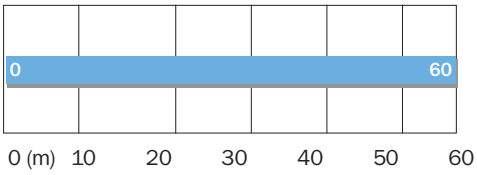
Dimensional drawing



dimensions in mm

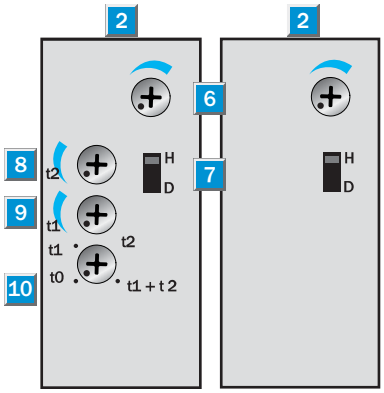
Excess gain





Adjustments

WS/WE 34-R240	WS/WE 34-R230



1 Alignment sight
2 LED signal strength indicator
3 Center of optical axis
4 Mounting hole Ø 5.5 mm, for M5 hexagon nuts on both sides
5 M16 screw fixing rotatable by 90°
6 Sensitivity control
7 Light/dark selector
8 Time control t_2 = OFF-delay
9 Time control t_1 = ON-delay
10 Time delay selector switch

Order information

Type	Part no.
WS/WE 34-R230	1 019 257
WS/WE 34-R240	1 019 258

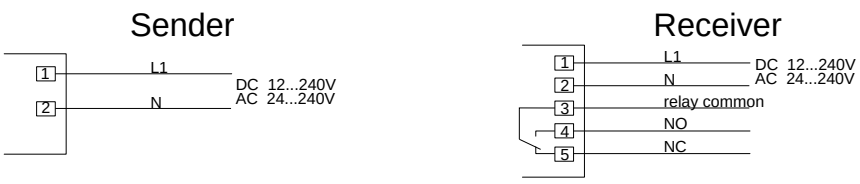
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

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Technical data	WS/WE 34-	R230	R240							
Sensing range	0...196.9 ft (0...60 m)									
Sensitivity	Adjustable									
Light source[1], light type	LED, red light									
Light spot diameter	Approx. 27.6 in at 164.0 ft (700 mm at 50 m)									
Angle of divergence/angle of reception	1°/2.5°									
Supply voltage V_S	12...240 V DC[2], 24...240 V AC[3]									
Power consumption	< 2 VA									
Switching output	Relay, SPDT, electrically isolated[4]									
Max. switching voltage	250 V AC/120 V DC									
Max. switching current	4 A/240 V AC, 4 A/100 W DC									
Max. switching capacity	1000 VA AC/100 VA DC									
Response time	≤ 10 ms									
Max. switching frequency[5]	10 Hz									
Time delay	Adjustable, 0.5 to 10 s									
Connection type	M16 terminal chamber									
VDE protection class[6]	□									
Circuit protection[7]	A, C									
Enclosure rating	IP 67									
Ambient temperature	Operation -40...140° F (-40...60° C)									
	Storage -40...167° F (-40...75° C)									
Approximate weight	4.9 oz (140 g)									
Housing material	Glass fiber reinforced ABS									

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) ± 10%
4) Provide suitable spark suppression for inductive or capacitive loads
5) With light/dark ratio 1:1
6) Withstand voltage 250 V UC
7) A = V_S connections reverse-polarity protected
C = Interference pulse suppression

Connection diagram



WT 250

Proximity/Diffuse Sensors - Background Suppression



0.2...12.2 in (5...310 mm)
sensing range

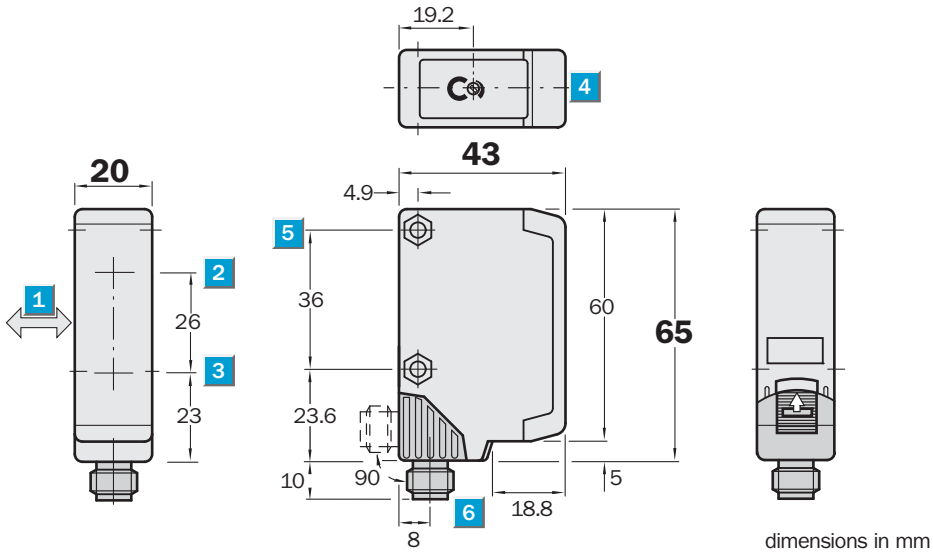
Highlights

- Rugged plastic housing
- Adjustable background suppression
- Adjustable sensing range
- Red light for easy alignment
- M12 connections swivel 90° for easy installation
- Cable or M12 quick disconnect versions
- Easy mounting with included bracket

WT 250

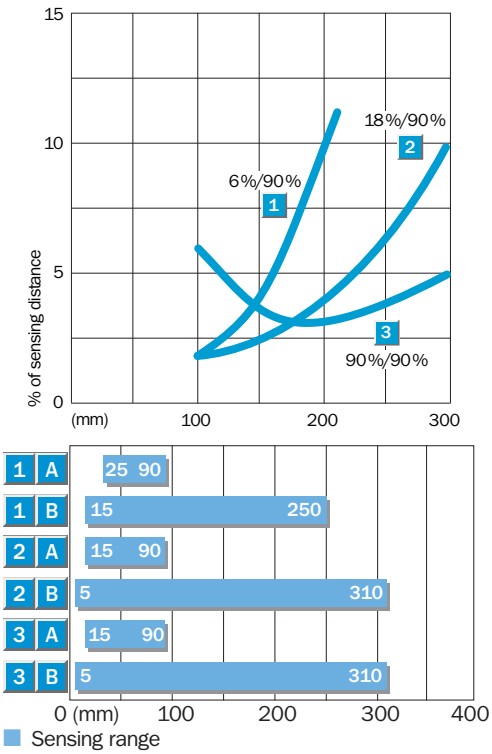


Dimensional drawing



dimensions in mm

Background suppression

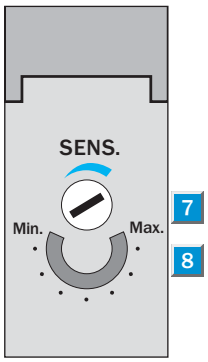


Sensing range

1	Sensing range on black[11], white background
2	Sensing range on gray[11], white background
3	Sensing range on white[11], white background
A	Sensing range control set to MIN
B	Sensing range control set to MAX

Adjustments

All types



1	Standard direction of the material to be sensed
2	Transmission axis
3	Reception axis
4	Red LED signal strength indicator
5	Through borehole Ø 4.2 mm, for M4 hexagon nut on both sides
6	Connection cable or M12 4-pin plug; plug position rotatable by 90° (V > H) V ➔ vertical final position H ➔ horizontal final position; can be locked with slider
7	Sensing range adjustment (2 turns), over-turn protected
8	Position indicator for sensing range setting (270°)

Order information

Type	Part no.
WT 250-P142	6 010 619
WT 250-P440	6 010 621
WT 250-N142	6 010 616
WT 250-N440	6 010 618

Accessories	page
Cables and connectors	1180
Mounting systems	1234

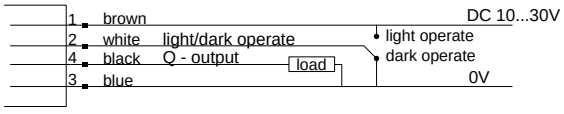
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Technical data	WT 250-	P142	P440	N142	N440
Sensing range, adjustable	0.2…12.2 in (5…310 mm)[1]	■	■	■	■
Background suppression	0.4…3.5 in (10…310 mm)[1]	■	■	■	■
Background suppression capability	% of set sensing distance (see previous pg)	■	■	■	■
Sensitivity	Potentiometer, 2 turns, with position indicator	■	■	■	■
Light source,[2] light type	LED, visible red light	■	■	■	■
Light spot diameter	Approx. 1.4 in at 19.7 in (35 mm at 500 mm)	■	■	■	■
Angle of divergence	Approx. 3 °	■	■	■	■
Supply voltage V_S	10...30 V DC[3]	■	■	■	■
Ripple[4]	≤ 5 V_{SS}	■	■	■	■
Current consumption[5]	≤ 35 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Output current I_A max.	100 mA	■	■	■	■
Light receiver, switching type	Light/dark switching via control wire:	■	■	■	■
	+ V_S = light switching	■	■	■	■
	0 V = dark switching	■	■	■	■
Response time[6]	≤ 2 ms	■	■	■	■
Max. switching frequency[7]	250 Hz	■	■	■	■
Connection types	Cable, PVC, 2 m[8] 4 x 0.18 mm², Ø 3.8 mm	■		■	
	Plug, M12 4-pin, 90° rotatable		■		■
VDE protection class[9]	□	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■
Approximate weight	2.8 oz (80 g)	■		■	
	1.4 oz (40 g)		■		■
Housing material	Glass fiber reinforced ABS	■	■	■	■

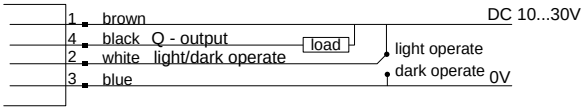
1) 90% remission of material sensed (based on standard white according to DIN 5033)
2) Average service life T_A = 25° C; LED, red light 100,000 h
3) Limit value
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With dark/light ratio 1:1, without time level
8) Do not bend cable below 0° C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
C = Interference pulse suppression
D = Output overcurrent and short-circuit protected
11) Black = 6% remission
Gray = 18% remission
White = 90% remission

Connection diagram

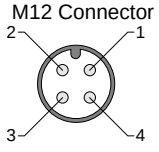
PNP Models



NPN Models

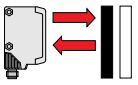


M12 Connector



WT 250

Proximity/Diffuse Sensors- Background Suppression






0.4...23.6 in (10...600 mm)
sensing range

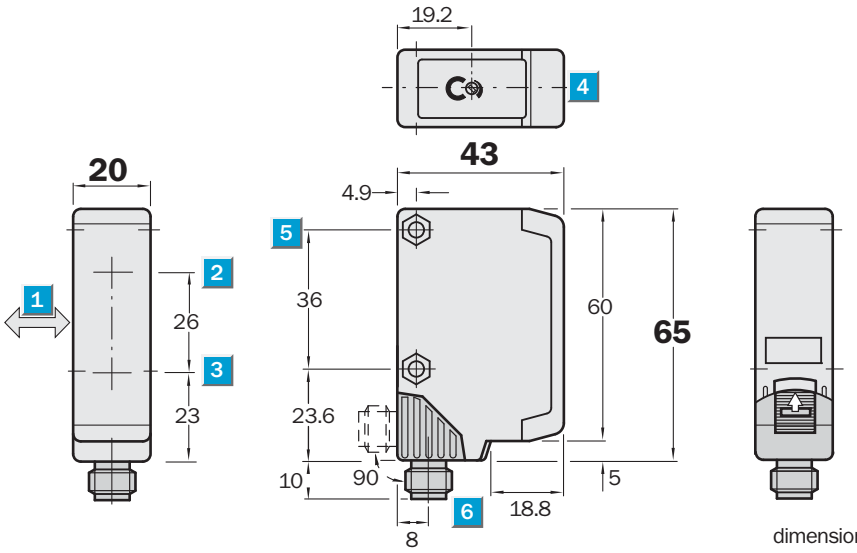
Highlights

- Adjustable background suppression
- Adjustable sensing range
- Rugged plastic housing
- Visible red light for easy alignment
- Cable or M12 quick disconnect versions
- Easy mounting with included bracket
- M12 plug rotatable by 90°

WT 250

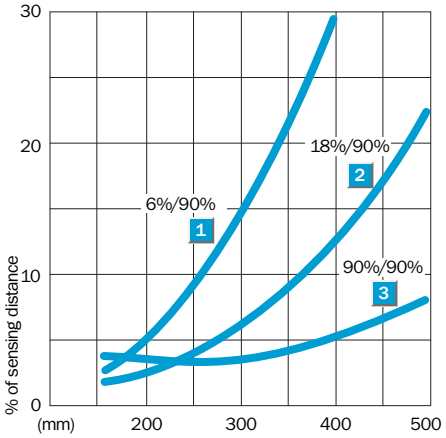


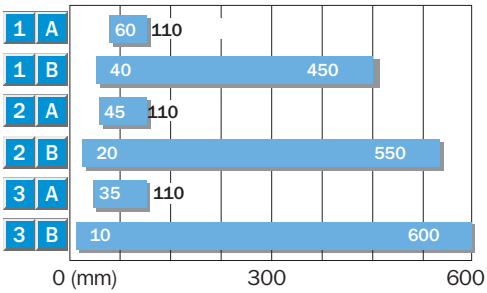
Dimensional drawing



dimensions in mm

Background suppression

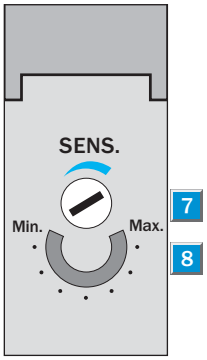




1	Sensing range on black[11], white background
2	Sensing range on gray[11], white background
3	Sensing range on white[11], white background
A	Sensing range control set to MIN
B	Sensing range control set to MAX

Adjustments

All types



1	Standard direction of the material to be sensed
2	Center of optical axis, sender
3	Center of optical axis, receiver
4	LED signal strength indicator
5	Through borehole Ø 4.2 mm, for M4 hexagon nut on both sides
6	Connection cable or M12 4-pin plug; plug position rotatable by 90° (V > H), V ➔ vertical final position H ➔ horizontal final position; can be locked with slider
7	Sensing range adjustment (2 turns), over-turn protected
8	Position indicator for sensing range setting (270°)

Order information

Type	Part no.
WT 250-P162	6 010 704
WT 250-P460	6 010 706
WT 250-N162	6 010 701
WT 250-N460	6 010 703

Accessories	page
Cables and connectors	1180
Mounting systems	1234

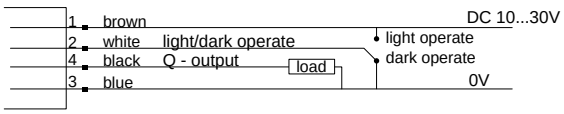
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Technical data	WT 250-	P162	P460	N162	N460					
Sensing range, adjustable	0.4…23.6 in (10…600 mm)[1]	■	■	■	■					
Background suppression	0.8…21.7 in (20…550 mm)	■	■	■	■					
Background suppression capability	% of set sensing distance (see previous page)	■	■	■	■					
Sensitivity	Potentiometer, 2 turns, with position indicator	■	■	■	■					
Light source[2], light type	LED, red light	■	■	■	■					
Light spot diameter	Approx. 1.4...19.7 in (35 mm at 500 mm)	■	■	■	■					
Angle of divergence	Approx. 3°	■	■	■	■					
Supply voltage V_S	10…30 V DC[3]	■	■	■	■					
Ripple[4]	≤ 5 V_{SS}	■	■	■	■					
Current consumption[5]	≤ 35 mA	■	■	■	■					
Switching outputs	PNP, open collector: Q	■	■							
	NPN, open collector: Q			■	■					
Output current I_A max.	100 mA	■	■	■	■					
Operation mode	Light/dark switching via control wire:	■	■	■	■					
	+ V_S = light switching	■	■	■	■					
	0 V = dark switching	■	■	■	■					
Response time[6]	≤ 2 ms	■	■	■	■					
Max. switching frequency[7]	250 Hz	■	■	■	■					
Connection types	Cable, PVC, 2 m[8] 4 x 0.18 mm², Ø 3.8 mm	■		■						
	Plug, M12 4-pin		■		■					
VDE protection class[9]	□	■	■	■	■					
Circuit protection[10]	A, B, C, D	■	■	■	■					
Enclosure rating	IP 67/NEMA 6	■	■	■	■					
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■					
	Storage -40…58° F (-40…70° C)	■	■	■	■					
Approximate weight	2.8 oz (80 g)	■		■						
	1.4 oz (40 g)		■		■					
Housing material	Glass fiber reinforced ABS	■	■	■	■					

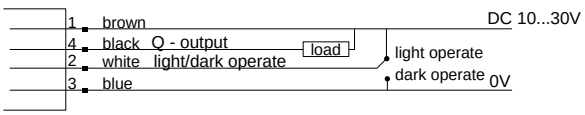
1) 90% remission of material sensed (based on standard white according to DIN 5033)
2) Average service life T_A = 25° C; LED, red light 100,000 h
3) Limit value
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With dark/light ratio 1:1
8) Do not bend below 0°C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
C = Interference pulse suppression
D = Output overcurrent and short-circuit protected
11) Black = 6% remission
Gray = 18% remission
White = 90% remission

Connection diagram

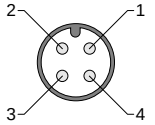
PNP Models



NPN Models



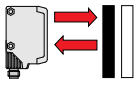
M12 Connector



wire colors refer to standard cable, not included with quick disconnect models

WT 250

Proximity/Diffuse Sensors- Background Suppression






0.4...23.6 in (10...1100 mm)

sensing range

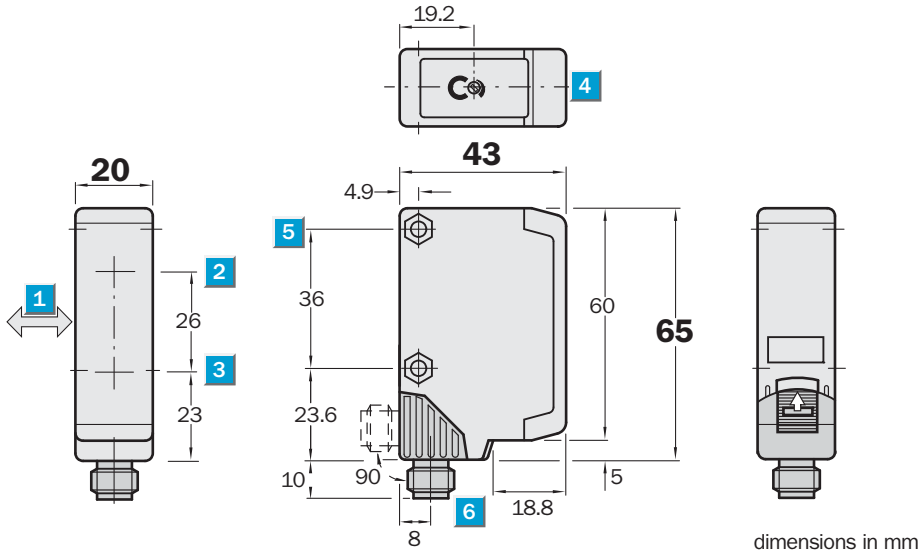
Highlights

- Adjustable background suppression
- Adjustable sensing range
- Rugged plastic housing
- Visible red light for easy alignment
- Cable or M12 quick disconnect versions
- Easy mounting with included bracket
- M12 plug rotatable by 90°

WT 250

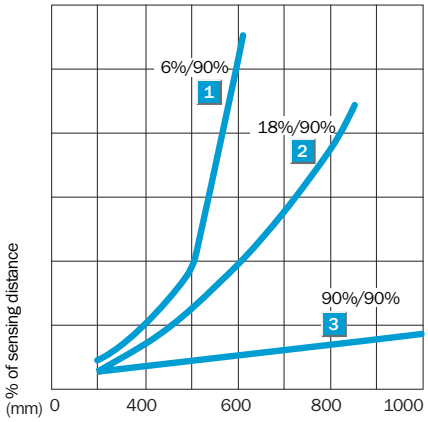


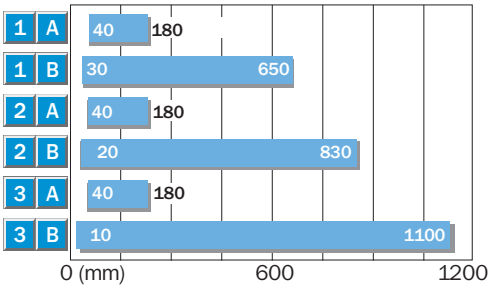
Dimensional drawing



dimensions in mm

Background suppression

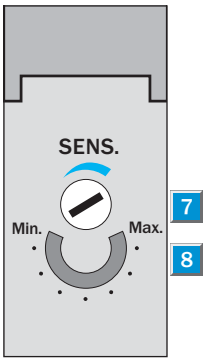




1	Sensing range on black[11], white background
2	Sensing range on gray[11], white background
3	Sensing range on white[11], white background
A	Sensing range control set to MIN
B	Sensing range control set to MAX

Adjustments

All types



1	Standard direction of the material to be sensed
2	Center of optical axis, sender
3	Center of optical axis, receiver
4	LED signal strength indicator
5	Through borehole Ø 4.2 mm, for M4 hexagon nut on both sides
6	Connection cable or M12 4-pin plug; plug position rotatable by 90° (V > H), V ➔ vertical final position H ➔ horizontal final position; can be locked with slider
7	Sensing range adjustment (2 turns), over-turn protected
8	Position indicator for sensing range setting (270°)

Order information

Type	Part no.
WT 250-P172	6 012 647
WT 250-P470	6 012 649
WT 250-N172	6 012 644
WT 250-N470	6 012 646

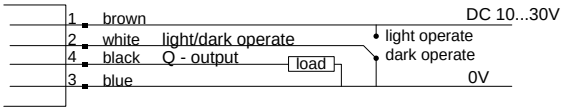
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Technical data	WT 250-	P172	P470	N172	N470
Sensing range, adjustable	0.4…43.3 in (10…1100 mm)[1]	■	■	■	■
Background suppression	0.8…39.4 in (20…1000 mm)	■	■	■	■
Background suppression capability	% of set sensing distance (see previous page)	■	■	■	■
Sensitivity	Potentiometer, 2 turns, with position indicator	■	■	■	■
Light source[2], light type	LED, red light	■	■	■	■
Light spot diameter	Approx. 2.8…39.4 in (70 mm at 1000 mm)	■	■	■	■
Angle of divergence	Approx. 3°	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■
Ripple[4]	≤ 5 V_{SS}	■	■	■	■
Current consumption[5]	≤ 35 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Output current I_A max.	100 mA	■	■	■	■
Operation mode	Light/dark switching via control wire:	■	■	■	■
	+ V_S = light switching	■	■	■	■
	0 V = dark switching	■	■	■	■
Response time[6]	≤ 2 ms	■	■	■	■
Max. switching frequency[7]	250 Hz	■	■	■	■
Connection types	Cable, PVC, 2 m[8] 4 x 0.18 mm², Ø 3.8 mm	■		■	
	Plug, M12 4-pin		■		■
VDE protection class[9]	□	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■
Approximate weight	2.8 oz (80 g)	■		■	
	1.4 oz (40 g)		■		■
Housing material	Glass fiber reinforced ABS	■	■	■	■

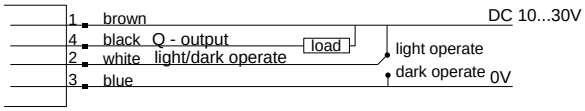
1) 90% remission of material sensed (based on standard white according to DIN 5033)
2) Average service life T_A = 25° C; LED, red light 100,000 h
3) Limit value
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With dark/light ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
C = Interference pulse suppression
D = Output overcurrent and short-circuit protected
11) Black = 6% remission
Gray = 18% remission
White = 90% remission

Connection diagram

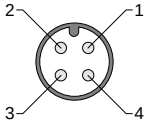
PNP Models



NPN Models



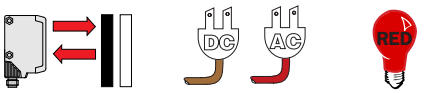
M12 Connector



wire colors refer to standard cable, not included with quick disconnect models

WT 250

Proximity/Diffuse Sensors-Background Suppression



0.2...12.2 in (5...310 mm)
sensing range

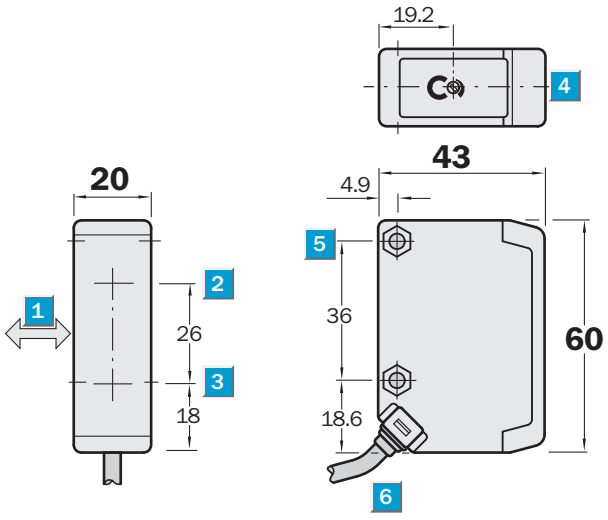
Highlights

- Adjustable background suppression
- Adjustable sensing range
- Rugged plastic housing
- Universal current, relay switching output, SPDT
- Cable connections swivel 90° for easy installation
- Cable or M12 quick disconnect versions
- Easy mounting with included bracket

WT 250

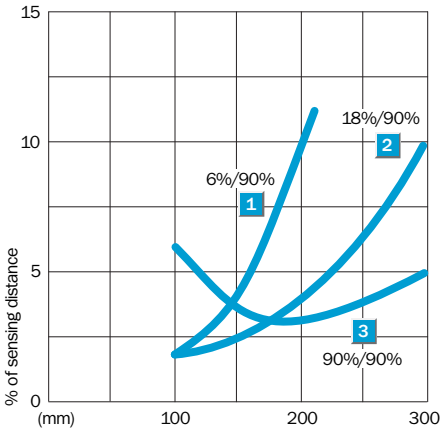


Dimensional drawing



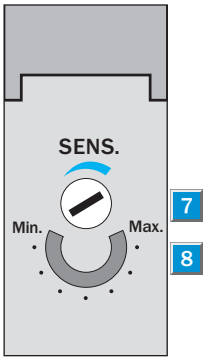
dimensions in mm

Background suppression

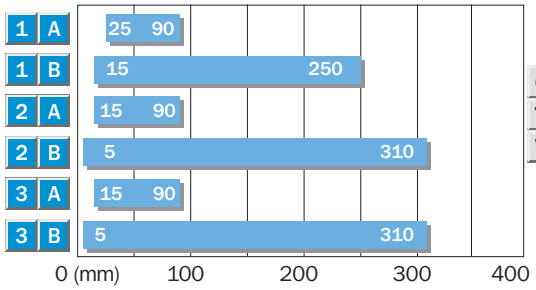


Adjustments

WT 250-S142



1	Standard direction of the material to be sensed
2	Center of optical axis, sender
3	Center of optical axis, receiver
4	Red LED signal strength indicator
5	Through hole Ø 4.2 mm, for M4 hexagon nut on both sides
6	Connection cable
7	Sensing range adjustment (2 turns), over-turn protected
8	Position indicator for sensing range setting (270°)



1	Sensing range on black[9], white background
2	Sensing range on gray[9], white background
3	Sensing range on white[9], white background
A	Sensing distance control set to MIN
B	Sensing distance control set to MAX

(see footnotes on next page)

Accessories	page
Mounting systems	1234

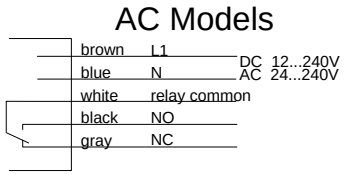
Order information

Type	Part no.
WT 250-S142	6 010 622

Technical data	WT 250-	S142								
Sensing range, adjustable	0.2…12.2 in (5…310 mm)[1]									
Background suppression	3.5…12.2 in (90…310 mm)									
Background suppression capability	% of set sensing distance (see previous page)									
Sensitivity	Potentiometer, 2 turns, with position indicator									
Light source[2], light type	LED, visible red light									
Light spot diameter	Approx. 1.0 in at 11.8 in (25 mm at 300 mm)									
Angle of divergence	Approx. 3°									
Supply voltage V_S[3]	12…240 V DC									
	24…240 V AC									
Power consumption	≤ 2 VA									
Switching outputs	Relay, SPDT, electrically isolated									
Switching current I_A max.[4]	3 A/240 V AC; 3 A/30 V DC									
Operation mode	Light switching									
Response time	≤ 15 ms									
Max. switching frequency[5]	33/s									
Connection type	Cable PVC[6], 2 m 5 x 0.76 mm², Ø 6.3 mm									
VDE protection class[7]	□									
Circuit protection[8]	A, C									
Enclosure rating	IP 67/NEMA 6									
Ambient temperature T_A	Operation -13…131° F (-25…55° C)									
	Storage -40…158° F (-40…70° C)									
Approximate weight	5.3 oz (160 g)									
Housing material	Body: glass fiber reinforced ABS									
	Lens: polycarbonate									

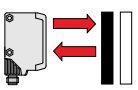
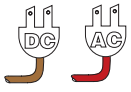
1) 90% remission of material sensed (based on standard white according to DIN 5033)
2) Average service life T_A = 25° C; LED, red light 100,000 h
3) ± 10%
4) Ensure spark extinguishing for inductive or capacitive load
5) With dark/light ratio 1:1
6) Do not bend below 0° C
7) Reference voltage 250 V UC
8) A = V_s connections reverse-polarity protected
C = Interference pulse suppression
9) Black = 6% remission
Gray = 18% remission
White = 90% remission

Connection diagram



WT 250

Proximity/Diffuse Sensors-Background Suppression



0.4...23.6 in (10...600 mm)
sensing range

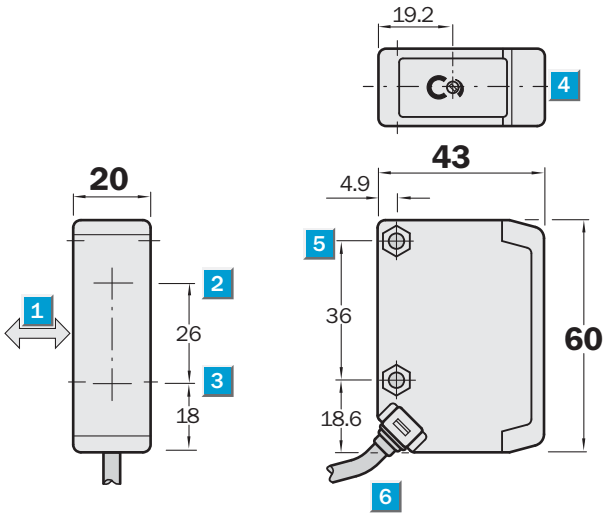
Highlights

- Adjustable background suppression
- Rugged plastic housing
- Visible red light for easy alignment
- Wide range supply voltage
- Adjustable sensing range
- Easy mounting with included bracket

WT 250

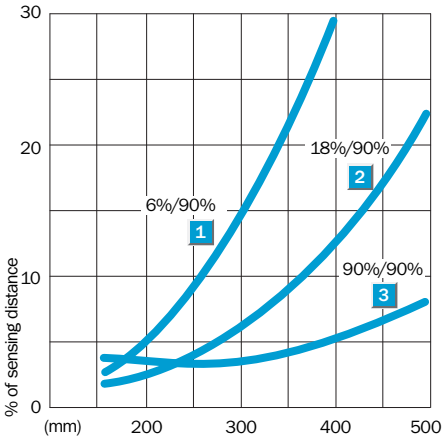


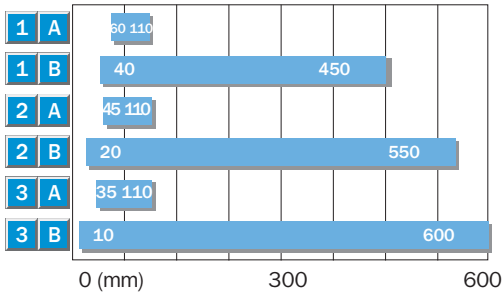
Dimensional drawing



dimensions in mm

Background suppression



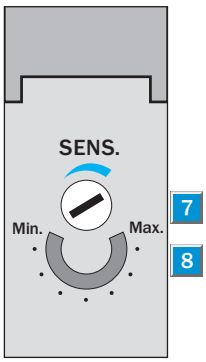


1	Sensing range on black[9], white background
2	Sensing range on gray[9], white background
3	Sensing range on white[9], white background
A	Sensing distance control set to MIN
B	Sensing distance control set to MAX

(see footnotes on next page)

Adjustments

WT 250-S162



1	Standard direction of the material to be sensed
2	Center of optical axis, sender
3	Center of optical axis, receiver
4	Red LED signal strength indicator
5	Through hole Ø 4.2 mm, for M4 hexagon nut on both sides
6	Connection cable
7	Sensing range adjustment (2 turns), over-turn protected
8	Position indicator for sensing range setting (270°)

Accessories	page
Mounting systems	1234

Order information

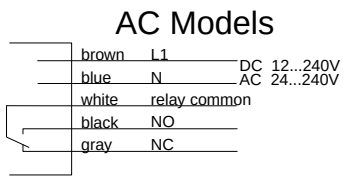
Type	Part no.
WT 250-S162	6 010 707

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Technical data	WT 250-	S162								
Sensing range, adjustable	0.4…23.6 in (10…600 mm)[1]									
Background suppression	3.9…23.6 in (100…600 mm)									
Background suppression capability	% of set sensing distance (see previous page)									
Sensitivity	Potentiometer, 2 turns, with position indicator									
Light source[2], light type	LED, visible red light									
Light spot diameter	Approx. 1.4 in at 19.7 in (35 mm at 500 mm)									
Angle of divergence	Approx. 3°									
Supply voltage V_S	10…240 V DC[3]									
	24…240 V AC									
Power consumption	≤ 2 VA									
Switching outputs	Relay, SPDT, electrically isolated									
Switching current I_A max.[4]	3 A/240 V AC; 3 A/30 V DC									
Operation mode	Light switching									
Response time	≤ 15 ms									
Max. switching frequency[5]	33/s									
Connection type	Cable PVC[6], 2 m 5 x 0.76 mm², Ø 6.3 mm									
VDE protection class[7]	□									
Circuit protection[8]	A, C									
Enclosure rating	IP 67 / NEMA 6									
Ambient temperature T_A	Operation -13…131° F (-25…55° C)									
	Storage -40…158° F (-40…70° C)									
Approximate weight	5.3 oz (160 g)									
Housing material	Body: glass fiber reinforced ABS									
	Lens: polycarbonate									

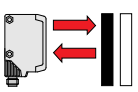
1) 90% remission of material sensed (based on standard white according to DIN 5033)
2) Average service life T_A = 25° C; LED, red light 100,000 h
3) ± 10%
4) Ensure spark extinguishing for inductive or capacitive load
5) With dark/light ratio 1:1
6) Do not bend below 0° C
7) Reference voltage 250 V UC
8) A = V_S connections reverse-polarity protected
C = Interference pulse suppression
9) Black = 6% reflectance
Gray = 18% reflectance
White = 90% reflectance

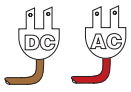
Connection diagram



WT 250

Proximity/Diffuse Sensors-Background Suppression







0.4...23.6 in (10...1100 mm)
sensing range

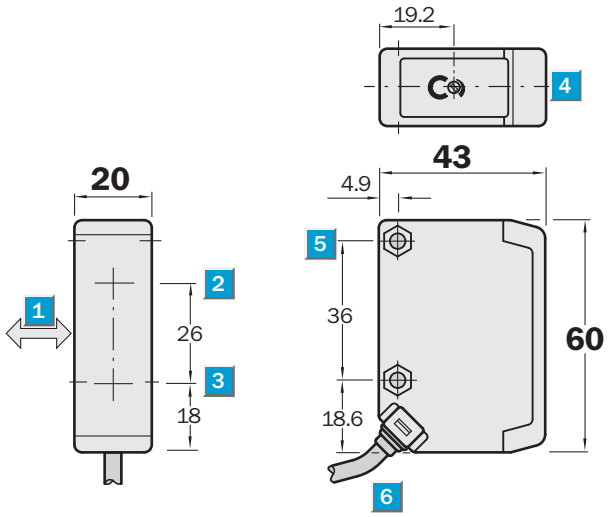
Highlights

- Adjustable background suppression
- Rugged plastic housing
- Visible red light for easy alignment
- Wide range supply voltage
- Adjustable sensing range
- Easy mounting with included bracket

WT 250

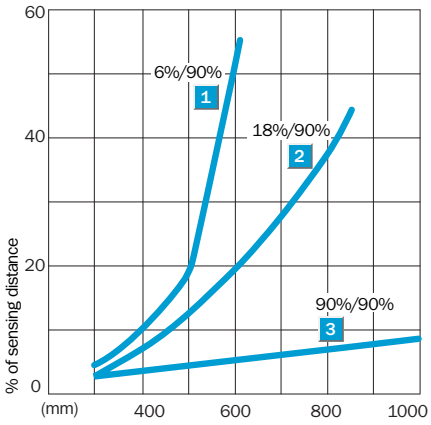


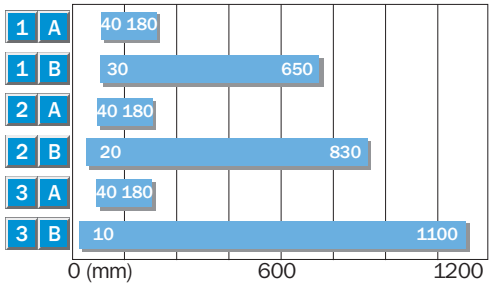
Dimensional drawing



dimensions in mm

Background suppression



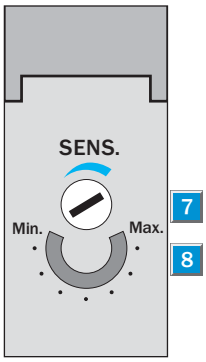


1	Sensing range on black[9], white background
2	Sensing range on gray[9], white background
3	Sensing range on white[9], white background
A	Sensing distance control set to MIN
B	Sensing distance control set to MAX

(see footnotes on next page)

Adjustments

WT 250-S172



1	Standard direction of the material to be sensed
2	Center of optical axis, sender
3	Center of optical axis, receiver
4	Red LED signal strength indicator
5	Through hole Ø 4.2 mm, for M4 hexagon nut on both sides
6	Connection cable
7	Sensing range adjustment (2 turns), over-turn protected
8	Position indicator for sensing range setting (270°)

Accessories	page
Mounting systems	1234

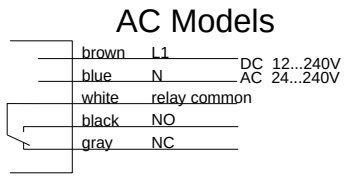
Order information

Type	Part no.
WT 250-S172	6 012 650

Technical data	WT 250-	S172								
Sensing range, adjustable	0.4…43.3 in (10…1100 mm)[1]									
Background suppression	6.7…43.3 in (170…1100 mm)									
Background suppression capability	% of set sensing distance (see previous page)									
Sensitivity	Potentiometer, 2 turns, with position indicator									
Light source[2], light type	LED, visible red light									
Light spot diameter	Approx. 2.8 in at 39.4 in (70 mm at 1000 mm)									
Angle of divergence	Approx. 3°									
Supply voltage V_S	10…240 V DC[3]									
	24…240 V UC									
Power consumption	≤ 2 VA									
Switching outputs	Relay, SPDT, electrically isolated									
Switching current I_A max.[4]	3 A/240 V AC; 3 A/30 V DC									
Operation mode	Light switching									
Response time	≤ 15 ms									
Max. switching frequency[5]	33/s									
Connection type	Cable PVC[6], 2 m 5 x 0.76 mm², Ø 6.3 mm									
VDE protection class[7]	□									
Circuit protection[8]	A, C									
Enclosure rating	IP 67 / NEMA 6									
Ambient temperature T_A	Operation -13…131° F (-25…55° C)									
	Storage -40…158° F (-40…70° C)									
Approximate weight	5.3 oz (160 g)									
Housing material	Body: glass fiber reinforced ABS									
	Lens: polycarbonate									

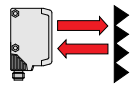
1) 90% remission of material sensed (based on standard white according to DIN 5033)
2) Average service life T_A = 25° C; LED, red light 100,000 h
3) ± 10%
4) Ensure spark extinguishing for inductive or capacitive load
5) With dark/light ratio 1:1
6) Do not bend below 0° C
7) Reference voltage 250 V UC
8) A = V_S connections reverse-polarity protected
C = Interference pulse suppression
9) Black = 6% reflectance
Gray = 18% reflectance
White = 90% reflectance

Connection diagram



WL 250

Reflex/Retro-Reflective Sensors






0.03...44.3 ft (0.01....13.5 m)
sensing range

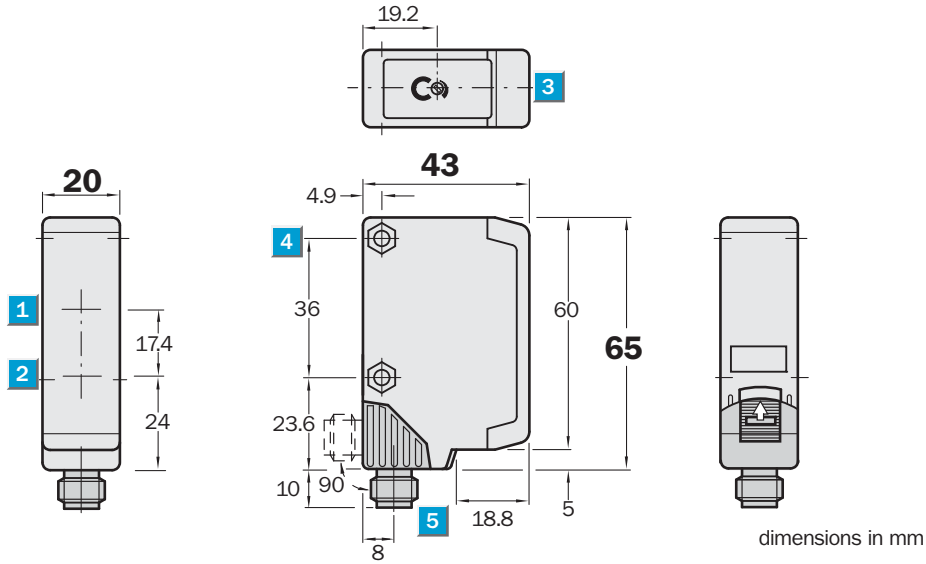
Highlights

- Polarizing filters prevent false readings on reflective surfaces
- Rugged plastic housing
- Red light for easy alignment
- M12 plug connections swivel 90° for easy installation
- Easy mounting with included bracket
- Sensitivity adjustment

WL 250

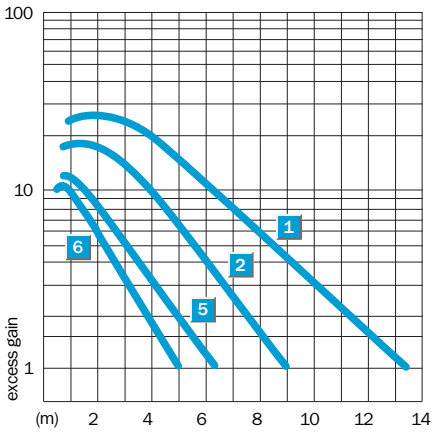


Dimensional drawing



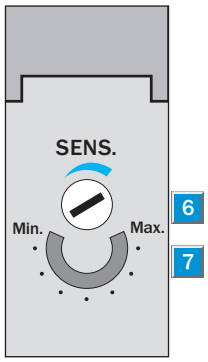
dimensions in mm

Excess gain



Adjustments

All types



1 Center of optical axis, receiver
2 Center of optical axis, sender
3 Red LED signal strength indicator
4 Through borehole Ø 4.2 mm, for M4 hexagon nut on both sides
5 Connection cable or plug, M12 4-pin
plug position rotatable by 90° (V > H),
V ➔ vertical final position
H ➔ horizontal final position; can be locked with slider
6 Sensitivity adjustment (2 turns), over-turn protection
7 Position indicator for sensitivity setting (270°)

Reflector type		Sensing range
1	PL 80 A	0.01...13.5 m
2	P 250	0.01...9.0 m
3	PL 50 A, PL 40 A	0.01...10.5 m
4	PL 30 A, PL 31 A	0.01...8.2 m
5	PL 20 A	0.01...6.3 m
6	Reflective tape diamond grade	0.01...5.0 m

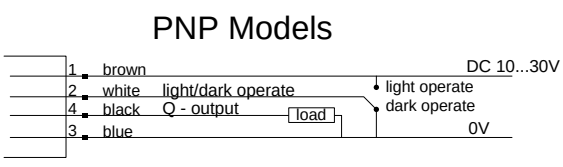
Order information	
Type	**Part no.**
WL 250-P132	6 010 608
WL 250-P430	6 010 610
WL 250-N132	6 010 605
WL 250-N430	6 010 607

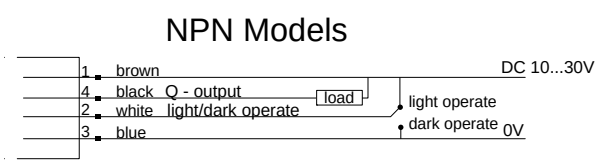
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

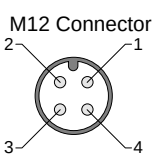
Technical data	WL 250-	P132	P430	N132	N430
Sensing range	0.003…29.5 ft (0.01…9 m) / P 250 (included)	■	■	■	■
	0.003…44.3 ft (0.01…13.5 m) / PL 80 A	■	■	■	■
Sensitivity, adjustable	Potentiometer, 2 turns, with position indicator	■	■	■	■
Light source[1], **light type**	LED, visible red light, polarized	■	■	■	■
Light spot diameter	Approx. 15.7 in at 26.2 ft (400 mm at 8 m)	■	■	■	■
Angle of divergence	Approx. 2.5°	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■
Residual ripple[3]	≤ 5 V_{SS}	■	■	■	■
Current consumption[4]	≤ 35 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Output current I_A max.	100 mA	■	■	■	■
Operation mode	Light/dark switching via wire:	■	■	■	■
	+ V_S = light switching	■	■	■	■
	0 V = dark switching	■	■	■	■
Response time[5]	≤ 0.7 ms	■	■	■	■
Max. switching frequency[6]	700 Hz	■	■	■	■
Connection types	Cable, PVC, 2 m[7] 4 x 0.18 mm², Ø 3.8 mm	■		■	
	Plug, M12 4-pin, 90° rotatable		■		■
VDE protection class[8]	□	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■
Approximate weight	2.8 oz (80 g)	■		■	
	1.4 oz (40 g)		■		■
Housing material	Glass fiber reinforced ABS	■	■	■	■

1) Average service life at T_A = 25° C; LED, red light 100,000 h
2) Limit value
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1, without time delay
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
C = Interference pulse suppression
D = Output overcurrent and short-circuit protected

Connection diagram







wire colors refer to standard cable, not included with quick disconnect models

WL 250

Reflex/Retro-Reflective Sensors



0.3...44.3 ft (0.01...13.5 m)
sensing range

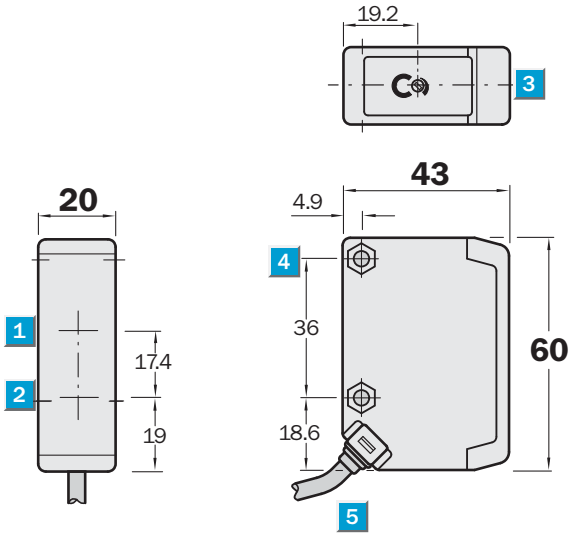
Highlights

- Rugged plastic housing
- Red light for easy alignment
- Sensitivity adjustment
- Wide range supply voltage
- Polarizing filters prevent false readings on reflective surfaces

WL 250

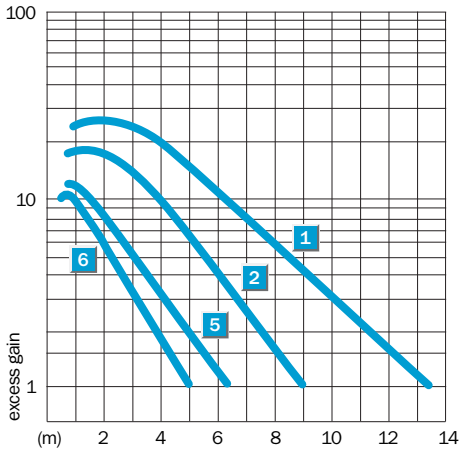


Dimensional drawing



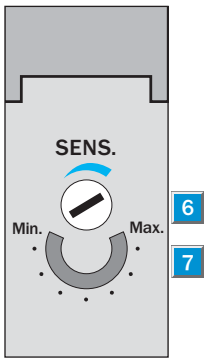
dimensions in mm

Excess gain



Adjustments

WL 250-S132



1 Receiver axis
2 Sender axis
3 Red LED signal strength indicator
4 Through borehole Ø 4.2 mm, for M4 hexagon nut on both sides
5 Connection cable
6 Sensitivity adjustment (2 turns), over-turn protection
7 Position indicator for sensitivity setting (270°)

Accessories	page
Mounting systems	1234
Reflectors	1256

Reflector type		Sensing range
1	PL 80 A	0.01...13.5 m
2	P 250	0.01...9.0 m
3	PL 50 A, PL 40 A	0.01...10.5 m
4	PL 30 A, PL 31 A	0.01..8.2 m
5	PL 20 A	0.01...6.3 m
6	Reflective tape diamond grade	0.01...5.0 m

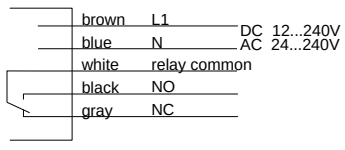
Order information

Type	Part no.
WL 250-S132	6 010 611

Technical data	WL 250-	S132
Sensing range	03…29.5 ft (0.01…9 m)/P 250 (included)	
	03…44.3 ft (0.01…13.5 m)/PL 80 A	
Sensitivity, adjustable	Potentiometer, 2 turns,	
	with position indicator	
Light source[1], **light type**	LED, visible red light, polarized	
Light spot diameter	Approx. 15.7 in at 26.2 ft (400 mm at 8 m)	
Angle of divergence	Approx. 2.5°	
Supply voltage V_S[2]	12…240 V DC	
	24…240 V AC	
Power consumption	≤ 2 VA	
Switching outputs	Relay, SPDT, electrically isolated	
Switching current I_A max.[3]	3 A/240 V AC; 3 A/30 V DC	
Operation mode	Light switching	
Response time	≤ 15 ms	
Max. switching frequency[4]	33 Hz	
Connection type	Cable, PVC, 2 m[5] 5 x 0.76 mm², Ø 6.3 mm	
VDE protection class[6]	□	
Circuit protection[7]	A, C	
Enclosure rating	IP 67	
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	
	Storage -40…158° F (-40…70° C)	
Approximate weight	5.6 oz (160 g)	
Housing material	Glass fiber reinforced ABS	

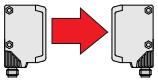
1) Average service life at T_A = 25° C; LED, red light 100,000 h
2) ± 10%
3) Ensure spark extinguishing with inductive or capacitive load
4) With light/dark ratio 1:1, without time delay
5) Do not bend below 0° C
6) Reference voltage 250 V UC
7) A = V_S connections reverse-polarity protected
C = Interference pulse suppression

Connection diagram



WS/WE 250

Through-beam Sensors






0...82 ft (0...25 m)
sensing range

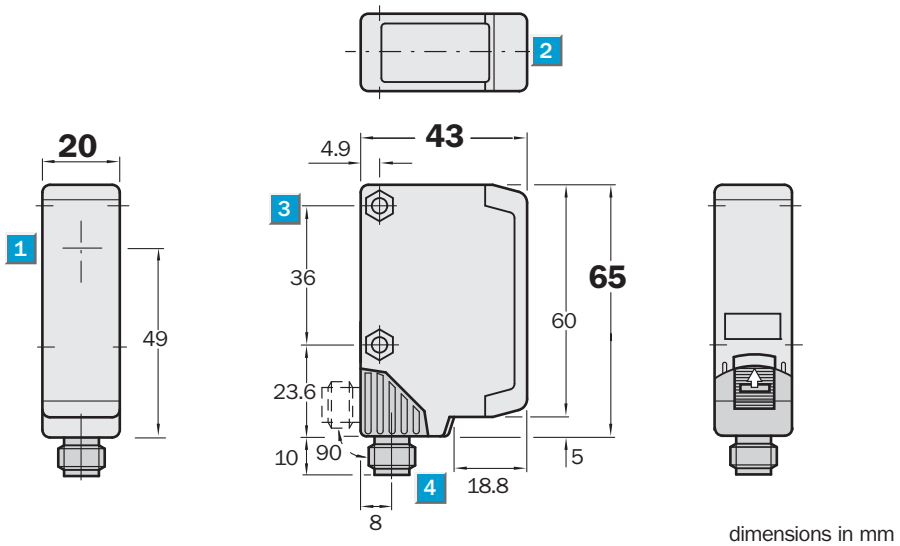
Highlights

- Rugged plastic housing
- Red light for easy alignment
- Sensitivity adjustment
- Easy mounting with included bracket
- Cable or M12 quick disconnect versions
- M12 connections swivel 90° for easy installation

WS/WE 250



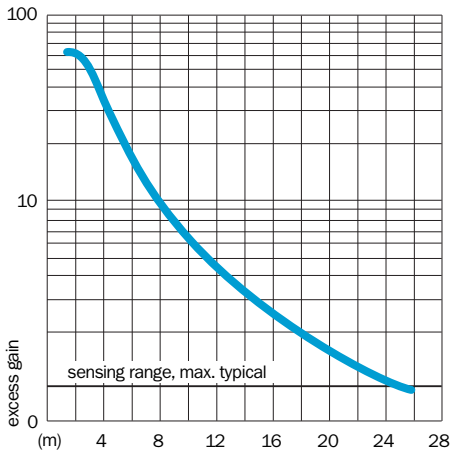
Dimensional drawing

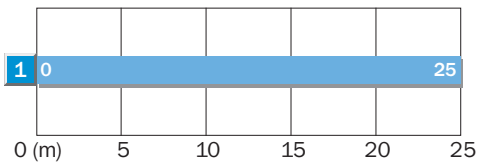


dimensions in mm

1 Center of optical axis, sender (WS 250), receiver (WE 250)
2 Red LED signal strength indicator (WE 250)
3 Through hole Ø 4.2 mm, for M4 hexagon nut on both sides
4 Cable or M12 plug
plug position rotatable by 90°
V - vertical final position
H - horizontal final position; can be locked with slider

Excess gain





Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WS/WE 250-P142	6 026 266
WS/WE 250-P440	6 026 268
WS/WE 250-N142	6 026 263
WS/WE 250-N440	6 026 265

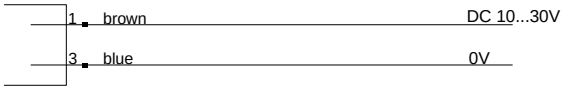
7028071 - © 2008 SICK, Inc.

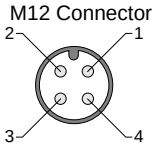
Technical data	WS/WE 250-	P142	P440	N142	N440
Sensing range	0…82 ft (0…25 m)	■	■	■	■
Light source[1], **light type**	LED, red light	■	■	■	■
Light spot diameter	Approx. 4.9 ft at 65.6 ft (1.5 m at 20 m)	■	■	■	■
Angle of divergence	Approx. 4°	■	■	■	■
Angle of reception	Approx. 20°	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■
Ripple[3]	≤ 5 V_{SS}	■	■	■	■
Current consumption[4]					
sender	≤ 20 mA	■	■	■	■
receiver	≤ 35 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Output current I_A max.	100 mA	■	■	■	■
Operation mode	Light/dark switching via control wire:	■	■	■	■
	+ V_S = light switching	■	■	■	■
	0 V = dark switching	■	■	■	■
Response time[5]	≤ 1 ms	■	■	■	■
Max. switching frequency[6]	500 Hz	■	■	■	■
Connection types	Cable, PVC[7], 2 m	■		■	
	Sender WS, 3 x 0.18 mm², Ø 3.8 mm	■		■	
	Receiver WE, 4 x 0.18 mm², Ø 3.8 mm	■		■	
	Plug, M12 4-pin, 90° rotatable		■		■
VDE protection class[8]	□	■	■	■	■
Circuit protection[9]					
sender	A, B	■	■	■	■
receiver	A, B, C, D	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■
Approximate weight	5.3 oz (150 g)	■		■	
	2.5 oz (70 g)		■		■
Housing material	Glass fiber reinforced ABS	■	■	■	■

1) Average service life at T_A = 25° C; LED, red light 100,000 h
2) Limit value
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
C = Interference pulse suppression
D = Output overcurrent protected

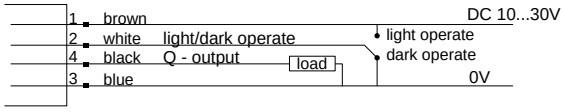
Connection diagram

Sender

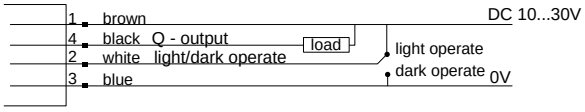




Receiver, PNP Models



Receiver, NPN Models



wire colors refer to standard cable, not included with quick disconnect models

WS/WE 250

Through-beam Sensors



0...82 ft (0...25 m)
sensing range

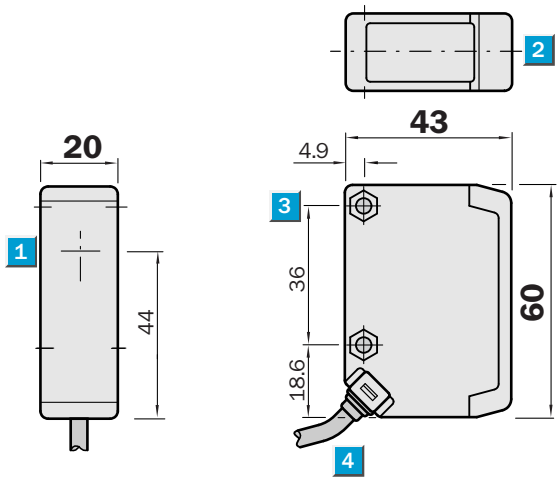
Highlights

- Rugged plastic housing
- Red light for easy alignment
- Sensitivity adjustment
- Relay output
- Wide range supply voltage
- Easy mounting with included bracket

WS/WE 250



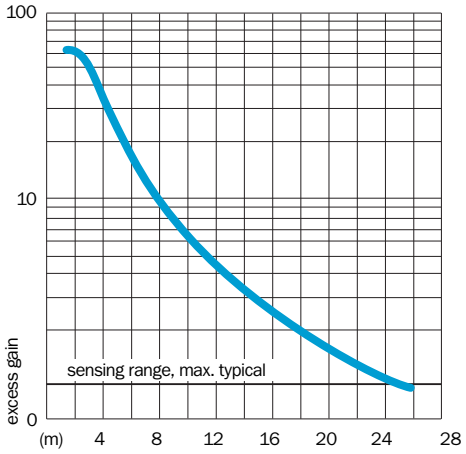
Dimensional drawing

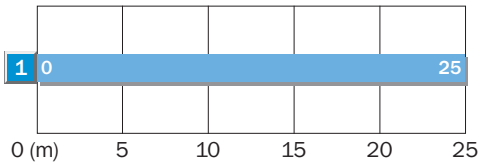


dimensions in mm

1 Center of the optical axis, sender (WS 250), receiver (WE 250)
2 Red LED signal strength indicator (receiver only WE 250)
3 Through borehole Ø 4.2 mm, for M4 hexagon nut on both sides
4 Connection cable

Excess gain





Accessories	page
Mounting systems	1234

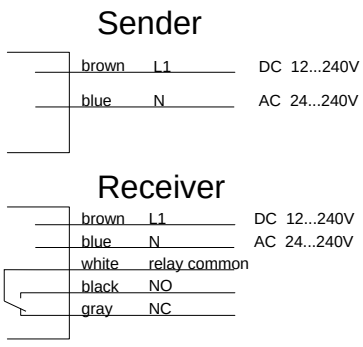
Order information

Type	Part no.
WS/WE 250-S132	6 010 603

Technical data	WS/WE 250-	S132
Sensing range	0…82.0 ft (0…25 m)	
Light source[1], **light type**	LED, visible red light	
Light spot diameter	Approx. 4.9 ft at 65.6 ft (1.5 m at 20 m)	
Angle of divergence	Approx. 4°	
Angle of reception	Approx. 20°	
Supply voltage V_S[2]	12…240 V DC	
	24…240 V AC	
Power consumption		
sender	≤ 2 VA	
receiver	≤ 2 VA	
Switching outputs	Relay, SPDT, electrically isolated	
Switching current I_A max.[3]	3 A/240 V AC; 3 A/30 V DC	
Operation mode	Light switching	
Response time	≤ 15 ms	
Max. switching frequency[4]	33 Hz	
Connection types	Cable, 2 m PVC[5]	
sender WS	2 x 0.76 mm², Ø 6.3 mm	
receiver WE	5 x 0.76 mm², Ø 6.3 mm	
VDE protection class[6]	□	
Circuit protection[7]	A, C	
Enclosure rating	IP 67	
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	
	Storage -40…158° F (-40…70° C)	
Approximate weight	10.2 oz (290 g)	
Housing material	Glass fiber reinforced ABS	

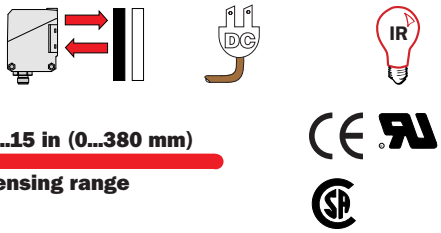
1) Average service life at T_A = 25° C; LED, red light 100,000 h
2) ± 10%
3) Ensure spark extinguishing with inductive or capacitive load
4) With light/dark ratio 1:1
5) Do not bend below 0° C
6) Reference voltage 250 V UC
7) A = V_s connections reverse-polarity protected
C = Interference pulse suppression

Connection diagram



WT 260

Proximity/Diffuse Sensors - Background Suppression



0...15 in (0...380 mm)
sensing range

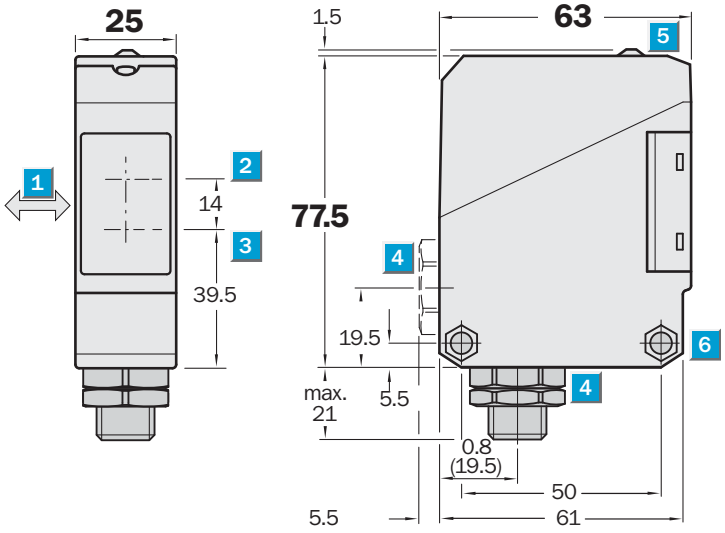
Highlights

- Reliable detection of dark objects even against light backgrounds
- Adjustable sensing range
- Rugged plastic housing
- Sensitivity adjustment
- Alarm output and test input
- Signal strength indicator

WT 260

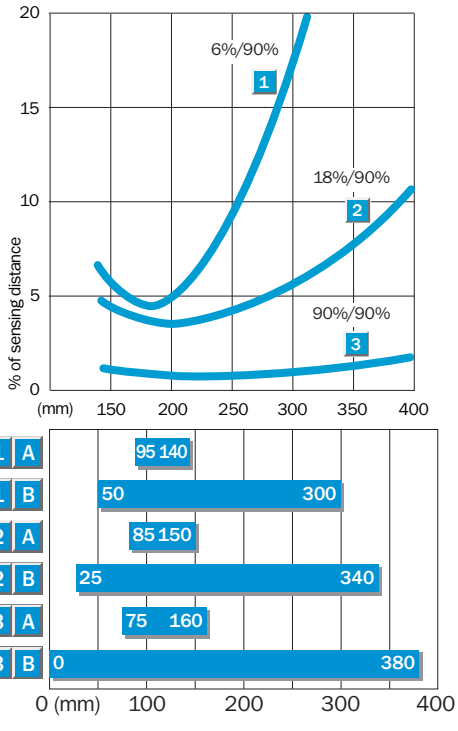


Dimensional drawing



dimensions in mm

Background suppression

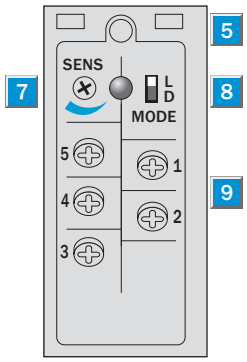


1	Sensing range on black[11]/background white
2	Sensing range on gray[11]/background white
3	Sensing range on white[11]/background white
A	Sensing range control set to MIN
B	Sensing range control set to MAX

see footnotes on next page

Adjustments

All types



1	Standard direction of material being sensed
2	Center of optical axis, receiver
3	Center of optical axis, sender
4	Cable entry gland 1/2 in PF thread for cable diameters from 6 to 10 mm optionally at bottom or rear; or M12 equipment plug bottom
5	LED signal strength indicator, red
6	Through hole Ø 5.2 mm on both sides for M5 hex nut
7	Sensing range adjustment
8	Light/dark switching (L = light switching, D = dark switching)
9	Terminals

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

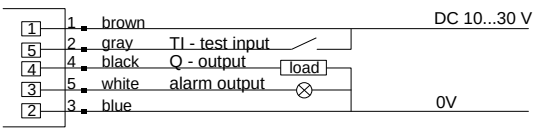
Type	Part no.
WT 260-P260	6 009 471
WT 260-P460	1 011 540
WT 260-P560	1 011 541

7028071 - © 2008 SICK, Inc.

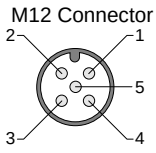
Technical data	WT 260-	P260	P460	P560
Sensing range, adjustable	0…15 in (0…380 mm)[1]	■	■	■
Background suppression	1.0…15 in (25…380 mm)	■	■	■
Background suppression capability	% of set sensing distance (see previous page)	■	■	■
Sensitivity	Adjustable, potentiometer 270°	■	■	■
Light source[2], **light type**	LED, infrared light	■	■	■
Light spot diameter	Approx. 0.7 in at 11.8 in (17 mm at 300 mm)	■	■	■
Angle of divergence	Approx. 1.5°	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■
Ripple[4]	≤ 5 V_{SS}	■	■	■
Current consumption[5]	≤ 35 mA	■	■	■
Switching outputs	PNP, open collector: Q	■	■	■
Output current I_A max.	100 mA	■	■	■
Light receiver, switching mode	Light/dark switching selectable via switch	■	■	■
Response time[6]	≤ 2 ms	■	■	■
Max. switching frequency[7]	250 Hz	■	■	■
Alarm output VMA[8]	100 mA, static	■		■
Test input "TE" sender off	PNP: TE to + V_S	■	■	■
Connection types	Terminal chamber	■		
	Plug, M12 4-pin		■	
	Plug, M12 5-pin			■
VDE protection class[9]	□	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■
Enclosure rating	IP 66/NEMA 4	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■
Approximate weight	4.2 oz (120 g)	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■

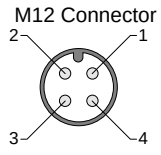
1) Object with 90% remission (based on standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) With resistive load
7) With light/dark ratio 1:1
8) Operating reserve < 50 %
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Inputs/outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected
11) Black = 6% remission
Gray = 18% remission
White = 90% remission

Connection diagram



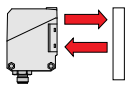
wire colors refer to standard cable, not included





WT 260

Proximity/Diffuse Sensors-Energetic






0.2...59.0 in (5...1500 mm)
sensing range

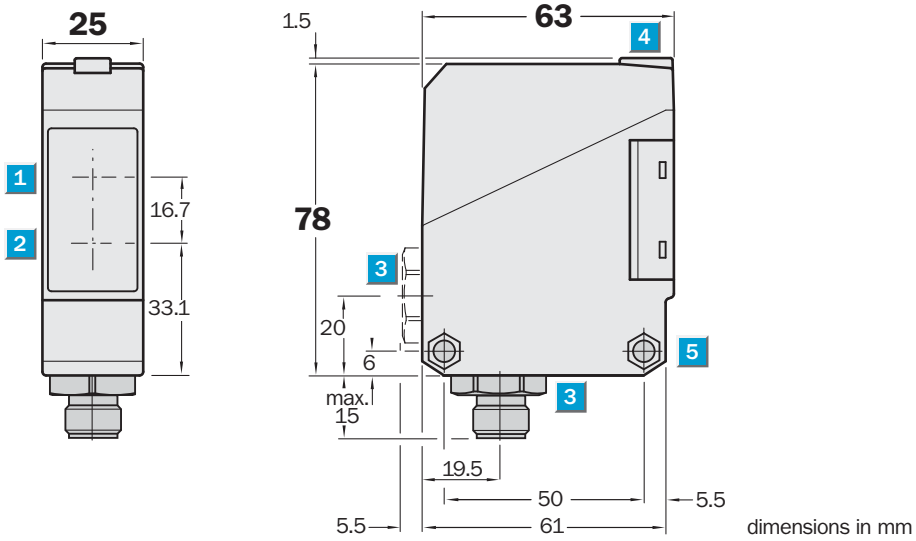
Highlights

- Rugged plastic housing
- Adjustable sensitivity
- Terminal chamber or M12 4-pin plug for connection flexibility
- Test input
- Easy mounting with included bracket

WT 260

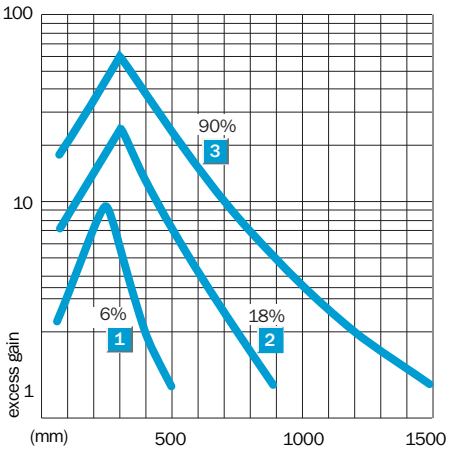


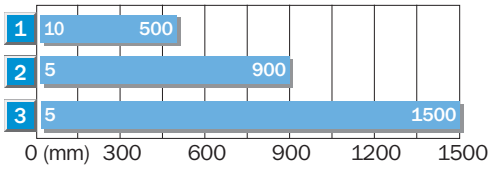
Dimensional drawing



dimensions in mm

Excess gain

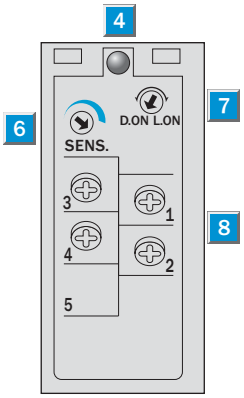




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

All types



1	Center of optical axis, receiver
2	Center of optical axis, sender
3	Cable entry gland 1/2 in PF thread for cable diameters from 6 to 10 mm optionally at bottom or rear; or M12 equipment plug, bottom
4	LED signal strength indicator
5	Through hole Ø 5.2 mm on both sides for M5 hex nut
6	Sensitivity adjustment
7	Light/dark rotary switch L.ON = light switching, D.ON = dark switching
8	Terminals

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
WT 260-F270	6 020 979
WT 260-F470	6 020 980
WT 260-E270	6 020 981
WT 260-E470	6 021 815

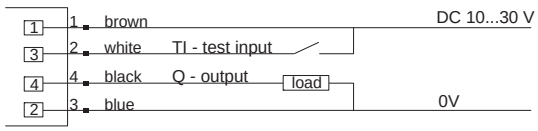
7028071 - © 2008 SICK, Inc.

Technical data	WT 260-	F270	F470	E270	E470
Sensing range, adjustable[1]	0.2...59.0 in (5...1500 mm)	■	■	■	■
Sensitivity	Adjustable, potentiometer 270°	■	■	■	■
Light source[2], **light type**	LED, red light	■	■	■	■
Light spot diameter	Approx. 1.8 in at 39.4 in (45 mm at 1000 mm)	■	■	■	■
Angle of divergence	Approx. 2.5°	■	■	■	■
Supply voltage V_S	10...30 V DC[3]	■	■	■	■
Ripple[4]	≤ 5 V_{SS}	■	■	■	■
Current consumption[5]	≤ 35 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Output current I_A max.	100 mA	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■
Response time[6]	≤ 1.5 ms	■	■	■	■
Max. switching frequency[7]	333 Hz	■	■	■	■
Test input "TE" sender off	PNP: TE to + V_S	■	■		
	NPN: TE to 0 V			■	■
Connection types	Terminal chamber	■		■	
	Plug, M12 4-pin		■		■
VDE protection class[8]	□	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight	4.2 oz (120 g)	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■

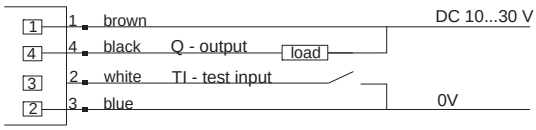
1) Object with 90% remission (based on standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) With resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Inputs/outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

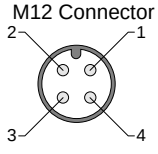
PNP Models



NPN Models



M12 Connector



wire colors refer to standard cable, not included

WT 260 Long

Proximity/Diffuse Sensors-Energetic



0.4...82.7 in (70...2100 mm)
sensing range

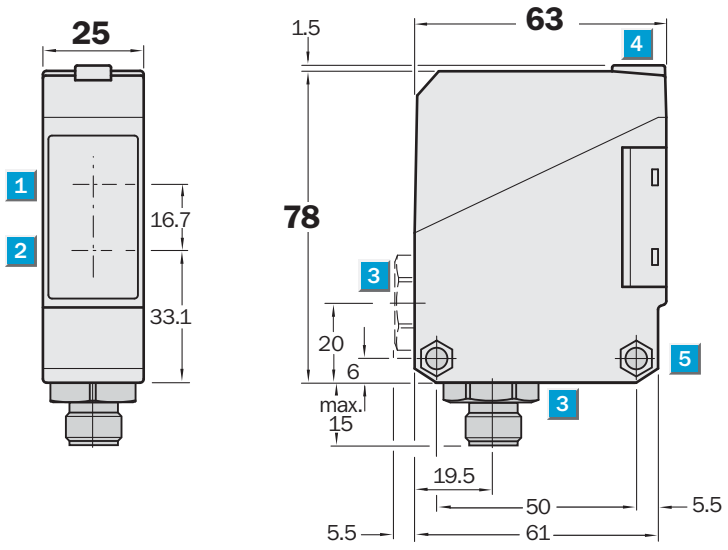
Highlights

- Rugged plastic housing
- Adjustable sensitivity
- Test input
- Terminal chamber for connection flexibility
- Easy mounting with included bracket

WT 260

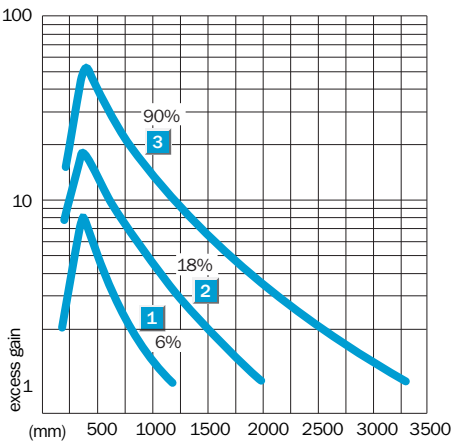


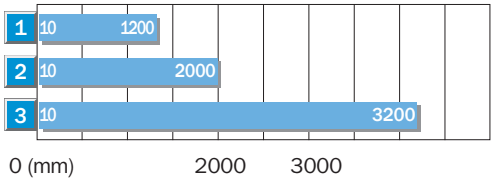
Dimensional drawing



dimensions in mm

Excess gain

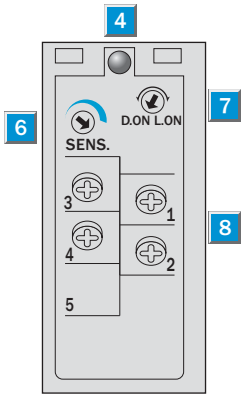




1 Sensing range on black, 6% remission
2 Sensing range on gray, 18% remission
3 Sensing range on white, 90% remission

Adjustments

All types



1 Center of optical axis, receiver
2 Center of optical axis, sender
3 Cable entry gland 1/2 in PF thread for cable diameters from 6 to 10 mm optionally at bottom or rear; or M12 equipment plug, bottom
4 LED signal strength indicator, yellow,
5 Through hole Ø 5.2 mm on both sides for M5 hex nut
6 Sensitivity adjustment
7 Light/dark rotary switch
L.ON = light switching, D.ON = dark switching
8 Terminals

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

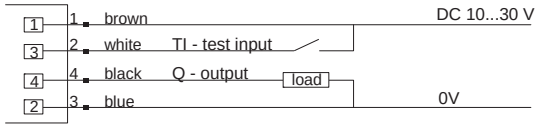
Type	Part no.
WT 260-F280	6 020 982
WT 260-F480	6 020 983
WT 260-E280	6 020 984
WT 260-E480	6 021 816

Technical data	WT 260-	F280	F480	E280	E480
Sensing range, adjustable[1]	0.4...126.0 in (10...3200 mm)	■	■	■	■
Sensitivity	Adjustable, potentiometer 270°	■	■	■	■
Light source[2], **light type**	LED, infrared light	■	■	■	■
Light spot diameter	Approx. 3.1 in at 98.4 in (80 mm at 2500 mm)	■	■	■	■
Angle of divergence	Approx. 1.8°	■	■	■	■
Supply voltage V_S	10...30 V DC[3]	■	■	■	■
Ripple[4]	≤ 5 V_{SS}	■	■	■	■
Current consumption[5]	≤ 35 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Output current I_A max.	100 mA	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■
Response time[6]	≤ 5 ms	■	■	■	■
Max. switching frequency[7]	100 Hz	■	■	■	■
Test input "TE" sender off	PNP: TE to + V_S	■	■		
	NPN: TE to 0 V			■	■
Connection types	Terminal chamber	■		■	
	Plug, M12 4-pin		■		■
VDE protection class[8]	□	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight	4.2 oz (120 g)	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■

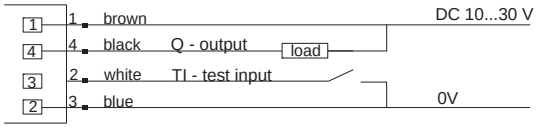
1) Object with 90% remission (based on standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) With resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Inputs/outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

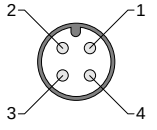
PNP Models



NPN Models



M12 Connector



wire colors refer to standard cable, not included

WT 260T

Proximity/Diffuse Sensors - Background Suppression



2.8...126.0 in (10...3200 mm)
sensing range

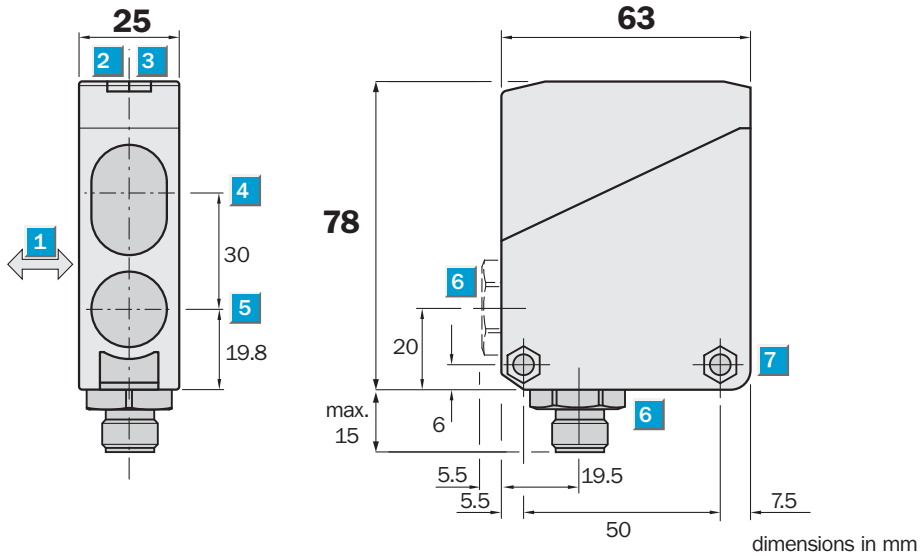
Highlights

- Rugged plastic housing
- Adjustable sensitivity
- Test input
- Terminal chamber for connection flexibility
- Easy mounting with included bracket

WT 260

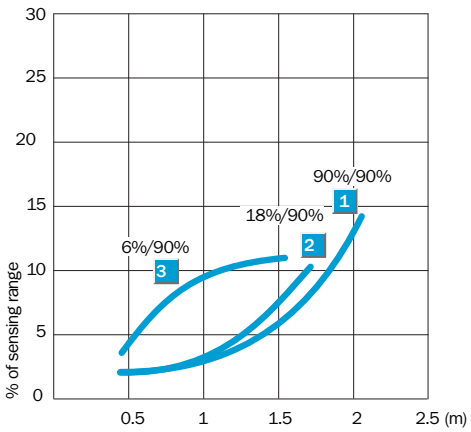


Dimensional drawing



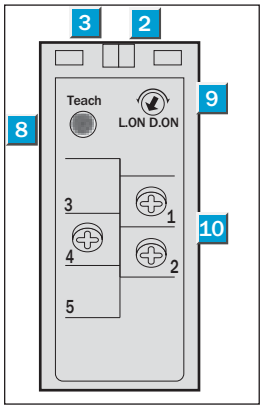
dimensions in mm

Excess gain

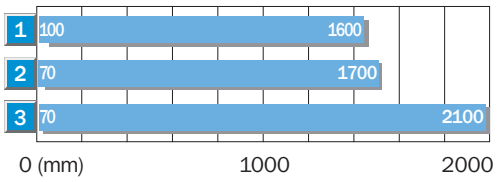


Adjustments

All types



1 Standard direction of material being sensed
2 LED signal indicator orange, switching output active
3 LED signal indicator green, operating reserve
4 Center of optical axis, receiver
5 Center of optical axis, sender
6 Cable entry gland 1/2 in PF thread for cable diameters from 6 to 10 mm optionally at bottom or rear; or M12 equipment plug, bottom (4-pin)
LED signal strength indicator, yellow,
7 Through hole Ø 5.2 mm on both sides for M5 hex nut
8 Teach-in button (sensing range setting/ background suppression)
9 Light/dark switching
(L.ON = light switching, D.ON = dark switching)
10 Terminals



1 Sensing range on black, 6% remission
2 Sensing range on gray, 18% remission
3 Sensing range on white, 90% remission

Order information

Type	Part no.
WT 260T-P290	6 021 919
WT 260T-P490	6 021 920
WT 260T-N290	6 021 921
WT 260T-N490	6 021 922

Accessories	page
Cables and connectors	1180
Mounting systems	1234

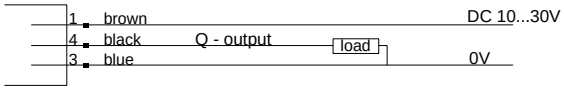
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Technical data	WT 260T-	P290	P490	N290	N490
Sensing range, adjustable	2.8...82.7 in (70...2100 mm)[1]	■	■	■	■
Background suppression	3.9...78.7 in (100...2000 mm)	■	■	■	■
Sensing range setting	Automatic, per teach-in	■	■	■	■
Light source[2], light type	LED, infrared light	■	■	■	■
Light spot diameter	Approx. 7.9 in at 78.7 in (200 mm at 2000 mm)	■	■	■	■
Angle of divergence	Approx. 6°	■	■	■	■
Supply voltage V_S	10...30 V DC[3]	■	■	■	■
Ripple[4]	≤ 10 V_{SS}	■	■	■	■
Current consumption[5]	≤ 55 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Output current I_A max.	100 mA	■	■	■	■
Light receiver, switching mode	Light/dark switching selectable via switch	■	■	■	■
Response time[6]	≤ 5 ms	■	■	■	■
Max. switching frequency[7]	100 Hz	■	■	■	■
Connection types	Terminal chamber	■		■	
	Plug, M12 4-pin		■		■
VDE protection class[8]	□	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight	4.2 oz (120 g)	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■

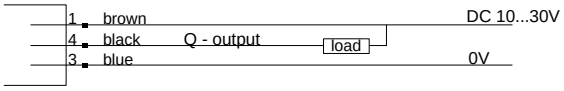
1) Object with 90% remission (based on standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) With resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Inputs/outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

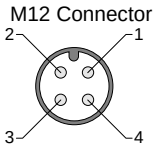
Connection diagram

PNP Models



NPN Models

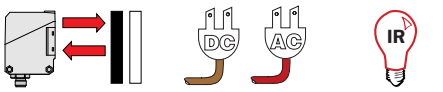




wire colors refer to standard cable, not included with quick disconnect models.

WT 260

Proximity/Diffuse Sensors-Background Suppression



0...15.0 in (0...380 mm)
sensing range

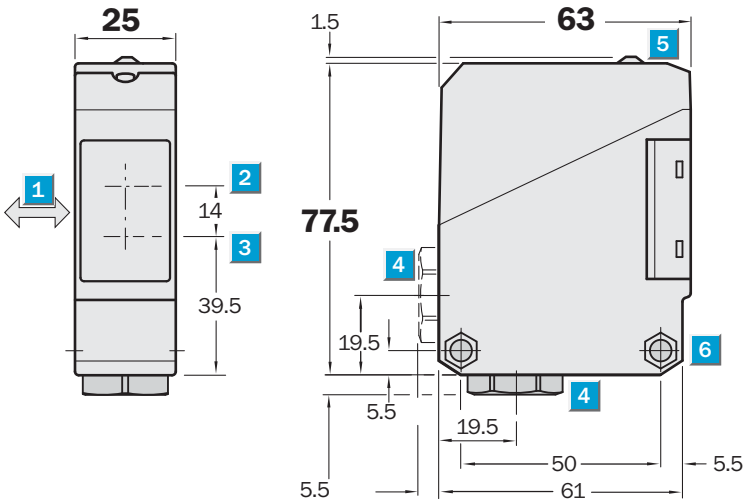
Highlights

- Rugged plastic housing
- Easy mounting with included bracket
- Terminal chamber for connection flexibility
- Universal current supply, relay output, SPST, timer optional
- Adjustable background suppression
- Sensitivity adjustment
- Selectable time delays
- Signal strength indicator

WT 260

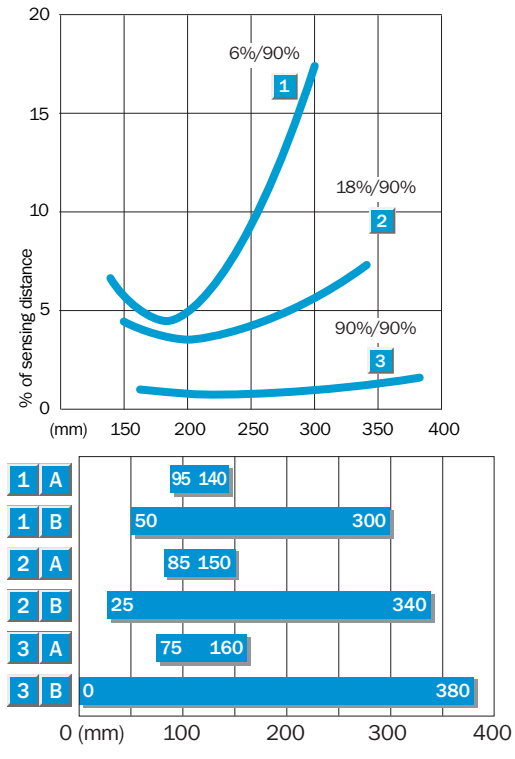


Dimensional drawing



dimensions in mm

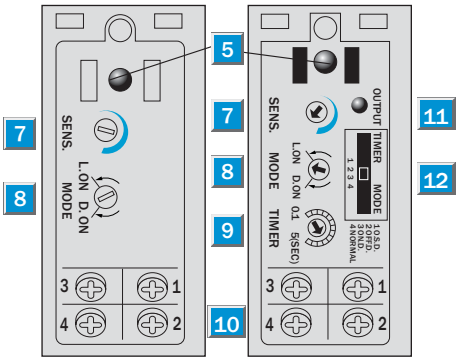
Background suppression



1	Sensing range on black[8]/background white
2	Sensing range on gray[8]/background white
3	Sensing range on white[8]/background white
A	Sensing distance control set to MIN
B	Sensing distance control set to MAX

Adjustments

WT 260-S260 | WT 260-R260



1	Standard direction of material being sensed
2	Center of optical axis, receiver
3	Center of optical axis, sender
4	Cable entry gland 1/2 in PF thread for cable diameters from 6 to 10 mm optionally at bottom or rear
5	LED signal strength indicator, red
6	Through hole Ø 5.2 mm on both sides for M5 hex nut
7	Sensing range adjustment
8	Light/dark rotary switch (L.ON = light switching, D.ON = dark switching)
9	Time range control
10	Terminals
11	Red LED status indicator
12	Time delay selector switch O.S.D. = One Shot OFF.D. = OFF delay ON.D. = ON delay Normal = No delay

Order information

Type	Part no.
WT 260-S260	6 009 473
WT 260-R260	6 009 472

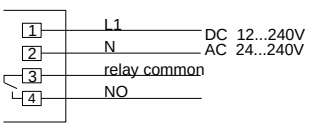
Accessories	page
Mounting systems	1234

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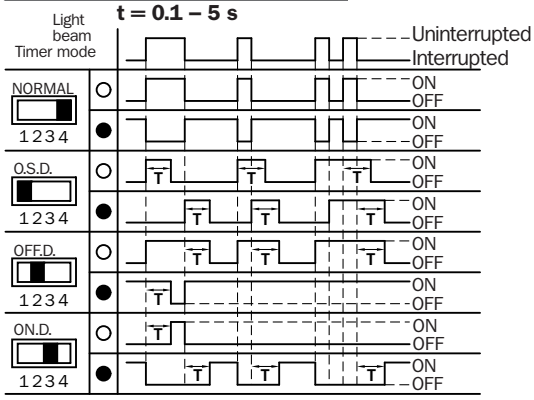
Technical data		WT 260-	S260	R260
Sensing range, adjustable		0...15.0 in (0...380 mm)[1]		
Background suppression		3.0...15.0 in (75...380 mm)		
Background suppression capability		% of set sensing distance (see previous page)		
Sensitivity		Adjustable, potentiometer 270°		
Light source[2], light type		LED, infrared light		
Light spot diameter		Approx. 0.7 in at 11.8 in (17 mm at 300 mm)		
Angle of divergence		Approx. 1.5°		
Supply voltage V_S[3]		12...240 V DC		
		24...240 V AC		
Power consumption		≤ 5 VA		
Switching outputs		Relay, SPST, electrically isolated		
Switching current I_A max.[4]		3 A/240 V AC; 3 A/30 V DC		
Operation mode		Light/dark switching by rotary switch		
Response time		≤ 20 ms		
Max. switching frequency[5]		25 Hz		
Time delay		With LED display: switching output active		
Switch position:	«1 O.S.D.»	«One shot»		
	«2 OFF.D.»	OFF delay		
	«3 ON.D.»	ON delay		
	«4 Normal»	No delay		
Delay		Adjustable, 0.1…5 s; potentiom. 270°		
Connection type		Terminal chamber		
VDE protection class[6]		□		
Circuit protection[7]		A, C		
Enclosure rating		IP 66/NEMA 4		
Ambient temperature T_A		Operation -13...131° F (-25...55° C)		
		Storage -40...158° F (-40...70° C)		
Approximate weight		4.2 oz (120 g)		
Housing material		Body: glass fiber reinforced ABS		
		Lens: polycarbonate		

1) Object with 90% remission (based on standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) ± 10%
4) Provide suitable spark suppression for inductive or capacitive loads
5) With light/dark ratio 1:1
6) Reference voltage 250 V UC
7) A = V_S connections reverse-polarity protected
C = Interference suppression
8) Black = 6% remission
Gray = 18% remission
White = 90% remission

Connection diagram



Time delay



Setting mode: ❍ light-switching
● dark-switching

WT 260

Proximity/Diffuse Sensors-Energetic



0.2...66.9 in (5...1700 mm)
sensing range

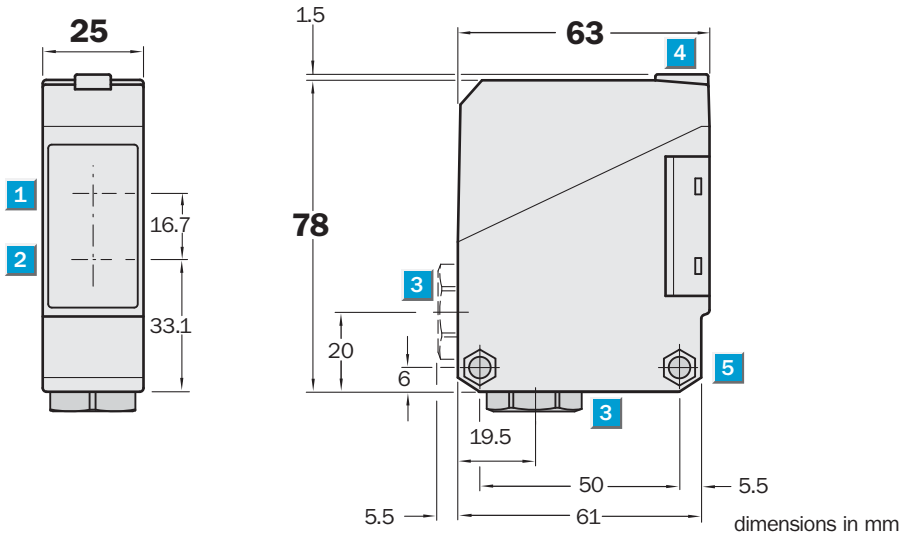
Highlights

- Rugged plastic housing
- Adjustable sensitivity
- Terminal chamber for connection flexibility
- Adjustable time delays
- Wide range supply voltage
- Signal strength indicator
- Easy mounting with included bracket

WT 260

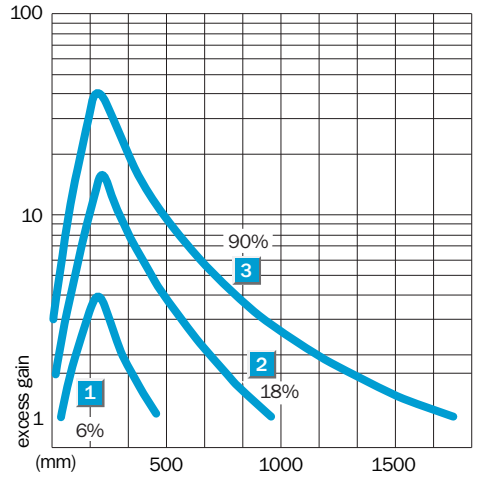


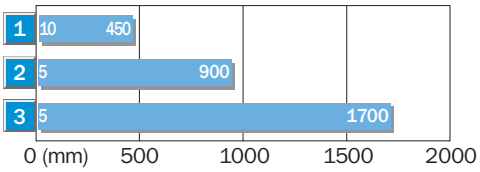
Dimensional drawing



dimensions in mm

Excess gain

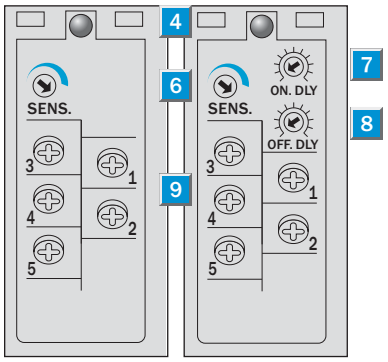




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

WT 260-S270	WT 260-R270



1	Center of optical axis, receiver
2	Center of optical axis, sender
3	Cable entry gland 1/2 in PF thread for cable diameters from 6 to 10 mm optionally at bottom or rear
4	LED signal strength indicator, red
5	Through hole Ø 5.2 mm on both sides for M 5 hex nut
6	Sensitivity adjustment
7	Time control ON-delay t_{ON}
8	Time control OFF-delay t_{OFF}
9	Terminals

Accessories	page
Mounting systems	1234

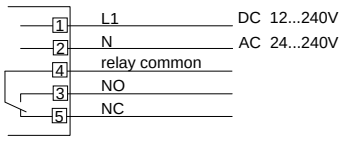
Order information

Type	Part no.
WT 260-S270	6 020 769
WT 260-R270	6 020 770

Technical data	WT 260-	S270	R270
Sensing range, adjustable	0.2...66.9 in (5...1700 mm)[1]		
Sensitivity	Adjustable, potentiometer 270°		
Light source[2], light type	LED, red light		
Light spot diameter	Approx. 2.4 in at 51.2 in (60 mm at 1300 mm)		
Angle of divergence	Approx. 1.8°		
Supply voltage V_S[3]	12...240 V DC		
	24...240 V AC		
Power consumption	≤ 5 VA		
Switching output	Relay, SPDT, electrically isolated		
Switching current I max[4]	3 A/240 V AC; 3 A/30 V DC		
Operation mode	Light switching		
Response time	≤ 20 ms		
Max. switching frequency[5]	25 Hz		
Time delays			
ON-delay t_{ON}	0.1...10 s, can be connected separately		
OFF-delay t_{OFF}	0.1...10 s, can be connected separately		
Connection type	Terminal chamber		
CE noise radiation	Level EN 50081-1		
	("Residential standard")		
VDE protection class[6]	□		
Circuit protection[7]	A, C		
Enclosure rating	IP 67/NEMA 6		
Ambient temperature T_A	Operation -13...131° F (-25...55° C)		
	Storage -40...158° F (-40...70° C)		
Approximate weight	4.2 oz (120 g)		
Housing material	Body: glass fiber reinforced ABS		
	Lens: polycarbonate		

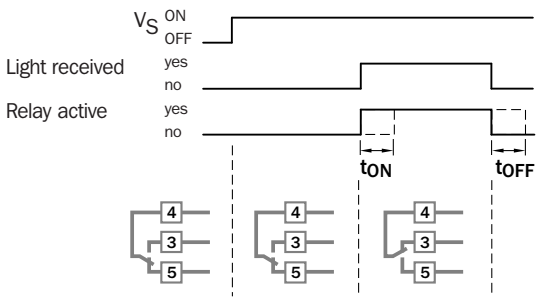
1) Object with 90% remission (based on standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) ± 10%
4) Provide suitable spark suppression for inductive or capacitive loads
5) With light/dark ratio 1:1
6) Reference voltage 250 V UC
7) A = V_S connections reverse-polarity protected
C = Interference suppression

Connection diagram



Time delay

t = 0.1 – 10 s



WT 260

Proximity/Diffuse Sensors-Energetic



0.4...137.8 in (10...3500 mm)
sensing range

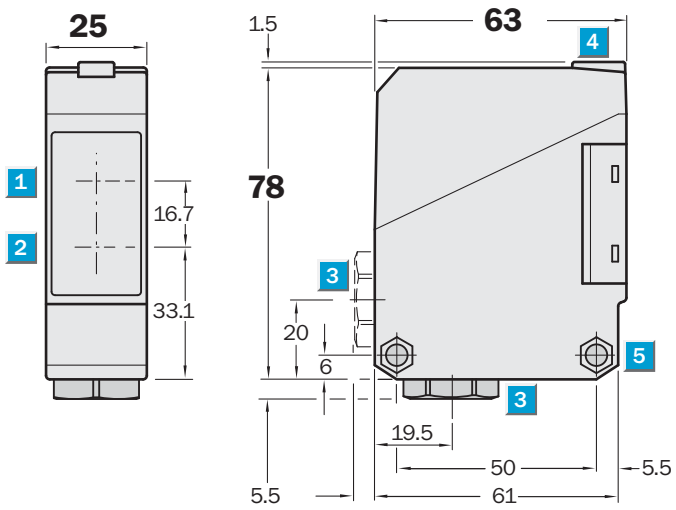
Highlights

- Rugged plastic housing
- Adjustable sensitivity
- Terminal chamber for connection flexibility
- Wide range supply voltage
- Adjustable time delays
- Signal strength indicator
- Easy mounting with included brackets

WT 260

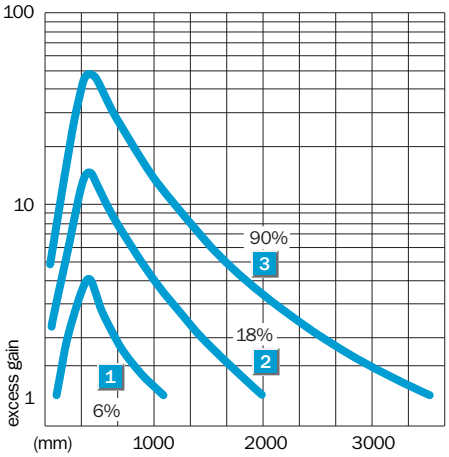


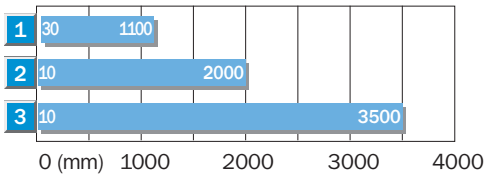
Dimensional drawing



dimensions in mm

Excess gain

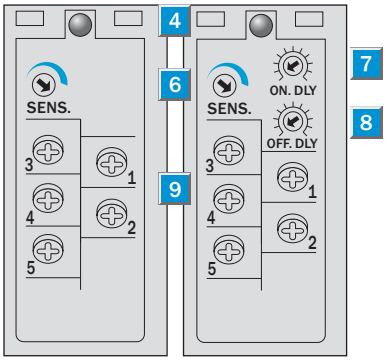




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

WT 260-S280	WT 260-R280



1	Center of optical axis, receiver
2	Center of optical axis, sender
3	Cable entry gland 1/2 in PF thread for cable diameters from 6 to 10 mm optionally at bottom or rear
4	LED signal strength indicator, red
5	Through hole Ø 5.2 mm on both sides for M5 hex nut
6	Sensitivity adjustment
7	Time control ON-delay t_{ON}
8	Time control OFF-delay t_{OFF}
9	Terminals

Accessories	page
Mounting systems	1234

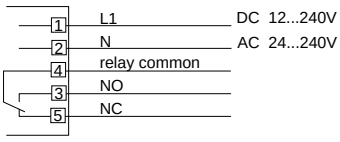
Order information

Type	Part no.
WT 260-S280	6 020 771
WT 260-R280	6 020 772

Technical data	WT 260-	S280	R280
Sensing range, adjustable	0.4...137.8 in (10...3500 mm)[1]		
Sensitivity	Adjustable, potentiometer 270°		
Light source[2], light type	LED, infrared light		
Light spot diameter	Approx. 3.7 in at 118.1 in (95 mm at 3000 mm)		
Angle of divergence	Approx. 1.7°		
Supply voltage V_S[3]	12...240 V DC		
	24...240 V AC		
Power consumption	≤ 5 VA		
Switching output	Relay, SPDT, electrically isolated		
Switching current I max[4]	3 A/240 V AC; 3 A/30 V DC		
Operation mode	Light switching		
Response time	≤ 20 ms		
Max. switching frequency[5]	25/s		
Time delays			
ON delay t_{ON}	0.1...10 s, can be connected separately		
OFF delay t_{OFF}	0.1...10 s, can be connected separately		
Connection type	Terminal chamber		
CE noise radiation	Level EN 50081-1		
	("Residential standard")		
VDE protection class[6]	□		
Circuit protection[7]	A, C		
Enclosure rating	IP 67/NEMA 6		
Ambient temperature T_A	Operation -13...131° F (-25...55° C)		
	Storage -40...158° F (-40...70° C)		
Approximate weight	4.2 oz (120 g)		
Housing material	Body: glass fiber reinforced ABS		
	Lens: polycarbonate		

1) Object with 90% remission (based on standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) ± 10%
4) Provide suitable spark suppression for inductive or capacitive loads
5) With light/dark ratio 1:1
6) Reference voltage 250 V UC
7) A = V_s connections reverse-polarity protected
C = Interference suppression

Connection diagram



WT 260T

Proximity/Diffuse Sensors - Background Suppression



2.8...82.7 in (70...2100 mm)
sensing range

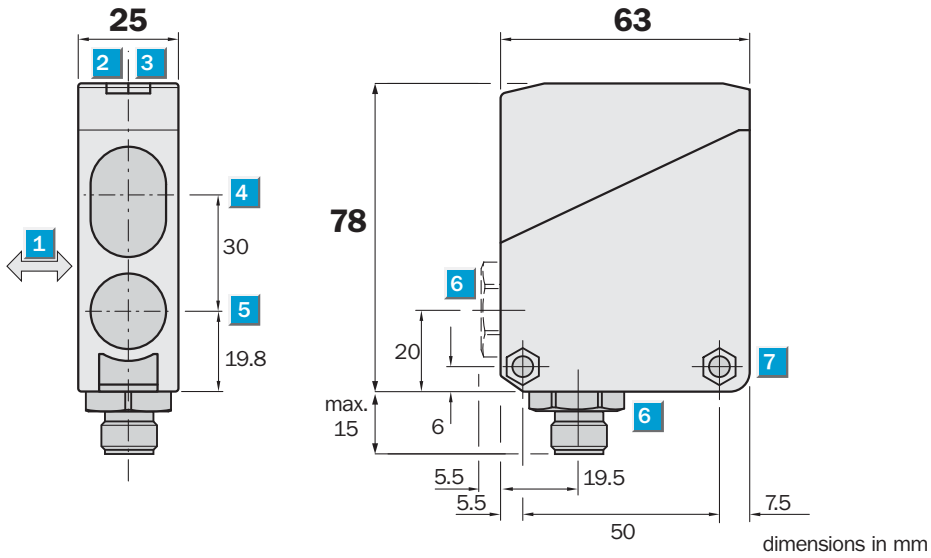
Highlights

- Rugged plastic housing
- Adjustable sensitivity
- Test input
- Terminal chamber for connection flexibility
- Easy mounting with included bracket

WT 260

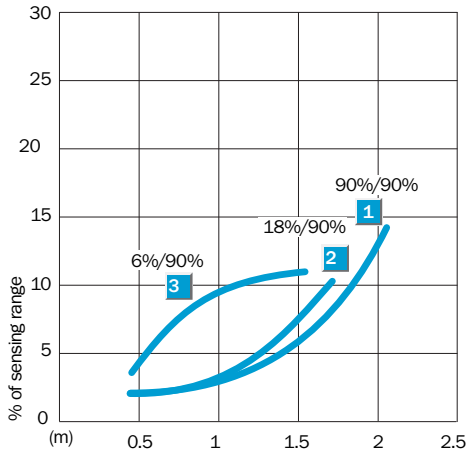


Dimensional drawing

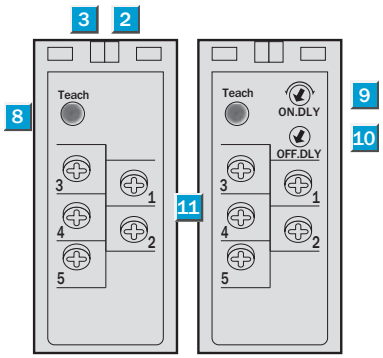


dimensions in mm

Excess gain

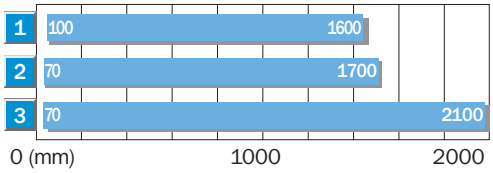


Adjustments



WT 260T-S290	WT 260T-R290

1 Standard direction of material being sensed
2 LED signal indicator orange, switching output active
3 LED signal indicator green, operating reserve
4 Center of optical axis, receiver
5 Center of optical axis, sender
6 Cable entry gland 1/2 in PF thread for cable diameters from 6 to 10 mm optionally at bottom or rear; or M12 equipment plug, bottom (4-pin)
LED signal strength indicator, yellow,
7 Through hole Ø 5.2 mm on both sides for M5 hex nut
8 Teach-in button (sensing range setting/ background suppression)
9 Time control ON delay t_{ON}
10 Time control OFF delay t_{OFF}
11 Terminals



1 Sensing range on black, 6% remission
2 Sensing range on gray, 18% remission
3 Sensing range on white, 90% remission

Order information

Type	Part no.
WT 260T-S290	6 021 923
WT 260T-R290	6 021 924

Accessories	page
Mounting systems	1234

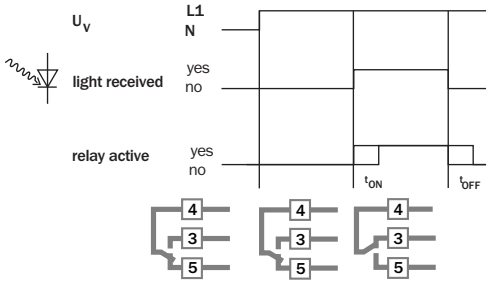
7028071 - © 2008 SICK, Inc.

Technical data	WT 260T-	S290	R290
Sensing range, adjustable	2.8...82.7 in (70...2100 mm)[1]		
Background suppression	3.9...78.7 in (100...2000 mm)		
Sensing range setting	Automatic, per teach-in		
Light source[2], light type	LED, infrared light		
Light spot diameter	Approx. 7.9 in at 78.7 in (200 mm at 2000 mm)		
Angle of divergence	Approx. 6°		
Supply voltage V_S	10...30 V DC[3]		
	24...240 V UC		
Current consumption	≤ 5 VA		
Switching outputs	Relay, SPDT, electrically isolated		
Switching current I Max.[4]	3 a/240 V AC; 3 A/30 V DC		
Light receiver, switching mode	Light switching		
Response time[6]	≤ 20 ms; 25/s		
Max. switching frequency[7]	25/s		
Time delay			
ON delay t_{ON}	0.1...10 s, can be connected separately		
OFF delay t_{OFF}	0.1...10 s, can be connected separately		
Connection types	Terminal chamber		
VDE protection class[8]	□		
Circuit protection[9]	A, C		
Enclosure rating	IP 67		
Ambient temperature T_A	Operation -13...131° F (-25 ...55° C)		
	Storage -40...158° F (-40...70° C)		
Approximate weight	4.2 oz (120 g)		
Housing material	Glass fiber reinforced ABS		

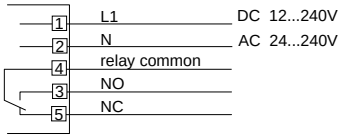
1) Object with 90% remission (based on standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) With resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
C = Interference suppression

Time delay

t = 0.1-10 s



Connection diagram



WL 260

Reflex/Retro-Reflective Sensors



0.03...45.9 ft (0.01...14 m)
sensing range

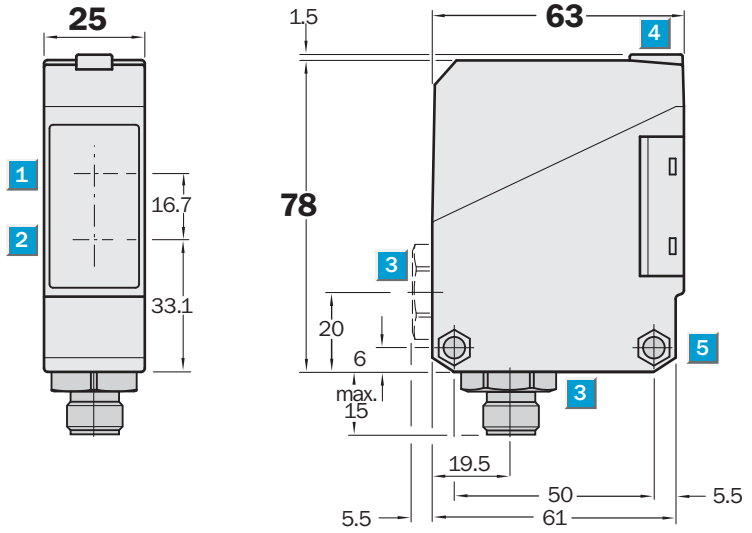
Highlights

- Rugged plastic housing
- Sensitivity adjustment
- Terminal chamber for connection flexibility
- Test input
- Signal strength indicator
- Polarizing filters prevent false readings on reflective surfaces
- Easy mounting with included nuts

WL 260

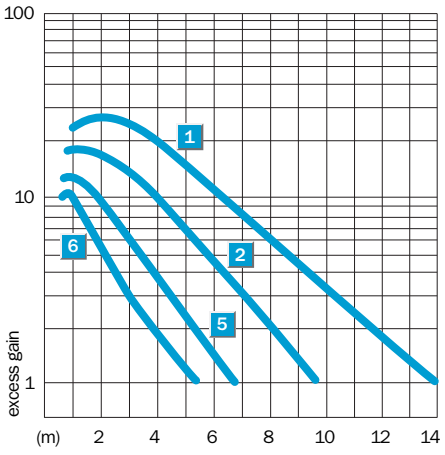


Dimensional drawing



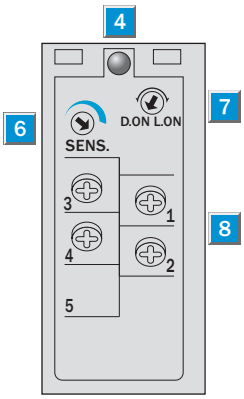
dimensions in mm

Excess gain



Adjustments

All types



1 Center of optical axis, receiver
2 Center of optical axis, sender
3 Cable entry gland 1/2 in PF thread for cable diameters from 6 to 10 mm optionally at bottom or rear; or plug, M12, bottom
4 LED signal strength indicator, yellow,
5 Through hole Ø 5.2 mm on both sides for M 5 hex nut
6 Sensitivity adjustment
7 Light/dark rotary switch
L.ON = light switching, D.ON = dark switching
8 Terminals

Reflector type		Sensing range
1	PL 80 A	0.01…14.0 m
2	P 250	0.01…9.5 m
3	PL 50 A, PL 40 A	0.01…11.0 m
4	PL 30 A, PL 31 A	0.01…8.5 m
5	PL 20 A	0.01…7.0 m
6	Reflective tape diamond grade	0.02…5.5 m

Order information

Type	Part no.
WL 260-F270	6 020 976
WL 260-F470	6 020 977
WL 260-E270	6 020 978
WL 260-E470	6 021 814

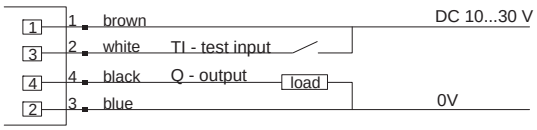
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Technical data	WL 260-	F270	F470	E270	E470
Sensing range	0.03...31.2 ft (0.01...9.5 m)/P 250 (included)	■	■	■	■
	0.03...45.9 ft (0.01...14 m)/PL 80 A	■	■	■	■
Sensitivity	Adjustable, potentiometer 270°	■	■	■	■
Light source[1], **light type**	LED, visible red light, polarized	■	■	■	■
Light spot diameter	Approx. 9.4 in at 26.2 ft (240 mm at 8 m)	■	■	■	■
Angle of divergence	Approx. 1.7°	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■
Ripple[3]	≤ 5 V_{SS}	■	■	■	■
Current consumption[4]	≤ 35 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Output current I_A max.	100 mA	■	■	■	■
Light receiver, switching mode	Light /dark switching by rotary switch	■	■	■	■
Response time[5]	≤ 1.5 ms	■	■	■	■
Max. switching frequency[6]	333 Hz	■	■	■	■
Test input "TE" sender off	PNP: TE to + V_S	■	■		
	NPN: TE to 0 V			■	■
Connection types	Terminal chamber	■		■	
	Plug, M12 4-pin		■		■
VDE protection class[7]	□	■	■	■	■
Circuit protection[8]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight	4.2 oz (120 g)	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■

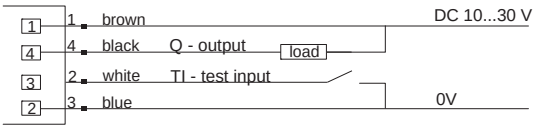
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) Must be within V_S tolerances
4) Without load
5) With resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Inputs/outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

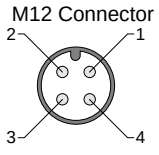
PNP Models



NPN Models



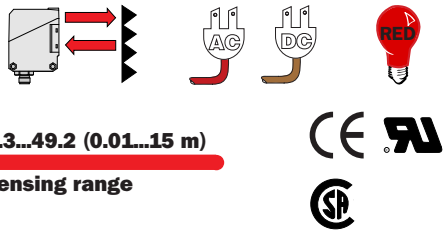
M12 Connector



wire colors refer to standard cable, not included

WL 260

Reflex/Retro-Reflective Sensors



0.3...49.2 (0.01...15 m)
sensing range

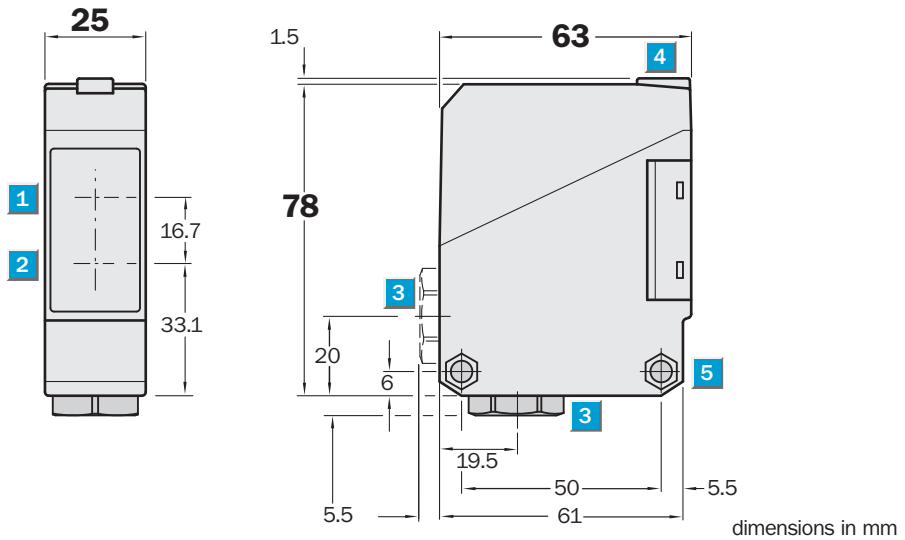
Highlights

- Rugged plastic housing
- Polarizing filters prevent false readings on reflective surfaces
- Terminal chamber for connection flexibility
- Sensitivity adjustment
- Wide range supply voltage
- Adjustable time delays
- Reflector included

WL 260

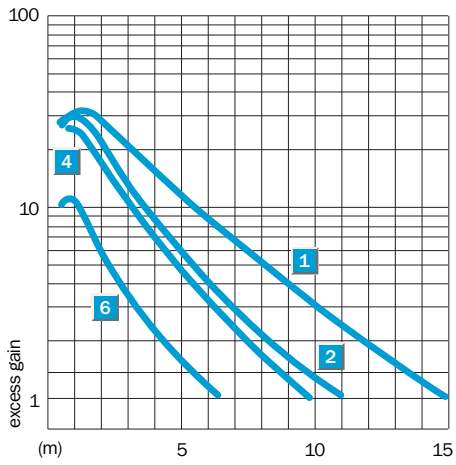


Dimensional drawing

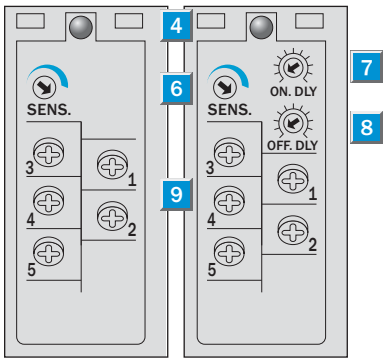


dimensions in mm

Excess gain



Adjustments



1 Center of optical axis, receiver
2 Center of optical axis, sender
3 1/2 in terminal chamber PF thread for cable diameters from 6 to 10 mm optionally at bottom or rear
4 LED signal strength indicator, red
5 Through hole Ø 5.2 mm on both sides for M5 hex nut
6 Sensitivity adjustment
7 Time control ON-delay t_{ON}
8 Time control OFF-delay t_{OFF}
9 Terminals

Reflector type		Sensing range
1	PL 80 A	0.01…15.0 m
2	P 250	0.01…11.0 m
3	PL 50 A, PL 40 A	0.01…12.5 m
4	PL 30 A, PL 31 A	0.01…9.7 m
5	PL 20 A	0.01…7.8 m
6	Reflective tape diamond grade	0.01…6.5 m

Order information	
Type	**Part no.**
WL 260-S270	6 020 767
WL 260-R270	6 020 768

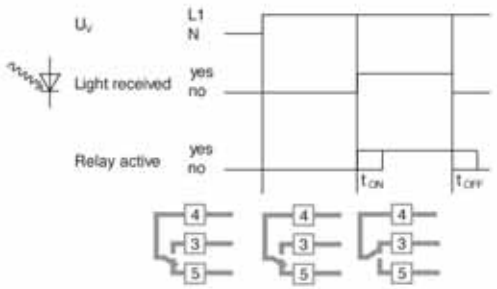
Accessories	page
Mounting systems	1234
Reflectors	1256

Technical data	WL 260-	S270	R270
Sensing range	0.3...36.1 ft (0.01...11 m)/P 250 (included)		
	0.3...49.2 ft (0.01...15 m)/PL 80 A		
Sensitivity	Adjustable, potentiometer 270°		
Light source[1], **light type**	LED, visible red light, polarized		
Light spot diameter	Approx. 11.8 in at 32.8 ft (300 mm at 10 m)		
Angle of divergence	Approx. 1.7°		
Supply voltage V_S[2]	12...240 V DC		
	24...240 V AC		
Power consumption	≤ 5 VA		
Switching output	Relay, SPDT, electrically isolated		
Switching current I_A max.[3]	3 A/240 V AC; 3 A/30 V DC		
Operation mode	Light switching		
Response time	≤ 20 ms		
Max. switching frequency[4]	25 Hz		
Time delays			
ON delay t_{ON}	0.1…10 s, can be connected separately		
OFF delay t_{OFF}	0.1…10 s, can be connected separately		
Connection type	Terminal chamber		
CE noise radiation	Level EN 50081-1		
	("Residential standard")		
VDE protection class[5]	□		
Circuit protection[6]	A, C		
Enclosure rating	IP 67		
Ambient temperature T_A	Operation -13...131° F (-25...55° C)		
	Storage -40...158° F (-40...70° C)		
Approximate weight	4.2 oz (120 g)		
Housing material	Glass fiber reinforced ABS		

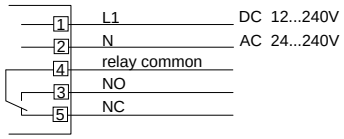
1) Average service life 100,000 h at T_A = 25° C
2) ± 10%
3) Provide suitable spark suppression for inductive or capacitive loads
4) With light/dark ratio 1:1
5) Reference voltage 250 V UC
6) A = V_s connections reverse-polarity protected
C = Interference suppression

Time delays

t = 0.1–10 s

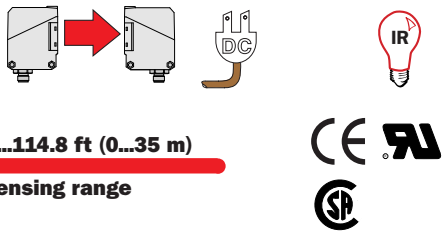


Connection diagram



WS/WE 260

Through-beam Sensors



0...114.8 ft (0...35 m)
sensing range

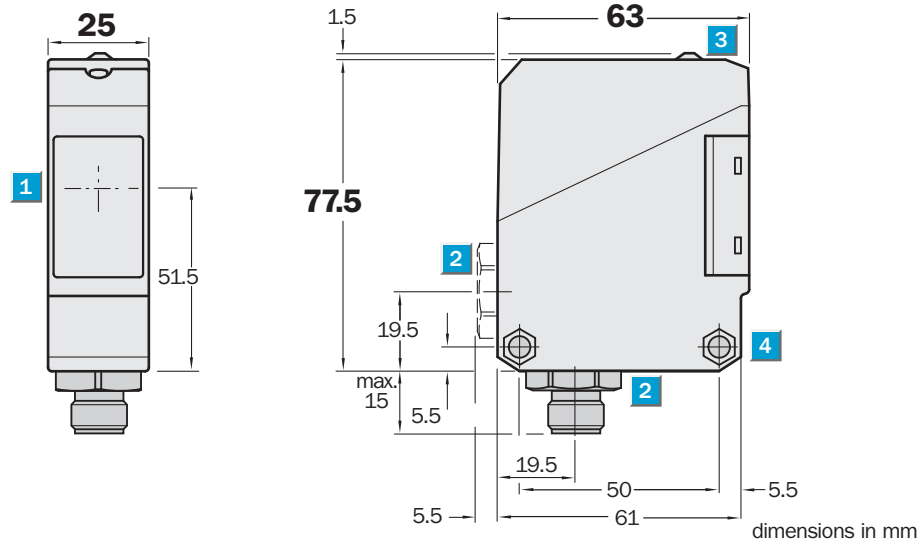
Highlights

- Rugged plastic housing
- Sensitivity adjustment
- Signal strength indicator
- Test input
- Optional slotted masks
- Terminal chamber for connection flexibility
- Easy mounting with included bracket

WS/WE 260

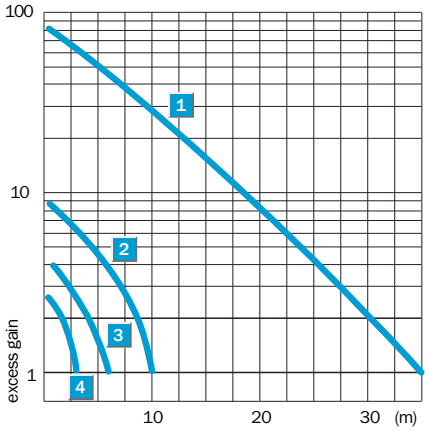


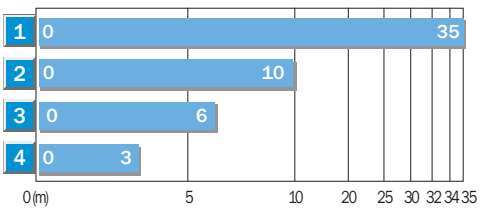
Dimensional drawing



dimensions in mm

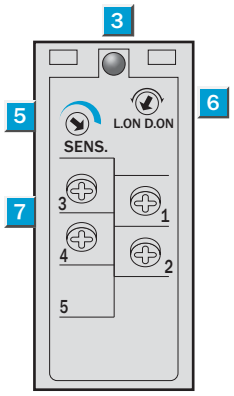
Excess gain





Adjustments

All types



1 Center of optical axis, sender/receiver
2 Cable entry gland 1/2 in PF thread
for cable diameters from 6 to 10 mm
optionally at bottom or rear;
or M12 equipment plug, bottom
3 LED signal strength indicator, orange
WE 260: switching output active
WS 260: sender active
4 Through hole Ø 5.2 mm on both sides
for M5 hex nut
5 Sensitivity adjustment (WE 260)
6 Light/dark rotary switch (WE 260)
L.ON = light switching, D.ON = dark switching
7 Terminals
Terminal 3: WS 260 only
Terminal 4: WE 260 only

Order information

Type	Part no.
WS/WE 260-F270	6 020 973
WS/WE 260-F470	6 020 974
WS/WE 260-E270	6 020 975
WS/WE 260-E470	6 021 817

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

Sensing range reduction with slotted masks

1	Without slotted mask
2	Slot width 5 mm
3	Slot width 2 mm
4	Slot width 1 mm

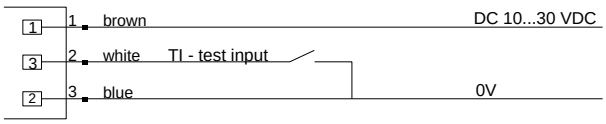
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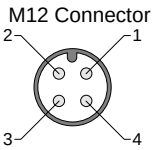
Technical data	WS/WE 260-	F270	F470	E270	E470
Sensing range	0...114.8 ft (0...35 m)	■	■	■	■
Sensitivity	Adjustable, potentiometer 270°	■	■	■	■
Light source[1], **light type**	LED, infrared light	■	■	■	■
Light spot diameter	Approx. 27.6 in at 98.4 ft (700 mm at 30 m)	■	■	■	■
Angle of divergence	Approx. 1.4°	■	■	■	■
Angle of reception	Approx. 20°	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■
Ripple[3]	≤ 5 V_{SS}	■	■	■	■
Current consumption[4]					
sender	≤ 20 mA	■	■	■	■
receiver	≤ 35 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Output current I_A max.	100 mA	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■
Response time[5]	≤ 1.5 ms	■	■	■	■
Max. switching frequency[6]	333 Hz	■	■	■	■
Test input "TE" sender off	PNP, NPN: TE to 0 V	■	■	■	■
Connection types	1/2 in PF terminal chamber	■		■	
	Plug, M12 4-pin		■		■
VDE protection class[7]	□	■	■	■	■
Circuit protection[8]					
sender	A, B	■	■	■	■
receiver	A, B, C, D	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight	4.2 oz (120 g)	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■

1) Average service life 100 000 h at T_A = 25° C
2) Limit values
3) Must be within V_S tolerances
4) Without load
5) With resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_s connections reverse-polarity protected
B = Inputs/outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

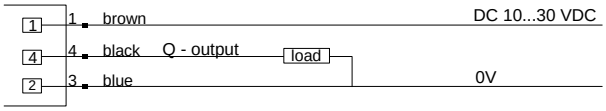
Connection diagram

Sender

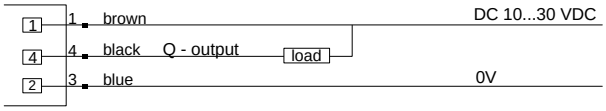




Receiver, PNP Models

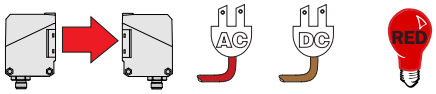


Receiver, NPN Models



WS/WE 260

Through-beam Sensors



0...147.6 ft (0...45 m)
sensing range

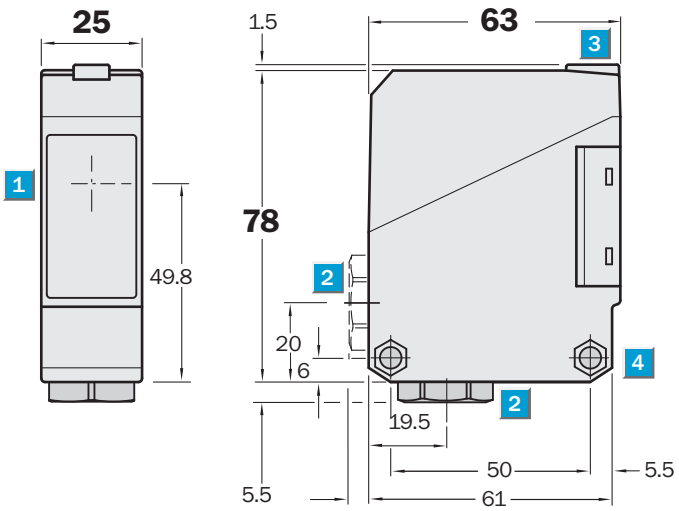
Highlights

- Rugged plastic housing
- Sensitivity adjustment
- Terminal chamber for connection flexibility
- Wide range supply voltage
- Adjustable time delays
- Easy mounting with included bracket

WS/WE 260

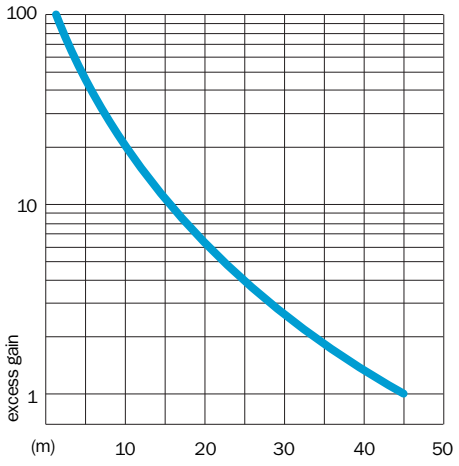


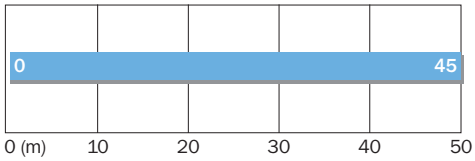
Dimensional drawing



dimensions in mm

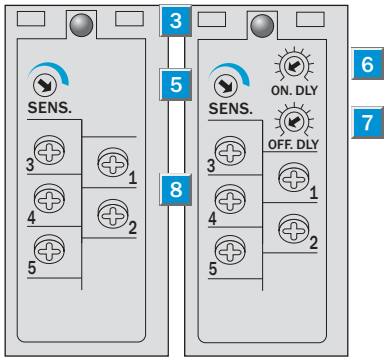
Excess gain





Adjustments

WS/WE 260-S270	WS/WE 260-R270



1 Center of optical axis, sender and receiver
2 Cable entry gland 1/2 in PF thread
for cable diameters from 6 to 10 mm
optionally at bottom or rear
3 LED signal strength indicator, red
4 Through hole Ø 5.2 mm on both sides
for M5 hex nut
5 Sensitivity adjustment
6 Time control ON-delay t_{ON}
7 Time control OFF-delay t_{OFF}
8 Terminals

Order information

Type	Part no.
WS/WE 260-S270	6 020 773
WS/WE 260-R270	6 020 774

Accessories	page
Mounting systems	1234
Special Accessories	1314

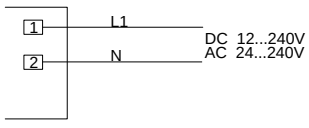
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Technical data	WS/WE 260-	S270	R270
Sensing range	0...147.6 ft (0...45 m)		
Sensitivity	Adjustable, potentiometer 270°		
Light source[1], **light type**	LED, visible red light		
Light spot diameter	Approx. 27.6 in at 131.2 ft (700 mm at 40 m)		
Angle of divergence, sender	Approx. 1°		
Angle of reception, receiver	Approx. 20°		
Supply voltage V_S[2]	12...240 V DC		
	24...240 V AC		
Power consumption			
Sender	≤ 4 VA		
Receiver	≤ 5 VA		
Switching output	Relay, SPDT, electrically isolated		
Switching current I_A max.[3]	3 A/240 V AC; 3 A/30 V DC		
Operation mode	Light switching		
Response time	≤ 20 ms		
Max. switching frequency[4]	25 Hz		
Time delays			
ON-delay t_{ON}	0.1...10 s, can be connected separately		
OFF-delay t_{OFF}	0.1...10 s, can be connected separately		
Connection type	Terminal chamber		
CE noise radiation	Level EN 50081-1		
	("Residential standard")		
VDE protection class[5]	□		
Circuit protection[6]	A, C		
Enclosure rating	IP 67		
Ambient temperature T_A	Operation -13...131° F (-25...55° C)		
	Storage -40...158° F (-40...70° C)		
Approximate weight	4.2 oz (120 g)		
Housing material	Glass fiber reinforced ABS		

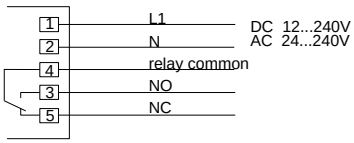
1) Average service life 100,000 h at T_A = 25° C
2) ± 10%
3) Provide suitable spark suppression for inductive or capacitive loads
4) With light/dark ratio 1:1
5) Reference voltage 250 V UC
6) A = V_S connections reverse-polarity protected
C = Interference suppression

Connection diagram

Sender

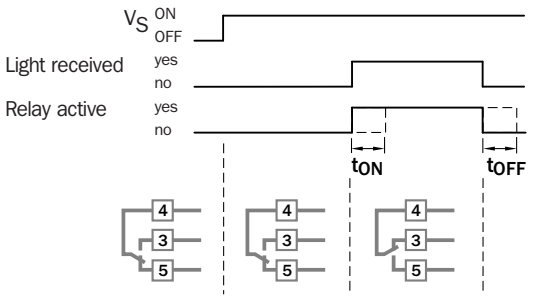


Receiver



Time delay

t = 0.1 – 10 s



WTB27-3 Red

Proximity/Diffuse Sensors- Background Suppression

1.2...43.3 in (30...1100 mm)
sensing range

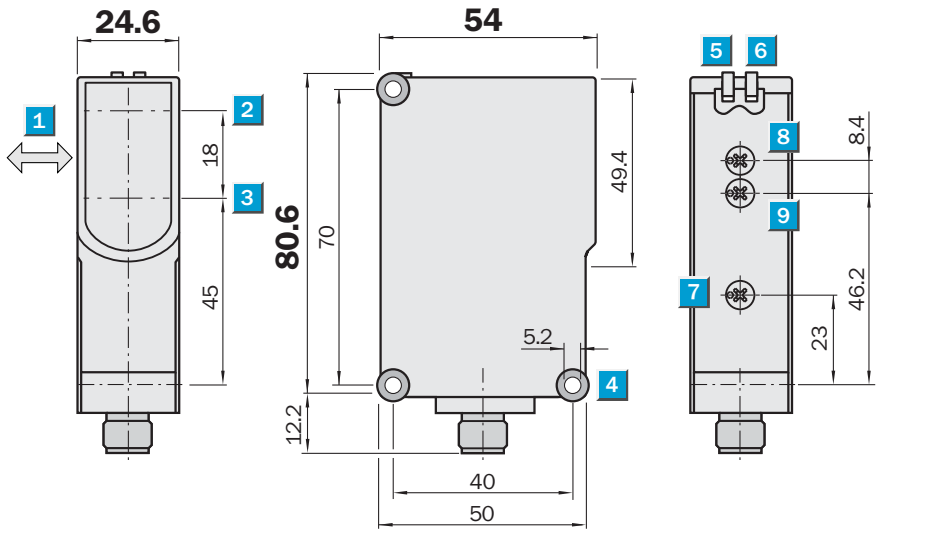
Highlights

- Precise background suppression without sensing distance drift
- Easy teach-in, simple and fast commissioning
- Reliable in industrial environments; secure against the effects of ambient light, unwanted optical reflections, other sensors mounted adjacently and in temperatures from -40...140° F (-40...60° C)

WTB27-3

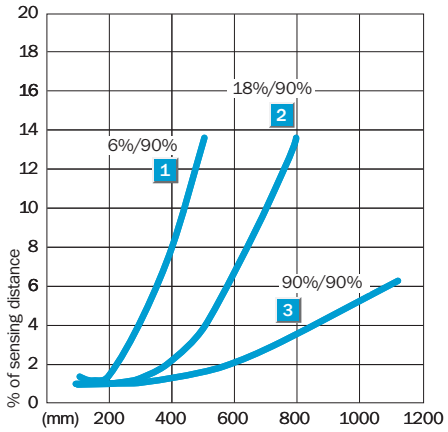


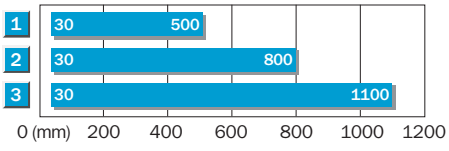
Dimensional drawing



dimensions in mm

Background suppression

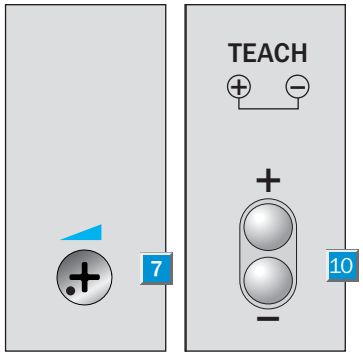




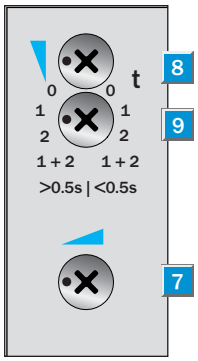
1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

WTB27-3P2441 | WTB27-3P2443 | WTB27-3P3741



WTB27-3E2641 | WTB27-3F2641



1	Standard direction of the material being sensed
2	Optical axis sender
3	Optical axis receiver
4	Mounting hole ø 5.2 mm
5	LED indicator green; power on
6	LED indicator yellow; status of received light beam
7	Adjustment of sensing distance
8	Time control
9	Time delay selector switch
10	Adjustment of sensing distance: double teach button

Switch-selectable time delay

0.02 – 0.5 s or 0.5 – 10 s

0	Without time delay
1	Time delay from trailing edge of object
2	Time delay from leading edge of object
1+2	Time delay from trailing and leading edge of object

Order information

Type	Part no.
WTB27-3E2641	1 027 747
WTB27-3F2641	1 027 746
WTB27-3P2441	1 027 744
WTB27-3P2443	1 027 745
WTB27-3P3741	1 027 748

Accessories

	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

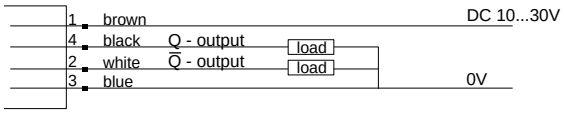
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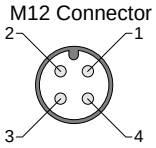
Technical data	WTB27-3	E2641	F2641	P2441	P2443	P3741
Sensing range, typ. max	1.2...43.3 in (30...1100 mm)[1]	■	■	■	■	■
Operating distance	3.9...43.3 in (100...1100 mm)[1]	■	■	■	■	■
Adjustment of operating distance	Potentiometer	■	■	■		■
	Teach-in: double teach button				■	
Light source[2], light type	LED, red light, 660 nm[2]	■	■	■	■	■
Light spot diameter	Approx. 0.6 in at 19.7 in (15 mm at 500 mm)	■	■	■	■	■
Supply voltage V_S	10...30 V DC[3]	■	■	■	■	■
Ripple[4]	≤ 5 V_{pp}	■	■	■	■	■
Current consumption[5]	≤ 35 mA	■	■	■	■	■
Switching outputs	NPN antivalent	■				
	PNP antivalent		■	■	■	■
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V		■	■	■	■
Signal voltage NPN HIGH/LOW	Approx. V_S/ < 2.5 V	■				
Output current I_A max.	100 mA	■	■	■	■	■
Response time[6]	≤ 1.5 ms	■	■	■	■	■
Max. switching frequency[7]	350 Hz	■	■	■	■	■
Time delay	Selectable: 0.5…10 s/0.02…0.5 s	■	■			
Time type	OFF, T_{off}, T_{on}, T_{off} + T_{on}	■	■			
Test input sender OFF	TE to V_S	■				
	TE to 0 V		■			
Connection types	Connector Q6, 6-pin, DC	■	■			
	Connector, M12 4-pin			■	■	
	Cable with plug, Q7, 7-pin, DC, PVC, 150 mm[8]					■
VDE protection class[9]	□	■	■	■	■	■
Circuit protection[10]	A, B, C	■	■	■	■	■
Enclosure rating	IP 65	■	■			
	IP 66, IP 67			■	■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■
Approximate weight	3.5 oz (100 g)	■	■	■	■	
	4.2 oz (120 g)					■
Housing material	ABS, PMMA	■	■	■	■	■

1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values, operation in short-circuit protected network max. 8 A
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression

Connection diagram

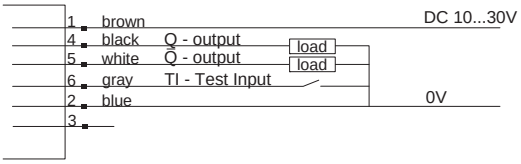
PNP Models



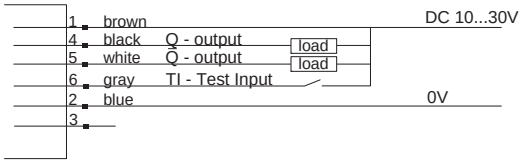


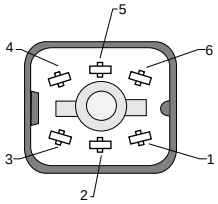
wire colors refer to standard cable, not included with quick disconnect models

PNP

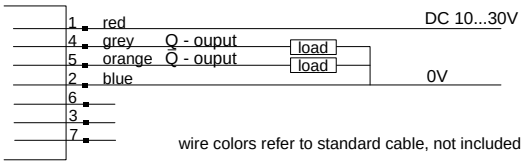


NPN

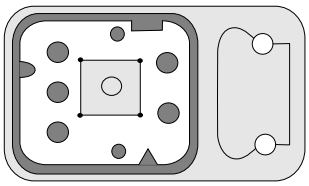




PNP



wire colors refer to standard cable, not included



WTB27-3 Red

Proximity/Diffuse Sensors-Background Suppression



1.2...43.3 in (30...1100 mm)
sensing range

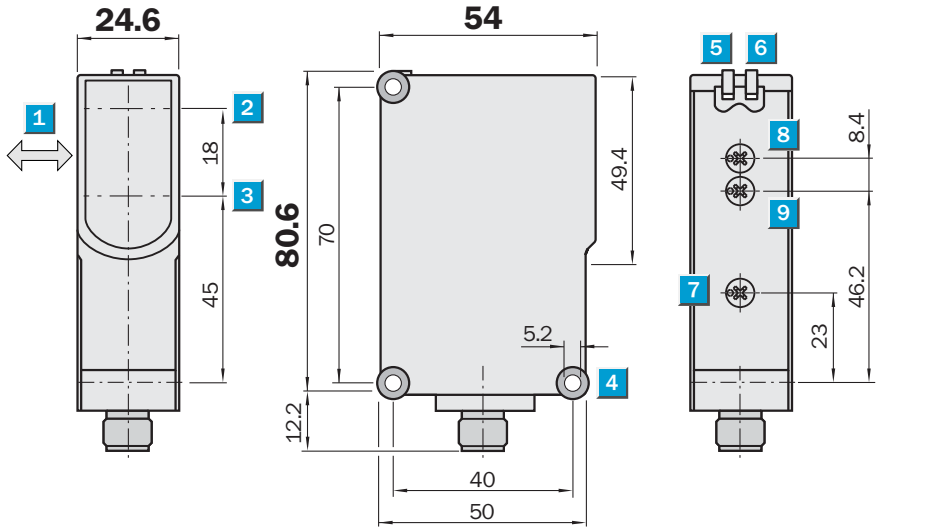
Highlights

- Universal supply voltage
- High-precision background suppression without sensing distance drift
- Reliable in industrial environments; secure against the effects of ambient light, unwanted optical reflections, other sensors mounted adjacently and in temperatures from -40…140° F (-40…60° C)

WTB27-3

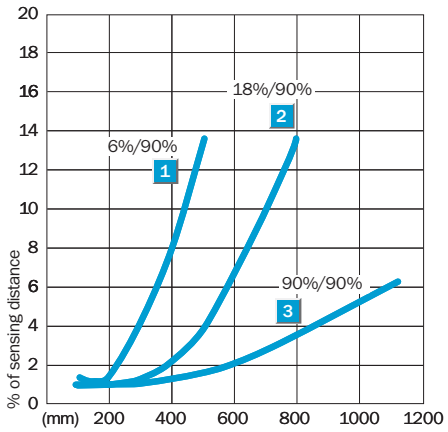


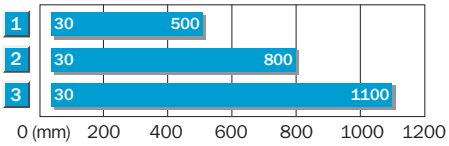
Dimensional drawing



dimensions in mm

Background suppression

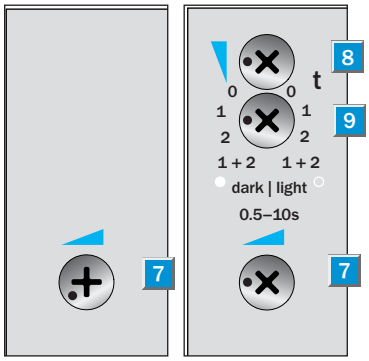




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

WTB27-3S1541 | WTB27-3R2641 | WTB27-3S3741



1	Standard direction of the material being sensed
2	Optical axis sender
3	Optical axis receiver
4	Mounting hole ø 5.2 mm
5	LED indicator green; power on
6	LED indicator yellow; status of received light beam
7	Adjustment of sensing distance
8	Time control
9	Time delay selector switch
○	Light switching (L)
●	Dark switching (D)

Switch-selectable time delay

D | L 0.5 - 10 s
0 | 0 Without time delay
2 | 1 Time delay from trailing edge of object
1 | 2 Time delay from leading edge of object
1+2 Time delay from trailing and leading edge of object

Order information

Type	Part no.
WTB27-3R2641	1 027 750
WTB27-3S1541	1 027 749
WTB27-3S3741	1 027 751

Accessories

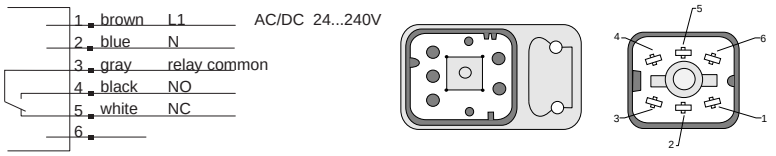
	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

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Technical data	WTB27-3	R2641	S1541	S3741
Sensing range, typ. max	1.2...43.3 in (30...1100 mm)[1]	■	■	■
Operating distance	3.9...43.3 in (100...1100 mm)[1]	■	■	■
Adjustment of operating distance	Potentiometer	■	■	■
Light source, light type	LED, red light, 660 nm[2]	■	■	■
Light spot diameter	Approx. 0.6 in at 19.7 in (15 mm at 500 mm)	■	■	■
Supply voltage V_S	24...240 V UC[3]	■	■	■
Switching outputs	Relay 1 x c/o, electrically isolated[4]	■		
	Relay 1 x c/o, electrically isolated[5]		■	■
Switching mode	Light/dark switching, switchable	■		
	Light switching		■	■
Current consumption	≤ 2.5 VA	■	■	■
Max. switching voltage	250 V AC/250 V DC (max. 0.11 A)	■	■	■
Switching current max.	3 A @ 250 V AC o. 24 V DC[6]	■	■	■
Max. switching power	750 W AC/72 W DC	■	■	■
Response time	≤ 10 ms	■	■	■
Max. switching frequency[7]	10 Hz	■	■	■
Time delay	Selectable: 0.5…10 s	■		
Time type	OFF, T_{off}, T_{on}, T_{off} + T_{on}	■		
Connection types	Connector Q6, 6-pin, AC/UC	■		
	Cable, PVC, 2 m[8]		■	
	Cable with plug, Q7, 7-pin, AC/UC, PVC, 150 mm[8]			■
VDE protection class[9]	□	■	■	■
Circuit protection[10]	A, B	■	■	■
Enclosure rating	IP 65	■		
	IP 66, IP 67		■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)[11]	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■
Approximate weight	4.2 oz (120 g)	■		
	7.0 oz (200 g)		■	
	4.9 oz (140 g)			■
Housing material	ABS, PMMA	■	■	■

1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25°C
3) ± 10%
4) Provide suitable spark suppression for inductive or capacitive loads. Relay contacts are separated from the power supply by a basic isolation of 3 mm. Depending on the application, additional isolation might have to be applied in the user's circuit.
5) Provide suitable spark suppression for inductive or capacitive loads
6) Usage category to EN 60947-1, AC-15, DC-13
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 250 V AC
10) A = V_S connections reverse-polarity protected
B = Interference pulse suppression
11) UL: 0…60° C

Connection diagram



WTB27-3 IR

Proximity/Diffuse Sensors- Background Suppression

1.2...63 in (30...1600 mm)
sensing range

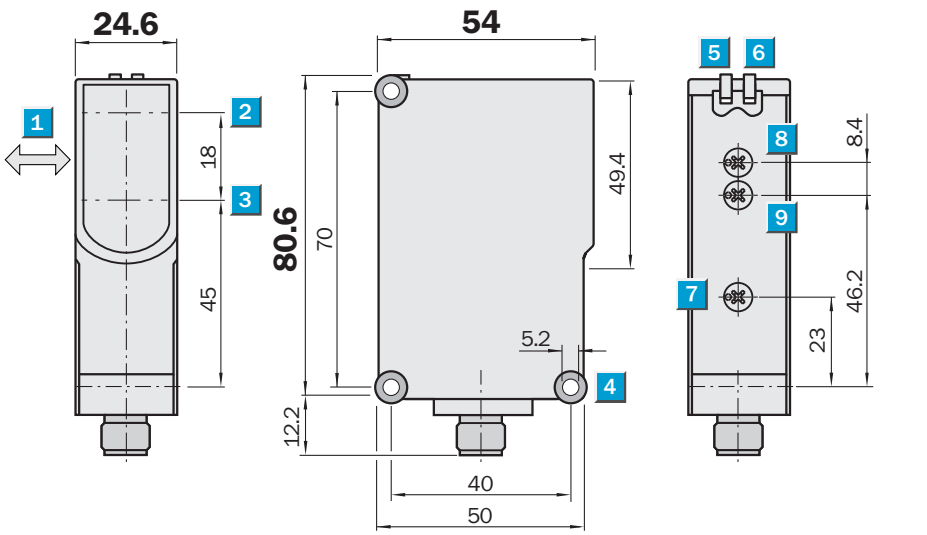
Highlights

- Infrared light, long sensing distance
- Time delays, test input, front screen heating
- Reliable in industrial environments; secure against the effects of ambient light, unwanted optical reflections, other sensors mounted adjacently and in temperatures from -40…140° F (-40…60° C)

WTB27-3

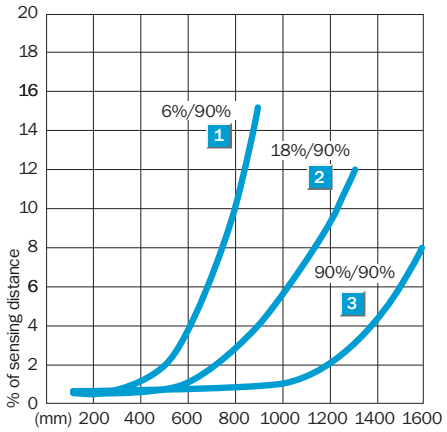


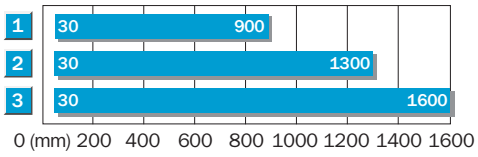
Dimensional drawing



dimensions in mm

Background suppression

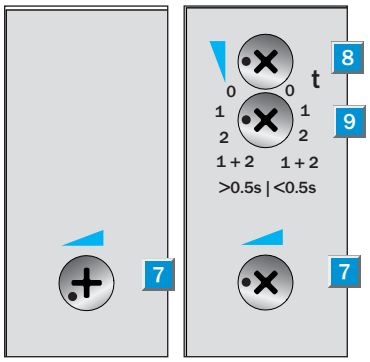




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

WTB27-3P1111	WTB27-3E2411
WTB27-3P2411	WTB27-3E2611
WTB27-3P2421	WTB27-3F2411
WTB27-3P3711	WTB27-3F2611



1	Standard direction of the material being sensed
2	Optical axis sender
3	Optical axis receiver
4	Mounting hole ø 5.2 mm
5	LED indicator green; power on
6	LED indicator yellow; status of received light beam
7	Adjustment of sensing distance
8	Time control
9	Time delay selector switch

Switch-selectable time delay

0.02 - 0.5 s or 0.5 - 10 s

0	Without time delay
1	Time delay from trailing edge of object
2	Time delay from leading edge of object
1+2	Time delay from trailing and leading edge of object

Order information

Type	Part no.
WTB27-3E2411	1 027 755
WTB27-3E2611	1 027 757
WTB27-3F2411	1 027 753
WTB27-3F2611	1 027 756
WTB27-3P1111	1 027 752
WTB27-3P2411	1 025 994
WTB27-3P2421	1 027 754
WTB27-3P3711	1 027 758

Accessories

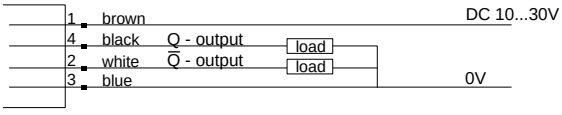
	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

Technical data	WTB27-3	E2411	E2611	F2411	F2611	P1111	P2411	P2421	P3711
Sensing range, typ. max	1.2...63 in (30...1600 mm)[1]	■	■	■	■	■	■	■	■
Operating distance	3.9...63 in (100...1600 mm)[1]	■	■	■	■	■	■	■	■
Adjustment of operating distance	Potentiometer	■	■	■	■	■	■	■	■
Light source, light type	LED, Infrared light, 880 nm[2]	■	■	■	■	■	■	■	■
Light spot diameter	Approx. 1 in at 31.5 in (25 mm at 800 mm)	■	■	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[3]	■	■	■	■	■	■	■	■
Ripple	≤ 5 V_{pp}[4]	■	■	■	■	■	■	■	■
Current consumption	≤ 40 mA[5]	■	■	■	■	■	■		■
	≤ 55 mA[5]							■	
Switching outputs	NPN antivalent	■	■						
	PNP antivalent			■	■	■	■	■	■
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V			■	■	■	■	■	■
Signal voltage NPN HIGH/LOW	Approx. V_S/< 2.5 V	■	■						
Output current I_a max	100 mA	■	■	■	■	■	■	■	■
Response time[6]	≤ 1.5 ms	■	■	■	■	■	■	■	■
Max. switching frequency[7]	350 Hz	■	■	■	■	■	■	■	■
Time delay	Selectable: 0.5…10 s/0.02…0.5 s	■	■	■	■				
Time type	OFF, T_{off}, T_{on}, T_{off} + T_{on}	■	■	■	■				
Test input sender off	TE to V_S		■						
	TE to 0 V				■				
Connection types	Connector M12 4-pin	■		■			■	■	
	Connector, Q6, 6-pin, DC		■		■				
	Cable, PVC, 2 m[8]					■			
	Cable with plug, Q7, 7-pin, DC, PVC, 150 mm[8]								■
VDE protection class[9]	□	■	■	■	■	■	■	■	■
Circuit protection[10]	A, B, C	■	■	■	■	■	■	■	■
Enclosure rating	IP 66, IP 67	■		■		■	■	■	■
	IP 65		■		■				
Ambient temperature T_A	Operation -40...140° F (-40...60° C)[11]	■	■	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■	■	■
Approximate weight	3.5 oz (100 g)	■	■	■	■		■	■	
	6.3 oz (180 g)					■			
	4.2 oz (120 g)								■
Front screen heating	√							■	
Housing material	ABS, PMMA	■	■	■	■	■	■	■	■

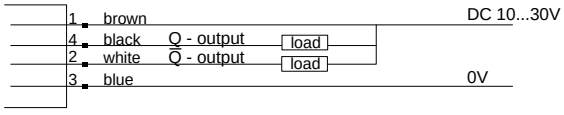
1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values, operation in short-circuit proteted network max. 8 A
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression

Connection diagram

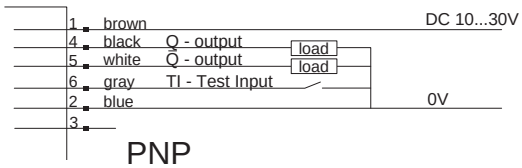
PNP Models



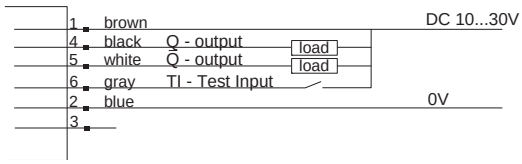
NPN Models



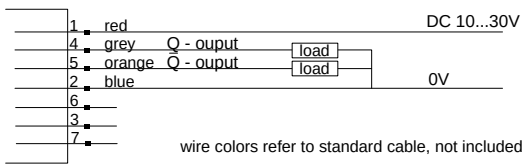
PNP



NPN

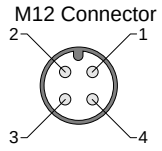


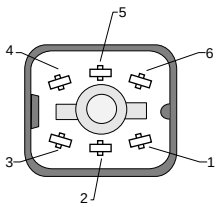
PNP

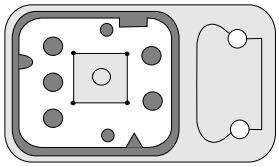


wire colors refer to standard cable, not included

M12 Connector







WTB27-3 IR

Proximity/Diffuse Sensors- Background Suppression

1.2...63 in (30...1600 mm)
sensing range

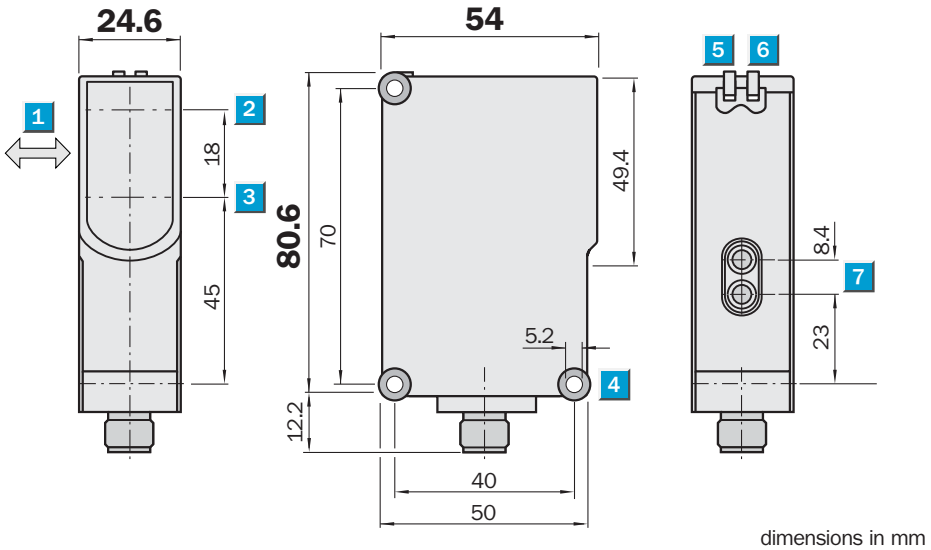
Highlights

- Infrared light, long sensing distance
- Easy teach-in, simple and fast commisssioning
- Reliable in industrial environments; secure against the effects of ambient light, unwanted optical reflections, other sensors mounted adjacently and in temperatures from -40…140° F (-40…60° C)

WTB27-3

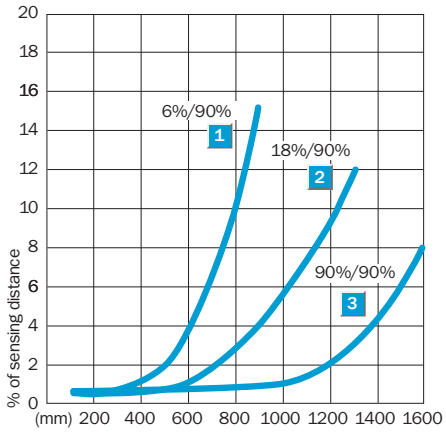


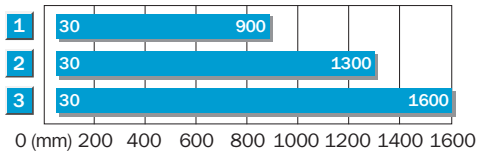
Dimensional drawing



dimensions in mm

Background suppression

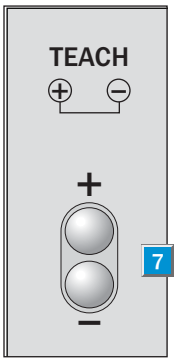




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

WTB27-3N2413
WTB27-3P1113
WTB27-3P2413



1	Standard direction of the material being sensed
2	Optical axis sender
3	Optical axis receiver
4	Mounting hole ø 5.2 mm
5	LED indicator green; power on
6	LED indicator yellow; status of received light beam
7	Adjustment of sensing distance: double teach button

Order information

Type	Part no.
WTB27-3N2413	1 027 761
WTB27-3P1113	1 027 759
WTB27-3P2413	1 027 760

Accessories	page
Cables and connectors	1180
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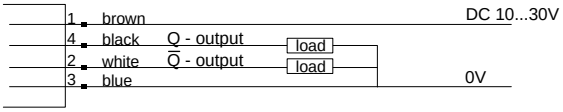
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Technical data	WTB27-3	N2413	P1113	P2413
Sensing range, typ. max	1.2...63 in (30...1600 mm)[1]	■	■	■
Operating distance	3.9...63 in (100...1600 mm)[1]	■	■	■
Adjustment of operating distance	Teach-in: double teach button	■	■	■
Light source, light type	LED, Infrared light, 880 nm[2]	■	■	■
Light spot diameter	Approx. 1 in at 31.5 in (25 mm at 800 mm)	■	■	■
Supply voltage V_S	10...30 V DC[3]	■	■	■
Ripple	≤ 5 V_{pp}[4]	■	■	■
Current consumption	≤ 40 mA[5]	■	■	■
Switching outputs	NPN antivalent	■		
	PNP antivalent		■	■
Signal voltage PNP HIGH/LOW	> V_S - 2.5 V/approx. 0 V		■	■
Signal voltage NPN HIGH/LOW	Approx. V_S/< 2.5 V	■		
Output current I_a max	100 mA	■	■	■
Response time[6]	≤ 1.5 ms	■	■	■
Max. switching frequency[7]	350 Hz	■	■	■
Connection types	Connector M12 4-pin	■		■
	Cable, PVC, 2 m[8]		■	
VDE protection class[9]	□	■	■	■
Circuit protection[10]	A, B, C	■	■	■
Enclosure rating	IP 66, IP 67	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■
Approximate weight	3.5 oz (100 g)	■		■
	6.3 oz (180 g)		■	
Housing material	ABS, PMMA	■	■	■

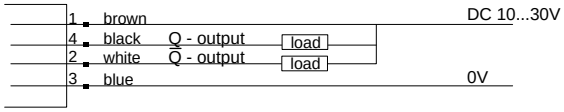
1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values, operation in short-circuit proteted network max. 8 A
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression

Connection diagram

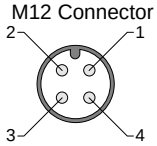
PNP Models



NPN Models



M12 Connector



wire colors refer to standard cable, not included with quick disconnect models

WTB27-3 IR

Proximity/Diffuse Sensors- Background Suppression

1.2...63 in (30...1600 mm)
sensing range

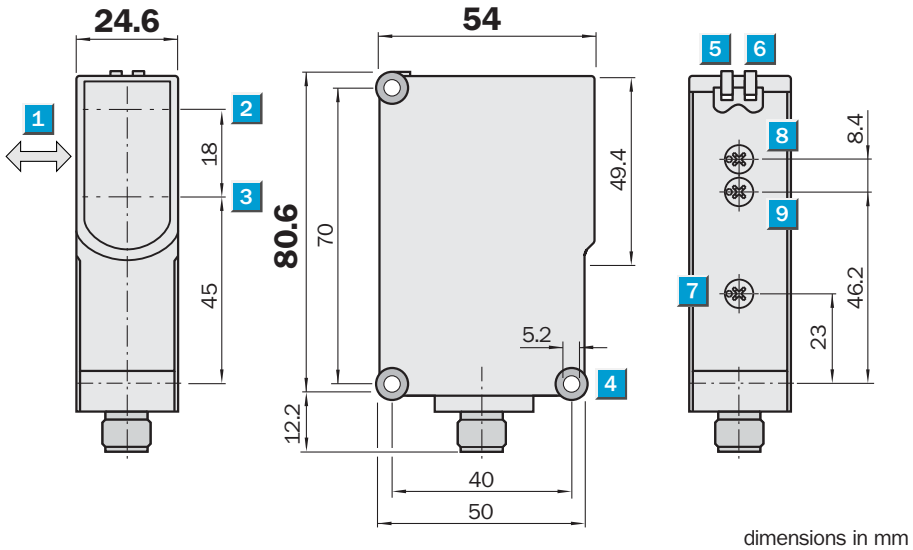
Highlights

- Universal supply voltage
- Infrared light, long sensing distance
- Time delays
- Reliable in industrial environments; secure against the effects of ambient light, unwanted optical reflections, other sensors mounted adjacently and in temperatures from -40…140° F (-40…60° C)

WTB27-3

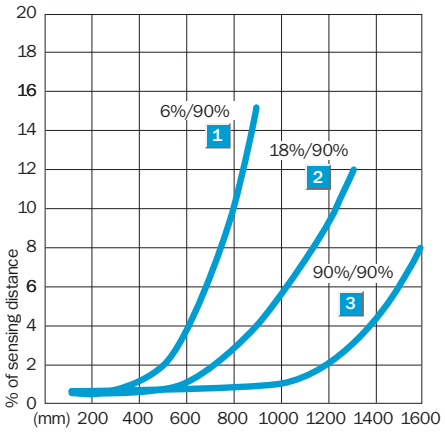


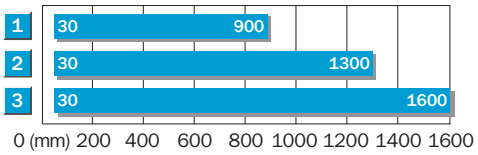
Dimensional drawing



dimensions in mm

Background suppression

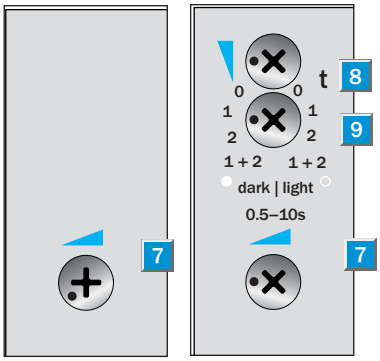




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

WTB27-3S1511 | WTB27-3R2611 | WTB27-3S3711



1	Standard direction of the material being sensed
2	Optical axis sender
3	Optical axis receiver
4	Mounting hole ø 5.2 mm
5	LED indicator green; power on
6	LED indicator yellow; status of received light beam
7	Adjustment of sensing distance
8	Time control
9	Time delay selector switch
○	Light switching (L)
●	Dark switching (D)

Switch-selectable time delay

D | L 0.5 -10 s

0 | 0 Without time delay
2 | 1 Time delay from trailing edge of object
1 | 2 Time delay from leading edge of object
1+2 Time delay from trailing and leading edge of object

Order information

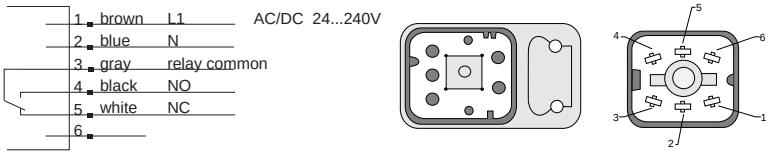
Type	Part no.
WTB27-3R2611	1 027 763
WTB27-3S1511	1 027 762
WTB27-3S3711	1 027 764

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

Technical data	WTB27-3	R2611	S1511	S3711
Sensing range, typ. max	1.2...63 in (30...1600 mm)[1]	■	■	■
Operating distance	3.9...63 in (100...1600 mm)[1]	■	■	■
Adjustment of operating distance	Potentiometer	■	■	■
Light source, light type	LED, infrared light, 880 nm[2]	■	■	■
Light spot diameter	Approx. 1 in at 31.5 in (25 mm at 800 mm)	■	■	■
Supply voltage V_S	24...240 V UC[3]	■	■	■
Switching outputs	Relay 1 x c/o, electrically isolated[4]	■		
	Relay 1 x c/o, electrically isolated[5]		■	■
Switching mode	Light/dark switching, switchable	■		
	Light switching		■	■
Current consumption	≤ 2.5 VA	■	■	■
Max. switching voltage	250 V AC/250 V DC (max. 0.11 A)	■	■	■
Switching current max.	3 A @ 250 V AC o. 24 V DC[6]	■	■	■
Max. switching power	750 W AC/72 W DC	■	■	■
Response time	≤ 10 ms	■	■	■
Max. switching frequency[7]	10 Hz	■	■	■
Time delay	Selectable: 0.5…10 s	■		
Time type	OFF, T_{off}, T_{on}, T_{off} + T_{on}	■		
Connection types	Connector Q6, 6-pin, AC/UC	■		
	Cable, PVC, 2 m[8]		■	
	Cable with plug, Q7, 7-pin, AC/UC, PVC, 150 mm[8]			■
VDE protection class[9]	□	■	■	■
Circuit protection[10]	A, B	■	■	■
Enclosure rating	IP 65	■		
	IP 66, IP 67		■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)[11]	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■
Approximate weight	4.2 oz (120 g)	■		
	7.0 oz (200 g)		■	
	4.9 oz (140 g)			■
Housing material	ABS, PMMA	■	■	■

1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25°C
3) ± 10%
4) Provide suitable spark suppression for inductive or capacitive loads. Relay contacts are separated from the power supply by basic isolation of 3 mm. Depending on the application, additional isolation might have to be applied in the user's circuit.
5) Provide suitable spark suppression for inductive or capacitive loads
6) Usage category to EN 60947-1, AC-15, DC-13
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 250 V AC
10) A = V_S connections reverse-polarity protected
B = Interference pulse suppression
11) UL: 0…60° C

Connection diagram



WT 27-2

Proximity/Diffuse Sensors-Background Suppression



1.2...39.4 in (30...1000 mm)
sensing range

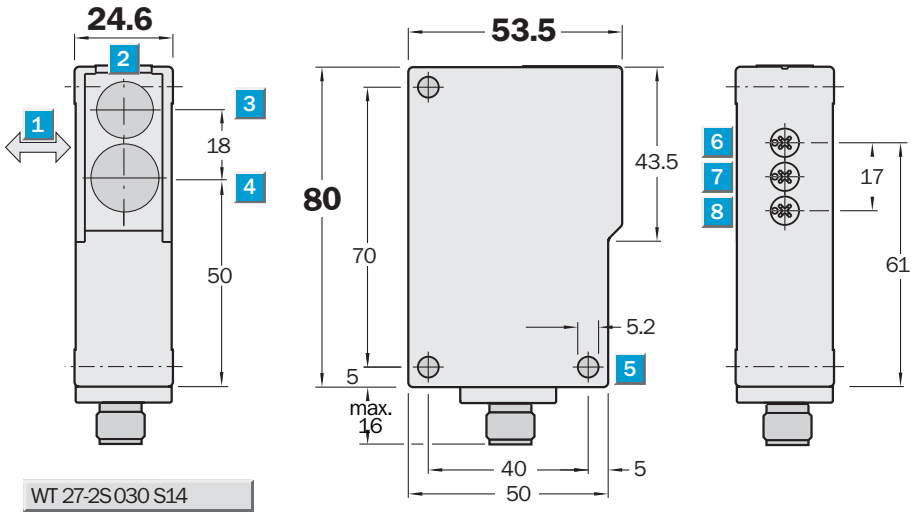
Highlights

- Rugged plastic housing
- Red light for easy alignment
- Adjustable background suppression
- Selectable time delays
- Signal strength indicator
- Cable or quick disconnect versions
- Wide range supply voltage

WT 27-2



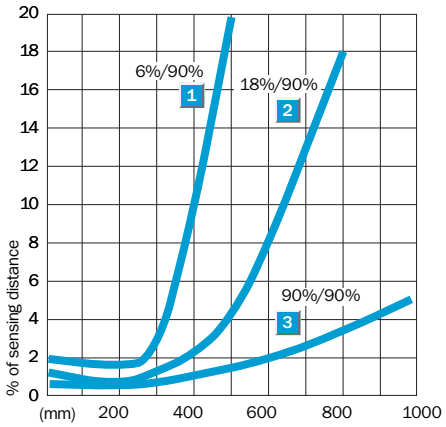
Dimensional drawing

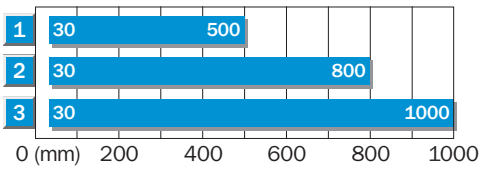


WT 27-2S 030 S14

dimensions in mm

Background suppression

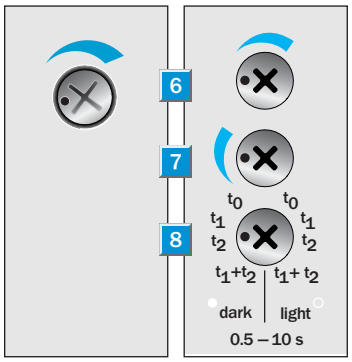




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Adjustments

WT 27-2S030 S14	WT 27-2R830



1	Standard direction of the material being sensed
2	LED signal strength indicator
3	Center of optical axis, sender
4	Center of optical axis, receiver
5	Mounting hole Ø 5.2 mm
6	Sensitivity adjustment
7	Time control
8	Time delay selector switch
○	Light switching
●	Dark switching

Switch-selectable time delay

0.5 – 10 s

t_0	Without time delay
t_1	OFF-delay from trailing edge of object
t_2	ON-delay from leading edge of object
$t_1 + t_2$	OFF- and ON-delay

Order information

Type	Part no.
WT 27-2R830	1 016 074
WT 27-2S 030S14	1 015 709

Accessories

	page
Cables and connectors	1180
Mounting systems	1234

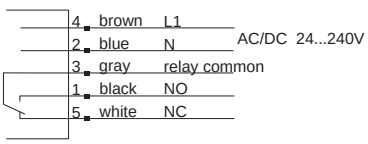
7028071 - © 2008 SICK, Inc.

Technical data	WT 27-2-	S030 S14[7]	R830							
Sensing range, adjustable	1.2...39.4 in (30...1000 mm)									
Background suppression	3.9...39.4 in (100...1000 mm)									
Background suppression capability	% of set sensing distance (see previous page)									
Light source[1], light type	LED, red light									
Light spot diameter	Approx. 0.5 in at 19.7 in (15 mm at 500 mm)									
Angle of divergence	Approx. 1.8°									
Supply voltage V_S	24...240 V UC (+ 10%, – 20%)									
Current consumption	< 2 VA									
Switching outputs	Relay, SPDT, isolated[2]									
Max. switching voltage	250 V AC / 120 V DC									
Max. switching current	4 A / 240 V AC or 24 V DC									
Max. switching capacity	AC 1000 V A / DC 100 W									
Response time	< 6 ms									
Max. switching frequency[3]	10 Hz									
Time delay	0.5...10 s									
Connection types	Plug, mini 5-pin									
VDE protection class[5]	⧈									
Circuit protection[6]	A, C									
Enclosure rating	IP 67/NEMA 6									
Ambient temperature T_A	Operation -40...140° F (-40...60° C)									
	Storage -40...167° F (-40...75° C)									
Approximate weight	3.5 oz (100 g)									
Housing material	Glass fiber reinforced ABS									

1) Average service life 100,000 h at T_A = 25° C
2) Provide suitable spark suppression for inductive and capacitive loads
3) With light/dark ratio 1:1
4) Do not bend below 0° C
5) Reference voltage 250 V AC
6) A = V_S connections reverse-polarity protected
C = Interference pulse suppression
7) Wet contact

Connection diagram

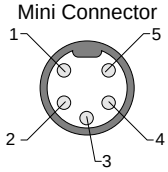
WT 27-2R830



WT 27-2S030S14



Mini Connector



WT 27-2

Proximity/Diffuse Sensors-Background Suppression



1.2...59.1 in (30...1500 mm)
sensing range

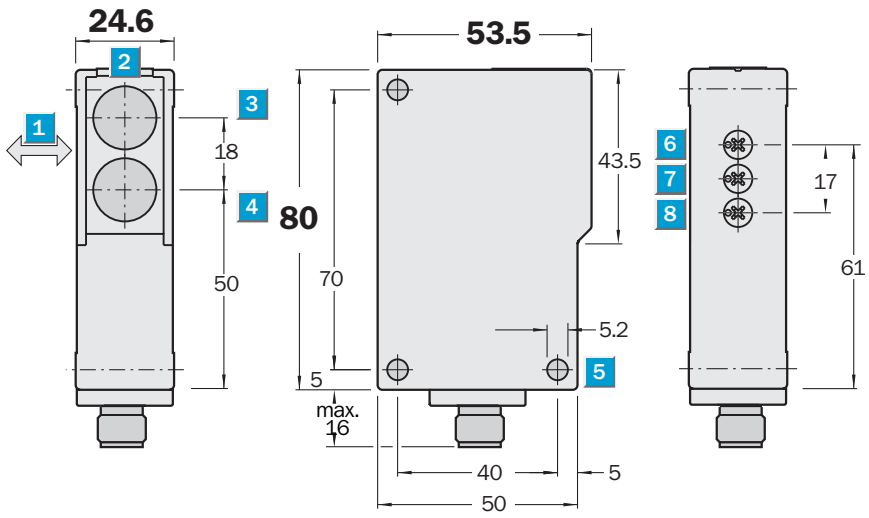
Highlights

- Rugged plastic housing
- Infrared light
- Adjustable background suppression
- Selectable time delays
- Signal strength indicator
- Adjustable sensing range
- Crosstalk immunity
- Wide range supply voltage
- Cable or mini quick disconnect versions

WT 27-2

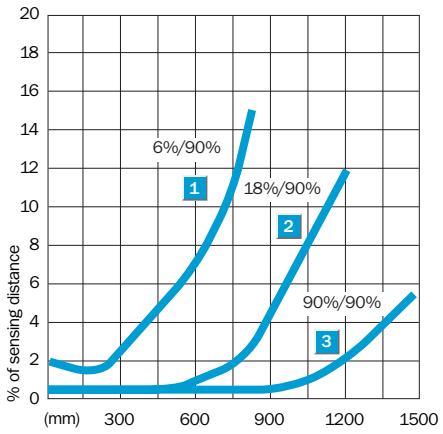


Dimensional drawing



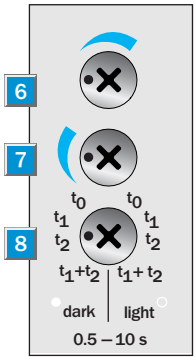
dimensions in mm

Background suppression



Adjustments

WT 27-2R810

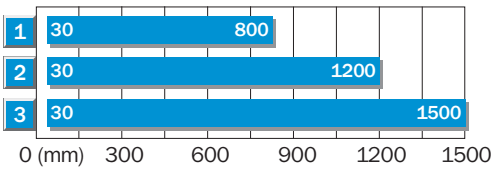


1	Standard direction of the material being sensed
2	LED signal strength indicator
3	Center of optical axis, sender
4	Center of optical axis, receiver
5	Mounting hole Ø 5.2 mm
6	Sensitivity adjustment
7	Time control
8	Time delay selector switch
○	Light switching
●	Dark switching

Switch-selectable time delay

0.5 – 10 s

t_0	Without time delay
t_1	OFF-delay from trailing edge of object
t_2	ON-delay from leading edge of object
$t_1 + t_2$	OFF- and ON-delay



1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Order information

Type	Part no.
WT 27-2R810	1 016 073

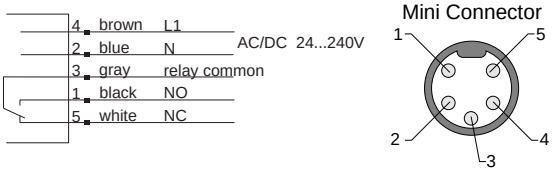
Accessories	page
Cables and connectors	1180
Mounting systems	1234

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Technical data	WT 27-2-	R810								
Sensing range, adjustable	1.2...59.1 in (30...1500 mm)									
Background suppression	3.9...59.1 in (100...1500 mm)									
Background suppression capability	% of set sensing distance (see previous page)									
Light source[1]**, light type**	LED, infrared light									
Light spot diameter	Approx. 1.0 in at 31.5 in (25 mm at 800 mm)									
Angle of divergence	Approx. 1.8°									
Supply voltage V_S	24...240 V UC (+ 10%, – 20%)									
Current consumption	< 2 VA									
Switching outputs	Relay, SPDT, isolated[2]									
Max. switching voltage	250 V AC / DC 120 V									
Max. switching current	4 A / 240 V AC or 24 V DC									
Max. switching capacity	AC 1000 V A / DC 100 W									
Response time	< 6 ms									
Max. switching frequency[3]	10 Hz									
Delay range	0.5...10 s									
Connection types	Plug, mini 5-pin									
VDE protection class[4]	□									
Circuit protection[5]	A, C									
Enclosure rating	IP 67/NEMA 6									
Ambient temperature T_A	Operation -40...140° F (-40...60° C)									
	Storage -40...167° F (-40...75° C)									
Approximate weight	3.5 oz (100 g)									
Housing material	Glass fiber reinforced ABS									

1) Average service life 100,000 h at T_A = 25° C
2) Provide suitable spark suppression for inductive and capacitive loads
3) With light/dark ratio 1:1
4) Reference voltage 250 V AC
5) A = V_S connections reverse-polarity protected
C = Interference pulse suppression

Connection diagram



WL27-3

Reflex/Retro-Reflective Sensors



0.33...49.2 ft (0.1...15 m)
sensing range

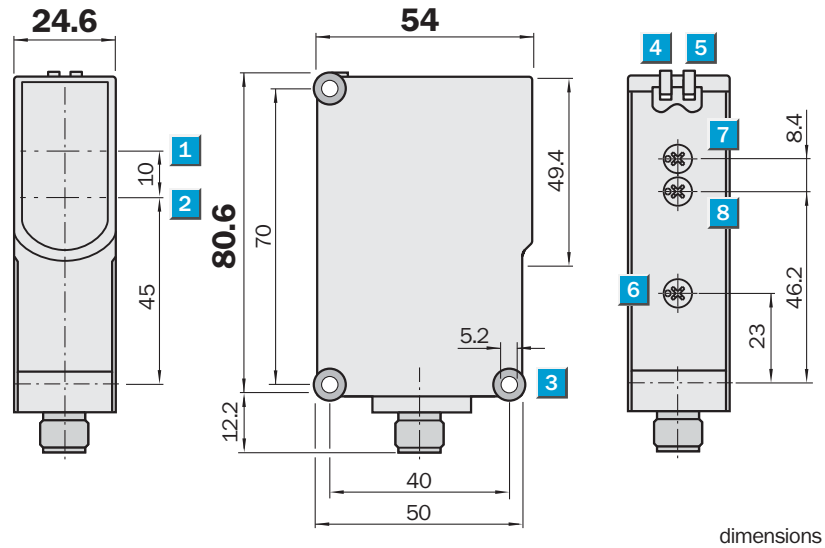
Highlights

- Red light for easier alignment
- Long range, high operating reserve
- Front screen heating, time delays
- Reliable in industrial environments; secure against the effects of ambient light, other sensors mounted adjacently and in temperatures from -40…140° F (-40…60° C)

WL27-3

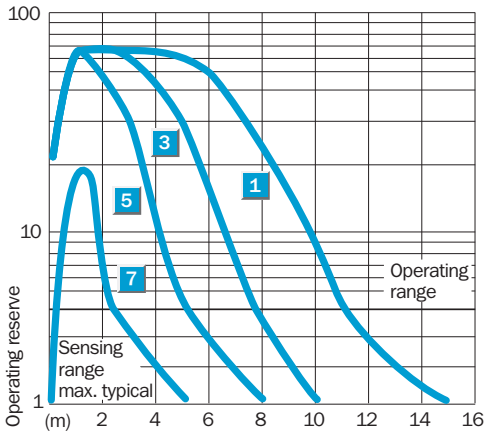


Dimensional drawing



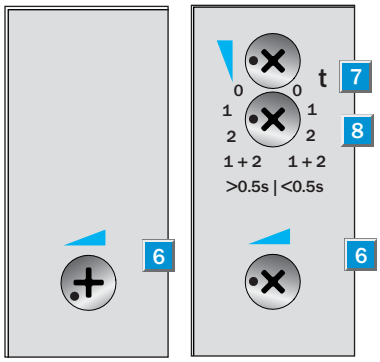
dimensions in mm

Excess gain



Adjustments

WL27-3P1131	WL27-3E2631
WL27-3P2431	WL27-3F2631
WL27-3P2451	

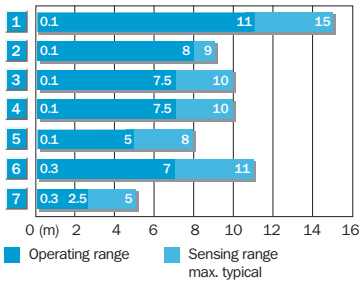


1	Optical axis sender
2	Optical axis receiver
3	Mounting hole ø 5.2 mm
4	LED indicator green; power on
5	LED indicator yellow; status of received light beam
6	Sensitivity adjustment
7	Time control
8	Time delay selector switch

Switch-selectable time delay

0.02 -0.5 s or 0.5- 10 s

0	Without time delay
1	Time delay from trailing edge of object
2	Time delay from leading edge of object
1+2	Time delay from trailing and leading edge of object



	Reflector type	Operating range
1	PL 80 A	0.1 ... 11.0 m
2	PL 50 A	0.1 ... 8.0 m
3	PL 40 A	0.1 ... 7.5 m
4	PL 30 A	0.1 ... 7.5 m
5	PL 20 A	0.1 ... 5.0 m
6	P975	0.3 ... 7.0 m
7	Reflective tape Diamond Grade	0.3 ... 2.5 m

Order information

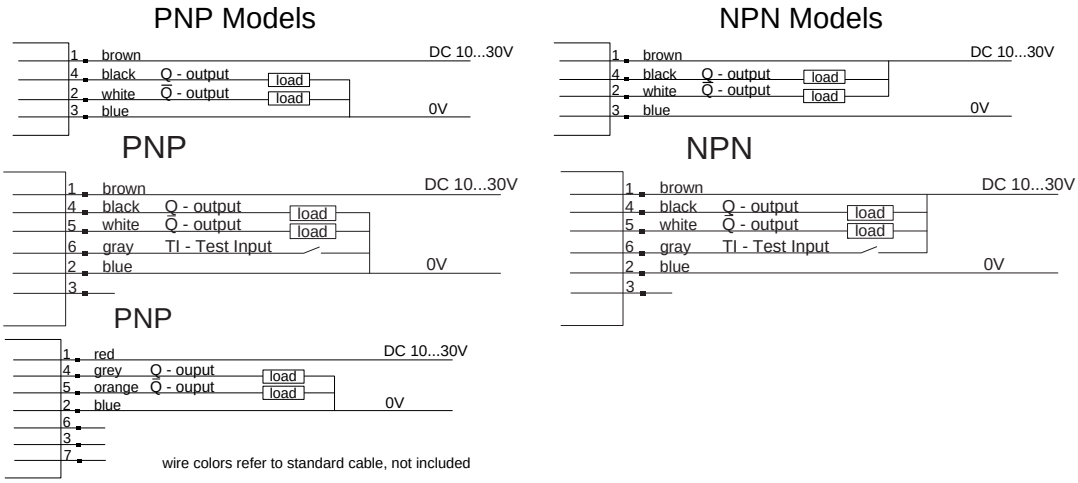
Type	Part no.
WL27-3E2631	1 027 773
WL27-3F2631	1 027 772
WL27-3P1131	1 027 768
WL27-3P2430	1 027 769
WL27-3P2431	1 027 982
WL27-3P2450	1 027 771
WL27-3P2451	1 027 770
WL27-3P3730	1 027 774

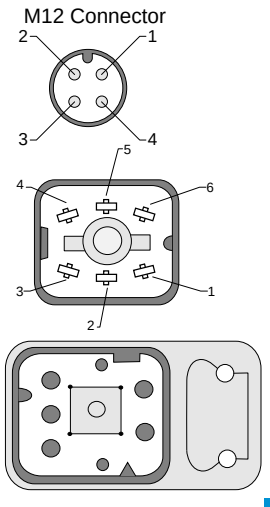
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256
Special Accessories	1314

Technical data	WL27-3	E2631	F2631	P1131	P2430	P2431	P2450	P2451	P3730
Sensing range, typ. max	0.33...49.2 ft (0.1...15 m)	■	■	■	■	■	■	■	■
Operating distance	0.33...36.1 ft (0.1...11 m)	■	■	■	■	■	■	■	■
Relating to	Reflector PL80 A	■	■	■	■	■	■	■	■
Sensitivity adjustment	Potentiometer	■	■	■		■		■	
Light source, light type	LED, red light, 660 nm[1]	■	■	■	■	■	■	■	■
Light spot diameter	Approx. 8.7 in at 32.8 ft (220 mm at 10 m)	■	■	■	■	■	■	■	■
Angle of dispersion	Approx. 1.5°	■	■	■	■	■	■	■	■
Polarization filter	√	■	■	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■	■	■	■
Ripple[3]	≤ 5 V_{pp}	■	■	■	■	■	■	■	■
Current consumption	≤ 45 mA[4]	■					■	■	
	≤ 30 mA[4]		■	■	■	■			■
Switching outputs	NPN antivalent	■							
	PNP antivalent		■	■	■	■	■	■	■
Signal voltage PNP HIGH/LOW	> Vs - 2.5 V/approx. 0 V		■	■	■	■	■	■	■
Signal voltage NPN HIGH/LOW	Approx. Vs/< 2.5 V	■							
Output current I_a max	100 mA	■	■	■	■	■	■	■	■
Response time[5]	≤ 500 µs	■	■	■	■	■	■	■	■
Max. switching frequency[6]	1000 Hz	■	■	■	■	■	■	■	■
Time delay	Selectable: 0.5…10 s/0.02…0.5 s	■	■						
Time type	OFF, T_{off}, T_{on}, T_{off} + T_{on}	■	■						
Test input sender off	TE to Vs	■							
	TE to 0 V		■						
Connection types	Connector Q6, 6-pin, DC	■	■						
	Cable, PVC, 2 m[7]			■					
	Connector M12 4-pin				■	■	■	■	
	Cable with plug, Q7, 7-pin, DC, PVC								■
VDE protection class[8]	□	■	■	■	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■	■	■	■
Enclosure rating	IP 65	■	■						
	IP 66, IP 67			■	■	■	■	■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)[11]	■	■	■	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■	■	■	■
Approximate weight	3.5 oz (100 g)	■	■		■	■	■	■	
	6.3 oz (180 g)			■					
	4.2 oz (120 g)								■
Front screen heating	√						■	■	
Housing material	ABS, PMMA	■	■	■	■	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C
2) Limit values, operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression

Connection diagram





WL27-3

Reflex/Retro-Reflective Sensors



0.33...49.2 ft (0.1...15 m)
sensing range

c UL US

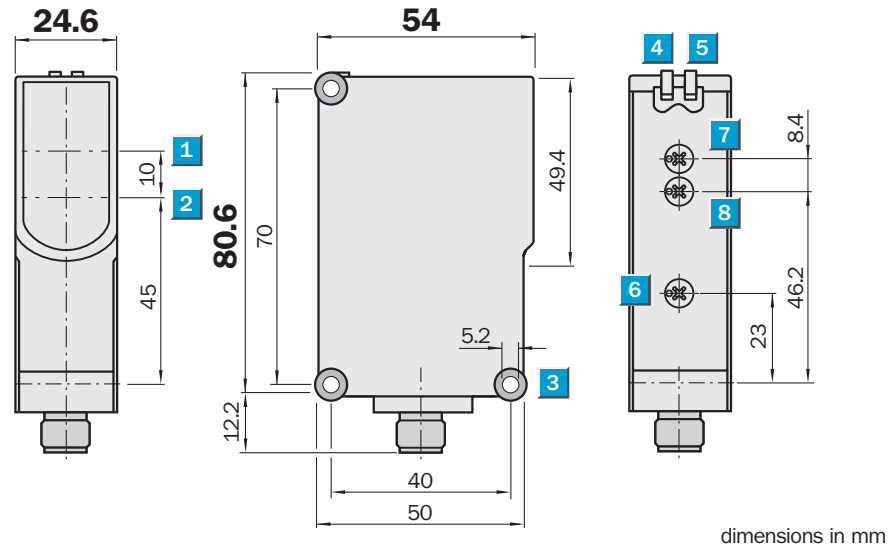
Highlights

- Universal supply voltage
- Red light for easier alignment
- Time delays
- Reliable in industrial environments; secure against the effects of ambient light, other sensors mounted adjacently and in temperatures from -40…140° F (-40…60° C)

WL27-3

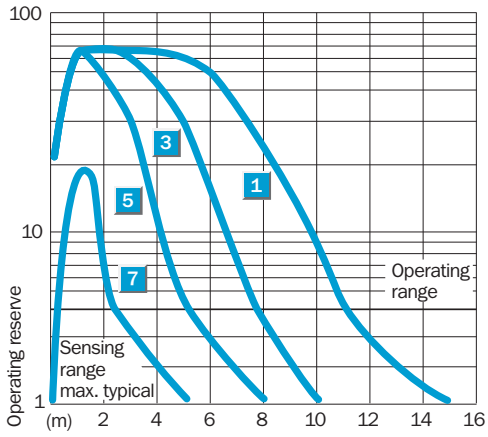


Dimensional drawing



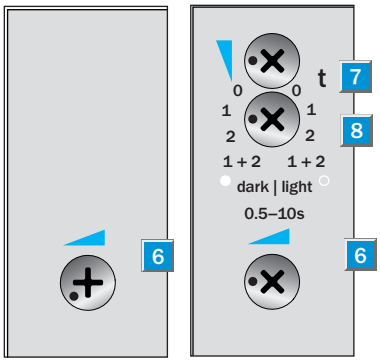
dimensions in mm

Excess gain



Adjustments

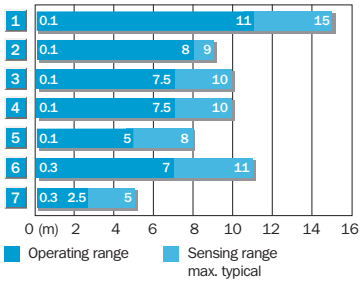
WL27-3S1531	WL27-3R2631
WL27-3S3731	



1 Optical axis sender
2 Optical axis receiver
3 Mounting hole ø 5.2 mm
4 LED indicator green; power on
5 LED indicator yellow; status of received light beam
6 Sensitivity adjustment
7 Time control
8 Time delay selector switch
Light switching (L)
Dark switching (D)

Switch-selectable time delay

D | L 0.5 -10s
0 | 0 Without time delay
2 | 1 Time delay from trailing edge of object
1 | 2 Time delay from leading edge of object
1+2 Time delay from trailing and leading edge of object



	Reflector type	Operating range
1	PL 80 A	0.1 ... 11.0 m
2	PL 50 A	0.1 ... 8.0 m
3	PL 40 A	0.1 ... 7.5 m
4	PL 30 A	0.1 ... 7.5 m
5	PL 20 A	0.1 ... 5.0 m
6	P975	0.3 ... 7.0 m
7	Reflective tape Diamond Grade	0.3 ... 2.5 m

Order information

Type	Part no.
WL27-3R2631	1 027 776
WL27-3S1531	1 027 775
WL27-3S3731	1 027 777

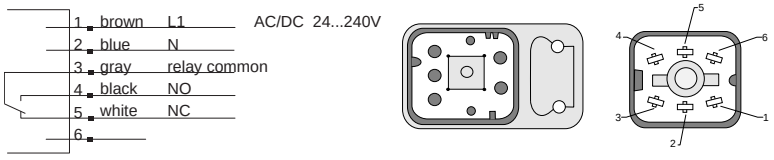
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256
Special Accessories	1314

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Technical data	WL27-3	R2631	S1531	S3731
Sensing range, typ. max	0.33...49.2 ft (0.1...15 m)			
Operating distance	0.33...36.1 ft (0.1...11 m)			
Relating to	Reflector PL80 A			
Sensitivity adjustment	Potentiometer			
Light source, light type	LED, red light, 660 nm[1]			
Light spot diameter	Approx. 8.7 in at 32.8 ft (220 mm at 10 m)			
Angle of dispersion	Approx. 1.5°			
Polarization filter	√			
Supply voltage V_S	24...240 V UC[2]			
Switching outputs	Relay 1 x c/o, electrically isolated[3]			
	Relay 1 x c/o, electrically isolated[4]			
Switching mode	Light/dark switching, selectable			
	Light switching			
Current consumption	≤ 2.5 VA			
Max. switching voltage	250 V AC/250 V DC (max. 0.11 A)			
Switching current max.	3 A @ 250 V AC o. 24 V DC[5]			
Max. switching power	750 W AC/72 W DC			
Response time	≤ 10 ms			
Max. switching frequency[6]	10 Hz			
Time delay	Selectable: 0.5…10 s			
Time type	OFF, T_{off}, T_{on}, T_{off} + T_{on}			
Connection types	Connector Q6, 6-pin, AC/UC			
	Cable, PVC, 2 m[7]			
	Cable with plug, Q7, 7-pin, AC/UC, PVC, 150 mm[7]			
VDE protection class[8]	□			
Circuit protection[9]	A, B			
Enclosure rating	IP 65			
	IP 66, IP 67			
Ambient temperature T_A	Operation -40...140° F (-40...60° C)			
	Storage -40...167° F (-40...75° C)			
Approximate weight	4.2 oz (120 g)			
	7.0 oz (200 g)			
	4.9 oz (140 g)			
Housing material	ABS, PMMA			

1) Average service life 100,000 h at T_a = 25° C
2) ± 10%
3) Provide suitable spark suppression for inductive or capacitive loads. Relay contacts are separated from the power supply by a basic isolation of 3 mm. Depending on the application, additional isolation might have to be applied in the user's circuit.
4) Provide suitable spark suppression for inductive or capacitive loads
5) Usage category to EN 60947-1, AC-15, DC-13
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 250 V AC
9) A = V_S connections reverse-polarity protected
B = Interference pulse suppression

Connection diagram



WL 27-2

Reflex/Retro-Reflective Sensors



0...45.9 ft (0...14 m)
sensing range

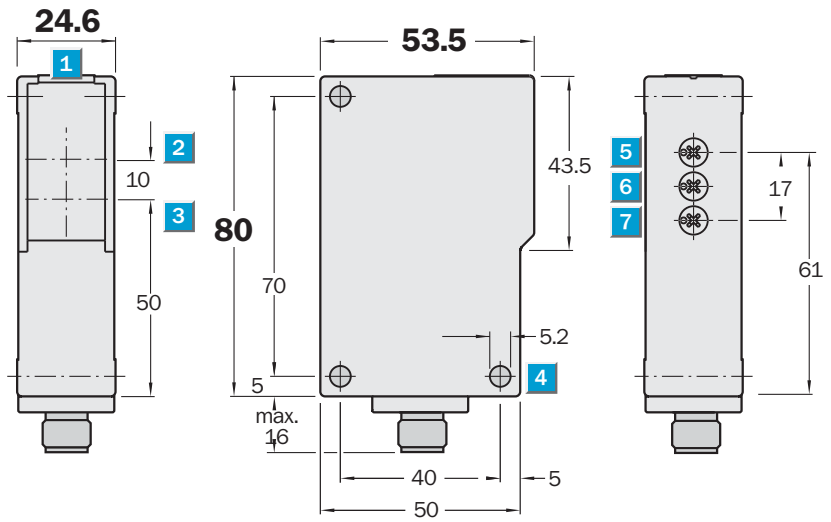
Highlights

- Red light for easy alignment
- Selectable time delays
- Rugged plastic housing
- Wide range supply voltage
- Sensitivity adjustment
- Crosstalk immunity
- Polarizing filters prevent false readings on reflective surfaces
- Cable or mini quick disconnect

WL 27-2

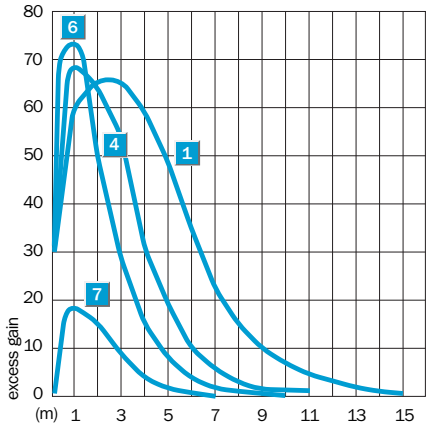


Dimensional drawing



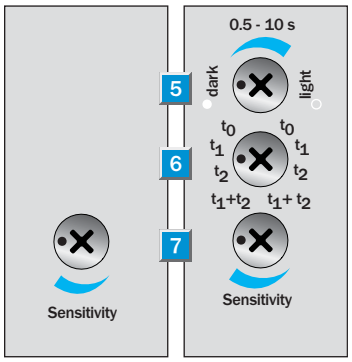
dimensions in mm

Excess gain



Adjustments

WL 27-2S030 S18	WL 27-2R830



1	LED signal strength indicator
2	Optical axis, sender
3	Optical axis, receiver
4	Mounting hole Ø 5.2 mm
5	Time control
6	Time delay selector switch
○	Light switching
●	Dark switching
7	Sensitivity adjustment

Switch-selectable time delay

0.5 – 10 s

t_0	Without time delay
t_1	ON-delay from interruption of light path
t_2	OFF-delay from reset of light path
$t_1 + t_2$	ON- and OFF-delay

Reflector type		Sensing range
1	PL 80 A	0.1...14.0 m
2	P975	0.3...10.0 m
3	PL 50 A	0.1...10.0 m
4	PL 40 A	0.1...9.0 m
5	PL 30 A	0.1...9.5 m
6	PL 20 A	0.1...7.0 m
7	Reflective tape diamond grade	0.3...4.3 m

Order information

Type	Part no.
WL 27-2S030 S18	1 015 896
WL 27-2R830	1 016 072

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

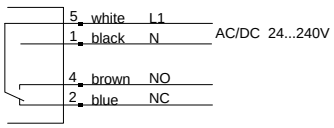
7028071 - © 2008 SICK, Inc.

Technical data	WL 27-2-	S030S18	R830
Sensing range	0...45.9 ft (0...14 m)/PL 80 A		
Sensitivity	Adjustable		
Light source[1], **light type**	LED, red light polarized		
Light spot diameter	Approx. 8.7 in at 0.4 in (220 mm at 10 mm)		
Supply voltage V_S	24...240 V UC (+ 10%, – 20%)		
Current consumption	< 2 VA		
Switching outputs	Relay, SPDT, electrically isolated[2]		
Max. switching voltage	250 V AC / 120 V DC		
Max. switching current	4 A / 240 V AC or 24 V DC		
Max. switching capacity	AC 1000 V A / DC 100 W		
Response time	< 6 ms		
Max. switching frequency[3]	10 Hz		
Timing	0.5…10 s (ON delay, OFF delay, ON/OFF delay)		
Connection types	Plug, mini 5-pin		
VDE protection class[4]	⊡		
Circuit protection[5]	A, C		
Enclosure rating	IP 67		
Ambient temperature T_A	Operation -40...140° F (-40...60° C)		
	Storage -40...167° F (-40...75° C)		
Approximate weight	3.5 oz (100 g)		
Polarizing filter			
Housing material	Glass fiber reinforced ABS		

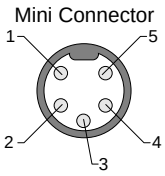
1) Average service life 100,000 h at $T_A = +25°$ C
2) Provide suitable spark suppression for inductive and capacitive loads.
3) With light/dark ratio 1:1
4) Reference voltage 250 V AC
5) A = V_S connections reverse-polarity protected
C = Interference pulse suppression

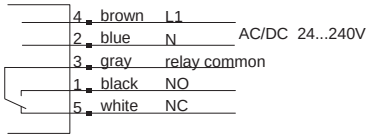
Connection diagram

WL 27-2S030S18



Mini Connector





wire colors refer to standard cable,
not included with quick disconnect models

WSE27-3

Through-beam Sensors



0...114.8 ft (0...35 m)
sensing range

c UL us

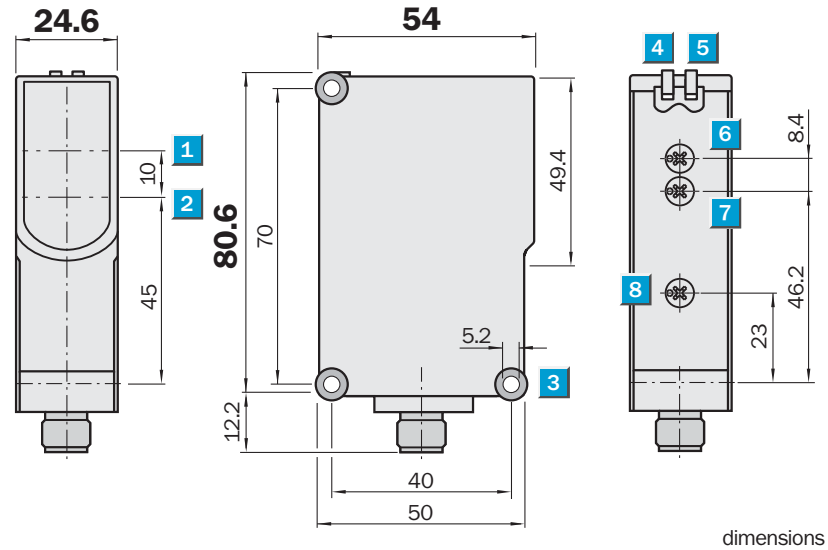
Highlights

- Red light for easier alignment
- Long range, high operating reserve
- Alarm output, front screen heating, test input, time delays
- Reliable in industrial environments; secure against the effects of ambient light and temperatures from -40…140° F (-40…60° C)

WSE27-3

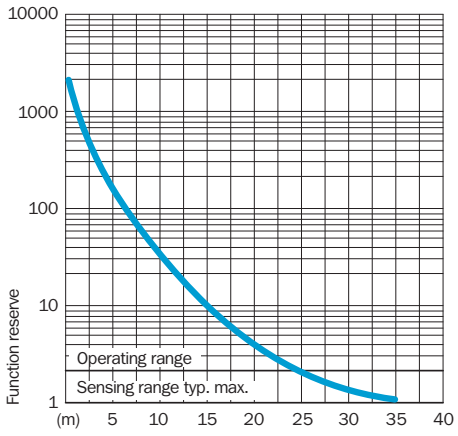


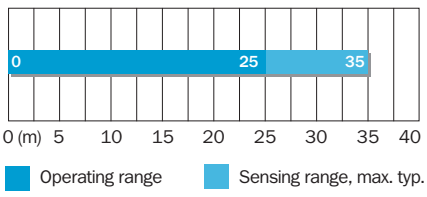
Dimensional drawing



dimensions in mm

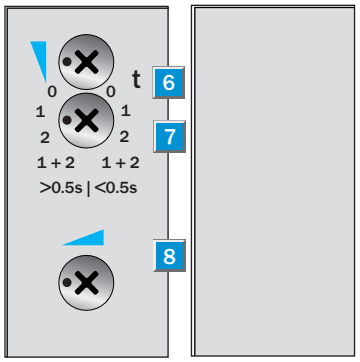
Excess gain





Adjustments

WSE27-3E2631	WSE27-3P2430
WSE27-3F2631	WSE27-3P2450
	WSE27-3P3730



1	Optical axis sender
2	Optical axis receiver
3	Mounting hole ø 5.2 mm
4	LED indicator green; power on
5	LED indicator yellow; status of received light beam
6	Time control
7	Time delay selector switch
8	Sensitivity adjustment

Switch-selectable time delay

0.02 -0.5 s or 0.5 -10 s

0	Without time delay
1	Time delay from trailing edge of object
2	Time delay from leading edge of object
1+2	Time delay from trailing and leading edge of object

Order information

Type	Part no.
WSE27-3E2631	1 027 793
WSE27-3F2631	1 027 792
WSE27-3P2430	1 027 790
WSE27-3P2450	1 027 791
WSE27-3P3730	1 027 794

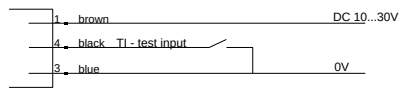
Accessories

	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

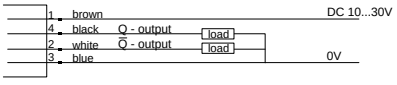
Technical data	WSE27-3	E2631	F2631	P2430	P2450	P3730
Sensing range, typ. max	0...114.8 ft (0...35 m)	■	■	■	■	■
Operating distance	0...82 ft (0...25 m)	■	■	■	■	■
Sensitivity adjustment	Potentiometer	■	■			
Light source, light type	LED, red light, 645 nm[1]	■	■	■	■	■
Light spot diameter	Approx. 23.6 in at 82 ft (600 mm at 25 m)	■	■	■	■	■
Angle of dispersion	Approx. 1.5°	■	■	■	■	■
Angle of reception	Approx. 3°	■	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■
Ripple[3]	≤ 5 V_{pp}	■	■	■	■	■
Current consumption, sender	≤ 35 mA without front screen heating	■	■	■		■
	≤ 50 mA with front screen heating				■	
Current consumption, receiver	≤ 20 mA without front screen heating[4]	■	■	■		■
	≤ 35 mA with front screen heating[4]				■	
Switching outputs	NPN antivalent	■				
	PNP antivalent		■	■	■	■
Signal voltage PNP HIGH/LOW	> V_S -2.5/approx. 0 V		■	■	■	■
Signal voltage NPN HIGH/LOW	approx. V_S/< 2.5 V	■				
Output cucrrent $I_a$max	100 mA	■	■	■	■	■
Response time[5]	≤ 500 µs	■	■	■	■	■
Max. switching frequency[6]	1000 Hz	■	■	■	■	■
Time delay	Selectable: 0.5…10 s/0.02…0.5 s	■	■			
Time type	OFF, T_{off}, T_{on}, T_{off} + T_{on}	■	■			
Test input sender off	TE to 0 V	■	■	■	■	■
Alarm output	Alarm[7]	■	■			
Connection types	Connector Q6, 6-pin, DC	■	■			
	Connector M12 4-pin			■	■	
	Cable with plug, Q7, 7-pin, DC, PVC, 150 mm[8]					■
VDE protection class[9]	□	■	■	■	■	■
Circuit protection[10]	A, B, C	■	■	■	■	■
Enclosure rating	IP 65	■	■			
	IP 66, IP 67			■	■	■
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	■	■	■	■	■
	Storage -40...167° F (-40...75° C)	■	■	■	■	■
Approximate weight	7.0 oz (200 g)	■	■	■	■	
	8.4 oz (240 g)					■
Front screen heating	√				■	
Housing material	ABS, PMMA	■	■	■	■	■

1) Average service life 100,000 h at T_a = 25° C
2) Limit values, operation in short-circuit protected network max. 8 A
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) NPN: Signal reserve > 50% HIGH
PNP: Signal reserve > 50% LOW
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = All outputs short-circuit protected
C = Interference pulse suppression

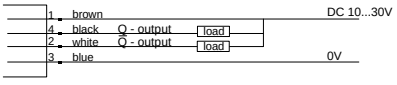
Connection diagram



PNP Models

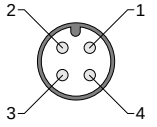


NPN Models

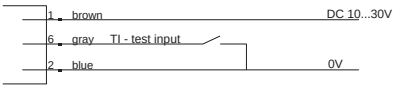


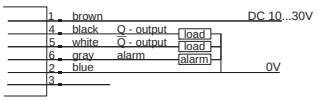
wire colors refer to standard cable, not included with quick disconnect models

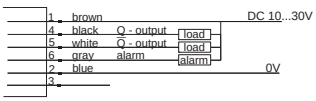
M12 Connector

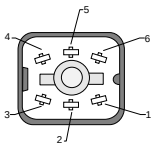


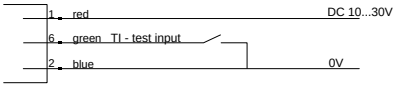
Sender

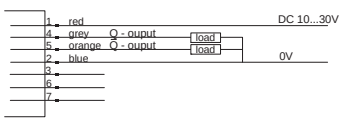


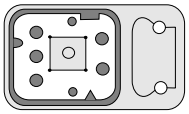












WSE27-3

Through-beam Sensors

0...114.8 ft (0...35 m)
sensing range

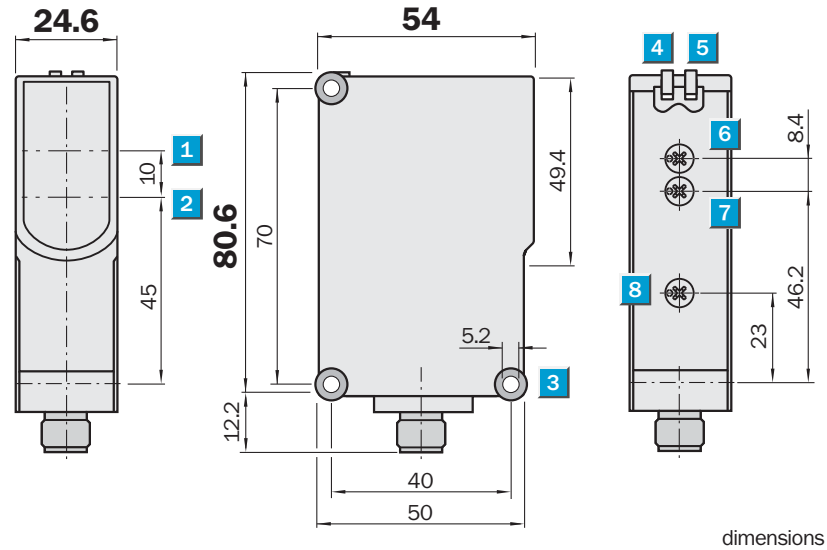
Highlights

- Universal supply voltage
- Red light for easier alignment
- Long range, high operating reserve
- Time delays
- Reliable in industrial environments; secure against the effects of ambient light and temperatures from -40…140° F (-40…60° C)

WSE27-3

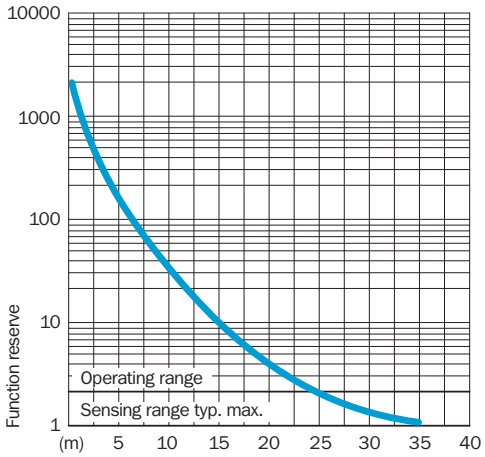


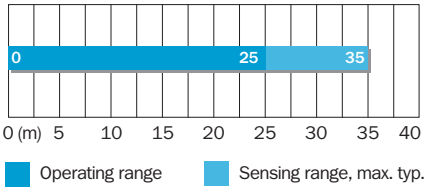
Dimensional drawing



dimensions in mm

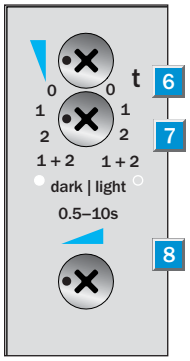
Excess gain





Adjustments

WSE27-3R2631



1 Optical axis sender
2 Optical axis receiver
3 Mounting hole ø 5.2 mm
4 LED indicator green; power on
5 LED indicator yellow; status of received light beam
6 Time control
7 Time delay selector switch
8 Sensitivity adjustment
○ Light switching (L)
● Dark switching (D)

Switch-selectable time delay

D | L 0.5 - 10 s
0 | 0 Without time delay
2 | 1 Time delay from trailing edge of object
1 | 2 Time delay from leading edge of object
1+2 Time delay from trailing and leading edge of object

Order information

Type	Part no.
WSE27-3R2631	1 027 795

Accessories

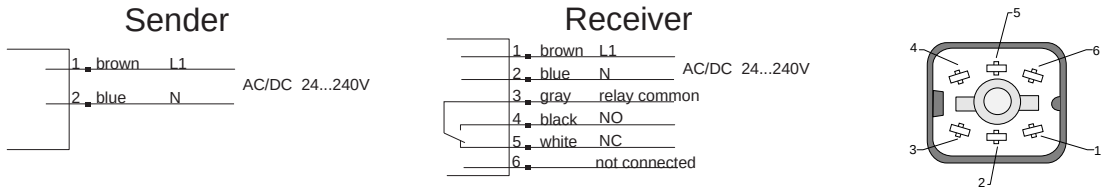
	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

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Technical data	WSE27-3	R2631
Sensing range, typ. max	0...114.8 ft (0...35 m)	
Operating distance	0...82 ft (0...25 m)	
Sensitivity adjustment	Potentiometer	
Light source, light type	LED, red light, 645 nm[1]	
Light spot diameter	Approx. 23.6 in at 82 ft (600 mm at 25 m)	
Angle of dispersion	Approx. 1.5°	
Angle of reception	Approx. 3°	
Supply voltage V_S	10...30 V UC[2]	
Switching outputs	Relay 1 x c/o, electrically isolated[3]	
Switching mode	Light/dark switching, selectable	
Current consumption, sender	≤ 2 VA	
Current consumption, receiver	≤ 2.5 VA	
Max switching power	750 AC/72 W DC	
Switching current max.	3 A @ 250 V AC o. 24 V DC[4]	
Max. switching current	750 AC/ 72 W DC	
Response time[5]	≤ 10 ms	
Max. switching frequency[6]	10 Hz	
Time delay	Selectable: 0.5…10 s	
Time type	OFF, T_{off}, T_{on}, T_{off} + T_{on}	
Connection types	Connector Q6, 6-pin, AC/UC	
VDE protection class[7]	⧈	
Circuit protection[8]	A, B	
Enclosure rating	IP 65	
Ambient temperature T_A	Operation -40...140° F (-40...60° C)[9]	
	Storage -40...167° F (-40...75° C)	
Approximate weight	8.4 oz (240g)	
Housing material	ABS, PMMA	

1) Average service life 100,000 h at T_a = 25° C
2) ± 10%
3) Provide suitable or capacitive loads. Relay contacts are separated from the power supply by a basic isolation of 3 mm. Depending on the application, additional isolation might have to be applied in the user's circuit.
4) Usage category to EN 60947-1, AC-15, DC-13
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 250 V AC
8) A = V_S connections reverse-polarity protected
B = Interference pulse suppression
9) UL: 0…60° C

Connection diagram



WS/WE 27-2

Through-beam Sensors



0...114.8 ft (0...35 m)
sensing range

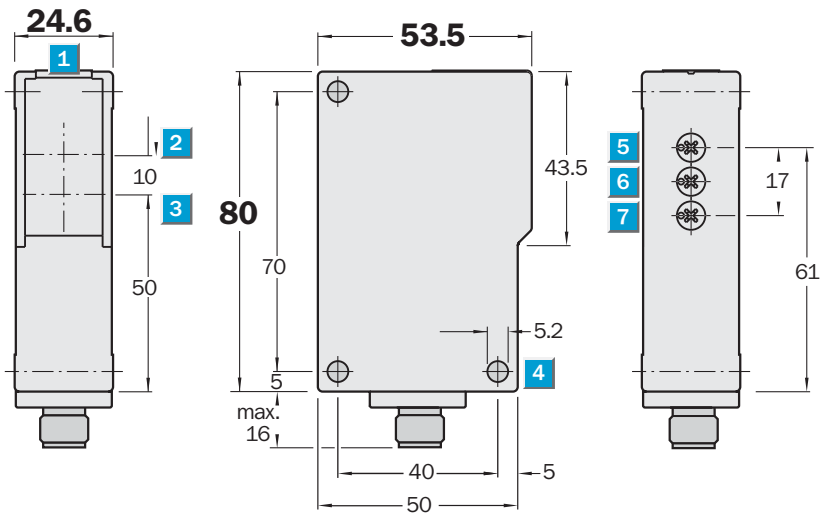
Highlights

- Rugged plastic housing
- Red light for easy alignment
- Selectable time delays
- Wide range supply voltage
- Signal strength indicator
- Sensitivity adjustment

WS/WE 27-2

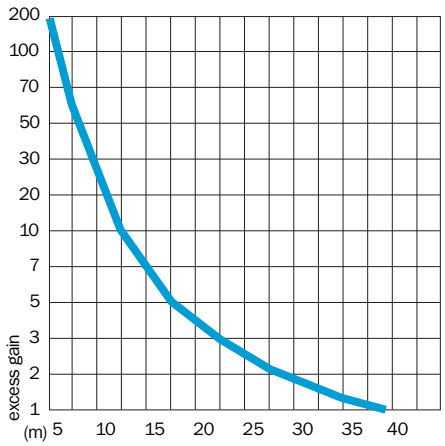


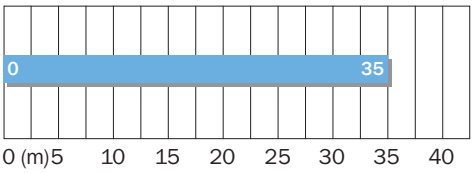
Dimensional drawing



dimensions in mm

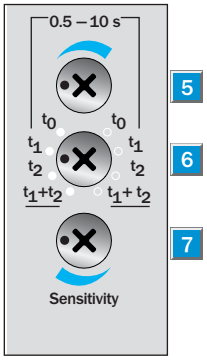
Excess gain





Adjustments

All types



1	LED signal strength indicator
2	Optical axis, sender
3	Optical axis, receiver
4	Mounting hole Ø 5.2 mm
5	Time control
6	Time delay selector switch
○	Light switching
●	Dark switching
7	Sensitivity adjustment

Switch-selectable time delay

0.5 – 10 s

t_0	Without time delay
t_1	ON-delay from interruption of light path
t_2	OFF-delay from reset of light path
$t_1 + t_2$	ON- and OFF-delay

Order information

Type	Part no.
WS/WE 27-2R830	1 016 075

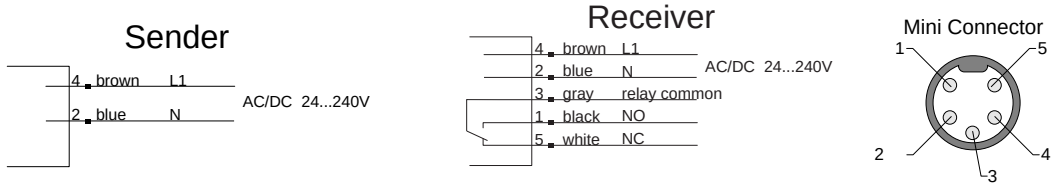
Accessories	page
Cables and connectors	1180
Mounting systems	1234

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Technical data	WS/WE 27-2-	R830
Sensing range	0...114.8 ft (0...35 m)	
Light source[1], **light type**	LED, red light	
Light spot diameter	Approx. 47.2 in at 182 ft (1200 mm at 25 m)	
Angle of divergence	Approx. 3°	
Supply voltage V_S	24...240 V UC (+ 10% – 20%)	
Current consumption	< 2 VA	
Switching outputs	Relay, SPDT, electrically isolated[2]	
Max. switching voltage	250 V AC / 120 V DC	
Max. switching current	4 A / 240 V AC or 24 V DC	
Max. switching capacity	AC 1000 V A / DC 100 W	
Response time	< 6 ms	
Max. switching frequency[3]	10 Hz	
Delay range	0.5...10 s	
Connection types	Plug, mini 5-pin	
VDE protection class[4]	□	
Circuit protection[5]	A, C	
Enclosure rating	IP 65	
Ambient temperature T_A	Operation -40...140° F (-40...60° C)	
	Storage -40...167° F (-40...75° C)	
Approximate weight	3.5 oz (100 g)	
Housing material	Glass fiber reinforced ABS	

1) Average service life 100,000 h at T_A = 25° C
2) Provide suitable spark suppression for inductive and capacitive loads.
3) With light/dark ratio 1:1
4) Reference voltage 250 V AC
5) A = V_S connections reverse-polarity protected
C = Interference pulse suppression

Connection diagram



WT 27 L-2

Proximity/Diffuse Sensors - Background Suppression



3.9...31.5 in (100...800 mm)
sensing range

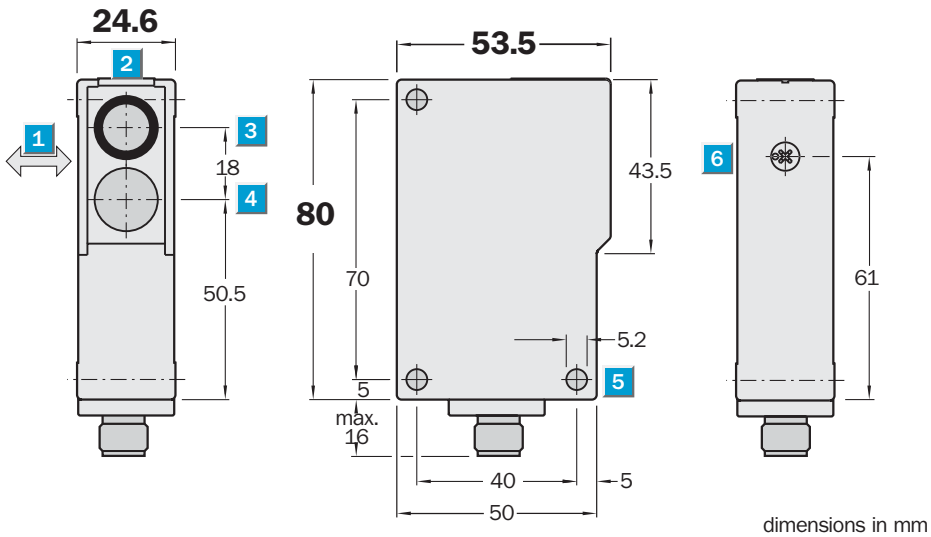
Highlights

- Rugged plastic housing
- Adjustable background suppression
- Laser, LED, red light source
- Signal strength indicator
- Crosstalk immunity

WT 27 L-2

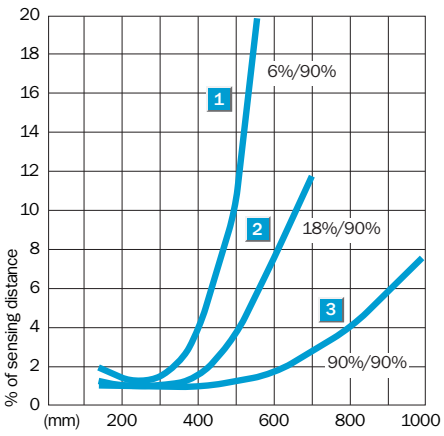


Dimensional drawing



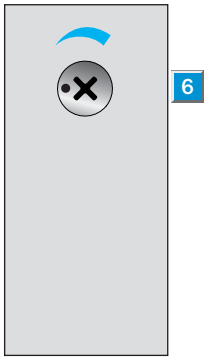
dimensions in mm

Background suppression



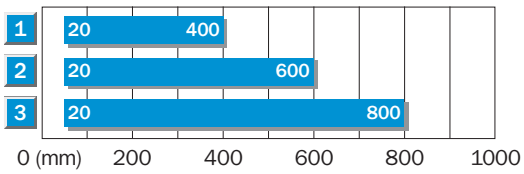
Adjustments

WT 27L-2F 430



1	Standard direction of the material being sensed
2	LED signal strength indicator
3	Optical axis, sender
4	Optic axis, receiver
5	Mounting hole ø5.2 mm
6	Sensitivity adjustment

Accessories	page
Cables and connectors	1180
Mounting systems	1234



1	Sensing range on black, 6% remission
2	Sensing range on grey, 18% remission
3	Sensing range on white, 90% remission

Order information

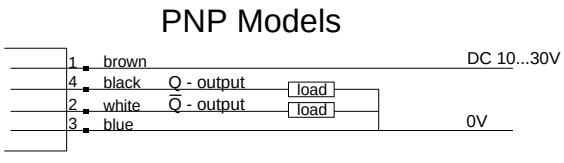
Type	Part no.
WT 27L-2F430A	1 016 247

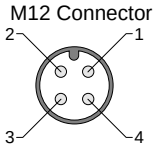
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Technical data	WT 27L-2-	F430A
Sensing range, adjustable	3.9...31.5 in (100...800 mm)	
Light source[1], **light type**	LED laser, red light	
Light spot diameter	Approx. 0.08 in at 15.7 in (2 mm at 400 mm)	
Supply voltage V_S	10...30 V DC[2]	
Ripple[3]	≤ 5 V_{SS}	
Current consumption[4]	≤ 35 mA	
Switching outputs	PNP, Q and $\overline{Q}$	
Output current I_A max.	100 mA	
Response time[5]	500 µs	
Max. switching frequency[6]	1000/s	
Connection type	Plug, M12 4-pin	
VDE protection class[7]	□	
Laser class[8]	2 (IEC 825/VDE 0837)	
Circuit protection[9]	A, B, C	
Enclosure rating	IP 67	
Ambient temperature T_A	Operation 14…113° F (-10…45° C)	
	Storage 14…167° F (-10…75° C)	
Approximate weight	3.5 oz (100 g)	
Housing material	ABS	

1) Average service life 50,000 h at $T_A = +25°C$
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal flight time with ohmic load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) Low power. Eyes normally protected by averting reaction and eyelid closing reflex.
9) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

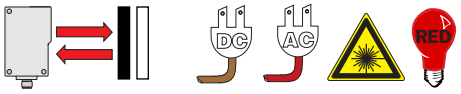




wire colors refer to standard cable, not included with quick disconnect models

WT 27L-2

Proximity/Diffuse Sensors-Background Suppression



1.1...31.5 in (30...800 mm)
sensing range

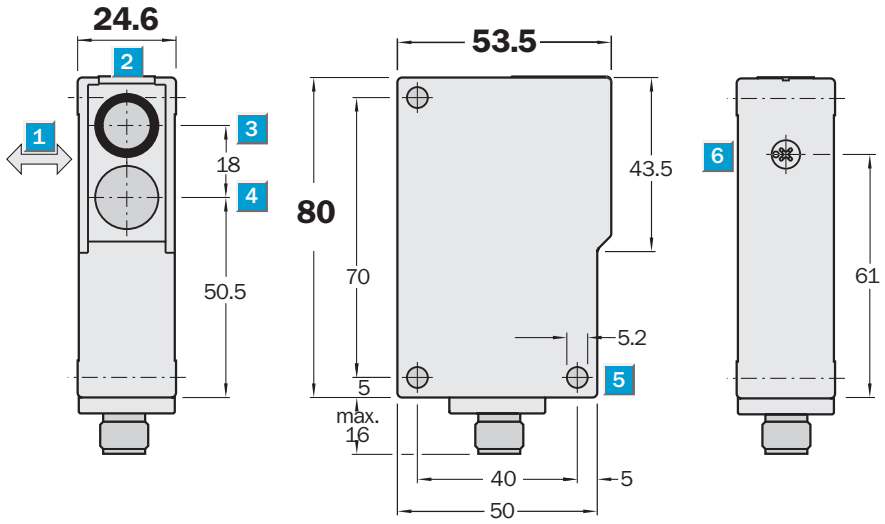
Highlights

- Adjustable background suppression
- Rugged plastic housing
- Crosstalk immunity
- Visible red light for easy alignment
- Wide range supply voltage
- Signal strength indicator
- Class 2 laser provides a very small light spot

WT 27L-2

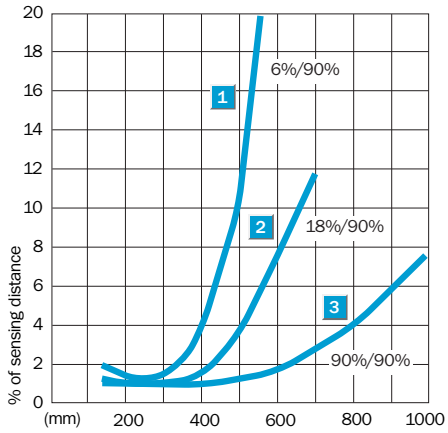


Dimensional drawing



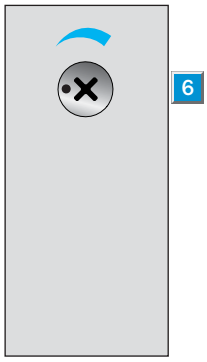
dimensions in mm

Background suppression



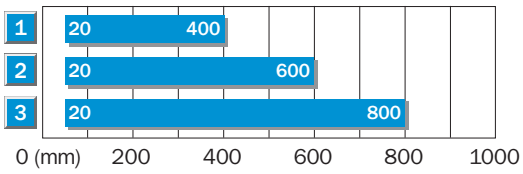
Adjustments

All types



1	Standard direction of the material being sensed
2	LED signal strength indicator
3	Center of optical axis, sender
4	Center of optic axis, receiver
5	Mounting hole ø5.2 mm
6	Sensitivity adjustment

Accessories	page
Cables and connectors	1180
Mounting systems	1234



1	Sensing range on black, 6 % remission
2	Sensing range on gray, 18 % remission
3	Sensing range on white, 90 % remission

Order information

Type	Part no.
WT 27L-2S830A	1 016 359
WT 27L-2S830A01	1 016 360
WT 27L-2S930A01	1 017 933

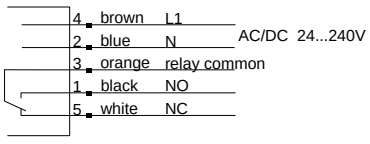
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Technical data	WT 27L-2	S83 0A	S830 A01	S930 A01						
Sensing range, adjustable	1.1...31.5 in (30...800 mm)[1]	■	■	■						
Background suppression	3.9...31.5 in (100...800 mm)[1]	■	■	■						
Background suppression capability	% of set sensing distance (see previous pg)	■	■	■						
Light source[2], light type	LED, laser, red light	■	■	■						
Light spot diameter	Approx. 0.07 in at 15.7 in (2 mm at 400 mm)	■	■	■						
Angle of divergence	Approx. 3°	■	■	■						
Supply voltage V_S	24...240 V UC[3] -10% - 20%	■	■	■						
Current consumption	≤ 2 VA	■	■	■						
Switching outputs	Relay, SPDT[4]	■	■	■						
Max. switching voltage	250 V AC/120 V DC	■	■	■						
Max. switching current I_A	4 A/240 V AC or 24 V DC	■	■	■						
Max. switching capacity	AC 1000 VA/DC 100 W	■	■	■						
Response time	≤ 6 ms	■	■	■						
Max. switching frequency[5]	10 Hz	■	■	■						
Connection types	Plug, mini 5-pin	■	■							
	Plug, micro 5-pin			■						
VDE protection class[6]	□	■	■	■						
Circuit protection[7]	A, B, C	■	■	■						
Enclosure rating	IP 67/NEMA 6	■	■	■						
Ambient temperature T_A	Operation -14...140° F (-10...60° C)	■	■	■						
	Storage -13...167° F (-25...75° C)	■	■	■						
Approximate weight	3.5 oz (100 g)	■	■	■						
Housing material	Glass fiber reinforced ABS	■	■	■						

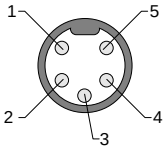
1) 90% remission of material scanned (based on standard white according to DIN 5033)
2) Average service life T_A = 25° C; LED, red light 100,000 h
3) ± 10%
4) Ensure spark extinguishing for inductive or capacitive load
5) With dark/light ratio 1:1
6) Reference voltage 250 V UC
7) A = V_s connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

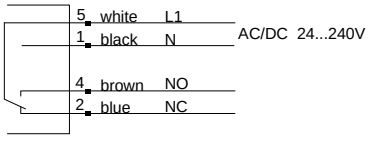
WT 27L-2S830A



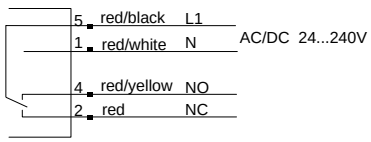
Mini Connector



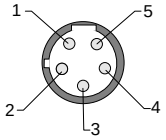
WT27L-2S830A01



WT 27L-2S930A01

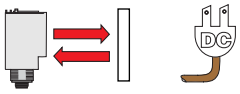


Micro Connector



WT 2000

Proximity/Diffuse Sensors-Energetic





0...11.5 ft (0...3.5 m)
sensing range

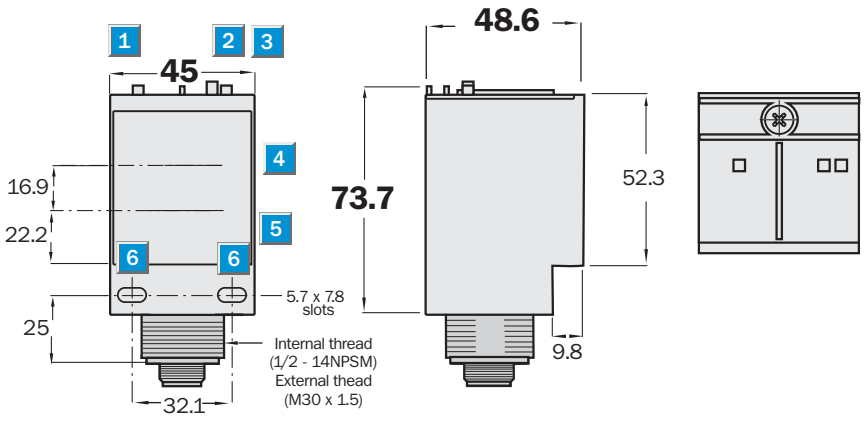
Highlights

- Rugged plastic housing
- Signal strength indicator
- Adjustable sensing range
- Selectable time delays
- Crosstalk immunity
- Alarm output
- Cable or M12 quick disconnect versions

WT 2000

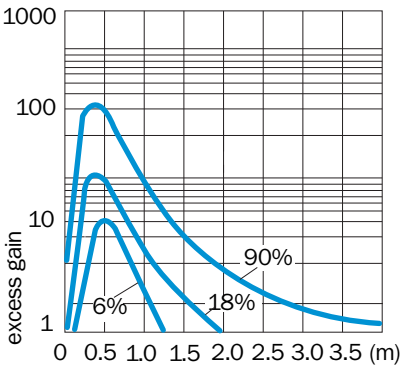


Dimensional drawing



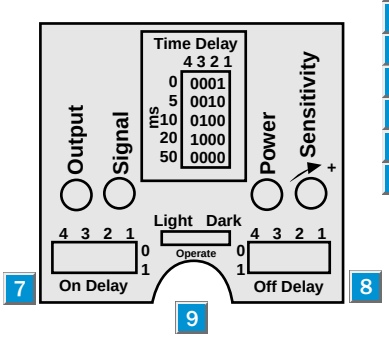
dimensions in mm

Excess gain



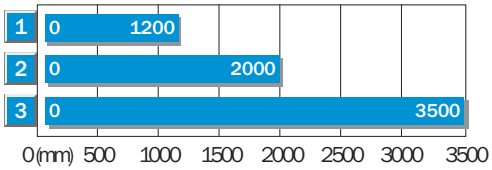
Adjustments

All types



1. LED power indicator (green)
2. LED signal strength indicator (red)
3. LED output indicator (yellow)
4. Center of optical axis, sender
5. Center of optical axis, receiver
6. Mounting through-hole Ø 0.2 x 0.8 mm,
7. ON delay selector
8. OFF delay selector
9. Light/dark switching selector

Accessories	page
Cables and connectors	1180
Mounting systems	1234



1. Sensing range on black, 6% remission
2. Sensing range on gray, 18% remission
3. Sensing range on white, 90% remission

Order information

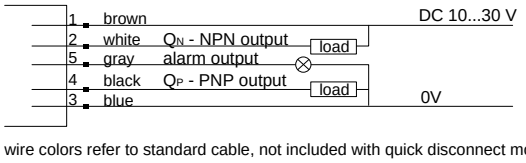
Type	Part no.
WT 2000-B1102	7 023 056
WT 2000-B1112	7 023 057
WT 2000-B1122	7 023 058
WT 2000-B5100	7 023 059
WT 2000-B5110	7 023 060
WT 2000-B5120	7 023 061
WT 2000-B4100	7 024 001

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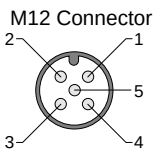
Technical data	WT 2000-	B1102	B1112	B1122	B5100	B5110	B5120	B4100
Sensing range, adjustable	0...11.5 ft (0...3.5 m)	■	■	■	■	■	■	■
Light source[1], light type	LED, infrared light, 880 nm	■	■	■	■	■	■	■
Light spot diameter	Approx. 2.2 in at 8.2 ft (55 mm at 2.5 m)	■	■	■	■	■	■	■
Angle of divergence	Approx. 1.3°	■	■	■	■	■	■	■
Supply voltage V_S[2]	10...30 V DC	■	■	■	■	■	■	■
Ripple[3]	≤ 5 V	■	■	■	■	■	■	■
Current consumption[4]	≤ 80 mA	■	■	■	■	■	■	■
Switching outputs	PNP or NPN, Q and $\overline{Q}$	■	■	■	■	■	■	■
Voltage drop (Max.)	2 V	■	■	■	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■	■
Response time[5]	≤ 1 ms	■	■	■	■	■	■	■
Max. switching frequency[6]	500 Hz	■	■	■	■	■	■	■
Alarm output	PNP	■	■	■	■	■	■	■
Time delay settings	0, 5, 10, 20 or 50 ms		■	■		■	■	
OFF delay			■			■		
ON/OFF delay				■			■	
Connection types	Cable, 2 m, PVC[7]	■	■	■				
	Plug, M12 5-pin				■	■	■	
	Plug, M12 4-pin							■
VDE protection class[8]	□	■	■	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -13...104° F (-25...40° C)	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■	■
Approximate weight	5.3 oz (150 g)	■	■	■	■	■	■	■
Housing material	Glass fiber reinforced plastic	■	■	■	■	■	■	■

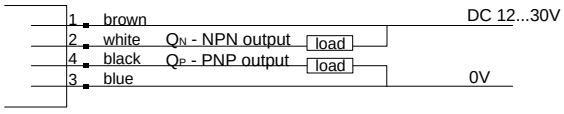
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

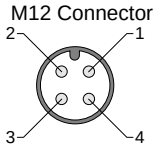
Connection diagram



wire colors refer to standard cable, not included with quick disconnect models







WT 2000

Proximity/Diffuse Sensors-Energetic



0...11.5 ft (0...3.5 m)
sensing range

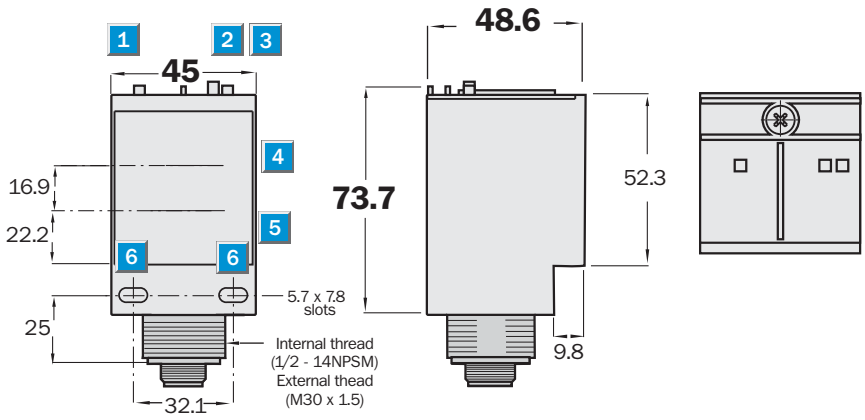
Highlights

- Rugged plastic housing
- Signal strength indicator
- Adjustable sensing range
- Selectable time delays
- Crosstalk immunity
- Adjustable sensing range
- Cable or mini quick disconnect versions

WT 2000

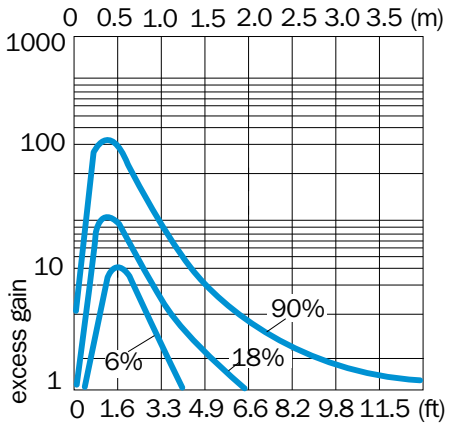


Dimensional drawing



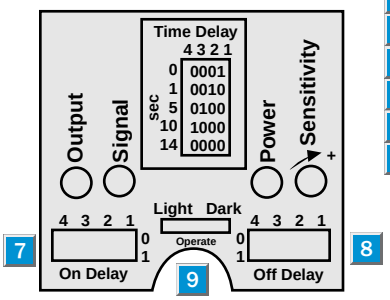
dimensions in inches (mm)

Excess Gain



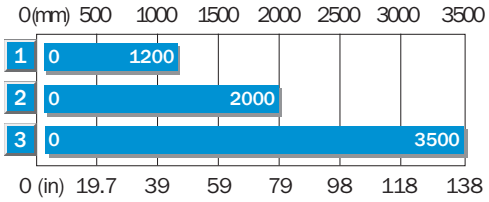
Adjustments

All types



1 LED power indicator (green)
2 LED signal strength indicator (red)
3 LED output indicator (yellow)
4 Center of optical axis, sender
5 Center of optical axis, receiver
6 Mounting through-hole Ø 0.2 x 0.8 mm,
7 ON delay selector
8 OFF delay selector
9 Light/dark switching selector

Accessories	page
Cables and connectors	1180
Mounting systems	1234



1 Sensing range on black, 6% remission
2 Sensing range on gray, 18% remission
3 Sensing range on white, 90% remission

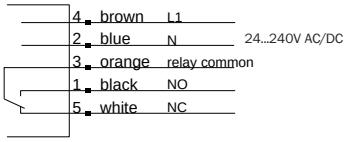
Order information

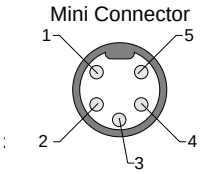
Type	Part no.
WT 2000-R1102	7 023 062
WT 2000-R1112	7 023 063
WT 2000-R1122	7 023 064
WT 2000-R5100	7 023 065
WT 2000-R5110	7 023 066
WT 2000-R5120	7 023 067

Technical data	WT 2000-	R1102	R1112	R1122	R5100	R5110	R5120
Sensing range, adjustable	0...11.5 ft (0...3.5 m)	■	■	■	■	■	■
Light source[1], light type	LED, infrared light, 880 nm	■	■	■	■	■	■
Light spot diameter	Approx. 2.2 in at 8.2 ft (55 mm at 2.5 m)	■	■	■	■	■	■
Angle of divergence	Approx. 1.3°	■	■	■	■	■	■
Supply voltage V_S[2]	24...240 V AC/DC	■	■	■	■	■	■
Current consumption[3]	≤ 6 W	■	■	■	■	■	■
Switching outputs	Relay, SPDT, isolated	■	■	■	■	■	■
Switching voltage (Max.)	265 V	■	■	■	■	■	■
Switching current (Max.)	3 A	■	■	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■	■	■
Response time[4]	≤ 10 ms	■	■	■	■	■	■
Max. switching frequency[5]	10 Hz	■	■	■	■	■	■
Time delay settings	0, 1, 5, 10 or 14 s		■	■		■	■
OFF delay			■			■	
ON/OFF delay				■			■
Connection types	Cable, 2 m, PVC[6]	■	■	■			
	Plug, mini 5-pin				■	■	■
VDE protection class[7]	⧈	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Ambient temperature T_A	Operation -13...104° F (-25...40° C)	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■
Approximate weight	5.3 oz (150 g)	■	■	■	■	■	■
Housing material	Glass fiber reinforced plastic	■	■	■	■	■	■

1) Average service life 100,000 h at $T_A = 25°C$
2) Limit values
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Do not bend below 0°C
7) Reference voltage 50 V DC

Connection diagram





wire colors refer to standard cable, not included with quick disconnect models

WT 2000

Proximity/Diffuse Sensors-Solid State-Energetic



0...11.5 ft (0...3.5 m)
sensing range

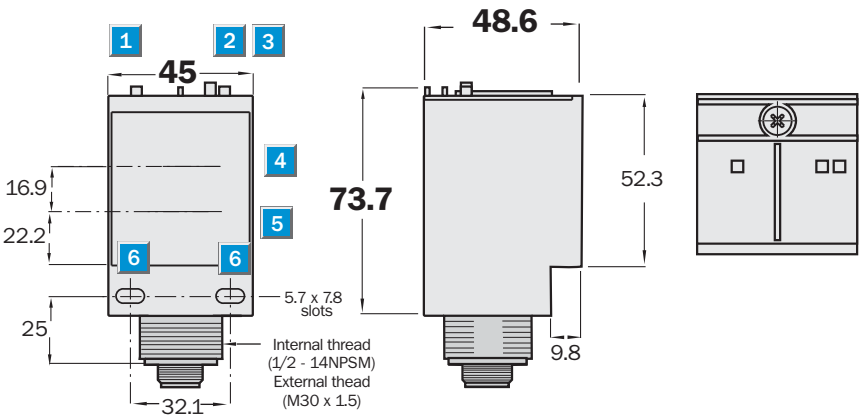
Highlights

- Rugged plastic housing
- Signal strength indicator
- Adjustable sensing range
- Red light for easy alignment
- Crosstalk immunity
- Polarizing filters prevent false readings on reflective surfaces
- Cable or M12 quick disconnect versions

WT 2000

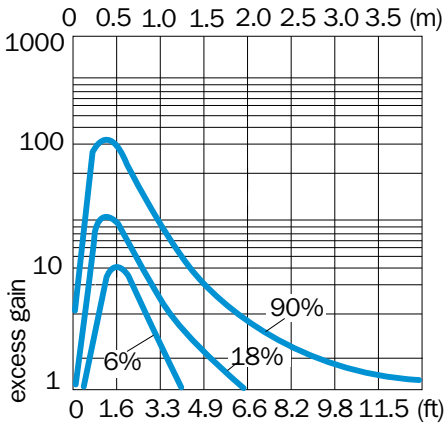


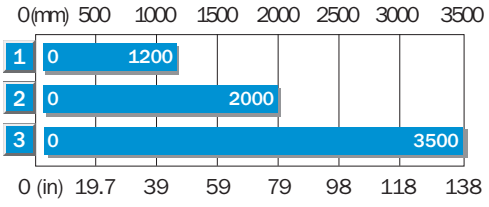
Dimensional Drawing



dimensions in inches mm

Excess gain

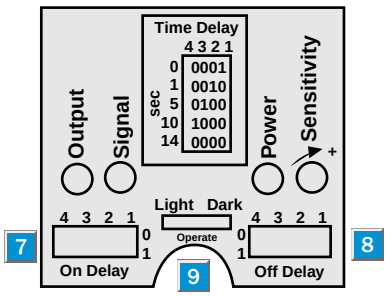




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Possible Adjustments

All types



1	LED power indicator (green)
2	LED signal strength indicator (red)
3	LED output indicator (yellow)
4	Center of optical axis, sender
5	Center of optical axis, receiver
6	Mounting through-hole Ø 0.2 x 0.8 mm,
7	ON delay selector
8	OFF delay selector
9	Light/dark switching selector

Order information

Type	Part no.
WT 2000-M1102	7 023 432
WT 2000-M1112	7 023 431
WT 2000-M1122	7 023 430
WT 2000-M4100	7 023 441
WT 2000-M4110	7 023 440
WT 2000-M4120	7 023 439
WT 2000-M9100	7 023 444
WT 2000-M9110	7 023 443
WT 2000-M9120	7 023 442

Accessories	page
Cables and connectors	1180
Mounting systems	1234

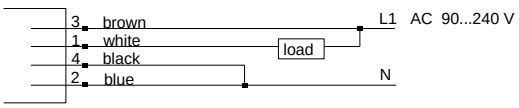
7028071 - © 2008 SICK, Inc.

