Retroreflectors

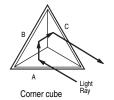
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Cutler-Hammer® Retroreflectors from Eaton's electrical business are used with reflex-type sensors. Two types of retroreflective target material are available: corner cube and embedded glass bead.

Corner Cube Retroreflectors

This type provides the highest signal return to the sensor, typically 2000 to 3000 times the reflectivity of white paper. Three adjoining sides are arranged at right angles to each other. When a ray of light strikes one of these sides (A), it is reflected to the second (B), then the third (C), and then back to the source parallel to its original course. Thousands of these cube shapes are molded into a rugged plastic reflector or vinyl tape material. Corner cube retroreflectors are suitable for use with both standard reflex and polarized reflex sensors.





Glass Bead Retroreflectors

Glass bead retroreflectors are available in tape form with an adhesive backing. The bead style surface is typically rated at 200 to 900 times the reflectivity of white paper — much lower than corner cube reflectors. Glass bead retroreflectors are not suitable for use with polarized reflex sensors.

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

High Quality Retroreflectors and Retroreflective Tape in a Wide Variety of Sizes to Meet Your Needs

Retroreflectors Available in
Both Rectangular and Round
Form Factors

Retroreflective Tape Comes in
Widths from 1 to 3 Inches

Retroreflector Size

The size of the retroreflective target has a significant effect on the excess gain and range of a reflex sensor. In general, we recommend you use the largest possible reflector in every reflex sensing application to maximize performance of the sensor and simplify alignment. To provide an even larger reflective area, multiple retroreflectors can be grouped together as shown.



7 Retroreflectors Grouped Together

Using Retroreflectors with Polarized Reflex Sensors

Only corner cube retroreflective material can be used with polarized reflex sensors. When polarized light from the sensor's light source strikes a corner cube retroreflector, it is returned to the sensor in a depolarized state. This allows some of the light to pass through the detector's polarizer, which is positioned at 90° to the source polarizer, to allow the sensor to operate.

Glass bead retroreflectors do not depolarize light and will not work with polarized reflex sensors.

Molded plastic corner cube retroreflectors are always recommended as they provide the highest signal return to the sensor.

Corner cube tape works with polarized reflex sensors but returns less light to the sensor. In all cases, Eaton recommends testing sensor and tape prior to final installation.

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.

August 2007

Model Selection — Retroreflectors

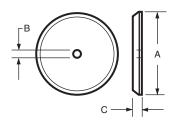
	Description	Catalog Number
Corner Cube Retroreflector		
	1.5 x 3.25 inch, adhesive backed, one per package	6200A-6507
greets Withing	3 inch diameter, with mounting hole, two per package	6200A-6501
	Bulk packaged version of above (ordered quantity will be bulk packaged)	6200AS6501
	3 inch diameter, with mounting hole, one per package	E51KR84
	3 inch diameter, metal backed, with mounting hole, one per package	6200A-6506
	2.18 inch diameter, with mounting hole, one per package	6200A-6505
	2.18 inch diameter, adhesive backed, one per package	6200A-6502
	1.25 inch diameter, adhesive backed, one per package	6200A-6504
	Bulk packaged version of above (ordered quantity will be sent bulk packaged)	6200AS6504
	1.25 inch diameter, no adhesive, one per package	E51KR32

Retroreflective Tape

Corner Cube Style ①	
2 inch wide, 1 piece, quantity is length in feet 6201/	
3 inch wide, 1 piece, quantity is length in feet	6203A-XXXX
Glass Bead Style (Not for use with polarized reflex sensors)	•
1 inch wide, 1 piece, quantity is length in feet	6200A-XXXX
2 inch wide, 1 piece, quantity is length in feet	6202A-XXXX

- ① Although corner cube tape works with polarized reflex sensors, we recommend testing sensor and tape prior to installation.
- Fast turn product with typical one business day lead-time to shipment.
- Stocked product, typical order quantities guaranteed in stock.

