



# Enhanced 50 Series Diffuse Photoelectric Sensors



**1351E-6547**



**1351E-6517**

- Fiberglass-reinforced plastic housing
- Field of view: 2.8°
- Cable wires or mini/micro connector termination
- NPN/PNP, Solid-State Relay, or SPDT EM Relay outputs
- IP67 rated



**1351E-6534**

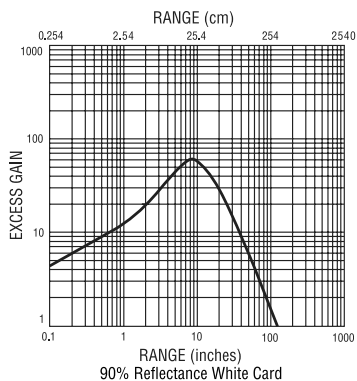
Note: Cutler-Hammer parts available for sale to North America locations only.

## Enhanced 50 Series Diffuse Photoelectric Sensors Selection Chart

Part Number	Price	Voltage Range	Sensing Range*	Optimum Range*	Sensing Beam	Output Type	Connection Type	Cable Part Number
<a href="#">1351E-6517</a>	\$139.00	10 - 40 VDC	10ft [3m]	1 to 60in [25 to 1520 mm]	Infrared	NPN/PNP 250mA	6-foot cable (300V)	Pre-wired 6ft [1.8 m]
<a href="#">1351E-6547</a>	\$139.00						4-pin Euro (Micro) DC connector	<a href="#">CSDS4A4CY2202</a> <a href="#">CSDS4A4CY2205</a>
<a href="#">1351E-6507</a>	\$142.00						4-pin Mini connector	<a href="#">CSMS4A4CY1602</a> <a href="#">CSMS4A4CY1606</a>
<a href="#">1351E-6513</a>	\$154.00	12 - 240 VDC 24 - 240 VAC	10ft [3m]	1 to 60in [25 to 1520 mm]	Infrared	Solid-state relay 300mA @ 240VAC/VDC	6-foot cable (300V)	Pre-wired 6ft [1.8 m]
<a href="#">1351E-6543</a>	\$154.00						4-pin Micro AC connector	<a href="#">CSAS4F4CY2202</a> <a href="#">CSAS4F4CY2205</a>
<a href="#">1351E-6503</a>	\$155.00						4-pin Mini connector	<a href="#">CSMS4A4CY1602</a> <a href="#">CSMS4A4CY1606</a>
<a href="#">1351E-6514</a>	\$146.00					SPDT EM relay 3A @ 120VAC	6-foot cable (300V)	Pre-wired 6ft [1.8 m]
<a href="#">1351E-6534</a>	\$146.00						5-pin Micro AC connector [7.5" pigtail]	<a href="#">CSAS5A5CY2202</a> <a href="#">CSAS5A5CY2205</a>
<a href="#">1351E-6504</a>	\$146.00						5-pin Mini connector	<a href="#">CSMS5A5CY1602</a> <a href="#">CSMS5A5CY1606</a>

\*Note: Ranges based on 90% reflectance white

### Characteristic curve chart



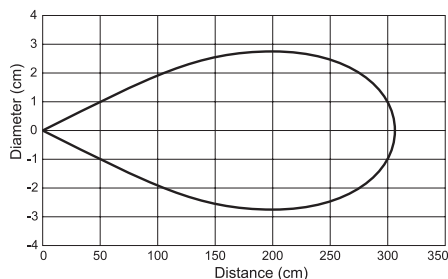
### Wiring Diagrams

(Pin numbers are for reference only. Rely on pin location when wiring.)

Operating Voltage	Models	Cable Models	Mini-Connector Models (Face View Male Shown)	Micro and Euro (Micro) Connector Models (Face View Male Shown)
10-40 VDC	Diffuse			
12 - 240 VDC or 24 - 240 VAC	Diffuse Solid-State Relay			
12 - 240 VDC or 24 - 240 VAC	Diffuse SPDT EM Relay			

① Connect load to appropriate output for either sinking or sourcing operation.

### Spot dimension chart





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# Enhanced 50 Series Photoelectric Sensors Selection Guide

## Overview

The Enhanced 50 family of high performance photoelectric sensors offers outstanding features, flexibility and durability at an incredible price. Choose from a wide selection of Through-beam, Polarized Reflex, Diffuse and even Clear Object models all designed in a rugged, industry standard, rectangular package. Each model comes with a variety of input options for maximum flexibility across many voltage ratings.

