OMRON

Photoelectric Sensor with Built-in Amplifier

E3Z

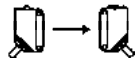
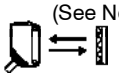
Compact Sensor Offers Long Sensing Distance and Superior Noise-Immunity



- Photo-IC provides long sensing distance: 15 m for through-beam, 4 m for retroreflective, and 1 m for diffuse
- Integrated Photo-IC improves noise immunity to interference from inverters and other inductive loads
- New injection molding technology assures IP67 rating to withstand water and dust
- Switch-selectable, Light-ON/Dark-ON operation
- M8 connector-ready and 2-m, pre-wired models
- NPN or PNP output models available

Ordering Information

■ SENSORS

Sensing method	Light source	Appearance	Connection method	Sensing distance	Part number	
					NPN output	PNP output
Through-beam	IR		Pre-wired	15 m	**E3Z-T61**	**E3Z-T81**
			Connector		**E3Z-T66**	**E3Z-T86**
Polarized retroreflective	RED	(See Note 1.) 	Pre-wired	100 mm to 4 m 100 mm to 3 m (See Note 2.)	**E3Z-R61**	**E3Z-R81**
			Connector		**E3Z-R66**	**E3Z-R86**
Diffuse reflective	IR		Pre-wired	5 to 100 mm (wide view)	**E3Z-D61**	**E3Z-D81**
			Connector		**E3Z-D66**	**E3Z-D86**
			Pre-wired	1 m	**E3Z-D62**	**E3Z-D82**
			Connector		**E3Z-D67**	**E3Z-D87**

Note: 1. The Reflector is sold separately. Select the Reflector model most suited to the application.

2. Sensing distance can be extended to 4 meters when the E39-R1S reflector is used. The sensing distance is 3 meters when the E39-R1 reflector is used.

■ ACCESSORIES (ORDER SEPARATELY)

Slit for Through-beam Models (E3Z-T□□)

Order a slit for each emitter and receiver.

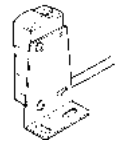
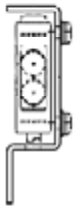
Slit width	Sensing distance (typical)	Minimum sensing object (typical)	**Part number**
0.5 mm dia.	50 mm	0.5 mm dia.	**E39-S65A**
1 mm dia.	200 mm	1 mm dia.	**E39-S65B**
2 mm dia.	800 mm	2 mm dia.	**E39-S65C**
0.5 × 10 mm	1 m	0.7 mm dia.	**E39-S65D**
1 × 10 mm	2.2 m	1.2 mm dia.	**E39-S65E**
2 × 10 mm	5 m	2.4 mm dia.	**E39-S65F**

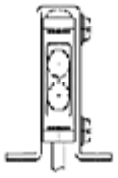
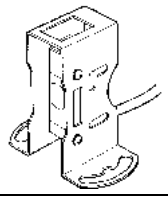
Reflectors for Retroreflective Models

Name	Sensing distance (typical)	**Part number**
Reflector	100 mm to 3 m	**E39-R1**
	100 mm to 4 m	**E39-R1S**
	100 mm to 5 m	**E39-R2**
	100 mm to 2.5 m	**E39-R9**
	100 mm to 3.5 m	**E39-R10**
Miniature Reflector	50 mm to 1.5 m	**E39-R3**
Tape Reflector	150 mm to 700 mm	**E39-RS1**
	150 mm to 1.1 m	**E39-RS2**
	150 mm to 1.4 m	**E39-RS3**

Note: The actual sensing distance may be reduced to approximately 70% of the typical sensing distance when using a Reflector other than the E39-R1 or the E39-R1S.

■ MOUNTING BRACKETS

Appearance	Description	**Part number**
	L-bracket, horizontal	**E39-L104**
	L-bracket, vertical	**E39-L44**
	Open top, 20° angle adjustability	**E39-L43**
	Protected top 5° angle adjustability	**E39-L144**

Appearance	Description	**Part number**
	Compact vertical protective cover bracket	**E39-L142**
	Vertical protective cover bracket	**E39-L98**

Note: If a through-beam model is used, order two Mounting Brackets — one for the emitter and one for the receiver.

M8 Connectors

Appearance	Cable type		Part number
Straight	2 m (6.56 ft)	Four-wire type	**XS3F-M421-402-A**
	5 m (16.40 ft)		**XS3F-M421-405-A**
Right angle	2 m (6.56 ft)		**XS3F-M422-402-A**
	5 m (16.40 ft)		**XS3F-M422-405-A**

