



<i>ifm - the company</i>	4 - 5
<i>General information</i>	6 - 7
<i>List of articles</i>	8 - 11
<i>Inductive sensors</i>	12 - 27
<i>Capacitive sensors</i>	28 - 31
<i>Magnetic sensors</i>	32 - 35
<i>Photoelectric sensors infrared / redlight</i>	38 - 47
<i>Photoelectric sensors laser</i>	48 - 51
<i>Photoelectric sensors fibre optics</i>	52 - 57
<i>Photoelectric sensors specific systems</i>	58 - 61
<i>Encoders</i>	62 - 65
<i>Evaluation systems</i>	66 - 69
<i>Level sensors</i>	70 - 75
<i>Flow sensors</i>	76 - 81
<i>Pressure sensors</i>	82 - 87
<i>Temperature sensors</i>	88 - 93
<i>Diagnostic systems</i>	94 - 95
<i>Bus systems</i>	96 - 105
<i>Power supplies</i>	106 - 109
<i>Connection technology</i>	110 - 117

The company in your vicinity.

State-of-the-art communication.

With the right address – www.ifm-electronic.com – only a mouse click separates you from the world of automation technology. See the power of our products in interactive representations. Gain an impression with 3-dimensional views of our units. Download CAD drawings for direct integration in your applications. And one more innovation on the internet: The e-shop*. Order online – now even faster, more convenient and reliable.

* Available in the USA, France and Switzerland. Further countries to follow.

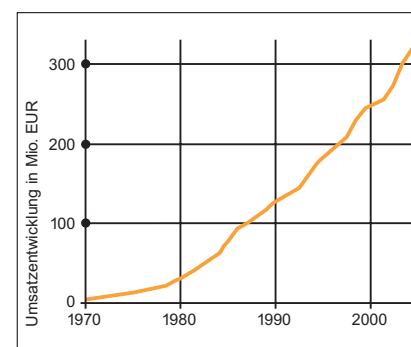
We are there for you.

Close contact with our customers is part of our success. Therefore we have consistently developed our sales network right from the start. Today ifm electronic is represented in more than 70 countries – close to you! With application advice and service at the heart of our operation. For the introduction of new products and technologies we support you with workshops and seminars in our training centres or in your plant.



Security by success.

Since its foundation in 1969 ifm electronic has constantly grown, now having more than 2800 employees worldwide, and achieved a turnover of EUR 330 million in 2005. This success gives you the security of having a reliable partner for the implementation of your automation projects. Comprehensive service and a warranty of up to 5 years on standard units are just two examples of this reliability.



www.ifm-electronic.com
Information around the clock and
around the globe in 15 languages on the internet.



• Information

- product innovations
- company news
- exhibition info
- locations
- jobs

• Documentation

- data sheets
- operating instructions
- manuals
- approvals
- CAD data

• Communication*

- request for documents
- recall service
- live advice
- newsletter

• Selection

- interactive product selection aids
- configuration tools
- data sheet direct

• Animation

- virtual product animations
- flash movies (video sequences)

• Application

- applications
- product recommendations
- calculation aids

• Transaction*

- e-shop processing
- e-procurement catalogues
- B2B services

Order no.	Approvals	Catalogue page	Order no.	Approvals	Catalogue page	Order no.	Approvals	Catalogue page	Order no.	Approvals	Catalogue page	Order no.	Approvals	Catalogue page	Order no.	Approvals	Catalogue page
AC003S	CE, CUL	99	DN1021	CE, CUL	107	E11490	CURUS	112	ID5059	CE, CUL	16	IIS860	CE	13	KG0003	CE, CCC	29
AC004S	CE, CUL	99	DN2012	CE, CUL	107 97	E11491	CURUS	112	IE5338	CE, CUL	13	IIS861	CE	13	KI0016	CE, CUL, CCC	29
AC005S	CE, CUL	99	DN2013	CE, CUL	107 97	E11493	CURUS	112	IE5340	CE, CUL	13	IIC200	CE, CUL	16	KI0020	CE, CUL, CCC	29
AC009S	CE, CURUS	99	DN2014	CE, CUL	107	E11494	CURUS	112	IF0005	CCC, CE	14	IIM208	CCC, CE, CUL	16	KI5001	CE, CUL	29
AC010S	CE, CSA, UL	99	DN2032	CE, CUL	107	E11495	CURUS	112	IF0007	CCC, CE	14	IIM209	CCC, CE, CUL	16	KI5002	CE, CUL	29
AC1209	CE, CUL	97	DN2033	CE, CUL	107	E11496	CURUS	112	IF5936	CE	13	IIS204	CE, CUL	15	KI5030	CCSAUS, CE	29
AC1212	CE, CUL	97	DN2035	CE, CUL	107	E11498	CURUS	112	IF5937	CE	13	IIS205	CE, CUL	15	KN0003	CE	71
AC1216	CE, CUL	97	DN2036	CE, CUL	107	E11499	CURUS	112	IFC204	CE, C							

Order no.	Approvals	Catalogue page
NG5001	CCSAUS, CE	18
NG5002	CCSAUS, CE	18
NG5003	CCSAUS, CE	18
NG5004	CCSAUS, CE	18
NI5001	CCSAUS, CE	18
NI5002	CCSAUS, CE	18
NI5003	CCSAUS, CE	18
NI5004	CCSAUS, CE	18
O1D100	CE, CUL	59
O5E200	CE, CUL	40
O5H200	CE, CUL	40
O5H500	CE, CUL	40
O5P200	CE, CUL	40
O5S200	CE, CUL	40
OB5013	CE, CUL	53
OB5014	CE, CUL	53
OB5021	CE, CUL	53
OB5022	CE, CUL	53
OD5005	CE	59
OD5007	CE	59
OD5009	CE	59
OD5011	CE	59
OD5013	CE	59
OG0030	CCC, CE, CUL	39
OG0033	CCC, CE	39
OG0035	CCC, CE	39
OG0039	CCC, CE	39
OG5042	CE, CUL	38
OG5044	CE, CUL	38
OG5047	CE, CUL	38
OG5051	CE, CUL	38
OG5056	CE, CUL	49
OG5058	CE, CUL	49
OG5059	CE, CUL	49
OG5061	CE, CUL	49
OG5114	CE	38
OG5115	CE	38
OG5116	CE	37
OG5117	CE	38
OG5119	CE, CUL	38
OG5123	CE, CUL	38
OG5124	CE, CUL	38
OG5125	CE, CUL	39
OG5126	CE, CUL	39
OG5127	CE, CUL	39
OG5128	CE, CUL	39
OG5129	CE, CUL	39
OGE200	CE, CUL	38
OGH200	CE, CUL	38
OGP200	CE, CUL	38

Order no.	Approvals	Catalogue page
OGP201	CE	38
OGS200	CE, CUL	38
OH5003	CE	37
OH5005	CE	37
OH5007	CE	37
OH5011	CE	37
OH5012	CE	37
OJ5022	CE, CUL	37
OJ5023	CE, CUL	37
OJ5026	CE, CUL	37
OJ5027	CE, CUL	37
OJ5030	CE, CUL	37
OJ5031	CE, CUL	37
OJ5032	CE, CUL	37
OJ5048	CE, CUL	37
OJ5054	CE, CUL	49
OJ5058	CE, CUL	49
OJ5071	CE, CUL	37
OJ5086	CE, CUL	59
OL0004	CCC, CE	40
OL0005	CCC, CE	40
OL0006	CE	40
OL0007	CCC, CE	40
OL5003	CE, CUL	40
OL5004	CE	40
OL5005	CE	40
OL5008	CE	40
OL5009	CE	40
OL5010	CE	40
OL5012	CE	39
OL5013	CE	39
OL5016	CE	39
OL5017	CE	39
OL5018	CE	39
OO5000	CE, CUL	53
OO5001	CE, CUL	53
OO5002	CE, CUL	53
OO5003	CE, CUL	53
PA3020	CE, CUL	83
PA3021	CE, CUL	83
PA3022	CE, CUL	83
PA3023	CE, CUL	83
PA3024	CE, CUL	83
PA3026	CE, CUL	83
PA3027	CE, CUL	83
PA3029	CE, CUL	83
PF2652	3A, CE, CUL	84
PF2653	3A, CE, CUL	84
PF2654	3A, CE, CUL	84
PF2656	3A, CE, CUL	83

Order no.	Approvals	Catalogue page
PF2657	3A, CE, CUL	83
PF2658	3A, CE, CUL	83
PI2093	3A, CE, EHEDG	84
PI2094	3A, CE, EHEDG	84
PI2095	3A, CE, EHEDG	84
PI2096	3A, CE, EHEDG	84
PI2097	3A, CE, EHEDG	84
PI2098	3A, CE, EHEDG	84
PI2099	3A, CE, EHEDG	84
PK6520	CE, CUL	83
PK6521	CE, CUL	83
PK6522	CE, CUL	83
PK6524	CE, CUL	83
PK7520	CE, CUL	83
PK7521	CE, CUL	83
PK7522	CE, CUL	83
PK7524	CE, CUL	83
PL2653	3A, CE, CUL	83
PL2654	3A, CE, CUL	83
PL2656	3A, CE, CUL	83
PL2657	3A, CE, CUL	83
PL2658	3A, CE, CUL	83
PM2053	3A, CE, CUL	83
PM2054	3A, CE, CUL	83
PM2057	3A, CE, CUL	83
PM2058	3A, CE, CUL	83
PN2009	CE, CUL	83
PN2020	CE, CUL	83
PN2021	CE, CUL	83
PN2022	CE, CUL	83
PN2023	CE, CUL	83
PN2024	CE, CUL	83
PN2026	CE, CUL	83
PN2069	CE	83
RB1015	CE, CURUS	63
RB6013	CE, CURUS	63
RB6015	CE, CURUS	63
RB6029	CE, CURUS	63
RM3005	CE, CURUS	63
RN6026	CE, CURUS	63
RO1364	CE, CURUS	63
RO6343	CE, CURUS	63
RO6344	CE, CURUS	63
RO6345	CE, CURUS	63
RU1025	CE, CURUS	63
SD2000	CE, CUL	78
SD6000	CE, CUL	78
SD6100	CE, CUL	78
SD8000	CE, CUL	78
SD9000	CE, CUL	78

Order no.	Approvals	Catalogue page
SF211A		77
SF221A		77
SF311A		77
SF321A		77
SF5200		77
SF5300		77
SF5350		77
SF5700		77
SF5800		77
SI1000	CE, CUL	77
SI1002	CE, CUL	77
SI1004	CE, CUL	77
SI1006	CE, CUL	77
SI1007	CE, CUL	77
SI1010	CE, CUL	77
SI1100	CE, CUL	77
SI2000	3A, CE, CUL	77
SI2100	3A, CE, CUL	77
SI2200	3A, CE, CUL	77
SL0101	CE	78
SL5101	CE	78
SN0150	CE	77
SN2302	CE	77
SN2304	CE	77
SR0150	CE	77
SR2301	CE	77
SU7000	CE, CUL	78
SU8000	CE, CUL	78
TA3130	CE	89
TA3430	CE, CUL	89
TA3431	CE, CUL	89
TAA131	CE	89
TAA431	CE	89
TAD161	3A, CE, CUL	89
TAD961	3A, CE, CUL	89
TM0061	3A, CUL, EHEDG	89
TM1061	3A, CUL, EHEDG	89
TM9061	3A, CUL, EHEDG	89
TN2530	CE, CUL	89
TN7530	CE, CUL	89
TR2432	CE, CUL	89
TR7430	CE, CUL	89
TR8430	CE, CUL	89
TS2051	CUL	89
TS2056		89
TS2256		89
TS5051	CUL	89
TT0061	3A, CUL	89
TT1050	CUL	89
TT1061	3A, CUL	89

Order no.	Approvals	Catalogue page
VE1001	CE, CUL	95
VE1101	CE, CUL	95



- Different connection options using cable, connector or terminals.
- Modular efector *m* units with increased sensing range.
- Special application sensors for almost all application areas.
- Cylindrical housings with a diameter of 4 to 34 mm & rectangular housings.
- Wide range of fixing accessories and sockets.

Introduction

In all automated processes sensors are absolutely necessary to provide the PLC with information. They supply the necessary signals on positions, limits or serve as pulse pick-ups for counting tasks or for monitoring rotational speed. Inductive and capacitive sensors are nowadays indispensable for industrial usage. As compared to mechanical switches they offer ideal conditions: non-contact operation free from any wear and tear, high switching frequencies and accuracy. In addition, they are insensitive to vibration, dust and moisture. Inductive sensors detect all metals without contact, capacitive sensors almost all solid and liquid media such as metal, glass, wood, plastic, water, oil, etc.

Operating principle of inductive sensors

Inductive sensors take advantage of the physical effect of the change in the quality factor in a resonant circuit caused by eddy current losses in conductive materials. This is how it works: A LC tuned circuit generates a high frequency electromagnetic field. This field is radiated from the active face of the sensor. If a conductive material enters this field, eddy currents will be formed in accordance with the law of inductance which draw energy from the oscillator. This reduces the oscillation amplitude. The change is converted into a switching signal. The operating principle permits detection of all metals irrespective of whether they are moving or not. The distance to the active face at which an electrically conductive material causes a change of signal in the sensor is called sensing range. The sensing range of an inductive sensor is defined by means of a target of mild steel (Fe 360). If the switch is damped by other metals, e.g. aluminium or copper, this is reduced. Using correction factors the user can calculate the attainable sensing ranges.

Modular sensors

A special series of inductive sensors are the application sensors "efector *m*". The feature shared by these proximity sensors is an increased sensing range. Due to a universal connection technology the sensors can be used as 3-wire or 2-wire units. The integrated setting LED display reduces mounting time and ensure utilization of the increased sensing range. All units have a permanent laser-etched type label. This allows clear identification of the units even after many years.

Type	Dimensions [mm]	Sensing range [mm]	Material	U _b [V]	Protection	f [Hz]	I _{load} [mA]	Draw- ing no.	Order no.
Terminals · Output function  · Electrical design DC PNP · Wiring diagram no. 5									
	40 x 40 x 120	15 f	PPE	10...36	IP 65	350	250	16	IM5020
	40 x 40 x 120	30 nf	PPE	10...36	IP 65	100	250	16	IM5046
Terminals · Output function  · Electrical design DC PNP/NPN · Wiring diagram no. 16									
	40 x 40 x 120	15 f	PPE	10...55	IP 65	> 350	400	16	IM5037
	40 x 40 x 120	20 nf	PPE	10...55	IP 65	> 300	400	16	IM5038
Terminals · Output function  · Electrical design DC PNP · Wiring diagram no. 6									
	40 x 40 x 118	15 f	PBT	10...60	IP 67	150	200	17	IV5003
	40 x 40 x 118	20 f	PBT	10...60	IP 67	150	200	17	IV5004
M12 connector · Output function  · Electrical design DC PNP · Wiring diagram no. 4									

Inductive sensors for oil and coolants

Type	Dimensions [mm]	Sensing range [mm]	Material	U _b [V]	Protection	f [Hz]	I _{load} [mA]	Draw- ing no.	Order no.
M12 connector · Output function  · Electrical design DC PNP · Wiring diagram no. 3									
	M12 / L = 45	4 f	brass	10...36	IP 68	700	100	40	IFC204
	M12 / L = 50	7 nf	brass	10...36	IP 68	700	100	28	IFC205
	M12 / L = 45	4 f	brass	10...36	IP 68	700	100	40	IFC206
	M18 / L = 46	8 f	brass	10...36	IP 68	400	100	31	IGC204
	M18 / L = 51	12 nf	brass	10...36	IP 68	300	100	32	IGC205
	M18 / L = 46	8 f	brass	10...36	IP 68	400	100	31	IGC206
	M30 / L = 50	15 f	brass	10...36	IP 68	100	100	35	IIC200