Technical data	WT 2000-	M1102	M1112	M1122	M4100	M4110	M4120	M9100	M9110	M9120
Sensing range, adjustable	0...11.5 ft (0...3.5 m)	■	■	■	■	■	■	■	■	■
Light source[1], **light type**	LED, infrared light, 880 nm	■	■	■	■	■	■	■	■	■
Light spot diameter	Approx. 2.2 in at 8.2 ft (55 mm at 2.5 m)	■	■	■	■	■	■	■	■	■
Angle of divergence	Approx. 1.3°	■	■	■	■	■	■	■	■	■
		■	■	■	■	■	■	■	■	■
Supply voltage V_S[2]	90...240 V AC	■	■	■	■	■	■	■	■	■
Current consumption[3]	≤ 6 W	■	■	■	■	■	■	■	■	■
Switching outputs	FET	■	■	■	■	■	■	■	■	■
Switching voltage (Max.)	240 V	■	■	■	■	■	■	■	■	■
Switching current (Max.)	150 mA	■	■	■	■	■	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■	■	■	■	■	■
Response time[4]	≤ 2 ms	■	■	■	■	■	■	■	■	■
Max. switching frequency[5]	250 Hz	■	■	■	■	■	■	■	■	■
Time delay settings	0, 1, 5, 10 or 14 s		■	■		■	■		■	■
OFF delay			■			■			■	
ON/OFF delay				■			■			■
Connection types	Cable, 2 m, PVC[6]	■	■	■						
	Plug, mini 4-pin				■	■	■			
	Plug, micro 4-pin							■	■	■
VDE protection class[7]	□	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -13...104° F (-25...40° C)	■	■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■	■	■	■
Approximate weight	5.3 oz (150 g)	■	■	■	■	■	■	■	■	■
Housing material	Glass fiber reinforced plastic	■	■	■	■	■	■	■	■	■

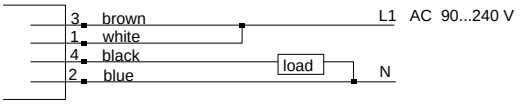
1) Average service life 100,000 h at T_A = 25°C
2) Limit values
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Do not bend below 0°C
7) Reference voltage 50 V DC

Connection diagram

Mini / Cable Versions

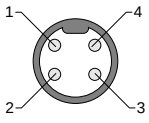


-OR-

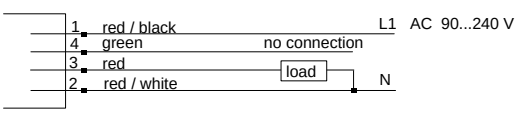


wire colors refer to standard cable, not included with quick disconnect mode

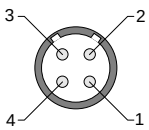
Mini Connector



Micro Versions

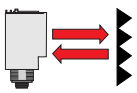


Micro Connector



WL 2000

Reflex/Retro-Reflective Sensors-Solid State





0...49 ft (0...15 m)
sensing range

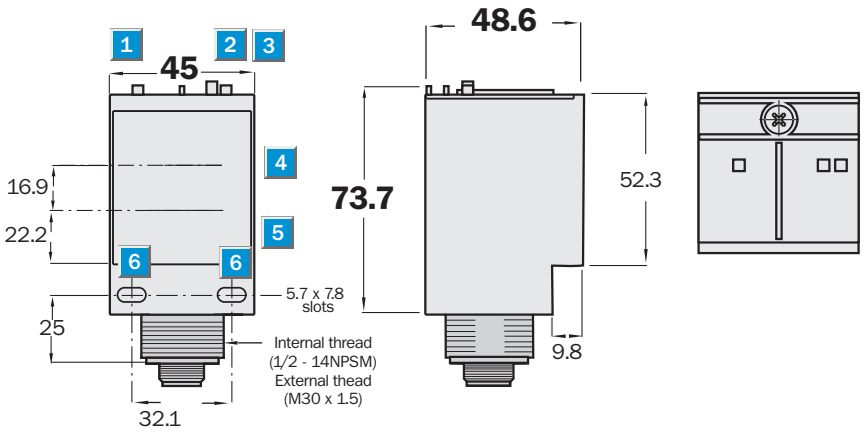
Highlights

- Rugged plastic housing
- Standard mounting for your existing applications
- Wide range supply voltage
- Signal strength indicator
- Crosstalk immunity
- Polarizing filters prevent false readings on reflective surfaces
- Red light for easy alignment
- Cable or quick disconnect versions

WL 2000

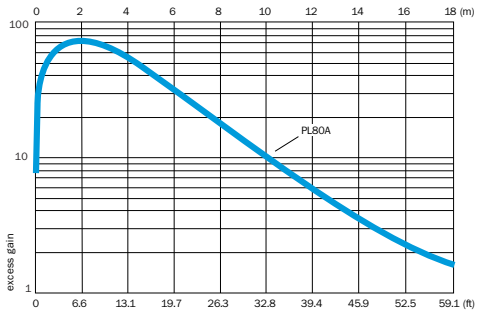


Dimensional drawing



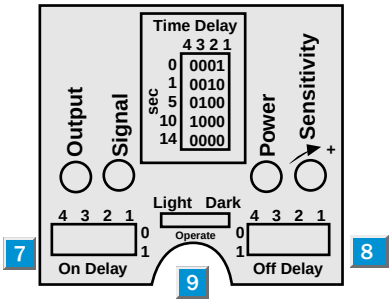
dimensions in mm

Excess gain



Adjustments

All types



1 LED power indicator (green)
2 LED signal strength indicator (red)
3 LED output indicator (yellow)
4 Center of optical axis, sender
5 Center of optical axis, receiver
6 Mounting through-hole Ø 0.2 x 0.8 mm,
7 ON delay selector
8 OFF delay selector
9 Light/dark switching selector

Reflector type		Sensing range
1	PL 80 A	1...15 m
2	PL 50 A	0...11 m
3	PL 40 A	0...11 m
4	PL 30 A	0...8 m
5	PL 20 A	0...8 m
6	Reflective tape diamond grade	0...8 m

Order information	
Type	**Part no.**
WL 2000-M1302	7 023 402
WL 2000-M1312	7 023 401
WL 2000-M1322	7 023 400
WL 2000-M4300	7 023 411
WL 2000-M4310	7 023 410
WL 2000-M4320	7 023 409
WL 2000-M9300	7 023 414
WL 2000-M9310	7 023 413
WL 2000-M9320	7 023 412

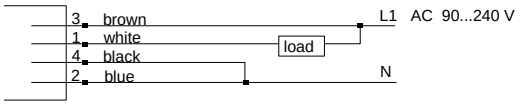
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Technical data	WL 2000-	M1302	M1312	M1322	M4300	M4310	M4320	M9300	M9310	M9320
Sensing range, adjustable	0...49 ft (0...15 m)	■	■	■	■	■	■	■	■	■
Light source[1], light type	LED, red light, 660 nm, polarized	■	■	■	■	■	■	■	■	■
Light spot diameter	Approx. 12.5 in at 45.9 ft (320 mm at 14 m)	■	■	■	■	■	■	■	■	■
Angle of divergence	Approx. 1.3°	■	■	■	■	■	■	■	■	■
Supply voltage V_S[2]	90...240 V AC	■	■	■	■	■	■	■	■	■
Current consumption[3]	≤ 6 W	■	■	■	■	■	■	■	■	■
Switching outputs	FET	■	■	■	■	■	■	■	■	■
Switching voltage (Max.)	240 V AC	■	■	■	■	■	■	■	■	■
Switching current (Max.)	150 mA	■	■	■	■	■	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■	■	■	■	■	■
Response time[4]	≤ 2 ms	■	■	■	■	■	■	■	■	■
Max. switching frequency[5]	250 Hz	■	■	■	■	■	■	■	■	■
Time delay settings	0, 1, 5, 10 or 14 s		■	■		■	■		■	■
OFF delay			■			■			■	
ON/OFF delay				■			■			■
Connection types	Cable, 2 m, PVC[6]	■	■	■						
	Plug, mini 4-pin				■	■	■			
	Plug, micro 4-pin							■	■	■
VDE protection class[7]	□	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -13...104° F (-25...40° C)	■	■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■	■	■	■
Approximate weight	5.3 oz (150 g)	■	■	■	■	■	■	■	■	■
Housing material	Glass fiber reinforced plastic	■	■	■	■	■	■	■	■	■

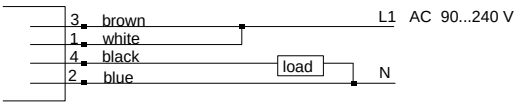
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Do not bend below 0°C
7) Reference voltage 50 V DC

Connection diagram

Mini / Cable Versions

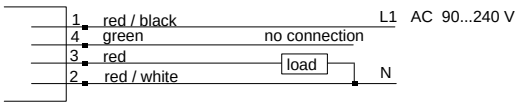


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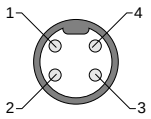


wire colors refer to standard cable, not included with quick disconnect models

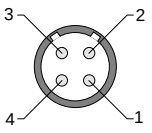
Micro Versions



Mini Connector

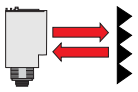


Micro Connector



WL 2000

Reflex/Retro-Reflective Sensors






0...49 ft (0...15 m)
sensing range

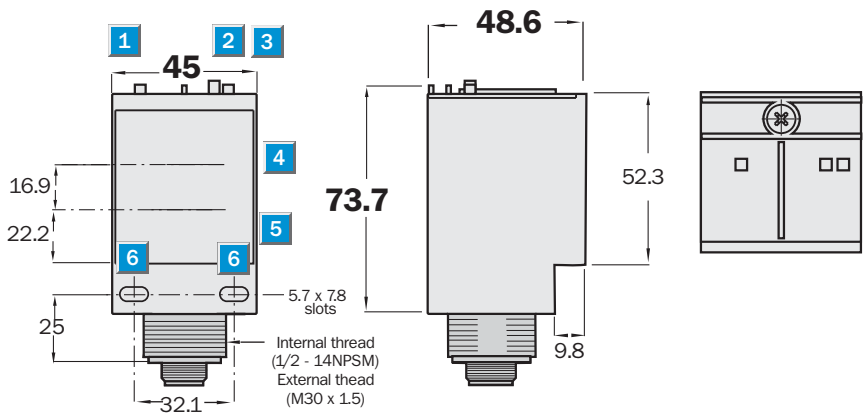
Highlights

- Rugged plastic housing
- Standard mounting for your existing applications
- Alarm output
- Crosstalk immunity
- Polarizing filters prevent false readings on shiny surfaces
- Red light for easy alignment
- Selectable time delays
- Cable or M12 quick disconnect versions

WL 2000

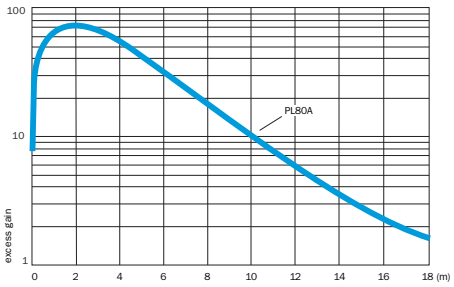


Dimensional drawing



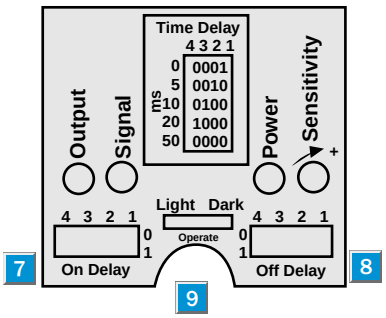
dimensions in mm

Excess gain



Adjustments

All types



1 LED power indicator (green)
2 LED signal strength indicator (red)
3 LED output indicator (yellow)
4 Center of optical axis, sender
5 Center of optical axis, receiver
6 Mounting through-hole Ø 0.2 x 0.8 mm,
7 ON delay selector
8 OFF delay selector
9 Light/dark switching selector

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

	Reflector type	Sensing range
1	PL 80 A	1...15 m
2	PL 50 A	0...11 m
3	PL 40 A	0...11 m
4	PL 30 A	0...8 m
5	PL 20 A	0...8 m
6	Reflective tape diamond grade	0...8 m

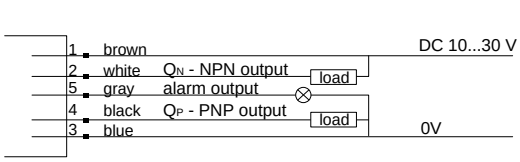
Order information

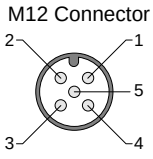
Type	Part no.
WL 2000-B1302	7 023 044
WL 2000-B1312	7 023 045
WL 2000-B1322	7 023 046
WL 2000-B5300	7 023 047
WL 2000-B5310	7 023 048
WL 2000-B5320	7 023 049
WL 2000-B4300	7 024 002

Technical data	WL 2000-	B1302	B1312	B1322	B5300	B5310	B5320	B4300
Sensing range	0...49 ft (0...15 m)	■	■	■	■	■	■	■
Light source[1], light type	LED, red light, 660 nm, polarized	■	■	■	■	■	■	■
Light spot diameter	Approx. 12.5 in at 45.9 ft (320 mm at 14 m)	■	■	■	■	■	■	■
Angle of divergence	Approx. 1.3°	■	■	■	■	■	■	■
Supply voltage V_S[2]	10...30 V DC	■	■	■	■	■	■	■
Ripple[3]	≤ 5 V	■	■	■	■	■	■	■
Current consumption[4]	≤ 80 mA	■	■	■	■	■	■	■
Switching outputs	PNP or NPN, Q and $\overline{Q}$	■	■	■	■	■	■	■
Voltage drop (Max.)	2 V	■	■	■	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■	■	■	■
Output current I_A max.	80 mA	■	■	■	■	■	■	■
Response time[5]	≤ 1 ms	■	■	■	■	■	■	■
Max. switching frequency	500 Hz	■	■	■	■	■	■	■
Alarm output	PNP	■	■	■	■	■	■	
Time delay settings	0, 5, 10, 20 or 50 ms		■	■		■	■	
OFF delay			■			■		
ON/OFF delay				■			■	
Connection types	Cable, 2 m, PVC[6]	■	■	■				
	Plug, M12 5-pin				■	■	■	
	Plug, M12 4-pin							■
VDE protection class[7]	□	■	■	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -13...104° F (-25...40° C)	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■	■
Approximate weight	5.3 oz (150 g)	■	■	■	■	■	■	■
Housing material	Glass fiber reinforced plastic	■	■	■	■	■	■	■

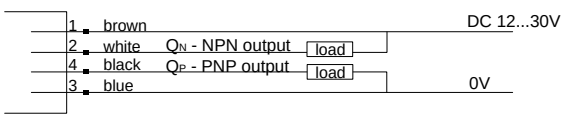
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) Do not bend below 0° C
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

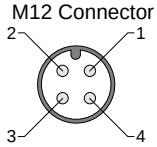
Connection diagram





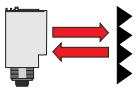
wire colors refer to standard cable, not included with quick disconnect models





WL 2000

Reflex/Retro-Reflective Sensors





0...49 ft (0...15 m)

sensing range

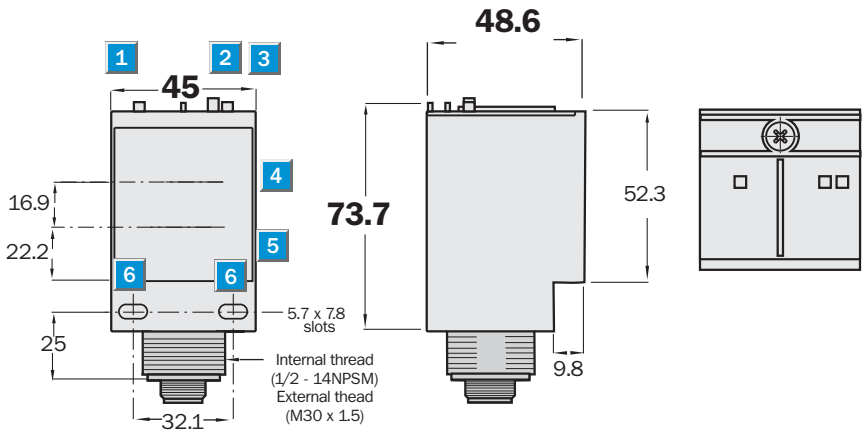
Highlights

- Rugged plastic housing
- Standard mounting for your existing applications
- Wide range supply voltage
- Signal strength indicator
- Relay output, SPDT
- Polarizing filters prevent false readings on reflective surfaces
- Red light for easy alignment
- Cable or mini quick disconnect versions

WI 2000

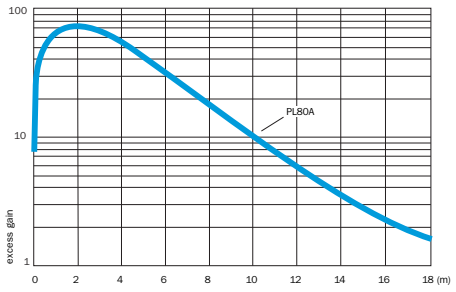


Dimensional drawing



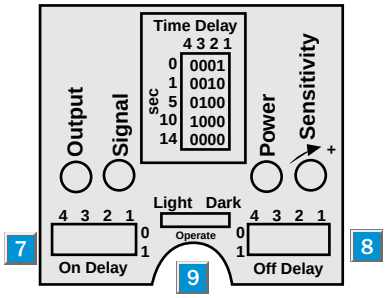
dimensions in mm

Excess gain



Adjustments

All types



1 LED power indicator (green)
2 LED signal strength indicator (red)
3 LED output indicator (yellow)
4 Center of optical axis, sender
5 Center of optical axis, receiver
6 Mounting through-hole Ø 0.2 x 0.8 mm,
7 ON delay selector
8 OFF delay selector
9 Light/dark switching selector

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

	Reflector type	Sensing range
1	PL 80 A	1...15 m
2	PL 50 A	0...11 m
3	PL 40 A	0...11 m
4	PL 30 A	0...8 m
5	PL 20 A	0...8 m
6	Reflective tape diamond grade	0...8 m

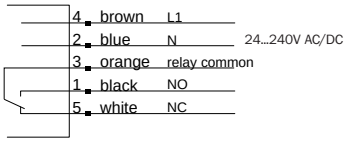
Order information

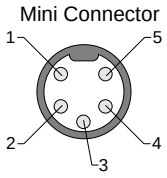
Type	Part no.
WL 2000-R1302	7 023 050
WL 2000-R1312	7 023 051
WL 2000-R1322	7 023 052
WL 2000-R5300	7 023 053
WL 2000-R5310	7 023 054
WL 2000-R5320	7 023 055

Technical data	WL 2000-	R1302	R1312	R1322	R5300	R5310	R5320
Sensing range, adjustable	0...49 ft (0...15 m)	■	■	■	■	■	■
Light source[1], **light type**	LED, red light, 660 nm, polarized	■	■	■	■	■	■
Light spot diameter	Approx. 12.5 in at 45.9 ft (320 mm at 14 m)	■	■	■	■	■	■
Angle of divergence	Approx. 1.3°	■	■	■	■	■	■
Supply voltage V_S[2]	24...240 V AC/DC	■	■	■	■	■	■
Current consumption[3]	≤ 6 W	■	■	■	■	■	■
Switching outputs	Relay, SPDT isolated	■	■	■	■	■	■
Switching voltage (Max.)	265 V	■	■	■	■	■	■
Switching current (Max.)	3 A	■	■	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■	■	■
Response time[4]	≤ 10 ms	■	■	■	■	■	■
Max. switching frequency[5]	10 Hz	■	■	■	■	■	■
Time delay settings	0, 1, 5, 10 or 14 s		■		■	■	■
OFF delay			■			■	
ON/OFF delay				■			■
Connection types	Cable, 2 m, PVC[6]	■	■	■			
	Plug, mini 5-pin				■	■	■
VDE protection class[7]	□	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Ambient temperature T_A	Operation -13...104° F (-25...40° C)	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■
Approximate weight	5.3 oz (150 g)	■	■	■	■	■	■
Housing material	Glass fiber reinforced plastic	■	■	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Do not bend below 0° C
7) Reference voltage 50 V DC

Connection diagram

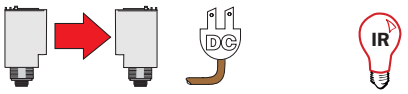




wire colors refer to standard cable, not included with quick disconnect models

WS/WE 2000

Through -beam Sensors



0...164 ft (0...50 m)
sensing range

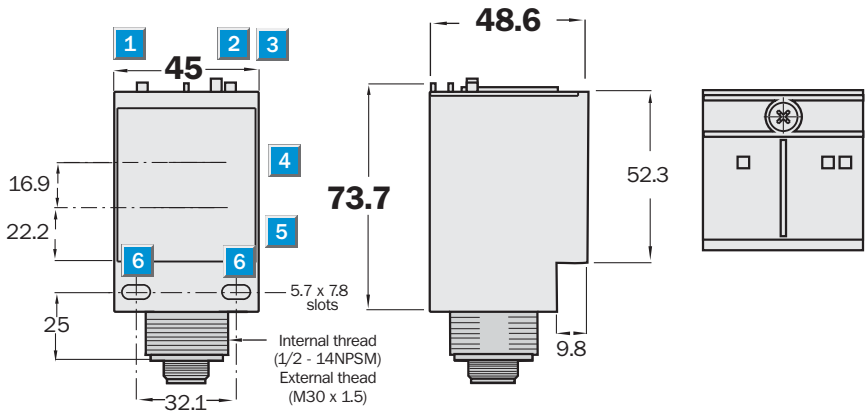
Highlights

- Rugged plastic housing
- Standard mounting for your existing applications
- Sensitivity adjustment
- Selectable time delays
- Alarm output
- Cable or M12 quick disconnect versions

WS/WE 2000

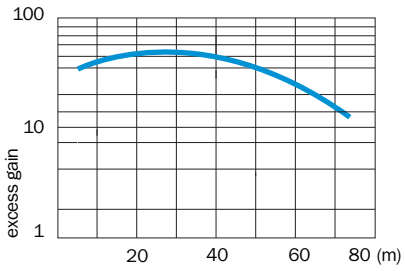


Dimensional drawing



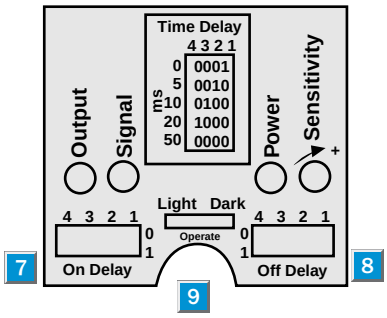
dimensions in mm

Excess gain



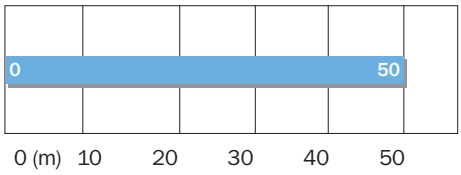
Adjustments

All types



1. LED power indicator (green)
2. LED signal strength indicator (red)
3. LED output indicator (yellow)
4. Center of optical axis, sender
5. Center of optical axis, receiver
6. Mounting through-hole Ø 0.2 x 0.8 mm,
7. ON delay selector
8. OFF delay selector
9. Light/dark switching selector

Accessories	page
Cables and connectors	1180
Mounting systems	1234



Order information

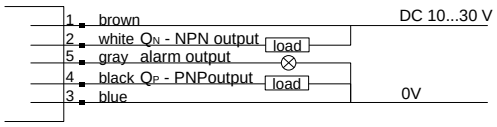
Type	Part no.
WS/WE 2000-B1102	7 025 964
WS/WE 2000-B1122	7 025 966
WS/WE 2000-B5100	7 025 965
WS/WE 2000-B5120	7 025 967
WS/WE 2000-B4100	7 028 604

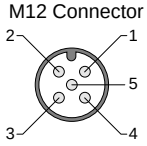
Technical data	WS/WE 2000-	B1102	B1122	B5100	B5120	B4100
Sensing range, adjustable	0...164 ft (0...50 m)	■	■	■	■	■
Light source[1], **light type**	LED, infrared light	■	■	■	■	■
Light spot diameter	Approx. 12.5 in at 45.9 ft (320 mm at 14 m)	■	■	■	■	■
Angle of divergence	Approx. 1.3°	■	■	■	■	■
Supply voltage V_S[2]	10...30 V DC	■	■	■	■	■
Ripple[3]	≤ 5 V	■	■	■	■	■
Current consumption[4]	≤ 80 mA	■	■	■	■	■
Switching outputs	PNP or NPN, Q and $\overline{Q}$	■	■	■	■	■
Voltage drop (Max.)	2 V	■	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■
Response time[5]	≤ 1 ms	■	■	■	■	■
Max. switching frequency[6]	500 Hz	■	■	■	■	■
Alarm output	PNP	■	■	■	■	
Time delay settings	0, 5, 10, 20 or 50 ms	■	■	■	■	
ON/OFF delay			■		■	
Connection types	Cable, 2 m, PVC[7]	■	■			
	Plug, M12 5-pin			■	■	
	Plug, M12 4-pin					■
VDE protection class[8]	□	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■
Ambient temperature T_A	Operation -13...104° F (-25...40° C)	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■
Approximate weight	5.3 oz (150 g)	■	■	■	■	■
Housing material	Glass fiber reinforced plastic	■	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

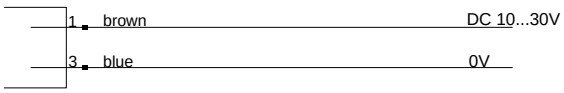
Connection diagram

Receiver

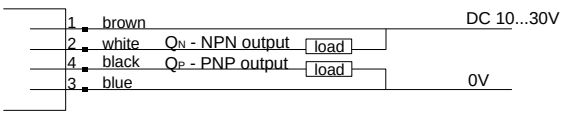


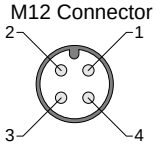


Sender



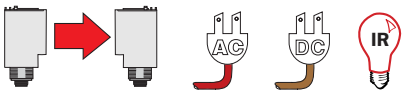
Receiver





WS/WE 2000

Through-beam Sensors



0...164 ft (0...50 m)
sensing range

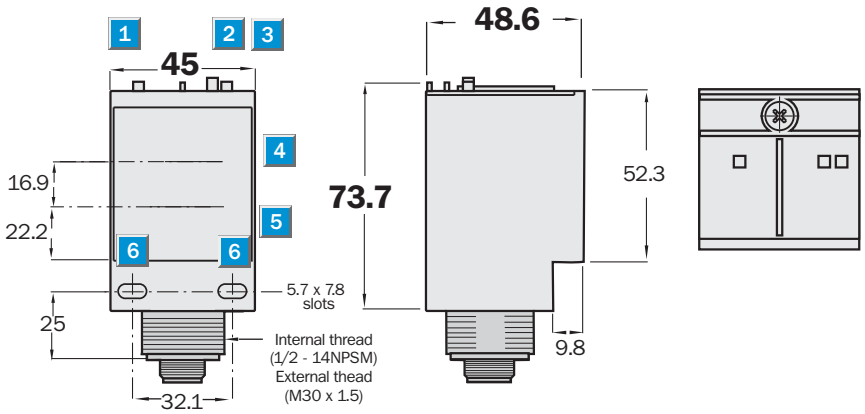
Highlights

- Rugged plastic housing
- Standard mounting for your existing applications
- Sensitivity adjustment
- Selectable time delays
- Wide range supply voltage
- Cable or mini quick disconnect versions

WS/WE 2000

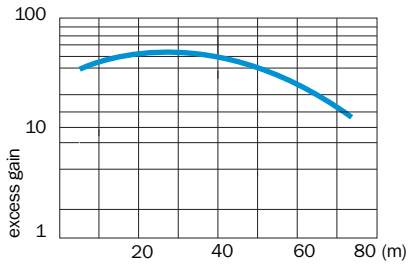


Dimensional drawing



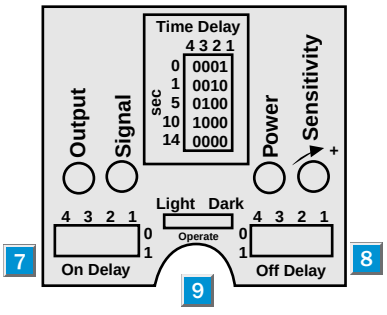
dimensions in mm

Excess Gain



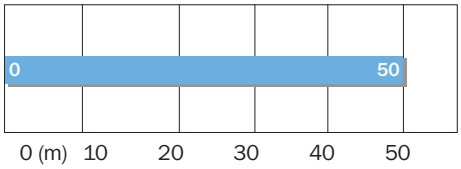
Adjustments

All types



1 LED power indicator (green)
2 LED signal strength indicator (red)
3 LED output indicator (yellow)
4 Center of optical axis, sender
5 Center of optical axis, receiver
6 Mounting through-hole Ø 0.2 x 0.8 mm,
7 ON delay selector
8 OFF delay selector
9 Light/dark switching selector

Accessories	page
Cables and connectors	1180
Mounting systems	1234



Order information

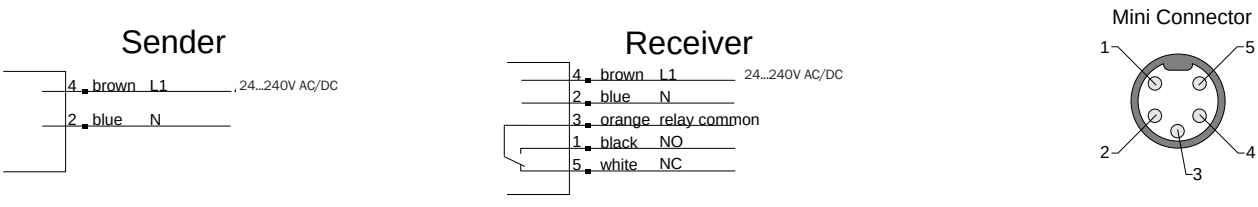
Type	Part no.
WS/WE 2000-R1102	7 025 968
WS/WE 2000-R1122	7 025 970
WS/WE 2000-R5100	7 025 969
WS/WE 2000-R5120	7 025 971

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Technical data	WS/WE 2000-	R1102	R1122	R5100	R5120
Sensing range, adjustable	0...164 ft (0...50 m)	■	■	■	■
Light source[1], **light type**	LED, infrared light	■	■	■	■
Light spot diameter	Approx. 12.5 in at 45.9 ft (320 mm at 14 m)	■	■	■	■
Angle of divergence	Approx. 1.3°	■	■	■	■
Supply voltage V_S[2]	24...240 V AC/DC	■	■	■	■
Current consumption[3]	≤ 6 W	■	■	■	■
Switching outputs	Relay, SPDT, electrically isolated	■	■	■	■
Switching voltage (Max.)	265 V (peak)		■	■	■
Switching current (Max.)	3 A	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■
Response time[4]	≤ 10 ms	■	■	■	■
Max. switching frequency[5]	10 Hz	■	■	■	■
Time delay settings	0, 1, 5, 10 or 14 s		■		■
OFF delay			■		■
ON/OFF delay					
Connection types	Cable, 2 m, PVC[6]	■	■		
	Plug, mini 5-pin			■	■
VDE protection class[7]	□	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13...104° F (-25...40° C)	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight	5.3 oz (150 g)	■	■	■	■
Housing material	Glass fiber reinforced plastic	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Do not bend below 0° C
7) Reference voltage 50 V DC

Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WT 45

Proximity/Diffuse Sensors-Background Suppression



7.9...78.7 in (200...2000 mm)
sensing range

CE

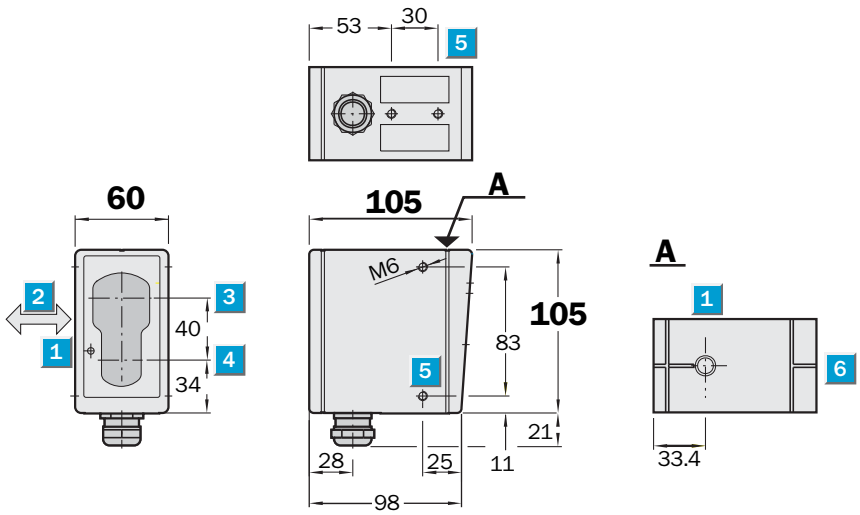
Highlights

- Robust metal housing
- Adjustable background suppression
- Adjustable sensing range
- Models available with integrated lens heater
- Optional dust shield, snow shield and cooling plates available
- Selectable time delays
- Test input

WT 45

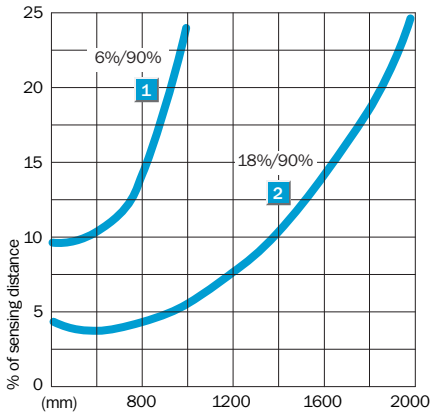


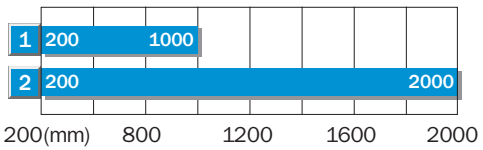
Dimensional drawing



dimensions in mm

Background suppression

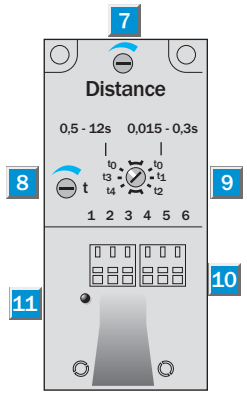




1	Sensing range on black, 6% remission
1	Sensing range on gray, 18% remission

Adjustments

All types



1	LED signal strength indicator
2	Standard direction of the material being sensed
3	Center of optical axis, receiver
4	Center of optical axis, sender
5	Threaded mounting hole M6 – 8 mm deep
6	Alignment sight
7	Sensing range adjustment
8	Time adjustment
9	Time delay selector switch
10	Terminal strip
11	Status indicator

Switch-selectable time delay

0.5 – 12 s	0.015 – 0.3 s
t_0 without time delay	t_0 without time delay
t_3 ON-delay when object enters detection zone	t_1 ON-delay when object enters detection zone
t_4 OFF-delay when object leaves detection zone	t_2 OFF-delay when object leaves detection zone

Order information

Type	Part no.
WT 45-P250	1 009 117
WT 45-P260	1 009 108
WT 45-N250	1 009 116
WT 45-N260	1 009 109
WT 45-P960	1 010 554
WT 45-P950	1 010 553
WT 45-N960	1 010 552
WT 45-N950	1 010 551

Accessories	page
Special Accessories	1314

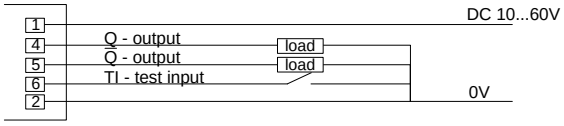
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Technical data	WT 45-	P250	P260	N250	N260	P950	P960	N950	N960
Sensing range, adjustable	7.9...78.7 in (200...2000 mm)	■	■	■	■	■	■	■	■
Background suppression	15.7...78.7 in (400...2000 mm)	■	■	■	■	■	■	■	■
Background suppression capability	% of set sensing distance (see previous page)	■	■	■	■	■	■	■	■
Light source[1], **light type**	LED, infrared light	■	■	■	■	■	■	■	■
Light spot diameter	1.4 in at 78.7 in (35 mm at 2000 mm)	■	■	■	■	■	■	■	■
Angle of divergence	Approx. 1°	■	■	■	■	■	■	■	■
Supply voltage V_S	10...60 V DC[2]	■	■	■	■	■	■	■	■
Ripple[3]	< 5 V_{SS}	■	■	■	■	■	■	■	■
Current consumption[4]	≤ 50 mA		■		■		■		■
	≤ 250 mA, front lens heating	■		■		■		■	
Switching outputs	PNP, Q and $\overline{Q}$	■	■			■	■		
	NPN, Q and $\overline{Q}$			■	■			■	■
Output current I_A max.	200 mA	■	■	■	■	■	■	■	■
Response time[5]	6 ms	■	■	■	■	■	■	■	■
Max. switching frequency[6]	50 Hz	■	■	■	■	■	■	■	■
Test input "TE"		■	■	■	■	■	■	■	■
Sender OFF	PNP: Test input to 0 V	■	■			■	■		
	NPN: Test input to V_S			■	■			■	■
Connection type	PG13.5 terminal chamber	■	■	■	■				
	1/2 in NPSM terminal chamber					■	■	■	■
VDE protection class	⏚	■	■	■	■	■	■	■	■
Circuit protection[7]	A, B, C	■	■	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■	■	■
Ambient temperature T_A[8]	Operation -13...131° F (-25...55° C)	■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■	■	■
Approximate weight	28.2 oz (800 g)	■	■	■	■	■	■	■	■
Front lens heating		■		■		■		■	
Housing material	Die cast zinc	■	■	■	■	■	■	■	■

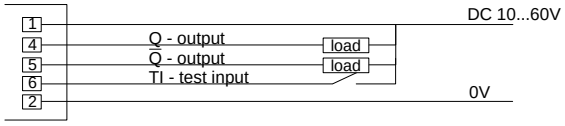
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) A = V_S connections reverse-polarity protected
B = Output Q_N and Q_P short-circuit protected
C = Interference pulse suppression
8) Up to 140° C with cooling plates (see Accessories)

Connection diagram

PNP Models



NPN Models



WT 45

Proximity/Diffuse Sensors-Background Suppression



7.9...78.7 in (200...2000 mm)
sensing range

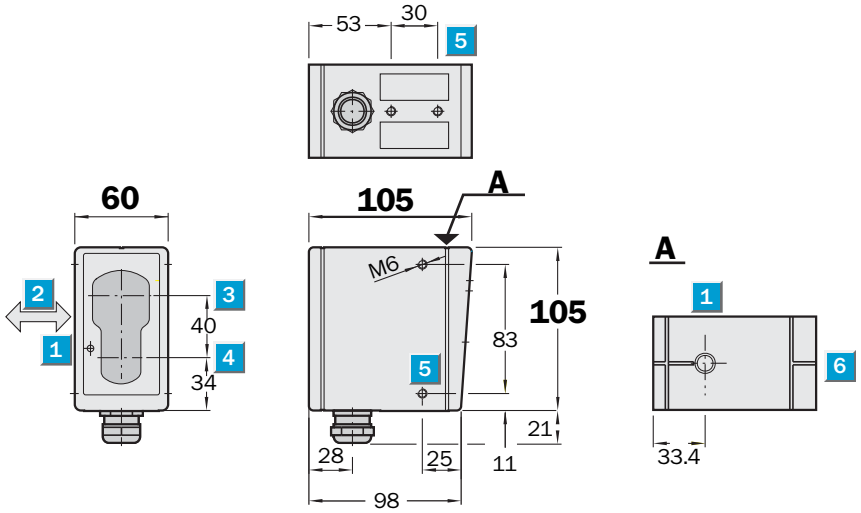
Highlights

- Robust metal housing
- Infrared light
- Adjustable background suppression
- Optional front lens heating
- Adjustable sensing range
- Selectable time delays
- Test input
- Models available with integrated lens heater
- Optional dust shield, snow shield and cooling plates available

WT 45

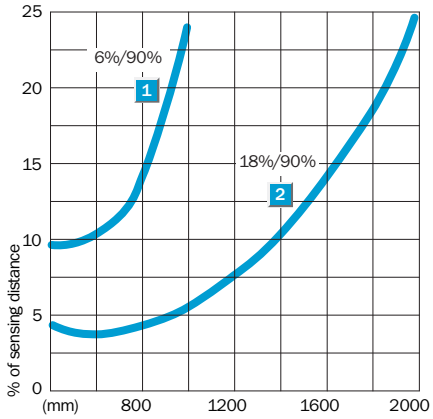


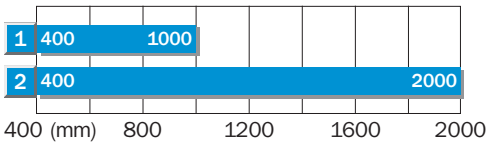
Dimensional drawing



dimensions in mm

Excess gain

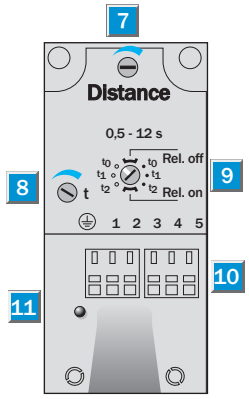




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission

Adjustments

All types



1	LED signal strength indicator
2	Standard direction of the material being sensed
3	Center of optical axis, receiver
4	Center of optical axis, sender
5	M6 threaded mounting hole – 8 mm deep
6	Alignment sight
7	Sensing range adjustment
8	Time adjustment
9	Time delay selector switch left: light switching, right: dark switching
10	Terminal strip
11	Status indicator

Switch-selectable time delay

0.5 – 12 s

t_0 without time delay

t_1 ON-delay when object enters detection zone

t_2 OFF-delay when object leaves detection zone

Order information

Type	Part no.
WT 45-R250	1 009 118
WT 45-R260	1 009 107
WT 45-R950	1 010 555
WT 45-R960	1 010 556

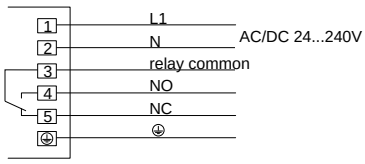
Accessories	page
Special Accessories	1314

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Technical data	WT 45-	R250	R260	R950	R960
Sensing range, adjustable	7.9...78.7 in (200...2000 mm)	■	■	■	■
Background suppression	15.7...78.7 in (400...2000 mm)	■	■	■	■
Background suppression capability	% of set sensing distance (see previous page)	■	■	■	■
Light source[1], **light type**	LED, infrared light	■	■	■	■
Light spot diameter	1.4 in at 78.7 in (35 mm at 2000 mm)	■	■	■	■
Angle of divergence	Approx. 1°	■	■	■	■
Supply voltage V_S	24...240 V UC (+ 10%, – 25%)	■	■	■	■
Power consumption	≤ 3 VA		■		■
	≤ 6 VA, front lens heating	■		■	
Switching outputs	Relay, SPDT, isolated[2]	■	■	■	■
Max. switching voltage	AC: 250 V / DC: 120 V	■	■	■	■
Switching current	4 A / 240 V AC o. 24 V DC	■	■	■	■
Max. switching capacity	AC: 1000 VA / DC: 100 W	■	■	■	■
Response time	≤ 20 ms	■	■	■	■
Max. switching frequency[3]	10 Hz	■	■	■	■
Connection types	PG 13.5 terminal chamber	■	■		
	1/2 in NPSM terminal chamber			■	■
VDE protection class	⏚	■	■	■	■
Circuit protection[4]	A, C	■	■	■	■
Enclosure rating	IP 67/NEMA 4	■	■	■	■
Ambient temperature T_A[5]	Operation -13...131° F (-25...55° C)	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight	28.2 oz (800 g)	■	■	■	■
Front lens heating		■		■	
Housing material	Metal	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C
2) Provide suitable spark suppression for inductive or capacitive loads
3) With light/dark ratio 1:1
4) A = V_S connections reverse-polarity protected
C = Interference pulse suppression
5) Up to 140° C with cooling plates (see Accessories)

Connection diagram



WL 45

Reflex/Retro-Reflective Sensors



0...180.4 ft (0...55 m)
sensing range

CE

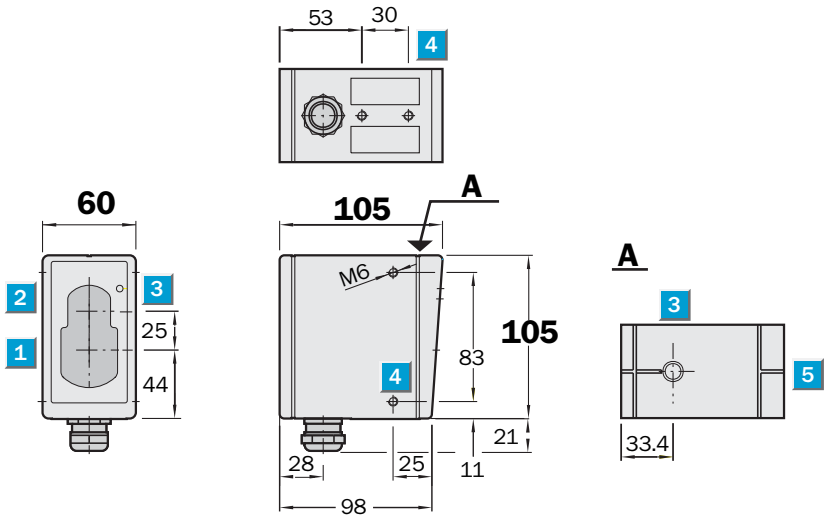
Highlights

- Rugged metal housing
- Red light for easy alignment
- Sensitivity adjustment
- Alarm output and test input
- Selectable time delays
- High output current
- Models available with integrated lens heater
- Optional dust shield, snow shield and cooling plates available

WL 45

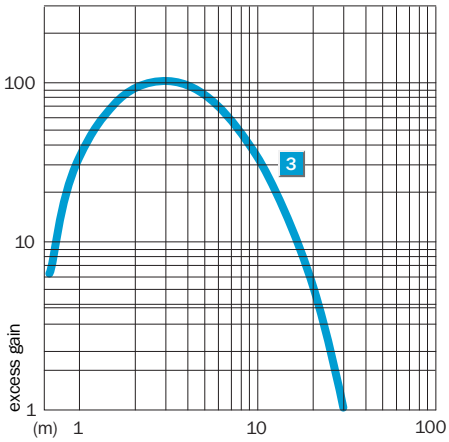


Dimensional drawing



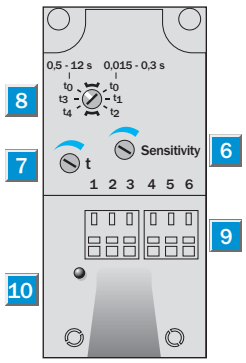
dimensions in mm

Excess gain



Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 LED signal strength indicator
4 M6 threaded mounting hole – 8 mm deep
5 Alignment sight
6 Sensitivity adjustment
7 Time adjustment
8 Time delay selector switch
9 Terminal strip
10 Status indicator

Switch-selectable time delay

0.5 – 12 s	0.015 – 0.3 s
t_0 without time delay	t_0 without time delay
t_3 ON-delay when object enters detection zone	t_1 ON-delay when object enters detection zone
t_4 OFF-delay when object leaves detection zone	t_2 OFF-delay when object leaves detection zone

Reflector type	Sensing range
1 OP 60 – ∞	1...55.0 m
2 4 x PL 80	0...35.0 m
3 PL 80 A	0...30.0 m
4 P 975	0.1...18.0 m
5 PL 50	0...14.0 m
6 PL 30	0...11.0 m
7 Reflective tape diamond grade	0.3...10.0 m

Order information

Type	Part no.
WL 45-P250	1 008 840
WL 45-P260	1 008 668
WL 45-N250	1 008 839
WL 45-N260	1 008 669
WL 45-P950	1 010 559
WL 45-P960	1 010 560
WL 45-N950	1 010 557
WL 45-N960	1 010 558

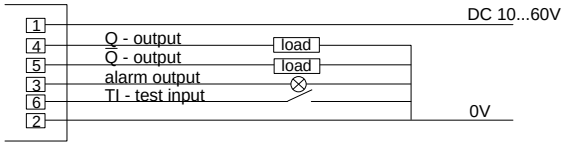
Accessories	page
Reflectors	1256
Special Accessories	1314

Technical data	WL 45-	P250	P260	N250	N260	P950	P960	N950	N960
Sensing range	0...180.4 ft (0...55 m)/OP 60	■	■	■	■	■	■	■	■
Sensitivity	Adjustable	■	■	■	■	■	■	■	■
Light source[1], light type	LED, visible red light, polarized	■	■	■	■	■	■	■	■
Light spot diameter	Approx. 9 in at 52.5 ft (230 mm at 16 m)	■	■	■	■	■	■	■	■
Supply voltage V_S	10...60 V DC[2]	■	■	■	■	■	■	■	■
Ripple[3]	< 5 V_{SS}	■	■	■	■	■	■	■	■
Current consumption[4]	≤ 50 mA		■		■		■		■
	≤ 250 mA, front lens heating	■		■		■		■	
Switching outputs	PNP, Q and $\overline{Q}$	■	■			■	■		
	NPN, Q and $\overline{Q}$			■	■			■	■
Output current I_A max.	200 mA	■	■	■	■	■	■	■	■
Response time[5]	≤ 1.2 ms	■	■	■	■	■	■	■	■
Max. switching frequency[6]	400 Hz	■	■	■	■	■	■	■	■
Alarm output	Alarm	■	■	■	■	■	■	■	■
Output current I_A max.	100 mA, open collector	■	■	■	■	■	■	■	■
Insufficient light received	Flashes at approx. 5/s, switch to V_S	■	■	■	■	■	■	■	■
(Reserve < 50%)									
Test input "TE"		■	■	■	■	■	■	■	■
Sender OFF	PNP: Test input to 0 V	■	■			■	■		
	NPN: Test input to V_S			■	■			■	■
Connection types	PG 13.5 terminal chamber	■	■	■	■				
	1/2 in NPSM terminal chamber					■	■	■	■
VDE protection class[7]	⏚	■	■	■	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■
Ambient temperature T_A[9]	Operation -13...131° F (-25 ...55° C)	■	■	■	■	■	■	■	■
	Storage -40...158° F (-40 ...70° C)	■	■	■	■	■	■	■	■
Approximate weight	28.2 oz (800 g)	■	■	■	■	■	■	■	■
Front lens heating		■		■		■		■	
Polarizing filter		■	■	■	■	■	■	■	■
Housing material	Die cast metal	■	■	■	■	■	■	■	■

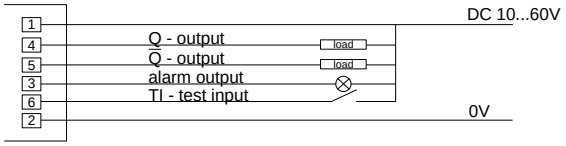
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Output Q_N and Q_P short-circuit protected
C = Interference pulse suppression
9) Up to 140° C with cooling plates (see Accessories)

Connection diagram

PNP Models



NPN Models



WL 45

Reflex/Retro-Reflective Sensors



0...180.4 ft (0...55 m)
sensing range

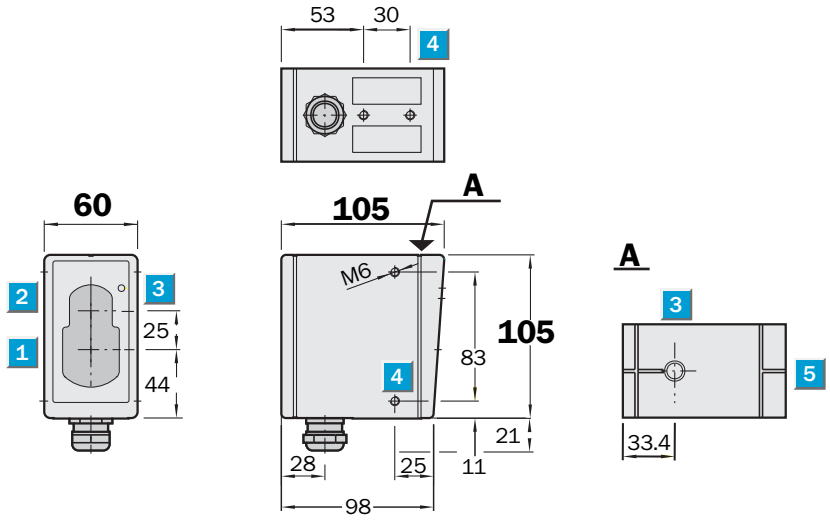
Highlights

- Rugged metal housing
- Red light for easy alignment
- Sensitivity adjustment
- Wide range supply voltage
- High output current
- Signal strength indicator
- Alarm output and test input
- Polarizing filters prevent false readings on reflective surfaces
- Models available with integrated lens heater

WL 45

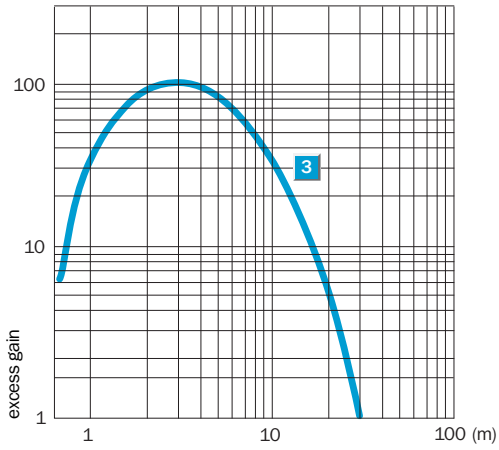


Dimensional drawing



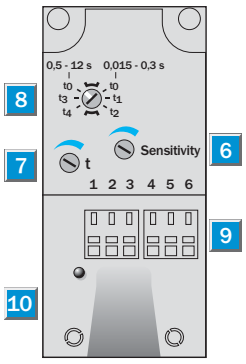
dimensions in mm

Excess gain



Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 LED signal strength indicator
4 M6 threaded mounting hole – 8 mm deep
5 Alignment sight
6 Sensitivity adjustment
7 Time adjustment
8 Time delay selector switch
left: light switching, right: dark switching
9 Terminal strip
10 Status indicator

Switch-selectable time delay

0.5 – 12 s

t_0 without time delay

t_1 ON-delay when object enters detection zone

t_2 OFF-delay when object leaves detection zone

Reflector type		Sensing range
1	OP 60 –∞	1...55.0 m
2	4 x PL 80	0...35.0 m
3	PL 80 A	0...30.0 m
4	P 975	0.1...18.0 m
5	PL 50	0...14.0 m
6	PL 30	0...11.0 m
7	Reflective tape diamond grade	0.3...10.0 m

Order information

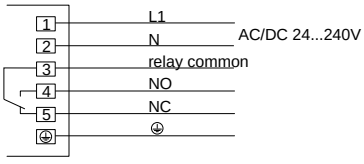
Type	Part no.
WL 45-R250	1 008 841
WL 45-R260	1 008 562
WL 45-R950	1 010 561
WL 45-R960	1 010 562

Accessories	page
Cables and connectors	1180
Reflectors	1256
Special Accessories	1314

Technical data	WL 45-	R250	R260	R950	R960
Sensing range	0...180.4 ft (0...55 m)/OP 60	■	■	■	■
Sensitivity	Adjustable	■	■	■	■
Light source[1], light type	LED, visible red light, polarized	■	■	■	■
Light spot diameter	Approx. 9 in at 52.5 ft (230 mm at 16 m)	■	■	■	■
Supply voltage V_S	24...240 V UC (+ 10%, – 25%)	■	■	■	■
Power consumption	≤ 3 VA		■		■
	≤ 6 VA, front lens heating	■		■	
Switching outputs	Relay, SPDT, isolated[2]	■	■	■	■
Max. switching voltage	AC: 250 V / DC: 120 V	■	■	■	■
Switching current	4 A / 240 V AC or 24 V DC	■	■	■	■
Max. switching capacity	AC: 1000 VA / DC: 1000 W	■	■	■	■
Response time	≤ 20 ms	■	■	■	■
Max. switching frequency[3]	10/s	■	■	■	■
Connection type	PG 13.5 terminal chamber	■	■		
	1/2 in NPSM terminal chamber			■	■
VDE protection class	⏚	■	■	■	■
Circuit protection[4]	A, C	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A[5]	Operation -13...131° F (-25...55° C)	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight	1.8 lb (800 g)	■	■	■	■
Front lens heating		■		■	
Polarizing filter		■	■	■	■
Housing material	Metal	■	■	■	■

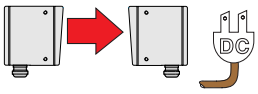
1) Average service life 100,000 h at T_A = 25° C
2) Provide suitable spark suppression for inductive or capacitive loads
3) With light/dark ratio 1:1
4) A = V_S connections reverse-polarity protected
C = Interference pulse suppression
5) Up to 140° C with cooling plates (see Accessories)

Connection diagram



WS/WE 45

Through-beam Sensors





0...1148.3 ft (0...350 m)
sensing range

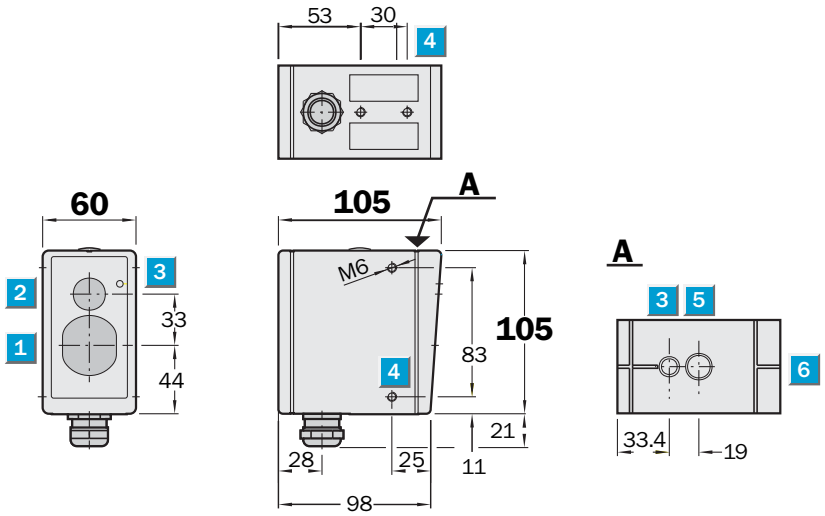
Highlights

- Rugged metal housing
- Selectable time delays
- Sensitivity adjustment
- Alarm output and test input
- Wide range supply voltage
- Optical sight for easy alignment
- Models available with integrated lens heater
- Terminal chamber for connection flexibility

WS/WE 45

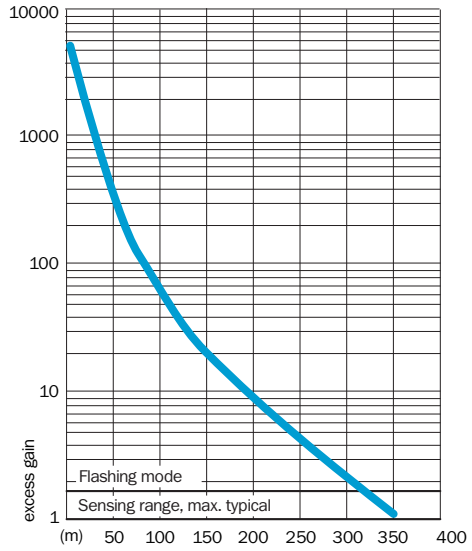


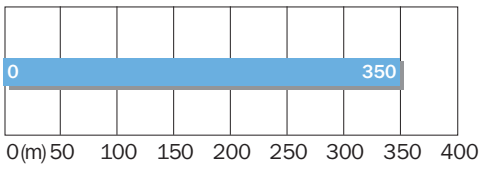
Dimensional drawing



dimensions in mm

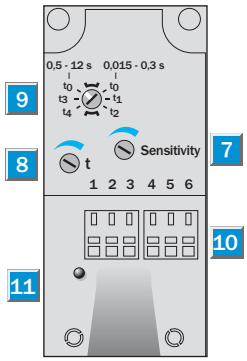
Excess gain





Adjustments

All types



1 Center of optical axis, sender (WS), receiver (WE)
2 View finder lens
3 LED signal strength indicator
4 M6 threaded mounting hole – 8 mm deep
5 Eyepiece for alignment aid
6 Alignment sight
7 Sensitivity adjustment
8 Time adjustment
9 Time delay selector switch
10 Terminal strip
11 Status indicator

Switch-selectable time delay

0.5 – 12 s	0.015 – 0.3 s
t_0 without time delay	t_0 without time delay
t_3 ON-delay when object enters detection zone	t_1 ON-delay when object enters detection zone
t_4 OFF-delay when object leaves detection zone	t_2 OFF-delay when object leaves detection zone

Order information

Type	Part no.
WS/WE 45-P250	1 010 983
WS/WE 45-P260	1 010 985
WS/WE 45-N250	1 010 982
WS/WE 45-N260	1 010 984
WS/WE 45-P950	1 010 991
WS/WE 45-P960	1 010 993
WS/WE 45-N950	1 010 990
WS/WE 45-N960	1 010 992

Accessories	page
Special Accessories	1314

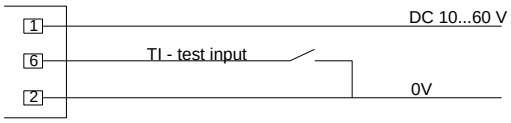
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Technical data	WS/WE 45-	P250	P260	N250	N260	P950	P960	N950	N960
Sensing range	0...1148.3 ft (0...350 m)	■	■	■	■	■	■	■	■
Sensitivity	Adjustable	■	■	■	■	■	■	■	■
Light source[1], **light type**	LED, infrared light	■	■	■	■	■	■	■	■
Light spot diameter	Approx. 14.8 ft at 984.3 ft (4.5 m at 300 m)	■	■	■	■	■	■	■	■
Angle of divergence	Approx. 0.9°	■	■	■	■	■	■	■	■
Supply voltage V_S	10...60 V DC[2]	■	■	■	■	■	■	■	■
Ripple[3]	< 5 V_{SS}	■	■	■	■	■	■	■	■
Current consumption[4]									
sender without heating	≤ 50 mA		■		■		■		■
sender with heating	≤ 250 mA	■		■		■		■	
receiver without heating	≤ 50 mA		■		■		■		■
receiver with heating	≤ 250 mA	■		■		■		■	
Switching outputs	PNP, Q and $\overline{Q}$	■	■			■	■		
	NPN, Q and $\overline{Q}$			■	■			■	■
Output current I_A max.	200 mA	■	■	■	■	■	■	■	■
Response time[5]	≤ 500 µs	■	■	■	■	■	■	■	■
Max. switching frequency[6]	1000 Hz	■	■	■	■	■	■	■	■
Alarm output	Alarm	■	■	■	■	■	■	■	■
Max. output current I_{Alarm}	100 mA, open collector	■	■	■	■	■	■	■	■
Insufficient light received	Flashes at approx. 5/s, switch to V_S	■	■	■	■	■	■	■	■
(Reserve < 50%)									
Test input "TE," sender OFF	PNP: Test input to 0 V	■	■			■	■		
	NPN: Test input to V_S			■	■			■	■
Connection type	PG 13.5 terminal chamber	■	■	■	■				
	1/2 in NPSM terminal chamber					■	■	■	■
VDE protection class	⏚	■	■	■	■	■	■	■	■
Circuit protection[7]	A, B, C	■	■	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)[8]	■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■	■	■
Approximate weight	28 oz (800 g)	■	■	■	■	■	■	■	■
Front lens heating		■		■		■		■	
Housing material	Die cast metal	■	■	■	■	■	■	■	■

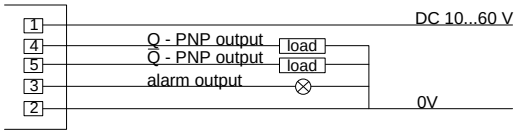
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) A = V_S connections reverse-polarity protected
B = Output Q_N and Q_P short-circuit protected
C = Interference pulse suppression
8) Up to 140° C with cooling plates (see Accessories)

Connection diagram

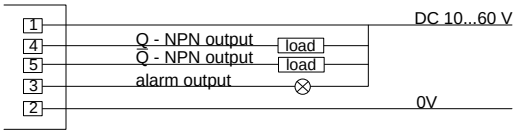
Sender



Receiver, PNP Model

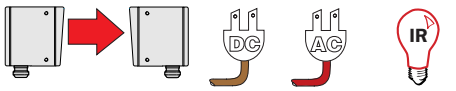


Receiver, NPN Model



WS/WE 45

Through-beam Sensors



0...1148.3 ft (0...350 m)
sensing range

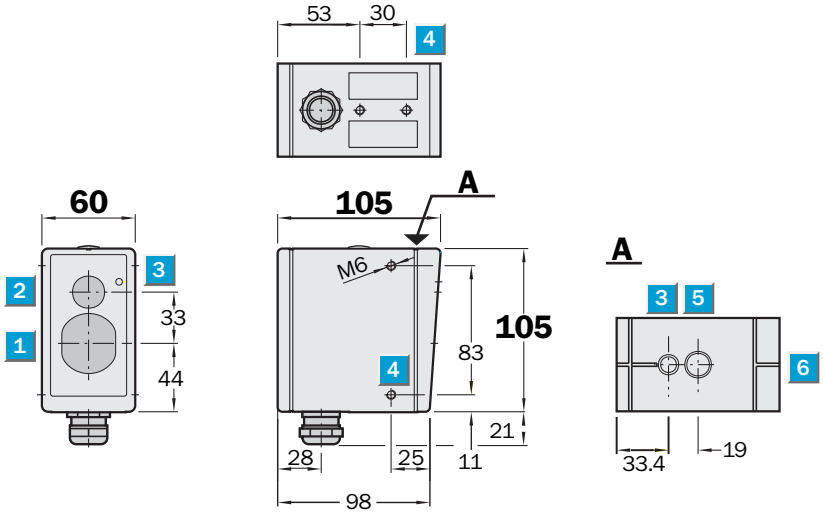
Highlights

- Rugged metal housing
- Signal strength indicator
- Sensitivity adjustment
- Wide range supply voltage
- Selectable time delays
- Terminal chamber for connection flexibility
- Models available with integrated lens heater

WS/WE 45

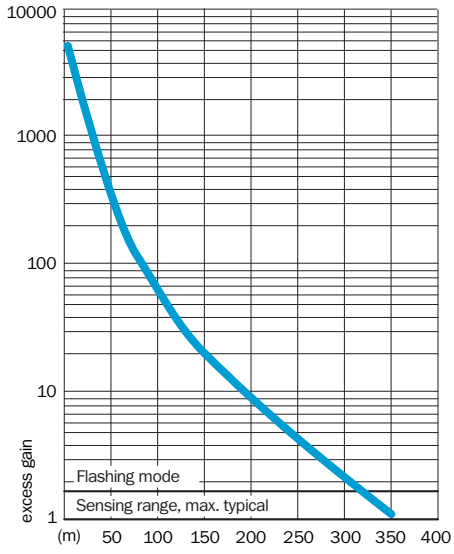


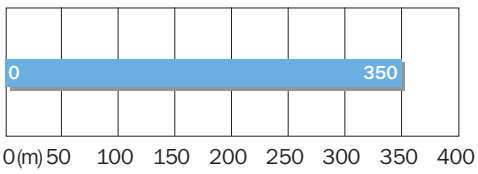
Dimensional drawing



dimensions in mm

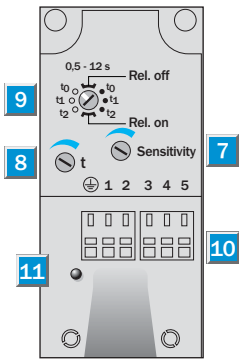
Excess gain





Adjustments

All types



1 Center of optical axis, sender (WS), receiver (WE)
2 View finder lens
3 LED signal strength indicator
4 M6 threaded mounting hole – 8 mm deep
5 Eyepiece for alignment aid
6 Alignment sight
7 Sensitivity adjustment
8 Time adjustment
9 Time delay selector switch
left: light switching, right: dark switching
10 Terminal strip
11 Status indicator

Switch-selectable time delay
0.5 – 12 s
t_0 without time delay
t_1 ON-delay when object enters detection zone
t_2 OFF-delay when object leaves detection zone

Order information

Type	Part no.
WS/WE 45-R250	1 010 994
WS/WE 45-R260	1 010 995
WS/WE 45-R950	1 010 998
WS/WE 45-R960	1 010 999

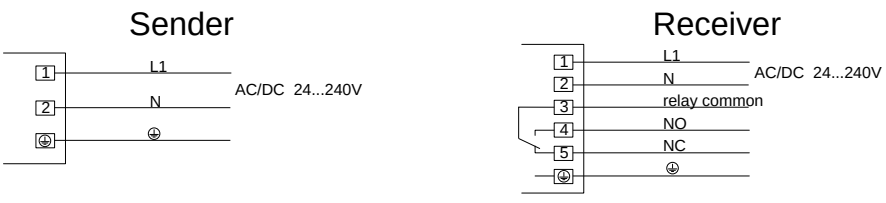
Accessories	page
Special Accessories	1314

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Technical data	WS/WE 45-	R250	R260	R450	R960
Sensing range	0…1148.3 ft (0…350 m)	■	■	■	■
Sensitivity	Adjustable	■	■	■	■
Light source[1], **light type**	LED, infrared light, pulsating	■	■	■	■
Light spot diameter	Approx. 14.8 ft at 984.3 ft (4.5 m at 300 m)	■	■	■	■
Angle of divergence	Approx. 0.9°	■	■	■	■
Supply voltage V_S	24…240 V UC (+ 10%, – 25%)	■	■	■	■
Power consumption					
sender without heating	≤ 3 VA		■		■
sender with heating	≤ 6 VA	■		■	
receiver without heating	≤ 3 VA		■		■
receiver with heating	≤ 6 VA	■		■	
Switching outputs	Relay, SPDT, isolated[2]	■	■	■	■
Max. switching voltage	AC: 250 V / DC: 120 V	■	■	■	■
Switching current	4 A / 240 V AC o. 24 V DC	■	■	■	■
Max. switching capacity	AC: 1000 VA / DC: 100 W	■	■	■	■
Response time	≤ 10 ms	■	■	■	■
Max. switching frequency[3]	10/s	■	■	■	■
Connection type	Terminal chamber PG 13.5	■	■		
	1/2 in NPSM terminal chamber			■	■
VDE protection class	⏚	■	■	■	■
Circuit protection[4]	A, C	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25… 55° C)[5]	■	■	■	■
	Storage -40…158° F (-40… 70° C)	■	■	■	■
Approximate weight	28 oz (800 g)	■	■	■	■
Front lens heating		■		■	
Housing material	Metal	■	■	■	■

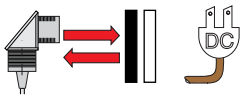
1) Average service life 100,000 h at T_A = 25° C
2) Provide suitable spark suppression for inductive or capacitive loads
3) With light/dark ratio 1:1
4) A = V_S connections reverse-polarity protected
C = Interference pulse suppression
5) Up to 140° C with cooling plates (see Accessories)

Connection diagram



ET 1

Proximity/Diffuse Sensors - Background Suppression



0...2 in (0...50 mm)

sensing range

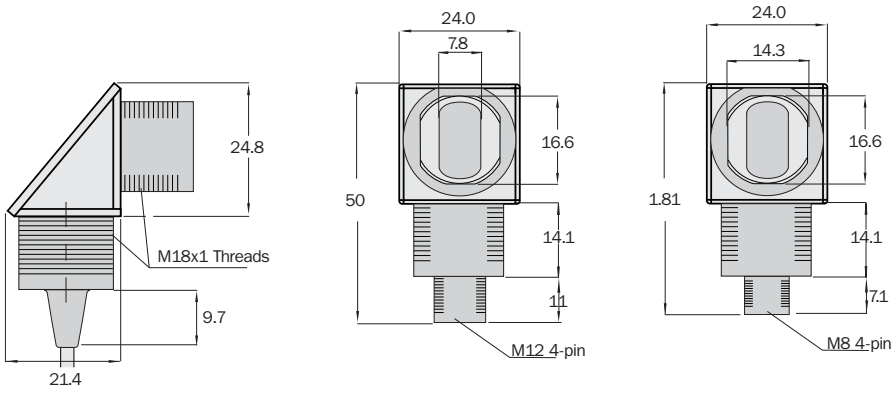
Highlights

- ELF - economical, little, functional
- Extremely compact to fit almost any application
- Universal mounting configuration for simple installation
- Unparalleled optical performance
- Electrical functionality previously available only in large sensors
- Available with M8 or M12 connector or pre-leaded cable

ET 1

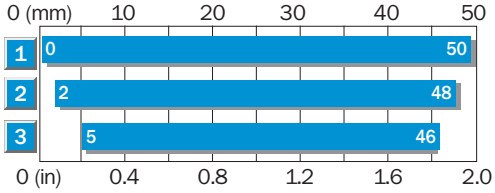


Dimensional drawing



dimensions in mm

Sensing range



1	Sensing range on white, 90% reflectance
2	Sensing range on gray, 18% reflectance
3	Sensing range on black, 6% reflectance

Accessories	page
Cables and connectors	1180
Mounting systems	1234

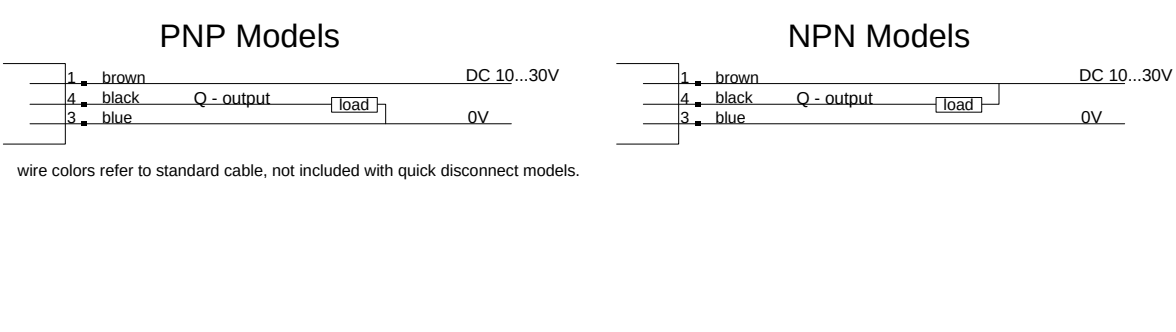
Order information

Type	Part no.
ET 1-P122	7 027 222
ET 1-N122	7 027 223
ET 1-P124	7 027 224
ET 1-N124	7 027 225
ET 1-P127	7 027 276
ET 1-N127	7 027 277

Technical data	ET 1-	P122	N122	P124	N124	P127	N127
Sensing range	0...2 in (0...50 mm)	■	■	■	■	■	■
Light source [1]	LED, infrared light	■	■	■	■	■	■
Light spot	3.1 x 3.1 in at 78.7 in (80 x 80 mm at 2 m)	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC, limit values	■	■	■	■	■	■
Ripple	< 5 V_{SS}, must be within V_S tolerances	■	■	■	■	■	■
Current consumption	< 20 mA, without load	■	■	■	■	■	■
Switching outputs	PNP	■		■		■	
	NPN		■		■		■
	Light operate	■	■	■	■	■	■
	Dark operate						
Output current I_A max.	50 mA	■	■	■	■	■	■
Response time	< 2.5 ms	■	■	■	■	■	■
Switching frequency	200 Hz, programmable up to 700 Hz on request	■	■	■	■	■	■
Connection types	Cable[2], 2 m length; 3 conductor 28 AWG, 2.3 mm O.D.;	■	■				
	Plug, M12 4-pin			■	■		
	Plug, M8 4-pin					■	■
Enclosure rating	IP 54	■	■	■	■	■	■
Ambient temperature	Operation -13...122° F (-25...50° C)	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■
Circuit protection	Reverse polarity protection,	■	■	■	■	■	■
	overload and short-circuit protection	■	■	■	■	■	■
Mounting hardware	Quantity 1, M18 x 1 nut which can be used	■	■	■	■	■	■
	near connector or lens						

1) Average service life 100,000 h at $T_U = 25°C$
2) Do not bend below 0°C

Connection diagram



wire colors refer to standard cable, not included with quick disconnect models.

ET 1

Proximity/Diffuse Sensors - Energetic



0.04...3.9 in (1...100 mm)
sensing range

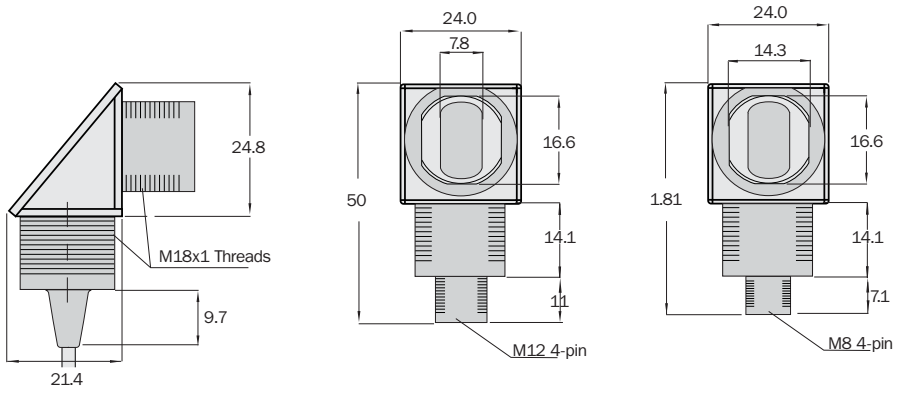
Highlights

- ELF - economical, little, functional
- Extremely compact to fit almost any application
- Universal mounting configuration for simple installation
- Unparalleled optical performance
- Electrical functionality previously available only in large sensors
- Available with M8 or M12 connector or pre-leaded cable

ET 1

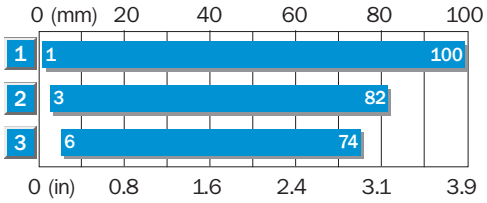


Dimensional drawing



dimensions in mm

Sensing range



1	Sensing range on white, 90% reflectance
2	Sensing range on gray, 18% reflectance
3	Sensing range on black, 6% reflectance

Accessories	page
Cables and connectors	1180
Mounting systems	1234

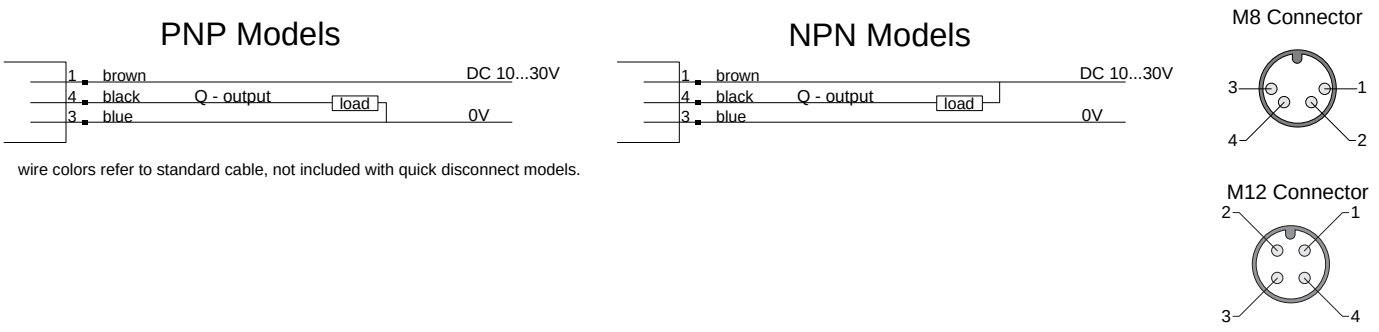
Order information

Type	Part no.
ET 1-P222	7 027 226
ET 1-N222	7 027 227
ET 1-P224	7 027 228
ET 1-N224	7 027 229
ET 1-P227	7 027 278
ET 1-N227	7 027 279

Technical data	ET 1-	P222	N222	P224	N224	P227	N227			
Sensing range	0.04...3.9 in (1...100 mm)									
Light source [1]	LED, infrared									
Light spot	3.1 x 3.1 in at 78.7 in (80 x 80 mm at 2 m)									
Supply voltage V_S	10...30 V DC, limit values									
Ripple	< 5 V_{SS}, must be within V_S tolerances									
Current consumption	< 20 mA, without load									
Switching outputs	PNP									
	NPN									
	Light operate									
	Dark operate									
Output current I_A max.	50 mA									
Response time	< 2.5 ms									
Switching frequency	200 Hz, programmable up to 700 Hz on request									
Connection types	Cable[2], 2 m length; 3 conductor 28 AWG, 2.3 mm O.D.;									
	Plug, M12 4-pin									
	Plug, M8 4-pin									
Enclosure rating	IP 54									
Ambient temperature	Operation -13...122° F (-25...50° C)									
	Storage -40...158° F (-40...70° C)									
Housing material	Glass fiber reinforced ABS									
Circuit protection	Reverse polarity protection,									
	overload and short-circuit protection									
Mounting hardware	Quantity 1, M18 x 1 nut which can be used									
	near connector or lens									

1) Average service life 100,000 h at $T_U = 25°$ C
2) Do not bend below 0° C

Connection diagram



wire colors refer to standard cable, not included with quick disconnect models.

EL 1

Reflex/Retro-Reflective Sensors



0.2...13.1 ft (0.07...4 m)
sensing range

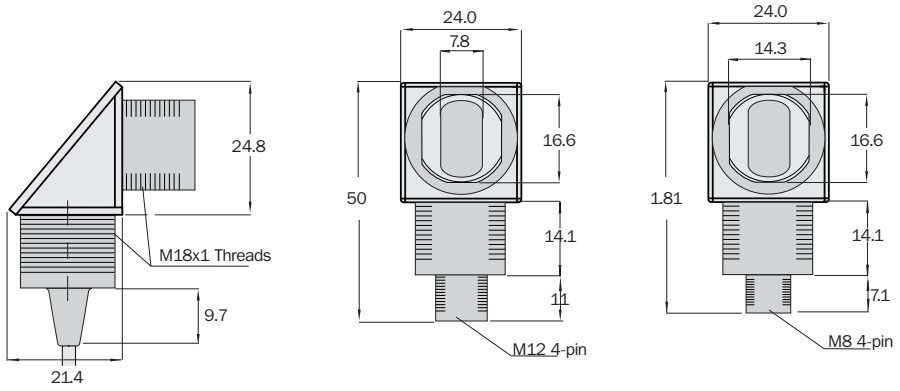
Highlights

- ELF - economical, little, functional
- Extremely compact to fit almost any application
- Universal mounting configuration for simple installation
- Unparalleled optical performance
- Electrical functionality previously available only in large sensors
- Available with M8 or M12 connector or pre-leaded cable

EL 1

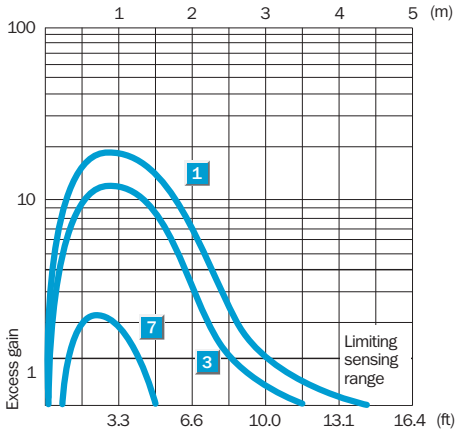


Dimensional drawing



dimensions in mm

Excess gain



	Reflector type	Sensing range
1	PL 80 A	0.07...4.0 m
2	PL 50 A	0.07...2.7 m
3	P250	0.07...3.3 m
4	PL 40 A	0.07...2.4 m
5	PL 30 A	0.07...2.1 m
6	PL 20 A	0.07...1.5 m
7	2000X reflective tape	0.2...1.5 m
	min 50 x 50 mm²	

Order information

Type	Part no.
EL 1-P122	7 027 206
EL 1-F122	7 027 207
EL 1-N122	7 027 208
EL 1-E122	7 027 209
EL 1-P123	7 027 210
EL 1-F123	7 027 211
EL 1-N123	7 027 212
EL 1-E123	7 027 213
EL 1-P124	7 027 214
EL 1-F124	7 027 215
EL 1-N124	7 027 216
EL 1-E124	7 027 217
EL 1-P125	7 027 218
EL 1-F125	7 027 219
EL 1-N125	7 027 220
EL 1-E125	7 027 221
EL 1-P127	7 027 268
EL 1-F127	7 027 269
EL 1-N127	7 027 270
EL 1-E127	7 027 271
EL 1-P128	7 027 272
EL 1-F128	7 027 273
EL 1-N128	7 027 274
EL 1-E128	7 027 275

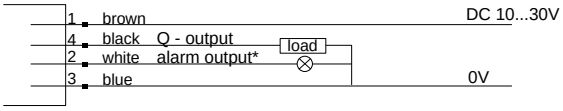
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Technical data	EL 1-	P122	F122	N122	E122	P123	F123	N123	E123
Sensing range	0.2...13.1 ft (0.07...4 m)	■	■	■	■	■	■	■	■
Light source[1]	LED, red light, polarized	■	■	■	■	■	■	■	■
Light spot	3.1 x 3.1 in at 78.7 in (80 x 80 mm at 2 m);	■	■	■	■				
	w/ alarm 4.7 x 4.7 in at 78.7 in (120 x 120 mm at 2 m)					■	■	■	■
Supply voltage V_S	10...30 V DC, limit values	■	■	■	■	■	■	■	■
Ripple	< 5 V_{SS}, must be within V_S tolerances	■	■	■	■	■	■	■	■
Current consumption	< 20 mA, without load	■	■	■	■	■	■	■	■
Switching outputs	PNP	■	■			■	■		
	NPN			■	■			■	■
	Alarm					■	■	■	■
	Light operate	■		■		■		■	
	Dark operate		■		■		■		■
Output current I_A max.	50 mA	■	■	■	■	■	■	■	■
Response time	< 2.5 ms	■	■	■	■	■	■	■	■
Switching frequency	200 Hz, programmable up to 700 Hz on request	■	■	■	■	■	■	■	■
Connection types	Cable[2], 2 m length; 3 conductor 28 AWG, 2.3 mm O.D.;	■	■	■	■				
	Cable[2], with alarm 4 conductor 28 AWG, 2.7 mm O.D.					■	■	■	■
Enclosure rating	IP 54	■	■	■	■	■	■	■	■
Ambient temperature	Operation -13...122° F (-25...50° C)	■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■	■	■
Circuit protection	Reverse polarity protection,	■	■	■	■	■	■	■	■
	overload and short-circuit protection	■	■	■	■	■	■	■	■
Mounting hardware	Quantity 1, M18 x 1 nut which can be	■	■	■	■	■	■	■	■
	used near connector or lens								

1) Average service life 100,000 h at $T_U = 25°$ C
2) Do not bend below 0° C

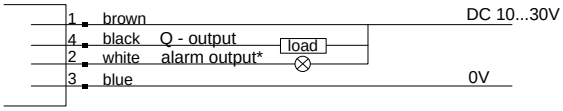
Connection diagram

PNP Models



wire colors refer to standard cable, not included with quick disconnect models

NPN Models



*available on models with alarm function

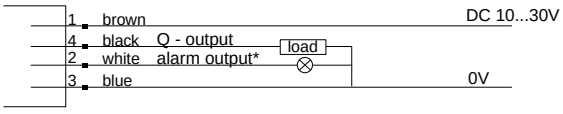
EL 1

Technical data	EL 1-	P124	F124	N124	E124	P125	F125	N125	E125
Sensing range	0.2...13.1 ft (0.07...4 m)	■	■	■	■	■	■	■	■
Light source [1]	LED, red light, polarized	■	■	■	■	■	■	■	■
Light spot	3.1 x 3.1 in at 78.7 in (80 x 80 mm at 2 m);	■	■	■	■				
	w/ alarm 4.7 x 4.7 in at 78.7 in (120 x 120 mm at 2 m)					■	■	■	■
Supply voltage V_S	10...30 V DC, limit values	■	■	■	■	■	■	■	■
Ripple	< 5 V_{SS}, must be within V_S tolerances	■	■	■	■	■	■	■	■
Current consumption	< 20 mA, without load	■	■	■	■	■	■	■	■
Switching outputs	PNP	■	■			■	■		
	NPN			■	■			■	■
	Alarm					■	■	■	■
	Light operate	■		■		■		■	
	Dark operate		■		■		■		■
Output current I_A max.	50 mA	■	■	■	■	■	■	■	■
Response time	< 2.5 ms	■	■	■	■	■	■	■	■
Switching frequency	200 Hz, programmable up to 700 Hz on request	■	■	■	■	■	■	■	■
Connection type	Plug, M12 4-pin	■	■	■	■	■	■	■	■
Enclosure rating	IP 54	■	■	■	■	■	■	■	■
Ambient temperature	Operation -13...122° F (-25...50° C)	■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■	■	■
Circuit protection	Reverse polarity protection,	■	■	■	■	■	■	■	■
	overload and short-circuit protection	■	■	■	■	■	■	■	■
Mounting hardware	Quantity 1, M18 x 1 nut which can be	■	■	■	■	■	■	■	■
	used near connector or lens								

1) Average service life 100,000 h
at T_U = 25° C

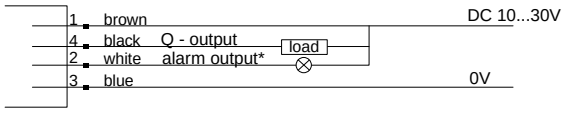
Connection diagram

PNP Models



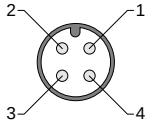
wire colors refer to standard cable, not included with quick disconnect models

NPN Models



*available on models with alarm function

M12 Connector

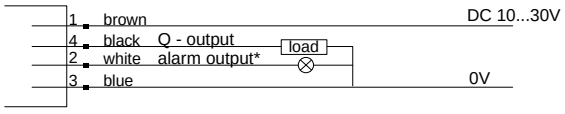


Technical data	EL 1-	P127	F127	N127	E127	P128	F128	N128	E128
Sensing range	0.2...13.1 ft (0.07...4 m)	■	■	■	■	■	■	■	■
Light source [1]	LED, red light, polarized	■	■	■	■	■	■	■	■
Light spot	3.1 x 3.1 in at 78.7 in (80 x 80 mm at 2 m);	■	■	■	■				
	w/ alarm 4.7 x 4.7 in at 78.7 in (120 x 120 mm at 2 m)					■	■	■	■
Supply voltage V_S	10...30 V DC, limit values	■	■	■	■	■	■	■	■
Ripple	< 5 V_{SS}, must be within V_S tolerances	■	■	■	■	■	■	■	■
Current consumption	< 20 mA, without load	■	■	■	■	■	■	■	■
Switching outputs	PNP	■	■			■	■		
	NPN			■	■			■	■
	Alarm					■	■	■	■
	Light operate	■		■		■		■	
	Dark operate		■		■		■		■
Output current I_A max.	50 mA	■	■	■	■	■	■	■	■
Response time	< 2.5 ms	■	■	■	■	■	■	■	■
Switching frequency	200 Hz, programmable up to 700 Hz on request	■	■	■	■	■	■	■	■
Connection type	Plug, M8 4-pin	■	■	■	■	■	■	■	■
Enclosure rating	Housing IP 54	■	■	■	■	■	■	■	■
Ambient temperature	Operation -13...122° F (-25...50° C)	■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■	■	■
Circuit protection	Reverse polarity protection,	■	■	■	■	■	■	■	■
	overload and short-circuit protection	■	■	■	■	■	■	■	■
Mounting hardware	Quantity 1, M18 x 1 nut which can be	■	■	■	■	■	■	■	■
	used near connector or lens								

1) Average service life 100,000 h at $T_U = 25°$ C

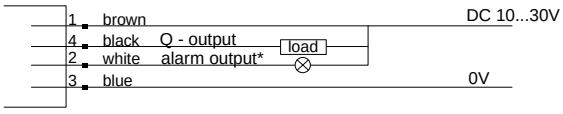
Connection diagram

PNP Models



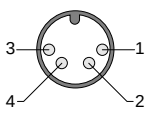
wire colors refer to standard cable, not included with quick disconnect models

NPN Models



*available on models with alarm function

M8 Connector



EL 2 Wash-Down

Reflex/Retro-Reflective Sensors



0.2...10.5 ft (0.07...3.0 m)
sensing range

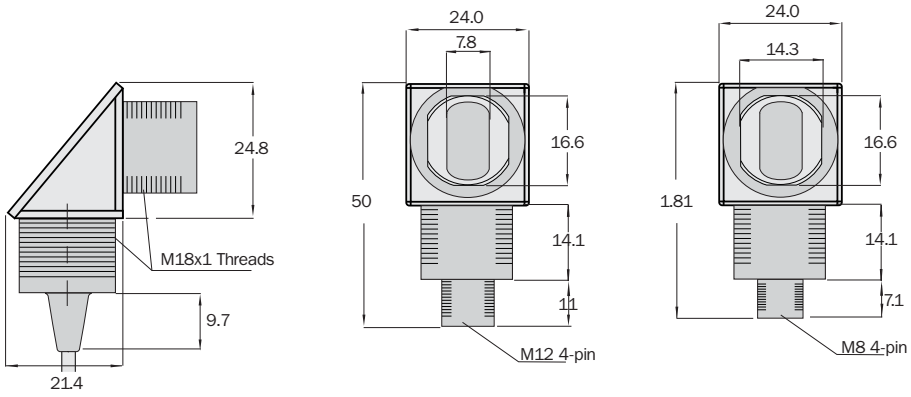
Highlights

- ELF - economical, little, functional
- IP 67 rated for wash-down applications
- Extremely compact to fit almost any application
- Universal mounting configuration for simple installation
- Unparalleled optical performance
- Electrical functionality previously available only in large sensors
- Available with M8 or M12 connector or pre-leaded cable

EL 2

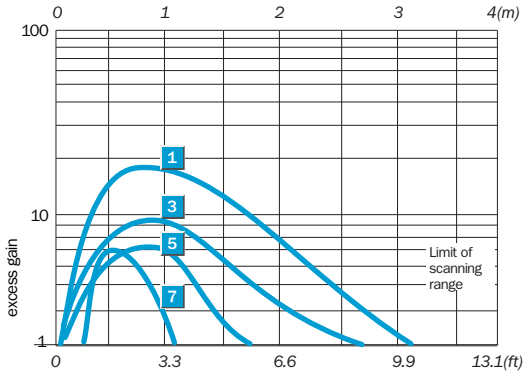


Dimensional drawing



dimensions in mm

Excess gain



Reflector type		Sensing range
1	PL80 A	0.07...3.0 m
2	PL50 A	0.07...2.0 m
3	P250	0.07...2.6 m
4	PL40 A	0.07...1.9 m
5	PL30 A	0.07...1.6 m
6	PL20 A	0.07...1.5 m
7	2000X reflective tape	0.2...1.0 m
	min 50 x 50 mm²	

Order information

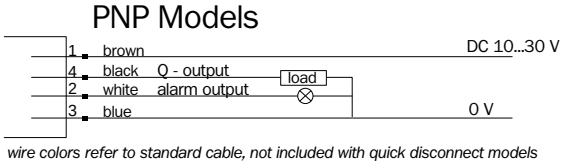
Type	Part no.
EL 2-P122	7 028 618
EL 2-F122	7 028 619
EL 2-N122	7 028 620
EL 2-E122	7 028 621
EL 2-P123	7 028 622
EL 2-F123	7 028 623
EL 2-N123	7 028 624
EL 2-E123	7 028 625
EL 2-P124	7 028 626
EL 2-F124	7 028 627
EL 2-N124	7 028 628
EL 2-E124	7 028 629
EL 2-P125	7 028 630
EL 2-F125	7 028 631
EL 2-N125	7 028 632
EL 2-E125	7 028 633
EL 2-P127	7 028 634
EL 2-F127	7 028 635
EL 2-N127	7 028 636
EL 2-E127	7 028 637
EL 2-P128	7 028 638
EL 2-F128	7 028 639
EL 2-N128	7 028 640
EL 2-E128	7 028 641

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

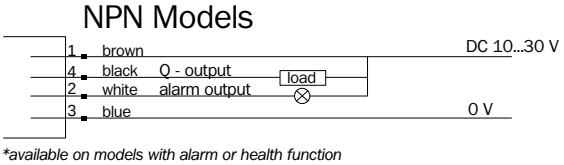
Technical data	EL 2-	P122	F122	N122	E122	P123	F123	N123	E123
Sensing range	0.2...10 ft (0.07...3.0 m)	■	■	■	■	■	■	■	■
Light source [1]	LED, red light, polarized	■	■	■	■	■	■	■	■
Light spot	3.1 x 3.1 in at 78.7 in (80 x 80 mm at 2 m);	■	■	■	■				
	w/ alarm 4.7 x 4.7 in at 78.7 in (120 x 120 mm at 2 m)					■	■	■	■
Supply voltage V_S	10...30 V DC, limit values	■	■	■	■	■	■	■	■
Ripple	< 5 V_{SS}, must be within V_S tolerances	■	■	■	■	■	■	■	■
Current consumption	< 20 mA, without load	■	■	■	■	■	■	■	■
Switching outputs	PNP	■	■			■	■		
	NPN			■	■			■	■
	Alarm [3]					■	■	■	■
	Light operate	■		■		■		■	
	Dark operate		■		■		■		■
Output current I_A max.	50 mA	■	■	■	■	■	■	■	■
Response time	< 2.5 ms	■	■	■	■	■	■	■	■
Switching frequency	200 Hz, programmable up to 700 Hz on request	■	■	■	■	■	■	■	■
Connection types	Cable [2], 2 m length; 3 conductor 28 AWG, 2.3 mm O.D.;	■	■	■	■				
	Cable [2], with alarm 4 conductor 28 AWG, 2.7 mm O.D.					■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■
Ambient temperature	Operation -13...122° F (-25...50° C)	■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■	■	■
Housing material	Body, glass fiber reinforced ABS; front window, acrylic	■	■	■	■	■	■	■	■
Circuit protection	Reverse polarity protection,	■	■	■	■	■	■	■	■
	overload and short-circuit protection								
Mounting hardware	Quantity 1, M18 x 1 nut which can be	■	■	■	■	■	■	■	■
	used near connector or lens; 15 ft•lb typical								

1) Average service life 100,000 h at $T_A = 25°$ C
2) Do not bend below 0° C
3) Inverted alarm (health) available

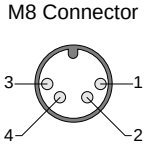
Connection diagram

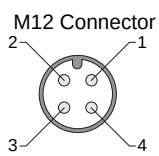


wire colors refer to standard cable, not included with quick disconnect models



**available on models with alarm or health function*

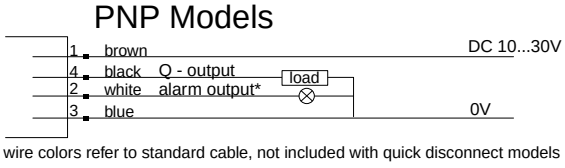




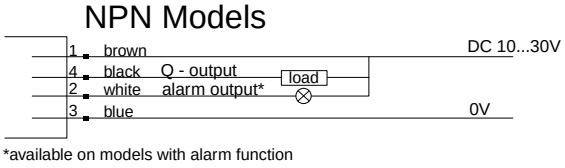
Technical data	EL 2-	P124	F124	N124	E124	P125	F125	N125	E125
Sensing range	0.2...10 ft (0.07...3.0 m)	■	■	■	■	■	■	■	■
Light source [1]	LED, red light, polarized	■	■	■	■	■	■	■	■
Light spot	3.1 x 3.1 in at 78.7 in (80 x 80 mm at 2 m);	■	■	■	■				
	w/ alarm 4.7 x 4.7 in at 78.7 in (120 x 120 mm at 2 m)					■	■	■	■
Supply voltage V_S	10...30 V DC, limit values	■	■	■	■	■	■	■	■
Ripple	< 5 V_{SS}, must be within V_S tolerances	■	■	■	■	■	■	■	■
Current consumption	< 20 mA, without load	■	■	■	■	■	■	■	■
Switching outputs	PNP	■	■			■	■		
	NPN			■	■			■	■
	Alarm [2]					■	■	■	■
	Light operate	■		■		■		■	
	Dark operate		■		■		■		■
Output current I_A max.	50 mA	■	■	■	■	■	■	■	■
Response time	< 2.5 ms	■	■	■	■	■	■	■	■
Switching frequency	200 Hz, programmable up to 700 Hz on request	■	■	■	■	■	■	■	■
Connection type	Plug, M12 4-pin	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■
Ambient temperature	Operation -13...122° F (-25...50° C)	■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■	■	■
Housing material	Body, glass fiber reinforced ABS; front window, acrylic	■	■	■	■	■	■	■	■
Circuit protection	Reverse polarity protection,	■	■	■	■	■	■	■	■
	overload and short-circuit protection								
Mounting hardware	Quantity 1, M18 x 1 nut which can be	■	■	■	■	■	■	■	■
	used near connector or lens; 15 ft•lb typical								

1) Average service life 100,000 h at $T_U = 25°$ C
2) Inverted alarm (health) available

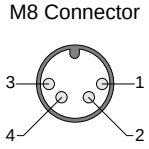
Connection diagram

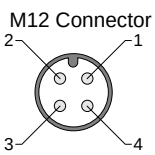


wire colors refer to standard cable, not included with quick disconnect models



*available on models with alarm function



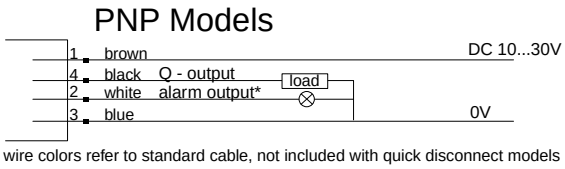


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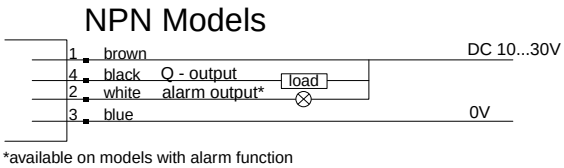
Technical data	EL 2-	P127	F127	N127	E127	P128	F128	N128	E128
Sensing range	0.2...10 ft (0.07...3.0 m)	■	■	■	■	■	■	■	■
Light source [1]	LED, red light, polarized	■	■	■	■	■	■	■	■
Light spot	3.1 x 3.1 in at 78.7 in (80 x 80 mm at 2 m);	■	■	■	■				
	w/ alarm 4.7 x 4.7 in at 78.7 in (120 x 120 mm at 2 m)					■	■	■	■
Supply voltage V_S	10...30 V DC, limit values	■	■	■	■	■	■	■	■
Ripple	< 5 V_{SS}, must be within V_S tolerances	■	■	■	■	■	■	■	■
Current consumption	< 20 mA, without load	■	■	■	■	■	■	■	■
Switching outputs	PNP	■	■			■	■		
	NPN			■	■			■	■
	Alarm [2]					■	■	■	■
	Light operate	■		■		■		■	
	Dark operate		■		■		■		■
Output current I_A max.	50 mA	■	■	■	■	■	■	■	■
Response time	< 2.5 ms	■	■	■	■	■	■	■	■
Switching frequency	200 Hz, programmable up to 700 Hz on request	■	■	■	■	■	■	■	■
Connection type	M8 4-pin	■	■	■	■	■	■	■	■
Enclosure rating	Housing IP 67	■	■	■	■	■	■	■	■
Ambient temperature	Operation -13...122° F (-25...50° C)	■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■	■	■
Housing material	Body, glass fiber reinforced ABS; front window, acrylic	■	■	■	■	■	■	■	■
Circuit protection	Reverse polarity protection,	■	■	■	■	■	■	■	■
	overload and short-circuit protection	■	■	■	■	■	■	■	■
Mounting hardware	Quantity 1, M18 x 1 nut which can be	■	■	■	■	■	■	■	■
	used near connector or lens; 15 ft•lb typical								

1) Average service life 100,000 h at $T_U = 25°$ C
2) Inverted alarm (health) available

Connection diagram

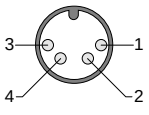


wire colors refer to standard cable, not included with quick disconnect models

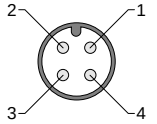


*available on models with alarm function

M8 Connector

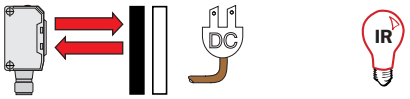


M12 Connector



ET 2 Wash-Down

Proximity/Diffuse Sensors - Background Suppression



0...2 in (0...50 mm)

sensing range

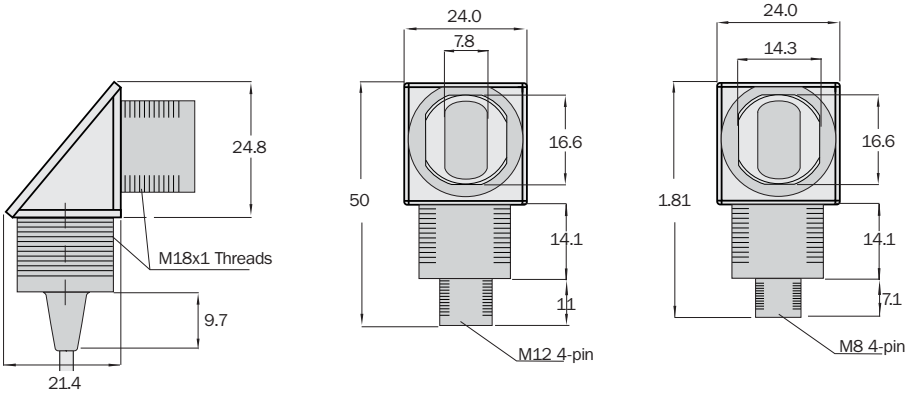
Highlights

- ELF - economical, little, functional
- IP 67 rated for wash-down applications
- Extremely compact to fit almost any application
- Universal mounting configuration for simple installation
- Unparalleled optical performance
- Electrical functionality previously available only in large sensors
- Available with M8 or M12 connector or pre-leaded cable

ET 2

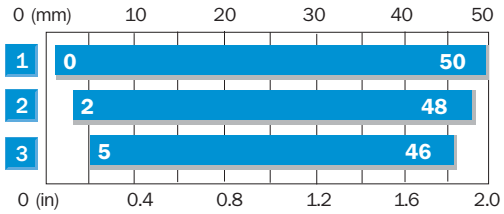


Dimensional drawing



dimensions in mm

Sensing range



1	Sensing range on white , 90% reflectance
2	Sensing range on gray , 18% reflectance
3	Sensing range on black , 6% reflectance

Accessories	page
Cables and connectors	1180
Mounting systems	1234

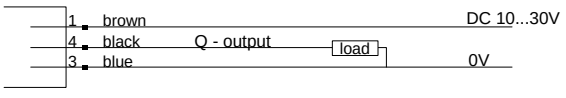
Order information

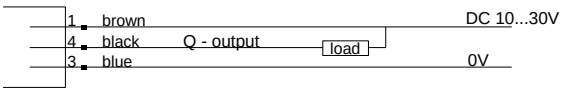
Type	Part no.
ET 2-P122	7 028 642
ET 2-N122	7 028 643
ET 2-E122	7 028 644
ET 2-P124	7 028 645
ET 2-N124	7 028 646
ET 2-E124	7 028 983
ET 2-P127	7 028 647
ET 2-N127	7 028 648
ET 2-E127	7 028 984

Technical data	ET 2-	P122	N122	E122	P124	N124	E124	P127	N127	E127
Sensing range	0…2 in (0…50 mm)	■	■	■	■	■	■	■	■	■
Light source[1]	LED, infrared light	■	■	■	■	■	■	■	■	■
Light spot	3.1 x 3.1 in at 78.7 in (80 x 80 mm at 2 m);	■	■	■	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC, limit values	■	■	■	■	■	■	■	■	■
Ripple	< 5 V_{SS}, must be within V_S tolerances	■	■	■	■	■	■	■	■	■
Current consumption	< 20 mA, without load	■	■	■	■	■	■	■	■	■
Switching outputs	PNP	■			■			■		
	NPN		■	■		■	■		■	■
	Light operate	■	■		■	■		■	■	
	Dark operate			■			■			■
Output current I_A max.	50 mA	■	■	■	■	■	■	■	■	■
Response time	< 2.5 ms	■	■	■	■	■	■	■	■	■
Switching frequency	200 Hz, programmable up to 700 Hz on request	■	■	■	■	■	■	■	■	■
Connection type										
Cable[2]	2 m length; 3 conductor 28 AWG, 2.3 mm O.D.;	■	■	■						
Connector	M12 4-pin				■	■	■			
	M8 4-pin							■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■	■
Ambient temperature	Operation -13...122° F (-25...50° C)	■	■	■	■	■	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■	■	■	■	■	■
Housing material	Body, glass fiber reinforced ABS; front window, acrylic	■	■	■	■	■	■	■	■	■
Circuit protection	Reverse polarity protection,	■	■	■	■	■	■	■	■	■
	overload and short-circuit protection									
Mounting hardware	Quantity 1, M18 x 1 nut which can be	■	■	■	■	■	■	■	■	■
	used near connector or lens; 15 ft•lb typical									

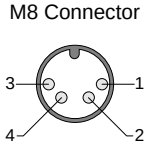
1) Average service life 100,000 h at $T_U = 25°$ C
2) Do not bend below 0° C

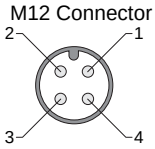
Connection diagram





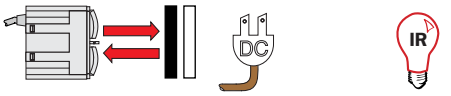
wire colors refer to standard cable, not included with quick disconnect models.





MHT 1 50 mm

Proximity/Diffuse Sensors - Background Suppression



0...2.0 in (0...50 mm)
sensing range

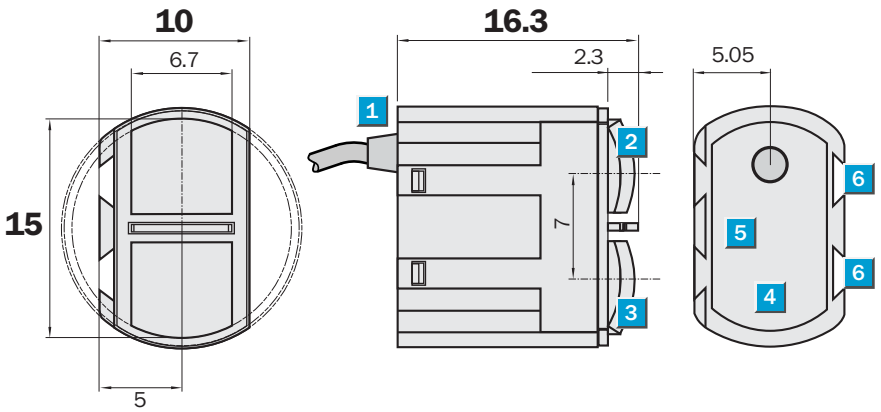
Highlights

- Excellent price/performance ratio due to an optical ASIC
- Can be mounted quickly and reliably using a snap holder
- Sensors are stackable
- Mounting via dovetail
- PNP or NPN output

MHT 1



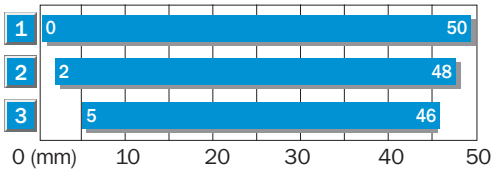
Dimensional drawing



dimensions in mm

1	Connection cable 2 m, 3 x 0.25 mm²
2	Optical axis, sender
3	Optical axis, receiver
4	LED function indicator
5	Translucent back
6	Mounting slots

Sensing range



1	Sensing range on white, 90% reflectance
2	Sensing range on gray, 18% reflectance
3	Sensing range on black, 6% reflectance

Accessories	page
Mounting systems	1234

Order information

Type	Part no.
MHT 1-P122	1 016 051
MHT 1-N122	1 019 707

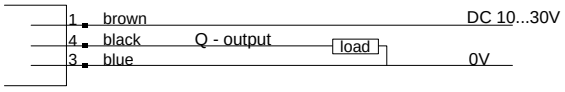
7028071 - © 2008 SICK, Inc.

Technical data	MHT 1-	P122	N122							
Sensing range	0…2.0 in (0…50 mm)									
Light source[1]	LED, infrared light									
Supply voltage V_S[2]	10…30 V DC									
Ripple[3]	< 5 V_{SS} within U_V									
Current consumption[4]	< 20 mA									
Switching outputs	PNP									
	NPN									
	Light switching									
Output current I_A max.	50 mA									
Response time	< 2.5 ms									
Switching frequency[5]	200 Hz									
Connection type[6]	Cable, 2 m									
Enclosure rating	IP 40									
Ambient temperature	Operation -13…122° F (-25…50° C)									
	Storage -40…158° F (-40…70° C)									
Housing material	Glass fiber reinforced ABS									

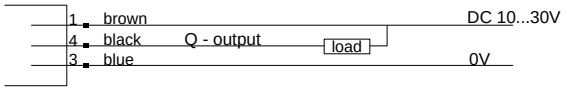
1) Average service life 100,000 h at $T_U = 25°C$
2) Limit values
3) Must be within V_S tolerances
4) Without load
5) Programmable up to 700/s on request
6) Do not bend below 0° C

Connection diagram

PNP Models



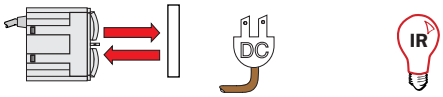
NPN Models



wire colors refer to standard cable, not included with quick disconnect models.

MHT 1 100 mm

Proximity/Diffuse Sensors – Energetic



0.04...3.9 in (1...100 mm)
sensing range

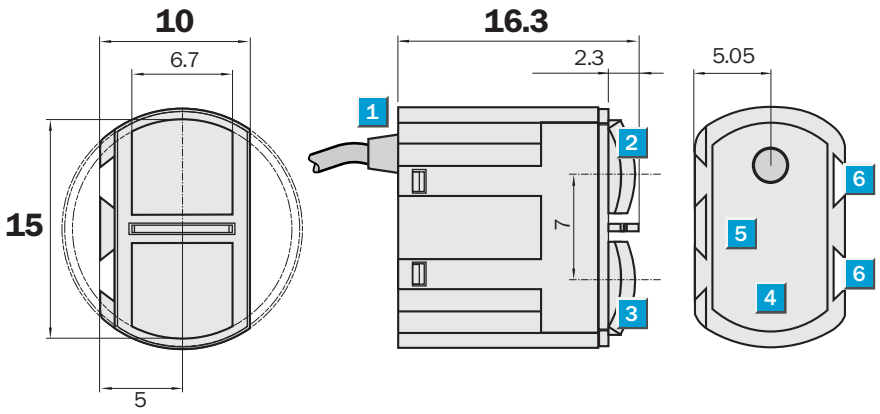
Highlights

- Excellent price/performance ratio thanks to an optical ASIC
- Can be mounted quickly and reliably using a snap holder
- Sensors are stackable
- Mounting via dovetail
- PNP or NPN output

MHT 1



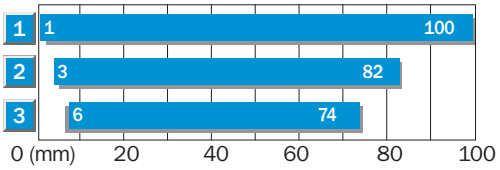
Dimensional drawing



dimensions in mm

1 Connection cable 2 m, 3 x 0.25 mm²
2 Optical axis, sender
3 Optical axis, receiver
4 LED function indicator
5 Translucent back
6 Mounting slots

Sensing range



1 Sensing range on white, 90% reflectance
2 Sensing range on gray, 18% reflectance
3 Sensing range on black, 6% reflectance

Accessories	page
Mounting systems	1234

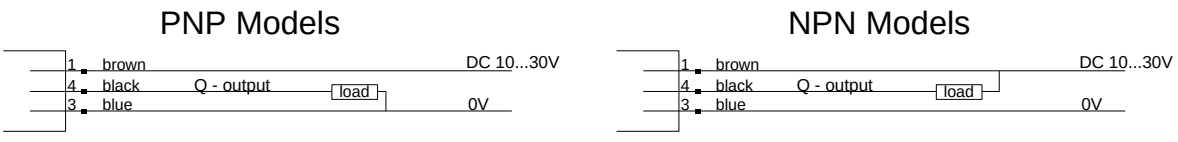
Order Information

Type	Part no.
MHT 1-P222	1 019 706
MHT 1-N222	1 019 708

Technical data	MHT 1-	P222	N222							
Sensing range	0.04…3.9 in (1…100 mm)									
Light source[1]	LED, infrared light									
Supply voltage V_S[2]	10…30 V DC									
Ripple[3]	< 5 V_{SS} within U_V									
Current consumption[4]	< 20 mA									
Switching outputs	PNP									
	NPN									
	Light switching									
Output current I_A max.	50 mA									
Response time	< 2.5 ms									
Switching frequency[5]	200 Hz									
Type of connection[6]	Cable, 2 m									
Enclosure rating	Housing IP 40									
Ambient temperature	Operation -13…122° F (-25…50° C)									
	Storage -40…158° F (-40…70° C)									
Housing material	Glass fiber reinforced ABS									

1) Average service life 100,000 h at $T_U = 25°$ C
2) Limit values
3) Must be within V_S tolerances
4) Without load
5) Programmable up to 700/s on request
6) Do not bend below 0° C

Connection diagram



MHL 1

Reflex/Retro-Reflective Sensors



0...13.1 ft (0...4 m)
sensing range

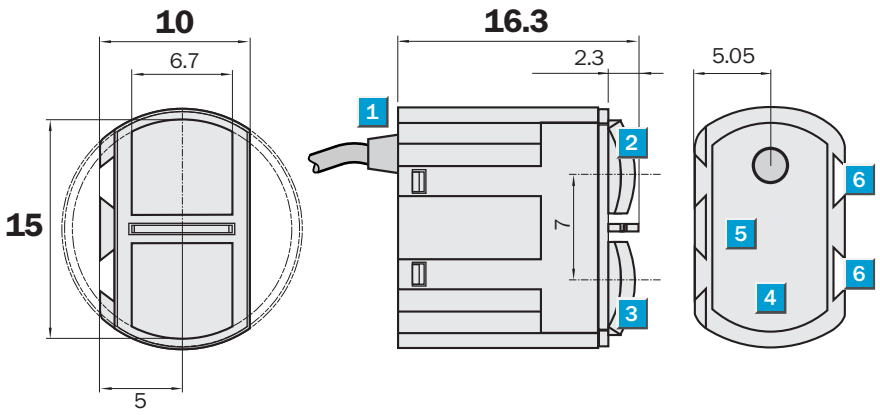
Highlights

- With polarization filter
- Excellent price/performance ratio
- Mounting via dovetail
- Can be mounted quickly and reliably using a snap holder
- PNP or NPN output
- Stackable sensors
- Red light for easy alignment

MHL 1



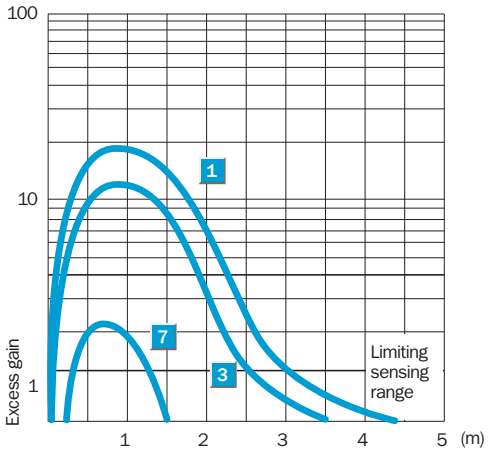
Dimensional drawing



dimensions in mm

1 Connection cable 2 m, 3 x 0.25 mm²
2 Optical axis, sender
3 Optical axis, receiver
4 LED output indicator
5 Translucent back
6 Mounting slots

Excess gain



Accessories	page
Mounting systems	1234
Reflectors	1256

	Reflector type	Sensing range
1	PL 80 A	0.07...4.0 m
2	PL 50 A	0.07...2.7 m
3	PL 250	0.07...3.3 m
4	PL 40 A	0.07...2.4 m
5	PL 30 A	0.07...2.1 m
6	PL 20 A	0.07...1.5 m
7	Reflective tape diamond grade*	0.2...1.5 m

* size min. 50 x 50 mm²

Order information	
Type	**Part no.**
MHL 1-P122	1 019 709
MHL 1-F122	1 019 845
MHL 1-N122	1 019 710
MHL 1-E122	1 019 846
MHL 1-P122S07	1 025 344
MHL 1-F122S01	1 023 616
MHL 1-N122S05	1 025 343
MHL 1-E122S02	1 023 617

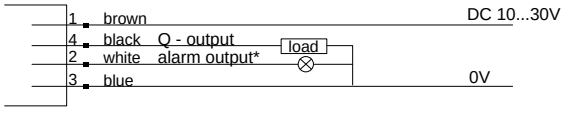
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Technical data	MHL 1-	P122	F122	N122	E122	P122S07	F122S01	N122S05	E122S02
Sensing range	0…13.1 ft (0…4 m) / PL 80 A	■	■	■	■	■	■	■	■
Light source [1]	LED, red light, polarized	■	■	■	■	■	■	■	■
Light spot	3.1 x 3.1 in at 78.7 in (80 x 80 mm at 2000 mm)	■	■	■	■	■	■	■	■
Supply voltage V_S [2]	10…30 V DC	■	■	■	■	■	■	■	■
Ripple [3]	< 5 V_{SS}	■	■	■	■	■	■	■	■
Current consumption [4]	< 20 mA	■	■	■	■	■	■	■	■
Switching outputs	PNP	■	■			■	■		
	NPN			■	■			■	■
	Light switching	■		■		■		■	
	Dark switching		■		■		■		■
Output current I_A max.	50 mA	■	■	■	■	■	■	■	■
Response time	< 2.5 ms	■	■	■	■	■	■	■	■
Switching frequency [5]	200 Hz	■	■	■	■	■	■	■	■
Connection type [6]	Cable [2], 2 m length; 3 conductor 28 AWG, 2.3 mm O.D.;	■	■	■	■				
	Cable [2], with alarm 4 conductor 28 AWG, 2.7 mm O.D.					■	■	■	■
Enclosure rating	IP 40	■	■	■	■	■	■	■	■
Ambient temperature	Operation -13…122° F (-25…50° C)	■	■	■	■	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■	■	■

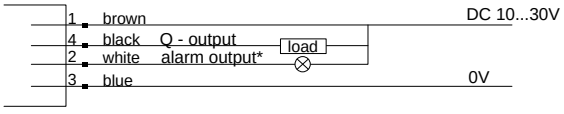
1) Average service life 100,000 h at $T_U = 25°$ C
2) Limit values
3) Must be within V_S tolerances
4) Without load
5) Programmable up to 700/s on request
6) Do not bend below 0° C

Connection diagram

PNP Models



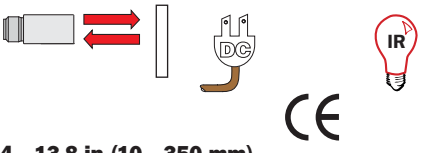
NPN Models



*available on models with alarm function

MHT15

Proximity Diffuse Sensors - Energetic



0.4...13.8 in (10...350 mm)
sensing distance

Class 2
LISTED 87LL

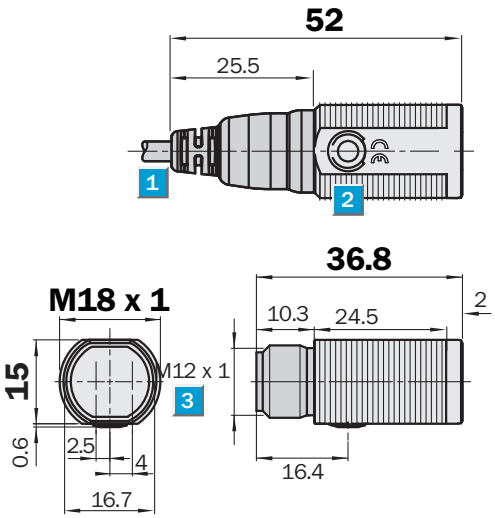
Highlights

- Long sensing range
- Adjustable sensitivity
- Indicator LED shows output and operating reserve
- Straight optic axis
- Mounting accessories included - M18 nuts and patented snap ring

MHT15

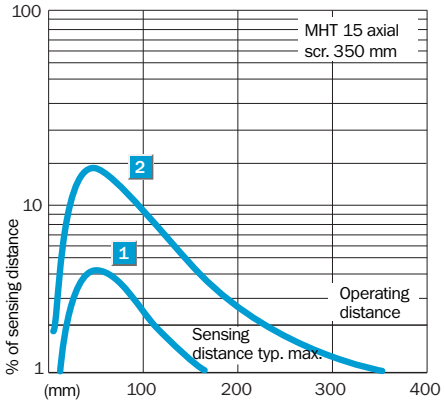


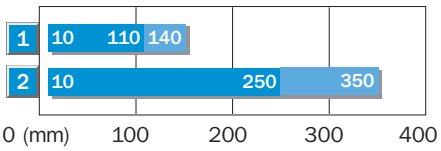
Dimensional drawing



dimensions in mm

Sensing distance

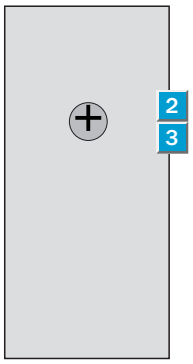




1 Sensing range on gray, 18% remission
2 Sensing range on white, 90% remission

Adjustments

All types



1 Connector cable 2 m
2 Sensitivity control 270°
3 Yellow LED indicator,
-lights continuously:
Light reception > reserve factor 1.3
-blinks:
Light reception < reserve factor 1.3,
but light reception > switching threshold 1
4 M12 plug, 3-pin

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
MHT15-N2247	1026106
MHT15-N3247	1026107
MHT15-N2347	1026108
MHT15-N3347	1026109
MHT15-P2247	1026110
MHT15-P3247	1026111
MHT15-P2347	1026112
MHT15-P3347	1026113

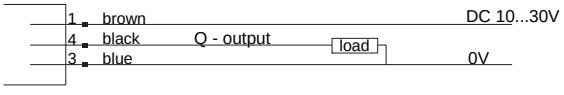
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Technical data	MHT15	P2247	P3247	P2347	P3347	N2247	N3247	N2347	N3347
Sensing range SD, typ. max.[1]	0.4…13.8 in (10…350 mm)								
Operating range SD[1]	0.4…9.8 in (10…250 mm)								
Light spot diameter	Approx. 1.9 in at 13.8 in (50 mm at 350 mm)								
Angle of dispersion sender	Approx. 4.5°								
Light source[2], **light type**	LED infrared, 950 nm								
Optical axis	Axial								
Sensitivity adjustable	Potentiometer 270°								
Light reception indicator	Yellow LED: lights continuously:								
	Reserve factor > 1.3								
	Blinks: reserve factor > 1.0…< 1.3								
Supply voltage V_S	10…30 V DC[3]								
Residual ripple[4]	≤ 5 V_{PP}								
Current consumption[5]	≤ 30 mA								
Switching outputs	Q: PNP								
	Q: NPN								
Signal voltage HIGH	V_S - 2.9 V								
	V_S								
Signal voltage LOW	Approx. 0 V								
	≤ 2.9 V								
Switching mode	Light-switching								
	Dark-switching								
Output current I_A max.	≤ 100 mA								
Response time[6]	≤ 1.25 ms								
Max. switching frequency[7]	400/s								
Connection type plug	M12, 3-pin								
cable[8]	PUR, 2 m, 3 x 0.14 mm², Ø 3.6 mm								
VDE protection class cable[9]	□								
Enclosure rating	IP 67								
Circuit protection[10]	A, B, C								
Ambient temperature	Operation -13…131° F (-25…55° C)								
	Storage -13…158° F (-25…70° C)								
Weight	With plug, approx 0.01 lb. (7 g)								
	With cable, approx. 0.2 lb. (90 g)								
Housing material	Housing: ABS								
	Optic: PMMA								

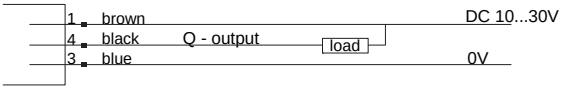
1) Object with 90% remission (based on standard white DIN 5033)
3.9 x 3.9 in (100 x 100 mm)
2) Average service life 100,000 h at T_A=77° F (25° C)
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 32° F (0° C)
9) Reference voltage 50 V DC
10) A = V_S connection reverse-polarity protected
B = Interference pulse suppression
C = Outputs overcurrent and short circuit protected

Connection types	
MHT15-N3247	MHT15-N2247
MHT15-N3347	MHT15-N2347
MHT15-P3247	MHT15-P2247
MHT15-P3347	MHT15-P2347

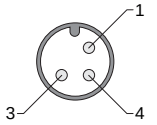
PNP Models



NPN Models



M12 Connector



Wire colors refer to standard cable, not included with quick disconnect models.

MHT15

Proximity/Diffuse Sensors - Energetic



0.4...9.8 in (10...250 mm)
sensing distance

Class 2
LISTED 87LL

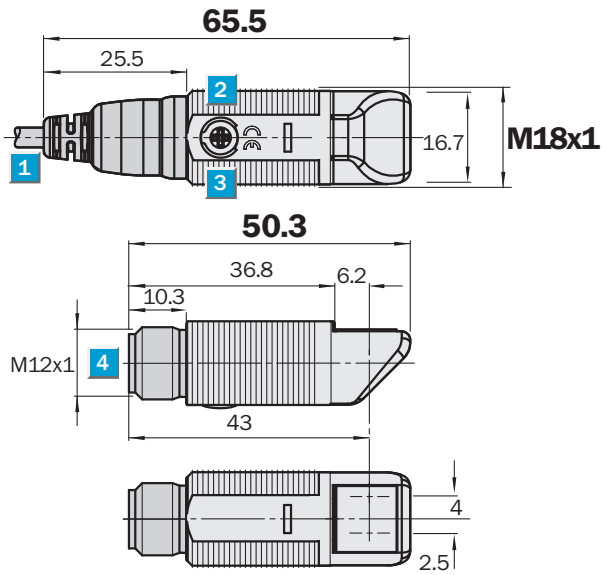
Highlights

- Long sensing range
- Adjustable sensitivity
- Indicator LED shows output and operating reserve
- Right-angle optic axis
- Mounting accessories included - M18 nuts and patented snap ring

MHT15

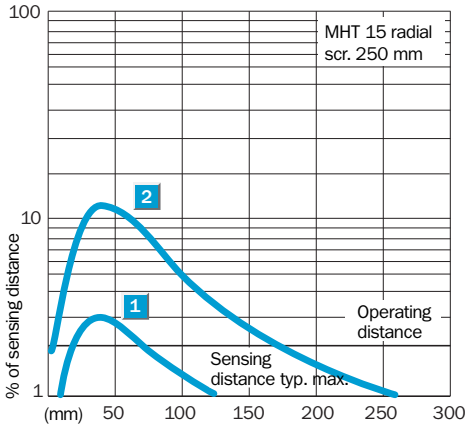


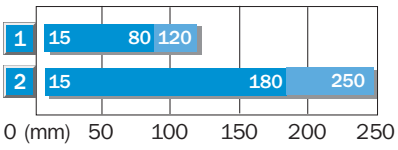
Dimensional drawing



dimensions in mm

Sensing distance

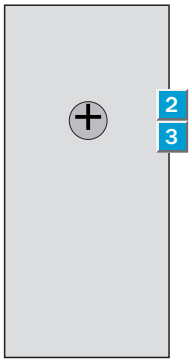




1	Sensing range on gray, 18% remission
2	Sensing range on white, 90% remission

Adjustments

All types



1	Connector cable 2 m
2	Sensitivity control 270°
3	Yellow LED indicator, -lights continuously: Light reception > reserve factor 1.3 -blinks: Light reception < reserve factor 1.3, but light reception > switching threshold 1
4	M12 plug, 3-pin

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
MHT15-N2249	1026114
MHT15-N3249	1026115
MHT15-N2349	1026116
MHT15-N3349	1026117
MHT15-P2249	1026118
MHT15-P3249	1026119
MHT15-P2349	1026120
MHT15-P3349	1026121

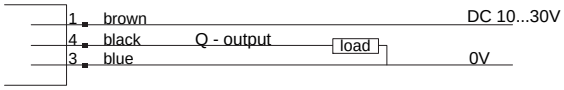
Technical data	MHT15	P2249	P3249	P2349	P3349	N2249	N3249	N2349	N3349
Sensing range SD, typ. max.[1]	0.6…9.8 in (15…250 mm)	■	■	■	■	■	■	■	■
Operating range SD[1]	0.6…7.1 in (15…180 mm)	■	■	■	■	■	■	■	■
Light spot diameter	Approx. 1.6 in at 9.8 in (40 mm at 250 mm)	■	■	■	■	■	■	■	■
Angle of dispersion sender	Approx. 4.5°	■	■	■	■	■	■	■	■
Light source[2], **light type**	LED infrared, 950 nm	■	■	■	■	■	■	■	■
Optical axis	Radial (90°)	■	■	■	■	■	■	■	■
Sensitivity adjustable	Potentiometer 270°	■	■	■	■	■	■	■	■
Light reception indicator	Yellow LED: lights continuously:	■	■	■	■	■	■	■	■
	Reserve factor > 1.3	■	■	■	■	■	■	■	■
	Blinks: reserve factor > 1.0…< 1.3	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■	■	■	■	■
Residual ripple[4]	≤ 5 V_{PP}	■	■	■	■	■	■	■	■
Current consumption[5]	≤ 30 mA	■	■	■	■	■	■	■	■
Switching outputs	Q: PNP	■	■	■	■				
	Q: NPN					■	■	■	■
Signal voltage HIGH	V_S - 2.9 V	■	■	■	■				
	V_S					■	■	■	■
Signal voltage LOW	Approx. 0 V	■	■	■	■				
	≤ 2.9 V					■	■	■	■
Switching mode	Light-switching			■	■			■	■
	Dark-switching	■	■			■	■		
Output current I_A max.	≤100 mA	■	■	■	■	■	■	■	■
Response time[6]	≤ 1.25 ms	■	■	■	■	■	■	■	■
Max. switching frequency[7]	400/s	■	■	■	■	■	■	■	■
Connection type plug	M12, 3-pin		■		■		■		■
cable[8]	PUR, 2 m, 3 x 0.14 mm², Ø 3.6 mm	■		■		■		■	
VDE protection class cable[9]	□	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■
Circuit protection[10]	A, B, C	■	■	■	■	■	■	■	■
Ambient temperature	Operation -13…131° F (-25…55° C)	■	■	■	■	■	■	■	■
	Storage -13…158° F (-25…70° C)	■	■	■	■	■	■	■	■
Weight	With plug, approx 0.01 lb. (8 g)		■		■		■		■
	With cable, approx. 0.2 lb. (91 g)	■		■		■		■	
Housing material	Housing: ABS	■	■	■	■	■	■	■	■
	Optic: PMMA	■	■	■	■	■	■	■	■

1) Object with 90% remission (based on standard white DIN 5033) 3.9 x 3.9 in (100 x 100 mm)
2) Average service life 100,000 h at T_A=77° F (25° C)
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 32° F (0° C)
9) Reference voltage 50 V DC
10) A = V_S connection reverse-polarity protected
B = Interference pulse suppression
C = Outputs overcurrent and short circuit protected

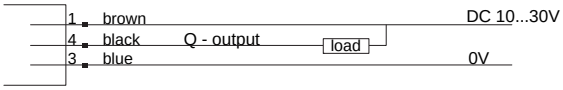
Connection types

MHT15-N3249	MHT15-N2249
MHT15-N3349	MHT15-N2349
MHT15-P3249	MHT15-P2249
MHT15-P3349	MHT15-P2349

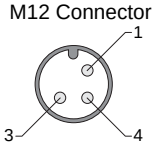
PNP Models



NPN Models



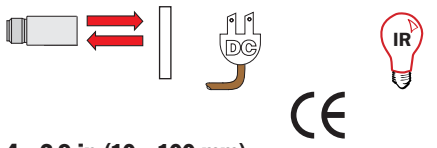
M12 Connector



Wire colors refer to standard cable, not included with quick disconnect models.

MHT15

Proximity/Diffuse Sensors - Energetic



0.4...3.9 in (10...100 mm)
sensing distance

Class 2
LISTED 87LL

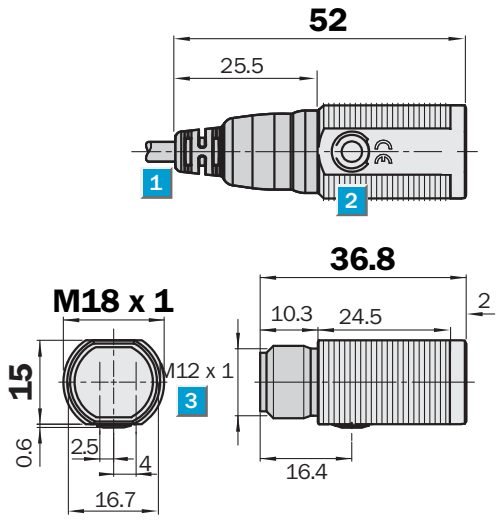
Highlights

- Standard sensing range
- Adjustable sensitivity
- Indicator LED shows output and operating reserve
- Straight optic axis
- Mounting accessories included - M18 nuts and patented snap ring

MHT15

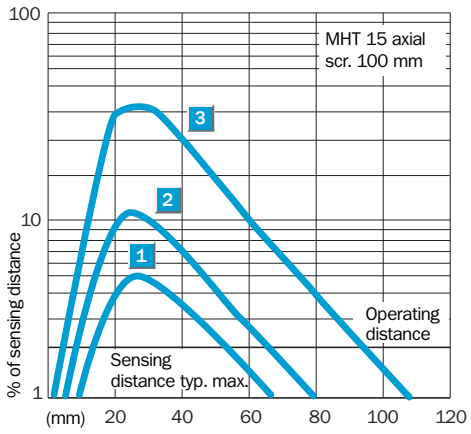


Dimensional drawing



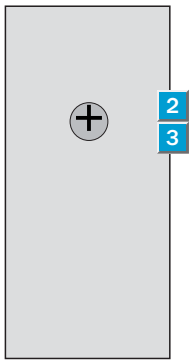
dimensions in mm

Sensing distance



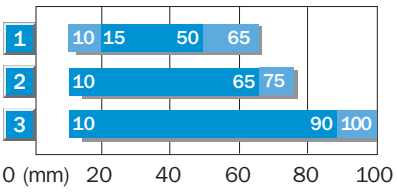
Adjustments

All types



1 Connector cable 2 m
2 Sensitivity control 270°
3 Yellow LED indicator,
-lights continuously:
Light reception > reserve factor 1.3
-blinks:
Light reception < reserve factor 1.3,
but light reception > switching threshold 1
4 M12 plug, 3-pin

Accessories	page
Cables and connectors	1180
Mounting systems	1234



1 Sensing range on black, 6% remission
2 Sensing range on gray, 18% remission
2 Sensing range on white, 90% remission

Order information

Type	Part no.
MHT15-N2217	1026090
MHT15-N3217	1026091
MHT15-N2317	1026092
MHT15-N3317	1026093
MHT15-P2217	1026094
MHT15-P3217	1026095
MHT15-P2317	1026096
MHT15-P3317	1026097

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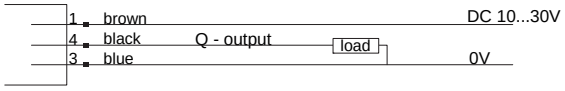
Technical data	MHT15	P2217	P3217	P2317	P3317	N2217	N3217	N2317	N3317
Sensing range SD, typ. max.[1]	0.4…3.9 in (10…100 mm)	■	■	■	■	■	■	■	■
Operating range SD[1]	0.4…3.5 in (10…90 mm)	■	■	■	■	■	■	■	■
Light spot diameter	Approx. 0.08 in at 3.9 in (20 mm at 100 mm)	■	■	■	■	■	■	■	■
Angle of dispersion sender	Approx. 4.5°	■	■	■	■	■	■	■	■
Light source[2], **light type**	LED infrared, 950 nm	■	■	■	■	■	■	■	■
Optical axis	Axial	■	■	■	■	■	■	■	■
Sensitivity adjustable	Potentiometer 270°	■	■	■	■	■	■	■	■
Light reception indicator	Yellow LED: lights continuously:	■	■	■	■	■	■	■	■
	Reserve factor > 1.3	■	■	■	■	■	■	■	■
	Blinks: reserve factor > 1.0…< 1.3	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■	■	■	■	■
Residual ripple[4]	≤ 5 V_{PP}	■	■	■	■	■	■	■	■
Current consumption[5]	≤ 30 mA	■	■	■	■	■	■	■	■
Switching outputs	Q: PNP	■	■	■	■				
	Q: NPN					■	■	■	■
Signal voltage HIGH	V_S - 2.9 V	■	■	■	■				
	V_S					■	■	■	■
Signal voltage LOW	Approx. 0 V	■	■	■	■				
	≤ 2.9 V					■	■	■	■
Switching mode	Light-switching			■	■			■	■
	Dark-switching	■	■			■	■		
Output current I_A max.	≤100 mA	■	■	■	■	■	■	■	■
Response time[6]	≤ 1.25 ms	■	■	■	■	■	■	■	■
Max. switching frequency[7]	400/s	■	■	■	■	■	■	■	■
Connection type plug	M12, 3-pin		■		■		■		■
cable[8]	PUR, 2 m, 3 x 0.14 mm², Ø 3.6 mm	■		■		■		■	
VDE protection class cable[9]	□	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■
Circuit protection[10]	A, B, C	■	■	■	■	■	■	■	■
Ambient temperature	Operation -13…131° F (-25…55° C)	■	■	■	■	■	■	■	■
	Storage -13…158° F (-25…70° C)	■	■	■	■	■	■	■	■
Weight	With plug, approx 0.01 lb. (7 g)		■		■		■		■
	With cable, approx. 0.2 lb. (90 g)	■		■		■		■	
Housing material	Housing: ABS	■	■	■	■	■	■	■	■
	Optic: PMMA	■	■	■	■	■	■	■	■

1) Object with 90% remission (based on standard white DIN 5033)
3.9 x 3.9 in (100 x 100 mm)
2) Average service life 100,000 h at T_A=77° F (25° C)
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 32° F (0° C)
9) Reference voltage 50 V DC
10) A = V_S connection reverse-polarity protected
B = Interference pulse suppression
C = Outputs overcurrent and short circuit protected

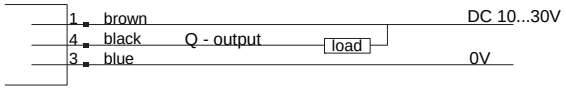
Connection diagram

MHT15-N3217	MHT15-N2217
MHT15-N3317	MHT15-N2317
MHT15-P3217	MHT15-P2217
MHT15-P3317	MHT15-P2317

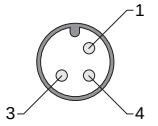
PNP Models



NPN Models



M12 Connector



Wire colors refer to standard cable, not included with quick disconnect models.

MHT15

Proximity/Diffuse Sensors - Energetic



0.2...3.5 in (5...90 mm)
sensing distance

Class 2
LISTED 87LL

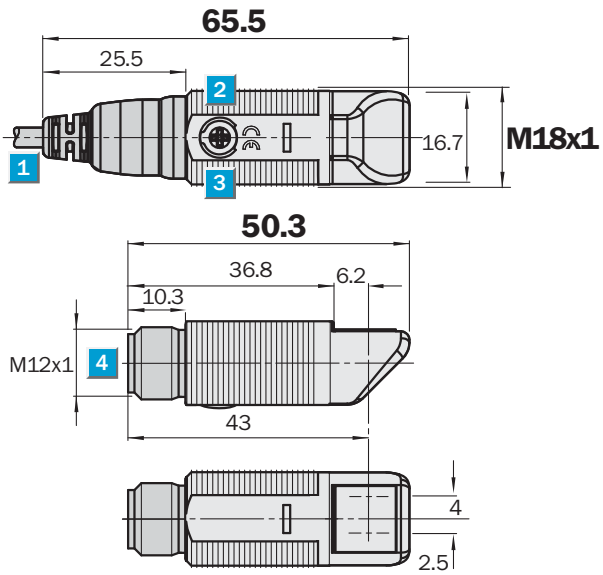
Highlights

- Standard sensing range
- Adjustable sensitivity
- Indicator LED shows output and operating reserve
- Right-angle optic axis
- Mounting accessories included - M18 nuts and patented snap ring

MHT15

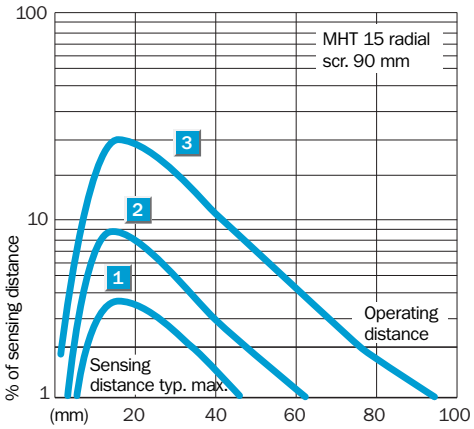


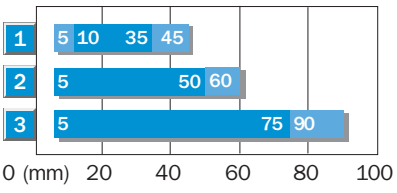
Dimensional drawing



dimensions in mm

Sensing distance

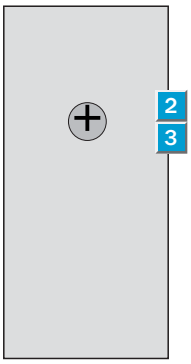




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
2	Sensing range on white, 90% remission

Adjustments

All types



1	Connector cable 2 m
2	Sensitivity control 270°
3	Yellow LED indicator, -lights continuously: Light reception > reserve factor 1.3 -blinks: Light reception < reserve factor 1.3, but light reception > switching threshold 1
4	M12 plug, 3-pin

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
MHT15-N2219	1026098
MHT15-N3219	1026099
MHT15-N2319	1026100
MHT15-N3319	1026 101
MHT15-P2219	1026102
MHT15-P3219	1026103
MHT15-P2319	1026104
MHT15-P3319	1026105

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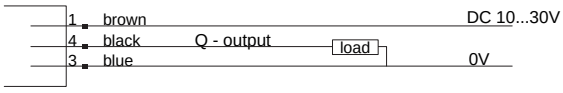
Technical data	MHT15	P2219	P3219	P2319	P3319	N2219	N3219	N2319	N3319
Sensing range SD, typ. max.[1]	0.2…3.5 in (5…90 mm)	■	■	■	■	■	■	■	■
Operating range SD[1]	0.2…2.9 in (5…75 mm)	■	■	■	■	■	■	■	■
Light spot diameter	Approx. 0.09 in at 3.5 in (25 mm at 90 mm)	■	■	■	■	■	■	■	■
Angle of dispersion sender	Approx. 5°	■	■	■	■	■	■	■	■
Light source[2], **light type**	LED infrared, 950 nm	■	■	■	■	■	■	■	■
Optical axis	Radial (90°)	■	■	■	■	■	■	■	■
Sensitivity adjustable	Potentiometer 270°	■	■	■	■	■	■	■	■
Light reception indicator	Yellow LED: lights continuously:	■	■	■	■	■	■	■	■
	Reserve factor > 1.3	■	■	■	■	■	■	■	■
	Blinks: reserve factor > 1.0…< 1.3	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■	■	■	■	■
Residual ripple[4]	≤ 5 V_{PP}	■	■	■	■	■	■	■	■
Current consumption[5]	≤ 30 mA	■	■	■	■	■	■	■	■
Switching outputs	Q: PNP	■	■	■	■				
	Q: NPN					■	■	■	■
Signal voltage HIGH	V_S - 2.9 V	■	■	■	■				
	V_S					■	■	■	■
Signal voltage LOW	Approx. 0 V	■	■	■	■				
	≤ 2.9 V					■	■	■	■
Switching mode	Light-switching			■	■			■	■
	Dark-switching	■	■			■	■		
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■	■	■
Response time[6]	≤ 1.25 ms	■	■	■	■	■	■	■	■
Max. switching frequency[7]	400/s	■	■	■	■	■	■	■	■
Connection type plug	M12, 3-pin		■		■		■		■
cable[8]	PUR, 2 m, 3 x 0.14 mm², Ø 3.6 mm	■		■		■		■	
VDE protection class cable[9]	□	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■
Circuit protection[10]	A, B, C	■	■	■	■	■	■	■	■
Ambient temperature	Operation -13…131° F (-25…55° C)	■	■	■	■	■	■	■	■
	Storage -13…158° F (-25…70° C)	■	■	■	■	■	■	■	■
Weight	With plug, approx 0.01 lb. (8 g)		■		■		■		■
	With cable, approx. 0.2 lb. (91 g)	■		■		■		■	
Housing material	Housing: ABS	■	■	■	■	■	■	■	■
	Optic: PMMA	■	■	■	■	■	■	■	■

1) Object with 90% remission (based on standard white DIN 5033)
3.9 x 3.9 in (100 x 100 mm)
2) Average service life 100,000 h at T_A=77° F (25° C)
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 32° F (0° C)
9) Reference voltage 50 V DC
10) A = V_S connection reverse-polarity protected
B = Interference pulse suppression
C = Outputs overcurrent and short circuit protected

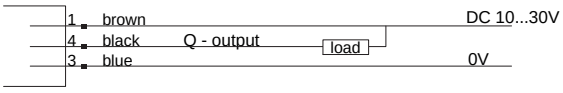
Connection diagram

MHT15-N3219	MHT15-N2219
MHT15-N3319	MHT15-N2319
MHT15-P3219	MHT15-P2219
MHT15-P3319	MHT15-P2319

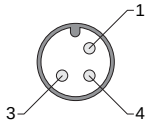
PNP Models



NPN Models



M12 Connector



Wire colors refer to standard cable, not included with quick disconnect models.

MHT15V

Proximity/Diffuse Sensors



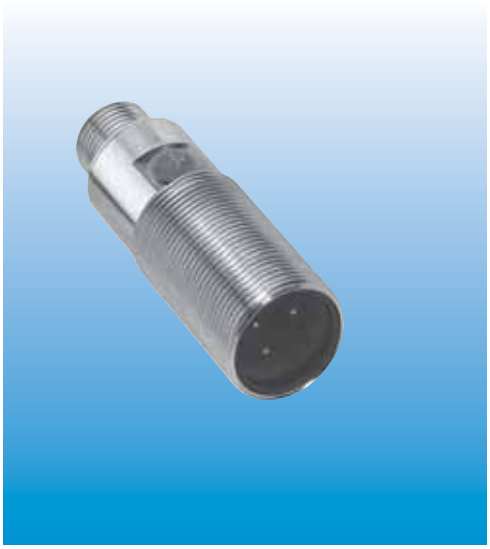
0.4...13.8 in (10...350 mm)
sensing distance

ECOLAB
JohnsonDiversey
Stainless Steel

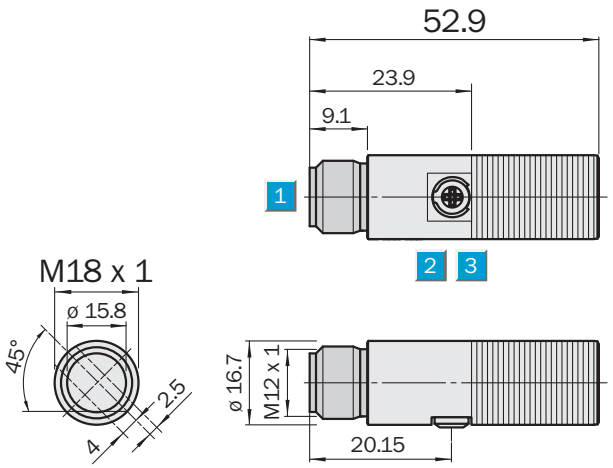
Highlights

- 100% stainless steel housing 316L
- IP 69K, IP 68, IP 67 enclosure ratings
- Very short housing
- Adjustable sensitivity

MHT15V

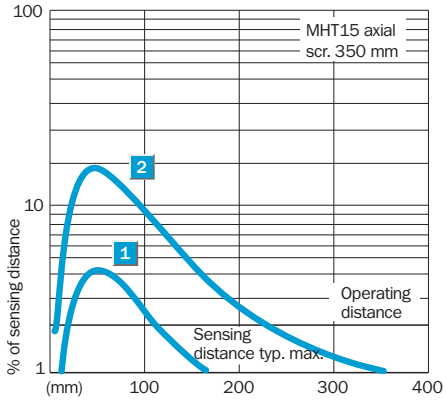


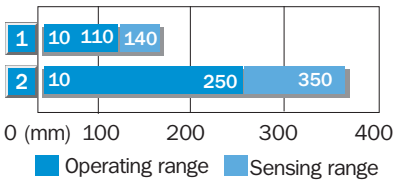
Dimensional drawing



dimensions in mm

Sensing distance

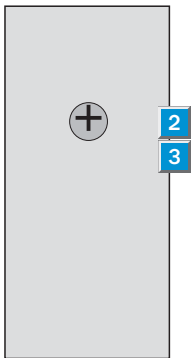




1	Sensing range on gray, 18% remission
2	Sensing range on white, 90% remission

Adjustments

All types



1	M12 plug, 3-pin
2	Sensitivity control 270°
3	Yellow LED indicator • lights continuously: Light reception > reserve factor 1.3 • blinks: Light reception > reserve factor 1.3, but light reception > switching threshold 1

Accessories	page
Cables and connectors	1180
Mounting systems	1234

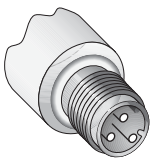
Order information

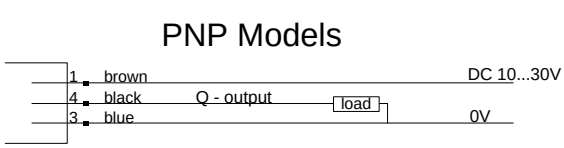
Type	Part no.
MHT15-P3247V	1 043 810
MHT15-P3347V	1 043 811
MHT15-N3247V	1 043 808
MHT15-N3347V	1 043 809

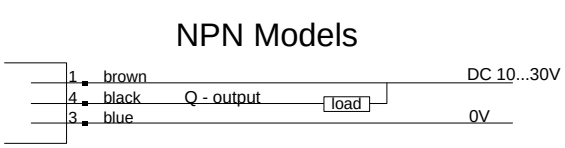
Technical data	MHT15	P3247V	P3347V	N3247V	N3347V
Sensing range SD, typ. max.[1]	0.4…13.8 in (10…350 mm)				
Operating range SD[1]	0.4…9.8 in (10…250 mm)				
Light spot diameter	Approx. 2.0 in at 13.8 in (50 mm at 350 mm)				
Angle of dispersion sender	Approx. 4.5°				
Light source[2], **light type**	LED infrared, 950 nm				
Optical axis	Axial				
Sensitivity adjustable	Potentiometer 270°				
Light reception indicator	Yellow LED: lights continuously:				
	Reserve factor > 1.3				
	Blinks: reserve factor > 1.0…< 1.3				
Supply voltage V_S	10…30 V DC[3]				
Residual ripple[4]	≤ 5 V_{PP}				
Current consumption[5]	≤ 30 mA				
Switching outputs	Q: PNP				
	Q: NPN				
Signal voltage HIGH	V_S - 2.9 V				
	V_S				
Signal voltage LOW	Approx. 0 V				
	≤ 2.9 V				
Switching mode	Light switching				
	Dark switching				
Output current I_A max.	≤ 100 mA				
Response time[6]	≤ 1.25 ms				
Max. switching frequency[7]	400/s				
Connection type plug	M12, 3-pin[8]				
VDE protection class cable[9]	□				
Enclosure rating to DIN 40050	IP 67, IP 68, IP 69K				
Certificates[10]	ECOLAB, JohnsonDiversey				
Circuit protection[11]	A, B, C				
Ambient temperature	Operation -13…131° F (-25…55° C)				
	Storage -13…158° F (-25…70° C)				
Weight	With plug, approx 1.8 oz (50 g)				
Housing material	Housing: 100% stainless steel 1.4404				
	Optic: PMMA 3 mm, surface hardened & tempered				

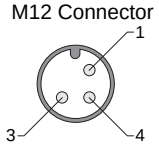
1) Object with 90% remission (based on standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) May not exceeded or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Gold-plated contact pins
9) Reference voltage 50 V DC
10) Refer to the corresponding certificates for details
11) A = V_S connections reverse-polarity protected
B = Interference pulse suppression
C = Outputs overcurrent and short-circuit protected

Connection diagram









wire colors refer to standard cable, not included with quick disconnect models.

MHT15V

Proximity/Diffuse Sensors



0.4...3.9 in (10...100 mm)
sensing distance

ECOLAB
JohnsonDiversey
Stainless Steel

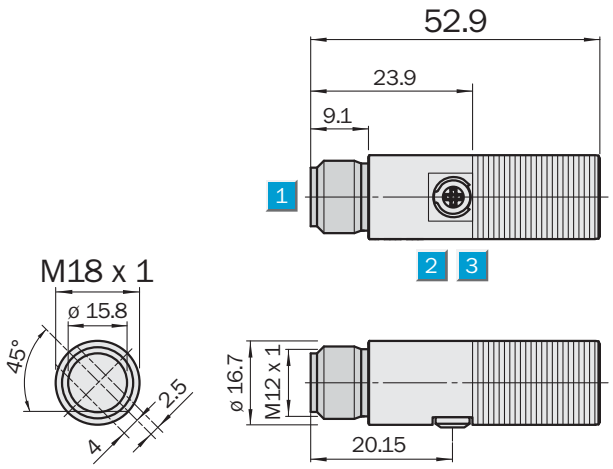
Highlights

- 100% stainless steel housing 316L
- IP 69K, IP 68, IP 67 enclosure ratings
- Very short housing
- Sensitivity adjustable

MHT15V

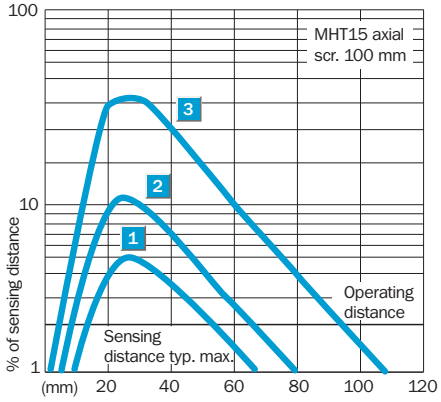


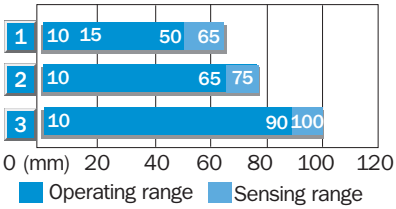
Dimensional drawing



dimensions in mm

Sensing distance

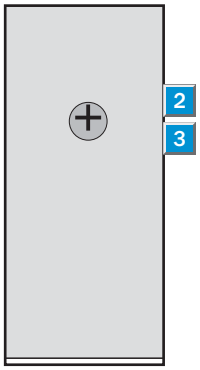




1 Sensing range on black, 6% remission
2 Sensing range on gray, 18% remission
3 Sensing range on white, 90% remission

Adjustments

All types



1 M12 plug, 3-pin
2 Sensitivity control 270°
3 Yellow LED indicator
- lights continuously:
  Light reception > reserve factor 1.3
- blinks:
  Light reception > reserve factor 1.3, but light reception > switching threshold 1

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
MHT15-P3217V	1 043 805
MHT15-P3317V	1 043 806
MHT15-N3217V	1 043 803
MHT15-N3317V	1 043 804

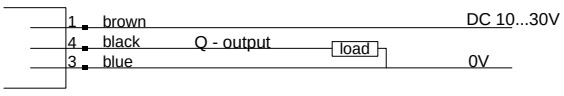
Technical data	MHT15	P3217V	P3317V	N3217V	N3317V
Sensing range SD, typ. max.[1]	0.4…3.9 in (10…100 mm)	■	■	■	■
Operating range SD[1]	0.4…3.5 in (10…90 mm)	■	■	■	■
Light spot diameter	Approx. 0.8 in at 3.9 in (20 mm at 100 mm)	■	■	■	■
Angle of dispersion sender	Approx. 4.5°	■	■	■	■
Light source[2], **light type**	LED infrared, 950 nm	■	■	■	■
Optical axis	Axial	■	■	■	■
Sensitivity adjustable	Potentiometer 270°	■	■	■	■
Light reception indicator	Yellow LED: lights continuously:	■	■	■	■
	Reserve factor > 1.3	■	■	■	■
	Blinks: reserve factor > 1.0…< 1.3	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■
Residual ripple[4]	≤ 5 V_{PP}	■	■	■	■
Current consumption[5]	≤ 30 mA	■	■	■	■
Switching outputs	Q: PNP	■	■		
	Q: NPN			■	■
Signal voltage HIGH	V_S - 2.9 V	■	■		
	V_S			■	■
Signal voltage LOW	Approx. 0 V	■	■		
	≤ 2.9 V			■	■
Switching mode	Light switching		■		■
	Dark switching	■		■	
Output current I_A max.	≤ 100 mA	■	■	■	■
Response time[6]	≤ 1.25 ms	■	■	■	■
Max. switching frequency[7]	400/s	■	■	■	■
Connection type plug	M12, 3-pin[8]	■	■	■	■
VDE protection class cable[9]	□	■	■	■	■
Enclosure rating to DIN 40050	IP 67, IP 68, IP 69K	■	■	■	■
Certificates[10]	ECOLAB, JohnsonDiversey	■	■	■	■
Circuit protection[11]	A, B, C	■	■	■	■
Ambient temperature	Operation -13…131° F (-25…55° C)	■	■	■	■
	Storage -13…158° F (-25…70° C)	■	■	■	■
Weight	With plug, approx 1.8 oz (50 g)	■	■	■	■
Housing material	Housing: 100% stainless steel 1.4404	■	■	■	■
	Optic: PMMA 3 mm, surface hardened & tempered	■	■	■	■

1) Object with 90% remission (based on standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) May not exceeded or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Gold-plated contact pins
9) Reference voltage 50 V DC
10) Refer to the corresponding certificates for details
11) A = V_S connections reverse-polarity protected
B = Interference pulse suppression
C = Outputs overcurrent and short-circuit protected

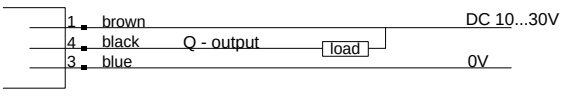
Connection diagram



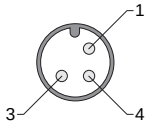
PNP Models



NPN Models



M12 Connector



wire colors refer to standard cable, not included with quick disconnect models.

MHL15

Reflex/Retro Reflective Sensors



0.1…16.4 ft (0.035…5 m)
(PL 80 A)
sensing range

Class 2
LISTED 87LL

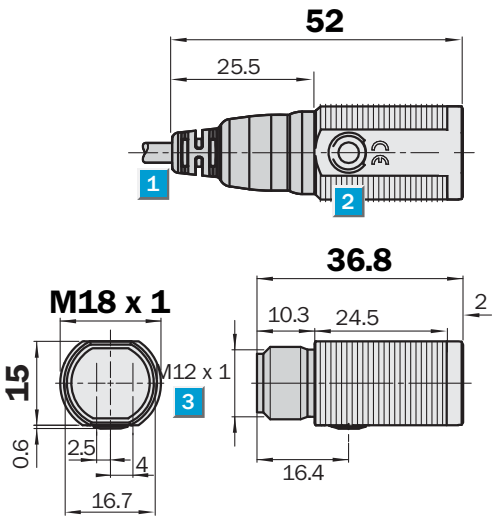
Highlights

- Long sensing range
- Polarizing filter for reliable detection of shiny surfaces
- Indicator LED shows output and operating reserve
- Straight optic axis
- Mounting accessories included - M18 nuts and patented snap ring

MHL15

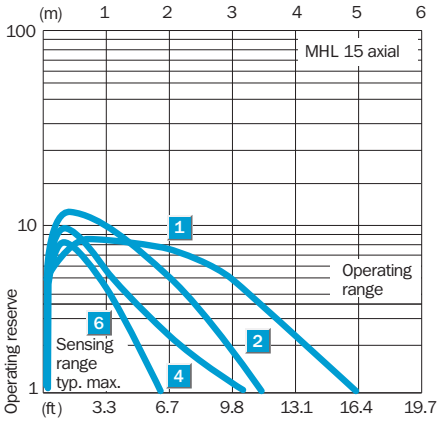


Dimensional drawing



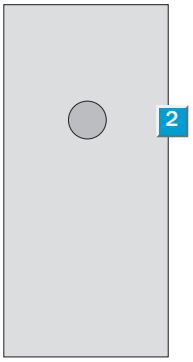
dimensions in mm

Sensing distance



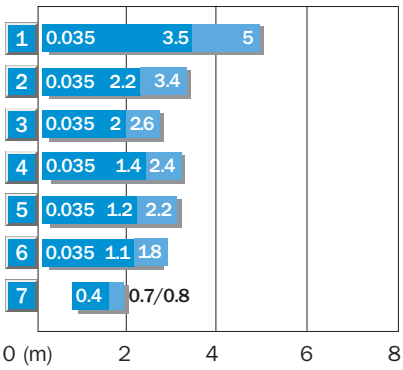
Adjustments

All types



1 Connector cable 2 m
2 Yellow LED indicator,
-lights continuously:
Light reception > reserve factor 1.3
-blinks:
Light reception < reserve factor 1.3,
but light reception > switching threshold 1
3 M12 plug, 3-pin

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256



	Reflector type	Operating range
1	PL 80 A	0.035…3.5 m
2	P 250	0.035…2.2 m
3	P 975	0.035…2.0 m
4	PL 50 A/PL 40 A	0.035…1.4 m
5	PL 30 A/PL 31 A	0.035…1.2 m
6	PL 20 A	0.035…1.1 m
7	Reflective tape Diamond Grade 50 mm x 50 mm	0.4…0.7 m

Order information

Type	Part no.
MHL15-N2236	1026122
MHL15-N3236	1026123
MHL15-N2336	1026124
MHL15-N3336	1026125
MHL15-P2236	1026126
MHL15-P3236	1026127
MHL15-P2336	1026128
MHL15-P3336	1026129

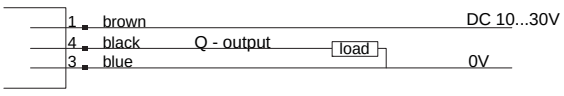
Technical data	MHL15	P2236	P3236	P2336	P3336	N2236	N3236	N2336	N3336
Sensing range SR, typ. max./reflect.	0.1…16.4 ft (0.035…5 m) (PL 80 A)	■	■	■	■	■	■	■	■
Operating range	0.2…2.9 in (0.035…3.5 m) (PL 80 A)	■	■	■	■	■	■	■	■
Light spot diameter	Approx. 3.1 in at 11.5 ft (80 mm at 3.5 m)	■	■	■	■	■	■	■	■
Angle of dispersion sender	Approx. 1.5°	■	■	■	■	■	■	■	■
Optical axis	Axial	■	■	■	■	■	■	■	■
Light source[1], light type	LED red light, with pol. filter, 650 nm	■	■	■	■	■	■	■	■
Light reception indicator	Yellow LED: lights continuously:	■	■	■	■	■	■	■	■
	Reserve factor > 1.5	■	■	■	■	■	■	■	■
	Blinks: reserve factor > 1.0…< 1.5	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■	■	■
Residual ripple[3]	≤ 5 V_{PP}	■	■	■	■	■	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■	■	■	■	■	■
Switching outputs	Q: PNP	■	■	■	■				
	Q: NPN					■	■	■	■
Signal voltage HIGH	V_S - 2.9 V	■	■	■	■				
	V_S					■	■	■	■
Signal voltage LOW	Approx. 0 V	■	■	■	■				
	≤ 2.9 V					■	■	■	■
Switching mode	Light switching			■	■			■	■
	Dark switching	■	■			■	■		
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■	■	■
Response time[5]	≤ 1.25 ms	■	■	■	■	■	■	■	■
Max. switching frequency[6]	400/s	■	■	■	■	■	■	■	■
Connection type plug	M12, 3-pin		■		■		■		■
cable[7]	PUR, 2 m, 3 x 0.14 mm², Ø 3.6 mm	■		■		■		■	
VDE protection class cable[8]	□	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■	■	■	■	■
	Storage -13…158° F (-25…70° C)	■	■	■	■	■	■	■	■
Weight	With plug, approx 0.01 lb. (7 g)		■		■		■		■
	With cable, approx. 0.2 lb. (90 g)	■		■		■		■	
Housing material	Housing: ABS	■	■	■	■	■	■	■	■
	Optic: PMMA	■	■	■	■	■	■	■	■

1) Average service life 100,000 h at T_A=77°F (25° C)
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 32° F (0° C)
8) Reference voltage 50 V DC
9) A = V_S connection reverse-polarity protected
B = Interference pulse suppression
C = Outputs overcurrent and short circuit protected

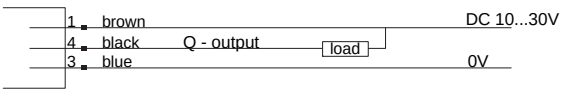
Connection diagram

MHL15-N3236	MHL15-N2236
MHL15-N3336	MHL15-N2336
MHL15-P3236	MHL15-P2236
MHL15-P3336	MHL15-P2336

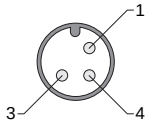
PNP Models



NPN Models



M12 Connector



Wire colors refer to standard cable, not included with quick disconnect models.

MHL15

Reflex/Retro Reflective Sensors



0.1…14.8 ft (0.035…4.5 m) (PL 80 A)

sensing range

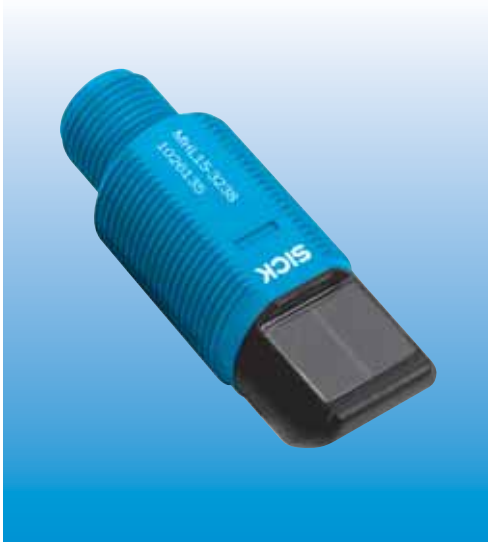
Class 2

LISTED 87LL

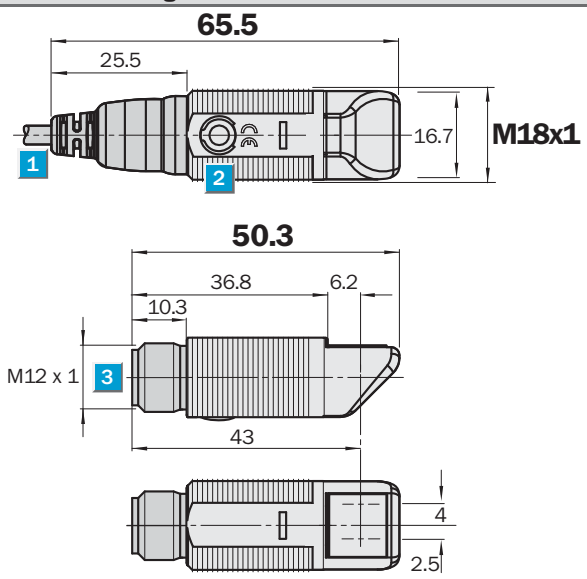
Highlights

- Long sensing range
- Polarizing filter for reliable detection of shiny surfaces
- Indicator LED shows output and operating reserve
- Right-angle optic axis
- Mounting accessories included - M18 nuts and patented snap ring

MHL15

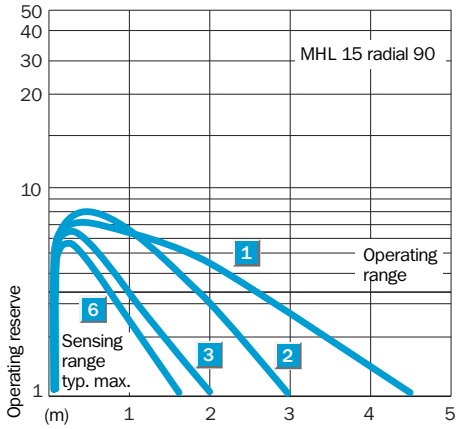


Dimensional drawing



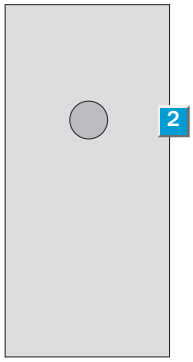
dimensions in mm

Sensing distance



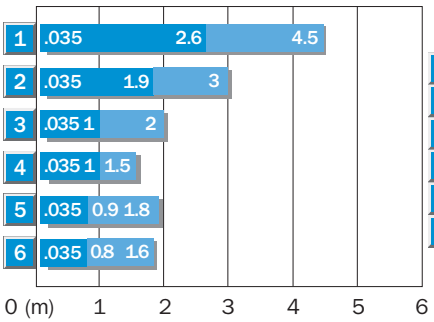
Adjustments

All types



1 2 m connector cable
2 Yellow LED indicator,
-lights continuously:
Light reception > reserve factor 1.5
-blinks:
Light reception < reserve factor 1.5,
but light reception > switching threshold 1
3 M12 plug, 3-pin

Accessories	page
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Reflectors	1256



	Reflector type	Operating range
1	PL 80 A	0.035…2.6 m
2	P 250	0.035…1.9 m
3	PL 50 A/PL 40 A	0.035…1.0 m
4	P 975	0.035…1.0 m
5	PL 30 A/PL 31 A	0.035…0.9 m
6	PL 20 A	0.035…0.8 m

Order information

Type	Part no.
MHL15-N2238	1026130
MHL15-N3238	1026131
MHL15-N2338	1026132
MHL15-N3338	1026133
MHL15-P2238	1026134
MHL15-P3238	1026135
MHL15-P2338	1026136
MHL15-P3338	1026137

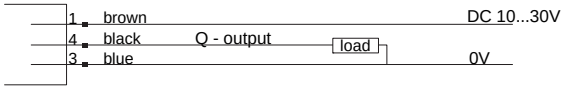
Technical data		MHL15	P2238	P3238	P2338	P3338	N2238	N3238	N2338	N3338
Sensing range SR, typ. max.		0.1…14.8 ft (0.035…4.5 m) (PL 80 A)								
Operating range		0.2…8.5 ft (0.035…2.6 m) (PL 80 A)								
Light spot diameter		Approx. 2.4 in at 8.5 ft (60 mm at 2.6 m)								
Angle of dispersion sender		Approx. 1.5°								
Optical axis		Radial (90°)								
Light source[4], light type		LED red light, with pol. filter, 650 nm								
Light reception indicator		Yellow LED: lights continuously:								
		Reserve factor > 1.5								
		Blinks: reserve factor > 1.0…< 1.5								
Supply voltage V_S		10…30 V DC[2]								
Residual ripple[3]		≤ 5 V_{PP}								
Current consumption[4]		≤ 30 mA								
Switching outputs		Q: PNP								
		Q: NPN								
Signal voltage HIGH		V_S - 2.9 V								
		V_S								
Signal voltage LOW		Approx. 0 V								
		≤ 2.9 V								
Switching mode		Light switching								
		Dark switching								
Output current I_A max.		≤100 mA								
Response time[5]		≤ 1.25 ms								
Max. switching frequency[6]		400/s								
Connection type	plug	M12, 3-pin								
	cable[7]	PUR, 2 m, 3 x 0.14 mm², Ø 3.6 mm								
VDE protection class cable[8]		□								
Enclosure rating		IP 67								
Circuit protection[9]		A, B, C								
Ambient temperature T_A		Operation -13…131° F (-25…55° C)								
		Storage -13…158° F (-25…70° C)								
Weight	With plug,	approx 0.01 lb. (8 g)								
	With cable,	approx. 0.2 lb. (91 g)								
Housing material		Housing: ABS								
		Optic: PMMA								

1) Average service life 100,000 h at T_A=77° F (25° C)
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 32° F (0° C)
8) Reference voltage 50 V DC
9) A = V_S connection reverse-polarity protected
B = Interference pulse suppression
C = Outputs overcurrent and short circuit protected

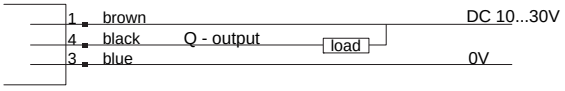
Connection types

MHL15-N3238	MHL15-N2238
MHL15-N3338	MHL15-N2338
MHL15-P3238	MHL15-P2238
MHL15-P3338	MHL15-P2338

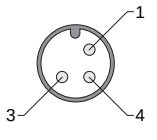
PNP Models



NPN Models



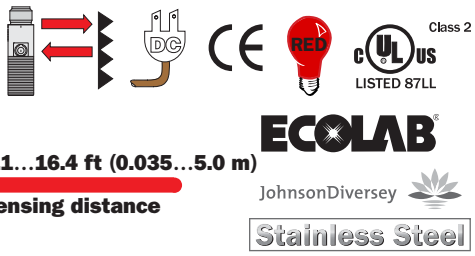
M12 Connector



Wire colors refer to standard cable, not included with quick disconnect models.

MHL15V

Reflex/Retro-Reflective Sensors

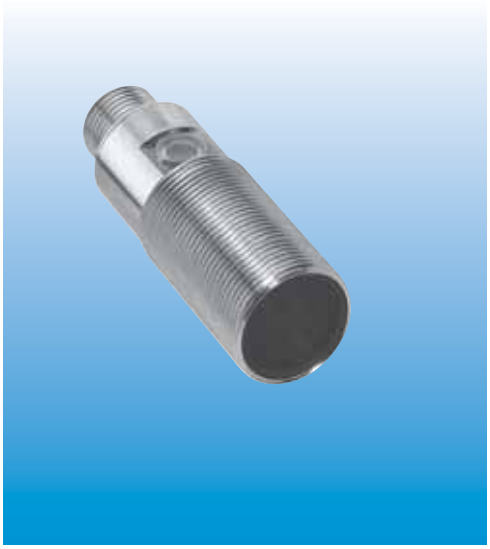


0.1…16.4 ft (0.035…5.0 m)
sensing distance

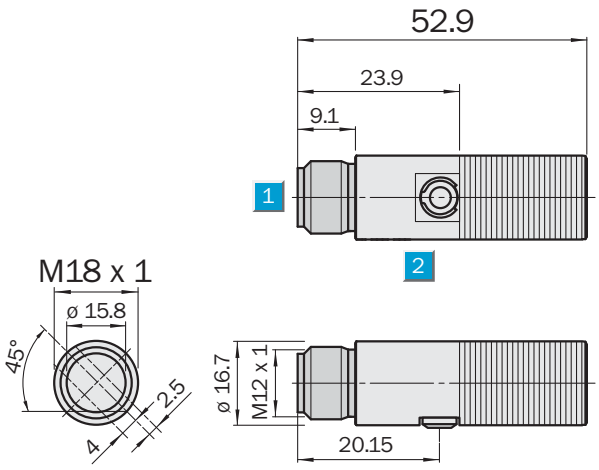
Highlights

- 100% stainless steel housing 316L
- IP 69K, IP 68, IP 67 enclosure rating
- Very short housing
- Polarizing filter for reliable detection of shiny surfaces

MHL15V

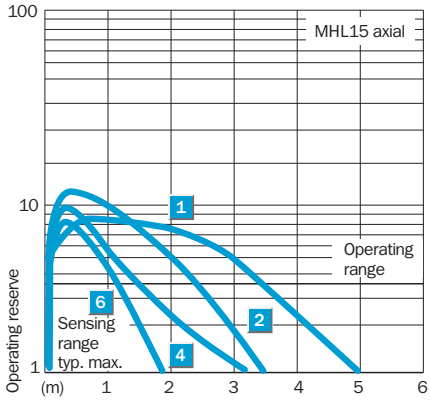


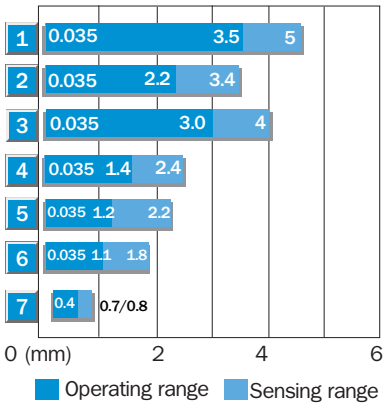
Dimensional drawing



dimensions in mm

Sensing distance

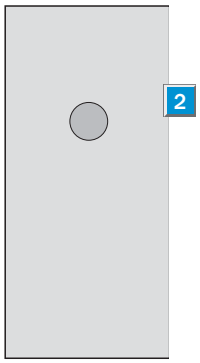




	Reflector type	Operating range
1	PL80A	0.035…3.5 m
2	P250	0.035…2.2 m
3	P975	0.035…3.0 m
4	PL50A/PL40A	0.035…1.4 m
5	PL30A/PL31A	0.035…1.2 m
6	PL20A	0.035…1.1 m
7	Reflective tape Diamond Grade 50 mm x 50 mm	0.035…0.7 m

Adjustments

All types



1 M12 plug, 3-pin
2 Yellow LED indicator
- lights continuously:
  Light reception > reserve factor 1.5
- blinks:
  Light reception > reserve factor 1.5, but light reception > switching threshold 1

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

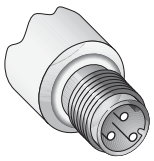
Order information

Type	Part no.
MHL15-P3236V	1 043 814
MHL15-P3336V	1 043 815
MHL15-N3236V	1 043 812
MHL15-N3336V	1 043 813

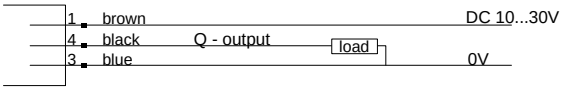
Technical data	MHL15	P3236V	P3336V	N3236V	N3336V
Sensing range SD, typ. max.	0.1…16.4 ft (0.035…5.0 m)	■	■	■	■
Operating range SD	0.1…11.5 ft (0.035…3.5 m)	■	■	■	■
Light spot diameter	Approx. 3.1 in at 11.5 ft (80 mm at 3.5 m)	■	■	■	■
Angle of dispersion sender	Approx. 1.5°	■	■	■	■
Light source[1], light type	LED, red light, with pol. filter, 650 nm	■	■	■	■
Optical axis	Axial	■	■	■	■
Light reception indicator	Yellow LED: lights continuously:	■	■	■	■
	Reserve factor > 1.5	■	■	■	■
	Blinks: reserve factor > 1.0…< 1.5	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■
Residual ripple[3]	≤ 5 V_{PP}	■	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■	■
Switching outputs	Q: PNP	■	■		
	Q: NPN			■	■
Signal voltage HIGH	V_S - 2.9 V	■	■		
	V_S			■	■
Signal voltage LOW	Approx. 0 V	■	■		
	≤ 2.9 V			■	■
Switching mode	Light switching		■		■
	Dark switching	■		■	
Output current I_A max.	≤ 100 mA	■	■	■	■
Response time[5]	≤ 1.25 ms	■	■	■	■
Max. switching frequency[6]	400/s	■	■	■	■
Connection type plug	M12, 3-pin[7]	■	■	■	■
VDE protection class cable[8]	□	■	■	■	■
Enclosure rating to DIN 40050	IP 67, IP 68, IP 69K	■	■	■	■
Certificates[9]	ECOLAB, JohnsonDiversey	■	■	■	■
Circuit protection[10]	A, B, C	■	■	■	■
Ambient temperature	Operation -13…131° F (-25…55° C)	■	■	■	■
	Storage -13…158° F (-25…70° C)	■	■	■	■
Weight	With plug, approx 1.8 oz (50 g)	■	■	■	■
Housing material	Housing: 100% stainless steel 1.4404	■	■	■	■
	Optic: PMMA 3 mm, surface hardened & tempered	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceeded or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Gold-plated contact pins
8) Reference voltage 50 V DC
9) Refer to the corresponding certificates for details
10) A = V_S connections reverse-polarity protected
B = Interference pulse suppression
C = Outputs overcurrent and short-circuit protected

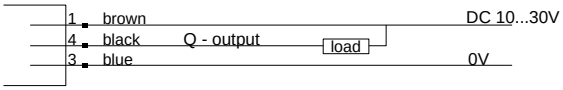
Connection diagram



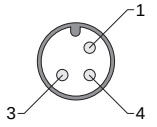
PNP Models



NPN Models



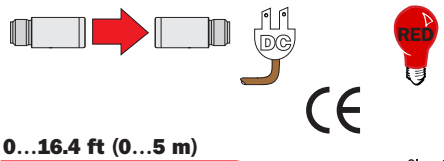
M12 Connector



wire colors refer to standard cable, not included with quick disconnect models.

MHSE15

Through-beam Sensors



0...16.4 ft (0...5 m)
sensing range

Class 2
LISTED 87LL

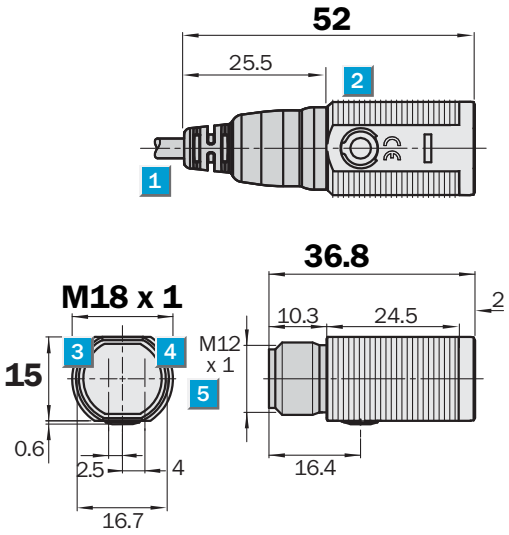
Highlights

- Long sensing range
- Indicator LED shows output and operating reserve
- Straight optic axis
- Mounting accessories included - M18 nuts and patented snap ring

MHSE15

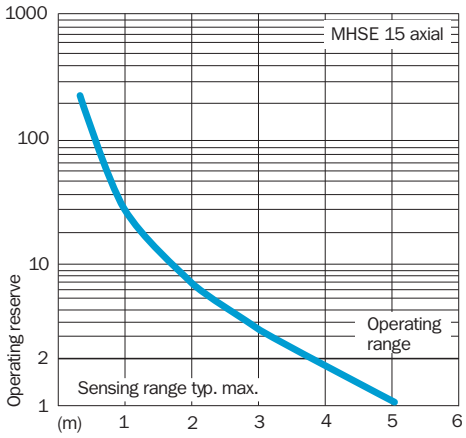


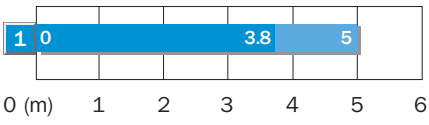
Dimensional drawing



dimensions in mm

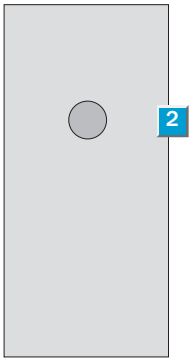
Sensing distance





Adjustments

All types



1 2 m connector cable
2 Yellow LED indicator, (only receiver MHE 15)
-lights continuously:
Light reception > switching threshold 1
3 Axis of sender
4 Axis of receiver
5 M12 plug, 3-pin

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.[1]
MHSE15-N2236	1026138
MHSE15-N3236	1026139
MHSE15-N2336	1026140
MHSE15-N3336	1026141
MHSE15-P2236	1026142
MHSE15-P3236	1026143
MHSE15-P2336	1026144
MHSE15-P3336	1026145

[1] Order number includes sender and receiver (pair)

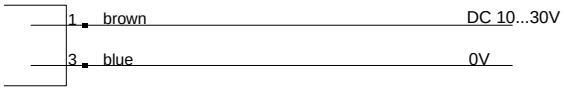
Technical data	MHSE15	P2236	P3236	P2336	P3336	N2236	N3236	N2336	N3336
Sensing range SR, typ. max./reflect	0…16.4 ft (0…5 m)	■	■	■	■	■	■	■	■
Operating range	0…12.5 ft (0…3.8 m)	■	■	■	■	■	■	■	■
Light spot diameter	Approx. 2.6 in at 13.1 ft (65 mm at 4 m)	■	■	■	■	■	■	■	■
Angle of dispersion sender	Approx. 1.5°	■	■	■	■	■	■	■	■
Optical axis	Axial	■	■	■	■	■	■	■	■
Light source[1], light type	LED red light, 650 nm	■	■	■	■	■	■	■	■
Light reception indicator	Yellow LED: lights continuously:	■	■	■	■	■	■	■	■
	Light reception > switching threshold 1	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■	■	■
Residual ripple[3]	≤ 5 V_{PP}	■	■	■	■	■	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■	■	■	■	■	■
Switching outputs	Q: PNP	■	■	■	■				
	Q: NPN					■	■	■	■
Signal voltage HIGH	V_S - 2.9 V	■	■	■	■				
	V_S					■	■	■	■
Signal voltage LOW	Approx. 0 V	■	■	■	■				
	≤ 2.9 V					■	■	■	■
Switching mode	Light switching			■	■			■	■
	Dark switching	■	■			■	■		
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■	■	■
Response time[5]	≤ 1.4 ms	■	■	■	■	■	■	■	■
Max. switching frequency[6]	350/s	■	■	■	■	■	■	■	■
Connection type plug	M12, 3-pin		■		■		■		■
cable[7] sender	PUR, 2 m, 2x0.14 mm², Ø 3.6 mm	■		■		■		■	
cable[7] receiver	PUR, 2 m, 3x0.14 mm², Ø 3.6 mm	■		■		■		■	
VDE protection class cable[8]	□	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■	■	■	■	■
	Storage -13…158° F (-25…70° C)	■	■	■	■	■	■	■	■
Weight	With plug, sender/receiver each approx 0.01 lb. (7 g)		■		■		■		■
	With cable 2 m, sender/receiver each approx. 0.2 lb. (90 g)	■		■		■		■	
Housing material	Housing: ABS	■	■	■	■	■	■	■	■
	Optic: PMMA	■	■	■	■	■	■	■	■

1) Average service life 100,000 h at T_A=77° F (25° C)
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 32° F (0° C)
8) Reference voltage 50 V DC
9) A = V_S connection reverse-polarity protected
B = Interference pulse suppression
C = Outputs overcurrent and short circuit protected

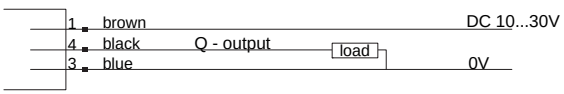
Connection diagram

MHSE15-N3236	MHSE15-N2236
MHSE15-N3336	MHSE15-N2336
MHSE15-P3236	MHSE15-P2236
MHSE15-P3336	MHSE15-P2336

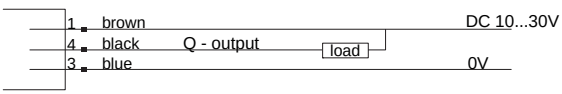
Sender



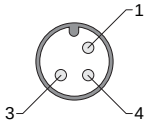
PNP Models



NPN Models



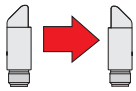
M12 Connector



Wire colors refer to standard cable, not included with quick disconnect models.

MHSE15

Through-beam Sensors






0...13.1 ft (0...4 m)
sensing range

Class 2
LISTED 87LL

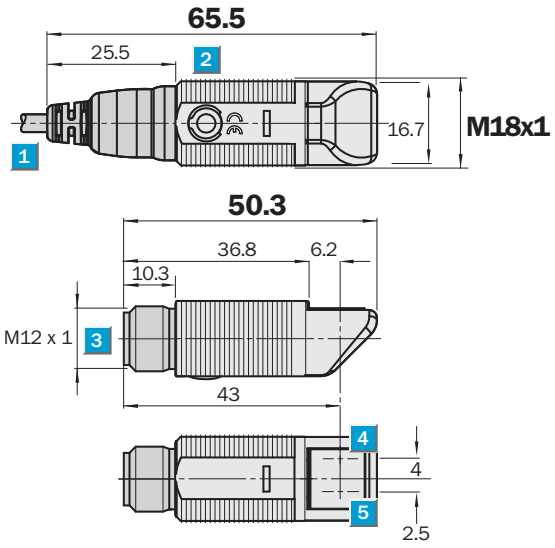
Highlights

- Long sensing range
- Indicator LED shows output and operating reserve
- Right-angle optic axis
- Mounting accessories included - M18 nuts and patented snap ring

MHSE15

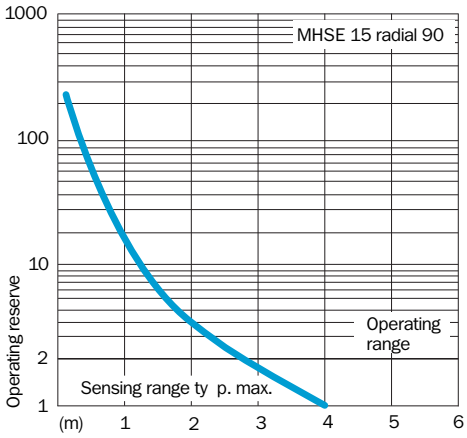


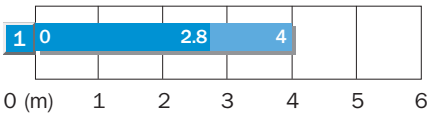
Dimensional drawing



dimensions in mm

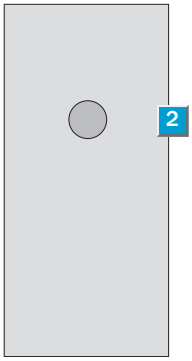
Sensing distance





Adjustments

All types



1 2 m connector cable
2 Yellow LED indicator, (only receiver MHE 15)
-lights continuously:
Light reception > switching threshold 1
3 M12 plug, 3-pin
4 Axis of sender
5 Axis of receiver

Accessories	page
Cables and connectors	1180
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Order information

Type	Part no.[1]
MHSE15-N2238	1026146
MHSE15-N3238	1026147
MHSE15-N2338	1026148
MHSE15-N3338	1026149
MHSE15-P2238	1026150
MHSE15-P3238	1026151
MHSE15-P2338	1026152
MHSE15-P3338	1026153

[1] Order number includes sender and receiver (pair)

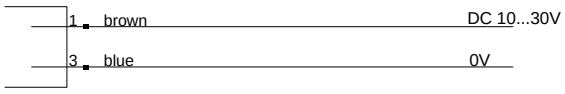
Technical data		MHSE15	P2238	P3238	P2338	P3338	N2238	N3238	N2338	N3338
Sensing range SR, typ. max./reflect.		0…13.1 ft (0…4 m)	■	■	■	■	■	■	■	■
Operating range		0… 9.2 ft (0…2.8 m)	■	■	■	■	■	■	■	■
Light spot diameter		Approx. 1.9 in at 9.8 ft (50 mm at 3 m)	■	■	■	■	■	■	■	■
Angle of dispersion sender		Approx. 1.5°	■	■	■	■	■	■	■	■
Optical axis		Radial (90°)	■	■	■	■	■	■	■	■
Light source[1], light type		LED red light, 650 nm	■	■	■	■	■	■	■	■
Light reception indicator		Yellow LED: lights continuously:	■	■	■	■	■	■	■	■
		Light reception > switching threshold 1	■	■	■	■	■	■	■	■
Supply voltage V_S		10…30 V DC[2]	■	■	■	■	■	■	■	■
Residual ripple[3]		≤ 5 V_{PP}	■	■	■	■	■	■	■	■
Current consumption[4]		≤ 30 mA	■	■	■	■	■	■	■	■
Switching outputs		Q: PNP	■	■	■	■				
		Q: NPN					■	■	■	■
Signal voltage HIGH		V_S - 2.9 V	■	■	■	■				
		V_S					■	■	■	■
Signal voltage LOW		Approx. 0 V	■	■	■	■				
		≤ 2.9 V					■	■	■	■
Switching mode		Light switching			■	■			■	■
		Dark switching	■	■			■	■		
Output current I_A max.		≤ 100 mA	■	■	■	■	■	■	■	■
Response time[5]		≤ 1.4 ms	■	■	■	■	■	■	■	■
Max. switching frequency[6]		350/s	■	■	■	■	■	■	■	■
Connection type	plug	M12, 3-pin		■		■		■		■
	cable[7] sender	PUR, 2 m, 2x0.14 mm², Ø 3.6 mm	■		■		■		■	
	cable[7] receiver	PUR, 2 m, 3x0.14 mm², Ø 3.6 mm	■		■		■		■	
VDE protection class cable[8]		□	■	■	■	■	■	■	■	■
Enclosure rating		IP 67	■	■	■	■	■	■	■	■
Circuit protection[9]		A, B, C	■	■	■	■	■	■	■	■
Ambient temperature T_A		Operation -13…131° F (-25…55° C)	■	■	■	■	■	■	■	■
		Storage -13…158° F (-25…70° C)	■	■	■	■	■	■	■	■
Weight	With plug	Sender/receiver each approx 0.01 lb. (8 g)		■		■		■		■
	With cable 2 m	Sender/receiver each approx. 0.2 lb. (91 g)	■		■		■		■	
Housing material		Housing: ABS	■	■	■	■	■	■	■	■
		Optic: PMMA	■	■	■	■	■	■	■	■

1) Average service life 100,000 h at T_A=77° F (25° C)
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 32° F (0° C)
8) Reference voltage 50 V DC
9) A = V_S connection reverse-polarity protected
B = Interference pulse suppression
C = Outputs overcurrent and short circuit protected

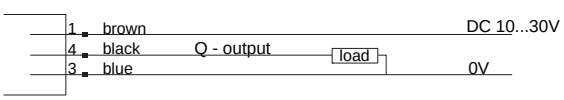
Connection diagram

MHSE15-N3238	MHSE15-N2238
MHSE15-N3338	MHSE15-N2338
MHSE15-P3238	MHSE15-P2238
MHSE15-P3338	MHSE15-P2338

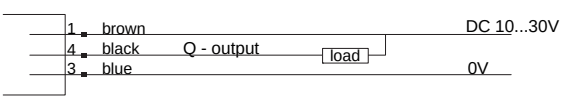
Sender



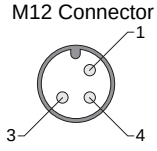
PNP Models



NPN Models



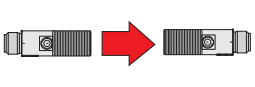
M12 Connector



Wire colors refer to standard cable, not included with quick disconnect models.

MHSE15V

Through-beam Sensors



Class 2

LISTED 87LL

0...16.4 ft (0...5.0 m)
sensing distance

JohnsonDiversey

Stainless Steel

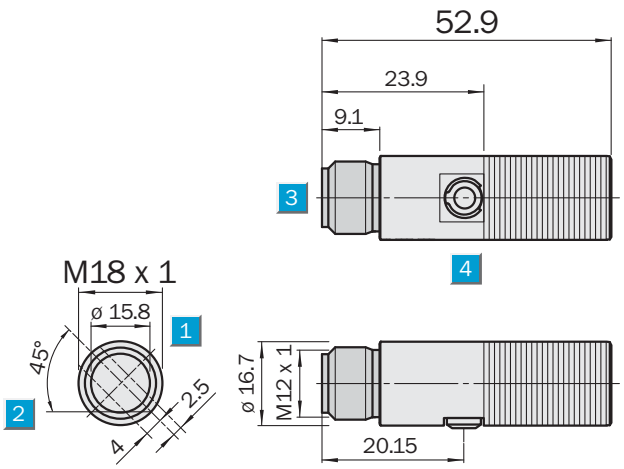
Highlights

- 100% stainless steel housing 316L
- IP 69K, IP 68, IP 67 enclosure ratings
- Very short housing

MHSE15V

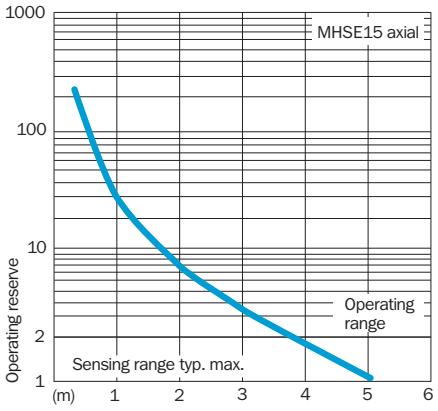


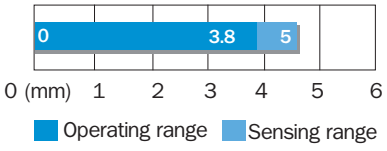
Dimensional drawing



dimensions in mm

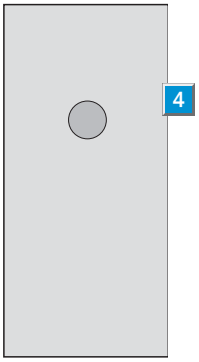
Sensing distance





Adjustments

All types



1 Sender axis
2 Receiver axis
3 M12 plug, 3-pin
4 Yellow LED indicator (only receiver MHE15V)
• lights continuously:
Light reception > reserve factor 1

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
MHSE15-P3236V	1 043 818
MHSE15-P3336V	1 043 819
MHSE15-N3236V	1 043 816
MHSE15-N3336V	1 043 817

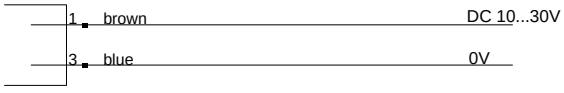
Technical data		MHSE15	P3236V	P3336V	N3236V	N3336V
Sensing range SD, typ. max.		0…16.4 ft (0…5.0 m)	■	■	■	■
Operating range SD		0…12.5 ft (0…3.8 m)	■	■	■	■
Light spot diameter		Approx. 2.6 in at 13.1 ft (65 mm at 4.0 m)	■	■	■	■
Angle of dispersion sender		Approx. 1.5°	■	■	■	■
Light source[1], light type		LED, red light, 650 nm	■	■	■	■
Optical axis		Axial	■	■	■	■
Light reception indicator		Yellow LED: lights continuously:	■	■	■	■
		Light reception > switching threshold 1	■	■	■	■
Supply voltage V_S		10…30 V DC[2]	■	■	■	■
Residual ripple[3]		≤ 5 V_{PP}	■	■	■	■
Current consumption[4]		≤ 30 mA	■	■	■	■
Switching outputs		Q: PNP	■	■		
		Q: NPN			■	■
Signal voltage HIGH		V_S - 2.9 V	■	■		
		V_S			■	■
Signal voltage LOW		Approx. 0 V	■	■		
		≤ 2.9 V			■	■
Switching mode		Light switching		■		■
		Dark switching	■		■	
Output current I_A max.		≤ 100 mA	■	■	■	■
Response time[5]		≤ 1.4 ms	■	■	■	■
Max. switching frequency[6]		350/s	■	■	■	■
Connection type	plug	M12, 3-pin[7]	■	■	■	■
VDE protection class cable[8]		□	■	■	■	■
Enclosure rating to DIN 40050		IP 67, IP 68, IP 69K	■	■	■	■
Certificates[9]		ECOLAB, JohnsonDiversey	■	■	■	■
Circuit protection[10]		A, B, C	■	■	■	■
Ambient temperature		Operation -13…131° F (-25…55° C)	■	■	■	■
		Storage -13…158° F (-25…70° C)	■	■	■	■
Weight		With plug, approx 1.8 oz (50 g)	■	■	■	■
Housing material		Housing: 100% stainless steel 1.4404	■	■	■	■
		Optic: PMMA 3 mm, surface hardened & tempered	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceeded or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Gold-plated contact pins
8) Reference voltage 50 V DC
9) Refer to the corresponding certificates for details
10) A = V_S connections reverse-polarity protected
B = Interference pulse suppression
C = Outputs overcurrent and short-circuit protected

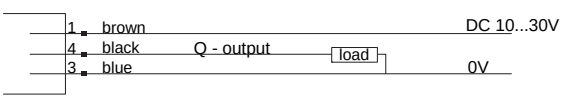
Connection diagram



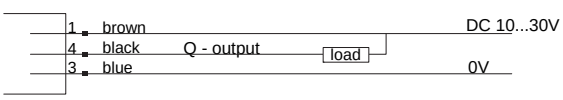
Sender



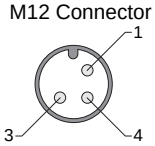
PNP Models



NPN Models



M12 Connector



Wire colors refer to standard cable, not included with quick disconnect models.

VT 12T-2

Proximity/Diffuse Sensors-Energetic



0...4.5 in (0...115 mm)
sensing range

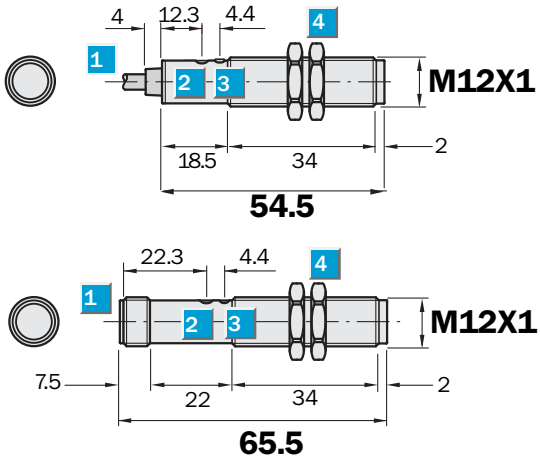
Highlights

- Rugged metal housing
- Sensitivity can be set via teach-in
- Reverse polarity and short-circuit protection
- Easy mounting with included nuts
- Cable or M12 quick disconnect versions

VT 12T-2

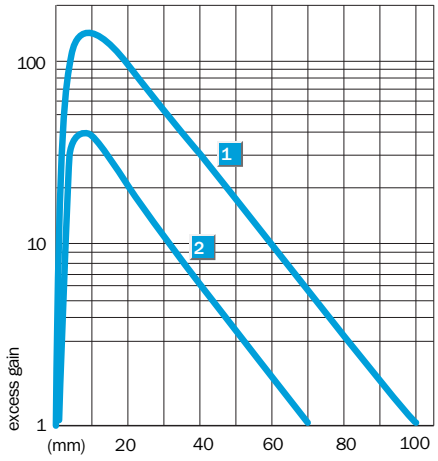


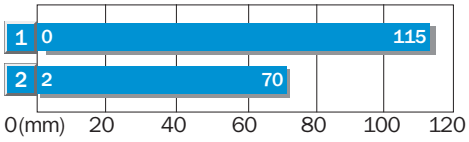
Dimensional drawing



dimensions in mm

Excess gain

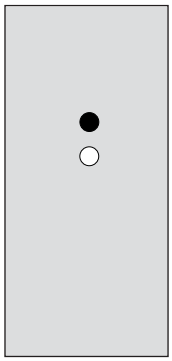




1 Sensing range on white, 90% remission
1 Sensing range on gray, 18% remission

Adjustments

All types



1 Cable or plug, M12 4-pin
2 Sensitivity adjustment (teach-in button)
3 Yellow LED indicator:
-lights continuously: reception signal > reserve factor 2
-blinks: reception signal < reserve factor 2
but > switching threshold 1
4 Mounting nuts (2x), SW 17, metal

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Order information

Type	Part no.
VT 12T-2P112	6 026 211
VT 12T-2P410	6 026 212
VT 12T-2N112	6 026 209
VT 12T-2N410	6 026 210

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Technical data	VT 12T-2-	P112	P410	N112	N410					
Sensing range, adjustable	0...4.5 in (0...115 mm)[1]	■	■	■	■					
Sensitivity setting	Manual, per teach-in button	■	■	■	■					
	Electronic, per control input C (0 V)[2]	■	■	■	■					
Light source[3], light type	LED, infrared light	■	■	■	■					
Light spot diameter	Approx. 0.8 in at 3.9 in (20 mm at 100 mm)	■	■	■	■					
Angle of divergence	Approx. 11.4° (SD = max.)	■	■	■	■					
	Approx. 22.6° (SD = 1/2 max.)	■	■	■	■					
Supply voltage V_S	10...30 V DC[4]	■	■	■	■					
Ripple[5]	± 10%	■	■	■	■					
Current consumption[6]	≤ 20 mA	■	■	■	■					
Switching outputs	Q: PNP	■	■							
	Q: NPN			■	■					
Output current I_A max.	100 mA	■	■	■	■					
Operation mode	Light/dark switching selectable[2]	■	■	■	■					
Response time[7]	≤ 1.25 ms	■	■	■	■					
Max. switching frequency[8]	400 Hz	■	■	■	■					
Connection types	Cable, PVC, 2 m[9]; 4 x 0.14 mm², Ø 3.75 mm	■		■						
	Plug, M12 4-pin		■		■					
VDE protection class[10]	⧈	■	■	■	■					
Circuit protection[11]	A, B, C, D	■	■	■	■					
Enclosure rating	IP 67/NEMA 6	■	■	■	■					
Ambient temperature T_A	Operation -13...158° F (-25...70° C)	■	■	■	■					
	Storage -13...158° F (-25...70° C)	■	■	■	■					
Approximate weight	1.9 oz (54 g)	■		■						
	0.6 oz (18 g)		■		■					
Housing material	Nickel-coated brass housing/PA	■	■	■	■					

1) Object to be detected with 90% remission (relating to standard white in acc. with DIN 5033)
2) Control input C
- L.ON/L.ON and - External teach-in
C = open: light switching L.ON
C = V_S: dark switching D.ON
C = 0 V: Sensitivity setting per "external Teach-in" active
3) Average service life 100,000 h at T_A = 25° C
4) Limit values
5) May not exceed or fall short of V_S tolerances
6) Without load
7) Signal transit time with resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0° C
10) Reference voltage DC 50 V
11) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

Sensitivity setting per teach-in function

Programming optionally
– manually per teach-in button or
– electronically per control input C
Very simple programming:
Always position the scanning object at the target position in the light path.
Press the teach-in button 1 x or activate control input C (0 V) 1 x:
Sensitivity setting has been completed.
Feedback: yellow LED indicator
Permanent storage of the "taught-in switching threshold and hysteresis,"
even if power is interrupted for longer times.
Two programming types for your sensitivity adjustment.
Two easy-to-operate teach-in modes are available to let you adjust sensitivity optimally.

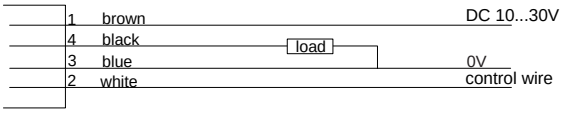
Sensitivity setting
Always position the scanning object at the target position in the light path.

1. Sensitivity setting 1, applications: substantial operating reserve
For all standard applications:
– Large operating reserve, factor > 2 above switching threshold:
Short "teach-in time" > 2 s ... < 7 s.
Press the teach-in button 1 x or activate control input C (0 V) = > 2 s ... < 7 s.
Yellow LED indicator → goes off → lights after > 2 s again → deactivate teach-in signal → **sensitivity setting completed!** → Check application.
Yellow LED indicator lights after teach-in process has been completed.

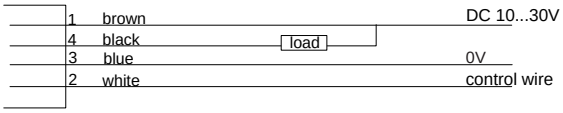
2. Sensitivity setting 2, applications: precise switching point
For slight differences between scanning object and background
For positioning tasks
For simple contrast detection:
– Small switching hysteresis, smaller operating reserve, factor > 1 < 2 above switching threshold:
Long "teach-in time" > 8 s
Press the teach-in button 1 x or activate control input C (0 V) = > 8 s
Yellow LED indicator → goes off → lights after > 2 s again → Blinks after > 8 s → deactivate teach-in signal → **sensitivity setting completed!** → Check application.
Yellow LED indicator blinks permanently after teach-in process has been completed.

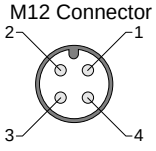
Connection diagram

PNP Models



NPN Models





wire colors refer to standard cable, not included with quick disconnect models

VT 12T-2

Proximity/Diffuse Sensors-Energetic



0...13.4 in (0...340 mm)
sensing range

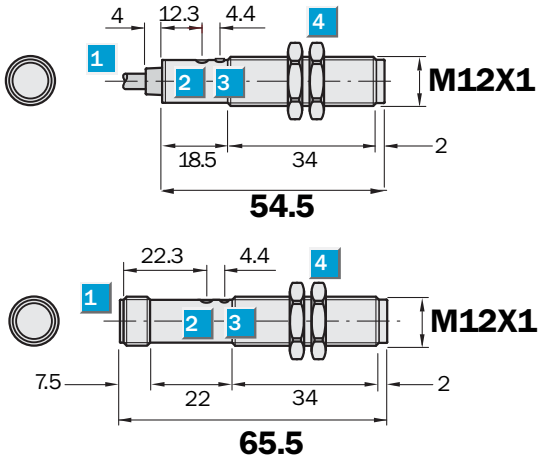
Highlights

- Rugged metal housing
- Sensitivity can be set via teach-in
- Reverse polarity and short-circuit protection
- Easy mounting with included nuts
- Cable or M12 quick disconnect versions

VT 12T-2

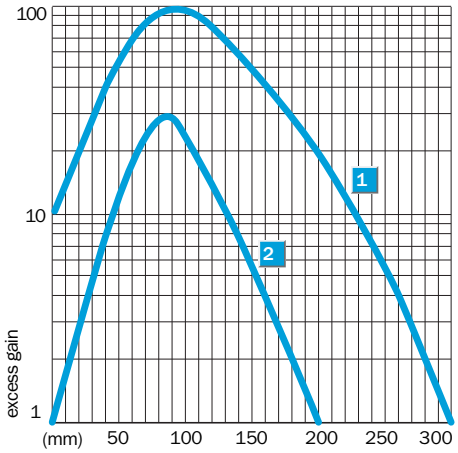


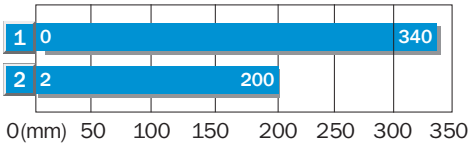
Dimensional drawing



dimensions in mm

Excess gain

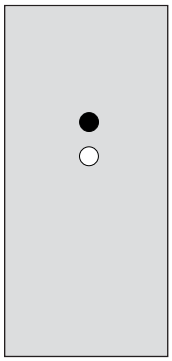




1 Sensing range on white, 90% remission
1 Sensing range on gray, 18% remission

Adjustments

All types



1 Cable or plug, M12 4-pin
2 Sensitivity adjustment (teach-in button)
3 Yellow LED indicator:
-lights continuously: reception signal > reserve factor 2
-blinks: reception signal < reserve factor 2
but > switching threshold 1
4 Mounting nuts (2x), SW 17, metal

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Order information

Type	Part no.
VT 12T-2P132	6 026 215
VT 12T-2P430	6 026 216
VT 12T-2N132	6 026 213
VT 12T-2N430	6 026 214

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Technical data	VT 12T-2-	P132	P430	N132	N430
Sensing range, adjustable	0...13.4 in (0...340 mm)[1]	■	■	■	■
Sensitivity setting	Manual, per teach-in button	■	■	■	■
	Electronic, per control input C (0 V)[2]	■	■	■	■
Light source[3], light type	LED, infrared light	■	■	■	■
Light spot diameter	Approx. 1.1 in at 11.8 in (28 mm at 300 mm)	■	■	■	■
Angle of divergence	Approx. 5.3° (SD = max.)	■	■	■	■
	Approx. 11.2° (SD = 1/2 max.)	■	■	■	■
Supply voltage V_S	10...30 V DC[4]	■	■	■	■
Ripple[5]	± 10%	■	■	■	■
Current consumption[6]	≤ 20 mA	■	■	■	■
Switching outputs	Q: PNP	■	■		
	Q: NPN			■	■
Output current I_A max.	100 mA	■	■	■	■
Operation mode	Light/dark switching selectable[2]	■	■	■	■
Response time[7]	≤ 1.25 ms	■	■	■	■
Max. switching frequency[8]	400 Hz	■	■	■	■
Connection types	Cable, PVC, 2 m[9]; 4 x 0.14 mm², Ø 3.75 mm	■		■	
	Plug, M12 4-pin		■		■
VDE protection class[10]	⧈	■	■	■	■
Circuit protection[11]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	Operation -13...158° F (-25...70° C)	■	■	■	■
	Storage -13...158° F (-25...70° C)	■	■	■	■
Approximate weight	1.9 oz (54 g)	■		■	
	0.6 oz (18 g)		■		■
Housing material	Nickel-coated brass housing/PA	■	■	■	■

1) Object to be detected with 90% remission (relating to standard white in acc. with DIN 5033)
2) Control input C
- L.ON/L.ON and - External teach-in
C = open: light switching L.ON
C = V_S: dark switching D.ON
C = 0 V: Sensitivity setting per "external Teach-in" active
3) Average service life 100,000 h at T_A = 25° C
4) Limit values
5) May not exceed or fall short of V_S tolerances
6) Without load
7) Signal transit time with resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0° C
10) Reference voltage DC 50 V
11) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

Sensitivity setting per teach-in function

Programming optionally
– manually per teach-in button or
– electronically per control input C
Very simple programming:
Always position the scanning object at the target position in the light path.
Press the teach-in button 1 x or activate control input C (0 V) 1 x:
Sensitivity setting has been completed.
Feedback: yellow LED indicator
Permanent storage of the "taught-in switching threshold and hysteresis,"
even if power is interrupted for longer times.
Two programming types for your sensitivity adjustment.
Two easy-to-operate teach-in modes are available to let you adjust sensitivity optimally.

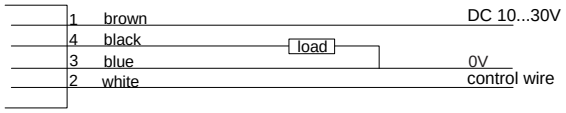
Sensitivity setting
Always position the scanning object at the target position in the light path.

1. Sensitivity setting 1, applications: substantial operating reserve
For all standard applications:
– Large operating reserve, factor > 2 above switching threshold:
Short "teach-in time" > 2 s ... < 7 s.
Press the teach-in button 1 x or activate control input C (0 V) = > 2 s ... < 7 s.
Yellow LED indicator → goes off → lights after > 2 s again → deactivate teach-in signal → **sensitivity setting completed!** → Check application.
Yellow LED indicator lights after Teach-in process has been completed.

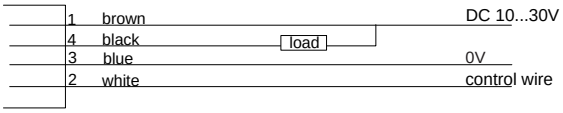
2. Sensitivity setting 2, applications: precise switching point
For slight differences between scanning object and background
For positioning tasks
For simple contrast detection:
– Small switching hysteresis, smaller operating reserve, factor > 1 < 2 above switching threshold:
Long "teach-in time" > 8 s
Press the teach-in button 1 x or activate control input C (0 V) = > 8 s
Yellow LED indicator → goes off → lights after > 2 s again → Blinks after > 8 s → deactivate teach-in signal → **sensitivity setting completed!** → Check application.
Yellow LED indicator blinks permanently after teach-in process has been completed.

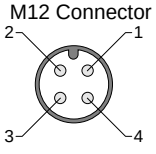
Connection diagram

PNP Models



NPN Models

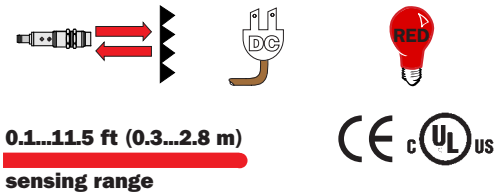




wire colors refer to standard cable, not included with quick disconnect models

VL 12-2

Reflex/Retro-Reflective Sensors



0.1...11.5 ft (0.3...2.8 m)
sensing range

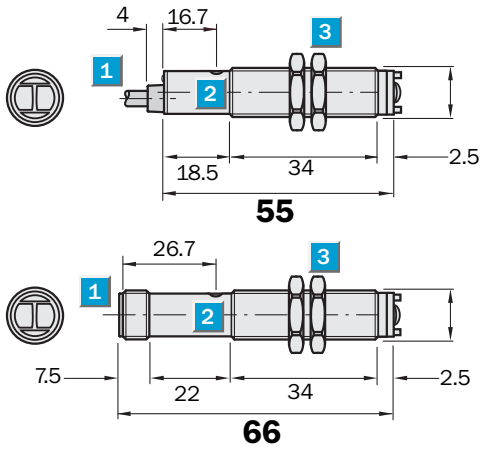
Highlights

- Rugged metal housing
- Signal strength indicator
- Standard 12 mm diameter
- Reverse polarity and short-circuit protection
- Easy mounting with included nuts
- Cable or M12 quick disconnect versions

WL 12-2

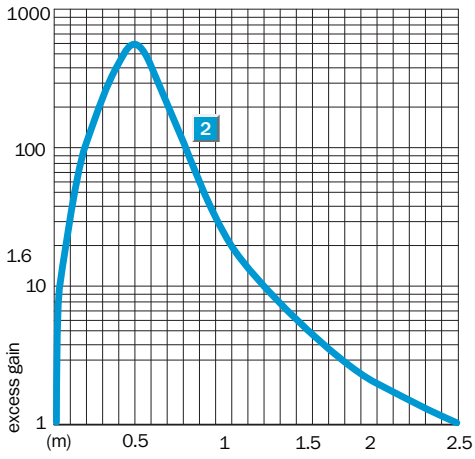


Dimensional drawing



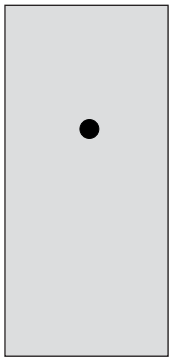
dimensions in mm

Excess gain



Adjustments

All types



1 Cable or plug, M12 4-pin
2 Yellow LED indicator:
- lights continuously: Reception signal > reserve factor 2
- blinks: Reception signal < reserve factor 2 but > switching threshold 1
3 Mounting nuts (2x), SW 17, metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

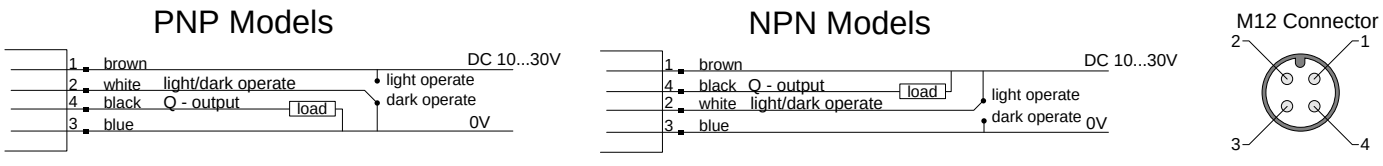
	Reflector type	Sensing range
1	PL 80 A	0.03...2.3 m
2	P975	0.03...2 m
3	PL 50 A/PL 40 A/ P 250	0.03...1.8 m
4	Reflective tape diamond grade	0.1...0.7 m

Order information	
Type	**Part no.**
VL12-2P132	6 026 219
VL12-2P430	6 026 220
VL12-2N132	6 026 217
VL12-2N430	6 026 218

Technical data	VL 12-2-	P132	P430	N132	N430
Sensing range	0.1...9.2 ft (0.03...2.8 m)/PL 80 A	■	■	■	■
Sensitivity setting	Not available	■	■	■	■
Light source[1], light type	LED, red light, with polarization filter	■	■	■	■
Light spot diameter	Approx. 3.9 in at 78.7 in (100 mm at 200 cm)	■	■	■	■
Angle of divergence	Approx. 2.3° (SR = max.)	■	■	■	■
	Approx. 6.3° (SR = 1/2 max.)	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■
Ripple[3]	± 10%	■	■	■	■
Current consumption[4]	≤ 20 mA	■	■	■	■
Switching outputs	Q: PNP	■	■		
	Q: NPN			■	■
Output current I_A max.	100 mA	■	■	■	■
Operation mode	Light/dark switching selectable	■	■	■	■
Response time[5]	≤ 1.25 ms	■	■	■	■
Max. switching frequency[6]	400 Hz	■	■	■	■
Connection types	Cable, PVC, 2 m[7]; 4 x 0.14 mm², Ø 3.75 mm	■		■	
	Plug, M 12 4-pin		■		■
VDE protection class[8]	□	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Ambient temperature T_A	-13...158° F (-25...70° C)	■	■	■	■
Approximate weight	1.9 oz (54 g)	■		■	
	0.6 oz (18 g)		■		■
Housing material	Nickel-coated brass housing/PA	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage DC 50 V
9) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

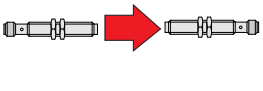
Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

VS/VE 12-2

Through-beam Sensors



0...16.4 ft (0...5 m)
sensing range

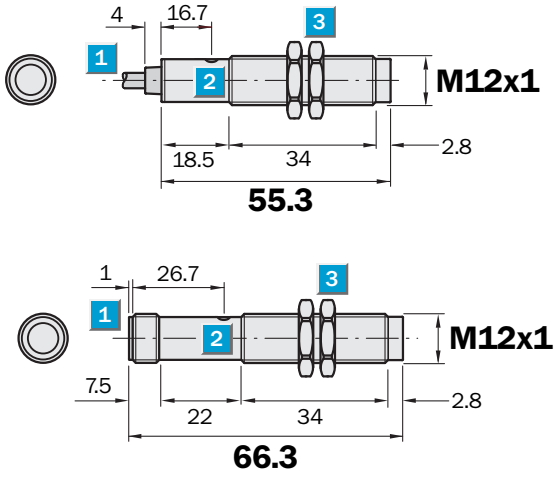
Highlights

- Rugged nickel-plated housing
- Standard 12 mm diameter
- Easily replaces 12 mm inductive sensors for difficult applications
- Easy mounting with included nuts
- Cable or M12 quick disconnect versions

VE/VE 12

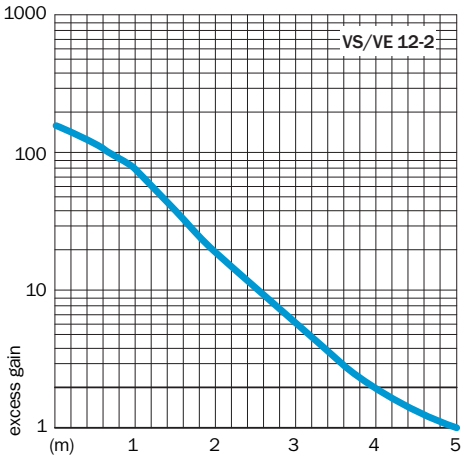


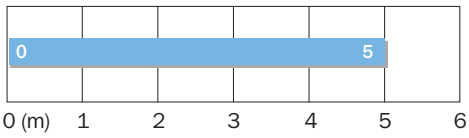
Dimensional drawing



dimensions in mm

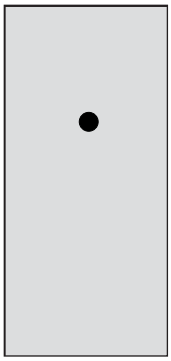
Excess gain





Adjustments

All types



1 Cable or plug M12 4-pin
2 Yellow LED indicator (continuously:
Sender VS 12-2: - power on, sender active
Receiver VE 12-2: - light reception > switching threshold 1
3 Mounting nuts (2x), SW 17 metal

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.[11]
VS/VE12-2P132	6 026 223
VS/VE12-2P430	6 026 224
VS/VE12-2N132	6 026 221
VS/VE12-2N430	6 026 222

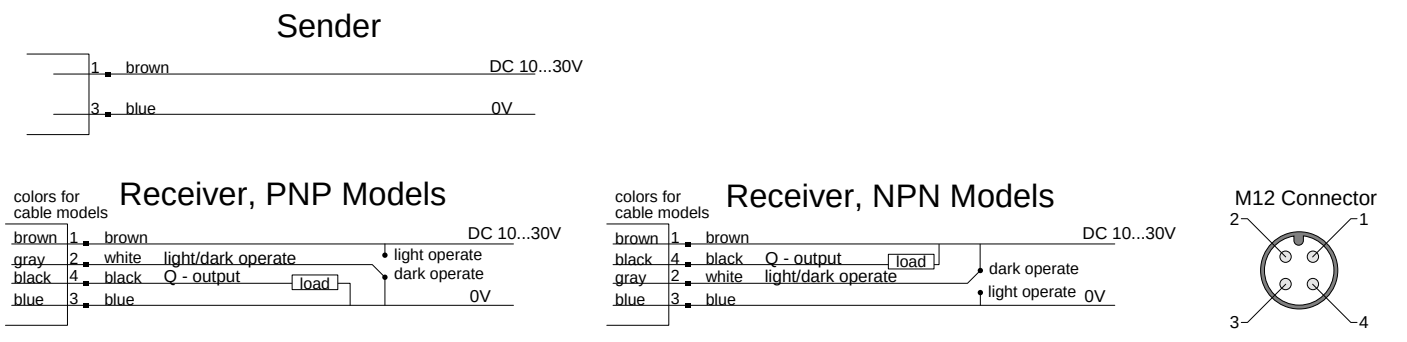
11) Part no. includes sender and receiver unit

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Technical data	VS/VE 12-2-	P132	P430	N132	N430
Sensing range	0...16.4 ft (0...5 m)	■	■	■	■
Light source[1], light type	LED, infrared light	■	■	■	■
Light spot diameter	Approx. 3.9 in at 13.1 ft (100 mm at 4 m)	■	■	■	■
Angle of divergence	Approx. 1.4° (SR = max.)	■	■	■	■
Angle of reception	Approx. 4.5° (SR = 1/2 max.)	■	■	■	■
Supply voltage V_S	10...30 V DC [2]	■	■	■	■
Ripple[3]	≤ 10%	■	■	■	■
Current consumption[4]	≤ 20 mA	■	■	■	■
Switching outputs	Q: PNP	■	■		
	Q: NPN			■	■
Output current I_A max.	≤ 100 mA	■	■	■	■
Operation mode	Light/dark switching selectable[5]	■	■	■	■
Response time[6]	≤ 2 ms	■	■	■	■
Max. switching frequency[7]	250 Hz	■	■	■	■
Connection types	Cable, PVC, 2 m[8]	■		■	
	Sender VS, 2 x 0.14 mm², Ø 3.75 mm	■		■	
	Receiver VE, 3 x 0.14 mm², Ø 3.75 mm	■		■	
	Plug, M12 4-pin		■		■
VDE protection class[9]	□	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A	Operation -13...158° F (-25...70° C)	■	■	■	■
	Storage -13...158° F (-25...70° C)	■	■	■	■
Approximate weight	Sender and receiver each 1.9 oz (54 g)	■		■	
	Sender and receiver each 0.6 oz (18 g)		■		■
Housing material	Nickel-plated brass housing / PA	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) L/D switching type control line
L/D = open (not assigned)
dark switching D.ON
L/D = + V_S: light switching L.ON
L/D = 0 V: dark switching D.ON
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A= V_S connections reverse-polarity protected
B= Inputs and outputs reverse-polarity protected
C= Interference pulse suppression
D= Outputs overload and short-circuit protected

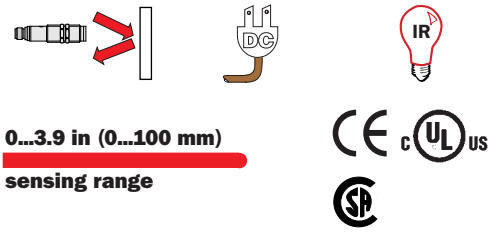
Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

VTF 18

Proximity/Diffuse Sensors-Fixed Focus



0...3.9 in (0...100 mm)
sensing range

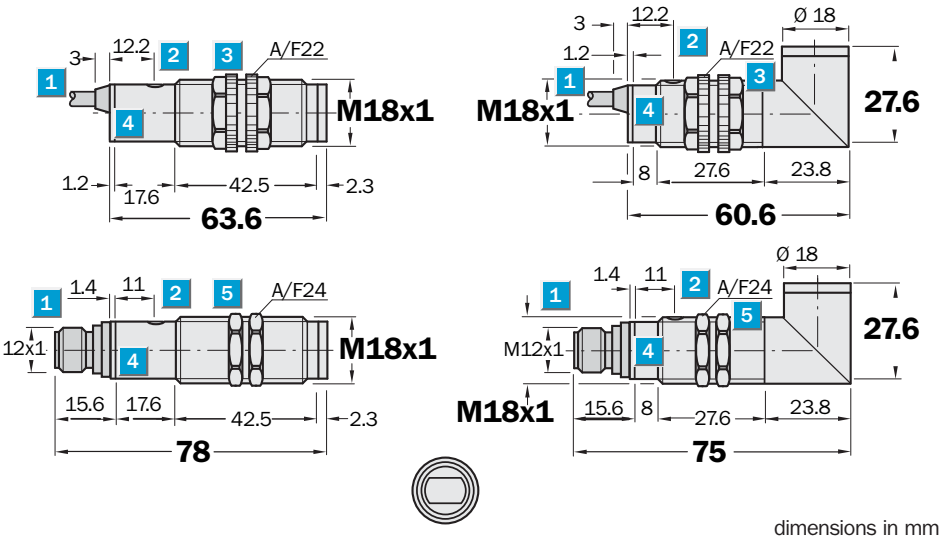
Highlights

- 2 sensing range options: 50 mm or 100 mm
- Signal strength indicator
- Crosstalk immunity
- Rugged plastic or metal housing
- Cable or M12 quick disconnects available
- Easy mounting with included nuts

VTF 18

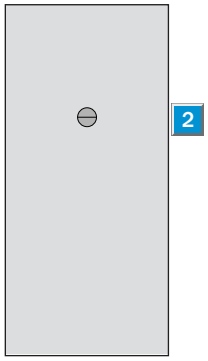


Dimensional drawing



dimensions in mm

Adjustments



1 Connecting cable or plug
2 Sensitivity control
3 Fastening nut, width across 22 mm, made of plastic for equipment with plastic housing
4 Signal strength indicator, LED, yellow
5 Fastening nut, width across 24 mm, made of metal for equipment with metal housing

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

See V.18 Selection Guide on page 1170

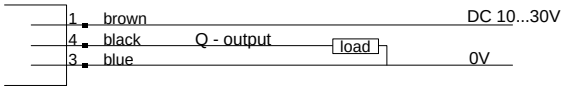
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Technical data	VTF 18-	3_5...	4_5...	3_1...	4_1...					
Housing	Straight	■	■	■	■					
	Angled, 90°	■	■	■	■					
VTF 18 2.0 in (50 mm)										
Sensing range[1]	0...2.0 in (0...50 mm)	■	■							
Light spot diameter	Approx. 0.1 in at 1.0 in (3 mm at 25 mm)	■	■							
Angle of divergence	Focused, focus 1.0 in (25 mm)	■	■							
Sensitivity, adjustable (optional)	Potentiometer 270°	■	■							
VTF 18 3.9 in (100 mm)										
Sensing range[1]	0.1...3.9 in (3...100 mm)			■	■					
Light spot diameter	Approx. 0.1 in at 2.0 in (3 mm at 50 mm)			■	■					
Angle of divergence	Focused, focus 2.0 in (50 mm)			■	■					
Sensitivity, adjustable (optional)	Potentiometer 270°			■	■					
Light source[2], light type	LED, infrared light	■	■	■	■					
Supply voltage V_S	10…30 V DC[3]	■	■	■	■					
Ripple[4]	± 10%	■	■	■	■					
Current consumption[5]	≤ 30 mA	■	■	■	■					
Switching outputs (optional)	PNP/NPN	■	■	■	■					
Operation mode	Q, dark switching	■		■						
	Q, light switching	■		■						
via control wire[6]	Q, light/dark switching		■		■					
	+ V_S = light switching		■		■					
	0 V = dark switching		■		■					
Output current I_A max.	100 mA	■	■	■	■					
Response time[7]	≤ 2 ms	■	■	■	■					
Max. switching frequency[8]	250 Hz	■	■	■	■					
Connection types	Cable, 2 m[9], PVC, 3 x 0.14 mm², Ø 3.1 mm	■		■						
	Cable, 2 m[9], PVC, 4 x 0.14 mm², Ø 5 mm		■		■					
	Plug, M12 4-pin	■	■	■	■					
VDE protection class[10]	□	■	■	■	■					
Circuit protection[11]	A, B, C, D	■	■	■	■					
Enclosure rating	IP 67	■	■	■	■					
Ambient temperature T_A	-13...158° F (-25...70° C)	■	■	■	■					
Approximate weight	Metal housing: 4.2 oz (120 g)	■	■	■	■					
	Plastic housing: 3.5 oz (100 g)	■	■	■	■					
Housing material	Nickel-plated brass, PBT/PC	■	■	■	■					
	Plastic housing, PBT/PC	■	■	■	■					

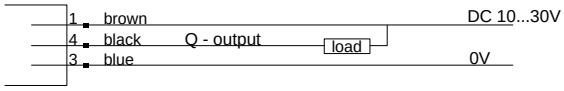
1) Object with 90% reflectance (referred to standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) Control wire open:
NPN: light-switching
PNP: dark-switching
7) With resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0° C
10) Reference voltage 50 V DC
11) A = V_s connections reverse-polarity protected
B = Inputs/outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

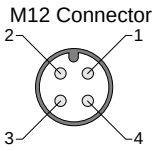
PNP Models



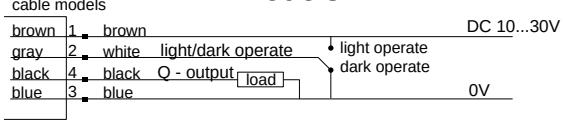
NPN Models



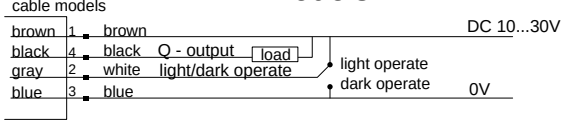
M12 Connector



PNP Models



NPN Models



wire colors refer to standard cable, not included with quick disconnect models

VTE 18

Proximity/Diffuse Sensors-Energetic



0.1...31.5 in (3...800 mm)
sensing range

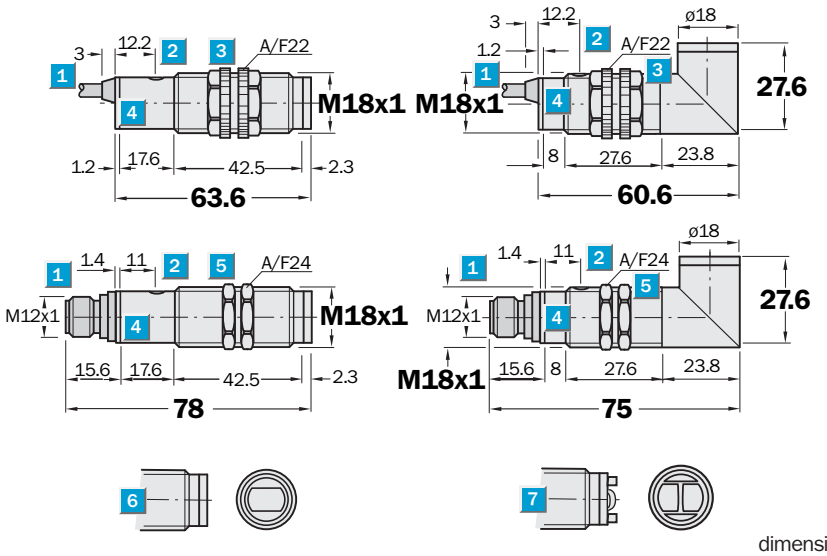
Highlights

- Rugged plastic or metal housing
- Light or dark switching available
- 3 sensing range options:
  SD 1 = 7.9 in (200 mm)
  SD 2 = 15.7 in (400 mm)
  SD 3 = 31.5 in (800 mm)
- Standard 18 mm diameter
- Easy mounting with included nuts

VT 18

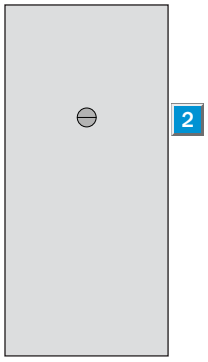


Dimensional drawing



dimensions in mm

Adjustments



1 Connecting cable or M12 plug
2 Sensitivity control
3 Fastening nut, width across 22 mm, made of plastic for equipment with plastic housing
4 Signal strength indicator, LED, yellow
5 Fastening nut, width across 24 mm, made of metal for equipment with metal housing
6 Sensors with a range of 200 mm to 400 mm
7 Sensors with a range of 800 mm

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

See V.18 Selection Guide on page 1170

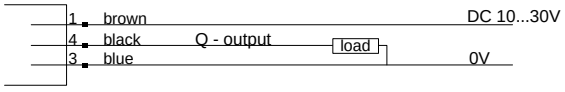
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Technical data	VTE 18-	3_2...	4_2...	3_4...	4_4...	3_8...	4_8...
Housing	Straight	■	■	■	■	■	■
	Angled, 90°	■	■	■	■	■	■
VTE 18 sensing range 7.9 in (200 mm)							
Sensing range[1]	0.1...7.9 in (3...200 mm)	■	■				
Light spot diameter	Approx. 0.4 in at 7.9 in (10 mm at 200 mm)	■	■				
VTE 18 sensing range 15.7 in (400 mm)							
Sensing range[1]	0.2...15.7 in (5...400 mm)			■	■		
Light spot diameter	Approx. 0.8 in at 15.7 in (20 mm at 400 mm)			■	■		
VTE 18 sensing range 31.5 in (800 mm)							
Sensing range[1]	0.4...31.5 in (10...800 mm)					■	■
Light spot diameter	Approx. 1.6 in at 31.5 in (40 mm at 800 mm)					■	■
Sensitivity adjustable (optional)	Potentiometer 270°	■	■	■	■	■	■
Light source[2], **light type**	LED, infrared light	■	■	■	■	■	■
Angle of divergence	Approx. 2.8°	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[3]	■	■	■	■	■	■
Ripple[4]	± 10%	■	■	■	■	■	■
Current consumption[5]	≤ 30 mA	■	■	■	■	■	■
Switching outputs (optional)	PNP/NPN; open collector: Q	■	■	■	■	■	■
Operation mode	Q, light/dark switching	■		■		■	
	Q, light switching	■		■		■	
	Q, light/dark switching via control wire L/D[6]		■		■		■
	+ V_S = light switching		■		■		■
	0 V = dark switching		■		■		■
Output current I_A max.	100 mA	■	■	■	■	■	■
Response time[7]	≤ 2 ms	■	■	■	■	■	■
Max. switching frequency[8]	250 Hz	■	■	■	■	■	■
Connection types	Cable, 2 m,[9] PVC, 3 x 0.14 mm², Ø 3.1 mm	■		■		■	
	Cable, 2 m,[9] PVC, 4 x 0.14 mm², Ø 5 mm		■		■		■
	Plug, M12 4-pin	■	■	■	■	■	■
VDE protection class[10]	□	■	■	■	■	■	■
Circuit protection[11]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Ambient temperature T_A	-13...158° F (-25...70° C)	■	■	■	■	■	■
Approximate weight	Metal housing: 4.2 oz (120 g)	■	■	■	■	■	■
	Plastic housing: 3.5 oz (100 g)	■	■	■	■	■	■
Housing material	Nickel-plated brass, PBT/PC	■	■	■	■	■	■
	Plastic housing, PBT/PC	■	■	■	■	■	■

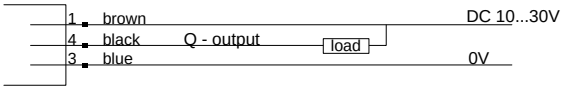
1) Object with 90% reflectance (referred to standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) Control wire open: NPN: light-switching PNP: dark-switching
7) With resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0° C
10) Reference voltage 50 V DC
11) A = V_S connections reverse-polarity protected
B = Inputs/outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

PNP Models

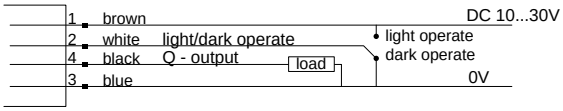


NPN Models

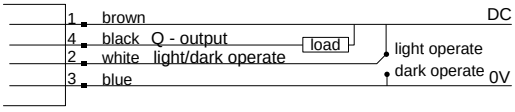


wire colors refer to standard cable, not included with quick disconnect models.

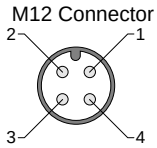
PNP Models



NPN Models



M12 Connector



VTE 18 L

Proximity/Diffuse Sensors-Energetic



0...15.7 in (0...400 mm)
0.08...9.8 in (2...250 mm)

sensing range

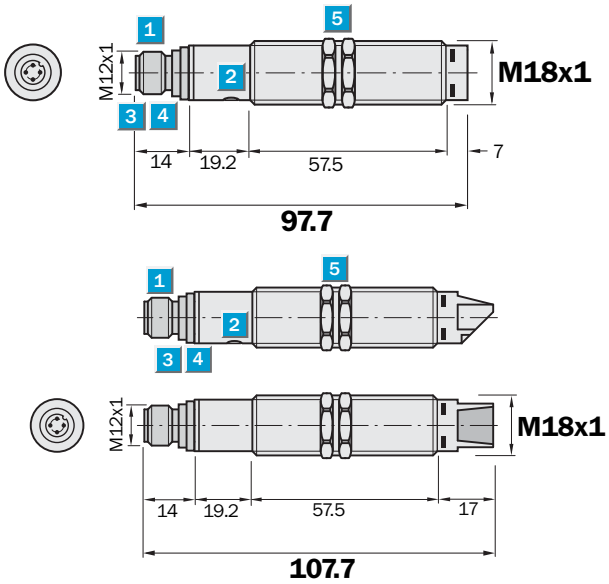
Highlights

- Detects small parts precisely due to the small laser light spot
- Laser Class 1
- Adjustable sensitivity

VTE 18 L

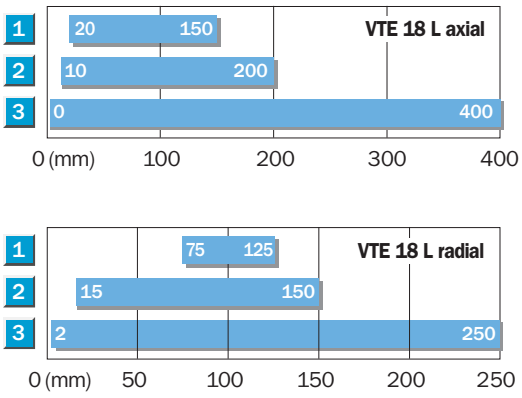


Dimensional drawing



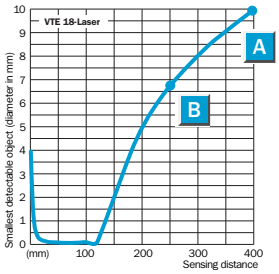
dimensions in mm

Excess gain



Sensing range, max. typ.

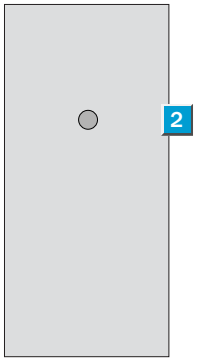
1 Sensing range on black, 6% remission
2 Sensing range on gray, 18% remission
3 Sensing range on white, 90% remission



A Axial optics
B Radial optics

Adjustments

All types

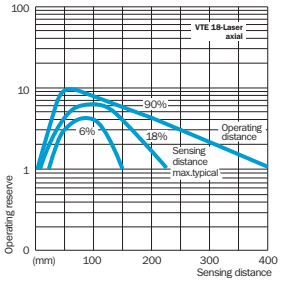


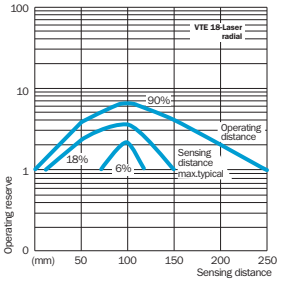
1 Plug M12, 4-pin
2 Sensitivity adjustment (teach-in button)
3 Green LED indicator: V_S supply voltage feed
4 Yellow LED indicator:
– lights continuously:
reception signal > reserve factor 2
– blinks: Reception signal < reserve factor 2
but > switching threshold 1
5 Mounting nuts (2x), SW 24, metal
(included with delivery)

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

Type	Part no.
VTE 18 L-4P324	6 027 418
VTE 18 L-4N324	6 027 420
VTE 18 L-4P344	6 027 422
VTE 18 L-4N344	6 027 424

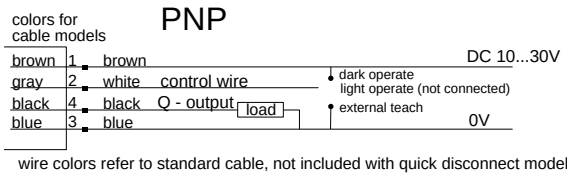


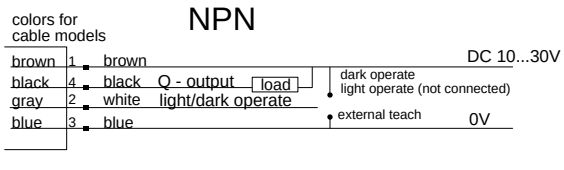


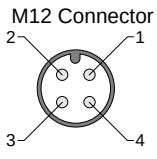
Technical data	VTE 18 L-	4P324	4P344	4N324	4N344					
Sensing range, max. typical [1]	0...15.7 in (0...400 mm)	■		■						
	0.08...9.8 in (2...250 mm)		■		■					
Minimum object diameter[1]	= Light spot diameter	■	■	■	■					
Light spot diameter	Approx. 0.004 in at 3.9 in (0.1 mm in 100 mm) (= Focus)	■	■	■	■					
	Approx. 0.2 in at 7.9 in (5.0 mm in 200 mm)	■	■	■	■					
	Approx. 0.3 in at 11.8 in (8.0 mm in 300 mm) (only axial)	■		■						
Angle of divergence	Focused, focus at 3.9 in (100 mm)	■	■	■	■					
Light source[2], Light type	Red laser LED, 650 nm	■	■	■	■					
Laser class	Laser Class 1 (IEC 60825-1)	■	■	■	■					
Laser sender output capacity	Max. 0.4 mW	■	■	■	■					
Housing	Axial optics	■		■						
	Radial optics		■		■					
Sensitivity setting	Manual, per teach-in button	■	■	■	■					
	Electronic, per control input C (0 V)[3]	■	■	■	■					
Status indicators	Yellow LED: switching output active, reserve	■	■	■	■					
	LED green: supply voltage V_S = ON	■	■	■	■					
Supply voltage V_S	10...30 V DC [4]	■	■	■	■					
Ripple[5]	≤ 10 %	■	■	■	■					
Current consumption[6]	≤ 30 mA	■	■	■	■					
Switching outputs	Q: PNP	■	■							
	Q: NPN			■	■					
Output current I_A max.	≤ 100 mA	■	■	■	■					
Switching mode	Light/dark switching selectable[3]	■	■	■	■					
Response time[7]	≤ 0.625 ms	■	■	■	■					
Switching frequency max.[8]	800/s	■	■	■	■					
Connection types	Plug, M12 4-pin	■	■	■	■					
VDE protection class[9]	□	■	■	■	■					
Enclosure rating	IP 67	■	■	■	■					
Circuit protection[10]	A, B, C, D	■	■	■	■					
Ambient temperature	Operation 5....131° F (-15...55° C)	■	■	■	■					
	Storage -13...158° F (-25...70° C)	■	■	■	■					
Approximate weight	With plug 2.1 oz (60 g)	■	■	■	■					
Housing material	Housing: Nickel-coated brass/PC	■	■	■	■					
	Optics: PC with protective glass pane	■	■	■	■					

1) Object to be detected with 90% emission (elating to standard white in acc. with DIN 5033); 100 x 100 mm
2) Average service life 100,000 h at T_A = +25° C
3) Control input C
– L.ON/D.ON and
– external teach-in
C = open: light switching L.ON
C = + V_S: dark switching D.ON
C = 0 V: Sensitivity setting per "external teach-in"
4) Limit values
5) May not exceed or fall short of V_S tolerances
6) Without load
7) Signal transit time with resistive load
8) With light/dark ratio 1:1
9) Reference voltage 50 V
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

Connection diagram







wire colors refer to standard cable, not included with quick disconnect models

VTF18V & VTE18V

Proximity/Diffuse Sensors



0...31.5 in (0...800 mm)/
0...15.7 in (0...400 mm)/
0...3.9 in (0...100 mm)

sensing range

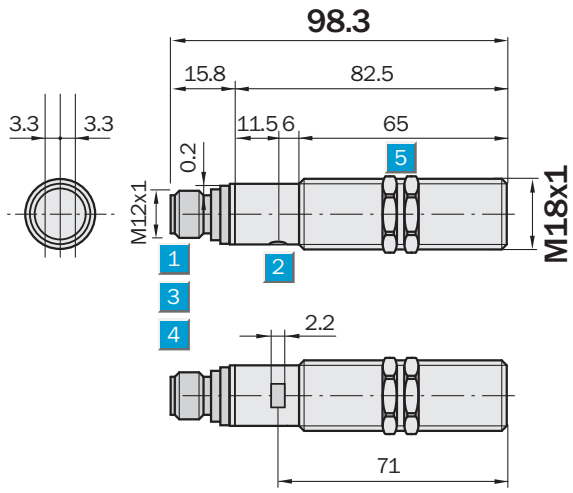
VTF18V & VTE18V



Highlights

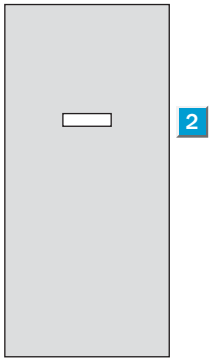
- Patented touch teach-in
- Sensitivity adjustment on equipment, but without mechanical operating elements
- Wash-down design: resistant against detergents, humidity and temperature

Dimensional drawing



dimensions in mm

Adjustments possible for VT18V	
VTF18-4P1240V	VTF18-4N1240V
VTE18-4P4240V	VTE18-4N4240V
VTE18-4P8240V	VTE18-4N8240V



1 Plug M12, 4-pin
2 Sensitivity adjustment touch-teach-in
3 Green LED indicator: signalizing touch-teach-in
4 Yellow LED indicator: light received
– lights continuously:
reception signal > reserve factor 2
– blinks: reception signal < reserve factor 2
but > switching threshold 1
5 Mounting nuts (2x), SW 24, stainless steel 316L (included with delivery)

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

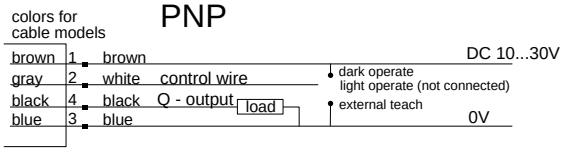
Type	Part no.
VTF18-4P1240V	6 035 487
VTF18-4N1240V	6 035 488
VTE18-4P4240V	6 035 489
VTE18-4N4240V	6 035 490
VTE18-4P8240V	6 035 491
VTE18-4N8240V	6 035 492

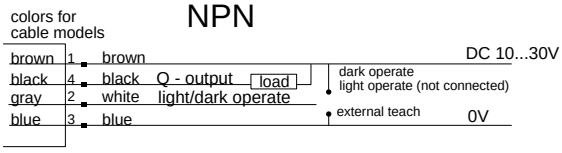
Technical data	VTF18V/VTE18V-	4P8240V	4N8240V	4P4240V	4N4240V	4P1240V	4N1240V
Sensing range RW, max. typical [1]	0...39.4 in (0...1000 mm)	■	■				
	0...17.3 in (0...440 mm)			■	■		
	0...4.3 in (0...110 mm)					■	■
Operating distance TW[1]	0.2...31.5 in (5...800 mm)	■	■				
	0.2...15.7 in (5...400 mm)			■	■		
	0.2...3.9 in (5...100 mm)					■	■
Light spot diameter	Approx. 2.4 in at 31.5 in (60 mm at 800 mm)	■	■				
	Approx. 1.2 in at 15.7 in (30 mm at 400 mm)			■	■		
	Approx. 0.4 in at 3.9 in (10 mm at 100 mm)					■	■
Angle of divergence	4.5°	■	■	■	■	■	■
Light source[2], Light type	Red laser LED, 660 nm					■	■
	Infrared LED, 880 nm	■	■	■	■		
Sensitivity adjustable	Manual, via touch teach-in[3]	■	■	■	■	■	■
Visualizing touch teach-in	LED green	■	■	■	■	■	■
Light reception indicator	LED yellow	■	■	■	■	■	■
	Light continuously: reserve factor > 2	■	■	■	■	■	■
	Blinks: reserve factor > 1.0…< 2.0	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC [4]	■	■	■	■	■	■
Ripple[5]	≤ 10 %	■	■	■	■	■	■
Current consumption[6]	≤ 35 mA	■	■	■	■	■	■
Switching outputs	Q: PNP, open collector	■		■		■	
	Q: NPN, open collector		■		■		■
Signal voltage PNP	V_S-2.0 V/approx. 0 V	■		■		■	
Signal voltage NPN	V_S/≤ 2.0 V		■		■		■
Switching mode	Light/dark switching selectable[7]	■	■	■	■	■	■
Output current I_A max.	≤ 100 mA	■	■	■	■	■	■
Response time[8]	≤ 1 ms	■	■	■	■	■	■
Switching frequency max.[9]	500/s	■	■	■	■	■	■
Connection types	Plug, M12 4-pin[10]	■	■	■	■	■	■
VDE protection class[11]	□	■	■	■	■	■	■
Enclosure rating to DIN 40050	IP 67, IP 68, IP 69K	■	■	■	■	■	■
Certificates[12]	ECOLAB, JohnsonDiversey	■	■	■	■	■	■
Circuit protection[13]	A, B, C, D	■	■	■	■	■	■
Ambient temperature	Operation -13....185° F (-25...85° C)	■	■	■	■	■	■
	Operation -13....212° F (-25...100° C)	■	■	■	■	■	■
	Storage -40...212° F (-40...100° C)	■	■	■	■	■	■
Approximate weight	With plug 4.2 oz (120 g)	■	■	■	■	■	■
Housing material	Housing: Stainless steel AISI 316L	■	■	■	■	■	■
	Device plug: M12, PPS	■	■	■	■	■	■
	Optics: Plan, PPMA surface hardened and tempered (FDA[14])	■	■	■	■	■	■

1) Object to be detected with 90% emission (elating to standard white in acc. with DIN 5033); 100 x 100 mm
2) Average service life 100,000 h at T_A = +25° C
3) Patent number: M02007A00275 Date: 31.08.2007
4) Limit values
5) May not exceed or fall short of V_S tolerances
6) Without load at Vs 30 V DC
7) L/D switching type control line
L/D = + Vs: light switching L.ON
L/D = 0 V: dark switching D.ON
Control line open
NPN: light switching L.ON
PNP: dark switching D.ON
8) Signal transit time with resistive load
9) With light/dark ratio 1:1
10) Pins gold-plated
11) Reference voltage 50 V
12) Refer to the corresponding certificates for details
13) A=V_S connections reverse-polarity protected
B=Inputs and outputs reverse-polarity protected
C=Interference pulse suppression
D=Outputs overload and short-circuit protected
14) Synthetic material with FDA certificate

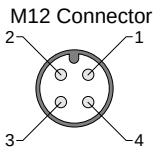
Connection diagram







wire colors refer to standard cable, not included with quick disconnect models



Sensitivity adjustable per touch teach-in for photoelectric switches V18V in stainless steel housing

Simple & Smart:

Sensitivity adjustment per touch teach-in for photoelectric switches VTF18V, VTE18V and VL18V glass.

- **Manual sensitivity adjustment**
  - Per touch teach-in
  - Simple handling
- **Activate touch-teach-in 1 x**
  - Sensitivity setting completed
  - FEEDBACK: Yellow LED indicator
  - Permanent storage of the "taught-in switching threshold and hysteresis," even if power is interrupted for long periods of time.

Sensitivity setting HANDLING:

- **Photoelectric proximity switch VTF18V & VTE18V:**
  - Always position object at target position
  - Object directly on sensing object
- **VL18V photoelectric reflex switch:**
  - Always remove object
  - Align VL18V directly on the reflector (max. light reception).

Manipulation protection of touch-teach-in

Simple & smart: Locking/unlocking of the sensitivity adjustment per touch teach-in.

- **Handling:**
  - EXTRA-LONG TOUCH; activate "teach-in" > 14 s
  - Signalizing LED green: 1x OFF/ON – blinks fast – OFF
  - Locking/unlocking activated
- **Signalizing:**
  - LED green ON: touch teach-in active (ex-works setting)
  - LED green OFF: touch teach-in inactive (locked)

Optimum sensitivity adjustment due to 2 easy-to-operate touch teach-in options.

1 short teach

Standard setting for high operating reserve

- **Applications:**
  - For all standard applications
  - High operating reserve, factor > 2 above switching threshold
- **Handling:**
  - Short Touch; activate "teach-in" > 2 s…< 7 s
  - Signalizing LED green: 1x OFF/ON
    Sensitivity adjustment completed; check application.
- Signalizing: Green LED indicator: Lit continuously
  Yellow LED indicator: Lit continuously

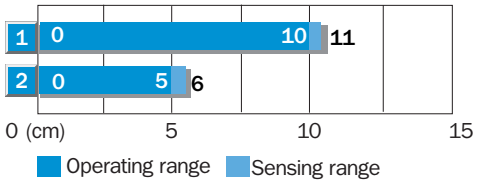
2 Long teach

Sensitivity adjustment for the precise switching point

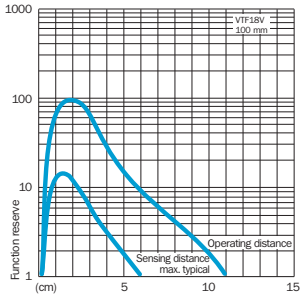
- **Applications:**
  - For slight differences between sensing object and background and for simple contrast detection
  - For positioning tasks
  - For detecting transparent objects (VL18V glass)
  - "Reduced" operating reserve, factor > 1 < 2 above switching threshold, reduced, optimized hysteresis
- **Handling:**
  - Long Touch; activate "teach-in" > 8 s… < 13 s
  - Signalizing LED green: 1x OFF/ON - blinks fast
    Sensitivity adjustment completed; check application.
- Signalizing: Green LED indicator: Lit continuously
  Yellow LED indicator: Blinks

Sensing distance VTF18V & VTE18V

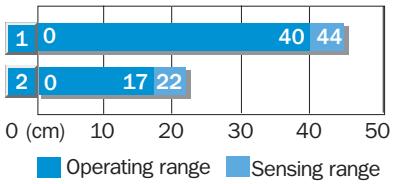
100 mm sensing distance VTF18V



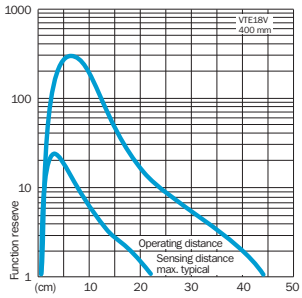
1 Sensing range on white, 90% remission
2 Sensing range on gray, 18% remission



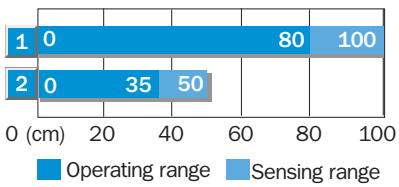
400 mm sensing distance VTE18V



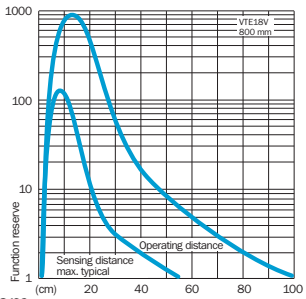
1 Sensing range on white, 90% remission
2 Sensing range on gray, 18% remission



800 mm sensing distance VTE18V



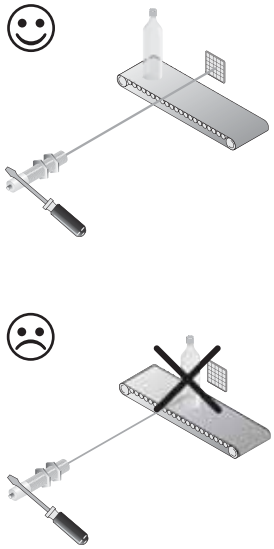
1 Sensing range on white, 90% remission
2 Sensing range on gray, 18% remission



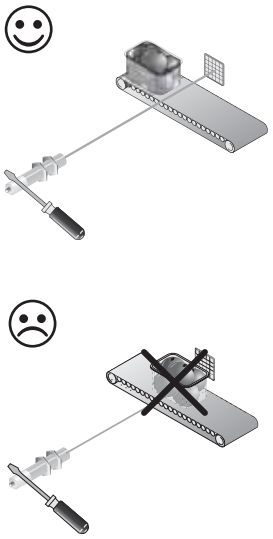
Touch teach-in: Sensitivity adjustable for photoelectric switches V18V in stainless steel housing

Application VL18V glass photoelectric proximity switch

- **Substatial operating reserve**
  short “teach-in time”
  > 2 s... < 7 s.

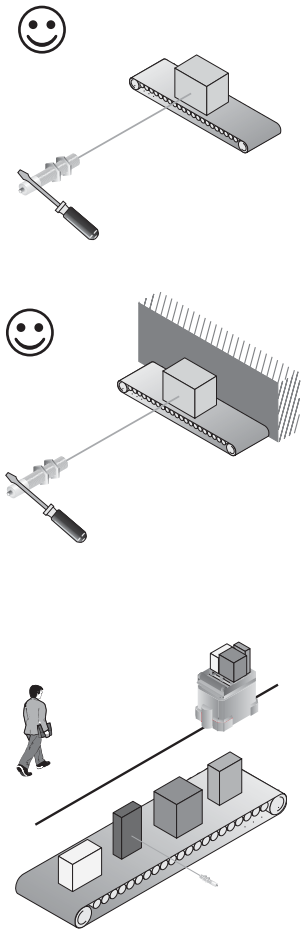


- **Precise switching point**
  long “teach-in time”
  > 8 s... < 18 s.

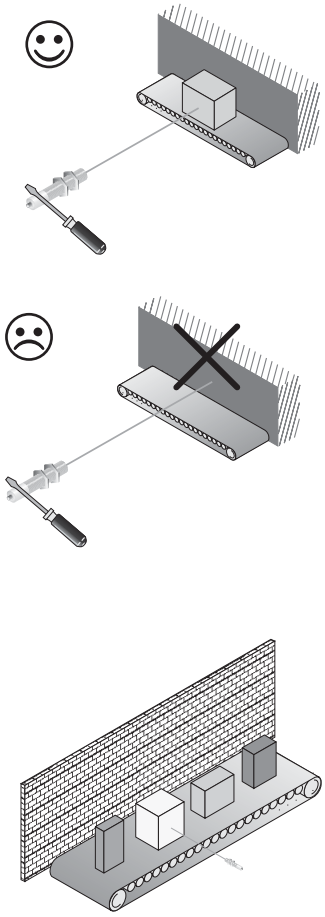


Application VTF18V & VTE18V photoelectric proximity switch

- **Substantial operating reserve**
  short “teach-in time”
  > 2 s... < 7 s.



- **Precise switching point**
  long “teach-in time”
  > 8 s... < 13 s.



VL 18

Reflex/Retro-Reflective Sensors



0.02...16.4 ft (0.005...5 m)
sensing range

Highlights

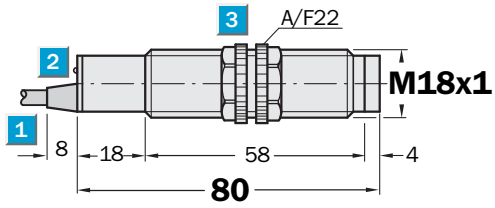
- Rugged plastic housing
- Wide range supply voltage
- High output current
- Cable or M12 quick disconnect versions
- Easy mounting with included nuts
- Standard 18 mm size

VL 18

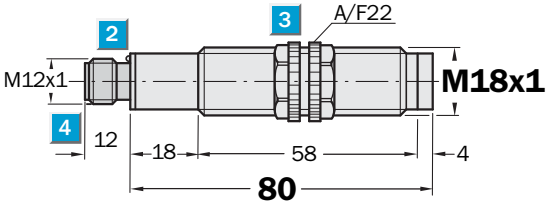


Dimensional drawing

VL 18-2T2132
VL 18-2T2162



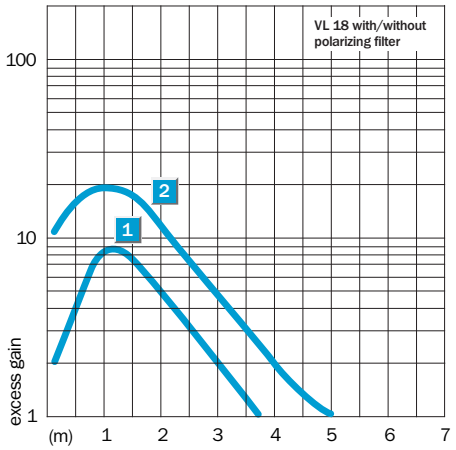
VL 18-2T2430
VL 18-2T2460



dimensions in mm

1 Connecting cable
2 Signal strength indicator
3 Fastening nuts, width across 22 mm (included)
4 Plug, M12 4-pin

Excess gain



Polarizing filter		Reflector type	Sensing range
1	yes	P 975	0.01...3.5 m
2	no	P 975	0.01...5.0 m

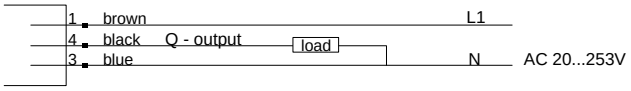
Order information	
Type	**Part no.**
VL 18-2T2162	6 011 377
VL 18-2T2460	6 011 379
VL 18-2T2132	6 011 376
VL 18-2T2430	6 011 378

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

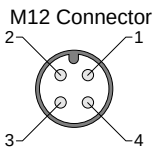
Technical data	VL 18-2T-	2162	2460	2132	2430
Housing	M18, straight	■	■	■	■
Sensing range	0.02...11.5 ft (0.005 ... 3.5 m)/P 975	■	■		
Light source[1], light type	LED, red light, polarized	■	■		
Sensing range	0.02...16.4 ft (0.005 ... 5.0 m)/P 975			■	■
max. typical/on reflector					
Light source[1], light type	LED, infrared light, without polarizing filter			■	■
Light spot diameter	Approx. 1.2 in at 118.1 in (30 mm at 300 cm)	■	■	■	■
Angle of divergence	Approx. 6°	■	■	■	■
Supply voltage V_S[2]	20 ... 253 V AC/50 ... 60 Hz	■	■	■	■
Current consumption[3]	≤ 30 mA	■	■	■	■
Switching output	Triac	■	■	■	■
Switching current I_A max.	5 to 300 mA	■	■	■	■
voltage drop	3 V max. (U = 250 V AC)	■	■	■	■
max. switching current	6 A/10 ms; f = 10 Hz	■	■	■	■
leakage current	max. 1.5 mA (V_S = 250 V AC)	■	■	■	■
Switching voltage	V_S	■	■	■	■
Operation mode	Dark switching	■	■	■	■
Response time[4]	≤ 20 ms	■	■	■	■
Max. switching frequency[5]	25 Hz	■	■	■	■
Connection types	Cable, PVC, 2 m[6]; 3 x 0.34 mm², Ø 4.7 mm	■		■	
	Plug, M12 4-pin		■		■
VDE protection class[7]	□	■	■	■	■
Circuit protection[8]	C	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A	-13...158° F (-25...70° C)	■	■	■	■
Approximate weight	3.4 oz (95 g)	■		■	
	1.1 oz (30 g)		■		■
Housing material	PBT/PC	■	■	■	■

1) Average service life 100,000 h at T_U =25° C
2) Limit values
3) Without load
4) With resistive load
5) With light/dark ratio 1:1
6) Do not bend below 0° C
7) Reference voltage 250 V AC
8) C = Interference suppression

Connection diagram



wire colors refer to standard cable, not included with quick disconnect models.



VL 18 L

Reflex/Retro-Reflective Sensors



0.3...114.8 ft (0.1...35 m)

sensing range

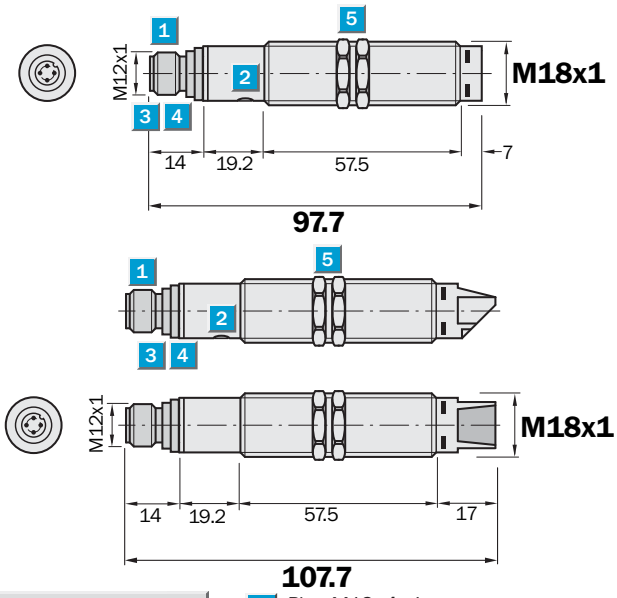
Highlights

- Longest ranges
- Detects small parts and switches precisely due to small laser spot
- Laser Class 1
- Polarization filter ensures reliable switching even on shiny objects

VL 18 L

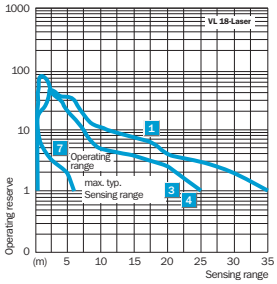


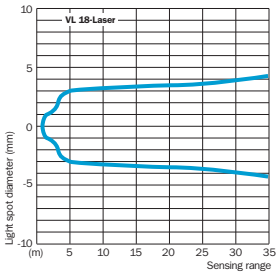
Dimensional drawing



dimensions in mm

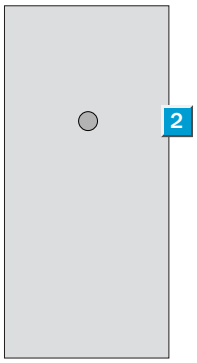
Excess gain





Adjustments

All types



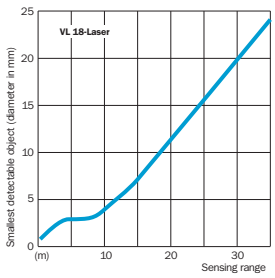
1 Plug M12, 4-pin
2 Sensitivity adjustment (teach-in button)
3 Green LED indicator: V_S supply voltage feed
4 Yellow LED indicator:
– lights continuously:
reception signal > reserve factor 2
– blinks: reception signal < reserve factor 2
but > switching threshold 1
5 Mounting nuts (2x), SW 24, metal
(included with delivery)

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Reflector type		Sensing range
1	PL 250 F	0.1...30 m
2	PL 10 F	0.1...25 m
3	PL 80 A	0.1...22 m
4	P 250	0.1...22 m
5	P975	0.1...18 m
6	PL 20 F	0.1...15 m
7	Reflective tape diamond grade	0.1...5 m

Order information

Type	Part no.
VL 18 L-4P324	6 027 430
VL 18 L-4N324	6 027 432
VL 18 L-4P344	6 027 434
VL 18 L-4N344	6 027 436



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Technical data	VL 18 L-	4P324	4P344	4N324	4N344
Sensing range, max. typical/Reflector	0.3...114.8 ft (0.1 m...35 m)/P 250 F	■	■	■	■
Smallest detectable object[1]	Approx. 0.3 in Ø at 3.3 ft (0.7 mm Ø at 1 m)	■	■	■	■
	Approx. 1 in Ø at 114.8 ft (25 mm Ø at 35 m)	■	■	■	■
Light spot diameter	Approx. 0.4 in at 114.8 ft (9 mm at 35 m)	■	■	■	■
Angle of dispersion of sender	Approx. 0.04° (SR = max.)	■	■	■	■
	Approx. 0.02° (SR = 1/2 max.)	■	■	■	■
Light source[2], Light type	Red laser light, 650 nm	■	■	■	■
Laser class	Laser Class 1 (IEC 60825-1)	■	■	■	■
Laser sender output capacity	Max. 0.4 mW	■	■	■	■
Housing	Axial optics	■		■	
	Radial optics		■		■
Sensitivity setting	Manual, per teach-in button	■	■	■	■
	Electronic, per control input C (0 V)[3]	■	■	■	■
Status indicators	Yellow LED:	■	■	■	■
	Switching output active, reserve				
	LED green: supply voltage V_S = ON	■	■	■	■
Supply voltage V_S	10...30 V DC[4]	■	■	■	■
Ripple[5]	≤ 10 %	■	■	■	■
Current consumption[6]	≤ 20 mA	■	■	■	■
Switching outputs	Q: PNP	■	■		
	Q: NPN			■	■
Output current I_A max.	≤ 100 mA	■	■	■	■
Switching mode	Light/dark switching selectable[3]	■	■	■	■
Response time[7]	≤ 0.625 ms	■	■	■	■
Switching frequency max.[8]	800/s	■	■	■	■
Connection types	Plug, M12 4-pin	■	■	■	■
VDE protection class[9]	□	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Ambient temperature	Operation 5...131° F (-15...55° C)	■	■	■	■
	Storage -13...158° F (-25...70° C)	■	■	■	■
Approximate weight	With plug 2.1 oz (60 g)	■	■	■	■
Housing material	Housing: Nickel-coated brass/PC	■	■	■	■
	Optics: PC with protective glass pane	■	■	■	■

1) Suitable reflectors for laser photoelectric reflex switches: We recommend our "F" reflectors with micro triple structure or DG reflector tape for short distances up to 5 m and our standard reflectors for ranges > 5 m (also see the accessories; reflectors for VL 18 L)

2) Average service life 100,000 h at T_A = 25° C

3) Control input C
– L.ON/D.ON and
– external teach-in
C = open: light-switching L.ON
C = + V_S: dark-switching D.ON
C = 0 V: Sensitivity setting per "external teach-in"

4) Limit values

5) May not exceed or fall short of V_S tolerances

6) Without load

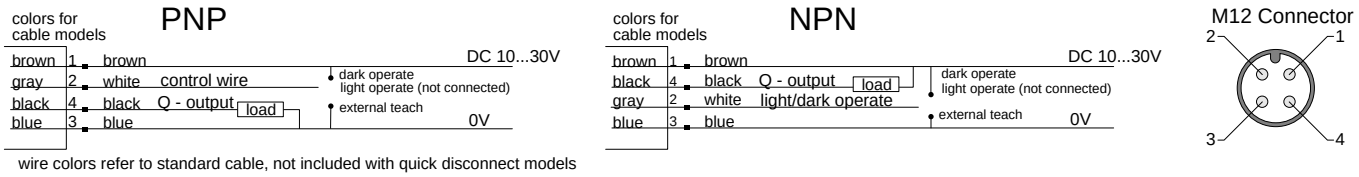
7) Signal transit time with resistive load

8) With light/dark ratio 1:1

9) Reference voltage 50 V

10) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

VL18V

Reflex/Retro-Reflective Sensors



0.3...16.4 ft (0.1...5 m)
sensing range

ECOLAB
JohnsonDiversey
Stainless Steel

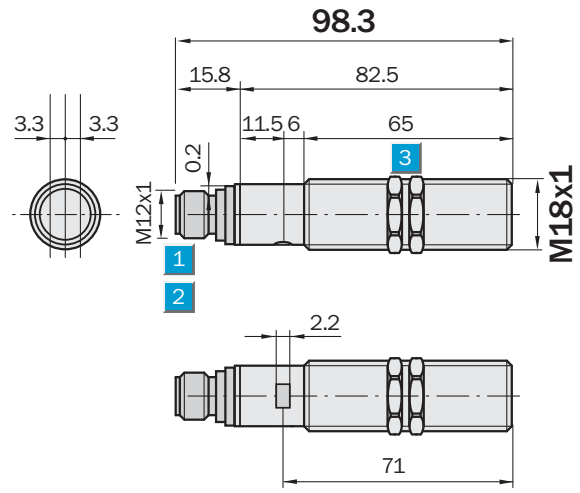
Highlights

- Wash-down design: resistant against detergents, humidity and temperature
- Hygienic design: stainless steel housing & suitable, certified synthetic materials
- For T_u + 85° C (15 min: 100° C)

VL18V

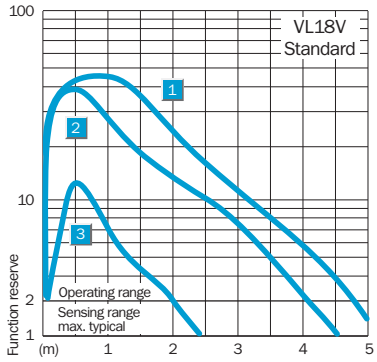


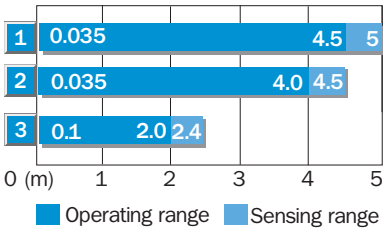
Dimensional drawing



dimensions in mm

Sensing range and operating reserve





Reflector type	Operating range
1 PL 80A	0.035...4.5 m
2 P975	0.035...4.0 m
3 Reflective tape Diamond grade 50 x 50 mm	0.1...2.0 m

Adjustments possible for VL18V	
VL18-4P3140V	VL18-4N3140V

1 Plug M12, 4-pin
2 Yellow LED indicator: light received
– lights continuously: reception signal > reserve factor 2
– blinks: reception signal < reserve factor 2, but > switching threshold 1
3 Mounting nuts (2x), SW 24, stainless steel 316L (included with delivery)

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information	
Type	**Part no.**
VL18-4P3140V	6 035 495
VL18-4N3140V	6 035 496

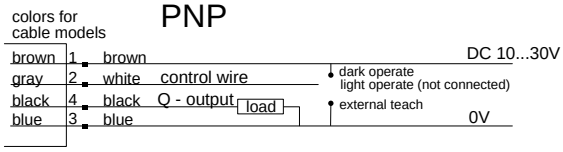
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Technical data	VL18-	4P3140V	4N3140V							
Sensing range, max. typical/Reflector	0.3…16.4 ft (0.1…5.0 m)/PL80A									
Operating distance	0.3…14.8 ft (0.1…4.5 m)/PL80A									
Light spot diameter	Approx. 3.1 in at 14.8 ft (80 mm at 4.5 m)									
Angle of dispersion of sender	Approx. 1.5°									
Light source[1], light type	LED, red 660 nm, with polarizing filter									
Light reception indicator	LED yellow									
	Lights continuously: reserve factor > 2									
	Blinks: reserve factor > 1.0…< 2.0									
Supply voltage V_S	10…30 V DC[2]									
Ripple[3]	≤ 10 %									
Current consumption[4]	≤ 35 mA									
Switching outputs	Q: PNP, open collector									
	Q: NPN, open collector									
Signal voltage PNP	V_S-2.0 V/Approx. 0 V									
NPN	V_S ≤ 2.0 V									
Signal voltage Low	Approx. 0 V									
Switching mode	Light/dark switching selectable[5]									
Output current I_A max.	≤ 100 mA									
Response time[6]	≤ 1 ms									
Switching frequency max.[7]	500/s									
Connection types[8]	Plug, M12 4-pin									
VDE protection class[9]	□									
Enclosure rating to DIN 40050	IP 67, IP 68, IP 69K									
Certificates [10]	ECOLAB, JohnsonDiversey									
Circuit protection[11]	A, B, C, D									
Ambient temperature	Operation -13…185° F (-25…85° C)									
	Operation -13…212° F (-25…100° C)									
	Storage -40…212° F (-40…100° C)									
Approximate weight	4.2 oz (120 g)									
Housing material	Housing: stainless steel AISI 316L									
	Device plug: M12, PPS									
	Optics: Plan, PMMA surface hardened and tempered (FDA[12])									

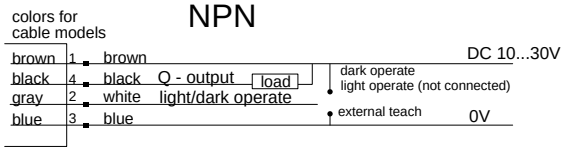
1) Average service life 100,000 h at T_A = +25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) L/D switching type control line
L/D = + Vs: light switching L.ON
L/D = 0 V: dark switching D.ON
Control line open
NPN: light switching L.ON
PNP: dark switching D.ON
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Pins gold-plated
9) Reference voltage 50 V
10) Refer to the corresponding certificates for details
11) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected
12) Synthetic material with FDA certificate

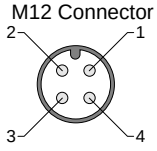
Connection diagram





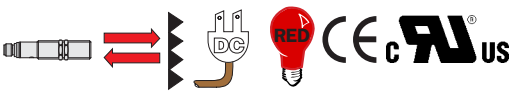
wire colors refer to standard cable, not included with quick disconnect models





VL18V

Reflex/Retro-Reflective Sensors



0.3...3.3 ft (0.1...1.0 m)
sensing range

ECOLAB
JohnsonDiversey
Stainless Steel

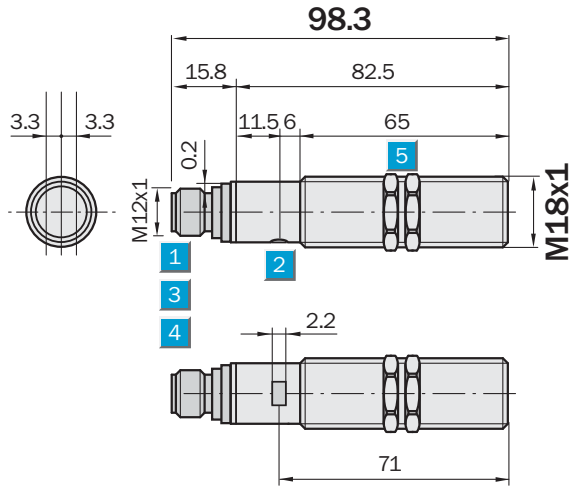
Highlights

- Wash-down design: resistant against detergents, humidity and temperature
- Patented touch teach-in (See VTF18V & VTE18V touch teach-in pages for details)
- Sensitivity adjustment on equipment, but without mechanical operating elements
- Ideal for detecting glass and transparent foils

VL18V

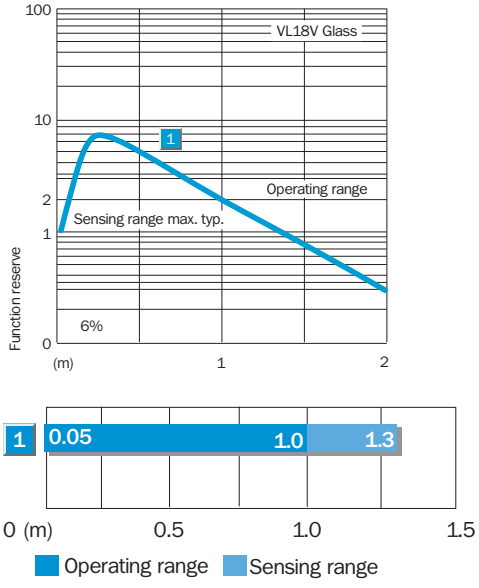


Dimensional drawing



dimensions in mm

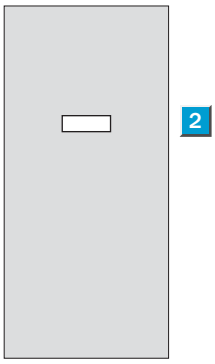
Sensing range and operating reserve



Reflector type		Operating range
1	P250	0.05...1.0 m
2	PL40A	0.05...1.0 m

Adjustments possible for VL18V

VL18-4P2240V	VL18-4N2240V



1 Plug M12, 4-pin
2 Sensitivity adjustment Touch-Teach-in
3 Green LED indicator: signalizing Touch-Teach-in
4 Yellow LED indicator: light received
– lights continuously:
reception signal > reserve factor 2
– blinks: reception signal < reserve factor 2,
but > switching threshold 1
5 Mounting nuts (2x), SW 24, stainless steel 316L (included with delivery)

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

Type	Part no.
VL18-4P2240V	6 035 497
VL18-4N2240V	6 035 498

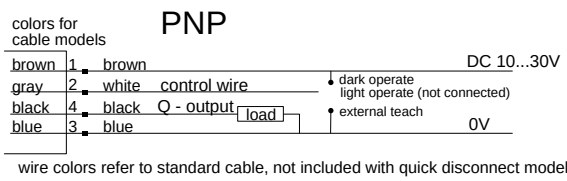
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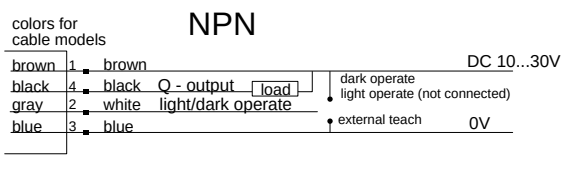
Technical data	VL18-	4P2240V	4N2240V
Sensing range, max. typical/Reflector	1.6…4.3 ft (0.5…1.3 m)/PL80A		
Operating distance	0.3…3.3 ft (0.1…1.0 m)/PL80A		
Light spot diameter	Approx. 0.8 in at 3.3 ft (20 mm at 1.0 m)		
Angle of dispersion of sender	Approx. 1.5°		
Detection of transparent objects			
Attenuation in light path	≥ 20%		
Attenuation difference in light path	≥ 15%		
Object attenuation difference	≥ 7.5%		
Light source[1], light type	LED, red 660 nm, with polarizing filter		
Sensitivity adjustable	Manual, via touch teach-in[2]		
Visualizing Touch-Teach-in	LED green		
Light reception indicator	LED yellow		
	Lights continuously: reserve factor > 2		
	Blinks: reserve factor > 1.0…< 2.0		
Supply voltage V_S	10…30 V DC[3]		
Ripple[4]	≤ 10 %		
Current consumption[5]	≤ 35 mA		
Switching outputs	Q: PNP, open collector	■	
	Q: NPN, open collector		■
Signal voltage PNP	V_S-2.0 V/Approx. 0 V	■	
NPN	V_S ≤ 2.0 V		■
Signal voltage Low	Approx. 0 V	■	
Switching mode	Light/dark switching selectable[6]		
Output current I_A max.	≤ 100 mA		
Response time[7]	≤ 1 ms		
Switching frequency max.[8]	500/s		
Connection types[9]	Plug, M12 4-pin		
VDE protection class[10]	□		
Enclosure rating to DIN 40050	IP 67, IP 68, IP 69K		
Certificates [11]	ECOLAB, JohnsonDiversey		
Circuit protection[12]	A, B, C, D		
Ambient temperature	Operation -13…185° F (-25…85° C)		
	Operation -13…212° F (-25…100° C)		
	Storage -40…212° F (-40…100° C)		
Approximate weight	4.2 oz (120 g)		
Housing material	Housing: stainless steel AISI 316L		
	Device plug: M12, PPS		
	Optics: Plan, PMMA surface hardened and tempered (FDA[13])		

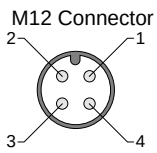
1) Average service life 100,000 h at T_A = +25° C
2) Patent number: M02007A00275 Date: 31.08.2007
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load at Vs 30 V DC
6) L/D switching type control line
L/D = + Vs: light switching L.ON
L/D = 0 V: dark switching D.ON
Control line open
NPN: light switching L.ON
PNP: dark switching D.ON
7) Signal transit time with resistive load
8) With light/dark ratio 1:1
9) Pins gold-plated
10) Reference voltage 50 V
11) Refer to the corresponding certificates for details
12) A=V_S connections reverse-polarity protected
B=Inputs and outputs reverse-polarity protected
C=Interference pulse suppression
D=Outputs overload and short-circuit protected
13) Synthetic material with FDA certificate

Connection diagram









wire colors refer to standard cable, not included with quick disconnect models

VS/VE 18

Through-beam Sensors






0...65.6 ft (0...20 m)
sensing range

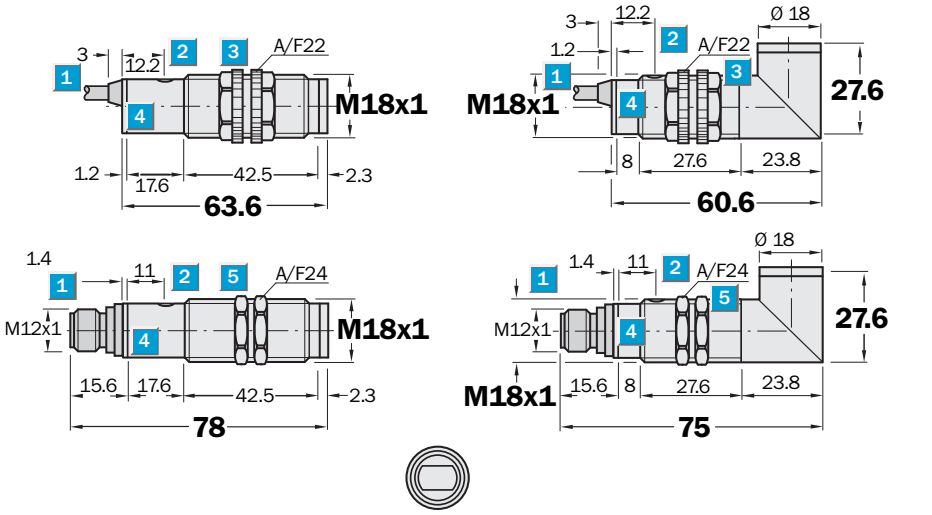
Highlights

- Rugged plastic or metal housing
- Infrared sender
- Standard 18 mm size
- Easy mounting with included nuts
- Cable or M12 quick disconnect versions

VS/VE 18

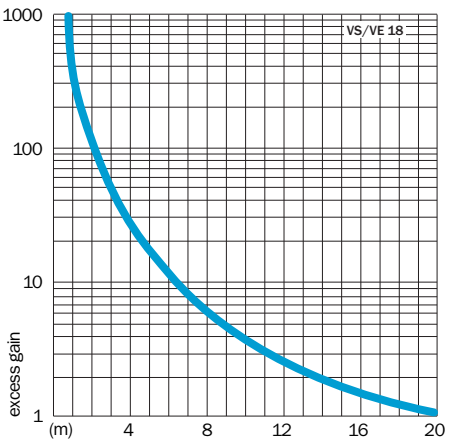


Dimensional drawing

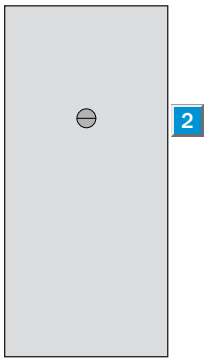


dimensions in mm

Excess gain



Adjustments possible



1 Connecting cable or plug
2 Sensitivity control
3 Fastening nut, width across 22 mm, made of plastic for equipment with plastic housing
4 Operating display for VS, LED, yellow
Signal strength indicator for VE, LED, yellow
5 Fastening nut, width across 24 mm, made of metal for equipment with metal housing

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

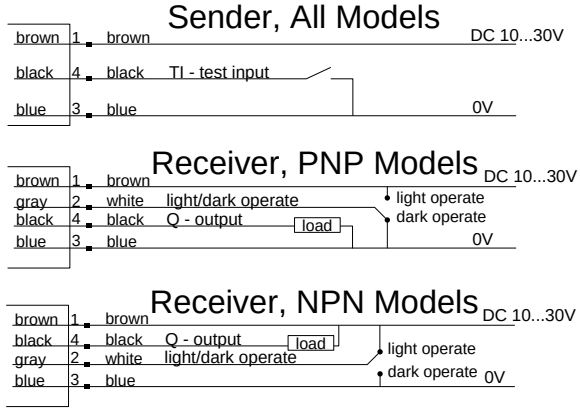
See V.18 Selection Guide on page 1170

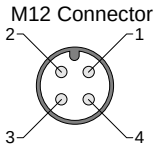
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Technical data	VS/VE 18-	3...	4...
Housing design	Straight		
	Angled, 90°		
Sensing range, max. typical	0...65.6 ft (0...20 m)		
Light spot diameter	Approx. 27.6 in at 45.9 ft (700 mm at 14 m)		
Angle of divergence	2.8°		
Sensitivity adjustable (optional)	Potentiometer 270°		
Light source[1], **light type**	LED, infrared light		
Supply voltage V_S	10...30 V DC[2]		
Ripple[3]	± 10%		
Current consumption[4]	≤ 30 mA		
Switching outputs (optional)	PNP/NPN; open collector: Q		
Operation mode	Q, dark switching		
	Q, light switching		
via control wire[5]	Q, light/dark switching		
	+ V_S = light switching		
	0 V = dark switching		
Output current I_A max.	100 mA		
Response time[6]	≤ 2 ms		
Max. switching frequency[7]	250 Hz		
Test input "TE," VS sender off	PNP, NPN: TE to 0 V		
Connection types			
sender VS 18-0D...	Cable, 2 m[8], PVC, 3 x 0.14 mm², Ø 3.1 mm		
receiver VE 18...	Cable, 2 m[8], PVC, 3 x 0.14 mm², Ø 3.1 mm		
	Cable, 2 m[8], PVC, 4 x 0.14 mm², Ø 5 mm		
sender VS 18-0D...	Plug, M12 4-pin		
receiver VE 18...	Plug, M12 4-pin		
VDE protection class[9]	□		
Circuit protection[10]	A, B, C, D		
Enclosure rating	IP 67/NEMA 6		
Ambient temperature T_A	-13...158° F (-25...70° C)		
Approximate weight	Metal housing: sender & receiver ea. 4.2 oz (120 g)		
	Plastic housing: sender & receiver ea. 3.5 oz (100 g)		
Housing material	Metal housing, nickel-plated brass; PBT/PC		
	Plastic housing, PBT/PC		

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) Must be within V_S tolerances
4) Without load
5) Control wire open:
NPN: light-switching
PNP: dark-switching
6) With resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A = Connections reverse-polarity protected
B = Inputs/outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

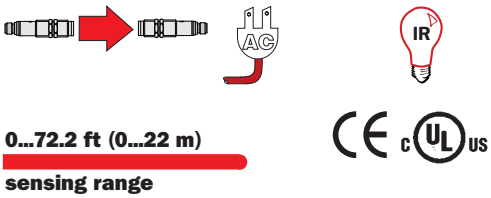




wire colors refer to standard cable, not included with quick disconnect models

VS/VE 18

Through-beam Sensors



0...72.2 ft (0...22 m)
sensing range

Highlights

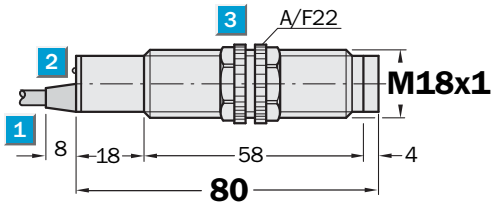
- Rugged plastic housing
- Wide range supply voltage
- Enhanced sensing range
- Cable and M12 quick disconnect styles available
- Easy mounting with included nuts

VS/VE 18

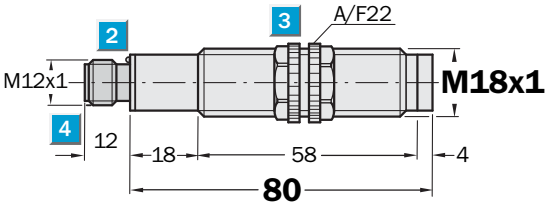


Dimensional drawing

VE 18-2T 2132



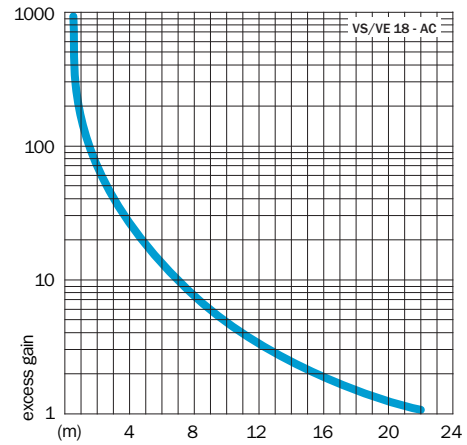
VE 18-2T 2430

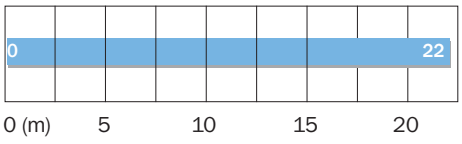


dimensions in mm

1 Connecting cable
2 Signal strength indicator (VE)
3 Fastening nuts, width across 22 mm, included
4 Equipment plug M12, 4-pin

Excess gain





Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

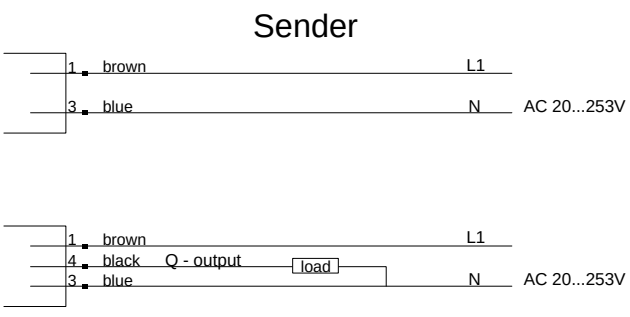
Type	Part no.
VS/VE 18-2T 2132	6 011 380
VS/VE 18-2T 2430	6 011 381

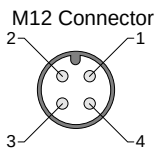
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Technical data	VS/VE 18-	2T2132	2T2430
Housing	M18, straight		
Sensing range, max. typical	0…72.2 ft (0…22 m)		
Light source[1], light type	LED, infrared light		
Light spot diameter	Approx. 31.5 in at 52.5 ft (800 mm at 16 m)		
Angle of divergence of sender	Approx. 2.9°		
Angle of reception of receiver	Approx. 20°		
Supply voltage V_S[2]	20 …253 V AC/50…60 Hz		
Current consumption[3] sender	≤ 30 mA		
receiver	≤ 15 mA		
Switching output	Triac		
Switching current I_A max.	5…300 mA		
voltage drop	3 V max. (U = 250 V AC)		
max. switching current	6 A/10 ms; f = 10 Hz		
leakage current	Max. 1.5 mA (V_S = 250 V AC)		
Switching voltage	V_S		
Operation mode	Dark switching		
Response time[4]	≤ 20 ms		
Max. switching frequency[5]	25 Hz		
Connection types	Cable, 2 m[6]		
	Sender VS : 2 x 0.34 mm², Ø 4.7 mm		
	Receiver VE: 3 x 0.34 mm², Ø 4.7 mm		
	Plug, M12 4-pin		
VDE protection class[7]	□		
Circuit protection[8]	C		
Enclosure rating	IP 67		
Ambient temperature T_A	-1…158° F (- 25… 70° C)		
Approximate weight	Sender: 3.4 oz (95 g);		
	Receiver: 3.4 oz (95 g)		
	Sender: 1.1 oz (30 g);		
	Receiver: 1.1 oz (30 g)		
Housing material	PBT/PC		

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) Without load
4) With resistive load
5) With light/dark ratio 1:1
6) Do not bend below 0° C
7) Reference voltage 250 V AC
8) C = Interference suppression

Connection diagram





wire colors refer to standard cable, not included with quick disconnect models.

