5

Comet Series Sensors

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Comet Series Sensors

Product Description

The Comet Series from Eaton's Electrical Sector is a complete line of high performance, 18 mm tubular sensors with a variety of models and modes to solve virtually any sensing problem.

The sensors are available in thru-beam, reflex, polarized reflex, diffuse reflective, focused diffuse reflective, wide angle diffuse reflective, Perfect Prox, fine spot Perfect Prox and fiber optic sensing. Perfect Prox is one of the most powerful problem-solving sensors available. These sensors can reliably detect targets of different color, reflectance, contrast or surface shape at the same range, while ignoring background objects just a fraction of an inch away.

The Comet Series includes AC/DC and DC-only models with two-, three- and four-wire circuitry. Choose from cable or micro-connector. Mini-connectors are available on two-wire models for easy retrofit. Each sensor features a Light/Dark Operation switch and a gain control to provide for quick adjustment to peak optical performance.

The unique threaded body with flat sides allows quick mounting in a 3/4 inch hole or against any flat surface. Internal components are rigidly sealed in a solid encapsulated package for excellent performance in high-vibration and high-shock applications.

Features

- Industry standard 18 mm diameter threaded body has flat sides allowing it to be mounted like a tubular sensor or against any flat surface
- Right Angle viewing models mount in a depth of only 6/10th of an inch
- Perfect Prox technology provides exceptional background rejection and application problem-solving
- Visible sensing beams let you see where the beam is aimed for quick setup and alignment
- Solid polyurethane housing completely encapsulates internal circuits for high resistance to shock and vibration
- Adaptable modulation circuit provides immunity to crosstalk from other closely mounted sensors
- The industry's only background rejection sensors with a two-wire circuit design
- Models available with both AC and DC operation in a single unit—up to 264 Vac
- Four-wire DC sensors offer both NPN and PNP outputs
- Output status indicator visible from a wide 270° angle

Standards and Certifications

- UL Recognized
- cUL Recognized
- CE (except two-wire DC models)

DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

For the most current information on this product, visit our Web site: www.eaton.com

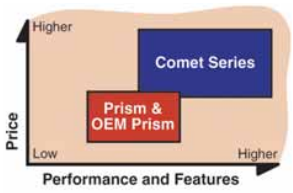
For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.
For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Overview

Product Comparison

Eaton's cost-effective Prism Series, OEM Prism and premium Comet Series all share the same 18 mm flat-sided housing. This results in the largest interchangeable sensor family available, allowing you to select from well over 250 different models to solve the widest variety of sensing applications.

Comparison



Compared to similar-looking Prism and OEM Prism, the Comet Series includes the following advantages:

- AC/DC two-wire versions available
- Light/dark output configuration
- Perfect Prox background rejection technology

Sensing Modes

Thru-Beam

This sensing mode is available with ranges of 20 and 80 ft (6 and 24m). The 20 ft (6m) range is available in forward and Right Angle viewing, and can be intermixed in any combination for the best fit in your application. Long range models feature a visible sensing beam to help simplify installation and alignment.

Reflex and Polarized Reflex

In reflex sensing, the sensing beam is reflected from a retroreflector back to the sensor. The Comet Series includes standard and polarized models with two-wire, three-wire and four-wire circuits. Right Angle models are also available. Polarized models feature a polarizing filter built into the sensor to ensure that only light reflected from a corner-cube retroreflector is recognized by the sensor. This allows reliable detection of shiny targets that could reflect light and be missed by a non-polarized sensor. Most models include a visible sensing beam for easy installation and alignment.

Diffuse Reflective, Focused Diffuse and Wide Angle Diffuse

A wide variety of diffuse reflective models are available with ranges of 8 in (200 mm) and 24 in (610 mm). Forward and Right Angle viewing configurations offer identical optical performance in this series. Focused diffuse reflective models feature a light beam that is focused at a point 1.6 in (40 mm) in front of the sensor lens for applications where you need to avoid sensing objects in front of or behind the target. Wide angle diffuse models provide a large spot and wide detection area.

Perfect Prox

This is a unique type of diffuse reflective sensor that combines extremely high sensing power (called "excess gain") with a sharp optical cutoff to ignore backgrounds. This allows the sensor to reliably detect targets regardless of variations in color, reflectance, contrast or surface shape, while ignoring objects that are just slightly outside the target range. This gives the Perfect Prox an outstanding ability to solve sensing applications that would be difficult or impossible to manage with other types of sensors. It also makes Perfect Prox one of the easiest photoelectric sensors to set up and use.

Eaton's Comet Series includes more background rejection models than any other family on the market. Choose from forward or Right Angle viewing, two-, three- or four-wire circuits, cable, micro or mini-connector terminations and a variety of sensing ranges. A visible sensing beam on most models lets you quickly confirm that the sensor is aligned correctly with the target. Fine spot models provide an extremely small 0.05 in (1.3 mm) light spot for accurately detecting tiny targets such as fine strands of wire or targets that are in or behind small diameter holes.

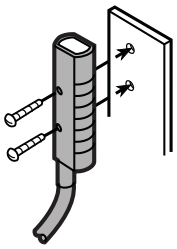
Fiber Optic

The Comet Series also includes sensors that utilize fiber optic cables to sense objects where space is restricted, temperatures are high, or tight viewing angles are required. Choose from models that accept low cost plastic fiber optic cables, or use our glass fiber optic adapter that inexpensively converts our standard diffuse reflective sensors for use with durable glass fiber optic cables.

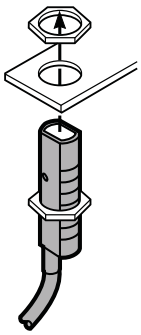
Mounting

Comet Series sensors feature a threaded housing and include two jam nuts and washers for mounting into any 0.75 in (19 mm) hole or a selection of accessory mounting brackets available from Eaton. The flat sides of the sensor feature two mounting holes for easily attaching the sensor to any flat surface with #4 hardware.

Mounting Sensor using #4 Hardware



Mounting Sensor using a Jam Nut



Note: See **Pages V8-T5-62** and **V8-T5-63**, and **Tab 8**, **section 8.2** for a full list of mounting brackets compatible with the Comet Series.

