



Description

The use of electrical sensors in hazardous locations presents many challenges. The traditional method has been to place these devices and the connected wiring in explosion-proof enclosures and conduit systems, which would be capable of containing a potential explosion. Although a proven method, these systems tend to be very difficult to install and maintain, have a high material and labor cost, and offer limited flexibility and corrosion protection. Therefore, many users have migrated to the use of intrinsic safety as the preferred choice for explosion protection.

The Series 9000 Transmitted Beam Photoelectric Sensor is designed and approved as an intrinsically safe apparatus under the entity concept to worldwide standards. It may be installed into a Class I, II, III; Division 1 (Zones 0, 1, 2) hazardous location when connected to an appropriate safety barrier. The sensor is also approved as nonincendive for installation into Class I; Division 2 hazardous locations without the need for a safety barrier. Further, the user may follow the same wiring practices as for nonhazardous location installations with few exceptions. The result is a safer, more flexible, easily maintained, and lower cost system.

The sensor offers a long sensing range 106m (350ft) and high operating margin. This makes it an ideal solution for use in the harsh industrial environments commonly found in the automotive, petrochemical, and grain processing industries. It also retains many of the same features, which have made the Series 9000 an industry standard.

General Specifications

Light Source	Infrared LED (880nm)
Unit Protection	Overload, short circuit, reverse polarity, false pulse
Supply Voltage	13 to 30V DC
Current Consumption	25mA maximum
Output Type	Both NPN and PNP
Output Mode	Light/dark operate selectable
Output Rating	8.5mA (PNP) 15mA (NPN)
Response Time	10ms maximum
Housing Material	Valox®
Lens Material	Acrylic
LED Indicators	See User Interface on page 1-216
Connection Types	2m 300V cable, 4-pin DC micro QD, 4-pin DC mini QD
Supplied Accessories	#129-130 mounting kit
Optional Accessories	Series 897H intrinsic safety barriers, mounting brackets, 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	-20°C to +70°C (-4°F to +158°F)
Relative Humidity	5...95%
Approvals	FM approved, CSA approved, CE marked for all applicable directives

For other sensing modes refer to the Intrinsically Safe Series 5000 photoelectric sensor. Information on the Series 897H intrinsic safety barriers may be found on page 7-114.

Features

- Intrinsically safe to North American standards
- Transmitted beam sensing mode
- Compatible with Series 897H intrinsic safety barriers
- 30mm harsh duty package
- Fast response time
- Variety of connection types

