Distance-settable Photoelectric Sensors
E3AS-HL

OMRON

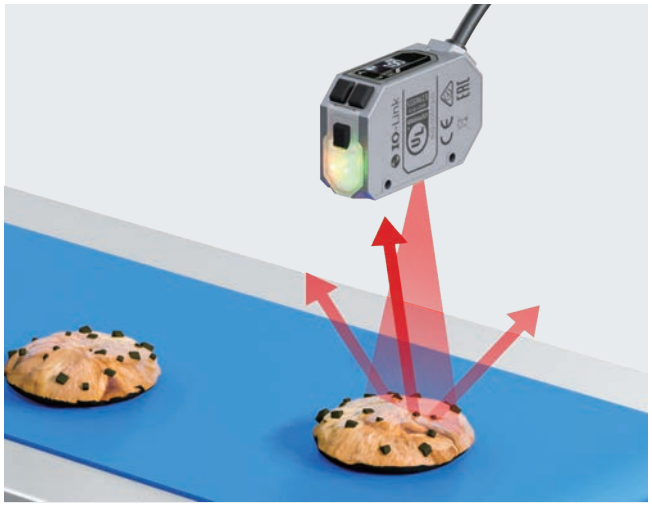
Reliable detection of difficult workpieces helps reduce equipment design and commissioning time

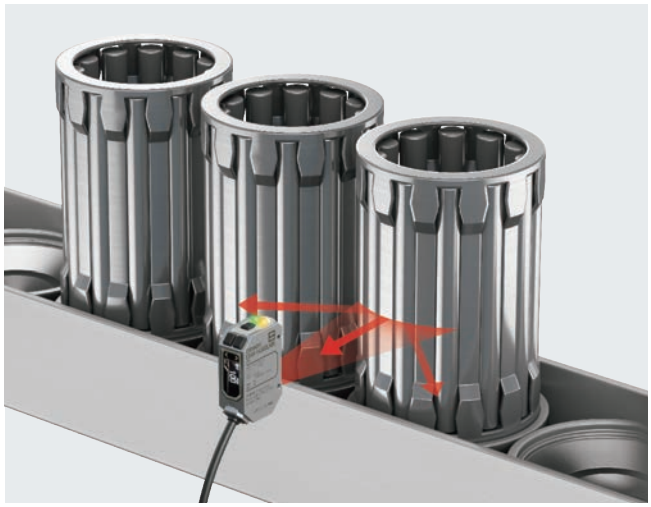
IO-Link ECOLAB

E3AS-HL changes the “way of using” reflective photoelectric sensors

In order to satisfy various consumers' needs, products have become more diversified, and got shorter life cycles. As a result of advanced equipment and shortage of skilled workers, quick equipment design and stable operation are critical issues at manufacturing sites. OMRON’s E3AS-HL offers new ways of using reflective photoelectric sensors to reduce equipment commissioning time.

Complex-shaped, colored, patterned, or glossy surfaces can be detected

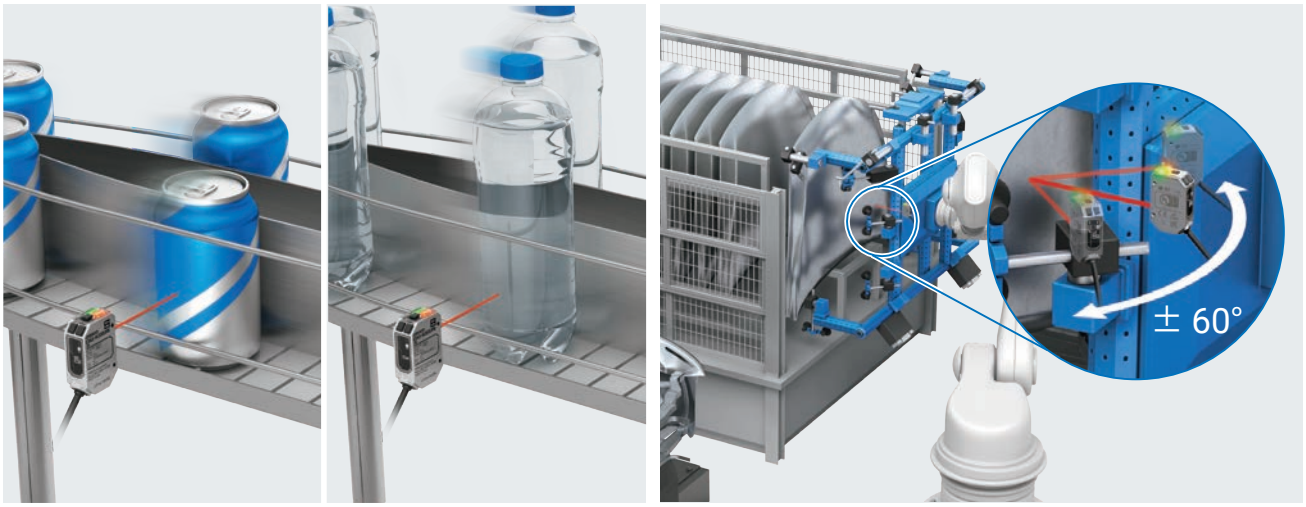




Design, Commissioning

Stable detection for variable workpiece eliminates the need for redesign P.4

Flexible to design with no need for reflectors



Design, Commissioning

Compact body overcomes space limitations, increasing design flexibility P.6

Easy to commission and maintain with no reliance on people's skills

Commissioning

Teaching enables easy, quick, and optimal setting P.8

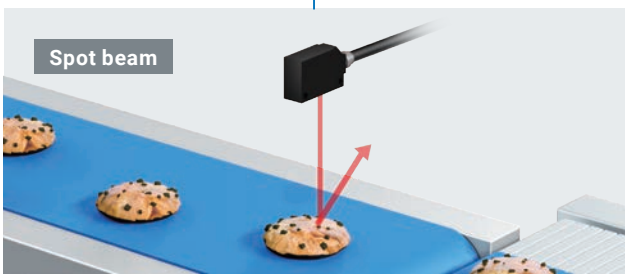
Maintenance

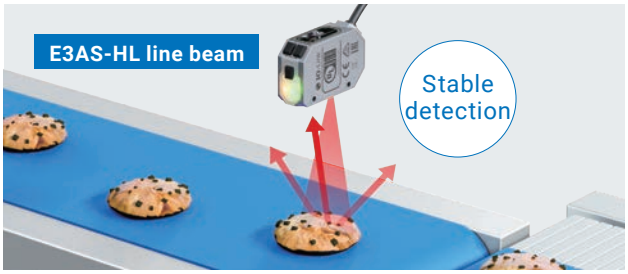
Enhanced environmental resistance reduces line downtime and maintenance frequency P.10