VSE 18 L

Through-beam Sensors



0...196.9 ft (0...60 m)

sensing range

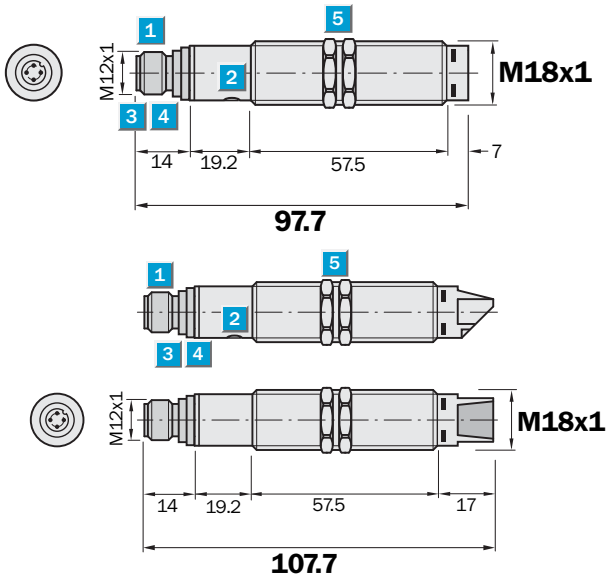
Highlights

- Longest ranges
- Detects small parts and switches precisely due to small laser spot
- Laser Class 1
- Optionally (integrated) horizontal and radial optic axes

VSE 18 L

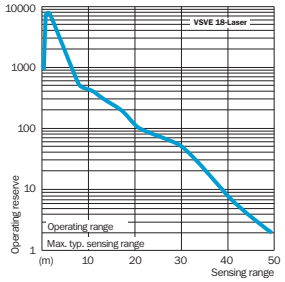


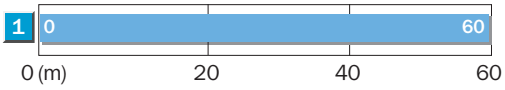
Dimensional drawing



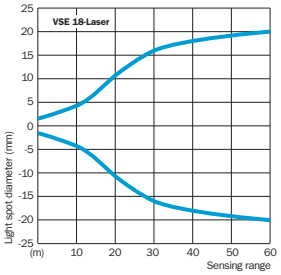
dimensions in mm

Excess gain



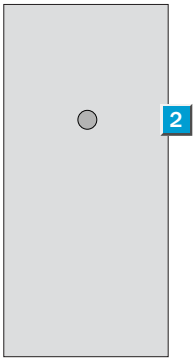


Max. typical sensing range



Adjustments

All types



1 Plug M12, 4-pin
2 Sensitivity adjustment, trimmer 270° (only receiver VE 18 L)
3 Green LED indicator: V_S supply voltage feed
4 Yellow LED indicator (only receiver VE 18 L),
– lights continuously: reception signal > reserve factor 2
– blinks: Reception signal < reserve factor 2 but > switching threshold 1
Yellow LED indicator (only sender VS 18 L),
– lights continuously: Sender active
– does not light: Sender off
5 Mounting nuts (2x), SW 24, metal (included with delivery)

Order information

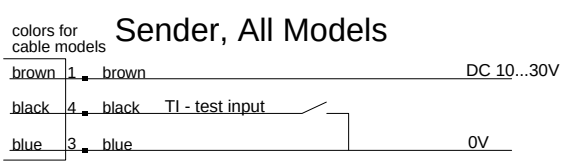
Type	Part no.
VS/VE 18 L-4P324	6 027 931
VS/VE 18 L-4N324	6 027 933
VS/VE 18 L-4P344	6 027 935
VS/VE 18 L-4N344	6 027 937

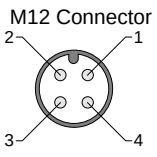
Accessories	page
Cables and connectors	1180
Mounting systems	1234

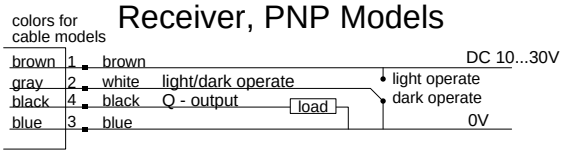
Technical data	VS/VE 18 L-	4P324	4P344	4N324	4N344	VS-0D314	VS-0D334
Sensing range RW, max. typical	0...196.9 ft (0...60 m)	■	■	■	■	■	■
		■	■	■	■	■	■
Smallest detectable object	Approx. 0.02 in Ø at 3.3 ft (0.5 mm Ø at 1 m)	■	■	■	■	■	■
	Approx. 0.031 in Ø at 6.6 ft (0.8 mm Ø at 2 m)	■	■	■	■	■	■
	Approx. 0.4 in Ø at 164 ft (10 mm Ø at 50 m)	■	■	■	■	■	■
Light spot diameter	Approx. 1.6 in at 164 ft (40 mm at 50 m)					■	■
Angle of divergence of sender	Approx. 0.06° (SR = max.)					■	■
	Approx. 0.04° (SR = 1/2 max.)					■	■
Receiver reception angle	Approx. 0.08° (SR = max.)	■	■	■	■		
	Approx. 0.06° (SR = 1/2 max.)	■	■	■	■		
Light source[1] Light type	Red laser light, 650 nm					■	■
Laser class	Laser Class 1 (IEC 60825-1)					■	■
Laser sender output capacity	Max. 0.4 mW					■	■
Housing	Axial optics	■		■		■	
	Radial optics		■		■		■
Sensitivity setting	Trimmer 270° (only receiver VE 18 L)	■	■	■	■		
Status indicators	Yellow LED:	■	■	■	■	■	■
	Switching output/sender active						
	LED green: supply voltage V_S = ON	■	■	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■	■	■
Ripple[3]	≤ 10 %	■	■	■	■	■	■
Current consumption[4]	≤ 25 mA	■	■	■	■	■	■
Switching outputs	Q: PNP	■	■				
	Q: NPN			■	■		
Output current I_A max.	≤ 100 mA	■	■	■	■		
Switching mode	Light/dark switching selectable[5]	■	■	■	■		
Response time[6]	≤ 0.5 ms	■	■	■	■		
Switching frequency max.[7]	1000/s	■	■	■	■		
Test input »TE«	0 V = Sender not active					■	■
Connection types	Plug, M12	■	■	■	■	■	■
VDE protection class[9]	□	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■	■	■
Ambient temperature	Operation 5...131° F (-15...55° C	■	■	■	■	■	■
	Storage -13...158° F (-25...70° C)	■	■	■	■	■	■
Approximate weight	With plug (2.1 oz) 60 g	■	■	■	■	■	■
Housing material	Housing: Nickel-coated brass/PC	■	■	■	■	■	■
	Optics: PC with protective glass pane	■	■	■	■	■	■

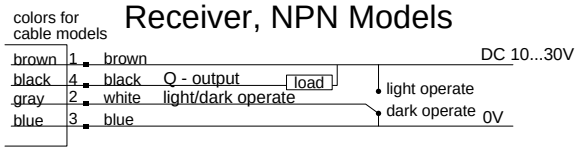
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) L/D switching type control line
L/D = open (not assigned)
dark-switching D.ON
L/D = + V_S: light-switching L.ON
L/D = 0 V: dark-switching D.ON
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V
9) A = V_S connections reverse-polarity protected
B = Inputs and output reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

Connection diagram





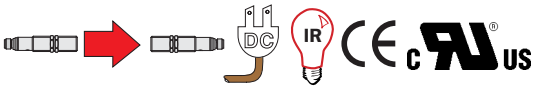




wire colors refer to standard cable, not included with quick disconnect models

VS/VE18V

Through-beam Sensors



0...82 ft (0...25 m)

sensing range

ECOLAB
JohnsonDiversey
Stainless Steel

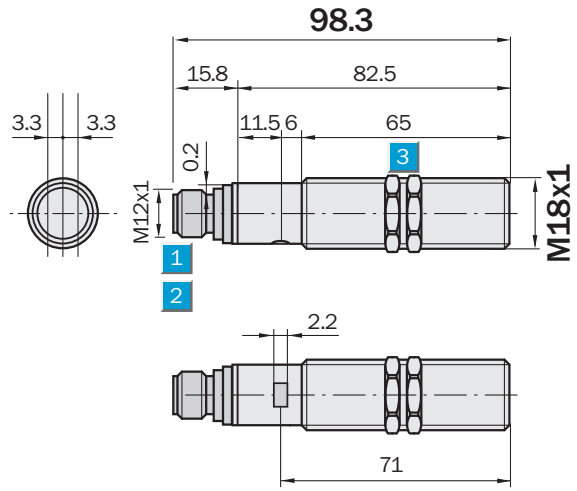
Highlights

- Wash-down design: resistant against detergents, humidity and temperature
- Hygienic design: stainless steel housing & suitable, certified synthetic materials
- For Tu +85° C (15 min: 100° C)

VS/VE18V

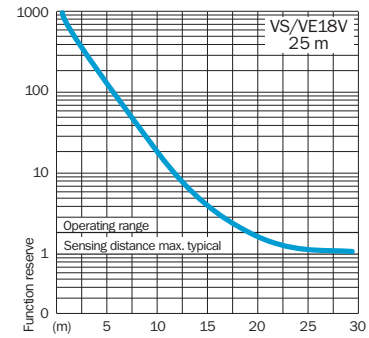


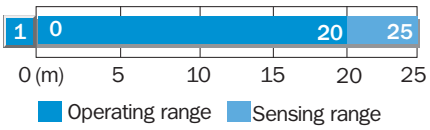
Dimensional drawing



dimensions in mm

Sensing range and operating reserve





Adjustments

VS/VE18-4P3140V | VS/VE18-4N3140V

1 Plug M12, 4-pin

2 Yellow LED indicator (only receiver VE18V),
- lights continuously: reception signal > reserve factor 2
- blinks: reception signal < reserve factor 2, but > switching threshold 1

Yellow LED indicator (only sender VS18V),
- lights continuously: sender active
- does not light: sender off

3 Mounting nuts (2x), SW 24, stainless steel 316L (included with delivery)

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

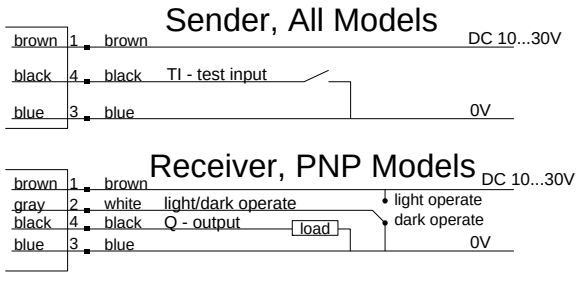
Type	Part no.
VS/VE18-4P3140V	6 035 499
VS/VE18-4N3140V	6 035 500

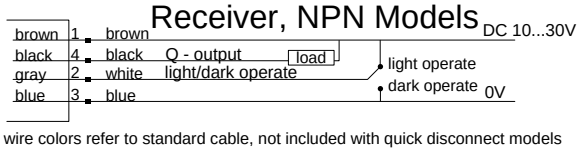
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Technical data	VS/VE18	4P2240V	4N2240V
Sensing range R_W, max. typical	0…82 ft (0…25 m)		
Operating distance R_W	0…65.6 ft (0…20 m)		
Light spot diameter	Approx. ø 15.7 in at 65.6 ft (ø 400 mm at 20 m)		
Angle of dispersion sender	Approx. 35°		
Angle of reception receiver	Approx. 8° (R_W = max.)		
Light source[1] light type	LED, infrared, 880 nm		
Status indicators	LED yellow (only VS18V): sender on		
Light reception indicator	LED yellow (only VE18V):		
	Light continuously: reserve factor > 2		
	Blinks: reserve factor > 1.0…< 2.0		
Supply voltage V_S	10…30 V DC[2]		
Ripple[3]	≤ 10 %		
Current consumption[4] Sender	≤ 35 mA		
Receiver	≤ 40 mA		
Switching outputs	Q: PNP, open collector		
	Q: NPN, open collector		
Signal voltage High	V_S-2.0 V		
	V_S		
Signal voltage Low	Approx. 0 V		
	≤ 2.0 V		
Switching mode	Light/dark switching selectable[5]		
Output current I_A max.	≤ 100 mA		
Response time[6]	≤ 2 ms		
Switching frequency max.[7]	200/s		
Test input »TE«	0 V = Sender not active		
Connection types[8]	Plug, M12, 4-pin		
VDE protection class[9]	☐		
Enclosure rating ti DIN 40050	IP 67, IP 68, IP 69K		
Certificates [10]	ECOLAB, JohnsonDiversey		
Circuit protection[11]	A, B, C, D		
Ambient temperature	Operation -13…185° F (-25…85° C)		
	Operation -13…212° F (-25…100° C)		
	Storage -40…212° F (-40…100° C)		
Approximate weight	4.2 oz (120 g)		
Housing material	Housing: Stainless steel AISI 316L		
	Device plug: M12, PPS		
	Optics: Plan, PMMA surface hardened and tempered (FDA[12])		

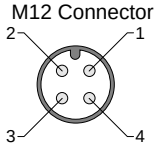
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) L/D switching type control line
L/D = + V_S: light switching L.ON
L/D = 0 V: dark switching D.ON
Control line open
NPN: light switching L.ON
PNP: dark switching D.ON
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Pins gold-plated
9) Reference voltage 50 V
10) Refer to the corresponding certificates for details
11) A = Vs connections reverse-polarity protected
B = Inputs and output reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected
12) Synthetic material with FDA certificate

Connection diagram





wire colors refer to standard cable, not included with quick disconnect models



VT 18-2

Proximity/Diffuse Sensors-Background Suppression

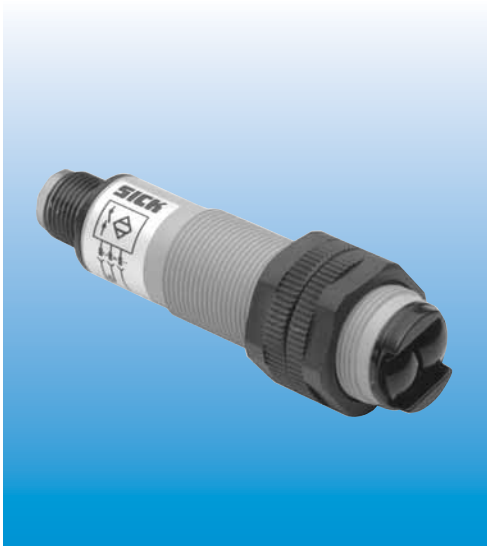


0...4.1 in (0...105 mm)
sensing range

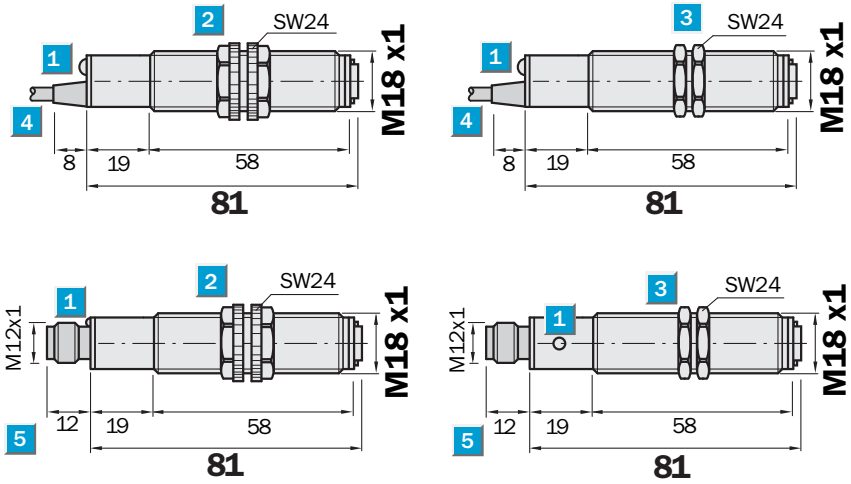
Highlights

- Rugged plastic housing
- Fixed background suppression provides much better performance than fixed focus sensors
- PNP/NPN and light or dark switching
- Easy mounting with included nuts
- Cable or M12 quick disconnect versions

VT 18-2



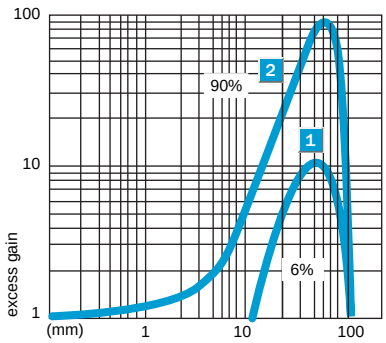
Dimensional drawing

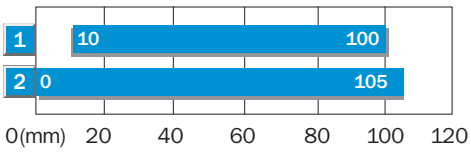


dimensions in mm

1	Red LED signal strength indicator
2	Locking nut, plastic (SW 24) included
3	Locking nut, metal (SW 24) included
4	Connecting cable
5	Plug, M12 4-pin

Excess gain





1	Sensing range on black, 6% remission
1	Sensing range on white, 90% remission

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information

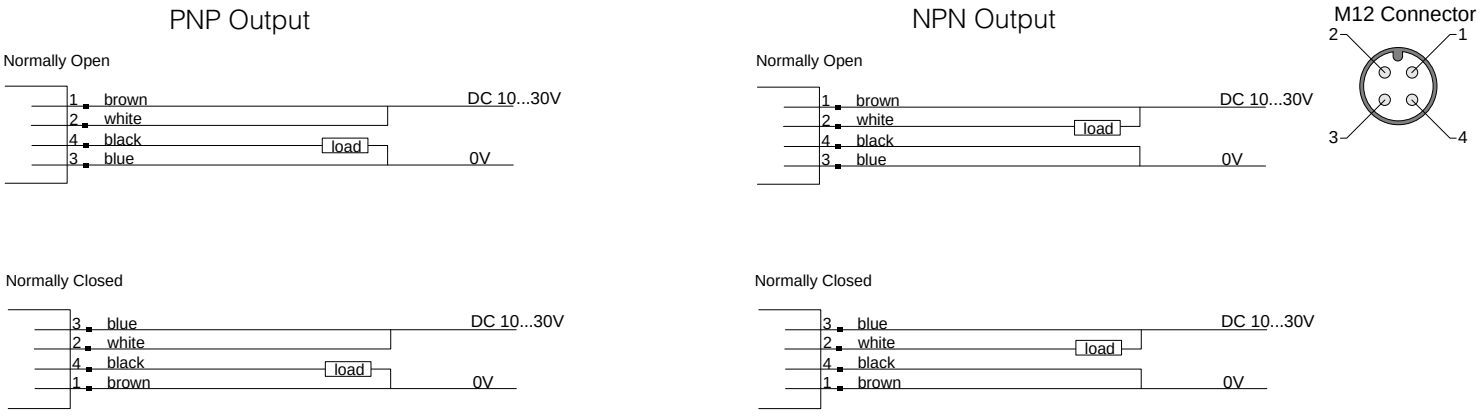
Type	Part no.
VT 18-204172	6 012 018
VT 18-204470	6 012 019
VT 18-204172 S01	6 012 020
VT 18-204470 S01	6 012 021

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Technical data	VT 18-2-	04172	04172 S01	04470	04470 S01					
Housing	M18, straight									
Sensing range, typ. max. [1]	0…4.1 in (0…105 mm)									
Background suppression[1]	starting from 4.5 in (115 mm)									
Light source[1], **light type**	LED, infrared light, 880 nm									
Light spot diameter	0.2 in at 2 in (4 mm at 50 mm)/0.3 in at 3.9 in (8 mm at 100 mm)									
Angle of divergence	Approx. 4.5°									
Supply voltage V_S	10…30 V DC[3]									
Ripple[4]	± 10%									
Current consumption[5]	≤ 40 mA									
Switching outputs	PNP, NPN									
programmable via	Q, dark switching									
control wire	Q, light switching									
Output current I_A max.	100 mA									
Response time[6]	≤ 6.25 ms									
Max. switching frequency[7]	≥ 80/s									
Connection type	Cable[8], PVC, 4 x 0.34 mm², Ø 4.7 mm									
	Plug, M12 4-pin									
VDE protection class[9]	□									
Circuit protection[10]	A, B, C, D									
Enclosure rating	IP 67/NEMA 6									
Ambient temperature T_A[8]	Operation -13…158° F (-25…70° C)									
	Storage -13…167° F (-25…75° C)									
Approximate weight	5.3 oz (150 g)									
	3.5 oz (100 g)									
Housing material	Metal housing: nickel plated brass									
	Plastic housing: polyamide									
	Optics: PMMA									

1) Object with 90% reflectance (referred to standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend cable below 0° C
9) Withstand voltage of 50 V DC
10) A = V_S connections reverse-polarity protected
B = Inputs/outputs reverse polarity protected
C = Interference pulse suppression
D = Outputs overcurrent and short circuit protected

Connection diagram



VT 18-2

Proximity/Diffuse Sensors-Energetic



0.1...15.7 in (2...400 mm)
sensing range

Highlights

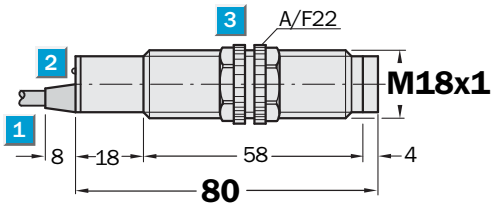
- Rugged plastic housing
- Three sensing ranges can be selected: 100, 200 or 400 mm
- Voltage supply 20...253 V AC; triac output
- Infrared sender
- Easy mounting with included nuts
- Cable or M12 quick disconnect versions

VT 18-2

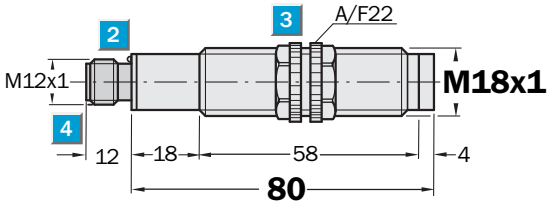


Dimensional drawing

VT 18-2T1112
VT 18-2T1132
VT 18-2T1152



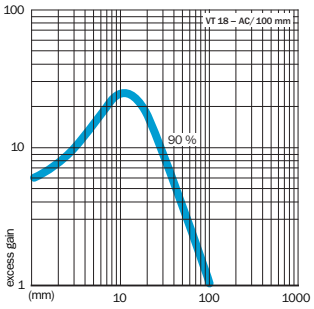
VT 18-2T1410
VT 18-2T1430
VT 18-2T1450

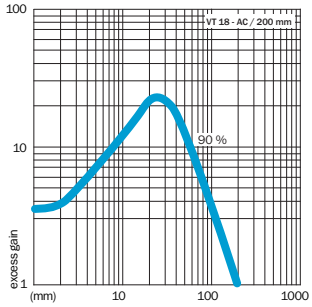


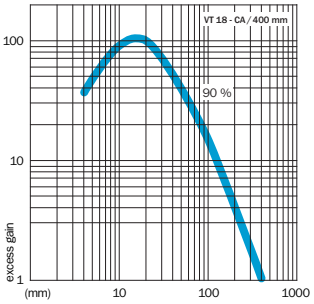
dimensions in mm

1 Connecting cable
2 Signal strength indicator
3 Fastening nuts, width across 22 mm, (included)
4 Equipment plug, M12 4-pin

Excess gain







Accessories	page
Cables and connectors	1180
Mounting systems	1234

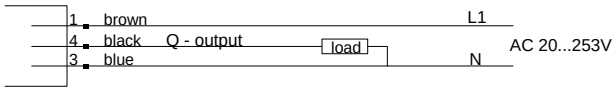
Order information

Type	Part no.
VT 18-2T1112	6 011 370
VT 18-2T1410	6 011 373
VT 18-2T1132	6 011 371
VT 18-2T1430	6 011 374
VT 18-2T1152	6 011 372
VT 18-2T1450	6 011 375

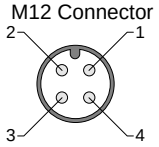
Technical data	VT 18-2T-	1112	1410	1132	1430	1152	1450			
Housing	Straight	■	■	■	■	■	■			
Sensing range	0.1…3.9 in (2…100 mm)[1]	■	■							
Light source[2], light type	LED, infrared light	■	■							
Light spot diameter	Approx. 0.5 in at 3.9 in (12 mm at 100 mm)	■	■							
Angle of divergence	Approx. 3.5°	■	■							
Sensing range	0.1...7.9 in (2...200 mm)[1]			■	■					
Light source[2], light type	LED, infrared light			■	■					
Light spot diameter	Approx. 0.9 in at 7.9 in (24 mm at 200 mm)			■	■					
Angle of divergence	Approx. 3.5°			■	■					
Sensing range	0.1…15.7 in (2…400 mm)[1]					■	■			
Light source[2], type	LED, infrared light					■	■			
Light spot diameter	Approx. 1.9 in at 15.7 in (48 mm at 400 mm)					■	■			
Angle of divergence	Approx. 3.5°					■	■			
Supply voltage V_S[3]	20 …253 V AC/50 ... 60 Hz	■	■	■	■	■	■			
Current consumption[4]	≤ 30 mA	■	■	■	■	■	■			
Switching output	Triac	■	■	■	■	■	■			
Switching current I_A max.	5 … 300 mA	■	■	■	■	■	■			
voltage drop	3 V max. (U = 250 V AC)	■	■	■	■	■	■			
max. switching current	6 A/10 ms; f = 10 Hz	■	■	■	■	■	■			
leakage current	max. 1.5 mA (V_S = 250 V AC)	■	■	■	■	■	■			
Switching voltage	V_S	■	■	■	■	■	■			
Operation mode	Light switching	■	■	■	■	■	■			
Response time[5]	≤ 20 ms	■	■	■	■	■	■			
Max. switching frequency[6]	25 Hz	■	■	■	■	■	■			
Connection types	Cable, PVC, 2 m[7]; 3 x 0.34 mm², Ø 4.7 mm	■		■		■				
	Plug, M12 4-pin		■		■		■			
VDE protection class[8]	□	■	■	■	■	■	■			
Circuit protection[9]	C	■	■	■	■	■	■			
Enclosure rating	IP 67 / NEMA 6	■	■	■	■	■	■			
Ambient temperature T_A	-13…158° F (-25…70° C)	■	■	■	■	■	■			
Approximate weight	3.4 oz (95 g)	■		■		■				
	1.1 oz (30 g)		■		■		■			
Housing material	Body: PBT/PC	■	■	■	■	■	■			
	Lens: PMMA	■	■	■	■	■	■			

1) Object with 90% reflectance (referred to standard white DIN 5033
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) Without load
5) With resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 250 V AC
9) C = Interference suppression

Connection diagram

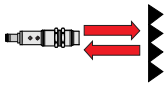


wire colors refer to standard cable, not included with quick disconnect models.



VL 18-3/4

Reflex/Retro-Reflective Sensors



0.2...12.1 ft (0.05...3.7 m)
sensing range

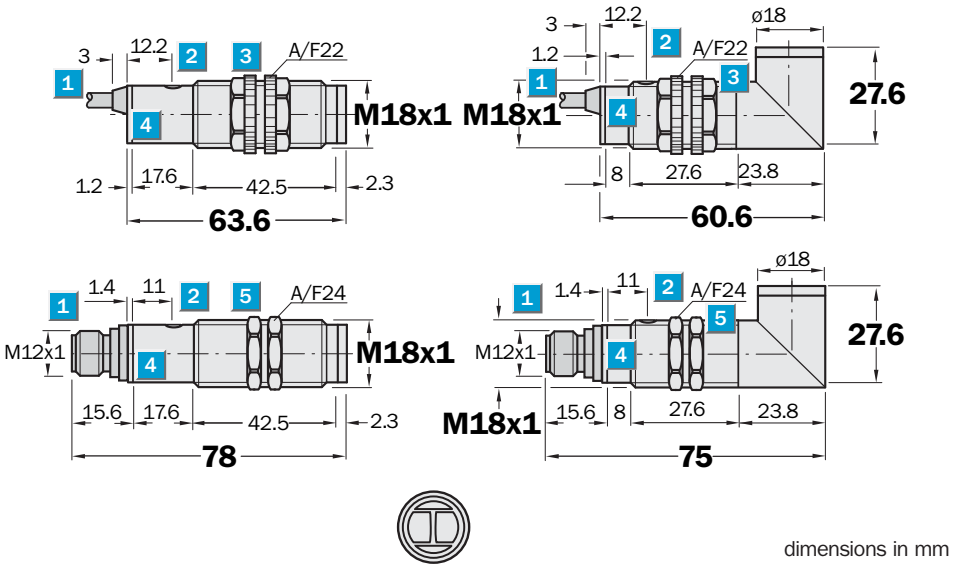
Highlights

- Rugged plastic or metal housing
- Light or dark switching available
- Standard 18 mm diameter
- Easy mounting with included nuts

VL 18-3/4

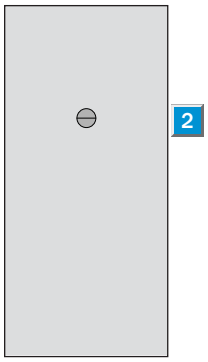


Dimensional drawing



dimensions in mm

Adjustments



1 Connecting cable or M12 plug
2 Sensitivity control
3 Fastening nut, width across 22 mm, made of plastic for equipment with plastic housing
4 Signal strength indicator, LED, yellow
5 Fastening nut, width across 24 mm, made of metal for equipment with metal housing

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

See V.18 Selection Guide on page 1170

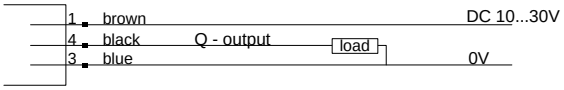
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Technical data	VL 18-	3...	4...
Housing	Straight		
	Angled, 90°		
Sensing range[1]	0.2…12.1 ft (0.05…3.7 m)		
Sensitivity adjustable (optional)	Potentiometer 270°		
Light source[2], **light type**	LED, red light with polarizing filter		
Light spot diameter	Approx. 5.9 in at 9.8 ft (150 mm at 3 m)		
Angle of divergence	Approx. 2.8°		
Supply voltage V_S	10…30 V DC[3]		
Ripple[4]	± 10%		
Current consumption[5]	≤ 30 mA		
Switching outputs (optional)	PNP/NPN; open collector: Q		
Operation mode	Q, dark switching		
	Q, light switching		
	Q, light/dark switching via control wire L/D[6]		
	+ V_S = light switching		
	0 V = dark switching		
Output current I_A max.	100 mA		
Response time[7]	≤ 2 ms		
Max. switching frequency[8]	250 Hz		
Connection types	Cable, 2 m,[9] PVC, 3 x 0.14 mm², Ø 3.1 mm		
	Cable, 2 m,[9] PVC, 4 x 0.14 mm², Ø 5 mm		
	Plug, M12 4-pin		
VDE protection class[10]	□		
Circuit protection[11]	A, B, C, D		
Enclosure rating	IP 67/NEMA 6		
Ambient temperature T_A	-13…158° F (-25…70° C)		
Approximate weight	Metal housing: 4.2 oz (120 g)		
	Plastic housing: 3.5 oz (100 g)		
Housing material	Nickel-plated brass, PBT/PC		
	Plastic, PBT/PC		

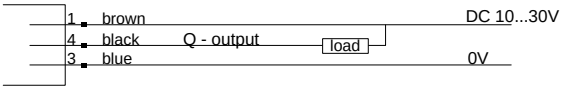
1) Object with 90% reflectance (referred to standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) Control wire open:
NPN: light-switching
PNP: dark-switching
7) With resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0° C
10) Reference voltage 50 V DC
11) A = V_S connections reverse-polarity protected
B = Inputs/outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

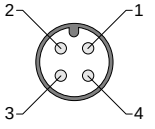
PNP Models



NPN Models

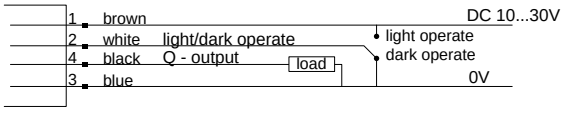


M12 Connector

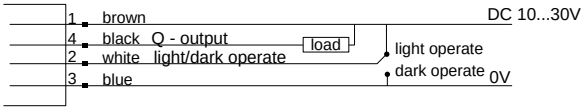


wire colors refer to standard cable, not included with quick disconnect models.

PNP Models



NPN Models



VT 180

Proximity/Diffuse Sensors-Energetic



0...4.3 in (0...110 mm)
sensing range

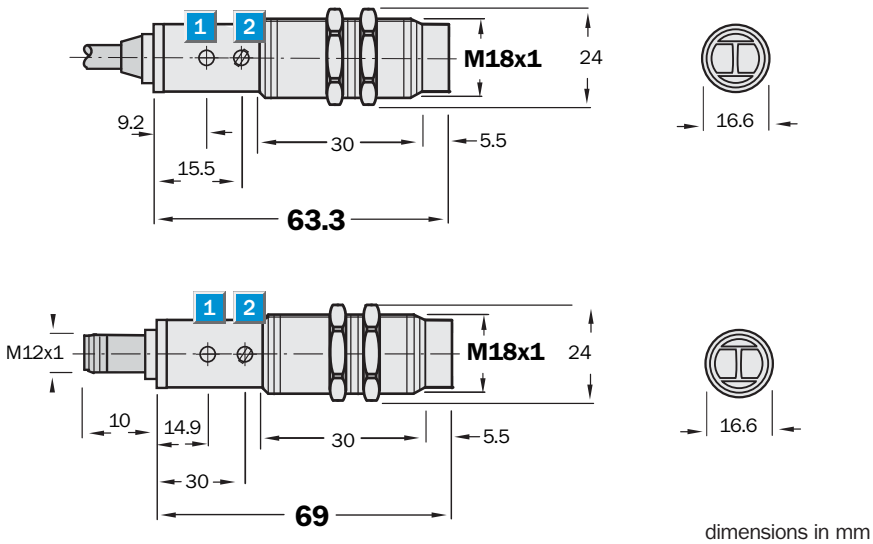
Highlights

- Rugged metal housing
- LED status indicator
- Standard 18 mm size
- Adjustable sensitivity
- Easy mounting with included nuts
- Cable or M12 quick disconnect versions

VT 180



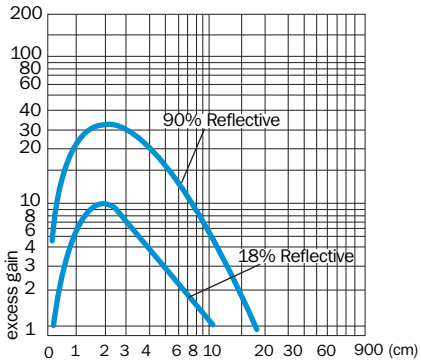
Dimensional drawing



dimensions in mm

1 Output indicator
2 Sensitivity adjustment

Excess gain



Accessories	page
Cables and connectors	1180
Mounting systems	1234

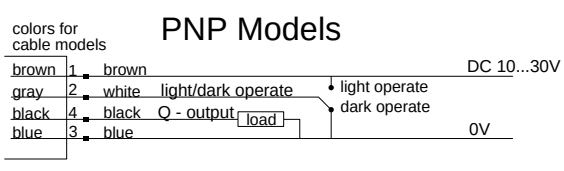
Order information

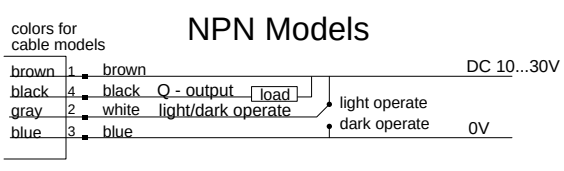
Type	Part no.
VT 180-P112	6 008 787
VT 180-N112	6 008 788
VT 180-P410	6 008 789
VT 180-N410	6 008 790

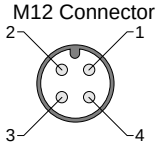
Technical data	VT 180-	P112	N112	P410	N410					
Sensing range, adjustable[1]	0...4.3 in (0...110 mm)	■	■	■	■					
Light source[2], light type	LED, infrared light	■	■	■	■					
Light spot diameter	Approx. 2.6 in at 4.3 in (65 mm at 110 mm)	■	■	■	■					
Angle of divergence	Approx. 33°	■	■	■	■					
Supply voltage V_S	10...30 V DC[3]	■	■	■	■					
Ripple[4]	≤ 5 V	■	■	■	■					
Current consumption[5]	≤ 30 mA	■	■	■	■					
Switching outputs	PNP	■		■						
	NPN		■		■					
Output current I_A max.	100 mA	■	■	■	■					
Operation mode	Light or dark switching selectable via wire	■	■	■	■					
Response time[6]	≤ 1.5 ms	■	■	■	■					
Max. switching frequency[7]	333 Hz	■	■	■	■					
Connection types	Cable, PVC, 2 m[8]; 3 x 0.14 mm², Ø 3.1 mm	■	■							
	Plug, M12 4-pin			■	■					
VDE protection class[9]	□	■	■	■	■					
Circuit protection[10]	A, B, C, D	■	■	■	■					
Enclosure rating	IP 66/NEMA 4	■	■	■	■					
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■					
	Storage -40...158° F (-40...70° C)	■	■	■	■					
Approximate weight	4.4 oz (125 g)	■	■							
	2.3 oz (65 g)			■	■					
Housing material	Nickel-plated brass housing	■	■	■	■					

1) Object to be detected with 90% remission (relating to standard white in acc. with DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage DC 50 V
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

Connection diagram







wire colors refer to standard cable, not included with quick disconnect models

VT 180 Long Range

Proximity/Diffuse Sensors-Energetic



0...15.8 in (0...400 mm)

sensing range

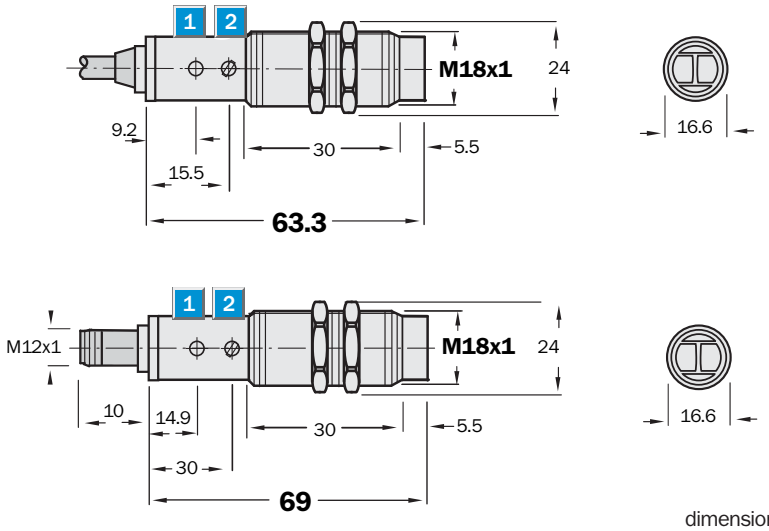
Highlights

- Rugged metal housing
- LED status indicator
- Standard 18 mm size
- Adjustable sensitivity
- Easy mounting with included nuts
- Cable or M12 quick disconnect versions

VT 180



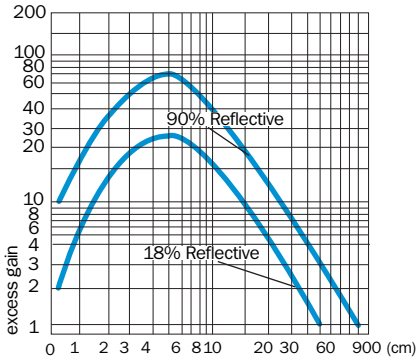
Dimensional drawing



dimensions in mm

1 Output indicator
2 Sensitivity adjustment

Excess gain



Accessories	page
Cables and connectors	1180
Mounting systems	1234

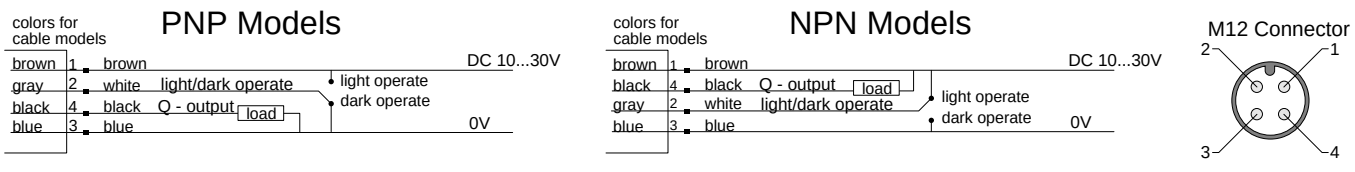
Order information

Type	Part no.
VT 180-P142	6 008 791
VT 180-N142	6 008 792
VT 180-P440	6 008 793
VT 180-N440	6 008 794

Technical data	VT 180-	P142	N142	P440	N440					
Sensing range, adjustable[1]	0...15.8 in (0...400 mm)	■	■	■	■					
Light source[2], light type	LED, infrared light	■	■	■	■					
Light spot diameter	Approx. 1.2 in at 15.7 in (30 mm at 400 mm)	■	■	■	■					
Angle of divergence	Approx. 4°	■	■	■	■					
Supply voltage V_S	10...30 V DC[3]	■	■	■	■					
Ripple[4]	≤ 5 V	■	■	■	■					
Current consumption[5]	≤ 30 mA	■	■	■	■					
Switching outputs	PNP	■		■						
	NPN		■		■					
Output current I_A max.	100 mA	■	■	■	■					
Operation mode	Light or dark switching selectable via wire	■	■	■	■					
Response time[6]	≤ 1.5 ms	■	■	■	■					
Max. switching frequency[7]	333 Hz	■	■	■	■					
Connection types	Cable, PVC, 2 m[8]; 3 x 0.14 mm², Ø 3.1 mm	■	■							
	Plug, M12 4-pin			■	■					
VDE protection class[9]	□	■	■	■	■					
Circuit protection[10]	A, B, C, D	■	■	■	■					
Enclosure rating	IP 66/NEMA 4	■	■	■	■					
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■					
	Storage -40...158° F (-40...70° C)	■	■	■	■					
Approximate weight	4.4 oz (125 g)	■	■							
	2.3 oz (65 g)			■	■					
Housing material	Nickel-plated brass housing	■	■	■	■					

1) Object to be detected with 90% remission (relating to standard white in acc. with DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) Reference voltage DC 50 V
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

VL 180

Reflex/Retro-Reflective Sensors



0...7.2 ft (0...2.2 m)
sensing range

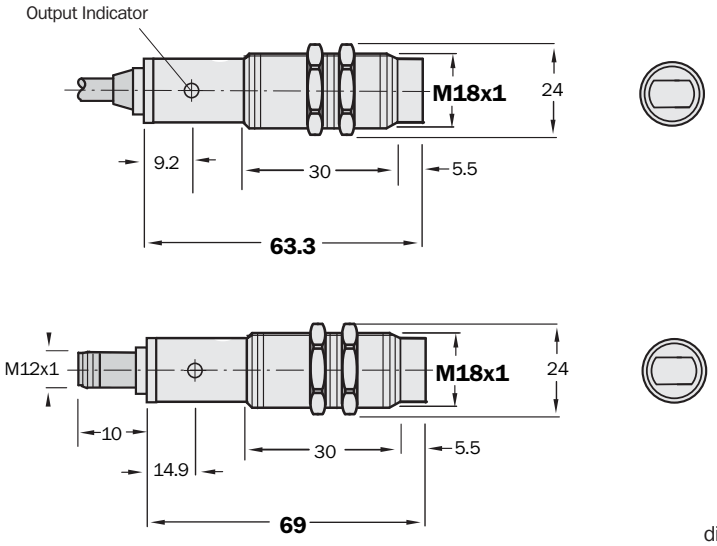
Highlights

- Rugged metal housing
- LED status indicator
- Standard 18 mm size
- Adjustable sensitivity
- Easy mounting with included nuts
- Cable or M12 quick disconnect versions
- Polarizing filters prevent false readings on reflective surfaces

VL 180

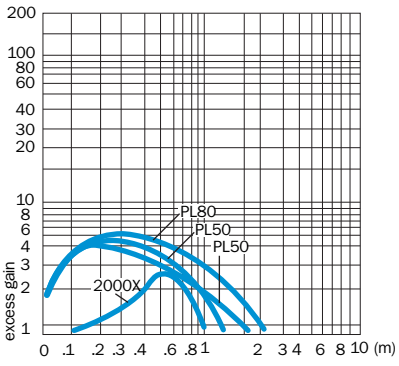


Dimensional drawing



dimensions in mm

Excess gain



Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Order information

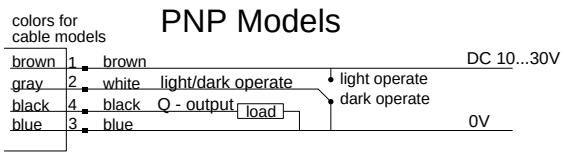
Type	Part no.
VL 180-P162	6 008 783
VL 180-N162	6 008 784
VL 180-P460	6 008 785
VL 180-N460	6 008 786

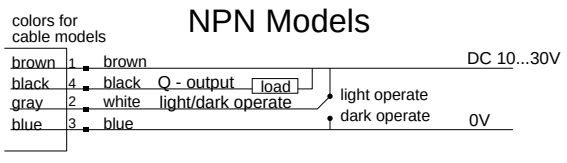
7028071 - © 2008 SICK, Inc.

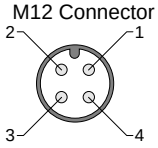
Technical data	VL 180-	P162	N162	P460	N460
Sensing range	0...5.9 ft (0...2.2 m)/PL 80 A	■	■	■	■
Light source[1], light type	LED, red light, polarized	■	■	■	■
Light spot diameter	Approx. 2 in at 3.3 ft (50 mm at 1 m)	■	■	■	■
Angle of divergence	Approx. 3°	■	■	■	■
Supply voltage V_S	10...30 V DC[2]	■	■	■	■
Ripple[3]	≤ 5 V	■	■	■	■
Current consumption[4]	≤ 30 mA	■	■	■	■
Switching outputs	PNP	■		■	
	NPN		■		■
Output current I_A max.	100 mA	■	■	■	■
Operation mode	Light or dark switching selectable via wire	■	■	■	■
Response time[5]	≤ 1.5 ms	■	■	■	■
Max. switching frequency[6]	333 Hz	■	■	■	■
Connection types	Cable, PVC, 2 m[7]; 3 x 0.14 mm², Ø 3.1 mm	■	■		
	Plug, M 12 4-pin			■	■
VDE protection class[8]	□	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■
Enclosure rating	IP 66/NEMA 4	■	■	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■
	Storage -40...158° F (-40...70° C)	■	■	■	■
Approximate weight	4.4 oz (125 g)	■	■		
	2.3 oz (65 g)			■	■
Housing material	Nickel-plated brass housing	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage DC 50 V
9) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

Connection diagram







wire colors refer to standard cable, not included with quick disconnect models

VL 180

Reflex/Retro-Reflective Sensors



0...18 ft (0...5.5 m)

sensing range

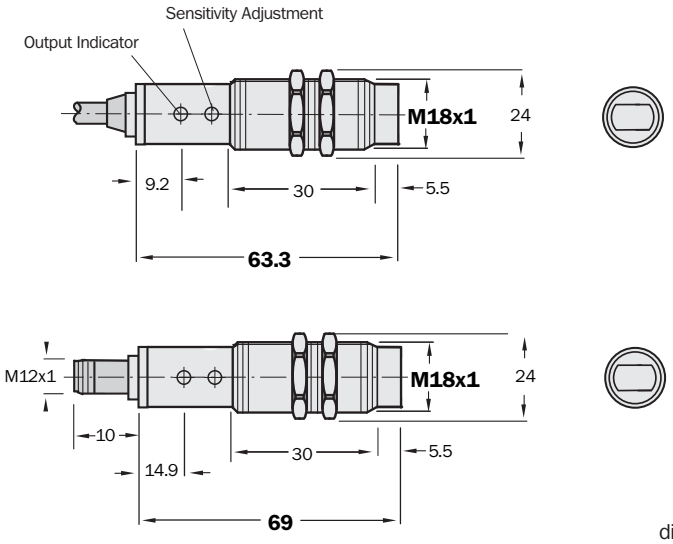
Highlights

- Rugged metal housing
- LED status indicator
- Standard 18 mm size
- Adjustable sensitivity
- Easy mounting with included nuts
- Cable or M12 quick disconnect versions

VL 180

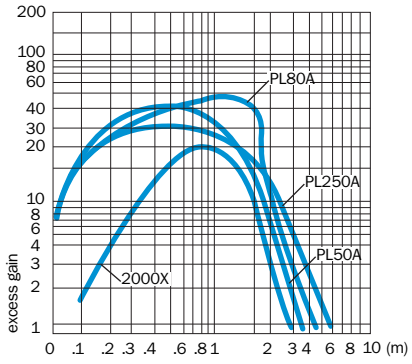


Dimensional drawing



dimensions in mm

Excess gain



Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

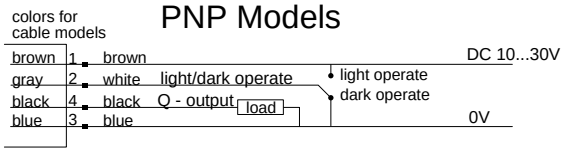
Order information

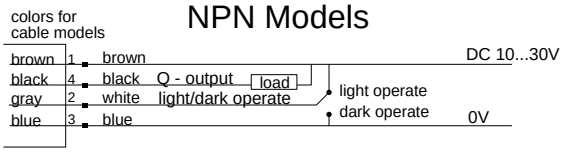
Type	Part no.
VL 180-P132	6 008 779
VL 180-N132	6 008 780
VL 180-P430	6 008 781
VL 180-N430	6 008 782

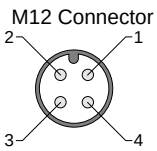
Technical data	VL 180-	P132	N132	P430	N430					
Sensing range	0...18 ft (0...5.5 m)/PL 80 A	■	■	■	■					
Light source[1], light type	LED, infrared light	■	■	■	■					
Light spot diameter	Approx. 5.9 in at 9.8 ft (150 mm at 3 m)	■	■	■	■					
Angle of divergence	Approx. 3°	■	■	■	■					
Supply voltage V_S	10...30 V DC[2]	■	■	■	■					
Ripple[3]	≤ 5 V	■	■	■	■					
Current consumption[4]	≤ 30 mA	■	■	■	■					
Switching outputs	PNP	■		■						
	NPN		■		■					
Output current I_A max.	100 mA	■	■	■	■					
Operation mode	Light or dark switching selectable via wire	■	■	■	■					
Response time[5]	≤ 1.5 ms	■	■	■	■					
Max. switching frequency[6]	333 Hz	■	■	■	■					
Connection types	Cable, PVC, 2 m[7]; 3 x 0.14 mm², Ø 3.1 mm	■	■							
	Plug, M 12 4-pin			■	■					
VDE protection class[8]	□	■	■	■	■					
Circuit protection[9]	A, B, C, D	■	■	■	■					
Enclosure rating	IP 66/NEMA 4	■	■	■	■					
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■					
	Storage -40...158° F (-40...70° C)	■	■	■	■					
Approximate weight	4.4 oz (125 g)	■	■							
	2.3 oz (65 g)			■	■					
Housing material	Nickel-plated brass housing	■	■	■	■					

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage DC 50 V
9) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

Connection diagram



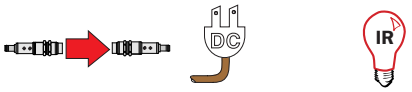




wire colors refer to standard cable, not included with quick disconnect models

VS/VE 180

Through-beam Sensors

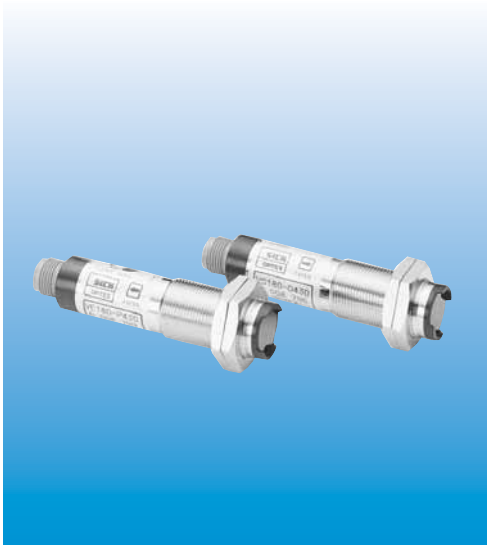


0...75.5 ft (0...23 m)
sensing range

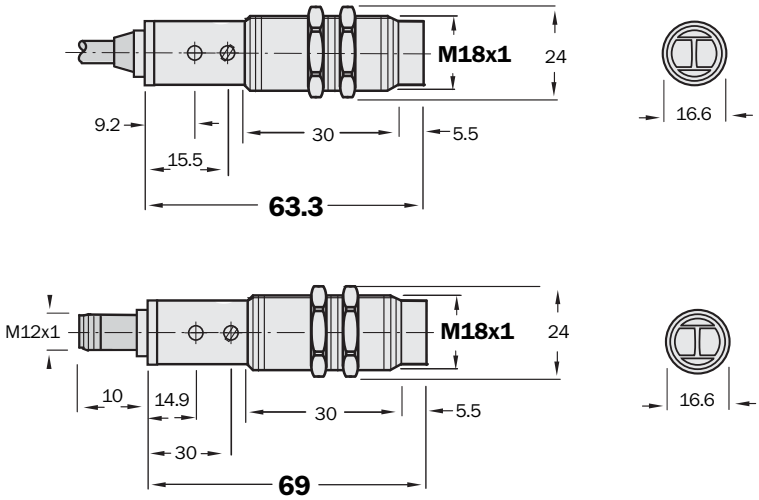
Highlights

- Rugged metal housing
- LED status indicator
- Standard 18 mm size
- Adjustable sensitivity
- Easy mounting with included nuts
- Cable or M12 quick disconnect versions

VS/VE 180

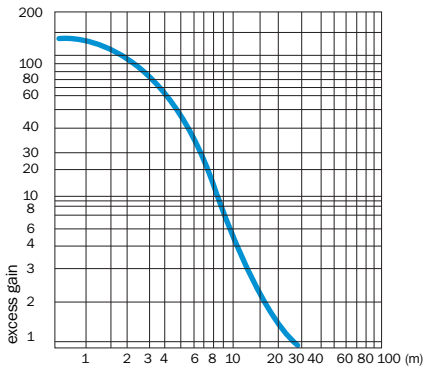


Dimensional drawing



dimensions in mm

Excess gain



Accessories	page
Cables and connectors	1180
Mounting systems	1234

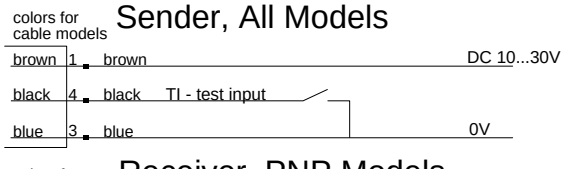
Order information

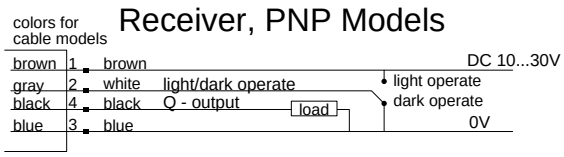
Type	Part no.
VS/VE 180-P132	6 008 864
VS/VE 180-N132	6 008 865
VS/VE 180-P430	6 008 866
VS/VE 180-N430	6 008 867

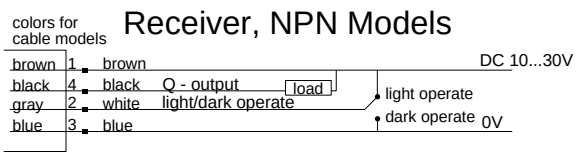
Technical data	VS/VE 180-	P132	N132	P430	N430					
Sensing range, adjustable	0...75.5 ft (0...23 m)	■	■	■	■					
Light source[1], light type	LED, infrared light	■	■	■	■					
Light spot diameter	Approx. 31.5 in at 42.2 ft (800 mm at 15 m)	■	■	■	■					
Angle of divergence	Approx. 3°	■	■	■	■					
Supply voltage V_S	10...30 V DC[2]	■	■	■	■					
Ripple[3]	≤ 5 V	■	■	■	■					
Current consumption[4]	≤ 30 mA	■	■	■	■					
Switching outputs	PNP	■		■						
	NPN		■		■					
Output current I_A max.	100 mA	■	■	■	■					
Operation mode	Light or dark switching selectable via wire	■	■	■	■					
Response time[5]	≤ 1.5 ms	■	■	■	■					
Max. switching frequency[6]	333 Hz	■	■	■	■					
Connection types	Cable, PVC, 2 m[7]; 3 x 0.14 mm², Ø 3.1 mm	■	■							
	Plug, M 12 4-pin			■	■					
VDE protection class[8]	□	■	■	■	■					
Circuit protection[9]	A, B, C, D	■	■	■	■					
Enclosure rating	IP 66/NEMA 4	■	■	■	■					
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■					
	Storage -40...158° F (-40...70° C)	■	■	■	■					
Approximate weight	2.3 oz (65 g)			■	■					
sender and receiver each approx.	4.4 oz (125 g)	■	■							
Housing material	Nickel-coated brass housing	■	■	■	■					

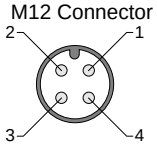
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage DC 50 V
9) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

Connection diagram





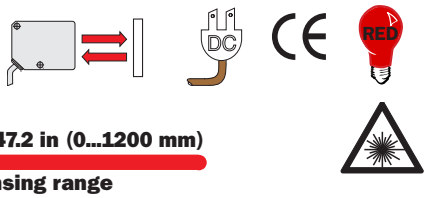




wire colors refer to standard cable, not included with quick disconnect models

WT130L

Proximity/Diffuse Sensors - Energetic



0...47.2 in (0...1200 mm)
sensing range

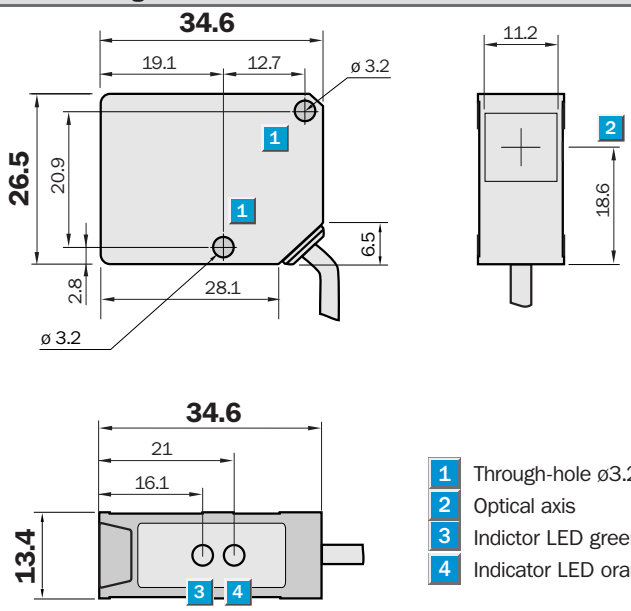
Highlights

- Laser sensor in a compact housing
- Easy alignment through red light laser Class 2
- Co-axial light path
- Configuration via amplifier unit

WT130L



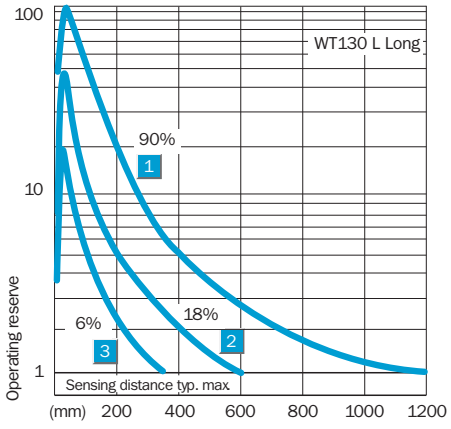
Dimensional drawing

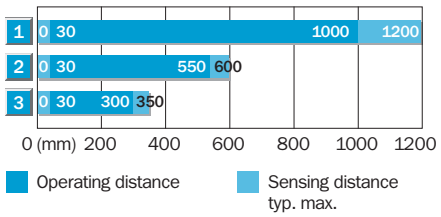


dimensions in mm

1 Through-hole ø3.2 mm
2 Optical axis
3 Indictor LED green: operational status indicator
4 Indicator LED orange: switching output

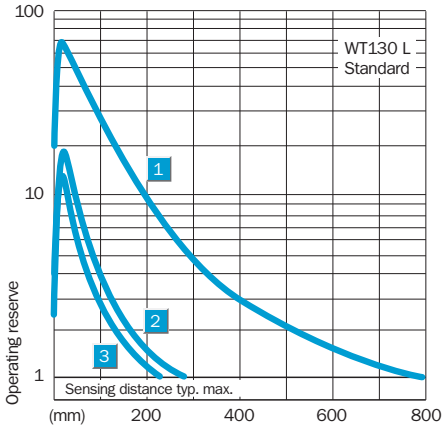
Mode: long

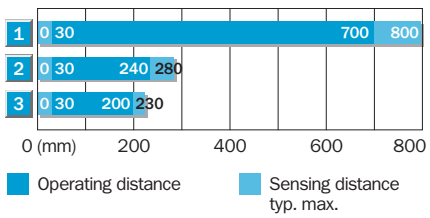




1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

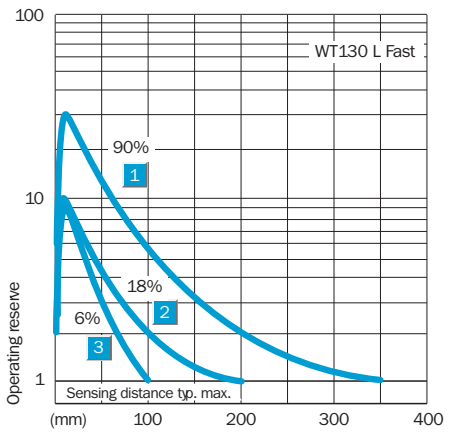
Mode: standard

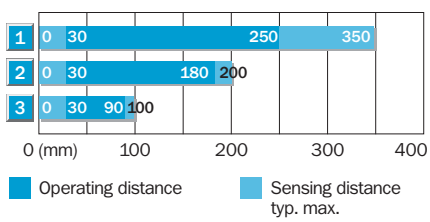




Sensing range on black, 6% remission
Sensing range on gray, 18% remission
Sensing range on white, 90% remission

Mode: fast





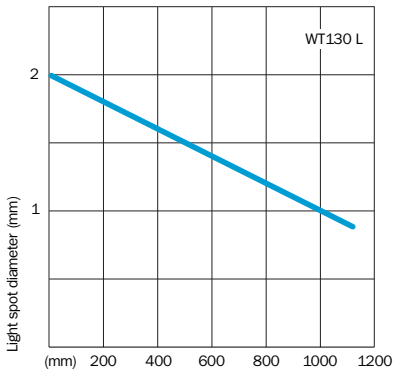
Sensing range on black, 6% remission
Sensing range on gray, 18% remission
Sensing range on white, 90% remission

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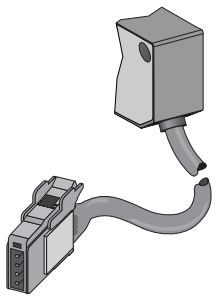
Technical data	WT130L-	32								
Sensor head	Operation in combination with amplifier unit WI130									
Sensing distance typ. max	0…47.2 in (0…1200 mm)[1]									
Operating distance	1.2…39.4 in (30…1000 mm)[1]									
Light source[2], light type	Laser, red light									
Laser protection class	2 (IEC 60 825-1/C.D.R.H)									
Light spot diameter	0.04 in at 3.3 ft (1 mm at 1 m)									
Supply voltage V_S	See amplifier unit WI130									
Switching outputs	See amplifier unit WI130									
Connection types	Cable with plug, PVC/PBT, 2 m[3]									
VDE protection class	⏀									
Enclosure rating	IP 67									
Ambient temperature T_A	Operation -14...131° F (-10…55° C)									
	Storage -13...158° F (-25…70° C)									
Approximate weight	1.2 oz (35 g)									
Housing material	PC, polycarbonate, glass									

1) Object with 90% remission (based on standard white to DIN 5033). Sensing distance depends on chosen operating mode.
2) Average service life 50,000 h at T_A = 25° C.
3) Connection between sensor head and amplifier unit with system specific plug. Do not bend cable below 0° C.

Light spot diameter



Connection diagram

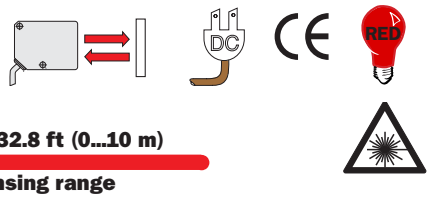


Order information

Type	Part no.
WT130L-32	6 029 861

WL130L

Proximity/Diffuse Sensors



0...32.8 ft (0...10 m)
sensing range

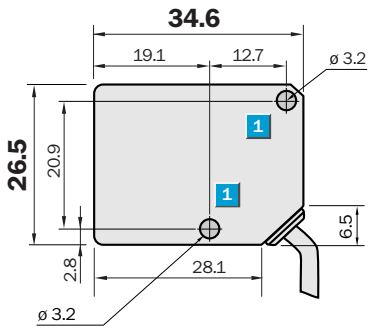
Highlights

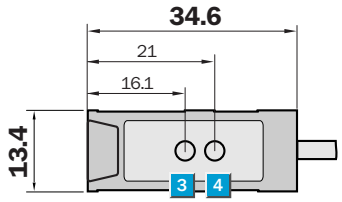
- Laser sensor in a compact housing
- Easy alignment through red light laser Class 2
- Co-axial light path
- Configuration via amplifier unit
- Line laser through line attachment

WL130L



Dimensional drawing

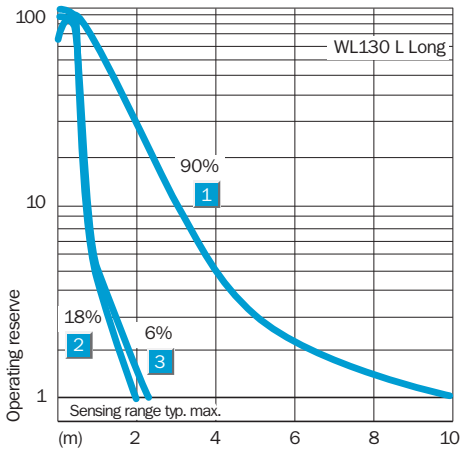


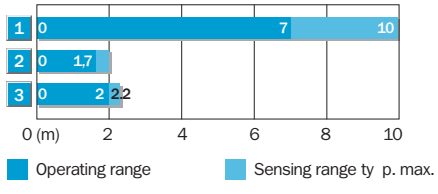


dimensions in mm

1 Through-hole ø3.2 mm
2 Optical axis
3 Indictor LED green: operational status indicator
4 Indicator LED orange: switching output

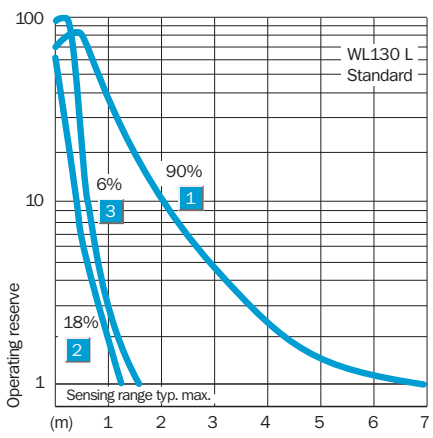
Mode: long

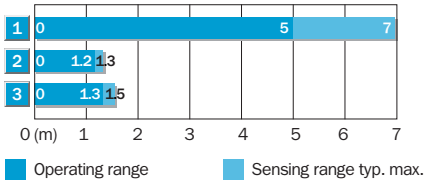




Reflector type	Operating range
1 P41F (without tip adapter lens)	0 ... 7 m
2 P41F (with area tip adapter lens)	0 ... 1.7 m
3 P41F (with line tip adapter lens)	0 ... 2 m

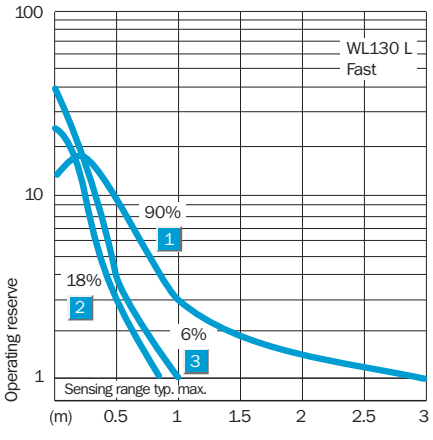
Mode: standard

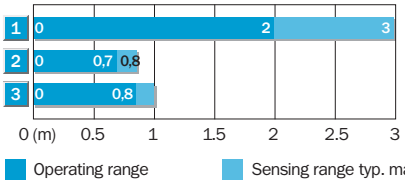




Reflector type	Operating range
1 P41F (without tip adapter lens)	0 ... 5 m
2 P41F (with area tip adapter lens)	0 ... 1.2 m
3 P41F (with line tip adapter lens)	0 ... 1.5 m

Mode: fast





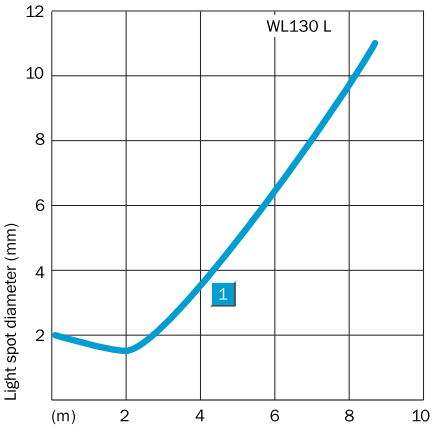
Reflector type	Operating range
1 P41F (without tip adapter lens)	0 ... 2 m
2 P41F (with area tip adapter lens)	0 ... 0.7 m
3 P41F (with line tip adapter lens)	0 ... 0.8 m

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Technical data	WL130L-	32								
Sensor head	Operation in combination with amplifier unit WI130									
Sensing distance typ. max	0…32.8 ft (0…10 m)									
Sensing range, recommended	0…23 ft (0…7 m)									
Laser line through lens	√									
Laser line dimension	1 x 0.02 in at 7.9 in (26 x 0.5 mm at 200 mm)									
Light source[1], light type	Laser, red light									
Laser protection class	2 (IEC 60 825-1/C.D.R.H)									
Light spot diameter	0.08 in at 6.6 m (2 mm in 2 m)									
Polarization filter	√									
Supply voltage V_S	See amplifier unit WI130									
Switching outputs	See amplifier unit WI130									
Connection types	Cable with plug, PVC/PBT, 2 m[2]									
VDE protection class	⧫									
Enclosure rating	IP 67									
Ambient temperature T_A	Operation -14…131° F (-10…55° C)									
	Storage -13…158° F (-25…70° C)									
Approximate weight	1.2 oz (35 g)									
Housing material	PC, polycarbonate, PMMA									
Included with delivery	Reflector P41F									

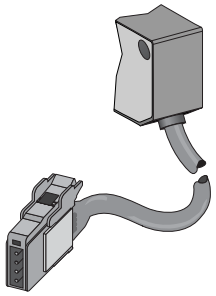
1) Average service life 50,000 h at T_A = 25° C
2) Connection between sensor head and amplifier unit with system specific plug. Do not bend cable below 0° C.

Light spot diameter



Accessories	page
Reflectors	1256
Special Accessories	1314

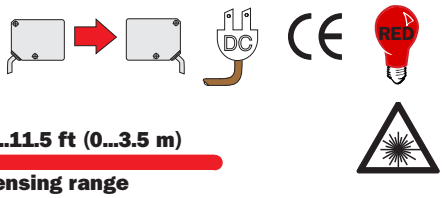
Connection diagram



Order information	
Type	**Part no.**
WL130L-32	6 029 862

WS/WE130L “SPOT”

Through-beam Sensors



0...11.5 ft (0...3.5 m)
sensing range

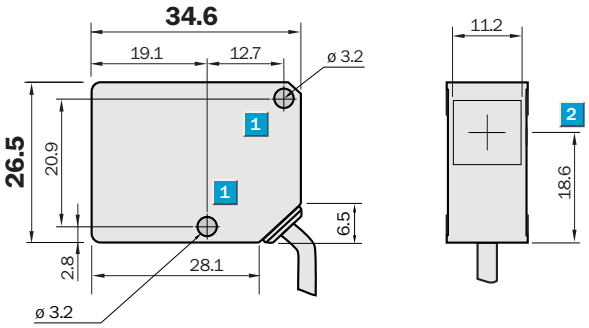
Highlights

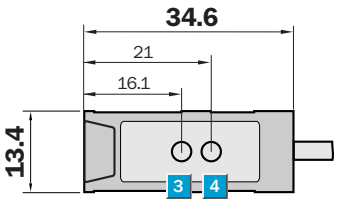
- Laser sensor in a compact housing
- “Eye safe” (Class 1) red light laser
- Configuration via amplifier unit

WS/WE130L “SPOT”



Dimensional drawing

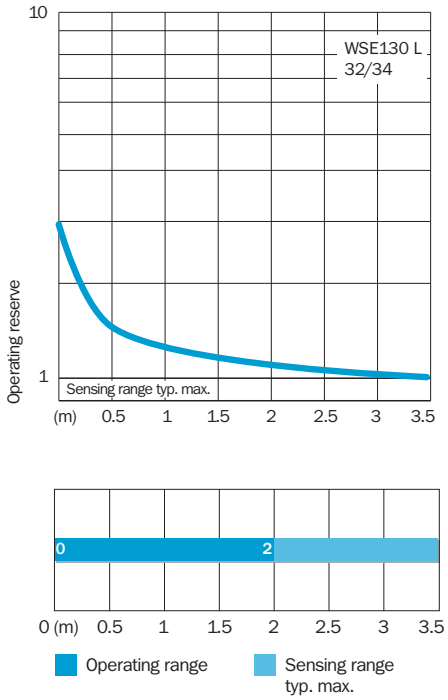




dimensions in mm

1 Through-hole ø 3.2 mm
2 Optical axis
3 Indictor LED green: operational status indicator
4 Indicator LED orange: switching output

Sensing range

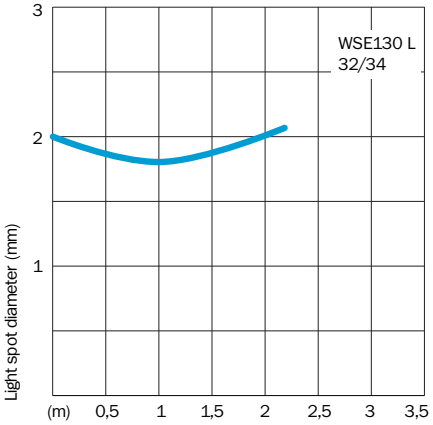


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Technical data	WS/WE130L-	32	34
Sensor head	Operation in combination with amplifier unit WI130		
Sensing distance typ. max	0…11.5 ft (0…3.5 m)		
Sensing distance, recommended	0…6.6 ft (0…2 m)		
Light source[1], **light type**	Laser, red light		
Laser protection class	1 (EN 60 825-1)		
Light spot diameter	0.08 in at 6.6 m (2 mm at 2 m)		
Supply voltage V_S	See amplifier unit WI130		
Switching outputs	See amplifier unit WI130		
Connection types	Cable with plug, PVC/PBT, 2 m[2]		
	Cable with plug and coupling, PVC/PBT, 2 m[3]		
VDE protection class	⧫		
Enclosure rating	IP 67		
Ambient temperature T_A	Operation -14…131° F (-10…55° C)		
	Storage -13…158° F (-25…70° C)		
Approximate weight	2.5 oz (70 g)		
Housing material	PC, polycarbonate, PMMA		

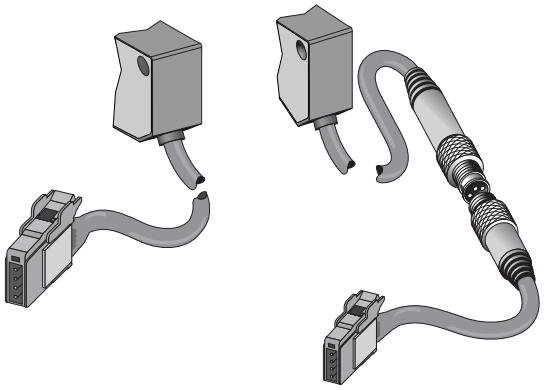
1) Average service life 50,000 h at T_A = 25° C
2) Connection between sensor head and amplifier unit with system specific plug. Do not bend cable below 0° C.
3) System cable M8, 2 m necessary for connection. Included with delivery. Do not bend cable below 0° C.

Light spot diameter



Connection diagram

WS/WE130L-32 | WS/WE130L-34

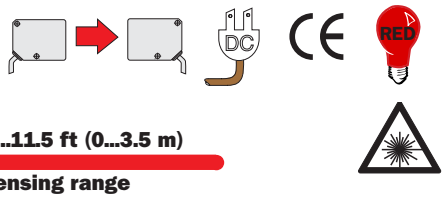


Order information

Type	Part no.
WS/WE130L-32	6 029 863
WS/WE130L-34	6 029 866

WS/WE130L “LINE”

Through-beam Sensors

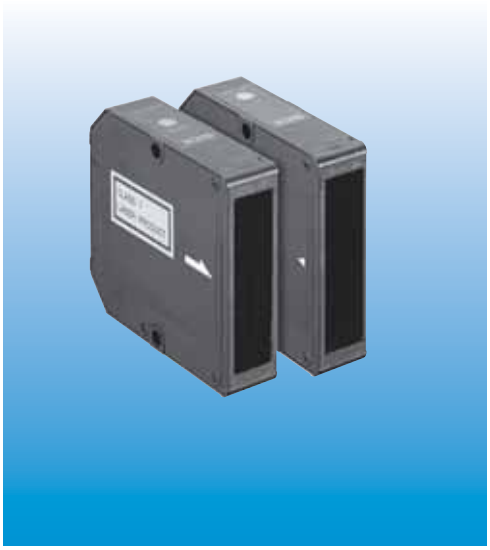


0...11.5 ft (0...3.5 m)
sensing range

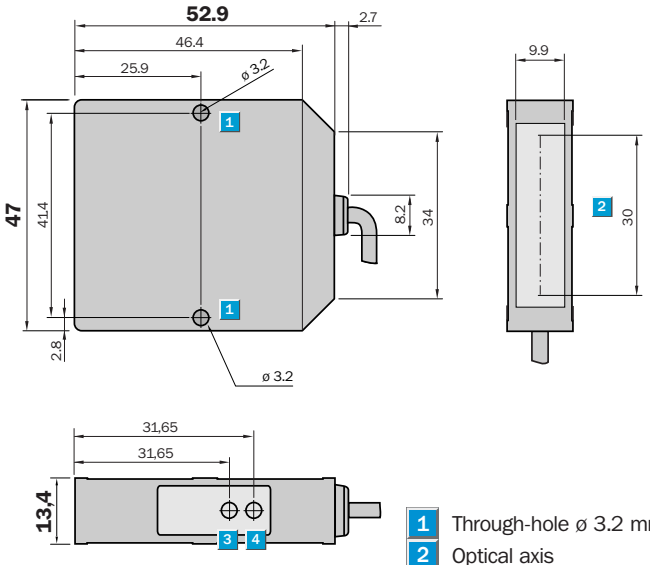
Highlights

- Parallel laser line 1.2 in (30 mm) wide
- Range up to 6.6 ft (2 m)
- “Eye safe” (Class 1) red light laser
- Configuration via amplifier unit enables application solutions such as edge control and detection of objects with position tolerance

WS/WE130L “LINE”



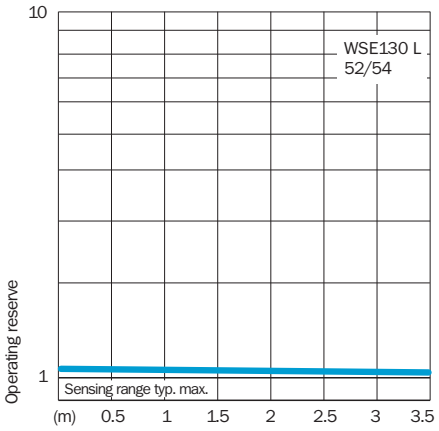
Dimensional drawing

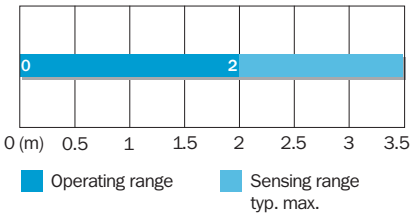


dimensions in mm

1 Through-hole ø 3.2 mm
2 Optical axis
3 Indictor LED green: operational status indicator
4 Indicator LED orange: switching output

Sensing range



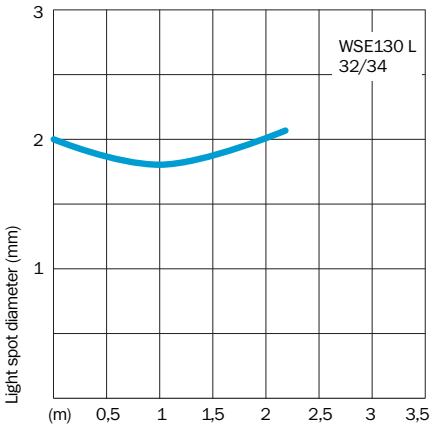


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Technical data	WS/WE130L-	52	54
Sensor head	Operation in combination with amplifier unit WI130		
Sensing distance typ. max	0…11.5 ft (0…3.5 m)		
Sensing range, recommended	0…6.6 ft (0…2 m)		
Laser line dimension	30 x 2.5 mm parallel		
Light source[1], light type	Laser, red light		
Laser protection class	1 (EN 60 825-1)		
Supply voltage V_S	See amplifier unit WI130		
Switching outputs	See amplifier unit WI130		
Connection types	Cable with plug, PVC/PBT, 2 m[2]		
	Cable with plug and coupling, PVC/PBT, 2 m[3]		
VDE protection class	III		
Enclosure rating	IP 67		
Ambient temperature T_A	Operation -14…131° F (-10…55° C)		
	Storage -13…158° F (-25…70° C)		
Approximate weight	3.5 oz (100 g)		
Housing material	PC, polycarbonate, PMMA		

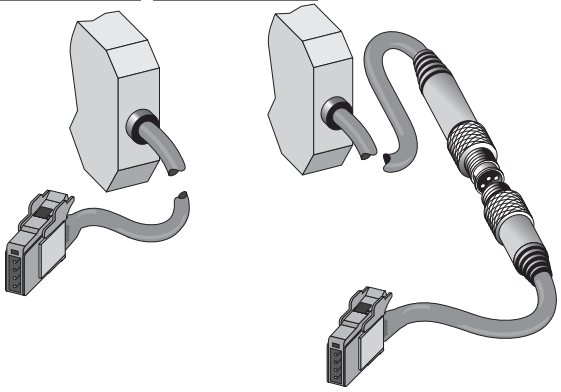
1) Average service life 50,000 h at T_A = 25° C
2) Connection between sensor head and amplifier unit with system specific plug. Do not bend cable below 0° C.
3) System cable M8, 2 m necessary for connection. Included with delivery. Do not bend cable below 0° C.

Light spot diameter



Connection diagram

WS/WE130L-52 | WS/WE130L-54



Order information

Type	Part no.
WS/WE130L-52	6 029 865
WS/WE130L-54	6 029 868

WI130T

Amplifier with switching output

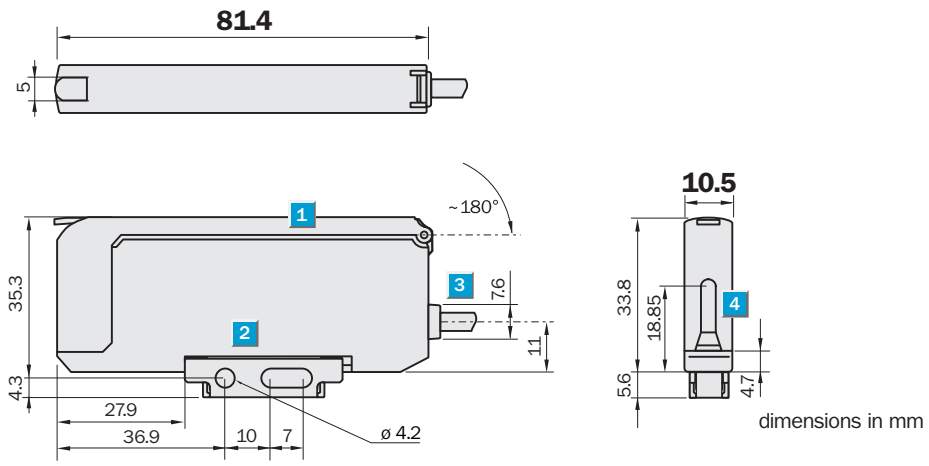
Highlights

- Provision of varied functions for configuration
- Easy commissioning
- Display for operational status indicator and operator guidance
- Switching and analog outputs
- Switching frequency up to 8.3 kHz

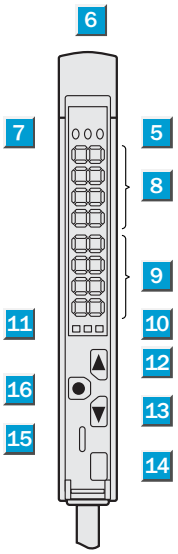
WI130T



Dimensional drawing



Adjustments possible



1	Protective hood; can be folded open (180° approx.)
2	Mounting bracket (included with delivery)
3	Connection
4	Connection for sensor heads
5	Indicator LED: output 1
6	Indicator LED: laser active
7	Indicator LED: output 2
8	Display: measurement value
9	Display: switching point
10	Indicator: SET active
11	Indicator LED: output 1 or 2 activated
12	Function key
13	Function key
14	Teach-in key
15	Set/Run selector switch
16	Operating key

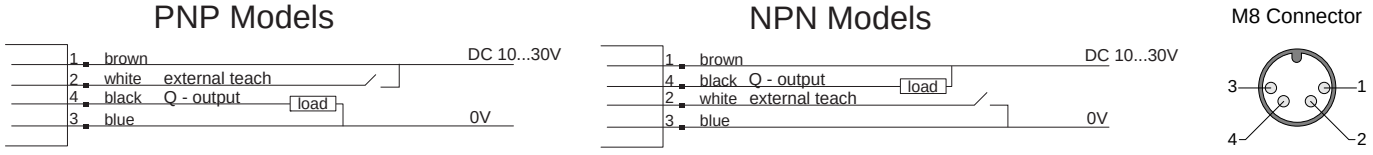
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Technical data	WI130T-	P340	N340							
Amplifier unit	Operation in combination with sensor heads from W130L series	■	■							
Adjustment of operating distance	Teach-in: teach button & cable (ET)	■	■							
Supply voltage V_S	12…24 V DC[1]	■	■							
Current consumption	≤ 50 mA	■	■							
Switching outputs	PNP, Q	■								
	NPN, Q		■							
Switching mode	Programmable/configurable	■	■							
Output current $I_a$max	≤ 100 mA	■	■							
Response time	60 µs/500 µs/5 ms	■	■							
Time delay	On/Off Delay, 0…9 s	■	■							
Connection types	Connector, M8 4-pin	■	■							
VDE protection class	⧫	■	■							
Circuit protection[3]	A, B	■	■							
Enclosure rating	IP 50	■	■							
Ambient temperature T_A	Operation -13...131° F (-25…55° C)[2]	■	■							
	Storage -40...158° F (-40…70° C)	■	■							
Approximate weight	0.7 oz (20 g)	■	■							
Housing material	PPE/PC	■	■							
Included with delivery	Mounting bracket	■	■							

1) ± 10%
2) More than 2 devices mounted as a block max. 50° C
3) A = Vs connections reverse-polarity protected
B = Output Q short-circuit protected

Order information	
Type	**Part no.**
WI130T-P340	6 032 851
WI130T-N340	6 032 852

Connection diagram



wire colors refer to standard cable, not included with quick disconnect models

WI130T

Amplifier with switching and analog output

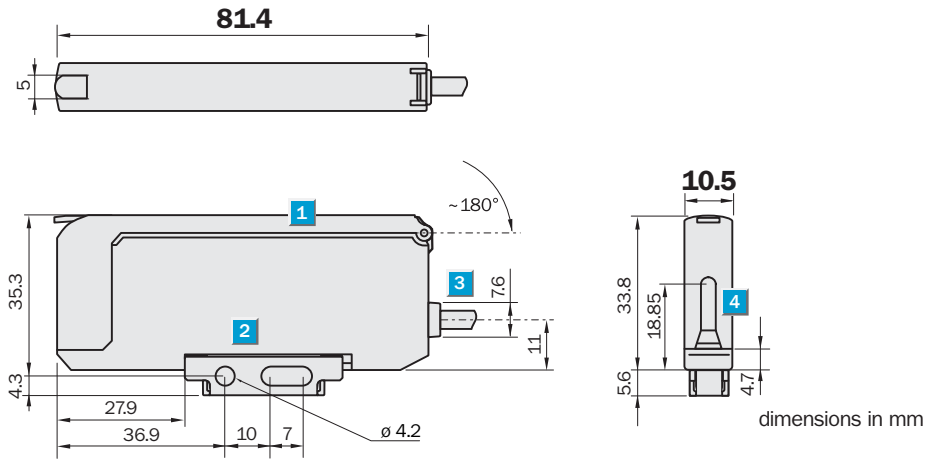
Highlights

- Provision of varied functions for configuration
- Easy commissioning
- Display for operational status indicator and operator guidance
- Switching and analog outputs
- Switching frequency up to 8.3 kHz

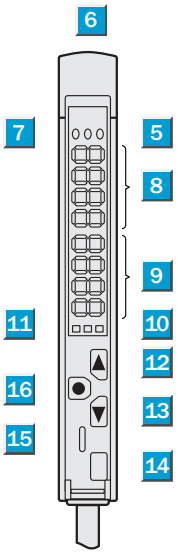
WI130T



Dimensional drawing



Adjustments possible



1	Protective hood; can be folded open (180° approx.)
2	Mounting bracket (included with delivery)
3	Connection
4	Connection for sensor heads
5	Indicator LED: output 1
6	Indicator LED: laser active
7	Indicator LED: output 2
8	Display: measurement value
9	Display: switching point
10	Indicator: SET active
11	Indicator LED: output 1 or 2 activated
12	Function key
13	Function key
14	Teach-in key
15	Set/Run selector switch
16	Operating key

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Technical data	WI130T-	N720	P720								
Amplifier unit	Operation in combination with sensor heads from W130L series										
Adjustment of operating distance	Teach-in: teach button & cable (ET)										
Supply voltage V_S	12…24 V DC[1]										
Current consumption	≤ 50 mA										
Switching outputs	NPN, Q1, Q2 and analog output										
	PNP, Q1, Q2 and analog output										
Switching mode	Programmable/configurable										
Output current $I_a$max	≤ 100 mA										
Response time	60 µs/500 µs/5 ms										
Time delay	On/Off Delay, 0…9 s										
Connection types	Cable, PVC/PBT, 2 m										
VDE protection class	⏀										
Circuit protection[3]	A, B										
Enclosure rating	IP 50										
Ambient temperature T_A	Operation -13…131° F (-25…55° C)[2]										
	Storage -40…158° F (-40…70° C)										
Approximate weight	2.8 oz (80 g)										
Housing material	PPE/PC										
Included with delivery	Mounting bracket										

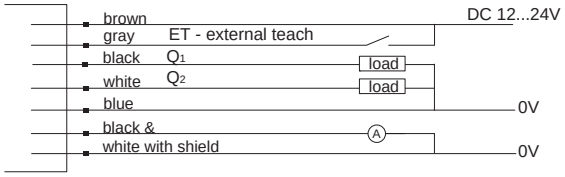
1) ± 10%
2) More than 2 devices mounted as a block max. 50° C
3) A = Vs connections reverse-polarity protected
B = Output Q short-circuit protected

Order information

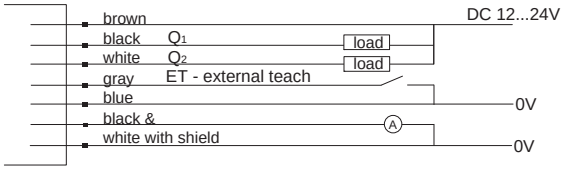
Type	Part no.
WI130T-N720	6 032 854
WI130T-P720	6 032 853

Connection diagram

PNP Models

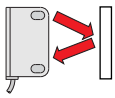


NPN Models



ST 130

Proximity/Diffuse Sensors - Fixed Focus







0.2...1.2 in (5...30 mm)
sensing range

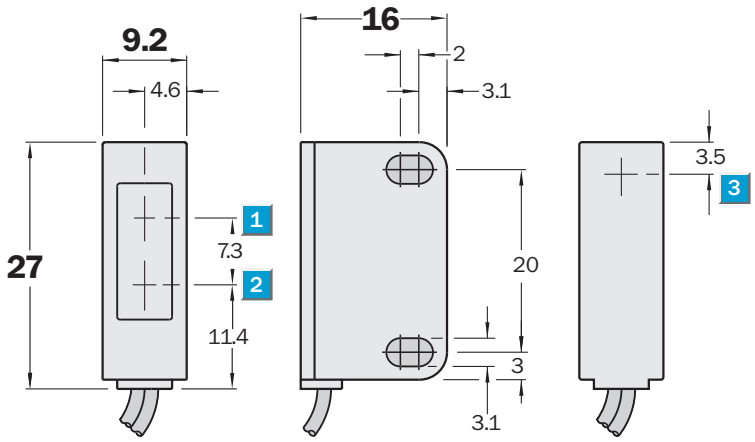
Highlights

- Ultra-miniature housing
- Focused optics, small light spot
- Red light for easy alignment
- Easy mounting with included bracket

ST 130



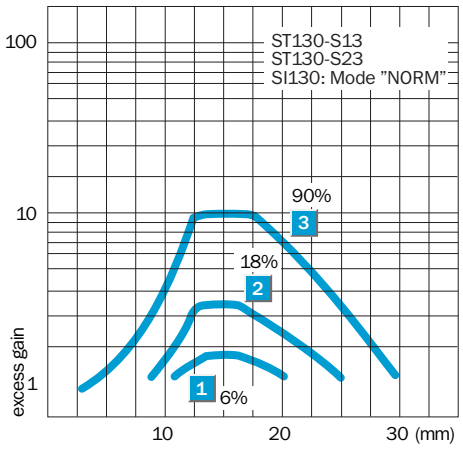
Dimensional drawing

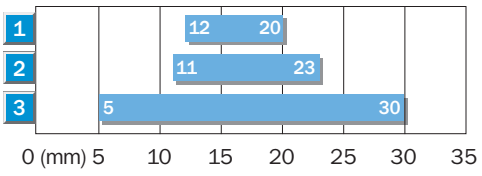


dimensions in mm

1 Center of optical axis, transmitter
2 Center of optical axis, receiver
3 LED indicator, red: light reception

Excess gain





1 Sensing range on black, 6% remission
2 Sensing range on gray, 18% remission
3 Sensing range on white, 90% remission

Accessories	page
Mounting systems	1234

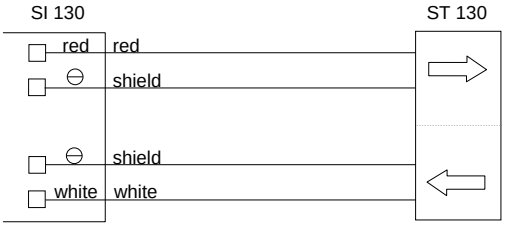
Order information

Type	Part no.
ST 130-S13	6 011 083
ST 130-S23	6 011 085

Technical data	ST 130-	S13	S23
Photoelectric proximity switches	SI 130 in "NORM" mode	■	■
Sensing range	0.2...1.2 in (5...30 mm)	■	■
	(object with 90% remission)		
Background suppression	From approx. 1.8 in (45 mm)	■	■
	(object with 90% remission)		
Light source[1], light type	LED, visible red light	■	■
Light spot size	Approx. 1 x 4 mm w. focal point 16 mm	■	
	Approx. 1 x 1 mm w. focal point 16 mm		■
Angle of divergence, sender	Focused, focal point 16 mm ± 0.5 mm	■	■
Power supply and evaluation unit	ST 130 only functional in combination	■	■
	with separate interpreter (SI 130)		
Supply voltage V_S	For detailed specifications, see SI 130		
Switching outputs			
Output current I_A max.			
Operation mode			
Response time[2]			
Max. switching frequency[3]			
Connection types	Cable, PVC, 2 m[4] (screened),	■	■
	(cannot be extended)		
VDE protection class	⧫	■	■
Circuit protection[5]	A	■	■
Enclosure rating	IP 65	■	■
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■
	Storage -40...158° F (-40...70° C)	■	■
Approximate weight	0.8 oz (23 g)	■	■
Housing material	Glass fiber reinforced ABS	■	■

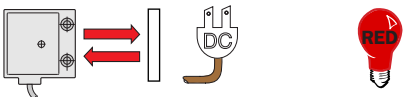
1) Average service life 100,000 h at T_A = 25° C
2) Signal transit time with resistive load
3) With light/dark ratio 1:1
4) Do not bend below 0° C
5) A = V_S connections reverse-polarity protected

Connection diagram



ST 130

Proximity/Diffuse Sensors - Energetic



0...2.4 in (0...60 mm)

sensing range

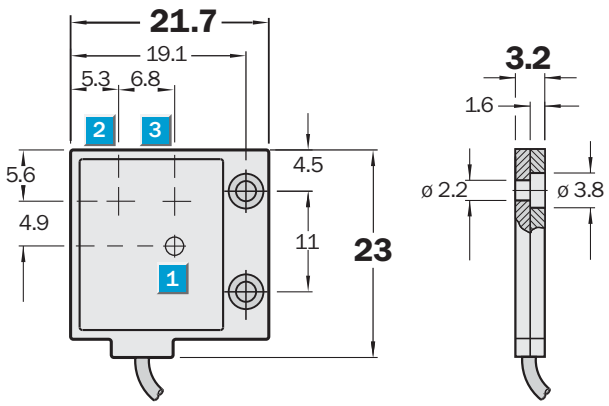
Highlights

- Ultra-miniature housing
- Large sensing range
- Red light and LED signal for easy alignment
- Easy mounting with included bracket

ST 130



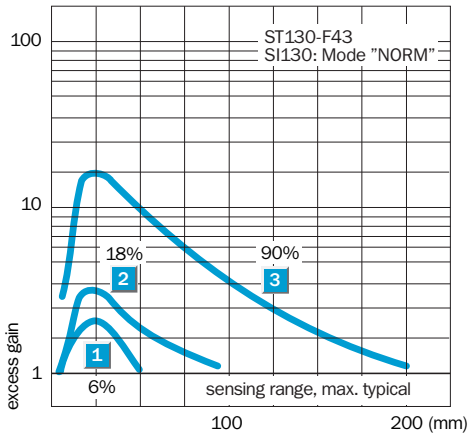
Dimensional drawing

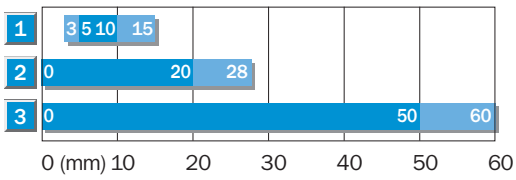


dimensions in mm

1 LED indicator, red: light reception
2 Center of optical axis, transmitter
3 Center of optical axis, receiver

Background suppression





1 Sensing range on black, 6% remission
2 Sensing range on gray, 18% remission
3 Sensing range on white, 90% remission

Accessories	page
Mounting systems	1234

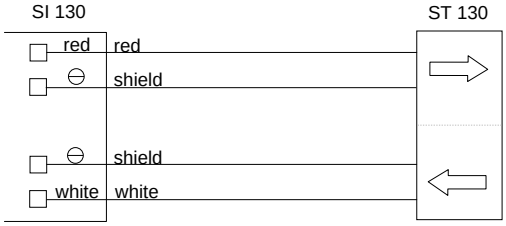
Order information

Type	Part no.
ST 130-F 43	6 011 082

Technical data	ST 130-	F43								
Sensing range, max. typical	0...2.4 in (0...60 mm)[1]									
Operating distance	0...2 in (0...50 mm)[1]									
Light source[2], **light type**	LED, visible red light									
Light spot size	Approx. 1.4 in at 2 in (35 mm at 50 mm)									
Angle of divergence, sender	Approx. 38°									
Power supply and evaluation unit	ST 130 only functional in combination									
	with separate interpreter (SI 130)									
Supply voltage V_S	For detailed specifications, see SI 130									
Switching outputs										
Output current I_A max.										
Light receiver, switching mode										
Response time[3]										
Max. switching frequency[4]										
Connection type	Cable, PVC, 2 m[5] (screened),									
	(cannot be extended)									
VDE protection class	⧫									
Circuit protection[6]	A									
Enclosure rating	IP 66									
Ambient temperature T_A	Operation -13…131° F (-25...55° C)									
	Storage -40…158° F (-40...70° C)									
Approximate weight with cable 2 m	ST 130-F 43: 0.7 (20 g)									
	ST 130-F 43: 0.7 (20 g)									
Housing material	Housing: ABS/optics: PC									

1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at $T_A = +25°$ C
3) Signal transit time with resistive load
4) With light/dark ratio 1:1
5) Do not bend below 0° C
6) A = V_S connections reverse-polarity protected

Connection diagram



ST 130

Proximity/Diffuse Sensors - Energetic



0...7.9 in (0...200 mm)

sensing range

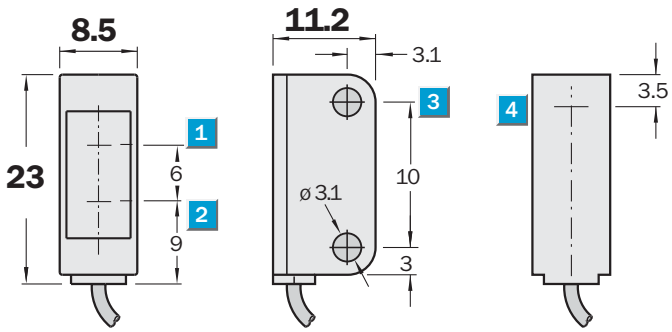
Highlights

- Ultra-miniature housing
- Large sensing range
- Red light and LED signal for easy alignment
- Easy mounting with included bracket

ST 130



Dimensional drawing

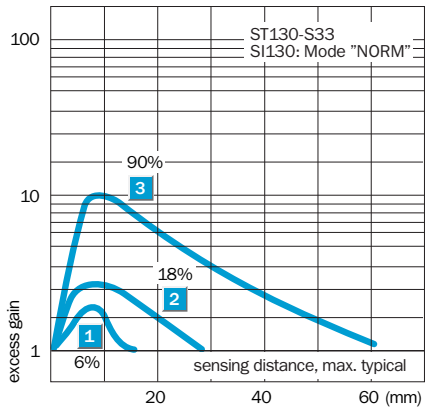


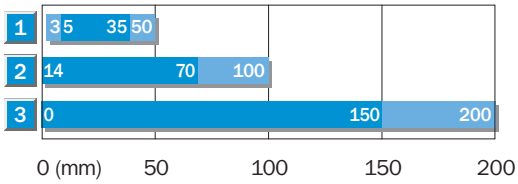
dimensions in mm

1 Center of optical axis, transmitter
2 Center of optical axis, receiver
3 Mounting hole ø3.1 mm
4 LED indicator, red: light reception

Mounting bracket BEF-130-SP included

Background suppression





1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

Accessories	page
Mounting systems	1234

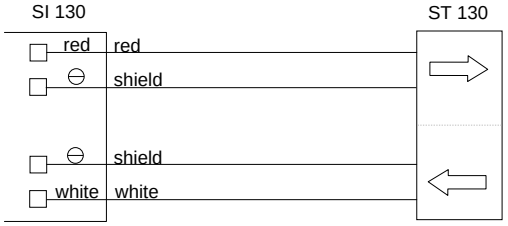
Order information

Type	Part no.
ST 130-S33	6 011 081

Technical data	ST 130-	S33
Sensing range, max. typical	0...7.9 in (0...200 mm)[1]	
Operating distance	0...5.9 in (0...150 mm)[1]	
Light source[2]**, light type**	LED, visible red light	
Light spot size	Approx. 0.5 x 0.5 in at 5.9 in (13 x 13 mm at 150 mm)	
Angle of divergence, sender	Approx. 5°	
Power supply and evaluation unit	ST 130 only functional in combination with separate interpreter (SI 130)	
Supply voltage V_S	For detailed specifications, see SI 130	
Switching outputs		
Output current I_A max.		
Light receiver, switching mode		
Response time[3]		
Max. switching frequency[4]		
Connection type	Cable, PVC, 2 m[5] (screened), (cannot be extended)	
VDE protection class	III	
Circuit protection[6]	A	
Enclosure rating	IP 65	
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	
	Storage -40...158° F (-40...70° C)	
Approximate weight with cable 2 m	ST 130-S 33: 0.8 oz (23 g)	
Housing material	Housing: ABS/optics: PC	

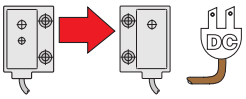
1) Object with 90 % remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at $T_A = +25°$ C
3) Signal transit time with resistive load
4) With light/dark ratio 1:1
5) Do not bend below 0° C
6) A = V_S connections reverse-polarity protected

Connection diagram



SS/SE 130

Through-beam Sensors





0...1.1 ft (0...0.35 m)
sensing range

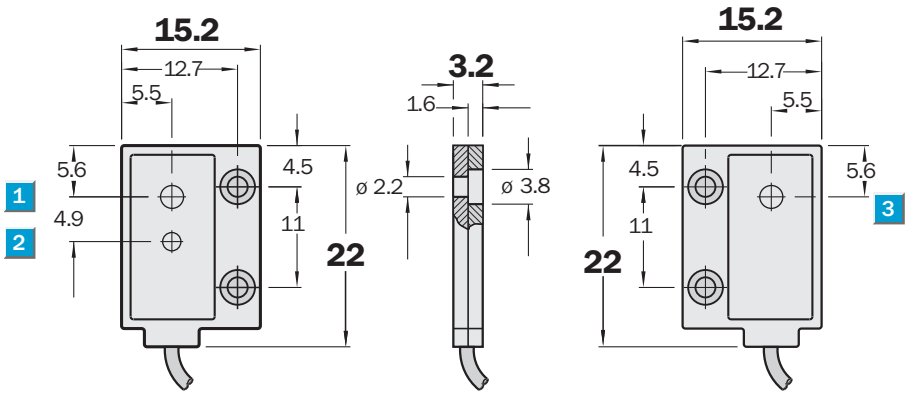
Highlights

- Ultra-miniature housing
- Large sensing range
- Red light and LED signal strength indicator for easy alignment
- Extremely flexible connection cable

SS/SE 130



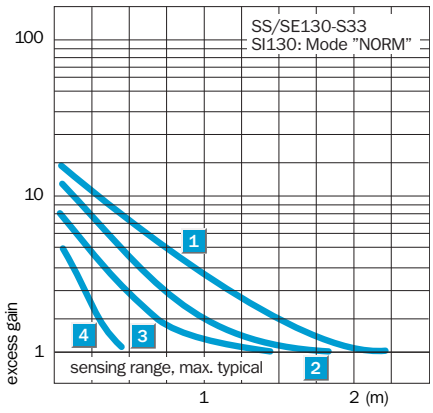
Dimensional drawing

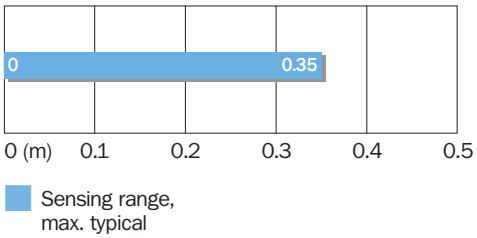


dimensions in mm

1 Center of optical axis, sender
2 LED indicator, red (sender only)
SS 130: active. Light reception by
SE 130 receiver ≥ switching threshold
3 Center of optical axis, receiver

Excess gain





Sensing range, max. typical

Accessories	page
Mounting systems	1234

Order information

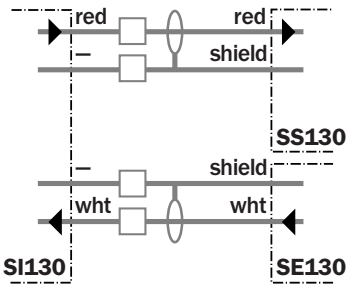
Type	Part no.
SS/SE 130-F33	6 011 080

7028071 - © 2008 SICK, Inc.

Technical data	SS/SE 130-	F33								
"Flat" housing (F)										
Sensing range, max. typical	1.1 ft (0.35 m)									
Light source[1], **light type**	LED, red light									
Light spot size	Approx. 7.9 in at 1.1 ft (200 mm at 0.3 m)									
Angle of dispersion, sender	Approx. 36°									
Angle of dispersion, receiver	Approx. 20°									
Power supply and evaluation unit	ST 130 only functional in combination									
	with separate interpreter (SI 130)									
Supply voltage V_S	For detailed specifications, see SI 130									
Switching outputs										
Output current I_A max.										
Light receiver, switching mode										
Response time[2]										
Max. switching frequency[3]										
Connection type	PVC cable, 2 m[4] (screened),									
	(cannot be extended)									
VDE protection class	III									
Circuit protection[5]	A									
Enclosure rating	IP 66									
Ambient temperature T_A	Operation -13...131° F (-25...55° C)									
	Storage -40...158° F (-40...70° C)									
Approximate weight with cable 2 m	Sender: 0.4 oz (11 g)/									
	Receiver: 0.4 oz (11 g)									
Housing material	Housing: ABS/optics: PC									

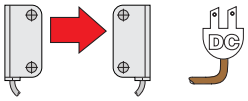
1) Average service life 100,000 h at T_A = + 25° C
2) Signal transit time with resistive load
3) With light/dark ratio 1:1
4) Do not bend below 0° C
5) A = V_S connections reverse-polarity protected

Connection diagram



SS/SE 130

Through-beam Sensors





0...7.2 ft (0...2.2 m)
sensing range

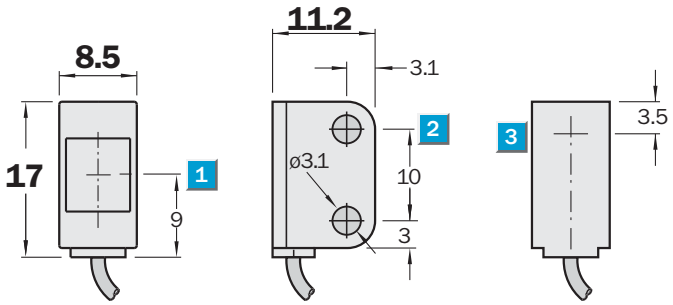
Highlights

- Ultra-miniature housing
- Large sensing range
- Red light and LED signal strength indicator for easy alignment
- Extremely flexible connection cable

SS/SE 130



Dimensional drawing

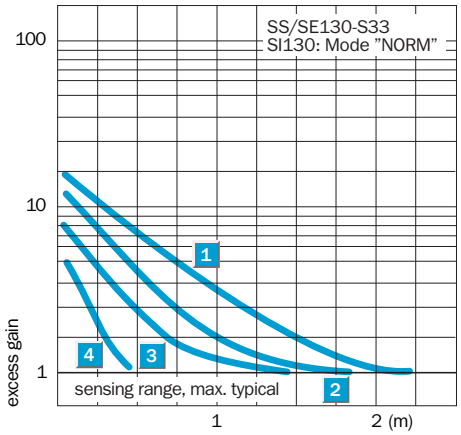


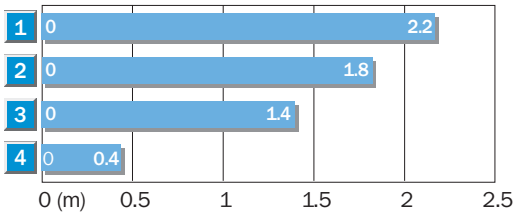
dimensions in mm

1 Center of optical axis
2 Mounting hole Ø3.1 mm
3 LED indicator, red (sender only)
SS 130: active. Light reception by SE 130 receiver ≥ switching threshold

Mounting bracket BEF-130 ST for SS/SE 130-S 33, see accessories (included)

Excess gain





Sensing range, max. typical

1	Without mask
2	With mask, 2 mm wide
3	With mask, 1 mm wide
4	With mask, 0.5 mm wide

Accessories	page
Mounting systems	1234

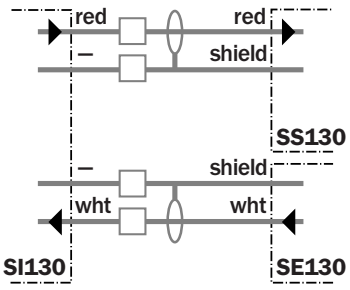
Order information

Type	Part no.
SS/SE 130-S33	6 011 079

Technical data	SS/SE 130-	S33								
"Slim" housing (S)										
Sensing range, max. typical	7.2 ft (2.2 m)									
Operating range with mask, width 0.08 in (2.0 mm)	3.3 ft (1.0 m)									
Operating range with mask, width 0.04 in (1.0 mm)	2.3 ft (0.7 m)									
Operating range with mask, width 0.02 in (0.5 mm)	1.0 ft (0.3 m)									
Light source[1], **light type**	LED, red light									
Light spot size	approx. 180 mm at 1.5 m									
Angle of dispersion, sender	approx. 7°									
Angle of dispersion, receiver	approx. 18°									
Supply voltage V_S	For detailed specifications, see SI 130									
Switching outputs										
Output current I_A max.										
Light receiver, switching mode										
Response time[2]										
Max. switching frequency[3]										
Connection type	PVC cable[4], 2 m (screened), (cannot be extended)									
VDE protection class	⧫									
Circuit protection[5]	A									
Enclosure rating	IP 66									
Ambient temperature T_A	Operation -13...131° F (-25...55° C)									
	Storage -40...158° F (-40...70° C)									
Approximate weight with cable (2 m)	Sender: 0.4 oz (11 g)									
	Receiver: 0.4 oz (11 g)									
Housing material	Housing: ABS/optics: PC									

1) Average service life 100,000 h at T_A = + 25 ° C
2) Signal transit time with resistive load
3) With light/dark ratio 1:1
4) Do not bend below 0° C
5) A = V_S connections reverse-polarity protected

Connection diagram



SI 130

Through-beam Sensors

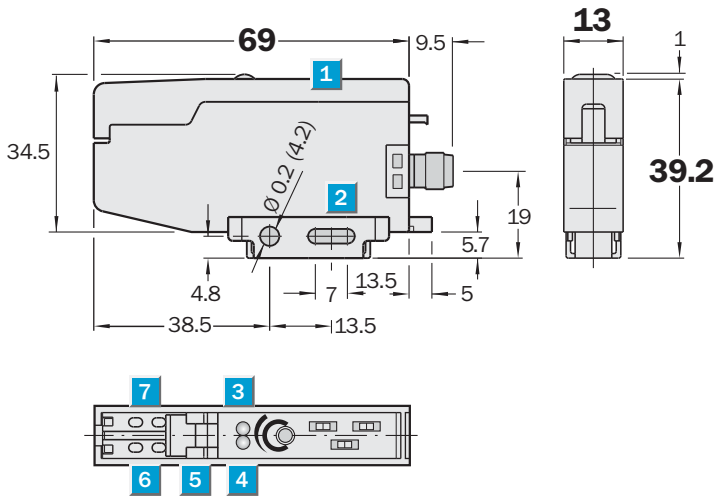
Highlights

- Basic unit for all S 130 sensors
- Simple connection of sensors
- DIN rail mounted
- Selectable off delay
- Selectable light or dark switching

SI 130

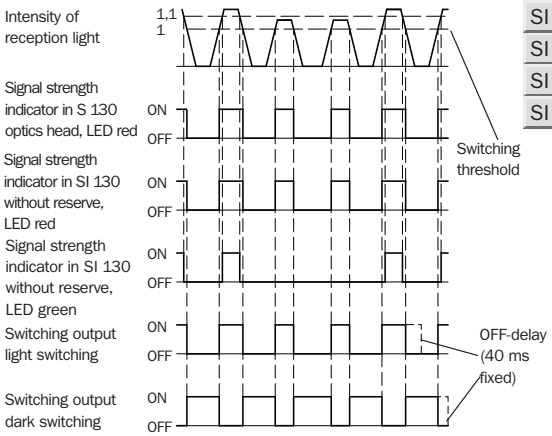


Dimensional drawing



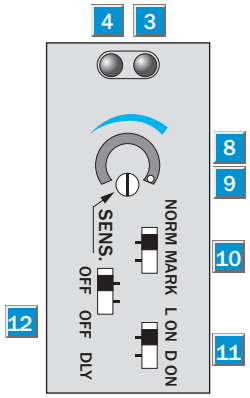
dimensions in mm

S 130 function diagram



Adjustments

SI 130-P12
SI 130-N12
SI 130-P40
SI 130-N40



1 Protective hood
2 BF-WLL 160 mounting bracket (included)
3 LED signal strength indicator, red (lights up when switching threshold is exceeded)
4 LED signal strength indicator, green (lights up with reception reserve > 10%)
5 For releasing/locking connection wires of S 130 photoelectric switches/photoelectric proximity switches
6 Sender terminals (red), screen (–)
7 Receiver terminals (white), screen (–)
8 Sensitivity scale (270°)
9 Sensitivity control (2 revolutions)
10 Selector switch for "NORM"/"MARK" detection (t = 0.5 ms/t ≤ 0.2 ms)
11 Selector switch for light- ("L.ON")/ dark- ("D.ON") switching
12 Selector switch for OFF-delay "OFF"/ "OFF DLY," 40 ms fixed

Order information

Type	Part no.
SI 130-P12	6 011 089
SI 130-P40	6 011 090
SI 130-N12	6 011 087
SI 130-N40	6 011 088

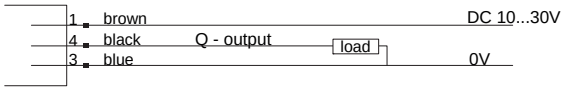
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Technical data	SI 130-	P12	P40	N12	N40					
Power supply and evaluation unit	S 130 photoelectric switch series	■	■	■	■					
	in ultra-miniature housing,									
	see ST 130 or SS/SE 130 pages for sensing specs									
Operating mode										
"NORM" mode	All S 130 optics heads in	■	■	■	■					
	photoelectric switch mode									
"MARK" mode	Optics heads ST 130-S 13,	■	■	■	■					
	ST 130-S 19, ST 130-S 23,									
	ST 130-S 29 in									
	contrast scanner mode									
Sensitivity, adjustable	Potentiometer, 2 turns	■	■	■	■					
	with sensitivity scale 270°									
Time delay										
OFF-delay t_{OFF}	40 ms fixed, selectable via sliding switch	■	■	■	■					
Supply voltage V_S	10...30 V DC [1]	■	■	■	■					
Ripple[2]	± 10%	■	■	■	■					
Current consumption[3]	≤ 35 mA	■	■	■	■					
Switching outputs	PNP, open collector: Q	■	■							
	NPN, open collector: Q			■	■					
Output current I_A max.	100 mA	■	■	■	■					
Light receiver, switching mode	Light/dark switching	■	■	■	■					
	selectable via sliding switch									
Response time[4]/										
Max. switching frequency[5]										
"NORM" mode	≤ 0.5 ms/1000/s	■	■	■	■					
"MARK" mode	≤ 0.2 ms/2500/s	■	■	■	■					
Connection types	Cable, PVC, 2 m[6]	■		■						
	Plug, M8 4-pin		■		■					
VDE protection class	⧫	■	■	■	■					
Circuit protection[7]	A, B, C, D	■	■	■	■					
Enclosure rating	IP 50	■	■	■	■					
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■	■	■					
	Storage -40...158° F (-40...70° C)	■	■	■	■					
Approximate weight	2.5 oz (70 g)	■		■						
	1.1 oz (30 g)		■		■					
Housing material	ABS	■	■	■	■					

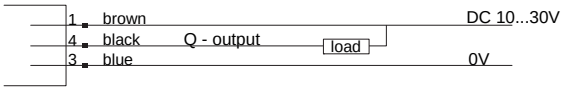
1) Limit values
2) May not exceed or fall short of V_S tolerances
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Do not bend below 0° C
7) A = V_S connections reverse-polarity protected
B = Inputs/outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

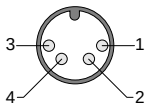
PNP Models



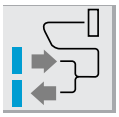
NPN Models



M8 Connector



Wire colors refer to standard cable, not included with quick disconnect models.



Fiber-optic photoelectric sensors

- Sender and receiver in one housing
- 2 fiber-optic cables, sensing or through-beam principle possible
- Appropriate fiber-optic cable available for each task
- Especially suitable where installation space is limited and for use in hostile environments

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WLL190T-2	866
WLL12	880
WLL1000	882
WLL2000	886
WLL260	892
VLL18	896

Theory of Operation...Fiber-Optic Sensors

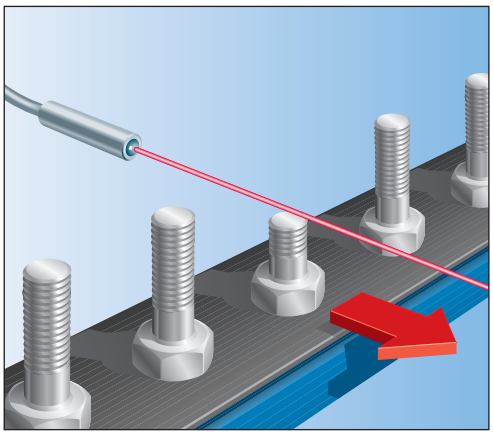


Fig. 1 Photoelectric sensor with a fiber-optic cable

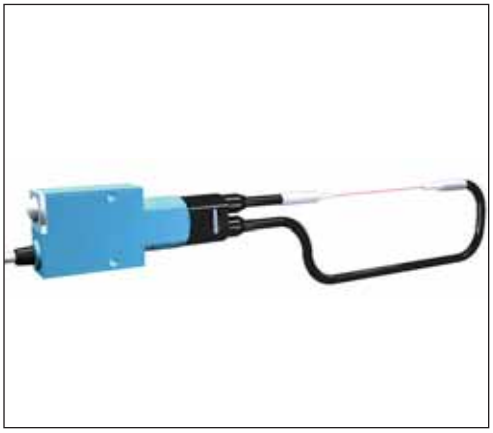


Fig. 2 Photoelectric fiber-optic sensor

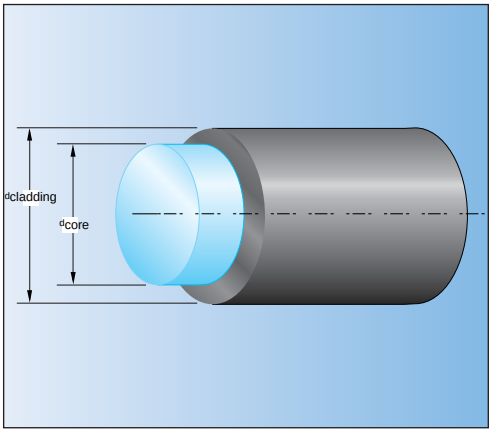


Fig. 3 Fiber-optic cable cross-section

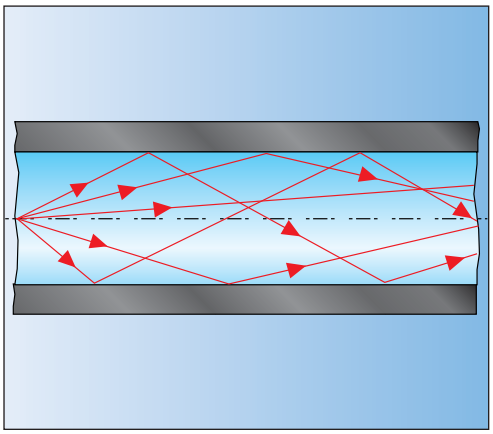
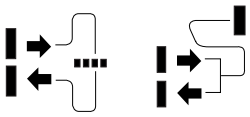


Fig. 4 Light propagation in a fiber-optic cable



About Fiber-optic Sensors

Photoelectric fiber-optic sensors (designated by an "LL," as in the WLL 1000), include the sender and receiver in the same housing. By using flexible plastic or glass fiber-optic cables, the sensor can reach application areas that are inaccessible to standard photoelectric sensors. Fiber-optic cables can be used in harsh environments that might be damaging to some photoelectric devices, for instance at temperatures as high as 300° C (572° F), or in areas with heavy vibration or corrosive substances.

Fiber-optic cables consist of a high-refractive-index core with a low-refractive-index coating, also referred to as the "cladding." Propagation of light in the transparent core takes place on the principle of total reflection.

Light beams meeting the core/cladding boundary at an angle greater than the limiting angle of total reflection are reflected back into the core. They are therefore propagated to the other end of the fiber following a kind of zigzag path.

To allow fiber-optic cables to be flexible and still transmit large beam cross-sections, fiber-optic cables often consist of bundles of individual fibers.

Fiber-optic sensors are ideal in applications that require long sensing ranges, simple handling and system flexibility. Fiber-optic sensors can be used for general detection tasks as well as complicated applications, such as the detection of small objects, parts with background interference and color markers and transparent objects. Fiber-optic sensors are widely used in the semiconductor industry, electronic component assembly and packaging industry as well as in the construction of special purpose machines and precision engineering.



Fig. 5 Object detection using fiber-optic cables; checks presence of spout on containers



Fig. 6 Fiber-optic cable, individual fibers

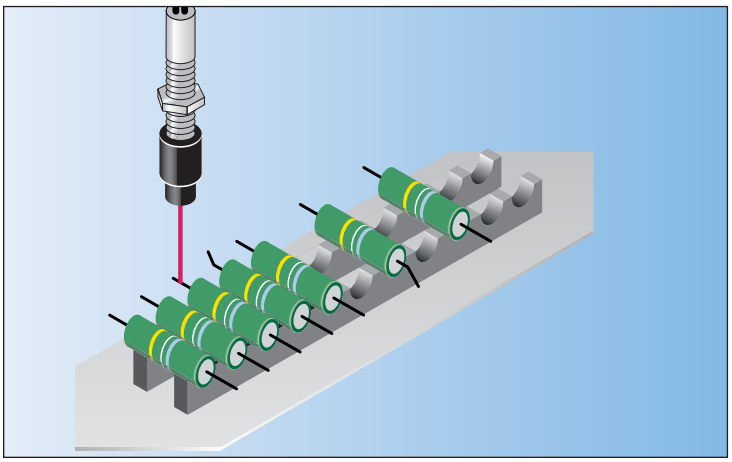


Fig. 7 Detection of thin wires in resistor production

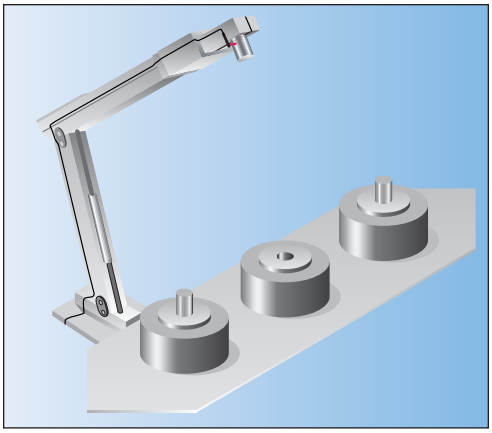


Fig. 8 Monitors presence or position of small objects

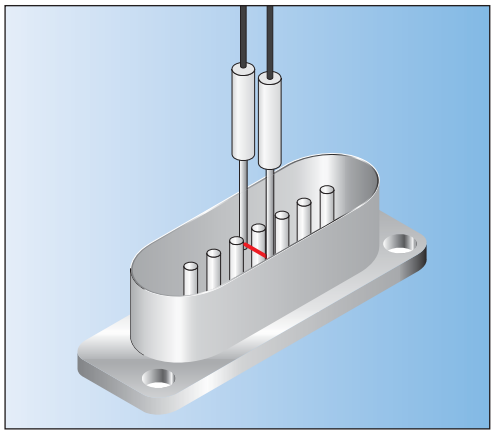


Fig. 9 Detects contact pins in areas where space is restricted

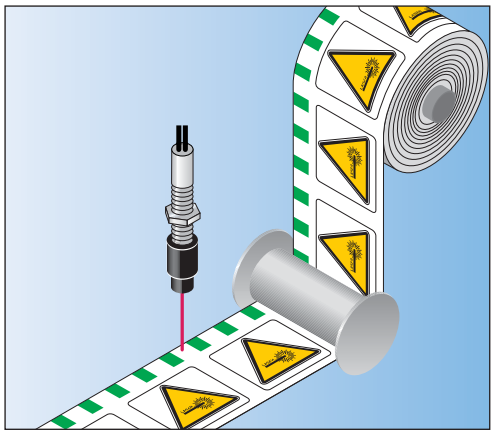


Fig. 10 Detects print marks on labeling machines

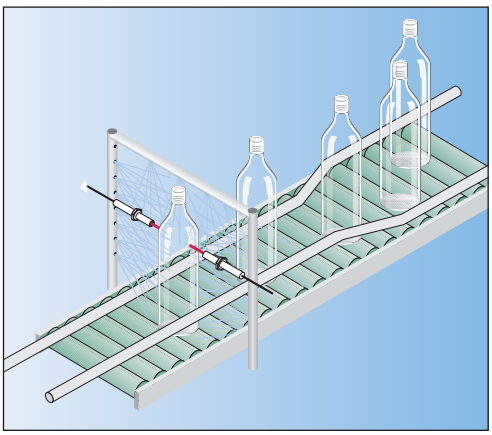


Fig. 11 Verification in harsh environments

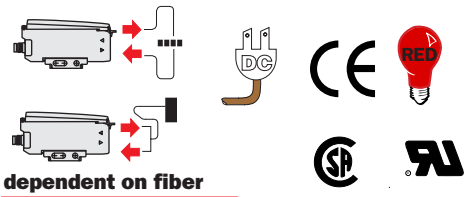
Selection Table...Fiber-Optic Sensors

Fiber-optic sensors

Sensor Type	Light Source			Voltage		Enclosure Rating	Output	Connection Type						Page
	Red	IR	Green	DC	AC			M8	M12	Cable	Mini	Micro	Terminal	
WLL 160	■			■		IP 66	PNP/NPN	■		■				848
WLL 160T	■			■		IP 66	PNP/NPN	■		■				850
WLL 170-2	■		■	■		IP 66	PNP/NPN	■		■				852
WLL 170 Analog	■			■		IP 50	Analog	■		■				858
WLL 170T-2	■		■	■		IP 66	PNP/NPN	■		■				860
WLL 190T-2	■		■	■		IP 66	PNP/NPN/Analog	■		■				866
WLL 12	■	■	■	■		IP 67	PNP/NPN		■					880
WLL 1000	■			■		IP 67	PNP/NPN		■	■				882
WLL 1000		■		■		IP 67	PNP/NPN		■	■				884
WLL 2000	■			■		IP 67	PNP/NPN		■	■				886
WLL 2000	■			■	■	IP 67	Relay			■	■			888
WLL 2000	■			■	■	IP 67	FET			■	■	■		890
WLL 260	■			■		IP 66	PNP/NPN		■				■	892
WLL 260	■			■	■	IP 66	Relay						■	864
VLL 18	■			■		IP 67	PNP/NPN		■	■			■	896

WLL 160

Fiber-Optic Sensors



dependent on fiber sensing range

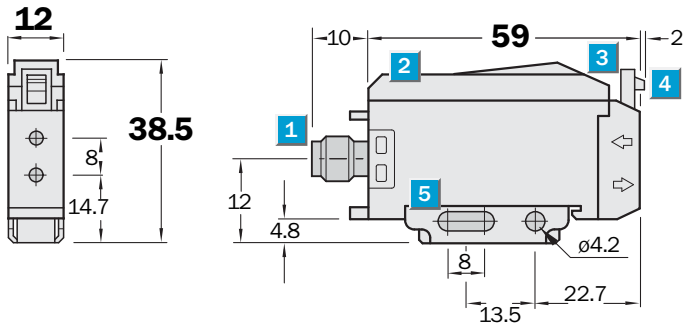
Highlights

- Rugged plastic housing
- Sensitivity adjustment
- High switching frequency
- Signal strength indicator
- Signal strength also shown at fiber tip: red = strong, orange = weak
- Alarm output and test input
- Glass or plastic fibers available with many tip configurations

WLL 160

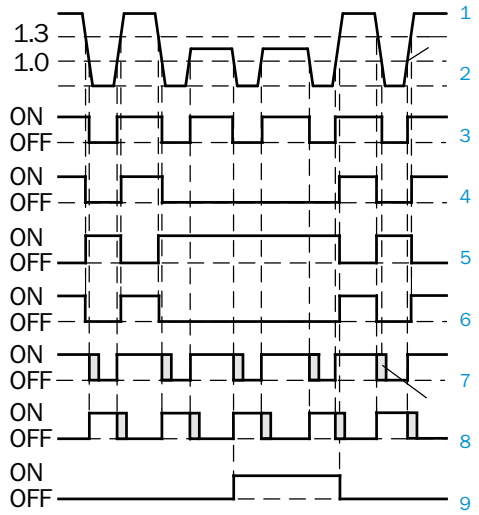


Dimensional drawing



dimensions in mm

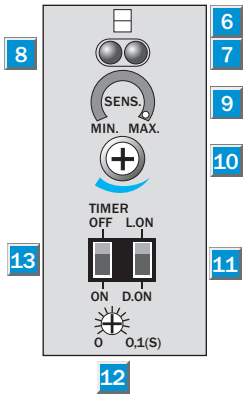
LED function diagram



1 Light reception 1.3
2 Switching threshold (1)
3 Red LED indicator(from switching threshold)
4 Green LED indicator(from switching threshold with reserve)
5 Transmitter-LED orange(reception without reserve)
6 Transmitter-LED red (from switching threshold with reserve)
7 Switching output Q (light-switching)
8 Switching output Q(dark-switching)
9 Alarm output (VMA)

Adjustments

All types



1 Plug, M8 4-pin or connection cable
2 Protective hood
3 Fiber-optic cable lock (press down)
4 Fiber-optic cable release (press lug)
5 Mounting bracket, included (see accessories)
6 Fiber insertion indicator
7 LED output indicator (red)
8 LED signal strength indicator (green)
9 Sensitivity scale
10 Sensitivity control (4 turns)
11 Light/dark switch
12 OFF delay adjustment
13 OFF delay switch

Order information

Type	Part no.
WLL 160-F122	6 009 989
WLL 160-E122	6 009 981
WLL 160-F420	6 009 990
WLL 160-E420	6 009 982

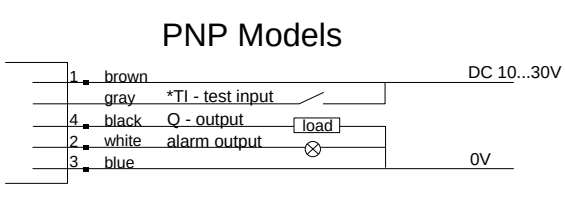
Accessories

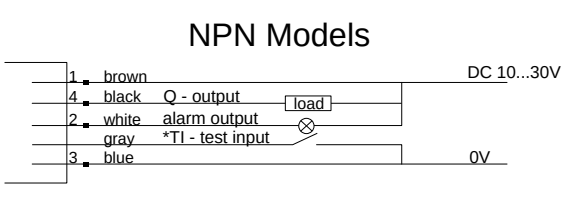
	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

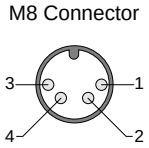
Technical data	WLL 160-	F122	F420	E122	E420
Sensing range	Depends on fiber-optic cable used	■	■	■	■
Typical range (through-beam)	0...19.7 in (0…500 mm)	■	■	■	■
	[with tip adapter 0...6.6 ft (0…2 m)]	■	■	■	■
Typical range (proximity)	0…2.8 in (0…70 mm)[1]	■	■	■	■
Adjustable sensitivity	Potentiometer, 4 turns with scaling 270°	■	■	■	■
Light source[2], **light type**	LED, red light (high excess gain)	■	■	■	■
	LED, red-orange light (low excess gain)	■	■	■	■
Light spot diameter	Depends on sensing range	■	■	■	■
Divergence angle of LL3 fiber-optic	Approx. 65°	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■
Ripple[4]	± 10%	■	■	■	■
Current consumption[5]	≤ 30 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Output current I_A max.	100 mA	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■
Response time[6]/max. switching freq.[7]	≤ 0.35 ms / 1.5 kHz	■	■	■	■
Alarm output (VMA)	100 mA, static	■	■	■	■
Test input "TE"[8]	Sender off; PNP: TE to +V	■			
	Sender off; NPN: TE to 0 V			■	
Time delay T_{OFF} (OFF-delay)	Selectable, per slide switch	■	■	■	■
Time range	Adjust., 0…100 ms; potentiometer 270°	■	■	■	■
Connection types	Cable, PVC, 2m[9]; 5 x 0.2 mm², Ø 4.2 mm	■		■	
	Plug, M8 4-pin		■		■
VDE protection class[10]	□	■	■	■	■
Circuit protection[11]	A, B, C, D	■	■	■	■
Enclosure rating	IP 66/NEMA 4	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■
Approximate weight	2.8 oz (80 g)	■		■	
	1.1 oz (30 g)		■		■
Housing material	Glass fiber reinforced ABS	■	■	■	■

1) Sensed material with 90% remission (based on standard white according to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) TE not with plug model
9) Do not bend below 0° C
10) Reference voltage 50 V DC
11) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

Connection diagram



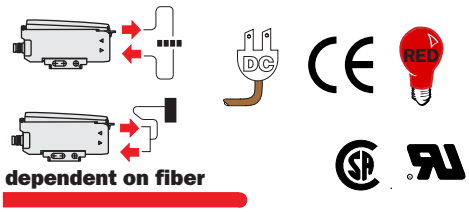




*test input available on cable models only
wire colors refer to standard cable, not included with quick disconnect models

WLL 160T

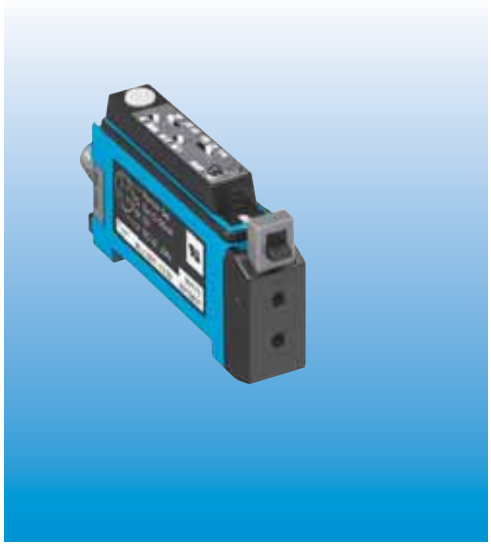
Fiber-Optic Sensors



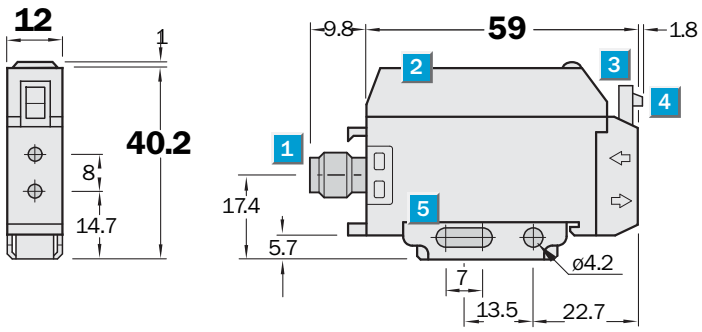
Highlights

- Rugged plastic housing
- Push button teach-in for easy setup
- High switching frequency
- Signal strength indicator
- Alarm output
- Glass or plastic fibers available with many tip configurations

WLL 160T

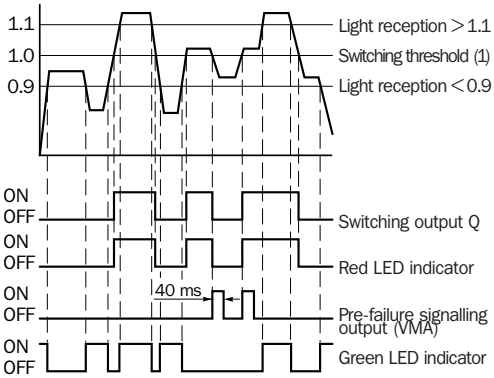


Dimensional drawing



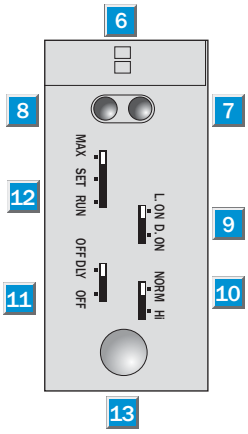
dimensions in mm

LED function diagram



Adjustments

All types



1 Plug, 4-pin M8 or connection cable
2 Protective hood
3 Fiber-optic cable lock (press down)
4 Fiber-optic cable release (press lug)
5 Mounting bracket, included (see accessories)
6 Indication of correct fiber-optic cable mounting
7 LED output indicator, red
8 LED signal strength indicator, green
9 Light/dark-switch
10 Response time, selector switch
NORM (600 µs)/HI (300 µs)
11 OFF delay switch
12 Set/Run switch
13 Teach button

Order information

Type	Part no.
WLL 160T-F132	6 010 650
WLL 160T-F430	6 010 651
WLL 160T-E132	6 010 648
WLL 160T-E430	6 010 649

Accessories

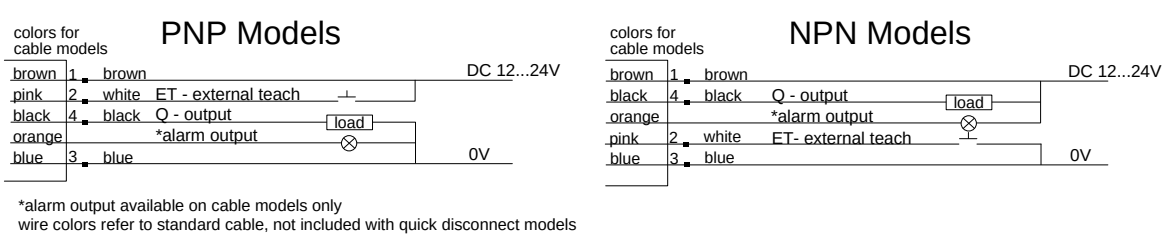
	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

Technical data	WLL 160T-	F132	F430	E132	E430
Sensing range	Depends on fiber-optic cable used	■	■	■	■
Typical range (through-beam)	0…19.7 ft (0…500 mm)	■	■	■	■
	[with tip adapter 0…6.6 ft (0…2 m)]	■	■	■	■
Typical range (proximity)	0…2.8 in (0 … 70 mm)[1]	■	■	■	■
Adjustable sensitivity	Automatic, via TEACH-IN key or “MAX” mode	■	■	■	■
Mode selector “Max”	Max. range, set permanently	■	■	■	■
“Set”	Teach-in active (Push button)	■	■	■	■
“Run”	Teach-in inactive (Push button)	■	■	■	■
TEACH-IN manual	Via button (switch in “SET” position)	■	■	■	■
external TEACH-IN	Only active if mode switch is in “RUN” position	■	■	■	■
	PNP: control wire + V	■	■		
	NPN: control wire 0 V			■	■
Light source[2], **light type**	LED, red light	■	■	■	■
Light spot diameter	Depends on sensing range	■	■	■	■
Divergence angle of LL3 fiber-optic	Approx. 65°	■	■	■	■
Supply voltage V_S	12 … 24 V DC	■	■	■	■
Ripple[3]	≤ 5 V_{SS}	■	■	■	■
Current consumption[4]	≤ 50 mA	■	■	■	■
Switching outputs	PNP, open collector: Q	■	■		
	NPN, open collector: Q			■	■
Output current I_A max.	100 mA	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■
Response time[5]/max. switching freq.[6]	≤ 0.6 ms/830 Hz, (Norm mode)	■	■	■	■
	≤ 0.3 ms/1660 Hz[7] (Hi mode)	■	■	■	■
Alarm output (VMA)	30 mA, one shot, pulse length 40 ms	■		■	
Time delay T_{OFF} (Off delay)	40 ms fixed, selectable, via slide switch	■	■	■	■
Connection types	Cable, PVC, 2 m[8]; 5 x 0.18 mm², Ø 4.0 mm	■		■	
	Plug, M8 4-pin		■		■
VDE protection class[9]	□	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 66/NEMA 4	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25… 55° C)	■	■	■	■
	Storage -40…158° F (-40… 70° C)	■	■	■	■
Approximate weight	2.8 oz (80 g)	■		■	
	1.1 oz (30 g)		■		■
Housing material	Glass fiber reinforced ABS	■	■	■	■

1) Sensed material with 90% remission (based on standard white according to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit period with resistive load
6) With light/dark ratio 1:1
7) Sensing distance reduction approx. 30%
8) Do not bend below 0° C
9) Reference voltage 50 V DC
10) A=V_S connections reverse-polarity protected

B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overload and short-circuit protected

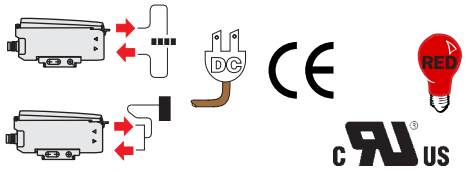
Connection diagram



*alarm output available on cable models only
wire colors refer to standard cable, not included with quick disconnect models

WLL 170-2

Fiber-Optic Sensors



0…157.5 in (0…4000 mm) Through-beam
0…6.3 in (0…160 mm) Proximity/Diffuse sensing range (dependent on fiber)

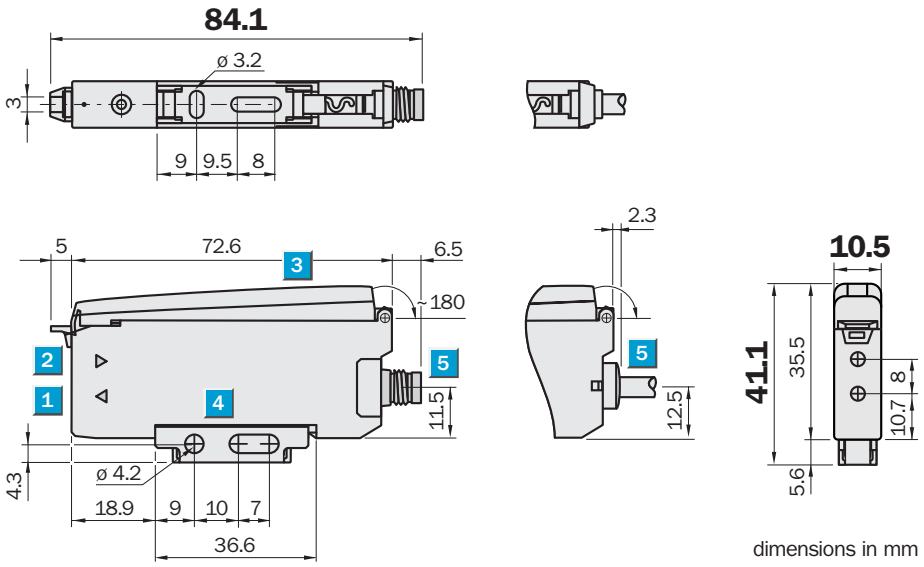
Highlights

- Sender LED red for standard applications
- Manual sensitivity adjustment
- Simple installation and alignment

WLL 170-2



Dimensional drawing



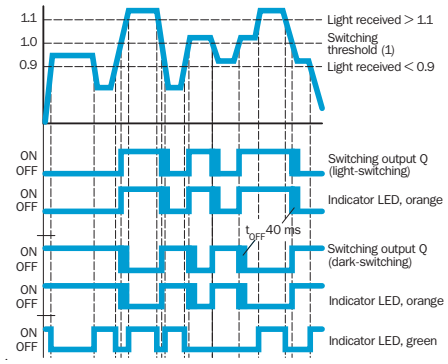
dimensions in mm

LED function diagram

WLL 170-2

Orange LED display: lights up when switching output Q is active. Dependent on setting of light/dark selector switch.

Green LED display: lights up when light received is < 0.9 or > 1.1 (based on the switching threshold Q, switching threshold = 1).



Adjustments

All types



1 Sender LED, installation of LL 3 fiber-optic cable (sender fiber)
2 Receiver, installation of LL 3 fiber-optic cable (receiver fiber)
3 Protective hood, can be raised at both ends
4 Mounting bracket, included with delivery (see Accessories)
5 Connector
6 Indication of correct fiber-optic cable mounting
7 Indicator LED orange: lights up when switching output is active
8 LED signal strength indicator green, lights up when light received < 0.9 or >1.1 (switching threshold = 1)
9 Sensitivity scale 270°
10 Sensitivity control (10 revolutions)
11 Selector switch for OFF delay: "OFF DLY" (=ON/"OFF," 40 ms fixed)
12 Selector switch: "L.ON" (light switching)/"D.ON" (dark switching)

Order information

Type	Part no.
WLL170-2N132	6 029 515
WLL170-2N330	6 029 517
WLL170-2N430	6 029 518
WLL170-2P132	6 029 511
WLL170-2P330	6 029 513
WLL170-2P430	6 029 514

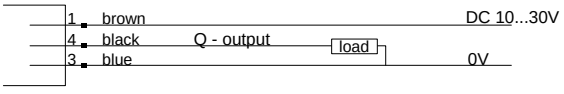
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

Technical data	WLL 170-2	N132	N330	N430	P132	P330	P430
Operating distance	0…6.3 in (0…160 mm)[1]	■	■	■	■	■	■
Fiber-optic cable (proximity system)	LL3-DK06	■	■	■	■	■	■
Adjustment of operating distance	Poti, 10 revolutions[2]	■	■	■	■	■	■
Sensing range max. typ.	0…157.5 in (0…4000 mm)	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB02 and tip adapter LL3-TA01	■	■	■	■	■	■
Operating range, recommended	0…27.6 in (0…700 mm)	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB01	■	■	■	■	■	■
Sensitivity adjustment	Poti, 10 revolutions[2]	■	■	■	■	■	■
Light source[2], light type	LED, red light, 660 nm[3]	■	■	■	■	■	■
Light spot diameter	Depends on sensing range	■	■	■	■	■	■
Angle of dispersion	Approx. 65° (see LL3 fiber-optic data)	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[4]	■	■	■	■	■	■
Residual Ripple[3]	10%[5]	■	■	■	■	■	■
Current consumption[6]	≤ 30 mA	■	■	■	■	■	■
Switching outputs	NPN, open collector: Q	■	■	■			
	PNP, open collector: Q				■	■	■
Switching mode	Light/dark switching; switchable	■	■	■	■	■	■
Output current $I_a$max	≤ 100 mA	■	■	■	■	■	■
Response time	≤ 0.25 ms[7]	■	■	■	■	■	■
Switching frequency	2,000 Hz[8]	■	■	■	■	■	■
Time delay	40 ms fix, selectable by sliding switch	■	■	■	■	■	■
Time type	Off delay t_{OFF}	■	■	■	■	■	■
Connection type	Cable, ø3.8 mm, PVC, 2 m[9]	■			■		
	Connector, M8 3-pin		■			■	
	Connector, M8 4-pin			■			■
VDE protection class	III	■	■	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 66[11]	■	■	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■
Approximate weight	2.5 oz (70 g)	■	■	■	■	■	■
Housing material	ABS/PC	■	■	■	■	■	■

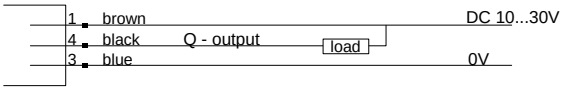
1) Object with 90% remission (based on standard white to DIN 5033)
2) Sensitivity scale 270°
3) Average service life 100,000 h at T_A = 25° C
4) Limit values
5) May not exceed or fall short of V_S tolerances
6) Without load
7) Signal transit time with resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0° C
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit
11) With correctly attached fiber-optic cable LL3 and closed protection hood

Connection diagram

PNP Models

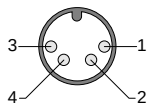


NPN Models

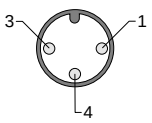


wire colors refer to standard cable, not included with quick disconnect models.

M8 Connector

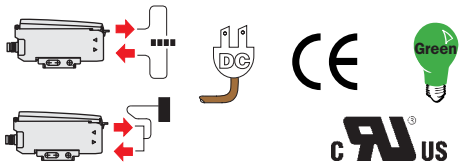


M8 Connector



WLL 170-2

Fiber-Optic Sensors



0...66.9 in (0...1700 mm) Through-beam
0...1.8 in (0...45 mm) Proximity/Diffuse
sensing range (dependent on fiber)

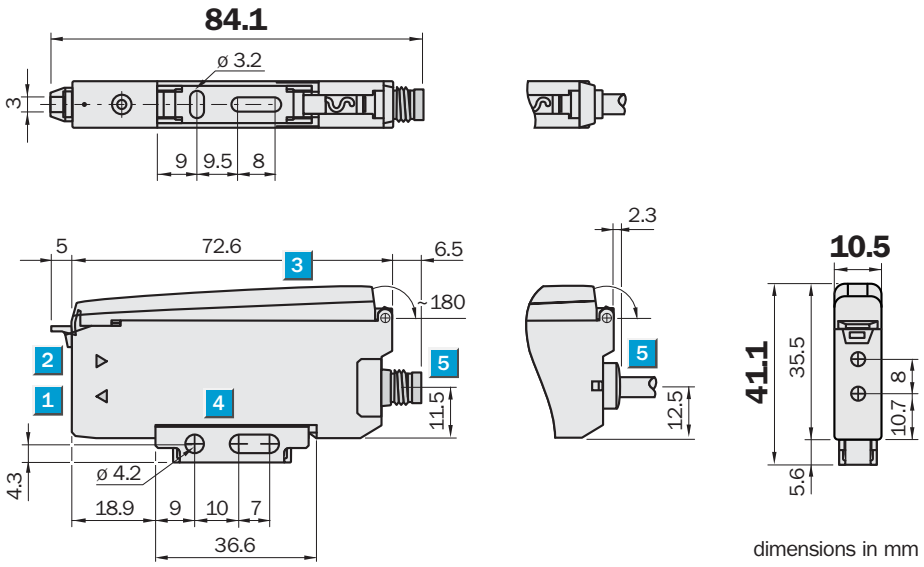
Highlights

- Sender LED green for standard applications and print mark recognition
- Manual sensitivity adjustment
- Simple installation and alignment

WLL 170-2



Dimensional drawing



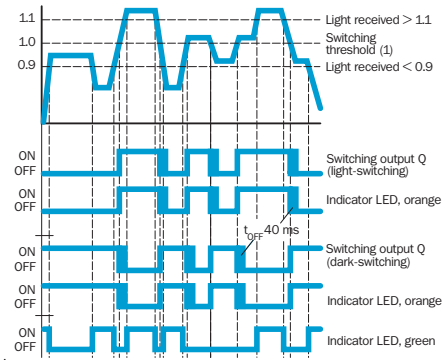
dimensions in mm

LED function diagram

WLL 170-2

Orange LED display: lights up when switching output Q is active. Dependent on setting of light/dark selector switch.

Green LED display: lights up when light received is < 0.9 or > 1.1 (based on the switching threshold Q, switching threshold = 1).



Adjustments

All types



1 Sender LED, installation of LL 3 fiber-optic cable (sender fiber)
2 Receiver, installation of LL 3 fiber-optic cable (receiver fiber)
3 Protective hood, can be raised at both ends
4 Mounting bracket, included with delivery (see Accessories)
5 Connector
6 Indication of correct fiber-optic cable mounting
7 Indicator LED orange: lights up when switching output is active
8 LED signal strength indicator green, lights up when light received < 0.9 or >1.1 (switching threshold = 1)
9 Sensitivity scale 270°
10 Sensitivity control (10 revolutions)
11 Selector switch for OFF delay: "OFF DLY" (=ON/"OFF," 40 ms fixed)
12 Selector switch: "L.ON" (light switching)/"D.ON" (dark switching)

Order information

Type	Part no.
WLL170-2N192	6 029 523
WLL170-2N390	6 029 525
WLL170-2N490	6 029 526
WLL170-2P192	6 029 519
WLL170-2P390	6 029 521
WLL170-2P490	6 029 522

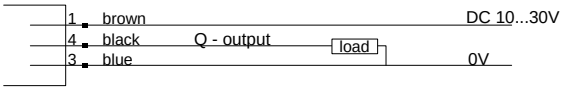
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

Technical data	WLL 170-2	N192	N390	N490	P192	P390	P490
Operating distance	0…1.8 in (0…45 mm)[1]	■	■	■	■	■	■
Fiber-optic cable (proximity system)	LL3-DK06	■	■	■	■	■	■
Adjustment of operating distance	Poti, 10 revolutions[2]	■	■	■	■	■	■
Sensing range max. typ.	0…66.9 in (0…1700 mm)	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB02 and tip adapter LL3-TA01	■	■	■	■	■	■
Operating range, recommended	0…13.8 in (0…350 mm)	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB01	■	■	■	■	■	■
Sensitivity adjustment	Poti, 10 revolutions[2]	■	■	■	■	■	■
Light source[2], light type	LED, green light, 520 nm[3]	■	■	■	■	■	■
Light spot diameter	Depends on sensing range	■	■	■	■	■	■
Angle of dispersion	Approx. 65° (see LL 3 fiber-optic data)	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[4]	■	■	■	■	■	■
Residual Ripple[3]	10%[5]	■	■	■	■	■	■
Current consumption[6]	≤ 30 mA	■	■	■	■	■	■
Switching outputs	NPN, open collector: Q	■	■	■			
	PNP, open collector: Q				■	■	■
Switching mode	Light/dark switching; switchable	■	■	■	■	■	■
Output current $I_a$max	≤ 100 mA	■	■	■	■	■	■
Response time	≤ 0.25 ms[7]	■	■	■	■	■	■
Switching frequency	2,000 Hz[8]	■	■	■	■	■	■
Time delay	40 ms fix, selectable by sliding switch	■	■	■	■	■	■
Time type	Off delay t_{OFF}	■	■	■	■	■	■
Connection type	Cable, ø3.8 mm, PVC, 2 m[9]	■			■		
	Connector, M8 3-pin		■			■	
	Connector M8 4-pin			■			■
VDE protection class	⧈ III	■	■	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 66[11]	■	■	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25… 55° C)	■	■	■	■	■	■
	Storage -40…158° F (-40… 70° C)	■	■	■	■	■	■
Approximate weight	2.5 oz (70 g)	■	■	■	■	■	■
Housing material	ABS/PC	■	■	■	■	■	■

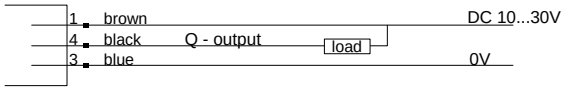
1) Object with 90% remission (based on standard white to DIN 5033)
2) Sensitivity scale 270°
3) Average service life 100,000 h at T_A = 25° C
4) Limit values
5) May not exceed or fall short of V_S tolerances
6) Without load
7) Signal trasit time with resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0° C
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit
11) With correctly attached fiber-optic cable LL3 and closed protection hood

Connection diagram

PNP Models

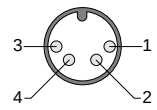


NPN Models

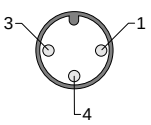


wire colors refer to standard cable, not included with quick disconnect models.

M8 Connector

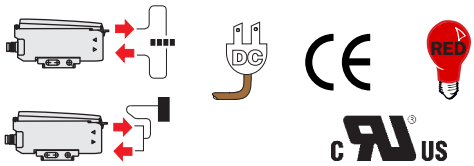


M8 Connector



WLL 170-2 High Speed

Fiber-Optic Sensors



0...63 in (0...1600 mm) Through-beam
0...2.6 in (0...65 mm) Proximity/Diffuse
sensing range (dependent on fiber)

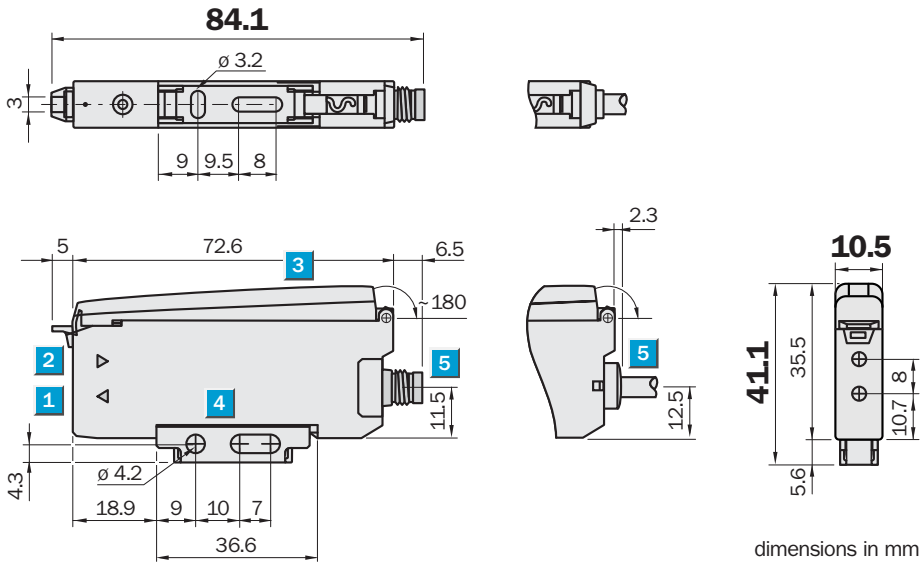
Highlights

- High speed 10,000/sec., for extremely fast processes
- Sender LED red
- Manual sensitivity adjustment
- Time delay 40 ms for signal extension

WLL 170-2



Dimensional drawing



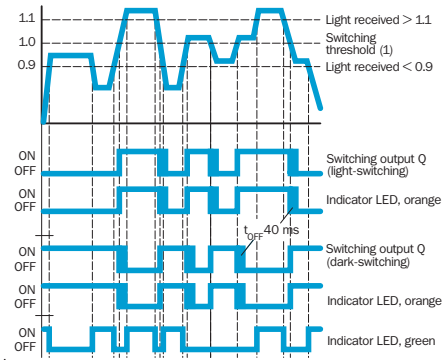
dimensions in mm

LED function diagram

WLL 170-2

Orange LED display: lights up when switching output Q is active. Dependent on setting of light/dark selector switch.

Green LED display: lights up when light received is < 0.9 or > 1.1 (based on the switching threshold Q, switching threshold = 1).



Adjustments

All types



1 Sender LED, installation of LL 3 fiber-optic cable (sender fiber)
2 Receiver, installation of LL 3 fiber-optic cable (receiver fiber)
3 Protective hood, can be raised at both ends
4 Mounting bracket, included with delivery (see Accessories)
5 Connector
6 Indication of correct fiber-optic cable mounting
7 Indicator LED orange: lights up when switching output is active
8 LED signal strength indicator green, lights up when light received < 0.9 or >1.1 (switching threshold = 1)
9 Sensitivity scale 270°
10 Sensitivity control (10 revolutions)
11 Selector switch for OFF delay: "OFF DLY" (=ON/"OFF," 40 ms fixed)
12 Selector switch: "L.ON" (light switching)/"D.ON" (dark switching)

Order information

Type	Part no.
WLL170-2N162	6 029 531
WLL170-2N360	6 029 533
WLL170-2N460	6 029 534
WLL170-2P162	6 029 527
WLL170-2P360	6 029 529
WLL170-2P460	6 029 530

Accessories

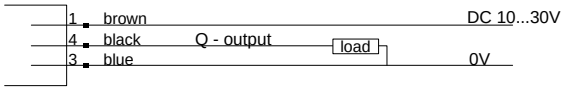
	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

Technical data	WLL 170-2	N162	N360	N460	P162	P360	P460
Operating distance	0…2.6 in (0…65 mm)[1]						
Fiber-optic cable (proximity system)	LL3-DB01						
Adjustment of operating distance	Poti, 10 revolutions[2]						
Sensing range max. typ.	0…63 in (0…1600 mm)						
Fiber-optic cable (through-beam)	LL3-TB02 and tip adapter LL3-TA01						
Operating range, recommended	0…13.8 in (0…350 mm)						
Fiber-optic cable(through-beam)	LL3-TB01						
Sensitivity adjustment	Poti, 10 revolutions[2]						
Light source[2], light type	LED, red light, 660 nm[3]						
Light spot diameter	Depends on sensing range						
Angle of dispersion	Approx. 65° (see LL 3 fiber-optic data)						
Supply voltage V_S	10…30 V DC[4]						
Residual Ripple[3]	10%[5]						
Current consumption[6]	≤ 30 mA						
Switching outputs	NPN, open collector: Q						
	PNP, open collector: Q						
Switching mode	Light/dark switching; switchable						
Output current $I_a$max	≤ 100 mA						
Response time	≤ 50 µs[7]						
Switching frequency	10,000 Hz[8]						
Time delay	40 ms fix, selectable by sliding switch						
Time type	Off delay t_{OFF}						
Connection type	Cable, ø3.8 mm, PVC, 2 m[9]						
	Connector, M8 3-pin						
	Connector M8 4-pin						
VDE protection class	III						
Circuit protection[10]	A, B, C, D						
Enclosure rating	IP 66[11]						
Ambient temperature T_A	Operation -13…131° F (-25…55° C)						
	Storage -40…158° F (-40…70° C)						
Approximate weight	2.5 oz (70 g)						
Housing material	ABS/PC						

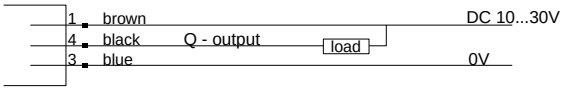
1) Object with 90% remission (based on standard white to DIN 5033)
2) Sensitivity scale 270°
3) Average service life 100,000 h at T_A = 25° C
4) Limit values
5) May not exceed or fall short of V_S tolerances
6) Without load
7) Signal transit time with resistive load
8) With light/dark ratio 1:1
9) Do not bend below 0° C
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit
11) With correctly attached fiber-optic cable LL3 and closed protection hood

Connection diagram

PNP Models

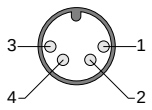


NPN Models

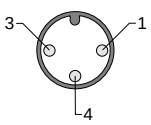


wire colors refer to standard cable, not included with quick disconnect models.

M8 Connector

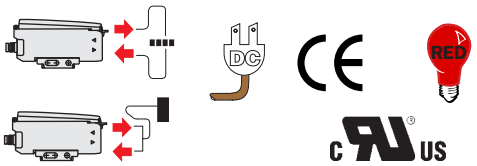


M8 Connector



WLL 170 Analog

Fiber-optic Sensors



0...23.6 in (0...600 mm) Through-beam
0...3.9 in (0...100 mm) Proximity/Diffuse
sensing range (dependent on fiber)

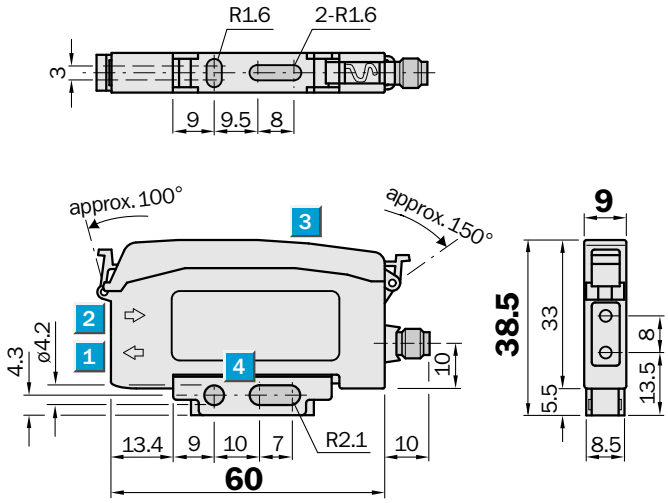
Highlights

- Analog output voltage 1...5 V
- Large range of suitable LL 3 fiber-optic cables
- Ideal for more complex requirements, e.g. positioning tasks, turbidity/transmission measurement, contrast resolution

WLL 170

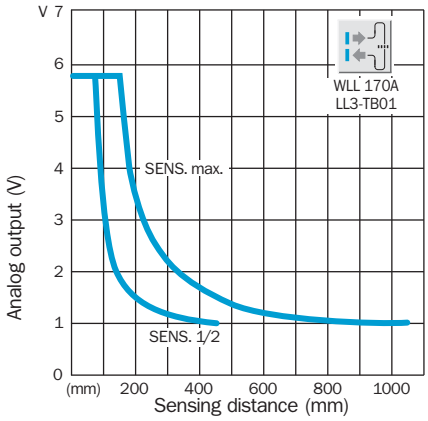


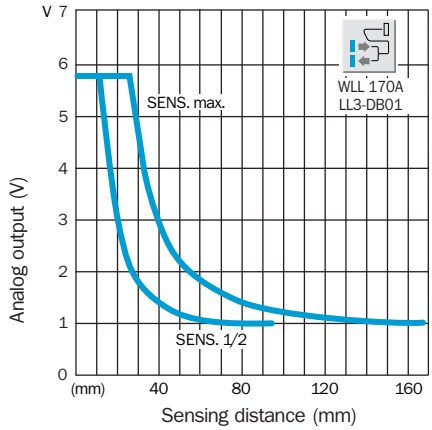
Dimensional drawing



dimensions in mm

WLL 170 Analog, typical curves





Adjustments

WLL 170A-V132
WLL 170A-V330
WLL 170A-V430



1 Sender LED, installation of LL 3 fiber-optic cable (sender fiber)
2 Receiver, installation of LL 3 fiber-optic cable (receiver fiber)
3 Protective hood: can be raised at both ends, removable
4 Mounting bracket included (see Accessories)
5 Indicator LED orange: analog output with saturation (≥ 5 V)
6 LED signal strength indicator green, lights up when light received
7 Sensitivity scale, min/max = 270°
8 Sensitivity control (min./max. = 7 revolutions)
9 Selector switch for analog output response time

Order information

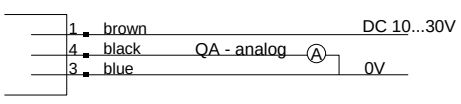
Type	Part no.
WLL170A-V132	6 021 078
WLL170A-V330	6 021 962
WLL170A-V430	6 021 080

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

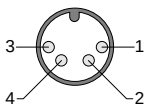
Technical data	WLL 170 A	V132	V330	V430
Suitable fiber-optic cable	LL 3 plastic fiber-optic cables			
Sensing range[1]	Depends on fiber-optic cable used			
Operating range, recommended	0…23.6 in (0…600 mm); through-beam			
	[with tip adapters 0…126 in (0…3200 mm)]			
Operating range, recommended[1]	0…3.9 in (0…100 mm[2]); proximity system			
Light source[3], **light type**	LED, visible red light			
Light spot diameter of LL 3	Depends on sensing range			
Angle of dispersion of LL 3	Approx. 65° [4]			
Supply voltage V_S[5]	10…30 V DC			
Residual Ripple[6]	10%			
Current consumption[7]	≤ 40 mA			
Analog output				
Voltage output	1…5 V			
	1 V = no light received			
	5 V = saturation			
Load current max.	10 mA			
Output resistance (RI)	47 Ω			
Load resistance	≥ 5 kΩ (recommended)			
Response time, selectable[8]	1 ms/10 ms			
Sensitivity adjustable	Potentiometer, 7 turns[9]			
Connection types	PVC, 2 m, 3 x 0.2 mm², ø 4.0 mm, cable[10]			
	M8 3-pin, plug			
	M8 4-pin, plug			
Cable extension	max. 100 m; signal loss to be expected			
Circuit protection[10]	A, B, C			
VDE protection class	III			
Enclosure rating	IP 50[11]			
Ambient temperature T_A	Operation -13…131° F (-25…55° C)			
	Storage -40…158° F (-40…70° C)			
Approximate weight				
with cable	2.1 oz (60 g)			
with M8 plug	0.7 oz (20 g)			
Housing material	ABS			

1) See Accessories; selection table for LL 3 fiber-optic cables
2) Object with 90% remission (based on standard white to DIN 5033)
3) Average service life 100,000 h at T_A = 25° C
4) Deviations, see data for LL 3
5) Limit values
6) Ma not exceed or fall short of V_S tolerances
7) Without load
8) Delay time: change in received light/change in analog output, (90% of upper range value)
9) Scale 270 °
10) Do not bend below 0° C
11) A = V_S connections reverse-polarity protected
B = Interference pulse suppression
C = Outputs overcurrent and short-circuit protected

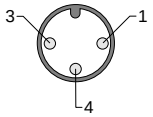
Connection diagram



M8 Connector

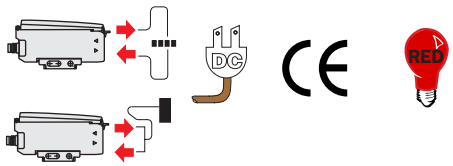


M8 Connector



WLL170T-2

Fiber-Optic Sensors



0...23.6 in (0...3500 mm) Through-beam
0...6.3 in (0...160 mm) Proximity/Diffuse
sensing range (dependent on fiber)

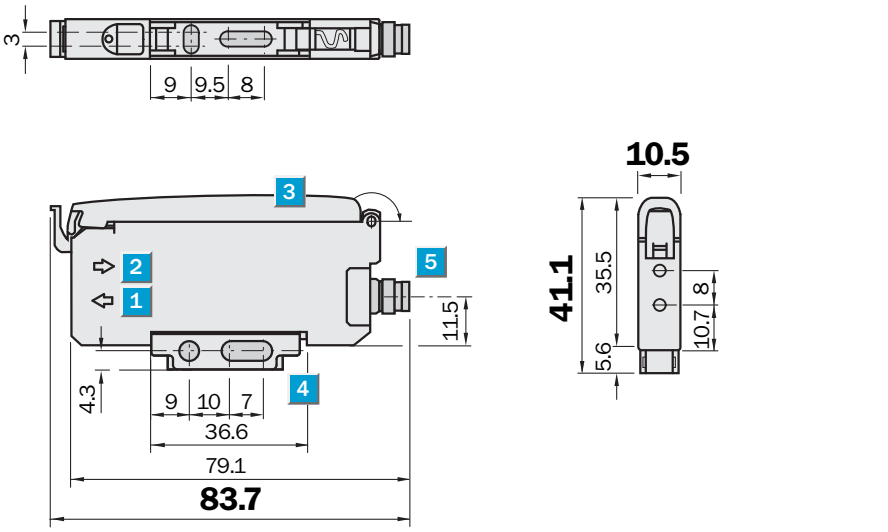
Highlights

- Red sensor LED
- For standard applications and mark recognition
- Easy alignment and commissioning by teach-in

WLL170T-2



Dimensional drawing



dimensions in mm

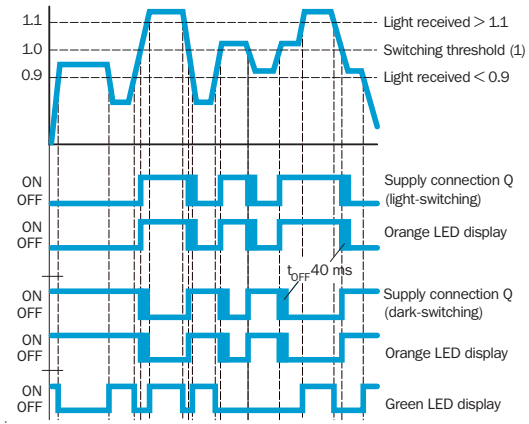
Function diagram

WLL170T-2 in sensor mode

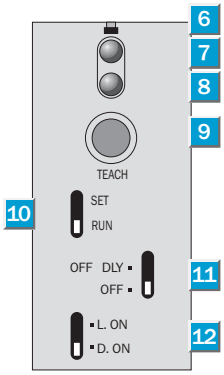
Operating mode selector switch in RUN mode (after setting the switching threshold by means of teach-in.)

Orange LED display: lights up if supply connection Q is active. Dependent on setting of light/dark-selector switch.

Green LED display: lights up if light received is < 0.9 or > 1.1 (based on the switching threshold Q, switching threshold = 1).



Adjustments



1 Sender LED, installation of LL 3 fiber-optic cable (sender fiber)
2 Receiver, installation of LL 3 fiber-optic cable (receiver fiber)
3 Protective hood, can be raised at both ends
4 Mounting bracket included (see Accessories)
5 Connector
6 Indication of correct fiber-optic cable mounting
7 Indicator LED orange: lights up when switching output is active
8 LED signal strength indicator green, lights up when light received < 0.9 or > 1.1 (switching threshold = 1)
9 Teach-in button
10 Mode selector switch: SET = teach-in mode. RUN = sensor mode
11 Selector switch for OFF delay: "OFF DLY (=ON)/"OFF," 40 ms fixed
12 Selector switch: "L.ON" (light switching)/"D.ON" (dark switching)

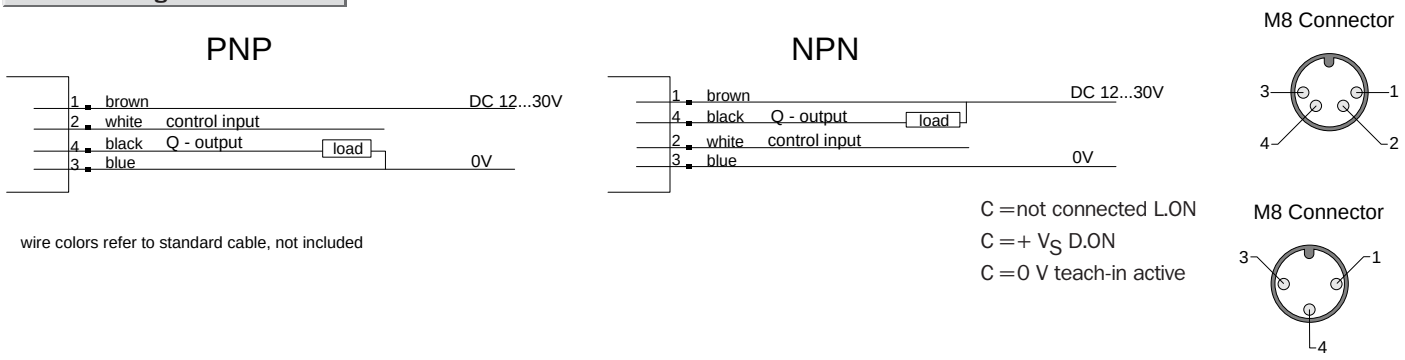
Order information

Type	Part no.
WLL170T-2N132	6 033 951
WLL170T-2N330	6 033 952
WLL170T-2N430	6 033 953
WLL170T-2P132	6 033 948
WLL170T-2P330	6 033 949
WLL170T-2P430	6 033 950

Technical data	WLL 170T-2	N132	N330	N430	P132	P330	P430
Operating distance	0…6.3 in (0…160 mm)[1]	■	■	■	■	■	■
Fiber-optic cable (proximity system)	LL3-DM01	■	■	■	■	■	■
Adjustment of operating distance	Teach-in: single-teach button & cable	■		■	■		■
	Teach-in: single-teach button		■			■	
Sensing range typ. max	0…137.8 in (0…3500 mm)	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB02 and tip adapter LL3-TA01	■	■	■	■	■	■
Sensing range, recommended	0…27.6 in (0…700 mm)	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB01	■	■	■	■	■	■
Sensitivity adjustment	Teach-in: single-teach button & cable	■		■	■		■
	Teach-in: single-teach button		■			■	
Light source[2], light type	LED, red light, 660 nm	■	■	■	■	■	■
Light spot diameter	Depends on sensing range	■	■	■	■	■	■
Angle of dispersion	Approx. 65° (see LL3 data for deviations)	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■	■	■
Residual Ripple[4]	10%	■	■	■	■	■	■
Current consumption[5]	≤ 30 mA	■	■	■	■	■	■
Switching outputs	NPN: open collector: Q	■	■	■			
	PNP: open collector: Q				■	■	■
Switching mode	Light/dark switching via slide switch	■	■	■	■	■	■
Output current I_a max	100 mA	■	■	■	■	■	■
Response time	≤ 0.25 ms[6]	■	■	■	■	■	■
Switching frequency	2000 Hz[7]	■	■	■	■	■	■
Time delay	OFF delay 40 ms fix, selectable by sliding switch	■	■	■	■	■	■
Teach-in input (ET)	Teach 0 V	■	■	■			
	Run V_S or unswitched	■	■	■			
Time type	Off delay t_{OFF}	■	■	■	■	■	■
Connection type	Cable, PVC, 2 m[8]	■			■		
	Connector, M8 3-pin		■			■	
	Connector, M8 4-pin			■			■
VDE protection class	⧖	■	■	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 66[10]	■	■	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■
Approximate weight	2.1 oz (60 g)	■	■	■	■	■	■
Housing material	ABS	■	■	■	■	■	■

1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) A = V_S connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected
10) With correctly attached fiber-optic cable LL3 and closed protection hood

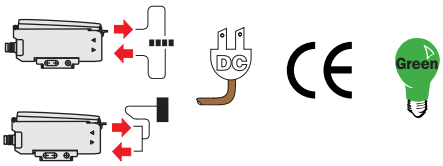
Connection diagram



wire colors refer to standard cable, not included

WLL170T-2

Fiber-Optic Sensors



0…63 in (0…1600 mm) Through-beam
0…1.4 in (0…35 mm) Proximity/Diffuse
sensing range (dependent on fiber)

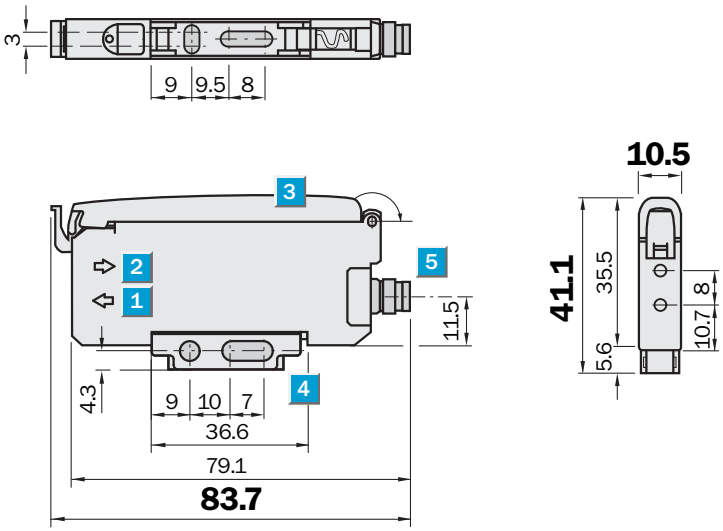
Highlights

- Green sensor LED
- Ideal for recognition of red marks, contrasts or parts
- Easy alignment and commissioning by teach-in

WLL170T-2



Dimensional drawing



dimensions in mm

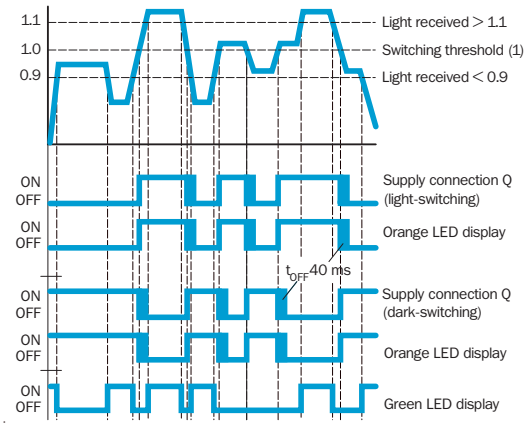
Function diagram

WLL170T-2 in sensor mode

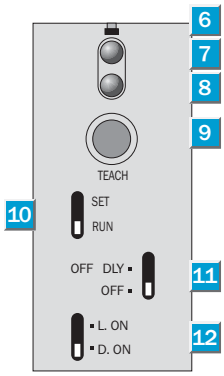
Operating mode selector switch in RUN mode (after setting the switching threshold by means of teach-in.)

Orange LED display: lights up if supply connection Q is active. Dependent on setting of light/dark-selector switch.

Green LED display: lights up if light received is < 0.9 or > 1.1 (based on the switching threshold Q, switching threshold = 1).



Adjustments



1 Sender LED, installation of LL 3 fiber-optic cable (sender fiber)
2 Receiver, installation of LL 3 fiber-optic cable (receiver fiber)
3 Protective hood, can be raised at both ends
4 Mounting bracket included (see Accessories)
5 Connector
6 Indication of correct fiber-optic cable mounting
7 Indicator LED orange: lights up when switching output is active
8 LED signal strength indicator green, lights up when light received < 0.9 or > 1.1 (switching threshold = 1)
9 Teach-in button
10 Mode selector switch: SET = teach-in mode. RUN = sensor mode
11 Selector switch for OFF delay: "OFF DLY (=ON)/"OFF," 40 ms fixed
12 Selector switch: "L.ON" (light switching)/"D.ON" (dark switching)

Order information

Type	Part no.
WLL170T-2N192	6 033 957
WLL170T-2N390	6 033 958
WLL170T-2N490	6 033 959
WLL170T-2P192	6 033 954
WLL170T-2P390	6 033 955
WLL170T-2P490	6 033 956

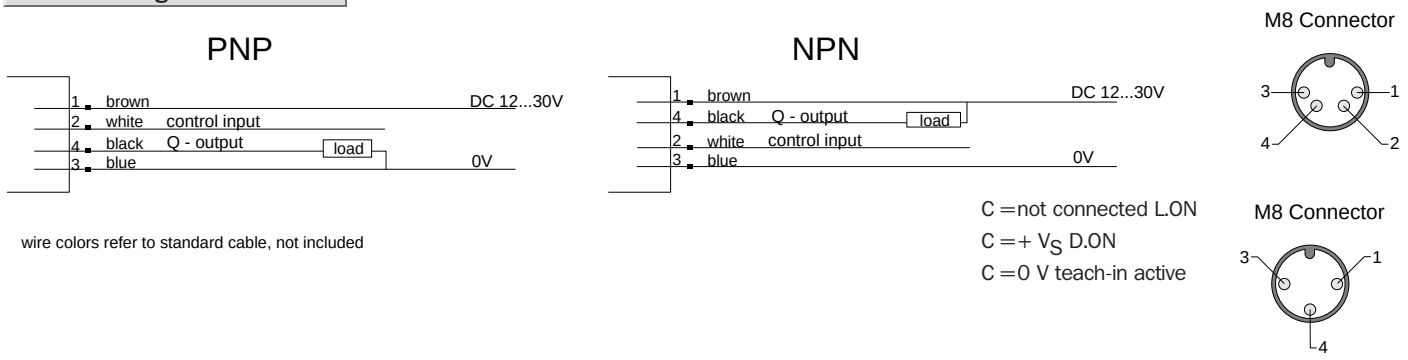
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

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Technical data	WLL 170T-2	N192	N390	N490	P192	P390	P490
Operating distance	0…1.4 in (0…35 mm)[1]	■	■	■	■	■	■
Fiber-optic cable (proximity system)	LL3-DM01	■	■	■	■	■	■
Adjustment of operating distance	Teach-in: single-teach button & cable	■		■	■		■
	Teach-in: single-teach button		■			■	
Sensing range typ. max	0…63 in (0…1600 mm)	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB02 and tip adapter LL3-TA01	■	■	■	■	■	■
Sensing range, recommended	0…10.6 in (0…270 mm)	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB01	■	■	■	■	■	■
Sensitivity adjustment	Teach-in: single-teach button & cable	■		■	■		■
	Teach-in: single-teach button		■			■	
Light source[2], light type	LED, green light, 525 nm	■	■	■	■	■	■
Light spot diameter	Depends on sensing range	■	■	■	■	■	■
Angle of dispersion	Approx. 65° (see LL3 data for deviations)	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■	■	■
Residual Ripple[4]	10%	■	■	■	■	■	■
Current consumption[5]	≤ 30 mA	■	■	■	■	■	■
Switching outputs	NPN: open collector: Q	■	■	■			
	PNP: open collector: Q				■	■	■
Switching mode	Light/dark switching via slide switch	■	■	■	■	■	■
Output current I_a max	100 mA	■	■	■	■	■	■
Response time	≤ 0.25 ms[6]	■	■	■	■	■	■
Switching frequency	2000 Hz[7]	■	■	■	■	■	■
Time delay	OFF delay 40 ms fix, selectable by sliding switch	■	■	■	■	■	■
Teach-in input (ET)	Teach 0 V	■	■	■			
	Run V_S or unswitched	■	■	■			
	Teach > 10 V…< V_S				■	■	■
	Run 0 V or unswitched				■	■	■
Time type	Off delay t_{OFF}	■	■	■	■	■	■
Connection type	Cable, PVC, 2 m[8]	■			■		
	Connector, M8 3-pin		■			■	
	Connector, M8 4-pin			■			■
VDE protection class	⧫III⧫	■	■	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 66[10]	■	■	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■
Approximate weight	2.1 oz (60 g)	■	■	■	■	■	■
Housing material	ABS	■	■	■	■	■	■

1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) A = V_S connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected
10) With correctly attached fiber-optic cable LL3 and closed protection hood

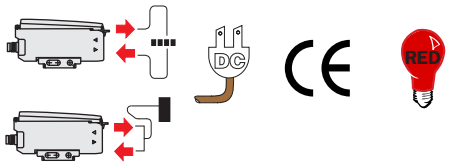
Connection diagram



wire colors refer to standard cable, not included

WLL170T-2 High Speed

Fiber-Optic Sensors



0...59.1 in (0...1500 mm) Through-beam
0...2.4 in (0...60 mm) Proximity/Diffuse
sensing range (dependent on fiber)

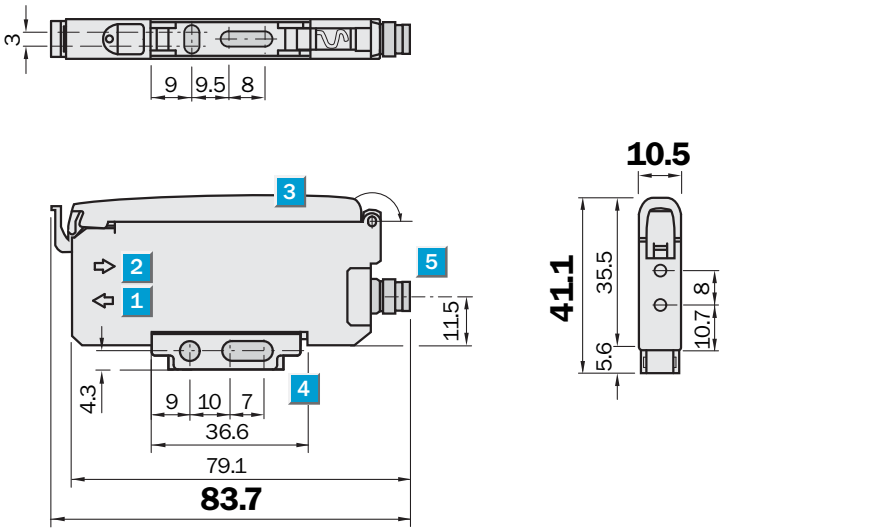
Highlights

- High speed 10,000/sec., for extremely fast processes
- Red sender LED
- Easy alignment and commissioning by teach-in

WLL170T-2



Dimensional drawing



dimensions in mm

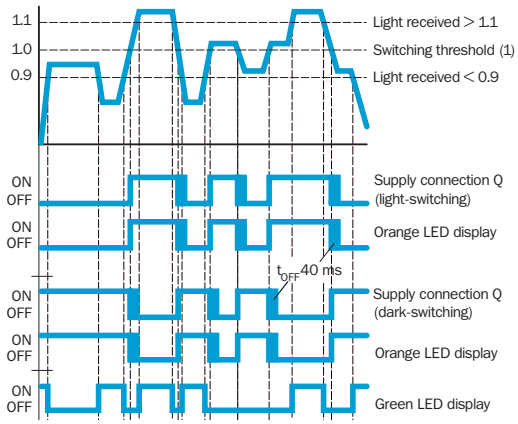
Function diagram

WLL170T-2 in sensor mode

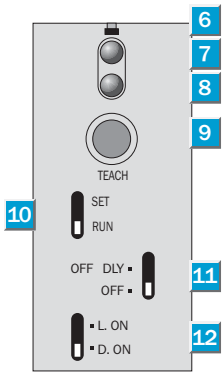
Operating mode selector switch in RUN mode (after setting the switching threshold by means of teach-in.)

Orange LED display: lights up if supply connection Q is active. Dependent on setting of light/dark-selector switch.

Green LED display: lights up if light received is < 0.9 or > 1.1 (based on the switching threshold Q, switching threshold = 1).



Adjustments



1 Sender LED, installation of LL 3 fiber-optic cable (sender fiber)
2 Receiver, installation of LL 3 fiber-optic cable (receiver fiber)
3 Protective hood, can be raised at both ends
4 Mounting bracket included (see Accessories)
5 Connector
6 Indication of correct fiber-optic cable mounting
7 Indicator LED orange: lights up when switching output is active
8 LED signal strength indicator green, lights up when light received < 0.9 or > 1.1 (switching threshold = 1)
9 Teach-in button
10 Mode selector switch: SET = teach-in mode. RUN = sensor mode
11 Selector switch for OFF delay: "OFF DLY (=ON)/"OFF," 40 ms fixed
12 Selector switch: "L.ON" (light switching)/"D.ON" (dark switching)

Order information

Type	Part no.
WLL170T-2N162	6 033 960
WLL170T-2N360	6 033 961
WLL170T-2N460	6 033 962
WLL170T-2P162	6 033 963
WLL170T-2P360	6 033 964
WLL170T-2P460	6 033 965

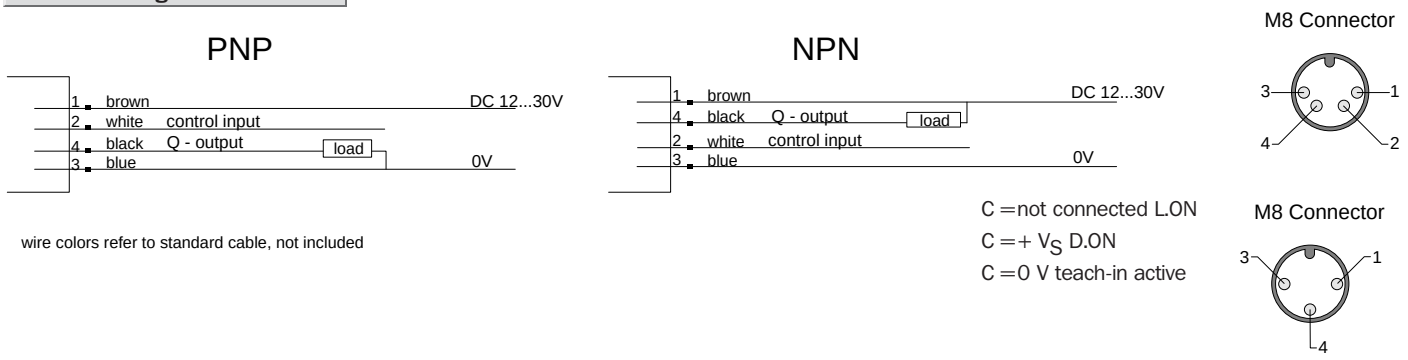
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

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Technical data	WLL 170T-2	N162	N360	N460	P162	P360	P460
Operating distance	0…2.4 in (0…60 mm)[1]	■	■	■	■	■	■
Fiber-optic cable (proximity system)	LL3-DM01	■	■	■	■	■	■
Adjustment of operating distance	Teach-in: single-teach button & cable	■		■	■		■
	Teach-in: single-teach button		■			■	
Sensing range typ. max	0…59.1 in (0…1500 mm)	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB02 and tip adapter LL3-TA01	■	■	■	■	■	■
Sensing range, recommended	0…11.8 in (0…300 mm)	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB01	■	■	■	■	■	■
Sensitivity adjustment	Teach-in: single-teach button & cable	■		■	■		■
	Teach-in: single-teach button		■			■	
Light source[2], light type	LED, red light, 660 nm	■	■	■	■	■	■
Light spot diameter	Depends on sensing range	■	■	■	■	■	■
Angle of dispersion	Approx. 65° (see LL3 data for deviations)	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■	■	■
Residual Ripple[4]	10%	■	■	■	■	■	■
Current consumption[5]	≤ 30 mA	■	■	■	■	■	■
Switching outputs	NPN: open collector: Q	■	■	■			
	PNP: open collector: Q				■	■	■
Switching mode	Light/dark switching via slide switch	■	■	■	■	■	■
Output current I_a max	100 mA	■	■	■	■	■	■
Response time	≤ 50 µs[6]	■	■	■	■	■	■
Switching frequency	10,000 Hz[7]	■	■	■	■	■	■
Time delay	OFF delay 40 ms fix, selectable by sliding switch	■	■	■	■	■	■
Teach-in input (ET)	Teach 0 V	■	■	■			
	Run V_S or unswitched	■	■	■			
	Teach > 10 V…< V_S				■	■	■
	Run 0 V or unswitched				■	■	■
Time type	Off delay t_{OFF}	■	■	■	■	■	■
Connection type	Cable, PVC, 2 m[8]	■			■		
	Connector, M8 3-pin		■			■	
	Connector, M8 4-pin			■			■
VDE protection class	⧫III⧫	■	■	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 66[10]	■	■	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■
Approximate weight	2.1 oz (60 g)	■	■	■	■	■	■
Housing material	ABS	■	■	■	■	■	■

1) Object with 90% remission (based on standard white to DIN 5033)
2) Average service life 100.000 h at T_A = 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Do not bend below 0° C
9) A = V_S connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected
10) With correctly attached fiber-optic cable LL3 and closed protection hood

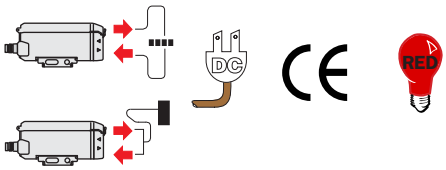
Connection diagram



wire colors refer to standard cable, not included

WLL190T-2

Fiber-Optic Sensors



0...157.5 in (0...4000 mm) Through-beam
0...18.9 in (0...480 mm) Proximity/Diffuse
sensing range (dependent on fiber)

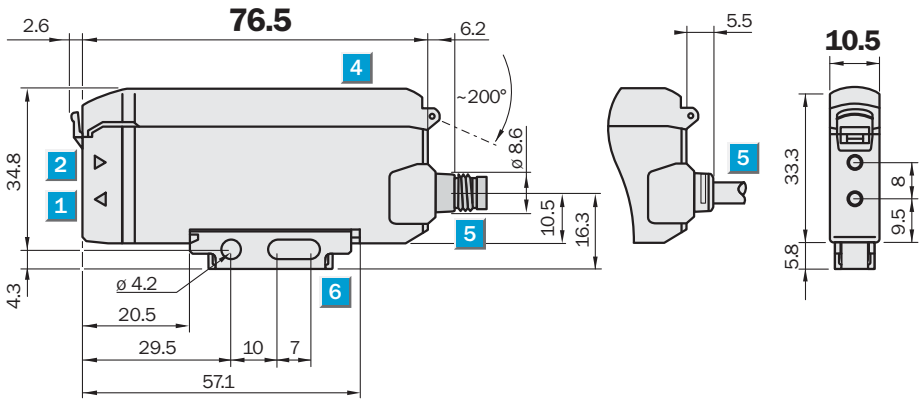
Highlights

- Long sensing ranges
- Fast switching frequency
- Precise, stable switching point
- Dual display
- Red light
- Teach-in
- Interactive user prompting
- Appropriate for the LL3 fiber-optic cable series

WLL190T-2

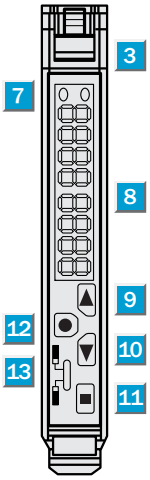


Dimensional drawing



dimensions in mm

Adjustments



1 Sender LED, installation of LL 3 fiber-optic cable (sender fiber)
2 Receiver LED, installation of LL 3 fiber-optic cable (receiver fiber)
3 Locking of fiber-optic cables
4 Protective hood: can be folded out approx. 180°
5 Connector
6 Mounting bracket included (see accessories)
7 2 x indicator LED, orange: lights up when switching output is active
8 Numerical display: 2 x 4-digit
green: switching threshold, operating mode
red: actual value, teach-in and function parameter
9 Step button < (manual switching threshold: higher; or next function parameter)
10 Step button > (manual switching threshold: lower; or previous functon parameter)
11 "Teach-in" push button
12 Mode/Enter button (programming button)
13 Operating mode selector switch:
"SET:" active teach-in-switching threshold
"RUN:" sensor mode and function parameter selection

Order information

Type	Part no.
WLL190T-2N333	6 032 556
WLL190T-2N432	6 032 552
WLL190T-2N434	6 032 554
WLL190T-2P333	6 032 555
WLL190T-2P432	6 032 551
WLL190T-2P434	6 032 553

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

Technical data	WLL190T-2	N333	N432	N434	P333	P432	P434
Operating distance	0…18.9 in (0…480 mm)[1]	■	■	■	■	■	■
Fiber-optic cable (proximity system)	LL3-DM01	■	■	■	■	■	■
Adjustment of operating distance	Teach-in: single-teach button	■			■		
	Teach-in: single-teach button & cable		■	■		■	■
Sensing range typ. max	0…157.5 in (0…4000 mm)	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB01 and tip adapter LL3-TA01	■	■	■	■	■	■
Sensing range, recommended	0…78.7 in (0…2000 mm)[2]	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB01	■	■	■	■	■	■
Sensitivity adjustment	Teach-in: single-teach button	■			■		
	Teach-in: single-teach button & cable		■	■		■	■
Precise correction	Step button +/– manual	■	■	■	■	■	■
Light source[3], light type	LED, red light, 650 nm	■	■	■	■	■	■
Light spot diameter	Depends on sensing range	■	■	■	■	■	■
Angle of dispersion	Approx. 65° (see LL3 data for deviations)	■	■	■	■	■	■
Supply voltage V_S	12…24 V DC[4]	■	■	■	■	■	■
Residual Ripple[5]	≤ 10%	■	■	■	■	■	■
Current consumption[6]	≤ 50 mA	■	■	■	■	■	■
Switching outputs	NPN, Q	■					
	NPN, Q1, Q2[7]		■	■			
	PNP, Q				■		
	PNP, Q1, Q2[7]					■	■
Switching mode	Light/dark switching, selectable	■	■	■	■	■	■
Output current I_a max	≤ 100 mA	■	■	■	■	■	■
Response time	selectable: 60 µs/250 µs/2 ms	■	■	■	■	■	■
Switching frequency	8333 Hz/2000 Hz/ 250 Hz	■	■	■	■	■	■
Time delay	Programmable 0…9,999 ms	■	■	■	■	■	■
Time type	Programmable	■	■	■	■	■	■
	OFF/T_{off}/T_{on}/ONE-SHOT	■	■	■	■	■	■
Connection type	Connector, M8 3-pin	■			■		
	Cable, PVC, 2 m[8]		■			■	
	Connector, M8 4-pin			■			■
VDE protection class	⧈	■	■	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 66[10]	■	■	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25… 55° C)	■	■	■	■	■	■
	Storage -40…158° F (-40… 70° C)	■	■	■	■	■	■
Approximate weight	0.9 oz (25 g)	■		■	■		■
	0.7 oz (20 g)		■			■	
Housing material	ABS, PC	■	■	■	■	■	■

1) Object with 90% remission (based on standard white to DIN 5033). Sensing distance at resonse time 2 ms. Distance reduction at shorter response time (see LL3/WLL190T-2 table)
2) Sensing range at response time 2 ms. Range reduction at shorter response time (see LL3/WLL190T-2 table)
3) Average service life 100,000 h at T_A = 25° C
4) ± 10%
5) May not exceed or fall short of V_S tolerances
6) Without load
7) Selectable Q2, ext. teach or counter reset
8) Do not bend below 0° C
9) A = V_S connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected
10) Only with correct adaptation of the LL3 fiber-optic cable

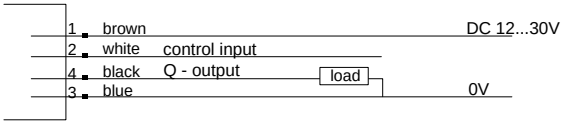
Sensitivity setting

The following optimization modes can be programmed
a) Normal mode (default) - 4 alternatives
- max. teach-in
- 1-point teach-in
- 2-point teach-in
- auto teach-in

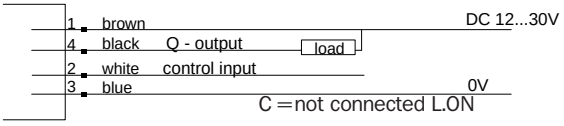
b) Zone teach-in (window technology)
c) Glass teach-in (detection of transparent objects)

Connection diagram

PNP



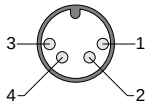
NPN



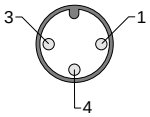
C = not connected L.ON
C = + V_S D.ON
C = 0 V teach-in active

wire colors refer to standard cable, not included

M8 Connector

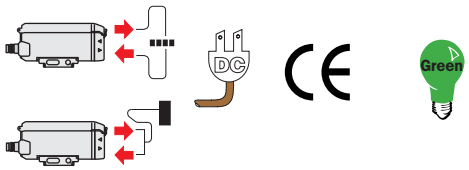


M8 Connector



WLL190T-2

Fiber-Optic Sensors



0...157.5 in (0...4000 mm) Through-beam
0...6.3 in (0...160 mm) Proximity/Diffuse
sensing range (dependent on fiber)

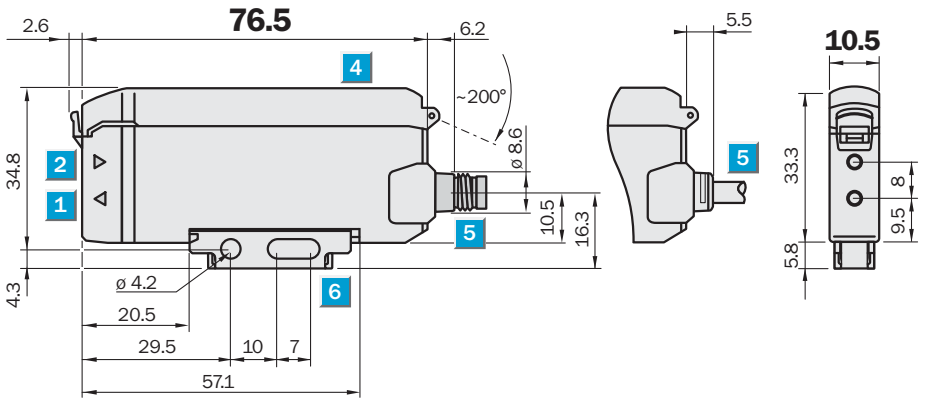
Highlights

- For detection of marks
- Long sensing ranges
- Fast switching frequency
- Precise, stable switching point
- Dual display
- Interactive user prompting
- Appropriate for the LL3 fiber-optic cable series
- Green light
- Mark sensors
- Teach-in

WLL190T-2

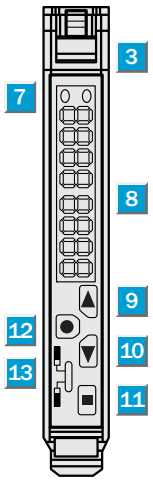


Dimensional drawing



dimensions in mm

Adjustments



1 Sender LED, installation of LL 3 fiber-optic cable (sender fiber)
2 Receiver LED, installation of LL 3 fiber-optic cable (receiver fiber)
3 Locking of fiber-optic cables
4 Protective hood: can be folded out approx. 180°
5 Connector
6 Mounting bracket included (see accessories)
7 2 x indicator LED, orange: lights up when switching output is active
8 Numerical display: 2 x 4-digit
green: switching threshold, operating mode
red: actual value, teach-in and function parameter
9 Step button < (manual switching threshold: higher; or next function parameter)
10 Step button > (manual switching threshold: lower; or previous funcion parameter)
11 "Teach-in" push button
12 Mode/Enter button (programming button)
13 Operating mode selector switch:
"SET:" active teach-in-switching threshold
"RUN:" sensor mode and function parameter selection

Order information

Type	Part no.
WLL190T-2N393	6 032 564
WLL190T-2N492	6 032 560
WLL190T-2N494	6 032 562
WLL190T-2P393	6 032 563
WLL190T-2P492	6 032 559
WLL190T-2P494	6 032 561

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

Technical data	WLL190T-2	N393	N492	N494	P393	P492	P494
Operating distance	0…6.3 in (0…160 mm)[1]	■	■	■	■	■	■
Fiber-optic cable (proximity system)	LL3-DM01	■	■	■	■	■	■
Adjustment of operating distance	Teach-in: single-teach button	■			■		
	Teach-in: single-teach button & cable		■	■		■	■
Sensing range typ. max	0…157.5 in (0…4000 mm)	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB02 and tip adapter LL3-TA01	■	■	■	■	■	■
Sensing range, recommended	0…35.4 in (0…900 mm)[2]	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB01	■	■	■	■	■	■
Sensitivity adjustment	Teach-in: single-teach button	■			■		
	Teach-in: single-teach button & cable		■	■		■	■
Precise correction	Step button +/– manual	■	■	■	■	■	■
Light source[3], light type	LED, green light, 525 nm	■	■	■	■	■	■
Light spot diameter	Depends on sensing range	■	■	■	■	■	■
Angle of dispersion	Approx. 65° (see LL3 data for deviations)	■	■	■	■	■	■
Supply voltage V_S	12…24 V DC[4]	■	■	■	■	■	■
Residual Ripple[5]	≤ 10%	■	■	■	■	■	■
Current consumption[6]	≤ 50 mA	■	■	■	■	■	■
Switching outputs	NPN, Q	■					
	NPN, Q1, Q2[7]		■	■			
	PNP, Q				■		
	PNP, Q1, Q2[7]					■	■
Switching mode	Light/dark switching, selectable	■	■	■	■	■	■
Output current I_a max	≤ 100 mA	■	■	■	■	■	■
Response time	selectable: 60 µs/250 µs/2 ms	■	■	■	■	■	■
Switching frequency	8333 Hz/2000 Hz/ 250 Hz	■	■	■	■	■	■
Time delay	Programmable 0…9,999 ms	■	■	■	■	■	■
Time type	Programmable	■	■	■	■	■	■
	OFF/T_{OFF}/T_{ON}/ONE-SHOT	■	■	■	■	■	■
Connection type	Connector, M8 3-pin	■			■		
	Cable, PVC, 2 m[8]		■			■	
	Connector, M8 4-pin			■			■
VDE protection class	⧈	■	■	■	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 66[10]	■	■	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■
Approximate weight	0.9 oz (25 g)	■		■	■		■
	0.7 oz (20 g)		■			■	
Housing material	ABS, PC	■	■	■	■	■	■

1) Object with 90% remission (based on standard white to DIN 5033). Sensing distance at response time 2 ms. Distance reduction at shorter response time (see LL3/WLL190T-2 table)
2) Sensing range at response time 2 ms. Range reduction at shorter response time (see LL3/WLL190T-2 table)
3) Average service life 100,000 h at T_A = 25° C
4) ± 10%
5) May not exceed or fall short of V_S tolerances
6) Without load
7) Selectable Q2, ext. teach or counter reset
8) Do not bend below 0° C
9) A = V_S connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected
10) Only with correct adaptation of the LL3 fiber-optic cable

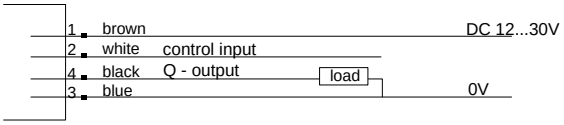
Sensitivity setting

The following optimization modes can be programmed
a) Normal mode (default) - 4 alternatives
- max. teach-in,
- 1-point teach-in
- 2-point teach-in
- auto teach-in

b) Zone teach-in (window technology)
c) Glass teach-in (detection of transparent objects)

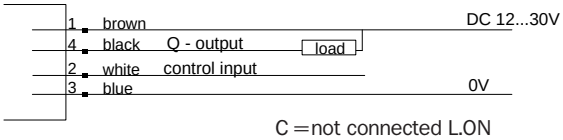
Connection diagram

PNP



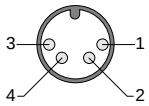
wire colors refer to standard cable, not included

NPN

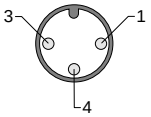


C = not connected L.ON
C = + V_S D.ON
C = 0 V teach-in active

M8 Connector

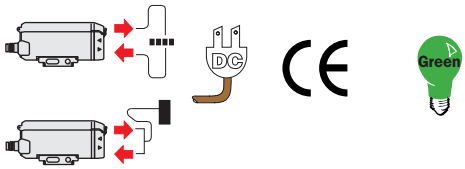


M8 Connector



WLL190T-2

Fiber-Optic Sensors



0...157.5 in (0...4000 mm) Through-beam
0...18.9 in (0...480 mm) Proximity/Diffuse
sensing range (dependent on fiber)

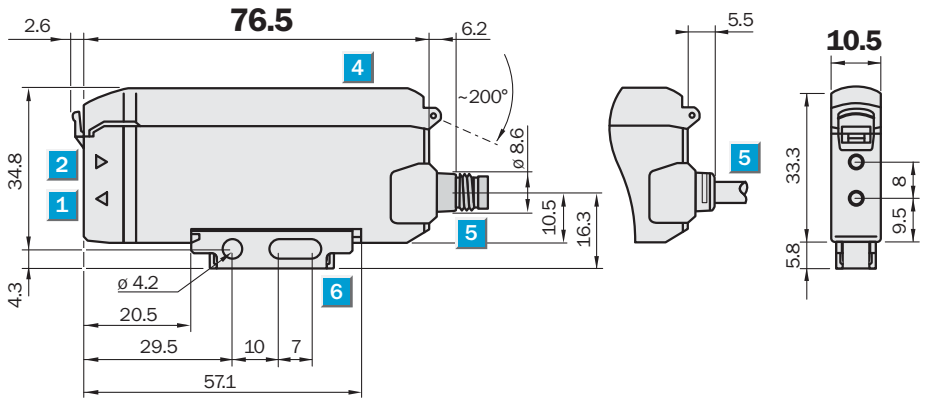
WLL190T-2



Highlights

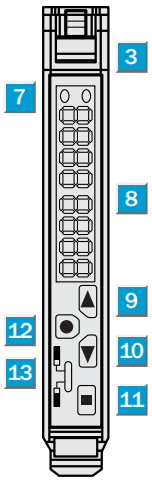
- Analog output
- Long sensing ranges
- Fast switching frequency
- Precise, stable switching point
- Dual display
- Interactive user prompting
- Appropriate for the LL3 fiber-optic cable series

Dimensional drawing



dimensions in mm

Adjustments



1 Sender LED, installation of LL 3 fiber-optic cable (sender fiber)
2 Receiver LED, installation of LL 3 fiber-optic cable (receiver fiber)
3 Locking of fiber-optic cables
4 Protective hood: can be folded out approx. 180°
5 Connector
6 Mounting bracket included (see accessories)
7 2 x indicator LED, orange: lights up when switching output is active
8 Numerical display: 2 x 4-digit
green: switching threshold, operating mode
red: actual value, teach-in and function parameter
9 Step button < (manual switching threshold: higher; or next function parameter)
10 Step button > (manual switching threshold: lower; or previous funcion parameter)
11 "Teach-in" push button
12 Mode/Enter button (programming button)
13 Operating mode selector switch:
"SET:" active teach-in-switching threshold
"RUN:" sensor mode and function parameter selection

Order information

Type	Part no.
WLL190T-2N532	6 032 558
WLL190T-2P532	6 032 557

Accessories	page
Mounting systems	1234
Fiber-optic cables	1178

Technical data	WLL190T-2	N532	P532
Operating distance	0…18.9 in (0…480 mm)[1]		
Fiber-optic cable (proximity system)	LL3-DB01		
Adjustment of operating distance	Teach-in: single-teach button		
Sensing range typ. max	0…157.5 in (0…4000 mm)		
Fiber-optic cable (through-beam)	LL3-TB01 and tip adapter LL3-TA01		
Sensing range, recommended	0…78.7 in (0…2000 mm)[2]		
Fiber-optic cable (through-beam)	LL3-TB01		
Sensitivity adjustment	Teach-in: single-teach button		
Precise correction	Step button +/– manual		
Light source[3], light type	LED, red light, 650 nm		
Light spot diameter	Depends on sensing range		
Angle of dispersion	Approx. 65° (see LL3 data for deviations)		
Supply voltage V_S	12…24 V DC[4]		
Residual Ripple[5]	≤ 10%		
Current consumption[6]	≤ 50 mA		
Switching outputs	NPN, Q		
	PNP, Q		
Analog output	4…20 mA		
Switching mode	Light/dark switching, selectable		
Output current I_a max	≤ 100 mA		
Response time	selectable: 60 µs/250 µs/2 ms		
Switching frequency	8333 Hz/2000 Hz/250 Hz		
Time delay	Programmable 0 ms…9,999 ms		
Time type	Programmable		
	OFF/T_{OFF}/T_{ON}/ONE-SHOT		
Connection type	Cable, PVC, 2 m[7]		
VDE protection class	III		
Circuit protection[8]	A, B, C, D		
Enclosure rating	IP 66[9]		
Ambient temperature T_A	Operation -13…131° F (-25… 55° C)		
	Storage -40…158° F (-40… 70° C)		
Approximate weight	0.7 oz (20 g)		
Housing material	ABS, PC		

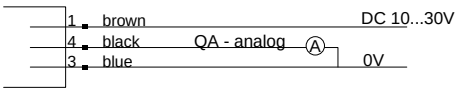
1) Object with 90% remission (based on standard white to DIN 5033). Sensing distance at response time 2 ms. Distance reduction at shorter response time (see LL3/WLL190T-2 table)
2) Sensing range at response time 2 ms. Range reduction at shorter response time (see LL3/WLL190T-2 table)
3) Average service life 100,000 h at T_A = 25° C
4) ± 10%
5) May not exceed or fall short of V_S tolerances
6) Without load
7) Do not bend below 0° C
8) A = V_S connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected
9) Only with correct adaptation of the LL3 fiber-optic cable

Sensitivity setting

The following optimization modes can be programmed
a) Normal mode (default) - 4 alternatives
- max. teach-in
- 1-point teach-in
- 2-point teach-in
- auto teach-in

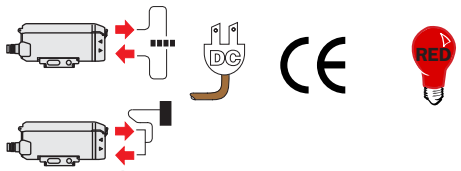
b) Zone teach-in (window technology)
c) Glass teach-in (detection of transparent objects)

Connection diagram



WLL190T-2

Fiber-Optic Sensors



0...157.5 in (0...4000 mm) Through-beam
0...18.9 in (0...480 mm) Proximity/Diffuse
sensing range (dependent on fiber)

WLL190T-2

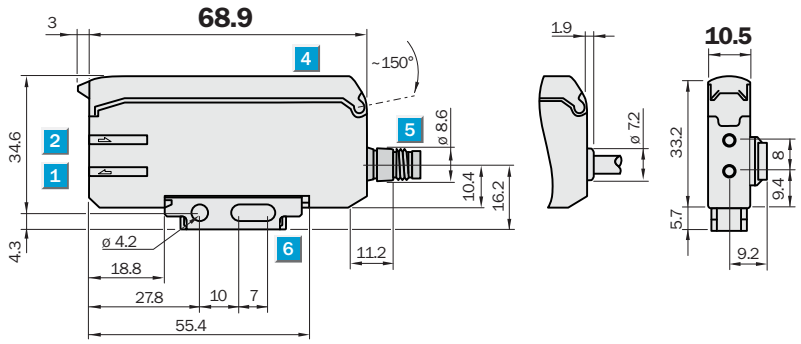


Highlights

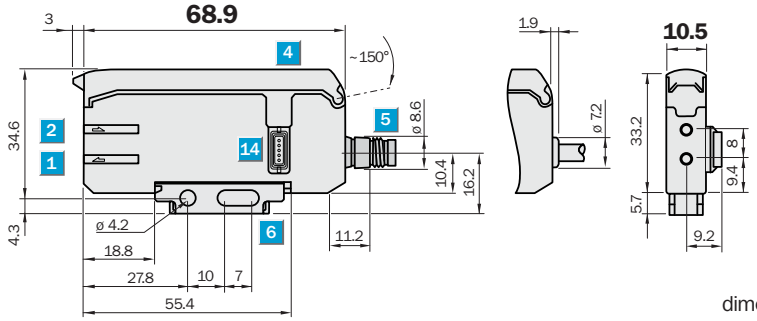
- Cable saving bus mode
- Automatic anti-interference
- Long sensing ranges
- Fast switching frequency
- Dual display
- Red light
- PNP

Dimensional drawing

Base unit



Expansion unit



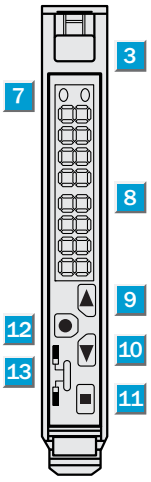
dimensions in mm

Order information

Type	Part no.
WLL190T-2F232	6 032 571
WLL190T-2F333	6 032 569
WLL190T-2F434	6 032 567
WLL190T-2M333	6 033 294
WLL190T-2M432	6 033 290
WLL190T-2M434	6 033 292

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

Adjustments



1 Sender LED, installation of LL 3 fiber-optic cable (sender fiber)
2 Receiver LED, installation of LL 3 fiber-optic cable (receiver fiber)
3 Locking of fiber-optic cables
4 Protective hood: can be folded out approx. 180°
5 Connector
6 Mounting bracket included (see accessories)
7 2 x indicator LED, orange:
lights up when switching output is active
8 Numeric display: 2 x 4-digit
green: switching threshold, operating mode
red: actual value, teach-in and function parameter
9 Step button < (manual switching threshold: higher; or next function parameter)
10 Step button > (manual switching threshold: lower; or previous funcion parameter)
11 "Teach-in" push button
12 Mode/Enter button (programming button)
13 Operating mode selector switch:
"SET:" active teach-in-switching threshold
"RUN:" sensor mode and function parameter selection
14 Bus connector

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Technical data	WLL190T-2	F232	F333	F434	M333	M432	M434
Device type	Expansion unit	■	■	■			
	Base unit[1]				■	■	■
Operating distance	0…18.9 in (0…480 mm)[2]	■	■	■	■	■	■
Fiber-optic cable (proximity system)	LL3-DB01	■	■	■	■	■	■
Adjustment of operating distance	Teach-in: single-teach button & cable	■		■		■	■
	Teach-in: single-teach button		■		■		
Sensing range typ. max	0…157.5 in (0…4000 mm)	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB01 and tip adapter LL3-TA01	■	■	■	■	■	■
Sensing range, recommended	0…78.7 in (0…2000 mm)[3]	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB01	■	■	■	■	■	■
Sensitivity adjustment	Teach-in: single-teach button & cable	■		■		■	■
	Teach-in: single-teach button		■		■		
Precise correction	Step button +/– manual	■	■	■	■	■	■
Light source[4], light type	LED, red light, 650 nm	■	■	■	■	■	■
Light spot diameter	Depends on sensing range	■	■	■	■	■	■
Angle of dispersion	Approx. 65° (see LL3 data for deviations)	■	■	■	■	■	■
Supply voltage V_S	12…24 V DC[5]	■	■	■	■	■	■
Residual Ripple[6]	≤ 10%	■	■	■	■	■	■
Current consumption[7]	≤ 50 mA	■	■	■	■	■	■
Switching outputs	PNP, Q1, Q2[8]	■		■		■	■
	PNP, Q		■		■		
Switching mode	Light/dark switching, selectable	■	■	■	■	■	■
Output current I_a max	≤ 100 mA	■	■	■	■	■	■
Response time	selectable: 60 µs/250 µs/2 ms	■	■	■	■	■	■
Switching frequency	8333 Hz/2000 Hz/250 Hz	■	■	■	■	■	■
Time delay	Programmable 0…9,999 ms	■	■	■	■	■	■
Time type	Programmable	■	■	■	■	■	■
	OFF/T_{OFF}/T_{ON}/ONE-SHOT	■	■	■	■	■	■
Connection type	Cable, PVC, 2 m[9]	■				■	
	Connector, M8 3-pin		■		■		
	Connector, M8 4-pin			■			■
VDE protection class	⧫	■	■	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 54[11]	■	■	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)[12]	■	■	■			
	-13…131° F (-25…55° C)				■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■
Approximate weight	0.7 oz (20 g)	■				■	
	0.9 oz (25 g)		■	■	■		■
Housing material	ABS, PC	■	■	■	■	■	■

1) Up to 15 expansion units can be connected
2) Object with 90% remission (based on standard white to DIN 5033). Sensing distance at response time 2 ms. Distance reduction at shorter response time (see LL3/WLL190T-2 table)
3) Sensing range at response time 2 ms. Range reduction at shorter response time (see LL3/WLL190T-2 table)
4) Average service life 100,000 h at T_A = 25° C
5) ± 10%
6 May not exceed or fall short of V_S tolerances
7) Without load
8) Selectable Q2, ext. teach or counter reset
9) Do not bend below 0° C
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected
11) Only with correct adaptation of the LL3 fiber-optic cable
12) Operating temp may vary depending on number of connected units: 4-8 units: -25…50° C (output current 50 mA), 9-16 units: -25…45° C (output current 20 mA)

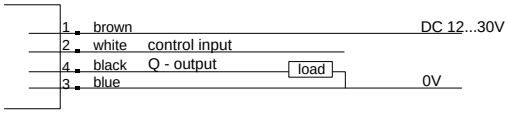
Sensitivity setting

The following optimization modes can be programmed
a) Normal mode (default) - 4 alternatives
- max. teach-in
- 1-point teach-in
- 2-point teach-in
- auto teach-in

b) Zone teach-in (window technology)
c) Glass teach-in (detection of transparent objects)

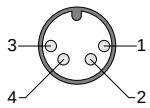
Connection diagram

PNP

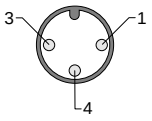


C = not connected L.ON
C = + V_S D.ON
C = 0 V teach-in active

M8 Connector



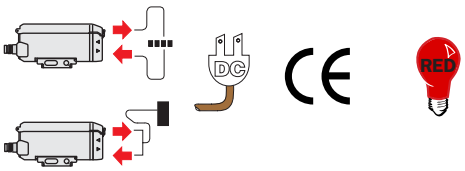
M8 Connector



wire colors refer to standard cable, not included

WLL190T-2

Fiber-Optic Sensors



0...157.5 in (0...4000 mm) Through-beam
0...18.9 in (0...480 mm) Proximity/Diffuse
sensing range (dependent on fiber)

WLL190T-2

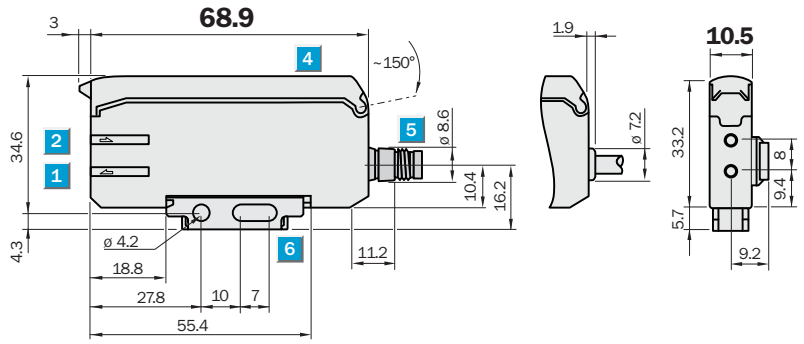


Highlights

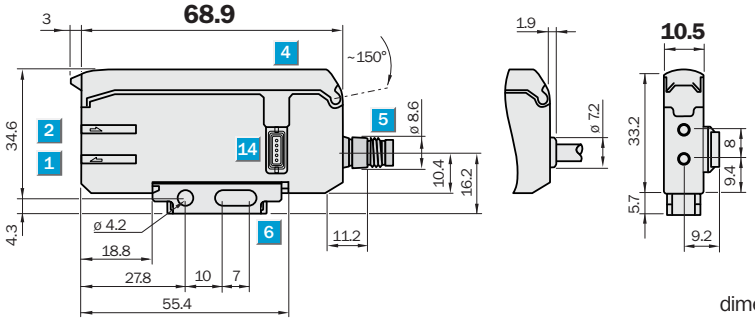
- Cable saving bus mode
- Automatic anti-interference
- Long sensing ranges
- Fast switching frequency
- Dual display
- NPN
- Red light

Dimensional drawing

Base unit



Expansion unit



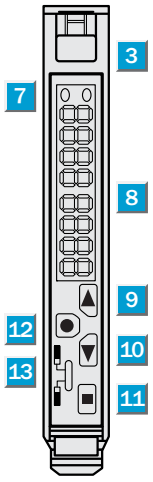
dimensions in mm

Order information

Type	Part no.
WLL190T-2E232	6 032 572
WLL190T-2E333	6 032 570
WLL190T-2E434	6 032 568
WLL190T-2L333	6 033 295
WLL190T-2L432	6 033 291
WLL190T-2L434	6 033 293

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

Adjustments



1 Sender LED, installation of LL 3 fiber-optic cable (sender fiber)
2 Receiver LED, installation of LL 3 fiber-optic cable (receiver fiber)
3 Locking of fiber-optic cables
4 Protective hood: can be folded out approx. 180°
5 Connector
6 Mounting bracket included (see accessories)
7 2 x indicator LED, orange:
lights up when switching output is active
8 Numeric display: 2 x 4-digit
green: switching threshold, operating mode
red: actual value, teach-in and function parameter
9 Step button < (manual switching threshold: higher; or next function parameter)
10 Step button > (manual switching threshold: lower; or previous funcion parameter)
11 "Teach-in" push button
12 Mode/Enter button (programming button)
13 Operating mode selector switch:
"SET:" active teach-in-switching threshold
"RUN:" sensor mode and function parameter selection
14 Bus connector

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Technical data	WLL190T-2	E232	E333	E434	L333	L432	L434			
Device type	Expansion unit	■	■	■						
	Base unit[1]				■	■	■			
Operating distance	0…18.9 in (0…480 mm)[2]	■	■	■	■	■	■			
Fiber-optic cable (proximity system)	LL3-DB01	■	■	■	■	■	■			
Adjustment of operating distance	Teach-in: single-teach button & cable	■		■		■	■			
	Teach-in: single-teach button		■		■					
Sensing range typ. max	0…157.5 in (0…4000 mm)	■	■	■	■	■	■			
Fiber-optic cable (through-beam)	LL3-TB01 and tip adapter LL3-TA01	■	■	■	■	■	■			
Sensing range, recommended	0…78.7 in (0…2000 mm)[3]	■	■	■	■	■	■			
Fiber-optic cable (through-beam)	LL3-TB01	■	■	■	■	■	■			
Sensitivity adjustment	Teach-in: single-teach button & cable	■		■		■	■			
	Teach-in: single-teach button		■		■					
Precise correction	Step button +/– manual	■	■	■	■	■	■			
Light source[4], light type	LED, red light, 650 nm	■	■	■	■	■	■			
Light spot diameter	Depends on sensing range	■	■	■	■	■	■			
Angle of dispersion	Approx. 65° (see LL3 data for deviations)	■	■	■	■	■	■			
Supply voltage V_S	12…24 V DC[5]	■	■	■	■	■	■			
Residual Ripple[6]	≤ 10%	■	■	■	■	■	■			
Current consumption[7]	≤ 50 mA	■	■	■	■	■	■			
Switching outputs	NPN Q1, Q2[8]	■		■		■	■			
	NPN, Q		■		■					
Switching mode	Light/dark switching, selectable	■	■	■	■	■	■			
Output current I_a max	≤ 100 mA	■	■	■	■	■	■			
Response time	selectable: 60 µs/250 µs/2 ms	■	■	■	■	■	■			
Switching frequency	8333 Hz/2000 Hz/250 Hz	■	■	■	■	■	■			
Time delay	Programmable 0…9,999 ms	■	■	■	■	■	■			
Time type	Programmable	■	■	■	■	■	■			
	OFF/T_{OFF}/T_{ON}/ONE-SHOT	■	■	■	■	■	■			
Connection type	Cable, PVC, 2 m[9]	■				■				
	Connector M8 3-pin		■		■					
	Connector M8 4-pin			■			■			
VDE protection class	⏀	■	■	■	■	■	■			
Circuit protection[10]	A, B, C, D	■	■	■	■	■	■			
Enclosure rating	IP 54[11]	■	■	■	■	■	■			
Ambient temperature T_A	Operation -13…131° F (-25…55° C)[12]	■	■	■						
	-13…131° F (-25…55° C)				■	■	■			
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■			
Approximate weight	0.7 oz (20 g)	■				■				
	0.9 oz (25 g)		■	■	■		■			
Housing material	ABS, PC	■	■	■	■	■	■			

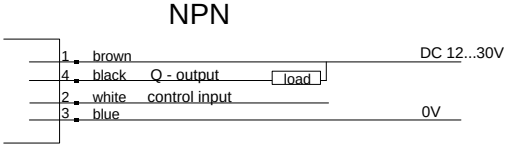
1) Up to 15 expansion units can be connected
2) Object with 90% remission (based on standard white to DIN 5033). Sensing distance at response time 2 ms. Distance reduction at shorter response time (see LL3/WLL190T-2 table)
3) Sensing range at response time 2 ms. Range reduction at shorter response time (see LL3/WLL190T-2 table)
4) Average service life 100,000 h at T_A = 25° C
5) ± 10%
6 May not exceed or fall short of V_S tolerances
7) Without load
8) Selectable Q2, ext. teach or counter reset
9) Do not bend below 0° C
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected
11) Only with correct adaptation of the LL3 fiber-optic cable
12) Operating temp may vary depending on number of connected units: 4-8 units: -25…50° C (output current 50 mA), 9-16 units: -25…45° C (output current 20 mA)

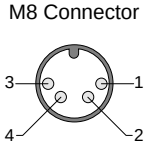
Sensitivity setting

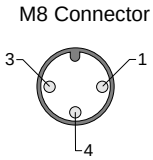
The following optimization modes can be programmed
a) Normal mode (default) - 4 alternatives
- max. teach-in
- 1-point teach-in
- 2-point teach-in
- auto teach-in

b) Zone teach-in (window technology)
c) Glass teach-in (detection of transparent objects)

Connection diagram

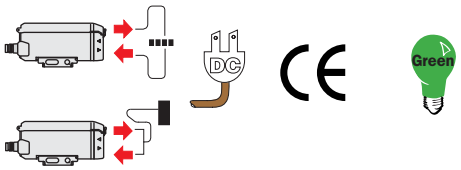






WLL190T-2

Fiber-Optic Sensors



0...157.5 in (0...4000 mm) Through-beam
0...6.3 in (0...160 mm) Proximity/Diffuse
sensing range (dependent on fiber)

WLL190T-2

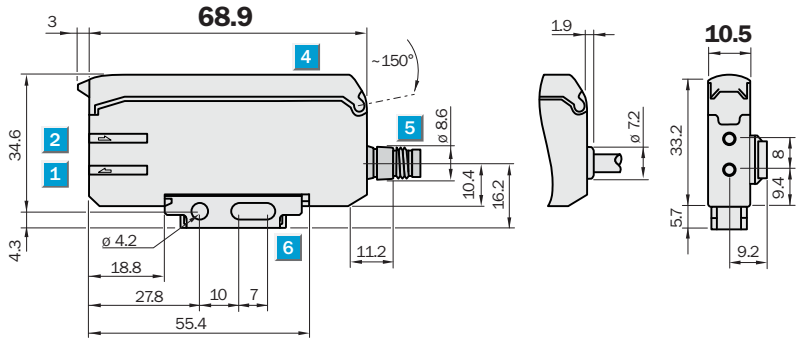


Highlights

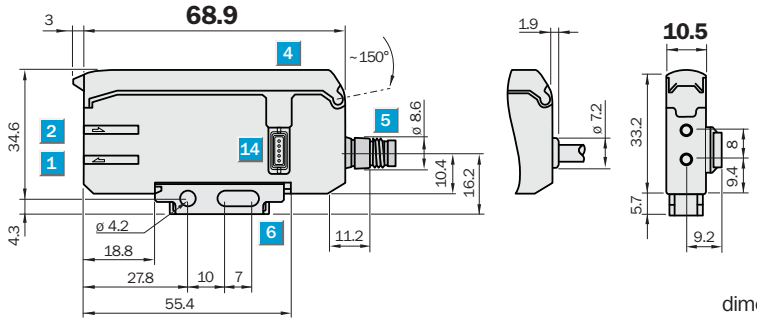
- Cable saving bus mode
- Automatic anti-interference
- Long sensing ranges
- Fast switching frequency
- Dual display
- For detection of marks
- Green light
- PNP

Dimensional drawing

Base unit



Expansion unit



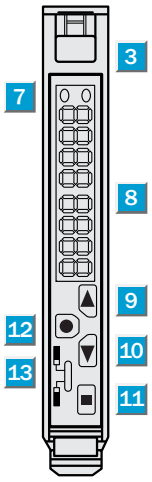
dimensions in mm

Order information

Type	Part no.
WLL190T-2F292	6 032 579
WLL190T-2F393	6 032 577
WLL190T-2F494	6 032 575
WLL190T-2M393	6 033 300
WLL190T-2M492	6 033 296
WLL190T-2M494	6 033 298

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

Adjustments



1 Sender LED, installation of LL 3 fiber-optic cable (sender fiber)
2 Receiver LED, installation of LL 3 fiber-optic cable (receiver fiber)
3 Locking of fiber-optic cables
4 Protective hood: can be folded out approx. 180°
5 Connector
6 Mounting bracket included (see accessories)
7 2 x indicator LED, orange:
lights up when switching output is active
8 Numeric display: 2 x 4-digit
green: switching threshold, operating mode
red: actual value, teach-in and function parameter
9 Step button < (manual switching threshold: higher; or next function parameter)
10 Step button > (manual switching threshold: lower; or previous funcion parameter)
11 "Teach-in" push button
12 Mode/Enter button (programming button)
13 Operating mode selector switch:
"SET:" active teach-in-switching threshold
"RUN:" sensor mode and function parameter selection
Bus connector

Technical data	WLL190T-2	F292	F393	F494	M393	M492	M494			
Device type	Expansion unit	■	■	■						
	Base unit[1]				■	■	■			
Operating distance	0…6.3 in (0…160 mm)[2]	■	■	■	■	■	■			
Fiber-optic cable (proximity system)	LL3-DM01	■	■	■	■	■	■			
Adjustment of operating distance	Teach-in: single-teach button & cable	■		■		■	■			
	Teach-in: single-teach button		■		■					
Sensing range typ. max	0…157.5 in (0…4000 mm)	■	■	■	■	■	■			
Fiber-optic cable (through-beam)	LL3-TB02 and tip adapter LL3-TA01	■	■	■	■	■	■			
Sensing range, recommended	0…35.4 in (0…900 mm)[3]	■	■	■	■	■	■			
Fiber-optic cable (through-beam)	LL3-TB01	■	■	■	■	■	■			
Sensitivity adjustment	Teach-in: single-teach button & cable	■		■		■	■			
	Teach-in: single-teach button		■		■					
Precise correction	Step button +/– manual	■	■	■	■	■	■			
Light source[4], light type	LED, green light, 525 nm	■	■	■	■	■	■			
Light spot diameter	Depends on sensing range	■	■	■	■	■	■			
Angle of dispersion	Approx. 65° (see LL3 data for deviations)	■	■	■	■	■	■			
Supply voltage V_S	12…24 V DC[5]	■	■	■	■	■	■			
Residual Ripple[6]	≤ 10%	■	■	■	■	■	■			
Current consumption[7]	≤ 50 mA	■	■	■	■	■	■			
Switching outputs	PNP, Q1, Q2[8]	■		■		■	■			
	PNP, Q		■		■					
Switching mode	Light/dark switching, selectable	■	■	■	■	■	■			
Output current I_a max	≤ 100 mA	■	■	■	■	■	■			
Response time	selectable: 60 µs/250 µs/2 ms	■	■	■	■	■	■			
Switching frequency	8333 Hz/2000 Hz/250 Hz	■	■	■	■	■	■			
Time delay	Programmable 0…9,999 ms	■	■	■	■	■	■			
Time type	Programmable	■	■	■	■	■	■			
	OFF/T_{OFF}/T_{ON}/ONE-SHOT	■	■	■	■	■	■			
Connection type	Cable, PVC, 2 m[9]	■				■				
	Connector, M8 3-pin		■		■					
	Connector, M8 4-pin			■			■			
VDE protection class	⧫	■	■	■	■	■	■			
Circuit protection[10]	A, B, C, D	■	■	■	■	■	■			
Enclosure rating	IP 54[11]	■	■	■	■	■	■			
Ambient temperature T_A	Operation -13…131° F (-25…55° C)[12]	■	■	■						
	-13…131° F (-25…55° C)				■	■	■			
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■			
Approximate weight	0.7 oz (20 g)	■				■				
	0.9 oz (25 g)		■	■	■		■			
Housing material	ABS, PC	■	■	■	■	■	■			

1) Up to 15 expansion units can be connected
2) Object with 90% remission (based on standard white to DIN 5033). Sensing distance at response time 2 ms. Distance reduction at shorter response time (see LL3/WLL190T-2 table)
3) Sensing range at response time 2 ms. Range reduction at shorter response time (see LL3/WLL190T-2 table)
4) Average service life 100,000 h at T_A = 25° C
5) ± 10%
6 May not exceed or fall short of V_S tolerances
7) Without load
8) Selectable Q2, ext. teach or counter reset
9) Do not bend below 0° C
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected
11) Only with correct adaptation of the LL3 fiber-optic cable
12) Operating temp may vary depending on number of connected units: 4-8 units: -25…50° C (output current 50 mA), 9-16 units: -25…45° C (output current 20 mA)

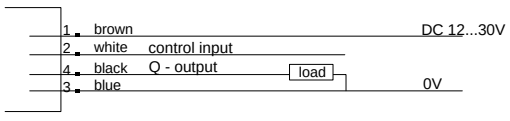
Sensitivity setting

The following optimization modes can be programmed
a) Normal mode (default) - 4 alternatives
- max. teach-in
- 1-point teach-in
- 2-point teach-in
- auto teach-in

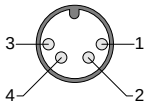
b) Zone teach-in (window technology)
c) Glass teach-in (detection of transparent objects)

Connection diagram

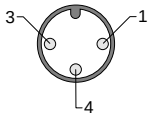
PNP



M8 Connector



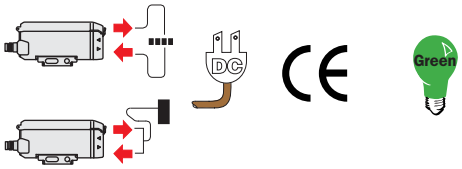
M8 Connector



wire colors refer to standard cable, not included

WLL190T-2

Fiber-Optic Sensors



0...157.5 in (0...4000 mm) Through-beam
0...6.3 in (0...160 mm) Proximity/Diffuse
sensing range (dependent on fiber)

WLL190T-2

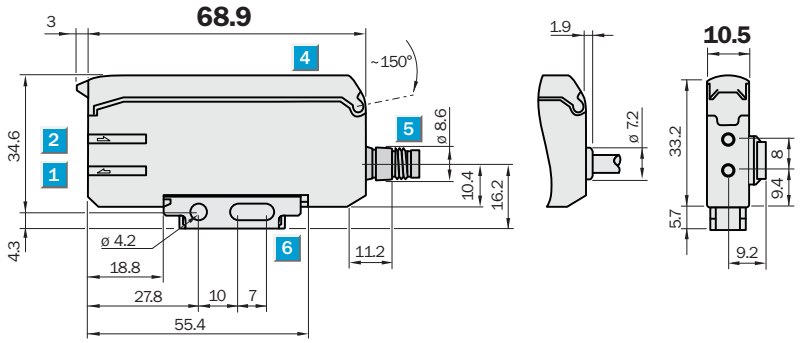


Highlights

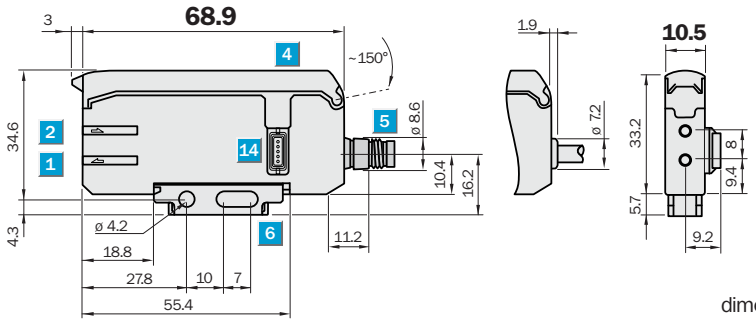
- Cable saving bus mode
- Automatic anti-interference
- Long sensing ranges
- Fast switching frequency
- Dual display
- For detection of marks
- Green light
- NPN

Dimensional drawing

Base unit



Expansion unit



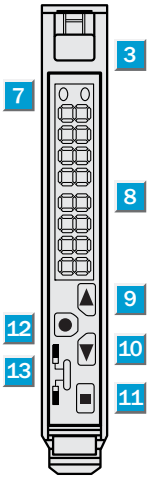
dimensions in mm

Order information

Type	Part no.
WLL190T-2E292	6 032 580
WLL190T-2E393	6 032 578
WLL190T-2E494	6 032 576
WLL190T-2L393	6 033 301
WLL190T-2L492	6 033 297
WLL190T-2L494	6 033 299

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

Adjustments



1 Sender LED, installation of LL 3 fiber-optic cable (sender fiber)
2 Receiver LED, installation of LL 3 fiber-optic cable (receiver fiber)
3 Locking of fiber-optic cables
4 Protective hood: can be folded out approx. 180°
5 Connector
6 Mounting bracket included (see accessories)
7 2 x indicator LED, orange:
lights up when switching output is active
8 Numeric display: 2 x 4-digit
green: switching threshold, operating mode
red: actual value, teach-in and function parameter
9 Step button < (manual switching threshold: higher; or next function parameter)
10 Step button > (manual switching threshold: lower; or previous funcion parameter)
11 “Teach-in” push button
12 Mode/Enter button (programming button)
13 Operating mode selector switch:
“SET:” active teach-in-switching threshold
14 “RUN:” sensor mode and function parameter selection
Bus connector

Technical data	WLL190T-2	E292	E393	E494	L393	L492	L494
Device type	Expansion unit	■	■	■			
	Base unit[1]				■	■	■
Operating distance	0…6.3 in (0…160 mm)[2]	■	■	■	■	■	■
Fiber-optic cable (proximity system)	LL3-DM01	■	■	■	■	■	■
Adjustment of operating distance	Teach-in: single-teach button & cable	■		■		■	■
	Teach-in: single-teach button		■		■		
Sensing range typ. max	0…157.5 in (0…4000 mm)	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB02 and tip adapter LL3-TA01	■	■	■	■	■	■
Sensing range, recommended	0…35.4 in (0…900 mm)[3]	■	■	■	■	■	■
Fiber-optic cable (through-beam)	LL3-TB01	■	■	■	■	■	■
Sensitivity adjustment	Teach-in: single-teach button & cable	■		■		■	■
	Teach-in: single-teach button		■		■		
Precise correction	Step button +/– manual	■	■	■	■	■	■
Light source[4], light type	LED, green light, 525 nm	■	■	■	■	■	■
Light spot diameter	Depends on sensing range	■	■	■	■	■	■
Angle of dispersion	Approx. 65° (see LL3 data for deviations)	■	■	■	■	■	■
Supply voltage V_S	12…24 V DC[5]	■	■	■	■	■	■
Residual Ripple[6]	≤ 10%	■	■	■	■	■	■
Current consumption[7]	≤ 50 mA	■	■	■	■	■	■
Switching outputs	NPN, Q1, Q2[8]	■		■		■	■
	NPN, Q		■		■		
Switching mode	Light/dark switching, selectable	■	■	■	■	■	■
Output current I_a max	≤ 100 mA	■	■	■	■	■	■
Response time	selectable: 60 µs/250 µs/2 ms	■	■	■	■	■	■
Switching frequency	8333 Hz/2000 Hz/250 Hz	■	■	■	■	■	■
Time delay	Programmable 0…9,999 ms	■	■	■	■	■	■
Time type	Programmable	■	■	■	■	■	■
	OFF/T_{OFF}/T_{ON}/ONE-SHOT	■	■	■	■	■	■
Connection type	Cable, PVC, 2 m[9]	■				■	
	Connector, M8 3-pin		■		■		
	Connector, M8 4-pin			■			■
VDE protection class	⧖	■	■	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■	■	■
Enclosure rating	IP 54[11]	■	■	■	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)[12]	■	■	■			
	-13…131° F (-25…55° C)				■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■
Approximate weight	0.7 oz (20 g)	■				■	
	0.9 oz (25 g)		■	■	■		■
Housing material	ABS, PC	■	■	■	■	■	■

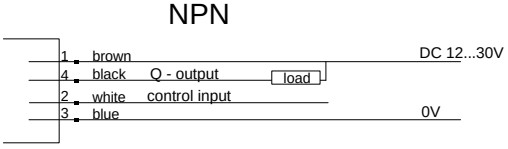
1) Up to 15 expansion units can be connected
2) Object with 90% remission (based on standard white to DIN 5033). Sensing distance at response time 2 ms. Distance reduction at shorter response time (see LL3/WLL190T-2 table)
3) Sensing range at response time 2 ms. Range reduction at shorter response time (see LL3/WLL190T-2 table)
4) Average service life 100,000 h at T_A = 25° C
5) ± 10%
6 May not exceed or fall short of V_S tolerances
7) Without load
8) Selectable Q2, ext. teach or counter reset
9) Do not bend below 0° C
10) A = V_S connections reverse-polarity protected
B = Inputs and outputs short-circuit protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected
11) Only with correct adaptation of the LL3 fiber-optic cable
12) Operating temp may vary depending on number of connected units: 4-8 units: -25…50° C (output current 50 mA), 9-16 units: -25…45° C (output current 20 mA)

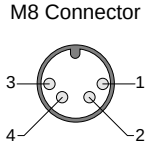
Sensitivity setting

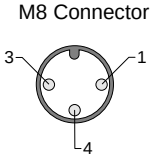
The following optimization modes can be programmed
a) Normal mode (default) - 4 alternatives
- max. teach-in
- 1-point teach-in
- 2-point teach-in
- auto teach-in

b) Zone teach-in (window technology)
c) Glass teach-in (detection of transparent objects)

Connection diagram

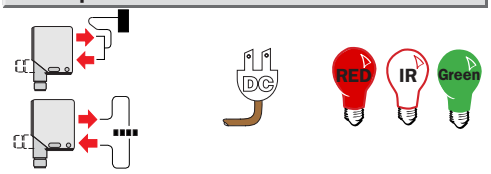






WLL 12

Fiber-Optic Sensors



dependent on fiber sensing range

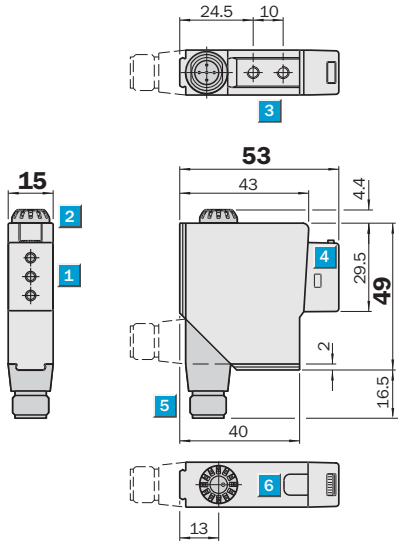
Highlights

- Rugged die cast metal housing
- Red, infrared or green light
- Signal strength indicator
- Special version with adjustable background suppression
- Adjustable sensitivity
- Glass or plastic fibers available with many tip configurations

WLL 12



Dimensional drawing



dimensions in mm

Adjustments

All types



1	Connector for fiber-optic cable
2	Sensitivity control
3	M4 threaded mounting hole – 4 mm deep
4	Adapter
5	Plug not rotatable
6	LED signal strength indicator

Order information

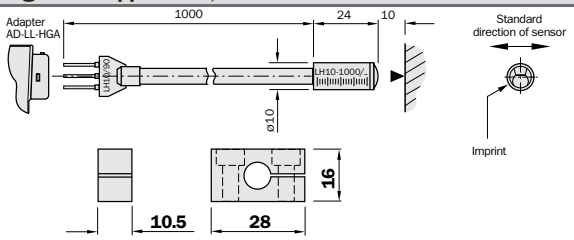
Type	Part no.
WLL 12-B5181	1 011 677
WLL 12-B5281	1 011 687
WLL 12-B5381	1 011 688
WLL 12-B5481	1 011 965

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

Technical data	WLL 12-	B5181	B5281	B5381	B5481
Sensing range	Dependent on fibers used, see page 1309				
Fiber optic adapters	See adapter selection table on page 1309				
Sensitivity	Adjustable				
Sensing range[1] (bgs model)	0.4 in (10 mm) ± 1 mm, fixed				
Light source[2], **light type**	LED, red light[3]				
	Infrared light[4]				
	Green light[5]				
Supply voltage V_S	10…30 V DC[6]				
Ripple[7]	≤ 5 V_{SS}				
Current consumption[8]	≤ 35 mA				
Switching outputs	PNP: Q/NPN: Q				
Output current I_A max.	100 mA				
Switching cycles	1300/s				
Response time[9]	360 µs				
Max. switching frequency[10]	1.3 kHz				
Operation mode	Light/dark switching via L/D control wire				
Connection type	Plug, M12 5-pin				
VDE protection class[12]	⧈				
Circuit protection[13]	A, B, C				
Enclosure rating	IP 67/NEMA 6				
Ambient temperature T_A	Operation -13…131° F (-25…55° C)				
	Storage -13…158° F (-25…70° C)				
Approximate weight	4.6 oz (130 g)				
Housing material	Die cast zinc				

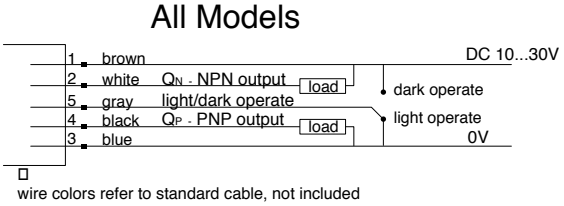
1) With LH 10-1000 fiber-optic cable
2) Average service life 100,000 h at T_A = 25° C
3) Preferably LL 3 fiber-optic cable
4) Preferably LM/LT fiber-optic cable
5) Preferably contrast detection
6) Limit values
7) May not exceed or fall short of V_S tolerances
8) Without load
9) Signal transit time with resistive load
10) With light/dark ratio 1:1
11) Plug facing backwards on request
12) Reference voltage 50 V DC
13) A = V_S connections reverse-polarity protected
B = Output Q and $\bar{Q}$ short-circuit protected
C = Interference pulse suppression

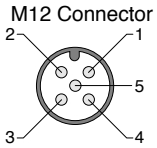
Proximity system with background suppression, WLL 12-B 5481 with LH 10-1000 fiber-optic cable



Sensing range:	10 mm (–1 mm), fixed
Light spot diameter:	approx. 2.5 x 3.5 mm
Switching hysteresis :	≤ 0.3 mm, based on standard white 90% to standard black 6%

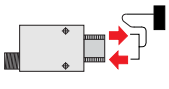
Connection diagram





WLL 1000

Fiber-Optic Sensors





dependent on fiber sensing range

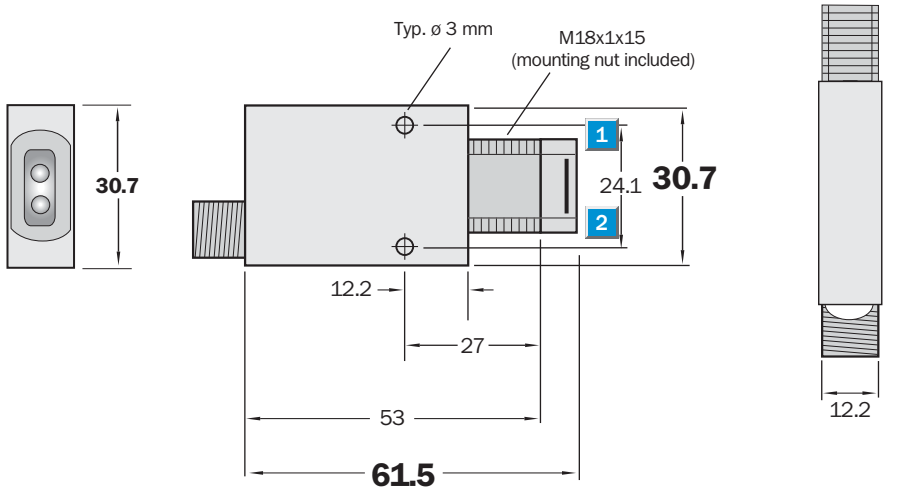
Highlights

- Fiber-optic sensor with teach-in
- Teach-in modes for easy detection
- Works with glass and plastic style fibers with included adapter
- Signal strength indicator
- Digital signal evaluation provides exceptional ambient light immunity
- Plastic housing is ultrasonically welded for outstanding durability
- Cable or quick disconnect versions available

WLL 1000



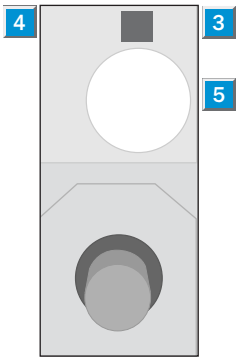
Dimensional drawing



dimensions in mm

Adjustments

All types



1 LED sender
2 Receiver
3 Output indicator
4 Signal strength indicator
5 Teach button

Order information

Type	Part no.
WLL 1000-P132	7 025 881
WLL 1000-P430	7 025 883
WLL 1000-P431	7 025 884
WLL 1000-N132	7 025 885
WLL 1000-N430	7 025 887
WLL 1000-N431	7 025 888

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

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Technical data	WLL 1000-	P132	P430	P431	N132	N430	N431
Sensing range, fixed	Depends on fiber-optic cable used	■	■	■	■	■	■
Typical range (through-beam)	3.3 ft (1 m)	■	■	■	■	■	■
Typical range (proximity)	5.9 in (150 mm)	■	■	■	■	■	■
Sensitivity adjustment	Adjustable via teach button	■	■	■	■	■	■
Light source[1], light type	LED, red, 660 nm	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■
Ripple[2]	≤ 5 V peak to peak	■	■	■	■	■	■
Current consumption[3]	≤ 50 mA	■	■	■	■	■	■
Switching outputs	PNP	■	■	■			
	NPN				■	■	■
Max. output current I_A	100 mA	■	■	■	■	■	■
Switching mode	Light or dark switching selectable via control wire L/D	■	■	■	■	■	■
Response time[4]	600 µs	■	■	■	■	■	■
Max. switching frequency[5]	840 Hz	■	■	■	■	■	■
Connection types	Cable 2 m	■			■		
	Plug, M12 4-pin		■			■	
	Cable 150 mm, with 4-pin plug			■			■
VDE protection class[6]	⧈	■	■	■	■	■	■
Circuit protection[7]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■	■	■	■
	Storage -40…167° F (-40… 75° C)	■	■	■	■	■	■
Approximate weight	3.5 oz (100 g)	■		■	■		■
	1.1 oz (30 g)		■			■	
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■

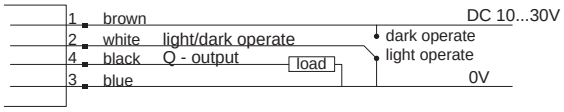
1) Average service life 50,000 h where $T_A = 25°$ C
2) May not exceed or fall short of V_S tolerances
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Reference voltage 50 V DC
7) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression

Teach-in function

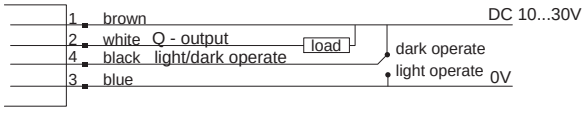
- **Programming via teach-in button.**
- **Simple programming:**
  Align through-beam fibers with no object present; or for proximity sensing, place object in front of fiber.
  Push button: finished.
  LED confirms the teach-in procedure.
- **Teach-in values can be stored.**
- **Two operating modes:**
  Default setting: short teach-in time (< 8 s);
  for standard applications;
  approx. double reserve via switching threshold;
  LED lights continuously.
  Precise setting: long teach-in time (> 8 s);
  for precise applications;
  small switching hysteresis;
  LED blinks.

Connection diagram

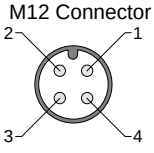
PNP Models



NPN Models



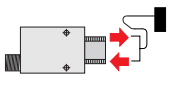
M12 Connector



wire colors refer to standard cable, not included with quick disconnect models

WLL 1000

Fiber-Optic Sensor






dependent on fiber sensing range

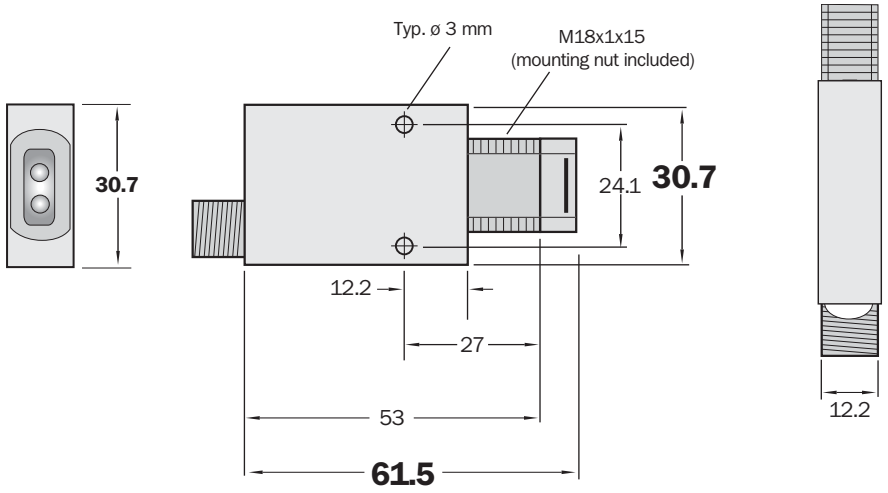
Highlights

- Fiber-optic sensor with teach-in
- Teach-in modes for easy detection
- Works with glass and plastic style fibers with included adapter
- Signal strength indicator
- Digital signal evaluation provides exceptional ambient light immunity
- Plastic housing is ultrasonically welded for outstanding durability
- Cable or quick disconnect versions available

WLL 1000



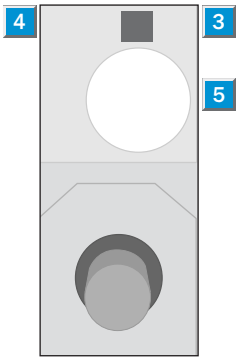
Dimensional drawing



dimensions in mm

Adjustments

All types



1 LED sender
2 Receiver
3 Output indicator
4 Signal strength indicator
5 Teach button

Order information

Type	Part no.
WLL 1000-P112	7 023 835
WLL 1000-P410	7 023 836
WLL 1000-P411	7 024 624
WLL 1000-N112	7 023 837
WLL 1000-N410	7 023 838
WLL 1000-N411	7 024 625

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

Technical data	WLL 1000-	P112	P410	P411	N112	N410	N411
Sensing range, fixed	Depends on fiber-optic cable used	■	■	■	■	■	■
Typical range (through-beam)	3.3 ft (1 m)	■	■	■	■	■	■
Typical range (proximity)	5.9 in (150 mm)	■	■	■	■	■	■
Sensitivity adjustment	Adjustable via teach button	■	■	■	■	■	■
Light source[1], light type	LED, infrared, 880 nm	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■
Ripple[2]	≤ 5 V peak to peak	■	■	■	■	■	■
Current consumption[3]	≤ 50 mA	■	■	■	■	■	■
Switching outputs	PNP	■	■	■			
	NPN				■	■	■
Max. output current I_A	100 mA	■	■	■	■	■	■
Switching mode	Light or dark switching selectable via control wire L/D	■	■	■	■	■	■
Response time[4]	600 µs	■	■	■	■	■	■
Max. switching frequency[5]	840 Hz	■	■	■	■	■	■
Connection types	Cable 2 m	■			■		
	Plug, M12 4-pin		■			■	
	Cable 150 mm, with 4-pin plug			■			■
VDE protection class[6]	□	■	■	■	■	■	■
Circuit protection[7]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Ambient temperature T_A	Operation -40…140° F (-40…60° C)	■	■	■	■	■	■
	Storage -40…167° F (-40… 75° C)	■	■	■	■	■	■
Approximate weight	3.5 oz (100 g)	■		■	■		■
	1.1 oz (30 g)		■			■	
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■

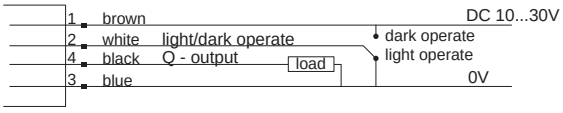
1) Average service life 50,000 h where $T_A = 25°$ C
2) May not exceed or fall short of V_S tolerances
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Reference voltage 50 V DC
7) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression

Teach-in function

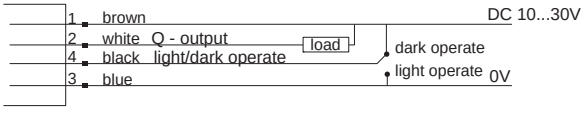
- **Programming via teach-in button.**
- **Simple programming:**
  Align through-beam fibers with no object present; or for proximity sensing, place object in front of fiber.
  Push button: finished.
  LED confirms the teach-in procedure.
- **Teach-in values can be stored.**
- **Two operating modes:**
  Default setting: short teach-in time (< 8 s);
  for standard applications;
  approx. double reserve via switching threshold;
  LED lights continuously.
  Precise setting: long teach-in time (> 8 s);
  for precise applications;
  small switching hysteresis;
  LED blinks.

Connection diagram

PNP Models

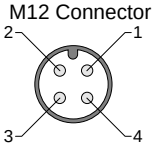


NPN Models



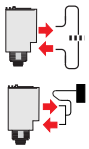
wire colors refer to standard cable, not included with quick disconnect models

M12 Connector



WLL 2000

Fiber-Optic Sensors







dependent on fiber sensing range

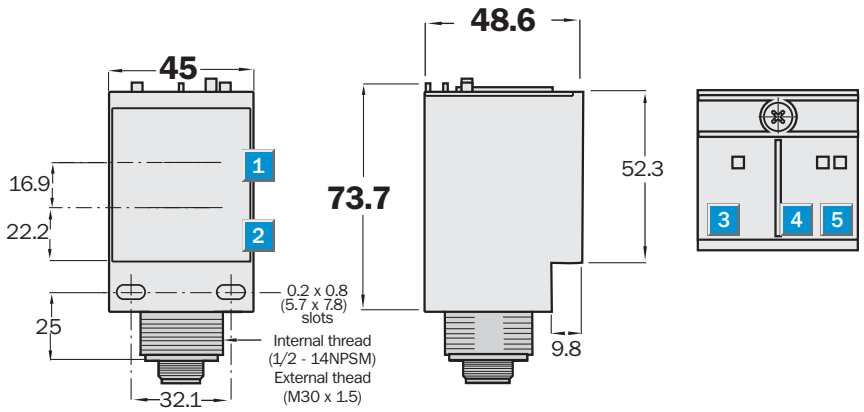
Highlights

- Rugged plastic housing
- Standard mounting for your existing applications
- Compatible with industry standard plastic and glass fibers
- Signal strength indicator
- Crosstalk immunity
- Immune to ambient light
- Red light for easy alignment
- Cable or M12 quick disconnect versions

WLL 2000

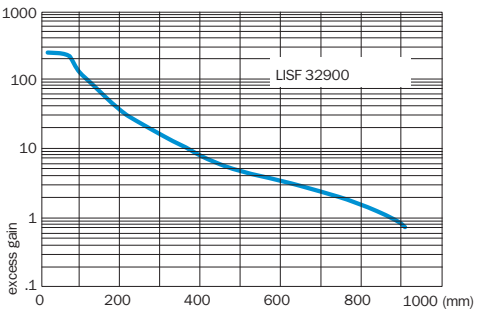


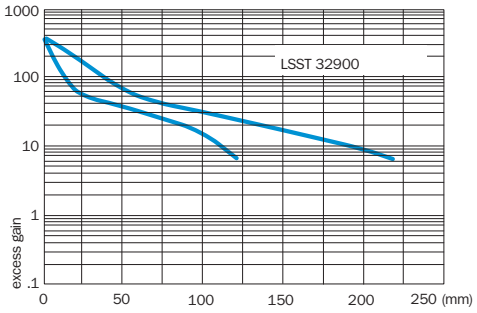
Dimensional drawing



dimensions in mm

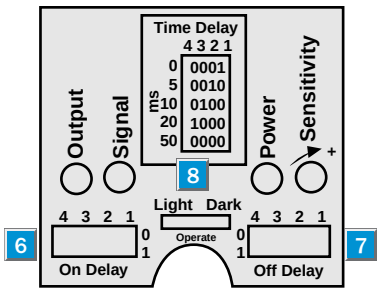
Excess gain





Adjustments

All types



1 LED sender
2 Receiver
3 Power indicator
4 LED signal strength indicator
5 Output indicator
6 On delay switch
7 Off delay switch
8 Light/dark switch

Order information

Type	Part no.
WLL 2000-B1302	7 023 068
WLL 2000-B1312	7 023 069
WLL 2000-B1322	7 023 070
WLL 2000-B5300	7 023 071
WLL 2000-B5310	7 023 072
WLL 2000-B5320	7 023 073
WLL 2000-B4300	7 024 462

Accessories

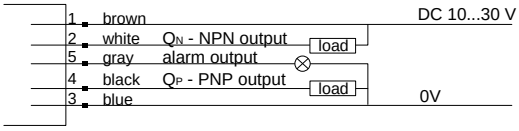
	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

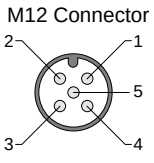
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Technical data	WLL 2000-	B1302	B1312	B1322	B5300	B5310	B5320	B4300
Sensing range, adjustable	Depends on fiber-optic cable used	■	■	■	■	■	■	■
Light source[1], **light type**	LED, red, 660 nm	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC	■	■	■	■	■	■	■
Ripple[3]	≤ 5 V	■	■	■	■	■	■	■
Current consumption[4]	≤ 80 mA	■	■	■	■	■	■	■
Switching outputs	PNP or NPN, Q and $\overline{Q}$	■	■	■	■	■	■	■
Voltage drop (Max.)	2 V	■	■	■	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■	■
Response time[5]	≤ 1 ms	■	■	■	■	■	■	■
Max. switching frequency[6]	500 Hz	■	■	■	■	■	■	■
Alarm output	PNP	■	■	■	■	■	■	
Time delay settings	0, 5, 10, 20 or 50 ms		■	■		■	■	
OFF delay			■			■		
ON/OFF delay				■			■	
Connection types	Cable 2 m, PVC	■	■	■				
	Plug, M12 5-pin				■	■	■	
	Plug, M12 4-pin							■
VDE protection class[8]	□	■	■	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -13…104° F (-25…40° C)	■	■	■	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■	■
Approximate weight	5.3 oz (150 g)	■	■	■	■	■	■	■
Housing material	Glass fiber reinforced plastic	■	■	■	■	■	■	■

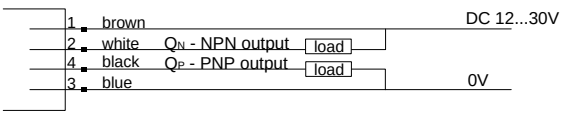
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

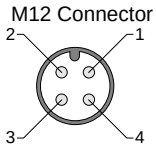
Connection diagram





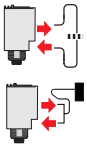
wire colors refer to standard cable, not included with quick disconnect models





WLL 2000

Fiber-Optic Sensors





dependent on fiber sensing range

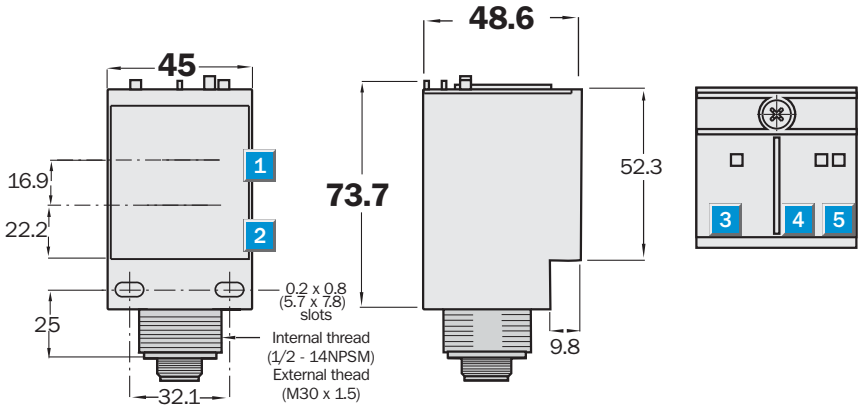
Highlights

- Rugged plastic housing
- Standard mounting for your existing applications
- Compatible with industry standard glass and plastic fibers
- Signal strength indicator
- Crosstalk immunity
- Selectable time delays
- Red light for easy alignment
- Cable or mini quick disconnect versions

WLL 2000



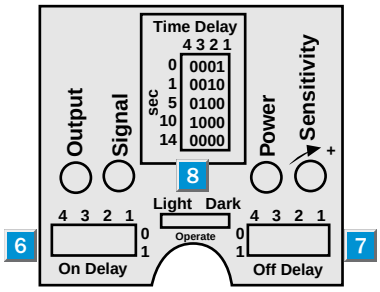
Dimensional drawing



dimensions in mm

Adjustments

All types



1 LED sender
2 Receiver
3 Power indicator
4 LED signal strength indicator
5 Output indicator
6 On delay switch
7 Off delay switch
8 Light/dark switch

Order information

Type	Part no.
WLL 2000-R1302	7 023 074
WLL 2000-R1312	7 023 075
WLL 2000-R1322	7 023 076
WLL 2000-R5300	7 023 077
WLL 2000-R5310	7 023 078
WLL 2000-R5320	7 023 079

Accessories

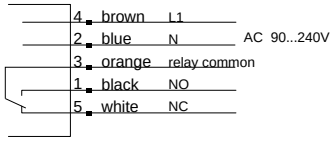
	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

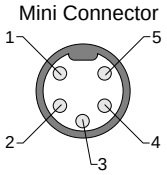
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Technical data	WLL 2000-	R1302	R1312	R1322	R5300	R5310	R5320
Sensing range, adjustable	Depends on fiber-optic cable used	■	■	■	■	■	■
Light source[1], light type	LED, red, 660 nm	■	■	■	■	■	■
Supply voltage V_S	90…240 V AC	■	■	■	■	■	■
Current consumption[4]	≤ 6 W	■	■	■	■	■	■
Switching outputs	Relay, SPDT isolated	■	■	■	■	■	■
Switching voltage (Max.)	265 V	■	■	■	■	■	■
Switching current (Max.)	3 A	■	■	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■	■	■
Response time[5]	≤ 10 ms	■	■	■	■	■	■
Max. switching frequency[6]	10 Hz	■	■	■	■	■	■
Time delay settings	0, 1, 5, 10 or 14 s	■	■	■	■	■	■
OFF delay			■			■	
ON/OFF delay				■			■
Connection types	Cable 2 m, PVC	■	■	■			
	Plug, mini 5-pin				■	■	■
VDE protection class[8]	□	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Ambient temperature T_A	Operation -13…104° F (-25…40° C)	■	■	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■
Approximate weight	5.3 oz (150 g)	■	■	■	■	■	■
Housing material	Glass fiber reinforced plastic	■	■	■	■	■	■

1) Average service life 100,000 h at $T_A = 25°$ C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram





wire colors refer to standard cable, not included with quick disconnect models

WLL 2000

Fiber-Optic Sensor-Solid State



dependent on fiber

sensing range

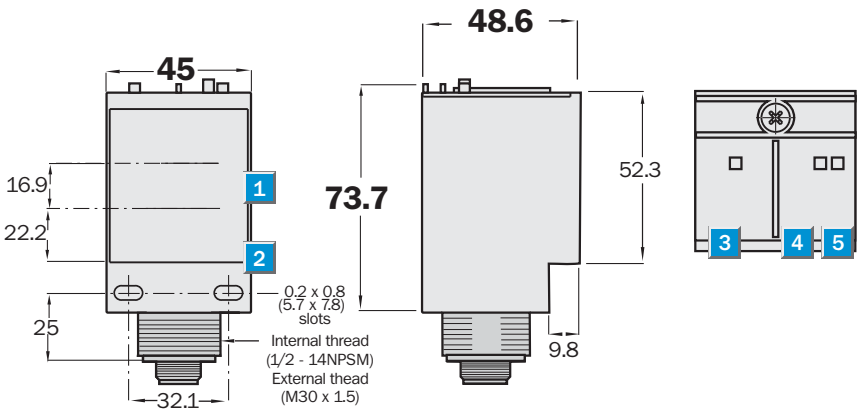
Highlights

- Rugged plastic housing
- Standard mounting for your existing applications
- Compatible with industry standard glass and plastic fibers
- Signal strength indicator
- Crosstalk immunity
- Selectable time delays
- Red light for easy alignment
- Cable or mini quick disconnect versions

WLL 2000



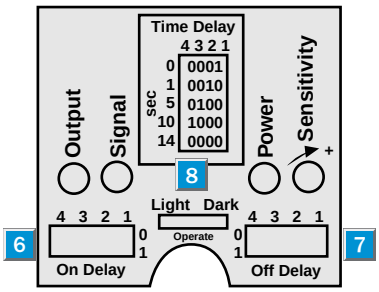
Dimensional drawing



dimensions in mm

Adjustments

All types



1 LED sender
2 Receiver
3 Power indicator
4 LED signal strength indicator
5 Output indicator
6 On delay switch
7 Off delay switch
8 Light/dark switch

Order information

Type	Part no.
WLL 2000-M1302	7 023 417
WLL 2000-M1312	7 023 416
WLL 2000-M1322	7 023 415
WLL 2000-M4300	7 023 426
WLL 2000-M4310	7 023 425
WLL 2000-M4320	7 023 424
WLL 2000-M9300	7 023 429
WLL 2000-M9310	7 023 428
WLL 2000-M9320	7 023 427

Accessories

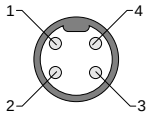
	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

Technical data	WLL 2000-	M1302	M1312	M1322	M4300	M4310	M4320	M9300	M9310	M9320
Sensing range, adjustable	Depends on fiber-optic cable used	■	■	■	■	■	■	■	■	■
Light source[1], light type	LED, red, 660 nm	■	■	■	■	■	■	■	■	■
Supply voltage V_S	90…240 V AC	■	■	■	■	■	■	■	■	■
Current consumption[4]	≤ 6 W	■	■	■	■	■	■	■	■	■
Switching outputs	FET	■	■	■	■	■	■	■	■	■
Switching voltage (Max.)	240 V	■	■	■	■	■	■	■	■	■
Switching current (Max.)	150 mA	■	■	■	■	■	■	■	■	■
Operation mode	Light/dark switching via switch	■	■	■	■	■	■	■	■	■
Response time[5]	≤ 2 ms	■	■	■	■	■	■	■	■	■
Max. switching frequency[6]	250 Hz	■	■	■	■	■	■	■	■	■
Time delay settings	0, 1, 5, 10 or 14 s		■	■		■	■		■	■
OFF delay			■			■			■	
ON/OFF delay				■			■			■
Connection types	Cable 2 m, PVC	■	■	■				■	■	■
	Plug, mini 4-pin				■	■	■			
	Plug, micro 4-pin	■	■	■	■	■	■	■	■	■
VDE protection class[8]	⧈	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation -13…104° F (-25…40° C)	■	■	■	■	■	■	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■	■	■	■	■	■	■
Approximate weight	5.3 oz (150 g)	■	■	■	■	■	■	■	■	■
Housing material	Glass fiber reinforced plastic	■	■	■	■	■	■	■	■	■

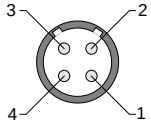
1) Average service life 100,000 h at $T_A = 25°$ C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

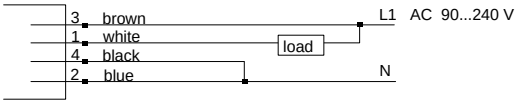
Mini Connector



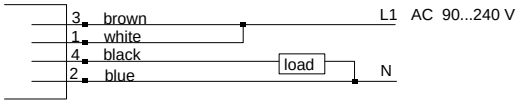
Micro Connector



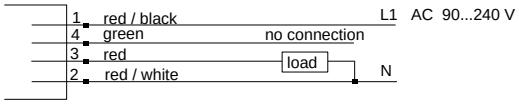
Mini / Cable Versions



-OR-



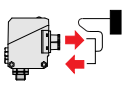
Micro Versions



wire colors refer to standard cable, not included with quick disconnect models

WLL 260

Fiber-Optic Sensors






dependent on fiber sensing range

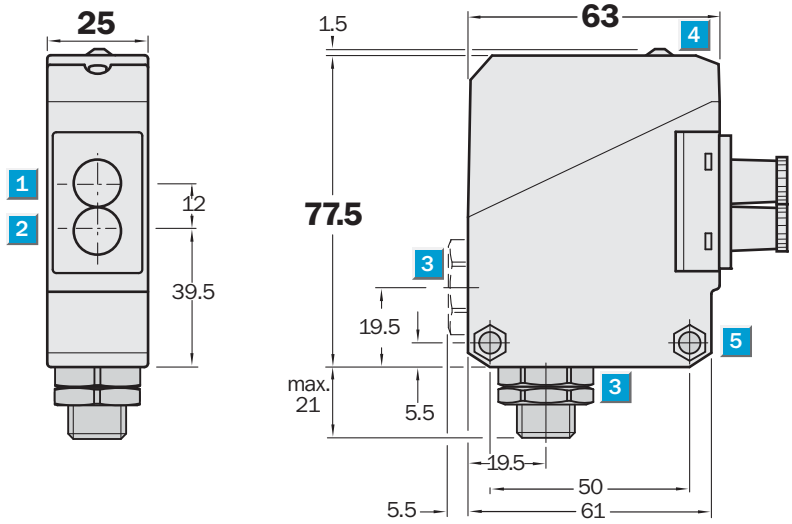
Highlights

- Rugged plastic housing
- Signal strength indicator
- Adjustable sensitivity
- Terminal chamber for connection flexibility
- Alarm output and test input
- Glass fibers available with many tip configurations

WLL 260



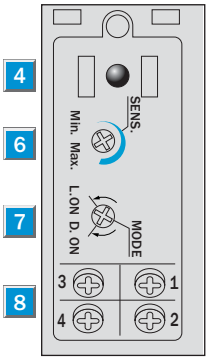
Dimensional drawing



dimensions in mm

Adjustments

All types



1 Center of optical axis, receiver
2 Center of optical axis, sender
3 Cable entry gland 1/2 in PF thread for cable diameters from 6 to 10 mm optionally at bottom or rear; or M12 equipment plug, bottom
4 LED signal strength indicator, red
5 Through hole Ø 5.2 mm on both sides for M5 hex nut
6 Sensitivity adjustment
7 Light/dark rotary switch
L.ON = light switching, D.ON = dark switching
8 Terminals

Order information

Type	Part no.
WLL 260-F240	6 020 064
WLL 260-F440	6 020 065
WLL 260-E240	6 020 063

Accessories

	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

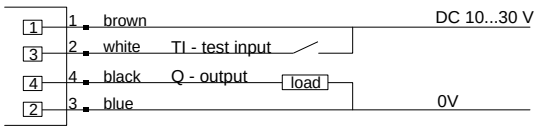
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Technical data	WLL 260-	F240	F440	E240
Sensing range	Depends on fiber-optic cable used	■	■	■
Typical range[1] (through-beam)	0…31.5 in (0…800 mm)	■	■	■
Typical range (proximity)	0…2.6 in (0…65 mm)	■	■	■
	0…4.3 in (0…110 mm) w. special fiber-optic cable	■	■	■
Sensitivity	Adjustable, potentiometer 270°	■	■	■
Light source[2]**, light type**	LED, red light	■	■	■
Light spot diameter	Depends on sensing range	■	■	■
Divergence angle of LL3 fiber-optic	Approx. 65°	■	■	■
Supply voltage V_S	10…30 V DC[3]	■	■	■
Ripple[4]	≤ 5 V_{SS}	■	■	■
Current consumption[5]	≤ 35 mA	■	■	■
Switching outputs	PNP, open collector: Q	■	■	
	NPN, open collector: Q			■
Output current I_A max.	100 mA	■	■	■
Operation mode	Light/dark switching via rotary switch	■	■	■
Response time[6]	≤ 0.7 ms	■	■	■
Max. switching frequency[7]	700 Hz	■	■	■
Test input "TE" sender off	PNP: TE to + V_S	■	■	
	NPN: TE to 0 V			■
Connection types	Terminal chamber	■		■
	Plug, M12 4-pin		■	
VDE protection class[8]	⧈	■	■	■
Circuit protection[9]	A, B, C, D	■	■	■
Enclosure rating	IP 66/NEMA 4	■	■	■
Ambient temperature T_A	Operation -13…131° F (-25…55° C)	■	■	■
	Storage -40…158° F (-40…70° C)	■	■	■
Approximate weight	2.8 oz (120 g)	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■

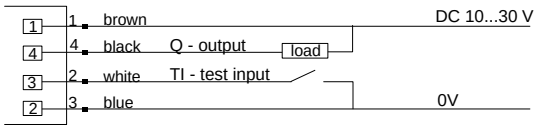
1) Object with 90% remission (based on standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) Must be within V_S tolerances
5) Without load
6) With resistive load
7) With light/dark ratio 1:1
8) Reference voltage 50 V DC
9) A = V_s connections reverse-polarity protected
B = Inputs/outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

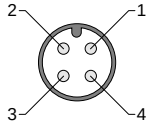
PNP Models



NPN Models



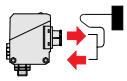
M12 Connector



wire colors refer to standard cable, not included

WLL 260

Fiber-Optic Sensors





dependent on fiber sensing range

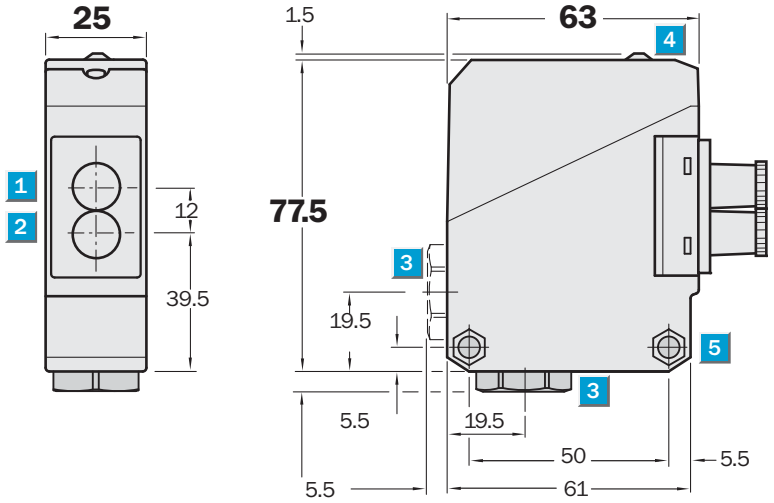
Highlights

- Rugged plastic housing
- Signal strength indicator
- Adjustable sensitivity
- Terminal chamber for connection flexibility
- Wide range supply voltage
- Glass fibers available with many tip configurations
- Available with off delay, on delay and one-shot timing

WLL 260



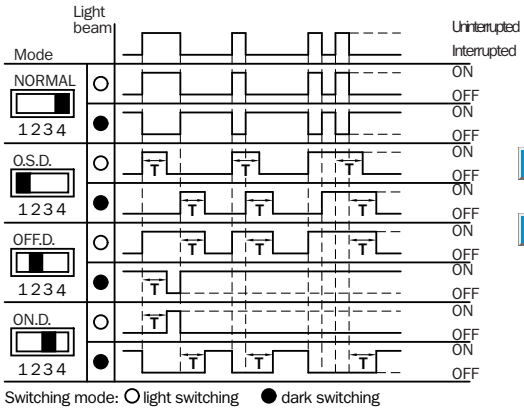
Dimensional drawing



dimensions in mm

Time delay

t = 0.1 – 5 s

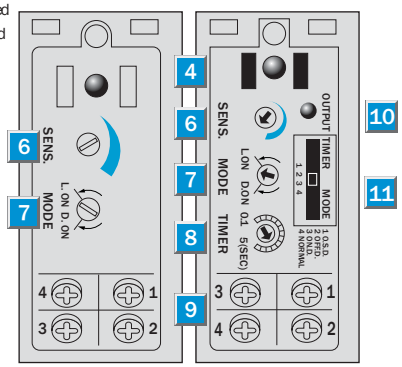


Switching mode: ○ light switching ● dark switching

Switching mode: ❍ light switching
● dark switching

Adjustments

WLL 260-S240 | WLL 260-R240



1 Center of optical axis, receiver
2 Center of optical axis, sender
3 Cable entry gland 1/2 in PF thread for cable diameters from 6 to 10 mm optionally at bottom or rear
LED signal strength indicator, red
4 Through hole Ø 5.2 mm on both sides for M5 hex nut
5 Sensitivity adjustment
6 Light/dark rotary switch
7 L.ON = light switching, D.ON = dark switching
8 Time range control
9 Terminals
10 LED output indicator (red)
11 Time delay selector switch
O.S.D. = One Shot OFF.D. = OFF delay
ON.D. = ON delay Normal = No delay

Order information

Type	Part no.
WLL 260-S240	6 009 504
WLL 260-R240	6 009 503

Accessories

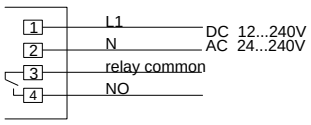
	page
Mounting systems	1234
Fiber-optic cables	1178

7028071 - © 2008 SICK, Inc.

Technical data		WLL 260-	S240	R240								
Sensing range		Depends on fiber-optic cable used										
Typical range[1] (Through-beam)		0…31.5 in (0…800 mm)										
Typical range (Proximity)		0…2.6 in (0…65 mm)										
With special fiber-optic cable		0…4.3 in (0…110 mm)										
Sensitivity		Adjustable, potentiometer 270°										
Light source[2], **light type**		LED, red light										
Light spot diameter		Depends on sensing range										
Divergence angle of LL3 fiber-optic		Approx. 65°										
Supply voltage V_S[3]		12…240 V DC										
		24…240 V AC										
Power consumption		≤ 5 VA										
Switching output		Relay, SPST, electrically isolated										
Switching current I_A max.[4]		3 A/240 V AC; 3 A/30 V DC										
Operation mode		Light/dark switching via rotary switch										
Response time		≤ 20 ms										
Max. switching frequency[5]		25 Hz										
Time delays		With indicator LED: switching										
		output active										
Switch position:	«1 O.S.D.»	1: «One shot»										
	«2 OFF.D.»	OFF delay t_{OFF}										
	«3 ON.D.»	ON delay t_{ON}										
	«4 Normal»	No delay										
Time range		Adjustable, 0.1…5 s;										
		potentiometer 270°										
Connection type		Terminal chamber										
VDE protection class[6]		□										
Circuit protection[7]		A, C										
Enclosure rating		IP 66/NEMA 4										
Ambient temperature T_A		Operation -13…131° F (-25…55° C)										
		Storage -40…158° F (-40…70° C)										
Approximate weight		2.8 oz (120 g)										
Housing material		Glass fiber reinforced ABS										

1) Object with 90% remission (based on standard white DIN 5033)
2) Average service life 100,000 h at T_A = 25° C
3) ± 10%
4) Provide suitable spark suppression for inductive or capacitive loads
5) With light/dark ratio 1:1
6) Reference voltage 50 V DC
7) A = V_S connections reverse-polarity protected
C = Interference suppression

Connection diagram



VLL 18

Fiber-Optic Sensor



0...7.9 in (0...200 mm)
0...2 in (0...50 mm)

sensing range (dependent on fiber)

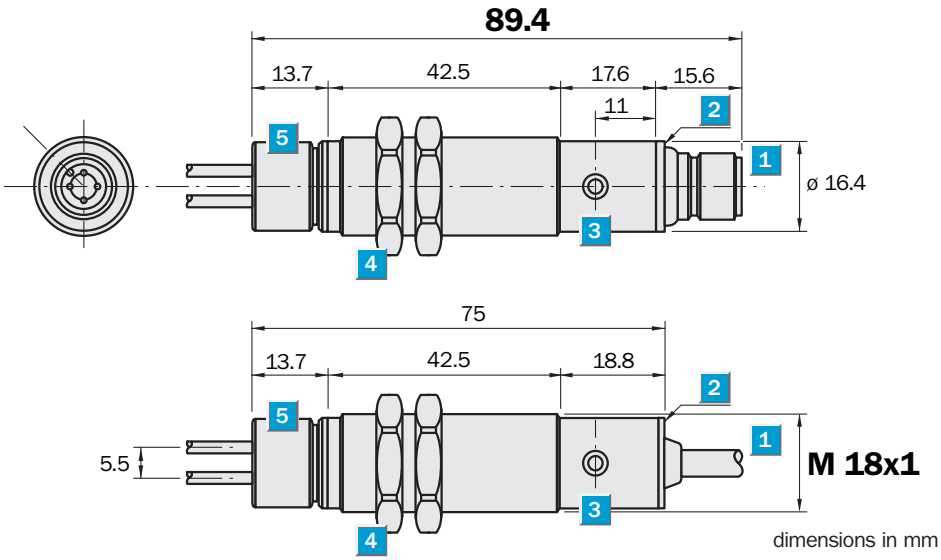
Highlights

- Appropriate for the LL 3 fiber-optic cable series
- Adjustable sensitivity: per teach-in at the push of a button or per control input C
- Simple handling

VLL 18



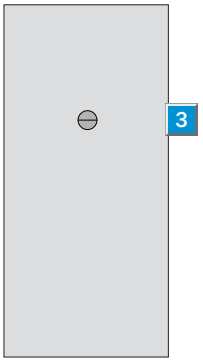
Dimensional drawing



dimensions in mm

Setting options

All types



1 Connection cable or plug M 12, 4-pin
2 Yellow LED indicator:
– lights continuously:
reception signal > reserve factor 2
– blinks: reception signal < reserve factor 2
but > switching threshold 1
3 Sensitivity control (Teach-in button)
4 Fastening nuts (2x); SW 24, metal
5 Locking nut, fiber-optic cable mounting:
turn left = unlock; turn right = lock.
Insert LL 3 fiber-optic cable until it catches.
Caution: Only loosen nut; do not remove it.
IP protection only with adapted fiber-optic cable!

