



Cutler-Hammer

# Enhanced 50 Series Through-beam Photoelectric Sensors



**1151E-6504**



**1251E-6504**

- Long sensing distances
- Fiberglass-reinforced plastic housing
- Field of view: 2.4°
- Cable wires or mini/micro connector termination
- NPN/PNP, Solid-State Relay, or SPDT EM Relay outputs
- IP67 rated



**1151E-6517**



**1251E-6517**

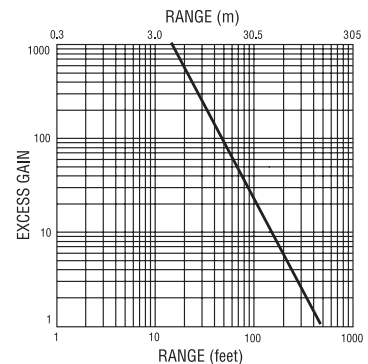
Note: Cutler-Hammer parts available for sale to North America locations only.

Enhanced 50 Series Through-beam Photoelectric Sensors Selection Chart												
Part Number	Price	Voltage Range	Sensing Range	Optimum Range	Sensing Beam	Through-Beam Component	Output Type	Connection Type	Cable Part Number			
<a href="#">1151E-6517</a>	\$125.00	10 - 40 VDC	500ft [152 m]	0.1 to 250ft [0.03 to 77 m]	Infrared	Source/Emitter	N/A	6-foot cable (300V)	pre-wired 6ft [1.8 m]			
<a href="#">1251E-6517</a>	\$112.00					Detector/Receiver	NPN/PNP 250mA					
<a href="#">1151E-6547</a>	\$125.00					Source/Emitter	N/A	4-pin Euro (Micro) DC connector	CSDS4A4CY2202 CSDS4A4CY2205			
<a href="#">1251E-6547</a>	\$112.00					Detector/Receiver	NPN/PNP 250mA					
<a href="#">1151E-6513</a>	\$125.00	12 - 240 VDC 24 - 240 VAC				500ft [152 m]	0.1 to 250ft [0.03 to 77 m]	Infrared	Source/Emitter	N/A	6-foot cable (300V)	pre-wired 6ft [1.8 m]
<a href="#">1251E-6513</a>	\$124.00								Detector/Receiver	Solid-state relay 300mA @ 240 VAC/VDC		
<a href="#">1151E-6543</a>	\$125.00								Source/Emitter	N/A	4-pin Micro AC connector	CSAS4F4CY2202 CSAS4F4CY2205
<a href="#">1251E-6543</a>	\$124.00								Detector/Receiver	Solid-state relay 300mA @ 240 VAC/VDC		
<a href="#">1151E-6504</a>	\$125.00		Source/Emitter	N/A	4-pin Mini connector				CSMS4A4CY1602 CSMS4A4CY1606			
<a href="#">1251E-6503</a>	\$125.00		Detector/Receiver	Solid-state relay 300mA @ 240 VAC/VDC								
<a href="#">1251E-6504</a>	\$121.00	Detector/Receiver	SPDT EM relay 3A @ 120VAC	5-pin Mini connector	CSMS5A5CY1602 CSMS5A5CY1606							

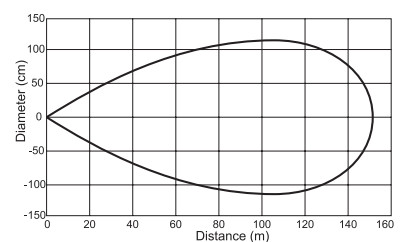
Note: Purchase one source and one detector for a complete set.

