Photoelectric Sensor Technologies Expand Applications

What type of photoelectric sensor is best for me?

There are many different styles of photoelectric sensors, but really only four basic technologies: through-beam, reflective, diffuse, and background suppression. The chart describes some advantages and disadvantages of each technology.

Type	Advantages	Disadvantages
Through-beam	· Most accurate · Longest sensing range · Very reliable	· Must install at two points on system: emitter and receiver · Costly - must purchase both emitter and receiver
Reflective	· Cost less than through-beam · Only slightly less accurate than through-beam · Sensing range better than diffuse · Very reliable	· Must install at two points on system: sensor and reflector · Slightly more costly than diffuse · Sensing range less than through-beam
Diffuse	· Only install at one point · Cost less than through-beam or reflective	· Less accurate than through-beam or reflective · More setup time involved
Background Suppression	· Effective with reflective backgrounds	· Cost more than diffuse, reflective or through-beam · Most setup time required

How do these sensors benefit me?

Everybody wants to know how a particular product will help them. With AUTOMATIONDIRECT photoelectric sensors, you benefit from:

- Approximately 2-to-1 list pricingcompared to the competition. Thisallows OEM-like pricing on single item purchases.
- Rectangular formats that provide mounting holes directly into the sensor. This eliminates the need for mounting plates and allows for easier installation.
- Quick-disconnect cable versions available for all sensors. The Q/D sensors make for fast and easy replacement. Troubleshooting is also much faster with Q/D 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, thus speeding up the replacement process with much less room for error.
- Electrical protection against short circuit, reverse polarity, and transient noise. Even if the sensor is initially wired wrong, or wired into a noisy environment, the sensor will still operate properly.
- 30-day, money-back guarantee. Nothing else needs to be said. If you are not satisfied with the performance of your sensor, just send it back.

The Most Popular Photoelectric Sensor Styles

The most popular and widely-accepted photoelectric sensor mounting shape in the U.S. market is the 18 mm round format. From a standard through-beam (plastic) sensor to a unique right-angle, background suppression diffuse sensor, AUTOMATIONDIRECT has a model to fit your needs.

- Metal or plastic housing
- Diffuse, polarized retroreflective, through-beam, and background suppression models
- Straight or unique right-angle optics
- 3-wire and 4-wire outputs
- NPN and PNP models
- Normally open and normally closed (light or dark operation) models

Also available are 5, 8 and 12 mm diameter models in various styles.

A photoelectric sensor must suit your application, and must also be easy to install, simple to set up, and operate flawlessly. AUTOMATIONDIRECT understands these needs and offers products that solve your application problems:

- **Unique right-angle mounting sensors.** Have you ever tried to install a right-angle sensor? Have you tried getting the mounting nut over the right-angle head of the sensor? It's not easy! We offer a right-angle sensor that a nut will fit directly over. Our competitors don't offer a product that's so easy to use. This technology will save you time and headaches during installation.
- **IP67 (washdown) rating**. All of our sensors are watertight and built to last. Since you won't have to swap sensors out constantly, you will ultimately save money.
- **Metal or plastic sensors.** Plastic sensors are great for corrosion resistance, while metal sensors are rugged and can absorb more punishment. We offer both.
- **Alignment LEDs.** With onboard indicators, our sensors simplify installation to save you time and money.

We are so confident of our sensors' quality, we offer a 30-day money-back guarantee if you don't like them.

Rectangular styles for unique mounting needs

- The CX series offers a built-in LED that indicates when dirt is blocking the light emission. This feature ensures reliable operation and eliminates constant cleaning of the sensor. The CX series is also completely sealed with potting and has an IP65, watertight rating.
- The FG series offers universal voltages with a 3A relay output
- All sensors contain adjustment potentiometers and double-alignment LEDs. This simplifies installation and setup time and allows for customization to your specific application.

