

55 Series Photoelectric Sensors

Contents

Overview	1
Model Selection, Sensors	2
Model Selection, Compatible Connector Cables	4
Model Selection, Accessories	5
Wiring Diagrams	6
Specifications	7
Dimensions	7

Cutler-Hammer® 55 Series Photoelectric Sensors are identical to Eaton's 50 Series except without the interchangeable outputs or logic functions. They offer durability and high optical performance in a cost-effective, self-contained package. The 55 Series features sensors with AC and DC operation in a single unit. A relay option is available on these models that provides a 3 Amp SPDT relay output for high current switching.

Sensors are available that in thru-beam, reflex, polarized reflex, diffuse reflective and fiber optic sensing modes. Each sensor features a built-in swivel bracket for easy mounting and to allow precise adjustment of the sensor alignment.

Approvals

- UL Listed
- CSA Certified



Unless otherwise noted, the products contained in this document are not designed or intended for use in human safety applications.

High Optical Performance and a Built-In Swivel Bracket for Easy and Precise Alignment





Product Features

- High optical performance includes 100-foot (30.5m) thru-beam range and 6-foot (1.8m) diffuse reflective range
- Both AC and DC operation in a single unit
- Short circuit protected solid-state outputs on AC/DC and DC-only versions (except thru-beam)
- Relay output option provides 3 Amp current switching on AC/DC models
- Thru-beam models feature an infrared sensing beam along with a visible red LED behind the lens in the source unit to aid in sensor alignment
- Fiber optic sensors operate in thru-beam or diffuse reflective mode depending on the fiber optic cable selected
- Glass fiber optic cables plug into NEMA 4 rated sockets on the front of the sensor. Sockets are leakproof even when the fiber optic cables are not plugged in
- Fully potted construction for use in areas subject to washdown, high shock and/or vibration
- Choice of pre-wired power cable or built-in mini-connector versions. Standard pre-wired cable length is 6 feet (1.8m)
- Built-in, patented, 360° rotation 10° tilt ball-swivel base

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 — Sensors

	Operating Voltage	Sensing Range ①	Optimum Range ②	Field of View	Thru-Beam Component	Sensing Beam	Connection Type and output	Catalog Number	
								Light Operate	Dark Operate
<div>Thru-Beam</div> <div></div> <div>Source</div> <div>Detector</div> <div>Minimum object size is 0.4 x 0.7 Inches (10 x 18 mm)</div> <div>For a complete system, order One Source and One Detector</div>	115V AC	70 feet (21.3m)	0.1 – 35 feet (0.03 – 11m)	4 inch (102 mm) diameter at 100 inches (2540 mm)	Source	Infrared (with visible red LED to aid alignment)	6-foot Cable	1155A-6511	—
					Detector		2-pin Mini-Connector	1155A-6501 ☺	—
							6-foot Cable	1256A-6511	—
					3-pin Mini-Connector		1256A-6501 ☺☺	—	
		100 feet (30.5m)	0.1 – 50 feet (0.03 – 15m)	4 inch (102 mm) diameter at 100 inches (2540 mm)	Source		6-foot Cable	1155A-6511	—
					Detector		2-pin Mini-Connector	1155A-6501 ☺	—
							6-foot Cable	1255A-6511	—
					3-pin Mini-Connector		1255A-6501 ☺☺	—	
	230V AC	70 feet (21.3m)	0.1 – 35 feet (0.03 – 11m)	4 inch (102 mm) diameter at 100 inches (2540 mm)	Source	6-foot Cable	1155A-6512	—	
					Detector	2-pin Mini-Connector	1155A-6502 ☺	—	
						6-foot Cable	1256A-6512	—	
					3-pin Mini-Connector	1256A-6502 ☺☺	—		
		100 feet (30.5m)	0.1 – 50 feet (0.03 – 15m)	4 inch (102 mm) diameter at 100 inches (2540 mm)	Source	6-foot Cable	1155A-6512	—	
					Detector	2-pin Mini-Connector	1155A-6502 ☺	—	
						6-foot Cable	1255A-6512	—	
					3-pin Mini-Connector	1255A-6502 ☺☺	—		
	10 – 30V DC	70 feet (21.3m)	0.1 – 35 feet (0.03 – 11m)	4 inch (102 mm) diameter at 100 inches (2540 mm)	Source	6-foot Cable	1155A-6517	—	
					Detector	2-pin Mini-Connector	1155A-6507 ☺	—	
						6-foot Cable	1256A-6517	—	
					4-pin Mini-Connector	1256A-6507 ☺☺	—		
		100 feet (30.5m)	0.1 – 50 feet (0.03 – 15m)	4 inch (102 mm) diameter at 100 inches (2540 mm)	Source	6-foot Cable	1155A-6517	—	
					Detector	2-pin Mini-Connector	1155A-6507 ☺	—	
						6-foot Cable	1255A-6517	—	
					4-pin Mini-Connector	1255A-6507 ☺☺	—		
<div>Standard Reflex</div> <div></div> <div>Retroreflector (Not Included)</div> <div>Sensor</div> <div>For a complete system, order Sensor and Retroreflector (See PG.05E.17.T.E)</div>	20 – 264V AC or 15 – 30V DC	30 feet (9.1m)	0 – 15 feet (0 – 4.6m)	2 inch (51 mm) diameter at 100 inches (2540 mm)	—	Infrared	6-foot Cable	1455A-6513	1455AD6513
							6-foot Cable Relay Output	1455R-6513	1455RD6513
							3-pin Mini-Connector	1455A-6503 ☺☺	1455AD6503
							5-pin Mini-Connector Relay Output	1455R-6503 ☺☺☺	1455RD6503
	10 – 30V DC	30 feet (9.1m)	0 – 15 feet (0 – 4.6m)	2 inch (51 mm) diameter at 100 inches (2540 mm)	—	Infrared	6-foot Cable	1455A-6517	1455AD6517
							4-pin Mini-Connector	1455A-6507 ☺☺	1455AD6507