Cabling choices include built-in mini-connector, micro-connector, pigtail micro-connector or a 6 ft. integrated cable. Other convenient features included are Dark-on/Light-on selectability and Gain adjustment, available on all models. Use the Selection Guide below to find the sensor model that best suits your requirements.



Enhanced 50 Photoelectric Sensors Specifications by Model Type				
Specifications	Through-Beam	Diffuse	Polarized Reflex	Clear Object Detector
<b>Voltage Range</b>	10 - 40 VDC 12 - 240 VDC 24 - 240 VAC	10 - 40 VDC 12 - 240 VDC 24 - 240 VAC	10 - 40 VDC 12 - 240 VDC 24 - 240 VAC	10 - 40 VDC 12 - 240 VDC 24 - 240 VAC
<b>Sensing Range</b>	500ft [152m]	10ft [3m]	16ft [4.9 m]	45in [1.2 m]
<b>Optimum Power</b>	0.1 to 250ft [0.03 to 77m]	1 to 60in [25 to 1520mm]	0.5 to 8ft [0.2 to 2.5 m]	1 to 24in [25 to 610mm]
<b>Sensing Beam</b>	Infrared	Infrared	Visible Red	Visible Red
<b>Output Types</b>	NPN/PNP 250mA, Solid-state relay 300mA @ 240 VAC/VDC, SPDT EM relay 3A @ 120VAC	NPN/PNP 250mA, Solid-state relay 300mA @ 240 VAC/VDC, SPDT EM relay 3A @ 120VAC	NPN/PNP 250mA, Solid-state relay 300mA @ 240 VAC/VDC, SPDT EM relay 3A @ 120VAC	NPN/PNP 250mA, Solid-state relay 300mA @ 240 VAC/VDC, SPDT EM relay 3A @ 120VAC

Enhanced 50 Photoelectric Sensors Specifications by Input Type			
Specifications	AC/DC EM Relay Models	AC/DC Solid-State Relay Models	DC Only Models
<b>Input Voltage</b>	12 – 240 VDC 24 – 240 VAC	12 – 240 VDC 24 – 240 VAC	10 – 40 VDC
<b>Light/Dark Operation</b>	Switch selectable		
<b>Operating Temperature</b>	-13 to 131°F [-25 to 55°C]		
<b>Humidity</b>	95% relative humidity, non-condensing		
<b>Case Material</b>	Fiberglass reinforced plastic		
<b>Lens Material</b>	Acrylic		
<b>Vibration</b>	IEC 60947-5-2 part 7.4.2		
<b>Shock</b>	IEC 60947-5-2 part 7.4.1		
<b>Protection</b>	Output short circuit and overcurrent protection, reverse polarity protection		
<b>Enclosure Ratings</b>	IP67		
<b>Agency Approvals</b>	IEC IP67, cCSAus, UL508 (CSA File 224447)		
<b>Output Load</b>	3A @ 120VAC 3A @ 28VAC 3A @ 240VAC	300mA @ 240 VAC/VDC	250mA
<b>Response Time</b>	15ms	2ms	
<b>No Load Current Draw</b>	<30 mA		
<b>Leakage Current (max.)</b>	—	1mA @ 240VAC	<10µA
<b>Indicator LEDs</b>	Through-Beam Source..... All Others: Red: Power..... Green: Output ..... Yellow: Power ..... Red: Alignment		



# Enhanced 50 Series Photoelectric Sensors

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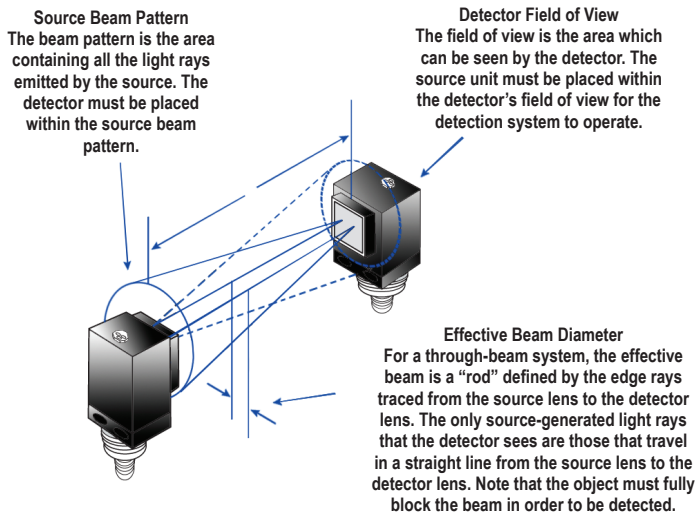
## Sensors

