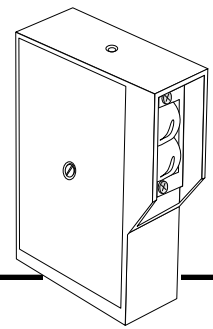
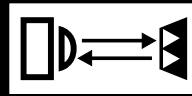


Heavy Duty

Photoelectric Sensors

Retro-Reflective



Photoelectric Sensors

- Non-Polarized
- Modulated LED
- Choice of Outputs
- Diecast Aluminum Housing Epoxy Coated
- Tri-Color LED Indicator
- Optional Plug-In Time Delays
- NEMA 3, 4, 12 & 13 Design
- -20°C to +70°C

These beefed-up sensors are smart as well as tough. Die cast aluminum housings and totally sealed optics help make them ideal for severe environments. All

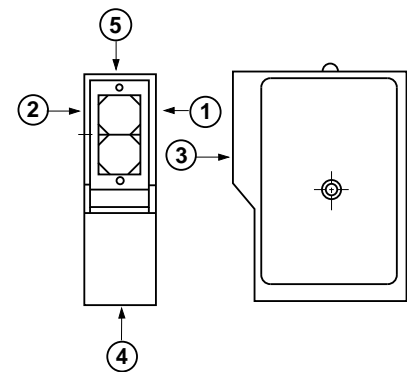
models use a modulated infrared LED emitter and receiver to ignore ambient light. Plug-in time delay modules offer wide flexibility in application options.

Designed for harsh industrial environments, the EP100 Series is especially equipped to alert you to potential problems. When other sensors run into alignment or dirty optic problems, you don't know about it until they fail. The EP100 uses a unique "tri-color" LED to indicate impending problems. When the LED glows:

- Green — stable operation
>70% reflected signal strength
- Yellow — marginal operation
40-70% reflected signal strength
- Red — insufficient reflected signal

Target Repeatability

For best repeatability, it is recommended to have target travel in direction (1) or (2). Traveling toward lens (3) will result in slightly higher tolerance on switch point. It is not recommended to have target travel in direction (4) and (5).



Supply Voltage	Power Consumption	Output Circuit Type	Model No.	Output Rating	Response Time On/Off	Maximum Switching Frequency	Leakage Current
RELAY OUTPUTS							
120 VAC	1.0 VA	DPDT	EP110-12001*	5A Resistive @ 250 VAC or 30 VDC	15mS/20ms	25 Hz	—
11-30 VDC	70 mA	DPDT	EP110-15001	5A Resistive @ 250 VAC or 30 VDC	15mS/20ms	25 Hz	—
TRANSISTOR OUTPUTS							
120 VAC	1.0 VA	NPN	EP110-12201*	25 mA @ 40 VDC	2mS/2ms	250 Hz	—
11-30 VDC	70 mA	NPN	EP110-15201	25 mA @ 40 VDC	2mS/2ms	250 Hz	—

* UL Listed and CSA Approved

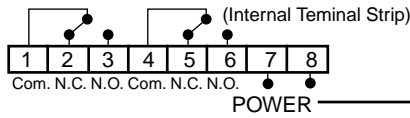
Common Sensor Characteristics

RETROREFLECTIVE HEAVY DUTY SENSORS	
Sensing Range	0-30 ft.*
Standard Retroreflector Target	4" x 4" square reflector
Lens	Glass
Light Source	Modulated Infrared LED
Light/Dark Operate — Selectable	yes
Optional Plug-in Timers	yes
NEMA Enclosure Types	3, 4, 12 & 13
Temperature Range	-20°C to +70°C
UL/CSA Certifications	yes
Sensitivity Adjustment	yes
Optic Heater	no
Cable Entry	1/2" - 14 NPT Conduit
Shipping Weight	18 oz.

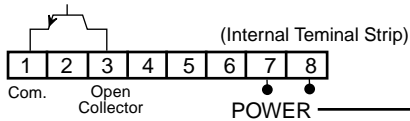
* Using EP175-13900, 4" x 4" square reflector

Circuit Drawings

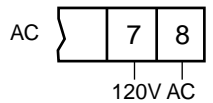
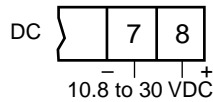
RELAY (DPDT) OUTPUTS



TRANSISTOR (NPN) OUTPUTS

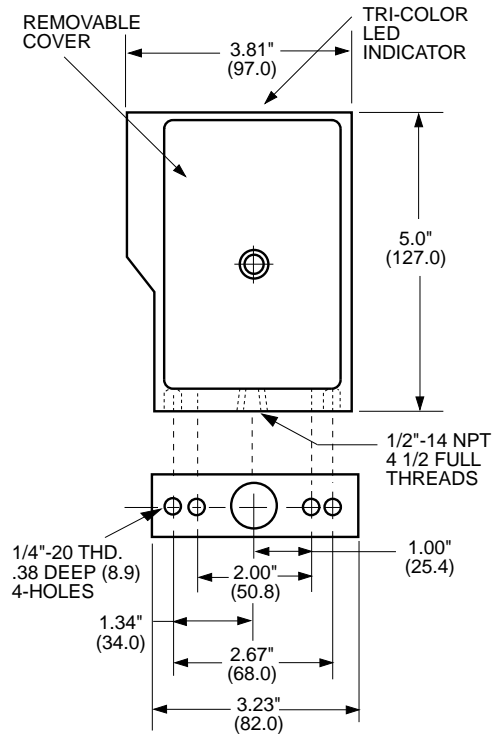


POWER INPUT:

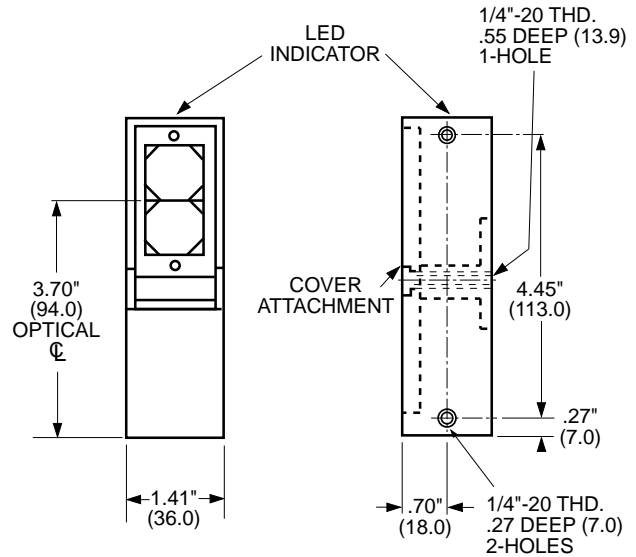


Dimensional Drawings

SIDE & BOTTOM VIEW



FRONT & REAR VIEW



NAMCO

Namco Controls Corporation

Mayfield Village, OH 44143

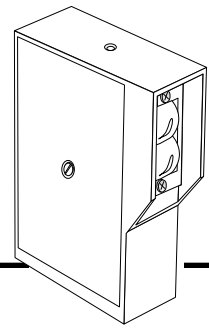
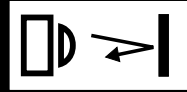
(440) 460-1360 • FAX (440) 460-3800 • namcocontrols.com

For technical assistance, call 1-800-NAMTECH

Heavy Duty

Photoelectric Sensors

Diffuse Proximity



Photoelectric Sensors

- Modulated LED
- Choice of Outputs
- Diecast Aluminum Housing Epoxy Coated
- Tri-Color LED Indicator
- Optional Plug-In Time Delays
- NEMA 3, 4, 12 & 13 Design
- -20°C to +70°C

These beefed-up sensors are smart as well as tough. Die cast aluminum housings and totally sealed optics help make them ideal for severe environments. All models use a modulated infrared LED

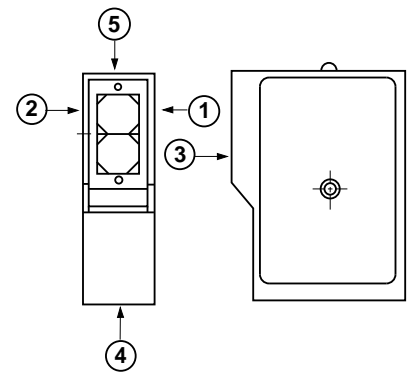
emitter and receiver to ignore ambient light. Plug-in time delay modules offer wide flexibility in application options.

Designed for harsh industrial environments, the EP100 Series is especially equipped to alert you to potential problems. When other sensors run into alignment or dirty optic problems, you don't know about it until they fail. The EP100 uses a unique "tri-color" LED to indicate impending problems. When the LED glows

- Green — stable operation >70% reflected signal strength
- Yellow — marginal operation 40-70% reflected signal strength
- Red — insufficient reflected signal

Target Repeatability

For best repeatability, it is recommended to have target travel in direction (1) or (2). Traveling toward lens (3) will result in slightly higher tolerance on switch point. It is not recommended to have target travel in direction (4) and (5).



Supply Voltage	Power Consumption	Output Circuit Type	Fixed Range			Adjustable Range	Output Rating	Response Time (On/Off)	Maximum Switching Frequency	Leakage Current
			1.0'	2.5'	6.5'					
RELAY OUTPUTS										
120 VAC	1.0 VA	DPDT	EP130-12003*	EP130-12002*	EP130-12001*	—	5A Resistive @ 250 VAC or 30 VDC	20ms/25ms	25 Hz	—
11-30 VDC	70 mA	DPDT	EP130-15003	EP130-15002	EP130-15001	—	5A Resistive @ 250 VAC or 30 VDC	20ms/25ms	25 Hz	—
110/220 VAC	4.0 VA	SPDT	—	—	—	EP130-12004	50 W - 250 VDC 60 VA - 250 VAC	70ms	7 Hz	—
11-30 VDC ± 10%	90 mA	SPDT**	—	—	—	EP130-15004	50 W-250 VDC 60 VA - 250 VAC	70ms	7 Hz	—
TRANSISTOR OUTPUTS										
120 VAC	1.0 VA	NPN	EP130-12203*	EP130-12202*	EP130-12201*	—	25 mA @ 40 VDC	60ms/10ms	60 Hz	—
11-30 VDC	70 mA	NPN	EP130-15203	EP130-15202	EP130-15201	—	25 mA @ 40 VDC	60ms/10ms	60 Hz	—
11-30 VDC ± 10%	90 mA	PNP**	—	—	—	EP130-15004	100mA	70ms	7 Hz	—

* UL Listed and CSA Approved

** Relay/Transistor (PNP) outputs on EP130-15004.

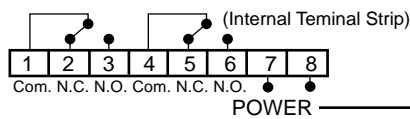
Common Sensor Characteristics

DIFFUSE PROXIMITY HEAVY DUTY SENSORS		
	Fixed Range	Adjustable Range
Sensing Ranges	1.0, 2.5, 6.5 ft.*	100-800 mm Adjustable*
Standard Target	White Bond Paper	
Lens	Glass	
Light Source	Modulated Infrared LED	
Light/Dark Operate — Selectable	yes	
Optional Plug-in Timers	yes	
NEMA Enclosure Type	3, 4, 12 & 13	
Temperature Range	-20°C to +70°C	-20°C to +60°C
UL/CSA Certifications	yes	
Sensitivity Adjustment	yes	
Optic Heater	no	
Cable Entry	1/2" - 14 NPT Conduit	
Shipping Weight	16 oz.	18 oz.

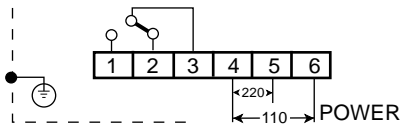
*Using White Bond Paper

Circuit Drawings

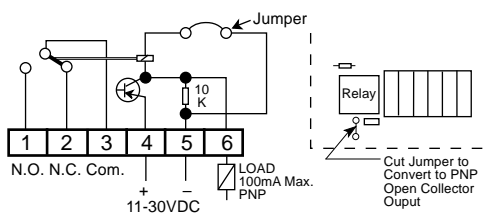
RELAY (DPDT) OUTPUTS



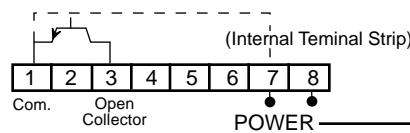
AC OUTPUTS ADJUSTABLE RANGE (SPDT)/AC POWER



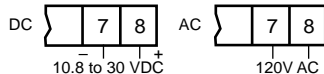
DC OUTPUTS ADJUSTABLE RANGE (SPDT/PNP)/DC POWER



TRANSISTOR (NPN) OUTPUTS

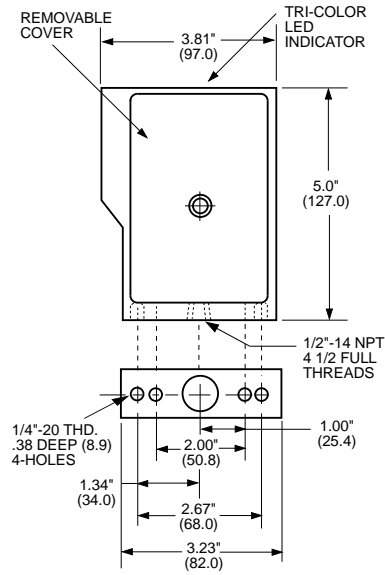


POWER INPUT:

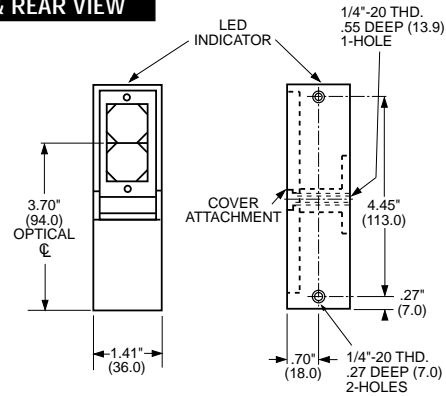


Dimensional Drawings

SIDE & BOTTOM VIEW



FRONT & REAR VIEW



Tolerance vs. Range

For Adjusted Range Diffuse Scanner EP130-12004 & EP130-15004

Adjusted Range	Total Sensing Range From:	Max. Range of White Target When Range is Set On Black Target	
		Black Paper	White Paper
3.94" (100mm)	1.97" to 3.94" (50mm to 100mm)	3.94" (100mm)	4.02" (102mm)
11.80" (300mm)	3.94" to 11.80" (100mm to 300mm)	11.80" (300mm)	12.20" (310mm)
19.68" (500mm)	4.72" to 19.68" (120mm to 500mm)	19.68" (500mm)	21.26" (540mm)
31.50" (800mm)	5.90" to 31.50" (150mm to 800mm)	31.50" (800mm)	31.50" (800mm)

NAMCO

Namco Controls Corporation

Mayfield Village, OH 44143

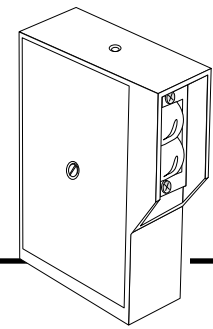
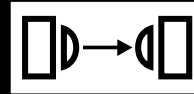
(440) 460-1360 • FAX (440) 460-3800 • namcocontrols.com

For technical assistance, call 1-800-NAMTECH

Heavy Duty

Photoelectric Sensors

Thru-Beam & Fiber Optic



Photoelectric Sensors

- Modulated LED
- Choice of Outputs
- Diecast Aluminum Housing Epoxy Coated
- Tri-Color LED Indicator
- Optional Plug-In Time Delays
- 400 Ft. Range Thru-Beam
- Sealed Heated Optics Thru-Beam
- NEMA 3, 4, 12 & 13 Design
- -20°C to +70°C

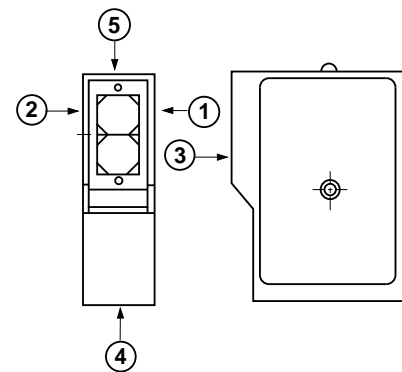
These beefed-up sensors are smart as well as tough. Die cast aluminum housings and totally sealed optics help make them ideal for severe environments. All models use a modulated infrared LED emitter and receiver to ignore ambient light. Plug-in time delay modules offer wide flexibility in application options.