Stable detection for variable workpieces eliminates the need for redesign

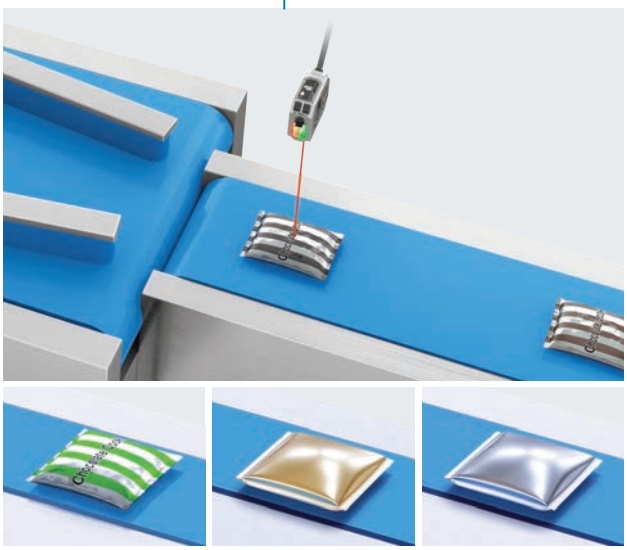
Conventional sensors have to be selected each time the shape, color, pattern, or reflectivity of the workpiece changes, so the equipment sometimes need to be redesigned. The E3AS-HL can detect workpieces without being significantly affected by variable shapes, colors, and materials, saving redesign time.

E3AS-HL for complex-shaped, colored, patterned, or glossy workpieces

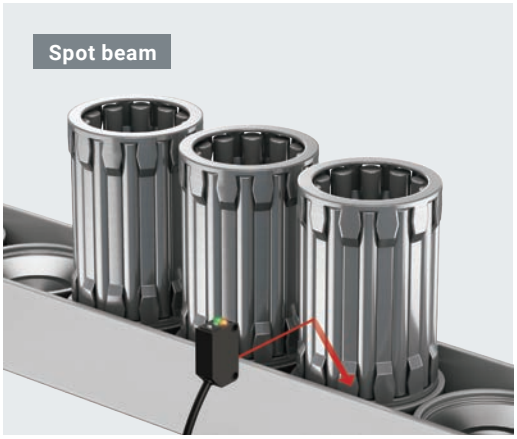




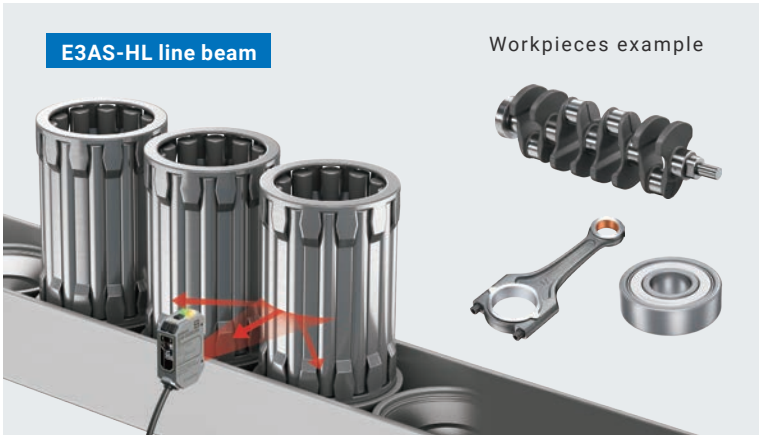
With spot beam, detection is unstable since the reflected light does not reach the sensor depending on the profile of the workpiece surface. With the line beam of the E3AS-HL Sensor, detection is less affected by the profile of the surface since the reflected light reaches the sensor from any part of the surface.



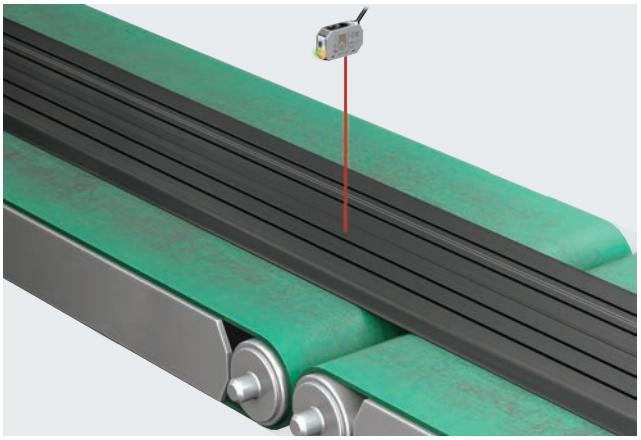
Detection is prone to be unstable because color, pattern, or reflectivity affects the sensing distance. The E3AS-HL Sensor is less likely to be affected by them, providing stable detection even when packaging materials change.



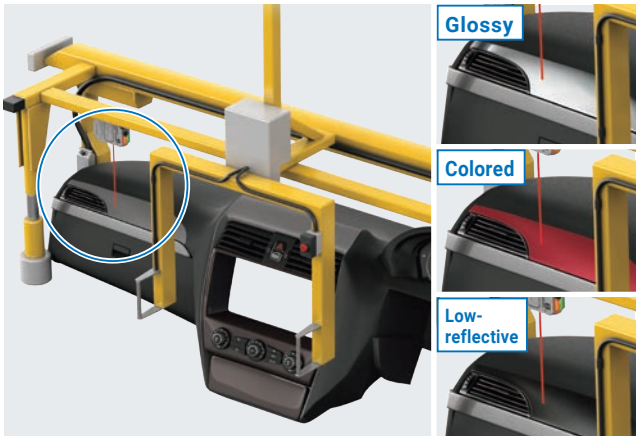
With spot beam, detection is unstable since the reflected light does not reach the sensor depending on the profile of the surface.