### Application Guide

The Enhanced 50 Series Photoelectric Sensors are a great fit for applications such as material handling, packaging, wrapping and sortation. This family of sensors, with its four basic models (Through-beam, Polarized Reflex, Diffuse and Clear Object), meets the needs for almost any sensing requirement, including harsh environments with excessive dust or high temperature. Follow the application guide below to choose the best sensor model for your application.

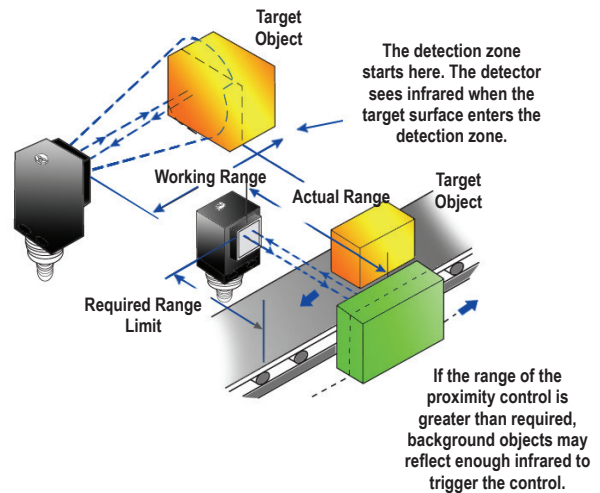
#### Through-Beam

- Most accurate
- Longest sensing range
- Most reliable
- Must be installed in two points on system: emitter and receiver
- More costly



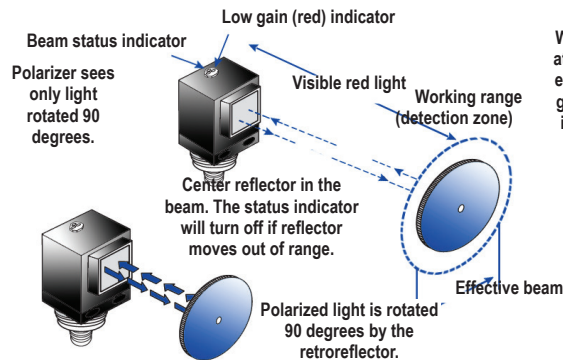
#### Diffuse

- Lower cost
- Install at one point
- Less accurate than Through-Beam or Polarized Reflex
- More setup time involved



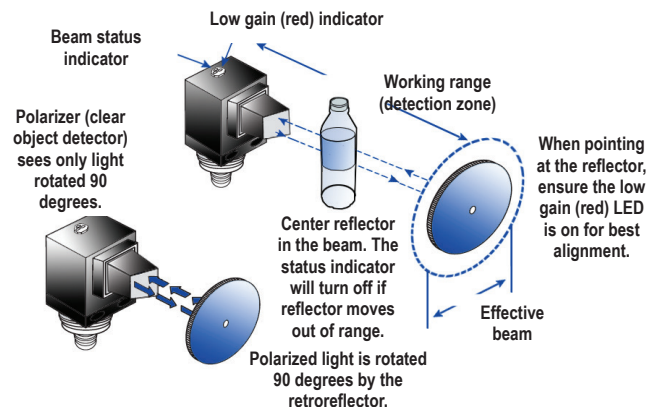
#### Polarized Reflex

- Lower cost than Through-Beam
- Longer sensing range than Diffuse
- Very reliable
- Must be installed in two points on system: sensor and reflector



#### Clear Object Detector

- Most reliable for sensing transparent objects
- Must be installed in two points on system: sensor and reflector.
- Short sensing distance: 45 inches max.





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# Enhanced 50 Series Photoelectric Sensors Connector Cables

Note: Cutler-Hammer parts available for sale to North America locations only.

