

Series 7000

Miniature Rectangular Style



Description

The Series 7000 is a family of general purpose photoelectric sensors intended for light to medium duty industrial applications. They offer a compact package, wide variety of sensing modes, and high speed response time.

The Series 7000 is available in eight sensing modes thereby, ensuring an optimal solution for most applications. Even clear object detection applications can be solved with the use of the ClearSight version.

The Series 7000 are DC operated and provide dual (N.O. and N.C.) NPN or PNP outputs. The 500µs response time makes them ideally suited for high speed applications.

For ease of maintenance, all adjustments are made on a user interface panel located on the top of the sensor. A clutch-protected 5-turn potentiometer is used as the sensor sensitivity adjustment. A single red LED provides a visual indication of the output status.

When economics is the driving factor in the selection of a photoelectric sensor, Rockwell Automation/Allen-Bradley offers the Series 7000 LTD. This family of sensors retains many of the same features as the Series 7000 with the following exceptions: lower response time, reduced environmental protection, limited sensing and operating modes, and limited or no sensitivity adjustment. Refer to page 1–152 for further information on the Series 7000 LTD.

General Specifications

Light Source	See Selection Guide
Unit Protection	Reverse polarity
Supply Voltage	11–28V DC
Current Consumption	46mA maximum
Output Type	Dual (N.O. and N.C.) NPN or PNP
Output Mode	Both light/dark operate
Output Rating	100mA @ 28V DC
Response Time	500µs
Housing Material	Valox®
Lens Material	Acrylic (glass on polarized retroreflective models)
LED Indicators	See User Interface on page 1–143
Connection Types	3m 300V cable, 4-pin DC micro QD on 12in pigtail
Supplied Accessories	None
Optional Accessories	Mounting brackets, reflectors, cordsets
Operating Environment	NEMA 3, 4X, 6P, 12, 13 (IP67)
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	–40°C to +65°C (–40°F to +150°F)
Relative Humidity	5...95%
Approvals	UL listed, CSA approved, and CE marked for all applicable directives

Features

- Compact rectangular package
- Wide selection of sensing modes
- 24VDC operation
- N.O. and N.C. outputs
- Fast response time
- Variety of connection types

General Information

- Wiring Diagrams page 1–143
- Dimensions page 1–144

Sensing Modes

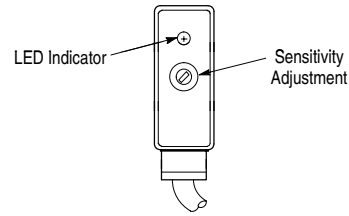
- Retroreflective page 1–145
- Polarized Retroreflective page 1–146
- Standard Diffuse page 1–147
- Wide Angle Diffuse page 1–148
- Fixed Focus page 1–149
- Transmitted Beam page 1–150
- Visible Red Fiber Optic page 1–151
- ClearSight™ page 1–91

Accessories

- Fiber Optic Cables page 1–245
- Quick-Disconnect Cables page 5–1
- Mounting Assemblies page 1–301
- Reflectors, Reflective Tape page 1–311

User Interface Panel

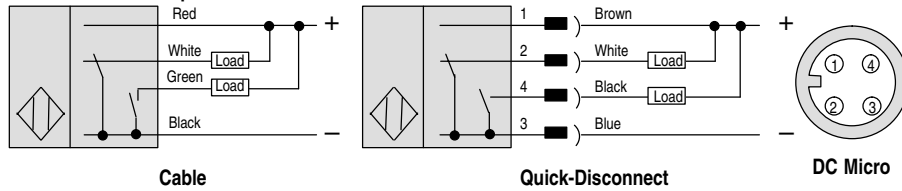
Label	Color	State	Status
Output	Red	OFF	Sensor output de-activated
		ON	Sensor output activated