Product Selection

Thru-Beam Sensors

Three-Wire and Four-Wire Sensors

Operating Voltage	Sensing Range	Optimum Range	Field of View	Thru-Beam Component	Connection Type	Catalog Number
Thru-Beam Forward Viewing	**Thru-Beam Forward Viewing** ①②					
20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	20 ft (6m)	0.1 to 10 ft (0.03 to 3m)	30 in (760 mm) diameter at 10 ft (3m) ③	Source (Visible alignment beam)	6 ft cable	**11100A6513**
					4-pin micro AC connector	**11100AQD03**
				Detector	6 ft cable	**12100A6513**
					4-pin micro AC connector	**12100AQD03**
	80 ft (24m)	0.1 to 40 ft (0.03 to 12m)	40 in (1m) diameter at 40 ft (12m)	Source (Visible red beam)	6 ft cable	**11102A6513**
					4-pin micro AC connector	**11102AQD03**
				Detector	6 ft cable	**12102A6513**
					4-pin micro AC connector	**12102AQD03**
10–30 Vdc (NPN and PNP)	20 ft (6m)	0.1 to 10 ft (0.03 to 3m)	30 in (760 mm) diameter at 10 ft (3m) ③	Source (Visible alignment beam)	6 ft cable	**11100A6517**
					4-pin micro DC connector	**11100AQD07**
				Detector	6 ft cable	**12100A6517**
					4-pin micro DC connector	**12100AQD07**
	80 ft (24m)	0.1 to 40 ft (0.03 to 12m)	40 in (1m) diameter at 40 ft (12m)	Source (Visible red beam)	6 ft cable	**11102A6517**
					4-pin micro DC connector	**11102AQD07**
				Detector	6 ft cable	**12102A6517**
					4-pin micro DC connector	**12102AQD07**
Thru-Beam Right Angle Viewing	**Thru-Beam Right Angle Viewing** ①②					
20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	20 ft (6m)	0.1 to 10 ft (0.03 to 3m)	30 in (760 mm) diameter at 10 ft (3m) ③	Source (Visible alignment beam)	6 ft cable	**11100R6513**
					4-pin micro AC connector	**11100RQD03**
				Detector	6 ft cable	**12100R6513**
					4-pin micro AC connector	**12100RQD03**
10–30 Vdc (NPN and PNP)	20 ft (6m)	0.1 to 10 ft (0.03 to 3m)	30 in (760 mm) diameter at 10 ft (3m) ③	Source (Visible alignment beam)	6 ft cable	**11100R6517**
					4-pin micro DC connector	**11100RQD07**
				Detector	6 ft cable	**12100R6517**
					4-pin micro DC connector	**12100RQD07**

Thru-Beam Forward Viewing

Thru-Beam Right Angle Viewing

Notes

See listing of compatible connector cables on **Page V8-T5-62**.

① For a complete system, order one source and one detector.

② 11100 sources and 12100 detectors may be interchanged in any combination. 11102 models must be used with 12102 models.

③ The effective beam (minimum object size that can be detected) is 0.25 in (6.5 mm) diameter.

Reflex Sensors

Two-Wire Sensors

Operating Voltage	Sensing Range ①	Optimum Range ②	Field of View	Sensing Beam	Connection Type	Catalog Number
Standard Reflex Forward Viewing						
90–132 Vac 50/60 Hz or 18–50 Vdc	25 ft (7.6m)	0.1 to 15 ft (0.03 to 4.5m)	1 in (25 mm) diameter at 50 in (1.3m)	Visible red beam	6 ft cable	**14102AS6515**
					3-pin micro AC connector	**14102ASQD05**
Polarized Reflex Forward Viewing ④						
90–132 Vac 50/60 Hz or 18–50 Vdc	15 ft (4.5m)	0.1 to 10 ft (0.03 to 3m)	1 in (25 mm) diameter at 50 in (1.3m)	Visible red beam	6 ft cable	**14101AS6515**
					3-pin micro AC connector	**14101ASQD05**

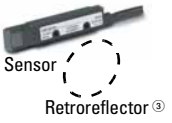
Standard Reflex Forward Viewing

Polarized Reflex Forward Viewing

Three-Wire and Four-Wire Sensors

Operating Voltage	Sensing Range ①	Optimum Range ②	Field of View	Sensing Beam	Connection Type	Catalog Number
Standard Reflex Forward Viewing ⑤						
20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	25 ft (7.6m)	0.1 to 15 ft (0.03 to 4.5m)	1 in (25 mm) diameter at 50 in (1.3m)	Visible red beam	6 ft cable	**14102A6513**
					4-pin micro AC connector	**14102AQD03**
				Infrared beam	6 ft cable	**14100A6513**
					4-pin micro AC connector	**14100AQD03**
10–30 Vdc (NPN and PNP)	25 ft (7.6m)	0.1 to 15 ft (0.03 to 4.5m)	1 in (25 mm) diameter at 50 in (1.3m)	Visible red beam	6 ft cable	**14102A6517**
					4-pin micro DC connector	**14102AQD07**
				Infrared beam	6 ft cable	**14100A6517**
					4-pin micro DC connector	**14100AQD07**
Standard Reflex Right Angle Viewing ⑤						
20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	15 ft (4.5m)	0.1 to 10 ft (0.03 to 3m)	1 in (25 mm) diameter at 50 in (1.3m)	Visible red beam	6 ft cable	**14102R6513**
					4-pin micro AC connector	**14102RQD03**
10–30 Vdc (NPN and PNP)	15 ft (4.5m)	0.1 to 10 ft (0.03 to 3m)	1 in (25 mm) diameter at 50 in (1.3m)	Visible red beam	6 ft cable	**14102R6517**
					4-pin micro DC connector	**14102RQD07**
Polarized Reflex Forward Viewing ④⑤						
20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	15 ft (4.5m)	0.1 to 10 ft (0.03 to 3m)	1 in (25 mm) diameter at 50 in (1.3m)	Visible red beam	6 ft cable	**14101A6513**
					4-pin micro AC connector	**14101AQD03**
10–30 Vdc (NPN and PNP)	15 ft (4.5m)	0.1 to 10 ft (0.03 to 3m)	1 in (25 mm) diameter at 50 in (1.3m)	Visible red beam	6 ft cable	**14101A6517**
					4-pin micro DC connector	**14101AQD07**
Polarized Reflex Right Angle Viewing ②④⑤						
20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	10 ft (3m)	0.1 to 5 ft (0.03 to 1.5m)	1 in (25 mm) diameter at 50 in (1.3m)	Visible red beam	6 ft cable	**14101R6513**
					4-pin micro AC connector	**14101RQD03**
10–30 Vdc (NPN and PNP)	10 ft (3m)	0.1 to 5 ft (0.03 to 1.5m)	1 in (25 mm) diameter at 50 in (1.3m)	Visible red beam	6 ft cable	**14101R6517**
					4-pin micro DC connector	**14101RQD07**

Standard Reflex Right Angle Viewing



Polarized Reflex Forward Viewing

Polarized Reflex Right Angle Viewing

Notes

See listing of compatible connector cables on **Page V8-T5-62**.

① Ranges based on a 3 in diameter retroreflector.

② Right Angle viewing polarized reflex models are rated NEMA 1 only.
See Prism Series on **Page V8-T5-69** for a Right Angle viewing polarized reflex sensor rated NEMA 4X and 6.

