OMRON

Distance-settable Photoelectric Sensor TOF Laser Sensor

E3AS-F Series

Optimal sensing distance (50 to 1,500 mm) for use on conveyor lines

- Wide sensing distance of 50 to 1,500 mm*, enabling use on any conveyor line width
- Time of flight (TOF) type sensors for use with any type of conveyed object
- Compact body can be mounted anywhere
- (Metal body (SUS316L), Plastic body type (PBT/PC))
- Teaching method allows anyone to set optimal threshold values
- Manufactured using Omron's proprietary laser sealing method (IP67/IP69K/IP67G)
- Antifouling coatings reduce the cleaning frequency on the lens.
- IO-Link reduces time required for startups and changeovers

* The sensing distance of the E3AS-F1500 series.

Refer to *Safety Precautions* on page 9.

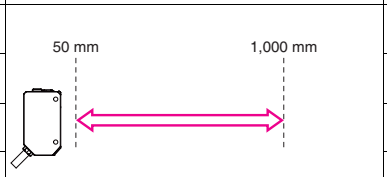
For the most recent information on models that have been certified for safety standards, refer to your Omron website.

Ordering Information

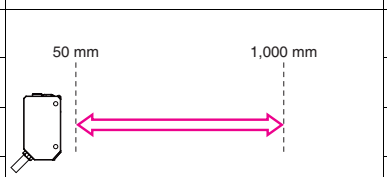
Sensors [Refer to *Dimensions* on page 11.]

SUS 316L Body

Infrared light

Connection method	Sensing distance (white paper)	Output	Model		
			NPN output	PNP output	PNP output
		IO-Link baud rate	---	COM2 (38.4 kbps)	COM3 (230.4 kbps)
Pre-wired (2 m) [1]			E3AS-F1500IMN 2M	E3AS-F1500IMD 2M	E3AS-F1500IMT 2M
M8 Connector			E3AS-F1500IMN M3	E3AS-F1500IMD M3	E3AS-F1500IMT M3
M8 Pre-wired Connector			E3AS-F1500IMN-M3J 0.3M	E3AS-F1500IMD-M3J 0.3M	E3AS-F1500IMT-M3J 0.3M
M12 Pre-wired Connector [2]			E3AS-F1500IMN-M1TJ 0.3M	E3AS-F1500IMD-M1TJ 0.3M	E3AS-F1500IMT-M1TJ 0.3M
Pre-wired (2 m) [1]			E3AS-F1000IMN 2M	E3AS-F1000IMD 2M	E3AS-F1000IMT 2M
M8 Connector			E3AS-F1000IMN M3	E3AS-F1000IMD M3	E3AS-F1000IMT M3
M8 Pre-wired Connector			E3AS-F1000IMN-M3J 0.3M	E3AS-F1000IMD-M3J 0.3M	E3AS-F1000IMT-M3J 0.3M
M12 Pre-wired Connector [2]			E3AS-F1000IMN-M1TJ 0.3M	E3AS-F1000IMD-M1TJ 0.3M	E3AS-F1000IMT-M1TJ 0.3M

PBT Body

Connection method	Sensing distance (white paper)	Output	Model		
			NPN output	PNP output	PNP output
		IO-Link baud rate	---	COM2 (38.4 kbps)	COM3 (230.4 kbps)
Pre-wired (2 m) [1]			E3AS-F1500IPN 2M	E3AS-F1500IPD 2M	E3AS-F1500IPT 2M
M8 Connector			E3AS-F1500IPN M3	E3AS-F1500IPD M3	E3AS-F1500IPT M3
M8 Pre-wired Connector			E3AS-F1500IPN-M3J 0.3M	E3AS-F1500IPD-M3J 0.3M	E3AS-F1500IPT-M3J 0.3M
M12 Pre-wired Connector [2]			E3AS-F1500IPN-M1TJ 0.3M	E3AS-F1500IPD-M1TJ 0.3M	E3AS-F1500IPT-M1TJ 0.3M
Pre-wired (2 m) [1]			E3AS-F1000IPN 2M	E3AS-F1000IPD 2M	E3AS-F1000IPT 2M
M8 Connector			E3AS-F1000IPN M3	E3AS-F1000IPD M3	E3AS-F1000IPT M3
M8 Pre-wired Connector			E3AS-F1000IPN-M3J 0.3M	E3AS-F1000IPD-M3J 0.3M	E3AS-F1000IPT-M3J 0.3M
M12 Pre-wired Connector [2]			E3AS-F1000IPN-M1TJ 0.3M	E3AS-F1000IPD-M1TJ 0.3M	E3AS-F1000IPT-M1TJ 0.3M

1. Models with 5-m cable length are also available with “5M” suffix. (Example: E3AS-F1500IMN 5M/E3AS-F1500IPN 5M)
2. The Pre-wired Connector (M12) is Smartclick Connector.

Accessories (Sold Separately)

Sensor I/O Connectors (Sockets on One Cable End)

(Models for Connectors / Pre-wired Connectors)
A Sensor I/O Connector is not provided with the Sensor. Order separately.
Round Water-resistant Connectors XS3F-M8 series

Appearance	Cable specification	Cable diameter (mm)	Cable connection direction	Cable length (m)	Sensor I/O Connector model number
M8 Connector Straight type 	PVC cable	5 dia.	Straight	2	**XS3F-M8PVC4S2M**
				5	**XS3F-M8PVC4S5M**
Right-angle type 			Right-angle	2	**XS3F-M8PVC4A2M**
				5	**XS3F-M8PVC4A5M**

Note: 1. The XS3W (Socket and Plug on Cable Ends) is also available. Refer to *XS3W-M8/XS3F-M8 Series Datasheet* (Cat. No. G140).
2. The connectors will not rotate after they are connected.
3. The cable is fixed at an angle of 180° from the sensor emitter/receiver surface.

Round Water-resistant Connectors XS5 series

Appearance	Cable specification	Cable diameter (mm)	Cable connection direction	Cable length (m)	Sensor I/O Connector model number
M12 Smartclick Connector Straight type 	PVC robot cable	6 dia.	Straight	2	**XS5F-D421-D80-F**
				5	**XS5F-D421-G80-F**
Right-angle type 			Right-angle	2	**XS5F-D422-D80-F**
				5	**XS5F-D422-G80-F**

Note: 1. The XS5W (Socket and Plug on Cable Ends) is also available. Refer to *XS5* on your Omron website for details.
2. The connectors will not rotate after they are connected.
3. The cable is fixed at an angle of 180° from the sensor emitter/receiver surface.