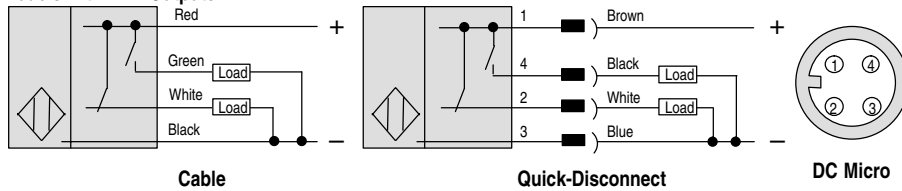
Wiring Diagrams

10.8–30V DC Sensors

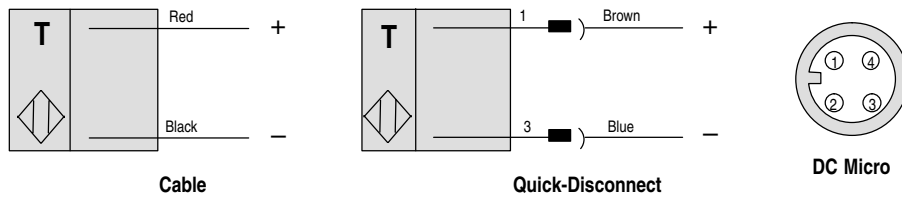
Models with NPN Outputs



Models with PNP Outputs



Transmitted Beam Source—All Models



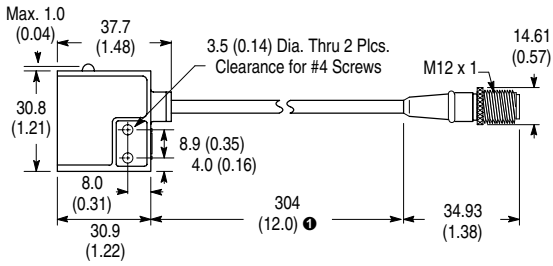
Note: Details regarding connection of Allen-Bradley Bulletin Series 7000 photoelectric sensors to Allen-Bradley Programmable Controllers can be found in publication 42-2.0.

Series 7000

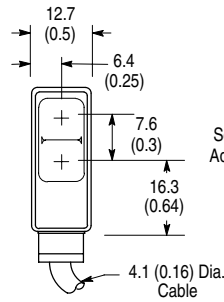
Miniature Rectangular Style

Dimensions

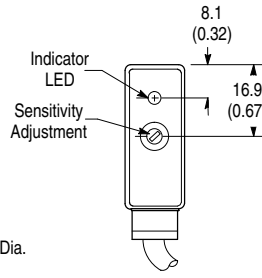
All Models Except Visible Red Plastic Fiber Optic—mm (inches)



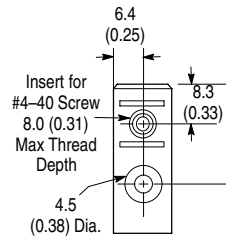
Ⓢ Quick-disconnect cable length shown. Cable versions length is 10ft (3m).



Front View (Lens)

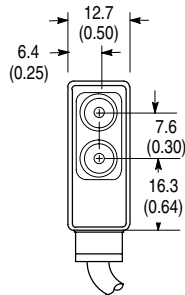
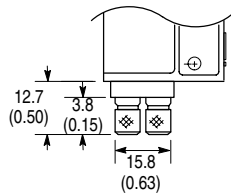


Rear View



Bottom View

Visible Red Plastic Fiber Optic Models—mm (inches)



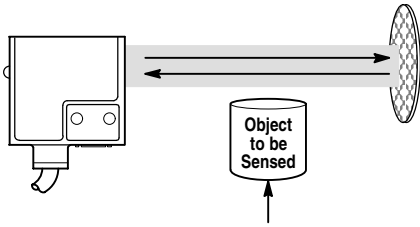
Front View



Bottom View

Series 7000 Retroreflective

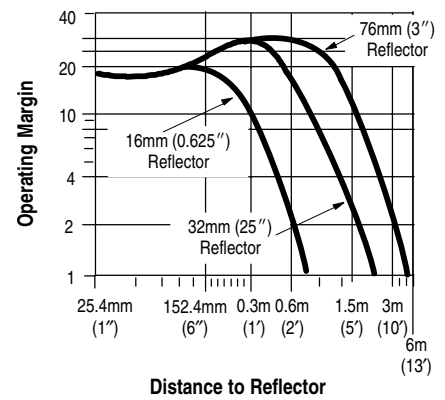
Miniature Rectangular Style



QD Cordsets and Accessories

Description	Catalog/Page Number
DC Micro QD Cordset, 4-pin, 2m	889D-F4AC-2
Other Cordsets Available	5-1
Tilt/Swivel Bracket	60-2619
76mm (3in) Diameter Reflector	92-39
32mm (1.25in) Diameter Reflector	92-47

Typical Response Curve



Specifications

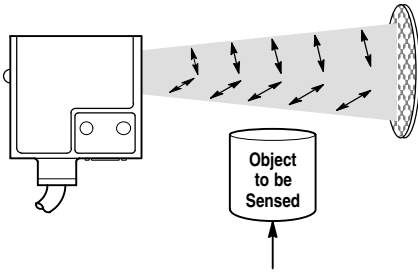
Field of View	3°
Emitter LED	Visible red 660nm

Selection Guide

Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number
11-28V DC 46mA	25.4mm (1in) to 3.7m (12.0ft)	Complementary N.O./N.C.	NPN 100mA 500µs	10µA	3m cable	42SMU-7000
					4-pin DC micro QD	42SMU-7000-QD
			PNP 100mA 500µs		3m cable	42SMU-7001
					4-pin DC micro QD	42SMU-7001-QD