Operating Voltage	Models	Cable Models	Mini-Connector Models (Face View Male Shown)	Micro and Euro (Micro) Connector Models (Face View Male Shown)
10 - 40V DC	Thru-Beam Source/Emitter	BR (+) <sup>2</sup> BK Test BU (-)	Test ① ④ ② ③	② ① ③ ④
	Thru-Beam Detector/Receiver	BR (+) WH Load BK Load BU (-)	PNP ① ④ ② ③ NPN Load	① ④ ② ③ NPN Load PNP Load
12 - 240V DC or 24 - 240V AC Solid-State Relay	Thru-Beam Source/Emitter	BR L1 (+) BU L2 (-)	L2 (-) ① ④ ② ③ L1 (+)	③ ② ④ ① L2 (-) L1 (+)
	Thru-Beam Detector/Receiver	BR L1 (+) <sup>1</sup> WH Isolated AC/DC Output BK Isolated AC/DC Output BU L2 (-)	Isolated AC/DC Output ① ④ ② ③ L2 (-) L1 (+)	Isolated AC/DC Output ③ ② ④ ① L2 (-) L1 (+)
12 - 240V DC or 24 - 240V AC SPDT EM Relay	Thru-Beam Source/Emitter	BR L1 (+) BU L2 (-)	L2 (-) ① ④ ② ③ L1 (+)	③ ② ④ ① L2 (-) L1 (+)
	Thru-Beam Detector/Receiver	BR L1 (+) BK Load N.C. Out OR COM WH Load N.C. Out BU Load L2 (-)	N.C. Out ① ⑤ ② ④ L2 (-) L1 (+) COM	L2 (-) ① ⑤ ② ④ N.C. COM L1 (+)

Characteristic curve chart



Spot dimension chart



<sup>1</sup> Connect load to appropriate output for either sinking or sourcing operation.  
<sup>2</sup> Connecting the test input to 0 VDC allows you to switch the light source off for troubleshooting while leaving the sensor under power.



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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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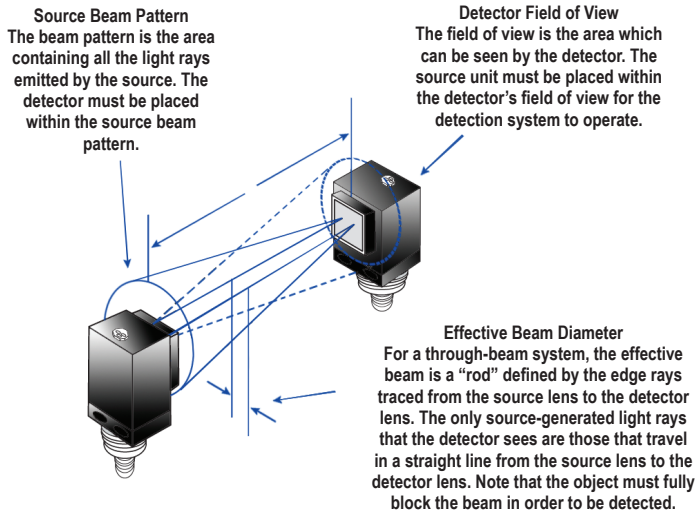
## Sensors