Quick-disconnect cables and accessories

Quick-disconnect cables, reflectors, mounting brackets and other accessories available include:

- Micro (12 mm) and pico (8 mm) Q/D sizes in 2 m, 5 m, and 7 m lengths
- Extension cables for quick-disconnect sensors
- Round and rectangular reflectors in many sizes
- Photoelectric shutters that focus your photoelectric sensor on small targets
- Right-angle adapters for special mounting applications

Photoelectric Sensor Lineup

5 mm, C5 series
- Power: 10-30 VDC
- Embedded cable or M8 Q/D
- 3 wire, NPN/PNP output
- Fixed sensitivity

8 mm, HE series thru-beam
- Power: 10-30 VDC
- Embedded cable or M8 Q/D
- 3 wire, NPN or PNP output,
- Fixed sensitivity

12 mm, DM series
- Power: 10-30 VDC
- Embedded cable or M12 Q/D
- 4 wire, NPN/PNP output, LO/DO selectable
- Teach auto calibration

18 mm non-metal, SS/MS/MV series
- Power: 10-30 VDC or 20-250VAC
- Embedded cable or M12 Q/D
- 4 wire, NPN/PNP output, LO/DO selectable, triac output
- Fixed sensitivity

18 mm metal, C18 series
- Power: 10-30 VDC
- Embedded cable or M12 Q/D
- 3 wire, NPN/PNP output
- Adjustable sensitivity
- Axial or right-angle optics

18 mm non-metal, FA series
- Power: 10-30 VDC
- Embedded cable or M12 Q/D
- 4 wire, NPN/PNP output, LO/DO selectable
- Laser or LED, fixed sensitivity

AC/DC rectangular, FG series
- Universal voltage, 12-240 VAC/VDC
- Embedded cable
- 3A SPDT relay output
- Adjustable sensitivity

Mini DC Rectangular, FE Series
- Power: 10-30 VDC
- Embedded cable or M8 Q/D
- 3 wire, NPN/PNP output, LO/DO selectable switch
- Adjustable sensitivity

DC rectangular, CX series
- Embedded cable or M8 Q/D
- 3 wire, NPN/PNP output
- Adjustable sensitivity

DC rectangular, QX series
- Power: 10-30 VDC
- Embedded cable or M12 Q/D
- 4 wire, NPN/PNP output,
- Fixed sensitivity

DIN rail fiber amplifiers, DFT and DFP series
- Power: 10-30 VDC
- Embedded cable or M8 Q/D
- 3 wire, NPN/PNP output, LO/DO selectable via user interface

Cutler-Hammer Enhanced 50 Series
- Drop-in replacement for A-B 9000 series
- Diffuse, retroreflective, through-beam and clear object detection

18 mm fiber amplifier, SSF series
- Power: 10-30 VDC
- Embedded cable or M12 Q/D
- 4 wire, NPN/PNP output, LO/DO selectable
- Teach auto calibration

Cuttable fibers, CF series
- 2.2 mm ∅ Diameter
- Length 2 m, field cuttable
- Use with DFP/DFT/SSF series

Light screens, BX series
- Power: 12-24 VDC
- M12 Q/D
- 4 wire, NPN/PNP output, NO/NC selectable
- Screen measures 2 m x 70 mm
- 12 light beams, 5 mm resolution