Order information

Type	Part no.
VLL 18T-4P3212	6 026 482
VLL 18T-4P3240	6 026 483
VLL 18T-4N3212	6 026 480
VLL 18T-4N3240	6 026 481

Accessories

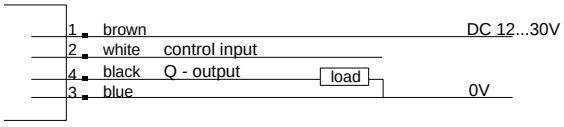
	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

Technical data	VLL 18T-4	P 3212	P 3240	N 3212	N 3240
Suitable fiber-optic cables	LL3 plastic fiber-optic cable series	■	■	■	■
Scanning ranges SR	Dependent on fiber-optic cable used	■	■	■	■
Recommended operating range	0…7.9 in (0…200 mm) (through-beam system) [1]	■	■	■	■
Recommended operating distance [2]	0…2 in (0…50 mm) (proximity system)	■	■	■	■
Sensitivity setting	Manual, per teach-in button	■	■	■	■
	Electronic, per control input C (0 V)[3]	■	■	■	■
Light source[4], light type	LED, visible red light	■	■	■	■
Light spot diameter LL 3	Dependent on sensing range SR	■	■	■	■
Dispersion angle LL 3 fiber-optic cable	Approx. 65° [5]	■	■	■	■
Supply voltage V_S	10…30 V DC[6]	■	■	■	■
Ripple[7]	≤ 10 %	■	■	■	■
Current consumption[8]	≤ 20 mA	■	■	■	■
Switching outputs	Q: PNP	■	■		
	Q: NPN			■	■
Output current I_A max.	≤ 100 mA	■	■	■	■
Switching mode [3]	Light/dark switching, selectable	■	■	■	■
Response time[9]	≤ 625 µs	■	■	■	■
Switching frequency max.[10]	800/s	■	■	■	■
Connection type	Cable[11] PVC, 2 m, 4 x 0.34 mm², Ø 4.7 mm	■		■	
	Plug, M12 4-pin		■		■
VDE protection class [12]	□	■	■	■	■
Enclosure rating [13]	IP 67	■	■	■	■
Circuit protection[14]	A, B, C, D	■	■	■	■
Ambient temperature T_A	Operation -13…158° F (-25…70° C)	■	■	■	■
	Storage -13…158° F (-25…70° C)	■	■	■	■
Approximate weight	4.9 oz (140 g)	■		■	
	2.3 oz (65 g)		■		■
Housing material	Nickel-plated brass/PBT	■	■	■	■

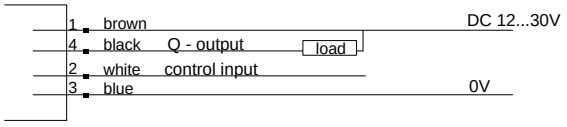
1) With front lenses 0 ... 2000 mm
2) Object with 90 % remission (based on standard white to DIN 5033); 100 x 100 mm
3) Control input C, programming:
– Switching type L.ON/D.ON and
– External Teach-in
C = open (not assigned): light-switching L.ON
C = + V_S: dark-switching D.ON
C = 0 V: sensitivity setting per "external Teach-in" active
4) Average service life 100.000 h at T_A = +25 °C
5) See LL 3 data for deviations
6) Limit values
7) May not exceed or fall short of V_S tolerances
8) Without load
9) With resistive load
10) With light/dark ratio 1:1
11) Do not bend below 0 °C
12) Reference voltage 50 V
13) Only with correct adaptation of the LL 3 fiber-optic cable
14) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

Connection diagram

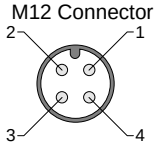
PNP



NPN



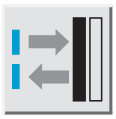
M12 Connector



wire colors refer to standard cable, not included

C = not connected L.ON
C = + V_S D.ON
C = 0 V teach-in active

Zero Pressure Accumulation



Photoelectric proximity sensors with background suppression (BGS)

- Detection of objects within a defined sensing range. Objects beyond this range are not detected.



Photoelectric reflex sensors

- Sender and receiver in one housing
- Different reflector sizes for different ranges and object sizes
- Long sensing ranges
- Polarization filters also allow reflective objects to be detected
- Automatic sensitivity adjustment with teach-in sensors

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WTR2 with M12 connector	918
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ZoneControl Power Supply	926

Theory of Operation...Zero Pressure Accumulation

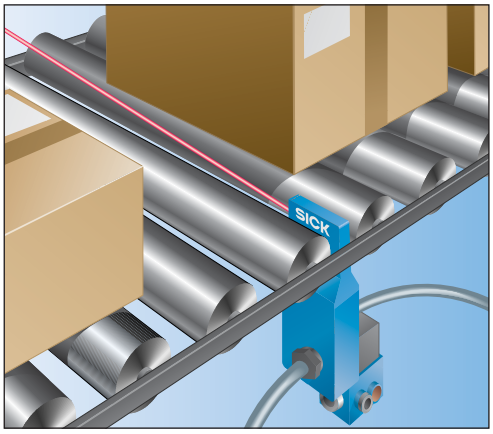
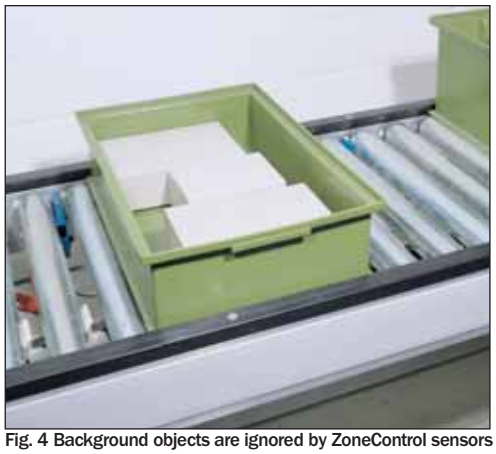


Fig. 1 WTR sensor mounted between the conveyor rollers


Fig. 2 ZoneControl sensors are ideal in conveyor applications


Fig. 3 Checking and triggering accumulation of conveyed objects, as needed


Fig. 4 Background objects are ignored by ZoneControl sensors

About *ZoneControl*™ Sensors

What is an accumulation conveyor?
An accumulation conveyor is a transportation conveyor designed to efficiently stage product when demand is low and deliver product when demand is high. An accumulation conveyor acts as the shock absorber in any distribution warehouse, logistics center or work-in-process operation.

What is ZPA?
Zero Pressure Accumulation (ZPA) is a more specific reference to an accumulation conveyor. A ZPA conveyor is designed to accumulate and release product with zero forward pressure on product. This results in a decreased risk of product damage or derailment.

What is ZoneControl?
ZoneControl is the SICK family of ZPA control solutions. *ZoneControl* consist of integrated ZPA systems designed for accumulation conveyors and all the necessary peripherals and accessories to support the system. The *ZoneControl* family of products offers multiple ZPA solutions, all of which are similar in their function, but accommodate different types of conveyors by utilizing a variety of mounting configurations.

What is an integrated solution?
A ZPA control system typically consists of four primary components: a ZPA logic circuit, a pneumatic valve or other discrete output for motor control, a sensing device and daisy chain cabling. Integrated ZPA solutions generally integrate three or four of the primary components. Solutions which integrate only three of the components will have connectivity for the fourth component, usually the sensing device or pneumatic valve.

How is ZPA control accomplished?
Accumulation conveyors are designed with integral zones that are independently controlled. The individually controlled zones are activated or deactivated according to the control logic circuit and sensor status at the local and neighboring zones. There are two basic types of ZPA control: pneumatic and electric.

Pneumatic Control – AtoB and AtoD
Accumulation conveyors that pneumatically actuate the drive system utilize small air bladders, often called pucks, to actuate the conveyor drive and/or brake system. When the logic circuit generates an output, a pneumatic solenoid valve is energized causing the valve to open or close. An open valve will allow air to flow and inflate the air bladder, a closed valve will prevent airflow to the bladder causing the bladder to exhaust and deflate. The air bladder, when inflated, will elevate a drive or brake system against the conveyor transportation medium respectively activating or deactivating the zone.

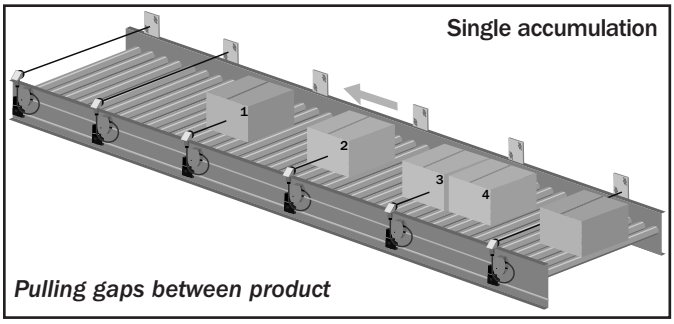
A system that activates or drives the conveyor with airflow to the air bladder is referred to as air-to-drive (AtoD). A pneumatic system that deactivates or brakes the conveyor with airflow to the air bladder is referred to as air-to-brake (AtoB).

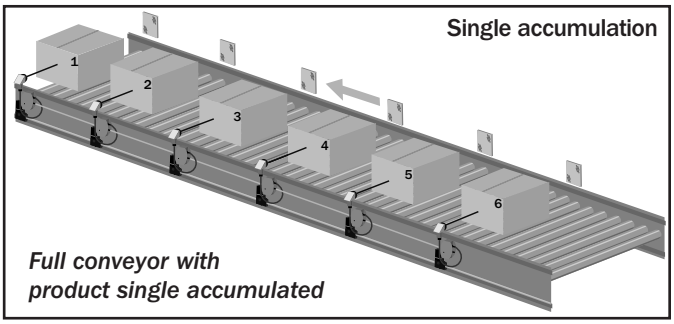
Electric Control
An electrically controlled accumulation conveyor utilizes individual electric motors to drive each zone. The logic circuit generates a discrete output to an electric motor drive circuit that activates the electric motor, in turn activating the zone.

What accumulation modes are available with ZoneControl?
The most typical accumulation modes are single and slug accumulation; occasionally an accumulation time delay is used to manipulate product accumulation.

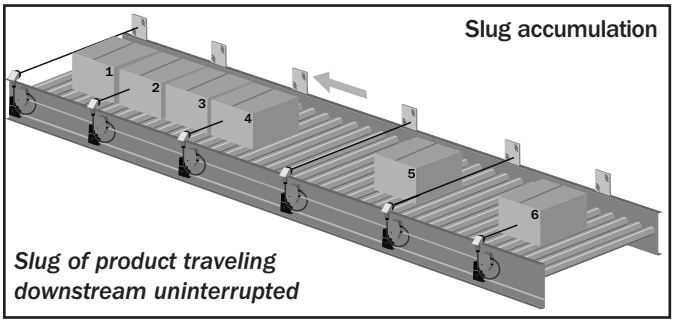
Theory of Operation...Zero Pressure Accumulation

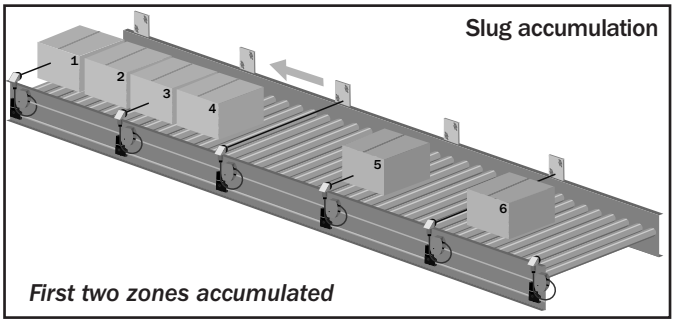
Single accumulation will not allow a large block or slug of product to travel from the in-feed zone of an accumulation conveyor to the discharge zone without adding a gap between packages. Single accumulation will accumulate (deactivate) the upstream zone of any two consecutive zones that are detecting product, or in other words, any zone will accumulate when it is detecting product AND the downstream zone is detecting product. The result is a zone length gap between packages. The discharge zone does not have a downstream zone, which is effectively a full downstream zone; therefore, the discharge zone will accumulate when it receives a package.





Slug accumulation will allow a large block or slug of product to travel uninterrupted from the in-feed zone of an accumulation conveyor to the furthest downstream zone, typically the discharge zone. The conveyor will not accumulate (deactivate) any zone until product reaches the furthest downstream zone at which time that zone will accumulate and the immediate upstream zone effectively becomes the furthest downstream zone.





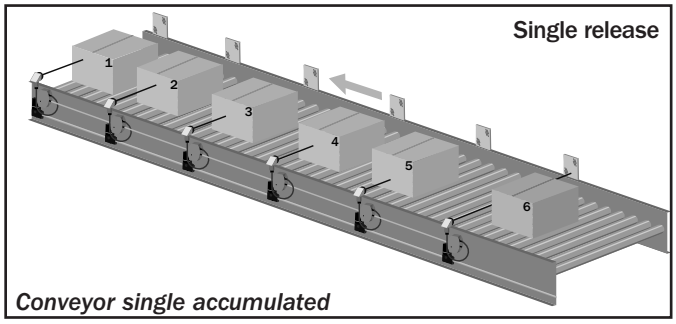
Adjustable accumulation utilizes an adjustable accumulation time delay, that effectively delays package detection, which varies the accumulation function from single to slug. When the accumulation time delay is set to zero seconds, any package detection will be immediately recognized, causing the upstream zone to accumulate (deactivate) in the same manner as single accumulation. As the time delay is increased, smaller packages will not be recognized and will advance until stopped by accumulated product downstream. As the stopped packages back up into the sensing device, the accumulation time delay will time out causing the upstream zone to accumulate in a manner similar to slug accumulation.

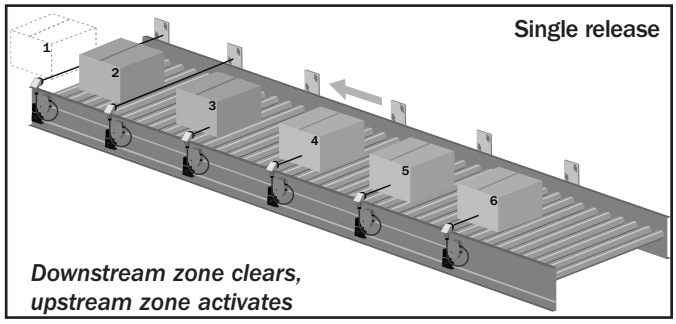
What release modes are available with ZoneControl?
The most typical release modes are single and slug release; occasionally time delays are used to manipulate product release.

In **single release** mode, a given zone will not release (activate) until the sensing device in the downstream zone has been cleared of packages. Single release can be initiated by applying an electrical release signal at the discharge zone or removing packages in the discharge zone.

Applying an electrical single release signal at the discharge zone will act as an empty downstream zone that will cause the discharge zone to release; the immediate upstream zone will not release until the discharge zone has cleared.

Removal of packages from the discharge zone will cause that zone and the immediate upstream zone to release. Subsequent upstream zones will not release until the immediate downstream zone has cleared.

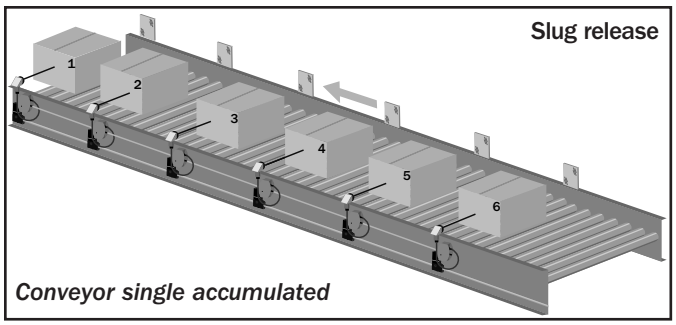


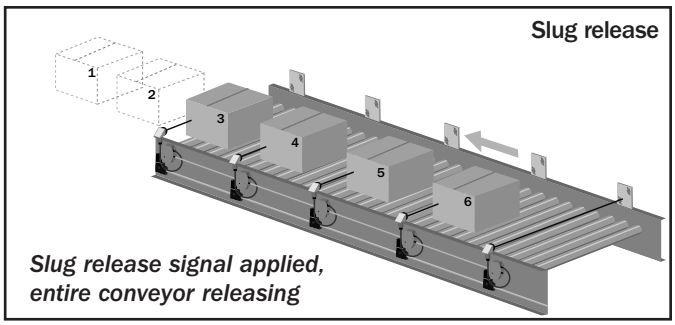


Theory of Operation...Zero Pressure Accumulation

Single release time delay will add an additional gap between zones as they are released. The additional gap is directly proportional to the time delay selected.

In **slug release** mode, all zones will be activated simultaneously, regardless of sensor status, for as long as the slug release signal is applied. Slug release is initiated by applying an electrical signal at any zone using a *ZoneControl* T-cable or Zone Interface Module (ZIM).





Slug release time delay will inflict a small gap between zones as they are released. The small gap is directly proportional to the time delay selected. When applying a *ZoneControl* solution with slug release time delay, the release signal must be applied at the discharge zone.

When are single and slug modes most commonly used?
Single accumulation and release is most effective when extremely high throughput is not necessary or the risk of forward pressure is not acceptable. Large or heavy products are frequently accumulated and released in single mode.
Slug accumulation and release is most effective when extremely high throughput is desired and instances of low momentary forward pressure can be tolerated. High speed conveying with small to medium package sizes are often accumulated and released in slug mode.

What is slug release termination?
In some applications it is necessary to terminate a slug release signal after a determined number of zones. Slug release termination interrupts the slug release signal by opening the slug release wire. Slug release termination is accomplished with an in-line cable that does not pass the slug signal; all other conductors are passive. Or, slug release termination can be accomplished with a ZIM in which the user can remove a jumper to interrupt the slug release signal. The slug termination cable and ZIM are offered in the *ZoneControl* family of products.

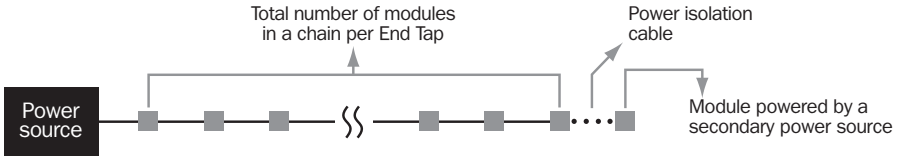
Power Isolation
Power isolation is necessary when more than one power supply is used on a ZPA control system. Power isolation interrupts the positive voltage supply line between two ZPA chains on separate power supplies. Power isolation is accomplished with an in-line cable that does not pass the positive supply voltage; all other conductors are passive. See examples on the following page.

Modules per Tap
There is a limit to the number of *ZoneControl* devices that can be connected in series (chain) before an additional power supply and power isolation unit are required. This limit is known as the “Modules per Tap” specification. The number of Modules per Tap will vary from one ZPA solution to another and is affected primarily by the power source, pneumatic valve or output load, and daisy chain cabling. There are three common wiring schemes for ZPA systems: End Tap, Center Tap and Dual Center Tap.

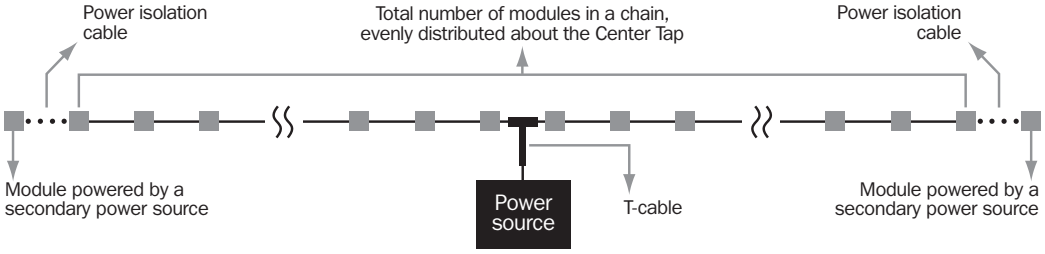
All *ZoneControl* Modules per Tap specifications are calculated using a 100 W power source, 24 and 28 V DC and 1 m power supply cable for End Tap and Center Tap. Dual Center Tap is calculated using the appropriate power supply cable length for the chain.

Theory of Operation...Zero Pressure Accumulation

The End Tap wiring scheme positions the power source at one end of a ZPA chain, typically the discharge end. A short power cable is used to connect the power source to the first ZPA module. When using End Tap wiring a 28 V DC power source will accommodate the most modules per chain. End Tap wiring is most effective when the ZPA system requires a relatively small number of modules or

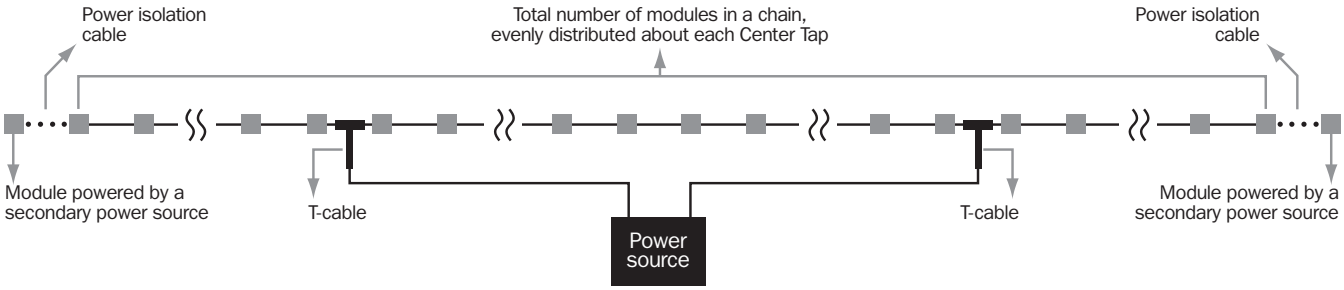


when a small number of modules remain unpowered on a large ZPA system that uses Center Tap wiring.
The Center Tap wiring scheme positions the power source at the center point of a ZPA chain. A short cable with an attached T-cable is used to connect the power source to the ZPA chain between two modules. This Center Tap supplies power to the chain in both directions. The Center Tap configuration is the simplest and most common installation for wiring the power source to ZPA systems.



The Dual Center Tap wiring scheme positions the power source at the center point of a ZPA chain. Two long cables with attached T-cables are used to apply a Center Tap at the mid point between the power source and the end of the ZPA chain in both directions, hence, Dual Center Tap. When using Dual Center Tap wiring, a 24 V DC power source will accommodate the most modules per chain.

Zone Size

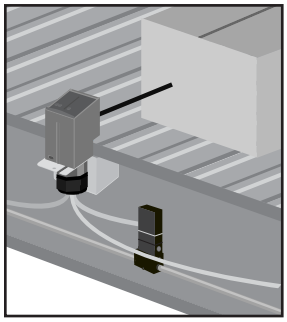


Zone size is the length of an individual zone within an accumulation conveyor. Typically, an accumulation conveyor has two-, three- or six-foot zones.

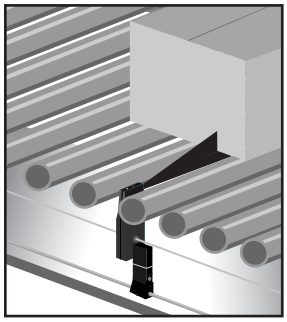
Mounting Location

In general, there are three basic locations where the sensing device of a ZPA system can be located or mounted to the accumulation conveyor: Over-the-Conveyor, Under-the-Conveyor or Side-Frame-Mount. The *ZoneControl* family of products offers multiple solutions and each can be easily mounted in one of the three basic locations.

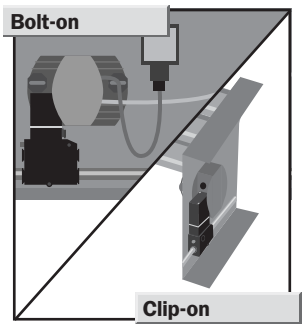
Over-the-Conveyor



Under-the-Conveyor



Side-Frame-Mount



Selection Table...Zero Pressure Accumulation

Zero pressure accumulation sensors

Sensor Type	Sensing Range m	Mounting	Voltage DC	Voltage AC	Integrated Sensor	Integrated Logic	Integrated Daisy Chain	Output	Logic	Page
ZLM 1	External sensor dependent	Side-Frame-Mount	■			■	■	valve	1)	906
	External sensor dependent	Side-Frame-Mount	■			■	■	valve	2)	908
WTR 1	■ 0.9	Under-the-Conveyor	■		■	■	■	valve	1)	910
	■ 0.9	Under-the-Conveyor	■		■	■	■	valve	3)	
WTR 2-P621	■ 0.9	Under-the-Conveyor	■		■	■	■	cable	1)	912
WLR 2100-D	■ 9	Over-the-Conveyor	■		■	■	■	cable	1)	914
	■ 9	Over-the-Conveyor	■		■	■	■	cable	2)	
WLR 2100-M	■ 9	Over-the-Conveyor		■	■	■	■	cable	4)	916
	■ 9	Over-the-Conveyor		■	■	■	■	cable	5)	
WTR 2	■ 0.9	Under-the-Conveyor	■		■			PNP/NPN	6)	918

[1] Single Accumulation with Single and Slug Release
[2] Slug Accumulation with Slug Release
[3] Slug Accumulation with Single Release
[4] Adjustable accumulation with single or adjustable slug release
[5] Adjustable accumulation with slug or adjustable single release
[6] None. To be used as a stand alone sensor or with ZLM

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ZLM 1

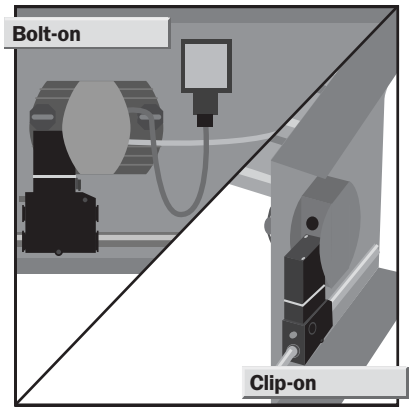
Conveyor Sensors

Highlights

- Side-Frame-Mount
- Integrated ZPA logic, pneumatic valve, daisy chain cables and sensor cable
- American style valve with Imperial size quick connect fittings
- Connection cable for standard sensor, mounted remotely
- Single or slug accumulation logic
- Single or slug release logic
- Industrial grade M12 daisy chain cables

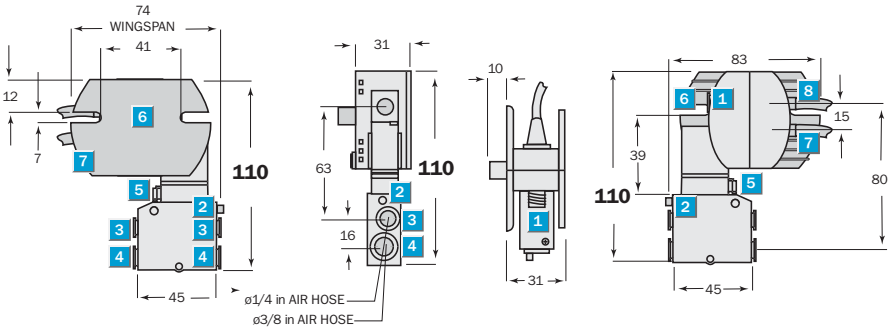
ZPA logic module with pneumatic valve output



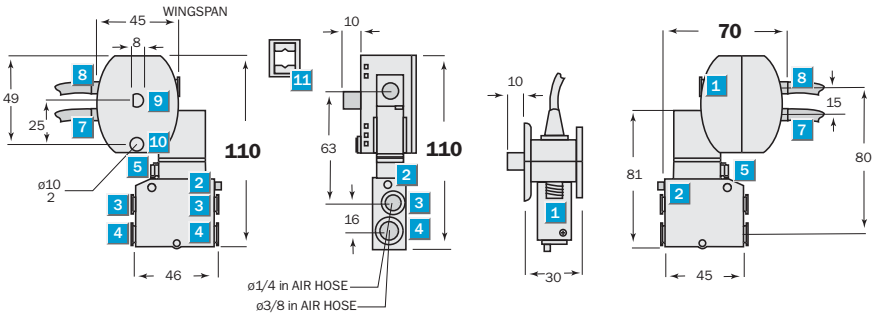


Dimensional drawing

Bolt-on



Clip-on



dimensions in mm

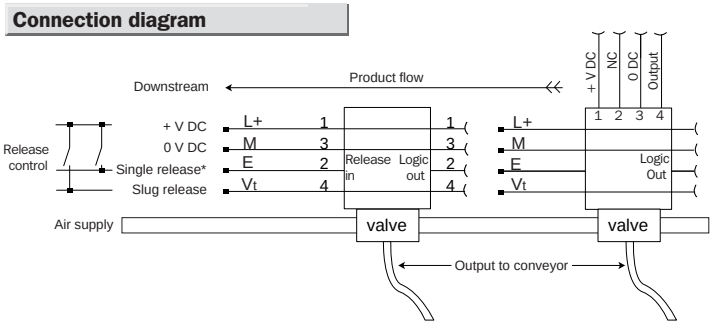
1	Daisy chain connector, male	7	Daisy chain cable, female or male
2	Exhaust	8	Sensor connection cable, female
3	Output port (x1)	9	Mounting stud
4	Supply ports (x2)	10	Anti-rotation stud
5	Manual over-ride switch	11	Mounting clip
6	Mounting slots (x2)		

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

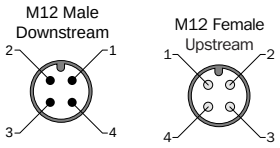
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Technical data ZLM 1-	C	B
Power		
Supply voltage V_s	24 V DC +20/-10%	
Ripple	< 5 V_{ss} within V_s	
Current consumption	≤ 47 mA with valve, without sensor	
Sensor		
Photoelectric sensor connection type	Cable - 0.5 m, 4-pin M8 or M12 female, (connects to sensing device - sold separately)	
Photoelectric sensor output requirements	PNP, light operate retro-reflective or dark operate diffuse (prox), 20 mA typical	
Interconnection		
Logic output type	PNP	
Logic output voltage	Single accumulation mode - beam blocked = V_s - (≤ 2 V), beam unblocked = 0 V	
	Slug accumulation mode - D.S. zone activated = V_s - (≤ 2 V), D.S. zone deactive = 0 V	
Logic output current max.	100 mA	
Logic output switching frequency/response time	200 Hz/2.5 ms	
Daisy chain connection type	Connector - 4-pin M12 male (connects to downstream sensor)	
	Cable - 1.1 m or 2.1 m, 4-pin M12 female (connects to upstream sensor)	
Circuit protection	Short circuit protection; interference pulse suppression; V_s reverse polarity protected	
Modules per End Tap (100 W source)	24 V_s: 3 ft zones = 26, 6 ft zones = 20	28 V_s: 3 ft zones = 35, 6 ft zones = 27
Modules per Center Tap (100 W source)	24 V_s: 3 ft zones = 52, 6 ft zones = 40	28 V_s: 3 ft zones = 46, 6 ft zones = 46
Modules per Dual Center Tap (100 W source)	24 V_s: 3 ft zones = 60, 6 ft zones = 52	28 V_s: 3 ft zones = N/A, 6 ft zones = N/A
Logic function		
Accumulation mode	Single; slug	
Release mode	Single (signal applied at discharge zone); slug (signal applied anywhere along chain)	
Valve		
Compressed air	Filtered, lubricated or unlubricated	
Operation mode	AtoD (Air to Drive); AtoB (Air to Brake)	
Pneumatic circuit function	3/2 way	
Port connections	Quick connect - 3/8 in supply; 1/4 in output (connects to local zone)	
Coil ratings	24 V DC, 1 W	
Output flow rate	40 Nl/min; 1.4 SCFM	
Exhaust flow rate	40 Nl/min; 1.4 SCFM	
Orifice size	0.047 in (1.2 mm)	
Operating pressure range	0…4.5 bar (0…65 PSI)	
Response time	Partially open: 10 ms; open: 23 ms; close: 21 ms	
Physical properties		
VDE protection class		
Enclosure rating	IP 40, NEMA 2	
Ambient operating temperature	14…131° F (-10…55° C)	
Storage temperature	-40…167° F (-40…75° C)	
Shock load	IEC 68	
Approximate weight	5.9 oz (168 g) with 1.1 m cable; 7.3 oz (206 g) with 2.1 m cable: 4.1 oz (115 g) no daisy chain cable	
Housing material	ABS	
Fastening method	Clip-on	Bolt-on
Typical mounting location	Side-Frame-Mount	

Connection diagram



*Single accumulation models only



ZLM 1

ZLM 1 clip-on mounting

Zone Length	Sensor Connection		Single Accumulation - Single and Slug Release		Slug Accumulation - Slug Release	
			AtoD ⇩	AtoB ⇩	AtoD ⇩	AtoB ⇩
3 ft	cable M8	⇨	ZLM 1-C1121A10	ZLM 1-C1121A11	ZLM 1-C2121A10	ZLM 1-C2121A11
3 ft	cable M12	⇨	ZLM 1-C1111A10	ZLM 1-C1111A11	ZLM 1-C2111A10	ZLM 1-C2111A11
6 ft	cable M8	⇨	ZLM 1-C1221A10	ZLM 1-C1221A11	ZLM 1-C2221A10	ZLM 1-C2221A11
6 ft	cable M12	⇨	ZLM 1-C1211A10	ZLM 1-C1211A11	ZLM 1-C2211A10	ZLM 1-C2211A11
M12 male connector	connector M8	⇨	ZLM 1-C1021A10	ZLM 1-C1021A11	ZLM 1-C2021A10	ZLM 1-C2021A11
M12 male connector	connector M12	⇨	ZLM 1-C1011A10	ZLM 1-C1011A11	ZLM 1-C2011A10	ZLM 1-C2011A11

ZLM 1 bolt-on mounting

Zone Length	Sensor Connection		Single Accumulation - Single and Slug Release		Slug Accumulation - Slug Release	
			AtoD ⇩	AtoB ⇩	AtoD ⇩	AtoB ⇩
3 ft	cable M8	⇨	ZLM 1-B1121A10	ZLM 1-B1121A11	ZLM 1-B2121A10	ZLM 1-B2121A11
3 ft	cable M12	⇨	ZLM 1-B1111A10	ZLM 1-B2111A11	ZLM 1-B2111A10	ZLM 1-B2111A11
6 ft	cable M8	⇨	ZLM 1-B1221A10	ZLM 1-B1221A11	ZLM 1-B2221A10	ZLM 1-B2221A11
6 ft	cable M12	⇨	ZLM 1-B1211A10	ZLM 1-B1211A11	ZLM 1-B2211A10	ZLM 1-B2211A11
M12 male connector	connector M8	⇨	ZLM 1-B1021A10	ZLM 1-B1021A11	ZLM 1-B2021A10	ZLM 1-B2021A11
M12 male connector	connector M12	⇨	ZLM 1-B1011A10	ZLM 1-B1011A11	ZLM 1-B2011A10	ZLM 1-B2011A11

Order information					
Model number	**Part number**	**Model number**	**Part number**	**Model number**	**Part number**
ZLM 1-C1121A10	7 027 756	ZLM 1-C1111A10	7 027 764	ZLM 1-C1221A10	7 027 772
ZLM 1-C1121A11	7 027 757	ZLM 1-C1111A11	7 027 765	ZLM 1-C1221A11	7 027 773
ZLM 1-C2121A10	7 027 758	ZLM 1-C2111A10	7 027 766	ZLM 1-C2221A10	7 027 774
ZLM 1-C2121A11	7 027 759	ZLM 1-C2111A11	7 027 767	ZLM 1-C2221A11	7 027 775
ZLM 1-B1121A10	7 027 760	ZLM 1-B1111A10	7 027 768	ZLM 1-B1221A10	7 027 776
ZLM 1-B1121A11	7 027 761	ZLM 1-B1111A11	7 027 769	ZLM 1-B1221A11	7 027 777
ZLM 1-B2121A10	7 027 762	ZLM 1-B2111A10	7 027 770	ZLM 1-B2221A10	7 027 778
ZLM 1-B2121A11	7 027 763	ZLM 1-B2111A11	7 027 771	ZLM 1-B2221A11	7 027 779

Model number	**Part number**	**Model number**	**Part number**	**Model number**	**Part number**
ZLM 1-C1211A10	7 027 780	ZLM 1-C1021A10	7 027 788	ZLM 1-C1011A10	7 027 796
ZLM 1-C1211A11	7 027 781	ZLM 1-C1021A11	7 027 789	ZLM 1-C1011A11	7 027 797
ZLM 1-C2211A10	7 027 782	ZLM 1-C2021A10	7 027 790	ZLM 1-C2011A10	7 027 798
ZLM 1-C2211A11	7 027 783	ZLM 1-C2021A11	7 027 791	ZLM 1-C2011A11	7 027 799
ZLM 1-B1211A10	7 027 784	ZLM 1-B1021A10	7 027 792	ZLM 1-B1011A10	7 027 800
ZLM 1-B1211A11	7 027 785	ZLM 1-B1021A11	7 027 793	ZLM 1-B1011A11	7 027 801
ZLM 1-B2211A10	7 027 786	ZLM 1-B2021A10	7 027 794	ZLM 1-B2011A10	7 027 802
ZLM 1-B2211A11	7 027 787	ZLM 1-B2021A11	7 027 795	ZLM 1-B2011A11	7 027 803

WTR 1

Conveyor Sensors



3.9...35.4 in (100...900 mm)
sensing range

CE

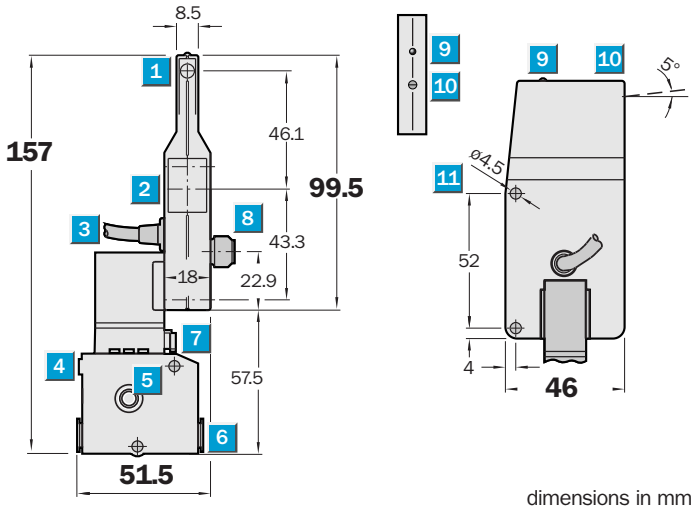
Highlights

- Under-the-Conveyor Mount
- Integrated ZPA logic, photoelectric sensor, pneumatic valve and daisy chain cables
- American style valve with Imperial size quick connect fittings
- Adjustable background suppression
- Single or slug accumulation logic
- Single or slug release logic
- Industrial grade M12 daisy chain cables

Sensor with *ZoneControl* logic & valve

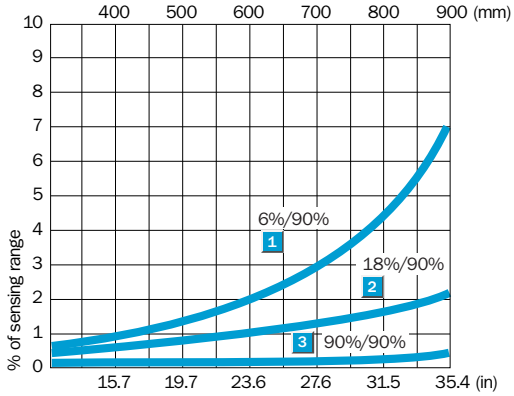


Dimensional drawing



dimensions in mm

Background suppression



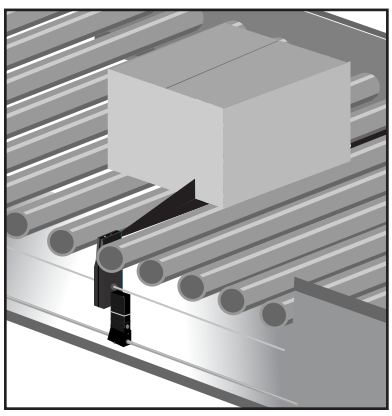
1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission

1	Sender
2	Receiver
3	Daisy chain cable, female
4	Exhaust
5	Output port (x1)
6	Supply ports (x2)
7	Manual over-ride switch
8	Daisy chain connection, male
9	Signal strength indicator
10	Sensing distance adjustment
11	Mounting through-holes (x2)

Selection table

Zone Length	Single Accumulation-Single and Slug Release		Slug Accumulation-Single Release	
	AtoD ⇩	AtoB ⇩	AtoD ⇩	AtoB ⇩
3 ft ⇨	WTR 1-P421A10	WTR 1-P721A11	WTR 1-P921A10	WTR 1-P821A11
3 ft ⇨	WTR1-P471A33[1)]			
6 ft ⇨	WTR 1-P421B10	WTR 1-P721B11	WTR 1-P921B10	WTR 1-P821B11

1) 0 ... 5 second accumulation (product detect) delay



Order information

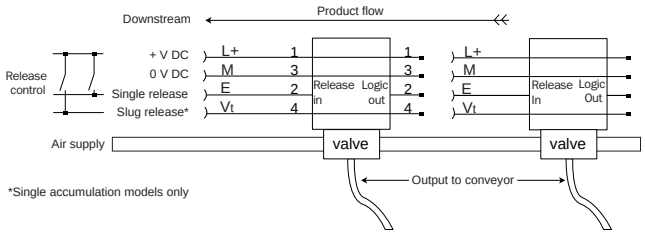
Model number	Part number
WTR 1-P421A10	1 025 373
WTR 1-P721A11	1 025 374
WTR 1-P921A10	1 025 375
WTR 1-P821A11	1 025 376
WTR 1-P421B10	1 025 390
WTR 1-P721B11	1 025 391
WTR 1-P921B10	1 025 392
WTR 1-P821B11	1 025 393
WTR 1-P471A33	7 029 119

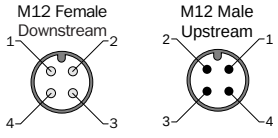
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

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Technical data	WTR 1-	P…
Power		
Supply voltage V_s	24 V DC +20/-10%	
Ripple	< 5 V_{ss} within V_s	
Current consumption	≤ 67 mA with valve	
Sensor		
Sensing range	3.9…35.4 in (100…900 mm)	
Adjustable background suppression	11.8…35.4 in (300…900 mm)	
Light spot diameter	Approx. 1.6 in at 35.4 in (40 mm at 900 mm)	
Light source	LED, IR, average life 100,000 hours at 77°F (25°C)	
Light beam tilt angle	5° upward from center	
Interconnection		
Logic output type	PNP	
Logic output voltage	Single accumulation mode - beam blocked = V_s - (≤ 2 V), beam unblocked = 0 V	
	Slug accumulation mode - D.S. zone activated = V_s - (≤ 2 V), D.S. zone deactive = 0 V	
Logic output current max.	100 mA	
Logic output switching frequency/response time	250 Hz/2.0 ms	
Daisy chain connection type	Cable - 1.2 m or 2.0 m, 4-pin M12 female, threaded connector (connects to downstream sensor)	
	Connector - 4-pin M12 male (connects to upstream sensor)	
Circuit protection	Short circuit protection; interference pulse suppression; V_s reverse polarity protected	
Modules per End Tap (100 W source)	24 V_s: 3 ft zones = 23, 6 ft zones = 18	28 V_s: 3 ft zones = 32, 6 ft zones = 26
Modules per Center Tap (100 W source)	24 V_s: 3 ft zones = 46, 6 ft zones = 36	28 V_s: 3 ft zones = 48, 6 ft zones = 48
Modules per Dual Center Tap (100 W source)	24 V_s: 3 ft zones = 60, 6 ft zones = 48	28 V_s: 3 ft zones = N/A, 6 ft zones = N/A
Logic function		
Accumulation mode	Single; slug	
Release mode	Single (signal applied at discharge zone); slug (signal applied anywhere along chain)	
Valve		
Compressed air	Filtered, lubricated or unlubricated	
Operation mode	AtoD (Air to Drive); AtoB (Air to Brake)	
Pneumatic circuit function	3/2 way	
Port connections	Quick connect - 3/8 in supply; 1/4 in output (connects to local zone)	
Coil ratings	24 V DC, 1 W	
Output flow rate	40 Nl/min; 1.4 SCFM	
Exhaust flow rate	40 Nl/min; 1.4 SCFM	
Orifice size	0.047 in (1.2 mm)	
Operating pressure range	0…4.5 bar (0…65 PSI)	
Response time	Partially open: 10 ms; open: 23 ms; close: 21 ms	
Physical properties		
VDE protection class	⧈	
Enclosure rating	IP 54, NEMA 3	
Ambient operating temperature	14…131° F (-10…55° C)	
Storage temperature	-40…167° F (-40…75° C)	
Shock load	IEC 68	
Approximate weight	5.9 oz (168 g) with 1.1 m cable; 7.3 oz (206 g) with 2.1 m cable: 4.1 oz (115 g) no daisy chain cable	
Housing material	Glass fiber reinforced ABS	
Typical mounting location	Under-the-Conveyor	

Connection diagram





WTR 2

Conveyor Sensors



3.9...35.4 in (100...900 mm)
sensing range

CE

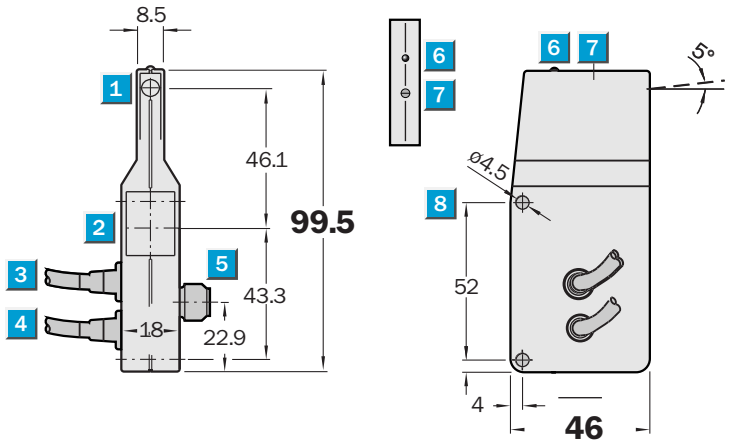
Highlights

- Under-the-Conveyor Mount
- Integrated ZPA logic, photoelectric sensor, electric output cable and daisy chain cables
- Output cable for connection to external actuator
- Adjustable background suppression
- Single accumulation logic
- Single or slug release logic
- Industrial grade M12 daisy chain cables

Sensor with *ZoneControl* logic and electric output



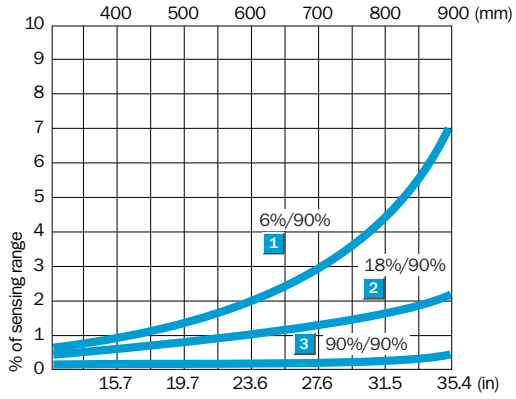
Dimensional drawing



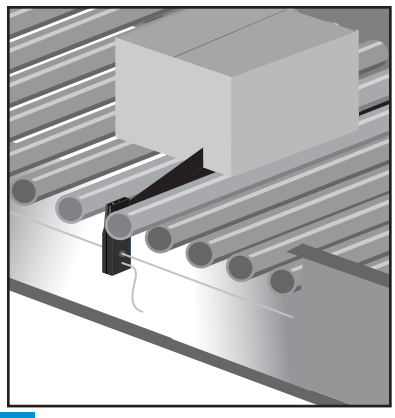
dimensions in mm

1	Sender
2	Receiver
3	Daisy chain cable, female
4	Output cable
5	Daisy chain connection, male
6	Signal strength indicator
7	Sensing distance adjustment
8	Mounting through-holes (x2)

Background suppression



1	Sensing range on black
2	Sensing range on gray
3	Sensing range on white



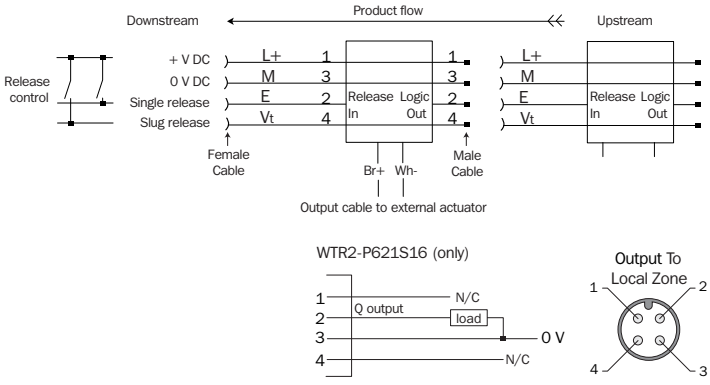
Order information	
Model number	**Part number**
WTR 2-P621	1 015 157
WTR 2-P621S16	1 026 608

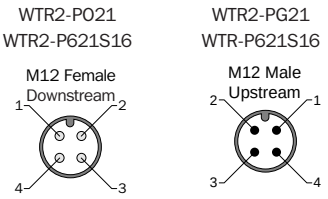
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

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Technical data	WTR 2-	P621	P621S16
Power			
Supply voltage V_s		10…30 V DC	
Ripple		< 5 V_{ss} within V_s	
Current consumption		≤ 25 mA without load, without valve	
Sensor			
Sensing range		3.9…35.4 in (100…900 mm)	
Adjustable background suppression		11.8…35.4 in (300…900 mm)	
Light spot diameter		Approx. 1.6 in at 35.4 in (40 mm at 900 mm)	
Light source		LED, IR, average life 100,000 hours at 77°F (25°C)	
Light beam tilt angle		5° upward from center	
Interconnection			
Logic output type		PNP	
Logic output voltage		Single accumulation mode - beam blocked = V_s - (≤ 2 V), beam unblocked = 0 V	
Logic output current max.		100 mA	
Logic output switching frequency/response time		250 Hz/2.0 ms	
Daisy chain connection type		2.0 m, 4-pin M12 female (connects to downstream sensor) Connector - 4-pin M12 male (connects to upstream sensor)	1.2 m, 4-pin M12 female (connects to downstream sensor)
Circuit protection		Short circuit protection; interference pulse suppression; V_s reverse polarity protected	
Modules per End Tap (100 W source, 1 W load)		24 V_s: 3 ft zones = 23, 6 ft zones = 18	28 V_s: 3 ft zones = 32, 6 ft zones = 26
Modules per Center Tap (100 W source, 1 W load)		24 V_s: 3 ft zones = 46, 6 ft zones = 36	28 V_s: 3 ft zones = 48, 6 ft zones = 48
Modules per Dual Center Tap (100 W source, 1 W load)		24 V_s: 3 ft zones = 60, 6 ft zones = 48	28 V_s: 3 ft zones = N/A, 6 ft zones = N/A
Logic function			
Accumulation mode		Single	
Release mode		Single (signal applied at discharge zone); slug (signal applied anywhere along chain)	
Output to external actuator			
Output type		PNP	
Output voltage		HIGH = V_s - (≤ 2 V); LOW = 0 V	
Output current max.		600 mA	
Circuit protection		None	
Connection type (connects to local zone)		Cable - 1.5 m, 2-wire flying leads	Cable - 230 mm, 4-pin M12 female
Switching frequency/response time		250 Hz/2.0 ms	
Physical properties			
VDE protection class		⧈	
Enclosure rating		IP 54, NEMA 3	
Ambient operating temperature		-40…140° F (-40…60° C)	
Storage temperature		-40…167° F (-40…75° C)	
Shock load		IEC 68	
Approximate weight		3.9 oz (110 g) with 1.2 m cable; 5.3 oz (149 g) with 2.1 m cable	
Housing material		Glass fiber reinforced ABS	
Typical mounting location		Under-the-Conveyor	

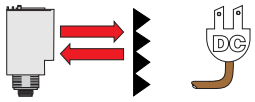
Connection diagram





WLR 2100-D

Conveyor Sensors



0...29.5 ft (0...9 m)
sensing range

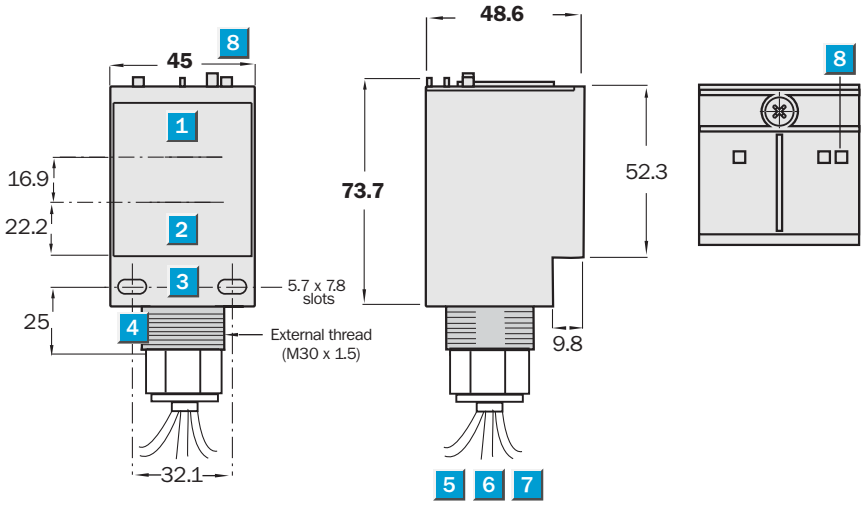
Highlights

- Over-the-Conveyor Mount
- Integrated ZPA logic, photoelectric sensor, electric output cable and daisy chain cables
- Output cable for connection to external actuator
- Industrial grade M12 daisy chain cables
- Linear polarized retro-reflective sensing technology eliminates false detection of shiny or plastic-wrapped objects
- Single or slug accumulation logic
- Single or slug release logic

ZPA sensor with *ZoneControl* logic and electric output

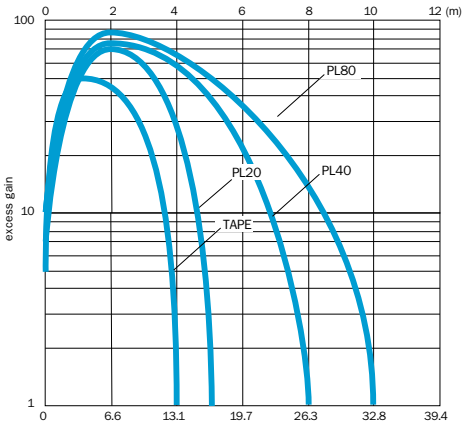


Dimensional drawing



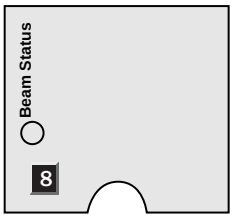
dimensions in mm

Excess gain



Inside cover

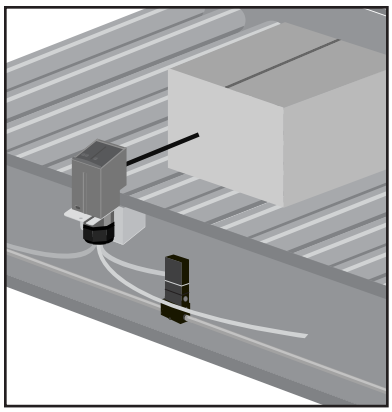
All types



1 Sender
2 Receiver
3 Mounting through-holes (x2)
4 Threaded mount
5 Daisy chain cable, female
6 Output cable, female
7 Daisy chain cable, male
8 Beam status indicator

Selection table

Zone Length	Valve Connection	Single Accumulation - Single and Slug Release ⇩	Slug Accumulation - Slug Release ⇩
3 ft	DIN 9.4 mm ⇨	WLR 2100-D2311	WLR 2100-D2321
3 ft	Spade Conn ⇨	WLR 2100-D1311	WLR 2100-D1321
6 ft	DIN 9.4 mm ⇨	WLR 2100-D2312	WLR 2100-D2322
6 ft	Spade Conn ⇨	WLR 2100-D1312	WLR 2100-D1322



Order information

Model number	Part number
WLR 2100-D1311	7 027 185
WLR 2100-D2311	7 027 808
WLR 2100-D1321	7 027 754
WLR 2100-D2321	7 027 809
WLR 2100-D1312	7 027 753
WLR 2100-D2312	7 027 811
WLR 2100-D1322	7 027 755
WLR 2100-D2322	7 027 810

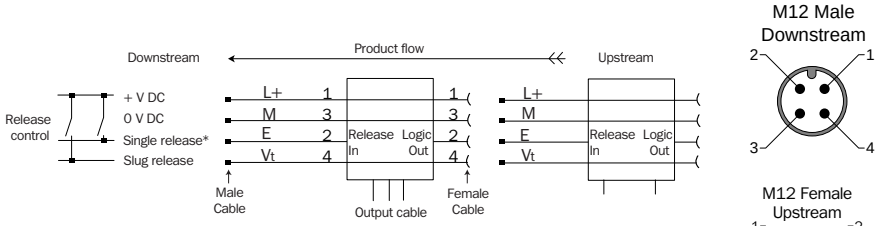
Accessories

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256
Special accessories	1314

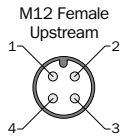
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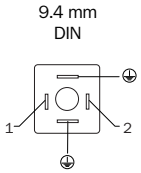
Technical data	WLR 2100-	D....
Power		
Supply voltage V_s	10…30 V DC	
Ripple	< 5 V_{ss} within V_s	
Current consumption	≤ 40 mA, without load, without valve	
Sensor		
Sensing range	0…29.5 ft (0…9 m) with PL 80A reflector	
Light spot diameter	Approx. 8.0 in at 29.5 ft (205 mm at 9 m)	
Light source	LED, red, polarized, average life 100,000 hours at 77°F (25°C)	
Interconnection		
Logic output type	PNP	
Logic output voltage	Single accumulation mode - beam blocked = V_s - (≤ 2 V), beam unblocked = 0 V	
	Slug accumulation mode - D.S. zone activated = V_s - (≤ 2 V), D.S. zone deactivated = 0 V	
Logic output current max.	100 mA	
Logic output switching frequency/response time	500 Hz/1.0 ms	
Daisy chain connection type	Cable - 300 mm, 4-pin M12 male (connects to downstream sensor)	
	Cable - 1.1 m or 2.1 m, 4-pin M12 female (connects to upstream sensor)	
Circuit protection	Short circuit protection; interference pulse suppression; V_s reverse polarity protected	
Modules per End Tap (100 W source, 1 W load)	24 V_s: 3 ft zones = 23, 6 ft zones = 18	28 V_s: 3 ft zones = 31, 6 ft zones = 25
Modules per Center Tap (100 W source, 1 W load)	24 V_s: 3 ft zones = 46, 6 ft zones = 36	28 V_s: 3 ft zones = 46, 6 ft zones = 46
Modules per Dual Center Tap (100 W source, 1 W load)	24 V_s: 3 ft zones = 60, 6 ft zones = 42	28 V_s: 3 ft zones = N/A, 6 ft zones = N/A
Logic function		
Accumulation mode	Single; slug	
Release mode	Single (signal applied at discharge zone); slug (signal applied anywhere along chain)	
Output to external actuator		
Output type	PNP	
Output voltage	HIGH = V_s - (≤ 2 V); LOW = 0 V	
Output current max.	100 mA	
Circuit protection	None	
Connection type	Cable - 300 mm, 2-wire spade or 9.4 mm DIN (43650) type C female (connects to local zone)	
Switching frequency/response time	500 Hz/1.0 ms	
Physical properties		
VDE protection class	⧈	
Enclosure rating	IP 67, NEMA 6	
Ambient operating temperature	-13…131° F (-25…55° C)	
Storage temperature	-40…158° F (-40…70° C)	
Shock load	IEC 68	
Approximate weight	5.3 oz (150 g) with 1.1 m cable; 6.6 oz (188 g) with 2.1 m cable	
Housing material	Glass fiber reinforced ABS	
Typical mounting location	Over-the-Conveyor	

Connection diagram



*Single accumulation models only





WLR 2100-M

Conveyor Sensors



0...29.5 ft (0...9 m)
sensing range

c UL us

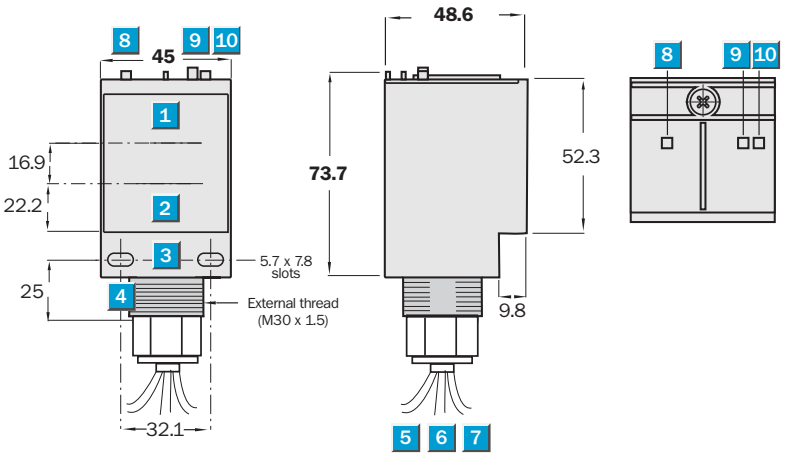
Highlights

- Over-the-Conveyor Mount
- Integrated ZPA logic, photoelectric sensor, electric output cable and daisy chain cables
- Output cable for connection to external actuator
- Linear polarized retro-reflective sensing technology eliminates false detection of shiny or plastic-wrapped objects
- Single or slug time delay release
- Individual slug release configurability, switch selectable

ZPA sensor with *ZoneControl* logic and electric output

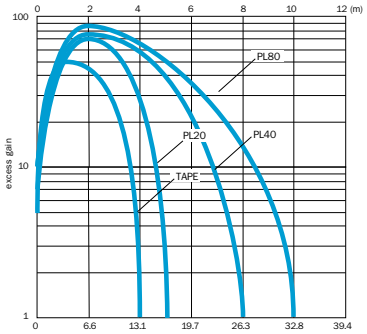


Dimensional drawing



dimensions in mm

Excess gain



A Slug/Accumulation Delay Settings 0...2 seconds

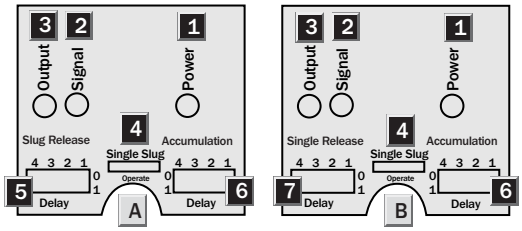
msec.	4321	msec.	4321
0	0000	1095	1000
360	0001	1225	1001
300	0010	1370	1010
435	0011	1500	1011
550	0100	1615	1100
680	0101	1745	1101
820	0110	1890	1110
955	0111	2020	1111

B Release/Accumulation Delay Settings 0...10 seconds

msec.	4321	msec.	4321
0.1	0000	5.2	1000
0.7	0001	5.9	1001
1.4	0010	6.6	1010
2.0	0011	7.2	1011
2.6	0100	7.8	1100
3.2	0101	8.4	1101
3.9	0110	9.1	1110
4.6	0111	9.8	1111

Inside cover and adjustments

WLR 2100-M6361 | WLR 2100-M6381
WLR 2100-M6362 | WLR 2100-M6382



1 Power indicator
2 Signal strength indicator
3 Output status indicator
4 Single/slug selector switch
5 Slug release time delay DIP switches
6 Accumulation time delay DIP switches
7 Single release time delay DIP switches

1 Sender
2 Receiver
3 Mounting through-holes (x2)
4 Threaded mount
5 Daisy chain cable, female
6 Output cable, female
7 Daisy chain cable, male
8 Power indicator
9 Signal strength indicator
10 Output status indicator

Selection table

Zone Length	Valve Connection	Adjustable Accumulation - Single or Adjustable Slug Release	Adjustable Accumulation - Slug or Adjustable Single Release
3 ft	DIN 9.4 mm	WLR 2100-M6361	WLR 2100-M6381
6 ft	DIN 9.4 mm	WLR 2100-M6362	WLR 2100-M6382

Order information

Model number	Part number
WLR 2100-M6381	7 027 819
WLR 2100-M6382	7 027 820
WLR 2100-M6361	7 027 089
WLR 2100-M6362	7 027 090

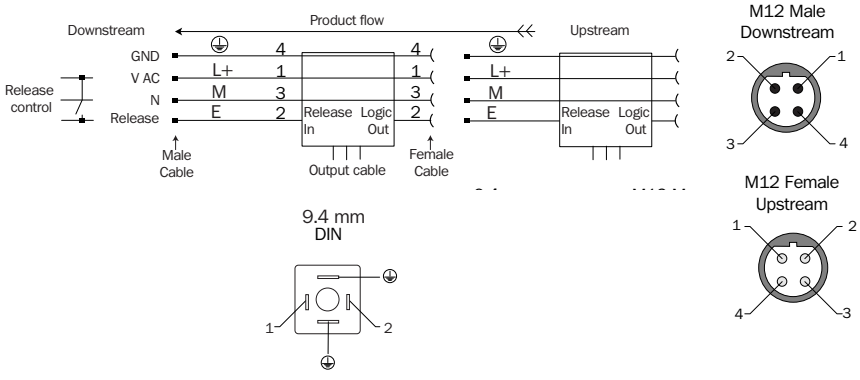
Accessories

	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

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Technical data	WLR 2100-	M....
Power		
Supply voltage V_s		90…240 V AC
Ripple		< 5 V_{ss} within V_s
Power consumption		≤ 6 W
Sensor		
Sensing range		0…29.5 ft (0…9 m) with PL 80A reflector
Light spot diameter		Approx. 8.0 in at 29.5 ft (205 mm at 9 m)
Light source		LED, red, polarized, average life 100,000 hours at 77° F (25° C)
Interconnection		
Logic output type		FET
Logic output current max.		100 mA
Logic output switching frequency/response time		250 Hz/2.0 ms
Daisy chain connection type		Cable - 300 mm, 4-pin M12 male (connects to downstream sensor)
		Cable - 1.1 m or 2.1 m, 4-pin M12 female (connects to upstream sensor)
Circuit protection		Short circuit protection; interference pulse suppression; V_s reverse polarity protected
Modules per End Tap (440 W source, 5 W load)		24 V_s: 3 ft zones = 27, 6 ft zones = 22
Modules per Center Tap (440 W source, 5 W load)		24 V_s: 3 ft zones = 40, 6 ft zones = 40
Logic function		
Accumulation mode		Adjustable time delay
Release mode		Single and adjustable time delay slug (switch configurable) or slug and adjustable time delay single (switch configurable)
Output to external actuator		
Output type		PNP
Output voltage		HIGH = V_s - (≤ 2 V); LOW = 0 V
Output current max.		150 mA
Circuit protection		None
Connection type		Cable - 300 mm, 9.4 mm DIN (43650) type C female (connects to local zone)
Switching frequency/response time		500 Hz/1.0 ms
Physical properties		
VDE protection class		□
Enclosure rating		IP 67, NEMA 6
Ambient operating temperature		-13…131° F (-25…55° C)
Storage temperature		-40…158° F (-40…70° C)
Shock load		IEC 68
Approximate weight		5.3 oz (150 g) with 1.1 m cable; 6.6 oz (188 g) with 2.1 m cable
Housing material		Glass fiber reinforced ABS
Typical mounting location		Over-the-Conveyor

Connection diagram



WTR 2

Conveyor sensors



3.9...35.4 in (100...900 mm)
sensing range

CE

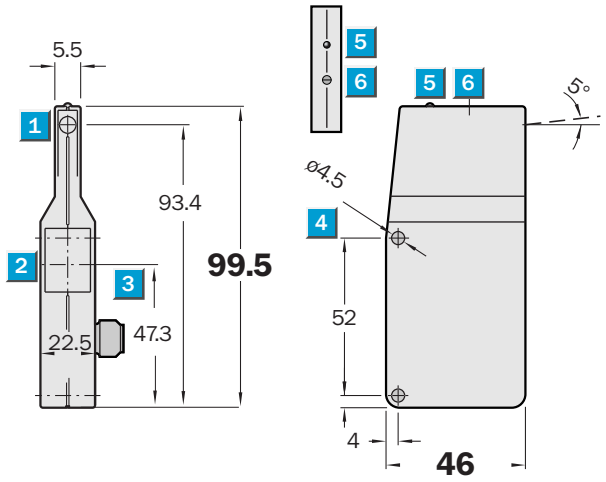
Highlights

- Under-the-Conveyor Mount
- Stand-alone sensor easily integrated with ZPA systems
- Multiple output configurations including: PNP, NPN, light and dark operate
- Adjustable background suppression sensing technology, ignores background targets and no reflector is required
- Industrial grade M12 cable connection

Sensor with M12 connector



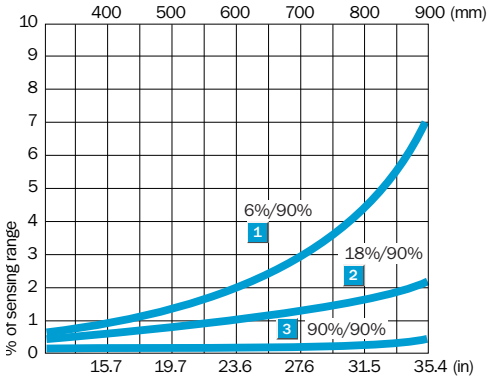
Dimensional drawing



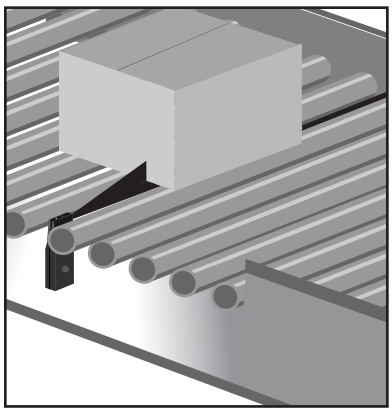
dimensions in mm

1	Sender
2	Receiver
3	Connector, M12 male
4	Mounting through-holes (x2)
5	Signal strength indicator
6	Sensing distance adjustment

Background suppression



1	Sensing range on black, 6% remission
2	Sensing range on gray, 18% remission
3	Sensing range on white, 90% remission



Order information

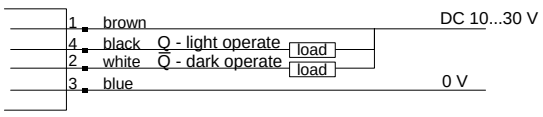
Model number	Part number
WTR 2-P551S08	1 022 927
WTR 2-N551S05	1 019 320
WTR 2-N551S06	1 019 583
WTR 2-P521	1 015 074
WTR 2-P511	1 015 158
WTR 2-P521S14	1 025 619

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

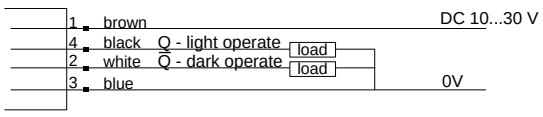
Technical data WTR 2-	P551S08	N551S05	N551S06	P521S14	P521	P511
Sensing range	3.9…35.4 in (100…900 mm)					
Adjustable background suppression	11.8…35.4 in (300…900 mm)					
Light spot diameter	Approx. 1.6 in at 35.4 in (40 mm at 900 mm)					
Light source	LED, infrared light					
External light immunity	Modulated light source with digital signal evaluation via SICK custom ASIC					
Crosstalk immunity	Automatic modulation frequency shift via SICK custom ASIC					
Response time frequency	< 25 ms beam block, < 1 ms beam unblock/40 Hz				< 1 ms/500 Hz	
Supply voltage V_S	10…30 V DC (limit values)					
Ripple (within V_S tolerance)	< 5 V peak to peak					
Current consumption (no load)	< 40 mA					
Switching type	PNP	NPN		PNP		
Switching current max.	200 mA					
Health output type	-		NPN	-		
Health output current max.	-		200 mA	-		
Output switching mode	Light or dark switching via complimentary outputs		Dark switching			Light switching
Connection type	M12 4-pin connector					
Housing	Glass fiber reinforced plastic					
Enclosure rating	IP 54					
VDE protection class	☐					
EMC	IEC 801					
Shock rating	IEC 68					
Circuit protection	Outputs short circuit protected, V_S reverse polarity protected					
Ambient operating temperature	-40…140° F (-40…60° C)					
Storage temperature	-40…167° F (-40…75° C)					
Mounting bracket	2 017 417 (not included)					
Approximate weight	Approx. 3.5 oz (100 g)					

Connection diagram

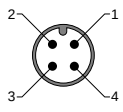
WTR2-N551S05



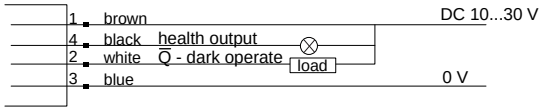
WTR2-P551S08



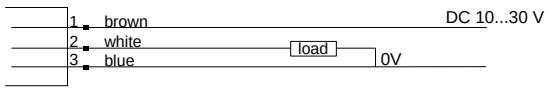
M12 Male



WTR2-N551S06

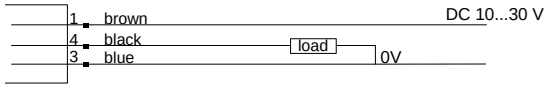


WTR2-P521
WTR2-P511



wire colors refer to standard cable, not included

WTR2-P521S14



WTR 2

Conveyor Sensors



3.9...35.4 in (100...900 mm)
sensing range

CE

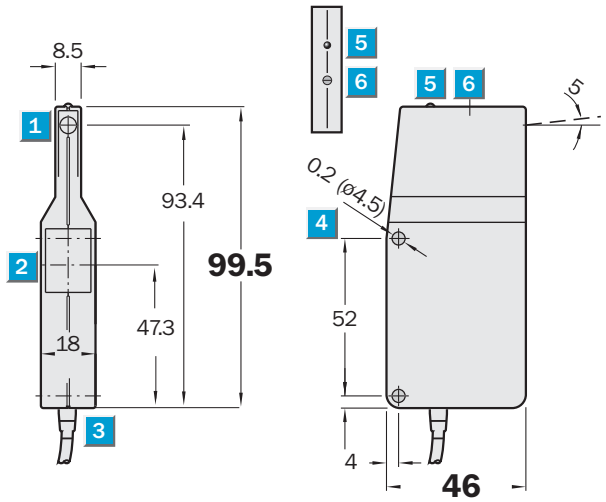
Highlights

- Under-the-Conveyor Mount
- Stand-alone sensor easily integrated with ZPA systems
- Multiple output configurations including: PNP, NPN, light and dark operate
- Adjustable background suppression sensing technology, ignores background targets and no reflector is required
- WAGO 733-103 for connection to popular driver cards

Sensor with cable



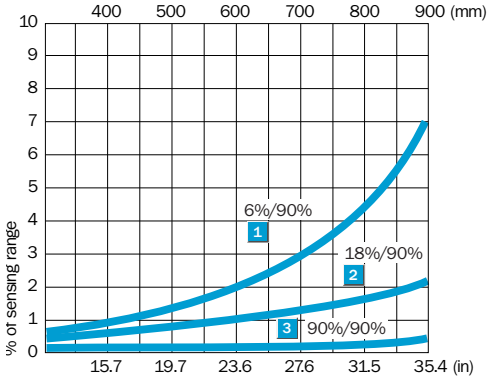
Dimensional drawing



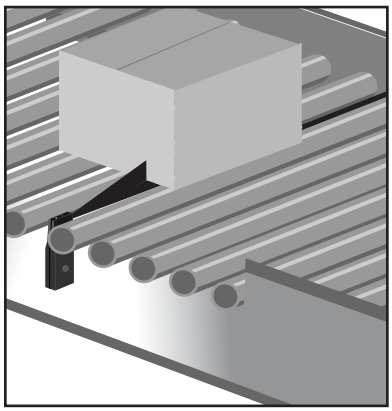
dimensions in mm

1 Sender
2 Receiver
3 Output cable, flying leads or Wago 733-103 connector
4 Mounting through-holes (x2)
5 Signal strength indicator
6 Sensing distance adjustment

Background suppression



1 Sensing range on black, 6% remission
2 Sensing range on gray, 18% remission
3 Sensing range on white, 90% remission



Order information	
Model number	Part number
WTR 2-P511S20	1028700
WTR 2-P511S20A10	1029257
WTR 2-P511S20A03	7029979
WTR 2-P511S20A11	1029258
WTR 2-P021S24	1041629

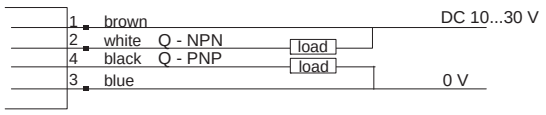
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

7028071 - © 2008 SICK, Inc.

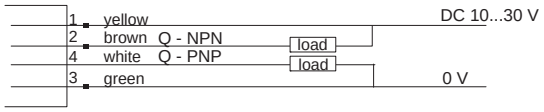
Technical data	WTR2-	P021S24	P511S20	P511S20A10	P511S20A03	P511S20A11
Sensing range		3.9…35.4 in (100…900 mm)				
Adjustable background suppression		11.8…35.4 in (300…900 mm)				
Light spot diameter		Approx. 1.6 in at 35.4 in (40 mm at 900 mm)				
Light source		LED, infrared light				
External light immunity		Modulated light source with digital signal evaluation via SICK custom ASIC				
Crosstalk immunity		Automatic modulation frequency shift via SICK custom ASIC				
Response time frequency		< 25 ms beam block, < 1 ms beam unblock/40 Hz				
Supply voltage V_s		10…30 V DC (limit values)				
Ripple (within V_s tolerance)		< 5 V peak to peak				
Current consumption (no load)		< 25 mA				
Switching type		PNP/NPN		NPN	PNP	NPN
Switching current max.		200 mA				
Output switching mode		Dark switching	Light switching			
Cable Length		118 in (3m)	79 in (2 m)	30 in (761 mm)	40 in (1 m)	79 in (2 m)
Connection type		Flying leads		Wago 733-103		
Housing		Glass fiber reinforced plastic				
Enclosure rating		IP 54				
Protection class		□				
EMC		IEC 801				
Shock rating		IEC 68				
Circuit protection		Outputs short circuit protected, V_s reverse polarity protected				
Ambient operating temperature		-40…140° F (-40…60° C)				
Storage temperature		-40…167° F (-40…75° C)				
Approximate weight		Approx. 3.5 oz (100 g)				

Connection diagram

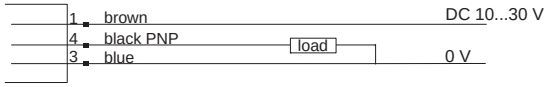
WTR2-P511S20



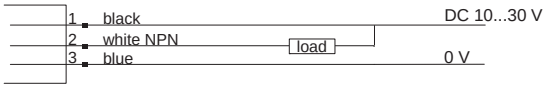
WTR2-P021S24



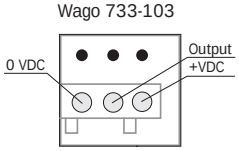
WTR2-P511S20A03



WTR2-P511S20A10
WTR2-P511S20A11



Wago 733-103



ZIM-2

Conveyor Sensors

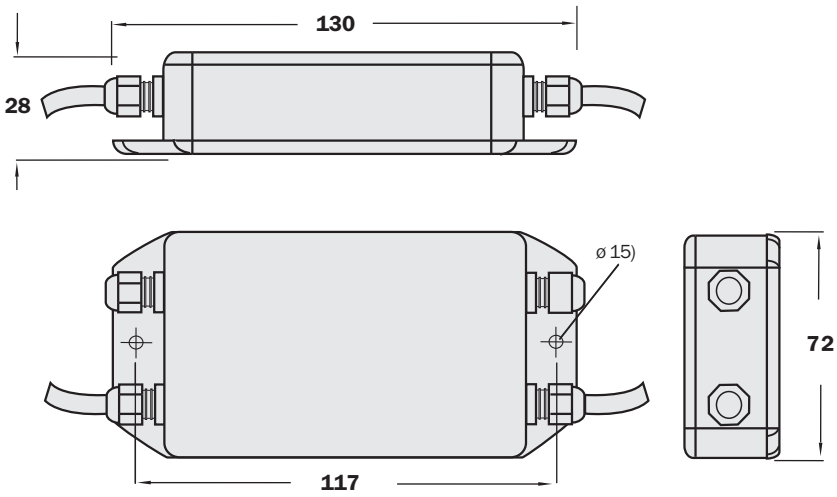
Highlights

- Provides simple and flexible interface to ZPA control systems
- Reduces installation labor and component costs
- Plug-n-play connectivity for error proof installation
- Relay isolated single and slug release
- Adjustable zone release time delay, 0 to 20 seconds
- Zone status reporting
- Stop zone function
- Provides power tap connections

ZoneControl interface module



Dimensional drawing

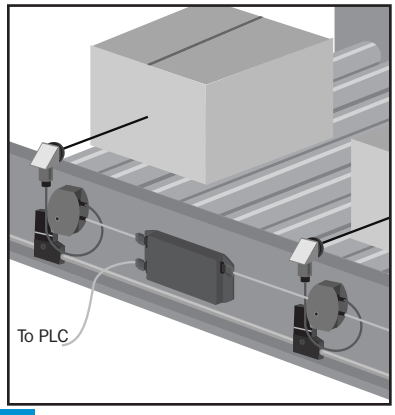


dimensions in mm

Warning

CAUTION

RISK OF ELECTRICAL SHOCK-MORE THAN ONE DISCONNECT SWITCH MAY BE REQUIRED TO DE-ENERGIZE THE EQUIPMENT BEFORE SERVICING



Order information

Model Number	Part Number
ZIM-2B1110	7 029 608
ZIM-2B2110	7 029 704

Technical data ZIM-2	B 1	B 2
Interface to ZPA system	ZLM1, WLR2100-D	WTR
Upstream connection	Female, M12, 5-pin, 300 mm cable	Male, M12, 5-pin, 300 mm cable
Downstream connection	Male, M12, 5-pin, 300 mm cable	Female, M12, 5-pin, 300 mm cable
Power		
Supply voltage from daisy chain	18…30 V DC[3]	
Power consumption of ZIM	10 mA, no load	
ZoneControl system power TB4 input	24…28 V DC typical; 30 V DC max.[3]	
Input ratings		
TB5 & TB4 power + V DC, 0 V	24…28 V DC typical, 30 V DC max.[3]	
TB4 release/interrupt/zone status	18…30 V DC[3]	
	Guaranteed OFF voltage: ≤ 4 V DC	
	Guaranteed ON voltage: ≥ 15 V DC	
	Typical ON state current draw at 24 V: 4 mA	
TB1 single release/logic interrupt[1]	18…250 V UC	
	Guaranteed OFF voltage: ≤ 4 V DC	
	Guaranteed ON voltage: ≥ 15 V DC	
	Typical ON state current draw 2.5 mA	
TB2 Slug Release	18…250 V UC[1]	
	Guaranteed OFF voltage: ≤ 4 V DC	
	Guaranteed ON voltage: ≥ 15 V DC	
	Typical ON state current draw 2.5 mA	
	maximum number of logic modules slugged: 80 across no more than 2 power supplies*	
Output ratings		
TB5 logic	PNP; 2.21 kΩ impedance typical	
TB5 zone status	PNP; 2.21 kΩ impedance typical	
TB3 zone status relay[2]	250 V UC max; 100 mA max. Resistive load[2]	
Delays		
Timing	All delays are 0…20 s	
Physical properties		
Terminal block		
Terminal block wire	30…12 AWG (2.5…0.2 mm^2), strip length 0.25 in (6.0 mm)	
Screw terminal torque	5 in-lbs (0.56 Nm)	
Potentiometers		
Mechanical angle	270° nominal	
Stop strength	7.0 oz-in minimum	
Housing		
Dimensions	5.25 x 3.75 x 1.125 in (130 x 95 x 29 mm)	
Mounting	3/16 in holes in mounting flange or double-sided adhesive, any orientation	
Enclosure rating	IP 42, NEMA 1	
Shock and vibration	IEC 68 2-27, IEC 68 2-29, and EC 68 2-6	
Operating temperature	-13…131° F (-25…55° C)	
Storage temperature	-40…185° F (-40…85° C)	
Approximate weight	0.9 lb (400 g)	
Certifications	cULus	

[1] These inputs are optically isolated from the rest of the Class 2 circuitry. Isolation voltage from Universal-Voltage inputs to Class 2 circuitry: 5000 V rms. Inputs are not sensitive to polarity.

[2] Optically isolated solid state relay with 1 Normally Open and 1 Normally Closed contact. Isolation voltage from Zone Status relay terminals to Class 2 circuitry: 5000 V rms.

[3] Class 2 source required

NOTE: Specifications above are for Full Function Module. Some data may not apply to Release and Zone Status modules.

* See application section for more info on slug specifications

ZIM-2

Applications

The following rules apply to the following applications.
- All references of upstream or downstream are given with respect to the ZIM
- Factory default jumper (JPx) position is 1-2
- Jumpers (JPx) other than those referenced in a given application note have no influence on that application

Single Release
Action: Upstream Logic Module releases despite upstream and downstream zone status.
Isolated AC/DC Configuration: Apply a high (ON) signal input to TB1 terminals when JP3 is on 1-2.
Non-isolated DC Configuration: Apply a high (ON) signal input to TB4 terminal 3 when JP4 is on 1-2.

Slug Release
Action: All Logic Modules connected to the Slug line will release regardless of zone status or accumulation status. (see Logic Crossover configuration for exception)
Slug Interrupt/Isolator should be used to limit the number of logic modules slug released by a single ZIM module to 80 logic modules across no more than 2 power supplies. If more than 2 power supplies or more than 80 logic modules are to be slug released, use an additional ZIM to release the additional logic modules. If the logic modules use 2 power supplies, reduce the modules per tap maximum by 3 for the power tap section supplying the ZIM.
Isolated AC/DC Configuration: Apply a high signal level (ON) to TB2 with JP1 on 1-2 and JP3 on 1-2.
Logic Crossover Configuration: The downstream logic release signal (downstream logic line ON) is crossed-over to the upstream slug release line when JP1 is on 4-5 and JP2 is on 2-3.

Pulse Release
Action: Upstream Logic Module releases for a duration of time set by ZS ON (0-20 s) and then accumulates for a duration of time set by ZS OFF (0-20 s), despite upstream and downstream zone status.
Isolated AC/DC Configuration: Apply a high signal (ON) to TB1 when JP3 is removed.
Adjustability: Release time is set by ZS ON potentiometer from 0 to 20 seconds. Accumulation time is set by ZS OFF potentiometer from 0 to 20 seconds.

Zone Release Delay (Logic Line Delay)
Action: Upstream logic module will release after the downstream zone has cleared and the logic delay has expired.
Adjustability: Adjust LOGIC potentiometer from 0 to 20 seconds.

Logic Interrupt/Stop Zone
Action: Upstream logic module accumulates when the upstream Logic Module detects a package, despite downstream zone status.
Isolated AC/DC Configuration: Apply a low (OFF) signal input to TB1 when JP3 is on 2-3.
Non-isolated DC Configuration: Apply a low (OFF) signal input to TB4 when JP4 is on 2-3.

Downstream Slug Interrupt
Action: Downstream Logic Modules will not slug release when Slug Release is initiated at the ZIM or upstream of the ZIM.
Configuration: JP1 is on 2-3 and JP2 is on 1-2.

Upstream Slug Interrupt
Action: Upstream Logic Modules will not slug release when Slug Release is initiated at the ZIM or downstream of the ZIM.
Configuration: JP1 is on 1-2 and JP2 is on 2-3.

Zone Status Indication
Action: Zone status output on TB5 terminal 1 and TB3 is activated when the downstream logic module or remote sensor indicate an occupied zone.
Configuration for Downstream Logic Module: JP4 is on 1-2 or 2-3 and JP5 is on 1-2 or removed.
Configuration for Auxiliary Sensor or PLC Input: JP4 is removed and a high (ON) signal is applied to TB4 terminal 3.
Zone Status Delay: The output transition of the Zone Status from (OFF) to (ON) or (ON) to (OFF) will only occur if the time delays set by the ZS ON and ZS OFF delay potentiometers have expired. A non-zero delay setting will filter out transitions that occur for less than the set time. This is typically used to indicate a zone is full only after a product is detected for a period of time indicative of a full and accumulated lane.

ZSM jumper (JP) position & function

JP1 - DOWNSTREAM SLUG	
POS.	FUNCTION
1-2	DS SLUG PASSTHROUGH
2-3	DS SLUG INTERRUPT
3-4	DS SLUG INTERRUPT
4-5	DS LOGIC CROSSOVER
NC	DS SLUG INTERRUPT

JP4 - TB4 FUNCTION SELECT	
POS.	FUNCTION
1-2	SINGLE RELEASE
2-3	LOGIC INTERRUPT
NC	ZS INPUT (OVERRIDES JP5 SETTING)

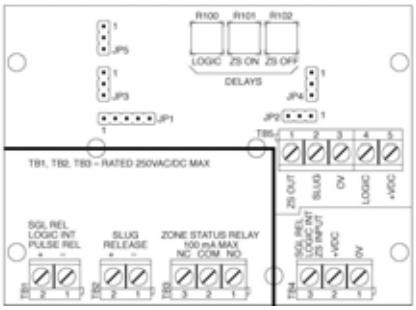
JP2 - UPSTREAM SLUG	
POS.	FUNCTION
1-2	US SLUG PASSTHROUGH
2-3	US SLUG INTERRUPT
NC	US SLUG INTERRUPT

JP5 - ZONE STATUS INPUT SELECT	
POS.	FUNCTION
1-2	DS LOGIC SIGNAL (PIN 2)
2-3	DS SENSOR SIGNAL (PIN 5)
NC	DS LOGIC SIGNAL (PIN 2)

JP3 - TB1 FUNCTION SELECT	
POS.	FUNCTION
1-2	SINGLE RELEASE
2-3	LOGIC INTERRUPT
NC	PULSE RELEASE

NC = NO CONNECTION (JUMPER REMOVED)
DS = DOWNSTREAM
US = UPSTREAM
ZS = ZONE STATUS

ZIM board layout - full function



Model number	Part number	Description
ZIM-2B1110	7029608	Full Function Module, for ZLM or WLR2100
ZIM-2B2110	7029704	Full Function Module, for WTR1

Warnings and cautions

NOTE: A qualified electrician must perform installation and servicing, in addition to checking with local code before installation, to ensure safe operation of the product. For technical assistance with this product, call SICK at 1-800-325-7425.

- Be consistent with UL listing requirements for maximum protection. The input line cable and line fuses must be sized in accordance with the rated input current of the unit.
- Do not make any connections when connected to AC/DC utility supply line.
- Before applying power, make sure that all covers are closed.
- Verify there is no possible floating ground potential.
- Provide recommended interfacing wire type (i.e. 16-24 AWG multi-strand heat resistive copper wires).
- Any motor cables should cross other cables at an angle of 90 degrees.
- If conduit is being used for wiring, use separate conduits for the input power wiring, the output power wiring, the signal wiring and the control wiring.
- Serviceability/field repair: Devices are not serviceable.

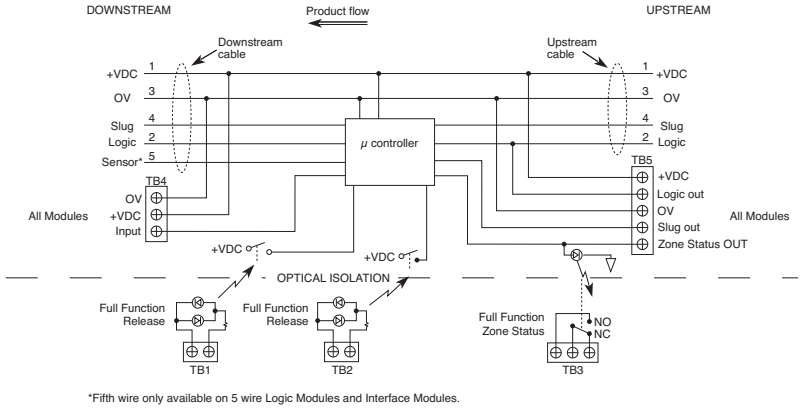
Read manuals thoroughly and make sure you understand the procedures before you attempt to install, set up, or operate any SICK brand *ZoneControl* devices.

The information contained in this manual is subject to change without notice.

CAUTION

RISK OF ELECTRICAL SHOCK-MORE THAN ONE DISCONNECT SWITCH MAY BE REQUIRED TO DE-ENERGIZE THE EQUIPMENT BEFORE SERVICING

Connection diagram



*Fifth wire only available on 5 wire Logic Modules and Interface Modules.

ZoneControl Power Supply

Conveyor Sensors

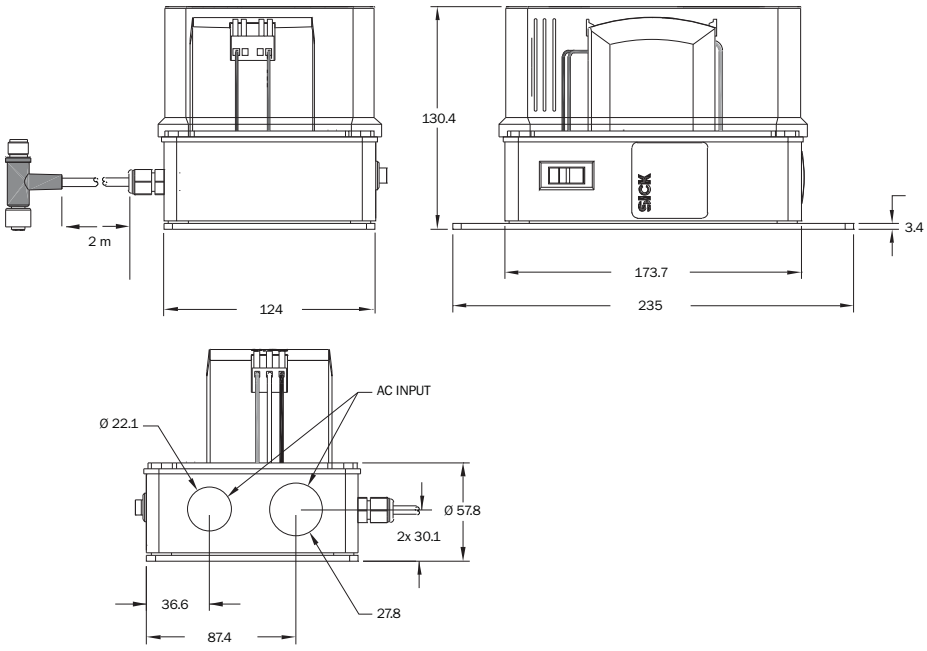
Highlights

- Adjustable output voltage up to 24…28 V DC
- 115/230 V AC input
- State-of-the-art design
- Perfect integration with *ZoneControl* system
- IP 20 enclosure
- Bolt on mounting
- Provides power tap connections

ZoneControl Power Supply



Dimensional drawing



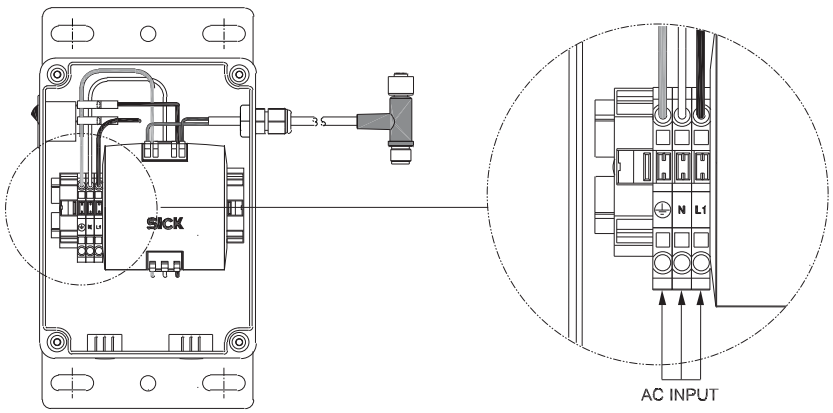
dimensions in mm

SICK PS 50W-24V-ENC and PS 95W-24V-ENC power supplies feature a compact housing design that is designed specifically for use with SICK's *ZoneControl* line of Logic Modules and conveyor sensors.

These units meet the latest NEC Class II requirements, in accordance with UL, EN, IEC standards. Installation is fast and easy due to slotted holes in a durable mounting plate that mounts directly to the side of the conveyor.

SICK PS 50W-24V-ENC and PS 95W-24V-ENC power supplies are also capable of buffering brief power failure conditions at rated voltage (e.g. 20 ms at 120 V AC), in accordance with EN 60 624-1. Global acceptance is also achieved by conformance with cULus standards (North American compliance) and CE standard requirements (European compliance).

Connection diagram



Order information	
Model number	Part number
PS50W-24V-ENC	7029741
PS95W-24V-ENC	7029740

Technical data	PS50W-24V-ENC	PS95W-24V-ENC
Input parameters		
Input voltage range V AC (nominal)	100…240 V	100…120/220…240 V
Input voltage range V AC (continuous)	85…264 V	85…132/184…264 V
Input frequency	47…63 Hz	
Input voltage range V DC (see derating requirements)	85…375 V	220…375 V
Power Consumption	< 11.5 W max	
Inrush current	< 10 A (100 V AC) < 0.6 A (196 V AC)	< 2.0 A (100 V AC) < 0.95 A (196 V AC)
Transient immunity over entire load range	In acc. VDE 0160/W2 (750 V/1.3 ms)	
Output parameters (at tee cable)		
Power	50 W	95 W
Output voltage	24…28 V DC adjustable (factory set to 24 V)[3]	
Output voltage preset	24.5 ± 0.5%	
Ripple/noise at 20 MHz, 50 Ohm	< 50 m V_{pp}	
Output voltage regulation accuracy	0.5% V_{out} static, ± 2.0% V_{out} dynamic	0.5% V_{out} static, ± 1.5% V_{out} dynamic
Output rated current	2.1 A (at 24 V DC), 1.8 A (at 28 V DC)	3.9 A (at 24 V DC), 3.2 A (at 28 V DC)
Hold up time during input supply interruption	> 97 ms (196 V AC) > 17 ms (100 V AC)	> 20 ms (196 V AC, 24.5 V/3.9 A) > 20 ms (100 V AC, 24.5 V/3.9 A)
General device parameters		
Operating temperature range (T_{amb}) - full load	14…122°F (-10…50°C)	14…122°F (-10…50°C)
Operating temperature range (T_{amb}) - derated	122…140°F (50…60°C)	
Storage temperature	-13…185°F (-25…85°C)	
Humidity	90% max., non-condensing	
Input cable access	one hole for 3/4" conduit, one hole for 1/2" conduit	
AC connection wires[1]		
Stranded cable	0.3…2.5 mm^2/AWG 28-12	
Solid cable	0.3…4 mm^2/AWG 28-12	
Stripping at wire end	0.24 in (6 mm)	
Output connector cables	M12 4-pin tee cable, 2 m/AWG 22	
Efficiency	88.5% (typ. at 230 V AC), 88% (typ. at 110 V AC); 2.1 A	90% (typ. at 230 V AC), 89% (typ. at 110 V AC); 3.9 A
Protection class	IP 20 (DIN/IEC 60 529)	IP 20 (DIN/IEC 60 529)
MTBF[2]	600,000 hours	500,000 hours
Dimensions	9.25 x 5.67 x 5.13 in (235 x 144 x 130.4 mm)	9.25 x 5.67 x 5.13 in (235 x 144 x 130.4 mm)
Weight	4.1 lbs (1.9 kg)	3.9 lbs (1.8 kg)
Mounting	Only vertical mounting with 3 vent slots on top and AC entering bottom. Any other orientation may cause damage to device.	
Clearance	Keep 2 in clearance around vents	
Applicable standards		
EN 60 950, IEC 60 950	Yes	
EN 60 204-1, EN 50 178	Yes	
Third party approvals		
UL 508 Listing (US and Canada)	Multiple listing	
UL 60 950 Recognition (US and Canada)	Multiple listing	
NEC Class II according to UL 1310	Multiple listing	

1) NOTE: Secure wires from strain
2) MTBF at 24 V DC, 4 A; 230 V AC; T_{amb} 104°F (+40° C)
3) 24…28 VDC is set at power supply. Actual at tee cable is 27 V full load.

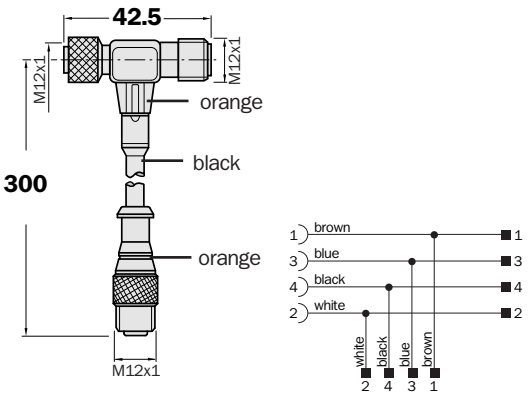
Warnings and cautions

This is not a user or installation manual. See manual supplied with the power supply for full details, specifications, installation warnings and cautions!

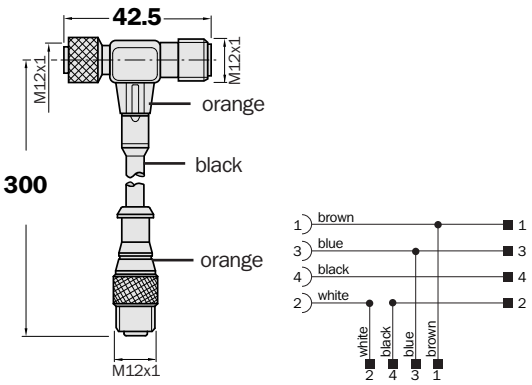
ZoneControl Cables

Power and Interconnect Cables		
Model Number	Part Number	Description
DSL-12Ø4-TØM3	6011682	Tee cable type 1, M12 DC 4-pin, 300 mm
DSL-11Ø4-TØM3	6011683	Tee cable type 2, M12 DC 4-pin, 300 mm
JD4-TM122000A	7122472	Tee cable type 1, M12 DC 4-pin, 2 m
JD4-TM122000C	7029863	Tee cable type 1, M12 DC 4-pin, to flying leads, 2 m
DOL-1204-G02M	6009382	2 m straight M12 DC 4-pin cable
DOL-1204-G05M	6009866	5 m straight M12 DC 4-pin cable
DOL-1204-G010M	6010543	10 m straight M12 DC 4-pin cable
DOL-1204-W02M	6009383	2 m right angle M12 DC 4-pin cable
DOL-1204-W05M	6009867	5 m right angle M12 DC 4-pin cable
DOL-1204-W010M	6010541	10 m right angle M12 DC 4-pin cable
ZPI-P1	7027723	Power isolator
ZSI-P4	7027187	Slug interrupt
ZL1-P2	7029124	Logic interrupt cable
ZGC-1	7027804	Gender changer - male/male
ZGC-2	7028421	Gender changer - female/female
ZLCO-MD	7028474	Logic crossover - pin 2 male, pin 4 female
ZLCO-FD	7029473	Logic crossover - pin 2 female, pin 4 male
KA14-SEM121	7027083	1 m straight M12 reverse-key AC 4-pin cable
KA14-SEM122	7027086	2 m straight M12 reverse-key AC 4-pin cable
KD4-SEM120.25SM12	7028981	Extension cable, M12 DC 4-pin, 0.25 m
KD4-SEM121SM12	7124105	Extension cable, M12 DC 4-pin, 1 m
DSL-1204-G02M	6022567	Extension cable, M12 DC 4-pin, 2 m
KD4-SIM123SM12	7028657	Extension cable, M12 DC 4-pin, 3 m
-	7028451	Kit, 1/4 in plug and clip
-	7028457	1/4 in plug
-	7028425	3/8 in plug

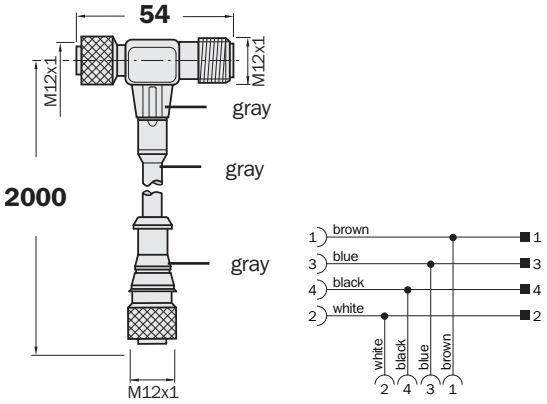
Tee cable type 1, M12 DC 4-pin, 300 mm



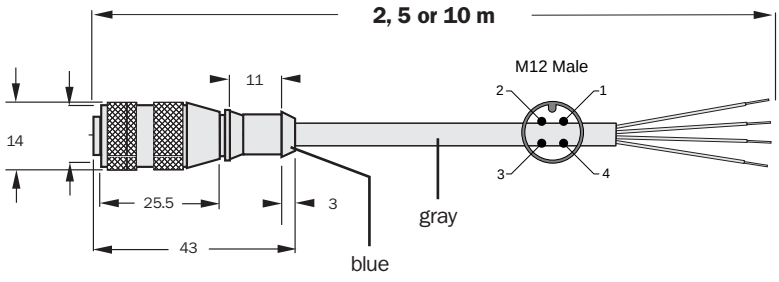
Tee cable type 2, M12 DC 4-pin, 300 mm



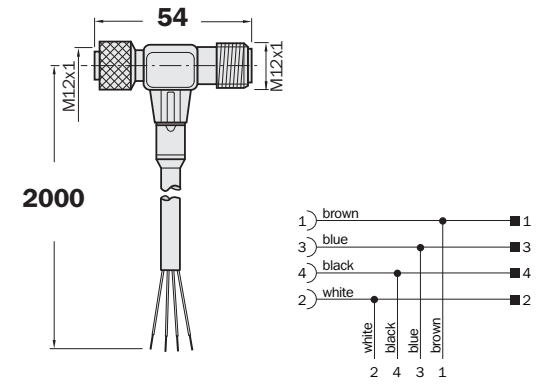
Tee cable type 1, M12 DC 4-pin, 2 m



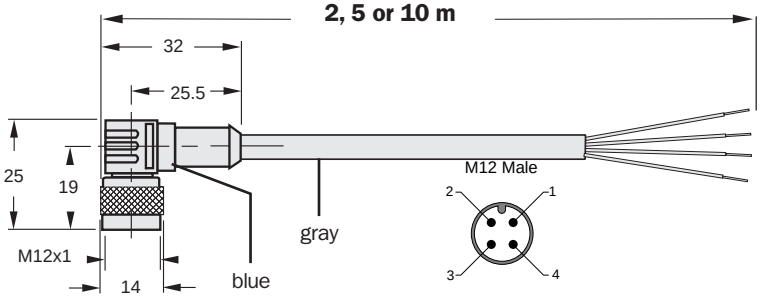
2 m, 5 m, 10 m straight M12 DC 4-pin cable



Tee cable type 1, M12 DC 4-pin to flying leads, 2 m



2 m, 5 m, 10 m right angle M12 DC 4-pin cable

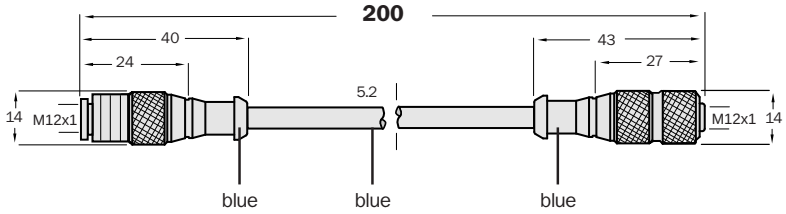


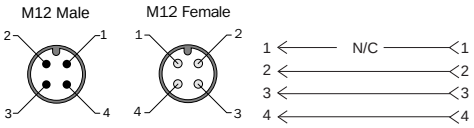
dimensions in inches (mm)

7028071 - © 2008 SICK, Inc.

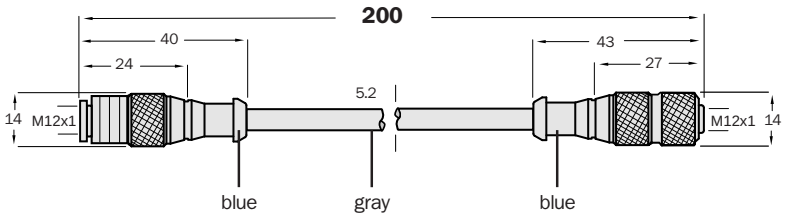
ZoneControl Cables

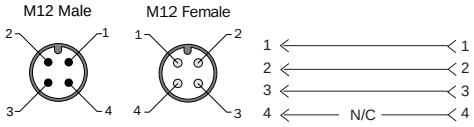
Power isolator



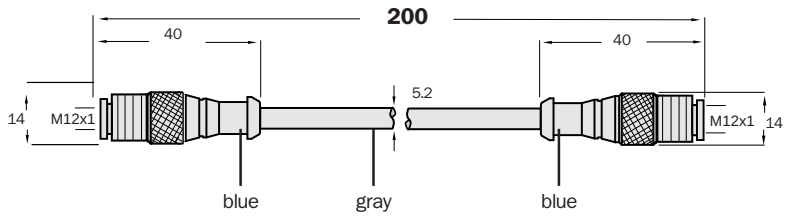


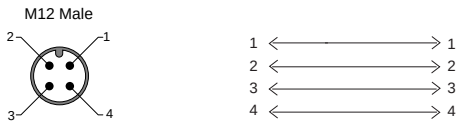
Slug interrupt



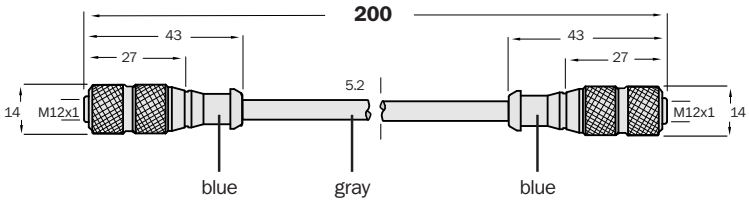


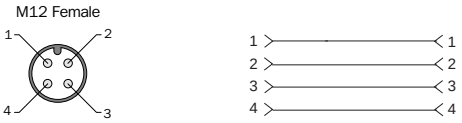
Gender changer - male/male



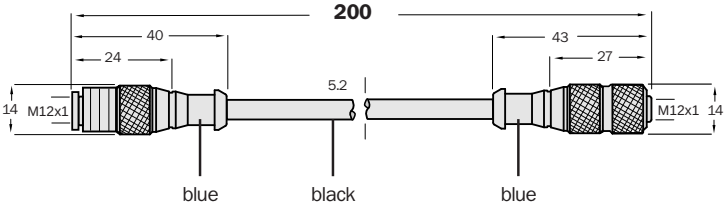


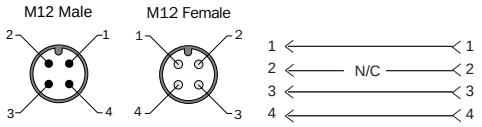
Gender changer - female/female



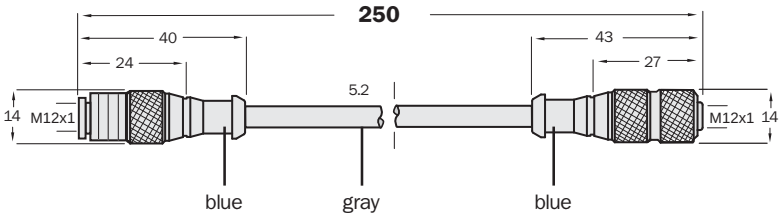


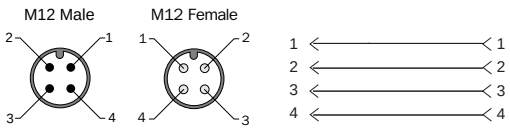
Logic interrupt



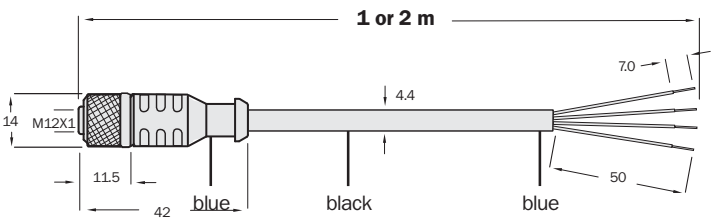


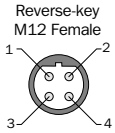
Extension cable





1 m, 2 m, straight M12 reverse-key AC 4-pin cable





Fork Sensors



Fork sensors

- Sender and receiver in one housing
- Large number of different fork widths
- Can be precisely adjusted to the object
- Detection of minute differences in light intensity
- Teach-in function by button or control cable (WF 3T, WF 5T)

Table of Contents

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Selection Table	933
WF3T/5T	934
WF Next, Manual	936
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UF3	940

Theory of Operation...Fork Sensors

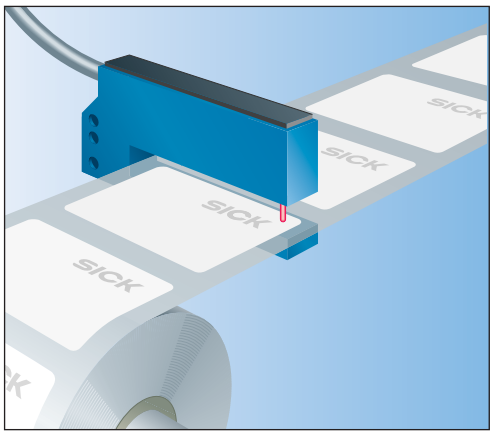
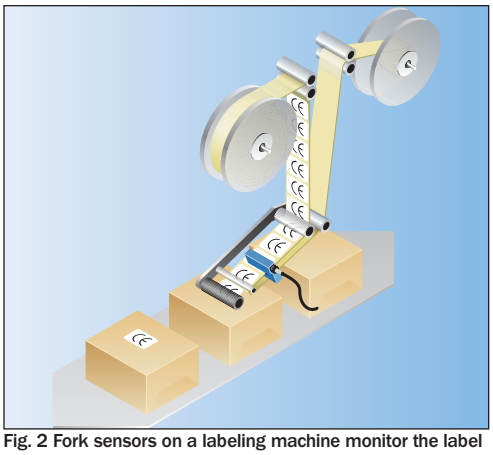
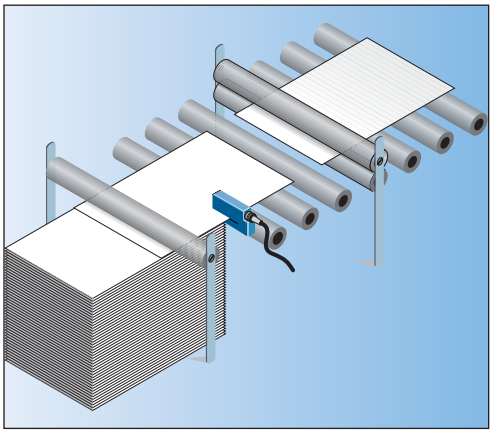
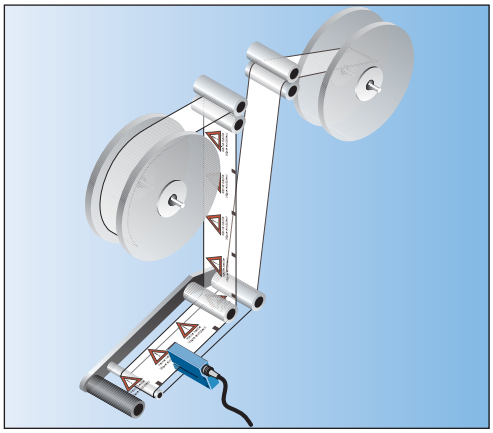


Fig. 1 Fork sensor


Fig. 2 Fork sensors on a labeling machine monitor the label strip to ensure that a label is attached to every package


Fig. 3 The fork sensor detects double sheets of paper on conveyor belts carrying material to a paper cutter


Fig. 4 Fork sensor detects registration marks

About Fork Sensors

Fork sensors, also called slot sensors, look different than any other sensor family SICK manufactures because the sender and receiver share a single housing. The distance between the sender and receiver is determined by the shape of the housing and is referred to as the fork width. In WF slot sensors, the emitted light, in the form of a highly concentrated beam and the high detection accuracy means that the fork sensor can detect even minute differences in light attenuation.

The UF slot sensor does not rely on optical properties, but instead uses the attenuation of the sensor's acoustic signal – which depends on the thickness of the material. This allows for reliable detection of labels and backings regardless of color, material, or printing. The UF is especially suited for sensing clear labels and metallic labels.

Fork sensors are ideal for applications in the printing and paper industries. Fork sensors are also ideal for label detection because they can sense labels on thick backing and cellophane also does not present a problem. Fork sensor models include the WF series and WF T series, as well as the UF ultrasonic fork sensor.

Selection Table...Fork Sensors

Fork sensors						
Sensor Type	**Sensing Range/ Fork Width**	**Sensing Method**	**Voltage**	**Output**	**Connection Type**	**Page**
WF 3T/5T	3 mm/5 mm	Infrared LED	DC	PNP/NPN	Plug, M8 4-pin	934
WF	2...120 mm	Infrared LED	DC	PNP/NPN	Plug, M8 4-pin	936
UF3	3 mm	Ultrasonic	DC	PNP/NPN	Plug, M8 4-pin	940

WF 3T/5T

Fork Sensors



0.1 in (3 mm)/0.2 in (5 mm) sensing range/fork width

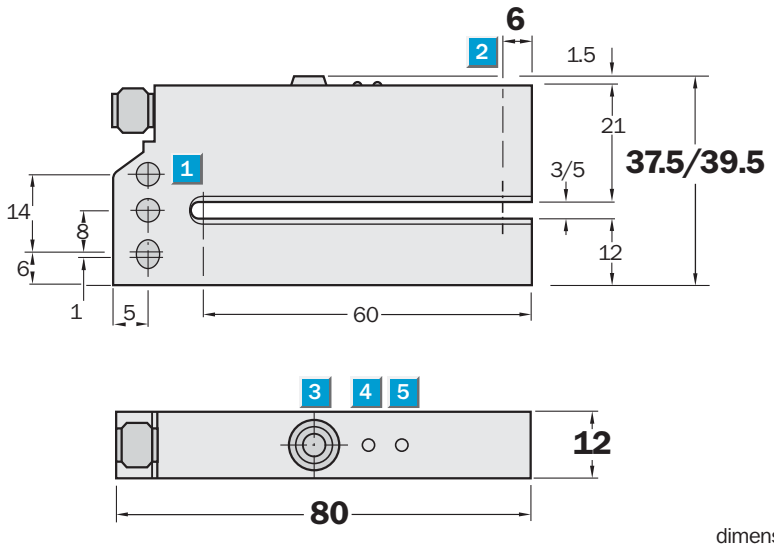
Highlights

- Rugged metal housing
- Push button teach for easy application setup
- "Standard" and "fine" modes using teach-in process
- Immune to ambient light
- PNP and NPN in the same switch
- Perfect for label detection and mark detection

WF 3T/5T



Dimensional drawing



dimensions in mm

Teach-in procedure

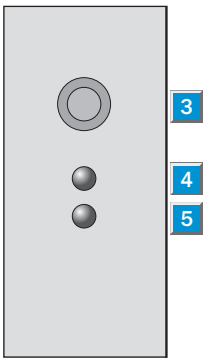
The switching threshold is set for this slot sensor by a simple teach-in procedure. This can be set via push button on the unit or the "ET" (External Teach) input line.

Procedure

1. Place the background material in the light spot.
2. For standard adjustments: push the teach button once (approx. 1..3 seconds); red LED flashes.
3. For fine adjustment with small switching hysteresis:
   a. push teach button (approx. 1..3 seconds)
   b. wait one second.
   c. push teach button (approx. 1..3 seconds); yellow LED flashes.

Adjustments

All types



1 Mounting holes, Ø 4.2 mm (3x)
2 Optical axis
3 Teach-in button
4 Teach indicator, LED red
5 Output indicator, LED yellow

Notes

- To lock teach function: push teach button for approx. 6 seconds, red LED lights.
- To release teach function: push teach button for approx. 6 seconds, red LED switches off.
- Teach-in value is stored in non-volatile memory.

Order information

Type	Part no.
WF 3T-B4210	6 020 874
WF 5T-B4210	6 021 220

Accessories

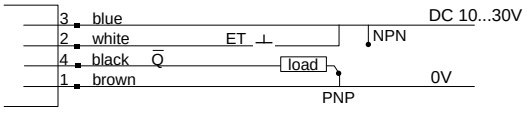
	page
Cables and connectors	1180

Technical data	WF-	3T-B4210	5T-B4210
Sensing range/fork width	0.1 in (3 mm)	■	
	0.2 in (5 mm)		■
Light source[1], **light type**	LED, infrared light, incandescent light	■	■
Supply voltage V_S[1]	10 … 30 V DC	■	■
Current consumption[2]	40 mA	■	■
Ripple[3]	< 10%, < 5 V_S	■	■
Switching outputs	PNP/NPN, light/dark switching	■	■
Signal voltage HIGH at I_A max.	V_S – (< 2 V) PNP, Q	■	■
Signal voltage LOW at I_A max.	Approx. 0 V PNP, Q	■	■
Output current I_A max.	100 mA	■	■
Response time[4]	50 µs	■	■
Max. switching frequency[5]	10 kHz	■	■
Teach-in through switch			
Teach-in with ET input	ET to V_S	■	■
Standard setting	1 pulse 1… 4 s	■	■
Fine setting	1 pulse 1… 4 s + pause 1… 1.3 s + 1 pulse 0.3…4 s	■	■
Connection type	Plug, M8 4-pin	■	■
Ambient light safety	3,000 lux	■	■
VDE protection class[6]	□	■	■
Enclosure rating	IP 65/NEMA 4	■	■
Circuit protection[7]	B, C	■	■
Ambient temperature	Operation -4…140° F (-20… 60° C)	■	■
	Storage -4…176° F (-20… 80° C)	■	■
Approximate weight	2.1 oz (60 g)	■	■
Housing material	Aluminum	■	■

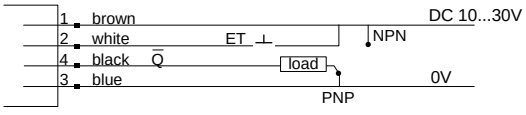
1) Limit values
2) Without load
3) May not exceed or fall short of V_S tolerances
4) Signal transit time with resistive load
5) With light/dark ratio 1:1; no time delay
6) Reference voltage 50 V DC
7) B = Outputs short-circuit protected
C = Interference pulse suppression

Connection diagram

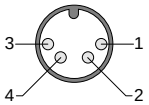
Dark Switching



Light Switching



M8 Connector



WF Next, Manual

Fork Sensors

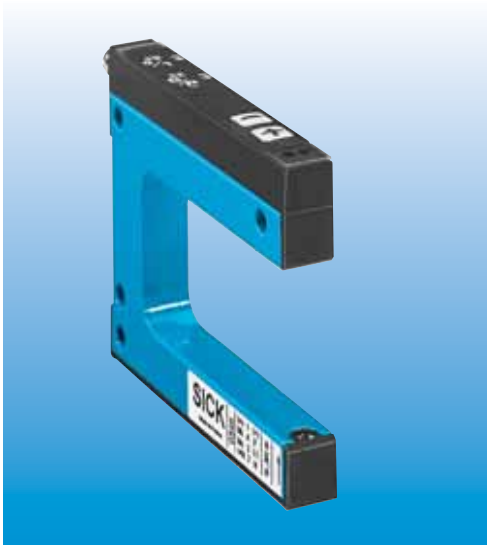


0.08...4.7 in (2...120 mm)
sensing range/fork width

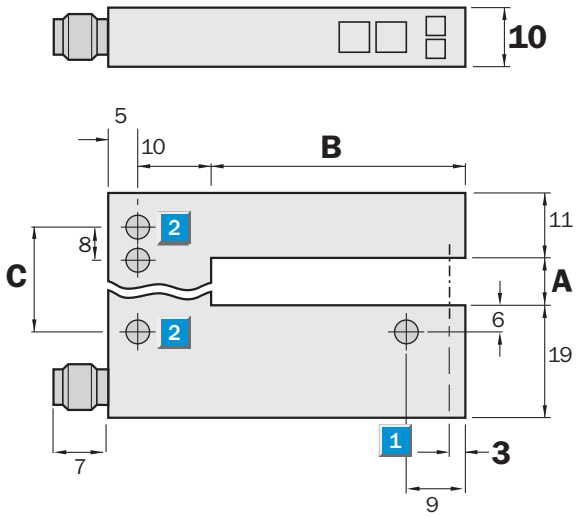
Highlights

- Simple and accurate adjustment via "+" and "-" buttons
- PNP and NPN switching output
- Selectable light/dark switching
- Rugged aluminum housing

WF Next



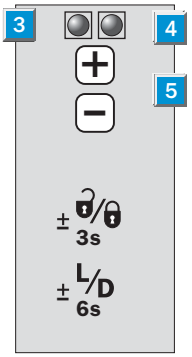
Dimensional drawing



dimensions in mm

Adjustments

All types



1 Optical axis
2 Mounting holes, Ø 4.2 mm
3 Function indicator (red)
4 Function indicator (yellow), switching output
5 "+"/"-" buttons and function button

Dimensions

	A (mm)	B (mm)	C (mm)
	Fork width	**Fork depth**	
WF2	**2**	42/59/95	14
WF5	**5**	42/59/95	14
WF15	**15**	42/59/95	27
WF30	**30**	42/59/95	42
WF50	**50**	42/59/95	40
WF80	**80**	42/59/95	70
WF120	**120**	42/59/95	110

Accessories	page
Cables and connectors	1180

Order information

Fork depth 40 mm		Fork depth 60 mm		Fork depth 95 mm	
Type	**Part no.**	**Type**	**Part no.**	**Type**	**Part no.**
WF2-40B410	6028428	WF2-60B410	6028436	WF2-95B410	6028443
WF5-40B410	6028429	WF5-60B410	6028437	WF5-95B410	6028444
WF15-40B410	6028430	WF15-60B410	6028438	WF15-95B410	6028445
WF30-40B410	6028431	WF30-60B410	6028439	WF30-95B410	6028446
WF50-40B410	6028432	WF50-60B410	6028440	WF50-95B410	6028447
WF80-40B410	6028433	WF80-60B410	6028441	WF80-95B410	6028448
WF120-40B410	6028435	WF120-60B410	6028442	WF120-95B410	6028449

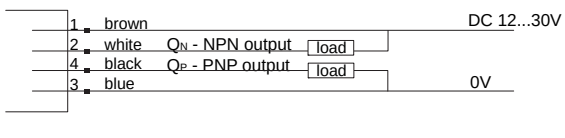
Technical data	WF-	2-XX[1] B410	5-XX[1] B410	15-XX[1] B410	30-XX[1] B410	50-XX[1] B410	80-XX[1] B410	120-XX[1] B410
Sensing range/fork width	0.1 in (2 mm)	■						
	0.2 in (5 mm)		■					
	0.6 in (15 mm)			■				
	1.2 in (30 mm)				■			
	2.0 in (50 mm)					■		
	3.2 in (80 mm)						■	
	4.7 in (120 mm)							■
Fork depth	40, 60, or 95 mm	■	■	■	■	■	■	■
Light source	LED, infrared light, pulsed	■	■	■	■	■	■	■
Minimum detectable object size	0.008 in (0.2 mm)	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■	■
Current consumption[3]	40 mA	■	■	■	■	■	■	■
Residual ripple[4]	< 10%	■	■	■	■	■	■	■
Switching output	PNP/NPN	■	■	■	■	■	■	■
	Light/dark adjustable via button	■	■	■	■	■	■	■
Signal voltage								
PNP	HIGH = V_S – (< 2 V)/LOW = 0 V	■	■	■	■	■	■	■
NPN	HIGH = V_S/LOW = < 2 V	■	■	■	■	■	■	■
Output current I_A	100 mA	■	■	■	■	■	■	■
Stability of response time[5]	± 20 µs	■	■	■	■	■	■	■
Response time[5], switching frequency[6]	Max. 100 µs; 10,000/s	■	■	■	■	■	■	■
Initialization time	100 ms	■	■	■	■	■	■	■
Ambient light safety								
Incandescent lamp	5,000 Lux	■	■	■	■	■	■	■
Sunlight	10,000 Lux	■	■	■	■	■	■	■
VDE protection class[7]	III	■	■	■	■	■	■	■
Enclosure rating	IP 65	■	■	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■	■	■
Ambient temperature[9]	Operation -4…140° F (-20…60° C)	■	■	■	■	■	■	■
	Storage -22…176° F (-30…80° C)	■	■	■	■	■	■	■
Housing	Aluminum	■	■	■	■	■	■	■
Weight	Approx. 1.26…5.6 oz (36…160 g)[10]	■	■	■	■	■	■	■

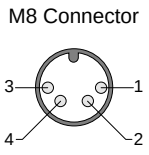
1) XX = Fork depth (e.g. 40 = fork depth equivalent to 40 mm)
2) Limit values, reverse polarity protected
3) Without load
4) May not exceed or fall short of V_S tolerances
5) Signal transit time with resistive load
6) With light/dark ratio 1:1; no time delay
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression
9) Do not bend when temperature is below -32° F (0° C)
10) Depending on fork width

Output function

Switching type:	Light switching (Q)		Dark switching ($\bar{Q}$)	
Light path free	Yes	No	Yes	No
PNP/NPN output	HIGH	LOW	LOW	HIGH
Function indicator (yellow)	On	Off	Off	On

Connection diagram





wire colors refer to standard cable, not included

WF Next, Teach-In

Fork Sensors



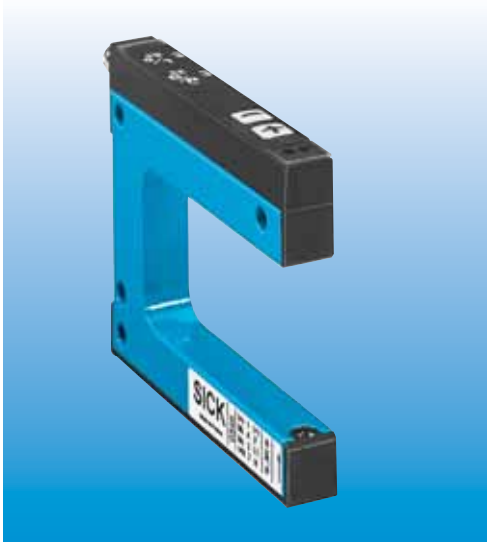
0.08...4.7 in (2...120 mm)
sensing range

CE

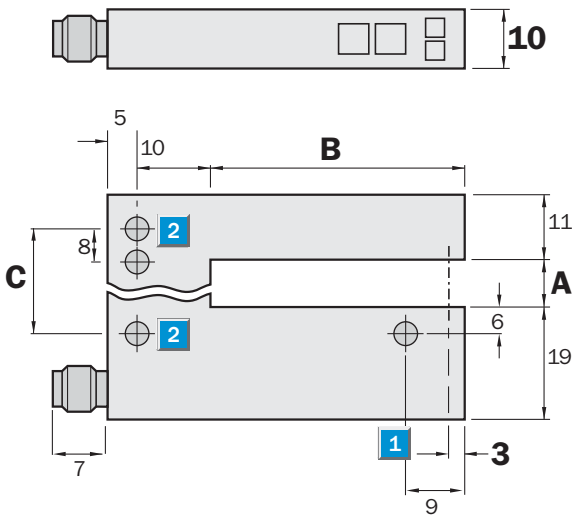
Highlights

- Simple setup using two-point teach-in
- PNP and NPN switching output
- Selectable light/dark switching
- Rugged aluminum housing

WF Next



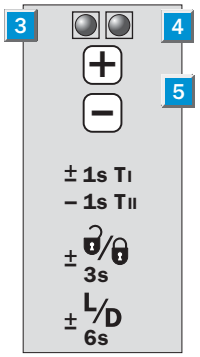
Dimensional drawing



dimensions in mm

Adjustments

All types



1 Optical axis
2 Mounting holes, Ø 4.2 mm
3 Function indicator (red)
4 Function indicator (yellow), switching output
5 "+"/"-" buttons and function button

Dimensions

	A (mm) Fork width	B (mm) Fork depth	C (mm)
WF2	**2**	42/59/95	14
WF5	**5**	42/59/95	14
WF15	**15**	42/59/95	27
WF30	**30**	42/59/95	42
WF50	**50**	42/59/95	40
WF80	**80**	42/59/95	70
WF120	**120**	42/59/95	110

Accessories	page
Cables and connectors	1180

Order information

Fork depth 40 mm		Fork depth 60 mm		Fork depth 95 mm	
Type	**Part no.**	**Type**	**Part no.**	**Type**	**Part no.**
WF2-40B416	6028450	WF2-60B416	6028457	WF2-95B416	6028464
WF5-40B416	6028451	WF5-60B416	6028458	WF5-95B416	6028465
WF15-40B416	6028452	WF15-60B416	6028459	WF15-95B416	6028466
WF30-40B416	6028453	WF30-60B416	6028460	WF30-95B416	6028467
WF50-40B416	6028454	WF50-60B416	6028461	WF50-95B416	6028468
WF80-40B416	6028455	WF80-60B416	6028462	WF80-95B416	6028469
WF120-40B416	6028456	WF120-60B416	6028463	WF120-95B416	6028470

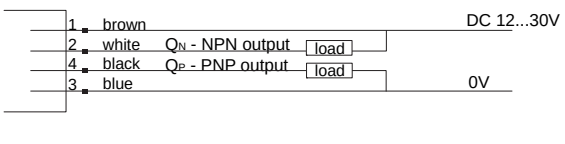
Technical data	WF-	2-XX[1] B416	5-XX[1] B416	15-XX[1] B416	30-XX[1] B416	50-XX[1] B416	80-XX[1] B416	120-XX[1] B416
Sensing range/fork width	0.1 in (2 mm)	■						
	0.2 in (5 mm)		■					
	0.6 in (15 mm)			■				
	1.2 in (30 mm)				■			
	2.0 in (50 mm)					■		
	3.2 in (80 mm)						■	
	4.7 in (120 mm)							■
Fork depth	40, 60, or 95 mm	■	■	■	■	■	■	■
Light source	LED, infrared modulated	■	■	■	■	■	■	■
Minimum detectable object size	0.008 in (0.2 mm)	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■	■
Current consumption[3]	40 mA	■	■	■	■	■	■	■
Residual ripple[4]	< 10%	■	■	■	■	■	■	■
Switching output	PNP/NPN	■	■	■	■	■	■	■
	Light/dark adjustable via button	■	■	■	■	■	■	■
Signal voltage		■	■	■	■	■	■	■
PNP	HIGH = V_S – (< 2 V)/LOW = 0 V	■	■	■	■	■	■	■
NPN	HIGH = V_S/LOW = < 2 V	■	■	■	■	■	■	■
Output current	100 mA	■	■	■	■	■	■	■
Stability of response time[5]	± 20 µs	■	■	■	■	■	■	■
Response time[5], switching frequency[6]	Max. 100 µs; 10,000/s	■	■	■	■	■	■	■
Teach-in via button		■	■	■	■	■	■	■
Initialization time	100 ms							
Ambient light safety		■	■	■	■	■	■	■
Incandescent lamp	5,000 Lux	■	■	■	■	■	■	■
Sunlight	10,000 Lux	■	■	■	■	■	■	■
VDE protection class[7]	III	■	■	■	■	■	■	■
Enclosure rating	IP 65	■	■	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■	■	■
Ambient temperature[9]	Operation -4…140° F (-20…60° C)	■	■	■	■	■	■	■
	Storage -22…176° F (-30…80° C)	■	■	■	■	■	■	■
Housing	Aluminum	■	■	■	■	■	■	■
Weight	Approx. 1.26…5.6 oz (36…160 g)[10]							

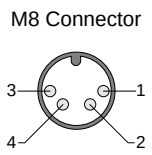
1) XX = Fork depth (e.g. 40 = fork depth equivalent to 40 mm)
2) Limit values, reverse polarity protected
3) Without load
4) May not exceed or fall short of V_S tolerances
5) Signal transit time with resistive load
6) With light/dark ratio 1:1; no time delay
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression
9) Do not bend when temperature is below -32° F (0° C)
10) Depending on fork width

Output function

Switching type:	Light switching (Q)		Dark switching ($\bar{Q}$)	
Light path free	Yes	No	Yes	No
PNP/NPN output	HIGH	LOW	LOW	HIGH
Function indicator (yellow)	On	Off	Off	On

Connection diagram

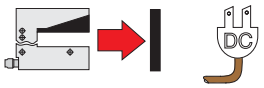




wire colors refer to standard cable, not included

UF3

Fork Sensors



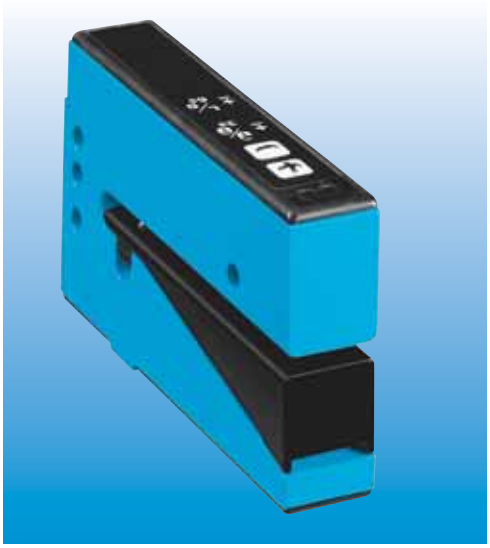
0.1 in (3 mm)
sensing range

CE

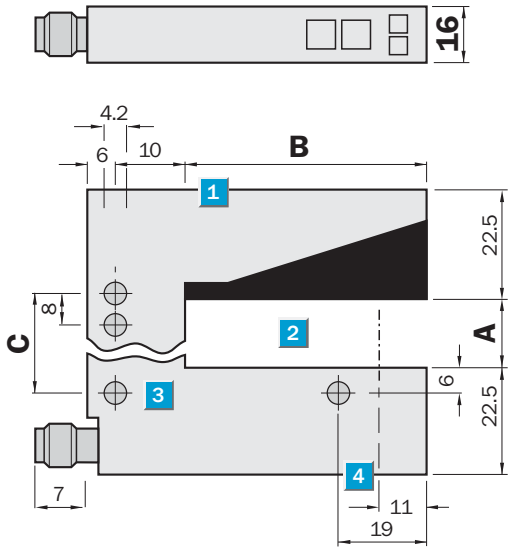
Highlights

- Detection of labels – whether transparent, opaque or printed
- Unaffected by metallized colors
- Accurate detection through stable response time
- Small, industry-standard housing

UF3



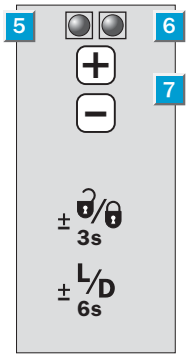
Dimensional drawing



dimensions in mm

Adjustments

All types



1	Screw for removing the leg for cleaning purposes
2	Fork width: Fork width 3 mm; Fork depth 69 mm
3	Mounting holes, Ø 4.2 mm
4	Detection axis
5	Function indicator (yellow), switching output
7	Function indicator (red)
8	"+"/"-" button and function button

Dimensions

	A (mm)	B (mm)	C (mm)
	Fork width	**Fork depth**	
UF3	**3**	**69**	**14**

Order information

Type	Part no.
UF3-70B410	6034888

Accessories	page
Cables and connectors	1180

7028071 - © 2008 SICK, Inc.

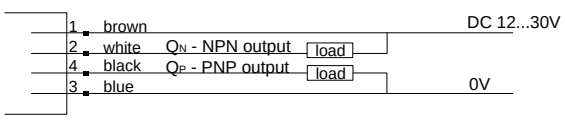
Technical data	UF	3-70 B410
Sensing range/fork width	0.1 in (3 mm)	
Minimum detectable object size[1]		
Gap between labels	0.08 in (2 mm)	
Size of labels	0.08 in (2 mm)	
Supply voltage V_S	10…30 V DC[2]	
Current consumption[3]	40 mA	
Residual ripple (at 10 mA)[4]	< 1 V	
Switching output	PNP/NPN	
	Light/dark adjustable via button	
Signal voltage		
PNP	HIGH = U_V – (< 2 V)/LOW = 0 V	
NPN	HIGH = U_V/LOW = < 2 V	
Output current I_A	100 mA	
Capacitive load	200 nF	
Response time[5]	300 µs	
Initialization time	100 ms	
VDE protection class[6]	III	
Enclosure rating	IP 65	
Circuit protection[7]	B, C	
Ambient temperature	Operation 41…131° F (5…55° C)	
	Storage -22…158° F (-30…70° C)	
Housing	Aluminum	
Weight	Approx. 3.4 oz (95 g)	

1) Depends on label thickness
2) Limit values, reverse polarity protected
3) Without load
4) At 10 mA
5) For 1:1 light/dark ratio, typical, dependent on material and speed
6) Reference voltage 50 V DC
7) B = Outputs short-circuit protected
C = Interference pulse suppression

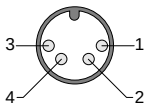
Notes

• Leg can be removed for cleaning.

Connection diagram



M8 Connector



wire colors refer to standard cable, not included

Ultrasonic Sensors



Ultrasonic proximity sensors

- Non-contact detection and distance measurement of objects using ultrasound
- Teach-in
- High measurement accuracy
- Large sensing ranges
- Detects even transparent objects and liquids
- Immune to airborn particulate matter
- Compact, dirt-resistant design
- Binary switching output or analog output



Ultrasonic double-sheet detector

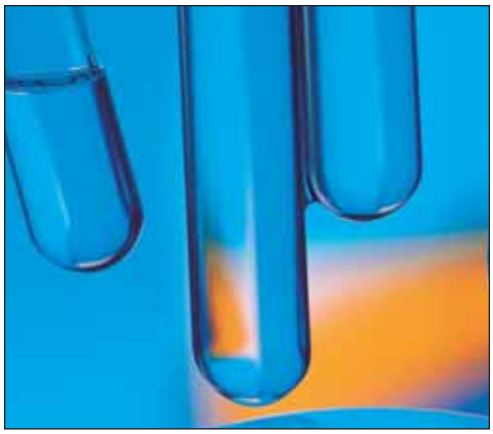
- Detection of double sheets and missing sheets
- Automatic setting, no adjustment necessary
- Spectrum of materials from ultra-thin film to thin metal sheets

Table of Contents

Ultrasonic Sensors	
Theory of Operations	944
Selection Table	949
UM18	950
UM30	954
UC4	960
UC12	962

Theory of Operation...Ultrasonic Sensors











About Ultrasonic Sensors

Light and sound are two natural phenomena which let every living being recognize their environment without physical contact and over widely varying distances. Likewise, industrial processes require reliable environmental information. SICK's UM18, UM30, UC4 and UC12 Ultrasonic Sensors detect objects and measure distances with high accuracy.

Ultrasonic sensors are often the better choice for many industrial applications.



Never confused by loud colors

Not even the oddest colors can bias ultrasonic sensors. Reflective objects do not irritate them at all. When objects change color, there is no need to readjust the sensors. They just go on working as before.



Detection and measurement, regardless of material

Transparent objects such as glass and film often present a challenge for sensors, as do clear and colored fluids. But it is hard to deceive ultrasonic sensors. Almost all materials affect and reflect sound waves.

Sound has an advantage – even on superficial inspection

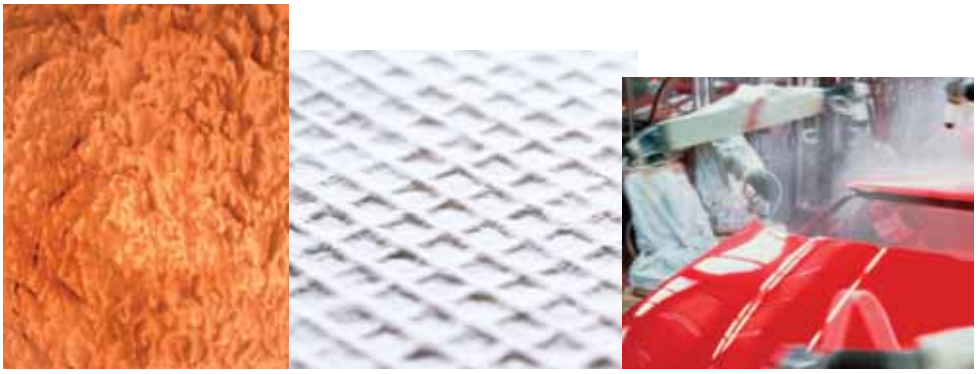
Whether the surface is rough or smooth, reflective or retro-reflective, regular or irregular in shape, ultrasonic sensors are generally unaffected. They reliably detect objects, almost independently of their appearance.



Highly reliable, even under difficult conditions

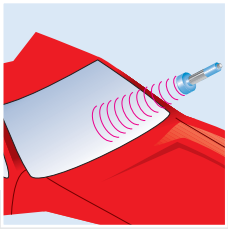
Dust and dirt, steam and spray are no problem for ultrasonic sensors. Unfavorable environments have little effect on them. Interferences are simply “blanked out.” Ultrasonic sensors do not even mind strong light and adverse temperatures.







Detect, measure and switch with the UM 30

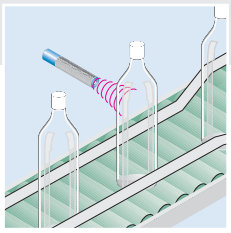


◀ Positioning: object detection and distance measurement independent of material

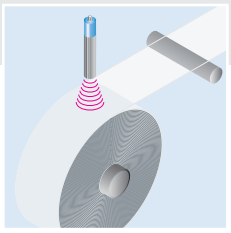
Sensors with a profile – defining the detection area

SICK ultrasonic sensors generate an ultrasonic wave by means of a piezo element in the front part of the housing. The wave spreads in the atmosphere in accordance with the laws of physics. The same piezo element can detect and measure the sound reflected by an object. Therefore, it functions alternately as sender and receiver (transceiver).

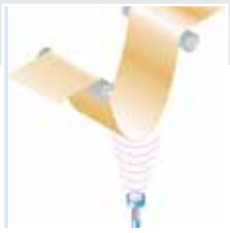
The measurement principle of ultrasonic sensors is based on the time taken for ultrasonic waves to travel through air. The signals are transmitted in defined "packages." With the help of its processing electronics, the transceiver evaluates the time taken between the transmission of a sound "package" and the arrival of the reflection from an object. As a result, either a signal proportionate to the distance is sent via an analog interface, or a switching signal, depending on a previously set distance parameter, is sent through a binary output. The accuracy of the measurement and the maximum sensing range lie within a tolerance range which depends mainly on the state of the carrier medium air and the roughness of the object in question.



◀ Detection: recognize transparent objects



◀ Unwind: distance measurement for diameter check



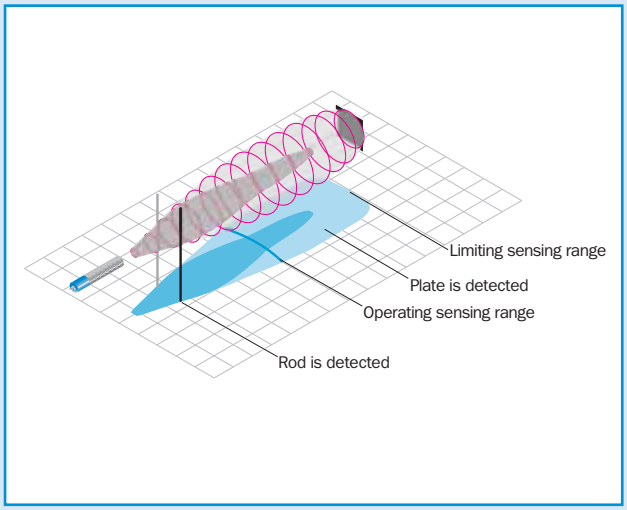
◀ Adjust: Control material looping

Detection range

To determine the detection area of the sensors, a series of measurements are carried out with two standardized objects, a thin round rod and a plate. The three-dimensional area within which the sensor responds to the rod is in the form of a thin club. It marks the typical operating sensing range of the sensor.

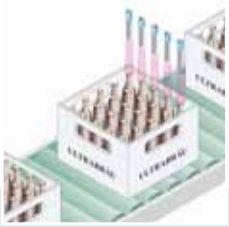
The sensor responds to the plate within the area of a larger beam. This area defines the maximum or limit detection range of the sensor.

When projected onto a two-dimensional grid, typical profiles are created. These are the operating diagrams of the ultrasonic sensors, from which the operating sensing range, the limiting sensing range, the specific shape and the blind zone of the detection range can be read off. Objects which are smaller than the round rod may only be detected within an area smaller than the operating sensing range.



Every ultrasonic sensor has a characteristic club-shaped detection range. It is narrow for smaller objects and wide for larger ones. The typical detection areas are depicted by sound beam diagrams.

Double-sheet detection with SICK UM 18



◀ Package:
check on package content

Sensors in action – sensing and measuring reflections

UM 30 ultrasonic sensors are used as non-contact proximity switches which process reflected signals, e.g. from objects on a conveyor belt. An essential benefit of ultrasonic sensors is the almost complete blanking of the background, a prerequisite for accurate detection.

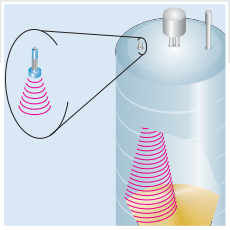
Sensing around corners – thanks to the right accessories

UM 30 ultrasonic sensors are small and easily installed even in confined spaces. And if things get really tight, the right accessories can help out. Suitable reflectors allow sound to be deflected almost without loss.

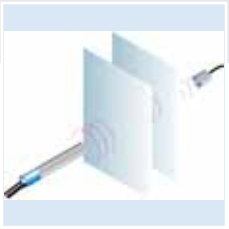
This sound goes right through ...

When an ultrasonic sensor is used to detect two thin sheets, one of which is immediately behind the other, e.g. paper, film or thin sheet material, separate sender and receiver units are required. The continuously transmitted sonic waves packages cause vibrations in the first sheet which it then transmits via the intervening air to the second sheet, which also begins to vibrate. The receiver unit is able to detect these weakened signals via the air.

The sender and receiver units of the UM 18 are only 40 mm apart and work effectively without having to be parametered. They adjust automatically to a wide spectrum of different materials.



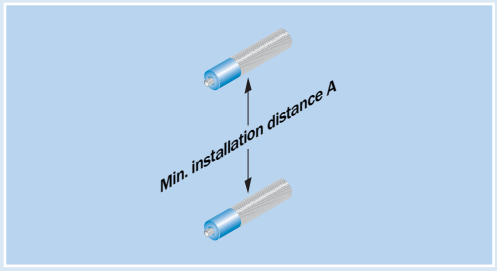
◀ Monitoring:
level control in silos and containers



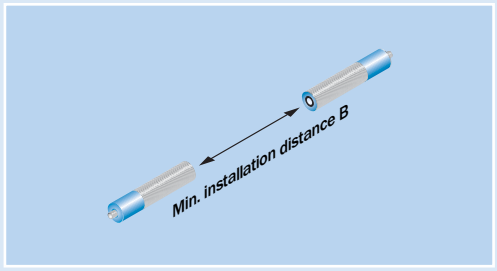
◀ Recognize:
detection of double sheet and misfed sheet

Installation

Ultrasonic sensors installed close together or opposite one another may affect each other mutually. For this reason, different axial and lateral distances have to be maintained depending on the detection range. The sensor with the largest detection range determines the minimum distance.



Operating sensing range	Min. installation distance A	Min. installation distance B
0.25 m	10 cm	≥ 100 cm
0.35 m	≥ 30 cm	≥ 170 cm
1.3 m	≥ 60 cm	≥ 540 cm
3.4 m	≥ 160 cm	≥ 1,600 cm
6 m	≥ 260 cm	≥ 3,000 cm



Reliable detection and measurement with SICK's new ultrasonic sensors

UC4 Features

- Compact ultrasonic sensor in W4 housing
- Standard and low cost versions available
- Sensing distance: 250 mm (standard with temperature compensation), 150 mm (without temperature compensation; low cost)
- Narrow sonic beam
- High reliablity in harsh environmental conditions

UC4 – High-performance ultrasonic sensor in compact design

SICK has developed the new UC4 series of mini ultrasonic sensors for object detection when space is limited, with difficult surfaces and other detection tasks with extreme demands. With its very narrow ultrasonic lobe, and background suppression that is adjustable with millimeter accuracy, the UC4 sensors are capable of reliably solving detection tasks with heightened precision, even under difficult conditions.

UC12 Features

- Sensing distance: 20...150 (250) mm and 55...250 (350) mm
- Temperature compensation
  1 x PNP/NPN switching output
- Excellent background suppression
- Rotatable M12 4-pin plug: L+, M, Q, /Q
- Small & compact W12 housing
- Single push button teach for 3 modes

UC12 Ultrasonic Sensors – small and compact

The UC12 comes in the same compact housing as the W12 series of sensors, and offers complete mechanical and electrical compatibility. It also has a teachable switching point for three modes and rotatable connection plug – providing more flexibility.

The UC12 has a sensing range of 20…250 or 50…350 mm with a switching point that can be taught-in. Due to its IP 67 metal housing, the sensor is suitable for harsh conditions. Another advantage of the UC12 is its ability to detect transparent objects or liquids. In addition to fill level measurement, the UC12 is ideal for positioning tasks, monitoring heights and distances for collision prevention, and other object detection applications.

UM18 Features

- Sensing distance: 30...250 (350 mm)
- 2 versions: High-End & Standard
- Set up/teach-In: Via MF-Input
- High-End variant:
  - Temperature compensation
  - 2 Function LEDs
  - Synchronization
  - ObSB Mode
  - 2 switching outputs

UM18 - Integrated switching reliability for critical objects

The UM18 Ultrasonic Sensor from SICK is ideal for applications where space is limited, as well as for detecting objects with critical levels of reflectivity. The device, in a compact M18 housing, is available in two variants – Standard and High End. Both offer an operating sensing distance between 30 mm and 250 mm, as well as teach-in and switching threshold programming via the control cable. Applications include the detection of transparent objects, checking liquid levels in test tubes, and measuring fill levels.

A background teach-in feature is an additional advantage. Objects with surfaces or shapes that are critical in terms of their sound reflectivity can be reliably detected. This feature is called object between sensor and background mode (foreground suppression). Detecting shiny, colorful, sound absorbent and odd-shaped objects (such as potato chip bags on a conveyor) is possible by teaching the sensor to a constant background.

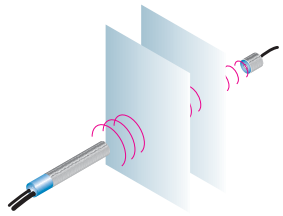
UM18 Double Sheet Detector Features

- 2 PNP outputs for: double sheet and misfed sheet determination
- Detection of different materials
- Plug and Play sensor: automatic adjustment on the material
- Stand-alone device: no additional unit necessary
- Compact design

UM18 Double Sheet Detector

The sender and receiver of the UM18 are located in an 18 mm threaded tube, and, because they are mounted only 40 mm apart, can be accommodated in the most confined spaces. No need to tell it what to do. The UM18 adjusts to its task automatically.

The UM18 can find out whether one or two sheets of film, paper, metal or cardboard lie between its sender and receiver.



UM30 Features

- High flexibility: analog output U/I - automatic adaptation
- Teach-in up to 6 m
- Temperature compensation in the sensor head
- 1 and 2 switching outputs Q and /Q

UM30 Ultrasonic Sensors

The UM30 has three sensing ranges. The minimum operating distance is 30 mm and the long sensing range is 6000 mm. The UM30 is unaffected by dust-laden air, steam, vapor and spray. The background can be blanked almost completely.

The UM30 is available with switching or analog outputs. Depending on the task, objects can simply be detected or their distance measured. Ultrasonic time measurements depend on the medium transmitting the sound, e.g. the air. UM30 sensors automatically compensate for temperature fluctuations, ensuring precision and reliability.

Ultrasonic Sensors

Sensor Type	Sensing Range	Switching Frequency	Voltage	Output			Page
				Single	Double	Analog	
UM 18...	30...250 mm	< 15/s		■	■	■	950
UM 18...	40 mm ± 3 mm	Double sheet detector	12...30 V DC	■	■		952
UM 30-1...	30...250 mm	< 11/s	12...30 V DC	■	■	■	954
UM 30-2...	60...350 mm	< 8/s	12...30 V DC	■	■	■	956
UM 30-3...	200...1300 mm	< 6/s	12...30 V DC	■	■	■	958
UM 30-4...	350...3400 mm	< 3/s	12...30 V DC	■	■	■	960
UM 30-5...	800...6000 mm	< 2/s	12...30 V DC	■	■	■	962
UC 4...	13...150 mm	< 20/s	20...30 V DC	■			960
UC 12...	20...250 mm	< 25/s	10...30 V DC	■			962

UM18

Ultrasonic Sensor

1.2...9.85 in (30...250 mm)
sensing range

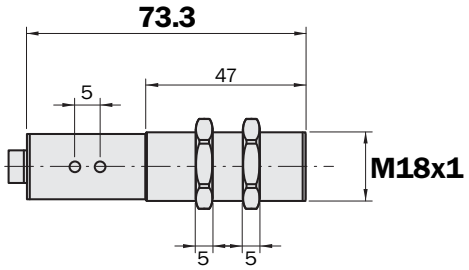
Highlights

- Detection of objects independent of material shape, including films, glass, foil, and bottles
- Synchronization and temperature compensation
- Insensitive to dirt, dust and fog in harsh environment applications
- 1 switching output, 2 switching outputs (PNP or NPN) or analog output
- Sensing mode and deflector mode

UM18



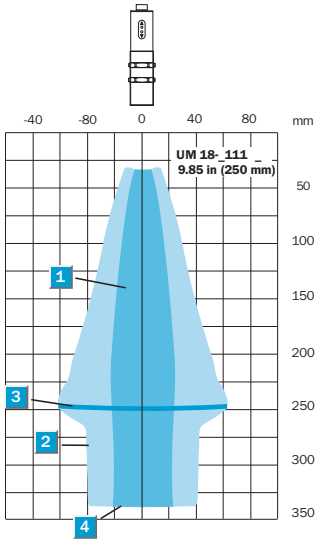
Dimensional drawing



dimensions in mm

1 Locking nuts, 24 mm A/F
2 Connection plug M12
3 LED 1 (UM18-51112, UM18-51114, UM18-11116, and UM18-11117)
4 LED 2 (UM18-51112, UM18-51114, UM18-11116, and UM18-11117)

Detection ranges



1 Aligned plate 500 x 500 mm²
2 Tube diameter 10 mm
3 Operating sensing range
4 Maximum sensing range

Order information	
Type	**Part no.**
UM18-51111	6028965
UM18-51112	6028964
UM18-51114	6028973
UM18-51115	6028974
UM18-11116	6029507
UM18-11117	6029508

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Technical data	UM18-	51111	51112	51114	51115	11116	11117			
Operating distance	1.2…9.85 in (30…250 mm) (max. 350 mm)	■	■	■	■	■	■			
Ultrasonic frequency	320 kHz	■	■	■	■	■	■			
Resolution	0.36 mm	■	■	■	■	■	■			
Reproducibility	Typ. ± 0.15% of final value	■	■	■	■	■	■			
Accuracy	≤ 2% of final value		■	■		■	■			
Operating voltage	V_S = 10…30 V DC	■	■	■	■	■	■			
Residual ripple	10%	■	■	■	■	■	■			
Current consumption	≤ 40 mA	■	■	■	■	■	■			
Control input MF	Teach-in	■	■	■	■	■	■			
Switching outputs PNP, invertible	1 x PNP[1]	■								
	2 x PNP[2]		■							
Switching outputs NPN, invertible	1 x NPN[3]				■					
	2 x NPN[4]			■						
Analog output	4…20 mA R_L ≤ 100 Ω at 10 V ≤ V_S ≤ 20 V					■				
	R_L ≤ 500 Ω at V_S ≥ 20 V									
	0…10 V R_L ≥ 100 kΩ at V_S ≥ 15 V						■			
Temperature compensation	Yes		■	■		■	■			
Synchronization option	Yes		■	■		■	■			
Functional display	Yes		■	■		■	■			
Scanning mode	Yes	■	■	■	■	■	■			
Object between sensor and background mode	Yes		■	■						
Switching hysteresis	2.0 mm ± 10%	■	■	■	■	■	■			
Switching frequency	15 Hz	■	■	■	■					
Response time	32 ms	■	■	■	■	■	■			
Standby delay	< 300 ms	■	■	■	■	■	■			
Enclosure rating to EN 60 529	IP 67	■	■	■	■	■	■			
Connection Type	M12 plug, 5-pin	■	■	■	■	■	■			
Display elements	2 yellow LEDs		■	■		■	■			
Ambient temperature	Operation: -13…158° F (-25…70° C)	■	■	■	■	■	■			
	Storage: -40…185° F (-40…85° C)	■	■	■	■	■	■			
Weight	Approx. 65 g (with 2 nuts)	■	■	■	■	■	■			
Housing material	Sensor: brass tube, nickel plated	■	■	■	■	■	■			
	Plastic parts: PBT	■	■	■	■	■	■			
	Ultrasonic converter: polyurethane foam, epoxy resin with glass content	■	■	■	■	■	■			

1) (L+) – 2 V, I_{max} = 500 mA, short-circuit proof

2) (L+) – 2 V, I_{max} = 2 x 500 mA, short-circuit proof

3) M + 2 V, I_{max} = 500 mA, short-circuit proof

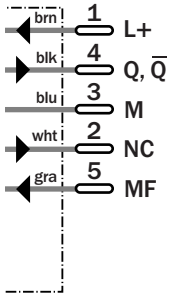
4) M + 2 V, I_{max} = 2 x 500 mA, short-circuit proof

Connection diagram

UM18-51111
UM18-51115



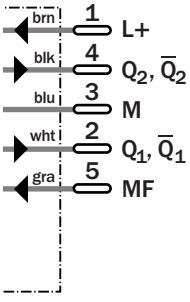
5-pin, M12



UM18-51112
UM18-51114



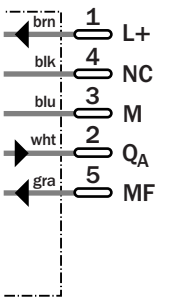
5-pin, M12



UM18-11116
UM18-11117



5-pin, M12



UM 18 Double Sheet Detector

Ultrasonic Sensors

1.6 in ±0.12 in (40 mm ±3 mm)
detection range

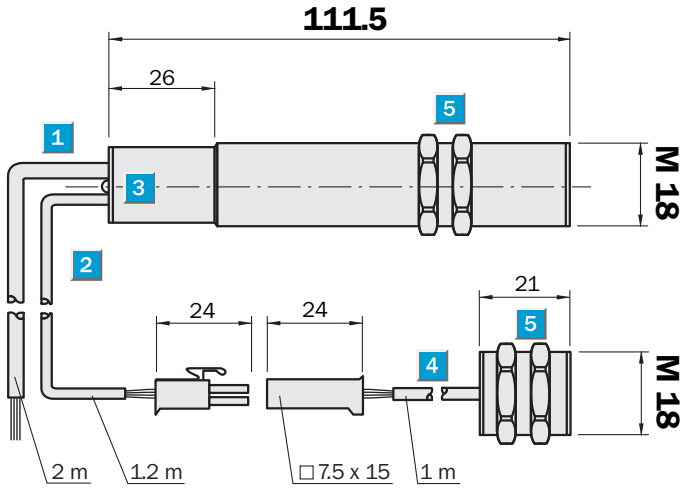
Highlights

- Double-sheet detection of foils, metal sheets and ultra-fine corrugated cardboard
- Automatic adjustment, no teach-in necessary
- Color-independent
- Plug & Play
- 2 PNP outputs for double and mis-fed-sheets

UM 18

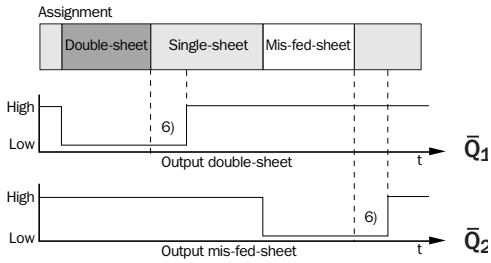


Dimensional drawing



dimensions in mm

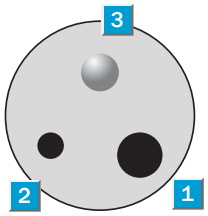
Detection range



6) Off delay

Adjustments

UM 18-20012



1 Connection cable 2 m (receiver)
2 Connection cable 1.2 m, 2-pin sender and receiver
3 2-color LED indicator, receiver
4 Connection cable 1 m, 2-pin sender and receiver
5 Fastening nuts, width across 24 mm

Order information

Type	Part no.
UM 18-20012	6 025 670

Accessories

	page
Cables and connectors	1180
Mounting systems	1234

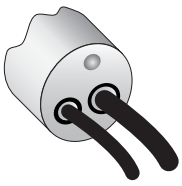
Technical data	UM 18-	20012
Installation distance		
sender – receiver	1.6 in ± 0.12 in (40 mm ± 3 mm)	
Blind zone	0.3 in (7 mm), each time before sender	
	and receiver	
Permissible angle deviation	± 45° perpendicular to sheet	
Ultrasonic frequency	400 kHz	
Resolution	Double-sheets not completely	
	glued together	
Operational area		
Paper grams per square meter	20…1200 g/m²	
Metal-laminated sheets and films	≤ 0.4 mm thickness	
Self-adhesive films, metal sheets	≤ 0.3 mm	
Ultra-fine corrugated cardboard		
Supply voltage V_S	12…30 V DC [1]	
Ripple	± 10%	
Current consumption [2]	≤ 45 mA	
Double-sheet switching/Q_1 [3]	PNP, V_S –2 V, I_{max} = 500 mA	
Misfed sheet switching output/Q_2 [3]	PNP, V_S –2 V, I_{max} = 500 mA	
Response time [4]	2.5 ms or 6.5 ms	
Off delay	10 ms	
V_S at control unit [4]	Response time 6.5 ms: $V_S > 9$ V DC	
	Response time 2.5 ms: $V_S < 5$ V DC	
Standby delay	300 ms	
Connection type	Cable PVC, 2 m; 5 x 0.25 mm²	
Sender cable [5]	PVC, 1.2 m with 2-pin plug	
Receiver cable [5]	PVC, 1 m with 2-pin plug	
Enclosure rating	IP 65	
Ambient temperature	Operation 41…140° F (5…60° C)	
	Storage -40…185° F (-40…85° C)	
Approximate weight	9.9 oz (280 g)	
Housing material	Nickel-plated brass	

1) Limit values
2) Without load
3) Outputs short-circuit protected, Opener; no switching hysteresis
4) If the control line is laid against a ground, the response time is 2.5 ms. If the control line is laid against L+, the response time is 6.5 ms.
5) Not reverse-polarity protected

Connection diagram

UM 18-20012[*]

Receiver



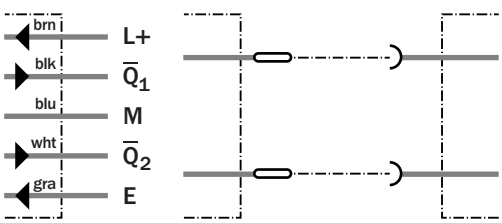
Sender



5 x 0,25 mm²

2-pin

2-pin



UM 30

Ultrasonic Sensors

1.2...51.2 in (30...1300 mm)

detection range

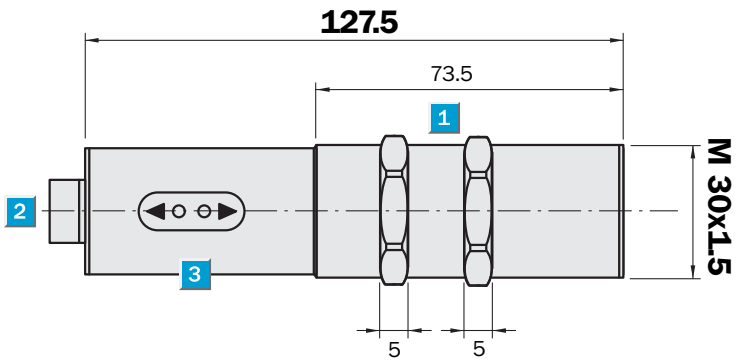
Highlights

- High measurement accuracy due to time-of-flight measurement
- Detection of objects independent of material shape, including films, glass, foil, and bottles
- Teach-in
- Insensitive to dirt, dust and fog
- Operating sensing range up to 1,300 mm
- Binary outputs or analog output

UM 30

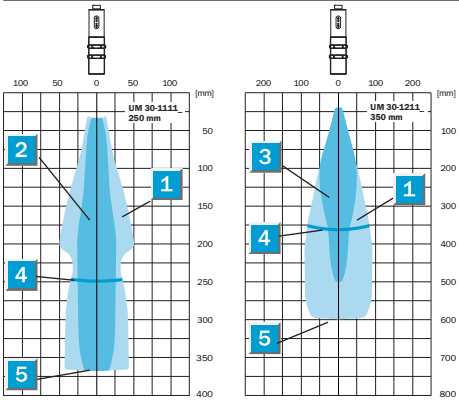


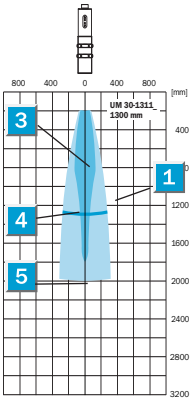
Dimensional drawing



dimensions in mm

Detection ranges

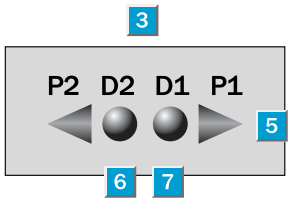




1	Aligned plate 500 x 500 mm
2	Pipe diameter 10 mm
3	Pipe diameter 27 mm
4	Operating detecting range
5	Limiting detecting range

Adjustments

All types



1	Fastening nuts, width across 36 mm
2	Connection plug M12
3	Control and display panel
4	Setting key 2
5	Setting key 1
6	LED 2
7	LED 1

Order information

Type	Part no.
UM 30-11111	6 025 655
UM 30-12111	6 025 656
UM 30-13111	6 025 657
UM 30-11112	6 025 660
UM 30-12112	6 025 661
UM 30-13112	6 025 662
UM 30-11113	6 025 665
UM 30-12113	6 025 666
UM 30-13113	6 025 667

Accessories	page
Cables and connectors	1180
Mounting systems	1234

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Technical data	UM 30-	11111	11112	11113	12111	12112	12113	13111	13112	13113
Operating detection range										
(limiting detection range)	1.2…9.8 in (30…250 mm) [13.8 in (350 mm)]	■	■	■						
	2.4…13.8 in (60…350 mm) [23.6 in (600 in)]				■	■	■			
	7.9…51.2 in (200…1300 mm) [78.7 in (2000)]							■	■	■
Ultrasonic frequency	320 kHz	■	■	■						
	400 kHz				■	■	■			
	200 kHz							■	■	■
Resolution	0.36 mm	■	■	■	■	■	■	■	■	■
Reproducibility	± 0.15% of final value	■	■	■	■	■	■	■	■	■
Accuracy	≤ 2% of final value	■	■	■	■	■	■	■	■	■
Supply voltage V_S	12…30 V DC [1]	■	■	■	■	■	■	■	■	■
Ripple	± 10%	■	■	■	■	■	■	■	■	■
Current consumption [2]	≤ 70 mA	■	■	■	■	■	■	■	■	■
Switching outputs, reversible [3]	Q: PNP, V_S –2 V, I_{max} = 500 mA	■			■			■		
	Q_1, Q_2: PNP, V_S –2 V, I_{max} = 500 mA		■			■			■	
Analog output, reversible [3] [4]	Q_A: 4 ... 20 mA/0 ... 10 V			■			■			■
Response time [5]	50 ms	■	■	■						
	70 ms				■	■	■			
	110 ms							■	■	■
Switching frequency	11/s	■	■							
	8/s				■	■				
	6/s							■	■	
Switching hysteresis	0.8 in (20 mm)							■	■	
	0.2 in (5 mm)				■	■				
	0.09 in (2.5 mm)	■	■							
Standby delay	2 s	■	■	■	■	■	■	■	■	■
Connection type	Plug M12, 5-pin	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 65	■	■	■	■	■	■	■	■	■
Ambient temperature [6]	Operation -4…158° F (-20…70° C)	■	■	■	■	■	■	■	■	■
	Storage -40…185° F (-40…85° C)	■	■	■	■	■	■	■	■	■
Approximate weight	9.2 oz (260 g)	■	■	■	■	■	■	■	■	■
Housing material	Nickel-plated brass	■	■	■	■	■	■	■	■	■

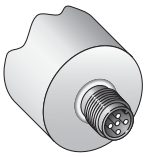
1) Limit values
2) Without load
3) Outputs short-circuit protected
4) Automatic switching between voltage and current outputs dependent on load

Current output 4…20 mA:
R_L ≤ 500 Ω, V_S ≥ 20 V;
R_L ≤ 100 Ω, V_S ≥ 12 V
Voltage output 0 ... 10 V:
R_L ≥ 100 kΩ; V_S > 15 V

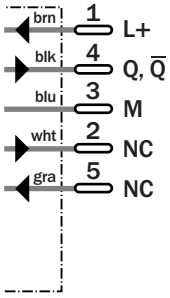
5) Only with UM 30-____3: Recovery time 32 ms according to EMC EN 50 319
6) Temperature compensation at –20 ... +50° C

Connection diagram

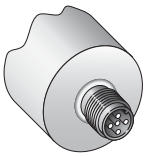
UM 30-11111
UM 30-12111
UM 30-13111



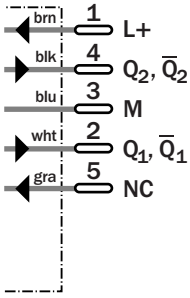
5-pin, M 12



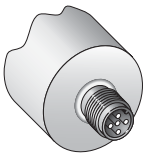
UM 30-11112
UM 30-12112
UM 30-13112



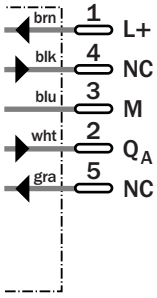
5-pin, M 12



UM 30-11113
UM 30-12113
UM 30-13113



5-pin, M 12



UM 30

Ultrasonic Sensors

13.8...133.9 in (350...3400 mm)
detection range

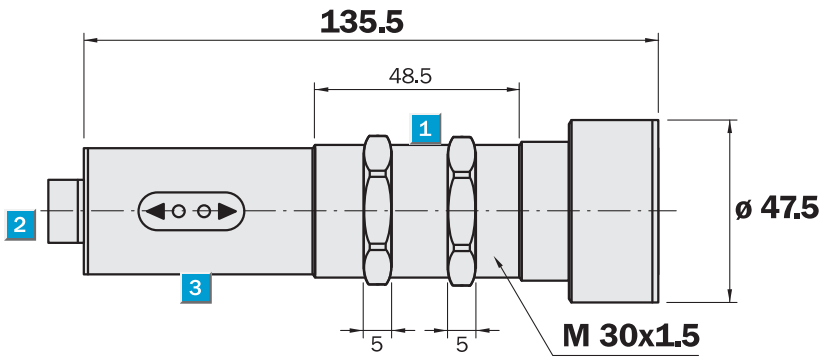
Highlights

- High measurement accuracy due to time-of-flight measurement
- Detection of objects independent of material shape, including films, glass, foil, and bottles
- Teach-in
- Insensitive to dirt, dust and fog
- Operating sensing range up to 3,400 mm
- Binary outputs or analog output

UM 30

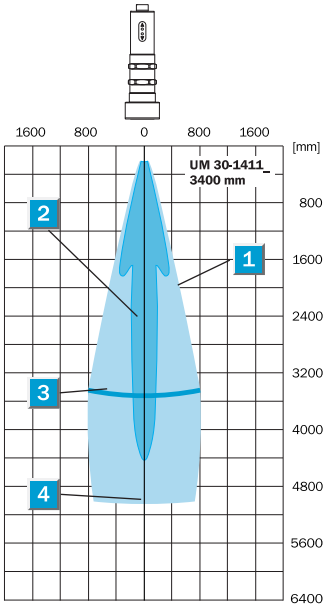


Dimensional drawing



dimensions in mm

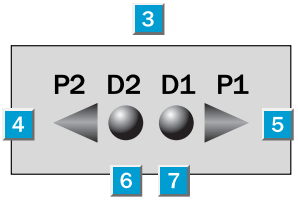
Detection ranges



1	Aligned plate 500 x 500 mm
2	Pipe diameter 27 mm
3	Operating detecting range
4	Limiting detecting range

Adjustments

All types



1	Fastening nuts, width across 36 mm
2	Connection plug M12
3	Control and display panel
4	Setting key 2
5	Setting key 1
6	LED 2
7	LED 1

Order information

Type	Part no.
UM 30-14111	6 025 658
UM 30-14112	6 025 663
UM 30-14113	6 025 668

Accessories	page
Cables and connectors	1180
Mounting systems	1234

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Technical data	UM 30-	14111	14112	14113						
Operating detection range										
(limiting detection range)	13.8…133.9 in (350…3400 mm) [196.8 in (5000 mm)]	■	■	■						
Ultrasonic frequency	120 kHz	■	■	■						
Resolution	0.04 in (1 mm)	■	■	■						
Reproducibility	± 0.15% of final value	■	■	■						
Accuracy	≤ 2% of final value	■	■	■						
Supply voltage V_S	12…30 V DC [1]	■	■	■						
Ripple	± 10%	■	■	■						
Current consumption [2]	≤ 70 mA	■	■	■						
Switching outputs, reversible [3]	Q: 1 x PNP, V_S –2 V, I_{max} = 500 mA	■								
	Q_1, Q_2: 2 x PNP, V_S –2 V, I_{max} = 500 mA		■							
Analog output, reversible [3] [4]	Q_A: 4 ... 20 mA/0 ... 10 V			■						
Response time [5]	180 ms	■	■	■						
Switching frequency	3/s	■	■							
Switching hysteresis	2 in (50 mm)	■	■							
Standby delay	2 s	■	■	■						
Connection type	Plug M12, 5-pin	■	■	■						
Enclosure rating	IP 65	■	■	■						
Ambient temperature [6]	Operation -4…158° F (-20…70° C)	■	■	■						
	Storage -40…185° F (-40…85° C)	■	■	■						
Approximate weight	10.9 oz (310 g)	■	■	■						
Housing material	Nickel-plated brass	■	■	■						

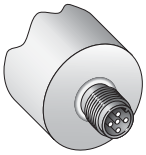
1) Limit values
2) Without load
3) Outputs short-circuit protected
4) Automatic switching between voltage and current outputs dependent on load

Current output 4 ... 20 mA:
R_L ≤ 500 Ω, V_S ≥ 20 V;
R_L ≤ 100 Ω, V_S ≥ 12 V
Voltage output 0 ... 10 V:
R_L ≥ 100 kΩ; V_S > 15 V

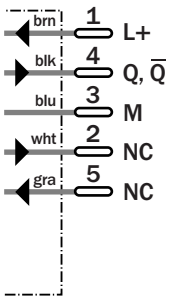
5) Only with UM 30-____3: Recovery time according to EMV EN 50 319
6) Temperature compensation at –20 ... +50 °C

Connection diagram

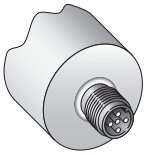
UM 30-14111



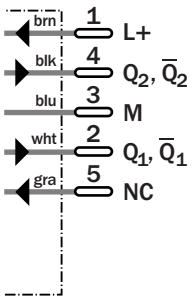
5-pin, M 12



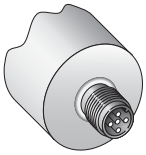
UM 30-14112



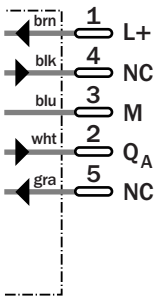
5-pin, M 12



UM 30-14113



5-pin, M 12



UM 30

Ultrasonic Sensors

31.5...236.2 in (800...6000 mm)
detection range

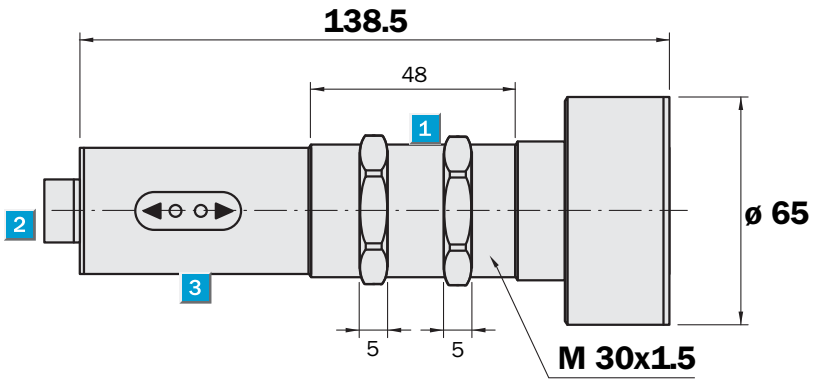
Highlights

- High measurement accuracy due to time-of-flight measurement
- Detection of objects independent of material shape, including films, glass, foil, and bottles
- Teach-in
- Insensitive to dirt, dust and fog
- Operating sensing range up to 6,000 mm
- Binary outputs or analog output

UM 30

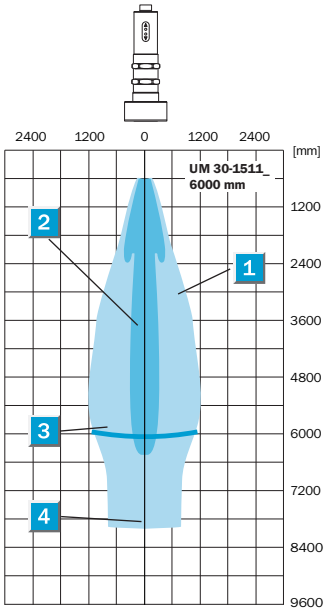


Dimensional drawing



dimensions in mm

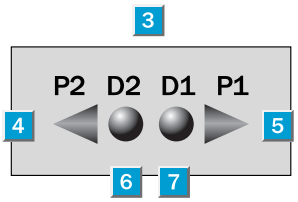
Detection range



1	Aligned plate 500 x 500 mm
2	Pipe diameter 27 mm
3	Operating detecting range
4	Limiting detecting range

Adjustments

All types



1	Fastening nuts, width across 36 mm
2	Connection plug M12
3	Control and display panel
4	Setting key 2
5	Setting key 1
6	LED 2
7	LED 1

Order information

Type	Part no.
UM 30-15111	6 025 659
UM 30-15112	6 025 664
UM 30-15113	6 025 669

Accessories

	page
Cables and connectors	1180
Mounting systems	1234

Technical data	UM 30-	15111	15112	15113						
Operating detection range										
(limiting detection range)	31.5…236.2 in (800…6000 mm) [314.9 in (8000 mm)]	■	■	■						
Ultrasonic frequency	80 kHz	■	■	■						
Resolution	0.04 in (1 mm)	■	■	■						
Reproducibility	± 0.15% of final value	■	■	■						
Accuracy	≤ 2% of final value	■	■	■						
Supply voltage V_S	12…30 V DC [1]	■	■	■						
Ripple	± 10%	■	■	■						
Current consumption [2]	≤ 70 mA	■	■	■						
Switching outputs, reversible [3]	Q: PNP, V_S –2 V, I_{max} = 500 mA	■								
	Q_1, Q_2: 2 x PNP, V_S –2 V, I_{max} = 500 mA		■							
Analog output, reversible [3] [4]	Q_A: 4…20 mA/0…10 V			■						
Response time [5]	240 ms	■	■	■						
Switching frequency	2/s	■	■							
Switching hysteresis	3.9 in (100 mm)	■	■							
Standby delay	2 s	■	■	■						
Connection type	Plug M12, 5-pin	■	■	■						
Enclosure rating	IP 65	■	■	■						
Ambient temperature [6]	Operation -4…158° F (-20…70° C)	■	■	■						
	Storage -40…185° F (-40…85° C)	■	■	■						
Approximate weight	12.7 in (360 g)	■	■	■						
Housing material	Nickel-plated brass	■	■	■						

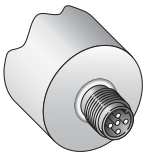
1) Limit values
2) Without load
3) Outputs short-circuit protected
4) Automatic switching between voltage and current outputs dependent on load

Current output 4 ... 20 mA:
R_L ≤ 500 Ω, V_S ≥ 20 V;
R_L ≤ 100 Ω, V_S ≥ 12 V
Voltage output 0 ... 10 V:
R_L ≥ 100 kΩ; V_S > 15 V

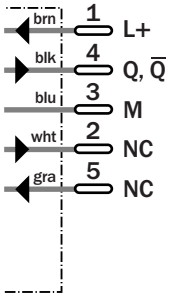
5) Only with UM 30-_ _ _ _3: Recovery time according to EMV EN 50 319
6) Temperature compensation at –20 ... +50° C

Connection diagram

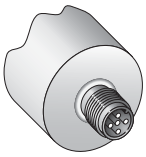
UM 30-15111



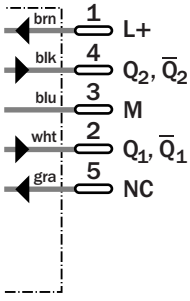
5-pin, M 12



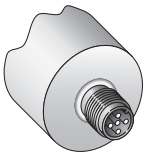
UM 30-15112



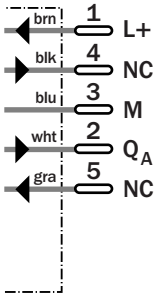
5-pin, M 12



UM 30-15113



5-pin, M 12



UC4

Ultrasonic Sensor

0.5...3.9 in (13...100 mm)
0.5...5.9 in (13...150 mm)
sensing range

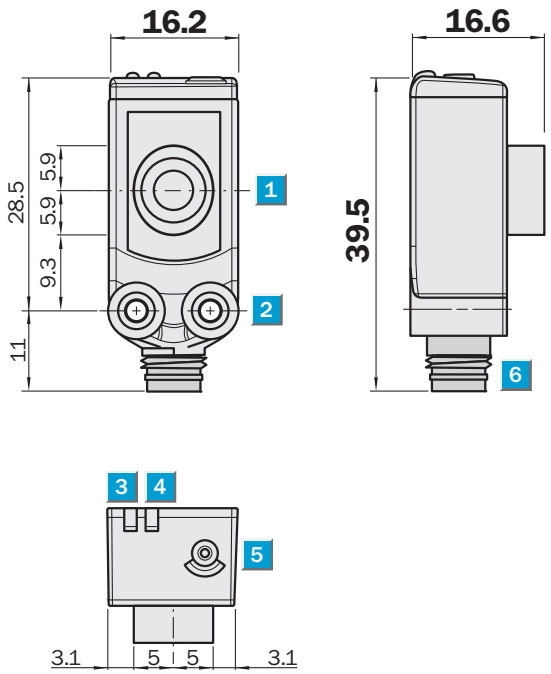
Highlights

- High switching accuracy due to time-of-flight measurement
- Detection of objects independent of material shape, including films, glass, foils, and bottles
- 1 switching output PNP/NPN
- Proximity, Window and Reflector mode
- Insensitive to dirt, dust and fog in harsh environment applications
- Very good background suppression (BGS)

UC4



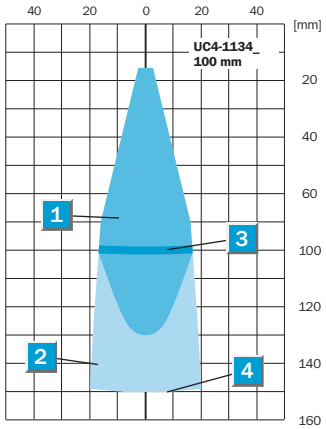
Dimensional drawing

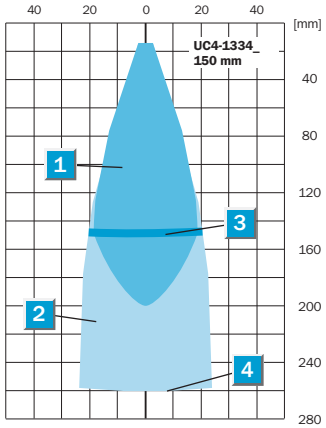


dimensions in mm

1 Center of sender and receiver axis
2 Mounting hole M3
3 LED indicator yellow, status of switching output
4 LED indicator green, power on
5 Teach button
6 Connector M8, 3-pin

Detection ranges





1 Pipe diameter 10 mm
2 Aligned plate 10 x 10 mm²
3 Operating sensing distance
4 Limiting sensing distance

Order information

Type	Part no.
UC4-11341	6034667
UC4-13341	6034669
UC4-11345	6034668
UC4-13345	6034670

Accessories	page
Cables and connectors	1180
Mounting systems	1234

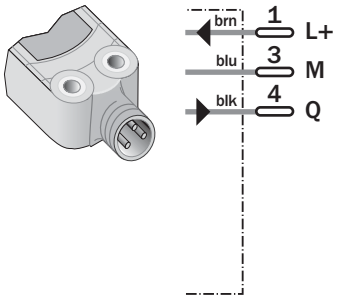
7028071 - © 2008 SICK, Inc.

Technical data	UC4-	11341	13341	11345	13345					
Operating sensing range[1]	0.5…3.9 in (13…100 mm) (max. 150 mm)	■		■						
	0.5…5.9 in (13…150 mm) (max. 250 mm)		■		■					
Ultrasonic frequency	Approx. 380 kHz	■	■	■	■					
Resolution	0.18 mm	■	■	■	■					
Reproducibility	± 0.15%	■	■	■	■					
Temperature drift	0.17%/K	■		■						
	≤ 2%[2][3]		■		■					
Supply voltage V_S	20…30 V DC	■	■	■	■					
Residual ripple	10%	■	■	■	■					
Current consumption	< 25 mA	■	■	■	■					
Switching output[4]	Q, $\overline{Q}$: PNP	■	■							
	Q, $\overline{Q}$: NPN			■	■					
Response time[5]	24 ms	■	■	■	■					
Switching frequency	< 20/s	■	■	■	■					
Switching hysteresis	0.08 in (2.0 mm)	■	■	■	■					
Standby delay	< 300 ms	■	■	■	■					
Indicator	Two color LED green/yellow	■	■	■	■					
Control element(s)	Teach-in button	■	■	■	■					
Connection type	M8 plug, 3-pin	■	■	■	■					
VDE protection class	III	■	■	■	■					
Temperature compensation	Yes		■		■					
Enclosure rating	IP 67	■	■	■	■					
Ambient temperature	Operation: -4…158° F (-20…70° C)	■	■	■	■					
	Storage: -40…185° F (-40…85° C)	■	■	■	■					
Weight	Approx. 0.4 oz (10 g)	■	■	■	■					
Housing material[6]	ABS plastic	■	■	■	■					

1) Teach-in from 21 mm onward
2) Reference: limiting sensing range
3) After maximum of 30 minutes warm-up time. Erratic temperature changes can cause temporary increase of switching accuracy.
4) Outputs short-circuit protected
I_{max} = 200 mA
PNP: HIGH = V_S - (< 2 V)/LOW = 0 V
NPN: HIGH = V_S/LOW ≤ 2 V
5) Object inserted sideways into measuring range
6) Ultrasonic transducer; Polyurethane-foam, glass epoxy resin

Connection diagram

All types | 3-pin, M8



UC12

Ultrasonic Sensor

0.78...5.91 in (20...150 mm)
2.16...9.85 in (55...250 mm)

sensing range

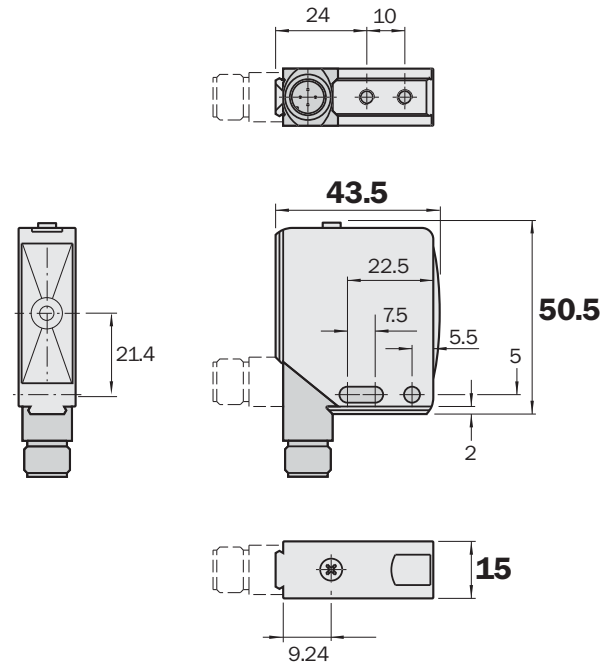
Highlights

- High switching accuracy due to time-of-flight measurement
- Detection of objects independent of material shape, including films, glass, foils, and bottles
- Teach-in with one push button
- Insensitive to dirt, dust and fog in harsh environment applications
- 1 switching output PNP/NPN
- Very good background suppression (BGS)

UC12

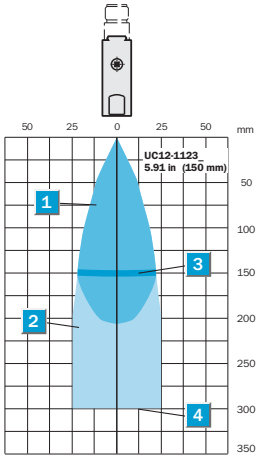


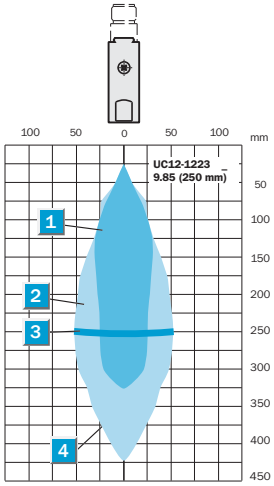
Dimensional drawing



dimensions in mm

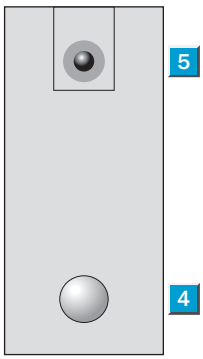
Detection ranges





1 Aligned plate 10 x 10 mm²
2 Pipe diameter 10 mm
3 Operating sensing distance
Limiting sensing distance

Adjustments



1 Center of sender and receiver axis
2 M4 threaded mounting hole – 4 mm deep
3 Mounting hole Ø4.2 mm
4 Control element(s)
5 Signal strength indicator

Order information

Type	Part no.
UC12-11231	6029831
UC12-12231	6029832
UC12-11235	6029833
UC12-12235	6029834

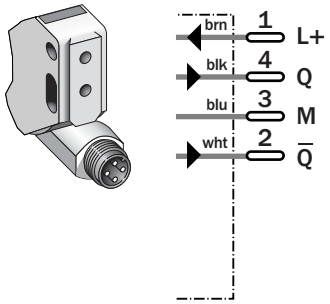
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Technical data	UC12-	11231	12231	11235	12235					
Operating sensing range	0.78…5.91 in (20…150 mm) (max. 250 mm)	■		■						
	2.16…9.85 in (55…250 mm) (max. 350 mm)		■		■					
Angle of sound-beam	See detection ranges	■	■	■	■					
Ultrasonic frequency	Approx. 380 kHz	■		■						
	Approx. 500 kHz		■		■					
Resolution	0.18 mm	■	■	■	■					
Reproducibility	± 0.15%	■	■	■	■					
Accuracy	≤ 2%[1]	■	■	■	■					
Supply voltage V_S	10…30 V DC	■	■	■	■					
Residual ripple	10%	■	■	■	■					
Current consumption	< 40 mA	■	■	■	■					
Switching output[2]	PNP: U_V – 2 V, I_{max} = 500 mA	■	■							
	NPN: -U_V + 2 V, I_{max} = 500 mA			■	■					
Response time	27 ms	■	■	■	■					
Switching frequency	< 25/s	■	■	■	■					
Switching hysteresis	2.0 mm	■	■	■	■					
Standby delay	< 300 ms	■	■	■	■					
Indicator	Two color LED green/yellow	■	■	■	■					
Control element(s)	Teach-in button	■	■	■	■					
Connection type	M12 plug, 4-pin	■	■	■	■					
VDE protection class	III	■	■	■	■					
Temperature compensation	Yes	■	■	■	■					
Enclosure rating	IP 67	■	■	■	■					
Ambient temperature	Operation: -4…158° F (-20…70° C)	■	■	■	■					
	Storage: -40…185° F (-40…85° C)	■	■	■	■					
Weight	Approx. 2.6 oz (75 g)	■	■	■	■					
Housing material[3]	Nickel-plated brass	■	■	■	■					

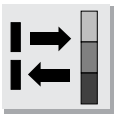
1) Reference: limiting sensing distance
2) Outputs short-circuit protected
3) Ultrasonic transducer: Polyurethane-foam, glass epoxy resin

Connection diagram

All types | 4-pin, M12



Contrast, Color and Luminescence Sensors



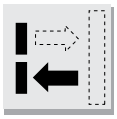
Contrast sensors

- Very high contrast resolution
- Switching threshold can be set manually or by teach-in (static or dynamic)
- User-friendly setting via display
- High switching frequency
- Can detect print marks using the difference in contrast between the marks and the background
- Also available with fiber-optic cables



Color sensors

- Identification, checking and sorting according to color
- Precise color recognition using transmitted and incidental light
- Detection of up to three colors
- Simple programming by means of teach-in
- Also available with fiber-optic cables



Luminescence sensors

- React to luminescent subtances
- Detect markings otherwise invisible to the naked eye
- Sensing range adjusted by changing lens
- Also available with fiber-optic cables

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KTL10	996

Color sensors	
CSM1	998
CS8	1000
CSL1	1002

Luminescence sensors	
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LUT3-6	1006
LUT3-8	1008
LUT3-9	1010
LUT1-4	1012
LUT1-5	1014

Theory of Operation...Contrast Sensors

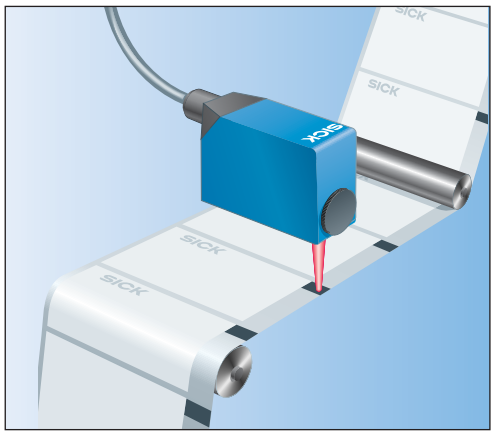
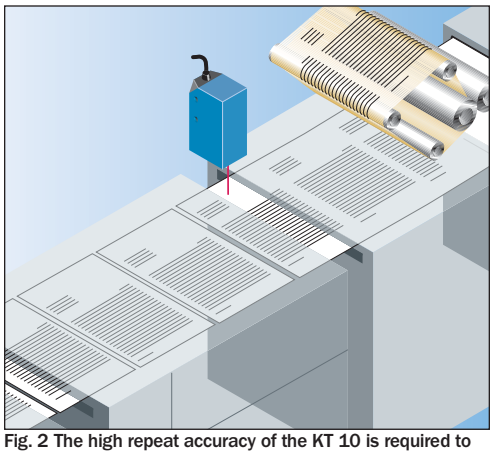


Fig. 1 Contrast sensor


Fig. 2 The high repeat accuracy of the KT 10 is required to ensure precise cutting

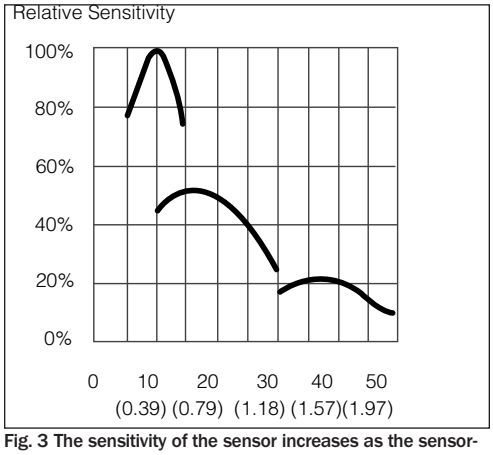


Fig. 3 The sensitivity of the sensor increases as the sensor-to-object distance decreases

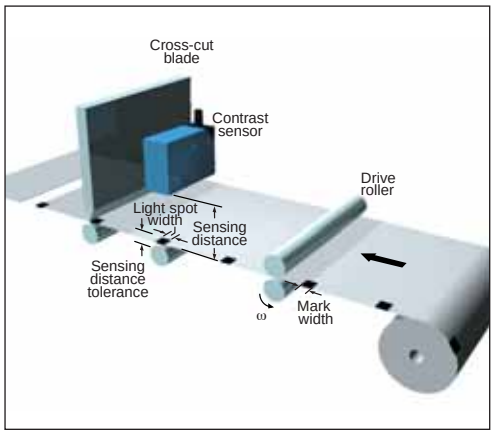


Fig. 4 The sensing distance tolerance is ±3 mm

About Contrast Sensors

Contrast sensors (designated by "KT" as in the KT 10), can be used in a variety of applications, including positioning data processing forms, positioning labels, cans or tubes, and recognizing codes. The contrast sensor signals the machine control to cut, fold, or fuse material or to stop material feed.

Contrast sensors detect registration marks by monitoring changes in the light reflected by the background and the mark. The mark is the symbol on the object that the contrast sensor must detect; the background is the area around the registration mark and must be in contrast to the mark.

Contrast sensors recognize colors as gray scale values. Therefore, two colors such as red and green that have approximately the same gray scale value may be difficult for a sensor to distinguish. When a sensor lens is chosen to increase the operating range, the contrast between the mark and the background may need to be increased. An ideal contrast is black and white.

The receiver in the contrast sensor detects the reflected light and converts it into an analog voltage. This voltage is dependent on the color or reflectivity of the scanned material, thus allowing the registration mark to be detected. As part of the setup procedure, the voltage level for the lighter color is stored in memory. The switching threshold is then set in relation to the stored level.

Each time the analog voltage from the received light exceeds or drops below the switching threshold, an output from the sensor is triggered.

Contrast detection is increased by utilizing a sensor that has 3 LEDs; red, green and blue. With these sensors, during the teach-in process the sensor compares the voltage levels for mark and background for each LED. Then, the sensor selects the LED that has the largest voltage difference and uses that LED. Contrast resolution is improved, with no loss of switching speed.

Sensing Distance
The sensing distance is the distance between the front edge of the lens and the scanned material. This distance is a function of the selected optics. The sensitivity of the contrast sensor increases as the sensor-to-object distance decreases, as shown in Fig. 3.

The sensing distance tolerance is approximately ± 3 mm (± 0.12 in), depending on the contrast level. This is the range within the distance from sensor to material can vary and the sensor will still reliably detect marks. An example is shown in Fig. 4.

Light Spot Orientation
The light spot may be vertical/parallel to the body of the contrast sensor, or the light spot may be horizontal/perpendicular to it, depending on the model selected. For the most reliable detection, the long side of the light spot should be parallel to the long side of the mark.

Lens Position
The lens position of contrast sensors can be changed 90 degrees by moving the lens and the threaded cap. (Not available on KT 2 or KT 3.)

Installation
The best location for the KT is where the scanned material experiences the least lateral and vertical movement (flutter). The sensor works best when positioned as close as possible to the designated focal point.

Lateral movement can be compensated for by increasing the length of the mark. However, flutter must remain within the sensing distance tolerance, or the contrast and the operating reliability will be significantly reduced. An optimum arrangement would be to guide the material over a fixed roller with the KT aimed at the surface of the roller.

Mounting brackets should be designed and installed with sufficient stability to prevent strong vibrations from affecting the KT. The selected location should be shielded from extremely bright ambient light. The lens can be installed in either opening depending on the location of the scanning plane.

If the scanned material has a glossy (reflective) surface, the sensor should be mounted at an angle approximately 10-15 degrees perpendicular to the scanned material.

Theory of Operation...Color Sensors

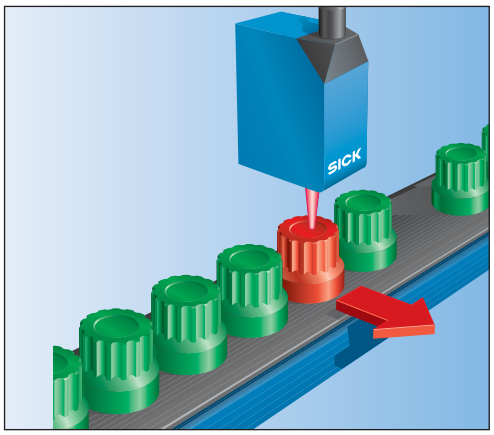


Fig. 1 Color sensor sorting colored products

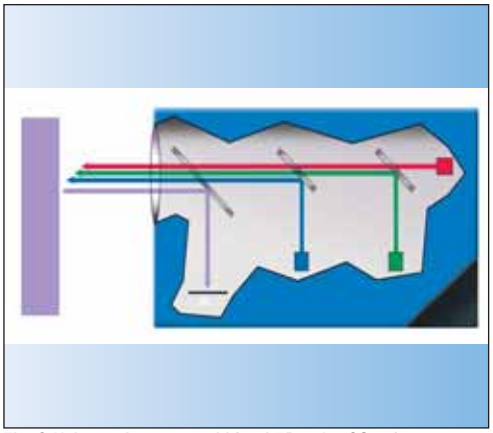

Fig. 2 Using red, green and blue LEDs, the CS color sensor can detect even very subtle changes in color


Fig. 3 A CS sensor checking the color of thread before it is packaged


Fig. 4 The CS ensures all cans are packed facing the same way



About Color Sensors

The CSM1, CS81 and CS84 color sensors are small, compact and powerful for color detection of either opaque or transparent targets. Consequently, these can be used for the automation of all industrial processes where color is a factor.

These sensors use three colored LEDs simultaneously as their light source and evaluate both the wavelength and amount of reflected light. The measured values are compared with stored reference color values that the operator enters using a simple teach-in process. If the values are within the defined tolerance, the sensor produces an output. Depending on the application, one or four reference colors can be taught and stored by the sensor. Color sensors are also extremely insensitive to ambient light sources.

Theory of Operation...Luminescence Sensors

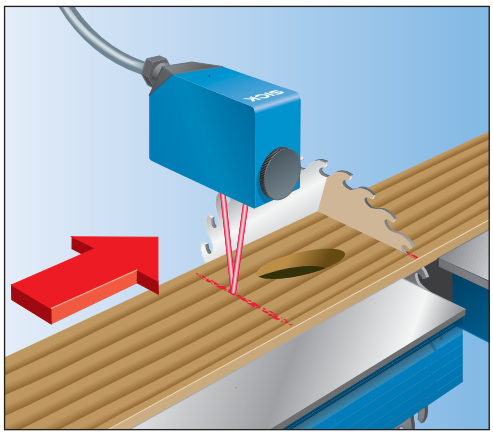


Fig. 1 LUT looking for fluorescent marks on lumber to control the circular saw

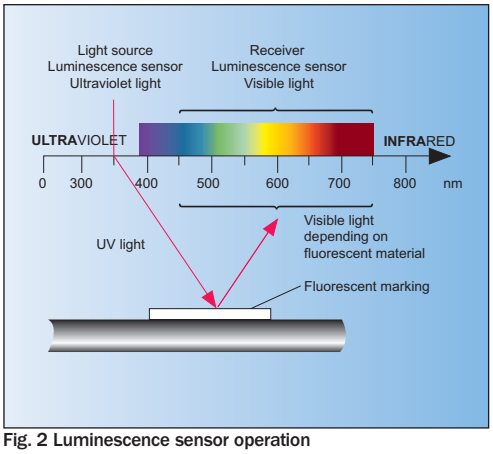


Fig. 2 Luminescence sensor operation



Fig. 3 Label verification by LUT 3-8 in the pharmaceutical industry

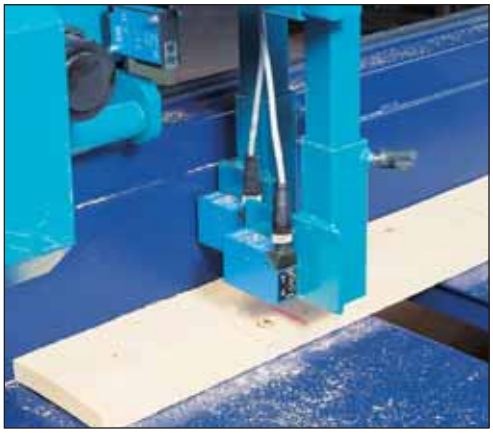


Fig. 4 LUT 3-9 with filter detects markings used to control a saw

About Luminescence Sensors

Luminescence sensors offer unparalleled power; luminescence sensors are able to handle more advanced applications than standard photoelectric proximity sensors. In the case of a registration mark on an irregular background that can't be read reliably (such as grained wood), a luminescence sensor may help. The sensitivity of the device can be set with a potentiometer to allow optimum adjustment to the fluorescent material. The background that the fluorescent material is applied to doesn't affect the level of detection reliability.

The LUT series reacts only to luminescent materials activated by the UV light source in the sensor (Fig. 2). Luminescent pigments can be added to the target or can be applied in the form of colored marks with fluorescent chalk or paint (Fig. 1, 4). Since these markings can also be invisible, they can be used as control marks on goods for proof of authenticity, without spoiling the appearance of the finished product.

Selection Table...Contrast Sensors

Contrast sensors

Sensor Type	Sensing Distance	Switching Frequency	Light Source					Sensitivity Adj.		Housing Material		Page
			Red	Laser	IR	Green	Blue	Manual	Teach-in	Metal	Plastic	
KT 3	12.5 mm	10 kHz	■			■	■		■		■	972
KT 3L	60 mm	1.5 kHz		■					■		■	974
KT 2	13.5 mm	10 kHz	■			■		■		■		976
KT 5G-2	10/20/40 mm	10 kHz				■		■		■		978
KT 5G-2 Teach	10/20 mm	10 kHz				■			■	■		980
KT 5W-2 Dyn. Teach	10/20 mm	10 kHz	■			■	■		■	■		982
KT 5G-2 Auto.	10 mm	10 kHz				■		■		■		984
KT 5W-2 Mark Teach	10 mm	10 kHz	■			■	■		■	■		986
KT 8L	800 mm	17 kHz		■					■	■		988
KT 10W-2	12.5 mm	25 kHz	■			■	■		■	■		990
KTL 5G-2	Dependent on fiber	10 kHz				■		■		■		992
KTL 5W-2 Dyn. Teach	Dependent on fiber	10 kHz	■			■	■		■	■		994
KTL 10W	Dependent on fiber	25 kHz	■			■	■		■	■		996

Selection Table...Color and Luminescence Sensors

Color sensors

Sensor Type	Sensing Distance	Switching Frequency	Output	Light Source			Sensitivity Adj.		Housing Material		Page
				Red	Green	Blue	Manual	Teach-in	Metal	Plastic	
CSM 1	12.5 mm	1500 Hz	PNP/NPN	■	■	■		■		■	998
CS81	12.5/60 mm	5000 Hz	PNP/NPN	■	■	■		■	■		100
CS84	12.5/60 mm	3500 Hz	PNP/NPN	■	■	■		■	■		100
CSL 1	Dependent on fiber	1000 Hz	PNP/NPN	■	■	■		■	■		102

Luminescence sensors

Sensor Type	Sensing Distance	Switching Frequency	Output	Light Source	Sensitivity Adj.		Housing Material		Page
				UV	Manual	Teach-in	Metal	Plastic	
LUT 2	12.5 mm	500/2000 Hz	PNP/NPN	■		■		■	1004
LUT 3-6	10...50 mm	1.5 kHz	PNP/NPN	■	■		■		1006
LUT 3-8	10/20/50/90 mm	1.5 kHz	PNP/NPN/Analog	■	■		■		1008
LUT 3-9	10/20/50/90 mm	1.5 kHz	PNP/NPN/Analog	■	■		■		1010
LUT 1-5	1.5...140 mm	250 hz	PNP/NPN/Analog	■	■		■		1012
LUT 1-4	5...300 mm	5 kHz	PNP/Analog	■	■		■		1014

KT 3

Contrast Sensors



0.5 in (12.5 mm)
sensing distance

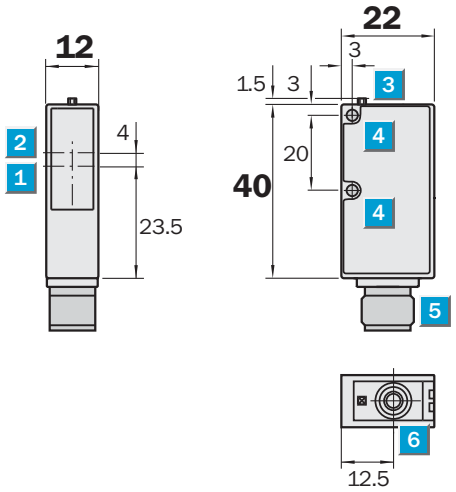
Highlights

- Green or red/green/blue light source
- Integrated switching threshold adjustment for detection of extremely shiny objects
- Teach-in sensitivity adjustment, mark and background
- Small, compact housing
- High switching frequency

KT 3

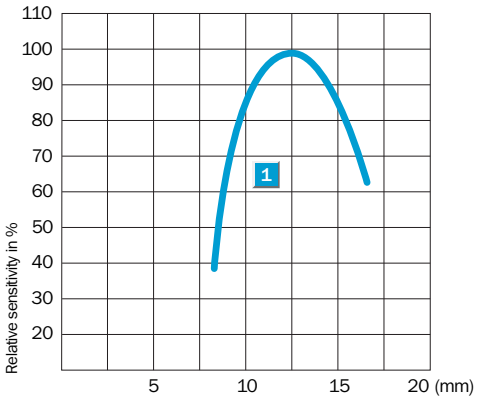


Dimensional drawing



dimensions in mm

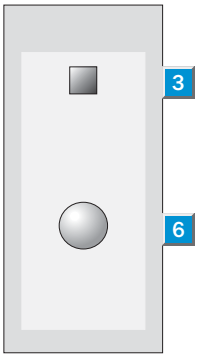
Relative sensitivity



1 Sensing distance 12.5 mm

Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 LED signal strength indicator
4 Mounting hole Ø 0.1 in (3 mm)
5 Plug, M12 4-pin
6 Operating components

Order information

Type	Part no.
KT 3W-P1116	1 019 338
KT 3W-N1116	1 019 337
KT 3G-P1116	1 019 446
KT 3G-N1116	1 019 445

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Technical data	KT 3-	W-P 1116	W-N 1116	G-P 1116	G-N 1116
Sensing distance	0.5 in ± 0.08 in (12.5 mm ± 2 mm)	■	■	■	■
Light spot dimensions	0.06 x 0.26 in (1.5 x 6.5 mm)	■	■		
	0.06 x 0.14 in (1.5 x 3.5 mm)			■	■
Light source[1], light type	Red, green, blue	■	■		
	Green			■	■
Supply voltage V_S	24 V DC ± 20%	■	■	■	■
Ripple[2]	< 5 V_{PP}	■	■	■	■
Current consumption[3]	< 35 mA	■	■	■	■
Switching outputs	NPN: HIGH = V_S / LOW = < 2 V		■		■
	PNP: HIGH = V_S- < 2 V/ LOW = approx. 0 V	■		■	
Output current I_A max.	100 mA	■	■	■	■
Response time[4]	50 µs	■	■	■	■
Switching frequency[5]	10 KHz	■	■	■	■
Teach-in input ET	PNP: Teach > 10 V...< V_S	■		■	
	NPN: Teach 0 V		■		■
Connection type	Plug, M12 4-pin	■	■	■	■
VDE protection class[6]	⧈	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Circuit protection[7]	A, B, C	■	■	■	■
Ambient temperature	Operation 14…131° F (-10…55° C)	■	■	■	■
	Storage -13…167° F (-20…75° C)	■	■	■	■
Shock/vibration	To IEC 68	■	■	■	■
Approximate weight	0.7 oz (20 g)	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C
2) May not exceeded or fall short of V_S tolerances
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Reference voltage 50 V DC
7) A = V_S connections reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression

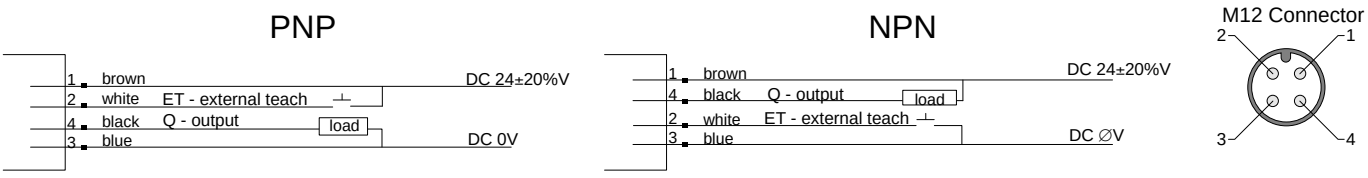
Static teach-in

Static teach-in KT 3 via control panel:
1. Place mark in light spot.
2. Press the Teach-in button on the equipment for >1 s, then trigger the first teach-in procedure.
3. Place the light spot on the background, and then trigger the second teach-in procedure.

Teach-in via control wire:
1. Place mark in light spot.
2. Trigger the first teach-in procedure via the control wire.
3. Place the light spot on the background, and then trigger the second teach-in procedure via the control wire.

The KT 3W selects transmission light from among red, blue and green automatically.
Confirmation: After the first teach-in procedure, the red transmitter light blinks with the KT 3W and the green with the KT 3G, and the status indicator blinks slowly and signals that a second teach-in procedure must be triggered.
LED and status indicator blink rapidly = insufficient contrast.
LED and status indicator do not blink = teach-in procedure completed.

Connection diagram



KT 3 L

Contrast Sensors



0.8…2..4 in (20…60 mm)
sensing distance

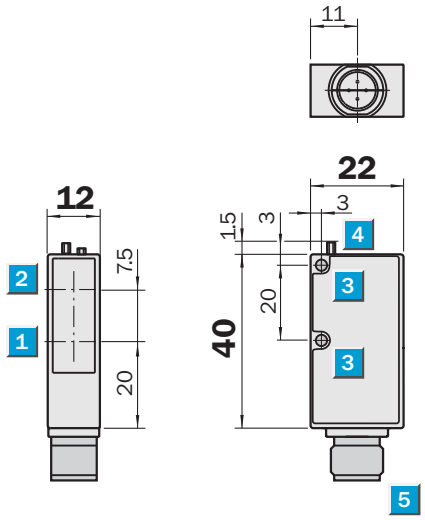
Highlights

- Light source laser
- Automatic switching threshold adjustment for detection of extremely shiny objects
- Static teach-in to mark and background via control cable and control panel
- Switching frequency 1,500/s
- M12 plug

KT 3 L

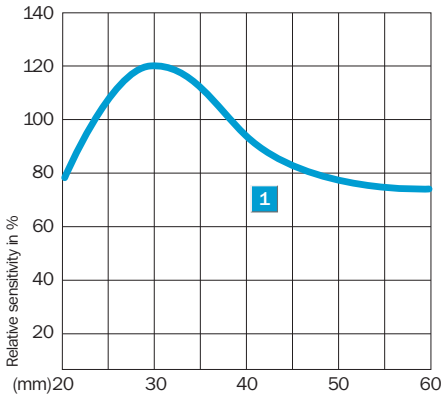


Dimensional drawing



dimensions in mm

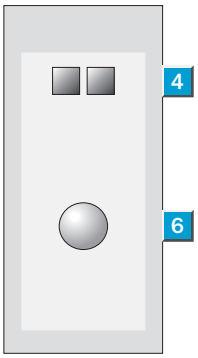
Sensing distance



1 Sensing distance 0.8…2.4 in (20…60 mm)

Adjustments

All types



1 Axis of the sender optics
2 Axis of the receiver optics
3 Through hole ø 3.2 mm
4 Operating signal green; signal strength indicator yellow
5 Plug M12, 4-pin
6 Teach-in button

Order information

Preferred type	Part no.
KT 3L-P 3216	1 026 244
KT 3L-N 3216	1 026 245

Accessories

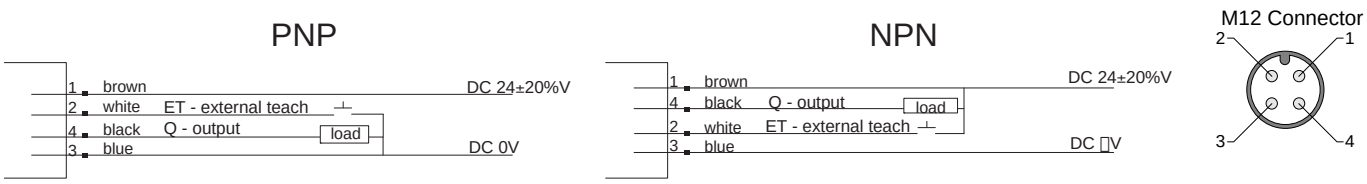
	page
Cables and connectors	1180
Mounting systems	1234

7028071 - © 2008 SICK, Inc.

Technical data	KT 3L-	P3216	N3216							
Sensing distance	0.8…2.4 in (20…60 mm)	■	■							
from front edge of lens										
Light spot dimensions	0.03 x 0.08 at 1.6 in (1 x 2 mm at 40 mm)	■	■							
Light source[1], light type	Laser Class 2	■	■							
Wavelength (nm)	655	■	■							
Supply voltage V_S	10…30 V DC	■	■							
Ripple[2]	< 5 V_{PP}	■	■							
Current consumption[3]	< 35 mA	■	■							
Switching outputs	PNP: HIGH = V_S- < 2 V/ LOW = approx. 0 V	■								
	NPN: HIGH = V_S / LOW = < 2 V		■							
Output current I_A max.	100 mA	■	■							
Response time[4]	400 µs	■	■							
Switching frequency[5]	1,500/s	■	■							
Time delay, optional	20 ms	■	■							
Teach-in input ET	PNP: ET < 2 V	■								
	NPN: ET > 8 V		■							
Connection type	Plug, M12 4-pin	■	■							
VDE protection class[6]	□	■	■							
Enclosure rating	IP 67	■	■							
Circuit protection[7]	A, B, C	■	■							
Ambient temperature	Operation 14…131° F (-10…55° C)	■	■							
	Storage -13…167° F (-20…75° C)	■	■							
Shock/vibration	To IEC 68	■	■							
Approximate weight	2.8 oz (80 g)	■	■							
Housing material	ABS	■	■							

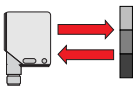
1) Average service life 50,000 h at T_A = 25° C
2) May not exceeded or fall short of V_S tolerances
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Reference voltage 32 V DC
7) A = V_S connections reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression

Connection diagram



KT 2

Contrast Sensors






0.5 in (13.5 mm)
sensing distance

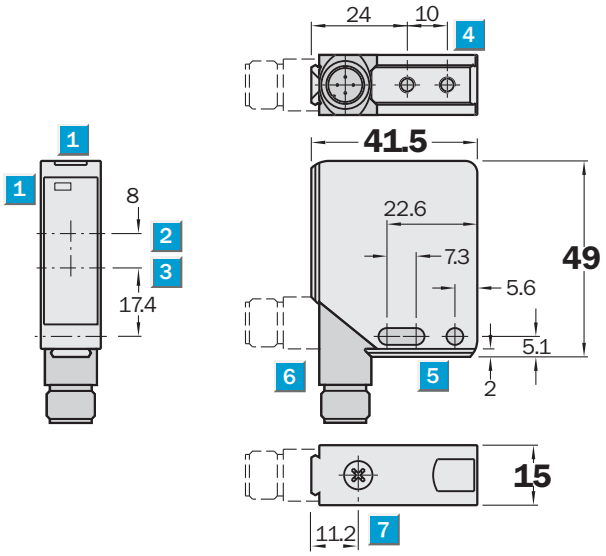
Highlights

- Rugged die cast metal housing
- Red or green light transmitter
- Light or dark switching selectable via control cable
- High switching frequency
- PNP and NPN switching output
- Rotatable quick disconnect

KT 2

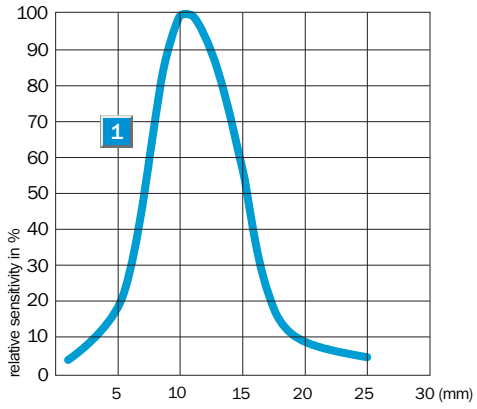


Dimensional drawing



dimensions in mm

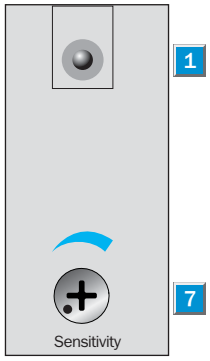
Relative sensitivity



1	Sensing distance	13.5 mm

Adjustments

All types



1	Output indicator
2	Optical axis – receiver
3	Optical axis – sender
4	M4 threaded mounting hole, 4 mm deep
5	Through hole Ø 4.2 mm
6	Plug M12 (rotatable 90°)
7	Sensitivity adjustment

Order information

Type	Part no.
KT 2R-2B3711	1 016 115
KT 2G-2B3711	1 016 112
KT 2R-2B3721	1 016 114

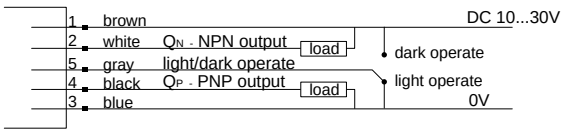
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Technical data	KT 2-	R-2B 3711	G-2B 3711	R-2B 3721						
Sensing distance	0.5 in (13.5 mm)	■	■	■						
Sensing distance tolerance	± 0.04 in (1 mm)	■	■	■						
Light spot diameter	0.08 in (2 mm)	■	■	■						
Light source[1], **light type**	LED, red	■		■						
	LED, green		■							
Supply voltage V_S	10…30 V DC[2]	■	■	■						
Ripple[3]	< 5 V_{SS}	■	■	■						
Current consumption[4]	< 80 mA	■	■	■						
Switching outputs	Light/dark switching, selectable via wire	■	■	■						
	PNP: HIGH = V_S – < 2.9V/LOW = approx. 0 V	■	■	■						
	NPN: HIGH = V_S/LOW = < 1.5 V	■	■	■						
Output current I_A max.	100 mA	■	■	■						
Response time[5]	≤ 50 µs	■	■	■						
Max. switching frequency[6]	10 kHz	■	■	■						
Timing options	20 ms OFF delay			■						
L/D input, light/dark switching	PNP: dark = > 10 V… < V_S	■	■	■						
	light = 0 V or no connection	■	■	■						
	NPN: dark = > 10 V... < V_S	■	■	■						
	light = 0 V or no connection	■	■	■						
Connection type	Plug, M12 5-pin,	■	■	■						
VDE protection class[7]	□	■	■	■						
Enclosure rating	IP 67/NEMA 6	■	■	■						
Circuit protection[8]	A, B, C	■	■	■						
Ambient temperature T_A	Operation 14…131° F (-10… 55° C)	■	■	■						
	Storage -13…167° F (-25… 75° C)	■	■	■						
Shock/vibration	To IEC 68	■	■	■						
Approximate weight	14 oz (400 g)	■	■	■						
Housing material	Die cast zinc	■	■	■						

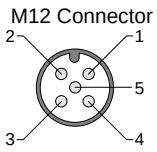
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
C = Interference pulse suppression

Connection diagram

All Models

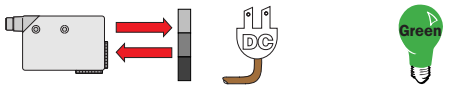


wire colors refer to standard cable, not included



KT 5G-2

Contrast Sensors



0.4/0.8/1.6 in (10/20/40 mm) sensing distance

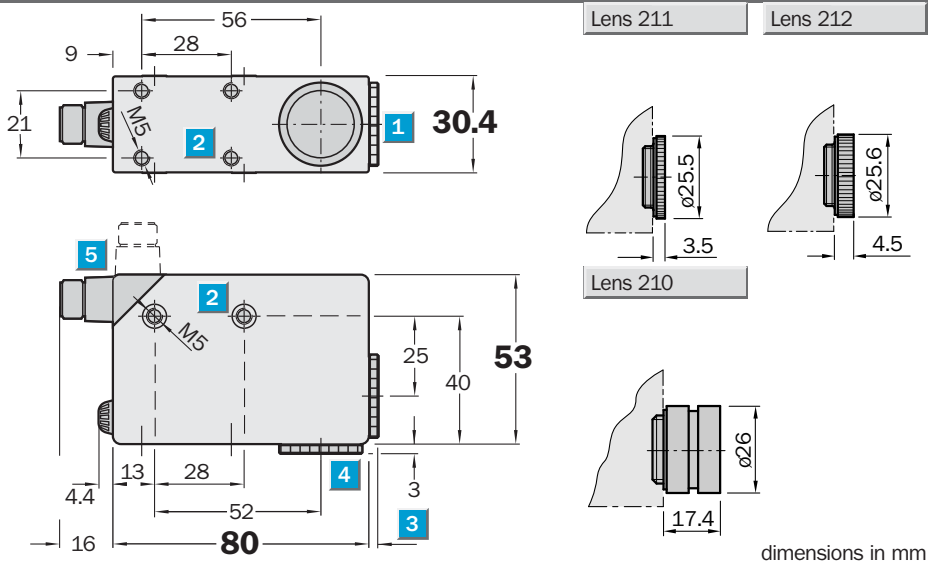
Highlights

- Rugged die cast metal housing
- Red-green LED light source
- Changeable lens position
- Switching frequency to 10 kHz
- Insensitive to ambient light
- Indicator LEDs for easy setup
- Rotatable quick disconnect

KT 5G-2

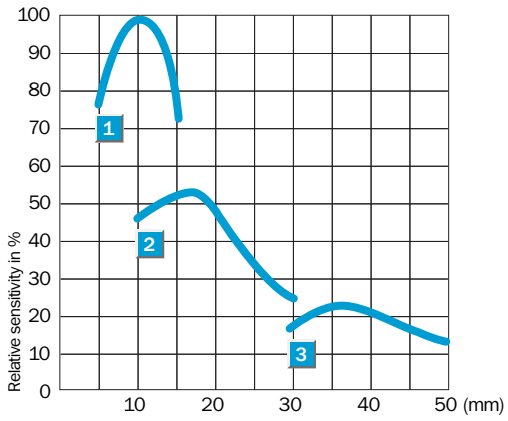


Dimensional drawing



dimensions in mm

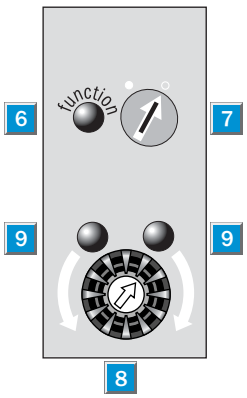
Relative sensitivity



1	Sensing distance 10 mm
2	Sensing distance 20 mm
3	Sensing distance 40 mm

Adjustments

All types



1	Lens (light transmission), can be replaced by item 4
2	M5 mounting holes, 5.5 mm deep
3	See Dimensional drawing of lens
4	Blind screw, can be replaced by item 1
5	M12 plug (rotatable 90°)
6	Output indicator (yellow)
7	Operating mode switch
○	Light switching
●	Dark switching
8	Switching threshold adjustment
9	Setting aid (green)

Order information

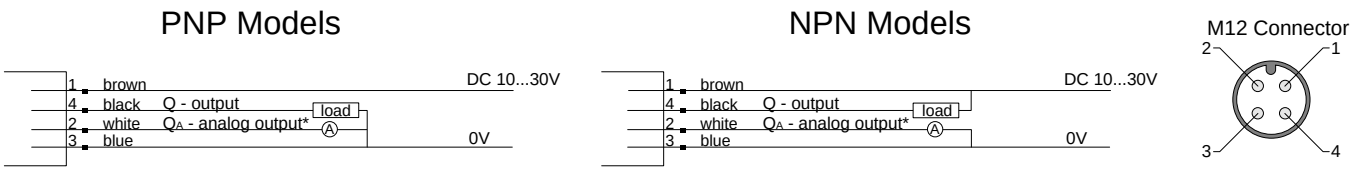
Type	Part no.
KT 5G-2P1111	1 015 993
KT 5G-2P1121	1 015 997
KT 5G-2N1121	1 015 983
KT 5G-2P1311	1 016 003
KT 5G-2N1111	1 015 981
KT 5G-2N1311	1 015 988

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

Technical data	KT 5G-2-	P1111	P1121	N1121	P1311	N1111	N1311			
Sensing range from front edge of lens/										
Light spot dimensions	0.4 in ±0.1 in (10 ±3 mm)/0.05 x 0.2 in (1.2 x 4.2 mm)	■	■	■		■				
	0.8 in ±0.1 in (20 ±3 mm)/0.06 x 0.2 in (1.5 x 5.5 mm)									
	1.6 in ±0.1 in (40 ±3 mm)/0.04 x 0.2 in (1.1 x 4.2 mm)				■		■			
Light spot orientation	Parallel or perpendicular to long side of sensor	■	■	■	■	■	■			
Light source[1], **light type, wavelength**	LED, green light, 520 nm	■	■	■	■	■	■			
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■			
Ripple[3]	< 5 V_{SS}	■	■	■	■	■	■			
Current consumption[4]	< 80 mA	■	■	■	■	■	■			
Switching outputs	Light/dark switching, selectable via switch	■	■	■	■	■	■			
	PNP: HIGH = V_S – < 2 V / LOW = 0 V	■	■		■					
	NPN: HIGH = V_S / LOW = < 2 V			■		■	■			
Output current I_A max.	100 mA	■	■	■	■	■	■			
Response time[5]	50 µs	■	■	■	■	■	■			
Max. switching frequency[6]	to 10 kHz	■	■	■	■	■	■			
Optional timing functions	No timing element	■			■	■	■			
	Deactivation delay, …20 ms		■	■						
Analog output Q_A, (optional)	0.3 … 10 mA (consult factory for models)									
Switching threshold	Adjustable (standard type)	■	■	■	■	■	■			
Connection type	Plug, M12 4-pin	■	■	■	■	■	■			
VDE protection class[7]	□	■	■	■	■	■	■			
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■			
Circuit protection[8]	A, B, C	■	■	■	■	■	■			
Ambient temperature T_A	Operation 14…131° F (-10… 55° C)	■	■	■	■	■	■			
	Storage -13…167° F (-25… 75° C)	■	■	■	■	■	■			
Shock/vibration	To IEC 68	■	■	■	■	■	■			
Approximate weight	14 oz (400 g)	■	■	■	■	■	■			
Housing material	Die cast zinc	■	■	■	■	■	■			

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Output Q and Q_A short-circuit protected
C = Interference pulse suppression

Connection diagram

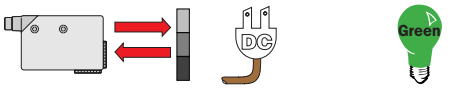


wire colors refer to standard cable, not included

*analog output available on certain models only

KT 5G-2 Teach

Contrast Sensors



0.4 in (10 mm)/0.8 in (20 mm) sensing distance

Highlights

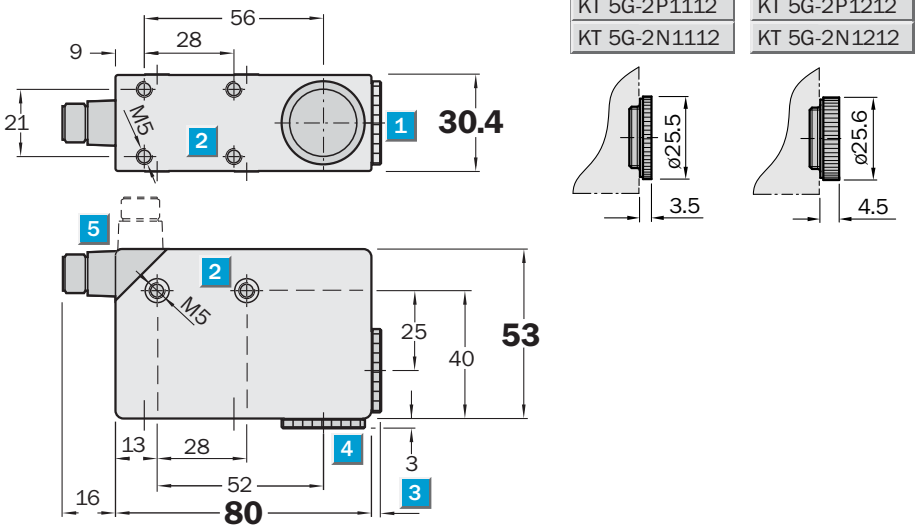
- Rugged die cast metal housing
- Teach-in sensitivity setting
- Fine/coarse sensitivity adjustment or teach-in can be done by wire
- Insensitive to ambient light
- Switching rate up to 10 kHz
- Changeable lens position
- Rotatable quick disconnect

KT 5G-2 Teach



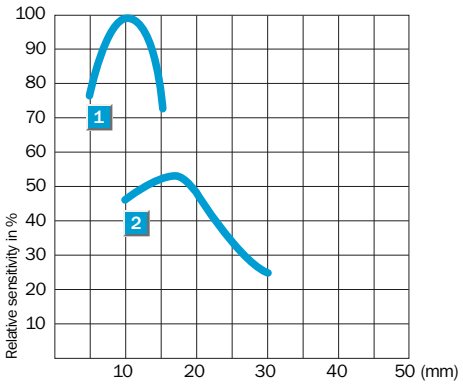
Dimensional drawing

KT 5G-2P1112	KT 5G-2P1212
KT 5G-2N1112	KT 5G-2N1212



dimensions in mm

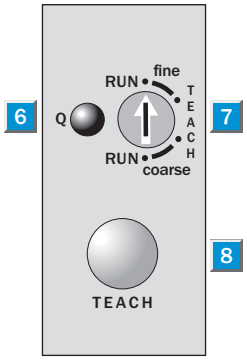
Relative sensitivity



1	Sensing distance with lens 211	10 mm
2	Sensing distance with lens 212	20 mm

Adjustments

All types



1 Lens (light transmission), can be replaced by Item 4
2 M5 mounting holes, 5.5 mm deep
3 See Dimensional drawing of lens
4 Blind screw, can be replaced by Item 1
5 M12 plug (rotatable 90°)
6 Output indicator (yellow)
7 Pre-selection switch for minimum contrast
8 Teach-in button

Teach-in

Teach-in and fine/coarse (contrast resolution)
The two settings can be triggered simultaneously either via control panel or control cables.

Control panel: The teach-in button can be locked against accidental actuation with "run."
In an undefined switching position, no teach-in procedure can be triggered.

Setting via control panel:
1. Select "fine" or "coarse" using rotating switch
2. Position light spot on mark
3. Trigger teach-in via teach-in switch
Light-/dark-switching is not required/acknowledge/signal or Q active = teach-in procedure completed

Setting via control cable:
1. Select "fine" or "coarse" using rotating switch
2. Position light spot on mark
3. Trigger teach-in via ET control cable

Order information

Type	Part no.
KT 5G-2P1112	1 016 628
KT 5G-2N1112	1 016 717
KT 5G-2P1212	1 016 718
KT 5G-2N1212	1 016 719
KT 5G-2P1122	1 017 296
KT 5G-2N1122	1 017 977
KT 5G-2P2112	1 017 956
KT 5G-2N2112	1 018 164

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

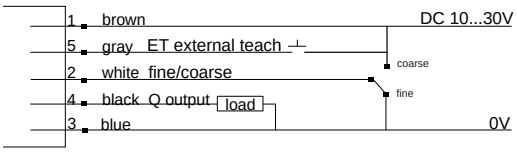
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Technical data	KT 5G-2-	P1112	N1112	P1212	N1212	P1122	N1122	P2112	N2112
Sensing distance	0.4 in (10 mm) ± 0.1 in (3 mm)	■	■			■	■	■	■
	0.8 in (20 mm) ± 0.1 in (3 mm)			■	■				
Light spot dimensions, vertical	0.05 x 0.2 in (1.2 x 4.2 mm)	■	■	■	■	■	■		
horizontal	0.05 x 0.2 in (1.2 x 4.2 mm)							■	■
Light source[1], **light type**	LED, green	■	■	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■	■	■
Ripple[3]	< 5 V_{SS}	■	■	■	■	■	■	■	■
Current consumption[4]	< 80 mA	■	■	■	■	■	■	■	■
Switching outputs	PNP: HIGH = V_S – < 2 V / LOW = 0 V	■		■		■		■	
	NPN: HIGH = V_S / LOW = < 2 V		■		■		■		■
Output current I_A max.	100 mA, short-circuit protected	■	■	■	■	■	■	■	■
Response time[5]	50 µs	■	■	■	■	■	■	■	■
Max. switching frequency[6]	to 10 kHz	■	■	■	■	■	■	■	■
Time delay	Optional 20 ms OFF delay					■	■		
Teach-in input ET	PNP - Teach > 10 V…< V_S	■		■		■		■	
	Run 0 V or no connection	■		■		■		■	
	NPN - Teach 0 V		■		■		■		■
	Run V_S or no connection		■		■		■		■
Pulse duration	ET > 10 ms	■	■	■	■	■	■	■	■
Retention time	25 ms non-volatile memory	■	■	■	■	■	■	■	■
Fine/coarse input F/C	PNP: Fine: 0 V or no connection	■		■		■		■	
	Coarse: > 10 V…< V_S	■		■		■		■	
	NPN: Fine: V_S or no connection		■		■		■		■
	Coarse: 0 V		■		■		■		■
Connection type	Plug, M12 5-pin	■	■	■	■	■	■	■	■
VDE protection class[7]	□	■	■	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■	■	■	■
Ambient temperature T_A	Operation 14…131° F (-10…55° C)	■	■	■	■	■	■	■	■
	Storage -13…167° F(-25…75° C)	■	■	■	■	■	■	■	■
Shock/vibration	To IEC 68	■	■	■	■	■	■	■	■
Approximate weight	14 oz (400 g)	■	■	■	■	■	■	■	■
Housing material	Die cast zinc	■	■	■	■	■	■	■	■

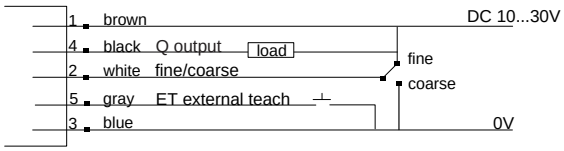
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
C = Interference pulse suppression

Connection diagram

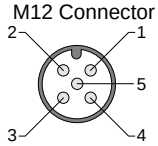
PNP Models



NPN Models



M12 Connector



wire colors refer to standard cable, not included

KT 5W-2 Dynamic Teach

Contrast Sensors



0.4 in (10 mm)/ 0.8 in (20 mm) sensing distance

Highlights

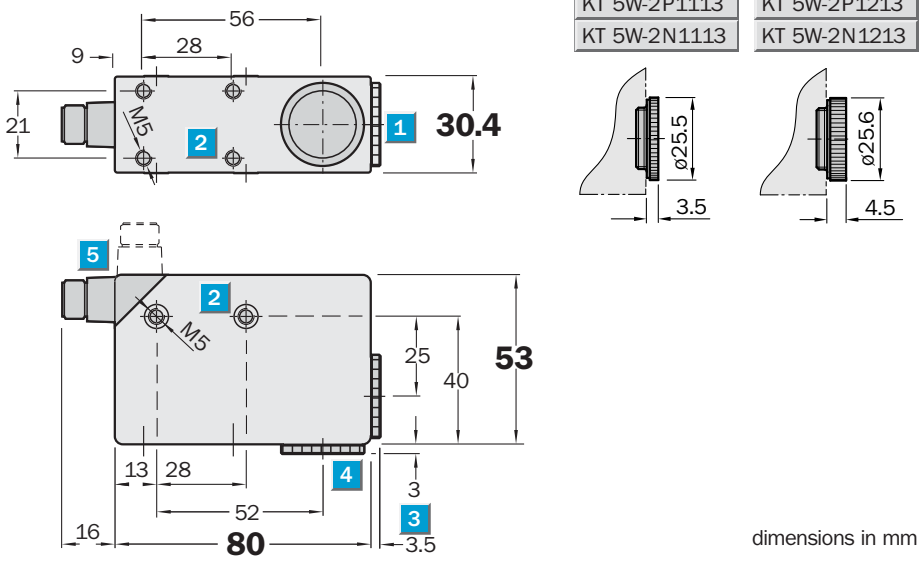
- Rugged die cast metal housing
- Red, blue and green light source automatically selected
- Insensitive to ambient light
- Teach-in sensitivity adjustment “on the fly”
- Switching frequency up to 10 kHz
- Light/dark selection or teach-in can be done via wire
- Changeable lens position

KT 5W-2 Dynamic Teach



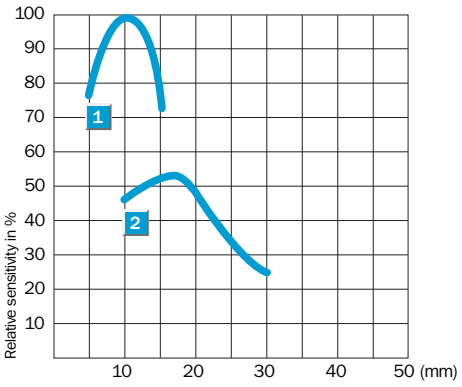
Dimensional drawing

KT 5W-2P1113	KT 5W-2P1213
KT 5W-2N1113	KT 5W-2N1213



dimensions in mm

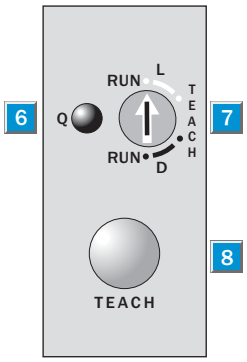
Relative sensitivity



1	Sensing distance with lens 211	10 mm
2	Sensing distance with lens 212	20 mm

Adjustments

All types



1. Lens (light transmission), can be replaced by Item 4
2. M5 mounting holes, 5.5 mm deep
3. See Dimensional drawing of lens
4. Blind screw, can be replaced by Item 1
5. M12 plug (rotatable 90°)
6. Output indicator (yellow)
7. L/D switch
8. Teach button

Teach-in

Teach-in and light/dark
The two settings can be triggered simultaneously either via control panel or control cable.

Control panel: The teach-in button can be locked against accidental actuation with “run.” In an undefined switching position, no teach-in procedure can be triggered.

Setting through control panel:
1. Select “light (L)” or “dark (D)” using rotating switch
2. Trigger teach-in via teach-in button
3. Run the object to be detected at least one register length through the light spot

Acknowledged via Q or LED control flashes=insufficient contrast.

Setting via control cable (overrides setting on control panel)
1. Select “light” or “dark” using control cable
2. Trigger teach-in via ET control cable
3. Run the object to be detected at least one register length through the light spot
4. End teach-in

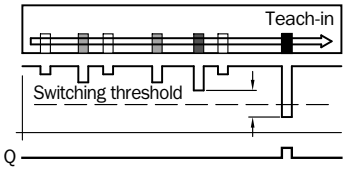
Material speed during teach-in:
min. 25 mm/s, max. 300 mm/s.

Order information

Type	Part no.
KT 5W-2P1113	1 016 629
KT 5W-2N1113	1 016 630
KT 5W-2P1213	1 016 715
KT 5W-2N1213	1 016 716

Accessories

	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314



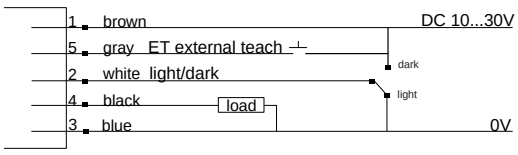
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Technical data	KT 5W-2-	P1113	N1113	P1213	N1213
Sensing distance	0.4 in (10 mm) ± 0.1 in (3 mm)	■	■		
	0.8 in (20 mm) ± 0.1 in (3 mm)			■	■
Light spot dimensions	0.05 x 0.2 in (1.2 x 4.2 mm)	■	■		
Light source[1], **light type**	LED, red, blue, green	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■
Ripple[3]	< 5 V_{SS}	■	■	■	■
Current consumption[4]	< 80 mA	■	■	■	■
Switching outputs Q	PNP: HIGH = V_S – < 2 V / LOW = 0 V	■		■	
	NPN: HIGH = V_S / LOW = < 2 V		■		■
Output current I_A max.	100 mA, short-circuit protected	■	■	■	■
Response time[5]	50 µs	■	■	■	■
Max. switching frequency[6]	to 10 kHz	■	■	■	■
Teach-in input ET	PNP - Teach: > 10 V…< V_S	■		■	
	Run: 0 V or no connection	■		■	
	NPN - Teach: 0 V		■		■
	Run: V_S or no connection		■		■
Retention time	25 ms non-volatile memory	■	■	■	■
L/D input, light/dark switching	PNP: dark = > 10 V…< V_S	■		■	
	light = 0 V or no connection	■		■	
	NPN: dark = 0 V		■		■
	light = V_S or no connection		■		■
Connection type	Plug, M12 5-pin	■	■	■	■
VDE protection class[7]	□	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■
Ambient temperature T_A	Operation 14…131° F (-10… 55° C)	■	■	■	■
	Storage -13…167° F (-25… 75° C)	■	■	■	■
Shock/vibration	To IEC 68	■	■	■	■
Approximate weight	14 oz (400 g)	■	■	■	■
Housing material	Die cast zinc	■	■	■	■

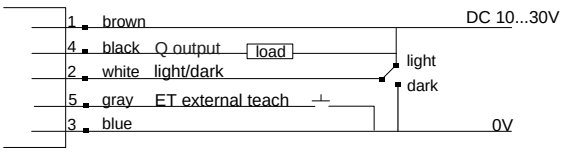
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
C = Interference pulse suppression

Connection diagram

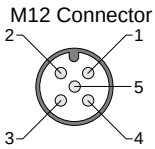
PNP Models



NPN Models



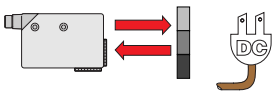
M12 Connector



wire colors refer to standard cable, not included

KT 5G-2 Automatic

Contrast Sensors





0.4 in (10 mm)
sensing distance

Highlights

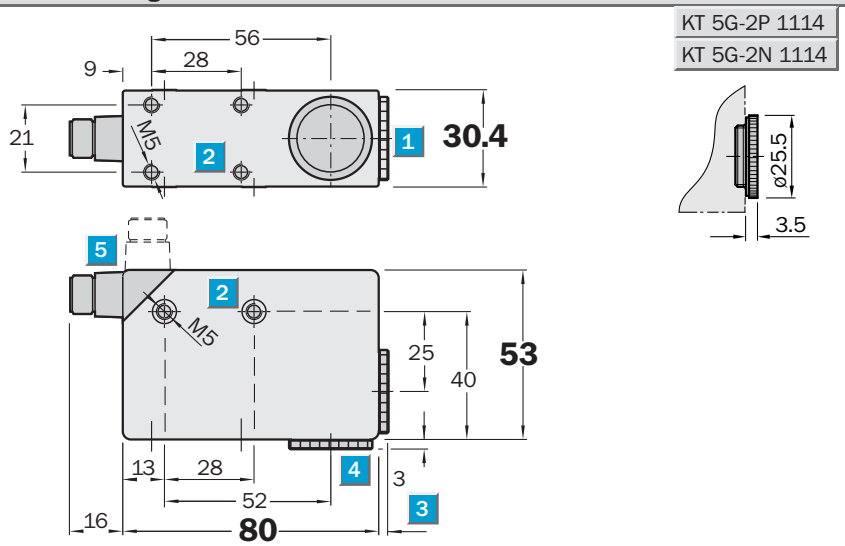
- Rugged die cast metal housing
- Continuous, automatic sensitivity adjustment
- Fine/course and light/dark adjustments can be made via the control wire
- Switching frequency up to 10 kHz
- Insensitive to ambient light
- Changeable lens position
- Rotatable quick disconnect

KT 5G-2 Automatic



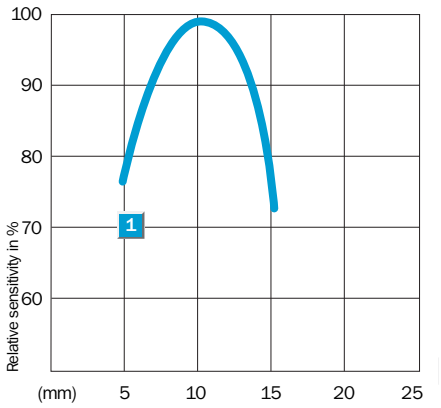
Dimensional drawing

KT 5G-2P 1114
KT 5G-2N 1114



dimensions in mm

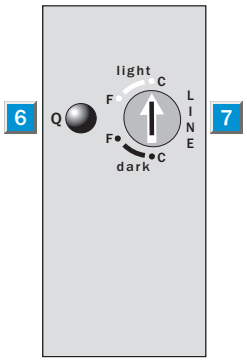
Relative sensitivity



1	Sensing distance	10 mm

Adjustments

All types



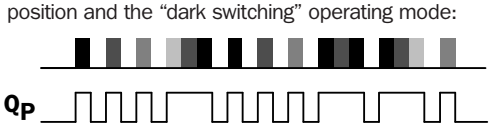
1	Lens (light transmission), can be replaced by Item 4
2	M5 mounting holes, 5.5 mm deep
3	See dimensional drawing of lens
4	Blind screw, can be replaced by Item 1
5	M12 plug (rotatable 90°)
6	Output indicator (yellow)
7	Fine/coarse selection

Function

The switching threshold for the KT 5G-2 P/N 1114 contrast scanner is tracked dynamically to the existing contrast. No teach-in procedure is required. The “fine” or “coarse” contrast and the “light” or “dark” selection can be triggered via the switch on the control panel or the control cable.

In the LINE switching position, the control panel is blocked, only F/C and L/D settings triggered via the control cable are accepted.

The following example shows function in the “coarse” position and the “dark switching” operating mode:



Order information

Type	Part no.
KT 5G-2P1114	1 016 999
KT 5G-2N1114	1 017 000

Accessories

	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

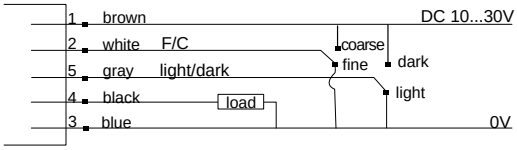
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Technical data	KT5G-2-	P1114	N1114
Sensing distance	0.4 in ± 0.1 in (10 mm ± 3 mm)		
Light spot dimensions	0.05 x 0.2 in (1.2 x 4.2 mm)		
Light source[1], **light type**	LED, green		
Supply voltage V_S	10…30 V DC[2]		
Ripple[3]	< 5 V_{SS}		
Current consumption[4]	< 80 mA		
Switching outputs	PNP: HIGH = V_S – < 2 V / LOW = 0 V		
	NPN: HIGH = V_S / LOW = < 2 V		
Output current I_A max.	100 mA, short-circuit protected		
Response time[5]	50 µs		
Max. switching frequency[6]	to 10 kHz		
Fine/coarse input, F/C	PNP - Fine 0 V or no connection		
	Coarse > 10 V… < V_S		
	NPN - Fine V_S or no connection		
	Coarse 0 V		
L/D input, light/dark switching	PNP: dark = > 10 V… < V_S		
	light = 0 V or no connection		
	NPN: dark = 0 V		
	light = V_S or no connection		
Connection type	Plug, M12 5-pin		
VDE protection class[7]	□		
Enclosure rating	IP 67/NEMA 6		
Circuit protection[8]	A, B, C		
Ambient temperature T_A	Operation 14…131° F (-10… 55° C)		
	Storage -13…167° F (-25… 75° C)		
Shock/vibration	To IEC 68		
Approximate weight	14 oz (400 g)		
Housing material	Coated metal		

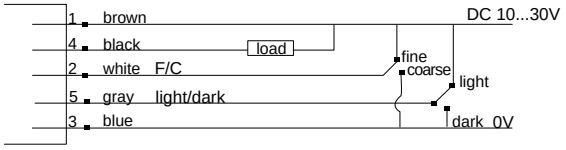
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
C = Interference pulse suppression

Connection diagram

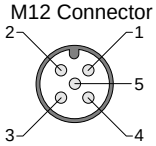
PNP Models



NPN Models



M12 Connector



wire colors refer to standard cable, not included

KT 5W-2 Mark Teach with Bar Graph Display

Contrast Sensors



0.4 in (10 mm)
sensing distance

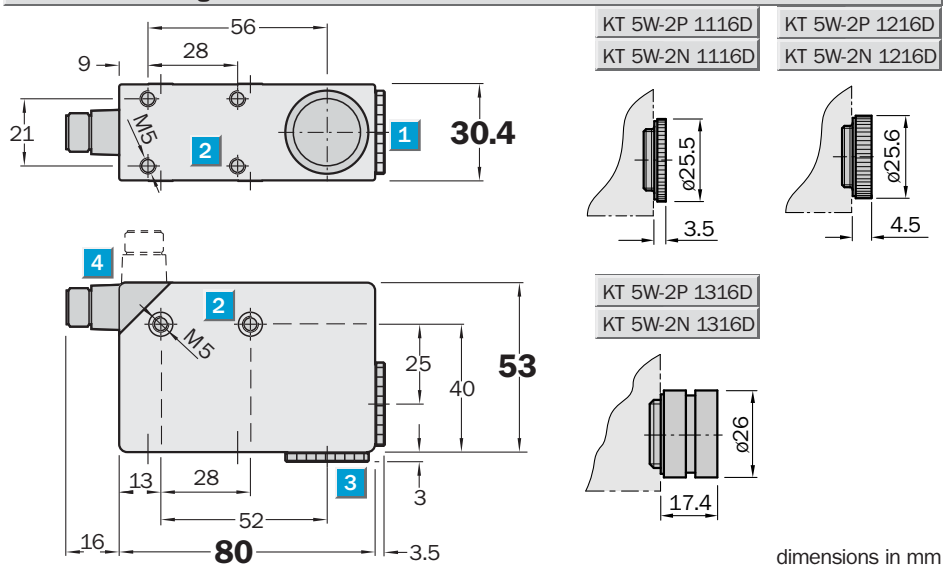
Highlights

- Integrated 10-segment bar graph display
- Teach-in sensitivity adjustment mark-background
- Switching rate up to 10 kHz
- Adjustable threshold after teach-in
- Insensitive to ambient light
- Red, green or blue light source automatically selected
- Rotatable quick disconnect
- Rugged die cast metal housing

KT 5W-2 Mark Teach

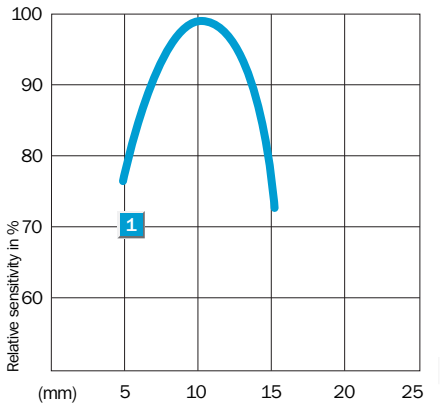


Dimensional drawing



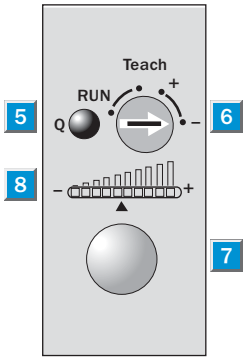
dimensions in mm

Relative sensitivity



Adjustments

All types



1. Lens (light transmission), can be replaced by Item 3
2. M5 mounting holes, 5.5 mm deep
3. Blind screw, can be replaced by Item 1
4. 5-pin, M12 x 1 plug (rotatable through 90°)
5. Function signal indicator (yellow)
6. Pre-selection switch
7. Teach-in button
8. Bar display

1 Sensing distance with lens 211 10 mm

Static teach-in

Control panel: The teach-in button can be locked against accidental actuation with "run." In an undefined switching position, no teach-in procedure can be triggered.
Setting via push button:
1. Select teach-in using rotating switch
2. Position mark or background under the light spot
   – trigger first teach-in procedure via teach-in button
3. Position background or mark under the light spot
   – trigger second teach-in procedure via teach-in button.

Setting via control cable:
1. Position mark or background under the light spot
   – trigger first teach-in procedure via ET control cable
2. Position background or mark under the light spot
   – trigger second teach-in procedure via ET control cable.

Acknowledgement: After the first teach-in procedure, the red transmission light flashes and the function signal slowly indicates that a second teach-in procedure must be triggered.
-- LED and Q flash quickly = insufficient contrast
-- LED and Q do not flash = teach-in completed
Light/dark-switching not required, unit switches on the object to be detected, that was under the light spot during the first teach-in procedure (mark or background).

Order information

Type	Part no.
KT 5W-2P1116D	1 026 538
KT 5W-2N1116D	1 026 540
KT 5W-2P1216D	1 026 577
KT 5W-2P1316D	1 026 578
KT 5W-2N1216D	1 026 580
KT 5W-2N1316D	1 026 581

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

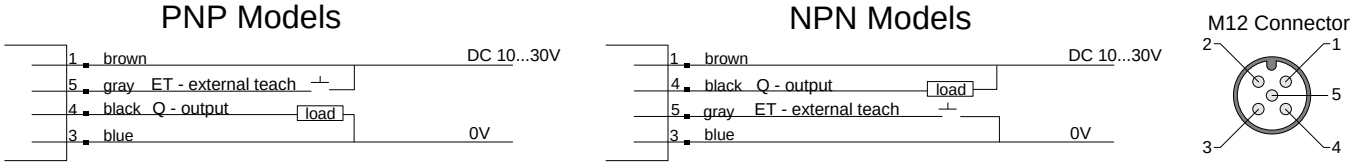
Bar graph status

Detection reliability: After teach-in, the bar graph displays the quality of the taught-in contrast. The more lighted LEDs, the more reliable the detection of the mark.
1 LED: minimum contrast difference, not reliable
≤ 4 LEDs: sufficient contrast difference, reliable operation
> 4 LEDs: high contrast difference, very reliable operation
Operation and adjustment: In RUN, bar displays the current level of the material being sensed. Threshold is in the middle, output changes state as threshold is passed. Adjusting +/- changes switching threshold 1/2 LED per press of button.

Technical data	KT 5W-2-	P1116D	N1116D	P1216D	N1216D	P1316D	N1316D
Sensing distance*	0.4 in ± 0.1 in (10 mm ± 3 mm)	■	■				
	0.8 in ± 0.1 in (20 mm ± 3 mm)			■	■		
	1.6 in ± 0.1 in (40 mm ± 3 mm)					■	■
Light spot dimensions	0.05...0.2 in (1.2 x 4.2 mm)	■	■				
	0.1...0.2 in (1.5 x 5.5 mm)			■	■		
	0.04...0.2 in (1.1 x 4.2 mm)					■	■
Light source[1], light type	LED, red, blue, green	■	■	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■
Ripple[3]	< 5 V_{SS}	■	■	■	■	■	■
Current consumption[4]	< 130 mA	■	■	■	■	■	■
Switching outputs	PNP: HIGH = V_S – < 2 V / LOW = 0 V	■		■		■	
	NPN: HIGH = V_S / LOW = < 2 V		■		■		■
Output current I_A max.	100 mA, short-circuit protected	■	■	■	■	■	■
Response time[5]	50 µs	■	■	■	■	■	■
Max. switching frequency[6]	10,000/s	■	■	■	■	■	■
Light spot position	Vertical	■	■	■	■	■	■
Teach-in input (ET)	PNP - Teach: > 10 V…< V_S	■		■		■	
	Run: 0 V or no connection	■		■		■	
	NPN - Teach: 0 V		■		■		■
	Run: V_S or no connection		■		■		■
Retention time	25 ms non-volatile memory	■	■	■	■	■	■
Connection type	Plug, M12 5-pin	■	■	■	■	■	■
VDE protection class[7]	□	■	■	■	■	■	■
Enclosure rating	IP 67/NEMA 6	■	■	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■	■	■
Ambient temperature T_A	Operation 14…131° F (-10… 55° C)	■	■	■	■	■	■
	Storage -13…167° F (-25… 75° C)	■	■	■	■	■	■
Shock/vibration	To IEC 68	■	■	■	■	■	■
Approximate weight	14 oz (400 g)	■	■	■	■	■	■
Housing material	Cast zinc	■	■	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 32 V DC
8) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
C = Interference pulse suppression

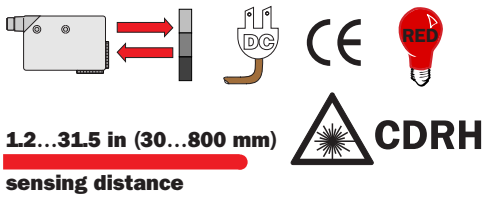
Connection diagram



wire colors refer to standard cable, not included

KT8L

Contrast Sensors



1.2...31.5 in (30...800 mm)
sensing distance

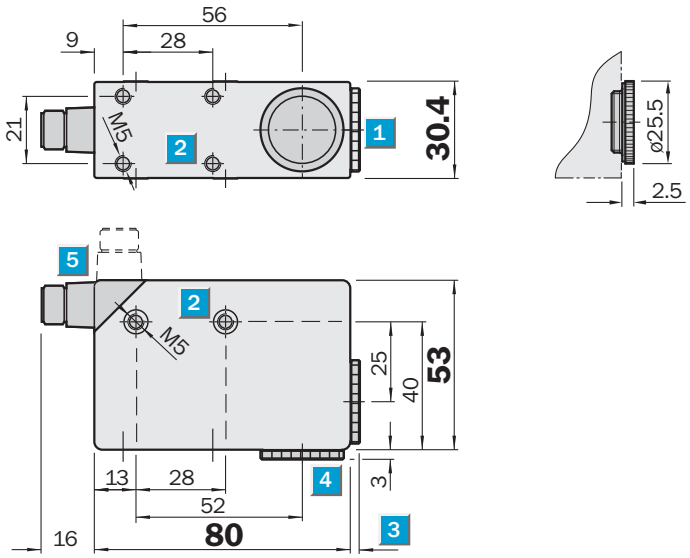
Highlights

- Long sensing distance
- Precise detection of smallest marks
- Switching frequency 17 kHz for high-speed applications
- Analog output
- Great depth of field – suitable for web fluttering materials

KT 5G-2



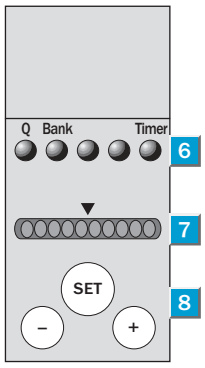
Dimensional drawing



dimensions in mm

Adjustments

All types



1	Blind screw
2	M5 mounting holes, 5.5 mm deep
3	See Dimensional drawing of the lens
4	Lens (light transmission)
5	5-pin, M12 x 1 plug (rotatable trough 90°)
6	Functional signal indicator (yellow)
7	Bar display
8	Teach-in button, “+” and “–” button

Order information

Type	Part no.
KT8L-N3656	1 041 263
KT8L-N3756	1 041 352
KT8L-P3656	1 041 262
KT8L-P3756	1 041 351

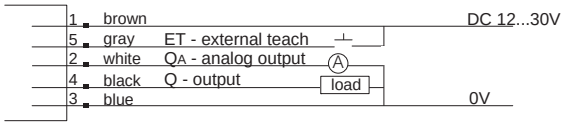
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Technical data	KT8L-	N3656	N3756	P3656	P3756
Sensing range	5.9 in (150 mm)[1]	■	■	■	■
Operating distance	1.2…31.5 in (30…800 mm)[1]	■		■	
	1.2…23.6 in (30…600 mm)[1]		■		■
Light source[2], **light type**	Laser diode, Laser, red light	■	■	■	■
Laser class	2 (IEC 60 825-1/C.D.R.H)	■	■	■	■
Light spot size	Ø < 0.1 in at 5.9 in (0.3 mm at 150 mm)	■		■	
	Ø 0.1 in at 5.9 in (3 mm at 150 mm)		■		■
Supply voltage V_S	10…30 V DC[3]	■	■	■	■
Ripple[4]	< 5 V	■	■	■	■
Current consumption[5]	< 80 mA	■	■	■	■
Switching outputs	NPN	■	■		
	PNP			■	■
Switching mode	Light/dark switching, adjustable via teach-in	■	■	■	■
Signal voltage PNP HIGH/LOW	V_S - < 2 V/0 V			■	■
Signal voltage NPN HIGH/LOW	V_S /< 2 V	■	■		
Output current I_a max.	< 100 mA	■	■	■	■
Response time[6]	< 30 µs	■	■	■	■
Max. switching frequency[7]	17 kHz	■	■	■	■
Analog output	0.3…10 mA	■	■	■	■
Jitter	< 10 µs	■	■	■	■
Teach-in input (ET), PNP	Teach > 10 V…< V_S			■	■
	Run 0 V or unswitched[8]			■	■
Teach-in input (ET), NPN	Teach 0 V	■	■		
	Run V_S or unswitched[8]	■	■		
Adjustment	2-point teach-in, static	■	■	■	■
	Teach-in dynamic (min/max)	■	■	■	■
Time delay	Deactivation delay inactive (default)	■	■	■	■
	20 ms (adjustable)	■	■	■	■
Retention time	25 ms non-volatile memory	■	■	■	■
Connection type	Connector, M12 5-pin	■	■	■	■
VDE protection class[9]	□	■	■	■	■
Circuit protection[10]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A	Operation 14…113° F (-10…45° C)	■	■	■	■
	Storage -13…167° F (-25…75° C)	■	■	■	■
Shock/vibration	To IEC 68	■	■	■	■
Approximate weight	14 oz (400 g)	■	■	■	■
Housing material	Die cast zinc	■	■	■	■

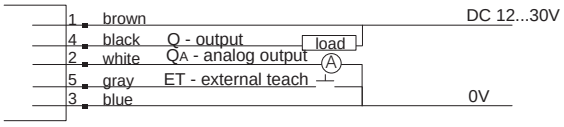
1) From front edge of lens. Relating to black-white contrast 90%/6%
2) Average service life 50,000 h at T_A = 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) ET > 2 ms
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Output Q and Q_A short-circuit protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

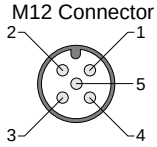
Connection diagram

PNP Models



NPN Models





wire colors refer to standard cable, not included

KT 10W-2

Contrast Sensors



0.5 in (12.5 mm)
sensing distance

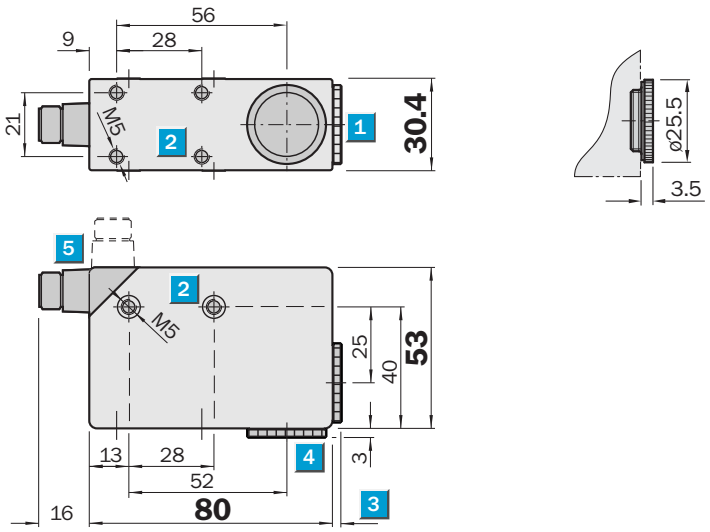
Highlights

- 20 µs response time (jitter < 10 µs) for fast applications
- Precise light spot for high repeatability
- RGB emission LED (automatic selection)
- 2 light exits (changeable)
- 5 bank memory
- Automatic drift correction

KT 10W-2

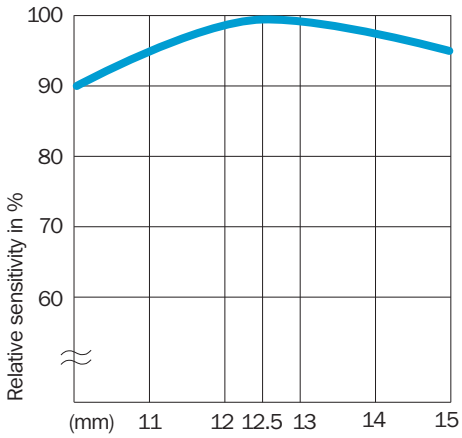


Dimensional drawing



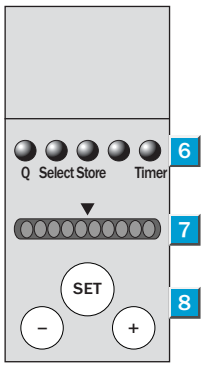
dimensions in mm

Relative sensitivity



Adjustments

All types



1 Lens (light transmission)
2 M5 mounting holes, 5.5 mm deep
3 See dimensional drawing of lens
4 Blind screw can be replaced by lens
5 5-pin, M12 x 1 plug (rotatable trough 90°)
6 Function signal indicators (yellow)
7 Bar display
8 Teach-in button “+” and “–” button

Order information

Type	Part no.
KT10W-2P1115	1 028 232
KT10W-2N1115	1 028 233
KT10W-2P2115	1 029 070
KT10W-2N2115	1 029 071

Accessories	page
Cables and connectors	1180
Mounting systems	1234

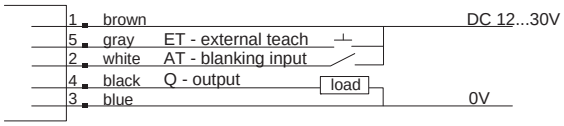
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Technical data	KT10W-2-	P1115	N1115	P2115	N2115
Sensing distance	from front edge of lens 0.4 ± 0.1 in (10 ± 3 mm)	■	■	■	■
	from front edge of housing 0.5 ± 0.1 in (12.5 ± 3 mm)	■	■	■	■
Light source[1], **light type**	LED, red, green, blue	■	■	■	■
Wavelength (nm)	640, 525, 470	■	■	■	■
Light spot dimensions	0.2 x 0.03 in at 0.4 in (4 x 0.8 mm at 10 mm)	■	■	■	■
Light spot position	Longitudinal	■	■		
	Transverse			■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■
Ripple[3]	< 5 V	■	■	■	■
Current consumption[4]	< 80 mA	■	■	■	■
Switching outputs	PNP: HIGH = V_S – < 2 V/LOW = 0 V	■		■	
	NPN: HIGH = V_S/LOW = < 2 V		■		■
Output current I_A max.	< 100 mA	■	■	■	■
Output logic	Light/dark via teach-in procedure (default)	■	■	■	■
(Adjustable)	Light switching; dark switching	■	■	■	■
Max. switching frequency[5]	25000/s	■	■	■	■
Response time[6]	20 µs	■	■	■	■
Jitter	< 10 µs	■	■	■	■
Teach-in input ET	PNP - Teach: > 10 V…< V_S	■		■	
	Run: 0 V or no connection	■		■	
	NPN - Teach: 0 V		■		■
	Run: V_S or no connection		■		■
Teach-in procedure	Dynamic teach-in (default)	■	■	■	■
(Adjustable)	2-point-teach-in	■	■	■	■
Timer deactivation delay	None (default)	■	■	■	■
(Adjustable)	20 ms	■	■	■	■
Blanking input AT		■	■	■	■
Blanked	PNP: AT > 10 V	■		■	
Free running	AT > 2 V or no connection	■		■	
Blanked	NPN: AT < 2 V		■		■
Free running	AT > 10 V or no connection		■		■
Retention time	25 ms non-volatile memory	■	■	■	■
Connection type	Plug, M12 5-pin	■	■	■	■
VDE protection class[7]	⧈	■	■	■	■
Circuit protection[8]	A, B, C, D	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A	Operation 14…131° F (-10… 55° C)	■	■	■	■
	Storage -13…167° F (-25… 75° C)	■	■	■	■
Shock/vibration	To IEC 68	■	■	■	■
Approximate weight	14 oz (400 g)	■	■	■	■
Housing material	Die cast zinc	■	■	■	■

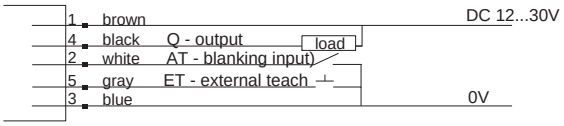
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Outputs Q and $\bar{Q}$ short-circuit protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

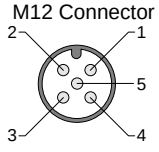
Connection diagram

PNP Models



NPN Models

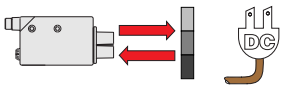




wire colors refer to standard cable, not included

KTL 5G-2

Contrast Sensors





dependent on fiber sensing distance

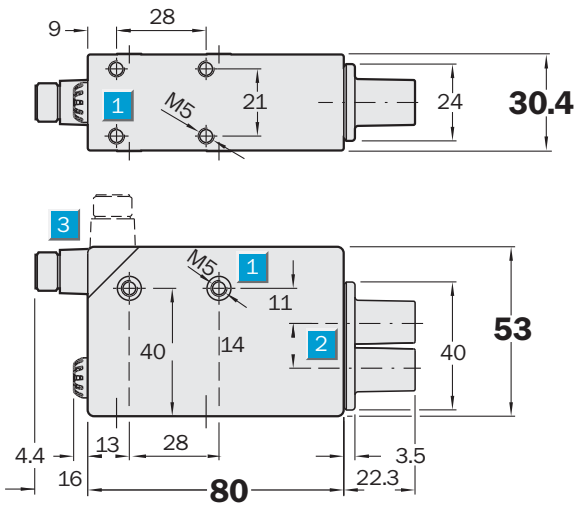
Highlights

- Rugged metal housing
- Selectable light or dark switching
- Indicator LEDs for easy setup
- Insensitive to ambient light
- Switching frequency 10 kHz
- Uses industry standard fibers
- Rotatable M12 quick disconnect

KTL 5G-2

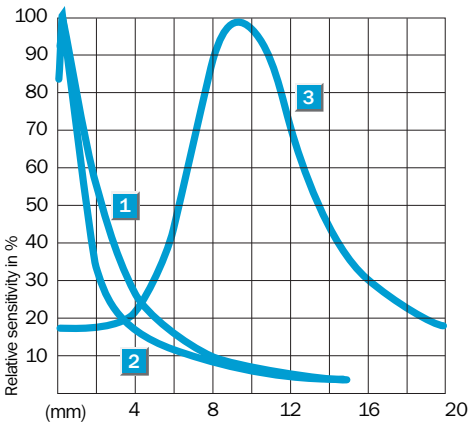


Dimensional drawing



dimensions in mm

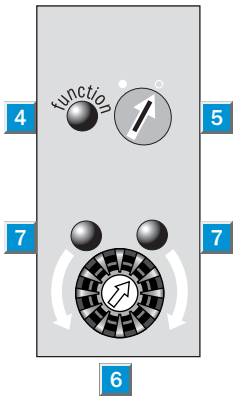
Relative sensitivity



1	Fiber-optic cable LBST 32900
2	Fiber-optic cable LBSR 32900
3	Fiber-optic cable OCSL

Adjustments

All types



1	M5 mounting holes, 5.5 mm deep
2	Fiber-optic adapter (M12 x 1 internal thread)
3	M12 plug (rotatable 90°)
4	Output indicator (yellow)
5	Operating mode switch
○	Light switching
●	Dark switching
6	Switching threshold adjustment
7	Adjustment indicators (green)

Order information

Type	Part no.
KTL 5G-2 P 11	1 016 294
KTL 5G-2 N 11	1 016 295

Accessories	page
Cables and connectors	1180
Mounting systems	1234

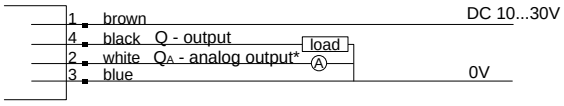
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Technical data	KTL 5G-2-	P11	N11
Sensing distance	Dependent on fiber used		
Light source[1], **light type**	LED, green		
Supply voltage V_S	10…30 V DC[2]		
Ripple[3]	< 5 V_{SS}		
Current consumption[4]	< 30 mA at 24 V DC		
Switching outputs	Light/dark switching, selectable via switch		
	PNP: HIGH = V_S – < 2 V/LOW = 0 V		
	NPN: HIGH = V_S /LOW = < 2 V		
Output current I_A max.	100 mA, short-circuit protected		
Response time[5]	50 µs		
Max. switching frequency[6]	To 10 kHz		
Analog output Q_A	0.3…10 mA (consult factory for models)		
Connection type	Plug, M12 4-pin		
VDE protection class[7]	□		
Enclosure rating	IP 67/NEMA 6		
Circuit protection[8]	A, B, C		
Ambient temperature T_A	Operation 14…131° F (-10…55° C)		
	Storage -13…167° F (-25…75° C)		
Shock/vibration	To IEC 68		
Approximate weight	14 oz (400 g)		
Housing material	Die cast zinc		

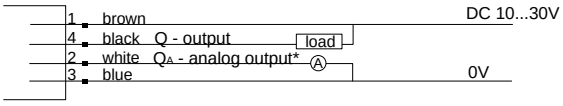
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Outputs Q and Q_A short-circuit protected
C = Interference pulse suppression

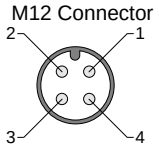
Connection diagram

PNP Models



NPN Models





wire colors refer to standard cable, not included

*analog output available on certain models only

KTL 5W-2 Dynamic Teach

Contrast Sensors



dependent on fiber sensing distance

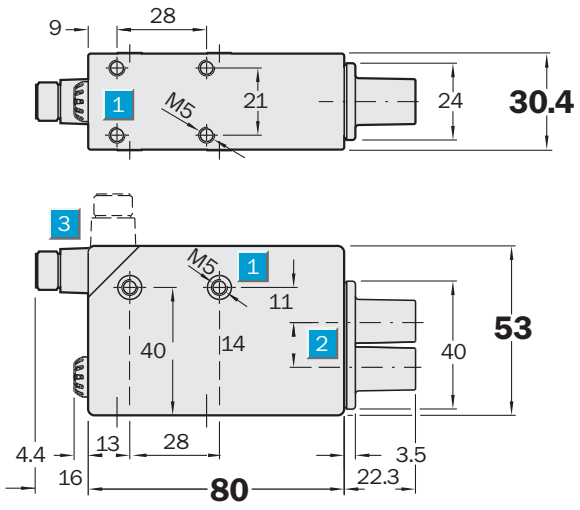
Highlights

- Rugged die cast metal housing
- Red, blue and green light source automatically selected
- Insensitive to ambient light
- Teach-in sensitivity adjustment “on the fly”
- Switching frequency up to 10 kHz
- Light/dark selection or teach-in can be done via wire
- Uses industry standard fibers

KTL 5W-2 Dynamic Teach

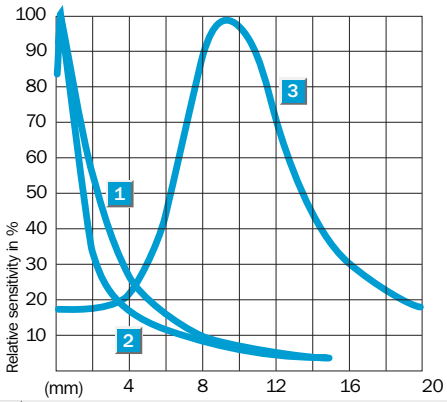


Dimensional drawing



dimensions in mm

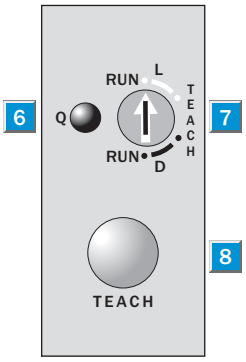
Relative sensitivity



1	Fiber-optic cable LBST 32900
2	Fiber-optic cable LBSR 32900
3	Fiber-optic cable OCSL

Adjustments

All types



1	Lens (light transmission), can be replaced by Item 4
2	M5 mounting holes, 5.5 mm deep
3	See dimensional drawing of lens
4	Blind screw, can be replaced by Item 1
5	M12 plug (rotatable 90°)
6	Output indicator (yellow)
7	L/D switch
8	Teach button

Teach-in

Teach-in and light/dark
The two settings can be triggered simultaneously either via control panel or control cable.

