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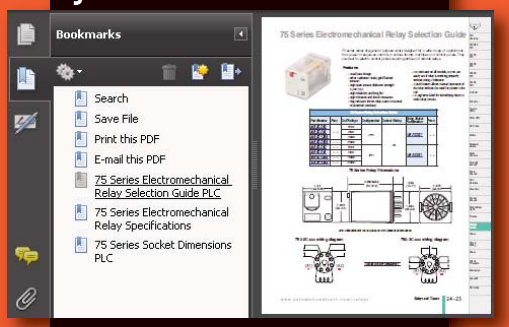

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- **Use bookmarks to save, search, print or e-mail the catalog section**
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Our Sensors at a Glance . . .

Proximity Sensors Section 18

- Inductive, capacitive and ultrasonic technologies
- 3 mm to 30 mm round with standard sensing distance
- 8 mm to 30 mm round with double/triple sensing distance
- Rectangular formats
- Stainless steel round models
- AC and DC supply voltages available
- 2-, 3-, and 4-wire output configurations
- Embedded cables and quick-disconnects in M8 and M12

Photoelectric Sensors

Section 19

- 18 mm threaded round, metal or plastic with diffuse, reflective, through-beam and background suppression sensing
- 12 mm threaded round in diffuse, reflective and through-beam styles
- 5 mm threaded round in diffuse and through-beam styles
- Straight or right-angle optics
- Rectangular formats with diffuse, reflective, through-beam and background suppression sensing
- Light screens

Fiber Optic Sensors Section 19

- Supreme noise protection and small sizes for tough applications
- 18 mm round and DIN-rail amplifiers
- 3, 4, 6 and 7 mm fiber heads available
- 2.2 mm diameter cuttable plastic fibers

Limit Switches Section 20

Over 50 different models

- IEC switches with eight standard actuators
- Heavy-duty die-cast aluminum models
- Double-insulated PBT non-metal body models
- Miniature PBT non-metal body models

High-Quality, Rugged Encoders Section 21

- Light-duty encoders, 6 mm solid or 8 mm hollow shafts with 38 mm diameter bodies,incremental resolutions from 100 to 2,500 pulses/revolution
- Medium-duty encoders, 8 mm solid or hollow shafts with 50 mm diameter bodies, incremental resolutions from 60 to 2,500 pulses/revolution, absolute resolutions from 256 to 1,024 pulses/revolution
- Heavy-duty encoders, 10 mm solid shafts with 78 mm diameter bodies, incremental resolutions from 100 to 1,000 pulses/revolution, IP65 rated

Current Switches and Transducers Section 22

- ACT series **current transducers** have jumper-selectable current input ranges and 4-20mA or 0-10 VDC outputs
- ACTR series transducers combine a current transformer and true RMS signal conditioner
- ACS series **current operated switches** offer discrete outputs for low-cost alarming
- ACSX series switches include field-adjustable time delay to minimize nuisance trips

ACUAMP™

Pressure Sensors Section 23

- PSD series electronic **pressure switches** are an ideal alternative to mechanical piston pressure switches; available in 145, 1450 and 5800 psi ranges.
- PTD series compact **pressure and vacuum transmitters** provide an analog output for reliable pressure indication; available in 15, 30, 100, 500, 1,000 and 3,000 psi ranges, or 0 to 100 inches water column, with 4-20 mA or 0-10V output options

prosense™ by AUTOMATIONDIRECT

Temperature Switches & Transmitters, RTD Probes / Thermowells Section 24

prosense™ by AUTOMATIONDIRECT

- TSD25 series high-performance **temperature switches** offer simple setup for temperature monitoring and control; Operating temperature range is -4 to 284°F (-20 to 140°C)
- TTD25 series temperature transmitters are compact measuring devices that provides a 4-20mA analog output over ranges of 0 to 100°C or 0 to 300°F.
- Use 4-wire 100 ohm platinum, Class A **RTD probes** and meet DIN EN 60751.
- **Thermowells** allow RTD probes to be inserted and removed without stopping or shutting down the process.

Name Brand Quality at an AutomationDirect Price

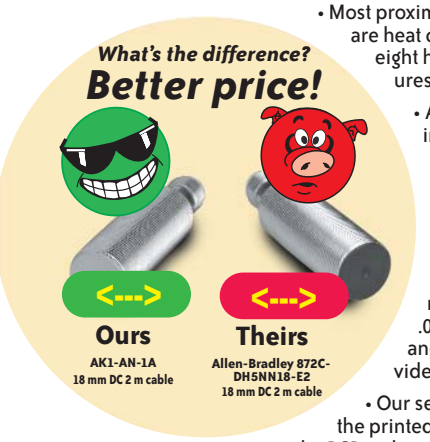
30-day money-back guarantee

Why buy a proximity sensor from AutomationDirect?

A sensor may only cost $16.75, but it may be responsible for millions of dollars worth of product for you or your customer. That is why AUTOMATIONDIRECT only works with world class manufacturing companies that have been in the industry for decades, and operate in hundreds of thousands of installations around the world. Our customers can rest easy knowing we work with the best.

All of our sensors are certified by CE to ensure the highest quality, and most are certified by UL and CSA. Here are a few examples of how serious we are when it comes to design and manufacturing quality:

- Every proximity sensor is tested five times during the manufacturing process to ensure out of the box operation.
- Most proximity and photoelectric sensors are heat cycled from -25˚C to 55˚C for eight hours to eliminate startup failures.
- A vacuum of 30 mBar is pulled in the resin filling process of every proximity sensor to eliminate air bubbles which may form in the epoxy and cause long-term maintenance problems or short-term failures.
- Every proximity sensor has a resistor that is laser trimmed to .001 inches to ensure repeatable and accurate detection and provide you better product stability.
- Our sensor suppliers manufacture the printed circuit board (PCB), populate the PCB with components, and assemble and test the product from start to finish to ensure the highest quality.



But actions speak louder than words. That's why we back every sensor with a **30-day, money-back guarantee, and all proximity sensors carry a limited lifetime warranty**. All this results in a return rate that is near zero.

CHECK OUT OUR PRICES

Proximity Sensors	AutomationDirect	VS.	Allen-Bradley
5 mm three-wire DC unshielded prox with pico Q/D	$35.50 PD1-AP-1F		$124.00 871C-D1NP5-P3
8 mm three-wire DC unshielded prox with pico Q/D	$18.50 AE1-AN-1F		$87.00 872C-D3NN8-P3
12 mm two-wire DC shielded prox with 2 m cable	$18.00 AM1-A0-1A		$74.00 872C-D3NE12-A2
18 mm three-wire NPN DC shielded prox with 2 m cable	$18.50 AK1-AN-1A		$78.00 872C-DH5NN18-E2
12 mm four-wire with Q/D stainless steel shielded	$38.00 PMW-0N-1H		$101.00 871TM-DH2NN12-D4
18 mm shielded AC prox with 2 m cable	$31.00 VK1-A0-1B		$95.00 872C-A5N18-A2

Q/D = quick disconnect

All prices are U.S. published prices. AutomationDirect prices are from March 2010 Price List Prices and specifications may vary by dealer and configuration. Allen-Bradley prices are from http://shop.rockwellautomation.com 9/29/09. Prices subject to change without notice.

Round Proximity Sensors For All Applications

All the features you expect

These proximity sensors provide benefits to our customers on everything from price to quality:

- **Super low prices compared to the competition.** This allows OEM-like pricing on single item purchases. In fact, some of our sensors are actually cheaper than competitors' cables.
- **2-wire designs on the most popular models.** This makes for easier and faster terminations (i.e., one less wire to terminate). Faster wiring time and fewer termination points (materials) result in lower system costs. This technology works with sinking or sourcing devices, eliminating the need for multiple sensors, since one sensor works both ways.
- **Most sensors are available in quick-disconnect cable versions.** Proximity sensors are subject to physical damage from machine overtravel, etc. and quick-disconnect sensors make for fast and easy replacement. Also, troubleshooting is much faster with quick-disconnect devices, as the user need only unscrew the connector and change out the sensor. This eliminates the need for disconnecting wires and cutting wire ties, and speeds up the replacement process with much less room for error.

What do 2-, 3- or 4-wire outputs mean to me?

	Benefits
2-wire	• Will work with sinking or sourcing devices • Only 2 wires to terminate
3-wire	• Most popular output - familiar to most users • Must select between NPN and PNP outputs
4-wire	• Allows configurability in one device • May have both NPN/PNP selection or NO/NC selection. Allows user to stock one part for numerous applications.

- **Shielded or unshielded sensors are available for mounting variations.** Shielded versions allow flush mounting, but limit the target detection range, while unshielded versions do not allow flush mounting, but offer greater sensing distance and area.
- **All sensors feature electrical protection for short circuit, reverse polarity, and transient noise.** Whether the sensor is initially wired wrong, or wired into a noisy environment, it will still operate properly.
- **A lifetime warranty means you can install your proximity sensor and be assured of its quality and endurance.**

Sometimes a round proximity sensor will not fit a square hole

Rectangular sensors are the answer

Have you ever tried using a round sensor or short body sensor, and not been able to make it fit? We offer rectangular sensors to meet your needs. The same technology found in our standard round proximity sensor is put into a rectangular housing, including sensing distances, electrical protection and switching frequencies.

We currently offer the most popular formats available.

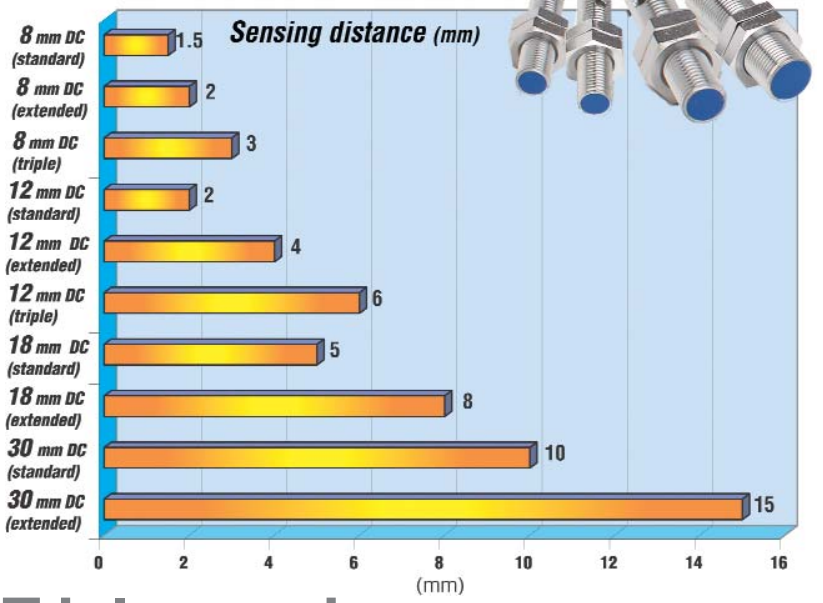
Extended and Triple-sensing Distances for Tough-to-reach Applications

8 mm and 12 mm triple-sensing distance sensors

Why extended distance?

In many applications, it might not be possible to mount a sensor close to the sensed object. In those cases, longer sensing distances are needed. For instance:

- Longer sensing distances may eliminate the need to buy more expensive high temperature sensors. If a sensor is placed too close to a hot temperature source, the sensor will fail quicker and require more maintenance.
- Mounting the sensor further from the detection object may eliminate unneeded contact with the sensor, which will extend the life of the sensor.



Stainless Steel Triple-sensing Proximity Sensors

IP68 rated:
to 290 psi or 669 ft. of water

Three-wire DC

With a unique sensing technology, this IP68 rated sensor (embedded cable version only) can be mounted under water up to 290 psi (or 669 feet of water). It will last a lifetime and pay for itself over and over again. This technology has many benefits:

One-piece stainless steel body

The sensing technology allows object detection through stainless steel material. The sensor can be located in the harshest conditions, including oil or water submersion up to 290 psi (20 bars).

Triple sensing

This sensor offers three times the sensing distance of any standard proximity sensor for tremendous flexibility in your design.

Virtually the same sensing distance for all metals

Sense iron, aluminum, brass, etc., all at the sensor-rated distance. Have you ever chosen a sensor with 10 mm sensing distance and had to reduce it to 2 mm or less because you were sensing an aluminum object? With this sensor, you can design the installation to use the entire 10 mm sensing distance.

CHECK OUT OUR PRICES

Proximity Sensor

12 mm stainless, three-wire shielded DC with micro quick-disconnect

	AutomationDirect PMW-AP-5H	VS.	Allen-Bradley 871TM-DN2NP12-D4
Sensor body	Stainless		Stainless
Sensor face	Stainless		Stainless
Detect all metals at same distance	Yes		No
Sensing distance	6 mm		2 mm
Rating	IP67		IP67
Price	$83.75		$227.00

AutomationDirect prices are from March 2010 Price List. Allen-Bradley prices are from http://shop.rockwellautomation.com 9/29/09.

We sell good proximity sensors at great prices – and we back them up!

AutomationDirect Lifetime Warranty

Registration required

For inductive proximity sensors sold to the Original User for the lifetime of the original application.

The following terms apply to the LIFETIME WARRANTY in addition to the General Terms:

1. This warranty is available only to AutomationDirect's authorized Value Added Resellers and to the Original User. In the event the ownership of the product is transferred to a person, firm, or corporation other than the Original User, this WARRANTY shall terminate.

2. This WARRANTY is applicable only to the original installation of the product. In the event the machinery, equipment, or production line to which the product is connected, or on which it is installed, is substituted, changed, moved or replaced, the WARRANTY shall terminate.

3. This WARRANTY shall be valid only if the product was purchased by the Original User from AutomationDirect, or from an authorized AutomationDirect Value Added Reseller, or was an integral part of a piece of machinery and equipment obtained by the Original User from an original equipment manufacturer, where the part was purchased by the original equipment manufacturer directly from AutomationDirect or from an authorized AutomationDirect Value Added Reseller.

Purchaser's remedies

This remedy shall apply to all WARRANTIES. If an AutomationDirect Value Added Reseller desires to make a WARRANTY claim, the Value Added Reseller shall, if requested by AutomationDirect, ship the product to AutomationDirect's facility in Cumming, GA postage or freight prepaid. If the Original User desires to make a WARRANTY Claim, they shall notify the authorized Value Added Reseller from whom it was purchased or, if purchased directly from AutomationDirect, shall notify AutomationDirect and, if requested by AutomationDirect, ship the Product to AutomationDirect's facility in Cumming, GA postage or freight prepaid. AutomationDirect shall, at its option, take any of the following two courses of action for any products which AutomationDirect determines are defective in materials or workmanship.

1. Repair or replace the product and ship the product to the Original User or to the authorized AutomationDirect Value Added Reseller, postage or freight prepaid; or

2.-Repay to the Original User that price paid by the Original User; provided that if the claim is made under the lifetime warranty, and such product is not then being supplied by AutomationDirect, then the amount to be repaid by AutomationDirect to the Original User shall be reduced according to the following schedule:

Number of Years Since Date of Purchase by Original User	Percent of Original Purchase Price To Be Paid by AutomationDirect
10	50 percent
15	25 percent
20	10 percent
More than 20	5 percent

REMEDIES OF PURCHASER'S AND VALUE ADDED RESELLERS SHALL BE LIMITED EXCLUSIVELY TO THE RIGHT OF REPLACEMENT, REPAIR OR REPAYMENT AS PROVIDED ABOVE AND DOES NOT INCLUDE ANY LABOR COST OR REPLACEMENT AT ORIGINAL USER'S SITE. AUTOMATIONDIRECT.COM SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF ANY WARRANTY, EXPRESSED OR IMPLIED, APPLICABLE TO THE PRODUCT, INCLUDING WITHOUT LIMITATION, ANY DAMAGES RESULTING FROM PROPERTY DAMAGE, PERSONAL INJURY OR BUSINESS INTERRUPTION, EVEN IF NOTIFIED OF THE POSSIBILITY OF SUCH DAMAGES.

Inductive proximity sensors warranty form may be obtained online at:

http://www.automationdirect.com/static/specs/proxwarranty.pdf

Proximity Sensor Lineup

Proximity sensors allow non-contact detection of objects. They are used in many industries, including manufacturing, robotics, semiconductor, etc. Inductive sensors detect metallic objects while capacitive sensors detect all other materials. Ultrasonic sensors detect all materials by using sound wave reflections to determine presence.

STAINLESS STEEL

Miniature
(3, 4, 5 mm)

PY & PD SERIES
Three-wire DC
3 mm prox, from $64.75
4 mm prox, from $64.75
5 mm prox, from $35.50
(quick-disconnect)

Sensing distance:
- Standard

Starting from $35.50

start on pp. 18-14

18 mm
round

AK SERIES
Two- and three-wire DC, embedded cable or M12 quick-disconnect

Sensing distance:
- Standard, from $18.50
- Extended, from $25.00

Starting from $18.50

p. 18-22

8 mm x 8 mm
rectangular

CR8 SERIES
Three-wire DC with embedded cable or M8 quick-disconnect

Sensing distance:
- Standard, from $20.75
- Extended, from $28.25
- Triple, from $43.00

Starting from $20.75

p. 18-34

STAINLESS STEEL

Stainless steel
triple sensing range

PKW, PTW and PMW SERIES
Three-wire DC,one-piece body, virtually same sensing distance of all metals, Q/D version is IP67 rated,cable version is IP68 to 290 psi

Sensing distance: **Triple**
- 12 mm prox, from $83.75
- 18 mm prox, from $93.25
- 30 mm prox, from $108.50

Starting from $83.75

p. 18-26

8 mm
round

AE SERIES
Three-wire DC with embedded cable, M8 or M12 quick-disconnect

Sensing distance:
- Standard, from $18.50
- Extended, from $25.00
- Triple, from $50.25

Starting from $18.50

p. 18-16

30 mm
round

AT SERIES
Two- and three-wire DC, IP65 rating, embedded cable or M12 quick-disconnect

Sensing distance:
- Standard, from $25.00
- Extended, from $28.00

Starting from $25.00

p. 18-24

10 mm x 16 mm
rectangular

DR10 SERIES
Three-wire DC with embedded cable or M12 quick-disconnect, IP67 rating

Sensing distance:
- Standard, from $25.75
- Extended, from $25.75

Starting from $25.75

p. 18-36

STAINLESS STEEL

Stainless steel
round standard

PKW and PMW SERIES
Four-wire DC with M12 quick-disconnect, IP67 rating

Sensing distance: **Standard**
- 12 mm prox, from $38.00
- 18 mm prox, from $41.25

Starting from $38.00

p. 18-26

12 mm
round

AM SERIES
Two- and three- wire DC, embedded cable or M12 quick-disconnect

Sensing distance:
- Standard, from $18.50
- Extended, from $25.00
- Triple, from $53.25

Starting from $18.50

p. 18-19

5 mm x 5 mm
rectangular

CR5 SERIES
Three-wire DC, IP67 rating, embedded cable or M8 quick-disconnect

Sensing distance:
- Standard, from $29.25
- Extended, from $48.25

Starting from $29.25

p. 18-33

12 mm x 27 mm
rectangular

APS4 SERIES
Three-wire DC with embedded cable, IP67 rating

Sensing distance: **Standard,** from $16.75

Starting from $16.75

p. 18-37

AC prox
(12, 18, 30 mm)

V SERIES
Two-wire AC with embedded cable or quick-disconnect, 20-253 VAC input signals

Sensing distance: **Standard**
- 12 mm, from $35.00
- 18 mm, from $31.00
- 30 mm, from $37.00

Starting from $31.00

p. 18-31

p. 18-38

30 mm
capacitive

CT SERIES
Three-wire DC with embedded cable

Sensing distance: **Standard**

p. 18-43

Ultrasonic

SU & TU SERIES
DC with discrete or analog output, embedded cable or quick-disconnect, IP67rating

Sensing distance: **up to 2,500 mm**

- 18 mm, from $280.25
- 30 mm, from $299.75

p. 18-47

UHZ SERIES
DC, discrete output, through-beam pair, embedded cable

Sensing distance: **up to 300 mm**

- Rectangular, from $159.00

p. 18-16

Short body
round

AE & AM SERIES
3-wire DC,embedded cable or quick-disconnect, IP67 rating

Sensing distance: **Extended**

- 8 mm, from $31.00
- 12 mm, from $31.00

p. 18-40

Proximity
with analog output

AE, AM, AK & AT ANALOG SERIES
DC with analog output (voltage/current), embedded cable or quick-disconnect, IP67 rating

Sensing distance: **Triple**

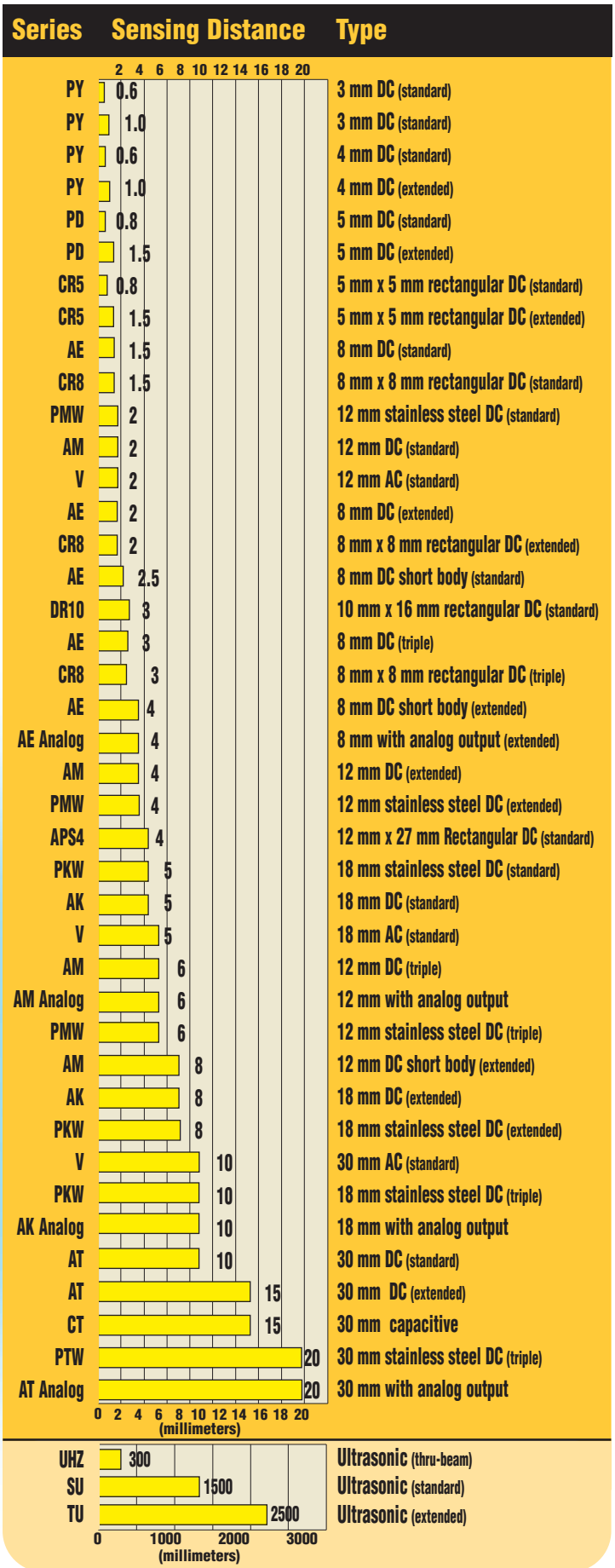
- 8 mm, from $152.75
- 12 mm, from $93.25
- 18 mm, from $97.25
- 30 mm, from $119.25

Q/D
extension cables

CDP SERIES
Axial or right-angle connectors, M8 or M12 connector sizes, 1 m or 3 m lengths, IP67 rating

start on pp. 19-71

Our Proximity Sensors - at a glance



How do I Choose the Right Sensor?

All applications have certain specific needs, but, in general, the following steps will help you choose the correct sensor for your application:

Step 1:

What is the sensing distance required?

The sensing distance is the distance between the tip of the sensor and the object to be sensed. The selection guide and the specifications table for each sensor family lists the sensing distances.

Some things to keep in mind are:

A. In many applications, it is beneficial to place the sensor as far as possible from the sensing object due to temperature concerns. If a sensor is placed too close to a hot temperature source, the sensor will fail quicker and require more maintenance.

Round sensors

Greater distance may be achieved with extended and triple range sensors. In many applications, a sensor may not be mountable close to the sensed object. In this case, longer sensing distances are needed. Extended sensing distance sensors are offered in 8mm to 30mm dimeters, and triple sensing distance sensors in 8mm and 12mm formats.

Rectangular sensors

In many cases, using an extended distance sensor to get the sensor farther away from the detected object can be beneficial to the life of the sensor. For example, without an extended distance sensor you may not be able to place the sensor close enough to the detectable object, or you may need to buy more expensive high temperature sensors.

Another example would be a mechanical overshoot situation, where mounting the sensor farther from the detection object may eliminate unneeded contact with the sensor, thereby extending the life of the sensor.

These are just a few examples, but the benefits of using extended distance sensors are obvious in many applications. Think of how extended distance sensors could save you time and money in your application.

B. The material being sensed (i.e. brass, copper, aluminum, steel, etc.) makes a difference in the type of sensor needed.

Note: If you are sensing a non-metallic object, you must use a capacitive sensor.

The sensing distances specified in this catalog were calculated using FE360 material. Many materials are more difficult to sense and require a shorter distance from the sensor tip to the object sensed.

If sensing a material that is difficult to sense, you may consider using our unique stainless steel sensing technology. This will measure virtually all materials at the specified sensing distances.

Step 2:

How much space is available for mounting the sensor?

Have you ever tried using a round sensor or short body version, and not been able to make it fit? Our rectangular sensors can meet your needs. The same technology used in a standard round proximity sensor is enclosed in a rectangular housing. This technology includes sensing distances, electrical protection and switching frequencies similar to round sensors.

Step 3:

Is a shielded or unshielded sensor needed?

Shielded and unshielded sensors are also referred to as embeddable and non-embeddable. Unshielded sensors allow longer sensing distances but shielded sensors allow flush mounting.

Shielded sensor (embeddable)

Unshielded sensor (non-embeddable)

Step 4:

Consider environmental placement concerns. Will the sensor be placed underwater, in a high-temperature environment, continually splashed with oil, etc.? This will determine the type of sensor you may use. In the selection table and in the specification tables for each sensor family, we list the environmental protection degree ratings. Most of our sensors are rated IEC-IP67 and others are rated IP65 or IP68.

These ratings are defined as:

IP65: Protection from live or moving parts, dust, and protection from water jets from any direction.

IP67: Protection from live or moving parts, dust, and protection from immersion in water.

IP68: Protection from live or moving parts, dust, and protection from submersion in water under pressure.

Step 5:

What is the sensor output connected to?

Note: If using AC sensors, please skip this step.

The type of output required must be determined (i.e., NPN, PNP or analog). Most PLC products will accept either output. If connecting to a solid state relay, a PNP output is needed.

Step 6a:

Do I need 2, 3, or 4-wire discrete outputs?

This is somewhat determined by what the sensor will be connected to. Some simple guidelines to use are:

Type	Guidelines
2-wire	• Will work with sinking or sourcing . . . devices. • Only 2 wires to terminate. • Higher leakage current.
3-wire	• Most popular output. Familiar to most users. (Must select between NPN and PNP outputs.)
4-wire	• Allows configurability in one device. . . May have both NPN/PNP selection or NO/NC selection. Allows user to stock one part for numerous applications.

Step 6b:

Do I need analog outputs?

This is determined by the sensor application and what the sensor will be connected to. Sensors with analog outputs produce an output signal approximately proportional to the target distance.

Type	Guidelines
1-5mA	available on AM9, AK9 and AT9 series analog inductive sensors
4-20mA	available on AM9, AK9 and AT9 series analog inductive sensors
0-5VDC	available on AM9, AK9 and AT9 series analog inductive sensors
0-10VDC	available on AE9, AM9, AK9 and AT9 series analog inductive sensors and SU and TU ultrasonic sensors

Step 7:

Determine output connection type.

Do you want an axial cable factory attached to the sensor (pigtail) or a quick-disconnect cable?

There are many advantages to using a quick-disconnect cable, such as easier maintenance and replacement. All proximity sensors will fail in time and using a Q/D (quick-disconnect) cable allows for simple replacement.

Factory attached axial cables come in a 2 meter length. CD08/CD12 Q/D cables come in 2 meter, 5 meter , and 7 meter lengths. Extension cables are available in 1 meter and 3 meter lengths to extend the length of the standard Q/D cables.