### 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.

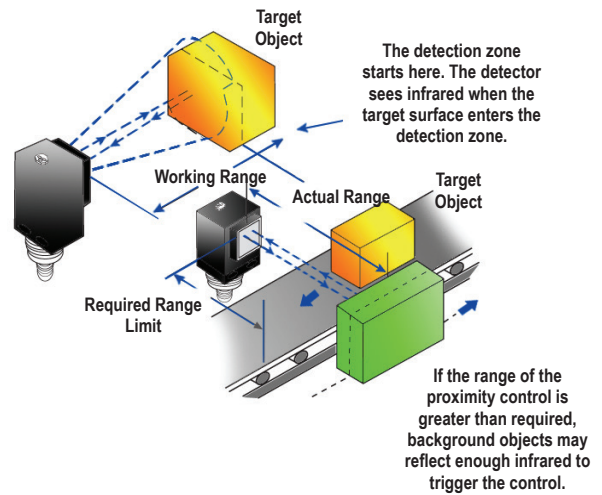
#### Through-Beam

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



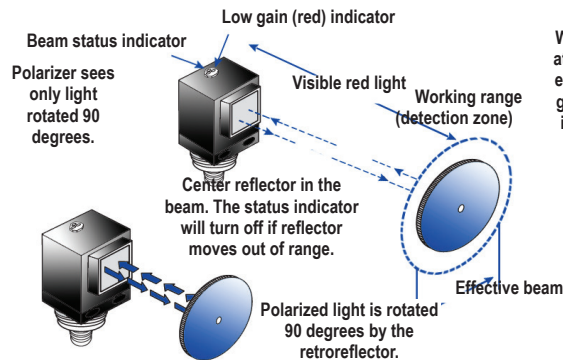
#### Diffuse

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



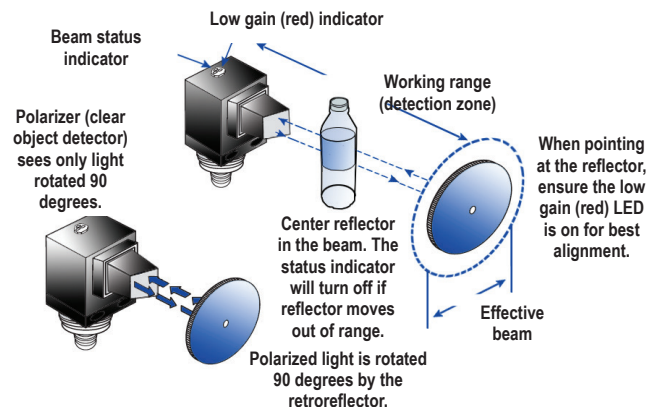
#### Polarized Reflex

- 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.

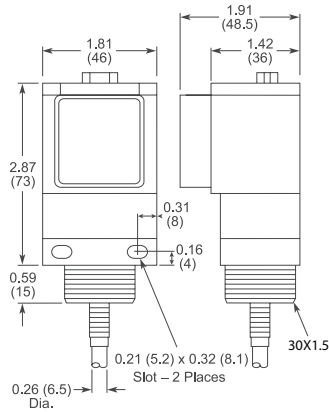


# Enhanced 50 Series Photoelectric Sensors Dimensions

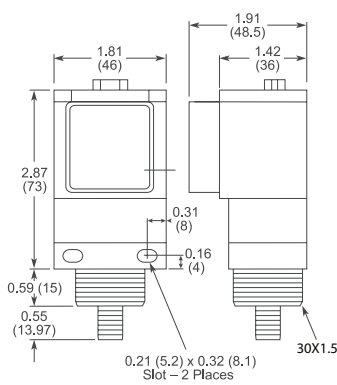
## Sensor Dimensions

inches (mm)

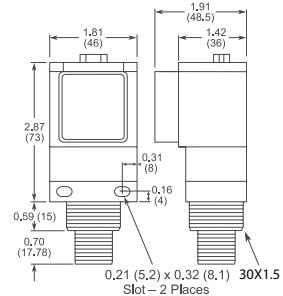
Cable and Pigtail Connector\* Version



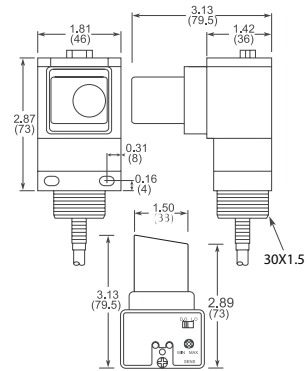
AC/DC Micro or Euro (Micro) Connector Versions



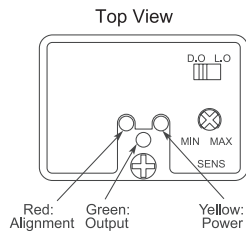
Mini Connector Versions



Clear Object Versions (Cable Version Shown)



