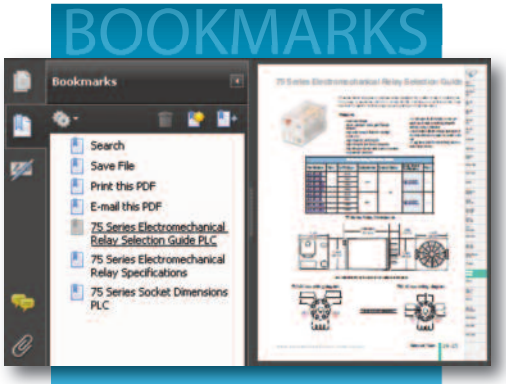
AUTOMATIONDIRECT.com

Proximity Sensors



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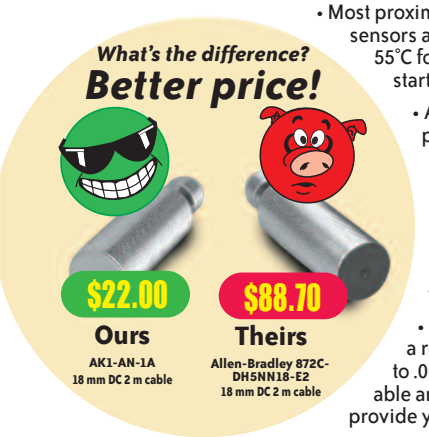


Why buy a proximity sensor from AutomationDirect?

A sensor may only cost $13.50, 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 prox with pico Q/D	$43.50 PD1-AP-1F		$154.32 871C-D1NP5-P3
8 mm three-wire DC prox with pico Q/D	$21.00 AE1-AN-2F		$98.32 872C-D3NN8-P3
12 mm two-wire DC shielded prox with 2 m cable	$22.00 AM1-A0-2A		$85.40 872C-D3NE12-A2
18 mm three-wire NPN DC shielded prox with 2 m cable	$22.00 AK1-AN-1A		$88.70 872C-DH5NN18-E2
18 mm shielded AC prox with 2 m cable	$31.00 VK1-A0-1B		$112.50 872C-A5N18-A2

Q/D = quick disconnect

All prices are U.S. published prices. AutomationDirect prices are from April 2014 Price List Prices and specifications may vary by dealer and configuration. Allen-Bradley prices are from www.rockwellautomation.com/en/e-tools 2/20/2014. 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.
- **Food and Beverage sensors available.** IP69K rated, stainless steel, made of FDA approved materials able to withstand 1500psi of 80°C water jet at varying angles, 4-6" away

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.**

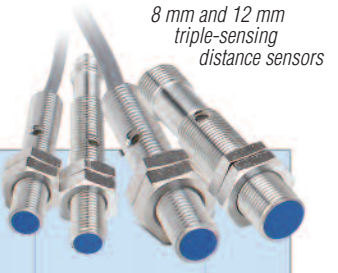
Sometimes a round proximity sensor will not fit a square hole

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

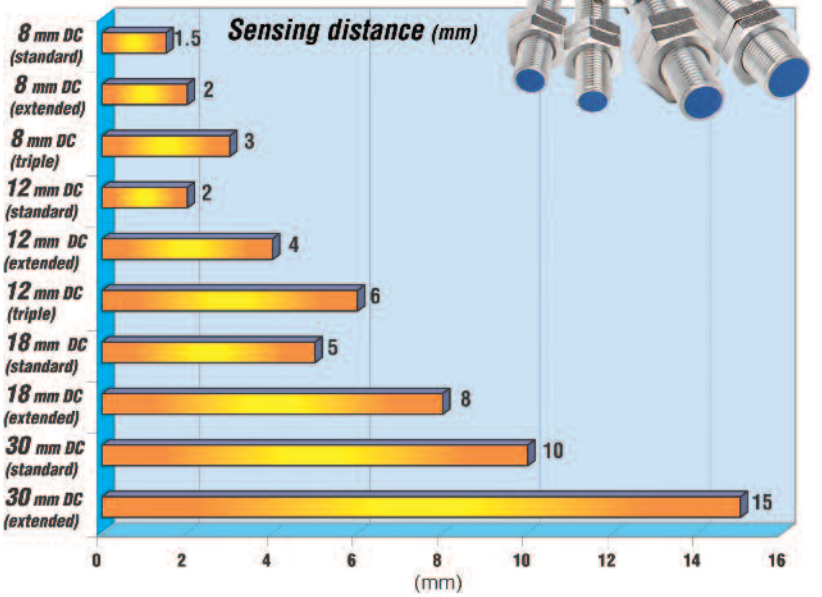


8 mm and 12 mm triple-sensing distance sensors

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

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.

Three-wire DC

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.

Lifetime Warranty

Starting from $35.50

12, 18, 30 mm
IP69K FDA-approved materials

PFM, PFK, PFT, VF & MAF SERIES
New! An assortment of AC and DC IP69K rated Q/D proximity sensors.
Suitable for harsh environments

- 12 mm, from $35.50
- 18 mm, from $35.50
- 30 mm, from $45.50

Starting from $43.50

Miniature
(3, 4, 5 mm)

PY & PD SERIES
Three-wire DC
3 mm prox, from $79.00
4 mm prox, from $79.00
5 mm prox, from $43.50 (quick-disconnect)

Sensing distance:
- Standard

Starting from $21.00

8 mm
round

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

Sensing distance:
- Standard, from $21.00
- Extended, from $26.50
- Triple, from $61.00
- Stainless Steel, from $45.00

Starting from $13.50

12 mm
round

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

Sensing distance:
- Standard, from $13.50
- Extended, from $25.50
- Triple, from $65.00

Starting from $14.00

18 mm
round

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

Sensing distance:
- Standard, from $14.00
- Extended, from $26.50

Starting from $16.50

30 mm
round

AT and PBT SERIES
Two- and three-wire DC, IP67 rating, embedded cable or M12 quick-disconnect

Sensing distance:
- Standard, from $16.50
- Extended, from $32.50

Starting from $36.00

5 mm x 5 mm
rectangular

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

Sensing distance:
- Standard, from $36.00
- Extended, from $58.00

Starting from $25.00

8 mm x 8 mm
rectangular

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

Sensing distance:
- Standard, from $25.00
- Extended, from $34.50
- Triple, from $77.00

Starting from $26.00

10 mm x 16 mm
rectangular

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

Sensing distance:
- Standard, from $26.00
- Extended, from $26.00

Starting from $17.50

12 mm x 27 mm
rectangular

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

Sensing distance: **Standard** from $17.50

Starting from $103.00

Stainless steel
triple sensing range

PKW, PTW and PMW SERIES triple
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 $103.00
- 18 mm prox, from $78.25
- 30 mm prox, from $132.00

Starting from $38.50

Stainless steel
round standard

PKW, PMW and PTW SERIES standard
Three and four-wire DC with M12 quick-disconnect, IP67 rating

Sensing distance: **Standard & Extended**
- 12 mm prox, from $38.50
- 18 mm prox, from $41.50
- 30 mm prox, from $49.00

Starting from $31.00

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 $35.50
- 18 mm, from $31.00
- 30 mm, from $37.50

Proximity Sensors Ranges at a glance

40 mm x 40 mm
rectangular

Starting from $39.00

LF SERIES
Three-wire and four-wire DC, IP67 rating, M12 quick-disconnect

- 3-wire, from $39.00
- 4-wire, from $42.00

Capacitive
(12, 18, 30 mm round, and rectangular)

Starting from $59.00

CM, CK, CT and CR SERIES
Two-wire AC and three-wire DC with M12 quick-disconnect or embedded cable

Ultrasonic

Starting from $99.00

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

Sensing distance: **up to 3,500 mm**

- 18 mm, from $99.00
- 30 mm, from $189.00

Starting from $160.00

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

Sensing distance: **up to 300 mm**

- Rectangular, from $160.00

Short body
round

Starting from $31.00

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

Proximity
with analog output

Starting from $114.00

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

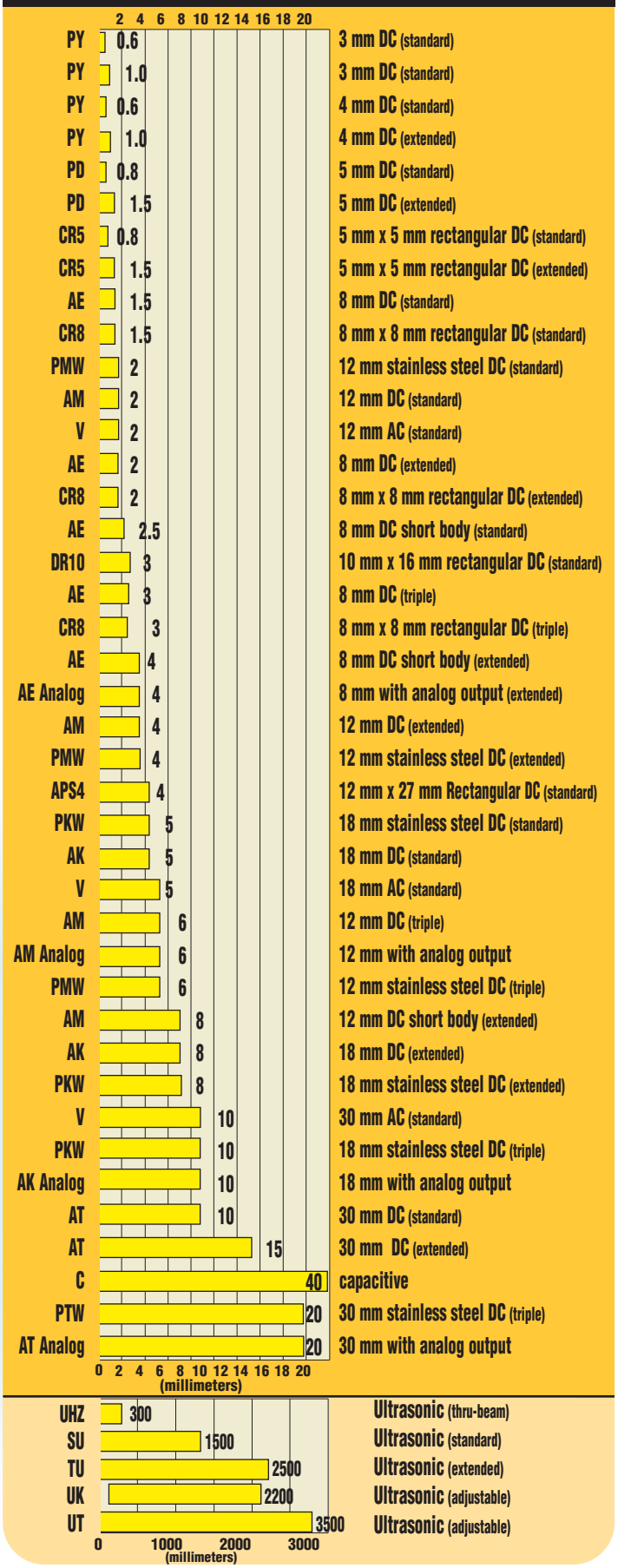
Sensing distance: **Triple**

- 8 mm, from $186.00
- 12 mm, from $114.00
- 18 mm, from $119.00
- 30 mm, from $145.00

Q/D
extension cables

Starting from $8.75

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



How do I Choose the Right Proximity 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?

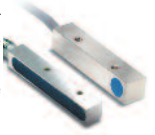
The sensing distance is the distance between the tip of the sensor and the object to be sensed. The selection guide and the specifications table for each sensor family lists the sensing distances.

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:

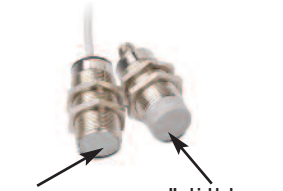
How much space is available for mounting the sensor?

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.

P69K: Protection against high-pressure/steam-jet cleaning.

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.

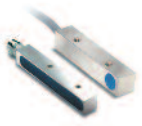
Proximity Sensor Selection Guide

Specifications	PY Stainless Steel DC	PD Stainless Steel DC	AE Series DC	AM Series DC	AK Series DC
Description	Miniature inductive proximity sensors, 3 mm and 4 mm, DC, stainless steel	Miniature inductive proximity sensors, 5 mm, DC, stainless steel	Inductive proximity sensors, 8 mm, DC, metal, standard and short body lengths	Inductive proximity sensors, 12 mm, DC, metal, standard and short body lengths	Inductive proximity sensors, 18 mm, DC, metal
Sensing Distances	Standard distance: 0.6 mm Extended distance: 1mm	Standard distance: 0.8 mm Extended distance:1.5 mm	Standard distance: 0 to 1.5 mm, 0 to 2.5 mm Extended distance: 0 to 2 mm ,0 to 4 mm Triple distance: 0 to 3 mm	Standard distance shielded: 0 to 2 mm unshielded: 0 to 4 mm Extended distance: shielded: 0 to 4 mm unshielded: 0 to 8 mm Triple distance: shielded: 6 mm	Standard distance: shielded 5 mm, unshielded 8 mm Extended distance: shielded 8 mm, unshielded 12 mm
Output State	N.O.	N.O.	N.O.	N.O.	N.O.
Logic Output	NPN / PNP	NPN / PNP	NPN / PNP	NPN / PNP / Sink / Source	NPN / PNP / Sink / Source
Connection Type	Axial cable	Axial cable / M8 connector	Axial cable /M8 / M12 connector	Axial cable / M12 connector	Axial cable / M12 connector
Supply Voltage	10 to 30 VDC	10 to 30 VDC	10 to 30 VDC	10-to-30 VDC	10 to 30 VDC
Switching Frequency	Standard distance: 5kHz Extended distance: 3kHz	Standard distance: 5kHz Extended distance: 3kHz	Standard distance: shielded: 3kHz unshielded: 2.5kHz Extended distance: shielded/unshielded: 3kHz Triple distance: shielded: 1kHz	Standard distance shielded/unshielded: 3 wire 2 kHz, 2-wire: 1.5kHz Extended distance shielded/unshielded: 1kHz Triple distance shielded: 800Hz	Standard distance shielded: 600Hz, Standard distance unshielded Extended distance shielded/unshielded: 300Hz
Protection Degree	IEC-IP67	IEC-IP67	IEC-IP67	IEC-IP67	IEC-IP67

Specifications	AT Series DC	PB Series DC	PEW Stainless Steel DC	PMW Stainless Steel DC	PKW Stainless Steel DC
Description	Inductive proximity sensors, 30 mm, DC, metal,	Inductive proximity sensors, 12 mm, 18 mm, 30 mm DC, metal,	Inductive proximity sensors, 8 mm, DC, stainless steel	Inductive proximity sensors, 12 mm, DC, stainless steel	Inductive proximity sensors, 18 mm, DC, stainless steel
Sensing Distances	Standard distance: shielded: 10 mm, unshielded: 15 mm Extended distance: shielded: 15 mm unshielded: 20 mm	M12: shielded: 2 mm unshielded: 4 mm M18: shielded: 5 mm unshielded: 8 mm M30: shielded: 10 mm unshielded: 15 mm	Standard distance: 2 mm	Standard distance: 2 mm Extended distance: 3 mm, 4 mm Triple distance: 6 mm	Standard distance: 5 mm Extended distance: 8 mm Triple distance: 10 mm
Output State	N.O.	N.O.	N.O.	N.O.; N.O. / N.C.	N. O.; N.O. / N.C.
Logic Output	NPN / PNP / Sink / Source	NPN / PNP	PNP	NPN / PNP	NPN / PNP
Connection Type	Axial cable / M12 connector	M12 connector	M8 / M12 connector	Axial Cable / M12 connector	Axial cable / M12 connector
Supply Voltage	10 to 30 VDC	15 to 30 VDC	10 to 36 VDC	10 to 30 VDC PMW-AP-1H:10 to 36 VDC	10 to 30 VDC; PKW-AP-1H:10 to 36 VDC
Switching Frequency	Standard distance shielded/unshielded: 2 wire: 150Hz, 3-wire 200Hz. Extended distance shielded /unshielded: 2-wire and 3-wire: 150Hz	M12 shielded/unshielded, 3 wire: 800Hz M18 shielded: 3-wire: 400Hz unshielded: 3-wire: 300Hz M30 shielded/unshielded: 3 wire: 200Hz	Standard distance, shielded: 100Hz	Standard/extended distance: 2kHz Triple distance: 400Hz	Standard/extended distance: 1kHz Triple distance: 200Hz
Protection Degree	IEC-IP67	IEC-IP67	PEW-AP-1F: IEC-IP67 PEW-AP-1H: IEC-IP67 and IP68	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)

Proximity Sensor Selection Guide




Specifications	PTW Stainless Steel DC	V Series AC	CR5 Rectangular DC	CR8 Rectangular DC	LF40 Rectangular DC
Description	30 mm inductive proximity sensors, DC, stainless steel	12 mm/18 mm/30 mm inductive proximity sensor, AC, metal	5 x 5 rectangular inductive proximity sensors, DC, metal	8 x 8 rectangular inductive proximity sensors, DC, metal	40 x 40 x 66 rectangular inductive proximity sensors, DC, plastic
Sensing Distances	PTW-A*-5: 20 mm PTW-AP-1: 10 mm	M12 models shielded: 2 mm Unshielded: 4 mm M18 models shielded: 5 mm Unshielded: 8 mm M30 models shielded 10 mm unshielded:15 mm	Standard: 0.8 mm Extended distance: 1.5 mm	Standard distance: shielded: 0 to 1.5mm Extended distance: shielded: 0 to 2mm Triple distance: shielded: 3mm	Shielded: 20mm Unshielded: 35mm
Output State	N.O.	N.O.	N.O.	N.O.	N.O.; N.O. / N.C. Complementary
Logic Output	PTW-A*-5: NPN / PNP PTW-AP-1: PNP	-	NPN / PNP	NPN / PNP	PNP
Connection Type	PTW-A*-5: Axial Cable / M12 connector PTW-AP-1: M12 connector	Axial cable / M12 connector	Axial cable / M8 connector	Axial cable / M8 connector	M12 connector
Supply Voltage	PTW-A*-5: 10 to 30 VDC; PTW-AP-1: 10 to 36 VDC	20 to 253 VAC, 50/60Hz	10 to 30 VDC	10 to 30 VDC	10 to 36 VDC
Switching Frequency	PTW-A*-5:100Hz; PTW-AP-1: 50Hz	25Hz	Standard distance: 5kHz Extended distance: 3kHz	1kHz	Shielded: 100Hz Unshielded: 80Hz
Protection Degree	PTW-A*-5:IEC-IP67 (connector/ IP68 cable) PTW-AP-1: IEC-IP67, IP68	IEC-IP67	IEC-IP67	IEC-IP67	IEC-IP67






Specifications	DR10 Rectangular DC	APS4 Rectangular DC	CM Capacitive DC	CK Capacitive DC	CT Capacitive DC, AC/DC	CR Capacitive DC
Description	10 x 16 rectangular inductive prox sensor, DC, plastic	12 x 27 compact rectangular inductive prox, DC, plastic	12 mm capacitive proximity sensors; DC, metal	18 mm capacitive proximity sensors; DC, plastic	30 mm capacitive proximity sensors, DC, AC/DC, plastic and metal	Rectangular capacitive proximity sensors; DC, plastic
Sensing Distances	Shielded: 3 mm Unshielded: 6 mm	4 mm	Shielded: 6 mm Unshielded: 12 mm	12 mm	Shielded: 15 mm Unshielded: 20 mm, 40 mm	12 mm
Output State	N.O.	N.O.	N.O.	N.O./N.C.	N.O., N.C., N.O./N.C.	N.O./N.C.
Logic Output	NPN/ PNP	NPN/ PNP	PNP	NPN/ PNP	NPN/ PNP, NPN, PNP	NPN/ PNP
Connection Type	Axial cable / M8 connector	Axial cable	M12 connector	M12 connector	Axial cable, M12 connector and 1/2 inch AC micro connector	Axial cable
Supply Voltage	10 to 30 VDC	10 to 30 VDC	10-36 VDC	10-36 VDC	10 to 30 VDC, 10 to 36 VDC, 20 to 250 VDC/30 to 250 VAC	10-36 VDC
Switching Frequency	3kHz	200Hz	50Hz	10Hz	100Hz, 10Hz	10Hz
Protection Degree	IEC-IP67	IEC-IP67	IEC-IP65	IEC-IP65, IEC-IP67	IEC-IP65, IEC-IP67	IEC-IP65, IEC-IP67

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	0-5 VDC, 1-5mA / 0-10 VDC, 4 -20mA	0-5 VDC, 1-5mA / 0-10 VDC, 4-20mA	0-5 VDC, 1-5mA / 0-10 VDC, 4-20mA
Supply Voltage	15-30 VDC	10-30 VDC / 15-30 VDC	10-30 VDC / 15-30 VDC	10-30 VDC / 15-30 VDC
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




Specifications	UK1 Ultrasonic Sensor	UK6 Ultrasonic Sensor	UT1 Ultrasonic Sensor	UT2 Ultrasonic Sensor
Description	Ultrasonic Sensor, 18mm, plastic, DC and analog output models	Ultrasonic Sensor, 18mm, plastic, DC and analog output models, short body	Ultrasonic Sensor, 30mm, plastic, DC and analog output models	Ultrasonic Sensor, 30mm, plastic, DC and analog output models
Sensing Distances	50-2200 mm	40-900 mm	250-3500 mm	350-6000 mm
Output	DC models: PNP, NPN, N.O./N.C. Analog models: 0-10 VDC or 4-20 mA	DC models: PNP, NPN, N.O./N.C. Analog models: 0-10 VDC or 4-20 mA	DC models: PNP, NPN, N.O./N.C. Analog models: 0-10 VDC or 4-20 mA	DC models: PNP, NPN, N.O./N.C. Analog models: 0-10 VDC or 4-20 mA
Supply Voltage	15—30 VDC	15—30VDC	12–30 VDC, 15–30 VDC (0–10 VDC)	12–30 VDC, 15–30 VDC (0–10 VDC)
Connection Type	M12 connector or 2m prewired output cable	M12 (12mm) connector or 2m prewired output cable	M12 (12mm) connector or 2m prewired output cable	M12 (12mm) connector or 2m prewired output cable
Protection Degree	IEC-IP67	IEC-IP67	IEC-IP67	IEC-IP67

Proximity Sensors Selection Guide




Specifications	SU Ultrasonic Sensor	TU Ultrasonic Sensor	UHZ Ultrasonic Sensor	PFM Series DC
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	Food and Beverage Inductive Proximiy Sensors 12 mm stainless steel, DC
Sensing Distances	100 to 600 mm 200 to 1500 mm	300 to 2500 mm	300 mm	Standard Shielded: 2 mm Unshielded: 4 mm Extended Shielded: 4 mm Unshielded: 7 - 8 mm
Output State	DC models: PNP N.O. Analog models: 0-10VDC	DC models: PNP N.O. Analog models: 0-10VDC	PNP/NPN, N.O./N.C.	N.O./N.C. selectable; N. O.
Logic Output	NA			NPN/PNP
Connection Type	Axial cable/M12 connector	M12 connector	2 meter Axial cable	M12 connector
Supply Voltage	DC models: 15-30VDC Analog models: 18-30VDC	19-30VDC	18-30VDC	N.O. only: 10 to 36 VDC; N.O./N.C.: 10 to 30 VDC
Switching Frequency	NA	NA	NA	N.O. only - 800Hz N.O./N.C. - 2000Hz
Protection Degree	IEC-IP67	IEC-IP67	IEC-IP67	IEC IP68, IP69K




Specifications	PFK Series DC	PFT Series DC	VF Series AC	MAF Series DC
Description	Food and Beverage Inductive Proximity Sensors 18 mm stainless steel, DC	IP69K-rated Inductive Proximity Sensors 30 mm stainless steel, DC	IP69K-rated Inductive Proximity Sensors 18 mm/30 mm stainless steel, AC	IP69K-rated Magnetic Proximity Sensors 12 mm or 18 mm stainless steel, DC
Sensing Distances	Standard Shielded: 5mm Unshielded: 8 mm Extended Shielded: 8 mm Unshielded: 12 mm	Shielded: 14 - 15 mm Unshielded: 22 mm	18 mm models: Shielded: 5 mm Unshielded: 12 mm 30 mm models: Shielded: 14 mm Unshielded: 22 mm	12 mm housing - 60 mm (with AW-MAG) 18 mm housing - 70 mm (with AW-MAG)
Output State	N.O./N.C. selectable; N. O.	N. O.	N. O.	N.O.
Logic Output	NPN/PNP	PNP	–	PNP
Connection Type	M12 connector	M12 connector	1/2" micro AC	M12 connector
Supply Voltage	N.O. only: 10 to 36 VDC; N.O./N.C.: 10 to 30 VDC	10 to 36 VDC	20 to 140 AC/DC, 47 to 63 Hz AC	10 to 30 VDC
Switching Frequency	N.O. only - Shielded: 600Hz Unshielded: 300Hz N.O./N.C. - 1500 Hz	N.O. only - Shielded: 50Hz Unshielded: 100Hz	AC - 25Hz DC 18 mm - 300Hz DC 30 mm - 100Hz	5kHz
Protection Degree	IEC IP68, IP69K	IEC IP68, IP69K	IEC IP68, IP69K	IEC IP68, IP69K

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
- Lifetime warranty

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	$79.00	Ø3*	0.6 mm (0.024 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Figure 1
PY3-AP-1A	$79.00	Ø3*				PNP	2 m (6.5') axial cable	Figure 1
PY4-AN-1A	$79.00	4 mm				NPN	2 m (6.5') axial cable	Figure 2
PY4-AP-1A	$79.00	4 mm				PNP	2 m (6.5') axial cable	Figure 2
Extended Distance								
PY3-AN-3A	$89.00	Ø3*	1 mm (0.039 in)	Shielded	N.O	NPN	2 m (6.5') axial cable	Figure 1
PY3-AP-3A	$89.00	Ø3*				PNP	2 m (6.5') axial cable	Figure 1
PY4-AN-3A	$89.00	4mm				NPN	2 m (6.5') axial cable	Figure 2
PY4-AP-3A	$89.00	4mm				PNP	2 m (6.5') axial cable	Figure 2

*Smooth barrel, no threads

PY Series Specifications	Ø3	M4	Ø3	M4
Mounting Type	***Standard Distance***		***Extended Distance***	
	Shielded			
Nominal Sensing Distance	0.6 mm (0.024 in)		1 mm (0.039 in)	
Operating Distance	N/A		N/A	
Material Correction Factors	See Material Influence table #1 later in this section.			
Output Type	NPN or PNP/N.O. only/3-wire			
Operating Voltage	10 to 30 VDC			
No-load Supply Current	≤10mA			
Operating (Load) Current	≤100mA			
Off-state (Leakage) Current	≤10µA		≤0.1mA	
Voltage Drop	≤2.0 V			
Switching Frequency	5 kHz		3 kHz	
Differential Travel *(% of Nominal Distance)*	≤10%			
Repeat Accuracy	≤5%			
Ripple	≤20%			
Time Delay Before Availability (tv)	10 ms			
Reverse Polarity Protection	Yes			
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)			
Operating Temperature	-25° to +70°C (-13° to 158 F)			
Protection Degree (DIN 40050)	IEC IP67			
Indication/Switch Status	Yellow (output energized)			
Housing Material	Stainless steel			
Sensing Face Material	Polyester			
Shock/Vibration	See terminology section.			
Tightening Torque	0.8 Nm (7.08 in./lbs.)			
Weight	23 g (0.81 oz)		22 g (0.78 oz)	26 g (0.92oz)
Connection	2 meter PVC cable			
Agency Approvals	UL file E328811			

Dimensions

mm [inches]

Figure 1

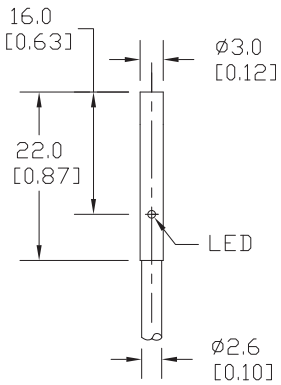
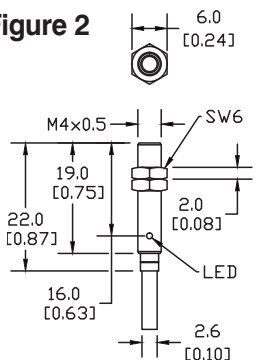
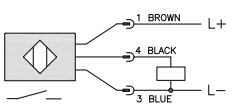


Figure 2

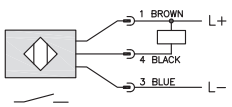


Wiring diagrams

PNP Output



NPN Output



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
- Lifetime warranty

PD Series M5 DC Inductive Prox Selection Chart							
Part Number	**Price**	**Sensing Range**	**Housing**	**Output State**	**Logic**	**Connection**	**Dimensions**
Standard Distance							
PD1-AN-1A	$43.50	0.8 mm (0.03 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Figure 1
PD1-AP-1A	$43.50				PNP	2 m (6.5') axial cable	Figure 1
PD1-AN-1F	$43.50				NPN	M8 (8 mm) connector	Figure 2
PD1-AP-1F	$43.50				PNP	M8 (8 mm) connector	Figure 2
Extended Distance							
PD1-AN-3A	$51.00	1.5 mm (0.059 in)	Shielded	N.O	NPN	2 m (6.5') axial cable	Figure 1
PD1-AP-3A	$51.00				PNP	2 m (6.5') axial cable	Figure 1
PD1-AN-3F	$51.00				NPN	M8 (8 mm) connector	Figure 2
PD1-AP-3F	$51.00				PNP	M8 (8 mm) connector	Figure 2

PD Series Specifications		
Mounting Type	***Standard Distance***	***Extended Distance***
	Shielded	
Nominal Sensing Distance	0.8 mm (0.03 in)	1.5 mm (0.059 in)
Operating Distance	N/A	
Material Correction Factors	See Material Influence table #1 later in this section	
Output Type	NPN or PNP/N.O. only/3-wire	
Operating Voltage	10 to 30 VDC	
No-load Supply Current	≤10mA	
Operating (Load) Current	≤200mA	
Off-state (Leakage) Current	≤10µA	≤0.1mA
Voltage Drop	≤2.0 V	
Switching Frequency	5 kHz	3 kHz
Differential Travel (% of Nominal Distance)	≤10%	
Repeat Accuracy	≤1.5%	
Ripple	≤20%	
Time Delay Before Availability (tv)	10 ms	
Reverse Polarity Protection	Yes	
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)	
Operating Temperature	-25° to +70°C (-13° to 158°F)	
Protection Degree (DIN 40050)	IEC IP67	
Indication/Switch Status	Yellow (output energized)	
Housing Material	Stainless steel	
Sensing Face Material	Polybutylene Terephthalate (PBT)	Polyester
Shock/Vibration	See terminology section.	
Tightening Torque	1.5 Nm (13.3 lb./in.)	
Weight	43 g (1.52 oz)/10 g (0.36 oz)	34 g (1.20 oz)/4 g (0.14 oz)
Connection	2 meter PVC axial cable / M8 connector	
Agency Approvals	UL file E328811	

Dimensions

mm [inches]

Figure 1

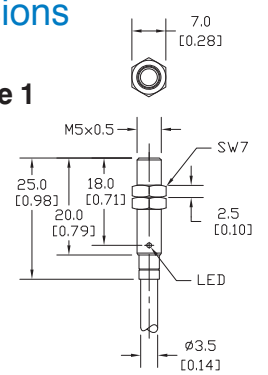
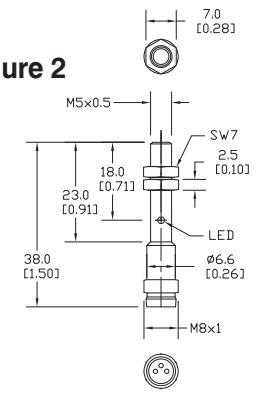
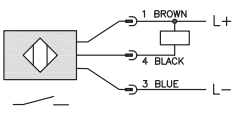


Figure 2

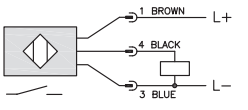


Wiring diagrams

NPN Output

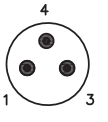


PNP Output



Connector

M8 connector



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° around the cylinder
- Lifetime warranty