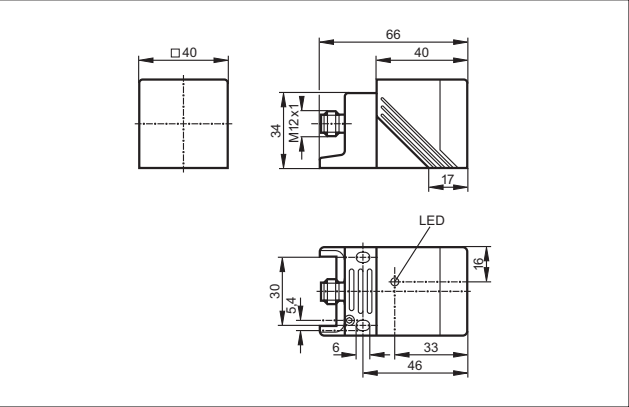
Mobile

Type	Dimensions [mm]	Sensing range [mm]	Material	U _b [V]	Protection	f [Hz]	I _{load} [mA]	Draw- ing no.	Order no
------	--------------------	--------------------------	----------	-----------------------	------------	-----------	---------------------------	---------------------	-------------

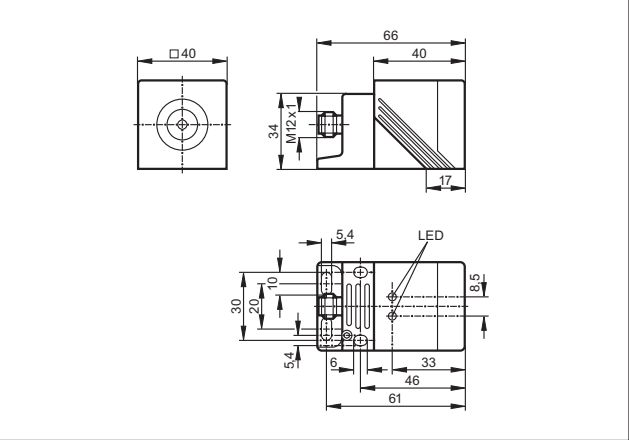
Type	Dimensions [mm]	Sensing range [mm]	Material	U _b [V]	Protection	f [Hz]	I _{load} [mA]	Drawing no.	Order no.
M12 connector · Output function  · Electrical design DC PNP · Wiring diagram no. 3									
	M30 / L = 50	22 nf	V4A (316S12)	10...36	IP 68 / IP 69 K	100	100	36	IIT200
	M30 / L = 50	14 f	V4A (316S12)	10...36	IP 68 / IP 69 K	100	100	35	IIT205
M12 connector · Output function  · Electrical design 3-wire DC PNP; 2-wire DC PNP/NPN · Wiring diagram no. 13									
	M30 / L = 70	22 nf	V4A (316S12)	10...36	IP 68 / IP 69 K	100	100	8	IIT202
	M30 / L = 70	14 f	V4A (316S12)	10...36	IP 68 / IP 69 K	100	100	37	IIT204
Cable 6 m · Output function  · Electrical design DC PNP · Wiring diagram no. 1									
	M30 / L = 59	22 nf	V4A (316S12)	10...36	IP 68 / IP 69 K	100	100	63	IIT207
	M30 / L = 59	14 f	V4A (316S12)	10...36	IP 68 / IP 69 K	100	100	64	