\* Pigtail length: 7.5" nominal

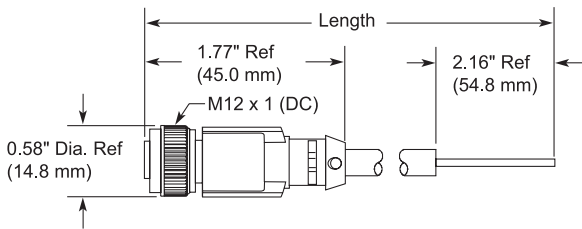


## Connector Cables Dimensions

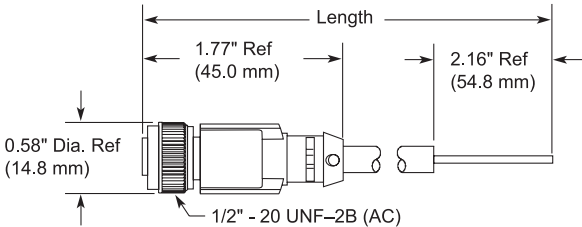
(in/mm)

### Micro Style Connector Cables

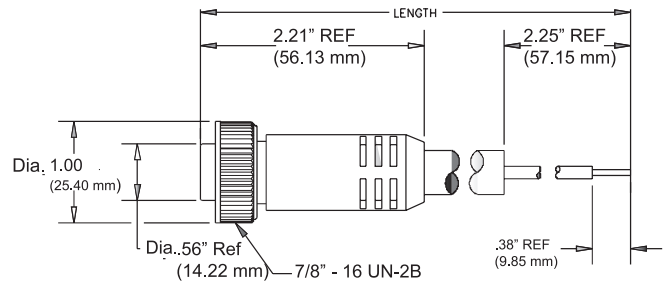
#### M12 x 1 (DC) connector cable



#### 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



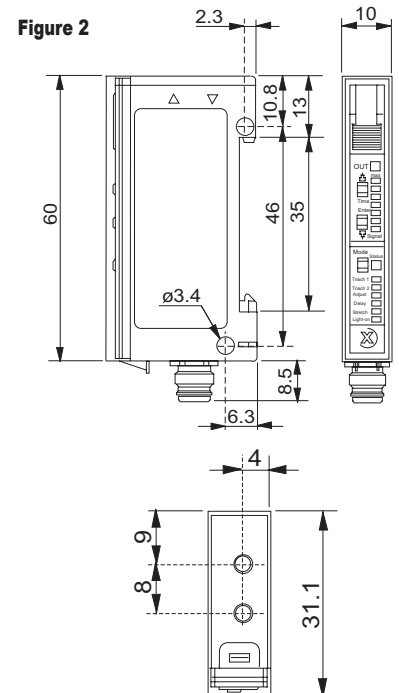
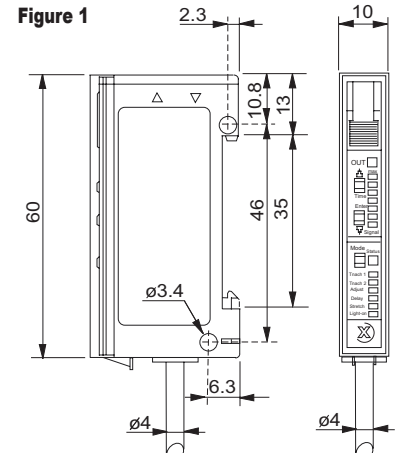
DFT Series Fiber Photoelectric Amplifier Selection Chart							
Part Number	Price	Sensing Range	Output State	Logic	Connection	Wiring	Dimensions
<a href="#">DFT-AN-1A</a>	\$172.00	Optical fiber Dependent	N.O./N.C. selectable	NPN	2m [6.5 ft] axial cable	Diagram 1	Figure 1
<a href="#">DFT-AN-1F</a>	\$172.00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

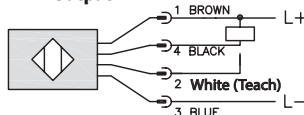
(mm)