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	$21.00	0 to 1.5 mm (0-0.059 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AE1-AP-1A	$21.00				PNP	2 m (6.5') axial cable	Diagram 2	Figure 1
AE1-AN-1H	$21.00				NPN	M12 (12 mm) connector	Diagram 1	Figure 2
AE1-AP-1H	$21.00				PNP	M12 (12 mm) connector	Diagram 2	Figure 2
AE1-AN-1F	$21.00				NPN	M8 (8 mm) connector	Diagram 1	Figure 3
AE1-AP-1F	$21.00				PNP	M8 (8 mm) connector	Diagram 2	Figure 3
AE1-AN-2A	$21.00	0 to 2.5 mm (0-0.098 in)	Unshielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AE1-AP-2A	$21.00				PNP	2 m (6.5') axial cable	Diagram 2	Figure 1
AE1-AN-2H	$21.00				NPN	M12 (12 mm) connector	Diagram 1	Figure 2
AE1-AP-2H	$21.00				PNP	M12 (12 mm) connector	Diagram 2	Figure 2
AE1-AN-2F	$21.00				NPN	M8 (8 mm) connector	Diagram 1	Figure 3
AE1-AP-2F	$21.00				PNP	M8 (8 mm) connector	Diagram 2	Figure 3
Extended Distance								
AE1-AN-3A	$26.50	0 to 2 mm (0-0.079 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AE1-AP-3A	$26.50				PNP	2 m (6.5') axial cable	Diagram 2	Figure 1
AE1-AN-3F	$26.50				NPN	M8 (8 mm) connector	Diagram 1	Figure 3
AE1-AP-3F	$26.50				PNP	M8 (8 mm) connector	Diagram 2	Figure 3
AE1-AN-4A	$26.50	0 to 4 mm (0-0.157 in)	Unshielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AE1-AP-4A	$26.50				PNP	2 m (6.5') axial cable	Diagram 2	Figure 1
AE1-AN-4F	$26.50				NPN	M8 (8 mm) connector	Diagram 1	Figure 3
AE1-AP-4F	$26.50				PNP	M8 (8 mm) connector	Diagram 2	Figure 3
Triple Distance								
AE1-AN-5A	$61.00	0 to 3 mm (0-0.118 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AE1-AP-5A	$61.00				PNP	2 m (6.5') axial cable	Diagram 2	Figure 1
AE1-AN-5F	$61.00				NPN	M8 (8 mm) connector	Diagram 1	Figure 4
AE1-AP-5F	$61.00				PNP	M8 (8 mm) connector	Diagram 2	Figure 4

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	$31.00	0 to 2 mm (0-0.079 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 5
AE6-AP-3A	$31.00				PNP	2 m (6.5') axial cable	Diagram 2	Figure 5
AE6-AN-3F	$31.00				NPN	M8 (8 mm) connector	Diagram 1	Figure 6
AE6-AP-3F	$31.00				PNP	M8 (8 mm) connector	Diagram 2	Figure 6
AE6-AN-4A	$31.00	0 to 4 mm (0-0.157 in)	Unshielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 5
AE6-AP-4A	$31.00				PNP	2 m (6.5') axial cable	Diagram 2	Figure 5
AE6-AN-4F	$31.00				NPN	M8 (8 mm) connector	Diagram 1	Figure 6
AE6-AP-4F	$31.00				PNP	M8 (8 mm) connector	Diagram 2	Figure 6

AE Series Inductive Proximity Sensors

AE Series Specifications					
Mounting Type	**Standard Distance Models**		**Extended Distance Models**		**Triple Distance Models**
	Shielded	Unshielded	Shielded	Unshielded	Shielded
Nominal Sensing Distance	1.5mm (0.059in)	2.5mm (0.098in)	2mm (0.079in)	4mm (0.157in)	3mm (0.118in)
Operating Distance	N/A				
Material Correction Factors	See Material Influence table #1 later in this section				See Material Influence table #2 later in this section
Output Type	NPN or PNP/N.O. only/3-wire				
Operating Voltage	10 to 30 VDC				
No-load Supply Current	≤20mA		≤10mA		
Operating (Load) Current	≤200mA				
Off-state (Leakage) Current	≤10µA		≤120µA		
Voltage Drop	≤1.2 V				≤2.0 V
Switching Frequency	3 kHz	2.5 kHz	3 kHz		1 kHz
Differential Travel (% of Nominal Distance)	2 to 10%		1 to 20		≤10%
Repeat Accuracy	≤2%		≤5%		
Ripple	≤10%				≤20%
Time Delay Before Availability (tv)	100 ms (5 ms for AE6 short body models)				50 ms
Reverse Polarity Protection	Yes				
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)				
Operating Temperature	-25° to +70°C (-13° to 158°F)				
Protection Degree (DIN 40050)	IEC IP67				
Indication/Switch Status	Yellow (output energized)				
Housing Material	Nickel-plated brass				Chrome-plated brass
Sensing Face Material	Polybutylene Terephthalate (PBT)				
Shock/Vibration	See terminology section				
Tightening Torque	4 Nm (2.95 lb-ft)				
Weight *(cable/M8 connector/M12 connector)*	43 g (1.52 oz)/16 g (0.56 oz)/20 g (0.71 oz)				54 g (1.90 oz)/26 g (0.92 oz)/(N/A)
Connection	2 meter PVC axial cable / M8 connector / M12 connector				
Agency Approvals	N/A				UL file E328811

Wiring diagrams

Diagram 1

NPN Output

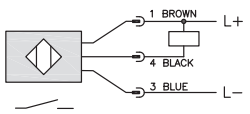
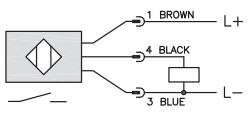


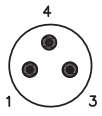
Diagram 2

PNP Output



Connectors

M8 connector



M12 connector

AE Series Inductive Proximity Sensors

Dimensions

mm [inches]

Figure 1

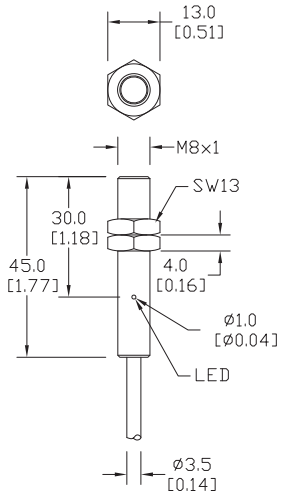


Figure 2

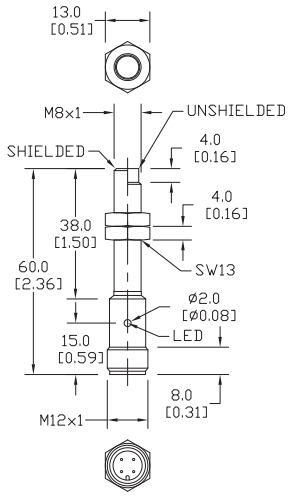


Figure 3

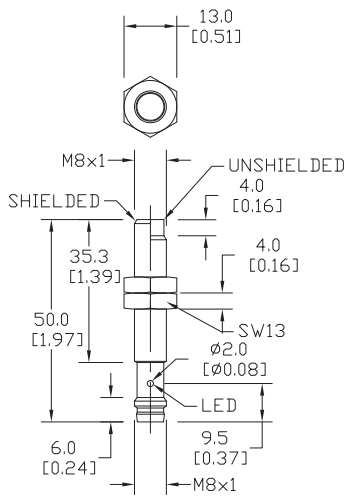


Figure 4

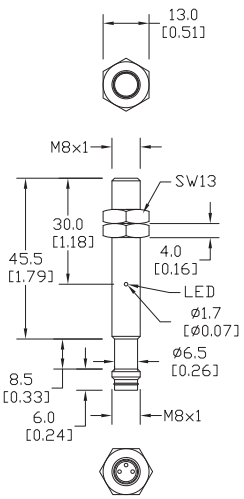


Figure 5

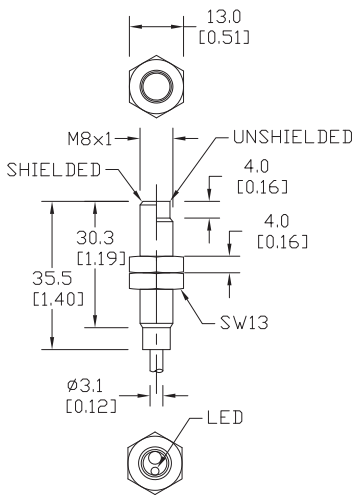
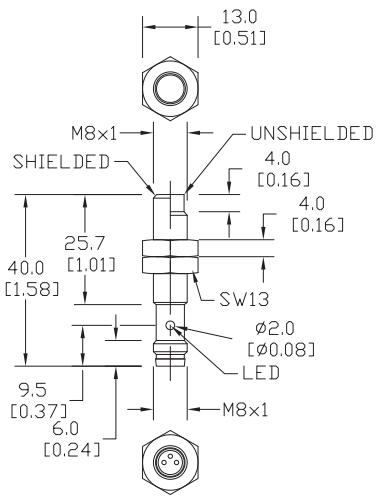


Figure 6



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
- Lifetime warranty

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	$20.00	0 to 2 mm (0-0.079 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AM1-AP-1A	$20.00				PNP	2 m (6.5') axial cable	Diagram 1	Figure 1
AM1-A0-1A	$22.00				Sink/source	2 m (6.5') axial cable	Diagram 2	Figure 1
AM1-AN-1H	$20.00				NPN	M12 (12 mm) connector	Diagram 1	Figure 2
AM1-AP-1H	$20.00				PNP	M12 (12 mm) connector	Diagram 1	Figure 2
AM1-A0-1H	$22.00				Sink/source	M12 (12 mm) connector	Diagram 2	Figure 2
AM1-AN-2A	$20.00	0 to 4 mm (0-0.157 in)	Unshielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AM1-AP-2A	$20.00				PNP	2 m (6.5') axial cable	Diagram 1	Figure 1
AM1-A0-2A	$22.00				Sink/source	2 m (6.5') axial cable	Diagram 2	Figure 1
AM1-AN-2H	$20.00				NPN	M12 (12 mm) connector	Diagram 1	Figure 2
AM1-AP-2H	$20.00				PNP	M12 (12 mm) connector	Diagram 1	Figure 2
AM1-A0-2H	$22.00				Sink/source	M12 (12 mm) connector	Diagram 2	Figure 2
Extended Distance								
AM1-AN-3A	$25.50	0 to 4 mm (0-0.157 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AM1-AP-3A	$25.50				PNP	2 m (6.5') axial cable	Diagram 1	Figure 1
AM1-A0-3A	$27.50				Sink/source	2 m (6.5') axial cable	Diagram 2	Figure 1
AM1-AN-3H	$25.50				NPN	M12 (12 mm) connector	Diagram 1	Figure 2
AM1-AP-3H	$25.50				PNP	M12 (12 mm) connector	Diagram 1	Figure 2
AM1-A0-3H	$27.50				Sink/source	M12 (12 mm) connector	Diagram 2	Figure 2
AM1-AN-4A	$25.50	0 to 8 mm (0-0.314 in)	Unshielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AM1-AP-4A	$25.50				PNP	2 m (6.5') axial cable	Diagram 1	Figure 1
AM1-A0-4A	$27.50				Sink/source	2 m (6.5') axial cable	Diagram 2	Figure 1
AM1-AN-4H	$25.50				NPN	M12 (12 mm) connector	Diagram 1	Figure 2
AM1-AP-4H	$25.50				PNP	M12 (12 mm) connector	Diagram 1	Figure 2
AM1-A0-4H	$27.50				Sink/source	M12 (12 mm) connector	Diagram 2	Figure 2
Triple Distance								
AM1-AN-5H	$65.00	6 mm (0.236 in)	Shielded	N.O.	NPN	M12 (12 mm) connector	Diagram 1	Figure 3
AM1-AP-5H	$65.00				PNP	M12 (12 mm) connector	Diagram 1	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	$31.00	0 to 4 mm (0-0.157 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 4
AM6-AP-3A	$31.00				PNP	2 m (6.5') axial cable	Diagram 1	Figure 4
AM6-AN-3H	$31.00				NPN	M12 (12 mm) connector	Diagram 1	Figure 5
AM6-AP-3H	$31.00				PNP	M12 (12 mm) connector	Diagram 1	Figure 5
AM6-AN-4A	$31.00	0 to 8 mm (0-0.314 in)	Unshielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 4
AM6-AP-4A	$31.00				PNP	2 m (6.5') axial cable	Diagram 1	Figure 4
AM6-AN-4H	$31.00				NPN	M12 (12 mm) connector	Diagram 1	Figure 5
AM6-AP-4H	$31.00				PNP	M12 (12 mm) connector	Diagram 1	Figure 5

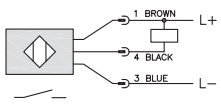
AM Series Inductive Proximity Sensors

AM Series Specifications					
Mounting Type	**Standard Distance Models**		**Extended Distance Models**		**Triple Distance Models**
	Shielded	Unshielded	Shielded	Unshielded	Shielded
Nominal Sensing Distance	2 mm (0.079 in)	4 mm (0.157 in)	4 mm (0.157 in)	8 mm (0.315 in)	6 mm (0.236 in)
Operating Distance	N/A				
Material Correction Factors	See Material Influence table #1 later in this section				See Material Influence table #2 later in this section
Output Type	NPN or PNP/N.O. only/3-wire				
Operating Voltage	10 to 30 VDC				
No-load Supply Current	≤20mA		≤10mA		
Operating (Load) Current	3-wire: ≤200mA / 2-wire: 3-100mA		3-wire: ≤200mA / 2-wire: 3-100mA		≤200mA
Off-state (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.				≤2.0 V
Switching Frequency	3-wire: 2kHz / 2 wire: 1.5 kHz		3-wire: 2kHz / 2 wire: 1 kHz		800 Hz
Differential Travel (% of Nominal Distance)	2 to 10%		1 to 20		
Repeat Accuracy	≤2%		≤5%		
Ripple	≤10%				≤20%
Time Delay Before Availability (tv)	3-wire: 100ms / 2 wire: 50ms		100 ms		
Reverse Polarity Protection	Yes				
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)				
Operating Temperature	-25° to +70°C (-13° to 158°F)				
Protection Degree (DIN 40050)	IEC IP67				
Indication/Switch Status	Yellow (output energized)				
Housing Material	Nickel-plated brass				Chrome-plated brass
Sensing Face Material	Polybutylene Terephthalate (PBT)				
Shock/Vibration	See terminology section				
Tightening Torque	10 Nm (7.37 lb-ft)				
Weight *(cable/M12 connector)*	70 g (2.47 oz)/30 g (1.06 oz)				96 g (3.39 oz)/34 g (1.2 oz)
Connection	2 meter PVC axial cable / M12 connector				
Agency Approvals	N/A				UL file E328811

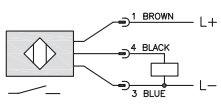
Wiring diagrams

Diagram 1

NPN Output



PNP Output

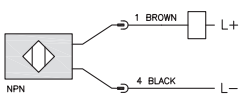


Connector

M12 connector

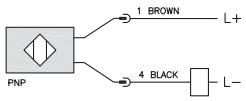
Diagram 2

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.

AM Series Inductive Proximity Sensors

Dimensions

mm [inches]

Figure 1

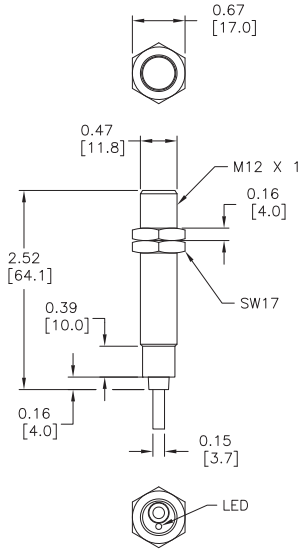


Figure 2

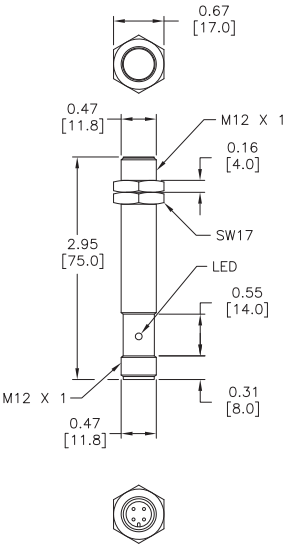


Figure 3

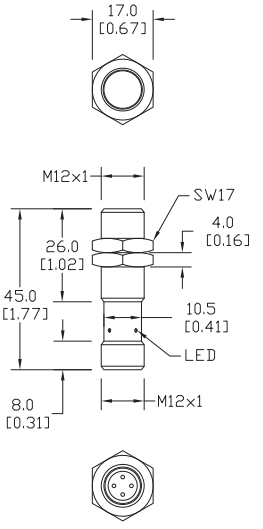


Figure 4

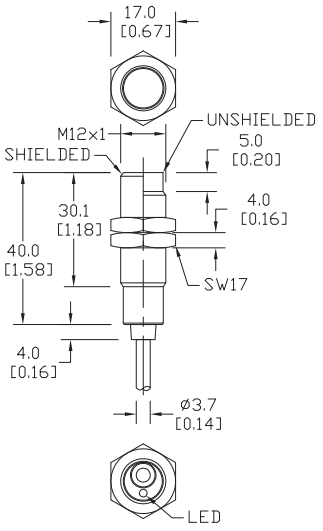
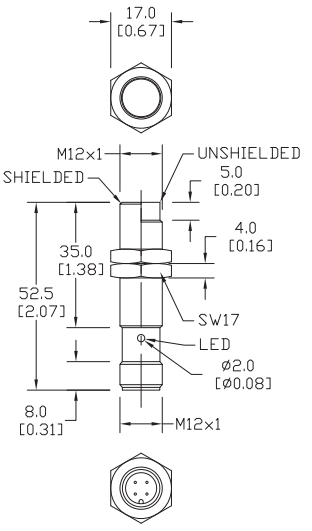


Figure 5



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
- Lifetime warranty

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	$22.00	5 mm (0.197 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AK1-AP-1A	$22.00				PNP	2 m (6.5') axial cable	Diagram 1	Figure 1
AK1-A0-1A	$23.00				Sink/source	2 m (6.5') axial cable	Diagram 2	Figure 1
AK1-AN-1H	$22.00				NPN	M12 (12 mm) connector	Diagram 1	Figure 2
AK1-AP-1H	$22.00				PNP	M12 (12 mm) connector	Diagram 1	Figure 2
AK1-A0-1H	$23.00				Sink/source	M12 (12 mm) connector	Diagram 2	Figure 2
AK1-AN-2A	$22.00	8 mm (0.315 in)	Unshielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AK1-AP-2A	$22.00				PNP	2 m (6.5') axial cable	Diagram 1	Figure 1
AK1-A0-2A	$23.00				Sink/source	2 m (6.5') axial cable	Diagram 2	Figure 1
AK1-AN-2H	$22.00				NPN	M12 (12 mm) connector	Diagram 1	Figure 2
AK1-AP-2H	$22.00				PNP	M12 (12 mm) connector	Diagram 1	Figure 2
AK1-A0-2H	$23.00				Sink/source	M12 (12 mm) connector	Diagram 2	Figure 2
Extended Distance								
AK1-AN-3A	$26.50	8 mm (0.315 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AK1-AP-3A	$26.50				PNP	2 m (6.5') axial cable	Diagram 1	Figure 1
AK1-A0-3A	$29.50				Sink/source	2 m (6.5') axial cable	Diagram 2	Figure 1
AK1-AN-3H	$26.50				NPN	M12 (12 mm) connector	Diagram 1	Figure 2
AK1-AP-3H	$26.50				PNP	M12 (12 mm) connector	Diagram 1	Figure 2
AK1-A0-3H	$29.50				Sink/source	M12 (12 mm) connector	Diagram 2	Figure 2
AK1-AN-4A	$26.50	12 mm (0.472 in)	Unshielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AK1-AP-4A	$26.50				PNP	2 m (6.5') axial cable	Diagram 1	Figure 1
AK1-A0-4A	$29.50				Sink/source	2 m (6.5') axial cable	Diagram 2	Figure 1
AK1-AN-4H	$26.50				NPN	M12 (12 mm) connector	Diagram 1	Figure 2
AK1-AP-4H	$26.50				PNP	M12 (12 mm) connector	Diagram 1	Figure 2
AK1-A0-4H	$29.50				Sink/source	M12 (12 mm) connector	Diagram 2	Figure 2

Dimensions

mm [inches]

Figure 1

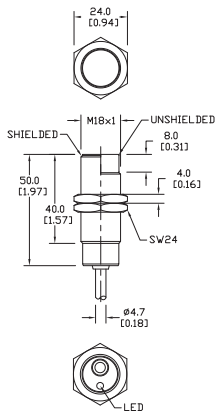
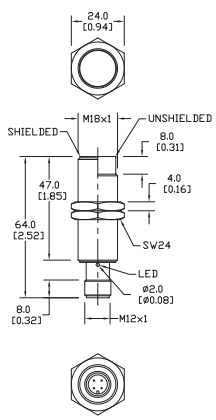


Figure 2



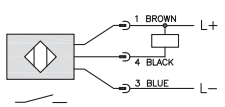
AK Series Inductive Proximity Sensors

AK Series Specifications				
Mounting Type	**Standard Distance**		**Extended Distance**	
	Shielded	Unshielded	Shielded	Unshielded
Nominal Sensing Distance	5 mm (0.197 in)	8 mm (0.315 in)	8 mm (0.315 in)	12 mm (0.472 in)
Operating Distance	N/A			
Material Influence Factors	See Material Influence table #1 later in this section			
Output Type	3- wire: NPN or PNP/N.O. (normally open) / 2-wire: sink/source, N.O. only			
Operating Voltage	10 to 30 VDC			
No-load Supply Current	≤ 20 mA for 3 mins			
Operating (Load) Current	3-wire: ≤400mA / 2-wire: 3-100mA			
Off-state (Leakage) Current	3-wire: ≤10µA / 2-wire: ≤0.8mA max			
Voltage Drop	3-wire: 1 volt max. / 2-wire: ≤2.8V max.			
Switching Frequency	600 Hz	300 Hz		
Differential Travel (% of Nominal Distance)	2 to ≤10%		2 to ≤15%	
Repeat Accuracy	≤2%		≤5%	
Ripple	≤10%			
Time Delay Before Availability (tv)	3-wire: 100ms / 2-wire:-50ms			
Reverse Polarity Protection	Yes			
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)			
Operating Temperature	-25° to +70°C (-13° to 158°F)			
Protection Degree (DIN 40050)	IEC IP67			
Indication/Switch Status	Yellow (N.O. output energized)			
Housing Material	Nickel-plated brass			
Sensing Face Material	Polybutylene Terephthalate (PBT)			
Shock/Vibration	See terminology section.			
Tightening Torque	25 Nm (18.44 lbs-ft.)			
Weight	**A** type (w/ cable): 130 g (4.59 oz) **H** type: 55 g (1.94 oz)			
Connection	2 meter PVC axial cable / M12 connector			
Agency Approvals	N/A			

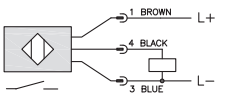
Wiring diagrams

Diagram 1

NPN Output



PNP Output



Connector

M12 connector

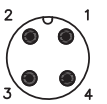
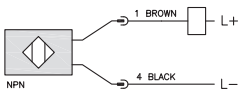


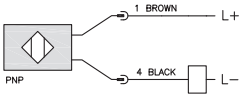
Diagram 2

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.

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
- Lifetime warranty

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	$26.50	10 mm (0.394 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AT1-AP-1A	$26.50				PNP	2 m (6.5') axial cable	Diagram 1	Figure 1
AT1-A0-1A	$32.50				Sink/source	2m (6.5') axial cable	Diagram 2	Figure 1
AT1-AN-1H	$26.50				NPN	M12 (12 mm) connector	Diagram 1	Figure 2
AT1-AP-1H	$26.50				PNP	M12 (12 mm) connector	Diagram 1	Figure 2
AT1-A0-1H	$37.00				Sink/source	M12 (12mm) connector	Diagram 2	Figure 2
AT1-AN-2A	$26.50	15 mm (0.591 in)	Unshielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AT1-AP-2A	$26.50				PNP	2 m (6.5') axial cable	Diagram 1	Figure 1
AT1-A0-2A	$32.50				Sink/source	2 m (6.5') axial cable	Diagram 2	Figure 1
AT1-AN-2H	$26.50				NPN	M12 (12 mm) connector	Diagram 1	Figure 2
AT1-AP-2H	$26.50				PNP	M12 (12 mm) connector	Diagram 1	Figure 2
AT1-A0-2H	$37.00				Sink/source	M12 (12 mm) connector	Diagram 2	Figure 2
Extended Distance								
AT1-AN-3A	$32.50	15 mm (0.591 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AT1-AP-3A	$32.50				PNP	2 m (6.5') axial cable	Diagram 1	Figure 1
AT1-A0-3A	$36.00				Sink/source	2 m (6.5') axial cable	Diagram 2	Figure 1
AT1-AN-3H	$32.50				NPN	M12 (12 mm) connector	Diagram 1	Figure 2
AT1-AP-3H	$32.50				PNP	M12 (12 mm) connector	Diagram 1	Figure 2
AT1-A0-3H	$36.00				Sink/source	M12 (12 mm) connector	Diagram 2	Figure 2
AT1-AN-4A	$32.50	20 mm (0.787 in)	Unshielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
AT1-AP-4A	$32.50				PNP	2 m (6.5') axial cable	Diagram 1	Figure 1
AT1-A0-4A	$36.00				Sink/source	2 m (6.5') axial cable	Diagram 2	Figure 1
AT1-AN-4H	$32.50				NPN	M12 (12 mm) connector	Diagram 1	Figure 2
AT1-AP-4H	$32.50				PNP	M12 (12 mm) connector	Diagram 1	Figure 2
AT1-A0-4H	$36.00				Sink/source	M12 (12 mm) connector	Diagram 2	Figure 2

Dimensions

mm[inches]

Figure 1

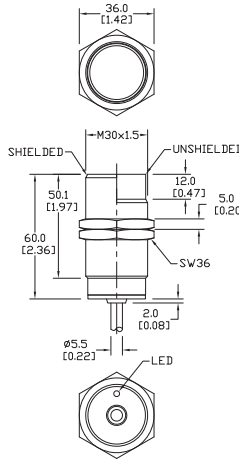
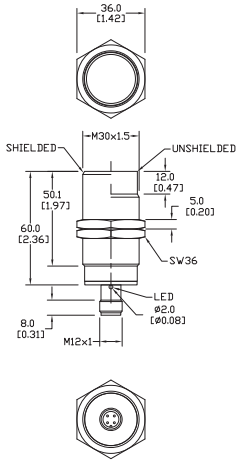


Figure 2



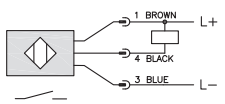
AT Series Inductive Proximity Sensors

AT Series Specifications				
Mounting Type	***Standard Distance Models***		***Extended Distance Models***	
	Shielded	Unshielded	Shielded	Unshielded
Nominal Sensing Distance	10 mm (0.394 in)	15 mm (0.591 in)	15 mm (0.591 in)	20 mm (0.787 in)
Operating Distance	N/A			
Material Correction Factors	See Material Influence table #1 later in this section			
Output Type	Three wire: NPN or PNP/N.O. (normally open) / Two wire: sink/source, N.O. only			
Operating Voltage	10 to 30 VDC			
No-load Supply Current	≤ 20 mA for 3 mins			
Operating (Load) Current	3 wire: ≤400mA / 2-wire: 3-100mA		2-wire and 3-wire:≤400mA	
Off-state (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≤10%		3-wire: ≤1 volt max. / 2-wire: ≤2.8V	
Switching Frequency	3-wire: 200Hz / 2-wire: 150Hz		2-and 3-wire:150Hz	
Differential Travel	2 to 10%		2 to 15%	
Repeat Accuracy	3-wire: 2% / 2-wire: 5%		2-wire and 3-wire: 5%	
Ripple	≤10%			
Time Delay Before Availability (tv)	3-wire: 100ms / 2-wire: 50ms		3-wire:100ms / 2-wire: 50ms	
Reverse Polarity Protection	Yes			
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)			
Operating Temperature	-25° to + 70°C (-13° to 158°F); drift: 10% Sr			
Protection Degree (DIN 40050)	IEC IP67			
Indication/Switch Status	Yellow (N.O. output energized)			
Housing Material	Nickel-plated brass			
Sensing Face Material	Polybutylene Terephthalate (PBT)			
Shock/Vibration	See terminology section.			
Tightening Torque	50 Nm (36.88 lbs-ft.)			
Weight	**A** type (w/ cable): 180 g (6.35 oz) **H** type: 110 g (3.88 oz)			
Connection	2 meter axial cable or M12 connector			
Agency Approvals	N/A			

Wiring diagrams

Diagram 1

NPN Output



PNP Output

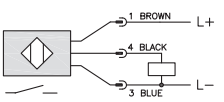
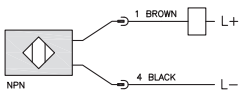


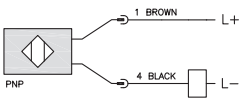
Diagram 2

Sink/Source Output



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

Sink/Source Output

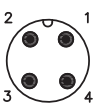


Wiring diagram when sensor is wired in sourcing mode used with a sinking module.