Scale drawings

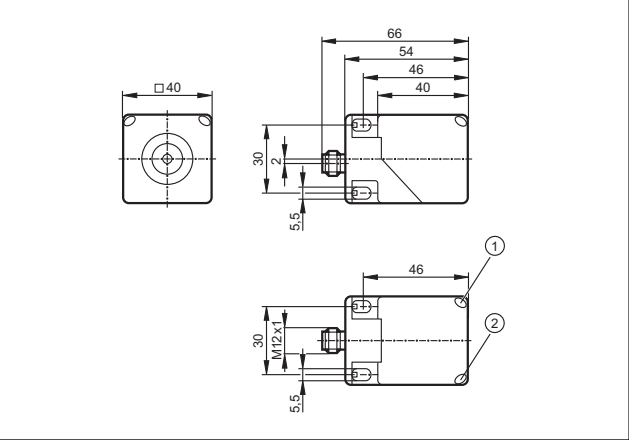
13



14

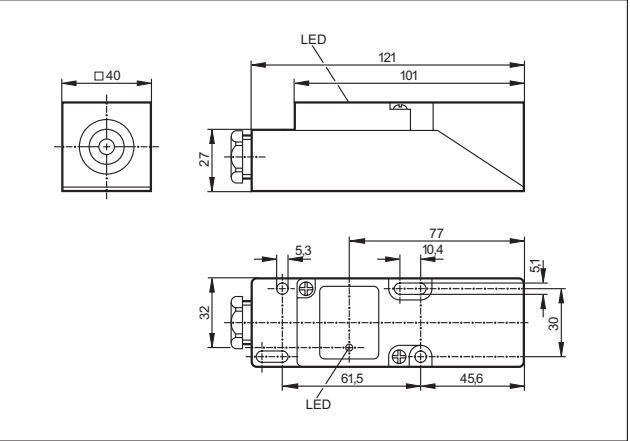


15

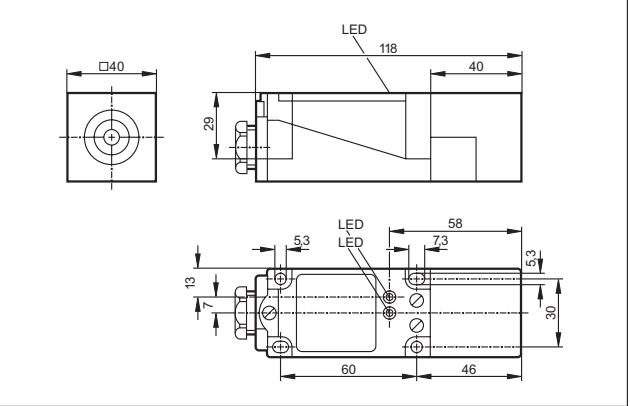


1: LED yellow, 2: LED green

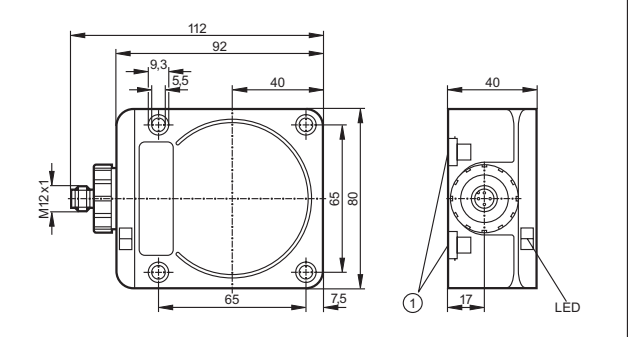
16



17

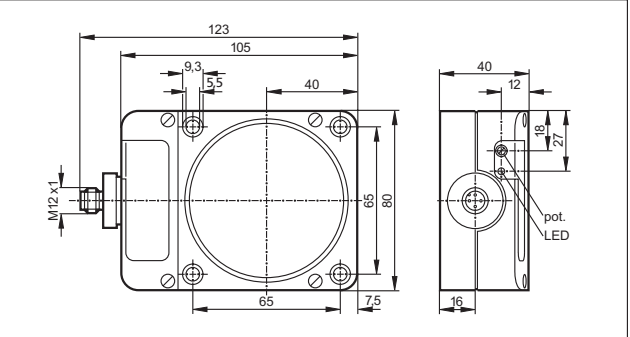


18



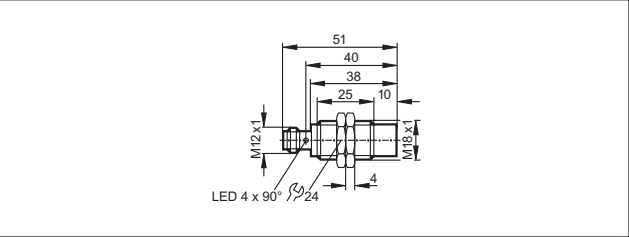
1: mounting on DIN rail

19

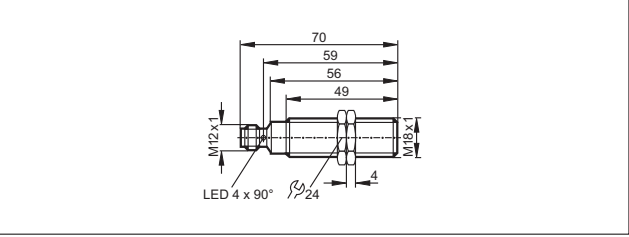


Scale drawings

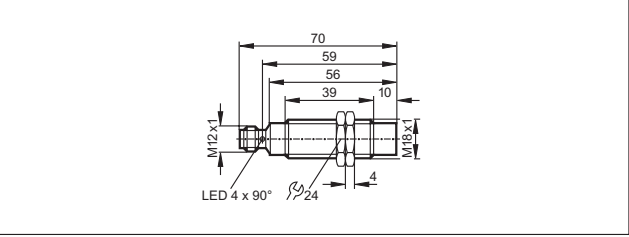
32



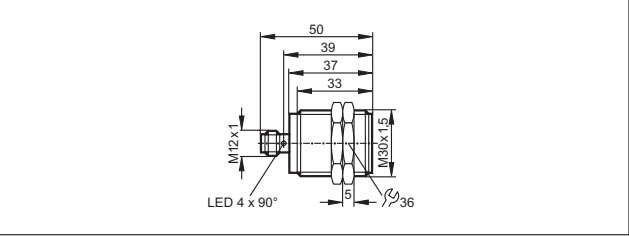
33



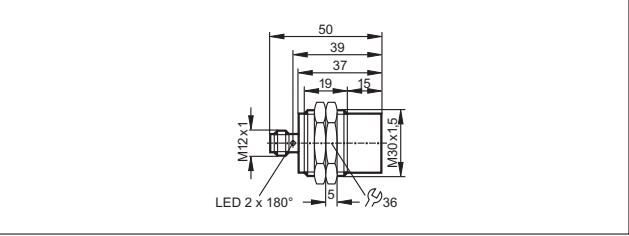
34



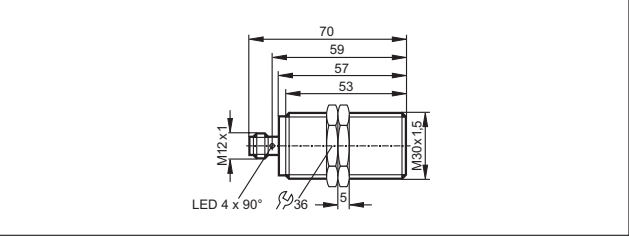
35



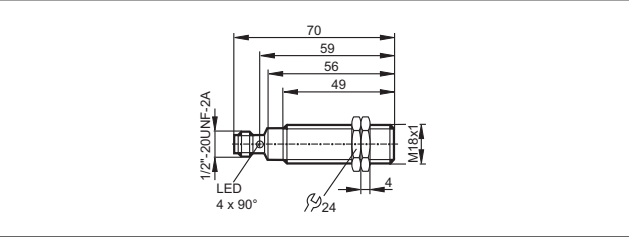
36



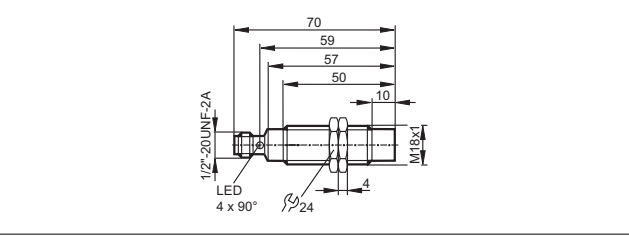
37



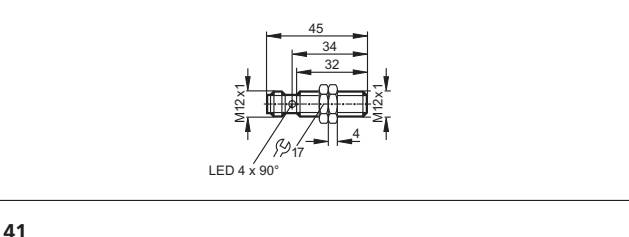
38



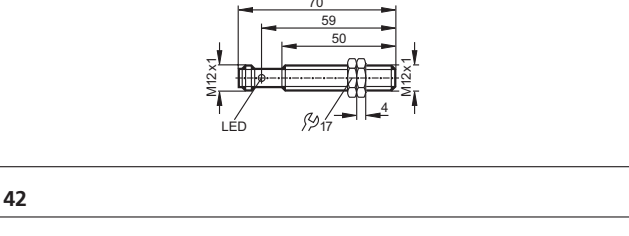
39



40

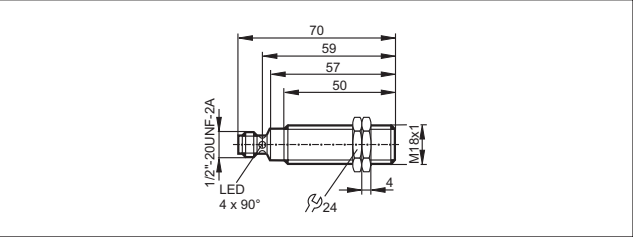


41

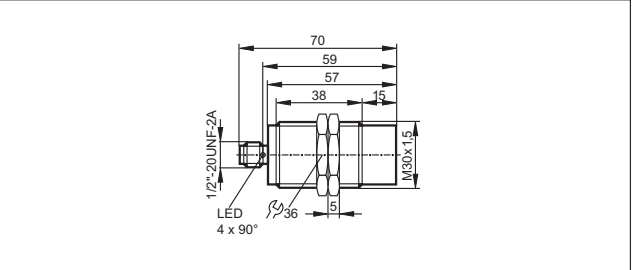


Scale drawings

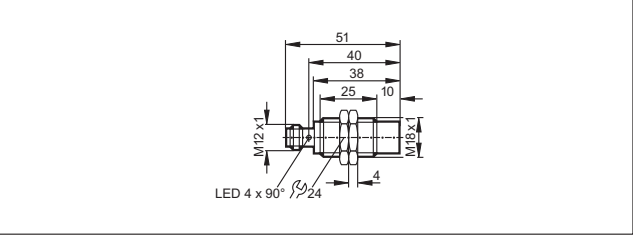
56



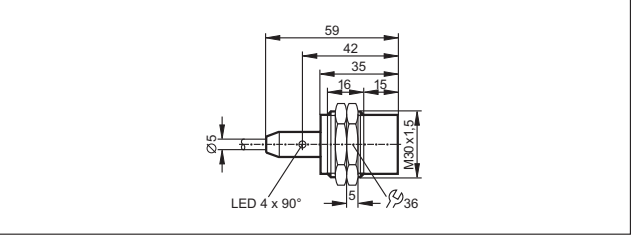
62



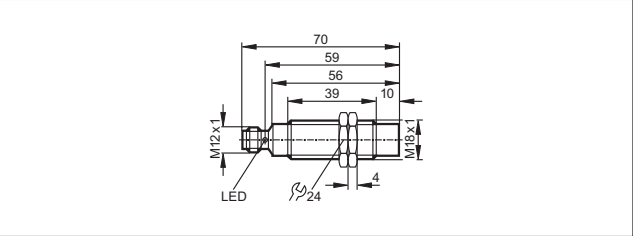
57



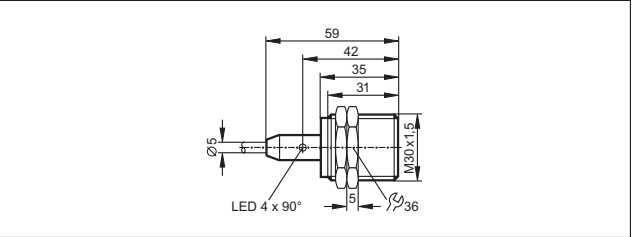
63



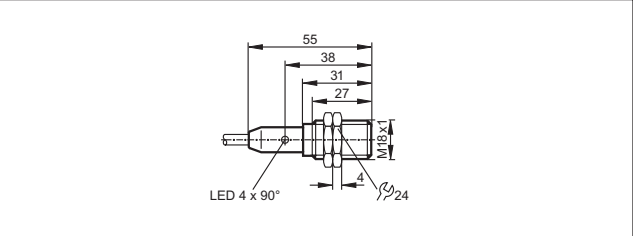
58



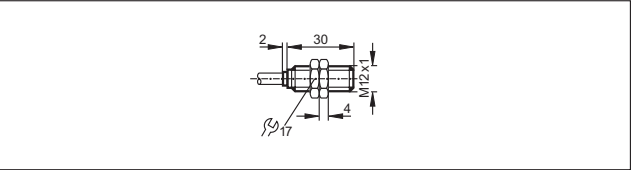
64



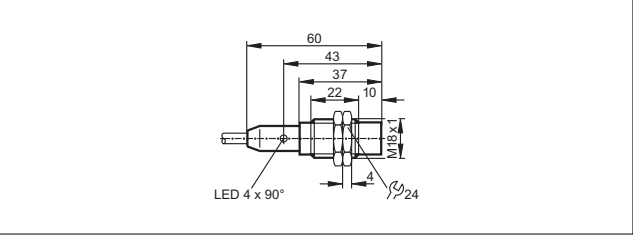
59



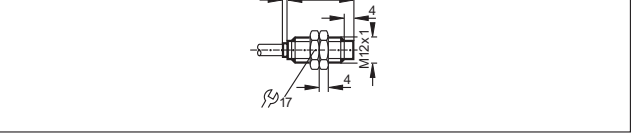
65



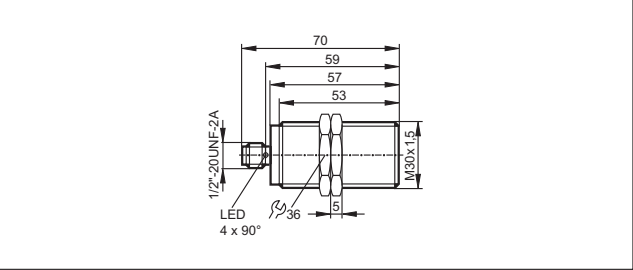
60



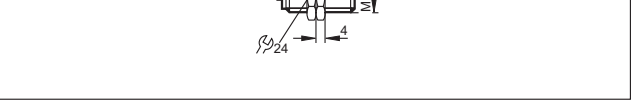
66



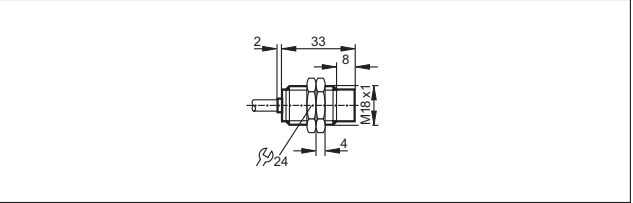
61



67

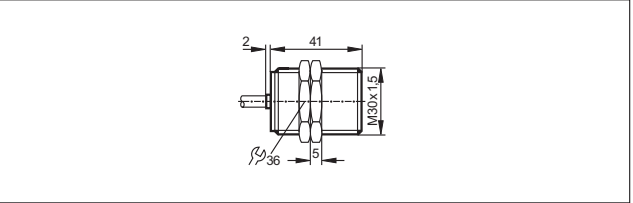


68

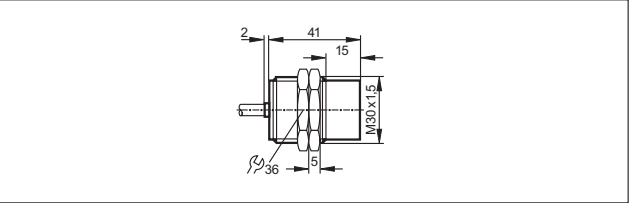


Scale drawings

69



70





- High operational reliability due to increased noise immunity.
- Adjustable sensing range up to 15 mm by means of a potentiometer.
- Resistant plastic housing for various applications.
- Different connection options using cable, connector or terminals.
- Types with programmable output function available.

Introduction

Capacitive sensors are used for the non-contact detection of any objects. In contrast to inductive sensors, which only detect metallic objects, capacitive sensors can also detect non-metallic materials.

Typical applications are in the wood, paper, glass, plastic, food and chemical industries. Capacitive sensors for example monitor that the contents of a cardboard box are complete or check the presence of the non-metallic caps.

Operating principle

The capacitance between the active electrode of the sensor and the electrical earth potential is measured. An approaching object influences the electrical alternating field between these two "capacitor plates". This applies to metallic and non-metallic objects.

In principle, capacitive sensors work with an RC oscillator. A very small change in capacitance is enough to influence the oscillation amplitude. The evaluation electronics converts this into a switched signal. The sensitivity can be set with a potentiometer.

Increased noise immunity

When detecting objects very small changes in capacitance of 0.02 pF (with a basic capacitance of the electrode of 0.2 pF!) must be reliably converted into useful switched signals. This makes high requirements for the electronics as the circuit and design-related parasitic basic capacitances (e.g. conductive tracks, input capacitances of the components) can be much higher thus making a precise capacitance measurement much more difficult.

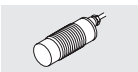
ifm electronic therefore developed a future-oriented solution to this problem. A new sensor circuit effectively avoids the indicated problems of the RC oscillator with an acceptable level of input. The new circuit concept achieves much better values with respect to all relevant noise parameters.

Special attention was given to very common noise sources in practice (frequency inverters, switched-mode power supplies, stepper-motor controllers, etc.).

Not only metal: Capacitive sensors detect almost all materials, here for example a log in

Type	Dimensions [mm]	Sensing range [mm]	Material	U _{nom.} at 1KΩ [V]	U _b [V]	Internal capacit. [nf]	Internal inductance [uH]	f [Hz]	Drawing no.	Order no.
------	--------------------	--------------------------	----------	------------------------------------	-----------------------	------------------------------	--------------------------------	-----------	----------------	--------------

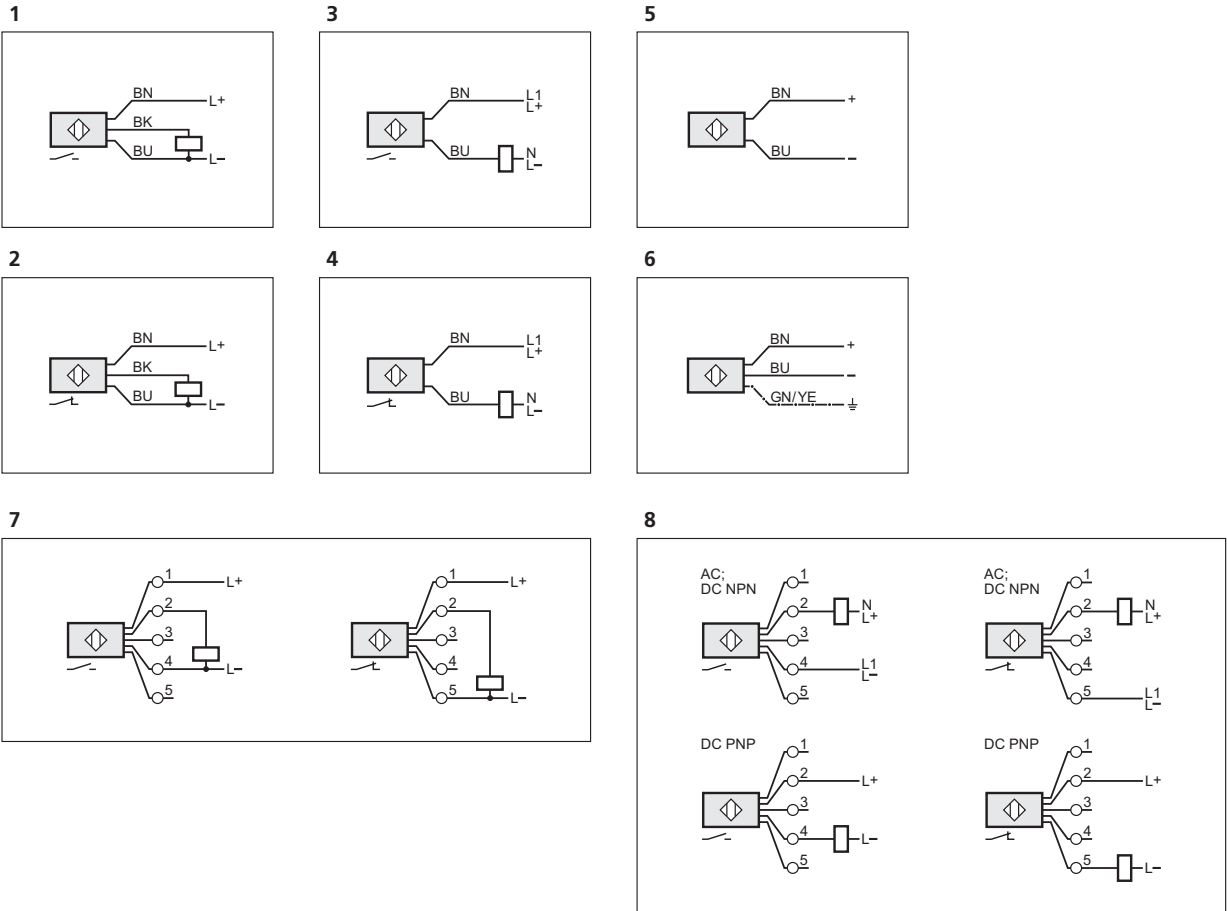
Cable 2 m · Output function  · Wiring diagram no. 6

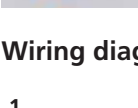
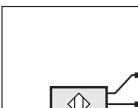
	M34 / L = 92	15 nf	brass	8.2 DC	7.5...15	375	1	40	4	KX5001
---	--------------	-------	-------	--------	----------	-----	---	----	---	--------

Accessories

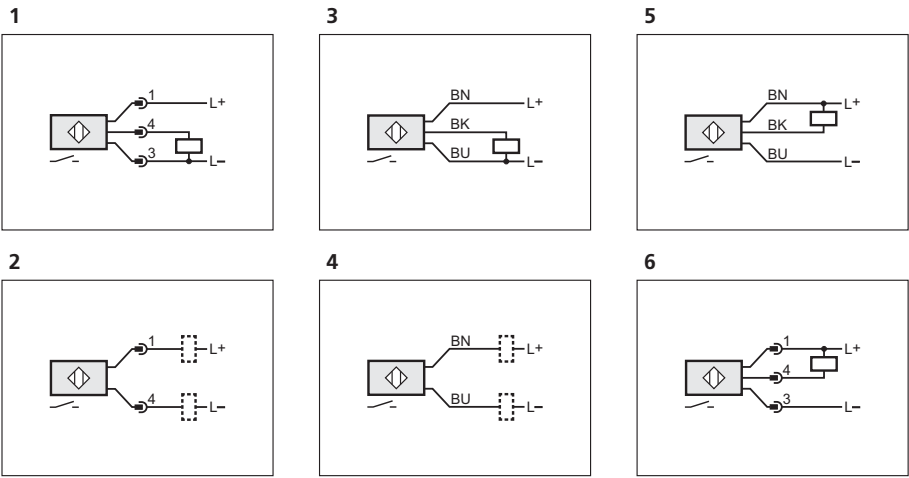
Type	Description	Order no.
	Amplifier, NV1121/230VAC/RL/1D/1G	N0031A
	Amplifier, NV1222/24VDC/TR/1D/1G	N0534A
	Mounting adapter, M30 x 1.5 - G 1 1/2	E11033
	Locknut G 1 1/2 for mounting adapter	E11031

Wiring diagrams



Type	Description	Order no.
	Fixing strap for clean-line cylinders Ø 25...32mm for types MKT	E11818
	Fixing strap for clean-line cylinders Ø 40 mm for types MKT	E11819
	Fixing strap for clean-line cylinders Ø 50 mm for types MKT	E11820
	Fixing strap for clean-line cylinders Ø 63 mm for types MKT	E11821
	Fixing strap for clean-line cylinders Ø 80 mm for types MKT	E11822
	Fixing strap for clean-line cylinders Ø 100 mm for types MKT	E11823
	Adapter for tie rod / integrated profile cylinders for types MKT (T-Nut cylinder sensors)	E11801
	Adapter for tie rod / integrated profile cylinders for types MKT (T-Nut cylinder sensors)	E11797
	Adapter for tie rod / integrated profile cylinders for types MKT (T-Nut cylinder sensors)	E11799
	Adapter for trapezoidal slot cylinders for types MKT (T-Nut cylinder sensors)	E11796
	T-slot cylinder memorisation block for types MKT (T-Nut cylinder sensors)	E11798

Wiring diagrams

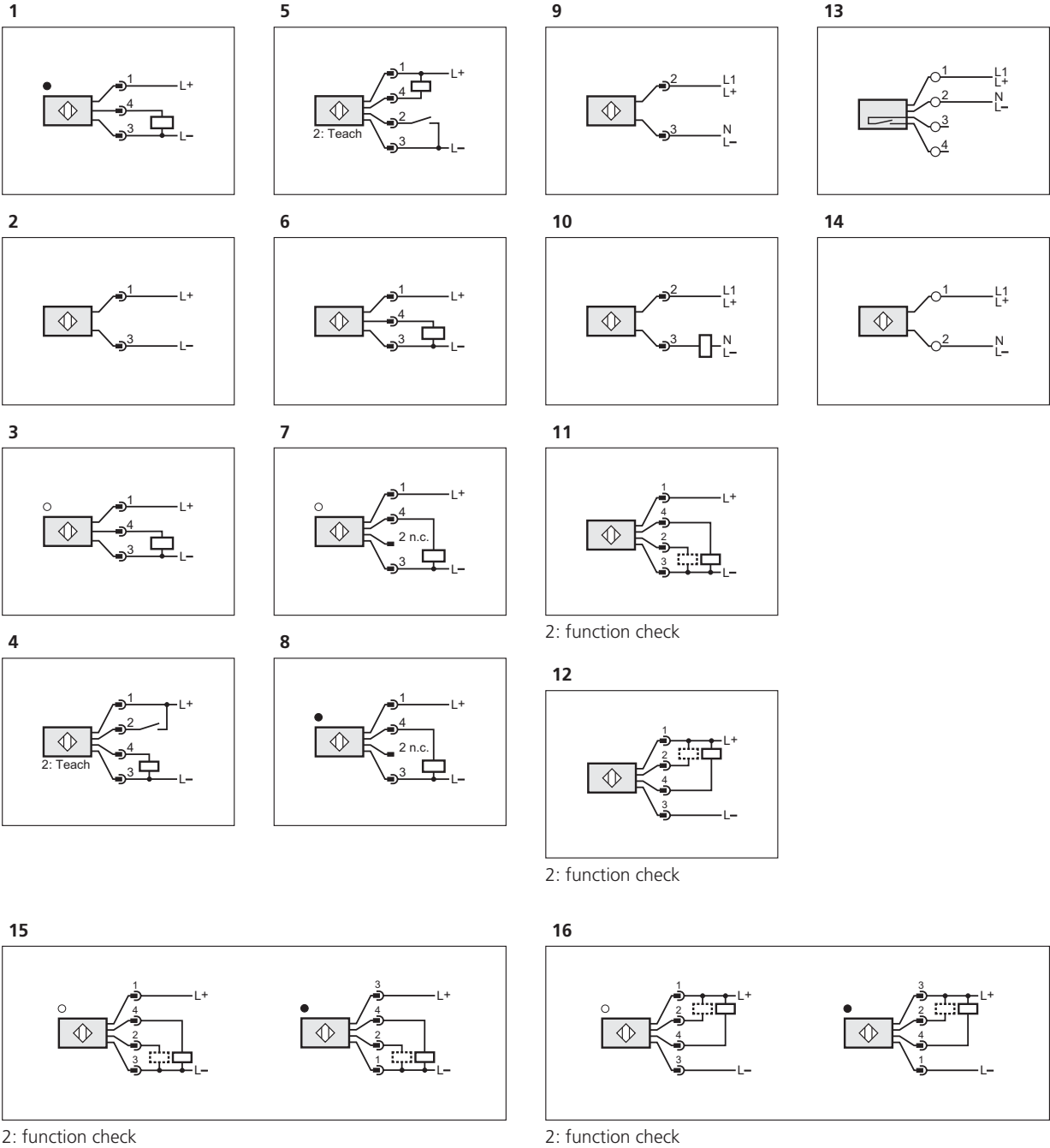


Housing	Function	Sensing range [m]	Spot Ø at max. range [m]	Output L = light-on D = dark-on	U _b [V]	Wiring diagram no.	Draw- ing no.	Order no.
Type OL · with polarization filter · M12 connector · plastics · DC								
	Retro-reflective sensor	0.3...5	250	L/D PNP	10...36	11	16	OL5004
	Retro-reflective sensor	0.3...5	250	L/D PNP	10...36	11	16	OL5003
	Retro-reflective sensor	0.3...5	250	L/D NPN	10...36	12	16	OL5005
Type OL · M12 connector · plastics · DC								
	Diffuse reflection sensor	0.001...1	< 300	L/D PNP	10...36	11	15	OL5009
	Diffuse reflection sensor	0.001...1	< 300	L/D PNP	10...36	11	15	OL5008
	Diffuse reflection sensor	0.001...1	< 300	L/D NPN	10...36	12	15	OL5010
Type OL · receiver · Terminals · plastics · AC								
	Through-beam sensor	25	–	L/D AC/relay	20...250	13	17	OL0007
Type OL · transmitter · Terminals · plastics · AC								
								