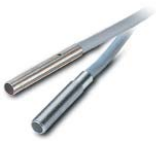
Q/D cables are offered in PVC and PUR jackets for meeting the requirements of all applications. Axial cables typically come with a PVC jacket. PVC is a general purpose insulation while PUR provides excellent oxidation, oil and ozone resistance. PUR is beneficial if the cable is exposed to oils or placed in direct sunlight.

There are also advantages to a factory attached axial cable:

Cost: The cable is integrated into the sensor and included in the price. Q/D cables must be purchased separately.

Environmental impact: Since the cable is sealed into the sensor, there is less chance of oil, water or dust penetration into the sensor, which could cause failure.

Proximity Sensor Selection Guide




Specifications	PY Stainless Steel DC	PD Stainless Steel DC	AE Series DC	AM Series DC
Description	Miniature inductive prox sensors, 3mm and 4mm, DC, stainless steel	Miniature inductive proximity sensors, 5mm, DC, stainless steel	Inductive proximity sensors, 8mm, DC, metal, standard and short body lengths	Inductive proximity sensors, 12mm, DC, metal, standard and short body lengths
Sensing Distances	Standard distance: 0.6mm Extended distance: 1mm	Standard distance: 0.8mm Extended distance:1.5mm	Standard distance: 0 to 1.5mm, 0 to 2.5mm Extended distance: 0 to 2 mm ,0 to 4mm Triple distance: 0 to 3mm	Standard shielded: 0 to 2mm Standard unshielded: 0 to 4mm Extended shielded: 0 to 4mm Extended unshielded: 0 to 8mm Triple distance shielded: 6mm
Output State	N.O.	N.O.	N.O.	N.O.
Logic Output	NPN / PNP	NPN / PNP	NPN / PNP	NPN / PNP / Sink / Source
Connection Type	Axial cable	Axial cable / M8 connector	Axial cable /M8 / M12 connector	Axial cable / M12 connector
Supply Voltage	10-30VDC	10-30VDC	10-30VDC	10-30VDC
Switching Frequency	Standard distance: 5kHz Extended distance: 3kHz	Standard distance: 5kHz Extended distance: 3kHz	Standard shielded: 3kHz Unshielded: 2.5kHz Extended shielded/unshielded: 3kHz Triple shielded: 1kHz	Standard distance shielded/unshielded: 3 wire 2kHz, 2-wire: 1.5kHz Extended distance shielded/unshielded: 1kHz Triple distance shielded: 800Hz
Protection Degree	IEC-IP67	IEC-IP67	IEC-IP67	IEC-IP67
Prices start at	<--->	<--->	<--->	<--->
Page	18-14	18-15	18-16	18-19




Specifications	AK Series DC	AT Series DC	PMW Stainless Steel DC	PKW Stainless Steel DC
Description	Inductive proximity sensors, 18mm, DC, metal	Inductive proximity sensors, 30mm, DC, metal	Inductive proximity sensors, 12mm, stainless steel, DC	Inductive proximity sensors, 18mm, stainless steel, DC
Sensing Distances	Standard distance: shielded 5mm, unshielded 8mm Extended distance: shielded, 8mm, unshielded 12mm	Standard distance shielded: 10mm, unshielded: 15mm Extended distance shielded: 15mm unshielded: 20mm	Standard distance: 2mm Extended distance: 4mm Triple distance: 6mm	Standard distance: 5mm Extended distance: 8mm Triple distance: 10mm
Output State	N.O.	N.O.	N.O./ N.C.	N.O. / N.C.
Logic Output	NPN / PNP / Sink / Source	NPN / PNP / Sink / Source	NPN / PNP	NPN / PNP
Connection Type	Axial cable / M12 connector	Axial cable / M12 connector	Axial Cable / M12 connector	Axial cable / M12 connector
Supply Voltage	10-30VDC	10-30VDC	10-30VDC	10-30VDC
Switching Frequency	Standard distance shielded: 600Hz Standard distance unshielded, Extended distance shielded, unshielded: 300Hz	Standard distance shielded/unshielded: 2 wire: 150Hz, 3 wire 200Hz Extended distance shielded/unshielded: 2 wire and 3 wire: 150Hz	Standard distance/extended distance: 2kHz Triple distance: 400Hz	Standard/extended distance: 1kHz Triple distance: 200Hz
Protection Degree	IEC-IP67	IEC-IP67	Standard/extended distance: IEC-IP67/68 Triple distance: IEC-IP67 connector / IP68 (Cable)	Standard/extended distance: IEC-IP67/68 Triple distance: IEC-IP67 connector / IP68 (Cable)
Prices start at	<--->	<--->	<--->	<--->
Page	18-22	18-24	18-26	18-28

Proximity Sensor Selection Guide




Specifications	PTW Stainless Steel DC	V Series AC	CR5 Rectangular DC	CR8 Rectangular DC
Description	Inductive proximity sensors, 30mm, DC, stainless steel	12mm/18mm/30mm inductive proximity sensor, AC, metal	5 x 5 rectangular inductive proximity sensors, DC, metal	8 x 8 rectangular inductive proximity sensors, DC, metal
Sensing Distances	20mm	M12 models shielded: 2mm / Unshielded: 4mm M18 models shielded: 5mm / Unshielded: 8mm M30 models shielded 10mm / Unshielded:15mm	Standard: 0.8mm Extended distance: 1.5mm	Standard distance shielded: 0 to 1.5mm Extended distance shielded: 0 to 2mm Triple distance shielded: 3mm
Output State	N.O.	N.O.	N.O.	N.O.
Logic Output	NPN / PNP	-	NPN / PNP	NPN / PNP
Connection Type	Axial Cable / M12 connector	Axial cable / M12 connector	Axial cable / M8 connector	Axial cable / M8 connector
Supply Voltage	10-30VDC	20-253VAC, 50/60Hz	10-30VDC	10-30VDC
Switching Frequency	100Hz	25Hz	Standard distance: 5kHz Extended distance: 3kHz	1kHz
Protection Degree	IEC-IP67 (connector/ IP68 cable)	IEC-IP67	IEC-IP67	IEC-IP67
Prices start at	<--->	<--->	<--->	<--->
Page	18-30	18-31	18-33	18-34



Specifications	DR10 Rectangular DC	APS4 Rectangular DC	CT Capacitive DC
Description	10 x 16 rectangular inductive prox sensor, DC, plastic	12 x 27 compact rectangular inductive prox, DC, plastic	30mm capacitive proximity sensors, DC, metal
Sensing Distances	Shielded: 3mm Unshielded: 6mm	4mm	Shielded: 2-15mm Unshielded: 2-20mm
Output State	N.O.	N.O.	N.C.
Logic Output	NPN/ PNP	NPN / PNP	NPN/ PNP
Connection Type	Axial cable/M8 connector	Axial cable	Axial cable
Supply Voltage	10-30VDC	10-30VDC	10-30VDC
Switching Frequency	3kHz	200Hz	100Hz
Protection Degree Rating	IEC-IP67	IEC-IP67	IEC-IP65
Prices start at	<--->	<--->	<--->
Page	18-36	18-37	18-38

Cables and Accessories

Cables and accessories start on page 18-48.

Proximity Sensor Selection Guide




Specifications	AE Analog Prox	AM Analog Prox	AK Analog Prox	AT Analog Prox
Description	Analog inductive proximity sensors, 8mm, metal	Analog inductive proximity sensors, 12mm, metal	Analog inductive proximity sensors, 18mm, metal	Analog inductive proximity sensors, 30mm, metal
Sensing Distance	4mm	6mm	10mm	20mm
Output	0-10VDC	0-5VDC, 1-5mA / 0-10VDC, 4-20mA	0-5VDC, 1-5mA / 0-10VDC, 4-20mA	0-5VDC, 1-5mA / 0-10VDC, 4-20mA
Supply Voltage	15-30VDC	10-30VDC / 15-30VDC	10-30VDC, 15-30VDC	10-30VDC / 15-30VDC
Connection Type	Axial cable / M8 connector	Axial cable / M12 connector	Axial cable / M12 connector	Axial cable / M12 connector
Protection Degree	IEC-IP67	IEC-IP67	IEC-IP67	IEC-IP67
Prices start at	<--->	<--->	<--->	<--->
Page	18-39	18-40	18-41	18-42



Specifications	SU Ultrasonic Sensor	TU Ultrasonic Sensor	UHZ Ultrasonic Sensor
Description	Ultrasonic Sensor, 18mm, plastic, DC and analog output models	Ultrasonic Sensor, 30mm, plastic, DC and analog output models	Ultrasonic Sensor, 30 mm x 20 mm, plastic, thru-beam models
Sensing Distances	100 to 600mm 200 to 1500mm	300 to 2500mm	300 mm
Output	DC models: PNP N.O. Analog models: 0-10VDC	DC models: PNP N.O. Analog models: 0-10VDC	PNP/NPN, N.O./N.C.
Supply Voltage	DC models: 15-30VDC Analog models: 18-30VDC	19-30VDC	18-30VDC
Connection Type	Axial cable/M12 connector	M12 connector	2 meter Axial cable
Protection Degree	IEC-IP67	IEC-IP67	IEC-IP67
Prices start at	<--->	<--->	<--->
Page	18-43	18-45	18-46

PY Series Inductive Proximity Sensors

Miniature Ø3 (3 mm) and M4 (4 mm) stainless steel – DC

- Smallest self-contained inductive proximity sensor available on the U.S. market
- Eight models available
- Complete overload protection
- IP67 rated
- Stainless steel construction
- LED status indicator

PY Series Ø3 and M4 DC Inductive Prox Selection Chart								
Part Number	**Price**	**Size**	**Sensing Range**	**Housing**	**Output State**	**Logic**	**Connection**	**Dimensions**
Standard Distance								
PY3-AN-1A	<--->	Ø3*	0.6mm (0.024in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Figure 1
PY3-AP-1A	<--->	Ø3*				PNP	2m (6.5') axial cable	Figure 1
PY4-AN-1A	<--->	4mm				NPN	2m (6.5') axial cable	Figure 2
PY4-AP-1A	<--->	4mm				PNP	2m (6.5') axial cable	Figure 2
Extended Distance								
PY3-AN-3A	<--->	Ø3*	1mm (0.039in)	Shielded	N.O	NPN	2m (6.5') axial cable	Figure 1
PY3-AP-3A	<--->	Ø3*				PNP	2m (6.5') axial cable	Figure 1
PY4-AN-3A	<--->	4mm				NPN	2m (6.5') axial cable	Figure 2
PY4-AP-3A	<--->	4mm				PNP	2m (6.5') axial cable	Figure 2

*Smooth barrel, no threads

	Ø3	M4	Ø3	M4
Specifications	***Standard Distance***		***Extended Distance***	
Type	Shielded			
Operating Distance	0.6mm (0.024in)		1mm (0.039in)	
Material Correction Factors	**See Material Influence table #1			
Differential Travel	≤10%			
Repeat Accuracy	≤5%			
Operating Voltage	10-30VDC			
Ripple	≤20%			
No-load Supply Current	≤10mA			
Load Current	≤100mA			
Leakage Current	≤10µA		≤0.1mA	
Voltage Drop	≤2.0 V			
Output Type	NPN or PNP/N.O. only/3-wire			
Switching Frequency	5kHz		3kHz	
(tv) Time Delay Before Availability	10ms			
Input Voltage Transient Protection	Up to 30VDC			
Input Power Polarity Reversal Protection	Yes			
Output Power Short-Circuit Protection	Yes (switch auto-resets after overload is removed)			
Temperature Range	-25° to +70° C (-13° to 158° F)			
Temperature Drift	10% Sr			
Protection Degree (DIN 40050)	IEC IP67			
Agency Approvals	UL file E328811			
LED Indicators	Yellow (output energized)			
Housing Material	Stainless steel			
Sensing Face Material	Polyester			
Tightening Torque	0.8Nm (7.08-in./lbs.)			
Weight	23g (0.81 oz)		22g (0.78 oz)	26g (0.92oz)

**See Material Influence table #1 on page 18-57

Dimensions

Figure 1

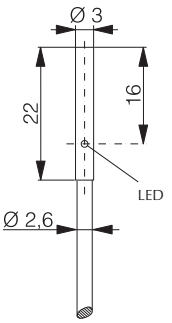
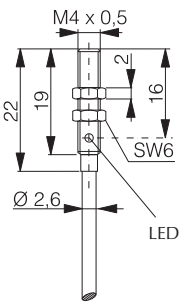
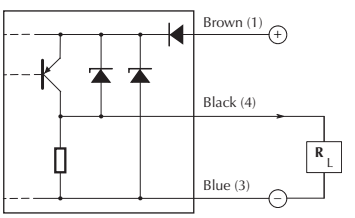


Figure 2

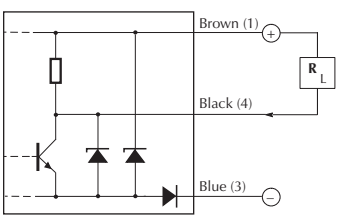


Wiring diagrams

PNP Output



NPN Output



Cables and Accessories

Cables and accessories start on page 18-48.

PD Series Inductive Proximity Sensors

Miniature M5 (5 mm) stainless steel – DC

- Eight models available
- Stainless steel construction
- Axial cable or M8 quick-disconnect models
- Complete overload protection
- IP67 rated
- Smallest self-contained inductive proximity sensor available on the U.S. market
- LED status indicator

PD Series M5 DC Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Dimensions
Standard Distance							
PD1-AN-1A	<--->	0.8mm (0.03in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Figure 1
PD1-AP-1A	<--->				PNP	2m (6.5') axial cable	Figure 1
PD1-AN-1F	<--->				NPN	M8 (8mm) connector	Figure 2
PD1-AP-1F	<--->				PNP	M8 (8mm) connector	Figure 2
Extended Distance							
PD1-AN-3A	<--->	1.5mm (0.059in)	Shielded	N.O	NPN	2m (6.5') axial cable	Figure 1
PD1-AP-3A	<--->				PNP	2m (6.5') axial cable	Figure 1
PD1-AN-3F	<--->				NPN	M8 (8mm) connector	Figure 2
PD1-AP-3F	<--->				PNP	M8 (8mm) connector	Figure 2

Specifications

Specifications	Standard Distance Models	Extended Distance Models
Type	Shielded	
Operating Distance	0.8mm (0.03in)	1.5mm (0.059in)
Material Correction Factors	*See Material Influence table #1	
Differential Travel	≤10%	
Repeat Accuracy	≤1.5%	
Operating Voltage	10-30VDC	
Ripple	≤20%	
No-load Supply Current	≤10mA	
Load Current	≤200mA	
Leakage Current	≤10µA	≤0.1mA
Voltage Drop	≤2.0 V	
Output Type	NPN or PNP/N.O. only/3-wire	
Switching Frequency	5kHz	3kHz
(tv) Time Delay Before Availability	10ms	
Input Voltage Transient Protection	Up to 30VDC	
Input Power Polarity Reversal Protection	Yes	
Output Power Short-Circuit Protection	Yes (switch auto-resets after overload is removed)	
Temperature Range	-25° to +70° C (-13° to 158° F)	
Temperature Drift	10% Sr	
Protection Degree (DIN 40050)	IEC IP67	
Agency Approvals	UL file E328811	
LED Indicators	Yellow (output energized)	
Housing Material	Stainless steel	
Sensing Face Material	PBT	Polyester
Tightening Torque	1.5Nm (13.3lb./in.)	
Weight (cable/M8 connector)	43g (1.52oz)/10g (0.36oz)	34g (1.20)/4g (0.14oz)

*See Material Influence table #1 on page 18-57

Dimensions

Figure 1

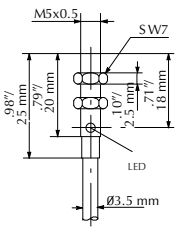
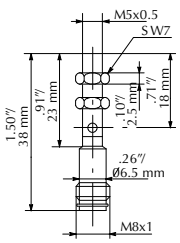
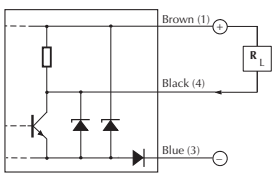


Figure 2

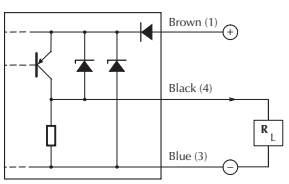


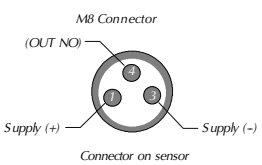
Wiring diagrams

NPN Output



PNP Output





Cables and Accessories

Cables and accessories start on page 18-48.

AE Series Inductive Proximity Sensors

M8 (8 mm) metal – DC

- 24 standard length models available
- 8 short body length models available
- Compact metal housing
- Axial cable, M8 or M12 quick-disconnect models
- Complete overload protection
- IP67 rated
- LED status indicators are visible 360 degrees around the cylinder

Cables and Accessories

Cables and accessories start on page 18-48.

AE1 Series Standard Length M8 DC Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Wiring	Dimensions
Standard Distance								
AE1-AN-1A	<--->	0 to 1.5mm (0-0.059in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
AE1-AP-1A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 1
AE1-AN-1H	<--->				NPN	M12 (12mm) connector	Diagram 1	Figure 2
AE1-AP-1H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 2
AE1-AN-1F	<--->				NPN	M8 (8mm) connector	Diagram 1	Figure 3
AE1-AP-1F	<--->				PNP	M8 (8mm) connector	Diagram 1	Figure 3
AE1-AN-2A	<--->	0 to 2.5mm (0-0.098in)	Unshielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
AE1-AP-2A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 1
AE1-AN-2H	<--->				NPN	M12 (12mm) connector	Diagram 1	Figure 2
AE1-AP-2H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 2
AE1-AN-2F	<--->				NPN	M8 (8mm) connector	Diagram 1	Figure 3
AE1-AP-2F	<--->				PNP	M8 (8mm) connector	Diagram 1	Figure 3
Extended Distance								
AE1-AN-3A	<--->	0 to 2mm (0-0.079in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
AE1-AP-3A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 1
AE1-AN-3F	<--->				NPN	M8 (8mm) connector	Diagram 1	Figure 3
AE1-AP-3F	<--->				PNP	M8 (8mm) connector	Diagram 1	Figure 3
AE1-AN-4A	<--->	0 to 4mm (0-0.157in)	Unshielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
AE1-AP-4A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 1
AE1-AN-4F	<--->				NPN	M8 (8mm) connector	Diagram 1	Figure 3
AE1-AP-4F	<--->				PNP	M8 (8mm) connector	Diagram 1	Figure 3
Triple Distance								
AE1-AN-5A	<--->	0 to 3mm (0-0.118in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Diagram 2	Figure 4
AE1-AP-5A	<--->				PNP	2m (6.5') axial cable	Diagram 2	Figure 4
AE1-AN-5F	<--->				NPN	M8 (8mm) connector	Diagram 2	Figure 5
AE1-AP-5F	<--->				PNP	M8 (8mm) connector	Diagram 2	Figure 5

AE6 Series Short Body M8 DC Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Wiring	Dimensions
Extended Distance								
AE6-AN-3A	<--->	0 to 2mm (0-0.079in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 6
AE6-AP-3A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 6
AE6-AN-3F	<--->				NPN	M8 (8mm) connector	Diagram 1	Figure 7
AE6-AP-3F	<--->				PNP	M8 (8mm) connector	Diagram 1	Figure 7
AE6-AN-4A	<--->	0 to 4mm (0-0.157in)	Unshielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 6
AE6-AP-4A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 6
AE6-AN-4F	<--->				NPN	M8 (8mm) connector	Diagram 1	Figure 7
AE6-AP-4F	<--->				PNP	M8 (8mm) connector	Diagram 1	Figure 7

AE Series Inductive Proximity Sensors

Specifications	Standard Distance Models		Extended Distance Models		Triple Distance Models
Type	Shielded	Unshielded	Shielded	Unshielded	Shielded
Operating Distance	1.5mm (0.059in)	2.5mm (0.098in)	2mm (0.079in)	4mm (0.157in)	3mm (0.118in)
Material Correction Factors	*See Material Influence table #1				*See Material Influence table #2
Differential Travel	2 to 10%		1 to 20%		≤10%
Repeat Accuracy	≤2%		≤5%		
Operating Voltage	10-30VDC				
Ripple	≤10%				≤20%
No-load Supply Current	≤20mA		≤10mA		
Load Current	≤200mA				
Leakage Current	≤10µA		≤120µA		
Voltage Drop	≤1.2 V				≤2.0 V
Output Type	NPN or PNP/N.O. only/3-wire				
Switching Frequency	3kHz	2.5kHz	3kHz		1kHz
(tv) Time Delay Before Availability	100ms (5ms for AE6 short body models)				50ms
Input Voltage Transient Protection	Up to 30VDC				
Input Power Polarity Reversal Protection	Yes				
Output Power Short-Circuit Protection	Yes (switch auto-resets after overload is removed)				
Temperature Range	-25° to +70° C (-13° to 158° F)				
Temperature Drift	≤10% Sr				
Protection Degree (DIN 40050)	IEC IP67				
Agency Approvals	N/A				UL file E328811
LED Indicators	Yellow (output energized)				
Housing Material	Nickel-plated brass				Chrome-plated brass
Sensing Face Material	PBT				
Tightening Torque	4Nm (35lb-in)				
Weight (cable/M8 connector/M12 connector)	43g (1.52oz)/16g (0.56oz)/20g (0.71oz)				54g (1.90oz)/26g (0.92oz)/(N/A)

*See Material Influence tables #1 and #2 on page 18-57

Wiring diagrams

Diagram 1

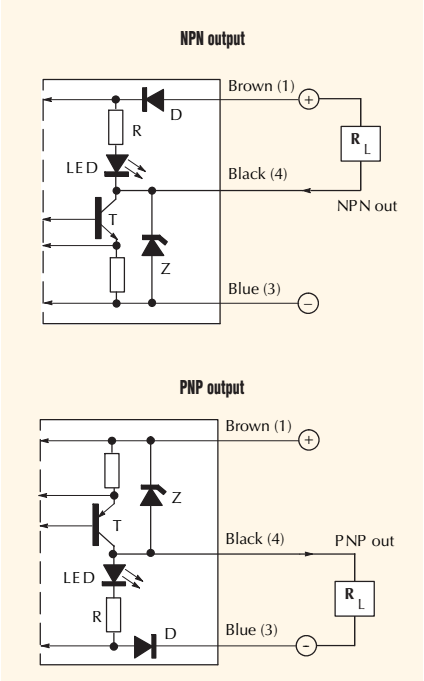
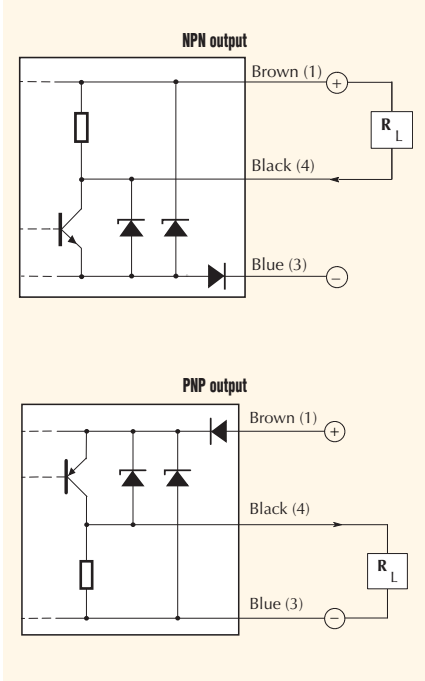
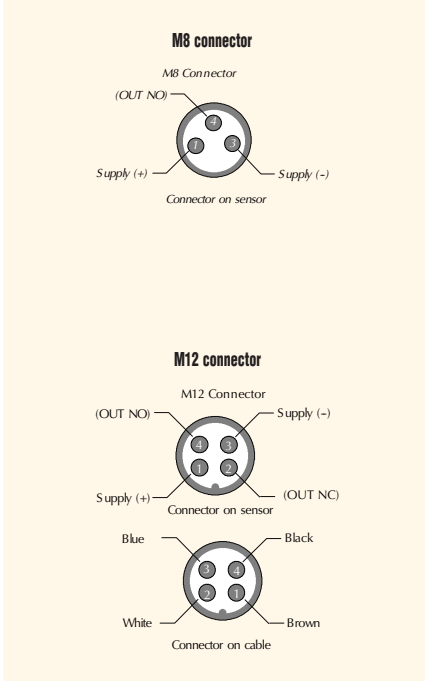


Diagram 2



Connectors



AE Series Inductive Proximity Sensors

Dimensions

Figure 1

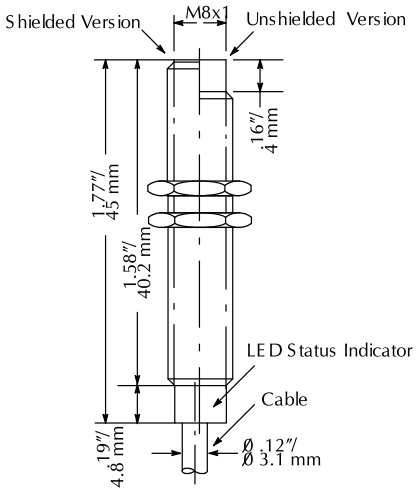


Figure 2

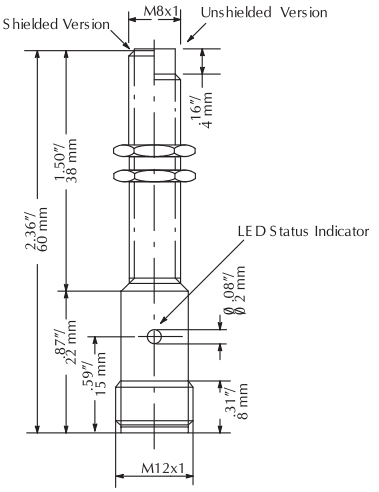


Figure 3

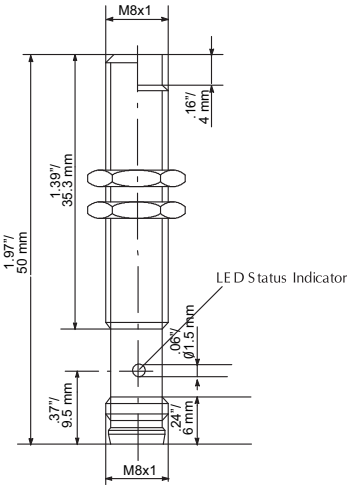


Figure 4

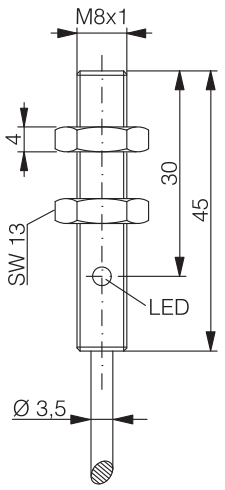


Figure 5

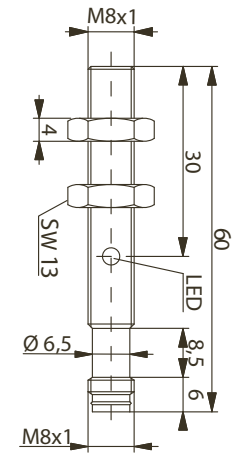


Figure 6

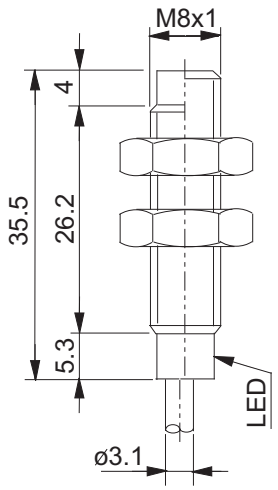
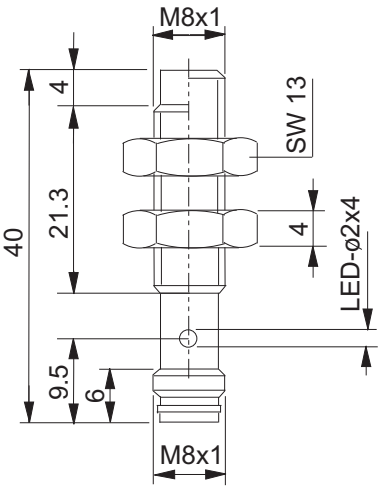