Designed for harsh industrial environments, the EP100 Series is especially equipped to alert you to potential problems. When other sensors run into alignment or dirty optic problems, you don't know about it until they fail. The EP100 uses a unique "tri-color" LED to indicate impending problems. When the LED glows

- Green — stable operation
>70% reflected signal strength
- Yellow — marginal operation
40-70% reflected signal strength
- Red — insufficient reflected signal

Target Repeatability

For best repeatability, it is recommended to have target travel in direction (1) or (2). Traveling toward lens (3) will result in slightly higher tolerance on switch point. It is not recommended to have target travel in direction (4) and (5).



Supply Voltage	Power Consumption	Output Circuit Type	Thru-Beam		Fiber Optic	Output Rating	Response Time On/Off	Maximum Switching Frequency	Leakage Current
			Emitter	Receiver					
110/220 VAC	3.5 VA	—	EP120-12501	—	—	—	—	—	—
24 VDC ± 10%	35 mA	—	EP120-15501	—	—	—	—	—	—
RELAY OUTPUTS									
120 VAC	1.0 VA	DPDT	—	—	EP140-12001	5A Resistive @ 250 VAC or 30 VDC	20mS/25ms	25 Hz	—
110/220 VAC	4.5 VA	SPDT	—	EP120-12701	—	50W - 250 VDC 60 VA - 250 VAC	30mS/150ms	6 Hz	—
11-30 VDC	70 mA	DPDT	—	—	EP140-15001	5A Resistive @ 250 VAC or 30 VDC	20mS/25ms	20 Hz	—
24 VDC ± 10%	100 mA	SPDT**	—	EP120-15701	—	50W - 250 VDC 60 VA - 250 VAC	—	20 Hz	—
TRANSISTOR OUTPUTS									
11-30 VDC	70 mA	NPN	—	—	EP140-15201	25 mA @ 40 VDC	6mS/10ms	60 Hz	—
24 VDC ± 10%	100 mA	PNP**	—	EP120-15701	—	100 mA	—	100 Hz	—

* UL Listed

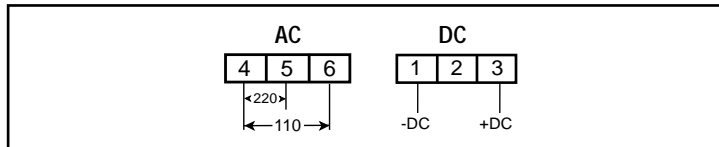
** Relay/Transistor (PNP) outputs on EP120-15701

Common Sensor Characteristics

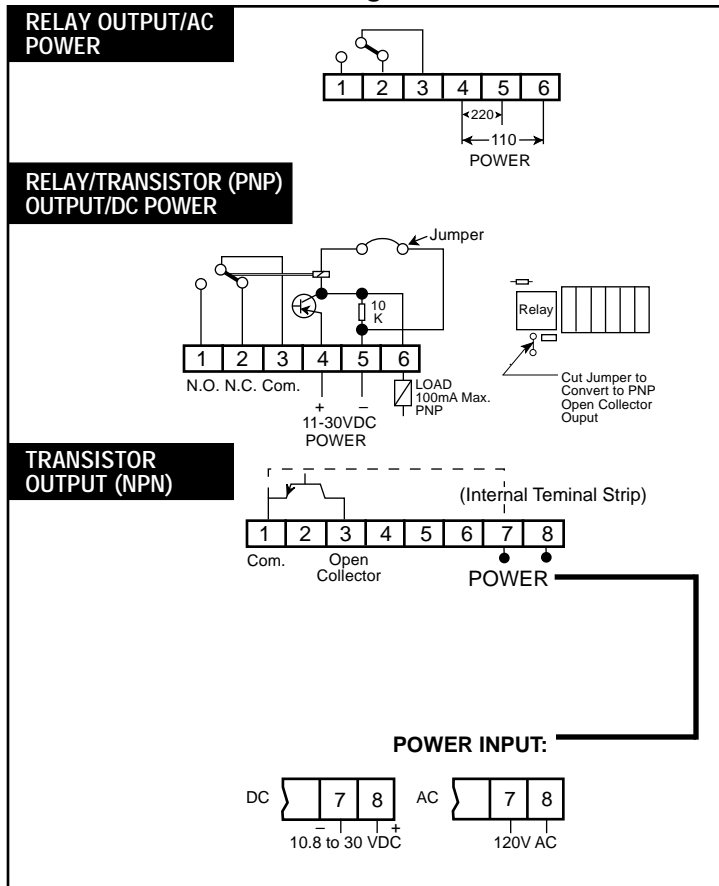
THRU-BEAM & FIBER OPTIC HEAVY DUTY SENSORS		
	Thru-Beam	Fiber Optic
Sensing Range	0-400 ft.	See Photoelectric Accessories section
Lens	Glass	
Light Source	Modulated Infrared LED	
Light/Dark Operate — Selectable	no	yes
Optional Plug-in Timers*	yes	
NEMA Enclosure Type	3, 4, 12 & 13	
Temperature Range	-30°C to +60°C	-20°C to +70°C
UL/CSA Certifications	no	yes
Sensitivity Adjustment	no	yes
Optic Heater	yes	no
Cable Entry	1/2" - 14 NPT Conduit	
Shipping Weight	18 oz.	20 oz.

* Refer to Photoelectric Accessories section

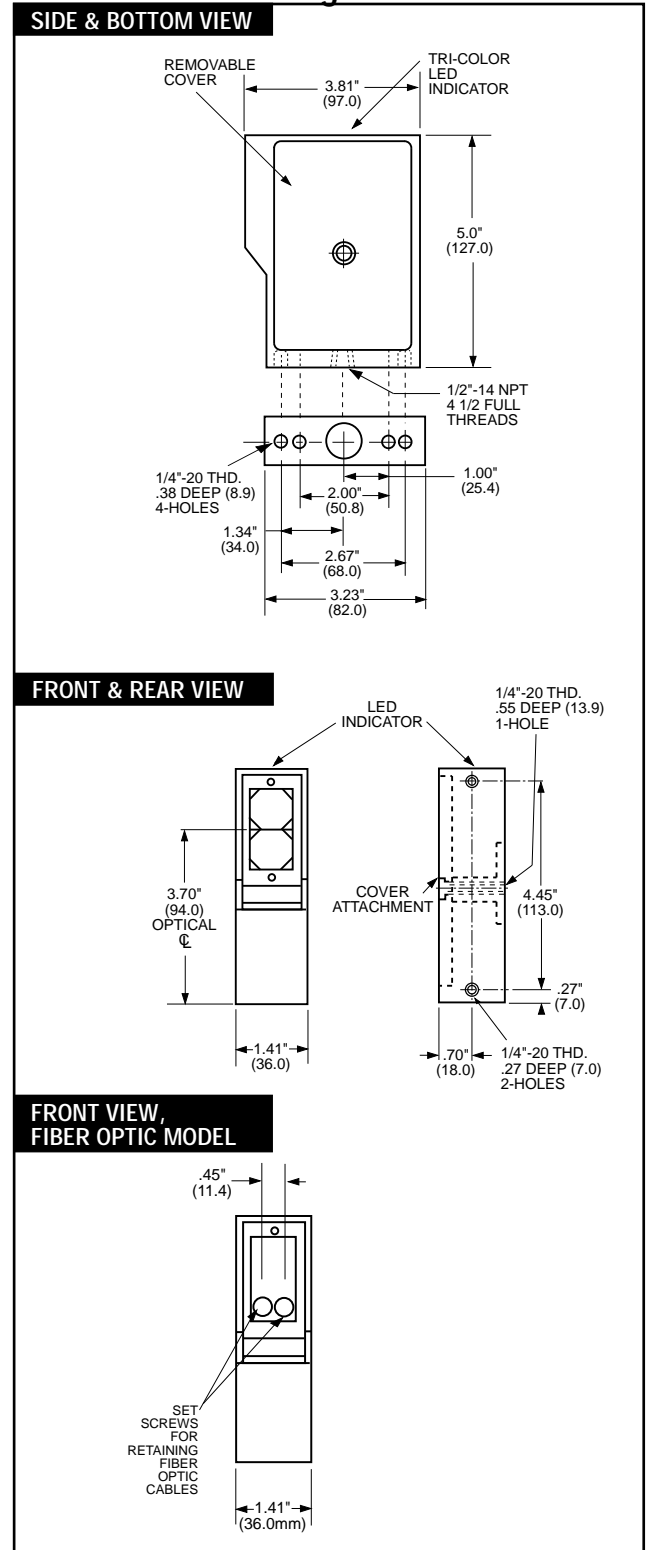
Emitter Circuit Drawings



Receiver Circuit Drawings



Dimensional Drawings



Photoelectric Sensors



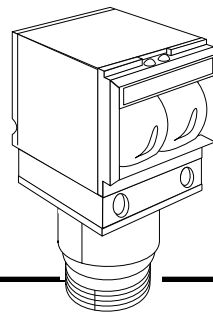
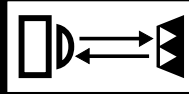
Namco Controls Corporation
 Mayfield Village, OH 44143
 (440) 460-1360 • FAX (440) 460-3800 • namcocontrols.com

For technical assistance, call 1-800-NAMTECH

Compact

Photoelectric Sensors

Retro-Reflective



Photoelectric Sensors

- Programmable Controller Compatible
- NPN/PNP wire selectable
- Integral yoke bracket provides four 90°-indexed mounting positions
- Light/dark operate user selectable for optimum flexibility and minimum inventory
- Sensitivity gain adjust (all models)
- 2 wire AC, 3 wire AC, or 4 wire DC circuit types
- Dual LED status indicators

If you need a reliable photoelectric sensor, you can't do much better than the EP200. Only 2.45 inches high, it fits in the tightest spots. For easy installation, its U-shaped yoke slips off allowing you to rotate the sensor in 90° increments.

A Rynite® plastic housing holds the surface mount electronics which are themselves encapsulated in epoxy. A wide variety of configurations are available to fit your specific needs. In its retroreflective version, it is great for long range jobs...up to 30 feet. Polarized versions are immune from "proxing" or false signals from highly reflective objects like aluminum cans, shrink wrap, bottles, foil, etc.

The EP200 series of sensors is backed by Namco's Lifetime Replacement Program.

LED Functions

PHOTOELECTRIC SWITCH FUNCTION				
Type	Sensor Receiver Recognizes	Status Output	Status LED	
			Ready	Target
L.O.	DARK	OPEN	ON	OFF
L.O.	LIGHT	CLOSED	OFF	ON
D.O.	LIGHT	OPEN	ON	OFF
D.O.	DARK	CLOSED	OFF	ON



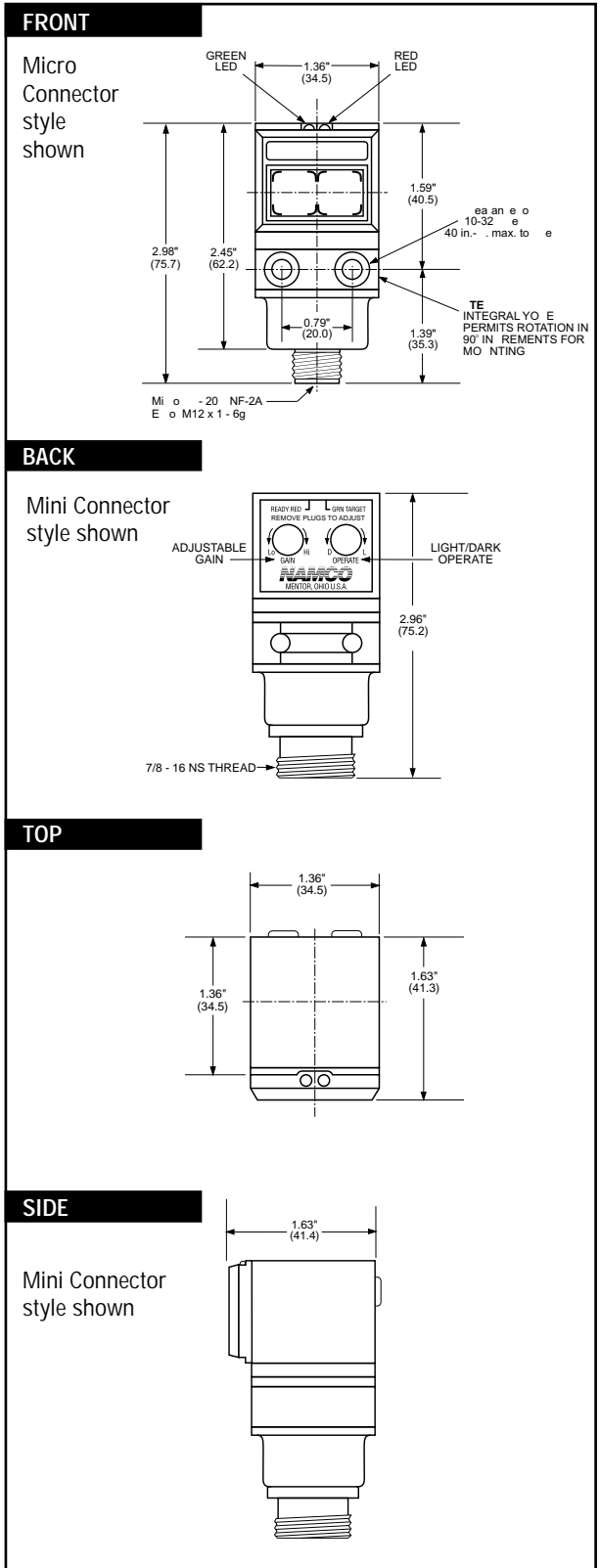
Termination Type	Power Consumption	Output Circuit Type	Non-Polarized Model No. (Plastic Lens)	Polarized Model No. (Glass Lens)	Output Rating	Leakage Current	Voltage Drop	Maximum Switching Frequency	Response Time On/Off
2-WIRE AC 20-150V									
3-pin Mini	0.3W @ 120V	2W	EP210-24400	EP210-24401	500mA	1.7mA	≤ 10V	15Hz	30ms
3-pin Micro	0.3W @ 120V	2W	EP210-24420	EP210-24421	500mA	1.7mA	≤ 10V	15Hz	30ms
6' Cable	0.3W @ 120V	2W	EP210-24410	EP210-24411	500mA	1.7mA	≤ 10V	15Hz	30ms
3-WIRE AC 85-132V									
3-pin Mini	0.7W @ 120 VAC	3W	EP210-24600	EP210-24601	500mA	—	≤ 2.5V	33Hz	15ms
4-pin Micro	0.7W @ 120 VAC	3W	EP210-24620	EP210-24621	500mA	—	≤ 2.5V	33Hz	15ms
6' Cable	0.7W @ 120 VAC	3W	EP210-24610	EP210-24611	500mA	—	≤ 2.5V	33Hz	15ms
4-WIRE DC 10-30V									
4-pin Mini	0.9W @ 30 VDC	4W, NPN & PNP	EP210-24500	EP210-24501	200mA	—	NPN @ 100mA: 0.8V PNP @ 100mA: 2.0V	250Hz	2ms
4-pin Euro	0.9W @ 30 VDC	4W, NPN & PNP	EP210-24520	EP210-24521	200mA	—	NPN @ 100mA: 0.8V PNP @ 100mA: 2.0V	250Hz	2ms
6' Cable	0.9W @ 30 VDC	4W, NPN & PNP	EP210-24510	EP210-24511	200mA	—	NPN @ 100mA: 0.8V PNP @ 100mA: 2.0V	250Hz	2ms