## Wiring Diagrams

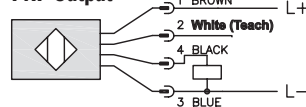
### Diagram 1

#### NPN Output



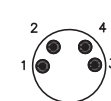
### Diagram 2

#### 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.

# DFP Series Fiber Photoelectric Amplifiers

Compact rectangular plastic  
DIN-rail mount DC

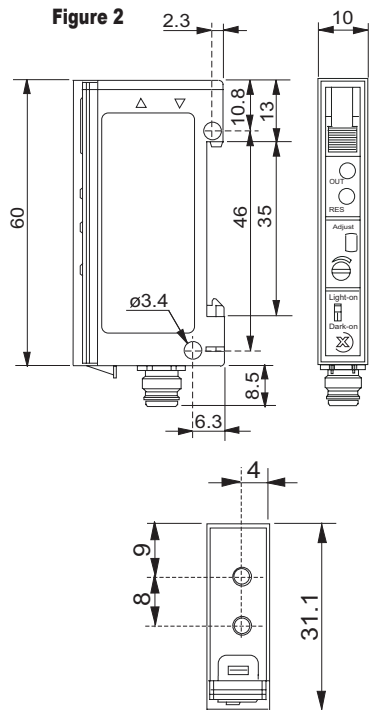
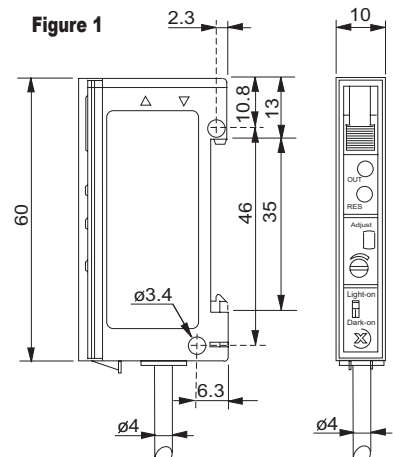
- DIN-rail mounting
- 12-turn potentiometer sensitivity setting with illuminated scale
- NPN or PNP, Light-on/Dark-on selectable outputs
- Red LED with visible spot
- IP64 rated



DFP Series Fiber Photoelectric Amplifier Selection Chart							
Part Number	Price	Sensing Range	Output State	Logic	Connection	Wiring	Dimensions
<a href="#">DFP-AN-1A</a>	\$109.00	Optical fiber dependent	N.O./N.C. selectable	NPN	2m [6.5 ft] axial cable	Diagram 1	Figure 1
<a href="#">DFP-AN-1F</a>	\$109.00				M8 [8mm] connector	Diagram 1	Figure 2
<a href="#">DFP-AP-1A</a>	\$109.00			2m [6.5 ft] axial cable	Diagram 2	Figure 1	
<a href="#">DFP-AP-1F</a>	\$109.00			M8 [8mm] connector	Diagram 2	Figure 2	

## Dimensions

(mm)



Specifications		
Type	DFP-AN-1*	DFP-AP-1*
Sensing Distance	See Optical Fibers Table	
Light Spot Diameter	N/A	
Emission	red (680nm)	
Sensitivity	12-turn Potentiometer with illuminated scale	
Output Type	NPN Light-on or Dark-on Selectable	PNP Light-on or Dark-on Selectable
Operating Voltage	10-30VDC	
No-load Supply Current	≤15mA	
Operating (Load) Current	≤200mA	
Off-state (Leakage) Current	≤0.1mA	
Voltage Drop	2V maximum at 200mA	
Switching Frequency	1.5kHz	
Ripple	≤20%	
Time Delay Before Availability (tv)	300ms	
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 Indicator - Switching Status	Pin 4 (black): switching status - yellow Pin 2 (pink): excess gain status - green	
Housing Material	PBT	
Lens Materials	Acrylic	
Shock/Vibration	See terminology section	
Tightening Torque	N/A	
Weight (cable/connector)	69g [2.44oz] / 18g [0.63oz]	
Connectors	2m [6.5 ft] axial cable; M8 [8mm] connector	
Agency Approvals	UL file E32881	