Series 7000 Polarized Retroreflective

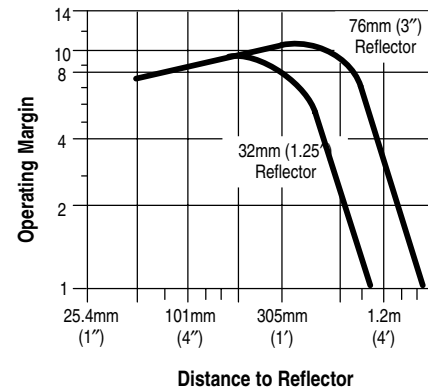
Miniature Rectangular Style



QD Cordsets and Accessories

Description	Catalog/Page Number
DC Micro QD Cordset, 4-pin, 2m	889D-F4AC-2
Other Cordsets Available	5-1
Tilt/Swivel Bracket	60-2619
76mm (3in) Diameter Reflector	92-39
32mm (1.25in) Diameter Reflector	92-47

Typical Response Curve

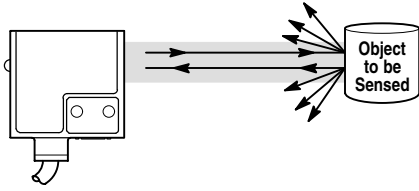


Specifications

Field of View	3°
Emitter LED	Visible red 660nm

Selection Guide

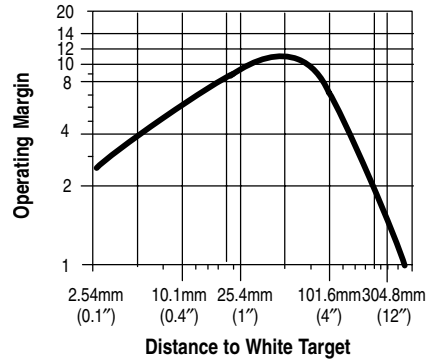
Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number
11-28V DC 46mA	50.8mm (2in) to 2m (6.6ft)	Complementary N.O./N.C.	NPN 100mA 500µs PNP 100mA 500µs	10µA	3m cable	42SMU-7200
					4-pin DC micro QD	42SMU-7200-QD
					3m cable	42SMU-7201
					4-pin DC micro QD	42SMU-7201-QD



QD Cordsets and Accessories

Description	Catalog/Page Number
DC Micro QD Cordset, 4-pin, 2m	889D-F4AC-2
Other Cordsets Available	5-1
Tilt/Swivel Bracket	60-2619

Typical Response Curve



Specifications

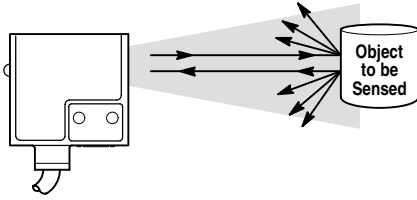
Field of View	7°
Emitter LED	Infrared 880nm

Selection Guide

Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number
11-28V DC 46mA	25.4mm (1in) to 229mm (9.0in)	Complementary N.O./N.C.	NPN 100mA 500µs	10µA	3m cable	42SMP-7000
					4-pin DC micro QD	42SMP-7000-QD
			PNP 100mA 500µs		3m cable	42SMP-7001
					4-pin DC micro QD	42SMP-7001-QD

Series 7000 Wide Angle Diffuse

Miniature Rectangular Style



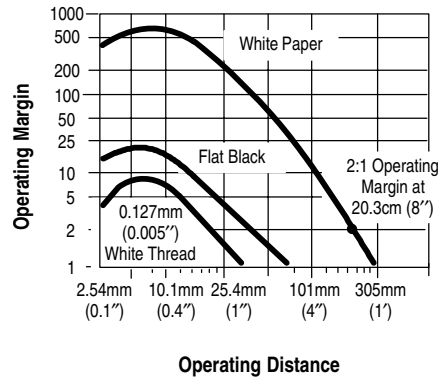
Specifications

Field of View	43°
Emitter LED	Infrared 880nm

QD Cordsets and Accessories

Description	Catalog/Page Number
DC Micro QD Cordset, 4-pin, 2m	889D-F4AC-2
Other Cordsets Available	5-1
Tilt/Swivel Bracket	60-2619

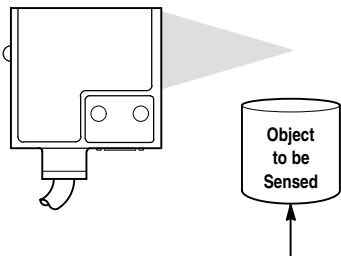
Typical Response Curve



Selection Guide

Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number
11-28V DC 46mA	5mm (0.2in) to 280mm (11in)	Complementary N.O./N.C.	NPN 100mA 500µs	10µA	3m cable	42SMP-7010
					4-pin DC micro QD	42SMP-7010-QD
			PNP 100mA 500µs		3m cable	42SMP-7011
					4-pin DC micro QD	42SMP-7011-QD

PHOTOSWITCH® Photoelectric Sensors
Series 7000 Fixed Focus Diffuse
Miniature Rectangular Style

