

Series 9000

Darkroom

Description

Series 9000 darkroom sensors are designed for use in areas where the emission of visible light must be sharply reduced, such as in the manufacture of photographic films and papers. These On/Off sensors have been specifically designed and constructed to reduce visible light emission to less than 0.003 millilux measured 25mm (1in) from the sensor.

Series 9000 darkroom sensors use an LED light source with very little visible light emission. Visible light radiation from the sensor is further controlled through the use of special construction techniques and lens and housing materials.

Like standard Series 9000 On/Off sensors, these sensors contain Power, Output, and Margin/Short Circuit indicators. Using these indicators can speed setup and maintenance. During normal “lights out” operation, the opaque sensor cover must be closed and the cover screw tightened with a torque equal to 0.226 to 0.452 Newton-meter (2 to 4 inch-pounds) to prevent visible light emission from these indicators.

Series 9000 darkroom version sensors are available in several versions that operate from supply voltages of 10–40V DC or 70–264V AC/DC. DC models are available with NPN and PNP outputs. The AC/DC models are available with SPDT electro-mechanical relay outputs, allowing the sensor and output to be supplied with different AC and/or DC voltage levels.

General Specifications

Light Source	Infrared LED (940nm)
Unit Protection	Overload, short circuit, reverse polarity, false pulse
Supply Voltage	24V DC, 120V AC, 220V AC (see Product Selection tables)
Current Consumption	See Product Selection tables
Output Type	NPN and PNP (DC models); SPDT relay (AC/DC models)
Output Mode	Light/Dark operate selectable
Output Rating	100mA @ 30V DC (DC models); 2A @ 132V AC (AC/DC sensor); 1A @ 264V AC (AC/DC sensor)
Response Time	2ms (DC models); 15ms (AC/DC models)
Housing Material	Valox®
Lens Material	Acrylic
LED Indicators	See User Interface on page 1-235.
Connection Types	2m 300V cable, 4-pin DC micro QD, 5-pin AC mini QD
Supplied Accessories	#129-130 mounting kit
Optional Accessories	Mounting brackets, reflectors, cordsets
Operating Environment	NEMA 3, 4X, 6P, 12, 13 (IP67) 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	-34°C to +70°C (-29°F to +158°F)
Relative Humidity	5...95%
Approvals	UL listed, CSA approved, CE marked for all applicable directives

Features

- Reduced light emission for darkroom applications
- Harsh duty 30mm package
- Wide selection of sensing modes
- Both DC and AC/DC operation
- Fast response time
- Variety of connection types

General Information

Dimensions page 1-235
 Wiring Diagrams page 1-236

Sensing Modes

Darkroom
 Operation page 1-234
 Retroreflective page 1-237
 Standard Diffuse page 1-238
 Transmitted Beam page 1-239
 Infrared Glass Fiber Optic page 1-240