With the line beam of the E3AS-HL Sensor, detection is less affected by the profile of the surface since the reflected light reaches the sensor from any part of the surface. Glossy objects such as oily metal workpieces also hardly affect detection.



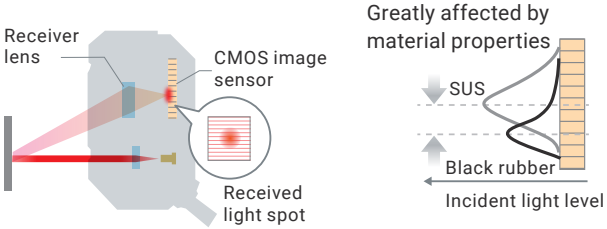
Level differences between low-reflective thin workpieces and the background sometimes cannot be detected. E3AS-HL Sensors, hardly affected by material type or color, can detect level differences.



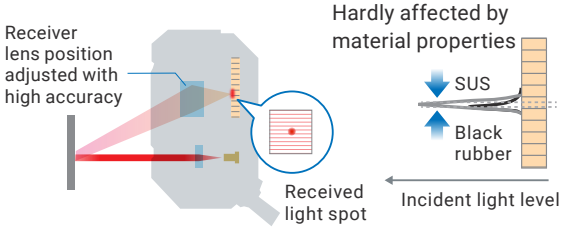
Detection is prone to be unstable because the sensing distance varies depending on the workpiece material and color. E3AS-HL Sensors, hardly affected by material type or color, requires no adjustment for each workpiece.

CMOS sensing with built-in lens alignment technology minimizes the influence of material properties PATENT PENDING *1

From Material properties greatly affect the detection due to blurred received light spot on CMOS as a result of low position adjustment accuracy of the receiver lens.



To Material properties hardly affect the detection since the receiver lens position is automatically adjusted to the micrometer level to minimize the received light spot.

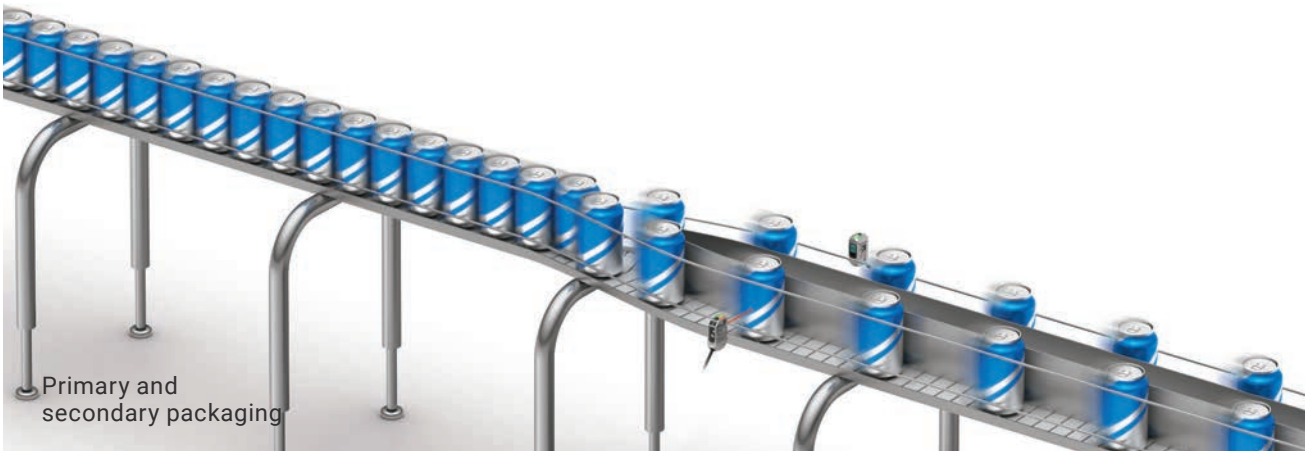


*1. "PATENT PENDING" means that we applied for a patent in Japan. (As of February 2024)

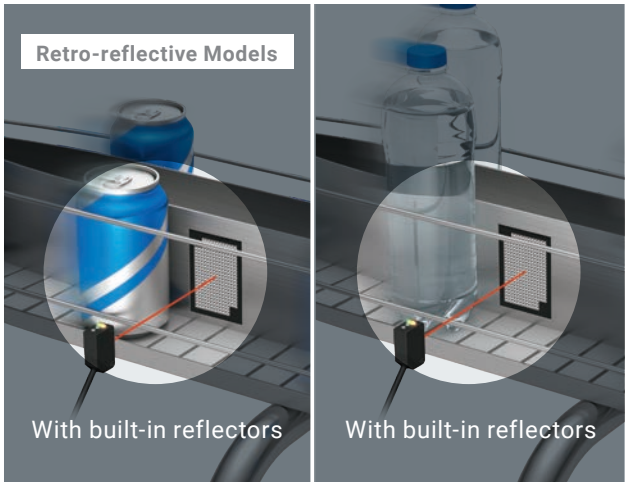
Overcomes space limitations, increasing design flexibility

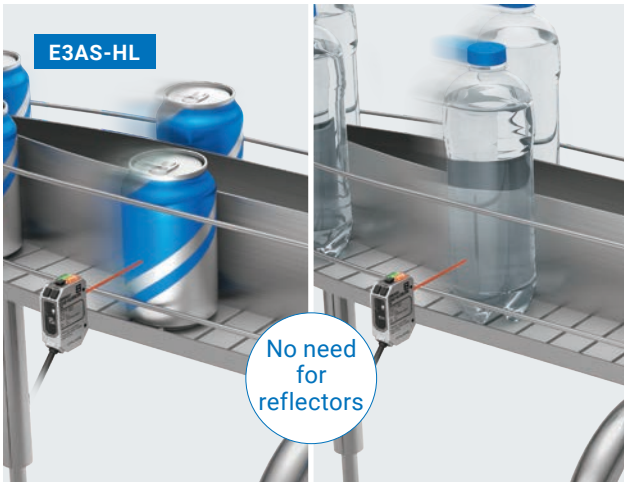
Retro-reflective sensors are used to detect difficult workpieces or where long sensing distance is needed. Designing with retro-reflective sensors is time consuming due to installation space constraints as the equipment gets sophisticated and complex. On the other hand, the E3AS-HL allows for designing without reflectors.