Approximate Dimensions in Inches (mm)



Round Retroreflectors

Catalog Number	Approximate Dimensions in Inches (mm)				
	A — Diameter	B — Hole Size	C — Thickness		
6200A-6501	3.30 (84)	0.20 (5)	0.35 (9)		
6200A-6502	2.40 (61)	None	0.30 (7.5)		
6200A-6504	1.30 (33)	None	0.25 (6)		
6200A-6505	2.40 (61)	0.25 (6)	0.30 (7.5)		
6200A-6506	3.30 (84)	0.20 (5)	0.30 (7.5)		
E51KR32	1.25 (32)	None	0.35 (9)		
E51KR84	3.30 (84)	0.20 (5)	0.35 (9)		

ENSUR CCESSORIES

Sensor Mounting Brackets

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

The Cutler-Hammer® Mounting Brackets by Eaton's electrical business found in this section are suited for use with 8 mm to 30 mm diameter tubular sensors only. Cutler-Hammer Mounting Brackets designed to specifically fit other types of sensors are found in the respective "Accessories" sections for those sensor families.

When choosing a bracket, consider:

- Adjustability Do you need minimal alignment capability (mounting an inductive proximity sensor), or a high level of alignment precision (mounting a long range photoelectric thru-beam sensor)?
- Material of Construction This can be dictated by the sensing environment or the type of sensor you are using.

Model Selection — **Mounting Brackets for Tubular Sensors**

	Description	Size	Catalog Number	Approximate Dimensions in Inches (mm)
L-Shaped Bracket	Adjustability: Allows some adjustment in two axes Sensor Mounting: Sensor mounts with two jam nuts and washers (included with sensor) Material of Construction: Stainless steel Packaging: One per package	8 mm	E57KM8	G B B
		12 mm	E57KM12	0.625 (16)
				Size A B C D 8 mm 3.00 (76) 1.35 (34) 1.125 (29) 0.65 (17) 12 mm 3.00 (76) 1.35 (34) 1.125 (29) 0.65 (17) 18 mm 3.00 (76) 1.35 (34) 1.125 (29) 0.65 (17)
		30 mm	E57KM30	30 mm 4.25 (108) 2.15 (55) 1.75 (45) 1.00 (25) Size E F G H
L-Shaped Bracket	Adjustability: Allows some adjustment in one axis and allows for aiming of the sensor through a short arc Sensor Mounting: Sensor mounts with two jam nuts and washers (included with sensor) Material of Construction: Aluminum with chromate finish Packaging: Two per package Same as 6161A-6501 (above), except: Packaging: Bulk packaged (ordered quantity will be sent bulk packed)	18 mm	6161A-6501 6161AS6501	1.75 (44) 1.50 (38) 1.50 (19) 0.75 0.28 (7) 0.31 (8) 1.50 (38) (38) (38) 0.35 (9) 0.31 (8)

Stocked product, typical order quantities guaranteed in stock.

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**.

Model Selection — Mounting Brackets for Tubular Sensors (Continued)

	Description	Size	Catalog Number	Approximate Dimensions in Inches (mm)
L-Shaped Bracket	Allows a minimum range. Suitable for 30 mm sensors. Adjustability: Allows some adjustment in one axis Sensor Mounting: Sensor mounts with two jam nuts (included with sensor) Material of Construction: Zinc dichromate Packaging: One per package	30 mm	6167A-6501	2.50 (63.5) 0.17 Rad. (4.3) 0.25 Rad. (6.3) 0.99 1.01 1.01 1.01 1.02 1.01 1.02 1.04 1.05 1
L-Shaped Bracket with Slot	Adjustability: Allows some adjustment in one axis and allows for aiming of the sensor through a short arc Sensor Mounting: Sensor mounts with two jam nuts and washers (included with sensor) Material of Construction: Aluminum with chromate finish Packaging: Bulk packaged (ordered quantity will be sent bulk packed) Note: Allows installation of sensor with jam nuts already in place on Sensor Body (Comet and Prism Sensors only).	18 mm	6161AS7050	0.75 (19) 0.75 (19)
Flat Bracket	Adjustability: Allows some adjustment in one axis and allows for aiming of the sensor through a short arc Sensor Mounting: Sensor mounts with two jam nuts and washers (included with sensor) Material of Construction: Aluminum with chromate finish Packaging: Bulk packaged (ordered quantity will be sent bulk packed)	18 mm	6161AS5295	0.75 0.75 0.75 0.31 (8) 0.62 (16) 0.75 0.028 0.75 0.035 (9)
Adjustable Bracket	Adjustability: Locking vertical and horizontal adjustments for independent adjustments in each axis Sensor Mounting: Sensor mounts with two jam nuts and washers (included with sensor) Material of Construction: 304 stainless steel Packaging: One per package Note: Sensor is electrically isolated from mounting surface. Same as E58KAM18, except not electrically isolated from mounting surface.	18 mm	E58KAM18U	0.33 x 0.66 (6.4 x 16.8) 2 Places (51) (51) (41)
Adjustable Bracket	Adjustability: Locking vertical and horizontal adjustments for independent adjustment in each axis Sensor Mounting: Sensor mounts with two jam nuts (included with sensor) Material of Construction: 304 stainless steel Packaging: One per package Note: Sensor is electrically isolated from mounting surface. Same as E58KAM30, except not electrically isolated from mounting surface.	30 mm	E58KAM30U	4.0 (102) 2.97 (75) 0.51 (13) 0.68 (8.4 x 16.8) 2.000 (51) 2.000 (51) 1.35 (50)