Mounting Brackets [Refer to *Dimensions* on page 12.]

A Mounting Bracket is not enclosed with the Sensor. Order as needed.

Appearance	Model (material)	Applicable Sensor E3AS series			
		Pre-wired	M8 Pre-wired Connector	M12 Pre-wired Smartclick Connector	M8 Connector
L-shaped Mounting Bracket	E39-L201 (SUS304)	Yes	Yes	Yes	---
Horizontal Protective Cover Bracket	E39-L202 (SUS304)	Yes	Yes	Yes	---
Rear Mounting Bracket	E39-L203 (SUS304)	Yes	Yes	Yes	Yes [2]
Robust Mounting Bracket	E39-L204 (SUS304)	Yes	Yes	Yes	---
L-shaped Mounting Bracket	E39-L211 (SUS304)	--- [1]	--- [1]	--- [1]	Yes [3]
Horizontal Protective Cover Bracket	E39-L212 (SUS304)	--- [1]	--- [1]	--- [1]	Yes [3]
Robust Mounting Bracket	E39-L214 (SUS304)	--- [1]	--- [1]	--- [1]	Yes [3]

1. Can be used for Pre-wired models, M8 Pre-wired Connector models, and M12 Pre-wired Smartclick Connector models. However, confirm the bracket shape in advance.
2. Confirm the installation environment and bracket shape of the Sensor I/O Connector to be connected.
3. Use an L-shaped Sensor I/O Connector. Straight types cannot be installed.

E3AS-F Series

Ratings and Specifications

Item				
Model	Sensing method	TOF (Time of flight)		
	Type	Metal case (□: M), Plastic case (□: P)		
	NPN output	E3AS-F1500I□N	E3AS-F1000I□N	
	PNP output/ COM2	E3AS-F1500I□D	E3AS-F1000I□D	
	PNP output/ COM3	E3AS-F1500I□T	E3AS-F1000I□T	
Sensing distance		50 mm to the set distance (White paper or black paper 200 × 200 mm)	50 mm to the set distance (White paper or black paper 200 × 200 mm)	
Setting range		100 to 1,500 mm (White paper 200 × 200 mm) 100 to 1,000 mm (Black paper 200 × 200 mm)	100 to 1,000 mm (White paper 200 × 200 mm) 100 to 500 mm (Black paper 200 × 200 mm)	
Spot diameter (reference value)		95 mm dia. (at distance of 1,000 mm)		
Differential travel		15% max. of set distance (Set distance 200 mm min.)		
Reflectivity characteristic (black/white error)		10% max. of set distance (Set distance 200 mm min.)		
Light source (wavelength)		Infrared laser (940 nm) Class1 (IEC/EN60825-1:2014)		
Power supply voltage		10 to 30 VDC (including 10% ripple (p-p)), Class2		
Current consumption		30 mA max.		
Input/output	Control output	Load power supply voltage: 30 VDC max., Class2, Load current: 100 mA max. (Residual voltage: Load current of less than 10 mA: 1 V max. Load current of 10 to 100 mA: 2 V max.) Open-collector output (NPN/PNP output depending on model)		
	NPN	OUTPUT 1: NO (Normally open), OUTPUT 2: NC (Normally closed)		
	PNP/COM2 PNP/COM3	OUTPUT 1: NO (Normally open)/COM□, OUTPUT 2: NC (Normally closed)		
Protection circuits		Power supply reverse polarity protection, Output short-circuit protection, and Output reverse polarity protection		
Response time		Operate or reset: 150 ms max.	Operate or reset: 90 ms max.	
Distance setting		Teaching method/IO-Link communications		
Ambient illumination (Receiver side)		Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max.		
Ambient temperature range		Operating: -20 to 55°C, Storage: -40 to 70°C (with no icing or condensation)		
Ambient humidity range		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 with a 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance		500 m/s^2 for 3 times each in X, Y, and Z directions		
Degree of protection		IP67 (IEC60529) and IP67G[1] (JIS C 0920 Annex 1), IP69K (ISO20653)		
Indicators		Operation indicator (orange), stability/communication indicator (green [2])		
Connection method		Pre-wired (standard cable length: 2 m), M8 Connector, M8 Pre-wired Connector (standard cable length: 0.3m), M12 Pre-wired Smartclick Connector (standard cable length: 0.3m)		
Weight (packed state/ Sensor only)	Pre-wired (2 m)	Metal case type: Approx. 135 g/approx. 90 g Plastic case type: Approx. 115 g/approx. 70 g		
	M8 Connector	Metal case type: Approx. 75 g/approx. 30 g Plastic case type: Approx. 60 g/approx. 15 g		
	M8 Pre-wired Connector (0.3m)	Metal case type: Approx. 85 g/approx. 40 g Plastic case type: Approx. 70 g/approx. 25 g		
	M12 Pre-wired Smartclick Connector (0.3m)	Metal case type: Approx. 95 g/approx. 50 g Plastic case type: Approx. 75 g/approx. 30 g		
Materials	Case	Metal case type: Main unit/mounting part/connector part Stainless steel (SUS316L) Plastic case type: Main unit Polybutylene terephthalate (PBT) /polycarbonate (PC), Mounting part/connector part Nickel-plated brass		
	Lens	Methacrylate resin (PMMA)		
	Display	Metal case type: Polyamide 11 (PA11) Plastic case type: Polyethersulfone (PES)		
Main IO-Link functions		Operation mode switching between NO and NC, execution of teaching (2-point teaching, Background teaching), setup of the threshold, timer function of the control output and timer time selecting, monitor output (Detection level, Incident light level), Restore Factory Settings, Key Lock (Unlock, Lock, Lock (No Button))		
IO-Link Communication specifications	IO-Link specification	Ver. 1.1		
	Baud rate	COM2 (38.4 kbps), COM3 (230.4 kbps)		
	Data length	PD size: 4 bytes, OD size: 1 byte (M-sequence type: TYPE_2_V)		
	Minimum cycle time	COM2: 3.5 ms, COM3: 1.2 ms		
Accessories		Instruction manual, compliance sheet, index list (attached for IO-Link type only) and FDA certification label Note: Mounting Brackets must be ordered separately.		