E3AS-HL for multi-lane conveyor lines of workpieces with curved surface



Stably detects cans and plastic bottles without reflectors





Retro-reflective sensors are used to detect poorly reflective curved surfaces of cans and transparent plastic bottles, but securing installation space for reflectors on multi-lane conveyor lines is difficult.

The E3AS-HL Sensor, a reflective model capable of detecting the slightest change in the incident light level or distance, can stably detect cans and plastic bottles without reflectors.

Background Reference Teaching (sensitive) for easy setup of transparent object detection PATENT PENDING *1

Previously, the setup of sensors for transparent objects required the experience and finesse of skilled workers, but it can now be done with just the press of a button. The E3AS-HL Sensor detects presence of workpieces from the variation (correlation) of background distance information and incident light level information.

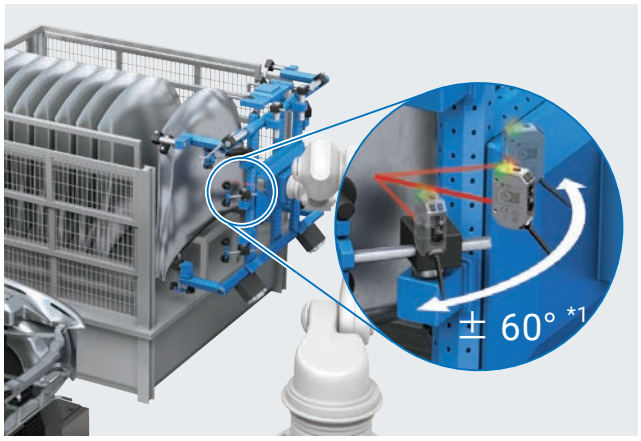
1. Correlation is 100% without a workpiece in place.

Without workpiece
(Correlation is 100%)

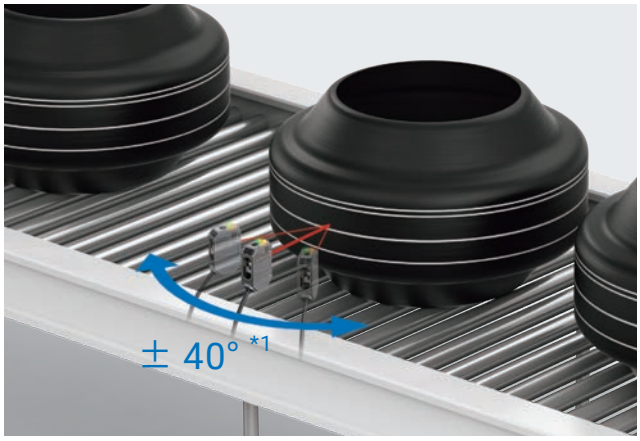
2. A transparent object (e.g., glass or plastic bottle) passing through is detected as the correlation with the background changes.

With workpiece
(Example: Correlation is 40%)

*1. "PATENT PENDING" means that we applied for a patent in Japan. (As of February 2024)

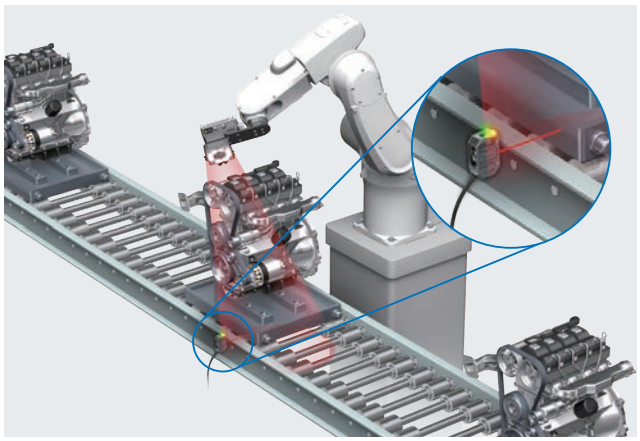


Curved surfaces of metal workpieces tend to affect detection, and it is time consuming to design the mounting angle. E3AS-HL Sensors can be mounted at a wide angle, making setup easy.



Curved surfaces of low-reflective workpieces tend to affect detection, and it is time consuming to design the mounting angle. E3AS-HL Sensors can be mounted at a wide angle, making setup easy.

Interference with other sensors must be considered during design. E3AS-HL Sensors prevent mutual interference between up to 4 sensors, allowing close installation for applications like item identification from hole positions.



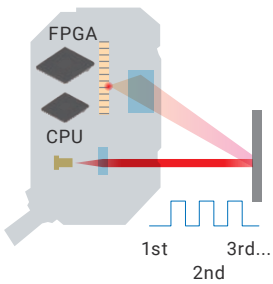
Effects of lights for cameras and sunlight must be considered during design. E3AS-HL Sensors can be operated under ambient illumination of 20,000 lx, which reaches the best in class level *2. This allows you to install the sensors in the vicinity of lights.

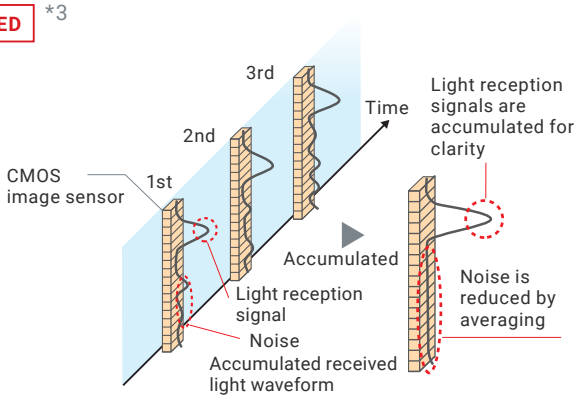
Sensing algorithm detects minimal reflected light from curved surface

Industry First *2 PATENTED *3

E3AS-HL Sensors equipped with FPGA use the industry-first sensing algorithm to perform high-speed sampling of received light waveforms at 10,000 times per second and OMRON's unique accumulation processing, significantly increasing its sensitivity. They amplify the slightest amount of light to stably detect workpieces with glossy or uneven surfaces, complex shaped workpieces, or other workpieces from which it is difficult to receive reflected light.

