

PHOTOELECTRIC SENSORS

Comet Series



- 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 $\frac{6}{10}$ "
- 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
- Models Available with Both AC and DC Operation in a Single Unit—up to 264 Vac!
- 4-Wire DC Sensors Offer Both NPN and PNP Outputs
- Output Status Indicator Visible from a Wide 270° Angle

The Cutler-Hammer® Comet Series 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.



15100A6517 shown smaller than actual size.

13104A6517 shown smaller than actual size.

13104RQD07 shown smaller than actual size.

The Comet Series includes AC/DC and DC-only models with, 3- and 4-wire circuitry. Choose from cable or microconnector.

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 $\frac{3}{8}$ " 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.

SPECIFICATIONS

Input Voltage AC/DC Models:

AC Operation: 20 to 264 Vac, 50/60 Hz
DC Operation: 15 to 30 Vdc
[15 to 24 Vdc above 155°C (31°F)]

Input Voltage DC-Only Models:

10 to 30 Vdc, [10 to 24 Vdc above 55°C (131°F)]

Power Dissipation:

AC/DC Models: 1.5 W maximum
DC-Only Models: 1 W maximum

Output Type:

AC/DC Models—AC Operation:
VMOS (bi-directional)
AC/DC Models—DC Operation:
NPN (sink)
DC Only Models: NPN and PNP (dual outputs)

Current Switching:

AC/DC Models: 300 mA max
DC Only Models:
PNP: 100 mA max
NPN: 250 mA maximum
[NPN: 120 mA maximum above 55°C (131°F)]

Voltage Switching:

AC/DC Models: 375V peak maximum
DC Only Models: 30 Vdc maximum

Off-State Leakage:

AC/DC Models: 250 μ A typical;
500 μ A maximum
DC Only Models: 10 μ A maximum

Surge Current:

AC/DC Models: 2 A maximum
DC Only Models: 1 A maximum

On-State Voltage Drop:

AC/DC Models – AC Operation: n/a
AC/DC Models – DC Operation:
1.8V at 10 mA; 3.5V at 300 mA

DC Only Models:

NPN: 400 mV at 10 mA,
1.5V at 250 mA;
PNP: 2.4V at 100 mA

Response Time:

AC/DC Models: 10 ms
DC Only Models: 1 ms;
3.5 ms (thru-beam)

Short Circuit Protection:

AC/DC Models: 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.
DC-Only Models: Sensor will turn off immediately when short or overload is detected (indicator LED flashes). Sensor will reset when short is removed.

Temperature Range:

Thru-Beam Source:
-20 to 70°C (-4 to 158°F)
All Others: -40 to 70°C (-40 to 158°F)

Light/Dark Operation: Switch selectable

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' cable

Connector Versions: Male mini and micro connectors (refer to wiring diagrams for number of pins per model) on nominal 8" pigtails

Vibration and Shock:

Vibration: 30g over 10 Hz to 2 kHz

Shock: 100g for 3 ms ½ sine wave pulse

Indicator LED: Lights steady when output is ON; flashes when short circuit protection is in latch condition

Sunlight Immunity:

Perfect Prox: 5000 foot-candles

All Others: 10,000 foot-candles

Enclosure Ratings: NEMA 1, 2, 3, 4, 4X, 6, 12 and 13 NEMA 6P models available—contact factory

Approvals: UL and C-UL recognized (all models), CE compliant

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

Sensing Modes

Thru-Beam

Separate light source and detector units face one another across an area. The column of light traveling in a straight line between the two lenses is the effective sensing beam. An object crossing the path has to completely block the beam to be detected.

Polarized Reflex

The source and detector are positioned parallel to each other on the same side of the object to be detected. Another element, called a retroreflector, is placed across from the source and detector. The sensing beam is reflected from a retroreflector back to the sensor. The Comet Series includes polarized models with 3-wire and 4-wire circuits. Right-angle models are also available. 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

The source and detector are positioned on the same side of the target. The two components are aligned so that their fields of view cross. When the target moves into the area, light from the source is reflected off the target surface back to the detector. A retroreflector is not required. Forward and right-angle viewing configurations offer identical optical performance in this series.