③ Retroreflector is not included.

④ Polarized reflex sensors may not operate with retroreflective tape. Test selected tape prior to installation.

⑤ For complete system, order sensor and retroreflector, see **Tab 8**, **section 8.1**.

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Diffuse Reflective and Focused Diffuse Reflective Sensors

Three-Wire and Four-Wire Sensors

Operating Voltage	Sensing Range ①	Optimum Range	Field of View	Sensing Beam	Connection Type	Catalog Number
Diffuse Reflective Forward Viewing						
						
20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	8 in (200 mm)	0.1 to 5 in (3 to 127 mm)	2 in (50 mm) diameter at 5 in (127 mm)	Infrared beam	6 ft cable	**13106A6513**
					4-pin micro AC connector	**13106AQD03**
	24 in (610 mm)	0.1 to 15 in (3 to 380 mm)	5 in (127 mm) diameter at 15 in (380 mm)	Infrared beam	6 ft cable	**13100A6513**
					4-pin micro AC connector	**13100AQD03**
10–30 Vdc (NPN and PNP)	8 in (200 mm)	0.1 to 5 in (3 to 127 mm)	2 in (50 mm) diameter at 5 in (127 mm)	Infrared beam	6 ft cable	**13106A6517**
					4-pin micro DC connector	**13106AQD07**
	24 in (610 mm)	0.1 to 15 in (3 to 380 mm)	5 in (127 mm) diameter at 15 in (380 mm)	Infrared beam	6 ft cable	**13100A6517**
					4-pin micro DC connector	**13100AQD07**
Diffuse Reflective Right Angle Viewing						
						
20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	8 in (200 mm)	0.1 to 5 in (3 to 127 mm)	2 in (50 mm) diameter at 5 in (127 mm)	Infrared beam	6 ft cable	**13106R6513**
					4-pin micro AC connector	**13106RQD03**
	24 in (610 mm)	0.1 to 15 in (3 to 380 mm)	5 in (127 mm) diameter at 15 in (380 mm)	Infrared beam	6 ft cable	**13100R6513**
					4-pin micro AC connector	**13100RQD03**
10–30 Vdc (NPN and PNP)	8 in (200 mm)	0.1 to 5 in (3 to 127 mm)	2 in (50 mm) diameter at 5 in (127 mm)	Infrared beam	6 ft cable	**13106R6517**
					4-pin micro DC connector	**13106RQD07**
	24 in (610 mm)	0.1 to 15 in (3 to 380 mm)	5 in (127 mm) diameter at 15 in (380 mm)	Infrared beam	6 ft cable	**13100R6517**
					4-pin micro DC connector	**13100RQD07**
Wide Beam Diffuse Reflective Forward Viewing						
						
20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	6 in (150 mm)	0.1 to 4 in (3 to 101 mm)	4.3 in (109 mm) diameter at 3 in (76 mm)	Infrared beam	6 ft cable	**13107AS6513**
					4-pin micro AC connector	**13107ASQD03**
10–30 Vdc (NPN and PNP)	6 in (150 mm)	0.1 to 4 in (3 to 101 mm)	4.3 in (109 mm) diameter at 3 in (76 mm)	Infrared beam	6 ft cable	**13107AS6517**
					4-pin micro DC connector	**13107ASQD07**
Wide Beam Diffuse Reflective Right Angle Viewing						
						
20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	6 in (150 mm)	0.1 to 4 in (3 to 101 mm)	4.3 in (109 mm) diameter at 3 in (76 mm)	Infrared beam	6 ft cable	**13107RS6513**
					4-pin micro AC connector	**13107RSQD03**
10–30 Vdc (NPN and PNP)	6 in (150 mm)	0.1 to 4 in (3 to 101 mm)	4.3 in (109 mm) diameter at 3 in (76 mm)	Infrared beam	6 ft cable	**13107RS6517**
					4-pin micro DC connector	**13107RSQD07**
Focused Diffuse Reflective Forward Viewing						
						
20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	Focused at 1.6 in (40 mm)	1.5 to 1.9 in (38 to 48 mm)	0.05 in (1.3 mm) diameter at 1.6 in (40 mm)	Visible red beam	6 ft cable	**13102A6513**
					4-pin micro AC connector	**13102AQD03**
10–30 Vdc (NPN and PNP)	Focused at 1.6 in (40 mm)	1.5 to 1.9 in (38 to 48 mm)	0.05 in (1.3 mm) diameter at 1.6 in (40 mm)	Visible red beam	6 ft cable	**13102A6517**
					4-pin micro DC connector	**13102AQD07**

Notes

See listing of compatible connector cables on **Page V8-T5-62**.

① Sensor will detect a 90% reflective white card at this range.

Perfect Prox Background Rejection Sensors

Two-Wire Sensors

Perfect Prox Forward Viewing

Operating Voltage	Nominal Range ①	Optimum Range	Cut-Off Range ②	Filed of View	Sensing Beam	Connection Type	Catalog Number
Perfect Prox Forward Viewing							
90–132 Vac 50/60 Hz or 18–50 Vdc	2 in (50 mm) sharp cutoff	0.4 to 1.8 in (10 to 45 mm)	2.25 in (57 mm) and beyond	0.25 in (6 mm) diameter at 2.25 in (64 mm)	Visible red	6 ft cable	**13104A6515**
						3-pin micro AC connector	**13104AQD05**
						3-pin mini-connector	**13104AQD25**
	4 in (100 mm) sharp cutoff	0.5 to 3 in (13 to 76 mm)	5 in (127 mm) and beyond	0.35 in (9 mm) diameter at 5 in (127 mm)		6 ft cable	**13101AS6515** ③
						3-pin micro AC connector	**13101ASQD05** ③
						3-pin mini- connector	**13101ASQD25** ③
Perfect Prox Right Angle Viewing							
90–132 Vac 50/60 Hz or 18–50 Vdc	2 in (50 mm) sharp cutoff	0.4 to 1.8 in (10 to 45 mm)	2.25 in (57 mm) and beyond	0.25 in (6 mm) diameter at 2.25 in (64 mm)	Visible red	6 ft cable	**13104R6515**
						3-pin micro AC connector	**13104RQD05**
						3-pin mini-connector	**13104RQD25**
	4 in (100 mm) sharp cutoff	0.5 to 3 in (13 to 76 mm)	5 in (127 mm) and beyond	0.35 in (9 mm) diameter at 5 in (127 mm)		6 ft cable	**13101RS6515** ③
						3-pin micro AC connector	**13101RSQD05** ③