Common Sensor Characteristics

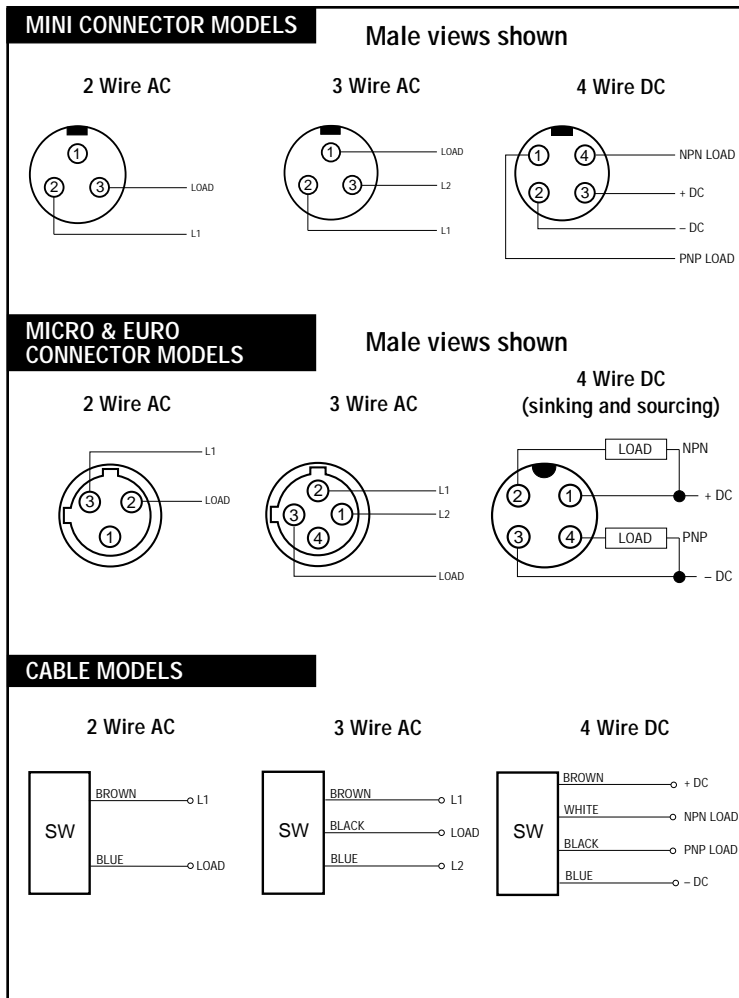
COMPACT RETRO-REFLECTIVE SENSORS		
	Polarized	Non-Polarized
Sensing Range	15 feet*	30 feet*
Standard Target	3.23" diameter reflector	
Light Source (LED)	Visible	Modulated Infrared
Light/Dark Operate — Selectable	yes	
Sensitivity Adjustment	yes	
Ambient Temperature Range	-20°C to +70°C	
Reverse Polarity Protected	4W DC only	
Short Circuit Protected	no	
NEMA Enclosure Type	3, 4, 5, 12, 13	
Dual LED Indicators	yes	
Plastic Housing Material	Rynite®	
Shipping Weight	16 oz.	

* Using EP175-23200, 3.23" dia. reflector.
 ® Thermal Plastic Polyester Resin, Registered Trademark of E.I. Dupont

Dimensional Drawings



Circuit Drawings



Photoelectric Sensors



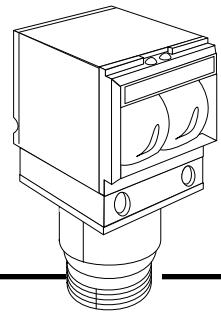
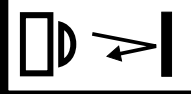
Namco Controls Corporation
 Mayfield Village, OH 44143
 (440) 460-1360 • FAX (440) 460-3800 • namcocontrols.com

For technical assistance, call 1-800-NAMTECH

Compact

Photoelectric Sensors

Diffuse Proximity



Photoelectric Sensors

- Programmable Controller Compatible
- NPN/PNP wire selectable
- Integral yoke bracket provides four 90°-indexed mounting positions
- Light/dark operate user selectable for optimum flexibility and minimum inventory
- Sensitivity gain adjust (all models)
- 2 wire AC, 3 wire AC, or 4 wire DC circuit types
- Dual LED status indicators

If you need a reliable photoelectric sensor, you can't do much better than the EP200. Only 2.45 inches high, it fits in the tightest spots. For easy installation, its "U"-shaped yoke slips off, allowing you to rotate the sensor in 90° increments.

A wide variety of configurations are available to fit your specific needs. Diffuse proximity sensing should be used when the following conditions exist: (1) the object itself is sufficiently reflective to return incident light to the receiver photodiode; (2) the installation of a reflector on the opposite side of the object is impractical.

The EP200 series of sensors is backed by Namco's Lifetime Replacement Program.

LED Functions

PHOTOELECTRIC SWITCH FUNCTION				
Type	Sensor Receiver Recognizes	Status Output	Status LED	
			Ready	Target
L.O.	DARK	OPEN	ON	OFF
L.O.	LIGHT	CLOSED	OFF	ON
D.O.	LIGHT	OPEN	ON	OFF
D.O.	DARK	CLOSED	OFF	ON

Termination Type	Power Consumption	Output Circuit Type	Model No.	Output Rating	Leakage Current	Voltage Drop	Response Time On/Off	Maximum Switching Frequency
2-WIRE AC 20-150V								
3-pin Mini	0.3W @ 120 VAC	2W	EP230-24400	500mA	1.7mA	≤10V	30ms	15 Hz
3-pin Micro	0.3W @ 120 VAC	2W	EP230-24420	500mA	1.7mA	≤10V	30ms	15 Hz
6' Cable	0.3W @ 120 VAC	2W	EP230-24410	500mA	1.7mA	≤10V	30ms	15 Hz
3-WIRE AC 85-132V								
3-pin Mini	0.7W @ 120 VAC	3W	EP230-24600	500mA	—	≤2.5V	15ms	33 Hz
4-pin Micro	0.7W @ 120 VAC	3W	EP230-24620	500mA	—	≤2.5V	15ms	33 Hz
6' Cable	0.7W @ 120 VAC	3W	EP230-24610	500mA	—	≤2.5V	15ms	33 Hz
4-WIRE DC 10-30V								
4-pin Mini	0.9W @ 30 VDC	4W, NPN & PNP	EP230-24500	200mA	—	0.8V: NPN @ 100mA 2.0V: PNP @ 100mA	2ms	250 Hz
4-pin Euro	0.9W @ 30 VDC	4W, NPN & PNP	EP230-24520	200mA	—	0.8V: NPN @ 100mA 2.0V: PNP @ 100mA	2ms	250 Hz
6' Cable	0.9W @ 30 VDC	4W, NPN & PNP	EP230-24510	200mA	—	0.8V: NPN @ 100mA 2.0V: PNP @ 100mA	2ms	250 Hz

Common Sensor Characteristics

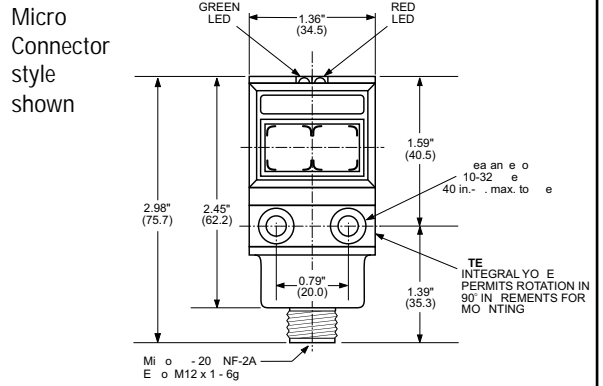
DIFFUSE PROXIMITY COMPACT SENSORS	
Sensing Range	30"*
Standard Target	White Bond Paper
Light Source	Modulated Infrared LED
Light/Dark Operate — Selectable	yes
Sensitivity Adjustment	yes
Ambient Temperature Range	-20°C to +70°C
Reverse Polarity Protected	4W DC only
Short Circuit Protected	no
NEMA Enclosure Type	3, 4, 5, 12, 13
Dual LED Indicators	yes
Plastic Housing Material	Rynite®
Shipping Weight	6 oz.

* Using White Bond Paper

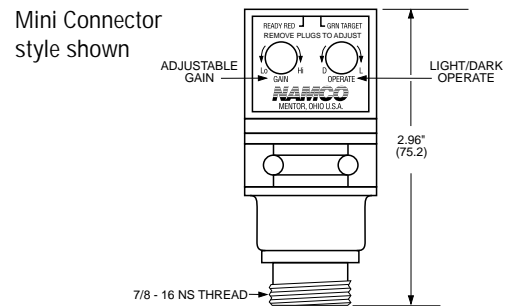
® Thermal Plastic Polyester Resin, Registered Trademark of E.I. Dupont

Dimensional Drawings

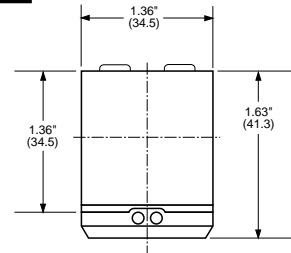
FRONT



BACK

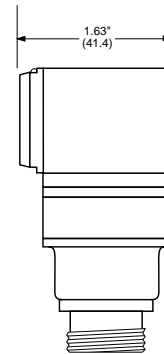


TOP



SIDE

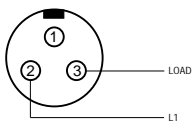
Mini Connector style shown



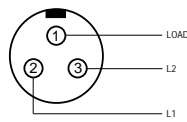
Circuit Drawings

MINI CONNECTOR MODELS

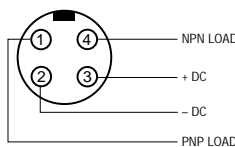
2 Wire AC



3 Wire AC

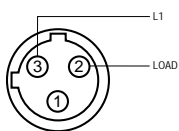


4 Wire DC

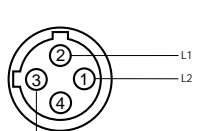


MICRO & EURO CONNECTOR MODELS

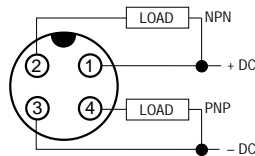
2 Wire AC



3 Wire AC

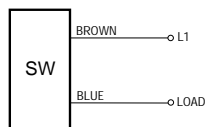


4 Wire DC (sinking and sourcing)

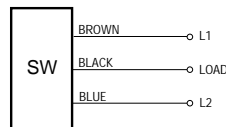


CABLE MODELS

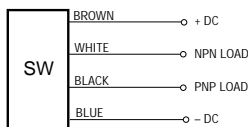
2 Wire AC



3 Wire AC



4 Wire DC



Photoelectric Sensors

NAMCO

Namco Controls Corporation

Mayfield Village, OH 44143

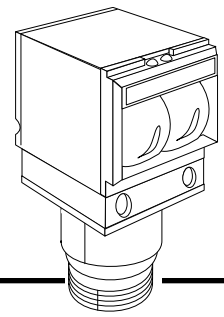
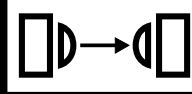
(440) 460-1360 • FAX (440) 460-3800 • namcocontrols.com

For technical assistance, call 1-800-NAMTECH

Compact

Photoelectric Sensors

Thru-Beam & Fiber Optic



Photoelectric Sensors

- Programmable Controller Compatible
- NPN/PNP wire selectable
- Integral yoke bracket provides four 90°-indexed mounting positions
- Light/dark operate user selectable for optimum flexibility and minimum inventory
- Sensitivity gain adjust (all models)
- 2 wire AC, 3 wire AC, or 4 wire DC circuit types
- Dual LED status indicators

If you need a reliable photoelectric sensor, you can't do much better than the EP200. Only 2.45 inches high, it fits in the tightest spots. For easy installation, its U-shaped yoke slips off allowing you to rotate the sensor in 90° increments.

A Rynite® plastic housing holds the surface mount electronics which are themselves encapsulated in epoxy. A wide variety of configurations are available to fit your specific needs.

The EP200 series of sensors is backed by Namco's Lifetime Replacement Program.

