

Series 10,000

Teachable



Description

The Series 10,000 photoelectric sensor combines practical, proven design and performance of the Series 9000 family with advanced microprocessor design. The result is the most intelligent photoelectric sensor available on the market today.

To speed up installation time, the Series 10,000 incorporates a self-teach design. At the push of a button, the sensor will “learn” the background, followed by the target to be sensed. The sensor will then configure itself for optimum application performance.

The Series 10,000 complements this self-teach design by including an automatic sensitivity adjustment called Control Watch™. This feature will automatically adjust the sensitivity levels to accommodate for changing environmental conditions such as dust buildup, splashing liquids and mist. The accurate display of sensor margin values is made possible with the MarginView™ feature. When the margin drops to an unacceptable level, a visual indication, Red LED, and an electrical output, diagnostic, are activated.

For those users who prefer to manually configure the sensor, an LCD display and pushbuttons are provided making it easy to set any other desired parameters required for the application. These include response time, pulse rates, hysteresis, ON/OFF and ONE-SHOT time delays, and light/dark operate modes. Once these parameters are configured they may be stored and retrieved for use at a later time. The Series 10,000 is also capable of optically transferring this configuration data to other Series 10,000 sensors.

An autojitter crosstalk avoidance feature allows up to 16 sensors to be installed in close proximity without crosstalk.

General Specifications

Unit Protection	Overload, short circuit, reverse polarity, false pulse
Supply voltage	10–30V DC
Current Consumption	70mA maximum
Output Type	NPN and PNP
Output Mode	Light/dark operate selectable
Output Rating	250mA @ 30V DC
Response Time	250µs to 4ms selectable
Housing Material	Valox®
Lens Material	Acrylic
LED Indicators	See User Interface on page 1–138
Connection Types	5-pin micro QD, 5-pin mini QD, 2m PVC 22AWG cable
Supplied Accessories	#129–130 mounting kit
Optional Accessories	Cordsets, mounting brackets—see page 7–1
Operating Environment	NEMA 3, 4X, 6P, 12, 13; IP67 (IEC 529) 1200psi washdown
Vibration	10–55Hz, 1mm amplitude, Meets or exceeds IEC 60947–5–2
Shock	30g with 1ms pulse duration, Meets or exceeds IEC 60947–5–2
Operating Temperature	–25°C to +60°C (–13°F to +140°F)
Relative Humidity	5...95%
Approvals	UL listed, CSA certified, and CE marked for all applicable directives

Features

- Self-teach operation
- Automatic sensitivity control
- LCD display for easy status indication
- Selectable hysteresis, pulse rates
- Selectable response times
- Selectable ON/OFF, ONE-SHOT timer
- Automatic crosstalk immunity
- Optical program transfer
- Both NPN and PNP outputs

General Information

- Wiring Diagrams page 1–138
- Dimensions page 1–138

Sensing Modes

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- Polarized Retroreflective page 1–140
- Standard Diffuse page 1–141
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- Visible Red Plastic Fiber Optic page 1–143
- Green Glass Fiber Optic page 1–144

Accessories

- Quick-Disconnect Cables page 7–1
- Mounting Assemblies page 1–375
- Reflectors, Reflective Tape page 1–386