General Information

Wiring Diagrams page 1-216
Dimensions page 1-217

Sensing Modes

Transmitted Beam page 1-218

Accessories

Quick-Disconnect Cables page 7-1
Mounting Assemblies page 1-375

Allen-Bradley Replacements

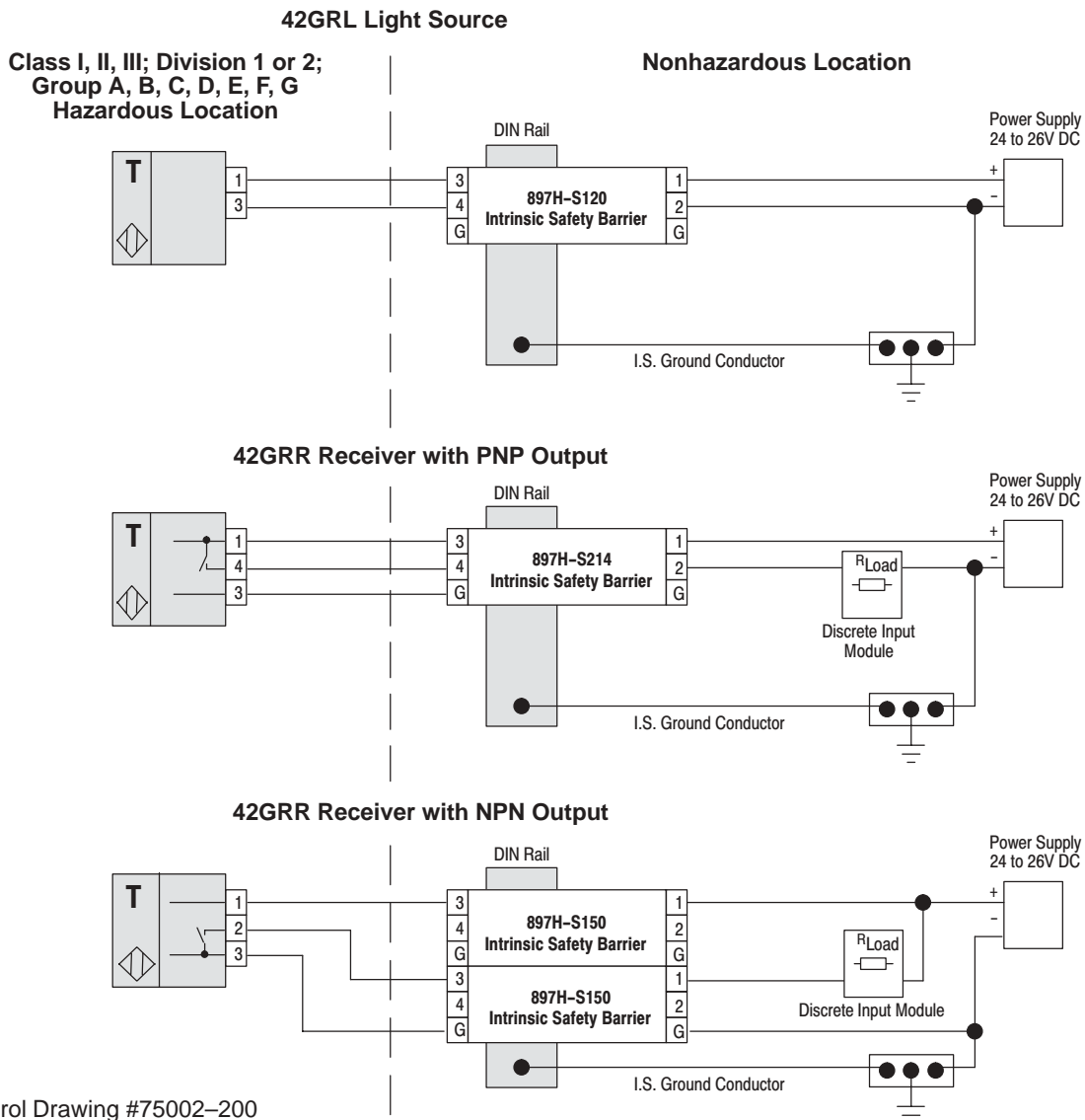
Series 9000

Intrinsically Safe

User Interface

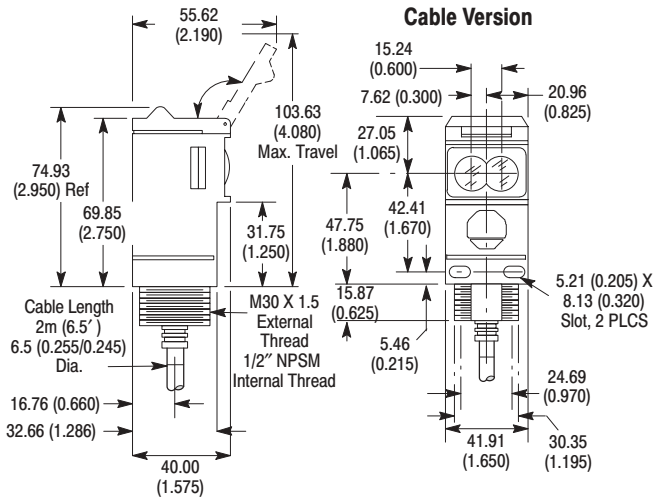
Label	Color	State	Status
Output	Green	OFF	Sensor output de-activated
		ON	Sensor output activated
Margin/SCP	Red	OFF	Margin <2.5
		ON	Margin >2.5
		Flashing	Output SCP active
Power	Yellow	OFF	Sensor not powered
		ON	Sensor powered

Wiring Diagrams

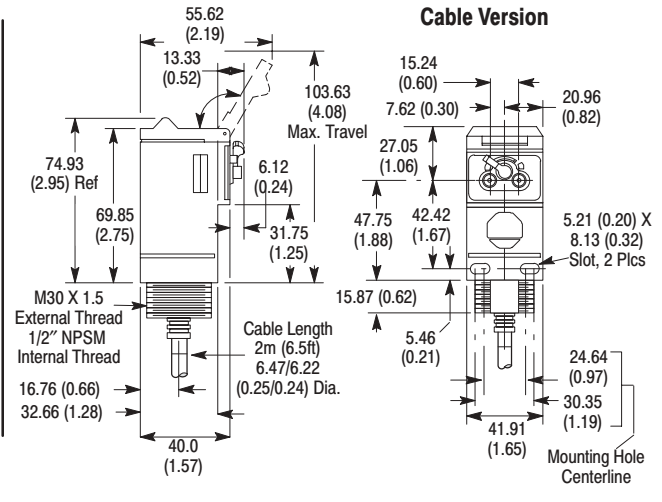


Dimensions—mm (inches)