LED Functions

PHOTOELECTRIC SWITCH FUNCTION				
Type	Sensor Receiver Recognizes	Status Output	Status LED	
			Ready	Target
L.O.	DARK	OPEN	ON	OFF
L.O.	LIGHT	CLOSED	OFF	ON
D.O.	LIGHT	OPEN	ON	OFF
D.O.	DARK	CLOSED	OFF	ON



Termination Type	Power Consumption	Output Circuit Type	Thru-Beam		Fiber Optic	Output Rating	Leakage Current	Voltage Drop	Response Time On/Off	Maximum Switching Frequency
			Emitter	Receiver						
2-WIRE AC/DC*										
3-pin Mini	0.9W @ 120 V	2W	EP220-23400	—	—	—	—	—	—	—
3-pin Micro	0.9W @ 120 V	2W	EP220-23420	—	—	—	—	—	—	—
6' Cable	0.9W @ 120 V	2W	EP220-23410	—	—	—	—	—	—	—
2-WIRE AC 20-150V										
3-pin Mini	0.3W @ 120 VAC	2W	—	EP220-24400	EP240-24400	500mA	1.7mA	≤10V	30ms	15 Hz
3-pin Micro	0.3W @ 120 VAC	2W	—	EP220-24420	EP240-24420	500mA	1.7mA	≤10V	30ms	15 Hz
6' Cable	0.3W @ 120 VAC	2W	—	EP220-24410	EP240-24410	500mA	1.7mA	≤10V	30ms	15 Hz
3-WIRE AC 85-132V										
3-pin Mini	0.7W @ 120 VAC	3W	—	EP220-24600	EP240-24600	500mA	—	≤2.5V	15ms	33 Hz
4-pin Micro	0.7W @ 120 VAC	3W	—	EP220-24620	EP240-24620	500mA	—	≤2.5V	15ms	33 Hz
6' Cable	0.7W @ 120 VAC	3W	—	EP220-24610	EP240-24610	500mA	—	≤2.5V	15ms	33 Hz
4-WIRE DC 10-30V										
4-pin Mini	0.9W @ 30 VDC	4W, NPN & PNP	—	EP220-24500	EP240-24500	200mA	—	0.8V: NPN @ 100mA 2.0V: PNP @ 100mA	2ms	250 Hz
4-pin Euro	0.9W @ 30 VDC	4W, NPN & PNP	—	EP220-24520	EP240-24520	200mA	—	0.8V: NPN @ 100mA 2.0V: PNP @ 100mA	2ms	250 Hz
6' Cable	0.9W @ 30 VDC	4W, NPN & PNP	—	EP220-24510	EP240-24510	200mA	—	0.8V: NPN @ 100mA 2.0V: PNP @ 100mA	2ms	250 Hz

* 20-150 VAC / 10-180 VDC

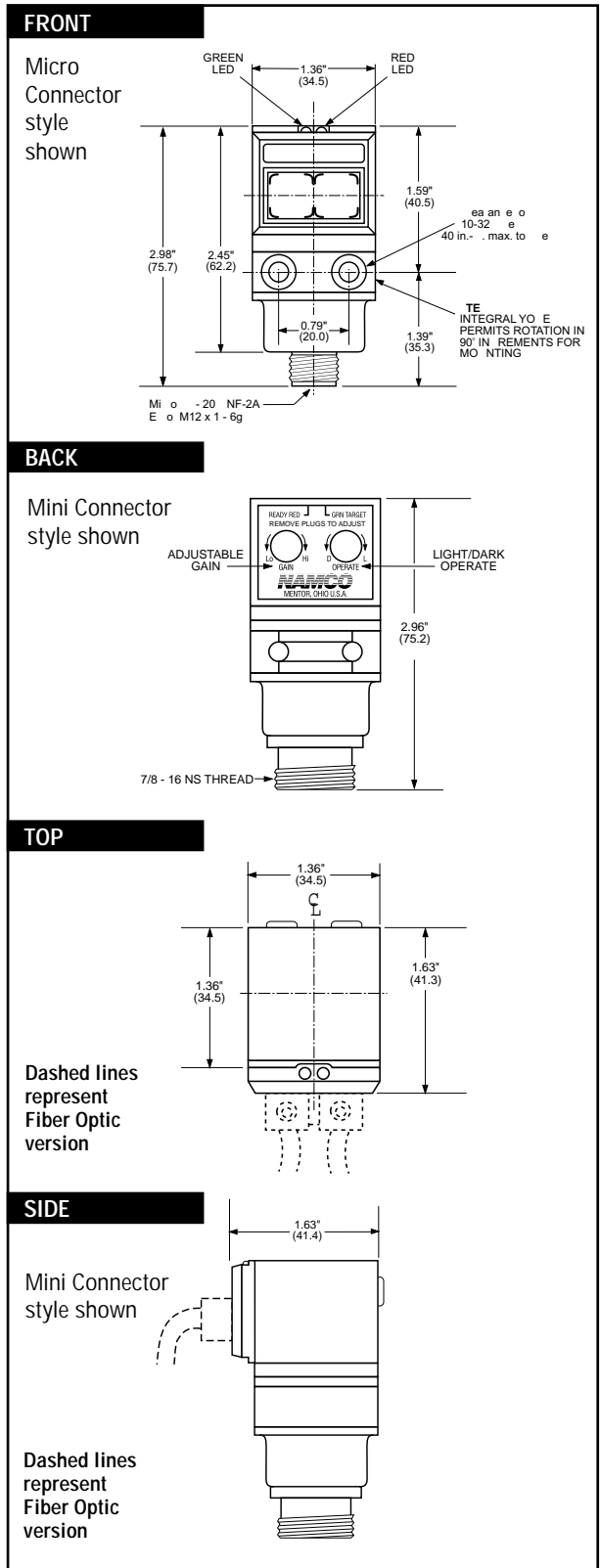
► Fiber optic cables not included with fiber optic sensors.

Common Sensor Characteristics

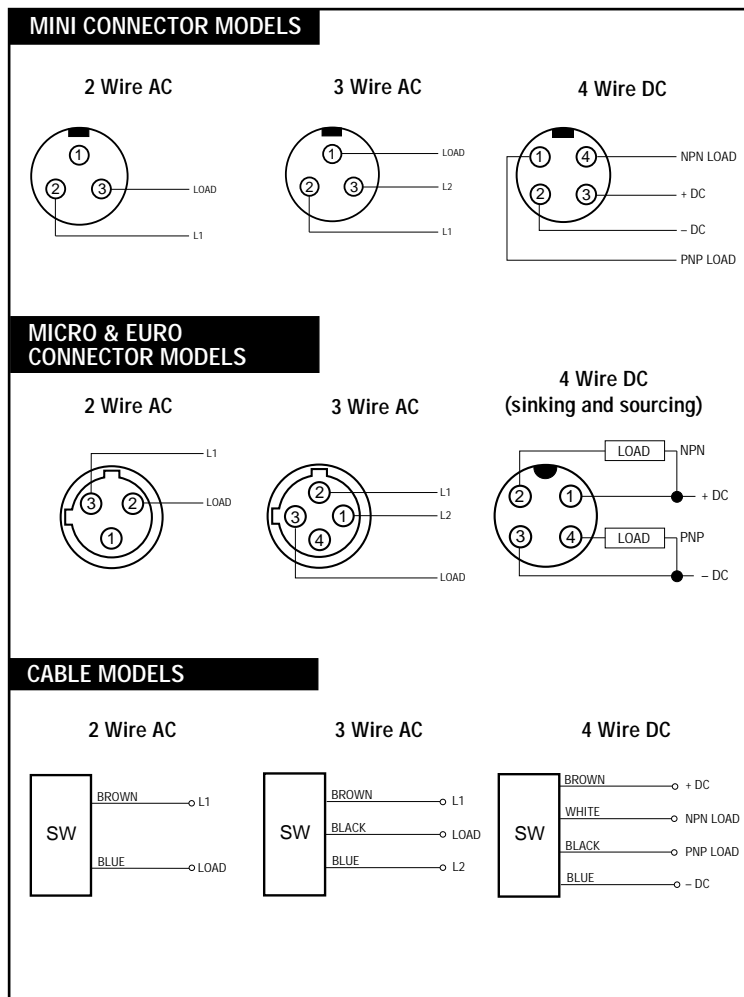
THRU-BEAM & FIBER OPTIC SENSORS		
	Thru-Beam	Fiber Optic
Sensing Range	200 feet	See Photoelectric Accessories section
Light/Dark Operate — Selectable	yes	
Light Source	Modulated Infrared LED	
Sensitivity Adjustment	yes	
Ambient Temperature Range	-20°C to +70°C	
Reverse Polarity Protected	4W DC only	
Short Circuit Protected	no	
NEMA Enclosure Type	3, 4, 5, 12, 13	
Dual LED Indicators	yes	
Plastic Housing Material	Rynite®	
Shipping Weight	6 oz.	

® Thermal Plastic Polyester Resin, Registered Trademark of E. I. DuPont

Dimensional Drawings



Circuit Drawings



Photoelectric Sensors



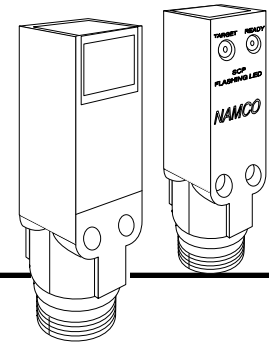
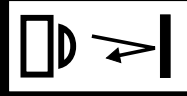
Namco Controls Corporation
Mayfield Village, OH 44143
(440) 460-1360 • FAX (440) 460-3800 • namcocontrols.com

For technical assistance, call 1-800-NAMTECH

Weld Field Immune

Photoelectric Sensors

Diffuse Proximity



- Side and end-sensing types available
- 2-wire AC, 3-wire AC, or 3-wire DC circuit types
- Short circuit protected
- Dual LED indication
- Weld Field Immune

The EP570 series sensor is an economical, reliable photoelectric sensor for nearly all applications. Programmable controller compatible, these are very good sensors for automotive body and assembly tooling or material handling tasks. Tough housing contains the latest in surface mount electronics technology for trouble-free use.

These sensors are appropriate for more demanding applications such as metal stamping. They use the same proven short circuit protected electronics found on Namco's Heavy Industry sensors.

Photoelectric Sensors

Termination Type	Power Consumption	Output Circuit Type	Sensing Position	Model No.	Output Rating	Leakage Current	Voltage Drop	Response Time On/Off	Maximum Switching Frequency
2-WIRE AC/DC 20-230V									
3-pin Mini	0.44W @ 230V	2W	End	EP570-11400	4-400mA	≤1.7mA	≤10V	20ms	25 Hz
3-pin Mini	0.44W @ 230V	2W	Side	EP570-21400	4-400mA	≤1.7mA	≤10V	20ms	25 Hz
4-pin Mini	0.44W @ 230V	2W	End	EP570-11410	4-400mA	≤1.7mA	≤10V	20ms	25 Hz
4-pin Mini	0.44W @ 230V	2W	Side	EP570-21410	4-400mA	≤1.7mA	≤10V	20ms	25 Hz
3-pin Micro	0.44W @ 230V	2W	End	EP570-11430	4-400mA	≤1.7mA	≤10V	20ms	25 Hz
3-pin Micro	0.44W @ 230V	2W	Side	EP570-21430	4-400mA	≤1.7mA	≤10V	20ms	25 Hz
3-WIRE AC 85-132V									
4-pin Mini	≤ 1W @ 120V	3W	End	EP570-11510	200mA	—	≤3V	20ms	25 Hz
4-pin Mini	≤ 1W @ 120V	3W	Side	EP570-21510	200mA	—	≤3V	20ms	25 Hz
3-WIRE DC 10-30V									
4-pin Mini	0.9W @ 30V	3W, PNP	End	EP570-11010	200mA	—	≤3.5V	2.5ms	200 Hz
4-pin Mini	0.9W @ 30V	3W, PNP	Side	EP570-21010	200mA	—	≤3.5V	2.5ms	200 Hz
4-pin Micro	0.9W @ 30V	3W, PNP	End	EP570-11040	200mA	—	≤3.5V	2.5ms	200 Hz
4-pin Micro	0.9W @ 30V	3W, PNP	Side	EP570-21040	200mA	—	≤3.5V	2.5ms	200 Hz



Common Sensor Characteristics

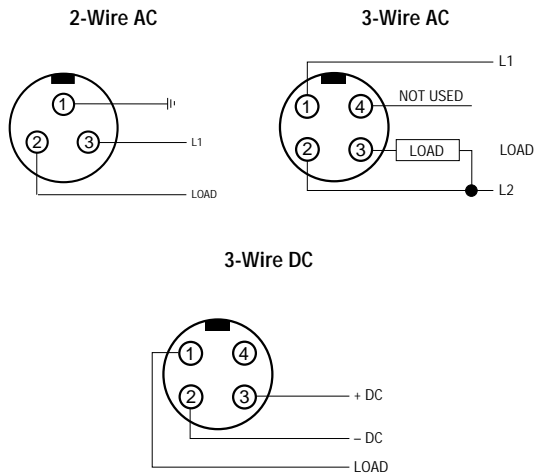
WELD FIELD IMMUNE DIFFUSE PROXIMITY SENSORS	
Sensing Range	2.8" ± 0.20**
Standard Target	White Bond Paper
Light Source	Modulated Infrared LED
Light/Dark Operate	Light Operate Only
Sensitivity Adjustment	no
Ambient Temperature Range	-20° C to + 70° C
Reverse Polarity Protected	3W DC Only
Short Circuit Protected	yes
NEMA Enclosure Type	1, 12, 13
Dual LED Indicators	yes
Plastic Housing Material	Rynite®
Shipping Weight	5 oz.

*Using White Bond Paper

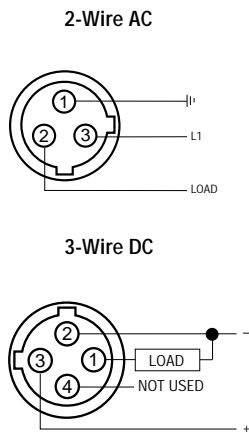
® Thermal Plastic Polyester Resin, Trademark of E. I. Dupont

Circuit Drawings

MINI CONNECTOR MODELS

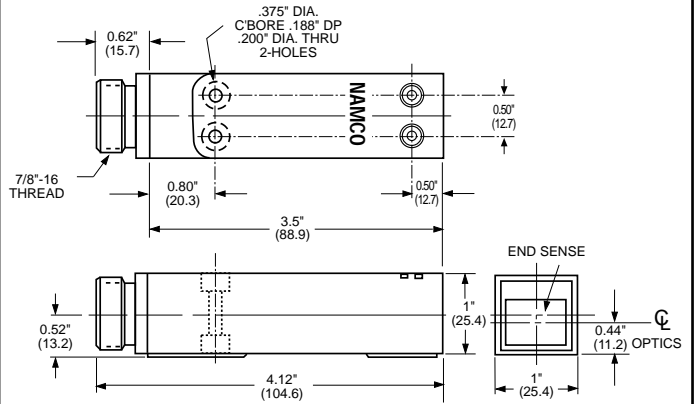


MICRO CONNECTOR MODEL

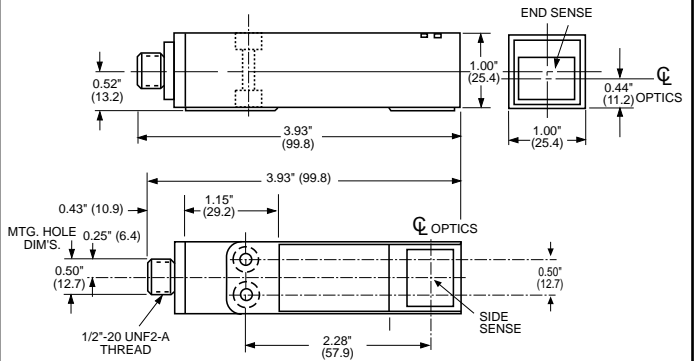


Dimensional Drawings

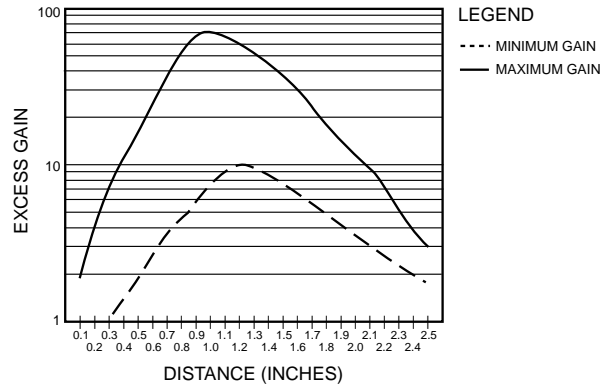
MINI CONNECTOR MODEL



MICRO CONNECTOR MODEL



EP570 Excess Gain

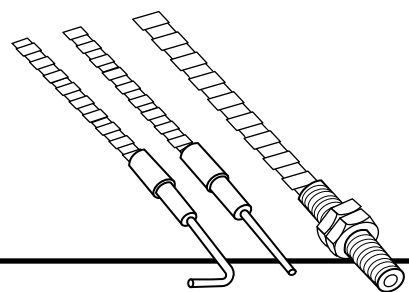


Namco Controls Corporation
 Mayfield Village, OH 44143
 (440) 460-1360 • FAX (440) 460-3800 • namcocontrols.com

For technical assistance, call 1-800-NAMTECH

Fiber Optic Cables

Photoelectric Sensors Accessories



Photoelectric Sensors

- Choice of Sensor Head
- Glass
- PVC or Stainless Steel Jacket
- Sealed Construction
- 3 or 6-Foot Lengths, Standard

The addition of fiber optic cables greatly increases the flexibility of Namco's photoelectric sensors. These cables are used for EP140 and EP240 Series Switches.