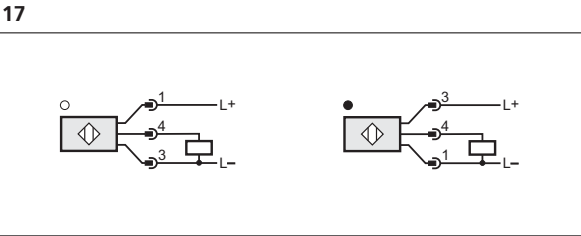
Type	Description	Order no.
	Mounting set for reflector Ø 80 mm	E20915
	Mounting set for reflector Ø 50 mm	E20911
	Mounting set for reflector Ø 35 mm	E20907
	Mounting set for reflector Ø 25 mm	E20903
	Angle bracket for types M18	E10736
	Mounting clamp for types M18	E11048
	Mounting set Ø 18.5 mm for types OG, IG, KG	E20870
	Mounting set Ø 18.5 mm for types OG, IG, KG	E20718
	Angle bracket for types OL	E20788
	Angle bracket for types OL	E20789
	Mounting set for types OL	E20877
	Mounting set for types OL	E20793
	Mounting set for types OL	E20792
	Mounting set, OL	E21012
	Mounting set for reflector	E21007

Type	Description	Order no.
	Mounting set Ø 30.2 mm for types OI, II, KI	E20874

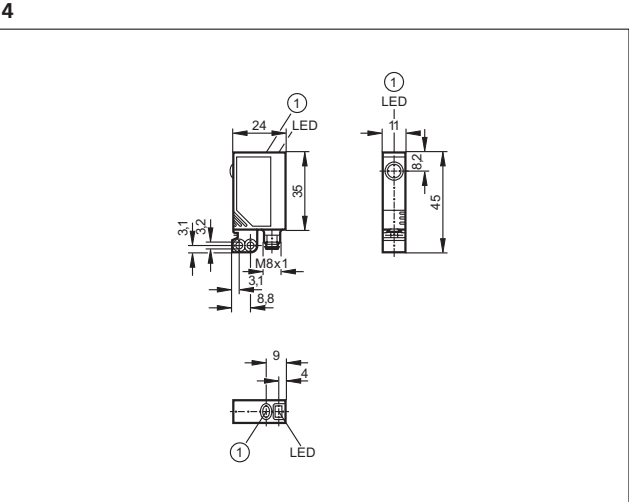
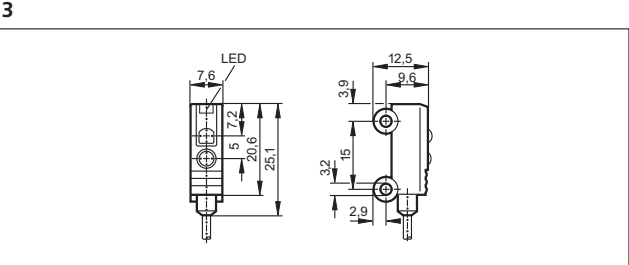
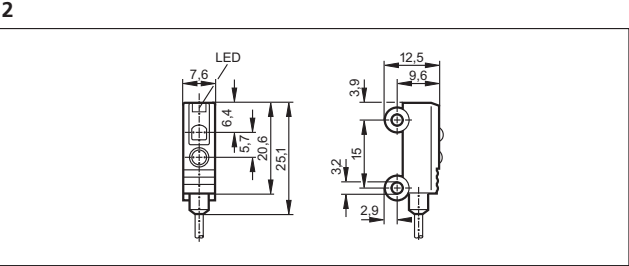
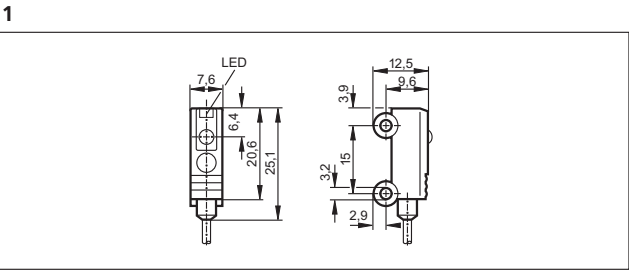
Wiring diagrams



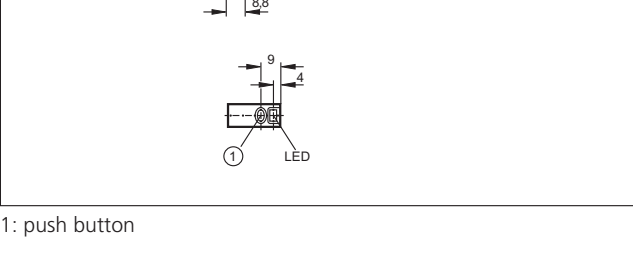
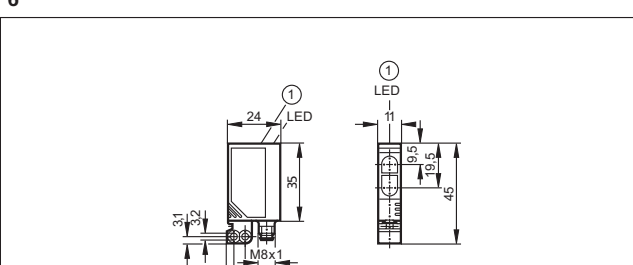
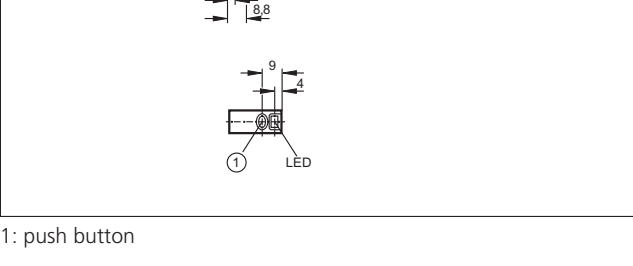
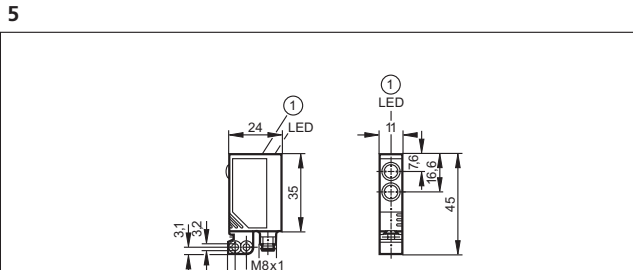
Wiring diagrams



Scale drawings



1: push button





- Detection of minute objects by means of a focussed laser beam.
- Clearly visible red light for easy setting to the object.
- Automatic switch point setting by pressing a pushbutton.
- Application sensors available for special application areas.
- System components available for fine adjustment.

Introduction

Laser systems are used where detection of small objects or precise positioning is required. They are available as through-beam sensors, retro-reflective sensors or diffuse reflection sensors.

Laser light consists of light waves of identical length which have a defined phase relation (coherence). This results in an important feature of laser systems, that is the almost parallel light beam. Result: Due to the small angle of divergence long ranges of up to 60 metres can be achieved. The laser spot which is also clearly visible at daylight simplifies the alignment of the system. Apart from the advantages some points have to be taken into account for the selection of the suitable optical system: compared to standard sensors the laser sensors have a reduced temperature range (-10...50 °C). In view of the small light spot and the often high ranges the system is more sensitive to vibrations than standard sensors.

Mounting aids

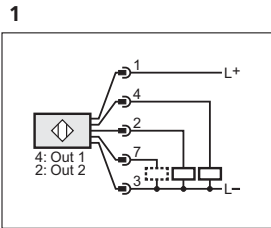
The ifm laser sensors offer a useful function for easier alignment: The laser power is increased during adjustment: This leads to a particularly bright laser spot which enables safe alignment from a distance even at daylight.

How dangerous are laser sensors?

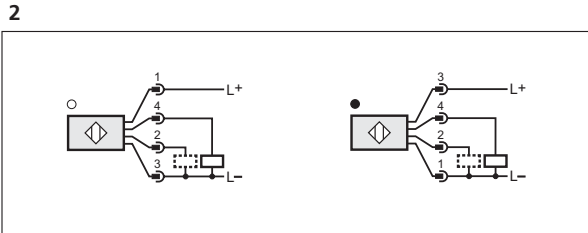
Due to the small angle of divergence laser beams are focussed on a small area. The energy and power density on this area is extremely high. ifm laser sensors comply with the European standard EN60825 or the international standard IEC60825. These standards describe the operation of laser systems. ifm laser sensors are classified in the laser protection class II. Thus the laser power, also in the setting mode with increased power, is max. 1 mW. When the laser beam hits the human eye, the eyelid is instinctively closed. When hitting the unprotected eye within a time of 0.25 s the laser beam must not cause any damage.



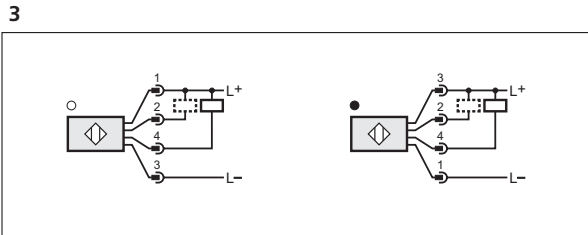
Wiring diagrams



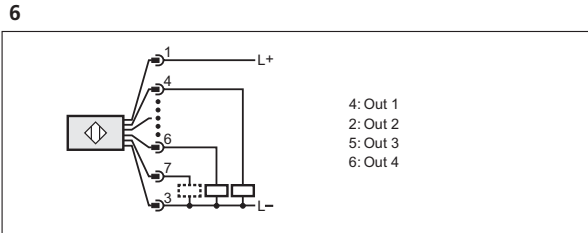
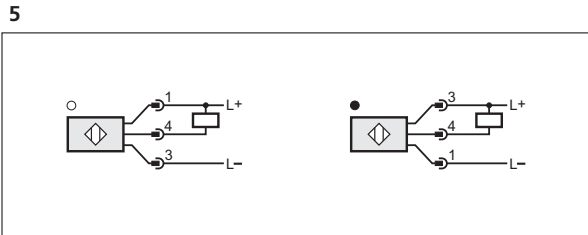
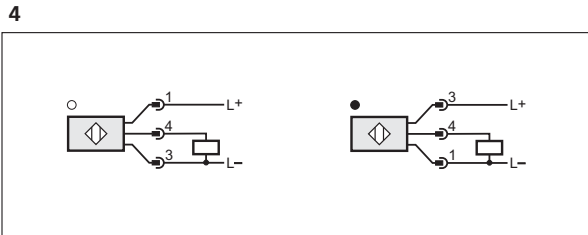
7: function check