Photoelectric Sensors Selection Guide

Specification	FA Series LED DC	FA Series Laser DC	SS Series DC	MS Series DC
Description	18mm plastic, DC	18mm plastic, DC	18mm plastic, DC	18mm plastic with background suppression, DC
Sensing Distances	Diffuse models: 1m Reflective models: 3m Through-beam: 20m	Diffuse models: 300mm Reflective models: 20m Through-beam: 50m	Diffuse models: 100mm, 200mm, 400mm Reflective models: 2m Through-beam models: 8m	Standard distance models: 50mm Extended distance models: 100mm
Output State	Complementary N.O / N.C.	Complementary N.O / N.C.	N.O. / N.C. selectable	N.O. / N.C. selectable
Logic Output	NPN / PNP	NPN / PNP	NPN / PNP	NPN / PNP selectable
Connection Type	Axial cable / M12 connector	Axial cable / M12 connector	Axial cable / M12 connector	Axial cable / M12 connector
Supply Voltage	10-30VDC	10-30VDC	10-30VDC	10-30VDC
Switching Frequency	250Hz	Diffuse and reflective models: 800Hz Through-beam models: 1kHz	Diffuse and reflective models: 250Hz Though-beam models 25Hz	80Hz
Rating	IEC IP67	IEC IP67	IEC IP67	IEC IP67
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Specification	FARS Series DC	MQ Series AC	MV Series AC	C5 Series DC	HE/HER Series DC
Description	18 mm diffuse with background suppression	18 mm diffuse with background suppression, 90° radial optic	18mm plastic, AC	5mm stainless steel, DC	8 mm Thru-Beam
Sensing Distances	30 to 130 mm	Standard distance models: 50mm Extended distance models: 100mm	Diffuse: 100mm, 200mm, 400mm Reflective: 3m Through-beam: 16m	Diffuse models: 50mm Through-beam models: 250mm	1000 mm / Ex. gain = 2
Output State	N.O./N.C. background suppression Light-on/Dark-on selectable Q/Qnot	N.O./ N.C. background suppression	N.O./ receiver dependent	N.O. / receiver dependent	N.O./ N.C.
Logic Output	NPN/PNP	Triac	Triac	NPN / PNP/ N.O. only	PNP / NPN
Connection Type	Axial cable M12 quick disconnect	M12 quick disconnect	Axial cable M12 connector	Axial cable M8 connector	Axial cable M8 quick disconnect
Supply Voltage	10-30VDC	20-253VAC	20-253VAC	10-30VDC	10-30VDC
Switching Frequency	1 kHz	25Hz	25Hz	250Hz	10kHz
Rating	IEC IP67	IEC IP67	IEC IP67	IEC IP67	IEC IP67
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Photoelectric Sensors Selection Guide

Specification	DM Series DC	C18 Series DC	FE Series DC	CX Series DC	QX Series DC
Description	12mm nickel-plated brass with Teach operating distance function, DC	18mm nickel-plated brass, DC	Mini-rectangular plastic, DC	Mini-rectangular plastic, DC	Rectangular plastic, DC
Sensing Distances	Diffuse models: 100mm, 300mm Reflective models: 2m Through-beam: 4m	Diffuse models: up to 600mm Diffuse models w/ background suppression: 10 to 120mm Reflective models: 2m Through-beam models: Up to 6m	Diffuse models: 800mm Reflective models: 4m Through-beam: 12m	Diffuse models: up to 600mm Diffuse models w/ background suppression: 15 to 150mm Reflective models: Up to 2m Through-beam models: Up to 6m	Diffuse models: 300mm Reflective models: 2m Through-beam models: 8m
Output State	Diffuse: N.O./ N.C. selectable Polarized reflective: N.O./ N.C. selectable Through-beam: N.O / N.C./ receiver dependent	N.O.	Light-on/Dark-on selectable	N.O.	N.O./receiver dependent
Logic Output	NPN / PNP	NPN/PNP/receiver dependent	NPN / PNP	NPN / PNP	NPN/PNP selectable/receiver dependent
Connection Type	Axial cable / M12 connector	Axial cable/M12 connector	Axial cable / M8 connector	Axial cable / M8 connector	Axial cable / M12 connector
Supply Voltage	10-30VDC	10-36VDC	10-30VDC	10-36VDC	10.8-30VDC
Switching Frequency	Diffuse and reflective models: 400Hz Though-beam models: 250Hz	Diffuse models:1kHz Diffuse models w/ background suppression: 500Hz Reflective models:1kHz Through-beam models: 1kHz	1kHz	Diffuse models: 1kHz Diffuse models w/ background suppression: 500Hz Reflective models: 1kHz Through-beam models: 1kHz	Diffuse and reflective models: 750Hz (Tr=0.5ms) Through-beam models: 500Hz (Tr=0.75ms)
Rating	IEC IP67	IEC IP67	IEC IP67	IEC IP65	IEC IP65
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Specification	FG Series AC/DC	CH Enhanced 50 Series
Description	Rectangular plastic, AC/DC	Fiberglass-reinforced plastic
Sensing Distances	Diffuse models: 550mm Reflective models: 9m Through-beam: 20m	Through-beam: 500 ft (152 m) Diffuse models: 10 ft. (3 m) Polarized reflex: 16 ft. (4.9 m) Clear /object detector: 45 in (1.2 m)
Output State	N.O./N.C.	Light-on/Dark-on selectable
Logic Output	SPDT 3A relay-	Through-beam:NPN/PNP 250 mA, Solid-state relay 300 mA @ 240 VAC/VDC, SPDT EM relay 3 A @ 120 VAC Diffuse: NPN/PNP 250 mA, Solid-state relay 300 mA @ 240 VAC/VDC, SPDT EM relay 3 A @ 120 VAC Polarized reflex: NPN/PNP 250 mA, Solid-state relay 300 mA @ 240 VAC/VDC, SPDT EM relay 3 A @ 120 VAC Clear object detector: NPN/PNP 250 mA, Solid-state relay 300 mA @ 240 VAC/VDC, SPDT EM relay 3 A @ 120 VAC
Connection Type	Axial cable	Cable or mini/micro connection
Supply Voltage	12-240VDC / 24-240VAC	10 - 40 VDC, 12 - 240 VDC, 24 - 240 VAC
Switching Frequency	33Hz	various
Rating	IEC IP67	IEC IP67
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Photoelectric Sensors Selection Guide

