

# PHOTOELECTRIC SENSORS

## COMET SERIES



Comet Series  
Starts at  
£39



- 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 15.3 mm
- 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, polarised reflex, diffuse reflective, focused diffuse reflective, wide angle diffuse reflective, Perfect Prox®, fine spot Perfect Prox® and fibre optic sensing.

Perfect Prox® is one of the most powerful problem-solving sensors available. These sensors can reliably detect targets of different colour, reflectance, contrast or surface shape at the same range, while ignoring background objects just millimetres away.

Manufactured by Cutler-Hammer for OMEGA



15100A6517, £68, shown smaller than actual size.

13104A6517, £84, shown smaller than actual size.

13104RQD07, £94, 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 19 mm 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)

#### Input Voltage DC-Only Models:

10 to 30 Vdc, (10 to 24 Vdc above 55°C)

#### 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)

#### Voltage Switching:

**AC/DC Models:** 375V peak maximum

**DC Only Models:** 30 Vdc maximum

#### Off-State Leakage:

**AC/DC Models:** 250 µA typical; 500 µA maximum

**DC Only Models:** 10 µA 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

**All Others:** -40 to 70°C



**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:** 1.8 m cable

**Connector Versions:** Male mini and micro connectors (refer to wiring diagrams for number of pins per model) on nominal 203 mm 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:** IP65, NEMA 1, 2, 3, 4, 4X, 6, 12 and 13 NEMA 6P models available—contact factory

**Approvals:** UL and C-UL recognised (all models)

*Note: These products conform to IP ratings as indicated, however, some severe washdown applications can exceed these IP 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.

### Polarised 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 polarised models with 3-wire and 4-wire circuits. Right-angle models are also available. Models feature a polarising filter built into the sensor to ensure that only light reflected from a corner-cube retroreflector is recognised by the sensor. This allows

reliable detection of shiny targets that could reflect light and be missed by a non-polarised 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 colour, 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.

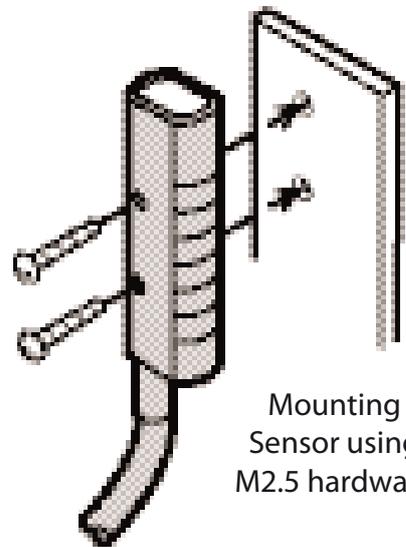
Eaton’s Comet Series includes more background rejection models than any other family on the market. Choose from forward or right-angle viewing, 3- or 4-wire circuits, cable, micro or mini-connector terminations and a variety of sensing ranges.

### Fibre Optic

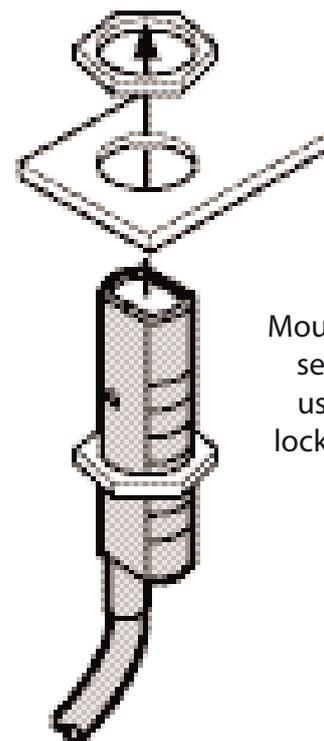
The Comet Series also includes sensors that use fibre optic cables to sense objects where space is restricted, temperatures are high, or tight viewing angles are required. Choose from models that accept low cost plastic fibre optic cables, or use our patented glass fibre optic adapter that inexpensively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

## Mounting

Comet Series sensors feature a threaded housing and include two lock nuts and washers for mounting into any 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 M2.5 hardware.