Three-Wire and Four-Wire Sensors

Perfect Prox Forward Viewing

Operating Voltage	Nominal Range ①	Optimum Range	Cut-Off Range ②	Filed of View	Sensing Beam	Connection Type	Catalog Number
Perfect Prox Forward Viewing							
20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	2 in (50 mm) sharp cutoff	0.4 to 1.8 in (10 to 45 mm)	2.25 in (57 mm) and beyond	0.25 in (6 mm) diameter at 2.25 in (64 mm)	Visible red	6 ft cable	**13104A6513**
						4-pin micro AC connector	**13104AQD03**
	4 in (100 mm) sharp cutoff	0.5 to 3 in (13 to 76 mm)	5 in (127 mm) and beyond	0.35 in (9 mm) diameter at 5 in (127 mm)		6 ft cable	**13101A6513**
						4-pin micro AC connector	**13101AQD03**
	6 in (150 mm) standard cutoff	0.1 to 4 in (3 to 100 mm)	9 in (228 mm) and beyond	0.6 in (15 mm) diameter at 6 in (150 mm)	Infrared	6 ft cable	**13108A6513**
						4-pin micro AC connector	**13108AQD03**
	9 in (225 mm) standard cutoff	0.1 to 6 in (3 to 150 mm)	12 in (304 mm) and beyond	0.9 in (23 mm) diameter at 9 in (225 mm)		6 ft cable	**13103A6513**
						4-pin micro AC connector	**13103AQD03**
10–30 Vdc (NPN and PNP)	2 in (50 mm) sharp cutoff	0.4 to 1.8 in (10 to 45 mm)	2.25 in (57 mm) and beyond	0.25 in (6 mm) diameter at 2.25 in (64 mm)	Visible red	6 ft cable	**13104A6517**
						4-pin micro DC connector	**13104AQD07**
	4 in (100 mm) sharp cutoff	0.5 to 3 in (13 to 76 mm)	5 in (127 mm) and beyond	0.35 in (9 mm) diameter at 5 in (127 mm)		6 ft cable	**13101A6517**
						4-pin micro DC connector	**13101AQD07**
	6 in (150 mm) standard cutoff	0.1 to 4 in (3 to 100 mm)	9 in (228 mm) and beyond	0.6 in (15 mm) diameter at 6 in (150 mm)	Infrared	6 ft cable	**13108A6517**
						4-pin micro DC connector	**13108AQD07**
	9 in (225 mm) standard cutoff	0.1 to 6 in (3 to 150 mm)	12 in (304 mm) and beyond	0.9 in (23 mm) diameter at 9 in (225 mm)		6 ft cable	**13103A6517**
						4-pin micro DC connector	**13103AQD07**

Notes

See listing of compatible connector cables on **Page V8-T5-62**.

① Sensor will detect a 90% reflectance card at this range.

② Sensor will ignore a 90% reflectance card at this range.

③ Consult factory for approval status.

Three-Wire and Four-Wire Sensors, continued

Perfect Prox Right Angle Viewing

Operating Voltage	Nominal Range ①	Optimum Range	Cut-Off Range ②	Filed of View	Sensing Beam	Connection Type	Catalog Number
Perfect Prox Right Angle Viewing							
20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	2 in (50 mm) sharp cutoff	0.4 to 1.8 in (10 to 45 mm)	2.25 in (57 mm) and beyond	0.25 in (6 mm) diameter at 2.25 in (64 mm)	Visible red	6 ft cable	**13104R6513**
						4-pin micro AC connector	**13104RQD03** ⠿
	4 in (100 mm) sharp cutoff	0.5 to 3 in (13 to 76 mm)	5 in (127 mm) and beyond	0.35 in (9 mm) diameter at 5 in (127 mm)		6 ft cable	**13104RS5013**
						4-pin micro AC connector	**13104RS5003** ⠿
	6 in (150 mm) standard cutoff	0.1 to 4 in (3 to 100 mm)	9 in (228 mm) and beyond	0.6 in (15 mm) diameter at 6 in (150 mm)	Infrared	6 ft cable	**13108R6513**
						4-pin micro AC connector	**13108RQD03** ⠿
	9 in (225 mm) standard cutoff	0.1 to 6 in (3 to 150 mm)	12 in (304 mm) and beyond	0.9 in (23 mm) diameter at 9 in (225 mm)		6 ft cable	**13103R6513**
						4-pin micro AC connector	**13103RQD03** ⠿
10–30 Vdc (NPN and PNP)	2 in (50 mm) sharp cutoff	0.4 to 1.8 in (10 to 45 mm)	2.25 in (57 mm) and beyond	0.25 in (6 mm) diameter at 2.25 in (64 mm)	Visible red	6 ft cable	**13104R6517**
						4-pin micro DC connector	**13104RQD07** ⠿
	4 in (100 mm) sharp cutoff	0.5 to 3 in (13 to 76 mm)	5 in (127 mm) and beyond	0.35 in (9 mm) diameter at 5 in (127 mm)		6 ft cable	**13104RS5020**
						4-pin micro DC connector	**13104RS5007** ⠿
	6 in (150 mm) standard cutoff	0.1 to 4 in (3 to 100 mm)	9 in (228 mm) and beyond	0.6 in (15 mm) diameter at 6 in (150 mm)	Infrared	6 ft cable	**13108R6517**
						4-pin micro DC connector	**13108RQD07** ⠿
	9 in (225 mm) standard cutoff	0.1 to 6 in (3 to 150 mm)	12 in (304 mm) and beyond	0.9 in (23 mm) diameter at 9 in (225 mm)		6 ft cable	**13103R6517**
						4-pin micro DC connector	**13103RQD07** ⠿

Fine Spot Perfect Prox Forward Viewing

Fine Spot Perfect Prox Forward Viewing							
20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	2 in (50 mm) sharp cutoff	0.9 to 1.8 in (23 to 45 mm)	2.25 in (57 mm) and beyond	0.05 in (1.3 mm) diameter at 1.7 in (43 mm)	Visible red	6 ft cable	**13105A6513**
						4-pin micro AC connector	**13105AQD03** ⠿
10–30 Vdc (NPN and PNP)	2 in (50 mm) sharp cutoff	0.9 to 1.8 in (23 to 45 mm)	2.25 in (57 mm) and beyond	0.05 in (1.3 mm) diameter at 1.7 in (43 mm)		6 ft cable	**13105A6517**
						4-pin micro DC connector	**13105AQD07** ⠿

Notes

⠿ See listing of compatible connector cables on **Page V8-T5-62**.

① Sensor will detect a 90% reflectance card at this range.

② Sensor will ignore a 90% reflectance card at this range.

③ Consult factory for approval status.

