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

Rectangular sensors are available as AC or DC-powered models, in varying sizes and sensing styles, including diffuse, retroreflective, and through-beam.

NEW!

GX Series

from $39.00

GX Series DC photoelectric sensors

- Power: 10 - 30 VDC
- 18 mm diameter threaded lens with rectangular base
- 12 models available
- Fixed sensing ranges
- NPN or PNP, Light-on, Dark-on output models
- M12 quick-disconnect

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
- LED sensor cables for signal confirmation
- 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

from $68.00

5 mm, C5 series

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

from $80.00 pair

8 mm, HE series thru-beam

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

from $65.00

18 mm IP69K, FF & FFRS series

- Power: 10-30 VDC
- M12 Q/D
- Diffuse, Polarized reflective, Through beam, Retro-reflective
- Suitable for harsh environments

from $21.50

18 mm non-metal, SS/MS/MV,MQ, FB and FA series

- Power: 10-30 VDC or 20-250VAC
- Embedded cable or M12 Q/D
- 4-wire, NPN or PNP output, LO/DO selectable
- Fixed sensitivity

from $36.75

18 mm metal, C18 series

- Power: 10-30 VDC
- Embedded cable or M12 Q/D
- 3 or 4-wire, NPN or PNP output
- Adjustable sensitivity
- Axial or right-angle optics

from $46.50

12 mm, DM series

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

from $39.00

M18 DC rectangular, GX Series

- Power: 10 - 30 VDC
- 18 mm diameter threaded lens with rectangular base
- 12 models available
- Fixed sensing ranges
- NPN or PNP, Light-on, Dark-on output models
- M12 quick-disconnect

from $91.75

AC/DC rectangular, FG series

- Universal voltage, 12-240 VDC or 24-240 VAC
- Embedded cable
- 3A SPDT relay output
- Adjustable sensitivity

from $81.25

Mini DC rectangular, FE Series

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

from $43.75

DC rectangular, CX series

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

from $53.00

DC rectangular, QX series

- Power: 10-30 VDC
- Embedded cable or M12 Q/D
- 4-wire, NPN/PNP selectable output
- Adjustable sensitivity
- Axial or right-angle optics

from $74.75

DIN rail fiber amplifiers, DFT, DFP series and cuttable fibers

- Power: 10-30 VDC
- Embedded cable or M8 Q/D
- 4-wire, NPN or PNP output, LO/DO selectable

from $53.50

Cutler-Hammer Enhanced 50 Series

- Drop-in replacement for AB 9000 series
- Diffuse, retroreflective, through-beam and clear object detection

from $45.25

18 mm fiber amplifier, SSF series

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

from $164.75

Light screens, BX series

- Power: 12-24 VDC
- M12 Q/D
- 4-wire, NPN or 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	FB Series DC	SS Series DC
Description	18mm plastic, DC	18mm plastic, DC	18mm plastic, DC	18mm plastic, DC
Sensing Distances	Diffuse models: 1m Reflective models: 3m Through-beam: 20m	Diffuse models: 300mm Reflective models: 20m Through-beam: 50m	Diffuse models: 400mm Reflective models: 2.5m Through-beam models: 8m	Diffuse models: 100mm, 200mm, 400mm Reflective models: 2m Through-beam models: 8m
Output State	Complementary N.O. / N.C.	Complementary N.O. / N.C.	Light-on, Dark-on	N.O. / N.C. selectable
Logic Output	NPN / PNP	NPN / PNP	NPN / PNP	NPN / PNP
Connection Type	Axial cable / M12 connector	Axial cable / M12 connector	M12 connector	Axial cable / M12 connector
Supply Voltage	10 to 30 VDC	10 to 30 VDC	10 to 30 VDC	10 to 30 VDC
Switching Frequency	250Hz	Diffuse and reflective models: 800Hz Through-beam models: 1kHz	1kHz	Diffuse and reflective models: 250Hz Though-beam models 25Hz
Rating	IEC IP67	IEC IP67	Diffuse: IEC IP65 Retro-reflective and Thru-beam: IEC IP67	IEC IP67