All Versions Except Fiber Optic



Fiber Optic



Product Selection for Intrinsic Safety Barriers

The 42GRx-95x0 is approved as an intrinsically safe apparatus under the entity concept by FM and CSA. Therefore, any safety barrier which meets both the stated operational and safety requirements (see Table 1) of the sensor may be used. Note that the sensor is also approved as nonincendive (FM) for installation into Class I; Division 2 hazardous locations without the need for a safety barrier.

When installing intrinsically safe systems the user should refer to all relevant national standards and/or those standards set forth by the “authority having jurisdiction” at the installation site. Reference should also be made to Rockwell Automation/Allen-

Bradley documents #75002-200 (Control Drawing) and PA-9802 (Installation Instructions). Other installation guidelines may be found in the ANSI/ISA RP 12.6 (Wiring Practices for Hazardous (Classified) Location Instrumentation) document. Contact the Allen-Bradley Product Support Center for a complete list of compatible A-B I/O modules.

It is recommended that wiring for intrinsically safe systems be identified as such through the use of light blue jacketing and/or through appropriate labels. Such labels are required by NEC Article 504 and ANSI/ISA RP-12.6 to be placed at no more than 25 foot intervals.

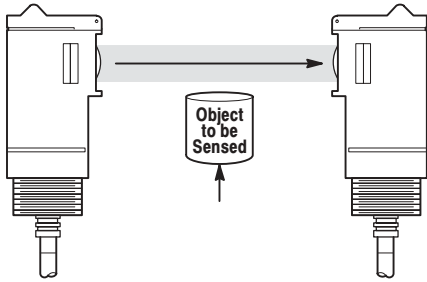
For more information on Intrinsically Safe Barriers, see page 7-114.

Table 1 Entity Parameters

Sensor			Barrier	
V_{max}	31.5V	\geq	V_t	
I_{max}	150mA	\geq	I_t	
P_{max}	0.95W	\geq	P_t	
$C_i + C_{leads}$	0uF	\leq	C_a	
$L_i + L_{leads}$	0mH	\leq	L_a	

Series 9000 Transmitted Beam

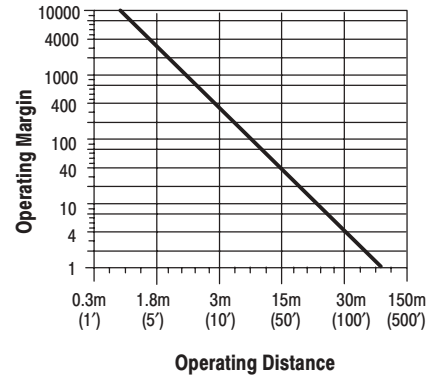
Intrinsically Safe



QD Cordsets and Accessories

Description	Catalog Number
1.8m (6ft) 4-pin, Mini QD Cordset	889N-F4AF-6F ❶
2m (6.5ft) 4-pin, DC Micro QD Cordset	889D-F4AC-2 ❶
Mounting Bracket	60-2439

Typical Response Curve



Specifications

Field of View	1.5° Receiver
Transmitting LED	Infrared 880nm

Product Selection for Light Sources

Operating Voltage Supply Current	Sensing Distance	Connection Type	Catalog Number
14 to 30V DC 16mA	25.4mm (2in) to 106m (350ft)	2m 300V cable	42GRL-9540
		4-pin micro QD	42GRL-9540-QD
		4-pin mini QD	42GRL-9540-QD1

Product Selection for Receivers

Operating Voltage Supply Current	Sensing Distance	Output Energized	Output Type/ Capacity Response Time	Max Leakage Current	Connection Type	Catalog Number
13 to 30V DC 25mA	25.4mm (2in) to 106m (350ft)	Light/Dark Operate	PNP/8.5mA NPN/15mA 10ms max.	10uA	2m 300V cable	42GRR-9500
					4-pin micro QD	42GRR-9500-QD
					4-pin mini QD	42GRR-9500-QD1

❶ Intrinsically Safe wiring labels 897H-L1 or 897H-L2 must be applied every 7.6m (25ft).