Fiber Optic Sensors

Three-Wire and Four-Wire Sensors

Plastic Fiber Optic Forward Viewing

Operating Voltage	Sensing Range (Optimum Range is 50% of Sensing Range) ① Bulk Length Fibers ② Thru-Beam Mode	Diffuse Reflective Mode	Pre-Assembled Fiber Optic Cables Thru-Beam Mode 0.5 mm Diameter Fibers	Thru-Beam Mode 1 mm Diameter Fibers	Diffuse Reflective Mode 0.5 mm Diameter Fibers	Diffuse Reflective Mode 1 mm Diameter Fibers	Connection Type	Catalog Number
18 mm Diameter Plastic Fiber Optic Forward Viewing								
20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	5 in (123 mm)	1.5 in (38 mm)	2.1 in (53 mm)	5 in (127 mm)	0.6 in (15 mm)	1.5 in (38 mm)	6 ft cable	**15100A6513**
							4-pin micro AC connector	**15100AQD03** ⠿
10–30 Vdc (NPN and PNP)	5 in (123 mm)	1.5 in (38 mm)	2.1 in (53 mm)	5 in (127 mm)	0.6 in (15 mm)	1.5 in (38 mm)	6 ft cable	**15100A6517**
							4-pin micro DC connector	**15100AQD07** ⠿
Glass Fiber Optic Adapter								
Use our glass fiber optic adapter with any diffuse reflective sensor model—see below for details.								

Glass Fiber Optic Adapter

This simple adapter allows glass fiber optic cables to be used with standard Comet Series diffuse reflective sensors.

Glass Fiber Optic Adapter with Hex Wrench,

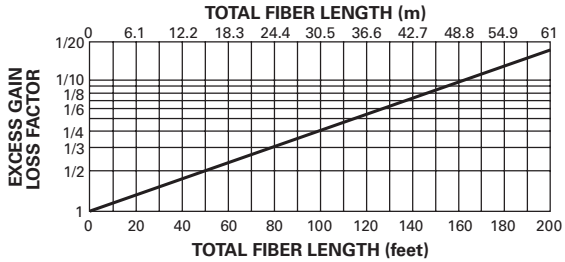
Glass Fiber Optic Adapter

Sensors	Fibers	Catalog Number
Glass Fiber Optic Adapter with Hex Wrench		
Forward viewing, diffuse reflective sensors (ordered separately, see **Page V8-T5-58**)	Glass fiber optic cables (ordered separately, see **Tab 9**, **section 9.2**) **Note:** Use only with the E51KF series fibers.	**6235A-6501**

Notes

⠿ See listing of compatible connector cables on **Page V8-T5-62**.

① Ranges are with bare fibers—no lenses. Sensing range is affected by power of sensor, length of fiber optic cable and use of lenses. Lenses will increase ranges. As bulk fiber length increases, sensing range decreases—see table below. For example, for 100 ft of fiber (the total of source and detector fiber lengths), the excess gain shown in gain graphs below would be reduced to about 1/4 its nominal value.



② Sensing range is based on 6 ft (2m) of plastic 1 mm diameter source and detector fiber optic cable for a total length of 13.1 ft (4m). To determine performance with longer lengths, see graph above.
Compatible fiber optic cables are shown in **Tab 9**, **section 9.1**.

5

Compatible Connector Cables

Micro-Style, Straight Female

Standard Cables—Micro [1]

Voltage Style	Number of Pins	Gauge	Length	Pin Configuration/ Wire Colors (Face View Female Shown)	PVC Jacket Catalog Number	PUR Jacket Catalog Number	IRR PUR Jacket Catalog Number
Micro-Style, Straight Female							
AC	3-pin, 3-wire	22 AWG	6 ft (2m)	 1-Green 2-Red/Black 3-Red/White	**CSAS3F3CY2202**	**CSAS3F3RY2202**	—
	4-pin, 4-wire	22 AWG	6 ft (2m)	 1-Red/Black 2-Red/White 3-Red 4-Green	**CSAS4F4CY2202**	**CSAS4F4RY2202**	**CSAS4F4IO2202**
DC	4-pin, 4-wire	22 AWG	6 ft (2m)	 1-Brown 2-White 3-Blue 4-Black	**CSDS4A4CY2202**	**CSDS4A4RY2202**	**CSDS4A4IO2202**

Mini-Style, Straight Female

Standard Cables—Mini [1]

Current Rating at 600V	Voltage Style	Number of Pins	Gauge	Length	Pin Configuration/ Wire Colors (Face View Female Shown)	Catalog Number
Mini-Style, Straight Female						
13A	—	3-pin	16 AWG	6 ft (2m)	 1-Green 2-Black 3-White	**CSMS3F3CY1602**

Accessories

Comet Series Sensors

Description	Catalog Number
Retroreflectors	
Retroreflectors and retroreflective tape	See **Tab 8, section 8.1**
Mounting Brackets	
A wide variety of mounting brackets for tubular sensors	See **Tab 8, section 8.2**

Flush Mount Bracket

Flush Mount Bracket	
Contoured design is ideal for flush mounting of Right Angle Comet Series reflex to mounting surface using 1/4-in hardware. No alignment adjustment. Sensor mounts on #4 studs. 304 stainless steel	**6161AS5296**

Flush Mount Bracket

Flush Mount Bracket	
Same as above except without contour. Ideal for right angle diffuse and thru-beam sensors. 304 stainless steel	**6161AS5297**

Dimensions, see **Page V8-T5-68**.

Note

[1] For a full selection of connector cables, see **Tab 10**, **section 10.1**.

Comet Series Sensors, continued

Description	Catalog Number
Adjustable Protective Bracket	
Adjustable Protective Bracket  Heavy-duty bracket protects the sensor from damage. Works with all Comet Series sensors except two inch Perfect Prox models. Ideal for material handling applications with Right Angle reflex sensors. Provides locking vertical and horizontal adjustments for independent adjustment in each axis. Sensor mounts on #4 studs. 10 ga. painted steel	**E58KS5200**
Comet Ball Swivel Bracket	
Comet Ball Swivel Bracket  Allows 360° rotation and 10° vertical tilt. Hole spacing is identical to our 50 and 55 Series sensors. Ideal for mounting Right Angle sensors. Made of Noryl.	**6181AS5200**
Accessories	
Replacement mounting brackets, nuts and other accessories	See **Tab 8, sections 8.2** and **8.3**
Connector Cables	
A variety of cables, connector blocks and accessories	See **Tab 10, section 10.1**
Dimensions, see **Page V8-T5-68**.	

Technical Data and Specifications

Glass Fiber Optic Adapter

Description	Specification
Sensor specifications	See Comet Series specifications on **Page V8-T5-64**
Material of construction	Adapter: 360 brass; gasket: silicone
Vibration (sensor/adapter)	30g over 10 Hz to 2 kHz
Shock (sensor/adapter)	50g for 10 ms 1/2 sinewave pulse
Enclosure ratings	NEMA 1 ①

Note

① The adapter will resist the entrance of moisture in the area between the lenses and the fiber ends when properly assembled. However, moisture entry is possible during direct high pressure sprays. Since the Comet Series sensors are rated NEMA 1, 2, 3, 4, 4X, 6, 12 and 13, this will not result in damage to the sensors themselves.