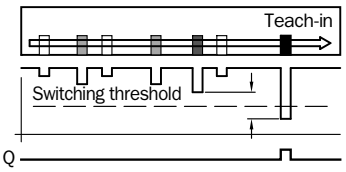
Control panel: The teach-in button can be locked against accidental actuation with “run”. In an undefined switching position, no teach-in procedure can be triggered.

Setting through control panel:
1. Select “light (L)” or “dark (D)” using rotating switch
2. Trigger teach-in via teach-in button
3. Run the object to be detected at least one register length through the light spot

Acknowledged via Q or LED control flashes=insufficient contrast.

Setting via control cable (overrides setting on control panel)
1. Select “light” or “dark” using control cable
2. Trigger teach-in via ET control cable
3. Run the object to be detected at least one register length through the light spot
4. End teach-in

Material speed during teach-in:
min. 25 mm/s, max. 300 mm/s.



Order information

Type	Part no.
KTL 5W-2 N13	1 019 661
KTL 5W-2 P23	1 019 551

Accessories	page
Cables and connectors	1180
Mounting systems	1234

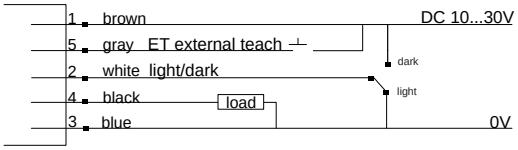
7028071 - © 2008 SICK, Inc.

Technical data	KTL 5W-2-	P23	N13
Sensing distance	Dependent on fiber used		
Light source[1], **light type**	LED, red, blue, green		
Supply voltage V_S	10…30 V DC[2]		
Ripple[3]	< 5 V_{SS}		
Current consumption[4]	< 80 mA		
Switching outputs Q	PNP: HIGH = V_S – < 2 V / LOW = 0 V		
	NPN: HIGH = V_S / LOW = < 2 V		
Output current I_A max.	100 mA, short-circuit protected		
Response time[5]	50 µs		
Max. switching frequency[6]	to 10 kHz		
Teach-in input ET	PNP - Teach: > 10 V…< V_S		
	Run: 0 V or no connection		
	NPN - Teach: 0 V		
	Run: V_S or no connection		
Retention time	25 ms non-volatile memory		
L/D input, light/dark switching	PNP: dark = > 10 V…< V_S		
	light = 0 V or no connection		
	NPN: dark = 0 V		
	light = V_S or no connection		
Connection type	Plug, M12 5-pin		
VDE protection class[7]	□		
Enclosure rating	IP 67/NEMA 6		
Circuit protection[8]	A, B, C		
Ambient temperature T_A	Operation 14…131° F (-10… 55° C)		
	Storage -13…167° F (-25… 75° C)		
Shock/vibration	To IEC 68		
Approximate weight	14 oz (400 g)		
Housing material	Die cast zinc		

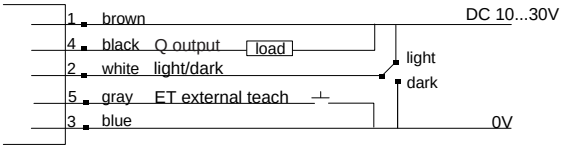
1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
C = Interference pulse suppression

Connection diagram

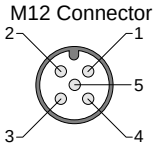
PNP Models



NPN Models



M12 Connector



wire colors refer to standard cable, not included

KTL 10W

Contrast Sensors



dependent on fiber sensing distance

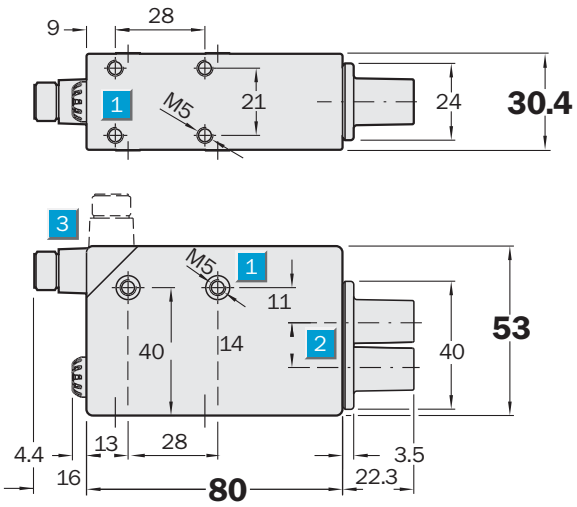
Highlights

- Rugged metal housing
- Advanced “on the fly” teach-in of settings that automatically select the proper light source
- Insensitive to ambient light
- Red, green and blue LEDs provide the ability to read a color mark
- Switching rate up to 25 kHz
- Rotatable M12 quick disconnect
- Uses industry standard fibers

KTL 10W



Dimensional drawing



dimensions in mm

Teach-in

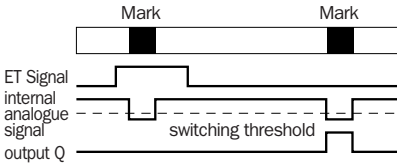
The switching threshold is set using the teach-in procedure, with either the ET teach-in cable or the teach-in button on the unit.

Procedure:

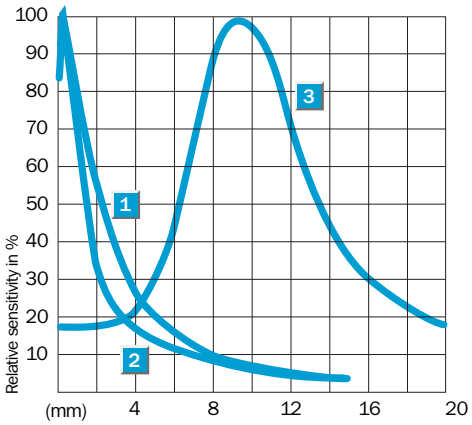
- Move program selector switch to position Q.
- Shine light spot in front of the mark on template.
- Activate and retain teach signal through teach button or ET cable.
- Move the template with the mark through the light spot.
- Deactivate teach signal.
- The switching threshold has settled in the center between the receiver signals from background and mark and is saved in the non-volatile memory.
- The optimum light source is selected automatically.

Note:

- For small marks, the material speed during the teach-in procedure must not exceed 10 m / minute.
- Teach-in one mark only.
- If the teach-in procedure is unsuccessful, the output switches at approx. 5 kHz and the LED signal flashes. The received signal was too low, too high (possibly through brightness) or the contrast differential was too low.



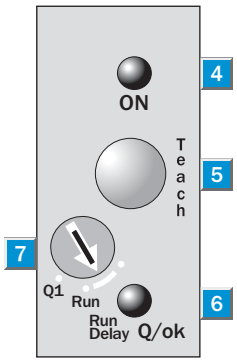
Relative sensitivity



1	Fiber-optic cable LBST 32900
2	Fiber-optic cable LBSR 32900
3	Fiber-optic cable OCSL

Adjustments

All types



1	M5 threaded mounting hole, 5.5 mm deep
2	Lens (light transmission)
3	Plug, M12 5-pin, (rotatable)
4	Power indicator (green)
5	Teach-in button
6	Output indicator and teach-in (yellow)
7	Set/run switch

Order information

Type	Part no.
KTL 10W-P15	1 023 419
KTL 10W-N15	1 023 498

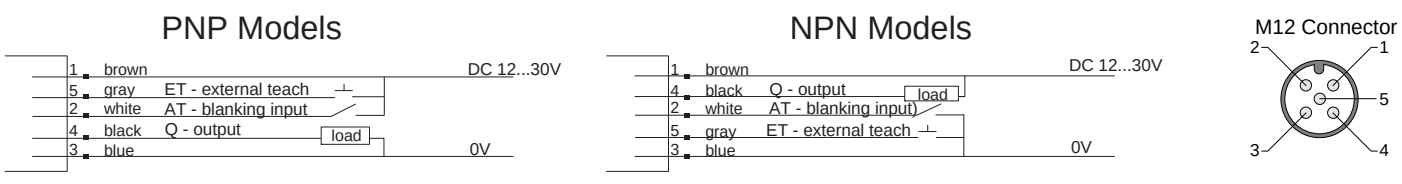
Accessories

	page
Cables and connectors	1180
Mounting systems	1234

Technical data	KTL 10W-	P15	N15
Sensing distance	Dependent on fiber used		
Light source[1], **light type**	LED, red, green, blue		
Supply voltage V_S	12…30 V DC[2]		
Ripple[3]	< 5 V		
Current consumption[4]	< 150 mA		
Switching outputs	PNP: HIGH = V_S – < 2 V/LOW = 0 V		
	NPN: HIGH = V_S/LOW = < 2 V		
Output current I_A max.	100 mA		
Response time[5]	< 20 µs		
Max. switching frequency[6]	25 kHz		
Jitter	< 10 µs		
Timing options	20 ms, adjustable OFF delay		
Teach-in input ET	PNP - Teach: > 10 V		
	Run: < 2 V or no connection		
	NPN - Teach: < 2 V		
	Run: > 10 V or no connection		
Blanking input AT			
Blanked	PNP: AT > 10 V		
Free running	AT < 2 V or no connection		
	NPN: AT < 2 V		
	AT > 10 V or no connection		
Connection type	Plug M 12, 5-pin		
VDE protection class[7]	□		
Circuit protection[8]	A, B, C		
Enclosure rating	IP 67/NEMA 6		
Ambient temperature T_A	Operation 14…140° F (-10…60° C)		
	Storage -13…167° F (-25…75° C)		
Shock/vibration	To IEC 68		
Approximate weight	14 oz (400 g)		
Housing material	Die cast zinc		

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
B = Outputs Q and $\bar{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram



wire colors refer to standard cable, not included

CSM 1

Color Sensors







0.5 in (12.5 mm)
sensing distance

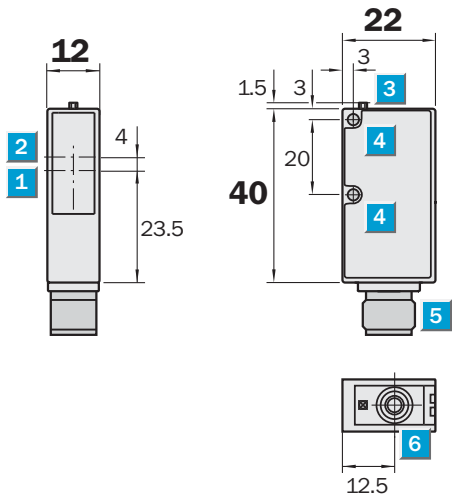
Highlights

- Teach-in programming by push button or control wire
- Selectable color tolerance
- Small compact housing
- High switching frequency
- M12 quick disconnect

CSM 1



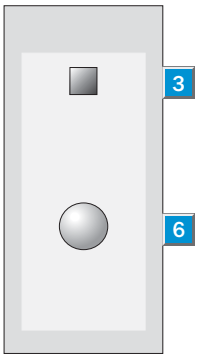
Dimensional drawing



dimensions in mm

Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 LED signal strength indicator
4 Mounting hole Ø 0.1 in (3 mm)
5 Plug, M12 4-pin
6 Teach-in button

Order information

Type	Part no.
CSM 1-P1114	1 022 569
CSM 1-N1114	1 018 514

Accessories

	page
Cables and connectors	1180
Mounting systems	1234

Technical data	CSM 1-	P1114	N1114
Sensing distance	0.5 in ± 0.08 in (12.5 mm ± 2 mm)	■	■
Light spot dimensions	0.06 x 0.26 in (1.5 x 6.5 mm)	■	■
Light source[1], light type	Red, green, blue	■	■
Supply voltage V_S	24 V DC ± 20%	■	■
Ripple[2]	< 5 V_{PP}	■	■
Current consumption[3]	< 35 mA	■	■
Switching outputs	NPN: HIGH = V_S / LOW = < 2 V		■
	PNP: HIGH = V_S < 2 V/ LOW = approx. 0 V	■	
Output current I_A max.	100 mA	■	■
Response time[4]	500 µs	■	■
Switching frequency[5]	1500 Hz	■	■
Teach-in input ET	PNP: Teach > 10 V...< V_S	■	
	NPN: Teach 0 V		■
Connection type	Plug, M12 4-pin	■	■
VDE protection class[6]	□	■	■
Enclosure rating	IP 67	■	■
Circuit protection[7]	A, B, C	■	■
Ambient temperature	Operation 14…131° F (-10…55° C)	■	■
	Storage -4…167° F (-25… 75° C)	■	■
Shock/vibration	To IEC 68	■	■
Approximate weight	0.7 oz (20 g)	■	■
Housing material	Glass fiber reinforced ABS	■	■
Mounting bracket	BEF-WN-W9-2 (#2022855)	■	■

1) Average service life 100,000 h at T_A = 25° C
2) May not exceeded or fall short of V_S tolerances
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Reference voltage 50 V DC
7) A = V_S connections reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression

Static teach-in

Static Teach-in and color tolerance selection CSM 1

1. Place object in light spot.
2. Press the teach-in button on the sensor for >1 s, until the light spot goes out. Green transmitter light goes on for approx. 2 s.
3. Press the teach-in button during this time:
   "Medium" color tolerance selected (default state) and teach procedure is triggered.
   Do not press teach-in button, green transmitter light goes out and blue transmitter light goes on for approx. 1 s.
4. Press the teach-in button during this time:
   "Precise" color tolerance selected and teach procedure is triggered.
   Do not press the teach-in button, blue transmitter light goes out and red transmitter light goes on for approx. 1 s.
5. Press the teach-in button during this time:
   "Coarse" color tolerance selected and teach-in procedure is triggered.
   Do not press teach-in button, color tolerance selection/teach procedure process repeats (green transmitter light goes on for approx. 2 s.)

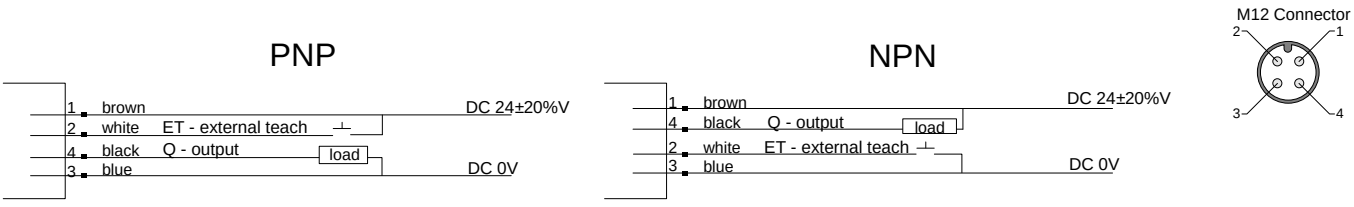
Teach-in via control wire:

1. Place object in light spot.
2. Trigger the teach-in procedure via the control wire.

When using the control wire for teach-in, the last color tolerance set via the push button on the sensor or the "medium" default state is selected, i.e., the color tolerance can only be set via the push button on the sensor.

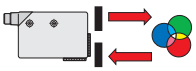
Confirmation:
Red transmitter light and status indicator blink = unsuccessful teach-in.
Transmitter light and status indicator do not blink = teach-in completed.

Connection diagram



CS8

Displacement Sensor



0.49…2.36 in (12.5…60 mm)
sensing range

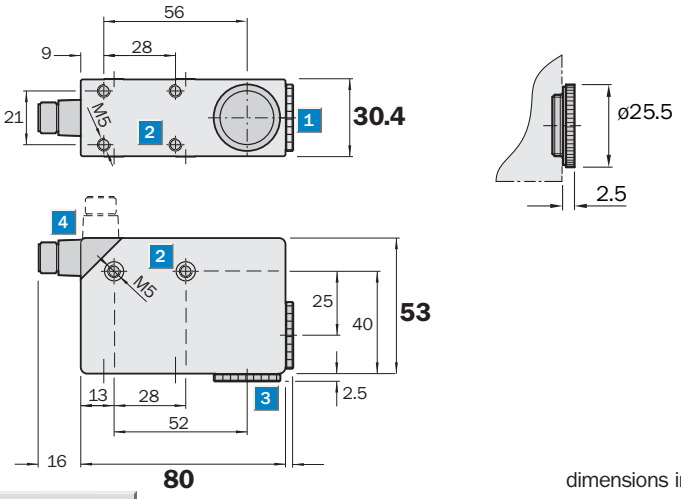
Highlights

- Response time up to 85 µs
- High color resolution
- Quality of teach-in indicated on bar graph display
- Very precise light spot
- Adjustable color tolerance
- Metal housing with 2 lens positions (selectable)

CS8



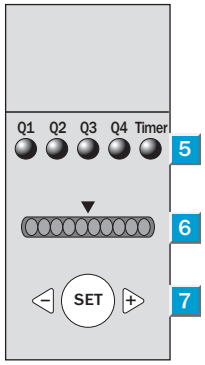
Dimensional drawing



dimensions in mm

Adjustments

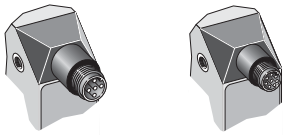
All types



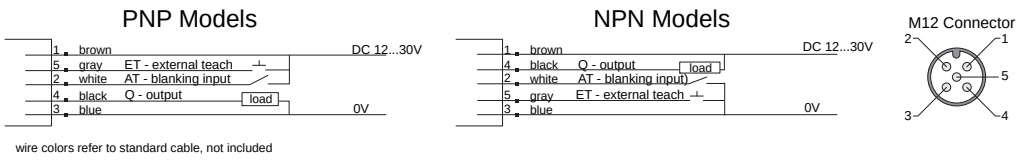
1 Lens (light transmission)
2 M5 mounting holes, 5.5 mm deep
3 Blank lens cover can be replaced by lens 1
4 5-pin, M12 x 1 plug (rotatable) or
8-pin, M12 x 1 plug (rotatable)
5 Function signal indicators (yellow)
6 Bar display (green), power on (left LED)
7 Teach-in button/ "+" and "-" adjustment buttons

Connection diagram

CS8-1 | CS8-4

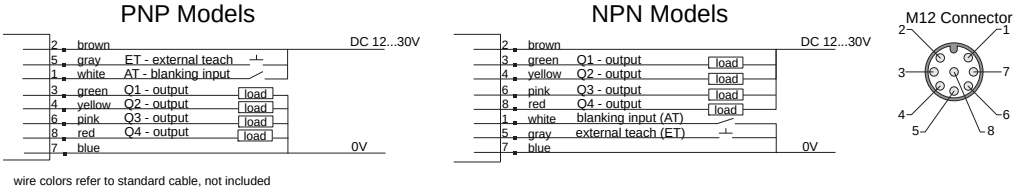


5-pin, M12



wire colors refer to standard cable, not included

8-pin, M12



wire colors refer to standard cable, not included

Accessories	page
Cables and connectors	1180
Mounting systems	1234

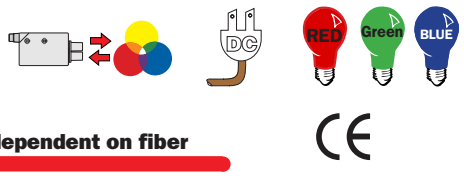
Technical data	CS8	1-P1112	1-P3612	4-P1112	4-P3612	1-N1112	1-N3612	4-N1112	4-N3612
Scanning distance	12.5 ± 3 mm	■		■		■		■	
from front edge of housing	60 ± 9 mm		■		■		■		■
Light spot size	4 x 2 mm² (at 12.5 mm)	■		■		■		■	
	13 x 13 mm² (at 60 mm)		■		■		■		■
Light source[1]	LED; red, green, blue	■	■	■	■	■	■	■	■
Wave length (nm)	640, 525, 470	■	■	■	■	■	■	■	■
Light spot direction	Longitudinal	■		■		■		■	
Scanning range with PL80A reflector	100…250 mm	■		■		■		■	
	250…1000 mm		■		■		■		■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■	■	■	■	■
Residual ripple[3]	< 5 V	■	■	■	■	■	■	■	■
Current consumption[4]	< 80 mA	■	■	■	■	■	■	■	■
Switching outputs	PNP: HIGH = V_S – < 2 V / LOW = 0 V	■	■	■	■				
	NPN: HIGH = V_S / LOW = < 2 V					■	■	■	■
Output current I_A max.	< 120 mA	■	■	■	■	■	■	■	■
Switching frequency[5]	Adjustable	■	■	■	■	■	■	■	■
	1 kHz (0.5 ms); 3 kHz (160 µs); 5 kHz (85µs)	■	■			■	■		
	0.5 kHz (1 ms); 1 kHz (500 µs); 3.5 kHz (145µs)			■	■			■	■
Timer	Off delay 20 ms adjustable	■	■	■	■	■	■	■	■
Output (channel)	1 color	■	■			■	■		
	4 colors			■	■			■	■
Teach-in input ET (ET > 2 ms)	PNP: Teach > 10 V…< V_S	■	■	■	■				
	Run 0 V or not connected	■	■	■	■				
	NPN: Teach 0 V					■	■	■	■
	Run V_S or not connected					■	■	■	■
Blanking input AT	AT > 200 µs								
Blanked	PNP: AT >10 V	■	■	■	■				
Free running	AT < 2 V or not connected	■	■	■	■				
	NPN: AT < 2 V					■	■	■	■
	AT > 10 V or not connected					■	■	■	■
Retention time	25 ms, non-volatile memory	■	■	■	■	■	■	■	■
Connection type	M12 plug, 5-pin	■	■			■	■		
	M12 plug, 8-pin			■	■			■	■
VDE protection class[6]	□	■	■	■	■	■	■	■	■
Circuit protection[7]	A, B, C, D	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■
Ambient temperature	Operation: 14…131° F (-10…55° C)	■	■	■	■	■	■	■	■
	Storage: -13…167° F (-25…75° C)	■	■	■	■	■	■	■	■
Shock load	To IEC 68	■	■	■	■	■	■	■	■
Weight	Approx. 400 g	■	■	■	■	■	■	■	■
Housing material	Cast zinc	■	■	■	■	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) With light/dark ratio 1:1
6) Reference voltage 50 V DC
7) A = V_S connection reverse-polarity protected
B = Output Q or Q_1 to Q_4 short-circuit protected
C = Interference pulse suppression
D = Output overcurrent and short-circuit protected

Order information	
Type	**Part no.**
CS81-P1112	1028224
CS81-P3612	1028225
CS84-P1112	1028226
CS84-P3612	1028227
CS81-N1112	1028228
CS81-N3612	1028229
CS84-N1112	1028230
CS84-N3612	1028231

CSL 1

Fiber-Optic Color Sensors



dependent on fiber sensing range

CE

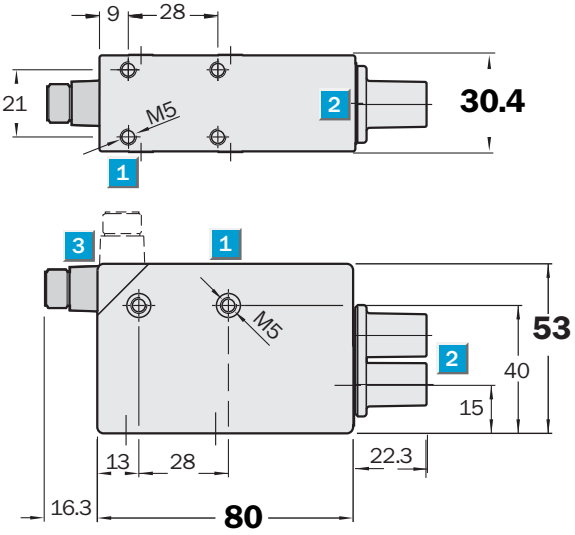
Highlights

- Rugged plastic housing
- Uses reflected or transmitted light
- Fiber-optic cable connection
- Fiber-optic cable for high temperatures
- Teach-in programming
- Color tolerance selector
- Insensitive to ambient light
- Switching frequency of 700 Hz
- M12 quick disconnect

CSL 1

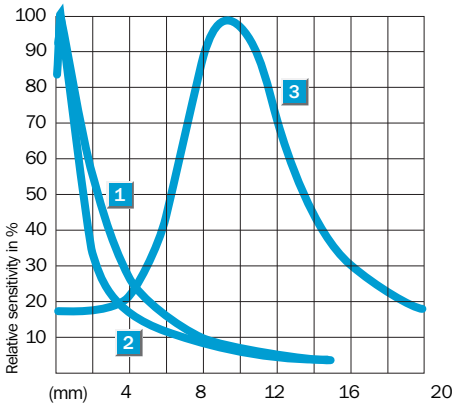


Dimensional drawing



dimensions in mm

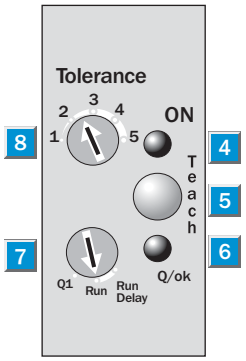
Sensing distance



1	Fiber-optic cable LBST 32900
2	Fiber-optic cable LBSR 32900
3	Fiber-optic cable OCSL

Adjustments

All types



1	M5 threaded mounting hole, 5.5 mm deep
2	Center of optical axis
3	M12 plug (rotatable)
4	Power indicator, green
5	Teach-in button
6	Function indicator: output/teach-in (yellow)
7	Set/run switch
8	Tolerance adjustment

Adjustment

In order to simplify adjustment and operation of the device, the reference color is programmed using the teach-in method. The tolerance can be selected by changing the position on the rotary switch. Just press the button to store the reference colors. The programming method can also be carried out automatically via the external teach-in (ET) wire. With each pulse, the sensor moves into programming mode, establishes the color of the object being scanned and is then ready to be used again. After external teach-in the device is ready for use after 200 ms.

Order information

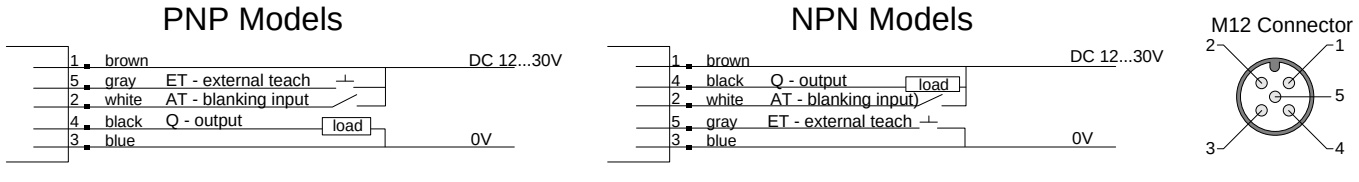
Type	Part no.
CSL 1-P11	1 016 292
CSL 1-N11	1 016 293

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178

Technical data		CSL 1-	P11	N11								
Sensing distance	Dependent on fiber		■	■								
Light source[1], **light type**	LED, green, red, blue		■	■								
Supply voltage V_S	12...30 V DC[2]		■	■								
Ripple[3]	< 5 V		■	■								
Current consumption[4]	< 80 mA		■	■								
Switching outputs	PNP: HIGH = V_S – < 2 V/LOW = 0 V		■									
	NPN: HIGH = V_S/LOW = < 2 V			■								
Output current I_A max.	100 mA		■	■								
Switching frequency	1000 Hz		■	■								
Response time[5]	< 700 µs		■	■								
Timing options	20 ms OFF delay, fixed		■	■								
Teach-in input ET	PNP - Teach: > 12 V...< V_S		■									
	Run: < 2 V or no connection		■									
	NPN - Teach: 0 V...12 V			■								
	Run: V_S or no connection			■								
Pulse duration	ET: > 0.5 ms		■	■								
Blanking input AT												
Blanked	PNP: > 12 V...< V_S		■									
Free running	< 2 V or no connection		■									
Blanked	NPN: 0 V...V_S			■								
Free running	V_S or no connection			■								
Response time	< 0.2 ms		■	■								
Connection type	Plug, M12 5-pin		■	■								
VDE protection class[6]	⧈		■	■								
Circuit protection[7]	A, B, C		■	■								
Enclosure rating	IP 67/NEMA 6		■	■								
Ambient temperature T_A	Operation 14...131° F (-10...55° C)		■	■								
	Storage -13...158° F (-25...70° C)		■	■								
Shock/vibration	To IEC 68		■	■								
Approximate weight	14 oz (400 g)		■	■								
Housing material	Die cast zinc		■	■								

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
7) Reference voltage DC 50 V
8) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
C = Interference pulse suppression

Connection diagram



wire colors refer to standard cable, not included

LUT 2

Luminescence Sensors



0.5 in (12.5 mm)
sensing distance

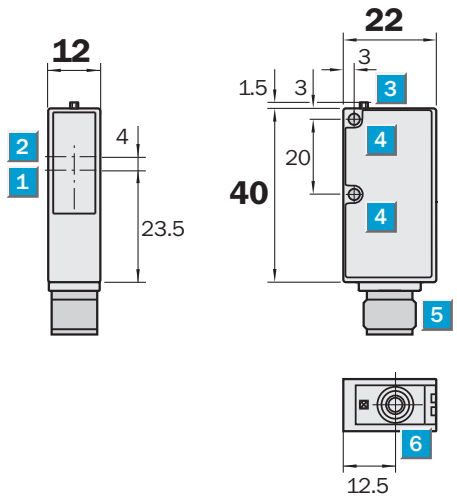
Highlights

- Static teach-in sensitivity adjustment, mark and background, by push button or control wire
- Switching threshold adjustment for low fluorescence
- Small compact housing
- High switching frequency
- M12 quick disconnect

LUT 2



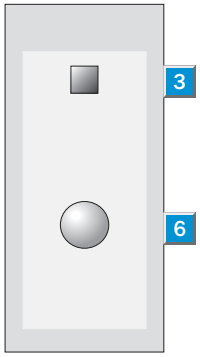
Dimensional drawing



dimensions in mm

Adjustments

All types



1 Center of optical axis, sender
2 Center of optical axis, receiver
3 LED signal strength indicator
4 Mounting hole Ø 0.1 in (3 mm)
5 Plug, M12 4-pin
6 Teach-in button

Order information

Type	Part no.
LUT 2-P1116	1 023 500
LUT 2-N1116	1 023 501

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Technical data	LUT 2-	P1116	N1116
Sensing distance	0.5 in ± 0.08 in (12.5 mm ± 2 mm)		
Wave Length	370 nm		
Light spot dimensions	0.08 x 0.10 in (2 x 2.5 mm)		
Light source[1], light type	UV light source		
Supply voltage V_S	24 V DC ± 20%		
Ripple[2]	< 5 V_{PP}		
Current consumption[3]	< 30 mA		
Switching outputs	NPN: HIGH = V_S / LOW = < 2 V		
	PNP: HIGH = V_S < 2 V/ LOW = approx. 0 V		
Output current I_A max.	100 mA		
Response time[4]	1 ms and 250 µs		
Switching frequency[5]	500 Hz and 2000 Hz		
Teach-in input ET	PNP: Teach > 10 V…< V_S		
	NPN: Teach 0 V		
Connection type	Plug, M12 4-pin		
VDE protection class[6]	□		
Enclosure rating	IP 67		
Circuit protection[7]	A, B, C		
Ambient temperature	Operation 14…131° F (-10…55° C)		
	Storage -13…167° F (-25…75° C)		
Shock/vibration	To IEC 68		
Approximate weight	0.7 oz (20 g)		
Housing material	Glass fiber reinforced ABS		
Mounting bracket	BEF-WN-W9-2 (#2022855)		

1) Average service life 100,000 h at T_A = 25° C
2) May not exceeded or fall short of V_S tolerances
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Reference voltage 50 V DC
7) A = V_S connections reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression

Static Teach-in

Static teach-in LUT 2 via push button:
1. Place object in light spot.
2. Press the teach-in button on the sensor for >1 s. First teach-in procedure is triggered.
3. Place the light spot on the background, press the teach-in button. Second teach-in procedure is triggered.

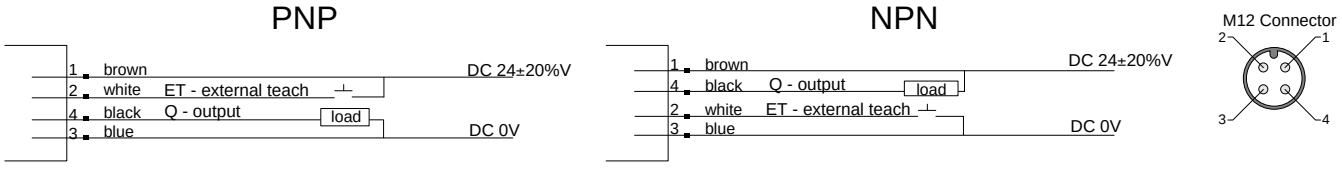
Teach-in via control wire:
1. Place object in light spot.
2. Trigger the first teach-in procedure via the control wire.
3. Place the light spot on the background, and then trigger the second teach-in procedure via the control wire.

Confirmation:
LED and status indicator do not blink = teach-in procedure completed with standard sensitivity (2000 Hz).
LED and status indicator blink 2x quickly = teach-in procedure completed with high sensitivity (500 Hz).
LED and status indicator blink rapidly = teach-in procedure not completed.

Preselection of high-sensitivity (500 Hz) via push-button
1. Place object in light spot.
2. Press the teach-in button on the sensor for >1s. First teach-in procedure is triggered.
3. Place the light spot on the background, press the teach-in button. Second teach-in procedure is triggered.
4. Press the teach-in button on the sensor again within the next two seconds.

Confirmation
LED and status indicator blink 2x quickly = teach-in procedure completed with high sensitivity (500 Hz).
LED and status indicator blink rapidly = teach-in procedure not completed.

Connection diagram



LUT 3-6

Luminescence Sensors



0.4...2.0 in (10...50 mm)
sensing distance

Highlights

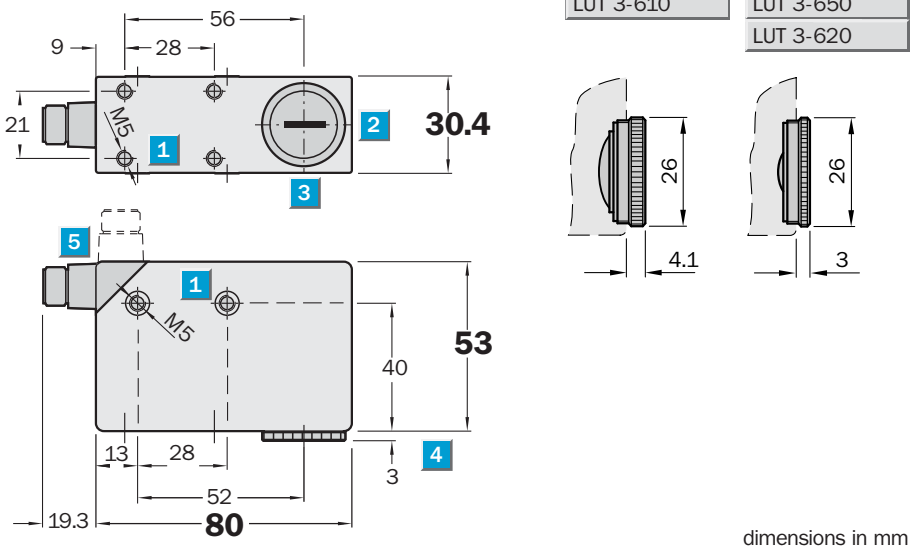
- Compact, rugged die cast metal housing
- Semiconductor UV light source
- No lamp replacement
- Interchangeable lenses for sensing range options
- Adjustable sensitivity
- Status indicator
- No interference from surface reflection
- M12 rotatable quick disconnect

LUT 3-6



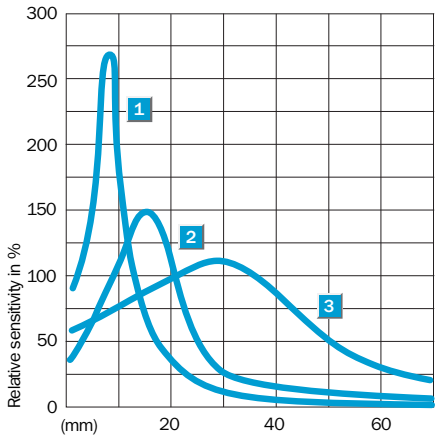
Dimensional drawing

LUT 3-610 | LUT 3-650 | LUT 3-620



dimensions in mm

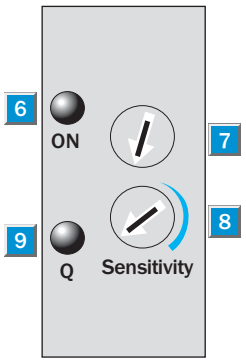
Relative sensitivity



1	Sensing distance	10 mm
2	Sensing distance	20 mm
3	Sensing distance	50 mm

Adjustments

All types



1	M5 threaded mounting hole, 5.5 mm deep
2	Light spot direction
3	Center of optical axis
4	See dimensional drawing for lens
5	M12 plug (rotatable)
6	Power indicator
7	Not used
8	Sensitivity adjustment
9	Output indicator

Order information

Type	Part no.
LUT 3-610	1 015 396
LUT 3-620	1 015 397
LUT 3-650	1 015 398

LUT 3-6 replacement lens

OBJ-LUT 3-10	2 016 348
OBJ-LUT 3-20	2 016 349
OBJ-LUT 3-50	2 016 350

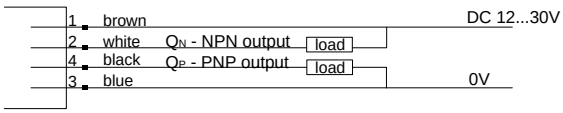
Accessories

	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

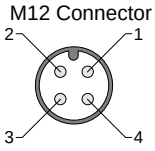
Technical data	LUT 3-	610	620	650
Sensing distance[1]**/**	0.4 in/0.08 x 0.2 in (10 mm/2 x 6 mm)	■		
light spot sizes	0.8 in/0.1 x 0.4 in (20 mm/3 x 9 mm)		■	
	2.0 in/0.2 x 0.6 in (50 mm/5 x 15 mm)			■
Light spot direction	Vertical	■	■	■
Light source[2]**, light type**	UV light source	■	■	■
Wavelength	380 nm	■	■	■
Supply voltage V_S	12…30 V DC[3]	■	■	■
Ripple[4]	max. 2 V	■	■	■
Current consumption[5]	60 mA	■	■	■
Switching outputs	Light switching	■	■	■
	PNP: HIGH = V_S – <3 V/LOW = 0 V	■	■	■
	NPN: HIGH = V_S/LOW = <2 V	■	■	■
Output current I_A max.	100 mA	■	■	■
Response time[6]	0.3 ms	■	■	■
Switching frequency[7]	1.5 kHz	■	■	■
Connection type	Plug, M12 4-pin	■	■	■
VDE protection class[8]	□	■	■	■
Circuit protection[9]	A, B, C	■	■	■
Enclosure rating	IP 67	■	■	■
Ambient temperature T_A	Operation 14...131° F (-10…55° C)	■	■	■
	Storage -13...167° F (-25…75° C)	■	■	■
Shock/vibration	To IEC 68	■	■	■
Approximate weight	14 oz (400 g)	■	■	■
Housing material	Die cast metal	■	■	■

1) From front edge of lens
2) Average service life 100,000 h at T_A =25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Reference voltage DC 50 V
9) A = V_S connections reverse-polarity protected
B = Outputs Q_P and Q_N short-circuit protected
C = Interference pulse suppression

Connection diagram



wire colors refer to standard cable, not included



LUT 3-8

Luminescence Sensors



0.4/0.8/2.0/3.5 in (10/20/50/90 mm)
sensing distance

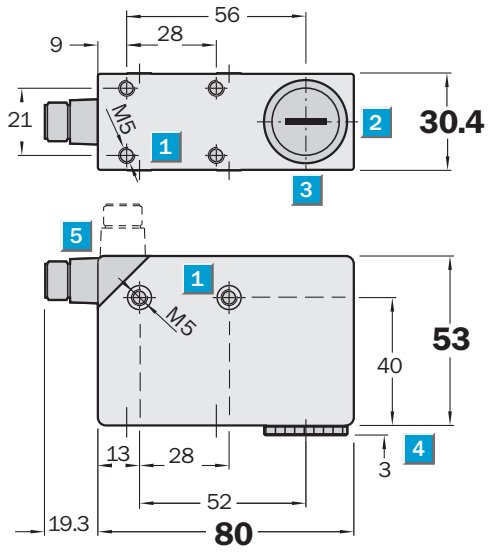
Highlights

- Compact, rugged die cast metal housing
- Semiconductor UV light source
- Adjustable time delay
- Interchangeable lenses for sensing range options (10, 20, 50, 90 mm)
- Fiber-optic cable connection
- Analog output
- Optical filters available for difficult applications
- M12 rotatable quick disconnect

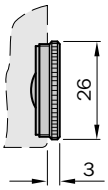
LUT 3-8



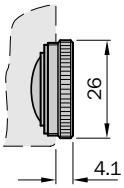
Dimensional drawing



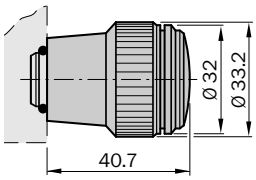
LUT 3-820
LUT 3-821
LUT 3-850
LUT 3-851
LUT 3-852
LUT 3-853



LUT 3-810

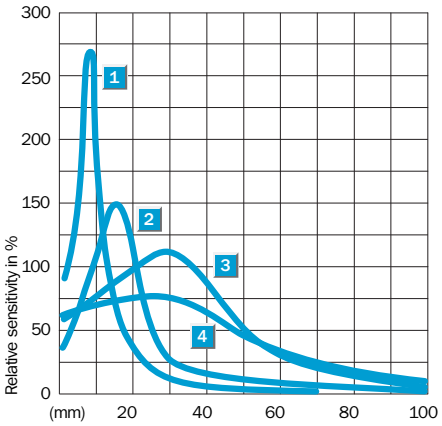


LUT 3-890



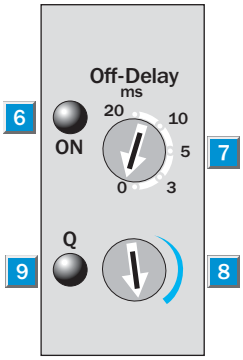
dimensions in mm

Relative sensitivity



Adjustments

All types



1 M5 threaded mounting hole, 5.5 mm deep
2 Light spot direction
3 Center of optical axis
4 See dimensional drawing for lens
5 M12 plug (rotatable)
6 Operating indicator
7 Time delay selector switch
8 Sensitivity adjustment
9 Output indicator

1	Sensing distance	10 mm
2	Sensing distance	20 mm
3	Sensing distance	50 mm
4	Sensing distance	90 mm

Order information

Type	Part no.
LUT 3-810	1 012 867
LUT 3-820	1 012 868
LUT 3-850	1 012 869
LUT 3-890	1 014 058

With additional optical filters

LUT 3-821	1 016 922	OG 570 Filter
LUT 3-851	1 012 870	OG 570 Filter
LUT 3-852	1 012 871	RG 610 Filter
LUT 3-853	1 012 872	RG 665 Filter

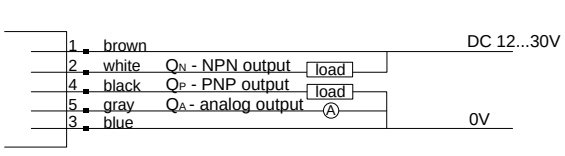
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178
Special Accessories	1314

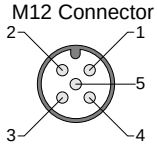
7028071 - © 2008 SICK, Inc.

Technical data		LUT 3-	810	820	850	890*	821	851	852	853		
Sensing distance[1]/	0.4 in/0.08 x 0.2 in (10 mm/2 x 6 mm)		■									
light spot sizes	0.8 in/0.1 x 0.4 in (20 mm/3 x 9 mm)			■			■					
	2.0 in/0.2 x 0.6 in (50 mm/5 x 15 mm)				■			■	■	■		
	3.5 in/0.3 x 0.8 in (90 mm/8 x 20 mm)					■						
Light spot direction	Vertical		■	■	■	■	■	■	■	■		
Light source[2], **light type**	UV light source		■	■	■	■	■	■	■	■		
Wavelength	385 nm		■	■	■	■	■	■	■	■		
Supply voltage V_S	12…30 V DC[3]		■	■	■	■	■	■	■	■		
Ripple[4]	max. 2 V		■	■	■	■	■	■	■	■		
Current consumption[5]	60 mA		■	■	■	■	■	■	■	■		
Switching outputs	Light switching		■	■	■	■	■	■	■	■		
	PNP: HIGH = V_S – <3 V/LOW = 0 V		■	■	■	■	■	■	■	■		
	NPN: HIGH = V_S/ LOW = <2 V		■	■	■	■	■	■	■	■		
Output current I_A max.	100 mA		■	■	■	■	■	■	■	■		
Response time[6]	0.3 ms		■	■	■	■	■	■	■	■		
Switching frequency[7]	1.5 kHz		■	■	■	■	■	■	■	■		
Time delay (OFF delay)	3 ms, 5 ms, 10 ms, 20 ms, adjustable		■	■	■	■	■	■	■	■		
Analog output Q_A	0.5…10 mA, 800 Ω		■	■	■	■	■	■	■	■		
Connection type	Plug, M12 5-pin		■	■	■	■	■	■	■	■		
VDE protection class[8]	□		■	■	■	■	■	■	■	■		
Circuit protection[9]	A, B, C		■	■	■	■	■	■	■	■		
Enclosure rating	IP 67/NEMA 6		■	■	■	■	■	■	■	■		
Ambient temperature T_A	Operation 14...131° F (-10…55° C)		■	■	■	■	■	■	■	■		
	Storage -13...167° F (-25…75° C)		■	■	■	■	■	■	■	■		
Shock/vibration	IEC 68		■	■	■	■	■	■	■	■		
Approximate weight	14 oz (400 g)		■	■	■	■	■	■	■	■		
Housing material	Die cast metal		■	■	■	■	■	■	■	■		

1) From front edge of lens
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Reference voltage DC 50 V
9) A = V_S connections reverse-polarity protected
B = Outputs Q_P and Q_N short-circuit protected
C = Interference pulse suppression
* Lens is not interchangeable with other models

Connection diagram





wire colors refer to standard cable, not included

LUT 3-9

Luminescence Sensors



0.4/0.8/2.0/3.5 in (10/20/50/90 mm)

sensing distance

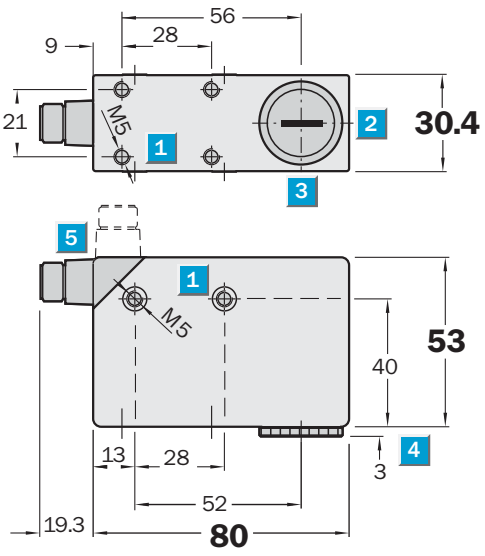
Highlights

- Compact, rugged die cast metal housing
- Semiconductor UV light source
- Adjustable time delay
- Interchangeable lenses for sensing range options (10, 20, 50, 90 mm)
- Fiber-optic cable connection
- Analog output
- Optical filters available for difficult applications
- M12 rotatable quick disconnect

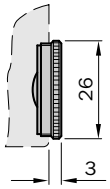
LUT 3-9



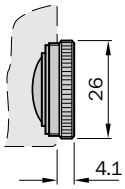
Dimensional drawing



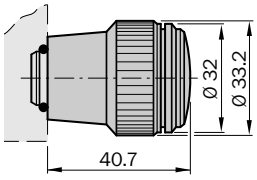
LUT 3-920
LUT 3-950
LUT 3-951
LUT 3-952
LUT 3-953



LUT 3-910

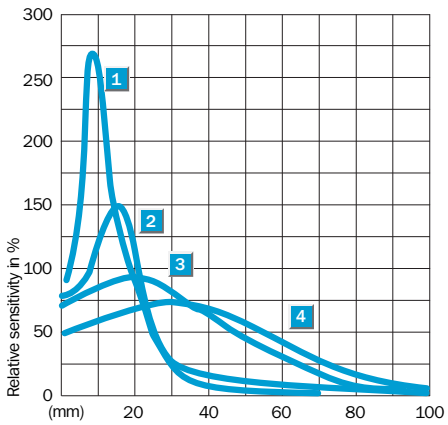


LUT 3-990



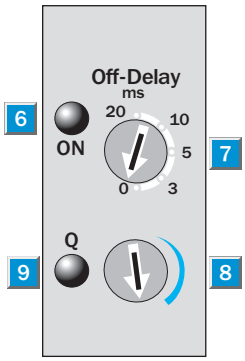
dimensions in mm

Relative sensitivity



Adjustments

All types



1	M5 threaded mounting hole, 5.5 mm deep
2	Light spot direction
3	Center of optical axis
4	See dimensional drawing for lens
5	M12 plug (rotatable)
6	Operating indicator
7	Time delay selector switch
8	Sensitivity adjustment
9	Output indicator

1	Sensing distance	10 mm
2	Sensing distance	20 mm
3	Sensing distance	50 mm
4	Sensing distance	90 mm

Order information

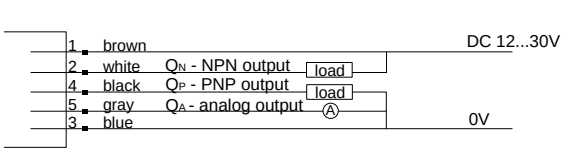
Type	Part no.	
LUT 3-910	1 019 285	
LUT 3-920	1 019 286	
LUT 3-950	1 019 287	
LUT 3-990	1 019 291	
With additional optical filters		
LUT 3-951	1 019 288	OG 570 Filter
LUT 3-952	1 019 289	RG 610 Filter
LUT 3-953	1 019 290	RG 665 Filter

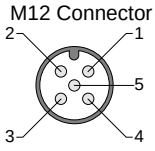
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Fiber-optic cables	1178
Special Accessories	1314

Technical data		LUT 3-	910	920	950	990*	951	952	953			
Sensing distance[1]**/**	0.4 in/0.08 x 0.2 in (10 mm/2 x 6 mm)		■									
light spot sizes	0.8 in/0.1 x 0.4 in (20 mm/3 x 9 mm)			■								
	2.0 in/0.2 x 0.6 in (50 mm/5 x 15 mm)				■		■	■	■			
	3.5 in/0.3 x 0.8 in (90 mm/8 x 20 mm)					■						
Light spot direction	Vertical		■	■	■	■	■	■	■			
Light source[2]**, light type**	UV light source		■	■	■	■	■	■	■			
Wavelength	370 nm		■	■	■	■	■	■	■			
Supply voltage V_S	12…30 V DC[3]		■	■	■	■	■	■	■			
Ripple[4]	max. 2 V		■	■	■	■	■	■	■			
Current consumption[5]	60 mA		■	■	■	■	■	■	■			
Switching outputs	Light switching		■	■	■	■	■	■	■			
	PNP: HIGH = V_S – <3 V/LOW = 0 V		■	■	■	■	■	■	■			
	NPN: HIGH = V_S/LOW = <2 V		■	■	■	■	■	■	■			
Output current I_A max.	100 mA		■	■	■	■	■	■	■			
Response time[6]	0.3 ms		■	■	■	■	■	■	■			
Switching frequency[7]	1.5 kHz		■	■	■	■	■	■	■			
Time delay (OFF delay)	3 ms, 5 ms, 10 ms, 20 ms, adjustable		■	■	■	■	■	■	■			
Analog output Q_A	0.5…10 mA, 800 Ω		■	■	■	■	■	■	■			
Connection type	Plug, M12 5-pin		■	■	■	■	■	■	■			
VDE protection class[8]	□		■	■	■	■	■	■	■			
Circuit protection[9]	A, B, C		■	■	■	■	■	■	■			
Enclosure rating	IP 67/NEMA 6		■	■	■	■	■	■	■			
Ambient temperature T_A	Operation 14…131° F (-10…55° C)		■	■	■	■	■	■	■			
	Storage -13…167° F (-25…75° C)		■	■	■	■	■	■	■			
Shock/vibration	IEC 68		■	■	■	■	■	■	■			
Approximate weight	14 oz (400 g)		■	■	■	■	■	■	■			
Housing material	Die cast metal		■	■	■	■	■	■	■			

1) From front edge of lens
2) Average service life 100,000 h at T_A = 25° C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) Reference voltage DC 50 V
9) A = V_S connections reverse-polarity protected
B = Outputs Q_P and Q_N short-circuit protected
C = Interference pulse suppression
* Lens is not interchangeable with other models

Connection diagram





wire colors refer to standard cable, not included

LUT 1-4

Luminescence Sensors



0.2...11.8 in (5...300 mm)
sensing distance

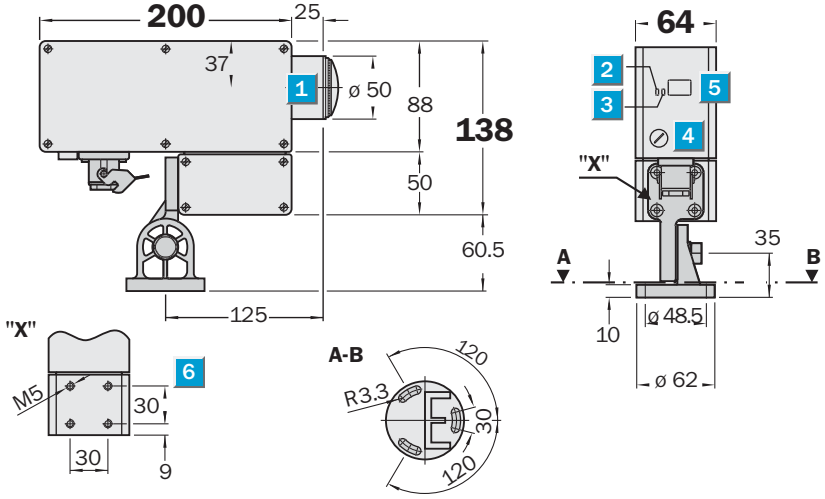
Highlights

- Rugged metal housing
- UV light source with high-pressure mercury vapor lamp
- Interchangeable lenses for sensing range options
- Allows fiber connection
- No interference from surface reflection
- Digital indicator shows received light intensity
- Colored filters available for difficult applications

LUT 1-4

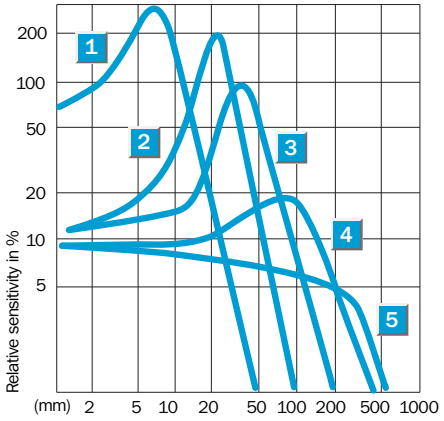


Dimensional drawing



dimensions in mm

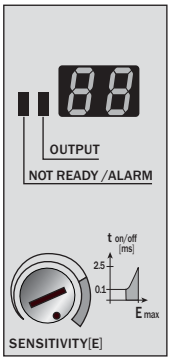
Relative sensitivity



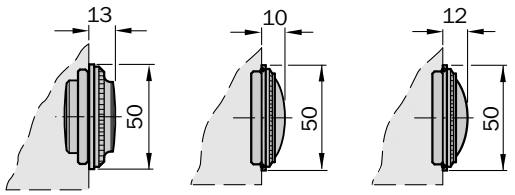
1	Sensing distance	10 mm
2	Sensing distance	20 mm
3	Sensing distance	50 mm
4	Sensing distance	125 mm
5	Sensing distance	300 mm

Adjustments

All types



LUT 1-410
LUT 1-420
LUT 1-430
LUT 1-440
LUT 1-450



1 Lens, see dimensional drawing
2 Readiness indicator
3 Output indicator
4 Sensitivity adjustment
5 Digital intensity signal
6 Threaded mounting hole, 12 mm deep

Order information

Type	Part no.
LUT 1-400	1 007 626
LUT 1-410	1 005 935
LUT 1-420	1 005 936
LUT 1-430	1 005 937
LUT 1-440	1 005 938
LUT 1-450	1 005 939

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Cables and connectors	1180
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Special accessories

Color filter

Type	Wavelength	Part no.
FLTR-570-LUT 1-4	570...750 nm	4 005 810
FLTR-610-LUT 1-4	610...750 nm	4 012 735
FLTR-630-LUT 1-4	630...750 nm	4 014 153
FLTR-665-LUT 1-4	665...750 nm	4 014 154

Spare lamp

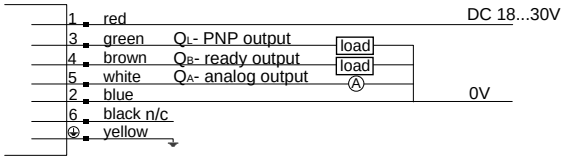
SLA-LUT 1-4	1 002 262

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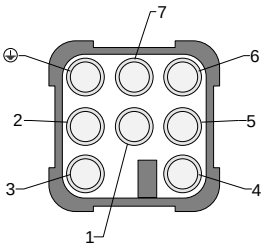
Technical data	LUT 1-	400	410	420	430	440	450
Sensing distance[1]/	0.4 in/Ø 0.1 in (10 mm/Ø 3 mm)		■				
light spot diameter	0.8 in/Ø 0.2 in (20 mm/Ø 4 mm)			■			
	2.0 in/Ø 0.3 in (50 mm/Ø 8 mm)				■		
	4.9 in/Ø 0.6 in (125 mm/Ø 15 mm)					■	
	11.8 in/Ø 1.6 in (300 mm/Ø 40 mm)						■
With fiber optic cable, no lens	0.3 in/Ø 0.4 in (8 mm/Ø 10 mm)	■					
With fiber optic cable, with 144 lens	0.6 in/Ø 0.2 in (15 mm/Ø 6 mm)	■					
With fiber optic cable, with 144 lens and diaphragm	0.6 in/Ø 0.2 in (15 mm/Ø 3 x 6 mm)	■					
Light source	High-pressure mercury vapor lamp	■	■	■	■	■	■
Light type, wavelength	UV, 365 nm	■	■	■	■	■	■
Average service life	4000 h	■	■	■	■	■	■
Supply voltage V_S	18 … 30 V DC [2]	■	■	■	■	■	■
Ripple[3]	2 V	■	■	■	■	■	■
Current consumption[4]	700 mA	■	■	■	■	■	■
Switching outputs Q_L[5] and Q_B[6]	Light/dark-switching, selectable	■	■	■	■	■	■
	PNP: HIGH = V_S – <2 V/LOW = 0 V	■	■	■	■	■	■
Output current I_A max.	200 mA	■	■	■	■	■	■
Max. switching frequency[7]	5 kHz	■	■	■	■	■	■
At max. sensitivity	200 Hz	■	■	■	■	■	■
Response time	0.1 ms	■	■	■	■	■	■
At max. sensitivity	2.5 ms	■	■	■	■	■	■
Analog output Q_A	0 … 1.5 V	■	■	■	■	■	■
Connection type	Plug	■	■	■	■	■	■
VDE protection class[8]	□	■	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 63	■	■	■	■	■	■
Ambient temperature	Operation 32…113° F (0…45° C)	■	■	■	■	■	■
	Storage -13…167° F (-25…75° C)	■	■	■	■	■	■
Approximate weight	5.5 lb (2.5 kg)	■	■	■	■	■	■
Housing material	Die cast metal	■	■	■	■	■	■

1) From front edge of lens
2) Limit values
3) May not exceed or fall short of V_S
4) Without load
5) Q_L = signal output
6) Q_B = operational readiness
7) With light/dark ratio 1:1
8) Reference voltage DC 50 V
9) A = V_S connections reverse-polarity protected
B = Outputs Q_L, Q_B and Q_{LU} short-circuit protected
C = Interference pulse suppression

Connection diagram



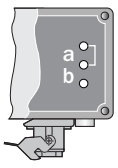
wire colors refer to standard cable, not included



Truth table LUT 1-4

Internal Jumper	o a o b o			o a o b o		
	Delivered state					
Switching type	Light switching			Dark switching		
Sender lamp	off	started		off	started	
Luminescence	–	yes	no	–	yes	no
Output Q_B (PNP)	LOW	HIGH		LOW	HIGH	
Readiness indicator (red)	on	off/(flashing*)		on	off/(flashing*)	
Output Q_L (PNP)	LOW	HIGH	LOW	LOW	LOW	HIGH
Status indicator (green)	off	on	off	off	on	off

* Flashing: lamp power still sufficient for operation



LUT 1-5

Luminescence Sensors



0.06...5.5 in (1.5...140 mm)
sensing distance

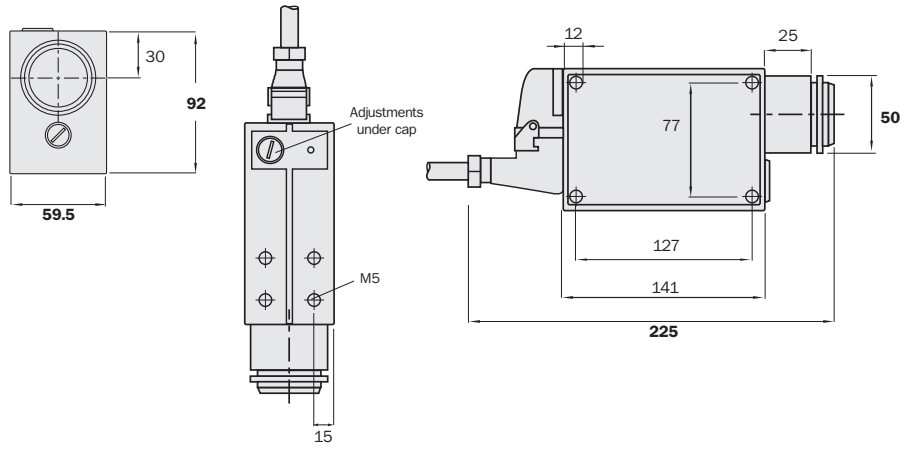
Highlights

- Rugged metal housing
- Adjustable sensitivity
- Interchangeable lenses for sensing range options
- Allows fiber cable connection
- Status indicator
- No interference from surface reflection
- Analog output for quality control
- Colored filters available for difficult applications

LUT 1-5

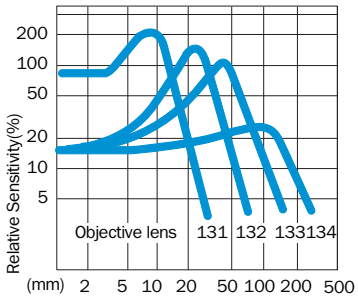


Dimensional drawing



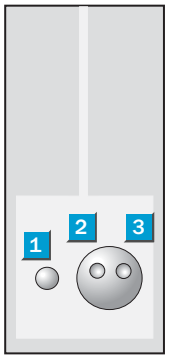
dimensions in mm

Relative sensitivity



Adjustments

All types



1 LED output
2 Delay adjustment
3 Sensitivity adjustment

1	LUT1-510 1.5...10 mm	8 mm focus
2	LUT1-520 14...28 mm	20 mm focus
3	LUT1-530 22...56 mm	50 mm focus
4	LUT1-540 30...140 mm	125 mm focus

Order information

Type	Part no.
LUT 1-500	1 007 597
LUT 1-510	1 005 931
LUT 1-520	1 005 932
LUT 1-530	1 005 933
LUT 1-540	1 005 934

Accessories

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Cables and connectors	1180
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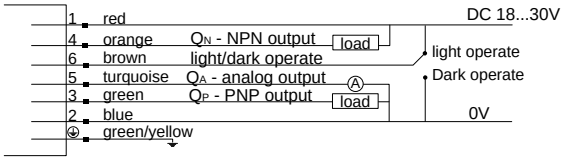
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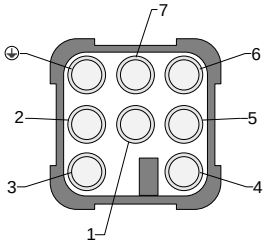
Technical data	LUT 1-	500*	510	520	530	540
Sensing distance[1]	0.3 in/Ø 0.2 in (8 mm/Ø 5 mm)		■			
light spot diameter	0.8 in/Ø 0.2 in (20 mm/Ø 8 mm)			■		
	2.0 in/Ø 0.6 in (50 mm/Ø 15 mm)				■	
	4.9 in/Ø 1.4 in (125 mm/Ø 35 mm)					■
With fiber-optic cable, no lens*	0.3 in/Ø 0.4 in (8 mm/Ø 10 mm)	■				
With fiber-optic cable, with 144 lens*	0.6 in/Ø 0.2 in (15 mm/Ø 6 mm)	■				
With fiber-optic cable, with 144 lens and diaphragm*	0.6 in/Ø 0.2 in (15 mm/Ø 3 x 6 mm)	■				
Light source	UV-A florescent tube	■	■	■	■	■
Light type, wavelength	UV 365 nm	■	■	■	■	■
Average service life	8000 hours	■	■	■	■	■
Supply voltage V	18-30 V DC[2]	■	■	■	■	■
Ripple[3]	2 V	■	■	■	■	■
Current consumption[4]	800 mA	■	■	■	■	■
Switching outputs Q_N[5] and Q_P[6]	NPN or PNP Light or dark switching	■	■	■	■	■
Output current I_A max.	200 mA	■	■	■	■	■
Max. switching frequency[7]	250 Hz	■	■	■	■	■
Response time	1 ms	■	■	■	■	■
OFF time delay	3…100 ms	■	■	■	■	■
Analog output Q_A	0…10 mA	■	■	■	■	■
Connection type	Rectangular 7-pin DIN 43 652	■	■	■	■	■
VDE protection class[8]	□	■	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■	■
Enclosure rating	IP 64	■	■	■	■	■
Ambient temperature	Operation -13…122° F (-25… 50° C)	■	■	■	■	■
	Storage -13…167° F (-25… 75° C)	■	■	■	■	■
Approximate weight	5.5 lb (1.1 kg)	■	■	■	■	■
Housing material	Die cast metal	■	■	■	■	■

* Fiber optic cables and lenses are not included with the LUT 1-500. These accessories must be purchased separately.

1) From front edge of lens
2) Limit values
3) May not exceed or fall short of V_S
4) Without load
5) Q_L = signal output
6) Q_B = operational readiness
7) With light/dark ratio 1:1
8) Reference voltage DC 50 V
9) A = V_S connections reverse-polarity protected
B = Outputs Q_L, Q_B and Q_{LU} short-circuit protected
C = Interference pulse suppression

Connection diagram





wire colors refer to standard cable, not included




Light grids

- Through-beam and reflection systems
- Two-dimensional detection range
- Recording and counting irregular objects
- Measuring and sorting different heights
- Presence and protrusion monitoring
- Sag monitoring for web-shaped materials
- Teach-in function
- Software-supported user-friendly parameterization and user guidance via application wizards

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Pick2Light	1020
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HLG	1024
MLG	1026
ELG	1032

Theory of Operation...Light Grid Sensors

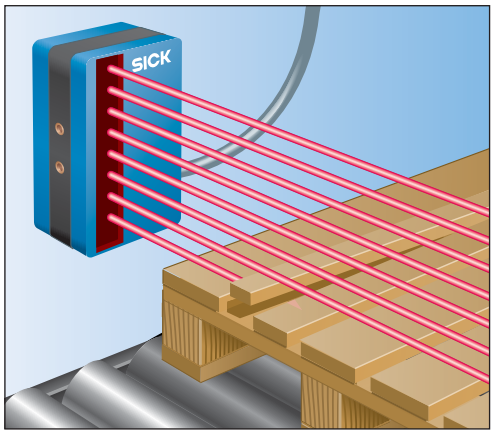
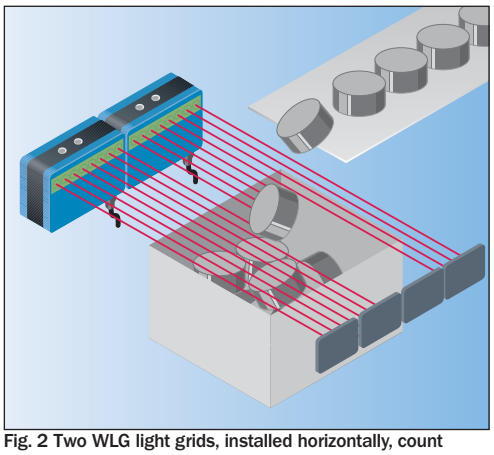


Fig. 1 Reflex light grid sensor


Fig. 2 Two WLG light grids, installed horizontally, count objects before packaging.

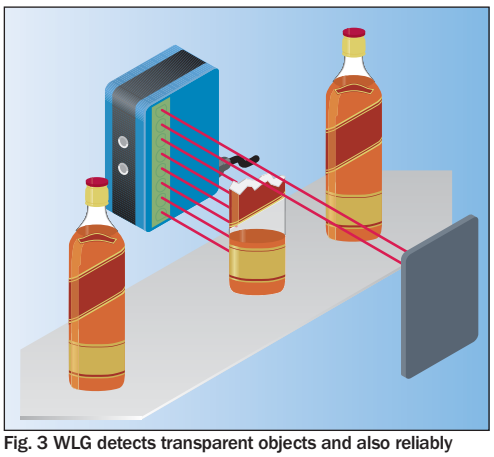

Fig. 3 WLG detects transparent objects and also reliably detects defective containers.


Fig. 4 Counts irregularly shaped objects during production



About Light Grid Sensors

Light grid photoelectric sensors are a small, non-safety version of our innovative light curtains.

The WLG and PLG light grids function according to the reflection principle. A suitable reflector, mounted directly across from the sensor's exit window, reflects the emitted light back to the receiver of the sensor. This produces a two-dimensional detection plane between the sensor and reflector. When the detection plane is broken, the sensor produces an output.

The HLG light grid sensor is specifically designed for use in parts ejection or part counting applicationswhere product-positioning variations occur. They can also be used to determine the leading edge of packages, flats and letters.

The MLG and ELG light grids are designed to meet a variety of application requirements. They offer a host of possibilities with regard to size, resolution, configuration and interfaces. The electronics are completely integrated into the compact housing. Height measurement, zone division and monitoring, object recognition, hole and crack detection, slack control and blanking control are all suitable tasks. In addition, the multiple scan function makes it possible to detect large and small objects.

Discrete inputs, outputs and serial data offer a wide range of interface combinations. Important parameters, such as the size of objects to be detected can be defined using the user-friendly MLG setup software. The MLG setup application assistant helps set up the most common applications.

Type Code and Selection Table...Light Grid Sensors

Type code MLG Light Grid

MLG with cable synchronization

Example to order a pair of MLG

MLG 1 - 0290 F 5 1 1

MLG Type
MLG = Modular light Grid (pair)
MLG S = Emitter (only)
MLG E = Receiver (only)

Beam Spacing
1 = 10 mm
2 = 20 mm
3 = 30 mm
5 = 50 mm
7 = 70 mm PROFIBUS models only

Interface (& Synchronization Mode)
F(2xx) = 6 Outputs PNP, 2 Inputs 12-pin cable
F(5xx) = 1x Output PNP, 5-pin cable
F(8xx) = 3 Outputs PNP, 1 Input, 8-pin cable
I(2xx) = RS485, 4 Outputs PNP, 2 Inputs, 12-pin cable
I(8xx) = RS485, 1 Output PNP, 1 Input, 8-pin cable
E(2xx) = 6 Outputs NPN, 2 Inputs, 12-pin cable
E(5xx) = 1x Output NPN, 5-pin cable
E(8xx) = 3 Outputs NPN, 1 Input, 8-pin cable
T(2xx) = RS485, 4 Outputs NPN, 2 Inputs, 12-pin cable
T(8xx) = RS485, 1 Output NPN, 1 Input, 8-pin cable
P(8x1) = PROFIBUS

Connection
2 = Terminal chamber, 12 pins
5 = M12 plug, 5 pins
8 = M12 plug, 8 pins

Optical features
1 = 5 m; Infrared light
2 = 8.5 m; Infrared light

Parameter Mode
1 = Standard (only the Interface modes market with * are avaialble)
2 = Programmable (with MLG setup)
3 = Multiple scan

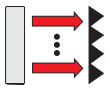
MLG 1 –	MLG 2–	MLG 3–	MLG 5 –
Beam spacing 10 mm	Beam spacing 20 mm	Beam spacing 30 mm	Beam spacing 50 mm
Detection height (mm)	Detection height (mm)	Detection height (mm)	Detection height (mm)
0140 (15 beams)	0140 (8 beams)	0120 (5 beams)	0100 (3 beams)
0290 (30 beams)	0280 (15 beams)	0270 (10 beams)	0250 (6 beams)
0440 (45 beams)	0440 (23 beams)	0420 (15 beams)	0400 (9 beams)
0590 (60 beams)	0580 (30 beams)	0570 (20 beams)	0550 (12 beams)
0740 (75 beams)	0740 (38 beams)	0720 (25 beams)	0700 (15 beams)
0890 (90 beams)	0880 (45 beams)	0870 (30 beams)	0850 (18 beams)
1040 (105 beams)	1040 (53 beams)	1020 (35 beams)	1000 (21 beams)
1190 (120 beams)	1180 (60 beams)	1170 (40 beams)	1150 (24 beams)
1340 (135 beams)	1340 (68 beams)	1320 (45 beams)	1300 (27 beams)
1490 (150 beams)	1580 (75 beams)	1470 (50 beams)	1450 (30 beams)
1640 (165 beams)	1640 (83 beams)	1620 (55 beams)	1600 (33 beams)
1790 (180 beams)	1780 (90 beams)	1770 (60 beams)	1750 (36 beams)
1940 (195 beams)	1940 (98 beams)	1920 (65 beams)	1900 (39 beams)
2090 (210 beams)	2080 (105 beams)	2070 (70 beams)	2050 (42 beams)
2240 (225 beams)	2240 (113 beams)	2220 (75 beams)	2200 (45 beams)
2390 (240 beams)	2380 (120 beams)	2370 (80 beams)	2350 (48 beams)
	2540 (128 beams)	2520 (85 beams)	2500 (51 beams)
	2680 (135 beams)	2670 (90 beams)	2650 (54 beams)
	2840 (143 beams)	2820 (95 beams)	2800 (57 beams)
	2980 (150 beams)	2970 (100 beams)	2950 (60 beams)
	3140 (158 beams)	3120 (105 beams)	3100 (63 beams)

Light Grid Sensors

Sensor Type	Sensing Range	Sensing Type	Resolution								Output				Page
			2	6	10	20	30	50	60	70	PNP	NPN	RS 485	Profi	
WLG 12	0...1.5 m	Reflex		■							■	■			1022
MLG Standard	0...8.5 m	Through-beam			■	■	■	■			■	■	■		1026
MLG Programmable	0...8.5 m	Through-beam			■	■	■	■			■	■	■		1028
MLG Profibus	0.5...5 m	Through-beam			■	■	■	■		■	■	■	■	■	1030
ELG	0...12 m	Through-beam			■		■		■		■	■			1032
HLG	0...2 m	Through-beam	■								■	■			1024
PLG	0...2 m	Reflex					■				■	■			1020

Pick2Light

Light Grid



6.6 ft (2 m)
sensing range

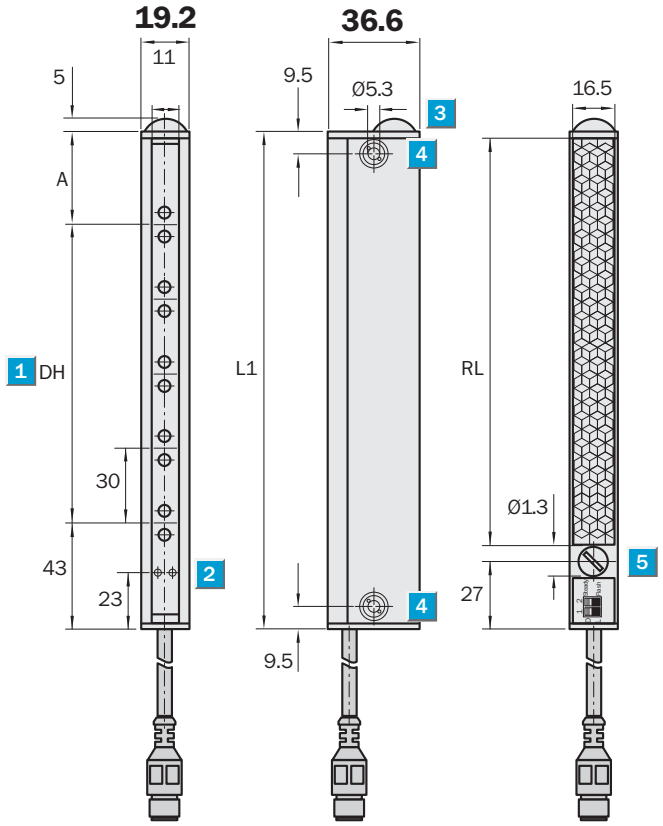
Highlights

- Single-sided picking light grid
- Only one sensor per bin
- Reliable hand detection
- Simple 2-screw mounting
- Mounts external to bin
- Steady/flashing job-LED
- Light/dark switching

PLG



Dimensional drawing



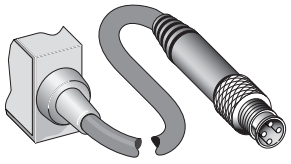
dimensions in mm

DH	A	L1	RL
120	36	199	162
210	26	279	242
270	36	349	312
360	26	429	392
420	36	499	462

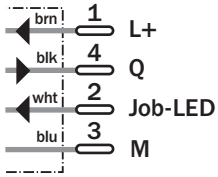
1 Detection height (DH) 120 to 420 mm
2 Indicator Power On: green; beam status: yellow
3 Green Job-LED
4 Configuration switches
5 Mounting holes Ø5.3 mm

Connection diagram

PLG-xxxF431



M12, 4-pin, with 280 mm cable



Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

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Technical data	PLG 3 -	120 F431	210 F431	270 F431	360 F431	420 F431
Sensing range, typ. max.	0.3…4.9 ft (0.1…1.5 m)/REF-PLG					
	0.3…6.6 ft (0.1…2.0 m)/PL150					
Detection height	4.7 in (120 mm)					
	8.3 in (210 mm)					
	10.6 in (270 mm)					
	14.2 in (360 mm)					
	16.5 in (420 mm)					
Supply voltage V_S	15…30 V DC[1]					
Residual ripple	< 10% within V_S tolerances					
Current consumption[2]	Sender: Typ. 45 mA					
	Job LED: Typ. 10 mA					
Light source	LED, visible red light					
Connection	M12, 4-pin with 11 inch (280 mm) cable					
Switching output[3]	PNP output: Q					
Operating mode	Dark & light switching (switch selectable)					
Output current I_A max.	100 mA					
Output load	Capacitive load: 100 nF/					
	Inductive load: 1 mH					
Response time[4]	< 180 ms					
Initialization period	Max. 600 ms					
Input Job LED activate	Input to V_S (15…30 V DC)					
Input current I_A max.	12 mA					
Protection class	III					
Circuit protection[5]	A, B, C					
Enclosure rating	IP 54					
Ambient temperature T_A	Operation: 14…131° F (-10…55° C)					
	Storage: -13…158° F (-25…70° C)					
Mechanical resistance	Vibration: 5 g/10-55/s – IEC 68-2-6					
	Shock: 10 g/16 ms – IEC 68-2-29					
Weight	Approx. 7.1 oz (200 g)[6]					
Material	Housing: Aluminum, anodized					
	Front lens: PMMA					

1) Limit values
2) Without load at V_S = 24 V, without Job LED
3) NPN on request
4) With resistive load
5) A = V_S connection, reverse-polarity protected
B = Outputs short-circuit protected
C = Interference suppression
6) Increment: 50 g/50 mm detection height

Optical performance

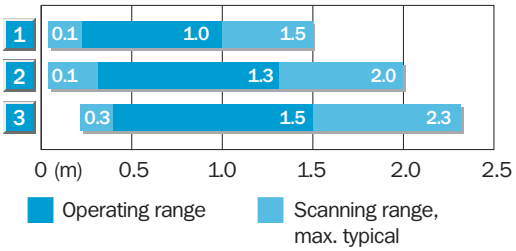
Beam spacing	Detection height	MDO: minimum detectable object size			
		in front of PLG	at 1.0 ft (0.3 m)	at 2.0 ft (0.6 m)	at 3.3 ft (1.0 m)
1.2 in (30 mm)	4.7…16.5 in (120…420 mm)	1.2 in (30 mm)	1.8 in (45 mm)	2.4 in (60 mm)	3.2 in (80 mm)

MDO: Minimum Detectable Object size for non-moving objects measured in a direction parallel to Pick2Light

Order information

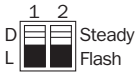
Type	Part no.
PLG3-120F431	1 028 953
PLG3-210F431	1 028 548
PLG3-270F431	1 029 130
PLG3-360F431	1 029 131
PLG3-420F431	1 029 132

Min./operating/max.range vs reflector



1 REF-PLG
2 PL150
3 PL180

Configuration over switches:



Switch 1: D: Dark switching
L: Light switching
Switch 2: Steady: Job-LED steady
Flash: Job-LED flashes, 3 Hz

WLG 12

Light Grid Sensors



0...5 ft (0...1.5 m)
sensing range

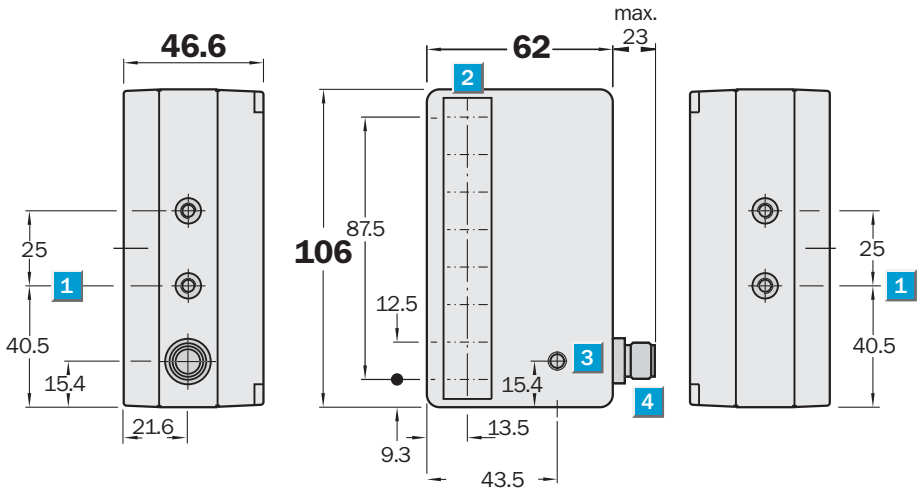
Highlights

- Rugged plastic housing
- Teach-in for easy sensitivity setting and blanking
- Can detect objects as small as 6 mm in diameter
- Alarm output
- Eight light senders to cover a wide range
- Polarizing filters prevent false readings on shiny objects

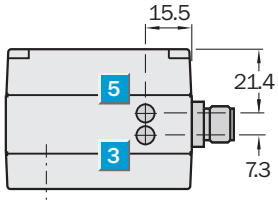
WLG 12



Dimensional drawing



1 M5 threaded mounting hole, 6 mm deep
2 Optics
3 Multi-function indicators at front and top: output indicator, contamination indicator, teach-in error
4 M12 plug or 2 m cable
5 Power indicator
6 Potentiometer for sensitivity adjustment

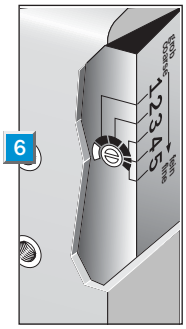


dimensions in mm

Teaching

The WLG 12-G137, -V537 and -P537 are equipped with a non-volatile memory. A teach-in should be done when the unit is first set up. This setting will be remembered even if power is removed.

.



Sensitivity setting			
Potentiometer setting	**Resolution**	**Sensing range**	**Reflector**
1	> 12.5 mm	1.5 m	2 x PL 80 A/PL 40 A
2	> 10 mm	1.2 m	2 x PL 80 A/PL 40 A
3	> 9 mm	1.0 m	PL 180 E01
4	> 7 mm	0.8 m	PL 180 E01
5	> 6 mm	0.4 m	PL 180 E01

Notes

The sensitivity range should be selected in a voltage-free condition. In the event of temperature fluctuations > 15 ° C, adjustment or contamination, a new teach-in process must be done. The switching threshold that has been taught is maintained on loss of voltage.

Order information	
Type	**Part no.**
WLG 12-G 137	1 016 046
WLG 12-V 537	1 016 045
WLG 12-P 537	1 015 798

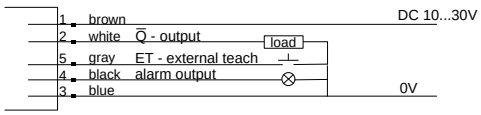
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Technical data	WLG 12-	G137	V537	P537
Sensing range, on reflector	5 ft (1.5 m)/to 2 x PL 40 A or 2 x PL 80 A			
Light source[1], **light type**	Red light, pulsed			
Resolution, adjustable	0.2...0.5 in (6…12.5 mm)			
	(see table of settings)			
Light spot diameter	0.4 in (10 mm)			
Distance to optic axis	0.5 in (12.5 mm)			
Divergence of adjacent channels	Approx. 0.2°			
Angle of divergence	Approx. 0.4°			
Supply voltage V_S	18…30 V DC [2]			
Ripple[3]	< 5 V_{SS}			
Current consumption[4]	Approx. 80 mA			
Switching outputs	PNP, 8 x $\overline{Q}$ and alarm			
	PNP, $\overline{Q}$ and alarm			
	PNP, $\overline{Q}$ and Q			
Output current I_A max.	Total 100 mA + 100 mA for alarm			
	100 mA per output			
Output voltage HIGH	V_S – (≤ 2 V, at I max.)			
Output voltage LOW	0 V			
Response time[5]	0.6 ms			
Max. switching frequency[6]	850 Hz			
Alarm output	Alarm is activated acc. to teach-in procedure			
	if at least one of the light beams			
	is damped such that the required			
	level of functional safety is not achieved.			
Teach-in (TI)				
Teach-in minimum time	Approx. 10 ms			
Teach-in activation time	Approx. 200 ms			
Connection type	2 m, 12-wire cable[7]			
	Plug, M12 5-pin			
VDE protection class[8]	□			
Circuit protection[9]	A, B, C			
Enclosure rating	IP 67/NEMA 6			
Ambient temperature T_A	Operation -13...131° F (-25...55° C)			
	Storage -13...167° F (-25...75° C)			
Approximate weight	8.1 oz (230 g)			
Polarization filter				
Housing material	Fiberglass reinforced plastic			

1) Average service life 100,000 h at T_A = 25° C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0° C
8) Reference voltage DC 50 V
9) A = V_S connections reverse-polarity protected
B = Outputs Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

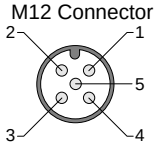
Connection diagram

WLG 12-V537

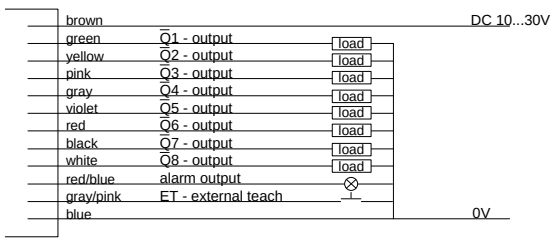


wire colors refer to standard cable, not included with WLG 12-V537
*This is Q-output on P537

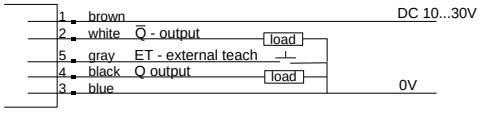
M12 Connector



WLG 12-G137



WLG 12-P537



wire colors refer to standard cable, not included with WLG 12-V537
*This is Q-output on P537

HLG

Through-beam Light Grid



0...2 m

sensing range

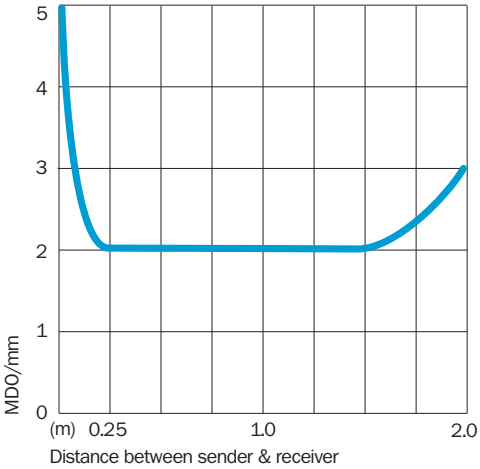
Highlights

- 2 mm resolution
- Short response time
- Industrial standard outputs
- Teach-in for optimal sensitivity adjustment

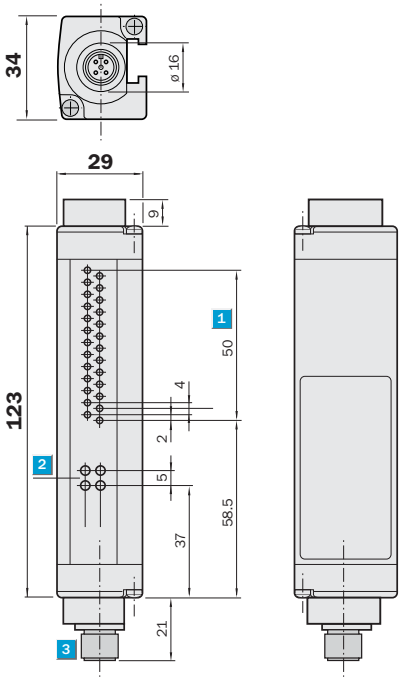
HLG



MDO: Minimum Detectable Object size measured in a direction parallel to the HLG.



Dimensional drawing



dimensions in mm

1 Detection height: 50 mm
2 Status indicator/Power ON
3 M12 plug, 8-pin

Connection diagram	
Type	**Part no.**
HLG2-050F811	1029853
HLG2-050E811	1041849

Accessories	page
Cables and connectors	1180
Mounting systems	1234

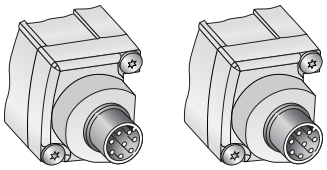
7028071 - © 2008 SICK, Inc.

Technical data	HLG2-	050 F811	050 E811
Beam spacing	0.1 in (2 mm)		
MDO/Resolution*See chart			
Detection height	2.0 in (50 mm)		
Number of beams	26		
Scanning range [1]	0...78 in (0...2 m)		
Synchronization	Synchronization by wire Sync A/Sync B		
Light source	LED, infrared		
Supply voltage VS [2]	15...30 V DC		
Residual ripple	< 10 % within Vs tolerances		
Current consumption sender	< 100 mA		
Current consumption receiver [3]	< 100 mA		
Connection	M12 Plug, 8 pins		
Switching output [4]	PNP output: Q & $\overline{Q}$		
	NPN output: Q & $\overline{Q}$		
Operating mode	Q dark-switching, $\overline{Q}$ light-switching		
Output current IA max.	100 mA		
Output load	Capacitive load: 100 nF		
	Inductive load: 1 H		
Test input "TE"	Sender OFF: Test input to Vs		
Response time [5]	3 ms		
Initialisation duration after Power ON	Max. 800 ms		
High immunity to ambient light	50.000 lx		
VDE protection class	III		
Circuit protection [6]	A, B, C		
Enclosure rating	IP 54		
Ambient temperature T_A	Operation -13...131° F (–25...+55° C)		
	Storage -40...158° F (–40...+70 ° C)		
Mechanical resistance	Vibration: 5 g/10-55 Hz - IEC 68-2-6		
	Shock: 10 g/ 16ms - IEC 68-2-29		
Weight	Approx. 4.8 oz (135 g)		
Front lens material	PMMA		
Housing	Aluminium, anodized		

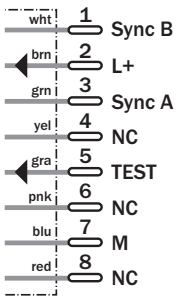
1) Max. range: 78 in (2 m) Operating range: 59 in (1.5 m)
2) Limit values
3) Without load at Vx = 14 V
4) NPN on demand
5) With resistive load
6) A = Vx connection, reverse polarity protected
B = Outputs Q and $\overline{Q}$ short-circuits protected
C = interference suppression

Connection diagram

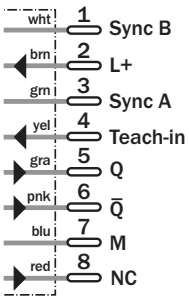
HLGS2-50E811	HLGS2-50E811
HLGS2-50F811	HLGS2-50F811



8-pin, M12
Sender



8-pin, M12
Sender



MLG Standard

Light Grid Sensors



0...16.4 ft (0...5 m)
0...27.9 ft (0...8.5 m)
sensing range

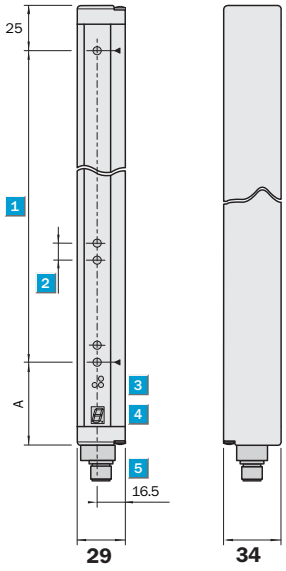
Highlights

- High modularity: beam spacing, detection height, sensing range, interface
- Compact housing
- Short response time
- Teach-in for optimal sensitivity adjustment

MLG



Dimensional drawing



dimensions in mm

Distance: MLG edge – first beam

Dimensions (mm)	A
Beam spacing 10 mm	49
Beam spacing 20 mm	59
Beam spacing 30 mm	69
Beam spacing 50 mm	89

1 Detection height (see optical performance)
2 Beam spacing (10, 20, 30, 50 mm)
3 Status indicator: LED green/LED yellow/LED red
4 Indicator panel, 7-segment display
5 M12 plug, 8-pin/M12 plug, 5-pin

Optical performance

	Detection height			Minimum Detectable Object (MDO)	
	Minimum	**Increment**	**Maximum**	**Beam spacing**	**MDO** [9]
MLG 1:	140 mm	150 mm	2390 mm	10 mm	15[10]/20[11] mm
MLG 2:	140 mm	140 mm, 160 mm	3140 mm	20 mm	25[10]/30[11] mm
MLG 3:	120 mm	150 mm	3120 mm	30 mm	35[10]/40[11] mm
MLG 5:	100 mm	150 mm	3100 mm	50 mm	55[10]/60[11] mm

9) MDO for non-moving objects measured in a direction parallel to the MLG
10) Sensing range: 5 m
11) Sensing range: 8.5 m

Order Information

See selection guide at the front of this section and check www.sickusa.com for product availability.

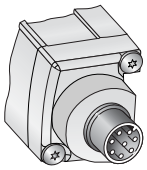
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Technical data	MLG-	x-xxxx x8x1	x-xxxx x5x1							
Beam spacing[1]	0.4 in (10 mm)/0.8 in (20 mm)/1.2 in (30 mm)/2 in (50 mm)	■	■							
Maximum number of beams	240 beams	■	■							
Sensing range	0...16.4 ft (0...5 m) (max. 7 m) / 0...39.4 ft (0...8.5 m) (max. 12 m)	■	■							
Synchronization[2]	By cable sync A/sync B	■	■							
Light source	LED, infrared light	■	■							
Supply voltage V_S[3]	15…30 V DC	■	■							
Current consumption sender	< 140 mA + 2 mA/beam	■	■							
Current consumption receiver[4]	< 100 mA + 3 mA/beam	■	■							
Connections	M12 plug, 8-pin	■								
	M12 plug, 5-pin		■							
Teach-in (ET)	PNP: Teach > 10 V…< V_S	■								
Teach-in (ET)	External Teach-in input	■								
	Automatic by each Power on		■							
Output current I_A max.	100 mA per output	■	■							
Output load	Capacitive load: 100 nF/output	■	■							
	Inductive load: 1H/output	■	■							
Outputs/Operating mode	Q dark-switching	■	■							
	$\overline{Q}$ light-switching	■								
Alarm output (contamination)		■								
Response time[5]	Max. 3x (150 µs per beam + 1 ms)[6]	■	■							
Immunity to ambient light	50,000 lx (continuous light)	■	■							
VDE protection class	III	■	■							
Circuit protection[7]	A, B, C	■	■							
Enclosure rating	IP 65	■	■							
Ambient temperature T_A	Operation -13...131° F (-25...55° C)	■	■							
	Storage -40...158° F (-40...70° C)	■	■							
Mechanical resistance	Vibration: 5 g; 10-55/s – IEC 68-2-6	■	■							
	Shock: 10 g; 10 ms – IMC 68-2-29	■	■							
Approximate weight	52.2 oz (1480 g)[8]	■	■							
Material	Housing: Al, anodized; optics: PMMA	■	■							

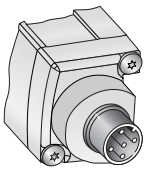
1) Further beam spacing possible
2) Sender (MLG S) and receiver (MLG E)
3) Limit values
4) Without load at V_S = 24 V
5) With resistive load
6) Depends on selected basic function
7) A = V_S connection, reverse polarity protected
   B = Outputs short-circuit protected
   C = Interference pulse suppression
8) For 1200 mm detection height, increment 160 g per 150 mm detection height

Connection diagram

MLG x-xxxxx8x1

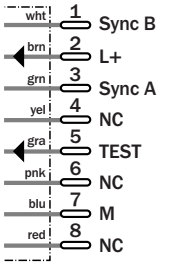


MLG x-xxxxx5x1

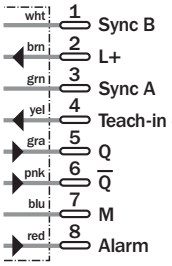


8-pin, M12

Sender

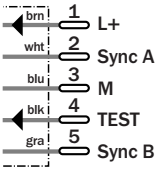


Receiver

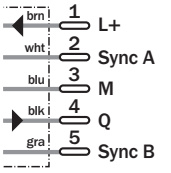


5-pin, M12

Sender



Receiver



MLG Programmable

Light Grid Sensors



0...16.4 ft (0...5 m)
0...27.9 ft (0...8.5 m)
sensing range

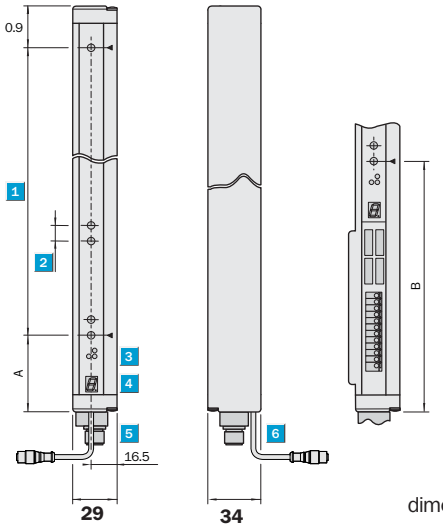
Highlights

- High modularity: beam spacing, detection height, sensing range and interface
- Compact housing
- Short response time
- Teach-in for optimal sensitivity adjustment
- MLG setup software for visualization and parameterization (included)

MLG



Dimensional drawing



dimensions in mm

Distance: MLG edge – first beam

Dimensions (mm)	A	B
MLG 1 10 mm	49	160
MLG 2 20 mm	59	170
MLG 3 30 mm	69	180
MLG 5 50 mm	89	200

1 Detection height (see optical performance)
2 Beam spacing 10, 20, 30, 50 mm
3 Status indicator: LED green/LED yellow/LED red
4 Indicator panel, 7-segment display
5 PG 9/M12 plug, 8-pin
6 Programming cable M8 plug, 4-pin

Optical performance

	Detection height			Minimum Detectable Object (MDO)		
	Minimum	Increment	Maximum	Beam spacing	MDO[14]	MDO[14] with multiple scan[15]
MLG 1:	140 mm	150 mm	2390 mm	10 mm	15[16]/20[17] mm	< 10[16]/< 15[17] mm
MLG 2:	140 mm	140 mm, 160 mm	3140 mm	20 mm	25[16]/30[17] mm	< 15[16]/< 20[17] mm
MLG 3:	120 mm	150 mm	3120 mm	30 mm	35[16]/40[17] mm	< 20[16]/< 25[17] mm
MLG 5:	100 mm	150 mm	3100 mm	50 mm	55[16]/60[17] mm	< 30[16]/< 35[17] mm

14) MDO for non-moving objects measured in a direction parallel to the MLG

15) Multiple scan MDO sizes are determined at the mid point between the sender and receiver. Scanning range: Multiple scan usage will reduce scanning range and prolong response time.

16) Sensing range: 5 m
17) Sensing range: 8.5 m

Order information

See selection guide at the front of this section and check www.sickusa.com for product availability.

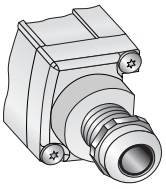
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Technical data	MLG-	[1]								
Maximum number of beams	240 beams									
Scanning range	0...16.4 ft (0...5 m)/0...27.9 ft (0...8.5 m)									
Synchronization mode[2]	Synchronized by cable sync A/sync B									
Supply voltage V_S[3]	15...30 V DC									
Current consumption sender	< 140 mA + 2 mA/beam									
Current consumption receiver [4]	< 100 mA + 3 mA/beam									
Teach-in (ET)	PNP: Teach > 10...< V_S									
Teach-in (ET)	External teach-in input									
Output current I_A max.	100 mA per output[5]									
Output load	Capacitive load: 100 nF/output									
	Inductive load: 1H/output									
Operating mode outputs	Configurable with MLG setup									
Response time[6]	150 µs per beam + 1 s)[7]									
Alarm output (contamination)	Configurable with MLG setup[8]									
Data interface	RS 485[9]									
Configuration plug[10]	4-pin, M8 plug, RS 232: 9.6 kBaud fix[11]									
Immunity to ambient light	50,000 lx (continuous light)									
VDE protection class	III									
Circuit protection[12]	A, B, C									
Enclosure rating	IP 65									
Ambient temperature T_A	Operation -13...131° F (-25...55° C)									
	Storage -40...158° F (-40...70° C)									
Mechanical resistance	Vibration: 5 g/10-55/s – IEC 68-2-6									
	Shock: 10 g/10 ms – IMC 68-2-29									
Approximate weight (with PG 9)	52.2 oz (1480 g) [13]									
Material	Housing: Alu., anodized; optics: PMMA									

1) See selection table
2) Sender (MLG S) and receiver (MLG E)
3) Limit values
4) Without load at V_S = 24 V
5) Max. ∑ = 550 mA
6) With resistive load
7) Depends on selected basic function
8) Default setting on Q3
9) Baud Rate, reporting mode configurable per MLG setup
10) Plug built on receiver (MLG E)
11) Configurable with MLG setup
12) A = V_S connection, reverse polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression
13) For 1200 mm detection height, increment 160 g per 150 mm detection height

Connection diagram

MLG x-xxxxx2x2



PG 9, terminals

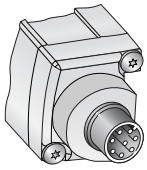
Sender

1	L+
2	M
3	Sync A
4	Sync B
5	TEST
6	NC
7	NC
8	NC
8	NC
10	NC
11	NC
12	NC

Receiver

1	L+
2	M
3	Sync A
4	Sync B
5	Teach-in (ET)
6	In-Sig. 2
7	Q_1
8	Q_2
8	Q_3
10	Q_4
11	Q_5/RS 485 A
12	Q_6/RS 485 B

MLG x-xxxxx8x2



8-pin, M12

Sender

wht	1	Sync B
brn	2	L+
grn	3	Sync A
yel	4	NC
gra	5	TEST
pnk	6	NC
blu	7	M
red	8	NC

Receiver

wht	1	Sync B
brn	2	L+
grn	3	Sync A
yel	4	Teach-in (ET)
gra	5	Q_1
pnk	6	Q_2/RS 485 A
blu	7	M
red	8	Q_3/RS 485 B

MLG PROFIBUS

Light Grid Sensors



0...16.4 ft (0...5 m)
0...27.9 ft (0...8.5 m)
sensing range

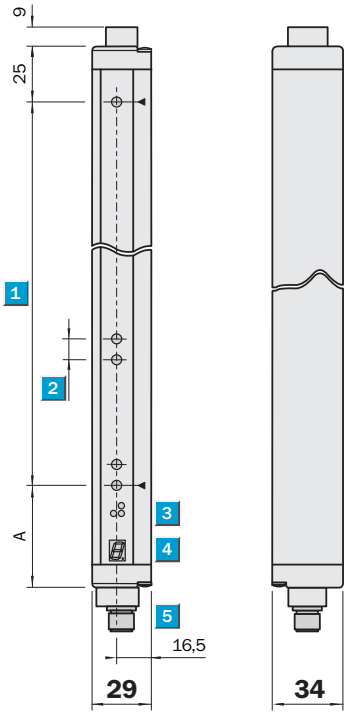
Highlights

- Integrated PROFIBUS interface
- High modularity: beam spacing, detection height and sensing range
- Compact housing
- Teach-in for optimal sensitivity adjustment
- GSD file included

MLG Profibus



Dimensional drawing



dimensions in mm

Distance: MLG edge – first beam

Dimensions (mm)	A
MLG 1 10 mm	49
MLG 2 20 mm	59
MLG 7 25 mm	52
MLG 3 30 mm	69
MLG 5 50 mm	89

1 Detection height (see optical performance)
2 Beam spacing 10, 20, 30, 50 mm
3 Status indicator: LED green/LED yellow/LED red
4 Indicator panel, 7-segment display
5 M12 plug, 8-pin (receiver), 5-pin (sender)
6 Address setting
7 Bus termination

Optical performance

	Detection height			Minimum Detectable Object (MDO)	
	Minimum	Increment	Maximum	Beam spacing	MDO[8]
MLG 1:	140 mm	150 mm	2390 mm	10 mm	15[9]/20[10] mm
MLG 2:	140 mm	140 mm, 160 mm	3140 mm	20 mm	25[9]/30[10] mm
MLG 3:	120 mm	150 mm	3120 mm	30 mm	35[9]/40[10] mm
MLG 5:	100 mm	150 mm	3100 mm	50 mm	55[9]/60[10] mm
MLG 7:	125 mm	150 mm	3125 mm	25 mm	30[9] mm

8) MDO for non-moving objects measured in a direction parallel to the MLG
9) Sensing range: 5 m
10) Sensing range: 8.5 m

Order information

See selection guide at the front of this section and check www.sickusa.com for product availability.

Accessories	page
Cables and connectors	1180
Mounting systems	1234

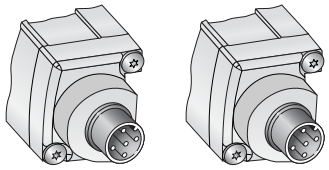
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Technical data	MLG-	x-xxx xP8x1
Beam spacing	10 mm/20 mm/25 mm/30 mm/50 mm	
Maximum number of beams	240 beams	
Scanning range	0...16.4 ft (0...5 m) / 0...27.0 ft (0...8.5 m)	
Synchronization[1]	By cable sync A/sync B	
Light source	LED, infrared light	
Supply voltage VS[2]	15...30 V DC	
Current consumption sender	< 140 mA + 2 mA/beam	
Current consumption receiver[3]	< 130 mA + 3 mA/beam	
Connections	M12 plug	
Teach-in input	PNP: Teach > 10 V...< VS	
Teach-in Profibus	Via control byte	
Output current IA max.	100 mA	
Output load	Inductive load: 1H	
	Capacitive load: 100 nF	
Output/operating mode	Q1 dark-switching	
Interface	Profibus, data rate up to 12 MBd	
Termination, address setting	Integrated in MLG E	
Response time[4]	Typ. 0.2 ms per beam + 8.8 ms	
Test input »TE«	Sender OFF: Test input to VS	
Immunity to ambient light	50,000 lx (continuous light)	
VDE protection class	III	
Circuit protection[5]	A, B, C	
Enclosure rating	IP 65	
Ambient temperature TA	Operation –25...+55° C	
	Storage –40...+70° C	
Mechanical resistance	Vibration: 5 g/10-55/s – IEC 68-2-6	
	Shock: 1 g/ 10 ms – IMC 68-2-29	
Weight	Approx. 1480 g[6]	
Material	Housing Aluminium anodized	
Front lens	PMMA	

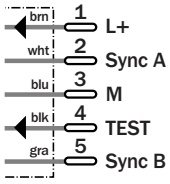
1) Sender (MLG S) and receiver (MLG E)
2) Limit values
3) Without load at V_S = 24V
4) With resistive load; 1.2 ms per beam when crossed out
5) A = V_S-connection, reverse polarity protected
B = Outputs Q and Q short-circuit protected
C = Interference pulse suppression
6) 1480 g for 1200 m detection height, increment 160 g per 150 mm1

Connection diagram

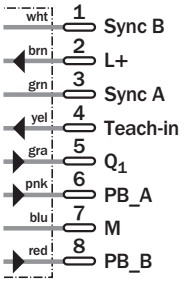
MLG x-xxxxx8x1



5-pin, M12
Sender



8-pin, M12
Sender



ELG 1 Short Range

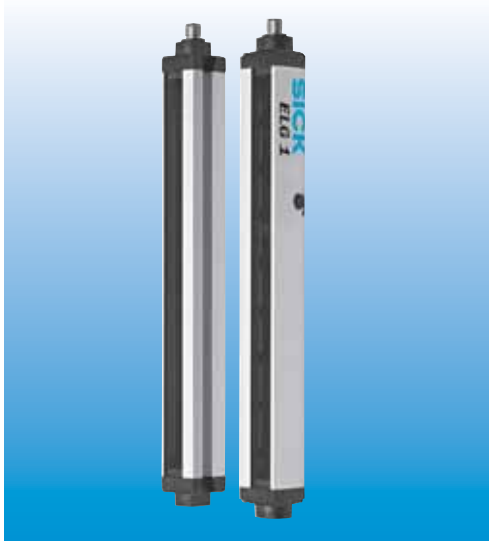
Through-beam Light Grid Sensors

0...9.8 ft (0...3 m)
sensing range

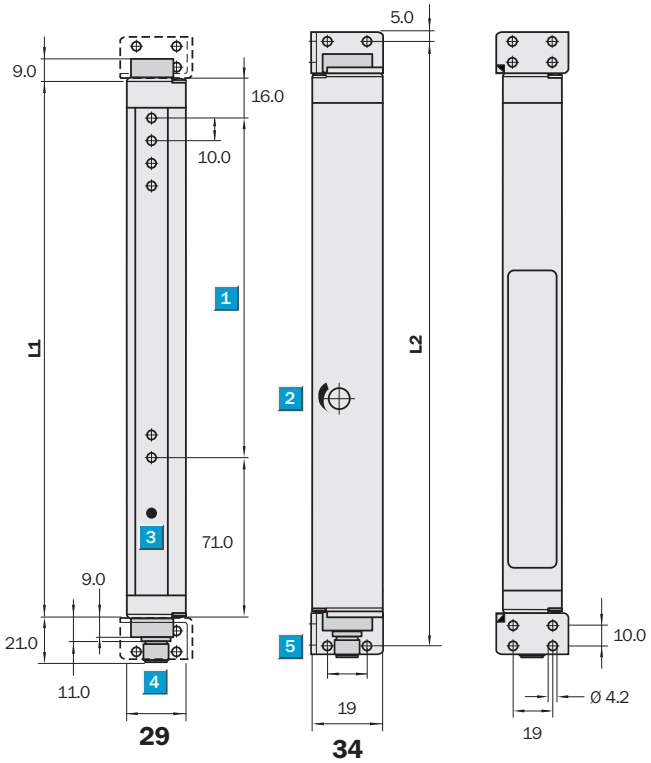
Highlights

- Beam spacing 10 mm
- Industrial standard outputs
- Optical synchronization
- Compact housing
- Mounting bracket included with delivery

ELG 1



Dimensional drawing



dimensions in mm

Dimensions		
1	L1	L2
100 mm	187 mm	217 mm
150 mm	237 mm	267 mm

1 Detection height: 100/150 mm
2 Sensitivity adjustment
3 Status indicator (ELG E)/Power on (ELG S)
4 M12 plug, 4-pin
5 Mounting bracket (included with delivery)

Optical performance

Beam spacing	Detection height	MDO: minimum detectable object [1]		
		in front of ELG S or ELG E	at mid-point between ELG S and ELG E	
10 mm	100/150 mm	15 mm	15 mm	10 mm [2]

1) MDO: minimum detectable object for non-moving objects, measured in a direction parallel to ELG

2) At mid-point between ELG S and ELG E with multiple scan

Accessories	page
Cables and connectors	1180
Mounting systems	1234

Order information	
Type	Part no.
ELG 1-0100P531	1 026 807
ELG 1-0150P531	1 026 741
ELG 1-0100P533	1 026 808
ELG 1-0150P533	1 026 809

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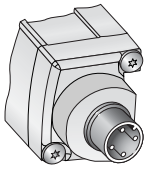
Technical data	ELG 1-	0100 P531	0150 P531	0100 P533	0150 P533						
Beam spacing	0.4 in (10 mm)	■	■	■	■						
Detection height	3.9 in (100 mm)	■		■							
	5.9 in (150 mm)		■		■						
Number of beams	11	■		■							
	16		■		■						
Sensing range	0…9.8 ft (0…3 m)	■	■	■	■						
Multiple scan	3 x (see optical performance)			■	■						
Synchronization	Optical synchronization	■	■	■	■						
Light source	LED, infrared light	■	■	■	■						
Voltage supply V_s [1]	15…30 V DC	■	■	■	■						
Residual ripple	< 10 % within V_s tolerance	■	■	■	■						
Current consumption Sender	< 100 mA	■	■	■	■						
Current consumption Receiver [2]	< 100 mA	■	■	■	■						
Connection	M12 plug, 4-pin	■	■	■	■						
Switch output	2 x PNP output [3]: $\overline{Q}$ and Q	■	■	■	■						
Operating mode	Q: dark-/$\overline{Q}$: light-switching	■	■	■	■						
Output current I_A max.	100 mA	■	■	■	■						
Output load	Capacitive load: 100 nF	■	■	■	■						
	Inductive load: 1H	■	■	■	■						
Test input »TE«	Sender OFF: Test input to V_s	■	■	■	■						
Response time [4]	Max. 12 ms	■	■								
	Max. 36 ms			■	■						
Initialization duration after power ON	Max. 300 ms	■	■	■	■						
High immunity against ambient light	150,000 lx (sunlight)	■	■	■	■						
VDE protection class	III	■	■	■	■						
Circuit protection [5]	A, B, C	■	■	■	■						
Enclosure rating	IP 65	■	■	■	■						
Ambient temperature T_A	Operation -13…131° F (–25…+55° C)	■	■	■	■						
	Storage -40…158° F (–40…+70° C)	■	■	■	■						
Mechanical resistance	Vibration: 5 g; 10-55/s – IEC 68-2-6	■	■	■	■						
	Shock: 10 g; 16 ms – IEC 68-2-29	■	■	■	■						
Weight	Approx. 350 g	■	■	■	■						
Housing Material	Aluminum anodized	■	■	■	■						
Front Lens	PMMA	■	■	■	■						

1) Limit values
2) Without load at V_s = 24 V
3) NPN available upon request
4) With resistive load

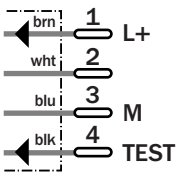
5) A = V_s connections, reverse-polarity protected
B = Outputs Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Connection diagram

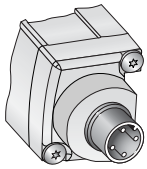
ELG S1-xxxxD53x



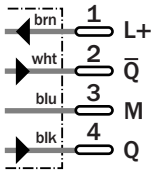
Sender
M12, 4-pin



ELG E1-xxxxP53x



Receiver
M12, 4-pin



ELG Short Range

Light Grid Sensors



0...6.6 ft (0...2 m)
sensing range

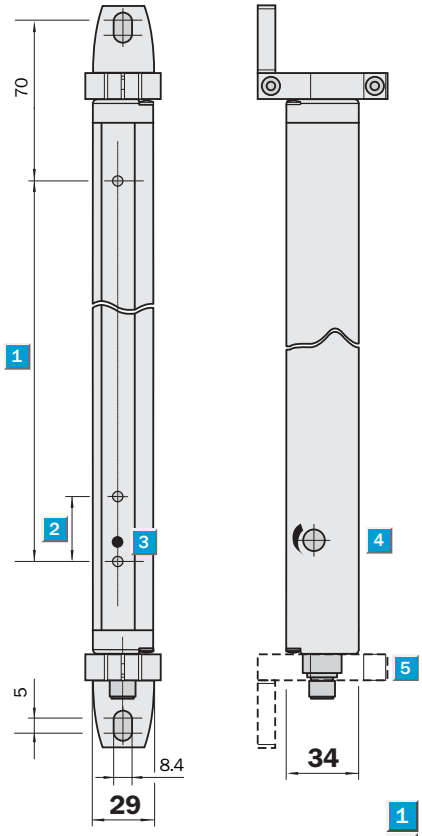
Highlights

- Industrial standard outputs
- Optical synchronization
- Compact housing
- Manual sensitivity adjustment
- High sunlight immunity

ELG



Dimensional drawing



dimensions in mm

1 Detection height
2 Beam spacing
3 Status indicator (ELG E)/Power on (ELG S)
4 Sensitivity adjustment
5 M12 plugs, 4-pin

Optical performance

Beam spacing	Detection height	MDO: minimum detectable object [7]		
		in front of ELG S or ELG E	at mid-point between ELG S and ELG	
30 mm	90...930 mm	35 mm	35 mm	25 mm [8]

7) MDO: minimum detectable object for non-moving objects, measured in a direction parallel to ELG

8) Only ELG 3-XXXXP513 with multiple scan

Accessories	page
Cables and connectors	1180
Mounting systems	1234

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Technical data	ELG 3-	0090	0150	0210	0330	0210	0330	0450	0570	0690	0930
Beam spacing	1.2 in (30 mm)										
Detection height	See selection table p1038										
Number of beams	See selection table p1038										
Sensing range	0…6.6 ft (0…2 m)										
Multiple scan	3 x (reduced MDO)										
Synchronization	Optical synchronization										
Light source	LED, infrared light										
Voltage supply V_s [1]	15…30 V DC										
Residual ripple	< 10 % within V_s tolerance										
Current consumption Sender	< 100 mA										
Current consumption Receiver [2]	< 100 mA										
Connection	M12 plug, 4-pin										
Switch output	2 x PNP output [3]: $\overline{Q}$ and Q										
Operating mode	Q: dark-/$\overline{Q}$: light-switching										
Output current I_A max.	100 mA										
Output load	Capacitive load: 100 nF/output										
	Inductive load: 1H/output										
Response time [4]	Max. 50 ms										
Initialization duration	Max. 300 ms										
High immunity against ambient light	150,000 lx (sunlight)										
VDE protection class	III										
Circuit protection [5]	A, B, C										
Enclosure rating	IP 65										
Ambient temperature	Operation -13…131° F (–25…+55° C)										
	Storage -40…158° F (–40…+70° C)										
Mechanical resistance	Vibration: 5 g; 10-55/s – IEC 68-2-6										
	Shock: 10 g; 16 ms – IEC 68-2-29										
Weight [6]	Approx. 350…1700 g										
Material	Aluminum anodized										

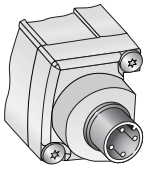
1) Limit values
2) Without load at V_s = 24 V
3) NPN also available
4) With resistive load

5) A = V_s connection, reverse polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression

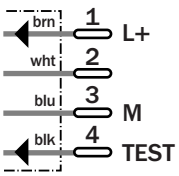
6) 350 g for 90 mm detection height, increase 160 g per 100 mm

Connection diagram

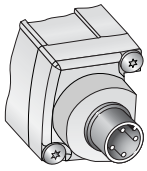
ELG S3-xxxxD511



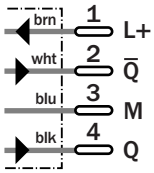
Sender
M12, 4-pin



ELG E3-xxxxP511



Receiver
M12, 4-pin



ELG Long Range

Light Grid Sensors







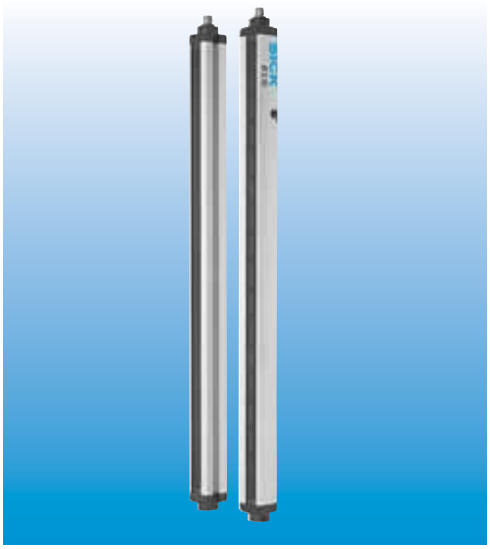
0...39 ft (0...12 m)

sensing range

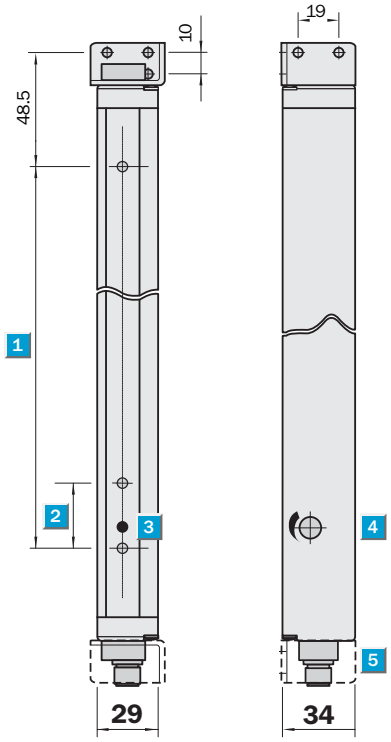
Highlights

- Wide range of options
- High sunlight immunity
- Optical synchronization
- Compact housing
- Beam spacing 30 mm/60 mm
- Manual sensitivity adjustment

ELG



Dimensional drawing



dimensions in mm

1 Detection height (see next page)
2 Beam spacing ELG 3: 30 mm/ELG 6: 60 mm
3 Status indicator (ELG E)/Power on (ELG S)
4 Sensitivity adjustment
5 M12 plugs, 4-pin

Optical performance

Beam spacing	Detection height	MDO: minimum detectable object [7]		
		in front of ELG S or ELG E	at mid-point between ELG S and ELG E	
30 mm	210...1890 mm	35 mm	35 mm	25 mm [8]
60 mm	900...2460 mm	65 mm	65 mm	35 mm [8]

7) MDO: minimum detectable object for non-moving objects, measured in a direction parallel to ELG

8) Only ELG 3-xxxxP523/ELG 6-xxxxP523 with multiple scan

Accessories	page
Cables and connectors	1180
Mounting systems	1234

7028071 - © 2008 SICK, Inc.

Technical data	ELG X-	0450	0570	0690	0930	1050	1410	1650	1890	2070	2370
Beam spacing	See selection table p1038										
Detection height	See selection table p1038										
Number of beams	See selection table p1038										
Sensing range	0…39 ft (0…12 m)										
Synchronization	Optical synchronization										
Light source	LED, infrared light										
Voltage supply V_s [1]	15…30 V DC										
Residual ripple	< 10 % within V_s tolerance										
Current consumption Sender	< 100 mA										
Current consumption Receiver [2]	< 100 mA										
Connection	M12 plug, 4-pin (cable optional)										
Switch output [3]	2 x PNP output: $\overline{Q}$ and Q										
Operating mode	Q: dark-/$\overline{Q}$: light-switching										
Output current I_A max.	100 mA										
Output load	Capacitive load: 100 nF/output										
	Inductive load: 1H/output										
Response time [4]	Max. 100 ms										
Initialization duration	Max. 300 ms										
High immunity against ambient light	150,000 lx (sunlight)										
VDE protection class	III										
Circuit protection [5]	A, B, C										
Enclosure rating	IP 65										
Ambient temperature	Operation -13…131° F (–25…+55° C)										
	Storage -40…158° F (–40…+70° C)										
Mechanical resistance	Vibration: 5 g; 10-55/s – IEC 68-2-6										
	Shock: 10 g; 16 ms – IEC 68-2-29										
Weight [6]	Approx. 950…3300 g										
Material	Aluminum anodized										

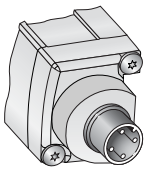
1) Limit values
2) Without load at V_S = 24 V
3) NPN also available
4) With resistive load

5) A = V_S connection, reverse polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression

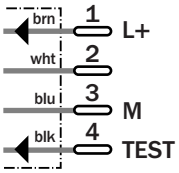
6) 950 g for 450 mm detection height, increase 160 g per 100 mm

Connection diagram

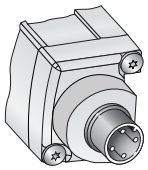
ELG S3-xxxxD521
ELG S6-xxxxD521



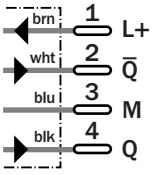
Sender
M12, 4-pin



ELG E3-xxxxP521
ELG E6-xxxxP521



Receiver
M12, 4-pin



Selection table/Order information *)

ELG short range, range = 0...2 m/beam spacing 30 mm

Type	Part no.	Height	No. of beams	Interface/Multiple scan
ELG 3-0090P513	1 025 443	90 mm	4	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input, 3 x multiple scan
ELG 3-0150P513	1 025 578	150 mm	6	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input, 3 x multiple scan
ELG 3-0210P513	1 025 438	210 mm	8	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input, 3 x multiple scan
ELG 3-0330P513	1 025 576	330 mm	12	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input, 3 x multiple scan
ELG 3-0210P511	1 025 510	210 mm	8	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-0330P511	1 025 575	330 mm	12	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-0450P511	1 025 490	450 mm	16	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-0570P511	1 025 501	570 mm	20	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-0690P511	1 025 499	690 mm	24	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-0930P511	1 025 492	930 mm	32	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input

ELG long range, range = 0...12 m/beam spacing 30 mm

Type	Part no.	Height	No. of beams	Interface/Multiple scan
ELG 3-0210P521	1 025 574	210 mm	8	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-0450P521	1 025 440	450 mm	16	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-0690P521	1 025 568	690 mm	24	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-0810P521	1 025 577	810 mm	28	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-0930P521	1 025 511	930 mm	32	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-1050P521	1 025 570	1050 mm	36	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-1170P521	1 025 579	1170 mm	40	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-1410P521	1 025 502	1410 mm	48	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-1650P521	1 025 503	1650 mm	56	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-1890P521	1 025 504	1890 mm	64	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-2070P521	1 025 505	2070 mm	70	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-2070P523	1 025 572	2070 mm	70	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input, 3 x multiple scan
ELG 3-2370P521	1 025 573	2370 mm	80	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-0210N521	1 025 613	210 mm	8	NPN, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-0450N521	1 025 614	450 mm	16	NPN, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-0690N521	1 025 615	690 mm	24	NPN, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-0930N521	1 025 616	930 mm	32	NPN, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-1170N521	1 025 617	1170 mm	40	NPN, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-1410N521	1 025 618	1410 mm	48	NPN, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-1650N521	1 025 620	1650 mm	56	NPN, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 3-1890N521	1 025 621	1890 mm	64	NPN, 1 x $\overline{Q}$, 1 x Q, 1 Test input

ELG long range, range = 0...12 m/beam spacing 60 mm

Type	Part no.	Height	No. of beams	Interface/Multiple scan
ELG 6-0900P521	1 025 447	900 mm	16	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 6-1080P521	1 025 586	1080 mm	19	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 6-1380P521	1 025 587	1380 mm	24	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 6-1380P523	1 025 588	1380 mm	24	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input, 3 x multiple scan
ELG 6-1860P521	1 025 589	1860 mm	32	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 6-1860P523	1 025 593	1860 mm	32	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input, 3 x multiple scan
ELG 6-2040P523	1 025 594	2040 mm	35	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input, 3 x multiple scan
ELG 6-2340P521	1 025 596	2340 mm	40	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input
ELG 6-2460P523	1 024 293	2460 mm	42	PNP, 1 x $\overline{Q}$, 1 x Q, 1 Test input, 3 x multiple scan

*) Additional options on request, minimum order: 20 systems



Displacement sensors

- Non-contact, precise distance measurement with red or laser light
- Large operational ranges
- High resolution
- Easy to use due to programmable parameters or teach-in
- Serial interfaces, also SSI for further external processing
- Can be connected to PROFIBUS, Interbus-S, DeviceNet bus
- Used for positioning cranes, automated guided vehicle systems, rack serving units as well as for monitoring filling levels, loop control and detecting minute parts to µm tolerances

Table of Contents

Displacement sensors	
OD (30/50)	1044
OD (100/130/250)	1046
OD-Hi (30/50)	1048
OD-Hi (80/100/250)	1050
OD-MAX	1052
OD-MAX Transparent	1056

Theory of Operation..Displacement Sensors

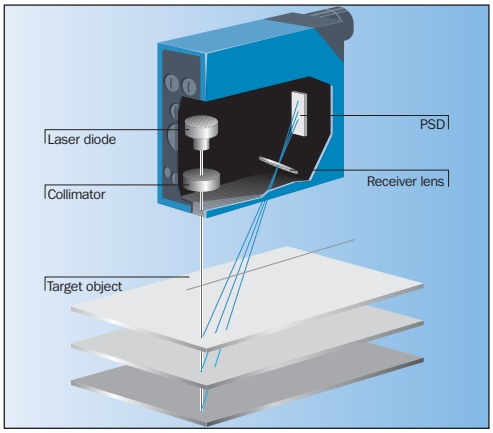


Fig. 1 All-in-one sensor with PSD technology: Triangulation measurement forms the physical basis of the OD sensor

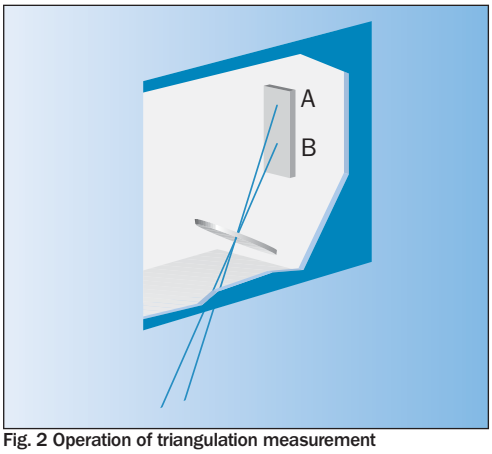
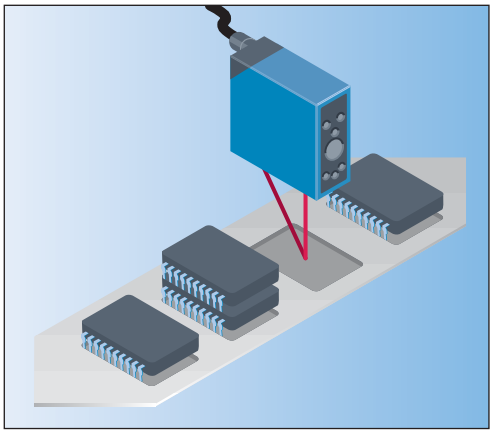
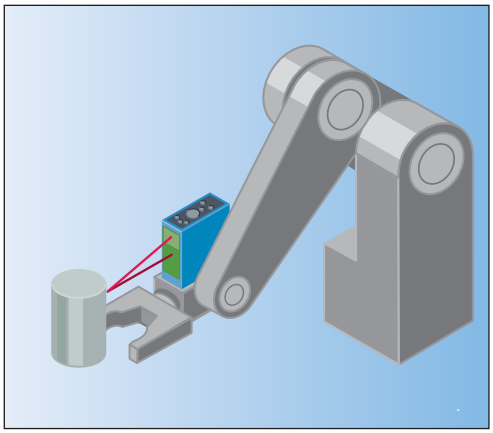


Fig. 2 Operation of triangulation measurement


Fig. 3 OD sensor verifies presence of ICs during packaging in semiconductor industry


Fig. 4 In the robotics industry, OD sensors align and position robot arms



About Displacement Sensors

The OD displacement sensors are a sensing and measuring system in one easy-to-use, easy-to-install, compact package. The intelligent micro-controller technology makes it possible to integrate both sensing and measuring functions into a single device. Calibration of the analog output and the adjustment of the sensing range of the switching output are performed with the user-friendly teach-in function.

Displacement sensors detect minute variations, recesses or unevenness in the target object. They can measure with ultra precision and reliably detect the presence of objects such as those found in the automotive, electronics packaging and robotics industries.

The OD is an all-in-one sensor with advanced technologies. The OD sensors use triangulation for accurate measurement. The optical, circuit and signal processing systems are designed for maximum resolution while maintaining high linearity. (see Fig. 1)

The position of the light spot on the receiver array depends on the distance to the object that has been detected. Signals A and B change according to the position of the light spot. The signals are processed in the micro-controller to produce a linear output signal based on the distance to the object. (See Fig. 2)

New to the OD family are sensors with a CMOS receiver. These sensors provide even higher performance when the target objects are either very shiny, very dark or both.

Additionally, the new OD sensors with CMOS have a digital display and easy-to-use buttons for simple setup and adjustment.

Selection Table...Displacement Sensors

Displacement sensors

Sensor Type	Sensing Range	Resolution	Operating Temperature	Light Source		Output			Page
				Red	Laser	PNP	NPN	Analog	
OD 30	30 ± 4 mm	1 µm	14...104° F (-10...40° C)		■		■	■	1044
OD 50	50 ± 10 mm	3 µm	14...104° F (-10...40° C)		■		■	■	1044
OD 100	100 ± 35 mm	15 µm	14...104° F (-10...40° C)		■		■	■	1046
OD 130	130 ± 50mm	20 µm	14...104° F (-10...40° C)		■		■	■	1046
OD 250	250 ± 150 mm	150 µm	14...104° F (-10...40° C)		■		■	■	1046
OD Hi	30 ± 4 mm	4 µm	14...104° F (-10...40° C)		■		■	■	1048
OD Hi	50 ± 10 mm	75 µm	14...104° F (-10...40° C)		■		■	■	1048
OD Hi	80 ± 15 mm	15 µm	14...104° F (-10...40° C)		■		■	■	1050
OD Hi	100 ± 40 mm	35 µm	14...104° F (-10...40° C)		■		■	■	1050
OD Hi	250 ± 150 mm	75 µm	14...104° F (-10...40° C)		■		■	■	1050
OD-MAX	30 ± 5 mm	1 µm	14...113° F (-10...45° C)		■		■	■	1052
OD-MAX	85 ± 20 mm	5 µm	14...113° F (-10...45° C)		■		■	■	1054
OD-MAX	350 ± 100 mm	50 µm	14...113° F (-10...45° C)		■		■	■	1056
OD-MAX Trans.	25 ± 1 mm	0.1 µm	14...113° F (-10...45° C)		■		■	■	1058

OD

Displacement Sensor



1.2 ± 0.2 in (30 ± 4 mm)
2 ± 0.4 in (50 ± 10 mm)
sensing range

Highlights

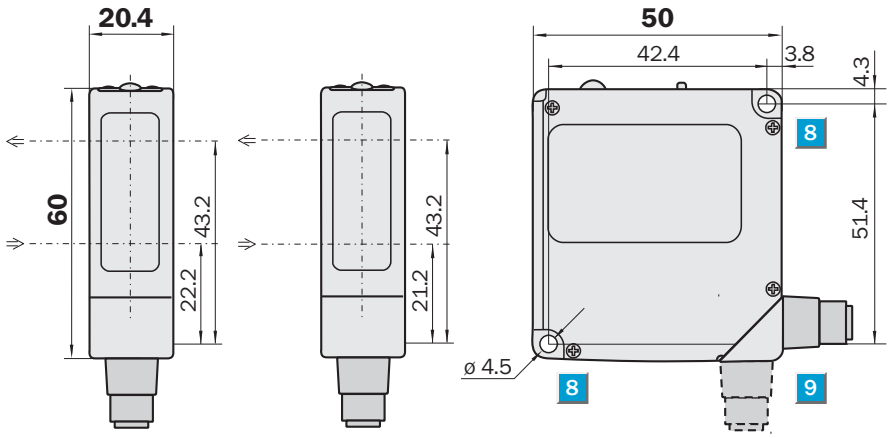
- Laser technology: Measurement or detection of very small objects
- PSD technology: Measurement of diffusely reflective surfaces

OD



Dimensional drawing

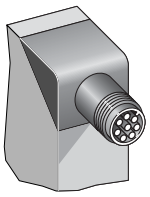
OD 30
OD 50



dimensions in mm

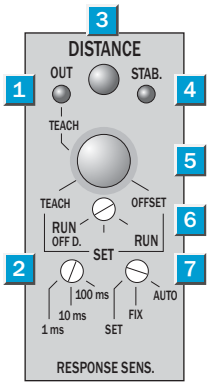
8-pin M12

OD30-04N840
OD30-04P840
OD50-10N840
OD50-10P840



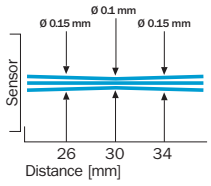
Adjustments

All types

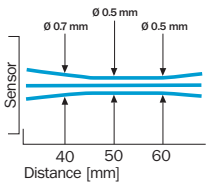


1 Teach-in indicator/output indicator
2 Response time selector
3 Distance indicator
4 Stable indicator
5 Teach-in button
6 Mode selector
7 Sesitivity selector
8 Mounting hole, Ø 0.2 in (4.5 mm)
9 M12 plug; 90° rotatable

OD 30-04: Light spot diameter



OD 50-10: Light spot diameter



Technical data	OD	30-04 P840	30-04 N840	50-10 P840	50-10 N840
Light source	Red laser diode 2 (II)[1]	■	■	■	■
Measuring range	1.2 ± 0.2 in (30 ± 4 mm)	■	■		
	2 ± 0.4 in (50 ± 10 mm)			■	■
Resolution[2]	1 µm	■	■		
	3 µm			■	■
Reproducibility[3]	3 µm	■	■		
	9 µm			■	■
Accuracy[4]	± 160 µm	■	■		
	± 400 µm			■	■
Temperature drift	± 0.01% FS[5]/°C	■	■	■	■
Response time[6]	100/10/1 ms	■	■	■	■
Measuring frequency/Output rate	5 kHz	■	■	■	■
In- and outputs	PNP	■		■	
	NPN		■		■
Outputs					
1 Analog current output	4…20 mA[7]	■	■	■	■
1 Control output	Max. 100 mA/30 V DC	■	■	■	■
Inputs					
1 Sample and Hold input	Synchronization of the sensor	■	■	■	■
1 Teach input	To reference the measurement	■	■	■	■
Supply voltage V_S	12…24 V DC, -5%, 10%	■	■	■	■
Current consumption[8]	≤ 1.8 W	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
VDE protection class	III	■	■	■	■
Ambient temperature T_A	Operation: 14…104° F (-10…40° C)[9]	■	■	■	■
	Storage: -4…140° F (-20…60° C)	■	■	■	■
Ambient light limit	Max. 3,000 lx (artificial light)	■	■	■	■
	Max. 10,000 lx (sunlight)	■	■	■	■
Vibration resistance	10/s…55/s[10]	■	■	■	■
Shock resistance	50 G (500 m/s²)	■	■	■	■
Weight	7 oz (200 g) plug, 10.5 oz (300 g) cable	■	■	■	■
Housing material	Zinc	■	■	■	■
Cable extension[11]	Plug M12 8-pin	■	■	■	■

1) Wavelength 650 nm, max. output 1 mW
2) At a selected response time of 100 ms with 90% remission
3) At a selected response time of 100 ms with 90% remission and constant conditions
4) For 18…90% remission; equivalent ± 2% of full scale
5) Full scale = Measuring range:
OD30-04 = 0.3 in (8 mm)
OD50-10 = 0.8 in (20 mm)
6) Dependent on the selected response time
7) Load impedance max. 300 Ω
8) Including analog current output
9) Non-condensing:
do not bend below 0° C
10) Amplitude 0.1 in (1.5 mm)
2 h for axes XYZ
11) 2 m cable: 6020663
5 m cable: 6020664

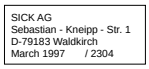
Order information

Type	Part no.
OD30-04N840	6021842
OD30-04P840	6021841
OD50-10N840	6020640
OD50-10P840	6020641

Beam Attenuator

The OD sensors are equipped with an M12 style quick disconnect. The cable can be removed quickly and easily in the event that personnel require access to the area where the sensor is mounted.

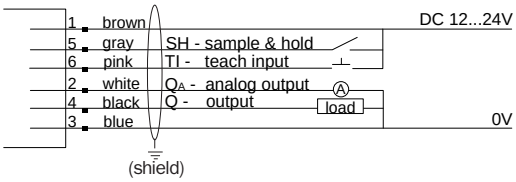




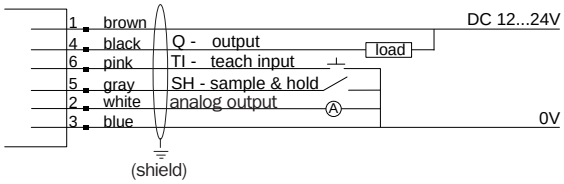


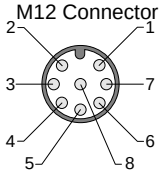
Connection diagram

PNP Models



NPN Models





wire colors refer to cable 6 020 663, not included with quick disconnect models

OD

Displacement Sensor

3.9 ± 1.4 in (100 ± 35 mm)
5.1 ± 2 in (130 ± 50 mm)/9.8 ± 5.9 in (250 ± 150 mm)
sensing range

Highlights

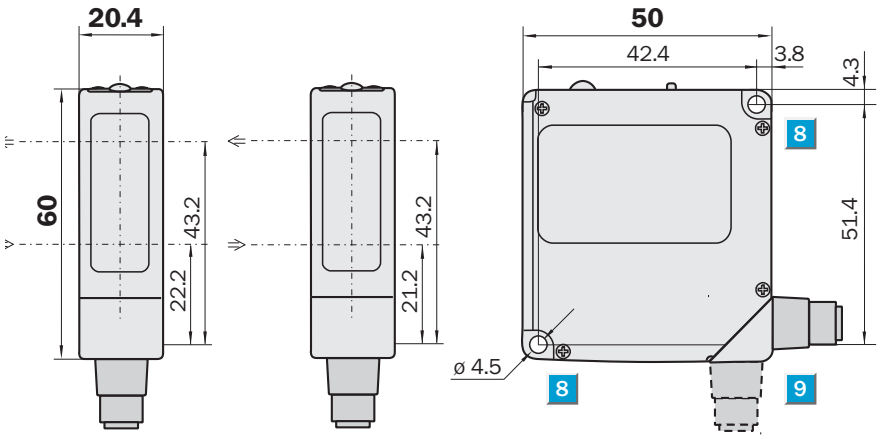
- Laser technology: Measurement or detection of very small objects
- PSD technology: Measurement of diffusely reflective surfaces

OD



Dimensional drawing

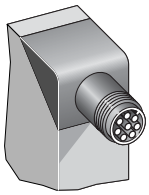
OD 100
OD 130
OD 250



dimensions in mm

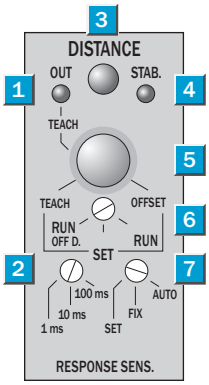
8-pin M12

OD100-35P840
OD100-35N840
OD130-50P840
OD130-50N840
OD250-150P840
OD250-150N840



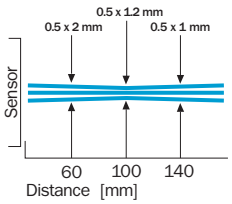
Adjustments

All types

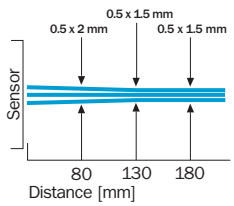


1 Teach-in indicator/output indicator
2 Response time selector
3 Distance indicator
4 Stable indicator
5 Teach-in button
6 Mode selector
7 Sesitivity selector
8 Mounting hole, Ø 0.2 in (4.5 mm)
9 M12 plug; 90° rotatable

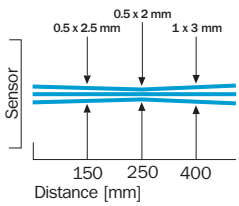
OD 100-35: Light spot diameter



OD 130-50: Light spot diameter



OD 250-150: Light spot diameter



7028071 - © 2008 SICK, Inc.

Technical data	OD	100-35 P840	100-35 N840	130-50 P840	130-50 N840	250-150 P840	250-150 N840			
Light source	Red laser diode 2 (II)[1]	■	■	■	■	■	■			
Measuring range	3.9 ± 1.4 in (100 ± 35 mm)	■	■							
	5.1 ± 2.0 in (130 ± 50 mm)			■	■					
	9.8 ± 5.9in (250 ± 150 mm)					■	■			
Resolution[2]	15 µm	■	■							
	20 µm			■	■					
	150 µm					■	■			
Reproducibility[3]	45 µm	■	■							
	60 µm			■	■					
	450 µm					■	■			
Accuracy[4]	± 0.06 in (± 1.4 mm)	■	■							
	± 0.08 in (± 2 mm)			■	■					
	± 0.4 in (± 9 mm)					■	■			
Temperature drift	± 0.01% FS[5]/°C	■	■	■	■	■	■			
Response time[6]	100/10/1 ms	■	■	■	■	■	■			
Measuring frequency/Output rate	5 kHz	■	■	■	■	■	■			
In- and outputs	PNP	■		■		■				
	NPN		■		■		■			
Outputs										
1 Analog current output	4…20 mA[7]	■	■	■	■	■	■			
1 Control output	Max. 100 mA/30 V DC	■	■	■	■	■	■			
Inputs										
1 Sample and Hold input	Synchronization of the sensor	■	■	■	■	■	■			
1 Teach input	To reference the measurement	■	■	■	■	■	■			
Supply voltage V_S	12…24 V DC, -5%, 10%	■	■	■	■	■	■			
Current consumption[8]	≤ 1.8 W	■	■	■	■	■	■			
Enclosure rating	IP 67	■	■	■	■	■	■			
VDE protection class	III	■	■	■	■	■	■			
Ambient temperature T_A	Operation: 14…104° F (-10…40° C)[9]	■	■	■	■	■	■			
	Storage: -4…140° F (-20…60° C)	■	■	■	■	■	■			
Ambient light limit	Max. 3,000 lx (artificial light)	■	■	■	■	■	■			
	Max. 10,000 lx (sunlight)	■	■	■	■	■	■			
Vibration resistance	10/s…55/s[10]	■	■	■	■	■	■			
Shock resistance	50 G (500 m/s²)	■	■	■	■	■	■			
Weight	7 oz (200 g) plug, 10.5 oz (300 g) cable	■	■	■	■	■	■			
Housing material	Zinc	■	■	■	■	■	■			
Cable extension[11]	Plug M12 8-pin	■	■	■	■	■	■			

1) Wavelength 650 nm, max. output 1 mW
2) At a selected response time of 100 ms with 90% remission
3) At a selected response time of 100 ms with 90% remission and constant conditions
4) For 6…90% (OD250-150, 16…90%) remission; equivalent ± 2% of full scale (bei OD250-150 ± 3%)
5) Full scale = Measuring range:
OD100-35 = 2.8 in (70 mm)
OD130-50 = 3.9 in (100 mm)
OD250-150 = 11.8 in (300 mm)
6) Dependent on the selected response time
7) Load impedance max. 300 Ω
8) Including analog current output
9) Non-condensing: do not bend below 0° C
10) Amplitude 0.1 in (1.5 mm) 2 h for axes XYZ
11) 2 m cable: 6020663
5 m cable: 6020664

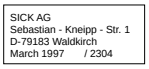
Order information

Type	Part no.
OD100-35N840	6022479
OD100-35P840	6022478
OD130-50N840	6021850
OD130-50P840	6021849
OD250-150N840	6021854
OD250-150P840	6021853

Beam Attenuator

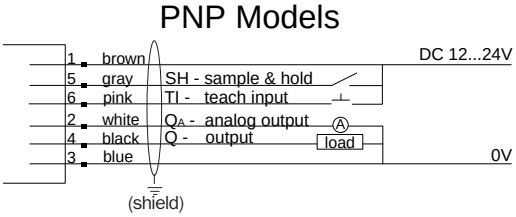
The OD sensors are equipped with an M12 style quick disconnect. The cable can be removed quickly and easily in the event that personnel require access to the area where the sensor is mounted.

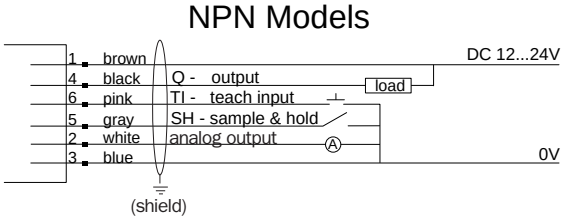


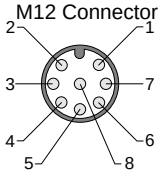




Connection diagram



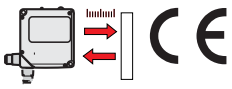




wire colors refer to cable 6 020 663, not included with quick disconnect models

OD Hi

Displacement Sensor



1.2 ± 0.2 in (30 ± 4mm)
2 ± 0.4 in (50 ± 10 mm)

sensing range

Highlights

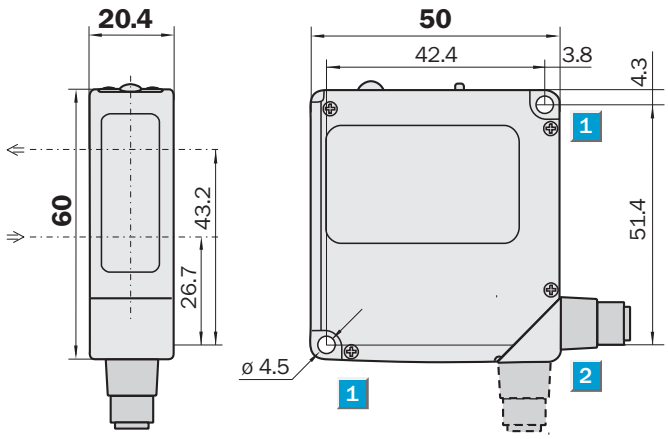
- Laser technology
- CMOS technology:
  - object indpendent measuring: shiny, dark
- Stand-alone device:
  - no additional external controller necessary
- Setting and display on the device – quick, fast and easy setup

OD Hi



Dimensional drawing

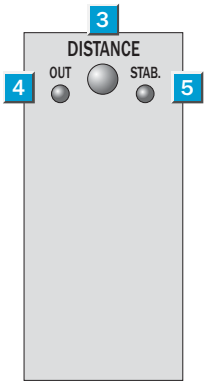
OD 30
OD 50



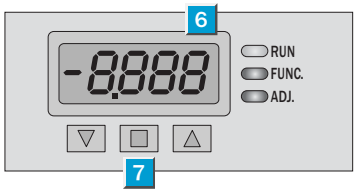
dimensions in mm

Adjustments

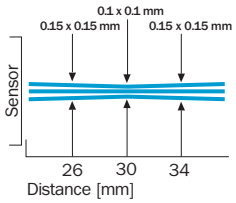
All types



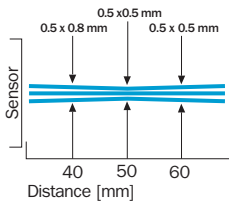
1 Mounting hole, ø 0.2 in (4.5 mm)
2 M12 plug: 90° rotatable
3 Distance indicator
4 Output indicator (OUT)
5 Stability indicator
6 Display
7 Mode buttons



OD 30-04: Light spot diameter



OD 50-10: Light spot diameter



Technical data	OD	30-04 P850	30-04 N850	50-10 P850	50-10 N850
Light source	Red laser diode 2 (II)[1]	■	■	■	■
Measuring range	1.2 ± 0.2 in (30 ± 4 mm)	■	■		
	2 ± 0.4 in (50 ± 10 mm)			■	■
Resolution[2]	4 µm	■	■		
	10 µm			■	■
Reproducibility[3]	12 µm	■	■		
	30 µm			■	■
Accuracy[4]	± 80 µm	■	■		
	± 200 µm			■	■
Temperature drift	± 0.08% FS[5]/°C	■	■	■	■
Response time[6]	2 ms	■	■	■	■
Measuring frequency/Output rate	1 kHz	■	■	■	■
In- and outputs	PNP	■		■	
	NPN		■		■
Outputs					
1 Analog current output	4…20 mA[7]	■	■	■	■
1 Control output	Max. 100 mA/30 V DC	■	■	■	■
Inputs					
1 Sample and Hold input	Synchronization of the sensor	■	■	■	■
1 Teach input	To reference the measurement	■	■	■	■
Display type	Alphanumeric display, 4-digit	■	■	■	■
Additional features	Averaging functions	■	■	■	■
	Autom./manual sensitivity setting	■	■	■	■
	Timer functions	■	■	■	■
	3 Memory banks	■	■	■	■
Supply voltage V_S	12…24 V DC, -5%, 10%	■	■	■	■
Current consumption[8]	≤ 2.88 W	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
VDE protection class	III	■	■	■	■
Ambient temperature T_A	Operation: 14…104° F (-10…40° C)[9]	■	■	■	■
	Storage: -4…140° F (-20…60° C)	■	■	■	■
Ambient light limit	Max. 3,000 lx (artificial light)	■	■	■	■
	Max. 10,000 lx (sunlight)	■	■	■	■
Vibration resistance	10/s…55/s[10]	■	■	■	■
Shock resistance	50 G (500 m/s²)	■	■	■	■
Weight	7 oz (200 g) plug, 10.5 oz (300 g) cable	■	■	■	■
Housing material	Zinc	■	■	■	■
Cable extension[11]	Plug M12 8-pin	■	■	■	■

1) Wavelength 650 nm, max. output 1 mW
2) Averaging: 64 measurements
Object: 6…90% remission
3) With constant environmental conditions;
Averaging: 64 measurements
4) For 18…90% remission; equivalent ± 1% of full scale
5) Full scale = Measuring range:
OD30-04 = 0.3 in (8 mm)
OD50-10 = 0.8 in (20 mm)
6) Without averaging and manually selected sensitivity
7) Load impedance max. 300 Ω
8) Including analog current output
9) Non-condenseing: do not bend below 0° C
10) Amplitude 0.1 in (1.5 mm)
2 h for axes XYZ
11) 2 m cable: 6020663
5 m cable: 6020664

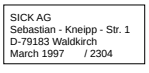
Order information

Type	Part no.
OD30-04N850	6025034
OD30-04P850	6025032
OD50-10N850	6025038
OD50-10P850	6025036

Beam Attenuator

The OD sensors are equipped with an M12 style quick disconnect. The cable can be removed quickly and easily in the event that personnel require access to the area where the sensor is mounted.

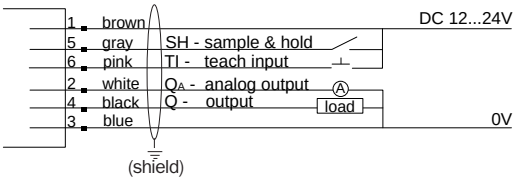




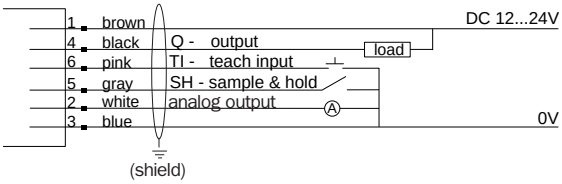


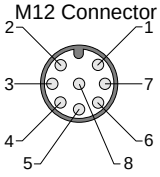
Connection diagram

PNP Models



NPN Models

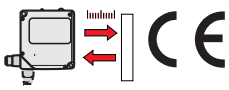




wire colors refer to cable 6 020 663, not included with quick disconnect models

OD Hi

Displacement Sensor



3.1 ± 0.6 in (80 ± 15 mm)
3.9 ± 1.6 in (100 ± 40 mm)/9.8 ± 5.9 in (250 ± 150 mm)

sensing range

Highlights

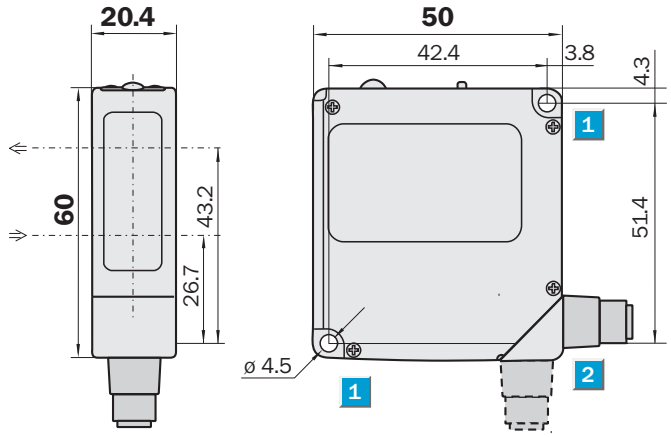
- Laser technology
- CMOS technology:
  - object independent measuring: shiny, dark
- Stand-alone device:
  - no additional external controller necessary
- Setting and display on the device – quick, fast and easy setup

OD Hi



Dimensional drawing

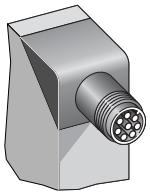
OD 80
OD 100
OD 250



dimensions in mm

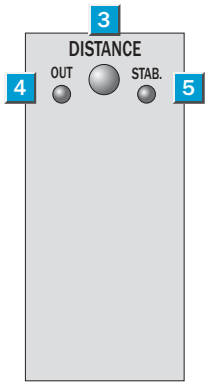
8-pin M12

OD80-15P850	OD250-150P850
OD80-15N850	OD250-150N850
OD100-40P850	
OD100-40N850	

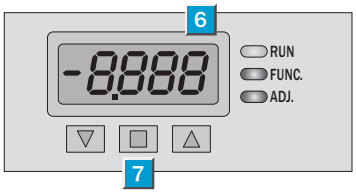


Adjustments

All types



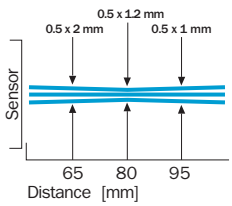
1 Mounting hole, ø 0.2 in (4.5 mm)
2 M12 plug: 90° rotatable
3 Distance indicator
4 Output indicator (OUT)
5 Stability indicator
6 Display
7 Mode buttons



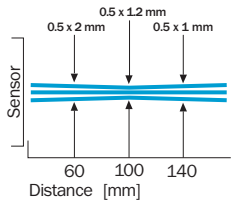
Order information

Type	Part no.
OD80-15N850	6025042
OD80-15P850	6025040
OD100-40N850	6025046
OD100-40P850	6025044
OD250-150N850	6028097
OD250-150P850	6028096

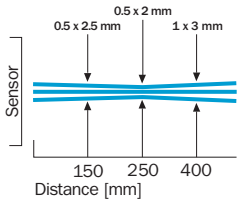
OD80-15: Light spot diameter



OD 100-40: Light spot diameter



OD 250-150: Light spot diameter



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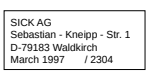
Technical data	OD	80-15 P850	80-15 N850	100-40 P850	100-40 N850	250-150 P850	250-150 N850
Light source	Red laser diode 2 (II)[1]	■	■	■	■	■	■
Measuring range	3.1 ± 0.6 in (80 ± 15 mm)	■	■				
	3.9 ± 1.6 in (100 ± 40 mm)			■	■		
	9.8 ± 5.9 in (250 ± 150 mm)					■	■
Resolution[2]	15 µm	■	■				
	35 µm			■	■		
	75 µm					■	■
Reproducibility[3]	45 µm	■	■				
	105 µm			■	■		
	225 µm					■	■
Accuracy[4]	± 300 µm	■	■				
	± 800 µm			■	■		
	± 6 mm					■	■
Temperature drift	± 0.08% FS[5]/°C	■	■	■	■	■	■
Response time[6]	2 ms	■	■	■	■	■	■
Measuring frequency/Output rate	1 kHz	■	■	■	■	■	■
In- and outputs	PNP	■		■		■	
	NPN		■		■		■
Outputs							
1 Analog current output	4…20 mA[7]	■	■	■	■	■	■
1 Control output	Max. 100 mA/30 V DC	■	■	■	■	■	■
Inputs							
1 Sample and Hold input	Synchronization of the sensor	■	■	■	■	■	■
1 Teach input	To reference the measurement	■	■	■	■	■	■
Display type	Alphanumeric display, 4-digit	■	■	■	■	■	■
Additional features	Averaging functions	■	■	■	■	■	■
	Autom./manual sensitivity setting	■	■	■	■	■	■
	Timer functions	■	■	■	■	■	■
	3 Memory banks	■	■	■	■	■	■
Supply voltage V_S	12…24 V DC, -5%, 10%	■	■	■	■	■	■
Current consumption[8]	≤ 2.88 W	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
VDE protection class	III	■	■	■	■	■	■
Ambient temperature T_A	Operation: 14…104° F (-10…40° C)[9]	■	■	■	■	■	■
	Storage: -4…140° F (-20…60° C)	■	■	■	■	■	■
Ambient light limit	Max. 3,000 lx (artificial light)	■	■	■	■	■	■
	Max. 10,000 lx (sunlight)	■	■	■	■	■	■
Vibration resistance	10/s…55/s[10]	■	■	■	■	■	■
Shock resistance	50 G (500 m/s²)	■	■	■	■	■	■
Weight	7 oz (200 g) plug, 10.5 oz (300 g) cable	■	■	■	■	■	■
Housing material	Zinc	■	■	■	■	■	■
Cable extension[11]	Plug M12 8-pin	■	■	■	■	■	■

1) Wavelength 650 nm, max.output 1 mW
2) Averaging: 64 measurements
Object: 6…90% remission
3) With constant environmental conditions;
Averaging: 64 measurements
4) For 18…90% remission; equivalent ± 1% of full scale (for OD250-150 ± 2%)
5) Full scale = Measuring range:
OD80-15 = 1.2 in (30 mm)
OD100-40 = 3.1 in (80 mm)
OD250-150 = 11.8 in (300 mm)
6) Without averaging and manually selected sensitivity
7) Load impedance max. 300 Ω
8) Including analog current output
9) Non-condenseing: do not bend below 0° C
10) Amplitude 0.1 in (1.5 mm)
2 h for axes XYZ
11) 2 m cable: 6020663
5 m cable: 6020664

Beam Attenuator

The OD sensors are equipped with an M12 style quick disconnect. The cable can be removed quickly and easily in the event that personnel require access to the area where the sensor is mounted.

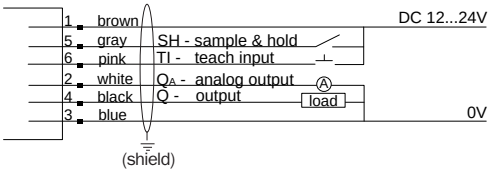




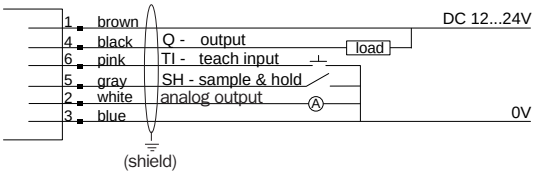


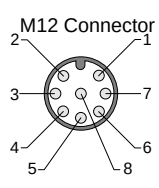
Connection diagram

PNP Models



NPN Models

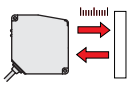




wire colors refer to cable 6 020 663, not included with quick disconnect models

OD-MAX Sensors

Displacement Sensor

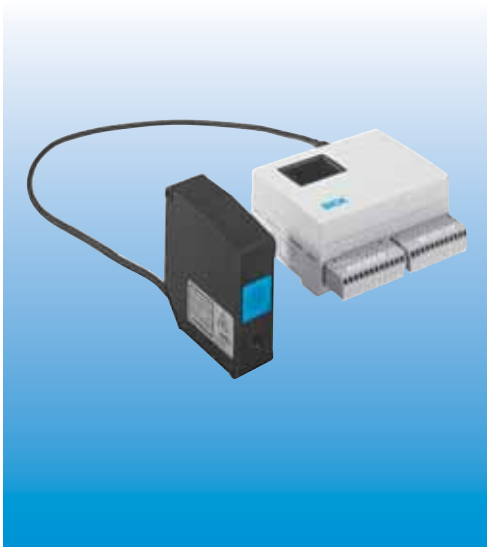


1.2 ± 0.2 in (30 ± 5 mm)/3.3 ± 0.8 in (85 ± 20mm)
13.8 ± 3.9 (350 ± 100 mm)
sensing range

Highlights

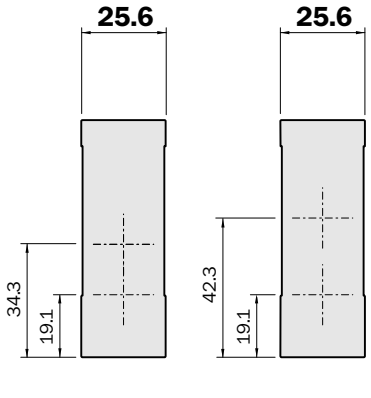
- Laser technology
- CMOS technology: object independent measuring from shiny to dark
- High measurement accuracy
- High-end system: 1 or 2 sensor heads per controller
- 4 analog outputs and 5 switching outputs
- RS 232C interface

OD-MAX

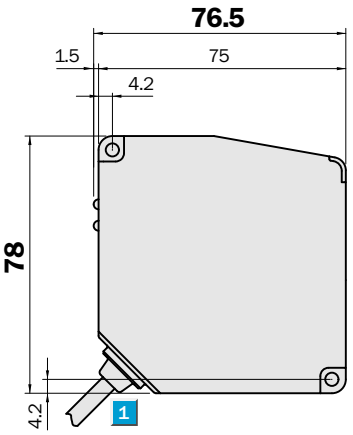


Dimensional drawing

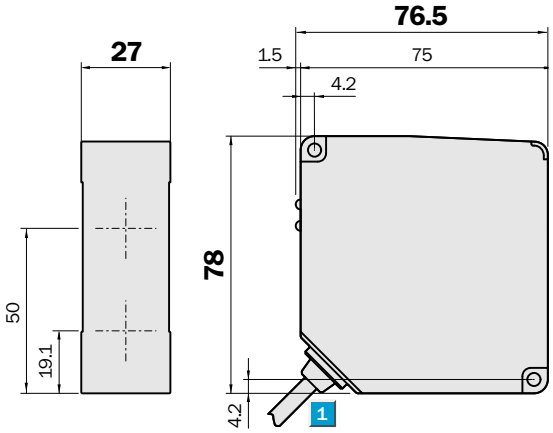
OD30-05T1



OD85-20T1



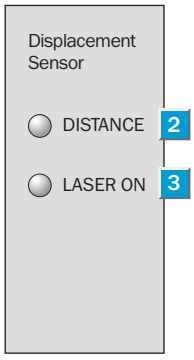
OD350-100T1



dimensions in mm

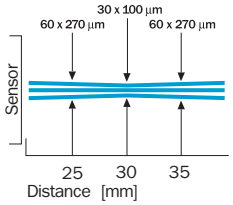
Adjustments

All types

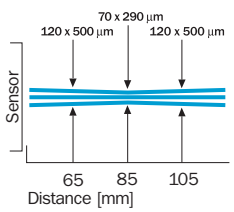


1 Cable Ø 5 mm/0.5 m with 10-pin connector
2 Distance indicator
3 Laser on LED

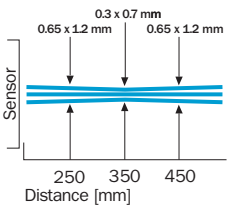
OD30-05T1: Light spot diameter



OD85-20T1: Light spot diameter



OD350-100T1: Light spot diameter

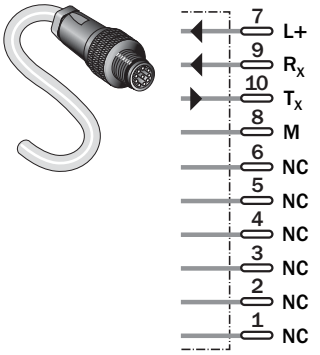


Technical data	OD-MAX	30-05T1	85-20T1	350-100T1
Measuring range	1.2 ± 0.2 in (30 ± 5 mm)	■		
	3.3 ± 0.8 in (85 ± 20 mm)		■	
	13.8 ± 3.9 in (350 ± 100 mm)			■
Light source	Red laser diode 2 (II)[1]	■	■	■
Measuring frequency	10 kHz	■	■	■
Resolution[2]	1 µm	■		
	5 µm		■	
	50 µm			■
Reproducibility[3]	3 µm	■		
	15 µm		■	
	150 µm			■
Accuracy[4]	± 10 µm	■		
	± 40 µm		■	
	± 200 µm			■
Supply voltage V_S	Supplied from the controller	■	■	■
Temperature drift	± 0.01% FS[5]/°C	■	■	■
Enclosure rating	IP 67	■	■	■
VDE protection class	III	■	■	■
Ambient temperature T_A	Operation: 14…113° F (-10…45° C)[6]	■	■	■
	Storage: -4…140° F (-20…60° C)	■	■	■
Ambient light limit	Max. 3,000 lx (fluorescent light)	■	■	■
	Max. 10,000 lx (sunlight)	■	■	■
Vibration resistance	10/s…55/s[7]	■	■	■
Shock resistance	50 G (500 m/s²)	■	■	■
Weight	8.8 oz (250 g) - including 50 cm cable	■	■	■
Housing material	Diecast aluminum (sensor head housing)	■	■	■
Cable extension	1.6 ft (0.5 m) pig tail with connector[8]	■	■	■

1) Wavelength 650 nm, max.output 1 mW
2) Averaging: 256 measurements
Object: 90% remission
Distance range: average distance
3) With constant environmental conditions;
Averaging: 256 measurements;
Objects: 90% remission
4) Equivalent ± 0.1% of full scale for 6…90% remission
5) Full scale:
OD30-05T1= 0.4 in (10 mm)
OD85-20T1= 1.6 in (40 mm)
OD350-100T1= 7.9 in (200 mm)
6) Non-condensing
7) Double amplitude 0.1 in (1.5 mm), 2 h for XYZ axes
8) Extendable by cable to max. 10 m

Connection diagram

All types | 10-pin

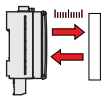


Order information

Type	Part no.
OD30-05T1	6028959
OD85-20T1	6028958
OD350-100T1	6028957

OD-MAX, Controller

Displacement Sensor



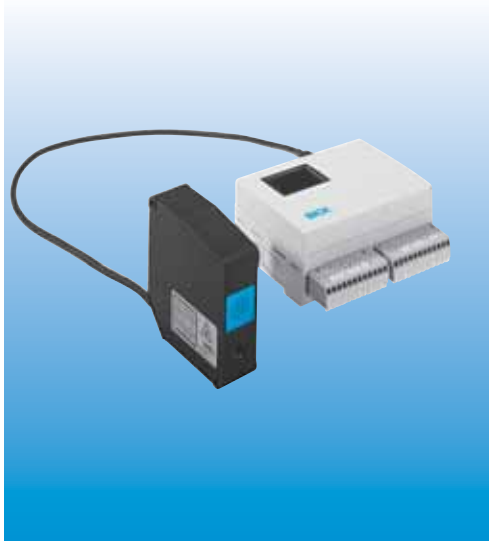
1.2 ± 0.2 in (30 ± 5)/3.3 ± 0.8 in (85 ± 20 mm)/ 13.8 ± 3.9 in (350 ± 100 mm)

sensing range

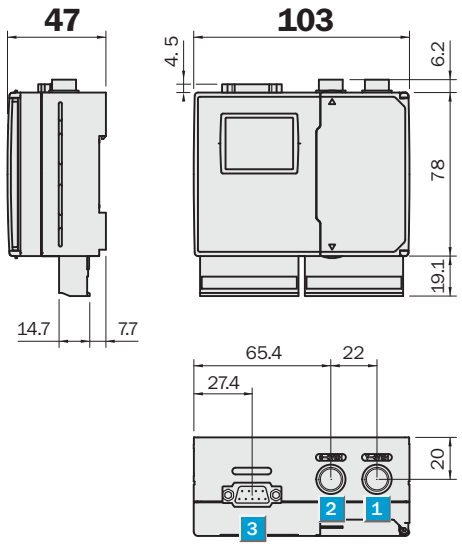
Highlights

- Laser technology
- CMOS technology: object independent measuring from shiny to dark
- High measurement accuracy
- High-end system: 1 or 2 sensor heads per controller
- 4 analog outputs and 5 switching outputs
- RS 232C interface

OD-MAX



Dimensional drawing

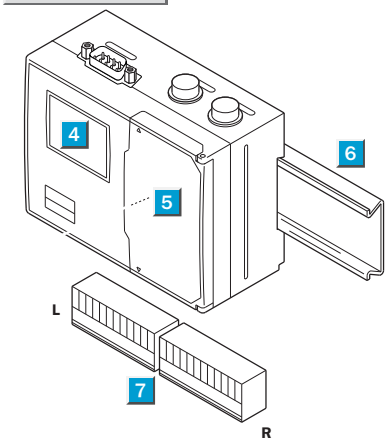


dimensions in mm

Adjustments

AOD-P1

AOD-N1



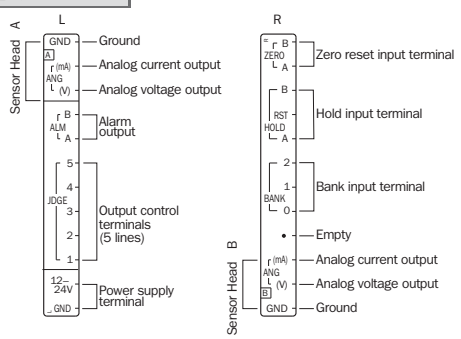
1 Sensor head A connection port
2 Sensor head B connection port
3 RS 232C interface
4 LCD display
5 Operation panel
6 DIN rail
7 Terminal board (detachable)

Technical data	OD-MAX	P1	N1
In- and outputs	PNP	■	
	NPN		■
Response time[1]	0.5 ms	■	■
Output rate	10 kHz	■	■
Supply voltage V_S	12…24 V DC ± 10%	■	■
Power consumption[2]	6 W	■	■
Outputs			
2 analog voltage outputs[3]	-5…+5 V[4]	■	■
2 analog current outputs[3]	4…20 mA[5]	■	■
5 switching outputs[6]	Max. 100 mA/24 V DC[7]	■	■
2 alarm outputs	To indicate failed measurements	■	■
Data interface	RS 232C (male)	■	■
Inputs			
3 Bank inputs	External memory bank selection	■	■
2 Hold inputs	Holding the measurement/Laser off	■	■
2 Zero reset inputs	To reference the measurement	■	■
Additional features	Arithmetical calculations	■	■
	Averaging functions	■	■
	Frequency filters	■	■
	Autom/manual sensitivity setting	■	■
	Timer functions	■	■
	8 Memory banks	■	■
	Hold functions	■	■
Display type	LCD color display	■	■
Enclosure rating	IP 20	■	■
VDE protection class	III	■	■
Ambient temperature T_A	Operation: 14…113° F (-10…45° C)[8]	■	■
	Storage: -4…140° F (-20…60° C)	■	■
Vibration resistance	10/s…55/s[9]	■	■
Shock resistance	20 G (196 m/s²)	■	■
Weight	8.4 oz (240 g) - including terminal board	■	■
Housing material	Polycarbonate	■	■
Terminal board material	Nylon 66	■	■
Connection type	Terminal board	■	■

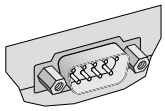
1) Without averaging and manually selected sensitivity
2) 1 for each sensor head, or 1 for the calculation result.
3) Output impedance max. 1 Ω resolution 1 mV
4) Output impedance max. 300 Ω, resolution 1.5 µA
5) For the calculation result
6) Residual voltage max. 1.8 V
7) When connected with 2 sensor heads. Including analog current output.
8) Non condensing
9) Double amplitude 1.5 mm, 2 h for XYZ axes

Connection terminal board

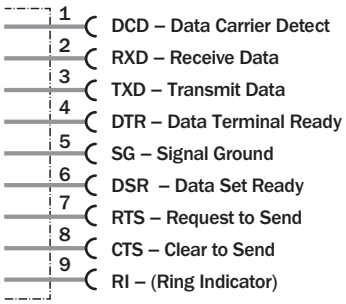
AOD-P1
AOD-N1



Connector pinning RS 232C



Female connector, 9-pin



Order information

OD-Max controller unit

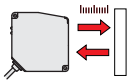
Type	Part no.
AOD-P1	6028960
AOD-N1	6028961

Accessories, extension cable

Type	Part no.	Length
DSL-1210-G02M	6028943	2 m
DSL-1210-G05M	6028944	5 m

OD-MAX Transparent

Displacement Sensor



1 ± 0.04 in (25 ± 1 mm)
sensing range

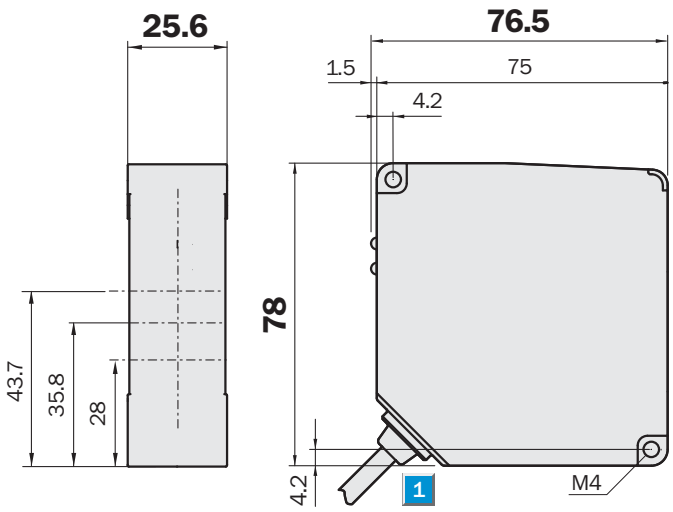
Highlights

- Laser technology
- Measurement of transparent materials
- High measurement accuracy
- High-end system: 1 or 2 sensor heads per controller
- 4 analog outputs and 5 switching outputs
- RS 232C interface

OD-MAX Transparent



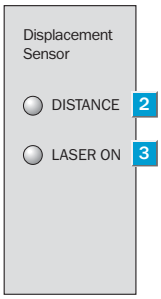
Dimensional drawing



dimensions in mm

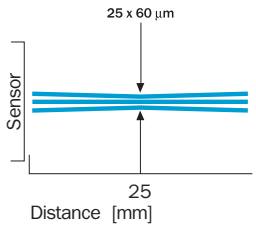
Sensor details

All types



1 Cable Ø 5 mm/0.5 m with 10-pin connector
2 Distance indicator LED
3 Laser on LED

OD25-01T1: Light spot diameter



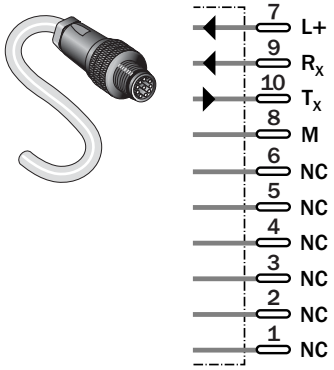
7028071 - © 2008 SICK, Inc.

Technical data	OD-MAX	25 01T1
Light source	Red laser diode 2 (II)[1]	
Measuring range	1 ± 0.04 in (25 ± 1 mm)	
Resolution[2]	0.1 µm	
Reproducibility[3]	0.3 µm	
Accuracy[4]	± 2 µm	
Temperature drift	± 0.05% FS[5]/°C	
Measuring frequency	10 kHz	
Supply voltage V_S	Supplied from the amplifier unit	
Enclosure rating	IP 67	
VDE protection class	III	
Ambient temperature	Operation: 14…113° F (-10…45° C)[6]	
	Storage: -4…140° F (-20…60° C)	
Ambient light limit	Max. 3,000 lx (artificial light)	
	Max. 10,000 lx (sunlight)	
Vibration resistance	10/s…55/s[7]	
Shock resistance	50 G (500 m/s²)	
Weight	8.8 oz (250 g) - incl. 50 cm cable	
Housing Material	Diecast aluminum	
Connection type	0.5 m pig tail with connector[8]	

1) Wavelength 650 nm, max. output 390 µW
2) Averaging: 256 measurement; Object 90% remission; Distance: average distance
3) With constant environmental conditions; Averaging: 256 measurements; Object: 90% remission
4) On glass; Parallel alignment of the active sensor surface to the object surface; Equivalent ±0.1% of full scale
5) Full scale = measuring range: OD25-01T1 = 0.1 in (2 mm)
6) Non-condensing
7) Double amplitude 0.1 in (1.5 mm), 2 h for XYZ axes
8) Extendable by max. 10 m

Connection diagram

All types	10-pin

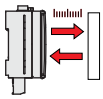


Order information

Type	Part no.
OD25-01T1	6030977

OD-MAX Transparent, Controller

Displacement Sensor

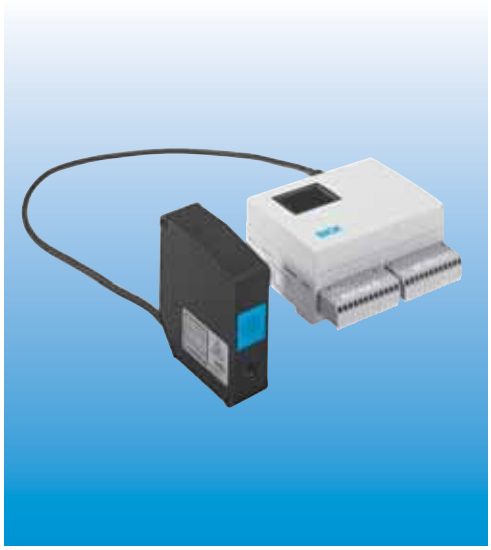


1 ± 0.04 in (25 ± 1 mm)
sensing range

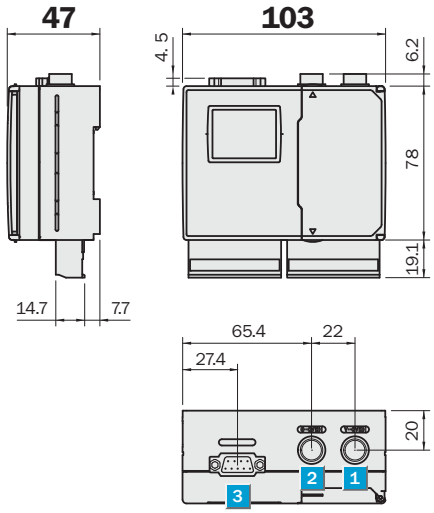
Highlights

- Laser technology
- Measurement of transparent materials
- High measurement accuracy
- High-end system: 1 or 2 sensor heads per controller
- 4 analog outputs and 5 switching outputs
- RS 232C interface

OD-MAX Transparent, Controller



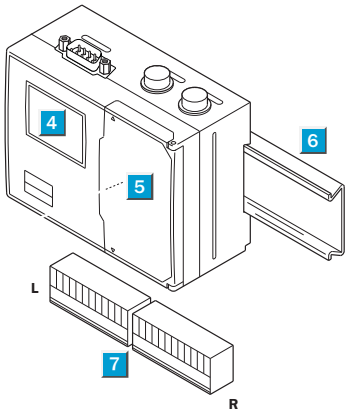
Dimensional drawing



dimensions in mm

Controller unit details

A0DG-P1
A0DG-N1



1 Sensor head A connection port
2 Sensor head B connection port
3 RS 232C interface
4 LCD display
5 Operation panel
6 DIN rail
7 Terminal board (detachable)

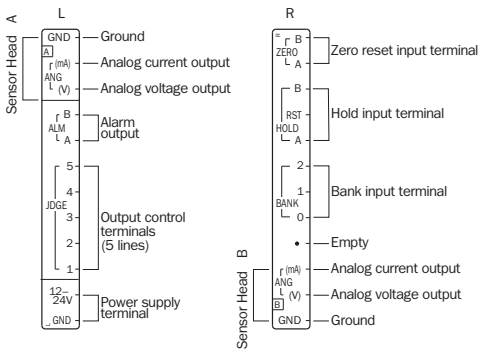
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Technical data	OD-MAX	P1	N1
Response time[1]	0.5 ms	■	■
Output rate	10 kHz	■	■
In- and outputs	PNP	■	
	NPN		■
Outputs			
2 analog voltage outputs[2]	-5…+5 V[3]	■	■
2 analog current outputs[4]	4…20 mA[5]	■	■
5 switching outputs[6]	Max. 100 mA/30 V DC[7]	■	■
2 alarm outputs	To indicate failed measurements	■	■
Data interface	RS 232C (male)	■	■
Inputs			
3 bank inputs	External memory bank selection	■	■
3 hold inputs	Holding the measurement/ laser off	■	■
2 zero reset inputs	To reference the measurement	■	■
Display type	LCD color display	■	■
Additional features	Arithmetical calculations	■	■
	Averaging functions	■	■
	Frequency filters	■	■
	Autom./manual sensitivity setting	■	■
	Timer functions	■	■
	8 memory banks	■	■
	Hold functions	■	■
Supply voltage V_S	12…24 V DC -5%, +10%	■	■
Power consumption[7]	6 W	■	■
Enclosure rating	IP 20	■	■
VDE protection class	III	■	■
Ambient temperature	Operation: 14…113° F (-10…45° C)[8]	■	■
	Storage: -4…140° F (-20…60° C)	■	■
Vibration resistance	10/s…55/s[9]	■	■
Shock resistance	20 G (500 m/s²)	■	■
Weight	8.4 oz (240 g) - incl. terminal board	■	■
Material	Housing: Polycarbonate	■	■
	Terminal board: Nylon 66	■	■
Connection type	Terminal board	■	■

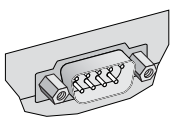
1) Without averaging and manually selected sensitivity
2) Load impedance max. 1kΩ, resolution 1 mV
3) Load impedance max. 300, resolution 1.5 µA
4) 1 for each sensor head, or 1 for the calculation result
5) For the calculation result
6) Residual voltage max. 1.8 V
7) When connected with 2 sensor heads, including analog current output.
8) Non condensing
9) Double amplitude 1.5 mm, 2 h for XYZ axes

Connection terminal board

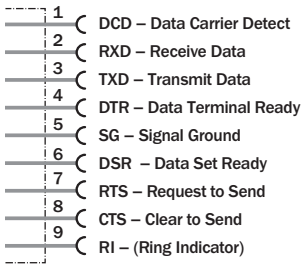
AODG-P1
AODG-N1



Connector pinning RS232C



Female connector, 9-pin



Order information

OD-MAX controller unit

Type	Part no.
AODG-P1	6030978
AODG-N1	6030979

Accessories, extension cable

Type	Part no.	Cable length
DSL-1210-G02M	6028943	2 m
DSL-1210-G05M	6028944	5 m



Distance sensors

- Non-contact, precise distance measurement with LED or laser light
- Large operational ranges
- High resolution
- Easy to use due to programmable parameters or teach-in
- Serial interfaces, also SSI for further external processing
- Can be connected to PROFIBUS, Interbus-S, DeviceNet bus
- Used for positioning cranes, automated guided vehicle systems, rack serving units as well as for monitoring filling levels, loop control and detecting minute parts to µm tolerances

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DL60	1078
DS60	1080
DS500	1088
DT500	1094
DT200	1100
DME2000	1102
DME3000	1104
DME5000	1108
DMT10-2	1114
DML40-2	1118

Theory of Operation...Distance Sensors



Fig. 1 Color sensor sorting colored products

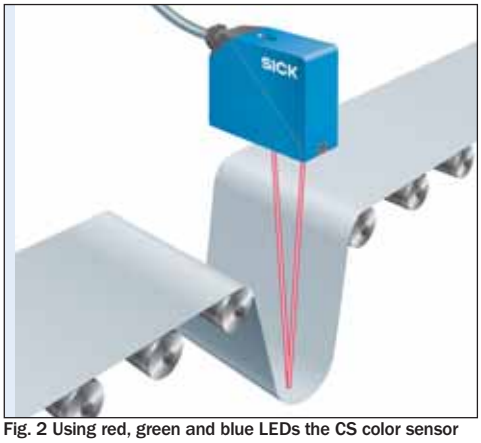
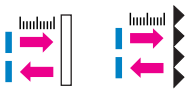


Fig. 2 Using red, green and blue LEDs the CS color sensor can detect even very subtle changes in color


Fig. 4 DME sensor detects drill holes as part of the inspection/quality control process in automotive assembly



About Distance Sensors

There are two types of distance measurement sensors. The first type uses time-of-flight measurement of laser light to determine the distance. In proximity mode, these devices can detect minute objects with lomg distances, even in front of a shiny background. When long measuring ranges are involved, the sensor measures the distance to a reflector. In this way, distances of up to 1.2 km can be reliably determined.

The second type uses laser light, red light or infrared light in conjunction with the triangulation measurement method. This user-friendly teach-in function is used to adjust and calibrate the sensors. These sensors, which can function as both sensors and measuring devices, can detect minute objects, indentations or unevenness.

Selection Table...Distance Sensors

Distance sensors

Sensor Type	Sensing Range	Resolution	Accuracy	Repeatability	Output	Light Source			Page
						Red	Laser	IR	
DT 2	50...300 mm	1 mm	± 8%	3%	Analog			■	1064
DT 10	50...500 mm	1.5 mm	± 3 mm	3 mm	PNP/NPN/Analog	■			1066
DT 20	90...1000 mm	1 mm	± 4 mm	± 1.5 mm	PNP/NPN/Analog			■	1068
DT 20 Hi	50...600 mm	0.1 mm	± 0.5 mm	± 0.2 mm	PNP/NPN/Analog	■			1070
DS 30	100...2000 mm				PNP/NPN			■	1072
DT 60	200...5300 mm	1.5 mm	± 10 mm	± 8 mm	PNP/NPN/Analog	■	■		1076
DL 60	0.3...24 m	1.5 mm	± 15mm	± 7 mm	PNP/NPN/Analog	■	■		1080
DS 60 Prox.	80...6000 mm				PNP/NPN x2	■	■	■	1078
DS 60 Reflex	0.2...20 m				PNP/NPN x2		■	■	1082
DS 500	0.2...70 m				PNP/NPN x2	■	■		1088
DT 500	0.2...70 m	0.1 mm	± 3mm	1 mm	Analog/CANOpen	■	■		1094
DT 200	100...2000 mm	0.125 mm	± 5 mm	1 mm	Analog	■	■		1100
DME 2000									1102
Proximity mode	100...2000 mm	1 mm	± 5 mm	1 mm	PNP/Analog/RS 232	■	■		1102
Reflex mode	0.1...130 m	1 mm	+5/-20 mm	2 mm	PNP/Analog/RS 232	■	■		1102
DME 3000 Reflex	0.1...500 m	0.125/1 mm	5 mm	0.5 mm max.	PNP/NPN/RS 422/SSI/PROFIBUS	■	■		1104
DME 3000 Prox.	100...8000 mm	0.125/1 mm	± 5 mm	0.5 mm	PNP/NPN/RS 422/SSI/PROFIBUS	■	■		1106
DME 5000	0.15...300 m	0.05 mm	± 2 mm	0.5 mm	PNP/NPN/RS 422/SSI/PROFIBUS/Dnet/Hiperface	■	■		1108
DMT 10-2	0.5...155 m	1 mm	± 10 mm	7 mm	Open collector/Analog/RS422-232/PROFIBUS		■	■	1114
DML 40-2	0.5...1200 m	1 mm	± 10 mm	6 mm	Open collector/RS 232, 422/Analog/PROFIBUS		■	■	1118

DT 2

Distance Sensors



2...11.8 in (50...300 mm)
sensing range

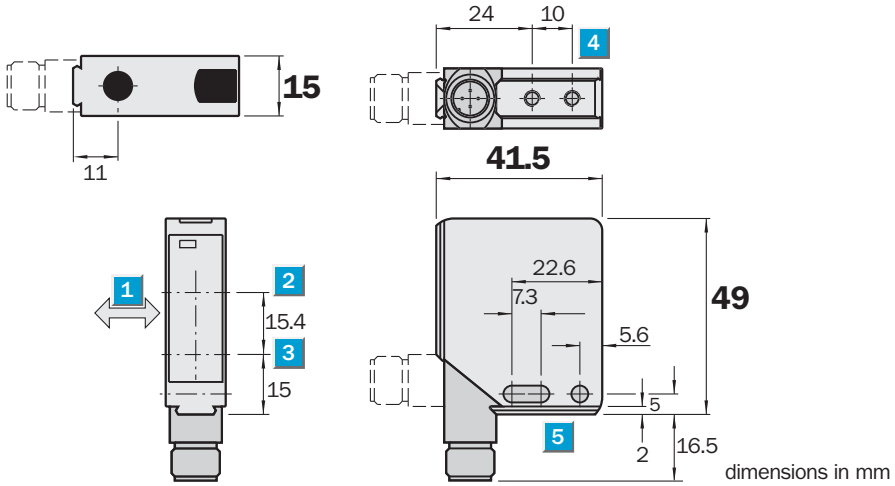
Highlights

- Rugged die cast metal housing
- Analog output
- 1 mm resolution
- M12 cable connections swivel 90° for easy installation

DT 2



Dimensional drawing



1	Standard direction of object being scanned
2	Center of optical axis, receiver
3	Center of optical axis, sender
4	M4 threaded mounting hole, 4 mm deep
5	Through borehole Ø 4.2 mm

Measurement range, repeatability, accuracy

Sensing range[1)]
90% remission 2...11.8 in (50...300 mm)
6% remission 2...9.8 in (50...250 mm)
Accuracy
Object with 90% remission ±8% to current value
Repeatability
Object with 90% remission 3% to 7.9 in (200 mm)
5% to 11.8 in (300 mm)
Resolution
0.04 in (1 mm)

Order information

Type	Part no.
DT 2-410	1 024 093

Accessories

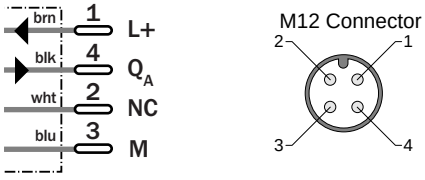
	page
Cables and connectors	1180
Mounting systems	1234

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Technical data	DT 2-	410
Sensing range[1]	90% remission 2...11.8 in (50...300 mm)	
	6% remission 2...9.8 in (50...250 mm)	
Accuracy		
Object with 90% remission	±8% to current value	
Repeatability		
Object with 90% remission	3% to 7.9 in (200 mm)	
	5% to 11.8 in (300 mm)	
Light source[2], **light type**	Infrared, 880 nm	
Light spot diameter	3.1 in at 11.8 in (80 mm at 300 mm)	
Supply voltage V_S	18...30 V DC[3]	
Ripple[4]	$< 5\ V_{PP}$	
Current consumption[5]	≤ 100 mA	
Analog output	0...20 mA	
Response time	200 ms	
Resolution	0.04 in (1 mm)	
Connection type	Plug, M12 4-pin	
VDE protection class[6]	⏀	
Enclosure rating	IP 67	
Ambient temperature T_A	Operation 14...113° F (-10...45° C)	
	Storage -13...167° F (-25...75° C)	

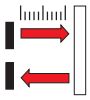
1) Falling below the measurement range results in ambiguous values
Exceeding the measurement range results in values = 20.3 mA
2) Average service life 50,000 h at T_A = 77° F (25° C)
3) Limit values, reverse polarity protected
4) May not exceed or fall short of Vs tolerances
5) Without load
6) Reference voltage 50 V DC

Connection diagram



DT 10

Distance Sensor



2.0…19.7 in (50…500 mm)
sensing range

CE

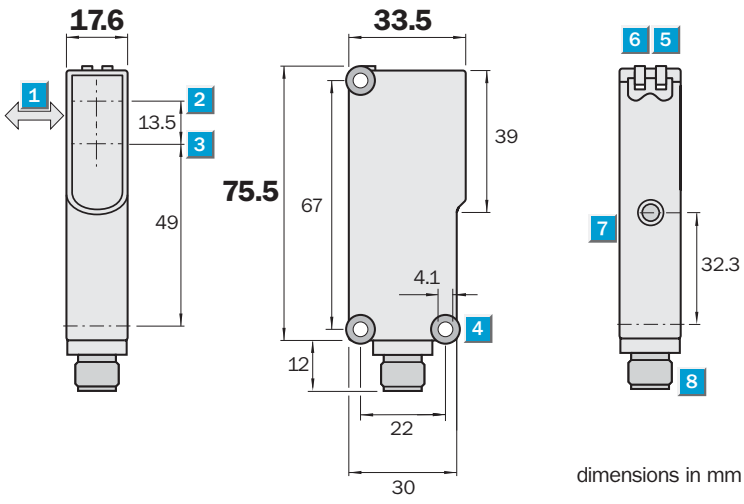
Highlights

- Analog output 4…20 mA
- High accuracy
- Visible red light
- Power-On LED
- Ambient light immunity
- Simple Plug and Play configuration

DT 10



Dimensional drawing



dimensions in mm

Adjustments

All types

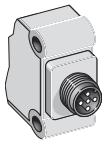


1 Standard direction of the material being detected
2 Optical axis, sender
3 Optical axis, receiver
4 Mounting hole Ø4.1 mm
5 LED indicator, yellow; switching output status active
6 LED indicator, green; power on
7 Teach button
8 M12 plug, 5-pin

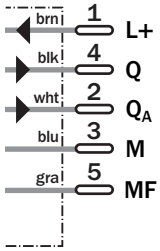
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Connection diagrams

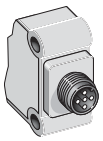
DT10-P10B5
DT10-N10B5



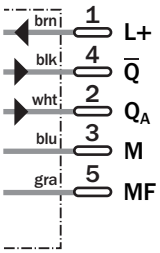
5-pin, M12



DT10-P10D5
DT10-N10D5



5-pin, M12

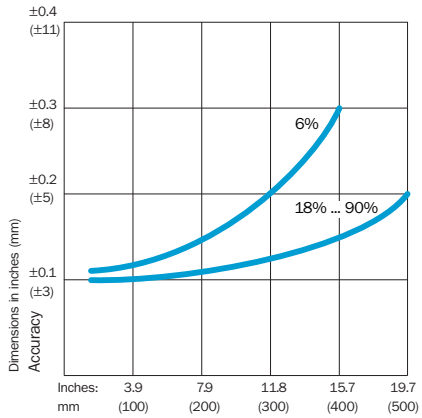


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Technical data	DT 10-	P10B5	P10D5	N10B5	N10D5
Measuring range					
Object with 6% remission	2.0…15.8 in (50…400 mm)				
Object with 18…90% remission	2.0…19.7 in (50…500 mm)				
Light source[1]	LED, red light				
Light spot diameter	0.8 in @ 15.8 in (20 mm at 400 mm)				
Supply voltage V_S[2]	10...30 V DC				
Current consumption[3]	<1.2 W				
Residual ripple[4]	≤5 V_{PP}				
Analog output[5]	4…20 mA				
Accuracy[6]	±0.1...0.3 in (±3…8 mm)				
Repeatability[7]	0.1 in (3 mm)				
Resolution	< 0.06 in (<1.5 mm)				
Response time[8]	20 ms				
Output rate[9]	1 ms				
Temperature drift	0.04 in/k (1.0 mm/k)				
Switching outputs	Q				
	$\overline{Q}$				
DT 10-P: PNP	HIGH = V_S – (<1 V)/LOW ≤ 1 V				
DT 10-N: NPN	HIGH = V_S – (<1 V)/LOW ≤ 1 V				
Multifunction MF	External teach				
Output current I_A[10]	100 mA				
Connection type	M12 plug, 5-pin				
VDE protection class[11]	□				
Enclosure rating	IP 67				
Ambient temperature T_A	Operation -13...122° F (-25...50° C)				
	Storage -40...167° F (-40...75° C)				
Warm-up time	30 min				
Initialization period	650 ms				
Weight	Approx. 1.4 oz (40 g)				

1) Average service life 100,000 h at T_A = 77° F (25° C)
2) Limit values, reverse polarity protected operation in short-circuit protected network max. 8 A
3) Without load
4) May not exceed or fall short of V_S tolerances
5) R_L <200 Ω, V_P ≥10 V
   R_L <500 Ω, V_P ≥16 V
6) At room temperature
7) Same ambient conditions
8) Lateral introduction of object into the measurement range
9) Object in measurement range
10) Output Q short-circuit protected
11) Reference voltage 50 V DC

Scanning distance

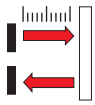


Order Information

Type	Part no.
DT10-P10B5	1 027 325
DT10-P10D5	1 027 326
DT10-N10B5	1 027 327
DT10-N10D5	1 027 328

DT20

DT20 Distance Sensor



3.5…23.6 in (90…600 mm)
3.9…39.4 in (100…1000 mm)
sensing range

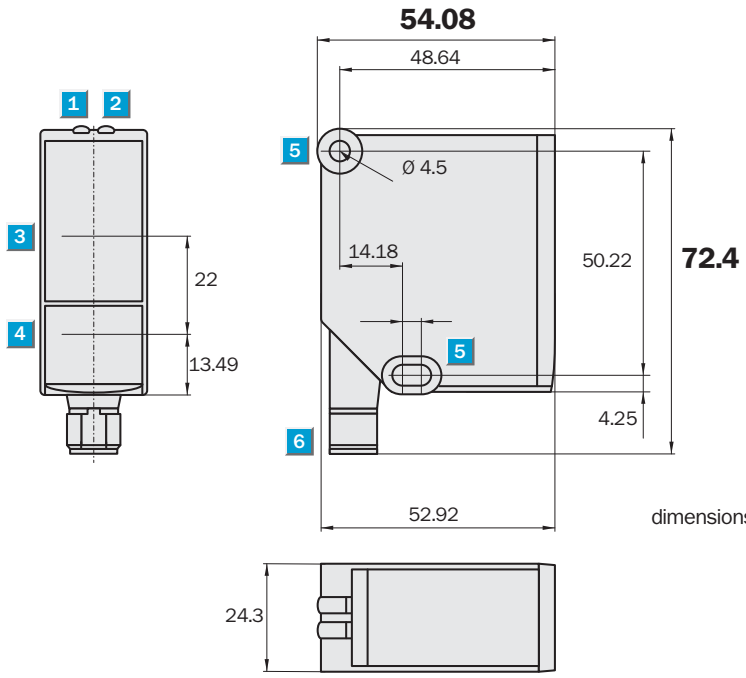
Highlights

- Analog output 4…20 mA
- High accuracy
- Power-On LED
- Ambient light immunity
- Simple Plug and Play configuration
- Robust metal housing
- Infrared light for inconspicuous detection
- Swivel M12 connection for flexible installation

DT20



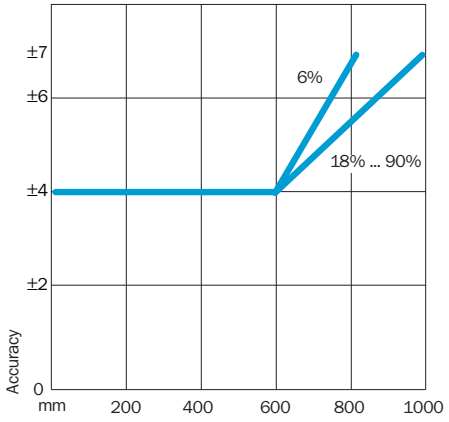
Dimensional drawing



dimensions in mm

1 LED indicator, green; Power on
2 LED indicator, yellow; switching output status active
3 Optical axis, receiver
4 Optical axis, sender
5 Mounting holes Ø4.5
6 Plug, M12, 5-pin, swivel

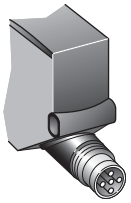
Accuracy



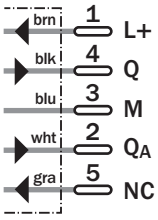
Measurement range

Connection type

DT20



5-pin, M12



Accessories	page
Cables and connectors	1180
Mounting systems	1234

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Technical data	DT20 -									
Sensing range										
Object with 6% remission	3.5...23.6 in (90…600 mm)	■								
	3.9...35.0 in (100…820 mm)		■							
Object with 18% remission	3.5...23.6 in (90…600 mm)	■								
	3.9...39.4 in (100…1000 mm)		■							
Object with 90% remission	3.5...23.6 in (90…600 mm)	■								
	3.9...39.4 in (100…1000 mm)		■							
Light source[1]	LED, infrared light	■								
Light spot diameter	3.4 in @ 39.4 ft (35 mm @ 1 m)	■								
Supply voltage V_S[2]	10…30 V DC	■								
Current consumption[3]	1.5 W	■								
Residual ripple[4]	≤5 V_{PP}	■								
Analog output	4…20 mA	■								
Repeatability	±0.06 in (±1.5 mm)	■								
	0.12 in (±3 mm)		■							
Resolution	0.04 in (1 mm)	■								
	0.08 in (2 mm)		■							
Response time	10 ms	■								
	15 ms		■							
Output rate	1 ms	■								
Temperature drift	0.01 in/k (0.25 mm/k)	■								
Switching outputs	PNP or NPN, Q by model	■								
Signal voltage PNP	HIGH = V_S - (< 2 V)/LOW = 0 V	■								
Signal voltage NPN	HIGH = V_S /LOW ≤ 2 V	■								
Connection type	M12 plug, 5-pin, swivel	■								
VDE protection class	□	■								
Enclosure rating	IP 66/IP67	■								
Ambient temperature	Operation: -13...131° F (-25…55° C)	■								
	Storage: -40...167° F (-40…75° C)	■								
Weight	4.8 oz (135 g)	■								
Housing material	Metal	■								

1) Average service life 100.000 h at T_A = 75° F (25° C)
2) Limit values, reverse polarity protected
3) Without load
4) May not exceed or fall short of V_S tolerances

Plug & Play: measurement range freely selectable, measurement range bb to ee 4…20 mA	
DT20-P/N130Bbbee	
bb: min. measurement range[6]	ee: max. measurement range[6]
09[7]	00[7]

6) Minimum range between bb and ee must be 10 units (05 = 5 cm; 10 = 10 cm)
7) 09 = 9 cm; 00 = 100 cm

1st example: measurement range 100…1000 mm	
DT20-P130B1000	
4 mA = 10 cm	20 mA = 100 cm

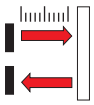
2nd example: measurement range 600…90 mm	
DT20-P130B6009	
4 mA = 60 cm	20 mA = 9 cm

Order information

Type	Part no.	Measurement range
DT20-P130B0960	1029273	90…600 mm
DT20-P130B1000	1028800	100…1000 mm
DT20-P130B1050	1027831	100…500 mm
DT20-P130B1080	1028720	100…800 mm
DT20-P130B2535	1028721	250…350 mm
DT20-P130B2545	1028724	250…450 mm
DT20-P130B2560	1028723	250…600 mm
DT20-P130B4000	1028722	400…1000 mm
DT20-N130B0960	1029274	90…600 mm
DT20-N130B1000	1029275	100…1000 mm

DT20 Hi

DT20 Hi Distance Sensor



2.0…6.0 in (50…150 mm)
4.0…11.8 in (100…300 mm)
4.0…23.6 in (100…600 mm)

sensing range

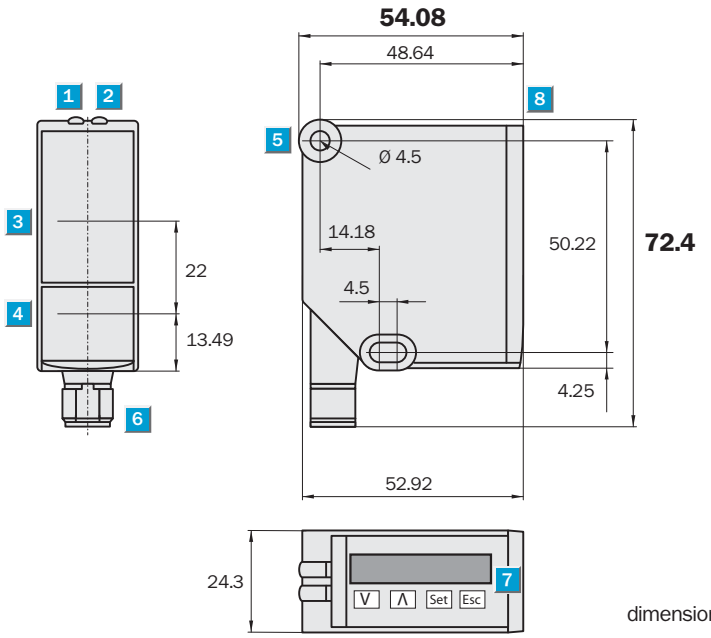
Highlights

- Analog output 4…20 mA
- High precision regardless of target reflectivity
- Fast and easy setup
- LCD display

DT20 Hi



Dimensional drawing



dimensions in mm

1 Power LED
2 Output indicator LED
3 Optical axis, receiver
4 Optical axis, sender
5 Mounting hole
6 Plug M12, 5-pin
7 Display and operating panel
8 Reference Edge

Order information

Type	Part no.
DT20-P214B	1040012
DT20-N214B	1040140
DT20-P244B	1040406
DT20-N244B	1040713
DT20-P254B	1041278
DT20-N254B	1041279

Accessories	page
Cables and connectors	1180
Mounting systems	1234

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Technical data	DT20 Hi	P214B	P244B	P254B	N214B	N244B	N254B
Sensing range							
Object with 6%…90% remission	4.0…23.6 in (100…600 mm)	■			■		
Object with 6%…90% remission	4.0…11.8 in (100…300 mm)		■			■	
Object with 6%…90% remission	2.0…6.0 in (50…150 mm)			■			■
Light source[1]	Laser Class 2	■	■	■	■	■	■
Light type	Red light	■	■	■	■	■	■
Light spot diameter	0.1 in at 4.0...4.0 in (3 mm at 100...600 mm)	■	■	■	■	■	■
Supply voltage V_S[2]	10…30 V DC	■	■	■	■	■	■
Current consumption[3]	1.8 W	■	■	■	■	■	■
Residual ripple[4]	≤ 5 V_{ss}	■	■	■	■	■	■
Analog output[5]	4…20 mA	■	■	■	■	■	■
Accuracy[6]	± 0.08 in (± 2 mm)	■			■		
	± 0.04 in (± 1 mm)		■			■	
	± 0.02 in (± 0.5 mm)			■			■
Repeatability[7]	± 0.04 in (± 1 mm)	■			■		
	± 0.02 in (± 0.5 mm)		■			■	
	± 0.008 (± 0.2 mm)			■			■
Resolution	< 0.02 in (< 0.5 mm)	■			■		
	< 0.008 in (< 0.2 mm)		■			■	
	< 0.004 in (< 0.1 mm)			■			■
Response time[8]	< 15 ms	■	■	■	■	■	■
Output rate	< 2.8 ms	■	■	■	■	■	■
Temperature drift	0.01 in/k (0.25 mm/k)	■	■	■	■	■	■
Switching outputs	PNP, Q/$\overline{Q}$	■	■	■			
	NPN, Q/$\overline{Q}$				■	■	■
Signal voltage PNP	HIGH = V_S - (< 2 V)/LOW = 0 V	■	■	■	■	■	■
Signal voltage NPN	HIGH = V_S /LOW = ≤ 2 V	■	■	■	■	■	■
Connection type	M12 plug, 5-pin	■	■	■	■	■	■
VDE protection class	⧈	■	■	■	■	■	■
Enclosure rating	IP 65	■	■	■	■	■	■
Ambient temperature[9]	Operation: -4…131° F (-20…55° C)	■	■	■	■	■	■
	Storage: -40…140° F (-40…60° C)	■	■	■	■	■	■
Weight	4.8 oz (135 g)	■	■	■	■	■	■
Housing material	Metal	■	■	■	■	■	■

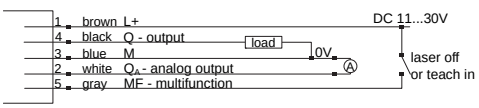
1) Average service life 50,000 h at T_A = 78° F (25° C)
2) Limit values, reverse polarity protected
Operation in short-circuit protected network max. 8 A
3) Without load
4) May not exceed or fall short of V_S tolerances
5) Freely scalable
6) At 6...90% remission
7) Setting: Avg = medium
8) Lateral entry of object into measurement range
9) At 24 V
10) Continuous change of distance in measurement area

Repeatability and response time dependent on set mode (adjustable on display)

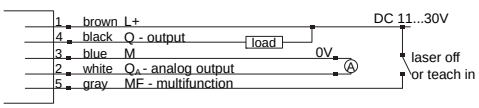
Mode	Response time[10]	Repeatability		
		600 mm	300 mm	150 mm
Fast	2.5 ms	±2 mm	±1 mm	±0.5 mm
Medium	10 ms	±1 mm	±0.5 mm	±0.25 mm
Slow	40 ms	±0.5 mm	±0.25 mm	±0.13 mm

Connection diagram

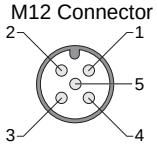
PNP Models



NPN Models



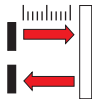
M12 Connector



wire colors refer to standard cable, not included

DS30

DS30 Distance Sensor





3.9...78.7 in (100...2000 mm)
sensing range

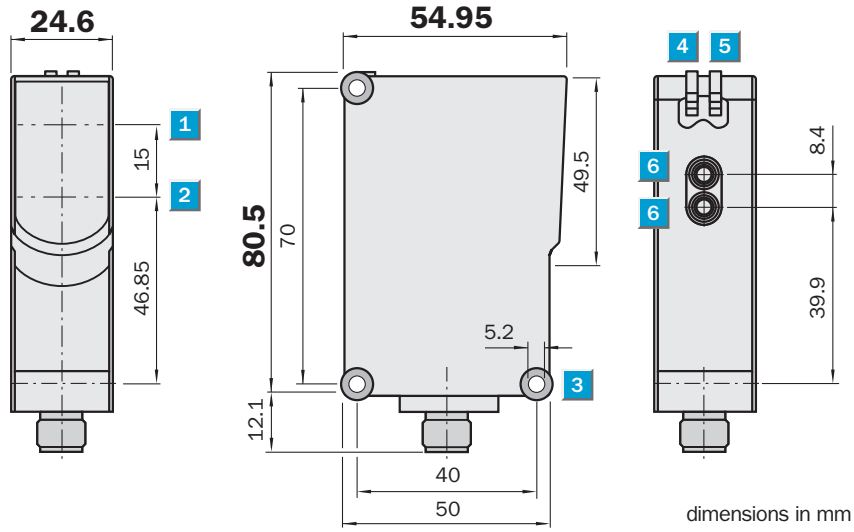
Highlights

- Full range on black, white, gloss or matte
- Background suppression up to 328 ft (100 m)
- Precise switch point independent of target reflectivity
- Power on LED Ambient Light Immune

DS30

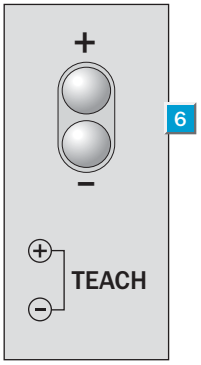


Dimensional drawing



dimensions in mm

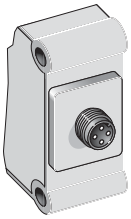
Adjustments possible

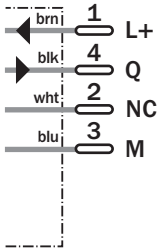


1 Optical axis, sender
2 Optical axis, receiver
3 Through hole Ø 5.2 mm
4 Indicator LED yellow: operating voltage active
5 Indicator LED green: switching status display
6 Setting for scanning distance; double teach button

Connection type

M12, 4-pin





Order information

Type	Part no.
DS30-P1241	1 040 034
DS30-N1241	1 042 181

Accessories	page
Cables and connectors	1180
Mounting systems	1234

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Technical data	DS30-	P1241	N1241							
Sensing range, adjustable[1]	3.9…78.7 in (100 mm…2000 mm)									
Light source[2]	Laser diode, infrared light - 850 mm									
Light spot diameter at 78.7 ft (2 m)	Ø 0.8 in (Ø 20 mm)									
Laser class	1 (EN 60 825-1)									
Supply voltage V_S[3]	10…30 V DC									
Ripple[5]	≤5 V_{PP}									
Current consumption[4]	< 1.7 W									
Teach Resolution	0.4 in (10 mm)									
Switching output	PNP: HIGH = V_S - (< 2 V)/LOW = 0V									
	NPN: HIGH = V_S/LOW = < 2 V									
Output current I_A[6]	100 mA									
Switching frequency	50/s									
Switching threshold	Adjustable via double teach button									
Connection type	M12 plug, 4-pin									
VDE protection class[7]	□									
Enclosure rating	IP 65									
Ambient temperature	Operation: -40…131° F (-40…55° C)									
	Storage: -40…167° F (-40…75° C)									
Weight	4.2 oz (120 g)									

1) Remission 6%...90%
2) Average service life 100,000 h, at T_A = +25° C, laser Category 1 (EN 60825-1: Nov. 2001; IEC 60825-1:AM2:2001)
3) Limit values, reverse polarity protected
4) Without load, 24 V and ambient temperature 25° C
5) Must be within Vs tolerances
6) Outputs Q short-circuit protected
7) Reference voltages 50 V DC

DT 60 Long

Distance Sensors-Long Range



7.9...208.7 in (200...5300 mm)
sensing range

Analog

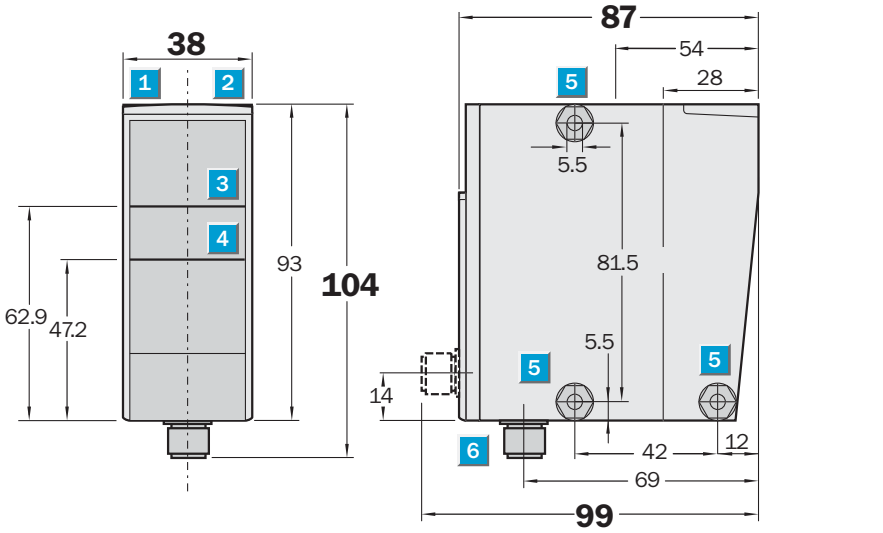
Highlights

- Analog output 4…20 mA for precise, continuous measurements
- User-scalable teach-in and factory preset Plug & Play versions available for maximum flexibility and quick installation
- Visible red laser for easy alignment

DT 60



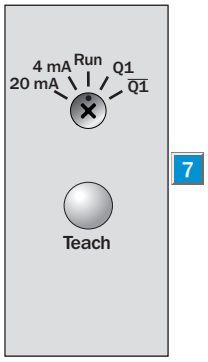
Dimensional drawing



dimensions in mm

Adjustments

DT 60-P111B
DT 60-N111B



1 Power
2 Function indicator
3 Optical axis, sender
4 Optical axis, receiver
5 Mounting hole
6 Plug, M12 5-pin
7 Operating panel, Teach-in version

Order information

Type	Part no.
DT 60-P111B	1 025 843
DT 60-N111B	1 025 844
DT 60-P111B0520	1 025 847
DT 60-P111B0253	1 026 063
DT 60-N111B0253	1 026 160
DT 60-P111Bbbee*)	X XXX XXX

*) Measuring range freely selectable

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256
Special accessories	1314

Technical data	DT60	P111B	N111B	P111B bbee	N111B bbee					
Sensing range										
Teach-in; user-scalable measurement range		■	■							
Plug & Play; factory preset measurement range				■	■					
Measuring range		■	■	■	■					
Object with 90% remission	7.9...208.7 in (200...5300 mm)	■	■	■	■					
Object with 18% remission	7.9...196.9 in (200...5000 mm)	■	■	■	■					
Object with 6% remission	7.9...110.2 in (200...2800 mm)	■	■	■	■					
Object with 3% remission	7.9...78.7 in (200...2000 mm)	■	■	■	■					
Light source[1]	Laser diode, red light	■	■	■	■					
Light spot at 78.7 in (2 m) distance	0.4 in (10 mm)	■	■	■	■					
Supply voltage V_S[2]	11…30 V DC	■	■	■	■					
Power consumption[3]	< 3 W	■	■	■	■					
Ripple[4]	≤ 5 V_{PP}	■	■	■	■					
Analog output (invertible)	4...20 mA	■	■	■	■					
Accuracy[5]	± 0.39 in (10 mm)	■	■	■	■					
Repeatability	± 0.31 in (8 mm) typ.	■	■	■	■					
Resolution	0.06 in (1.5 mm), 12 Bit	■	■	■	■					
Response time	50...250 ms[6]	■	■	■	■					
Output rate	< 15 ms	■	■	■	■					
Temperature drift	0.016 in (0.4 mm)/K typ.	■	■	■	■					
Switching outputs (invertible)	Q	■	■							
	$\overline{Q}$	■	■							
DT 60-P: PNP	HIGH = V_S – (< 2 V); LOW = 0 V	■		■						
DT 60-N: NPN	HIGH = V_S; LOW ≤ 2 V		■		■					
Output current I_A	100 mA	■	■	■	■					
Multi-function MF	Laser off V_S	■	■	■	■					
Connection type	Plug, M12 5-pin	■	■	■	■					
VDE protection class[7]	□	■	■	■	■					
Circuit protection	A, B[8]	■	■	■	■					
Laser protection class	2 (EN 60 825-1)	■	■	■	■					
Enclosure rating	IP 67	■	■	■	■					
Ambient temperature	Operation -13...131° F (-25...55° C)	■	■	■	■					
	Storage -13...167° F (-25...75° C)	■	■	■	■					
Approximate weight	7.2 oz (202 g)	■	■	■	■					

1) Average service life 50,000 h at T_A = 77° F (25° C)
2) Limit values
3) Without load
4) May not exceed or fall short of V_S tolerances
5) After 30 minutes warm-up
6) Adaptive, depending on degree of reflectance
7) Reference voltage 50 V DC
8) A = V_S connection reverse-polarity protected
B = Output Q short-circuit protected

Plug & Play version: non-adjustable, factory preset, measuring range bb…ee = 4…20 mA

DT 60-P/N111Bbbee

bb: min. measuring distance[9]	ee: max. measuring distance[9]
02[10]	53[11]

NOTE: Minimum distance between bb and ee must be 03 units (03 = 300 mm)
9) bb is distance that outputs 4 mA; ee is distance that outputs 20 mA
10) 02 = 200 mm; 53 = 5300 mm
11) 90% remission

1st example: measuring range 1200…3400 mm

DT 60-P/N111B1234

4 mA = 1200 mm	20 mA = 3400 mm

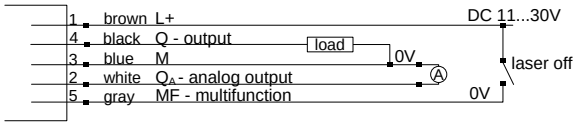
2nd example: measuring range 4200…3800 mm (inverted characteristic curve)

DT 60-P/N111B4238

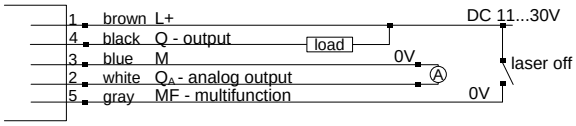
4 mA = 4200 mm	20 mA = 3800 mm

Connection diagram

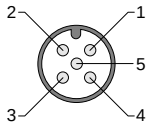
PNP Models



NPN Models



M12 Connector



wire colors refer to standard cable, not included

DT 60 Fast

Distance Sensors-Fast



7.9...208.7 in (200...5300 mm)
sensing range

Analog

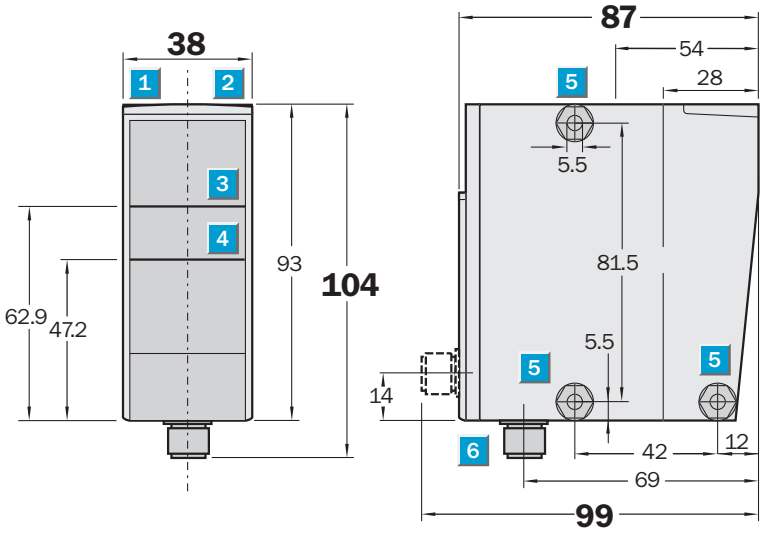
Highlights

- Analog output 4…20 mA for precise, continuous measurements
- User-scalable teach-in and factory preset Plug & Play versions available for maximum flexibility and quick installation
- Visible red laser for easy alignment

DT 60

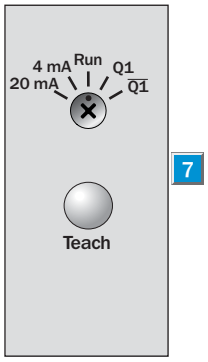


Dimensional drawing



dimensions in mm

Adjustments
DT 60-P211B
DT 60-N211B



1 Power
2 Function indicator
3 Optical axis, sender
4 Optical axis, receiver
5 Mounting hole
6 Plug, M12 5-pin
7 Operating panel, teach-in version

Order information	
Type	**Part no.**
DT 60-P211B	1 025 845
DT 60-N211B	1 025 846
DT 60-P211B0520	1 026 444
DT 60-P211B0253	1 026 445
DT 60-N211B0253	1 026 446
DT 60-P211Bbbee*)	X XXX XXX
DT 60-N211Bbbee*)	X XXX XXX

*) Measuring range freely selectable

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

Technical data	DT 60-	P211B	N211B	P211B bbee	N211B bbee					
Sensing range										
Teach-in; user-scalable measurement range		■	■							
Plug & Play; factory preset measurement range				■	■					
Measuring range[1]	**"Fast" range** / **Standard range**	■	■	■	■					
Object with 90% remission	7.9...196.9 in (200...5000 mm) / 208.7 in (...5300 mm)	■	■	■	■					
Object with 18% remission	7.9...94.5 in (200...2400 mm) / 141.7 in (...3600 mm)	■	■	■	■					
Object with 6% remission	7.9...55.1 in (200...1400 mm) / 78.7 in (...2000 mm)	■	■	■	■					
Object with 3% remission	7.9...39.4 in (200...1000 mm) / 55.1 in (...1400 mm)	■	■	■	■					
Light source[2]	Laser diode, red light	■	■	■	■					
Light spot at 78.7 in (2 m) distance	0.4 in (10 mm)	■	■	■	■					
Supply voltage V_S[3]	11...30 V DC	■	■	■	■					
Power consumption[4]	< 3 W	■	■	■	■					
Ripple[5]	≤ 5 V_{PP}	■	■	■	■					
Analog output (invertible)	4...20 mA	■	■	■	■					
Accuracy[6]	± 0.51 in (13 mm)	■	■	■	■					
Repeatability	± 0.39 in (10 mm)	■	■	■	■					
Resolution	0.06 in (1.5 mm), 12 Bit	■	■	■	■					
Response time[1]	30 ms within "fast" range / 50 ms	■	■	■	■					
Output rate[1]	1.2 ms within "fast" range / 3.6 ms	■	■	■	■					
Temperature drift	0.016 in (0.4 mm)/K typ.	■	■	■	■					
Switching outputs (invertible)	Q	■	■							
	$\overline{Q}$	■	■							
DT 60-P: PNP	HIGH = V_S – (< 2 V); LOW = 0 V	■		■						
DT 60-N: NPN	HIGH = V_S; LOW ≤ 2 V		■		■					
Output current I_A	100 mA	■	■	■	■					
Multi-function MF	Laser off V_S	■	■	■	■					
Connection type	Plug, M12 5-pin	■	■	■	■					
VDE protection class[7]	□	■	■	■	■					
Circuit protection	A, B[8]	■	■	■	■					
Laser protection class	2 (EN 60 825-1)	■	■	■	■					
Enclosure rating	IP 67	■	■	■	■					
Ambient temperature	Operation -13...131° F (-25...55° C)	■	■	■	■					
	Storage -13...167° F (-25...75° C)	■	■	■	■					
Approximate weight	7.2 oz (202 g)	■	■	■	■					

1) If the target is within the "fast" range, use "fast" specifications for response time and output rate
2) Average service life 50,000 h at T_A = 77° F (25° C)
3) Limit values, reverse-polarity protected
4) Without load
5) May not exceed or fall short of V_S tolerances
6) After 30 minute warm-up
7) Reference voltage 50 V DC
8) A = V_S connection reverse-polarity protected
B = Output Q short-circuit protected

Plug & Play version: non-adjustable, factory preset, measuring range bb...ee = 4...20 mA

DT 60-P/N111Bbbee

bb: min. measuring distance[9]	ee: max. measuring distance[9]
02[10]	53[11]

NOTE: Minimum distance between bb and ee must be 03 units (03 = 300 mm)
9) bb is distance that outputs 4 mA; ee is distance that outputs 20 mA
10) 02 = 200 mm; 53 = 5300 mm
11) 90% remission

1st example: measuring range 1200...3400 mm

DT 60-P/N111B1234

4 mA = 1200 mm	20 mA = 3400 mm

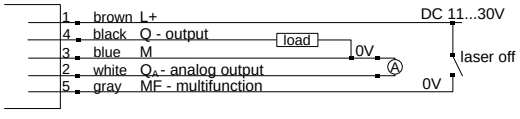
2nd example: measuring range 4200...3800 mm (inverted characteristic curve)

DT 60-P/N111B4238

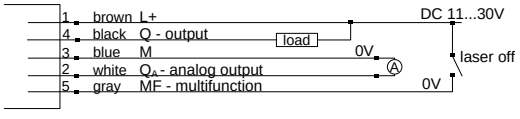
4 mA = 4200 mm	20 mA = 3800 mm

Connection diagram

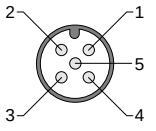
PNP Models



NPN Models



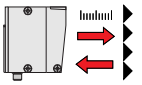
M12 Connector



wire colors refer to standard cable, not included

DL 60

Distance Sensors







11.8 in...78.7 ft (300 mm...24 m)
sensing range

Analog

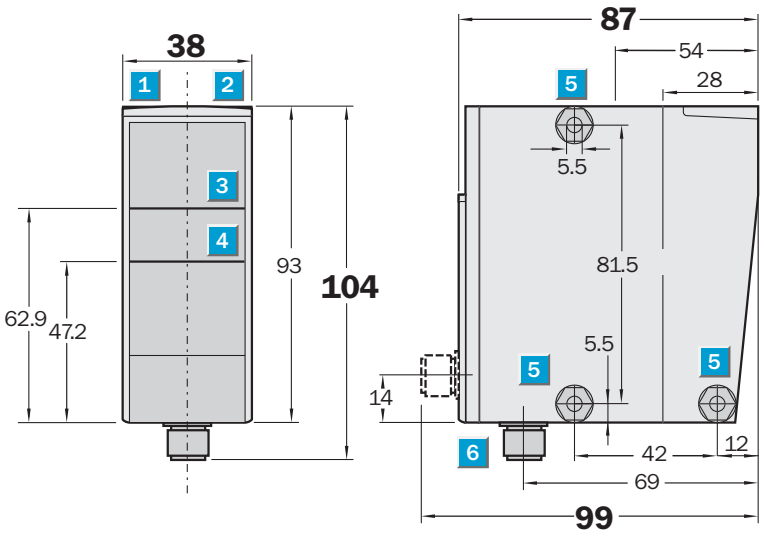
Highlights

- Analog output 4…20 mA for precise, continuous measurements
- User-scalable teach-in and factory preset Plug & Play versions available for maximum flexibility and quick installation
- Visible red laser for easy alignment

DL 60



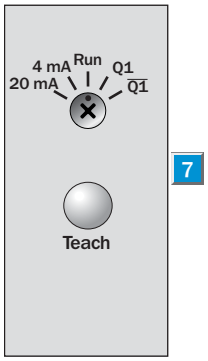
Dimensional drawing



dimensions in mm

Adjustments

DL 60-P111B
DL 60-N111B



1 Power
2 Function indicator
3 Optical axis, sender
4 Optical axis, receiver
5 Mounting hole
6 Plug, M12 5-pin
7 Operating panel, Teach-in version

Order information

Type	Part no.
DL 60-P111B	1 025 848
DL 60-N111B	1 026 360
DL 60-P111B0024	1 026 361
DL 60-P111B0210	1 026 362
DL 60-N111B0024	1 026 363
DL 60-P111Bbbee*)	X XXX XXX
DL 60-N111Bbbee*)	X XXX XXX

*) Measuring range freely selectable

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256
Special accessories	1314

Technical data		P111B	N111B	P111B bbee	N111B bbee					
Sensing range										
Teach-in; user-scalable measurement range		■	■							
Plug & Play; factory preset measurement range				■	■					
Reflective Tape: REF-5870	11.8...944.9 in (300...24,000 mm)	■	■	■	■					
Light source[1]	Laser diode, red light	■	■	■	■					
Light spot at 78.7 (2 m) distance	0.79 in (20 mm)	■	■	■	■					
Supply voltage V_S[2]	11...30 V DC	■	■	■	■					
Ripple[3]	≤ 5 V_{PP}	■	■	■	■					
Power consumption[4]	< 3 W	■	■	■	■					
Analog output (invertible)	4...20 mA	■	■	■	■					
Accuracy[5]	± 0.59 in (15 mm)	■	■	■	■					
Repeatability	± 0.28 in (7 mm)	■	■	■	■					
Resolution	12 Bit[6]	■	■	■	■					
Response time	130 ms	■	■	■	■					
Output rate	< 8 ms	■	■	■	■					
Temperature drift	0.016 in (0.4 mm)/K typ.	■	■	■	■					
Switching outputs (invertible)	Q	■	■							
	$\overline{Q}$	■	■							
DL 60-P: PNP	HIGH = V_S – (< 2 V); LOW = 0 V	■		■						
DL 60-N: NPN	HIGH = V_S; LOW ≤ 2 V		■		■					
Output current I_A	100 mA	■	■	■	■					
Multi-function MF	Laser off V_S	■	■	■	■					
Initialization time	550 ms	■	■	■	■					
Connection type	Plug, M12 5-pin	■	■	■	■					
VDE protection class[7]	□	■	■	■	■					
Circuit protection	A, B[8]	■	■	■	■					
Laser protection class	2 (EN 60 825-1)	■	■	■	■					
Enclosure rating	IP 67	■	■	■	■					
Ambient temperature	Operation -13...131° F (-25...55° C)	■	■	■	■					
	Storage -13...167° F (-25...75° C)	■	■	■	■					
Approximate weight	7.2 oz (202 g)	■	■	■	■					

1) Average service life 50,000 h at T_A = 77° F (25° C)
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) After 30 minute warm-up
6) 0.28 in (7 mm) at 78.7 ft (24 m)
7) Reference voltage 50 V DC
8) A = V_S connection reverse-polarity protected
B = Output Q short-circuit protected

Plug & Play version: non-adjustable, factory preset, measuring range bb...ee = 4...20 mA	
DL 60-P/N111Bbbee	
bb: min. measuring distance[10]	ee: max. measuring distance[10]
00[11]	24[11]

NOTE: Minimum distance between bb and ee must be 01 unit (01=1 m)

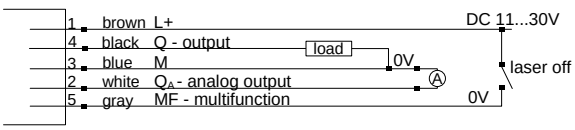
10) bb is distance that outputs 4 mA; ee is distance that outputs 20 mA
11) 00 = 300 mm; 24 = 24 m

1st example: measuring range 300 mm...24 m	
DL 60-P/N111B0024	
4 mA = 300 mm	20 mA = 24 m

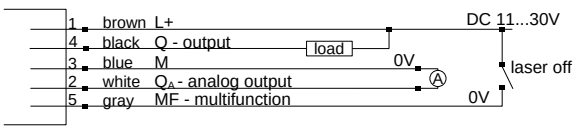
2nd example: measuring range 2 m...10 m	
DL 60-P/N111B0210	
4 mA = 2 m	20 mA W 10 m

Connection diagram

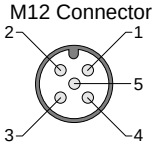
PNP Models



NPN Models



M12 Connector



wire colors refer to standard cable, not included

DS 60 BGS

Proximity/Diffuse Sensors - Background Suppression



3.1...177.2 in (200...6000 mm)

sensing range

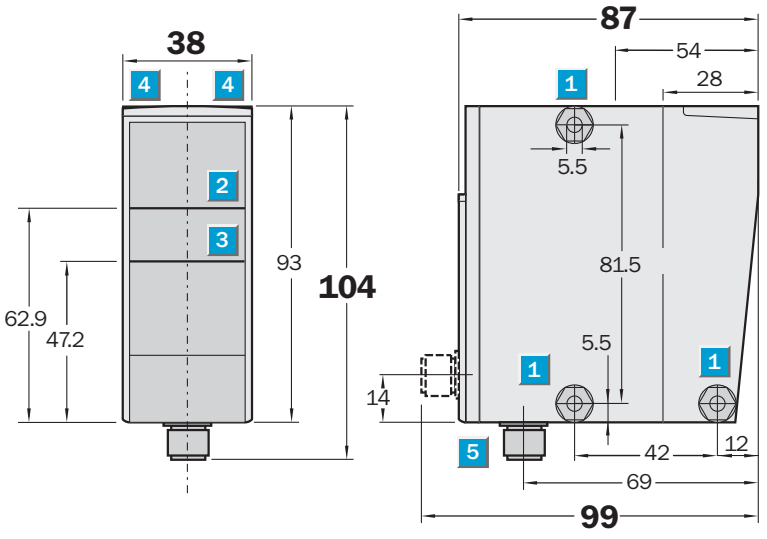
Highlights

- Rugged plastic housing
- Background suppression up to 328 ft (100 m) against shiny objects
- Works with objects from dull black to very shiny
- Two-function LED
- Red light alignment aid for easy setup
- Outputs set with one touch of a button
- Class 2 laser with time-of-flight technology for distance sensing

DS 60

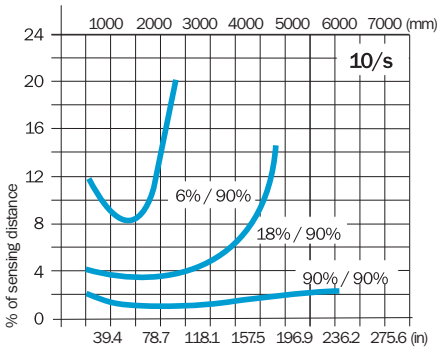


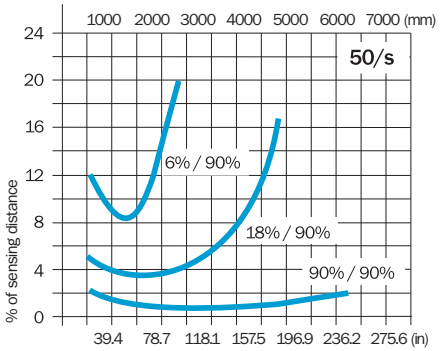
Dimensional drawing



dimensions in mm

Background suppression





Adjustments

All types



1 Mounting holes Ø 5.2 mm
2 Center of optical axis – sender
3 Center of optical axis – receiver
4 Function indicator
5 Plug, M12 5-pin
6 Control panel

Order information

Type	Part no.
DS 60-P21211	1 016 396
DS 60-N21211	1 016 491
DS 60-P41211	1 016 691
DS 60-N41211	1 016 692

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314



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Sebastian - Kneipp - Str. 1
D-79183 Waldkirch
March 1997 / 2304



Technical data	DS 60-	P 21211	N 21211	P 41211	N 41211
Sensing range, adjustable	7.9...236.2 in (200...6000 mm)	■	■	■	■
Object with 3% remission	3.1...55.1 in (80...1400 mm)	■	■		
	3.1...62.9 in (80...1600 mm)			■	■
Object with 6% remission	3.1...94.5 in (80...2400 mm)	■	■		
	3.1...102.4 in (80...2600 mm)			■	■
Object with 18% remission	3.1...181.1 in (80...4600 mm)	■	■		
	3.1...196.9 in (80...5000 mm)			■	■
Object with 90% remission[1]	3.1...236.2 in (80...6000 mm)	■	■	■	■
Light source[2]	Laser diode, red light (670 nm)	■	■	■	■
Light spot at 19.7 ft (6 m)	Ø 0.5 in (12 mm)	■	■	■	■
Laser protection class	II (21 CFR 1040-10)	■	■	■	■
Supply voltage V_S[3]	18...30 V DC	■	■	■	■
Power consumption[4]	< 3 W	■	■	■	■
Ripple[5]	≤ 5 V_{SS}	■	■	■	■
Switching outputs (invertible)	Q_1, Q_2	■	■	■	■
DS 60-P: PNP	HIGH = V_S – (< 2 V)/LOW = 0 V	■		■	
DS 60-N: NPN	HIGH = V_S/ LOW ≤ 2 V		■		■
Output current I_A[6]	100 mA	■	■	■	■
Response time/frequency	10 ms/50 Hz	■	■		
	50 ms/10 Hz			■	■
Switching threshold Q_1/Q_2	Adjustable [teach-in 3.1 in (200 mm) minimum]	■	■	■	■
Time delay	On request	■	■	■	■
Mulifunction MF	N.C./External Teach on request	■	■	■	■
Connection type	Plug, M12 5-pin	■	■	■	■
VDE protection class[7]	□	■	■	■	■
Laser protection class	2 (EN 60825-1)	■	■	■	■
Enclosure rating	IP 67 / NEMA 6	■	■	■	■
Ambient temperature T_A[8]	Operation -13...122° F (-25...50° C)	■	■	■	■
	Storage -13...167° F (-25...75° C)	■	■	■	■
Approximate weight	7.2 oz (202 g)	■	■	■	■
Housing material	Body: glass fiber reinforced ABS	■	■	■	■
	Lens: PMMA	■	■	■	■

1) Also shiny
2) Average service life 50,000 h at T_A = 78° F (25° C)
3) Limit values, reverse-polarity protected
4) Without load
5) May not exceed or fall short of V_S tolerances
6) Outputs Q_1 and Q_2 short-circuit protected
7) Reference voltage 50 V DC
8) Do not bend below 32° F (0° C)



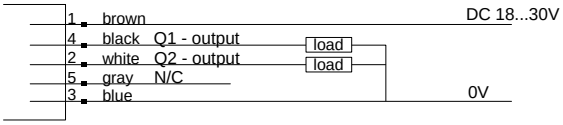


Emission Indicator
In order to meet the safety requirements for Class II laser products, a visible emission indicator must be located within 2 m (6.7 ft) of the sensor. We suggest using a switching amplifier with a power-ON indicator (the EN2 or EN3, for example) or a connector cable with a power-ON LED located on the connector.

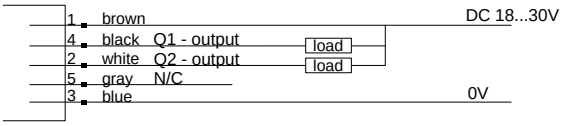
Beam Attenuator
The DS 60 sensor is equipped with an M12 style quick disconnect. The cable can be quickly and easily removed in the event that personnel require access to the area where the sensor is mounted.