Fiber optic cables transmit light from a control unit to an object and then return the reflected light back to the control unit producing an electrical signal. Because of their small size, fiber optic cables may be installed in areas that were inaccessible with other types of sensors. They are very flexible, vibration proof, submersible, and may be used in high temperature areas. Small part detection or counting is accomplished easily to replace unreliable methods such as weighing.

Special applications are easier to accomplish by specifying different tips rather than an entirely new photoelectric control.

Design Features

Optical glass fibers are encased in either a PVC jacket or, for added protection, a flexible armored stainless steel jacket to resist cuts or abrasion. The tips are constructed from stainless steel, brass, or aluminum for long life. The cables are sealed and may be used in "wash down" or submerged applications. Standard lengths are 3 feet and 6 feet. Consult factory for other lengths.

Jacketed Cables

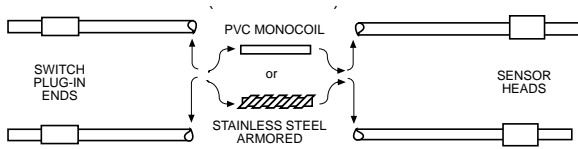
Sensor Head	Bundle Diameter	PVC		Stainless Steel		Approx. Range	
		3' Cable Model No.	6' Cable Model No.	3' Cable Model No.	6' Cable Model No.	Sensitivity Adjustment	
						Minimum	Maximum
SINGLE CABLES							
Hypo Tip	.062	EP181-11020	EP181-11021	EP181-12020	EP181-12021	0.62"	3.00"
Hypo Tip 90°	.062	EP181-11030	EP181-11031	EP181-12030	EP181-12031	0.62"	3.00"
Hypo Tip Bendable	.062	EP181-11120	EP181-11121	EP181-12120	EP181-12121	0.62"	3.00"
Flair Tip Narrow	.062	EP181-11050	EP181-11051	EP181-12050	EP181-12051	0.75"	3.50"
Tight 90° Tip	.094	EP181-11060	EP181-11061	EP181-12060	EP181-12061	4.00"	13.00"
Plain Tip	.125	EP181-11000	EP181-11001	EP181-12000	EP181-12001	5.00"	18.00"
Threaded Tip	.125	EP181-11010	EP181-11011	EP181-12010	EP181-12011	5.00"	18.00"
Flair Tip Wide	.125	EP181-11040	EP181-11041	EP181-12040	EP181-12041	3.25"	13.50"
Plain 90° Tip	.125	EP181-11080	EP181-11081	EP181-12080	EP181-12081	5.00"	18.00"
BIFURCATED CABLES							
Hypo Tip	.062	EP181-21020	EP181-21021	EP181-22020	EP181-22021	0.03"	0.53"
Hypo Tip 90°	.062	EP181-21030	EP181-21031	EP181-22030	EP181-22031	0.03"	0.53"
Hypo Tip Bendable	.062	EP181-21120	EP181-21121	EP181-22120	EP181-22121	0.03"	0.53"
Flair Tip Narrow	.062	EP181-21050	EP181-21051	EP181-22050	EP181-22051	0.00"	0.25"
Tight 90° Tip	.094	EP181-21060	EP181-21061	EP181-22060	EP181-22061	0.28"	1.12"
Plain Tip	.125	EP181-21000	EP181-21001	EP181-22000	EP181-22001	0.38"	1.50"
Threaded Tip	.125	EP181-21010	EP181-21011	EP181-22010	EP181-22011	0.38"	1.50"
Flair Tip Wide	.125	EP181-21040	EP181-21041	EP181-22040	EP181-22041	0.28"	1.12"
Plain 90° Tip	.125	EP181-21080	EP181-21081	EP181-22080	EP181-22081	0.38"	1.50"

NOTE:

	<u>PVC</u>	<u>Stainless Steel</u>
Sheathing O.D.	0.238"	0.234"
Minimum Bend Radius:	0.595"	0.585"
Temperature Range:	-40°F to +235°F	-40°F to +525°F

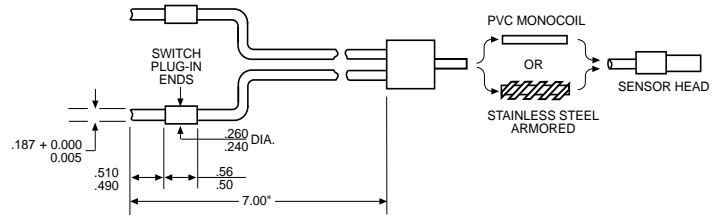
Cable Types

SINGLE CABLE (for Thru-Beam Sensing)



(Order Quantity of Two)

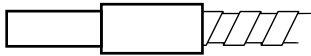
BIFURCATED CABLE (for Diffuse Sensing)



(Order Quantity of One)

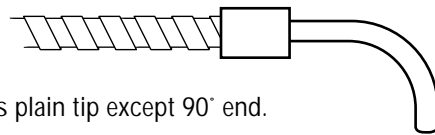
Common Cable Applications

PLAIN TIP



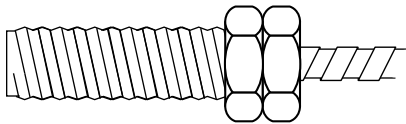
For general purpose use: may be fixed in-place with set screw; most common tip; furthest "Prox" thru-beam range.

PLAIN TIP 90°



Same as plain tip except 90° end.

THREADED TIP



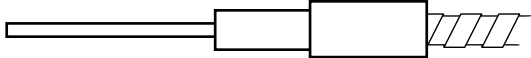
Same as Plain Tip but with brass threaded end; two jam nuts are furnished.

TIGHT TIP 90°



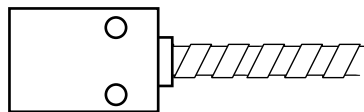
Tight 90° for use in close quarters; may be mounted on chute from vibrator feeder to monitor parts in automatic assembly operations.

HYPO TIP



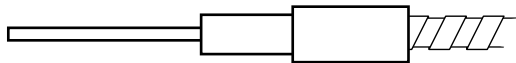
For very small parts or inaccessible areas: diffuse cable could "see" the edge of this page.

FLARE TIP WIDE



Used for edge control – detects very thin edges. With diffuse sensing, very small parts are detected when passed any place in front of the bundle height. Diffuse type also used for register marks detection.

HYPO TIP BENDABLE



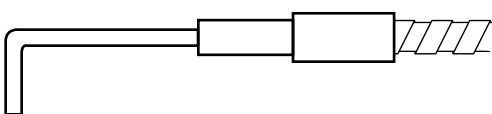
Same as standard hypo tip but tip may be bent to suit; min. bend 1/4"R. and not closer than 1/2" from either end.

FLARE TIP NARROW



Same as flare tip wide except smaller bundle height.

HYPO TIP 90°



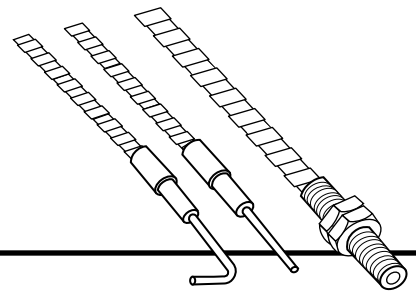
Same as standard hypo tip but with 90° bend. May be mounted very close along side narrow conveyor while viewing across it.



Namco Controls Corporation
Mayfield Village, OH 44143

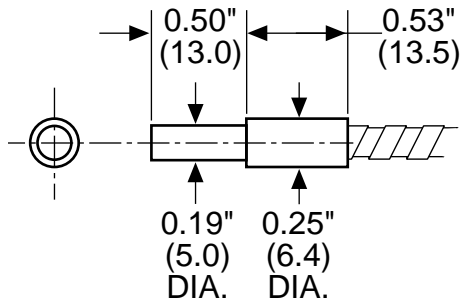
(440) 460-1360 • FAX (440) 460-3800 • namcocontrols.com

For technical assistance, call 1-800-NAMTECH

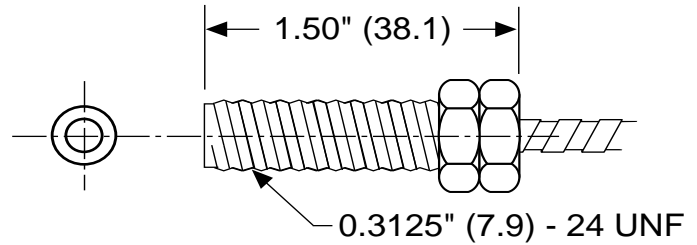


Dimensional Drawings

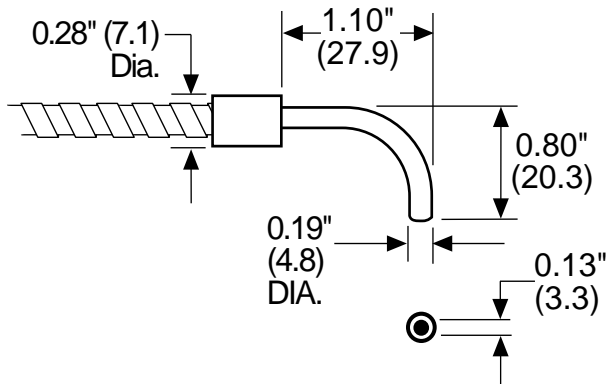
PLAIN TIP



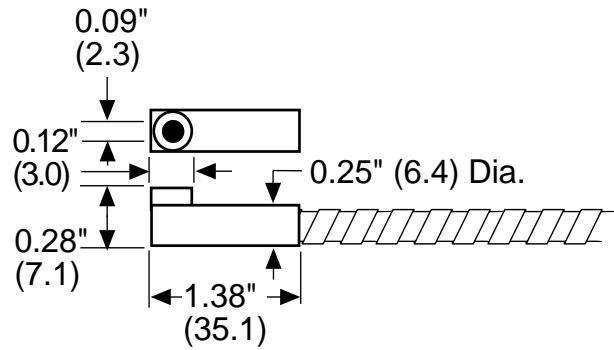
THREADED TIP



PLAIN TIP 90°

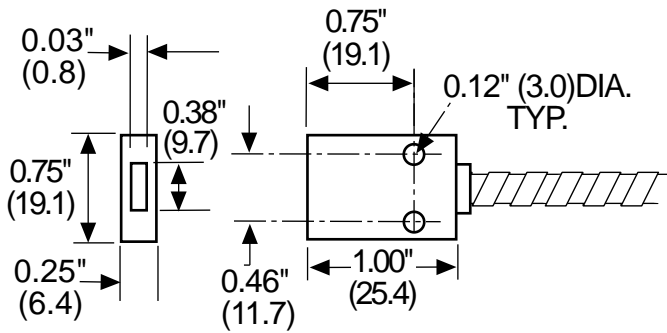


TIGHT TIP 90°

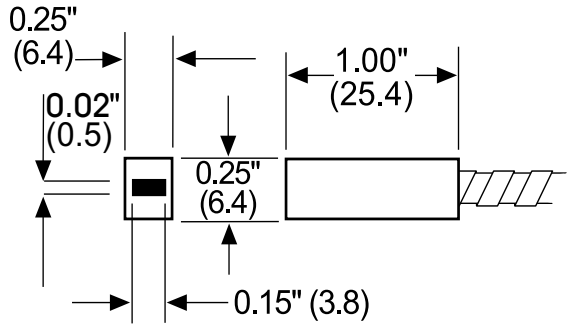


Dimensional Drawings

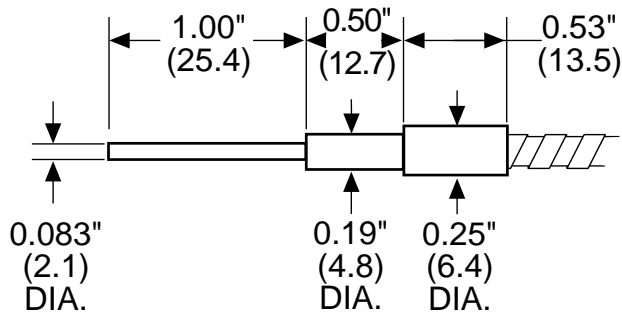
FLARE TIP WIDE



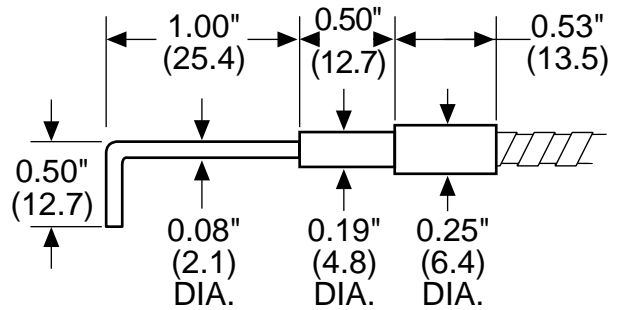
FLARE TIP NARROW



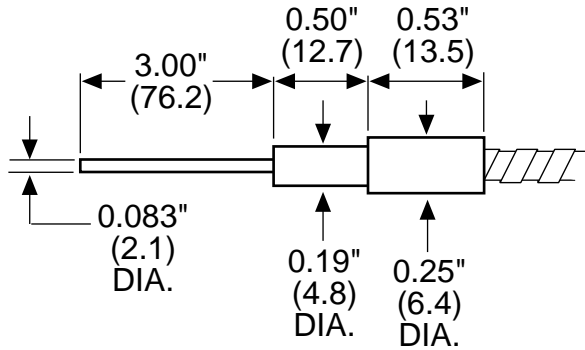
HYPOTIP



HYPOTIP 90°



HYPOTIP BENDABLE



NAMCO

Namco Controls Corporation
Mayfield Village, OH 44143

(440) 460-1360 • FAX (440) 460-3800 • namcocontrols.com

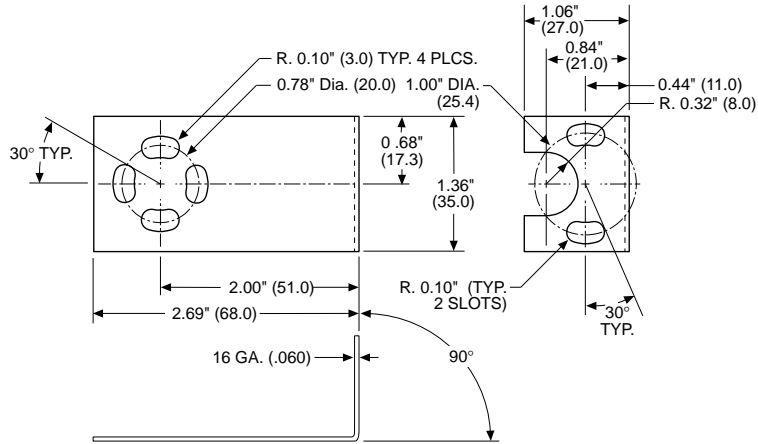
For technical assistance, call 1-800-NAMTECH