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.

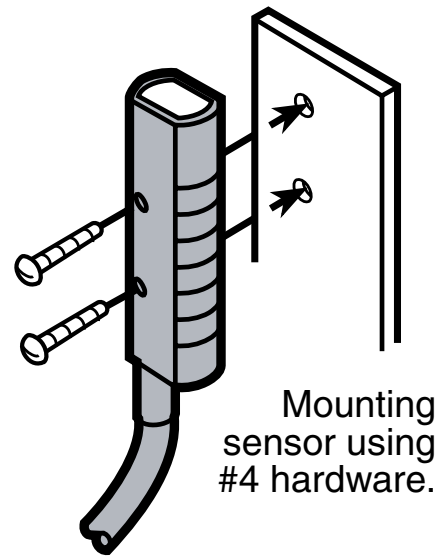
Eaton’s Comet Series includes more background rejection models than any other family on the market. Choose from forward or right-angle viewing, 3- or 4-wire circuits, cable, micro or mini-connector terminations and a variety of sensing ranges.

Fiber Optic

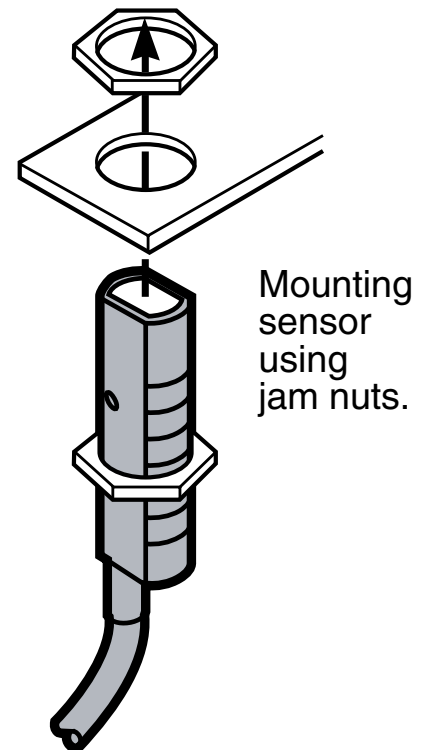
The Comet Series also includes sensors that utilize fiber optic cables to sense objects where space is restricted, temperatures are high, or tight viewing angles are required. Choose from models that accept low cost plastic fiber optic cables, or use our patented glass fiber optic adapter that inexpensively 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 19 mm (0.75") 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 jam nuts.