Enhanced 50 Series Cables Selection Chart				
Part Number	Price	Description	Gauge	Pin-Out Diagram
<a href="#">CSDS4A4CY2202</a>	\$32.00	DC Euro (Micro) connector cable for quick-disconnect photoelectric sensors, straight female, DC 4-pin/4-wire, PVC, 6 feet (2 meter) length	22	1-Brown 2-White 3-Blue 4-Black
<a href="#">CSDS4A4CY2205</a>	\$33.00	DC Euro (Micro) connector cable for quick-disconnect photoelectric sensors, straight female, DC 4-pin/4-wire, PVC, 16.4 feet (5 meter) length	22	1-Brown 2-White 3-Blue 4-Black
<a href="#">CSAS4F4CY2202</a>	\$36.00	AC Micro connector cable for quick-disconnect photoelectric sensors, straight female, AC 4-pin/4-wire, PVC, 6 feet (2 meter) length, 1/2" - 20 UNF thread	22	1-Red/Black 2-Red/White 3-Red 4-Green
<a href="#">CSAS4F4CY2205</a>	\$37.00	AC Micro connector cable for quick-disconnect photoelectric sensors, straight female, AC 4-pin/4-wire, PVC, 16.4 feet (5 meter) length, 1/2" - 20 UNF thread	22	1-Red/Black 2-Red/White 3-Red 4-Green
<a href="#">CSAS5A5CY2202</a>	\$45.50	AC Micro connector cable for quick-disconnect photoelectric sensors, straight female, AC 5-pin/5-wire, PVC, 6 feet (2 meter) length, 1/2" - 20 UNF thread	22	1-Brown 2-Blue 3-Gray 4-Black 5-White
<a href="#">CSAS5A5CY2205</a>	\$48.00	AC Micro connector cable for quick-disconnect photoelectric sensors, straight female, AC 5-pin/5-wire, PVC, 16.4 feet (5 meter) length, 1/2" - 20 UNF thread	22	1-Brown 2-Blue 3-Gray 4-Black 5-White
<a href="#">CSMS4A4CY1602</a>	\$49.00	Mini connector cable for quick-disconnect photoelectric sensors, straight female, 4-pin/4-wire, PVC, 6 feet (2 meter) length, 7/8" - 16 UN thread	16	1-Black 2-Blue 3-Brown 4-White
<a href="#">CSMS4A4CY1606</a>	\$79.00	Mini connector cable for quick-disconnect photoelectric sensors, straight female, 4-pin/4-wire, PVC, 19.69 feet (6 meter) length, 7/8" - 16 UN thread	16	1-Black 2-Blue 3-Brown 4-White
<a href="#">CSMS5A5CY1602</a>	\$57.00	Mini connector cable for quick-disconnect photoelectric sensors, straight female, 5-pin/5-wire, PVC, 6 feet (2 meter) length, 7/8" - 16 UN thread	16	1-Black 2-Blue 3-Orange 4-Brown 5-White
<a href="#">CSMS5A5CY1606</a>	\$91.00	Mini connector cable for quick-disconnect photoelectric sensors, straight female, 5-pin/5-wire, PVC, 19.69 feet (6 meter) length, 7/8" - 16 UN thread	16	1-Black 2-Blue 3-Orange 4-Brown 5-White



[CSDS4A4CY2205](#)



[CSAS4F4CY2205](#)



[CSAS5A5CY2202](#)

Connector Cables Specifications		
	Micro Style	Mini Style
Jacket Material	PVC	PVC
Contact Material	Gold-plated copper alloy	Gold-plated brass
Coupling Nut Material	Zinc die-cast epoxy-coat	Zinc die cast epoxy-coat
O-ring	Nitrile rubber	None
Cable	PVC insulation and jacket, stranded copper conductors	
Cable Strain Relief	35 pounds minimum	
Voltage Rating	320 V (24 VDC for LED plugs)	600 V
Current Rating	4A	4-pin: 10A 5-pin: 8 A
Contact Resistance	5mΩ max	5mΩ max
Isolation Resistance	1000MΩ min	100 MΩ min
Protection	IP67	NEMA 6P, IP68
Temperature Range	-25 to 90°C	-20 to 105°C
Cable Diameter (3/C = 3 Conductor)	22 AWG PVC: 4/C: 0.21 inch [5.3 mm] 5/C: 0.20 inch [5.1 mm]	16AWG PVC: 4/C: 0.42 inch [10.7 mm] 5/C: 0.50 inch [12.7 mm]
Bend Radius	Minimum recommended bend radius is 12X cable diameter	