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

Connector

M12 connector



PB Series Inductive Proximity Sensors

Nickel-plated Brass - DC

PBT-AN-1H PBT-AN-2H

- Low cost/high performance
- Twelve models available
- IP67 rated
- LED status indicators
- M12 quick-disconnect; purchase cable separately
- Lifetime warranty

Basic Series Inductive Prox Selection Chart								
Part Number	**Price**	**Sensing Range**	**Housing**	**Output State**	**Logic**	**Connection**	**Wiring**	**Dimensions**
M12 Models								
PBM-AN-1H	$13.50	2 mm (0.079 in)	Shielded	N.O.	NPN	M12 (12 mm) connector	Diagram 1	Figure 1
PBM-AP-1H	$13.50				PNP	M12 (12 mm) connector	Diagram 2	
PBM-AN-2H	$13.50	4 mm (0.157 in)	Unshielded		NPN	M12 (12 mm) connector	Diagram 1	
PBM-AP-2H	$13.50				PNP	M12 (12 mm) connector	Diagram 2	
M18 Models								
PBK-AN-1H	$14.00	5 mm (0.197 in)	Shielded	N.O.	NPN	M12 (12 mm) connector	Diagram 1	Figure 2
PBK-AP-1H	$14.00				PNP	M12 (12 mm) connector	Diagram 2	
PBK-AN-2H	$14.00	8 mm (0.315 in)	Unshielded		NPN	M12 (12 mm) connector	Diagram 1	
PBK-AP-2H	$14.00				PNP	M12 (12 mm) connector	Diagram 2	
M30 Models								
PBT-AN-1H	$16.50	10 mm (0.394 in)	Shielded	N.O.	NPN	M12 (12 mm) connector	Diagram 1	Figure 3
PBT-AP-1H	$16.50				PNP	M12 (12 mm) connector	Diagram 2	
PBT-AN-2H	$16.50	15 mm (0.590 in)	Unshielded		NPN	M12 (12 mm) connector	Diagram 1	
PBT-AP-2H	$16.50				PNP	M12 (12 mm) connector	Diagram 2	

Wiring diagrams

Diagram 1

NPN Output

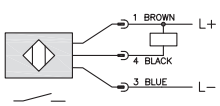
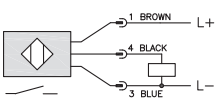


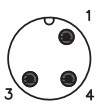
Diagram 2

PNP Output



Connector

M12 connector



PB Series Inductive Proximity Sensors

PB Series Specifications	M12 Models		M18 Models		M30 Models	
Mounting Type	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
Nominal Sensing Distance	2 mm (0.079 in)	4 mm (0.157 in)	5 mm (0.197 in)	8 mm (0.315 in)	10 mm (0.394 in)	15 mm (0.590 in)
Operating Distance	N/A					
Material Correction Factors	See Material Influence table #2 later in this section.					
Output Type	NPN or PNP, N.O. only					
Operating Voltage	15 to 30 VDC					
No-load Supply Current	<15 mA					
Operating (Load) Current	100 mA					
Off-state (Leakage) Current	<0.1 mA					
Voltage Drop	<2.5 V					
Switching Frequency	800Hz		400Hz	300Hz	200Hz	
Differential Travel (% of Nominal Distance)	N/A					
Repeat Accuracy	N/A					
Ripple	N/A					
Time Delay Before Availability (tv)	N/A					
Reverse Polarity Protection	Yes					
Short-circuit Protection	Yes, pulsed					
Operating Temperature	-25° to 70°C (-13° to 158°F)					
Protection Degree (DIN 40050)	IEC IP67					
Indication/Switch Status	Yellow (output energized)					
Housing Material	Housing: brass, nickel-plated; Lock nuts: brass					
Sensing Face Material	Polybutylene Terephthalate (PBT)					
Shock/Vibration	See terminology section					
Tightening Torque	7.0 Nm (5.16 lb-ft)		35.0 Nm (25.8 lb-ft)		50.0 Nm (36.8 lb-ft)	
Weight	1.70 g (0.06 oz)		2.83 g (0.10 oz)		8.50 g (0.30 oz)	5.70 g (0.20 oz)
Connectors	M12 connector. 2 lock nuts included					
Agency Approvals	cULus file E328811, CE, RoHS					

Dimensions

mm [inches]

Figure 1

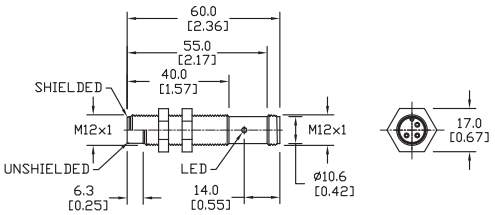


Figure 2

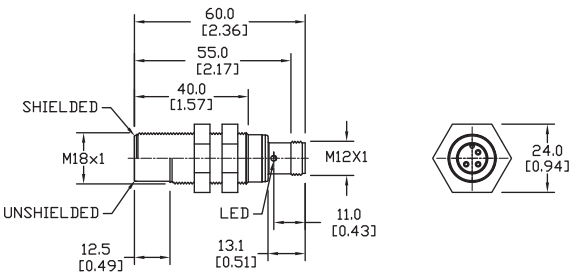
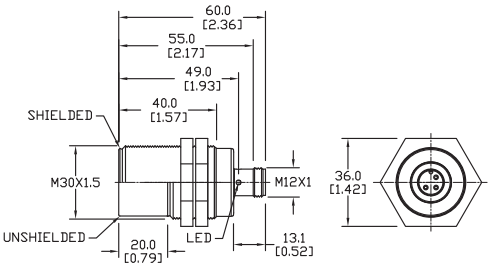


Figure 3



PEW Series Inductive Proximity Sensors

PEW-AP-1H

M8 (8 mm) stainless steel - DC

- Four flush-mountable models available
- Low cost/high performance
- Metal sensing face for extreme environments
- LED status indicators are visible at a wide angle.
- Sensing face withstands up to 1450 psi.
- M8 or M12 quick-disconnect models
- 2 M8 stainless steel lock nuts included
- Purchase cable separately
- Lifetime warranty

PEW Series DC Inductive Prox Selection Chart								
Part Number	**Price**	**Sensing Range**	**Housing**	**Output State**	**Logic**	**Connection**	**Wiring**	**Dimensions**
Extended Distance								
PEW-AN-1F	$33.75	2 mm (0.079 in)	Shielded	N.O.	NPN	M8 (8 mm) quick disconnect	Diagram 1	Figure 1
PEW-AP-1F	$45.00	2 mm (0.079 in)	Shielded	N.O.	PNP	M8 (8 mm) quick disconnect	Diagram 2	Figure 1
PEW-AN-1H	$45.00	2 mm (0.079 in)	Shielded	N.O.	NPN	M12 (12 mm) quick disconnect	Diagram 1	Figure 2
PEW-AP-1H	$45.00	2 mm (0.079 in)	Shielded	N.O.	PNP	M12 (12 mm) quick disconnect	Diagram 2	Figure 2

Wiring diagrams

Diagram 1

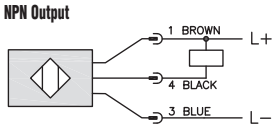
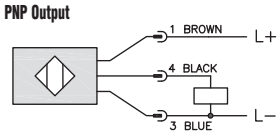
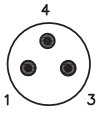


Diagram 2

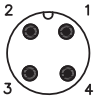


Connectors

M8 connector



M12 connector



Dimensions mm[inches]

Figure 1

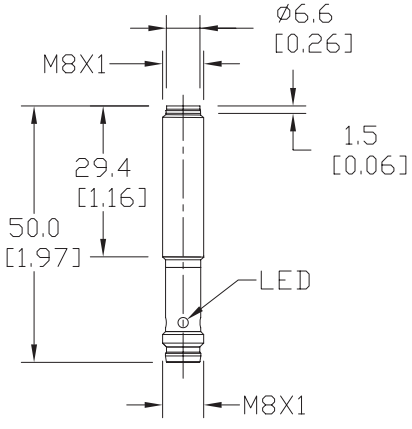
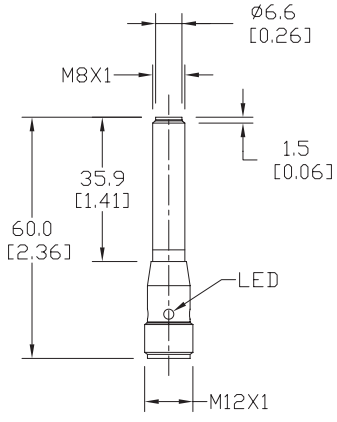


Figure 2



PEW Series Inductive Proximity Sensors

Specifications	PEW-AN-1F	PEW-AP-1F	PEW-AN-1H	PEW-AP-1H
Mounting Type	Shielded			
Nominal Sensing Distance	2 mm (0.079 in) ± 10%			
Operating Distance	0 to 1.6 mm (0.06 in)			
Material Correction Factors	See Material Influence table #2 later in this section.			
Output Type	NPN, N.O. only	PNP, N.O. only	NPN, N.O. only	PNP, N.O. only
Operating Voltage	10 to 36 VDC			
No-load Supply Current	< 20 mA			
Operating (Load) Current	100 mA			
Off-state (Leakage) Current	< 0.1 mA			
Voltage Drop	<2.5 V			
Switching Frequency	100 Hz			
Differential Travel (% of nominal Distance)	1 to 20% of Sr		1 to 15% of Sr	
Repeat Accuracy	N/A			
Ripple	N/A			
Reverse Polarity Protection	Yes			
Short-Circuit Protection	Yes (non-latching)			
Operating Temperature	-25° to 70°C (-13° to 158°F)			
Protection Degree (DIN 40050)	IEC IP67		IEC IP67/68	
Indication/Switch Status	4 Yellow			
Housing Material	316L stainless steel			
Sensing Face Material	316L stainless steel			
Shock/Vibration	See terminology section			
Tightening Torque	3.5 Nm (2.58 lb-ft)			
Weight	18 g (0.63 oz)		20 g (0.71 oz)	
Connection	M8 plug with gold-plated pins		M12 plug with gold-plated pins	
Agency Approvals	cULus file E328811, CE, RoHS			

PMW Series Inductive Proximity Sensors

M12 (12 mm) stainless steel – DC

- Twelve models available
- Low cost/high performance
- 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 or M12 quick-disconnect models
- Purchase cable separately (for quick-disconnect models).
- Lifetime warranty

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	$38.50	2 mm (0.079 in)	Shielded	N.O./N.C	NPN	M12 (12 mm) connector	Diagram 3	Figure 1
PMW-0P-1H	$38.50				PNP	M12 (12 mm) connector	Diagram 4	Figure 1
PMW-AN-1H	$45.00	3 mm (0.118 in)		N.O.	NPN	M12 (12 mm) connector	Diagram 1	Figure 4
PMW-AP-1H	$47.00				PNP	M12 (12 mm) connector	Diagram 2	Figure 4
Extended Distance								
PMW-0N-2H	$38.50	4 mm (0.157 in)	Unshielded	N.O./N.C	NPN	M12 (12 mm) connector	Diagram 3	Figure 1
PMW-0P-2H	$38.50				PNP	M12 (12 mm) connector	Diagram 4	Figure 1
PMW-AN-2H	$35.25	6 mm (0.236 in)		N.O.	NPN	M12 (12 mm) connector	Diagram 1	Figure 5
PMW-AP-2H	$49.00				PNP	M12 (12 mm) connector	Diagram 2	Figure 5
Triple Distance								
PMW-AN-5A	$103.00	6 mm (0.236 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 2
PMW-AP-5A	$103.00				PNP	2 m (6.5') axial cable	Diagram 2	Figure 2
PMW-AN-5H	$103.00				NPN	M12 (12 mm) connector	Diagram 1	Figure 3
PMW-AP-5H	$103.00				PNP	M12 (12 mm) connector	Diagram 2	Figure 3

Wiring diagrams

Diagram 1

NPN Output

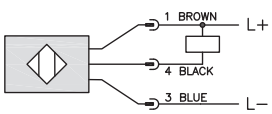


Diagram 2

PNP Output

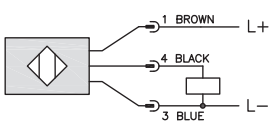


Diagram 3

NPN Output

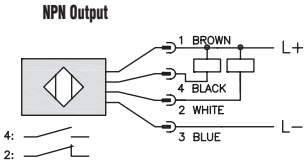
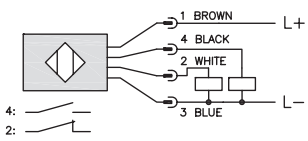


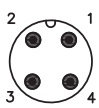
Diagram 4

PNP Output



Connector

M12 connector



Note: Pin 2 is not present on some models.

PMW Series Inductive Proximity Sensors

Specifications	Standard Distance Models	Extended Distance Models	Triple Distance Models	PMW-A*-1H	PMW-A*-2H
Mounting Type	Shielded	Unshielded	Shielded	Shielded	Unshielded
Nominal Sensing Distance	2 mm (0.079 in)[1]	4 mm (0.157 in)[1]	6 mm (0.236 in)	3 mm (0.118 in)	6 mm (0.236 in)
Operating Distance	N/A			0 to 2.4 mm (0.09 in)	0 to 4.9 mm (0.19 in)
Material Correction Factors	See Material Influence Table 2 later in this section.				
Output Type	NPN or PNP and N.O./N.C. complementary		NPN or PNP, N.O. only	NPN or PNP, N.O. only	
Operating Voltage	10 to 30 VDC			10 to 36 VDC	
No-load Supply Current	≤15 mA		≤10 mA	≤20 mA	≤25 mA
Operating (Load) Current	≤100 mA		≤200 mA	≤100 mA	≤100 mA
Off-state (Leakage) Current	≤10µA		≤100µA		
Voltage Drop	≤1.2 V		≤2.0 V	<2.5 V	
Switching Frequency	2k Hz		400 Hz	100 Hz	500 Hz
Differential Travel (% of Nominal Distance)	2 to 10%		≤15%	≤20%	
Repeat Accuracy	≤5%			Not available	
Ripple	≤10%		≤20%	Not available	
Time Delay Before Availability (tv)	100 ms		≤10 ms	negligible	
Reverse Polarity Protection	Yes				
Short-circuit Protection	Yes				
Operating Temperature / Temperature Drift	-25° to 70°C (-13° to 158°F) / 10%Sr			-25° to 70°C (-13° to 158°F) / 20%Sr	0° to 100°C (32° to 212°F)
Protection Degree (DIN 40050)	IEC IP67/68		IEC IP67[2] (connector/IP68 (cable)	IEC IP67/68	IEC IP65/67/68/69K
Indication/Switch Status	Yellow (N.O. output energized)				
Housing Material	Stainless steel		Stainless steel	Stainless steel. 2 lock nuts included.	
Sensing Face Material	PPS		Stainless steel	Stainless steel	
Shock/Vibration	See terminology section				
Tightening Torque	10 Nm (7.25 lb-in)			20 Nm (14.5 lb-in)	
Weight	35 g (1.23 oz)		89 g (3.14 oz)	29 g (1.023 oz.)	30 g (1.058 oz.)
Connections	M12 connector with gold-plated contacts				
Agency Approvals	–		UL file E328811, RoHS	cULus file E328811, CE, RoHS	

***Notes:** [1]With 12 x 12mm FE360 target [2]Fully submersible to 290 psi.*

Dimensions mm[inches]

Figure 1

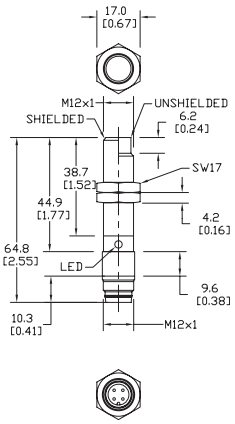


Figure 2

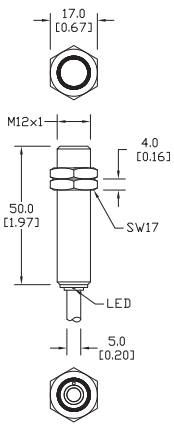


Figure 3

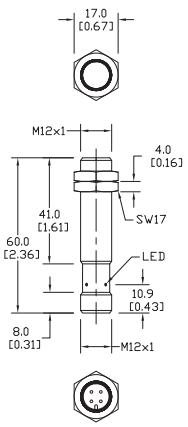


Figure 4

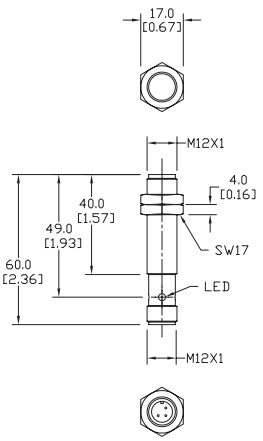
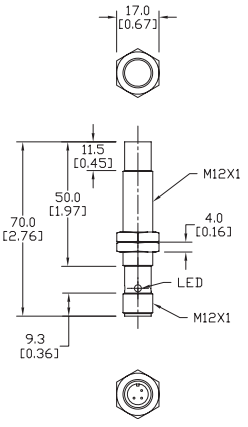


Figure 5



Note: Pin 2 is not present on some models.

PKW Series Inductive Proximity Sensors

M18 (18 mm) stainless steel - DC

- Twelve models available
- Low cost/high performance
- 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 or M12 quick-disconnect models
- Purchase cable separately (for quick-disconnect models).
- Lifetime warranty

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	$41.50	5 mm (0.197 in)	Shielded	N.O./N.C	NPN	M12 (12 mm) connector	Diagram 3	Figure 1
PKW-0P-1H	$41.50				PNP	M12 (12 mm) connector	Diagram 4	Figure 1
PKW-AN-1H	$47.00	5 mm (0.197 in)	Shielded	N.O.	NPN	M12 (12 mm) connector	Diagram 1	Figure 4
PKW-AP-1H	$47.00				PNP	M12 (12 mm) connector	Diagram 2	Figure 4
Extended Distance								
PKW-0N-2H	$28.25	8 mm (0.315 in)	Unshielded	N.O./N.C	NPN	M12 (12 mm) connector	Diagram 3	Figure 1
PKW-0P-2H	$41.50				PNP	M12 (12 mm) connector	Diagram 4	Figure 1
PKW-AN-2H	$55.00	12 mm (0.472 in)	Unshielded	N.O.	NPN	M12 (12 mm) connector	Diagram 1	Figure 4
PKW-AP-2H	$55.00				PNP	M12 (12 mm) connector	Diagram 2	Figure 4
Triple Distance								
PKW-AN-5A	$78.25	10 mm (0.394 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 2
PKW-AP-5A	$114.00				PNP	2 m (6.5') axial cable	Diagram 2	Figure 2
PKW-AN-5H	$114.00				NPN	M12 (12 mm) connector	Diagram 1	Figure 3
PKW-AP-5H	$114.00				PNP	M12 (12 mm) connector	Diagram 2	Figure 3

Wiring diagrams

Diagram 1

NPN Output

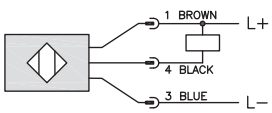


Diagram 2

PNP Output

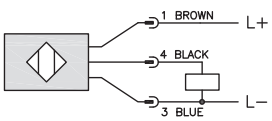


Diagram 3

NPN Output

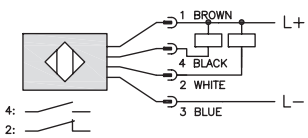
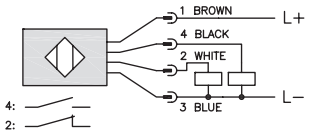


Diagram 4

PNP Output



Connector

M12 connector

Note: Pin 2 is not present on some models.

PKW Series Inductive Proximity Sensors

Specifications	Standard Distance Models	Extended Distance Models	Triple Distance Models	PKW-A*-1H	PKW-A*-2H
Mounting Type	Shielded	Unshielded	Shielded	Shielded	Unshielded
Nominal Sensing Distance	5 mm (0.197 in)[1]	8 mm (0.315 in)[1]	10 mm (0.394 in)	5 mm (0.197 in)	12 mm (0.472 in)
Operating Distance	N/A			0 to 4 mm	0 to 9.7 mm (0.38in)
Material Correction Factors	See Material Influence Table 2 later in this section.				
Output Type	NPN or PNP and N.O./N.C. complementary		NPN or PNP, N.O. only	NPN or PNP, N.O. only	
Operating Voltage	10 to 30 VDC			10 to 36 VDC	10 to 30 VDC
No-load Supply Current	15 mA		10 mA	20 mA	25 mA
Operating (Load) Current	≤400 mA		≤200 mA	100 mA	
Off-state (Leakage) Current	≤10µA		≤100µA	<0.1 mA	
Voltage Drop	≤0.8 V		≤2.0 V	<2.5 V	
Switching Frequency	1 kHz		200 Hz	100 Hz	500 Hz
Differential Travel (% of Nominal Distance)	2 to 10%		≤15%	≤20%	
Repeat Accuracy	≤5%		—	—	
Ripple	≤10%		≤20%	—	
Time Delay Before Availability (tv)	100 ms		≤10 ms	negligible	
Reverse Polarity Protection	Not available			Yes	
Short-circuit Protection	Not available			Yes (non-latching)	
Operating Temperature	-25° to 70°C (-13° to 158°F)				0° to 100°C (32° to 212°F)
Protection Degree (DIN 40050)	IEC IP67/68		IEC IP67[2] (connector) IP68 (cable)	IEC IP67, IP68	IEC IP65/67/68/69K
Indication/Switch Status	Yellow (N.O. output energized)				
Housing Material	Stainless steel				
Sensing Face Material	Polyphonylene Sulfide (PPS)		Stainless steel	Stainless steel	Stainless steel
Shock Resistance / Vibration Resistance	See terminology section				
Tightening Torque	40 Nm (29 lb-ft)		50 Nm (37 lb-ft)	50 Nm (37 lb-ft)	
Weight	70 g (2.47 oz)		114 g (4.02 oz) /50 g (1.76 oz)	56 g (1.98 oz)	
Connection	M12 connector		2 m (6.5') axial cable or M12 connector	M12 connector. 2 lock nuts included	
Agency Approvals	N/A		UL file E328811, RoHS	cULus file E328811, CE, RoHS	

Notes: [1]With 12 x 12mm FE360 target [2]Fully submersible to 290 psi.

Dimensions

mm [inches]

Figure 1

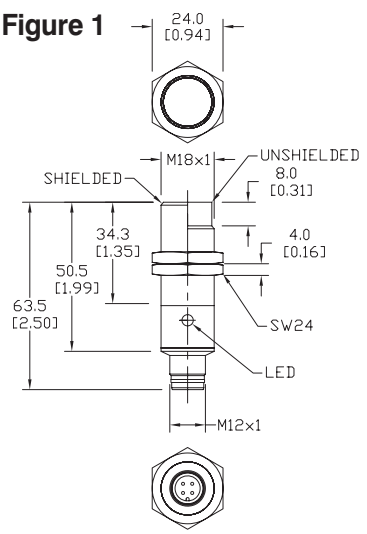


Figure 2

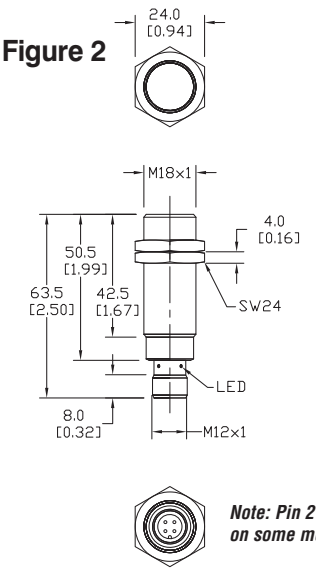


Figure 3

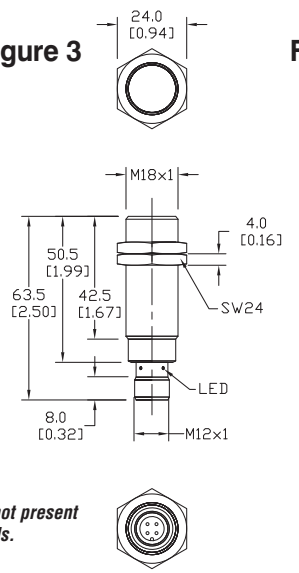
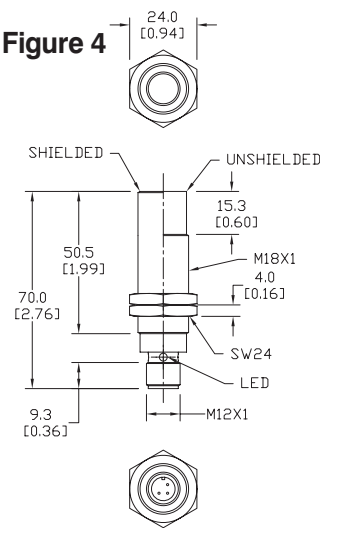


Figure 4



Note: Pin 2 is not present on some models.

PTW Series Inductive Proximity Sensors

M30 (30 mm) stainless steel - DC

- Eight low cost, high performance models available
- Metal sensing face for extreme environments
- LED status indicators are visible at a wide angle.
- Triple-sensing models sense all metals at the same distance.
- One-piece stainless design
- Axial cable or M12 quick-disconnect models
- Purchase cable separately (for quick-disconnect models).
- Lifetime warranty

PTW Series M30 DC SS Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Wiring	Dimensions
Standard Distance								
PTW-AN-1H	$37.25	10 mm (0.394 in)	Shielded	N.O	NPN	M12 (12 mm) connector	Diagram 1	Figure 1
PTW-AP-1H	$49.00				PNP	M12 (12 mm) connector	Diagram 2	Figure 1
Extended Distance								
PTW-AN-2H	$45.50	25 mm (0.984 in)	Unshielded	N.O	NPN	M12 (12 mm) connector	Diagram 1	Figure 1
PTW-AP-2H	$45.00				PNP	M12 (12 mm) connector	Diagram 2	Figure 1
Triple Distance								
PTW-AN-5A	$132.00	20 mm (0.787 in)	Shielded	N.O	NPN	2 m (6.5') axial cable	Diagram 1	Figure 2
PTW-AP-5A	$132.00				PNP	2 m (6.5') axial cable	Diagram 2	Figure 2
PTW-AN-5H	$132.00				NPN	M12 (12 mm) connector	Diagram 1	Figure 3
PTW-AP-5H	$132.00				PNP	M12 (12 mm) connector	Diagram 2	Figure 3

Wiring diagrams

Diagram 1

NPN Output

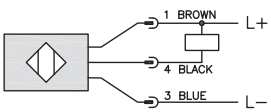
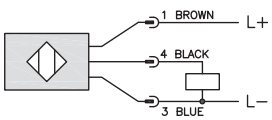


Diagram 2

PNP Output



Connector

M12 connector

Note: Pin 2 is not present on some models.

PTW Series Inductive Proximity Sensors

Specifications	PTW-A*-1H	PTW-A*-2H	PTW-A*-5*
Mounting Type	Shielded	Unshielded	Shielded
Nominal Distance	10 mm (0.394 in)	25 mm (0.984 in)	20 mm (0.787 in)
Operating Distance	0 to 8.1 mm (0.32 in)	0 to 24.3 mm (0.96 in)	N/A
Material Correction Factors	See Material Influence Table 2 later in this section.		
Output Type	NPN or PNP, N.O. only		
Operating Voltage	10 to 36 VDC		10 to 30 VDC
No-load Supply Current	20 mA	25 mA	10 mA
Operating (Load) Current	100 mA		≤200 mA
Off-state (Leakage) Current	<1 mA		≤100 µA
Voltage Drop	<2.5V		≤2.0V
Switching Frequency	50 Hz	250 Hz	100 Hz
Differential Travel (% of Nominal Distance)	≤20%		≤15%
Repeat Accuracy	Not available		≤5%
Ripple	Not available		≤20%
Time Delay Before Availability (tv)	negligible	Not available	≤10 ms
Reverse Polarity Protection	Yes		
Short-circuit Protection	Yes (non-latching)		
Operating Temperature	-25° to 70°C (-13° to 158°F)	0° to 100°C (32° to 212°F)	-25° to 70°C (-13° to 158°F)
Protection Degree (DIN 40050)	IEC IP67, IP68 (coolant)	IEC IP65/67/68/69K	IEC IP67[1] (connector) IP68[1] (cable)
Indication/Switch Status	Yellow (4 x 90°)		Yellow (N.O. output energized)
Housing Material	Stainless steel		Stainless steel
Sensing Face Material	Stainless steel		Stainless steel
Shock Resistance / Vibration Resistance	See terminology section		
Tightening Torque	80 Nm (50 lb-in)		150 Nm (111 lb-in)
Weight	145 g (5.11 oz)		114 g (4.02 oz) / 50 g (1.76 oz)
Connections	M12 connector, 2 lock nuts included		2 m (6.5') axial cable or M12 connector
Agency Approvals	cULus, UL file E328811, CE, RoHS		UL file E328811, CE, RoHS

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

Dimensions

mm [inches]

Figure 1

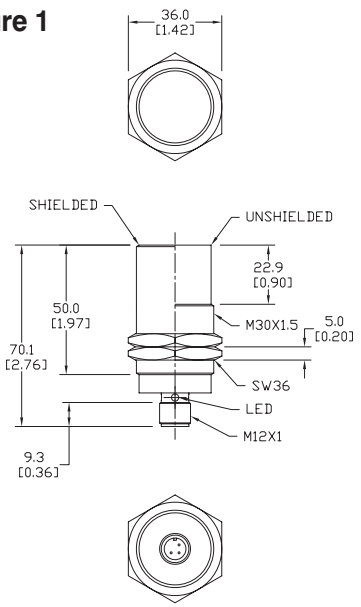
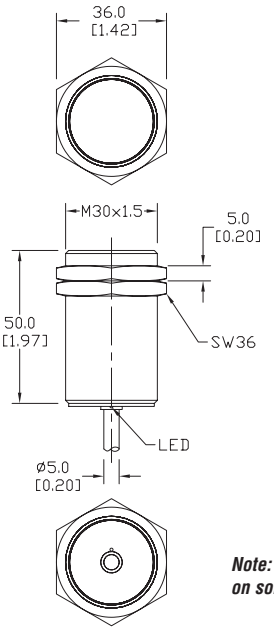
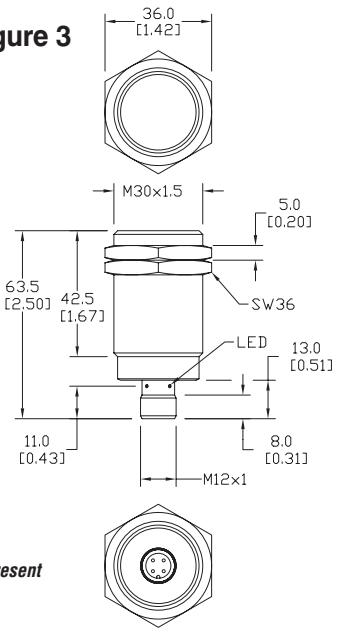


Figure 2



Note: Pin 2 is not present on some models.

Figure 3



V Series AC Inductive Proximity Sensors

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

- Multi-voltage: 20 to 253 VAC
- 2-wire
- Metal housing
- Axial cable with tang or quick-disconnect models; purchase cable separately
- IP67 rated
- LED status indicator
- Lifetime warranty

V Series M12/18/30 AC Inductive Prox Selection Chart

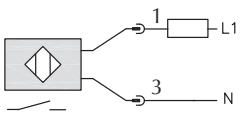
Part Number	Price	Sensing Range	Housing	Output State	Connection	Wiring	Dimensions
M12 Models							
VM1-A0-1B	$35.50	2 mm (0.079 in)[1]	Shielded	N.O.	2 m (6.5') axial cable	Diagram 1	Figure 1
VM1-A0-2B	$35.50	4 mm (0.157 in)[1]	Unshielded		2 m (6.5') axial cable	Diagram 1	Figure 1
VM1-A0-1H	$35.50	2 mm (0.079 in)[1]	Shielded		M12 (12 mm)	Diagram 1	Figure 2
VM1-A0-2H	$35.50	4 mm (0.157 in)[1]	Unshielded		M12 (12 mm)	Diagram 1	Figure 2
M18 Models							
VK1-A0-1B	$31.00	5 mm (0.197 in)[2]	Shielded	N.O.	2 m (6.5') axial cable	Diagram 1	Figure 3
VK1-A0-2B	$31.00	8 mm (0.315 in)[2]	Unshielded		2 m (6.5') axial cable	Diagram 1	Figure 3
VK1-A0-1H	$31.00	5 mm (0.197 in)[2]	Shielded		M12 (12 mm)	Diagram 1	Figure 4
VK1-A0-2H	$31.00	8 mm (0.315 in)[2]	Unshielded		M12 (12 mm)	Diagram 1	Figure 4
M30 Models							
VT1-A0-1B	$37.50	10 mm (0.394 in)[3]	Shielded	N.O.	2 m (6.5') axial cable	Diagram 1	Figure 5
VT1-A0-2B	$37.50	15 mm (0.591 in)[3]	Unshielded		2 m (6.5') axial cable	Diagram 1	Figure 5

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

**** V Series sensors with 4-pin M12 connectors do not work with Zip Port junction blocks.***

Wiring diagram

Diagram 1



Connector

M12 connector

Dimensions

mm [inches]

Figure 1

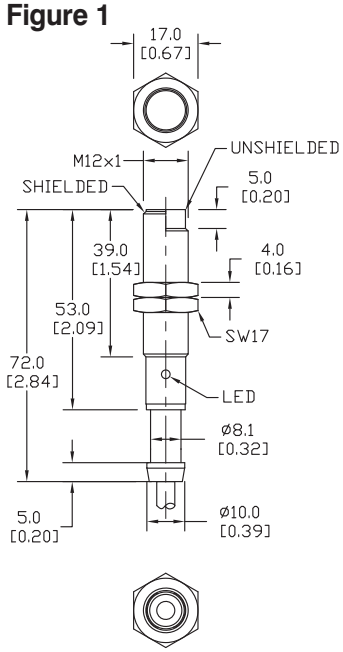


Figure 2

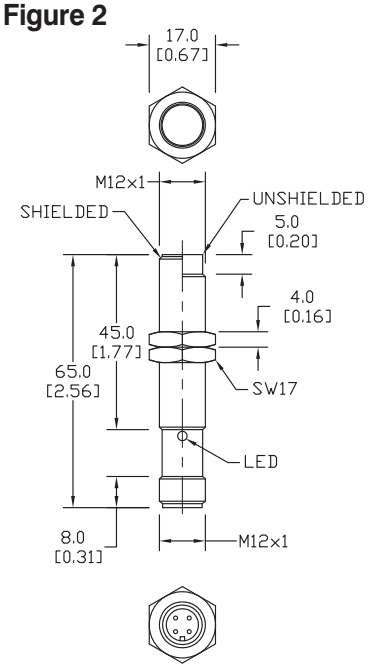
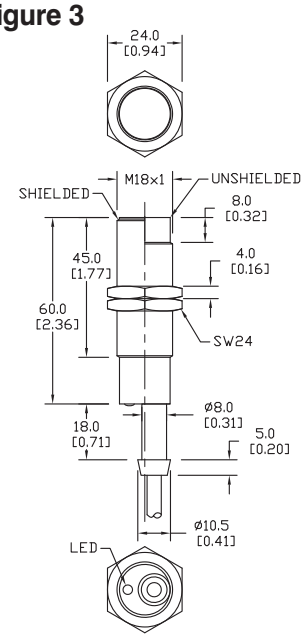


Figure 3



V Series AC Inductive Proximity Sensors

Specifications	M12 Models		M18 Models		M30 Models	
Mounting Type	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
Nominal Sensing Distance	2	4	5	8	10	15
Operating Distance	N/A					
Material Correction Factors	See Material Influence table #1 later in this section.					
Output Type	Triac/N.O./2-wire					
Operating Voltage	20 to 253 VAC, 50/60 Hz					
No-load Supply Current	N/A					
Operating (Load) Current	5 to 300 mA (RMS)					
Off-state Leakage Current	1.0 mA max. (RMS)					
Voltage Drop						
Switching Frequency	25 Hz					
Differential Travel (% of Nominal Distance)	2 to 10%					
Repeat Accuracy	5%					
Ripple	N/A					
Time Delay Before Availability (tv)	200 ms					
Reverse Polarity Protection	N/A					
Short Circuit Protection	No					
Operating Temperature	-25° to +70°C (-13° to 158°F)					
Protection Degree (DIN 40 050)	IEC IP67					
LED Indicators	Yellow (output energized)					
Housing Material	Nickel-plated brass					
Sensing Face Material	Polybutylene Terephthalate (PBT)					
Shock/Vibration	See Terminology Section					
Tightening Torque	10 Nm (11 lb-ft)		25 Nm (18.44 lb-ft)		50 Nm (36.88 lb-ft)	
Weight	70 g (2.47 oz)		120 g (4.23 oz)		300 g (10.6 oz)	
Connection	2 m (6.5') axial cable or M12 (12 mm) connector					
Agency Approvals	CE, ULRecognized file E130644					
Use only 2M or 7M cables for AC sensors with M12 connectors.						