Note: Not applicable to transparent objects.





*1. The reference values were measured using the OMRON standard sensing object.
*2. Based on OMRON investigation in September 2019.
*3. "PATENT PENDING" means that we applied for a patent in Japan, and "PATENTED" means that we obtained a patent in Japan. (As of February 2024)

Teaching enables easy, quick, and optimal setting

E3AS-HL allow virtually anyone to easily set optimal settings using the teaching method, eliminating rework due to problems during commissioning. Moreover, easy-to-standardize operability makes remote work instructions simple.

Single teach button prevents inconsistent settings

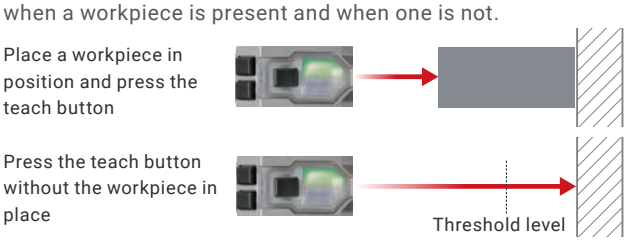
Easily and consistently set the optimal threshold level using the teach button

Background teaching

Set the threshold level at a point before the background (reference surface).

Two-point teaching

Set the threshold level at a value halfway between that when a workpiece is present and when one is not.



Key locking

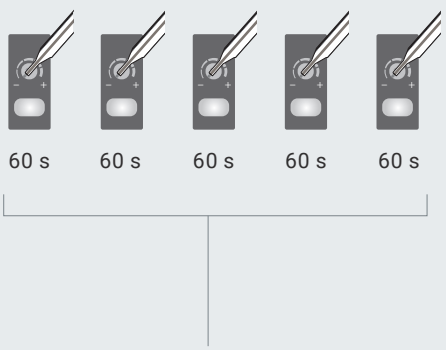
The key locking function prevents malfunction after setting.

Fast and easy setup also when setting a large number of sensors

Sensitivity adjustment using the conventional adjuster method requires experience, finesse as well as time since the threshold level must be adjusted one unit at a time.
With the E3AS-HL, just press the teach button to automatically set the threshold level, enabling fast and easy setting.

Adjuster method

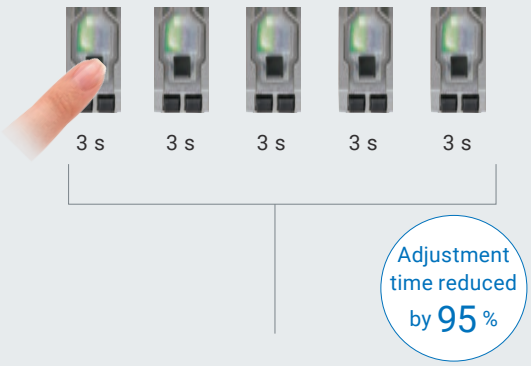
The adjuster must be turned to the left and right with a screwdriver for each and every unit because sensitivity differs depending on the installation location.



60 s x 5 units = 300 s in total

Teaching method (E3AS)

Setup can be completed by simply pressing the teach button on each sensor unit for 3 seconds.

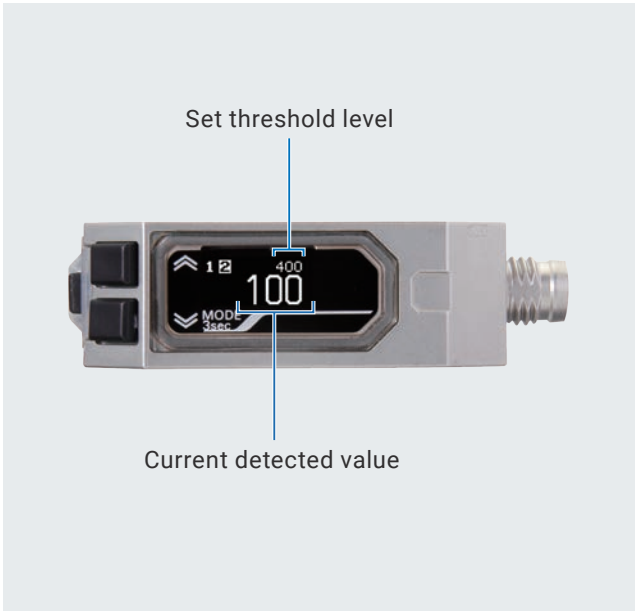


3 s x 5 units = 15 s in total

Easy-to-read, easy-to-understand OLED display

Threshold level and detected value display on the same screen makes threshold level setting easy. Moreover, wide viewing angle and display inverting allow on-site workers to easily see the display.

Detected value and threshold level at a glance



Detection display switching based on purpose

Bar display to grasp detection margin at a glance

ON/OFF display to easily check control output status

Easy-to-read setup menu display

Wide viewing angle allows reading from an angle

Invert display depending on sensor installation orientation

Inverting: Disabled

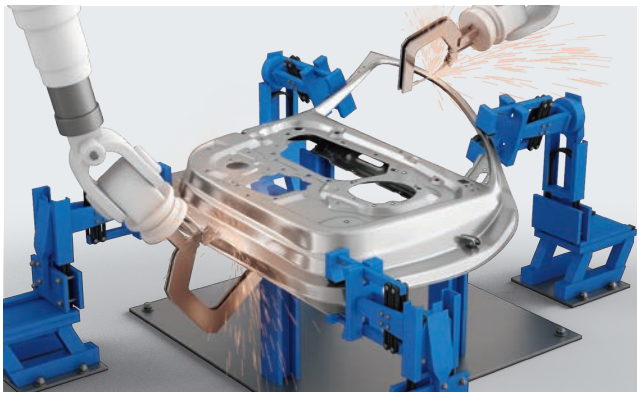
Inverting: Enabled

Enhanced environmental resistance reduces line downtime and maintenance frequency

When a sensor malfunction due to the environment causes a line stoppage during mass production, it can take a long time to restart. With enhanced environmental resistance, the E3AS-HL will be realized minimize line downtime and maximize uptime.