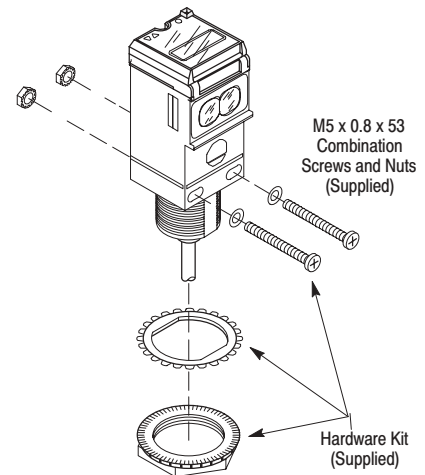
Standard Features

- Backlit LCD^①: Displays true application margin* (0.1 to 96 range) and complete setup information.
- Simple pushbutton user interface.
- ControlWatch™ Adaptive Sensitivity Adjustment System^①: The sensor will automatically and continuously raise or lower its sensitivity in response to changing sensing conditions. ControlWatch can compensate for gradual build up of dust on lenses or reflectors or changes in target reflectivity. This feature can reduce the need for maintenance or adjustment in many difficult applications.
- MarginView™ Dynamic Margin Display^①: The sensor will display accurate application margin values in very high speed applications. The sensor will alternately display the “target present” and “target absent” margins at a slower rate to allow for easy examination of application quality.
- Selectable high or low hysteresis.
- Selectable Light Operate or Dark Operate.
- Selectable sensing distance vs. response time: Four selections and choice of 2 or 4 pulse detection allows selections from long to short range sensing and response times from 4ms to 250µs.
- Automatic autojitter crosstalk avoidance. Allows up to 16 sensors to be applied in close proximity without crosstalk.
- Dual LED indicators: Output (yellow), Instability (red).
- Selectable N.O. or N.C. diagnostic output.
- Fuzzy logic based diagnostic algorithm^①.
- Multi-mode Timing: Digital On-delay and/or Off-delay, one-shot, and delayed one-shot timing can be selected with durations of up to 9.99sec. in 10ms increments. Timing is accurate to ±2ms.
- Point and Learn Sensitivity Adjustment (“Self-Teach”).
- Optical Program Transfer^①: Series 10,000 sensors with this feature can transmit the complete setup information to any other Series 10,000 sensor with the same feature.
- Multiple Stored Programs^①: Up to 3 sets of setup information can be stored and later recalled in Series 10,000 sensors with this feature.

For complete installation and setup information of the Series 10,000 please refer to publication PA-9507.

Supplied Accessories

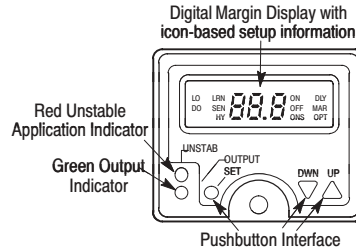
Hardware kit #129-130 (supplied with sensor) contains a plastic mounting nut, lock washer, 2 M5 x 0.8 x 53 screws and nuts.



^① Denotes world-exclusive general-purpose photoelectric sensor feature.

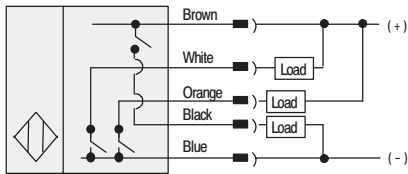
User Interface Panel

Label	Color	State	Status
Unstable	Red	OFF	Margin < 2.5
		ON	Margin > 2.5
Output	Green	OFF	Output not activated
		ON	Output activated

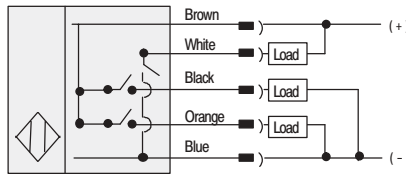


Wiring Diagrams

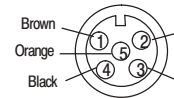
Sensors with NPN Diagnostic Output



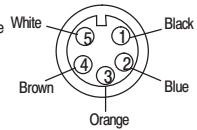
Sensors with PNP Diagnostic Output



Micro QD



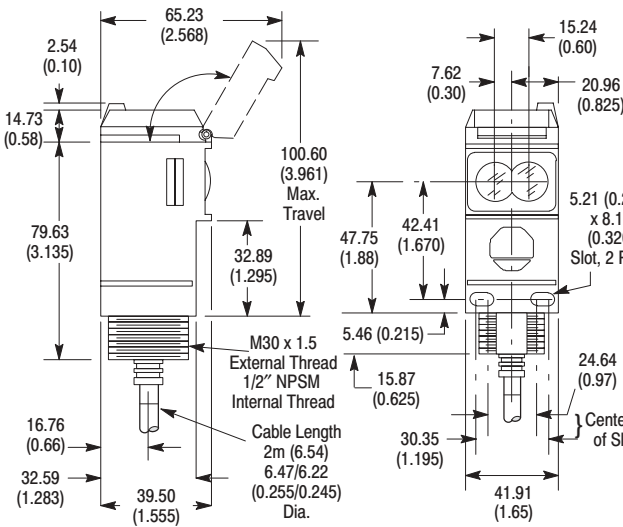
Mini QD



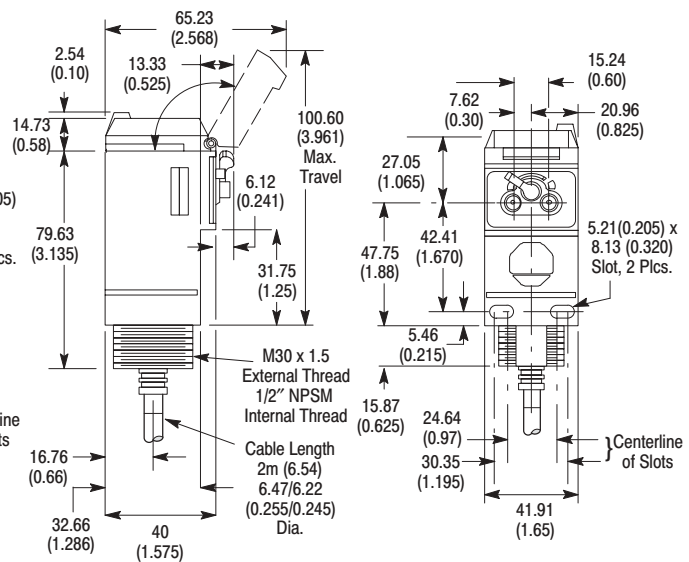
Note: Orange lead is diagnostic output.