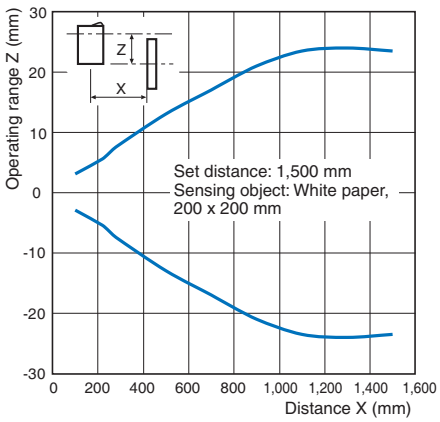
1. The IP67G is the degree of protection which is defined according to the JIS (Japanese Industrial Standards). The IP67 indicates the same level of protection as defined by the IEC, and the G indicates that a device has resistance to oil.
2. IO-Link mode: blinking

Engineering Data (Reference Value)

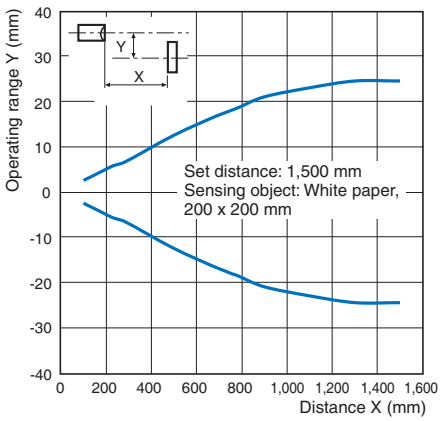
Operating Range

E3AS-F1500□

Z directions

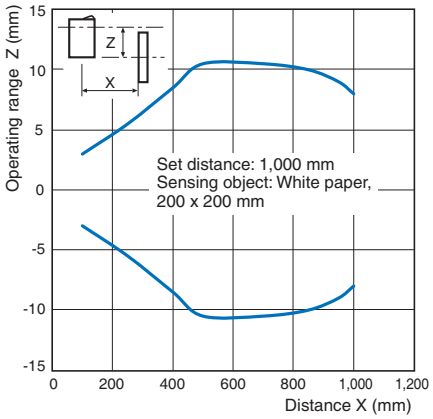


Y directions

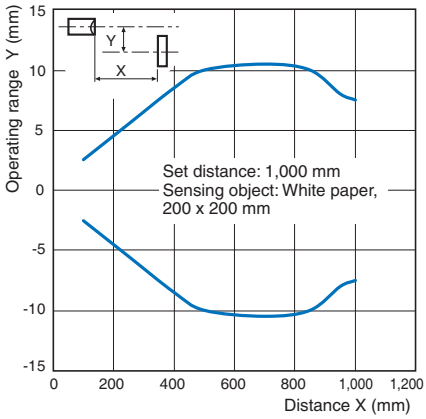


E3AS-F1000□

Z directions

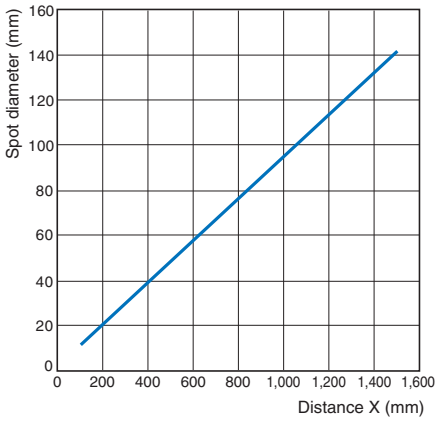


Y directions



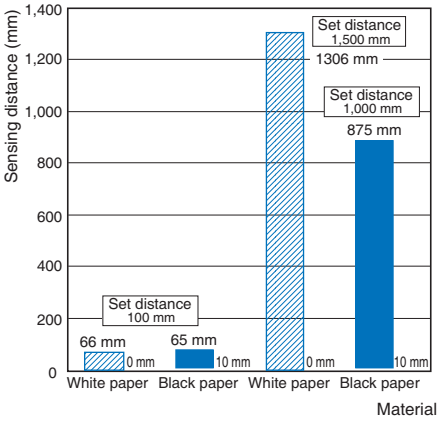
Spot Diameter vs. Sensing Distance

E3AS-F1500□
E3AS-F1000□

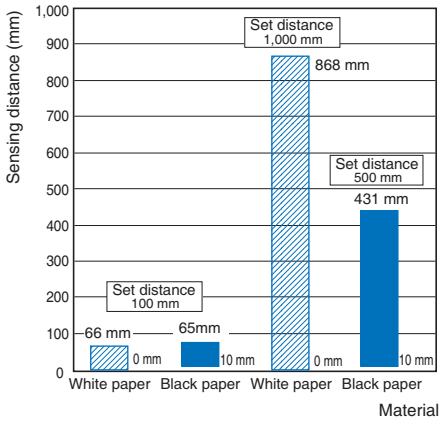


Close-range Characteristics

E3AS-F1500□

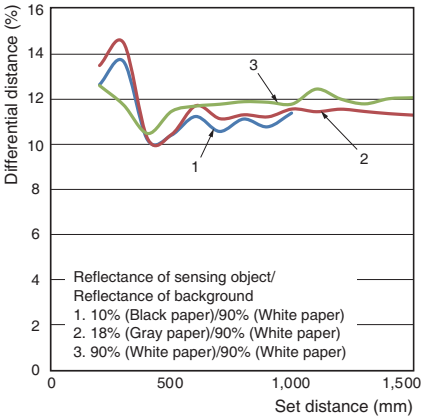


E3AS-F1000□