Specifications

Item	Sensing method	Through-beam	Polarized retroreflective	Diffuse reflective	
	NPN output	E3Z-T61/T66	E3Z-R61/R66	E3Z-D61/D66	E3Z-D62/D67
	PNP output	E3Z-T81/T86	E3Z-R81/R86	E3Z-D81/D86	E3Z-D82/D87
Sensing distance		15 m	100 mm (4 m Note 1) (when using E39-R1S) 100 mm (3 m Note 2) (when using E39-R1)	White paper (100 × 100 mm): 100 mm	White paper (300 × 300 mm): 1 m
Standard sensing object		Opaque: 12 mm (dia. min.)	Opaque: 75 mm (dia. min.)	---	
Hysteresis		---		20% max. of setting distance	
Directional angle		Both emitter and receiver: 3 to 15°	2 to 10°	---	
Light source (wave length)		Infrared LED (860 nm)	Red LED (680 nm)	Infrared LED (860 nm)	
Power supply voltage		12 to 24 VDC ±10% including 10% (p-p) max. ripple			
Current consumption		Emitter: 15 mA Receiver: 20 mA	30 mA max.		
Control output		100 mA max. at 26.4 VDC, open collector output (residual voltage: 1 V max.) L-ON/D-ON, switch selectable			
Circuit protection		Load short-circuit and reversed power supply protection	Reversed power supply connection, output short-circuit, and mutual interference protection		
Response time		1 ms max.			
Sensitivity adjustment		One-turn potentiometer			
Ambient illumination (receiver side)	Incandescent lamp	3,000 lux max.			
	Sunlight	10,000 lux max.			
Ambient temperature	Operating	-25°C to 55°C (-13°F to 131°F)			
	Storage	-40°C to 70°C (-40°F to 158°F) with no icing or condensation			
Ambient humidity	Operating	35% to 85%			
	Storage	35% to 95% with no condensation			
Insulation resistance		20 MΩ min. at 500 VDC			
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min			
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude or 300 m/s^2 for 2 hours each in X, Y, and Z axes			
Shock resistance	Destruction	500 m/s^2 3 times each in X, Y, and Z axes			
Enclosure rating		IP67 (IEC60529)			
Approvals		CE			
Connection method		2 m cable or M8 connector			
Indicator		Operation indicator (orange) Stability indicator (green) Emitter has power indicator (orange) only			
Weight (packed state)	Pre-wired cable (2 m)	Approx. 120 g (4.2 oz)	Approx. 65 g (2.3 oz)		
	Connector	Approx. 30 g (1.1 oz)	Approx. 20 g (0.7 oz)		
Material		Case: PBT (polybutylene terephthalate); Lens: Methacrylate resin			
Accessories		Instruction manual (Order Reflector and Mounting Bracket separately.)			

Note: 1. Sensing distance can be extended up to 4 meters when the E39-R1S reflector is used.

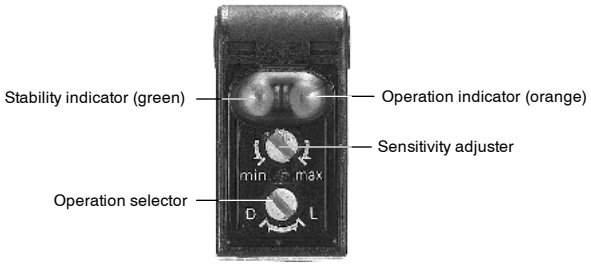
2. Sensing distance can be extended up to 3 meters when the E39-R1 reflector is used.

Nomenclature

Through-beam Models
E3Z-T6□ Receiver

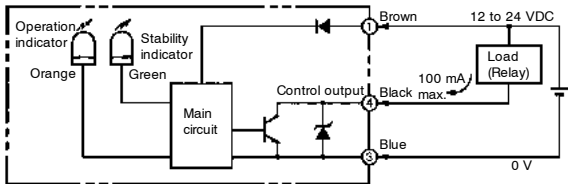
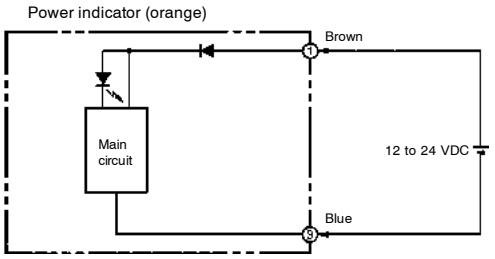
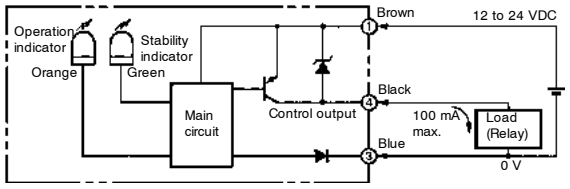
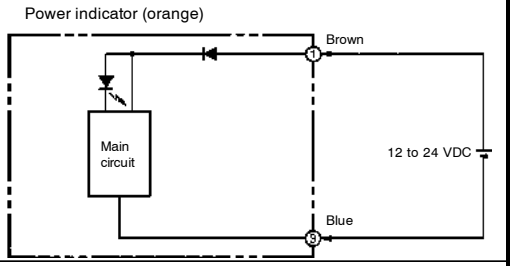
Retroreflective Models
E3Z-R6□

Diffuse-reflective Models
E3Z-D6□



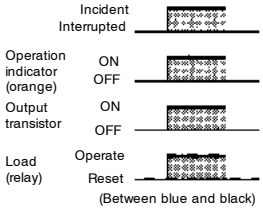
Operation

■ OUTPUT CIRCUITS

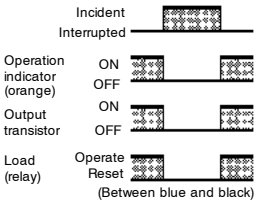
Model	E3Z-T61/-T66/-R61/-R66/-D61/-D66/-D62/-D67	
NPN output	Through-beam receiver Retroreflective model Diffuse reflective model	Through-beam emitter
		
Model	E3Z-T81/-T86/-R86/-D81/-D86/-D82/-D87	
PNP output	Through-beam receiver Retroreflective model Diffuse reflective model	Through-beam emitter
		
Connector pin arrangement	 Pin 2 is open.	 Pins 2, 4 are open.

■ TIMING CHARTS

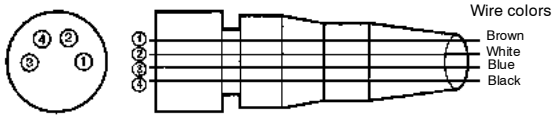
Light-ON (L-ON) Operation



Dark-ON (D-ON) Operation



■ CONNECTOR PIN-OUT



XS3F-M421-402-A XS3F-M421-405-A
XS3F-M422-402-A XS3F-M422-405-A

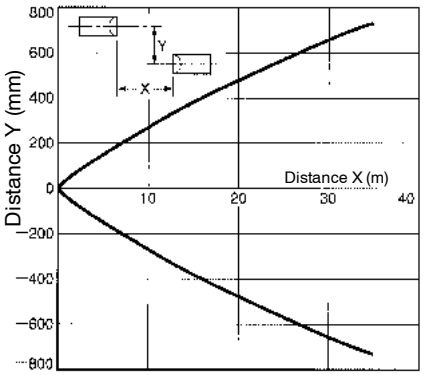
Classification	Wire color	Connector pin No.	Use
DC	Brown	A	Power supply (+V)
	White	B	Pin 2 is not used.
	Blue	C	Power supply (0 V)
	Black	D	Output

Note: The through-beam emitter does not use pins 2 and 4.