Mounting Sensor using M2.5 hardware



Mounting sensor using lock nuts

**To Order** (Specify Model Number)

**MOST POPULAR MODELS HIGHLIGHTED!**
**THRU-BEAM SENSORS**
**3-WIRE AND 4-WIRE SENSORS**

TYPE	MODEL NO.	PRICE	OPERATING VOLTAGE	SENSING RANGE m	OPTIMUM RANGE m	FIELD OF VIEW	THRU-BEAM COMPONENT	CONNECTION TYPE
Thru-Beam Forward Viewing  For a complete system order one source and one detector <sup>1</sup>	<b>11102A6513</b>	<b>£58.00</b>	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	24	0.03 to 12	1 m Dia @ 12 m	Source (Visible Red Beam)	1.8 m Cable
	<b>11102AQD03</b>	<b>70.00</b>					4-pin micro AC connector	
	<b>12102A6513</b>	<b>84.00</b>					Detector	1.8 m Cable
	<b>12102AQD03</b>	<b>94.00</b>					4-pin micro AC connector	
	<b>11102A6517</b>	<b>51.00</b>	10 to 30 Vdc (NPN and PNP)	24	0.03 to 12	1 m Dia @ 12 m	Source (Visible Red Beam)	1.8 m Cable
	<b>11102AQD07</b>	<b>63.00</b>					4-pin micro DC connector	
	<b>12102A6517</b>	<b>68.00</b>					Detector	1.8 m Cable
	<b>12102AQD07</b>	<b>83.00</b>					4-pin micro AC connector	
Thru-Beam Right Angle Viewing  For a complete system order one source and one detector <sup>1</sup>	<b>11100R6513</b>	<b>45.50</b>	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	6	0.03 to 3	760 mm Dia @ 3 m	Source (Visible Red Beam)	1.8 m Cable
	<b>11100RQD03</b>	<b>58.00</b>					4-pin micro AC connector	
	<b>12100R6513</b>	<b>70.00</b>					Detector	1.8 m Cable
	<b>12100RQD03</b>	<b>84.00</b>					4-pin micro AC connector	
	<b>11100R6517</b>	<b>39.00</b>	10 to 30 Vdc (NPN and PNP)	6	0.03 to 3	760 mm Dia @ 3 m	Source (Visible Red Beam)	1.8 m Cable
	<b>11100RQD07</b>	<b>51.00</b>					4-pin micro DC connector	
	<b>12100R6517</b>	<b>57.00</b>					Detector	1.8 m Cable
	<b>12100RQD07</b>	<b>72.00</b>					4-pin micro DC connector	

**Notes:** (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, £70 and 12102AQD03 is a thru beam detector with a 4-pin ac micro cable, £94.

Optional cable (2 required) CSAS4F4CY2202, 2 m AC cable with connector, £14.

**Retroreflectors used with Reflex Sensors**


6200A-6504, £3.40

6200A-6505, £3.40

E51KR84, £4



## To Order (Specify Model Number)

**MOST POPULAR MODELS HIGHLIGHTED!**

### POLARISED REFLEX SENSORS

#### 3-WIRE AND 4-WIRE SENSORS

TYPE	MODEL NO.	PRICE	OPERATING VOLTAGE	SENSING RANGE (1) m	OPTIMUM RANGE m	FIELD OF VIEW mm	SENSING BEAM	CONNECTION TYPE
Polarised Reflex Forward Viewing (3)(4) (Retroreflector not included)	14101A6513	£88	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	4.5	0.03 to 3	25 Dia @ 1.3 m	Visible Red Beam	1.8 m Cable
	14101AQD03	98						4-pin micro AC connector
	14101A6517	68	10 to 30 Vdc (NPN and PNP)	4.5	0.03 to 3	25 Dia @ 1.3 m	Visible Red Beam	1.8 m Cable
	14101AQD07	83						4-pin micro DC connector
Polarised Reflex Right Angle Viewing (2)(3)(4) (Retroreflector not included)	14101R6513	92	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	3	0.03 to 1.5	25 Dia @ 1.3 m	Visible Red Beam	1.8 m Cable
	14101RQD03	105						4-pin micro AC connector
	14101R6517	74	10 to 30 Vdc (NPN and PNP)	3	0.03 to 1.5	25 Dia @ 1.3 m	Visible Red Beam	1.8 m Cable
	14101RQD07	88						4-pin micro DC connector

**Notes:** (1) Ranges based on 3 inch diameter retroreflector. (2) Right-angle viewing polarised reflex models are rated IP10, NEMA 1 only. (3) Polarised 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.	PRICE	DESCRIPTION
6200A-6504	£3.40	Reflector, 32 mm diameter with adhesive back, 2 to 3K reflectivity
6200A-6505	3.40	Reflector, 55 mm diameter with mounting hole, 2 to 3K reflectivity
E51KR84	4.00	Reflector, 76 mm diameter with mounting hole, 10K reflectivity

### DIFFUSE REFLECTIVE SENSORS

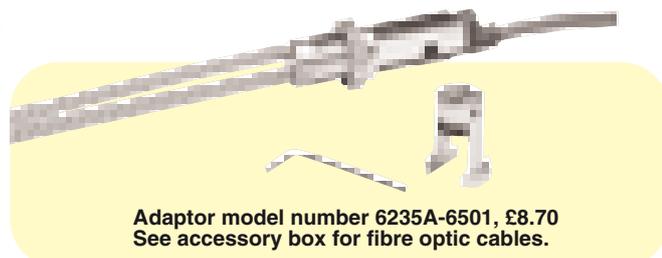
#### 3-WIRE AND 4-WIRE SENSORS

TYPE	MODEL NO.	PRICE	OPERATING VOLTAGE	SENSING RANGE (1) mm	OPTIMUM RANGE mm	FIELD OF VIEW mm	SENSING BEAM	CONNECTION TYPE
Diffuse Reflective Forward Viewing	13100A6513	£84	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	610	3 to 380	127 Dia @ 380	Infrared Beam	1.8 m Cable
	13100AQD03	94						4-pin micro AC connector
	13100A6517	65	10 to 30 Vdc (NPN and PNP)	610	3 to 380	127 Dia @ 380 50 Dia @ 127	Infrared Beam	1.8 m Cable
	13100AQD07	79						4-pin micro DC connector
Diffuse Reflective Right Angle Viewing	13100R6513	84	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	610	3 to 380	50 Dia @ 127	Infrared Beam	1.8 m Cable
	13100RQD03	94						4-pin micro AC connector
	13100R6517	65	10 to 30 Vdc (NPN and PNP)	610	3 to 380	127 Dia @ 380	Infrared Beam	1.8 m Cable
	13100RQD07	79						4-pin micro DC connector

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

## GLASS FIBRE OPTIC ADAPTOR

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



Adaptor model number 6235A-6501, £8.70  
See accessory box for fibre optic cables.