Dimensions

mm [inches]

Figure 4

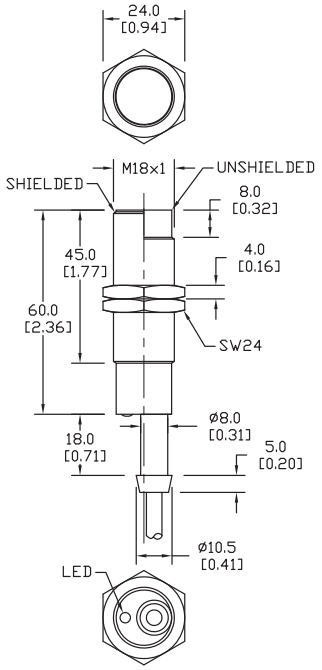
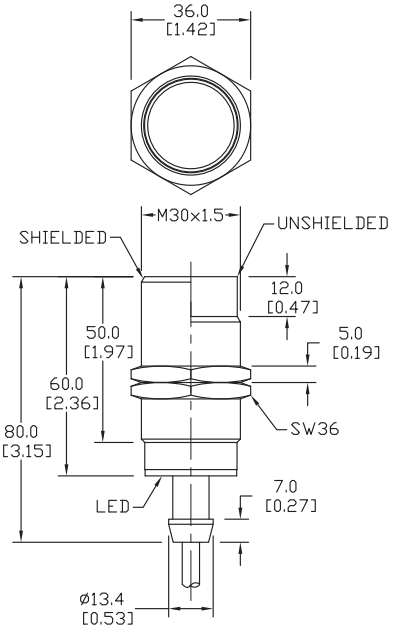


Figure 5



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; purchase cable separately
- Complete overload protection
- IP67 rated
- Screws included
- Lifetime warranty

CR5 Series 5x5 Rectangular DC Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Wiring	Dimensions
Standard Distance								
CR5-AN-1A	$36.00	0.8 mm (0.03 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
CR5-AP-1A	$36.00				PNP	2 m (6.5') axial cable	Diagram 2	Figure 1
CR5-AN-1F	$41.00				NPN	M8 (8 mm) connector	Diagram 1	Figure 2
CR5-AP-1F	$41.00				PNP	M8 (8 mm) connector	Diagram 2	Figure 2
Extended Distance								
CR5-AN-2A	$58.00	1.5 mm (0.059 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
CR5-AP-2A	$58.00				PNP	2 m (6.5') axial cable	Diagram 2	Figure 1
CR5-AN-2F	$65.00				NPN	M8 (8 mm) connector	Diagram 1	Figure 2
CR5-AP-2F	$65.00				PNP	M8 (8 mm) connector	Diagram 2	Figure 2

Specifications	Standard Distance Models	Extended Distance Models
Mounting Type	Shielded	Shielded
Nominal Distance	0.8 mm (0.03 in)	1.5 mm (0.059 in)
Operating Distance	N/A	
Material Correction Factors	See Material Influence table #1 later in this section	
Output Type	NPN or PNP/N.O. only/3-wire	
Operating Voltage	10 to 30 VDC	
No-load Supply Current	≤10 mA	
Operating (Load) Current	≤200 mA	
Off-state (Leakage) Current	≤10µA	
Voltage Drop	≤2.0 V	
Switching Frequency	5 kHz	3 kHz
Differential Travel (% of Nominal Distance)	≤10%	
Repeat Accuracy	≤1.5%	
Ripple	≤20%	
Time Delay Before Availability (tv)	10 ms	
Reverse Polarity Protection	Yes	
Short Circuit Protection	Yes (switch auto-resets after overload is removed)	
Operating Temperature	-25° to +70°C (-13° to 158°F)	
Protection Degree (DIN 40050)	IEC IP67	
Indication/Switch Status	Yellow (output energized)	
Housing Material	Nickel-plated brass	
Sensing Face Material	Polyester	
Shock/Vibration	See Terminology Section	
Tightening Torque	1.5 Nm (1.1 lb-in)	
Weight	26 g (0.92 oz)	27 g (0.95 oz)
Connection	2 m (6.5') axial cable or M8 (8 mm) connector	
Agency Approvals	UL file E328811	

Dimensions

mm [inches]

Figure 1

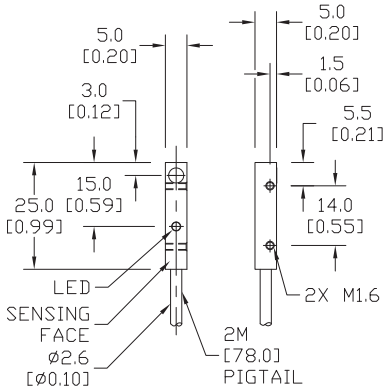
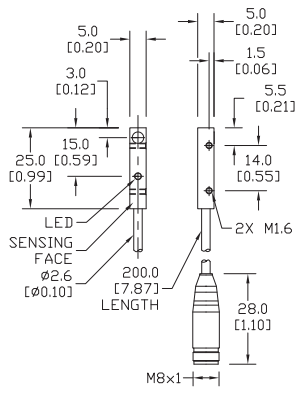


Figure 2



Wiring diagrams

Diagram 1

NPN output

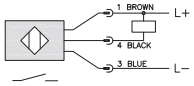
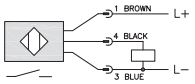


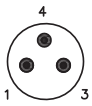
Diagram 2

PNP output



Connector

M8 connector



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; purchase cable separately
- Complete overload protection
- IP67 rated
- Screws included
- Lifetime warranty

CR8 Series 8x8 Rectangular DC Inductive Prox Selection Chart								
Part Number	***Price***	***Sensing Range***	***Housing***	***Output State***	***Logic***	***Connection***	***Wiring***	***Dimensions***
Standard Distance								
CR8-AN-1A	$25.00	0 to 1.5 mm (0 to 0.059 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
CR8-AP-1A	$25.00				PNP	2 m (6.5') axial cable	Diagram 2	Figure 1
CR8-AN-1F	$25.00				NPN	M8 (8 mm) connector	Diagram 1	Figure 2
CR8-AP-1F	$25.00				PNP	M8 (8 mm) connector	Diagram 2	Figure 2
Extended Distance								
CR8-AN-2A	$34.50	0 to 2 mm (0 to 0.079 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
CR8-AP-2A	$34.50				PNP	2 m (6.5') axial cable	Diagram 2	Figure 1
CR8-AN-2F	$34.50				NPN	M8 (8 mm) connector	Diagram 1	Figure 2
CR8-AP-2F	$34.50				PNP	M8 (8 mm) connector	Diagram 2	Figure 2
Triple Distance								
CR8-AN-3A	$77.00	3 mm (0.118 in)	Shielded	N.O.	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1
CR8-AP-3A	$77.00				PNP	2 m (6.5') axial cable	Diagram 2	Figure 1
CR8-AN-3F	$77.00				NPN	M8 (8 mm) connector	Diagram 1	Figure 2
CR8-AP-3F	$77.00				PNP	M8 (8 mm) connector	Diagram 2	Figure 2

Wiring diagrams

Diagram 1

NPN output

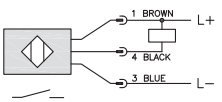
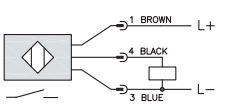


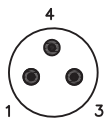
Diagram 2

PNP output



Connector

M8 connector



CR8 Series Inductive Proximity Sensors

Specifications	Standard Distance Models	Extended Distance Models	Triple Distance Models
Mounting Type	Shielded	Shielded	Shielded
Nominal Distance	1.5 mm (0.059 in)	2 mm (0.079 in)	3 mm (0.118 in)
Operating Distance	N/A	N/A	N/A
Material Correction Factors	See Material Influence table #1 later in this section		See Material Influence table #2
Output Type	NPN or PNP/N.O. only/3-wire		
Operating Voltage	10 to 30 VDC		
No-load Supply Current	≤10 mA		
Operating (Load) Current	≤200 mA		
Off-state (Leakage) Current	≤10µA		
Voltage Drop	≤2.0 V		
Switching Frequency	1 kHz		
Differential Travel (% of Nominal Distance)	≤10%		
Repeat Accuracy	≤5%		
Ripple	≤20%		
Time Delay Before Availability (tv)	10 ms		50 ms
Reverse Polarity Protection	Yes		
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)		
Operating Temperature	-25° to +70°C (-13° to 158°F)		
Protection Degree (DIN 40050)	IEC IP67		
Indication/Switch Status	Yellow (output energized)		
Housing Material	Nickel-plated brass		Chrome-plated brass
Sensing Face Material	Polybutylene Terephthalate (PBT)		
Shock/Vibration	See Terminology Section		
Tightening Torque	4 Nm (2.95 lb-ft)		
Weight (cable/M8 connector)	43 g (1.52 oz)/15 g (0.53 oz)		54 g (1.90 oz)/21 g (0.74 oz)
Connection	2 m (6.5') axial cable or M8 (8 mm) connector		
Agency Approvals	UL file E328811, CE		

Dimensions

mm [inches]

Figure 1

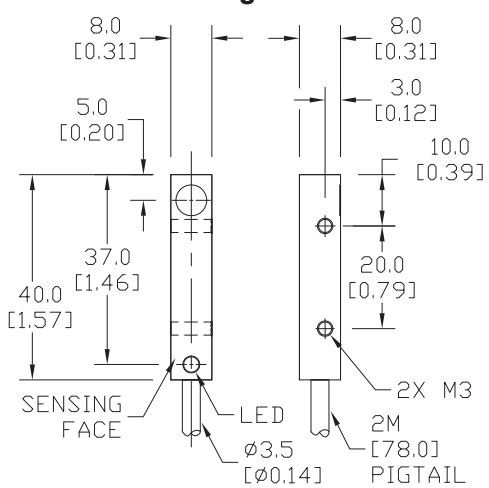
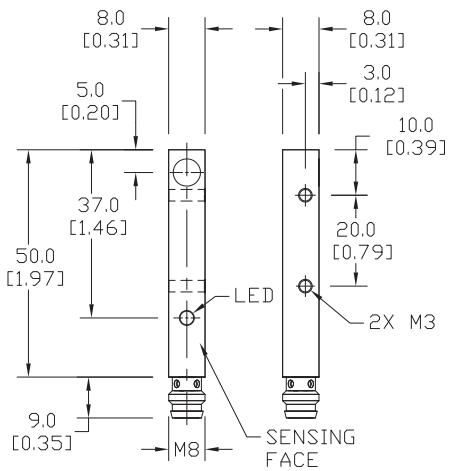


Figure 2



LF40 Series Inductive Proximity Sensors

40x40x66 mm rectangular plastic - DC

LF40-AP-2H

- Two shielded and two unshielded models available
- Sensing face has five selectable positions.
- IP67 rated
- LED power (green) and status (yellow) indicators are visible at a wide angle.
- Rotatable and locking M12 connector
- Single and complementary outputs available
- Purchase cable separately.
- Lifetime warranty

LF40 Series DC Inductive Prox Selection Chart								
Part Number	***Price***	***Sensing Range***	***Housing***	***Output State***	***Logic***	***Connection***	***Wiring***	***Dimensions***
LF40-AP-1H	$39.00	20 mm (0.79 in)	Shielded	N.O.	PNP	M12 (12 mm) quick disconnect	Diagram 1	Figure 1
LF40-0P-1H	$42.00	20 mm (0.79 in)	Shielded	N.O./N.C. Complementary	PNP	M12 (12 mm) quick disconnect	Diagram 2	Figure 1
LF40-AP-2H	$39.00	35 mm (1.38 in)	Unshielded	N.O.	PNP	M12 (12 mm) quick disconnect	Diagram 1	Figure 1
LF40-0P-2H	$42.00	35 mm (1.38 in)	Unshielded	N.O./N.C. Complementary	PNP	M12 (12 mm) quick disconnect	Diagram 2	Figure 1

NOTE: CLASS 2 POWER SUPPLY REQUIRED

Wiring diagrams

Diagram 1

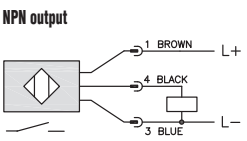
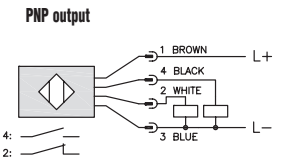


Diagram 2



Connector

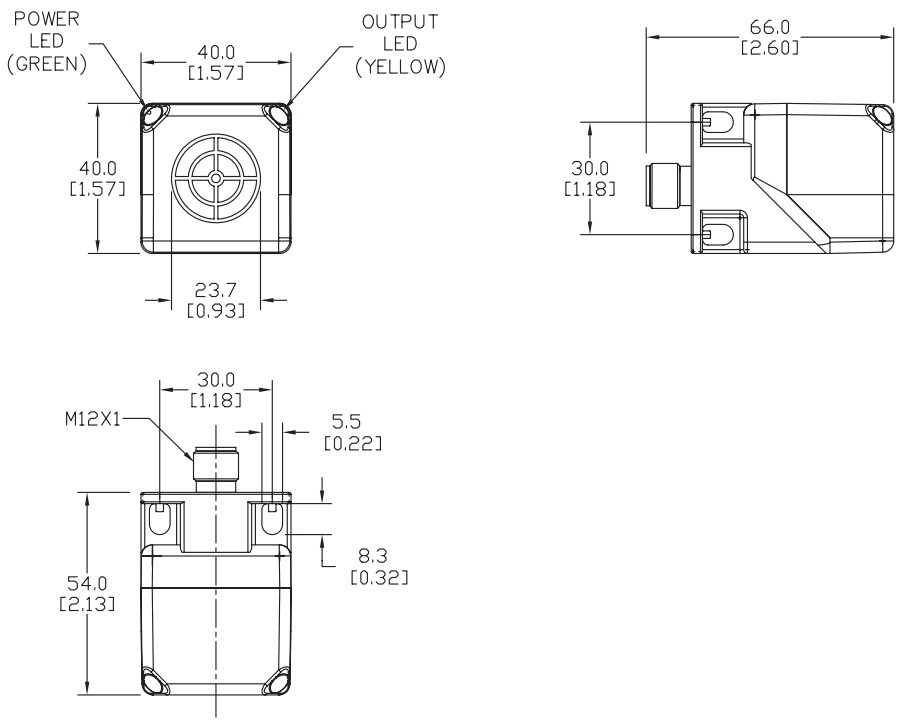
LF40 Series Inductive Proximity Sensors

LF40 Series Specifications	LF40-AP-1H	LF40-AP-2H	LF40-0P-1H	LF40-0P-2H
Mounting Type	Shielded	Unshielded	Shielded	Unshielded
Nominal Distance	20 mm ± 10%	35 mm ± 10%	20 mm ± 10%	35 mm ± 10%
Operating Distance	0 to 16.2 mm (0 to 0.64 in)	0 to 28.3 mm (0 to 1.11 in)	0 to 16.2 mm (0 to 0.64 in)	0 to 28.3 mm (0 to 1.11 in)
Material Correction Factors	See Material Influence table #2 later in this section.			
Output Type	PNP, N.O. only		PNP, N.O. N.C. Complementary	
Operating Voltage	10 to 36 VDC			
No-load Supply Current	< 20 mA			
Operating (Load) Current	200 mA			
Off-state (Leakage) Current	<0.1 mA			
Voltage Drop	<2.5 V			
Switching Frequency	100 Hz	80 Hz	100 Hz	80 Hz
Differential Travel (% of Nominal Distance)	1 to 20 % of Sr			
Repeat Accuracy	N/A			
Ripple	N/A			
Time Delay Before Availability (tv)	N/A			
Reverse Polarity Protection	Yes			
Short-Circuit Protection	Yes (non-latching)			
Operating Temperature	-25° to 70°C (-13° to 158°F)			
Protection Degree (DIN 40050)	IEC IP67			
Indication/Switch Status	**Power:** Green **Switching status:** Yellow			
Housing Material	PPE: diecast zinc nickel-plated			
Sensing Face Material	Polyamide (PA)			
Shock Resistance / Vibration	See terminology section			
Tightening Torque	N/A			
Weight	146 g (5.15 oz)	151 g (5.33 oz)	147 g (5.19 oz)	153 g (5.4 oz)
Connection	M12 quick disconnect			
Agency Approvals	cULus file E328811, CE, RoHS			

Dimensions

mm [inches]

Figure 1



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
- Purchase cable separately
- Lifetime warranty

DR10 Series Rectangular DC Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Wiring	Dimensions
DR10-AN-1A	$26.00	3mm (0.118in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
DR10-AP-1A	$26.00				PNP	2m (6.5') axial cable	Diagram 2	Figure 1
DR10-AN-1F	$26.00				NPN	M8 (8mm) connector	Diagram 1	Figure 2
DR10-AP-1F	$26.00				PNP	M8 (8mm) connector	Diagram 2	Figure 2
DR10-AN-2A	$26.00	6mm (0.236in)	Unshielded	N.O	NPN	2m (6.5') axial cabl	Diagram 1	Figure 1
DR10-AP-2A	$26.00				PNP	2m (6.5') axial cable	Diagram 2	Figure 1
DR10-AN-2F	$26.00				NPN	M8 (8mm) connector	Diagram 1	Figure 2
DR10-AP-2F	$26.00				PNP	M8 (8mm) connector	Diagram 2	Figure 2

Specifications

MountingType	Shielded	Unshielded
Nominal Distance	3mm (0.118in)	6mm (0.236in)
Operating Distance	N/A	
Material Correction Factors	See Material Influence table #1	
Output Type	NPN or PNP/N.O. only/3-wire	
Operating Voltage	10-30VDC	
No-load Supply Current	≤10mA	
Operating (Load) Current	≤300mA	
Off-state (Leakage) Current	≤10μA	
Voltage Drop	≤1.5 V	
Switching Frequency	3kHz	
Differential Travel	≤1-10%	
Repeat Accuracy	≤1%	
Ripple	≤10%	
Time Delay Before Availability (tv)	2ms	
Reverse Polarity Protection	Yes	
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)	
OperatingTemperature	-25° to +75° C (-13° to 167° F)	
Protection Degree (DIN 40050)	IEC IP67	
Indication/Switch Status	Yellow (output energized)	
Housing Material	Plastic	
Sensing Face Material	Plastic	
Shock/Vibration	See Terminology Section	
Tightening Torque	N/A	
Weight	113g (3.99oz)/6g (0.21oz)	
Connection	2m (6.5') axial cable or M8 (8mm) connector	
Agency Approvals	CE	

Dimensions

mm [inches]

Figure 1

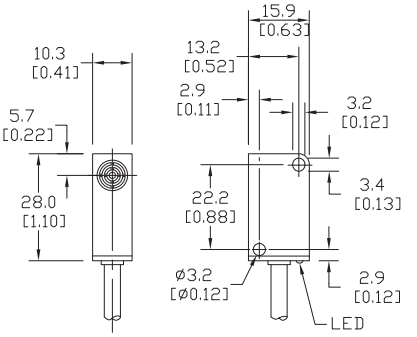
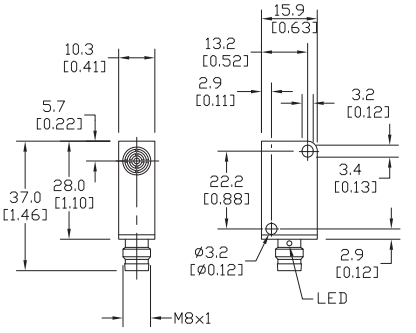


Figure 2



Wiring diagrams

Diagram 1

NPN Output

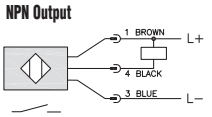
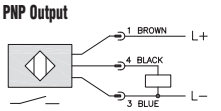


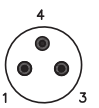
Diagram 2

PNP Output



Connector

M8 connector



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
- Lifetime warranty

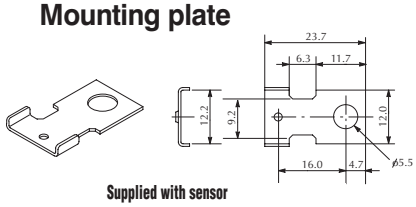
Compact Rectangular DC Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Wiring	Dimensions
APS4-12M-E-D	$17.50	4mm (0.157in)	Unshielded	N.O.	NPN	2m (6.5') axial cable	Diagram 1	Figure 1
APS4-12M-E2-D	$17.50				PNP		Diagram 2	Figure 1
APS4-12S-E-D	$17.50				NPN		Diagram 1	Figure 2
APS4-12S-E2-D	$17.50				PNP		Diagram 2	Figure 2

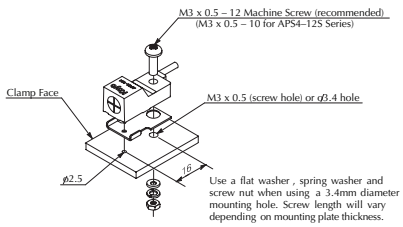
Specifications

Mounting Type	Unshielded
Nominal Distance	4mm (0.157in)
Operating Distance	N/A
Material Correction Factor	See Material Influence table #1later in this section
Output Type	NPN or PNP
Operating Voltage	10-30VDC
No-load Supply Current	≤10mA
Operating (Load) Current	≤50mA
Off-state (Leakage) Current	≤0.1mA
Voltage Drop	≤1.0VDC
Switching Frequency	200Hz
Differential Travel	N/A
Repeat Accuracy	N/A
Ripple	N/A
Time Delay Before Availability (tv)	5ms
Reverse Polarity Protection	N/A
Short Circuit Protection	N/A
Operating Temperature	-10° to +50° C (14° to 122° F)
Protection Degree (DIN 40 050)	IEC IP67
Indication/Switch Status	Displays operation status
Housing, Sensing Face Material	Polycarbonate
Shock/Vibration	See Terminology Section
Tightening Torque	N/A
Weight (cable/M8 connector)	1.41oz. (40g)
Connection	2m (6.5') axial cable
Agency Approvals	CE, cUR

Mounting plate



Supplied with sensor



Dimensions

mm [inches] **Figure 1**

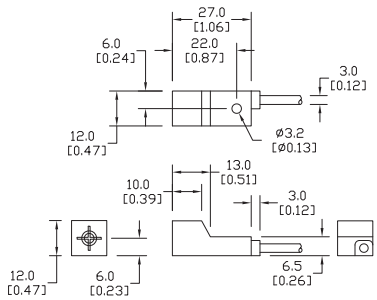
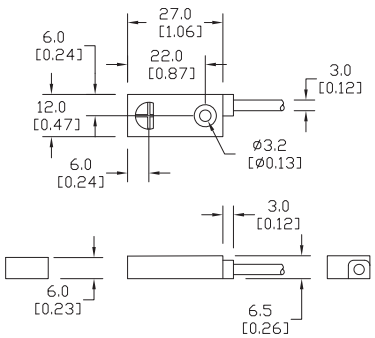


Figure 2



Wiring diagrams

Diagram 1

NPN Output

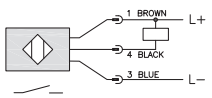
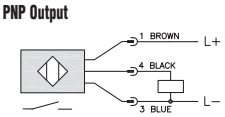


Diagram 2

PNP Output



CM Series Capacitive Proximity Sensors

M12 (12 mm) metal – DC

- Sensitivity adjustment via potentiometer
- IP65 rated
- LED status indicators
- M12 quick-disconnect; purchase cable separately
- Lifetime warranty

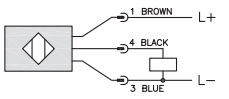
CM Series Capacitive Prox Selection Chart								
Part Number	**Price**	**Sensing Distance**	**Housing**	**Output State**	**Logic**	**Connection**	**Wiring**	**Dimensions**
CM1-AP-1H	$75.00	6 mm (0.236 in)	Shielded	N.O.	PNP	M12 (12 mm) quick disconnect	Diagram 1	Figure 1
CM1-AP-2H	$75.00	12 mm (0.472 in)	Unshielded	N.O.	PNP	M12 (12 mm) quick disconnect	Diagram 1	Figure 1

CM Series Specifications	CM1-AP-1H	CM1-AP-2H
Mounting Type	Shielded	Unshielded
Nominal Sensing Distance	6 mm (0.236 in)	12 mm (0.472 in)
Operating Distance	N/A	
Material Correction Factors		
Output Type	PNP; N.O. only	
Operating Voltage	10 to 36 VDC	
No-load Supply Current	<12 mA	
Operating (Load) Current	100 mA	
Off-state (Leakage) Current	N/A	
Voltage Drop	<2.5V	
Switching Frequency	50Hz	
Differential Travel (% of Nominal Distance)	N/A	
Repeat Accuracy		
Ripple		
Time Delay Before Availability (tv)		
Reverse Polarity Protection	Yes	
Short-circuit Protection	Yes, pulsed	
Operating Temperature	-25° to 70°C (-13° to 158°F)	
Protection Degree (DIN 40050)	IEC IP65	
Indication/Switch Status	Yellow (output energized)	
Housing Material	Stainless steel	
Sensing Face Material	Polyether Ether Ketone (PEEK)	
Shock/Vibration	See terminology section	
Tightening Torque	5.0 Nm	
Weight	54g (1.90 oz)	
Connectors	M12 connector. 2 lock nuts included	
Agency Approvals	cULus file E328811, CE, RoHS	

Wiring diagrams

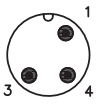
Diagram 1

PNP Output



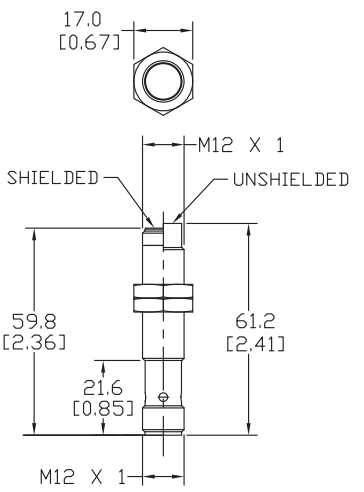
Connectors

M12 connector



Dimensions mm [inches]

Figure 1



CK Series Capacitive Proximity Sensors

M18 (18 mm) plastic – DC

- N.O./N.C. selectable
- IP65/IP67 rated
- LED status indicators
- M12 quick-disconnect; purchase cable separately
- Lifetime warranty
- Auto-detect circuit
- Push button teach
- Mounting accessories available

CK Series Capacitive Prox Selection Chart

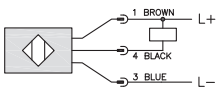
Part Number	Price	Sensing Distance	Housing	Output State	Logic	Connection	Wiring	Dimensions
CK1-00-2H	$79.00	12 mm (0.472 in)	Unshielded	N.O./N.C.	NPN/PNP	M12 (12 mm) quick disconnect	Diagram 1	Figure 1

CK Series Specifications	CK1-00-2H
Mounting Type	Unshielded
Nominal Sensing Distance	12 mm (0.472 in)
Operating Distance	N/A
Material Correction Factors	
Output Type	NPN/PNP; N.O./N.C.
Operating Voltage	10 to 36 VDC
No-load Supply Current	<20 mA
Operating (Load) Current	200 mA
Off-state (Leakage) Current	N/A
Voltage Drop	<2.5V
Switching Frequency	10Hz
Differential Travel (% of Nominal Distance)	N/A
Repeat Accuracy	
Ripple	
Time Delay Before Availability (tv)	
Reverse Polarity Protection	Yes
Short-circuit Protection	Yes, pulsed
Operating Temperature	-25° to 80°C (-13° to 176°F) Sensing face: -25° to 110°C (-13° to 230°F)
Protection Degree (DIN 40050)	IEC IP65/IP67
Indication/Switch Status	Yellow (output energized)
Housing Material	Polybutylene Terephthalate (PBT)
Sensing Face Material	
Shock/Vibration	See terminology section
Tightening Torque	2.0 Nm
Weight	59g (2.08 oz)
Connectors	M12 connector. 2 lock nuts included
Agency Approvals	cULus file E328811, CE, RoHS

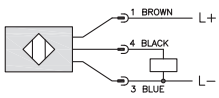
Wiring diagrams

Diagram 1

NPN Output

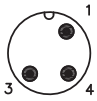


PNP Output



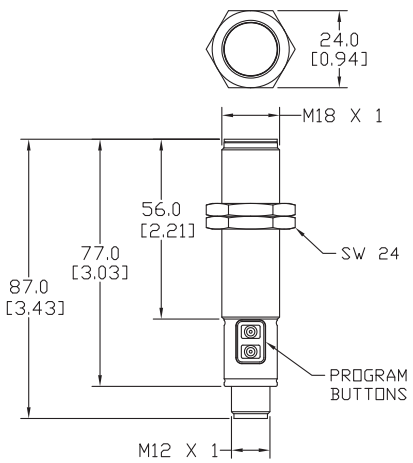
Connectors

M12 connector



Dimensions mm [inches]

Figure 1



CT Series Capacitive Proximity Sensors

M30 (30 mm) metal, plastic – DC, AC/DC

Plastic Housings:
- Auto-detect circuit (CT1-00-2H only)
- Push button teach
- N.O./N.C. selectable
- IP65/IP67 rated
- LED status indicators
- M12 or 1/2 inch Micro AC quick-disconnect; purchase cable separately
- Lifetime warranty
- Mounting accessories available

Metal Housings:
- N.O. or N.C. options
- IP65 rated
- 2m axial cable
- LED status indicators
- Lifetime warranty
- Mounting accessories available

CT Series Capacitive Prox Selection Chart								
Part Number	**Price**	**Sensing Distance**	**Housing**	**Output State**	**Logic**	**Connection**	**Wiring**	**Dimensions**
Plastic Housing								
CTV-00-2M	$88.00	40 mm (1.575 in)	Unshielded	N.O./N.C.	-	1/2 inch micro AC quick disconnect	Diagram 1	Figure 1
CT1-00-2H	$69.00				NPN/PNP	M12 (12 mm) quick disconnect	Diagram 2	Figure 2
Metal Housing								
CT1-AN-1A	$72.00	15 mm (0.59 in)	Shielded	N.O.	NPN	2m (6.5') axial cable	Diagram 3	Figure 3
CT1-AP-1A	$72.00				PNP		Diagram 4	
CT1-AN-2A	$72.00	20 mm (0.70 in)	Unshielded		NPN		Diagram 3	
CT1-AP-2A	$72.00				PNP		Diagram 4	
CT1-CN-2A	$72.00	20 mm (0.70 in)		N.C.	NPN		Diagram 3	
CT1-CP-2A	$72.00				PNP		Diagram 4	

Wiring diagrams

Diagram 1

AC Output

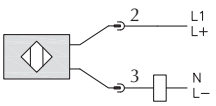
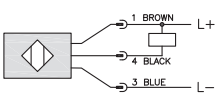


Diagram 2

NPN Output



PNP Output

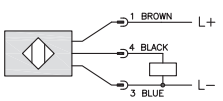


Diagram 3

NPN Output

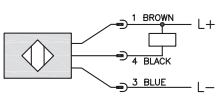
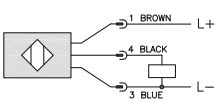


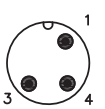
Diagram 4

PNP Output



Connectors

M12 connector



1/2" micro AC

CT Series Capacitive Proximity Sensors

CT Series Specifications	CT1-AN-1A	CT1-AP-1A	CT1-AN-2A	CT1-AP-2A	CT1-CN-2A	CT1-CP-2A	CT1-00-2H	CTV-00-2M
Mounting Type	Shielded		Unshielded					
Nominal Sensing Distance	15 mm (0.59 in)		20 mm (0.70 in)				40 mm (1.575 in)	
Operating Distance / *Material Correction Factors*	N/A							
Output Type	NPN/PNP; N.O./N.C.							AC/DC; N.O./N.C.
Operating Voltage	10 to 30 VDC						10 to 36 VDC	20 to 250 VDC/ 30 to 250 VAC
No-load Supply Current	8 mA						<20 mA	N/A
Operating (Load) Current	≤200 mA						200 mA	150 mA (40°C)/ 100 mA (80°C) continuous or 1.0 A (20 ms/ 0.5 Hz) peak
Off-state (Leakage) Current	≤10 µA						N/A	<2.5 mA (250 VAC)/ <1.7 mA (110 VAC)/ <1.5 mA (24 VDC)
Voltage Drop	1.8 volts maximum						<2.5 VDC	<8 VDC/ <10 VAC
Switching Frequency	100Hz						10Hz	
Differential Travel (% of Nominal Distance)	2 to 20%						N/A	
Repeat Accuracy	10%							
Ripple	≤10%							
Time Delay Before Availability (tv)	100 ms							
Reverse Polarity Protection	Yes							
Short-circuit Protection	Yes (switch auto-resets after overload is removed)						Yes, pulsed	No
Operating Temperature	-25° to +70°C (-13° to 158°F)						-25° to 80°C (-13° to 176°F) Sensing face: -25° to 110°C (-13° to 230°F)	
Protection Degree (DIN 40050)	IEC IP65						IEC IP65/IP67	
Indication/Switch Status	Green (supply, Red (N.O. output energized)						Yellow (output energized)	
Housing Material	Nickel-plated brass						Polybutylene Terephthalate (PBT)	
Sensing Face Material	Polybutylene Terephthalate (PBT)							
Shock/Vibration	See Terminology Section							
Tightening Torque	50 Nm (37 lb-ft)						8.0 Nm	
Weight	280g (19.88oz)						117g (4.13 oz)	122g (4.30 oz)
Connectors	2m (6.5') axial cable 2 lock nuts included						M12 connector 2 lock nuts included	1/2 inch micro AC connector 2 lock nuts included
Agency Approvals	CE						cULus file E328811, CE, RoHS	

Dimensions mm [inches]