To Order

THRU-BEAM SENSORS

3-WIRE AND 4-WIRE SENSORS

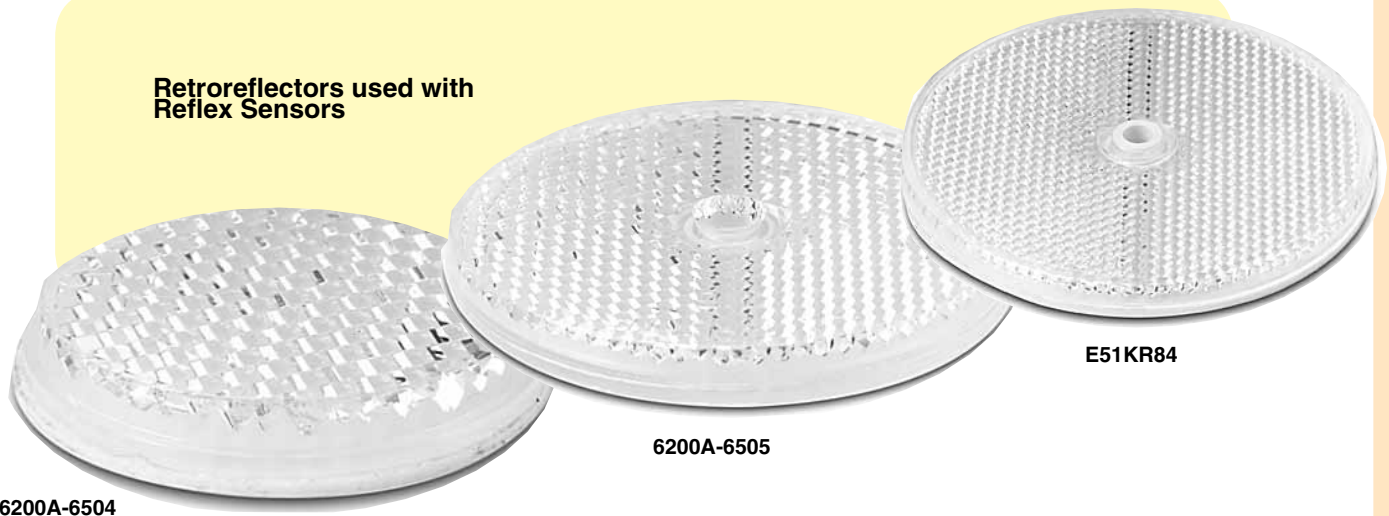
TYPE	MODEL NO.	OPERATING VOLTAGE	SENSING RANGE m (ft)	OPTIMUM RANGE m (ft)	FIELD OF VIEW	THRU-BEAM COMPONENT	CONNECTION TYPE
Thru-Beam Forward Viewing For a complete system order one source and one detector	11102A6513	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	24 (80)	0.03 to 12 (0.1 to 40)	1 m (40") Dia @ 12 m (40")	Source (Visible Red Beam)	1.8 m (6') Cable
	11102AQD03						4-pin micro AC connector
	12102A6513					Detector	1.8 m (6') Cable
	12102AQD03						4-pin micro AC connector
	11102A6517	10 to 30 Vdc (NPN and PNP)	24 (80)	0.03 to 12 (0.1 to 40)	1 m (40") Dia @ 12 m (40")	Source (Visible Red Beam)	1.8 m (6') Cable
	11102AQD07						4-pin micro DC connector
	12102A6517					Detector	1.8 m (6') Cable
	12102AQD07						4-pin micro AC connector
Thru-Beam Right Angle Viewing For a complete system order one source and one detector	11100R6513	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	6 (20)	0.03 to 3 (0.1 to 10)	760 mm (30") Dia @ 3 m (10")	Source (Visible Red Beam)	1.8 m (6') Cable
	11100RQD03						4-pin micro AC connector
	12100R6513					Detector	1.8 m (6') Cable
	12100RQD03						4-pin micro AC connector
	11100R6517	10 to 30 Vdc (NPN and PNP)	6 (20)	0.03 to 3 (0.1 to 10)	760 mm (30") Dia @ 3 m (10")	Source (Visible Red Beam)	1.8 m (6') Cable
	11100RQD07						4-pin micro DC connector
	12100R6517					Detector	1.8 m (6') Cable
	12100RQD07						4-pin micro DC connector

Note: (1) 11100 sources and 12100 detectors may be interchanged in any combination. 11102 models must be used with 12102 models.

Ordering Example: 11102AQD03 is a thru beam source with a 4-pin ac micro cable and 12102AQD03 is a thru beam detector with a 4-pin ac micro cable.

Optional cable (2 required) CSAS4F4CY2202, 2 m (6') AC cable with connector.

Retroreflectors used with Reflex Sensors



To Order

POLARIZED REFLEX SENSORS

3-WIRE AND 4-WIRE SENSORS

TYPE	MODEL NO.	OPERATING VOLTAGE	SENSING RANGE (1) m (ft)	OPTIMUM RANGE m (ft)	FIELD OF VIEW mm (in)	SENSING BEAM	CONNECTION TYPE
Polarized Reflex Forward Viewing (3)(4) (Retroreflector not included)	14101A6513	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	4.5 (15)	0.03 to 12 (0.1 to 10)	25 (1) Dia @ 1.3 m (50")	Visible Red Beam	1.8 m (6') Cable
	14101AQD03						4-pin micro AC connector
	14101A6517	10 to 30 Vdc (NPN and PNP)					1.8 m (6') Cable
	14101AQD07						4-pin micro DC connector
Polarized Reflex Right Angle Viewing (2)(3)(4) (Retroreflector not included)	14101R6513	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	3 (10)	0.03 to 1.5 (0.1 to 5)	25 (1) Dia @ 1.3 m (50")		1.8 m (6') Cable
	14101RQD03						4-pin micro AC connector
	14101R6517	10 to 30 Vdc (NPN and PNP)					1.8 m (6') Cable
	14101RQD07						4-pin micro DC connector

