

Description

Intrinsically Safe systems are recognized as a highly desirable means of providing sensor functions in hazardous environments without the use of “explosion proof” housings.

An Intrinsically Safe system limits the energy sources entering the hazardous area. For electronic sensors, energy limiting is accomplished by controlling the voltages and currents entering the hazardous area. In addition, stored electrical energy in the sensors is limited to levels that cannot cause ignition of a given atmosphere.

Photoswitch Series 5000 Intrinsically Safe sensors are UL listed and Factory Mutual approved for use in Class I, II, & III; Division 1 & 2; Group A, B, C, D, E, F, & G Hazardous Locations *with* Intrinsic Safety Zener Diode Barriers.

The same sensors are also approved as nonincendive for use in Class I, II, & III; Division 2 only; Group A, B, C, D, F, & G Hazardous Locations *without* Intrinsic Safety Zener Diode Barriers.

General Specifications

Light Source	See Product Selection
Unit Protection	False pulse
Supply Voltage	24V DC with suitable intrinsic safety barrier
Current Consumption	30mA maximum
Output Type	PNP and NPN
Output Mode	Light/dark operate selectable
Output Rating	20mA
Response Time	1ms
Housing Material	Valox®
Lens Material	Acrylic (glass on polarized models)
LED Indicators	See User Interface on page 1-220.
Connection Types	Screw terminal
Supplied Accessories	None
Optional Accessories	Mounting brackets, reflectors, cordsets
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	90% maximum
Approvals	UL listed, FM approved, and CE marked for all applicable directives

Features

- Intrinsically Safe to North American standards
- Nonincendive for Division 2 hazardous (classified) locations
- Modular package for increased flexibility
- Wide variety of sensing modes
- Selectable light/dark operation
- Both NPN and PNP outputs
- Screw terminal connections

General Information

- Wiring Diagrams page 1-220
- Dimensions page 1-221

Sensing Modes

- Operation page 1-219
- Retroreflective page 1-222
- Polarized Retroreflective page 1-223
- Standard Diffuse page 1-224
- Infrared Fiber Optic/Fixed Focus/Wide Angle Diffuse page 1-225

Accessories

- Zener Diode Barriers page 7-114
- Mounting Assemblies page 1-375
- Right Angle Mirror Adaptor page 1-380
- Counter and Totalizer page 1-380
- Protective Photoguard page 1-380

Series 5000

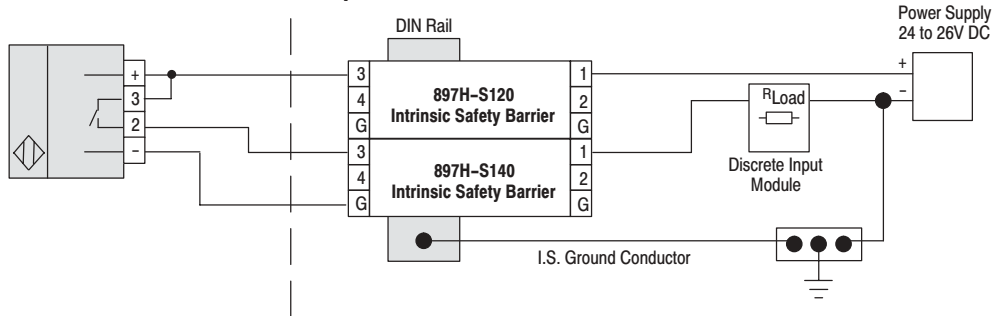
Intrinsically Safe

User Interface

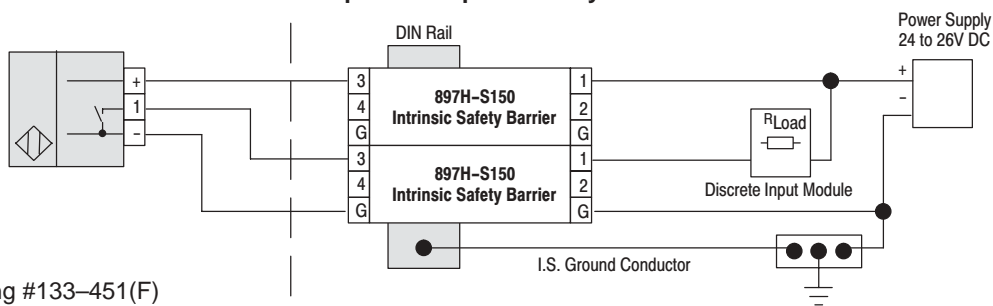
Label	Color	State	Status
Output	Red	OFF	Sensor output de-activated
		ON	Sensor output activated

Wiring Diagrams

Photohead and Terminal Base with PNP Output



Photohead and Terminal Base with NPN Output—Groups C–G only



Control Drawing #133-451(F)

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 document 133-451(F) (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.