① Ranges based on 3-inch retroreflector for reflex sensors, 90% reflectance white card for diffuse reflective sensors.

② See Excess Gain graphs on **Page 4**.

☺ Fast turn product with typical one business day lead-time to shipment.

☺☺☺☺ See listing of compatible connector cables on **Page 4**.

Model Selection — Sensors (Continued)

	Operating Voltage	Sensing Range ①	Optimum Range ②	Field of View	Sensing Beam	Connection Type	Catalog Number	
							Light Operate	Dark Operate
Polarized Reflex ③  Retroreflector (Not Included) Sensor For a complete system, order Sensor and Retroreflector (See PG.05E.17.T.E)	20–264V AC or 15–30V DC	15 feet (4.6m)	0.5–6 feet (0.2–1.8m)	2 inch (51 mm) diameter at 100 inches (2540 mm)	Visible Red	6-foot Cable	1456A-6513	1456AD6513
						6-foot Cable Relay Output	1456R-6513	1456RD6513
						3-pin Mini-Connector	1456A-6503 Ⓢ	1456AD6503 Ⓢ
						5-pin Mini-Connector Relay Output	1456R-6503 Ⓢ	1456RD6503 Ⓢ
	10–30V DC	15 feet (4.6m)	0.5–6 feet (0.2–1.8m)	2 inch (51 mm) diameter at 100 inches (2540 mm)		6-foot Cable	1456A-6517	1456AD6517
						4-pin Mini-Connector	1456A-6507 Ⓢ	1456AD6507 Ⓢ
Diffuse Reflective 	20–264V AC or 15–30V DC	10 inches (254 mm)	0.25–5 inches (6–127 mm)	1 inch (25 mm) diameter at 10 inches (254 mm)	Infrared	6-foot Cable	1355A-6513	1355AD6513
						6-foot Cable Relay Output	1355R-6513	1355RD6513
						3-pin Mini-Connector	1355A-6503 Ⓢ	1355AD6503 Ⓢ
						5-pin Mini-Connector Relay Output	1355R-6503 Ⓢ	1355RD6503 Ⓢ
		24 inches (610 mm)	1–8 inches (25–203 mm)	1 inch (25 mm) diameter at 10 inches (254 mm)		6-foot Cable	1356A-6513	1356AD6513
						6-foot Cable Relay Output	1356R-6513	1356RD6513
						3-pin Mini-Connector	1356A-6503 Ⓢ	1356AD6503 Ⓢ
						5-pin Mini-Connector Relay Output	1356R-6503 Ⓢ	1356RD6503 Ⓢ
		72 inches (1828 mm)	1–36 inches (25–914 mm)	5.5 inch (140 mm) diameter at 24 inches (610 mm)		6-foot Cable	1357A-6513	1357AD6513
						6-foot Cable Relay Output	1357R-6513	1357RD6513
						3-pin Mini-Connector	1357A-6503 Ⓢ	1357AD6503 Ⓢ
						5-pin Mini-Connector Relay Output	1357R-6503 Ⓢ	1357RD6503 Ⓢ
	10–30V DC	10 inches (254 mm)	0.25–5 inches (6–127 mm)	1 inch (25 mm) diameter at 10 inches (254 mm)		6-foot Cable	1355A-6517	1355AD6517
						4-pin Mini-Connector	1355A-6507 Ⓢ	1355AD6507 Ⓢ
		24 inches (610 mm)	1–8 inches (25–203 mm)	1 inch (25 mm) diameter at 10 inches (254 mm)		6-foot Cable	1356A-6517	1356AD6517
						4-pin Mini-Connector	1356A-6507 Ⓢ	1356AD6507 Ⓢ
		72 inches (1828 mm)	1–36 inches (25–914 mm)	5.5 inch (140 mm) diameter at 24 inches (610 mm)		6-foot Cable	1357A-6517	1357AD6517
						4-pin Mini-Connector	1357A-6507 Ⓢ	1357AD6507 Ⓢ
Fiber Optic  Glass Fiber Optic Cables Not Included (See PG.05E.15.T.E)	20–264V AC or 15–30V DC	Thru-Beam: 12 inches (305 mm) Diffuse Reflective: 2.25 inches (57 mm) ④	—	Depends on Fiber Selected	Infrared	6-foot Cable	1555A-6513	1555AD6513
						6-foot Cable Relay Output	1555R-6513	1555RD6513
						3-pin Mini-Connector	1555A-6503 Ⓢ	1555AD6503 Ⓢ
						5-pin Mini-Connector Relay Output	1555R-6503 Ⓢ	1555RD6503 Ⓢ
	10–30V DC	Thru-Beam: 12 inches (305 mm) Diffuse Reflective: 2.25 inches (57 mm) ④	—	Depends on Fiber Selected		6-foot Cable	1555A-6517	1555AD6517
						4-pin Mini-Connector	1555A-6507 Ⓢ	1555AD6507 Ⓢ