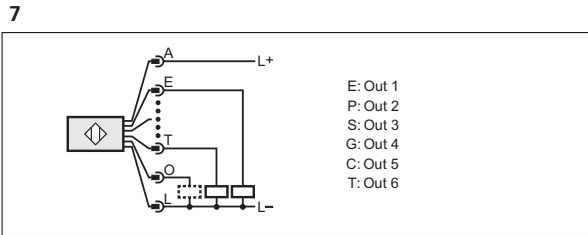
2: function check



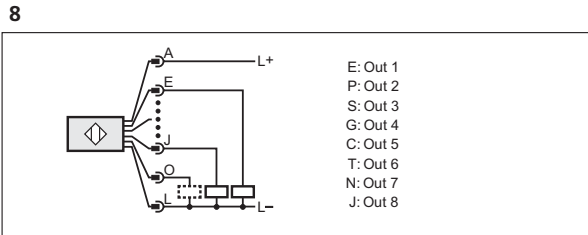
2: function check



7: function check

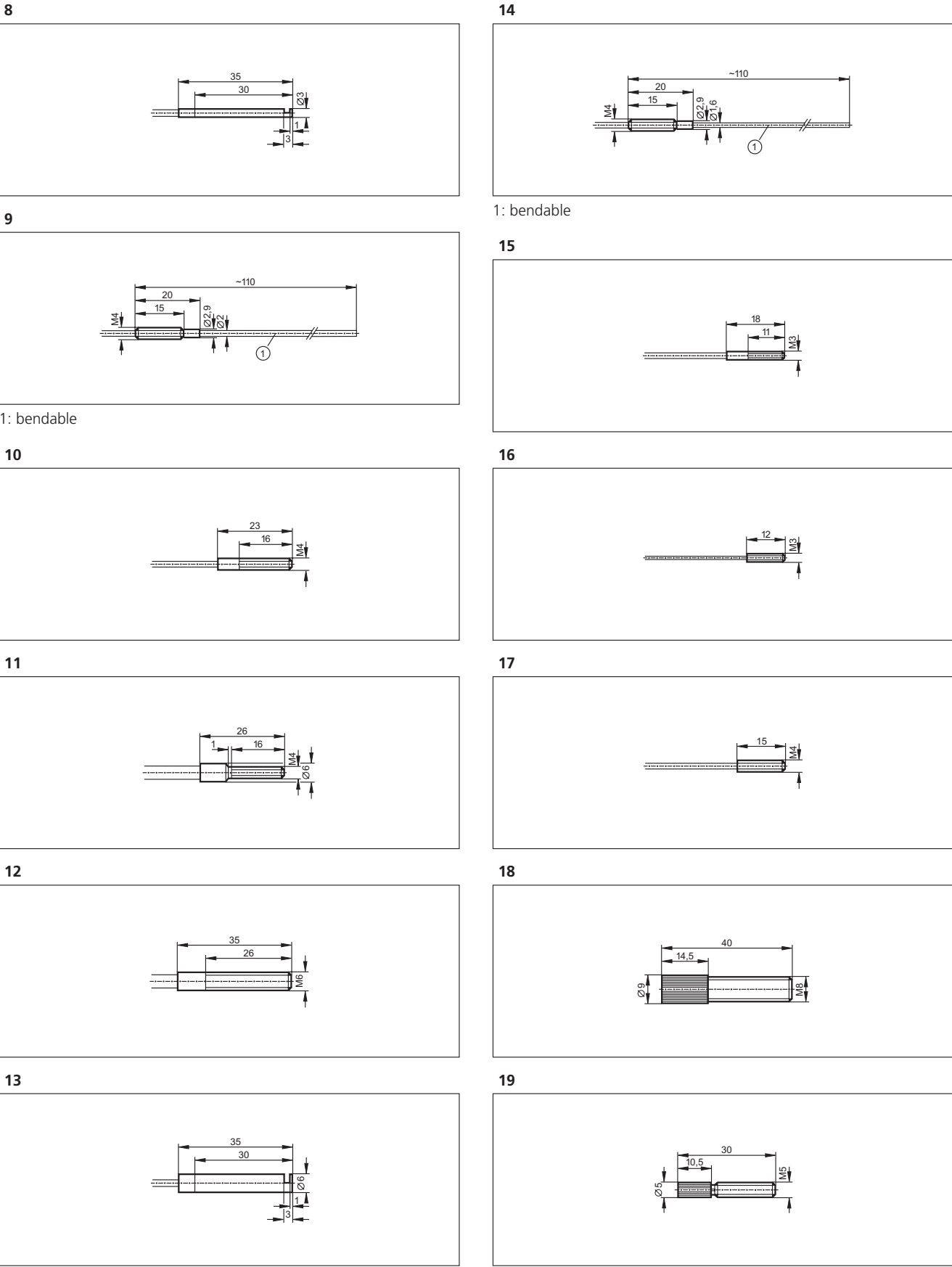


O: function check



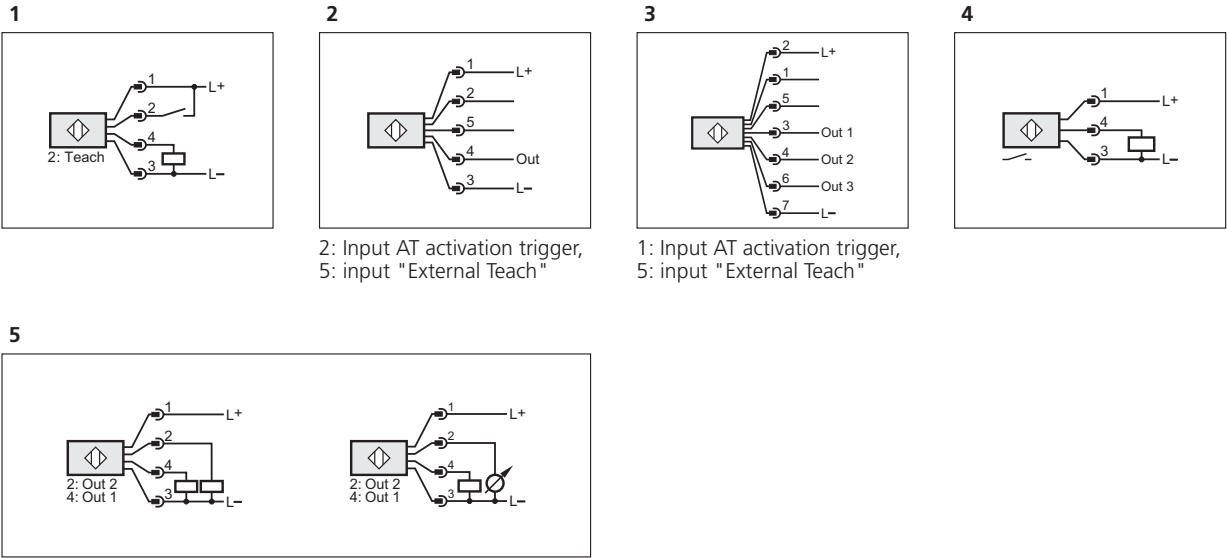
O: function check

Scale drawings

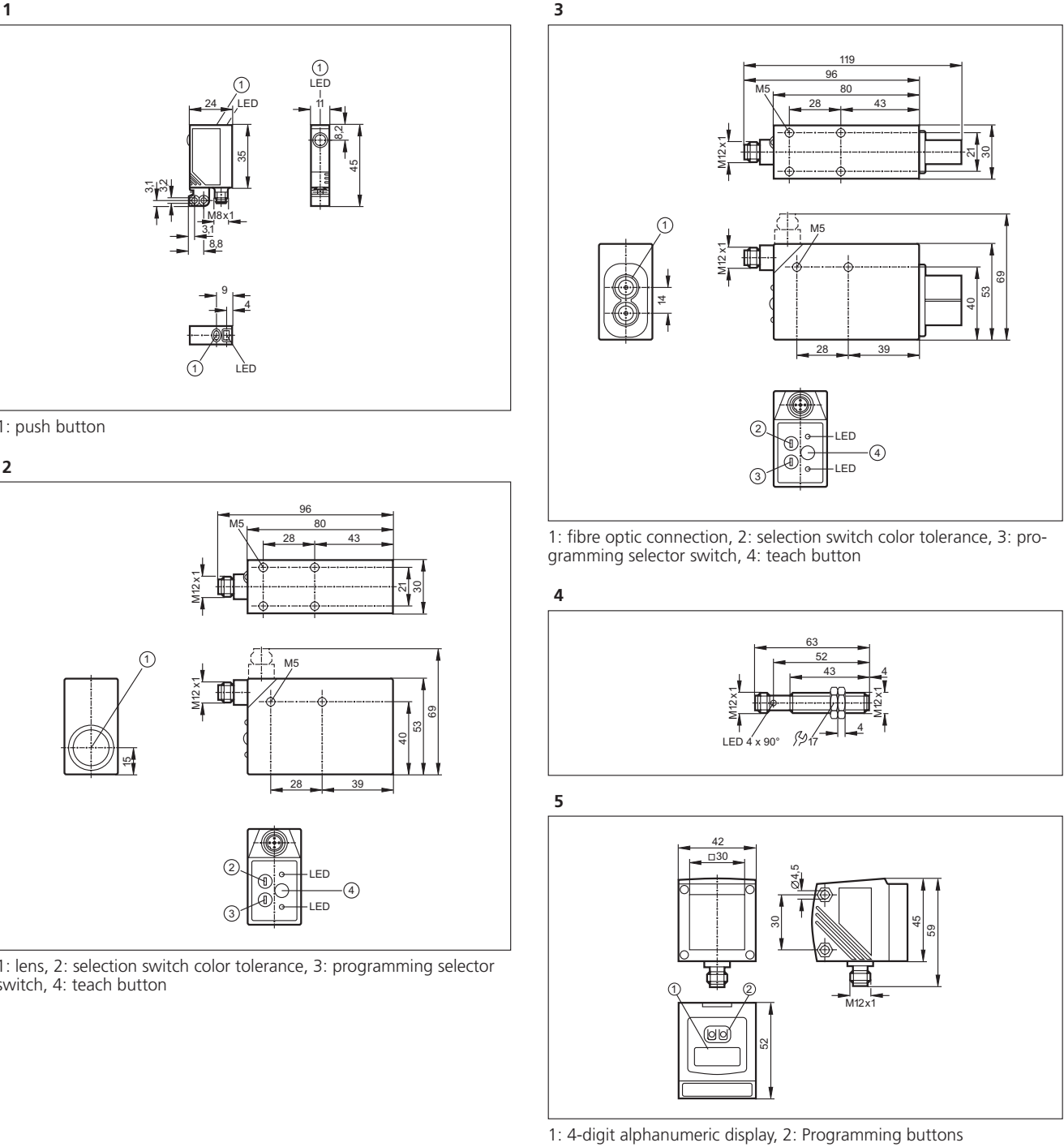


Type	Description	Order no.
	Prismatic reflector round fixing by screw, Ø 25 mm	E20953
	Prismatic reflector angular for laser units	E20722
	Prismatic reflector 30 x 20 mm for types OGPL, OJPL, OLPL	E20994
	Prismatic reflector Ø 19 mm for types OGPL, OJPL, OLPL	E20993
	Mounting set, O1D, O2D	E2D101

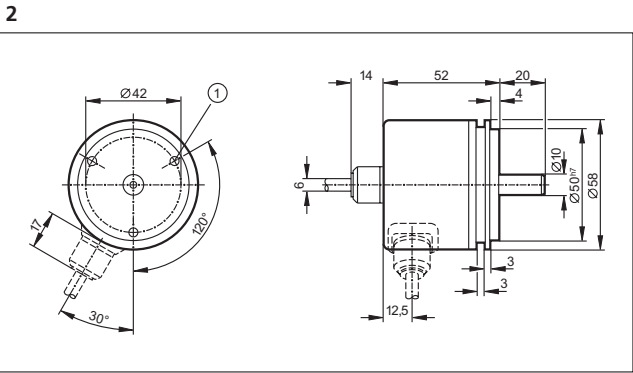
Wiring diagrams



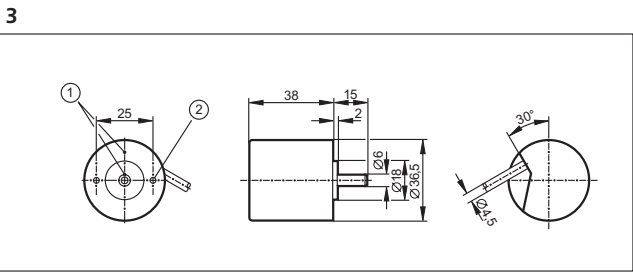
Scale drawings



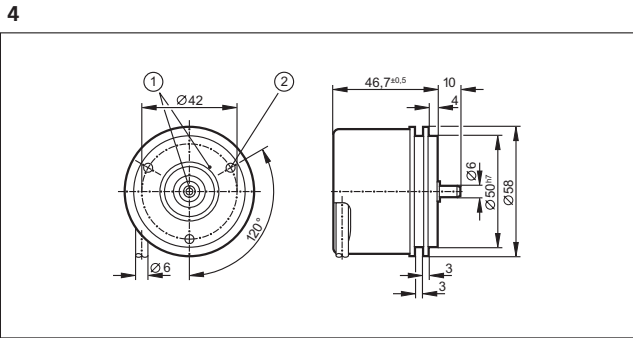
Scale drawings



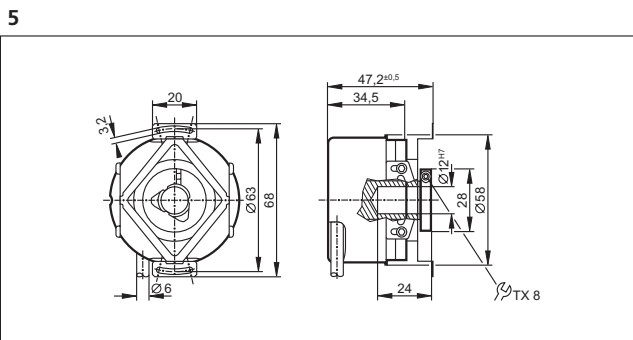
1: M4 5 mm deep



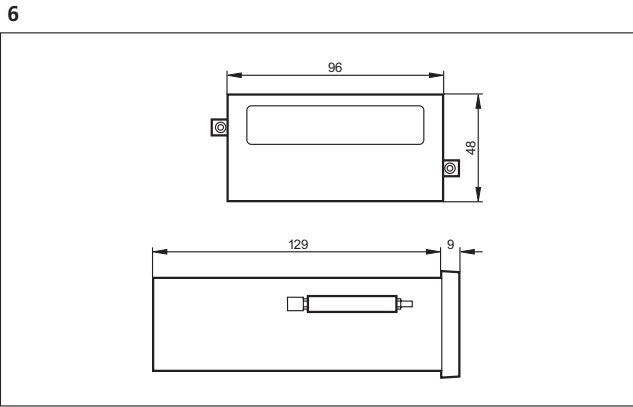
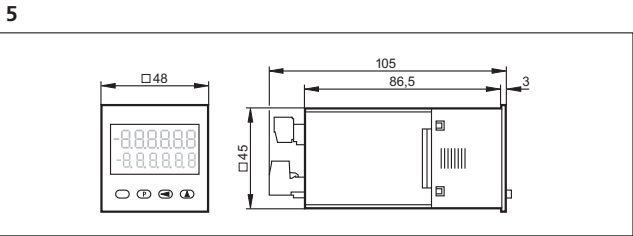
1: reference mark, 2: M3 5 mm deep

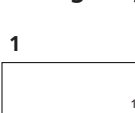
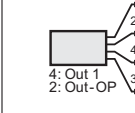
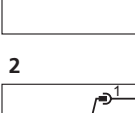


1: reference mark, 2: M4 5 mm deep

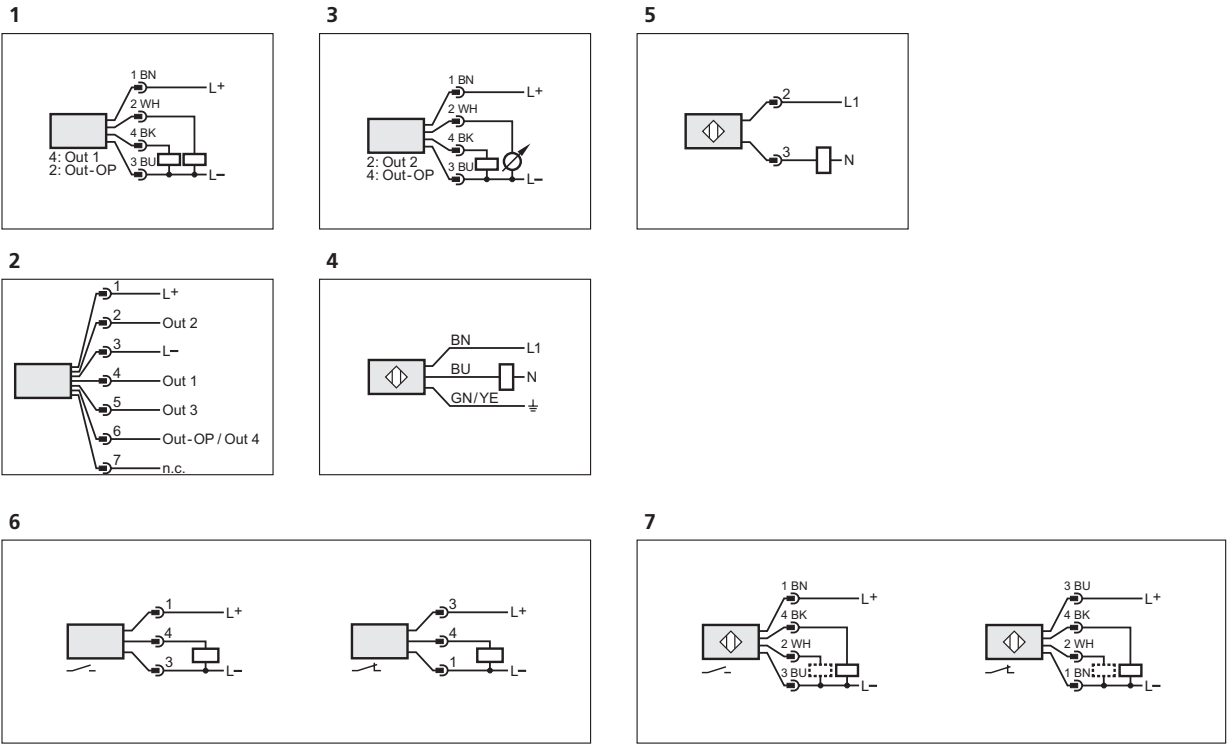


Scale drawings

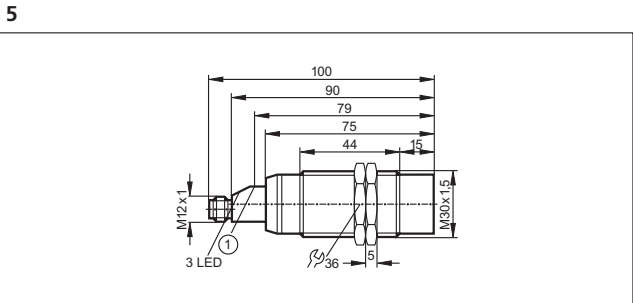


Type	Description	Order no.
	Mounting adapter G3/4 D16 for capacitive level sensors LK, LI, LT	E43003
	Mounting adapter G1 D16 for capacitive level sensors LK, LI, LT	E43004
	Flange plate 100-125 D16 for capacitive level sensors LK, LI, LT	E43005
	Flange plate 65-80 D16 for capacitive level sensors LK, LI, LT	E43006
	Protective cover for LK sensors	E43910
	Climatic tube, 132 mm	E43103
	Climatic tube, 264 mm	E43100
	Climatic tube, 472 mm	E43101
	Climatic tube, 728 mm	E43102
	Mounting adapter, G3/4 D22	E43008
	Mounting adapter, G1 D22	E43009