Figure 7



AM Series Inductive Proximity Sensors

M12 (12 mm) metal – DC

- 26 standard length models available
- 8 short body length models available
- 2-wire and 3-wire models
- Metal housing
- Axial cable or M12 quick-disconnect models
- Complete overload protection
- IP67 rated
- LED status indicator
- DC powered
- Several sensing distances available

AM1 Series Standard Length M12 DC Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Wiring	Dimensions
Standard Distance								
AM1-AN-1A	<--->	0 to 2mm (0-0.079in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
AM1-AP-1A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 1
AM1-A0-1A	<--->				Sink/source	2m (6.5') axial cable	Diagram 2	Figure 1
AM1-AN-1H	<--->				NPN	M12 (12mm) connector	Diagram 1	Figure 2
AM1-AP-1H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 2
AM1-A0-1H	<--->				Sink/source	M12 (12mm) connector	Diagram 2	Figure 2
AM1-AN-2A	<--->	0 to 4mm (0-0.157in)	Unshielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
AM1-AP-2A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 1
AM1-A0-2A	<--->				Sink/source	2m (6.5') axial cable	Diagram 2	Figure 1
AM1-AN-2H	<--->				NPN	M12 (12mm) connector	Diagram 1	Figure 2
AM1-AP-2H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 2
AM1-A0-2H	<--->				Sink/source	M12 (12mm) connector	Diagram 2	Figure 2
Extended Distance								
AM1-AN-3A	<--->	0 to 4mm (0-0.157in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
AM1-AP-3A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 1
AM1-A0-3A	<--->				Sink/source	2m (6.5') axial cable	Diagram 2	Figure 1
AM1-AN-3H	<--->				NPN	M12 (12mm) connector	Diagram 1	Figure 2
AM1-AP-3H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 2
AM1-A0-3H	<--->				Sink/source	M12 (12mm) connector	Diagram 2	Figure 2
AM1-AN-4A	<--->	0 to 8mm (0-0.314in)	Unshielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
AM1-AP-4A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 1
AM1-A0-4A	<--->				Sink/source	2m (6.5') axial cable	Diagram 2	Figure 1
AM1-AN-4H	<--->				NPN	M12 (12mm) connector	Diagram 1	Figure 2
AM1-AP-4H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 2
AM1-A0-4H	<--->				Sink/source	M12 (12mm) connector	Diagram 2	Figure 2
Triple Distance								
AM1-AN-5H	<--->	6mm (0.236in)	Shielded	N.O.	NPN	M12 (12mm) connector	Diagram 3	Figure 3
AM1-AP-5H	<--->				PNP	M12 (12mm) connector	Diagram 3	Figure 3

AM6 Series Short Body M12 DC Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Wiring	Dimensions
Extended Distance								
AM6-AN-3A	<--->	0 to 4mm (0-0.157in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 4
AM6-AP-3A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 4
AM6-AN-3H	<--->				NPN	M12 (12mm) connector	Diagram 1	Figure 5
AM6-AP-3H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 5
AM6-AN-4A	<--->	0 to 8mm (0-0.314in)	Unshielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 4
AM6-AP-4A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 4
AM6-AN-4H	<--->				NPN	M12 (12mm) connector	Diagram 1	Figure 5
AM6-AP-4H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 5

AM Series Inductive Proximity Sensors

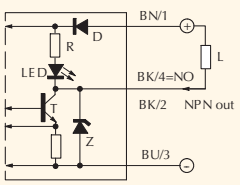
Specifications	Standard Distance Models		Extended Distance Models		Triple Distance Models
Type	Shielded	Unshielded	Shielded	Unshielded	Shielded
Operating Distance	2mm (0.079in)	4mm (0.157in)	4mm (0.157in)	8mm (0.315in)	6mm (0.236in)
Material Correction Factors	*See Material Influence table #1				*See Material Influence table #2
Differential Travel	2 to 10%		1 to 20%		
Repeat Accuracy	≤2%		≤5%		
Operating Voltage	10-30VDC				
Ripple	≤10%				≤20%
No Load Supply Current	≤20mA		≤10mA		
Load Current	3-wire: ≤200mA / 2-wire: 3-100mA		3-wire: ≤300mA / 2-wire: 3-100mA		≤200mA
Leakage Current	3-wire: ≤10µA / 2-wire: ≤0.8mA		3-wire: ≤120µA / 2-wire: ≤0.8mA		≤100µA
Voltage Drop	3-wire:1.2 volts max. / 2-wire: 2.8 volts max.				≤2.0V
Output Type	3-wire: NPN or PNP, N.O. only/ 2-wire: sink/source, N.O. only				NPN or PNP, N.O. only
Switching Frequency	3-wire: 2kHz / 2 wire: 1.5kHz		3-wire: 1kHz / 2-wire: 1.5kHz		800Hz
(tv) Time Delay Before Availability	3-wire: 100ms / 2 wire: 50ms		100ms		
Input Voltage Transient Protection	Up to 30 VDC				
Input Power Polarity Reversal Protection	Yes				
Output Power Short-Circuit Protection	Yes (switch auto-resets after overload is removed)				
Temperature Range	-25° to + 70° C (-13° to 158° F)				
Temperature Drift	10% Sr				
Protection Degree (DIN 40050)	IEC IP67				
Agency Approvals	N/A				UL File E328811
LED Indicators	Yellow (N.O. output energized)				
Housing Material	Nickel-plated brass				Chrome-plated brass
Sensing Face Material	PBT				
Tightening Torque	10Nm (88lb-in)				
Weight (cable/M12 connector)	70g (2.47oz)/30g (1.06oz)				96g (oz)/34g (oz)

*See Material Influence tables #1 and #2 on page 18-57

Wiring diagrams

Diagram 1

NPN Output



PNP Output

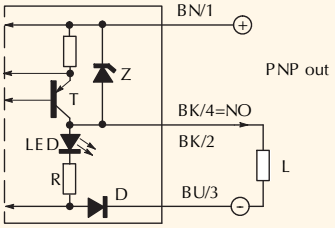
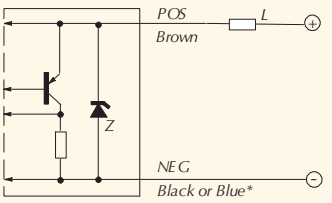


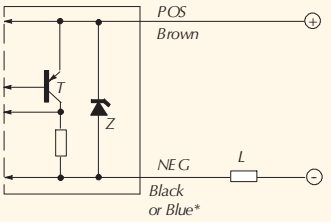
Diagram 2

Sink/Source Output



Wiring diagram when sensor is wired in sinking mode used with a sourcing module.

Sink/Source Output

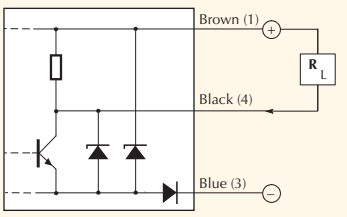


Wiring diagram when sensor is wired in sourcing mode used with a sinking module.

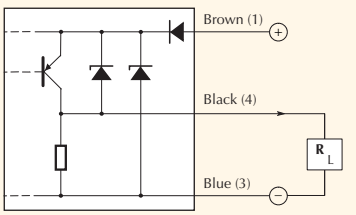
** Note: Negative (-) lead is Black on M12 quick-disconnect cables and Blue on axial cables.*

Diagram 3

NPN Output

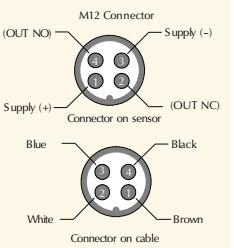


PNP Output

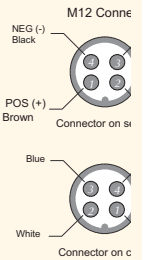


Connectors

3-wire models



2-wire models



AM Series Inductive Proximity Sensors

Dimensions

Figure 1

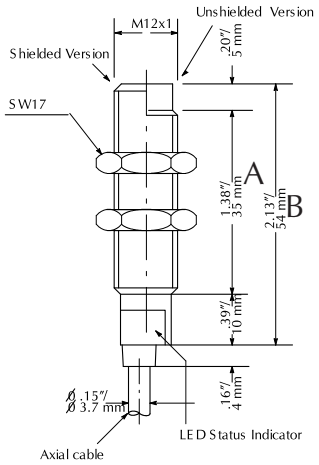


Figure 2

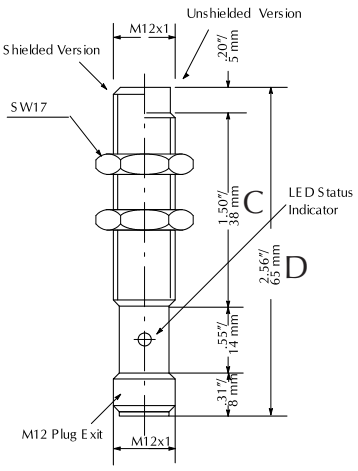


Figure 3

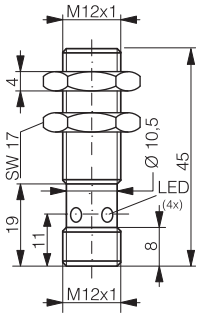


Figure 4

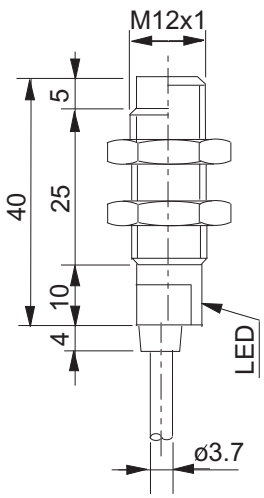
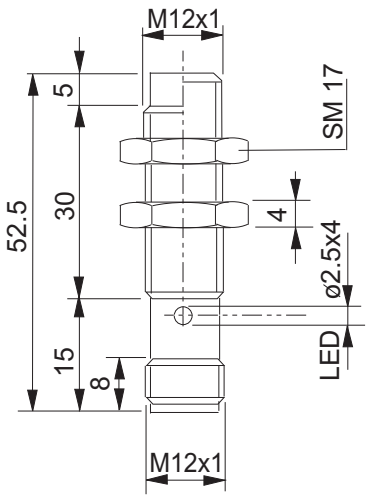


Figure 5



Dimensions				
Model	***A***	***B***	***C***	***D***
3-wire (standard distance)	1.38in (35mm)	2.13in (54mm)	1.50in (38mm)	2.56in (65mm)
3-wire (extended distance)	1.57in (40mm)	2.13in (54mm)	1.50in (38mm)	2.76in (70mm)
2-wire (all)	1.77in (45mm)	2.36in (60mm)	1.89in (48mm)	2.95in (75mm)

Cables and Accessories

Cables and accessories start on page 18-48.

AK Series Inductive Proximity Sensors

M18 (18 mm) metal – DC

- 24 models available
- Standard and extended distance models available
- 2-wire and 3-wire models
- Axial cable or M12 quick-disconnect models available
- Complete overload protection
- IP67 rated
- LED status indicators are visible 360° around the cylinder

AK Series M18 DC Inductive Prox Selection Chart								
Part Number	**Price**	**Sensing Range**	**Housing**	**Output State**	**Logic**	**Connection**	**Wiring**	**Dimensions**
Standard Distance								
AK1-AN-1A	<--->	5mm (0.197in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
AK1-AP-1A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 1
AK1-A0-1A	<--->				Sink/source	2m (6.5') axial cable	Diagram 2	Figure 1
AK1-AN-1H	<--->				NPN	M12 (12mm) connector	Diagram 1	Figure 2
AK1-AP-1H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 2
AK1-A0-1H	<--->				Sink/source	M12 (12mm) connector	Diagram 2	Figure 2
AK1-AN-2A	<--->	8mm (0.315in)	Unshielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
AK1-AP-2A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 1
AK1-A0-2A	<--->				Sink/source	2m (6.5') axial cable	Diagram 2	Figure 1
AK1-AN-2H	<--->				NPN	M12 (12mm) connector	Diagram 1	Figure 2
AK1-AP-2H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 2
AK1-A0-2H	<--->				Sink/source	M12 (12mm) connector	Diagram 2	Figure 2
Extended Distance								
AK1-AN-3A	<--->	8mm (0.315in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
AK1-AP-3A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 1
AK1-A0-3A	<--->				Sink/source	2m (6.5') axial cable	Diagram 2	Figure 1
AK1-AN-3H	<--->				NPN	M12 (12mm) connector	Diagram 1	Figure 2
AK1-AP-3H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 2
AK1-A0-3H	<--->				Sink/source	M12 (12mm) connector	Diagram 2	Figure 2
AK1-AN-4A	<--->	12mm (0.472in)	Unshielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
AK1-AP-4A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 1
AK1-A0-4A	<--->				Sink/source	2m (6.5') axial cable	Diagram 2	Figure 1
AK1-AN-4H	<--->				NPN	M12 (12mm) connector	Diagram 1	Figure 2
AK1-AP-4H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 2
AK1-A0-4H	<--->				Sink/source	M12 (12mm) connector	Diagram 2	Figure 2

Dimensions

Figure 1

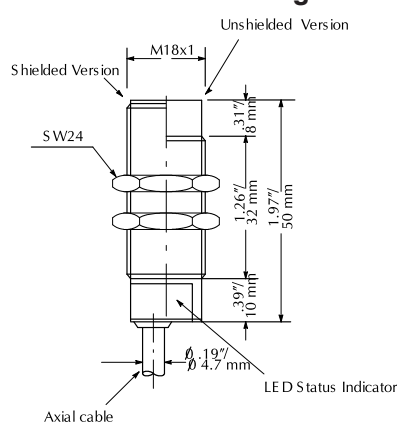
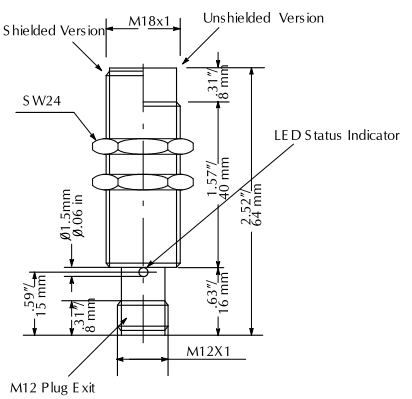


Figure 2



Cables and Accessories

Cables and accessories start on page 18-48.

AK Series Inductive Proximity Sensors

Specifications	Standard Distance Models		Extended Distance Models	
Type	Shielded	Unshielded	Shielded	Unshielded
Material Correction Factors	*See Material Influence table #1			
Differential Travel	2 to 10%		2 to 15%	
Repeat Accuracy	2%		5%	
Operating Voltage	10-30VDC			
Ripple	≤10%			
Load Current	3-wire: ≤400mA / 2-wire: 3-100mA			
Leakage Current	3-wire: ≤10µA / 2-wire: ≤0.8mA max.			
Voltage Drop	3-wire: 1 volt max. / 2-wire: ≤2.8V max.			
Output Type	3- wire: NPN or PNP/N.O. (normally open) / 2-wire: sink/source, N.O. only			
Switching Frequency	600Hz	300Hz		
(tv) Time Delay Before Availability	3-wire: 100ms / 2-wire:-50ms			
Input Voltage Transients Protection	Yes, as long as the transient peak does not exceed 30VDC			
Input Power Polarity Reversal Protection	Yes			
Output Power Short-Circuit Protection	Yes (switch auto-resets after overload is removed)			
Temperature Range	-25° to + 70° C (-13° to 158° F)			
Temperature Drift	10% Sr			
Protection Degree (DIN 40050)	IEC IP67			
LED Indicators	Yellow (N.O. output energized)			
Housing Material	Nickel-plated brass			
Sensing Face Material	PBT			
Tightening Torque	30Nm (22lbs/ft.)			
Weight	**A** type (w/ cable): 130g (4.59oz) **H** type: 55g (1.94oz)			

*See Material Influence table #1 on page 18-57

Wiring diagrams

Diagram 1

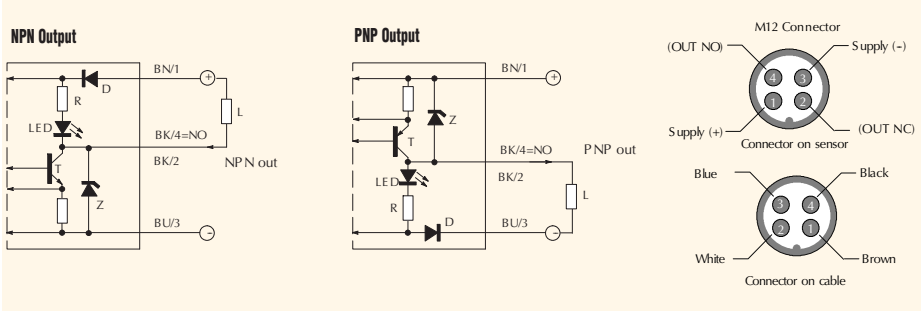
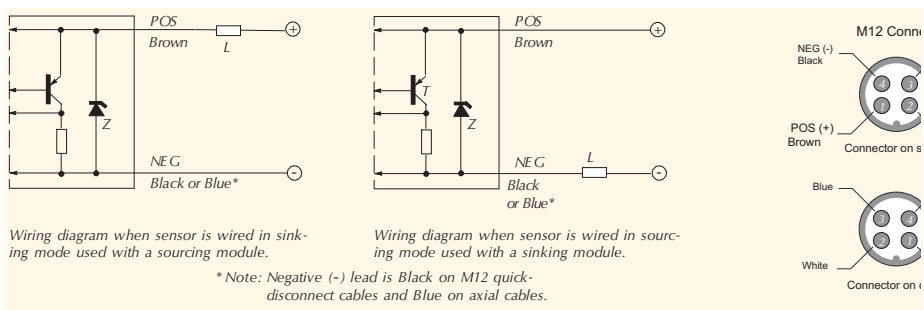


Diagram 2



Wiring diagram when sensor is wired in sinking mode used with a sourcing module.

Wiring diagram when sensor is wired in sourcing mode used with a sinking module.

** Note: Negative (-) lead is Black on M12 quick-disconnect cables and Blue on axial cables.*

AT Series Inductive Proximity Sensors

M30 (30 mm) metal – DC

- 24 models available
- Standard and extended distance models available
- 2-wire and 3-wire models
- Axial cable or M12 quick-disconnect models
- LED status indicators are visible 360° around the cylinder
- Complete overload protection
- IP67 rated

AT Series M30 DC Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Wiring	Dimensions
Standard Distance								
AT1-AN-1A	<--->	10mm (0.394in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
AT1-AP-1A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 1
AT1-A0-1A	<--->				Sink/source	2m (6.5') axial cable	Diagram 2	Figure 1
AT1-AN-1H	<--->				NPN	M12 (12mm) connector	Diagram 1	Figure 2
AT1-AP-1H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 2
AT1-A0-1H	<--->				Sink/source	M12 (12mm) connector	Diagram 2	Figure 2
AT1-AN-2A	<--->	15mm (0.591in)	Unshielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
AT1-AP-2A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 1
AT1-A0-2A	<--->				Sink/source	2m (6.5') axial cable	Diagram 2	Figure 1
AT1-AN-2H	<--->				NPN	M12 (12mm) connector	Diagram 1	Figure 2
AT1-AP-2H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 2
AT1-A0-2H	<--->				Sink/source	M12 (12mm) connector	Diagram 2	Figure 2
Extended Distance								
AT1-AN-3A	<--->	15mm (0.591in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
AT1-AP-3A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 1
AT1-A0-3A	<--->				Sink/source	2m (6.5') axial cable	Diagram 2	Figure 1
AT1-AN-3H	<--->				NPN	M12 (12mm) connector	Diagram 1	Figure 2
AT1-AP-3H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 2
AT1-A0-3H	<--->				Sink/source	M12 (12mm) connector	Diagram 2	Figure 2
AT1-AN-4A	<--->	20mm (0.787in)	Unshielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
AT1-AP-4A	<--->				PNP	2m (6.5') axial cable	Diagram 1	Figure 1
AT1-A0-4A	<--->				Sink/source	2m (6.5') axial cable	Diagram 2	Figure 1
AT1-AN-4H	<--->				NPN	M12 (12mm) connector	Diagram 1	Figure 2
AT1-AP-4H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 2
AT1-A0-4H	<--->				Sink/source	M12 (12mm) connector	Diagram 2	Figure 2

Dimensions

Figure 1

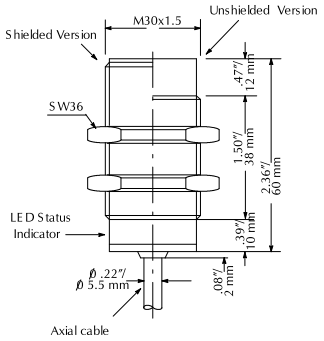
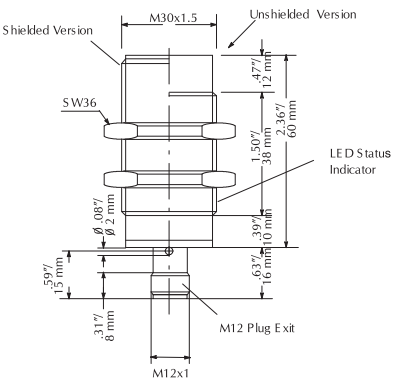


Figure 2



Cables and Accessories

Cables and accessories start on page 18-48.

AT Series Inductive Proximity Sensors

Specifications	Standard Distance Models		Extended Distance Models	
Type	Shielded	Unshielded	Shielded	Unshielded
Material Correction Factors	*See Material Influence table #1			
Differential Travel	2 to 10%		2 to 15%	
Repeat Accuracy	3-wire: 2% / 2-wire: 5%		2-wire and 3-wire: 5%	
Operating Voltage	10-30VDC			
Ripple	≤10%			
Load Current	3 wire: ≤400mA / 2-wire: 3-100mA		2-wire and 3-wire:≤400mA	
Leakage Current	3-wire:≤10µA / 2-wire: ≤0.8mA max.		3-wire ≤8µA / 2-wire: ≤0.8mA max.	
Voltage Drop	3-wire: ≤1 volt max. / 2-wire: ≤2.8V		3-wire: ≤1 volt max. / 2-wire: ≤2.8V	
Output Type	Three wire: NPN or PNP/N.O. (normally open) / Two wire: sink/source, N.O. only			
Switching Frequency	3-wire: 200Hz / 2-wire: 150Hz		2-and 3-wire:150Hz	
(tv) Time Delay Before Availability	3-wire: 100ms / 2-wire: 50ms		3-wire:100ms / 2-wire: 50ms	
Input Voltage Transients Protection	Yes, as long as the transient peak does not exceed 30VDC			
Input Power Polarity Reversal Protection	Yes			
Output Power Short-Circuit Protection	Yes (switch auto-resets after overload is removed)			
Temperature Range	-25° to + 70° C (-13° to 158° F)			
Temperature Drift	10% Sr			
Protection Degree (DIN 40050)	IEC IP67			
LED Indicators	Yellow (N.O. output energized)			
Housing Material	Nickel-plated brass			
Sensing Face Material	PBT			
Tightening Torque	60Nm (44lbs./ft.)			
Weight	**A** type (w/ cable): 180g (6.35oz) **H** type: 110g (3.88oz)			

*See Material Influence table #1 on page 18-57

Wiring diagrams

Diagram 1

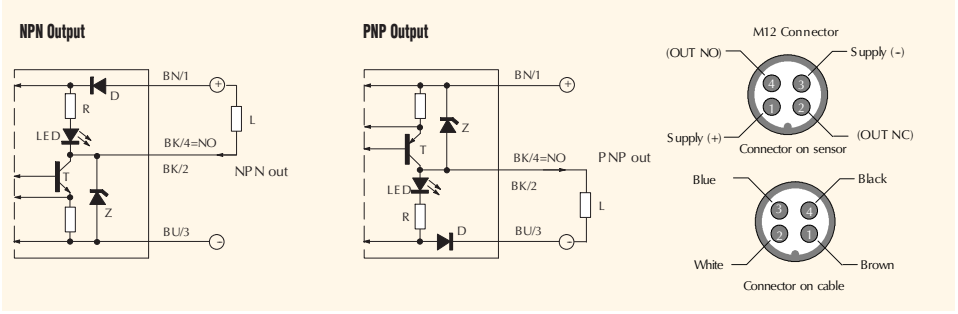
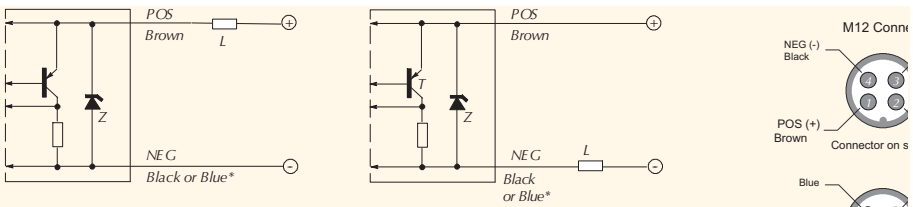


Diagram 2



Wiring diagram when sensor is wired in sinking mode used with a sourcing module.

Wiring diagram when sensor is wired in sourcing mode used with a sinking module.

** Note: Negative (-) lead is Black on M12 quick-disconnect cables and Blue on axial cables.*

PMW Series Inductive Proximity Sensors

M12 (12 mm) stainless steel – DC

- 8 models available
- Low cost/high performance
- IP67 rated
- LED status indicators are visible at a wide angle
- Triple distance models (shown) sense all metals at virtually the same distance, have one-piece stainless design, and are fully submersible up to 290 psi. Axial cable models have IP68 protection degree.

PMW Series M12 DC Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Wiring	Dimensions
Standard Distance								
PMW-0N-1H	<--->	2mm (0.079in)	Shielded	N.O./N.C	NPN	M12 (12mm) connector	Diagram 1	Figure 1
PMW-0P-1H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 1
Extended Distance								
PMW-0N-2H	<--->	4mm (0.157in)	Unshielded	N.O./N.C	NPN	M12 (12mm) connector	Diagram 1	Figure 1
PMW-0P-2H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 1
Triple Distance								
PMW-AN-5A	<--->	6mm (0.236in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Diagram 2	Figure 2
PMW-AP-5A	<--->				PNP	2m (6.5') axial cable	Diagram 2	Figure 2
PMW-AN-5H	<--->				NPN	M12 (12mm) connector	Diagram 2	Figure 3
PMW-AP-5H	<--->				PNP	M12 (12mm) connector	Diagram 2	Figure 3

Wiring diagrams

Diagram 1

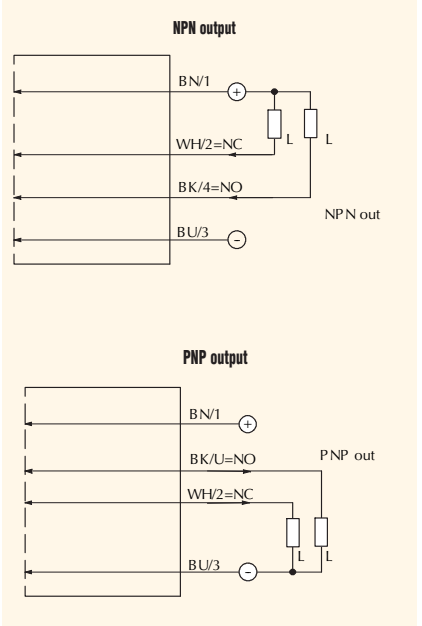
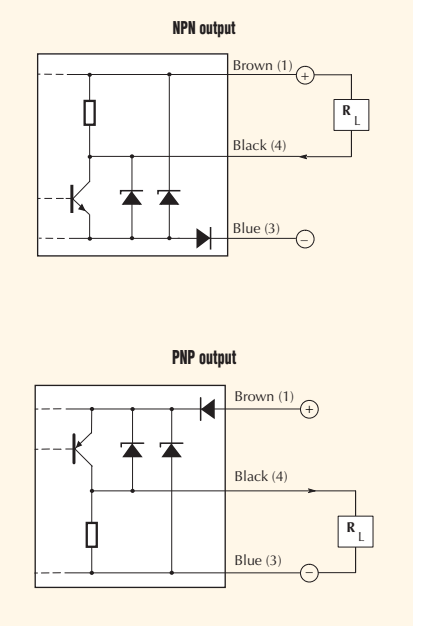
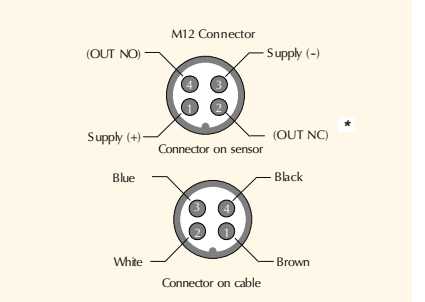


Diagram 2



Connectors



***Note: If using the N.C. output, use only 2M or 7M cables .**

Cables and Accessories

Cables and accessories start on page 18-48.