Specification	MS Series DC	FARS Series DC	FF Series	FFRS Series	
Description	18mm plastic with background suppression, DC	18mm diffuse with background suppression	IP69K sensors, 18 mm stainless steel, DC	IP69K sensors, 18mm stainless steel diffuse with background suppression, DC	
Sensing Distances	Diffuse Reflection Standard distance models: . . 50mm Extended distance models: . . 100mm	30 to 130 mm	Diffuse: 100m, 400m, 800mm Polarized reflective: 4m Through-beam: 20m Retro-reflective: 1m	Standard: 30 to 130mm Shiny object: 60 to 100mm	
Output State	N.O. / N.C. selectable	N.O. / N.C. background suppression Light-on/Dark-on selectable Q/Qnot	N.O. / N.C. Complementary; Light-on/Dark-on selectable	N.O. / N.C. Complementary; Light-on/Dark-on selectable	
Logic Output	NPN / PNP selectable	NPN/PNP	NPN / PNP	NPN / PNP	
Connection Type	Axial cable M12 connector	Axial cable M12 connector	M12 connector	M12 connector	
Supply Voltage	10 to 30 VDC	10 to 30 VDC	10 to 30 VDC	10 to 30 VDC	
Switching Frequency	80Hz	1kHz	Diffuse, Polarized reflective and Retro-reflective: 500Hz, Through-beam: 250Hz	Standard: 1kHz	Shiny: 400Hz
Rating	IEC IP67	IEC IP67	IEC IP68, IP69K	IEC IP68, IP69K	

Photoelectric Sensors Selection Guide





Specification	MQ Series AC	MV Series AC	C5 Series DC	HE/HER Series DC	DM Series DC
Description	18mm diffuse with background suppression, 90° radial optic	18mm plastic, AC	5mm stainless steel, DC	8mm Thru-Beam	12mm nickel-plated brass with Teach operating distance function, DC
Sensing Distances	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	Diffuse models: 100mm, 300mm Reflective models: 2m Through-beam: 4m
Output State	N.O./ N.C. background suppression	N.O./ receiver dependent	N.O. / receiver dependent	N.O./ N.C.	Diffuse: N.O./ N.C. selectable Polarized reflective: N.O./ N.C. selectable Through-beam: N.O / N.C./ receiver dependent
Logic Output	Triac	Triac	NPN / PNP/ N.O. only	NPN / PNP	NPN / PNP
Connection Type	M12 quick disconnect	Axial cable M12 connector	Axial cable M8 connector	Axial cable M8 quick disconnect	Axial cable / M12 connector
Supply Voltage	20 to 253 VAC	20 to 253 VAC	10 to 30 VDC	10 to 30 VDC	10 to 30 VDC
Switching Frequency	25Hz	25Hz	250Hz	10kHz	Diffuse and reflective models: 400Hz Though-beam models: 250Hz
Rating	IEC IP67	IEC IP67	IEC IP67	IEC IP67	IEC IP67





Specification	C18 Series DC	GX Series DC	FE Series DC	CX Series DC	QX Series DC
Description	18mm nickel-plated brass, DC	18mm rectangular plastic, DC	Mini-rectangular plastic, DC	Mini-rectangular plastic, DC	Rectangular plastic, DC
Sensing Distances	Diffuse models: up to 600mm Diffuse models w/ background suppression: 10 to 120mm Reflective models: Up to 2m Through-beam models: Up to 6m	Diffuse models w/ background suppression: Up to 150mm Reflective models: Up to 4m Through-beam models: Up to 20m	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: 2.5m Through-beam models: 8m
Output State	Diffuse: Light-on / Dark-on selectable Diffuse models with background suppression: Light-on Polarized reflective: Dark-on Through-beam: Light-on / Dark-on / receiver dependent	Diffuse models w/ background suppression: Light-on Polarized reflective: Light-on / Dark-on Through-beam: Light-on / Dark-on / receiver dependent	Light-on/Dark-on selectable	N.O.	N.O./receiver dependent
Logic Output	NPN / PNP/ receiver dependent	NPN / PNP/ receiver dependent	NPN / PNP	NPN / PNP	NPN / PNP selectable / receiver dependent
Connection Type	Axial cable / M12 connector	M12 connector	Axial cable / M8 connector	Axial cable / M8 connector	Axial cable / M12 connector
Supply Voltage	10 to 36 VDC	10 to 30 VDC	10 to 30 VDC	10 to 36 VDC	10.8 to 30VDC
Switching Frequency	Diffuse models: 1kHz Diffuse models w/ background suppression: 500Hz Reflective models:1kHz Through-beam models: 1kHz	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

Photoelectric Sensors Selection Guide

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 to 240 VDC / 24 to 240 VAC	10 to 40 VDC, 12 to 240 VDC, 24 to 240 VAC
Switching Frequency	33Hz	various
Rating	IEC IP67	IEC IP67

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 to 30 VDC	10 to 30 VDC	10 to 30 VDC
Switching Frequency	1.5kHz	1.5kHz	800Hz
Rating	IEC IP64	IEC IP64	IEC IP67

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	12 to 24 VDC
Switching Frequency	N/A	N/A
Rating	IEC IP67	IEC IP67