Figure 1

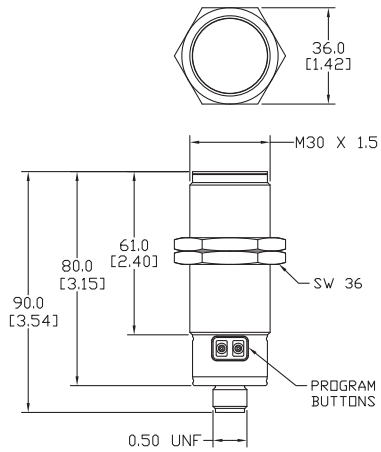


Figure 2

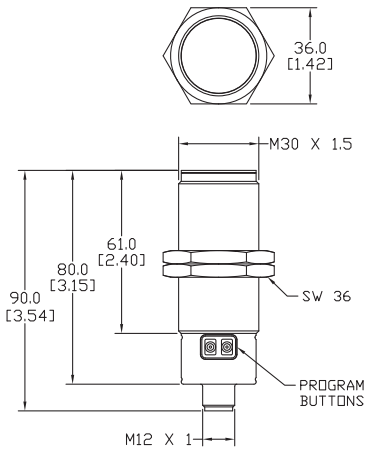
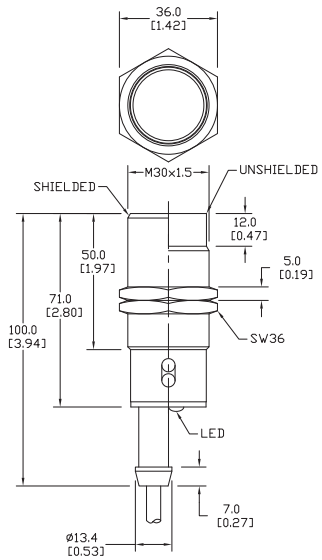


Figure 3



CR Series Capacitive Proximity Sensors

Rectangular plastic - DC

- Low profile housing ideal for sight glass applications
- N.O./N.C. selectable
- IP65/IP67 rated
- LED status indicators
- Lifetime warranty
- Auto-detect circuit
- Push button teach
- Mounting accessories available

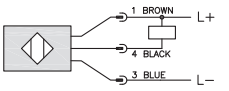
CR Series Capacitive Prox Selection Chart								
Part Number	**Price**	**Sensing Distance**	**Housing**	**Output State**	**Logic**	**Connection**	**Wiring**	**Dimensions**
CR1-00-2A	$59.00	12 mm (0.472 in)	Unshielded	N.O./N.C.	NPN/PNP	2 m (6.5 ft.) axial cable	Diagram 1	Figure 1

CR Series Specifications	CR1-00-2A
Mounting Type	Unshielded
Nominal Sensing Distance	12 mm (0.472 in)
Operating Distance	N/A
Material Correction Factors	
Output Type	NPN/PNP; N.O./N.C.
Operating Voltage	10 to 36 VDC
No-load Supply Current	<17 mA
Operating (Load) Current	100 mA
Off-state (Leakage) Current	N/A
Voltage Drop	<2.5V
Switching Frequency	10Hz
Differential Travel (% of Nominal Distance)	N/A
Repeat Accuracy	
Ripple	
Time Delay Before Availability (tv)	
Reverse Polarity Protection	Yes
Short-circuit Protection	Yes, pulsed
Operating Temperature	-25° to 80°C (-13° to 176°F)
Protection Degree (DIN 40050)	IEC IP65/IP67
Indication/Switch Status	Yellow (output energized)
Housing Material	Polybutylene Terephthalate (PBT)
Sensing Face Material	
Shock/Vibration	See terminology section
Tightening Torque	N/A
Weight	92g (3.25 oz)
Connectors	2 meter axial cable
Agency Approvals	cULus file E328811, CE, RoHS

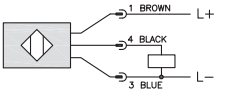
Wiring diagrams

Diagram 1

NPN Output

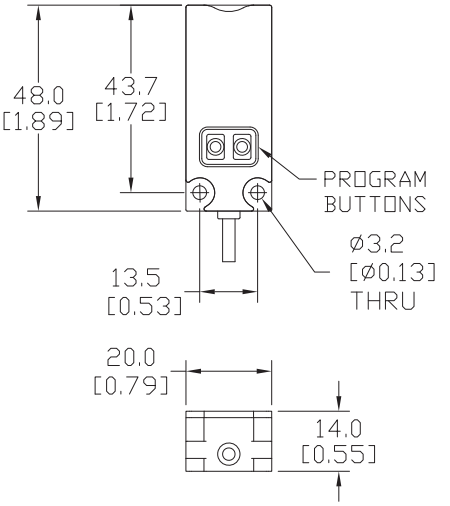


PNP Output



Dimensions mm [inches]

Figure 1



Capacitive Proximity Sensors - Accessories

Mounting Well

Mounting Adapter

Capacitive Proximity Sensors Accessory Chart				
Part Number	***Price***	***Description***	***Material***	***Dimensions***
Mounting Adapter				
CR1-ADPTR	$4.00	Adapter for CR1 series capacitive sensors	Housing: Polybutylene Terephthalate (PBT) Included Screws: M3 x 6 Steel (0.5 Nm)	Figure 1
Mounting Wells				
MWT-01	$43.00	30 mm sensor mounting well	PTFE - Polytetrafluoroethylene (Teflon®) Temp: -25° to 246°C (-13° to 474.8°F) Max. pressure: 100 PSI (6.9 bar)	Figure 2
MWK-01	$35.00	18 mm sensor mounting well		Figure 3

Dimensions mm[inches]

Figure 1

CR1 Adapter

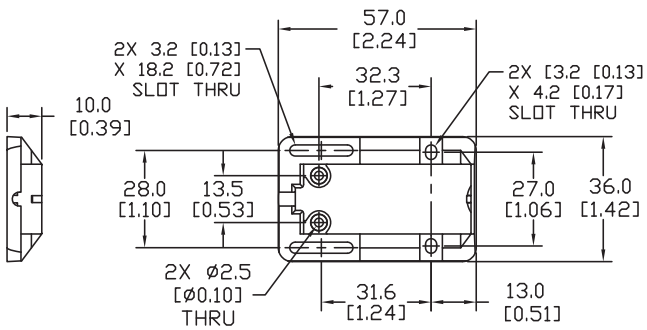


Figure 2

30mm Sensor Mounting Well

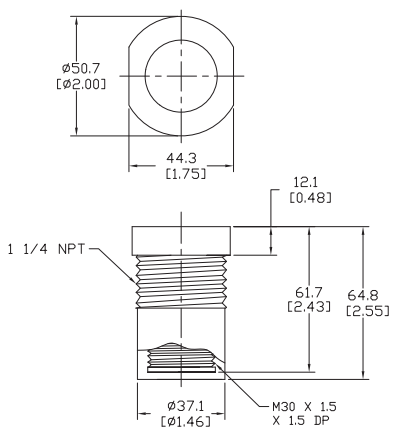
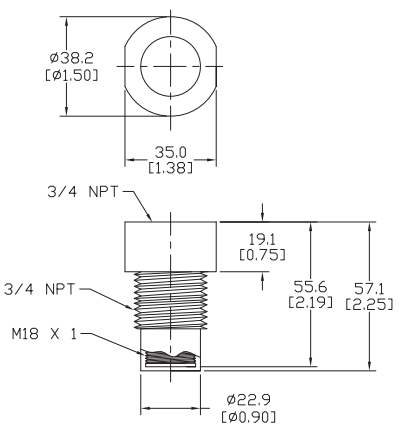


Figure 3

18mm Sensor Mounting Well



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
- Purchase cables separately (for quick-disconnect model)
- Lifetime warranty

AE Series M8 Analog Inductive Prox Selection Chart

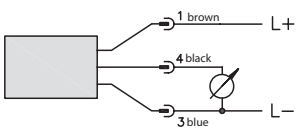
Part Number	Price	Sensing Range	Housing	Output	Connection	Wiring	Dimensions
AE9-10-1A	$186.00	0 to 4mm (0-0.157in)	Shielded	0-10VDC	2m (6.5') axial cable	Diagram 1	Figure 1
AE9-10-1F	$186.00				M8 (8mm) connector	Diagram 1	Figure 2

Specifications

	AE9-10-1*
Mounting Type	Shielded
Nominal Distance	0 to 4mm (0-0.157in)
Operating Distance	N/A
Material Correction Factors	See Material Influence Table 2 later in this section.
Output Type	0-10VDC
Operating Voltage	15-30VDC
No-load Supply Current	≤10mA
Operating (Load) Current	1kΩ
Off-state (Leakage) Current	N/A
Voltage Drop	≤2.0 V
Switching Frequency	N/A
Differential Travel (% of Nominal Distance)	N/A
Repeat Accuracy	±0.01mm
Ripple	≤20%
Response Time	0.6mc
Time Delay Before Availability (tv)	≤50ms
Reverse Polarity Protection	Yes
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)
Operating Temperature	-25° to +70° C (-13° to 158° F)
Protection Degree (DIN 40050)	IEC IP67
Indication/Switch Status	N/A
Housing Material	Chrome-plated brass
Sensing Face Material	Polybutylene Terephthalate (PBT)
Shock/Vibration	See Terminology Section
Tightening Torque	4Nm (2.95 lb-ft.)
Weight (cable/M8 connector)	50g (1.76 oz.) / 20g (0.71 oz.)
Connection	2m (6.5') axial cable or M8 (8mm) connector
Agency Approvals	UL file E328811

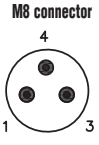
Wiring diagram

Diagram 1



Connector

M8 connector



Dimensions

mm [inches]

Figure 1

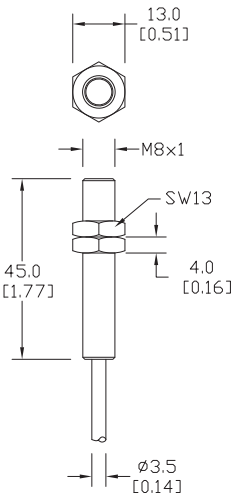
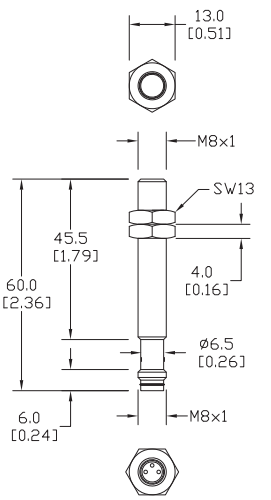


Figure 2



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
- Purchase cable separately (for quick-disconnect model)
- Lifetime warranty

AM Series M12 Analog Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output	Connection	Dimensions
AM9-05-1A	$114.00	0 to 6mm (0-0.24in)	Shielded	0 - 5VDC or 1-5mA	2m (6.5') axial cable	Figure 1
AM9-05-1H	$114.00				M12 (12mm) connector	Figure 2
AM9-10-1A	$127.00	0 to 6mm (0-0.24in)		0-10VDC or 4-20mA	2m (6.5') axial cable	Figure 1
AM9-10-1H	$127.00				M12 (12mm) connector	Figure 2

Specifications

	AM9-05-1*	AM9-10-1*
Mounting Type	Shielded	
Nominal Sensing Distance	0 to 6mm (0-0.24in)	0 to 6mm (0-0.24in)
Operating Distance	N/A	
Material Correction Factors	See Material Influence Table 2 later in this section.	
Output Type	0-5VDC or 1-5mA	0-10VDC or 4-20mA
Current Output Max. Load / Power Supply	1kΩ / 10VDC; 5kΩ / 30VDC	0.5kΩ / 15VDC; 1kΩ / 30VDC
Voltage Output Min. Load	500Ω	1kΩ
Operating Voltage	10 -30VDC	15 -30VDC
No-load Supply Current	≤10mA	≤12mA
Operating (Load) Current	1kΩ	0.5kΩ
Off-state (Leakage) Current	N/A	
Voltage Drop	≤2.0 V	
Switching Frequency	N/A	
Differential Travel (# of Nominal Distance)	N/A	
Repeat Accuracy	±0.01mm	
Ripple	≤20%	
Response Time	1ms	
Time Delay Before Availability (tv)	≤50ms	
Reverse Polarity Protection	Yes	
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)	
Operating Temperature	-25° to +70° C (-13° to 158° F)	
Protection Degree (DIN 40050)	IEC IP67	
Indication/Switch Status	N/A	
Housing Material	Chrome-plated brass	
Sensing Face Material	Polybutylene Terephthalate (PBT)	
Shock / Vibration	See Terminology Section	
Tightening Torque	10 Nm (7.37 lb-ft)	
Weight (cable/M8 connector)	95g (3.35 oz.) / 33g (1.16 oz.)	
Connection	2m (6.5') axial cable orM12 (12mm) connector	
Agency Approvals	UL file E328811	

Dimensions

mm [inches]

Figure 1

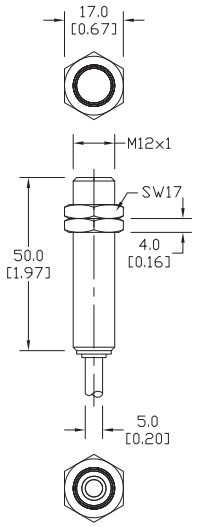
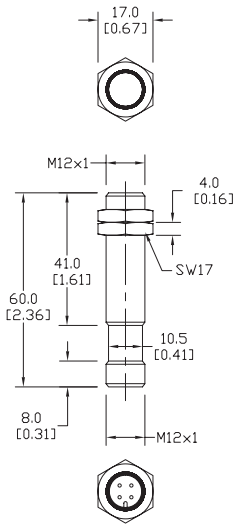
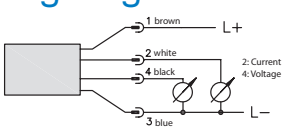


Figure 2



Wiring diagram



Connector

M12 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
- Purchase cable separately (for quick-disconnect model)
- Lifetime warranty

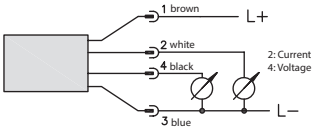
AK Series M18 Analog Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output	Connection	Dimensions
AK9-05-1A	$119.00	0 to 10mm (0-0.39in)	Shielded	0 - 5VDC or 1-5mA	2m (6.5') axial cable	Figure 1
AK9-05-1H	$89.25				M12 (12mm) connector	Figure 2
AK9-10-1A	$119.00	0 to 10mm (0-0.39in)		0-10VDC or 4-20mA	2m (6.5') axial cable	Figure 1
AK9-10-1H	$132.00				M12 (12mm) connector	Figure 2

Specifications

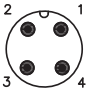
	AK9-05-1*	AK9-10-1*
Mounting Type	Shielded	Shielded
Nominal Sensing Distance	0 to 10mm (0-0.39in)	0 to 10mm (0-0.39in)
Operating Distance	N/A	
Material Correction Factors	See Material Influence Table 2 later in this section.	
Output Type	0-5VDC or 1-5mA	0-10VDC or 4-20mA
Current Output Max. Load / Power Supply	1kΩ / 10VDC; 5kΩ / 30VDC	0.5kΩ / 15VDC; 1kΩ / 30VDC
Voltage Output Min. Load	500Ω	1kΩ
Operating Voltage	10 -30VDC	15 -30VDC
No-load Supply Current	≤10mA	≤12mA
Operating (Load) Current		
Off-state (Leakage) Current	N/A	
Voltage Drop	≤2.0 V	
Switching Frequency	N/A	
Differential Travel (% of Nominal Distance)	N/A	
Repeat Accuracy	±0.02mm	
Ripple	≤20%	
Response Time	2ms	
Time Delay Before Availability (tv)	≤50ms	
Input Voltage Transient Protection	Up to 30VDC	
Reverse Polarity Protection	Yes	
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)	
Operating Temperature	-25° to +70° C (-13° to 158° F)	
Protection Degree (DIN 40050)	IEC IP67	
Indication/Switch Status	N/A	
Housing Material	Chrome-plated brass	
Sensing Face Material	Polybutylene Terephthalate (PBT)	
Shock/Vibration	See Terminology Section	
Tightening Torque	30 Nm (22 lb-ft)	
Weight (cable/M8 connector)	110g (3.88 oz.) / 50g (1.76 oz.)	
Connection	2m (6.5') axial cable orM12 (12mm) connector	
Agency Approvals	UL file E328811	

Wiring diagram



Connector

M12 connector



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

Dimensions

mm [inches]

Figure 1

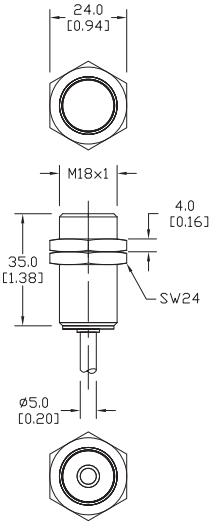
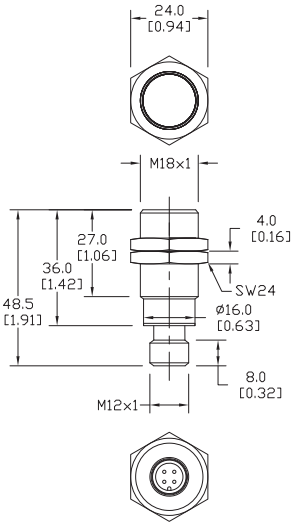


Figure 2



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
- Purchase cable separately (for quick-disconnect model)
- Lifetime warranty

AT Series M30 Analog Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output	Connection	Dimensions
AT9-05-1A	$145.00	0 to 20mm (0-0.79in)	Shielded	0 - 5VDC or 1-5mA	2m (6.5') axial cable	Figure 1
AT9-05-1H	$145.00				M12 (12mm) connector	Figure 2
AT9-10-1A	$145.00	0 to 20mm (0-0.79in)		0-10VDC or 4-20mA	2m (6.5') axial cable	Figure 1
AT9-10-1H	$145.00				M12 (12mm) connector	Figure 2

Specifications

	AT9-05-1*	AT9-10-1*
Mounting Type	Shielded	
Nominal Sensing Distance	0 to 20mm (0-0.79in)	0 to 20mm (0-0.79in)
Operating Distance	N/A	
Material Correction Factors	See Material Influence Table 2 later in this section.	
Output Type	0 to 5VDC or 1 to 5mA	0 to 10VDC or 4 to20mA
Current Output Max. Load / Power Supply	1kΩ / 10VDC; 5kΩ / 30VDC	0.5kΩ / 15VDC; 1kΩ / 30VDC
Voltage Output Min. Load	500Ω	1kΩ
Operating Voltage	10 to 30VDC	15 to 30VDC
No-load Supply Current	≤10mA	≤12mA
Operating (Load) Current		
Off-state (Leakage) Current	N/A	
Voltage Drop	≤2.0 V	
Switching Frequency	N/A	
Differential Travel (% of Nominal Distance)	N/A	
Repeat Accuracy	±0.05mm	
Ripple	≤20%	
Response Time	5ms	
Time Delay Before Availability (tv)	≤50ms	
Reverse Polarity Protection	Yes	
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)	
Operating Temperature	-25° to +70° C (-13° to 158° F)	
Protection Degree (DIN 40050)	IEC IP67	
Indication/Switch Status	N/A	
Housing Material	Chrome-plated brass	
Sensing Face Material	Polybutylene Terephthalate (PBT)	
Shock/Vibration	See Terminology Section	
Tightening Torque	60 Nm (44 lb-ft)	
Weight (cable/M8 connector)	190g (6.71 oz.) / 135g (4.76 oz.)	
Connection	2m (6.5') axial cable orM12 (12mm) connector	
Agency Approvals	UL file E328811	

Dimensions

mm [inches]

Figure 1

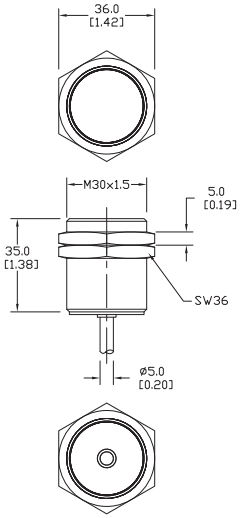
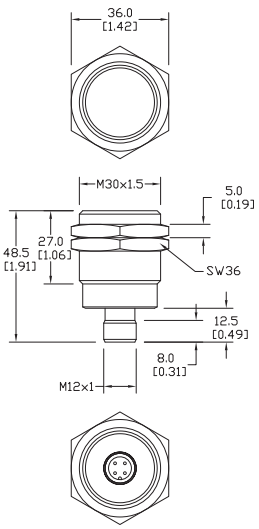
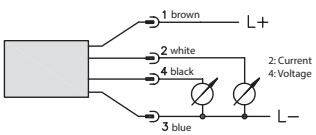


Figure 2



Wiring diagram



Connector

M12 connector

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

UK1 Series Ultrasonic Sensors

M18 (18 mm) plastic – Discrete or analog output

- 15 to 30 VDC
- Discrete models available with adjustable sensitivity
- Analog output models available
- Models available with analog and discrete switching outputs
- Complete overload protection
- IP67 rated
- LED status indicators
- Mounting hex nuts included
- Purchase cable for M12 plug separately
- Lifetime warranty

M12 Quick Disconnect

2m Output Cable

UK 1A Series Ultrasonic Discrete or Analog Output Sensor Selection Chart						
Part Number	***Price***	***Sensing Range***	***Output State***	***Connection***	***Wiring***	***Function***
UK1A-EN-0E	$99.00	50 to 400 mm (1.97 to 15.75 in)	NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 1	1
UK1A-EN-0A	$104.00		NPN, N.O./N.C. selectable	2m output cable	Diagram 1	1
UK1A-EP-0E	$99.00		PNP, N.O./N.C. selectable	M12 quick disconnect	Diagram 2	1
UK1A-EP-0A	$104.00		PNP, N.O./N.C. selectable	2m output cable	Diagram 2	1
UK1A-E1-0E	$105.00		0 to 10 VDC analog output	M12 quick disconnect	Diagram 3	2
UK1A-E1-0A	$110.00		0 to 10 VDC analog output	2m output cable	Diagram 3	2
UK1A-E2-0E	$105.00		4 to 20 mA analog output	M12 quick disconnect	Diagram 3	2
UK1A-E2-0A	$110.00		4 to 20 mA analog output	2m output cable	Diagram 3	2
UK1A-E3-0E	$105.00		NPN, 2 N.O./N.C. selectable	M12 quick disconnect	Diagram 4	3
UK1A-E3-0A	$110.00		NPN, 2 N.O./N.C. selectable	2m output cable	Diagram 4	3
UK1A-E4-0E	$109.00		4 to 20 mA analog output, NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 5	4
UK1A-E4-0A	$114.00		4 to 20 mA analog output, NPN, N.O./N.C. selectable	2m output cable	Diagram 5	4
UK1A-E5-0E	$105.00		PNP, 2 N.O./N.C. selectable	M12 quick disconnect	Diagram 6	3
UK1A-E5-0A	$110.00		PNP, 2 N.O./N.C. selectable	2m output cable	Diagram 6	3
UK1A-E6-0E	$109.00		4 to 20 mA analog output, PNP, N.O./N.C. selectable	M12 quick disconnect	Diagram 7	4
UK1A-E6-0A	$114.00		4 to 20 mA analog output, PNP, N.O./N.C. selectable	2m output cable	Diagram 7	4
UK1A-E7-0E	$109.00		0 to 10 VDC analog output, PNP, N.O./N.C. selectable	M12 quick disconnect	Diagram 7	4
UK1A-E7-0A	$114.00		0 to 10 VDC analog output, PNP, N.O./N.C. selectable	2m output cable	Diagram 7	4
UK1A-E9-0E	$109.00		0 to 10 VDC analog output, NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 5	4
UK1A-E9-0A	$114.00		0 to 10 VDC analog output, NPN, N.O./N.C. selectable	2m output cable	Diagram 5	4

UK1 Series Ultrasonic Sensors

UK 1C Series Ultrasonic Discrete or Analog Output Sensor Selection Chart						
Part Number	**Price**	**Sensing Range**	**Output State**	**Connection**	**Wiring**	**Function**
UK1C-EN-0E	$112.00	100 to 900 mm (3.94 to 35.43 in)	NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 1	1
UK1C-EN-0A	$117.00		NPN, N.O./N.C. selectable	2m output cable	Diagram 1	1
UK1C-EP-0E	$112.00		PNP, N.O./ N.C. selectable	M12 quick disconnect	Diagram 2	1
UK1C-EP-0A	$117.00		PNP, N.O./N.C. selectable	2m output cable	Diagram 2	1
UK1C-E1-0E	$115.00		0 to 10 VDC analog output	M12 quick disconnect	Diagram 3	2
UK1C-E1-0A	$120.00		0 to 10 VDC analog output	2m output cable	Diagram 3	2
UK1C-E2-0E	$115.00		4 to 20 mA analog output	M12 quick disconnect	Diagram 3	2
UK1C-E2-0A	$120.00		4 to 20 mA analog output	2m output cable	Diagram 3	2
UK1C-E3-0E	$115.00		NPN, 2 N.O./N.C. selectable	M12 quick disconnect	Diagram 4	3
UK1C-E3-0A	$120.00		NPN, 2 N.O./N.C. selectable	2m output cable	Diagram 4	3
UK1C-E4-0E	$119.00		4 to 20 mA analog output, NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 5	4
UK1C-E4-0A	$124.00		4 to 20 mA analog output, NPN, N.O./N.C. selectable	2m output cable	Diagram 5	4
UK1C-E5-0E	$115.00		PNP, 2 N.O./ N.C. selectable	M12 quick disconnect	Diagram 6	3
UK1C-E5-0A	$120.00		PNP, 2 N.O./ N.C. selectable	2m output cable	Diagram 6	3
UK1C-E6-0E	$119.00		4 to 20 mA analog output, PNP, N.O./N.C. selectable	M12 quick disconnect	Diagram 7	4
UK1C-E6-0A	$124.00		4 to 20 mA analog output, PNP, N.O./N.C. selectable	2m output cable	Diagram 7	4
UK1C-E7-0E	$119.00		0 to 10 VDC analog output, PNP, N.O./N.C. selectable	M12 quick disconnect	Diagram 7	4
UK1C-E7-0A	$124.00		0 to 10 VDC analog output, PNP, N.O./N.C. selectable	2m output cable	Diagram 7	4
UK1C-E9-0E	$119.00		0 to 10 VDC analog output, NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 5	4
UK1C-E9-0A	$124.00		0 to 10 VDC analog output, NPN, N.O./N.C. selectable	2m output cable	Diagram 5	4

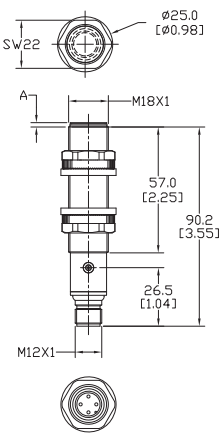
UK 1D Series Ultrasonic Discrete or Analog Output Sensor Selection Chart						
Part Number	**Price**	**Sensing Range**	**Output State**	**Connection**	**Wiring**	**Function**
UK1D-EN-0E	$122.00	150 to 1600 mm (5.90 to 62.99 in)	NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 1	1
UK1D-EN-0A	$127.00		NPN, N.O./N.C. selectable	2m output cable	Diagram 1	1
UK1D-EP-0E	$122.00		PNP, N.O./ N.C. selectable	M12 quick disconnect	Diagram 2	1
UK1D-EP-0A	$127.00		PNP, N.O./N.C. selectable	2m output cable	Diagram 2	1
UK1D-E1-0E	$125.00		0 to 10 VDC analog output	M12 quick disconnect	Diagram 3	2
UK1D-E1-0A	$130.00		0 to 10 VDC analog output	2m output cable	Diagram 3	2
UK1D-E2-0E	$125.00		4 to 20 mA analog output	M12 quick disconnect	Diagram 3	2
UK1D-E2-0A	$130.00		4 to 20 mA analog output	2m output cable	Diagram 3	2
UK1D-E3-0E	$125.00		NPN, 2 N.O./N.C. selectable	M12 quick disconnect	Diagram 4	3
UK1D-E3-0A	$130.00		NPN, 2 N.O./N.C. selectable	2m output cable	Diagram 4	3
UK1D-E4-0E	$130.00		4 to 20 mA analog output, NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 5	4
UK1D-E4-0A	$134.00		4 to 20 mA analog output, NPN, N.O./N.C. selectable	2m output cable	Diagram 5	4
UK1D-E5-0E	$125.00		PNP, 2 N.O./ N.C. selectable	M12 quick disconnect	Diagram 6	3
UK1D-E5-0A	$130.00		PNP, 2 N.O./ N.C. selectable	2m output cable	Diagram 6	3
UK1D-E6-0E	$129.00		4 to 20 mA analog output, PNP, N.O./N.C. selectable	M12 quick disconnect	Diagram 7	4
UK1D-E6-0A	$134.00		4 to 20 mA analog output, PNP, N.O./N.C. selectable	2m output cable	Diagram 7	4
UK1D-E7-0E	$129.00		0 to 10 VDC analog output, PNP, N.O./N.C. selectable	M12 quick disconnect	Diagram 7	4
UK1D-E7-0A	$134.00		0 to 10 VDC analog output, PNP, N.O./N.C. selectable	2m output cable	Diagram 7	4
UK1D-E9-0E	$129.00		0 to 10 VDC analog output, NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 5	4
UK1D-E9-0A	$134.00		0 to 10 VDC analog output, NPN, N.O./N.C. selectable	2m output cable	Diagram 5	4

UK1 Series Ultrasonic Sensors

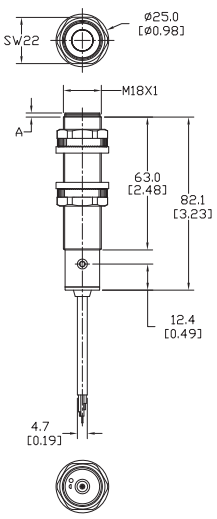
UK 1F Series Ultrasonic Discrete or Analog Output Sensor Selection Chart						
Part Number	**Price**	**Sensing Range**	**Output State**	**Connection**	**Wiring**	**Function**
UK1F-EN-0E	$135.00	200 to 2200 mm (7.87 to 86.61 in)	NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 1	1
UK1F-EN-0A	$140.00		NPN, N.O./N.C. selectable	2m output cable	Diagram 1	1
UK1F-EP-0E	$135.00		PNP, N.O./ N.C. selectable	M12 quick disconnect	Diagram 2	1
UK1F-EP-0A	$140.00		PNP, N.O./N.C. selectable	2m output cable	Diagram 2	1
UK1F-E1-0E	$139.00		0 to 10 VDC analog output	M12 quick disconnect	Diagram 3	2
UK1F-E1-0A	$144.00		0 to 10 VDC analog output	2m output cable	Diagram 3	2
UK1F-E2-0E	$139.00		4 to 20 mA analog output	M12 quick disconnect	Diagram 3	2
UK1F-E2-0A	$144.00		4 to 20 mA analog output	2m output cable	Diagram 3	2
UK1F-E3-0E	$139.00		NPN, 2 N.O./N.C. selectable	M12 quick disconnect	Diagram 4	3
UK1F-E3-0A	$144.00		NPN, 2 N.O./N.C. selectable	2m output cable	Diagram 4	3
UK1F-E4-0E	$144.00		4 to 20 mA output, NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 5	4
UK1F-E4-0A	$149.00		4 to 20 mA output, NPN, N.O./N.C. selectable	2m output cable	Diagram 5	4
UK1F-E5-0E	$139.00		PNP, 2 N.O./ N.C. selectable	M12 quick disconnect	Diagram 6	3
UK1F-E5-0A	$144.00		PNP, 2 N.O./ N.C. selectable	2m output cable	Diagram 6	3
UK1F-E6-0E	$144.00		4 to 20 mA analog output, PNP, N.O./N.C. selectable	M12 quick disconnect	Diagram 7	4
UK1F-E6-0A	$149.00		4 to 20 mA analog output, PNP, N.O./N.C. selectable	2m output cable	Diagram 7	4
UK1F-E7-0E	$144.00		0 to 10 VDC analog output, PNP, N.O./N.C. selectable	M12 quick disconnect	Diagram 7	4
UK1F-E7-0A	$149.00		0 to 10 VDC analog output, PNP, N.O./N.C. selectable	2m output cable	Diagram 7	4
UK1F-E9-0E	$144.00		0 to 10 VDC analog output, NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 5	4
UK1F-E9-0A	$149.00		0 to 10 VDC analog output, NPN, N.O./N.C. selectable	2m output cable	Diagram 5	4

Dimensions

mm [inches]



DIMENSION TABLE	
DRAWING NO.	DIM A
UK1A and UK1C	1.0 [0.04]
UK1D	1.5 [0.06]
UK1F	2.5 [0.08]



DIMENSION TABLE	
DRAWING NO.	DIM A
UK1A and UK1C	1.0 [0.04]
UK1D	1.5 [0.06]
UK1F	2.5 [0.08]