Stocked product, typical order quantities guaranteed in stock.

August 2007

Model Selection — **Mounting Brackets for Tubular Sensors** (Continued)

Sensor Accessories

Sensor Mounting Brackets

	Description	Size	Catalog Number	Approximate Dimensions in Inches (mm) Except Where Noted	
18 mm Ball Swivel Bracket	Adjustability: Allows 360° rotation and 10° vertical tilt Sensor Mounting: Mounts directly to any 18 mm threaded sensor Material of Construction: 5% glass filled Valox® Packaging: One per package	18 mm	E58KAM18B	0.160 (4) 0.28 (7) 2.2 Places 0.20 0.50 1.80 (46) M18X1-6G Thread 0.50	
Metal Ball Swivel Mount	Adjustability: Allows 5.5° rotation with screw lock to fix final position Sensor Mounting: Mounts directly to any 18 mm tubular sensor Material of Construction: Extremely rugged, made from zinc plated steel/Celenex® Packaging: One per package Note: Electrically isolates the sensor to prevent noise pick-up caused by poor grounding.	0.75 inch (18 mm)	6168A-6501	Note: Dimensions in Inches 4.0 3.0 1.1 0.75 Diameter Hole 1.0 1.0 1.0	
Plastic Ball Swivel Mount	Adjustability: Allows 10° rotation on X and Y axes with a clamping action to hold adjustment Sensor Mounting: Mounts directly to any 8 mm tubular sensor Material of Construction: Noryl (avoid exposing to chlorinated halogenated or aromatic hydrocarbons). Operating temperature: -40° to 160°F. Packaging: One per package	0.375 inch (8 mm)	6143A-6501	Clamping Gap This Side Clamping Gap This Side Clamping Gap This Side	
Plastic Ball Swivel Mount	Same as 6143A-6501(above), except: Sensor Mounting: Mounts directly to any 18 mm tubular sensor	0.75 inch (18 mm)	6142A-6501	Size A B C D 8 mm 1.96 (49.8) 1.56 (39.6) 0.20 (5.1) 0.40 (10.2) 18 mm 2.80 (71.1) 2.25 (57.2) 0.275 (7.0) 0.50 (12.7) Size E F G 8 mm 0.80 (20.3) 1.05 (26.7) 0.375 (9.5) 18 mm 1.00 (25.4) 1.64 (41.7) 0.75 (19.1)	
Cushioned Sensor Mounts	Precision machined, spring-loaded sleeves that hold tubular sensors to protect them from accidental impact due to overtravel of the target being sensed. Used for inductive proximity sensors only.	8 mm	E57KNZ8 E57KNZ12	Cushion Mount Diameter = B	
		18 mm	E57KNZ18	Protective Cap (Threads on Sensor)*	
		30 mm	E57KNZ30	12 mm M12 x 1 M22 x 1.5 0.87 (22) 1.12 (29) 0.41 (10) 18 mm M18 x 1 M30 x 1.5 1.17 (30) 1.41 (36) 0.49 (12) 30 mm M30 x 1.5 M47 x 1.5 1.47 (37) 1.72 (51) 0.57 (15)	

A Variety of Items for Replacement, Testing or Additional **Functionality**

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Sensor Accessories

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Cutler-Hammer® Accessories from Eaton's electrical business include Portable Power Supplies for testing or demonstrating DC sensors, a variety of Replacement Mounting Nuts, Protective End Caps for tubular proximity sensors, and Conduit Adapters for tubular sensors.