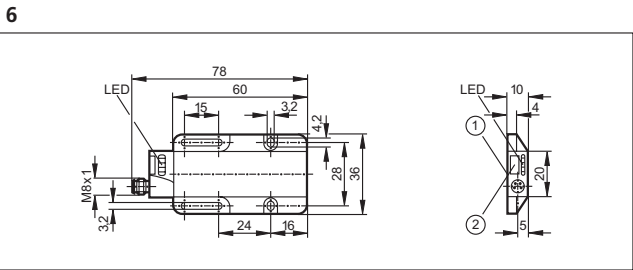
Wiring diagrams



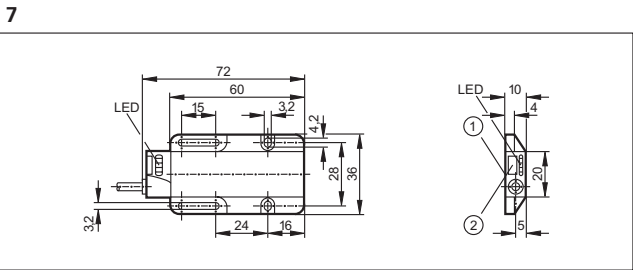
Scale drawings



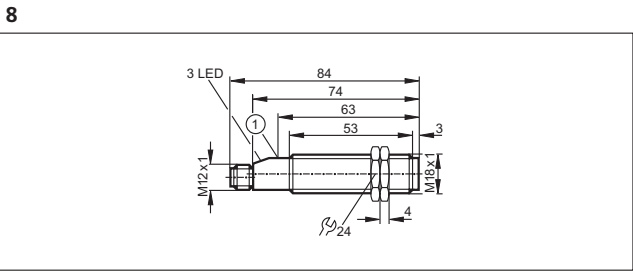
1: Programming button



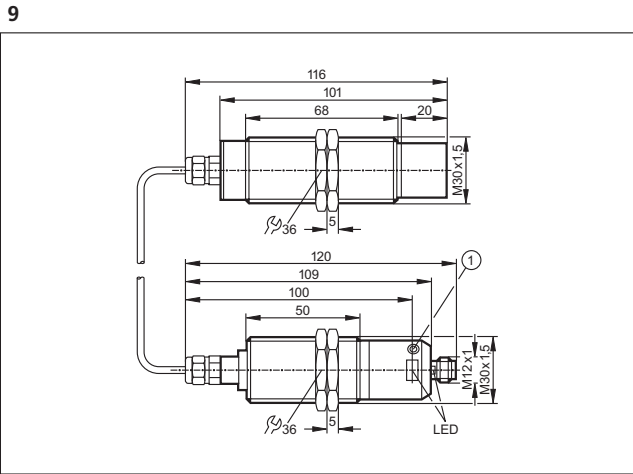
1: sensing face, 2: teach-in element



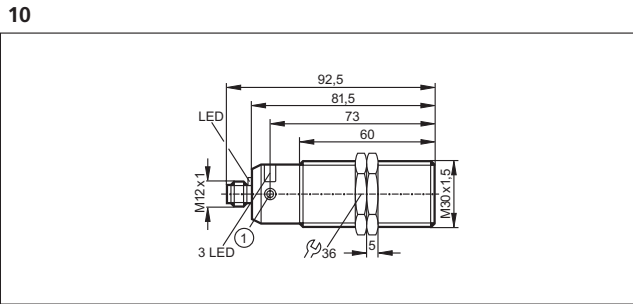
1: sensing face, 2: teach-in element



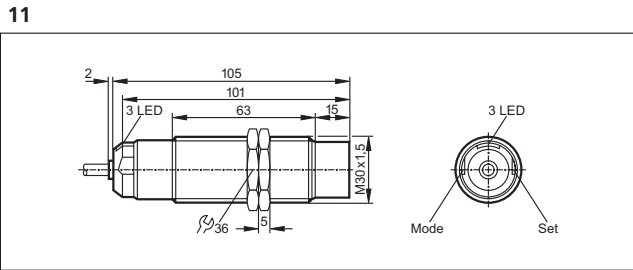
1: Programming button



1: Programming button



1: Programming button



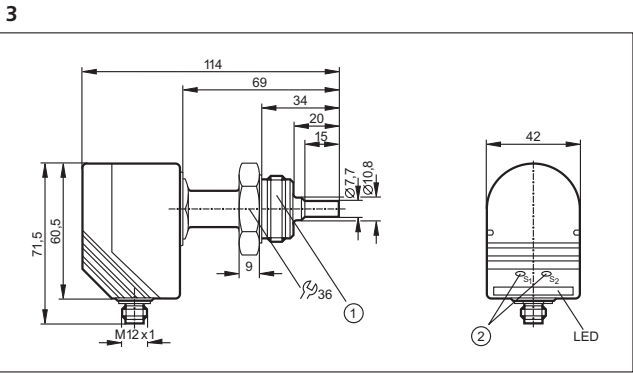
Compressed air measuring with programmable output

Measuring [NI/min / Nm³/h]	Setting range [NI/min / Nm³/h]	Pressure rating [bar]	Medium temp. [°C]	Process connec- tion	Drawing no.	Order no.
2.3 (3)...700	6...700	16	0...60	DN50	14	SD2000
0.25 (0.3)...75.0	0.7...75.0	16	0...60	DN15	15	SD6000
0.75 (0.8)...225.0	2.0...225.0	16	0...60	DN25	16	SD8000
1.3 (1.5)...410.0	3.5...410.0	16	0...60	DN40	17	SD9000
Ar: 0.35...105/CO2: 0.22...65/N2: 0.23...67.5	Ar: 0.9...105/CO2: 0.6...65/N2: 0.6...67.5	16	0...60	DN15	15	SD6100
—	—	1	-10...50	—	18	SL0101
—	—	1	-10...50	—	18	SL5101

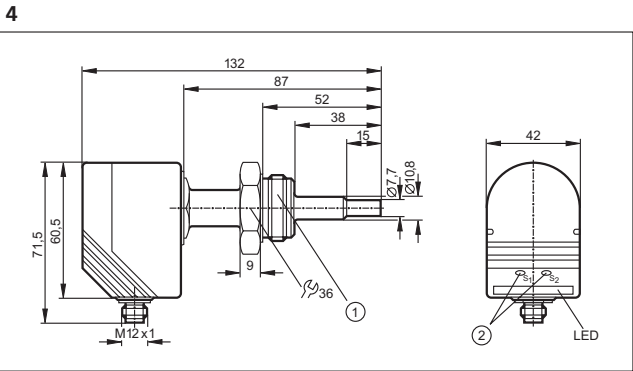
Ultrasonic flow rate meter for measuring flow and temperature

Measuring [NI/min / Nm³/h]	Setting range [NI/min / Nm³/h]	Pressure rating [bar]	Medium temp. [°C]	Process connec- tion	Drawing no.	Order no.
0...50	0.1...50.0	16	5...80	—	19	SU7000
0...100	0.2...100.0	16</				

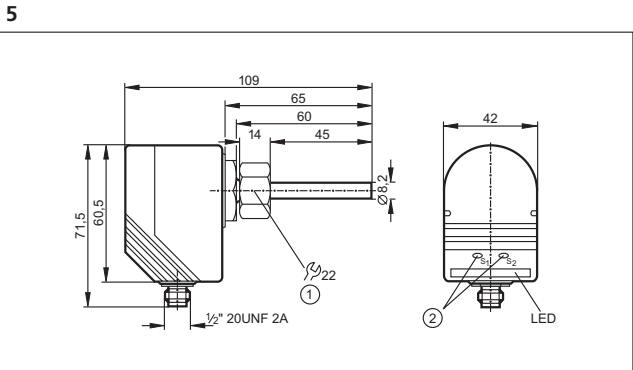
Scale drawings



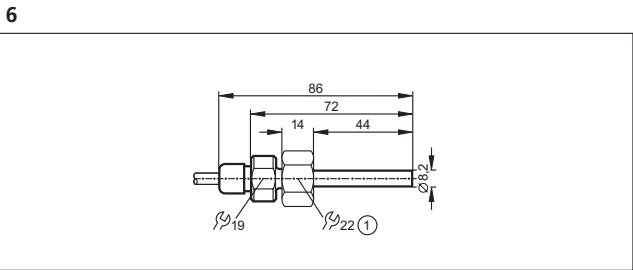
1: Aseptoflex thread, 2: setting pushbuttons



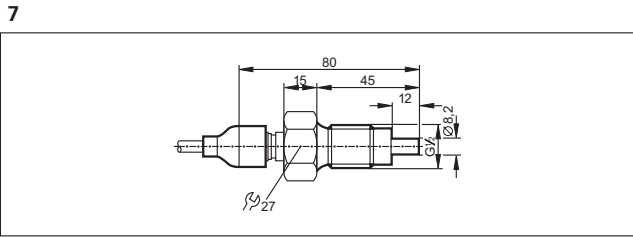
1: Aseptoflex thread, 2: setting pushbuttons



1: internal thread M18 x 1.5, 2: setting pushbuttons



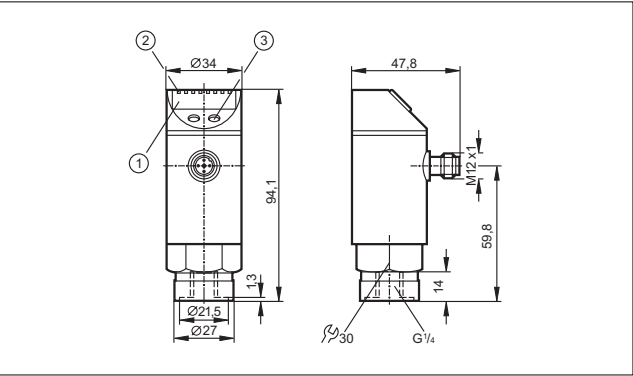
1: internal thread M18 x 1.5



Type	Process connection	Display LED	Measuring range [bar]	P _{overload max.} [bar]	P _{bursting min.} [bar]	U _b DC [V]	Output binary	Wiring diagram no.	Drawing no.	Order no.
M12 connector · Output function 2 x no / nc progr. or 1 x no / nc progr. + 1 x analogue · Wiring diagram no. 5										
	G1 A	7-segment	-0.5...10	50	150	20...30	–	5	7	PF2654
	G1 A	7-segment	-1.0...25	100	350	20...30	–	5	7	PF2653
	G1 A	7-segment	-1.0...100	200	650	20...30	–	5	8	PF2652
M12 connector · Output function 1 x no / nc progr. or 1 x no / nc progr. + 1 x analogue · Wiring diagram no. 6										
	–	4-digit	-1.00...25.00	100	350	18...32	–	6	9	PI2093
	–	4-digit	-1.00...10.00	50	150	18...32	–	6	9	PI2094
	–	4-digit	-1.000...4.000	30	100					

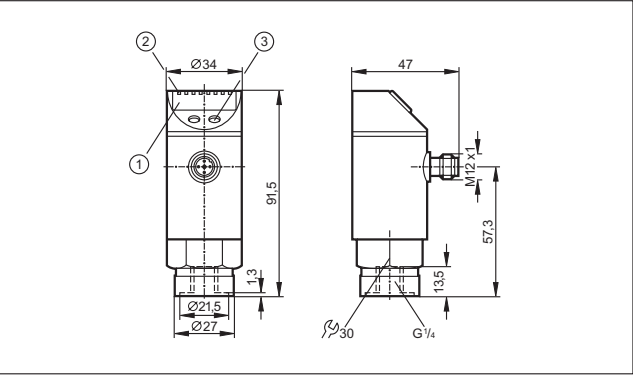
Scale drawings

5



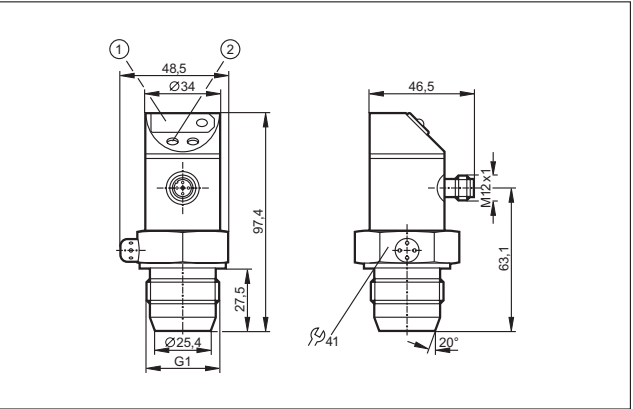
1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming button

6



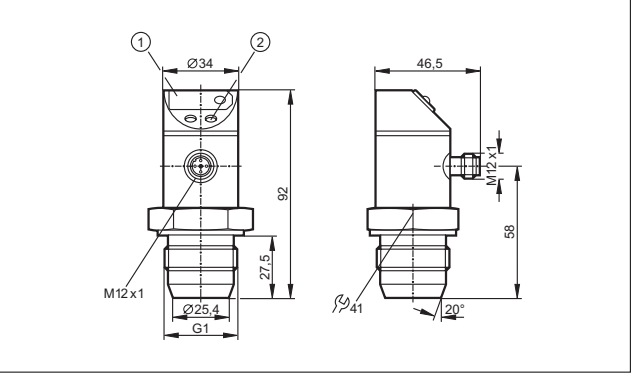
1: 4-digit alphanumeric display, 2: LEDs (display unit / switching status), 3: Programming button

7



1: 7-segment LED display, 2: Programming button

8

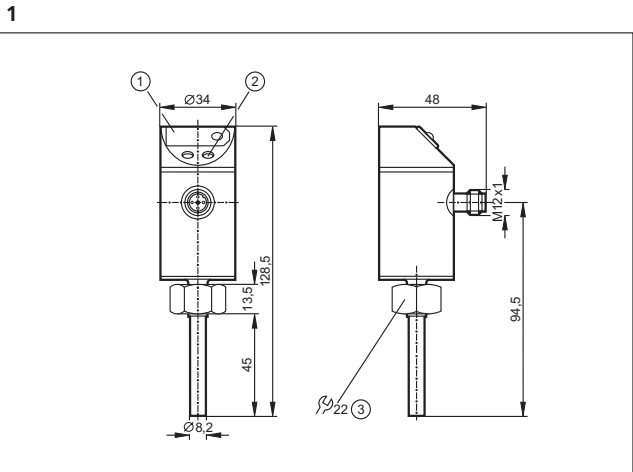


1: 7-segment LED

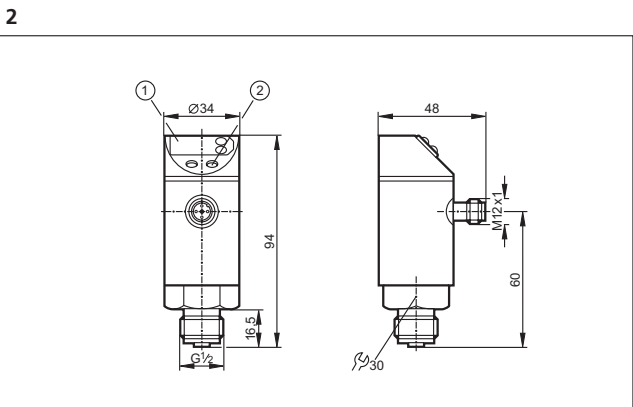
Accessories

Type	Description	Order no.
	Thermowell for temperature sensors, Ø 10 mm - G 1/2	E35010
	Progressive ring fitting for temperature sensors, Ø 10 mm - G 1/2	E30016
	Mounting set for direct adaption of temperature sensors TT to control monitors TR	E30017
	Clamp fitting Ø 6/8/10 mm - G 1/2 for temperature sensors TS / TT	E30018
	Mounting clamp, Ø 34 mm	E10017
	Protective cover, plastic	E30006
	Protective cover, stainless steel	E30104
	Thread cover for types TA	E30090
	Welding adapter G 1/2 - Ø 35 mm ball	E30055
	Welding adapter G 1/2 - Ø 45 mm collar	E30056
	Aseptoflex adapter, Clamp 1.5"	E33001
	Aseptoflex adapter, Clamp 2"	E33002
	Hygienic thermowell, Ø 10 mm	E34005