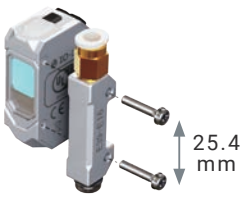
Front protection cover reduces sensor failures

Welding spatter on the sensing surface or collision during operation can cause a sensor failure, and the sensor sometimes need to be replaced. Mounting the front protection cover prevents sensor failures. When any problems occur with the front protection cover, just replace it. There is no need to replace the sensor and rewire it.

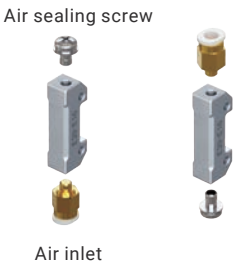


Air blow unit reduces the frequency of false detections PATENTED *1

Using an air blow unit greatly reduces the frequency of false detections since it prevents the sensing surface of sensors installed in confined, difficult to clean locations from becoming contaminated. It can be mounted to any photoelectric sensor with a 25.4 mm mounting hole pitch as well as the E3AS Sensors.



The air blow unit can be mounted on either side of any photoelectric sensor with a 25.4 mm mounting hole pitch



Air inlet position can be inverted

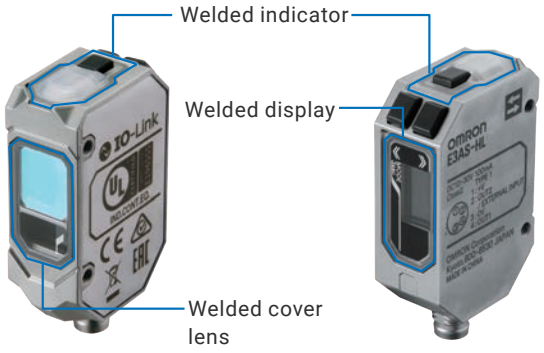
Unique case design reduces the frequency of replacements caused by failure

The sensor case is made of stainless steel (SUS316L). OMRON's unique laser welding technology for different materials enhances the sealing and adhesion between the stainless steel and resin.

IP69K
High temperatures/high water pressure

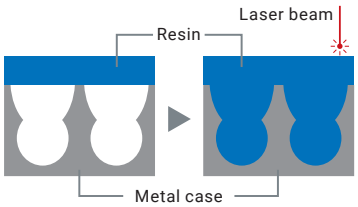
IP67G
Oil resistance

ECOLAB
Detergent resistance



Laser welding technology for different materials PATENTED *1

It is a technology to weld different materials, resin and metal, using laser beams. Tiny holes are bored into the metal case, then the resin part is melted in by a laser for secure sealing and adhesion.



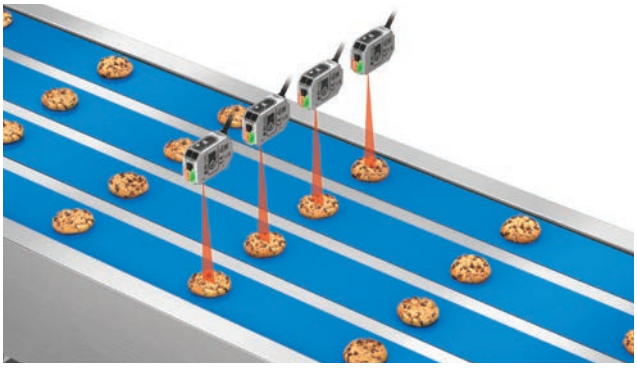
False detections due to environmental changes can be prevented

False detection may occur due to the effects of lights for vision sensors or nearby sensors after the production line layout is changed.
E3AS-HL Sensors can be operated in high ambient illumination conditions and have the mutual interference prevention function, reducing the frequency of false detections.

Operation under high ambient illumination

E3AS-HL Sensors can be operated under ambient illumination of 20,000 lx, which reaches the best in class level*2, preventing malfunctions caused by camera lights or sunlight.

Mutual interference prevention

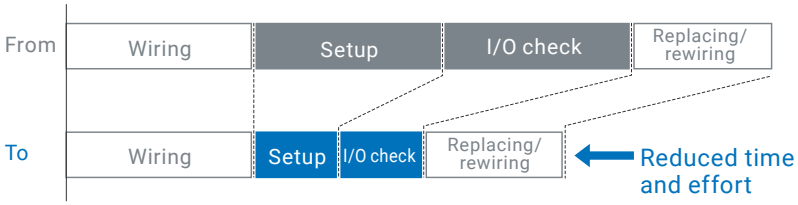


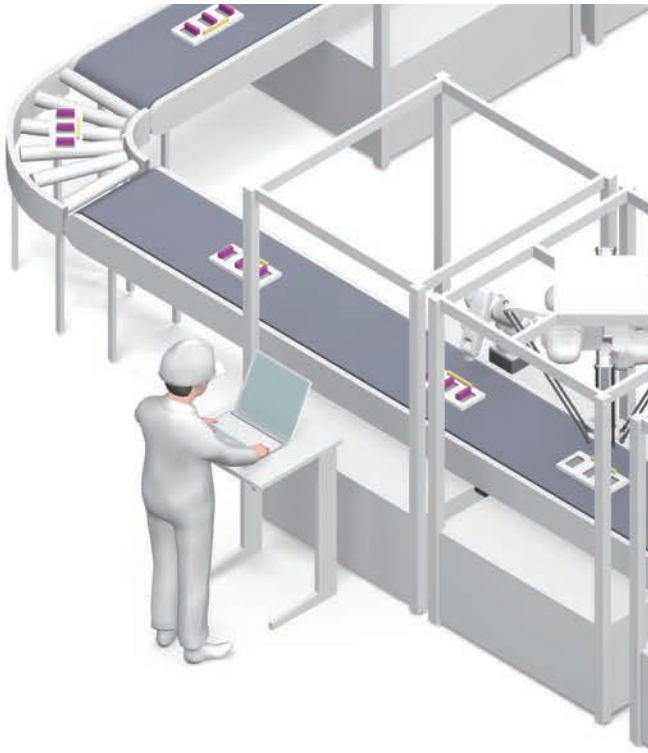
The mutual interference prevention function covers up to 4 units, allowing for false detections occurring upon sensor addition to be quickly resolved.