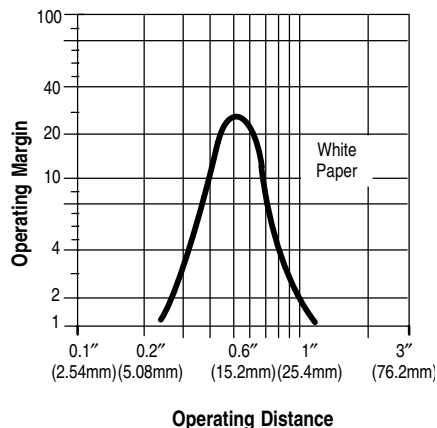


QD Cordsets and Accessories

Description	Catalog/Page Number
DC Micro QD Cordset, 4-pin, 2m	889D-F4AC-2
Other Cordsets Available	5-1
Tilt/Swivel Bracket	60-2619

Typical Response Curve

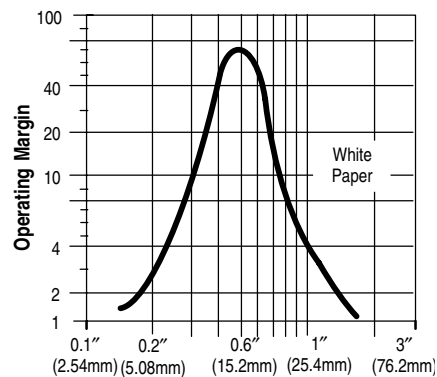
Green LED



Specifications

Field of View	0.60in (15.2mm)
Emitter LED	Visible red 660nm or Green 570nm (See Selection Guide)

Red LED

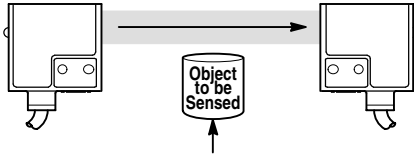


Selection Guide

Operating Voltage Supply Current	Emitter LED	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number
11-28V DC 46mA	Red 660nm	Complementary N.O./N.C.	NPN 100mA 500µs	10µA	3m cable	42SMP-7020
			PNP 100mA 500µs		4-pin DC micro QD	42SMP-7020-QD
					3m cable	42SMP-7021
			Green 570nm		4-pin DC micro QD	42SMP-7021-QD
	NPN 100mA 1ms				3m cable	42SMP-7320
	PNP 100mA 1ms				4-pin DC micro QD	42SMP-7320-QD
					3m cable	42SMP-7321
	4-pin DC micro QD		42SMP-7321-QD			

Series 7000 Transmitted Beam

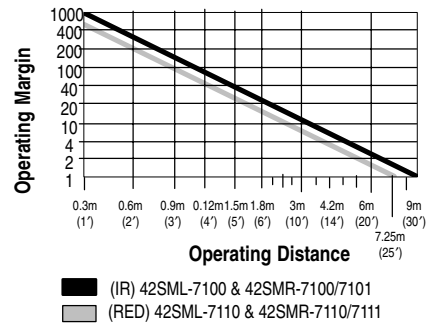
Miniature Rectangular Style



QD Cordsets and Accessories

Description	Catalog/Page Number
DC Micro QD Cordset, 4-pin, 2m	889D-F4AC-2
Other Cordsets Available	5-1
Tilt/Swivel Bracket	60-2619

Typical Response Curve



Specifications

Field of View	See Selection Guide
Emitter LED	See Selection Guide

Selection Guide for Light Source

Operating Voltage Supply Current	Sensing Distance	Field of View	Output Type/Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number
11-28V DC 45mA	10mm (0.39in) to 9.2m (30ft)	3°	Infrared	—	3m cable	42SML-7100
					4-pin DC micro QD	42SML-7100-QD
11-28V DC 35mA	10mm (0.39in) to 7.6m (25ft)		Red		3m cable	42SML-7110
					4-pin DC micro QD	42SML-7110-QD

Selection Guide for Receivers to Use With Infrared Light Sources

Operating Voltage Supply Current	Output Energized	Field of View	Output Type/Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number
11-28V DC 25mA	Complementary N.O./N.C.	8°	NPN 100mA 1ms ON/1.5ms OFF	10µA	3m cable	42SMR-7100
					4-pin DC micro QD	42SMR-7100-QD
			PNP 100mA 1ms ON/1.5ms OFF		3m cable	42SMR-7101
					4-pin DC micro QD	42SMR-7101-QD
		2°	NPN 100mA 1ms ON/1.5ms OFF		3m cable	42SMR-7120
					4-pin DC micro QD	42SMR-7120-QD
			PNP 100mA 1ms ON/1.5ms OFF		3m cable	42SMR-7121
					4-pin DC micro QD	42SMR-7121-QD