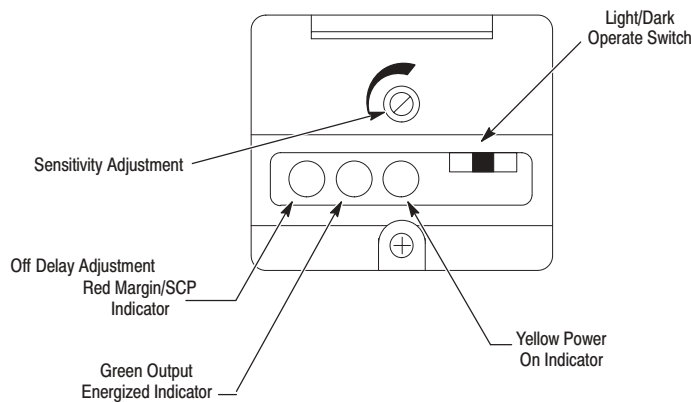
Accessories

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

User Interface

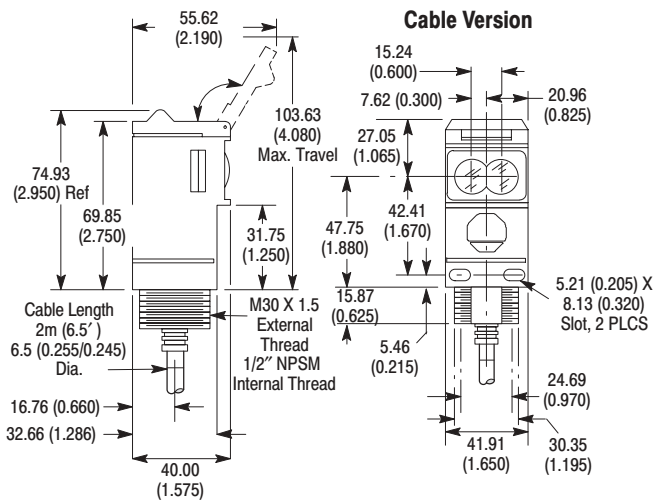
Label	Color	State	Status
Output	Green	OFF	Sensor output de-activated
		ON	Sensor output activated
Margin/SCP	Red	OFF	Margin < 2.5
		ON	Margin > 2.5
		Flashing	Output SCP active
Power	Yellow	OFF	Sensor not powered
		ON	Sensor powered

On/Off Sensors—Top View Detail

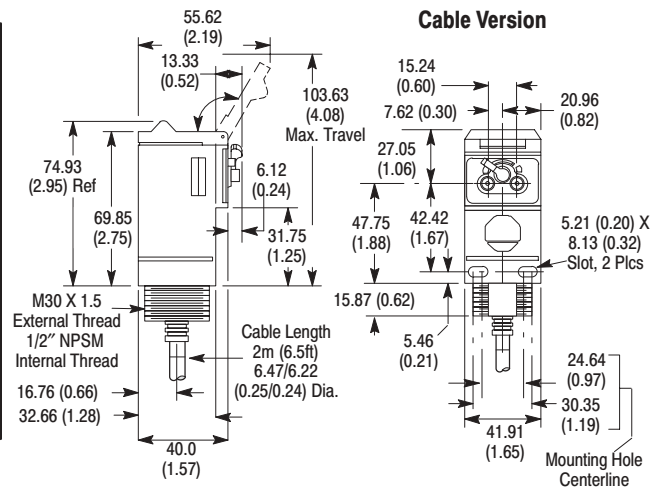


Dimensions—mm (inches)

All Versions Except Fiber Optic



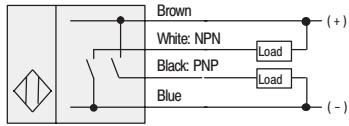
Fiber Optic



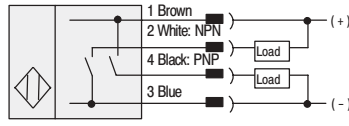
Wiring Diagrams 1 2

All Models Except Transmitted Beam Source

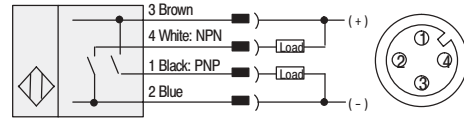
Cable Model: 9__0



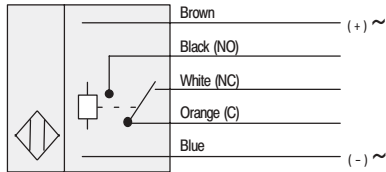
4-pin DC Micro QD Model: 9__0-QD



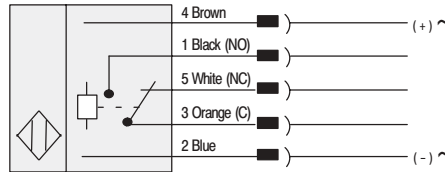
4-pin DC Mini QD Model: 9__0-QD1



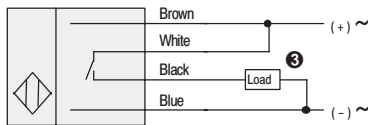
Cable Model: 9__1, 9__2



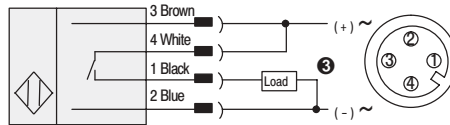
5-pin AC/DC Mini QD Model: 9__1-QD, 9__2-QD