Notes: (1) Ranges based on 3 inch diameter retroreflector. (2) Right-angle viewing polarized reflex models are rated NEMA 1 only.

(3) Polarized Reflex Sensors may not operate with retroreflective tape. Test selected tape prior to installation.

(4) For complete system, order sensor and retroreflector.

RETROREFLECTORS

MODEL NO.	DESCRIPTION
6200A-6504	Reflector, 1.25" diameter with adhesive back, 2 to 3K reflectivity
6200A-6505	Reflector, 2.18" diameter with mounting hole, 2 to 3K reflectivity
E51KR84	Reflector, 3" diameter with mounting hole, 10K reflectivity

DIFFUSE REFLECTIVE SENSORS

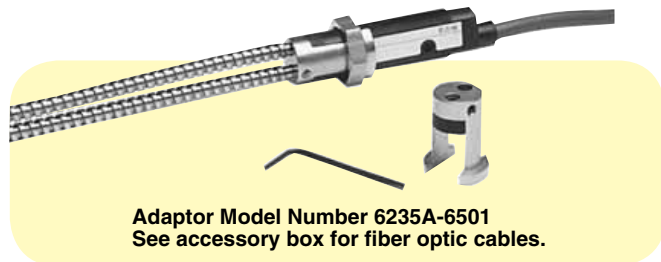
3-WIRE AND 4-WIRE SENSORS

TYPE	MODEL NO.	OPERATING VOLTAGE	SENSING RANGE (1) mm (in)	OPTIMUM RANGE mm (in)	FIELD OF VIEW mm (in)	SENSING BEAM	CONNECTION TYPE
Diffuse Reflective Forward Viewing	13100A6513	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	610 (24)	3 to 380 (0.1 to 15)	127 (5) Dia @ 380 (15)	Infrared Beam	1.8 m (6') Cable
	13100AQD03						4-pin micro AC connector
	13100A6517	10 to 30 Vdc (NPN and PNP)			50 (2) Dia @ 127 (5)		1.8 m (6') Cable
	13100AQD07						4-pin micro DC connector
Diffuse Reflective Forward Viewing	13100R6513	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	610 (24)	3 to 380 (0.1 to 15)	25 (1) Dia @ 1.3 m (50")		1.8 m (6') Cable
	13100RQD03				50 (2) Dia @ 127 (5)		4-pin micro AC connector
	13100R6517	10 to 30 Vdc (NPN and PNP)			127 (5) Dia @ 380 (15)		1.8 m (6') Cable
	13100RQD07						4-pin micro DC connector

Note: (1) Sensor will detect a 90% reflective white card at this range.

GLASS FIBER OPTIC ADAPTOR

This simple adaptor allows glass fiber optic cables to be used with standard Comet Series diffuse reflective sensors. With appropriate fiber optic cable. Diffuse reflective or thru-beam sensing may be achieved (the adaptor only works with the diffuse reflective sensors, the fiber optic cables provide for the different sensing mode).



Adaptor Model Number 6235A-6501
See accessory box for fiber optic cables.