Dimensions—mm (inches)

Cable Version



Fiber Optic Version

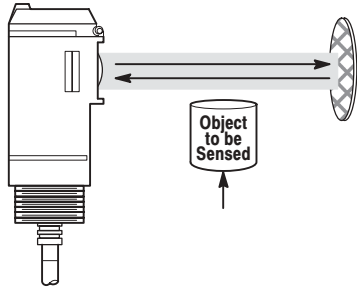


Connector Version



Thread Size

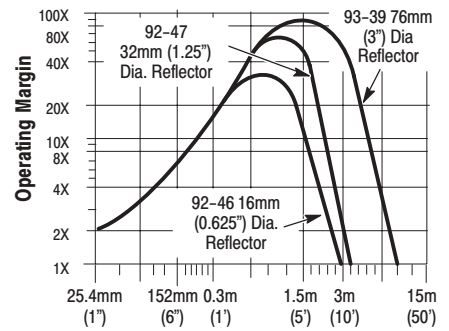
DC Micro	M12 x 1 1 Keyway
Mini	1/2 x 14 NPSM 1 Keyway



QD Cordsets and Accessories

Description	Catalog Number
2m (6.5ft) 5-pin DC Micro QD Cordset	889D-F5AC-2
1.8m (6ft) 5-pin Mini QD Cordset	889N-F5AF-6F
Swivel/Tilt Mounting Bracket	60-2439
76mm (3in) Dia. Reflector	92-39
32mm (1.25in) Dia. Reflector	92-47

Typical Response Curve



Specifications

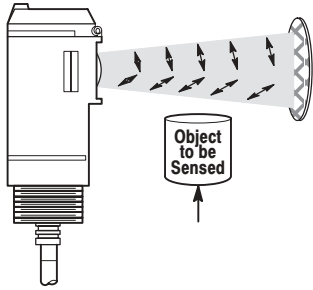
Field of View	1.5°
Emitter LED	Visible red 660nm

Product Selection

Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Diagnostic Output/Rating	Connection Type	Catalog Number
10-30V DC 70mA	51mm (2in) to 9.14m (30ft)	Light/Dark Selectable	NPN & PNP 250mA at 30V DC 250µs to 4ms Selectable	10µA	NPN 20mA at 30V DC	2m 300V cable	42GTGU-10000-02
						5-pin DC micro QD	42GTGU-10000-QD
						5-pin mini QD	42GTGU-10000-Q1
					PNP 20mA at 30V DC	2m 300V cable	42GTGU-10010-02
						5-pin DC micro QD	42GTGU-10010-QD
						5-pin mini QD	42GTGU-10010-Q1

Series 10,000 Polarized Retroreflective

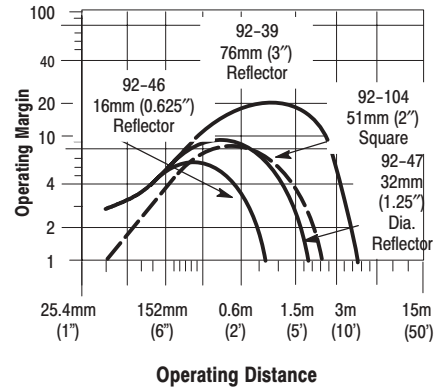
Teachable



QD Cordsets and Accessories

Description	Catalog Number
2m (6.5ft) 5-pin DC Micro QD Cordset	889D-F5AC-2
1.8m (6ft) 5-pin Mini QD Cordset	889N-F5AF-6F
Swivel/Tilt Mounting Bracket	60-2439
76mm (3in) Dia. Reflector	92-39
32mm (1.25in) Dia. Reflector	92-47