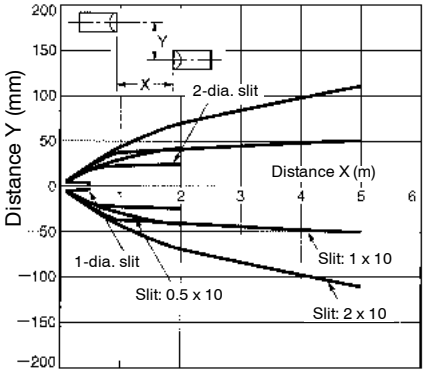
Engineering Data

■ PARALLEL OPERATING RANGE (TYPICAL)

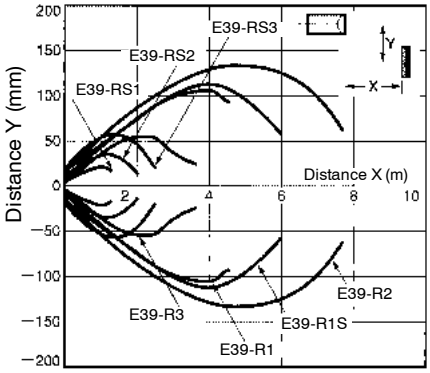
Through-beam Models
E3Z-T□1 (T□6)



Through-beam Models
E3Z-T□1 (T□6) and Slit

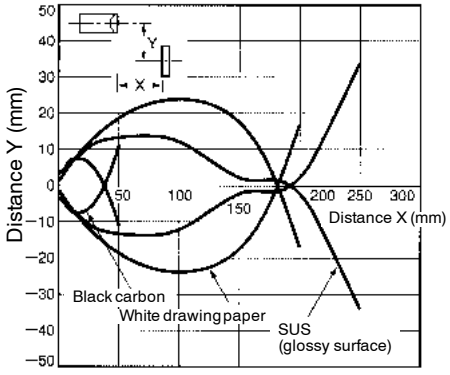


Retroreflective Models
E3Z-R□1 (R□6) and Reflector

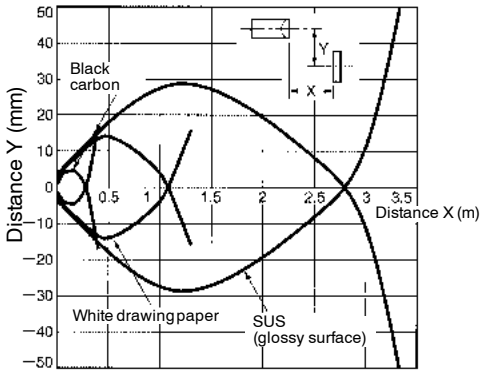


■ OPERATING RANGE (TYPICAL)

Diffuse Reflective Models
E3Z-D□1 (D□6)

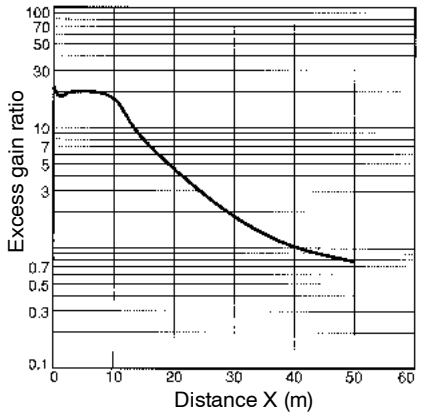


Diffuse Reflective Models
E3Z-D□2 (D□7)

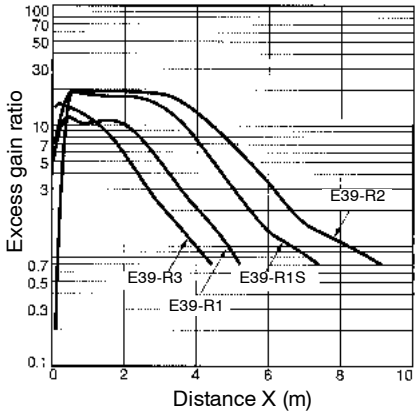


■ EXCESS GAIN RATIO VS. DISTANCE (TYPICAL)

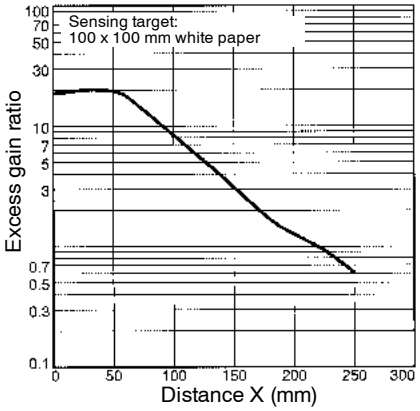
Through-beam Models
E3Z-T□1 (T□6)



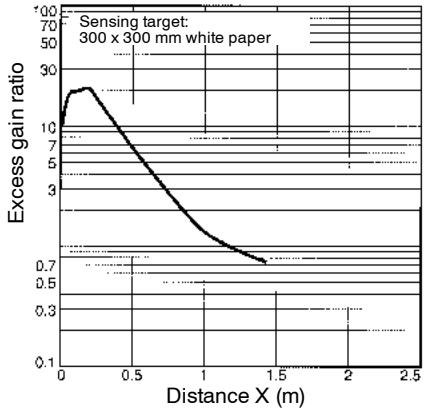
Retroreflective Models
E3Z-R□1 (R□6) and Reflector