Selection Guide for Receivers to Use With Visible Red Light Sources

Operating Voltage Supply Current	Output Energized	Field of View	Output Type/Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number
11-28V DC 25mA	Complementary N.O./N.C.	8°	NPN 100mA 1ms ON/1.5ms OFF	10µA	3m cable	42SMR-7110
					4-pin DC micro QD	42SMR-7110-QD
			PNP 100mA 1ms ON/1.5ms OFF		3m cable	42SMR-7111
					4-pin DC micro QD	42SMR-7111-QD
		2°	NPN 100mA 1ms ON/1.5ms OFF		3m cable	42SMR-7130
					4-pin DC micro QD	42SMR-7130-QD
			PNP 100mA 1ms ON/1.5ms OFF		3m cable	42SMR-7131
					4-pin DC micro QD	42SMR-7131-QD



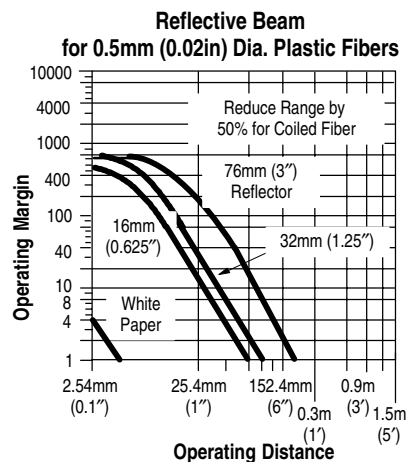
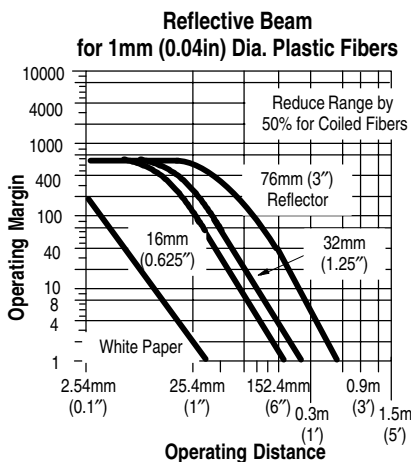
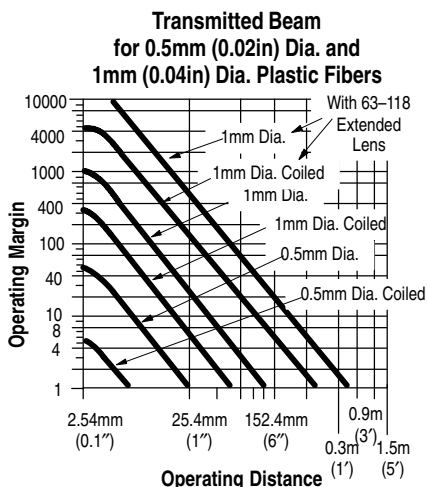
QD Cordsets and Accessories

Description	Catalog/Page Number
DC Micro QD Cordset, 4-pin, 2m	889D-F4AC-2
Other Cordsets Available	5-1
Tilt/Swivel Bracket	60-2619
Bifurcated Fiber Optic Cables, 1mm Diameter	99-801
Individual Fiber Optic Cables, 1mm Diameter	99-820

Specifications

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

Typical Response Curve



Selection Guide

Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number
11-28V DC 46mA	Depends on Fiber Optic cable selected	Complementary N.O./N.C.	NPN 100mA 1ms	10µA	3m cable	42SMF-7100
			PNP 100mA 1ms		4-pin DC micro QD	42SMF-7100-QD
					3m cable	42SMF-7101
					4-pin DC micro QD	42SMF-7101-QD

Series 7000 LTD

Miniature Rectangular Style



Description

The Series 7000 LTD family of photoelectric sensors is intended for use in light duty industrial environments where low cost is a driving factor in the selection process. The sensor retains many of the same features found in the Series 7000 with the following exceptions.

- Single output (NPN or PNP)
- Light operate mode
- Reduced response time
- Limited sensing modes
- Reduced environmental protection

For ease of maintenance, all adjustments are made on a user interface panel located on the top of the sensor. A clutch-protected single-turn potentiometer is used as the sensor sensitivity adjustment on the diffuse sensing mode only. A single red LED provides a visual indication of the output status.

General Specifications

Light Source	See Selection Guide
Unit Protection	Reverse polarity
Supply voltage	11–28V DC
Current Consumption	46mA maximum
Output Type	NPN or PNP
Output Mode	Light operate
Output Rating	100mA @ 28V DC
Response Time	1ms
Housing Material	Valox®
Lens Material	Acrylic
LED Indicators	See User Interface on page 1–153
Connection Types	3m 300V cable; 4-pin DC micro QD on 12-inch pigtail
Supplied Accessories	None
Optional Accessories	Mounting brackets, reflectors, cordsets
Operating Environment	NEMA 12 (IP62)
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	–40°C to +65°C (–40°F to +150°F)
Relative Humidity	5...95%
Approvals	UL listed, CSA approved, and CE marked for all applicable directives