Typical Response Curve

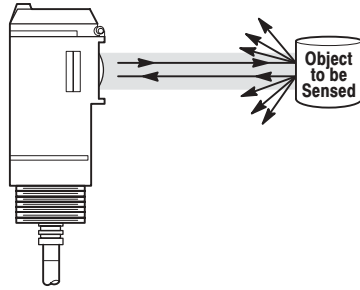


Specifications

Field of View	1.5°
Emitter LED	Visible red 660nm

Product Selection

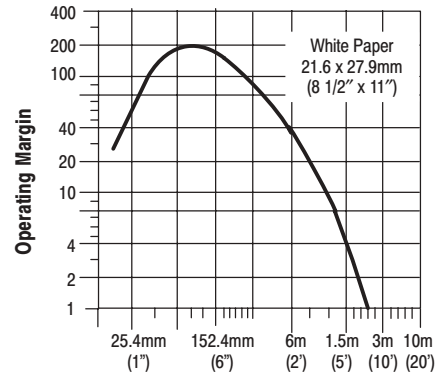
Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Diagnostic Output/Rating	Connection Type	Catalog Number
10-30V DC 70mA	51mm (2in) to 4.6m (15ft)	Light/Dark Selectable	NPN & PNP 250mA at 30V DC 250µs to 4ms Selectable	10µA	NPN 20mA at 30V DC	2m 300V cable	42GTGU-10200-02
						5-pin DC micro QD	42GTGU-10200-QD
						5-pin mini QD	42GTGU-10200-Q1
					PNP 20mA at 30V DC	2m 300V cable	42GTGU-10210-02
						5-pin DC micro QD	42GTGU-10210-QD
						5-pin mini QD	42GTGU-10210-Q1



QD Cordsets and Accessories

Description	Catalog Number
2m (6.5ft) 5-pin DC Micro QD Cordset	889D-F5AC-2
1.8m (6ft) 5-pin Mini QD Cordset	889N-F5AF-6F
Swivel/Tilt Mounting Bracket	60-2439

Typical Response Curve



Specifications

Field of View	3.5°
Emitter LED	Infrared 880nm

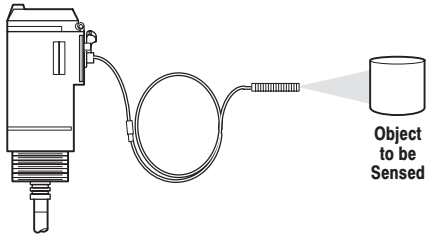
Operating Distance

Product Selection

Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Diagnostic Output/Rating	Connection Type	Catalog Number
10-30V DC 70mA	51mm (2in) to 2.7m (8.86ft)	Light/Dark Selectable	NPN & PNP 250mA at 30V DC 250µs to 4ms Selectable	10µA	NPN 20mA at 30V DC	2m 300V cable	42GTGP-10000-02
						5-pin DC micro QD	42GTGP-10000-QD
						5-pin mini QD	42GTGP-10000-Q1
					PNP 20mA at 30V DC	2m 300V cable	42GTGP-10010-02
						5-pin DC micro QD	42GTGP-10010-QD
						5-pin mini QD	42GTGP-10010-Q1

Series 10,000 Infrared Glass Fiber Optic

Teachable



QD Cordsets and Accessories

Description	Catalog Number
2m (6.5ft) 5-pin DC Micro QD Cordset	889D-F5AC-2
1.8m (6ft) 5-pin Mini QD Cordset	889N-F5AF-6F
Swivel/Tilt Mounting Bracket	60-2439

Specifications

Field of View	Depends on the fiber optic cable
Emitter LED	Infrared 880nm

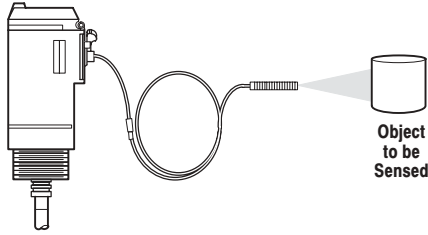
Infrared Glass Fiber Optic Range (Typical)

Fiber/Core Diameter	Sensing Mode	1.0ms	500µs	250µs	100µs
99-39-1/0.69mm (0.027in)	Diffuse	0.3in	0.2in	Not Recommended	
	Retroreflective	0.4in	Not Recommended		
99-30-1/3.18mm (0.125in)	Diffuse	4.0in	2.4in	0.9in	0.9in
	Retroreflective	50.0in	37.0in	21.0in	21.0in
99-50-1/3.18mm (0.125in)	Transmitted Beam	20.0in	13.0in	5.4in	5.4in
99-59-1/0.69mm (0.027in)	Transmitted Beam	1.5in	1.3in	0.45in	0.40in