[CSMS4A4CY1602](#)



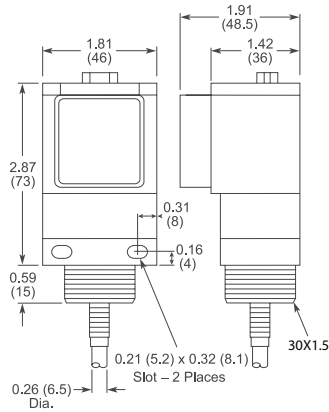
[CSMS5A5CY1602](#)

# Enhanced 50 Series Photoelectric Sensors Dimensions

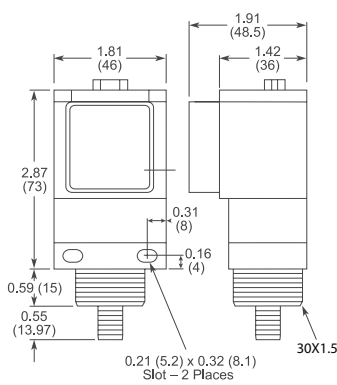
## Sensor Dimensions

inches (mm)

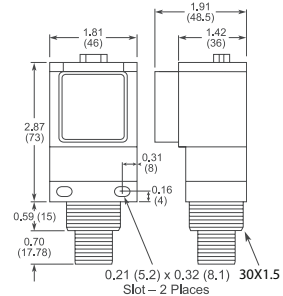
Cable and Pigtail Connector\* Version



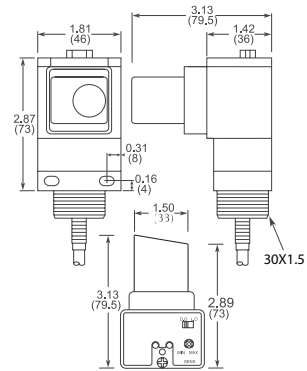
AC/DC Micro or Euro (Micro) Connector Versions



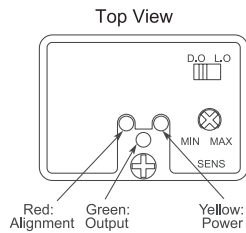
Mini Connector Versions



Clear Object Versions (Cable Version Shown)



\* Pigtail length: 7.5" nominal

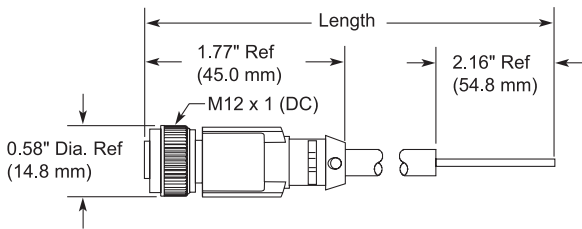


## Connector Cables Dimensions

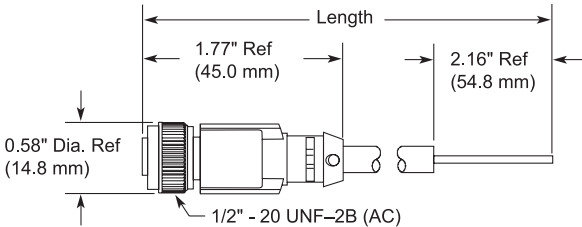
(in/mm)

### Micro Style Connector Cables

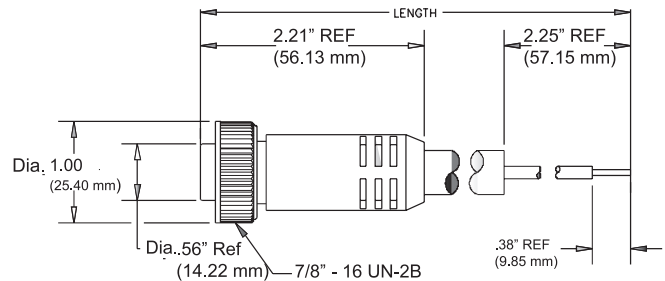
#### M12 x 1 (DC) connector cable



#### 1/2" - 20 UNF-2B (AC) connector cable



### Mini Style Connector Cables



# DFT Series Fiber Photoelectric Amplifiers



## Compact rectangular plastic DIN-rail mount with Teach function - DC

- DIN-rail mounting
- Bargraph signal-strength indicator
- NPN or PNP, Light-on/Dark-on selectable outputs
- Red LED with visible spot
- IP64 rated