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

## Wiring Diagrams

Diagram 1

NPN Output

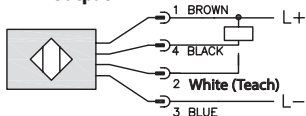
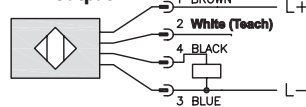


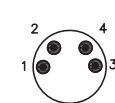
Diagram 2

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

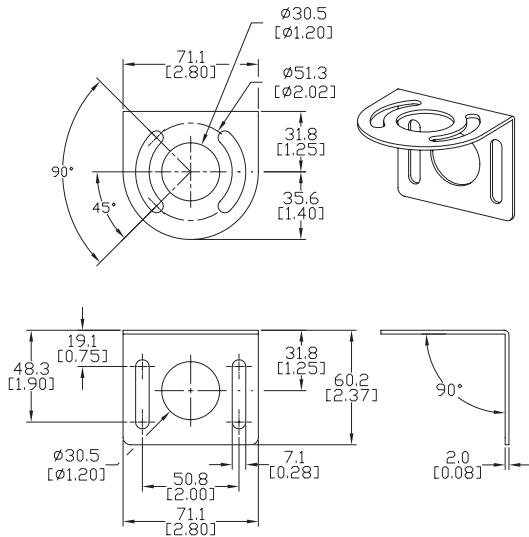
Short, tall or ball-swivel style of mounting brackets are available. All styles allow 360° rotation of the sensor.

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

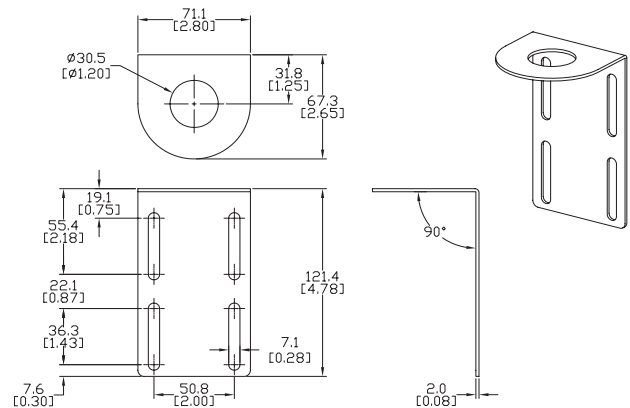
## Dimensions

mm [inches]

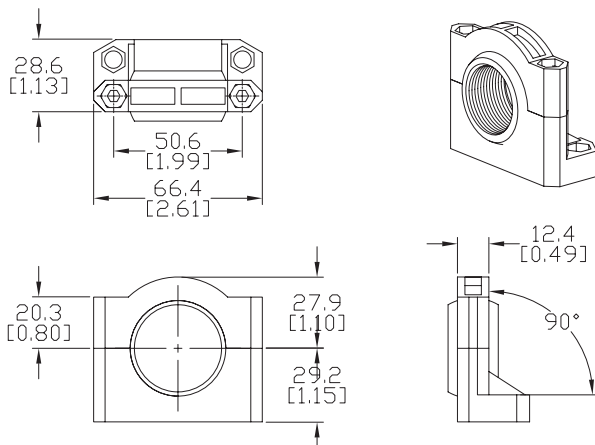
Accessories for Enhanced 50 Series Sensors			
Part Number	Price	Description	Weight [lb]
<a href="#"><u>6150E-6501</u></a>	\$7.75	Mounting bracket, right-angle, 1.5in vertical adjustment, nickel plated steel. For use with CH Enhanced 50 Series sensor.	0.20
<a href="#"><u>6150E-6502</u></a>	\$10.00	Mounting 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**