Comet Series Sensors

Description	Three-Wire and Four-Wire Sensors AC/DC Models (AC Operation)	AC/DC Models (DC Operation)	DC-Only Models	Two-Wire Sensors AC Models	DC Models
Input voltage	20 to 264 Vac, 50/60 Hz	15 to 30 Vdc (15 to 24 Vdc above 131°F/55°C)	10 to 30 Vdc, (10 to 24 Vdc above 131°F/55°C)	90 to 132 Vac, 50/60 Hz	18 to 50 Vdc
Power dissipation	1.5W maximum	1.5W maximum	1W maximum	2W maximum	2W maximum
Output type	VMOS (bi-directional)	NPN (sink)	NPN and PNP (dual outputs)	DMOS	DMOS
Current switching	300 mA maximum	300 mA maximum	PNP: 100 mA maximum; NPN: 250 mA maximum (NPN: 120 mA maximum above 131°F/55°C)	300 mA	300 mA
Voltage switching	375V peak maximum	375V peak maximum	30 Vdc maximum	132 Vac maximum	50 Vdc maximum
Off-state leakage	250 µA typical; 500 µA maximum	250 µA typical; 500 µA maximum	10 µA maximum	1.7 mA maximum	1.5 mA maximum
Surge current	2A maximum	2A maximum	1A maximum	1A maximum	1A maximum
On-state voltage drop	—	1.8V at 10 mA; 3.5V at 300 mA	NPN: 400 mV at 10 mA, 1.5V at 250 mA; PNP: 2.4V at 100 mA	10 Vac	8 Vdc
Response time	10 ms	10 ms	1 ms; 3.5 ms (thru-beam)	32 ms	32 ms
Time delay	Models with fixed time delay available—contact factory	Models with fixed time delay available—contact factory	Models with fixed time delay available—contact factory	Models with fixed time delay available—contact factory	Models with fixed time delay available—contact factory
Short circuit protection	①	①	②	Auto reset	Auto reset
Temperature range					
Thru-beam source	–4° to 158°F (–20° to 70°C)	–4° to 158°F (–20° to 70°C)	–4° to 158°F (–20° to 70°C)	–13° to 131°F (–25° to 55°C)	–13° to 131°F (–25° to 55°C)
All others	–40° to 158°F (–40° to 70°C)	–40° to 158°F (–40° to 70°C)	–40° to 158°F (–40° to 70°C)	—	—
Light/dark operation	Switch selectable	Switch selectable	Switch selectable	Switch selectable	Switch selectable

Description	All Models
Enclosure material	Lens: polycarbonate; cable jacket: PVC; body: structural polyurethane foam (do not expose to concentrated acids, alcohols or ketones)
Cable/connector	Cable versions: 6 ft cable (22 AWG) Connector versions: Male mini- and micro-connectors (refer to wiring diagrams for number of pins per model) on nominal 8 in pigtails
Vibration and shock	Vibration: 30g over 10 Hz to 2 kHz; shock: 100g for 3 ms 1/2 sine wave pulse
Indicator LED	Lights steady when output is ON; flashes when short circuit protection is in latch condition (except two-wire models)
Sunlight immunity	Perfect Prox: 5000 ft-candles; all others: 10,000 ft-candles
Enclosure ratings	NEMA 1, 2, 3, 4, 4X, 6, 12 and 13 ③④; IP69K

Notes

① Sensor will turn off immediately when short or overload is detected (indicator LED flashes). Turn power OFF and back ON to reset.
IMPORTANT: During installation, correct power connections must be made first to ensure fail-safe short circuit protection of outputs.

② Sensor will turn off immediately when short or overload is detected (indicator LED flashes). Sensor will reset when short is removed.

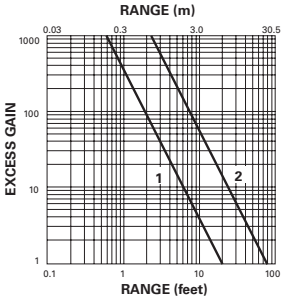
③ These products conform to NEMA tests as indicated, however, some severe washdown applications can exceed these NEMA test specifications.

④ NEMA 6P models available—contact factory.

Excess Gain

Thru-Beam Sensors

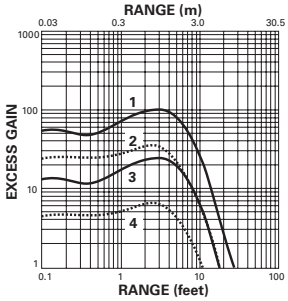
Thru-Beam



1. 12100A and 12100R detectors using 11100A or 11100R sources
2. 12102A detectors using 11102A sources

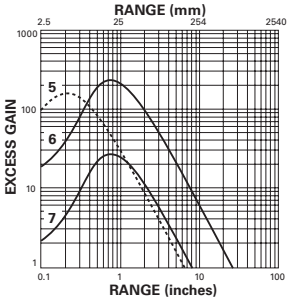
Reflex Sensors, Diffuse Reflective Sensors and Focused Diffuse Reflective Sensors

Reflex (3 In Diameter Retroreflector)



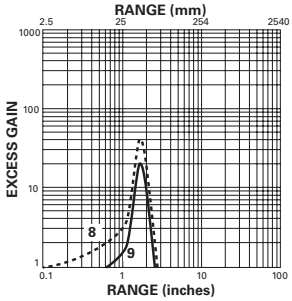
1. 14100A/14102A
2. 14102R
3. 14101A
4. 14101R

Diffuse Reflective (90% Reflective White Card)



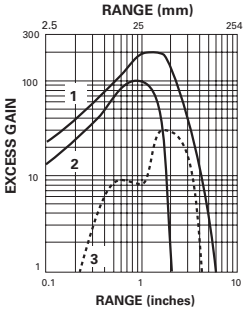
5. 13107
6. 13100
7. 13106

Focused Diffuse Reflective

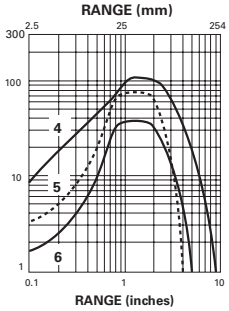


8. 13102A Typical
9. 13102A Minimum

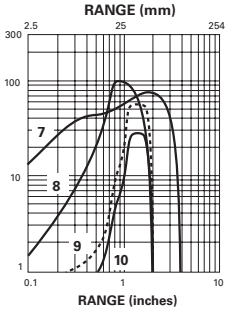
Perfect Prox Sensors



1. 13108A/13108R
2. 13104A
3. 13104RS



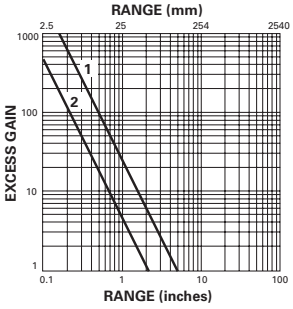
4. 13103A/13103R
5. 13101A Typical
6. 13101A Minimum