Diffuse Reflective Models
E3Z-D□1 (D□6)

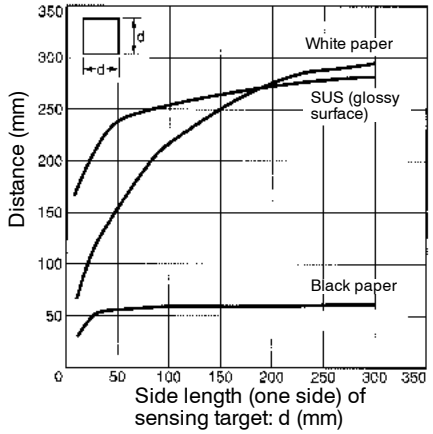


Diffuse Reflective Model
E3Z-D□2 (D□7)

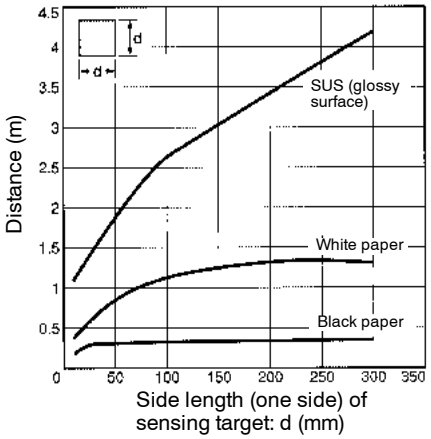


Sensing Target Size vs. Sensing Distance (Typical)

Diffuse Reflective Models
E3Z-D□1 (D□6)



Diffuse Reflective Models
E3Z-D□2 (D□7)



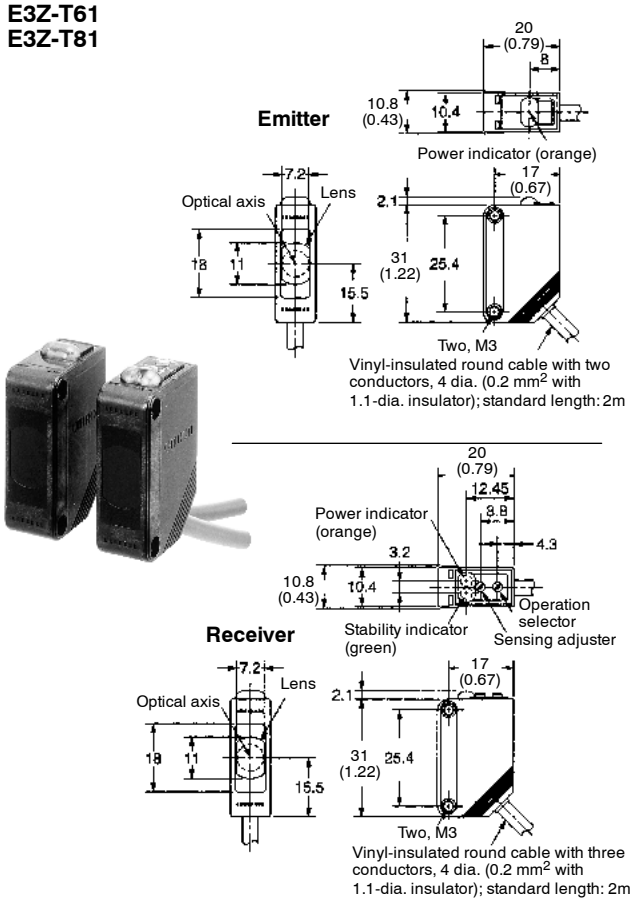
Dimensions

Unit: mm (inch)

■ SENSORS

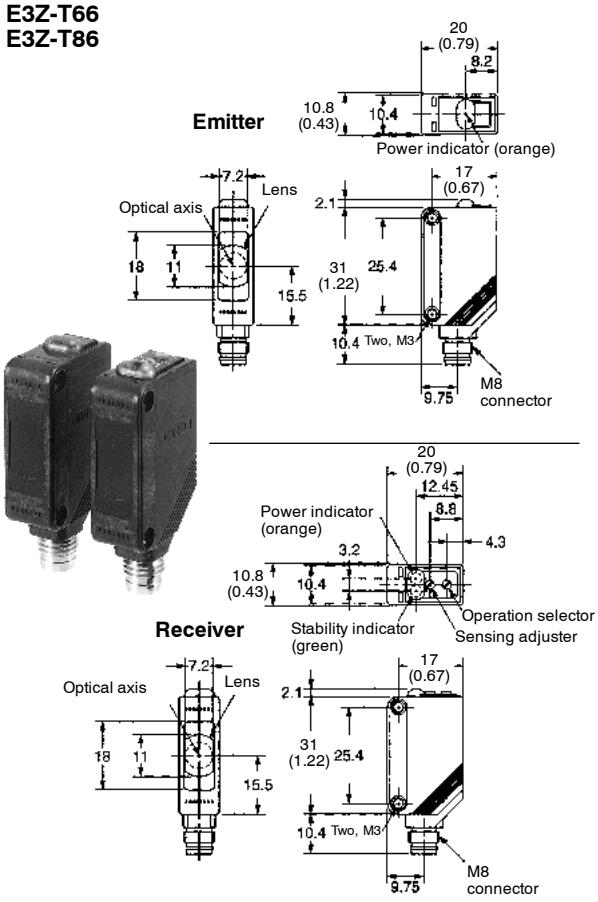
Through-beam (Pre-wired Models)

E3Z-T61
E3Z-T81



Through-beam (Connector Models)