PMW Series Inductive Proximity Sensors

Specifications	Standard Distance Models	Extended Distance Models	Triple Distance Models
Type	Shielded	Unshielded	Shielded
Operating Distance	2mm (0.079in)[1]	4mm (0.157in)[1]	6mm (0.236in)
Material Correction Factors	*See Material Influence table #1		*See Material Influence table #3
Differential Travel	2 to 10%		≤15%
Repeat Accuracy	≤5%		
Operating Voltage	10-30VDC		
Ripple	≤10%		≤20%
Load Current	≤100mA		≤200mA
Voltage Drop	≤1.2V		≤2.0V
Output Type	NPN or PNP and N.O./N.C. complementary		NPN or PNP, N.O. only
Leakage Current	≤10µA		≤100µA
Switching Frequency	2kHz		400Hz
(tv) Time Delay Before Availability	100ms		≤10ms
Temperature Range / Temperature Drift	-25° to +70° C (-13° to 158° F) / 10%Sr		
Protection Degree (DIN 40050)	IEC IP67/68[2]		IEC IP67[3] (connector/IP68[3] (cable)
Agency Approvals	N/A		UL file E328811
LED Indicators	Yellow (N.O. output energized)		
Housing Material	Stainless steel		Stainless steel
Sensing Face Material	PPS		Stainless steel
Tightening Torque	10Nm (7.25-in/ lbs)		
Weight	35g (1.23oz)		89g (3.14oz)/24g (0.85oz)

[1] With 12 x 12mm FE360 target [2] Only with M12 connector in fully-tightened position. While this sensor has good resistance to chemicals and oil, it should be tested before using in a harsh environment. [3] Fully submersible to 290 psi.

*See Material Influence tables #1 and #3 on page 18-57

Dimensions

Figure 1

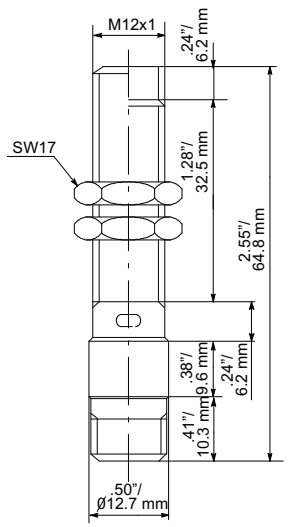


Figure 2

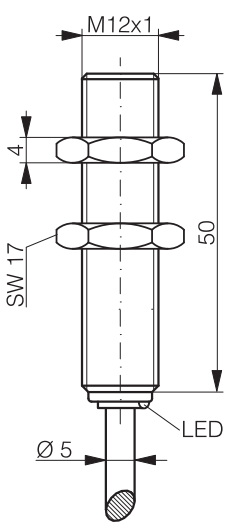
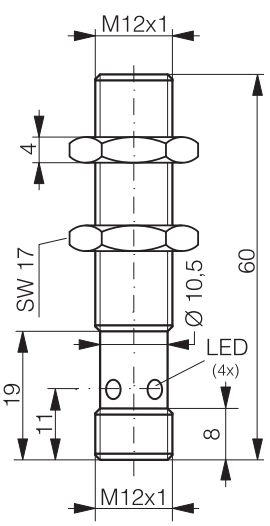


Figure 3



PKW Series Inductive Proximity Sensors

M18 (18 mm) stainless steel - DC

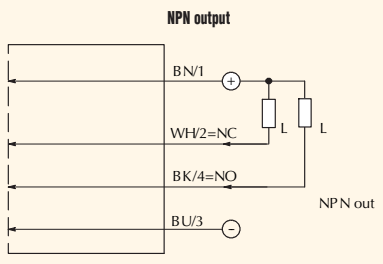
- Eight models available
- Low cost/high performance
- IP67 rated
- LED status indicators are visible at a wide angle
- Triple distance models (shown) sense all metals at virtually the same distance, have one-piece stainless design, and are fully submersible up to 290 psi. Axial cable models have IP68 protection degree.

PKW Series M18 DC Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Wiring	Dimensions
Standard Distance								
PKW-0N-1H	<--->	5mm (0.197in)	Shielded	N.O./N.C	NPN	M12 (12mm) connector	Diagram 1	Figure 1
PKW-0P-1H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 1
Extended Distance								
PKW-0N-2H	<--->	8mm (0.315in)	Unshielded	N.O./N.C	NPN	M12 (12mm) connector	Diagram 1	Figure 1
PKW-0P-2H	<--->				PNP	M12 (12mm) connector	Diagram 1	Figure 1
Triple Distance								
PKW-AN-5A	<--->	10mm (0.394in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Diagram 2	Figure 2
PKW-AP-5A	<--->				PNP	2m (6.5') axial cable	Diagram 2	Figure 2
PKW-AN-5H	<--->				NPN	M12 (12mm) connector	Diagram 2	Figure 3
PKW-AP-5H	<--->				PNP	M12 (12mm) connector	Diagram 2	Figure 3

Wiring diagrams

Diagram 1



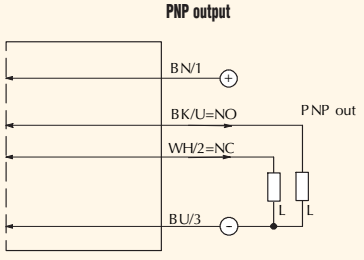
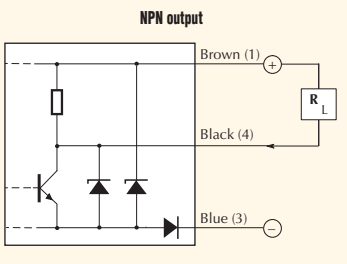
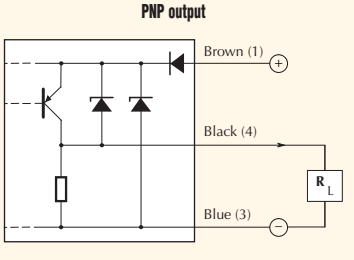
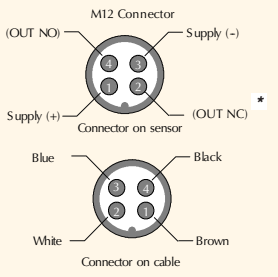


Diagram 2





Connectors



***Note: If using the N.C. output, use only 2M or 7M cables .**

Cables and Accessories

Cables and accessories start on page 18-48.

PKW Series Inductive Proximity Sensors

Specifications	Standard Distance Models	Extended Distance Models	Triple Distance Models
Type	Shielded	Unshielded	Shielded
Operating Distance	5mm (0.197in)[1]	8mm (0.315in)[1]	10mm (0.394in)
Material Correction Factors	*See Material Influence table #1		*See Material Influence table #3
Differential Travel	2 to 10%		≤15%
Repeat Accuracy	≤5%		
Operating Voltage	10-30VDC		
Ripple	≤10%		≤20%
Load Current	≤400mA		≤200mA
Voltage Drop	≤0.8V		≤2.0V
Output Type	NPN or PNP and N.O./N.C. complementary		NPN or PNP, N.O. only
Leakage Current	≤10µA		≤100µA
Switching Frequency	1kHz		200Hz
(tv) Time Delay Before Availability	100ms		≤10ms
Temperature Range / Temperature Drift	-25° to +70° C (-13° to 158° F) / 10%Sr		
Protection Degree (DIN 40050)	IEC IP67/68[2]		IEC IP67[3] (connector) IP68[3] (cable)
Agency Approvals	N/A		UL file E328811
LED Indicators	Yellow (N.O. output energized)		
Housing Material	Stainless steel		Stainless steel
Sensing Face Material	PSU		Stainless steel
Tightening Torque	40Nm (29lb./ft.)		50Nm (37lb./ft.)
Weight	70g (2.47oz)		114g (4.02oz)/50g (1.76oz)

[1]With 12 x 12mm FE360 target [2]Only with M12 connector in fully-tightened position. While this sensor has good resistance to chemicals and oil, it should be tested before using in a harsh environment. [3] Fully submersible to 290 psi.

*See Material Influence tables # 1 and #3 on page 18-57

Dimensions

Figure 1

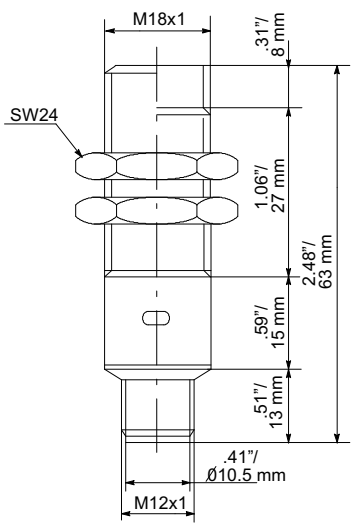


Figure 2

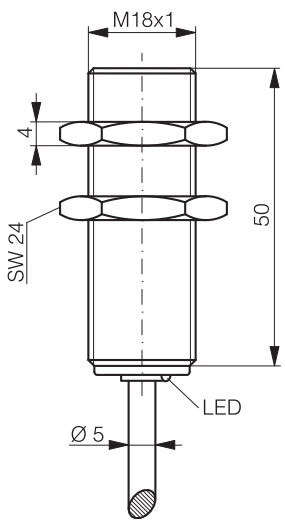
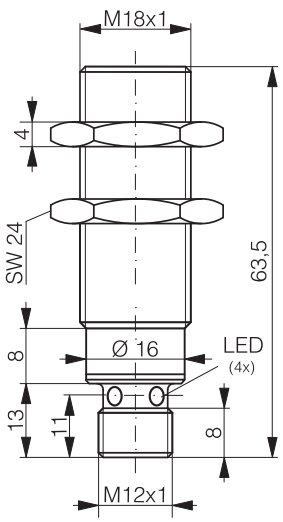


Figure 3



PTW Series Inductive Proximity Sensors

M30 (30 mm) stainless steel - DC

- 4 models available/Low cost/high performance
- M12 quick-disconnect models rated IP67, axial cable models rated IP68
- LED status indicators are visible at a wide angle
- Sense all metals at the same distance
- One-piece stainless design

PTW Series M30 DC SS Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Dimensions
PTW-AN-5A	<--->	20mm (0.787in)	Shielded	N.O	NPN	2m (6.5') axial cable	Figure 1
PTW-AP-5A	<--->				PNP	2m (6.5') axial cable	Figure 1
PTW-AN-5H	<--->				NPN	M12 (12mm) connector	Figure 2
PTW-AP-5H	<--->				PNP	M12 (12mm) connector	Figure 2

Specifications	
Type	Shielded
Operating Distance	20mm (0.787in)
Material Correction Factors	*See Material Influence table #3
Differential Travel	≤15%
Repeat Accuracy	≤5%
Operating Voltage	10-30VDC
Ripple	≤20%
Load Current	≤200mA
Voltage Drop	≤2.0V
Output Type	NPN or PNP, N.O. only
Leakage Current	≤100µA
Switching Frequency	100Hz
(tv) Time Delay Before Availability	≤10ms
Temperature Range / Temperature Drift	-25° to +70° C (-13° to 158° F) / 10%Sr
Protection Degree (DIN 40050)	IEC IP67[1] (connector) IP68[1] (cable)
Agency Approvals	UL file E328811
LED Indicators	Yellow (N.O. output energized)7
Housing Material	Stainless steel
Sensing Face Material	Stainless steel
Tightening Torque	150Nm (111lb./in.)
Weight	114g (4.02oz)/50g (1.76oz)

[1] Fully submersible to 290 psi (20 bar).

*See Material Influence table #3 on page 18-57

Dimensions

Figure 1

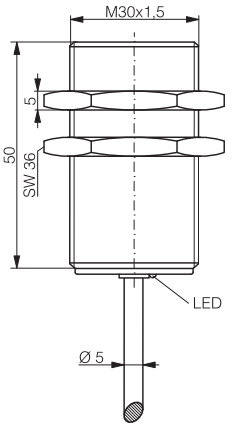
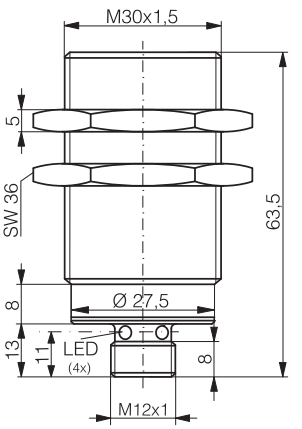


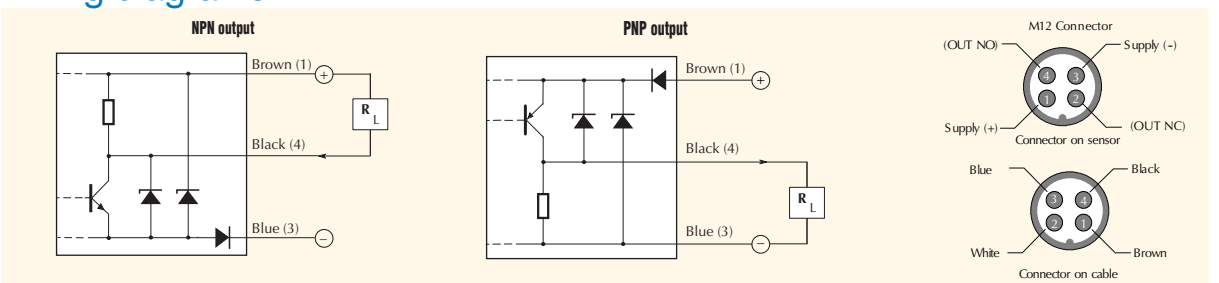
Figure 2



Cables and Accessories

Cables and accessories start on page 18-48.

Wiring diagrams



V Series AC Inductive Proximity Sensors

M12 (12 mm), M18 (18 mm), M30 (30 mm) metal – AC

- Multi-voltage: 20 to 253VAC
- 2-wire
- Metal housing
- Axial cable with tang or Quick-disconnect models
- IP67 rated
- LED status indicator

V Series M12/18/30 AC Inductive Prox Selection Chart						
Part Number	**Price**	**Sensing Range**	**Housing**	**Output State**	**Connection**	**Dimensions**
M12 Models						
VM1-A0-1B	<--->	2mm (0.079in)[1]	Shielded	N.O.	2m (6.5') axial cable	Figure 1
VM1-A0-2B	<--->	4mm (0.157in)[1]	Unshielded		2m (6.5') axial cable	Figure 1
VM1-A0-1H	<--->	2mm (0.079in)1	Shielded		M12 (12mm)	Figure 2
VM1-A0-2H	<--->	4mm (0.157in)1	Unshielded		M12 (12mm)	Figure 2
M18 Models						
VK1-A0-1B	<--->	5mm (.197in)[2]	Shielded	N.O.	2m (6.5') axial cable	Figure 3
VK1-A0-2B	<--->	8mm (0.315in)[2]	Unshielded		2m (6.5') axial cable	Figure 3
VK1-A0-1H	<--->	5mm (.197in)2	Shielded		M12 (12mm)	Figure 4
VK1-A0-2H	<--->	8mm(0.315in)2	Unshielded		M12 (12mm)	Figure 4
M30 Models						
VT1-A0-1B	<--->	10mm (.394in)[3]	Shielded	N.O.	2m (6.5') axial cable	Figure 5
VT1-A0-2B	<--->	15mm (0.591in)[3]	Unshielded		2m (6.5') axial cable	Figure 5

[1] With 12x12 Fe360 target [2] With 18x18 Fe360 target [3] With 30x30 Fe360 target

Specifications	M12 Models	M18 Models	M30 Models
Differential Travel	2 to 10%		
Repeat Accuracy	5%		
Material Correction Factors	*See Material Influence table #1		
Operating Voltage	20–253VAC, 50/60Hz		
Inrush Current	7A for up to 10ms		
Load Current	5 to 300mA (RMS)		
Leakage Current	1.0mA max. (RMS)		
Output Type	Triac/N.O./2-wire		
Switching Frequency	25Hz		
(tv) Time Delay Before Availability	200ms		
Temperature Range/Temperature Drift	-25° to +70° C (-13° to 158° F) / 10% Sr		
Protection Degree (DIN 40 050)	IEC IP67		
LED Indicators	Yellow (output energized)		
Housing Material	Nickel-plated brass		
Sensing Face Material	PBT	PBT	PBT
Tightening Torque	15Nm (11lb./ft.)	40Nm (29lb./ft.)	100Nm (73lb./ft.)
Weight	70g (2.47oz)	120g (4.23oz)	300g (10.6oz)

*See Material Influence table #1 on page 18-57

Use only 2M or 7M cables for AC sensors with M12 connectors,

Cables and Accessories

Cables and accessories start on page 18-48.

Dimensions

Figure 1

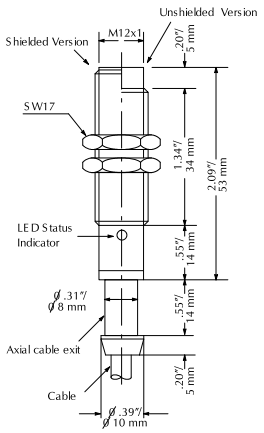


Figure 2

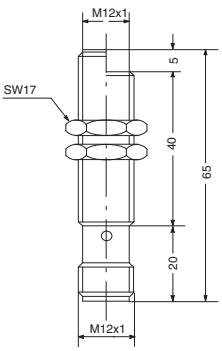
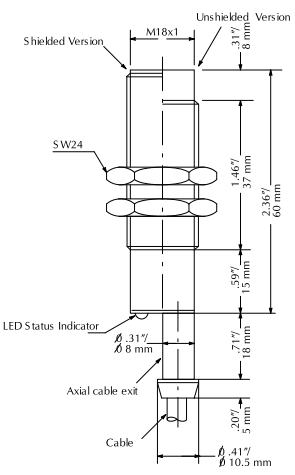


Figure 3



V Series AC Inductive Proximity Sensors

Figure 4

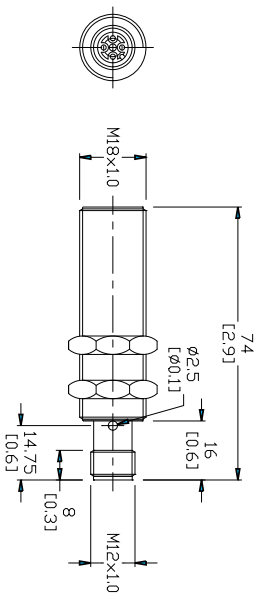
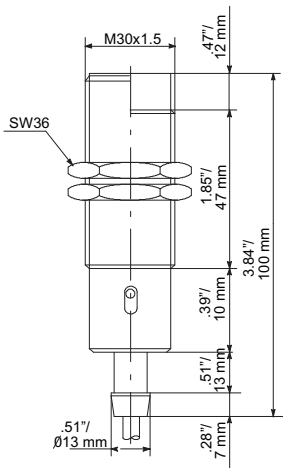
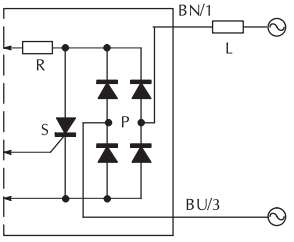


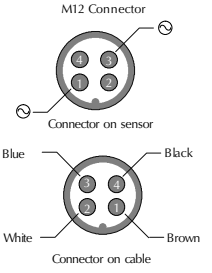
Figure 5



Wiring diagram



Connector Pinouts



CR5 Series Inductive Proximity Sensors

5 x 5 mm rectangular metal - DC

- Eight models available
- Compact 5 x 5 x 25 mm metal housing
- Axial cable or M8 quick-disconnect models
- Complete overload protection
- IP67 rated
- Screws included

CR5 Series 5x5 Rectangular DC Inductive Prox Selection Chart

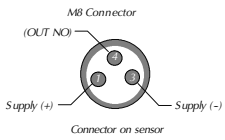
Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Dimensions
Standard Distance							
CR5-AN-1A	<--->	0.8mm (0.03in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Figure 1
CR5-AP-1A	<--->				PNP	2m (6.5') axial cable	Figure 1
CR5-AN-1F	<--->				NPN	M8 (8mm) connector	Figure 2
CR5-AP-1F	<--->				PNP	M8 (8mm) connector	Figure 2
Extended Distance							
CR5-AN-2A	<--->	1.5mm (0.059in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Figure 1
CR5-AP-2A	<--->				PNP	2m (6.5') axial cable	Figure 1
CR5-AN-2F	<--->				NPN	M8 (8mm) connector	Figure 2
CR5-AP-2F	<--->				PNP	M8 (8mm) connector	Figure 2

Specifications	Standard Distance Models	Extended Distance Models
Type	Shielded	Shielded
Operating Distance	0.8mm (0.03in)	1.5mm (0.059in)
Material Correction Factors	*See Material Influence table #1	
Differential Travel	≤10%	
Repeat Accuracy	≤1.5%	
Operating Voltage	10-30VDC	
Ripple	≤20%	
No-load Supply Current	≤10mA	
Load Current	≤200mA	
Leakage Current	≤10µA	
Voltage Drop	≤2.0 V	
Output Type	NPN or PNP/N.O. only/3-wire	
Switching Frequency	5kHz	3kHz
(tv) Time Delay Before Availability	10ms	
Input Voltage Transient Protection	Up to 30VDC	
Input Power Polarity Reversal Protection	Yes	
Output Power Short-Circuit Protection	Yes (switch auto-resets after overload is removed)	
Temperature Range	-25° to +70° C (-13° to 158° F)	
Temperature Drift	10% Sr	
Protection Degree (DIN 40050)	IEC IP67	
Agency Approvals	UL file E328811	
LED Indicators	Yellow (output energized)	
Housing Material	Nickel-plated brass	
Sensing Face Material	Polyester	
Tightening Torque	1.5Nm (13.3lb./in)	
Weight	26g (0.92oz)	27g (0.95oz)

*See Material Influence table #1 on page 18-57

Cables and Accessories

Cables and accessories start on page 18-48.



Dimensions

Figure 1

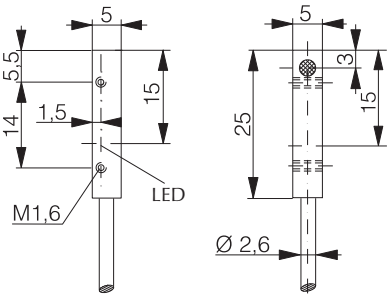
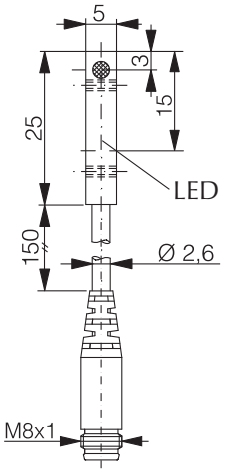
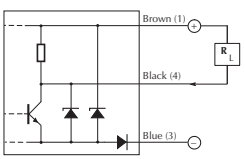


Figure 2

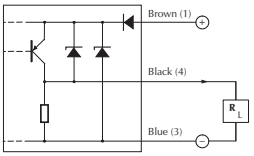


Wiring diagrams

NPN output



PNP output



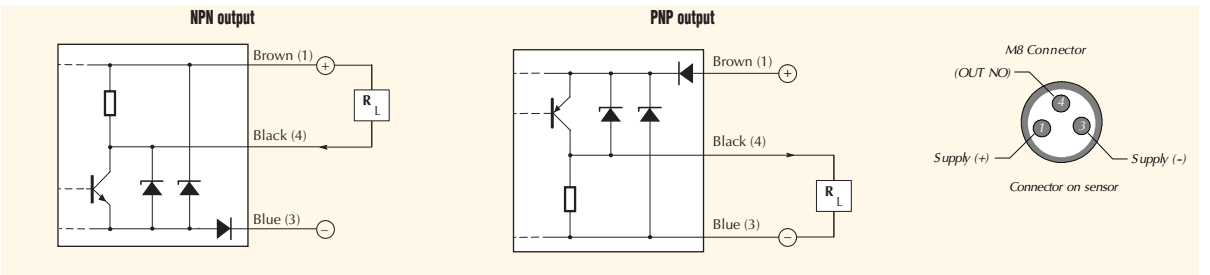
CR8 Series Inductive Proximity Sensors

8 x 8 mm rectangular metal – DC

- 12 models available
- Compact 8 x 8 x 40 mm metal housing
- Axial cable or M8 quick-disconnect models
- Complete overload protection
- IP67 rated
- Screws included

CR8 Series 8x8 Rectangular DC Inductive Prox Selection Chart							
Part Number	**Price**	**Sensing Range**	**Housing**	**Output State**	**Logic**	**Connection**	**Dimensions**
Standard Distance							
CR8-AN-1A	<--->	0 to 1.5mm (0 to 0.059in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Figure 1
CR8-AP-1A	<--->				PNP	2m (6.5') axial cable	Figure 1
CR8-AN-1F	<--->				NPN	M8 (8mm) connector	Figure 2
CR8-AP-1F	<--->				PNP	M8 (8mm) connector	Figure 2
Extended Distance							
CR8-AN-2A	<--->	0 to 2mm (0 to 0.079in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Figure 1
CR8-AP-2A	<--->				PNP	2m (6.5') axial cable	Figure 1
CR8-AN-2F	<--->				NPN	M8 (8mm) connector	Figure 2
CR8-AP-2F	<--->				PNP	M8 (8mm) connector	Figure 2
Triple Distance							
CR8-AN-3A	<--->	3mm (0.118in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Figure 1
CR8-AP-3A	<--->				PNP	2m (6.5') axial cable	Figure 1
CR8-AN-3F	<--->				NPN	M8 (8mm) connector	Figure 2
CR8-AP-3F	<--->				PNP	M8 (8mm) connector	Figure 2

Wiring diagrams



Cables and Accessories

Cables and accessories start on page 18-48.