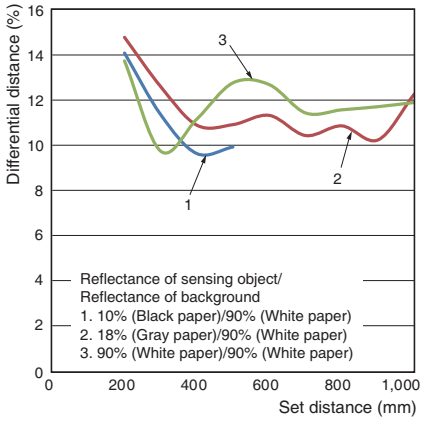


Differential distance for each sensing object Vs. Distance

E3AS-F1500□



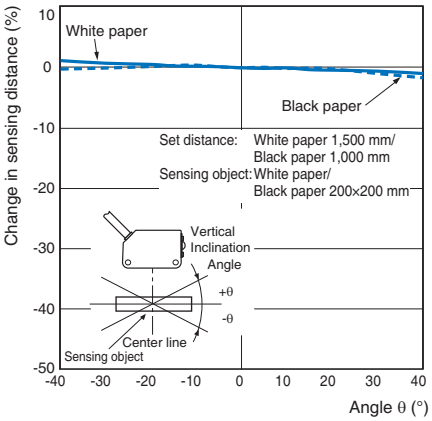
E3AS-F1000□



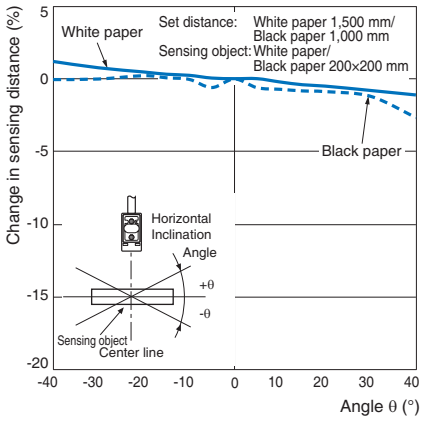
Sensing Object Angle Characteristics

E3AS-F1500□

Vertical

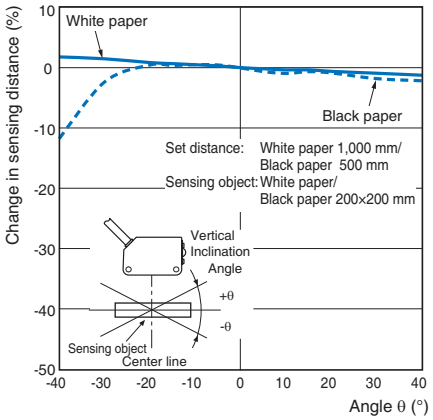


Horizontal

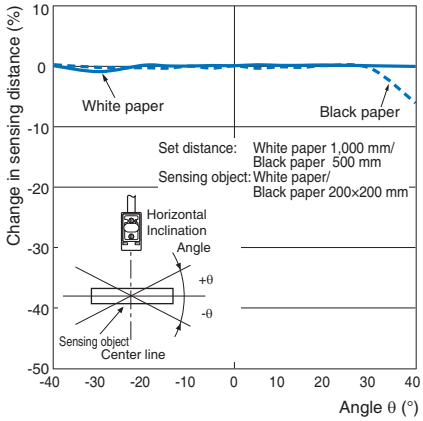


E3AS-F1000□

Vertical

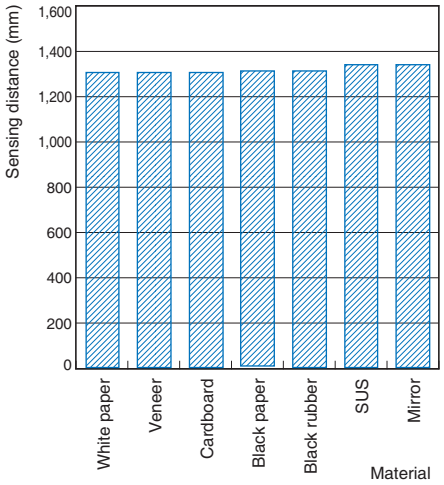


Horizontal

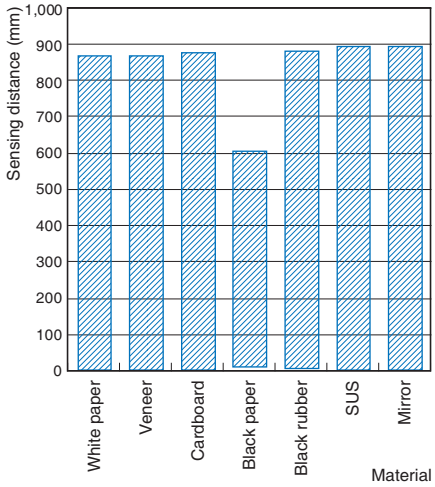


Sensing Distance vs. Sensing Object Material

E3AS-F1500□
(Set Distance of 1,500 mm using White Paper)

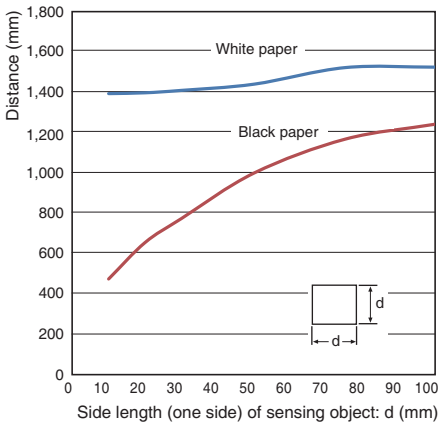


E3AS-F1000□
(Set Distance of 1,000 mm using White Paper)

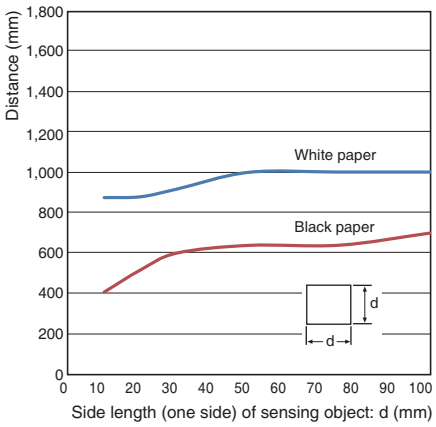


Sensing Object Size vs. Sensing Distance

E3AS-F1500□



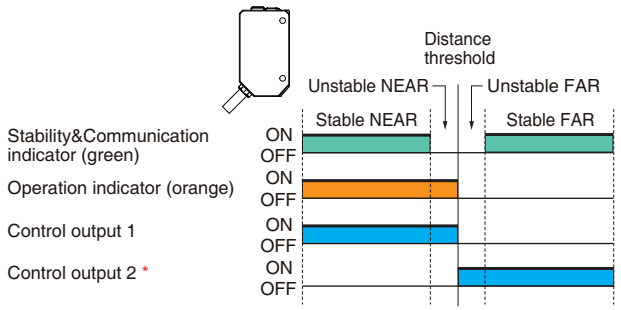
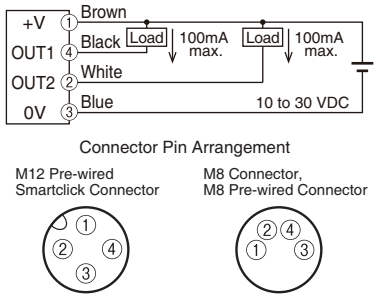
E3AS-F1000□