Product Selection

Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Diagnostic Output/Rating	Connection Type	Catalog Number
10-30V DC 70mA	5.08mm (0.2in) to Depends on Fiber Optic selected	Light/Dark Selectable	NPN & PNP 250mA at 30V DC 250µs to 4ms Selectable	10µA	NPN 20mA at 30V DC	2m 300V cable	42GTGF-10000-02
						5-pin DC micro QD	42GTGF-10000-QD
						5-pin mini QD	42GTGF-10000-QD1
					PNP 20mA at 30V DC	2m 300V cable	42GTGF-10010-02
						5-pin DC micro QD	42GTGF-10010-QD
						5-pin mini QD	42GTGF-10010-QD1

Allen-Bradley Automation



QD Cordsets and Accessories

Description	Catalog Number
2m (6.5ft) 5-pin DC Micro QD Cordset	889D-F5AC-2
1.8m (6ft) 5-pin Mini QD Cordset	889N-F5AF-6F
Swivel/Tilt Mounting Bracket	60-2439

Specifications

Field of View	Depends on the fiber optic cable
Emitter LED	Visible red 660nm

Visible Red Fiber Optic Range (Typical)

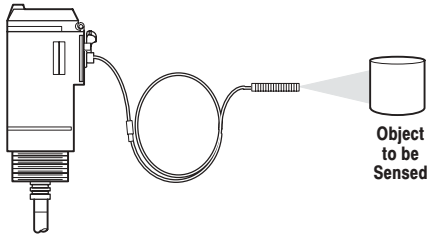
Fiber/Core Diameter	Sensing Mode	1.0ms	500µs	250µs	100µs
99-111/0.5mm (0.02in)	Diffuse	0.45in	0.22in	Not Recommended	
	Retroreflective	12.0in	10.0in		
99-94/1.0mm (0.04in)	Diffuse	1.75in	1.1in	0.45in	0.45in
	Retroreflective	26.0in	18.0in	10.0in	10.0in
99-109/0.5mm (0.02in)	Transmitted Beam	2.6in	1.5in	0.6in	0.45in
99-90/1.0mm (0.04in)	Transmitted Beam	5.0in	3.0in	1.3in	1.3in

Product Selection

Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Diagnostic Output/Rating	Connection Type	Catalog Number
10-30V DC 70mA	5.08mm (0.2in) to Depends on Fiber Optic selected	Light/Dark Selectable	NPN & PNP 250mA at 30V DC 250µs to 4ms Selectable	10µA	NPN 20mA at 30V DC	2m 300V cable	42GTGF-10100-02
						5-pin DC micro QD	42GTGF-10100-QD
						5-pin mini QD	42GTGF-10100-QD1
					PNP 20mA at 30V DC	2m 300V cable	42GTGF-10110-02
						5-pin DC micro QD	42GTGF-10110-QD
						5-pin mini QD	42GTGF-10110-QD1

Series 10,000 Green Glass Fiber Optic

Teachable



QD Cordsets and Accessories

Description	Catalog Number
2m (6.5ft) 5-pin DC Micro QD Cordset	889D-F5AC-2
1.8m (6ft) 5-pin Mini QD Cordset	889N-F5AF-6F
Swivel/Tilt Mounting Bracket	60-2439

Specifications

Field of View	Depends on the fiber optic cable
Emitter LED	Green 570nm

Visible Green Fiber Optic Range (Typical)

Fiber/Core Diameter	Sensing Mode	1.0ms	500µs	250µs	100µs
99-39-1/0.69mm (0.027in)	Diffuse	0.1in	Not Recommended		
	Retroreflective				
99-30-1/3.18mm (0.125in)	Diffuse	0.6in	0.4in	0.1in	0.1in
	Retroreflective	6.5in	5.0in	3.0in	3.0in
99-50-1/3.18mm (0.125in)	Transmitted Beam	2.5in	1.6in	0.7in	0.7in
99-59-1/0.69mm (0.027in)		0.25in	0.2in	Not Recommended	

Product Selection

Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Diagnostic Output/Rating	Connection Type	Catalog Number
10-30V DC 70mA	5.08mm (0.2in) to 8ft (2.7m)	Light/Dark Selectable	NPN & PNP 250mA at 30V DC 250µs to 4ms Selectable	10µA	NPN 20mA at 30V DC	2m 300V cable	42GTGF-10300-02
						5-pin DC micro QD	42GTGF-10300-QD
						5-pin mini QD	42GTGF-10300-QD1
					PNP 20mA at 30V DC	2m 300V cable	42GTGF-10310-02
						5-pin DC micro QD	42GTGF-10310-QD
						5-pin mini QD	42GTGF-10310-QD1

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