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







Replacement Mounting Nuts

And More...

Model Selection — Sensor Accessories

	Description	Sensor Diameter	Catalog Number	Approximate Dimensions in Inches (mm) Except Where Noted
	DC Sensor Tester/Demonstrator For 2-, 3- and 4-wire DC sensors Provides 27V DC power from three 9V batteries (included) Test output connections for both NPN and PNP outputs	_	9902A-6501	W x H x D 2.5 x 4.75 x 2.1 inches (65 x 120 x 55 mm)
Cutter-Hammer	AC Sensor Tester/Demonstrator For AC sensors Provides AC power from wall mount Includes AC adapter	_	9902A-6502	W x H x D 2.5 x 4.5 x 1.5 inches (65 x 114 x 38 mm)
	Replacement Mounting Nuts — Stainless Steel	8 mm	E57KNM8	L A - J BL-
	Where Used: Harsh environment for tubular sensors	12 mm	E57KNS12	
	Material of Construction: Stainless Steel	18 mm	E57KNS18	
	Packaging: Two per package	30 mm	E57KNS30	l ((+)) ++
	Replacement Mounting Nuts — Brass	18 mm	E60KNS18	H
	Where Used: General purpose for tubular sensors. These are the standard mounting nuts shipped with the Comet, Prism and OEM Prism Photoelectric Sensors.			THREAD SIZE C
	Material of Construction: Brass			Size Dimensions in Inches (mm) Except Where Noted
	Packaging: Two nuts and two wave washers per package			A B C
	Replacement Mounting Nuts — Stainless Steel	18 mm	E58KNS18	8 mm 0.5 (13) 0.16 (4) M8 x 1
	Where Used: Harsh environment for tubular sensors	30 mm	E58KNS30	8 mm 0.5 (13) 0.16 (4) 108 X 1 12 mm 0.7 (17) 0.16 (4) M12 X 1
	Material of Construction: Stainless Steel	JU IIIIII	EDOVINGO	18 mm 0.94 (24) 0.16 (4) M18 x 1
	Packaging: Two per package			30 mm 1.4 (36) 0.16 (4) M30 x 1.5

Stocked product, typical order quantities guaranteed in stock.

		vviiere ivoleu			
		Α	В	C	
	8 mm 12 mm 18 mm 30 mm	0.5 (13) 0.7 (17) 0.94 (24) 1.4 (36)	0.16 (4) 0.16 (4) 0.16 (4) 0.16 (4)	M8 x 1 M12 x 1 M18 x 1 M30 x 1.5	
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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.

Description	Sensor Diameter	Catalog Number	Approximate Dimensions in Inches (mm) Except Where Noted
Replacement Mounting Nuts — Plastic Where Used: Harsh environment for tubular and SM Series sensors Material of Construction: Plastic Packaging: Two per package	18 mm	E57KNC18	0.16 (4) 0.32 (8) 0.94 (24)
Protective Caps Where Used: Tubular Proximity Sensors Material of Construction: Delrin	12 mm	E57KP12	Size Dimensions in Inches (mm) in mm A (Switch B C D (Thick- Size) C D (Thick- ness)
Packaging: One per package	30 mm	E57KP18	B 30 1.18 0.59 1.42 0.07 (30) (15) (36) (1.7)
Conduit Adapters Where Used: To attach electrical conduit to rear of tubular sensors Material of Construction: Die cast steel	8 mm	E57KC8	C - TAP FOR SENSOR 1/2* - 14 NPT FOR CONDUIT
Packaging: One adapter and nut per package	12 mm	E57KC12	
	18 mm	E57KC18	Size Dimensions in Inches (mm) Except Where Noted A-Length B-Hex C-Tap
	30 mm	E57KC30	8 mm 1.0 (25) 1.0 (25) M8 x 1 12 mm 1.5 (38) 1.0 (25) M12 x 1 18 mm 1.5 (38) 1.0 (25) M18 x 1 30 mm 1.9 (48) 1.5 (38) M30 x 1.5
Conduit Adapters Where Used: To attach E58 Harsh Duty 30 mm sensors to half-inch conduit fittings Material of Construction: Stainless steel Packaging: One per package	30 mm	E58KC30	To fit flush to one thread below (28.5) Tap drill M30 x 1.5 Tap 1/2"-14 NPT for
			0.32

Stocked product, typical order quantities guaranteed in stock.