E3AS-F Series

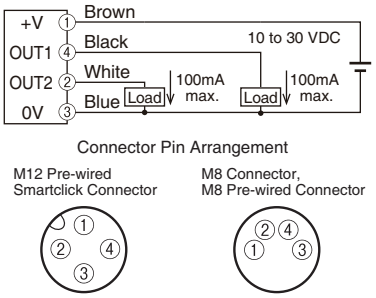
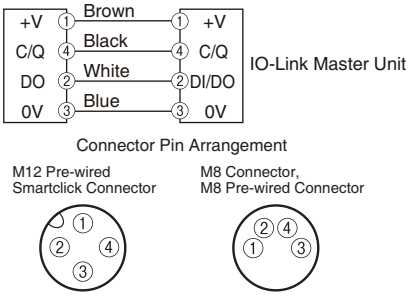
I/O Circuit Diagrams/ Timing Charts

NPN Output

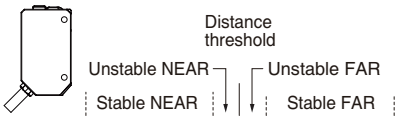
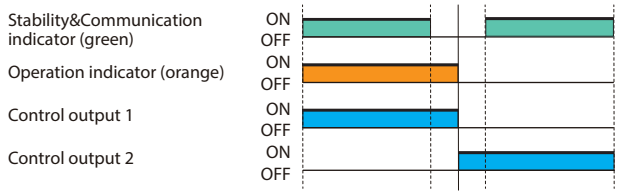
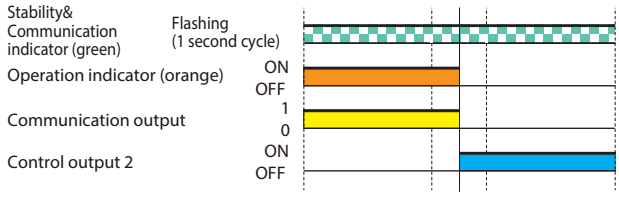
Model	Timing chart	Output circuit
E3AS-F1500I□N□ E3AS-F1000I□N□		

* The initial value of control output 2 is reverse of control output 1.

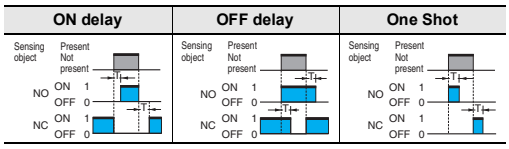
PNP Output

Model	Output circuit	
	Standard I/O mode (SIO mode) [1]	IO-Link Communication mode (COM mode) [2]
E3AS-F1500I□D□ E3AS-F1500I□T□ E3AS-F1000I□D□ E3AS-F1000I□T□		

1. Standard I/O mode is used as PNP ON/OFF output.
2. IO-Link Communication mode is used for communications with the IO-Link Master. C/Q performs IO-Link communications. Sensor output DO performs ON/OFF output.

	Timing charts
Output mode	
Standard I/O mode (SIO mode)	
IO-Link Communication mode (COM mode)	

1 The initial value of control output 2 is reverse of control output 1.
2. The timer function of the control output can be set up by the IO-Link communications. (It is able to select ON delay, OFF delay, or one-shot function and select a timer time of 1 to 9,999 ms (T).)

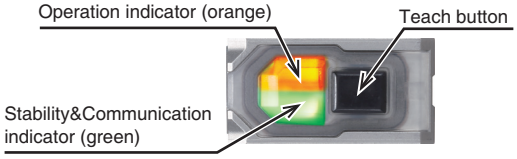


Please contact your Omron sales representative regarding the IO-Link setup file (IODD file).

Note: Shown above are the factory settings. Refer to the index list for the default settings at time of shipment from factory.
PNP/COM output logic can be reversed by IO-Link communication.
The operation indicator (orange) lights up when control output 1 is ON or communication output is 1.

Nomenclature

E3AS-F1500□
E3AS-F1000□



Note: The indicators work differently depending on sensor status.

Safety Precautions

Be sure to read the precautions for all models in the website at: http://www.ia.omron.com/.

Warning Indications

⚠ WARNING	**Warning level** Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.
⚠ CAUTION	**Caution level** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.
Precautions for Safe Use	Supplementary comments on what to do or avoid doing, to use the product safely.
Precautions for Correct Use	Supplementary comments on what to do or avoid doing, to prevent failure to operate, malfunction or undesirable effect on product performance.

Meaning of Product Safety Symbols

	General prohibition Indicates the instructions of unspecified prohibited action
	Caution, explosion Indicates the possibility of explosion under specific conditions
	Laser Caution Indicates information related to laser safety

⚠ WARNING

This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purpose.

⚠ CAUTION

Never use the product with an AC power supply. Otherwise, explosion may result.

To safely use laser products

⚠ WARNING

Do not expose your eyes to the laser beam either directly or indirectly (i.e., after reflection from a mirror or shiny surface). The laser beam has a high power density and exposure may result in loss of sight.

Laser safety measures for laser equipment are stipulated in Japan and other countries. For usage in Japan and for export to other countries combined with other products, follow the instructions described below categorized in three cases respectively.

1. **Usage in Japan**
   The JIS C6802:2014 standard stipulates the safety precautions that users must take according to the class of the laser product. This product is classified into Class 1 defined by this standard.
2. **Usage in U.S.**
   When this product is installed in a device and exported to the U.S., it is subjected to the U.S. FDA (Food and Drug Administration) laser regulations. This product is classified into Class 1 by the IEC 60825-1:2007 standard according to the provisions of Laser Notice No. 50 of the FDA standard. This product is already reported to CDRH (Center for Devices and Radiological Health).
   Accession Number: 1920014-000
   Because the product is small, we can not attach an FDA certification label on the main body, so we enclose it in the packing box. When exporting a device equipped with the product to the U.S., attach an FDA certification label near the sensor mounting of customer equipment.

FDA certification label

3. **Usage in China**
   This product is classified into Class 1 by the IEC60825-1:2007 standard.
4. **Usage in a country other than U.S. and China.**
   This product is classified into Class 1 by the IEC60825-1:2014 standard.