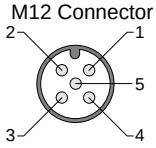
Connection diagram

PNP Models



NPN Models





wire colors refer to standard cable, not included

DS 60 IR Laser BGS

Proximity/Diffuse Sensors-Background Suppression



3.1...236.2 in (80...6000 mm)
sensing range

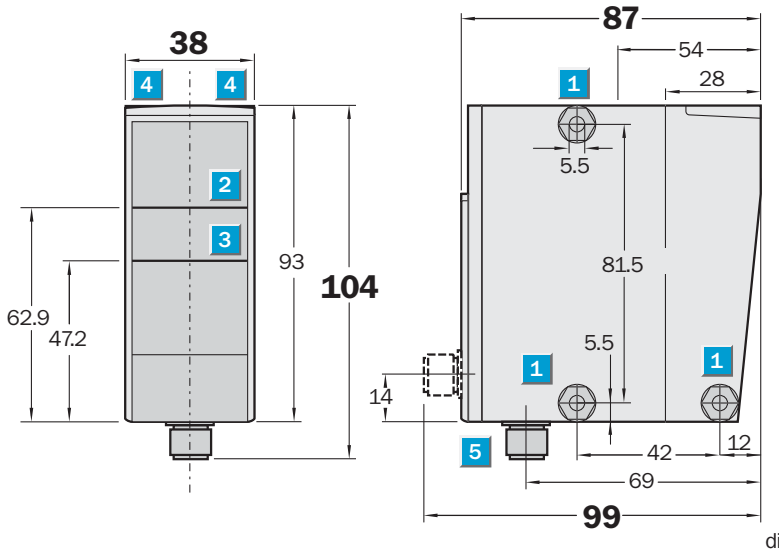
Highlights

- Rugged plastic housing
- Background suppression sensor with two programmable outputs
- Reliably detects objects to 6 m
- Red light alignment aid for easy setup
- Outputs set with the push of a button
- Class I laser with time-of-flight technology for distance sensing
- Works with objects from dull black to very shiny

DS 60

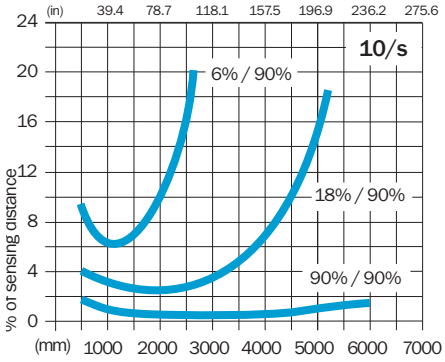


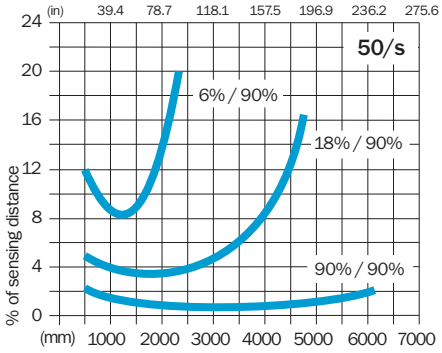
Dimensional drawing



dimensions in mm

Background suppression





Adjustments

All types



1 Mounting holes Ø 5.2 mm
2 Center of optical axis – sender
3 Center of optical axis – receiver
4 Output indicator
5 Plug, M12 5-pin
6 Control panel

Order information

Type	Part no.
DS 60-P21111	1 016 361
DS 60-P21311	1 016 393
DS 60-P41111	1 016 687
DS 60-P41311	1 016 689
DS 60-N21111	1 016 394
DS 60-N21311	1 016 686
DS 60-N41111	1 016 688
DS 60-N41311	1 016 690
DS 60-P41111-S03	1 023 745

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

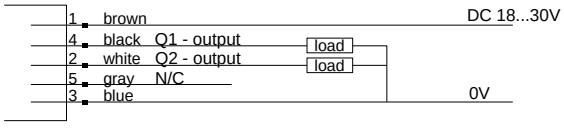
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Technical data	DS 60-	P 21111	N 21111	P 21311	N 21311	P 41111	N 41111	P 41311	N 41311	P4111 -S03
Sensing range, adjustable	3.1...236.2 in (80 mm...6000 mm)	■	■	■	■	■	■	■	■	■
Object with 3% remission	3.1...55.1 in (80...1400 mm)	■	■	■	■					
	3.1...63.0 in (80...1600 mm)					■	■	■	■	
	3.1...68.9 in (80...1750 mm)									■
Object with 6% remission	3.1...94.5 in (80...2400 mm)	■	■	■	■					
	3.1...102.4 in (80...2600 mm)					■	■	■	■	
	3.1...118.1 in (80...3000 mm)									■
Object with 18% remission	3.1...181.1 in (80...4600 mm)	■	■	■	■					
	3.1...196.9 in (80...5000 mm)					■	■	■	■	
	3.1...222.4 in (80...5650 mm)									■
Object with 90% remission[1]	3.1...236.2 in (80...6000 mm)	■	■	■	■	■	■	■	■	■
Light source[2], light type	Laser diode, infrared light	■	■	■	■	■	■	■	■	■
Light spot at 236.2 in (6 m)	2.4 in at 19.7 ft (60 mm at 6 m)	■	■			■	■			
	0.5 in (19.7 ft (12 mm at 6 m)			■	■			■	■	■
Supply voltage V_S[3]	18...30 V DC	■	■	■	■	■	■	■	■	■
Power consumption[4]	< 3 W	■	■	■	■	■	■	■	■	■
Ripple[5]	≤ 5 V_{SS}	■	■	■	■	■	■	■	■	■
Switching outputs (invertible)	Q_1, Q_2	■	■	■	■	■	■	■	■	■
DS 60-P: PNP	HIGH = V_S – (< 2 V)/LOW = 0 V	■		■		■		■		■
DS 60-N: NPN	HIGH = V_S/ LOW ≤ 2 V		■		■		■		■	
Output current I_A[6]	100 mA	■	■	■	■	■	■	■	■	■
Response time/frequency	10 ms/50 Hz	■	■	■	■					
	50 ms/10 Hz					■	■	■	■	
	5 Hz									■
Switching threshold Q_1/Q_2	Adjustable [teach-in 739 in (200 mm) minimum]	■	■	■	■	■	■	■	■	■
Connection type	Plug, M12 5-pin	■	■	■	■	■	■	■	■	■
VDE protection class[7]	□	■	■	■	■	■	■	■	■	■
Laser protection class	1 (EN 60 825-1)	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 67 /NEMA 6	■	■	■	■	■	■	■	■	■
		■	■	■	■	■	■	■	■	■
Ambient temperature T_A[8]	Operation -13...122° F (-25...50° C)									
	Storage -13...167° F (-25...75° C)	■	■	■	■	■	■	■	■	■
Approximate weight	7.2 oz (202 g)	■	■	■	■	■	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■	■	■	■

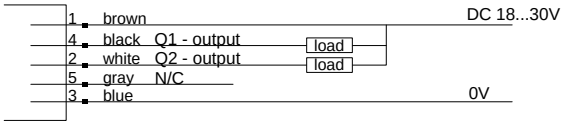
1) Also shiny
2) Average service life 100,000 h at T_A = 77° F (25° C)
3) Limit values, reverse-polarity protected
4) Without load
5) May not exceed or fall short of V_S tolerances
6) Outputs Q_1 and Q_2 short-circuit protected
7) Reference voltage 50 V DC
8) Do not bend below 32° F (0° C)

Connection diagram

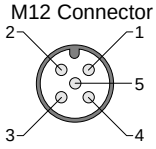
PNP Models



NPN Models



M12 Connector



wire colors refer to standard cable, not included

DS 60 FGS

Proximity/Diffuse Sensors-Foreground Suppression



3.1...236.2 in (80...6000 mm)
sensing range

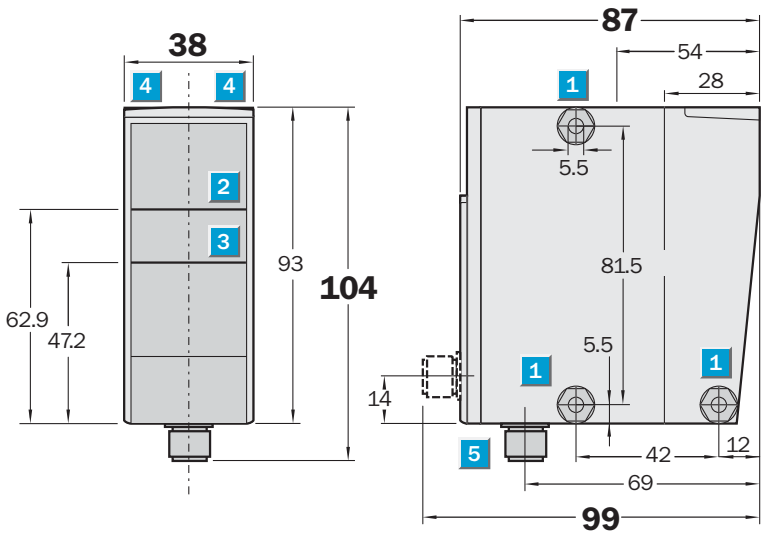
Highlights

- Rugged, lightweight plastic housing
- Foreground suppression sensor with two programmable outputs
- Works with objects from dull black to very shiny
- Two-function LED
- Red light alignment aid for easy setup
- Outputs set with the push of a button
- Class I laser with time-of-flight technology for distance sensing

DS 60

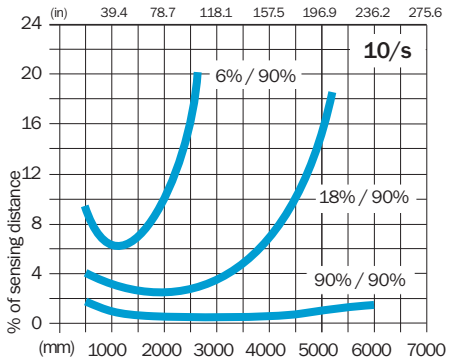


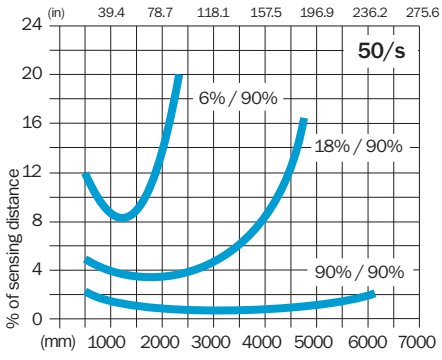
Dimensional drawing



dimensions in mm

Foreground suppression





Adjustments

All types



1 Mounting holes Ø 5.2 mm
2 Center of optical axis – sender
3 Center of optical axis – receiver
4 Output indicator
5 Plug, M12 5-pin
6 Control panel

Order information

Type	Part no.
DS 60-P31111	1 016 493
DS 60-P31311	1 016 693
DS 60-P51111	1 016 695
DS 60-P51311	1 016 697
DS 60-N31111	1 016 494
DS 60-N31311	1 016 694
DS 60-N51111	1 016 696
DS 60-N51311	1 016 698

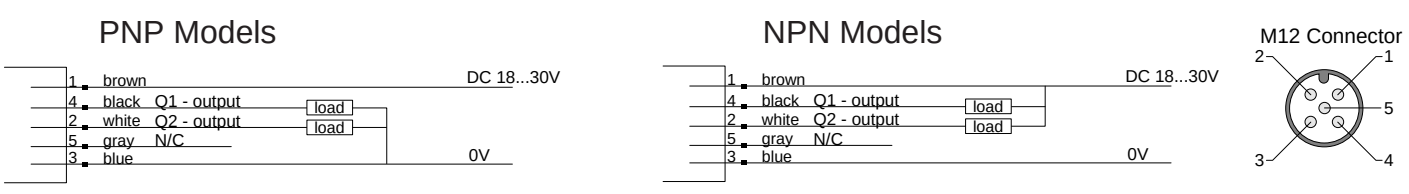
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

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Technical data	DS 60-	P 31111	N 31111	P 31311	N 31311	P 51111	N 51111	P 51311	N 51311
Sensing range, adjustable	3.1...236.2 in (80...6000 mm)	■	■	■	■	■	■	■	■
Object with 3% remission	3.1...55.1 in (80...1400 mm))	■	■	■	■				
	3.1...63.0 in (80...1600 mm)					■	■	■	■
Object with 6% remission	3.1...94.5 in (80...2400 mm)	■	■	■	■				
	3.1...102.3 in (80...2600 mm)					■	■	■	■
Object with 18% remission	3.1...181.1 in (80...4600 mm)	■	■	■	■				
	3.1...196.8 in (80...5000 mm)					■	■	■	■
Object with 90% remission[1]	3.1...236.2 in (80...6000 mm)	■	■	■	■	■	■	■	■
Light source[2]	Laser diode, infrared	■	■	■	■	■	■	■	■
Light spot diameter	2.4 in at 19.7 ft (60 mm at 6 m)	■	■			■	■		
	0.5 in at 19.7 ft (12 mm at 6 m)			■	■			■	■
Supply voltage V_S[3]	18...30 V DC	■	■	■	■	■	■	■	■
Power consumption[4]	< 3 W	■	■	■	■	■	■	■	■
Ripple[5]	≤ 5 V_{SS}	■	■	■	■	■	■	■	■
Switching outputs (invertible)	Q_1, Q_2	■	■	■	■	■	■	■	■
DS 60-P: PNP	HIGH = V_S – (< 2 V)/LOW = 0 V	■		■		■		■	
DS 60-N: NPN	HIGH = V_S/ LOW ≤ 2 V		■		■		■		■
Output current I_A[6]	100 mA	■	■	■	■	■	■	■	■
Response time/frequency	10 ms/50 Hz	■	■	■	■				
	50 ms/10 Hz					■	■	■	■
Switching threshold Q_1/Q_2	Adjustable [teach-in, 7.9 in (200 mm) minimum]	■	■	■	■	■	■	■	■
Connection type	Plug, M12 5-pin	■	■	■	■	■	■	■	■
VDE protection class[7]	□	■	■	■	■	■	■	■	■
Laser protection class	1 (EN 60 825-1)	■	■	■	■	■	■	■	■
Enclosure rating	IP 67 / NEMA 6	■	■	■	■	■	■	■	■
Ambient temperature T_A[8]	Operation -13...122° F (-25...50° C)	■	■	■	■	■	■	■	■
	Storage -13...167° F (-25...75° C)	■	■	■	■	■	■	■	■
Approximate weight	7.2 oz (202 g)	■	■	■	■	■	■	■	■
Housing material	Glass fiber reinforced ABS	■	■	■	■	■	■	■	■

1) Also shiny
2) Average service life 100,000 h at T_A = 77° F (25° C)
3) Limit values, reverse-polarity protected
4) Without load
5) May not exceed or fall short of V_S tolerances
6) Outputs Q_1 and Q_2 short-circuit protected
7) Reference voltage 50 V DC
8) Do not bend below 32 ° F (0° C)

Connection diagram



wire colors refer to standard cable, not included

DS 60 Reflex

Reflex/Retro-Reflective Sensors



0.7...65.6 ft (0.2...20 m)
sensing range

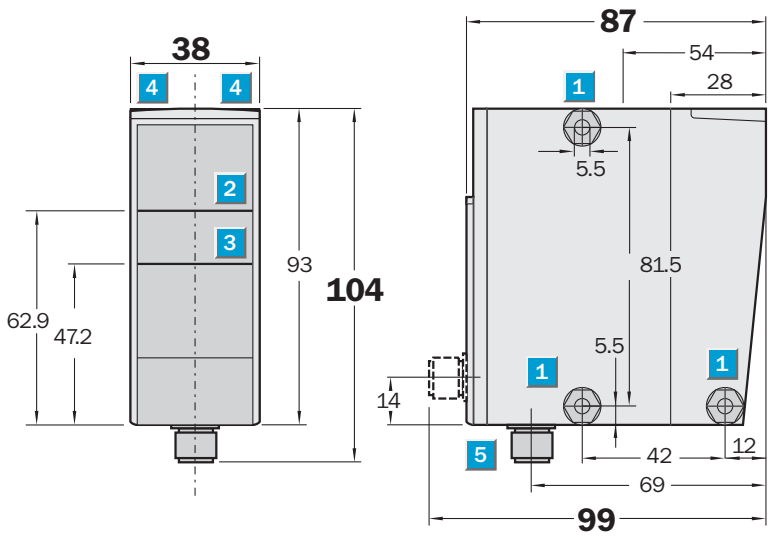
Highlights

- Distance to diamond grade tape
- Reflex sensor with two programmable outputs
- Test input
- Red light alignment aid for easy set up
- Laser with time of flight technology for distance sensing
- Reliably detects reflex tape up to 65.6 ft (20 m) away
- Outputs set with the push of a button

DS 60



Dimensional drawing



dimensions in mm

Adjustments

DS 60-P/-N11121



1 Mounting holes Ø 5.5 mm (through hole)
2 Optical axis, sender
3 Optical axis, receiver
4 Output indicators
5 Plug, M12 5-pin
6 Control panel

Order information

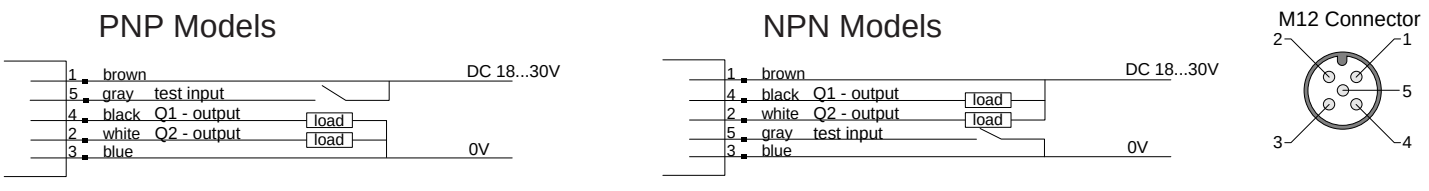
Type	Part no.
DS 60-P11121	1 016 397
DS 60-N11121	1 016 492

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256
Special accessories	1314

Technical data	DS 60-	P11121	N11121							
Sensing range	0.7...65.6 ft (0.2...20 m)									
Light source[1]	Laser, infrared light, Class I									
Light spot diameter	0.7. ft at 65.6 ft (0.2 m at 20 m)									
Supply voltage V_S[2]	18...30 V DC									
Power consumption[3]	< 3 W									
Ripple[4]	≤ 5 V_{SS}									
Switching outputs (invertible)	Q_1, Q_2									
DS 60-P: PNP	HIGH = V_S – (< 2 V)/LOW = 0 V									
DS 60-N: NPN	HIGH = V_S/ LOW ≤ 2 V									
Output current I_A[5]	100 mA									
Response time/switching frequency	10 ms/50 Hz									
Switching threshold Q_1/Q_2	Adjustable (teach-in)									
Multi-function MF	Test input									
Sender on	< 2 V or unswitched									
	V_S – (< 2 V) or unswitched									
Sender off	> 12 V to < V_S									
	0 V to V_S – (> 12 V)									
Connection type	Plug, M12 5-pin									
VDE protection class[6]	□									
Laser protection class	1 (EN 60 825-1)									
Enclosure rating	IP 67/NEMA 6									
Ambient temperature T_A[7]	Operation -13...122° F (-25...50° C)									
	Storage -13...167° F (-25...75° C)									
Approximate weight	7.2 oz (202 g)									
Housing material	Glass fiber reinforced ABS									

1) Average service life 100,000 h at T_A = 77° F (25° C)
2) Limit values, reverse-polarity protected
3) Without load
4) May not exceed or fall short of V_S tolerances
5) Outputs Q_1 and Q_2 short-circuit protected
6) Reference voltage DC 50 V
7) Do not bend below 32° F (0° C)

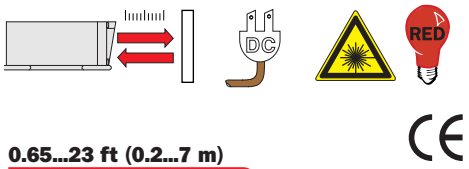
Connection diagram



wire colors refer to standard cable, not included

DS 500 Fast

Distance Sensors



0.65...23 ft (0.2...7 m)
sensing range

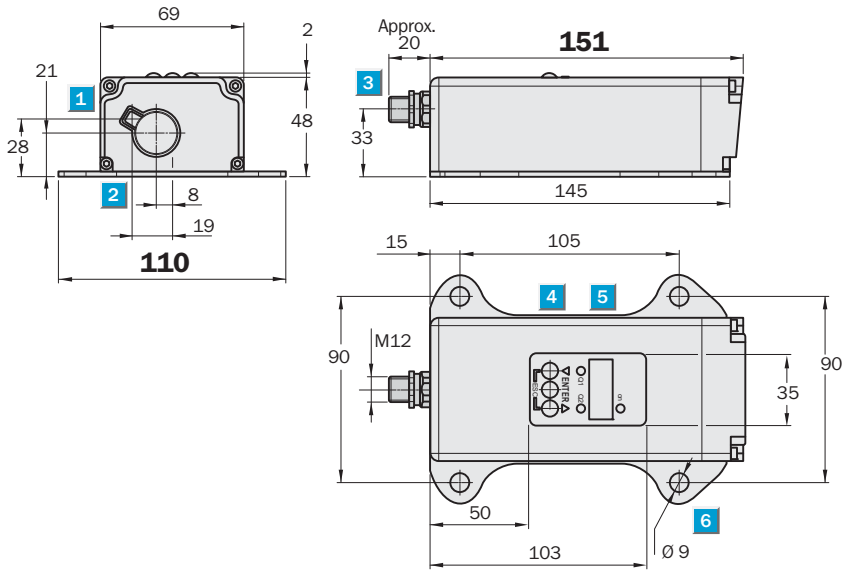
Highlights

- Incredible accuracy due to time-of-flight measurement
- Simple alignment using red laser light
- Two switching outputs
- Metal housing with integral heating for freezer applications
- Weather protection housing available for outdoor applications
- Alignment bracket available for precise setup

DS 500



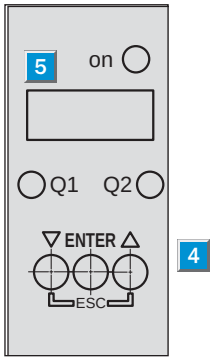
Dimensional drawing



dimensions in mm

Adjustments

All types



1 Optical axis, sender
2 Optical axis, receiver
3 Plug, M12 5-pin
4 Operating panel
5 Function indicator
6 Mounting hole

Teach-in	MF active
Q1	100 ms
$\bar{Q}1$	200 ms
Q2	300 ms
$\bar{Q}2$	400 ms

NOTE: Current measurement value is used as switching threshold

Order information	
Type	**Part no.**
DS 500-P311	1 040 477
DS 500-P411	1 040 478
DS 500-N311	1 040 481
DS 500-N411	1 040 482

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

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Technical data	DS 500-	P311	P411	N311	N411					
Sensing range	0.65...23 ft (0.2...7 m)									
Light source[1]	Laser diode, red light									
Light spot at 23 ft (7 m) distance	0.39 in (10 mm)									
Supply voltage V_S	10…30 V DC[2]									
Power consumption	2 W typ. (without heating)									
	22 W typ. (with heating)									
Ripple[3]	5 V_{PP}									
Switching outputs Q1, Q2	PNP									
	NPN									
Accuracy	± 0.12 in (3 mm)									
Response time	150 ms									
Temperature drift	0.002 in (0.05 mm)/K typ.									
External teach ET (MF) < 450 ms	Teach: > 12 V < V_S									
	Teach: < 2 V									
Laser off MF > 450 ms	Free running < 2 V or unswitched									
	Free running > 12 V < V_S									
Initialization period	500 ms typ.									
VDE protection class[4]	□									
Circuit protection	A, B[5]									
Laser protection class	2 (EN 60 825/21 CFR 1040)									
Enclosure rating	IP 65									
Ambient temperature	Operation 14...122° F (-10...50° C) (without heating)									
	Operation -40...122° F (-40...50° C) (with heating)[2]									
	Storage -13...167° F (-25...75° C)									
Approximate weight	2.0 oz (1000 g)									
EMC	EN 61000-6-2, EN 55011									
Mechanical Load	Shock: EN 600 86-2-27/-2-29									
	Sine: EN 600 68-2-6									
	Noise: EN 600 68-2-64									

1) Average service life 50,000 h at T_A = 77° F (25° C)
2) V_S ≥ 24 V DC for DS 500 with heating
3) May not exceed or fall short of V_S tolerances
4) Reference voltage 32 V DC
5) A = V_S connection reverse-polarity protected
B = Output Q short-circuit protected

"Error" or "no object in visibility field" indication

Error

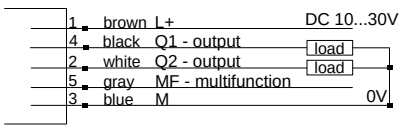
Measurement value output display:	0.000
Switching outputs:	Equivalent to measurement value of 0 m

No object in visibility field

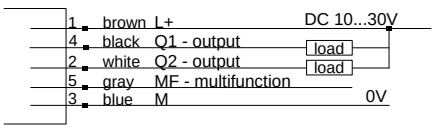
Measurement value output display:	99.99
Switching outputs:	Equivalent to measurement value of 99.99 m

Connection diagram

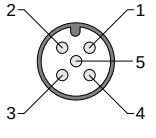
PNP Models



NPN Models



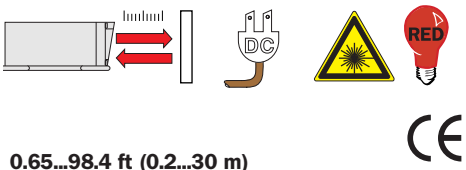
M12 Connector



wire colors refer to standard cable, not included

DS 500

Distance Sensors



0.65...98.4 ft (0.2...30 m)

sensing range

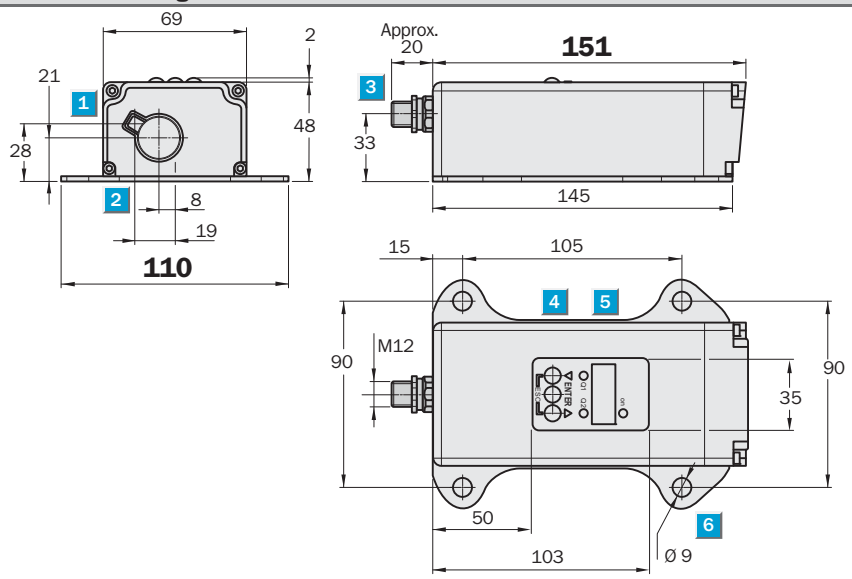
Highlights

- Incredible accuracy due to time-of-flight measurement
- Simple alignment using red laser light
- Two switching outputs
- Metal housing with integral heating for freezer applications
- Weather protection housing available for outdoor applications
- Alignment bracket available for precise setup

DS 500



Dimensional drawing

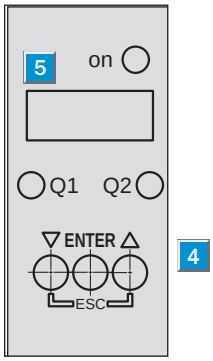


dimensions in mm

1 Optical axis, sender
2 Optical axis, receiver
3 Plug, M12 5-pin
4 Operating panel
5 Function indicator
6 Mounting hole

Adjustments

All types



Teach-in	MF active
Q1	100 ms
$\bar{Q}1$	200 ms
Q2	300 ms
$\bar{Q}2$	400 ms

NOTE: Current measurement value is used as switching threshold

Order information	
Type	**Part no.**
DS 500-P111	1 026 519
DS 500-P211	1 026 520
DS 500-N111	1 026 521
DS 500-N211	1 026 522

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

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Technical data	DS 500-	P111	P211	N111	N211					
Sensing range	Black: 0.65...59.1 ft (0.2...18 m), 6% remission	■	■	■	■					
	White: 0.65...98.4 ft (0.2...30 m), 90% remission	■	■	■	■					
Light source[1]	Laser diode, red light	■	■	■	■					
Light spot at 98 ft (30 m) distance	1.8 in (45 mm)	■	■	■	■					
Supply voltage V_S	10…30 V DC[2]	■	■	■	■					
Power consumption	3 W typ. (without heating)	■		■						
	22 W typ. (with heating)		■		■					
Ripple[3]	5 V_{PP}	■	■	■	■					
Switching outputs Q1, Q2	PNP	■	■							
	NPN			■	■					
Accuracy	± 0.12 in (3 mm)	■	■	■	■					
Response time	250 ms	■	■	■	■					
Temperature drift	0.002 in (0.05 mm)/K typ.			■	■					
External teach ET (MF pin)	Teach: > 12 V < V_S	■	■							
	Teach: < 2 V			■	■					
Laser off MF > 450 ms	Free running < 2 V or unswitched	■	■							
	Free running > 12 V < V_S			■	■					
Initialization period	500 ms typ.	■	■	■	■					
VDE protection class[4]	□	■	■	■	■					
Circuit protection	A, B[5]	■	■	■	■					
Laser protection class	2 (EN 60 825/21 CFR 1040)	■	■	■	■					
Enclosure rating	IP 65	■	■	■	■					
Ambient temperature	Operation 14...122° F (-10...50° C) (without heating)	■		■						
	Operation -40...122° F (-40...50° C) (with heating)[2]		■		■					
	Storage -13...167° F (-25...75° C)	■	■	■	■					
Approximate weight	2.0 oz (1000 g)	■	■	■	■					
EMC	EN 61000-6-2, EN 55011	■	■	■	■					
Mechanical Load	Shock: EN 600 86-2-27/-2-29	■	■	■	■					
	Sine: EN 600 68-2-6	■	■	■	■					
	Noise: EN 600 68-2-64	■	■	■	■					

1) Average service life 50,000 h at T_A = 77° F (25° C)
2) V_S ≥ 24 V DC for DS 500 with heating
3) May not exceed or fall short of V_S tolerances
4) Reference voltage 32 V DC
5) A = V_S connection reverse-polarity protected
B = Output Q short-circuit protected

"Error" or "no object in visibility field" indication

Error

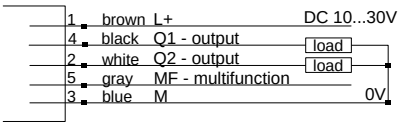
Measurement value output display:	0.000
Switching outputs:	Equivalent to measurement value of 0 m

No object in visibility field

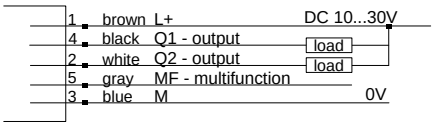
Measurement value output display:	99.99
Switching outputs:	Equivalent to measurement value of 99.99 m

Connection diagram

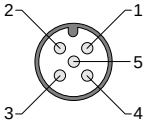
PNP Models



NPN Models



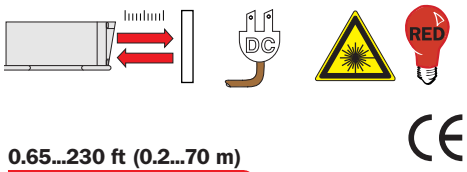
M12 Connector



wire colors refer to standard cable, not included

DS 500 Long Range

Distance Sensors



0.65...230 ft (0.2...70 m)
sensing range

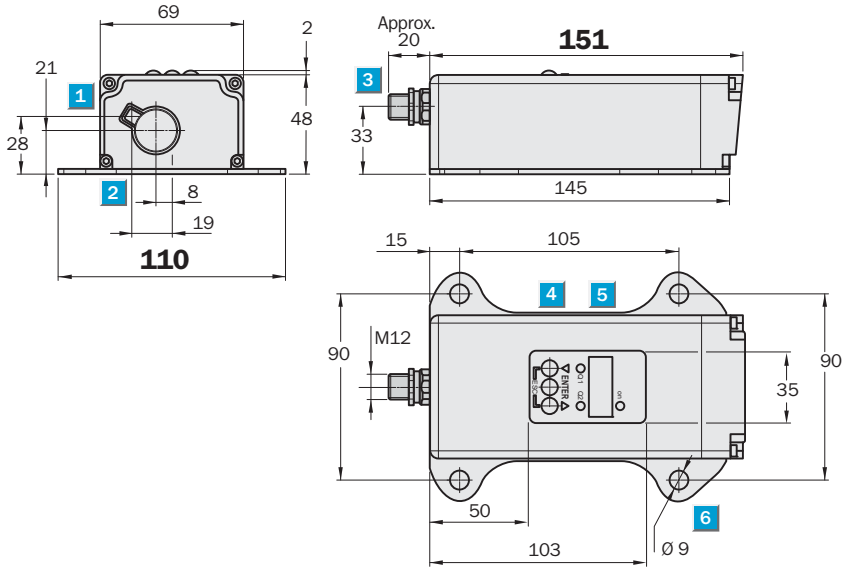
Highlights

- Incredible accuracy due to time-of-flight measurement
- Simple alignment using red laser light
- Two switching outputs
- Metal housing with integral heating for freezer applications
- Weather protection housing available for outdoor applications
- Alignment bracket available for precise setup

DS 500



Dimensional drawing

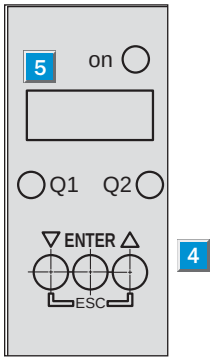


dimensions in mm

1	Optical axis, sender
2	Optical axis, receiver
3	Plug, M12 5-pin
4	Operating panel
5	Function indicator
6	Mounting hole

Adjustments

All types



Teach-in	MF active
Q1	100 ms
$\bar{Q}1$	200 ms
Q2	300 ms
$\bar{Q}2$	400 ms

NOTE: Current measurement value is used as switching threshold

Order information

Type	Part no.
DS 500-P511	1 040 479
DS 500-P611	1 040 480
DS 500-N511	1 040 483
DS 500-N611	1 040 484

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

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Technical data	DS 500-	P511	P611	N511	N611					
Sensing range	0.65...98.4 ft (0.2...30 m) 6% remission	■	■	■	■					
	White: 0.65...229 ft (0.2...70 m), 90% remission	■	■	■	■					
Light source[1]	Laser diode, red light	■	■	■	■					
Light spot at 230 ft (70 m) distance	4 in (100 mm)	■	■	■	■					
Supply voltage V_S	10…30 V DC[2]	■	■	■	■					
Power consumption	3 W typ. (without heating)	■		■						
	22 W typ. (with heating)		■		■					
Ripple[3]	5 V_{PP}	■	■	■	■					
Switching outputs Q1, Q2	PNP	■	■							
	NPN			■	■					
Accuracy	± 0.12 in (3 mm)	■	■	■	■					
Response time	0.15...6 s	■	■	■	■					
Temperature drift	0.002 in (0.05 mm)/K typ.			■	■					
External teach ET (MF) < 450 ms	Teach: > 12 V < V_S	■	■							
	Teach: < 2 V			■	■					
Laser off MF > 450 ms	Free running < 2 V or unswitched	■	■							
	Free running > 12 V < V_S			■	■					
Initialization period	500 ms typ.	■	■	■	■					
VDE protection class[4]	⧈	■	■	■	■					
Circuit protection	A, B[5]	■	■	■	■					
Laser protection class	2 (EN 60 825/21 CFR 1040)	■	■	■	■					
Enclosure rating	IP 65	■	■	■	■					
Ambient temperature	Operation 14...122° F (-10...50° C) (without heating)	■		■						
	Operation -40...122° F (-40...50° C) (with heating)[2]		■		■					
	Storage -13...167° F (-25...75° C)	■	■	■	■					
Approximate weight	2.0 oz (1000 g)	■	■	■	■					
EMC	EN 61000-6-2, EN 55011	■	■	■	■					
Mechanical Load	Shock: EN 600 86-2-27/-2-29	■	■	■	■					
	Sine: EN 600 68-2-6	■	■	■	■					
	Noise: EN 600 68-2-64	■	■	■	■					

1) Average service life 50,000 h at T_A = 77° F (25° C)
2) V_S ≥ 24 V DC for DS 500 with heating
3) May not exceed or fall short of V_S tolerances
4) Reference voltage 32 V DC
5) A = V_S connection reverse-polarity protected
B = Output Q short-circuit protected

"Error" or "no object in visibility field" indication

Error

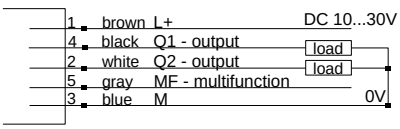
Measurement value output display:	0.000
Switching outputs:	Equivalent to measurement value of 0 m

No object in visibility field

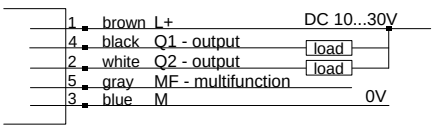
Measurement value output display:	99.99
Switching outputs:	Equivalent to measurement value of 99.99 m

Connection diagram

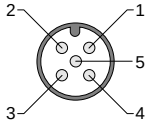
PNP Models



NPN Models



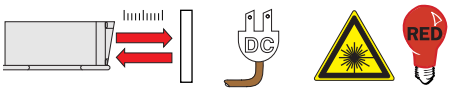
M12 Connector



wire colors refer to standard cable, not included

DT 500 Fast

Distance Sensors



0.65...23 ft (0.2...7 m)
sensing range

Analog
CAN Bus

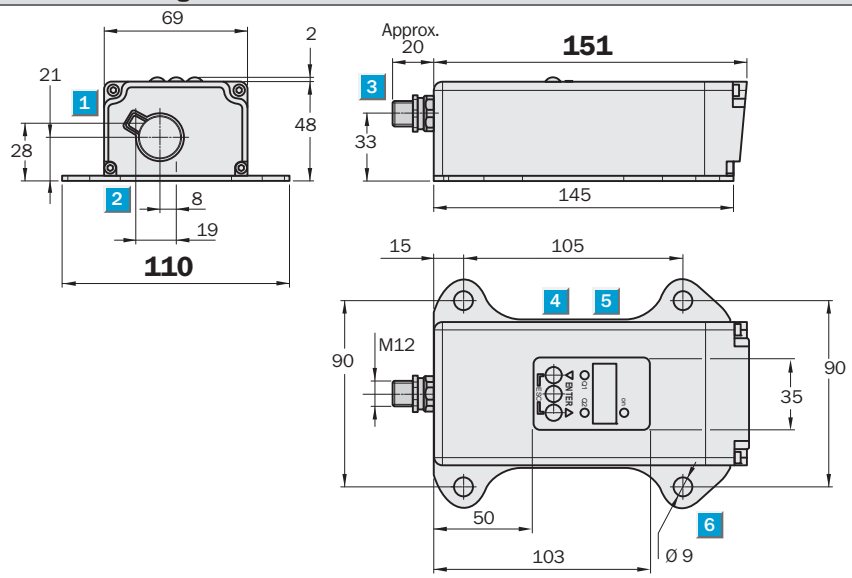
DT 500



Highlights

- Incredible accuracy due to time-of-flight measurement
- Simple alignment using red laser light
- Analog and CAN communication
- Metal housing with integral heating for freezer applications
- Weather protection housing available for outdoor applications
- Alignment bracket available for precise setup

Dimensional drawing

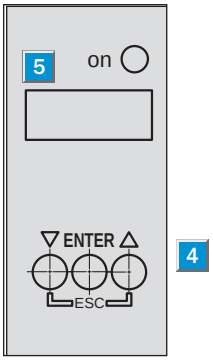


dimensions in mm

1 Optical axis, sender
2 Optical axis, receiver
3 Plug, M12 5-pin
4 Operating panel
5 Function indicator
6 Mounting hole

Adjustments

All types



Order information

Type	Part no.
DT 500-A311	1 040 475
DT 500-A411	1 040 465
DT 500-A323	1 040 470
DT 500-A423	1 040 471

Accessories

	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

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Technical data	DT 500-	A311	A411	A323	A423
Sensing range	0.65...23 ft (0.2...7 m)	■	■	■	■
Light source[1]	Laser diode, red light	■	■	■	■
Light spot at 23 ft (7 m) distance	0.39 in (10 mm)	■	■	■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■
Power consumption	3 W typ. (without heating)	■		■	
	22 W typ. (with heating)		■		■
Ripple[3]	5 V_{PP}	■	■	■	■
Analog output (adjustable)	0...20 mA or 4...20 mA (selectable)	■	■		
Accuracy	± 0.12 in (3 mm)	■	■	■	■
Repeatability[4]	± 0.04 in (1 mm)	■	■	■	■
Resolution	0.004 in (0.1 mm), 12 Bit D AC	■	■	■	■
Temperature drift	0.002 in (0.05 mm)/K typ.	■	■	■	■
Measured value output	150 ms	■	■	■	■
CAN (CANOpen Features)	20...1000 kbit/s			■	■
CAN Address	11 bits in size			■	■
Initialization period	500 ms typ.	■	■	■	■
VDE protection class[5]	⧈	■	■	■	■
Circuit protection[6]	A, B	■	■	■	■
Laser protection class	2 (EN 60 825/21 CFR 1040)	■	■	■	■
Enclosure rating	IP 65	■	■	■	■
Ambient temperature	Operation 14...122° F (-10...50° C) (without heating)	■		■	
	Operation -40...122° F (-40...50° C) (with heating)[2]		■		■
	Storage -13...167° F (-25...75° C)	■	■	■	■
Approximate weight	2.0 oz (1000 g)	■	■	■	■
EMC	EN 61000-6-2, EN 55011	■	■	■	■
Mechanical Load	Shock: EN 600 86-2-27/-2-29	■	■	■	■
	Sine: EN 600 68-2-6	■	■	■	■
	Noise: EN 600 68-2-64	■	■	■	■

1) Average service life 50,000 h at TA = 77° F (25° C)
2) VS ≥ 24 V DC for DT 500-A2xx with heating
3) May not exceed or fall short of VS tolerances
4) Statistical error 1 σ , environmental conditions constant
5) Reference voltage 32 V DC
6) A = VS connection reverse-polarity protected
B = Output Q short-circuit protected

"Error" or "no object in visibility field" indication

Error

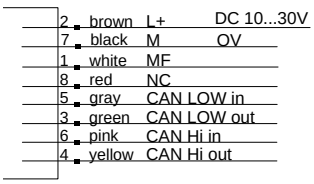
Measurement value output display:	0.000
Analog interface:	0/3.5 mA
CAN Bus:	00000

No object in visibility field

Measurement value output display:	99.99
Analog interface:	20.5 mA
CAN Bus:	99999

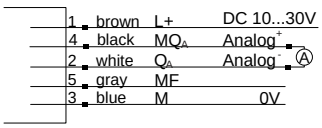
Connection diagram

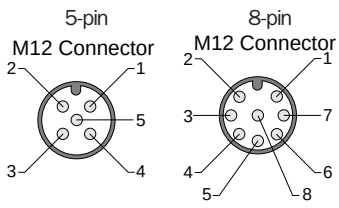
Serial (-A .. 3)
8-pin, M 12



wire colors refer to standard cable, not included

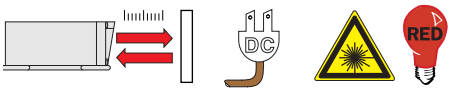
Analog (-A .. 1)
5-pin, M 12





DT 500

Distance Sensors



0.65...98.4 ft (0.2...30 m)
sensing range

Analog
CAN Bus

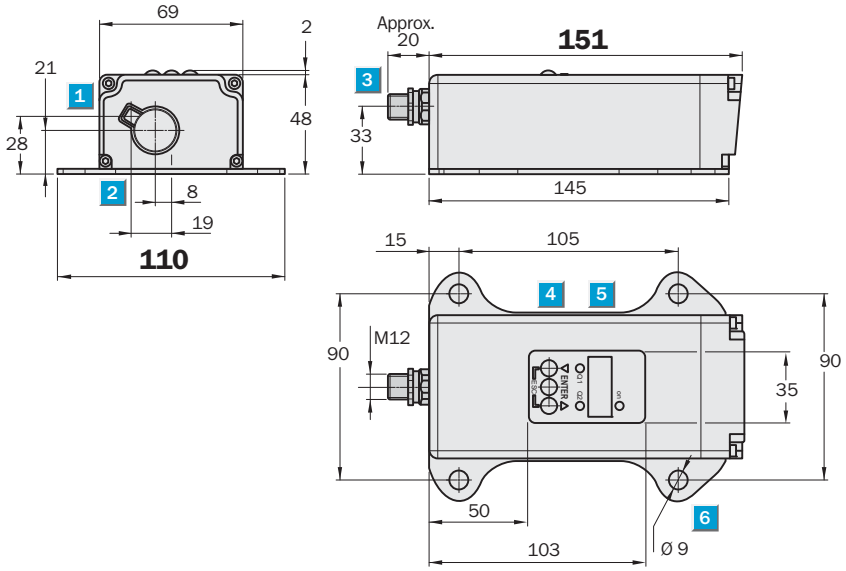
DT 500



Highlights

- Incredible accuracy due to time-of-flight measurement
- Simple alignment using red laser light
- Analog and CAN communication
- Metal housing with integral heating for freezer applications
- Weather protection housing available for outdoor applications
- Alignment bracket available for precise setup

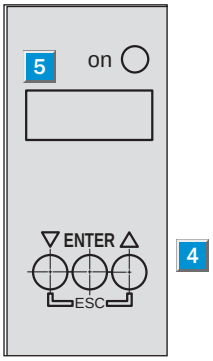
Dimensional drawing



dimensions in mm

Adjustments

All types



1 Optical axis, sender
2 Optical axis, receiver
3 Plug, M12 5-pin
4 Operating panel
5 Function indicator
6 Mounting hole

Order information

Type	Part no.
DT 500-A111	1 026 515
DT 500-A211	1 026 516
DT 500-A123	1 040 468
DT 500-A223	1 040 469

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

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Technical data	DT 500-	A111	A211	A123	A223					
Sensing range	Black: 0.65...59.1 ft (0.2...18 m), 6% remission	■	■	■	■					
	White: 0.65...98.4 ft (0.2...30 m), 90% remission	■	■	■	■					
Light source[1]	Laser diode, red light	■	■	■	■					
Light spot at 98 ft (30 m) distance	1.8 in (45 mm)	■	■	■	■					
Supply voltage V_S	10…30 V DC[2]	■	■	■	■					
Power consumption	3 W typ. (without heating)	■		■						
	22 W typ. (with heating)		■		■					
Ripple[3]	5 V_{PP}	■	■	■	■					
Analog output (adjustable)	0...20 mA or 4...20 mA (selectable)	■	■							
Accuracy	± 0.12 in (3 mm)	■	■	■	■					
Repeatability[4]	± 0.04 in (1 mm)	■	■	■	■					
Resolution	0.004 in (0.1 mm), 12 Bit D AC	■	■	■	■					
Temperature drift	0.002 in (0.05 mm)/K typ.	■	■	■	■					
Measured value output	250 ms	■	■	■	■					
CAN (CANOpen Features)	20...1000 kbit/s			■	■					
CAN Address	11 bits in size			■	■					
Initialization period	500 ms typ.	■	■	■	■					
VDE protection class[5]	⧈	■	■	■	■					
Circuit protectio[6]	A, B	■	■	■	■					
Laser protection class	2 (EN 60 825/21 CFR 1040)	■	■	■	■					
Enclosure rating	IP 65	■	■	■	■					
Ambient temperature	Operation 14...122° F (-10...50° C) (without heating)	■		■						
	Operation -40...122° F (-40...50° C) (with heating)[2]		■		■					
	Storage -13...167° F (-25...75° C)	■	■	■	■					
Approximate weight	2.0 oz (1000 g)	■	■	■	■					
EMC	EN 61000-6-2, EN 55011	■	■	■	■					
Mechanical Load	Shock: EN 600 86-2-27/-2-29	■	■	■	■					
	Sine: EN 600 68-2-6	■	■	■	■					
	Noise: EN 600 68-2-64	■	■	■	■					

1) Average service life 50,000 h at T_A = 77° F (25° C)
2) V_S ≥ 24 V DC for DT 500-A2xx with heating
3) May not exceed or fall short of V_S tolerances
4) Statistical error 1 σ , environmental conditions constant
5) Reference voltage 32 V DC
6) A = V_S connection reverse-polarity protected
B = Output Q short-circuit protected

"Error" or "no object in visibility field" indication

Error

Measurement value output display:	0.000
Analog interface:	0/3.5 mA
CAN Bus:	00000

No object in visibility field

Measurement value output display:	99.99
Analog interface:	20.5 mA
CAN Bus:	99999

Connection diagram

Serial (-A .. 3)

8-pin, M 12

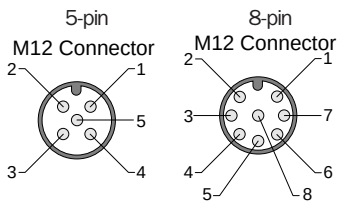
2	brown	L+	DC 10...30V
7	black	M	0V
1	white	MF	
8	red	NC	
5	gray	CAN LOW in	
3	green	CAN LOW out	
6	pink	CAN Hi in	
4	yellow	CAN Hi out	

wire colors refer to standard cable, not included

Analog (-A .. 1)

5-pin, M 12

1	brown	L+	DC 10...30V
4	black	MQ_A	Analog$^+$
2	white	Q_A	Analog$^-$ Ⓐ
5	gray	MF	
3	blue	M	0V



DT 500 Long Range

Distance Sensors



0.65...230 ft (0.2...70 m)
sensing range

Analog
CAN Bus

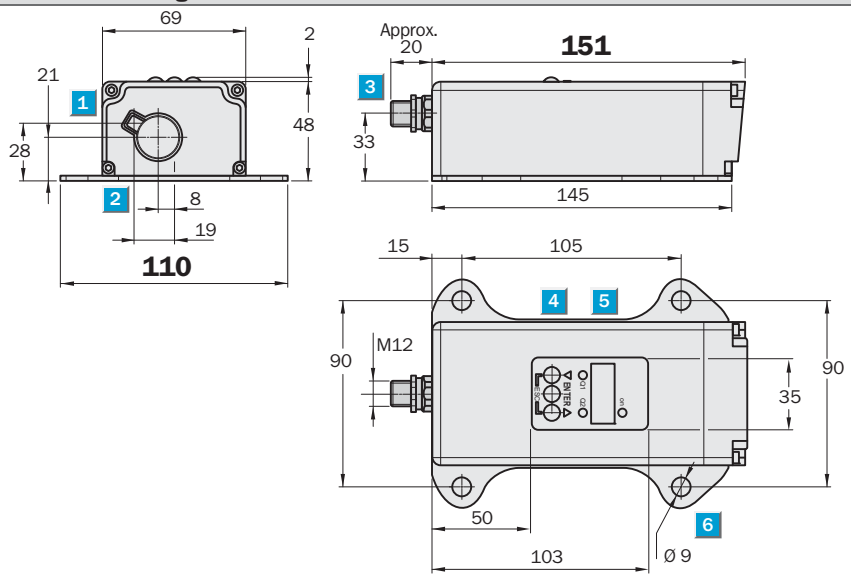
DT 500



Highlights

- Incredible accuracy due to time-of-flight measurement
- Simple alignment using red laser light
- Analog and CAN communication
- Metal housing with integral heating for freezer applications
- Weather protection housing available for outdoor applications
- Alignment bracket available for precise setup

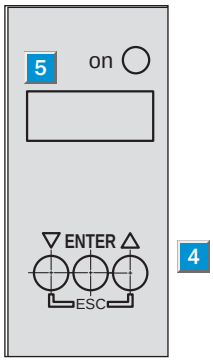
Dimensional drawing



dimensions in mm

Adjustments

All types



1 Optical axis, sender
2 Optical axis, receiver
3 Plug, M12 5-pin
4 Operating panel
5 Function indicator
6 Mounting hole

Order information

Type	Part no.
DT 500-A511	1 040 466
DT 500-A611	1 040 467
DT 500-A523	1 040 472
DT 500-A623	1 040 473

Accessories

	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

Technical data	DT 500-	A511	A611	A523	A623					
Sensing range	Black: 0.65...98.4 ft (0.2...30 m), 6% remission	■	■	■	■					
	White: 0.65...229 ft (0.2...70), 90% remission	■	■	■	■					
Light source[1]	Laser diode, red light	■	■	■	■					
Light spot at 230 ft (70 m) distance	4 in (100 mm)	■	■	■	■					
Supply voltage V_S	10…30 V DC[2]	■	■	■	■					
Power consumption	3 W typ. (without heating)	■		■						
	22 W typ. (with heating)		■		■					
Ripple[3]	5 V_{PP}	■	■	■	■					
Analog output (adjustable)	0...20 mA or 4...20 mA (selectable)	■	■							
Accuracy	± 0.12 in (3 mm)	■	■	■	■					
Repeatability[4]	± 0.04 in (1 mm)	■	■	■	■					
Resolution	0.004 in (0.1 mm), 12 Bit D AC	■	■	■	■					
Temperature drift	0.002 in (0.05 mm)/K typ.	■	■	■	■					
Measured value output	150 ms - 6 s free running	■	■	■	■					
CAN (CANOpen Features)	20...1000 kbit/s			■	■					
CAN Address	11 bits in size			■	■					
Initialization period	500 ms typ.	■	■	■	■					
VDE protection class[5]	□	■	■	■	■					
Circuit protection[6]	A, B	■	■	■	■					
Laser protection class	2 (EN 60 825/21 CFR 1040)	■	■	■	■					
Enclosure rating	IP 65	■	■	■	■					
Ambient temperature	Operation 14...122° F (-10...50° C) (without heating)	■		■						
	Operation -40...122° F (-40...50° C) (with heating)[2]		■		■					
	Storage -13...167° F (-25...75° C)	■	■	■	■					
Approximate weight	2.0 oz (1000 g)	■	■	■	■					
EMC	EN 61000-6-2, EN 55011	■	■	■	■					
Mechanical Load	Shock: EN 600 86-2-27/-2-29	■	■	■	■					
	Sine: EN 600 68-2-6	■	■	■	■					
	Noise: EN 600 68-2-64	■	■	■	■					

1) Average service life 50,000 h at T_A = 77° F (25° C)
2) V_S ≥ 24 V DC for DT 500-A2xx with heating
3) May not exceed or fall short of V_S tolerances
4) Statistical error 1 σ , environmental conditions constant
5) Reference voltage 32 V DC
6) A = V_S connection reverse-polarity protected
B = Output Q short-circuit protected

"Error" or "no object in visibility field" indication

Error

Measurement value output display:	0.000
Analog interface:	0/3.5 mA
CAN Bus:	00000

No object in visibility field

Measurement value output display:	99.99
Analog interface:	20.5 mA
CAN Bus:	99999

Connection diagram

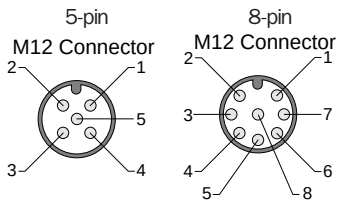
Serial (-A .. 3)
8-pin, M 12

2	brown	L+	DC 10...30V
7	black	M	0V
1	white	MF	
8	red	NC	
5	gray	CAN LOW in	
3	green	CAN LOW out	
6	pink	CAN Hi in	
4	yellow	CAN Hi out	

wire colors refer to standard cable, not included

Analog (-A .. 1)
5-pin, M 12

1	brown	L+	DC 10...30V
4	black	MQ_A	Analog$^+$
2	white	Q_A	Analog$^-$ Ⓐ
5	gray	MF	
3	blue	M	0V



DT 200

Distance Sensors



Analog

3.9...78.7 in (100...2000 mm)

sensing range

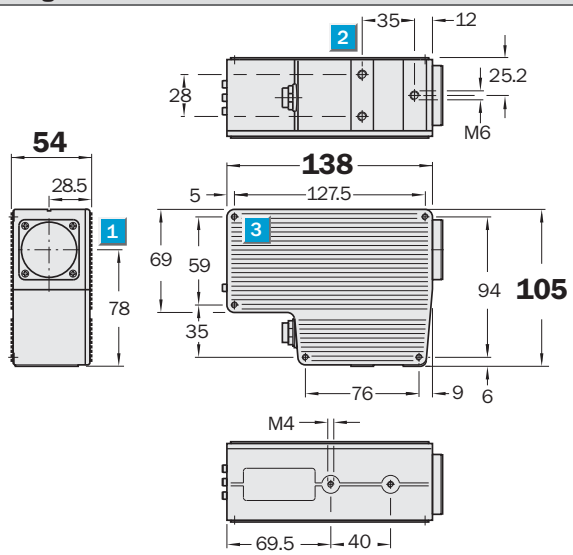
Highlights

- Visible red light for easy alignment
- Analog output
- Non-contact distance measurement on any surface
- Perfect for web control, contour detection, coil diameter measurement and small parts detection

DT 200



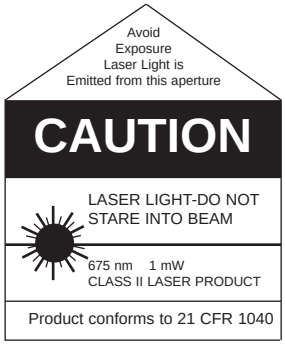
Dimensional drawing



dimensions in mm

1 Center of optical axis
2 M6 threaded mounting hole, 10 mm deep
3 M4 threaded mounting hole, 14 mm deep (this side only)
4 M4 threaded mounting hole, 6 mm deep

Laser warning



Measurement range, repeatability, accuracy

Sensing range[1]	3.9...78.7 in (100...2000 mm)
Accuracy	
Object with 90% remission	±0.20 in (5 mm)
Object with 18% remission	±0.43 in (11 mm)
Object with 6% remission	±2.56 in (65 mm)
Repeatability[7]	
Object with 90% remission	0.04 in (1 mm)
Object with 18% remission	0.12 in (3 mm)
Object with 6% remission	0.98 in (25 mm)
Resolution	1 mm (0.01 mA/mm)

Order information

Type	Part no.
DT 200-111A01	1 022 946

Accessories

	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256
Special accessories	1314

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Technical data	DT 200-	111A01
Sensing range[1]	3.9...78.7 in (100...2000 mm)	
Light spot diameter	0.2 in at 78.7 in (5 mm at 2000 mm)	
Light source[2], light type	Laser diode, red light	
Laser category	Class II (EN 825-1/IEC 60825-1/CDRH)	
Accuracy		
Object with 90% remission	±0.20 in (5 mm)	
Object with 18% remission	±0.43 in (11 mm)	
Object with 6% remission	±2.56 in (65 mm)	
Repeatability[7]		
Object with 90% remission	0.04 in (1 mm)	
Object with 18% remission	0.12 in (3 mm)	
Object with 6% remission	0.98 in (25 mm)	
Resolution	1 mm (0.01 mA/mm)	
Supply voltage V_S	18...30 V DC[3]	
Ripple[4]	≤ 5 V_{PP}	
Power consumption[5]	≤ 6 W[4]	
Circuit protection[8]	A	
Output		
Analog	0...20 mA, non-scalable	
Measurement output rate		
Analog	≤ 30 ms response time	
Temperature drift	Typ. 0.4 mm/K	
Connection type	Plug, M12 4-pin	
VDE protection class[6]	□	
Enclosure rating	IP 65	
Ambient temperature T_A	Operation 14...113° F (-10...45° C)	
	Storage -13...167° F (-25...75° C)	
Approximate weight	34.6 oz (980 g)	

1) Falling below the measurement range results in values < 0.1 mA
Exceeding the measurement range results in ambiguous values (Example: Scanning distance of 3 m = 10 mA with sufficient reflectance

2) Average service life 50,000 h at T_A = 77° F (25° C)

3) Limit values, reverse polarity protected

4) May not exceed or fall short of V_S tolerances

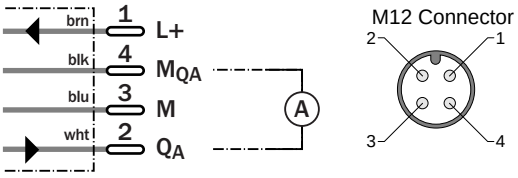
5) Without load

6) Reference voltage 50 V DC

7) Environmental conditions constant, 30 min. warm-up period

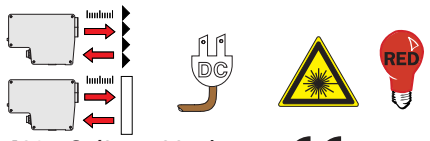
8) A = V_S connections reverse-polarity protected

Connection diagram



DME 2000

Distance Sensors



0.3...426.5 ft (0.1...130 m)
3.9...80.6 in (100...2047 mm)
sensing range

RS 232
Analog

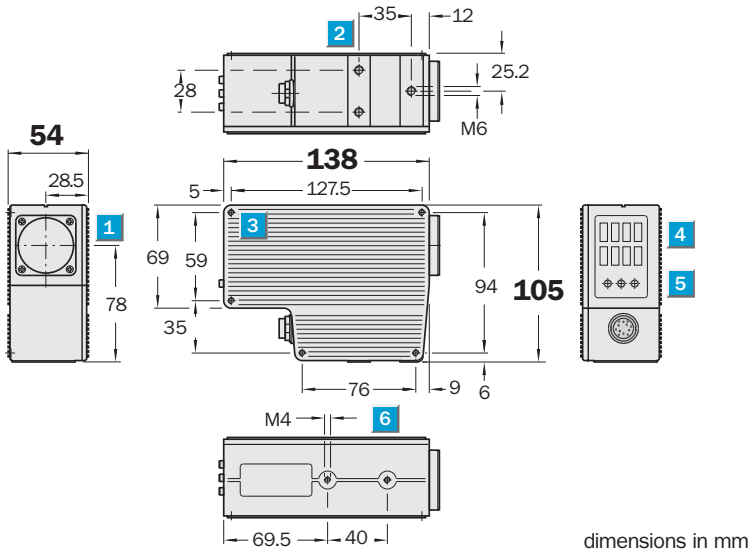
Highlights

- Visible red light for easy alignment
- Non-contact distance measurement; reflex and proximity in one unit
- Analog output
- Two programmable discrete outputs
- Plausibility and service outputs

DME 2000

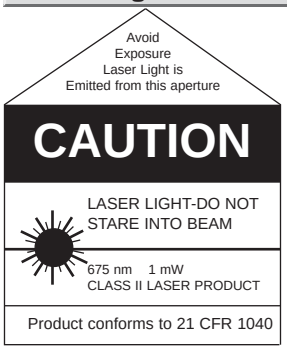


Dimensional drawing



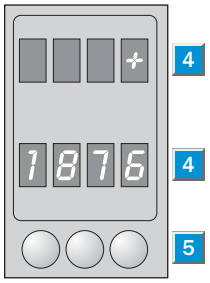
dimensions in mm

Laser warning



Adjustments

All types



1 Center of optical axis
2 M6 threaded mounting hole, 10 mm deep
3 M4 threaded mounting hole, 14 mm deep (this side only)
4 8-digit alphanumeric indicator
5 Keypad
6 M4 threaded mounting hole, 6 mm deep

Measurement range, repeatability, accuracy

Sensing range
In proximity mode: 3.9...80.6 in (100...2047 mm)
In reflex mode:0.3...426.5 ft (0.1...130 m) with RTAPM tape
9.8...328.1 ft (3...100 m) with diamond grade tape
0.3...295.3 ft (0.1...90 m) with 7610 tape
0.3...131.2 ft (0.1...40 m) with 3290 tape
Accuracy[8]
In proximity mode: ±0.098 in (5 mm) at 90% remission
±0.43 in (11 mm) at 18% remission
±2.56 in (65 mm) at 6% remission
In reflex mode:+ 0.20/- 0.79 in (+ 5/- 20 mm)
Repeatability[8]
In proximity mode: ±0.04 in (1 mm) at 90% remission
±0.11 in (3 mm) at 18% remission
±0.98 in (25 mm) at 6% remission
In reflex mode:0.08 in (2 mm)[11]
Resolution
0.04 in (1 mm)

Order information

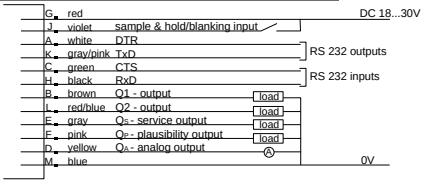
Standard Type	Part no.
DME 2000-000S01	1 013 484
DME 2000-000A01	7 022 818

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

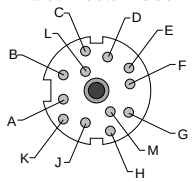
Technical data		DME 2000-	000 S01	000 A01							
Sensing range	In proximity mode:	3.9...80.6 in (100...2047 mm)									
	In reflex mode:	0.3...426.5 ft (0.1...130 m) with RTAPM tape									
		9.8...328.1 ft (3...100 m) with diamond grade tape									
		0.3...295.3 ft (0.1...90 m) with 7610 tape									
		0.3...131.2 ft (0.1...40 m) with 3290 tape									
Light source[1], **light type**		Laser diode, red light									
Light spot diameter	In proximity mode:	0.2 in at 6.6 ft (5 mm at 2 m)									
	In reflex mode:	9.8 in at 426.5 ft in (250 mm at 130 m)									
Laser category		Class II (IEC 825-1/EN 60825-1) 21 CFR 1040.10									
NIR blocking filter, high temp. targets		For high temp. targets up to 1600° F (871.1° C)									
Accuracy[8]	In proximity mode:	±0.098 in (5 mm) at 90% remission									
		±0.43 in (11 mm) at 18% remission									
		±2.56 in (65 mm) at 6% remission									
	In reflex mode:	+ 0.20/- 0.79 in (+ 5/- 20 mm)									
Repeatability[8]	In proximity mode:	±0.04 in (1 mm) at 90% remission									
		±0.11 in (3 mm) at 18% remission									
		±0.98 in (25 mm) at 6% remission									
	In reflex mode:	0.08 in (2 mm)[11]									
Resolution		0.04 in (1 mm)									
Supply voltage V_S		18...30 V DC [2]									
Ripple		≤ 5 V_{PP}[3]									
Power consumption		≤ 6 W[4]									
Circuit protection[6]		A, B									
Outputs	Output type	PNP									
Voltage		Active: V_S – ≤2 V; Deactive: ≤2 V									
Maximum current		100 mA									
Switching distance		Adjustable in 1 mm increments									
Switching hysteresis		0...10 in (0...254 mm) adjustable in 2 mm increments									
Output logic		Invertible Q/$\overline{Q}$									
Plausibility Q_P		Active: measurement correct; Deactive: measurement error									
Service Q_S		Active: device OK; Deactive: early failure warning									
Analog		0...20 mA or 4...20 mA, selectable, scalable									
Effect of compressed air		In reflex mode: 0.3 ppm/mbar									
Effect of air temperature		In reflex mode: 1 ppm/k									
Temperature drift		Typical 0.01 in/k (0.3 mm/k)									
Interface		RS 232									
Baud rate		4.8/9.6/19.2 kBaud									
Measurement output rate											
Serial interface		In proximity mode: 29 ms; In reflex mode: 100 ms									
Analog		≤30 ms									
Maximum running speed		In reflex mode: 12 m/s									
Connection type		Plug									
VDE protection class[5]		□									
Enclosure rating		IP 65/NEMA 4									
Ambient temperature T_A		Operation 14...113° F (-10...45° C)									
		Storage -13...167° F (-25...75° C)									
Mechanical load		IEC 68									
Approximate weight		2.2 lb (980 g)									

1) Average service life 50,000 h at T_A =77° F (25° C)
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Reference voltage 50 V DC
6) A=V_S connections reverse-polarity protected
B = Output Q reverse-polarity protected
7) Relative to front edge of object
8) Environmental conditions constant at 30 min. minimum warm-up period
9) Measurement distance 39 in (1 m), 90% remission
10) 68° F (20° C) ambient temperature, 1013 mbar, 30 min. switching period, re-calibration recommended after 25,000 h
11) Analog is 12 bits over spanned distance and full analog range

Connection diagram



DME connector - side



DME 3000 Reflex

Distance Sensors



0.3...1640 ft (0.1...500 m)
sensing range

RS 422

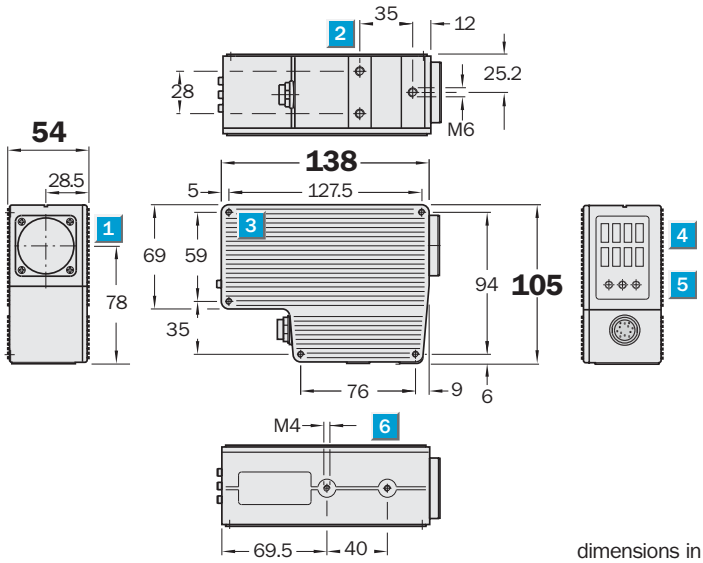
Highlights

- Visible red light for easy alignment
- Long distance measurement with a reflector
- Remote programmability for system flexibility
- Two programmable discrete outputs (invertible)
- Plausibility and service outputs

DME 3000-1



Dimensional drawing



dimensions in mm

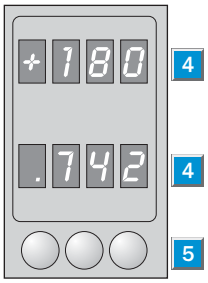
Measurement range, repeatability, accuracy

Repeatability (0.02 in)	**0.5 mm**
Measurement range with reflector	
Reflective tape 3290	0.1 m...20 m
Reflective tape 7610	0.1 m...40 m
Reflective tape «diamond grade»	3.0 m...90 m
Multi-reflector PL240F	0.1 m...250 m
Multi-reflector PL560F	0.1 m...270 m
Multi-reflector PL880F	10 m...300 m

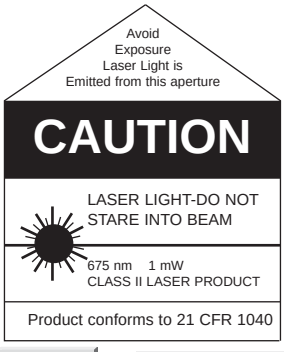
Repeatability	**2 mm**
Measurement range with reflector	
Reflective tape 3290	0.1 m...40 m
Reflective tape 7610	0.1 m...90 m
Reflective tape «diamond grade»	0.5 m...250 m
Multi-reflector PL240F	0.1 m...300 m
Multi-reflector PL560F	0.1 m...350 m
Multi-reflector PL880F	8.0 m...500 m

Adjustments

All types



1 Center of optical axis
2 M6 threaded mounting hole, 10 mm deep
3 M4 threaded mounting hole, 14 mm deep (this side only)
4 8-digit alphanumeric signal indicator
5 Keypad
6 M4 threaded mounting hole, 6 mm deep



Order information

Type	Part no.
DME 3000-111S01	1 015 921
DME 3000-311S14	1 022 082
DME 3000-111P01	1 018 575

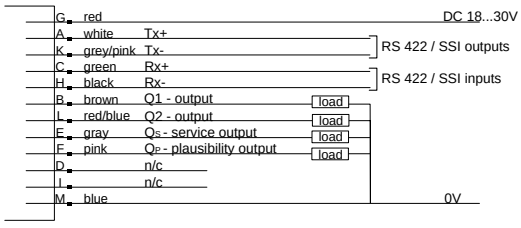
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256
Special accessories	1314

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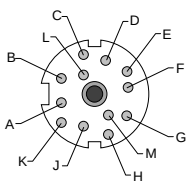
Technical data	DME 3000-	111 S01	311 S14	111 P01
Sensing range	0.3...1640 ft (0.1…500 m), dependent on reflector, see measurement range chart on prior page	■	■	■
Light source[4], **light type**	Laser diode, red light	■	■	■
Light spot diameter	3.3 ft at 1640 ft (1 m at 500 m)	■	■	■
Laser category	Class II (IEC 825-1/EN 60825-1) 21 CFR 1040.10	■	■	■
Accuracy[1] [2]	± 0.2 in (5 mm)	■	■	■
Repeatability[3]	0.5 mm max. dependent on range, see prior page	■	■	■
Resolution	SSI: 0.005 in (0.125 mm); RS 422: 0.04 in (1 mm)	■	■	■
Supply voltage V_S	18...30 V DC[5]	■	■	■
Ripple	≤ 5 V_{PP}[6]	■	■	■
Power consumption[7]	Standard: ≤ 6 W[7] Profibus: ≤ 8 W[7]	■	■	■
Circuit protection[9]	A, B	■	■	■
Outputs Output type	PNP/NPN	■	■	■
Voltage	Active: V_S – ≤ 2 V; Deactive: ≤ 2 V	■	■	■
Maximum current I_A	100 mA	■	■	■
Switching distance	Limit adjustable in 1 mm increments	■	■	■
Switching hysteresis	Hysteresis adjustable in 2 mm increments 0...254 mm	■	■	■
Output logic	Invertible Q/$\overline{Q}$	■	■	■
Plausibility Q_P	Active: measurement correct; Deactive: error	■	■	■
Service Q_S	Active: device OK; Deactive: early failure warning	■	■	■
Effect of compressed air	0.3 ppm/mbar	■	■	■
Effect of air temperature	1 ppm/K	■	■	■
Temperature drift	Typical 0.01 in/k (0.3 mm/k)	■		■
	Typical 0.008 in/k (0.2 mm/k)		■	
Interfaces				
SSI	SSI: GRAY/BINARY, 24 or 25 bits	■	■	
Serial interface	RS 422: 4.8/9.6/19.2/38.4 kBaud	■	■	
Profibus	Uses RS 485, automatic baud rate detection, Max. 12 MBaud			■
Measurement output rate				
SSI	1 ms	■	■	
Serial interface	RS 422 at 38.4 kBaud = 5 ms	■	■	
Profibus	1.5 ms			■
Initialization period	4 s	■		■
Max. running speed	10 m/s	■	■	■
Connection type	Plug	■	■	■
VDE protection class[8]	□	■	■	■
Enclosure rating	IP 65/NEMA 4	■	■	■
Ambient temperature T_A	Operation 14...113° F (-10...45° C)	■	■	■
	Storage -13...167° F (-25...75° C)	■	■	■
Mechanical load	IEC 68	■	■	■
Approximate weight	2.2 lb (980 g)	■	■	■

1) 23° C air temperature, 977 hPa, min warm-up period 30 min
2) Re-calibration recommended after 25,000 h
3) Environmental conditions constant, min. switching period 30 min.
4) Average service life 50,000 h at T_A = 77° F (25° C)
5) Limit values
6) May not exceed or fall short of V_S tolerances
7) Without load
8) Reference voltage 32 V DC
9) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected

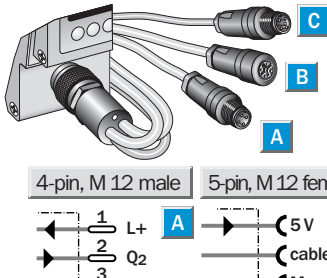
Connection diagram - standard



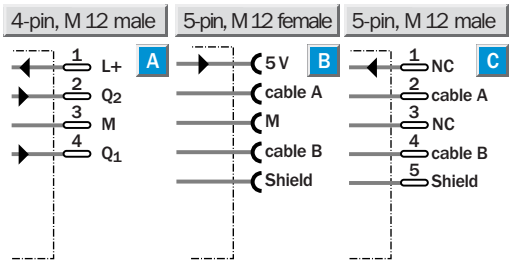
wire colors refer to standard cable, not included

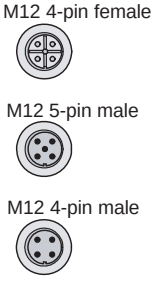


Connection diagram - PROFIBUS



Adapter not included in delivery





DME 3000 Proximity

Distance Sensors



3.9...314.9 in (100...8000 mm)
sensing range

RS 422

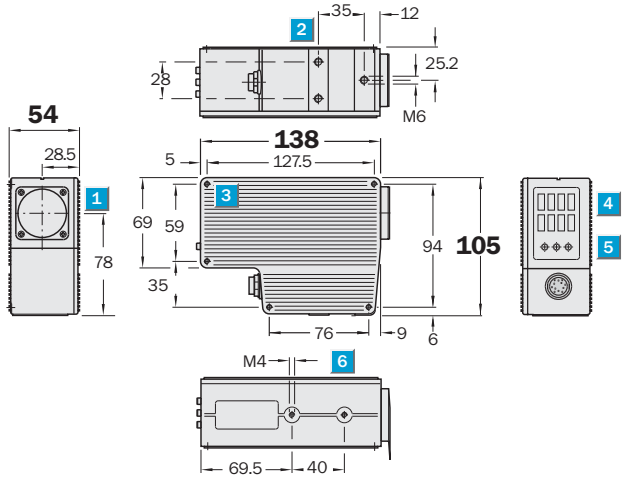
Highlights

- Visible red light for easy alignment
- Non-contact distance measurement on any surface
- Remote programmability for system flexibility
- Two programmable discrete outputs (invertible)
- Plausibility and service outputs

DME 3000-2



Dimensional drawing



dimensions in mm

Measurement range, repeatability, accuracy

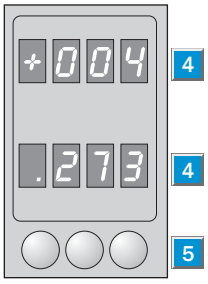
Measurement distance	1 m	2 m
Repeatability[1]		
White, 90% remission	1 mm	2 mm
Grey, 18% remission	2 mm	5 mm
Black, 6% remission	5 mm	25 mm
Accuracy[2][3]		
White, 90% remission	±5 mm	±5 mm
Grey, 18% remission	±5 mm	±10 mm
Black, 6% remission	±10 mm	±20 mm

Measurement distance	4 m	6 m
Repeatability[1]		
White, 90% remission	5 mm	10 mm
Grey, 18% remission	25 mm	–
Black, 6% remission	–	–
Accuracy[2][3]		
White, 90% remission	±10 mm	±20 mm
Grey, 18% remission	±30 mm	–
Black, 6% remission	–	–

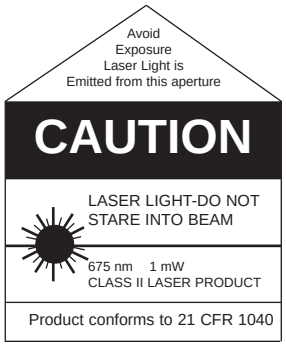
Measurement distance	8 m
Repeatability[1]	
White, 90% remission	25 mm
Accuracy[2][3]	
White, 90% remission	±30 mm

Adjustments

All types



1 Center of optical axis
2 M6 threaded mounting hole, 10 mm deep
3 M4 threaded mounting hole, 14 mm deep (this side only)
4 8-digit alphanumeric indicator
5 keypad
6 M4 threaded mounting hole, 6 mm deep



Order information

Type	Part no.
DME 3000-211S02	1 015 922
DME 3000-212	1 015 906
DME 3000-211P02	1 018 576

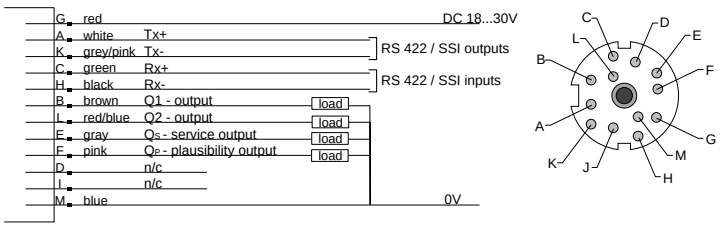
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

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Technical data	DME 3000-	211 S02	212	211 P02
Sensing range	3.9...314.9 in (100...800 mm), dependent on reflector, see measurement range chart on prior page	■	■	■
Light source[4], **light type**	Laser diode, red light	■	■	■
Light spot diameter	0.2 in at 26.2 ft (5 mm at 8 m)	■	■	■
Laser category	Class II (IEC 825-1/EN 60825-1) 21 CFR 1040.10	■	■	■
NIR blocking filter, high temp. targets	For high temp. targets up to 1600° F		■	
Accuracy[2] [3]	±0.2 in (5 mm), see prior page	■	■	■
Repeatability[1]	10.04 in (mm max) see prior page	■	■	■
Resolution	SSI: 0.005 in (0.125 mm)/RS 422: 0.04 in (1 mm)	■	■	■
Supply voltage V_S	18...30 V DC[5]	■	■	■
Ripple	≤ 5 V_{PP}[6]	■	■	■
Power consumption[7]	Standard: ≤ 6 W Profibus: ≤ 8 W	■	■	■
Circuit protection[9]	A, B	■	■	■
Outputs Output type	PNP/NPN	■	■	■
Voltage	Active: V_S – ≤ 2 V; Deactive: ≤ 2 V	■	■	■
Maximum current I_A	100 mA	■	■	■
Switching distance	Limit adjustable in 1 mm increments	■	■	■
Switching hysteresis	Hysteresis adjustable in 2 mm increments 0...254 mm	■	■	■
Output logic	Invertible Q/$\overline{Q}$	■	■	■
Averaging	1, 2, 4, 8, 16, 32, 64, 128 values; moving avg. output	■	■	■
Plausibility Q_P	Active: measurement correct/ Deactive: error	■	■	■
Service Q_S	Active: device OK/Deactive: early failure warning	■	■	■
Temperature drift	Typical 0.01 in/k (0.3 mm/k)	■	■	■
Interfaces				
SSI	SSI: GRAY/BINARY, 24 or 25 bit	■	■	
Serial interface	RS 422: 4.8/9.6/19.2/38.4 kBaud	■	■	
Profibus	Uses RS 485, automatic baud rate detection, Max. 12 MBaud			■
Measurement output rate				
SSI	21 ms min.	■	■	
Serial interface	RS 422 at 19.2 kBaud and higher: 21 ms min.	■	■	
Profibus	21 ms min.			■
Initialization period	5 s	■	■	■
Connection type	Plug	■	■	■
VDE protection class[8]	□	■	■	■
Enclosure rating	IP 65/NEMA 4	■	■	■
Ambient temperature T_A	Operation 14...113° F (-10...45° C)	■	■	■
	Storage -13...167° F (-25...75° C)	■	■	■
Mechanical load	IEC 68	■	■	■
Approximate weight	2.2 lb (980 g)	■	■	■

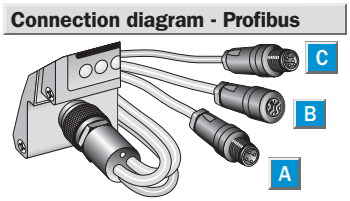
1) Environmental conditions constant, min. switching period 30 min.
2) 73° F (23° C) air temp, 977 hPA, min. switching period 30 min.
3) Re-calibration recommended after 25,000 h.
4) Average service life 50,000 h at T_A = 77° F (25° C)
5) Limit values
6) May not exceed or fall short of V_S tolerances
7) Without load
8) Reference voltage 32 V DC
9) A=V_S connections reverse-polarity protected
B= Output Q short-circuit protected

Connection diagram - Standard

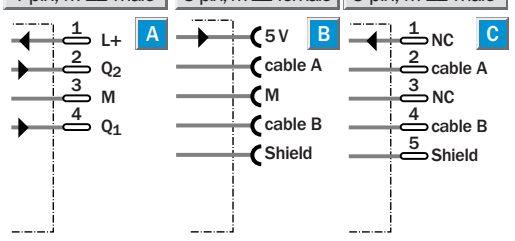


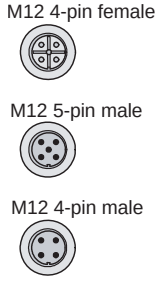
wire colors refer to standard cable, not included

Connection diagram - Profibus



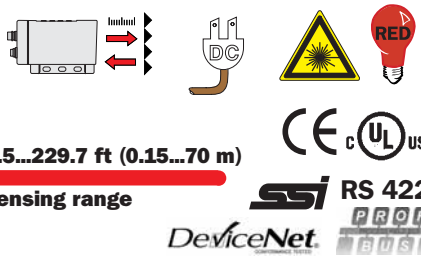
Adapter not included in delivery





DME 5000

Distance Sensors



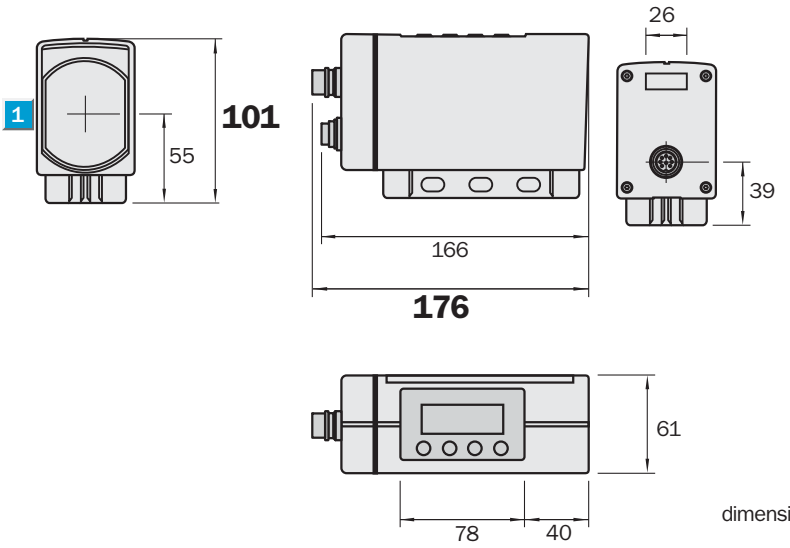
Highlights

- Visible red light for easy alignment
- Non-contact distance measurement on reflective tape
- Two programmable switching outputs
- Preset function for simple setup
- Very fast measurement and communication for quick closed loop positioning
- Special bracket for easy assembly, alignment and replacement

DME 5000



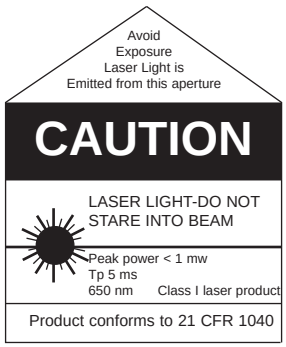
Dimensional drawing



dimensions in mm

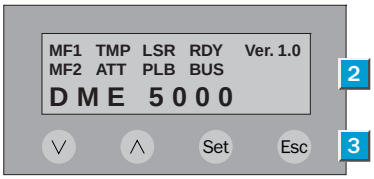
1 Center of optical axis
2 LCD display
3 keypad

Laser warning



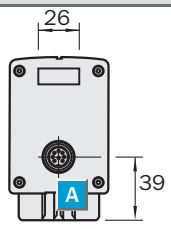
Adjustments

All types

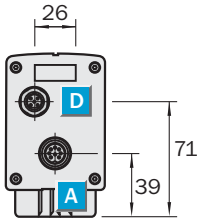


Back view

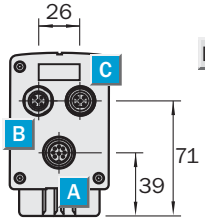
DME 5000-111
DME 5000-113



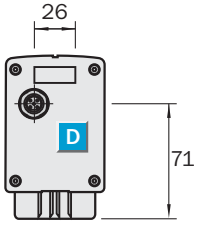
DME 5000-114



DME 5000-112



DME 5000-115



Order information

Type	Part no.	Type	Part no.
DME 5000-111	1 022 949	DME 5000-121	1 024 083
DME 5000-112	1 023 668	DME 5000-122	1 024 084
DME 5000-113	1 025 248	DME 5000-123	1 025 249
DME 5000-114	1 025 832	DME 5000-124	1 025 836
DME 5000-115	1 025 833		

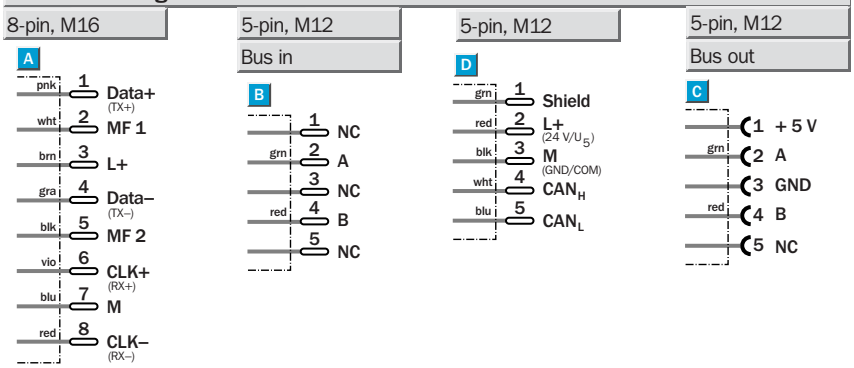
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

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Technical data		DME 5000-	111	112	113	114	115	121	122	123	124
Sensing range		0.5...229.7 ft (0.15...70 m)	■	■	■	■	■	■	■	■	■
Accuracy[1]		± 0.08 in (2 mm)	■	■	■	■	■	■	■	■	■
Repeatability[1]		0.019 in (0.5 mm)	■	■	■	■	■	■	■	■	■
Light spot diameter		Approx. 5.1 in at 229.7 (130 mm at 70 m)	■	■	■	■	■	■	■	■	■
Resolution (adjustable)		0.0019...0.2 in (0.05...5 mm)	■	■	■	■	■	■	■	■	■
Light source[2], **light type**		Laser diode, red light	■	■	■	■	■	■	■	■	■
Laser category		Class II (IEC 60825-1/EN 60825-1) 21 CFR 1040.10	■	■	■	■	■	■	■	■	■
Supply voltage V_S[3]		18...30 V DC	■	■	■	■	■	■	■	■	■
Ripple[4]		≤ 5 V_{PP}	■	■	■	■	■	■	■	■	■
Power consumption		≤ 250 mA at DC 24 V	■	■	■	■	■				
		with heating ≤ 1000 mA						■	■	■	■
Circuit protection[6]		A, B	■	■	■	■	■	■	■	■	■
Outputs											
Output type		PNP, NPN	■	■	■	■		■	■	■	■
Voltage	Output (MF1/MF2)	Active: V_S-≤ 3 V; Deactive: < 2 V	■	■	■	■		■	■	■	■
	Input (MF1)	Active: > 12 V; Deactive: < 3 V	■	■	■	■		■	■	■	■
Maximum current[7]		100 mA	■	■	■	■		■	■	■	■
Switching distance		Set upper and lower switch points, 1 mm increments	■	■	■	■		■	■	■	■
Output logic		Outputs invertible (active, deactive)	■	■	■	■		■	■	■	■
Plausibility Q_p		Active - faulty measured value	■	■	■	■		■	■	■	■
Service Q_S		Programmable; active - prefailure warning	■	■	■	■		■	■	■	■
Effect of compressed air		0.3 ppm/mbar	■	■	■	■	■	■	■	■	■
Effect of air temperature		1 ppm/K	■	■	■	■	■	■	■	■	■
Temperature drift		Typ. 0.004 in/k (0.1 mm/k)	■	■	■	■	■	■	■	■	■
Interface		SSI (GRAY/Binary 24 or 25 bit)	■					■			
		Profibus 12 MBd		■					■		
		RS 422			■					■	
		DeviceNet 500 KBd				■	■				■
Serial/ SSI Baud rate		4.8k, 9.2k, 19.2k, 38.4k, 115.2k, Baud	■		■			■		■	
Measurement output rate											
		1 ms	■					■			
		2 ms		■	■	■	■		■	■	■
Initialization period		500 ms	■	■	■	■	■	■	■	■	■
Max. travel speed		10 m/s	■	■	■	■	■	■	■	■	■
VDE protection class[5]		⧈	■	■	■	■	■	■	■	■	■
Enclosure rating		IP 65	■	■	■	■	■	■	■	■	■
Ambient temperature		Operation 14...131° F (-10...55° C)	■	■	■	■	■				
		with heating Operation -40...131° F (-40...55° C)						■	■	■	■
		Storage -13...167° F (-25...75° C)	■	■	■	■	■	■	■	■	■
Approximate weight		58.2 oz (1650 g)	■	■	■	■	■	■	■	■	■
EMC		EN 61000-6-2, EN 55011: class B	■	■	■	■	■	■	■	■	■
Mechanical load		Shock: IEC 68-2-27, IEC 68-2-29	■	■	■	■	■	■	■	■	■
		Sine: IEC 68-2-6, Noise: IEC 68-2-64	■	■	■	■	■	■	■	■	■

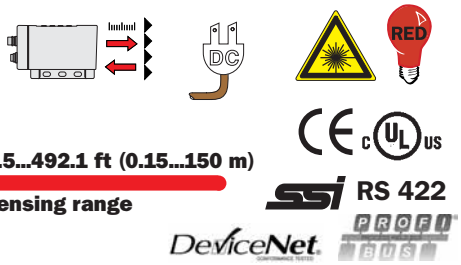
1) Environmental conditions constant, 10 min. warm-up period
2) Average service life 50,000 h at T_A = +77° F (25° C)
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Reference voltage 32 V DC
6) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
7) Max. 100 nF/20mH

Connection diagram



DME 5000

Distance Sensors



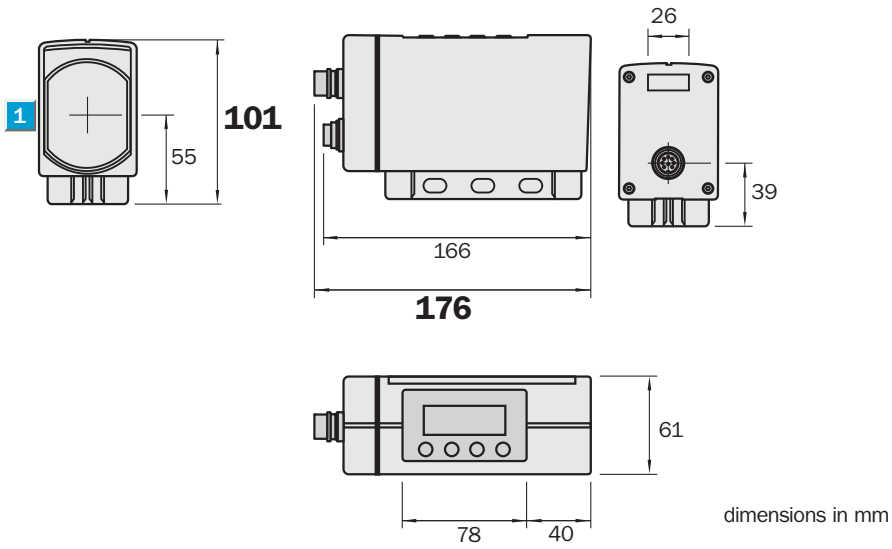
Highlights

- Visible red light for easy alignment
- Non-contact distance measurement on reflective tape
- Two programmable switching outputs
- Preset function for simple set up
- Very fast measurement and communication for quick closed loop positioning
- Special bracket for easy assembly, alignment and replacement

DME 5000

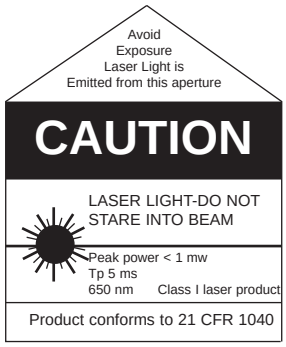


Dimensional drawing



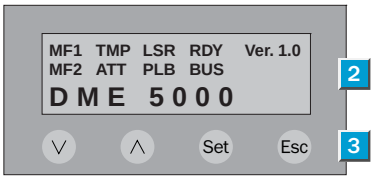
dimensions in mm

Laser warning



Adjustments

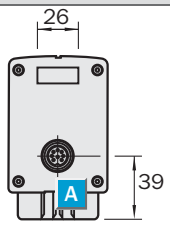
All types



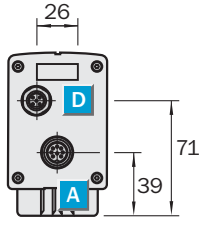
1 Center of optical axis
2 LCD display
3 keypad

Back view

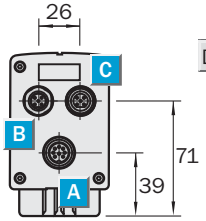
DME 5000-211
DME 5000-213



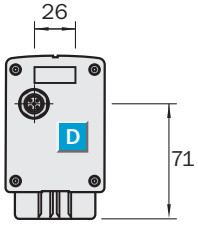
DME 5000-214



DME 5000-212



DME 5000-215



Order Information

Type	Part no.	Type	Part no.
DME 5000-211	1 024 081	DME 5000-221	1 024 085
DME 5000-212	1 024 082	DME 5000-222	1 024 086
DME 5000-213	1 025 250	DME 5000-223	1 025 251
DME 5000-214	1 025 834	DME 5000-224	1 025 837
DME 5000-215	1 025 835		

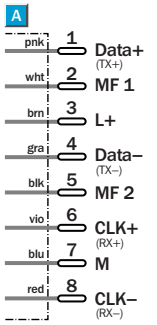
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

Technical data		DME 5000-	211	212	213	214	215	221	222	223	224
Sensing range	0.5...492.1 ft (0.15...150 m)		■	■	■	■	■	■	■	■	■
Accuracy[1]	±0.11 in (3 mm)		■	■	■	■	■	■	■	■	■
Repeatability[1]	0.04 in (1 mm)		■	■	■	■	■	■	■	■	■
Light spot diameter	Approx. 10.6 in at 492.1 (270 mm at 150 m)		■	■	■	■	■	■	■	■	■
Resolution (adjustable)	0.0019...0.2 in (0.05...5 mm)		■	■	■	■	■	■	■	■	■
Light source[2], **light type**	Laser diode, red light		■	■	■	■	■	■	■	■	■
Laser category	Class II (IEC 60825-1/EN 60825-1) 21 CFR 1040.10		■	■	■	■	■	■	■	■	■
Supply voltage V_S[3]	18...30 V DC		■	■	■	■	■	■	■	■	■
Ripple[4]	≤ 5 V_{PP}		■	■	■	■	■	■	■	■	■
Power consumption	≤ 250 mA at DC 24 V		■	■	■	■	■				
	with heating ≤ 1000 mA							■	■	■	■
Circuit protection[6]	A, B		■	■	■	■	■	■	■	■	■
Outputs											
Output type	PNP, NPN		■	■	■	■		■	■	■	■
Voltage Output (MF1/MF2)	Active: V_S-≤ 3 V; Deactive: < 2 V		■	■	■	■		■	■	■	■
Input (MF1)	Active: > 12 V; Deactive: < 3 V		■	■	■	■		■	■	■	■
Maximum current[7]	100 mA		■	■	■	■		■	■	■	■
Switching distance	Set upper and lower switch points, 1 mm increments		■	■	■	■		■	■	■	■
Output logic	Outputs invertible (active, deactive)		■	■	■	■		■	■	■	■
Plausibility Q_p	Active - faulty measured value		■	■	■	■		■	■	■	■
Service Q_S	Programmable; active - prefailure warning		■	■	■	■		■	■	■	■
Effect of compressed air	0.3 ppm/mbar		■	■	■	■	■	■	■	■	■
Effect of air temperature	1 ppm/K		■	■	■	■	■	■	■	■	■
Temperature drift	Typ. 0.004 in/k (0.1 mm/k)		■	■	■	■	■	■	■	■	■
Interface	SSI (GRAY/Binary 24 or 25 bit)		■					■			
	Profibus 12 MBd			■					■		
	RS 422				■					■	
	DeviceNet 500 KBd					■	■				■
Serial/SSi Baud rate	4.8k, 9.2k, 19.2k, 38.4k, 115.2k, Baud		■		■			■		■	
Measurement output rate											
	2 ms		■	■	■	■	■	■	■	■	■
Initialization period	500 ms		■	■	■	■	■	■	■	■	■
Max. travel speed	10 m/s		■	■	■	■	■	■	■	■	■
VDE protection class[5]	⧈		■	■	■	■	■	■	■	■	■
Enclosure rating	IP 65		■	■	■	■	■	■	■	■	■
Ambient temperature	Operation 14...131° F (-10...55° C)		■	■	■	■	■				
	with heating Operation -40...131° F (-40...55° C)							■	■	■	■
	Storage -13...167° F (-25...75° C)		■	■	■	■	■	■	■	■	■
Approximate weight	58.2 oz (1650 g)		■	■	■	■	■	■	■	■	■
EMC	EN 61000-6-2, EN 55011: class B		■	■	■	■	■	■	■	■	■
Mechanical load	Shock: IEC 68-2-27, IEC 68-2-29		■	■	■	■	■	■	■	■	■
	Sine: IEC 68-2-6, Noise: IEC 68-2-64		■	■	■	■	■	■	■	■	■

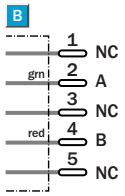
1) Environmental conditions constant, 10 min. warm-up period
2) Average service life 50,000 h at T_A = +77° F (25° C)
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Reference voltage 32 V DC
6) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
7) Max. 100 nF/20mH

Connection diagram

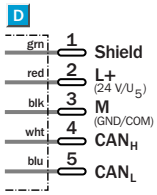
8-pin, M16



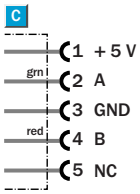
5-pin, M12
Bus in



5-pin, M12

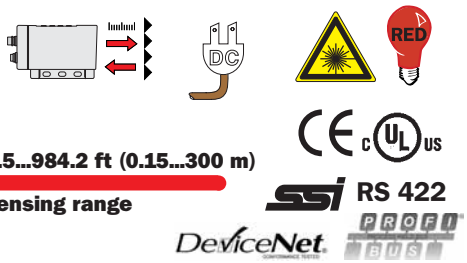


5-pin, M12
Bus out



DME 5000

Distance Sensors



0.5...984.2 ft (0.15...300 m)
sensing range

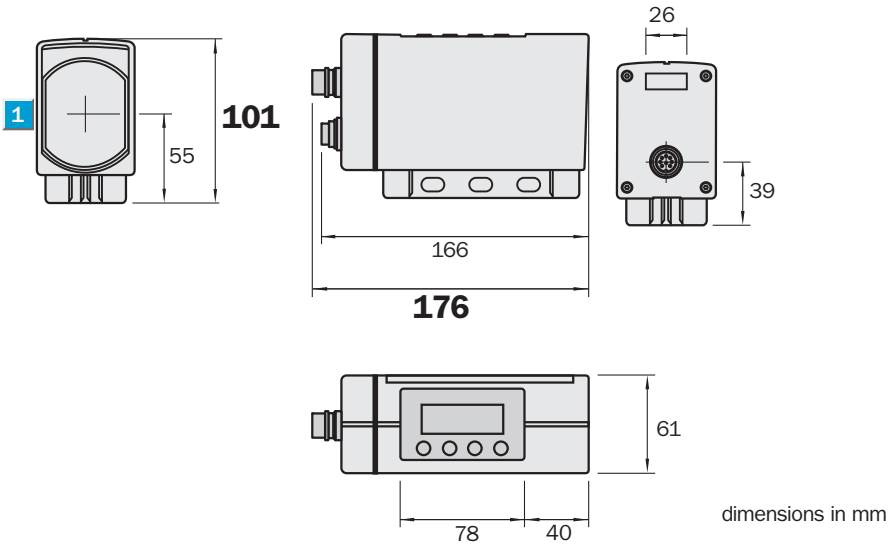
Highlights

- Visible red light for easy alignment
- Non-contact distance measurement on reflective tape
- Two programmable switching outputs
- Preset function for simple set up
- Very fast measurement and communication for quick closed loop positioning
- Special bracket for easy assembly, alignment and replacement

DME 5000

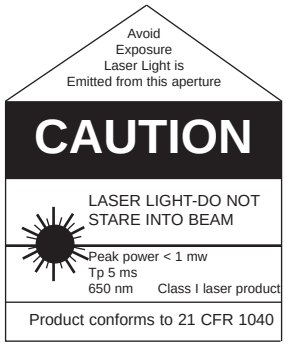


Dimensional drawing



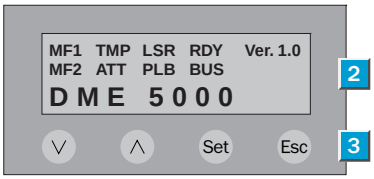
dimensions in mm

Laser warning



Adjustments

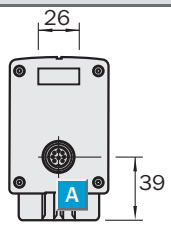
All types



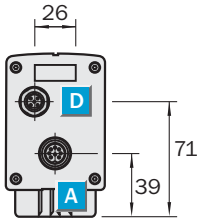
1 Center of optical axis
2 LCD display
3 keypad

Back view

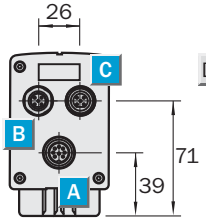
DME 5000-311
DME 5000-313



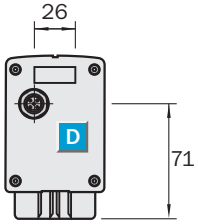
DME 5000-314



DME 5000-312



DME 5000-315



Order information

Type	Part no.	Type	Part no.
DME 5000-311	1 025 244	DME 5000-321	1 025 246
DME 5000-312	1 025 245	DME 5000-322	1 025 247
DME 5000-313	1 025 252	DME 5000-323	1 025 253
DME 5000-314	1 026 002	DME 5000-324	1 026 004
DME 5000-315	1 026 003		

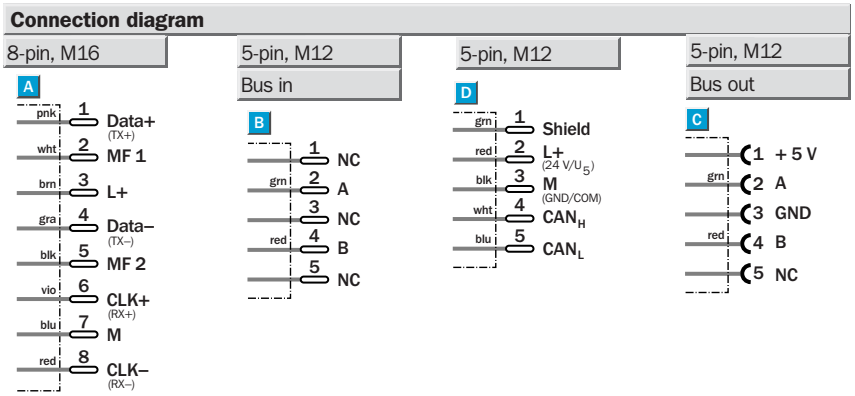
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special accessories	1314

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Technical data		DME 5000-	311	312	313	314	315	321	322	323	324
Sensing range		0.5...984.2 ft (0.15...300 m)	■	■	■	■	■	■	■	■	■
Accuracy[1]		±0.20 in (±5 mm)	■	■	■	■	■	■	■	■	■
Repeatability[1]		0.08 in (20 mm)	■	■	■	■	■	■	■	■	■
Light spot diameter		Approx. 5.1 in at 229.7 (550 mm at 300 m)	■	■	■	■	■	■	■	■	■
Resolution (adjustable)		0.0019...0.2 in (0.05...5 mm)	■	■	■	■	■	■	■	■	■
Light source[2], **light type**		Laser diode, red light	■	■	■	■	■	■	■	■	■
Laser category		Class II (IEC 60825-1/EN 60825-1) 21 CFR 1040.10	■	■	■	■	■	■	■	■	■
Supply voltage V_S[3]		18...30 V DC	■	■	■	■	■	■	■	■	■
Ripple[4]		≤ 5 V_{PP}	■	■	■	■	■	■	■	■	■
Power consumption		≤ 250 mA at DC 24 V	■	■	■	■	■				
		with heating ≤ 1000 mA						■	■	■	■
Circuit protection[6]		A, B	■	■	■	■	■	■	■	■	■
Outputs											
Output type		PNP, NPN	■	■	■	■		■	■	■	■
Voltage	Output (MF1/MF2)	Active: V_S-≤ 3 V; Deactive: < 2 V	■	■	■	■		■	■	■	■
	Input (MF1)	Active: > 12 V; Deactive: < 3 V	■	■	■	■		■	■	■	■
Maximum current[7]		100 mA	■	■	■	■		■	■	■	■
Switching distance		Set upper and lower switch points, 1 mm increments	■	■	■	■		■	■	■	■
Output logic		Outputs invertible (active, deactive)	■	■	■	■		■	■	■	■
Plausibility Q_p		Active - faulty measured value	■	■	■	■		■	■	■	■
Service Q_S		Programmable; active - prefailure warning	■	■	■	■		■	■	■	■
Effect of compressed air		0.3 ppm/mbar	■	■	■	■	■	■	■	■	■
Effect of air temperature		1 ppm/K	■	■	■	■	■	■	■	■	■
Temperature drift		Typ. 0.004 in/k (0.1 mm/k)	■	■	■	■	■	■	■	■	■
Interface		SSI (GRAY/Binary 24 or 25 bit)	■					■			
		Profibus 12 MBd		■					■		
		RS 422			■					■	
		DeviceNet 500 KBd				■	■				■
Serial/SSI Baud rate		4.8k, 9.2k, 19.2k, 38.4k, 115.2k, Baud	■		■			■		■	
Measurement output rate											
		2 ms	■	■	■	■	■	■	■	■	■
Initialization period		500 ms	■	■	■	■	■	■	■	■	■
Max. travel speed		10 m/s	■	■	■	■	■	■	■	■	■
VDE protection class[5]		□	■	■	■	■	■	■	■	■	■
Enclosure rating		IP 65	■	■	■	■	■	■	■	■	■
Ambient temperature		Operation 14...131° F (-10...55° C)	■	■	■	■	■				
		with heating Operation -40...131° F (-40...55° C)						■	■	■	■
		Storage -13...167° F (-25...75° C)	■	■	■	■	■	■	■	■	■
Approximate weight		58.2 oz (1650 g)	■	■	■	■	■	■	■	■	■
EMC		EN 61000-6-2, EN 55011: class B	■	■	■	■	■	■	■	■	■
Mechanical load		Shock: IEC 68-2-27, IEC 68-2-29	■	■	■	■	■	■	■	■	■
		Sine: IEC 68-2-6, Noise: IEC 68-2-64	■	■	■	■	■	■	■	■	■

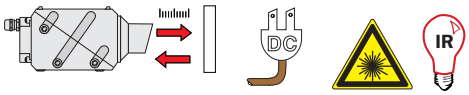
1) Environmental conditions constant, 10 min. warm-up period
2) Average service life 50,000 h at T_A = +77° F (25° C)
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Reference voltage 32 V DC
6) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
7) Max. 100 nF/20mH

Connection diagram



DMT 10-2 Serial, Analog

Distance Sensors



1.6...508.3 ft (0.5...155 m)
sensing range

RS 232
RS 422
Analog

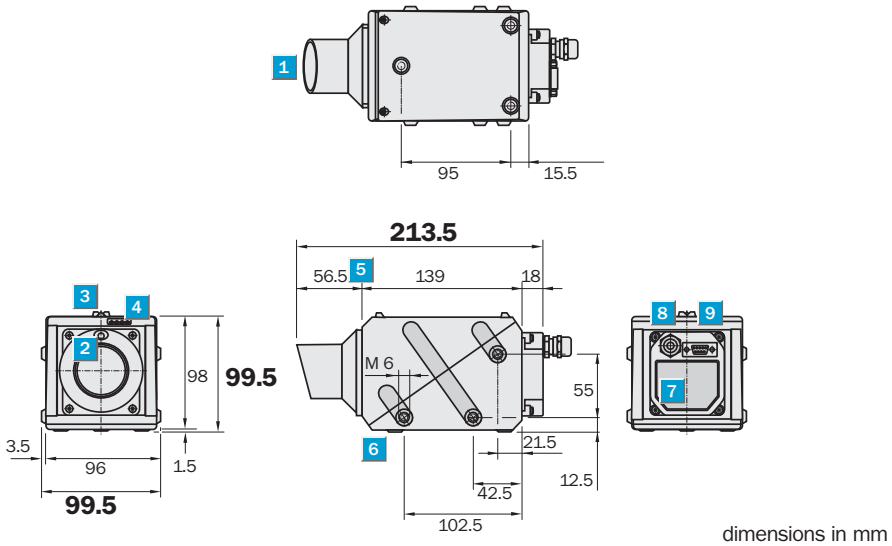
Highlights

- Excellent measurement accuracy due to time-of-flight measurement
- Infared laser for difficult atmospheric conditions and discrete sensing
- Simple adjustment using visible laser light
- Two programmable switching outputs
- RS 422/RS232 serial interface
- Analog output

DMT 10-2

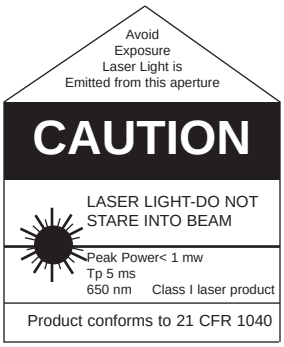


Dimensional drawing



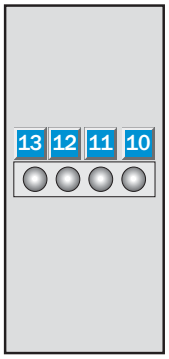
dimensions in mm

Laser warning



Adjustments

All types



1	Dust protection tube
2	Laser pointer pilot light - Class I
3	Alignment sight
4	Function indicator (4 LEDs)
5	Measurement zero point
6	Mounting hole M6 threaded – 6 mm deep
7	Plug cover
8	PG 9 terminal chamber
9	Plug, sub D 9-pin
10	Plausibility (measurement error) LED red
11	Power indicator, LED green
12	Q_1 output indicator
13	Q_2 output indicator

Measurement range, repeatability, accuracy

Sensing range[1]	1 m	10 m	40 m	65 m	155 m
Accuracy					
Object with 90% remission	10 m	10 m	10 m	10 m	10 m
Object with 18% remission	10 m	10 m	10 m	10 m	-
Object with 6% remission	10 m	10 m	10 m	-	-
Repeatability[7]					
Object with 90% remission	7 m	7 m	7 m	7 m	10 m
Object with 18% remission	7 m	7 m	7 m	10 m	-
Object with 6% remission	7 m	7 m	10 m	-	-
Resolution	0.04 in (1 mm)				

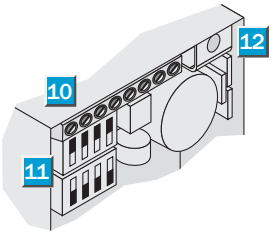
Order information

Type	Part no.
DMT10-2-1111	1 027 603
DMT10-2-1113	1 027 605
DMT10-2-2111	1 028 540

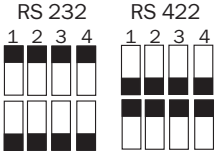
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Connection diagram

All types



DIP Switch Setting



Terminals
DIP switch RS 232/RS 422 switch
Cable shield ground

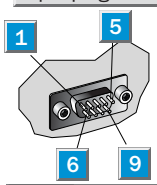
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Technical data	DMT 10-2	1111	1113	2111
Sensing range	1.6...508.5 ft (0.5...155 m)	■		■
	0.5...20 m, max. object temp. 1200° C		■	
Light spot diameter/distance	20 mm + (5 mm x distance in m)	■	■	■
Light source[1], light type	Laser diode, infrared light	■	■	■
Laser category	1 (EN 60825-1: NOV. 2001:	■	■	■
	IEC 60825-1:AM2:2001)	■	■	■
Alignment laser	Red Light	■	■	■
Accuracy	± 0.4 in (10 mm)	■	■	■
Repeatability	0.3 in (7 mm)	■	■	■
Resolution	0.04 in (1 mm)	■	■	■
Supply voltage V_S	18...30 V DC[2]	■	■	■
Ripple	≤ 5 V_{PP}[3]	■	■	■
Power consumption	≤ 6 W[4]	■	■	■
Circuit protection[6]	A, B	■	■	■
Outputs				
Output type	Open collector[10]	■	■	■
Input L+/Q, Q_A[4) 5)]	+5...30 V DC, supply Q1/Q2[8]	■	■	■
Maximum current	100 mA	■	■	■
Switching distance	Programmable upper and lower switch points	■	■	■
Averaging	1/16/64/256/1024 values[9]	■	■	■
Analog	4...20 mA, scalable	■	■	■
Temperature drift		■	■	
32...104° F (0° C...+40° C)	Typ. 0.01 in/k (0.3 mm/k)	■	■	
13...32° F (-10° C...0° C); 104...131° F (+40° C...+55° C)	Typ. 0.02 in/k (0.6 mm/k)	■	■	
14...131° F (-10 ° C...+55 ° C)	Typ. 0.1 in/k (3.0 mm/k)			■
Response Time				
	Max. 1025 ms	■	■	
	1 ms			■
Measurement output rate				
Serial interface (no PROFIBUS)	RS 232, 422 switchable, output rate 1, 16, 64, 256, 1024 ms[3]	■	■	■
Initialization period	6 s	■	■	■
Connection type	Plug, Sub D 9-pin, PG 9 terminal chamber	■	■	■
VDE protection class[5]	III	■	■	■
Enclosure rating	IP 65	■	■	■
Ambient temperature T_A	Operation -10...55 ° C (14 ° F...131 ° F)	■	■	■
	Storage -13...158 ° F (-25...70 ° C)	■	■	■
Approximate weight	42.3 oz (1200 g)	■	■	■

1) Average service life 50,000 h at T_A = 77° F (25° C)
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Reference voltage 50 V DC, PELV voltage (EN 50178)
6) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
7) Environmental conditions constant, minimal switching period 30 min
8) Must use isolated power supply (PELV)
9) Moving or block average output
10) Q_2 not available when analog is active
11) Dependent on averaging value

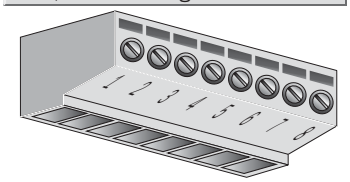
Connection diagram

9-pin plug Sub D Male RS 232/422



	Signal	Significance
1	nRESET	Reset input (hardware reset)
2	RxD	RS 232 input
3	TxD	RS 232 output
4	NC	Not connected
5	GND	Signal ground
6	NC	Not connected
7	NC	Not connected
8	NC	Not connected
9	NC	Not connected

PG 9, terminal assignment

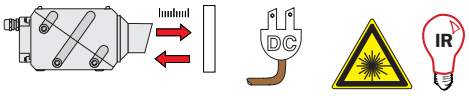


	Signal	Significance
1	L+	18...30 V DC
2	M	Ground 0V
3	Q_1	Output
4	Q_2[10]	Output
5	L+/Q	V DC in Q1 Q2 output*
6	M/Q_A	Analog ground
7	Q_A	Analog out
8	NC	Not connected

*External voltage 5...30 V DC supply only with protective extra low voltage (100 ma max supply current)

DMT 10-2 PROFIBUS

Distance Sensors



1.6...508.3 ft (0.5...155 m)
sensing range

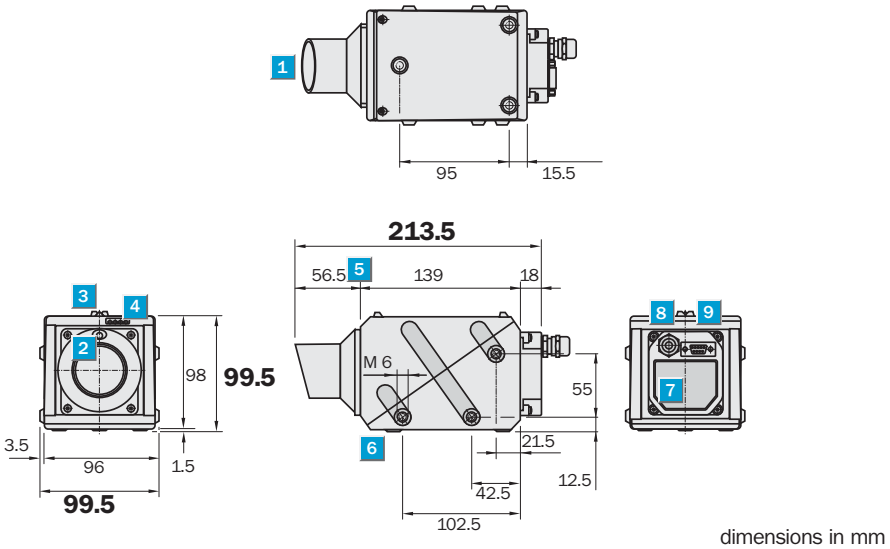
Highlights

- Excellent measurement accuracy due to time-of-flight measurement
- Infared Laser for difficult atmospheric conditions and discrete sensing
- Simple adjustment using pilot light
- Freely programmable parameters
- Profibus/RS 232 interface

DMT 10-2

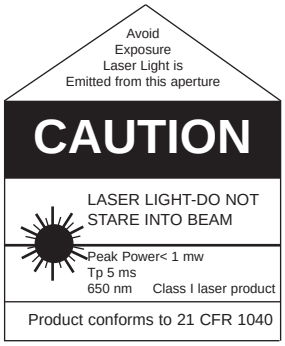


Dimensional drawing



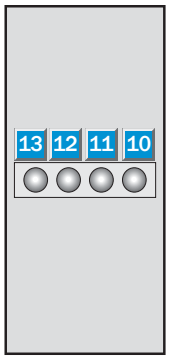
dimensions in mm

Laser warning



Adjustments

All types



1	Dust protection tube
2	Laser pointer pilot light - Class I
3	Alignment sight
4	Function indicator (4 LEDs)
5	Measurement zero point
6	Mounting hole M6 threaded – 6 mm deep
7	Plug cover
8	PG 9 terminal chamber
9	Plug, sub D 9-pin
10	Plausibility (measurement error) LED red
11	Power indicator, LED green
12	Q_1 output indicator
13	Q_2 output indicator

Measurement range, repeatability, accuracy

Sensing range[1]	1 m	10 m	40 m	65 m	155 m
Accuracy					
Object with 90% remission	10 m	10 m	10 m	10 m	10 m
Object with 18% remission	10 m	10 m	10 m	10 m	-
Object with 6% remission	10 m	10 m	10 m	-	-
Repeatability[7]					
Object with 90% remission	7 m	7 m	7 m	7 m	10 m
Object with 18% remission	7 m	7 m	7 m	10 m	-
Object with 6% remission	7 m	7 m	10 m	-	-
Resolution	0.04 in (1 mm)				

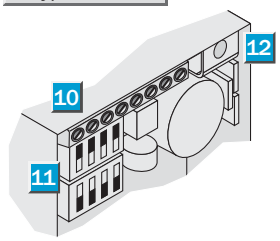
Order information

Type	Part no.
DMT10-2-1211	1 027 604
DMT10-2-1213	1 027 606
DMT10-2-2211	1 028 541

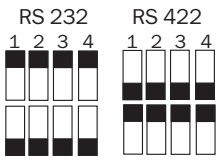
Accessories	page
Cables and connectors	1180
Mounting systems	1234

Connection diagram

All types



DIP Switch Setting



Terminals
DIP switch RS 232/RS 422 switch
Cable shield ground

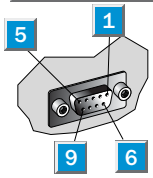
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Technical data	DMT 10-2	1211	1213	2211
Sensing range	1.6...508.5 ft (0.5...155 m)	■		■
	0.5...20 m, max. object temp. 1200° C		■	
Light spot diameter/distance	20 mm + (5 mm x distance in m)	■	■	■
Light source[1], light type	Laser diode, infrared light	■	■	■
Laser category	1 (EN 60825-1: NOV 2001;	■	■	■
	IEC 60825-1:AM2:2001)	■	■	■
Alignment laser	Red Light	■	■	■
Accuracy	± 0.4 in (10 mm)	■	■	■
Repeatability	0.3 in (7 mm)	■	■	■
Resolution	0.04 in (1 mm)	■	■	■
Supply voltage V_S	18...30 V DC[2]	■	■	■
Ripple	≤ 5 V_{PP}[3]	■	■	■
Power consumption	≤ 6 W[4]	■	■	■
Circuit protection[6]	A, B	■	■	■
Input L+/Q, Q_A[4] [5]	+5...30 V DC, supply Q1/Q2[8]	■	■	■
Maximum current	100 mA	■	■	■
Switching distance	Programmable upper and lower switch points	■	■	■
Averaging	1/16/64/256/1024 values[9]	■	■	■
Analog	4...20 mA, Scalable	■	■	■
Temperature drift		■	■	■
32...104° F (0...+40° C)	Typ. 0.01 in/k (0.3 mm/k)	■	■	
13...32° F (-10...0° C); 104...131° F (+40... +55° C)	Typ. 0.02 in/k (0.6 mm/k)	■	■	
14...131° F (-10... +55° C)	Typ. 0.1 in/k (3.0 mm/k)			■
Response Time				
	Max. 1025 ms	■	■	
	1 ms			■
Measurement output rate				
Serial interface (no PROFIBUS)	RS 232, 422 switchable, output rate 1, 16, 64, 256, 1024 ms[11]	■	■	■
Initialization period	6 s	■	■	■
Connection type	Plug, Sub D 9-pin, PG 9 terminal chamber	■	■	■
VDE protection class[5]	III	■	■	■
Enclosure rating	IP 65	■	■	■
Ambient temperature T_A	Operation -10...55° C (14 ° F...131° F)	■	■	■
	Storage -13...158° F (-25...70° C)	■	■	■
Approximate weight	42.3 oz (1200 g)	■	■	■

1) Average service life 50,000 h at T_A = 77° F (25° C)
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Reference voltage 50 V DC, PELV voltage (EN 50178)
6) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
7) Environmental conditions constant, minimal switching period 30 min
8) Must use isolated power supply (PELV)
9) Moving or block average output
10) Q_2 not available when analog is active
11) Dependent on averaging value

Connection diagram

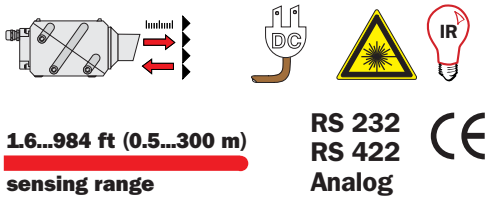
9-pin plug Sub D Female



	Signal	Significance
1	NC	Not connected
2	NC	Not connected
3	B	Profibus line B 9RXD/TXD+)
4	RTS	Control signal (direction detection LWL)
5	GND	Signal ground
6	+ 5 V	With reference to GND, pin 5
7	NC	Not connected
8	A	Profibus line A (RXD/TXD+)
9	NC	Not connected

DML 40-2

Distance Sensors



1.6...984 ft (0.5...300 m)
sensing range

RS 232
RS 422
Analog

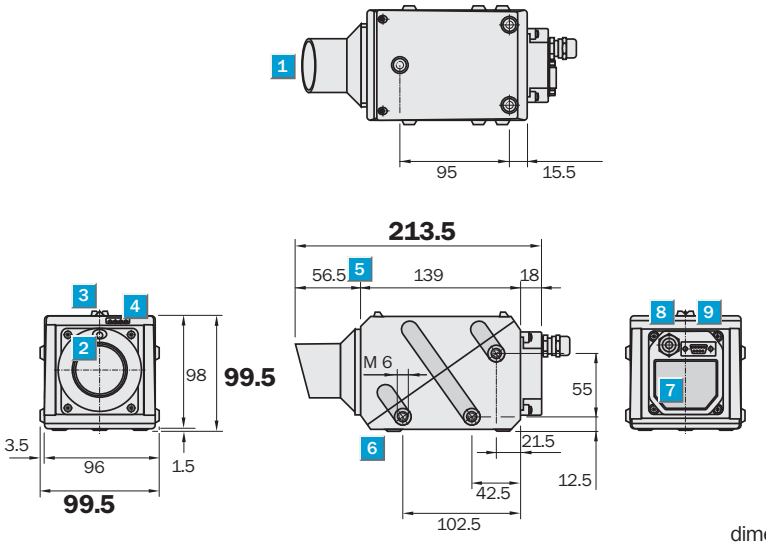
Highlights

- Excellent measurement accuracy due to time-of-flight measurement
- Simple adjustment using pilot light
- Freely programmable parameters - 2 switching outputs
- RS 422/RS 232 serial interface analog output
- Analog output

DML 40

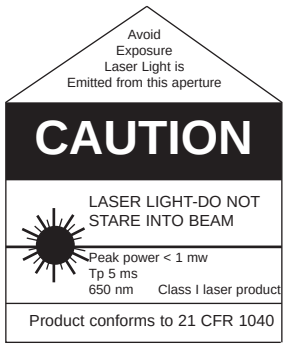


Dimensional drawing



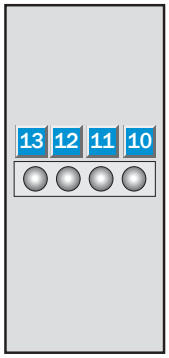
dimensions in mm

Laser warning



Adjustments

All types



1	Dust protection tube
2	Laser pointer pilot light - Class I
3	Alignment sight
4	Function indicator (4 LEDs)
5	Measurement zero point
6	Mounting hole M6 threaded – 6 mm deep
7	Plug cover
8	PG 9 terminal chamber
9	Plug, sub D 9-pin
10	Q_2 output indicator
11	Q_1 output indicator
12	Power indicator, LED green
13	Plausibility (measurement error) LED red

Measurement range, repeatability, accuracy

Sensing range

1.6...3609 ft (0.5...1100 m) / OP 55 reflector

1.6...1968.5 ft (0.5...600 m) / PL 880F reflector

1.6...984 ft (0.5...300 m) / diamond grade tape

Accuracy[7)8)9)]

± 0.4 in (10 mm)

Repeatability[7)8)9)]

0.2 in (6 mm)

Resolution

0.04 in (1 mm) maximum

Order information

Type	Part no.
DML 40-2-1111	1 027 607

Accessories	page
Cables and connectors	1180
Mounting systems	1234

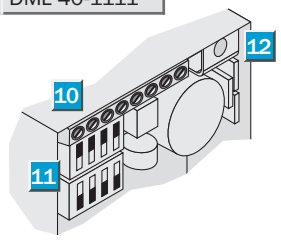
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Technical data	DML 40-2	1111								
Sensing range	1.6...3609 ft (0.5...1100 m) / OP 55 reflector									
	1.6...1968.5 ft (0.5...600 m) / PL 880F reflector									
	1.6...984 ft (0.5...300 m) / diamond grade tape									
Light spot diameter	1.0 in at 3.3 ft (25 mm at 1 m), 2.8 in at 32.8 ft									
	(70 mm at 10 m), 20.5 in at 328.1 ft (520 mm at 100 m)									
Light source[1], light type	Laser diode, infrared light									
Laser category	Class I (IEC 825-1/EN 60825-1:Nov 2001)									
Alignment laser	Class II (IEC 60825), visible red, 21 CFR 1040-10									
Accuracy[7)8)9)]	± 0.4 in (10 mm)									
Repeatability[7)8)9)]	0.2 in (6 mm)									
Resolution	0.04 in (1 mm) maximum									
Supply voltage V_S	18...30 V DC[2)]									
Ripple	≤ 5 V_{PP}[3)]									
Power consumption	≤ 6 W[4)]									
Circuit protection[6)]	A, B									
Outputs										
Output type	Open collector[10)]									
Voltage	Input L+/Q +5...+30 V DC supply for Q_1/Q_2 [11)]									
Maximum current	100 mA									
Switching distance	Set upper and lower switch points									
Output logic	Invertible Q/$\bar{Q}$									
Averaging	16/64/256/1024 values; moving or block average output									
Analog	4...20 mA, scalable									
Temperature drift	Typ. 0.01 in/k (0.3 mm/k)									
Interface										
Serial	RS 232 and RS 422, ASCII text or binary									
Baud rate	1.2, 2.4, 4.8, 9.6, 19.2, 38.4 kBaud									
Measurement output rate										
Serial interface	3.2/12.8/50/200 ms dependent on averaging value									
Analog	500 ms									
Initialization period	6 s									
Connection type	Plug, Sub D 9-pin/PG 9 terminal chamber									
VDE protection class[5)]	III									
Enclosure rating	IP 65									
Ambient temperature T_A	Operation 32...104° F (0...40° C)									
	Storage-13...158° F (-25...70° C)									
Approximate weight	42.3 oz (1200 g)									

1) Average service life 50,000 h at T_A = 77° F (25° C)
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Reference voltage 50 V DC PELV voltage (EN 50178)
6) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
7) Environmental conditions constant, minimal switching period 30 min
8) 73° F (23° C) air temperature, 977 hPa, minimal switching period 30 min
9) Recalibration recommended after 25,000 h
10) Q_2 not available when analog is active
11) Must use isolated power supply PELV (Protective Extra Low Voltage)

Connection diagram

DML 40-1111

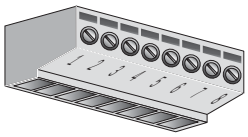


10 Terminals
11 DIP switch RS 232/RS 422 switch
12 Cable shield ground

DIP Switch Setting

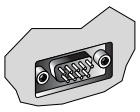


PG 9, terminal assignment



	Signal	Significance
1	L+	18...30 V DC
2	M	Ground 0V
3	Q_1	Output
4	Q_2[10)]	Output
5	L+/Q[11)]	V DC in Q1 Q2 output (PELV)
6	M/Q_A	Analog ground
7	Q_A	Analog out
8	NC	Not connected

9-pin plug Sub D



	Signal	Significance
1	NC	Not connected
2	RxD	RS 232 input
3	TxD	RS 232 output
4	NC	Not connected
5	GND	Signal ground
6	Tx +	RS 422 output
7	Tx -	RS 422 output
8	Rx +	RS 422 input
9	Rx -	RS 422 input

DML 40-2 PROFIBUS

Distance Sensors



1.6...984 ft (0.5...300 m)
sensing range

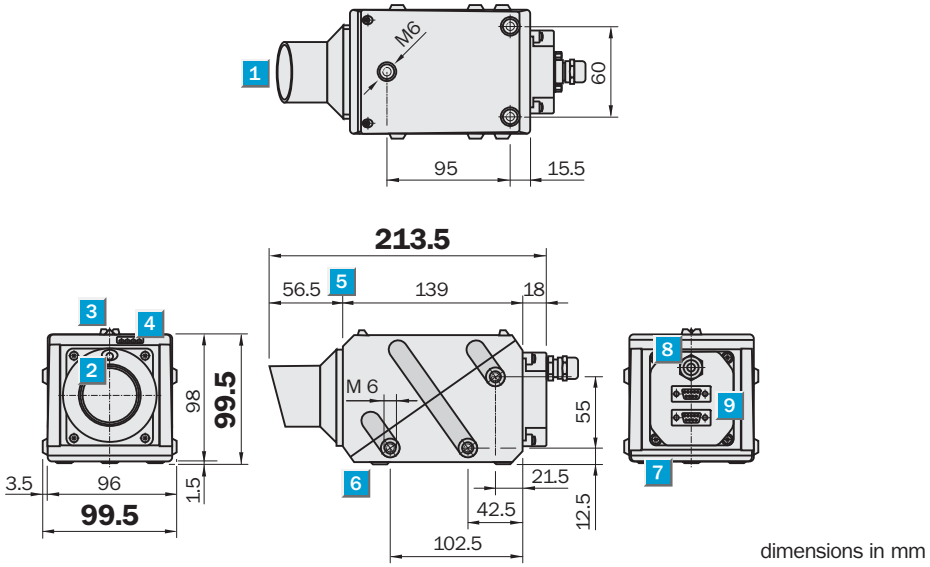
Highlights

- Excellent measurement accuracy due to time-of-flight measurement
- Simple adjustment using pilot light
- Freely programmable parameters
- PROFIBUS/RS 232 serial interface

DML 40

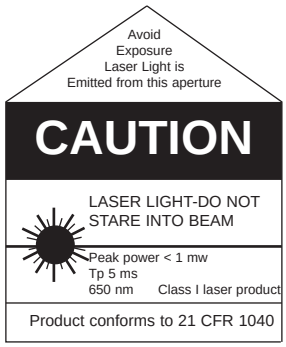


Dimensional drawing



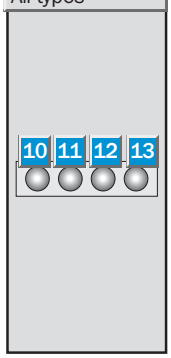
dimensions in mm

Laser warning



Adjustments

All types



1	
2	Dust protection tube
3	Laser pointer pilot light - Class I
4	Alignment sight
5	Function indicator (4 LEDs)
6	Measurement zero point
7	M6 mounting hole threaded – 6 mm deep
8	Plug cover
9	PG 9 terminal chamber
10	Plug, sub D 9-pin
11	Plausibility (measurement error) LED red
12	Operating active, LED green
13	Q_2 output indicator
	Q_1 output indicator
	Power indicator, LED green

Measurement range, repeatability, accuracy[6)7)8)]

Sensing range
1.6...3937 ft (0.5...1200 m)
Accuracy[7)]
± 0.4 in (10 mm)
Repeatability[6)]
0.2 in (6 mm)
Resolution
0.04 in (1 mm) maximum

Order information

Type	Part no.
DML-40-2-1211	1 027 608

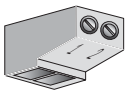
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Reflectors	1256

Technical data	DML 40-	1211
Measurement range		
	1.6...1968 ft (0.5...600 m) on Diamond Grade	
	1.6...2624 ft (0.5...800 m) on reflector PL 880 FS01	
	1.6...3937 ft (0.5...1200 m) on reflector OP 55	
Light spot diameter	20 mm + (5 mm x distance in m)	
Resolution	0.04 in (1 mm)	
Light source, light type	Laser diode, infrared light	
Laser category	1 (EN 60825-1: Nov. 2001;	
	IEC 60825-1:ÄM2:2001)	
Supply voltage V_S	18...30 V DC[1]	
Residual ripple	< 5 V_{SS}[2]	
Power consumption	≤ 6 W[3]	
Serial interface	Profibus DP, max. 12 mBaud	
Interface	RS 232	
Measured value output		
Mean value creation	1/16/64/256/1024 values	
Output rate (min)	1 ms/3.2 ms/12.8 ms/50 ms/200 ms	
Temperature drift		
32...104 ° F (0...40° C)	Typ. 0.01 in/k (0.3 mm/k)	
14...32 ° F (–10...0° C); 104...131° F (40...55° C)	Typ. 0.02 in/k (0.6 mm/k)	
Initialization period	6 s	
VDE protection class[4]	III	
Circuit protection[5]	A, B	
Enclosure rating	IP 65	
Ambient temperature T_A	Operation 14... 131° F (– 10...55° C)	
	Storage -13... 158° F (– 25...70° C)	
Weight	Approx. 1200 g	

1) Limit values
2) May not exceed or fall short of V_S tolerances
3) Without load
4) Reference voltage 50 V DC PELV- voltage (EN 50178)
5) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
6) Environmental conditions constant, minimal switching period 30 min
7) 73° F (23° C) air temperature, 977 hPa, minimal switching period 30 min
8) Accuracy may be reduced by factor 2.5 operating in 104...131°F (40..55° C)

Connection diagram

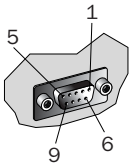
Terminal



1	L+
2	M

9-pin plug (bush) Sub D

Profibus

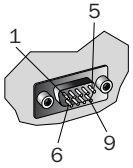


1	NC
2	NC
3	B
4	RTS

5	M
6	L+
7	NC
8	A
9	NC

9-pin plug Sub D

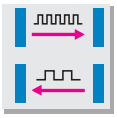
RS 232



1	nReset
2	RxD
3	TxD
4	NC

5	M
6	NC
7	NC
8	NC
9	NC

Infrared Data Transmission



Infrared Data Transmission sensors

- Cableless transmission of data
- Bidirectional communication between sender and receiver
- Low cable installation and maintenance costs
- High degree of immunity against ambient light
- Large operational ranges
- Compatible with PROFIBUS, Interbus and SSI

Table of Contents

Infrared Data Transmission	
Theory of Operations	1124
Selection Table	1125
ISD230	1126
ISD260/280	1128
ISD300	1130

Theory of Operation...Infrared Data Transmission Sensors

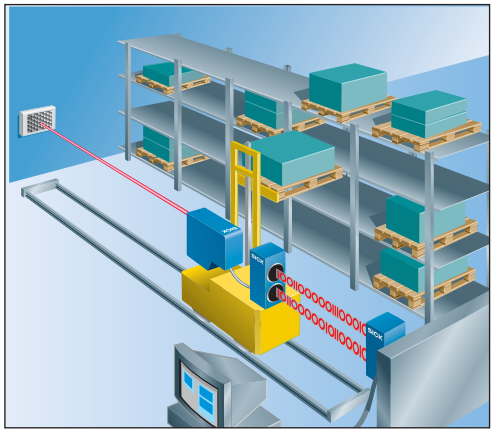


Fig. 1 Distance measurement and cable free transmission work together in warehouse operations allowing no trailing cables

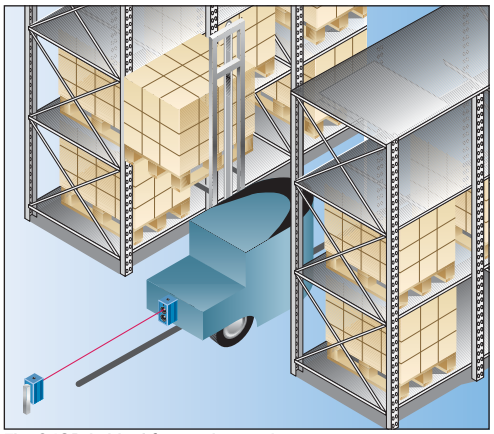


Fig. 2 ISD is ideal for use in warehouses



Fig. 3 ISD enables connection of high bay stackers to control components of, for example, Profibus DP



About Infrared Data Transmission Sensors

The infrared data transmission sensors (ISD) are used to establish a wireless link for transferring serial data in full-duplex mode using infrared light. The link, in this sense, always comprises a pair of devices (2 units) with different carrier frequencies. Depending on the type of link, the units are either installed at a fixed and mobile station (variable link) or at two fixed stations (fixed link).

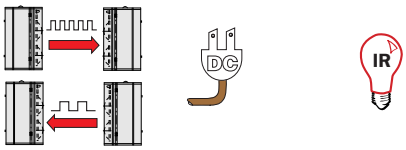
The ISD substitutes a cable link with an infrared transmission line. The point-to-point light beam is monitored during data transmission. Interruption of the light beam is indicated both optically on the device and signaled via a special function interface. For example, the systems realized the data transmission of automatic guided vehicles (AGVs) or substitute the loop and trailing of cables from retrieval units in a high bay warehouse. The ISD systems ensure high functionality, reliable transmission, simple assembly and fast alignment.

Selection Table...Infrared Data Transmission Sensors

Infrared Data Transmission Systems					
Sensor Type	**Sensing Range**	**Baud Rate**	**Operating Temperature**	**Output**	**Page**
ISD 230	0.2...200 m	38.4 kBd	-36.4…131° F (-38…55° C)	RS 232/422/485/CL 20 mA/Sinec	1126
ISD 260/280	0.2...180 m	0.5/1.5 M Bd	-36…104° F (-38…40° C)	RS 422/485/SSI/Profibus/Interbus	1128
ISD 300 PROFIBUS	0.2...200 m	1.5 M Bd	-22…122° F (-30…50° C)	RS 485/Profibus	1130
ISD 300 Interbus RS 422	0.2...200 m	500 kBd	-22…122° F (-30…50° C)	RS 422/Interbus	1132
ISD 300 Interbus Fiber-Optic	0.2...200 m	2 M Bd	-22…122° F (-30…50° C)	Interbus	1134
ISD 300 DH+/RIO	0.2...200 m	230.4 kBd	-22…122° F (-30…50° C)	DH+/RIO	1136
ISD 300 CANopen/DeviceNet	0.2...200 m	1 M Bd	23…122° F (-5…50° C)	CANopen/DeviceNet	1138
ISD 300 Ethernet	0.2...200 m	2 M Bd	23…122° F (-5…50° C)	Ethernet	1140

ISD 230

Infrared Data Transmission Sensors



0.7...656.2 ft (0.2...200 m)
sensing range

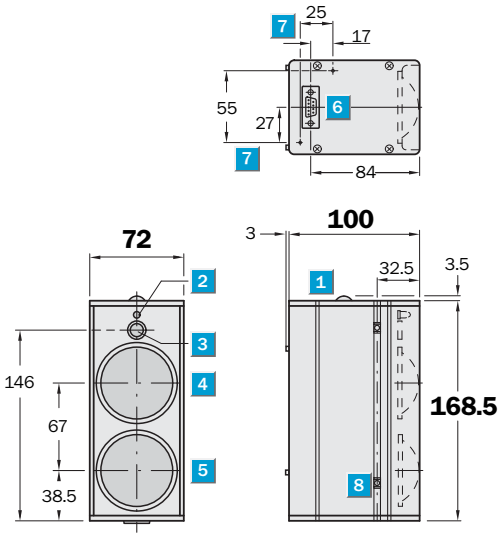
Highlights

- Duplex operation
- Closed loop analog, RS 232
- RS 422/485
- 38,000 bit/s

ISD 230



Dimensional drawing



dimensions in mm

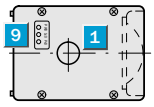
Notes

Two equivalent devices are required to create a data transfer section. The data transfer frequencies are set via jumpers (see Operating Instructions, Part no. 8 008 207).

The ISD 230 unit pairs must be set to different transmission frequencies before installation.

Adjustments

All types



1 Optical adjustment aid (cross-hair)
2 Warning LED
3 Optical adjustment aid lens
4 Receiver lens
5 Sender lens
6 9-pin D-sub plug
7 Mounting hole M3 threaded – 5 mm deep, for plug cover
8 M5 T-nut (in groove), max. screwing depth 10 mm from housing surface
9 LED function indicators Power on, RxD and TxD

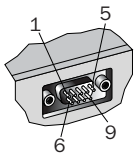
Order information

Type	Part no.
ISD 230-2111	1 017 388
ISD 230-4111	1 017 389
ISD 230-5111	1 017 390
ISD 230-4121	1 017 543
ISD 230-5121	1 017 544

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

Technical data		ISD 230-	2111	4111	5111	4121	5121				
Sensing range	0.7...656.2 ft (0.2...200 m)										
Light source	Infrared diode										
Carrier frequency	3 MHz ± 0.5 MHz										
Transmit/receive angle	Approx. ± 4° / approx. ± 0.8°										
Light spot diameter	Approx. 2.3 ft at 164 ft (0.7 m at 50 m),										
	Approx. 4.6 ft at 328 ft (1.4 m at 100 m)										
Data transfer rate	Max. 38.4 kBd										
Signal delay (optical)	Max. 10 µs										
LED indicators	4 status functions: light beam status,										
	Power on, RxD, TxD										
Data interface	Closed loop, 20 mA, active, passive selectable										
	RS 232/RS 422/RS 485										
	Sinec L1 (for bus terminals BT 777)										
Switching inputs	Sender off, 24 V, (5 mA)										
Switching outputs	Light path free, PNP, 24 V, 20 mA max.										
	Contamination alarm, PNP, 24 V, 20 mA max.										
Electrical connections	9-pin D-sub plug										
Supply voltage V_S	With heating 24 V DC + 20%/– 5%										
	24 V DC ± 20%										
Current consumption	Max. 0.4 A										
	With heating max. 2.5 A										
Enclosure rating	IP 54, DIN 40 050,										
	With plug cover IP 65										
Protection class to VDE 0106	III										
EMC vibration test	IEC 801/IEC 68-2-6 Test FC										
Mounting	4 M5 running nuts, 4x M5 T-nuts										
Ambient temperature	Operation	32...131° F (0...55° C)									
		-36.4...131° F (-38...55° C) (with heating)									
	Storage	-4...158° F (-20...70° C)									
Max. relative humidity	90%, uncondensed										
Approximate weight per unit	2.2 lb (1 kg) (excluding accessories)										
Housing material	Aluminum (treated), glass lens										

Connection diagram and data interfaces



9-pin plug

	Function interfaces	Data interfaces		
		CL 20 mA RS 422 RS 485 (4L)	RS 485 (2L)	RS 232
1	DC + 24 V			
2	Switching output [2], contamination			
3	Switching output [2], light path free			
4	Switching input, sender off			
5	GND/0 V	GND/0 V	GND/0 V	GND/0 V
6		R+ [3]	R+/T+ [3] or B [4]	R x D
7		R– [3]	R–/T– [3] or A [4]	–
8		T+	–	T x D
9		T–	–	–

1) Wire cross-section on device with heating; min. 0.25 mm² with 5 m cable
2) PNP

3) With additional cable connection (cable termination)
4) Symbols A and B apply to PROFIBUS and PROFIBUS-DP

ISD 260/280

Infrared Data Transmission Sensors



0.7...492.1 ft (0.2...150 m)/
0.7...590.6 ft (0.2...180 m)
sensing range

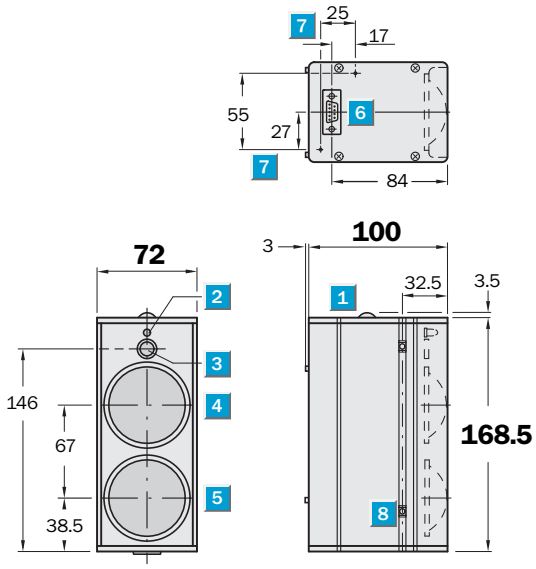
Highlights

- Duplex operation
- RS 422 /485
- PROFIBUS
- Interbus-S

ISD 260/280



Dimensional drawing



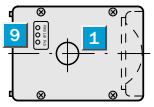
dimensions in mm

Notes

A pair of devices with numbers ending in 1 and 2 are required.

Adjustments

All types



1 Optical adjustment aid (cross-hair)
2 Warning LED
3 Optical adjustment aid lens
4 Receiver lens
5 Sender lens
6 9-pin D-sub plug
7 5-pin M12 round plug (power supply and function interfaces)
8 Mounting hole M3 threaded – 5 mm deep, for plug cover
9 M5 T-nut (in groove), max. screwing depth 10 mm from housing surface
10 LED function indicators Power on, RxD and TxD

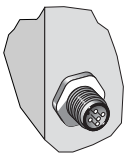
Order information

Type	Part no.
ISD 260-1111	1 017 379
ISD 260-1112	1 017 380
ISD 260-1121	1 017 381
ISD 260-1122	1 017 382
ISD 280-1111	1 017 046
ISD 280-1112	1 017 047
ISD 280-1121	1 017 375
ISD 280-1122	1 017 376

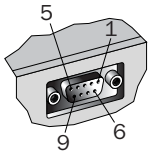
Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

Technical data		ISD-	260 -1111 -1112	260 -1121 -1122	280 -1111 -1112	280 -1121 -1122
Sensing range	0.7…590.6 ft (0.2…180 m)		■	■		
	0.7…492.1 ft (0.2…150 m)				■	■
Light source	Infrared diode		■	■	■	■
Carrier frequency	4 MHz ± 0.5 MHz/11 MHz ± 0.75 MHz		■	■	■	■
Transmit/receive angle	Approx. ± 4° / approx. ± 0.8°		■	■	■	■
Light spot diameter	Approx. 2.3 ft at 164 ft (0.7 m at 50 m)		■	■	■	■
	Approx. 4.6 ft at 328 ft (1.4 m at 100 m)		■	■	■	■
Data transfer rate	Max. 0.5 MBd		■	■		
	Max. 1.5 MBd				■	■
Signal delay (optical)	Max. 2 µs		■	■	■	■
LED indicators	4 status functions: light beam status		■	■	■	■
	Power on, RxD, TxD					
Data interfaces	RS 422 or RS 485 in 2 or 4 line configuration		■	■	■	■
	Profibus, Interbus					
Switching inputs	Sender off, 24 V, (5 mA)		■	■	■	■
Switching outputs	Light path free, PNP, 24 V, 20 mA max.		■	■	■	■
Electrical connections	9-pin sub-D female		■	■	■	■
	5-pin round plug		■	■	■	■
Supply voltage V_S	With heating 24 V DC + 20%/– 5%			■		■
	24 V DC ± 20%		■		■	
Current consumption	Max. 0.4 A		■		■	
	With heating max. 2.5 A			■		■
Enclosure rating	IP 54 to DIN 40 050,		■	■	■	■
	With plug cover IP 65		■	■	■	■
Protection class to VDE 0106	⏀		■	■	■	■
EMC vibration test	IEC 801/IEC 68-2-6 Test FC		■	■	■	■
Mounting	4 - M5 running nuts, 4x M5 T-nuts		■	■	■	■
Ambient temperature	Operation	32…104° F (0…40° C)	■		■	
		-36…104° F (-38…40° C) (with heating)		■		■
	Storage	-4…158° F (-20…70° C)	■	■	■	■
Max. relative humidity	90%, non-condensing		■	■	■	■
Approximate weight per unit	2.2 lb (1 kg) (excluding accessories)		■	■	■	■
Housing material	Aluminum (treated), glass/plastic lens		■	■	■	■

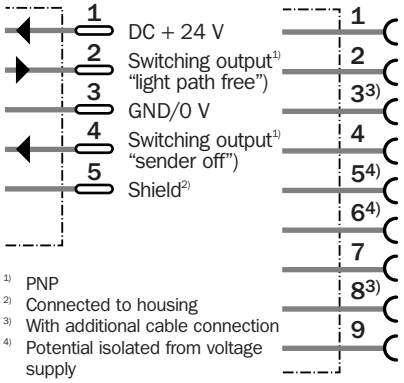
Connection diagram and data interfaces



5-pin, M 12



9-pin sub-D female

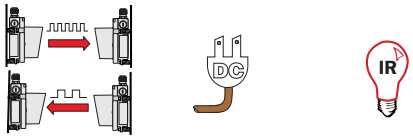


[1] PNP
[2] Connected to housing
[3] With additional cable connection
[4] Potential isolated from voltage supply

Data interface		
RS 422	RS 485 (2L)	Profibus
RS 485 (4L)		Profibus-DP
NC	NC	NC
NC	NC	NC
R+	R+/T+	B
T+	Reserved	Reserved
GND	GND	GND
+ 5 V	+ 5 V	+ 5 V
NC	NC	NC
R –	R –/T–	A
T–	Reserved	Reserved

ISD 300 PROFIBUS, RS 485

Infrared Data Transmission Sensors



0.7...393.7 ft (0.2...120 m)
0.7...656.2 ft (0.2...200 m)
sensing range

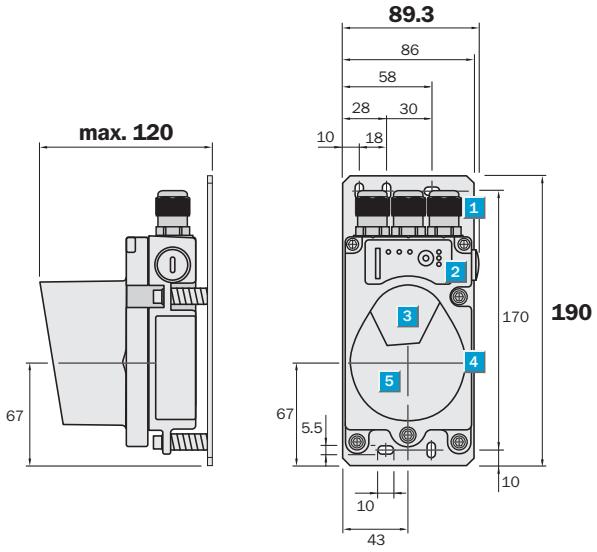
Highlights

- PROFIBUS interface
- Removable optics
- Front access control panel
- Easy one-man setup and alignment
- Up to 1.5 Mbit/s transfer rate
- Signal strength indicator

ISD 300 PROFIBUS



Dimensional drawing



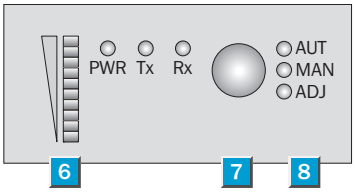
dimensions in mm

Notes

A pair of devices with numbers ending in 1 and 2 are required.

Adjustments

All types



1 M16 cable gland
2 Control panel
3 Sender lens
4 Center of receiver optical axis
5 Receiver lens
6 Signal level display
7 Function button
8 LED indicator

Order information

Type	Part no.
ISD 300-1211	6 024 759
ISD 300-1212	6 024 760
ISD 300-1221	6 024 838
ISD 300-1222	6 024 839
ISD 300-1111	6 024 761
ISD 300-1112	6 024 837
ISD 300-1121	6 024 840
ISD 300-1122	6 024 841
ISD 300-1311	6 028 213
ISD 300-1312	6 028 214

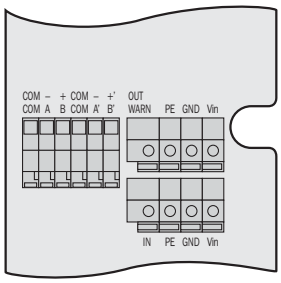
Accessories

	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

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Technical data	ISD-	300 -1211 -1212	300 -1221 -1222	300 -1111 -1112	300 -1121 -1122	300 -1311 -1312
Sensing range	0.7…393.7 ft (0.2…120 m)			■	■	
	0.7…656.2 ft (0.2…200 m)	■	■			
	0.7…984.3 ft (0.2…300 m)					■
Light source	Infrared light	■	■	■	■	■
Transmit/receive angle	± 0.5° for optical axis	■	■	■	■	■
Light spot diameter	3 ft at 16.4 ft (0.9 m at 50 m)/5.7 ft at 328 ft	■	■	■	■	■
	(1.75 m at 100 m)/11.4 ft at 656.2 ft (3.5 m at 200 m)	■	■	■	■	■
Data transfer rate	1.5 Mbit/s Profibus RS 485	■	■	■	■	■
Signal delay (optical)	1.5 µs + 1 Tbit	■	■	■	■	■
LED indicators	Power, function mode	■	■	■	■	■
	data transfer, signal level	■	■	■	■	■
Data interface	Profibus/RS 485	■	■	■	■	■
Switching inputs	Sender/receiver off, 0…2 V DC	■	■	■	■	■
	Sender/receiver on, 18…30 V DC	■	■	■	■	■
Switching outputs	Normal operation, 0…2 V DC	■	■	■	■	■
	Contamination alarm, V_{in}-2 V DC	■	■	■	■	■
Electrical connections	Terminals	■	■	■	■	■
Supply voltage V_S	18...30 V DC	■	■	■	■	■
Current consumption	200 mA at 24 V DC (without heating)	■		■		■
	800 mA at 24 V DC (with heating)		■		■	
Enclosure rating	IP 65	■	■	■	■	■
Protection class	1	■	■	■	■	■
EMC vibration test	EN 61326 (1998) + A1 (1999)	■	■	■	■	■
Ambient temperature	Operation 41…122° F (5…50° C)	■		■		
	-22…122° F (-30…50° C) (with heating)		■		■	■
	Storage -22…158° F (-30…70° C)	■	■	■	■	■
Max. relative humidity	Max. 90%, non-condensing	■	■	■	■	■
Approximate weight per unit	42.3 oz (1200 g)	■	■	■	■	■
Housing material	Aluminum die cast, glass lenses	■	■	■	■	■

Connection type and data interface



Terminals, general		Terminals, PROFIBUS	
Vin	L+	A, –	A wire
GND	M	B, +	B wire
PE	Shield	COM	Common
OUT/WARN	Q	A', –'	A wire
IN	Switch. input	B', +'	B wire

ISD 300 Interbus, RS 422

Infrared Data Transmission Sensors



0.7...393.7 ft (0.2...120 m)
0.7...656.2 ft (0.2...200 m)

sensing range

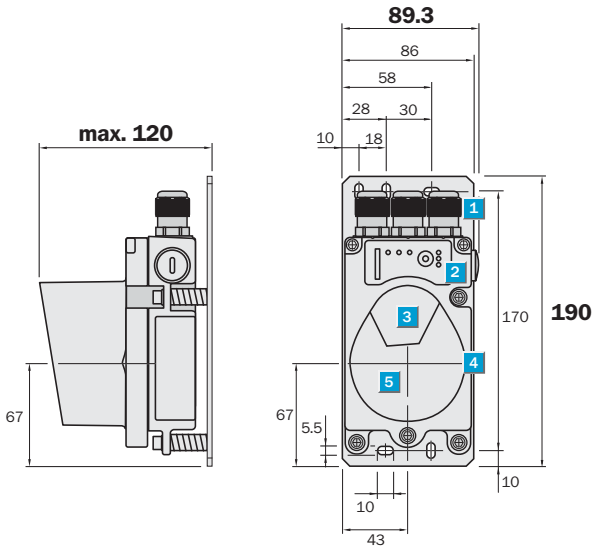
Highlights

- Interbus interface
- Removable optics
- Front access control panel
- Easy one-man setup and alignment
- Up to 500 kbit/s transfer rate
- Signal strength indicator

ISD 300 Interbus RS 422



Dimensional drawing



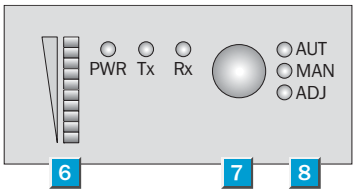
dimensions in mm

Notes

A pair of devices with numbers ending in 1 and 2 are required. A pair of devices with numbers ending in 1 and 2 are required.

Adjustments

All types



1 M16 cable gland
2 Control panel
3 Sender lens
4 Center of receiver optical axis
5 Receiver lens
6 Signal level display
7 Function button
8 LED indicator

Order information

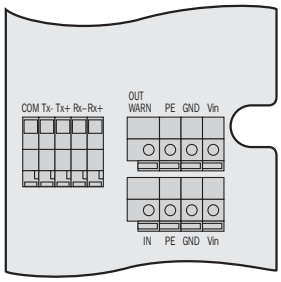
Type	Part no.
ISD 300-2211	6 024 842
ISD 300-2212	6 024 843
ISD 300-2221	6 024 846
ISD 300-2222	6 024 847
ISD 300-2111	6 024 844
ISD 300-2112	6 024 845
ISD 300-2121	6 024 848
ISD 300-2122	6 024 849

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

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Technical data		ISD-	300 -2211 -2212	300 -2221 -2222	300 -2111 -2112	300 -2121 -2122
Sensing range	0.7…393.7 ft (0.2…120 m)				■	■
	0.7…656.2 ft (0.2…200 m)		■	■		
Light source	Infrared light		■	■	■	■
Transmit/receive angle	± 0.5° for optical axis		■	■	■	■
Light spot diameter	3 ft at 16.4 ft (0.9 m at 50 m)/5.7 ft at 328 ft		■	■	■	■
	(1.75 m at 100 m)/11.4 ft at 656.2 ft (3.5 m at 200 m)		■	■	■	■
Data transfer rate	500 kbit/s Interbus RS 422		■	■	■	■
Signal delay (optical)	1.5 µs		■	■	■	■
LED indicators	Power, function mode,		■	■	■	■
	data transfer, signal level		■	■	■	■
Data interface	Interbus/RS 422		■	■	■	■
Switching inputs	Sender/receiver off, 0…2 V DC		■	■	■	■
	Sender/receiver on, 18…30 V DC		■	■	■	■
Switching outputs	Normal operation, 0…2 V DC		■	■	■	■
	Contamination alarm, V_{in}-2 V DC		■	■	■	■
Electrical connections	Terminals		■	■	■	■
Supply voltage V_S	18…30 V DC		■	■	■	■
Current consumption	200 mA at 24 V DC (without heating)		■		■	
	800 mA at 24 V DC (with heating)			■		■
Enclosure rating	IP 65		■	■	■	■
Protection class	1		■	■	■	■
EMC vibration test	EN 61326 (1998) + A1 (1999)		■	■	■	■
Ambient temperature	Operation 41…122° F (5… 50° C)		■		■	
	-22…122° F (-30… 50° C) (with heating)			■		■
	Storage -22…158° F (-30… 70° C)		■	■	■	■
Max. relative humidity	Max. 90%, non-condensing		■	■	■	■
Approximate weight per unit	42.3 oz (1200 g)		■	■	■	■
Housing material	Aluminum die cast, glass lenses		■	■	■	■

Connection type and data interface



Terminals, general		Terminals, Interbus	
Vin	L+	DO1/DI2, Rx+	Receiver wire
GND	M	$\overline{DO1}$/$\overline{DI2}$, Rx–	Receiver wire
PE	Shield	DI1/DO2, Tx+	Send wire
OUT/WARN	Q	$\overline{DI1}$/$\overline{DO2}$, Tx–	Send wire
IN	Switch. input	COM	Common

ISD 300 Interbus, Fiber-Optic

Infrared Data Transmission Sensors



0.7...656.2 ft (0.2...200 m)
sensing range

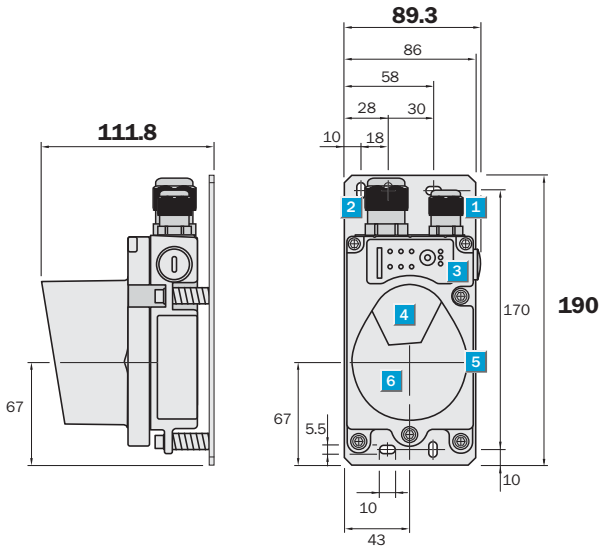
Highlights

- Interbus interface
- Removable optics
- Front access control panel
- Easy one-man setup and alignment
- Up to 2 Mbit/s transfer rate
- Signal strength indicator

ISD 300 Interbus Fiber-optic



Dimensional drawing



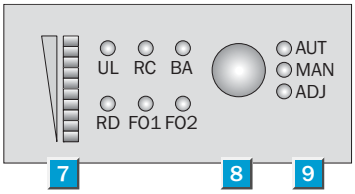
dimensions in mm

Notes

A pair of devices with numbers ending in 1 and 2 are required.

Adjustments

All types



1 M20 cable gland
2 M16 cable gland
3 Control panel
4 Sender lens
5 Center of receiver optical axis
6 Receiver lens
7 Signal level display
8 Function button
9 LED indicator

Order information

Type	Part no.
ISD 300-3211	6 024 850
ISD 300-3212	6 024 851
ISD 300-3221	6 024 852
ISD 300-3222	6 024 853

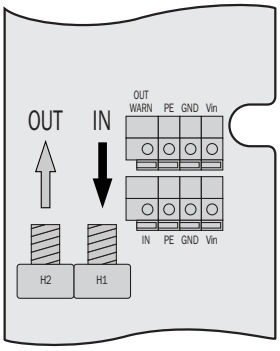
Accessories

	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

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Technical data	ISD-	300 -3211 -3212	300 -3221 -3222
Sensing range	0.7…656.2 ft (0.2…200 m)		
Light source	Infrared light		
Transmit/receive angle	± 0.5° for optical axis		
Light spot diameter	3 ft at 16.4 ft (0.9 m at 50 m)/5.7 ft at 328 ft		
	(1.75 m at 100 m)/11.4 ft at 656.2 ft (3.5 m at 200 m)		
Data transfer rate	2 Mbit/s Interbus fiber optic		
Signal delay (optical)	2.5 µs		
LED indicators	Power, function mode,		
	data transfer, signal level		
Data interface	Interbus/fiber optic		
Switching inputs	Sender/receiver off, 0…2 V DC		
	Sender/receiver on, 18…30 V DC		
Switching outputs	Normal operation, 0…2 V DC		
	Contamination alarm, V_{in}-2 V DC		
Electrical connections	Terminals		
Supply voltage V_S	18…30 V DC		
Current consumption	200 mA at 24 V DC (without heating)		
	800 mA at 24 V DC (with heating)		
Enclosure rating	IP 65		
Protection class	1		
EMC vibration test	EN 61326 (1998) + A1 (1999)		
Ambient temperature	Operation 41…122° F (5… 50° C)		
	-22…122° F (-30… 50° C) (with heating)		
	Storage -22…158° F (-30… 70° C)		
Max. relative humidity	Max. 90%, non-condensing		
Weight per unit	42.3 oz (1200 g)		
Housing material	Aluminum die cast, glass lenses		

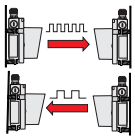
Connection type and data interface



Terminals, general		Fiber-optic socket, Interbus	
Vin	L+	H1	Receiver
GND	M	H2	Sender
PE	Shield		
OUT/WARN	Q		
IN	Switch. input		

ISD 300 DH+/RIO

Infrared Data Transmission Sensors







0.7...656.2 ft (0.2...200 m)

sensing range

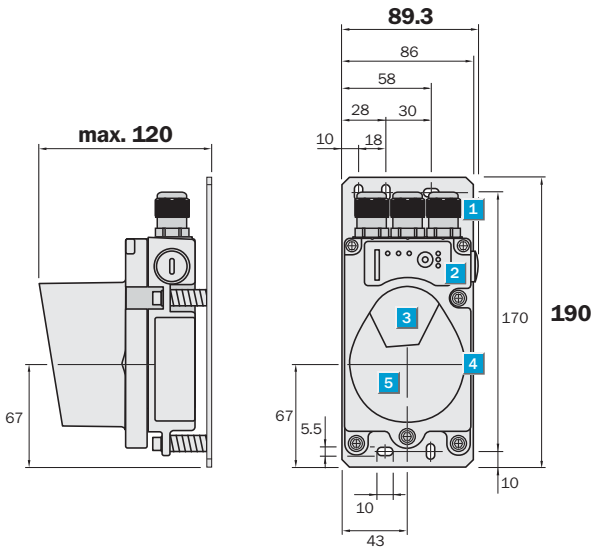
Highlights

- DH+/RIO interface
- Removable optics
- Front access control panel
- Easy one-man setup and alignment
- Up to 230.4 kbit/s transfer rate
- Signal strength indicator

ISd 300 DH+/RIO



Dimensional drawing



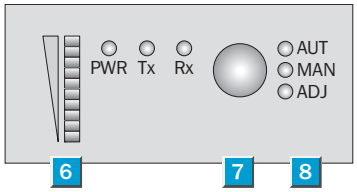
dimensions in mm

Notes

A pair of devices with numbers ending in 1 and 2 are required.

Adjustments

All types



1	M16 cable gland
2	Control panel
3	Sender lens
4	Center of receiver optical axis
5	Receiver lens
6	Signal level display
7	Function button
8	LED indicator

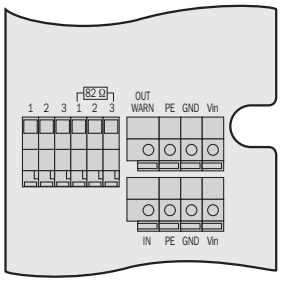
Order information

Type	Part no.
ISD 300-4211	6 024 854
ISD 300-4212	6 024 855
ISD 300-4221	6 024 856
ISD 300-4222	6 024 857

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

Technical data		ISD-	300 -4211 -4212	300 -4221 -4222
Sensing range	0.7…656.2 ft (0.2…200 m)			
Light source	Infrared light			
Transmit/receive angle	± 0.5° for optical axis			
Light spot diameter	3 ft at 16.4 ft (0.9 m at 50 m)/5.7 ft at 328 ft			
	(1.75 m at 100 m)/11.4 ft at 656.2 ft (3.5 m at 200 m)			
Data transfer rate	230.4 kbit/s DH+/RIO			
Signal delay (optical)	1.5 µs + 1.5 Tbit			
LED indicators	Power, function mode,			
	data transfer, signal level			
Data interface	DH+/RIO			
Switching inputs	Sender/receiver off, 0…2 V DC			
	Sender/receiver on, 18…30 V DC			
Switching outputs	Normal operation, 0…2 V DC			
	Contamination alarm, V_{in}-2 V DC			
Electrical connections	Terminals			
Supply voltage V_S	18…30 V DC			
Current consumption	200 mA at 24 V DC (without heating)			
	800 mA at 24 V DC (with heating)			
Enclosure rating	IP 65			
Protection class	1			
EMC vibration test	EN 61326 (1998) + A1 (1999)			
Ambient temperature	Operation 41…122° F (5… 50° C)			
	-22…122° F (-30… 50° C) (with heating)			
	Storage -22…158° F (-30… 70° C)			
Max. relative humidity	Max. 90%, non-condensing			
Weight per unit	42.3 oz (1200 g)			
Housing material	Aluminum die cast, glass lenses			

Connection type and data interface



Terminals, general		Terminals, DH+/DH–	
Vin	L+	1	Clear/blue
GND	M	2	Shield
PE	Shield	3	Blue/clear
OUT/WARN	Q		
IN	Switch. input		

ISD 300 CANopen/DeviceNet

Infrared Data Transmission Sensors



0.7...656.2 ft (0.2...200 m)
sensing range

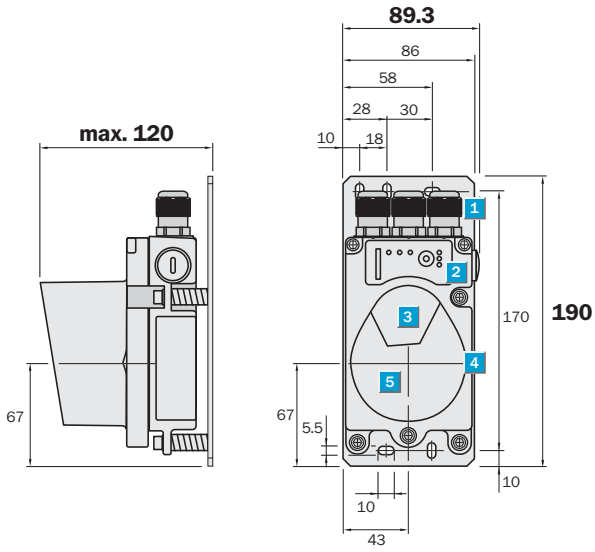
Highlights

- CANopen/DeviceNet interface
- Removable optics
- Front access control panel
- Easy one-man setup and alignment
- Up to 1 MBbit/s transfer rate
- Signal strength indicator

ISD 300 DH+/RIO



Dimensional drawing



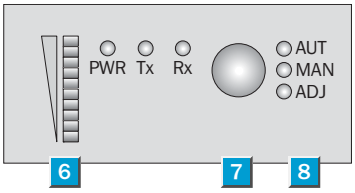
dimensions in mm

Notes

A pair of devices with numbers ending in 1 and 2 are required.

Adjustments

All types



1 M16 cable gland
2 Control panel
3 Sender lens
4 Center of receiver optical axis
5 Receiver lens
6 Signal level display
7 Function button
8 LED indicator

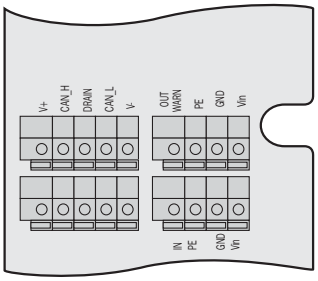
Order information

Type	Part no.
ISD 300-5211	6 027 231
ISD 300-5212	6 027 232

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

Technical data	ISD-	300 -5211	300 -5212
Sensing range	0.7…656.2 ft (0.2…200 m)		
Light source	Infrared light		
Transmit/receive angle	± 0.5° for optical axis		
Light spot diameter	3 ft at 16.4 ft (0.9 m at 50 m)/5.7 ft at 328 ft		
	(1.75 m at 100 m)/11.4 ft at 656.2 ft (3.5 m at 200 m)		
Data transfer rate	Max. 500 kbit/s DeviceNet		
	Max. 1 MBit/s CANopen		
LED indicators	Power, function mode,		
	data transfer, signal level		
Data interface	CANopen/DeviceNet		
Switching inputs	Sender/receiver off, 0…2 V DC		
	Sender/receiver on, 18…30 V DC		
Switching outputs	Normal operation, 0…2 V DC		
	Contamination alarm, V_{in}-2 V DC		
Electrical connections	Terminals		
Supply voltage V_S	18…30 V DC		
Current consumption	200 mA at 24 V DC		
Enclosure rating	IP 65		
Protection class	1		
EMC vibration test	EN 61326 (1998) + A1 (1999)		
Ambient temperature	Operation 23…122° F (-5…50° C)		
	Storage -22…158° F (-30…70° C)		
Max. relative humidity	Max. 90%, non-condensing		
Weight per unit	42.3 oz (1200 g)		
Housing material	Aluminum die cast, glass lenses		

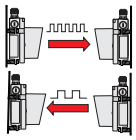
Connection type and data interface



Terminals, general		Terminals, CANopen/DeviceNet	
Vin	L+	V-	Neg. supply (CAN ground reference)
GND	M	CAN_L	Bus signal (LOW)
PE	Shield	DRAIN	Shield
OUT/WARN	Q	CAN_H	Bus signal (HIGH)
IN	Switch.input	V+	Pos. supply

ISD 300 Ethernet

Infrared Data Transmission Sensors







0.7...656.2 ft (0.2...200 m)

sensing range

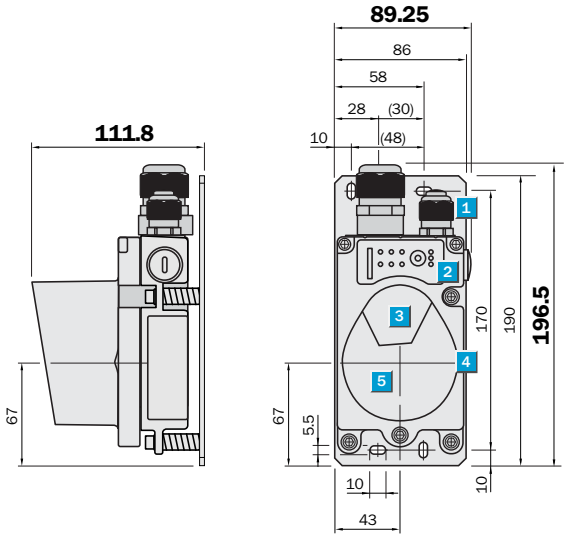
Highlights

- Ethernet interface
- Control panel front access
- Easy one-man setup
- Up to 2 MBit/s transfer rate
- Protocol-independent
- RJ 45 plug connection
- Integrated 3-point bracket

ISD 300 Ethernet



Dimensional drawing



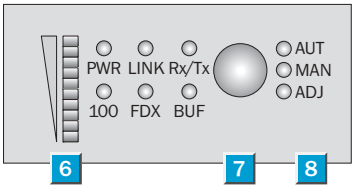
dimensions in mm

Notes

A pair of devices with numbers ending in 1 and 2 are required.

Adjustments

All types



1	M16
2	Control panel
3	Sender lens
4	Center of optical axis
5	Receiver lens
6	Signal level display
7	Function button
8	LED indicator

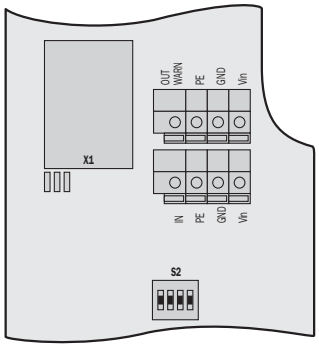
Order information

Type	Part no.
ISD 300-6211	6 028 692
ISD 300-6212	6 028 693

Accessories	page
Cables and connectors	1180
Mounting systems	1234
Special Accessories	1314

Technical data	ISD-	300 -6211	300 -6212
Sensing range	0.7…656.2 ft (0.2…200 m)		
Light source	Infrared light		
Transmit/receive angle	± 0.5° for optical axis		
Light spot diameter	3 ft at 16.4 ft (0.9 m at 50 m)/5.7 ft at 328 ft		
	(1.75 m at 100 m)/11.4 ft at 656.2 ft (3.5 m at 200 m)		
Data transfer rate	Max. 2 MBit/s		
LED indicators	Power, function mode,		
	data transfer, signal level		
Data interface	Ethernet		
Switching inputs	Sender/receiver off, 0…2 V DC		
	Sender/receiver on, 18…30 V DC		
Switching outputs	Normal operation, 0…2 V DC		
	Contamination alarm, V_{in}-2 V DC		
Electrical connections	Terminals		
Supply voltage V_S	18…30 V DC		
Current consumption	200 mA at 24 V DC		
Enclosure rating	IP 65		
Protection class	1		
EMC vibration test	EN 61326 (1998) + A1 (1999)		
Ambient temperature	Operation 23…122° F (-5…50° C)		
	Storage -22…158° F (-30…70° C)		
Max. relative humidity	Max. 90%, non-condensing		
Weight per unit	42.3 oz (1200 g)		
Housing material	Aluminum die cast, front screen: glass		

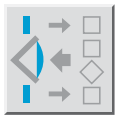
Connection type and data interface



Terminals, general	
V_{in}	L+
GND	M
PE	Shield
OUT/WARN	Q
IN	switch, input

Socket	Function	
X1	Socket for 10Base-T or 100Base-TX	
Switch	**Position**	**Function**
S2.1	**ON**	**Autonegotiation active (default)**
	OFF	Autonegotiation deactivated
S2.2	ON	100 MBit
	OFF	**10 MBit (default)**
S2.3	ON	Full duplex
	OFF	**Half duplex (default)**
S2.4	ON	Reserved
	OFF	**Reserved (default)**

Machine Vision



Vision sensors

- SICK's vision sensors are easy to use, rugged and reliable. They are designed to do application-specific tasks where a standard sensor would not work. SICK provides vision sensors for many applications, including part presence, identification, color sorting, and recognition. SICK vision sensors are easy to set up and manage. With a teach-in and initial configuration, the devices are ready for immediate operation in the production line.



3D cameras

- Ranger and Ruler cameras measure 3D features at unmatched speed, producing a series of profiles of the measured object. Providing a 3rd dimension adds height and shape measurement data, which can be critical when correctly classifying an object. The Ranger and Ruler cameras are key components in many market-leading in-line inspection machines for 3D vision. The generated 3D data is distributed over standard interfaces, such as CameraLink and Gigabit Ethernet, to a PC for analysis.



Smart cameras

- The IVC-2D and IVC-3D are robust smart cameras working with 2D images and 3D images or 3D profiles, respectively. The cameras operate stand-alone or as part of the factory network. The application development is done in the flexible and straight-forward PC application development tool IVC Studio. The inspection results can be sent directly to the PLC or handling equipment and also monitored via Ethernet.

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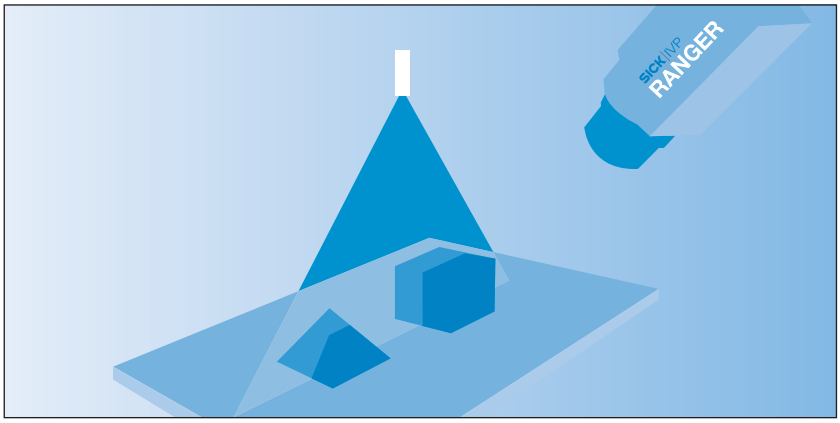
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Smart cameras (stand-alone)	
IVC-2D	1160
IVC-3D	1162

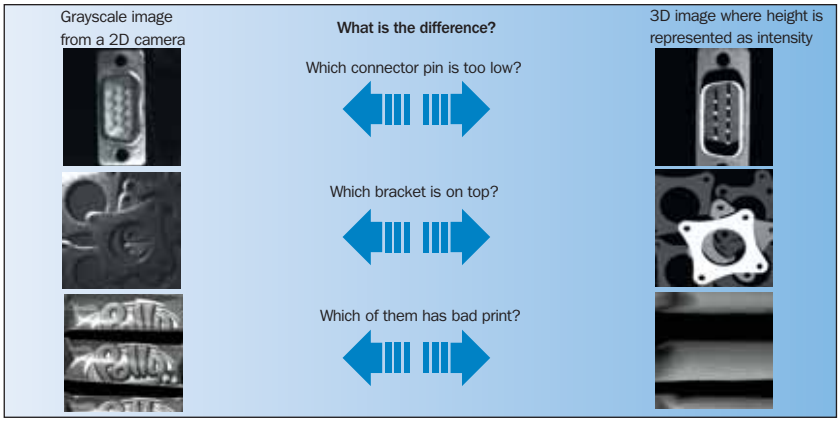
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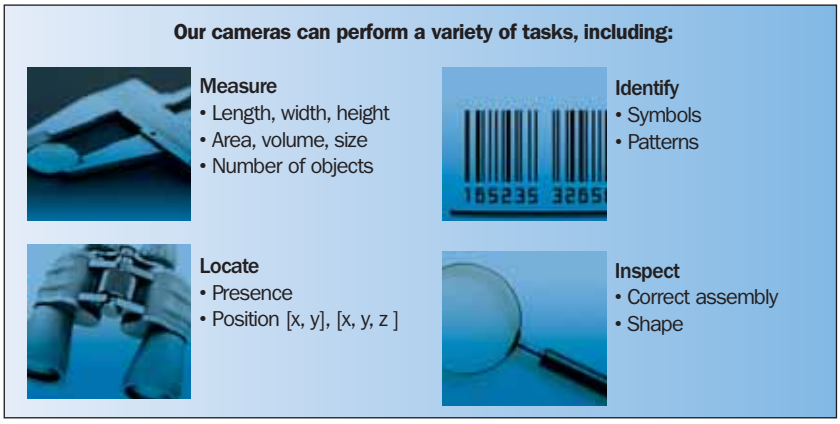
Theory of Operation...Machine Vision





SICK 3D products are based on laser line triangulation, a very robust way of gathering height information





SICK's machine vision solutions use the latest digital imaging technology to replace or complement manual inspection and measurement tasks. Our vision cameras are built for industrial environments. With SICK's machine vision solutions, customers can reduce the cost of manual inspection, improve product quality and production yield, increase customer satisfaction, and simplify inspection by using one camera instead of multiple sensor arrangements.

Every detail, from camera housing to cable connectors, is carefully designed to reflect SICK's extensive experience in industrial sensors for factory automation. The unsurpassed speed and performance of SICK's machine vision solutions are a result of SICK IVP's patented CMOS sensor technology. The powerful image processor is integrated on the sensor chip to allow for extremely fast image processing.

Vision Sensors

Vision sensors bridge the gap between photoelectric sensors and traditional vision systems. They take advantage of some aspects of machine vision, like a larger field of view and some programmability. They also tend to be specifically designed to solve a particular task or small range of similar applications. The ICS, AGD/DCI, and the CVS are SICK's three lines of vision sensors.

- ICS: A pixel counting sensor that works with binarized images, making it quite fast.
- AGD/DCI: The AGD (Area Gloss Detector) and DCI (Date Code Inspector) are more customized versions of the ICS family. They both have simplified setup procedures for each type of application.



- CVS : This line of vision sensors uses 3 separate receivers (RGB) to make actual color inspections of objects. With built-in memory, it's possible to store multiple setups directly on the sensor. In addition, this line of sensors also includes slightly more advanced versions that use color to define the contour or shape of an object (CVS3), while others are capable of doing OCR inspections on date and lot codes.



Smart Cameras

Smart Cameras are highly flexible stand-alone systems. They are programmed via a PC, and then images are captured and analyzed directly by the camera. There are more than 100 predefined tools available for programming that make the IVC cameras even more flexible.

The IVC-2D is a series of traditional 2D cameras that are programmed for many different applications. The IVC series can take measurements, identify patterns and detect the presence of a wide variety of objects. The series includes entry-level, low-cost units to high-resolution Reader versions, capable of reading 2D codes and OCR.



The IVC-3D smart camera – the world's first 3D smart camera – offers a solution for applications that are traditionally very difficult, if not impossible. The IVC-3D uses laser line triangulation to obtain height data while still relying on the user-friendly tools of 2D cameras. With an integrated laser line, the IVC-3D is ready to perform.



3D Cameras

SICK's line of 3D cameras uses laser line triangulation to obtain height data in a very robust way. They also have MultiScan capability, which allows one camera to do multiple inspections simultaneously. The data is then streamed to a PC for analysis.

- Ranger C: The CameraLink interface makes this series of cameras easy to integrate with industry standard framegrabers. With high-speed 3D and MultiScan, including laser scatter (patented) measurements, the Ranger C sets itself apart.
- Ranger E/D: The world's fastest 3D camera, capable of 35,000 profiles/second, communicates using Gigabit Ethernet. This eases integration and reduces the number of components used in a system. With high-speed 3D and MultiScan, including laser scatter (patented) measurements Ranger E/D is capable of solving even some of the most demanding applications.

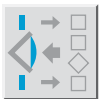


- Ruler: The Ruler, as its name implies, measures objects using laser line triangulation for height measurements. The robust housing and integrated laser illumination makes the Ruler appropriate for more demainding environments. The data is calibrated, making the integration into other systems easier. The Ruler E uses Gigabit Ethernet and, like the Ranger, has MultiScan capabilities.



CVS1 Easy

Color Vision Sensor



8.3…10.6 in (210…270 mm)
3.5…5.9 in (90…150 mm)
2.0…3.9 (50…100 mm)
sensing range

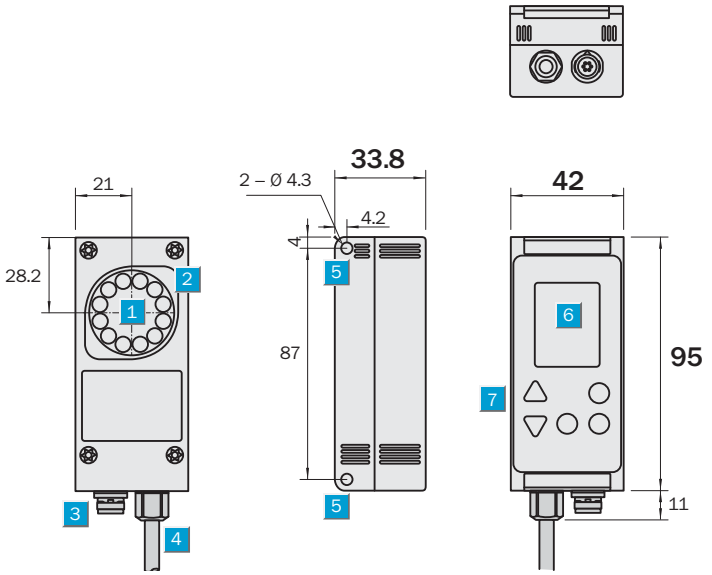
Highlights

- Detecting color
- Plug and Play teach
- Memory capacity for 8 colors
- Fast response time
- Long sensing ranges available
- Wide area of detection

CVS1 Easy



Dimensional drawing



dimensions in mm

1 Front screen
2 Lighting
3 Connection: external lighting/monitor
4 Connecting cable
5 Fixing hole
6 Color display
7 Input keypad

Adjustments

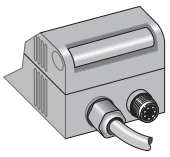
All types

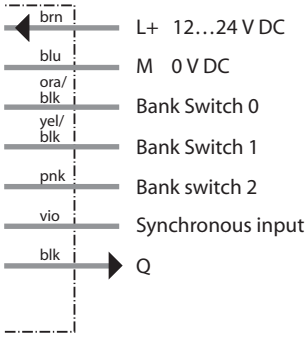


Accessories	page
Mounting systems	1234

Connection diagram

All types | Cable, 7-wire





Technnical data	CVS1 -	P112 Easy	P122 Easy	P142 Easy	N112 Easy	N122 Easy	N142 Easy
Sensing range	210…270 mm/40 x 50…55 x 65 mm²	■			■		
	90…150 mm/ 40 x 50…65 x 75 mm²		■			■	
	50…100 mm/50 x 65…100 x 115 mm²			■			■
Light source[1]	12 x LED , white	■	■	■	■	■	■
Resolution	Max. 200 x 240 x 3 (RGB)	■	■	■	■	■	■
Teach procedure	1-point	■	■	■	■	■	■
	Lower limit	■	■	■	■	■	■
Angle of divergence	Approx. 1°	■	■	■	■	■	■
Supply voltage V_S[2]	12…24 V DC	■	■	■	■	■	■
Ripple[3]	< 5 V_{PP}	■	■	■	■	■	■
Current consumption[4]	< 220 mA (at 24 V)	■	■	■	■	■	■
	< 120 mA (at 12 V)	■	■	■	■	■	■
Switching outputs	PNP	■	■	■			
	NPN				■	■	■
Output current I_A max.	< 100 mA	■	■	■	■	■	■
Response time[5]	0.6…22 ms	■	■	■	■	■	■
Trigger input	HIGH corresp. 8 V	■	■	■	■	■	■
I/O + V_S connection	Cable 7-pin, L = 2 m	■	■	■	■	■	■
Connection of additional device	HRS, 6-pin	■	■	■	■	■	■
Ambient temperature T_A[6]	Operation: 32…104° F (0…40° C)	■	■	■	■	■	■
	Storage: -4…158° F (-20…70° C)	■	■	■	■	■	■
Shock load	5 g, 6 directions	■	■	■	■	■	■
Housing material	ABS, acrylic, polycarbonate	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
Approximate weight	180 g	■	■	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C; 50% intensity fall
2) Limit values ± 10%
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Dependent on settings; see display on device
6) Relative humidity: 35…85%

Teach procedure	Explanation
1-point	Color parts of the object are taught in Switching limit = 50% of the taught-in color pixel sum (manually adjustable).
Lower limit	Lower switching limit of the object color is taught-in

Order information

Color Vision Sensor

Type	Part no.
CVS1-P112 Easy	1028668
CVS1-P122 Easy	1028669
CVS1-P142 Easy	1028670
CVS1-N112 Easy	1028665
CVS1-N122 Easy	1028666
CVS1-N142 Easy	1028667

Accessories

Type	Order no.
CVSM-1, external operating unit incl. monitor and keypad	1026355
CVSL-S5, external lighting, 12 x LED, white	1026356
Cable, DSL-SH06-G03M, 3 m	6028659

CVS2

Color Vision Sensors

8.3…10.6 in (210…270 mm)
3.5…5.9 in (90…150 mm)
2.0…3.9 (50…100 mm)
sensing range

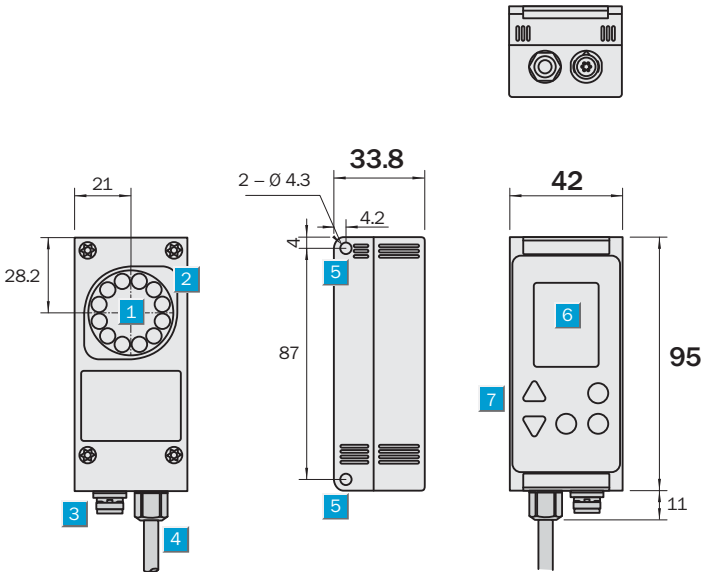
Highlights

- Detecting color
- Sorting colors
- Detecting objects using two colors
- Memory capacity for 15 colors
- RS 232 output
- 2 switching outputs for sorting up to 3 colors (binary output)

CVS2



Dimensional drawing



dimensions in mm

Adjustments

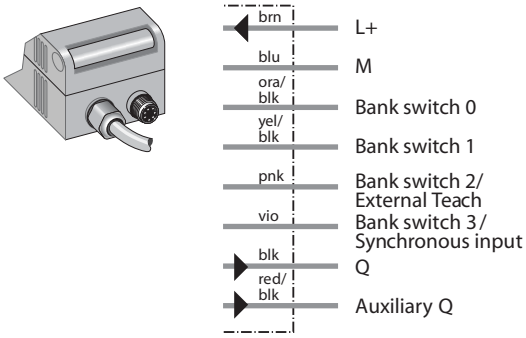


1 Front screen
2 Lighting
3 Connection: external lighting/monitor/PC
4 Connecting cable
5 Fixing hole
6 Color display
7 Input keypad

Accessories	page
Mounting systems	1234

Connection diagram

All types | Cable, 8-wire



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Technnical data	CVS2 -	P112	P122	P142	N112	N122	N142			
Sensing range	210…270 mm/40 x 50…55 x 65 mm²	■			■					
	90…150 mm/ 40 x 50…65 x 75 mm²		■			■				
	50…100 mm/50 x 65…100 x 115 mm²			■			■			
Light source[1]	12 x LED , white	■	■	■	■	■	■			
Resolution	Max. 208 x 236 x 3 (RGB)	■	■	■	■	■	■			
Teach procedure	1-point	■	■	■	■	■	■			
	2-point	■	■	■	■	■	■			
	Upper/lower limit	■	■	■	■	■	■			
Angle of divergence	Approx. 1°	■	■	■	■	■	■			
Supply voltage V_S[2]	12…24 V DC	■	■	■	■	■	■			
Ripple[3]	< 5 V_{PP}	■	■	■	■	■	■			
Current consumption[4]	< 240 mA (at 24 V)	■	■	■	■	■	■			
	< 140 mA (at 12 V)	■	■	■	■	■	■			
Switching outputs	PNP	■	■	■						
	NPN				■	■	■			
Output current I_A max.	< 100 mA	■	■	■	■	■	■			
Response time[5]	0.6…26.6 ms	■	■	■	■	■	■			
Trigger input	HIGH corresp. 8 V	■	■	■	■	■	■			
I/O + V_S connection	Cable 8-pin, L = 2 m	■	■	■	■	■	■			
Connection of additional device	HRS, 6-pin	■	■	■	■	■	■			
Ambient temperature T_A[6]	Operation: 32…104° F (0…40° C)	■	■	■	■	■	■			
	Storage: -4…158° F (-20…70° C)	■	■	■	■	■	■			
Shock load	5 g, 6 directions	■	■	■	■	■	■			
Housing material	ABS, acrylic, polycarbonate	■	■	■	■	■	■			
Enclosure rating	IP 67	■	■	■	■	■	■			
Housing material	180 g	■	■	■	■	■	■			

1) Average service life 100,000 h at T_A = 25° C; 50% intensity fall
2) Limit values ± 10%
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Dependent on settings; see display on device
6) Relative humidity: 35…85%

Teach procedure	Explanation
1-point	Color parts of the object are taught in Switching limit = 50% of the taught-in color pixel sum (manually adjustable).
2-point	Color parts of the object and the background are taught in. Switching limit = average between object and background.
Lower limit	Lower switching limit of the object color is taught-in

Order information

Color Vision Sensor

Type	Part no.
CVS2-P112	1027332
CVS2-P122	1027333
CVS2-P142	1027334
CVS2-N112	1027329
CVS2-N122	1027330
CVS2-N142	1027331

Accessories

Type	Order no.
CVSM-1, external operating unit incl. monitor and keypad	1026355
CVSL-S5, external lighting, 12 x LED, white	1026356
Cable, DSL-SH06-G03M, 3 m	6028659
Connection cable DSL-DH06-G02M, 2 m for CVS data transfer and save/load configuration files to/from PC	6029801

CVS3

Contour Vision Sensors

3.5…5.9 in (90…150mm)
1.2…1.5 in (31…39 mm)
sensing range

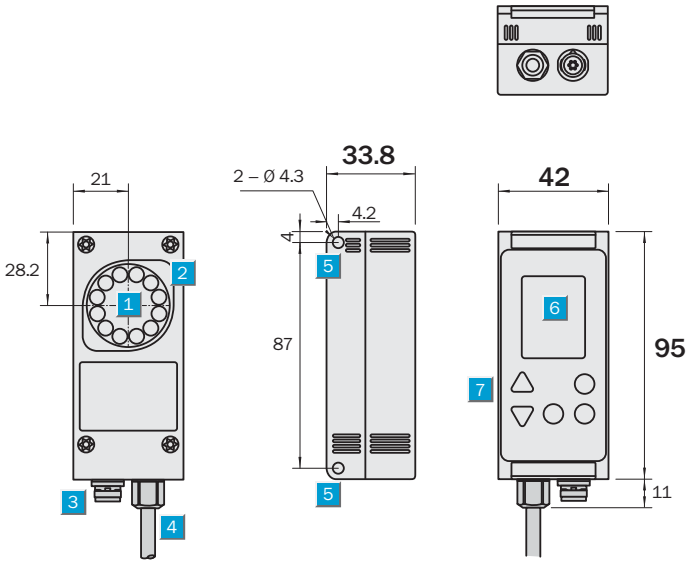
Highlights

- Object detection using shape or size
- Check for surface contamination
- Memory capacity for 15 images
- Memory for review of last 30 failed images
- RS 232 PC interface for setup

CVS3

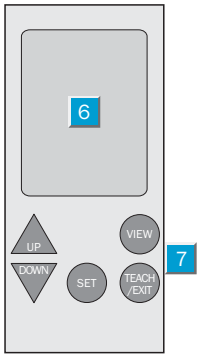


Dimensional drawing



dimensions in mm

Adjustments

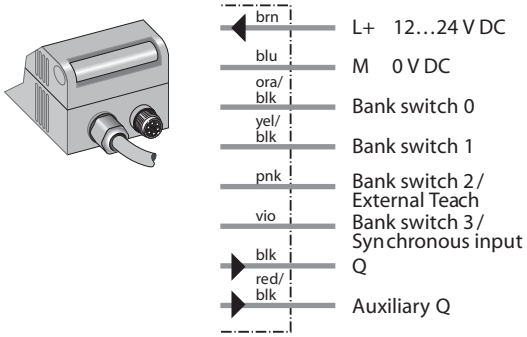


1 Front screen
2 Lighting
3 Connection: external lighting/monitor
4 Connecting cable
5 Fixing hole
6 Color display
7 Input keypad

Accessories	page
Mounting systems	1234

Connection diagram

All types | Cable, 8-wire



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Technnical data	CVS3 -	P122	P132	N122	N132					
Sensing range	90…150 mm/ 40 x 50…65 x 75 mm²	■		■						
	31…39 mm/ 15 x 18…19 x 22 mm²		■		■					
Light source[1]	12 x LED , white	■	■	■	■					
Resolution	Max. 208 x 236 x 3 (RGB)	■	■	■	■					
Supply voltage V_S[2]	12…24 V DC	■	■	■	■					
Current consumption[3]	< 140 mA (at 24 V)	■	■	■	■					
Interface	RS 232 TTL (4800…57600 Baud)	■	■	■	■					
Switching outputs	PNP	■	■							
	NPN			■	■					
Output current I_A max.	< 100 mA	■	■	■	■					
Response time[4]	0.6…22 ms	■	■	■	■					
Switching inputs	External trigger, teach and memory selection	■	■	■	■					
I/O + V_S connection	Cable 8-pin, L = 2 m	■	■	■	■					
Ambient temperature T_A[5]	Operation: 32…104° F (0…40° C)	■	■	■	■					
	Storage: -4…158° F (-20…70° C)	■	■	■	■					
Shock load	5 g, 6 directions	■	■	■	■					
Housing material	ABS, acrylic, polycarbonate	■	■	■	■					
Enclosure rating	IP 67	■	■	■	■					
Weight	180 g	■	■	■	■					

1) Average service life 100,000 h at T_A = 25° C; 50% intensity fall
2) Limit values ± 10%
3) Without load
4) Dependent on settings; see display on device
5) Relative humidity: 35…85%

Order information

Contour Vision Sensor CVS3

Type	Part no.
CVS3-P122	1028673
CVS3-P132	1028674
CVS3-N122	1028671
CVS3-N132	1028672

Accessories

Type	Order no.
CVSM-1, external operating unit incl. monitor and keypad	1026355
CVSL-S5, external lighting, 12 x LED, white	1026356
Cable, DSL-SH06-G03M, 3 m	6028659
Connection cable DSL-DH06-G02M, 2 m for save/load configuration files to/from PC	6029801

CVS4

Character Vision Sensor (OCR)

3.5…5.9 in (90…150 mm)
1.6…3.9 in (40…100 mm)
1.7…2.2 in (44…56 mm)
1.2…1.5 in (31…39 mm)
sensing range

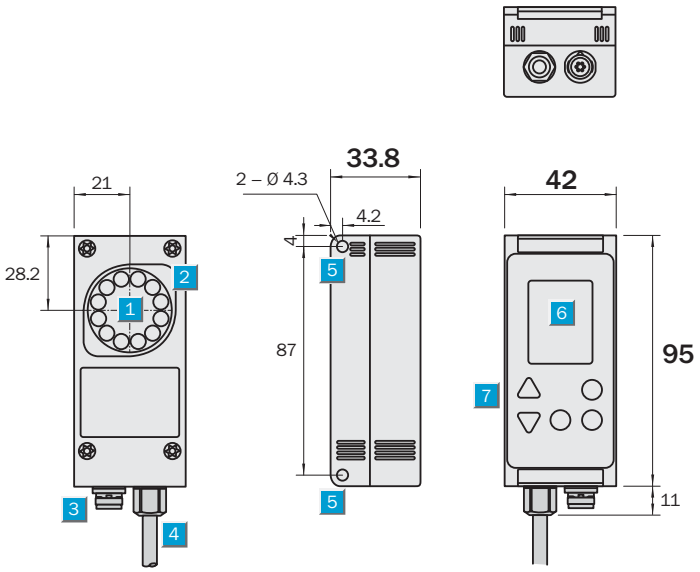
Highlights

- Detecting date, time, string or batch number
- Memory capacity of 16 teach configurations
- Read up to 60 characters (total) on up to 6 lines
- RS 232 PC interface for setup
- Built in calendar/clock for auto updating of date codes
- 12 built-in fonts

CVS4



Dimensional drawing



dimensions in mm

Adjustments

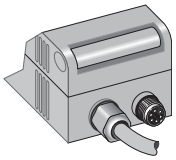


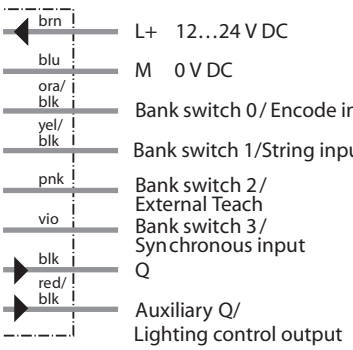
1 Front screen
2 Lighting
3 Connection: external lighting/monitor/PC
4 Connecting cable
5 Fixing hole
6 Color display
7 Input keypad

Accessories	page
Mounting systems	1234

Connection diagram

All types | Cable, 8-wire





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Technnical data	CVS4 -	N122	N132	N152	N150	N142	P122	P132	P152	P150	P142
Sensing range	90…150 mm/53 x 25…79 x 38 mm²	■					■				
	53 x 50…79 x 76 mm²	■					■				
	40…100 mm/53 x 25…115 x 53 mm²					■					■
	44…56 mm/15 x 30/ 30 x 30 mm²			■					■		
	44…56 mm/30 x 15/ 30 x 30 mm²				■					■	
	31…39 mm/21 x 10/ 21 x 20 mm²		■					■			
Character width/height (min…max.)	2.8…30 mm/2.8…62 mm	■					■				
	1.0…11 mm/1.1…24 mm			■	■				■	■	
	0.75…8.2 mm/0.75…16 mm		■					■			
	2.8…44 mm/2.8…43 mm					■					■
Light source[1]	12 x LED , white	■	■	■	■	■	■	■	■	■	■
Resolution	Max. 512 x 422 pixels (b/w)	■	■	■	■	■	■	■	■	■	■
Angle of divergence	Approx. 1°	■	■	■	■	■	■	■	■	■	■
Supply voltage V_S[2]	12…24 V DC	■	■	■	■	■	■	■	■	■	■
Current consumption[3]	< 140 mA (at 24 V)	■	■	■	■	■	■	■	■	■	■
Interface	RS 232 TTL (4800…57600 Baud)	■	■	■	■	■	■	■	■	■	■
Switching outputs	NPN	■	■	■	■	■					
	PNP						■	■	■	■	■
Output current I_A max.	< 100 mA	■	■	■	■	■	■	■	■	■	■
Response time[4]	23…48 ms[5]	■	■	■	■	■	■	■	■	■	■
Switching inputs	External trigger, teach, pulse counter	■	■	■	■	■	■	■	■	■	■
	string+ and memory selection	■	■	■	■	■	■	■	■	■	■
Filter switching inputs	< 12 ms[6]	■	■	■	■	■	■	■	■	■	■
	< 48 µs (in)/< 450 µs (out)[7]	■	■	■	■	■	■	■	■	■	■
Accuracy of integrated clock	Approx. -45 s…75 s per month	■	■	■	■	■	■	■	■	■	■
Power reserve of integrated clock	Stage 1: 3 days approx.[8]	■	■	■	■	■	■	■	■	■	■
	Stage 2: 5 years approx.[9]	■	■	■	■	■	■	■	■	■	■
I/O + V_S connection	Cable 8-pin, L = 2 m	■	■	■	■	■	■	■	■	■	■
Ambient temperature T_A[10]	Operation: 32…104° F (0…40° C)	■	■	■	■	■	■	■	■	■	■
	Storage: -4…158° F (-20…70° C)	■	■	■	■	■	■	■	■	■	■
Shock load	5 g, 6 directions	■	■	■	■	■	■	■	■	■	■
Housing material	ABS, acrylic, polycarbonate	■	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■	■	■
Approximate weight	200 g	■	■	■	■	■	■	■	■	■	■
Number of recognizable characters	60 characters max. (across all lines)	■	■	■	■	■	■	■	■	■	■
	6 lines max.	■	■	■	■	■	■	■	■	■	■
	30 characters max. per line	■	■	■	■	■	■	■	■	■	■
Recognizable date formats	Date, time, continuous serial/batch no.	■	■	■	■	■	■	■	■	■	■
	Max. of 4 different formats simultaneously[11]	■	■	■	■	■	■	■	■	■	■
User defined library	56 characters[12]	■	■	■	■	■	■	■	■	■	■

1) Average service life 100,000 h at T_A = 25° C; 50% intensity fall
2) Limit values ± 10%
3) Without load
4) Dependent on settings; see display on device
5) 20-character date code in 2 lines
6) For trigger, teach and memory selection
7) For pulse counters
8) With capacitor without V_S
9) With battery, without V_S
10) Relative humidity: 35…85%
11) Max. 2 date and/or time formats each, plus serial/batch number can be combined
12) Can be created and transmitted by PC

Order information

OCR Vision Sensor CVS4

Type	Part no.	Type	Part no.
CVS4-P122	1028679	CVS4-N122	1028675
CVS4-P132	1028680	CVS4-N132	1028676
CVS4-P142	1028965	CVS4-N142	1028966
CVS4-P150	1028682	CVS4-N150	1028678
CVS4-P152	1028681	CVS4-N152	1028677

Accessories

Type	Order no.
CVSM-1, external operating unit incl. monitor and keypad	1026355
CVSL-S5, external lighting, 12 x LED, white	1026356
Cable, DSL-SH06-G03M, 3 m	6028659
Connection cable DSL-DH06-G02M, 2 m for CVS data transfer and save/load configuration files to/from PC	6029801

CVS Accessories

Color Vision Sensors

8.3…10.6 in (210…270 mm)
3.5…5.9 in (90…150 mm)
2.0…3.9 (50…100 mm)

sensing range

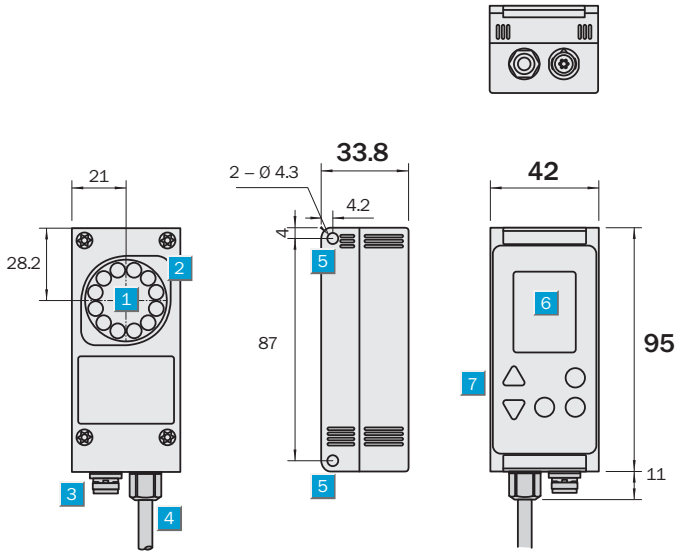
CVS1



Highlights

- Remote teach via Plug and Play CVS M-1
- Cascadable lighting for specific applications (3 max)

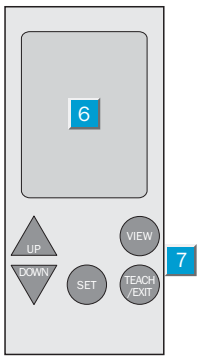
Dimensional drawing



dimensions in mm

Adjustments

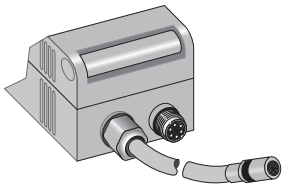
All types



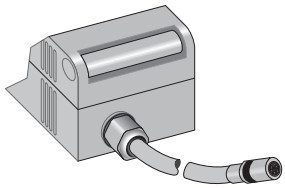
1 Front screen
2 Lighting
3 Connection: external lighting/monitor
4 Connecting cable
5 Fixing hole
6 Color display CVS M-1 only
7 Input keypad CVS M-1 only

Connection type

CVSL-S5



CSM-1



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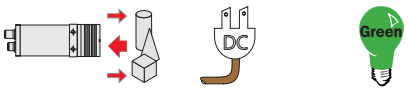
Technnical data		CVSM	CVSL-S5							
Light source[1]			■							
Supply voltage V_S[2]	12…24 V DC from CVS	■	■							
Current consumption[3]	< 75 mA (at 24 V)	■	■							
	< 150 mA (at 12 V)	■	■							
Connection of additional device[4]	HRS, 6-pin		■							
Ambient temperature T_A[5]	Operation: 32…104° F (0…40° C)	■	■							
	Storage: -4…158° F (-20…70° C)	■	■							
Shock load	5 g, 6 directions	■	■							
Housing material	ABS, acrylic, polycarbonate	■	■							
Enclosure rating	IP 67	■	■							
Approximate weight	100 g	■	■							

1) Average service life 100,000 h at T_A = 25° C; 50% intensity fall
2) Limit values ± 10%
3) Without load
4) No more than 3 units can be connected to a CVS or damage may occur
5) Relative humidity: 35…85%

Accessories	
Type	**Order no.**
CVSM-1, external operating unit incl. monitor and keypad	1026355
CVSL-S5, external lighting, 12 x LED, white	1026356
Cable, DSL-SH06-G03M, 3 m	6028659

ICS 100/110

Intelligent Camera Sensor



2.8 in (70 mm)
sensing distance

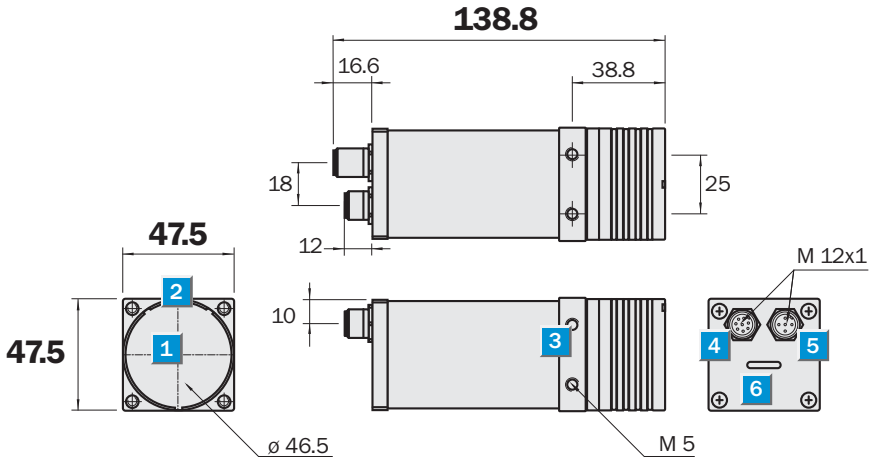
Highlights

- Independent, compact unit has an IP 64 rating
- Extremely simple to set up and program
- Integrated illumination with individually lensed LEDs
- Fast processing speed
- Performs shape check and allows for object rotation

ICS 110



Dimensional drawing



dimensions in mm

VSC 100 9



1 Lens
2 Ring light, 15x LED/focussing lenses
3 Mounting hole M5, 4-times
4 User output, 8-pin, M12
5 Operating unit connection, 5-pin, M12
6 Display of output switching state
7 LC Display
8 Keyboard
9 VSC 100: W x H x D = 150 x 82 x 31 mm³

Order information

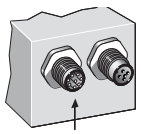
Type	Part no.
ICS 110-B1111	1 023 983
VSC 100-1111	2 025 857
ICS 100-B1111	1 022 631

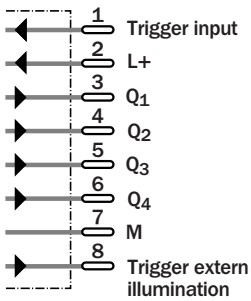
Technnical data	ICS-	ICS100 -B1111	ICS110 -B1111	VSC100 -1111
Sensing distance[1]	2.8 in (70 mm)	■	■	
Field of view	0.8 in x 0.8 in (20 mm x 20 mm)	■	■	
Teach/search window	0.08 in x 0.08 in…0.8 in x 0.8 in	■	■	
	(2 mm x 2 mm…20 mm x 20 mm)			
Search window	Adjustable, store up to 12 programs in memory	■		
Image sensor	CMOS, 512 x 512 pixel	■	■	
	lens: 320 x 320 pixels (high)	■		
	160 x 160 pixels (standard)	■		
Memory	Store up to 12 algorithms	■		
Number of teach windows	1…4 per algorithm	■		
Light source[2]	15 x LED green/with focusing lenses	■	■	
Flash length	30 µs to 1 ms, normally 500 µs	■	■	
Number of storable teach windows	12 in memory + 4 in working memory		■	
Supply voltage U_S [3]	24 V DC	■	■	
Ripple[4]	< 5 V_{PP}	■	■	
Current consumption[5]	< 450 mA	■	■	
Switching outputs	4 x B (NPN/PNP)	■	■	
Output current I_A max.[6]	< 100 mA	■	■	
Response time[7], cycle time[7]	≥ 2.5 ms	■	■	
Switching frequency max.	200/s	■	■	
Number of tests max.	400/s		■	
Trigger input[8]	Falling edge, HIGH = 10 V ... U_S	■	■	
Trigger output for ext. lighting	5 V when sender OFF (TTL)	■	■	
Connection type setup unit[9]	Plug, 5-pin M12	■	■	■
Connection type user output	Plug, 8-pin M12	■	■	
Operating unit display	16 gray levels	■		■
SICK logo in display				■
Protection type	IP 64	■	■	
	IP 40			■
Ambient temperature	Operation 32…122° F (0…50° C)	■	■	■
	Storage -13…158° F (25…70° C)	■	■	
	Storage -4…140° F (-20…60° C)	■		■
Shock load	15 g, 6 directions	■	■	■
Approximate weight	12.3 oz (350 g)	■	■	
	8.5 oz (240 g)			■
Housing material	Aluminum	■	■	
	Plastic			■

1) Range depending on object and parameters; e.g.: ± 8 mm with shape check and threshold = 95 %
2) Average service life at room temperature 50,000 h at T_U = +25° C
3) Limit values ± 20 %
4) Must be within U_S tolerances
5) Without load
6) Amount total for all four outputs
7) With resistive load
8) Trigger pulse > 0.5 ms
9) Cable length 2 m, PVC, Ø 5 mm, do not distort cable below 0 °C

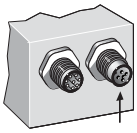
Connection diagram

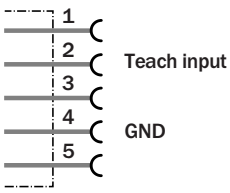
8-pin, M 12 (user output)





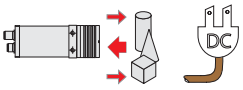
5-pin, M 12
Setup unit/teach input)





AGD 10/DCI 10

Intelligent Camera Sensor





0.8 x 0.8 in² (20 x 20 mm²)
field of view

CE

Highlights

- Simple handling in operation
- High clock cycle rate for fast processes
- Sturdy evaluation procedure
- DCI 10: warning in advance if pixel number is near the tolerance limit
- Reflections can be detected on shiny objects

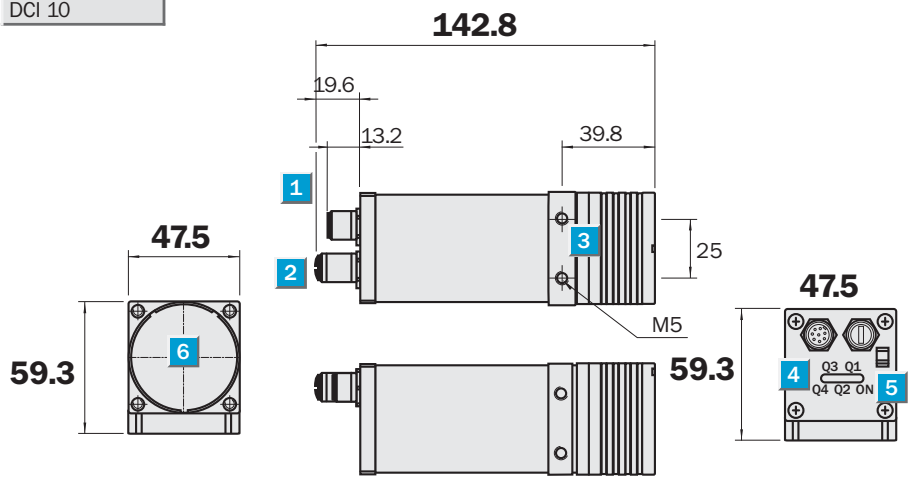
AGD 10/DCI 10



Dimensional drawing

AGD 10
DCI 10

dimensions in mm



VSC 100 9



1 Power connection (external thread), 8-pin, M12
2 Operating part connection (internal thread), 5-pin, M12
3 Fixing hole M5
4 Switch output indicator (Q1-Q4)
5 Power indicator
6 Optical axis sender, optical axis receiver
7 VSC 100: WxHxD = 150 x 82 x 31 mm³
8 LC Display
9 Keyboard

Order information

Intelligent Camera Sensor	
Type	**Part no.**
AGD 10-B1111	1 026 384
DCI 10-B1111	1 026 385
VSC 100	2 025 857

Mounting technology	
Type	**Part no.**
Angle mounting (set) ICS 100/110	2 027 839
Universal bracket ICS 100/110	2 022 464

Accessories

Type	Part no.
Cable, 2 m, with receptacle M 12, 8-pin	7 024 488
Cable AGD/DCI, 2 m, with plug M 12, 5-pin	7 027 023
Connection cable for control input, 2 m, plug M 12, 4-pin	6 028 077

Technnical data		AGD 10 -B1111	DCI 10 -B1111	VSC 100
Sensing distance/field of view	2.8 in (70 mm)/0.8 x 0.8 in² (20 x 20 mm²)	■	■	
Teach field/search field	Size can be changed	■	■	
	Position can be changed		■	
Filters/lens	Green (filter: 450…550 nm)	■	■	
Image sensor	CMOS; 512 x 512 pixel	■	■	
Light source[1]	15 x LED; focused green	■	■	
Real resolution	320 x 320 pixel	■	■	
Test mode	Pixel sum		■	
	Minimum pixel sum	■		
Supply voltage V_S [2]	24 V DC	■	■	
Residual ripple[3]	< 5 V_{PP}	■	■	
Current consumption[4]	< 450 mA	■	■	
Switching outputs	B (NPN/PNP)	■	■	
	Q1: value in tolerance range	■	■	
	Q2: value outside of tolerance	■	■	
	Q3: value near to or below lower tolerance limit		■	
	Q4: value near to or above upper tolerance limit		■	
Output current I_A max.[5]	< 100 mA	■	■	
Response time/cycle time[6]	3…6.4 ms	■	■	
Max. image frequency	Approx. 285/s	■	■	
Trigger input[7]	HIGH corresp. ≥ 10 V…28.8 V	■	■	
Trigger output for ext. lighting	TTL; LOW = active	■	■	
Connection type		■	■	
I/O + V_S	M12, 8-pin	■	■	
VSC - ICS	M12, 5-pin	■	■	■
Protection type	IP 64	■	■	
	IP 40			■
Ambient temperature	Operation 32…122° F (0…50° C)	■	■	■
	Storage -13…167° F (-25…75° C)	■	■	
	Storage -4…140° F (-20…60° C)			■
Shock load	15 g, 6 directions	■	■	
Approximate weight	12.3 oz (350 g)	■	■	
	8.5 oz (240 g)			■
Housing material	Aluminum, brass	■	■	
	Plastic			■

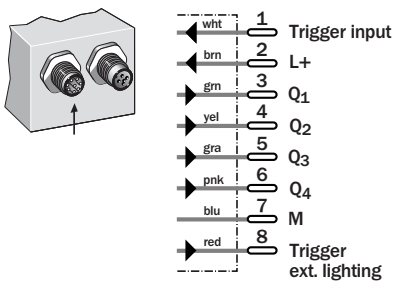
1) Average service life at room temperature 100,000 h at T_A = +25° C
2) Limit values ± 20 %
3) Must be within V_S tolerances
4) Without load
5) Amount total for all four outputs
6) Signal transit time with resistive load
7) Falling edge; pulse length ≥ 0.5 ms; reaction time = 3.5 ms

Test mode	Process[8]
Pixel sum	Check of the number of pixels at exceeding
	or falling below the limit values
Minimum pixel sum	Checking pixel number exceeding a limit

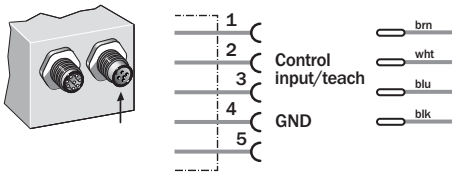
8) All procedures are used in the binary image.
A comparison is made each time between the taught-in reference image and the image to be checked.

Connection diagram

8-pin, M12 (output)



5-pin, M12 setup unit/teach input



IVC-2D

Smart Camera

640 x 480
1024 x768
resolution

Highlights

- Robust design for industrial environments
- Multiple inspections in one camera
- Sub-pixel measurements
- Reader models for OCV, OCR and 1D and 2D bar codes
- Ethernet/IP
- OPC compatible
- Coordinate transformation tools for robot integration

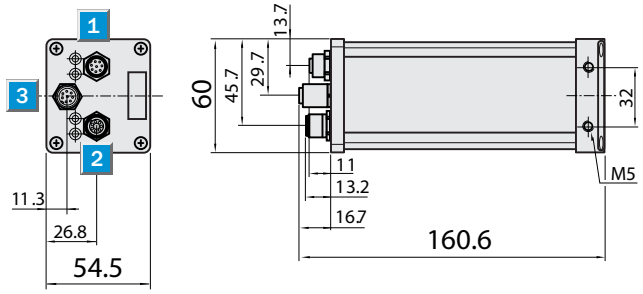
IVC-2D



Dimensional drawing

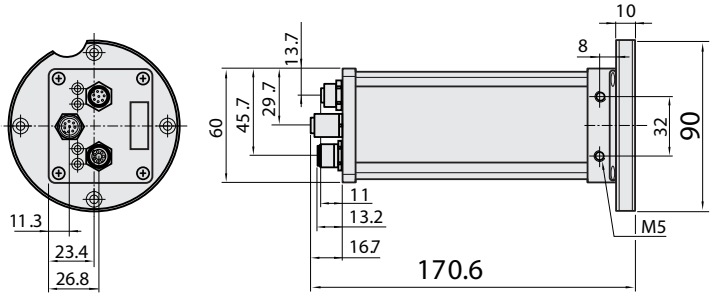
IVC-2D

dimensions in mm



1 Power I/O: M12, 8-pin, male (illumination trigger output)
2 Ethernet: M12, 4-pin, D-coded, female
3 RS485: M12, 8-pin, female

IVC-2D with adapter plate for SICK ring light



Order information

Smart Cameras

Type	Part no.
IVC-2DM1111 IVC-2D Standard	1 027 190
IVC-2DM1121 IVC-2D HiRes	1 028 407
IVC-2DM1112 IVC-2D Reader	1 029 135
IVC-2DM1122 IVC-2D HiRes Rdr	1 029 136
IVC-2DR111	1 040 057

Optional as accessories

Type	Part no.
Mounting bracket	2 032 753
Hood for IP 65	2 032 637
Hood for IP 65 with ICL 110	2 032 968
Extension ring	4 041 112

* Visit www.sickusa.com for lens and lighting options

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Technical data	IVC-2D	M1111 MC-2D	M1121 MC-2D HiRes	M1112 MC-2D Reader	M1122 MC-2D HRes Rdr	R1111
Performance	800 MHz processor and FPGA	■	■	■	■	
	150 MHz processor and FPGA					■
Memory	128 MB RAM 16 MB flash	■	■	■	■	
	64 MB RAM 16 MB flash					■
Interface	10/100 MB Fast Ethernet TCP/IP, UDP/IP, Ethernet/IP	■	■	■	■	■
Serial interface	RS 485	■	■	■	■	■
Digital I/O	4 program control inputs (1 trigger input)	■	■	■	■	■
	3 program control outputs	■	■	■	■	■
	Illumination trigger output	■	■	■	■	■
Enclosure rating	IP 65 with hood	■	■	■	■	■
Options	Stainless steel enclosure	■	■	■	■	■
Dimensions (L x H x D)	6.3 x 2.2 x 2.4 in (161 x 55 x 60 mm)	■	■	■	■	■
Resolution	640 x 480 pixels	■		■		■
	1024 x 768 pixels		■		■	
OCR/OCV				■	■	
2D codes/ Bar codes[1]				■	■	
Imager	CCD, electronic shutter	■	■	■	■	■
Lens adapter	CS-mount and C-mount[2]	■	■	■	■	■
Imager size	1/3 in, 4.8 mm x 3.6 mm	■	■	■	■	■
Ambient temperature		■	■	■	■	■
Operation:	32…122° F (0° C…50° C)	■	■	■	■	■
Storage:	–4…158° F (–20° C…70° C)	■	■	■	■	■
Weight	Approx. 505 g (17.8 oz)	■	■	■	■	■
Housing material	Aluminum, anodized	■	■	■	■	■
	Connectors = Nickel-plated brass	■	■	■	■	■
	Front window of hood = PMMA	■	■	■	■	■
Spectral response	Approx. 400 nm…750 nm	■	■	■	■	■
Exposure time	64 µs to 500 ms	■	■	■	■	■
Power supply	24 V DC ± 20 %	■	■	■	■	■
Current consumption	< 400 mA[3]	■	■	■	■	■
Ripple	< 5 Vss	■	■	■	■	■
Digital inputs	HIGH 10 V…28.8 V	■	■	■	■	■
Digital outputs	B–types; < 100 mA	■	■	■	■	■
Shock load	15 g, 3 x 6 directions	■	■	■	■	■
Vibration load	5 g, 58…150 Hz	■	■	■	■	■

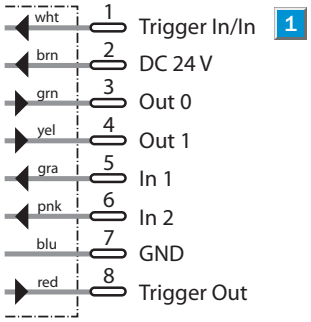
1) For example: EAN-13, UPC-A, EAN-8, code 39, code 128, pharmacode, i2of5, code 32, DATAMATRIX

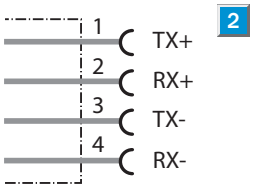
2) For CS-mount an adapter ring should be removed

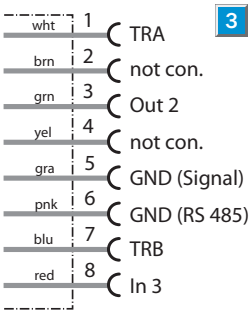
3) Without load and lighting

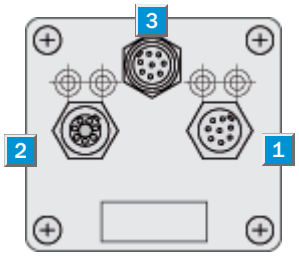
4) 100 mA = total amount of all digital outputs

Connection diagram









1 Power I/O: M12, 8-pin, male
2 Ethernet: M12, 4-pin, D-coded, female
3 RS 485: M12, 8-pin, female

M12, 8-pin, female plug with cable, 2 m, for power and I/O	
Part no.	6 020 633
M12, 8-pin, female plug with cable, 5 m, for power and I/O	
Part no.	6 020 993
M12, 4-pin, (D-coded) to RJ45 Ethernet cable, 3 m	
Part no.	6 029630
M12, 8-pin, male with 2 m cable for RS 485 and secondary I/O	
Part no.	6 029 330
M12, 8-pin, male with 5 m cable for RS 485 and secondary I/O	
Part no.	6 029 331

IVC-3D

Smart Camera

1.2 x 2.4 in (30 x 60 mm),
2 x 5.9 in (50 x 150 mm),
7.9 x 23.6 in (200 x 600 mm),
9.8 x 49.2 in (250 x 1250 mm)

field of view (h x w)

Highlights

- The first 3D Smart Camera available
- Calibrated 3D inspection at production speed
- Contrast-indpendent inspection
- No additional illumination required
- Robust industrial design
- Ethernet/IP
- OPC compatible
- Coordinate transformation tools for robot integration

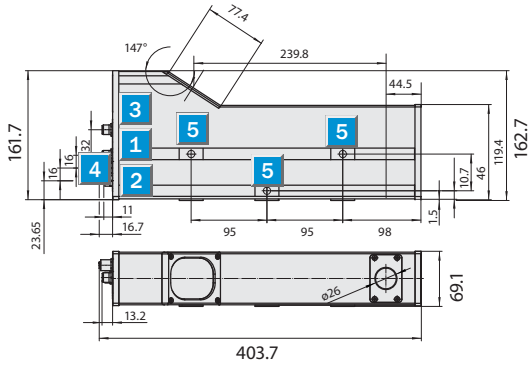
IVC-3D



Dimensional drawing

IVC-3D 200, IVC-3D 300, IVC-3D 100

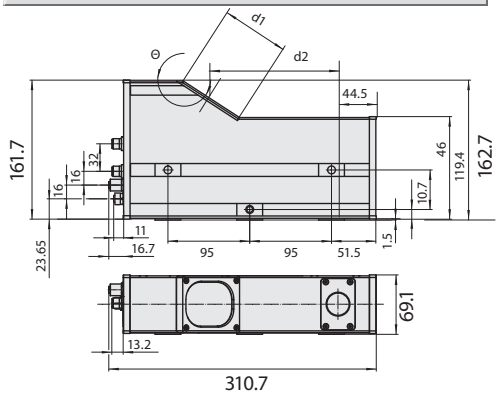
dimensions in mm



IVC-3D11111 and IVC-3D41111 (not to scale)

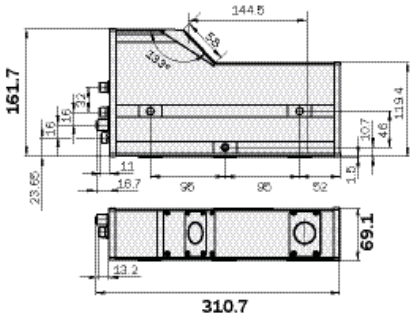
1 Power I/O: M12, 8-pin, male
2 Ethernet: M12, 4-pin, D-coded, female
3 Encoder: M2, 5-pin, male
4 RS485: M12, 8-pin, female
5 There are mounting holes (M8 x 10) situated on the back and on the upper side. These have the same hole pattern.

IVC-3D 50



IVC-3D31111 and IVC-3D2111x (not to scale)
IVC-3D-31111: Θ=133°, d_1=58.2 mm, d_2=144.5 mm
IVC-3D2111x: Θ=147°, d_1=77.4 mm, d_2=146.8 mm
d2 is the distance from the laser beam to where the optical axis intersects with the camera window.

IVC-3D 30

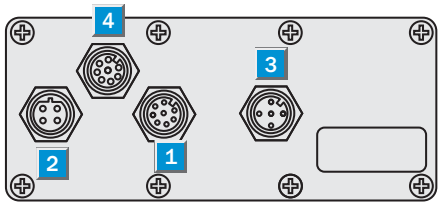


Order information

Smart Cameras

Type	Part no.
IVC-3D31111 IVC-3D 30	1 041 205
IVC-3D21111 IVC-3D 50	1 027 538
IVC-3D21112 IVC-3D 50	1 041 710 (plastic lens)
IVC-3D51111 IVC-3D 100	1 043 579
IVC-3D11111 IVC-3D 200	1 027 539
IVC-3D11112 IVC-3D 200	1 042 152 (plastic lens)
IVC-3D41111 IVC-3D 300	1 041 204

Connection type



1 Power I/O: M12, 8-pin, male
2 Ethernet: M12, 4-pin, D-coded, female
3 Encoder: M12, 5-pin, male
4 RS 485: M12, 8-pin, female

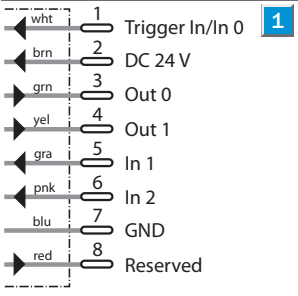
* Refer to connection diagram on next page

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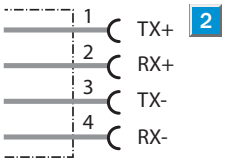
Technical data	IVC-3D	31111 IVC-3D30	21111 IVC-3D50	21112 IVC-3D50 plastic lens	51111 IVC-3D100	11111 IVC-3D200	11112 IVC-3D200 plastic lens	41111 IVC-3D300
Performance	5,000 profiles/second, image mode	■	■	■	■	■	■	■
	800 MHz processor and FPGA	■	■	■	■	■	■	■
Interface	10/100 MB Fast Ethernet TCP/IP, UDP/IP, Ethernet/IP, OPL	■	■	■	■	■	■	■
Serial interface	RS 485	■	■	■	■	■	■	■
Digital I/O	3 program control inputs (1 trigger input)	■	■	■	■	■	■	■
	3 program control outputs	■	■	■	■	■	■	■
Digital inputs	3 x HIGH = 10 V…28.8 V	■	■	■	■	■	■	■
Digital outputs	3 x B-type < 100 mA total current of all digital outputs	■	■	■	■	■	■	■
Encoder interface	RS 422, TTL SV	■	■	■	■	■	■	■
Max. encoder frequency	2 MHz	■	■	■	■	■	■	■
Enclosure rating	IP 65	■	■	■	■	■	■	■
Dimensions (L x H x D)	15.2 x 6.4 x 2.7 in (387 x 163 x 69 mm)				■	■	■	■
	11.6 x 6.4 x 2.7 in (294 x 163 x 69 mm)	■	■	■				
Weight	Approx. 4 kg (8.8 lb.)				■	■	■	■
	Approx. 3.2 kg (7.1 lb.)	■	■	■				
Housing material	Aluminum, anodized	■	■	■	■	■	■	■
	Connectors: Nickel-plated brass	■	■	■	■	■	■	■
	Front windows: Compound safety glass	■	■		■	■		■
Front windows	PMMA			■			■	
Shock load	15 g, 3 x 6 directions	■	■	■	■	■	■	■
Vibration load	5 g, 58 … 150 Hz	■	■	■	■	■	■	■
Laser class	2M/2	■	■	■	■	■	■	■
Imager	CMOS	■	■	■	■	■	■	■
3D height resolution	0.0005 in (0.015 mm)				■			
	0.0016 in (0.04 mm)	■						
	0.0028 in (0.07 mm)		■	■				
	0.0079 in (0.2 mm)					■	■	
	0.0472 in (1.2 mm)							■
Max. profile width	1400 points							■
	2048 points (software)	■	■	■	■	■	■	
Laser wavelength	Typ. 658 nm ± 15 nm	■	■	■	■	■	■	■
Laser filter	60 nm FWHM	■	■	■	■	■	■	■
Laser modes	Continuous or flashed, software controlled	■	■	■	■	■	■	■
Power supply	24 V DC ± 20 %	■	■	■	■	■	■	■
Current consumption	< 1 A	■	■	■	■	■	■	■
Ripple	< 5 Vpp	■	■	■	■	■	■	■
Ambient temperature	Operation: 32…104° F (0…40° C)	■	■	■	■	■	■	■
	Storage: -4…158° F (–20…70° C)	■	■	■	■	■	■	■

IVC Studio PC application development tool. Min system req. 550 MHz CPU, 128 MB RAM, CD-ROM or DVD, Fast Ethernet, Win 2000/WinXP. Graphics driver support for Open GIL 1.3 or higher. IVC Studio in English and German.

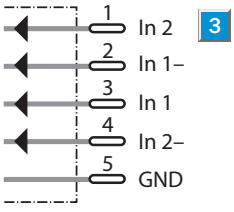
Connection diagram



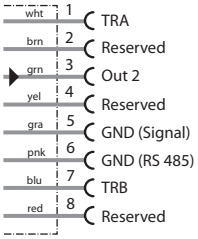
1



2



3



4

M12, 8-pin female plug w/ cable, 2 m, for power and I/O Part no. 6 020 633	M12, 4-pin, (D-coded)to RJ45 Ethernet cable, 3 m Part no. 6 029 630	M12, 5-pin, female with 2 m cable for Encoder Part no. 6 008 899	M12, 8-pin, male with 2 m cable for RS 458 and secondary I/O Part no. 6 029 330
M12, 8-pin, female plug w/ cable, 5 m, for power and I/O Part no. 6 020 993	M12, 4-pin, (D-coded) to RJ45 Ethernet cable, 10 m Part no. 6 030 928	M12, 5-pin, female with 5 m cable for Encoder Part no. 6 009 868	M12, 8-pin, male with 5 m cable for RS 458 and secondary I/O Part no. 6 029 331
	M12, 4-pin, (D-coded) to RJ45 Ethernet cable, 25 m Part no. 6 033 555	M12, 5-pin, female with 10 m cable for Encoder Part no. 6 010 544	M12, 8-pin, male with 10 m cable for RS 458 and secondary I/O Part no. 6 032 324

Ruler E

3D Cameras

9.8 x 23.6 in (250 x 600 mm),
9.8 x 47.2 in (250 x 1200 mm)
field of view (h x w)

Highlights

- Easy to integrate
- Data as real world coordinates
- Robust housing
- Operates in low temperatures
- Multi scan
- Patented laser scatter measurement (select models only)

Ruler E

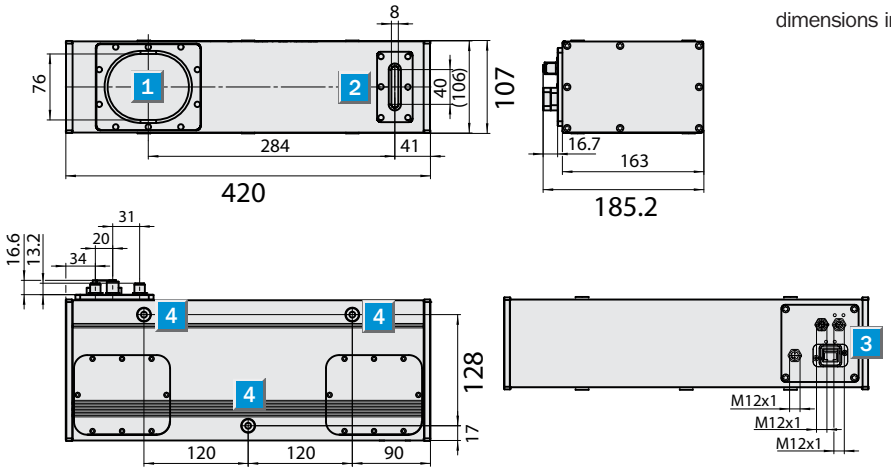






Dimensional drawing

dimensions in mm



1 Image sensor
2 Laser unit
3 Connectors
4 Fastening threads (M8 x 15 length)

Order information

Version	Type	Part no.
Ruler E600S	Ruler-E2112	1 029 238
Ruler E1200S	Ruler-E1112	1 029 230

* 3b (high power) laser and heating (-30…40° C) options available. See web for more information.

Ruler E accessories

Type	Part no.
Ruler E accessory kit	1 014 241

Content of Ruler E accessory kit (1014241)

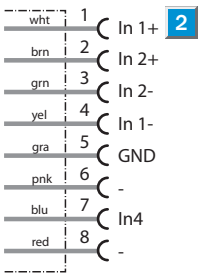
Type	Part no.
T-junction conn.	6 026 503
Power supply	1 014 242
Gigabit Ethernet cable, 10 m	6 032 322
Power and I/O cable, M12 to M12, 2 m	6 030 121
I/O cable, M12 to open, 2 m	6 029 330
Encoder cable, M12 to open, 2 m	6 029 330

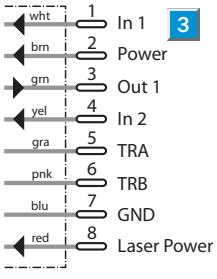
Technical data	Ruler E	2112	1112
Performance	10,000 3D profiles/second		
Interface	Gigabit Ethernet		
Host platform[1]	PC, Windows XP		
Development environment	.Net Assembly, C, or C++ (VS .NET 2003)		
Synchronization of data	Free running, light switch enable, rotary encoder trig		
Encoder interface	RS 422		
Max. encoder frequency	2 MHz		
Digital inputs	3 x HIGH = 10 V…28.8 V		
Digital outputs	1 x B – type; < 100 mA		
Power supply	24 V DC		
Current consumption	< 1 A		
Ripple	< 5 V_{pp}		
Dimensions (L x H x D)	16.5 x 6.4 x 4.1 in (420 x 163 x 105 mm)		
Weight	Approx. 7 kg (15.4 lb)		
Enclosure rating	IP 65		
Housing material	Aluminum, surface gray varnished		
	Connectors: nickel-plated brass		
	Windows: float glass, AR coated		
Shock load	15 g, 3 x 6 directions		
Vibration load	5 g, 58 … 150 Hz		
Laser class	2M		
	3b - see website for more information)		
Laser wavelength	660 ± 15 nm		
Laser filter	60 nm FWHM		
Imager	CMOS		
Max. profile width	1024 pixels		
	1536 pixels		
Typical height resolution	0.4 mm (15.7 mil)		
	0.2 mm (7.9 mil)		
Example field of view (h x w)	9.8 x 47.3 in (250 x 1200 mm)		
	9.8 x 23.6 in (250 x 600 mm)		
Scatter measurement			
Ambient temperature	Operation: 32…104° F (0…40° C)		
with heating	Operation: -22…104° F (-30…40° C) see web for more information		
	Storage: -4…158° F (–20…70° C)		

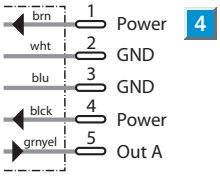
1) Recommended PC for Vision System: 3.0 GHz CPU, 800 MHz bus speed, 512 MB RAM (For evaluation purposes, a PC with lower performance may be sufficient)

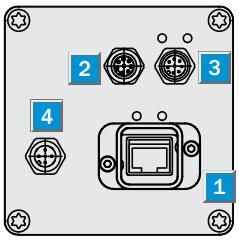
Connection diagram

Pin configuration 1 according to the Gigabit Ethernet standard defined by IEEE 802.3ab









1 Gigabit Ethernet
2 Encoder
3 Power I/O
4 Heating (by option)

Gigabit Ethernet cable, CAT 6	
Type	Part no.
5 m	6 032 321
10 m	6 032 322
20 m	6 032 323

Encoder cable open	
Type	Part no.
2 m	6 029 330
5 m	6 029 331
10 m	6 032 234

Power I/O cable open	
Type	Part no.
2 m	6 020 633
5 m	6 020 993
10 m	6 022 152
15 m	6 022 153

Heating cable	
Type	Part no.
2 m	6 032 485
5 m	6 032 486

Ranger C

3D Cameras

1536 x 512
512 x 512
resolution

Highlights

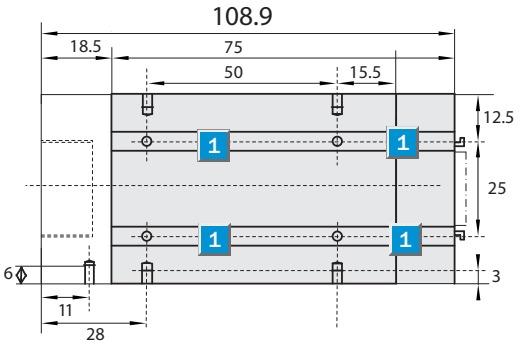
- MultiScan technology
- Easy to integrate into existing CameraLink systems
- Flexible product for a wide range of applications
- Best market price/performance
- Flexible field of view due to free choice of lens and geometry
- Patented laser scatter measurement technology

Ranger C



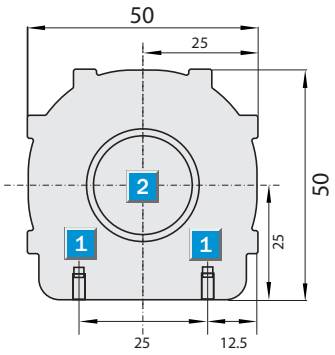
Dimensional drawing

Ranger C camera dimension, mid (mm)

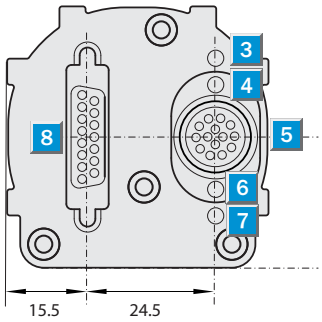


Ranger C camera dimension, front (mm)

dimensions in mm



Ranger C camera dimension, rear (mm)



1. Camera housing mounting holes
2. Sensor center
3. USR2 LED
4. USR1 LED
5. Power and I/O connection
6. PWR LED
7. COM LED
8. CameraLink connection

CameraLink connector

The CameraLink connector is specified in the CameraLink sandard and is a 26-position high-density Mini D Ribbon (MDR) female plug.

Order information

3D cameras	
Type	Part no.
Ranger C40	1 014 218
Ranger C50	1 014 216
Ranger C50-IR	1 014 223
Ranger C55	1 014 217
Ranger C55-IR	1 014 224

Smart Cameras	Part no.
Ranger C accessory kit	1 014 313

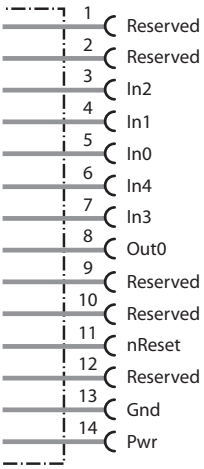
Ranger C accessory kit (1014313)	Part no.
Ranger M/C power - I/O terminal	1 014 284
Ranger power supply, 24 V DC	2 040 591
Ranger CameraLink cable, 3 m	1 014 310
SAH Power - I/O cable, 3 m	1 014 266
Lens, 25 mm, F1.4, 1 in	1 014 252
Camera mounting parts	1 014 255
Ranger C operating instructions	8 011 742

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Technical data	Ranger C	40	50	50-IR	55	55-IR
Performance	Up to 30,000 3D profiles/second	■	■	■	■	■
	MultiScan functionality	■	■	■	■	■
Communication Interface[1]	CameraLink	■	■	■	■	■
Host platform	PC, Windows XP	■	■	■	■	■
Development environment	C++ (VS .NET 2003) or C (VS .NET 2003, VS6)	■	■	■	■	■
Synchronization of data	Free running, light switch enable, rotary encoder	■	■	■	■	■
Encoder interface	TTL levels	■	■	■	■	■
Max. encoder frequency	2 MHz	■	■	■	■	■
Digital inputs	5 x TTL	■	■	■	■	■
Digital outputs	1 x TTL	■	■	■	■	■
Power supply	12…24 V DC	■	■	■	■	■
Power consumption	8 W, 1.25 A	■	■	■	■	■
Dimensions (L x H x D)	2 x 2 x 4.3 in (50 x 50 x 110 mm)	■	■	■	■	■
Weight	Approx. 13.7 oz. (390 g)	■	■	■	■	■
Enclosure rating	IP 20	■	■	■	■	■
Housing material	Aluminum, surface varnished	■	■	■	■	■
Camera house temperature	41…122° F (5…50° C)	■	■	■	■	■
HiRes gray line resolution	3,072 pixels				■	■
C-mount optics	1 in		■	■	■	■
	1/2 in	■				
Imager	CMOS	■	■	■	■	■
IR filter[3]	Band pass filter, c.w. 780 nm			■		■
Gray line resolution	1,536 pixels		■	■	■	■
	512 pixels	■				
3D profile resolution	1,536 pixels		■	■	■	■
	512 pixels	■				
Scatter resolution	1,536 pixels		■	■	■	■
	512 pixels	■				
Max. 3D heigh resolution	13 bits, 1/16 pixel	■	■	■	■	■

1) Frame Grabber requirements: 33/66 MHz, PCI 32 bit @ 33 MHz. Support for Com port mapping, 2 x 8 bit two-taps interleave data mode. Line-scan, true line-scan. Pixels/line: 512-64 kB depending on application
2) PC requirements: Min Pentium III, 1.5 GHz, 256 MB RAM, half-length PCI slot.
3) Sepearation of multiple light sources. Row 100-511 with filter, Row 0-10 without filter.

Connection diagram

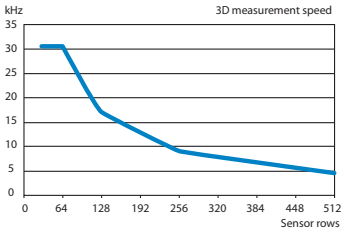


CameraLink cable	
Type	Part no.
3 m	1 014 310
10 m	1 014 311

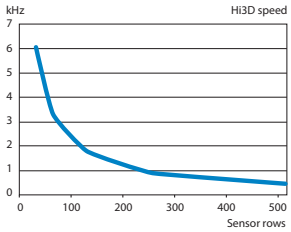
Power and I/O	
Type	Part no.
3 m	1 014 266
10 m	1 014 324

Diagrams

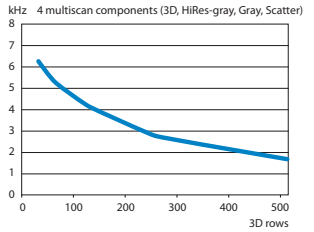
Max. speed 1/2 pixel resolution



Best resolution 1/16 pixel res.



MultiScan measurement speed



Ranger E/Ranger D

3D Cameras

1536 x 512
512 x 512
resolution

Highlights

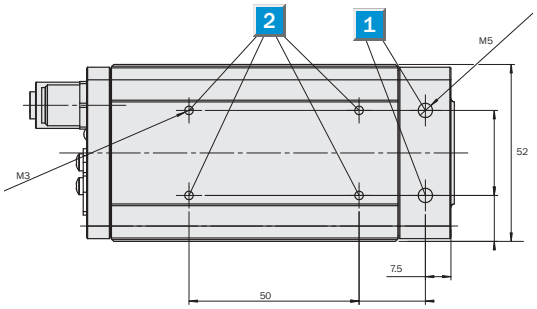
- The fastest 3D available
- MultiScan technology
- Easy to integrate into Gigabit Ethernet systems
- Flexible product for a wide range of applications
- Best market price/performance
- Flexible field of view due to free choice of lens and geometry
- Patented laser scatter measurement technology

Ranger E/Ranger D

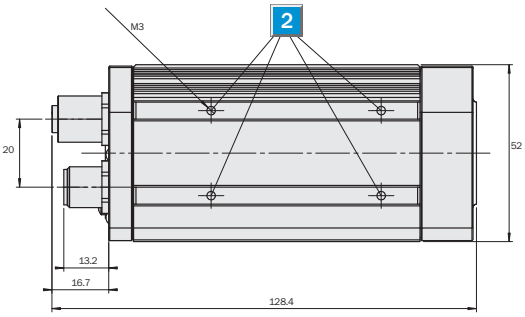


Dimensional drawing

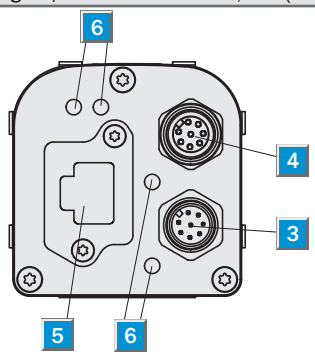
Ranger E/D camera dimension, bottom (mm)



Ranger E/D camera dimension, side (mm)



Ranger E/D camera dimension, rear (mm)



1 Mounting holes M5, 9 mm (2 x)
2 Mounting holes M3, 3 mm (4 x per side)
3 Power I/O connector (M12 male)
4 Encoder connector (M12 female)
5 Gigabit Ethernet connector (RJ 45)
6 LEDs:
On – Supply voltage OK (green)
Link Ethernet connected (green)
Data – Camera sends data (yellow)
Function Reserved

5 Pin configuration according to the Gigabit Ethernet standard defined by IEEE 802.3ab

* Refer to connection diagram on next page

Gigabit Ethernet cable, Cat. 6

Type	Part no.
5 m	6 033 029
10 m	6 033 030
20 m	6 033 031
70 m	6 033 032

Order information

3D cameras

Type	Part no.
Ranger E40	1 040 378
Ranger E50	1 040 379
Ranger E55	1 040 380
Ranger E50 IR	1 040 381
Ranger E55 IR	1 040 382
Ranger D40	1 040 383
Ranger D50	1 040 384

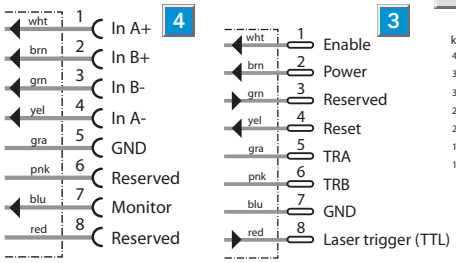
Ranger E/D accessories	Part no.
Ranger E/D accessory kit	2 040 857

Ranger E/D accessory kit (2040857)	Part no.
Ranger E/D power-I/O terminal	6 033 171
Ranger power supply, 24 V DC	2 040 591
Ranger E/D Gigabit Ethernet cable, 5 m	6 033 029
Ranger E/D PIO-encoder Y cable	6 033 172
Lens, 25 mm, F1.4, 1 in	1 014 252
Camera mounting parts	1 014 255
Ranger E/D operating instructions	8 011 731

Technical data	Ranger D & E	E40	E50	E50-IR	E55	E55-IR	D40	D50
Performance	Up to 35,000 3D profiles/second	■	■	■	■	■		
	Up to 1,000 3D profiles/second						■	■
	MultiScan functionality	■	■	■	■	■		
Communication Interface[1]	Gigabit Ethernet	■	■	■	■	■	■	■
Host platform	PC, Windows XP	■	■	■	■	■	■	■
Development environment	C++ (VS .NET 2003) or C (VS .NET 2003, VS6)	■	■	■	■	■	■	■
Synchronization of data	Free running, light switch enable, rotary encoder	■	■	■	■	■	■	■
Encoder interface	RS422 (TTL levels)	■	■	■	■	■	■	■
Max. encoder frequency	2 MHz	■	■	■	■	■	■	■
Digital inputs	4 x HIGH = 10 V… 28.8 V	■	■	■	■	■	■	■
Digital outputs	1 x TTL	■	■	■	■	■	■	■
	2 x B-type; < 100 mA	■	■	■	■	■	■	■
Power supply	24 V DC	■	■	■	■	■	■	■
Ripple	< 5 V_{pp}	■	■	■	■	■	■	■
Power consumption	7 W, 0.8 A	■	■	■	■	■	■	■
Dimensions (L x H x D)	4.9 x 2 x 2 in (125 x 52 x 52 mm)	■	■	■	■	■	■	■
Weight	Approx. 12.7 oz. (360 g)	■	■	■	■	■	■	■
Enclosure rating	IP 20	■	■	■	■	■	■	■
Housing material	Aluminium, surface varnished	■	■	■	■	■	■	■
	Connector: nickel-plated brass	■	■	■	■	■	■	■
Ambient temperature	Operation: 32…113° F (0…45° C)	■	■	■	■	■	■	■
	Storage: -4…158° F (-20…70° C)	■	■	■	■	■	■	■
Shock load	15 g, 3 x 6 directions	■	■	■	■	■	■	■
Vibration load	5 g, 58…150 Hz	■	■	■	■	■	■	■
C-mount optics	1 in		■	■	■	■		■
	1/2 in	■					■	
Imager	CMOS	■	■	■	■	■	■	■
IR filter[3]	Band pass filter, c.w. 780 nm			■		■		
HiRes gray line resolution	3,072 pixels				■	■		
Gray line resolution	1,536 pixels		■	■	■	■		
	512 pixels	■						
Scatter resolution	1,536 pixels		■	■	■	■		
	512 pixels	■						
3D profile resolution	1,536 pixels		■	■	■	■		■
	512 pixels	■					■	
Max. 3D height resolution	13 bits, 1/16 pixel	■	■	■	■	■	■	■

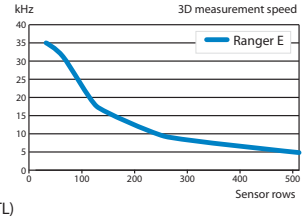
1) Recommended PC for Vision System: 3.0 GHz CPU, 800 MHz bus speed, 1,024 MB RAM
2) Separation of multiple light sources. Row 100-511 with filter. Row 0-10 without filter

Connection diagram

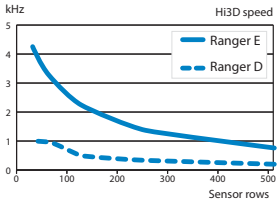


Diagrams

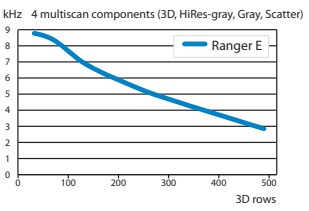
Max. speed 1/2 pixel resolution



Best resolution 1/16 pixel res.



MultiScan measurement speed



Encoder cable open	
Type	Part no.
2 m	6 029 330
5 m	6 029 331
10 m	6 032 324

Power and I/O cable open	
Type	Part no.
2 m	6 020 633
5 m	6 020 993
10 m	6 022 152
15 m	6 022 153

V.18 Selection Guide

Order data V 18 DC (10…30 V)



1 Basic type	
Through-beam photoelectric sensor (sender only)	VS
Through-beam photoelectric sensor (receiver only)	VE
Through-beam photoelectric sensor (sender and receiver)	VS/VE
Photoelectric reflex sensor	VL
Photoelectric proximity sensor (F = focussed)	VTF
Photoelectric proximity sensor (E = energetic)	VTE

2 Size and series	
Housing M 18 (V 18 Series)	18

3 Switching outputs and switching mode	
Sender only VS (with test input)	0D
3 line; Q = PNP, dark switching (D.ON)	3P
3 line; Q = PNP, light switching (L.ON)	3F
3 line; Q = NPN, dark switching (D.ON)	3N
3 line; Q = NPN, light switching (L.ON)	3E
4 line; Q = PNP, L.ON or D.ON selectable via control wire	4P
4 line; Q = NPN, L.ON oder D.ON selectable via control wire	4N

4 Sensing range and light source	
Sender VS: infrared light; Receiver VE for infrared light	
Photoelectric reflex sensor VL: red light and polarizing filter	3
Photoelectric proximity sensor VTF: sensing range 50 mm, infrared light	5
Photoelectric proximity sensor VTF: sensing range 100 mm, infrared light	1
Photoelectric proximity sensor VTE: sensing range 200 mm, infrared light	2
Photoelectric proximity sensor VTE: sensing range 400 mm, infrared light	4
Photoelectric proximity sensor VTE: sensing range 800 mm, infrared light	8

5 Housing (material and form), sensitivity control	
Metal, axial, without potentiometer	1
Metal, axial, with potentiometer	2
Metal, 90°, without potentiometer	3
Metal, 90°, with potentiometer	4
Plastic, axial, without potentiometer	6
Plastic, axial, with potentiometer	7
Plastic, 90°, without potentiometer	8
Plastic, 90°, with potentiometer	9

6 Connection type	
Cable, 2 m	12
Plug, M12, 4-pin	40

How to find *your* sensor

1 Example

1	**Base type photoelectric reflex sensor** Photoelectric proximity sensor (E = energetic)	VTE
2	**Model of housing** Housing M 18 (V 18 Series)	18
3	**Switching outputs and switching mode** 3 line; Q = PNP, light switching (L.ON)	3F
4	**Sensing range and light source** Photoelectric proximity sensor VTE: sensing range 200 mm, infrared light	2
5	**Housing (material and models)** **sensitivity control** Metal, 90°, without potentiometer	3
6	**Connection type** Plug, M12, 4-pin	40

2 Define type

VTE 18 – 3F 2 3 40

3 Select part number

Type	Part no.
VTE 18-3F 2340	6 013 422

Note: Not all models stocked. Check web site or call for availability.

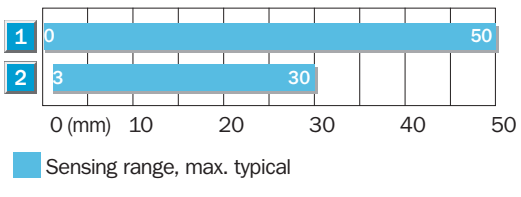
7028071 - © 2008 SICK, Inc.

Sensing range 0…50 mm

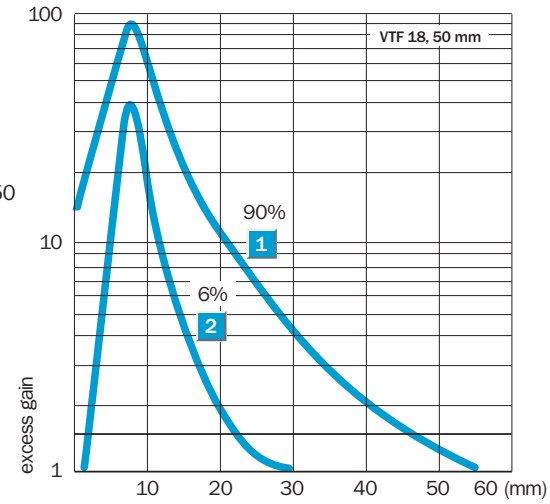
VTF 18-3, VTF 18-4 selection table, photoelectric proximity sensor, focused optics

Switching mode	Connection type	Without sensitivity control: NPN output Type	Part no.	PNP output Type	Part no.	With sensitivity control: NPN output Type	Part no.	PNP output Type	Part no.
Housing material: metal									
3 wire		**Optical axis: axial**							
VTF 18-3 Q = D.ON	Cable 2 m	VTF 18-3 N 5112	6 012 940	VTF 18-3 P 5112	6 012 949	VTF 18-3 N 5212	6 012 958	VTF 18-3 P 5212	6 012 967
	Plug M 12, 4-pin	VTF 18-3 N 5140	6 012 942	VTF 18-3 P 5140	6 012 951	VTF 18-3 N 5240	6 012 960	VTF 18-3 P 5240	6 012 969
VTF 18-3 Q = L.ON	Cable 2 m	VTF 18-3 E 5112	6 012 943	VTF 18-3 F 5112	6 012 952	VTF 18-3 E 5212	6 012 961	VTF 18-3 F 5212	6 012 970
	Plug M 12, 4-pin	VTF 18-3 E 5140	6 012 945	VTF 18-3 F 5140	6 012 954	VTF 18-3 E 5240	6 012 963	VTF 18-3 F 5240	6 012 972
4 wire, L/D control wire									
VTF 18-4 L.ON/D.ON	Cable 2 m	VTF 18-4 N 5112	6 012 946	VTF 18-4 P 5112	6 012 955	VTF 18-4 N 5212	6 012 964	VTF 18-4 P 5212	6 012 973
	Plug M 12, 4-pin	VTF 18-4 N 5140	6 012 948	VTF 18-4 P 5140	6 012 957	VTF 18-4 N 5240	6 012 966	VTF 18-4 P 5240	6 012 975
3 wire		**Optical axis: 90°**							
VTF 18-3 Q = D.ON	Cable 2 m	VTF 18-3 N 5312	6 012 976	VTF 18-3 P 5312	6 012 985	VTF 18-3 N 5412	6 012 994	VTF 18-3 P 5412	6 013 003
	Plug M 12, 4-pin	VTF 18-3 N 5340	6 012 978	VTF 18-3 P 5340	6 012 987	VTF 18-3 N 5440	6 012 996	VTF 18-3 P 5440	6 013 005
VTF 18-3 Q = L.ON	Cable 2 m	VTF 18-3 E 5312	6 012 979	VTF 18-3 F 5312	6 012 988	VTF 18-3 E 5412	6 012 997	VTF 18-3 F 5412	6 013 006
	Plug M 12, 4-pin	VTF 18-3 E 5340	6 012 981	VTF 18-3 F 5340	6 012 990	VTF 18-3 E 5440	6 012 999	VTF 18-3 F 5440	6 013 008
4 wire, L/D control wire									
VTF 18-4 L.ON/D.ON	Cable 2 m	VTF 18-4 N 5312	6 012 982	VTF 18-4 P 5312	6 012 991	VTF 18-4 N 5412	6 013 000	VTF 18-4 P 5412	6 013 009
	Plug M 12, 4-pin	VTF 18-4 N 5340	6 012 984	VTF 18-4 P 5340	6 012 993	VTF 18-4 N 5440	6 013 002	VTF 18-4 P 5440	6 013 011
Housing material: plastic									
3 wire		**Optical axis: axial**							
VTF 18-3 Q = D.ON	Cable 2 m	VTF 18-3 N 5612	6 013 012	VTF18-3 P 5612	6 013 021	VTF18-3 N 5712	6 013 030	VTF18-3 P 5712	6 013 039
	Plug M 12, 4-pin	VTF 18-3 N 5640	6 013 014	VTF18-3 P 5640	6 013 023	VTF18-3 N 5740	6 013 032	VTF18-3 P 5740	6 013 041
VTF 18-3 Q = L.ON	Cable 2 m	VTF 18-3 E 5612	6 013 015	VTF18-3 F 5612	6 013 024	VTF18-3 E 5712	6 013 033	VTF18-3 F 5712	6 013 042
	Plug M 12, 4-pin	VTF 18-3 E 5640	6 013 017	VTF18-3 F 5640	6 013 026	VTF18-3 E 5740	6 013 035	VTF18-3 F 5740	6 013 044
4 wire, L/D control wire									
VTB 18-4 L.ON/D.ON	Cable 2 m	VTF 18-4 N 5612	6 013 018	VTF 18-4 P 5612	6 013 027	VTF 18-4 N 5712	6 013 036	VTF 18-4 P 5712	6 013 045
	Plug M 12, 4-pin	VTF 18-4 N 5640	6 013 020	VTF 18-4 P 5640	6 013 029	VTF 18-4 N 5740	6 013 038	VTF 18-4 P 5740	6 013 047
3 wire		**Optical axis: 90°**							
VTF 18-3 Q = D.ON	Cable 2 m	VTF 18-3 N 5812	6 013 048	VTF 18-3 P 5812	6 013 057	VTF 18-3 N 5912	6 013 066	VTF 18-3 P 5912	6 013 075
	Plug M 12, 4-pin	VTF 18-3 N 5840	6 013 050	VTF 18-3 P 5840	6 013 059	VTF 18-3 N 5940	6 013 068	VTF 18-3 P 5940	6 013 077
VTF 18-3 Q = L.ON	Cable 2 m	VTF 18-3 E 5812	6 013 051	VTF 18-3 F 5812	6 013 060	VTF 18-3 E 5912	6 013 069	VTF 18-3 F 5912	6 013 078
	Plug M 12, 4-pin	VTF 18-3 E 5840	6 013 053	VTF 18-3 F 5840	6 013 062	VTF 18-3 E 5940	6 013 071	VTF 18-3 F 5940	6 013 080
4 wire, L/D control wire									
VTF 18-4 L.ON/D.ON	Cable 2 m	VTF 18-4 N 5812	6 013 054	VTF 18-4 P 5812	6 013 063	VTF 18-4 N 5912	6 013 072	VTF 18-4 P 5912	6 013 081
	Plug M 12, 4-pin	VTF 18-4 N 5840	6 013 056	VTF 18-4 P 5840	6 013 065	VTF 18-4 N 5940	6 013 074	VTF 18-4 P 5940	6 013 083

Sensing range



1 Sensing range on white, 90% remission
2 Sensing range on black, 6% remission



Note: Not all models stocked. Check web site or call for availability.

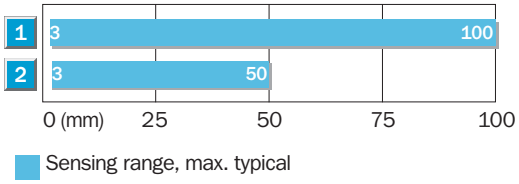
V.18 Selection Guide

Sensing range 3...100 mm

VTF 18-3, VTF 18-4 selection table, photoelectric proximity sensor, focused optics

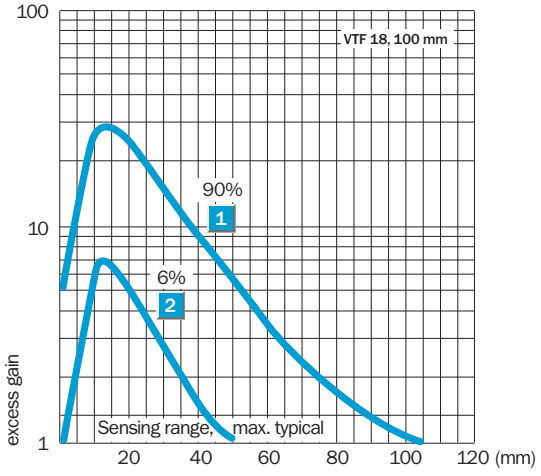
Switching mode	Connection type	Without sensitivity control: NPN output Type	Part no.	PNP output Type	Part no.	With sensitivity control: NPN output Type	Part no.	PNP output Type	Part no.
Housing material: metal									
3 wire		**Optical axis: axial**							
VTF 18-3 Q = D.ON	Cable 2 m	VTF 18-3 N 1112	6 012 796	VTF 18-3 P 1112	6 012 805	VTF 18-3 N 1212	6 012 814	VTF 18-3 P 1212	6 012 823
	M12 plug, 4-pin	VTF 18-3 N 1140	6 012 798	VTF 18-3 P 1140	6 012 807	VTF 18-3 N 1240	6 012 816	VTF 18-3 P 1240	6 012 825
VTF 18-3 Q = L.ON	Cable 2 m	VTF 18-3 E 1112	6 012 799	VTF 18-3 F 1112	6 012 808	VTF 18-3 E 1212	6 012 817	VTF 18-3 F 1212	6 012 826
	M12 plug, 4-pin	VTF 18-3 E 1140	6 012 801	VTF 18-3 F 1140	6 012 810	VTF 18-3 E 1240	6 012 819	VTF 18-3 F 1240	6 012 828
4 wire, L/D control wire									
VTF 18-4 L.ON/D.ON	Cable 2 m	VTF 18-4 N 1112	6 012 802	VTF 18-4 P 1112	6 012 811	VTF 18-4 N 1212	6 012 820	VTF 18-4 P 1212	6 012 829
	M12 plug, 4-pin	VTF 18-4 N 1140	6 012 804	VTF 18-4 P 1140	6 012 813	VTF 18-4 N 1240	6 012 822	VTF 18-4 P 1240	6 012 831
3 wire		**Optical axis: 90°**							
VTF 18-3 Q = D.ON	Cable 2 m	VTF 18-3 N 1312	6 012 832	VTF 18-3 P 1312	6 012 841	VTF 18-3 N 1412	6 012 850	VTF 18-3 P 1412	6 012 859
	M12 plug, 4-pin	VTF 18-3 N 1340	6 012 834	VTF 18-3 P 1340	6 012 843	VTF 18-3 N 1440	6 012 852	VTF 18-3 P 1440	6 012 861
VTF 18-3 Q = L.ON	Cable 2 m	VTF 18-3 E 1312	6 012 835	VTF 18-3 F 1312	6 012 844	VTF 18-3 E 1412	6 012 853	VTF 18-3 F 1412	6 012 862
	M12 plug, 4-pin	VTF 18-3 E 1340	6 012 837	VTF 18-3 F 1340	6 012 846	VTF 18-3 E 1440	6 012 855	VTF 18-3 F 1440	6 012 864
4 wire, L/D control wire									
VTF 18-4 L.ON/D.ON	Cable 2 m	VTF 18-4 N 1312	6 012 838	VTF 18-4 P 1312	6 012 847	VTF 18-4 N 1412	6 012 856	VTF 18-4 P 1412	6 012 865
	M12 plug, 4-pin	VTF 18-4 N 1340	6 012 840	VTF 18-4 P 1340	6 012 849	VTF 18-4 N 1440	6 012 858	VTF 18-4 P 1440	6 012 867
Housing material: plastic									
3 wire		**Optical axis: axial**							
VTF 18-3 Q = D.ON	Cable 2 m	VTF 18-3 N 1612	6 012 868	VTF 18-3 P 1612	6 012 877	VTF 18-3 N 1712	6 012 886	VTF 18-3 P 1712	6 012 895
	M12 plug, 4-pin	VTF 18-3 N 1640	6 012 870	VTF 18-3 P 1640	6 012 879	VTF 18-3 N 1740	6 012 888	VTF 18-3 P 1740	6 012 897
VTF 18-3 Q = L.ON	Cable 2 m	VTF 18-3 E 1612	6 012 871	VTF 18-3 F 1612	6 012 880	VTF 18-3 E 1712	6 012 889	VTF 18-3 F 1712	6 012 898
	M12 plug, 4-pin	VTF 18-3 E 1640	6 012 873	VTF 18-3 F 1640	6 012 882	VTF 18-3 E 1740	6 012 891	VTF 18-3 F 1740	6 012 900
4 wire, L/D control wire									
VTB 18-4 L.ON/D.ON	Cable 2 m	VTF 18-4 N 1612	6 012 874	VTF 18-4 P 1612	6 012 883	VTF 18-4 N 1712	6 012 892	VTF 18-4 P 1712	6 012 901
	M12 plug, 4-pin	VTF 18-4 N 1640	6 012 876	VTF 18-4 P 1640	6 012 885	VTF 18-4 N 1740	6 012 894	VTF 18-4 P 1740	6 012 903
3 wire		**Optical axis: 90°**							
VTF 18-3 Q = D.ON	Cable 2 m	VTF 18-3 N 1812	6 012 904	VTF 18-3 P 1812	6 012 913	VTF 18-3 N 1912	6 012 922	VTF 18-3 P 1912	6 012 931
	M12 plug, 4-pin	VTF 18-3 N 1840	6 012 906	VTF 18-3 P 1840	6 012 915	VTF 18-3 N 1940	6 012 924	VTF 18-3 P 1940	6 012 933
VTF 18-3 Q = L.ON	Cable 2 m	VTF 18-3 E 1812	6 012 907	VTF 18-3 F 1812	6 012 916	VTF 18-3 E 1912	6 012 925	VTF 18-3 F 1912	6 012 934
	M12 plug, 4-pin	VTF 18-3 E 1840	6 012 909	VTF 18-3 F 1840	6 012 918	VTF 18-3 E 1940	6 012 927	VTF 18-3 F 1940	6 012 936
4 wire, L/D control wire									
VTF 18-4 L.ON/D.ON	Cable 2 m	VTF 18-4 N 1812	6 012 910	VTF 18-4 P 1812	6 012 919	VTF 18-4 N 1912	6 012 928	VTF 18-4 P 1912	6 012 937
	M12 plug, 4-pin	VTF 18-4 N 1840	6 012 912	VTF 18-4 P 1840	6 012 921	VTF 18-4 N 1940	6 012 930	VTF 18-4 P 1940	6 012 939

Sensing range



Sensing range, max. typical

1	Sensing range on white, 90% remission
2	Sensing range on black, 6% remission



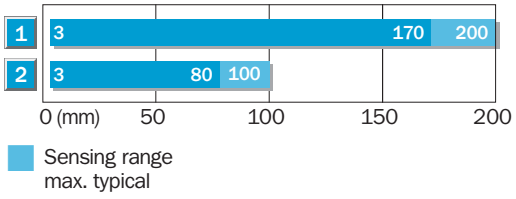
Note: Not all models stocked. Check web site or call for availability.

Sensing range 3…200 mm

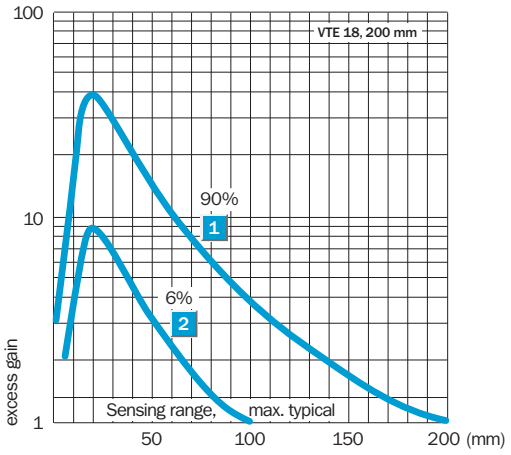
VTE 18-3, VTE 18-4 selection table, photoelectric proximity sensor, energetic

Switching mode	Connection type	Without sensitivity control: NPN output Type	Part no.	PNP output Type	Part no.	With sensitivity control: NPN output Type	Part no.	PNP output Type	Part no.
Housing material: metal									
Optical axis: axial									
3 wire									
VTE 18-3 Q = D.ON	Cable 2 m	VTE 18-3 N 2112	6 013 372	VTE 18-3 P 2112	6 013 381	VTE 18-3 N 2212	6 013 390	VTE 18-3 P 2212	6 013 399
	M12 plug, 4-pin	VTE 18-3 N 2140	6 013 374	VTE 18-3 P 2140	6 013 383	VTE 18-3 N 2240	6 013 392	VTE 18-3 P 2240	6 013 401
VTE 18-3 Q = L.ON	Cable 2 m	VTE 18-3 E 2112	6 013 375	VTE 18-3 F 2112	6 013 384	VTE 18-3 E 2212	6 013 393	VTE 18-3 F 2212	6 013 402
	M12 plug, 4-pin	VTE 18-3 E 2140	6 013 377	VTE 18-3 F 2140	6 013 386	VTE 18-3 E 2240	6 013 395	VTE 18-3 F 2240	6 013 404
4 wire, L/D control wire									
VTE 18-4 L.ON/D.ON	Cable 2 m	VTE 18-4 N 2112	6 013 378	VTE 18-4 P 2112	6 013 387	VTE 18-4 N 2212	6 013 396	VTE 18-4 P 2212	6 013 405
	M12 plug, 4-pin	VTE 18-4 N 2140	6 013 380	VTE 18-4 P 2140	6 013 389	VTE 18-4 N 2240	6 013 398	VTE 18-4 P 2240	6 013 407
Optical axis: 90°									
3 wire									
VTE 18-3 Q = D.ON	Cable 2 m	VTE 18-3 N 2312	6 013 408	VTE 18-3 P 2312	6 013 417	VTE 18-3 N 2412	6 013 426	VTE 18-3 P 2412	6 013 435
	M12 plug, 4-pin	VTE 18-3 N 2340	6 013 410	VTE 18-3 P 2340	6 013 419	VTE 18-3 N 2440	6 013 428	VTE 18-3 P 2440	6 013 437
VTE 18-3 Q = L.ON	Cable 2 m	VTE 18-3 E 2312	6 013 411	VTE 18-3 F 2312	6 013 420	VTE 18-3 E 2412	6 013 429	VTE 18-3 F 2412	6 013 438
	M12 plug, 4-pin	VTE 18-3 E 2340	6 013 413	VTE 18-3 F 2340	6 013 422	VTE 18-3 E 2440	6 013 431	VTE 18-3 F 2440	6 013 440
4 wire, L/D control wire									
VTE 18-4 L.ON/D.ON	Cable 2 m	VTE 18-4 N 2312	6 013 414	VTE 18-4 P 2312	6 013 423	VTE 18-4 N 2412	6 013 432	VTE 18-4 P 2412	6 013 441
	M12 plug, 4-pin	VTE 18-4 N 2340	6 013 416	VTE 18-4 P 2340	6 013 425	VTE 18-4 N 2440	6 013 434	VTE 18-4 P 2440	6 013 443
Housing material: plastic									
Optical axis: axial									
3 wire									
VTE 18-3 Q = D.ON	Cable 2 m	VTE 18-3 N 2612	6 013 444	VTE 18-3 P 2612	6 013 453	VTE 18-3 N 2712	6 013 462	VTE 18-3 P 2712	6 013 471
	M12 plug, 4-pin	VTE 18-3 N 2640	6 013 446	VTE 18-3 P 2640	6 013 455	VTE 18-3 N 2740	6 013 464	VTE 18-3 P 2740	6 013 473
VTE 18-3 Q = L.ON	Cable 2 m	VTE 18-3 E 2612	6 013 447	VTE 18-3 F 2612	6 013 456	VTE 18-3 E 2712	6 013 465	VTE 18-3 F 2712	6 013 474
	M12 plug, 4-pin	VTE 18-3 E 2640	6 013 449	VTE 18-3 F 2640	6 013 458	VTE 18-3 E 2740	6 013 467	VTE 18-3 F 2740	6 013 476
4 wire, L/D control wire									
VTE 18-4 L.ON/D.ON	Cable 2 m	VTE 18-4 N 2612	6 013 450	VTE 18-4 P 2612	6 013 459	VTE 18-4 N 2712	6 013 468	VTE 18-4 P 2712	6 013 477
	M12 plug, 4-pin	VTE 18-4 N 2640	6 013 452	VTE 18-4 P 2640	6 013 461	VTE 18-4 N 2740	6 013 470	VTE 18-4 P 2740	6 013 479
Optical axis: 90°									
3 wire									
VTE 18-3 Q = D.ON	Cable 2 m	VTE 18-3 N 2812	6 013 480	VTE 18-3 P 2812	6 013 489	VTE 18-3 N 2912	6 013 498	VTE 18-3 P 2912	6 013 507
	M12 plug, 4-pin	VTE 18-3 N 2840	6 013 482	VTE 18-3 P 2840	6 013 491	VTE 18-3 N 2940	6 013 500	VTE 18-3 P 2940	6 013 509
VTE 18-3 Q = L.ON	Cable 2 m	VTE 18-3 E 2812	6 013 483	VTE 18-3 F 2812	6 013 492	VTE 18-3 E 2912	6 013 501	VTE 18-3 F 2912	6 013 510
	M12 plug, 4-pin	VTE 18-3 E 2840	6 013 485	VTE 18-3 F 2840	6 013 494	VTE 18-3 E 2940	6 013 503	VTE 18-3 F 2940	6 013 512
4 wire, L/D control wire									
VTE 18-4 L.ON/D.ON	Cable 2 m	VTE 18-4 N 2812	6 013 486	VTE 18-4 P 2812	6 013 495	VTE 18-4 N 2912	6 013 504	VTE 18-4 P 2912	6 013 513
	M12 plug, 4-pin	VTE 18-4 N 2840	6 013 488	VTE 18-4 P 2840	6 013 497	VTE 18-4 N 2940	6 013 506	VTE 18-4 P 2940	6 013 515

Sensing range



1 Sensing range on white, 90% remission
2 Sensing range on black, 6% remission



Note: Not all models stocked. Check web site or call for availability.

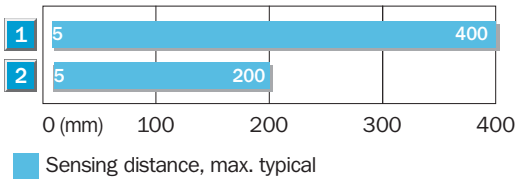
V.18 Selection Guide

Sensing range 5...400 mm

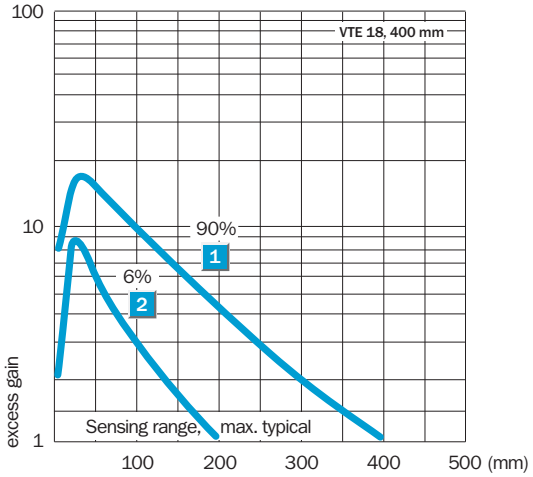
VTE 18-3, VTE 18-4 selection table, photoelectric proximity sensor, energetic

Switching mode	Connection type	Without sensitivity control: NPN output Type	Part no.	PNP output Type	Part no.	With sensitivity control: NPN output Type	Part no.	PNP output Type	Part no.
Housing material: metal									
3 wire		**Optical axis: axial**							
VTE 18-3 Q = D.ON	Cable 2 m	VTE 18-3 N 4112	6 013 228	VTE 18-3 P 4112	6 013 237	VTE 18-3 N 4212	6 013 246	VTE 18-3 P 4212	6 013 255
	M12 plug, 4-pin	VTE 18-3 N 4140	6 013 230	VTE 18-3 P 4140	6 013 239	VTE 18-3 N 4240	6 013 248	VTE 18-3 P 4240	6 013 257
VTE 18-3 Q = L.ON	Cable 2 m	VTE 18-3 E 4112	6 013 231	VTE 18-3 F 4112	6 013 240	VTE 18-3 E 4212	6 013 249	VTE 18-3 F 4212	6 013 258
	M12 plug, 4-pin	VTE 18-3 E 4140	6 013 233	VTE 18-3 F 4140	6 013 242	VTE 18-3 E 4240	6 013 251	VTE 18-3 F 4240	6 013 260
4 wire, L/D control wire									
VTE 18-4 L.ON/D.ON	Cable 2 m	VTE 18-4 N 4112	6 013 234	VTE 18-4 P 4112	6 013 243	VTE 18-4 N 4212	6 013 252	VTE 18-4 P 4212	6 013 261
	M12 plug, 4-pin	VTE 18-4 N 4140	6 013 236	VTE 18-4 P 4140	6 013 245	VTE 18-4 N 4240	6 013 254	VTE 18-4 P 4240	6 013 263
3 wire		**Optical axis: 90°**							
VTE 18-3 Q = D.ON	Cable 2 m	VTE 18-3 N 4312	6 013 264	VTE 18-3 P 4312	6 013 273	VTE 18-3 N 4412	6 013 282	VTE 18-3 P 4412	6 013 291
	M12 plug, 4-pin	VTE 18-3 N 4340	6 013 266	VTE 18-3 P 4340	6 013 275	VTE 18-3 N 4440	6 013 284	VTE 18-3 P 4440	6 013 293
VTE 18-3 Q = L.ON	Cable 2 m	VTE 18-3 E 4312	6 013 267	VTE 18-3 F 4312	6 013 276	VTE 18-3 E 4412	6 013 285	VTE 18-3 F 4412	6 013 294
	M12 plug, 4-pin	VTE 18-3 E 4340	6 013 269	VTE 18-3 F 4340	6 013 278	VTE 18-3 E 4440	6 013 287	VTE 18-3 F 4440	6 013 296
4 wire, L/D control wire									
VTE 18-4 L.ON/D.ON	Cable 2 m	VTE 18-4 N 4312	6 013 270	VTE 18-4 P 4312	6 013 279	VTE 18-4 N 4412	6 013 288	VTE 18-4 P 4412	6 013 297
	M12 plug, 4-pin	VTE 18-4 N 4340	6 013 272	VTE 18-4 P 4340	6 013 281	VTE 18-4 N 4440	6 013 290	VTE 18-4 P 4440	6 013 299
Housing material: plastic									
3 wire		**Optical axis: axial**							
VTE 18-3 Q = D.ON	Cable 2 m	VTE 18-3 N 4612	6 013 300	VTE 18-3 P 4612	6 013 309	VTE 18-3 N 4712	6 013 318	VTE 18-3 P 4712	6 013 327
	M12 plug, 4-pin	VTE 18-3 N 4640	6 013 302	VTE 18-3 P 4640	6 013 311	VTE 18-3 N 4740	6 013 320	VTE 18-3 P 4740	6 013 329
VTE 18-3 Q = L.ON	Cable 2 m	VTE 18-3 E 4612	6 013 303	VTE 18-3 F 4612	6 013 312	VTE 18-3 E 4712	6 013 321	VTE 18-3 F 4712	6 013 330
	M12 plug, 4-pin	VTE 18-3 E 4640	6 013 305	VTE 18-3 F 4640	6 013 314	VTE 18-3 E 4740	6 013 323	VTE 18-3 F 4740	6 013 332
4 wire, L/D control wire									
VTE 18-4 L.ON/D.ON	Cable 2 m	VTE 18-4 N 4612	6 013 306	VTE 18-4 P 4612	6 013 315	VTE 18-4 N 4712	6 013 324	VTE 18-4 P 4712	6 013 333
	M12 plug, 4-pin	VTE 18-4 N 4640	6 013 308	VTE 18-4 P 4640	6 013 317	VTE 18-4 N 4740	6 013 326	VTE 18-4 P 4740	6 013 335
3 wire		**Optical axis: 90°**							
VTE 18-3 Q = D.ON	Cable 2 m	VTE 18-3 N 4812	6 013 336	VTE 18-3 P 4812	6 013 345	VTE 18-3 N 4912	6 013 354	VTE 18-3 P 4912	6 013 363
	M12 plug, 4-pin	VTE 18-3 N 4840	6 013 338	VTE 18-3 P 4840	6 013 347	VTE 18-3 N 4940	6 013 356	VTE 18-3 P 4940	6 013 365
VTE 18-3 Q = L.ON	Cable 2 m	VTE 18-3 E 4812	6 013 339	VTE 18-3 F 4812	6 013 348	VTE 18-3 E 4912	6 013 357	VTE 18-3 F 4912	6 013 366
	M12 plug, 4-pin	VTE 18-3 E 4840	6 013 341	VTE 18-3 F 4840	6 013 350	VTE 18-3 E 4940	6 013 359	VTE 18-3 F 4940	6 013 368
4 wire, L/D control wire									
VTE 18-4 L.ON/D.ON	Cable 2 m	VTE 18-4 N 4812	6 013 342	VTE 18-4 P 4812	6 013 351	VTE 18-4 N 4912	6 013 360	VTE 18-4 P 4912	6 013 369
	M12 plug, 4-pin	VTE 18-4 N 4840	6 013 344	VTE 18-4 P 4840	6 013 353	VTE 18-4 N 4940	6 013 362	VTE 18-4 P 4940	6 013 371

Sensing range



1	Sensing range on white, 90% remission
2	Sensing range on black, 6% remission



Note: Not all models stocked. Check web site or call for availability.

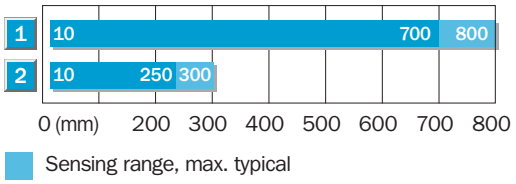
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Sensing range 10…800 mm

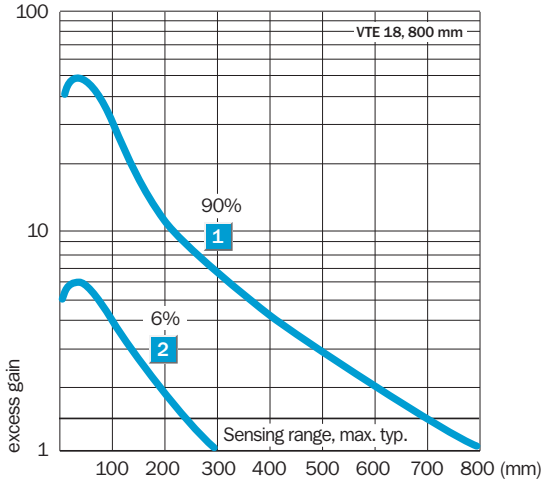
VTE 18-3, VTE 18-4 selection table, photoelectric proximity sensor, energetic

Switching mode	Connection type	Without sensitivity control: NPN output Type	Part no.	PNP output Type	Part no.	With sensitivity control: NPN output Type	Part no.	PNP output Type	Part no.
Housing material: metal									
Optical axis: axial									
3 wire									
VTE 18-3 Q = D.ON	Cable 2 m	VTE 18-3 N 8112	6 013 084	VTE 18-3 P 8112	6 013 093	VTE 18-3 N 8212	6 013 102	VTE 18-3 P 8212	6 013 111
	M12 plug, 4-pin	VTE 18-3 N 8140	6 013 086	VTE 18-3 P 8140	6 013 095	VTE 18-3 N 8240	6 013 104	VTE 18-3 P 8240	6 013 113
VTE 18-3 Q = L.ON	Cable 2 m	VTE 18-3 E 8112	6 013 087	VTE 18-3 F 8112	6 013 096	VTE 18-3 E 8212	6 013 105	VTE 18-3 F 8212	6 013 114
	M12 plug, 4-pin	VTE 18-3 E 8140	6 013 089	VTE 18-3 F 8140	6 013 098	VTE 18-3 E 8240	6 013 107	VTE 18-3 F 8240	6 013 116
4 wire, L/D control wire									
VTE 18-4 L.ON/D.ON	Cable 2 m	VTE 18-4 N 8112	6 013 090	VTE 18-4 P 8112	6 013 099	VTE 18-4 N 8212	6 013 108	VTE 18-4 P 8212	6 013 117
	M12 plug, 4-pin	VTE 18-4 N 8140	6 013 092	VTE 18-4 P 8140	6 013 101	VTE 18-4 N 8240	6 013 110	VTE 18-4 P 8240	6 013 119
Optical axis: 90°									
3 wire									
VTE 18-3 Q = D.ON	Cable 2 m	VTE 18-3 N 8312	6 013 120	VTE 18-3 P 8312	6 013 129	VTE 18-3 N 8412	6 013 138	VTE 18-3 P 8412	6 013 147
	M12 plug, 4-pin	VTE 18-3 N 8340	6 013 122	VTE 18-3 P 8340	6 013 131	VTE 18-3 N 8440	6 013 140	VTE 18-3 P 8440	6 013 149
VTE 18-3 Q = L.ON	Cable 2 m	VTE 18-3 E 8312	6 013 123	VTE 18-3 F 8312	6 013 132	VTE 18-3 E 8412	6 013 141	VTE 18-3 F 8412	6 013 150
	M12 plug, 4-pin	VTE 18-3 E 8340	6 013 125	VTE 18-3 F 8340	6 013 134	VTE 18-3 E 8440	6 013 143	VTE 18-3 F 8440	6 013 152
4 wire, L/D control wire									
VTE 18-4 L.ON/D.ON	Cable 2 m	VTE 18-4 N 8312	6 013 126	VTE 18-4 P 8312	6 013 135	VTE 18-4 N 8412	6 013 144	VTE 18-4 P 8412	6 013 153
	M12 plug, 4-pin	VTE 18-4 N 8340	6 013 128	VTE 18-4 P 8340	6 013 137	VTE 18-4 N 8440	6 013 146	VTE 18-4 P 8440	6 013 155
Housing material: plastic									
Optical axis: axial									
3 wire									
VTE 18-3 Q = D.ON	Cable 2 m	VTE 18-3 N 8612	6 013 156	VTE 18-3 P 8612	6 013 165	VTE 18-3 N 8712	6 013 174	VTE 18-3 P 8712	6 013 183
	M12 plug, 4-pin	VTE 18-3 N 8640	6 013 158	VTE 18-3 P 8640	6 013 167	VTE 18-3 N 8740	6 013 176	VTE 18-3 P 8740	6 013 185
VTE 18-3 Q = L.ON	Cable 2 m	VTE 18-3 E 8612	6 013 159	VTE 18-3 F 8612	6 013 168	VTE 18-3 E 8712	6 013 177	VTE 18-3 F 8712	6 013 186
	M12 plug, 4-pin	VTE 18-3 E 8640	6 013 161	VTE 18-3 F 8640	6 013 170	VTE 18-3 E 8740	6 013 179	VTE 18-3 F 8740	6 013 188
4 wire, L/D control wire									
VTE 18-4 L.ON/D.ON	Cable 2 m	VTE 18-4 N 8612	6 013 162	VTE 18-4 P 8612	6 013 171	VTE 18-4 N 8712	6 013 180	VTE 18-4 P 8712	6 013 189
	M12 plug, 4-pin	VTE 18-4 N 8640	6 013 164	VTE 18-4 P 8640	6 013 173	VTE 18-4 N 8740	6 013 182	VTE 18-4 P 8740	6 013 191
Optical axis: 90°									
3 wire									
VTE 18-3 Q = D.ON	Cable 2 m	VTE 18-3 N 8812	6 013 192	VTE 18-3 P 8812	6 013 201	VTE 18-3 N 8912	6 013 210	VTE 18-3 P 8912	6 013 219
	M12 plug, 4-pin	VTE 18-3 N 8840	6 013 194	VTE 18-3 P 8840	6 013 203	VTE 18-3 N 8940	6 013 212	VTE 18-3 P 8940	6 013 221
VTE 18-3 Q = L.ON	Cable 2 m	VTE 18-3 E 8812	6 013 195	VTE 18-3 F 8812	6 013 204	VTE 18-3 E 8912	6 013 213	VTE 18-3 F 8912	6 013 222
	M12 plug, 4-pin	VTE 18-3 E 8840	6 013 197	VTE 18-3 F 8840	6 013 206	VTE 18-3 E 8940	6 013 215	VTE 18-3 F 8940	6 013 224
4 wire, L/D control wire									
VTE 18-4 L.ON/D.ON	Cable 2 m	VTE 18-4 N 8812	6 013 198	VTE 18-4 P 8812	6 013 207	VTE 18-4 N 8912	6 013 216	VTE 18-4 P 8912	6 013 225
	M12 plug, 4-pin	VTE 18-4 N 8840	6 013 200	VTE 18-4 P 8840	6 013 209	VTE 18-4 N 8940	6 013 218	VTE 18-4 P 8940	6 013 227

Operating distance and function reserve



1	Sensing range on white, 90% remission
2	Sensing range on black, 6% remission



Note: Not all models stocked. Check web site or call for availability.

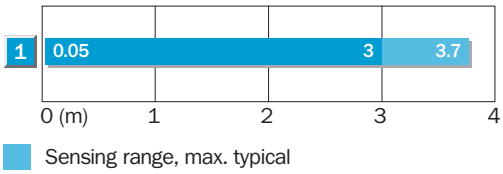
V.18 Selection Guide

Sensing range 0.05…3.7 m

VL 18-3, VL 18-4 selection table, photoelectric reflex sensor, with polarizing filter

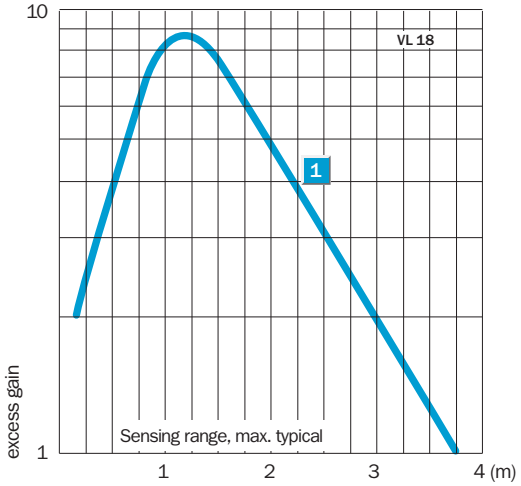
Switching mode	Connection type	Without sensitivity control: NPN output Type	Part no.	PNP output Type	Part no.	With sensitivity control: NPN output Type	Part no.	PNP output Type	Part no.
Housing material: metal									
3 wire		**Optical axis: axial**							
VL 18-3 Q = D.ON	Cable 2 m	VL 18-3 N 3112	6 013 516	VL 18-3 P 3112	6 013 525	VL 18-3 N 3212	6 013 534	VL 18-3 P 3212	6 013 543
	M12 plug, 4-pin	VL 18-3 N 3140	6 013 518	VL 18-3 P 3140	6 013 527	VL 18-3 N 3240	6 013 536	VL 18-3 P 3240	6 013 545
VL 18-3 Q = L.ON	Cable 2 m	VL 18-3 E 3112	6 013 519	VL 18-3 F 3112	6 013 528	VL 18-3 E 3212	6 013 537	VL 18-3 F 3212	6 013 546
	M12 plug, 4-pin	VL 18-3 E 3140	6 013 521	VL 18-3 F 3140	6 013 530	VL 18-3 E 3240	6 013 539	VL 18-3 F 3240	6 013 548
4 wire, L/D control wire									
VL 18-4 L.ON/D.ON	Cable 2 m	VL 18-4 N 3112	6 013 522	VL 18-4 P 3112	6 013 531	VL 18-4 N 3212	6 013 540	VL 18-4 P 3212	6 013 549
	M12 plug, 4-pin	VL 18-4 N 3140	6 013 524	VL 18-4 P 3140	6 013 533	VL 18-4 N 3240	6 013 542	VL 18-4 P 3240	6 013 551
3 wire		**Optical axis: 90°**							
VL 18-3 Q = D.ON	Cable 2 m	VL 18-3 N 3312	6 013 552	VL 18-3 P 3312	6 013 561	VL 18-3 N 3412	6 013 570	VL 18-3 P 3412	6 013 579
	M12 plug, 4-pin	VL 18-3 N 3340	6 013 554	VL 18-3 P 3340	6 013 563	VL 18-3 N 3440	6 013 572	VL 18-3 P 3440	6 013 581
VL 18-3 Q = L.ON	Cable 2 m	VL 18-3 E 3312	6 013 555	VL 18-3 F 3312	6 013 564	VL 18-3 E 3412	6 013 573	VL 18-3 F 3412	6 013 582
	M12 plug, 4-pin	VL 18-3 E 3340	6 013 557	VL 18-3 F 3340	6 013 566	VL 18-3 E 3440	6 013 575	VL 18-3 F 3440	6 013 584
4 wire, L/D control wire									
VL 18-4 L.ON/D.ON	Cable 2 m	VL 18-4 N 3312	6 013 558	VL 18-4 P 3312	6 013 567	VL 18-4 N 3412	6 013 576	VL 18-4 P 3412	6 013 585
	M12 plug, 4-pin	VL 18-4 N 3340	6 013 560	VL 18-4 P 3340	6 013 569	VL 18-4 N 3440	6 013 578	VL 18-4 P 3440	6 013 587
Housing material: plastic									
3 wire		**Optical axis: axial**							
VL 18-3 Q = D.ON	Cable 2 m	VL 18-3 N 3612	6 013 588	VL 18-3 P 3612	6 013 597	VL 18-3 N 3712	6 013 606	VL 18-3 P 3712	6 013 615
	M12 plug, 4-pin	VL 18-3 N 3640	6 013 590	VL 18-3 P 3640	6 013 599	VL 18-3 N 3740	6 013 608	VL 18-3 P 3740	6 013 617
VL 18-3 Q = L.ON	Cable 2 m	VL 18-3 E 3612	6 013 591	VL 18-3 F 3612	6 013 600	VL 18-3 E 3712	6 013 609	VL 18-3 F 3712	6 013 618
	M12 plug, 4-pin	VL 18-3 E 3640	6 013 593	VL 18-3 F 3640	6 013 602	VL 18-3 E 3740	6 013 611	VL 18-3 F 3740	6 013 620
4 wire, L/D control wire									
VL 18-4 L.ON/D.ON	Cable 2 m	VL 18-4 N 3612	6 013 594	VL 18-4 P 3612	6 013 603	VL 18-4 N 3712	6 013 612	VL 18-4 P 3712	6 013 621
	M12 plug, 4-pin	VL 18-4 N 3640	6 013 596	VL 18-4 P 3640	6 013 605	VL 18-4 N 3740	6 013 614	VL 18-4 P 3740	6 013 623
3 wire		**Optical axis: 90°**							
VL 18-3 Q = D.ON	Cable 2 m	VL 18-3 N 3812	6 013 624	VL 18-3 P 3812	6 013 633	VL 18-3 N 3912	6 013 642	VL 18-3 P 3912	6 013 651
	M12 plug, 4-pin	VL 18-3 N 3840	6 013 626	VL 18-3 P 3840	6 013 635	VL 18-3 N 3940	6 013 644	VL 18-3 P 3940	6 013 653
VL 18-3 Q = L.ON	Cable 2 m	VL 18-3 E 3812	6 013 627	VL 18-3 F 3812	6 013 636	VL 18-3 E 3912	6 013 645	VL 18-3 F 3912	6 013 654
	M12 plug, 4-pin	VL 18-3 E 3840	6 013 629	VL 18-3 F 3840	6 013 638	VL 18-3 E 3940	6 013 647	VL 18-3 F 3940	6 013 656
4 wire, L/D control wire									
VL 18-4 L.ON/D.ON	M12 plug, 3 pin	VL 18-4 N 3812	6 013 630	VL 18-4 P 3812	6 013 639	VL 18-4 N 3912	6 013 648	VL 18-4 P 3912	6 013 657
	M12 plug, 4-pin	VL 18-4 N 3840	6 013 632	VL 18-4 P 3840	6 013 641	VL 18-4 N 3940	6 013 650	VL 18-4 P 3940	6 013 659

Sensing range



Sensing range, max. typical

Reflector type		Sensing range
1	P975	0.05… 3 m



Note: Not all models stocked. Check web site or call for availability.

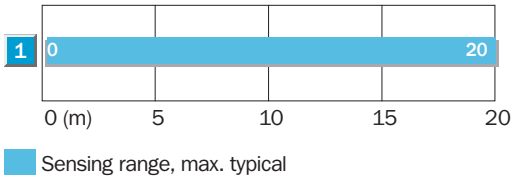
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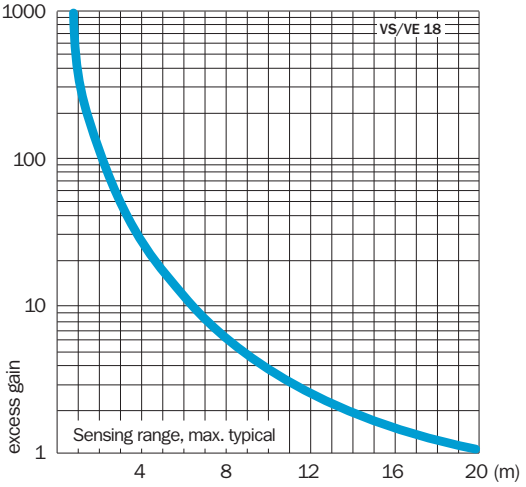
Sensing range 20 m

VS/VE 18-3, VS/VE 18-4 selection table, through-beam photoelectric sensor, pair

Switching mode	Connection type	Without sensitivity control: NPN output Type	Part no.	PNP output Type	Part no.	With sensitivity control: NPN output Type	Part no.	PNP output Type	Part no.
Housing material: metal									
Optical axis: axial									
3 wire									
VS/VE 18-3 Q = D.ON	Cable 2 m	VS/VE18-3N3112	6 013 660	VS/VE18-3P3112	6 013 669	VS/VE18-3N3212	6 013 678	VS/VE18-3P3212	6 013 687
	M12 plug, 4-pin	VS/VE18-3N3140	6 013 662	VS/VE18-3P3140	6 013 671	VS/VE18-3N3240	6 013 680	VS/VE18-3P3240	6 013 689
VS/VE 18-3 Q = L.ON	Cable 2 m	VS/VE18-3E3112	6 013 663	VS/VE18-3F3112	6 013 672	VS/VE18-3E3212	6 013 681	VS/VE18-3F3212	6 013 690
	M12 plug, 4-pin	VS/VE18-3E3140	6 013 665	VS/VE18-3F3140	6 013 674	VS/VE18-3E3240	6 013 683	VS/VE18-3F3240	6 013 692
4 wire, L/D control wire									
VS/VE 18-4 L.ON/D.ON	Cable 2 m	VS/VE18-4N3112	6 013 666	VS/VE18-4P3112	6 013 675	VS/VE18-4N3212	6 013 684	VS/VE18-4P3212	6 013 693
	M12 plug, 4-pin	VS/VE18-4N3140	6 013 668	VS/VE18-4P3140	6 013 677	VS/VE18-4N3240	6 013 686	VS/VE18-4P3240	6 013 695
Optical axis: 90°									
3 wire									
VS/VE 18-3 Q = D.ON	Cable 2 m	VS/VE18-3N3312	6 013 696	VS/VE18-3P3312	6 013 705	VS/VE18-3N3412	6 013 714	VS/VE18-3P3412	6 013 723
	M12 plug, 4-pin	VS/VE18-3N3340	6 013 698	VS/VE18-3P3340	6 013 707	VS/VE18-3N3440	6 013 716	VS/VE18-3P3440	6 013 725
VS/VE 18-3 Q = L.ON	Cable 2 m	VS/VE18-3E3312	6 013 699	VS/VE18-3F3312	6 013 708	VS/VE18-3E3412	6 013 717	VS/VE18-3F3412	6 013 726
	M12 plug, 4-pin	VS/VE18-3E3340	6 013 701	VS/VE18-3F3340	6 013 710	VS/VE18-3E3440	6 013 719	VS/VE18-3F3440	6 013 728
4 wire, L/D control wire									
VS/VE 18-4 L.ON/D.ON	Cable 2 m	VS/VE18-4N3312	6 013 702	VS/VE18-4P3312	6 013 711	VS/VE18-4N3412	6 013 720	VS/VE18-4P3412	6 013 729
	M12 plug, 4-pin	VS/VE18-4N3340	6 013 704	VS/VE18-4P3340	6 013 713	VS/VE18-4N3440	6 013 722	VS/VE18-4P3440	6 013 731
Housing material: plastic									
Optical axis: axial									
3 wire									
VS/VE 18-3 Q = D.ON	Cable 2 m	VS/VE18-3N3612	6 013 732	VS/VE18-3P3612	6 013 741	VS/VE18-3N3712	6 013 750	VS/VE18-3P3712	6 013 759
	M12 plug, 4-pin	VS/VE18-3N3640	6 013 734	VS/VE18-3P3640	6 013 743	VS/VE18-3N3740	6 013 752	VS/VE18-3P3740	6 013 761
VS/VE 18-3 Q = L.ON	Cable 2 m	VS/VE18-3E3612	6 013 735	VS/VE18-3F3612	6 013 744	VS/VE18-3E3712	6 013 753	VS/VE18-3F3712	6 013 762
	M12 plug, 4-pin	VS/VE18-3E3640	6 013 737	VS/VE18-3F3640	6 013 746	VS/VE18-3E3740	6 013 755	VS/VE18-3F3740	6 013 764
4 wire, L/D control wire									
VS/VE 18-4 L.ON/D.ON	Cable 2 m	VS/VE18-4N3612	6 013 738	VS/VE18-4P3612	6 013 747	VS/VE18-4N3712	6 013 756	VS/VE18-4P3712	6 013 765
	M12 plug, 4-pin	VS/VE18-4N3640	6 013 740	VS/VE18-4P3640	6 013 749	VS/VE18-4N3740	6 013 758	VS/VE18-4P3740	6 013 767
Optical axis: 90°									
3 wire									
VS/VE 18-3 Q = D.ON	Cable 2 m	VS/VE18-3N3812	6 013 768	VS/VE18-3P3812	6 013 777	VS/VE18-3N3912	6 013 786	VS/VE18-3P3912	6 013 795
	M12 plug, 4-pin	VS/VE18-3N3840	6 013 770	VS/VE18-3P3840	6 013 779	VS/VE18-3N3940	6 013 788	VS/VE18-3P3940	6 013 797
VS/VE 18-3 Q = L.ON	Cable 2 m	VS/VE18-3E3812	6 013 771	VS/VE18-3F3812	6 013 780	VS/VE18-3E3912	6 013 789	VS/VE18-3F3912	6 013 798
	M12 plug, 4-pin	VS/VE18-3E3840	6 013 773	VS/VE18-3F3840	6 013 782	VS/VE18-3E3940	6 013 791	VS/VE18-3F3940	6 013 800
4 wire, L/D control wire									
VS/VE 18-4 L.ON/D.ON	Cable 2 m	VS/VE18-4N3812	6 013 774	VS/VE18-4P3812	6 013 783	VS/VE18-4N3912	6 013 792	VS/VE18-4P3912	6 013 801
	M12 plug, 4-pin	VS/VE18-4N3840	6 013 776	VS/VE18-4P3840	6 013 785	VS/VE18-4N3940	6 013 794	VS/VE18-4P3940	6 013 803

Sensing range





Note: Not all models stocked. Check web site or call for availability.