① Ranges based on 3-inch retroreflector for reflex sensors, 90% reflectance white card for diffuse reflective sensors.

② See Excess Gain graphs on **Page 4**.

③ Polarized sensors may not operate with retroreflective tape. Test selected tape before installation.

④ Ranges using standard 0.125-inch diameter fiber optic cable.

Fast turn product with typical one business day lead-time to shipment.

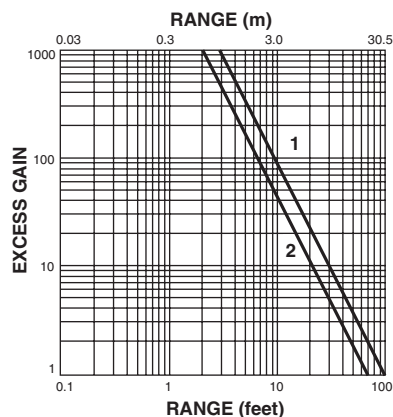
Stocked product, typical order quantities guaranteed in stock.

ⓈⓈⓈ See listing of compatible connector cables on **Page 4**.

Relay output option for AC/DC Models only (built-to-order, contact factory for delivery lead times). For a 3 Amp, SPDT relay output replace **A** in Catalog Number with **R**. (AC/DC Models only — not available in Thru-Beam).

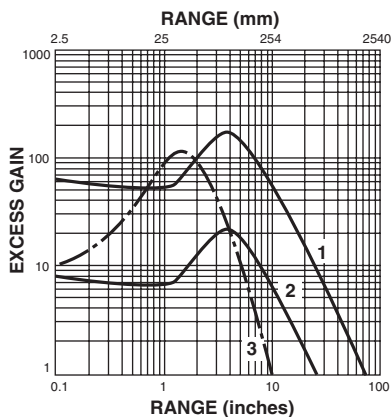
August 2007

Excess Gain



Thru-Beam

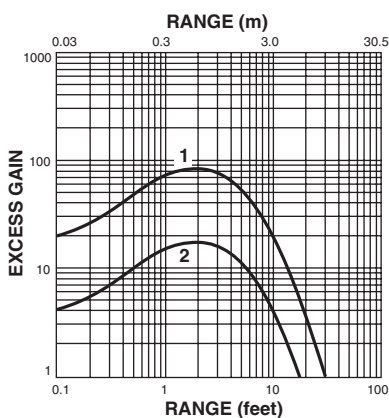
1. 1255A detectors using 1155A sources
2. 1256A detectors using 1155A sources