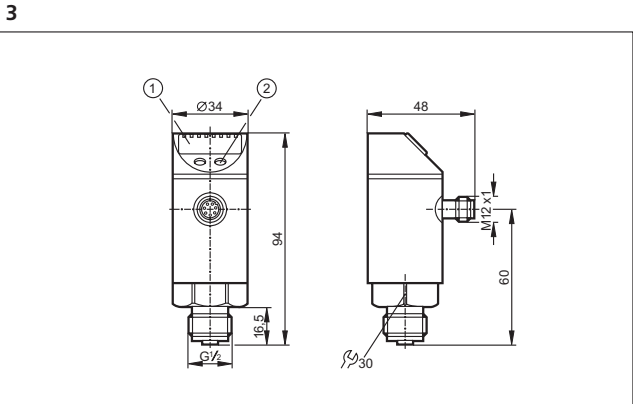
Scale drawings



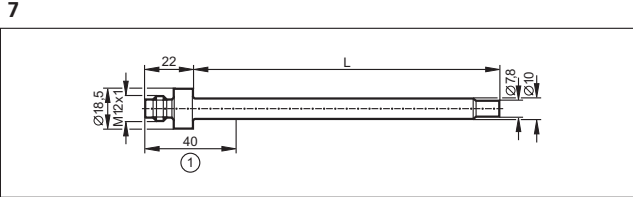
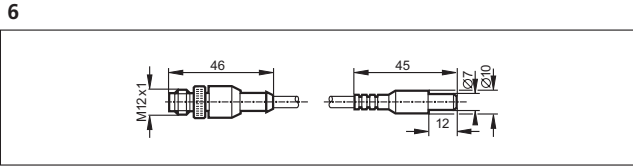
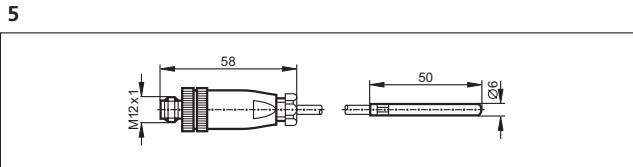
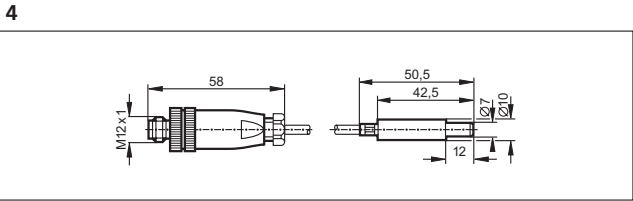
1: 7-segment LED display, 2: Programming button, 3: internal thread M18 x 1.5



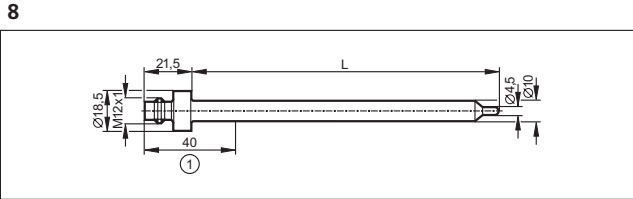
1: 7-segment LED display, 2: Programming button

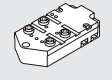
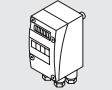


1: 4-digit alphanumeric display, 2: Programming button



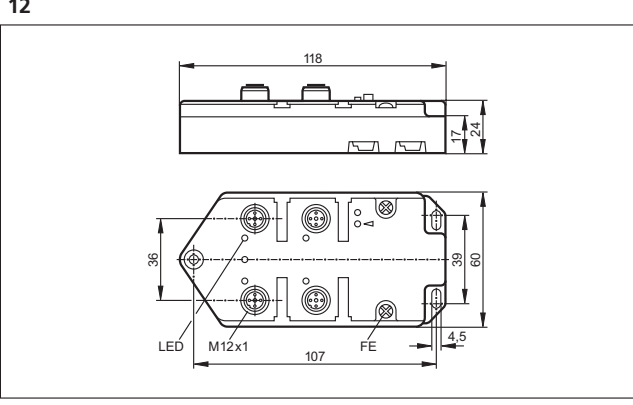
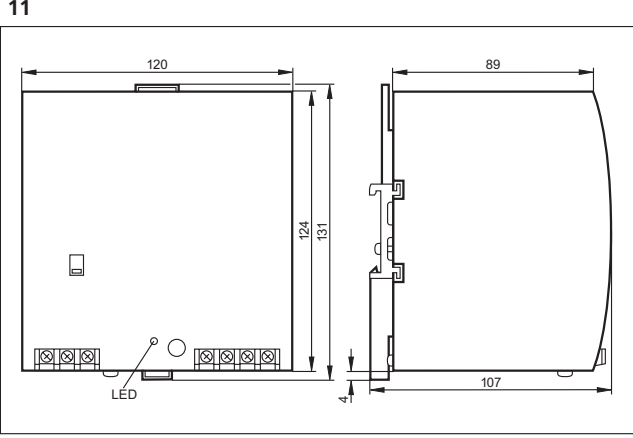
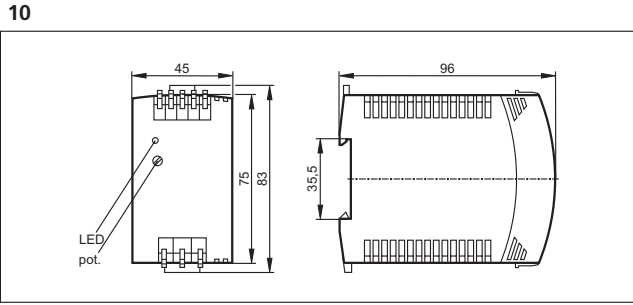
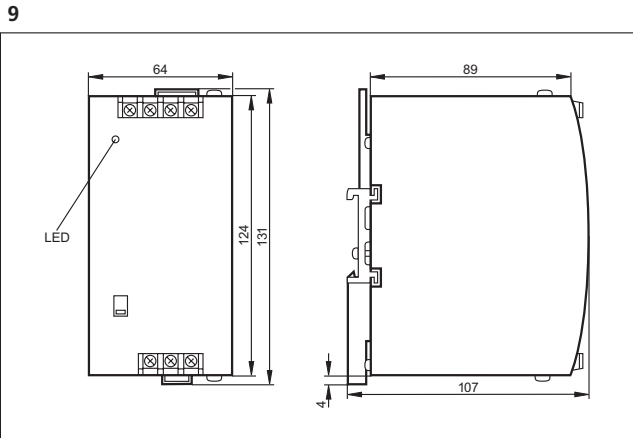
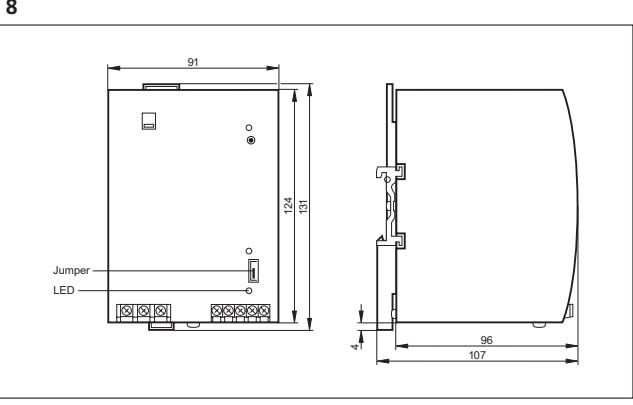
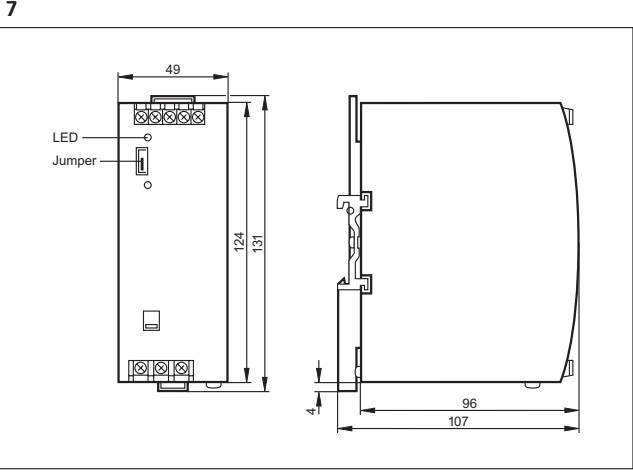
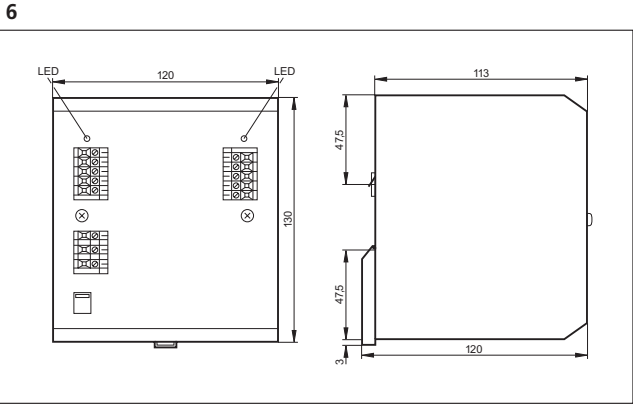
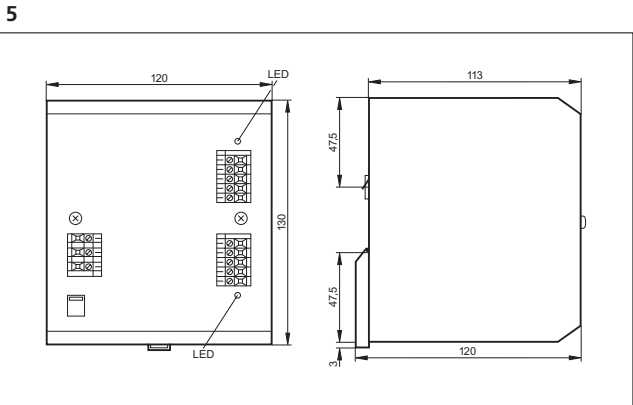
1: plug area



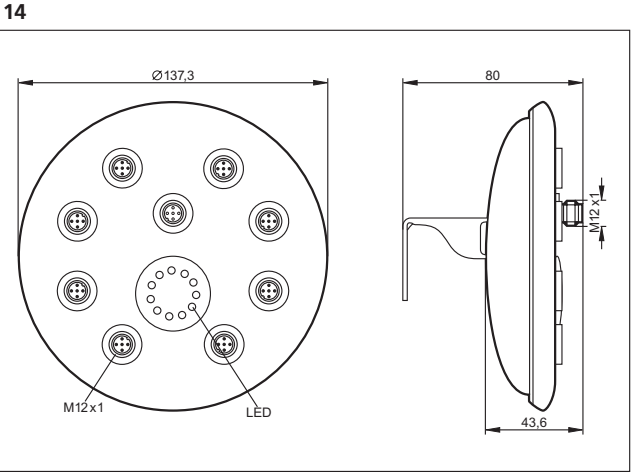
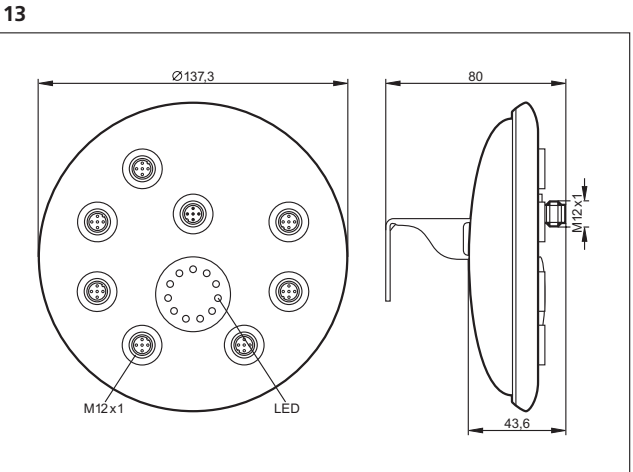
Type	Use	Description	Draw- ing no.	Order no.
	I/O modules for field applications	Active ProcessLine module · Version 2.1 with extended addressing mode · Protection rating IP 69K · high-grade stainless steel · Sockets M12 x 1	13	AC2904
	I/O modules for field applications	Active ProcessLine module · Version 2.1 with extended addressing mode · Protection rating IP 69K · high-grade stainless steel · Sockets M12 x 1	14	AC2910
	Splitter box modules for field applications	Passive splitter box AS-i ProcessLine · Protection rating IP 69K · high-grade stainless steel · Sockets M12 x 1	15	AC2900
	I/O modules for field applications	Passive compact module · Sockets M12 x 1	12	AC2413
	I/O modules for field applications	Active CompactLine module · IR addressing possible · Version 2.1 · Sockets M12 x 1	12	AC2451
	I/O modules for field applications	Active AS-i compact module · IR addressing possible · Version 2.1 · Sockets M12 x 1	16	AC2452
	I/O modules for field applications	Active CompactLine module · IR addressing possible · Version 2 · Sockets M12 x 1	12	AC2417
	I/O modules for field applications	Active CompactLine module · IR addressing possible · Sockets M12 x 1	12	AC2411
	I/O modules for field applications	Active CompactLine module · IR addressing possible · Sockets M12 x 1	12	AC2411
	I/O modules for field applications	Active CompactLine module · IR addressing possible · Version 2.1 · Sockets M12 x 1	16	AC2412
	I/O modules for field applications	Active ClassicLine module · IR addressing possible · Version 2.1 · Sockets M12 x 1	17	AC2505

Type	Description	Order no.
	Protective cap, M12	E70297
	FC splitter For order No. AC2904, AC2900	E70454
	FC splitter For order No. AC2904, AC2900	E70354
	Addressing cable for the addressing of active AS-i compact modules	E70123
	Viton compound / highgrade steel kit for ClassicLine Module	E70355
	Protective cap, M12	AC3004
	FC insulation displacement connector	
	AS-i flat cable	AC4000
	AS-i flat cable	AC4002
	AS-i flat cable	AC4007
	AS-i flat cable	AC4008
	bridging plug for safety modules for order No. AC005S	E70055
	Connection cable PC / AS-i safety monitor	E70015
	Connection cable AS-i safety monitor / AS-i safety monitor	E70025

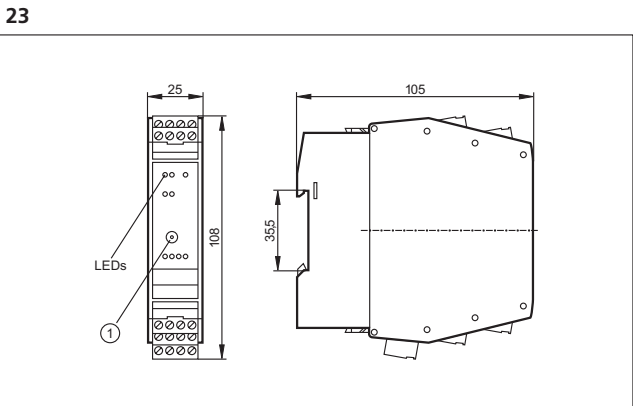
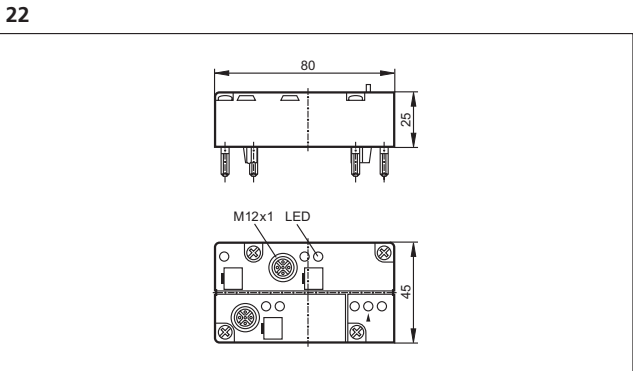
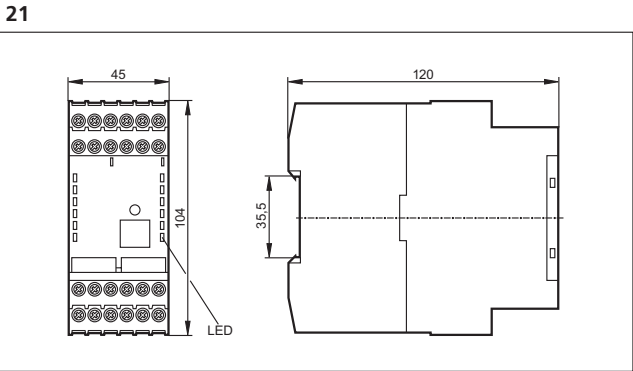
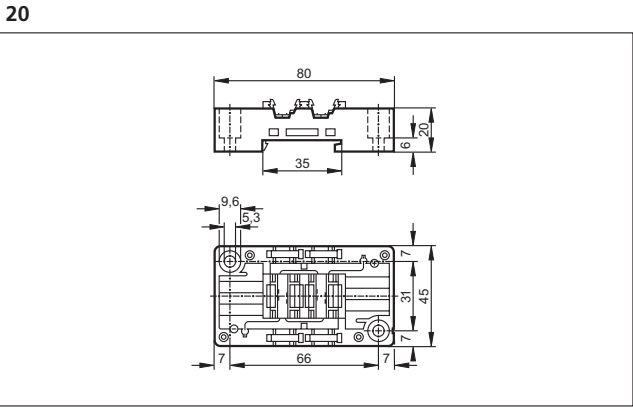
Scale drawings