Precautions for Safe Use

The following precautions must be observed to ensure safe operation.

(1) Do not reverse the power supply connection or connect to an AC current.
(2) Do not short the load.
(3) Be sure that before making supply the supply voltage is less than the maximum rated supply voltage (30 VDC).
(4) Do not use the product in environments subject to flammable or explosive gases.
(5) Do not use the product under a chemical or an oil environment without prior evaluation.
(6) Do not attempt to modify the product.

Precautions for Correct Use

(1) Do not hit the product using a hammer for installation.
(2) The product must be installed with the specified torque or less. For M8 connector, the proper tightening torque is from 0.3 to 0.4 N·m. For M12 connector, the proper tightening torque is from 0.39 to 0.49 N·m. In case of M12 smartclick connector, manually tighten the connector.
(3) Do not use the product in any atmosphere or environment that exceeds the ratings.
(4) Output pulses may occur when the power supply is turned OFF. We recommend that you turn OFF the power supply to the load or load line first.
(5) Use an extension cable less than 100 m long for Standard I/O mode and less than 20 m for IO-Link Communication mode.
(6) Do not pull on the cable with excessive strength.
(7) Please wait for at least 500 ms after turning on the product's power until it is available for use.
(8) Though this is type IP67, do not use in the water, rain or outdoors.
(9) If the Sensor wiring is placed in the same conduits or ducts as high-voltage or high-power lines, inductive noise may cause malfunction or damage. Wire the cables separately or use a shielded cable.
(10) Do not use the product in locations subject to direct sunlight.
(11) Do not use the product where humidity is high and dew condensation may occur.
(12) Do not use the product where corrosive gases may exist.
(13) If high-pressure washing water and so on hits the teach button, it might lead to malfunctioning. So, consider use of the key lock function.
(14) Do not apply high-pressure washing water directly to the sensor's light emitting / receiving surface from a short distance. As the antifouling feature may be impaired, keep a sufficient distance from the light emitting / receiving surface.
(15) Do not use the product at a location subject to shock or vibration.
(16) To use a commercially available switching regulator, FG (frame ground) must be grounded.
(17) Do not use organic solvents (e.g. paint thinner and alcohol) for cleaning. Otherwise optical properties and protective structure may deteriorate.
(18) Be sure to check the influence caused by surrounding environments such as background objects and LED lighting before using the product.
(19) Please dispose in accordance with applicable regulations.

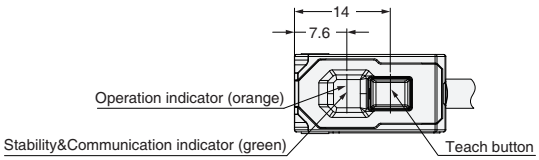
Dimensions

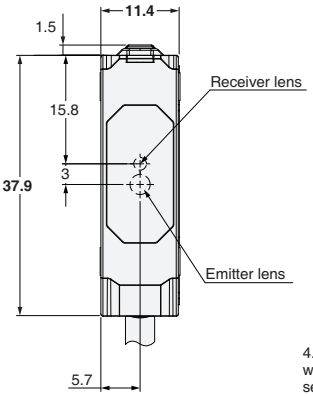
(Unit: mm)
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

Sensors

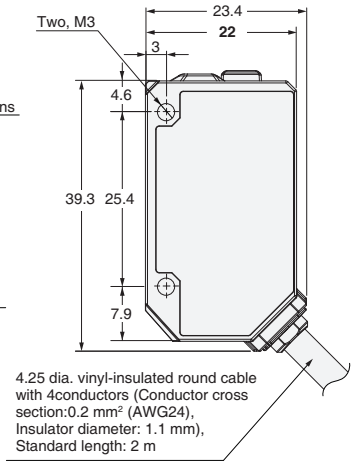
Pre-wired Models/Pre-wired Connector Models

E3AS-F1500□ (-M1TJ/-M3J)
E3AS-F1000□ (-M1TJ/-M3J)



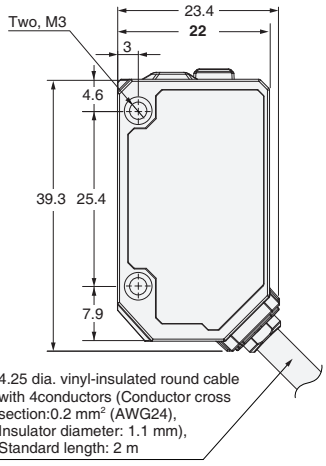


Metal case type



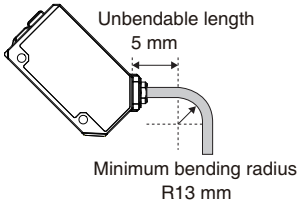
4.25 dia. vinyl-insulated round cable with 4conductors (Conductor cross section:0.2 mm² (AWG24), Insulator diameter: 1.1 mm), Standard length: 2 m

Plastic case type

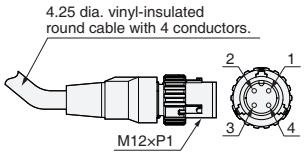


4.25 dia. vinyl-insulated round cable with 4conductors (Conductor cross section:0.2 mm² (AWG24), Insulator diameter: 1.1 mm), Standard length: 2 m

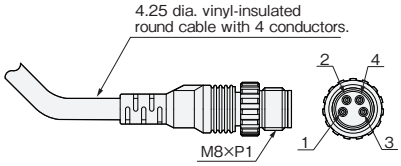
Minimum bending radius/unbendable length of cord



M12 Pre-wired Smartclick Connector type
E3AS-F1500□-M1TJ/E3AS-F1000□-M1TJ

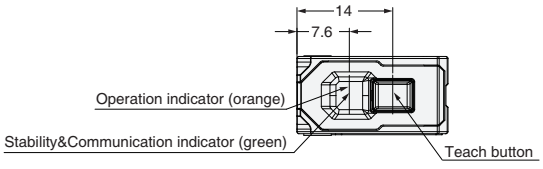


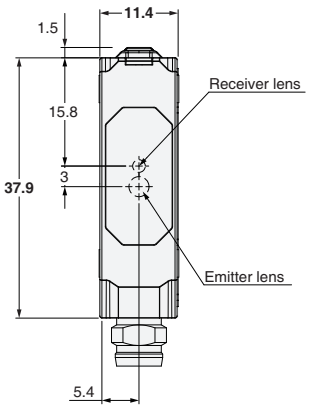
M8 Pre-wired connector type
E3AS-F1500□-M3J/E3AS-F1000□-M3J