Diffuse Reflective

(90% reflective white card)

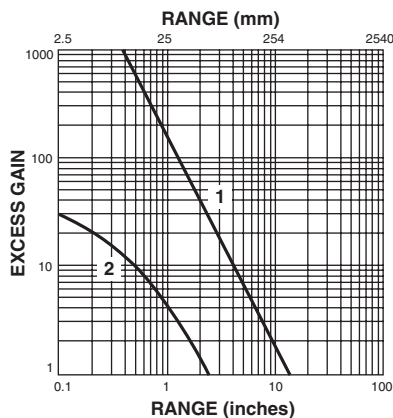
1. 1357A
2. 1356A
3. 1355A



Reflex

(3-inch diameter retroreflector)






1. 1455A
2. 1456A




Fiber Optic (standard 0.125-inch diameter fiber optic cable shown)

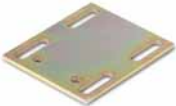
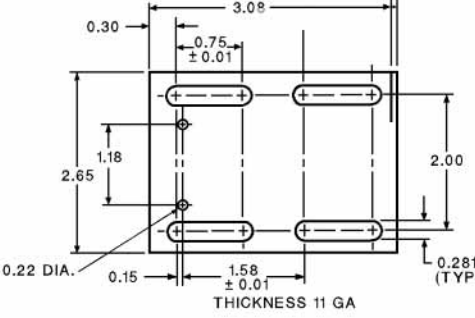

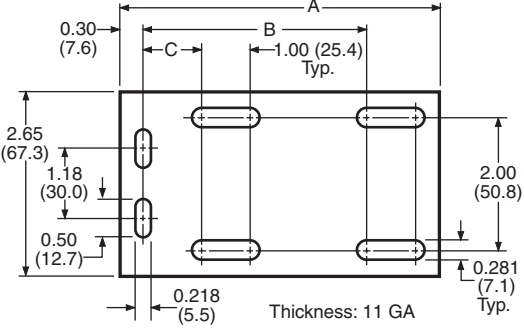

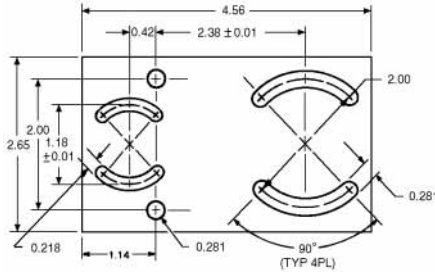
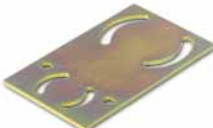

1. Thru-Beam mode
2. Diffuse reflective mode (90% reflective white card)

Model Selection — Compatible Connector Cables ^①

	Voltage Style	Number of Pins	Gauge	Length	Catalog Number	Pin Configuration/Wire Colors (Face View Female Shown)
Standard Cables — Mini Style						
Mini Style Straight Female  Current Rating @ 600V 3-pin: 13A	—	2-pin	16 AWG	6 feet (2m)	CSMS2D2CY1602	 1-White 2-Black
	—	3-pin	16 AWG	6 feet (2m)	CSMS3F3CY1602	 1-Green 2-Black 3-White
	—	4-pin	16 AWG	6 feet (2m)	CSMS4A4CY1602	 1-Black 2-White 3-Red 4-Green
	—	5-pin	16 AWG	6 feet (2m)	CSMS5A5CY1602	 1-White 2-Red 3-Green 4-Orange 5-Black

^① For a full selection of connector cables, see PG.05.05.T.E.
 Stocked product, typical order quantities guaranteed in stock.