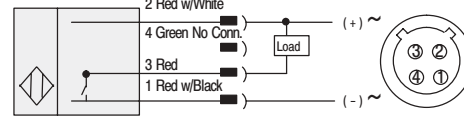
Cable Model: 9__3



AC/DC Mini QD Model: 9__3-QD



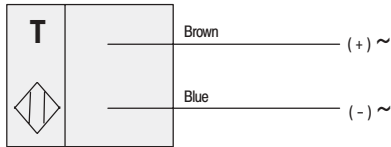
AC/DC Micro QD Model: 9__3-QD1



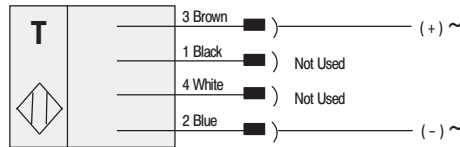
ⓐ Load can be placed on either black or white wire to create sourcing or sinking respectively.

Transmitted Beam Source

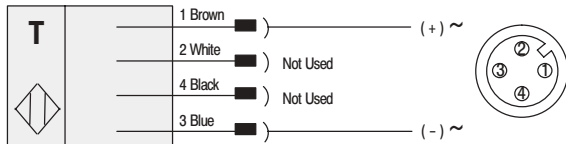
Cable Model: 42GRL-90__



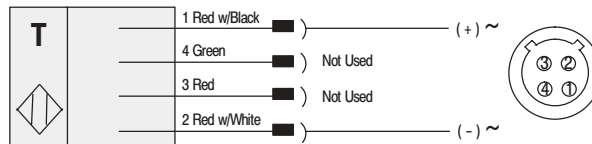
AC/DC Mini QD Model: 42GRL-90__2-QD



DC Micro QD Model: 42GRL-90__0-QD



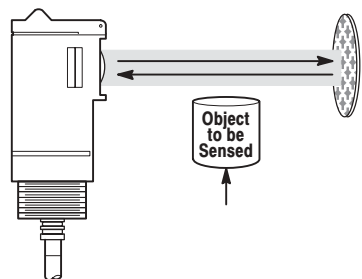
4-pin DC Micro QD Model: 42GRL-90__3-QD1



❶ For Allen-Bradley programmable controller compatible interface, refer to publication 42-2.0.

❷ Quick-disconnect wiring codes shown are valid for Allen-Bradley cables only.

ⓐ Load can be placed on either black or white wire to create sourcing or sinking respectively.



QD Cordsets and Accessories

Description	Catalog Number
1.8m (6ft) 5-pin, Mini QD Cordset	889N-F5AF-6F
2m (6.5ft) 4-pin, DC Micro QD Cordset	889D-F4AC-2
76mm (3in) Diameter with Center Mount Hole	92-39
32mm (1.25in) Diameter	92-47

Specifications

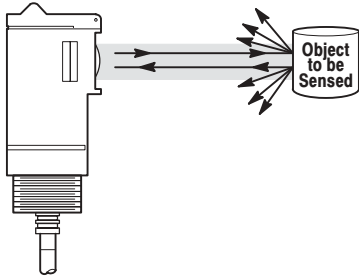
Field of View	1.5°
Emitter LED	Infrared 940nm

Product Selection for Sensors

Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number	
10-40V DC 30mA	50.8mm (2in) to 4.5m (15ft) with 78mm (3") Reflector	Light/Dark Selectable	NPN/PNP 250mA 2ms	10µA	2m 300V cable	42KRU-9000	
					4-pin DC micro QD	42KRU-9000-QD	
70-264V AC/DC 50/60Hz 15mA			2m 300V cable	SPDT EM Relay 2A/132V AC 1A/264V AC 1A/150V DC 15ms	—		42KRU-9002
						5-pin mini QD	42KRU-9002-QD

