

Comet Series Sensors



5

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

Contents

<i>Description</i>	<i>Page</i>
Comet Series Sensors	
Product Overview	V8-T5-55
Product Selection	
Thru-Beam Sensors	V8-T5-56
Reflex Sensors	V8-T5-57
Diffuse Reflective and Focused Diffuse Reflective Sensors	V8-T5-58
Perfect Prox Background Rejection Sensors	V8-T5-59
Fiber Optic Sensors	V8-T5-61
Glass Fiber Optic Adapter	V8-T5-61
Compatible Connector Cables	V8-T5-62
Accessories	V8-T5-62
Technical Data and Specifications	V8-T5-63
Excess Gain	V8-T5-65
Wiring Diagrams	V8-T5-66
Dimensions	V8-T5-66

- 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

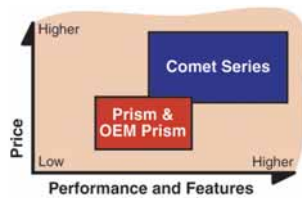
For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578. For Application Assistance in the U.S. and Canada call 1-800-426-9184.

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.

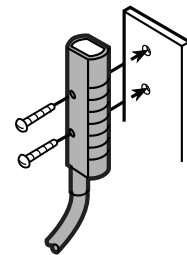
Fiber Optic

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.

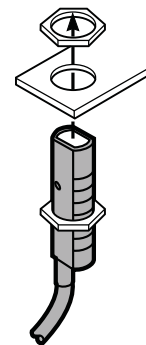
Mounting

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.

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 	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 	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 Ⓢ

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 	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 	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 Ⓢ
					6 ft cable	14102R6517	
					4-pin micro DC connector	14102RQD07 Ⓢ	
Polarized Reflex Forward Viewing 	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 Ⓢ
					6 ft cable	14101A6517	
					4-pin micro DC connector	14101AQD07 Ⓢ	
Polarized Reflex Right Angle Viewing 	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 Ⓢ
					6 ft cable	14101R6517	
					4-pin micro DC connector	14101RQD07 Ⓢ	

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**.

Comet Series Sensors

Description	Three-Wire and Four-Wire Sensors			Two-Wire Sensors AC Models	DC Models
	AC/DC Models (AC Operation)	AC/DC Models (DC Operation)	DC-Only 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 μ A typical; 500 μ A maximum	250 μ A typical; 500 μ A maximum	10 μ A 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 pigtailed				
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.