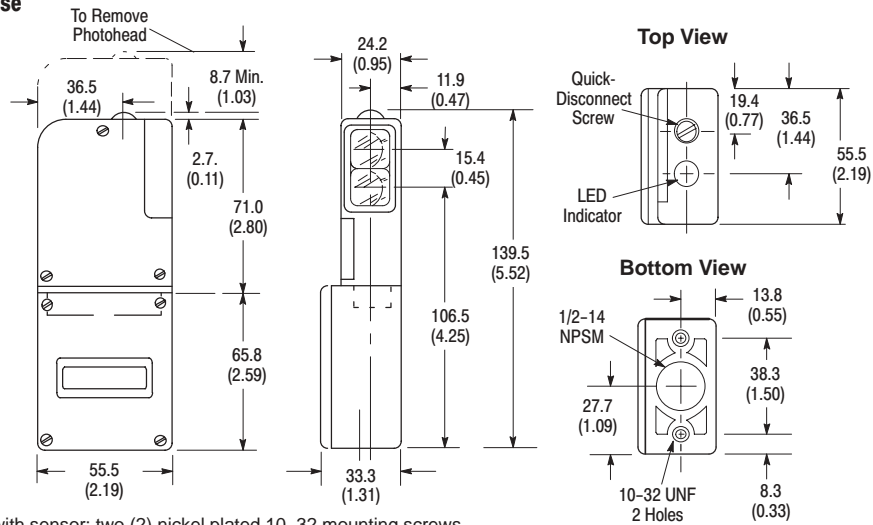
It is recommended that wiring for intrinsically safe systems be identified

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.

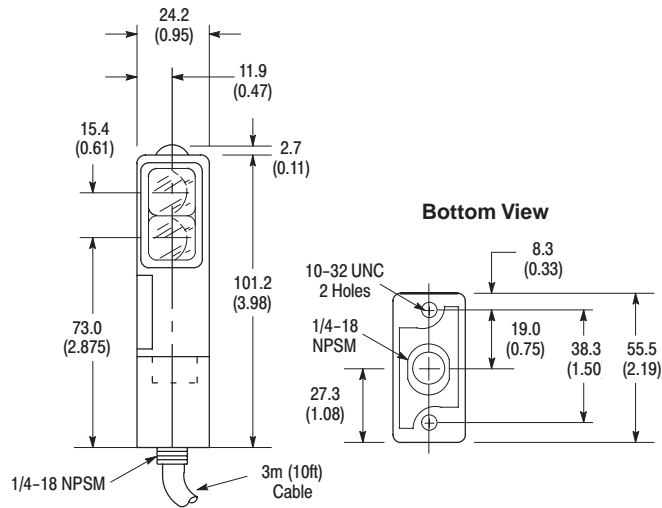
Dimensions (Applies to all versions)—mm (inches)

Terminal Style Power Base

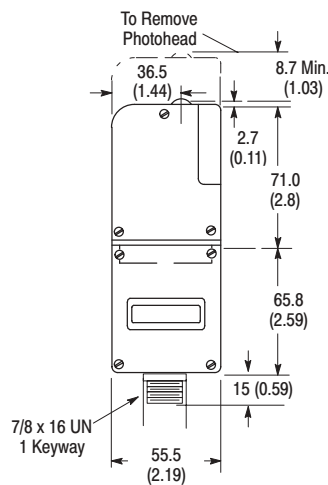


Note: Hardware included with sensor: two (2) nickel plated 10-32 mounting screws.