UK1 Series Ultrasonic Sensors

Specifications				
Model	***UK1A***	***UK1C***	***UK1D***	***UK1F***
Nominal Sensing Distance	50-400 mm (1.97 to 15.75 in)	100-900 mm (3.94 to 35.43 in)	150-1600 mm (5.90 to 62.99 in)	200-2200 mm (7.87 to 86.61 in)
Operating Distance (Sensing Range)	100-400 mm (3.94 to 15.75 in)	100-900 mm (3.94 to 35.43 in)	150-1600 mm (5.90 to 62.99 in)	200-2200 mm (7.87 to 86.61 in)
Output Type	See "Output State" column in selection chart			
Operating Voltage	15 to 30 VDC			
No-load Supply Current	50 mA			
Operating (Load) Current	100 mA			
Off-state (Leakage) Current	10 µA @ 30 VDC			
Analog Output	Voltage: minimum load is 3 kOhms / Current: maximum load is 500 Ohms at 24 VDC supply			
Voltage Drop	2.2 volts max@ 100 mA			
Switching Frequency	10 Hz	4 Hz	2 Hz	1 Hz
Repeat Accuracy	0.5%			
Time Delay Before Availability (tv)	500 ms; 900 ms (UK1*-E5/E3-0*)			
Reverse Polarity Protection	Yes			
Short-Circuit Protection	Yes			
Linearity Error	<1%			
Ultrasonic Frequency	400 kHz	300 kHz	230 kHz	200 kHz
Ultrasonic Beam Angle	±8°	±7°	±8°	±7°
Max. Response Time (digital output)	50 ms	125 ms	250 ms	500 ms
Sensitivity Adjustment	Yes, via teach-in button			
Input Voltage Transient Protection	Yes			
Operating Temperature	-20° to 60°C (-4° to 140°F)			
Temperature Compensation	Yes			
Protection Degree	IEC IP67			
Indication/Switch Status	Multi-function LED indicator			
Housing Material	Polybutylene Terephthalate (PBT)			
Shock/Vibration	See Terminology Section			
Tightening Torque	1 Nm (0.737 lb-ft)			
Weight	35g (1.23 oz) (plug exit) 88g (3.10 oz) (cable exit)			
Connection	M12 (12 mm) connector or 2m prewired output cable			
Agency Approvals	CE, cULus file E187310, RoHS			

Wiring Diagrams

Diagram 1

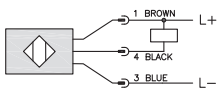


Diagram 2

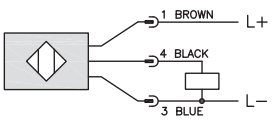


Diagram 3

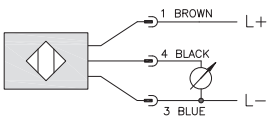


Diagram 4

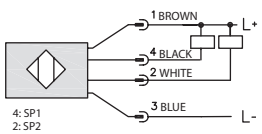


Diagram 5

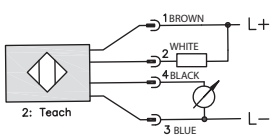


Diagram 6

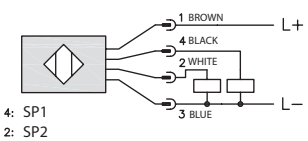
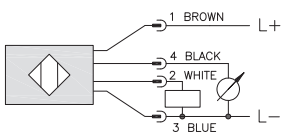
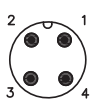


Diagram 7



Connector

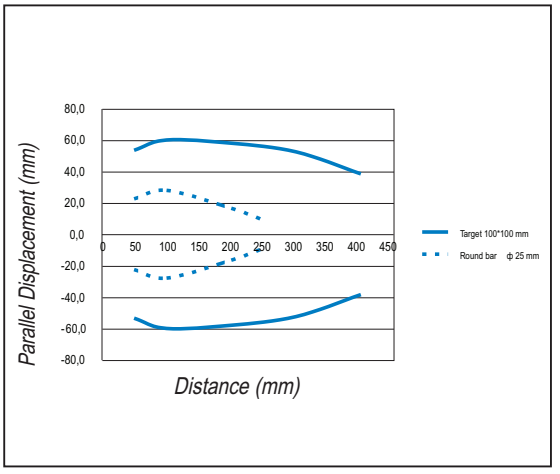
M12 connector



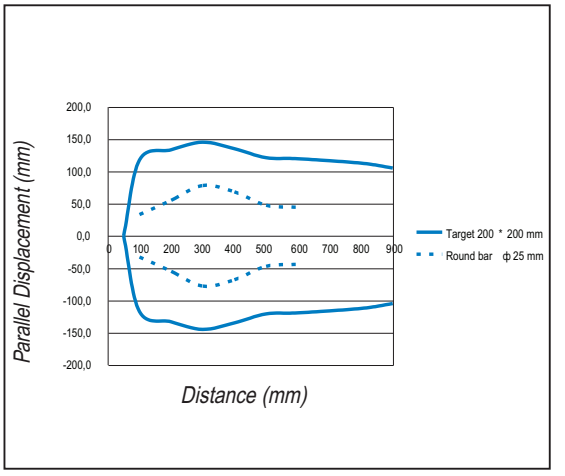
UK1 Series Ultrasonic Sensors

Characteristic Curves

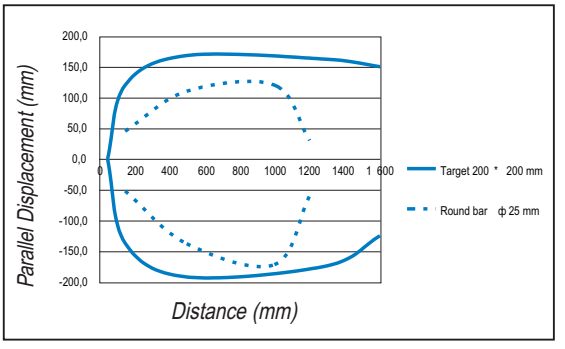
UK1A models



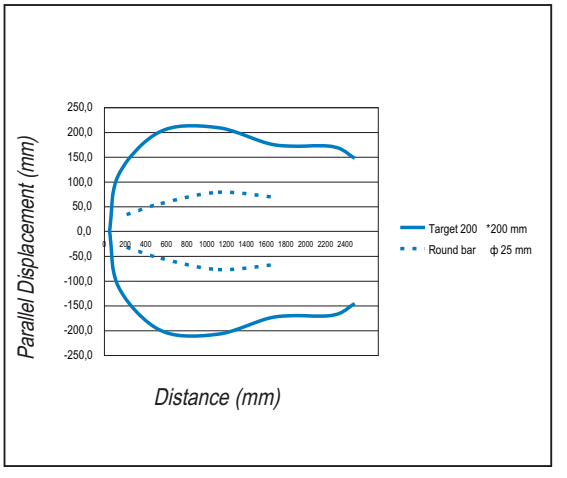
UK1C models



UK1D models



UK1F models



UK1 Series Ultrasonic Sensors

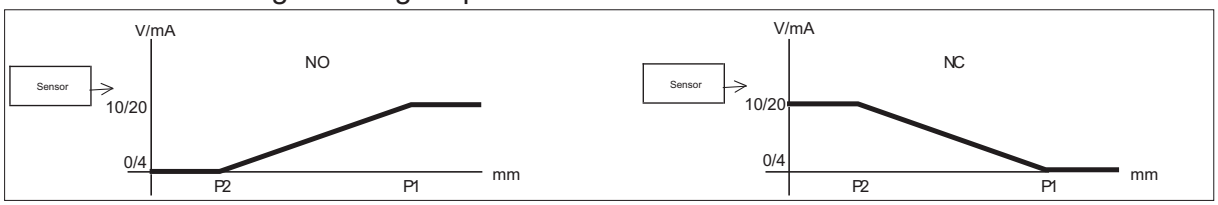
Functions

Models with single digital output

#1

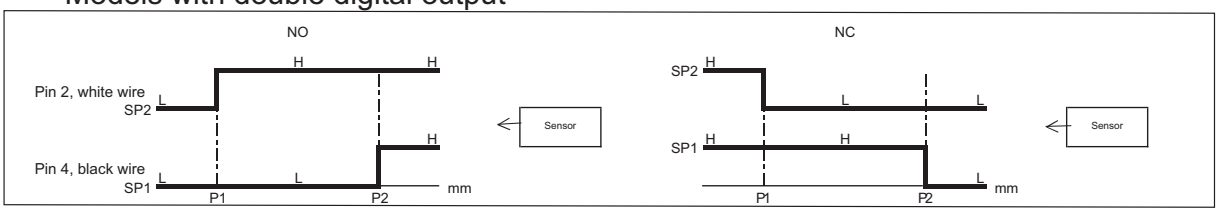
Models with single analog output

#2



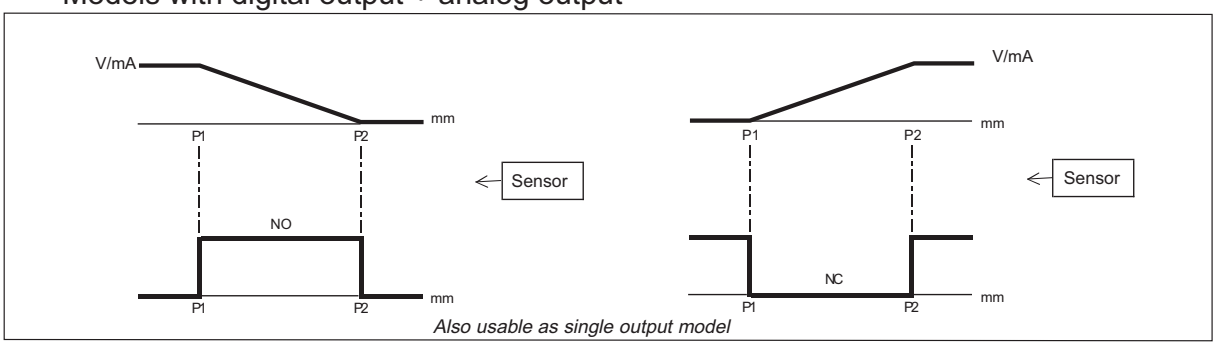
Models with double digital output

#3



Models with digital output + analog output

#4



Note: P1 *maximum selected working distance and first point to select*
P2 *minimum selected working distance and second point to select*

UK6 Series Ultrasonic Sensors

M18 (18 mm) plastic – Discrete or analog output

- 15 to 30 VDC
- Discrete models available with adjustable sensitivity
- Analog output models available
- Models available with analog or discrete switching outputs
- Short body for flexible mounting
- Complete overload protection
- IP67 rated
- LED status indicators
- Mounting hex nuts included
- Purchase cable for M12 plug separately
- Lifetime warranty

UK6A-D1-0A with 2m Output Cable

UK6A-D1-0E with M12 Quick Disconnect

UK6A Series Ultrasonic Discrete or Analog Output Sensor Selection Chart						
Part Number	**Price**	**Sensing Range**	**Output State**	**Connection**	**Wiring**	**Function**
UK6A-D1-0A	$95.00	40-300 mm (1.57— 11.81 in)	0-10 VDC analog output	2m output cable	Diagram 1	2
UK6A-D1-0E	$99.00		0-10 VDC analog output	M12 quick disconnect	Diagram 1	2
UK6A-D2-0A	$95.00		4-20 mA analog output	2m output cable	Diagram 1	2
UK6A-D2-0E	$99.00		4-20 mA analog output	M12 quick disconnect	Diagram 1	2
UK6A-DN-0A	$99.00		NPN, N.O./N.C. selectable	2m output cable	Diagram 2	1
UK6A-DN-0E	$89.00		NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 2	1
UK6A-DP-0A	$99.00		PNP, N.O./N.C. selectable	2m output cable	Diagram 3	1
UK6A-DP-0E	$89.00		PNP, N.O./N.C. selectable	M12 quick disconnect	Diagram 3	1

UK6C Series Ultrasonic Discrete or Analog Output Sensor Selection Chart						
Part Number	**Price**	**Sensing Range**	**Output State**	**Connection**	**Wiring**	**Function**
UK6C-D1-0A	$110.00	120-900 mm (4.72 to 35.43 in)	0-10 VDC analog output	2m output cable	Diagram 1	2
UK6C-D1-0E	$105.00		0-10 VDC analog output	M12 quick disconnect	Diagram 1	2
UK6C-D2-0A	$110.00		4-20 mA analog output	2m output cable	Diagram 1	2
UK6C-D2-0E	$105.00		4-20 mA analog output	M12 quick disconnect	Diagram 1	2
UK6C-DN-0A	$110.00		NPN, N.O./N.C. selectable	2m output cable	Diagram 2	1
UK6C-DN-0E	$105.00		NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 2	1
UK6C-DP-0A	$110.00		PNP, N.O./N.C. selectable	2m output cable	Diagram 3	1
UK6C-DP-0E	$105.00		PNP, N.O./N.C. selectable	M12 quick disconnect	Diagram 3	1

Wiring Diagrams

Diagram 1

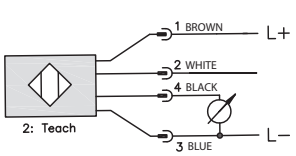


Diagram 2

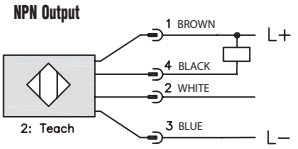
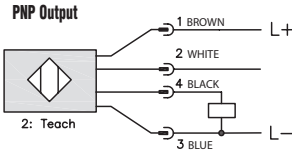
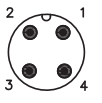


Diagram 3

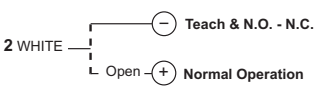


Connector

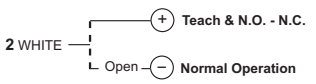
M12 connector



For Diagram 1 and 2



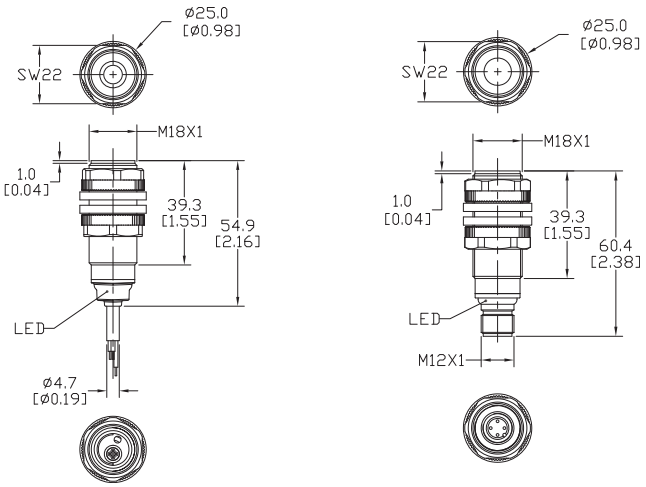
For Diagram 3



UK6 Series Ultrasonic Sensors

Specifications		
Model	***UK6A***	***UK6C***
Nominal Sensing Distance	40-300 mm (1.57 to 11.81 in)	120-900 mm (4.72 to 35.43 in)
Operating Distance (Sensing Range)	40-300 mm (1.57 to 11.81 in)	120-900 mm (4.72 to 35.43 in)
Output Type	See "Output State" column in selection chart	
Operating Voltage	15-30 VDC	
No-load Supply Current	35mA	
Operating (Load) Current	100mA	
Off-state (Leakage) Current	10µA @ 30VDC	
Analog Output	Voltage: minimum load is 3 kOhms / Current: maximum load is 500 Ohms at 24 VDC supply	
Voltage Drop	2.2 volts max@ 100mA	
Switching Frequency	20Hz	6Hz
Repeat Accuracy	2%	
Time Delay Before Availability (tv)	300ms (digital output) 900ms (analog output)	
Reverse Polarity Protection	Yes	
Short-Circuit Protection	Yes	
Linearity Error	<3%	
Ultrasonic Frequency	300kHz	
Ultrasonic Beam Angle	± 10°	± 8°
Max. Response Time (digital output)	25ms	83ms
Sensitivity Adjustment	Remote teach-in via cable	
Input Voltage Transient Protection	Yes	
Operating Temperature	-20°-60°C (-4° to 140°F)	
Temperature Compensation	Yes	
Protection Degree	IEC IP67	
Indication/Switch Status	Multi-function LED indicator	
Housing Material	Polybutylene Terephthalate (PBT)	
Shock/Vibration	See Terminology Section	
Tightening Torque	1Nm (0.737 lb-ft)	
Weight	15g (0.53 oz) (plug exit) 80g (2.82 oz) (cable exit)	
Connection	M12 (12mm) connector or 2m prewired output cable	
Agency Approvals	CE, cULus file E187310, RoHS	

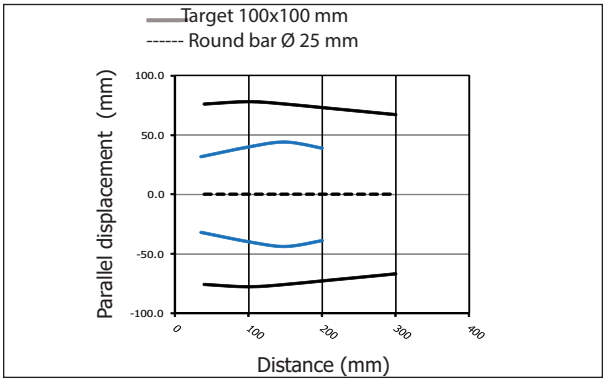
Dimensions mm [inches]



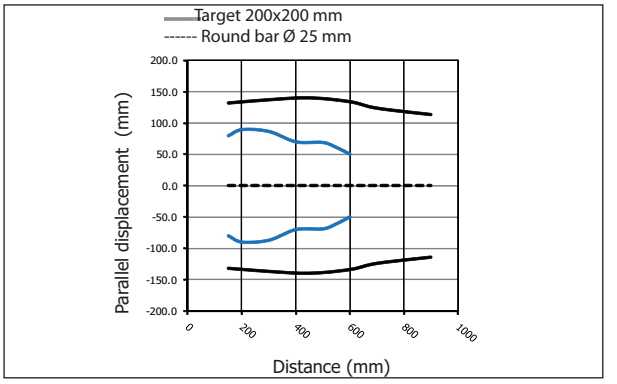
UK6 Series Ultrasonic Sensors

Characteristic Curves

UK6A models



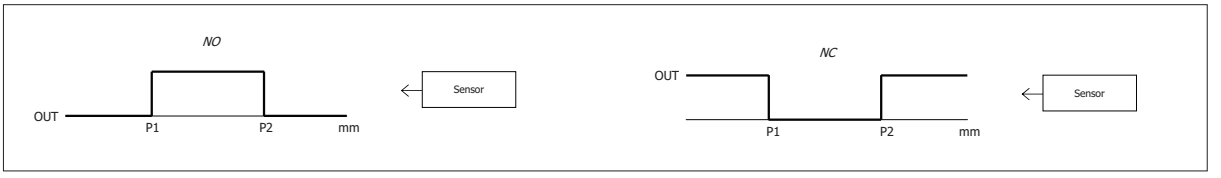
UK6C models



Functions

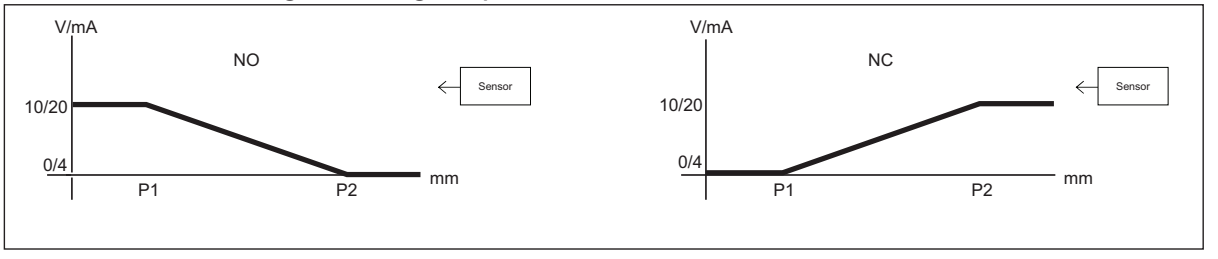
Models with single digital output

#1



Models with single analog output

#2



UT1 Series Ultrasonic Sensors

M30 (30mm) plastic – Discrete or analog output

- 12-30 VDC, 15 to 30 VDC (0 to 10 VDC)
- Discrete models available with adjustable sensitivity
- Analog output models available
- Models available with analog and discrete switching outputs
- Complete overload protection
- IP67 rated
- LED status indicators
- Mounting hex nuts included
- Purchase cable for M12 plug separately
- Lifetime warranty

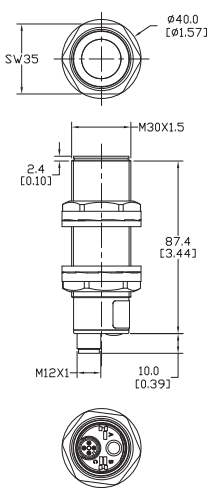
UT1B-E4-0E

UT1B-E4-0A

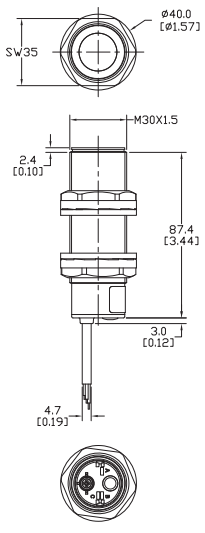
UT 1B Series Ultrasonic Discrete or Analog Output Sensor Selection Chart						
Part Number	***Price***	***Sensing Range***	***Output State***	***Connection***	***Wiring***	***Function***
UT1B-E4-0E	$185.00	250 to 3500 mm (9.84 to 137.8 in)	4 to 20 mA analog output, NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 5	4
UT1B-E4-0A	$189.00		4 to 20 mA analog output, NPN, N.O./N.C. selectable	2m output cable	Diagram 5	4
UT1B-E6-0E	$185.00		4 to 20 mA analog output, PNP, N.O./N.C. selectable	M12 quick disconnect	Diagram 7	4
UT1B-E6-0A	$189.00		4 to 20 mA analog output, PNP, N.O./N.C. selectable	2m output cable	Diagram 7	4
UT1B-E7-0E	$185.00		0 to 10 VDC analog output, PNP, N.O./N.C. selectable	M12 quick disconnect	Diagram 7	4
UT1B-E7-0A	$189.00		0 to 10 VDC analog output, PNP, N.O./N.C. selectable	2m output cable	Diagram 7	4
UT1B-E9-0E	$185.00		0 to 10 VDC analog output, NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 5	4
UT1B-E9-0A	$189.00		0 to 10 VDC analog output, NPN, N.O./N.C. selectable	2m output cable	Diagram 5	4
UT1B-EM-0E	$185.00		NPN, 2 outputs, hysteresis + window functions	M12 quick disconnect	Diagram 4	5
UT1B-EM-0A	$189.00		NPN, 2 outputs, hysteresis + window functions	2m output cable	Diagram 4	5
UT1B-EW-0E	$185.00		PNP, 2 outputs, hysteresis + window functions	M12 quick disconnect	Diagram 6	5
UT1B-EW-0A	$189.00		PNP, 2 outputs, hysteresis + window functions	2m output cable	Diagram 6	5

Dimensions

mm [inches]



UT1 Series M12 Quick Disconnect



UT1 Series 2m Cable

UT1 Series Ultrasonic Sensors

Specifications	
Model	***UT1B***
Nominal Sensing Distance	250 mm – 3500 mm (9.84 in – 137.80 in)
Operating Distance (Sensing Range)	250 mm – 3500mm (9.84 in – 137.80 in)
Output Type	See "Output State" column in selection chart
Operating Voltage	12 – 30 VDC; 15 – 30 VDC (for 0 – 10 VDC analog models)
No-load Supply Current	≤50 mA
Operating (Load) Current	100 mA
Off-state (Leakage) Current	Voltage: minimum load is 3 kOhms / Current: maximum load is 500 Ohms at 24 VDC supply
Analog Output	Voltage: minimum load is 3 kΩ / Current: maximum load is 500 Ω at 24 VDC supply
Voltage Drop	2.2 V max@ 100mA
Switching Frequency	2Hz
Repeat Accuracy	0.2%
Time Delay Before Availability (tv)	≤300 ms; <900 ms for UTIB-EM/W-0*
Reverse Polarity Protection	Yes
Short-Circuit Protection	Yes
Linearity Error	0.5%
Ultrasonic Frequency	112 kHz
Ultrasonic Beam Angle	12° ± 2°
Max. Response Time (digital output)	250 ms
Sensitivity Adjustment	Yes, via teach-in button
Input Voltage Transient Protection	Yes
Operating Temperature	-20° to +70°C (-4° to +158°F)
Temperature Compensation	Yes
Protection Degree	IEC IP67
Indication/Switch Status	Multi-function LED indicator
Housing Material	Polybutylene Terephthalate (PBT)
Shock/Vibration	See Terminology Section
Tightening Torque	1 Nm (0.737 lb-ft)
Weight	90g (3.17 oz) (plug exit) 160g (5.64 oz) (cable exit)
Connection	M12 (12 mm) connector or 2m prewired output cable
Agency Approvals	CE, cULus file E187310, RoHS

Wiring Diagrams

Diagram 1

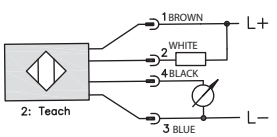


Diagram 2

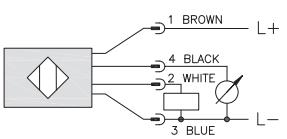


Diagram 3

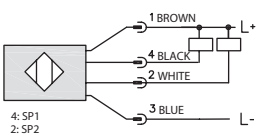
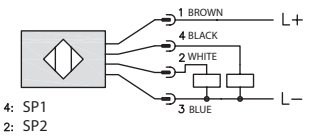
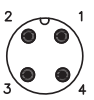


Diagram 4



Connector

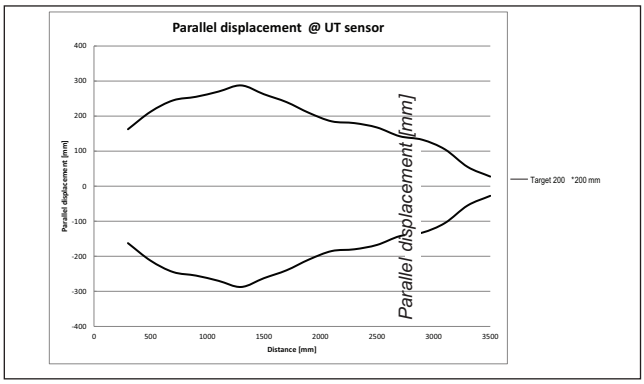
M12 connector



UT1 Series Ultrasonic Sensors

Characteristic Curves

UT1B models

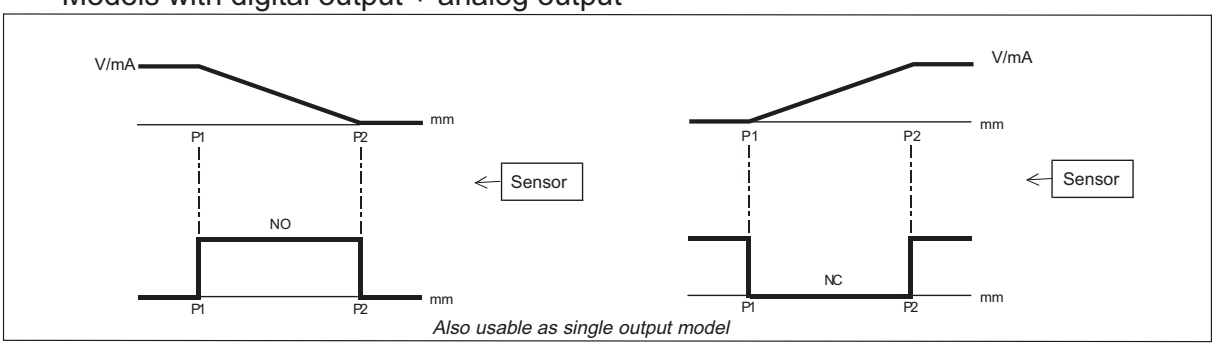


Distance [mm]

Functions

Models with digital output + analog output

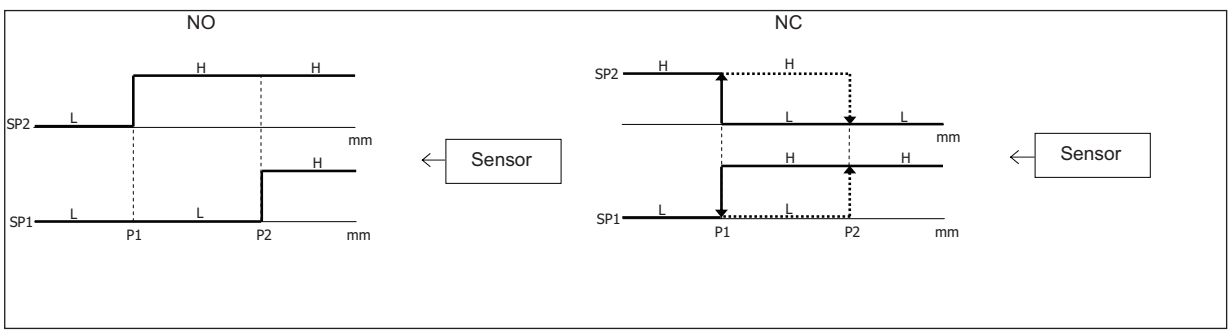
#1



Note: P1 *maximum selected working distance and first point to select*
P2 *minimum selected working distance and second point to select*

Models with double digital output: hysteresis or standard window

#2



UT2 Series Ultrasonic Sensors

M30 (30mm) plastic – Discrete or analog output

- 12 to 30 VDC or 15 to 30 VDC powered (model dependent)
- Discrete models available with adjustable sensitivity
- Analog output models available
- Models available with analog or discrete switching outputs
- Sensing distances up to 6m
- Complete overload protection
- IP67 rated
- LED status indicators
- Mounting hex nuts included
- Purchase cable for M12 plug separately
- Lifetime warranty

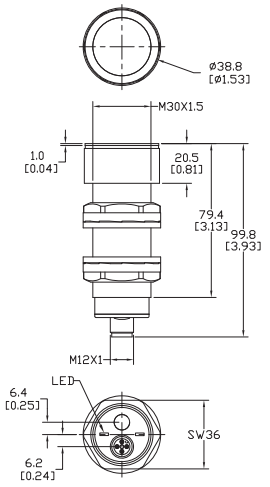
M12 Quick Disconnect

2m Output Cable

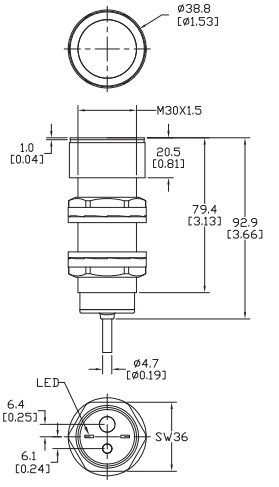
UT 2F Series Ultrasonic Discrete or Analog Output Sensor Selection Chart						
Part Number	***Price***	***Sensing Range***	***Output State***	***Connection***	***Wiring***	***Function***
UT2F-E7-0E	$325.00	350–6000 mm (13.8 in–236.22 in)	0–10 VDC analog output, PNP, N.O./N.C. selectable	M12 quick disconnect	Diagram 1	1
UT2F-E7-0A	$325.00		0–10 VDC analog output, PNP, N.O./N.C. selectable	2m output cable	Diagram 1	1
UT2F-E9-0E	$325.00		0–10 VDC analog output, NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 2	1
UT2F-E9-0A	$325.00		0–10 VDC analog output, NPN, N.O./N.C. selectable	2m output cable	Diagram 2	1
UT2F-E6-0E	$325.00		4–20 mA analog output, PNP, N.O./N.C. selectable	M12 quick disconnect	Diagram 1	1
UT2F-E6-0A	$325.00		4–20 mA analog output, PNP, N.O./N.C. selectable	2m output cable	Diagram 1	1
UT2F-E4-0E	$325.00		4–20 mA analog output, NPN, N.O./N.C. selectable	M12 quick disconnect	Diagram 2	1
UT2F-E4-0A	$325.00		4–20 mA analog output, NPN, N.O./N.C. selectable	2m output cable	Diagram 2	1
UT2F-EW-0E	$325.00		PNP, 2 outputs, hysteresis + window functions	M12 quick disconnect	Diagram 3	2
UT2F-EW-0A	$325.00		PNP, 2 outputs, hysteresis + window functions	2m output cable	Diagram 3	2
UT2F-EM-0E	$325.00		NPN, 2 outputs, hysteresis + window functions	M12 quick disconnect	Diagram 4	2
UT2F-EM-0A	$325.00		NPN, 2 outputs, hysteresis + window functions	2m output cable	Diagram 4	2

Dimensions

mm [inches]



UT2 Series M12 Quick Disconnect



UT2 Series 2m Cable

UT2 Series Ultrasonic Sensors

Specifications	
Model	***UT2F***
Nominal Sensing Distance	350mm – 6000mm (13.78 in – 236.22 in)
Operating Distance (Sensing Range)	350mm – 6000mm (13.78 in – 236.22 in)
Output Type	See "Output State" column in selection chart
Operating Voltage	12 – 30 VDC; 15 – 30 VDC (for 0 – 10 VDC analog models)
No-load Supply Current	≤50mA
Operating (Load) Current	100mA
Off-state (Leakage) Current	<10µA (VDC max)
Analog Output	Voltage: minimum load is 3 kΩ / Current: maximum load is 500 Ω at 24 VDC supply
Voltage Drop	2.2 V max@ 100mA
Switching Frequency	1Hz
Repeat Accuracy	0.5%
Time Delay Before Availability (tv)	≤300; ≤900ms for UT2F-EW-0*, UT2F-EM-0*
Reverse Polarity Protection	Yes
Short-Circuit Protection	Yes
Linearity Error	1%
Ultrasonic Frequency	75kHz
Ultrasonic Beam Angle	15° ± 2°
Max. Response Time (digital output)	500ms
Sensitivity Adjustment	Yes, via teach-in button
Input Voltage Transient Protection	Yes
Operating Temperature	-20° to +70°C (-4° to +158°F)
Temperature Compensation	Yes
Protection Degree	IEC IP67
Indication/Switch Status	Multi-function LED indicator
Housing Material	Polybutylene Terephthalate (PBT)
Shock/Vibration	See Terminology Section
Tightening Torque	1Nm (0.737 lb-ft)
Weight	130g (4.59 oz) (plug exit) 199g (7.02 oz) (cable exit)
Connection	M12 (12mm) connector or 2m prewired output cable
Agency Approvals	CE, cULus file E187310, RoHS