E3Z-T66
E3Z-T86

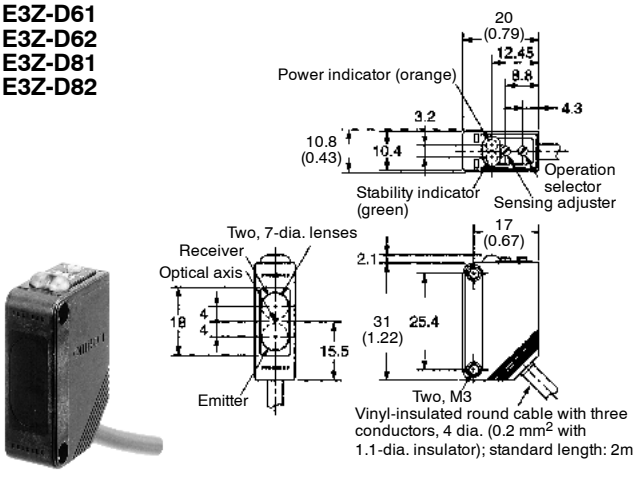


Retroreflective Models (Pre-wired Models)

E3Z-R61
E3Z-R81

Diffuse Reflective Models (Pre-wired Models)

E3Z-D61
E3Z-D62
E3Z-D81
E3Z-D82

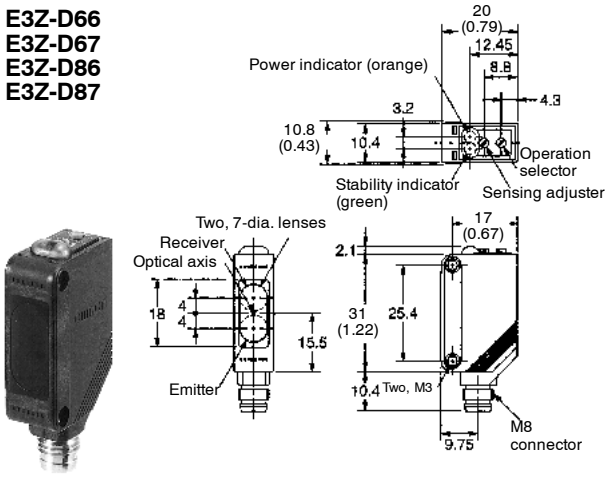


Retroreflective Models (Connector Models)

E3Z-R66
E3Z-R86

Diffuse Reflective Models (Connector Models)

E3Z-D66
E3Z-D67
E3Z-D86
E3Z-D87

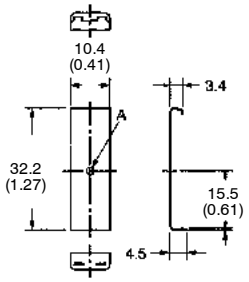


Unit: mm (inch)

■ SLITS

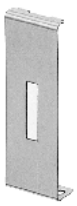
E39-S65A
E39-S65B
E39-S65C

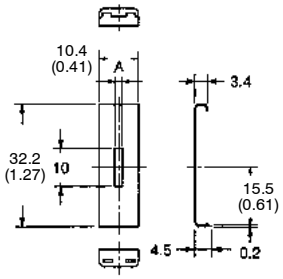




Model	Side A	Material
E39-S65A	0.5 dia.	SUS301 stainless steel
E39-S65B	1.0 dia.	
E39-S65C	2.0 dia.	

E39-S65D
E39-S65E
E39-S65F

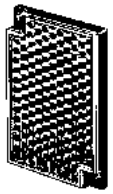




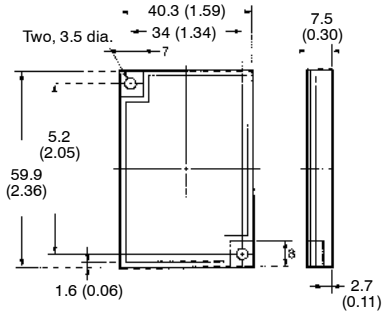
Model	Side A	Material
E39-S65D	0.5	SUS301 stainless steel
E39-S65E	1.0	
E39-S65F	2.0	

■ REFLECTORS

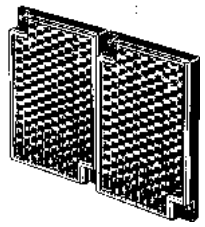
E39-R1
E39-R1S



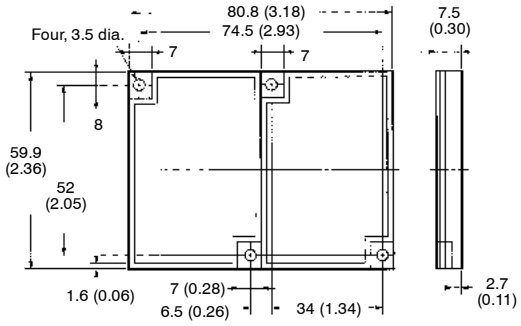
Material
Surface: Acrylic resin
Backside: ABS resin



E39-R2



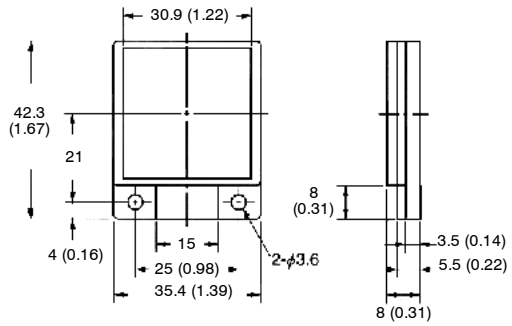
Material
Surface: Acrylic resin
Backside: ABS resin