PERFECT PROX® BACKGROUND REJECTION SENSORS									
3-WIRE AND 4-WIRE SENSORS									
TYPE	MODEL NO.	PRICE	OPERATING VOLTAGE	NOMINAL RANGE (1) mm	OPTIMUM RANGE mm	CUTOFF RANGE mm	FIELD OF VIEW mm	SENSING BEAM TYPE	CONNECTION TYPE
Perfect Prox® Forward Viewing	13104A6513	£103	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	50 sharp cutoff	10 to 45	57 and beyond	6 Dia @ 64	Visible Red	1.8 m Cable
	13104AQD03	115							4-pin Micro AC Connector
	13104A6517	84	10 to 30 Vdc (NPN and PNP)	50 sharp cutoff	10 to 45	57 and beyond	6 Dia @ 64	Visible Red	1.8 m Cable
	13104AQD07	94							4-pin Micro DC Connector
Perfect Prox® Forward Viewing	13104R6513	103	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	50 sharp cutoff	10 to 45	57 and beyond	6 Dia @ 64	Visible Red	1.8 m Cable
	13104RQD03	115							4-pin Micro AC Connector
	13104A6517	84	10 to 30 Vdc (NPN and PNP)	50 sharp cutoff	10 to 45	57 and beyond	6 Dia @ 64	Visible Red	1.8 m Cable
	13104RQD07	94							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.

FIBRE OPTIC SENSORS FOR USE WITH PLASTIC FIBRES										
3-WIRE AND 4-WIRE SENSORS										
TYPE	MODEL NO.	PRICE	OPERATING VOLTAGE	SENSING RANGE (OPTIMUM RANGE IS 50% OF SENSING RANGE)						CONN. TYPE
				THRU-BEAM MODE mm	DIFFUSE REFLECTIVE MODE mm	THRU-BEAM MODE		DIFFUSE REFLECTIVE MODEL (2)		
						0.5 mm DIA FIBRES mm	1 mm DIA FIBRES mm	0.5 mm DIA FIBRES mm	1 mm DIA FIBRES mm	
18 mm Dia Fibre Optic Forward Viewing (2)	15100A6513	£91	20 to 264 Vac 50/60 Hz or 15 to 30 Vdc (NPN)	123	38	53	127 and beyond	15	38	1.8 m cable
	15100AQD03	103								4-pin micro AC connector
	15100A6517	68	10 to 30 Vdc (NPN and PNP)	123	38	53	127 and beyond	15	38	1.8 m cable
	15100AQD07	83								4-pin micro DC connector

**Notes:** (1) Ranges are with bare fibres — no lenses. Sensing range is affected by power of sensor, length of fibre optic cable and use of lenses. Lenses will increase ranges. As bulk fibre length increases, sensing range decreases. (2) Used with plastic fibres, see accessory chart for fibres.

**Ordering Example:** 15100A6513, 18 mm Dia. forward viewing plastic fibre optic sensor with 1.8 m power cable, £91.

CONNECTORS						
MODEL NO.	PRICE	VOLTAGE STYLE	NUMBER OF PINS	GAUGE	LENGTH	PIN CONFIGURATON WIRE COLOURS (FACE VIEW FEMALE SHOWN)
CSAS4F4CY2202	£14.00	AC	4-pin 4-wire	22 AWG	2 m	
CSAS4F4CY2205	11.00	AC	4-pin 4-wire	22 AWG	6 m	
CSDS4A4CY2202	10.75	DC	4-pin 4-wire	22 AWG	2 m	
CSDS4A4CY2205	13.50	DC	4-pin 4-wire	22 AWG	5 m	

**Accessories**

MODEL NO.	PRICE	DESCRIPTION
E57KM18	£4.00	Bracket for 18 mm tubular sensors
E58KAM18B	8.00	Bracket, adjustable ball swivel for 18 mm tubular sensors
6323A-6501	41.50	Plastic fibre optic cable for Comet, forward viewing, threaded, thru-beam, 2 m long, 1 mm bundle Dia
6235A-6501	8.70	Glass fibre optic adaptor
E51KF723	73.00	Glass fibre optic cable for Comet adaptor, forward viewing, threaded, diffuse, 0.9 m long, 3 mm bundle Dia
E51KF823	52.00	Glass fibre optic cable for Comet adaptor, forward viewing, threaded, thru-beam, 0.9 m long, 3 mm bundle Dia

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