Features

- Low cost sensing solution
- Compact rectangular package
- Wide selection of sensing modes
- 24VDC operation
- NPN or PNP outputs
- Fast response time
- Variety of connection types

General Information

Wiring Diagrams page 1–153
 Dimensions page 1–153

Sensing Modes

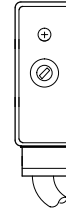
Retroreflective and Antiglare
 Retroreflective page 1–154
 Standard Diffuse page 1–155

Accessories

Quick-Disconnect Cables . . . page 5–1
 Mounting Assemblies page 1–301
 Reflectors, Reflective Tape page 1–311

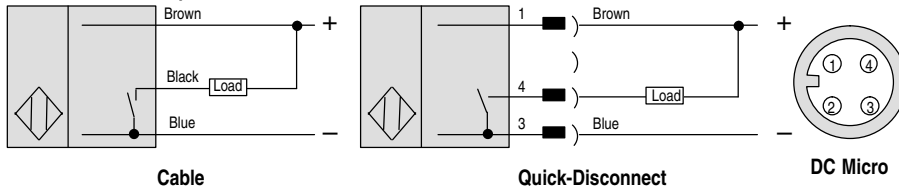
User Interface Panel

Label	Color	State	Status
Output	Red	OFF	Sensor output de-activated
		ON	Sensor output activated

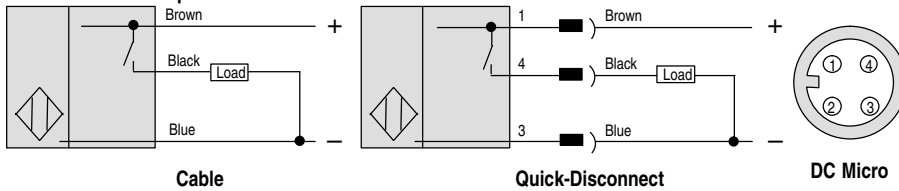


Wiring Diagrams

Models with NPN Output



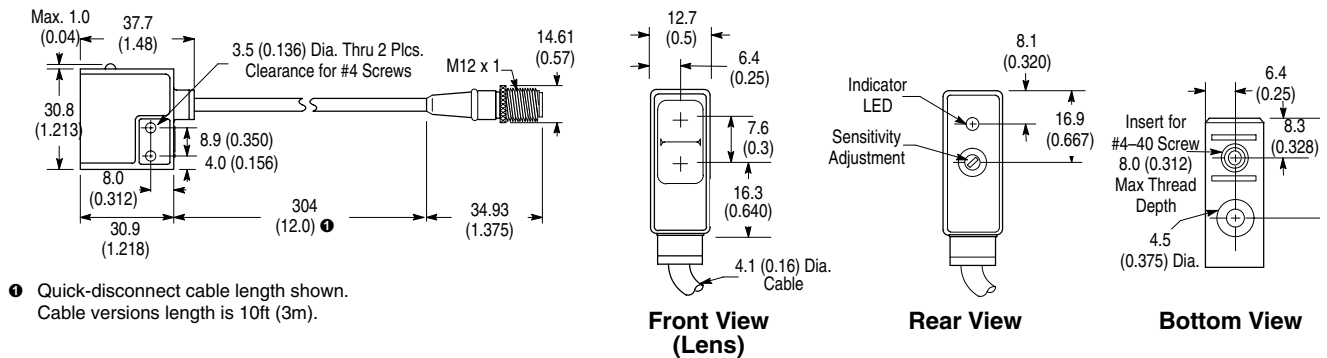
Models with PNP Output



Note: Details regarding connection of Allen-Bradley Series 7000 photoelectric sensors to Allen-Bradley Programmable Controllers can be found in publication 42-2.0.

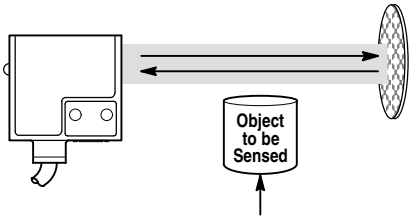
All wire colors shown refer to Allen-Bradley quick-disconnect cables.

Dimensions—mm (inches)



Series 7000 LTD Retroreflective and Anti-Glare Retroreflective

Miniature Rectangular Style

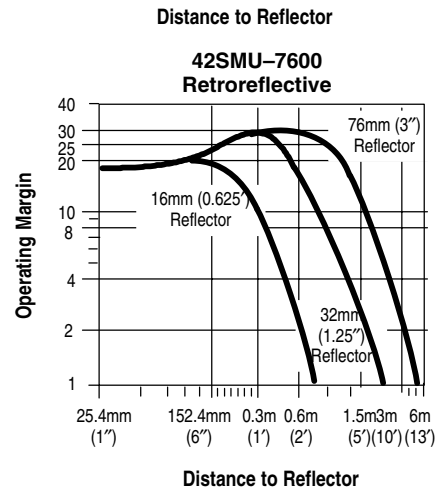
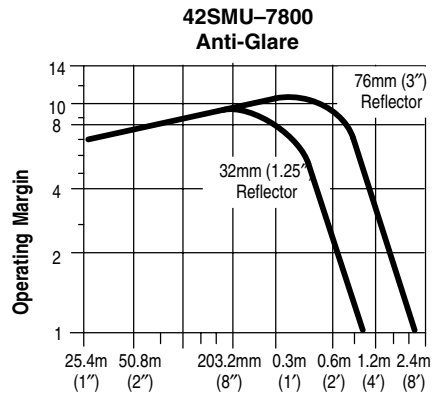