E39-R9

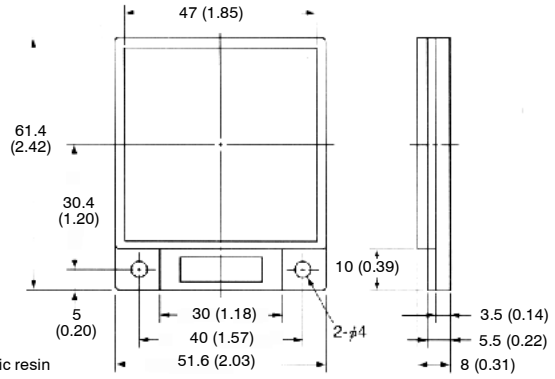


Material
Reflecting surface: Acrylic resin
Back: ABS resin



E39-R10





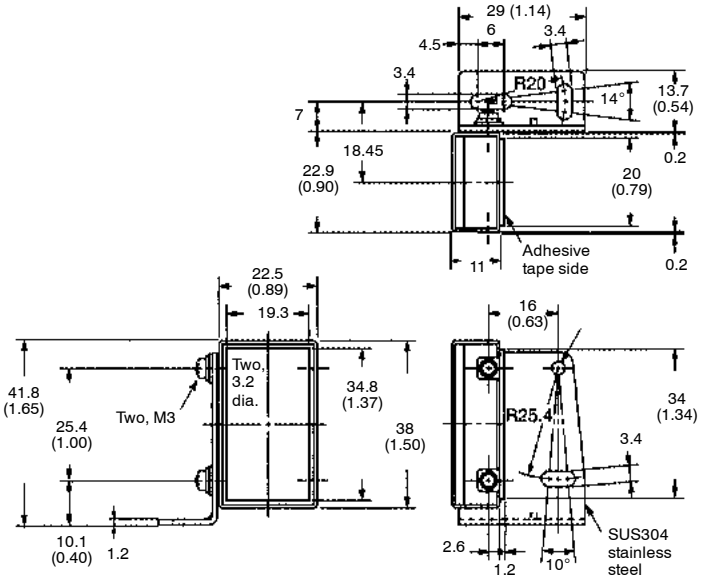
Material
Reflecting surface: Acrylic resin
Back: ABS resin

■ MINIATURE REFLECTOR

E39-R3



Material
Surface: Acrylic resin
Backside: ABS resin

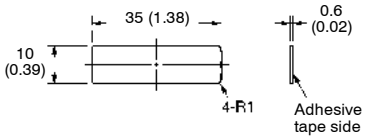


■ TAPE REFLECTORS

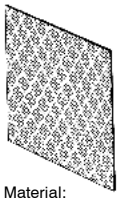
E39-RS1



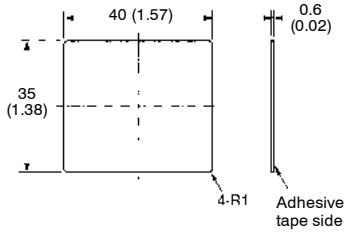
Material:
Acrylic resin



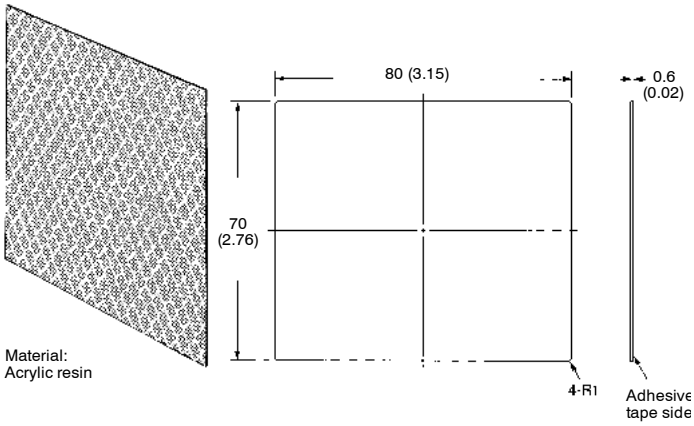
E39-RS2



Material:
Acrylic resin



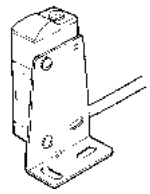
E39-RS3



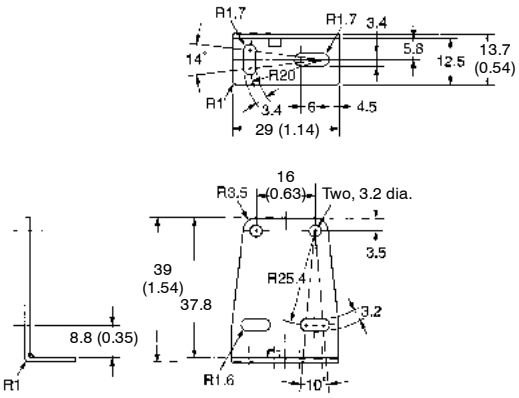
Unit: mm (inch)