7. 13101AS
8. 13104R
9. 13105A Typical
10. 13105A Minimum

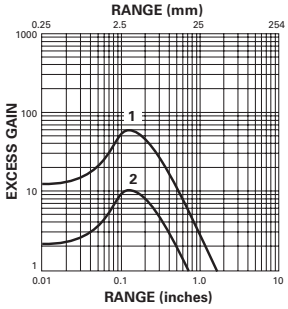
Fiber Optic Sensors (Performance using 13.1 ft [4m] of fiber)

Thru-Beam Mode



1. 15100 with 1 mm diameter fibers
2. 15100 with 0.5 mm diameter fibers

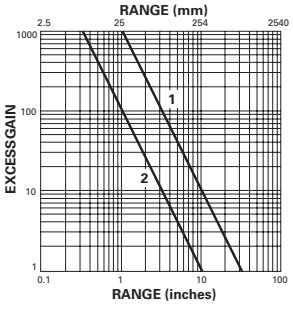
Diffuse Reflective Mode



1. 15100 with 1 mm diameter fibers
2. 15100 with 0.5 mm diameter fibers

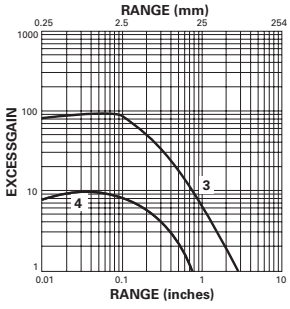
Glass Fiber Optic Adapters

When Using Single Fibers for Thru-Beam Sensing



Gain using E51KF823 fibers
1. 13100A Comet
2. 13106A Comet

When Using Duplex Fibers for Diffuse Reflective Sensing

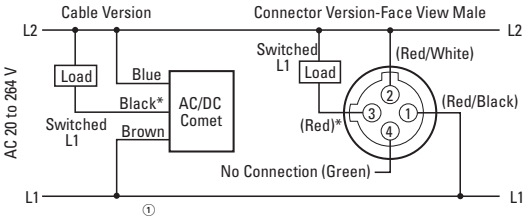


Gain using E51KF723 fibers, based on 90% reflective white card
3. 13100A Comet
4. 13106A Comet

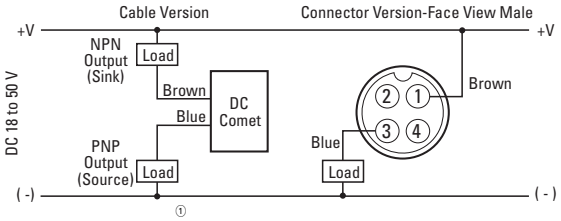
Wiring Diagrams

Pin numbers are for reference, rely on pin location when wiring.

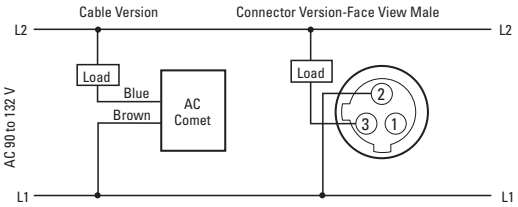
AC/DC Models (AC Connection)



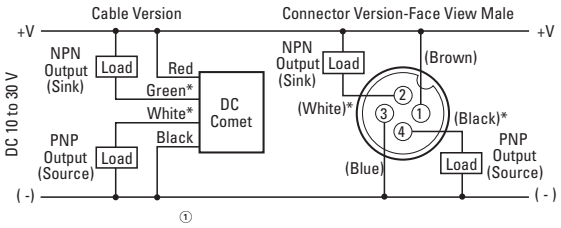
DC Models (Two-Wire)



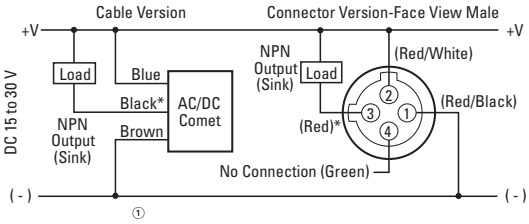
AC Models (AC Connection)



DC Models (Four-Wire)



AC/DC Models (DC Connection)



Notes

CAUTION: AC/DC connector version sensors use an AC-type connector. Use of DC power with AC-type connectors may not conform with established standards.

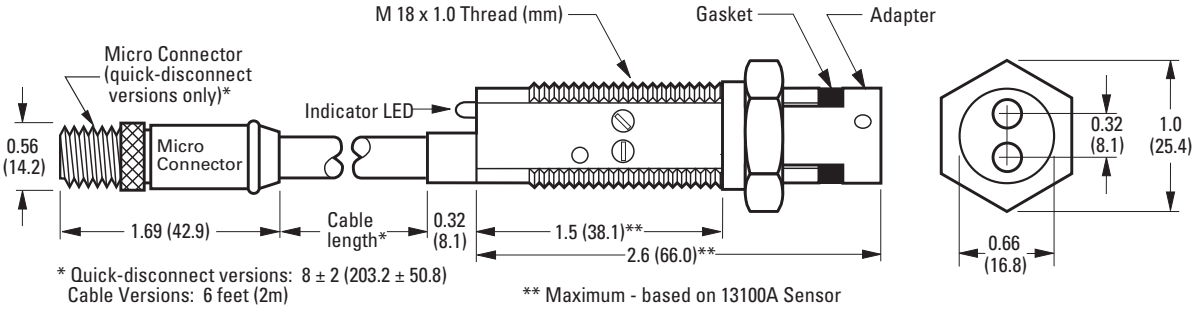
For connector versions, the pin numbering and color codes shown are typical of several manufacturers. However, variations are possible. In case of discrepancies, rely on function indicated and pin location rather than pin number or color code.

* No connection when using thru-beam sources.