Anti-glare Retroreflective sensors provide some degree of protection against the false detection of targets. Other A-B photoelectric sensor families include Polarized Retroreflective versions which provide for even greater protection when very shiny targets must be reliably detected.

QD Cordsets and Accessories

Description	Catalog/Page Number
DC Micro QD Cordset, 4-pin, 2m	889D-F4AC-2
Other Cordsets Available	5-1
Mounting Assemblies	1-301
76mm (3in) Diameter with Center Mount Hole	92-39
32mm (1.25in) Diameter	92-47

Typical Response Curve



Specifications

Field of View	5°
Emitter LED	Visible red 660nm

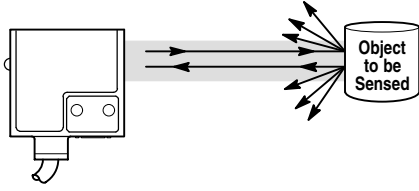
Selection Guide for Retroreflective Sensors

Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number
10-30V DC 20mA	50mm (2in) to 3.6m (12.0ft)	Light	NPN 100mA 1ms	10µA	3m cable	42SMU-7600
					4-pin DC micro QD	42SMU-7600-QD
					3m cable	42SMU-7601
					4-pin DC micro QD	42SMU-7601-QD

Selection Guide for Antiglare Retroreflective Sensors

Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number
10-30V DC 20mA	50mm (2in) to 2.0m (6.6ft)	Light	NPN 100mA 1ms	10µA	3m cable	42SMU-7800
					4-pin DC micro QD	42SMU-7800-QD
					3m cable	42SMU-7801
					4-pin DC micro QD	42SMU-7801-QD

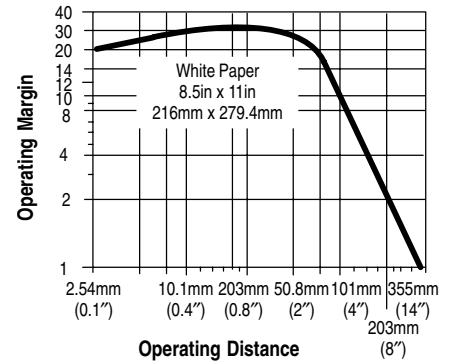
PHOTOSWITCH® Photoelectric Sensors
Series 7000 LTD Standard Diffuse
Miniature Rectangular Style



QD Cordsets and Accessories

Description	Catalog/Page Number
DC Micro QD Cordset, 4-pin, 2m	889D-F4AC-2
Other Cordsets Available	5-1
Mounting Assemblies	1-301

Typical Response Curve



Specifications

Field of View	6°
Emitter LED	Infrared 880nm

Selection Guide

Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number
10-30V DC 30mA	5mm (0.2in) to 210mm (8.5in)	Light	NPN 100mA 1ms	10µA	3m cable	42SMP-7600
					4-pin DC micro QD	42SMP-7600-QD
			PNP 100mA 1ms		3m cable	42SMP-7601
					4-pin DC micro QD	42SMP-7601-QD

Series 7000 Cylindrical



Description

Series 7000 Cylindrical sensors can provide a lower-cost replacement for fiber optic sensors and glass fiber optic cables in many simple Transmitted Beam applications.

Only 6.4mm (0.25in) in diameter, these sensors can operate in 12V DC or 24V DC (nominal) applications. The maximum sensing distance is 530mm (21.0in).

Series 7000 Cylindrical Receivers have a single red LED output indicator. A single NPN or PNP, Light Operate or Dark Operate output can be selected by catalog number. Most versions can supply 100mA output current.