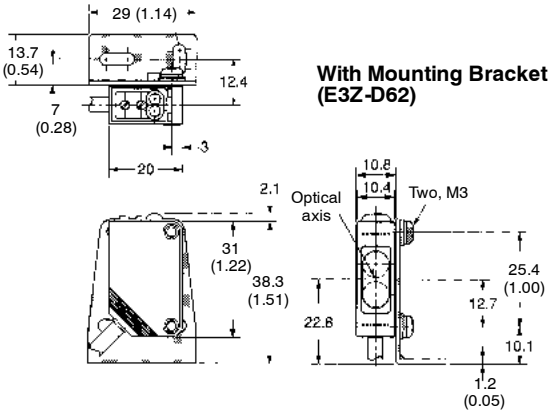
■ MOUNTING BRACKETS

E39-L104

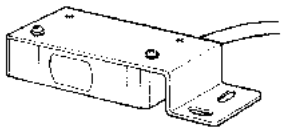


Material:
SUS304
stainless steel

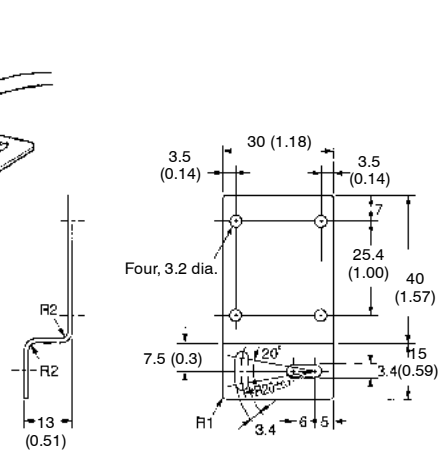


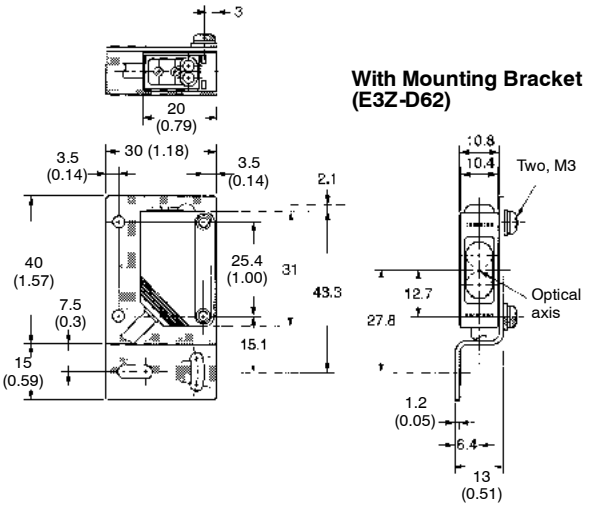


E39-L43

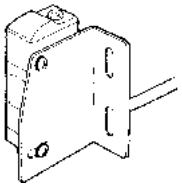


Material:
SUS304
stainless steel

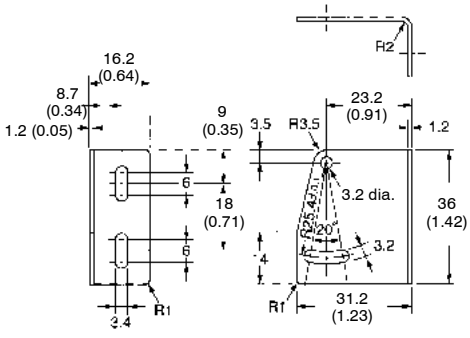


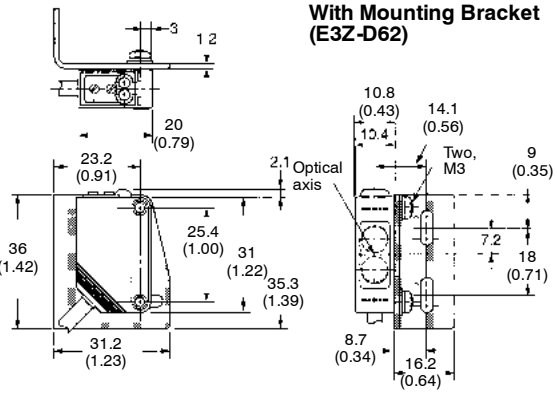


E39-L44

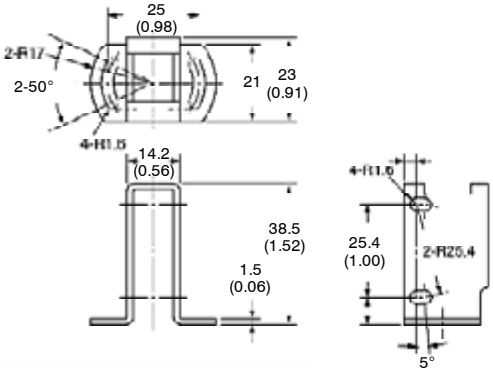


Material:
SUS304
stainless steel



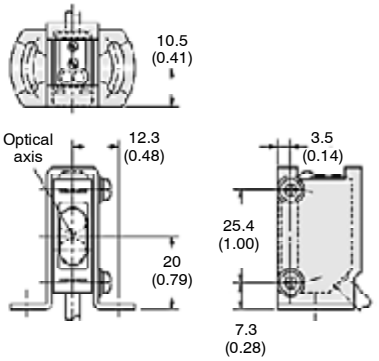


E39-L144

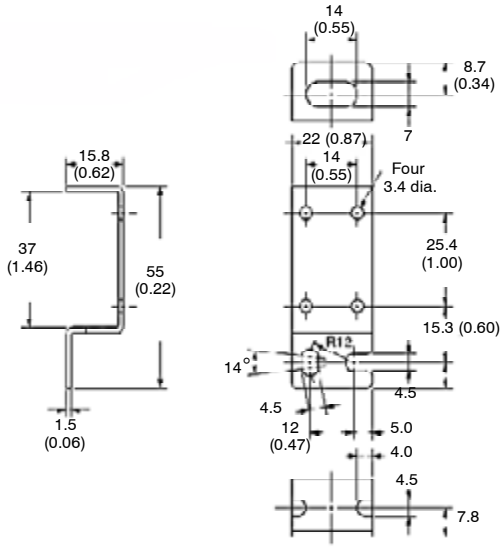


Material:
SUS304 stainless steel

With Sensor (Example: E3Z-L61)