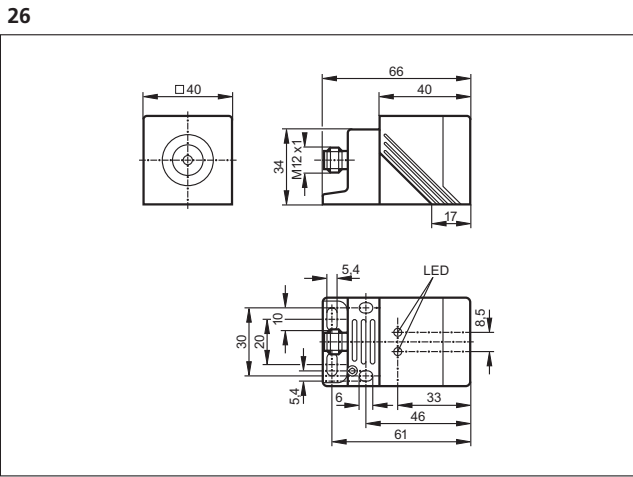
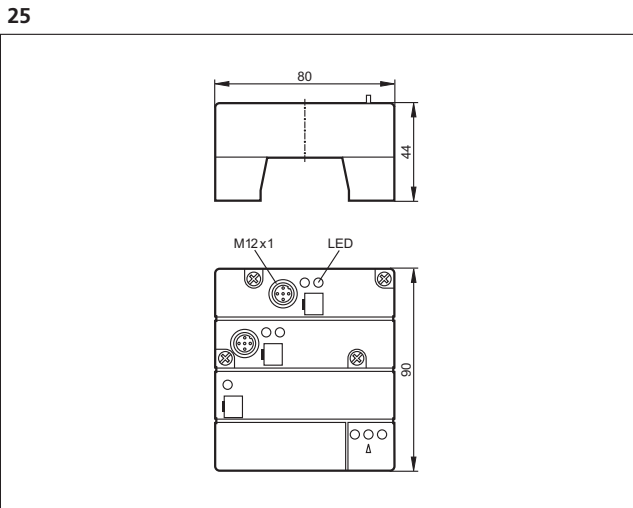
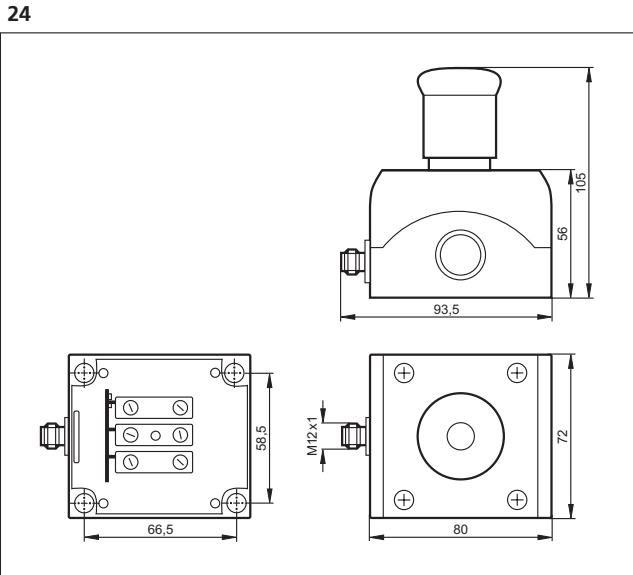
Scale drawings



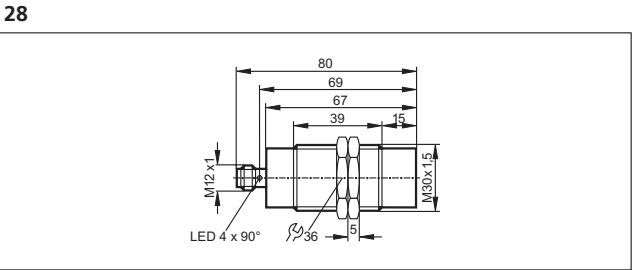
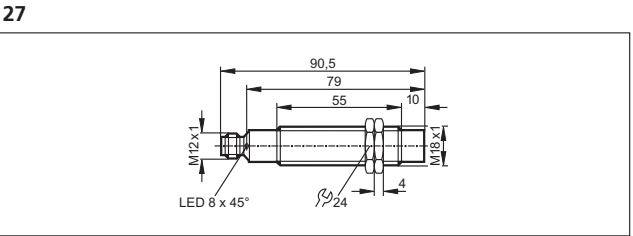
Scale drawings



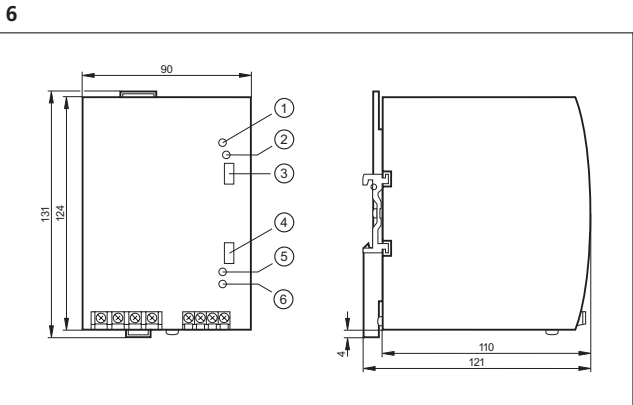
1: addressing socket



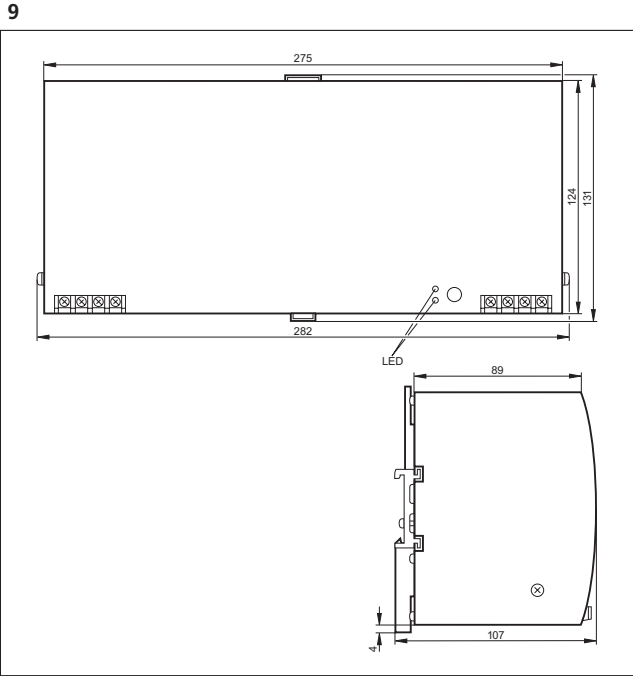
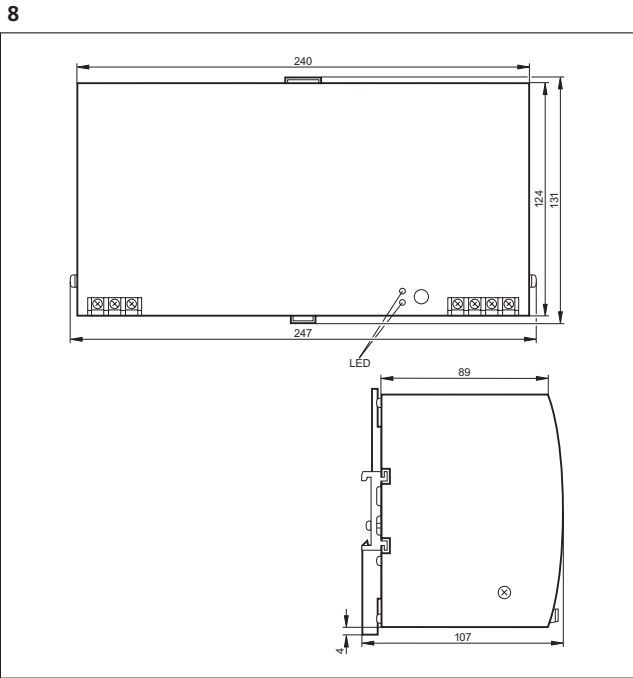
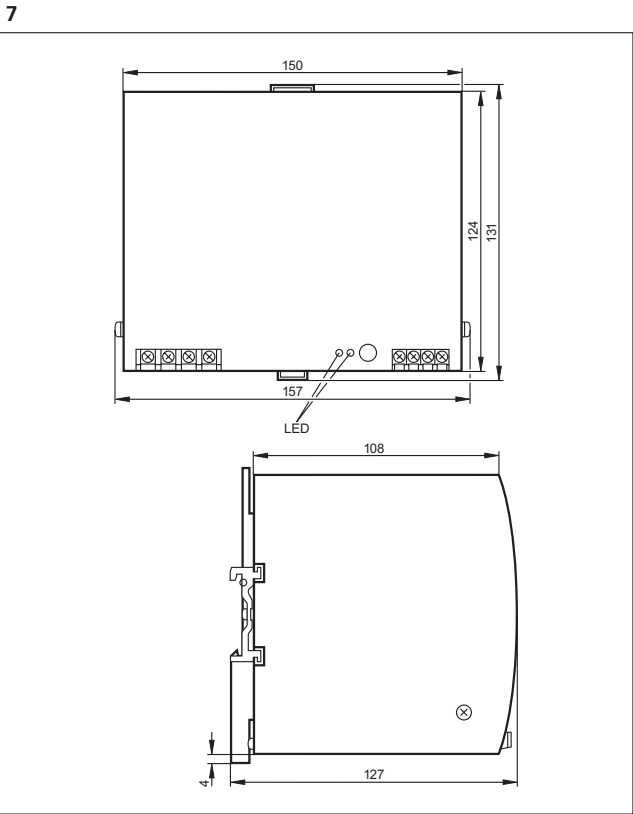
Scale drawings



Scale drawings

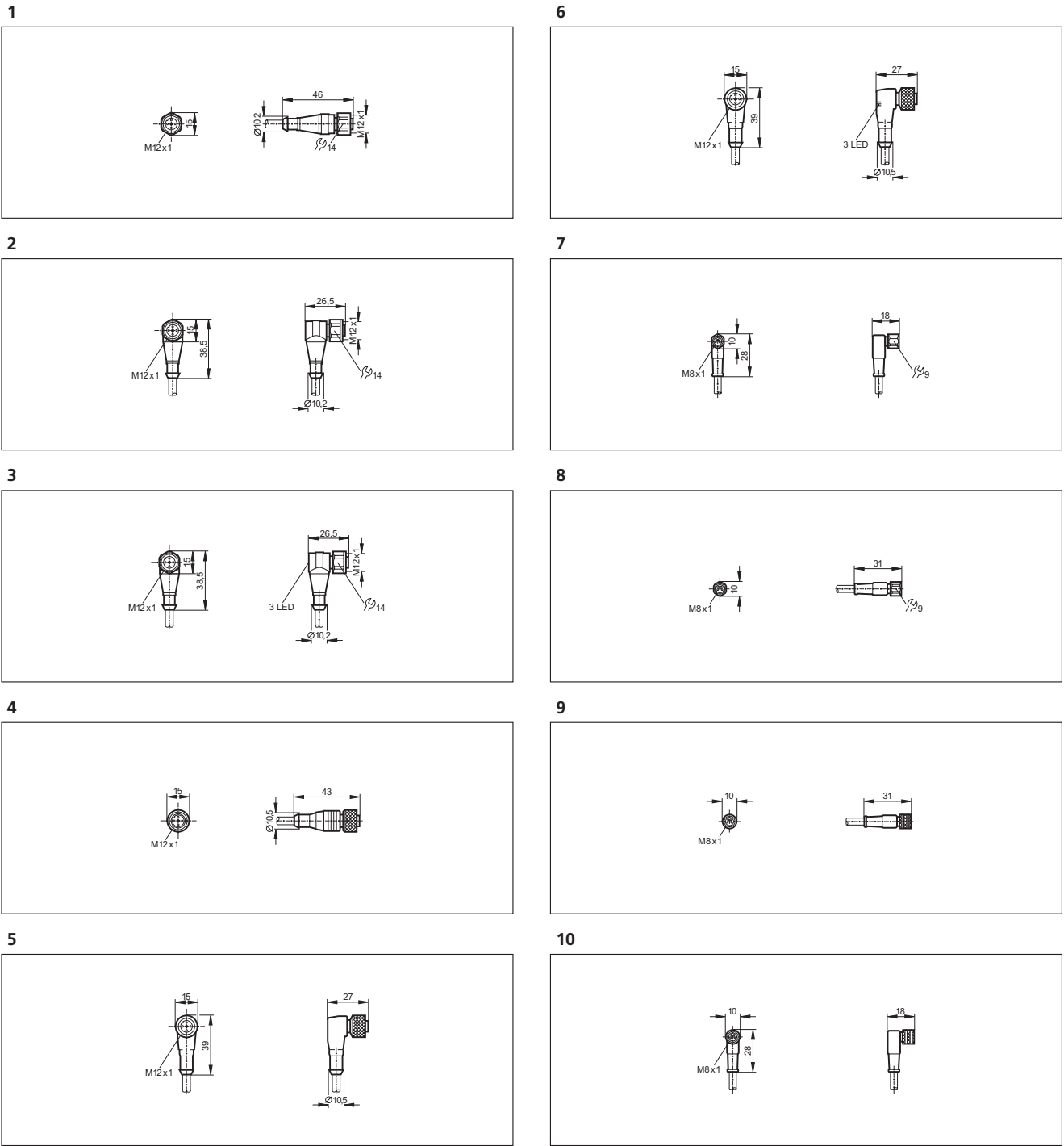


1: LED red, 2: reset push button, 3: jumper "overload performance", 4: jumper "single/parallel operation", 5: with pot., 6: LED green



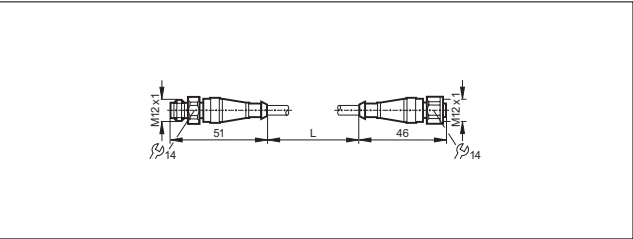
Type	Cable	Wire specification	Material housing/ nut	U [V]	T _a [°C]	Pro- tection	Gold- con- tacts	LEDs	Draw- ing no.	Order no.
Socket M12, 4-pole, 4-wire										
	5 m black PUR cable	4 x 0.34 mm ² Ø 5 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68	•	–	4	E11540
	5 m black PUR cable	4 x 0.34 mm ² Ø 5 mm	TPU / brass	250 AC 300 DC	-25...90	IP 68	•	–	5	E11542

Scale drawings

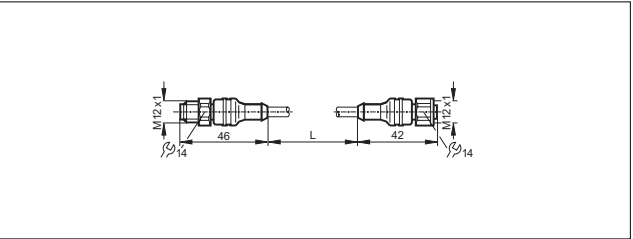


Scale drawings

23



24



visit our website:

www.ifm-electronic.com

■ Position sensors and object recognition

Inductive sensors
Capacitive sensors
Magnetic sensors,
cylinder sensors
Safety technology
Valve sensors
Photoelectric sensors
Object recognition
Encoders
Evaluation systems,
power supplies
Connection technology

● Fluid sensors and diagnostic systems

Level sensors
Flow sensors
Pressure sensors
Temperature sensors
Diagnostic systems
Evaluation systems,
power supplies
Connection technology

▲ Bus systems

Bus system AS-interface
Power supplies
Connection technology

▲ Identification systems

DataMatrix code-reading
systems
RF-identification systems
Power supplies
Connection technology

▲ Control systems

Control systems
for mobile vehicles
Connection technology

ifm electronic – close to you!