August 2007

Glass Fiber Optic Adapter

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



Model Selection — Glass Fiber Optic Adapter

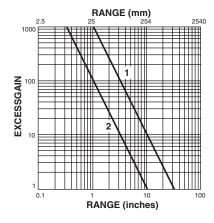
	Sensors	Fibers	Catalog Number
Glass Fiber Optic Adapter with Hex Wrench Patent #5,559,919	Forward Viewing, Diffuse Reflective Sensors (ordered separately, see Page 5-31)	Glass Fiber Optic Cables (ordered separately, see Section 9) Note: Use only with the E51KF Series Fibers.	6235A-6501

Stocked product, typical order quantities guaranteed in stock.

Excess Gain

When Using Single Fibers for Thru-Beam Sensing (Gain using E51KF823

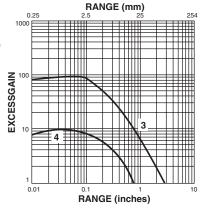
1. 13100A Comet 2. 13106A Comet



When Using Duplex Fibers for Diffuse Reflective Sensing (Gain using E51KF723 fibers, based on 90% reflective white card)

3. 13100A Comet

4. 13106A Comet

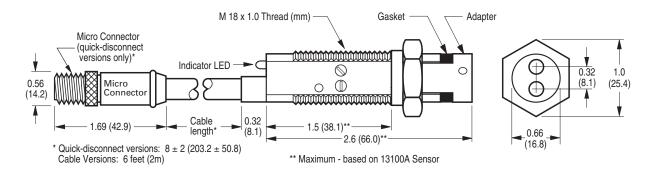


Specifications — Glass Fiber Optic Adapter

Sensor Specifications	See Comet Series Specifications on Page 5-37
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

① Note: 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

Approximate Dimensions — Sensor with Adapter Installed — in Inches (mm) Except Where Noted



Model Selection — Compatible Connector Cables ①

Photoelectric Sensors

Comet Series

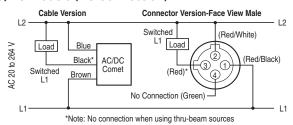
	Voltage		Gauge	Length		Catalog Number				Pin Configuration/Wire Colors
	Style	of Pins				PVC Jacket		PUR Jacket	IRR PUR Jacket	(Face View Female Shown)
Standard Cables — Micro Styl	9									
Micro Style Straight Female	AC	3-pin 3-wire	22 AWG	6.0 fee	et (2m)	CSAS3F3CY2202		CSAS3F3RY2202	_	2-Red/Black 3-Red/White
		4-pin 4-wire	22 AWG	6.0 fee	et (2m)	CSA	S4F4CY2202	CSAS4F4RY2202	CSAS4F4I02202	1-Red/Black 2-Red/White 3-Red 4-Green
	DC	4-pin 4-wire	22 AWG	6.0 feet (2m)		S4A4CY2202	CSDS4A4RY2202	CSDS4A4I02202	1-Brown 2-White 3-Blue 4-Black	
		Voltage Style	Number of Pins				Length	Catalog Number	Pin Configuration/Wire Colors (Face View Female Shown)	
Standard Cables — Mini Style			•					•	•	
Mini Style Straight Female		_	3-pin	3-pin 16 AW		6 feet (2m)		CSMS3F3CY1602	1-Green 2-Black 3-White	
Current Rating @ 600V										

- ① For a full selection of connector cables, see Section 10.
- Stocked product, typical order quantities guaranteed in stock.

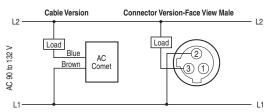
Wiring Diagrams

3-pin: 13A

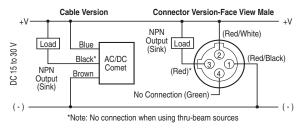
AC/DC Models (AC Connection)



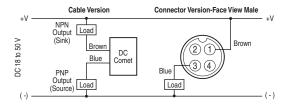
AC Models (AC Connection)



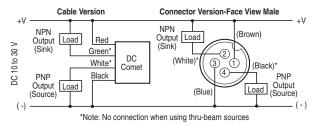
AC/DC Models (DC Connection)



DC Models (DC Connection)



DC Models (DC Connection)



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

NOTE: 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.