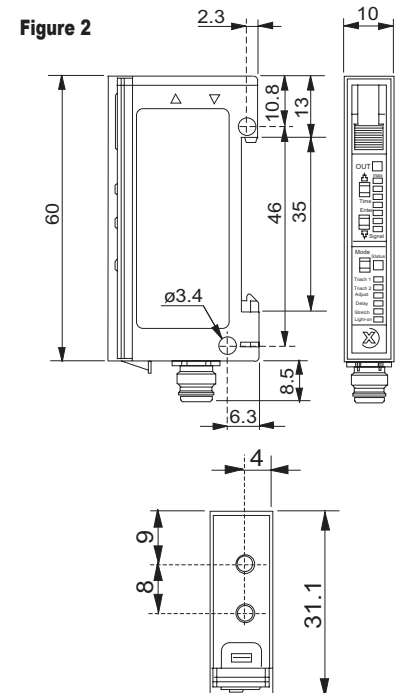
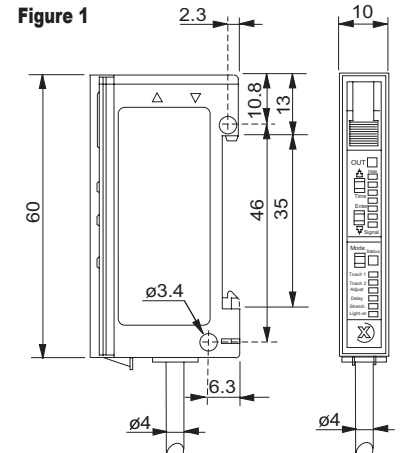
DFT Series Fiber Photoelectric Amplifier Selection Chart							
Part Number	Price	Sensing Range	Output State	Logic	Connection	Wiring	Dimensions
<a href="#">DFT-AN-1A</a>	\$172.00	Optical fiber Dependent	N.O./N.C. selectable	NPN	2m [6.5 ft] axial cable	Diagram 1	Figure 1
<a href="#">DFT-AN-1F</a>	\$172.00				M8 [8mm] connector	Diagram 1	Figure 2
<a href="#">DFT-AP-1A</a>	\$172.00			PNP	2m [6.5 ft] axial cable	Diagram 2	Figure 1
<a href="#">DFT-AP-1F</a>	\$172.00				M8 [8mm] connector	Diagram 2	Figure 2

Specifications		
Type	DFT-AN-1*	DFT-AP-1*
Sensing Distance	See Optical Fibers Table	
Light Spot Diameter	N/A	
Emission	red (680nm)	
Sensitivity	Dual Teach function	
Output Type	NPN Light-on or Dark-on Selectable Output delay or stretch programmable	PNP Light-on or Dark-on Selectable Output delay or stretch programmable
Operating Voltage	10-30VDC	
No-Load Supply Current	≤ 25mA	
Operating (Load) Current	≤ 200mA	
Off-state (Leakage) Current	≤ 0.1mA	
Voltage Drop	2V maximum at 200mA	
Switching Frequency	1.5 kHz	
Ripple	m20%	
Time Delay Before Availability (tv)	80ms	
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)	
Operating Temperature	-25 to 55°C [-13 to 131°F]	
Protection Degree	IEC IP64	
LED Indicators -Switching Status	Yellow (output energized)	
Housing Material	PBT	
Lens Material	Acrylic	
Shock/Vibration	See terminology section	
Tightening Torque	N/A	
Weight (cable/connector)	68g [2.39oz] / 17g [0.60oz]	
Connectors	2m [6.5 ft] axial cable; M8 [8mm] connector	
Agency Approvals	UL file E328811	

To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page.