Brackets

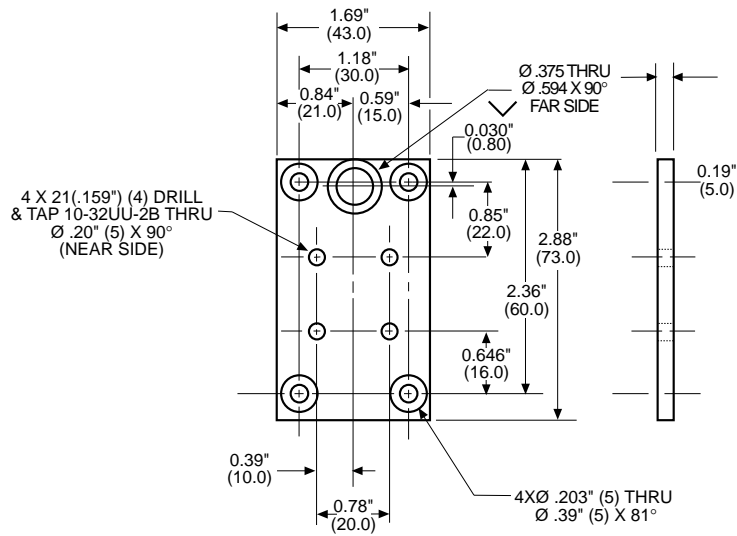
Photoelectric Sensor Accessories

Photoelectric Sensors

BRACKETS FOR EP200 SERIES

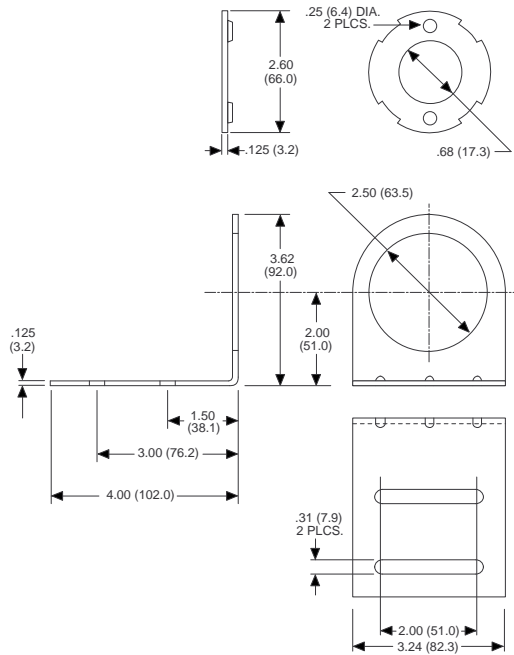


Part No. EP180-20010
Material: Cadmium Plated Steel



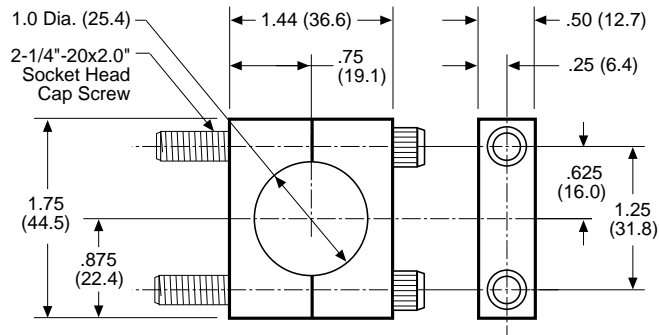
Part No. EP180-20011
Material: Aluminum Clear Anodized

BRACKET FOR TRI-COLOR UNITS



Part No. EP180-40000 (Swivel)
Material: Cadmium Plated Steel

BRACKET FOR EP570 SERIES



Part No. EP180-50000
(Used with EP570)
Material: Cadmium Plated Steel



Namco Controls Corporation
Mayfield Village, OH 44143
(440) 460-1360 • FAX (440) 460-3800 • namcocontrols.com

For technical assistance, call 1-800-NAMTECH

Reflectors

Photoelectric Sensor Accessories

Photoelectric Sensors

The reflector is 50% of a retro-reflective system. Namco tests each reflector to insure its performance. Constructed from a sealed plexiglass assembly, they will operate in most environments. For harsh environments such as solvents or strong chemicals use glass reflectors on next page.

To reduce the effective area of a reflector, mask it with tape or metal shields - NEVER CUT A REFLECTOR. (Exception : EP175-31200 tape)

All Namco Retro-Reflective Units are rated with EP175-13900 (4" x 4") reflector. See chart for additional range information.

Namco High Temperature Reflectors are the same high quality as general purpose types but are designed to withstand environments beyond the norm such as applications requiring "wash down" or in areas where solvents such as toluene or trichloroethylene are present. Temperatures of up to 120°C present no problem.

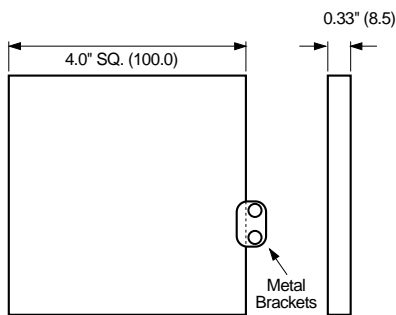
Namco also offers a metal reflector that will withstand a constant temperature of 480°C (900°F).

Recommended Ranges for Various Reflectors*

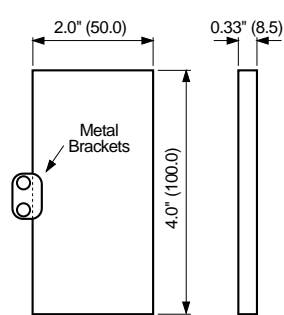
Reflector Model No.	SERIES	
	EP110	EP210
EP175-13900	0-30.0 ft.	0-10.0 ft.
EP175-31900	0-27.0 ft.	0-8.5 ft.
EP175-21000	1.5-9.0 ft.	0.3-3.0 ft.
EP175-23200	1.5-22.5 ft.	0.3-8.0 ft.
EP175-22400	0-20.0 ft.	0.3-6.0 ft.
EP175-31200	0.75-15.0 ft.	0.3-4.0 ft.
EP175-37100	0-20.0 ft.	0-7.0 ft.
EP175-32000	0-15.0 ft.	0-6.0 ft.
EP175-22600	0-15.0 ft.	0-6.0 ft.
EP175-23201	1.5-22.5 ft.	0.3-8.0 ft.
EP175-14000	0-12.0 ft.	0-4.0 ft.

* Rated with clean environment, lens & reflector.

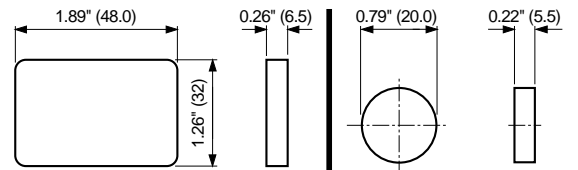
GENERAL PURPOSE REFLECTOR (Adhesive or Bracket mount)



Reflector EP175-13900
(Supplied with 2 metal brackets)



Reflector EP175-31900
(Supplied with 2 metal brackets)

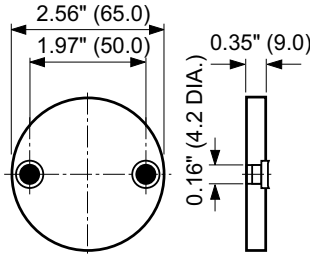


Reflector EP175-32000

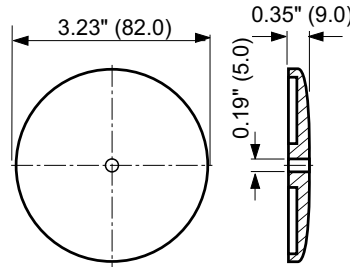
Reflector EP175-21000

Material: Plastic PMMA 8N (Plexiglass)
Temperature Range: -20°C to +60°C
Mounting: with glue, double face tape, or with brackets

**GENERAL PURPOSE REFLECTOR
(with Mounting Holes)**



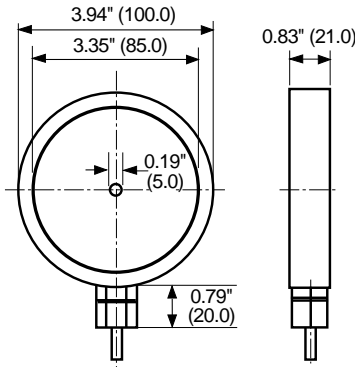
Reflector EP175-22600
Mounting holes for #6 screws



Reflector EP175-23200
Mounting hole for #8 screws

Material: Plastic PMMA 8N (Plexiglass)
Temperature Range: -20°C to +60°C
Mounting: with glue or screws

HEATED REFLECTOR



EP175-23201
Heated Reflector

Material: Plastic PMMA 8N (Plexiglass)
Temperature Range: -20°C to +60°C
Cable Length: 2M (6.6 ft.)
Input: 110VAC/2.0VA

Designed to operate in high humidity, fog, freezers, or outdoors and will keep reflective surface clear allowing proper performance. Shipped with EP175-23200 reflector. (Other voltages available.)

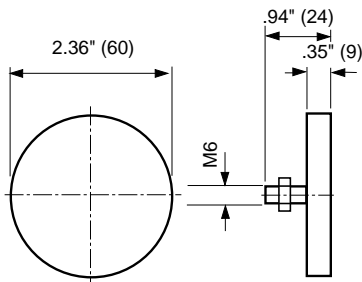
REFLECTIVE TAPE

EP175-31200

- Adhesive backed reflective tape
- 1" x 12" mylar coated, honey combed sealed

Application Note: When cutting to size, allow for loss of reflective surface at cut edge.

HIGH TEMPERATURE GLASS



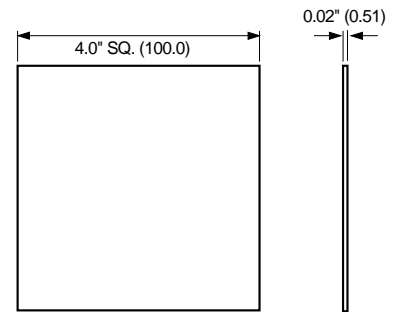
Reflector EP175-22400

Material: Glass
Temperature Range: -20°C to +120°C
Mounting: stud with nut

HIGH TEMPERATURE METAL

Namco High Temperature Reflectors are the same high quality as general purpose types but are designed to withstand environments beyond the norm. Applications requiring "wash down" or in areas where solvents such as toluene or trichloroethylene are present. Temperatures of 120°C present no problem. Totally encased, glass corner-cube elements allow this type of performance.

Namco now offers a metal reflector that will withstand a constant temperature of 480°C (900°F).



Reflector EP175-14000

Material: Aluminum .020 thk. (51mm)
Temperature Range: -20°C to +480°C (900°F) Intermittent to +540°C (1000°F)
Mounting: May be cut to size and attached with screws or clamps. May be cleaned with detergent and rinsed with water.



Namco Controls Corporation
Mayfield Village, OH 44143

(440) 460-1360 • FAX (440) 460-3800 • namcocontrols.com

For technical assistance, call 1-800-NAMTECH

Plug-In Time Delays

Photoelectric Sensor Accessories

Photoelectric Sensors

Model No.	Delay	ON Delay*	OFF Delay**	Description
EP115-00020	Adjustable ON & OFF; Retriggerable	250 ms to 10 sec.	250 ms to 10 sec.	Shifts Output signal.
EP115-00040	Adjustable ON	250 ms to 10 sec.	None	Output and Input turn OFF at the same point (signal removal).
EP115-00060	Adjustable OFF	None	250 ms to 10 sec.	Output turns ON with Input (catches and stretches short input signals).
EP115-00080	Adjustable ON; Adjustable One Shot (Single Pulse)	100 ms to 5 sec.	Output pulse duration: 100 ms to 5 sec.	Provides uniform Output signal for different Input signals (pulse starts at the end of ON delay period).

* Input signal must be longer than ON delay setting. Shorter input signals will be ignored.

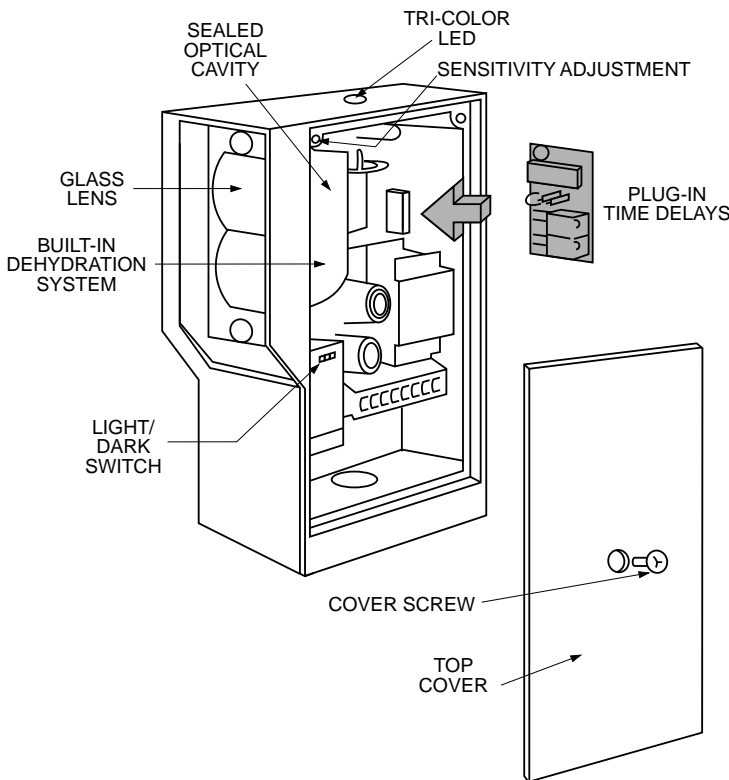
** Input signal must be OFF longer than OFF delay setting.

▶ When ordering factory installed time-delay units, specify model number to be installed with required time delay.

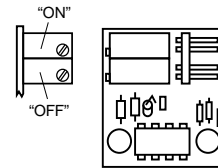
▶ Consult factory for plug-in "Under Speed" logic boards. Switch output is held unless speed drops below present pulse rate.