Accessories

An extensive range of practical sensor accessories completes the SENSICK program:

- To facilitate electrical and mechanical installation
- To finely adapt sensors to their intended application
- To assist in aligning the sensors
- To protect the sensors against moisture, dust, heat and cold
- To enable specified supply voltages to be connected
- To process output signals and to convert them into logic operations
- To integrate sensors in bus systems

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Cables and Connectors

Selection Table for Connector and Cable

Type	Part no.	Description	Page
SENSICK round connector M8 x 1 mm, M12 x 1 mm, terminal screwed			
Female connector M8, 3-pin, straight	7 902 077	DOS-0803-G	1186
Female connector M8, 3-pin, angled	7 902 078	DOS-0803-W	1186
Female connector, M8, 4-pin, straight	6 009 974	DOS-0804-G	1186
Female connector, M8, 4-pin, angled	6 009 975	DOS-0804-W	1186
Female connector, M12, 4-pin, straight	6 007 302	DOS-1204-G	1186
Female connector, M12, 4-pin, angled	6 007 303	DOS-1204-W	1186
Male connector, M12, 4-pin, straight (only in conjunction with round plug connectors)	6 009 932	STE-1204-G	1186
Male connector, M12, 4-pin, angled (only in conjunction with round plug connectors)	6 022 084	STE-1204-W	1186
Female connector, M12, 4-pin, straight, V4A-hexagon nut	6 028 357	DOS-1204-GN	1186
Female connector, M12, 4-pin, angled, V4A-hexagon nut	6 028 358	DOS-1204-WN	1186
Male connector, M12, 4-pin, straight, V4A-hexagon nut (only in conjunction with round plug connectors)	6 028 359	STE-1204-GN	1186
Male connector, M12, 4-pin, straight, duo-junction, V4A-hexagon nut (only in conjunction with round plug connectors)	6 028 360	STE-1204-TN	1186
Female connector, M12, 5-pin, straight	6 009 719	DOS-1205-G	1186
Female connector, M12, 5-pin, angled	6 009 720	DOS-1205-W	1186
SENSICK round connector M8 x 1 mm, M12 x 1 mm, PVC			
Female connector, M8, 3-pin, straight, cable 2 m	6 010 785	DOL-0803-G02M	1188
Female connector, M8, 3-pin, straight, cable 5 m	6 022 009	DOL-0803-G05M	1188
Female connector, M8, 3-pin, straight, cable 10 m	6 022 011	DOL-0803-G10M	1188
Female connector, M8, 3-pin, angled, cable 2 m	6 008 489	DOL-0803-W02M	1188
Female connector, M8, 3-pin, angled, cable 5 m	6 022 010	DOL-0803-W05M	1188
Female connector, M8, 3-pin, angled, cable 10 m	6 022 012	DOL-0803-W10M	1188
Female connector, M8, 4-pin, straight, cable 2 m	6 009 870	DOL-0804-G02M	1188
Female connector, M8, 4-pin, straight, cable 5 m	6 009 872	DOL-0804-G05M	1188
Female connector, M8, 4-pin, straight, cable 10 m	6 010 754	DOL-0804-G10M	1188
Female connector, M8, 4-pin, angled, cable 2 m	6 009 871	DOL-0804-W02M	1188
Female connector, M8, 4-pin, angled, cable 5 m	6 009 873	DOL-0804-W05M	1188
Female connector, M8, 4-pin, angled, cable 10 m	6 010 755	DOL-0804-W10M	1188
Female connector, M12, 4-pin, straight, cable 2 m	6 009 382	DOL-1204-G02M	1188
Female connector, M12, 4-pin, straight, cable 5 m	6 009 866	DOL-1204-G05M	1188
Female connector, M12, 4-pin, straight, cable 10 m	6 010 543	DOL-1204-G10M	1188
Female connector, M12, 4-pin, straight, cable 15 m	6 010 753	DOL-1204-G15M	1188
Female connector, M12, 4-pin, angled, cable 2 m	6 009 383	DOL-1204-W02M	1188
Female connector, M12, 4-pin, angled, cable 5 m	6 009 867	DOL-1204-W05M	1188
Female connector, M12, 4-pin, angled, cable 10 m	6 010 541	DOL-1204-W10M	1188
Female connector, M12, 4-pin, angled, cable 2 m, LED	6 027 945	DOL-1204-L02M	1188
Female connector, M12, 4-pin, angled, cable 5 m, LED	6 027 944	DOL-1204-L05M	1188
Female connector, M12, 4-pin, angled, cable 10 m, LED	6 027 946	DOL-1204-L10M	1188
Female connector, M12, 5-pin, straight, cable 2 m	6 008 899	DOL-1205-G02M	1188
Female connector, M12, 5-pin, straight, cable 5 m	6 009 868	DOL-1205-G05M	1188
Female connector, M12, 5-pin, straight, cable 10 m	6 010 544	DOL-1205-G10M	1188
Female connector, M12, 5-pin, angled, cable 2 m	6 008 900	DOL-1205-W02M	1188
Female connector, M12, 5-pin, angled, cable 5 m	6 009 869	DOL-1205-W05M	1188
Female connector, M12, 5-pin, angled, cable 10 m	6 010 542	DOL-1205-W10M	1188
Female connector, M12, 5-pin, straight, cable 5 m, shielded, shield on PIN 5	6 010 474	DOL-1205-G05MX	1188
SENSICK round connector M8 x 1 mm, M12 x 1 mm, PUR halogen free			
Female connector, M8, 3-pin, straight, cable 2 m	6 025 888	DOL-0803-G02MC	1190
Female connector, M8, 3-pin, straight, cable 5 m,	6 025 889	DOL-0803-G05MC	1190
Female connector, M8, 3-pin, straight, cable 10 m	6 025 890	DOL-0803-G10MC	1190
Female connector, M8, 3-pin, angled, cable 2 m	6 025 891	DOL-0803-W02MC	1190
Female connector, M8, 3-pin, angled, cable 5 m	6 025 892	DOL-0803-W05MC	1190
Female connector, M8, 3-pin, angled, cable 10 m	6 025 893	DOL-0803-W10MC	1190
Female connector, M8, 4-pin, straight, cable 2 m	6 025 894	DOL-0804-G02MC	1190
Female connector, M8, 4-pin, straight, cable 5 m	6 025 895	DOL-0804-G05MC	1190
Female connector, M8, 4-pin, straight, cable 10 m	6 025 896	DOL-0804-G10MC	1190
Female connector, M8, 4-pin, angled, cable 2 m	6 025 897	DOL-0804-W02MC	1190
Female connector, M8, 4-pin, angled, cable 5 m	6 025 898	DOL-0804-W05MC	1190
Female connector, M8, 4-pin, angled, cable 10 m	6 025 899	DOL-0804-W10MC	1190
Female connector, M12, 4-pin, straight, cable 2 m	6 025 900	DOL-1204-G02MC	1190
Female connector, M12, 4-pin, straight, cable 5 m	6 025 901	DOL-1204-G05MC	1190
Female connector, M12, 4-pin, straight, cable 10 m	6 025 902	DOL-1204-G10MC	1190
Female connector, M12, 4-pin, angled, cable 2 m	6 025 903	DOL-1204-W02MC	1190
Female connector, M12, 4-pin, angled, cable 5 m	6 025 904	DOL-1204-W05MC	1190
Female connector, M12, 4-pin, angled, cable 10 m	6 025 905	DOL-1204-W10MC	1190

Cables and Connectors

Selection Table for Connector and Cable

Type	Part no.	Description	Page
SENSICK round connector M8 x 1 mm, M12 x 1 mm, PUR halogen free			
Male connector, M12, 4-pin, straight, cable 2 m	6 028 077	STL-1204-G02MC	1190
Female connector, M12, 5-pin, straight, cable 2 m	6 025 906	DOL-1205-G02MC	1190
Female connector, M12, 5-pin, straight, cable 5 m	6 025 907	DOL-1205-G05MC	1190
Female connector, M12, 5-pin, straight, cable 10 m	6 025 908	DOL-1205-G10MC	1190
Female connector, M12, 5-pin, angled, cable 2 m	6 025 909	DOL-1205-W02MC	1190
Female connector, M12, 5-pin, angled, cable 5 m	6 025 910	DOL-1205-W05MC	1190
Female connector, M12, 5-pin, angled, cable 10 m	6 025 911	DOL-1205-W10MC	1190
SENSICK round connector M12 x 1 mm, Food & Beverage, PVC, V4A, IP 69K			
Female connector, M12, 4-pin, straight, cable 2 m	6 028 128	DOL-1204-G02MN	1192
Female connector, M12, 4-pin, straight, cable 5 m	6 028 130	DOL-1204-G05MN	1192
Female connector, M12, 4-pin, straight, cable 10 m	6 028 132	DOL-1204-G10MN	1192
Female connector, M12, 4-pin, straight, cable 25 m	6 028 134	DOL-1204-G25MN	1192
Female connector, M12, 4-pin, angled, cable 2 m	6 028 129	DOL-1204-W02MN	1192
Female connector, M12, 4-pin, angled, cable 5 m	6 028 131	DOL-1204-W05MN	1192
Female connector, M12, 4-pin, angled, cable 10 m	6 028 133	DOL-1204-W10MN	1192
Female connector, M12, 4-pin, angled, cable 25 m	6 028 135	DOL-1204-W25MN	1192
Female connector, M12, 4-pin, angled, cable 2 m, LED	6 028 136	DOL-1204-L02MN	1192
Female connector, M12, 4-pin, angled, cable 5 m, LED	6 028 137	DOL-1204-L05MN	1192
Female connector, M12, 4-pin, angled, cable 10 m, LED	6 028 138	DOL-1204-L10MN	1192
Female connector, M12, 4-pin, angled, cable 25 m, LED	6 028 139	DOL-1204-L25MN	1192
Female connector, M12, 5-pin, straight, cable 2 m	6 028 140	DOL-1205-G02MN	1192
Female connector, M12, 5-pin, straight, cable 5 m	6 028 141	DOL-1205-G05MN	1192
Female connector, M12, 5-pin, straight, cable 10 m	6 028 142	DOL-1205-G10MN	1192
Female connector, M12, 5-pin, straight, cable 25 m	6 028 143	DOL-1205-G25MN	1192
SENSICK extension cable M8 x 1 mm, M12 x 1 mm, PVC			
Extension cable, 0.6 m, female connector: M8, 3-pin, straight, male connector: M12, 3-pin, straight	6 022 570	DSL-8203-G0M6	1194
Extension cable, 2 m, female connector: M8, 3-pin, straight, male connector: M12, 3-pin, straight	6 022 572	DSL-8203-G02M	1194
Extension cable, 0.6 m, female connector: M8, 4-pin, straight, male connector: M12, 4-pin, straight	6 022 571	DSL-8204-G0M6	1194
Extension cable, 2 m, female connector: M8, 4-pin, straight, male connector: M12, 4-pin, straight	6 022 573	DSL-8204-G02M	1194
Extension cable, 0.6 m, female connector: M12, 4-/3-pin, straight, male connector: M12, 3-pin, straight*	6 022 564	DSL-1203-G0M6	1194
Extension cable, 2 m, female connector: M12, 4-/3-pin, straight, male connector: M12, 3-pin, straight*	6 022 566	DSL-1203-G02M	1194
Extension cable, 5 m, female connector: M12, 4-/3-pin, straight, male connector: M12, 3-pin, straight*	6 022 568	DSL-1203-G05M	1194
Extension cable, 0.6 m, female connector: M12, 4-pin, straight, male connector: M12, 4-pin, straight	6 022 565	DSL-1204-G0M6	1194
Extension cable, 2 m, female connector: M12, 4-pin, straight, male connector: M12, 4-pin, straight	6 022 567	DSL-1204-G02M	1194
Extension cable, 5 m, female connector: M12, 4-pin, straight, male connector: M12, 4-pin, straight	6 022 569	DSL-1204-G05M	1194
*Assignment 4-pin (3 contacts/1 blind hole)			
SENSICK extension cable M8 x 1 mm, M12 x 1 mm, PUR halogen free			
Extension cable, 0.6 m, female connector: M8, 3-pin, straight, male connector: M12, 3-pin, straight	6 025 914	DSL-8203-G0M6C	1196
Extension cable, 2 m, female connector: M8, 3-pin, straight, male connector: M12, 3-pin, straight	6 025 915	DSL-8203-G02MC	1196
Extension cable, 0.6 m, female connector: M8, 3-pin, angled, male connector: M12, 3-pin, straight	6 025 916	DSL-8203-B0M6C	1196
Extension cable, 2 m, female connector: M8, 3-pin, angled, male connector: M12, 3-pin, straight	6 025 917	DSL-8203-B02MC	1196
Extension cable, 0.6 m, female connector: M8, 4-pin, straight, male connector: M12, 4-pin, straight	6 025 918	DSL-8204-G0M6C	1196
Extension cable, 2 m, female connector: M8 4-pin, straight, male connector: M12, 4-pin, straight	6 025 919	DSL-8204-G02MC	1196
Extension cable, 0.6 m, female connector: M8, 4-pin, angled, male connector: M12, 4-pin, straight	6 025 920	DSL-8204-B0M6C	1196
Extension cable, 2 m, female connector: M8, 4-pin, angled, male connector: M12, 4-pin, straight	6 025 921	DSL-8204-B02MC	1196
Extension cable, 0.6 m, female connector: M12, 4-/3-pin, straight, male connector: M12, 3-pin, straight*	6 025 922	DSL-1203-G0M6C	1196
Extension cable, 2 m, female connector: M12, 4-/3-pin, straight, male connector: M12, 3-pin, straight*	6 025 923	DSL-1203-G02MC	1196
Extension cable, 0.6 m, female connector: M12, 4-/3-pin, angled, male connector: M12, 3-pin, straight*	6 025 924	DSL-1203-B0M6C	1196
Extension cable, 2 m, female connector: M12, 4-/3-pin, angled, male connector: M12, 3-pin, straight*	6 025 925	DSL-1203-B02MC	1196
Extension cable, 0.6 m, female connector: M12, 4-pin, straight, male connector: M12, 4-pin, straight	6 025 926	DSL-1204-G0M6C	1196
Extension cable, 2 m, female connector: M12, 4-pin, straight, male connector: M12, 4-pin, straight	6 025 927	DSL-1204-G02MC	1196
Extension cable, 0.6 m, female connector: M12, 4-pin, angled, male connector: M12, 4-pin, straight	6 025 928	DSL-1204-B0M6C	1196
Extension cable, 2 m, female connector: M12, 4-pin, angled, male connector: M12, 4-pin, straight	6 025 929	DSL-1204-B02MC	1196
Extension cable, 0.6 m, female connector: M12, 5-pin, straight, male connector: M12, 5-pin, straight	6 025 930	DSL-1205-G0M6C	1196
Extension cable, 2 m, female connector: M12, 5-pin, straight, male connector: M12, 5-pin, straight	6 025 931	DSL-1205-G02MC	1196
*Assignment 4-pin (3 contacts/1 blind hole)			

Cables and Connectors

Selection Table for Connector and Cable

Type	Part no.	Description	Page
SENSICK extension cable M12 x 1 mm Food & Beverage\, PVC, V4A, IP 69K			
Extension cable, 0.6 m, female connector: M12, 4-pin, straight, male connector: M12, 4-pin, straight	6 028 194	DSL-1204-G0M6N	1198
Extension cable, 2 m, female connector: M12, 4-pin, straight, male connector: M12, 4-pin, straight	6 028 195	DSL-1204-G02MN	1198
Extension cable, 5 m, female connector: M12, 4-pin, straight, male connector: M12, 4-pin, straight	6 028 196	DSL-1204-G05MN	1198
Extension cable, 0.6 m, female connector: M12, 4-pin, angled, male connector: M12, 4-pin, straight	6 028 197	DSL-1204-B0M6N	1198
Extension cable, 2 m, female connector: M12, 4-pin, angled, male connector: M12, 4-pin, straight	6 028 198	DSL-1204-B02MN	1198
Extension cable, 5 m, female connector: M12, 4-pin, angled, male connector: M12, 4-pin, straight	6 028 199	DSL-1204-B05MN	1198
SENSICK splitter boxes, Food & Beverage			
Food & Beverage, IP 69K, V4A (1.4404/316 L), cable 5 m	6 027 586	SNL-08D12-KA05	1200
Food & Beverage, IP 69K, V4A (1.4404/316 L), cable 10 m	6 027 587	SNL-08D12-KA10	1200
Food & Beverage, IP 69K, V4A (1.4404/316 L), cable 15 m	6 027 588	SNL-08P12-KA15	1200
SENSICK splitter boxes			
M12 x 1 mm, IP 67, cable 5 m	6 028 394	SBL-04D12-KC05	1202
M12 x 1 mm, IP 67, cable 10 m	6 028 395	SBL-04D12-KC10	1202
M12 x 1 mm, IP 67, cable 5 m	6 028 396	SBL-08D12-KC05	1202
M12 x 1 mm, IP 67, cable 10 m	6 028 397	SBL-08D12-KC05	1202
M12 x 1 mm, IP 67 M23 connector	6 028 398	SBL-04D12-SE	1202
M12 x 1 mm, IP 67 M23 connector	6 028 399	SBL-08D12-8E	1202
SENSICK connecting cables for sensor splitter boxes			
M23 x 1 mm, IP 68, cable 5 m	6 028 400	DOL-2319-G05	1204
M23 x 1 mm, IP 68, cable 10 m	6 028 401	DOL-2319-G10MB	1204
M23 x 1 mm, IP 68, cable 15 m	6 028 402	DOL-2319-G15MB	1204
M23 x 1 mm, IP 68, cable 5 m	6 028 403	DOL-2319-W05MB	1204
M23 x 1 mm, IP 68, cable 10 m	6 028 405	DOL-2319-W10MB	1204
M23 x 1 mm, IP 68, cable 15 m	6 028 404	DOL-2319-W15MB	1204
SENSICK round connector M12 x 1 mm, 8-pin, shield			
Female connector, M12, straight, terminal screwed	6 028 422	DOS-1208-G	1206
Female connector, M12, straight, 360° shield on locking nut, terminal screwed	6 028 369	DOS-1208-GA	1206
Male connector, M12, straight, 360° shield on locking nut, terminal screwed	6 028 370	STE-1208-GA	1206
Female connector, M12, straight, cable 2 m, PVC, 360° shield on locking nut	6 020 633	DOL-1208-G02MA	1206
Female connector, M12, straight, cable 5 m, PVC, 360° shield on locking nut	6 020 993	DOL-1208-G05MA	1206
Female connector, M12, straight, cable 10 m, PVC, 360° shield on locking nut	6 022 152	DOL-1208-G10MA	1206
Female connector, M12, straight, cable 15 m, PVC, 360° shield on locking nut	6 022 153	DOL-1208-G15MA	1206
Female connector, M12, angled, cable 2 m, PVC, shield on locking nut	6 020 992	DOL-1208-W02MA	1206
Female connector, M12, angled, cable 5 m, PVC, shield on locking nut	6 021 033	DOL-1208-W05MA	1206
Female connector, M12, straight, cable 2 m (7 Adern), PUR, shield on PIN 8	6 010 748	DOL-1208-G02MB	1206
Female connector, M12, straight, cable 2 m, PVC, 360° shield on locking nut, spec. color code for OD sensors	6 020 663	DOL-1208-G02MF	1206
Female connector, M12, straight, cable 5 m, PVC, 360° shield on locking nut, spec. color code for OD sensors	6 020 664	DOL-1208-G05MF	1206
Extension cable 1 m, female connector: M12, 8-pin, straight, male connector: M12, 8-pin, straight, PVC, 360° shield on locking nut	6 026 625	DSL-1208-G01MA	1206
Extension cable 2 m, female connector: M12, 8-pin, straight, male connector: M12, 8-pin, straight, PVC, 360° shield on locking nut	6 030 121	DSL-1208-G02MC	1206
Extension cable 5 m, female connector: M12, 8-pin, straight, male connector: M12, 8-pin, straight, PVC, 360° shield on locking nut	6 032 325	DSL-1208-G05MC	1206
SENSICK T-junction, M12, 4-, 8-pin			
T-junction with cable 0.3 m, female connector/male connector M12, 4-pin, (power supply and signal interrogation)	6 011 682	DSL-1204-T0M3	1208
T-junction with cable 0.3 m, female connector/male connector M12, 4-pin, (power supply, signal interrogation and logic interrupt)	6 011 683	DSL-1104-T0M3	1208
T-junction male connector M12, 8-pin, on 2 x female connector M12, 8-pin	6 026 503	SBO-02F12-SF	1208
SENSICK round connector, IEC 130-9, M16 x 0.75 mm, 12-pin			
Female connector, M16, straight, terminal screwed	6 007 092	DOS-1612-G	1210
Female connector, M16, angled, terminal screwed	6 007 988	DOS-1612-W	1210
Female connector, part no. 6 007 092, cable 5 m, PVC	2 013 353	DOL-1612-5M-2	1210
Female connector, part no. 6 007 092, cable 5 m, shielded, PVC	2 017 568	DOL-1612-5M-3	1210

Cables and Connectors

Selection Table for Connector and Cable

Type	Part no.	Description	Page
SENSICK round connector, M16 x 0.75 mm for DME			
Female connector, M16, straight, shielded, terminal screwed	6 025 726	DOS-1608-GA	1210
Female connector, M16, angled, shielded, terminal screwed	6 025 727	DOS-1608-WA	1210
Female connector, part no. 6 025 726, cable 5 m, PVC, shielded	2 026 742	DOL-1608-G05MA	1210
Female connector, part no. 6 025 726, cable 10 m, PVC, shielded	2 027 193	DOL-1608-G10MA	1210
Female connector, part no. 6 025 727, cable 5 m, PVC, shielded	2 026 743	DOL-1608-W05MA	1210
Female connector, part no. 6 025 727, cable 10 m, PVC, shielded	2 027 194	DOL-1608-W10MA	1210
SENSICK round connectors, M16 x 0.75 mm, 12-pin for DME			1210
SENSICK PROFIBUS-connector for DME			
PROFIBUS-receptacle adapter (extension cable) with connector (female connector M16, male/female connector M12), cable 0.2 m	2 021 463	PR-ADPT-DME	1212
PROFIBUS-terminal resistor, male connector, M12, 4-pin, straight, B-coding	6 021 156	PR-STE-END	1212
PROFIBUS-female connector, M12, 5-pin, straight, shielded, B-coding	6 021 353	PR-DOS-1205-G	1212
PROFIBUS-male connector, M12, 5-pin, straight, shielded, B-coding	6 021 354	PR-STE-1205-G	1212
PROFIBUS-female connector, M12, 5-pin, straight, shielded, B-coding, with PROFIBUS cable 5 m	6 026 006	DOL-12PR-G05M	1212
PROFIBUS-female connector, M12, 5-pin, straight, shielded, B-coding, with PROFIBUS cable 10 m	6 026 008	DOL-12PR-G10M	1212
PROFIBUS-male connector, M12, 5-pin, straight, shielded, B-coding, with PROFIBUS cable 5 m	6 026 005	STL-12PR-G05M	1212
PROFIBUS-male connector, M12, 5-pin, straight, shielded, B-coding, with PROFIBUS cable 10 m	6 026 007	STL-12PR-G10M	1212
SENSICK DeviceNet-connector for DME 5000			
Female connector, M12, 5-pin, straight, shielded, 360° shield on locking nut, terminal screwed	6 027 534	DOS-1205-GA	1214
Male connector, M12, 5-pin, straight, shielded, 360° shield on locking nut, terminal screwed	6 027 533	STE-1205-GA	1214
DeviceNet-female connector, M12, 5-pin, straight, cable 6 m, dropcable	6 028 326	DOL-1205-G06MK	1214
DeviceNet-extension cable 6 m, female connector M12, 5-pin, straight, male connector M12, 5-pin, straight, dropcable	6 028 327	DSL-1205-G06MK	1214
DeviceNet-T-junction female connector M12, 5-pin, male/female connector 7/8 in, 5-pin	6 028 330	SDO-02D78-SF	1214
DeviceNet-terminal resistor, female connector 7/8 in, 5-pin, straight	6 028 329	DOS-7805-GKEND	1214
DeviceNet-female connector, 7/8 in 5-pin, straight, PG16, terminal screwed	6 028 331	DOS-7805-GK	1214
DeviceNet-male connector, 7/8 in 5-pin, straight, PG16, terminal screwed	6 028 332	STE-7805-GK	1214
SENSICK Hiperface connectors for DME			1216
SENSICK Ethernet Interface connectors			1218
SENSICK round connector M18 x 1 mm, 4-pin			
Female connector, M18, straight, terminal screwed	6 009 436	DOS-1804-G	1220
Female connector, M18, angled, terminal screwed	6 009 437	DOS-1804-W	1220
SENSICK round connector R16 (M24), 6-pin + PE			
Male connector, straight, terminal screwed	6 004 193	STE-2606-G	1220
Female connector, straight, terminal screwed	6 004 194	DOS-2606-G	1220
SENSICK rectangular connector, DIN 43650, type A, 3-pin + PE			
Female connector, angled, terminal screwed	6 005 698	DOS-0303-W	1222
SENSICK rectangular connector, DIN 43652, 7-pin + PE			
Female connector, angled, terminal screwed	2 007 901	DOS-2707-W	1222
Female connector, part no. 2 007 901 with cable 2 m, PVC	2 006 545	DOL-2706-02M	1222
Female connector, part no. 2 007 901 with cable 6 m, PVC	2 006 860	DOL-2706-06M	1222
Female connector, part no. 2 007 901 with cable 10 m, PVC	2 007 595	DOL-2706-10M	1222
SENSICK rectangular connector Q6, 6-pin, DC-coding			
Female connector, angled, terminal screwed	6 006 710	DOS-1306-W	1224
Female connector, part no. 6 006 710 with cable 2 m, PVC	6 030 217	DOL-1306-02M	1224
Female connector, part no. 6 006 710 with cable 3 m, PVC	6 030 218	DOL-1306-03M	1224
Female connector, part no. 6 006 710 with cable 5.5 m, PVC	6 030 219	DOL-1306-05M5	1224
Female connector, part no. 6 006 710 with cable 10 m, PVC	6 030 220	DOL-1306-10M	1224
SENSICK rectangular connector Q6, 6-pin, AC-/UC-coding			
Female connector, angled, terminal screwed	6 006 685	DOS-1406-W	1224
Female connector, part no. 6 006 685 with cable 2 m, PVC	6 030 221	DOL-1406-02M	1224
Female connector, part no. 6 006 685 with cable 3 m, PVC	6 030 222	DOL-1406-03M	1224
Female connector, part no. 6 006 685 with cable 5.5 m, PVC	6 030 223	DOL-1406-05M5	1224
Female connector, part no. 6 006 685 with cable 10 m, PVC	6 030 224	DOL-1406-10M	1224

Cables and Connectors

Selection Table for Connector and Cable

Type	Part no.	Description	Page
SENSICK rectangular connector Q7, 7-pin, DC-coding			
Female connector, angled, terminal screwed	6 006 823	DOS-2107-W	1224
Female connector, part no. 6 006 823 with cable 2 m	7 020 484	KP-Q04502-2	1224
Female connector, part no. 6 006 823 with cable 2 m	7 020 242	KP-Q04502-3	1224
SENSICK rectangular connector Q7, 7-pin, AC-coding			
Female connector, angled, terminal screwed	6 006 821	DOS-2207-W	1224
Female connector, part no. 6 006 821 with cable 2 m	7 020 485	KP-Q03501-2	1224
SENSICK cable for parameterize (MLG), M8 x 1 mm, SUB D9			
Extension cable 2 m, female connector: M8, 4-pin, straight	2 023 695	DSL-8D04-G02M	
SENSICK special connector for WLL 190 T			
Cable 2 m, (Master, 3 active pins)	6 026 578	DOL-LL1903-02M	1226
Cable 5 m, (Master, 3 active pins)	6 028 379	DOL-LL1903-05M	1226
Cable 2 m, (Slave, 1 active pin)	6 026 579	DOL-LL1901-02M	1226
Cable 5 m, (Slave, 1 active pin)	6 028 380	DOL-LL1901-05M	1226
SENSICK round connector MICRO, AC-coding			
Female connector, straight, 3-pin, cable 2 m	7 023 593	KA23-SIF22	1228
Female connector, right-angled, 3-pin, cable 2 m	7 023 594	KA23-RIF22	1228
Female connector, striaght, 4-pin, cable 2 m	7 023 591	KA24-SIF22	1228
Female connector, right-angled, 4-pin, cable 2 m	7 023 592	KA24-RIF22	1228
Female connector, straight, 5-pin, cable 2 m	7 020 014	KA25-SIF22	1228
Female connector, straight, 5-pin, cable 2 m	7 020 024	KA25-SIF25	1228
Female connector, right-angled, 5-pin, cable 2 m	7 020 016	KA25-RIF22	1228
Female connector, right angled, 5-pin, cable 5 m	7 020 026	KA25-RIF25	1228
SENSICK round connector MINI, AC-coding			
Female connector, straight, 3-pin, cable 2 m	7 021 941	KA13-SYF86F	1230
Female connector, straight, 4-pin, cable 2 m	7 023 595	KA14-SGF82	1230
Female connector, right-angled, 4-pin, cable 2 m	7 023 596	KA14-RGF82	1230
Female connector, straight, 4-pin, cable 5 m	7 023 788	KA14-SGF85	1230
Female connector, right-angled, 4-pin, cable 5 m	7 023 789	KA14-RGF85	1230
Female connector, straight, 5-pin, cable	7 023 284	RA15-SF8	1230
Female connector, straight, 5-pin, cable 2 m	7 023 786	KA15-SGF82	1230
Female connector, straight, 5-pin, cable 5 m	7 023 788	KA15-SGF85	1230
Female connector, right-angled, 5-pin, cable 2 m	7 023 787	KA15-RGF82	1230
Female connector, right-angled, 5-pin, cable 5 m	7 023 789	KA15-FGF85	1230
Female connector, straight, 5-pin, cable 2 m	7 020 015	KA15-SDF82	1230
Female connector, straight, 5-pin, cable 5 m	7 020 025	KA15-SDF85	1230
Female connector, right-angle automotive, 5-pin, cable 1 m	7 020 095	KA15-RDF81	1230
Female connector, right-angle automotive, 5-pin, cable 2 m	7 020 017	KA15-RDF82	1230
Female connector, right-angle automotive, 5-pin, cable 5 m	7 020 027	KA15-RDF85	1230
ZoneControl Cables			1232

M8, M12

Round Connectors

(Except M8-connectors)

Highlights

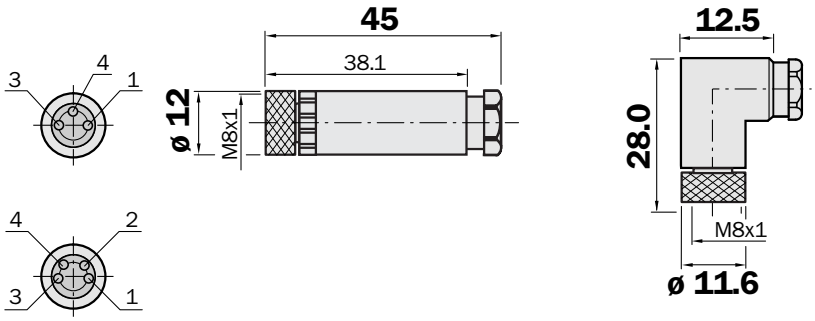
- Terminal screwed
- IP 67 enclosure rating (only in fully locked position with its plugs)
- Good resistance to oil and chemicals
- Housing material PA
- Locking nut V4A (only DOS-...N, STE-...N)

M8, M12

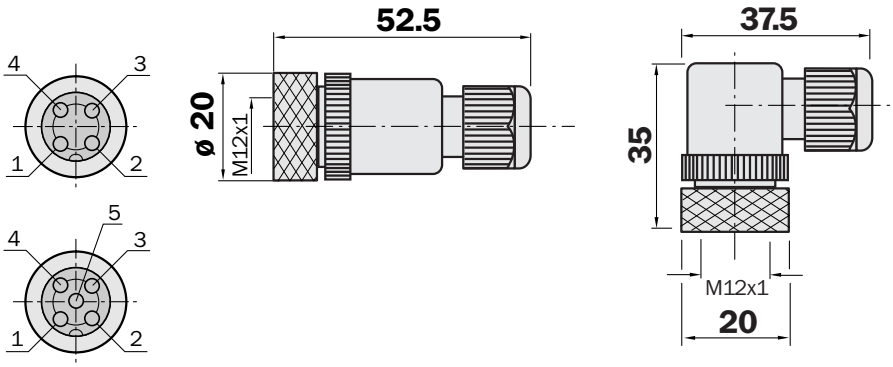


Dimensional drawings

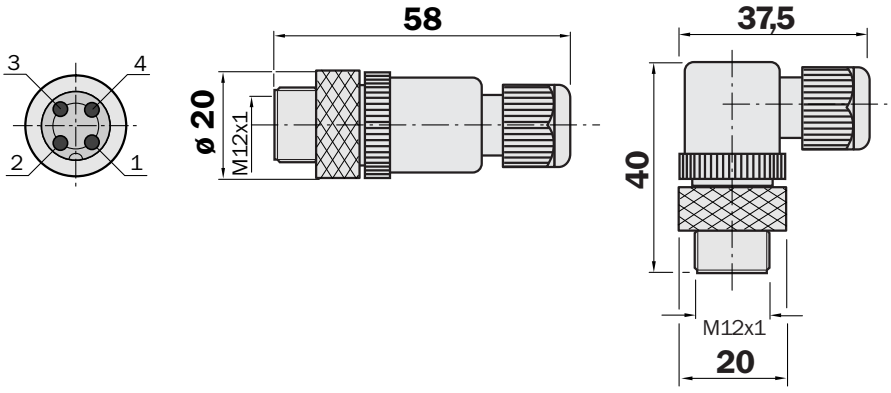
DOS-08...



DOS-12...



STE-1204...



dimensions in mm

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Technical data

Nominal voltage Ub	60 V AC/75 V DC (M8-connector)
	125 V AC/150 V DC (M12 4-pin-connector)
	30 V AC/36 V DC (M12, 5-pin-connector)
Nominal power	4 A
Test voltage	1.5 kV eff./60 s. (M8-connector)
	1.25 kV eff./60 s. (M12, 4-pin-connector)
	1.0 kV eff./60 s. (M12, 5-pin-connector)
Insulation group	C acc. VDE 0110
Insulation resistance	> 109
Max. wire section	Max. 0.5 mm^2 (M8-connector)
	Max. 0.75 mm2 (M12-connector)
Temperature range	-13...+194° F (–25...+90° C)
Enclosure rating	IP 67 [1]
Locking nut	CuZn, brass nickeled
	V4A (1.4404) (DOS-12...N, STE-12...N)
Housing	PA, black (self-extinguishing)

1) Only in fully locked position with its plugs

Order information

Round connectors M8 terminal screwed

Type	Part no.	Description		Contacts	Locking nut	Cable Ø (mm)
DOS-0803-G	7 902 077	Female connector	straight	3	CuZn	3.5...5.0
DOS-0803-W	7 902 078	Female connector	straight	3	CuZn	3.5...5.0
DOS-0804-G	6 009 974	Female connector	straight	4	CuZn	3.5...5.0
DOS-0804-W	6 009 975	Female connector	straight	4	CuZn	3.5...5.0

Round connectors M8 terminal screwed

Type	Part no.	Description		Contacts	Locking nut	Cable Ø (mm)
DOS-1204-G	6 007 302	Female connector	straight	4	CuZn	3.5...6.5
DOS-1204-W	6 007 303	Female connector	angled	4	CuZn	3.5...6.5
STE-1204-G	6 009 932	Female connector	straight	4	CuZn	3.5...6.5
STE-1204-W	6 022 084	Female connector	angled	4	CuZn	3.5...6.5
DOS-1204-GN	6 028 357	Female connector	straight	4	V4A	3.5...6.5
DOS-1204-WN	6 028 358	Female connector	angled	4	V4A	3.5...6.5
STE-1204-GN	6 028 359	Female connector	straight	4	V4A	3.5...6.5
STE-1204-WN	6 028 360	Female connector	straight	4	V4A	3.5...6.5 (2 x)
DOS-1205-G	6 009 719	Female connector	straight	5	CuZn	3.5...6.5
DOS-1205-W	6 009 720	Female connector	angled	5	CuZn	3.5...6.5

Connecting Cables, PVC

Round Connectors

(for M8-connector in preparation)

Highlights

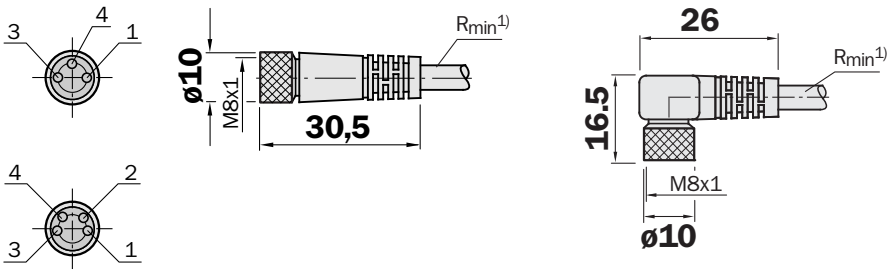
- Gold-plated pins
- Self locking threaded
- Conditional resistance to chemicals and oils
- Ideal for use in assembly, packaging and production lines
- IP 68 (M12)/IP 67 (M8) enclosure rating (only in fully locked position with its plugs)

Connecting cables, PVC

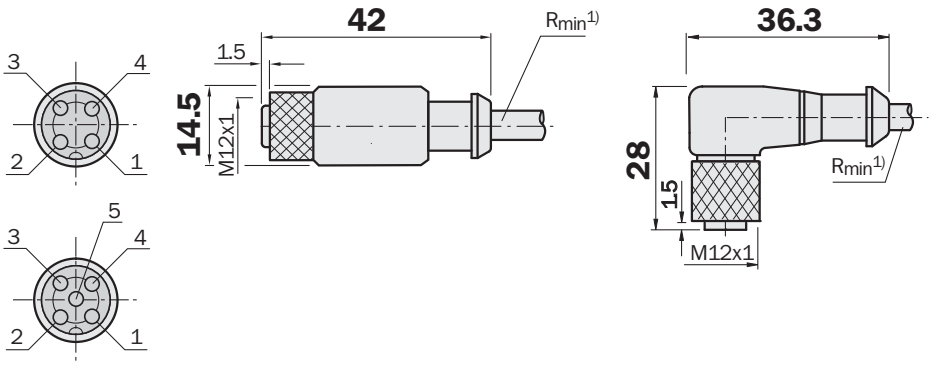


Dimensional drawings

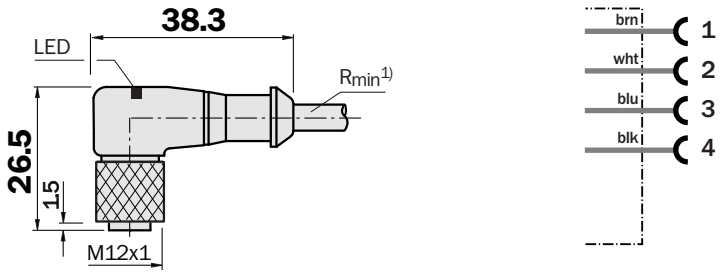
DOL-08...



DOL-12...



DOL1204-L...



Contacts	Wire color
1	brown
2	white
3	blue
4	black
5	gray

1) Minimum bend radius in dynamic use R_{min} = 20 x cable diameter

dimensions in mm

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Technical data

Nominal voltage Ub	60 V AC/75 V DC (M8-connector)	
	250 V AC/300 V DC (M12, 4-pin-connector)	
	30 V AC/36 V DC (M12, 5-pin-connector)	
	10...30 V DC (M12, LED-indicator)	
Contact resistance	≤ 5 m	
Nominal power	4 A (CSA = 3 A)	
Test voltage	2.0 kV eff./60 s. (M12, 4-pin-connector)	
	1.5 kV eff./60 s. (M8-connector and M12, 5-pin)	
Insulation group	C acc. VDE 0110	
Insulation resistance	> 109	
Temperature range	In fixed position	-40...176° F (–40...+80° C)
	In flexible motion	41...176° F (+5...+80° C)
Bending radius	> 10 x diameter of cable (in flexible motion)	
	5 x diameter of cable (in fixed position)	
Contact	CuZn, 0.3 µm gold-plated	
Locking nut	CuZn, brass nickeled	
Cable	PVC, color orange	
Conductor diameter	3 x 0.34 mm2	
	4 x 0.25 mm^2	
	5 x 0.5 mm^2	
Connector	TPU, color orange	

Order information

Round connectors M8 connecting cable, PVC

Type	Part no.	Description		Contacts	Cable length [m]
DOL-0803-G02M	6 010 785	Female connector	straight	3	2
DOL-0803-G05M	6 022 009	Female connector	straight	3	5
DOL-0803-G10M	6 022 011	Female connector	straight	3	10
DOL-0803-W02M	6 008 489	Female connector	angled	3	2
DOL-0803-W05M	6 022 010	Female connector	angled	3	5
DOL-0803-W10M	6 022 012	Female connector	angled	3	10
DOL-0804-G02M	6 009 870	Female connector	straight	4	2
DOL-0804-G05M	6 009 872	Female connector	straight	4	5
DOL-0804-G10M	6 010 754	Female connector	straight	4	10
DOL-0804-W02M	6 009 871	Female connector	angled	4	2
DOL-0804-W05M	6 009 873	Female connector	angled	4	5
DOL-0804-W10M	6 010 755	Female connector	angled	4	10

Round connectors M12 connecting cable, PVC

Type	Part no.	Description		Contacts	Cable length [m]
DOL-1204-G02M	6 009 382	Female connector	straight	3	2
DOL-1204-G05M	6 009 866	Female connector	straight	3	5
DOL-1204-G10M	6 010 543	Female connector	straight	3	10
DOL-1204-G15M	6 010 753	Female connector	straight	3	15
DOL-1204-W02M	6 009 383	Female connector	angled	3	2
DOL-1204-W05M	6 009 867	Female connector	angled	3	5
DOL-1204-W10M	6 010 541	Female connector	angled	4	10
DOL-1204-L02M	6 027 945	Female connector	angled LED (PNP)	4	2
DOL-1204-L05M	6 027 944	Female connector	angled LED (PNP)	4	5
DOL-1204-L10M	6 027 946	Female connector	angled LED (PNP)	4	10
DOL-1205-G02M	6 008 899	Female connector	straight	5	2
DOL-1205-G05M	6 009 868	Female connector	straight	5	5
DOL-1205-G10M	6 010 544	Female connector	straight	5	10
DOL-1205-W02M	6 008 900	Female connector	angled	5	2
DOL-1205-W05M	6 009 869	Female connector	angled	5	5
DOL-1205-W10M	6 010 542	Female connector	angled	5	10
DOL-1205-G05MX	6 010 474	Female connector	straight (shielded PIN 5)	5	5

Connecting Cables, PUR

Round Connectors

Highlights

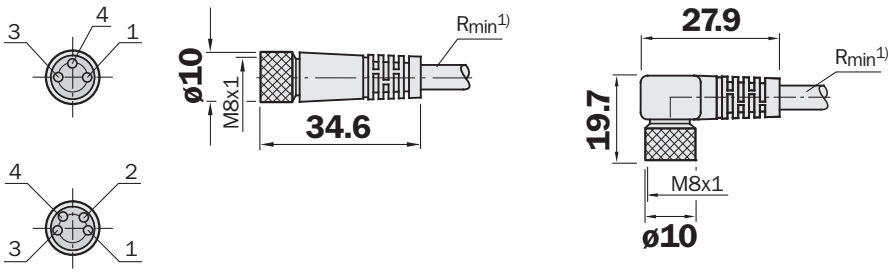
- Gold-plated pins
- Halogen-free, PVC-free, silicone-free-cable
- Flame-retardant IEC 332-2
- Resistant to coolants and lubricants
- Suitable for use with drag chains
- Resistant against hydrolysis
- IP 68 (M12)/IP 67 (M8) enclosure rating (only in fully locked position with its plugs)

Connecting cables , UR

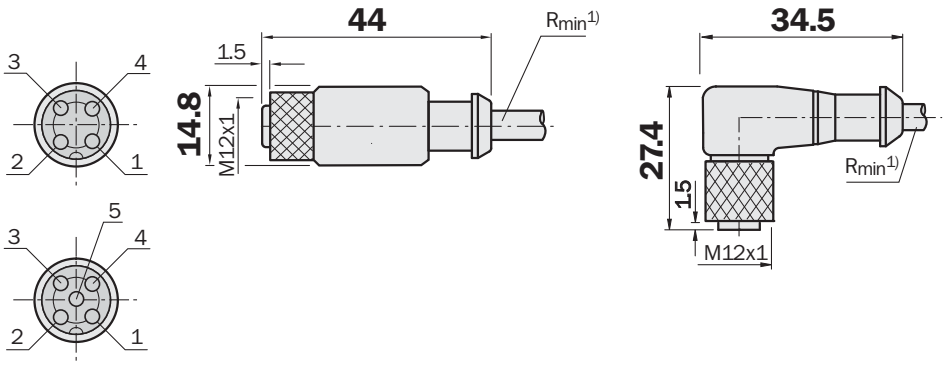


Dimensional drawings

DOL-08...



DOL-12...



Contacts	Wire color
1	brown
2	white
3	blue
4	black
5	gray

dimensions in mm

1) Minimum bend radius in dynamic use R_{min} = 20 x cable diameter

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Technical data

Nominal voltage Ub	60 V AC/75 V DC (M8-connector)	
	250 V AC/300 V DC (M12, 4-pin-connector)	
	30 V AC/36 V DC (M12, 5-pin-connector)	
Contact resistance	≤ 5 m	
Nominal power	4 A (CSA = 3 A)	
Insulation group	C acc. VDE0110	
Insulation resistance	> 109	
Temperature range	In fixed position	-58...176° F (–50...+80° C)
	In flexible motion	-13...176° F (–25...+80° C)
Bending radius	> 10 x diameter of cable	
Guaranteed bending cycles	≤ 2 million (at bend radius r = 60 mm)	
Max. allowed speed up	8.6 m/sec2	
Max. speed	90 m/min (for 2 m horizontal path)	
Contact	CuZn, gold-plated	
Cable	Color black, PUR halogen-free	
Conductor diameter	3 x 0.25 mm^2 (M8)	
	4 x 0.25 mm^2 (M8), 4 x 0.34 mm2 (M12)	
	5 x 0.34 mm^2	
Connector	Color black, TPU	

Order information

Round connectors M8 connecting cable, PUR halogen-free

Type	Part no.	Description		Contacts	Cable length [m]
DOL-0803-G02MC	6 025 888	Female connector	straight	3	2
DOL-0803-G05MC	6 025 889	Female connector	straight	3	5
DOL-0803-G10MC	6 025 890	Female connector	straight	3	10
DOL-0803-W02MC	6 025 891	Female connector	angled	3	2
DOL-0803-W05MC	6 025 892	Female connector	angled	3	5
DOL-0803-W10MC	6 025 893	Female connector	angled	3	10
DOL-0804-G02MC	6 025 894	Female connector	straight	4	2
DOL-0804-G05MC	6 025 895	Female connector	straight	4	5
DOL-0804-G10MC	6 025 896	Female connector	straight	4	10
DOL-0804-W02MC	6 025 897	Female connector	angled	4	2
DOL-0804-W05MC	6 025 898	Female connector	angled	4	5
DOL-0804-W10MC	6 025 899	Female connector	angled	4	10

Round connectors M12 connecting cable, PVC

Type	Part no.	Description		Contacts	Cable length [m]
DOL-1204-G02MC	6 025 900	Female connector	straight	4	2
DOL-1204-G05MC	6 025 901	Female connector	straight	4	5
DOL-1204-G10MC	6 025 902	Female connector	straight	4	10
DOL-1204-W02MC	6 025 903	Female connector	angled	4	2
DOL-1204-W05MC	6 025 904	Female connector	angled	4	5
DOL-1204-W10MC	6 025 905	Female connector	angled	4	10
STL-1204-G02-MC	6 028 077	Female connector	straight	4	2
DOL-1205-G02MC	6 025 906	Female connector	straight	5	2
DOL-1205-G05MC	6 025 907	Female connector	straight	5	5
DOL-1205-G10MC	6 025 908	Female connector	straight	5	10
DOL-1205-W02MC	6 025 909	Female connector	angled	5	2
DOL-1205-W05MC	6 025 910	Female connector	angled	5	5
DOL-1205-W10MC	6 025 911	Female connector	angled	5	10

Connecting Cables, Food & Beverage

Round Connectors

Highlights

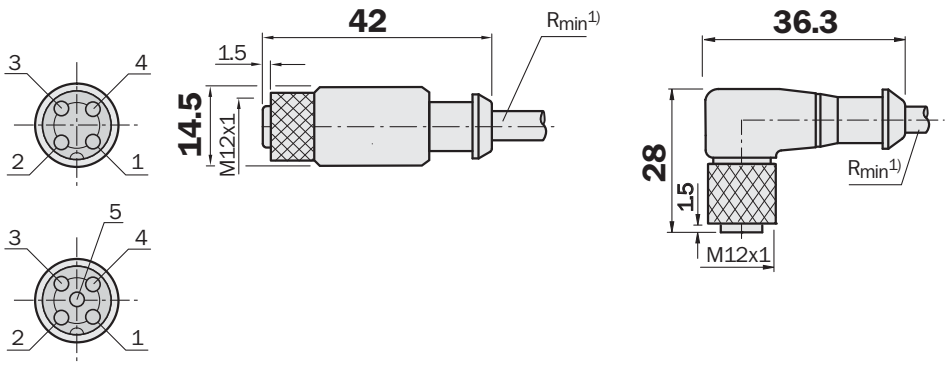
- Especially suitable for use in the Food & Beverage industry
- Gold-plated pins
- Improved resistance to chemicals, acids and cleaning agents
- IP 69K enclosure rating (only in fully locked position with its plugs)
- Stainless steel locking nut (V4A)

Connecting Cables, Food & Beverage

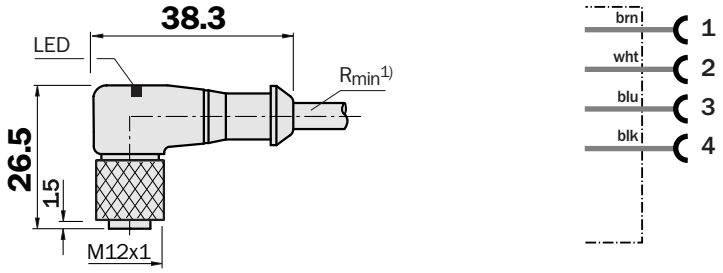


Dimensional drawings

DOL-12...



DOL-1204-L...



Contacts	Wire color
1	brown
2	white
3	blue
4	black
5	gray

dimensions in mm

1) Minimum bend radius in dynamic use R_{min} = 20 x cable diameter

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Technical data

Nominal voltage Ub	250 V AC/300 V DC (M12, 4-pin-connector)	
	30 V AC/36 V DC (M12, 5-pin-connector)	
	10...30 V DC (M12, LED-indicator)	
Contact resistance	≤ 5 m	
Nominal power	4 A (CSA = 3 A)	
Test voltage	2.0 kV eff./60 s. (4-pin)	
	1.5 kV eff./60 s. (5-pin)	
Insulation group	C acc. VDE 0110	
Insulation resistance	> 109	
Temperature range	In fixed position	-13...194° F (–25...+90° C)
	In flexible motion	41...194° F (+5...+90° C)
Bending radius	> 10 x diameter of cable	
Contact	CuZn, 0.3 µm gold-plated	
Locking nut	Stainless steel V4A	
Cable	PVC, color orange	
Conductor diameter	4 x 0.25 mm^2	
	5 x 0.5 mm^2	
Connector	PVC, color orange	

Order information

Round connectors M12 connecting cable, Food and Beverage

Type	Part no.	Description		Contacts	Cable length [m]
DOL-1204-G02MN	6 028 128	Female connector	straight	3	2
DOL-1204-G05MN	6 028 130	Female connector	straight	3	5
DOL-1204-G10MN	6 028 132	Female connector	straight	3	10
DOL-1204-G25MN	6 028 134	Female connector	straight	3	25
DOL-1204-W02MN	6 028 129	Female connector	angled	3	2
DOL-1204-W05MN	6 028 131	Female connector	angled	3	5
DOL-1204-W10MN	6 028 133	Female connector	angled	4	10
DOL-1204-W25MN	6 028 135	Female connector	angled	4	25
DOL-1204-L02MN	6 028 136	Female connector	angled LED (PNP)	4	2
DOL-1204-L05MN	6 028 137	Female connector	angled LED (PNP)	4	5
DOL-1204-L10MN	6 028 138	Female connector	angled LED (PNP)	5	10
DOL-1204-L25MN	6 028 139	Female connector	angled LED (PNP)	5	25
DOL-1205-G02MN	6 028 140	Female connector	straight	5	2
DOL-1205-G05MN	6 028 141	Female connector	straight	5	5
DOL-1205-G010MN	6 028 142	Female connector	straight	5	10
DOL-1205-G25MN	6 028 143	Female connector	straight	5	25

Extension Cable, PVC

Round Connectors

(for M8-connector in preparation)

Highlights

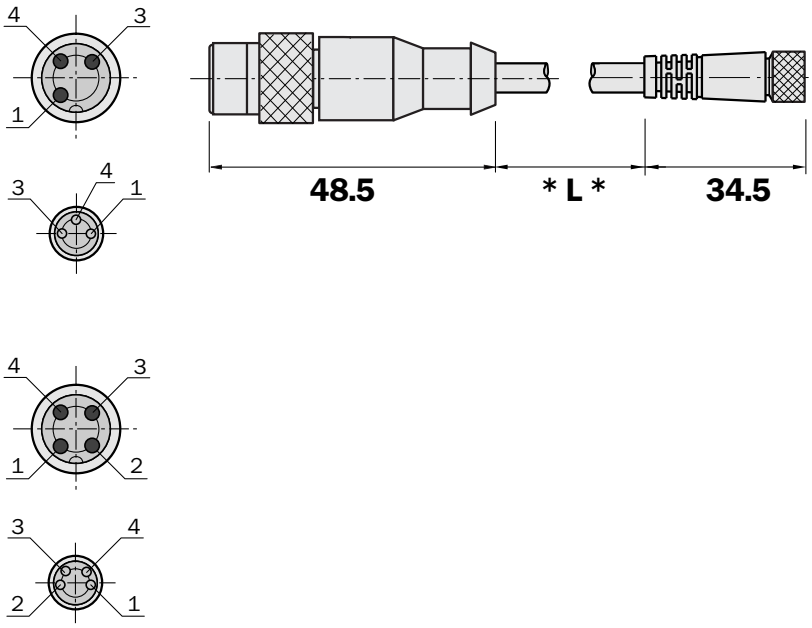
- Gold-plated pins
- Self locking threaded
- Conditional resistance to chemicals and oils
- Ideal for use in assembly, packaging and production lines
- Enclosure rating IP 68 (M12)/IP 67 (M8) (only in fully locked position with its plugs)

Extension cable, PVC

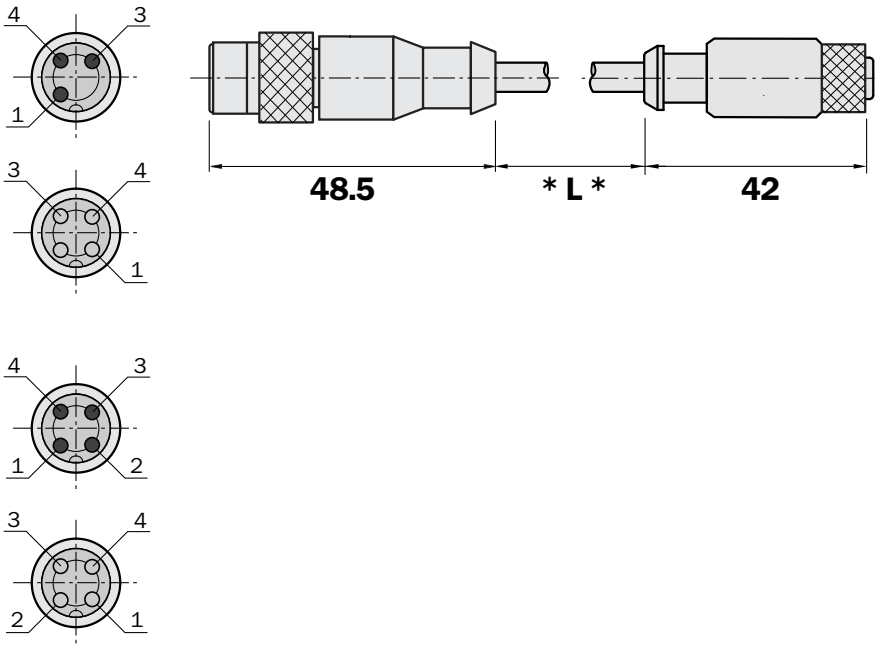


Dimensional drawings

DSL-82...



DSL-12...



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Technical data

Nominal voltage Ub	60 V AC/75 V DC (M8-connector)	
	250 V AC/300 V DC (M12-connector)	
Contact resistance	≤ 5 m	
Nominal power	4 A (CSA = 3 A)	
Test voltage	2.0 kV eff./60 s. (M12-connector)	
	1.5 kV eff./60 s. (M8-connector)	
Insulation group	C acc. VDE 0110	
Insulation resistance	> 109	
Temperature range	In fixed position	40° F...176° F (–40° C... +80° C)
	In flexible motion	41° F...176° F (+5° C .. +80° C)
Bending radius	> 10 x diameter of cable (in flexible motion)	
	5 x diameter of cable (in fixed position)	
Contact	CuZn, 0.3 µm gold plated	
Locking nut	CuZn, brass nickeled	
Cable	PVC, color orange	
Conductor diameter	3 x 0.34 mm^2	
	4 x 0.25 mm^2	
Connector	TPU, color orange	

Order information

Round connectors extension cable PVC, female connector M8 (straight), male connector M12 (straight)

Type	Part no.	Contacts	Contacts	Cable length [m]
		Female connector	Male connector	
DSL-8203-G0M6	6 022 570	3	3	0.6
DSL-8203-G02M	6 022 572	3	3	2
DSL-8204-G0M6	6 022 571	4	4	0.6
DSL-8204-G02M	6 022 573	4	4	2

Round connectors extension cable PVC, female connector M12 (straight), male connector M12 (straight)

Type	Part no.	Contacts	Contacts	Cable length [m]
		Female connector	Male connector	
DSL-1203-G0M6	6 022 564	4 (3 connected)	3	0.6
DSL-1203-G02M	6 022 566	4 (3 connected)	3	2
DSL-1203-G05M	6 022 568	4 (3 connected)	3	5
DSL-1204-G0M6	6 022 565	4	4	0.6
DSL-1204-G02M	6 022 567	4	4	2
DSL-1204-G05M	6 022 569	4	4	5

Extension Cable, PUR Halogen-Free

Round Connectors

Highlights

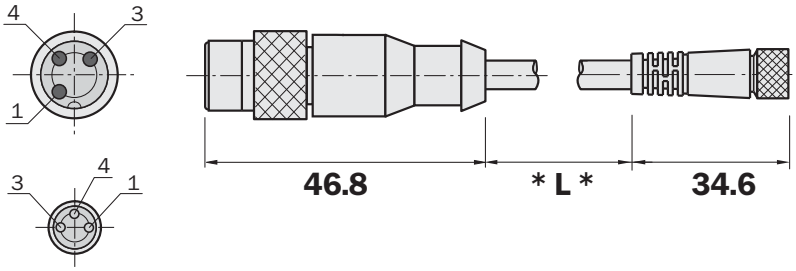
- Gold-plated pins
- Halogen-free, PVC-free, silicone-free-cable
- Flame-retardent IEC 332-2
- Resistant to coolants and lubricants
- Suitable for use with drag chain
- Resistant against hydrolysis
- Enclosure rating IP 67 (M8)/IP68 (M12) (only in fully locked position with its plugs)

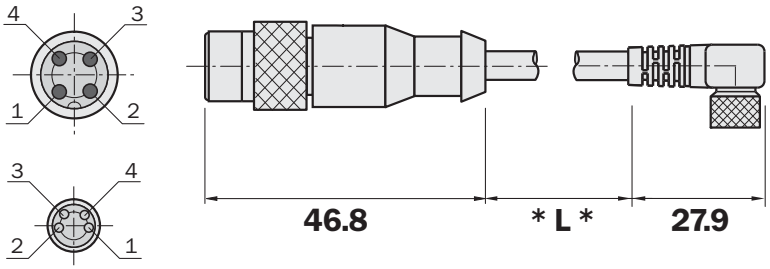
Extension Cable, PUR Halogen-Free



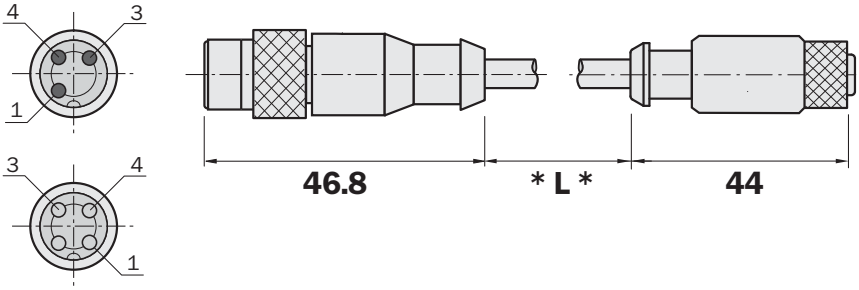
Dimensional drawings

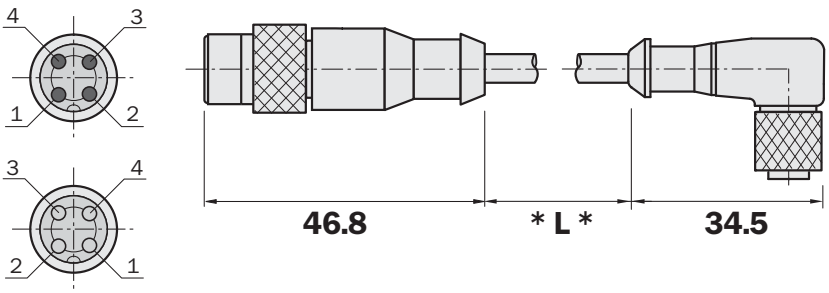
DSL-82...

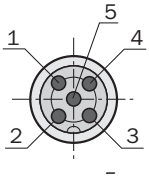




DSL-12...







dimensions in mm

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Technical data

Nominal voltage Ub	60 V AC/75 V DC (M8-connector)
	250 V AC/300 V DC (M12, 4-pin-connector)
	30 V AC/36 V DC (M12, 5-pin-connector)
Contact resistance	≤ 5 m
Nominal power	4 A (CSA = 3 A)
Insulation group	C acc. VDE 0110
Insulation resistance	> 109
Temperature range	In fixed position -58...176° F (–50...+80° C)
	In flexible motion -13...140° F (–25...+60° C)
Bending radius	> 10 x diameter of cable
Guaranteed bending cycles	≤ 2 million (at bend radius r = 60 mm)
Max. allowed speed up	8.6 m/sec2
Max. speed	90 m/min (for 5 m horizontal path)
Contact	CuZn, gold-plated
Cable	Color black, PUR halogen-free
Conductor diameter	3 x 0.25 mm^2 (M8), 3 x 0.34 mm2 (M12)
	4 x 0.25 mm^2 (M8), 4 x 0.34 mm2 (M12)
	5 x 0.34 mm^2
Connector	Color black, TPU

Order information

Round connectors extension cable , PUR halogen-free, female connector M8, male connector M12 (straight)

Type	Part no.	Description		Contacts	Contacts	Cable length [m]
				Female connector	Male connector	
DSL-8203-G0M6C	6 025 914	Female connector	straight	3	3	0.6
DSL-8203-G02MC	6 025 915	Female connector	straight	3	3	2
DSL-8203-B0M6C	6 025 916	Female connector	angled	3	3	0.6
DSL-8203-B02MC	6 025 917	Female connector	angled	3	3	2
DSL-8204-G0M6C	6 025 918	Female connector	straight	4	4	0.6
DSL-8204-G02MC	6 025 919	Female connector	straight	4	4	2
DSL-8204-B0M6C	6 025 920	Female connector	angled	4	4	0.6
DSL-8204-B02MC	6 025 921	Female connector	angled	4	4	2

Round connectors extension cable, PUR halogen-free, female connector M12, male connector M12 (straight)

Type	Part no.	Description		Contacts	Contacts	Cable length [m]
				Female connector	Male connector	
DSL-1203-G0M6C	6 025 922	Female connector	straight	4 (3 connected)	3	0.6
DSL-1203-G02MC	6 025 923	Female connector	straight	4 (3 connected)	3	2
DSL-1203-B0M6C	6 025 924	Female connector	angled	4 (3 connected)	3	0.6
DSL-1203-B02MC	6 025 925	Female connector	angled	4 (3 connected)	3	2
DSL-1204-G0M6C	6 025 926	Female connector	straight	4	4	0.6
DSL-1204-G02MC	6 025 927	Female connector	straight	4	4	2
DSL-1204-B0M6C	6 025 928	Female connector	angled	4	4	0.6
DSL-1204-B02MC	6 025 929	Female connector	angled	4	4	2
DSL-1204-B02MC	6 025 930	Female connector	straight	5	5	0.6
DSL-1204-B02MC	6 025 931	Female connector	straight	5	5	2

Extension Cable, Food & Beverage

Round Connectors

Highlights

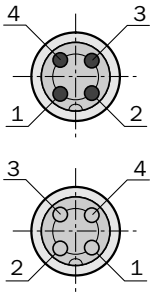
- Ideal for use in the Food & Beverage industry
- Gold-plated pins
- Improved resistance to chemicals, acids and cleaning agents
- Enclosure rating IP 67 (M8)/IP68 (M12) (only in fully locked position with its plugs)
- Stainless steel locking nut (V4A)

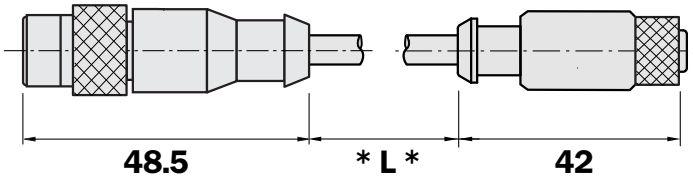
Extension cable, Food & Beverage

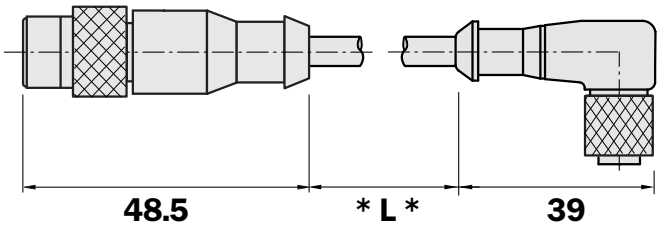


Dimensional drawings

DXSL-1204-...







dimensions in mm

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Technical data

Nominal voltage Ub	250 V AC/300 V DC	
Contact resistance	≤ 5 m	
Nominal power	4 A (CSA = 3 A)	
Test voltage	2.0 kV eff./60 s.	
Insulation group	C acc. VDE 0110	
Insulation resistance	> 109	
Temperature range	In fixed position	-13...194° F (–25...+90° C)
	In flexible motion	41...194° F (+5...+90° C)
Bending radius	> 10 x diameter of cable	
Contact	CuZn, 0.3 µm gold -plated	
Locking nut	Stainless steel (V4A)	
Cable	PVC, color orange	
Conductor diameter	4 x 0.25 mm^2	
Connector	PVC, color orange	

Order information

Round connectors extension cable, Food & Beverage, female connector M12, male connector M12 (straight)

Type	Part no.	Description		Contacts	Contacts	Cable length [m]
				Female connector	Male connector	
DSL-1204-G0M6N	6 028 194	Female connector	straight	4	4	0.6
DSL-1204-G02MN	6 028 195	Female connector	straight	4	4	2
DSL-1204-G05MN	6 028 196	Female connector	straight	4	4	5
DSL-1204-B0M6N	6 028 197	Female connector	angled	4	4	0.6
DSL-1204-B02MN	6 028 198	Female connector	angled	4	4	2
DSL-1204-B05MN	6 028 199	Female connector	angled	4	4	5

Food & Beverage IP 69K, V4A

Sensor splitter-box

Highlights

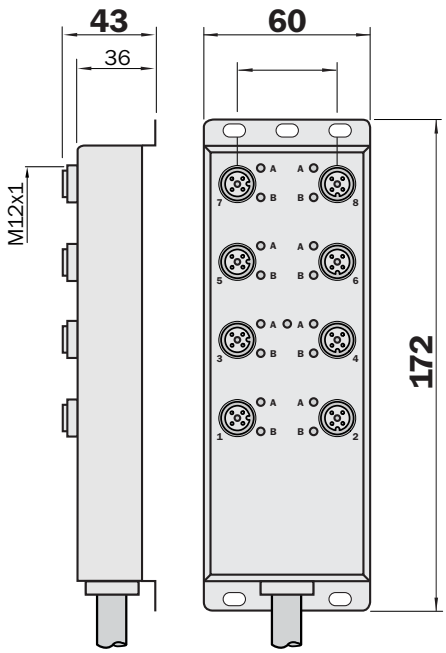
- Enclosure rating IP 69K (only in fully locked position with its plugs or dust covers)
- Housing & thread material: stainless steel V4A
- Ideal for use in the Food & Beverage industry
- Improved resistance to chemicals, acids and cleaning agent

Food & Beverage IP 69K, V4A



Dimensional drawings

SNL-08...



M12/contacts	Wire color	Signal/outlet
1	brown	+
3	blue	-
2	gray/pink	1
	red/blue	2
	white/green	3
	brown/green	4
	white/yellow	5
	yellow/brown	6
	white/gray	7
	gray/brown	8
4	white	1
	green	2
	yellow	3
	gray	4
	pink	5
	red	6
	black	7
	violet	8
5	green/yellow	PE

dimensions in mm

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Technical data

Temperature range	32...140° F (0...+60° C)
Materials	
Housing	V4A-stainless steel
Moulded body	PVC
Contact	CuZn, pre-nickeled and 0.8 µm gold plated
Threaded sleeve	V4A-stainless steel
O-Ring	EPDM
Mechanical data	
Enclosure rating	IP 69K (only in fully locked position with its plugs)
Electrical data	
Contact resistance	≤ 5 m
Nominal power	4 A per outlet/11 A max. total at 30° C (refer to correction factors EN 60204-1)
Nominal voltage Ub	10...30 V DC
Reference voltage	32 V ~ eff.
Insulation resistance	> 109
Pollution grade	2 acc. VDE 0110
Cable	PVC, color black, 3 x 1.0 mm^2 /16 x 0.5 mm^2 (appropriate for drag cable use)
Accessories	4 dust covers for unused sockets

Order information

Sensor splitter-box Food & Beverage, IP 69K, V4A (1.4404/316L), M12 x 1 mm (5-pin), 8 x female connector, type of connection, cable

		Connecting cable		
Type	**Part no.**	**Length [m]**	**Lead [m]**	**Cable**
SNL-08D12-DA05	6 027 586	5	3 x 1.0/16 x .5	PVC black
SNL-08D12-DA10	6 027 587	10	3 x 1.0/16 x .5	PVC black
SNL-08D12-DA15	6 027 588	15	3 x 1.0/16 x .5	PVC black

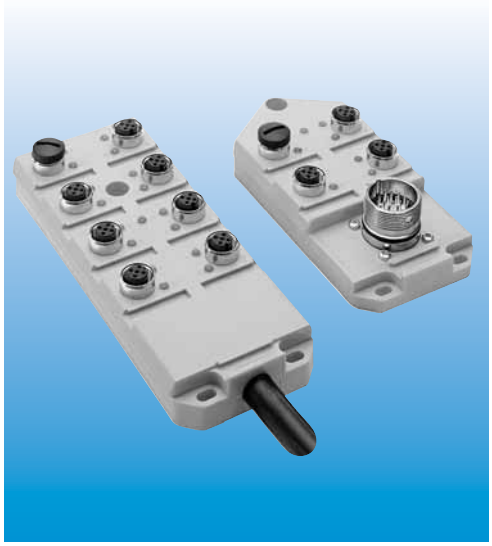
SENSICK Splitter Boxes

Sensor splitter-box

Highlights

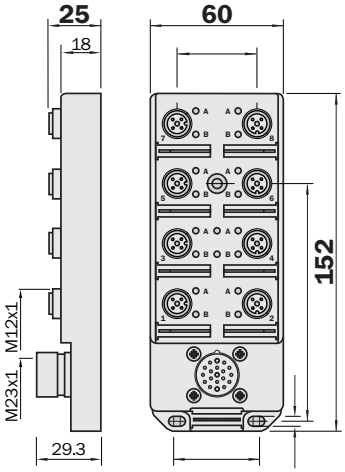
- Enclosure rating IP 69K (only in fully locked position with its plugs or dust covers)
- TPU housing, self-extinguishing, moulded
- Shock and vibration resistant
- Gold-plated pins
- 2 signals per M12-socket
- LED indication

M12 x 1, IP 67

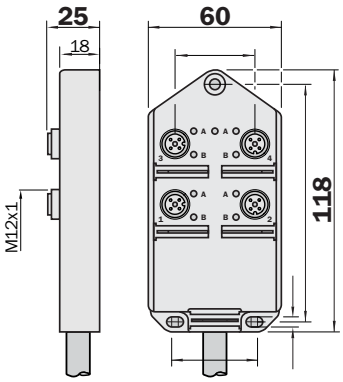


Dimensional drawings

SBL-08D12-KC...

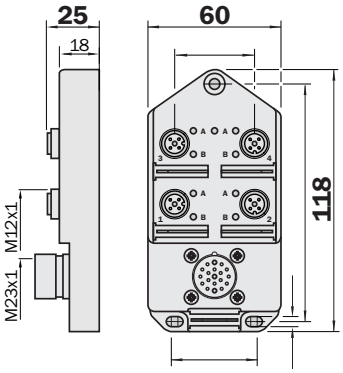


SBL-04D12-KC...



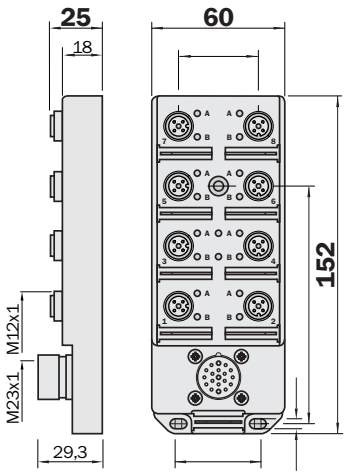
M12-Contacts	Wire color	Signal/outlet
1	brown	+
3	blue	-
2	gray/pink	1
	red/blue	2
	white/green	3
	brown/green	4
	white/yellow	5
	yellow/brown	6
	white/gray	7
	gray/brown	8
4	white	1
	green	2
	yellow	3
	gray	4
	pink	5
	red	6
	black	7
	violet	8
5	green/yellow	PE

SBL-04D12-SE...



M12-Contacts	Signal/outlet
1 = 19	+
2 = 1	7
2	4
3	8
4	14
5	9
6	13
7	10
8	18
3 = 6	-
4 = 1	15
2	5
3	16
4	3
5	17
6	2
7	11
8	1
5 = 2	PE

SBL-08D12-SE...



dimensions in mm

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Technical data

Temperature range	5...194° F (–15...+90° C)
Materials	
Housing	TPU, self-extinguishing
Moulded body	PA 6.6 GF, self-extinguishing, color orange
Contact	CuZn, pre-nickeled and 0.8 µm gold plated
Threaded sleeve	CuZn, brass nickeled
Mechanical data	
Enclosure rating	IP 67 (only in fully locked position with its plugs)
Electrical data	
Contact resistance	≤ 5 m
Nominal power	2 A per outlet/11 A max. total at 30° C (refer to correction factors EN 60204-1)
Nominal voltage Ub	10...30 V DC
Reference voltage	32 V ~ eff.
Insulation resistance	> 109
Pollution grade	2 acc. VDE 0110
Cable	PUR color black, 4-way box x 1.0 mm^2/8-way box 16 x 0.5 mm^2
Accessories	2 dust covers for unused sockets, 10 attachable molds

Order information

Sensor splitter-box M12 x 1 mm, 5-pin, type of connection, cable

		Connecting cable		
Type	**Part no.**	**Length [m]**	**Lead [mm^2]**	**Cable**
SBL-04D12-KC05	6 028 394	5	3 x 1.0/8 x .5	PUR halogen free
SBL-04D12-KC10	6 028 395	10	3 x 1.0/8 x .5	PUR halogen free
SBL-08D12-KC05	6 028 396	5	3 x 1.0/8 x .5	PUR halogen free
SBL-08D12-KC05	6 028 397	10	3 x 1.0/8 x .5	PUR halogen free

Sensor splitter-box M12 x 1 mm, 5-pin, type of connection, M23 connector

		Connection plug	
Type	**Part no.**	**Type**	**Description**
SBL-04D12-SE	6 028 398	5	Male connector, 19 contacts
SBL-08D12-8E	6 028 399	10	Male connector, 19 contacts

SENSICK Connecting Cables for Sensor Splitter Boxes

Connecting Cables

(Except M8-connectors)

Highlights

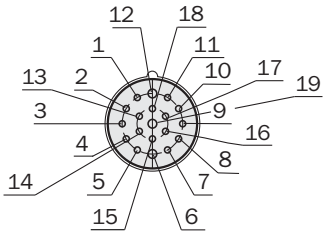
- Gold-plated pins
- IP 68 enclosure rating
- Connector for connection on sensor splitter-box SBL-...D12-SE
- Color connector/cable: black

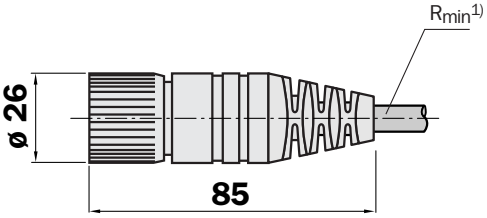
M23 x 1 mm, PUR



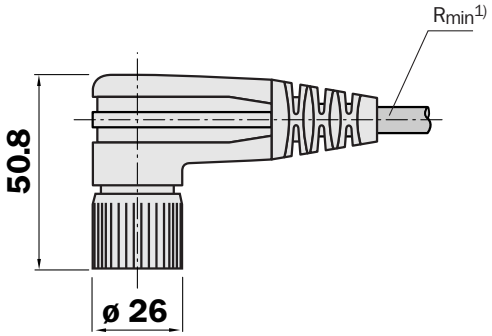
Dimensional drawings

DOL-2319-G...MB





DOL-2319-W...MB



Contacts	Wire color	Contacts	Wire color
1	violet	11	black
2	red	12	yellow/green
3	gray	13	yellow/brown
4	red/blue	14	brown/green
5	green	15	white
6	blue	16	yellow
7	gray/pink	17	pink
8	white/green	18	gray/brown
9	white/yellow	19	brown
10	white/gray		

dimensions in mm

Technical data

Temperature range	-13° F...230° C (–25° C...+110° C)
Materials	
Moulded body	PBTP
Contact	CuZn, pre-nickeled and 0.8 µm gold-plated
Body	PUR
Locking nut	CuZn, brass nickeled
Mechanical data	
Enclosure rating	IP 68 (only in fully locked position with its plugs)
Electrical data	
Contact resistance	≤ 5 m
Nominal power	19-pin 8 A pin ø 1 mm, 10 A Spin ø 1.5 mm
Reference voltage	19-pin 160 V eff.
Test voltage	19-pin 1.5 kV eff./60 s.
Insulation resistance	> 109
Pollution grade	IIIa acc. VDE 0110
Cable	PUR, color black, 3 x 1.0 mm^2/16 x 0.5 mm^2 (appropriate for drag cable use)i

Order information

Connecting cables M23 x 1 mm PUR for sensor splitter-boxes SBL-...D12-SE

Type	Part no.	Description		Contacts	Cable length[m]
DOL-2319-G05MB	6 028 400	Female connector	straight	19	5
DOL-2319-G10MB	6 028 401	Female connector	straight	19	10
DOL-2319-G15MB	6 028 402	Female connector	straight	19	15
DOL-2319-W05MB	6 028 403	Female connector	straight	19	5
DOL-2319-W10MB	6 028 405	Female connector	straight	19	10
DOL-2319-W15MB	6 028 404	Female connector	straight	19	15

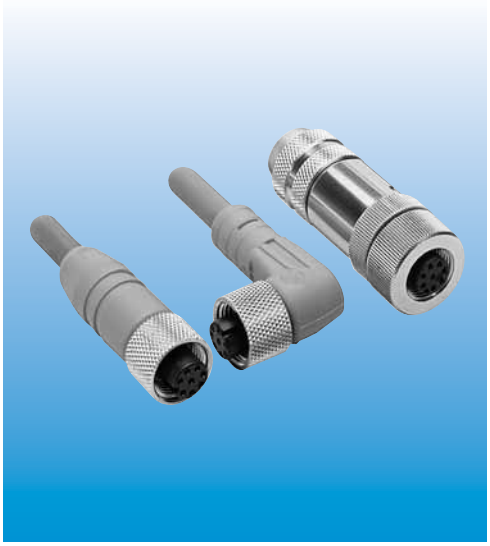
M12, 8-pin, Shielded

Round Connectors

Highlights

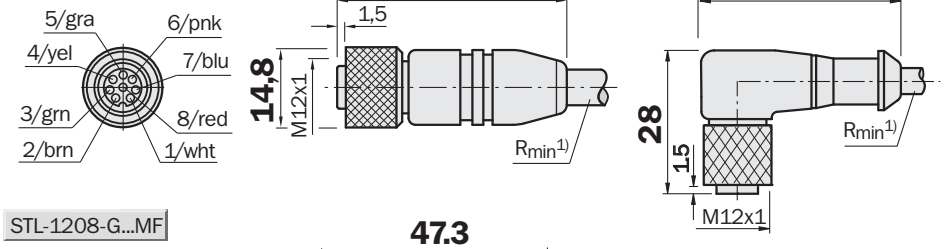
- Gold-plated pins
- Ideal for use in shielded applications
- 360° shield on locking nut
- Shield on PIN 8
- IP 67 enclosure rating (only in fully locked position with its plugs)

M12, 8-pin, Shielded

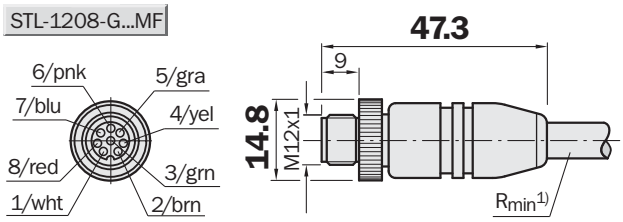


Dimensional drawings

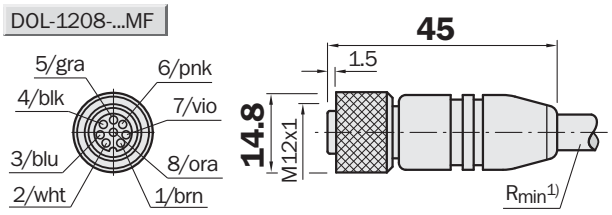
DOL-1208-...MA



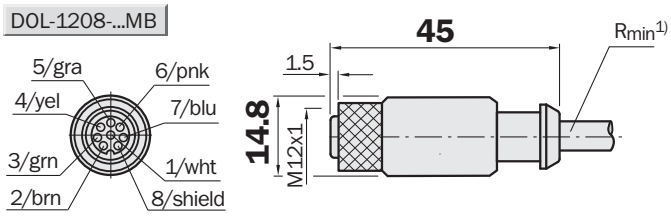
STL-1208-G...MF



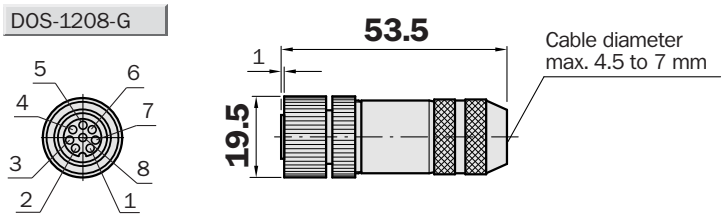
DOL-1208-...MF



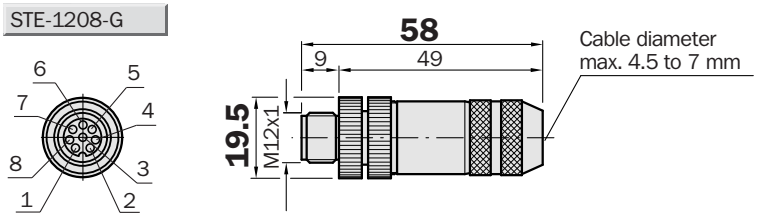
DOL-1208-...MB



DOS-1208-G



STE-1208-G



1) Minimum bend radius in dynamic use
R_{min} = 20 x cable diameter

dimensions in mm

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Technical data

Nominal voltage Ub		30 V AC/36 V DC	
Contact resistance		≤ 5 m	
Nominal power		1.5 A	
Insulation group		C acc. VDE0110	
Insulation resistance		> 109	
Temperature range		In fixed position	-13...221° F (–25...+105° C)
Temperature range	DOL-1208-...MF	In fixed position	-13...176° F (–25...+80° C)
Molded cable			
Bending radius		> 20 x diameter of cable	
Contact		CuZn, 0.3 µm gold plated	
Connector diameter	DOS-1208-GA, STE-1208-GA	Max. 0.75 mm^2	
Cable		PVC, color black (8 x 0.25 mm^2)	
		PUR, color black (7 x 0.25 mm^2 and shield)	
Connector		TPU, color black	
Terminal screwed connector			
Contact		CuZn, pre-nickeled, 2...4 µm CuSnZn	
Connection type		Connector	
Housing		CuZn, brass nickeled	

Order information

Round connectors M12, 8-pin shielded

Type	Part no.	Description		Shield	Cable length [m]	Cable
DOS-1208-G	6 028 422	Female connector	straight	360° on locking nut	terminal screwed	4...8 mm
DOS-1208-GA	6 028 369	Female connector	straight	360° on locking nut	terminal screwed	4...8 mm
STE-1208-GA	6 028 370	Female connector	straight	360° on locking nut	terminal screwed	4...8 mm
STL-1208-G02MA	6 029 330	Female connector	straight	360° on locking nut	2	PVC
STL-1208-G05MA	6 029 331	Female connector	straight	360° on locking nut	5	PVC
STL-1208-G10MA	6 032 324	Female connector	straight	360° on locking nut	10	PVC
DOL-1208-G02MA	6 020 633	Female connector	straight	360° on locking nut	2	PVC
DOL-1208-G05MA	6 020 993	Female connector	straight	360° on locking nut	5	PVC
DOL-1208-G010MA	6 022 152	Female connector	straight	360° on locking nut	10	PVC
DOL-1208-G15MA	6 022 153	Female connector	straight	360° on locking nut	15	PVC
DOL-1208-W02MA	6 020 992	Female connector	angled	360° on locking nut	2	PVC
DOL-1208-W05MA	6 021 033	Female connector	angled	360° on locking nut	5	PVC
DOL-1208-G02MB	6 010 748	Female connector	straight	on PIN 8	2	PUR
DOL-1208-G02MF*	6 020 663	Female connector	straight	360° on locking nut	2	PVC spec. core color
DOL-1208-G05MF*	6 020 664	Female connector	straight	360° on locking nut	5	PVC spec. core color

* Note: used with OD Displacement Sensors

Round connectors M12, 8-pin, shielded, female connector (straight) and male connector (straight)

Type	Part no.	Shield	Cable length [m]	Cable
DSL-1208-G01MA	6 026 625	360° on locking nut	1	PVC
DSL-1208-G02MC	6 030 121	360° on locking nut	2	PUR halogenfree
DSL-1208-G05MC	6 032 325	360° on locking nut	5	PUR halogenfree

T-Junction

Highlights

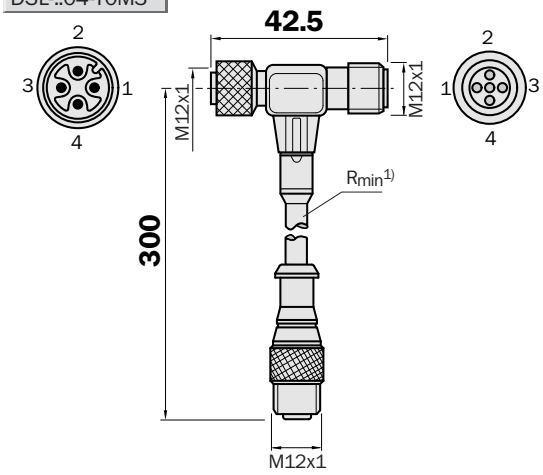
- Gold-plated pins
- T-Junction for connection on splitter-box (SBO-02C.../SBO-02D...)
- Housing material TPU
- IP 67 enclosure rating (only in fully locked position with its plugs)

M12, M8

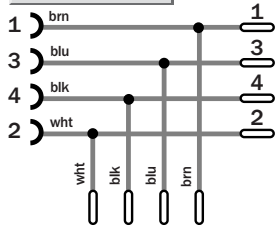


Dimensional drawings

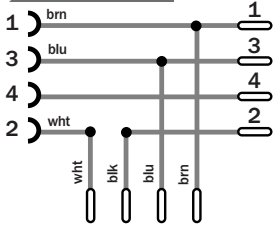
DSL-..04-T0M3



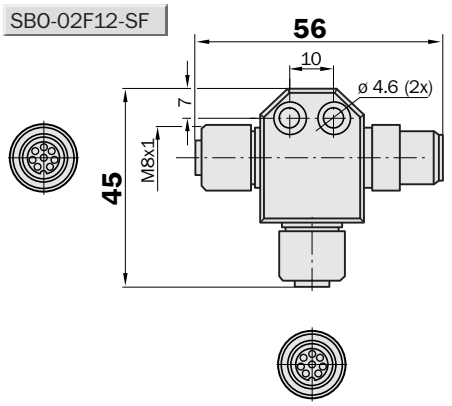
DSL-1204-T0M3

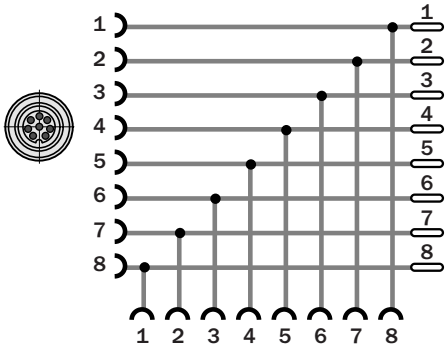


DSL-1104-T0M3

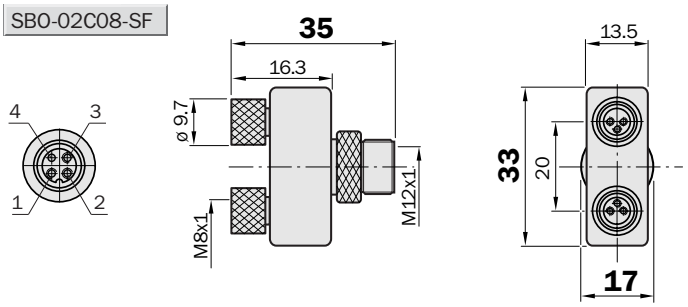


SBO-02F12-SF

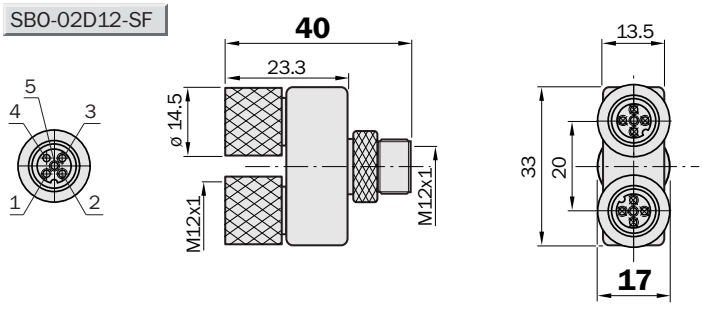




SBO-02C08-SF



SBO-02D12-SF



dimensions in mm

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Technical data

Nominal voltage Ub	60 V AC/75 V DC (M8, connector)
	250 V AC/300 V DC (M12, 4-pin, connector)
	30 V AC/36 V DC (M12, 5-pin, connector and M12, 8-pin, connector)
Contact resistance	≤ 5 m
Nominal power	4 A (CSA = 3 A)
Test voltage	2.0 kV eff./60 s. (M12, 4-pin, connector)
	1.5 kV eff./60 s. (M12, 5-pin, 8-pin, connector and M8, connector)
Insulation group	C acc. VDE 0110
Insulation resistance	> 109
Molding	TPU, self-extinguishing
Contact	0.8 µm gold-plated
Locking nut	CuZn, brass nickeled

Order information

T-Junction M12, M8

Type	Part no.	"T" splitter, line	T-junction 2 x connector	Specification
DSL-1204-T0M3	6 011 682	Male connector M12, 4-pin, straight + 0.3 m PVC	1 x female M12/1 x male connector M12, 4-pin, angled	Power supply signal
DSL-1104-T0M3	6 011 683	Male connector M12, 4-pin, straight + 0.3 m PVC	1 x female M12/1 x male connector M12, 4-pin, angled	Power supply signal and logic interrupt
SB0-02F12-SF	6 026 503	Male connector M12, 8-pin straight	2 x female connector M12, 8-pin, angled	Parallel connected
SB0-02C08-SF	6 028 393	Male connector M12, 4-pin straight	2 x female connector M8, 3-pin, straight	PIN 2, 4 split
SB0-02D12-SF	6 028 392	Male connector M12, 5-pin straight	2 x female connector M12, 5-pin, straight	PIN 2, 4 split

Round Connectors, M16 x 0.75 connections for DME

Round Connectors

Highlights

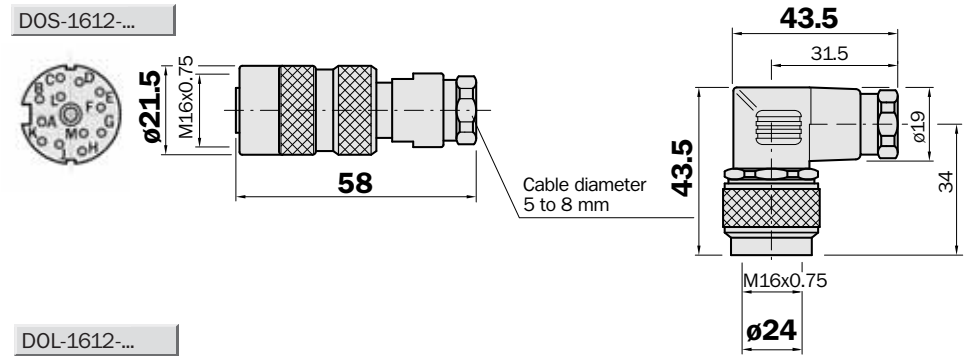
- Gold-plated pins
- IP 67 enclosure rating
- Connection type - solder

M16 x 0.75 connections for DME

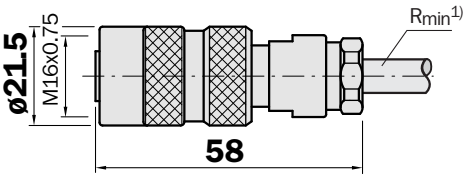


Dimensional drawings

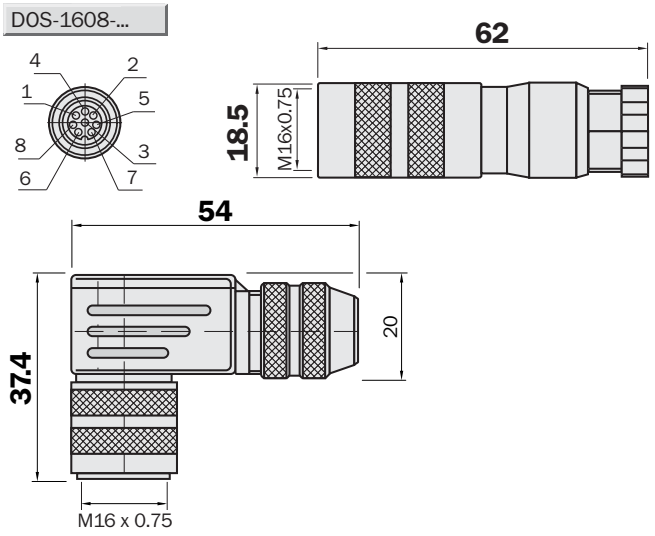
DOS-1612-...



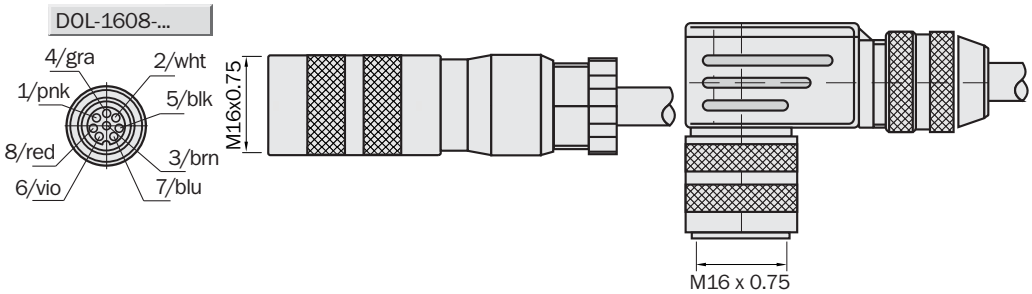
DOL-1612-...



DOS-1608-...



DOL-1608-...



1) Minimum bend radius in dynamic use
R_{min} = 20 x cable diameter

dimensions in mm

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Technical data

Nominal voltage Ub		60 V DC	
Transit resistance		≤ 5 m	
Nominal power 104° F (40° C)		5 A (8-pin)	
		3 A (12-pin)	
Test voltage		550 V	
Insulation resistance		≥ 1010	
Temperature range	DOS-16...	–30...+95° C	
	LTG-1812-MW/LTG-2010-MW	In fixed position	-22...176° F (–30...+80° C)
		In flexible motion	23...158° F (–5...+70° C)
	LTG-2308-MW	In fixed position	-40...176° F (–40...+80° C)
		In flexible motion	23...158° F (–5...+70° C)
Connector diameter	DOS-1608	Max. 0.75 mm^2	
	DOS-1612	Max. 0.25 mm^2	
Cable	LTG-1812-MW	PVC, 12 x 0.5 mm^2	
	LTG-2010-MW	PVC, 10 x 0.25 mm^2 + shield	
	LTG-2308-MW	PUR halogen-free (grsy), 2 x 0.5 mm^2/6 x 0.25 mm^2	
Enclosure rating		IP 67	
Contact		CuZn, gold-plated	
Housing connector		Zinc die-cast housing, brass, chrome-plated	

Order information

Round connectors M16 x 0.75 mm for DME

Type	Part no.	Description		Contacts	Cable	Cable length[m]
DOS-1612-G	6 007 092	Female connector	straight	12	5...8 mm	terminal screwed
DOS-1612-W	6 007 988	Female connector	angled	12	5...8 mm	terminal screwed
DOL-1612-5M-2	2 013 353	Female connector	straight	12	PVC (LTG-1812-MW)	5
DOL-1612-5M-3	2 017 568	Female connector	straight	12 (10)	PVC (LTG-2010-MW)	5
DOS-1608-GA	6 025 726	Female connector	straight	8	6...8 mm	terminal screwed
DOS-1608-WA	6 025 727	Female connector	angled	8	6...8 mm	terminal screwed
DOL-1608-G05MA	2 026 742	Female connector	straight	8	PUR (LTG-2308-MW)	5
DOL-1608-G10MA	2 027 193	Female connector	straight	8	PUR (LTG-2308-MW)	10
DOL-1608-W05MA	2 026 743	Female connector	angled	8	PUR (LTG-2308-MW)	5
DOL-1608-W10MA	2 027 194	Female connector	angled	8	PUR (LTG-2308-MW)	10

Connecting cables for round connectors M16 x 0.75 mm for DME

Type	Part no.	Description	Cable sheating	Cable length[m]
LTG-1812-MW	6 009 219	For DME 2000, 12 wire	PVC	by the meter
LTG-2010-MW	6 008 596	For DME 3000, 10 leads paired and shielded	PVC	by the meter
LTG-20308-MW	6 026 292	For DME 3000, 8 leads paired and shielded	PUR (gray)	by the meter

PROFIBUS connector for DME 3000 and DME 5000

PROFIBUS Connector

Highlights

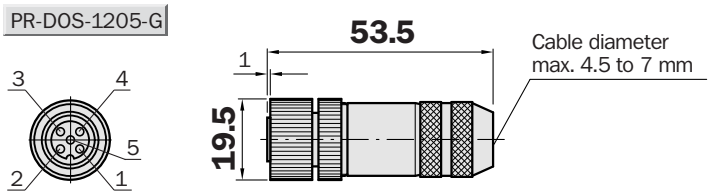
- Gold-plated pins
- PROFIBUS-DP signal cable
- IP 67 enclosure rating (only in fully locked position with its plugs)
- Shielded connection
- Improved resistance to oil and chemicals

For DME 3000 and DME 5000

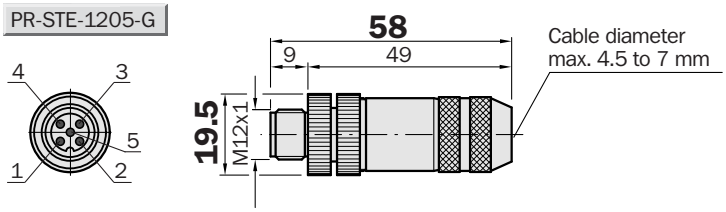


Dimensional drawings

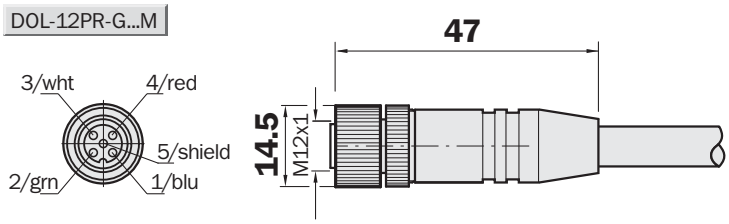
PR-DOS-1205-G



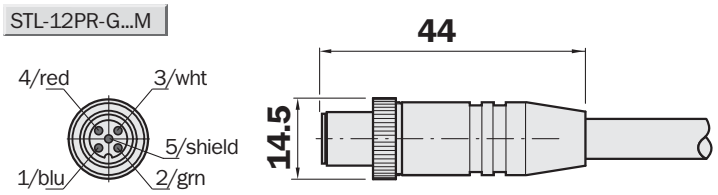
PR-STE-1205-G



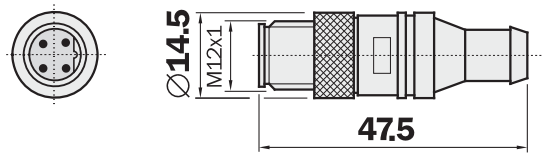
DOL-12PR-G...M



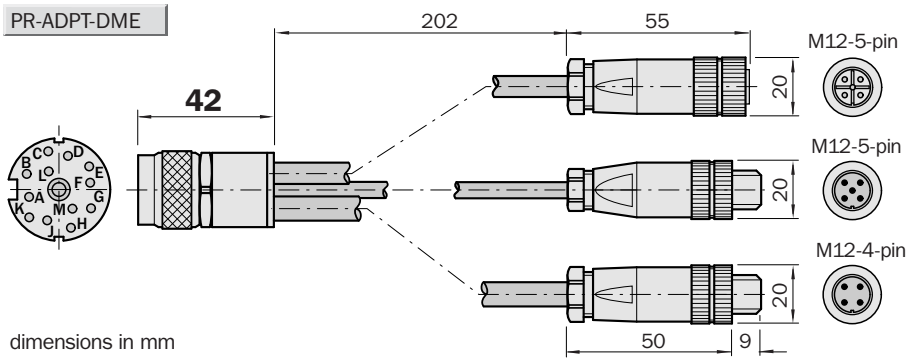
STL-12PR-G...M



PR-STE-END



PR-ADPT-DME



dimensions in mm

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Technical data

Nominal voltage Ub	≤ DC 250 V DC (cable PROFIBUS)
	30 V AC/36 V DC (M12, 5-pin)
Transit resistance	≤ 5 m
Nominal power	4 A/3 A (M16 x 0.75)
Test voltage	2.0 kV eff./60 s. (cable PROFIBUS)
	1.5 kV eff./60 s. (M12, 5-pin)
Insulation group	C acc. VDE 0110
Insulation resistance	≥ 2.5 x 109 /km
Operating capacity	≤ 25 pF/m, 800/s (A/A)
Wave impedance	160 ±10 %
Temperature range	In fixed position -40° F...176° F (–40° C...+80° C)
	In flexible motion 23° F...176° F (–5° C...+80° C)
Bending radius	> 100 mm (appropriate for drag cable use)
Cable	PUR halogen free, color violet (2 x 0.34 mm^2 + secondary sheathed flex wire + shield)
Screening	AL-PT film (core screening)
	C screen tin-plated (overall shield)
Contact	CuZn, gold-plated
Connector	Molding TPU, color black
Housing connector terminal screwed	CuZn, brass nickeled
Connector diameter	Max. 0.75 mm^2 (screw terminals)

Order information

PROFIBUS connector, M12 (B-coded), straight for DME 3000 and DME 5000

Type	Part no.	Description	Contacts	Specification	Cable	Cable length [m]
PR-DOS-1205-G	6 021 353	Female connector	5	360° shield on locking nut	4...8 mm	terminal screwed
PR-STE-1205-G	6 021 354	Female connector	5	360° shield on locking nut	4...8 mm	terminal screwed
DOL-12PR-G05M	6 026 006	Female connector	5	360° shield on locking nut	PUR-violet (PROFIBUS)	5
DOL-12PR-G10M	6 026 008	Female connector	5	360° shield on locking nut	PUR-violet (PROFIBUS)	10
STL-12PR-G05M	6 026 005	Female connector	5	360° shield on locking nut	PUR-violet (PROFIBUS)	5
STL-12PR-G10M	6 026 007	Female connector	5	360° shield on locking nut	PUR-violet (PROFIBUS)	10
PRE-STE-END	6 021 156	Female connector	4	PROFIBUS terminal-resistor		

PROFIBUS connector for DME 3000, connection adapter/male connector

Type	Part no.	Connection adapter, female connector	Connection adapter, female connector	Cable length [m]
PR-ADPT-DME	2 021 463	M16 x 0.75 mm, 12-pin	M12 x 1 mm, 4-/-pin	0.2

PROFIBUS connector for DME 3000 and DME 5000, cable

Type	Part no.	Description	Cable sheating	Cable length [m]
LTG-2102-MW	6 021 355	PROFIBUS specification (signal cable)	PUR (violet)	by the meter

DeviceNet connector for DME 5000

DeviceNet connector

Highlights

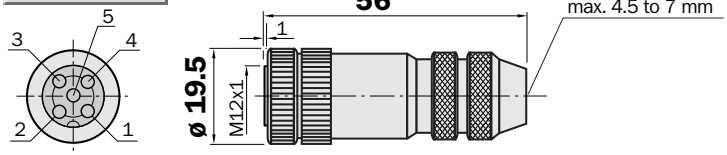
- Gold-plated pins
- DeviceNet specification (Connection 7/8 in and M12 x 1)
- IP 67 enclosure rating (only in fully locked position with its plugs)
- Cable conforming to DeviceNet specification
- Improved resistance to oil and chemicals

For DME 3000 and DME 5000

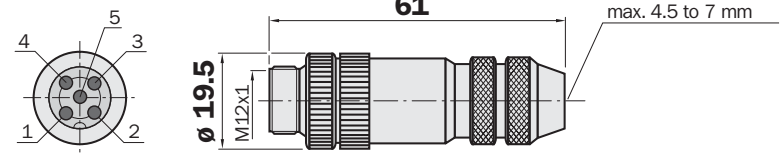


Dimensional drawings

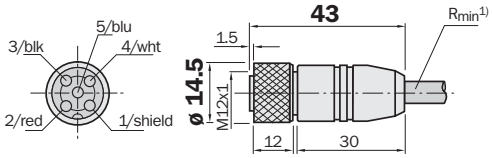
DOS-1205-GA



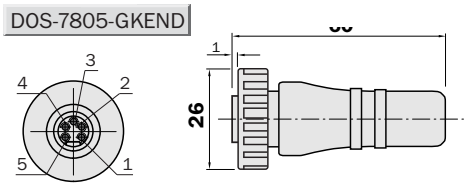
STE-1205-GA



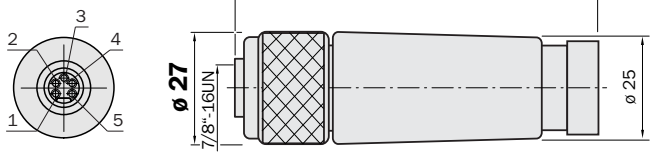
DOL-1205-G06MK



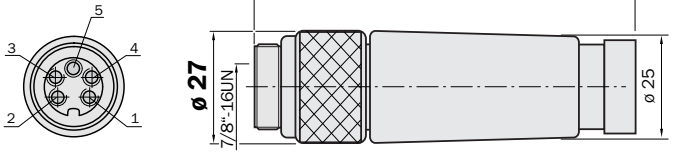
DOS-7805-GKEND



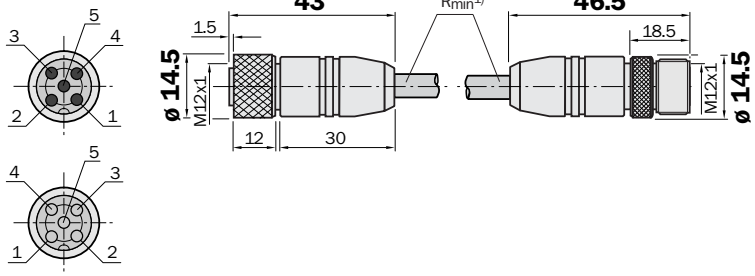
DOS-7805-GK



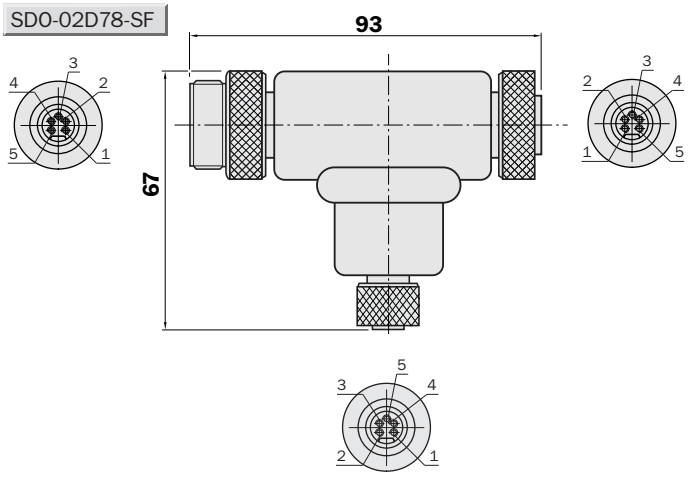
STE-7805-GK



DSL-1205-G06MK



SDO-02D78-SF



1) minimum bend radius in dynamic use
R_{min} = 20 x cable diameter

dimensions in mm

Technical data

Nominal voltage Ub	≤ DC 250 V DC (cable PROFIBUS)
	30 V AC/36 V DC (M12, 5-pin)
Transit resistance	≤ 5 m
Nominal power	4 A/3 A (M16 x 0.75)
Test voltage	2.0 kV eff./60 s. (cable PROFIBUS)
	1.5 kV eff./60 s. (M12, 5-pin)
Insulation group	C acc. VDE 0110
Insulation resistance	≥ 2.5 x 109 /km
Operating capacity	≤ 25 pF/m, 800/s (A/A)
Wave impedance	160 ±10 %
Temperature range	In fixed position -40° F...176° F (–40° C...+80° C)
	In flexible motion 23° F...176° F (–5° C...+80° C)
Bending radius	> 100 mm (appropriate for drag cable use)
Cable	PUR halogen-free, color violet (2 x 0.34 mm^2 + secondary sheathed flex wire + shield)
Screening	AL-PT film (core screening)
	C screen tin-plated (overall shield)
Contact	CuZn, gold-plated
Connector	Molding TPU, color black
Housing connector terminal screwed	CuZn, brass nickeled
Connector diameter	Max. 0.75 mm^2 (screw terminals)

Order information

DeviceNet connector for DME 5000, 5-pin, straight

Type	Part no.	Description	Specification	Cable	Cable length [m]
DOS-1205-GA	6 027 534	Female connector, M12	360° shield on locking nut	4...8 mm	terminal screwed
STE-1205-GA	6 027 533	Male connector, M12	360° shield on locking nut	4...8 mm	terminal screwed
DOL-1205-G06MK	6 028 326	Female connector, M12	260° overall shield on locking nut	Drop cable (PUR black)	6
DOS-7805-GKEND	6 028 329	Female connector, 7/in.	DeviceNet terminal resistor, 7/8 in		
DOS-7805-GK	6 028 331	Female connector, 7/in.	PG16	12...14 mm	terminal screwed
STE-7805-GK	6 028 332	Male connector, 7/in.	PG16	12...14 mm	terminal screwed

DeviceNet connector for DME 5000, female connector M12, 5-pin, straight and male connector, straight, M12, 5-pin, straight

Type	Part no.	Shield	Cable	Cable length [m]
DSL-1205-G06MK	6 028 327	360° overall shield on locking nut	Drop cable (PUR black)	6

DeviceNet connector for DME 5000, T-junction, female connector (drop), M12, 5-pin

Type	Part no.	T-Junction, female connector (drop)	Female/male connector (trunk)	Molding
SDO-02D78-SF	6 028 330	M12 x 1 mm, 5-pin	7/8 in, 5-pin	TPU

DeviceNet connector for DME 5000, cable

Type	Part no.	Description	Cable sheating	Cable length [m]
LTG-2804-MW	6 028 328	DeviceNet Specification (drop cable)	PUR (black)	by the meter

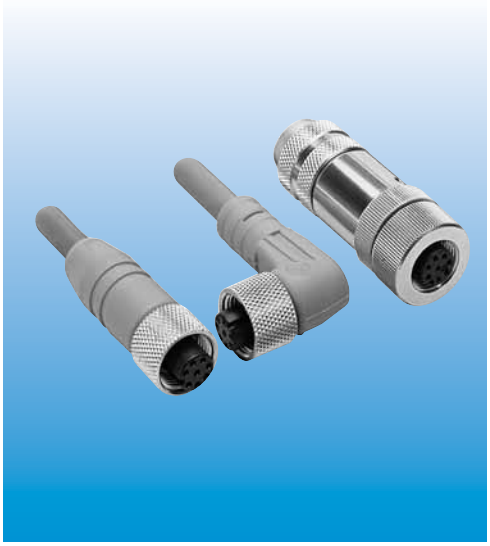
For Hiperface Interface

Hiperface Connectors

Highlights

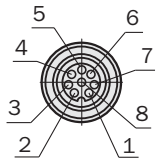
- Gold-plated pins
- Ideal for use of Hiperface interfaces
- 360° shield on locking nut
- PUR cable, stranded together in pairs, shielded
- IP 67 enclosure rating (only in fully locked position with its plugs)
- Halogen-free, PVC-free, silicone-free cable
- Resistant to coolants and lubricants

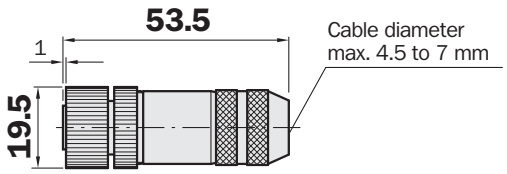
For Hiperface Interface



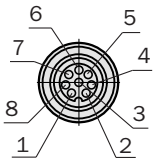
Dimensional drawings

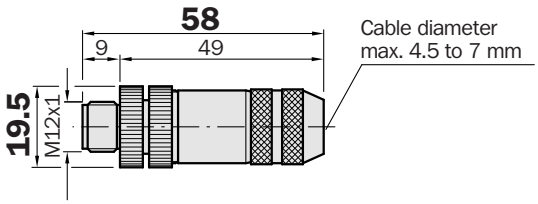
DOS-1208-GA



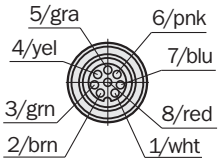


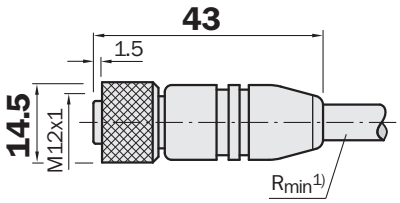
STE-1208-GA



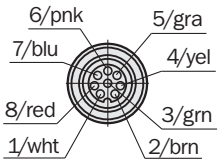


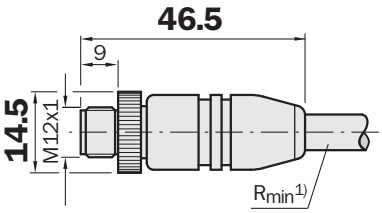
DOL-1208-G...MAC1





STL-1208-G...MAC1





dimensions in mm

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Technical data

Nominal voltage Ub		30 V AC/36 V DC
Contact resistance		≤ 5 m
Nominal power		1.5 A
Test voltage		1.5 kV eff./60 s
Insulation group		C acc. VDE0110
Insulation resistance		> 109 * km
Temperature range		In fixed position –40...+80° C
		In flexible motion –20...+80° C
Molded cable		
Bending radius		> 20 x Cable diameter
Contact		CuZn, 0.3 m gold-plated
Locking nut		CuZn, brass nickeled
Connector diameter	**DOS-1208-GA, STE-1208-GA**	max. 0.75 mm^2
Cable		PUR halogen-free, color black, (4 x 2 x 0.25 mm^2)
Connector		TPU, color black
Terminal screwed connector		
Contact		CuZn, pre-nickeled, 2...4 µm CuSnZn
Connection type		Connector
Housing		CuZn, brass nickeled

Order information

Hiperface round connector M12, 8-pin, leads paired and shielded

Type	Part no.	Description		Shield	Cable length[m]	Cable
DOS-1208-GA	6 028 369	Female connector	straight	360° shield on locking nut	terminal screwed	4...8 mm
STE-1208-GA	6 028 370	Female connector	straight	360° shield on locking nut	terminal screwed	4...8 mm
DOL-1208-G02MAC1	6 032 448	Female connector	straight	360° shield on locking nut	2	PUR halogen-free
DOL-1208-G05MAC1	6 032 449	Female connector	straight	360° shield on locking nut	5	PUR halogen-free
DOL-1208-G10MAC1	6 032 450	Female connector	straight	360° shield on locking nut	10	PUR halogen-free
DOL-1208-G020MAC1	6 032 451	Female connector	straight	360° shield on locking nut	20	PUR halogen-free
STL-1208-G02MAC1	6 032 452	Female connector	straight	360° shield on locking nut	2	PUR halogen-free
STL-1208-G05MAC1	6 032 453	Female connector	straight	360° shield on locking nut	5	PUR halogen-free
STL-1208-G10MAC1	6 032 454	Female connector	straight	360° shield on locking nut	10	PUR halogen-free
STL-1208-G20MAC1	6 032 455	Female connector	straight	360° shield on locking nut	20	PUR halogen-free

Hiperface round connector M12, 8-pin, leads paired and shielded

Type	Part no.	Description	Cable length[m]	Cable
LTG-3108-MW	6 032 456	leads paired and shielded (4 x 2 x 0.25 mm^2) (Hiperface signal cable)	by the meter	PUR halogen-free (black)

For Ethernet Interface

Ethernet Connectors

Highlights

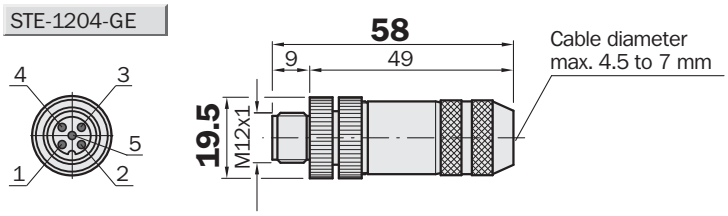
- Gold-plated pins
- Ethernet CAT 5 and CAT 6 signal cable
- IP 20 to IP 67 (RJ45), IP 67 (M12) enclosure rating), (connected/fully locked position)
- Shielded connection (M12-D-coded)
- Cable conforming to Ethernet specification

For Ethernet Interface

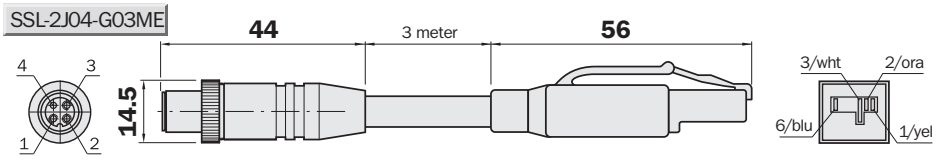


Dimensional drawings

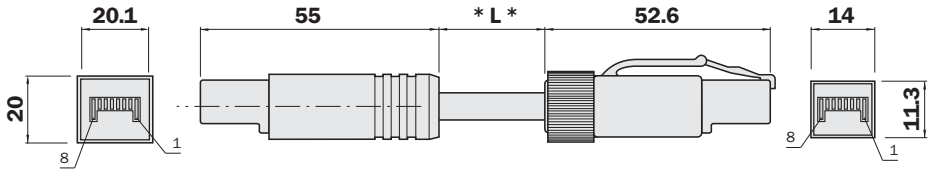
STE-1204-GE



SSL-2J04-G03ME



SSL-0J08-G...



dimensions in mm

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Technical data

Nominal voltage Ub	36 V DC 3
Test voltage	700 V
Cable resistance	Acc. CAT 5 resp. CAT 6, Ethernet Spec.
Cable impedance	Acc. CAT 5 resp. CAT 6, Ethernet Spec.
Temperature range	–40...+70° C
Bending radius	> 8 x Cable diameter
Cable	PVC, green
Screening	AL-PT film (core screening)
	C- screen tin-plated (overall shield)
Contact	CuZn, gold-plated
Connector	Polycarbonate, color black
Housing connector terminal screwed	CuZn, brass nickeled
Connector diameter	Max. 0.75 mm^2 (screw terminals)
Cable	8-wired, CAT 6, AWG 27/7, double-shielded
	4-wired, CAT 5, AWG 22/7, shielded

Order information

Ethernet connector, M12 (D-coded), 4-pin, straight, (IP 67), terminal screwed

Type	Part no.	Description		Shield	Connection
STE-1204-GE	6 032 802	Male connector (D-coded)	straight	360° shield on locking nut	terminal screwed

Ethernet patch connector (CAT 5), male connector (IP 67), M12 (D-coded), 4-pin, straight and male connector RJ45 (IP 20)

Type	Part no.	Description		Shield	Cable length[m]	Cable
SSL-2J04-G03ME	6 029 630	Male connector, male connector	straight	360° shield on locking nut M12	3	Ethernet Patch PVC green

Ethernet Gigabit connector (CAT 6), male connector RJ45 (IP 67, Push-Pull) and male connector RJ45 (IP 20), 8-pin

Type	Part no.	Description		Cable length[m]	Cable
SSL-0J08-G05ME	6 032 321	Male connector, male connector	straight	5	Ethernet Gigabit PVC green
SSL-0J08-G10ME	6 032 322	Male connector, male connector	straight	10	Ethernet Gigabit PVC green
SSL-0J08-G20ME	6 032 323	Male connector, male connector	straight	20	Ethernet Gigabit PVC green

Terminal Screwed

Round Connectors

Highlights

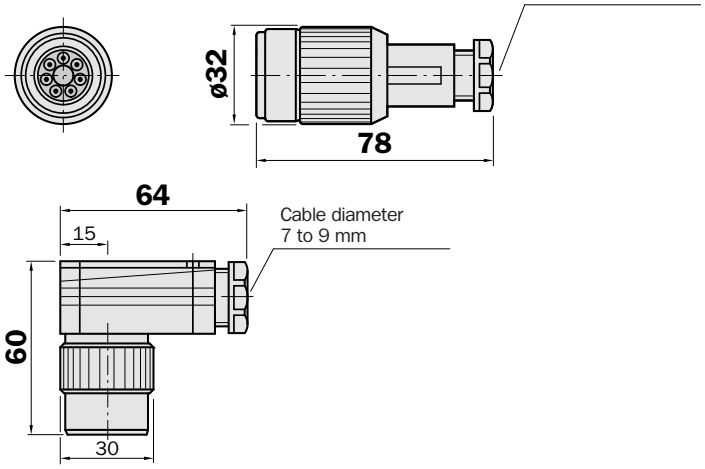
- Silver-plated contacts
- IP 65 (DOS-0606...)
  IP 65 (DOS-1804...)
  IP 66 (DOS-2606...)
  enclosure rating
  (only in fully locked position
  with its plugs)
- Utilization of round plug connectors for connecting special sensors

Terminal Screwed

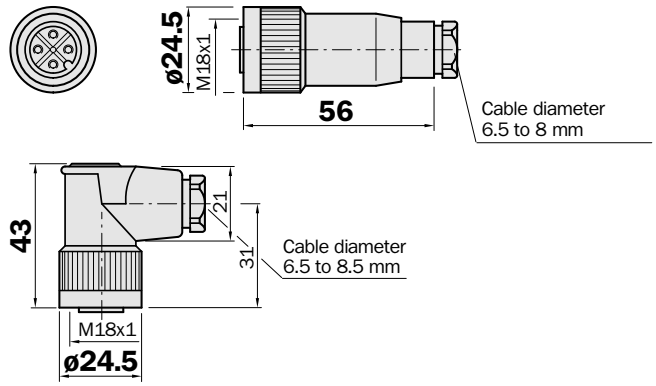


Dimensional rawings

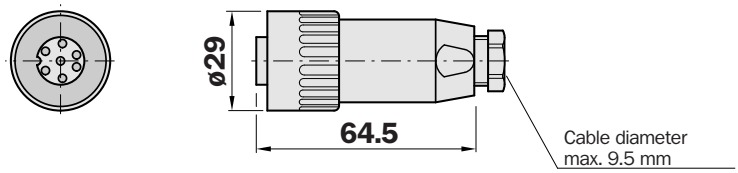
DOS-0606-



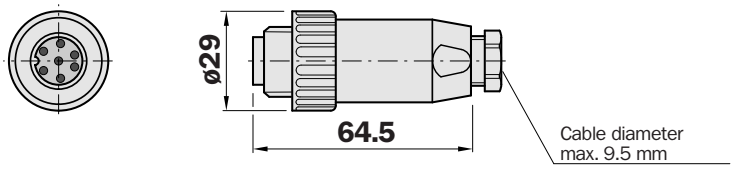
DOS-1804-



DOS-2606-G



STE-2606-G



dimensions in mm

Technical data

Nominal voltage Ub		250 V AC/300 V DC
Transit resistance		≤ 5 m
		≤ 8 m (DOS-1804...)
Nominal power	DOS-0606..., DOS-2606...	10 A (45° C)
	DOS-1804...	16 A (40° C)
Insulation resistance	DOS-0606..., DOS-2606...	≥ 1010
	DOS-1804...	≥ 1010
Connector diameter	DOS-0606	0.5...1.5 mm^2 (crimping)
	DOS-1804	max. 1.5 mm^2 (screw connection)
	DOS/STE-2606	max. 0.75 mm^2 (solder)
Housing material	DOS-0606...	Plastic, fiber glass reinforced
	DOS-1804..., DOS-2606...	PA 6.6
Contact		CuZn, silver-plated

Order information

Round connectors terminal screwed, DIN 43651, M26

Type	Part no.	Description		Contacts	Wire section [mm^2]	Screw joint for cable [mm]
DOS-0606-G	6 006 612	Female connector	straight	6 + PE	0.5...1.5	7...9
DOS-0606-W	6 006 613	Female connector	angled	6 + PE	0.5...1.5	7...9

Round connectors terminal screwed, M18

Type	Part no.	Description		Contacts	Wire section [mm^2]	Screw joint for cable [mm]
DOS-1804-G	6 009 436	Female connector	straight	4	max. 1.5	6.5...8.5
DOS-1804-W	6 009 437	Female connector	angled	4	max. 1.5	6.5...8.5

Round connectors terminal screwed, R16, M24

Type	Part no.	Description		Contacts	Wire section [mm^2]	Screw joint for cable [mm]
STE-2606-G	6 004 193	Male connector	straight	6 + PE	max. 0.75	max. 9.5
DOS-2606-G	6 004 194	Female connector	straight	6 + PE	max. 0.75	max. 9.5

DIN 43650, 43652

Rectangular Connector

Highlights

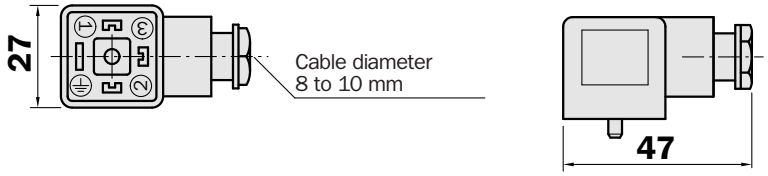
- IP 65 enclosure rating
- Connectors for connection of special sensors
- Connector acc. DIN 43650 (Design A) DIN 43652

DIN 43650, 43652

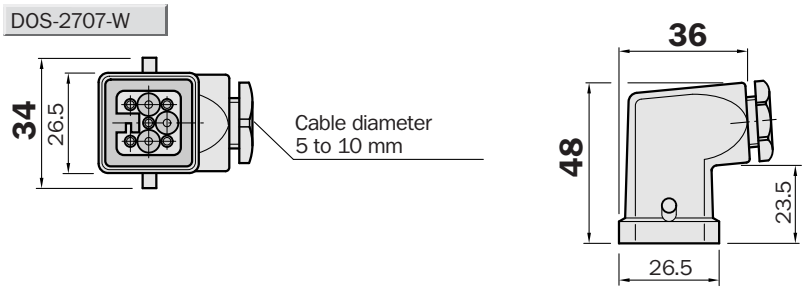


Dimensional drawings

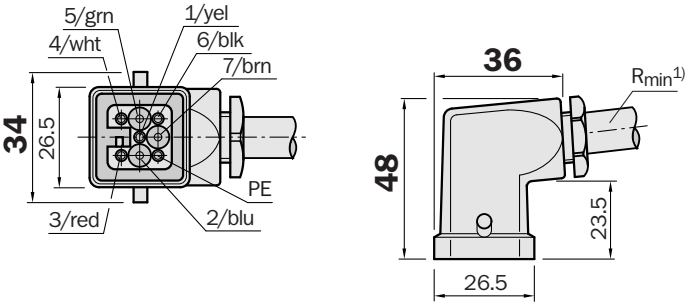
DOS-0303-W



DOS-2707-W



DOL-2706-..M



dimensions in mm

1) minimum bend radius in dynamic use
R_{min} = 20 x cable diameter

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Technical data

Nominal voltage Ub		250 V AC/300 V DC
Transit resistance	DOS-0303...	≤ 15 m
Nominal power	DOS-0303...	10 A
Insulation resistance	DOS-0303	> 1010
Connector diameter		Max. 1.5 mm^2
Housing material	DOS-0303	PA6
Contact		CuZn, brass nickeled
Cable (DOL-2706...)		PVC (3 x 0.75 mm^2/4 x 0.5 mm^2)

Order information

Rectangular connector, DIN 43650 (Design A)

Type	Part no.	Description	Contacts	Cable	Cable length [m]
DOS-0303-W	6 005 698	Female connector	3 + PE	8...10 mm	terminal screwed

Rectangular connector, DIN 43650 (26.5 x 26.5 mm^2)

Type	Part no.	Description	Contacts	Cable	Cable length [m]
DOS-2707-W	2 007 901	Female connector	7 + PE	5...10 mm	terminal screwed
DOL-2706-02M	2 006 545	Female connector	7 + PE	PVC	2
DOL-2706-06M	2 006 860	Female connector	7 + PE	PVC	6
DOL-2706-10M	2 007 595	Female connector	7 + PE	PVC	10

Q6, Q7, DC/AC-coding

Rectangular connector

(DOL-1306, DOL-1406)

Highlights

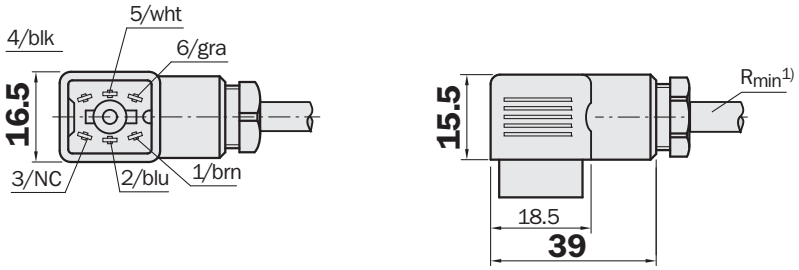
- IP 65 enclosure rating
- Connectors specifically for DC/AC voltage supply
- Connectors for connection of special sensors

Q6, Q7, CD-AC-coding

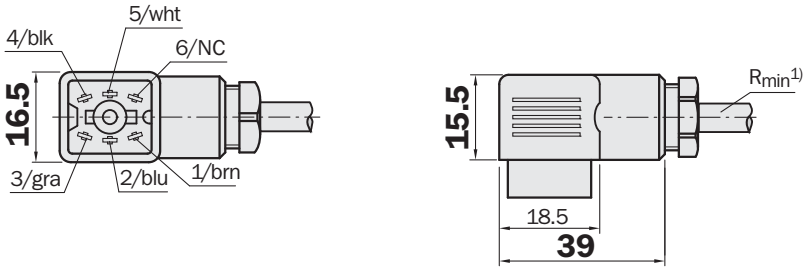


Dimensional drawings

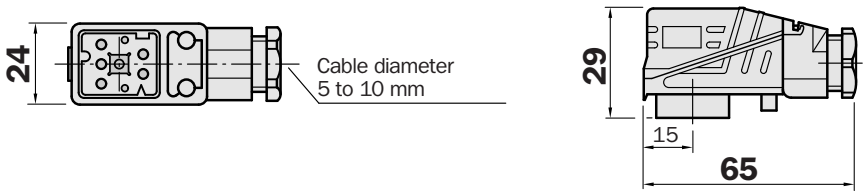
DO.-1306-...



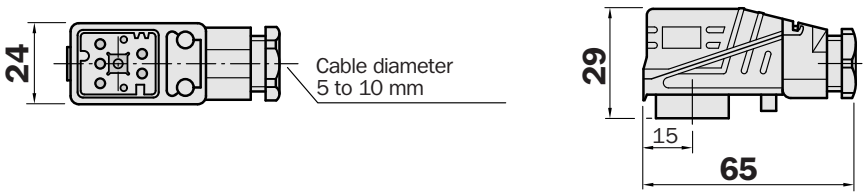
DO.-1406-...



DOS-2107-W, IP-Q04



DOS-2207-W, KP-Q03



dimensions in mm

1) minimum bend radius in dynamic use
R_{min} = 20 x cable diameter

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Technical data

Nominal voltage Ub	250 V AC/300 V DC
Nominal power	6 A
Insulation group	C acc. VDE 0110
Temperature range	–40...+90° C (connector)
Connector diameter	Max. 0.5 mm^2 (Q6 connector), solder
	Max. 1.0 mm^2 (Q7 connector), screw connection
Cable	PVC
	(5 x 0.25 mm^2, DC-coding)
	(5 x 0.5 mm^2, AC-coding)

Order information

Rectangular connector Q6 (16.5 x 18.5 mm^2), DC-/AC-coding

Type	Part no.	Description	Contacts	Specification	Cable	Cable length [m]
DOS-1306-W	6 006 710	Female connector	6	DC-coding	5...8 mm	terminal screwed
DOL-1306-W02M	6 030 217	Female connector	6	DC-coding	PVC	2
DOL-1306-W03M	6 030 218	Female connector	6	DC-coding	PVC	3
DOL-1306-W05M5	6 030 219	Female connector	6	DC-coding	PVC	5.5
DOL-1306-W10M	6 030 220	Female connector	6	DC-coding	PVC	10
DOS-1406-W	6 006 685	Female connector	6	AC-coding	5...8 mm	terminal screwed
DOS-1406-W02M	6 030 221	Female connector	6	AC-coding	PVC	2
DOS-1406-W03M	6 030 222	Female connector	6	AC-coding	PVC	3
DOS-1406-W05M5	6 030 223	Female connector	6	AC-coding	PVC	5.5
DOS-1406-W10M	6 030 224	Female connector	6	AC-coding	PVC	10

Rectangular connector Q7 (24 x 30 mm^2), DC-/AC-coding

Type	Part no.	Description	Contacts	Specification	Cable	Cable length [m]
DOS-2107-W	6 006 823	Female connector	7	DC-coding	5...10 mm	terminal screwed
DOS-2207-W	6 006 821	Female connector	7	AC-coding	5...10 mm	terminal screwed
KP-Q04502-2	7 020 484	Female connector	7	DC-coding		2
KP-Q04502-3	7 020 242	Female connector	7	DC-coding		3
KP-Q03501-2	7 020 485	Female connector	7	AC-coding		2

For WLL 190T

Connector

Highlights

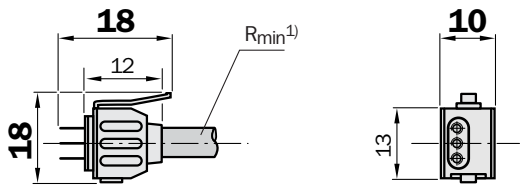
- Connectors for connection of WLL 190T sensors
- Gold-plated pins
- Master-/Slave connector

For WLL 190T



Dimensional drawings

DOL-LL19..-..M



dimensions in mm

1) minimum bend radius in dynamic use
R_{min} = 20 x cable diameter

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Technical data

Nominal voltage Ub	10...30 V DC
Nominal power	100 mA (see sensor WLL 190 T)
Temperature range	–20...+50° C
Contact	CUZn, gold-plated
Cable	PVC, color gray
	(3 x 0.14 mm^2, master-cable)
	(1 x 0.14 mm^2, slave-cable)

Order information

Connector for WLL 190T

Type	Part no.	Description	Contacts	Specification	Cable	Cable length [m]
DOL-LL1903-02M	6 026 578	Male connector	3	Master, 3 active pins	PVC	2
DOL-LL1903-05M	6 028 379	Male connector	3	Master, 3 active pins	PVC	5
DOL-LL1901-02M	6 026 579	Male connector	3 (1)	Slave, 1 active pin	PVC	2
DOL-LL1901-05M	6 028 380	Male connector	3 (1)	Slave, 1 active pin	PVC	5

Connector for WLL 190T/WI 130L

Type	Part no.	Description	Contacts	Specification
STE-WLL190-03P	6 026 581	Male connector	3	Software bus
STE-WLL190-05P	6 026 580	Male connector	5	Hardware bus for wire-saving

Micro Cables (1/2-20 Thread)

Connector

Highlights

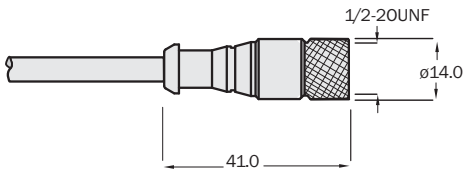
- Gold-plated pins
- IP 67 enclosure rating

Micro Cables (1/2-20 thread)

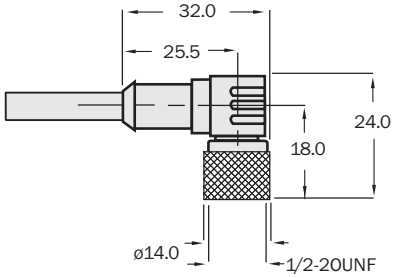
Dimensional drawings

Micro 3-pin cables (1/2-20 thread)

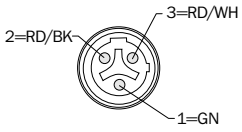
KA23-SIF22



KA23-RIF22



Female Pin-Out

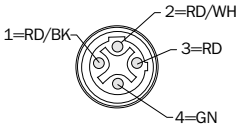


Micro 4-pin cables (1/2-20 thread)

KA24-SIF22

KA24-RIF22

Female Pin-Out



Micro 5-pin cables (1/2-20 thread)

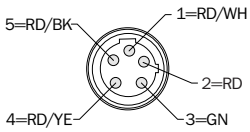
KA24-SIF22

KA24-SIF25

KA24-RIF22

KA24-RIF25

Female Pin-Out



Technical data

Contact carrier material	Nylon
Molded head material/color	Thermoplastic PUR/yellow
Contact material/plating	Gold-plated brass
Coupling nut material/plating	Nickel-plated brass
Rated current (A)	4.0 A
Rated Voltage (V)	250 V
Outer jacket material/color	PVC/yellow
Conductor insulation material	PVC
Temperature Rating	-40...+105° C (-40...+221° F)
Protection class	IP 67

Order information

Micro 3-pin cables (1/2-20 thread)

Type	Part no.	Description	Contacts	Specification	Cable	Cable length [m]
KA23-SIF22	7 023 593	female connector	3	straight connector	PVC	2
KA23-RIF22	7 023 594	female connector	3	right angled connector	PVC	2

Micro 4-pin cables (1/2-20 thread)

Type	Part no.	Description	Contacts	Specification	Cable	Cable length [m]
KA24-SIF22	7 023 591	female connector	4	straight connector	PVC	2
KA24-RIF22	7 023 592	female connector	4	right angled connector	PVC	2

Micro 5-pin cables (1/2-20 thread)

Type	Part no.	Description	Contacts	Specification	Cable	Cable length [m]
KA25-SIF22	7 020 014	female connector	5	straight connector	PVC	2
KA25-SIF25	7 020 024	female connector	5	straight connector	PVC	5
KA25-RIF22	7 020 016	female connector	5	right angled connector	PVC	2
KA25-RIF25	7 020 026	female connector	5	right angled connector	PVC	5

Mini Cables

Connector

Highlights

- Gold-plated pins
- IP 67 enclosure rating

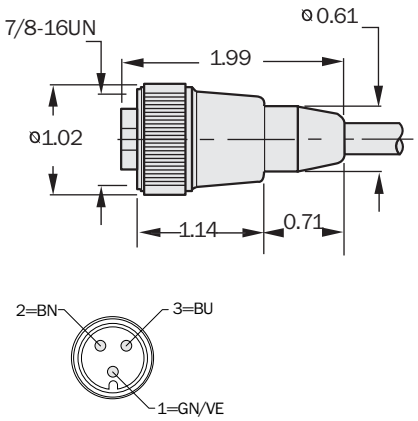
Mini Cables

Dimensional drawings

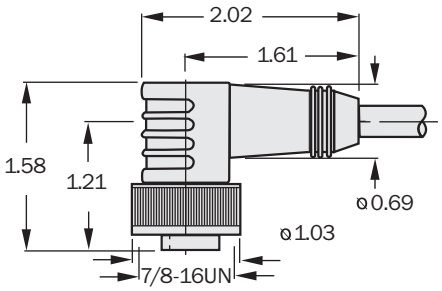
Mini 3-pin cables

KA13-SYF86F

Mini, Straight



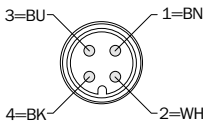
Mini, Right-angle



Mini 4-pin cables

KA14-SGF82
KA14-RGF82
KA14-SGF85
KA14-RGF85

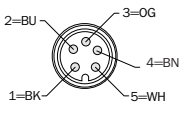
Female Pin-Out



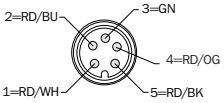
Mini 5-pin cables

RA15-SF8
KA15-SGF82
KA15-SGF85
KA15-RGF82
KA15-RGF85
KA15-SDF82
KA15-SDF85
KA15-RDF81
KA15-RDF82
KA15-RDF85

Female Pin-Out



Female Pin-Out (automotive)



dimensions in mm

Technical data

Contact carrier material	Thermoplastic PUR
Molded head material/color	Thermoplastic PUR/blue/gray
Contact material/plating	Gold-plated brass
Coupling nut material/plating	Nickel-plated brass
Rated current (A)	9.0 A
Rated Voltage (V)	300 V
Outer jacket material/color	PVC/yellow
Conductor insulation material	PVC
Temperature Rating	-30...+105° C (-22...+221° F)
Protection class	IP 67

Order information

Mini 3-pin cables

Type	Part no.	Description	Contacts	Specification	Cable	Cable length [m]
KA13-SYF86F	7 021 941	female connector	3	straight connector	PVC	2

Mini 4-pin cables

Type	Part no.	Description	Contacts	Specification	Cable	Cable length [m]
KA14-SGF82	7 023 595	female connector	4	straight connector	PVC	2
KA14-RGF82	7 023 596	female connector	4	right angled connector	PVC	2
KA14-SGF85	7 023 788	female connector	4	straight connector	PVC	5
KA14-RGF85	7 023 789	female connector	4	right angled connector	PVC	5

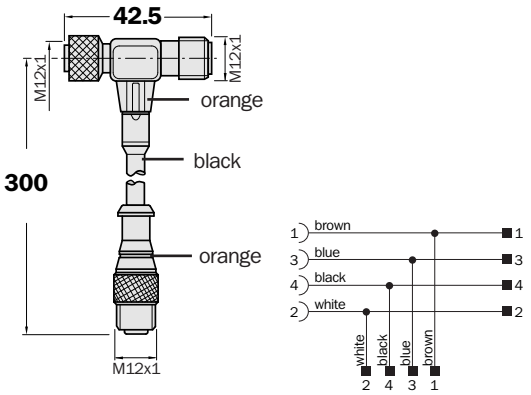
Mini 5-pin cables

Type	Part no.	Description	Contacts	Specification	Cable	Cable length [m]
RA15-SF8	7 023 284	female connector	5	receptacle	-	-
KA15-SGF82	7 023 786	female connector	5	straight connector	PVC	2
KA15-SGF85	7 023 788	female connector	5	straight connector	PVC	5
KA15-RGF82	7 023 787	female connector	5	right angled connector	PVC	2
KA15-RGF85	7 023 789	female connector	5	right angled connector	PVC	5
KA15-SDF82	7 020 015	female connector	5	straight automotive	PVC	2
KA15-SDF85	7 020 025	female connector	5	straight automotive	PVC	5
KA15-RDF81	7 020 095	female connector	5	right angled automotive	PVC	1
KA15-RDF82	7 020 017	female connector	5	right angled automotive	PVC	2
KA15-RDF85	7 020 027	female connector	5	right angled automotive	PVC	5

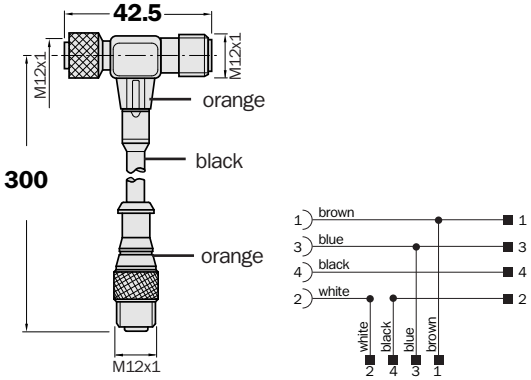
ZoneControl™ Cables

Power and Interconnect Cables		
Model Number	Part Number	Description
DSL-12Ø4-TØM3	6011682	Tee cable type 1, M12 DC 4-pin, 300 mm
DSL-11Ø4-TØM3	6011683	Tee cable type 2, M12 DC 4-pin, 300 mm
JD4-TM122000A	7122472	Tee cable type 1, M12 DC 4-pin, 2 m
JD4-TM122000C	7029863	Tee cable type 1, M12 DC 4-pin, to flying leads, 2 m
DOL-1204-G02M	6009382	2 m straight M12 DC 4-pin cable
DOL-1204-G05M	6009866	5 m straight M12 DC 4-pin cable
DOL-1204-G010M	6010543	10 m straight M12 DC 4-pin cable
DOL-1204-W02M	6009383	2 m right angle M12 DC 4-pin cable
DOL-1204-W05M	6009867	5 m right angle M12 DC 4-pin cable
DOL-1204-W010M	6010541	10 m right angle M12 DC 4-pin cable
ZPI-P1	7027723	Power isolator
ZSI-P4	7027187	Slug interrupt
ZL1-P2	7029124	Logic interrupt cable
ZGC-1	7027804	Gender changer - male/male
ZGC-2	7028421	Gender changer - female/female
ZLCO-MD	7028474	Logic crossover - pin 2 male, pin 4 female
ZLCO-FD	7029473	Logic crossover - pin 2 female, pin 4 male
KA14-SEM121	7027083	1 m straight M12 reverse-key AC 4-pin cable
KA14-SEM122	7027086	2 m straight M12 reverse-key AC 4-pin cable
KD4-SEM121SM12	7124105	Extension cable, M12 DC 4-pin, 1 m
KD4-SEM121SM12	7124105	Extension cable, M12 DC 4-pin, 1 m
KD4-SEM120.25SM12	7028981	Extension cable, M12 DC 4-pin, 0.25 m
DSL-1204-G02M	6022567	Extension cable, M12 DC 4-pin, 2 m
KD4-SIM123SM12	7028657	Extension cable, M12 DC 4-pin, 3 m
-	7028451	Kit, 1/4 in plug and clip
-	7028457	1/4 in plug
-	7028425	3/8 in plug

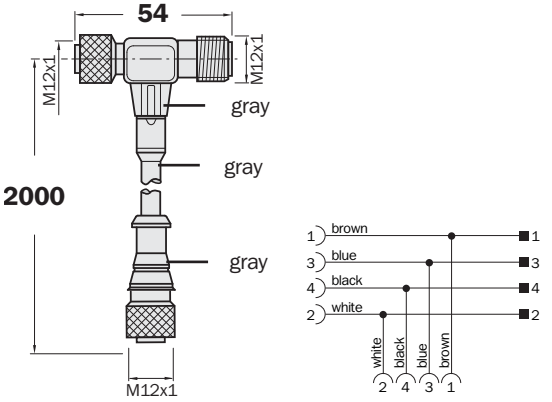
Tee cable type 1, M12 DC 4-pin, 300 mm



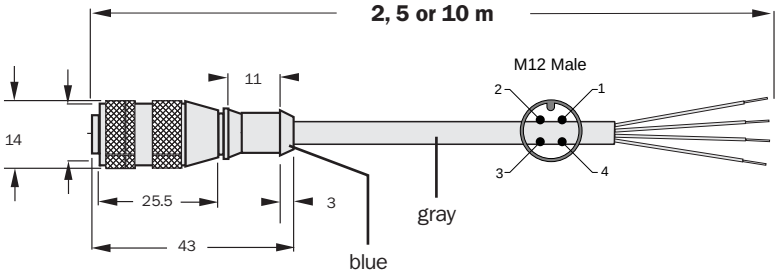
Tee cable type 2, M12 DC 4-pin, 300 mm



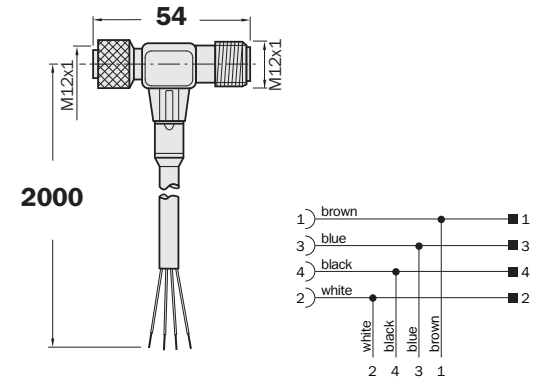
Tee cable type 1, M12 DC 4-pin, 2 m



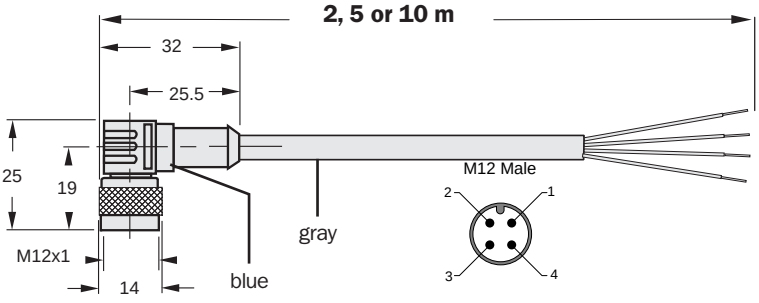
2 m, 5 m, 10 m straight M12 DC 4-pin cable



Tee cable type 1, M12 DC 4-pin to flying leads, 2 m



2 m, 5 m, 10 m right angle M12 DC 4-pin cable

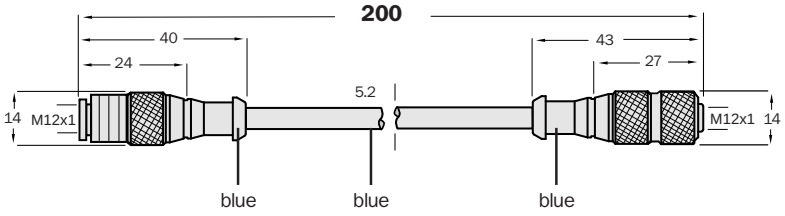


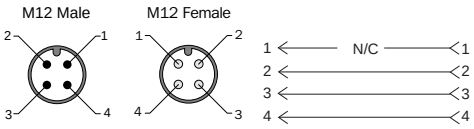
dimensions in mm

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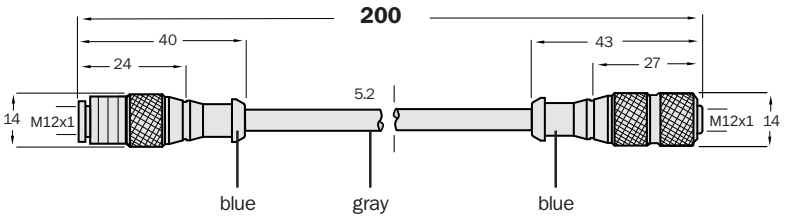
ZoneControl Cables

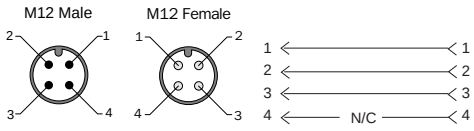
Power isolator



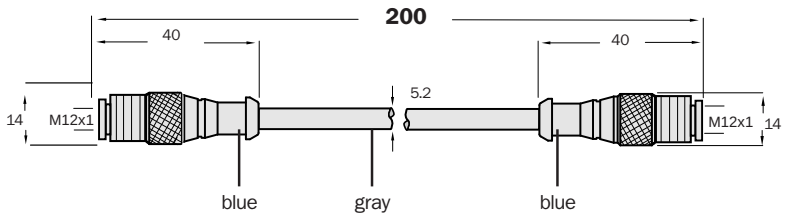


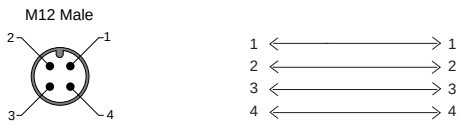
Slug interrupt



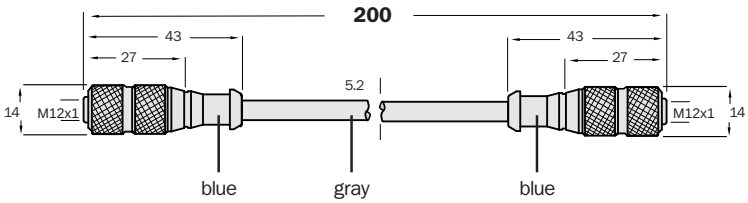


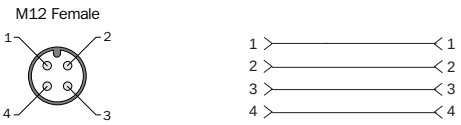
Gender changer - male/male



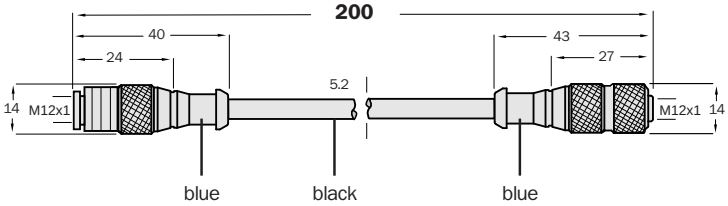


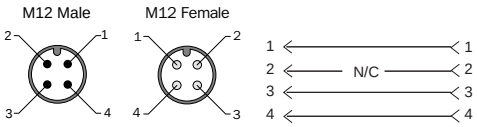
Gender changer - female/female



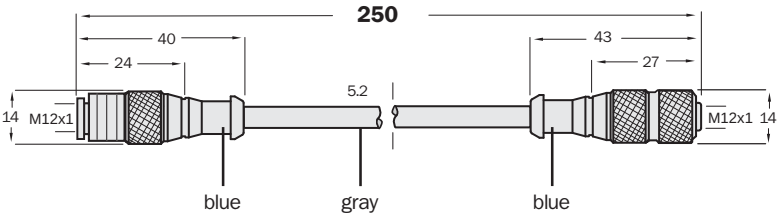


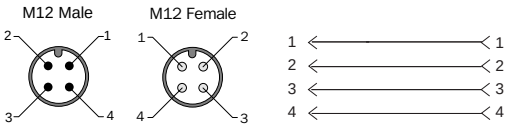
Logic interrupt



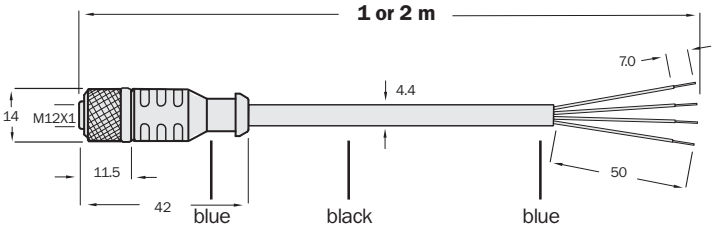


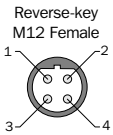
Extension cable





1 m, 2 m, straight M12 reverse-key AC 4-pin cable





Mounting systems

Selection table for mounting brackets, clamps and articulated mountings

Sensor	Description	Type	Part No.	Page no.
ST 130-S13,-S19,-S23,-S29	Mounting bracket	BEF-130-SM	5 306 246	1236
ST 130-S33	Mounting bracket	BEF-130-SP	5 306 245	1236
SI 130, WLL160	Mounting bracket	BEF-WLL160	5 305 400	1236
SS/SE130-S33	Mounting bracket	BEF-130-ST	5 306 244	1236
W150	Mounting bracket, horizontal*)	BEF-W150-A	5 306 217	1237
W150	Mounting bracket, vertical*)	BEF-W150-B	5 306 279	1237
W160	Mounting bracket	BEF-W160	5 305 197	1237
W170	Mounting bracket	BEF-W170	5 305 686	1237
WLL 170/WLL 190/WLL170-2/WLL190-2	Mounting bracket	BEF-WLL170	5 306 574	1237
WLL170/WI130L/WLL170-2	Endcap	BF-EB01-W190	5 313 011	1237
W140	Mounting bracket, horizontal	BEF-W 140-A	5 308 098	1238
W140	Mounting bracket, vertical	BEF-W 140-B	5 308 519	1238
W 4-2, W4-3, MH1, UC4	Mini ball joint bracket	BEF-GH-MINI01	2 023 160	1239
WT2, W9-2	Mounting bracket	BEF-WN-W9-2	4 033 146	1239
W9	Mounting bracket	BEF-AP-W9	2 022 734	1239
W9-2, KT3, CSM1, LUT2	Mounting bracket	BEF-WN-W9-2	2 022 855	1240
MH1	Mounting bracket	MB-MH-BC	7 027 712	1240
MH1	Mounting bracket	MB-MH-SH-50	2 021 351	1240
MH15	Mounting ring/mounting kit	BEF-WN-MH15-1	4 039 533	1241
MH15	Mounting nuts	Nuts-M18-MH15	4 040 270	1241
W12-2, W12L-2, KT2, UC12, DT2	Clamp	BEF-KH-W12	2 013 285	1241
W12-2, W12L-2, KT2, UC12	Double clamp	BEF-DKH-W12	2 013 947	1241
W12-2, W12L-2, KT2, UC12, DT2, W11	Mounting bracket, large	BEF-WG-W12	2 013 942	1241
W12-2, W12L-2, KT2, UC12, DT, W11	Mounting bracket, small	BEF-WK-W12	2 012 938	1242
W 14-2, W18-3	Mounting bracket	BEF-WN-W14	2 019 084	1242
W 14-2, W18-3, DT10	Mounting bracket	BEF-WN-W18	2 009 317	1242
W23-2, W 27-3	Mounting bracket	BEF-WN-W23	2 019 085	1242
W23-2, W 27-3	Mounting bracket	BEF-WN-W27	2 009 122	1243
W24-2, W24 Exi, WTA 24, W 34	Mounting bracket	MB-W24	2 015 248	1243
W 24-2, W 24 Exi, WTA 24, W 34	Mounting bracket, small	BEF-WK-W24	4 027 532	1243
W 250	Mounting bracket	BEF-W250	5 305 850	1243
W 260	Mounting bracket	BEF-W260	5 304 819	1244
W 30, W 32, W 34, W 36	Mounting bracket	BEF-WN-W32	2 005 806	1244
W 45	Universal joint, complete	BEF-KK-W45	2 011 436	1244
W 45	Mounting bracket	BEF-WN-W45	2 011 480	1244
V 12, IM 12, MM 12	Mounting bracket	BEF-WN-M12	5 308 447	1245
V 18, IM 18, MM 18, CM 18, ELF, MH15	Mounting bracket	BEF-WN-M18	5 308 446	1245
IM 30, CM 30	Mounting bracket	BEF-WN-M30	5 308 445	1245
V 18, IM 18, MM 18, CM 18, ELF, W1000	Mounting bracket with ball-joint	BEF-WN-M18-ST02	5 312 973	1245
IMF 12, INOX 12	Mounting bracket	BEF-WN-M12N	5 320 949	1246
IMF 12, INOX 12	Mounting bracket	BEF-WG-M12N	5 320 950	1246
IMF 18, INOX 18, V18V, MH15V	Mounting bracket	BEF-WN-M18N	5 320 947	1246
IMF 18, INOX 12, V18V, MH15V	Mounting bracket	BEF-WG-M18N	5 320 948	1246
WTR	Mounting bracket	BEF-WN-WTR	2 017 417	1247
MH15, ELF	Mounting bracket	MB-BS18MM	7 028 403	1247
WTR	Mounting bracket	MB-WTR-1KIT	7 029 344	1247
WLG 12	Mounting bracket	BEF-WN-WLG12	2 017 567	1247
W1000, ELF, MH15, V18, V180	Mounting bracket	MB-W1000	7 023 800	1248
W2000, WLR2100	Mounting bracket	MB-W2000B	7 022 976	1248
W2000	Mounting bracket	MB-W2000	7 022 981	1248

* includes mounting material

Selection table for mounting brackets, clamps and articulated mountings				
Sensor	Description	Type	Part No.	Page no.
CS8, KT5, LUT3, KT10	Mounting bracket	MB-CS-C	7 023 681	1249
CVS	Mounting bracket	CVS Bracket	5 320 680	1249
DT/DS 500	Mounting bracket	BEF-DSDT	2 031 377	1249
DT20/DT20 Hi	Mounting bracket	BEF-WN-DT20	4 043 524	1250
DS/DT/DL 60	Mounting bracket	BEF-WN-DS60	4 032 937	1250
DME2000/3000	Articulated mounting	BEF-GH-DME	2 015 229	1250
DMH/DMP	Articulated mounting	BEF-GH-DMH2	2 020 796	1250
DMT/DML	Articulated mounting	BEF-GH-DMT	5 309 130	1250
ISD 230/260/280	Three-point mounting	BEF-KH-ISD	5 306 369	1251
MLG	Mounting kit	BEF-NUT-MLG	2 023 696	1251
MLG S, MLG E	Mounting kit	Mounting Set 1	2 019 649	1251
ELG, MLG	Mounting kit	BEF-WK-XLG	2 029 100	1251
DMD	Mounting bracket	BEF-PL 140L	5 308 917	1252
DMD	Mounting bracket	BEF-WN-DMD	5 308 915	1252
DME 5000	Mounting bracket	BEF-AH-DME5	2 027 721	1252

Selection table for clamps, universal clamps, rod mounting				
For equipment	Description	Type	Part no.*	Page no.
W 23-2, W 27-3	Universal clamp/plate A	BEF-KHS-A01	2 022 458	1253
P 250, P 250 F, PL 30 A, PL 40 A, PL 50 A, PL 80 A, P975	Universal clamp/plate B	BEF-KHS-B01	2 022 459	1253
W 14-2, W 18-3	Universal clamp/plate C	BEF-KHS-C01	2 022 460	1253
W 11, W 12-2, W 12L-2, KT 2	Universal clamp/plate D	BEF-KHS-D01	2 022 461	1253
W 30, W 32, W 34, W 36	Universal clamp/plate E	BEF-KHS-E01	2 022 462	1253
PL 20 A, PL 20 F, P 250, P 250 F, W 260, W 280	Universal clamp/plate F	BEF-KHS-F01	2 022 463	1253
W 24-2, W 24 Exi, WTA 24, KT 5, KT 10, CS 1/3, LUT 3	Universal clamp/plate G	BEF-KHS-G01	2 022 464	1253
V 18, W 4-2, IM 18, MM 18, CM 18, UM 18	Universal clamp/plate H	BEF-KHS-H01	2 022 465	1253
PL 20 A, PL 20 F, PL 40 A, PL 50 A, P 250, P 250 F, P975	Universal clamp/plate J	BEF-KHS-J01	2 022 719	1253
W 11, W 12-2, W 12L-2, W 14-2, W 18-3, W 23-2, W 24-2, W 27-3	Universal clamp/plate K	BEF-KHS-K01	2 022 718	1253
W 30, W 32, W 34, KT 2, KT 5, KT 10, CS, LUT 3, DS 60, PL 20 A,				1253
PL 20 F, PL 30 A, PL 40 A, PL 50 A, PL 80 A, P 250, P 250 F, P975, W 280				1253
W 9-2, KT 3, P 250, P 250 F, W 250, W 140-2, W 150, W 160	Universal clamp/plate L	BEF-KHS-L01	2 023 057	1253
Clamp without mounting plate		BEF-KHS-KH1	2 022 726	1253

* Part no. includes bar clip and installation material

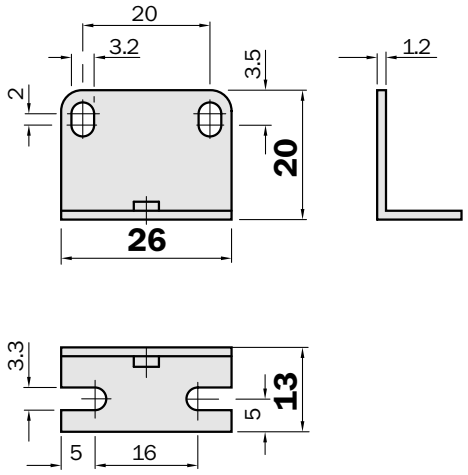
Table of adaptors for pneumatic cylinders				
For unit	Description	Type	Part No.	Page no.
MZT 6/RZT 6, MZT 1/RZT 1	Mounting bracket for profile-/tie-rod cylinders	BEF-KHZ-PT1	2 022 702	1254
MZT 6/RZT 6, MZT 1/RZT 1	Mounting bracket for round body cylinder/piston diameters of 8 ... 25 mm	BEF-KHZ-RT1-25	5 311 171	1254
MZT 6/RZT 6, MZT 1/RZT 1	Mounting bracket for round body cylinder/piston diameters of 8 ... 63 mm	BEF-KHZ-RT1-63	5 311 172	1254
MZT 6/RZT 6, MZT 1/RZT 1	Mounting bracket for cylinders with a dovetail slot	BEF-KHZ-ST1	2 022 703	1254
MZU 2	Clamping piece for cylinder with “T” slot/dovetail slot	BEF-KS-U2-T1	2 019 822	1255
MZU 2	Clamping piece for tie-rod cylinder	BEF-KS-U2-S1	4 030 922	1255
MZU 2	Clamping piece for tie-rod cylinder (Teflon)	BEF-KS-U2-S1T	4 031 632	1255
MZU 2	Clamping piece for profile rod cylinders up to a rod width 13 mm	BEF-KS-U2-P1	2 019 824	1255
MZU 2	Clamping piece for profile rod cylinders up to a rod width 18 mm	BEF-KS-U2-P2	2 019 823	1255

Table of mounting clamps for magnetic cylinder sensors MZR 2 on round body cylinders				
For unit	Description	Type	Part No.	Page no.
MZR 2	Cylinders with piston diameter 8 ... 16 mm	BEF-S-R2-16	7 901 762	1255
MZR 2	Cylinders with piston diameter 20 or 25 mm	BEF-S-R2-25	7 901 763	1255
MZR 2	Cylinders with piston diameter 32 mm	BEF-S-R2-30	7 901 764	1255
MZR 2	Cylinders with piston diameter 40 mm	BEF-S-R2-40	7 901 765	1255
MZR 2	Cylinders with piston diameter 50 mm	BEF-S-R2-50	7 901 766	1255
MZR 2	Cylinders with piston diameter 63 mm	BEF-S-R2-63	7 901 767	1255
MZR 2	Cylinders with piston diameter 80 mm	BEF-S-R2-80	7 901 768	1255
MZR 2	Cylinders with piston diameter 100 mm	BEF-S-R2-100	7 901 769	1255

Dimensional drawings and part information

Mounting bracket for ST 130-S13, -S19, -S23, -S29*

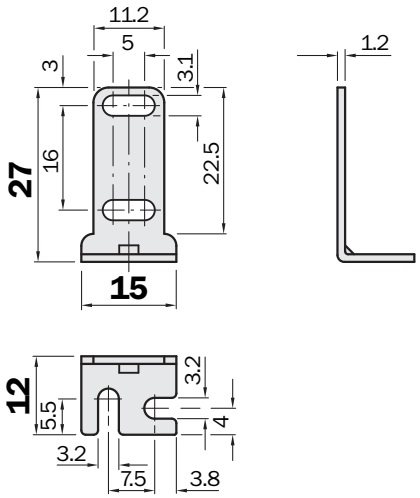
Type	Part no.	* Included with delivery
BEF-130-SM	5 306 246	



Dimensions in mm

Mounting bracket for ST 130-S33*

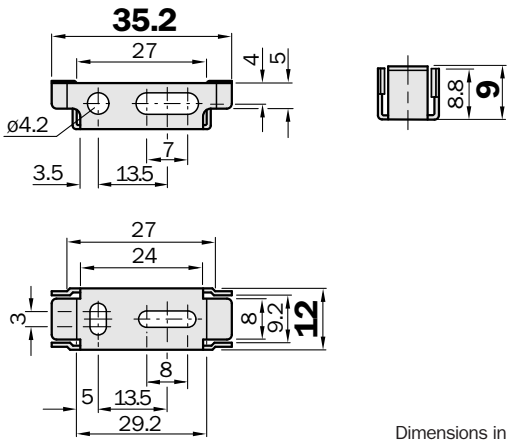
Type	Part no.	* Included with delivery
BEF-130-SP	5 306 245	



Dimensions in mm

Mounting bracket for SI 130*, WLL160*

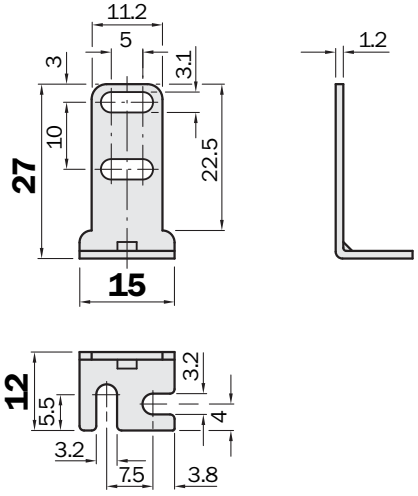
Type	Part no.	* Included with delivery
BEF-WLL 160	5 305 400	



Dimensions in mm

Mounting bracket for SS/SE 130-S33*

Type	Part no.	* Included with delivery
BEF-130-ST	5 306 244	

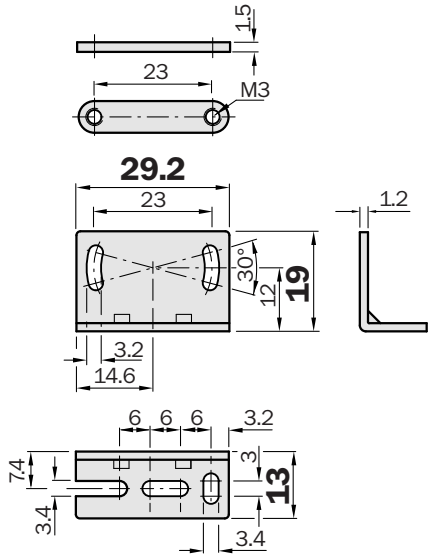


Dimensions in mm

Dimensional drawings and part information

Mounting bracket, horizontal for W 150*

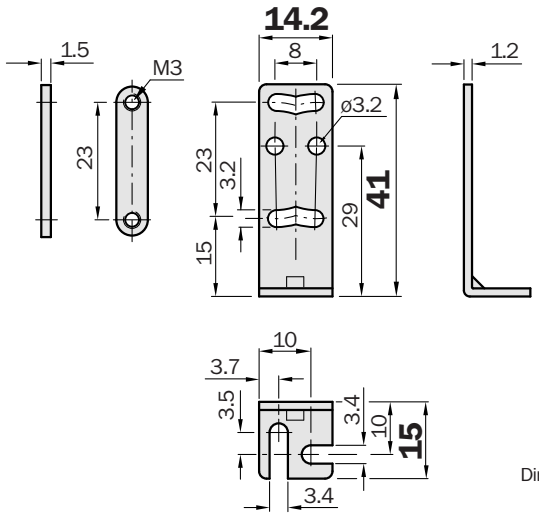
Type	Part no.	* Included with delivery
BEF-W150-A	5 306 217	



Dimensions in mm

Mounting bracket, vertical for W 150*

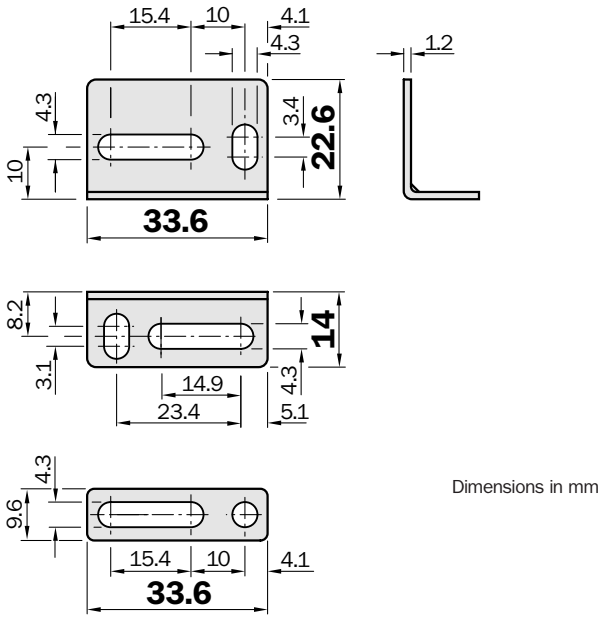
Type	Part no.	* Included with delivery
BEF-W150-B	5 306 279	



Dimensions in mm

Mounting bracket for W 160*

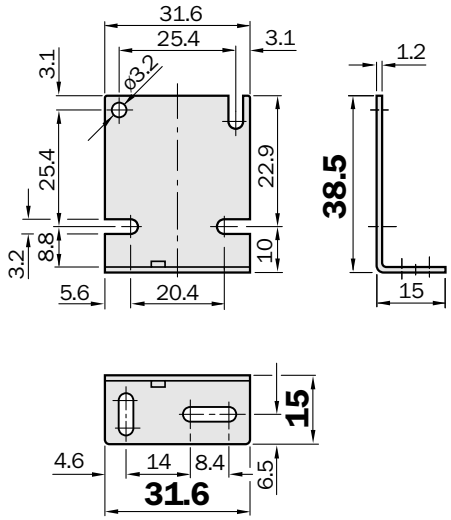
Type	Part no.	* Included with delivery
BEF-W160	5 305 197	



Dimensions in mm

Mounting bracket for W 170*

Type	Part no.	* Included with delivery
BEF-W170	5 305 686	

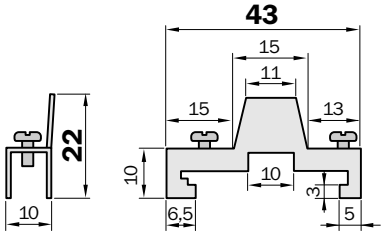


Dimensions in mm

Endcap for block installation of WLL 190T/WI130L on DIN-RAIL mounting[1]

Type	Part no.
BF-EB01-W190	5 313 011

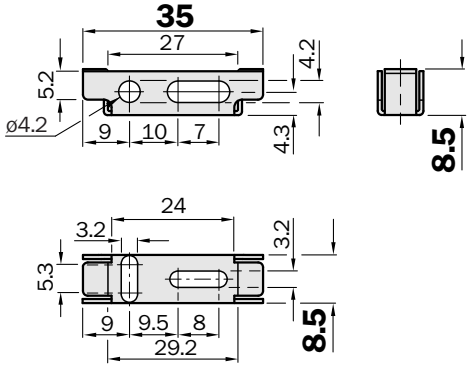
[1] 2 pieces included with delivery WLL190T



Dimensions in mm

Mounting bracket for WLL 170*, WLL 190*, WLL170-2, WLL190-2

Type	Part no.	* Included with delivery
BEF-WLL170	5 306 574	



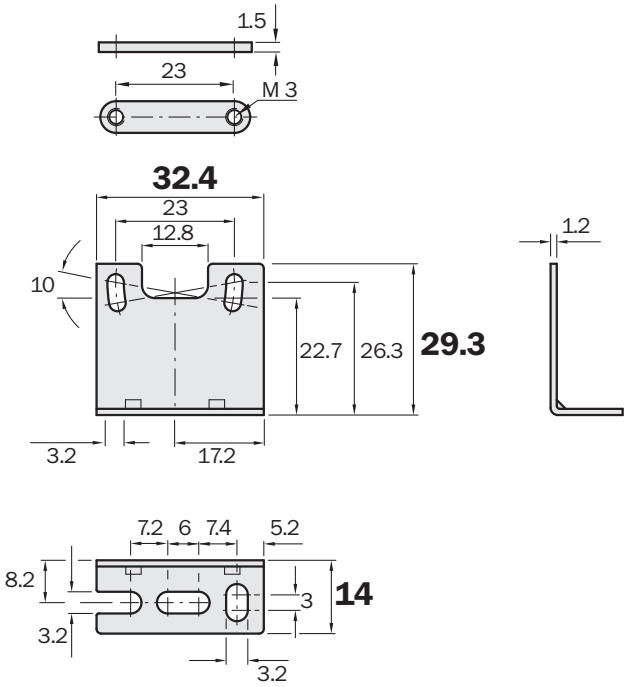
Dimensions in mm

Mounting brackets - dimensional drawings and part information

Mounting bracket, horizontal for W 140 *

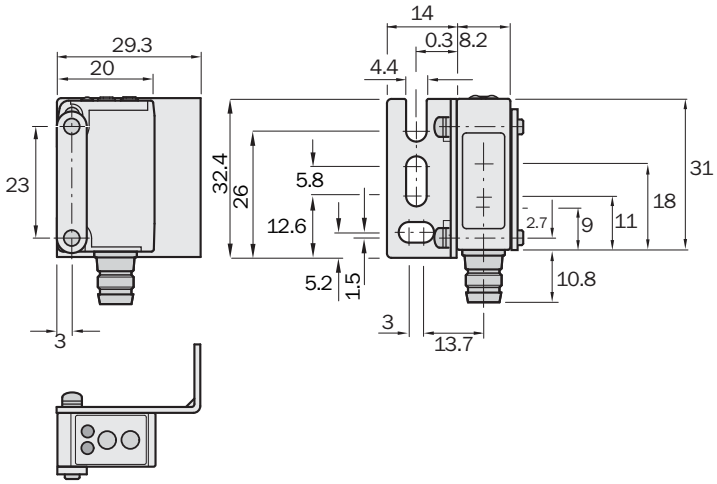
Type	Part no.
BEF-W 140-A	5 308 098

* Supplied with W 140



Dimensions in mm

Mounting

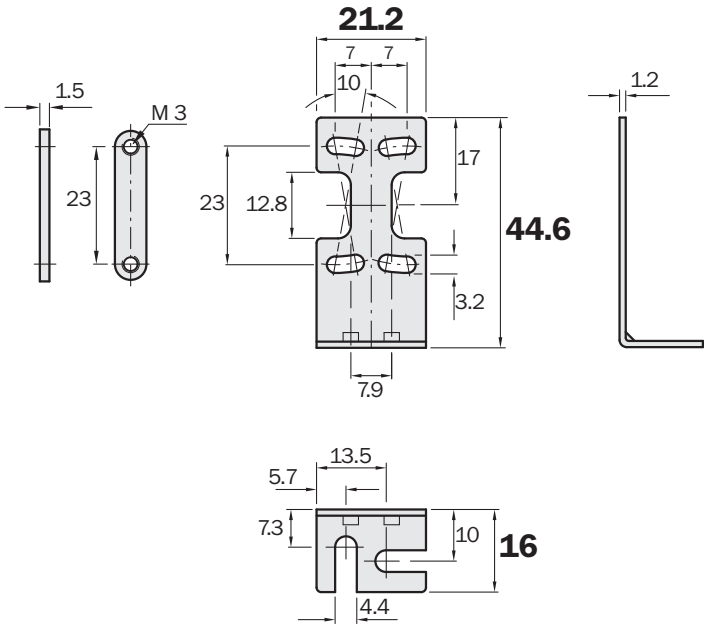


Dimensions in mm

Mounting bracket, vertical for W 140 **

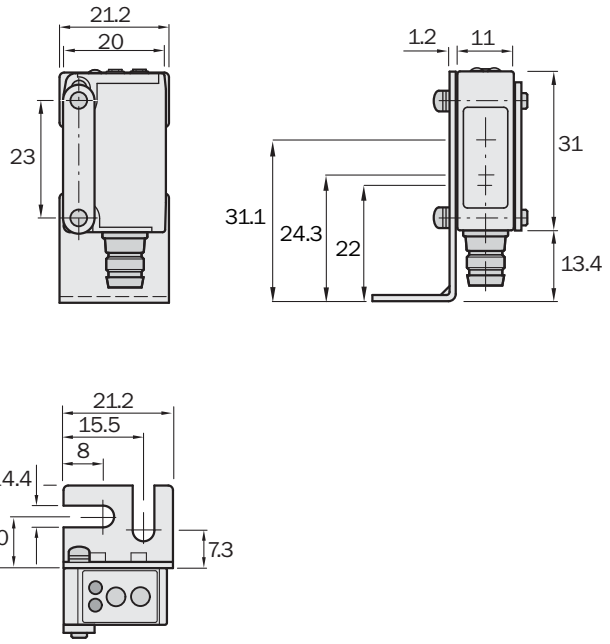
Type	Part no.
BEF-W 140-B	5 308 519

** Optional. Please order separately.



Dimensions in mm

Mounting

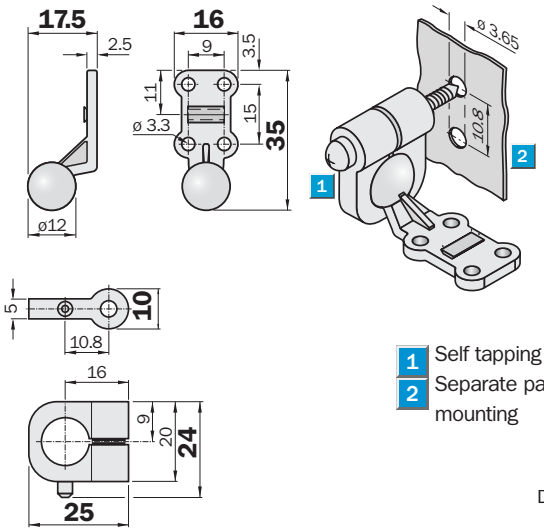


Dimensions in mm

Dimensional drawings and part information

Mini ball joint bracket for W4-2, W4-3, MH1, UC4

Type	Part no.
BEF-GH-MINI01	2 023 160

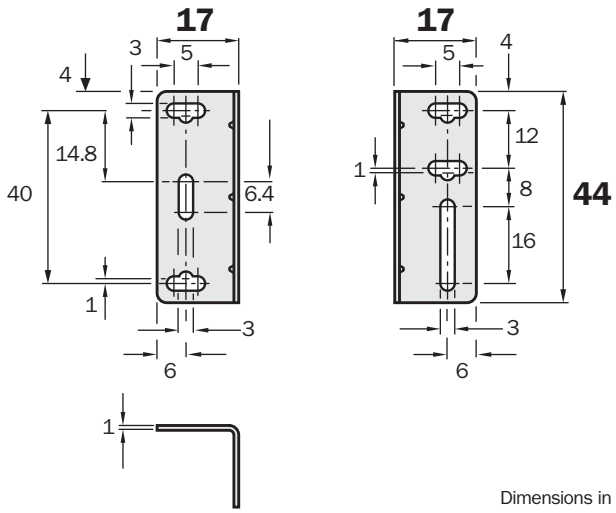


1 Self tapping screw ø4 mm
2 Separate part for machine mounting

Dimensions in mm

Mounting bracket for WT-2, W 9-2

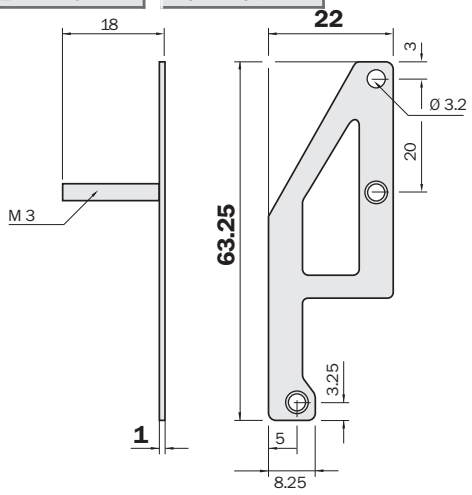
Type	Part no.
BEF-WN-W9-2	4 033 146



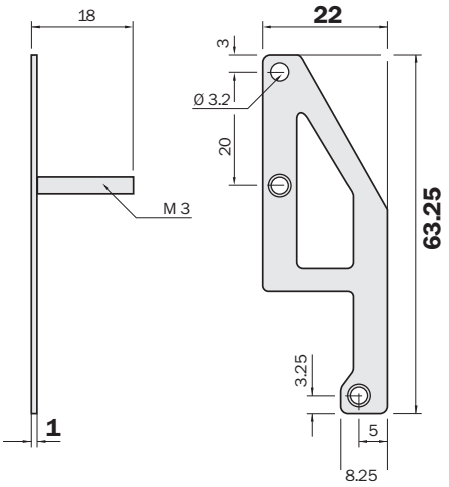
Dimensions in mm

Adapter set for W9

Type	Part no.
BEF-AP-W9	2 022 734

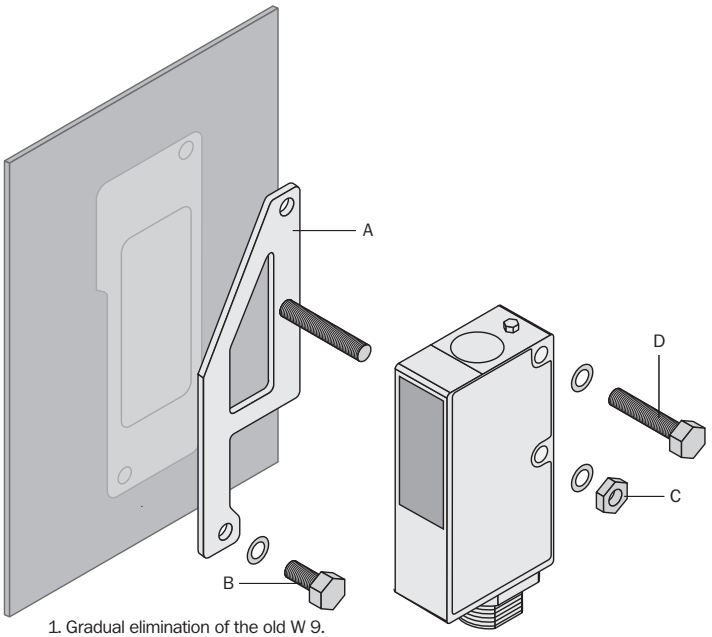


Adapter plate for light emission on the left side



Adapter plate for light emission on the right side

Dimensions in mm



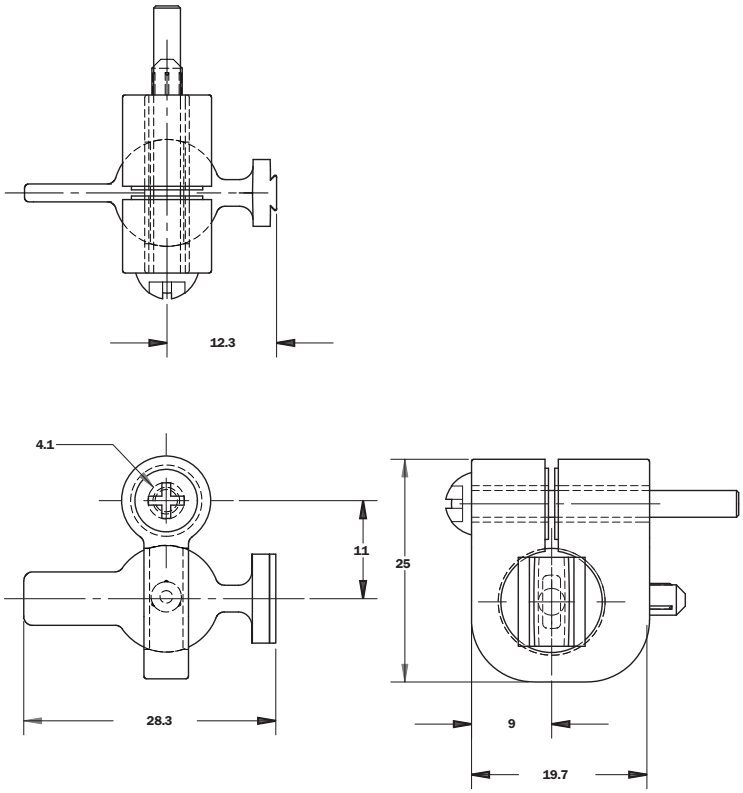
1. Gradual elimination of the old W 9.
2. Choose relevant adapter plate.
3. Align adapter angle "A" to existing hole pattern and attach angle attachment with screw "B."
4. Attach W 9-2 onto pre-mounted adapter angle.
5. Complete mounting of the W 9-2 with screw "D" and counter-nut "C."

If a device is going to be replaced we recommend using a W 9-2 with a pigtail or cable.

Attachment material is supplied with the adapter bracket.

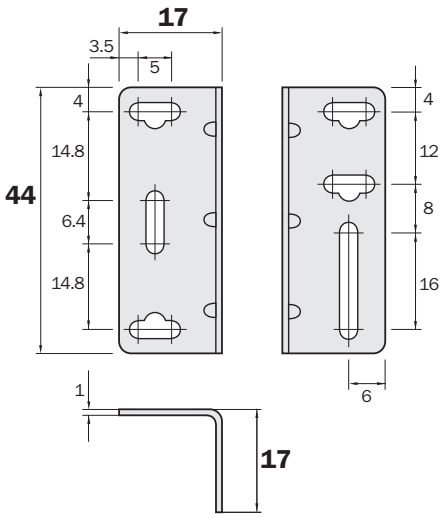
Mounting bracket for MH1

Type	Part no.
MB-MH-BC	7 027 712



Mounting bracket for W9-2, KT3, CSM1, LUT2

Type	Part no.
BEF-WN-W9-2	2 022 855



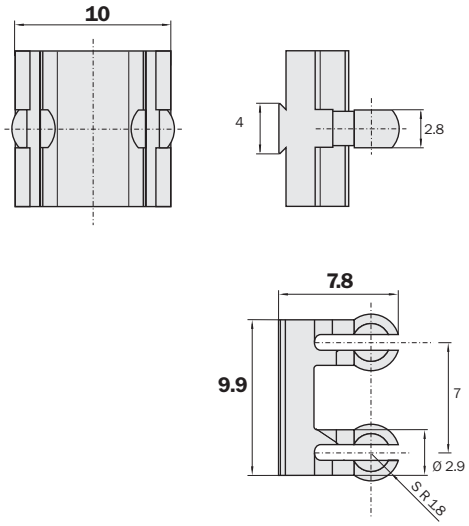
Dimensions in mm

Mounting brackets - dimensional drawings and part information

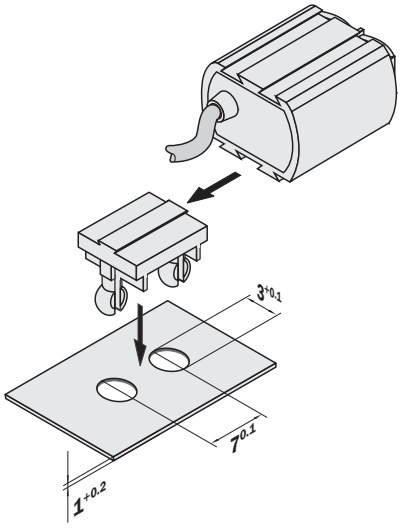
Snap holder for MH1

Pluggable for wall depth 1 to 1.2 mm

Type	Part no.	Pieces
MB-MH-SH-50	2 021 351	50



Mounting



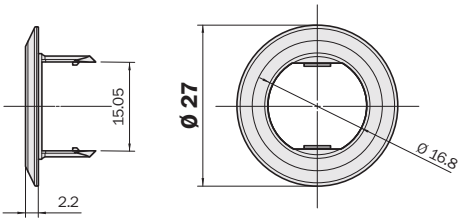
Dimensions in mm

Dimensional drawings and part information

Mouning ring for MH15

Type	Part no. **
BEF-WN-MH15-1	4 039 533

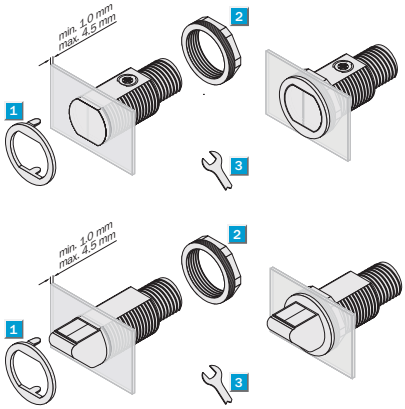
** Supplied with MH15



Mounting kit for MH15** for flush mounting, 2 x nuts M18

Description	Type	Part no.
1 x Mounting ring	BEF-WN-MH15-1	4 039 533
2 x nuts M18	Nuts-M18-MH15	4 040 270

**Supplied with MH15



1 Adapter BEF-WN-MH15-1 (4 039 533) for flush mounting**

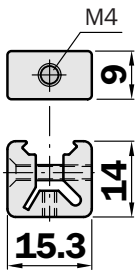
2 2 x Nuts-M18-MH15 (4 040 270)** (SW22)

3 **Mounting Instructions for MH15** MH15 mounting with a combination of mounting ring 1 and locknut M18 2: maximum torque 0.9 Nm MH15 mounting with a combination of 2 x locknuts M18 2 on both sides: maximum torque 2.0 Nm

Clamp for W 12-2, W 12L-2, KT 2, UC12, DT2

Type	Part no.
BEF-KH-W12	2 013 285

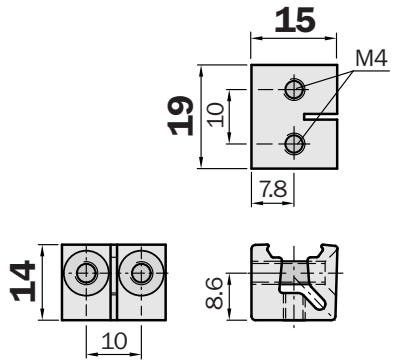
M4 x 15 mm countersunk screw included with delivery



Double clamp for W 12-2, W 12L-2, KT 2

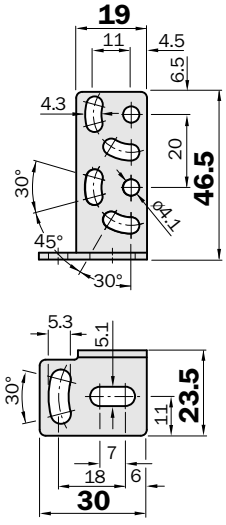
Type	Part no.
BEF-DKH-W12	2 013 947

2 M4 x 15 mm countersunk screws included with delivery



Mounting bracket, large (stainless steel) for W 12-2, W 12L-2, KT 2, UC12, DT2, W11

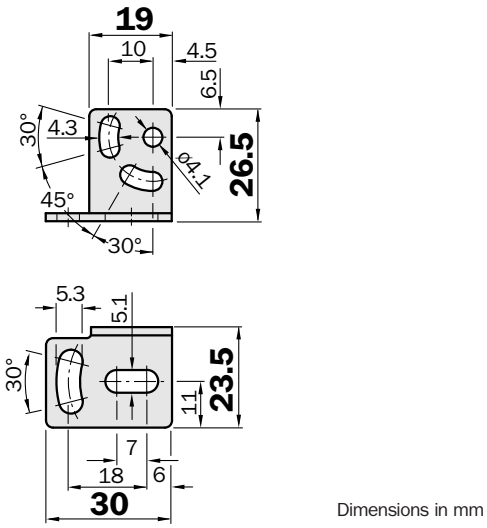
Type	Part no.
BEF-WG-W12	2 013 942



Dimensional drawings and part information

Mounting bracket, small (stainless steel) for W 12-2, W 12L-2, KT 2, UC12, W11, DT2

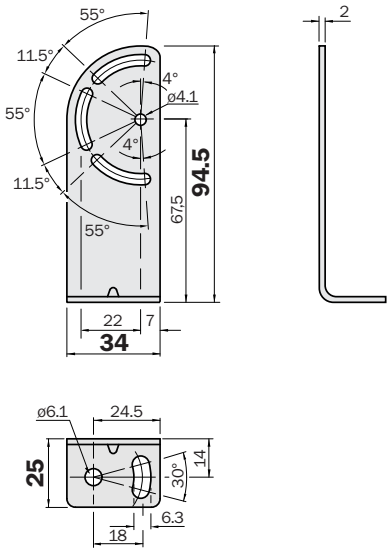
Type	Part no.
BEF-WK-W12	2 012 938



Dimensions in mm

Mounting bracket for W 14-2, W 18-3

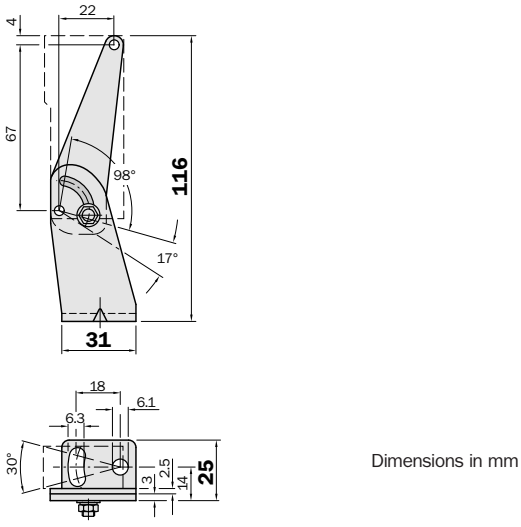
Type	Part no.
BEF-WN-W14	2 019 084



Dimensions in mm

Mounting bracket for W 14-2, W 18-3, DT10

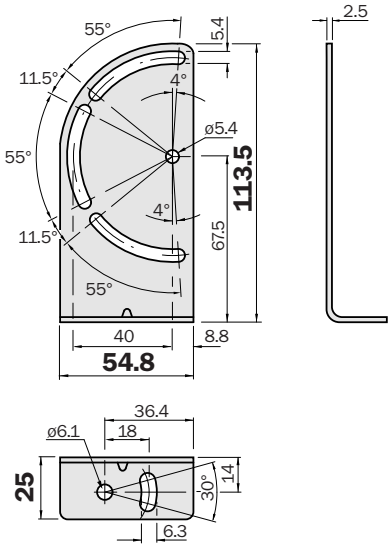
Type	Part no.
BEF-WN-W18	2 009 317



Dimensions in mm

Mounting bracket for W 23-2, W 27-3

Type	Part no.
BEF-WN-W23	2 019 085

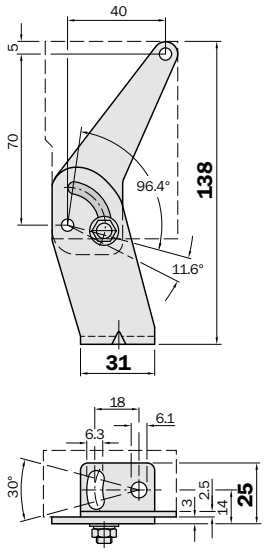


Dimensions in mm

Dimensional drawings and part information

Mounting bracket for W 23-2, W 27-3

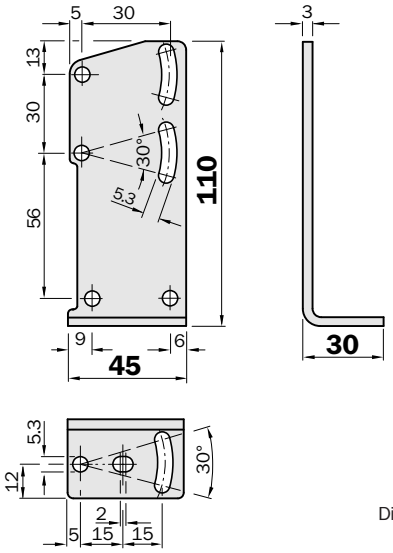
Type	Part no.
BEF-WN-W27	2 009 122



Dimensions in mm

Mounting bracket, large (stainless steel) for W 24-2, W 24 Exi, WTA 24, W 34

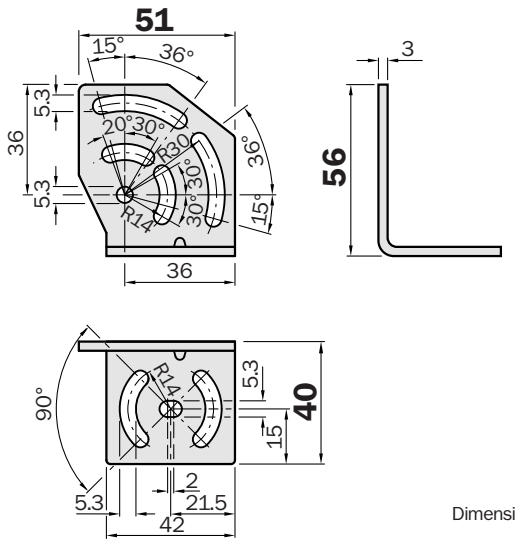
Type	Part no.
MB-W24	2 015 248



Dimensions in mm

Mounting bracket, small (stainless steel) for W 24-2, W 24 Exi, WTA 24, W 34

Type	Part no.
BEF-WK-W24	4 027 532

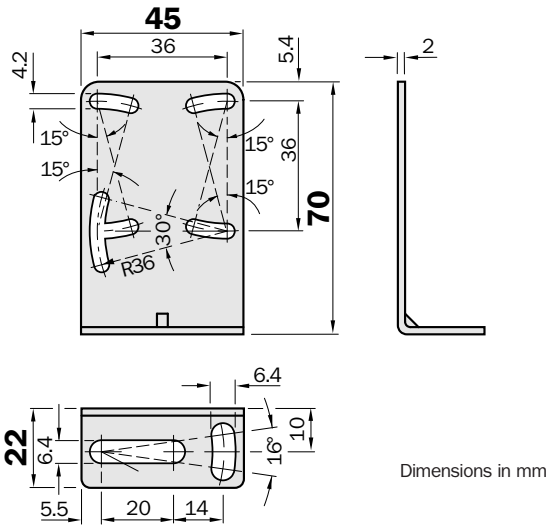


Dimensions in mm

Mounting bracket for W 250*

Type	Part no.
BEF-W250	5 305 850

* Included with delivery

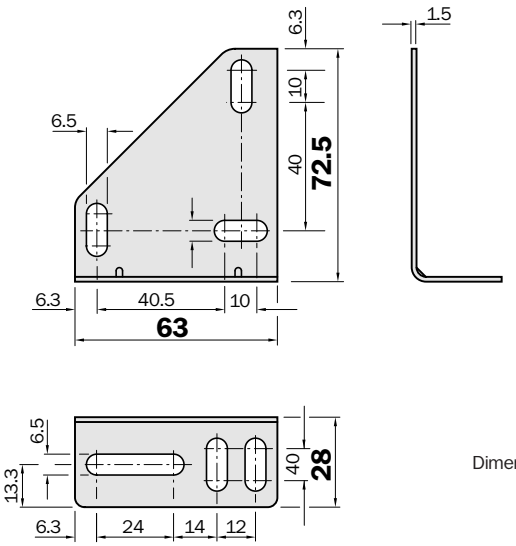


Dimensions in mm

Dimensional drawings and part information

Mounting bracket for W 260*

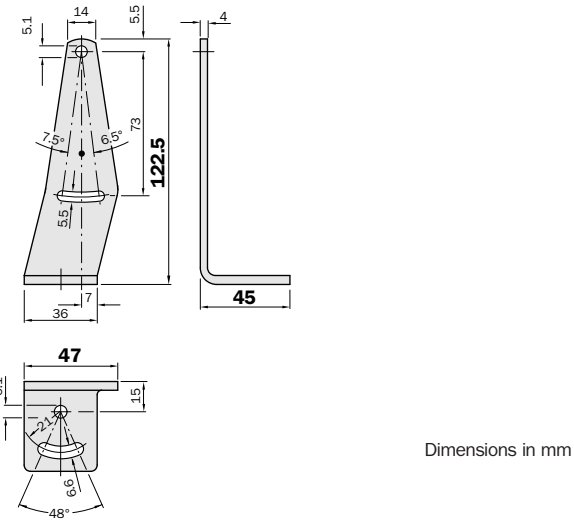
Type	Part no.
BEF-W260	5 304 819



Dimensions in mm

Mounting bracket for WT 30, WT 32, W 34, W 36

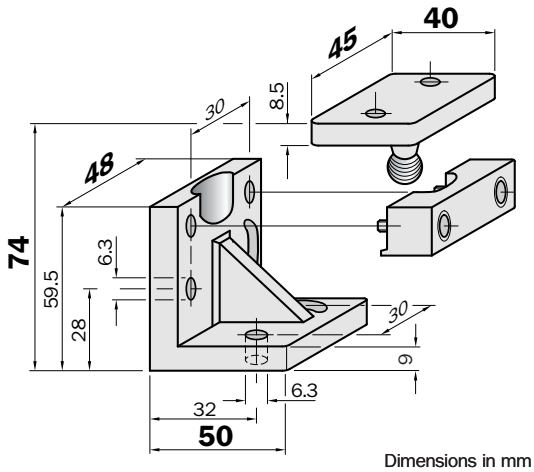
Type	Part no.
BEF-WN-W32	2 005 806



Dimensions in mm

Universal joint, complete, for W 45

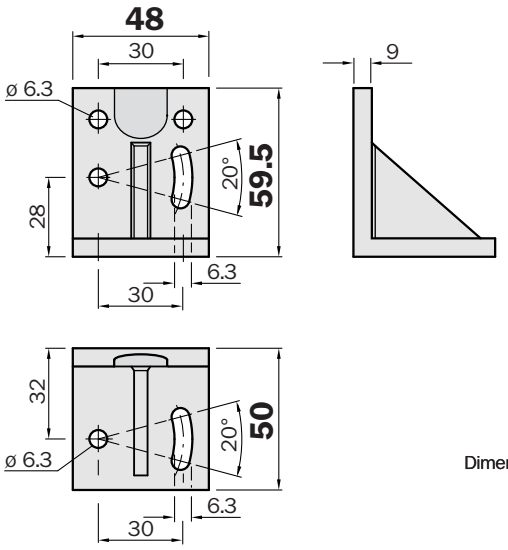
Type	Part no.
BEF-KK-W45	2 011 436



Dimensions in mm

Mounting bracket for W 45

Type	Part no.
BEF-WN-W45	2 011 480

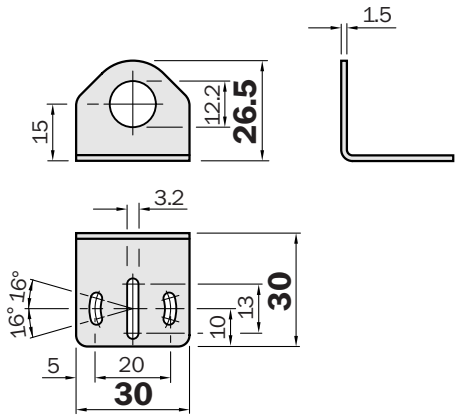


Dimensions in mm

Dimensional drawings and part information

Mounting bracket for V 12, IM 12, MM 12

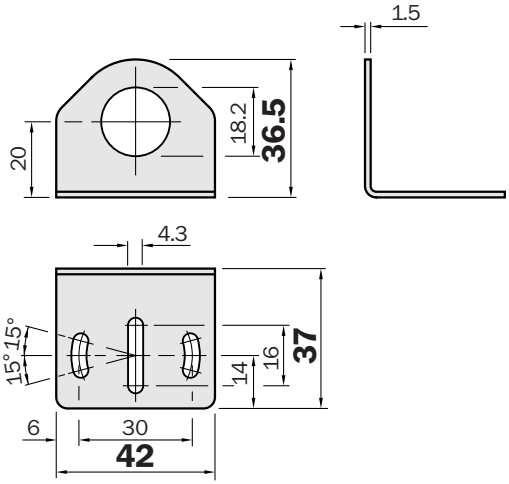
Type	Part no.
BEF-WN-M12	5 308 447



Dimensions in mm

Mounting bracket for V 18, IM 18, MM 18, CM 18, ELF, MH15

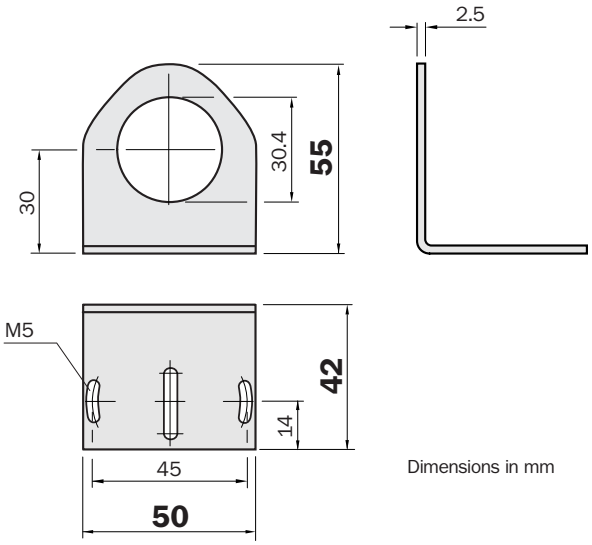
Type	Part no.
BEF-WN-M18	5 308 446



Dimensions in mm

Mounting bracket for IM 30, CM 30

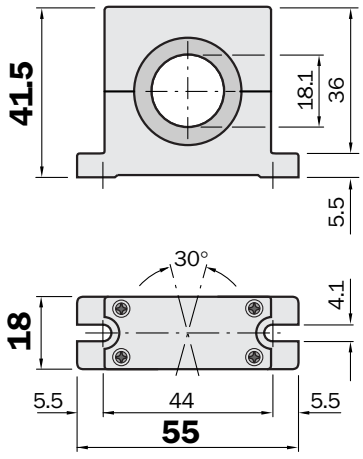
Type	Part no.
BEF-WN-M30	5 308 445



Dimensions in mm

Mounting bracket with ball-joint for V 18, IM 18, MM 18, CM 18, ELF, W1000

Type	Part no.
BEF-WN-M18-ST02	5 312 973



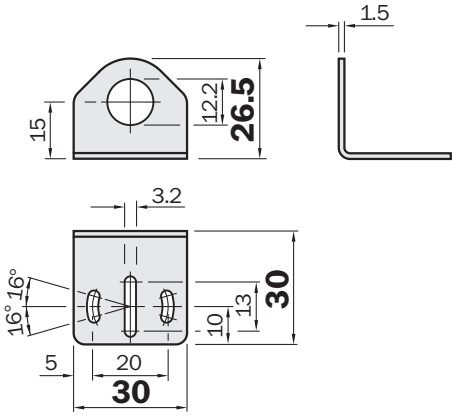
Dimensions in mm

Dimensional drawings and part information

Stainless steel for food & beverage applications

Mounting bracket for IMF 12, INOX 12

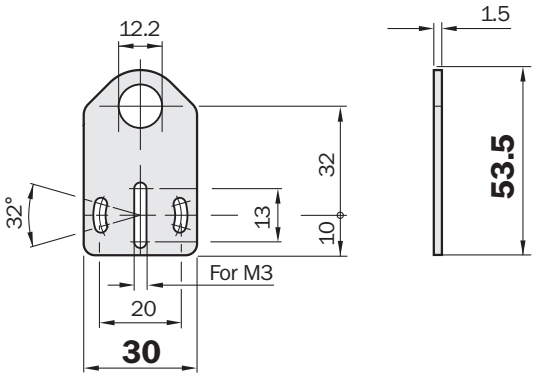
Type	Part no.
BEF-WN-M12N	5 320 949



Dimensions in mm

Mounting bracket for IMF 12, INOX 12

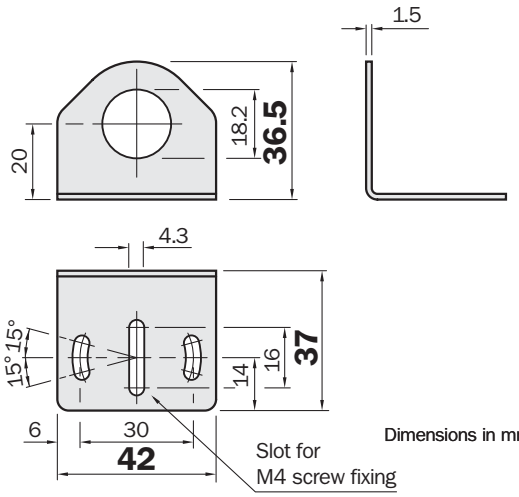
Type	Part no.
BEF-WG-M12N	5 320 950



Dimensions in mm

Mounting bracket for IMF 18, INOX 18, V18V, MH15V

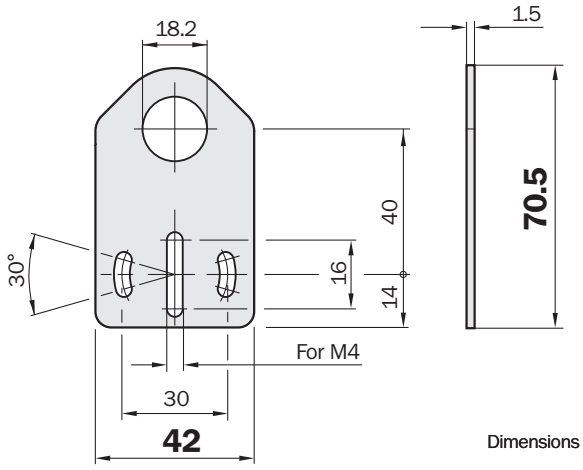
Type	Part no.
BEF-WN-M18N	5 320 947



Dimensions in mm

Mounting bracket for IMF 18, INOX 12, V18V, MH15V

Type	Part no.
BEF-WG-M18N	5 320 948

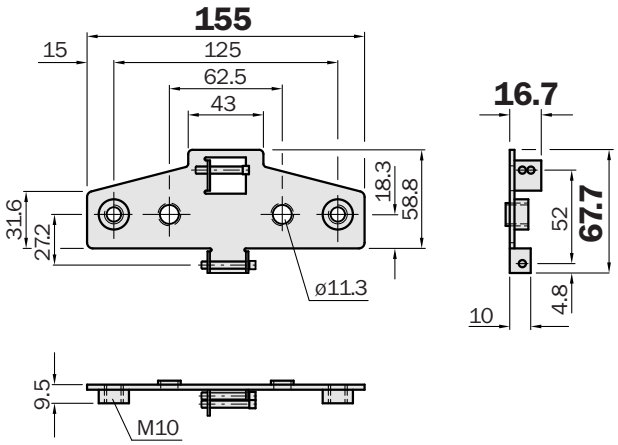


Dimensions in mm

Dimensional drawings and part information

Mounting bracket for WTR

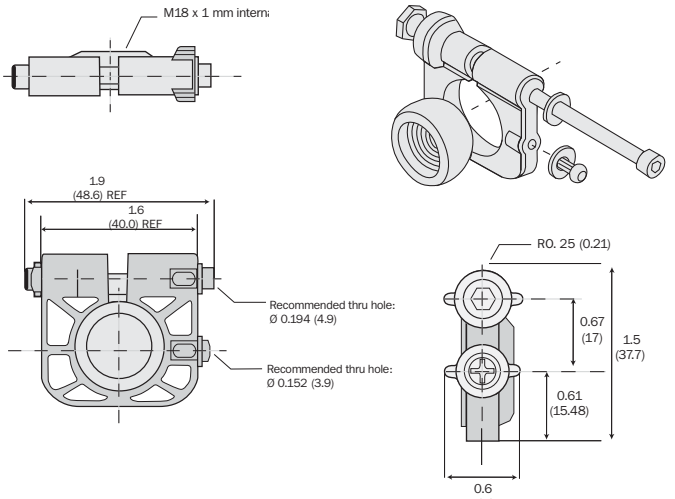
Type	Part no.
BEF-WN-WTR	2 017 417



Dimensions in mm

Mounting bracket for MH15, ELF

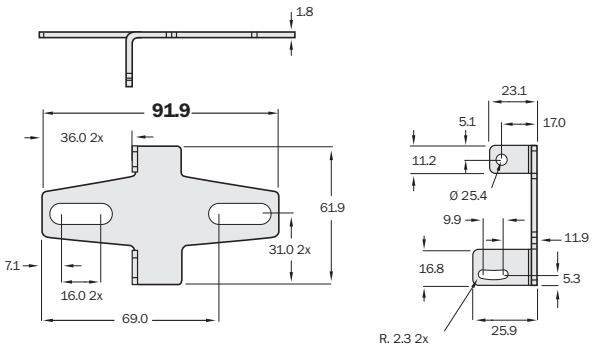
Type	Part no.
MB-BS18MM	7 028 403



Dimensions in mm

Mounting bracket kit, WTR

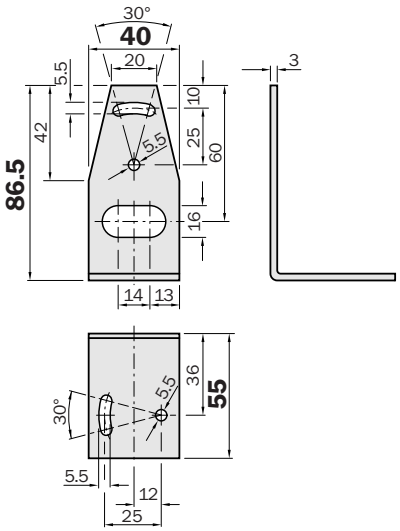
Type	Part no.
MB-WTR-1KIT	7 029 344



Dimensions in mm

Mounting bracket for WLG 12

Type	Part no.
BEF-WN-WLG12	2 017 567

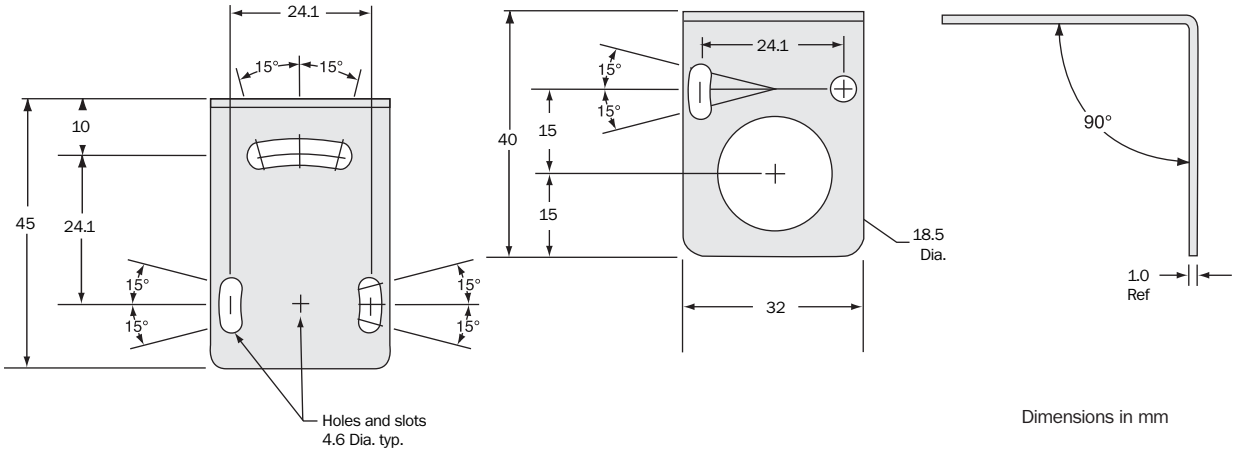


Dimensions in mm

Dimensional drawings and part information

Mounting bracket for W1000, ELF, MH15, V18, V180

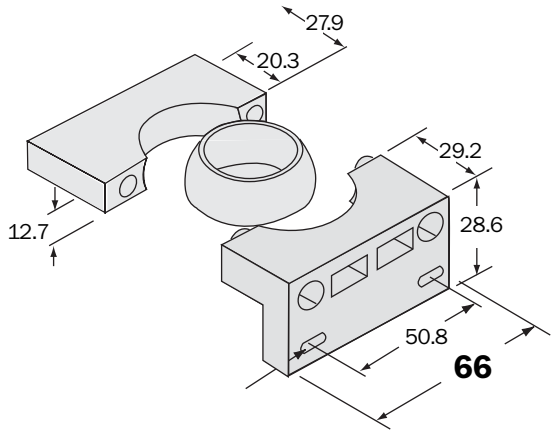
Type	Part no.
MB-W1000	7 023 800



Dimensions in mm

Mounting bracket for W2000, ball swivel; WLR2100

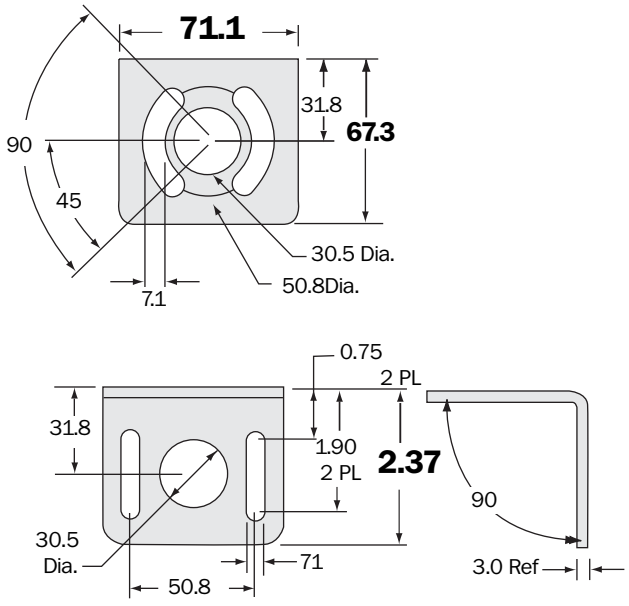
Type	Part no.
MB-W2000B	7 022 976



Dimensions in mm

Mounting bracket for W2000, stainless steel; WLR2100

Type	Part no.
MB-W2000	7 022 981

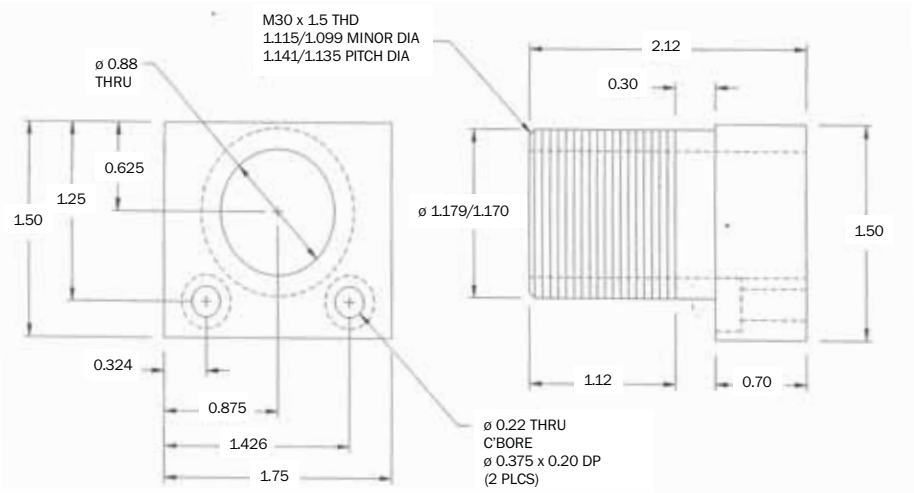


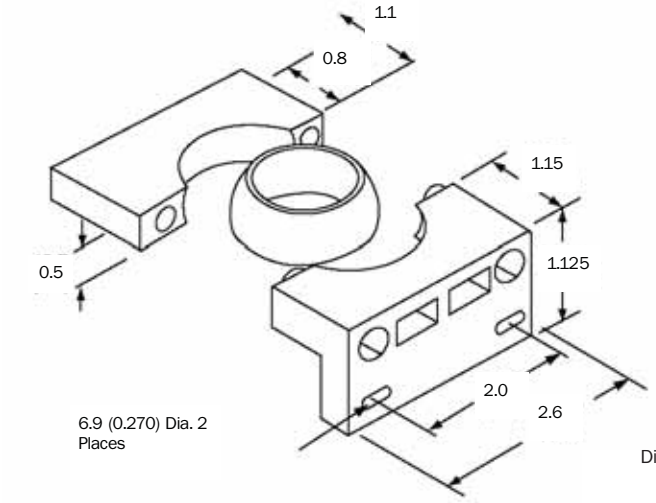
Dimensions in mm

Dimensional drawings and part information

Mounting bracket for CS8, KT5, KT10, LUT3

Type	Part no.
MB-CS-C	7 023 681

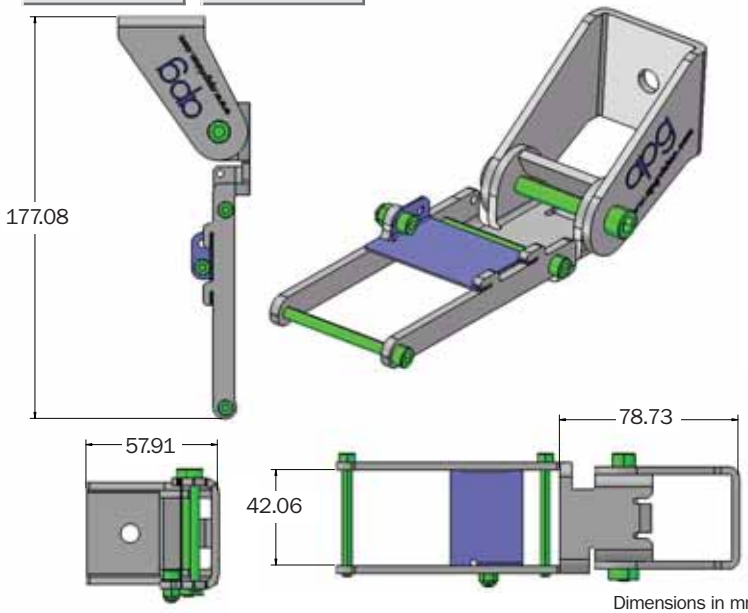




Dimensions in mm

Mounting bracket for CVS

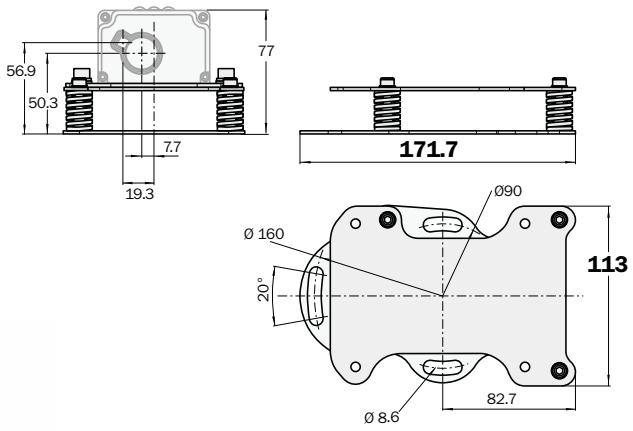
Type	Part no.
CVS Bracket	5 320 680



Dimensions in mm

Alignment bracket for DS 500 and DT 500

Type	Part no.
BEF-DSDT	2 031 377

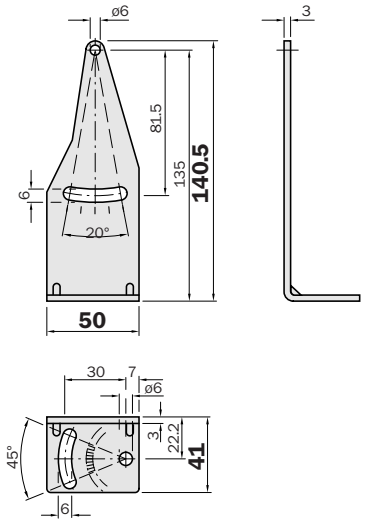


Dimensions in mm

Dimensional drawings and part information

Mounting bracket for DS/DT/DL 60

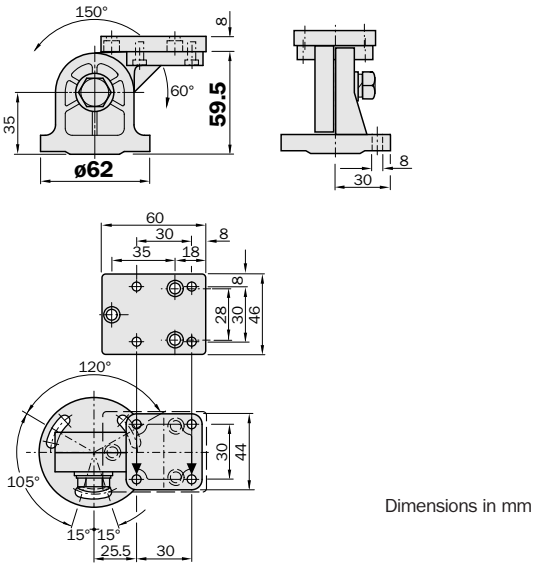
Type	Part no.
BEF-WN-DS60	4 032 937



Dimensions in mm

Articulated mounting for DME 2000/3000

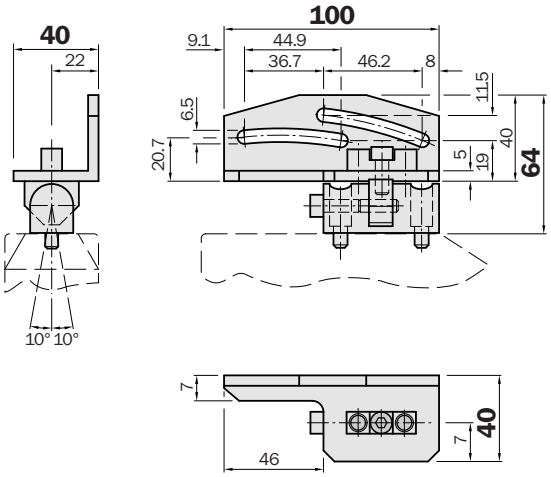
Type	Part no.
BEF-GH-DME	2 015 229



Dimensions in mm

Articulated mounting for DMH/DMP

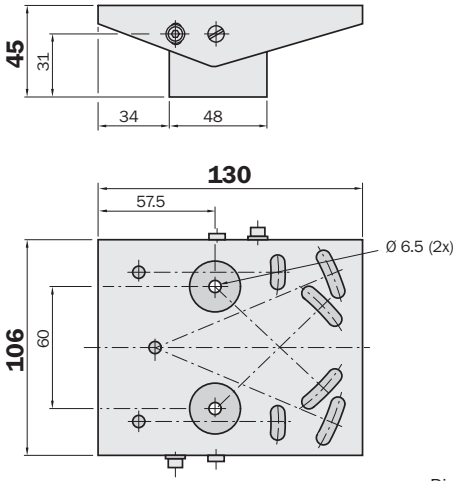
Type	Part no.
BEF-GH-DMH2	2 020 796



Dimensions in mm

Articulated mounting for DMT/DML

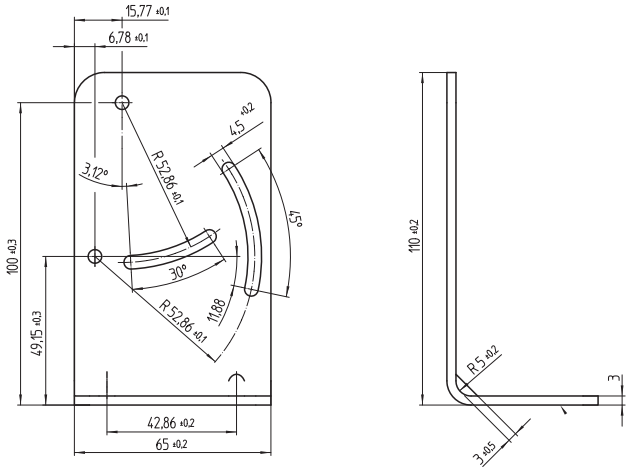
Type	Part no.
BEF-GH-DMT	5 309 130

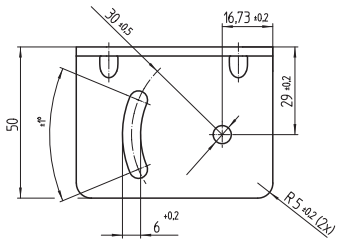


Dimensions in mm

Mounting bracket for DT20/DT20 Hi

Type	Part no.
BEF-WN-DT20	4 043 524



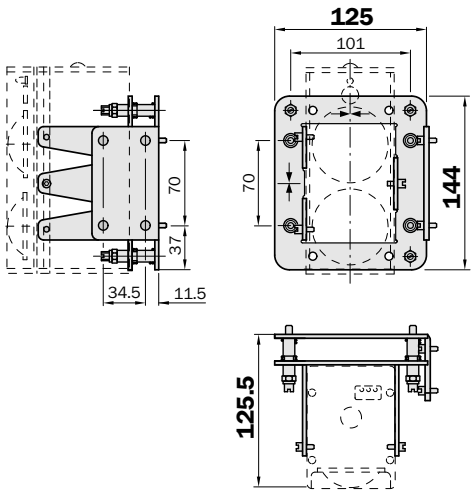


Dimensions in mm

Mounting brackets - dimensional drawings and part information

Three-point mounting for ISD 230, 260, 280

Type	Part no.
BEF-KH-ISD	5 306 369

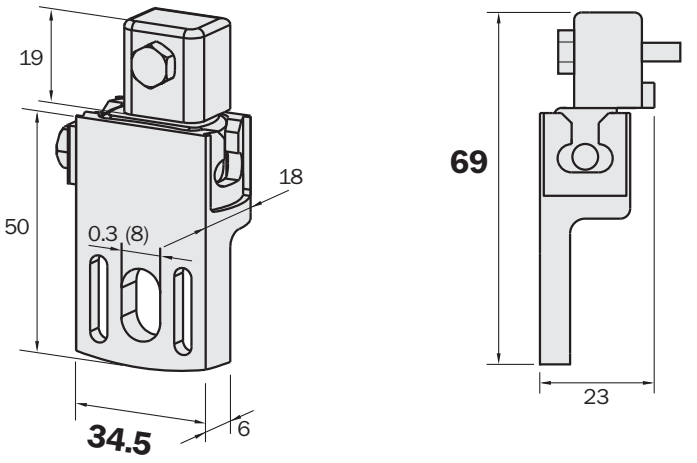


Dimensions in mm

MLG Mounting kit 4 – T-nuts with shifting nuts

Side mounting w/shift nuts for all heights (for high vibration & shock exposure)

Type	Part no.
BEF-NUT-MLG	2 023 696

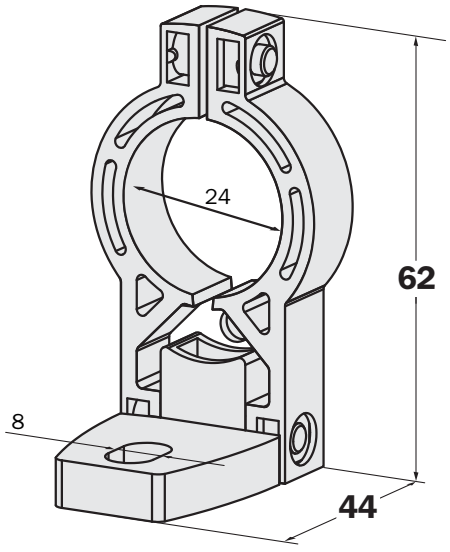


Dimensions in mm

Mounting kit 1 – swivel mount

For MLG S and MLG E, recommended for detection heights up to 1600 mm

Type	Part no.
Mounting Set 1	2 019 649

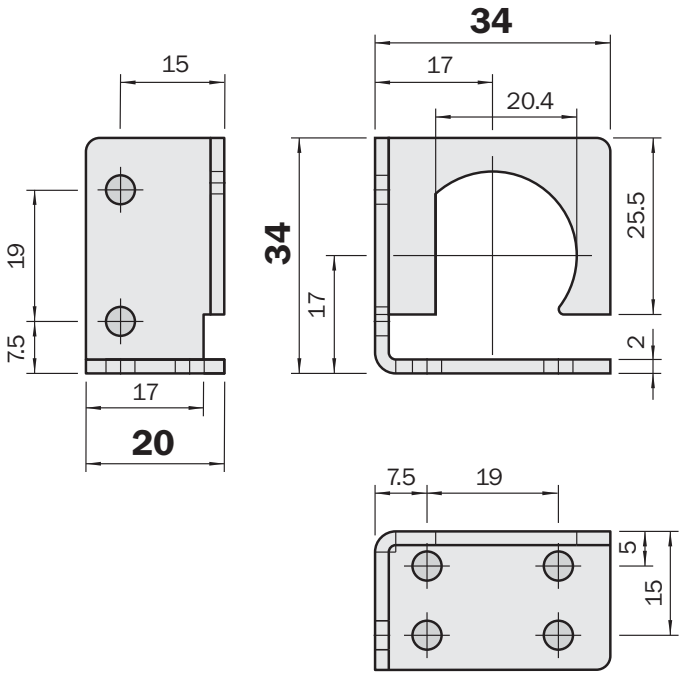


Dimensions in mm

Mounting kit 1 – compact metal angled bracket

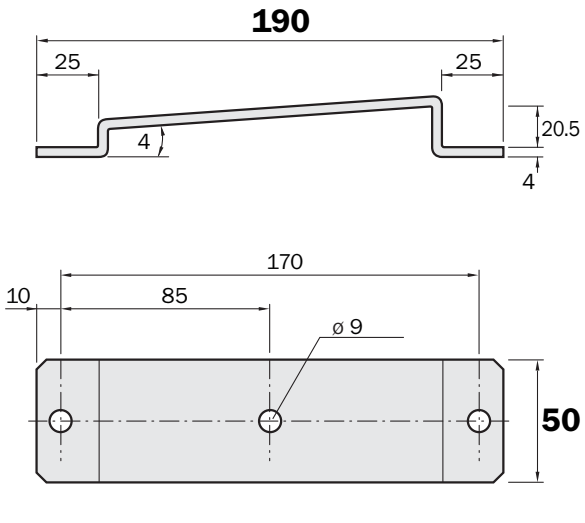
recommended for all detection heights for ELG and MLG

Type	Part no.
BEF-WK-XLG	2 029 100



Mounting bracket for lens reflector for DMD

Type	Part no.
BEF-PL 140L	5 308 917

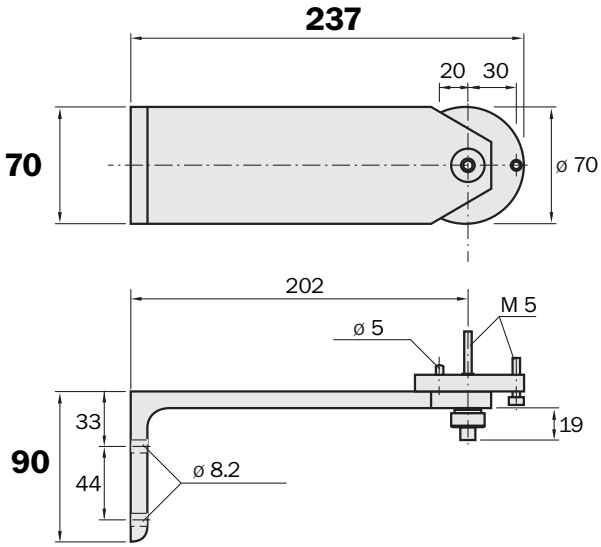


Dimensions in mm

Mounting bracket for DMD

Type	Part no.
BEF-WN-DMD	5 308 915

Included with DMD

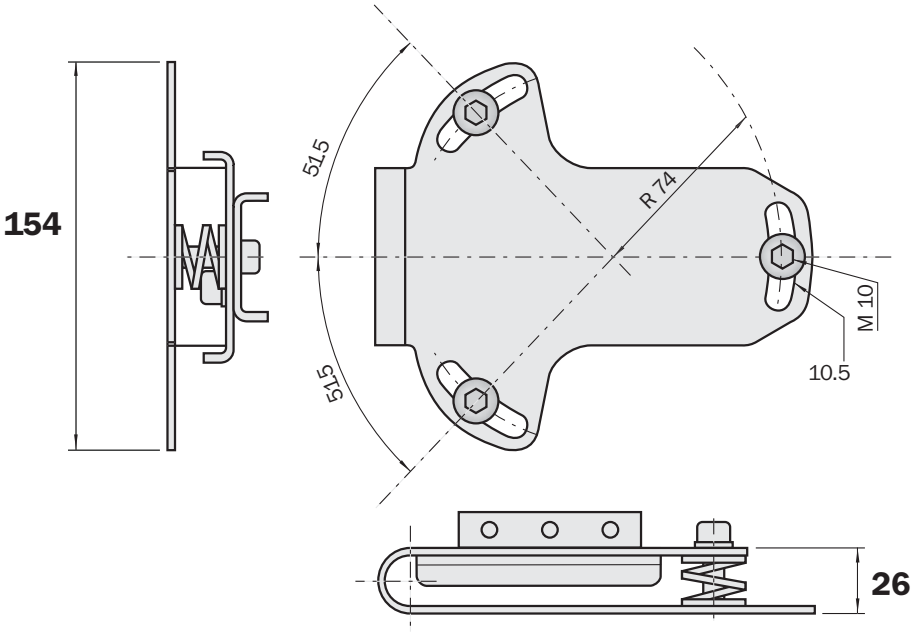


Dimensions in mm

Mounting brackets - dimensional drawings and part information

Alignment bracket for DME 5000

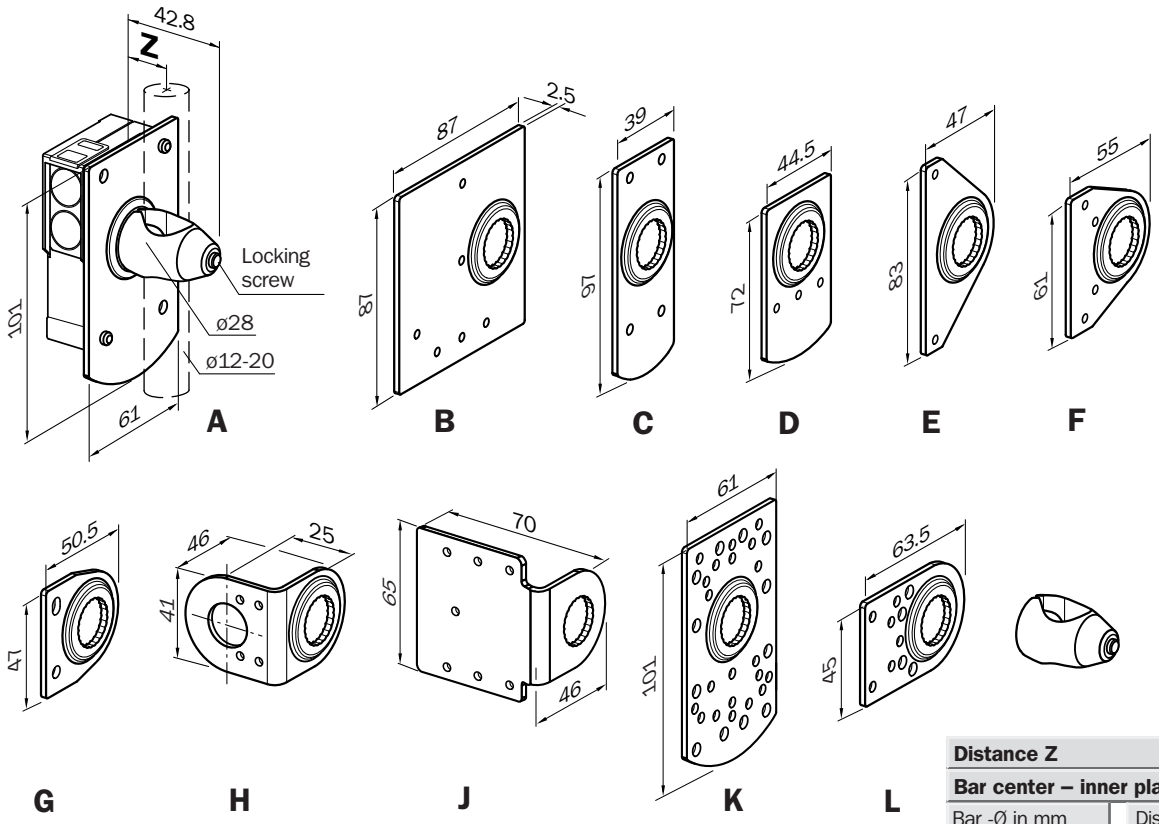
Type	Part no.
BEF-AH-DME5	2 027 721



Dimensions in mm

Dimensional drawings and part information

Universal bar clamps for sensors and reflectors



Distance Z	
Bar center – inner plate surface	
Bar -Ø in mm	Distance Z in mm
12	15.0
14	16.4
15	17.1
18	19.2
20	20.7

Mounting plates*	Type	Part no.**	for device/reflector type
A	BEF-KHS-A01	2 022 458	W 23-2, W 27-3
B	BEF-KHS-B01	2 022 459	P 250, P 250 F, PL 30 A, PL 40 A, PL 50 A, PL 80 A, P975
C	BEF-KHS-C01	2 022 460	W 14-2, W 18-3
D	BEF-KHS-D01	2 022 461	W 11, W 12-2, W 12L-2, KT 2
E	BEF-KHS-E01	2 022 462	W 30, W 32, W 34, W 36
F	BEF-KHS-F01	2 022 463	PL 20 A, PL 20 F, P 250, P 250 F, W 260, W 280
G	BEF-KHS-G01	2 022 464	W 24-2, W 24 Exi, WTA 24, KT 5, KT10, CS 1/3, LUT 3
H	BEF-KHS-H01	2 022 465	V 18, W 4-2, IM 18, MM 18, CM 18, UM 18
J	BEF-KHS-J01	2 022 719	PL 20 A, PL 20 F, PL 40 A, PL 50 A, P 250, P 250 F, P975
K	BEF-KHS-K01	2 022 718	W 11, W 12-2, W 12L-2, W 14-2, W 18-3, W 23-2, W 24-2, W 27-3, W 30, W 32, W 34, KT 2, KT 5, KT 10, CS 1/3, LUT 3, DS 60, PL 20 A, PL 20 F, PL 30 A, PL 40 A, PL 50 A, PL 80 A, P 250, P 250 F, P975, W 280
L	BEF-KHS-L01	2 023 057	W 9-2, KT 3, P 250, P 250 F, W 250, W 140-2, W 150, W 160
	BEF-KHS-KH1	2 022 726	Clamp without mounting plate

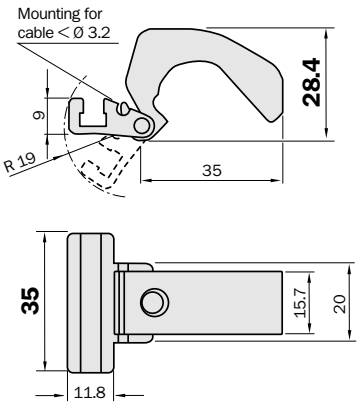
* More plates available on request

** Part no. includes bar support and mounting material

Dimensional drawings and part information

Mounting bracket for profile-/tie-rod cylinders MZT 6/RZT 6, MZT 1/RZT 1

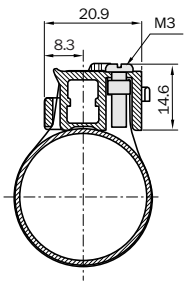
Type	Part no.
BEF-KHZ-PT1	2 022 702



Dimensions in mm

Mounting bracket for round body cylinder/piston diameters of 8...25 mm for MZT 6/RZT 6, MZT 1/RZT 1

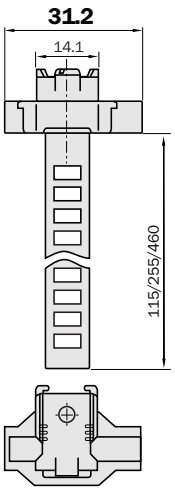
Type	Part no.
BEF-KHZ-RT1-25	5 311 171
BEF-KHZ-RT1-63	5 311 172



Type

BEF-KHZ-RT1-25

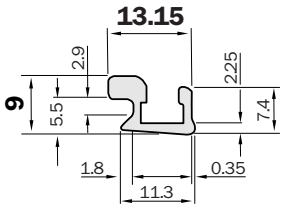
BEF-KHZ-RT1-63

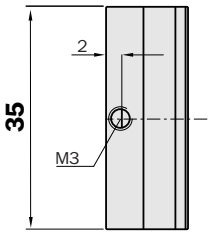


Dimensions in mm

Mounting bracket for cylinders with a dovetail slot for MZT 6/RZT 6, MZT 1/RZT 1

Type	Part no.
BEF-KHZ-ST1	2 022 703



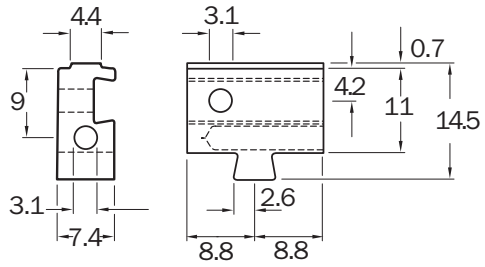


Dimensions in mm

Dimensional drawings and part information

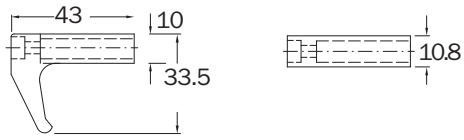
Clamping piece for cylinder with T-slot/dovetail slot

Type	Part no.
BEF-KS-U2-T1	2 019 822



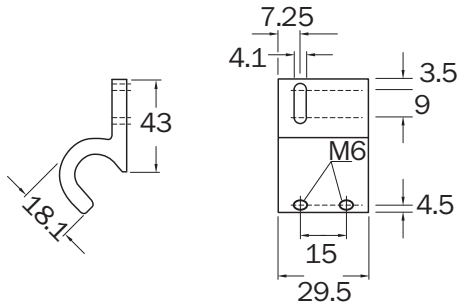
Clamping piece for tie-rod cylinder

Type	Part no.
BEF-KS-U2-S1	4 030 922
BEF-KS-U2-S1T	4 031 632



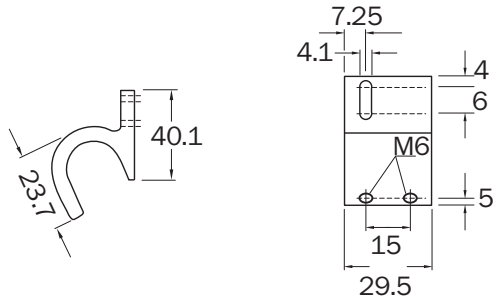
Clamping piece for profile rod cylinders up to a rod width of 13 mm

Type	Part no.
BEF-KS-U2-P1	2 019 824



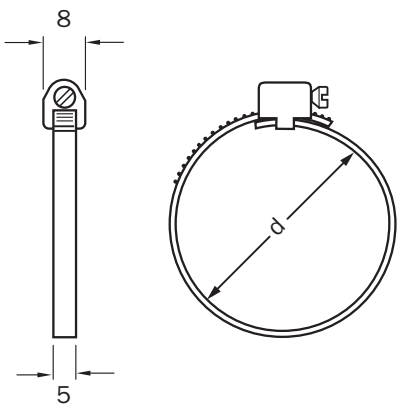
Clamping piece for profile rod cylinders up to a rod width of 18 mm

Type	Part no.
BEF-KS-U2-P2	2 019 823



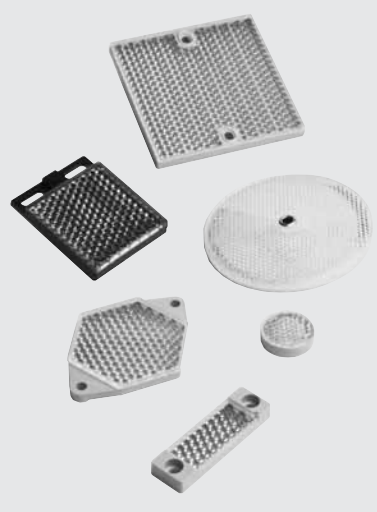
Clamping band for MZR 2 on round body cylinders

Type	Part no.	Cylinder range with piston diameter	Clamping range
BEF-S-R2-16	7 901 762	8…16 mm	18…29 mm
BEF-S-R2-25	7 901 763	20 or 25 mm	28…39 mm
BEF-S-R2-30	7 901 764	32 mm	38…49 mm
BEF-S-R2-40	7 901 765	40 mm	48…59 mm
BEF-S-R2-50	7 901 766	50 mm	58…69 mm
BEF-S-R2-63	7 901 767	63 mm	68…79 mm
BEF-S-R2-80	7 901 768	80 mm	88…99 mm
BEF-S-R2-100	7 901 769	100 mm	98…109 mm



Reflectors

Selection table, reflectors



Description	Type	Part no.	Page
Plastic reflectors for temperatures up to 65°C			
Reflector, Ø 22 mm, plug-in	PL 22-1	1 003 546	1258
Reflector, Ø 22 mm, self-adhesive	PL 22-2	1 003 621	1258
Reflector, Ø 22 mm, plug-in, for sheet metal	PL 22-3	1 004 488	1258
Reflector Ø 23 mm, self-adhesive	PL26	1 001 440	1258
Reflector, Ø 25.2 mm, mounting bolt M4	P 25	5 315 172	1258
Reflector, Ø 34.5 mm, plane	P 34	5 313 922	1258
Reflector, Ø 83 mm, center hole mounting	P 975	7 020 558	1258
Reflector 32.8 x 8.4 mm^2	P 45	5 308 002	1259
Reflector 20 x 40 mm^2	PL 20 A	1 012 719	1259
Reflector 20 x 40 mm^2, self-adhesive	PL 21 A	1 015 172	1259
Reflector 30 x 50 mm^2	PL 30A	1 002 314	1259
Reflector 30 x 50 mm^2, self-adhesive	PL 31 A	1 002 315	1259
Reflector 40 x 60 mm^2	PL 40 A	1 012 720	1259
Reflector, 6-sided, width across flats 48 mm	PL 50 A	1 000 132	1259
Reflector, 6-sided, width across flats 48 mm, self-adhesive	PL 51 A	1 001 628	1259
Reflector 47 x 47 mm^2	P 250	5 304 812	1259
Reflector 34 x 35 mm^2	P 42	5 314 825	1260
Reflector 32 x 48 mm^2	P 32	5 314 001	1260
Reflector 28 x 29 mm^2	P 40	5 313 923	1260
Reflector 70 x 51 mm^2, with mounting bolt M6	PL 72	5 304 145	1260
Reflector 80 x 80 mm^2	PL 80 A	1 003 865	1260
Reflector 40 x 180 mm^2	PL 180 E01	1 013 289	1260
Reflector 18 x 150 mm^2, self-adhesive	PL 150	5 315 548	1260
Reflector 20 x 20 mm^2, micro triple	PL 10 F	5 311 210	1261
Reflector 10 x 50 mm^2, plane, micro triple	PL 15 F	5 313 849	1261
Reflector 20 x 40 mm^2, micro triple	PL 20 F	5 308 844	1261
Reflector 47 x 47 mm^2, micro triple	P 250 F	5 308 843	1261
Reflector, width across flats 52 mm, micro triple	P 55 F	5 313 924	1261
Special reflectors			
Reflector, 6-sided, width across flats 48 mm, oil-tight	PL 53 A	1 000 382	1261
Combi-reflector, 3 x 3 PL 80 A, reflective foil center, for DME	PL 240 F	1 013 784	1263
Reflector, 280 x 280 mm^2, diamond grade, for DME	PL 240 DG	1 017 910	1263
Reflector, 280 x 280 mm^2, diamond grade, regulated heating	PL 240 DG-H	1 022 926	1263
Reflector, 280 x 280 mm^2, high grain, for DME	PL 240-7610	1 019 012	1263
Combi-reflector, 7 x 7 PL 80 A, reflective foil center, for DME	PL 560 F	1 013 785	1263
Reflector, 605 x 605 mm^2, diamond grade, for DME	PL 560 DG	1 016 806	1263
Reflector, 605 x 605 mm^2, diamond grade, regulated heating	PL 560 DG-H	1 023 888	1263
Combi-reflector, 11 x 11 PL 80 A, center reflectivity reduced, for DME	PL 880 F	1 013 786	1264
Reflector, 914 x 914 mm^2, diamond grade, for DME	PL 880 DG	1 018 975	1264
Reflector, 928 x 928 mm^2, 11 x 11 PL 80 A, able to be linked in a row, for DME	PL 880 FS01	7 017 865	1264
Triple reflector, glass, Ø 60 mm, f = ∞	OP 60-∞	1 000 141	1261
Triple reflector, glass, Ø 60 mm, f = 20 m	OP 60-20	1 000 136	1261
Triple reflector, glass, Ø 60 mm, f = 10 m	OP 60-10	1 000 138	1261
Reflectors with heating, 24 V UC; 1.4 W			
Reflector, 6-sided, width across flats 48 mm, continuous heating	PL 50 HK	1 011 545	1262
Reflector, 6-sided, width across flats 48 mm, regulated heating	PL 50 HS	1 009 871	1262
Triple reflectors, glass, for temperatures up to 300 °C			
Reflector, l 50 mm	SW 50	1 000 131	1262
Triple reflector, glass, Ø 60 mm, high temperature-resistant seals	OP 61-∞	1 002 627	1262
Triple reflector, glass, Ø 60 mm, with heating for DML	OP55	5 309 132	1265
Plastic reflectors for temperatures up to 110 °C			
Reflector 47 x 47 mm^2	P 250 H	5 135 124	1262

Reflectors

Selection table, reflectors

Description	Type	Part no.	Page
Reflectors for *ZoneConrol*			
Reflector, ø 34.5 mm, plug-in	P 35 P02	5 320 250	1258
Reflector, ø 34.5 mm, screwable	P 35 P01	5 320 249	1258
Reflector, ø 23 mm, self-adhesive	PL 1-25	7 029 889	1258
Reflector, 49 x 21.2 mm	PL 21 MS02	7 122 603	1259
Reflector, 83 mm, center hold mounting	P975	7 020 558	1258
Reflectors for Pick2Light			1264

Type	Part no.	Description	Page
Self-adhesive reflective tape for photoelectric sensors			
REF-APM	4 025 097	Reflective tape APM, sheet 225 x 225 mm	1257
RT3290 3-F	7 023 340	Reflective tape, width 91.4 cm, roll length 4.57 m, cut to size	1257
RT3290 3-15R	7 023 341	Reflective tape, width 91.4 cm, roll length 4.57 m, cut to size	1257
RT7610 2-F	7 023 338	Reflective tape, width 61 cm, roll length 4.57 m(use only with DME 2000)	1257
RT7610 2-15R	7 023 339	Reflective tape, width 61 cm, roll length 4.57 m(use only with DME 2000)	1257
Diamond grade polarized reflectors			
RTC 1-Y	7 020 540	Roll, 1 inch by desired length in yards (specify when ordering)	1257
RTC 2-Y	7 020 542	Roll, 2 inches by desired length in yards (specify when ordering)	1257
RTC 3-Y	7 020 541	Roll, 3 inches by desired length in yards (specify when ordering)	1257
RTC 1-50C	7 020 570	Roll, 1 inch by 50 yard case (two 25 yard rolls)	1257
RTC 2-25C	7 020 571	Roll, 2 inches by 25 yard case	1257
RTC 3-25C	7 020 572	Roll, 3 inches by 25 yard case	1257
RTC 3-3C	7 020 573	Sheet, 3 x 3 inch case (100 pieces)	1257
RTC 4-4C	7 020 574	Sheet, 4 x 4 inch case (50 pieces)	1257
RTC 3-3P	7 020 578	Sheet, 3 x 3 inch pack (10 pieces)	1257
RTC 4-4P	7 020 575	Sheet, 4 x 4 inch pack (10 pieces)	1257
RTC 8-11S	7 020 579	Sheet, 8.5 x 11 inch sheet	1257
RTC 8-11P	7 020 580	Sheet, 8.5 x 11 inch pack (5 pieces)	1257
RTC 8-11C	7 020 576	Sheet, 8.5 x 11 inch case (20 pieces)	1257
RTC 18-36S	7 020 581	Sheet 18 x 36 inch sheet	1257
RTC 18-36C	7 020577	Sheet, 18 x 36 inch case (5 pieces)	1257
RT5870	7 029 691	Sheet, 4 x 4 inch pack (10 pieces)	1257
RT5870	7 029 692	Sheet, 12 x 12 inch pack (5 pieces)	1257
RT58703F	5 313 688	Reflective tape, width 3 ft (sold by the foot)	1257
REF-DG	5320565	Reflective foil, 749 x 914 mm	

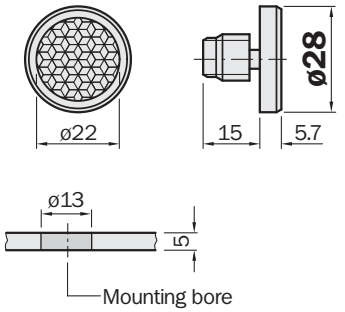
Reflectors

Dimensional drawings and order information

SENSICK reflectors, plastic design, round, for temperatures up to 65° C

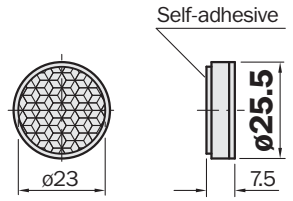
Reflector, ø 28 mm
plug-in

Type	Part no.
PL 22-1	1 003 546



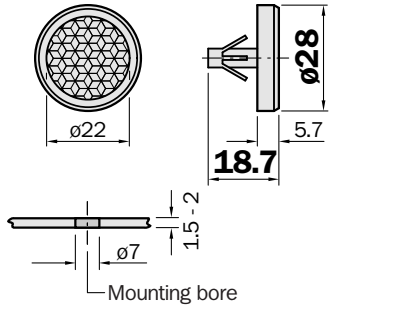
Reflector, ø 25.5 mm
self-adhesive

Type	Part no.
PL 22-2	1 003 621



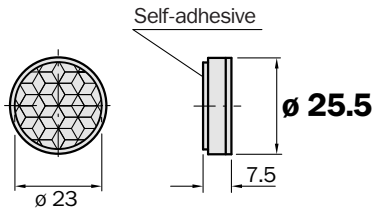
Reflector, ø 28 mm
plug-in for sheet metal

Type	Part no.
PL 22-3	1 004 488



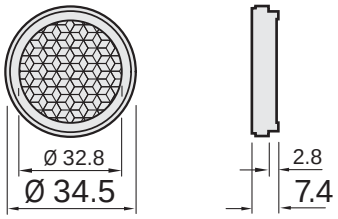
Reflector, ø 23 mm
Self-adhesive

Type	Part no.
PL 26	1 001 440



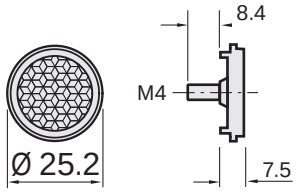
Reflector, ø 34.5 mm
plane

Type	Part no.
P34	5 313 922



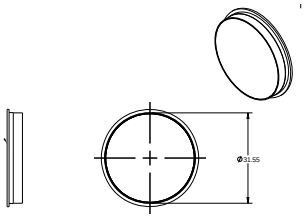
Reflector, ø 25.2 mm
screwable, M4 screw

Type	Part no.
P25	5 315 172



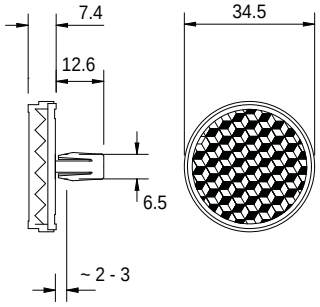
Reflective area ø 23 mm
self-adhesive

Type	Part no.
PL1-25	7 029 889



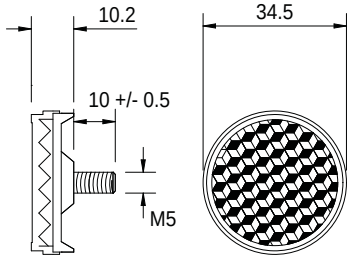
Reflector, ø 34.5 mm
plug-in

Type	Part no.
P35P02	5 320 250



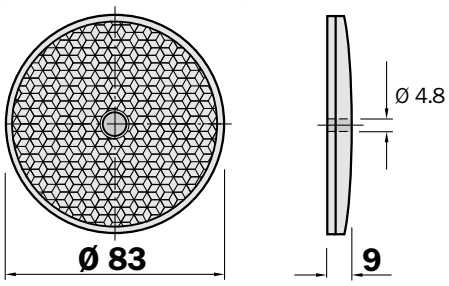
Reflector, ø 34.5
plug-in

Type	Part no.
P35P01	5 320 249



Reflector, ø 84 mm
plug-in for sheet metal

Type	Part no.
P975	7 020 558



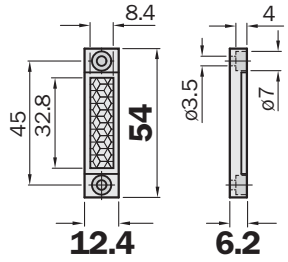
Reflectors

Dimensional drawings and order information

SENSICK reflectors plastic design, angular for temperatures up to 65° C

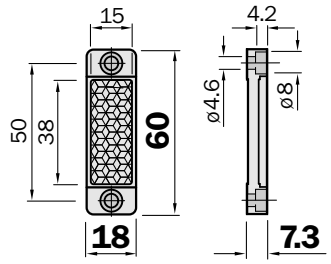
Reflector, ø 32.8 x 8.4 mm²
screwable

Type	Part no.
P 45	5 308 002



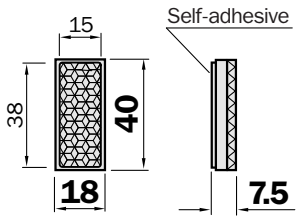
Reflector, ø 20 x 40 mm²
screwable

Type	Part no.
PL 20 A	1 012 719



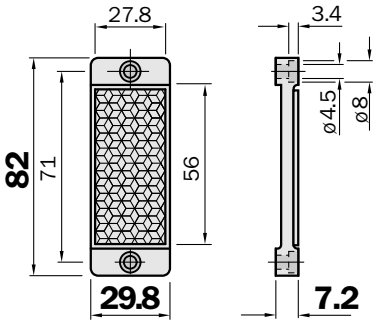
Reflector, ø 20 x 40 mm²
self-adhesive

Type	Part no.
PL 21 A	1 015 172



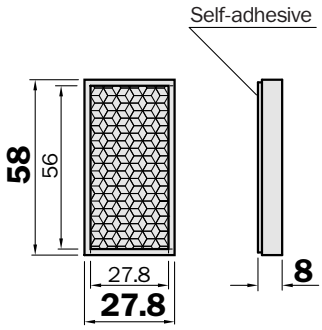
Reflector, ø 30 x 50 mm²
screwable

Type	Part no.
PL 30 A	1 002 314



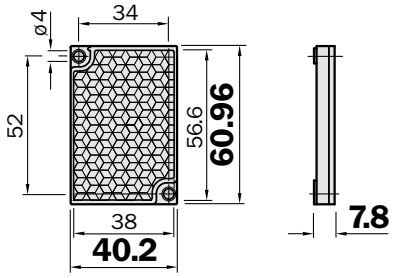
Reflector, ø 30 x 50 mm²
self-adhesive

Type	Part no.
PL 31 A	1 002 315



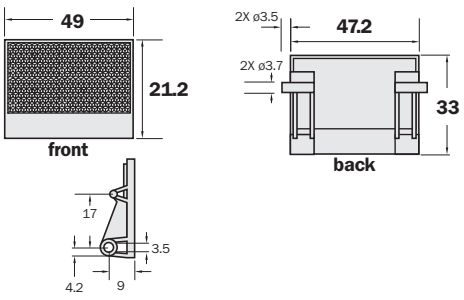
Reflector, ø 40 x 60 mm²
screwable

Type	Part no.
PL 40 A	1 012 720



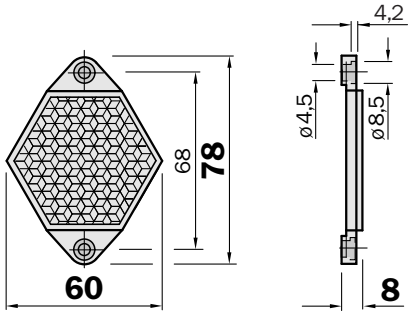
Reflector
square

Type	Part no.
PL 21 M02	7 122 603



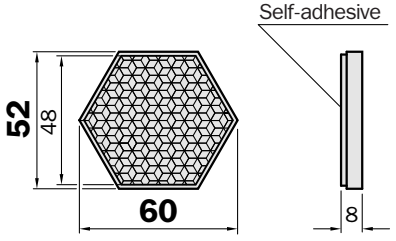
Reflector, 6-sided
width across flats 52 mm, screwable

Type	Part no.
PL 50 A	1 000 132



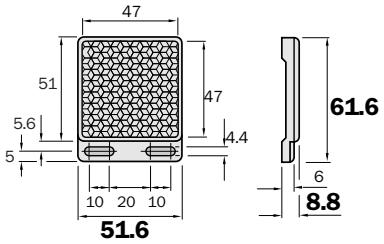
Reflector, 6-sided
width across flats 52 mm, self-adhesive

Type	Part no.
PL 51 A	1 001 628



Reflector 47 x 47 mm²
screwable

Type	Part no.
P 250	5 304 812



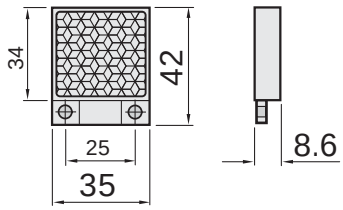
Reflectors

Dimensional drawings and order information

SENSICK reflectors plastic design, angular for temperatures up to 65° C

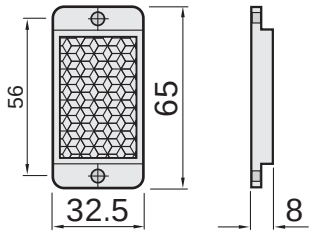
Reflector 34 x 35 mm²
screwable

Type	Part no.
P 42	5 314 825



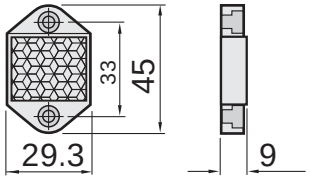
Reflector 32 x 48 mm²
screwable

Type	Part no.
P 32	5 314 001



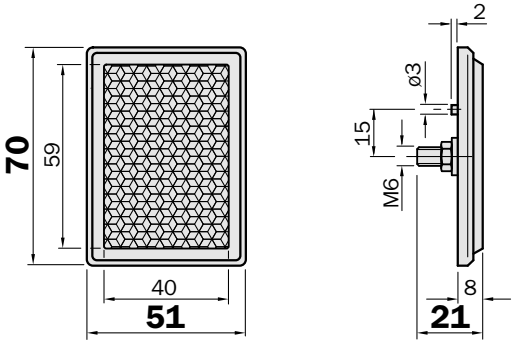
Reflector 28 x 29 mm²
screwable

Type	Part no.
P 40	5 313 923



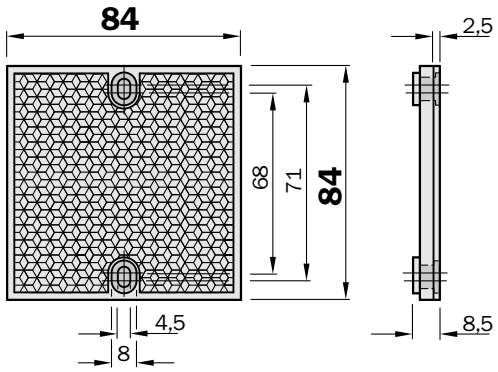
Reflector 70 x 51 mm²
with M6 mounting bolt

Type	Part no.
PL 72	5 304 145



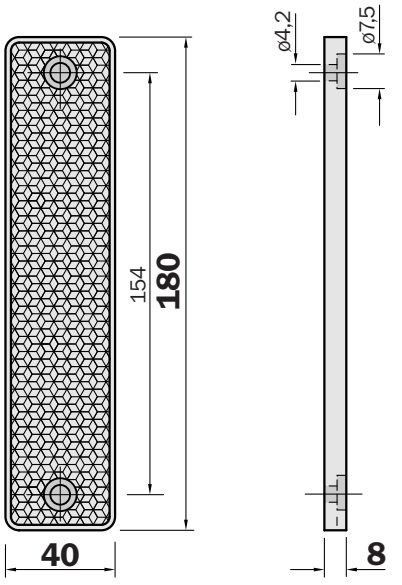
Reflector 80 x 80 mm²
screwable

Type	Part no.
PL 80 A	1 003 865



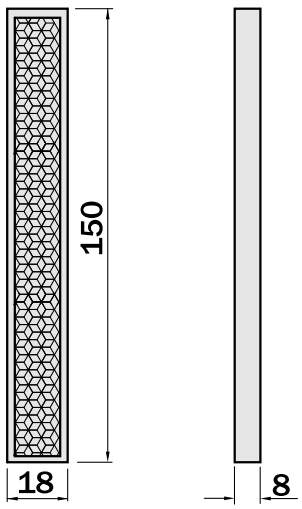
Reflector 40 x 180 mm²
screwable

Type	Part no.
PL 180 E01	1 013 289



Reflector 18 x 115 mm²
self-adhesive

Type	Part no.
PL 150	5 315 548



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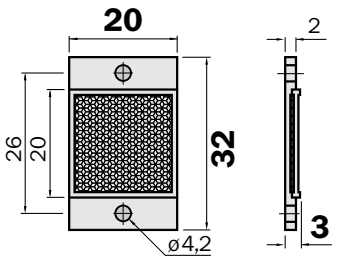
Reflectors

Dimensional drawings and order information

SENSICK reflectors plastic design, angular for temperatures up to 65° C

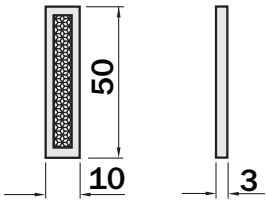
Micro triple reflector 20 x 20 mm²
screwable

Type	Part no.
PL 10 F	5 311 210



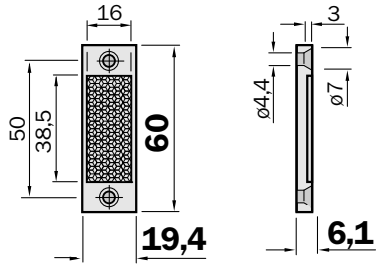
Micro triple reflector 10 x 50 mm²
plane

Type	Part no.
PL 15 F	5 313 849



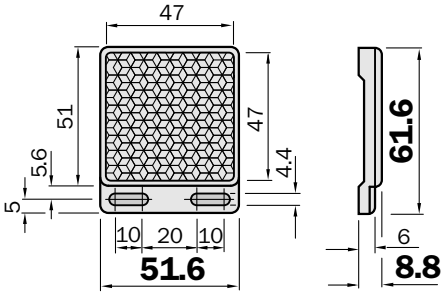
Micro triple reflector 20 x 40 mm²
screwable

Type	Part no.
PL 20 F	5 308 844



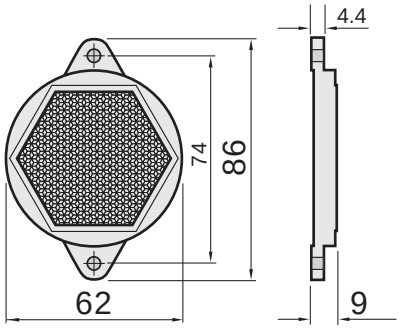
Micro triple reflector 47 x 47 mm²
screwable

Type	Part no.
P 250 F	5 308 843



Micro triple reflector, 6-sided
width across flats 52 mm, screwable

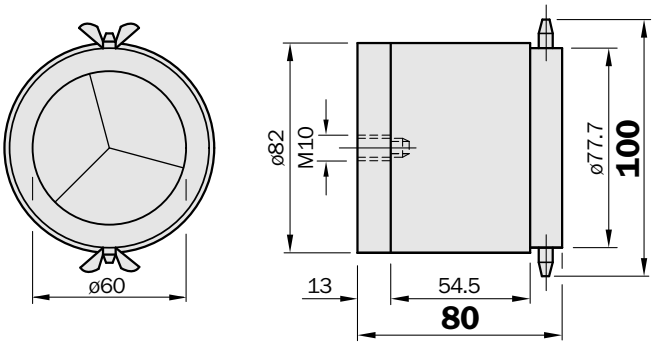
Type	Part no.
P 55 F	5 313 924



SENSICK special reflectors, glass for temperatures up to 65° C

Triple reflector, glass, ø 60 mm
screwable

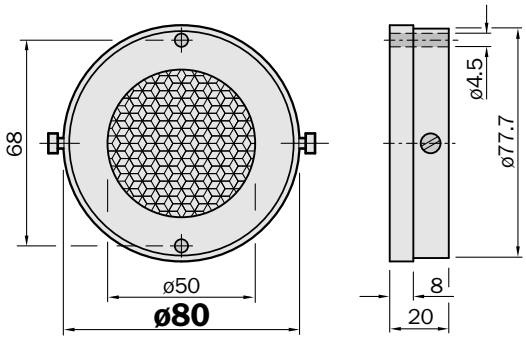
Type	Part no.	Remarks
OP 60-∞	1 000 141	f = ∞
OP 60-10	1 000 138	f = 10 m
OP 60-20	1 000 136	f = 20 m



SENSICK special reflectors, oil-tight for temperatures up to 65° C

Reflector, ø 50 mm
screwable

Type	Part no.
PL 53 A	1 000 382



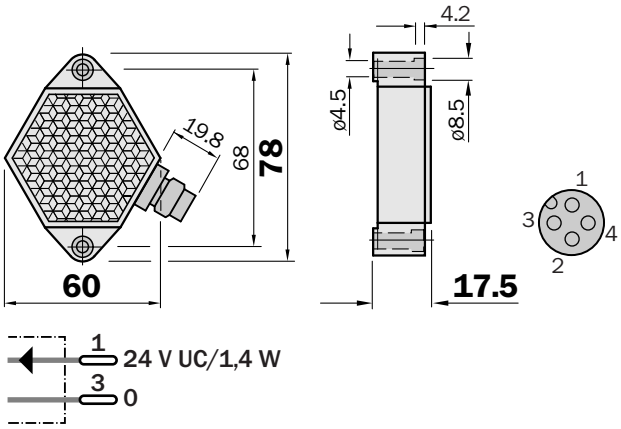
Reflectors

Dimensional drawings and order information

SENSICK special reflectors, with heating, for temperatures up to 65° C

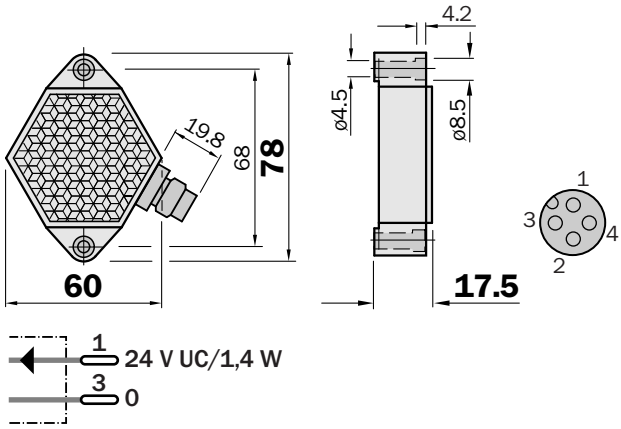
Reflector, 6-sided, width across flats 52 mm, continuous heating
screwable

Type	Part no.
PL 50 HK	1 011 545



Reflector, 6-sided, width across flats 52 mm, regulated heating
screwable

Type	Part no.
PL 50 HS	1 009 871

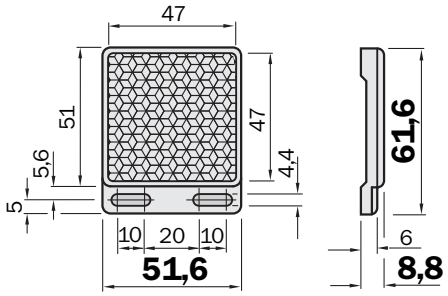


Heating ON: < 15 ° C

SENSICK special reflectors, plastic design, for temperatures up to 110 ° C

Reflector, 47 x 47 mm
screwable

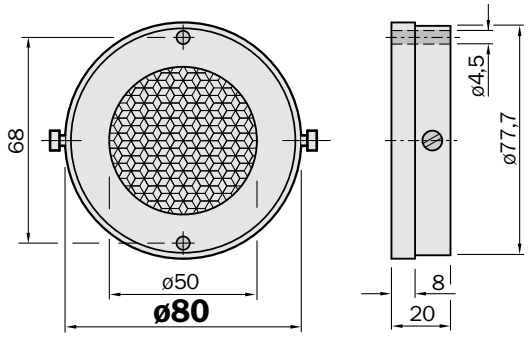
Type	Part no.
P 250 H	5 315 124



SENSICK special reflectors, plastic design, for temperatures up to 300 ° C

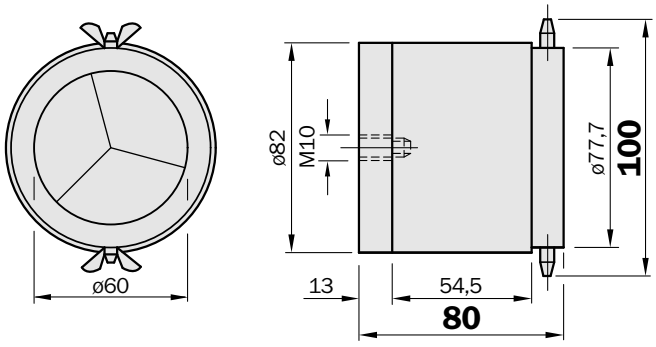
Reflector, ø 50 mm

Type	Part no.
SW 50	1 000 131



Triple reflector, glass, ø 60 mm
high temperature-resistant seals

Type	Part no.
OP 61-∞	1 002 627



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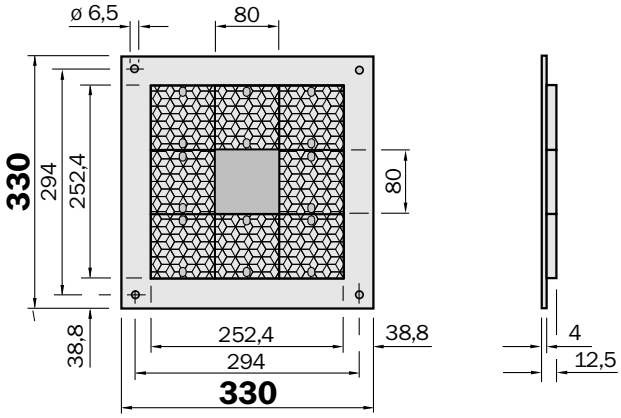
Reflectors

Dimensional drawings and order information

Special reflectors

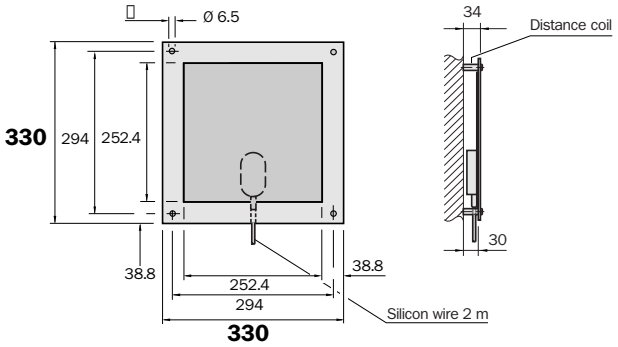
Combi-reflector, 3 x 3 PL 80 A, reflective foil center, for DME 2000, 3000

Type	Part no.
PL 240 F	1 013 784



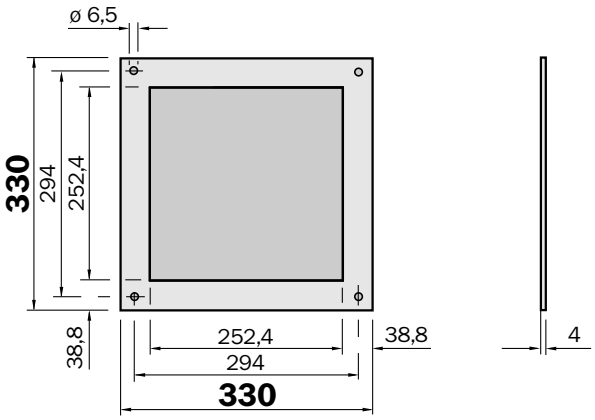
Reflector .3 x .3 m² diamond grade, regulated heating AC 230 V/200W

Type	Part no.
PL 240 DG-H	1 022 926



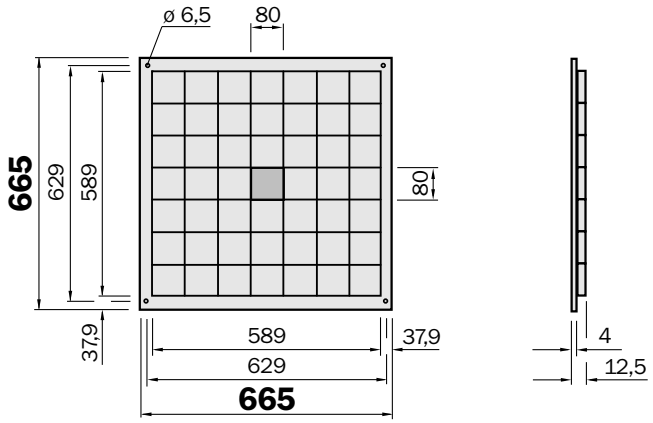
Reflector, 280 x 280 mm, for DME

Type	Part no.	Reflective tape
PL 240 DG	1 017 910	Diamond grade
PL 240-7610	1 019 012	High grain



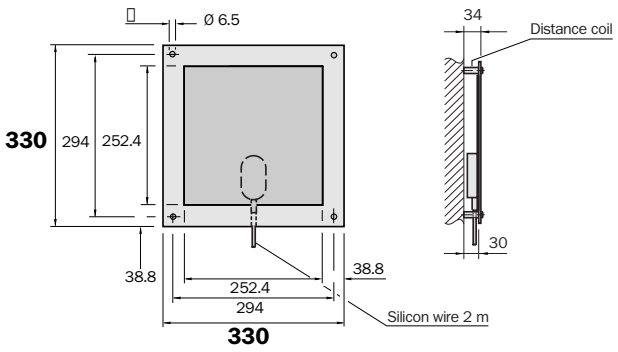
Combi-reflector, 7 x 7 PL 80 A, reflective foil center, for DME 2000, 3000

Type	Part no.
PL 560 F	1 013 785



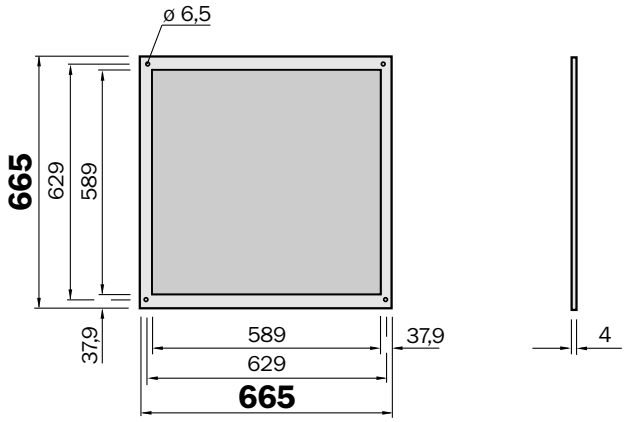
Reflector .6 x .6 m² diamond grade, regulated heating AC 230 V/200W

Type	Part no.
PL 560 DG-H	1 023 888



Reflector, 605 x 605 mm, diamond grade, for DME

Type	Part no.
PL 560 DG	1 016 806



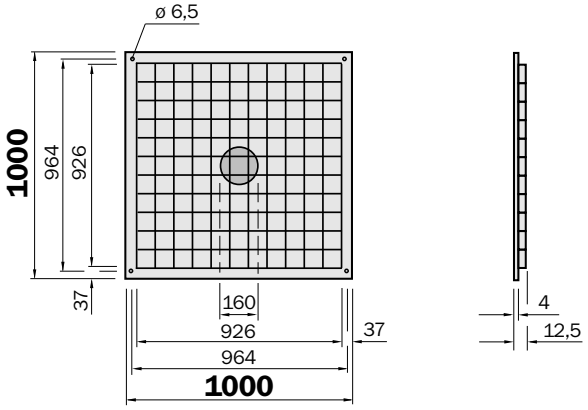
Reflectors

Dimensional drawings and order information

Special reflectors

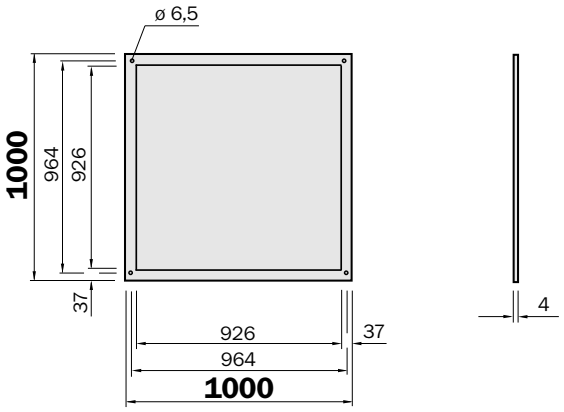
Combi-reflector, 11 x 11 PL 80 A, center reflectivity reduced for DME 2000, 3000

Type	Part no.
PL 880 F	1 013 786



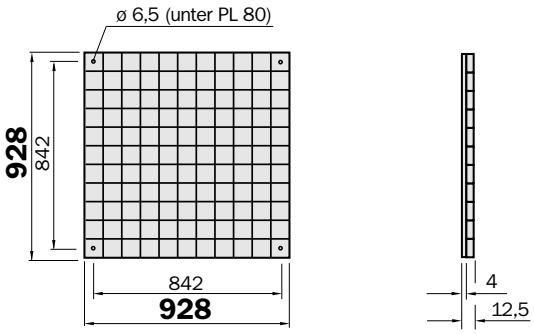
Reflector, 914 x 914 mm², diamond grade, for DME

Type	Part no.
PL 880 DG	1 018 975



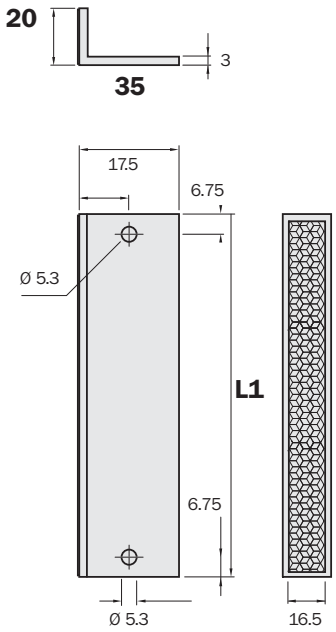
Reflector, 11 x 11 PL 80 A, can be linked in a row, for DME 2000, 3000

Type	Part no.
PL 880 FS01	1 017 865



Reflector, diamond grade on aluminum profile for Pick2Light, same mask as sensor

Type	Part no.
REF-PLG120	1 029 196
REF-PLG210	1 029 197
REF-PLG270	1 029 198
REF-PLG360	1 029 199
REF-PLG420	1 029 200



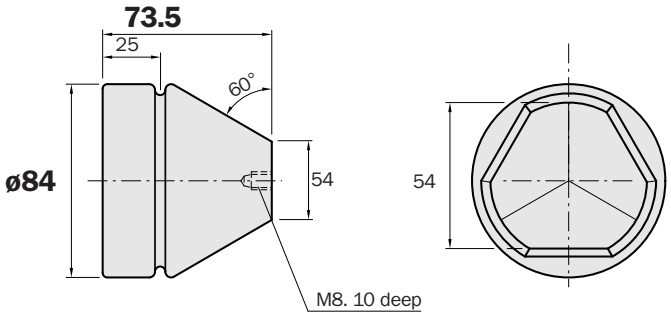
Reflectors

Dimensional drawings and order information

Special reflectors

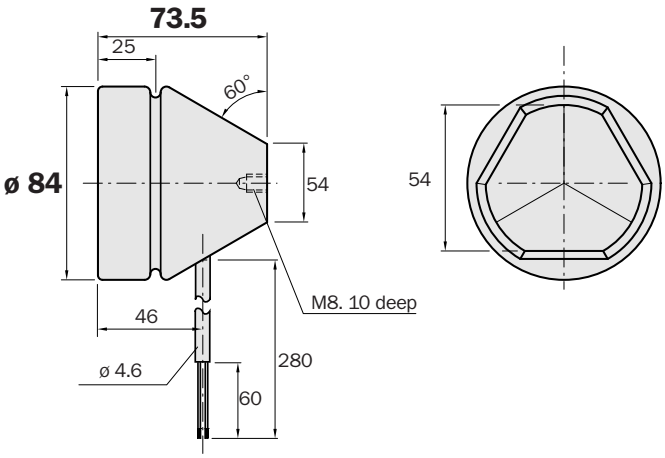
Triple reflector, glass for DML

Type	Part no.
OP 55	5 309 131



Triple reflector, glass, with heating for DML

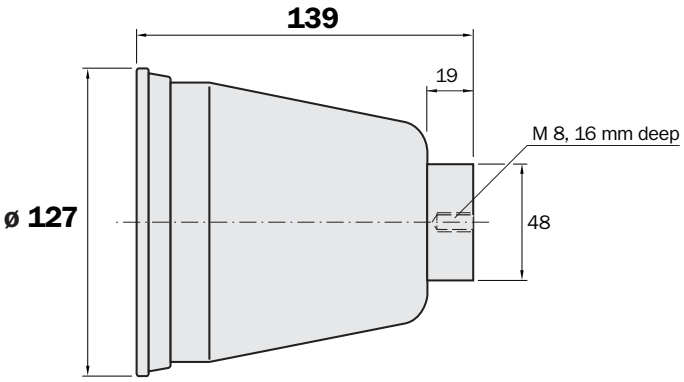
Type	Part no.
OP 55 H	5 309 132



Reflectors

Lens reflector for DMD

Type	Part no.
PL 140L	5 308 918



Deflecting reflector for DMD

Type	Part no.
USP-DMD	5 308 919

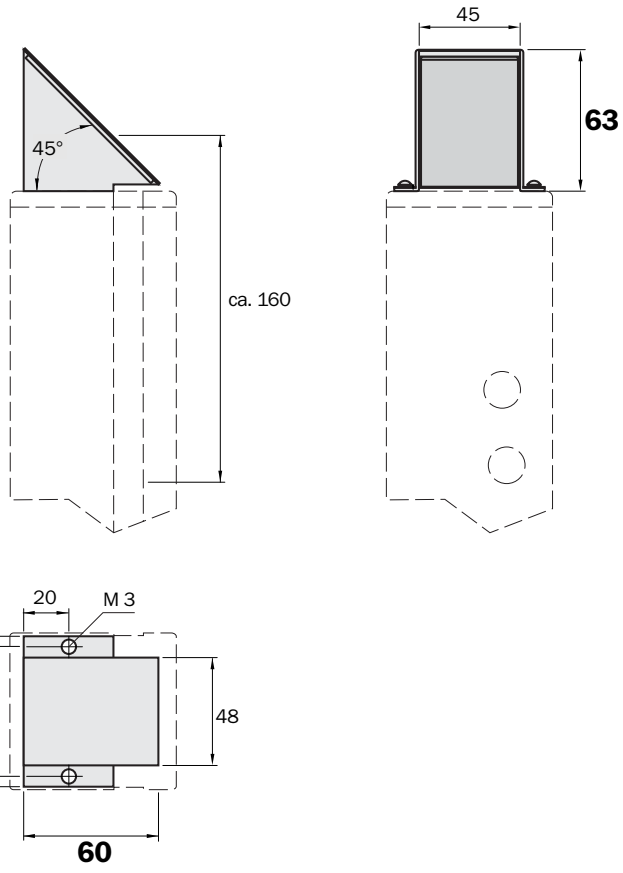
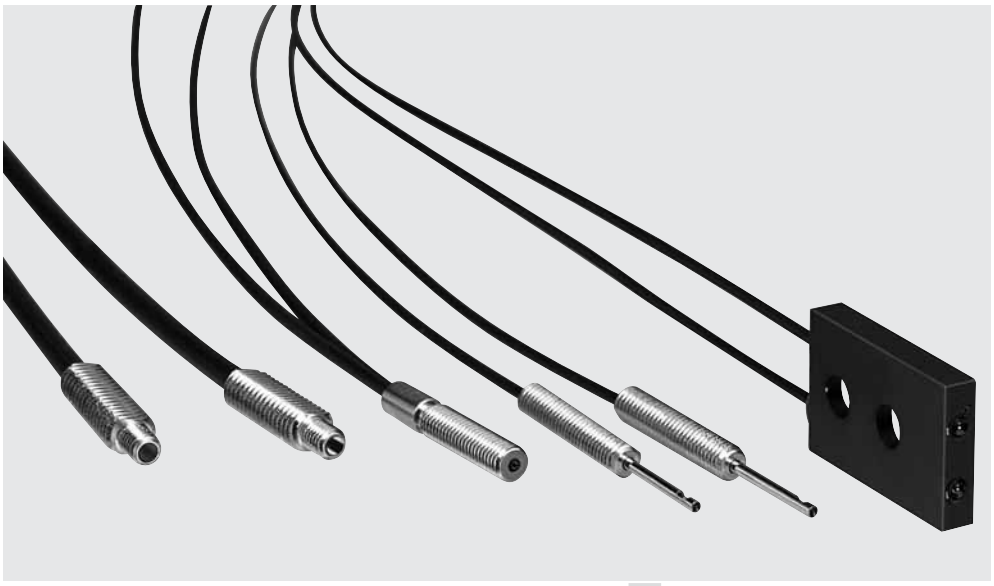


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LL3:
fiber-optic cables – solving automation problems



Fiber-optic cables
Through-beam systems

Fiber-optic cables
Proximity systems

Lack of installation space (even for miniature photoelectric switches) or exposure to chemicals or heat are frequent reasons for using the LL3 plastic fiber-optic cable. In combination with the WLL170(T) photoelectric switch series, the LL3s ensure reliable object detection even under difficult conditions.