## Dimensions

(mm)



## Wiring Diagrams

Diagram 1

NPN Output

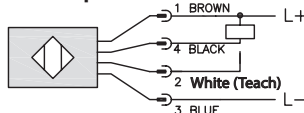
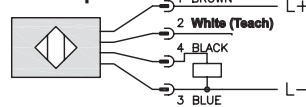


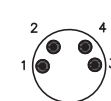
Diagram 2

PNP Output



Connector

M8 Connector



## Switching Element Function

	Through-beam and Reflective Models	Diffuse Reflective Models
Light-on	N.C.	N.O.
Dark-on	N.O.	N.C.

# Accessories for 50 Series Photoelectric Sensors

## Mounting Brackets

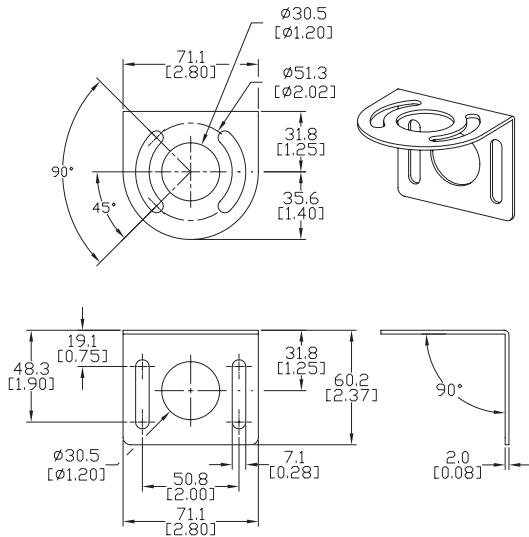
Short, tall or ball-swivel style of mounting brackets are available. All styles allow 360° rotation of the sensor.

*Note: Cutler-Hammer parts available for sale to North America locations only.*

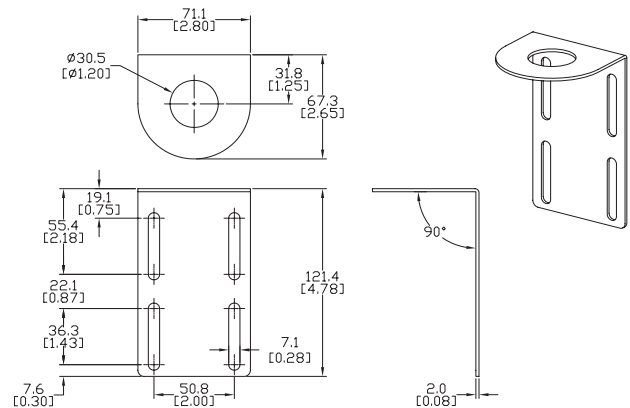
## Dimensions

mm [inches]

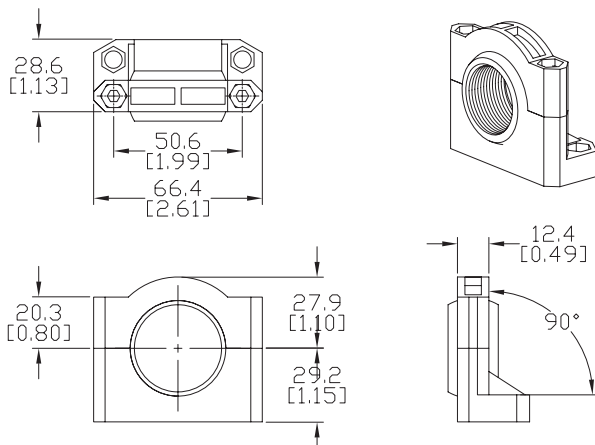
Accessories for Enhanced 50 Series Sensors			
Part Number	Price	Description	Weight [lb]
<a href="#"><u>6150E-6501</u></a>	\$7.75	Mounting bracket, right-angle, 1.5in vertical adjustment, nickel plated steel. For use with CH Enhanced 50 Series sensor.	0.20
<a href="#"><u>6150E-6502</u></a>	\$10.00	Mounting bracket, right-angle, 3.5in vertical adjustment, nickel plated steel. For use with CH Enhanced 50 Series sensor.	0.39
<a href="#"><u>6150E-6503</u></a>	\$10.00	Mounting bracket, right-angle ball swivel, 60 degree vertical and horizontal adjustment, plastic. For use with CH Enhanced 50 Series sensor. Ball swivel allows for ±30° angle.	0.11



**6150E-6501**



**6150E-6502**



**6150E-6503**