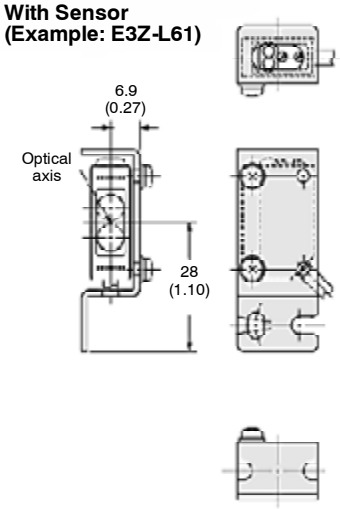


E39-L142



Material:
SUS304 stainless steel

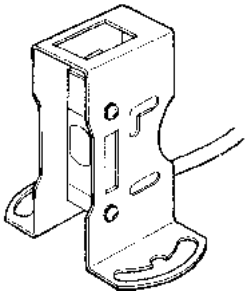
With Sensor (Example: E3Z-L61)



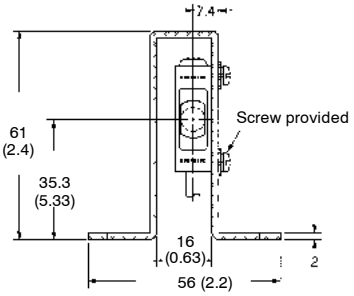
Unit: mm (inch)

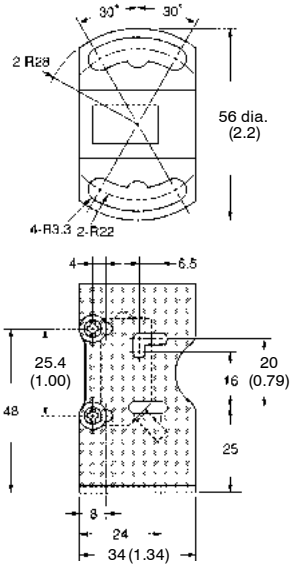
E39-L93

E39-L98

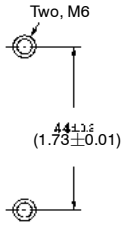


Material:
SUS304 stainless steel





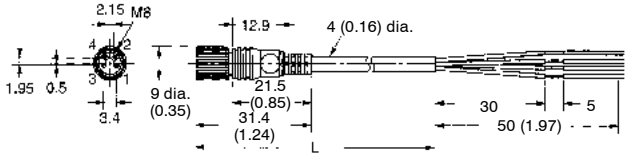
Mounting Holes



■ M8 CONNECTOR CORDSETS

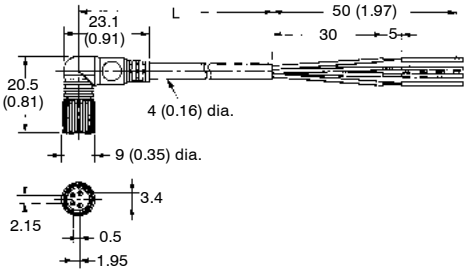
Straight
XS3F-M421-402-A (L=2 m)
XS3F-M421-405-A (L=5 m)





Right Angle
XS3F-M422-402-A (L=2 m)
XS3F-M422-405-A (L=5 m)





Precautions

To ensure safe sensor operation, please follow the following precautions:

■ WIRING

Power Supply Voltage

Make sure that the power supply to the Sensor is within the rated voltage range.

Load Short-circuiting

Do not short-circuit the load, or the Sensor may be damaged.

Polarity

Correct polarity wiring is required to prevent damage to the sensor.

Connection Without Load

Do not connect power supply to the Sensor with no load connected, or the internal elements may explode or burn.

■ OPERATING ENVIRONMENT

Do not use the Sensor in locations with explosive or flammable gas.

■ SETTINGS

Power Reset Time

The Sensor is ready to operate 100 ms after the Sensor is turned ON. If the load and Sensor are connected to independent power supplies respectively, be sure to turn ON the Sensor before turning the load ON.

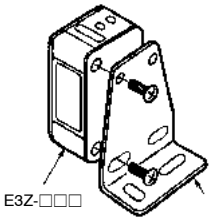
■ CONNECTIONS

M8 Metal Connector

- Turn off power before disconnecting the sensor.
- Remove the connector cover before connecting or disconnecting the metal connector.
- Secure the connector cover by hand. Do not use any pliers, or the connector may be damaged.
- The proper tightening torque range is between 0.3 and 0.4 N • m. Be sure to tighten the connector securely in order to maintain the the specified degree of protection and to keep the connector from loosening due to vibration.

■ MOUNTING

Use M3 screws to mount the sensor and tighten each screw to a maximum torque of 0.53 N • m.

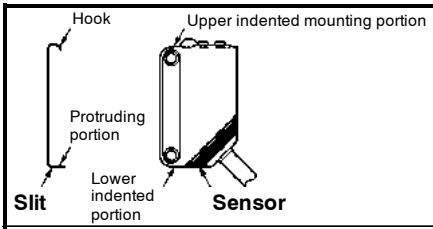


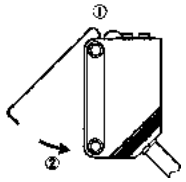
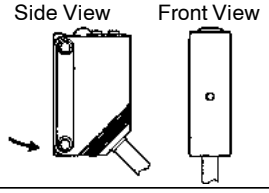
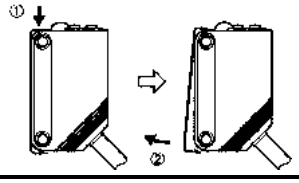
E3Z-□□□

E39-L104 Mounting Bracket
(sold separately)

■ ADJUSTMENT

Slits for Through-beam Models (E39-S65A/B/C/D/E/F) Sold Separately



Mounting Method 1. Hook the upper protruding portion of the Slit to the upper indented mounting portion of the Sensor and adjust the position of the Slit so that the Slit will be in parallel to the lens side of the Sensor. 2. Press the lower protruding portion of the Slit onto the indented mounting portion of the Sensor until the Slit snaps in.	
Mounting Condition	
Removal Method 1. Press the upper portion of the Slit. 2. Disconnect the lower protruding portion of the Slit from the Sensor and remove the Slit.	

NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.

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