Dimensions

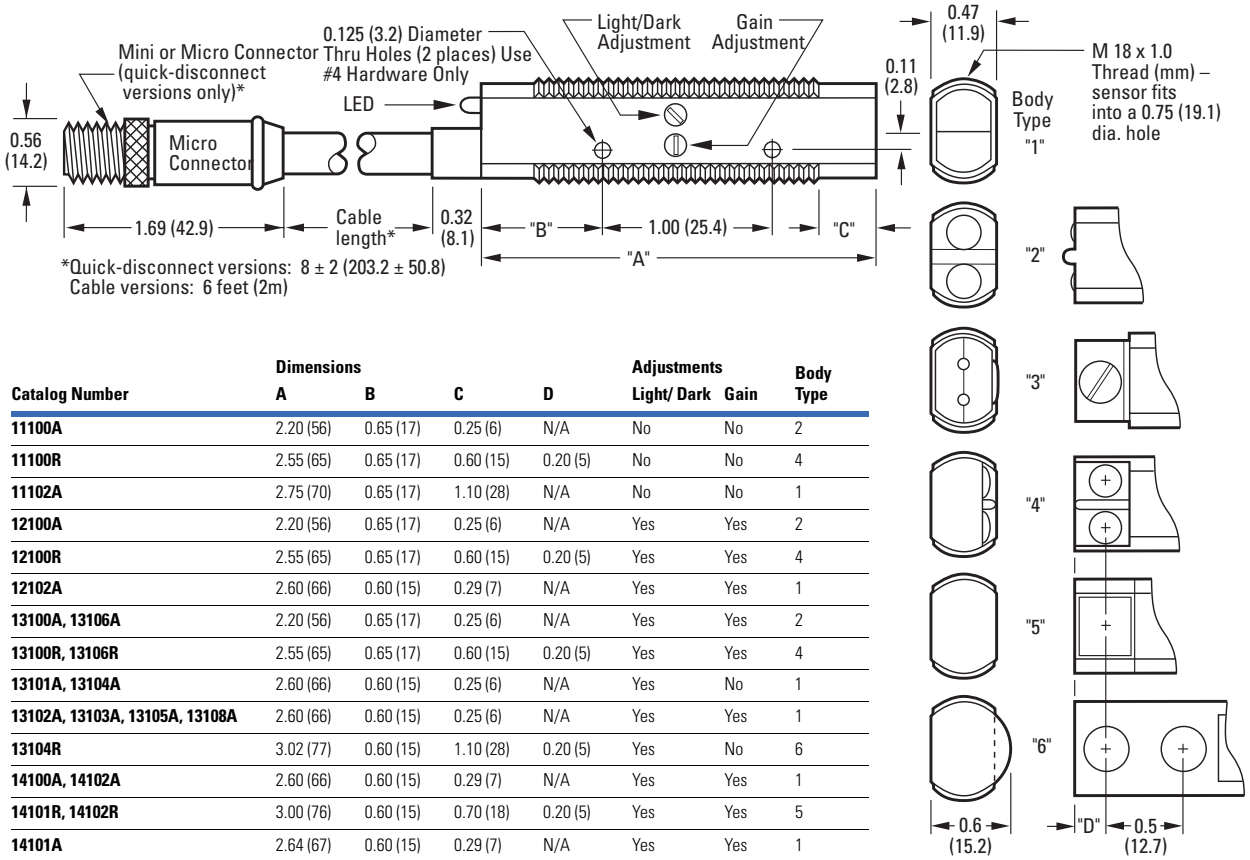
Approximate Dimensions in Inches (mm), unless otherwise noted

Sensor with Adapter Installed



Approximate Dimensions in Inches (mm), unless otherwise noted

Comet Series Sensor Dimensions and Specifications



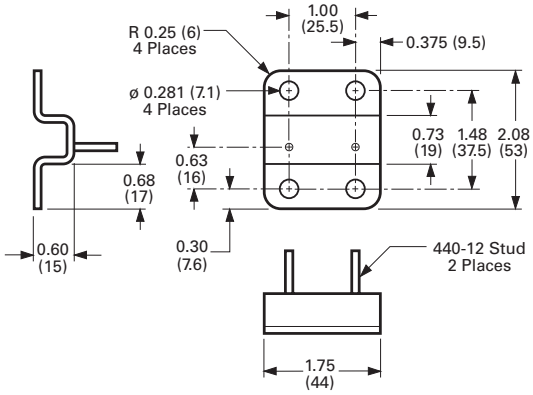
Catalog Number	Dimensions A	B	C	D	Adjustments Light/ Dark	Gain	Body Type
11100A	2.20 (56)	0.65 (17)	0.25 (6)	N/A	No	No	2
11100R	2.55 (65)	0.65 (17)	0.60 (15)	0.20 (5)	No	No	4
11102A	2.75 (70)	0.65 (17)	1.10 (28)	N/A	No	No	1
12100A	2.20 (56)	0.65 (17)	0.25 (6)	N/A	Yes	Yes	2
12100R	2.55 (65)	0.65 (17)	0.60 (15)	0.20 (5)	Yes	Yes	4
12102A	2.60 (66)	0.60 (15)	0.29 (7)	N/A	Yes	Yes	1
13100A, 13106A	2.20 (56)	0.65 (17)	0.25 (6)	N/A	Yes	Yes	2
13100R, 13106R	2.55 (65)	0.65 (17)	0.60 (15)	0.20 (5)	Yes	Yes	4
13101A, 13104A	2.60 (66)	0.60 (15)	0.25 (6)	N/A	Yes	No	1
13102A, 13103A, 13105A, 13108A	2.60 (66)	0.60 (15)	0.25 (6)	N/A	Yes	Yes	1
13104R	3.02 (77)	0.60 (15)	1.10 (28)	0.20 (5)	Yes	No	6
14100A, 14102A	2.60 (66)	0.60 (15)	0.29 (7)	N/A	Yes	Yes	1
14101R, 14102R	3.00 (76)	0.60 (15)	0.70 (18)	0.20 (5)	Yes	Yes	5
14101A	2.64 (67)	0.60 (15)	0.29 (7)	N/A	Yes	Yes	1
15100A, 15101A	2.87 (73)	0.60 (15)	0.60 (15)	N/A	Yes	Yes	3

5

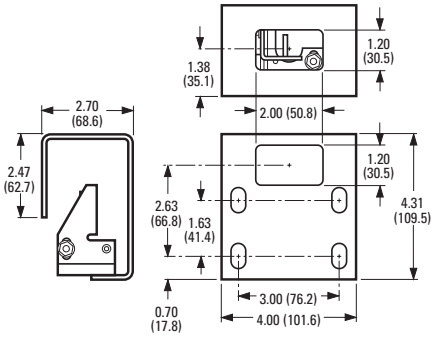
Approximate Dimensions in Inches (mm), unless otherwise noted

Accessories

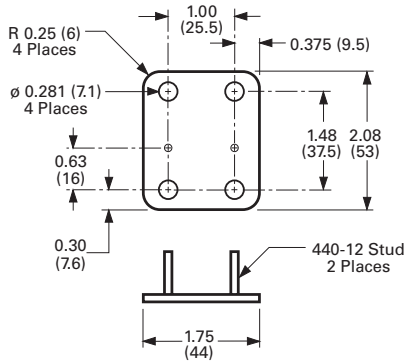
Flush Mount Bracket—6161AS5296



Adjustable Protective Bracket



Flush Mount Bracket—6161AS5297



Comet Ball Swivel Bracket