Its multiple flexibility is one of the main advantages of the LL3. It has small bending radii and can be easily shortened to the required length. A number of different end sleeves make it is easy to connect and install.

In addition, there are a large number of variants. Around 70 different versions of the LL3 offer optimum alternatives for virtually every application in the optical, mechanical and chemical fields. A number of different attachment lenses extend its field of possible applications. The LL3 fiber-optic cable and the SICK fiber-optic cable photoelectric switch are an unbeatable team for semiconductor and electronics assembly, packaging, handling and assembly systems, special engineering and fine mechanics applications.

LL3 options:
– Standard optical conductor
– Large range
– Attachment lenses
– Small end sleeves for confined spaces
– Highly flexible with small bending radii
– Integrated 90° deflection
– Temperature resistant up to 300° C
– Teflon sheath for corrosive surroundings
– Coaxial design
– Flexible end sleeves
– 10 meters in length
– Optical-guide line
– Level switch

Which fiber-optic cable fits which sensor?

WLL 160(T)



WLL 160
with LL 3 fiber-optic cable, plastic
- manual sensitivity adjustment
- alarm output and test input
- timer 0 to 100 ms
- light/dark switching

WLL 160T
with LL 3 fiber-optic cable, plastic
- teach-in sensitivity adjustment, via button on device or externally via control signal
- switching frequency 830/s or 1,600/s, switch-selectable
- timer

WLL 170(T)



WLL 170
with LL 3 fiber-optic cable, plastic
- manual sensitivity adjustment
- red light LED sender
- large sensing ranges
- timer and L.ON-/D.ON selector

WLL 170 high-speed
with LL 3 fiber-optic cable, plastic
- high-speed 10,000/s
- red light LED sender
- timer and L.ON-/D.ON selector

WLL 170 analog
with LL 3 fiber-optic cable, plastic
- analog output voltage 1 to 5 V
- red light LED sender
- variable gain

WLL 170T
with LL 3 fiber-optic cable, plastic
- teach-in sensitivity adjustment via button on device
- large sensing ranges
- red light LED sender
- optional: anti-interference

WLL 170T mark sensor
with LL 3 fiber-optic cable, plastic
- teach-in sensitivity adjustment via button on device
- green light LED sender
- optional: anti-interference

WLL 170T-2



WLL 170T-2
with LL 3 fiber-optic cable, plastic
- longer ranges
- fast response time of 50 µs for fast processes
- external teach in put
- light/dark switching

WLL 190T



WLL 190T
with LL 3 fiber-optic cable, plastic
- manual sensitivity adjustment
- alarm output and test input
- timer 0 to 100 ms
- light/dark switching

WLL 190T
with LL 3 fiber-optic cable, plastic
- teach-in sensitivity adjustment, via button on device or externally via control signal
- switching frequency 830/s or 1,600/s, switch-selectable
- timer

WLL 190T-2



WLL 190T-2
with LL 3 fiber-optic cable, plastic
- 2 x 4 digit display to monitor nominal and actual value
- fast resonse time of 60 µs
- automatic adjustment of switching threshold for transparent objects
- 2 outputs (switching outputs or alarm output)/analog output/external teach-in input
- saturation prevention by attenuation function

WLL 12



with LL 3, LT, LM fiber-optic cable
- red, infrared or green light LED sender
- complementary switching outputs, selectable via control cable
- switching frequency: 1,300/s

WLL 1000/WLL 2000



with LBS, LIS fiber-optic cable
- direct voltage supply
- cable chamber or M12 plug
- test input
- universal voltage supply, relay switching output

WLL 260



WLL 260 DC
with LBS, LIS fiber-optic cable
- direct voltage supply
- terminal chamber or M12 plug
- test input

WLL 260 UC
with LBS, LIS fiber-optic cable
- universal voltage supply, relay switching output
- terminal chamber

KTL 5G-2



with LBS, LIS, LSS fiber-optic cable
- green light LED sender
- switching frequency 10,000/s

LUT



LUT 3-820
with LLX 3 fiber-optic cable
- UV light source
- supplementary optical filter

LUT 1-4
with LLUV 5 fiber-optic cable
- UV light source with high-pressure mercury-vapor burner
- supplementary optical filter

CSL



with LBS, LSS, LIS fiber-optic cable
- teach-in
- adjustable color selectivity

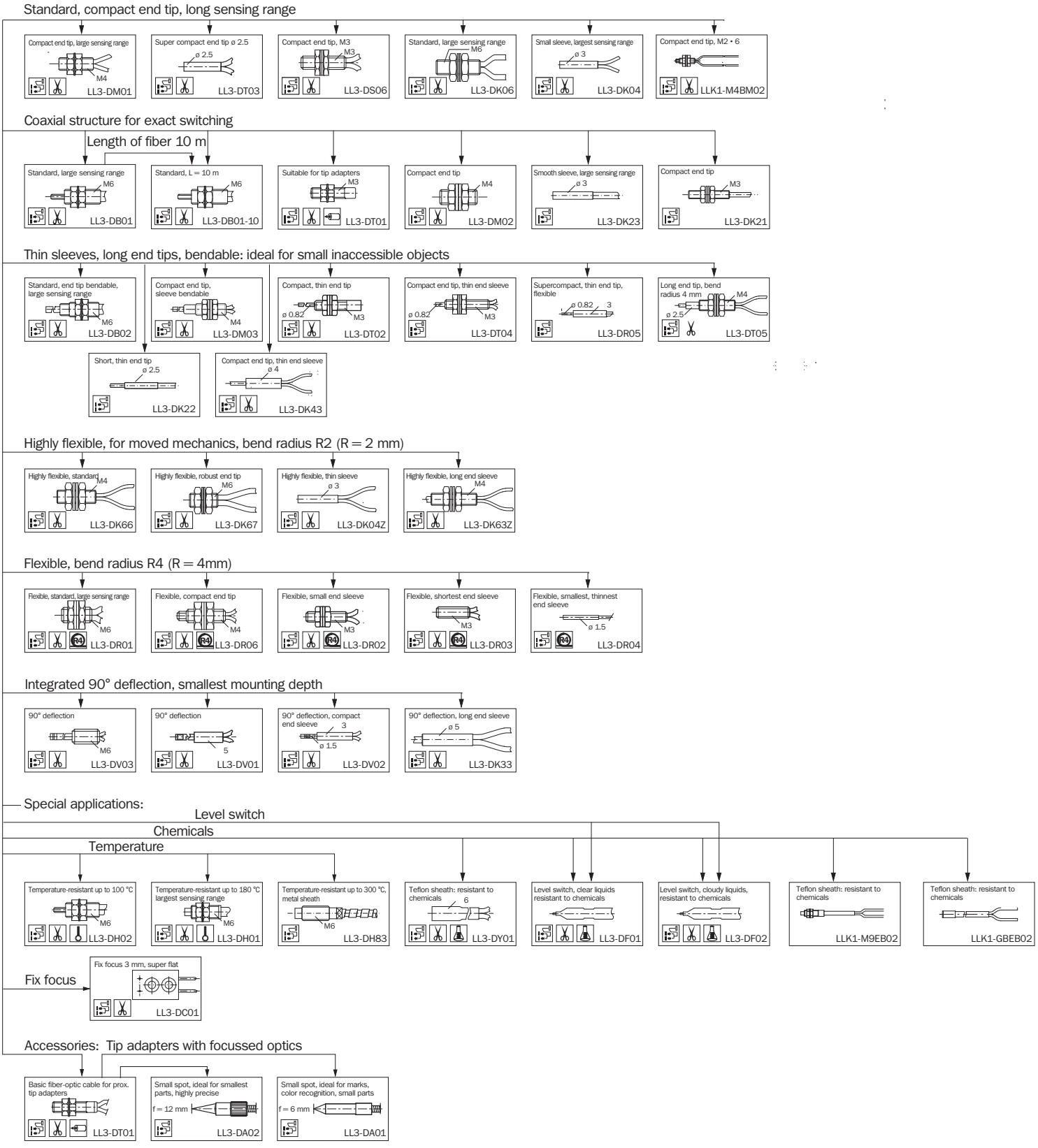
VLL 18



with LL 3 fiber-optic cable
- adjustable sensitivity: per teach-in
- simplest handling

Fiber-Optic Cables

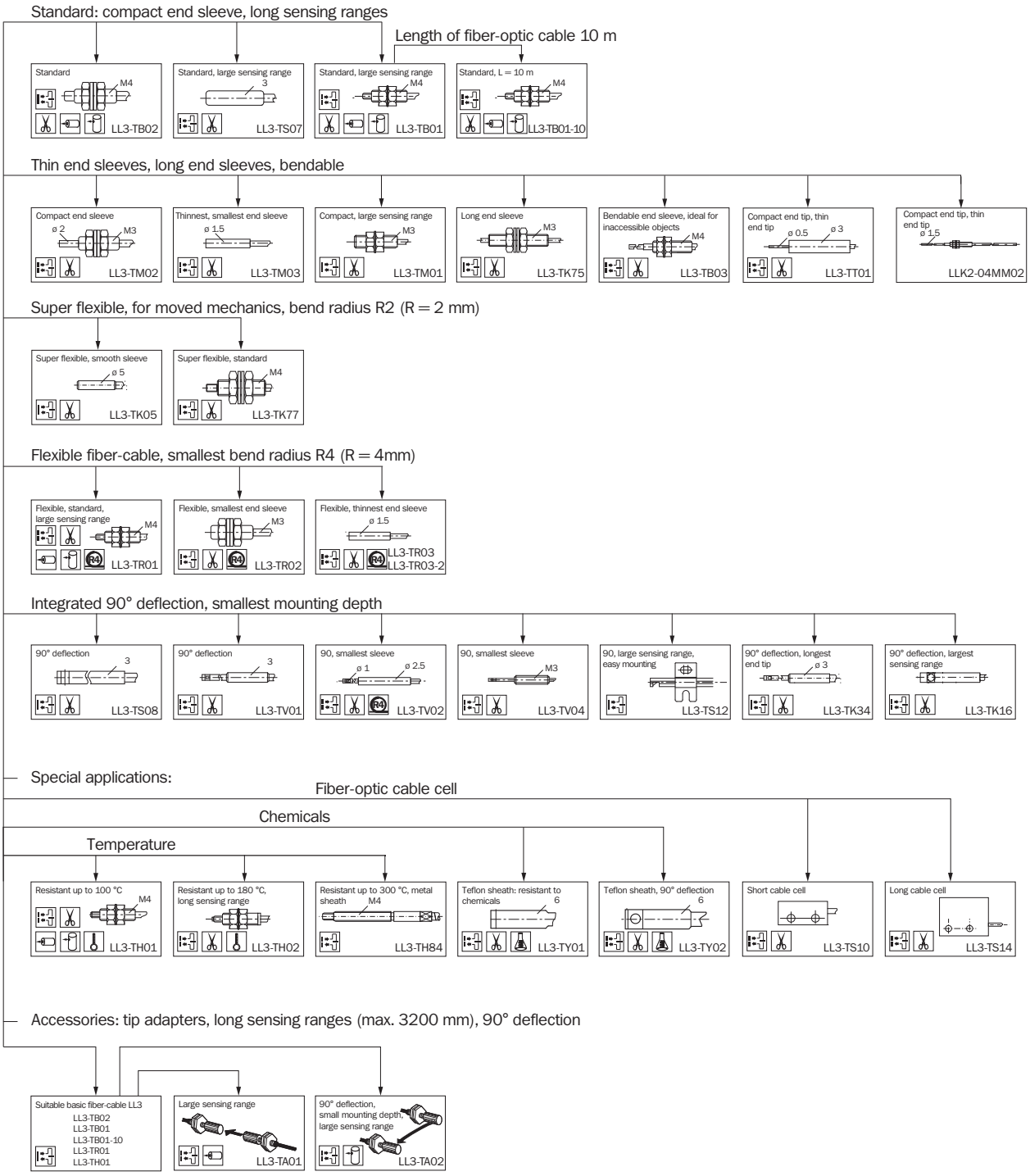
Flowchart for selection of fiber-optic cable, proximity systems

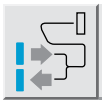


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Fiber-Optic Cables

Flowchart for selection of fiber-optic cable, through-beam systems





Fiber-optic cables
Proximity systems

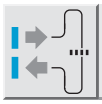
LL3 plastic fiber-optic cables
Proximity systems

Type Standard type	Part no.	Object size Standard: white 90%	Minimum[1]	Suitable for sensing tip adapter[2]	LL3 = Core structure C = Coaxial, S = Sender R = Receiver	Can be shortened as required[3]	LL3-Length	LL3-Outside Ø	Bend radius R LL3
LL3-DM01	5 308 071	100 x 100 mm	Ø 0.015 mm	No	2 x : Ø 1.0 mm	Yes	2 m	1.3 mm	R25
LL3-DT03	5 308 072	30 x 30 mm	Ø 0.015 mm	No	2 x : Ø 0.5 mm	Yes	2 m	1.0 mm	R15
LL3-DS06	5 308 073	30 x 30 mm	Ø 0.015 mm	No	2 x : Ø 0.5 mm	Yes	2 m	2.2 mm	R15
LL3-DK06	5 313 019	100 x 100 mm	Ø 0.015 mm	No	2 x : Ø 1.0 mm	Yes	2 m	2.2 mm	R25
LL3-DK04	5 313 020	100 x 100 mm	Ø 0.015 mm	No	2 x : Ø 1.0 mm	Yes	2 m	1.3 mm	R25
Coaxial cable									
LL3-DB01	5 308 074	100 x 100 mm	Ø 0.015 mm	No	C, S: Ø 1.0 mm, R: 16 x Ø 0.25 mm	Yes	2 m	2.2 mm	R25
LL3-DB01-10	5 308 075	100 x 100 mm	Ø 0.015 mm	No	C, S: Ø 1.0 mm, R: 16 x Ø 0.25 mm	Yes	10 m	2.2 mm	R25
LL3-DB03	5 313 021	100 x 100 mm	Ø 0.015 mm	No	C, S: Ø 1.0 mm, R: 16 x Ø 0.25 mm	Yes	2 m	2.2 mm	R25
LL3-DT01	5 308 076	30 x 30 mm	Ø 0.015 mm	Yes	C, S: Ø 0.5 mm, R: 9 x Ø 0.25 mm	Yes	2 m	1.3 mm	R15
LL3-DM02	5 308 077	30 x 30 mm	Ø 0.015 mm	No	C, S: Ø 0.5 mm, R: 9 x Ø 0.25 mm	Yes	2 m	1.3 mm	R15
LL3-DK23	5 313 022	30 x 30 mm	Ø 0.015 mm	No	C, S: Ø 1.0 mm, R: 16 x Ø 0.25 mm	No	0.5 m	2.6 mm	R25
LL3-DK21	5 313 023	30 x 30 mm	Ø 0.015 mm	No	C, S: Ø 0.25 mm, R: 10 x Ø 0.125 mm	No	2 m	1.6 mm	R15
Super flexible, bend radius R = 2 mm									
LL3-DK66	5 313 024	100 x 100 mm	Ø 0.015 mm	No	2 x : Ø 1.0 mm	Yes	2 m	1.3 mm	R2
LL3-DK67	5 313 025	100 x 100 mm	Ø 0.015 mm	No	2 x : Ø 1.0 mm	Yes	2 m	2.2 mm	R2
LL3-DK04Z	5 313 026	100 x 100 mm	Ø 0.015 mm	No	2 x : Ø 1.0 mm	Yes	2 m	1.3 mm	R2
LL3-DK63Z	5 313 027	100 x 100 mm	Ø 0.015 mm	No	2 x : Ø 1.0 mm	Yes	2 m	1.3 mm	R2
Flexible, bend radius R = 4 mm									
LL3-DR01	5 308 078	100 x 100 mm	Ø 0.015 mm	No	S: 16 x Ø 0.26 mm, R: 16 x Ø 0.26 mm	Yes	2 m	2.2 mm	R4
LL3-DR02	5 308 079	30 x 30 mm	Ø 0.015 mm	No	S: 2 x Ø 0.25 mm, R: 16 x Ø 0.25 mm	Yes	1 m	1.0 mm	R4
LL3-DR03	5 308 080	30 x 30 mm	Ø 0.015 mm	No	S: 4 x Ø 0.25 mm, R: 4 x Ø 0.25 mm	Yes	2 m	1.0 mm	R4
LL3-DR04	5 308 081	30 x 30 mm	Ø 0.015 mm	No	S: 2 x Ø 0.25 mm, R: 2 x Ø 0.25 mm	No	1 m	1.2 mm	R4
LL3-DR06	5 308 082	30 x 30 mm	Ø 0.015 mm	No	S: 4 x Ø 0.25 mm, R: 4 x Ø 0.25 mm	Yes	2 m	1.0 mm	R4
Long end tips									
LL3-DB02	5 308 083	100 x 100 mm	Ø 0.015 mm	No	C, S: Ø 1.0 mm, R: 16 x Ø 0.25 mm	Yes	2 m	2.2 mm	R25
LL3-DM03	5 308 084	30 x 30 mm	Ø 0.015 mm	No	2 x Ø 0.5 mm	Yes	2 m	1.0 mm	R15
LL3-DT02	5 308 085	30 x 30 mm	Ø 0.015 mm	No	2 x Ø 0.25 mm	Yes	2 m	1.0 mm	R4
LL3-DT04	5 308 086	30 x 30 mm	Ø 0.015 mm	No	C, S: Ø 0.25 mm, R: 9 x Ø 0.125 mm	No	0.5 m	1.2 mm	R4
LL3-DT05	5 313 028	30 x 30 mm	Ø 0.015 mm	No	2 x Ø 0.5 mm	Yes	2 m	1.0 mm	R15
LL3-DR05	5 308 087	30 x 30 mm	Ø 0.015 mm	No	2 x Ø 0.25 mm	No	0.5 m	2.2 mm	R4
LL3-DK22	5 313 029	30 x 30 mm	Ø 0.015 mm	No	C, S: Ø 0.5 mm, R: 9 x Ø 0.25 mm	No	0.5 m	2.1 mm	R15
LL3-DK43	5 313 030	30 x 30 mm	Ø 0.015 mm	No	2 x Ø 0.5 mm	Yes	2 m	1.0 mm	R15
Integrated 90° deflection									
LL3-DV01	5 308 088	30 x 30 mm	Ø 0.025 mm	No	2 x Ø 1.0 mm	Yes	2 m	2.2 mm	R25
LL3-DV02	5 308 089	30 x 30 mm	Ø 0.015 mm	No	2 x Ø 0.5 mm	Yes	2 m	1.0 mm	R15
LL3-DV03	5 308 090	30 x 30 mm	Ø 0.025 mm	No	2 x Ø 1.0 mm	Yes	2 m	2.2 mm	R25
LL3-DK33	5 313 031	30 x 30 mm	Ø 0.025 mm	No	2 x Ø 1.0 mm	Yes	2 m	2.2 mm	R25
Level switch for liquids									
LL3-DF01	5 308 094	clear liquid	–	No	2 x Ø 1.0 mm	Yes	2 m	6 mm	R60
LL3-DF02	5 308 095	cloudy liquid	–	No	2 x Ø 1.0 mm	Yes	2 m	6 mm	R60
Temperature-resistant									
LL3-DH01	5 308 091	100 x 100 mm	Ø 0.015 mm	No	2 x Ø 1.5 mm	Yes	2 m	2.2 mm	R35
LL3-DH02	5 308 092	100 x 100 mm	Ø 0.015 mm	No	2 x Ø 1.0 mm	Yes	2 m	2.2 mm	R25
LL3-DH83	5 313 032	100 x 100 mm	Ø 0.015 mm	No	Ø 1.6 mm (mixed 50 µm)	No	1 m	5 mm	R25
Teflon sheath									
LL3-DY01	5 308 093	100 x 100 mm	Ø 0.02 mm	No	2 x Ø 1.0 mm	Yes	2 m	6 mm	R60
Fix focus									
LL3-DC01	5 313 033	30 x 30 mm	Ø 0.015 mm	No	2 x Ø 0.5 mm	Yes	2 m	1.0 mm	R15

1) Minimum object diameter: sensing range reduction 2) See also LL3-Accessories: tip adapter 3) Cutter FC for fiber-optic cables included with delivery

Dimensioning mounting sleeve	End tip	Fiber material Core	Sheath	End tip[4]	Operating temperature	General description
M4	–	PMMA	PE	1.4305	-40…70° C	M4, core: 2 x Ø 1.0 mm
Ø 2.5 mm	–	PMMA	PE	1.4305	-40…70° C	2.5 mm cylindric, core: 2 x Ø 0.5 mm
M3	–	PMMA	PE	1.4305	-40…70° C	M3, core: 2 x Ø 0.5 mm
M6	–	PMMA	PE	1.4306	-40…70° C	M6, core: 2 x Ø 1.0 mm
Ø 3 mm	–	PMMA	PE	1.4306	-40…70° C	Ø 3, core: 2 x Ø 1.0 mm
M6	–	PMMA	PE	1.4305	-40…70° C	M6, core: S = Ø 1.0 mm/R = 16 x Ø 0.25 mm; fiber length 2 m
M6	–	PMMA	PE	1.4305	-40…70° C	M6, core: S = Ø 1.0 mm/R = 16 x Ø 0.25 mm; fiber length 10 m
M6	–	PMMA	PE	1.4305	-40…70° C	M6, core: S = Ø 1.0 mm/R = 16 x Ø 0.25 mm
M3	–	PMMA	PE	1.4305	-40…70° C	M3, core: S = Ø 0.5 mm/R = 9 x Ø 0.25 mm
M4	–	PMMA	PE	1.4305	-40…70° C	M4, core: S = Ø 0.5 mm/R = 9 x Ø 0.25 mm
Ø 3 mm	–	PMMA	PE	1.4306	-40…70° C	Ø 3 mm, core: S = Ø 1.0 mm/R = 16 x Ø 0.25 mm
M3	–	PMMA	PE	1.4306	-40…70° C	M3, core: S = Ø 0.25 mm/R = 10 x Ø 0.125 mm
M4	–	PMMA	PE	1.4305	-40…70° C	M4, core: 2 x Ø 1.0 mm; R = 2
M6	–	PMMA	PE	1.4305	-40…70° C	M6, core: 2 x Ø 1.0 mm; R = 2
Ø 3 mm	–	PMMA	PE	1.4306	-40…70° C	Ø 3 mm, core: 2 x Ø 1.0 mm/R = 2
M4	Ø 2.5 mm	PMMA	PE	1.4306	-40…70° C	M4, Ø 0.25 end tip (bendable R = 10); core 2 x Ø 1.0 mm
M6	–	PMMA	PE	CuZn	-40…70° C	M6, core: S = 16 x Ø 0.26 mm/R = 16 x Ø 0.26 mm; mixed; R = 4
M3	–	PMMA	PE	1.4305	-40…70° C	M3, core: S = 2 x Ø 0.25 mm/R = 2 x Ø 0.25 mm; mixed; R = 4
Ø 3 mm	–	PMMA	PE	1.4305	-40…70° C	Ø 3 cylindric, core: S = 4 x Ø 0.25 mm/R = 4 x Ø 0.25 mm mixed; R = 4
Ø 1.5 mm	–	PMMA	PE	1.4305	-40…70° C	Ø 1.5 cylindric, core: S = 2 x Ø 0.25 mm/R = 2 x Ø 0.25 mm mixed; R = 4
M4	–	PMMA	PE	1.4305	-40…70° C	M4, core: S = 4 x Ø 0.25 mm/R = 4 x Ø 0.25 mm split; R = 4
M6	Ø 2.5 mm	PMMA	PE	1.4305	-40…70° C	M6, Ø 0.25 end tip, bendable; coaxial: S = Ø 1.0 mm/R = 16 x Ø 0.25 mm
M4	–	PMMA	PE	1.4305	-40…70° C	M4, Ø 1.5 end tip, bendable; core: 2 x Ø 0.5 mm
M3	–	PMMA	PE	1.4305	-40…70° C	M3, Ø 0.82 end tip, core: 2 x Ø 0.25 mm: R = 4
M3	–	PMMA	PE	1.4305	-40…70° C	M3, Ø 0.82 end tip, coax: 1 x Ø 0.25 mm/9 x Ø 0.125 mm; fiber length 0.5 m; R = 4
M4	–	PMMA	PE	1.4305	-40…70° C	M4, Ø 1.5 end tip, not bendable; core: 2 x Ø 0.5 mm
Ø 3 mm	–	PMMA	PE	1.4305	-40…70° C	Ø 3 cylindric, Ø 0.82 end tip; core: 2 x Ø 0.25 mm; fiber length 0.5 m; R = 4
Ø 2.5 mm	–	PMMA	PE	1.4305	-40…70° C	Ø 2.5 mm cylindric, Ø 1.5 mm end tip/core: S = 4 x Ø 0.5 mm; R = 9 x Ø 0.25 mm
Ø 4.0 mm	–	PMMA	PE	1.4305	-40…70° C	Ø 4 mm, Ø 1.5 end tip, core: 2 x Ø 0.5 mm
Ø 5 mm	–	PMMA	PE	1.4305	-40…70° C	Ø 5 mm cylindric, side view, Ø 2.7 mm short sleeve; core: 2 x Ø 1.0 mm
Ø 3 mm	–	PMMA	PE	1.4305	-40…70° C	Ø 3 mm cylindric, side view, Ø 1.5 mm end tip; core: 2 x Ø 0.5 mm
M6	–	PMMA	PE	1.4305	-40…70° C	M6, side view, Ø 2.5 mm end tip; core: 2 x Ø 1.0 mm
Ø 5 mm	–	PMMA	PE	1.4305	-40…70° C	Ø 5 mm cylindric, side view, Ø 2.7 mm long sleeve; core: 2 x Ø 1.0 mm
Ø 6 mm	–	PTEE (Teflon sheath)			-40…70° C	Ø 6 mm cylindric, Teflon jacket, for clear liquid detection
Ø 6 mm	–	PTEE (Teflon sheath)			-40…70° C	Ø 6 mm cylindric, Teflon jacket, for cloudy liquid detection
M6	–	Si	FEP	1.4305	-40…180° C	Heat resistant to 180° C; M6; core 2 x Ø 1.5 mm
M6	–	PC	PVC	1.4305	-40…100° C	Heat resistant to 105° C; M6; core 2 x Ø 1.0 mm
M6	–	Glass		1.4305	-40…300° C	Heat resistant to 300° C; M6; core Ø 1.6 mm (mixed 50 µ)
Ø 6 mm	–	PTEE (Teflon sheath)			-40…100° C	Ø 6 mm cylindric, Teflon sheath
19 x 12 x 3	–	PMMA	PE	Al	-40…70° C	Fixed focus 3 mm

4) 1.4305 (German materials no.) stainless steel, resistant to rusting and acids



Fiber-optic cables
Through-beam systems

LL3 plastic fiber-optic cables
Through-beam systems

Type Standard type	Part no. [5]	Object size: Standard	Minimum[1]	Suitable for sensing tip adapter[2]	LL3 = Core structure	Can be shortened as required[3]	LL3-Length	LL3-Outside Ø	Bend radius R: LL3	Bend radius R: Sleeve
LL3-TS07	5 308 049	Ø 1.5 mm	Ø 0.5 mm	No	Ø 1.5 mm	Yes	2 m	2.2 mm	R30	–
LL3-TB01	5 308 050	Ø 1.5 mm	Ø 0.5 mm	Yes	Ø 1.5 mm	Yes	2 m	2.2 mm	R30	–
LL3-TB01-10	5 308 051	Ø 1.5 mm	Ø 0.5 mm	Yes	Ø 1.5 mm	Yes	10 m	2.2 mm	R30	–
LL3-TB02	5 308 048	Ø 1 mm	Ø 0.2 mm	Yes	Ø 1.0 mm	Yes	2 m	2.2 mm	R25	–
Super flexible, bend radius R = 2 mm										
LL3-TK05	5 313 034	Ø 1 mm	Ø 0.2 mm	No	Ø 1.0 mm (multi-core)	Yes	2 m	2.2 mm	R2	–
LL3-TK77	5 313 035	Ø 1 mm	Ø 0.2 mm	Yes	Ø 1.0 mm (multi-core)	Yes	2 m	2.2 mm	R2	–
Flexible, bend radius R = 4										
LL3-TR01	5 308 052	Ø 1 mm	Ø 0.3 mm	Yes	Ø 0.265 mm x 16	Yes	2 m	2.2 mm	R4	–
LL3-TR02	5 308 053	Ø 0.5 mm	Ø 0.1 mm	No	Ø 0.25 mm x 4	Yes	2 m	1.0 mm	R4	–
LL3-TR03	5 308 054	Ø 0.5 mm	Ø 0.1 mm	No	Ø 0.25 mm x 4	Yes	1 m	1.0 mm	R4	–
LL3-TR03-02	5 308 055	Ø 0.5 mm	Ø 0.1 mm	No	Ø 0.25 mm x 4	Yes	2 m	1.0 mm	R4	–
Long end tips										
LL3-TB03	5 308 056	Ø 1 mm	Ø 0.2 mm	No	Ø 1.0 mm	Yes	2 m	2.2 mm	R25	10
LL3-TT01	5 308 057	Ø 0.25 mm	Ø 0.1 mm	No	Ø 0.25 mm	Yes	2 m	1.0 mm	R15	–
LL3-TK75	5 313 036	Ø 0.5 mm	Ø 0.1 mm	No	Ø 0.5 mm	Yes	2 m	1.0 mm	R15	–
Integrated 90° deflection										
LL3-TV01	5 308 058	Ø 1 mm	Ø 0.2 mm	No	Ø 1.0 mm	Yes	2 m	2.2 mm	R25	–
LL3-TV02	5 308 059	Ø 0.5 mm	Ø 0.1 mm	No	Ø 0.5 mm	Yes	2 m	1.0 mm	R15	–
LL3-TV04	5 308 060	Ø 0.5 mm	Ø 0.1 mm	No	Ø 0.5 mm	Yes	2 m	1.0 mm	R15	–
LL3-TS08	5 308 061	Ø 1 mm	Ø 0.2 mm	No	Ø 1.0 mm	Yes	2 m	2.2 mm	R25	–
LL3-TS12	5 308 062	Ø 1.7 mm	Ø 0.5 mm	No	Ø 0.75 mm	Yes	2 m	2.2 mm	R25	–
LL3-TK34	5 313 037	Ø 1 mm	Ø 0.2 mm	No	Ø 1.0 mm	Yes	2 m	2.2 mm	R25	–
LL3-TK16	5 313 038	Ø 1 mm	Ø 0.2 mm	No	Ø 1.0 mm	Yes	2 m	2.2 mm	R25	–
Fiber-optic cable cell										
LL3-TS10	5 308 063	Ø 2 mm	Ø 1 mm	No	Ø 0.25 mm x 16	Yes	2 m	2.2 mm	R25	–
LL3-TS14	5 313 039	Ø 1.5 mm	Ø 0.5 mm	No	Ø 0.25 mm x 16	Yes	2 m	2.2 mm	R25	–
Temperature-resistant										
LL3-TH01	5 308 064	Ø 1 mm	Ø 0.2 mm	Yes	Ø 0.1 mm	Yes	2 m	2.2 mm	R25	–
LL3-TH02	5 308 065	Ø 1.5 mm	Ø 0.5 mm	No	Ø 1.5 mm	Yes	2 m	2.2 mm	R35	–
LL3-TH84	5 313 040	Ø 1 mm	Ø 0.2 mm	No	Ø 1.1 mm (multi-core Ø 50 µm)	No	1 m	2.2 mm	R25	–
Teflon sheath										
LL3-TY01	5 308 066	Ø 4 mm	Ø 0.3 mm	No	Ø 1.0 mm	Yes	2 m	6 mm	R60	–
LL3-TY02	5 308 067	Ø 4 mm	Ø 0.3 mm	No	Ø 1.0 mm	Yes	2 m	6 mm	R60	–
Smallest end sleeves										
LL3-TM01	5 308 068	Ø 1 mm	Ø 0.2 mm	No	Ø 1.0 mm	Yes	2 m	1.3 mm	R25	–
LL3-TM02	5 308 069	Ø 0.5 mm	Ø 0.1 mm	No	Ø 0.5 mm	Yes	2 m	1.0 mm	R15	–
LL3-TM03	5 308 070	Ø 0.5 mm	Ø 0.1 mm	No	Ø 0.5 mm	Yes	2 m	1.0 mm	R15	–

1) Minimum object diameter: sensing range reduction 2) See also LL3-Accessories: tip adapter 3) Cutter FC for fiber-optic cables included with delivery
5) The part number includes 2 fiber-optic cables, which are needed for a through-beam system.

Dimensioning: Mounting sleeve	End tip	Fiber material: Core	Sheath	End tip [4]	Operating temperature	General description
Ø 3 mm	–	PMMA	PE	1.4305	-40…70° C	Ø 3 mm cylindric
M4	–	PMMA	PE	1.4305	-40…70° C	M4, long range, fiber length 2 m
M4	–	PMMA	PE	1.4305	-40…70° C	M4, long range, fiber length 10 m
M4	–	PMMA	PE	CuZn	-40…70° C	M4, standard
Ø 3 mm	–	PMMA	PE	1.4305	-40…70° C	Ø 3 mm cylindric, multi-core, tubular
M4	–	PMMA	PE	CuZn	-40…70° C	M4 cylindric, multi-core, tubular
M4	–	PMMA	PE	CuZn	-40…70° C	flexible, R4 mm, M4
M3	–	PMMA	PE	1.4305	-40…70° C	flexible, R4 mm, M3
Ø 1.5 mm	–	PMMA	PE	1.4305	-40…70° C	flexible, R4 mm, Ø 1.5 mm cylindric, fiber length 1 m
1.5 mm	–	PMMA	PE	1.4305		flexible, R4 mm, Ø 1.5 mm cylindric, fiber length 2 m
M4	Ø 1.5 mm	PMMA	PE	1.4305	-40…70° C	M4, Ø 1.5 mm end tip bendable
Ø 3 mm	–	PMMA	PE	1.4305	-40…70° C	Ø 3 mm cylindric, Ø 1.5 mm end tip
M3	–	PMMA	PE	1.4305	-40…70° C	M3, Ø 1.0 mm end tip
Ø 3 mm	–	PMMA	PE	1.4305	-40…70° C	3 mm cylindric, side view 90°, Ø 2.0 mm end tip
Ø 2.5 mm	–	PMMA	PE	1.4305	-40…70° C	Ø 2.5 mm cylindric, side view 90°, Ø 1.0 mm end tip
M3	–	PMMA	PE	1.4305	-40…70° C	M3, side view 90°, Ø 1.0 mm end tip
Ø 3 mm	–	PMMA	PE	1.4305	-40…70° C	Ø 3 mm cylindric, side view 90°, Ø 2.0 mm end tip
Ø 4 mm	–	PMMA	PE	1.4305	-40…70° C	Ø 4 mm cylindric, side view 90°, special mounting
Ø 3 mm	–	PMMA	PE	1.4305	-40…70° C	Ø 3 mm cylindric, side view 90°, Ø 1.5 mm end tip
Ø 4 mm	–	PMMA	PE	1.4305	-40…100° C	Ø 4 mm cylindric, side view 90°, short end tip, heat resistant to 100 ° C
10 x 20 x 5	–	PMMA	PE	CuZn	-40…70° C	Fiber-optic cable cell 5.25 mm
19 x 25 x 5	–	PMMA	PE	CuZn	-40…70° C	Fiber-optic cable cell 10.5 mm
M4	–	PC	PE	CuZn	-40…100° C	Heat resistance to 100°, M4-sleeve
M4	–	Si	FEP	1.4305	-40…180° C	Heat resistance to 180°, M4-sleeve
M4	–	Glass	1.4305	1.4305	-40…300° C	Heat resistance to 300°, M4-sleeve, glass/metal
Ø 6 mm	–	PTEE (Teflon sheath)			-40…70° C	Ø 6 mm cylindric, Teflon sheath
Ø 6 mm	–	PTEE (Teflon sheath)			-40…70° C	Ø 6 mm cylindric, side view 90°, Teflon sheath
M3	–	PMMA	PE	1.4305	-40…70° C	M3, Ø LL-core: 1 mm
M3	–	PMMA	PE	1.4305	-40…70° C	M3, Ø LL-core: 0.5 mm
Ø 1.5 mm	–	PMMA	PE	1.4305	-40…70° C	1.5 mm cylindric, Ø LL-core: 0.5 mm

4) 1.4305 (German materials no.) stainless steel, resistant to rusting and acids

LL 3 plastic fiber-optic cables

Accessories – Tip adapters

Type LL3 proximity, lenses with focused optic	Part no.	Object size (White 90%) Standard	Object size (White 90%) Minimum	Dimensioning Thread	Dimensioning Outside Ø	Lens material Lens	Lens material Housing	Operating temperature	Remark
Focus 6 mm, spot size Ø 0.25 mm									
LL3-DA01	5308127			M3	Ø 5.0 mm			-40…70° C	• For detection of very small parts • Focused, very small light spot diameter • High sensitivity (6% remission) • For suppressing interference – causing backgrounds
Combined with standard fiber LL3									
LL3-DT01	5308076	Ø 0.25 mm	Ø 0.1 mm			Glass	Al	-40…70° C	
Focus 12 mm, spot size Ø 3.0 mm									
LL3-DA02	5308130			M3	Ø 5.0 mm			-40…70° C	• Suitable as a mark sensor for color marks • Focused, very small light spot diameter • High sensitivity (6% remission) • For suppressing interference – causing backgrounds
Combined with standard fiber LL3									
LL3-DT01	5308076	Ø 3.0 mm	Ø 0.1 mm			Glass	Al	-40…70° C	

Type LL3 through-beam lenses for extended sensing ranges	Part no.	Object size Standard	Object size Minimum	Dimensioning Thread	Dimensioning Outside Ø	Lens material Lens	Lens material Housing	Operating temperature	Remark
Axial optic, largest sensing ranges									
LL3-TA01	5 308 128			M2.6	Ø 5.0 mm	Glass	CuZn	-40…300° C	• For through-beam systems • For increased sensing ranges (up to factor 10 x) • Light spot diameter: approx. 170 mm at 1000 mm
Combined with standard fibers LL3									
LL3-TB01	5 308 050	–	Ø 3 mm[1]/4 mm²					-40…70° C	
LL3-TB01-10	5 308 051	–	Ø 3 mm[1]/4 mm²					-40…70° C	
LL3-TB02	5 308 048	–	Ø 3 mm[1]/4 mm²					-40…70° C	
Combined with super flexible fibers									
LL3-TK77	5 313 035	–	Ø 3 mm[1]/4 mm²					-40…70° C	
Combined with flexible fibers									
LL3-TR01	5 308 052	–	Ø 3 mm[1]/4 mm²					-40…100° C	
Combined with heat resisting fibers (100 °C)									
LL3-TH01	5 308 064	–	Ø 3 mm[1]/4 mm²					-40…100° C	
Integrated 90° deflection, large sensing ranges									
LL3-TA02	5 308 129			M2.6	Ø 5.0 mm	Glass	CuZn	-40…300° C	• For through-beam systems • Integrated 90° deflection • For increased sensing ranges • Light spot diameter: x-axis approx. 110 mm, y-axis approx. 170 mm (for 200 mm in each case) • Aperture: x-axis approx. 30°, y-axis approx. 40°
Combined with standard fibers LL3									
LL3-TB01	5 308 050	–	Ø 3 mm					-40…70° C	
LL3-TB01-10	5 308 051	–	Ø 3 mm					-40…70° C	
LL3-TB02	5 308 048	–	Ø 3 mm					-40…70° C	
Combined with super flexible fibers									
LL3-TK77	5 313 035	–	Ø 3 mm					-40…70° C	
Combined with flexible fibers									
LL3-TR01	5 308 052	–	Ø 3 mm					-40…70° C	
Combined with heat resisting fibers (100° C)									
LL3-TH01	5 308 064	–	Ø 3 mm					-40…70° C	

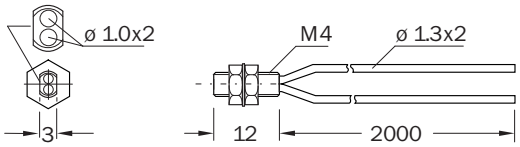
Proximity systems

Dimensional drawings and order information

Dimensional drawings for LL3 fiber-optic cables, proximity systems

Standard type

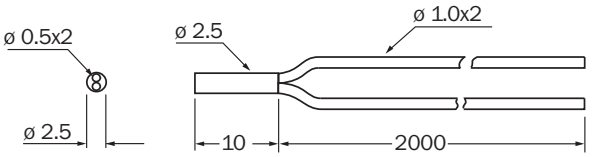
Type	Part no.
LL3-DM01	5 308 071



dimensions in mm

Standard type

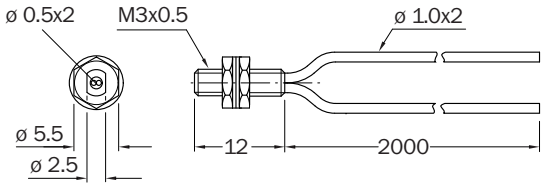
Type	Part no.
LL3-DT03	5 308 072



dimensions in mm

Standard type

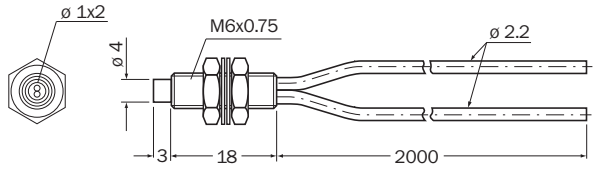
Type	Part no.
LL3-DS06	5 308 073



dimensions in mm

Standard type

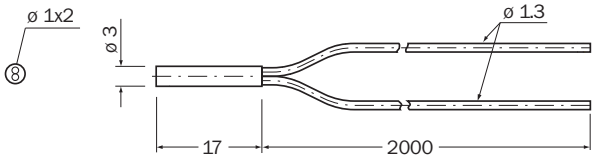
Type	Part no.
LLD-DK06	5 313 019



dimensions in mm

Standard type

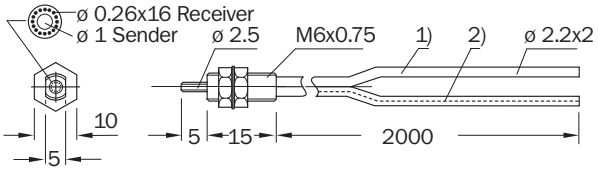
Type	Part no.
LL3-DK04	5 313 020



dimensions in mm

Standard type

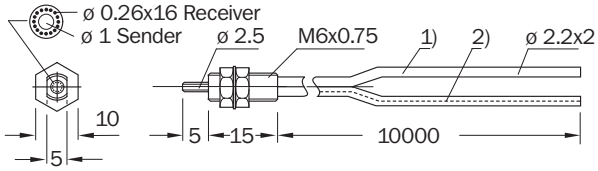
Type	Part no.
LL3-DB01	5 308 074



dimensions in mm

Standard type

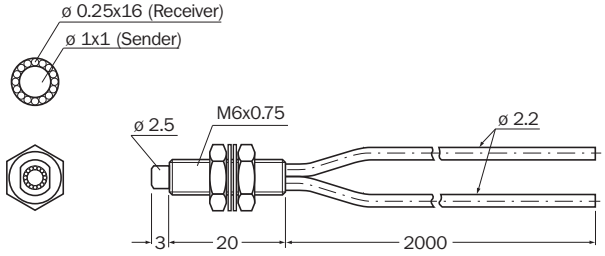
Type	Part no.
LL3-DB01-10	5 308 075



dimensions in mm

Standard type

Type	Part no.
LL3-DB03	5 313 021



dimensions in mm

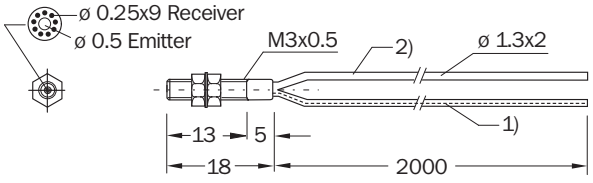
Proximity systems

Dimensional drawings and order information

Dimensional drawings for LL3 fiber-optic cables, proximity systems

Coaxial cable

Type	Part no.
LL3-DT01	5 308 076

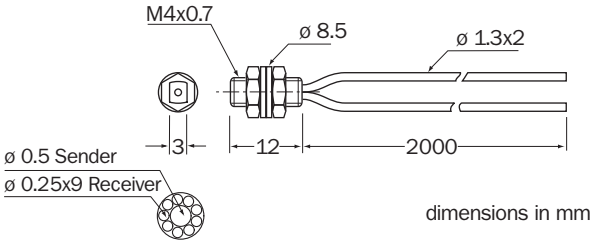


1) Sender
2) Receiver

dimensions in mm

Coaxial cable

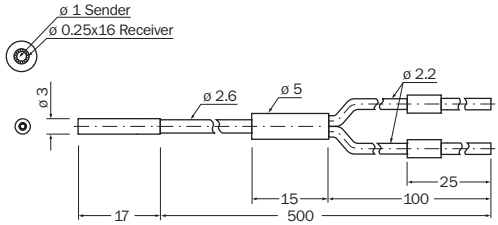
Type	Part no.
LL3-DM02	5 308 077



dimensions in mm

Coaxial cable

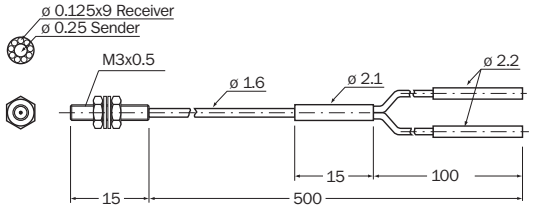
Type	Part no.
LL3-DK23	5 313 022



dimensions in mm

Coaxial cable

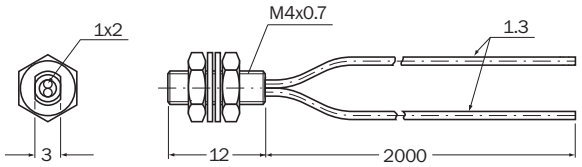
Type	Part no.
LL3-DK21	5 313 023



dimensions in mm

Super flexible, bend radius R = 2 mm

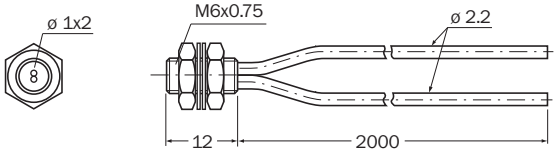
Type	Part no.
LL3-DK66	5 313 024



dimensions in mm

Super flexible, bend radius R = 2 mm

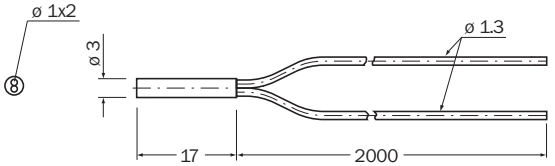
Type	Part no.
LL3-DK67	5 313 025



dimensions in mm

Super flexible, bend radius R = 2 mm

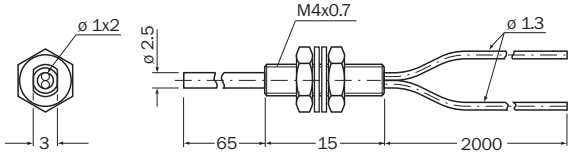
Type	Part no.
LL3-DK04Z	5 313 026



dimensions in mm

Super flexible, bend radius R = 2 mm

Type	Part no.
LL3-DK63Z	5 313 027



dimensions in mm

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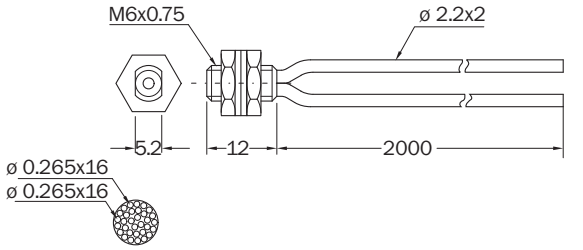
Proximity systems

Dimensional drawings and order information

Dimensional drawings for LL3 fiber-optic cables, proximity systems

Flexible, bend radius R = 4 mm

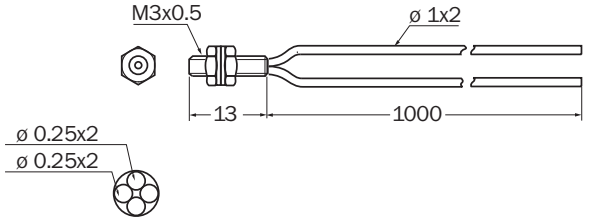
Type	Part no.
LL3-DR01	5 308 078



dimensions in mm

Flexible, bend radius R = 4 mm

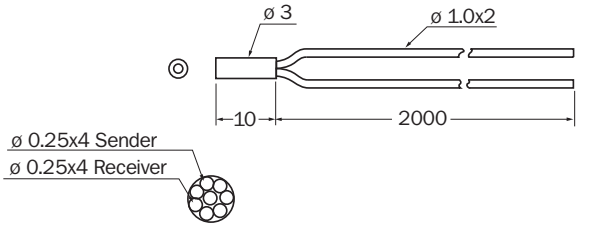
Type	Part no.
LL3-DR02	5 308 079



dimensions in mm

Flexible, bend radius R = 4 mm

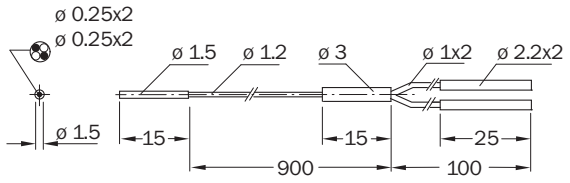
Type	Part no.
LL3-DR03	5 308 080



dimensions in mm

Flexible, bend radius R = 4 mm

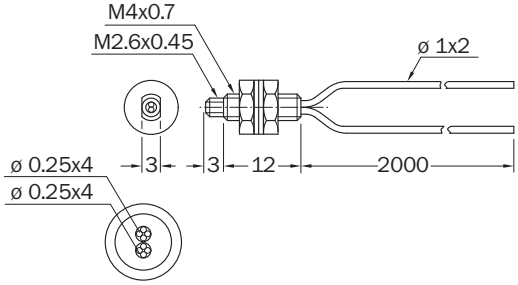
Type	Part no.
LL3-DR04	5 308 081



dimensions in mm

Flexible, bend radius R = 4 mm

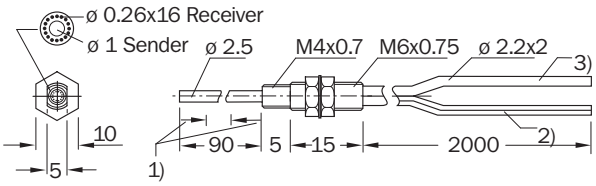
Type	Part no.
LL3-DR06	5 308 082



dimensions in mm

Long end tips

Type	Part no.
LL3-DB02	5 308 083



1) Flexible end tip, do not bend in this region (10 mm), bend radius R 10
2) Sender (marked blue)
3) Receiver

dimensions in mm

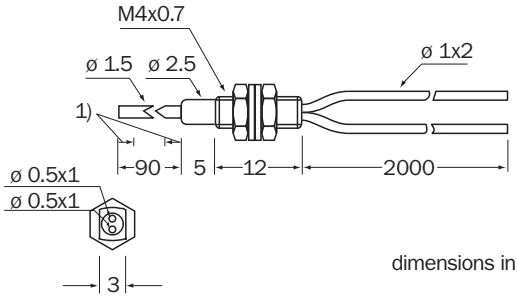
Proximity systems

Dimensional drawings and order information

Dimensional drawings for LL3 fiber-optic cables, proximity systems

Long end tips

Type	Part no.
LL3-DM03	5 308 084

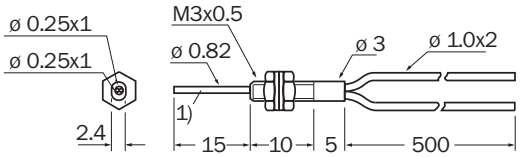


dimensions in mm

1) Flexible end tip, do not bend in this region (10 mm), bend radius R 10

Long end tips

Type	Part no.
LL3-DT02	5 308 085

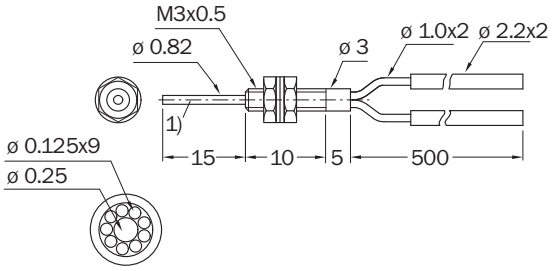


1) End tip cannot be bent

dimensions in mm

Long end tips

Type	Part no.
LL3-DT04	5 308 086

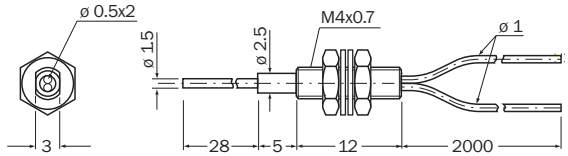


1) End tip cannot be bent

dimensions in mm

Long end tips

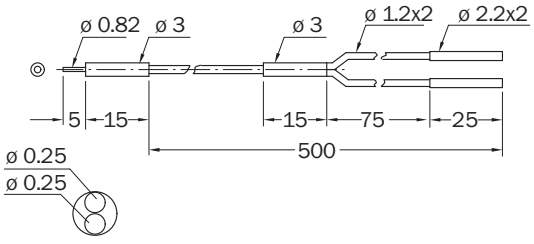
Type	Part no.
LL3-DT05	5 313 028



dimensions in mm

Long end tips

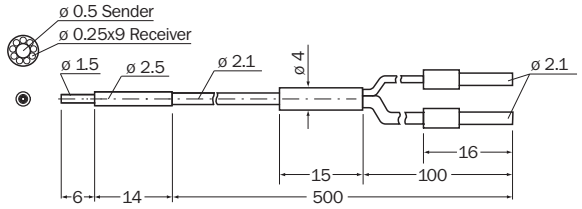
Type	Part no.
LL3-DR05	5 308 087



dimensions in mm

Long end tips

Type	Part no.
LL3-DK22	5 313 029



dimensions in mm

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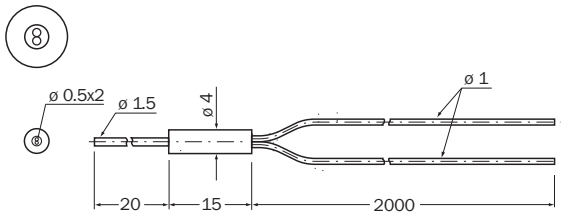
Proximity systems

Dimensional drawings and order information

Dimensional drawings for LL3 fiber-optic cables, proximity systems

Long end tips

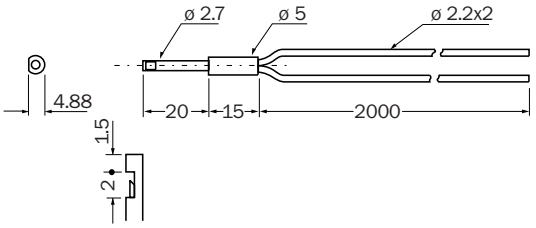
Type	Part no.
LL3-DK43	5 313 030



dimensions in mm

Integrated 90° deflection

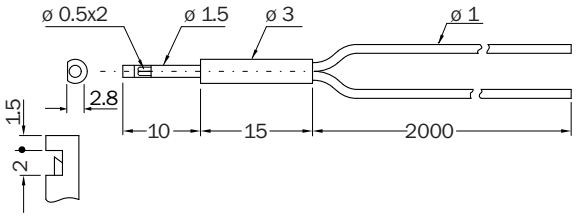
Type	Part no.
LL3-DV01	5 308 088



dimensions in mm

Integrated 90° deflection

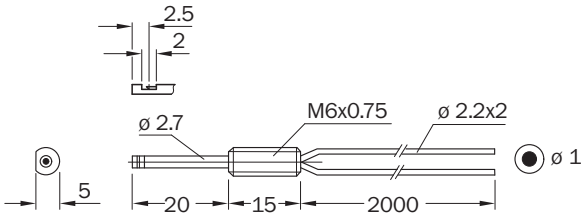
Type	Part no.
LL3-DV02	5 308 089



dimensions in mm

Integrated 90° deflection

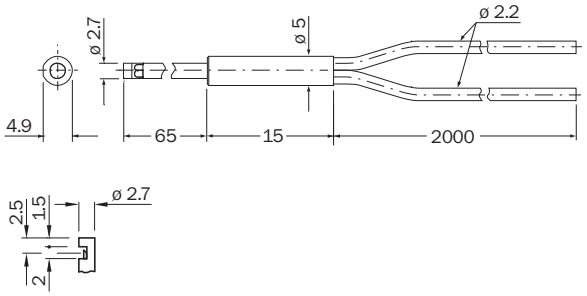
Type	Part no.
LL3-DV03	5 308 090



dimensions in mm

Integrated 90° deflection

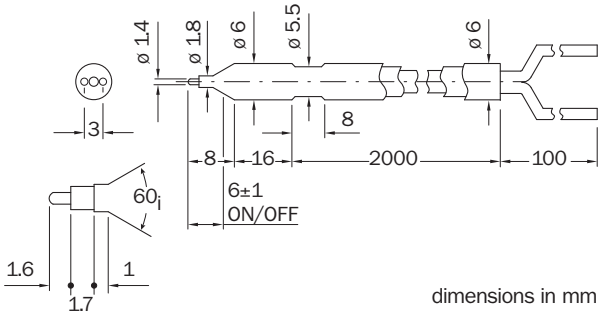
Type	Part no.
LL3-DK33	5 313 031



dimensions in mm

Level switch for liquids

Type	Part no.
LL3-DF01	5 308 094[1]
LL3-DF02	5 308 095[2]



dimensions in mm

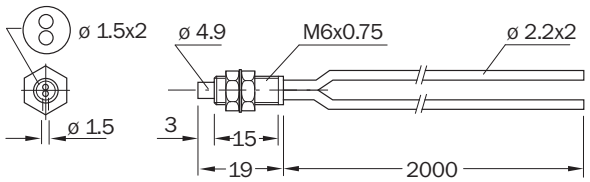
1) For transparent liquids
2) For cloudy liquids

Proximity systems

Dimensional drawings and order information

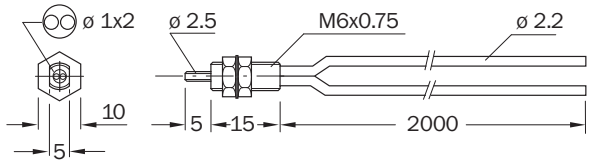
Dimensional drawings for LL3 fiber-optic cables, proximity systems

Temperature-resistant	
Type	**Part no.**
LL3-DH01	5 308 091



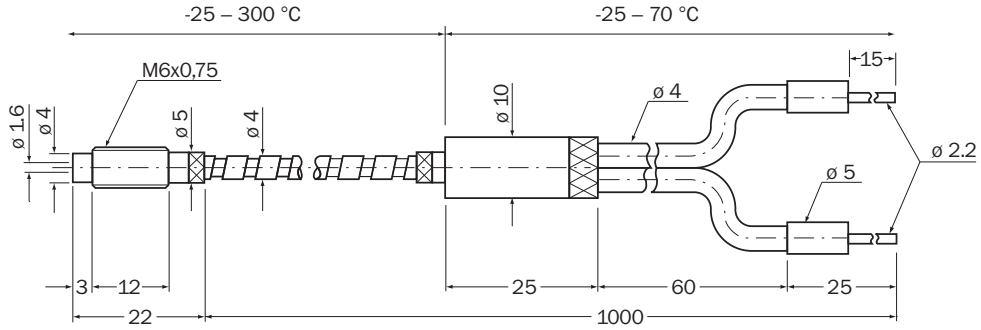
dimensions in mm

Temperature-resistant	
Type	**Part no.**
LL3-DH02	5 308 092



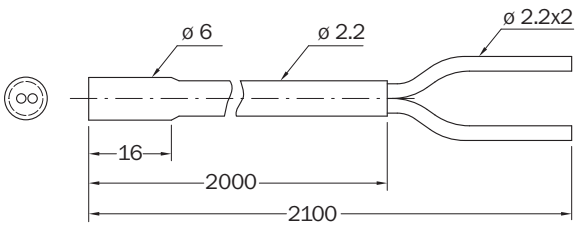
dimensions in mm

Temperature-resistant	
Type	**Part no.**
LL3-DH83	5 313 032



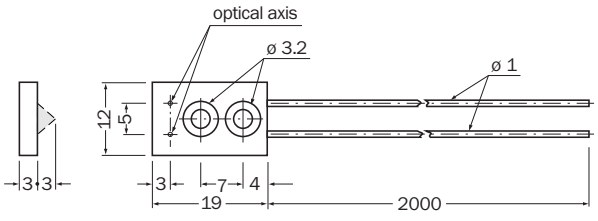
dimensions in mm

Teflon sheath	
Type	**Part no.**
LL3-DY01	5 308 093



dimensions in mm

Fix focus	
Type	**Part no.**
LL3-DC01	5 313 033



dimensions in mm

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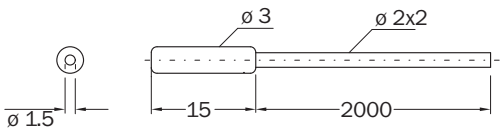
Through-beam systems

Dimensional drawings and order information

Dimensional drawings for LL3 fiber-optic cables, through-beam systems

Standard type

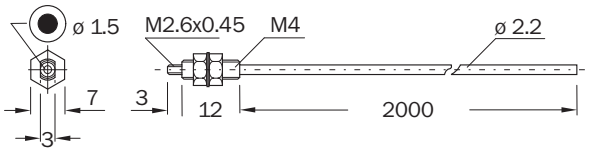
Type	Part no.
LL3-TS07	5 308 049



dimensions in mm

Standard type

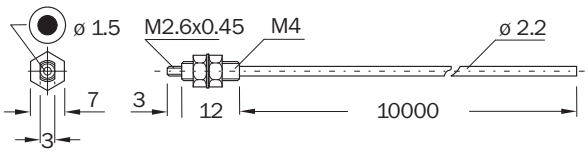
Type	Part no.
LL3-TB01	5 308 050



dimensions in mm

Standard type

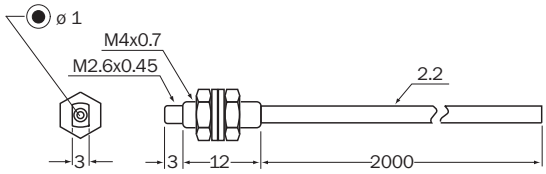
Type	Part no.
LL3-TB01-10	5 308 051



dimensions in mm

Standard type

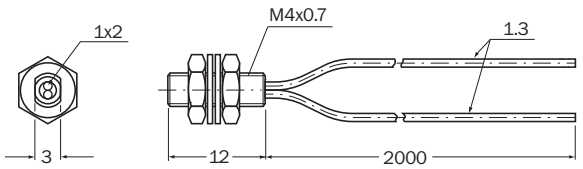
Type	Part no.
LL3-TB02	5 308 048



dimensions in mm

Super flexible, bend radius R = 2 mm

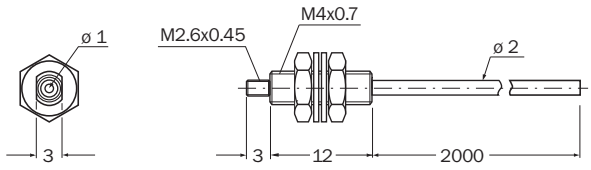
Type	Part no.
LL3-TK05	5 313 034



dimensions in mm

Super flexible, bend radius R = 2 mm

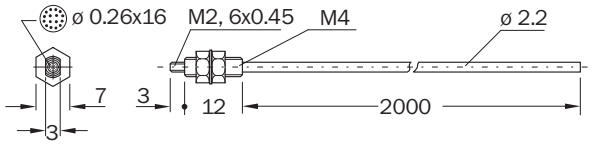
Type	Part no.
LL3-TK77	5 313 035



dimensions in mm

Super flexible, bend radius R = 4 mm

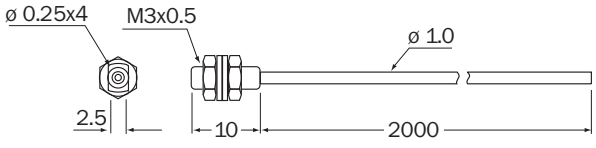
Type	Part no.
LL3-TR01	5 308 052



dimensions in mm

Super flexible, bend radius R = 4 mm

Type	Part no.
LL3-TR02	5 308 053



dimensions in mm

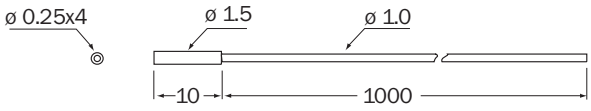
Through-beam systems

Dimensional drawings and order information

Dimensional drawings for LL3 fiber-optic cables, through-beam systems

Flexible, bend radius R = 4 mm

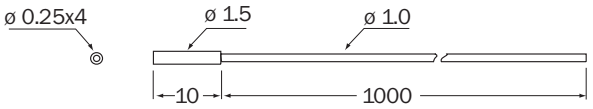
Type	Part no.
LL3-TR03	5 308 054



dimensions in mm

Flexible, bend radius R = 4 mm

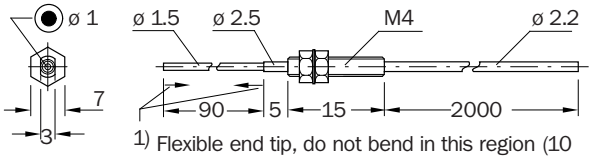
Type	Part no.
LL3-TR03-02	5 308 055



dimensions in mm

Long end tips

Type	Part no.
LL3-TB03	5 308 056

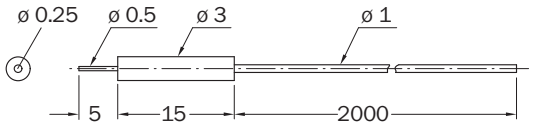


1) Flexible end tip, do not bend in this region (10 mm), bend radius R 10

dimensions in mm

Long end tips

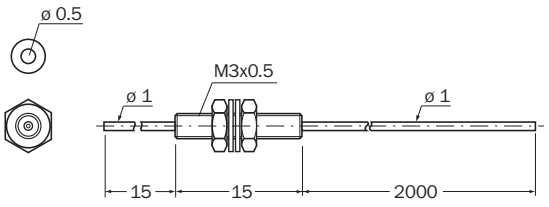
Type	Part no.
LL3-TT01	5 308 057



dimensions in mm

Long end tips

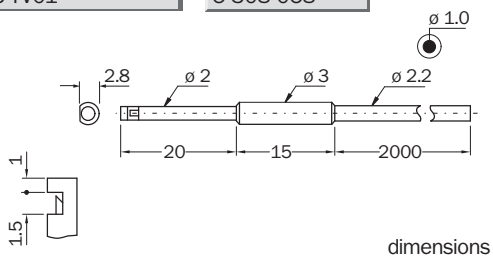
Type	Part no.
LL3-TK75	5 313 036



dimensions in mm

Integrated 90° deflection

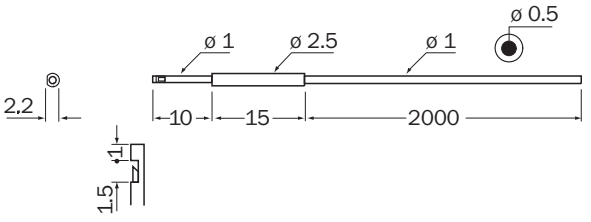
Type	Part no.
LL3-TV01	5 308 058



dimensions in mm

Integrated 90° deflection

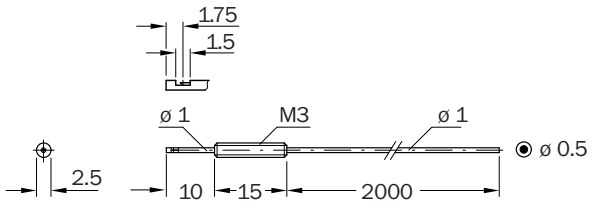
Type	Part no.
LL3-TV02	5 308 059



dimensions in mm

Integrated 90° deflection

Type	Part no.
LL3-TV04	5 308 060



dimensions in mm

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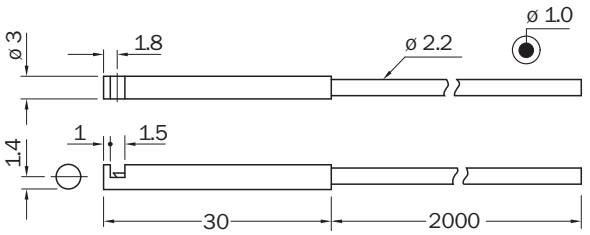
Through-beam systems

Dimensional drawings and order information

Dimensional drawings for LL3 fiber-optic cables, through-beam systems

Integrated 90° deflection

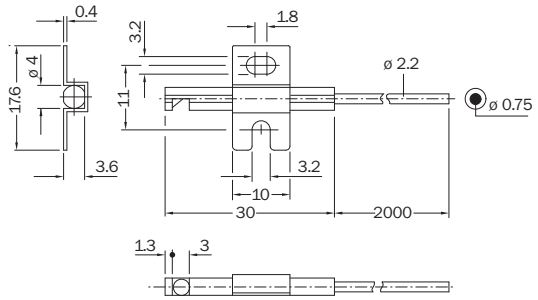
Type	Part no.
LL3-TS08	5 308 061



dimensions in mm

Integrated 90° deflection

Type	Part no.*
LL3-TS12	5 308 062

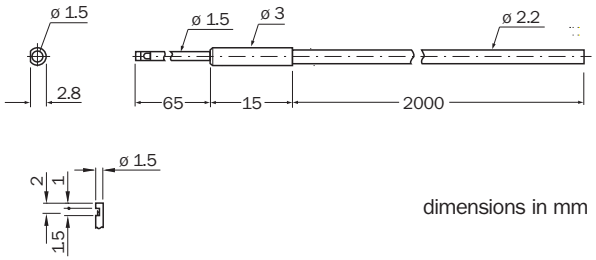


dimensions in mm

* Mounting bracket included with delivery

Integrated 90° deflection

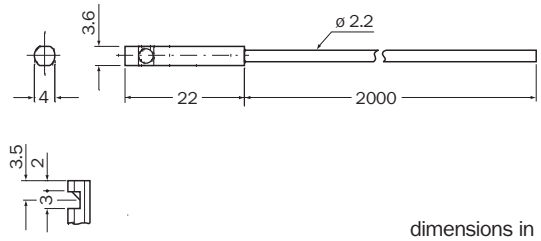
Type	Part no.
LL3-TK34	5 313 037



dimensions in mm

Integrated 90° deflection

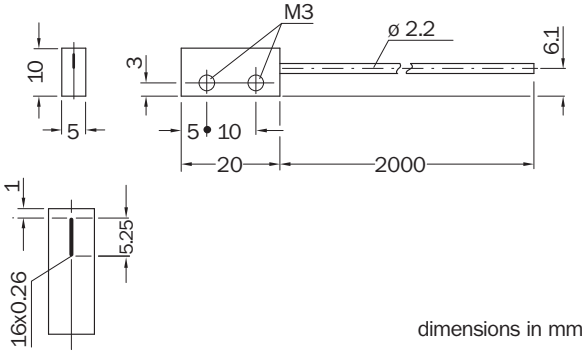
Type	Part no.
LL3-TK16	5 313 038



dimensions in mm

Fiber-optic cable cell

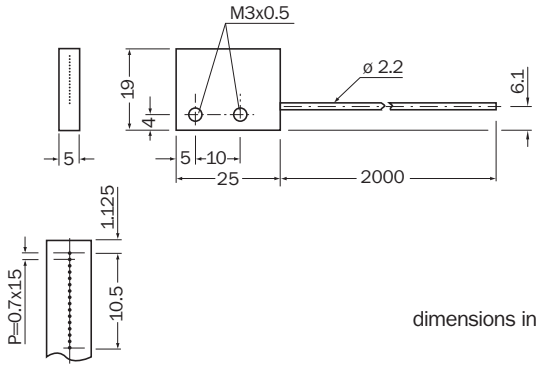
Type	Part no.
LL3-TS10	5 308 063



dimensions in mm

Fiber-optic cable cell

Type	Part no.
LL3-TS14	5 313 039



dimensions in mm

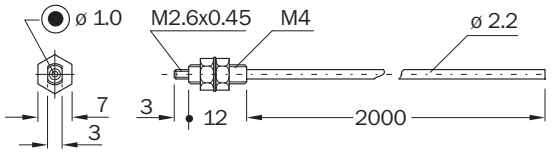
Through-beam systems

Dimensional drawings and order information

Dimensional drawings for LL3 fiber-optic cables, through-beam systems

Temperature-resistant

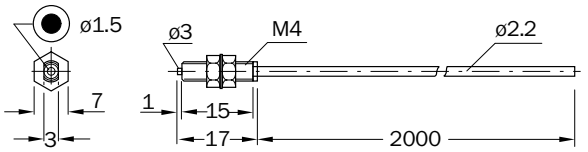
Type	Part no.
LL3-TH01	5 308 064



dimensions in mm

Temperature-resistant

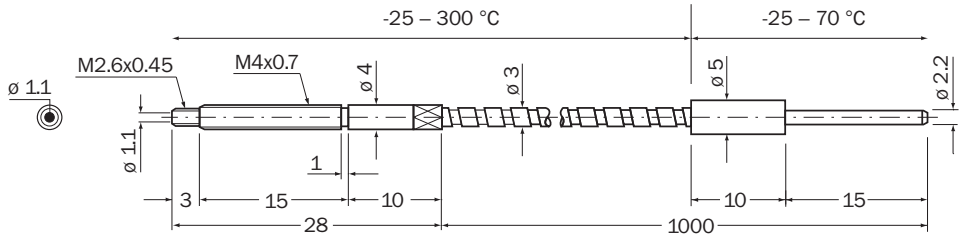
Type	Part no.
LL3-TH02	5 308 065



dimensions in mm

Temperature-resistant

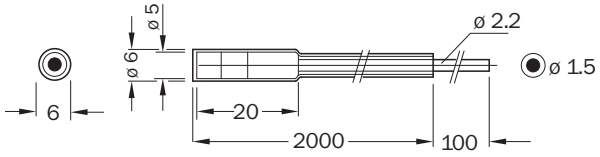
Type	Part no.
LL3-TB84	5 313 040



dimensions in mm

Teflon sheath

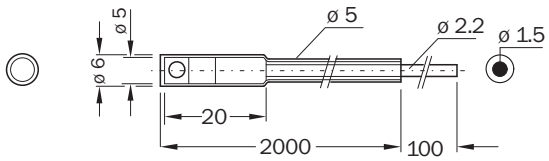
Type	Part no.
LL3-TY01	5 308 066



dimensions in mm

Teflon sheath

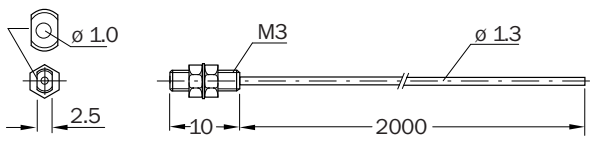
Type	Part no.
LL3-TY02	5 308 067



dimensions in mm

Smallest end sleeves

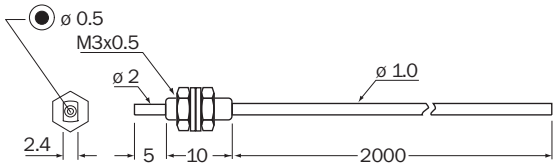
Type	Part no.
LL3-TM01	5 308 068



dimensions in mm

Smallest end sleeves

Type	Part no.
LL3-TM02	5 308 069



dimensions in mm

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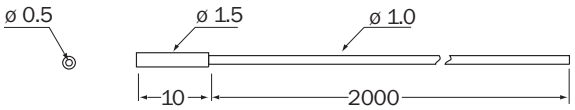
Through-beam systems

Dimensional drawings and order information

Dimensional drawings for LL3 fiber-optic cables, through-beam systems

Smallest end sleeves

Type	Part no.
LL3-TM03	5 308 070



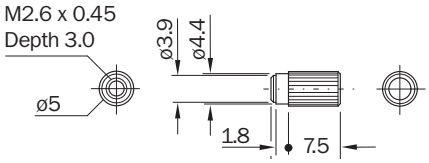
dimensions in mm

Accessories

LL3 Fiber-optic cables

Order information

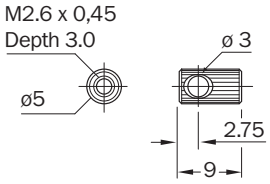
Type	Part no.
LL3-TA01	5 308 128



dimensions in mm

Order information

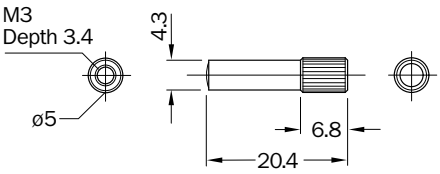
Type	Part no.
LL3-TA02	5 308 129



dimensions in mm

Order information

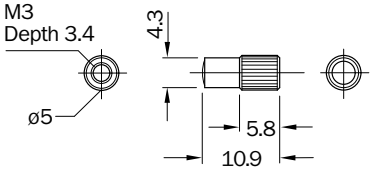
Type	Part no.
LL3-DA01	5 308 127



dimensions in mm

Order information

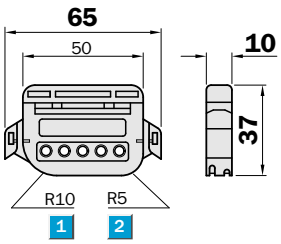
Type	Part no.
LL3-DA02	5 308 130



dimensions in mm

Cutter for fiber-optic cables[1)]

Type	Part no.
FC	5 304 141



1 Templing or bend radius R 10 mm, for end tips Ø 1.5 mm and Ø 2.5 mm

2 Bend radius R 5 mm

[1)] Supplied with fiber-optic cable for cutting to length

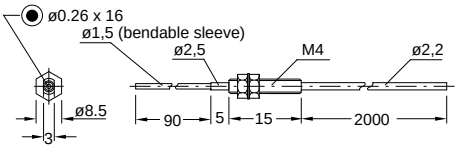
dimensions in mm

Accessories

Dimensional drawings and order information

Dimensional drawings for LLK fiber-optic cables, through-beam systems

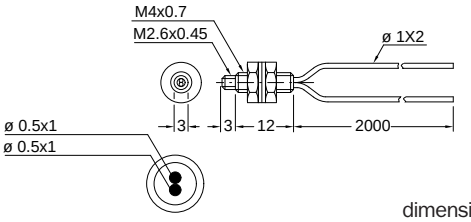
Order information	
Type	**Part no.**
LLK2-04MM02	5 304 155



dimensions in mm

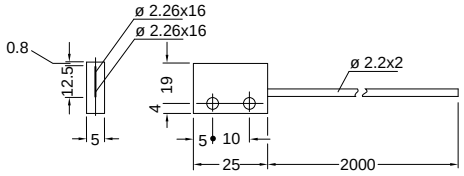
Dimensional drawings for LLK fiber-optic cables, proximity systems

Order information	
Type	**Part no.**
LLK1-M4BM02	5 304 161



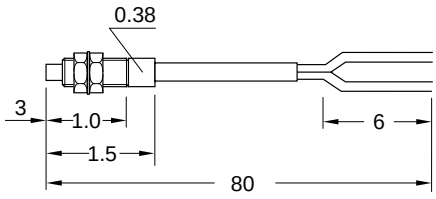
dimensions in mm

Order information	
Type	**Part no.**
LLK1-Y9NM02	5 304 167



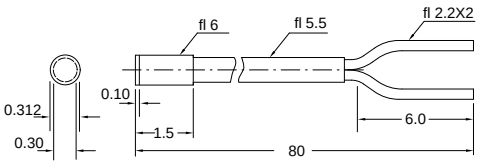
dimensions in mm

Order information	
Type	**Part no.**
LLK1-M9EB02	7 023 977



dimensions in mm

Order information	
Type	**Part no.**
LLK1-G8EB02	7 023 981



dimensions in mm



LL3 plastic fiber-optic cables, sensing ranges combined with WLL 190T series

Fiber-optic cables
Proximity systems

Type Standard type	Part no.	WLL 190T - LED red high-speed 1.24 kHz operating range (mm)	Standard operating range (mm)	Large sensing range operating range (mm)	WLL 190T - LED green high-speed 1.25 kHz Operating range (mm)	Standard operating range (mm)	Large sensing range operating range (mm)
LL3-DM01	5 308 071	80	150	250	20	30	40
LL3-DT03	5 308 072	25	45	80	15	25	40
LL3-DS06	5 308 073	25	45	80	15	25	40
LL3-DK06	5 313 019	100	200	300	30	45	60
LL3-DK04	5 313 020	100	200	300	30	45	60
Coaxial cable							
LL3-DB01	5 308 074	100	200	300	20	35	45
LL3-DB01-10	5 308 075	100	200	300	20	35	45
LL3-DB03	5 313 021	70	100	200	15	30	40
LL3-DT01	5 308 076	70	130	250	20	30	40
LL3-DM02	5 308 077	70	130	250	20	30	40
LL3-DK23	5 313 022	100	200	300	20	35	45
LL3-DK21	5 313 023	15	30	50	8	15	25
Super flexible, bend radius R = 2 mm							
LL3-DK66	5 313 024	80	150	250	25	40	50
LL3-DK67	5 313 025	80	150	250	25	40	50
LL3-DK04Z	5 313 026	80	150	250	25	40	50
LL3-DK63Z	5 313 027	80	150	250	25	40	50
Flexible, bend radius R = 4 mm							
LL3-DR01	5 308 078	80	150	250	25	35	50
LL3-DR02	5 308 079	15	25	50	8	15	25
LL3-DR03	5 308 080	30	50	100	15	30	50
LL3-DR04	5 308 081	15	25	50	8	15	25
LL3-DR06	5 308 082	30	50	100	15	30	30
Long end tips							
LL3-DB02	5 308 083	100	200	300	20	35	45
LL3-DM03	5 308 084	25	40	80	15	25	40
LL3-DT02	5 308 085	5	10	20	3	6	10
LL3-DT04	5 308 086	10	18	35	5	10	20
LL3-DT05	5 313 028	25	40	80	15	30	40
LL3-DR05	5 308 087	5	10	20	3	6	10
LL3-DK22	5 313 029	70	130	250	20	30	50
LL3-DK43	5 313 030	25	40	80	15	30	45
Integrated 90° deflection							
LL3-DV01	5 308 088	50	80	150	20	30	45
LL3-DV02	5 308 089	20	35	60	10	20	35
LL3-DV03	5 308 090	50	80	150	20	45	45
LL3-DK33	5 313 031	50	80	150	20	45	45
Level switch for liquids							
LL3-DF01	5 308 094	-	-	-	-	-	-
LL3-DF02	5 308 095	-	-	-	-	-	-
Temperature-resistant							
LL3-DH01	5 308 091	130	200	300	30	50	70
LL3-DH02	5 308 092	50	100	180	30	50	70
LL3-DH83	5 313 032	100	150	200	20	40	60
Teflon sheath							
LL3-DY01	5 308 093	50	80	100	20	30	40
Fix focus							
LL3-DC01	5 313 033	3	3	3	3	3	3

Fiber-Optic Cables



LL3, LLK plastic fiber-optic cables, sensing ranges combined with WLL 170 series

Fiber-optic cables
Proximity systems

Type Standard type	Part no.	WLL 170-2, manual sensitivity operating range (mm)	WLL 170-2, registration mark sensor, LED green operating range (mm)	WLL 170T sensitivity adjustment via teach-in operating range (mm)	WLL 170T, registration mark sensor, LED green operating range (mm)	WLL10 A, Analog output 1…5 V 5V	 3V	 1V	WLL 170-2, high speed 10,000 Hz operating range (mm)
LL3-DM01	5 308 071	160	45	100	25	30	45	170	60
LL3-DT03	5 308 072	45	5	25	4	11	15	60	15
LL3-DS06	5 308 073	45	5	25	4	11	15	60	15
LL3-DK06	5 313 019	160	45	100	25	30	45	170	60
LL3-DK04	5 313 020	160	45	100	25	30	45	170	60
LLK1-M4BM02	5 304 161	27	7	25	7	-	-	-	11
Coaxial cable									
LL3-DB01	5 308 074	150	45	100	25	28	40	170	65
LL3-DB01-10	5 308 075	80	45	50	20	15	20	90	25
LL3-DB03	5 313 021	150	35	100	25	28	40	170	65
LL3-DT01	5 308 076	70	10	35	7	15	20	90	20
LL3-DM02	5 308 077	70	10	35	7	15	20	90	20
LL3-DK23	5 313 022	150	45	100	25	28	40	170	65
LL3-DK21	5 313 023	20	4	14	not possible	np*	np*	np*	5
Super flexible, bend radius R = 2 mm									
LL3-DK66	5 313 024	110	25	80	20	25	65	140	45
LL3-DK67	5 313 025	110	25	80	20	25	35	150	45
LL3-DK04Z	5 313 026	110	25	80	20	25	35	150	45
LL3-DK63Z	5 313 027	110	25	80	20	25	35	140	45
Flexible, bend radius R = 4 mm									
LL3-DR01	5 308 078	130	15	85	20	25	35	140	45
LL3-DR02	5 308 079	20	2	14	not possible	np*	np*	np*	8
LL3-DR03	5 308 080	35	5	25	3	7	10	43	10
LL3-DR04	5 308 081	20	2	14	not possible	np*	np*	np*	8
LL3-DR06	5 308 082	35	5	25	3	7	10	43	10
Long end tips									
LL3-DB02	5 308 083	150	45	100	25	30	40	160	65
LL3-DM03	5 308 084	45	5	25	4	111	15	60	15
LL3-DT02	5 308 085	10	2	6	not possible	np*	np*	np*	3
LL3-DT04	5 308 086	15	2	13	not possible	np*	np*	np*	8
LL3-DT05	5 313 028	45	5	25	4	11	15	60	15
LL3-DR05	5 308 087	10	2	8	not possible	np*	np*	np*	3
LL3-DK22	5 313 029	70	10	35	7	15	20	90	20
LL3-DK43	5 313 030	45	5	25	4	7	10	43	15
Integrated 90° deflection									
LL3-DV01	5 308 088	90	25	50	10	17	24	170	40
LL3-DV02	5 308 089	15	3	12	not possible	np	np	np	5
LL3-DV03	5 308 090	90	25	50	10	17	24	170	40
LL3-DK33	5 313 031	90	25	50	10	17	24	170	40
Level switch for liquids									
LL3-DF01	5 308 094	-	-	-	not possible	np*	np*	np*	-
LL3-DF02	5 308 095	-	-	-	not possible	np*	np*	np*	-
Temperature-resistant									
LL3-DH01	5 308 091	210	40	135	25	45	65	200	90
LL3-DH02	5 308 092	110	7	75	5	22	30	125	40
LL3-DH83	5 313 032	140	25	125	25	40	60	180	55
Teflon sheath									
LL3-DY01	5 308 093	45	10	60	not possible	np*	np*	np*	5
LLK1-G8EB02	7 023 981	60	12	85	12	-	-	-	60
Array head									
LLK1-Y9NM02	5 304 167	50	15	50	15	-	-	-	20
Fix focus									
LL3-DC01	5 313 033	3	15	3	3	3	3	4	3

* Not possible

Fiber-Optic Cables



Fiber-optic cables
Proximity systems

LL3, LLK plastic fiber-optic cables, sensing ranges combined with WLL 160 and VLL 18T series

Type	Part no.	WLL 160, manual sensitivity	WLL 160T Large sensing range	WLL 160T High-speed 1,666 kHz	VLL 18T, teach-in, LED red
Standard type		operating range (mm)	operating range (mm)	operating range (mm)	operating range (mm)
LL3-DM01	5 308 071	70	70	50	50
LL3-DT03	5 308 072	20	20	14	15
LL3-DS06	5 308 073	20	20	14	15
LL3-DK06	5 313 019	70	70	50	50
LL3-DK04	5 313 020	70	70	50	50
LLK1-M4BM02	5 304 161	20	20	15	15
Coaxial cable					
LL3-DB01	5 308 074	70	70	50	50
LL3-DB01-10	5 308 075	40	40	30	25
LL3-DB03	5 313 021	70	70	50	50
LL3-DT01	5 308 076	25	25	18	20
LL3-DM02	5 308 077	25	25	18	20
LL3-DK23	5 313 022	70	70	50	50
LL3-DK21	5 313 023	8	8	5	not possible
Super flexible, bend radius R = 2 mm					
LL3-DK66	5 313 024	65	65	45	45
LL3-DK67	5 313 025	65	65	45	45
LL3-DK04Z	5 313 026	65	65	45	45
LL3-DK63Z	5313027	65	65	45	45
Flexible, bend radius R = 4 mm					
LL3-DR01	5 308 078	70	70	50	45
LL3-DR02	5 308 079	9	9	6	not possible
LL3-DR03	5 308 080	20	20	14	13
LL3-DR04	5 308 081	9	9	6	not possible
LL3-DR06	5 308 082	20	20	14	13
Long end tips					
LL3-DB02	5 308 083	70	70	50	50
LL3-DM03	5 308 084	20	20	14	15
LL3-DT02	5 308 085	5	5	3	not possible
LL3-DT04	5 308 086	9	9	5	not possible
LL3-DT05	5 313 028	20	20	14	15
LL3-DR05	5 308 087	5	5	3	not possible
LL3-DK22	5 313 029	30	30	25	not possible
LL3-DK43	5 313 030	20	20	14	15
Integrated 90° deflection					
LL3-DV01	5 308 088	40	40	30	25
LL3-DV02	5 308 089	9	9	5	not possible
LL3-DV03	5 308 090	40	40	30	25
LL3-DK33	5 313 031	40	40	30	25
Level switch for liquids					
LL3-DF01	5 308 094	clear liquid	clear liquid	not possible	not possible
LL3-DF02	5 308 095	cloudy liquid	cloudy liquid	not possible	not possible
Temperature-resistant					
LL3-DH01	5 308 091	100	100	70	65
LL3-DH02	5 308 092	55	55	50	35
LL3-DH83	5 313 032	100	100	70	65
Teflon sheath					
LL3-DY01	5 308 093	not possible	45	not possible	30
LLK1-M9EB02	7 023 977	60	60	40	30
LLK1-G8EB02	7 023 981	60	60	40	30
Array head					
LLK1-Y9NM02	5 304 167	50	35	35	35
Fix focus					
LL3-DC01	5 313 033	3	3	3	not possible

Fiber-Optic Cables



LL3 plastic fiber-optic cables, sensing ranges combined with WLL 190T

Fiber-optic cables
Through-beam systems

Type Standard type	Part no.*	WLL 190T - LED red high-speed 1.25 kHz operating range (mm)	Standard operating range (mm)	Large sensing range operating range (mm)	WLL 190T - LED green high-speed 1.25 kHz operating range (mm)	Standard operating range (mm)	Large sensing range operating range (mm)
LL3-TS07	5 308 049	450	800	1300	100	200	300
LL3-TB01	5 308 050	450	800	1300	100	200	300
LL3-TB01-10	5 308 051	350	450	900	100	150	250
LL3-TB02	5 308 048	250	450	800	80	150	200
Super flexible, bend radius R = 2 mm							
LL3-TK05	5 313 034	300	550	1000	80	150	600
LL3-TK77	5 313 035	300	550	1000	80	150	600
Flexible, bend radius R = 4 mm							
LL3-TR01	5 308 052	250	400	650	80	150	200
LL3-TR02	5 308 053	90	180	300	50	100	150
LL3-TR03	5 308 054	90	180	300	50	100	150
LL3-TR03-02	5 308 055	90	180	300	50	100	150
Long end tips							
LL3-TB03	5 308 056	250	500	800	80	150	250
LL3-TT01	5 308 057	20	40	55	10	20	30
LL3-TK75	5 313 036	25	60	90	20	30	40
Integrated 90° deflection							
LL3-TV01	5 308 058	250	450	700	80	150	250
LL3-TV02	5 308 059	50	90	150	30	50	70
LL3-TV04	5 308 060	50	90	150	30	50	70
LL3-TS08	5 308 061	250	400	650	80	150	250
LL3-TS12	5 308 062	2000	3500	3000	800	1000	1500
LL3-TK34	5 313 037	250	450	700	80	150	200
LL3-TK16	5 313 038	2500	3000	3000	1000	1500	2000
Fiber-optic cable cell							
LL3-TS10	5 308 063	300	500	800	80	150	300
LL3-TS14	5 313 039	300	500	800	80	150	300
Temperature-resistant							
LL3-TH01	5 308 064	250	400	700	80	150	250
LL3-TH02	5 308 065	250	600	1000	100	200	300
LL3-TH84	5 313 040	250	350	600	80	100	200
Teflon sheath							
LL3-TY01	5 308 066	1500	2500	3000	500	1000	1700
LL3-TY02	5 308 067	500	800	1000	150	250	350
Smallest end sleeves							
LL3-TM01	5 308 068	250	450	800	80	150	300
LL3-TM02	5 308 069	100	200	300	40	100	150
LL3-TM03	5 308 070	100	200	300	40	100	150

* The part number includes 2 fiber-optic cables, which are needed for a through-beam system



LL3, LLK plastic fiber-optic cables, sensing ranges combined with WLL 170 series

Fiber-optic cables
Through-beam systems

Type Standard type	Part no.*	WLL 170-2, manual sensivity operating range (mm)	WLL 170-2, registration mark sensor, LED green operating range (mm)	WLL 170T sensitivity adjustment via teach-in operating range (mm)	WLL 170T, registration mark sensor, LED green operating range (mm)	WLL 170A, analog output 1…5 V 5V	 3V	 1V	WLL 170-2, high-speed 10,000 Hz operating range (mm)
LL3-TS07	5 308 049	700	350	580	140	160	230	1000	350
LL3-TB01	5 308 050	700	350	580	140	160	230	1000	350
LL3-TB01-10	5 308 051	400	260	300	120	80	110	500	160
LL3-TB02	5 308 048	450	130	350	75	95	135	590	160
LLK2-M4AM02	5 304151	90	25	100	25	–	–	–	25
Super flexible, bend radius R = 2 mm									
LL3-TK05	5 313 034	360	110	350	75	95	135	590	120
LL3-TK77	5 313 035	360	110	350	75	95	135	590	120
Flexible, bend radius R = 4 mm									
LL3-TR01	5 308 052	330	120	270	60	80	110	500	120
LL3-TR02	5 308 053	110	20	80	15	25	35	150	35
LL3-TR03	5 308 054	110	20	80	15	25	35	150	35
LL3-TR03-02	5 308 055	110	20	80	15	25	35	150	35
Long end tips									
LL3-TB03	5 308 056	450	130	330	75	90	125	540	160
LL3-TT01	5 308 057	30	4	23	not possible	6	8	35	12
LL3-TK75	5 313 036	120	25	100	15	27	38	160	40
Integrated 90° deflection									
LL3-TV01	5 308 058	320	85	230	55	80	110	450	110
LL3-TV02	5 308 059	75	15	60	15	23	33	140	25
LL3-TV04	5 308 060	75	15	60	15	23	33	140	25
LL3-TS08	5 308 061	350	110	250	55	80	110	450	120
LL3-TS12	5 308 062	1700	750	1000	450	550	800	2500	830
LL3-TK34	5 313 037	320	85	230	55	80	110	450	110
LL3-TK16	5 313 038	2000	800	1300	550	600	900	3000	900
Fiber-optic cable cell									
LL3-TS10	5 308 063	330	85	330	60	85	120	530	120
LL3-TS14	5 313 039	330	85	330	60	85	120	530	120
Temperature-resistant									
LL3-TH01	5 308 064	300	45	250	60	70	95	430	120
LL3-TH02	5 308 065	600	120	500	85	130	180	770	250
LL3-TH84	5 313 040	350	130	240	50	65	90	380	150
Teflon sheath									
LL3-TY01	5 308 066	2000	380	1800	200	not possible	not possible	not possible	400
LL3-TY02	5 308 067	550	210	380	50	not possible	not possible	not possible	220
LLK2-M6DB02	7 024 459	800	150	1400	150	–	–	–	200
LLK2-M4DB02	7 023 478	100	90	350	90	–	–	–	100
Smallest end sleeves									
LL3-TM01	5 308 068	450	130	350	75	95	135	590	160
LL3-TM02	5 308 069	120	25	100	15	27	38	160	40
LL3-TM03	5 308 070	120	25	100	15	27	38	160	40
Sleeve									
LLK2-04MM02	5 304 155	175	90	175	90	–	–	–	100

* The part number includes 2 fiber-optic cables, which are needed for a through-beam system

Fiber-Optic Cables



Fiber-optic cables
Through-beam systems

LL3, LLK plastic fiber-optic cables, sensing ranges combined with WLL 160 and VLL 18T

Type Standard type	Part no.*	WLL 160, manual sensitivity operating range (mm)	WLL 160T, large sensing range operating range (mm)	High-speed 1,660 kHz operating range (mm)	VLL 18T, teach-in, LED red operating range (mm)
LL3-TS07	5 308 049	500	500	360	200
LL3-TB01	5 308 050	400	400	280	200
LL3-TB01-10	5 308 051	250	250	190	110
LL3-TB02	5 308 048	200	200	150	120
LLK2-M4AM02	5 304 151	70	70	50	40
Super flexible, bend radius R = 2 mm					
LL3-TK05	5 313 034	200	200	150	120
LL3-TK77	5 313 035	200	200	150	120
Flexible, bend radius R = 4 mm					
LL3-TR01	5 308 052	180	180	130	100
LL3-TR02	5 308 053	50	50	40	not possible
LL3-TR03	5 308 054	50	50	40	not possible
LL3-TR03-02	5 308 055	50	50	40	not possible
Long end tips					
LL3-TB03	5 308 056	200	200	150	120
LL3-TT01	5 308 057	18	18	10	not possible
LL3-TK75	5 313 036	70	70	50	not possible
Integrated 90° deflection					
LL3-TV01	5 308 058	150	150	130	70
LL3-TV02	5 308 059	40	40	30	not possible
LL3-TV04	5 308 060	40	40	30	not possible
LL3-TS08	5 308 061	200	200	150	80
LL3-TS12	5 308 062	700	700	400	350
LL3-TK34	5 308 037	150	150	130	70
LL3-TK16	5 313 038	800	800	500	450
Fiber-optic cable cell					
LL3-TS10	5 308 063	260	260	190	100
LL3-TS14	5 313 039	260	260	190	100
Temperature-resistant					
LL3-TH01	5 308 064	180	180	130	80
LL3-TH02	5 308 065	350	350	240	170
LL3-TH84	5 313 040	170	170	140	70
Teflon sheath					
LL3-TY01	5 308 066	1000	1000	700	350
LL3-TY02	5 308 067	250	250	180	120
LLK2-M6DB02	7 024 459	750	750	500	400
LLK2-M4DB02	7 023 478	200	200	150	125
Smallest end sleeves					
LL3-TM01	5 308 068	200	200	150	not possible
LL3-TM02	5 308 069	70	70	50	not possible
LL3-TM03	5 308 070	70	70	50	not possible
Sleeve					
LLK2-04MM02	5 304 155	140	140	100	120

* The part number includes 2 fiber-optic cables, which are needed for a through-beam system



Tip adapters for LL3 plastic fiber-optic cables, sensing ranges combined with WLL 190T series

Type LL3 proximity, lenses with focused optic	Part no.	WLL 190T - LED red high-speed 1.25 kHz operating range (mm)	Standard operating range (mm)	Large sensing range operating range (mm)	WLL 190T - LED green (registration mark sensor) high-speed 1.25 kHz operating range (mm)	Standard operating range (mm)	Large sensing range operating range (mm)
Focus 6 mm, spot size ø 0.25 mm							
LL3-DA01	5 308 127						
Combined with standard fiber LL 3							
LL3-DT01	5 308 076	6 ± 1	6 ± 1	6 ± 1	6 ± 1	6 ± 1	6 ± 1
Focus 12 mm, spot size ø 3.0 mm							
LL3-DA02	**5 308 130**						
Combined with standard fiber LL 3							
LL3-DT01	5 308 076	12 ± 3	12 ± 3	12 ± 3	12 ± 3	12 ± 3	12 ± 3

Type LL3 through-beam, lenses for extended sensing ranges	Part no.	WLL 190T - LED red high-speed 1.25 kHz operating range (mm)	Standard operating range (mm)	Large sensing range operating range (mm)	WLL 190T - LED green (mark sensor) high-speed 1.25 kHz operating range (mm)	Standard operating range (mm)	Large sensing range operating range (mm)
Axial optic, largest sensing ranges							
LL3-TA01	5 308 128						
Combined with standard fibers LL 3							
LL3-TB01	5 308 050	2000	4000	4000	1000	2000	3000
LL3-TB01-10	5 308 051	1300	2500	5500	700	1500	3000
LL3-TB02	5 308 048	3500	4000	4000	1500	2500	3000
Combined with super flexible fibers							
LL3-TK77	5 313 035	3500	4000	4000	1500	2500	3000
Combined with flexible fibers							
LL3-TR01	5 308 052	3500	4000	4000	1500	2500	3000
Combined with heat resisting fibers (100° C)							
LL3-TH01	5 308 064	3000	4000	4000	1500	2500	3000
Integrated 90° deflection, large sensing ranges							
LL3-TA02	5 308 129						
Combined with standard fibers LL 3							
LL3-TB01	5 308 050	400	700	1300	200	400	700
LL3-TB01-10	5 308 051	300	500	1000	150	300	500
LL3-TB02	5 308 048	500	1000	1500	300	600	800
Combined with super flexible fibers							
LL3-TK77	5 313 035	500	700	1300	300	400	700
Combined with flexible fibers							
LL3-TR01	5 308 052	450	600	800	250	350	450
Combined with heat resisting fibers (100° C)							
LL3-TH01	5 308 064	550	800	1000	300	450	600



Tip adapters for LL3 plastic fiber-optic cables, sensing ranges combined with WLL 170 series

Type LL3 proximity, lenses with focused optic	Part no.	WLL 170-2, manual sensitivity operating range (mm)	WLL 170-2, registration mark sensor, LED green operating range (mm)	WLL 170T, sensitivity adjustment via teach-in operating range (mm)	WLL 170T, registration mark sensor, LED green operating range (mm)	WLL 170A, analog output			WLL 170-2, high-speed 10,000 Hz operating range (mm)
						5 V	3 V	1 V	
Focus 6 mm, spot size ø 0.25 mm									
LL3-DA01	5 308 127								
Combined with standard fiber LL 3									
LL3-DT01	5 308 076	6 ± 1	6 ± 1	6 ± 1	6 ± 1	-	-	-	6 ± 1
Focus 12 mm, spot size ø 3.0 mm									
LL3-DA02	**5 308 130**								
Combined with standard fiber LL 3									
LL3-DT01	5 308 076	12 ± 3	12 ± 3	12 ± 3	12 ± 3	-	-	-	12 ± 3

Type LL3 through-beam, lenses for extended sensing ranges	Part no.	WLL 170-2, manual sensitivity operating range (mm)	WLL 170-2, registration mark sensor, LED green operating range (mm)	WLL 170T, sensitivity adjustment via teach-in operating range (mm)	WLL 170T, registration mark sensor, LED green operating range (mm)	WLL 170A, analog output			WLL 170-2, high-speed 10,000 Hz operating range (mm)
						5 V	3 V	1 V	
Axial optic, largest sensing ranges									
LL3-TA01	5 308 128								
Combined with standard fibers LL 3									
LL3-TB01	5 308 050	3000	1200	2500	600	650	950	4000	1200
LL3-TB01-10	5 308 051	1900	1100	1200	500	350	480	2200	800
LL3-TB02	5 308 048	4000	1700	3200	650	900	1300	5500	1600
Combined with super flexible fibers									
LL3-TK77	5 313 035	4000	1500	3200	650	900	1300	5500	1400
Combined with flexible fibers									
LL3-TR01	5 308 052	3000	1100	2500	550	640	880	4000	1500
Combined with heat resisting fibers (100° C)									
LL3-TH01	5 308 064	4000	800	2500	300	700	950	4300	1500
Integrated 90° deflection, large sensing ranges									
LL3-TA02	5 308 129								
Combined with standard fibers LL 3									
LL3-TB01	5 308 050	600	200	550	200	180	260	1100	200
LL3-TB01-10	5 308 051	450	250	300	150	80	110	500	180
LL3-TB02	5 308 048	600	250	500	130	170	250	1100	250
Combined with super flexible fibers									
LL3-TK77	5 313 035	600	200	500	130	170	250	1100	250
Combined with flexible fibers									
LL3-TR01	5 308 052	500	150	320	80	110	150	690	200
Combined with heat resisting fibers (100° C)									
LL3-TH01	5 308 064	500	90	320	55	100	150	670	200



Tip adapters for LL3 plastic fiber-optic cables, sensing ranges combined with WLL 160 & VLL 18T

Type LL3 proximity, lenses with focused optic	Part no.	WLL 160, manual sensitivity operating range (mm)	WLL 160T, Large sensing range operating range (mm)	High-speed 1,666 kHz operating range (mm)	VLL 18T, teach-in, LED red operating range (mm)
Focus 6 mm, spot size ø 0.25 mm					
LL3-DA01	5 308 127				
Combined with standard fiber LL 3					
LL3-DT01	5 308 076	6 ± 1	6 ± 1	not possible	not possible
Focus 12 mm, spot size ø 3.0 mm					
LL3-DA02	5 308 130				
Combined with standard fiber LL3					
LL3-DT01	5 308 076	12 ± 3	12 ± 3	not possible	not possible

Type LL3 proximity lenses with focused optic	Part no.	WLL 160, manual sensitivity operating range (mm)	WLL 160T, Large sensing range operating range (mm)	High-speed 1,666 kHz operating range (mm)	VLL 18T, teach-in, LED red operating range (mm)
Axial optic, largest sensing ranges					
LL3-TA01	5 308 128				
Combined with standard fibers LL3					
LL3-TB01	5 308 050	1500	1500	1050	850
LL3-TB01-10	5 308 051	900	900	660	450
LL3-TB02	5 308 048	2000	2000	1500	1100
Combined with super flexible fibers					
LL3-TK77	5 313 035	2000	2000	1500	1100
Combined with flexible fibers					
LL3-TR01	5 308 052	1200	1200	850	850
Combined with heat resisting fibers (100° C)					
LL3-TH01	5 308 064	1500	1500	1050	850
Integrated 90° deflection, large sensing ranges					
LL3-TA02	5 308 129				
Combined with standard fibers LL3					
LL3-TB01	5 308 050	400	400	270	200
LL3-TB01-10	5 308 051	250	250	180	100
LL3-TB02	5 308 048	350	350	250	170
Combined with super flexible fibers					
LL3-TK77	5 313 035	350	350	250	170
Combined with flexible fibers					
LL3-TR01	5 308 052	250	250	180	110
Combined with heat resisting fibers (100° C)					
LL3-TH01	5 308 064	250	350	180	110



LL3: sensing ranges (mm) combined with WLL 170T-2 series

Fiber-optic cables
Proximity systems

Fiber LL3 Proximity Standard type	Part no.	WLL 170T-2 LED red teach-in sensing range (mm)	WLL 170T-2 LED red high-speed teach-in sensing range (mm)	WLL170T-2 LED green MarkSens teach-in sensing range (mm)	Minimum object size: reduced sensing ranges standard: white 90%	 min.
LL3-DM01	5 308 071	160	60	35	100 x 100 mm	Ø 0.015 mm
LL3-DT03	5 308 072	45	15	5	30 x 30 mm	Ø 0.015 mm
LL3-DS06	5 308 073	45	15	5	30 x 30 mm	Ø 0.015 mm
LL3-DK06	5 313 019	160	60	35	100 x 100 mm	Ø 0.015 mm
LL3-DK04	5 313 020	160	60	35	100 x 100 mm	Ø 0.015 mm
Coaxial						
LL3-DB01	5 308 074	150	60	35	100 x 100 mm	Ø 0.015 mm
LL3-DB01-10	5 308 075	80	25	30	100 x 100 mm	Ø 0.015 mm
LL3-DB03	5 313 021	150	60	35	100 x 100 mm	Ø 0.015 mm
LL3-DT01	5 308 076	70	20	10	30 x 30 mm	Ø 0.015 mm
LL3-DM02	5 308 077	70	20	10	30 x 30 mm	Ø 0.015 mm
LL3-DK23	5 313 022	140	30	25	30 x 30 mm	Ø 0.015 mm
LL3-DK21	5 313 023	115	5	3	30 x 30 mm	Ø 0.015 mm
Super flexible, bending radius R = 2 mm						
LL3-DK66	5 313 024	110	45	25	100 x 100 mm	Ø 0.015 mm
LL3-DK67	5 313 025	110	45	25	100 x 100 mm	Ø 0.015 mm
LL3-DK04Z	5 313 026	110	45	25	100 x 100 mm	Ø 0.015 mm
LL3-DK63Z	5 313 027	110	45	25	100 x 100 mm	Ø 0.015 mm
Flexible, R = 4 mm						
LL3-DR01	5 308 078	130	45	15	100 x 100 mm	Ø 0.015 mm
LL3-DR02	5 308 079	20	8	2	30 x 30 mm	Ø 0.015 mm
LL3-DR03	5 308 080	35	10	5	30 x 30 mm	Ø 0.015 mm
LL3-DR04	5 308 081	20	8	2	30 x 30 mm	Ø 0.015 mm
LL3-DR06	5 308 082	35	10	5	30 x 30 mm	Ø 0.015 mm
Sleeve head						
LL3-DB02	5 308 083	150	65	40	100 x 100 mm	Ø 0.015 mm
LL3-DM03	5 308 084	45	15	7	30 x 30 mm	Ø 0.015 mm
LL3-DT02	5 308 085	8	3	2	30 x 30 mm	Ø 0.015 mm
LL3-DT04	5 308 086	8	3	2	30 x 30 mm	Ø 0.015 mm
LL3-DT05	5 313 028	45	15	7	30 x 30 mm	Ø 0.015 mm
LL3-DR05	5 308 087	10	3	2	30 x 30 mm	Ø 0.015 mm
LL3-DK22	5 313 029	70	20	10	30 x 30 mm	Ø 0.015 mm
LL3-DK43	5 313 030	45	15	7	30 x 30 mm	Ø 0.015 mm
Side view 90°						
LL3-DV01	5 308 088	90	40	20	30 x 30 mm	Ø 0.025 mm
LL3-DV02	5 308 089	15	3	3	30 x 30 mm	Ø 0.015 mm
LL3-DV03	5 308 090	90	40	20	30 x 30 mm	Ø 0.025 mm
LL3-DK33	5 313 031	90	40	20	30 x 30 mm	Ø 0.025 mm
Liquid level detection						
LL3-DF01	5 308 094				Clear liquid	
LL3-DF02	5 308 095				Cloudy liquid	
Heat resistance						
LL3-DH01	5 308 091	210	90	40	100 x 100 mm	Ø 0.015 mm
LL3-DH02	5 308 092	110	40	7	100 x 100 mm	Ø 0.015 mm
LL3-DH83	5 313 032	140	55	25	100 x 100 mm	Ø 0.015 mm
Teflon sheath						
LL3-DY01	5 308 093	45	25	10	100 x 100 mm	Ø 0.02 mm
Limited range (fix focus)						
LL3-DC01	5 313 033	3	2	2	30 x 30 mm	Ø 0.015 mm



LL3: sensing ranges (mm) combined with WLL 170T-2 series

Fiber-optic cables
Through-beam systems

LL3 Through-beam Standard type	Part no.*	WLL 170T-2 LED red teach-in sensing range (mm)	WLL 170T-2 LED red high-speed teach-in sensing range (mm)	WLL170T-2 LED green (mark sensor) teach-in sensing range (mm)	Minimum object size: reduced sensing ranges standard	 min.
LL3-TS07	5 308 049	700	300	270	Ø 1.5 mm	Ø 0.5 mm
LL3-TB01	5 308 050	700	300	270	Ø 1.5 mm	Ø 0.5 mm
LL3-TB01-10	5 308 051	400	160	220	Ø 1.5 mm	Ø 0.5 mm
LL3-TB01-30	5 315 499				Ø 1.5 mm	Ø 0.5 mm
LL3-TB02	5 308 048	450	160	130	Ø 1.0 mm	Ø 0.2 mm
Super flexible, bending radius R = 2 mm						
LL3-TK05	5 313 034	360	120	110	Ø 1.0 mm	Ø 0.2 mm
LL3-TK77	5 313 035	360	120	110	Ø 1.0 mm	Ø 0.2 mm
Flexible, R = 4 mm						
LL3-TR01	5 308 052	330	120	120	Ø 1.0 mm	Ø 0.3 mm
LL3-TR02	5 308 053	110	35	20	Ø 0.5 mm	Ø 0.1 mm
LL3-TR03	5 308 054	110	35	20	Ø 0.5 mm	Ø 0.1 mm
LL3-TR03-02	5 308 055	110	35	20	Ø 0.5 mm	Ø 0.1 mm
Sleeve head						
LL3-TB03	5 308 056	450	160	130	Ø 1.0 mm	Ø 0.2 mm
LL3-TT01	5 308 057	30	12	4	Ø 0.25 mm	Ø 0.1 mm
LL3-TK75	5 313 036	120	40	25	Ø 0.5 m	Ø 0.1 mm
Side view 90°						
LL3-TV01	5 308 058	320	110	85	Ø 1.0 mm	Ø 0.2 mm
LL3-TV02	5 308 059	75	25	15	Ø 0.5 mm	Ø 0.1 mm
LL3-TV04	5 308 060	75	25	15	Ø 0.5 mm	Ø 0.1 mm
LL3-TS08	5 308 061	350	120	110	Ø 1.0 mm	Ø 0.2 mm
LL3-TS12	5 308 062	1700	830	750	Ø 1.7 mm	Ø 0.5 mm
LL3-TK34	5 313 037	320	110	80	Ø 1.0 mm	Ø 0.2 mm
LL-TK16	5 313 038	2000	900	800	Ø 1.0 mm	Ø 0.2 mm
Array head						
LL3-TS10	5 308 063	330	120	85	Ø 2.0 mm	Ø 1.0 mm
LL3-TS14	5 313 039	330	120	85	Ø1.5 mm	Ø 0.5 mm
Heat resistance						
LL3-TH01	5 308 064	300	120	45	Ø 1.0 mm	Ø 0.2 mm
LL3-TH02	5 308 065	600	250	120	Ø 1.5 mm	Ø 0.5 mm
LL3-TH84	5 313 040	350	150	130	Ø 1.5 mm	Ø 0.5 mm
Teflon sheath						
LL3-TY01	5 308 066	2000	400	380	Ø 4.0 mm	Ø 0.3 mm
LL3-TY02	5 308 067	550	220	200	Ø 4.0 mm	Ø 0.3 mm
Small head						
LL3-TM01	5 308 068	450	160	130	Ø 1.0 mm	Ø 0.2 mm
LL3-TM02	5 308 069	120	40	25	Ø 0.5 mm	Ø 0.1 mm
LL3-TM03	5 308 070	120	40	25	Ø 0.5 mm	Ø 0.1 mm

* The part number includes 2 fiber-optic cables, which are needed for a through-beam system

Fiber-Optic Cables



Tip adapters for LL3 plastic fiber-optic cables combined with WLL 170T-2 series

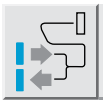
Fiber LL3: Accessories front lenses	Part no.*	WLL 170T-2 LED red teach-in sensing range (mm)	WLL 170T-2 LED red high-speed teach-in sensing range (mm)	WLL170T-2 LED green (mark sensor) teach-in sensing range (mm)	Minimum object size: reduced sensing ranges standard	min.
LL3 through-beam, lenses for extended sensing ranges						
Axial optic						
LL3-TA01	5 308 128					
Combined with standard fibers LL3						
LL3-TB01	5 308 050	2800	110	1200	–	Ø 4 mm
LL3-TB01-10	5 308 051	1600	750	1100	–	Ø 4 mm
LL3-TB02	5 308 048	3500	1500	1600	–	Ø 4 mm
Combined with super flexible fibers						
LL3-TK77	5 313 035	4000	1200	1450	–	Ø 4 mm
Combined with flexible fibers						
LL3-TR01	5 308 052	2700	1400	1000	–	Ø 4 mm
Combined with heat resisting fibers (100° C)						
LL3-TH01	5 308 064	4000	1300	750	–	Ø 4 mm
90°-optic						
LL3-TA02	5 308 129					
Combined with standard fibers LL3						
LL3-TB01	5 308 050	600	170	200	–	Ø 3 mm
LL3-TB01-10	5 308 051	400	150	230	–	Ø 3 mm
LL3-TB02	5 308 048	550	240	2130	–	Ø 3 mm
Combined with super flexible fibers						
LL3-TK77	5 313 035	550	170	200	–	Ø 3 mm
Combined with flexible fibers						
LL3-TR01	5 308 052	450	170	140	–	Ø 3 mm
Combined with heat resisting fibers (100° C)						
LL3-TH01	5 308 064	450	210	80	–	Ø 3 mm
LL3 proximity, lenses with focused optic					**White 90%**	**Min.**
Focus 6 mm, spot size , Ø 0.25 mm						
LL3-DA01	5 308 127					
Combined with standard fiber LL3						
LL3-DT01	5 308 076	6 ± 1 mm	6 ± 1 mm	6 ± 1 mm	Ø 0.25 mm	Ø 0.1 mm
Focus 12 mm, spot size, Ø 3.0 mm						
LL3-DA02	5 308 130					
Combined with standard fiber LL3						
LL3-DT01	5 308 076	12 ± 3 mm	12 ± 3 mm	12 ± 3 mm	Ø 3.0 mm	Ø 0.1 mm

* The part numbers includes 2 fiber-optic cables, which are needed for a through-beam system

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LL3: sensing ranges (mm) combined with WLL 190T-2 series



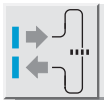
Fiber-optic cables
Proximity systems

Fiber LL3 Proximity Standard type	Part no.	WLL 190T-2 LED red high-speed 60 µs sensing range (mm)	standard 250 µs sensing range (mm)	long range 2 ms sensing range (mm)	WLL 190T-2 LED green (mark sensor) high-speed 60 µs sensing range (mm)	standard 250 µs sensing range (mm)	long range 2 ms sensing range (mm)	Minimum object size: reduced sensing ranges standard: white 90%	min.
LL3-DM01	5 308 071	130	280	450	40	80	160	350 x 350 mm	Ø 0.015 mm
LL3-DT03	5 308 072	35	90	130	6	15	30	350 x 350 mm	Ø 0.015 mm
LL3-DS06	5 308 073	35	90	130	6	15	30	350 x 350 mm	Ø 0.015 mm
LL3-DK06	5 313 019	130	280	450	40	80	160	350 x 350 mm	Ø 0.015 mm
LL3-DK04	5 313 020	130	280	450	40	80	160	350 x 350 mm	Ø 0.015 mm
Coaxial									
LL3-DB01	5 308 074	130	280	480	30	70	100	350 x 350 mm	Ø 0.015 mm
LL3-DB01-10	5 308 075	70	150	280	20	50	80	350 x 350 mm	Ø 0.015 mm
LL3-DB03	5 313 021	130	280	480	25	60	100	350 x 350 mm	Ø 0.015 mm
LL3-DT01	5 308 076	60	140	280	6	20	40	350 x 350 mm	Ø 0.015 mm
LL3-DM02	5 308 077	60	140	280	6	20	40	350 x 350 mm	Ø 0.015 mm
LL3-DK23	5 313 022	130	280	480	30	70	100	350 x 350 mm	Ø 0.015 mm
LL3-DK21	5 313 023	17	50	90	4	7	15	350 x 350 mm	Ø 0.015 mm
Super flexible, bending radius R = 2 mm									
LL3-DK66	5 313 024	100	210	350	20	45	80	350 x 350 mm	Ø 0.015 mm
LL3-DK67	5 313 025	100	210	350	20	45	80	350 x 350 mm	Ø 0.015 mm
LL3-DK04Z	5 313 026	100	210	350	20	45	80	350 x 350 mm	Ø 0.015 mm
LL3-DK04Z-05								350 x 350 mm	Ø 0.015 mm
LL3-DK63Z	5 313 027	100	210	350	20	45	80	350 x 350 mm	Ø 0.015 mm
Flexible, R = 4 mm									
LL3-DR01	5 308 078	100	230	380	30	50	100	350 x 350 mm	Ø 0.015 mm
LL3-DR02	5 308 079	20	40	90	3	7	15	350 x 350 mm	Ø 0.015 mm
LL3-DR03	5 308 080	30	70	140	5	12	25	350 x 350 mm	Ø 0.015 mm
LL3-DR04	5 308 081	20	40	90	3	7	15	350 x 350 mm	Ø 0.015 mm
LL3-DR06	5 308 082	30	70	140	5	12	25	350 x 350 mm	Ø 0.015 mm
Sleeve head									
LL3-DB02	5 308 083	130	280	480	30	70	100	350 x 350 mm	Ø 0.015 mm
LL3-DM03	5 308 084	40	80	150	6	15	30	350 x 350 mm	Ø 0.015 mm
LL3-DT02	5 308 085	8	20	70	1.5	3	6	350 x 350 mm	Ø 0.015 mm
LL3-DT04	5 308 086	18	50	100	3	6	12	350 x 350 mm	Ø 0.015 mm
LL3-DT05	5 313 028	40	80	130	6	15	30	350 x 350 mm	Ø 0.015 mm
LL3-DR05	5 308 087	8	20	70	1.5	3	6	350 x 350 mm	Ø 0.015 mm
LL3-DK22	5 313 029	60	140	280	6	20	40	350 x 350 mm	Ø 0.015 mm
LL3-DK43	5 313 030	15	80	130	6	15	30	350 x 350 mm	Ø 0.015 mm
Side view 90°									
LL3-DV01	5 308 088	60	150	250	15	35	80	350 x 350 mm	Ø 0.025 mm
LL3-DV02	5 308 089	10	40	100	3	8	15	350 x 350 mm	Ø 0.015 mm
LL3-DV02-05								350 x 350 mm	Ø 0.015 mm
LL3-DV03	5 308 090	60	150	250	15	35	80	350 x 350 mm	Ø 0.025 mm
LL3-DK33	5 313 031	60	150	250	15	35	80	350 x 350 mm	Ø 0.025 mm
Liquid level detection									
LL3-DF01	5 308 094	–	–	–	–	–	–	clear liquid	–
LL3-DF02	5 308 095	–	–	–	–	–	–	cloudy liquid	–
Heat resistance									
LL3-DH01	5 308 091	170	300	500	25	60	100	350 x 350 mm	Ø 0.015 mm
LL3-DH02	5 308 092	70	200	280	5	10	20	350 x 350 mm	Ø 0.015 mm
LL3-DH83	5 313 032	120	230	350	5	15	30	350 x 350 mm	Ø 0.015 mm
Teflon sheath									
LL3-DY01	5 308 093	80	90	120	10	20	50	–	Ø 0.02 mm
Limited range (fix focus)									
LL3-DC01	5 313 033	3	3	3	3	3	3	–	Ø 0.015 mm

Fiber-Optic Cables



LL3: sensing ranges (mm) combined with WLL 190T-2 series



Fiber-optic cables
Through-beam systems

Fiber LL3 Through-beam Standard type	Part no.*	WLL 190T-2 LED red high-speed 60 µs sensing range (mm)	 standard 250 µs sensing range (mm)	 long range 2 ms sensing range (mm)	WLL 190T-2 LED green (mark sensor) high-speed 60 µs sensing range (mm)	 standard 250 µs sensing range (mm)	 long range 2 ms sensing range (mm)	Minimum object size: reduced sensing ranges standard	 min.
LL3-TS07	5 308 049	550	1000	2000	200	400	800	Ø 1 mm	Ø 0.5 mm
LL3-TB01	5 308 050	550	1000	2000	200	400	800	Ø 1 mm	Ø 0.5 mm
LL3-TB01-10	5 308 051	350	600	1200	150	300	600	Ø 1 mm	Ø 0.5 mm
LL3-TB01-30	5 315 499							Ø 1 mm	Ø 0.5 mm
LL3-TB02	5 308 048	300	600	1100	100	250	450	Ø 1 mm	Ø 0.2 mm
Super flexible, bending radius R = 2 mm									
LL3-TK05	5 313 034	250	500	900	90	200	350	Ø 1 mm	Ø 0.2 mm
LL3-TK77	5 313 035	250	500	900	90	200	350	Ø 1 mm	Ø 0.2 mm
Flexible, R = 4 mm									
LL3-TR01	5 308 052	300	500	1000	120	250	500	Ø 1 mm	Ø 0.3 mm
LL3-TR02	5 308 053	110	220	400	20	40	70	Ø 0.5 mm	Ø 0.1 mm
LL3-TR03	5 308 054	110	220	400	20	40	70	Ø 0.5 mm	Ø 0.1 mm
LL3-TR03-02	5 308 055	110	220	400	20	40	70	Ø 0.5 mm	Ø 0.1 mm
Sleeve head									
LL3-TB03	5 308 056	300	700	1200	120	250	500	Ø 1 mm	Ø 0.2 mm
LL3-TT01	5 308 057	25	50	100	5	10	25	Ø 0.25 mm	Ø 0.1 mm
LL3-TK75	5 313 036	100	200	350	30	55	100	Ø 0.5 mm	Ø 0.1 mm
Side view 90°									
LL3-TV01	5 308 058	250	500	900	80	150	300	Ø 1 mm	Ø 0.2 mm
LL3-TV02	5 308 059	80	180	250	15	45	80	Ø 0.5 mm	Ø 0.1 mm
LL3-TV04	5 308 060	80	180	250	15	45	80	Ø 0.5 mm	Ø 0.1 mm
LL3-TS08	5 308 061	250	500	900	80	150	300	Ø 0.1 mm	Ø 0.2 mm
LL3-TS12	5 308 062	2500	3500	4000	400	900	1600	Ø 1.2 mm	Ø 0.5 mm
LL3-TK34	5 313 037	250	500	900	70	150	300	Ø 0.1 mm	Ø 0.2 mm
LL3-TK16	5 313 038	2500	3500	4000	450	1000	1800	Ø 0.1 mm	Ø 0.2 mm
Array head									
LL3-TS10	5 308 063	280	550	900	80	200	300	Ø 1.5 mm	Ø 1 mm
LL3-TS14	5 313 039	280	550	900	80	200	300	Ø 1.5 mm	Ø 0.5 mm
Heat resistance									
LL3-TH01	5 308 064	250	450	800	40	80	150	Ø 1 mm	Ø 0.2 mm
LL3-TH02	5 308 065	400	750	1200	80	180	350	Ø 1.5 mm	Ø 0.5 mm
LL3-TH84	5 313 040	250	450	900	80	180	350	Ø 1 mm	Ø 0.2 mm
Teflon sheath									
LL3-TY01	5 308 066	1500	2800	4000	300	1000	1800	Ø 2 mm	Ø 0.3 mm
LL3-TY02	5 308 067	500	1000	1700	130	300	400	Ø 2 mm	Ø 0.3 mm
Small head									
LL3-TM01	5 308 068	300	700	1200	120	250	500	Ø 1 mm	Ø 0.2 mm
LL3-TM02	5 308 069	110	220	400	30	60	120	Ø 0.5 mm	Ø 0.1 mm
LL3-TM03	5 308 070	110	220	400	30	60	120	Ø 0.5 mm	Ø 0.1 mm

* The part number includes 2 fiber-optic cables, which are needed for a through-beam system

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Tip adapter for LL3 plastic fiber-optic cables

Fiber LL3 Accessories front lenses	Part no.	WLL 190T-2 sender: LED red high-speed 60 µs sensing range (mm)	standard 250 µs sensing range (mm)	long range 2 ms sensing range (mm)	WLL 190T-2 LED green (mark sensor) high-speed 60 µs sensing range (mm)	standard 250 µs sensing range (mm)	long range 2 ms sensing range (mm)	Minimum object size: reduced sensing ranges standard	min.
LL3 through-beam, lenses for extended sensing ranges									
Axial optic									
LL3-TA01	5 308 128								
Combined with standard fibers LL3									
LL3-TB01	5 308 050	2000	4000	4000	800	1800	3000	–	Ø 3 mm
LL3-TB01-10	5 308 051	1300	3000	4000	600	1500	3000	–	Ø 3 mm
LL3-TB02	5 308 048	3500	4000	4000	1500	3000	4000	–	Ø 3 mm
Combined with super flexible fibers									
LL3-TK77	5 313 035	3500	4000	4000	3000	4000	4000	–	Ø 3 mm
Combined with flexible fibers									
LL3-TR01	5 308 052	3500	4000	4000	1500	3000	4000	–	Ø 3 mm
Combined with heat resisting fibers (100° C)									
LL3-TH01	5 308 064	3000	4000	4000	1000	2500	4000	–	Ø 3 mm
90°-optic									
LL3-TA02	5 308 129								
Combined with standard fibers LL3									
LL3-TB01	5 308 050	500	1000	1700	200	500	900	–	Ø 3 mm
LL3-TB01-10	5 308 051	350	700	1300	150	350	600	–	Ø 3 mm
LL3-TB02	5 308 048	500	1200	1700	250	600	1000	–	Ø 3 mm
Combined with super flexible fibers									
LL3-TK77	5 313 035	500	1000	1800	350	500	900	–	Ø 3 mm
Combined with flexible fibers									
LL3-TR01	5 308 052	500	900	1200	250	400	600	–	Ø 3 mm
Combined with heat resisting fibers (100° C)									
LL3-TH01	5 308 064	500	1000	1200	350	550	800	–	Ø 3 mm
LL3 proximity, lenses with focused optic								**White 90%**	**Min.**
Focus 6 mm, spot size ,Ø 0.25 mm									
LL3-DA01	5 308 127								
Combined with standard fiber LL3									
LL3-DT01	5 308 076	6 ± 1 mm	6 ± 1 mm	6 ± 1 mm	6 ± 1 mm	6 ± 1 mm	6 ± 1 mm	Ø 0.25 mm	Ø 0.1 mm
Focus 12 mm, spot size Ø 3.0 mm									
LL3-DA02	5 308 130								
LL3 through-beam, lenses for extending sensing ranges									
Axial optic									
Combined with standard fiber LL3									
LL3-DT01	5 308 076	12 ± 3 mm	12 ± 3 mm	12 ± 3 mm	12 ± 3 mm	12 ± 3 mm	12 ± 3 mm	Ø 3.0 mm	Ø 0.1 mm



Fiber-optic cables – solving automation problems

Fiber-optic cables provide “slimline” and flexible connection between the sensor and the sensing target. They are key to sensing solutions and often the only way to detect inaccessible objects, details, and printed marks.



OPTICAL FIBER

Optical fibers in plastic or glass. Suitable for all requirements.

Plastic fiber-optic cable
- Mono fiber or fiber bundle
- Smallest bending radii
- Extremely flexible
- Low weight
- Can be cut to desired length
- Ambient temperatures from -40…180° C

Glass fiber-optic cable
- Fiber bundle
- Chemically resistant
- For extreme temperatures from -55…315° C

END SLEEVE

Assembly-oriented end sleeves, enabling the fiber-optic cable to be easily mounted in the required sensing position.

End sleeve options
- Very thin end sleeves from Ø 1.5 mm
- Long, slim end sleeves
- Flexible end tips
- Integral 90° deflection
- Special end sleeves

PROTECTIVE SHEATHING

Protects the fiber core from mechanical or chemical damage.

Plastic sheathing
- Light weight
- Flexible
- Generally resistant
- For standard applications

Protective metal sheath
- For temperature up to 315° C
- Protection from mechanical stress

Teflon sheathing
- Protection from extremely aggressive chemicals

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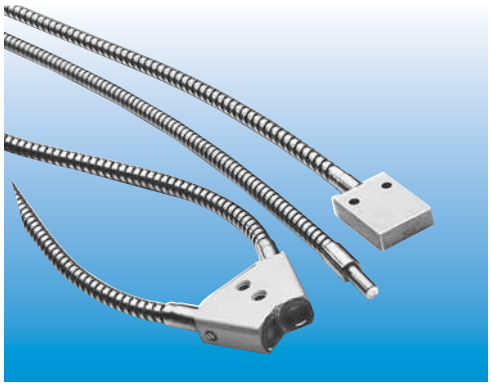
LIS/LBS/LSS Fiber-Optic Cables with Stainless Steel Sheath

Fiber-Optic Cables - Proximity Systems



Fiber-Optic Cables – Through-beam systems

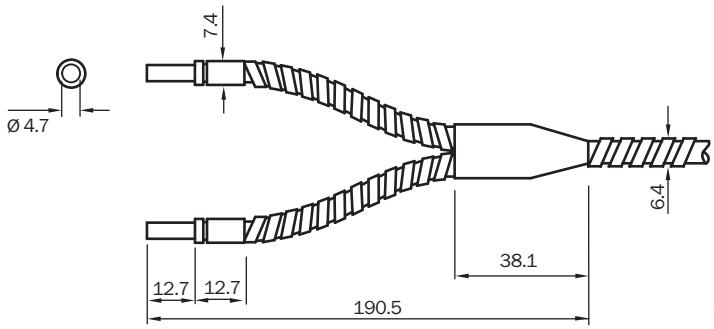




Highlights

- Glass fiber cable with stainless steel sheath
- Sender and receiver fibers are randomly mixed
- Operating temperature -72...599° F (-58...315° C)
- Length of fiber-optic cable 900 mm
- 19 mm bend radius

Proximity systems



dimensions in mm

Mounting materials (cap nut, clamp ring, O-ring seal and mounting instructions) are included with fiber-optic cables.

Selection table: sensors, fiber-optic cables, range/sensing distances

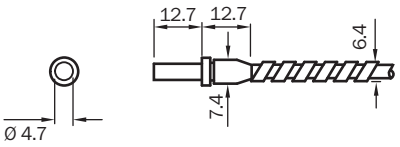
Proximity systems					
LBS fiber-optic cables			**Sensing distance in mm[1] when combined with sensor**		
Description	**Type[2]**	**Part no.**	WLL 260	KTL 5-2, CSL	W.1000/W.2000
End sleeve ø 7.4 mm, FOC ø 3.2 mm	LBSA 32 900	7 020 040	50	9	150/175
End sleeve ø 6.4 mm, FOC ø 2.3 mm	LBSAA 23 900	7 020 103	30	9	75/75
Mounting 5/16 in x 24, FOC ø 3.2 mm	LBSAT 32 900	7 020 036	50	9	150/175
End sleeve ø 7.4 mm, FOC ø 3.2 mm	LBSF 32 900	7 020 038	50	9	150/175
End sleeve ø 8 mm, FOC ø 1.2 mm	LBSM 12 900	7 020 054	6	9	70/80
End sleeve ø 7.9 mm, FOC ø 1.6 mm	LBSP 16 900	7 020 044	6	9	80/100
Fiber-optic cable cell 0.5 mm x 3.8 mm	LBSR 16 900	7 020 050	15	9	100/110
Fiber-optic cable cell 0.8 mm x 9.7 mm	LBSR 32 900	7 020 042	50	9	200/220
Fiber-optic cable cell 0.2 mm x 38.1 mm	LBSR 40 900	7 020 052	90	9	230/260
Mounting 5/16 in x 24, FOC ø 3.2 mm	LBST 32 900	7 020 046	50	9	150/175
Mounting 5/16 in x 24, FOC ø 3.2 mm	LBSTA 32 900	7 020 048	50	9	150/175
Optical head with fiber-optic cables	OCSL-S01	1 018 259	–	9	–
End sleeve ø 7.4 mm, FOC ø 3.2 mm, 50/50 split	LSSA 32 900	7 023 582	50	9	150/175
End sleeve ø 6.4 mm, FOC ø 2.3 mm, 50/50 split	LSSAA 23 900	7 023 583	30	9	75/100
Mounting 5/16 in x 24, FOC ø 3.2 mm, 50/50 split	LSSAT 32 900	7 023 584	50	9	150/175
End sleeve ø 7.4 mm, FOC ø 3.2 mm, 50/50 split	LSST 32 900	7 023 586	50	9	150/175
Mounting 5/16 in x 24, FOC ø 3.2 mm, 50/50 split	LSSTA 32 900	7 023 587	50	9	150/175
Mounting 5/16 in x 24, FOC ø 3.2 mm, 50/50 split	LSSF 32 900	7 023 585	50	9	150/175

1) Operating range or sensing distance
Sensed material 90% remission (DIN 5033)
Size of sensed material = diameter of light spot (aperture approx. 60°)

2) Only standard length fibers (900 mm) are listed. Please consult www.sickusa.com or call (800)325.7425 to check availability or alternate lengths.

Adaptation of fiber-optic cables

Through-beam systems



dimensions in mm

Through-beam systems					
LIS fiber-optic cables			**Sensing range in mm[1] when combined with sensor**		
Description	**Type[3]**	**Part No.[2]**	WLL 260	KTL 5-2, CSL	W.1000/W.2000
End sleeve ø 7.4 mm, FOC ø 3.2 mm	LISA 32 900	7 020 039	700	20	1 m/800 mm
End sleeve ø 6.4 mm, FOC ø 2.3 mm	LISAA 23 900	7 020 102	240	20	150/120 mm
Mounting 5/16 in x 24, FOC ø 3.2 mm	LISAT 32 900	7 020 035	700	20	1 m/800 mm
End sleeve ø 7.4 mm, FOC ø 3.2 mm	LISF 32 900	7 020 037	700	20	1 m/800 mm
End sleeve ø 8 mm, FOC ø 1.2 mm	LISM 12 900	7 020 053	90	20	
End sleeve ø 7.9 mm, FOC ø 1.6 mm	LISP 16 900	7 020 043	100	20	
Fiber-optic cable cell 0.5 mm x 3.8 mm	LISR 16 900	7 020 049	220	20	400/350 mm
Fiber-optic cable cell 0.8 mm x 9.7 mm	LISR 32 900	7 020 041	700	20	1 m/800 mm
Fiber-optic cable cell 0.2 mm x 38.1 mm	LISR 40 900	7 020 051	600	20	1 m/800 mm
Mounting 5/16 in x 24, FOC ø 3.2 mm	LIST 32 900	7 020 045	700	20	1 m/800 mm
Mounting 5/16 in x 24, FOC ø 3.2 mm	LISTA 32 900	7 020 047	700	20	1 m/800 mm

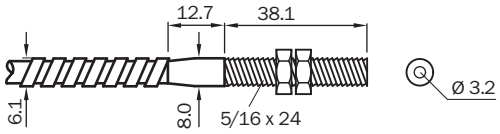
1) Operating range or sensing distance. Sensed material 90% remission (DIN 5033)
Size of sensed material = diameter of light spot (aperture approx. 60°)

2) The part number includes only one fiber-optic cable. Two fiber-optic cables are needed for a through-beam system.

3) Only standard length fibers (900 mm) are listed. Please consult www.sickusa.com or call (800)325.7425 to check availability or alternate lengths.

LIS/LBS 32 900 fiber-optic cables

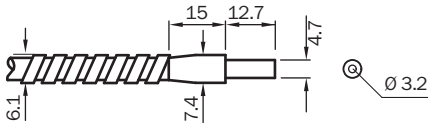
System	Type	Part no.
Through-beam	LIST 32 900	7 020 045
Proximity system	LBST 32 900	7 020 046
Proximity system	LSST 32 900	7 023 586



dimensions in mm

LIS/LBS 32 900 fiber-optic cables

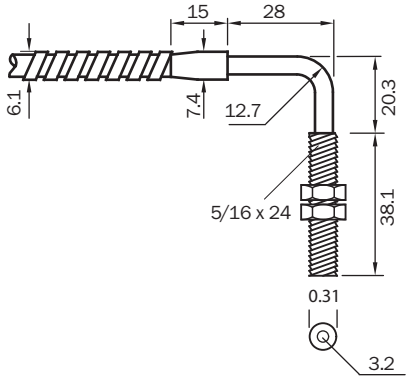
System	Type	Part no.
Through-beam	LISF 32 900	7 020 037
Proximity system	LBSF 32 900	7 020 038
Proximity system	LSSF 32 900	7 023 585



dimensions in mm

LIS/LBS 32 900 fiber-optic cables

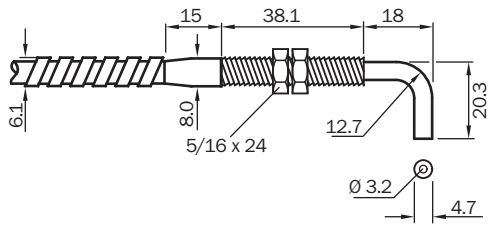
System	Type	Part no.
Through-beam	LISAT 32 900	7 020 035
Proximity system	LBSAT 32 900	7 020 036
Proximity system	LSSAT 32 900	7 023 584



dimensions in mm

LIS/LBS 32 900 fiber-optic cables

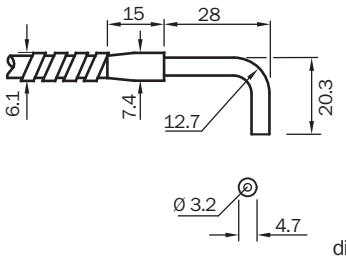
System	Type	Part no.
Through-beam	LISTA 32 900	7 020 047
Proximity system	LBSTA 32 900	7 020 048
Proximity system	LSSTA 32 900	7 023 587



dimensions in mm

LIS/LBS 32 900 fiber-optic cables

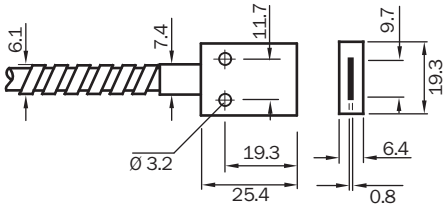
System	Type	Part no.
Through-beam	LISA 32 900	7 020 039
Proximity system	LBSA 32 900	7 020 040
Proximity system	LSSA 32 900	7 023 582



dimensions in mm

LIS/LBS 32 900 fiber-optic cables

System	Type	Part no.
Through-beam	LISR 32 900	7 020 041
Proximity system	LBSR 32 900	7 020 042



dimensions in mm

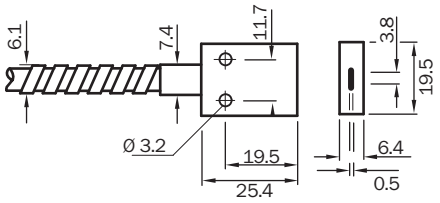
NOTE: Only standard length fibers are shown (900 mm). Please consult www.sickusa.com or call (800).325.7425 to check availability of alternate lengths

LIS/LBS Fiber-Optic Cables with Stainless Steel Sheath

Dimensional drawings and order information

LIS/LBS 16 900 fiber-optic cables

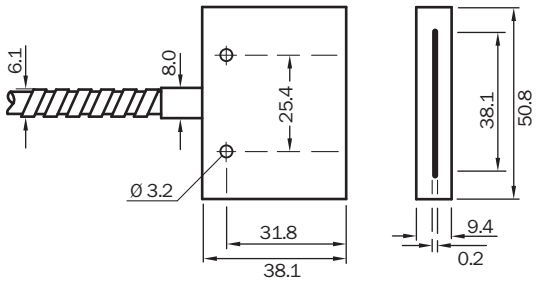
System	Type	Part no.
Through-beam	LISR 16 900	7 020 049
Proximity system	LBSR 16 900	7 020 050



dimensions in mm

LIS/LBS 40 900 fiber-optic cables

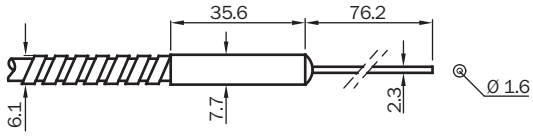
System	Type	Part no.
Through-beam	LISR 40 900	7 020 051
Proximity system	LBSR 40 900	7 020 052



dimensions in mm

LIS/LBS 16 900 fiber-optic cables

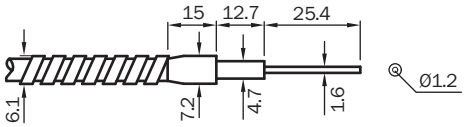
System	Type	Part no.
Through-beam	LISP 16 900	7 020 043
Proximity system	LBSP 16 900	7 020 044



dimensions in mm

LIS/LBS 12 900 fiber-optic cables

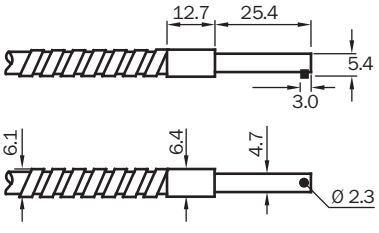
System	Type	Part no.
Through-beam	LISM 12 900	7 020 053
Proximity system	LBSM 12 900	7 020 054



dimensions in mm

LIS/LBS 23 900 fiber-optic cables

System	Type	Part no.
Through-beam	LISAA 23 900	7 020 102
Proximity system	LBSAA 23 900	7 020 103
Proximity system	LSSAA 23 900	7 023 583

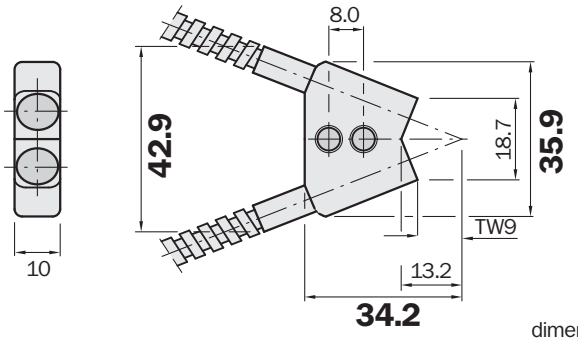


dimensions in mm

NOTE: Only standard length fibers are shown (900 mm). Please consult www.sickusa.com or call (800)325.7425 to check availability of alternate lengths

OCSL fiber-optic cables

System	Type	Part no.
Proximity system	OCSL-S01*	1 018 259



dimensions in mm

* Lens only, purchase with LISF 32900(2)

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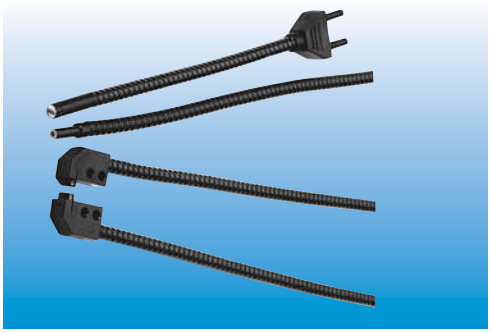
LM/LT Fiber-Optic Cables for WLL 12 Sensors

Fiber-Optic Cables - Proximity Systems



Fiber-Optic Cables - Through-beam Systems





Highlights

- Robust glass fiber-optic cable within a helical metal spring
- Operating temperature for chrome-plated helical metal spring -13...482° F (-25… 250° C)
- Operating temperature for helical metal spring with PVC sheath 14...140° F (-10… 60° C)
- 20 mm minimum bend radius

1	With reference to standard white, 90% remission
2	With reference to standard gray, 18% remission
3	With reference to standard black, 6% remission
4	On "diamond grade" reflective tape

Selection table: sensors, fiber-optic cables, sensing distance/range

Fiber-Optic cables, proximity systems

Description	Type	Part no.	Sensing range in mm with photoelectric switches								
			WLL 12-B 5181			WLL 12-B 5281			WLL 12-B 5381		
			1	2	4	1	2	4	1	2	3
			Red light			Infrared light			Green light		
150 mm	LM 31-150	2 015 225	50	12	280	60	20	280	5	2	60
450 mm	LM 31-450	2 015 223	50	12	280	60	20	280	5	2	60
750 mm	LM 31-750	2 015 224	50	12	280	60	20	280	5	2	60
1500 mm	LM 31-1500	2 017 381	50	12	280	60	20	280	5	2	60
150 mm, with rectangular light outlet	LM 35-150	2 015 226	50	12	280	60	20	280	5	2	60
450 mm, with rectangular light outlet	LM 35-450	2 015 230	50	12	280	60	20	280	5	2	60
750 mm, with rectangular light outlet	LM 35-750	2 015 231	50	12	280	60	20	280	5	2	60
150 mm, with 90° offset head with rectangular light outlet	LM 36-150	2 015 232	50	12	280	60	20	280	5	2	60
450 mm, with 90° offset head with rectangular light outlet	LM 36-450	2 015 233	50	12	280	60	20	280	5	2	60
750 mm, with 90° offset head with rectangular light outlet	LM 36-750	2 015 234	50	12	280	60	20	280	5	2	60
1000 mm, with 90° offset head with rectangular light outlet	LM 36-1000	2 016 772	50	12	280	60	20	280	5	2	60
1250 mm, with 90° offset head with rectangular light outlet	LM 36-1250	2 016 792	50	12	280	60	20	280	5	2	60
150 mm, as LM 36, but with light outlet turned 90°	LM 37-150	2 015 235	50	12	280	60	20	280	5	2	60
450 mm, as LM 36, but with light outlet turned 90°	LM 37-450	2 015 236	50	12	280	60	20	280	5	2	60
750 mm, as LM 36, but with light outlet turned 90°	LM 37-750	2 015 237	50	12	280	60	20	280	5	2	60
450 mm, up to 250° C	LT 31-450	2 015 227	50	12	280	60	20	280	5	2	60
750 mm, up to 250° C	LT 31-750	2 015 228	50	12	280	60	20	280	5	2	60
2200 mm, up to 250° C	LT 31-2200	2 017 871	50	12	280	60	20	280	5	2	60

Fiber-Optic cables, through-beam systems

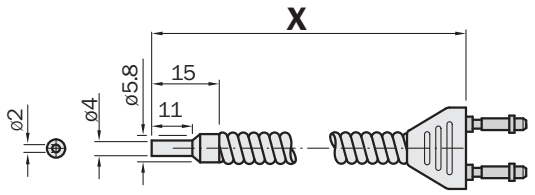
Description	Type	Part no.	Sensing range in mm with photoelectric switches		
			WLL 12-B 5181	WLL 12-B 5281	WLL 12-B 5381
			Red light	Infrared light	Green light
450 mm	LM 32-450	2 014 850	200	300	20
750 mm	LM 32-750	2 015 038	200	300	20
150 mm, with 90° offset head	LM 38-150	2 016 788	200	300	20
450 mm, with 90° offset head	LM 38-450	2 015 049	200	300	20
750 mm, with 90° offset head	LM 38-750	2 015 050	200	300	20
750 mm, with 90° offset head and front lens	LM 38-751	2 015 970	330	550	32
450 mm, as LM 38, but with light outlet turned 90°	LM 39-450	2 015 047	200	300	20
750 mm, as LM 38, but with light outlet turned 90°	LM 39-750	2 015 048	200	300	20
450 mm, up to 250° C	LT 32-450	2 015 072	200	300	20
750 mm, up to 250° C	LT 32-750	2 015 073	200	300	20

LM/LT Fiber-Optic Cables for WLL 12 Sensors

Dimensional drawings and order information

LM 31 fiber-optic cables, helical metal spring with PVC sheath

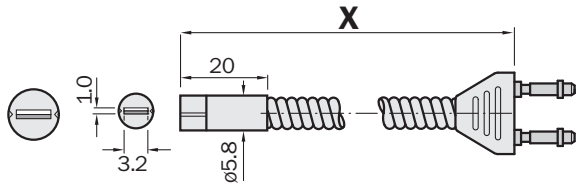
Type	Part no.	Length X
LM 31-150	2 015 225	150 mm
LM 31-450	2 015 223	450 mm
LM 31-750	2 015 224	750 mm
LM 31-1500	2 017 381	1500 mm



dimensions in mm

LM 35 fiber-optic cables, helical metal spring with PVC sheath

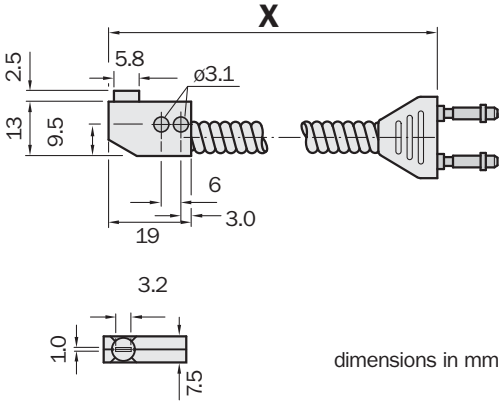
Type	Part no.	Length X
LM 35-150	2 015 226	150 mm
LM 35-450	2 015 230	450 mm
LM 35-750	2 015 231	750 mm



dimensions in mm

LM 36 fiber-optic cables, helical metal spring with PVC sheath

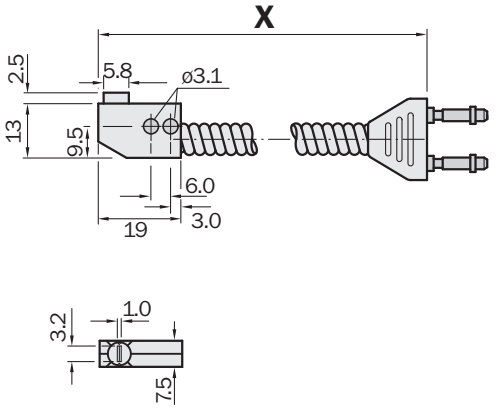
Type	Part no.	Length X
LM 36-150	2 015 232	150 mm
LM 36-450	2 015 233	450 mm
LM 36-750	2 015 234	750 mm
LM 36-1000	2 016 772	1000 mm
LM 36-1250	2 016 792	1250 mm



dimensions in mm

LM 37 fiber-optic cables, helical metal spring with PVC sheath

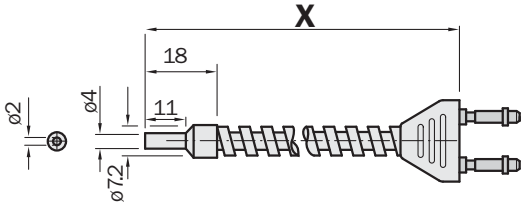
Type	Part no.	Length X
LM 37-150	2 015 235	150 mm
LM 37-450	2 015 236	450 mm
LM 37-750	2 015 237	750 mm



dimensions in mm

LT 31 fiber-optic cables, helical metal spring, chrome-plated

Type	Part no.	Length X
LT 31-450	2 015 227	450 mm
LT 31-750	2 015 228	750 mm
LT 31-2200	2 017 871	2200 mm



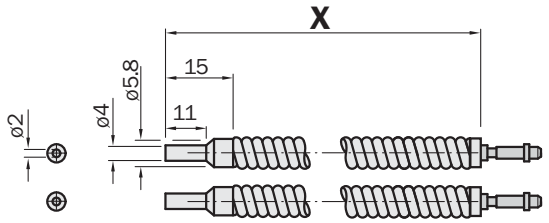
dimensions in mm

LM/LT Fiber-Optic Cables for WLL 12 Sensors

Dimensional drawings and order information

LM 32 fiber-optic cables, helical metal spring with PVC sheath

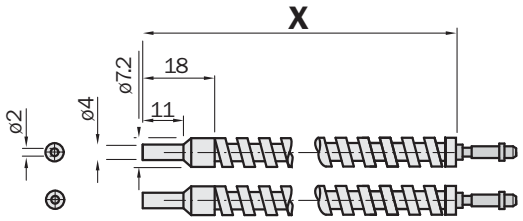
Type	Part no.	Length X
LM 32-450	2 014 850	450 mm
LM 32-750	2 015 038	750 mm



dimensions in mm

LT 32 fiber-optic cables, helical metal spring, chrome-plated

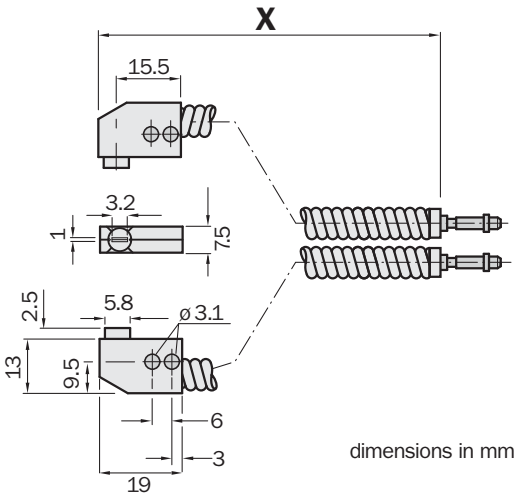
Type	Part no.	Length X
LT 32-450	2 015 072	450 mm
LT 32-750	2 015 073	750 mm



dimensions in mm

LM 38 fiber-optic cables, helical metal spring with PVC sheath

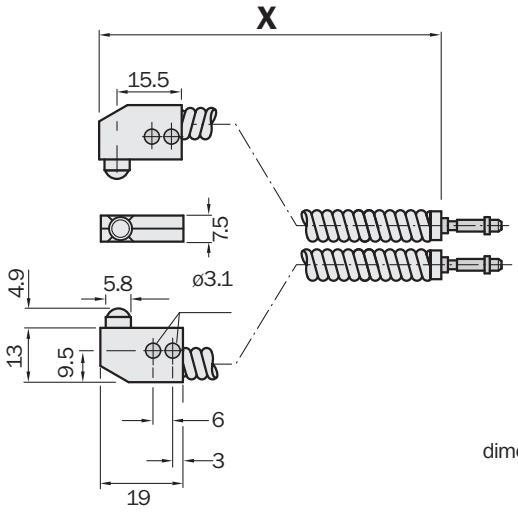
Type	Part no.	Length X
LM 38-150	2 015 788	150 mm
LM 38-450	2 015 049	450 mm
LM 38-750	2 015 050	750 mm



dimensions in mm

LM 38 fiber-optic cables, with front lens, helical metal spring with PVC sheath

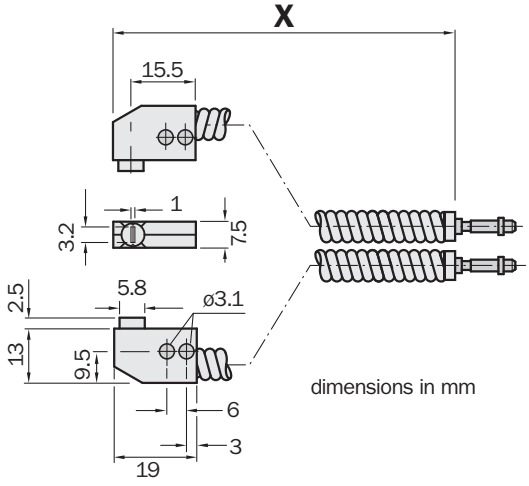
Type	Part no.	Length X
LM 38-751	2 015 970	750 mm



dimensions in mm

LM 39 fiber-optic cables, helical metal spring with PVC sheath

Type	Part no.	Length X
LM 39-450	2 015 047	450 mm
LM 39-750	2 015 048	750 mm



dimensions in mm

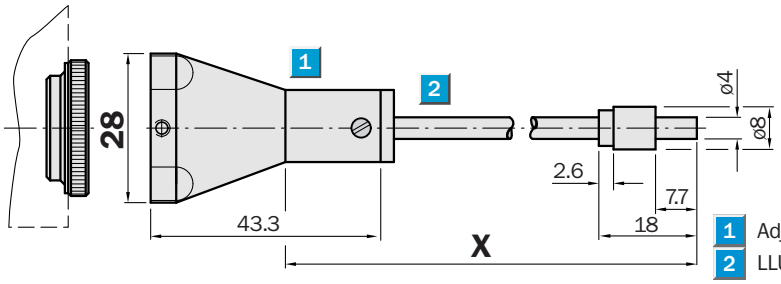
Fiber-optic cables for LUT luminescence sensor

- UV fiber-optic cables
- Operating temperature 23...95° F (-5…35° C)
  Unable to withstand mechanical loading outside this range
  Must not be bent below 32° F (0° C)

Dimensional drawings and order information

LLUV 8 fiber-optic cables for LUT 3-820 and LUT 3-920 luminescence sensor

Type	Part no.	Length X
LLUV 8-500	2 017 098	500 mm
LLUV 8-1000	2 017 099	1000 mm



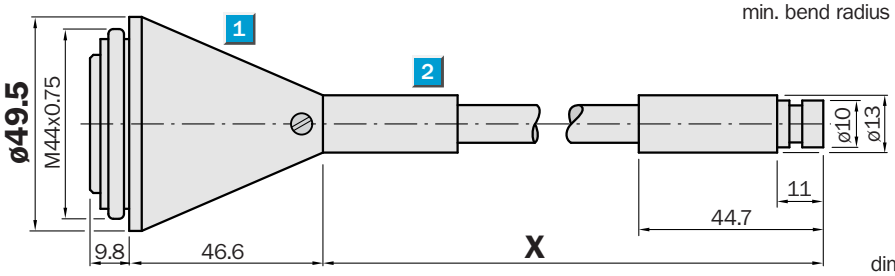
1 Adjustable lens
2 LLUV 8 fiber-optic cable,
min. bend radius R_{min} = 40 mm

dimensions in mm

LLUV 5 fiber-optic cables for LUT 1-4 luminescence sensor

Type	Part no.	Length X
with adjustable lens		
LLUV 5-500-A	1 005 621	500 mm
LLUV 5-1000-A	1 005 622	1000 mm
LLUV 5-1500-A	1 005 623	1500 mm
without adjustable lens		
LLUV 5-500	2 008 435	500 mm
LLUV 5-1000	2 008 436	1000 mm
LLUV 5-1500	2 008 437	1500 mm

1 Adjustable lens
2 LLUV 5 fiber-optic cable,
min. bend radius R_{min} = 60 mm

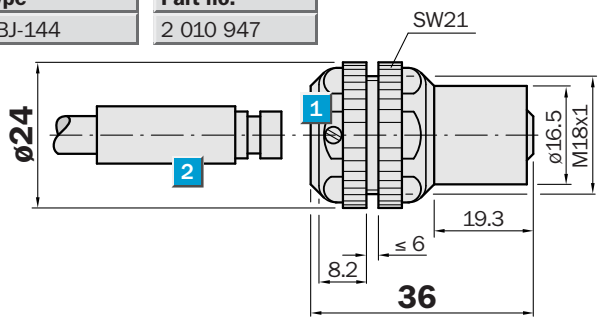


dimensions in mm

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Front lens for LLUV 5 fiber-optic cables

Type	Part no.
OBJ-144	2 010 947



1 M 3 Fixing screw
2 LLUV 5 fiber-optic cable

dimensions in mm

Special Accessories & Power Supplies

Selection table, special accessories



For equipment	Description	Type	Part No.	Page no.
Masks				
WS/WE 9-2	Mask card, 0.5/1.0/1.5/2.0 mm wide, self-adhesive	BL-9-2	4 033 253	1316
WS/WE 12-2, 12-3	Mask card, 0.5/1.0/1.5/2.0 mm wide, self-adhesive	BL 12-SKN	4 031 815	1316
WS/WE 140	Slotted maks, each 2 x 0.5 mm/ 1.0 mm/2.0 mm	BL140-10	5 308 458	1316
WS/WE 140	Polarizing filter	BL-140-POLF	5 308 457	1316
WS/WE 150	Slotted masks, each 2 x 0.5 mm/ 1.0 mm/2.0 mm wide	BL-150-10	5 306 216	1316
WS/WE 160	Slotted masks, 1.0 mm wide	BL-160-10	5 305 196	1316
WS/WE 170	Slotted masks, 1.0 mm wide	BL-170-10	5 305 687	1317
WS/WE 260	Slotted masks, each 2 x 1.0 mm/ 2.0 mm/5.0 mm wide	BL-260-SK	5 308 773	1317
Polarization filter				
WS/WE 170	Front lenses with polarizing filter 2 x X- and 2 x Y-polarization filters	BL-170-POLF	5 305 688	1317
Objective lens				
KT 5-2	Lens, sensing distance = 10 mm	OBJ-212	1 011 506	1317
KT 5-2	Lens, sensing distance = 18 mm	OBJ-213	2 009 266	1317
KT 5-2	Lens, sensing distance = 20 mm	OBJ-211	1 004 936	1317
KT 5-2	Lens, sensing distance = 40 mm	OBJ-210	2 010 945	1317
LUT 3	Lens, sensing distance = 10 mm	OBJ-LUT 3-10	2 016 348	1318
LUT 3	Lens, sensing distance = 20 mm	OBJ-LUT 3-20	2 016 349	1318
LUT 3	Lens, sensing distance = 50 mm	OBJ-LUT 3-50	2 016 350	1318
LUT 3	Adapter ring for lenses with thread M 20 x 0.75	AD-OBJ-01	2 017 097	1318
LUT1-4	Lens, sensing distance = 10 mm	OBJ-131	1 001 681	1318
LUT1-4	Lens, sensing distance = 20 mm	OBJ-132	1 001 682	1318
LUT1-4	Lens, sensing distance = 50 mm	OBJ-133	1 001 683	1318
LUT1-4	Lens, sensing distance = 125 mm	OBJ-134	1 001 684	1318
LUT1-4	Lens, sensing distance = 300 mm	OBJ-135	1 001 685	1318
Corner mirror				
DME	Corner mirror	USP-DME	2 016 330	1319

Selection table, special accessories

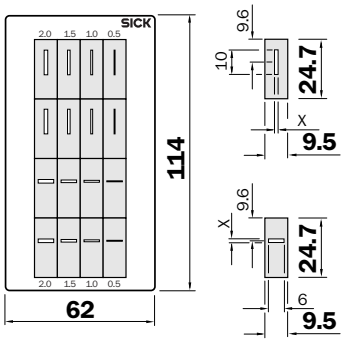
For equipment	Description	Type	Part No.	Page no.
Equipment protection, cooling and heating devices				
DT/DS 500	Weather-protection hood	WSG-DSDT	2 031 376	1319
W 23, W 23-2, W 24-2, W 24 Exi,	Weather-protection hood	OBW-KHS-M01	2 023 240	1319
W 27-3, W 34, W 260	Mounting bracket for weather-protection hood	BEF-WN-OBW	2 023 251	1319
W 24-2, W 24 Exi, WTA 24	Dust protection tube, air-purged	OBS-W 24	2 015 069	1319
W 24-2, W 34, DS 60	Weather-protecting hood (bar attachment)	WSG1-01	1 018 470	1320
W 45	Dust protection tube, 150 mm	OBS-W 45	2 011 432	1319
W 45	Air protection hood, 100 mm	OBW-W 45	2 011 431	1320
DME	Dust protection tube	OBS-DME	2 014 458	1320
PL 50 A	Front flange for dust protection tube and front air-purged	FLV-PL50	1 000 130	1320
PL 50 A	Front air-purged (front flange needed)	SLV-PL50	1 000 309	1320
PL 50 A	Dust protection tube, 90 mm long (front flange needed)	SST DO 80-090	1 000 252	1320
PL 50 A	Dust protection tube, 184 mm long (front flange needed)	SST DO 80-184	1 000 134	1320
PL 50 A	Dust protection tube, 314 mm long (front flange needed)	SST DO 80-314	1 000 133	1320
W 24-2, WTA 24	Cooling plate for water cooling, 2 units recommended per piece of equipment	BEF-KP-W 24	2 015 071	1321
W 45	Cooling plate for water cooling	BEF-KP-W 45	2 011 435	1321
DME	Cooling plate assembly kit for water cooling (complete)	BEF-KPM-DME	2 014 457	1321
DME	Peltier cooling unit with lid	BEF-KE-DME	2 019 912	1322
DME	Heating unit with lid	BEF-HE-DME	2 021 269	1322
DME	Weather hood	WSG-DME5	2 027 800	1323
DME 5000	Corner mirror	USP-DME5	2 027 710	1323
MLG	Alignment aid	AR 60	1 015 741	1323
MLG	Adapter	AR 60 bracket	4 023 462	1323
MLG	Programmable cable	PC to MLG	2 023 695	1323
MLG	Analog converter	LGE-A	7 001 107	1323
UM30	Diverter plate	USP-UM30	5 312 916	1323
Alignment assistance				
DME	Targeting telescope	OBZ-DME	2 014 194	1322
DME	Adjustment device for targeting telescope	OBZ-DME-J	2 014 191	1322
Power supply units				
EN 2	High-speed logic controller and power supply	All types	6 009 654	1324
EN 2T	High-speed logic controller and power supply	All types	6 010 342	1324
EN 3	Dual voltage power supply	All types	6 009 692	1328
EN2 EX-1	Power supply for NAMUR sensors	NAMUR sensors	6 010 459	1330
EN2 EX-2	Power supply for NAMUR sensors	NAMUR sensors	6 010 460	1330
EN2 EX-3	Power supply for NAMUR sensors	NAMUR sensors	6 010 944	1330
PS 24	Power supply	All types	7 025 584	1332
MVE 1-150	Power supply	NT 6, NT 8	1 008 964	1334
MVE 1-250	Power supply	NT 6, NT 8	1 010 494	1334

Dimensional drawings and part information

Masks

Slotted masks for WS/WE 9-2
with 2 self-adhesive masks each for sender (WS) and receiver (WE)
Slot width X: 0.5 mm/1.0 mm/2.0 mm

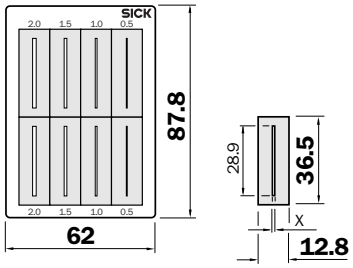
Type	Part no.
BL-9-2	4 033 253



Dimensions in mm

Slotted masks for WS/WE 12-2, 12-3
with 2 self-adhesive masks each for sender (WS) and receiver (WE)
Slot width X: 0.5 mm/1.0 mm/1.5 mm/2.0 mm

Type	Part no.
BL 12-SKN	4 031 815



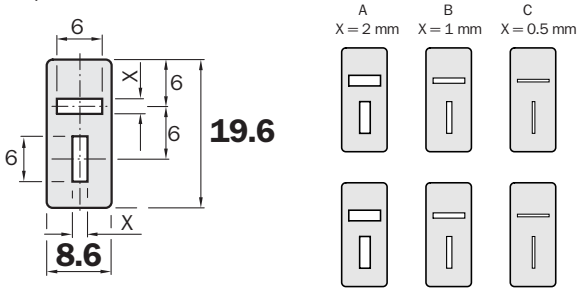
Dimensions in mm

Masks/polarization filter

Slotted Masks for WS/WE 140 *
Slot Width X: 0.5 mm/1.0 mm/2.0 mm

Type	Part no.
BL-140-10	5 308 458

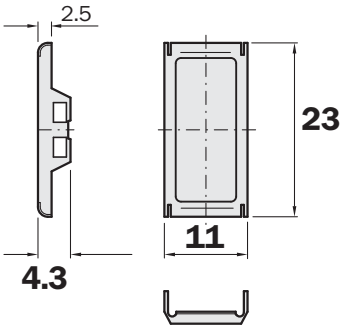
* Two pieces each



Dimensions in mm

Polarizing filter, vertical for W 140

Type	Part no.	Model
BL-140-POLF	5 308 457	4 pieces, each 2x for X and Y polarizing



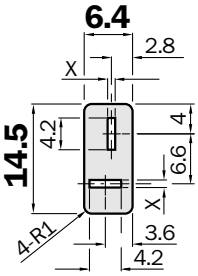
Dimensions in mm

3 pairs with slot widths A, B and C are supplied with equipment.
Mounting by self-adhesive back.
Stick mask on red optics body of WS 140 and WE 140.
For detecting smaller objects or increasing the switching accuracy.
Only for WS/WE 140.
Changed operating ranges:
A) Slot width 2.0 mm: SR = 4.0 m
B) Slot width 1.0 mm: SR = 2.0 m
C) Slot width 0.5 mm: SR = 1.0 m

Slotted masks* for WS/WE 150
Slot width X: 0.5 mm/1.0 mm/2.0 mm

Type	Part no.
BL-150-10	5 306 216

* 2 units respectively

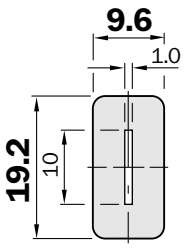


Dimensions in mm

Slotted masks* for WS/WE 160
Slot width X: 1.0 mm

Type	Part no.
BL-160-10	5 305 196

* 2 units respectively



Dimensions in mm

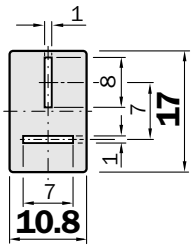
Dimensional drawings and part information

Masks/polarization filter

Slotted masks* for WS/WE 170

Type	Part no.	Slot width
BL-170-10	5 305 687	1.0 mm

* 2 units respectively

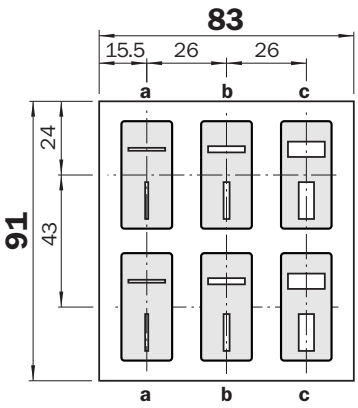


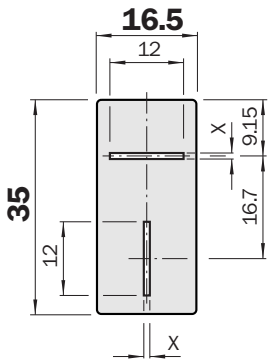
Dimensions in mm

Slotted masks* for WS/WE 260 (only for DC version)

Type	Part no.	Slot width X	Range
BL-260-SK	5 308 773	1.0 mm	1.5 m
		2.0 mm	3 m
		5.0 mm	6 m

* 2 units respectively

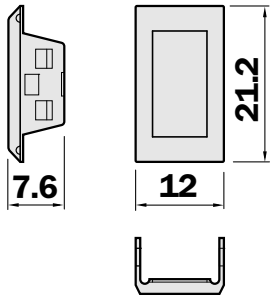




Dimensions in mm

Front polarization filter for WS/WE 170

Type	Part no.	Design
BL-170-POLF	5 305 688	2 x X and Y polarization

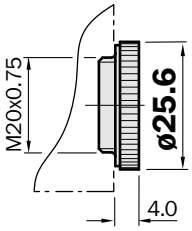


Dimensions in mm

Lenses (SD = Sensing distance, SR = Sensing range)

Lens, SD = 20 mm, for KT 5-2

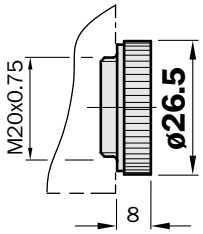
Type	Part no.
OBJ-212	1 011 506



Dimensions in mm

Objective, SD = 18 mm, for KT 5-2

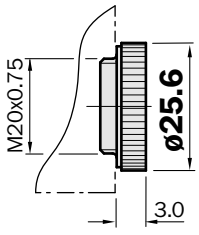
Type	Part no.
OBJ-213	2 009 266



Dimensions in mm

Objective, SD = 10 mm, for KT 5-2

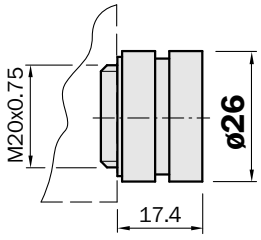
Type	Part no.
OBJ-211	1 004 936



Dimensions in mm

Lens, SD = 40 mm, for KT 5G-2

Type	Part no.
OBJ-210	2 010 945



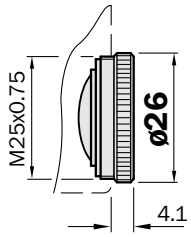
Dimensions in mm

Dimensional drawings and part information

Lenses (SD = Sensing distance, SR = Sensing range)

Lens, SD = 10/20 mm, for LUT 3

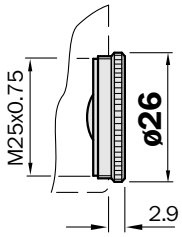
Type	Part no.	SD
OBJ-LUT3-10	2 016 348	10 mm
OBJ-LUT3-20	2 016 349	20 mm



Dimensions in mm

Lens SD = 50 mm, for LUT 3

Type	Part no.
OBJ-LUT3-50	2 016 350



Dimensions in mm

Adapter ring for lenses with M20 thread, for LUT 3

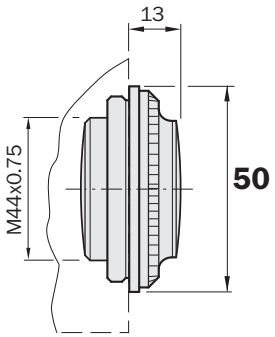
Type	Part no.
AD-OBJ-01	2 017 097



Dimensions in mm

Lens, SD = 10/20 mm, for LUT 1-4

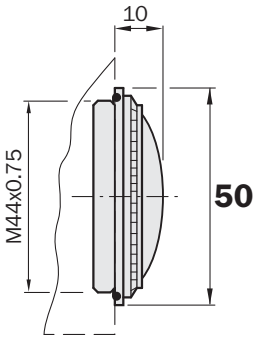
Type	Part no.	SD
OBJ-131	1 001 681	10 mm
OBJ-132	1 001 682	20 mm



Dimensions in mm

Lens, SD = 50/125 mm, for LUT 1-4

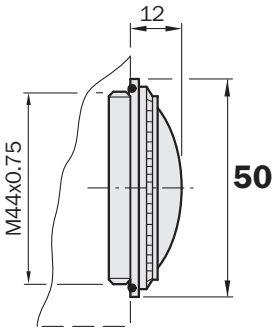
Type	Part no.	SD
OBJ-133	1 001 683	50 mm
OBJ-134	1 001 684	125 mm



Dimensions in mm

Lens, SD = 300 mm, for LUT 1-4

Type	Part no.
OBJ-135	1 001 685



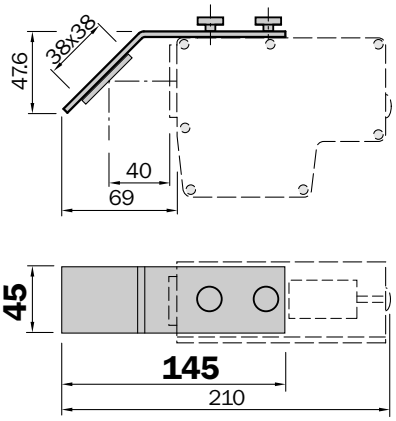
Dimensions in mm

Dimensional drawings and part information

Corner mirror

Corner mirror for DME 2000/3000

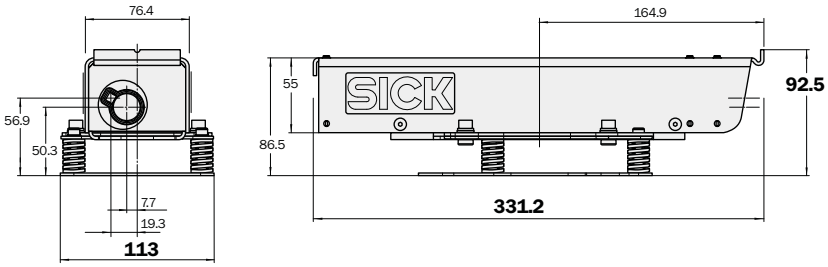
Type	Part no.
USP-DME	2 016 330



Dimensions in mm

Weather hood for DS 500 and DT 500

Type	Part no.
WSG-DSDT	2 031 376

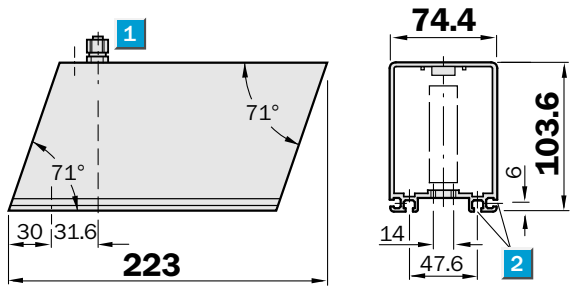


Dimensions in mm

Dust and weather protection devices

Dust protection tube, air-purged, for W 24-2, W 24 Exi, WTA 24

Type	Part no.
OBS-W24	2 015 069



Dimensions in mm

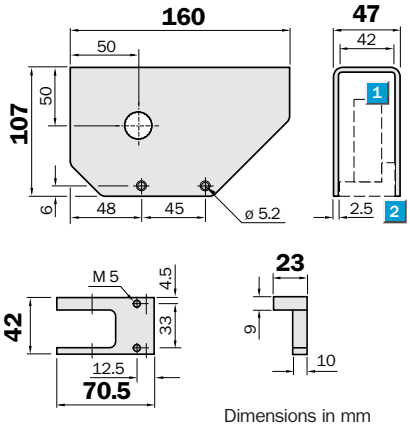
1 Fast action screw fitting for hose internal diameter 6 mm
2 Running nut channel for M 5 nut

Weather protection hood for W 23, W 24-2, W 24 Exi, W27-3, W 34, W 260*

Type	Part no.
OBW-KHS-M01	2 023 240

1 Sensor
2 Base plate with clamp supplied with unit

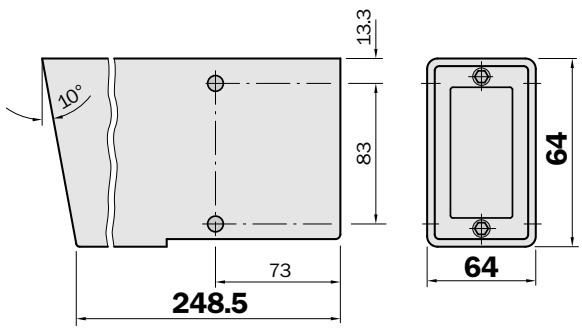
*Also available in a rod mounting version with separate clip BEF_KHS-KH1 (Part no. 2 022 726)



Dimensions in mm

Dust protection tube for W 45

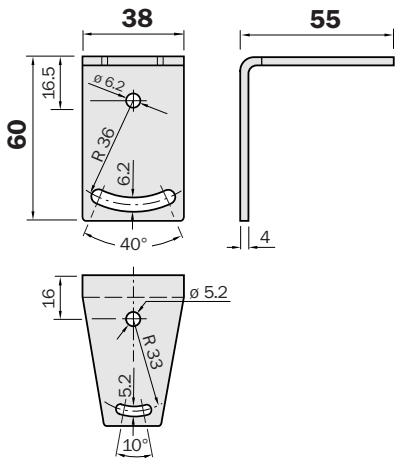
Type	Part no.
OBS-W 45	2 011 432



Dimensions in mm

Mounting bracket for weather protection hood OBW-KHS-M01

Type	Part no.
BEF-WN-OBW	2 023 251



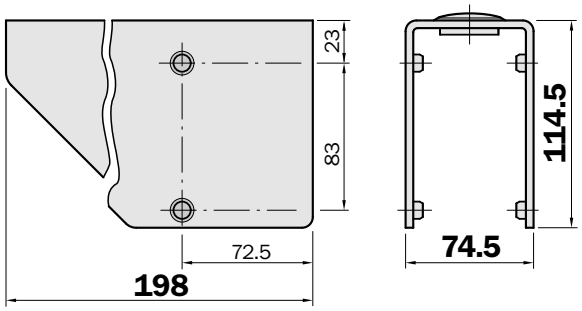
Dimensions in mm

Dimensional drawings and part information

Dust and weather protection devices

Air protection hood for W 45

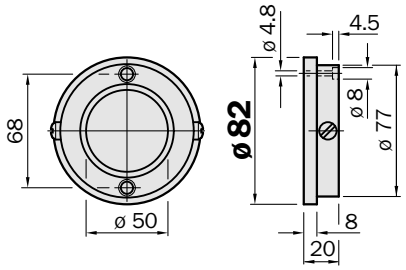
Type	Part no.
OBW-W 45	2 011 431



Dimensions in mm

Front flange for dust protection tube, weather protection and air-purging unit for PL 50 A

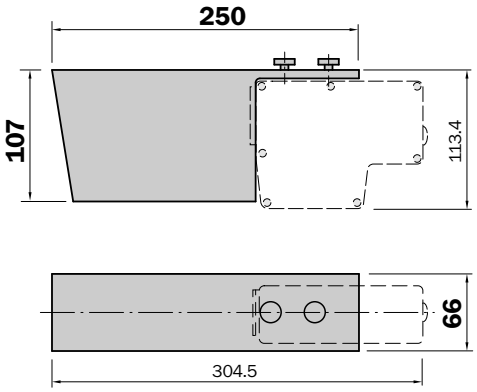
Type	Part no.
FLV-PL 50	1 000 130



Dimensions in mm

Dust protection tube for DME

Type	Part no.
OBS-DME	2 014 458

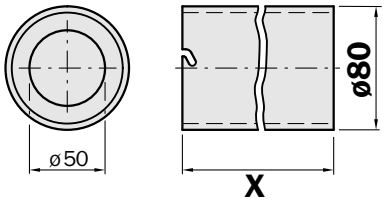


Dimensions in mm

Dust protection tube for PL 50 A (wth front flange 1 000 130)

PL 53 A, SW 50

Type	Part no.	Distance X
SST DO 80-090	1 000 252	90 mm
SST DO 80-184	1 000 134	184 mm
SST DO 80-314	1 000 133	314 mm

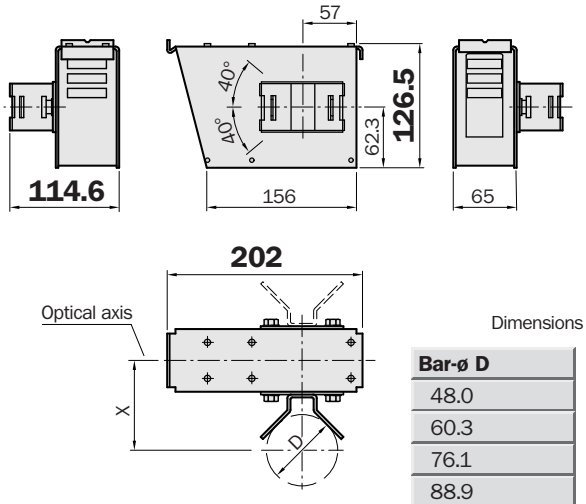


Dimensions in mm

Weather protection hood for W 24-2, W 34, DS 60

Type	Part no.*
WSG1-01	1 018 470

*Mounting materials included



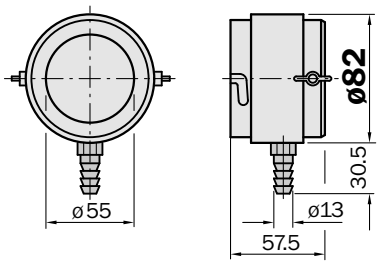
Dimensions in mm

Bar-ø D	Distance X
48.0	74.2
60.3	82.9
76.1	94.1
88.9	103.1
108.0	116.6

Front, air-purged, PL 50 A (only with front flange 1 000 130)

PL 53 A, SW 50

Type	Part no.
SLV-PL 50	1 000 309



Dimensions in mm

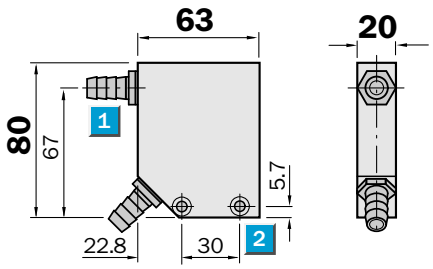
Dimensional drawings and part information

Equipment cooling devices

Cooling plate for water cooling for W 24-2, WTA 24

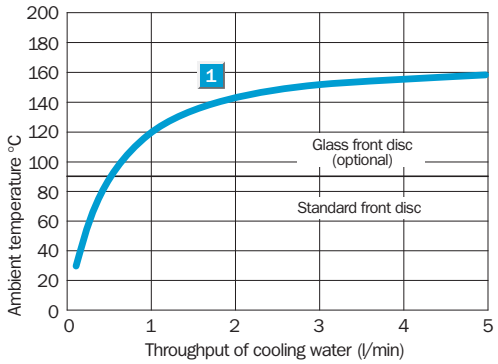
(only with front flange 1 000 130)

Type	Part no.
BEF-KP-W 24	2 015 071



1 Hose nozzle R 1/4 in
2 Tapped hole for countersunk screw M5

Dimensions in mm

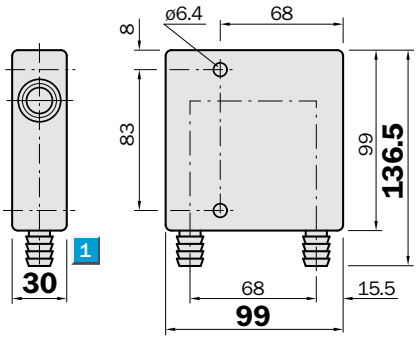


1 Temperature of cooling water 20° C, water pressure max. 5 bar

Cooling plate for water cooling for W 45

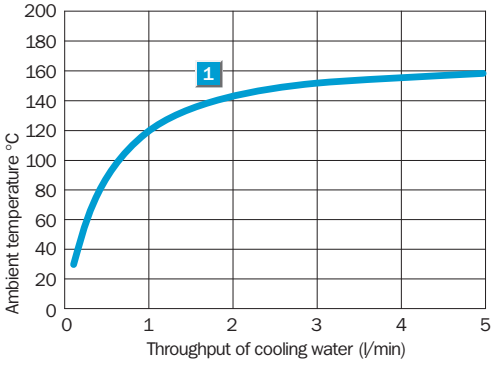
Type	Part no.
BEF-KP-W 45	2 011 435*

*including fixing screws



1 Hose nozzle R 1/2 in

Dimensions in mm

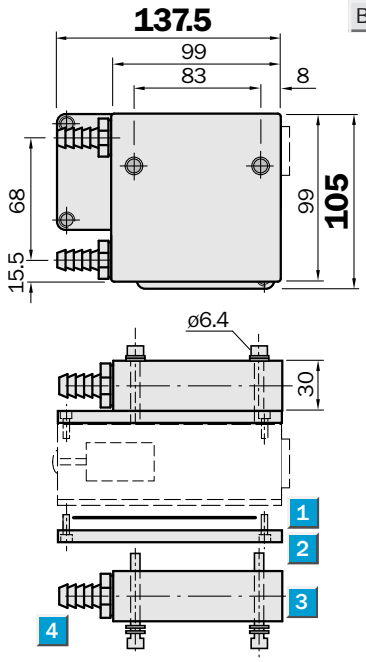


1 Temperature of cooling water 20° C, water pressure max. 5 bar

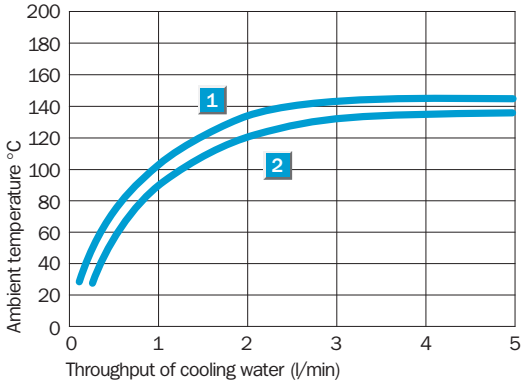
Cooling plate assembly kit (complete*), for water cooling on both sides, for DME

Type	Part no.
BEF-KPM-DME	2 014 457

*including heat conducting paste and fixing screw



1 Heat conducting cloth (2x)
2 Adapter plate (2x)
3 Cooling plate (2x)
4 Hose nozzle R 1/2 in



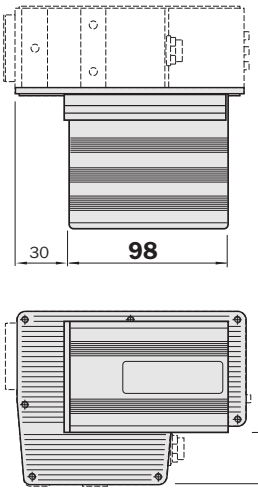
1 Temperature of cooling water 20° C
2 Temperature of cooling water 30° C

Dimensional drawings and part information

Equipment cooling and heating devices/alignment aid/alignment bracket

Peltier cooling unit with lid for DME

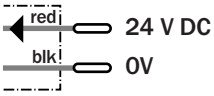
Type	Part no.
BEF-KE-DME	2 019 912

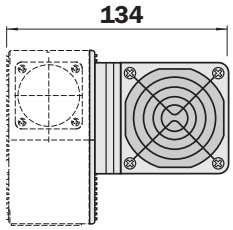


Technical Data

Supply voltage	24 V DC
Current rating	2 A
Ambient temperature	Operation: 131° F (55° C)
Connection type	Porcelain insulator

Connection Diagram





Dimensions in mm

Alignment aid for DME

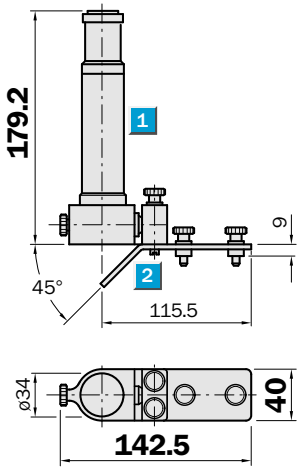
Consisting of:

Target Telescope

	Type	Part no.
1	OBZ-DME	2 014 194

Adjustment device for DME

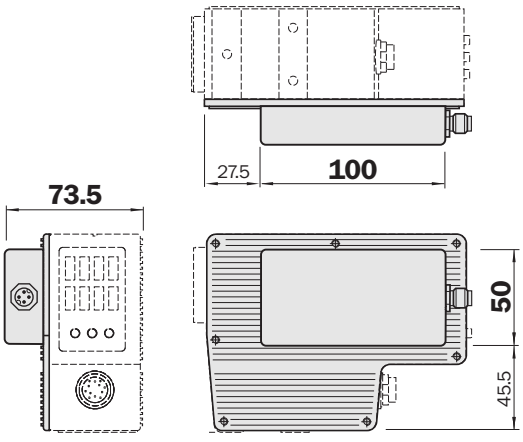
	Type	Part no.
2	OBZ-DME-J	2 014 191



Dimensions in mm

Heating element for DME

Type	Part no.
BEF-HE-DME	2 021 269

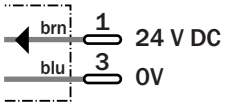


Dimensions in mm

Technical data

Supply voltage	24 V DC ± 20%
Current rating	< 400 mA
Ambient temperature	Operation: -18.4…104° F (-28…40° C)
Connection type	M12 plug

Connection diagram



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Dimensional drawings and part information

Alignment Aid for MLG

Laser alignment aid

Type	Part no.	Cable Length
AR 60	1 015 741	2 m

Alignment aid for MLG

Adapter for MLG Housing

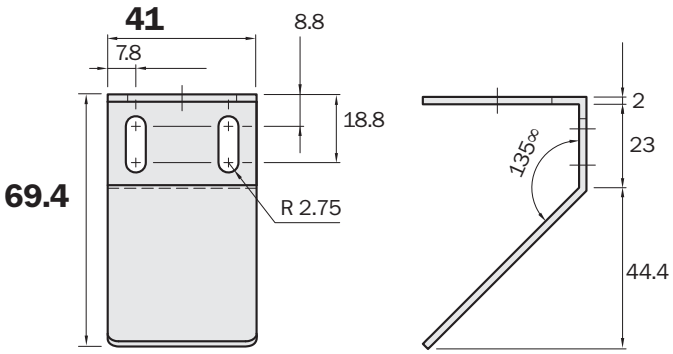
Type	Part no.
AR 60 bracket	4 032 462

Diverter plate for UM 30 to 1300 mm operating sensing range

Type	Part no.
USP-UM30	5 312 916

MLG programming cable

Type	Part no.
PC to MLG	2 023 695

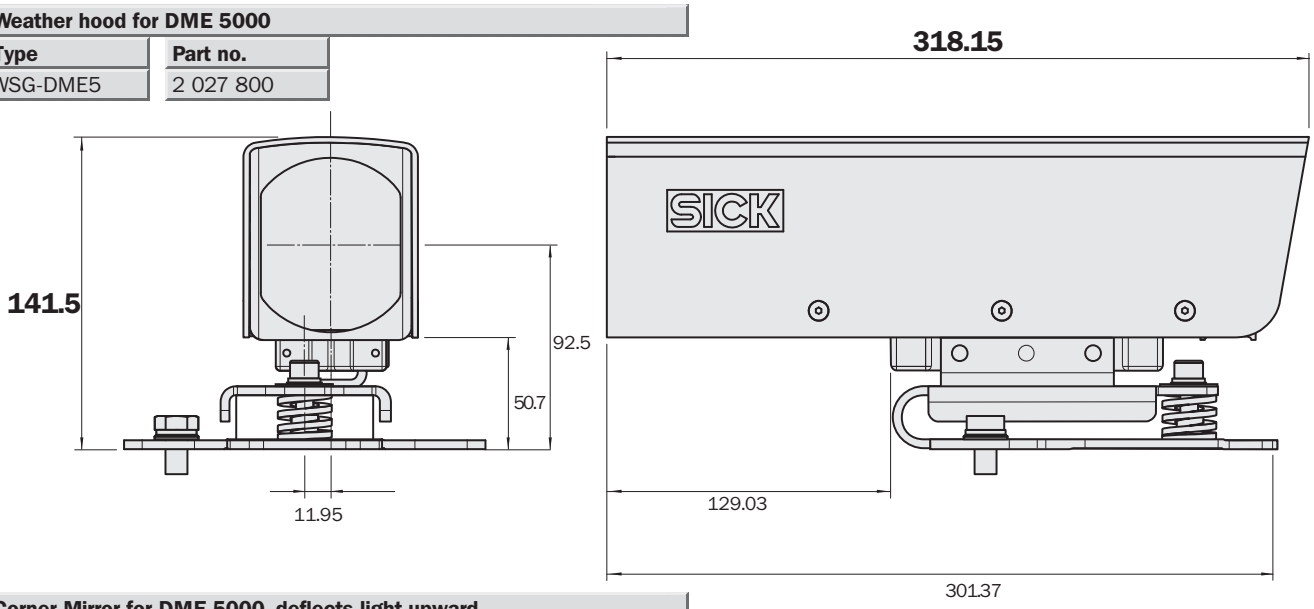


Analog converter for MLG

Type	Part no.
LGE-A	7 001 107

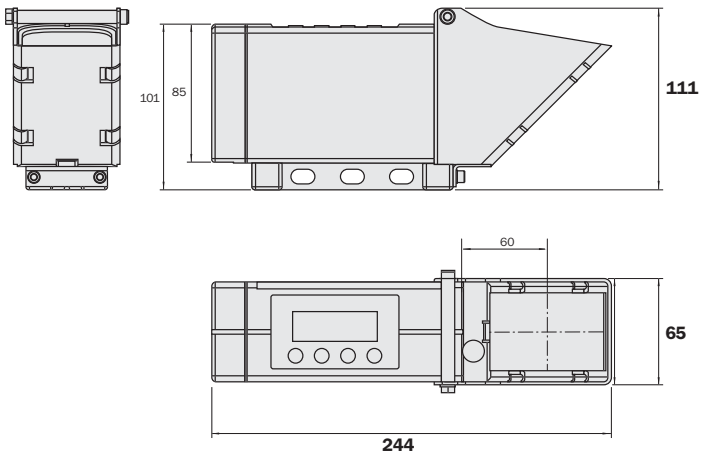
Weather hood for DME 5000

Type	Part no.
WSG-DME5	2 027 800



Corner Mirror for DME 5000, deflects light upward

Type	Part no.
USP-DME5	2 027 710



EN 2

EN 2

CE

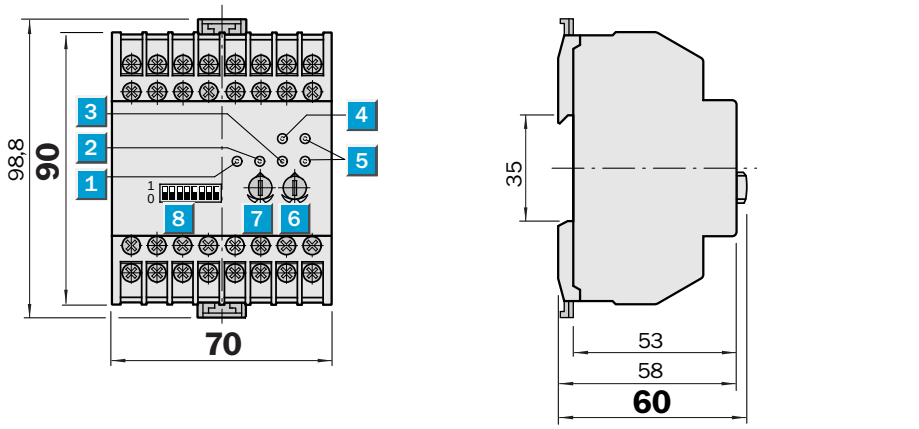
Highlights

- Universal supply voltage
- 3 inputs that can be connected via DIP switches
- Adjustable time stages
- Housing with snap fastening for support rail DIN 46277

EN2 – High-Speed Logic Controller & Power Supply



Dimensional drawing

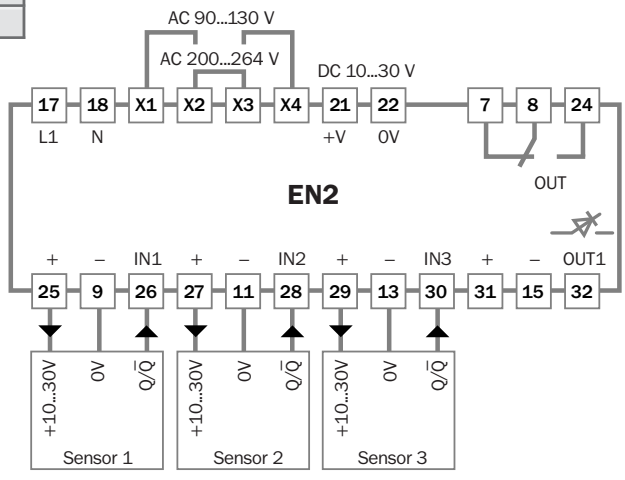


dimensions in mm

1 Display IN 1
2 Display IN 2
3 Display IN 3
4 Operating display
5 Display OUT (transistor/relay)
6 Time delay off t_2
7 Time delay on t_1
8 DIP switches F1-F8

Connection diagram

EN 2
EN 2T

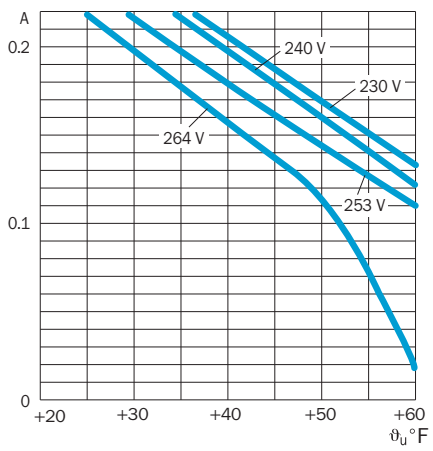


Note: Factory default: X2 and X3 are tied together for a 200-264 V AC I/P. For a 90-130 V AC input, tie X12 and X2 together, and also tie X3 and X4 together.

Technical data		EN 2	EN 2T
Supply voltage V_S	90…130 V AC or 200…264 V AC	■	■
	(can be reset using bridges)		
	10…30 V DC [1]	■	■
Main frequency	48…62 Hz	■	■
Current consumption	approx. 40 VA	■	■
Outputs			
Supply voltage for sensor	24 V DC ± 25%	■	■
Output current (total)	22 mA (1.4 A) in total, see load curve	■	■
Transistor output	32 (OUT 1)	■	■
Switching current, max.	100 mA, short-circuit-resistant,	■	■
	display OUT, flashes on overload,		
	goes out if there is a short-circuit		
Switching frequency	10 kHz	■	■
Relay output	7/8/24 (OUT)	■	■
Switching voltage, max.	250 V AC	■	■
Switching current, max.	2 A	■	■
Inputs	26 (IN 1) and 28 (IN 2) and 30 (IN 3)	■	■
	suitable for PNP, NPN[2] and B sensor outputs		
Input voltage	10…30 V DC	■	■
HIGH	> 10 V DC	■	■
LOW	> 6 V DC	■	■
Minimum switching time	5 µs	■	■
Logic	Linking the 3 inputs and delay and	■	■
	storage modes via DIP switches F1-F8		
	(see truth table and function diagrams)		
Time stages			
Time delay off t_1	0.005…1 s, adjustable	■	■
Time delay on t_2	0.005…1 s, adjustable	■	
	1…120 s, adjustable		■
VDE protection class	□	■	■
Enclosure rating	IP 20	■	■
Ambient temperature	Operation: -13…131° F (-25…55° C)	■	■
	Storage: -40…158° F (-40…70° C)	■	■
Shock load	Complying with IEC 68	■	■
Approximate weight	14.1 oz (400 g)	■	■
Housing material	Plastic	■	■

1) Delivery 200…264 V AC
2) External pull-up resistor ≤ 10 kΩ required for NPN variant

Load curve – output current



Order information	
Type	**Part no.**
EN 2	6 009 654
EN 2T	6 010 342

Truth table

Logic module:
The logic input levels of the 3 inputs are linked together depdning on the position of the 8 DIP switches F1-F8 on the front of the equipoment and immediately, or with a delay, produce a reaction at the output (which is formed in parallel as a relay and semiconductor output).

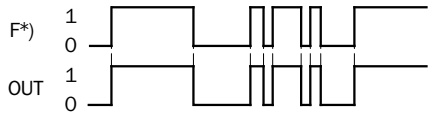
F3	0	IN 1 normal		
	1	IN 1 inverted		
F7	0	IN 2 normal		
	1	IN 2 inverted		
F5	0	f (IN 1, IN 2) = IN 1 or IN 2		
	1	f(IN 1, IN 2) = IN 1 and IN 2		
F8	0	F8 = 0		
	1		F8 = 1	
F6	0	f (IN 1, IN 2, IN 3) = IN 3 or f(IN 1, IN 2)	IN 3 normal	
	1	f (IN 1, IN 2, IN 3) = IN 3 and f(IN 1, IN 2)	IN 3 inverted	
F4	0	OUT 1 normal	F4 = 0	
	1	OUT 1 inverted		F4 = 1
F1 F2	0 0	Mode 1 (no delay)	Mode 5	Mode 9
	0 1	Mode 2 (switching on and switching off delay)	Mode 6	Mode 10
	1 0	Mode 3 (dynamic delay)	Mode 7	Mode 11
	1 1	Mode 4 (frequency discriminator)	Mode 8	Mode 12

Function diagrams and description of the modes

F8 = 0

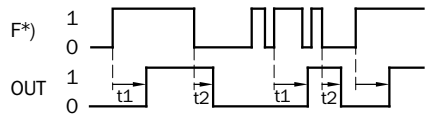
Mode 1

F1 = 0 F2 = 0



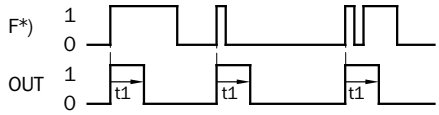
Mode 2

F1 = 0 F2 = 1



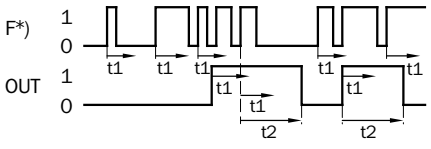
Mode 3

F1 = 1 F2 = 0



Mode 4

F1 = 1 F2 = 1



Delay modes

No delay

Output OUT follows the logic linking of the inputs IN 1, IN 2 and IN 3 F*) without delay.

Delay switching on and switching off

Output OUT follows with a delay in response and drop-out time F*).
F*) must be high for a minimum of t1 for OUT to react. If F*) is LOW, t1 is reset. When t1 elapses, OUT responds, the oscillator is stopped for t1.
If then F*) is low again, t2 begins to run, after the end of which OUT becomes inactive. If F*) goes high again during t2, t2 is reset and begins to run again at F*) = LOW. Both times t1 and t2 can therefore be retriggered.

Dynamic delay

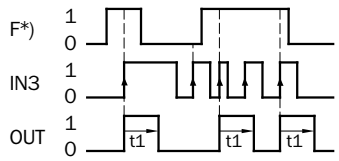
Output OUT is set with a rising signal edge of F*) for the duration of t1. This time cannot be retriggered here.

Frequency discriminator

The time stage t1 is set by the first rising signal edge of F*). If a further rising signal edge of F*) occurs within the course of t1, OUT is set for the duration of t2 and t1 is retriggered simultaneously. All further rising signal edges of F*), if they arrive within the course of t1, retrigger both t1 and t2. In practice, t2 should always be set greater than t1. If t1 has elapsed but t2 has not yet done so, t2 is not retriggered by the next rising signal edge of F*).
This function produces a frequency discriminator for the setting t2 > t1: If the duration of the period T of the input frequency of F*) is less than t1, OUT always goes to HIGH; if T is or becomes greater than t1 OUT remains or becomes LOW.

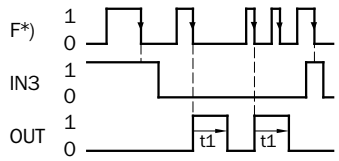
F*) logic link of the inputs: F = f (IN 1, IN 2, IN 3)

	F8 = 1	F4 = 0	Memory modes
Mode 5	F1 = 0	F2 = 0	



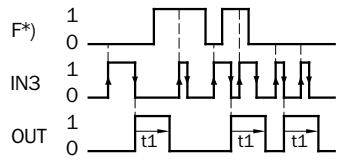
If during the rising signal edge of IN 3, the link F*) is HIGH, the output OUT is set with this signal edge for the time t1.

Mode 6	F1 = 0	F2 = 1	



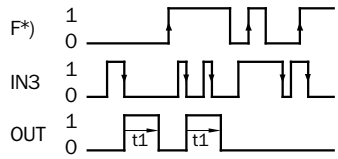
If during the falling signal edge of F*), IN 3 is not HIGH, the output is set for the duration of t1.

Mode 7	F1 = 1	F2 = 0	



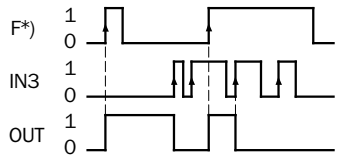
If F*) was not HIGH during the rising signal edge of IN 3, the output is set for the time t1 with the falling signal edge of IN 3.

Mode 8	F1 = 1	F2 = 1	



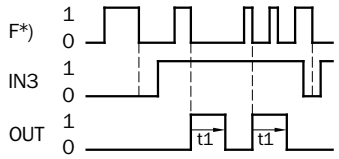
If no rising signal edge of F*) occurs during the HIGH time of IN 3, the output is set for the duration of t1 by the falling signal edge of IN 3.

	F8 = 1	F4 = 1	Memory modes
Mode 9	F1 = 0	F2 = 0	



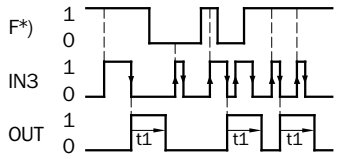
A rising signal edge of F*) sets the output; a rising signal edge of IN 3 resets it (signal edge-controlled RS-flipflop).

Mode 10	F1 = 0	F2 = 1	



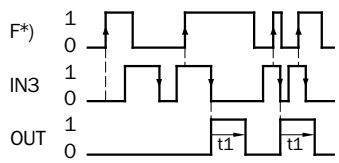
If IN 3 is HIGH during the falling signal edge of F*), the output is set for the duration of t1 (i.e. as mode 2, but used inverted in IN 3).

Mode 11	F1 = 1	F2 = 0	



If F*) was not HIGH when the signal edge of IN 3 was rising, as the signal edge of IN 3 falls, the output is set for the time t1 (as mode 3, F* used inverted).

Mode 12	F1 = 1	F2 = 1	



If no rising signal edge of F*) occurs during the HIGH time of IN 3, the output is set for the duration of t1 by the falling signal edge of IN 3.

F*) logic link of the inputs: F = f (IN 1, IN 2, IN 3)

EN 3

EN 3

CE

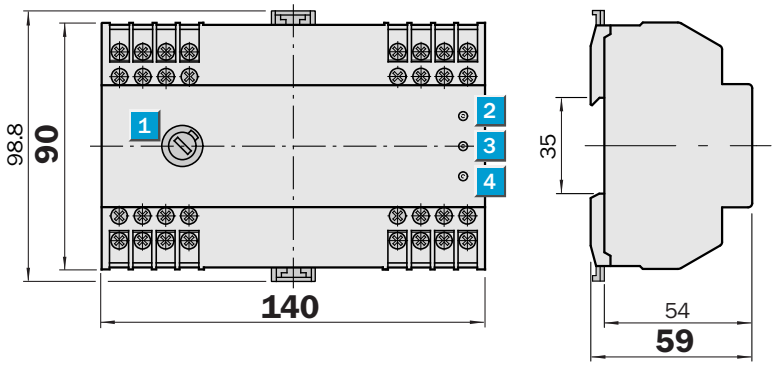
Highlights

- Universal supply voltage
- 2 inputs, each with a relay output
- Housing with snap fastening for support rail DIN 46277

EN3 – Dual Voltage Power Supply



Dimensional drawing

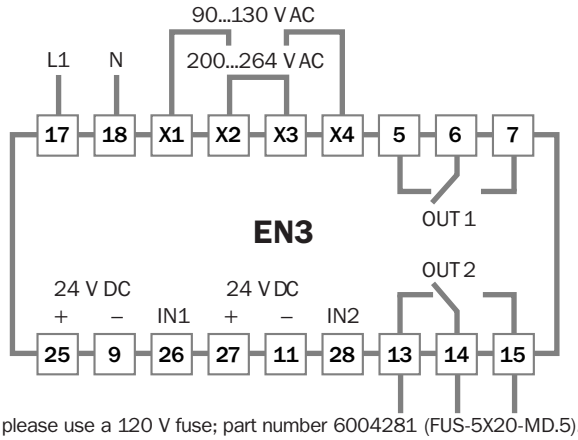


dimensions in mm

1 Fuse (250 V/0.25 A)
2 Display IN 1
3 Operating display
4 Display IN 2

Connection diagram

EN 3

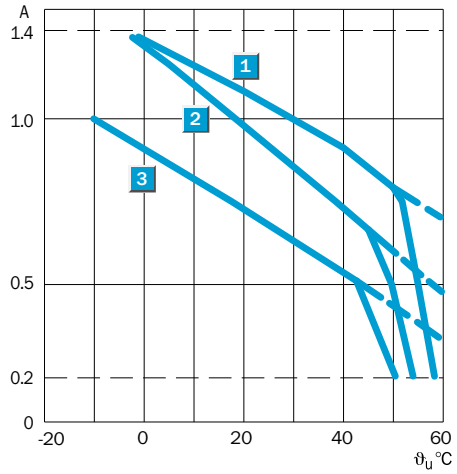


Note: For a 120 V supply, please use a 120 V fuse; part number 6004281 (FUS-5X20-MD.5).

Technical data		EN 3
Supply voltage V_S	90…130 V AC or 200…264 V AC[1]	
	(can be reset using bridges)	
Main frequency	48…62 Hz	
Current consumption	approx. 40 VA	
Outputs		
Supply voltage for sensor	24 V DC ± 25%	
Output current (total)	22 mA (1.4 A) in total, see load curve output current	
Min. load	200 mA	
Relay output	5/6/7 (OUT 1) and 13/14/15 (OUT 2)	
Switching voltage, max.	250 V AC	
Switching current, max.	2 A	
Switching frequency	20/s	
Inputs for PNP, NPN[2] and B sensor inputs	26 (IN1), 28 (IN 2)	
Input voltage	10…30 V DC	
HIGH	> 10 V DC	
LOW	> 6 V DC	
VDE protection class	□	
Enclosure rating	IP 20	
Ambient temperature	Operation: -13…131° F (-25…55° C)	
	Storage: -40…158° F (-40…70° C)	
Shock load	Complying with IEC 68	
Approximate weight	34.2 oz (970 g)	
Housing material	Plastic	

1) Delivery 200…264 V AC
2) External pull-up resistor ≤ 10 kΩ required for NPN variant

Load curve – output current



Order information	
Type	**Part no.**
EN 3	6 009 692

EN 2 Ex Switching Amplifier

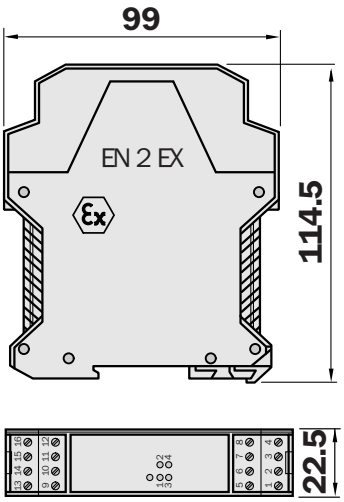
EN 2 Ex Switching Amplifier

Highlights

- Ex II (1) G/D [EEx ia] IIC according to Directive 94/9/EC (ATEX) with intrinisically safe inputs
- Reliable electrical isolation between input, output and supply voltage to VDE 0100 Part 410
- 2-channel each with one relay output 1 x u
- Invertible outputs
- Mounting on 35 mm (1.378 in) DIN rails according to DIN EN 60715



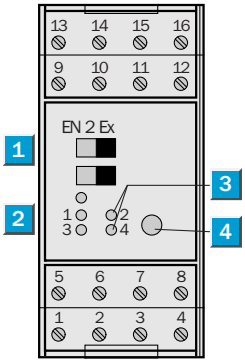
Dimensional drawing



dimensions in mm

Adjustments

All types



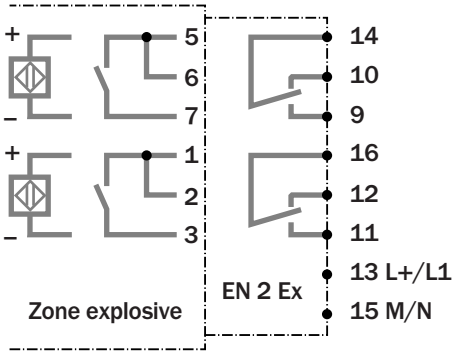
1 Switches to reverse action. Switch in position I and contact in the input circuit closed, output active (ON). Switch in position II, output action inverted.

2 LED (red), cable monitoring indicator:
The activation of the cable-break and cable short-circuit monitoring is only functional if a sensor/proximity switch to EN 60947-5-6 (NAMUR) or a mechanical contact with suitable resistance circuit as per the operating instructions is connected. This circuit monitors the input current and deactivates the output with input currents < 0.3 mA cable-break and > 6.5 mA short-circuit irrespective of setting for the direction of action.

3 LED (yellow), switch status indication:
This LED is activated in parallel to the output.

4 LED (green), supply voltage indication.

Connection diagram



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Technical data	EN 2 Ex-	1	2	3
Supply voltage V_S	120 V AC			
	230 V AC			
	24 V DC			
Power frequency	48…62/s			
Current consumption per channel	approx. 2.2 VA			
Current consumption, total	Approx. 0.7 W			
Inputs	For 1 or 2 sensors			
No-load voltage	8.5 V DC			
E-type examination certificate	TUV 03 ATEX 2346			
Output voltage U_O, max.	≤ 10.5 V			
Output voltage I_O, max.	≤ 26 mA			
Output voltage P_O, max.	67 mW			
External capacity C_a, max.	2.41 µF			
External indictivity L_a, max.	45 mH			
Ambient temperature T_A	Operation: -4° F ≤ T_a ≤ 140° F (-20° C ≤ T_a ≤60° C)			
Switching points	0 < 1.55 mA			
	1 > 1.75 mA			
Short circuit current	I ≥ 8.5 mA			
Switching outputs[1]	1 relay per input: SPDT			
Switching voltage $U_{max.}$	250 V AC			
Switching current $I_{max.}$	5 A			
Switching power $P_{max.}$	100 VA			
VDE protection class	I			
Enclosure rating	IP 20			
Ambient temperature	Operation: -13…185° F (-25…85° C)			
Approximate weight	6.2 oz (175 g)			
Housing material	Plastic			

1) Provide suitable spark suppression for inductive or capacitive loads

Transmission characteristics

Active direction (light-/dark-switching):	Can be changed over (see table)
Cable monitoring:	Can be switched off
Max. switching frequency:	20/s

Order information

Type	Part no.
EN 2 EX-1	6 010 459
EN 2 EX-2	6 010 460
EN 2 EX-3	6 009 944

Table of switching functions

Input		Active direction light/dark status change-over switch on		Cable monitoring		Output	
		I	II		Red LED	Relay	Yellow LED
No fault in input circuit	Contact open	Normal		as desired	off	dropped off	off
			Inverted	as desired	off	responded	on
	Contact closed	Normal		as desired	off	responded	on
			Inverted	as desired	off	dropped off	off
With fault in input circuit	Cable break	Normal		on	on	dropped off	off
			Inverted	on	on	dropped off	off
	Short circuit	Normal		on	on	dropped off	off
			Inverted	on	on	dropped off	off
	Cable break	Normal		off	off	dropped off	off
			Inverted	off	off	responded	on
	Short-circuit	Normal		off	off	responded	on
			Inverted	off	off	dropped off	off

PS 24

Special Accessories

CE

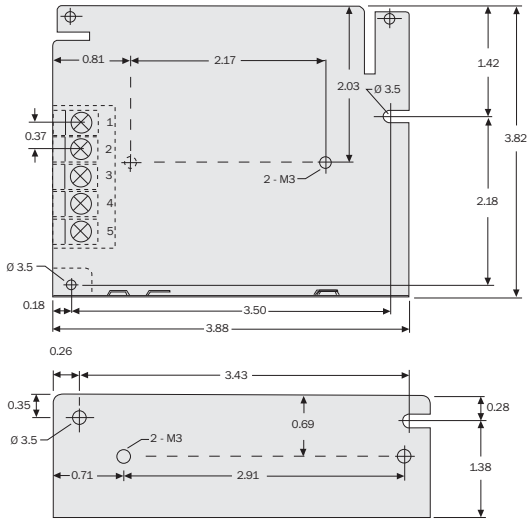
Highlights

- Low-cost, high efficiency power supply
- Universal AC input
- Compact size
- Power indicator
- DIN rail mountable
- 24 V DC at 1.1 A

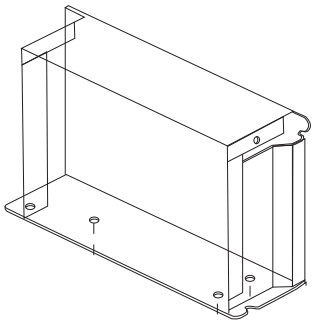
PS 24-Power Supply

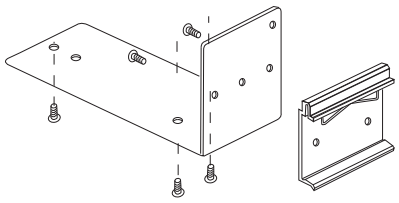


Dimensional drawing



dimensions in mm





Order information	
Type	**Part no.**
PS 24-25	7 025 584

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Technical data	PS 24-	-25								
Supply voltage V_S	85…264 V AC universal									
Frequency	47…440 Hz									
Power consumption	25 Watts									
Voltage output	24 V DC									
DC output voltage adjustable	23…30 V DC									
Output current	1.1 A									
Line regulation	±0.5% Max.									
Load regulation	±0.5% Max.									
Over voltage protection	115%…165% of output voltage									
Overload protection	105%…150% output pulsing mode									
Ambient temperature	Operation 14…140° F (-10…60° C)									
Approximate weight	1 lb (485 g)									
DIN rail mounting track DRT-35	5 303 710, sold in 1 m lengths									

MVE 1 Power Supply Units

Special Accessories

CE

Highlights

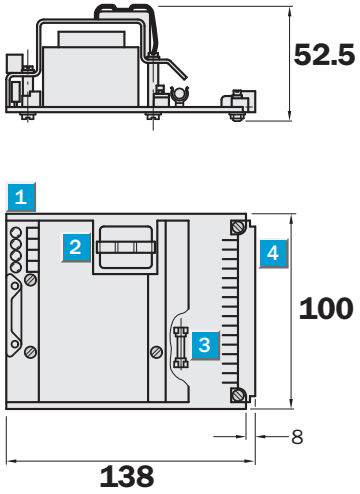
- Power supply units for NT 6, NT 8 contrast sensors
- Snap-rail assembly or European card (shortened) 100 x 130 mm with VG-strip complying with DIN, 32 pin, a and c occupied
- Plug-in card holder for wall mounting, connection at the front
- Mains voltage, selectable
- Lamp voltage 4.5 V, 1 A
- Relay output

MVE 1-Power Supply Units

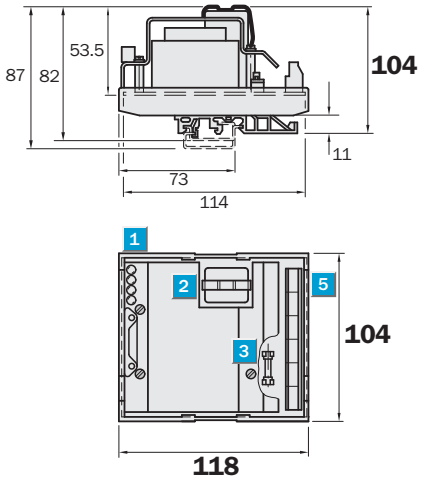


Dimensional drawing

MVE 1-150



MVE 1-250



1 Indicator lights
2 Relay (plug-in type)
3 Fuse (NT 8 transmission bulb)
4 Spring strip DIN 41612, shape D
5 Terminals

Input functions

Reset input RS

The memory is reset via a HIGH signal to RS. The RS input takes precedence over all other inputs.

Short distance scanner $\overline{NT}$

The memory is set with a LOW signal to NT. If not reset by an RS command (machine contact), NT can be linked to RS.

External circuit FS

The memory is set by a LOW signal to FS. FS is only effective for machine-controlled resetting.

Long distance scan input $\overline{AT}$

Sentence commands to $\overline{NT}$ and $\overline{FS}$ are ignored if there is a LOW signal at AT.

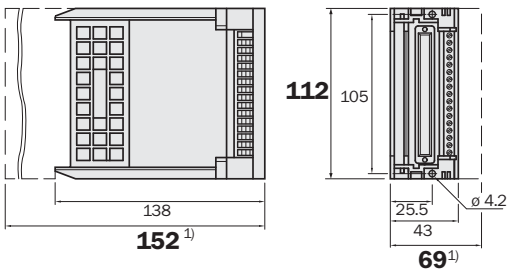
Order information

Type	Part no.
MVE 1-150	1 008 964
MVE 1-250	1 010 494
BEF-FL-MVE	6 000 353

Accessories

Accessory for MVE 1-150

Card holder BEF–FL-MVE

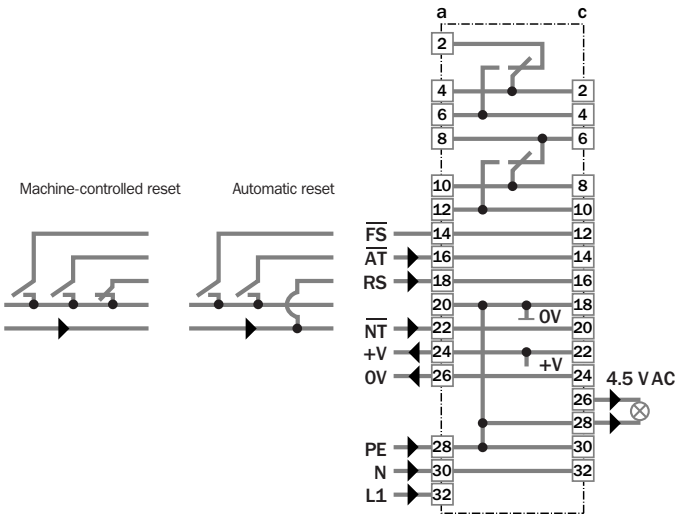


Technical data	MVE 1-	150	250
Assembly	In card holder	■	
	On snap rail		■
Supply voltage V_S	AC 100, 110, 120, 200, 220[1], 240	■	■
	+ 10 % – 15 %		
Power consumption	Approx. 10 VA	■	■
Outputs			
Voltage output for sensor	24 V DC + 5% – 15%	■	■
Output current I_A max.	80 mA	■	■
Voltage output for NT 8	4.5 V AC	■	■
Transmission bulb			
Output current	1 A	■	■
Relay output	2 x SPDT	■	■
Switching voltage max.	250 V AC	■	■
Switching current max.	10 A	■	■
Switching power max.	650 VA (AC), 240 W (24 V DC),	■	■
	48 W (48 V DC)		
Inputs	NT, FS, AT, RS	■	■
Input voltage HIGH	≥ 10…≤ 24 V	■	■
Input voltage LOW	≤ 2 V	■	■
Input current LOW	1 mA	■	■
Time periods			
Time delay on	0.1…2.5 s	■	■
Time delay off	0.1…2.5 s	■	■
Pulse responding	0.1…2.5 s	■	■
Pulse dropping off	0.1…2.5 s	■	■
Enclosure rating	IP 00	■	■
Ambient temperature	Operation -4…149° F (-20…65° C)	■	■
	Storage -4…167° F (-20…75° C)	■	■
Shock load	Complying with IEC 68	■	■
Approximate weight	22.2 oz (630 g)	■	■

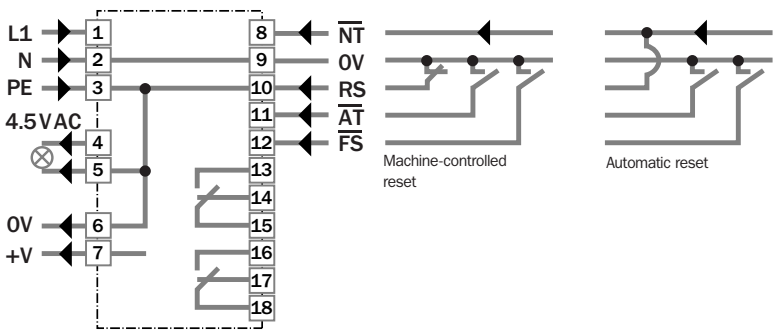
1) Default setting

Connection diagram

MVE 1-150



MVE 1-250



Glossary

A/D: Acronym for analog to digital converter; an electronic device that converts data from analog form to digital representation.

AC-coupled amplifier: AC-coupled amplifiers may sometimes be used reliably in close differential sensing applications, since they amplify only quick signal changes and ignore slow signal changes. As a result, very small changes in light level can be highly amplified. The output of AC-coupled amplifiers is a one-shot pulse. (See also "DC-coupled amplifier.") In photoelectric sensing, AC-coupled amplifiers are most often used to amplify the analog signal from a non-modulated remote sensor. However, AC-coupled amplifiers may also be used with specially designed modulated sensors. Use of AC-coupled amplifiers should be avoided, except when they are the only solution to a close differential sensing situation. Because AC-coupled amplifiers are sensitive to very small signal changes, they may respond to unwanted conditions like sensor vibration or electrical "noise."

Accuracy: A term used in measurement devices. It is the amount usually given as a percentage either of sensing range or percent of full scale. It relates the measured distance to the physical distance (actual).

Active face: Portion of the sensor which the electromagnetic field or ultrasonic pulse emanates.

Active switching zone: Area above the sensing face in which a proximity sensor responds by a change in switching status when attenuating material is brought nearer.

Alignment: Positioning of light source and receiver, reflector, or target in which maximum signal strength is obtained.

Alternate action: See "flip-flop."

Alternating current (AC): A sinusoidal current rated at a given frequency, usually 50 Hz or 60 Hz.

Ambient: The environmental conditions in a sensing area (e.g. temperature, light level, humidity, and air speed).

Ambient Light: Illumination of a receiver not generated by its light source.

Ampere (amp): A unit of measurement; electric current. One volt across one ohm of resistance causes a current flow of one amp. One ampere is equal to 6.28 x 10 18 electrons passing a point in one second.

Analog: Electronic circuit with a current or voltage output signal that varies as a function of the light intensity received by the photo detector.

AND logic: A logic function in which all of two or more defined input conditions must exist simultaneously before a load is energized (A and B and C = output).

Angle of acceptance: The included angle of the field of view of a sensor. See "field of view."

Angstrom: Unit of measurement used to determine the wavelength of light. 10 Angstrom (A) is equal to 1 nanometer (nm).

Anode: A positive electrode of a device. See "diode."

Anti-glare filter: See "polarizing filter."

Aperture: The size of a lens opening. A mechanical part attached to a lens used to restrict the size of a lens opening. Apertures are used to limit the amount of light reaching a photoelectric receiver. Apertures are used in opposed photoelectric sensing to shape the size of the effective beam to match the profile of the object to be sensed (e.g. a "line" or slit-type aperture is used on the receiver and/or emitter to sense small diameter wire or thread).

Artificial load: A resistor connected in parallel with a load to lower the load's effective resistance. Usually encountered when interfacing 2-wire sensors to high-impedance inputs in order to lower the off-state voltage at the input.

ASCII: Acronym of American Standard Code for Information Interchange. An 8 bit coded character set used to represent alphanumeric, punctuation marks and certain special control characters.

Attenuation: The reduction of signal strength. An example is when light travels through a fiber optic cable. The degree of attenuation depends on the fiber material and on the total length the fiber optic cable.

Axial approach: The approach of the target with its center maintained on the reference axis.

Background suppression (BGS): A photoelectric diffuse sensing mode with response that is similar to a diffuse sensor, but with a defined range limit. The amount of reflected light received by each of two opto-elements is compared. An object is recognized as long as the amount of light reaching receiver R 1 is equal to or greater than the amount seen by R 2. The sensor's output switches as soon as the amount of light at R 2 becomes greater than at R 1.

Barrier: See "intrinsic safety barrier."

Beam pattern: A two-dimensional graph of a sensor's response. (Beam patterns are assumed to have the same shape in all sensing planes.) Beam patterns are plotted for perfectly clean sensing conditions, optimum angular sensor alignment, and the sensitivity (gain) setting for the specified range. Beam patterns are included as part of the description of each sensor. The dimensions of the plot are typical, and should not be considered exact specifications. Beam pattern information and assumptions are slightly different for each sensing mode. Beam patterns are helpful in predicting the performance of the sensor.

Beam-break: See "opposed sensing mode."

Beamsplitter: A device for dividing a light beam into two or more separate beams.

Bifurcated fiber (optic):
A fiber-optic assembly that is branched to combine emitted light with received light in the same assembly. Bifurcated fibers are used for diffuse (divergent) mode proximity sensing, or they may be equipped with a lens for use in the retroreflective mode.

Bipolar output: The dual output configuration of a DC sensing device, where one output switch is a sinking device (NPN transistor) and the other output switch is a sourcing device (PNP transistor). The solid-state equivalent of a DPST relay (for most loads).

Blanking input: An input signal sent to a sensor that inhibits or "blanks" the output function.

Burn-through: Describes the ability of high-powered modulated opposed mode sensors to "see" through paper, thin cardboard, opaque plastics, and materials of similar optical density. Burn-through may be used to advantage in some sensing situations, such as when looking through an opaque walled container (like a cereal box) to sense the presence or absence of product inside.

Capacitive sensor: Capacitive proximity sensors are triggered by a change in the surrounding dielectric. The transducer of a capacitive sensor is configured to act as the plate of a capacitor. The dielectric property of any object present in the sensing field increases the capacitance of the transducer circuit and, in turn, changes the frequency of an oscillator circuit. A detector circuit senses this change in frequency, and signals the output to change state.

Cathode: A negative electrode of a device. See "diode."

CENELEC: Acronym for the European Committee for Electrotechnical Standardization. Responsible for the development of standards covering dimensional and operating characteristics of control components.

Close differential sensing: Sensing situations with low optical contrast (less than 3 to 1). Includes most color registration sensing applications. Also, breaking of a large effective beam with a small profile, as in ejected part detection or thread break detection. Close differential sensing often requires the use of an AC-coupled amplifier.

CMOS: Complementary Metal Oxide Semiconductor (device). Highly efficient semiconductors used in custom monolithic photoelectric circuit designs.

Collimation: Optical collimation is the process by which a lens converts a divergent beam into a parallel beam of light.

Complementary output: Output circuit with a dual output device such that when one output is energized the other output is de-energized (similar to SPDT contact).

Contact bounce: Occurs on the closure of a mechanical contact pair. When the contact pair closes, the contacts make and break several times before a stable closed condition is established. Contact bounce is not a characteristic of solid-state switch contacts.

Continuous current (Ia): Current at which the proximity sensor can function reliably.

Contrast (optical): The ratio of light falling on the receiver in the "light" state as compared to the "dark" state. Contrast is also referred to as the "light-to-dark-ratio." Optimizing the contrast in any sensing situation will increase the reliability of the sensing system.

Control end: Refers to the end of a fiber-optic assembly that attaches to the photoelectric sensor. An individual fiber-optic assembly has one control end; a bifurcated fiber has two.
See "fiber-optic."

Conventional current (flow): The concept of current flow from positive to negative.

Convergent beam sensing mode: A special variation of diffuse mode photoelectric proximity sensing which uses additional optics to create a small, intense and well-defined image at a fixed distance from the front surface of the sensor lens. Convergent beam sensing is the choice for photoelectric sensing of transparent materials that remain within the sensor's depth-of-field. Also called "fixed-focus proximity mode."

Corner-cube reflector: Also called a corner-cube prism. A prism has three mutually perpendicular surfaces and a hypotenuse face. Light entering through the hypotenuse face is reflected by each of the three surfaces and emerges back through the hypotenuse face parallel to the entering beam. The light beam is returned to its source. May also be constructed from three first-surface mirrors. Corner-cube geometry is used for retroreflective materials. See "retroreflector."

Correction factors: Suggested multiplication factors taking into account variations in the target material composition. When figuring actual sensing distance, this factor should be multiplied with the nominal sensing distance.

Crosstalk (electrical): Electrical crosstalk occurs in modulated photoelectric component systems when the modulated emitter signal (which is a high-current pulsed signal) couples directly onto the receiver lead wires. This results in a "lock-on" condition of the amplifier (i.e. the amplifier recognizes a light condition regardless of the sensor's status). Crosstalk is usually a result of improper splicing of additional remote sensor's lead length. In component systems, remote sensors require separate shielded cables for emitter and receiver lead extension, even if the original cable length contained wires for both the emitter and the receiver.

Glossary

Crosstalk (optical): Optical crosstalk occurs when a photoelectric receiver responds to light from an adjacent emitter. This is often an unwanted situation. If crosstalk cannot be resolved by repositioning of sensors, it can often be eliminated using sensor multiplexing.

CSA: Abbreviation for Canadian Standards Association. A testing agency analogous to Underwriters Laboratories, Inc. (UL) in the United States. A product that is "CSA certified" has been type-tested and approved by the Canadian Standards Association as meeting electrical and safety codes.

Current consumption: The current consumed by the proximity switch when the output device is in the off condition.

Current sinking output: The output of a DC device that switches ground (DC common) to a load. The load is connected between the output of the device and the positive side of the power supply. The switching component is usually an open collector NPN transistor, with its emitter tied to the negative side of the supply voltage.

Current sourcing output: The output of a DC device that switches positive DC to a load. The load is connected between the output of the device and the ground (DC common) side of the power supply. The switching component is usually an open collector PNP transistor, with its emitter tied to the positive side of the supply voltage.

Damping material: Material that causes a decrease in the strength of the electromagnetic or electrical field produced by the sensing coil.

Dark operate mode (D.O. or D/O): The initiation of a photoelectric sensor's output (or of timing logic) when the receiver goes sufficiently dark. Most photoelectric sensors (or sensing systems) can be programmed for either dark operate or light operate.

Depth-of-field: The range of distance in which a sensor has a response. Used to define the response pattern of proximity-mode sensors, especially ultrasonic and photoelectric convergent beam and background suppression mode sensors. See "convergent beam sensing mode."

Diagnostic: Advanced warning of loss in signal strength due to misalignment, dust and more, prior to loss of control output signal.

Differential travel: See "hysteresis."

Diffuse sensing mode:
A photoelectric proximity sensing mode in which light from the emitter strikes a surface of an object at some arbitrary angle and is diffused from the surface at all angles. The object is detected when the receiver captures some small percentage of the diffused light. Also called the "direct reflection mode" or simply the photoelectric "proximity mode."

Digital output: An output circuit with only two operating states that are either "On" or "Off." These operating states often are called "Hi" or "Low."

DIN standard: Abbreviation for "Deutsches Institut fur Normung." A collection of German industry standards that are recognized throughout the world.

Diode: A two-layer semiconductor that allows current to flow in only one direction; from cathode to anode.

Direct current (DC): A current that flows only in one direction through a circuit. May or may not have a DC ripple component. DC sources that are unfiltered should be referred to as full-wave or half-wave rectified AC.

Divergent sensing mode: A variation of the diffuse photoelectric sensing mode in which the emitted beam and the receiver's field of view are both very wide. Divergent mode sensors have very forgiving alignment requirements, but have shorter sensing range as compared to diffuse mode sensors of the same basic design. Divergent sensors are particularly useful for sensing transparent or translucent materials or for sensing objects with irregular surfaces (e.g. webs with "flutter"). They are also used to reflectively sense objects with very small profiles, like small diameter thread or wire, at close range.

DPDT relay: Abbreviation for "Double-Pole Double-Throw." A relay with two sets of single-pole double-throw form 1C contacts that are operated simultaneously by a single action. See "SPDT relay."

Dual output: Sensor which has two outputs which may be complementary or may be of a single type (i.e. two normally open or two normally closed).

Effective beam: The "working" part of a photoelectric beam. The portion of a beam that must be completely interrupted in order for an object to be reliably sensed. Not to be confused with the actual radiation pattern of the emitter, or with the field of view of the receiver.

Effective operating distance (Sr): The operating distance of an individual proximity switch measured at stated temperature, voltage, and mounting condition.

Electromagnetic interference (EMI): Electrical "noise" which may interfere with proper operation of sensors, programmable logic controllers, counters, data recorders, and other sensitive electronic equipment. Common sources of EMI include lighting fixtures and controls, motors, generators, and contactors. EMI emissions are distributed evenly across the radio frequency spectrum. Emissions are readily conducted along cables, so EMI sources can often be found by following along wireways with a portable radio.

Electromechanical relay: Conventional switching relays consisting of "hard" contacts (metal-to-metal), switched to opened or closed position by applying voltage to an electromagnetic coil. Can be constructed to reliably switch loads that demand much higher power levels than can be switched by most solid-state relays. Limited by relatively slow switching speeds and finite mechanical life.

EMC: Electromagnetic compatibility.

Emitter (photoelectric): 1. The sensor containing the light source in an opposed mode photoelectric sensing pair (see "opposed sensing mode"). 2. The light emitting device within any photoelectric sensor (e.g. LED, incandescent bulb, laser diode, etc.).

Enable: To allow an output to occur in response to an input signal. Synonymous with "interrogate" when used to describe the gating function in an inspection scheme. See "inspection logic."

Enclosure rating: See "IP rating" and also "NEMA rating."

Excess gain: A measurement of the amount of light energy falling on the receiver of a sensing system over and above the minimum amount of light required to operate the sensor's amplifier. Excess gain is a specification of every photoelectric sensor. It is plotted versus sensing distance. Excess gain values are used in the sensor selection process to predict the reliability of a photoelectric sensor in a known sensing environment.

False pulse: An undesired change in the state of the output of the proximity switch that lasts for more than two milliseconds.

False pulse protection: Circuitry designed to disable the output of a sensor or sensing system until the power supply circuit has time to stabilize at the proper voltage level. Typically 100 - 300 milliseconds (this time is always specified).

False trigger: Unwanted change of state of the output usually occurring during the "Power On" or "Power Down" actions.

False trigger protection: Circuitry designed to avoid false pulses during "Power On" or "Power Down" actions.

Ferrous metal: Any metal containing iron.

Ferrule: Tip or termination end of a fiber-optic cable.

FET (Field Effect Transistor): Bilateral FETs are semiconductors used as the output switch of some sensing devices for their ability to switch either AC or DC, their low on-state voltage drop, and their low off-state leakage current. Not tolerant of inrush current, typical of inductive loads.

Fiber-optics: Transparent fibers of glass or plastic used for conducting and guiding light energy. Used in photoelectrics as "light pipes" to conduct sensing light into and out of a sensing area. Glass fiber-optic assemblies consist of a "bundle" of small (about .002" diameter), discrete, glass optical fibers housed within a flexible sheath. Glass fiber-optics are able to withstand hostile sensing environments. Plastic fiber-optic assemblies are made up of either one or two acrylic monofilaments in a flexible sheath. Plastic fiber-optics are the smallest photoelectric sensors. There are two basic styles of fiber-optic assemblies: individual and bifurcated. Individual fiber-optic assemblies guide light from an emitter to a sensing location, or to a receiver from a sensing location. Bifurcated fibers use half of their fiber area to transmit light and the other half to receive light. See "individual fiber" and "bifurcated fiber."

Field of view: The region that is illuminated by the light source and can be seen by the receiver. Field of view is expressed in degrees but is three-dimensional.

Fixed focus: See "convergent sensing mode."

Fixed-field diffuse mode: See "background suppression (BGS)."

Flip-flop: An electronic circuit with two stable states (Hi and Low, On and Off, etc.). The circuit remains in one of the states until application of an external signal causes it to change to the opposite state. In sensing logic schemes, a flip-flop is a function that switches a load from "Off" to "On" and back again with each sequential input. Also known as "alternate action logic," "ratchet logic," or "divide-by-two logic." Used to split production lines into two lanes.

Fluorescence: The emission by a material of light radiation at a longer wavelength as a result of the absorption of some other radiation of shorter wavelengths. For example, the emission of visible light as a result of excitation by ultraviolet light.

Flush installation (shielded): A proximity sensor can be embedded in an attenuating material so that it is flush with the active surface.

Focal length: The distance from a lens' principal point to the corresponding focal point. Also referred to as the equivalent focal length and the effective focal length.

Foreground suppression (FGS): A specialized version of background suppression where the background is taught to the sensor and then used basically as a reflector. This is particularly helpful in the detection of objects on a shiny background.

Free zone: The area around the proximity switch which must be kept free from any damping material.

Frequency: Is a measure of the speed at which a sensor can trigger and be ready for another input. The units are Hertz.

Gain adjustment: See "sensitivity adjustment."

Gate: 1. A combination logic circuit having one or more input channels. 2. Used as shorthand for "interrogate." See "inspection logic."

Gating: The provision to apply an external signal to a sensor in order to prevent undesirable operation.

Glass fibers: Single glass optical fibers are small strands (typically .002 inch diameter) of glass with an outer cladding of glass of a different index of refraction Glass fiber assemblies are constructed of a bundle of individual glass fibers, contained and protected by a

sheath (typically a flexible armored cable). See “fiber-optics.”

Gray scale: Variations of values from white, through shades of gray, to black in a digitized image with black assigned the value of zero and white the value of one.

Ground: An often misused term. In power distribution systems it refers to earth ground. It is important at high power levels mainly for safety reasons. Within a manufacturing plant, it generally refers to conduit or machine frame ground. In electronic systems, it refers to the electronic chassis or enclosure ground or to dc common (voltage reference to the negative side of a dc power supply).

Hermetic seal: An airtight seal. In photoelectrics, the lens assemblies of some sensors have hermetic seals to exclude the entrance of air and water behind the lens, thereby preventing fogging of the inner surface of the lens.

Hertz (Hz): The international unit of frequency, equal to one cycle per second. Named after the German physicist Heinrich Rudolph Hertz.

High pass filter: A gray scale processing operation that enhances high frequencies (and attenuates low frequencies.)

Holding current: 1) A specification of a load, especially an electromechanical load. The current that is drawn by a load while it is energized. Also called “sealed current” of a load. See “inrush current.” 2) The current necessary to maintain a thyristor in the “On” state.

Hysteresis: The difference, in percentage (%), of the nominal sensing distance between the operate (switch on) and release point (switch off) when the target is moving away from the sensor’s active face. Without sufficient hysteresis a proximity sensor will “chatter” (continuously switch on and off) when there is significant vibration applied to the target or sensor.

Hysteresis (H): The hysteresis is the positional difference between the activation and deactivation point for attenuating material as it is brought closer or moved away. It is required to ensure a smooth, stable switching action. It is given as a percentage of the real sensing range or in mm.

Hysteresis, switching: Meaning, “to lag behind.” An electronic design consideration for sensors such that the operate point (received light level, etc.) is not the same as the release point of the sensor output. This differential prevents the output of a sensor or sensing system from “buzzing” or “chattering” when a signal at or near the threshold level is detected.

IEC: The International Electrotechnical Commission, headquarters in Geneva, Switzerland. This organization writes and distributes recommended safety and performance standards for electrical products and components. See “IP rating.”

Impedance: The opposition in an electric circuit to the flow of alternating current (AC) at a given frequency. Impedance consists of resistance, inductive reactance, and capacitive reactance. It is measured in ohms.

Individual fiber (optic): A fiber-optic assembly having one control end and one sensing end. Used for piping photoelectric light from an emitter to the sensing location or from the sensing location back to a receiver. Usually used in pairs in the opposing sensing mode, but can also be used side-by-side in the diffuse proximity mode or angled for the specular reflection or mechanical convergent mode.

Inductance: The property of an electric circuit whereby an electromotive force (emf) is induced in it by a change of current in itself or in a neighboring circuit. When a current changing at the rate of one ampere per second induces a voltage of 1 volt, the inductance of the circuit is 1 henry.

Inductive load: Electrical devices generally made of wire that is coiled to create a magnetic field to produce mechanical work when energized. Examples of inductive loads include motors, solenoids, and relays. Inductive loads exhibit inrush of current when energized that can be many times the steady state holding current. When de-energized, the magnetic field collapses, generating a high voltage transient. This transient can cause arcing across mechanical switching contacts or can cause damage to solid-state contacts. See “transient.”

Inductive proximity sensor: Sensors with an oscillator and coil that radiate an electromagnetic field that induces eddy currents on the surface of metallic objects approaching the sensor face. The eddy currents dampen the oscillator energy. This energy loss is sensed as a voltage drop, which causes a change in the sensor’s output state. Often called simply a “proximity sensor.”

Infrared (IR): Light with wavelengths generally greater than 800 nanometers (8000 Angstroms). Invisible to the eye and safe to most photographic films. Infrared LEDs used as the emitter source in photoelectric sensors offer the highest amount of excess gain. See “LED.”

Inhibit: In sensing logic schemes an inhibit signal (e.g. from an inspection sensor) cancels a timing function and/or output. See “inspection logic.”

Input: 1) The signal (voltage or current) applied to a circuit to cause the output of that circuit to change state. 2) The terminals, jack, or receptacle provided for reception of the input signal.

Input voltage: The power source required by an electric or electronic device (e.g. a self-contained sensor) in order for the device to operate properly.

Inrush current: The initial surge of current through a load when power is first applied. An important specification to consider whenever evaluating an interface. Inrush current to an inductive load (solenoid, contactor, etc.) is up to ten times the holding current.

Inspection logic: A logic scheme used in high-speed inspection applications that generally uses two sensors as inputs. One sensor, called the "product sensor" senses the product's presence and "interrogates" the "inspection sensor." If the inspection sensor "sees" a good product, it "inhibits" the inspection logic from rejecting the product.

Interrogate: In sensing logic schemes, an interrogate signal (e.g. from a product sensor) allows the information from one or more other inputs (e.g. an inspection sensor) to be recognized by the inspection or control logic. Also called "gate" or "enable." See "inspection logic."

Intrinsic safety: A design technique applied to electrical equipment (e.g. sensors and switches) and wiring for hazardous locations. The technique involves limiting electrical and thermal energy to a level below that required to ignite a specific hazardous atmosphere. Intrinsic safety design often eliminates the requirement for expensive and awkward explosion-proof enclosures.

Intrinsic safety barrier: A protective component designed to limit the voltage and current in a hazardous area. The barrier functions outside of the hazardous location to divert abnormal energy to ground.

Inverter (circuit): A circuit whose output is always in the opposite state (or phase) from the input. Also called a "NOT" circuit.

IP rating: A rating system established by IEC Publications 144 and 529 which defines the suitability of sensor and sensor system enclosures for various environments. Similar to NEMA ratings for enclosures.

Isolated output: An output that is optically separated from the input and other output and independent of the other output to a specified level.

Isolation voltage: Maximum rated voltage between isolated outputs or input and output.

Laser: An active electron device that converts input power into a narrow, intense beam of coherent visible or infrared light. The input power excites the atoms of an optical resonator to a higher energy level, and the resonator forces the excited atoms to radiate in phase. Term derived from "Light Amplification by Stimulated Emission of Radiation."

Latch (latching logic): A logic function in which an input signal (e.g. from a sensor) locks "on" the output. The output remains "on" until a signal is applied to a second input to reset the latch. The output of a "DC latch" will immediately latch "on" again if the input signal is present when the reset signal is removed. The reset signal of an "AC latch" will cancel the output, even if the input signal remains when the reset is removed. The output will not re-latch until the reset signal is removed and then the input signal is removed and then reapplied.

Lateral approach: The approach of the target perpendicular to the reference axis.

Leakage current: The small amount of (undesirable) current that is inherent in solid-state switches when they are in the "off" state. Most commonly encountered with 2-wire sensors that require leakage current in order to remain powered in the "off" state. High leakage current values are also inherent in some triac switches. Becomes important if the resultant "off" state voltage across the load being switched is too high for the load to de-energize. (The "off" state voltage across the load is equal to the leakage current of the switch multiplied by the resistance of the load.)

LED (Light Emitting Diode): Semi-conductor that generates monochromatic light when current flows in the conductive direction. An LED is the standard light source for most photoelectric sensors.

Lens: The optical component of a photoelectric sensor that collimates or focuses emitted light rays and/or focuses incident light rays upon the receiver optoelement.

Light operate: A light operate sensor energizes an output when the light intensity on the photoelectric sensor has increased to a sufficient level.

Line voltage: The normal in-plant power line supply voltage which is usually 120 or 220/240 V AC.

Linear output: Refers to the output of an analog sensor that has a "straight-line" relationship to a sensing parameter (e.g. sensing distance).

Linearity: Refers to the closeness an analog output actually follows a straight line. This is usually shown as a percentage of the full scale sensing range and can be affected significantly by the reflectivity of the viewed object.

Load: A general term for a device (or a circuit) that draws power when switched by another device (or circuit).

Logic high: The higher of two voltage levels in a digital circuit.

Logic level: Refers to the state of an input to or an output from a digital circuit (not applicable to analog circuits). It is always at one of only two possible voltages: "low" being a voltage usually less than 2 volts measured with respect to ground; and "high" being a voltage of some nominal level, usually within 2 volts of the positive supply.

Logic low: The lower of two voltage levels in a digital circuit.

Luminescence: The emission of light as in phosphorescence, fluorescence, and bioluminescence, by processes that derive energy from essentially non-thermal sources such as chemical, biochemical, or crystallographic changes, the motion of subatomic particles, or the excitation of an atomic system by radiation, especially such emission distinguished from incandescence.

Mask: A pattern used to control the retention or elimination of portions of another pattern. Regions of an image at a constant value,

usually white or black, form the mask.

Maximum inrush current: The maximum current level at which the proximity sensor can be operated for a short period of time.

Maximum load current: The maximum current level at which the proximity sensor can be continuously operated.

Mechanical convergence: A less precise form of convergent sensing as compared to the optical convergent beam sensing mode. In mechanical convergence, an emitter and a receiver are simply angled toward a common point, ahead of the sensor(s). This approach to reflective sensing results in more efficient use of light energy as compared to diffuse mode sensing, and a greater depth-of-field than realized with true optical convergence. Mechanical convergence may be customized for an application by mounting the emitter and receiver of an opposed sensing pair to mechanically converge at the desired distance. Depth-of-field is controlled by adjusting the angle between the emitter and the receiver.

Microsecond: One millionth of a second. 1 microsecond = 0.000001 second or 0.001 millisecond.

Millisecond: One thousandth of a second. 1 millisecond = 0.001 second or 1000 microseconds. Abbreviated: ms.

Minimum bending radius: The minimum radius that a fiber-optic bundle can withstand without breaking the fibers.

Minimum load current: Smallest load current that must flow with connected output in order to ensure the reliable operation of 2-wire proximity sensors.

Modulation: In photoelectrics, modulation of an LED simply means to turn it on and off at a high frequency (typically several kilohertz). The secret of a modulated photoelectric sensor's superior performance is that the sensor's phototransistor and amplifier are tuned to the frequency of modulation. Only the modulated light is amplified, and all other light, which reaches the receiver, is ignored. This is analogous to a radio receiver, which tunes solidly to one station, while ignoring all of the other radio waves that are present in the room. In fact, a modulated sensor's LED is most often referred to as the transmitter or emitter and its phototransistor as the receiver.

Multiplexing: A scheme in which an electronic control circuit interrogates each sensor of an array in sequence. "True" photoelectric multiplexing enables each modulated emitter only during the time that it samples the output of the associated receiver. In this way, the chance of false response of any receiver to the wrong light source is eliminated.

NAMUR: Photoelectric NAMUR sensors are 2-wire devices which change their internal resistance relative to the light level reaching the receiver. They are designed for use with approved switching amplifiers, with intrinsically safe circuits, which convert the current changes caused by the sensor's internal resistance change into a binary output signal. NAMUR sensors are most commonly used in hazardous (explosive) sensing environments.

Nanometer (nm): Unit of length used to specify the wavelength of light energy. 1 nm = 0.000000001 meter (10 -9 meter). 1 nm = 10 Angstroms.1 nm = .001 microns. Some typical wavelengths: red LEDs are 650 nm, green LEDs are 560 nm, infrared LEDs are 880 or 940 nm. See "LED."

NEMA: National Electrical Manufacturers Association. NEMA standards are used to specify suitability of sensor and sensing system enclosures for various sensing environments.

Noise (electrical): Term used to collectively describe undesirable energy that may cause false response of sensing system logic or may be falsely recognized as a received signal by a sensor amplifier. Includes EMI (electromagnetic interference) and RFI (radio frequency interference). Common sources of EMI are lighting fixtures and controls, motors, generators, and contactors. EMI is readily coupled to and conducted along wireways. RFI generators include in-plant two-way radios, stepper motor controls, computers, and CRTs. RFI occurs most often within a narrow band of frequencies. As a result, one electronic instrument may be radically affected by presence of RF interference, while another similar instrument in the same area may appear completely immune.

Non-ferrous metal: Any metal which does not contain iron.

Non-flush installation (unshielded): A proximity sensor must be installed in such a way that a free zone is maintained.

Normally closed: An output circuit that is conducting in the rest state with power applied.

Normally closed (NC): A proximity sensor with brake function is switched in the unattenuated state (low resistance) and disabled in the attenuated state (high resistance).

Normally open: An output circuit that is not conducting in the rest state.

NPN output: A transistor available as an output switch in most DC sensors and logic modules. Usually configured with its collector open and its emitter connected to ground (DC common). In this configuration, a load is connected between the output (collector) and the positive of the DC supply. This output configuration is also called a "sinking" output. See "current sinking output."

Null: This term is used in analog sensing and control to describe the minimum voltage (or current) in an analog output range. Analog sensors have an adjustment for setting the null value.

Off delay: The adjustable or fixed time length an output pulse continues after the input signal is no longer present.

Off delay (off delay logic): Timing logic in which the output energizes immediately when an input signal is received, and remains energized as long as the input signal is present. The off-delay timing begins at the trailing edge of the input signal, keeping the output energized. If a new input signal is received during the off-delay timing, the timer is reset, and the off-delay period begins again at the trailing edge of the new input signal. Off-delay timers allow sensing controls to ignore intermittent signal losses in tracking or flow control applications.

Ohm: Unit of measurement for resistance and impedance. The resistance through which a current of one ampere will flow when one volt is applied.

Ohm's law: E = I x R. Current (I) is directly proportional to voltage (E) and inversely proportional to total resistance (R) of a circuit.

On delay (on delay logic): Timing logic in which timing begins at the leading edge of an input signal, but the output is energized only after the preset on delay time has elapsed. The output ceases immediately at the trailing edge of the input signal. If the input signal is not present for the on delay time period, no output occurs. If the input signal is removed momentarily and then reestablished, the on-delay timing starts over again from the beginning. Used to allow sensing controls to ignore short interruptions of the light beam, such as the normal flow of products past a sensor in fill level or flow control applications.

On/off delay (on/off delay logic): Timing logic which combines on delay and off delay timing into a single function. The on delay and off delay times are often independently adjustable (in logic modules that offer timing adjustment). On/off delay logic is often used in jam and void control, high/low level control, and edge guiding applications.

One-shot (one-shot logic): Timing logic in which a timed output pulse begins at the leading edge of an input signal. The pulse is always of the same duration, regardless of the length of the input signal. The output cannot reenergize until the input signal is removed and then reapplied. A one-shot timer is useful for initiating a control function keyed to the passing of either the leading or trailing edge of a product. It is also used in "on-the-fly" inspection applications (see "inspection logic"). Also called "single-shot logic" or "pulse timer."

Opaque: A term used to describe a material that blocks the passage of light energy. "Opacity" is the relative ability of a material to obstruct the passage of light.

Open-collector: A term used to describe the NPN or PNP output of a DC device, where the collector of the output transistor is not connected to any other part of the output circuit (except through a diode for protection). Analogous to a SPST relay contact. See "NPN" and "PNP."

Operating distance, assured: Between 0 and 81% of the rated operating distance for inductive proximity switches.

Operating distance, rated: The operating distance specified by the manufacturer and used as a reference value. Also known as nominal sensing distance.

Operating margin: The ratio of electrical signal available at a given sensing range to the minimum signal.

Operating mode: See "Light Operate" and "Dark Operate."

Operating voltage (Ub): Voltage range in which the proximity sensor can function reliably.

Opposed sensing mode: See "through-beam."

Optical coupler (optical isolator): A solid-state photoelectric device combining a light-emitting diode (LED) and a phototransistor in a single package, so that when power is applied to the LED, the phototransistor conducts. This is the equivalent of a solid-state relay contact (SPST normally open) except that normally only currents of a few milliamps can flow through the phototransistor. The advantage of this type of coupling is total electrical isolation of the output from the input. Since the input and output communicate only by light, the main use is to interface two systems without the use of interconnecting lines. The result is exceptional noise immunity. Optical couplers are of great benefit when interfacing systems, which include programmable logic controllers, computers, microprocessors and instrumentation equipment.

Optical crosstalk: Optical crosstalk occurs when a photoelectric receiver responds to the signal from an adjacent emitter. Crosstalk can usually be resolved by repositioning the sensors.

OR logic: A logic function in which the presence of any of two or more defined input conditions will cause a load to energize (A or B or C = output). Usually created by wiring all outputs in parallel to a load.

Output: 1) The section of a sensor or control circuit that energizes and/or de-energizes the attached load (or input). 2) The useful energy delivered by a circuit or device.

Output function: Normally open (NO): A proximity sensor with make function is disabled in the unattenuated state (high resistance) and is switched in the attenuated state (low resistance).

Overload resistance: See also "short circuit protection." The response threshold for overload protection is greater than the value for continuous current-carrying capacity.

Parallel operation: Refers to the interconnection of two or more output devices (e.g. several sensor outputs) in parallel to a single input or load. See "OR logic."

Passive pullup: See "pullup resistor."

Peak current (Ik): Current that may flow for a specified period at a defined switching frequency without destroying the proximity sensor.

Phase shift: A process that either delays (electric) or rotates (optics)

the input signal. This is usually done by a corner-cube reflector and gives a shift of 90 degrees.

Photocell: A resistive photosensitive device in which the resistance varies in inverse proportion to the amount of incident light. The most common light-sensitive materials used are cadmium sulfide and cadmium selenide. Such devices are characterized by resistance from 1000 ohms to 1 megohm, response speed of several milliseconds, and color response roughly equivalent to that of the human eye. Also called "photoresistor."

Photodiode: A semiconductor diode in which the reverse current varies with illumination. Characterized by linearity of its output over several magnitudes of light intensity, very fast response time, and wide range of color response.

Photoelectric sensor: Electronic device recognizing changes in light intensity and converting these changes into a change in the output state.

Photon: A particle of light. A quantum of electromagnetic energy moving at the speed of light.

Phototransistor: A photojunction device in which current flow is directly proportional to the amount of incident light. The phototransistor is characterized by impedances from 1000 ohms to 1 megohm in most low level DC circuits. Response times are inversely proportional to incident light, but moderately high light levels yield response well under 1 millisecond. Color response is poor to greens and blues but good to reds and near infrareds. Phototransistors are well matched spectrally to infrared LEDs.

Plausibility output: An output pulse that drops from high to low when the input signal is either weak or not present for a time longer than normal transmission delay but shorter than time required to cause alarm or service output.

PNP output: Proximity sensors with PNP output switch the positive potential to the load. They are also described as positive-switching or current-sourcing.

Polarized light: Light which has all component waves in the same direction of displacement. Natural light is made up of waves having a variety of displacements. Photoelectric sensors with polarizing filters emit and detect only light waves of a specific polarization, while rejecting unwanted light of other polarizations. Also, various materials "bend" light waves (alter polarization) by known amounts. This may be used to an advantage to photoelectrically detect certain materials while ignoring others.

Polarizing filter: A lens attachment consisting of a pair of polarizing filters that are oriented so that planes of polarization are at 90° to one another. Used to enable a photoelectric receiver to "see" only light of the desired polarization (from its modulated emitter), while blocking unwanted light. Used with retroreflective sensors for minimizing "proxing" effects from shiny objects.

Programmable Logic Controller (PLC): A control device, usually used in industrial control applications, that employs the hardware architecture of a computer and relay ladder diagram language. Inputs to PLCs can originate from many sources including sensors and the outputs of other logic devices. Also called "programmable controller."

Programmable output: (N.O. or N.C.) Output which can be changed from N.O. to N.C. or N.C. to N.O. by way of a switch or jumper wire. Also known as selectable output.

Protection class: Sensors not bearing the symbol must be operated at power sources, which comply with the safety requirements for extra-low voltage as per VDE 100.

Proximity sensing mode: Direct sensing of an object by its presence in front of a sensor. For example, an object is sensed when its surface reflects a sound wave back to an ultrasonic proximity sensor. Also see "diffuse mode (photoelectric) sensing."

Proxing: In retroreflective sensing, "proxing" is used to describe undesirable reflection of the sensing beam directly back from an object that is supposed to break the beam. When sufficient light is reflected from the object back to the sensor, the sensor thinks it is seeing the retroreflective target, and the object may pass undetected. This is a common problem encountered when attempting to retroreflectively sense highly reflective objects. There are a number of cures for proxing, including use of anti-glare (polarizing) filters, angling of the retroreflective sensor and its target, and substitution of opposed mode sensors.

Pullup resistor: A resistor connected to the output of a device to hold that output voltage higher than the input transistion level of a digital circuit. Usually a resistor connected between the output of a current sinking (NPN) device and the positive supply voltage of a logic gate.

Pulse: A sudden, fast, change of a normally constant or relatively slow changing value such as voltage, current or light intensity.

Pulse modulated: See "modulation."

Pulse stretcher: See "one-shot."

PVC (polyvinyl chloride): A member of the vinyl plastic resin family, with many applications, including jacketing of wire and fiber-optic cables. Characterized by its high degree of flexibility and good chemical resistance.

QD: Quick Disconnect.

Radio Frequency Interference (RFI): Interference caused by electromagnetic radiation at radio frequencies to sensors or to other sensitive electronic circuitry. RFI may originate from radio control equipment, stepper motor controls, CRTs, computers, walkie-talkies, public service communications, commercial broadcast stations, or a variety of other sources. RFI occurs most often at a specific

frequency or within a specific range of frequencies. As a result, one electronic instrument may be radically affected by the presence of RF interference, while another similar instrument in the same area may appear completely immune.

Receiver: The transducer element that responds to the sensing energy. Also the name for the half of an opposed pair of photoelectric or ultrasonic sensors that receives the sensing energy from the emitter.

Reflectivity (relative): A measure of the efficiency of any material surface as a reflector of light, as compared to a Kodak white test card which is arbitrarily rated at 90% reflectivity. Relative reflectivity is of great importance in photoelectric proximity modes (diffuse, divergent, and convergent), where the more reflective an object is, the easier it is to sense.

Reflex sensing mode: Also called the retro-reflective mode or "retro." A retro-reflective photoelectric sensor contains both the emitter and receiver. A light beam is established between the sensor and a special retro-reflective target. As in opposed sensing, an object is sensed when it interrupts this beam. Retro is the most popular mode for conveyor applications where the objects are large (boxes, cartons, etc.), where the sensing environment is relatively clean, and where scanning ranges are typically a few feet. Retro is also used for code reading applications. Automatic storage and retrieval systems and automatic conveyor routing systems use retro-reflective code plates to identify locations and/or products.

Refraction: The "bending" of light rays as they pass through the boundary from a medium having one refractive index into a medium with a different refractive index. For example, as from air into water or from air into glass or plastic.

Registration mark: A mark printed on a material using a color that provides optical contrast to the material color. The mark is sensed as it moves past a photoelectric color sensor. Registration marks are used for cutoff control as in a wrapping or bagging operation, or for product positioning as in a tube end crimping process.

Relay: A switching device, operated by variations in the conditions of one circuit, which serves to make or break one or more connections in the same or another circuit. May be mechanical, as in the common electromechanical relay having an electromagnetic coil and metal contacts. Or, may be solid-state, in which switching is accomplished by a solid-state element such as a transistor or SCR. Relays are used as output switching devices for sensors and control modules, and serve to interface the sensor or module to the circuit under control.

Repeatability: A measure of the repeat accuracy of a sensor and/or timer and/or control mechanism (e.g. motor, brake, solenoid, etc.). Usually expressed as a distance or time.

Residual current (Ir): The residual current is used to supply power to the 2-wire sensors and also flows across the load if the output is disabled.

Resistance: The opposition to the flow of electric current. That property of a material which impedes electrical current and results in the dissipation of power in the form of heat. Measured in ohms.

Resolution: In presence sensing resolution is the smallest part profile dimension that will be reliably sensed. In position sensing applications it is the smallest increment of distance that can be reliably sensed. In line scanning: the projected distance between two adjacent pixels, i.e. the size of the field-of-view divided by the number of pixels in the CCD array.

Response time: The sum of the time needed for a string of electronic circuits to translate a change in light into a change of output status.

Retriggerable (one shot): One of two types of one-shot timing logic. The output pulse of a retriggerable one-shot is restarted with the reoccurrence of every input. The output will remain "on" as long as the time between consecutive inputs is shorter than the one-shot pulse time. A non-retriggerable one-shot timer must complete its output pulse before it will recognize any new input signals. Sometimes they offer an advantage in indexing or registration control applications where multiple input signals are possible during the advance of the product.

Retro-reflective sensing mode: See "reflex sensing mode."

Retro-reflector: A reflector used in retro-reflective sensing to return the emitted light directly back to the sensor. The most efficient type have corner-cube geometry (see "corner-cube reflector"). Reflective tapes use glass beads or smaller, less efficient corner-cubes.

Reverse polarity protection: Refers to the design feature of SICK DC sensors, which protect them from damage due to accidental reverse wiring to the power supply. Sensors without reverse polarity protection may be destroyed by accidental wrong-polarity connections.

Ripple: An AC voltage component on the output of a DC power supply. Usually expressed as a percentage of the supply voltage. Ripple may be suppressed ("smoothed") with capacitor filtering. Most DC-only devices require less than about 10% ripple for reliable operation.

Ripple (%): The percentage of alternating component left on a DC signal after rectifying. Measured peak to peak.

Ripple (Upp): The DC operating voltage of the ripple voltage content (maximum permissible peak value, given in % of Ub).

Rise time (10% Levels): The time required for an analog voltage or current output value to rise from 10% of its maximum value to 90% of its maximum value.

Saturation voltage: The voltage drop appearing across a switching transistor or SCR that is fully turned "on." See "voltage drop."

SCR (silicon controlled rectifier): Also known a "reverse blocking

triode thyristor." A semiconductor device used as the output relay in many ac sensors and modules. It normally acts as an open circuit, but switches rapidly to a conducting state when an appropriate gate signal is applied.

Self-checking (circuitry): A circuit having the capability to electronically verify that all of its own critical components, along with their redundant backups, are operating properly.

Self-contained sensor: A sensor that contains the sensing element, amplifier, power supply, and output switch in a single package.

Sensing distance: The distance at which an approaching target activates (changes state of) the proximity output.

Sensing face: Surface of a proximity sensor to which the sensing range relates.

Sensing range: The sensing range of a proximity sensor is the distance at which one of the measuring plates being moved axially towards the active surface triggers a signal change.

Sensing window: Glass fiber-optics: the size and shape of the fiber-optic bundle as it is terminated on the sensing end. Sensing windows maybe round, rectangular or other shapes. A single bundle of glass fiber-optics may terminate in several sensing windows. Analog sensing: the range of distance over which the sensor will recognize an object and produce an output. The near and far limits of the sensing window are set by the null and span controls, respectively. Sensing within a window is also called "ranging."

Sensitivity adjustment: An adjustment made to a sensor's amplifier that determines the sensor's ability to discriminate between different levels of received sensing energy.

Sensing end: A term used to describe the end of any fiber-optic cable at which sensing takes place (i.e. the end at which objects to be sensed are located). Sensing ends are manufactured in many mounting styles, and the sensing ends of glass fiber-optic assemblies may be shaped to match the profile of the object to be sensed. See "bifurcated fiber" or "individual fiber."

Sensor alignment: Positioning of a sensor so that the maximum amount of the emitted energy reaches the receiving sensing element.

Series operation: Refers to the interconnection of two or more output devices (e.g. several sensor outputs) in series to a single load. See "AND logic."

Short circuit protection: The ability of a solid-state output device or circuit to endure operation in a shorted condition indefinitely or for a defined period of time with no damage.

Single-shot: See "one-shot."

Sinking output: See "current sinking output."

Skew angle: An alignment technique used in diffuse, retro-reflective and convergent mode sensing to increase the optical contrast ratio. In diffuse and convergent sensing, it is done to reduce background reflections. The sensor is angled so that its beam strikes the background at an angle other than 90 degrees (i.e. straight on). In retro-reflective sensing, skewing the sensor is done to reduce the amount of light reflected directly back from the object that is supposed to break the beam established between the sensor and its retro target.

Solid state relay: See "relay."

Sourcing output: See "current sourcing output."

Span: This term is used in analog sensing and control to describe the maximum voltage (or current) in an analog output range. Analog sensors have an adjustment for setting the span value.

SPDT: Abbreviation for "Single Pole Double Throw." Refers to a switch or an electromechanical relay having one set of form 1C contacts. One contact is open when the other is closed (complementary switching).

Specular sensing mode (specular reflection): A photoelectric sensing mode where an emitter and a receiver are mounted at equal and opposite angles from the perpendicular to a highly reflective (mirror-like) surface. The distance from the shiny surface to the sensors must remain constant. The specular sensing mode is useful in some applications where it is necessary to differentiate between a shiny and a dull surface. It is particularly useful for detecting the presence of materials, which do not offer enough height differential from their background to be recognized by a convergent or fixed-field mode sensor. A common example is sensing cloth (diffuse) on a steel sewing machine table (shiny).

SPST: Abbreviation for "Single Pole Single Throw." Refers to a switch or a relay contact (electromechanical or solid-state) with a single contact that is either normally open or normally closed.

Status indicator: The forced triggering of the output (low-resistance) is indicated by an LED. With some sensors, a second LED indicates standby.

Switching frequency (f): Maximum number of switching actions per second.

Temperature drift: Shifting of the switching point caused by a change in ambient temperature.

Threshold (of a photoelectric amplifier): The value of voltage in a DC-coupled photoelectric amplifier that causes the output of the sensor or sensing system to change state. This voltage level is directly related to the amount of light that is incident on the photoelectric receiver. The threshold is the value of received signal representing an excess gain of 1x. The sensitivity control (where one is available) adjusts the threshold voltage level.

Through-beam sensing mode: A photoelectric sensing mode in which the emitter and receiver are positioned opposite each other so that the light from the emitter shines directly at the receiver. An object then breaks the light beam that is established between the two. Opposed sensing will always result in the most reliable photoelectric sensing system, as long as the item to be detected is opaque to light. Opposed sensing is the most efficient photoelectric sensing mode and offers the highest level of optical energy to overcome lens contamination, sensor misalignment, or long scanning ranges. Also often referred to as "direct scanning" and sometimes called the "beam-break" mode.

Time delay before availability (tv): Time required by the proximity sensor to become operational after the operating voltage is applied.

Translation: Movement left or right, up or down, but not rotated; geometrical operation, which shifts the position of an image from its original position.

Transmitted beam: A sensing mode where the light source and the receiver are opposite each other and where the target breaks the beam.

UL: Abbreviation for "Underwriters Laboratory, Inc.," a testing agency for products sold in the United States. A device that has "UL approval" has been type-tested and approved by Underwriter's Laboratory as meeting certain electrical and/or safety codes.

UV (ultraviolet): Invisible short wavelength light energy that lies immediately beyond the violet end of the color spectrum between approximately 100 and 380 nm. Some materials "fluoresce" and produce light of visible wavelengths when excited by UV energy. This re-radiation of visible light can be detected by a "UV sensor." See "LED."

Voltage: The term used most often in place of "electromotive force", "potential," "potential difference," or "voltage drop" to designate the electric pressure that exists between two points and is capable of producing a flow of current when a closed circuit is connected between the two points.

Voltage drop: The voltage that occurs across a solid-state device when its output is driving a load or the voltage that exists across each element of a series circuit. The magnitude of the voltage drop is dependent upon the circuit demand of the load.

Wavelength: Distance traveled by light while completing one complete sine wave. Is expressed in nanometers (nm). Each color has a specific wavelength.

White paper response: A calibration procedure performed on retroreflective sensors to eliminate all response to white paper with 90% reflectance.

Window: See "sensing window."

Wire-break protection: If one of the supply lines is broken, the output remains disabled (no operation).

Zener diode: A PN junction diode used as a voltage regulator because of its uniform breakdown characteristic when reverse biased.

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