Series 9000 Standard Diffuse

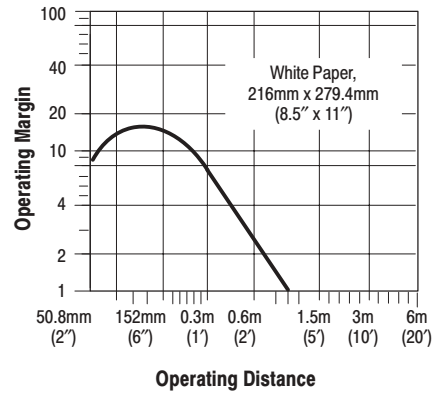
Darkroom



QD Cordsets and Accessories

Description	Catalog Number
1.8m (6ft) 5-pin, Mini QD Cordset	889N-F5AF-6F
2m (6.5ft) 4-pin, DC Micro QD Cordset	889D-F4AC-2

Typical Response Curve



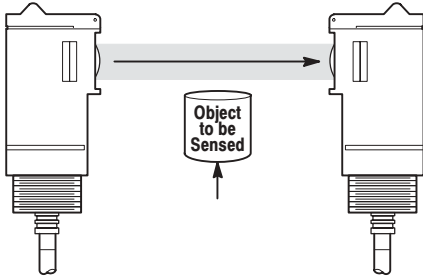
Specifications

Field of View	3.5°
Emitter LED	Infrared 940nm

Product Selection for Sensors

Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number
10-40V DC 30mA	50.8mm (2in) to 0.91m (3ft) to White Paper	Light/Dark Selectable	NPN/PNP 250mA 2ms	10µA	2m 300V cable	42KRP-9000
					4-pin DC micro QD	42KRP-9000-QD
70-264V AC/DC 50/60Hz 15mA	50.8mm (2in) to 0.91m (3ft) to White Paper	Light/Dark Selectable	SPDT EM Relay 2A/132V AC 1A/264V AC 1A/150V DC 15ms	—	2m 300V cable	42KRP-9002
					5-pin mini QD	42KRP-9002-QD

Allen-Bradley HMIs

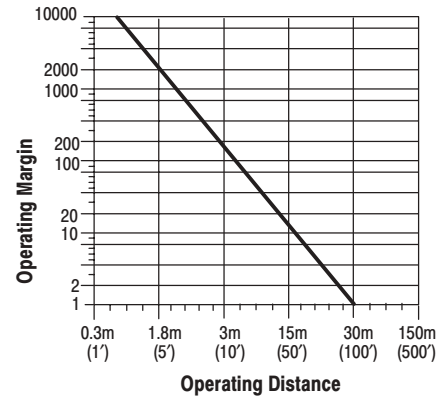


Light Sources and Receivers must be ordered separately. Any Light Source is compatible with any Receiver.

QD Cordsets and Accessories

Description	Catalog Number
1.8m (6ft) 4-pin, DC Mini QD Cordset	889N-F4AF-6F
1.8m (6ft) 5-pin, AC/DC Mini QD Cordset	889N-F5AF-6F
2m (6.5ft) 4-pin, DC Micro QD Cordset	889D-F4AC-2

Typical Response Curve



Specifications

Field of View	1.5°
Emitter LED	Infrared 940nm

Product Selection for Light Source

Operating Voltage Supply Current	Sensing Distance	Connection Type	Catalog Number
10-264V AC/DC 50/60Hz 15mA	25.4mm (1in) to 30m (100ft)	2m 300V cable	42KRL-9000
		4-pin DC micro QD	42KRL-9000-QD
		4-pin mini QD	42KRL-9002-QD