PERFECT PROX® BACKGROUND REJECTION SENSORS

3-WIRE AND 4-WIRE SENSORS

TYPE	MODEL NO.	OPERATING VOLTAGE	NOMINAL RANGE (1) mm (in)	OPTIMUM RANGE mm (in)	CUTOFF RANGE mm (in)	FIELD OF VIEW mm (in)	SENSING BEAM TYPE	CONNECTION TYPE
Perfect Prox® Forward Viewing	13104A6513	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	610 (24)	10 to 45 (0.4 to 1.8)	57 (2.25) and beyond	127 (5) Dia @ 380 (15)	Visible Red	1.8 m (6') Cable
	13104AQD03							4-pin micro AC connector
	13104A6517	10 to 30 Vdc (NPN and PNP)				50 (2) Dia @ 127 (5)		1.8 m (6') Cable
	13104AQD07					4-pin micro DC connector		
Perfect Prox® Forward Viewing	13104R6513	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	610 (24)	10 to 45 (0.4 to 1.8)	57 (2.25) and beyond	25 (1) Dia @ 1.3 m (50")	Visible Red	1.8 m (6') Cable
	13104RQD03					50 (2) Dia @ 127 (5)		4-pin micro AC connector
	13104A6517	10 to 30 Vdc (NPN and PNP)				127 (5) Dia @ 380 (15)		1.8 m (6') Cable
	13104RQD07							4-pin micro DC connector

Notes: (1) Sensor will detect a 90% reflective white card at this range. (2) Sensor will ignore a 90% reflective white card at this range. (3) See below for Cables with Connectors.

FIBER OPTIC SENSORS FOR USE WITH PLASTIC FIBERS

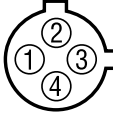
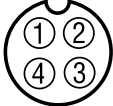
3-WIRE AND 4-WIRE SENSORS

TYPE	MODEL NO.	OPERATING VOLTAGE	SENSING RANGE (OPTIMUM RANGE IS 50% OF SENSING RANGE)						CONNECTION TYPE
			THRU-BEAM MODE mm (in)	DIFFUSE REFLECTIVE MODE m (ft)	THRU-BEAM MODE		DIFFUSE REFLECTIVE MODEL (2)		
					0.5 mm DIA FIBERS mm (in)	1 mm DIA FIBERS mm (in)	0.5 mm DIA FIBERS mm (in)	1 mm DIA FIBERS mm (in)	
18 mm Dia Fiber Optic Forward Viewing (2)	15100A6513	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	123 (5)	38 (1.5)	53 (2.1)	Visible Red Beam	15 (0.6)	38 (1.5)	1.8 m (6') Cable
	15100AQD03								4-pin micro AC connector
	15100A6517	10 to 30 Vdc (NPN and PNP)							1.8 m (6') Cable
	15100AQD07								4-pin micro DC connector

Notes: (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. (2) Used with plastic fibers, see accessory chart for fibers.

Ordering Example: 15100A6513, 18 mm Dia. forward viewing plastic fiber optic sensor with 1.8 m (6') power cable.

CONNECTORS

MODEL NO.	VOLTAGE STYLE	NUMBER OF PINS	GAGE	LENGTH	PIN CONFIGURATON WIRE COLORS (FACE VIEW FEMALE SHOWN)
CSAS4F4CY2202	AC	4-pin 4-wire AWG	22 (6.0')	2 m	 <ul style="list-style-type: none"> 1-Red/Black 2-Red/White 3-Red 4-Green
CSAS4F4CY2205	AC	4-pin 4-wire AWG	22 (15')	6 m	
CSDS4A4CY2202	DC	4-pin 4-wire AWG	22 (6.0')	2 m	 <ul style="list-style-type: none"> 1-Brown 2-White 3-Blue 4-Black
CSDS4A4CY2205	DC	4-pin 4-wire AWG	22 (15')	5 m	

Accessories

MODEL NO.	DESCRIPTION
E57KM18	Bracket for 18 mm tubular sensors
E58KAM18B	Bracket, adjustable ball swivel for 18 mm tubular sensors
6323A-6501	Plastic fiber optic cable for Comet, forward viewing, threaded, thru-beam, 6.5' long, 1 mm bundle Dia
6235A-6501	Glass fiber optic adaptor
E51KF723	Glass fiber optic cable for Comet adaptor, forward viewing, threaded, diffuse, 3' long, 1/8" bundle Dia
E51KF823	Glass fiber optic cable for Comet adaptor, forward viewing, threaded, thru-beam, 3' long, 1/8" bundle Dia