CR8 Series Inductive Proximity Sensors

Specifications	Standard Distance Models	Extended Distance Models	Triple Distance Models
Type	Shielded	Shielded	Shielded
Operating Distance	1.5mm (0.059in)	2mm (0.079in)	3mm (0.118in)
Material Correction Factors	*See Material Influence table #1		*See Material Influence table #2
Differential Travel	≤10%		
Repeat Accuracy	≤5%		
Operating Voltage	10-30VDC		
Ripple	≤20%		
No-load Supply Current	≤10mA		
Load Current	≤200mA		
Leakage Current	≤10µA		
Voltage Drop	≤2.0 V		
Output Type	NPN or PNP/N.O. only/3-wire		
Switching Frequency	1kHz		
(tv) Time Delay Before Availability	10ms		50ms
Input Voltage Transient Protection	Up to 30VDC		
Input Power Polarity Reversal Protection	Yes		
Output Power Short-Circuit Protection	Yes (switch auto-resets after overload is removed)		
Temperature Range	-25° to +70° C (-13° to 158° F)		
Temperature Drift	≤10% Sr		
Protection Degree (DIN 40050)	IEC IP67		
Agency Approvals	UL file E328811		
LED Indicators	Yellow (output energized)		
Housing Material	Nickel-plated brass		Chrome-plated brass
Sensing Face Material	PBT		
Tightening Torque	4Nm (35lb./in.)		
Weight *(cable/M8 connector)*	43g (1.52oz)/15g (0.53oz)		54g (1.90oz)/21g (0.74oz)

*See Material Influence tables #1 and #2 on page 18-57

Dimensions

Figure 1

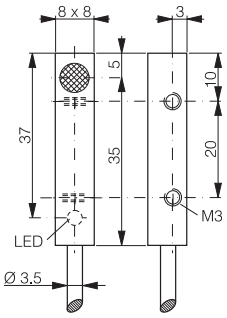
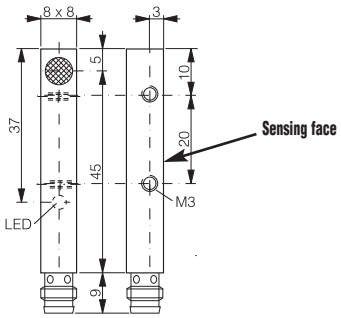


Figure 2



DR10 Series Inductive Proximity Sensors

10 x16 mm plastic –DC

- Eight models available
- Compact plastic housing
- Axial cable or M8 quick-disconnect models
- Complete overload protection
- IP67 rated

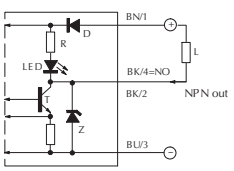
DR10 Series Rectangular DC Inductive Prox Selection Chart							
Part Number	**Price**	**Sensing Range**	**Housing**	**Output State**	**Logic**	**Connection**	**Dimensions**
DR10-AN-1A	<--->	3mm (0.118in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Figure 1
DR10-AP-1A	<--->				PNP	2m (6.5') axial cable	Figure 1
DR10-AN-1F	<--->				NPN	M8 (8mm) connector	Figure 2
DR10-AP-1F	<--->				PNP	M8 (8mm) connector	Figure 2
DR10-AN-2A	<--->	6mm (0.236in)	Unshielded	N.O	NPN	2m (6.5') axial cable	Figure 1
DR10-AP-2A	<--->				PNP	2m (6.5') axial cable	Figure 1
DR10-AN-2F	<--->				NPN	M8 (8mm) connector	Figure 2
DR10-AP-2F	<--->				PNP	M8 (8mm) connector	Figure 2

Specifications		
Type	Shielded	Unshielded
Operating Distance	3mm (0.118in)	6mm (0.236in)
Material Correction Factors	*See Material Influence table #1	
Differential Travel	≤1-10%	
Repeat Accuracy	≤1%	
Operating Voltage	10-30VDC	
Ripple	≤10%	
Power Consumption	≤10mA	
Load Current	≤300mA	
Leakage Current	≤10µA	
Voltage Drop	≤1.5 V	
Output Type	NPN or PNP/N.O. only/3-wire	
Switching Frequency	3kHz	
(tv) Time Delay Before Availability	2ms	
Input Voltage Transient Protection	Up to 30VDC	
Input Power Polarity Reversal Protection	Yes	
Output Power Short-Circuit Protection	Yes (switch auto-resets after overload is removed)	
Temperature Range	-25° to +75° C (-13° to 167° F)	
Temperature Drift	10% Sr	
Protection Degree (DIN 40050)	IEC IP67	
LED Indicators	Yellow (output energized)	
Housing Material	Plastic	
Sensing Face Material	Plastic	
Weight (cable/connector)	113g (3.99oz)/6g (0.21oz)	

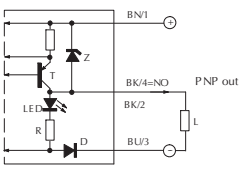
*See Material Influence table #1 on page 18-57

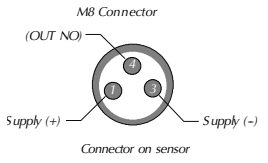
Wiring diagrams

NPN Output



PNP Output





Dimensions

Figure 1

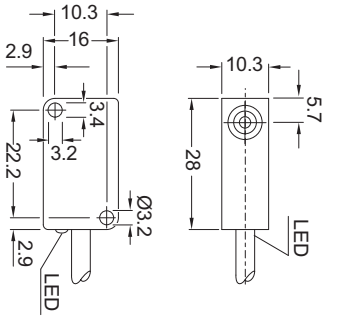
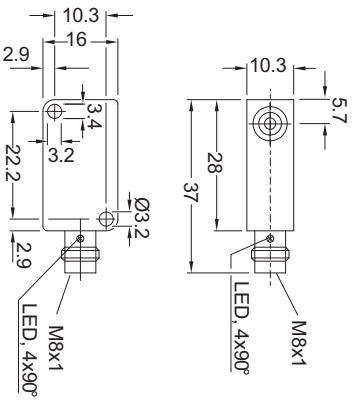


Figure 2



Cables and Accessories

Cables and accessories start on page 18-48.

APS4 Inductive Proximity Sensors

APS4-12S-E-D
APS4-12S-E2-D

APS4-12M-E-D
APS4-12M-E2-D

Compact 12 x27 mm plastic – DC

- 4 models available
- Compact polycarbonate housing; comes with mounting plate
- High-frequency oscillation type
- DC 3-wire, NPN or PNP / N.O.
- Axial cable
- LED indicator
- IP67 rated

Compact Rectangular DC Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Dimensions
APS4-12M-E-D	<--->	4mm (0.157in)	Unshielded	N.O.	NPN	2m (6.5') axial cable	Figure 1
APS4-12M-E2-D	<--->				PNP		Figure 1
APS4-12S-E-D	<--->				NPN		Figure 2
APS4-12S-E2-D	<--->				PNP		Figure 2

Specifications

Type	Unshielded
(Sn) Nominal Sensing Distance	4mm (0.157in)
Material Correction Factor	*See Material Influence table #1
Operating Voltage	10-30VDC
Load Current	≤50mA
Current Consumption	≤10mA
Voltage Drop	≤1.0VDC
Output Type	NPN or PNP
Leakage Current	≤0.1mA
Switching Frequency	200Hz
(tv) Time Delay Before Availability	5ms
Temperature Range	-10° to +50° C (14° to 122° F)
Protection Degree (DIN 40 050)	IEC IP67
LED Indicators	Displays operation status
Housing, Sensing Face Material	Polycarbonate
Weight	1.41oz. (40g)

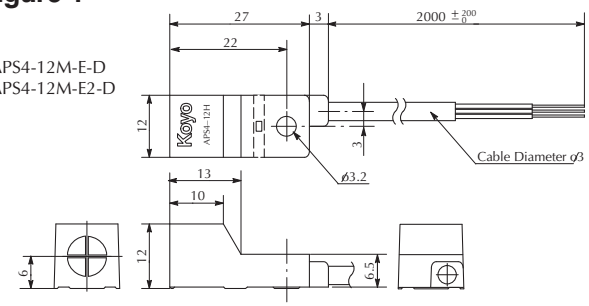
*See Material Influence table #1 on page 18-57

Dimensions

All dimensions in mm

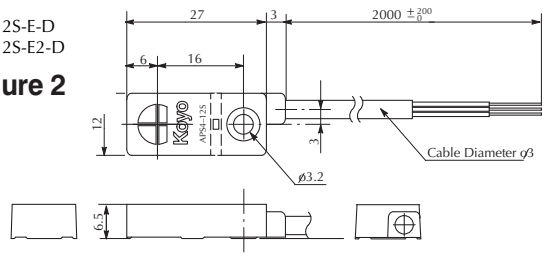
Figure 1

APS4-12M-E-D
APS4-12M-E2-D



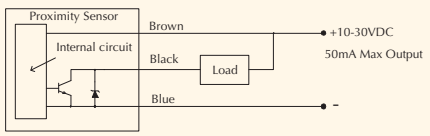
APS4-12S-E-D
APS4-12S-E2-D

Figure 2

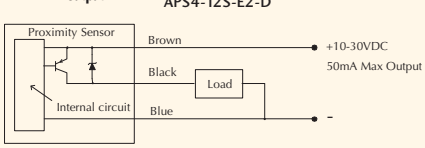


Wiring diagrams

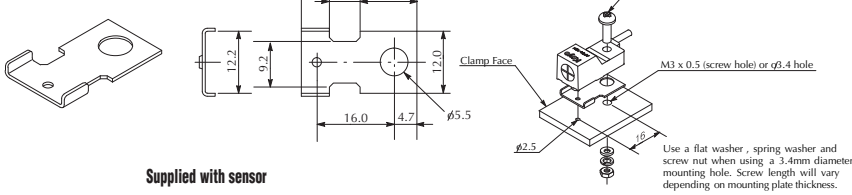
NPN output APS4-12M-E-D APS4-12S-E-D



PNP output APS4-12M-E2-D APS4-12S-E2-D



Mounting plate



Supplied with sensor

CT Series Capacitive Proximity Sensors

M30 (30 mm) metal – DC

- 6 models available
- Sensitivity adjustment with 20-turns trimmer
- Metal housing with axial cable
- Detects metallic and non-metallic objects
- Complete overload protection
- IP65 rated
- Double LED status indicators

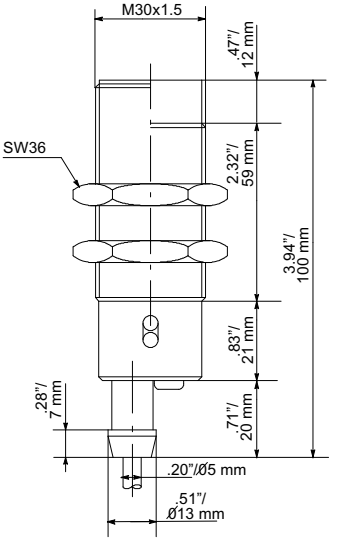
CT Series 30DC Capacitive Prox Sensor Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection
CT1-AN-1A	<--->	2 to 15mm (0.079-0.59in)	Shielded	N.O.	NPN	2m (6.5') axial cable
CT1-AP-1A	<--->				PNP	2m (6.5') axial cable
CT1-AN-2A	<--->	2 to 20mm (0.079-0.70in)	Unshielded	N.O.	NPN	2m (6.5') axial cable
CT1-AP-2A	<--->				PNP	2m (6.5') axial cable
CT1-CN-2A	<--->	2 to 20mm (0.079-0.70in)	Unshielded	N.C.	NPN	2m (6.5') axial cable
CT1-CP-2A	<--->				PNP	2m (6.5') axial cable

Specifications

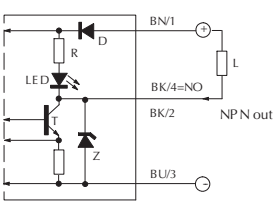
Type	Shielded	Unshielded
Operating Distance	2-15mm (0.079-0.59in)	2-20mm (0.079-0.70in)
Differential Travel	2 to 20%	
Repeat Accuracy	10%	
Operating Voltage	10-30VDC	
Ripple	≤10%	
No-load Supply Current	8mA	
Load Current	≤200mA	
Leakage Current	≤10µA	
Voltage Drop	1.8 volts maximum	
Output Type	NPN or PNP / N.O. or N.C. / 3-wire	
Switching Frequency	100Hz	
(tv) Time Delay Before Availability	100ms	
Input Voltage Transient Protection	Yes, only if transient peak does not exceed 30VDC	
Input Power Polarity Reversal Protection	Yes	
Output Power Short-Circuit Protection	Yes (switch auto-resets after overload is removed)	
Temperature Range	-25° to +70° C (-13° to 158° F)	
Temperature Drift	20% Sr	
Protection Degree (DIN 40050)	IEC IP65	
LED Indicators	Green (supply, Red (N.O. output energized)	
Housing Material	Nickel-plated brass	
Sensing Face Material	PBT	
Tightening Torque	100Nm (73.7lb./ft.)	
Weight (cable/connector)	280g (19.88oz)	

Dimensions

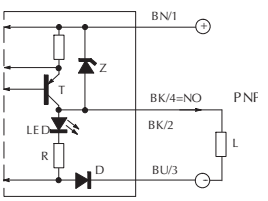


Wiring diagrams

NPN output



PNP output



Cables and Accessories

Cables and accessories start on page 18-48.

AE Series Analog Inductive Proximity Sensors

M8 (8 mm) metal – analog output

- 4 models available
- Compact metal housing
- Axial cable or M8 quick-disconnect models
- IP67 rated

Cables and Accessories

Cables and accessories start on page 18-48.

AE Series M8 Analog Inductive Prox Selection Chart						
Part Number	**Price**	**Sensing Range**	**Housing**	**Output**	**Connection**	**Dimensions**
AE9-10-1A	<--->	0 to 4mm (0-0.157in)	Shielded	0-10VDC	2m (6.5') axial cable	Figure 1
AE9-10-1F	<--->				M8 (8mm) connector	Figure 2

Specifications	
	AE9-10-1*
Output Type	0-10VDC
Resolution	≤1µm
Repeat Accuracy	±0.01mm
Material Correction Factors	See Proximity Sensor Terminology
Operating Voltage	15-30VDC
Ripple	≤20%
No-load Supply Current	≤10mA
Voltage Output Minimum Load	1kΩ
Voltage Drop	≤2.0 V
Time Delay Before Availability	≤50ms
Input Voltage Transient Protection	Up to 30VDC
Input Power Polarity Reversal Protection	Yes
Output Power Short-Circuit Protection	Yes (switch auto-resets after overload is removed)
Temperature Range	-25° to +70° C (-13° to 158° F)
Temperature Drift	≤10% Sr
Protection Degree (DIN 40050)	IEC IP67
Agency Approvals	UL file E328811
Housing Material	Chrome-plated brass
Sensing Face Material	PBT
Tightening Torque	4Nm (0.71lb./in.)
Weight (cable/M8 connector)	50g (1.76 oz.) / 20g (0.71 oz.)

Dimensions

Figure 1

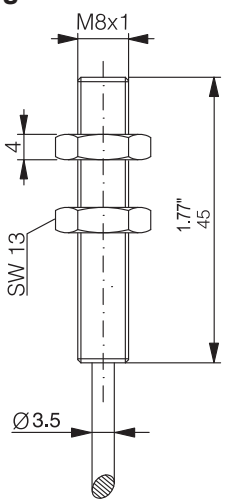
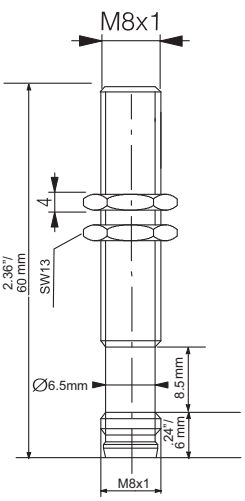
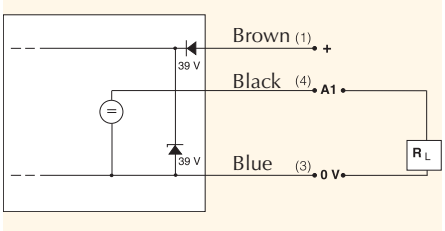


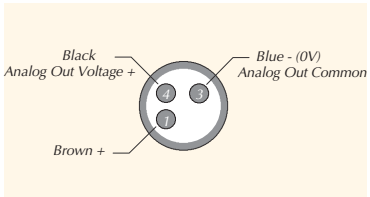
Figure 2



Wiring diagrams



Connector



AM Series Analog Inductive Proximity Sensors

M12 (12 mm) metal – analog output

- Voltage or current analog output
- 4 models available
- Metal housing
- Axial cable or M12 quick-disconnect models
- IP67 rated

Cables and Accessories

Cables and accessories start on page 18-48.

AM Series M12 Analog Inductive Prox Selection Chart						
Part Number	***Price***	***Sensing Range***	***Housing***	***Output***	***Connection***	***Dimensions***
AM9-05-1A	<--->	0 to 6mm (0-0.24in)	Shielded	0 - 5VDC or 1-5mA	2m (6.5') axial cable	Figure 1
AM9-05-1H	<--->				M12 (12mm) connector	Figure 2
AM9-10-1A	<--->	0 to 6mm (0-0.24in)		0-10VDC or 4-20mA	2m (6.5') axial cable	Figure 1
AM9-10-1H	<--->				M12 (12mm) connector	Figure 2

Specifications		
	AM9-05-1*	***AM9-10-1****
Output Type	0-5VDC or 1-5mA	0-10VDC or 4-20mA
Resolution	≤1µm	
Repeat Accuracy	±0.01mm	
Material Correction Factors	See Proximity Sensor Terminology	
Operating Voltage	10 -30VDC	15 -30VDC
Ripple	≤20%	
No-load Supply Current	≤10mA	≤12mA
Voltage Output Min. Load	500Ω	1kΩ
Current Output Max. Load / Power Supply	1kΩ / 10VDC; 5kΩ / 30VDC	0.5kΩ / 15VDC; 1kΩ / 30VDC
Voltage Drop	≤2.0 V	
Time Delay Before Availability	≤50ms	
Input Voltage Transient Protection	Up to 30VDC	
Input Power Polarity Reversal Protection	Yes	
Output Power Short-Circuit Protection	Yes (switch auto-resets after overload is removed)	
Temperature Range	-25° to +70° C (-13° to 158° F)	
Temperature Drift	≤10% Sr	
Protection Degree (DIN 40050)	IEC IP67	
Agency Approvals	UL file E328811	
Housing Material	Chrome-plated brass	
Sensing Face Material	PBT	
Tightening Torque	10Nm (88lb./in.)	
Weight *(cable/M8 connector)*	95g (3.35 oz.) / 33g (1.16 oz.)	

Figure 1

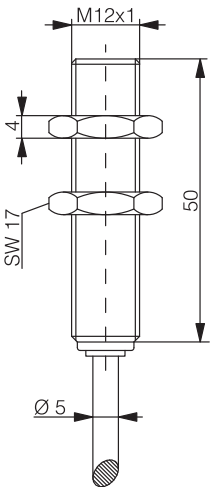
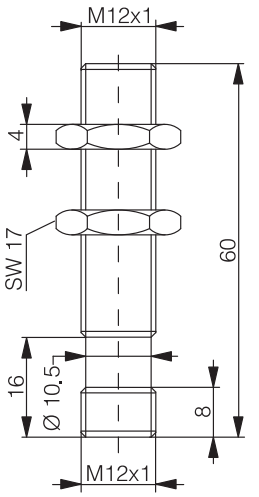
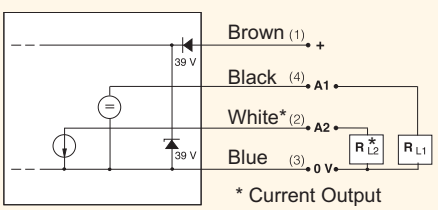


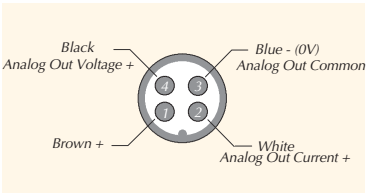
Figure 2



Wiring diagrams



Connector



Sensors with M12 connectors must use 2M or 7M cables (4-wire).

AK Series Analog Inductive Proximity Sensors

M18 (18 mm) metal – analog output

- Voltage or current analog output
- 4 models available
- Metal housing
- Axial cable or M12 quick-disconnect models
- IP67 rated

Cables and Accessories

Cables and accessories start on page 18-48.

AK Series M18 Analog Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output	Connection	Dimensions
AK9-05-1A	<--->	0 to 10mm (0-0.39in)	Shielded	0 - 5VDC or 1-5mA	2m (6.5') axial cable	Figure 1
AK9-05-1H	<--->				M12 (12mm) connector	Figure 2
AK9-10-1A	<--->	0 to 10mm (0-0.39in)		0-10VDC or 4-20mA	2m (6.5') axial cable	Figure 1
AK9-10-1H	<--->				M12 (12mm) connector	Figure 2

Specifications

	AK9-05-1*	AK9-10-1*
Output Type	0-5VDC or 1-5mA	0-10VDC or 4-20mA
Resolution	≤2µm	
Repeat Accuracy	±0.02mm	
Material Correction Factors	See Proximity Sensor Terminology	
Operating Voltage	10 -30VDC	15 -30VDC
Ripple	≤20%	
No-load Supply Current	≤10mA	≤12mA
Voltage Output Min. Load	500Ω	1kΩ
Current Output Max. Load / Power Supply	1kΩ / 10VDC; 5kΩ / 30VDC	0.5kΩ / 15VDC; 1kΩ / 30VDC
Voltage Drop	≤2.0 V	
Time Delay Before Availability	≤50ms	
Input Voltage Transient Protection	Up to 30VDC	
Input Power Polarity Reversal Protection	Yes	
Output Power Short-Circuit Protection	Yes (switch auto-resets after overload is removed)	
Temperature Range	-25° to +70° C (-13° to 158° F)	
Temperature Drift	≤10% Sr	
Protection Degree (DIN 40050)	IEC IP67	
Agency Approvals	UL file E328811	
Housing Material	Chrome-plated brass	
Sensing Face Material	PBT	
Tightening Torque	30Nm (22lbs./ft.)	
Weight (cable/M8 connector)	110g (3.88 oz.) / 50g (1.76 oz.)	

Figure 1

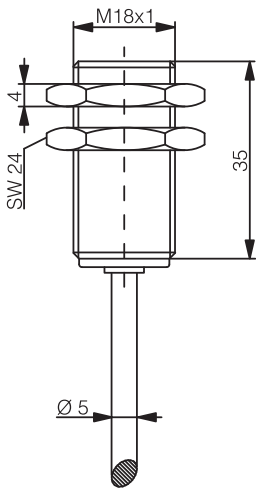
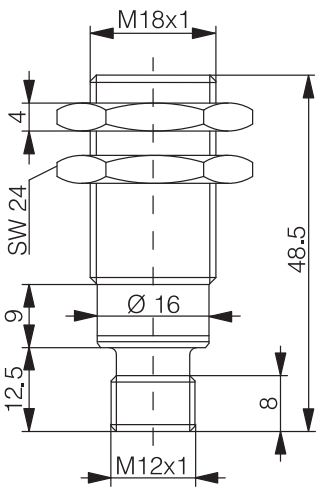
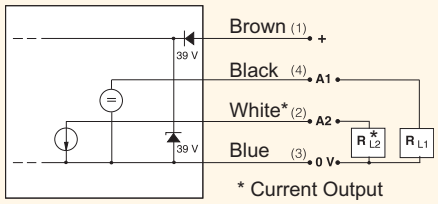


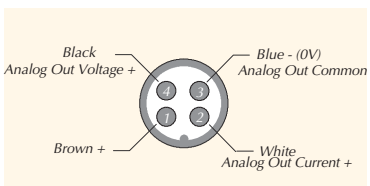
Figure 2



Wiring diagrams



Connector



Sensors with M12 connectors must use 2M or 7M cables (4-wire).

AT Series Analog Inductive Proximity Sensors

M30 (30 mm) metal – analog output

- Voltage or current analog output
- 4 models available
- Metal housing
- Axial cable or M12 quick-disconnect models
- IP67 rated

Cables and Accessories

Cables and accessories start on page 18-48.

AT Series M30 Analog Inductive Prox Selection Chart						
Part Number	**Price**	**Sensing Range**	**Housing**	**Output**	**Connection**	**Dimensions**
AT9-05-1A	<--->	0 to 20mm (0-0.79in)	Shielded	0 - 5VDC or 1-5mA	2m (6.5') axial cable	Figure 1
AT9-05-1H	<--->				M12 (12mm) connector	Figure 2
AT9-10-1A	<--->	0 to 20mm (0-0.79in)		0-10VDC or 4-20mA	2m (6.5') axial cable	Figure 1
AT9-10-1H	<--->				M12 (12mm) connector	Figure 2

Specifications		
	AT9-05-1*	**AT9-10-1***
Output Type	0-5VDC or 1-5mA	0-10VDC or 4-20mA
Resolution	≤5µm	
Repeat Accuracy	±0.05mm	
Material Correction Factors	See Proximity Sensor Terminology	
Operating Voltage	10 -30VDC	15 -30VDC
Ripple	≤20%	
No-load Supply Current	≤10mA	≤12mA
Voltage Output Min. Load	500Ω	1kΩ
Current Output Max. Load / Power Supply	1kΩ / 10VDC; 5kΩ / 30VDC	0.5kΩ / 15VDC; 1kΩ / 30VDC
Voltage Drop	≤2.0 V	
Time Delay Before Availability	≤50ms	
Input Voltage Transient Protection	Up to 30VDC	
Input Power Polarity Reversal Protection	Yes	
Output Power Short-Circuit Protection	Yes (switch auto-resets after overload is removed)	
Temperature Range	-25° to +70° C (-13° to 158° F)	
Temperature Drift	≤10% Sr	
Protection Degree (DIN 40050)	IEC IP67	
Agency Approvals	UL file E328811	
Housing Material	Chrome-plated brass	
Sensing Face Material	PBT	
Tightening Torque	60Nm (44lbs./ft.)	
Weight *(cable/M8 connector)*	190g (6.71 oz.) / 135g (4.76 oz.)	

Figure 1

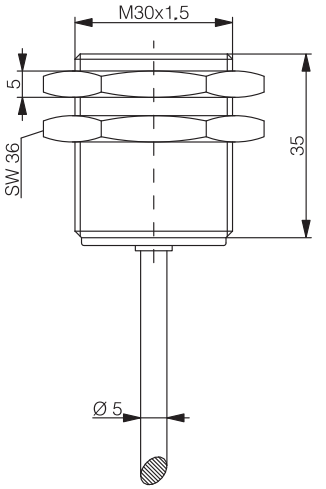
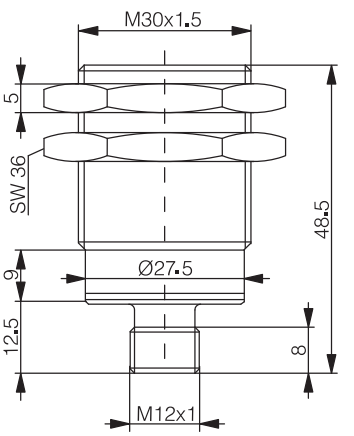
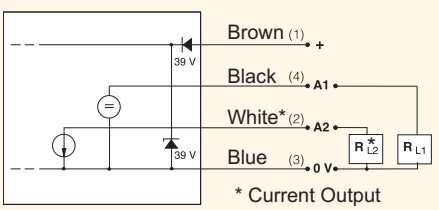


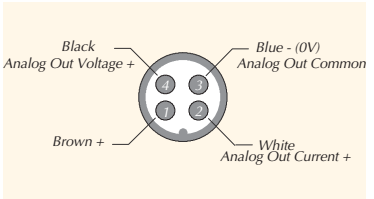
Figure 2



Wiring diagrams



Connector



Sensors with M12 connectors must use 2M or 7M cables (4-wire).

SU Series Ultrasonic Sensors

M18 (18 mm) plastic –DC or analog output

- High resolution
- 2 DC models available with adjustable sensitivity
- 3 analog models available
- Complete overload protection
- IP67 rated
- LED status indicator on DC models

Cables and Accessories

Cables and accessories start on page 18-48.

SU Series Ultrasonic DC Output Sensor Selection Chart

Part Number	Price	Sensing Range	Output State	Logic	Connection	Wiring
SU1-B0-0A	<--->	100 to 600mm (3.94-23.62in)	N.O.	PNP	2m (6.5') axial cable	Diagram1
SU2-A0-0A	<--->	200 to 1500mm (7.87-59.06in)		PNP	2m (6.5') axial cable	

SU Series Ultrasonic Analog Output Sensor Selection Chart

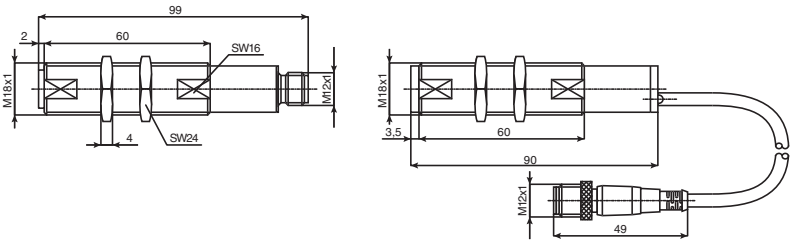
Part Number	Price	Sensing Range	Output	Connection	Wiring
SU1-B1-0A	<--->	100 to 600mm (3.94-23.62in)	0-10VDC	2m (6.5') axial cable	Diagram 2
SU1-B1-0E	<--->			M12 (12mm) connector	
SU2-A1-0E	<--->	200 to 1500mm (7.87-59.06in		M12 (12mm) connector	

Specifications

Type	SU1-B0-0A	SU2-A0-0A	SU1-B1-0*	SU2-A1-0E
Differential Travel	±2.5%	±2.0%	-	
Repeatability	0.2%		±2mm	
Operating Voltage	15-30VDC		18-30VDC	
Linearity Error	-		≤0.3%	
No-load Supply Current	≤35mA			
Load Current	≤500mA		≤5mA	
Leakage Current	≤10µA			
Voltage Drop	≤2.5 volts		-	
Output Type	PNP / N.O.		0-10VDC	
Ultrasonic Frequency	300kHz	180kHz	300kHz	180kHz
Ultrasonic Beam Angle	8°			
Switching Frequency	25Hz	8Hz	-	
Max. Response Time	-		50ms	150ms
(tv) Time Delay Before Availability	≤200ms		≤500ms	
Control Input	Hold / Sync			
Sensitivity Adjustment	Yes		-	
Input Voltage Transient Protection	Yes, only if transient peak does not exceed 30VDC			
Input Power Polarity Reversal Protection	Yes			
Output Power Short-Circuit Protection	Yes (switch auto-resets after overload is removed)			
Temperature Range	-25° to +70° C (-13° to 158° F)			
Temperature Compensation	Yes			
Protection Degree	IEC IP67			
LED Indicators	Yellow (output energized)		-	
Housing Material	PBT			
Tightening Torque	3Nm (2.21lb./ft.)			
Weight (cable/connector)	54g (1.90oz) / 38g (1.34oz.)			