*1. "PATENTED" means that we obtained a patent in Japan. (As of February 2024)
*2. Based on OMRON investigation in September 2020.

Line commissioning and maintenance with less people in less time with IO-Link

With IO-Link, reduce commissioning time by batch-setting the sensors and cut troubleshooting time during mass production by utilizing field data.



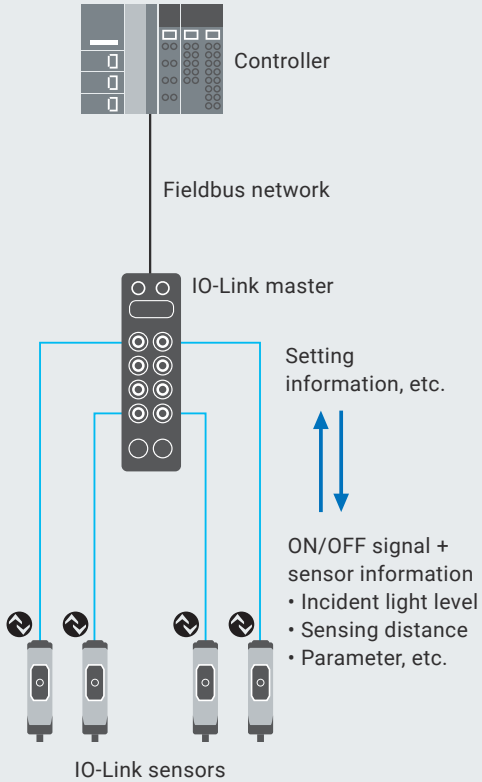


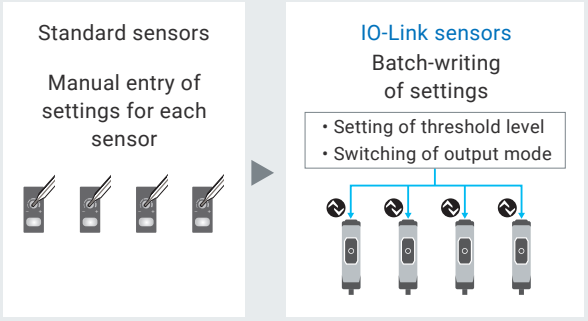
Reduce commissioning time by batch-writing settings from IO-Link device configuration tool

Setting information can be batch-written to thousands of sensors on a line, effectively reducing commissioning time and inconsistent settings.

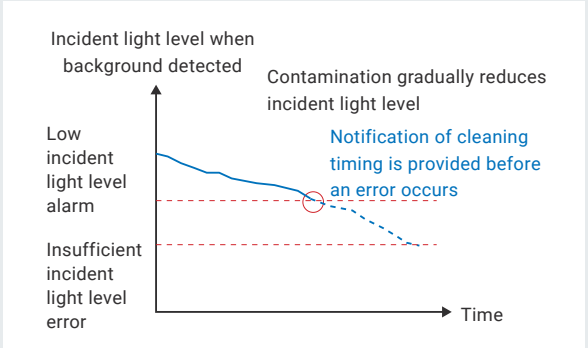
Predictive monitoring and quick recovery by checking and monitoring sensor data

The monitor shows light intensity decrease due to sensing surface contamination or other reason, allowing users to take proactive actions to prevent potential false detections. This reduces the frequency of unexpected failures.





Batch-writing



Sensor data checking and monitoring

(Example) Incident light level output function

Model lineup

	E3AS-HL
Appearance	
Case	SUS316L
Sensing distance	35 to 500 mm 35 to 150 mm
Standard detectable difference (mm)/ differential travel (%)	35 to 50 mm: 1 mm 50 to 100 mm: 2 mm 100 to 150 mm: 4 mm (E3AS-HL150: When response time is 10 ms)
Setting method of threshold level	Teaching method/ Manual operation
OLED display	✓
Antifouling coating	✓
Mutual interference prevention function	Up to 4 units
Degree of protection	IP67/69K/67G/Ecolab

Accessories enhance sensor usability

The E3AS-HL comes with a lineup of accessories that shorten sensor adjustment time upon commissioning and reduce the frequency of false detections during production.
They can be used with non-E3AS-HL with a standard mounting hole pitch of 25.4 mm as well.

*1

Flexible Mounting Bracket

Optical axis can be adjusted in three directions: vertical, horizontal, and angular.

*1

Air Blow Unit

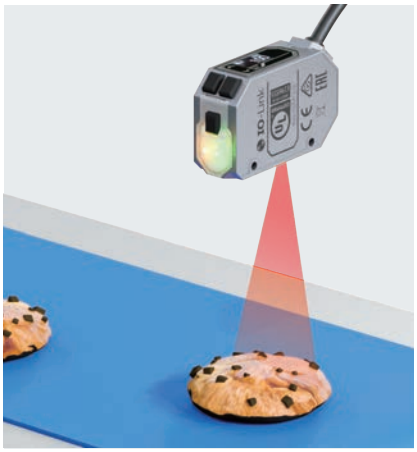
Blows paper dust and cleaning solutions off the sensing surface.

Front Protection Cover

Protects sensing surfaces from collisions with workpieces, containers, and pallets.

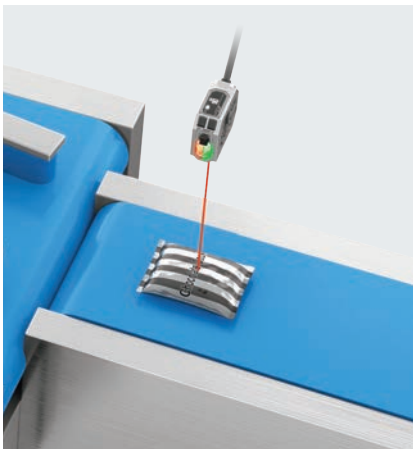
*1. “PATENTED” means that we obtained a patent in Japan. (As of February 2024)
Note: For details on ratings and specifications, refer to the *Ratings and Specifications* in this catalog.