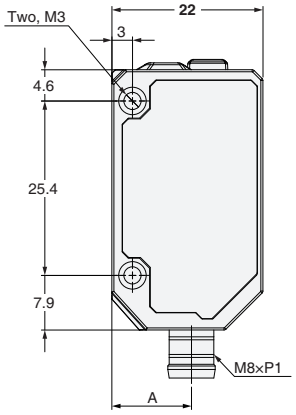


Connector Models

E3AS-F1500□ M3
E3AS-F1000□ M3





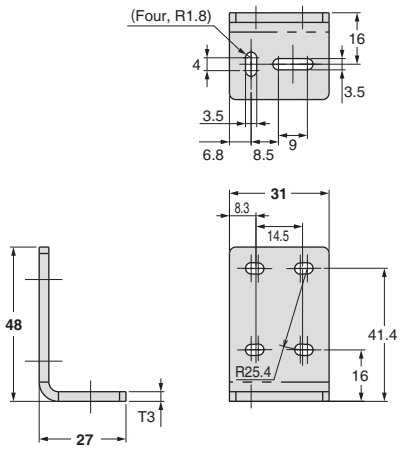


A:
Metal case type (E3AS-F□M□ M3) :9.6m
Plastic case type (E3AS-F□P□ M3) :11.6

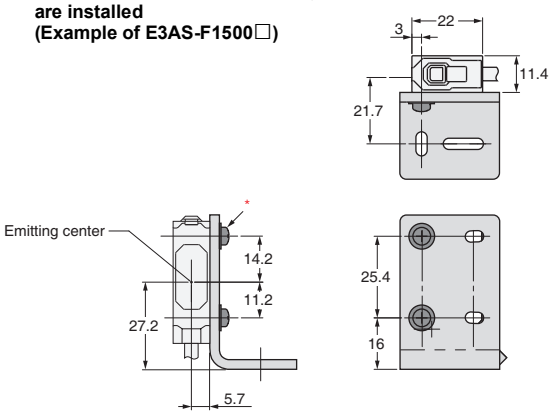
Accessories (Sold Separately)

Mounting Brackets

E39-L201

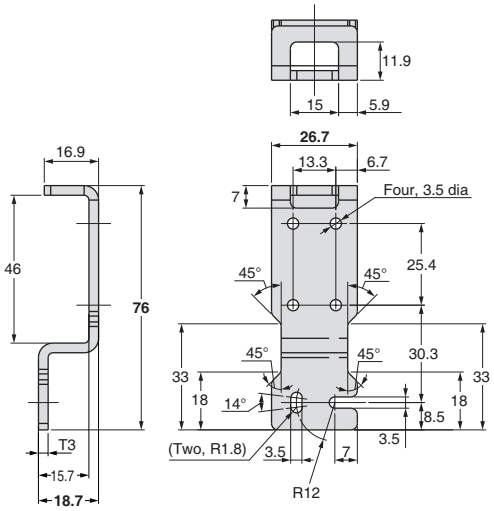


Photoelectric Sensor Accessory are installed (Example of E3AS-F1500☐)

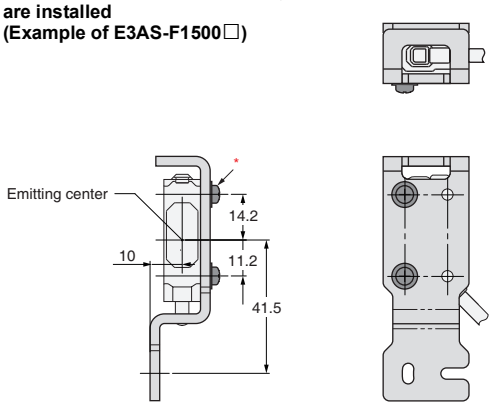


Material: Stainless steel (SUS304)
* Accessories
2-M3-L12 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

E39-L202

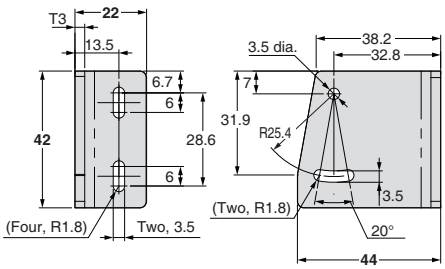


Photoelectric Sensor Accessory are installed (Example of E3AS-F1500☐)

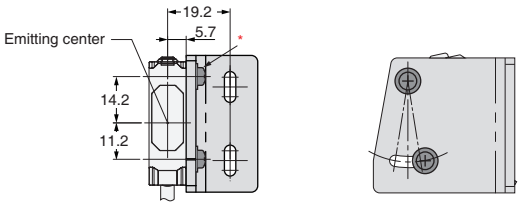


Material: Stainless steel (SUS304)
* Accessories
2-M3-L12 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

E39-L203

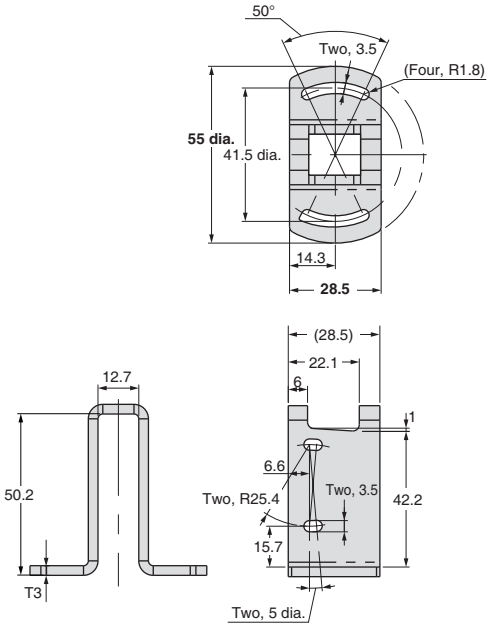


Photoelectric Sensor Accessory are installed (Example of E3AS-F1500☐)