Plug-In Time Delays/Installation

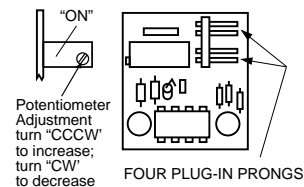
PLUG-IN TIME DELAY FEATURES



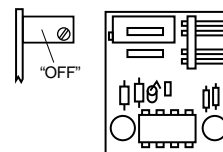
EP115-00020 – DUAL "ON" & "OFF" DELAY



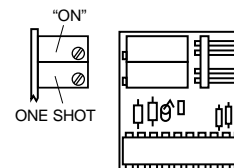
EP115-00040 – "ON" DELAY



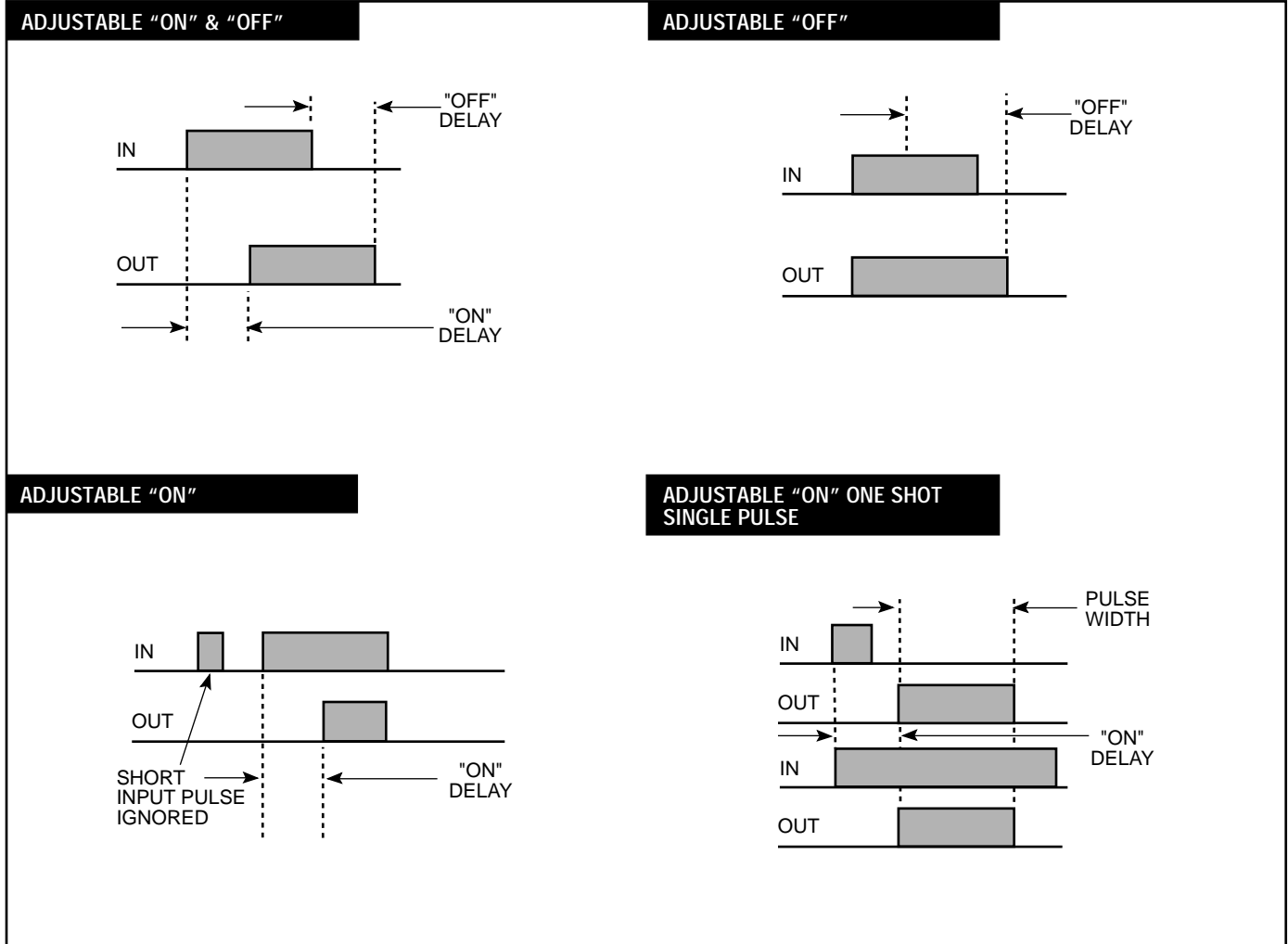
EP115-00060 – "OFF" DELAY



EP115-00080 – DELAYED ONE SHOT



Plug-In Time Delay Graphics



Specifications

PLUG-IN TIME DELAYS	
Retriggerable	Timing function will re-start if another object is sensed prior to completion of initial delay setting.
Non-Retriggerable	Timing function will not re-start until full cycle is completed.

NAMCO

Namco Controls Corporation
 Mayfield Village, OH 44143
 (440) 460-1360 • FAX (440) 460-3800 • namcocontrols.com

For technical assistance, call 1-800-NAMTECH





Photoelectric Performance

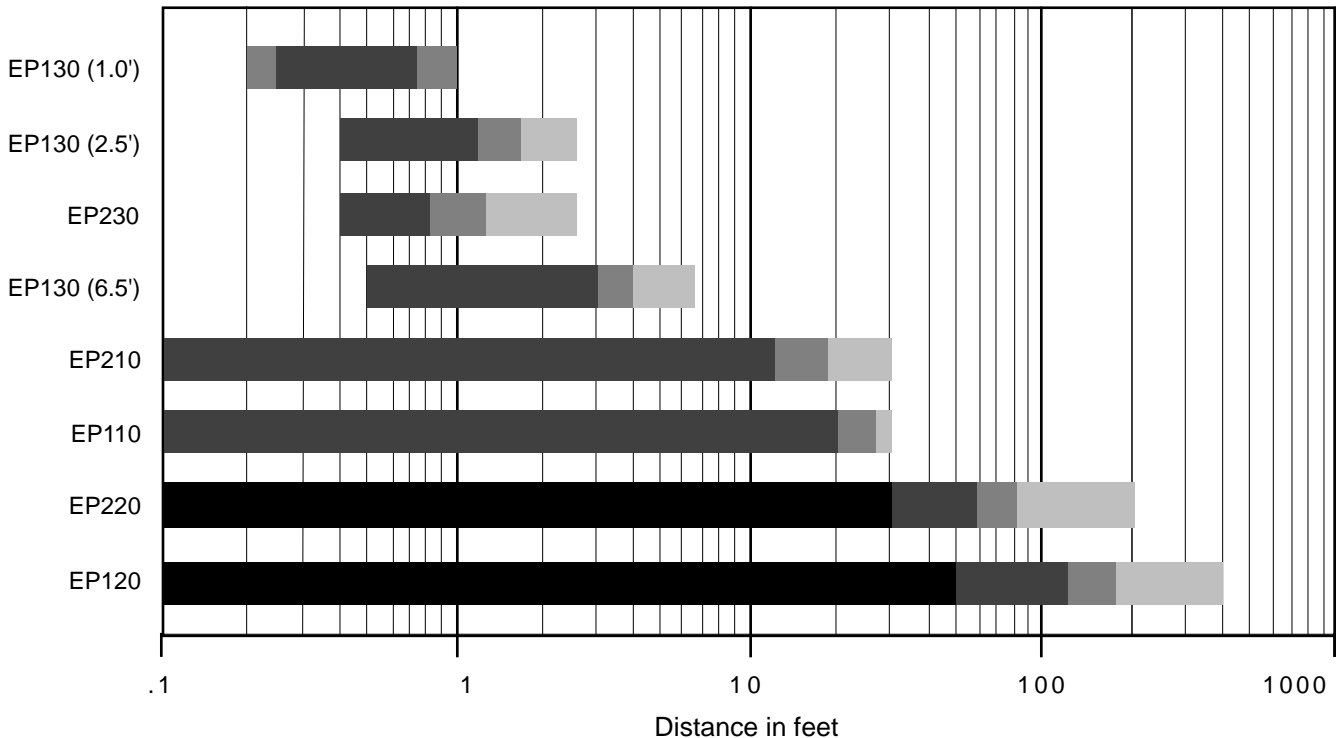
The selection of the proper photoelectric sensor for an application is critical for reliable, trouble-free operation. The graphs shown below are meant to be a guide for matching a type of environment to the sensor types most likely to perform in that environment.

Fiber optic sensor types are not shown due to the different performance characteristics of the many styles of fiber optic cables.

These charts were derived from the Excess Gain Curves for each product. Excess Gain Curves for specific sensors are available on request from Namco Controls.

If you have any questions regarding the suitability of a Namco photoelectric sensor for your application, call our toll-free Technical Assistance Hotline at 1-800-NAMTECH (1-800-626-8324).

-  Suitable for use at these ranges in "clean" environments with no dirt, dust, or water accumulation on the lenses.
-  Can be used at these ranges in slightly dirty environments; lenses should be cleaned regularly. Typical of warehouse or light industrial installations.
-  At these ranges, the sensor can be used in moderately dirty applications where there is visible contamination of lenses or reflectors. Lenses should be cleaned regularly. Most industrial applications fit this category.
-  Suitable for use in extremely dirty environments, or where heavy smoke, steam, or dust is present or when lenses will be cleaned only rarely. Typical environments are steel or paper mills.



NOTE: EP570 – See Excess Gain Chart in Photoelectric WFI Sensors section.

Photoelectric Sensors

Evolution of Photoelectrics

As photoelectrics have evolved, increasing emphasis has been placed on offering user-oriented values. Indicator lamps have been incorporated to signal sensing status; circuits have been expanded to include a solution for every wiring application; and with the implementation of surface mount technology, the features-to-size ratio has improved.

Sensor Light Sources

The first photoelectrics used incandescent light sources. These early products were susceptible to ambient light conditions and limited in application. With the introduction of light emitting diodes ("L.E.D.'s"), the opportunity for applying photoelectric sensors expanded. By modulating (pulsing) the L.E.D. and tuning the receiving photodiode to respond only to this rate of change, immunity to ambient light is improved. Further enhancements have been achieved by incorporating transmission filters to improve the signal-to-noise ratio associated with ambient light.

Reflectors are used in some sensing modes to provide an effective method for returning the emitted light beam to the receiving photodiode. While the most fundamental reflector returns the incident light back to the source only when the incident light strikes the reflector at 90 degrees to the surface of the reflector, the more commonly used "corner cube" retro-reflector will return the incident light to the receiving photodiode over a wide range of incident angles, making alignment angle with respect to the sensor significantly less critical.

Polarizing a light source orients the emitted rays into one plane. If a receiving photodiode is polarized in the same plane as the received light, it will detect the light. In sensing modes where retro-reflectors are used, the retro-reflector shifts the incident light 90 degrees. Photoelectric sensors designed for this mode of sensing are polarized to expect a shift of the incident light by the retro-reflector. Any light returned by specular reflection (from shiny objects) is not shifted and is intentionally undetected by the receiver.

Photoelectric controls are applicable in a wide range of industrial situations because of their long life, versatility, safety, and reliability. Namco's sensors have been tested and proven over many years of operation in all types of environments. Their precision optics can detect objects that cannot be detected by conventional photoelectrics. Namco photoelectric sensors are available in incandescent or LED and feature rugged construction, long-life LED output indication, and insensitivity to ambient light. They also offer time delays, logic delay systems, short circuit protection, and reverse polarity protection. All electronic circuitry is solid state. DC units may be operated from plant power supply or from optional relay/power pack combinations.

Performance

The performance of photoelectrics is dependent on environmental conditions; e.g., air contamination, steam, fog, oil spray. Excess gain is merely a statement of how much extra gain the sensor has over the minimum it needs to communicate in ideal conditions at a given range. The higher the excess gain for a given distance, the more likely the photoelectric is to be able to penetrate through the contamination to reach and be detected by the corresponding receiving photodiode. Since most applications are less than ideal, photoelectrics should be selected with ample excess gain for the intended range.

Output Options

Most of the photoelectrics offered in this catalog are self-contained in that no external stages of circuitry are required to operate the sensors. Newer circuit types include 2-wire AC for ease of installation and lowest cost installation, 3-wire AC for load current independent of input current, and 4-wire DC for user selectable sink (NPN) or source (PNP) connection. All of these are Programmable Logic Controller compatible.



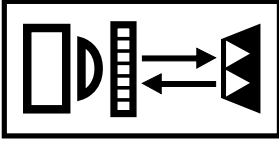
Namco Controls Corporation
Mayfield Village, OH 44143

(440) 460-1360 • FAX (440) 460-3800 • namcocontrols.com

For technical assistance, call 1-800-NAMTECH

Sensing Modes

Photoelectric Sensors



Retro-Reflective Sensing Mode

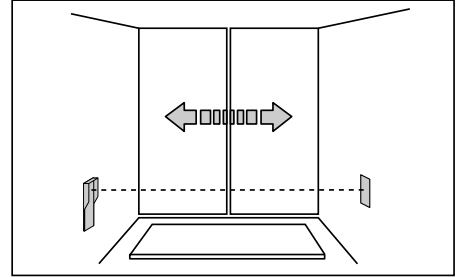
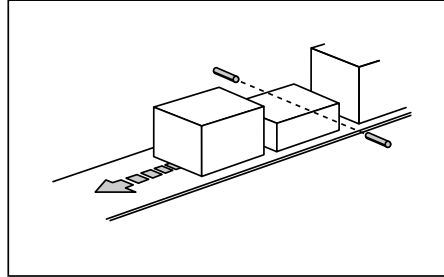
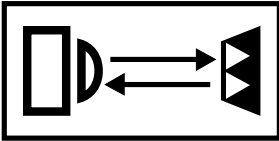
Retro-reflective sensing is particularly effective in applications that offer the

following conditions: (1) the object to be sensed is generally opaque; (2) a reflector can be easily installed so that the object must pass between the reflector and the sensor; or (3) the object may be detected by adding reflective tape to the object.

Available ranges of retro units are generally a fraction of the range of comparable size thru-beam units.

In the retro-reflective mode, a single sensor is used to both send and receive light directed to a reflector. Objects passing between the sensor unit and its corresponding reflector interrupt the light beam and signal the sensor to provide the indicated output. Using corner cube reflectors enables the light signal to be returned to the sensor over a wide range of incident angles.

Retro-reflective sensing is popular for its simplicity of installation, and if properly equipped with polarizing options, is independent of target material/color/texture. Operates at distances of up to 30 feet.



Thru-Beam Sensing Modes

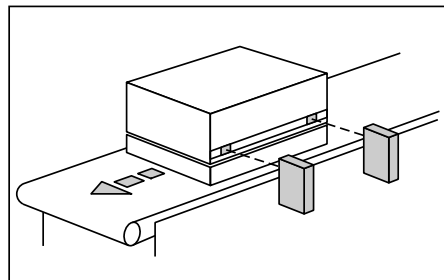
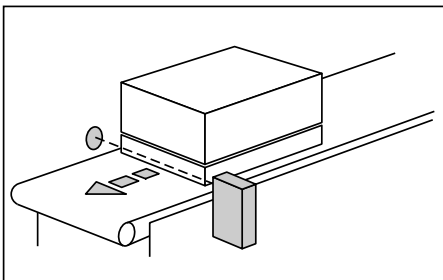
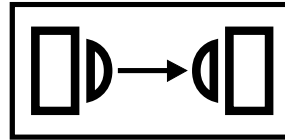
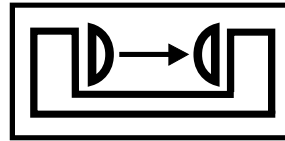
Thru-Beam (Opposed) Sensing Mode

Thru-beam sensing should be employed wherever longer sensing ranges (up to 400 ft.) are required and where harsh or dirty environments require more powerful performance or individually mounted transmitted receiver units.

Thru-beam configurations consist of separate emitter and receiver units aimed at one another and separated so that objects will pass between both units. Without the presence of objects, the emitted light

beam is sensed by the receiver. As objects pass between the two units, the light beam is interrupted, and the corresponding sensor output is provided.

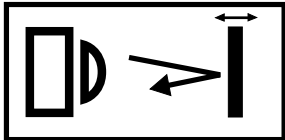
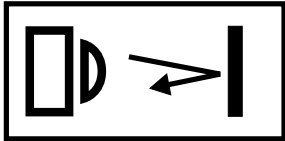
Thru-beam is the most reliable sensing mode. Since the receiver is a separate unit, sensing is totally immune to false proxing from shiny objects. Sensing of transparent objects may require gain control adjustment. Thru-beam systems are inherently higher cost and require additional wiring to the second unit.