Cable Style Power Base



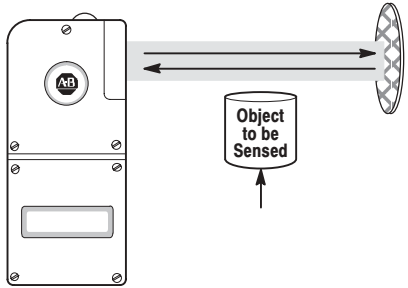
Quick-Disconnect Style Power Base



Allen-Bradley PLCs

Series 5000 Retroreflective

Intrinsically Safe



QD Cordsets and Accessories

Description	Page Number
Terminal Chambers	7-20
Mounting Assemblies	1-375
Intrinsic Safety Barriers	7-115
76mm (3in) Diameter Reflector	92-39
32mm (1.25in) Diameter Reflector	92-47

Specifications

Field of View	2.5°
Emitter LED	Infrared 880nm

Product Selection

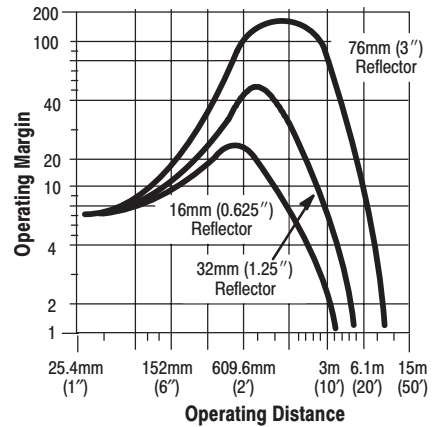
Photohead

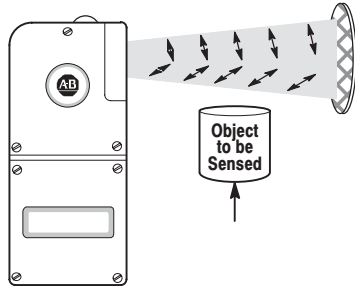
Sensing Mode	Sensing Distance	Output Energized	Output Type Capacity	Max Leakage Current	Response Time	Catalog Number
Retroreflective	50.8mm (2in) to 10m (33ft) with 76mm (3") Reflector	Light/Dark Selectable	NPN and PNP 20mA at 29.5V DC	1μA	1ms	42DRU-5500

Power Base

Style	Operating Voltage	Supply Current	Catalog Number
Terminal	13-29.5V DC	26mA max at 13V DC 30mA max at 29.5V DC	42DTB-5500

Typical Response Curve

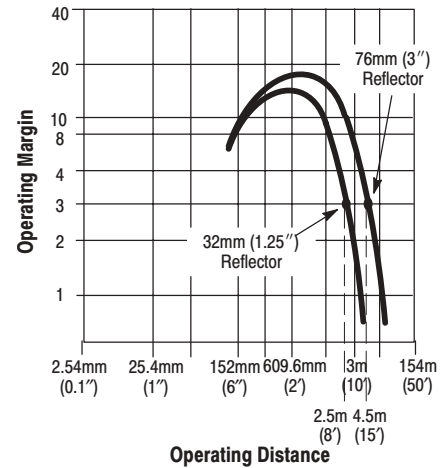




QD Cordsets and Accessories

Description	Page Number
Terminal Chambers	7-20
Mounting Assemblies	1-375
Intrinsic Safety Barriers	7-115
76mm (3in) Diameter Reflector	92-39
32mm (1.25in) Diameter Reflector	92-47

Typical Response Curve



Specifications

Field of View	2.5°
Emitter LED	Visible 660nm

Product Selection

Photohead

Sensing Mode	Sensing Distance	Output Energized	Output Type Capacity	Max Leakage Current	Response Time	Catalog Number
Polarized Retroreflective	50.8mm (2in) to 6m (20ft) with 76mm (3") Reflector	Light/Dark Selectable	NPN and PNP 20mA at 29.5V DC	1μA	1ms	42DRU-5700

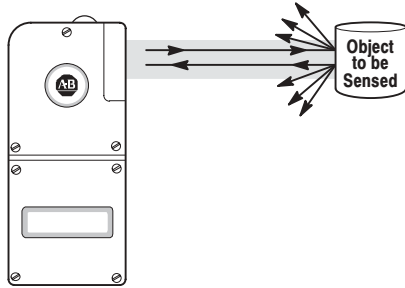
Power Base

Style	Operating Voltage	Supply Current	Catalog Number
Terminal	13-29.5V DC	26mA max at 13V DC 30mA max at 29.5V DC	42DTB-5500

Allen-Bradley PLCs

Series 5000 Standard Diffuse

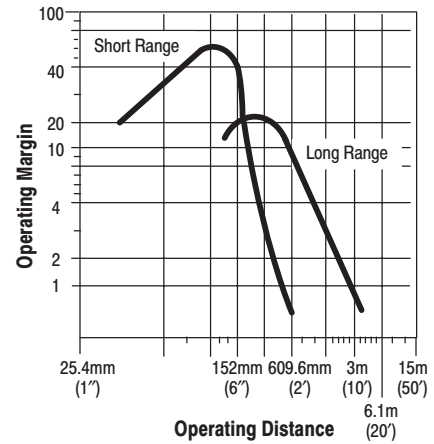
Intrinsically Safe



QD Cordsets and Accessories

Description	Page Number
Terminal Chambers	7-20
Mounting Assemblies	1-375
Intrinsic Safety Barriers	7-115