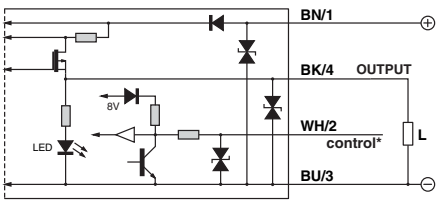
SU Series Ultrasonic Sensors

Dimensions



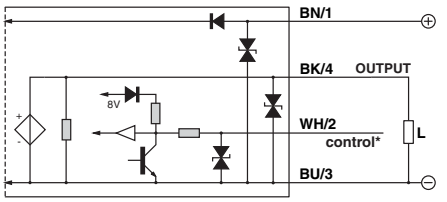
Wiring Diagrams

Diagram 1



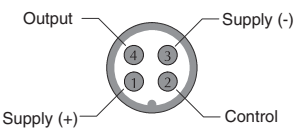
* Control wire can be used to inhibit sensor or to synchronize with another sensor.

Diagram 2



* Control wire can be used to inhibit sensor or to synchronize with another sensor.

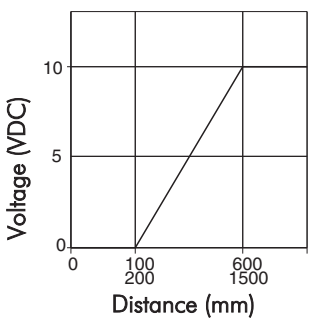
Connectors



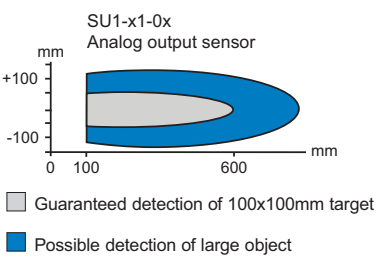
Must be used with 2M or 7M cable (4-wire)

Characteristic Curves

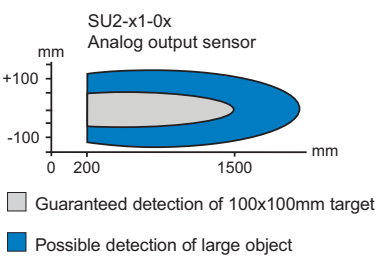
Analog Output



Detection Area SU1 Analog output



Detection Area SU2 Analog output



TU Series Ultrasonic Sensors

M30 (30 mm) plastic – DC or Analog Output

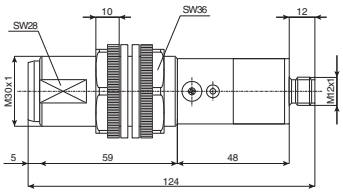
- High resolution
- DC output model available with adjustable sensitivity
- Complete overload protection
- IP67 rated
- LED status indicator on DC models

TU Series Ultrasonic DC Output Sensor Selection Chart						
Part Number	**Price**	**Sensing Range**	**Output State**	**Logic**	**Connection**	**Wiring**
TU1-C0-0E	<--->	300 to 2500mm (11.81-98.43in)	N.O.	PNP	M12 (12mm) connector	Diagram1

TU Series Ultrasonic Analog Output Sensor Selection Chart					
Part Number	**Price**	**Sensing Range**	**Output**	**Connection**	**Wiring**
TU1-C1-0E	<--->	300 to 2500mm (11.81-98.43in)	0-10VDC	M12 (12mm) connector	Diagram 2

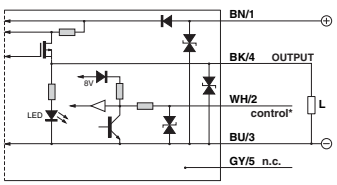
Specifications		
Type	**TU1-C0-0E**	**TU1-C1-0E**
Differential Travel	±2.0%	-
Repeat Accuracy	0.2%	±2mm
Operating Voltage	19-30VDC	
Linearity Error	-	≤0.3%
No-load Supply Current	≤35mA	
Load Current	≤500mA	≤5mA
Leakage Current	≤10µA	
Voltage Drop	≤2.5 volts	-
Output Type	PNP / N.O.	0-10VDC
Ultrasonic Frequency	130kHz	
Ultrasonic Beam Angle	8°	
Switching Frequency	1Hz	-
Max. Response Time	-	100ms
(tv) Time Delay Before Availability	≤200ms	≤1s
Control Input	Hold / Sync	
Sensitivity Adjustment	Yes	-
Input Voltage Transient Protection	Yes, only if transient peak does not exceed 30VDC	
Input Power Polarity Reversal Protection	Yes	
Output Power Short-Circuit Protection	Yes (switch auto-resets after overload is removed)	
Temperature Range	-25° to +70° C (-13° to 158° F)	
Temperature Compensation	Yes	
Protection Degree	IEC IP67	
LED Indicators	Yellow (output energized)	-
Housing Material	PBT	
Tightening Torque	3Nm (2.21lb./ft.)	
Weight (connector)	124g (4.37oz)	

Dimensions



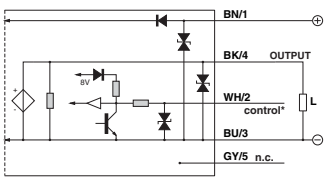
Wiring Diagrams

Diagram 1



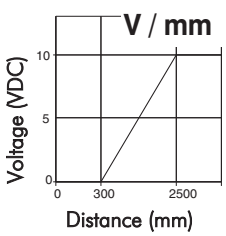
* Control wire can be used to inhibit sensor or to synchronize with another sensor.

Diagram 2

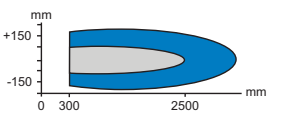


* Control wire can be used to inhibit sensor or to synchronize with another sensor.

Characteristic Curves (analog)



Detection Area



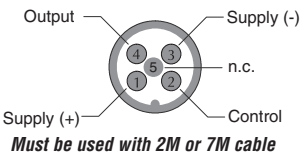
Guaranteed detection of 100x100mm target

Possible detection of large object

Cables and Accessories

Cables and accessories start on page 18-48.

Connector



Must be used with 2M or 7M cable

UHZ Series Ultrasonic Sensors

Measuring only 30 mm x 20 mm, these miniature sensors are specifically designed for applications with limited mounting space. Thru-beam pair sensors are often the most accurate and reliable sensor configurations, but can also be the most costly when compared to traditional diffuse or retro-reflective sensors. The low price of a UHZ series thru-beam pair allows it to be a competitive alternative to similarly priced but less accurate sensors.

Ultrasonic sensors (rectangular) are ideal for detecting objects in applications where the use of a normal photocell does not, such as:

- **level measurement: for tanks containing solid or liquid**
- **diameter or loop detection: for materials such as paper, sheet iron, etc.**
- **transparent object detection: for plastic or glass bottles, plastic filters, etc.**

Overview

The principle of ultrasonic sensors is based on the emission of a sound impulse and the measurement of the time elapsing of the return echo signal reflected by the detected object. The ultrasonic beam is well reflected by almost all materials (metal, wood, plastic, glass, liquid, etc.) and is not affected by colored, transparent, or shiny objects.

This allows the user to standardize on one sensor for many materials without any extra setup or sensing concerns.

Ultrasonic Thru-Beam Sensors Specifications	
Specifications	
Model Series	**UHZ**
Input Voltage	18 - 30 VDC
Sensing Range	300 mm
Switching Frequency	150 Hz
Sensing Beam	Beam angle 15°
Output Types	PNP/NPN, NO/ NC
Operating Temperature	5°F to 140°F (-15°C to +60°C)
Case Material	PBTP
Active Head Material	Ceramic
Vibration	per IEC EN 60947-5-2
Shock	per IEC EN 60947-5-2
Protection	Output short circuit and overcurrent protection, reverse polarity protection
Enclosure Ratings	IEC-IP67
Agency Approvals	CE
Output Load	500 mA
Response Time	1 ms
No Load Current Draw	< 40 mA
Leakage Current (max)	<10 µA @ 30 VDC
Indicator LEDs	Yellow Output State

UHZ Series Ultrasonic Sensors

The UHZ series of miniature ultrasonic sensors includes four models of rectangular thru-beam units. These tiny 20 mm x 30 mm sensors have a maximum sensing distance of 300 mm, with no dead zone at close range. This enables object sensing at a variety of distances. All models have an LED indicator on the receiver and are IP67 protection rated.

With two pre-drilled mounting holes, the UHZ units can be surface mounted more easily than traditional 18 mm or 30 mm threaded tubular designs, which often require a separate mounting bracket or a large mounting hole and additional locknuts.

Features

- 30x20x12 mm emitter/receiver rectangular ultrasonic sensor
- LED status indicator for all models
- Complete protection against electrical damage
- IP67 protection
- Strong plastic housing
- Switching frequency 150 Hz
- Sensing distance (sn): 300mm
- Beam angle: 15°
- Supply voltage: 18 - 30 VDC
- NPN or PNP, NO or NC models

Rectangular Ultrasonic Thru-Beam Sensors Selection Chart

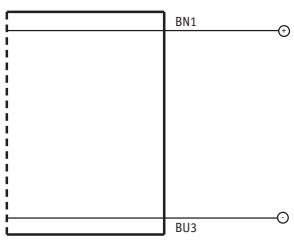
Part Number	Price	Voltage Range	Sensing Range	Switching Frequency	Sensing Beam	Thru-Beam Component	Output Type	Connection Type
UHZ-AN-0A	<--->	18 - 30 VDC	11.81 in. (0.3 m)	150 Hz	ultrasonic	pair	NPN NO	2 meter cable
UHZ-AP-0A	<--->					pair	PNP NO	
UHZ-CN-0A	<--->					pair	NPN NC	
UHZ-CP-0A	<--->					pair	PNP NC	

Cables and Accessories

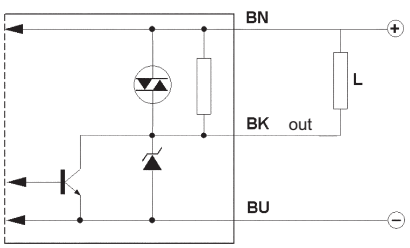
Cables and accessories start on page 18-48.

Wiring Diagram

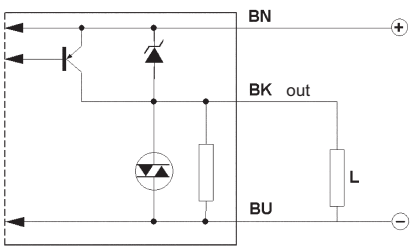
Emitter



Receiver (NPN)

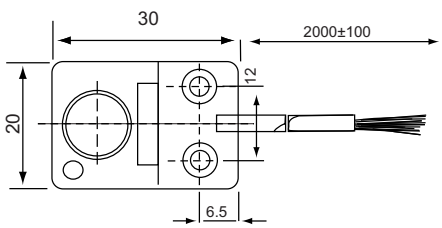


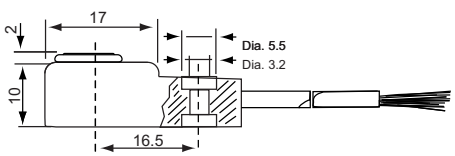
Receiver (PNP)



Dimensions

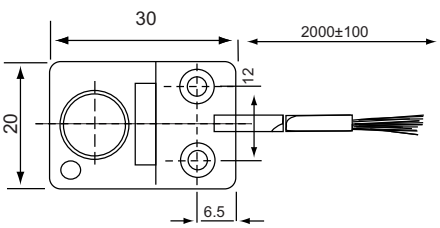
EMITTER

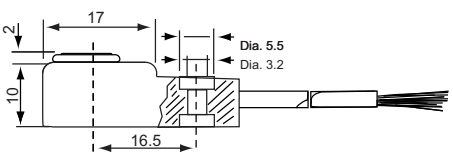




Brown: +24 VDC
Blue: GND

RECEIVER





Brown: +24 VDC
Blue: GND
Black: Output

dimensions unit = mm

Warning: These products are not safety sensors and are not suitable for use in personal safety applications.

Sensors Accessories: Cables

Cables with quick-disconnect plugs

- Industry standard axial and right-angle M8/M12 screw-lock connectors with open leads. The cables listed can be used with patch cables
- 2m, 5m, 7m and 10m cable lengths
- PVC (polyvinyl chloride) jacket for typical industrial applications
- PUR (polyurethane) jacket for oily and direct sunlight applications
- IP67 rated

CD12M-0B-050-C1 and -A1 shown

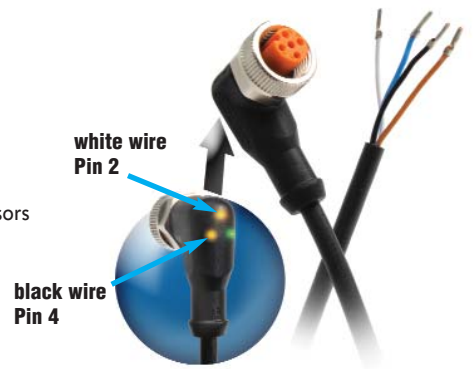
M8 Quick-Disconnect Cables (Pico, Nano)							
Part Number	**Price**	**Length**	**Poles**	**Connector**	**LED**	**Jacket**	**Dimensions**
M8 Quick-Disconnects							
CD08-0A-020-A1	<--->	2m (6.5ft.)	3	Axial	No	PVC	Figure 1
CD08-0A-020-C1	<--->	2m (6.5ft.)	3	Right-angle	No	PVC	Figure 2
CD08-0A-050-A1	<--->	5m (16.4ft.)	3	Axial	No	PVC	Figure 4
CD08-0C-050-A1	<--->	5m (16.4ft.)	3	Axial	No	PUR	Figure 3
CD08-0A-050-C1	<--->	5m (16.4ft.)	3	Right-angle	No	PVC	Figure 5
CD08-0C-050-C1	<--->	5m (16.4ft.)	3	Right-angle	No	PUR	Figure 5
CD08-0A-070-A1	<--->	7m (23ft.)	3	Axial	No	PVC	Figure 1
CD08-0A-070-C1	<--->	7m (23ft.)	3	Right-angle	No	PVC	Figure 2

M12 Quick-Disconnect Cables (Euro, Micro DC-Single Key)							
Part Number	**Price**	**Length**	**Poles**	**Connector**	**LED**	**Jacket**	**Dimensions**
M12 Quick-Disconnects							
CD12L-0B-020-A0	<--->	2m (6.5ft)	4	Axial	No	PVC	Figure 6
CD12L-0B-020-C0	<--->	2m (6.5ft)	4	Right-angle	No	PVC	Figure 7
CD12M-0B-050-A1*	<--->	5m (16.4ft)	3	Axial	No	PVC	Figure 8
CD12M-0D-050-A1*	<--->	5m (16.4ft)	3	Axial	No	PUR	Figure 9
CD12M-0B-050-C1*	<--->	5m (16.4ft)	3	Right-angle	No	PVC	Figure 10
CD12M-0D-050-C1*	<--->	5m (16.4ft)	3	Right-angle	No	PUR	Figure 11
CD12M-0B-070-A1	<--->	7m (23ft)	4	Axial	No	PVC	Figure 6
CD12M-0B-070-C1	<--->	7m (23ft)	4	Right-angle	No	PVC	Figure 7

** Note: Do not use with: DM, FA, QX, SS, SSF, SU, TU, VM, VK, MV, MS or MSF series sensors. These sensors require 4-pole cables.*

Cables with LED and quick-disconnect plugs

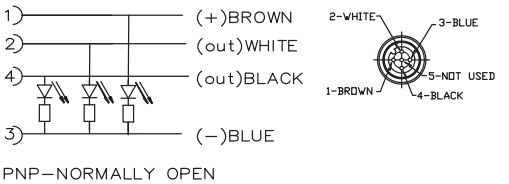
- Industry standard M12 right angle female plug with open leads
- These cables can be used with patch cables
- 2m, 5m and 10m cable lengths
- PUR (polyurethane) jacket for oily and direct sunlight applications
- IP67 /IP68 / IP69K, II rated
- LED indication for 10 -36 VDC PNP sensors only



M12 Quick-Disconnect Cables with LED Indicator (Euro, Micro DC-Single Key)							
Part Number	**Price**	**Length**	**Poles**	**Connector**	**LED**	**Jacket**	**Dimensions**
M12 Quick-Disconnects							
EVC178*	<--->	2m (6.5ft)	4	Right-angle	Yes	PUR	Figure 12
EVC179*	<--->	5m (16.4ft)	4	Right-angle	Yes	PUR	Figure 12
EVC180*	<--->	10m (32.8ft)	4	Right-angle	Yes	PUR	Figure 12

Note: LED for 10 to 36 VDC PNP only.
Do not use when white wire (Pin 2) is used for selection of a sensor function.

LED Models' Wiring



Sensors Accessories: Cables

Cable Specifications					
Specification	**M8**		**M12**		**M12 with LED**
Length	2m (6.5ft) / 7m (23ft)	5m (16.4ft)	2m (6.5ft) / 7m (23ft)	5m (16.4ft)	2m (6.5 ft) / 5m (16.4ft) / 10m (32.8ft)
Nominal Voltage	50VAC/75VDC	60VAC/DC	300VAC	250VAC/DC	10 to 36VDC
Max Current	4A		4A		4A
LED Current Loading	N/A	N/A	N/A	N/A	**10V input** Brown wire LED: 1.7mA White and/or Black LED: 0.9mA **36V input** Brown wire LED: 7.3mA White and/or Black LED: 4.7mA
Protection Degree	IP67	IP65 / IP68 / IP69K	IP67	PVC: IP68 PUR: IP68 / IP69K	IP67 / IP68 / IP69K
Material Nut	brass; nickel plated		brass; nickel plated		brass; nickel plated
Jacket Material	PVC	PVC:CD08-0A-xxx. PUR:CD08-0C-xxx	PVC	PVC:CD12M-0B-xxx. PUR:CD12M-0D-xxx	PUR
Housing Material	PUR		PUR		PUR
Contacts Material	Copper-Tin Alloy (CuSn) -gold plated		Copper-Tin Alloy (CuSn) -gold plated		Gold plated brass
Tightening Torque	0.5 Nm	≤ 0.4 Nm	0.5 Nm	≤ 0.4 Nm	0.6 to 1.5 Nm
Conductors Cross Section (AWG)	0.25mm^2 (24 AWG)	0.25mm^2 (24 AWG)	0.25mm^2 (24 AWG)	0.34mm^2 (22 AWG)	4 x 0.34mm^2 (4 x 22 AWG)
Ø Outer Cable	5mm	PVC: 4 mm PUR: 4 mm	5mm	PVC: 4.2 mm PUR: 4.3 mm	5mm
Temperature Range	-25° to +80°C (-13° to 176°F)	-25° to 90°C (-13° to 194°F)	-25° to +80°C (-13° to 176°F)	PVC: -30° to 70°C (-22° to 158°F) PUR: -50° to 90°C (-58° to 194°F)	-25° to +90°C (-13° to 194°F)
Environmental	N/A	Halogen free, Silicone free	N/A	Halogen free, Silicone free	Halogen free, Silicone free
Function Display Power LED	N/A	N/A	N/A	N/A	Green
Switching Status LED	N/A	N/A	N/A	N/A	2 x Yellow
Drag Chain (Roller Cable Tray) Suitability – **Bending Radius**	min. 10 x cable diameter				
Bending Cycles	N/A	N/A	N/A	N/A	>5 million
Travel Speed	N/A	N/A	N/A	N/A	Max. 3.3 m/s for a horizontal travel length of 5 meters and max. acceleration of 5 m/s^2
Torsional Strain	N/A	N/A	N/A	N/A	±180°/m
Agency Approvals	RoHS				UL File E191684, RoHS

UL Reference	
Part Number	**Mini-Series Female Cord Connectors Series M12, UL Catalog Number**
EVC178	ADOAH043MSS0002H04
EVC179	ADOAH043MSS0005H04
EVC180	ADOAH043MSS0010H04
Note: Shown in UL file under Mini-series Female Cord Connectors using catalog number	

Sensors Accessories: Cables

Dimensions (in/mm)

Figure 1

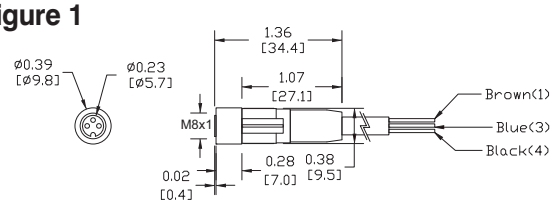


Figure 2

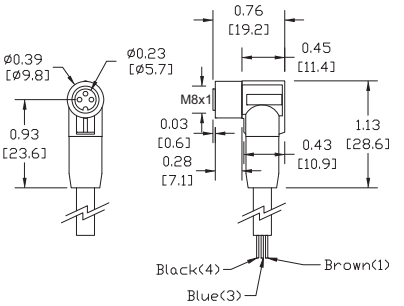


Figure 3

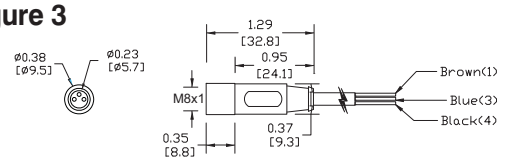


Figure 4

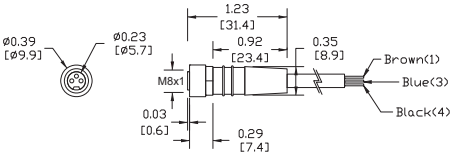


Figure 5

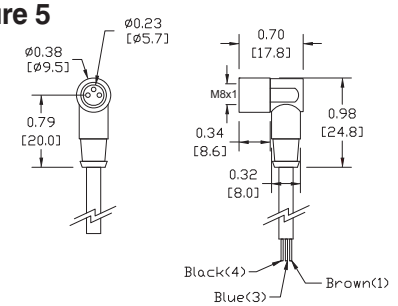


Figure 6

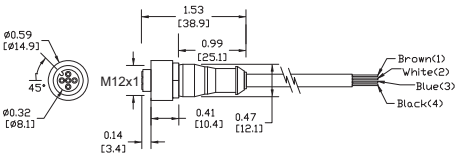


Figure 7

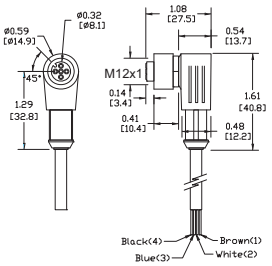


Figure 8

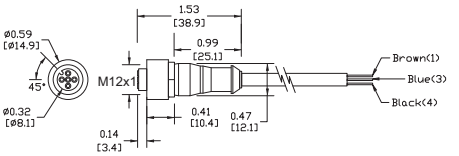


Figure 9

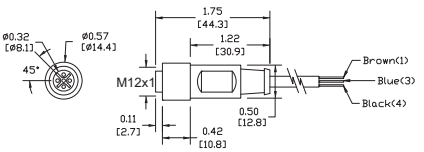


Figure 10

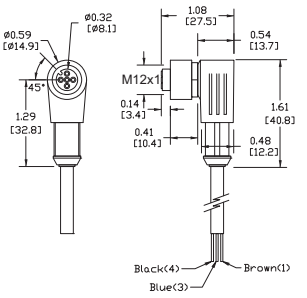


Figure 11

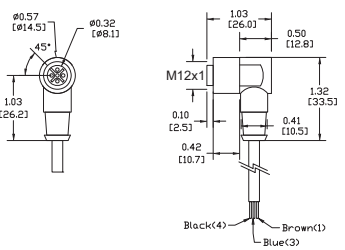
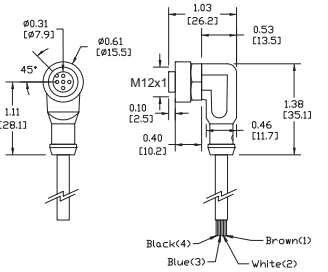


Figure 12



Sensors Accessories: Cables

Patch cables with quick-disconnect plugs on each end

Available patch cables include:

- Industry standard M8 and M12 screw-lock connectors
- One male and one female connector
- Axial and right-angle connector models
- 1m and 3m cable lengths
- PVC (polyvinyl chloride)jacket for typical industrial applications
- IP67 rated

M8 Patch Cables with Quick-Disconnect on Each End (Pico, Nano)						
Part Number	**Price**	**Length**	**Poles**	**Connectors**	**Jacket**	**Dimensions**
M8 Quick-Disconnect Patch Cables						
CDP08-0A-010-AA	<--->	1m (3.28ft)	3	2 Axial. One male and one female connector	PVC	Figure 1
CDP08-0A-010-BB	<--->	1m (3.28ft)	3	2 Right-angle. One male and one female connector	PVC	Figure 3
CDP08-0A-030-AA	<--->	3m (9.84ft)	3	2 Axial. One male and one female connector	PVC	Figure 2
CDP08-0A-030-BB	<--->	3m (9.84ft)	3	2 Right-angle. One male and one female connector	PVC	Figure 3

M12 Patch Cables with Quick-Disconnect on Each End (Euro, Micro DC-Single Key)						
Part Number	**Price**	**Length**	**Poles**	**Connectors**	**Jacket**	**Dimensions**
M12 Quick-disconnect Patch Cables						
CDP12-0B-010-AA	<--->	1m (3.28ft.)	4	2 Axial. One male and one female connector	PVC	Figure 4
CDP12-0B-010-BB	<--->	1m (3.28ft.)	4	2 Right-angle. One male and one female connector	PVC	Figure 5
CDP12-0B-030-AA	<--->	3m (9.84ft.)	4	2 Axial. One male and one female connector	PVC	Figure 4
CDP12-0B-030-BB	<--->	3m (9.84ft.)	4	2 Right-angle. One male and one female connector	PVC	Figure 5

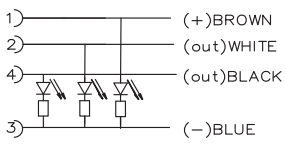
Patch Cables with LED

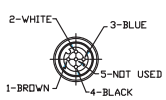
Available patch cables with LED include:

- Right-angle M12 female plug with LED indication on one end and axial male plug on the other end
- 0.3m, 0.6m, 1m, 2m, 5m, and 10m cable lengths
- PUR (polyurethane) jacket for oily and direct sunlight applications
- IP67 /IP68 / IP69K, II rated
- LED indication for 10 -36 VDC PNP sensors only

M12 Patch Cables with LED Indicator (Euro, Micro DC-Single Key)							
Part Number	**Price**	**Length**	**Poles**	**Connectors**	**LED**	**Jacket**	**Dimensions**
M12 Patch Cables							
EVC322*	<--->	0.3m (0.98ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
EVC323*	<--->	0.6m (1.97ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
EVC324*	<--->	1m (3.28ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
EVC325*	<--->	2m (6.5ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
EVC326*	<--->	5m (16.4ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
EVC327*	<--->	10m (32.8ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
Note: LED for 10 to 36 VDC PNP only. Do not use when white wire (Pin 2) is used for selection of a sensor function.							