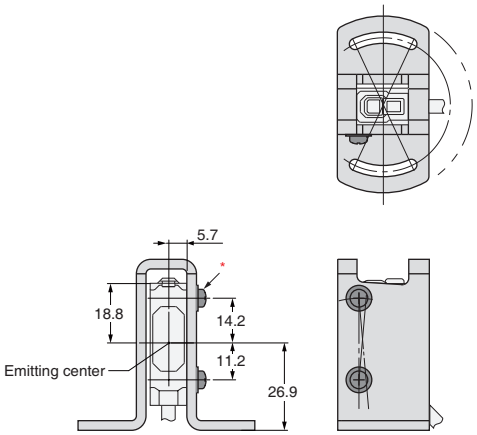


Material: Stainless steel (SUS304)
* Accessories
2-M3-L12 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

E39-L204

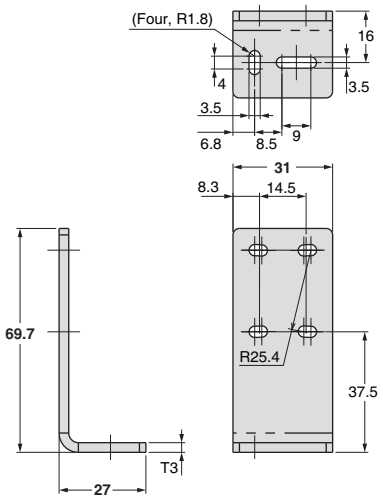


Photoelectric Sensor Accessory are installed (Example of E3AS-F1500☐)

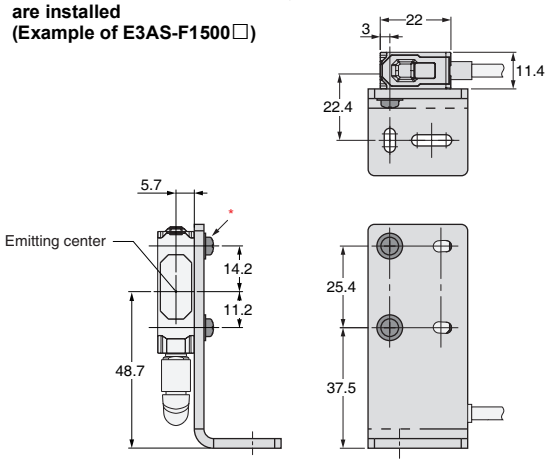


Material: Stainless steel (SUS304)
* Accessories
2-M3-L12 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

E39-L211

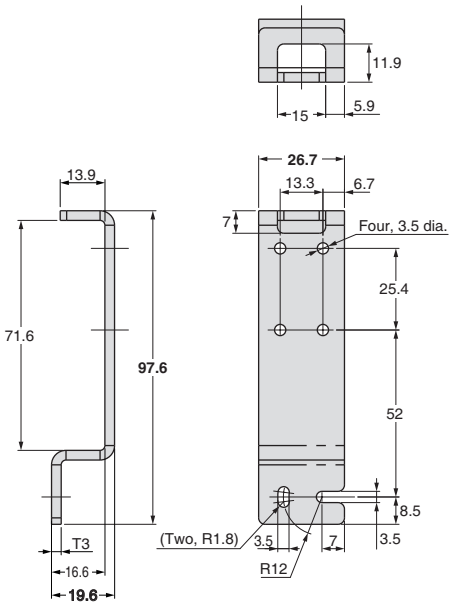


Photoelectric Sensor Accessory are installed (Example of E3AS-F1500☐)

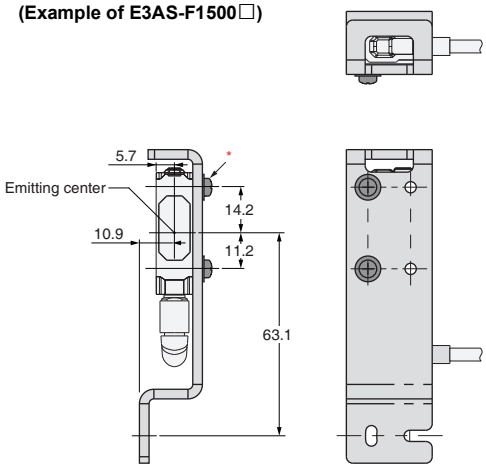


Material: Stainless steel (SUS304)
* Accessories
2-M3-L12 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

E39-L212

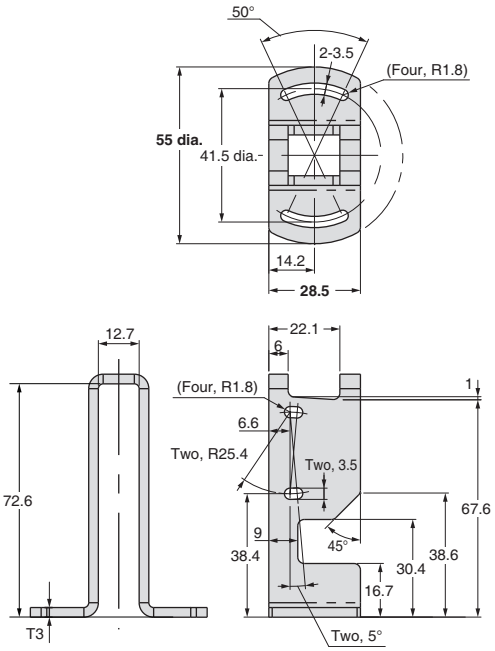


Photoelectric Sensor Accessory are installed (Example of E3AS-F1500☐)

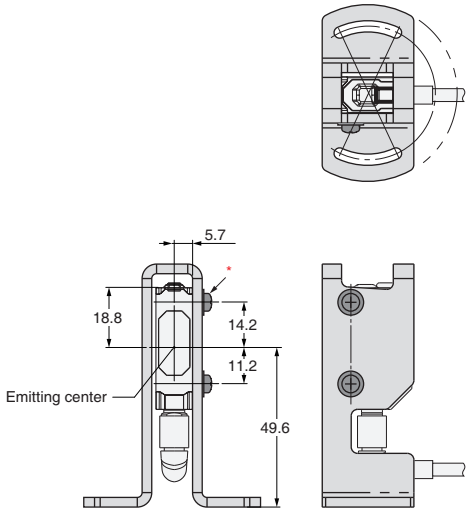


Material: Stainless steel (SUS304)
* Accessories
2-M3-L12 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

E39-L214



Photoelectric Sensor Accessory are installed (Example of E3AS-F1500☐)



Material: Stainless steel (SUS304)
* Accessories
2-M3-L12 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

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• Solid State Relays

Software
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