Features

- Miniature cylindrical package
- Transmitted beam sensing mode
- 12 or 24V DC operation
- NPN or PNP outputs
- Fast response time
- 3m (10ft) cable connection

General Specifications

Light Source	Infrared 940nm
Unit Protection	Reverse polarity
Supply voltage	See Selection Guide
Current Consumption	35mA maximum
Output Type	NPN or PNP
Output Mode	Light/dark operate
Output Rating	100mA @ 28V DC
Response Time	500µs
Housing Material	Stainless steel
Lens Material	Acrylic
LED Indicators	See User Interface on page 1–157
Connection Types	3m 300V cable
Supplied Accessories	None
Optional Accessories	Mounting brackets
Operating Environment	NEMA 3, 4, 12, 13 (IP66)
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	–40°C to +65°C (–40°F to +150°F)
Relative Humidity	5...95%
Approvals	UL listed, CSA approved, and CE marked for all applicable directives

General Information

Wiring Diagrams page 1–157

Dimensions page 1–157

Cylindrical Sensing Modes

Transmitted Beam page 1–158

Accessories

Mounting Assemblies page 1–301

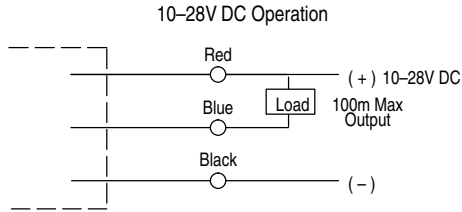
User Interface Panel

Label	Color	State	Status
Output	Red	OFF	Sensor output de-activated
Output	Red	ON	Sensor output activated

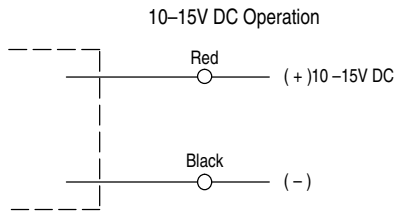
Wiring Diagrams

Connection Diagrams

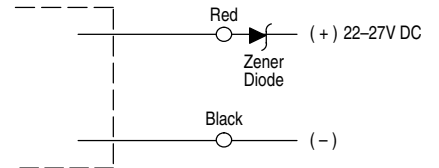
Receiver



Light Source



22-27V DC Operation

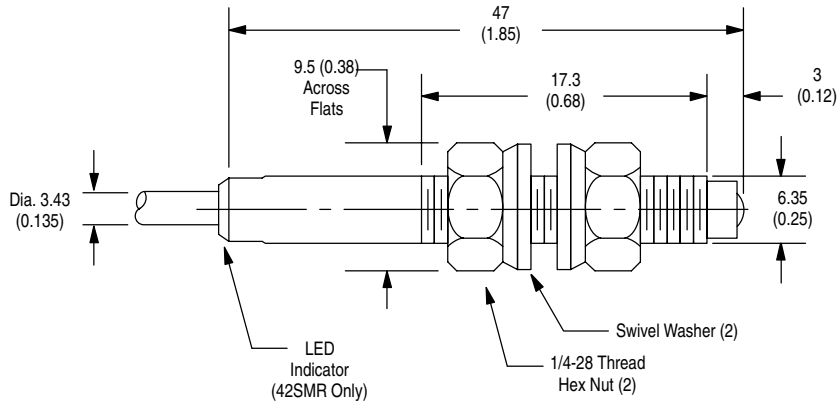


For sensors with NPN output: connect load between blue and red.
 For sensors with PNP output: connect load between blue and black.

12V Zener diode (supplied) must be used for 22-27V DC operation.
 Class 2 source required.

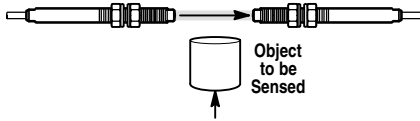
Note: Details regarding connection of Allen-Bradley Series 7000 photoelectric sensors to Allen-Bradley Programmable Controllers can be found in publication 42-2.0.

Dimensions—mm (inches)



Series 7000 Cylindrical Transmitted Beam

Miniature Cylindrical Style



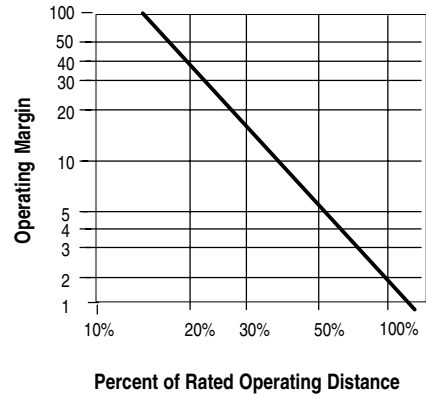
Accessories

Description	Page Number
Mounting Assemblies	1-301

Specifications

Field of View	See Selection Guide
Emitter LED	Infrared 940nm

Typical Response Curve



Selection Guide for Light Source

Operating Voltage Supply Current	Sensing Distance @ 1X Margin	Output Type Capacity Response Time	Max Leakage Current	Field of View	Connection Type	Catalog Number
10-15V DC 22-27V DC with Zener 35mA	5mm (0.19in) to 533.4mm (21in)	—	—	3°	3m cable	42SML-7000

Selection Guide for Receiver

Operating Voltage Supply Current	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Field of View	Connection Type	Catalog Number
10-28V DC 20mA	Light	NPN 100mA 500µs	10µA	7.5°	3m cable	42SMR-7000
	Dark					42SMR-7001
	Light	PNP 100mA (24V) 50mA (12V) 500µs				42SMR-7002
	Dark					42SMR-7003