LED Models' Wiring





Sensors Accessories: Cables

Cable Specifications			
Specification		**M8 / M12**	**M12 with LED**
Length		1m (3.28ft.) / 3m (9.84ft.)	0.3m (0.98ft) / 0.6m (1.97ft) / 1m (3.28ft) 2m (6.5ft) / 5m (16.4ft) / 10m (32.8ft)
Nominal Voltage		50VAC/75VDC	10 to 36VDC
Max Current		4A	4A
		N/A	**10V input** Brown wire LED: 1.7mA White and/or Black LED: 0.9mA **36V input** Brown wire LED: 7.3mA White and/or Black LED: 4.7mA
Protection Degree		IEC IP67	IEC IP67/IP68/IP69K
Material Nut		Brass: nickel plated	Brass: nickel plated
Jacket Material		PVC	PUR
Housing Material		PUR	Connector: Orange PUR, Socket: Black PUR
Contacts Material		Copper-tin(CuSn)=Brass	Brass; gold plated
Conductors Cross Section (AWG)		0.34mm^2	0.34mm^2 (22 AWG)
Tightening Torque		0.5 Nm	**Plug:** 0.6 to 1.5 Nm (take into account the maximum value of the counterpart) **Socket:** 0.6 to 1.5 Nm
Ø Outer Cable		5mm	5mm
Temperature Range		-25° to +70°C (-13° to 158°F)	-25° to +90°C (-13° to 194°F)
Environmental			Halogen-free, Silicone-free
Function Display LED		N/A	Green
Switching Status LED		N/A	2 x Yellow
Drag Chain (Roller Cable Tray) Suitability	**Bending Radius**	min. 10 x cable diameter	
	Bending Cycles	>5 million	
	Travel Speed	N/A	Max. 3.3 m/s for a horizontal travel length of 5 m and max. acceleration of 5 m/s^2
	Torsional Strain	N/A	±180°/m
Agency Approvals		RoHS	UL File E191684, RoHS

UL Reference	
Part Number	**Cable Assemblies Series M12, UL Catalog Number**
EVC322	VDOAH043MSS00.3H04STGH040MSS
EVC323	VDOAH043MSS00.6H04STGH040MSS
EVC324	VDOAH043MSS0001H04STGH040MSS
EVC325	VDOAH043MSS0002H04STGH040MSS
EVC326	VDOAH043MSS0005H04STGH040MSS
EVC327	VDOAH043MSS0010H04STGH040MSS
Note: Shown in UL file under Cable Assemblies using catalog number	

Sensors Accessories: Cables

Dimensions (in/mm)

Figure 1

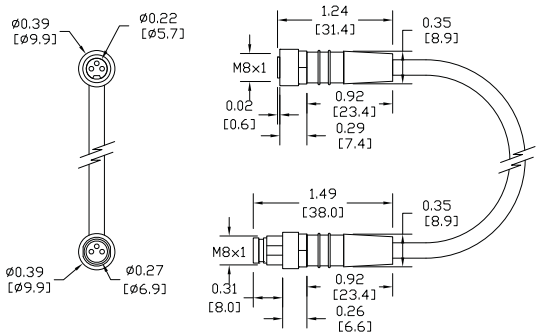


Figure 2

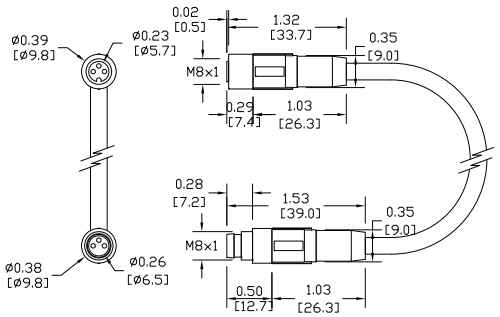


Figure 3

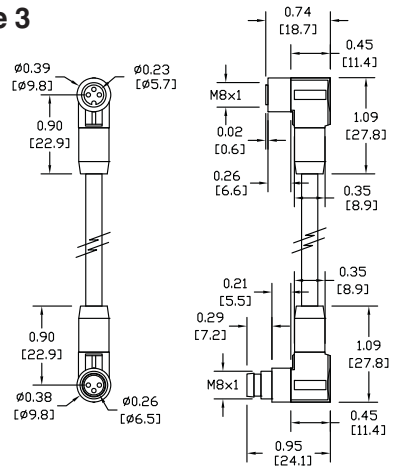


Figure 4

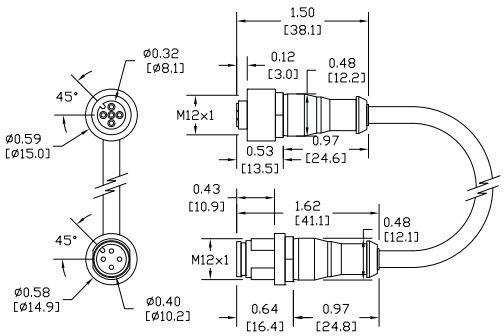


Figure 5

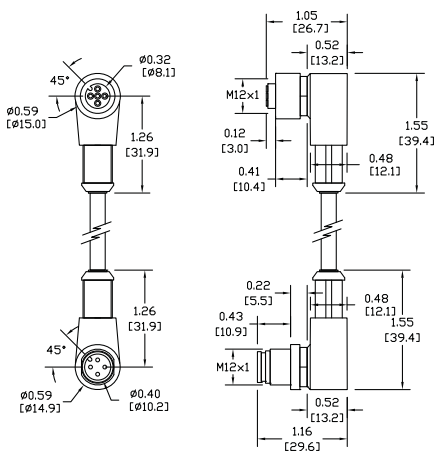
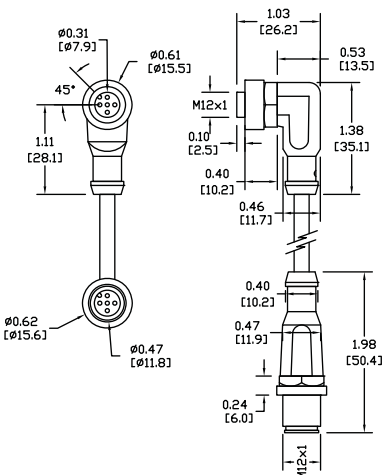


Figure 6

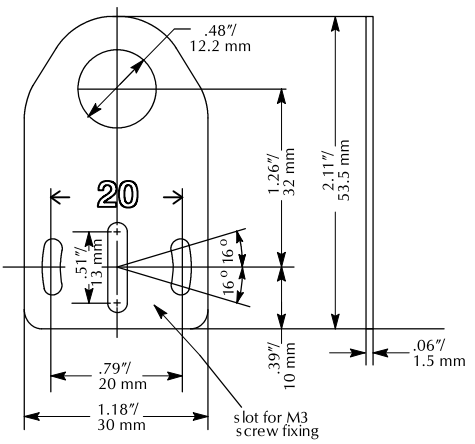


Accessories: Adapter, Mounting Brackets

ST12A metal axial bracket

For mounting M12 (12 mm) sensors. Has two mounting holes (use 3 mm screws) and allows the rotation of an optical axis for right-beam angle adapter sensors. Hexagonal nuts not included.

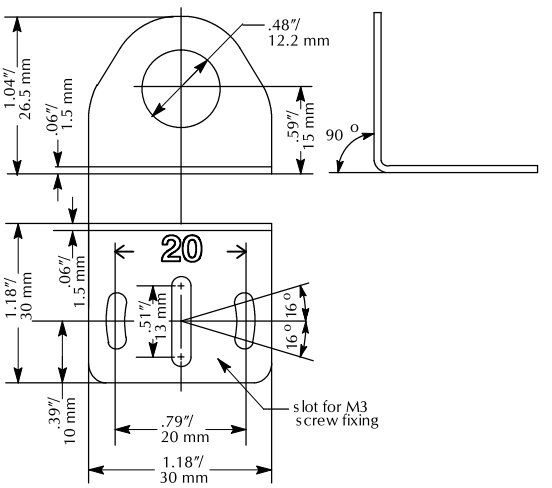
<---> (1 per pack)



ST12C metal right-angle bracket

Metal angular mounting bracket for use with M12 (12 mm) sensors. Has two mounting holes (use 3 mm screws) and allows the rotation of an optical axis for axial sensors. Hexagonal nuts not included.

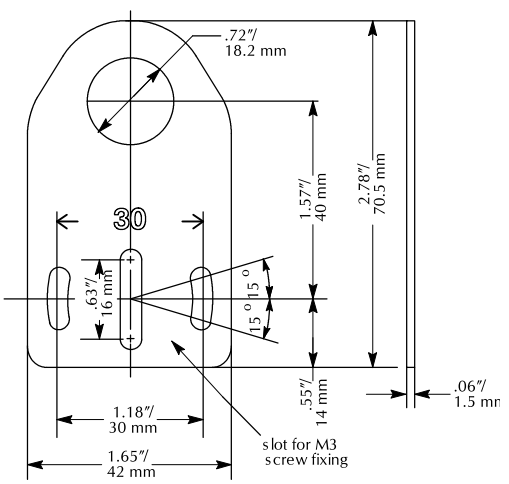
<---> (1 per pack)



ST18A axial bracket

Metal mounting bracket for M18 (18 mm) sensors. Has two mounting holes (use 4 mm screws) and allows the rotation of an optical axis for right-beam-angle-adapter sensors. Hexagonal nuts not included.

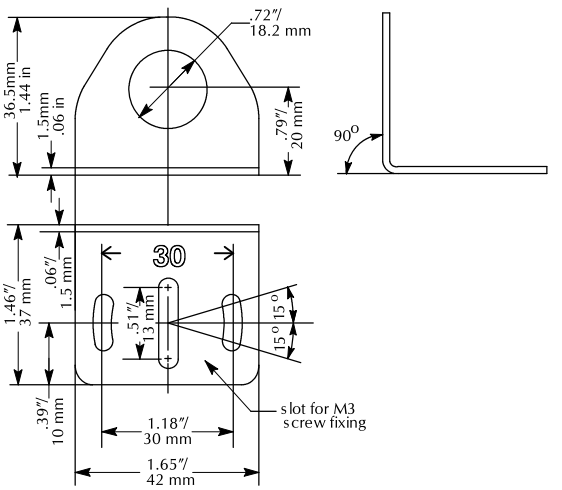
<---> (1 per pack)



ST18C metal right-angle bracket

Metal angular mounting bracket for M18 (18 mm) sensors. Has two mounting holes (use 4 mm screws) and allows the rotation of an optical axis for axial sensors. Hexagonal nuts not included.

<---> (1 per pack)

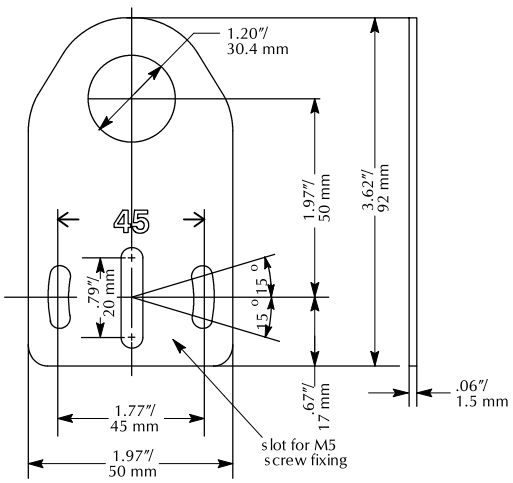


Accessories: Mounting Brackets

ST30A metal axial bracket

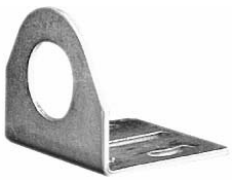
For mounting M30 (30 mm) sensors. Has two mounting holes (use 5 mm screws) and allows the rotation of an optical axis for right-beam-angle-adapter sensors. Hexagonal nuts not included.

<---> (1 per pack)

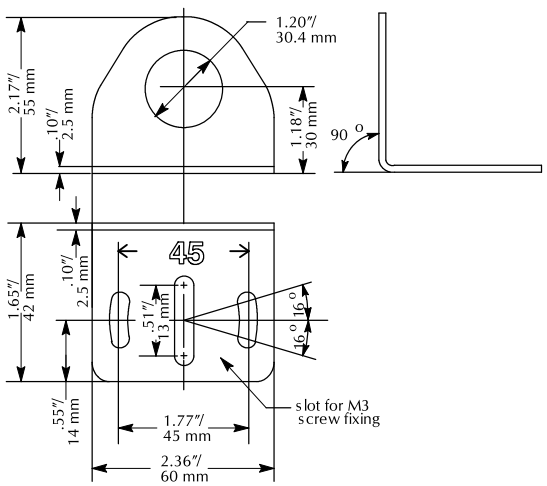


ST30C right-angle bracket

Metal angular mounting bracket for M30 (30 mm) sensors. Has two mounting holes (use 5 mm screws) and allows the rotation of an optical axis for axial sensors. Hexagonal nuts not included.



<---> (1 per pack)



Proximity Sensor Terminology

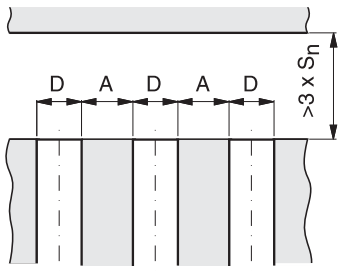
Never use this catalog for installation or operation of equipment. Refer to manual for installation and operation instructions.

The following descriptions refer to the European standard EN 60947-5-2. of September 95.

The specifications given here are intended to be minimum performance values described by the standard.

Alignment

Proximity switches must not be mutually influenced. For this reason, a minimum distance between them (referred to as alignment) must be provided.



Size D	Embeddable A (mm)	Non-Embeddable A (mm)
Ø3	0	--
M4	0	--
Ø4	0	--
M5	0	--
5X5	0	--
M8	2 / 3*	8
8X8	2 / 3*	--
M12	6 / 10*	12
M18	12 / 20*	30
M30	30	60

*Extended distance models

Break function (N.C., normally closed)

A break function causes load current to flow only when a target is not detected.

Degree of protection

If not otherwise specified, proximity switches (*when installed in accordance with manufacturer's instructions*) have minimum IP65 protection against dust and water jets.

Differential travel (H)

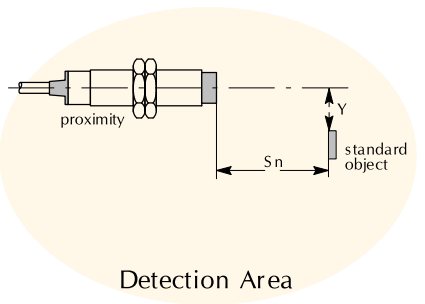
The differential travel is given as a percentage of the effective operating distance (Sr) and is the maximum difference between the switching distances. The differential is intentionally introduced to guarantee the stability of the output state in case the target is positioned near the switching points.

Electrical connections

Keep sensor cables and power cables separated to avoid electrical interference.

The power supply voltage must not exceed the specified limits UB.

If a non-stabilized supply voltage is used for DC sensors, the maximum voltage peak under minimum power consumption conditions and minimum voltage peak under maximum power consumption must not exceed UB limits.



If the power supply of the sensor is also used to switch inductive loads, a suppression device must be provided. A fuse to protect the power supply line is also recommended.

Installation notes

Select a sensor compatible with the operating environment: verify the compatibility between building materials, the presence of chemicals, temperature range, protection degree, vibrations, shocks, EMC, supply voltage available, load type, etc.

Select the sensor by referring to the size and type of material to be detected.

Check the minimum distances between sensor and damping materials or another sensor.

Check that the number of operations does not exceed the maximum switching frequency. If the phase of the output signal is important, check the turn on and turn off time.

Metallic chips or dust must not accumulate on the sensing face. The distance between the sensor and the object to detect must not exceed the assured operating distance Sa; the best operating distance is Sn/2.

Check the effect of vibrations.

Install the sensor using the installation accessories and do not exceed the maximum tightening torque.

Proximity Sensor Terminology

Leakage current

The leakage current is the current which passes through the output transistor when it is blocked (this must be taken into account, especially in the case of parallel connection of several switches).

LED status indicators

Proximity switches may incorporate one or more color indicators. The meaning of the colors are:

CONTINUOUS GREEN: Power ON

CONTINUOUS YELLOW: Output ON

CONTINUOUS RED: Fault
(on AC models, RED = output ON

Make function (N.O., normally open)

A make function causes load current to flow only when a target is detected.

Material influence

The nominal sensing distance **S(n)** is defined using precisely defined measuring conditions (See **Operating Distance.**) Other conditions may result in a reduction of the operating distance. The tables in the next column show the influence different target materials have on the operating distances of the sensors.

Material Influence: Table 1	
Target Material	***Operating Distance***
Steel Type FE 360	S(n) x 1.00
Brass	S(n) x 0.64
Aluminum	S(n) x 0.55
Copper	S(n) x 0.51
Stainless Steel (V2A)	S(n) x 0.85

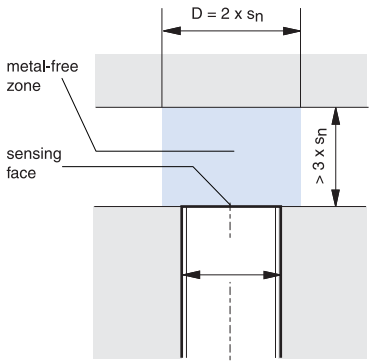
Material Influence: Table 2	
Target Material	***Operating Distance***
Steel Type FE 360	S(n) x 1.00
Brass	S(n) x 0.44
Aluminum	S(n) x 0.36
Copper	S(n) x 0.32
Stainless Steel (V2A)	S(n) x 0.69

Material Influence: Table 3	
Target Material	***Operating Distance***
Steel Type FE 360	S(n) x 1.00
Brass	S(n) x 1.00
Aluminum	S(n) x 1.30
Copper	S(n) x 0.89
SS (1mm thick)	S(n) x 0.57
SS (2mm thick)	S(n) x 0.90

Mounting

Shielded (embeddable) proximity switches

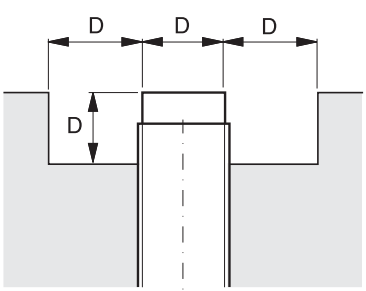
These proximity switches may be flush mounted regardless of the metal being used. For reliable operation, it is necessary to observe the minimum distances from adjacent metal targets.



Sn = Nominal sensing distance (see Rated operating distance)

Unshielded (non-embeddable) proximity switches

When mounting non-embeddable mounting proximity switches in conducting materials (metals), it is necessary to observe the minimum distances from adjacent metal targets. Flush mounting in non-conducting materials is permitted.



Off-state (leakage) current (Ir)

This is the current that flows through the load circuit of the proximity switch in the OFF state at the maximum supply voltage.

Open collector

The output transistor is not internally connected to a pull-up or pull-down load. It is therefore possible to connect an external load supplied by an external voltage.

Operating distance (sensing range) (S)

The operating distance is the distance at which a standard target approaching the active face of the sensor causes a sensor output state change.

Output type and load connections –3-wire NPN

There are two power wires and one output wire. The switching element is connected between the output wire and the negative terminal, and the load is connected between the output wire and the positive terminal. In the ON state, the current sinks from the load into the switching element.

Output type and load connections –3-wire PNP

There are two power wires and one output wire. The switching element is connected between the output wire and the positive terminal, and the load is connected between the output wire and the negative terminal. In the ON state, the current flows from the switching element into the load.

Overvoltage protection

No damage will occur in the presence of surge pulses exceeding UB and energy less than 0.5J.

Proximity Sensor Terminology

Polarity reversing protection

No damage will occur to proximity switches if the supply wires are reversed.

Protection against inductive loads

Unless otherwise specified, DC sensors are protected against inductive overvoltage by use of a surge diode or a zener diode.

Unshielded proximity switches

The sensor housing does not cover the side of the sensing head. This type of sensor has a higher sensing range than the shielded type.

Rated insulation voltage (Ui)

Unless specified differently, all of the sensors with a supply voltage of up to 50 VAC and 75 VDC are tested at 500 VAC.

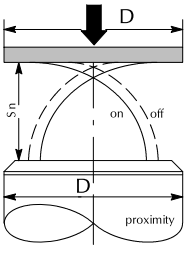
Sensors with a supply voltage up to 250 VAC are tested as follows:

Class 1 (with earth terminal) at 1500 VAC

Class 2 (with double insulation, without earth terminal) at 3000 VAC.

Rated operating distance —(nominal sensing distance) (Sn)

This distance does not take into account manufacturing tolerances (±10%) or variations due to external conditions, such as voltages and temperatures not falling within the rated values.



Rated Operating Distance

Repeat accuracy (R)

The repeat accuracy of the effective operating distance (Sr) is measured over an eight hour period at an ambient temperature of 73°F (±9°) [23°C (± 5°)] at a specified humidity and with a specified supply voltage. The difference between the measurements shall not exceed the specified value, or if not specified, 10% of Sr.

Ripple

This is given as a percentage of the mean supply voltage. It is the maximum peak-to-peak value of the admitted ripple voltage. A ripple voltage of <10% Ue is desirable.

Shocks

In accordance with IEC 68-2-27

Pulse shape: half-sine

Peak acceleration: 30g

Pulse duration: 11 ms

Shielded proximity switches

A metal housing surrounds the coil, and only the front of the active face is sensitive. The device allows flush installation on metal plates without any performance change. Refer to Alignment when installing shielded sensors side-by-side.

Short-circuit protection

All DC sensors have integrated short-circuit protection. AC sensors should be protected externally by such devices as fuses.

Standard target

A standard target is square, 1mm thick, and made from type FE360 carbon steel. The length of the side of the square is equal to the diameter of the sensor's active surface, or three times the rated operating distance (Sn), whichever is greater.

Switching frequency (f)

Switching frequency is the maximum output switching frequency performed by the output circuit when standard targets cross the sensing field at a distance of Sn/2. The targets are spaced 2d.

- **For DC sensors, the minimum output pulse width must not fall below 50 µS.**
- **For AC sensors, the minimum output pulse must not fall below half a sine period (ie. for 60 Hz, 1/60÷2 = 8.33 ms.)**

Temperature range

Unless otherwise specified, the minimum temperature range is –13 to +158°F (-25 to +70°C).

Turn-on time

Turn-on time is the elapsed time from when the target enters the sensing range until the output switches.

Turn-off time

Turn-off time is the elapsed time from when the target is removed until the output switches.

Proximity Sensor Terminology

Voltage drop (Ud)

This is the voltage measured across the active output of the proximity switch when the rated operational current (Ie) flows in the load at the rated supply voltage and the temperature is at 73°F (±9°) [(23°C (±5°)]. Unless specified differently, the following values are guaranteed:

- Two-wire DC models <8 VDC
- Three-wire DC models <3.5 VDC
- Two-wire AC models <10 VDC

Vibration

In accordance with IEC 68-2-6

Frequency range: 10-55 Hz

Amplitude: 1mm

Sweep cycle duration: 5 min.

Duration of endurance at 55 Hz: 30 min. in each of the three axis directions

4-wire NPN or PNP (programmable output state)

There are two power wires: one N.O./N.C. selection input wire and one output wire. The output state is programmable by connecting the input wire to one of the power supply lines.

4-wire NPN or PNP (complementary outputs)

There are two power wires: one normally open output wire and one normally closed output wire.

4-wire NPN and PNP

There are two power wires, and the output type is wiring programmable. An NPN output is available by connecting the PNP terminal to the negative power supply line. A PNP output is available by connecting the NPN terminal to the positive power supply line.

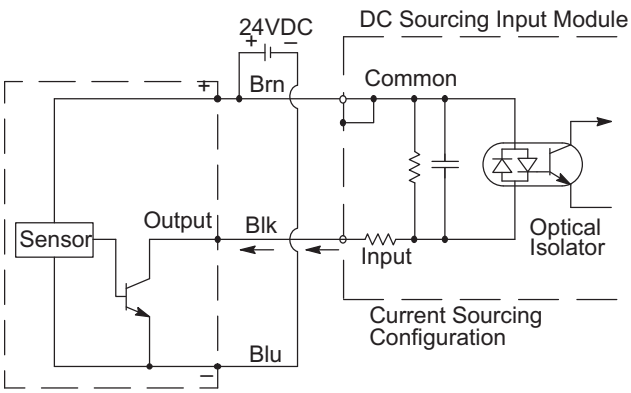
Time delay before availability (tv)

The time delay before availability is the time between the switching on of the supply voltage and the instant at which the sensor becomes ready to operate correctly.

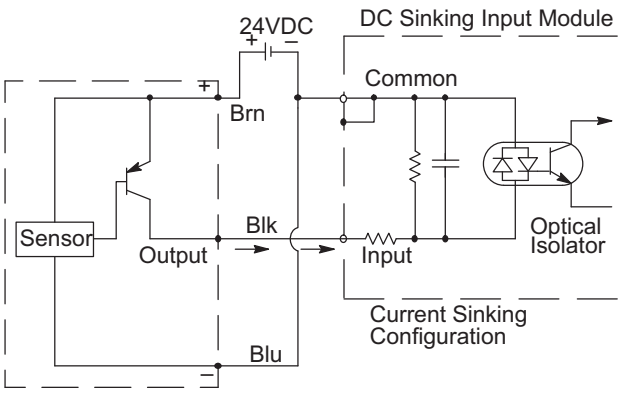
During the reset the output circuit is in OFF-state; false signal may be present but the duration shall not exceed 2 ms. If not specified otherwise, the reset duration doesn't exceed 300 ms.

Field Device Examples - 3-Wire Connections

NPN (Sinking)
Field Device Example



PNP (Sourcing)
Field Device Example



Frequently Asked Questions

How do inductive proximity switches work?

Inductive proximity switches are used to detect the presence of metallic objects without actually contacting the object. Their high-speed switching and small size make them indispensable in automation applications.

Inductive proximity switches consist of a coil driven by an oscillator. The oscillator creates an electromagnetic field which appears at the active face of the switch. If a metal target enters this area, the electromagnetic field is reduced and the switch turns on or off.

Some typical inductive sensor applications are: counting metallic objects, monitoring the position of elements in a machine, sensing the presence of metallic parts like screws, etc., and measuring the rotational speed of axial detecting cams.

What is the difference between inductive and capacitive sensors?

The primary difference is sensing material. Inductive sensors only detect metallic objects while capacitive sensors will detect materials such as wood, paper, liquids, cardboard, etc.

How do I know what size proximity sensor I need?

It depends on two factors: mounting space and sensing distance. Each application has a specific space available for the sensor and each application has a requirement for how close the sensor can be mounted to the sensed object.

What is the difference between shielded and unshielded?

With a shielded proximity sensor, the face of the sensor may be mounted flush with metal, whereas an unshielded sensor may NOT be mounted flush with metal (otherwise the sensor will always be ON). In many applications, flush mounting is a requirement. Also, unshielded proximity sensors allow for greater sensing distances.

What output do I need? NPN or PNP?

This is determined by the device you are connecting the sensor to. Most *Direct*LOGIC PLC modules (except 305 series) allow NPN or PNP sensors to be connected. This is determined by how the sensor is wired to the PLC.

How do I choose between normally open (N.O.) and normally closed (N.C.)?

N.O. sensors do not pass power to the PLC until an object is detected. N.C. sensors always pass power to the PLC until an object is detected. The majority of Centsable sensors are N.O.; however, some sensors offer the option of N.C., such as PKW, PMW and CT1 series.

When do I want quick disconnects (Q/D) versus embedded cable output?

There is a slight cost increase to purchase a sensor and a Q/D cable compared to only purchasing a sensor with a pre-attached cable. However, the Q/D output allows easy replacement of a failed sensor. This is important in minimizing machine or operation downtime.

What is the difference between 2-wire, 3-wire, and 4-wire sensors?

2-wire sensors: allows either NPN or PNP outputs (don't have to select).

3-wire sensors: standard sensors. When ordering, you must choose between NPN and PNP output.

4-wire sensors: Allow either N.O. or N.C. outputs (don't have to select). Must still select NPN or PNP output.

Do AutomationDirect supplied sensors operate on AC or DC voltage?

The majority of AutomationDirect supplied sensors operate on 10-30 VDC. However, we do offer the VT1, VK1, and VM1 series that operate on 20-253VAC.

Can my sensor be installed in a washdown area?

Yes. All AutomationDirect supplied proximity sensors carry an IP67 or IP68 enclosure rating. This rating allows temporary submersion of the sensor into water.

What does switching frequency mean to my application?

This is how fast your sensor can sense an object, reset, and sense another object. For example, if a sensor has a switching frequency of 100 Hz or 100 cycles per second, the sensor can sense a maximum of 100 objects per second. This is very critical in many applications such as gear rotation measurement.

Can the sensor be put into a vibrating environment?

Yes. Frequency range of 10-55 Hz, maximum amplitude of 1mm. Duration in any axis a maximum of 30 minutes.

What is the temperature range of the sensors?

Most sensors operate between -25°F and 70°F. However, check the specifications for exact ranges.

If I wire my proximity sensor wrong, will it damage it?

Possibly. All sensors contain polarity reversal, short-circuit and transient noise protection. However, the transient protection is only effective under 30 VDC.

Proximity Sensor Cross-reference Table

Note: Some newer models are not listed in table; check our Web site for updated information.