Model Selection — Accessories

	Description	Catalog Number	Approximate Dimensions in Inches (mm) Except Where Noted															
	Allows 55 Series sensor to replace Photoswitch® 5000 Series terminal base and 60-1785 normal duty bracket	6150A-6502	<p>NOTE: Dimensions in Inches</p> 															
	Allows 55 Series sensor to replace Photoswitch® 5000 Series cable base and 60-1785 normal duty bracket	6150A-6503	 <table border="1"> <thead> <tr> <th rowspan="2">Catalog Number</th><th colspan="3">Dimensions in Inches (mm)</th></tr> <tr> <th>A</th><th>B</th><th>C</th></tr> </thead> <tbody> <tr> <td>6150A-6503</td><td>4.45 (113.0)</td><td>2.83 (71.9)</td><td>1.09 (27.7)</td></tr> <tr> <td>6150A-6504</td><td>5.64 (143.3)</td><td>4.04 (102.6)</td><td>2.15 (54.6)</td></tr> </tbody> </table>	Catalog Number	Dimensions in Inches (mm)			A	B	C	6150A-6503	4.45 (113.0)	2.83 (71.9)	1.09 (27.7)	6150A-6504	5.64 (143.3)	4.04 (102.6)	2.15 (54.6)
Catalog Number	Dimensions in Inches (mm)																	
	A	B	C															
6150A-6503	4.45 (113.0)	2.83 (71.9)	1.09 (27.7)															
6150A-6504	5.64 (143.3)	4.04 (102.6)	2.15 (54.6)															
	Allows 55 Series sensor to replace Photoswitch® 4000 Series self-contained models and 60-1749 bracket	6150A-6504	<p>NOTE: Dimensions in Inches</p> 															
	Allows 55 Series sensor to replace Banner® Multibeam, (all models) and SMB700 bracket	6150A-6505																
Retroreflectors	Retroreflectors and retroreflective tape	See PG.05E.17.T.E																
Connector Cables	For use with connector version sensors	See PG.05.05.T.E																
	Lens protector kit. Clear glass cover fits snugly over the sensor lens to protect it from damage. Ideal for environments in which damage to the lens is likely. Not recommended for use with diffuse reflective sensors.	1450B-7501																

Stocked product, typical order quantities guaranteed in stock.

August 2007

Wiring Diagrams (Pin numbers are for reference only, rely on pin location when wiring)

Operating Voltage	Models	Cable Models	Mini-Connector Models (Face View Male Shown)
115V AC or 230V AC	Thru-Beam Source		
	Thru-Beam Detector		
20 – 264V AC or 15 – 30V DC	Standard Output		
	Relay Output		
10 – 30V DC	Thru-Beam Source		
	All others		

Specifications

	Thru-Beam			All Other Models	
	115V AC Models	230V AC Models	10 – 30V DC Models	AC/DC Models	10 – 30V DC Models
Input Voltage	90 – 132V AC, 60 Hz 100 – 132V AC, 50 Hz	180 – 264V AC, 60 Hz 200 – 264V AC, 50 Hz	10 – 30V DC, 35 mA	20 – 264V AC, 50/60 Hz or 15 – 30V DC	10 – 30V DC, 35 mA
Power Dissipation	2W	2W	1W	2W	1W
Operating Temperature	-22° to +158°F (-30° to +70°C)			-40° to +158°F (-40° to +70°C)	
Output:	VMOS, 50 mA maximum resistive or relay-load; Off-Stage leakage is 0.1 mA maximum		Sink/source/TTL, open collector transistor, 50 mA maximum load current	Standard Versions: VMOS, 300 mA max./NPN, 300 mA max. Relay Output Versions: 3A SPDT relay	NPN: 250 mA max., 1.8V drop max. PNP: 100 mA max., 2.6V drop max. (not TTL compatible) Optional Relay Models: SPDT 3A contact
Response Times	Dark-to-Light: 5 mS Light-to-Dark: 11 mS			10 mS	1 mS
Short Circuit Protection	—			Sensor will turn off immediately when a short or overload is detected (indicator LED will flash). 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 the outputs.	Sensor will turn off immediately when a short or overload is detected (indicator LED will flash). Sensor will reset when short is removed.
Sunlight Immunity	100 foot Thru-Beam models: 6,000 foot-candles All other models: 10,000 foot-candles				
Humidity	95% relative humidity, non-condensing				
Case Material	Noryl® (avoid exposing to chlorinated, halogenated, or aromatic hydrocarbons)				
Lens Material	Nylon				
Vibration	15g or 0.06 inch displacement, whichever is less, over 10 Hz to 2 kHz (relay models: 10g over 10 – 55 Hz)				
Shock	40g for 10 mS and 500g for 2 mS, 1/2 sine wave pulse (20g for relay models)				
Enclosure Ratings	NEMA 1, 3, 4, 6, 12 and 13 ^①				

① NOTE: Our products conform to NEMA tests as indicated, however, some severe washdown applications can exceed these NEMA test specifications. If you have questions about a specific application, contact Eaton's Cutler-Hammer Sensor Applications Department at 1-800-426-9184.

Approximate Dimensions in Inches (mm)

Sensors