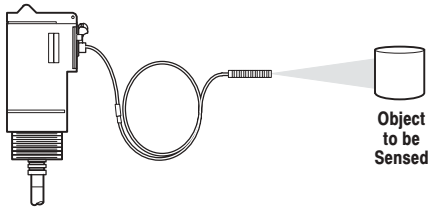
Product Selection for Receivers

Operating Voltage Supply Current	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number
10-40V DC 25mA	Receiver: Light/Dark Selectable	NPN/PNP 250mA 5ms	10µA	2m 300V cable	42KRR-9000
				4-pin DC micro QD	42KRR-9000-QD
70-264V AC/DC 50/60Hz 10mA		SPDT EM Relay 2A/132V AC 1A/264V AC 1A/150V DC 23ms	—	2m 300V cable	42KRR-9002
				5-pin mini QD	42KRR-9002-QD

Series 9000 Infrared Fiber Optic

Darkroom

QD Cordsets and Accessories



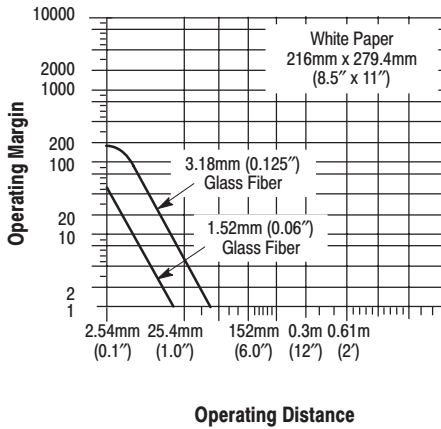
Description	Catalog Number
1.8m (6ft) 5-pin, Mini QD Cordset	889N-F5AF-6F
2m (6.5ft) 4-pin, DC Micro QD Cordset	889D-F4AC-2
Bifurcated Glass Fiber Optic Cable	99-32-1
Individual Glass Fiber Optic Cable	99-52-1

Specifications

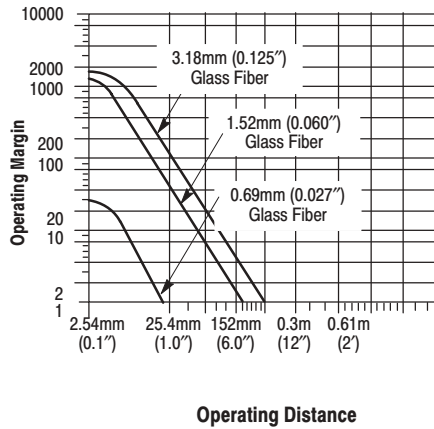
Emitter LED	Infrared 940nm
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Typical Response Curve

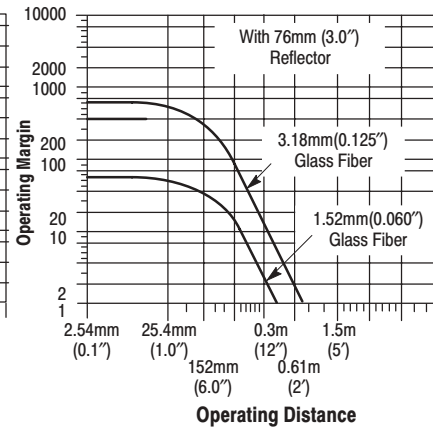
Standard Diffuse



Transmitted Beam



Retroreflective



Product Selection for Sensors

Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number
10-40V DC 30mA	Depends on Fiber Optic cable	Light/Dark Selectable	NPN/PNP 250mA 2ms	10µA	2m 300V cable	42KRF-9000
					4-pin DC micro QD	42KRF-9000-QD
70-264V AC/DC 50/60Hz 15mA	Depends on Fiber Optic cable	Light/Dark Selectable	SPDT EM Relay 2A/132V AC 1A/264V AC 1A/150V DC 15ms	-	2m 300V cable	42KRF-9002
					5-pin mini QD	42KRF-9002-QD

Allen-Bradley HMIs