Wiring Diagrams

Diagram 1

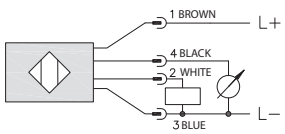


Diagram 2

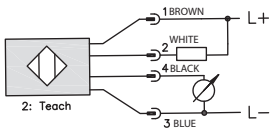


Diagram 3

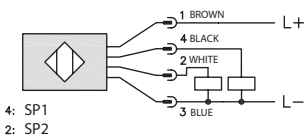
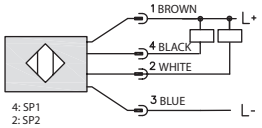
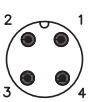


Diagram 4



Connector

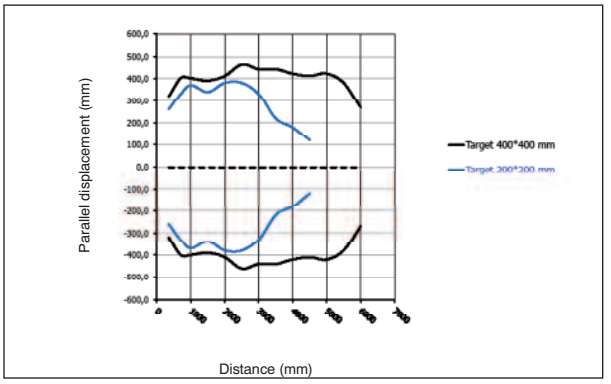
M12 connector



UT2 Series Ultrasonic Sensors

Characteristic Curves

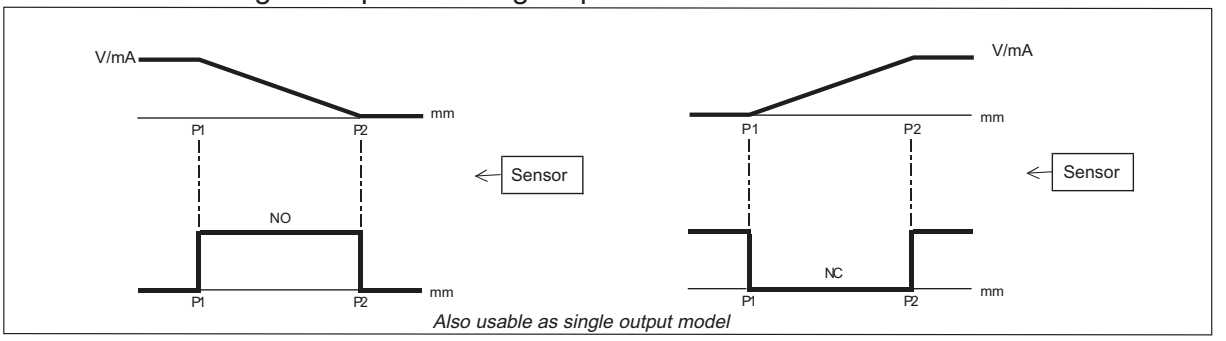
UT2F models



Functions

Models with digital output + analog output

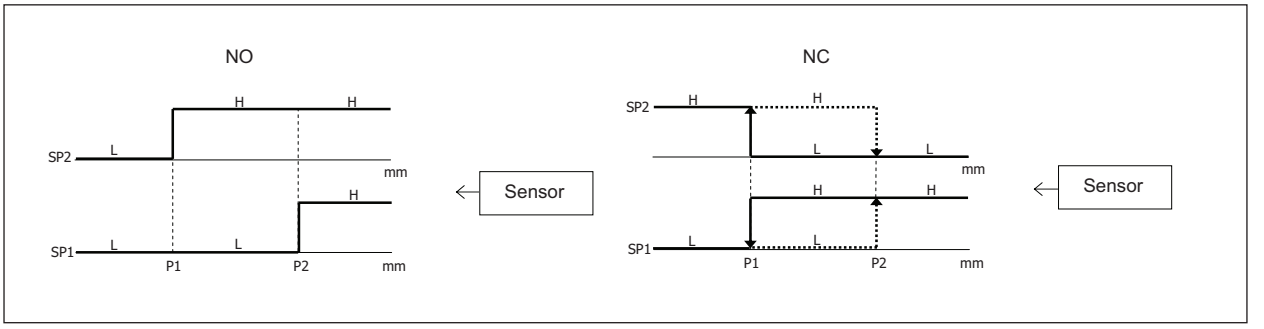
#1



Note: P1 *maximum selected working distance and first point to select*
P2 *minimum selected working distance and second point to select*

Models with double digital output: hysteresis or standard window

#2



SU Series Ultrasonic Sensors

M18 (18 mm) plastic –PNP or analog output

- High resolution
- 2 PNP models with adjustable sensitivity
- 3 analog models available
- Complete overload protection
- IP67 rated
- LED status indicator on PNP models
- Purchase cable separately (for quick-disconnect model)
- Lifetime warranty

SU Series Ultrasonic DC Output Sensor Selection Chart

Part Number	Price	Sensing Range	Output State	Logic	Connection	Wiring
SU1-B0-0A	$282.00	100 to 600mm (3.94-23.62in)	N.O.	PNP	2m (6.5') axial cable	Diagram1
SU2-A0-0A	$228.75	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	$282.00	100 to 600mm (3.94-23.62in)	0-10VDC	2m (6.5') axial cable	Diagram 2
SU1-B1-0E	$282.00			M12 (12mm) connector	
SU2-A1-0E	$282.00	200 to 1500mm (7.87-59.06in		M12 (12mm) connector	

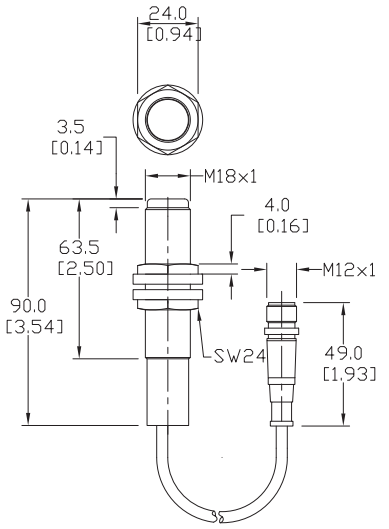
Specifications

Mounting Type	SU1-B0-0A	SU2-A0-0A	SU1-B1-0*	SU2-A1-0E
Nominal Sensing Distance	100 to 600mm (3.94-23.62in)	200 to 1500mm (7.87-59.06in)	100 to 600mm (3.94-23.62in)	200 to 1500mm (7.87-59.06in
Operating Distance	N/A			
Output Type	PNP / N.O.		0-10VDC	
Operating Voltage	15-30VDC		18-30VDC	
No-load Supply Current	≤35mA			
Operating (Load) Current	≤500mA		≤5mA	
Off-state (Leakage) Current	≤10µA			
Voltage Drop	≤2.5 volts			
Switching Frequency	25Hz	8Hz	–	
Differential Travel	±2.5%	±2.0%		
Repeat Accuracy	0.2%		±2mm	
Time Delay Before Availability (tv)	≤200ms		≤500ms	
Reverse Polarity Protection	Yes			
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)			
Linearity Error	-		≤0.3%	
Ultrasonic Frequency	300kHz	180kHz	300kHz	180kHz
Ultrasonic Beam Angle	8°			
Max. Response Time	-		50ms	150ms
Control Input	Hold / Sync			
Sensitivity Adjustment	Yes		-	
Input Voltage Transient Protection	Yes, only if transient peak does not exceed 30VDC			
Operating Temperature	-25° to +70°C (-13° to 158°F)			
Temperature Compensation	Yes			
Protection Degree	IEC IP67			
Indication/Switch Status	Yellow (output energized)		-	
Housing Material	Polybutylene Terephthalate (PBT)			
Shock/Vibration	See Terminology Section			
Tightening Torque	3 Nm (2.21lb-ft)			
Weight (cable/connector)	54g (1.90oz) / 38g (1.34oz.)			
Connection	2m (6.5') axial cable		2m (6.5') axial cable or M12 (12mm) connector	
Agency Approvals	CE, UL listed file E187310			

SU Series Ultrasonic Sensors

Dimensions

mm [inches]



Wiring Diagrams

Diagram 1*

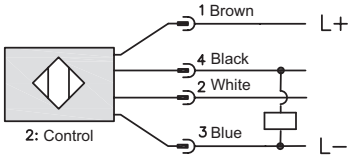
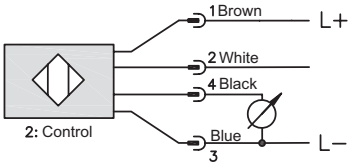


Diagram 2*



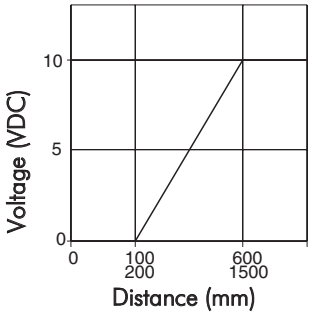
Note: Control wire can be used to inhibit sensor or to synchronize with another sensor.

Connector

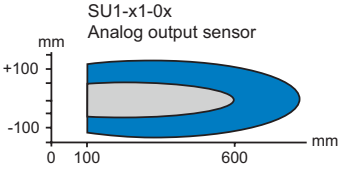
Must be used with 2M or 7M cable (4-wire)

Characteristic Curves

Analog Output



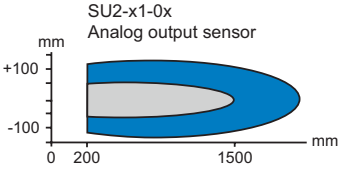
Detection Area
SU1 Analog output



Guaranteed detection of 100x100mm target

Possible detection of large object

Detection Area
SU2 Analog output



Guaranteed detection of 100x100mm target

Possible detection of large object

TU Series Ultrasonic Sensors

M30 (30 mm) plastic – PNP or Analog Output

- High resolution
- PNP output model with adjustable sensitivity
- Complete overload protection
- IP67 rated
- LED status indicator on PNP models
- Purchase cable separately
- Lifetime warranty

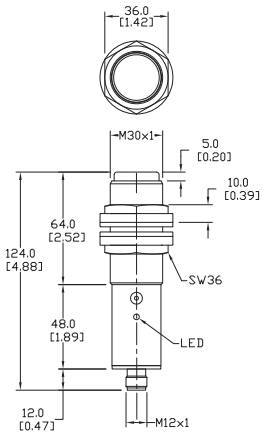
TU Series Ultrasonic PNP Output Sensor Selection Chart						
Part Number	**Price**	**Sensing Range**	**Output State**	**Logic**	**Connection**	**Wiring**
TU1-C0-0E	$302.00	300 to 2500mm (11.81-98.43in)	N.O.	PNP	M12 (12mm) connector	Diagram1

TU Series Ultrasonic Analog Output Sensor Selection Chart					
Part Number	**Price**	**Sensing Range**	**Output**	**Connection**	**Wiring**
TU1-C1-0E	$302.00	300 to 2500mm (11.81-98.43in)	0 to 10 VDC	M12 (12mm) connector	Diagram 2

Specifications		
Mounting Type	**TU1-C0-0E**	**TU1-C1-0E**
Nominal Sensing Distance	300 to 2500mm (11.81-98.43in)	300 to 2500mm (11.81-98.43in)
Operating Distance	N/A	N/A
Output Type	PNP / N.O.	0 to 10 VDC
Operating Voltage	19 to 30 VDC	
No-load Supply Current	≤35mA	
Operating (Load) Current	≤500mA	≤5mA
Off-state (Leakage) Current	≤10µA	
Voltage Drop	≤2.5 volts	–
Switching Frequency	1Hz	–
Differential Travel	±2.0%	–
Repeat Accuracy	0.2%	±2mm
Linearity Error	-	≤0.3%
Ultrasonic Frequency	130kHz	
Ultrasonic Beam Angle	8°	
Max. Response Time	-	100ms
Time Delay Before Availability (tv)	≤200ms	≤1s
Control Input	Hold / Sync	
Sensitivity Adjustment	Yes	-
Reverse Polarity Protection	Yes	
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)	
Operating Temperature	-25° to +70°C (-13° to 158°F)	
Temperature Compensation	Yes	
Protection Degree	IEC IP67	
Indication/Switch Status	Yellow (output energized)	–
Housing Material	Polybutylene Terephthalate (PBT)	
Tightening Torque	3 Nm (2.21lb-ft)	
Weight (connector)	124g (4.37oz)	
Connection	M12 (12mm) connector	
Agency Approvals	CE, UL listed file E187310	

Dimensions

mm [inches]



Wiring Diagrams

Diagram 1*

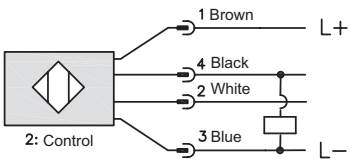
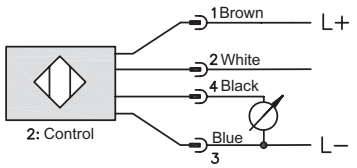
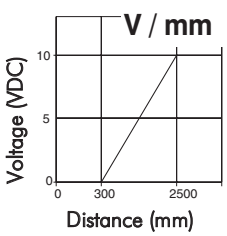


Diagram 2*

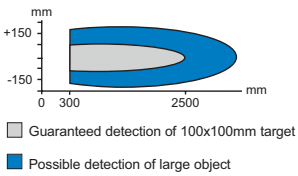


Note: Control wire can be used to inhibit sensor or to synchronize with another sensor.

Characteristic Curves (analog)



Detection Area



Connector

M12 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	**UHZ**
Nominal Sensing Distance	300 mm (11.81 in)
Operating Distance	N/A
Output Type	PNP/NPN, NO/ NC
Operating Voltage	18 - 30 VDC
No Load Supply Current	< 40 mA
Operating (Load) Current	500 mA
Off-state (Leakage) Current	<10 µA @ 30 VDC
Voltage Drop	N/A
Switching Frequency	150 Hz
Sensing Beam	Beam angle 15°
Differential Travel (% of Nominal Distance)	N/A
Repeat Accuracy	N/A
Ripple	N/A
Time Delay Before Availability (tv)	N/A
Response Time	1 ms
Reverse Polarity Protection	Yes
Short-Circuit Protection	Output short circuit and overcurrent protection, reverse polarity protection
Operating Temperature	5°F to 140°F (-15°C to +60°C)
Protection Degree	IEC-IP67
Indication/Switch Status	Yellow Output State
Case Material	PBTP
Active Head Material	Ceramic
Shock/Vibration	per IEC EN 60947-5-2
Tightening Torque	N/A
Weight	161 g (5.68 oz)
Connection	2m (6.5') axial cable
Agency Approvals	CE

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

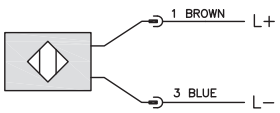
- 30x20x12 mm emitter/receiver rectangular ultrasonic sensor
- LED status indicator for all models
- Complete protection against electrical damage
- IP67 protection
- Strong plastic housing
- Switching frequency 150 Hz
- Sensing distance (sn): 300mm
- Beam angle: 15°
- Supply voltage: 18 - 30 VDC
- NPN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

Rectangular Ultrasonic Thru-Beam Sensors Selection Chart

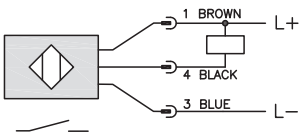
Part Number	Price	Voltage Range	Sensing Range	Switching Frequency	Sensing Beam	Thru-Beam Component	Output Type	Connection Type	Wiring
UHZ-AN-0A	$160.00	18 - 30 VDC	11.81 in. (0.3 m)	150 Hz	ultrasonic	pair	NPN /N.O.	2 meter cable	Diagram 1
UHZ-AP-0A	$160.00					pair	PNP/ N.O.		Diagram 2
UHZ-CN-0A	$160.00					pair	NPN /N.C.		Diagram 3
UHZ-CP-0A	$160.00					pair	PNP/ N.C.		Diagram 4

Wiring Diagram

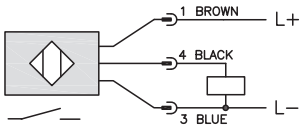
Emitter



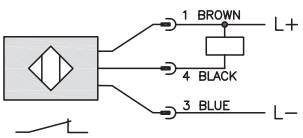
Receiver (NPN) Diagram 1



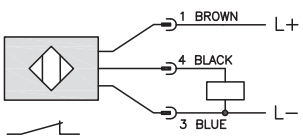
Receiver (PNP) Diagram 2



Receiver (NPN) Diagram 3

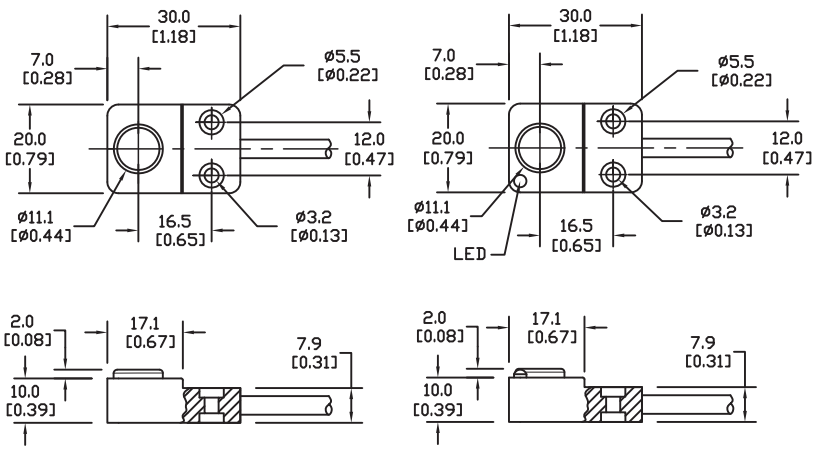


Receiver (PNP) Diagram 4



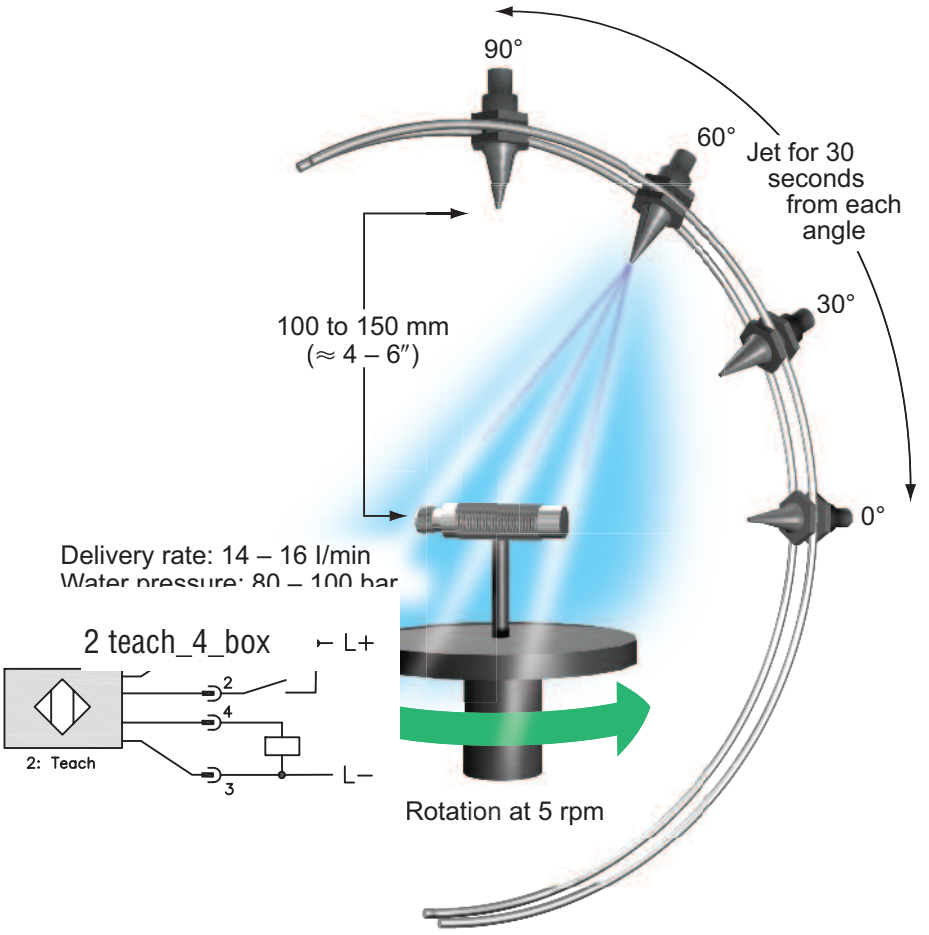
Dimensions

mm [inches]



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

IP69K-rated Proximity Sensors



Overview

IP69K high-pressure cleaning test

The ADC Food and Beverage products were tested in accordance with the IP69K standard, according to DIN 40050 part 9. The goal of this test was to duplicate pressure cleaning conditions on a plant floor. In the test fixture, the sensors were exposed to a 1500 psi spray of water at a temperature of 176 °F. The duration of each cleaning cycle was 30 seconds. The test was performed at specified angles using a spray nozzle located at a distance of 4″ from the switch.The sensors withstood test conditions and were still operable, providing 100% of sensing range.

Thermal endurance

In pressure cleaning environments, proximity and photo sensors can be exposed to extreme temperature conditions. A thermal shock test was performed on the proximity sensors by cycling the temperature to ensure their consistent high reliability. All proximity and FFRS photoeyes can withstand temperatures up to 100°C (212°F).

FDA certified Materials

The ADC Food & Beverage sensors are manufactured from materials capable of withstanding solutions used during equipment cleaning. These materials are all approved by the FDA for use in food production environments:

- 316L (V4A) stainless steel
- PMMA (acrylic)
- PEEK (Polyether Ether Ketone)
- PPS (Techtron)

Third Party chemical testing companies such as ECOLAB and Johnson Diversey have tested these products with common cleaning agents, such as P3-clint KF and P3-topax 52, to assure continued operation.

PFM Series IP69K-rated Proximity Sensors

PFM1-BN-1H

12 mm stainless steel - DC

- 10 models available
- 12mm diameter
- 316L stainless steel housing
- M12 quick-disconnect plug with gold-plated pins (purchase cable separately)
- Complete overload protection
- IP69K rated for food and beverage applications
- M12 mounting hex nuts included
- Lifetime warranty

PFM Series Food and Beverage DC Inductive Prox Selection Chart								
Part Number	***Price***	***Sensing Range***	***Housing***	***Output State***	***Logic***	***Connection***	***Wiring***	***Dimensions***
Standard								
PFM1-BN-1H	$42.50	0 to 2mm (0 to 0.079in)	Shielded	N.O./N.C.	NPN	M12 (12mm) connector	Diagram 1	Figure 2
PFM1-BP-1H	$42.50				PNP	M12 (12mm) connector	Diagram 2	Figure 2
PFM1-BN-2H	$42.50	0 to 4mm (0 to 0.157in)	Unshielded	N.O./N.C.	NPN	M12 (12mm) connector	Diagram 1	Figure 2
PFM1-BP-2H	$42.50				PNP	M12 (12mm) connector	Diagram 2	Figure 2
Extended								
PFM1-BN-3H	$42.50	0 to 4mm (0 to 0.157in)	Shielded	N.O./N.C.	NPN	M12 (12mm) connector	Diagram 1	Figure 2
PFM1-BP-3H	$42.50				PNP	M12 (12mm) connector	Diagram 2	Figure 2
PFM1-AP-3H	$35.50			N.O.	PNP	M12 (12mm) connector	Diagram 3	Figure 1
PFM1-BN-4H	$42.50	0 to 8 mm (0 to 0.315in)	Unshielded	N.O./N.C.	NPN	M12 (12mm) connector	Diagram 2	Figure 2
PFM1-BP-4H	$42.50				PNP	M12 (12mm) connector	Diagram 2	Figure 2
PFM1-AP-4H	$35.50	0 to 7 mm (0 to 0.275in)		N.O.	PNP	M12 (12mm) connector	Diagram 3	Figure 1

Wiring diagrams

Diagram 1

NPN Output

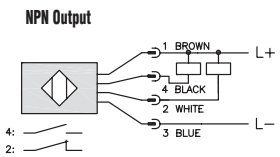
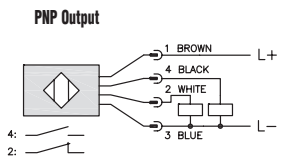


Diagram 2

PNP Output



Connector

M12 connector

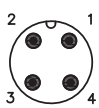
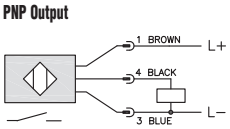


Diagram 3

PNP Output



NOTE: CLASS 2 POWER SUPPLY REQUIRED

PFM Series IP69K-rated Proximity Sensors

PFM Series Specifications	Standard		Extended			
MountingType	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
Nominal Sensing Distance	2mm (0.079in)	4mm (0.157in)	4mm (0.157in)	8mm (0.315in)	4mm (0.157in)	7mm (0.275in)
Operating Distance	N/A					
Material Correction Factors	See Material Influence table #2 later in this section.					
Output Type	NPN or PNP/4-wire, N.O./N.C.				PNP, N.O. only	
Operating Voltage	10 - 30 VDC				10 - 36 VDC	
No-load Supply Current	≤15 mA				≤10 mA	
Operating (Load) Current	≤200mA				≤100mA	
Off-state (Leakage) Current	≤10µA				–	
Voltage Drop	≤2.0 V				≤2.5 V	
Switching Frequency	2000 Hz				800 Hz	
Differential Travel *(% of Nominal Distance)*	1 - 20%					3 - 15%
Repeat Accuracy	5%				10%	
Ripple	≤10%				–	
Time Delay Before Availability (tv)	50ms				30ms	
Reverse Polarity Protection	Yes					
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)					
Operating Temperature	-40° to 80°C (-40° to 176°F), Short exposure (15 minutes) to 100°C (212°F) during cleaning processes				0° to 100°C (32° to 212°F)	
Temperature Drift	≤10% Sr					
Protection Degree (DIN 40050)	IEC IP67, IP68, IP69K				IEC IP68, IP69K	
Indication/Switch Status	Normally Open output energized - Yellow					
Housing Material	316L stainless steel					
Sensing Face Material	PPS (FDA certified)				PEEK (Polyether Ether Ketone)	
Shock/Vibration	See Terminology Section					
Tightening Torque	20 Nm (14.75 lb-ft)				20 Nm (14.75 lb-ft)	
Weight	35 g (1.23 oz)				25 g (0.88 oz)	
Connection	M12 plug with gold-plated pins					
Agency Approvals	UL file E187310, CE, ECOLAB, RoHS				UL file E328811, CE, ECOLAB, RoHS	

Dimensions

mm [inches]

Figure 1

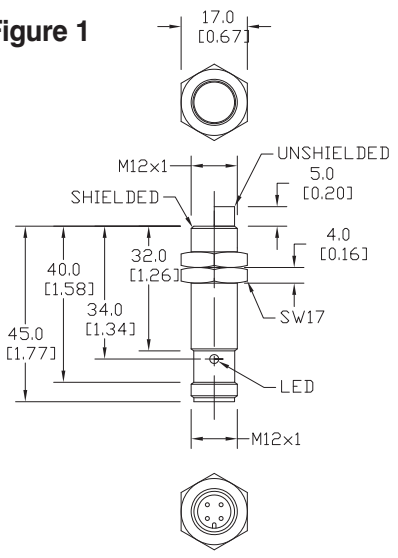
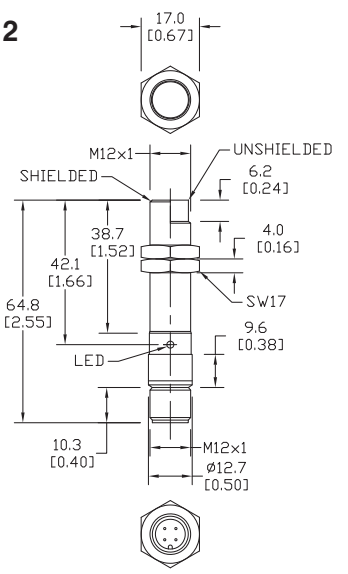


Figure 2



PFK Series IP69K-rated Proximity Sensors

PFK1-BN-1H

18mm stainless steel - DC

- 10 models available
- 18mm diameter
- 316L stainless steel housing
- M12 quick-disconnect plug with gold-plated pins (purchase cable separately)
- Complete overload protection
- IP69K rated for food and beverage applications
- M18 mounting hex nuts included
- Lifetime warranty

PFK Series Food and Beverage DC Inductive Prox Selection Chart								
Part Number	**Price**	**Sensing Range**	**Housing**	**Output State**	**Logic**	**Connection**	**Wiring**	**Dimensions**
Standard								
PFK1-BN-1H	$49.50	0 to 5mm (0 to 0.197in)	Shielded	N.O./N.C.	NPN	M12 (12mm) connector	Diagram 1	Figure 3
PFK1-BP-1H	$49.50				PNP	M12 (12mm) connector	Diagram 2	Figure 3
PFK1-BN-2H	$49.50	0 to 8mm (0 to 0.315in)	Unshielded	N.O./N.C.	NPN	M12 (12mm) connector	Diagram 1	Figure 3
PFK1-BP-2H	$49.50				PNP	M12 (12mm) connector	Diagram 2	Figure 3
Extended								
PFK1-BN-3H	$49.50	0 to 8mm (0 to 0.315in)	Shielded	N.O./N.C.	NPN	M12 (12mm) connector	Diagram 1	Figure 3
PFK1-BP-3H	$49.50				PNP	M12 (12mm) connector	Diagram 2	Figure 3
PFK1-AP-3H	$35.50			N.O.	PNP	M12 (12mm) connector	Diagram 3	Figure 1
PFK1-BN-4H	$55.00	0 to 12mm (0 to 0.472in)	Unshielded	N.O./N.C.	NPN	M12 (12mm) connector	Diagram 1	Figure 3
PFK1-BP-4H	$55.00				PNP	M12 (12mm) connector	Diagram 2	Figure 3
PFK1-AP-4H	$35.50			N.O.	PNP	M12 (12mm) connector	Diagram 3	Figure 2

Wiring diagrams

Diagram 1

NPN Output

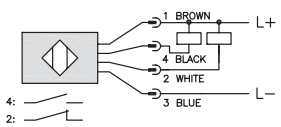
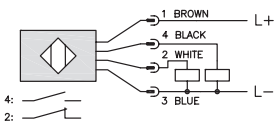


Diagram 2

PNP Output



Connector

M12 connector

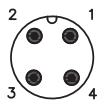
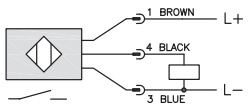


Diagram 3

PNP Output



NOTE: CLASS 2 POWER SUPPLY REQUIRED

PFK Series IP69K-rated Proximity Sensors

PFK Series Specifications	Standard		Extended			
Mounting Type	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
Nominal Sensing Distance	5mm (0.196in)	8mm (0.315in)	8mm (0.315in)	12mm (0.472in)	8mm (0.315in)	12mm (0.472in)
Operating Distance	N/A					
Material Correction Factors	See Material Influence table #2 later in this section.					
Output Type	NPN or PNP/4-wire, N.O./N.C.				PNP, N.O. only	
Operating Voltage	10 - 30 VDC				10 - 36 VDC	
No-load Supply Current	≤15 mA				≤10 mA	
Operating (Load) Current	≤200mA				≤100mA	
Off-state (Leakage) Current	≤10µA				–	
Voltage Drop	≤2.0 V				≤2.5 V	
Switching Frequency	1500 Hz				600 Hz	300 Hz
Differential Travel (% of Nominal Distance)	1 - 20%					3 - 15%
Repeat Accuracy	5%				10%	
Ripple	≤10%				–	
Time Delay Before Availability (tv)	50ms				30ms	
Reverse Polarity Protection	Yes					
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)					
Operating Temperature	-40° to 80°C (-40° to 176°F), Short exposure (15 minutes) to 100°C (212°F) during cleaning processes				0° to 100°C (32° to 212°F)	
Protection Degree (DIN 40050)	IEC IP67, IP68, IP69K				IEC IP68, IP69K	
Indication/Switch Status	Normally Open output energized - Yellow					
Housing Material	316L stainless steel					
Sensing Face Material	PPS (FDA certified)				PEEK (Polyether Ether Ketone)	
Shock/Vibration	See Terminology Section					
Tightening Torque	107 Nm (79 lb-ft)				50 Nm (37 lb-ft)	
Weight	35 g (1.23 oz)				45 g (1.587 oz)	
Connection	M12 plug with gold-plated pins					
Agency Approvals	UL file E187310, CE, ECOLAB, RoHS				UL file E328811, CE, ECOLAB, RoHS	

Dimensions

mm [inches]