Typical Response Curve



Specifications

Field of View	3°
Emitter LED	Infrared 880nm

Product Selection

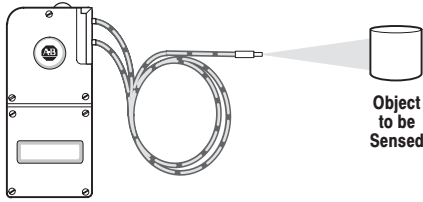
Photohead

Sensing Mode	Sensing Distance	Output Energized	Output Type Capacity	Max Leakage Current	Response Time	Catalog Number
Standard Diffuse	50.8mm (2in) to Short Range: 0.4m (16in) Long Range: 2.1m (7ft) with White Paper	Light/Dark Selectable	NPN and PNP 20mA at 29.5V DC	1μA	1ms	42DRP-5500

Power Base

Style	Operating Voltage	Supply Current	Catalog Number
Terminal	13-29.5V DC	26mA max at 13V DC 30mA at 29.5V DC	42DTB-5500

Series 5000 Infrared Glass Fiber Optic/Fixed Focus/Wide Angle Diffuse Intrinsically Safe



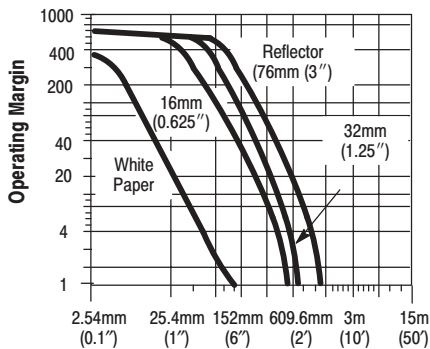
QD Cordsets and Accessories

Description	Page Number
Terminal Chambers	7-20
Mounting Assemblies	1-375
Intrinsic Safety Barriers	7-115

Specifications

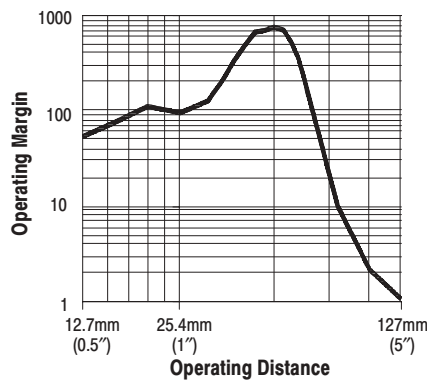
Field of View	Depends on Glass Fiber Optics and lens type
Emitter LED	Infrared 880nm

Typical Response Curve

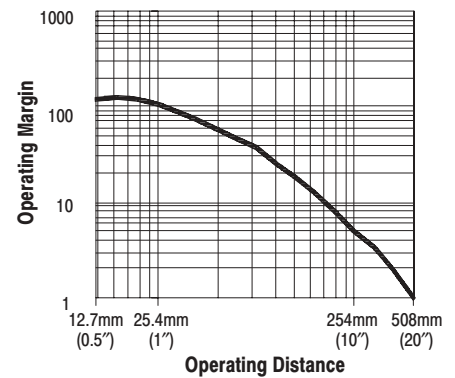


Operating Distance
Fibers #99-30-1 Through #99-37-1
See Fiber Optic section in this catalog for additional information.

Typical Response Curve for Fixed Focus Lens



Typical Response Curve for Wide Angle Lens



Product Selection

Photohead

Sensing Mode	Output Energized	Output Type Capacity	Max Leakage Current	Response Time	Catalog Number
Fiber Optic	Light/Dark Selectable	NPN & PNP 20mA at 29.5V DC	1μA	1ms	42DRA-5500

Power Base

Style	Operating Voltage	Supply Current	Catalog Number
Terminal	13-29.5V DC	26mA max at 13V DC 30mA max at 29.5V DC	42DTB-5500

Lens Assembly

Lens Type	Catalog Number
Fiber Optic	61-5550
Fixed Focus	61-5551
Wide Angle	61-5611

Allen-Bradley PLCs