AutomationDirect	Allen Bradley	Balluff	Baumer Electric	Cutler-Hammer	Efector
AE1-AN-1A	872C-D2NN8-E2	BES-516-343-E0-C-03 (SS)	IFRM 08N1504/L (SS)	E57EAL8T110SP (SS)	IEB3001ANOG
AE1-AN-1H	872C-D2NN8-D4	BES-516-343-S4-C (SS)	IFRM 08N1703/S14L (SS)	E57EAL8T110SD (SS)	IEB3001ANOG/US100DNS
AE1-AN-2A	872C-D3NN8-E2	BES-516-384-E0-C-03 (SS)	IFRM 08N1104/L (SS)	E57EAL8T110EP (SS)	NA
AE1-AN-2H	872C-D3NN8-D4	BES-516-384-S4-C (SS)	NA	E57EAL8T110ED (SS)	NA
AE1-AP-1A	872C-D2NP8-E2	BES-516-324-E0-C-03 (SS)	IFRM 08P1504/L (SS)	E57EAL8T111SP (SS)	IEB3001BPOG
AE1-AP-1H	872C-D2NP8-D4	BES-516-324-S4-C (SS)	IFRM 08P1703/S14L (SS)	E57EAL8T111SD (SS)	IEB3001BPOG/US100DPS
AE1-AP-2A	872C-D3NP8-E2	BES-516-383-E0-C-03 (SS)	IFRM 08P1104/L (SS)	E57EAL8T111EP (SS)	NA
AE1-AP-2H	872C-D3NP8-D4	BES-516-383-S4-C (SS)	NA	E57EAL8T111ED (SS)	NA
AM1-AN-1A	872C-DH3NN12-E2	BES-516-329-E4-Y-03	IFR 12.26.15/L	E57SAL12T110	IFA3002ANKG
AM1-AN-1H	872C-DH3NN12-D4	BES-516-329-E5-Y-S4	IFRM 12N1501/S14L	E57SAL12T110SD	IFK3002ANOG/US100DNS
AM1-AN-2A	872C-DH4NN12-E2	BES-516-357-E4-Y-03	IFR 12.26.11/L	E57SAL12T110E	IFA3004ANKG
AM1-AN-2H	872C-DH4NN12-D4	BES-516-357-E5-Y-S4	NA	E57SAL12T110ED	IFK3004ANOG/US100DNS
AM1-AN-3A	NA	BES-516-329-G-E4-Y-03	IFRM 12N1702/L	E57-12LE06-C	NA
AM1-AN-3H	NA	BES-516-329-G-E5-Y-S4	IFRM 12N1701/S14L	E57-12LE06-CD	NA
AM1-AN-4A	NA	NA	NA	E57-12LE10-C	NA
AM1-AN-4H	NA	NA	NA	E57-12LE10-CD	NA
AM1-AP-1A	872C-DH3NP12-E2	BES-516-325-E4-Y-03	IFR 12.26.35/L	E57SAL12T111	IFA3002BPKG
AM1-AP-1H	872C-DH3NP12-D4	BES-516-325-E5-Y-S4	IFRM 12P1501/S14L	E57SAL12T111SD	IFK3002BPOG/US100DPS
AM1-AP-2A	872C-DH4NP12-E2	BES-516-356-E4-Y-03	IFR 12.26.31/L	E57SAL12T111E	IFA3004BPKG
AM1-AP-2H	872C-DH4NP12-D4	BES-516-356-E5-Y-S4	NA	E57SAL12T111ED	IFK3004BPOG/US100DPS
AM1-AP-3A	871C-DE4NP12-E2	BES-516-325-G-E4-Y-03	IFRM 12P1702/L	E57-12LE06-B	NA
AM1-AP-3H	871C-DE4NP12-D4	BES-516-325-G-E5-Y-S4	IFRM 12P1701/S14L	E57-12LE06-BD	IFK3004BBPKG/US100DPS
AM1-AP-4A	NA	NA	NA	E57-12LE10-B	NA
AM1-AP-4H	NA	NA	IFRM 12P1301/S14L	E57-12LE10-BD	IFK3007BPKG/US100DPS
AM1-A0-1A	872C-D3NE12-A2	BES-516-542-B0-H-03	IFRM 12D1501/L	E57SAL12A2 (VDC)	IFB2002ARKG/UP
AM1-A0-2A	872C-D4NE12-A2	BES-516-544-B0-H-03	IFRM 12D1101/L	E57SAL12A2E (VDC)	IFB2004ARKG/UP
AM1-A0-1H	872C-D3NE12-D4	BES-516-542-S4-H (SS)	IFRM 12D1501/S14L	NA	IFB2002ARKG/UP/US100IRS
AM1-A0-2H	872C-D4NE12-D4	BES-516-544-S4-H (SS)	IFRM 12D1101/S14L	NA	IFB2002ARKG/UP/US100IRS
AK1-AN-1A	872C-DH5NN18-E2	BES-516-355-E4-Y-03	IFRM 18N1504/L	E57SAL18T110	IGA3005ANKG
AK1-AN-1H	872C-DH5NN18-D4	BES-516-355-S4-C	IFRM 18N1501/S14L	E57SAL18T110SD	IGB3005ANKG/US100DNS
AK1-AN-2A	872C-DH8NN18-E2	BES-516-361-E4-Y-03	IFRM 18N1104/L	E57SAL18T110E	IGA3008ANKG
AK1-AN-2H	872C-DH8NN18-D4	BES-516-361-S4-C	NA	E57SAL18T110ED	IGB3008ANKG/US100DNS
AK1-AN-3A	NA	BES-516-355-G-E4-Y-PU-3	NA	NO CROSS	NA
AK1-AN-3H	NA	NA	NA	NO CROSS	NA
AK1-AN-4A	NA	NA	NA	NO CROSS	NA
AK1-AN-4H	NA	NA	NA	NO CROSS	NA
AK1-AP-1A	872C-DH5NP18-E2	BES-516-326-E4-Y-03	IFRM 18P1504/L	E57SAL18T111	IGA3005BPKG
AK1-AP-1H	872C-DH5NP18-D4	BES-516-326-S4-C	IFRM 18P1501/S14L	E57SAL18T111SD	IGB3005BPKG/US100DPS
AK1-AP-2A	872C-DH8NP18-E2	BES-516-360-E4-Y-03	IFRM 18P1104/L	E57SAL18T111E	IGA3008BPKG
AK1-AP-2H	872C-DH8NP18-D4	BES-516-360-S4-C	NA	E57SAL18T111ED	IGB3008BPKG/US100DPS
AK1-AP-3A	871C-DE8NP18-E2	BES-516-326-G-E4-Y-03	NA	NO CROSS	NA
AK1-AP-3H	871C-DE8NP18-D4	BES-516-326-G-S4-L	NA	NO CROSS	IGK3008BBKG/US100DPS
AK1-AP-4A	NA	NA	IFRM 18P1301/L	NO CROSS	NA
AK1-AP-4H	NA	NA	IFRM 18P1301/S14L	NO CROSS	IGK3012BPKG/US100DPS
AK1-A0-1A	872C-D5NE18-A2	BES-516-538-B0-H-PU-3	IFRM 18D1501/L	E57SAL18A2 (VDC)	IGB2005ARKG/UP
AK1-A0-2A	872C-D8NE18-A2	BES-516-546-B0-H-3	IFRM 18D1101/L	E57SAL18A2E (VDC)	IGB2008ARKG/UP
AK1-A0-1H	872C-D5NE18-D4	BES-516-538-S4-H	IFRM 18D1501/S14L	NA	IGB2005ARKG/UP/US100IRS
AK1-A0-2H	872C-D8NE18-D4	BES-516-546-S4-H	IFRM 18D1101/S14L	NA	IGB2008ARKG/UP/US100IRS

Proximity Sensor Cross-reference Table

AutomationDirect	Allen Bradley	Balluff	Baumer Electric	Cutler-Hammer	Efector
AT1-AN-1A	872C-DH10NN30-E2	BES-516-359-B0-C-03	IFRM 30N1601/L	E57SAL30T110	IIA3010ANKG
AT1-AN-1H	872C-DH10NN30-D4	NA	NA	E57SAL30T110SD	IIB3010ANKG/ US100DPS
AT1-AN-2A	872C-DH15NN30-E2	BES-516-363-B0-C-03	IFRM 30N1201/L	E57SAL30T110E	IIA3015ANKG
AT1-AN-2H	872C-DH15NN30-D4	NA	NA	E57SAL30T110ED	IIB3015ANKG/ US100DNS
AT1-AN-3A	NA	NA	NA	NO CROSS	NA
AT1-AN-3H	NA	NA	NA	NO CROSS	NA
AT1-AN-4A	NA	NA	NA	NO CROSS	NA
AT1-AN-4H	NA	NA	NA	NO CROSS	NA
AT1-AP-1A	872C-DH10NP30-E2	BES-516-327-B0-C-03	IFRM 30P1601/L	E57SAL30T111	IIA3010BPKG
AT1-AP-1H	872C-DH10NP30-D4	BES-515-327-S4-C	IFRM 30P1501/S14L	E57SAL30T111SD	IIB3010BPKG/ US100DPS
AT1-AP-2A	872C-DH15NP30-E2	BES-516-362-B0-C-03	IFRM 30P1201/L	E57SAL30T111E	IIA3015BPKG
AT1-AP-2H	872C-DH15NP30-D4	BES-515-362-S4-C	IFRM 30P1101/S14L	E57SAL30T111ED	IIB3015BPKG/ US100DPS
AT1-AP-3A	871C-DE15NP30-E2	NA	NA	NO CROSS	NA
AT1-AP-3H	871C-DE15NP30-D4	NA	NA	NO CROSS	IIK3015BBPKG/ US100DPS
AT1-AP-4A	NA	NA	NA	NO CROSS	NA
AT1-AP-4H	NA	NA	NA	NO CROSS	IIK3022BPKG/ US100DPS
AT1-A0-1A	872C-D10NE30-A2	BES-516-540-B0-H-3	IFRM 30D1601/L	E57SAL30A2 (VDC)	IIB2010ARKG/UP
AT1-A0-2A	872C-D15NE30-A2	BES-516-548-B0-H-3	NA	E57SAL30A2E (VDC)	IIB2015ARKG/UP
AT1-A0-1H	872C-D10NE30-D4	BES-516-540-S4-H	NA	NA	IIB2010ARKG/UP/ US100IRS
AT1-A0-2H	872C-D15NE30-D4	BES-516-548-S4-H	NA	NA	IIB2015ARKG/UP/ US100IRS
PMW-0N-1H	871T-R2A12 (pre-wired)	BES-516-118-S4-C	NA	E57L(A or B)L12T110SD	NA
PMW-0P-1H	871T-L2A12 (pre-wired)	BES-516-113-S4-C	IFRM 12P(1or3)570/S14L	E57L(A or B)L12T111SD	NA
PMW-0N-2H	871T-R4B12 (pre-wired)	BES-516-122-S4-C	NA	E57L(A or B)L12T110ED	NA
PMW-0P-2H	871T-L4B12 (pre-wired)	BES-516-131-S4-C	NA	E57L(A or B)L12T111ED	NA
PKW-0N-1H	871T-R5A18 (pre-wired)	NA	NA	E57L(A or B)L18T110SD	NA
PKW-0P-1H	871T-L5A18 (pre-wired)	BES-515-326-S4-C (NO)	IFRM 18P1790/S14L	E57L(A or B)L18T111SD	NA
PKW-0N-2H	871T-R8B18 (pre-wired)	NA	NA	E57L(A or B)L18T110ED	NA
PKW-0P-2H	871T-L8B18 (pre-wired)	BES-515-123-S4-C	NA	E57L(A or B)L18T111ED	NA
VM1-A0-1B	872C-A2N12-A2	NA	IFRM 12A1501/L	E57SAL12A2	IFA2002AB0W
VM1-A0-2B	872C-A4N12-A2	NA	IFRM 12A1101/L	E57SAL12A2E	IFA2004AB0W
VK1-A0-1B	872C-A5N18-A2	NA	IFRM 18A1501/L	E57SAL18A2	IGA2005AB0A (AC/DC)
VK1-A0-2B	872C-A10N18-A2	NA	IFRM 18A1101/L	E57SAL18A2E	IGA2008AB0A (AC/DC)
VT1-A0-1B	872C-A10N30-A2	NA	IFRM 30A1601/L	E57SAL30A2	IIA2010AB0A (AC/DC)
VT1-A0-2B	872C-A15N30-A2	NA	IFRM 30A1201/L	E57SAL30A2E	IIA2015AB0A (AC/DC)
CD12L-0B-020-A0	889D-F4AC-2	NA	ES 34AP2	E57KYED129-2	US/3-DC-P/ N-SOL-PVC-2M/W
CD12L-0B-020-C0	889D-R4AC-2	NA	ES 33AP2	E57KYED130-2	US/3-DC-P/ N-ROL-PVC-2M/W
CD12M-0B-070-A1	889D-F4AC-5	BKS-S19-3-5	ES 34AP5	E57KYED129-5	US/3-DC-P/ N-SOL-PVC-5M/W
CD12M-0B-070-C1	889D-R4AC-5	BKS-S20-3-3	ES 33AP5	E57KYED130-5	US/3-DC-P/ N-ROL-PVC-5M/W

Notes:
AutomationDirect DC sensors operate on 10-30 VDC. If you are using a higher DC voltage with a competitor's sensor, do not cross to AutomationDirect.
Comparable sensor overall lengths and thread lengths may vary slightly.
AutomatinonDirect AC sensors are VAC only. Some competitors' sensors are AC/DC.
Significant sensing distance (SD) differences are noted. Others may vary slightly.
SS after the part number denotes the sensor is Stainless Steel.
NPB after the part number denotes the sensor is Nickel Plated Brass.
N.O. after the part number denotes the sensor operates normally open only.
VDC after part number means to cross to AutomationDirect only if competitor's sensor is used in VDC application.

Proximity Sensor Cross-Reference Table

AutomationDirect	Omron	Pepperl & Fuchs	Sick Optic	Siemens	Turck
AE1-AN-1A	E2E-X1R5E1-N (SS)	NBB1.5-8GM50-E0	IM08-01B5NS-ZW1	3RG40 11-0GB05 (SS)	Bi 1.5-EG08-AN6X (SS)
AE1-AN-1H	E2E-X1R5E1-M1-N (SS)	NBB1.5-8GM40-E0-V1	IM08-01B5NS-ZC1	3RG40 11-3GB05 (SS)	Bi 1.5-EG08-AN6X-H1341 (SS)
AE1-AN-2A	E2E-X2ME1-N (SS)	NBN2-8GM50-E0	IM08-02N5NS-ZW1	3RG40 21-0GB33 (SS)	Ni 3 -EG08-AN6X (SS)
AE1-AN-2H	E2E-X2ME1-M1-N (SS)	NBN2-8GM40-E0-V1	IM08-02N5NS-ZC1	NA	Ni 3-EG08-AN6X-H1341 (SS)
AE1-AP-1A	E2E-X1R5F1-N (SS)	NBB1.5-8GM50-E2	IM08-01B5PS-ZW1	3RG40 11-0AG05 (SS)	Bi 1.5-EG08-AP6X (SS)
AE1-AP-1H	E2E-X1R5F1-M1-N (SS)	NBB1.5-8GM40-E2-V1	IM08-01B5PS-ZC1	3RG40 11-3AG05 (SS)	Bi 1.5-EG08-AP6X-H1341 (SS)
AE1-AP-2A	E2E-X2MF1-N (SS)	NBN2-8GM50-E2	IM08-02N5PS-ZW1	3RG40 21-0AG33 (SS)	Ni 3-EG08-AP6X (SS)
AE1-AP-2H	E2E-X2MF1-M1-N (SS)	NBN2-8GM40-E2-V1	IM08-02N5PS-ZC1	NA	Ni 3-EG08-AP6X-H1341 (SS)
AM1-AN-1A	E2E-X2E1-N	NBB2-12GM50-E0	IM12-02BNS-ZW1	3RG40 12-0GB00	Bi 2-G12(K)-AN6X
AM1-AN-1H	E2E-X2E1-M1-N	NBB2-12GM50-E0-V1	IM12-02BNS-ZC1	3RG40 12-3GB00	Bi 2-M12-AN6X-H1141
AM1-AN-2A	E2E-X5ME1-N	NBN4-12GM50-E0	IM12-04NNS-ZW1	3RG40 22-0GB00	Ni 5-G12(K)-AN6X
AM1-AN-2H	E2E-X5ME1-M1-N	NBN4-12GM50-E0-V1	IM12-04NNS-ZC1	3RG40 22-3GB00	Ni 4-M12-AN6X-H1141
AM1-AN-3A	NA	NA	IM12-04BNS-ZU0	NA	NA
AM1-AN-3H	NA	NA	IM12-04BNS-ZC0	NA	Bi 4-M12-AN6X-H1141
AM1-AN-4A	NA	NA	IM12-08NNS-ZU0	3RG46 12-0GB01	NA
AM1-AN-4H	NA	NA	IM12-08NNS-ZC0	3RG46 12-3GB01	NA
AM1-AP-1A	E2E-X2F1-N	NBB2-12GM50-E2	IM12-02BPS-ZW1	3RG40 12-0AG01	Bi 2-G12(K)-AP6X
AM1-AP-1H	E2E-X2F1-M1-N	NBB2-12GM50-E2-V1	IM12-02BPS-ZC1	3RG40 12-3AG01	Bi 2-M12-AP6X-H1141
AM1-AP-2A	E2E-X5MF1-N	NBN4-12GM50-E2	IM12-04NPS-ZW1	3RG40 22-0AG01	Ni 5-G12(K)-AP6X
AM1-AP-2H	E2E-X5MF1-M1-N	NBN4-12GM50-E2-V1	IM12-04NPS-ZC1	3RG40 22-3AG01	Ni 4-M12-AP6X-H1141
AM1-AP-3A	NA	NBB4-12GM50-E2	IM12-04BPS-ZU0	3RG41 12-0AG01	NA
AM1-AP-3H	NA	NBB4-12GM50-E2-V1	IM12-04BPS-ZC0	3RG41 12-3AG01	Bi 4-M12-AP6X-H1141
AM1-AP-4A	NA	NA	IM12-08NPS-ZU0	3RG46 12-0AG01	NA
AM1-AP-4H	NA	NA	IM12-08NPS-ZC0	3RG46 12-3AB01	NA
AM1-A0-1A	E2E-X3D1-N-N	NCB2-12GM40-Z0	NA	3RG40 12-0JB00	Bi 2-M12-AD4X (65VDC)
AM1-A0-2A	E2E-X8MD1-N (8mm SD)	NBN4-12GM40-Z0	NA	3RG40 22-0JB00	Ni 4-M12-AD4X (65VDC)
AM1-A0-1H	E2E-X3D1-M1G-N	NCB2-12GM40-Z0-V1	NA	3RG40 12-3JB00	Bi 2-M12-AD4X-H1141 (65VDC)
AM1-A0-2H	E2E-X8MD1-M1G-N (8mm SD)	NBN4-12GM40-Z0-V1	NA	3RG40 22-3JB00	Ni 4-M12-AD4X-H1141 (65VDC)
AK1-AN-1A	E2E-X5E1-N	NBB5-18GM50-E0	IM18-05BNS-ZW1	3RG40 13-0GB00	Bi 5-G18(K)-AN6X
AK1-AN-1H	E2E-X5E1-M1-N	NBB5-18GM50-E0-V1	IM18-05BNS-ZC1	3RG40 13-3GB00	Bi 5-M18-AN6X-H1141
AK1-AN-2A	E2E-X10ME1-N	NBN8-18GM50-E0	IM18-08NNS-ZW1	3RG40 23-0GB00	Ni10-G18(K)-AN6X
AK1-AN-2H	E2E-X10ME1-M1-N	NBN8-18GM50-E0-V1	IM18-08NNS-ZC1	3RG40 23-3GB00	Ni 8-M18-AN6X-H1141
AK1-AN-3A	NA	NA	IM18-07BNS-ZU0	NA	NA
AK1-AN-3H	NA	NA	IM18-07BNS-ZC0	NA	Bi 8-M18-AN6X-H1141
AK1-AN-4A	NA	NA	IM18-12NNS-ZU0	3RG46 13-0GB00	NA
AK1-AN-4H	NA	NA	IM18-12NNS-ZC0	3RG46 13-3GB01	NA
AK1-AP-1A	E2E-X5F1-N	NBB5-18GM50-E2	IM18-05BPS-ZW1	3GR40 13-0AG01	Bi 5-G18(K)-AP6X
AK1-AP-1H	E2E-X5F1-M1-N	NBB5-18GM50-E2-V1	IM18-05BPS-ZC1	3RG40 13-3AG01	Bi 5-M18-AP6X-H1141
AK1-AP-2A	E2E-X10MF1-N	NBN8-18GM50-E2	IM18-08NPS-ZW1	3RG40 23-0AG01	Ni10-G18(K)-AP6X
AK1-AP-2H	E2E-X10MF1-M1-N	NBN8-18GM50-E2-V1	IM18-08NPS-ZC1	3RG40 23-3AG01	Ni 8-M18-AP6X-H1141
AK1-AP-3A	NA	NA	IM18-07BPS-ZU0	NA	NA
AK1-AP-3H	NA	NA	IM18-07BPS-ZC0	NA	Bi 8-M18-AP6X-H1141
AK1-AP-4A	NA	NEB12-18GM50-E2	IM18-12NPS-ZU0	3RG46 13-1AB01	NA
AK1-AP-4H	NA	NEB12-18GM50-E2-V1	IM18-12NPS-ZC0	3RG46 13-3AB01	NA
AK1-A0-1A	E2E-X7D1-N-N	NBB5-18GM50-Z0	IM18-05BUS-ZU0 (AC/DC)	3RG40 13-0JB00	Bi 5-M18-AD4X (65VDC)
AK1-A0-2A	E2E-X14MD1-N (14mm SD)	NBN8-18GM50-Z0	IM18-08NUS-ZU0 (AC/DC)	3RG40 23-0JB00	Ni 8-M18-AD4X (65VDC)
AK1-A0-1H	E2E-X7D1-M1G-N	NBB5-18GM50-Z0-V1	NA	3RG40 13-3JB00	Bi 5-M18-AD4X-H1141 (65VDC)
AK1-A0-2H	E2E-X14MD1-M1G-N (14mm SD)	NBN8-18GM50-Z0-V1	NA	3RG40 23-3JB00	Ni 8-M18-AD4X-H1141 (65VDC)

Proximity Sensor Cross-reference Table

AutomationDirect	Omron	Pepperl & Fuchs	Sick Optic	Siemens	Turck
AT1-AN-1A	E2E-X10E1-N	NBB10-30GM50-E0	IM30-10BNS-ZW1	3RG40 14-0GB00	Bi10-G30(K)-AN6X
AT1-AN-1H	E2E-X10E1-M1-N	NBB10-30GM50-E0-V1	IM30-10BNS-ZC1	3RG40 14-3GB00	Bi10-M30-AN6X-H1141
AT1-AN-2A	E2E-X18ME1-N	NBN15-30GM50-E0	IM30-15NNS-ZW1	3RG40 24-0GB00	Ni15-G30(K)-AN6X
AT1-AN-2H	E2E-X18ME1-M1-N	NBN15-30GM50-E0-V1	IM30-15NNS-ZC1	3RG40 24-3GB00	Ni15-M30-AN6X-H1141
AT1-AN-3A	NA	NA	IM30-15BNS-ZU0	NA	NA
AT1-AN-3H	NA	NA	IM30-15BNS-ZC0	NA	Bi15-M30-AN6X-H1141
AT1-AN-4A	NA	NA	IM30-20NNS-ZU0	NA	NA
AT1-AN-4H	NA	NA	IM30-20NNS-ZC0	NA	NA
AT1-AP-1A	E2E-X10F1-N	NBB10-30GM50-E2	IM30-10BPS-ZW1	3RG40 14-0AG01	Bi10-G30(K)-AP6X
AT1-AP-1H	E2E-X10F1-M1-N	NBB10-30GM50-E2-V1	IM30-10BPS-ZC1	3RG40 14-3AG01	Bi10-M30-AP6X-H1141
AT1-AP-2A	E2E-X18MF1-N	NBN15-30GM50-E2	IM30-15NPS-ZW1	3RG40 24-0AG01	Ni15-G30(K)-AP6X
AT1-AP-2H	E2E-X18MF1-M1-N	NBN15-30GM50-E2-V1	IM30-15NPS-ZC1	3RG40 24-3AG01	Ni15-M30-AP6X-H1141
AT1-AP-3A	NA	NA	IM30-15BPS-ZU0	3RG41 14-0AG01	NA
AT1-AP-3H	NA	NA	IM30-15BPS-ZC0	3RG41 14-3AG01	Bi15-M30-AP6X-H1141
AT1-AP-4A	NA	NA	IM30-20NPS-ZU0	NA	NA
AT1-AP-4H	NA	NA	IM30-20NPS-ZC0	NA	NA
AT1-A0-1A	E2E-X10D1-N-N	NBB10-30GM50-Z0	IM30-10BUS-ZU0 (AC/DC)	3RG40 14-0JB00	Bi 10-M30-AD4X (65VDC)
AT1-A0-2A	E2E-X20MD1-N (20mm SD)	NBN15-30GM50-Z0	IM30-15NUS-ZU0 (AC/DC)	3RG40 24-0JB00	Ni 15-M30-AD4X (65VDC)
AT1-A0-1H	E2E-X10D1-M1G-N	NBB10-30GM50-Z0-V1	NA	3RG40 14-3JB00	Bi 10-M30-AD4X-H1141 (65VDC)
AT1-A0-2H	E2E-X20MD1-M1G-N (20mm SD)	NBN15-30GM50-Z0-V1	NA	3RG40 24-3JB00	Ni 15-M30-AD4X-H1141 (65VDC)
PMW-0N-1H	NA	NJ2-12GM40-E0-V1 (NO)	NA	NA	Bi 2-EM12-AN6X-H1141
PMW-0P-1H	NA	NJ2-12GM40-E2-V1 (NO)	NA	3RG40 12-3CD00 (NPB)	NA
PMW-0N-2H	NA	NJ4-12GM40-E0-V1 (NO)	NA	NA	NA
PMW-0P-2H	NA	NJ4-12GM40-E2-V1 (NO)	NA	3RG40 22-3CD00 (NPB)	Bi 2-EM12-AP6X-H1141
PKW-0N-1H	NA	NJ5-18GM50-E0-V1 (NO)	NA	NA	Bi 5-EM18-AN6X-H1141
PKW-0P-1H	NA	NJ5-18GM50-E2-V1 (NO)	NA	3RG40 13-3CD00 (NPB)	NA
PKW-0N-2H	NA	NA	NA	NA	NA
PKW-0P-2H	NA	NJ8-18GM50-E2-V1	NA	3RG40 23-3CD00 (NPB)	Bi 5-EM18-AP6X-H1141
VM1-A0-1B	E2E-X2Y1-US-N	NJ2-12GM50-WS (SS)	IM12-02BAS-ZU0	3RG40 12-0KB00 (AC/DC)	Bi 2-G12-AZ33X
VM1-A0-2B	E2E-X5MY1-US-N	NJ4-12GM50-WS (SS)	IM12-04NAS-ZU0	3RG40 22-0KB00 (AC/DC)	Ni 4-G12-AZ33X
VK1-A0-1B	E2E-X5Y1-US-N	NBB5-18GM60-WS	IM18-05BUS-ZU0 (AC/DC)	3RG40 13-0KB00 (AC/DC)	Bi 5-M18T-AZ3X
VK1-A0-2B	E2E-X10MY1-US-N	NBN8-18GM60-WS	IM18-08NUS-ZU0 (AC/DC)	3RG40 23-0KB00 (AC/DC)	Ni 8-M18T-AZ3X
VT1-A0-1B	E2E-X10Y1-US-N	NBB10-30GM60-WS	IM30-10BUS-ZU0 (AC/DC)	3RG40 14-0KB00 (AC/DC)	Bi 10-M30T-AZ3X
VT1-A0-2B	E2E-X18MY1-US-N	NBN15-30GM60-WS	IM30-15NUS-ZU0 (AC/DC)	3RG40 24-0KB00 (AC/DC)	Ni 15-M30T-AZ3X
CD12L-0B-020-A0	Y96E-44SD2	V1-G-2M-PVC	KD4-SIM122	NA	RK 4T-2
CD12L-0B-020-C0	Y96E-44RD2	V1-W-2M-PVC	KD4-RIM122	NA	WK 4T-2
CD12M-0B-070-A1	Y96E-44SD5	V1-G-5M-PVC	KD4-SIM125	3RX1 513	RK 4T-6
CD12M-0B-070-C1	Y96E-44RD5	V1-W-5M-PVC	KD4-RIM125	3RX1 512	WK 4T-6

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NPB after the part number denotes the sensor is Nickel Plated Brass.
N.O. after the part number denotes the sensor operates normally open only.
VDC after part number means to cross to AutomationDirect only if competitors sensor is used in VDC application