Figure 1

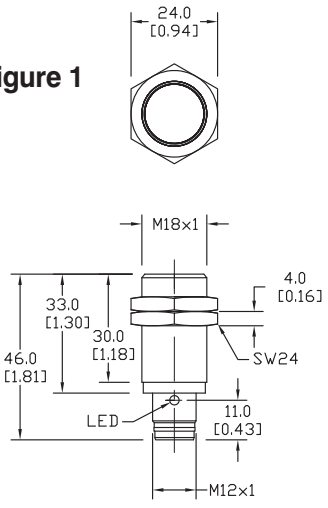


Figure 2

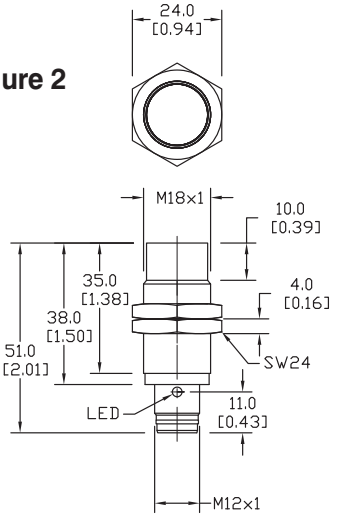
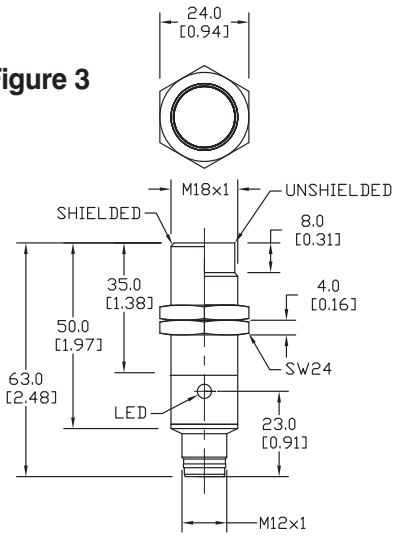


Figure 3



Shielded

Unshielded

PFT Series IP69K-rated Proximity Sensors

PFT1-AP-3H
PFT1-AP-4H

30mm stainless steel - DC

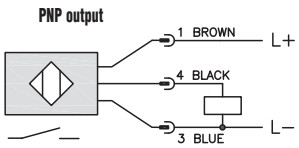
- 4 models available.
  PFT1 series – short-body length,
  PFT2 series – regular body length
- 30mm diameter
- 316L stainless steel housing
- M12 quick-disconnect plug with gold-plated pins (purchase cable separately)
- Complete overload protection
- IP69K rated for food and beverage applications
- M30 mounting hex nuts included
- Lifetime warranty

PFT Series Food and Beverage DC Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Wiring	Dimensions
PFT1-AP-3H	$45.50	0 to 14 mm (0 to 0.551 in)	Shielded	N.O.	PNP	M12 (12mm) connector	Diagram1	Figure 1
PFT2-AP-3H	$45.50	0 to 15 mm (0 to 0.590 in)			PNP	M12 (12mm) connector	Diagram1	Figure 2
PFT1-AP-4H	$45.50	0 to 22 mm (0 to 0.866 in)	Unshielded	N.O.	PNP	M12 (12mm) connector	Diagram1	Figure 1
PFT2-AP-4H	$45.50				PNP	M12 (12mm) connector	Diagram1	Figure 2

Wiring diagram

Diagram 1



Connector

NOTE: CLASS 2 POWER SUPPLY REQUIRED

PFT Series IP69K-rated Proximity Sensors

PFT Series Specifications				
Mounting Type	Shielded		Unshielded	
	PFT1	PFT2	PFT1	PFT2
Nominal Sensing Distance	14mm (0.551 in)	15mm (0.590 in)	22mm (0.866 in)	
Operating Distance	N/A			
Material Correction Factors	See Material Influence table #2 later in this section.			
Output Type	PNP, N.O. only			
Operating Voltage	10 - 36 VDC			
No-load Supply Current	≤10 mA			
Operating (Load) Current	≤100mA			
Off-state (Leakage) Current	—			
Voltage Drop	≤2.5 V			
Switching Frequency	50 Hz		100 Hz	
Differential Travel *(% of Nominal Distance)*	3 - 15%			
Repeat Accuracy	10%			
Ripple	N/A			
Time Delay Before Availability (tv)	30 ms			
Reverse Polarity Protection	Yes			
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)			
Operating Temperature	0° to 100°C (32° to 212°F)			
Protection Degree (DIN 40050)	IEC IP68, IP69K			
Indication/Switch Status	Normally Open output energized - Yellow			
Housing Material	316L stainless steel			
Sensing Face Material	PEEK (Polyether Ether Ketone)			
Shock/Vibration	See Terminology Section			
Tightening Torque	80 Nm (59 lb-ft)			
Weight	110g (3.88 oz)	130g (4.58 oz)	107g (3.77 oz)	124g (4.37 oz)
Connection	M12 plug with gold-plated pins			
Agency Approvals	UL file E328811, CE ECOLAB, RoHS			

Dimensions

mm [inches]

Figure 1

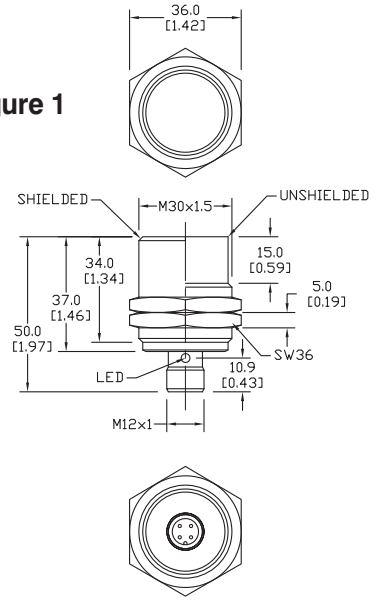
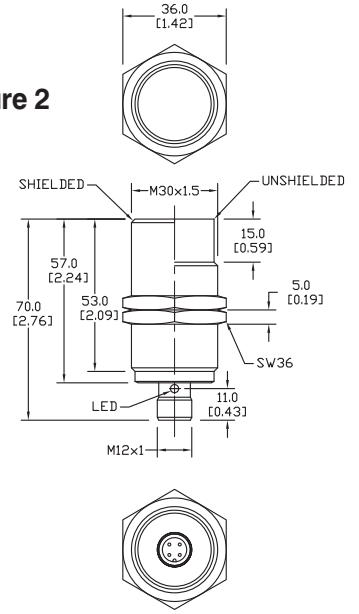


Figure 2



VFK Series IP69K-rated Proximity Sensors

VFK1-A0-1M
VFK1-A0-2M

18mm stainless steel - AC

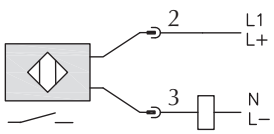
- 2 models available
- 18mm diameter
- 316L stainless steel housing
- 1/2" micro AC quick-disconnect plug with gold-plated pins (purchase cable separately)
- Complete overload protection
- IP69K rated for food and beverage applications
- M18 mounting hex nuts included
- Lifetime warranty

VFK Series Food and Beverage AC Inductive Prox Selection Chart

Part Number	Price	Sensing Range	Housing	Output State	Connection	Wiring	Dimensions
VFK1-A0-1M	$55.00	0 to 5 mm (0 to 0.197 in)	Shielded	N.O.	1/2" micro AC quick-disconnect plug	Diagram 1	Figure 1
VFK1-A0-2M	$55.00	0 to12 mm (0 to 0.472 in)	Unshielded		1/2" micro AC quick-disconnect plug	Diagram 1	Figure 1

Wiring diagram

Diagram 1



Connector

NOTE: CLASS 2 POWER SUPPLY REQUIRED

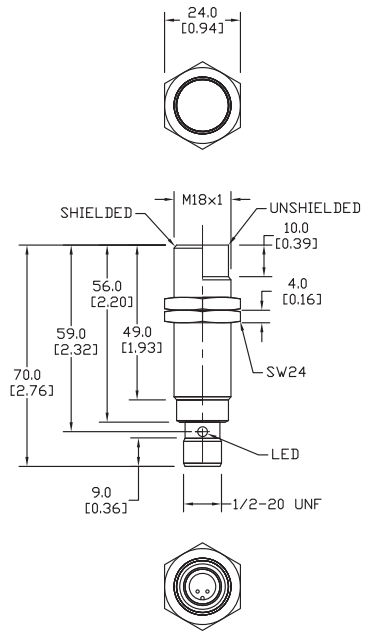
VFK Series IP69K-rated Proximity Sensors

VFK Series Specifications		
Mounting Type	Shielded	Unshielded
Nominal Sensing Distance	0 to 5 mm(0 to 0.197 in)	0 to12 mm (0 to 0.472 in)
Operating Distance	N/A	
Material Correction Factors	See Material Influence table #2 later in this section.	
Output Type	N.O. only	
Operating Voltage	20 to 140 VAC/VDC	
No-load Supply Current	N/A	
Operating (Load)Current	5 - 200mA	
Off-state (Leakage) Current	<1mA	
Voltage Drop	<5.5 V	
Switching Frequency	25 Hz VAC/400 Hz VDC	25 Hz VAC/300 Hz VDC
Differential Travel *(% of Nominal Distance)*	1 - 20%	
Repeat Accuracy	10%	
Ripple	N/A	
Time Delay Before Availability (tv)	1 s	
Reverse Polarity Protection	yes	
Short-Circuit Protection	yes (non latching)	
Operating Temperature	0° to 100°C (32° to 212°F)	
Protection Degree (DIN 40050)	IEC IP68/IP69K, II	
Indication/Switch Status	Normally Open output energized - Yellow	
Housing Material	316L stainless steel	
Sensing Face Material	PEEK (Polyether Ether Ketone)	
Shock/Vibration	See Terminology Section	
Tightening Torque	50 Nm (37 lb-ft)	
Weight	68 g (2.39 oz)	59 g (2.08 oz)
Connection	1/2" micro AC connector	
Agency Approvals	UL E328811, CE, ECOLAB, RoHS	

Dimensions

mm [inches]

Figure 1



VFT Series IP69K-rated Proximity Sensors

VFT1-A0-1M
VFT1-A0-2M

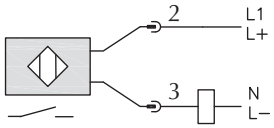
30mm stainless steel - AC

- 2 models available
- 30mm diameter
- 316L stainless steel housing
- 1/2" micro AC quick-disconnect plug with gold-plated pins (purchase cable separately)
- Complete overload protection
- IP69K rated for food and beverage applications
- M30 mounting hex nuts included
- Lifetime warranty

VFT Series Food and Beverage AC Inductive Prox Selection Chart							
Part Number	***Price***	***Sensing Range***	***Housing***	***Output State***	***Connection***	***Wiring***	***Dimensions***
VFT1-A0-1M	$59.00	0 to 14 mm (0 to 0.551 in)	Shielded	N.O.	1/2" micro AC quick-disconnect plug	Diagram 1	Figure 1
VFT1-A0-2M	$59.00	0 to 22 mm (0 to 0.866 in)	Unshielded		1/2" micro AC quick-disconnect plug	Diagram 1	Figure 1

Wiring diagram

Diagram 1



Connector

NOTE: CLASS 2 POWER SUPPLY REQUIRED

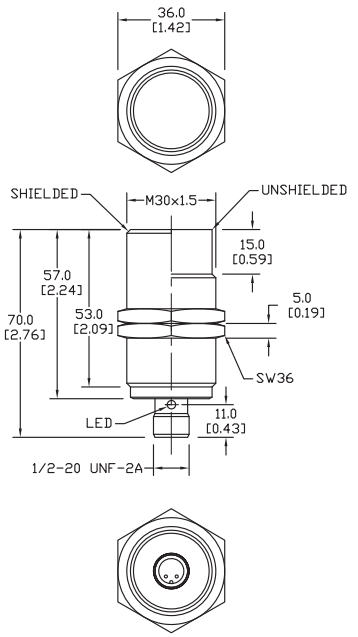
VFT Series IP69K-rated Proximity Sensors

VFT Series Specifications		
Mounting Type	Shielded	Unshielded
Nominal Sensing Distance	0 to 14 mm (0 to 0.551 in)	0 to 22 mm (0 to 0.866 in)
Operating Distance	N/A	N/A
Material Correction Factors	See Material Influence Table 2 later in this section.	
Output Type	N.O. only	
Operating Voltage	20 to 140 VAC/VDC	
No-load Supply Current	N/A	
Operating (Load) Current	5 - 200mA	
Off-state (Leakage) Current	<1mA	
Voltage Drop	<5.5 V	
Switching Frequency	25 Hz VAC/100 Hz VDC	
Differential Travel *(% of Nominal Distance)*	2 - 15%	3 - 15%
Repeat Accuracy	10%	
Ripple	N/A	
Time Delay Before Availability (tv)	1 s	
Reverse Polarity Protection	yes	
Short-Circuit Protection	yes (non latching)	
Operating Temperature	0° to 100°C (32° to 212°F)	
Protection Degree (DIN 40050)	IEC IP68/IP69K, II	
Indication/Switch Status	Normally Open output energized - Yellow	
Housing Material	316L stainless steel	
Sensing Face Material	PEEK (Polyether Ether Ketone)	
Shock/Vibration	See Terminology Section	
Tightening Torque	80 Nm (59 lb-ft)	
Weight	149 g (5.25 oz)	142 g (5.01 oz)
Connection	1/2" micro AC connector	
Agency Approvals	UL E328811, CE, ECOLAB, RoHS	

Dimensions

mm [inches]]

Figure 1



IP69K-rated Proximity Sensors - Magnetic

MAFM1-A0-1H
MAFK1-A0-1H

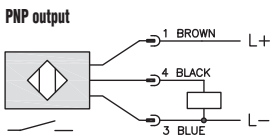
12mm and 18mm stainless steel-DC

- 2 models available
- 12mm or 18mm diameter
- 316L stainless steel housing
- M12 quick-disconnect plug with gold-plated pins (purchase cable separately)
- Complete overload protection
- IP69K rated for food and beverage applications
- M12 or M18, as applicable, mounting hex nuts included
- Lifetime warranty

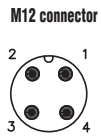
Magnetic DC Prox Food and Beverage Selection Chart								
Part Number	**Price**	**Sensing Range**	**Housing**	**Output State**	**Logic**	**Connection**	**Wiring**	**Dimensions**
12 mm Diameter								
MAFM1-A0-1H	$44.50	0 to 60 mm (0 to 2.362 in)	Shielded	N.O.	PNP	M12 (12mm) connector	Diagram 1	Figure 1
18 mm Diameter								
MAFK1-A0-1H	$49.50	0 to 70 mm (0 to 2.756 in)	Shielded	N.O.	PNP	M12 (12mm) connector	Diagram 1	Figure 2

Wiring diagram

Diagram 1



Connector



NOTE: CLASS 2 POWER SUPPLY REQUIRED

Magnet

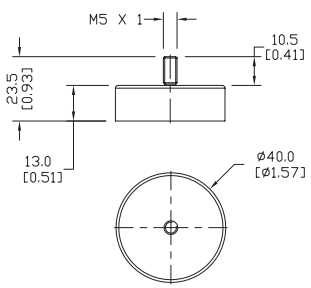
- Damping magnet for use with MAFM1 and MAFK1 series sensors
- Barium ferrite with stainless steel coating

Damping Magnet	
AW-MAG	$35.50

AW-MAG Damping Magnet Specifications	
Ambient Temperature	-13 to 266°F (-25 to 130°C)
Housing Materials	Barium ferrite, stainless steel coating (1.4571/316Ti)
Approvals	RoHS
Weight	82 g (2.89 oz)

Dimensions

mm [inches]



MAFM and MAFK Series IP69K-rated Magnetic Proximity Sensors

Magnetic Series Specifications		
Series	***MAFM***	***MAFK***
Mounting Type	Shielded	
Nominal Sensing Distance	0 to 60 mm (0 to 2.362 in)	0 to 70 mm (0 to 2.756 in)
Operating Distance	N/A	
Material Correction Factors	N/A	
Output Type	PNP, N.O. only	
Operating Voltage	10 to 30 VDC	
No-load Supply Current	<10 mA	
Operating (Load) Current	200mA	
Off-state (Leakage) Current	N/A	
Voltage Drop	<2.5 V	
Switching Frequency	5000 Hz VDC	
Differential Travel *(% of Nominal Distance)*	1 to 10%	
Repeat Accuracy	10%	
Ripple	N/A	
Time Delay Before Availability (tv)	1 s	
Reverse Polarity Protection	yes	
Short-Circuit Protection	yes (non latching)	
Operating Temperature	0° to 100°C (32° to 212°F)	
Protection Degree (DIN 40050)	IEC IP68/IP69K, II	
Indication/Switch Status	Normally Open output energized - Yellow	
Housing Material	316L stainless steel	
Sensing Face Material	PEEK (Polyether Ether Ketone)	
Shock/Vibration	See Terminology Section	
Tightening Torque	20 Nm (14.75 lb-ft)	50 Nm (37 lb-ft)
Weight	33 g (1.16 oz)	54 g (1.90 oz)
Connection	M12 connector	
Agency Approvals	UL E32881, CE, ECOLAB, RoHS	

Dimensions

mm [inches]

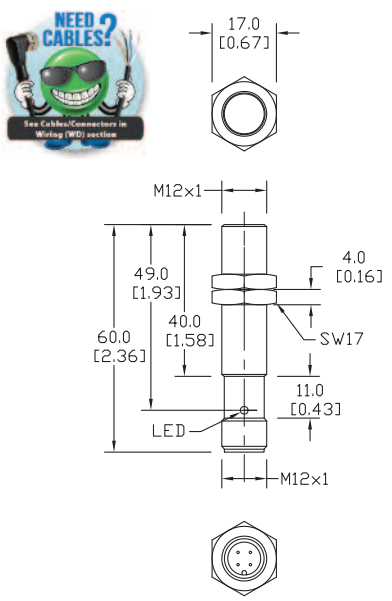
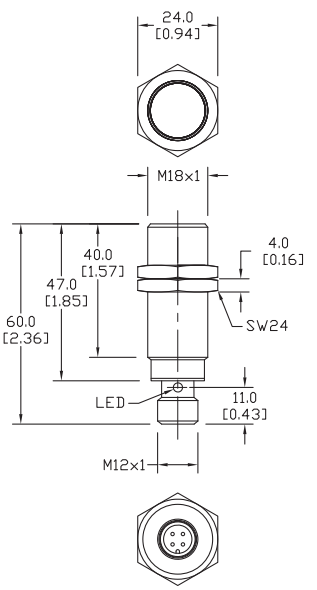


Figure 2



Accessories: Adapter, Mounting Brackets

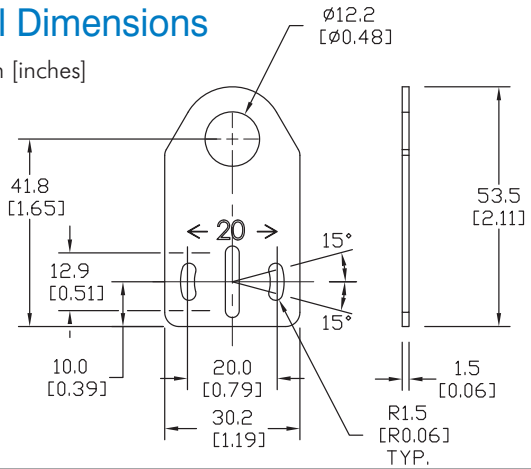
ST12A axial bracket

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.

Brackets		
Part Number	**Price**	**Description**
ST12A	$2.00	Zinc plated iron axial bracket for 12 mm sensors, 1/pk
ST12A7W	$6.00	316L stainless steel axial bracket for 12 mm sensors, 1/pk

All Dimensions

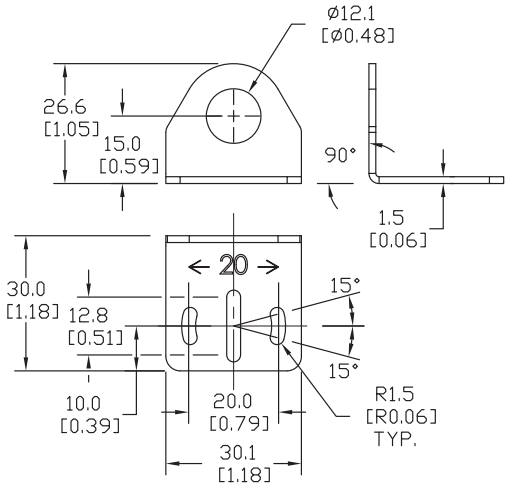
mm [inches]



ST12C right-angle bracket

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.

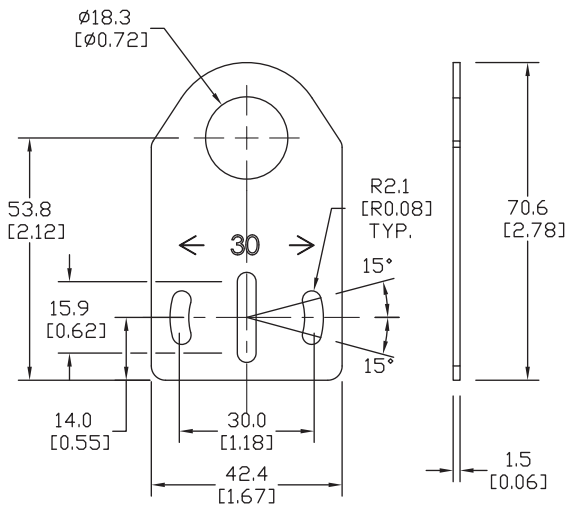
Brackets		
Part Number	**Price**	**Description**
ST12C	$2.00	Zinc plated iron right angle bracket for 12 mm sensors, 1/pk
ST12C7W	$6.00	316L stainless steel right angle bracket for 12 mm sensors, 1/pk



ST18A axial bracket

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.

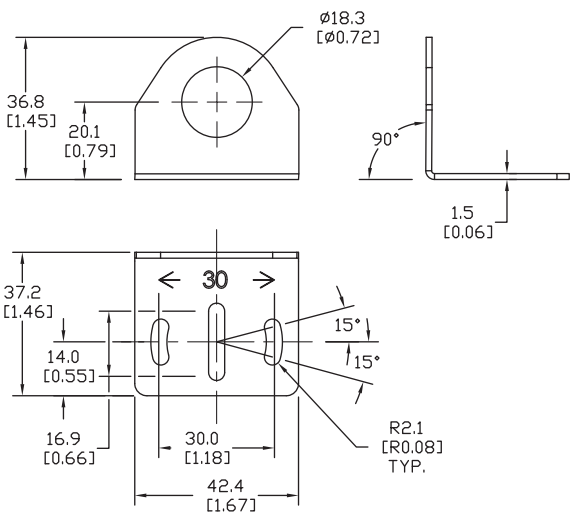
Brackets		
Part Number	**Price**	**Description**
ST18A	$1.25	Zinc plated iron axial bracket for 18 mm sensors, 1/pk
ST18A7W	$6.00	316L stainless steel axial bracket for 18 mm sensors, 1/pk



ST18C right-angle bracket

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.

Brackets		
Part Number	**Price**	**Description**
ST18C	$1.25	Zinc plated iron right angle bracket for 18 mm sensors, 1/pk
ST18C7W	$6.00	316L stainless steel right angle bracket for 18 mm sensors, 1/pk



Accessories: Mounting Brackets

ST30A axial bracket

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.

Brackets		
Part Number	**Price**	**Description**
ST30A	$2.25	Zinc plated iron axial bracket for 30 mm sensors, 1/pk

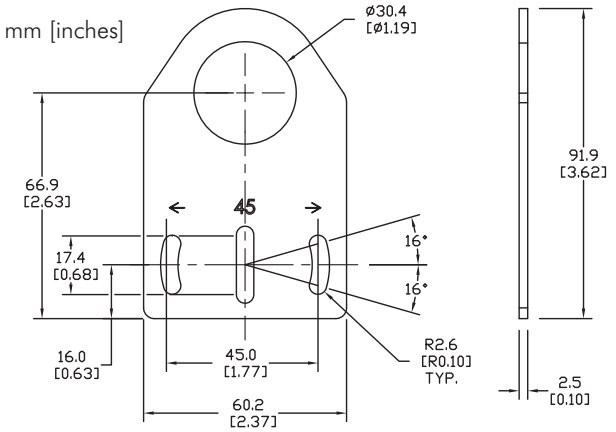
ST30C right-angle bracket

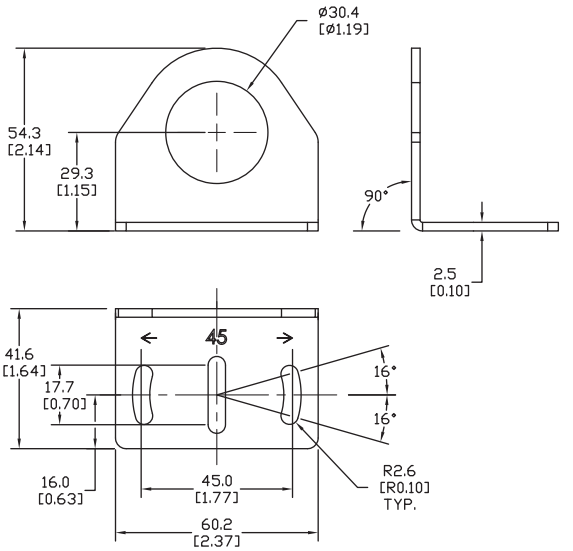
Angular mounting bracket for M30 (30 mm) sensors. Has two mounting holes (use 5 mm screws) and allows the rotation of an optical axis for axial sensors. Hexagonal nuts not included.

Brackets		
Part Number	**Price**	**Description**
ST30C	$2.25	Zinc plated iron right angle bracket for 30 mm sensors, 1/pk

All Dimensions

mm [inches]





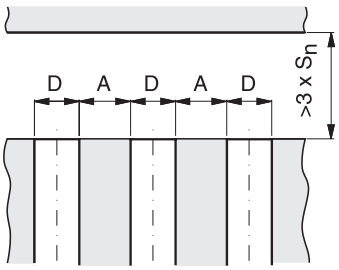
Proximity Sensor Terminology

The following descriptions refer to the European standard EN 60947-5-2. of 2007.

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.

Protection degree

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 (Hysteresis)

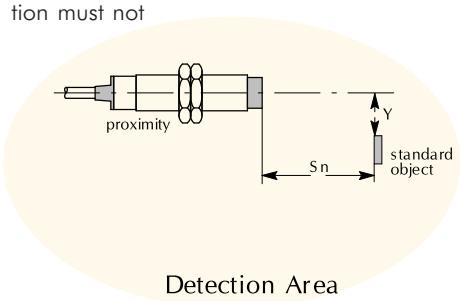
The differential travel is given as a percentage of the nominal sensing distance (Sn) and is the maximum difference between the switching distances. The differential is intentionally introduced to guarantee the stability of the output state in case the target is positioned near the switching points.

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 sensing range 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

Indication/switch status

Proximity switches may incorporate one or more color indicators. The meaning of the colors vary by part. Please see part specifications for meaning.

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 **(Sn)** 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	(Sn) x 1.00
Brass	(Sn) x 0.64
Aluminum	(Sn) x 0.55
Copper	(Sn) x 0.51
Stainless Steel (V2A)	(Sn) x 0.85

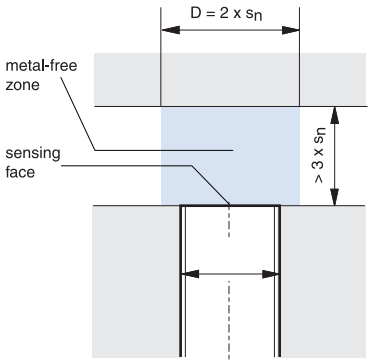
Material Influence: Table 2	
Target Material	***Operating Distance***
Steel Type FE 360	(Sn) x 1.00
Brass	(Sn) x 0.44
Aluminum	(Sn) x 0.36
Copper	(Sn) x 0.32
Stainless Steel (V2A)	(Sn) x 0.69

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

Mounting type

Shielded (embeddable) on flush proximity switches

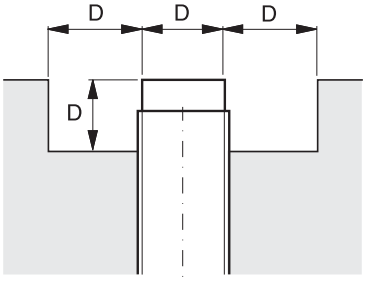
These proximity switches may be flush mounted regardless of the metal being used. For reliable operation, it is necessary to observe the minimum distances from adjacent metal targets.



Sn = Nominal sensing distance (see Rated operating distance)

Unshielded (non-embeddable) on non-flush 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

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 (assured sensing range) (Sa)

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.

Polarity reversing protection

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

Proximity Sensor Terminology

Protection against inductive loads

Unless otherwise specified, DC sensors are protected against inductive over-voltage 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)

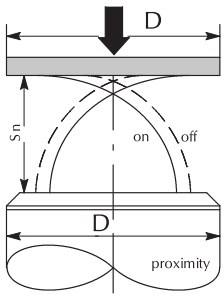
Unless specified differently, all of the sensors with a supply voltage of up to 50 VAC and 75 VDC are tested at 500 VAC.

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.**

Nominal sensing distance — (Rated operating 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.



Nominal Sensing 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 Sn.

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% Ub is desirable.

Shocks

In accordance with IEC 60068-2-27

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.

No load supply (current consumption)

Amount of current consumed by sensor when output is not energized.

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.

Operating voltage (Ub)

Supply voltage range for safe and correct sensor operation.

Operating (load) Current

Maximum current the sensor output is capable of switching.

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 60868-2-6

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.

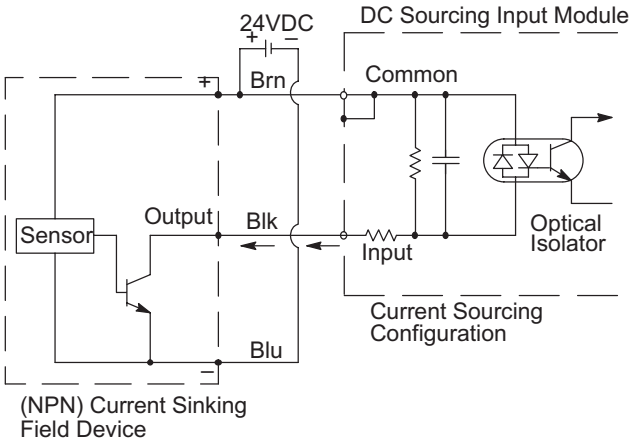
Time delay before availability (tv)

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.

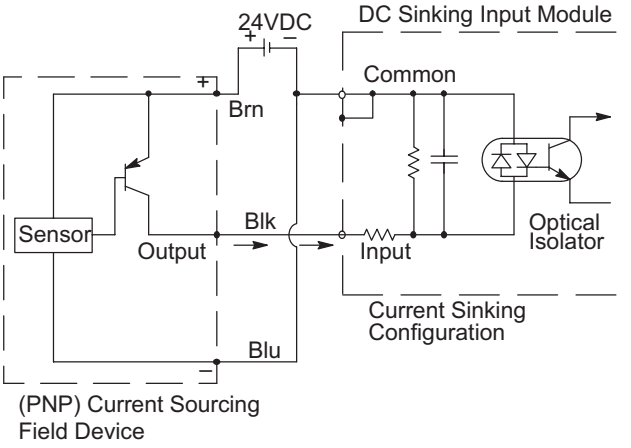
During the reset the output circuit is in OFF-state; false signal may be present but the duration shall not exceed 2 ms. If not specified otherwise, the reset duration doesn't exceed 300 ms.

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, VM1, VFT and VFK series that operate on 20-253VAC.

Can my sensor be installed in a washdown area?

Yes. Although most AutomationDirect sensors carry an IP67 protective rating which is suitable for submersion, we do offer units designed for harsh high-pressure cleaning environments. These units include the PFM, PFK, PFT, VFK and VFT series.

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.

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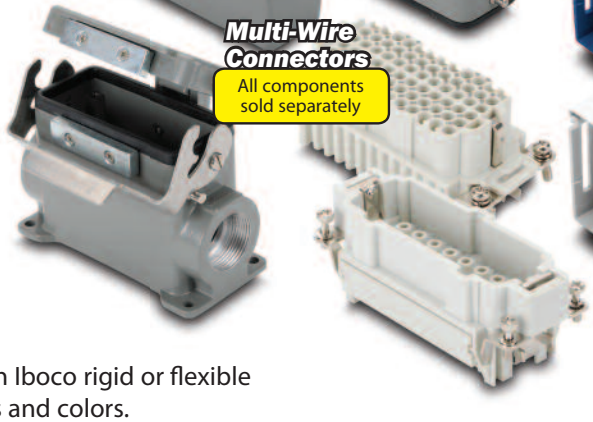
- **UL and CSA approved, RoHS compliant**

Multi-Conductor Control Cable
100-foot reels start at: **$50.00** *(V40166-100)*



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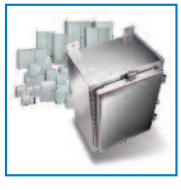
Enclosures



Wiring Devices

Terminal Blocks

Tools

Cat5e Cables

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