Specification	DFT Series Fiber Amp	DFP Series Fiber Amp	SSF Series Fiber Amp
Description	Compact rectangular plastic fiber optic amplifier with Teach operating distance function, DC	Compact rectangular plastic fiber optic amplifier, DC	18mm plastic fiber optic amplifier, DC
Sensing Distances	See Optical Fiber Tables following the amplifier's specifications	See Optical Fiber Tables following the amplifier's specifications	See Optical Fiber Tables following the amplifier's specifications
Output State	Light-on / Dark-on selectable	Light-on / Dark-on selectable	Light-on / Dark-on selectable
Logic Output	NPN / PNP	NPN / PNP	NPN / PNP
Connection Type	Axial cable / M8 connector	Axial cable / M8 connector	Axial cable / M12 connector
Supply Voltage	10-30VDC	10-30VDC	10-30VDC
Switching Frequency	1.5kHz	1.5kHz	800Hz
Rating	IEC IP64	IEC IP64	IEC IP67
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Specification	CF Series Optical Fibers	BX Series Light Screen
Description	Cuttable diffuse reflection and through-beam fiber optic cables (2.2mm diameter)	Rectangular plastic high resolution area sensor, DC
Sensing Distances	Amplifier dependent. Refer to fiber optic tables for sensing distances.	Through-beam: 2m with 70mm height area
Output State	N/A	Selectable N.O / N.C.
Logic Output	N/A	NPN / PNP
Connection Type	N/A	M12 connector
Supply Voltage	N/A	10-30VDC
Switching Frequency	N/A	-
Rating	IEC IP67	IEC IP67
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Custom Designed Sensors

AUTOMATIONDIRECT and Microdetectors (MD) have been partners in the sensor business for over 7 years. MD is located in Italy and has been in business for over 30 years. With high quality processes, including UL/CE design procedures, AUTOMATIONDIRECT and MD supply the North American market with industrial quality sensors at a very reasonable price. Based on this engineering quality and engineering design capabilities, MD and AUTOMATIONDIRECT are offering the opportunity for customized products for your special application needs. The MD Custom Design Service can add value to your products by implementing sensing technology ranging from optoelectronics to RFID.

Call 770-844-4200 and ask about custom-designed sensors.

Micro Detectors

MD has co-designed the following applications:

- Linear optical encoder
- Through-beam sensor for lift applications
- Tobacco sensor
- Moisture sensor for ceramic industry
- Bar code reader for domestic and household appliances field