Retro-Reflective Sensing Modes

Diffuse Proximity Sensing Mode

Diffuse proximity sensing should be used when the following conditions exist: (1) the object itself is sufficiently reflective to return incident light to the receiver photodiode; (2) the installation of a reflector on the opposite side of the object is impractical.



The diffuse proximity mode utilizes a single sensor unit as emitter and receiver and relies upon the object sighted to reflect sufficient light to be sensed by the receiver. Absence of objects in the light beam path result in light not returned to the receiver.

Diffuse sensing is the lowest cost approach but depends on the reflectivity (and color) of the target material. This system is suitable for detecting like objects where the gain can be adjusted once for the best performance.

Fiber-Optic Sensing Mode

Introducing a set of fiber-optic cables to photoelectric sensors adds considerable flexibility from an applications perspective. Fiber-optics work well in applications requiring either small part detection or where space in the immediate vicinity of the target object is at a premium. Using fiber-optic cables to reach into environments too harsh for the sensor unit itself is a common application. Fiber-optic cables are immune to electrical and radio frequency interference (EMI and RFI).

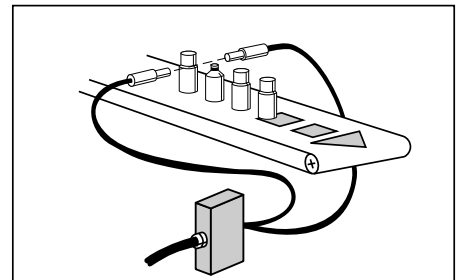
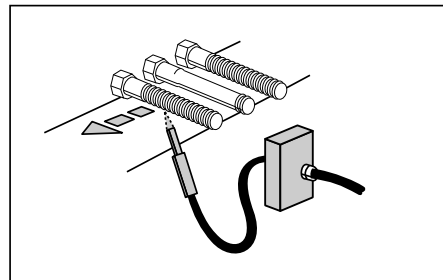
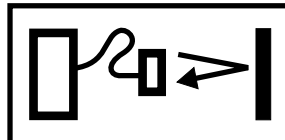
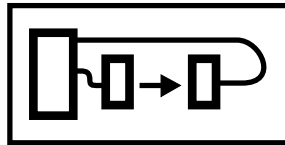
The fiber-optic sensing mode is obtained simply by adding fiber-optic cables to an existing sensor designed to accommodate them. While any sensing mode could utilize fiber-optics, typical cable offerings are designed for thru-beam and diffuse operation. Glass and plastic core materials are common in the industry, each offering their respective advantages and tradeoffs.

Glass cables have better light transmission capabilities, higher operating temperatures and cost, with a sacrifice in physical flexibility. Glass cables cannot be cut to length by the average user.

Plastic cables are lower temperature rated, are less efficient in light transmission, more flexible, lower cost, and can be easily cut to length in the field.

Protective jacketing for fiber-optics include either stainless steel spiral wrap armor or extruded pvc for glass fibers and extruded pvc for plastic fibers.

Both glass and plastic fiber-optic cables offer immunity to electrical interference and permit relocating of the sensor unit in applications where the environment in the sensing area is unusually harsh.



Fiber Optic Sensing Modes

NAMCO

Namco Controls Corporation
Mayfield Village, OH 44143

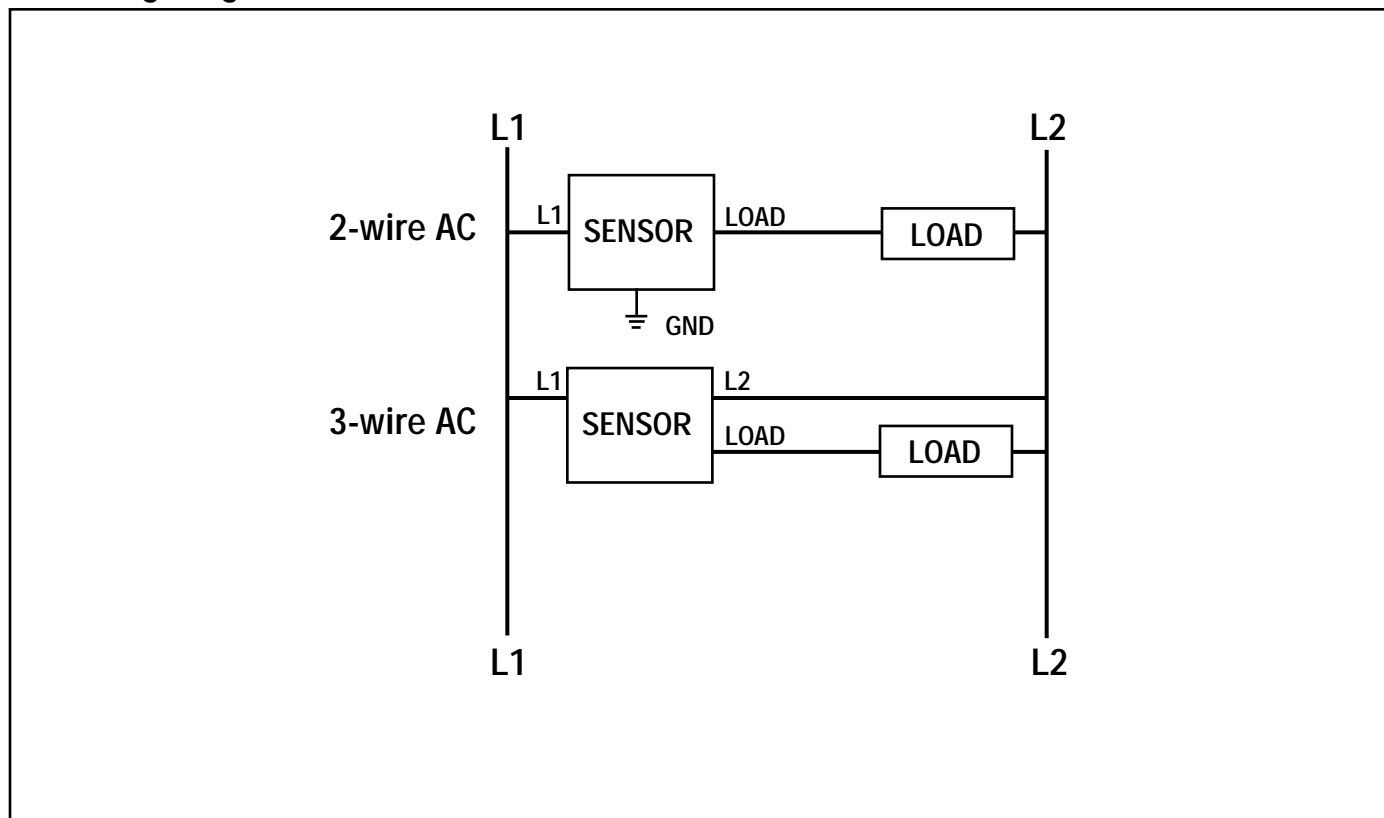
(440) 460-1360 • FAX (440) 460-3800 • namcocontrols.com

For technical assistance, call 1-800-NAMTECH

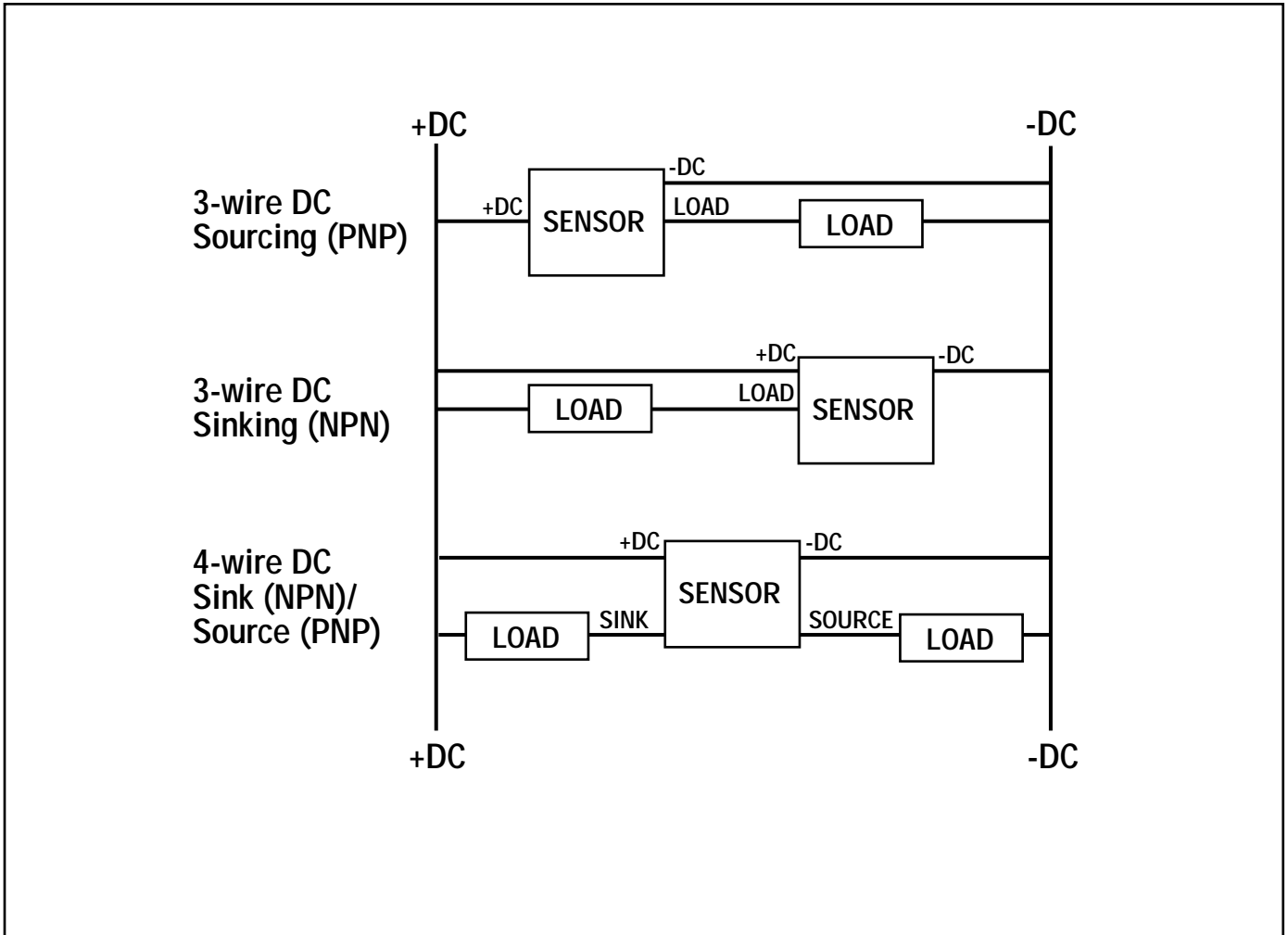
Notes:

1. These diagrams are valid for sensors with cables and connectors.
2. Sensors may or may not have ground connections or grounded housings. Refer to the specific connector or cable diagram for your particular sensor's model number to determine if it is grounded.
3. The markings on these wiring diagrams (L1, Load, etc.) are identical to those on the connector diagrams.
4. All switches are Normally Opened (N.O.) unless specifically marked Normally Closed (N.C.).
5. All switch outputs are Sourcing unless specifically marked Sink.

AC Wiring Diagrams



DC Wiring Diagrams



NAMCO

Namco Controls Corporation
Mayfield Village, OH 44143
(440) 460-1360 • FAX (440) 460-3800 • namcocontrols.com

For technical assistance, call 1-800-NAMTECH

Alignment: Relationship of the light source and the receiver. Proper alignment is necessary to achieve maximum sensitivity to objects being monitored.

Ambient Light: The surrounding light in which the photoelectric sensor operates. Because they use modulated LED switches, Namco sensors are insensitive to ambient light.

Control Module: A remote unit containing the power supply in which amplification, modulation, and conditioning of the photoreceiver signal take place.

Cross-Talk Immunity: A unique capability of Namco sensors that allows several LED controls to be placed close to each other with each receiver responding only to the light beam frequency of its own transmitter.

Current Sinking: The output circuit grounds or sinks the load or current. Current sinking (NPN) or sourcing (PNP) outputs are available on Namco sensors.

Current Sourcing: The output circuit switches the source voltage to the load. Current sinking (NPN) or sourcing (PNP) outputs are available on Namco sensors.

Dark-Operated: Operating mode in which the control is activated by interrupting the beam of light.

Diffuse Proximity: Sometimes called a proximity because of the required nearness of the light source and the photosensor to the reflective object.

Excess Gain: The diffused amount of light falling on the face of a receiver over and above the amount required to operate amplifier of the scanner. It is a guideline measurement for selection of retro-reflective and scanner type units.

Fiber Optic: Cables transmit light from a control unit to an object and then return the reflected light back to the control unit producing an electrical signal.

LED: Light emitting diode. Can be visible or invisible (infrared).

Light-Operated: Operating mode in which the control is activated by an uninterrupted beam of light.

Modulated LED: An LED in which the light is pulsed at a predetermined frequency to reduce interference from ambient light and/or to increase the sensing distance. The receiver is preset to respond only to that predetermined frequency.

Opaque: The quality of a material or object that prohibits light from passing through it.

Operating Mode: Condition of a sensor (dark or light-operated) that will activate it.

Photoreceiver: A unit positioned to detect light, or its absence, in a photoelectric sensor. It consists of a photosensor and a focusing lens in an enclosure.

Proximity: Sensing technique that utilizes a single sensor unit containing both emitter and receiver. Relies upon object to be sensed having high reflectivity.

Range: The distance at which a sensor (excluding thru-beams) will sense white paper on a flat black surface for maximum signal ratio. Retro-reflective units and diffuse proximity units are rated in distance from the unit to a reflector or target.

Repeatability: The ability of a photoelectric unit to sense an object continuously and reliably at a predetermined point within a given tolerance.

Response Time: Time required by a photosensor to respond to an input signal and activate the output.

Retro-Reflective: A sensing technique in which a beam of light is aimed at a specified reflector and reflected back to the photoreceiver.

Reverse Polarity Protection: Usually a diode inserted in one of the power leads of a D.C. switch. This protects the internal circuitry if connections are accidentally reversed.

Self-Contained Control: A photoelectric sensor capable of sensing, signal conditioning, and output in a single unit.

Signal Ratio: The relationship of light to dark when the sensor is illuminated. Proper control alignment is necessary to establish optimum light-to-dark signal ratio.

Specular: Reflective technique in which a light beam is reflected back to a photoreceiver at a predetermined angle from the object being monitored.

Thru-Beam: Sensing technique in which the light source and the sensor are located opposite each other, and the light beam passes from the source to the receiver directly without the use of a reflector.

Translucent: The quality of a material or object that permits light to pass through it but diffuses it. For detection purposes, a retro-reflective technique works best with translucent objects because light must pass through twice, thus producing a larger signal change.

NAMCO

Namco Controls Corporation

Mayfield Village, OH 44143

(440) 460-1360 • FAX (440) 460-3800 • namcocontrols.com

For technical assistance, call 1-800-NAMTECH