Applications and target workpieces

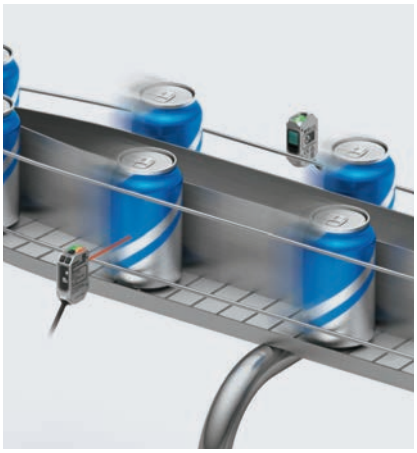


Presence detection of cookies

Presence detection of pizzas

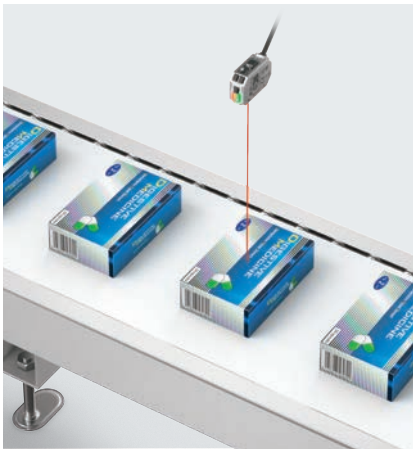


Presence detection of packaged workpieces

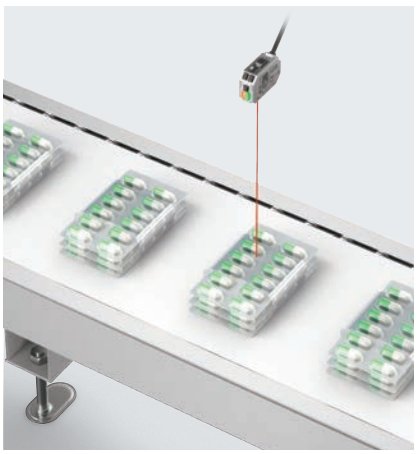


Presence detection of cans

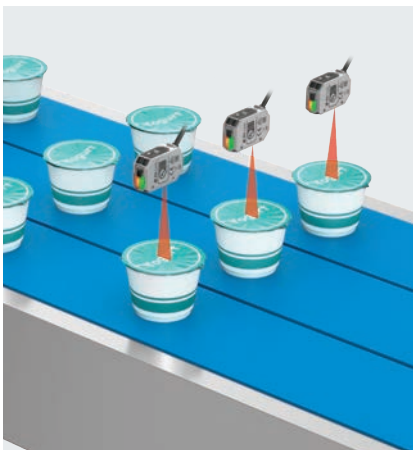
Presence detection of plastic bottles



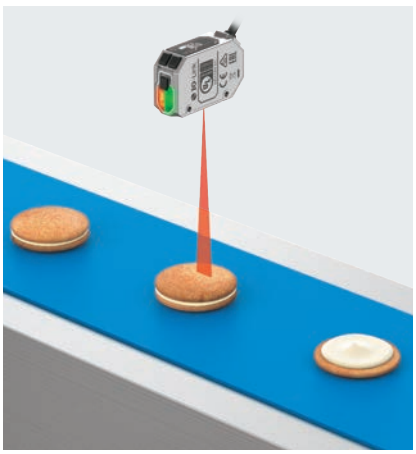
Presence detection of pharmaceutical packages



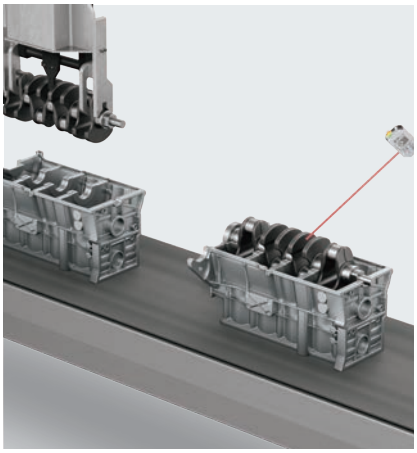
Detection of the number of tablet sheets



Presence detection of cups

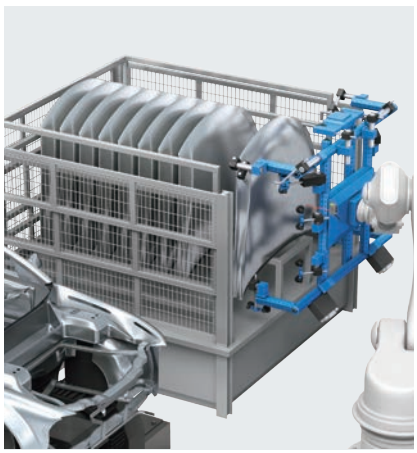


Detection of the number of cookies



Presence detection of crankshafts

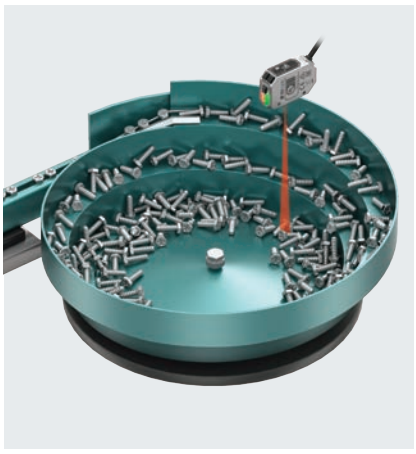
Presence detection of needle bearings



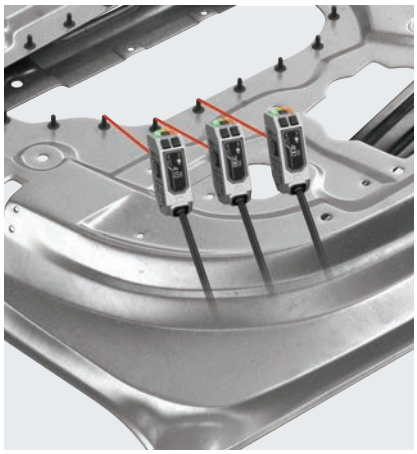
Presence detection of hoods

Parts identification using hole positions

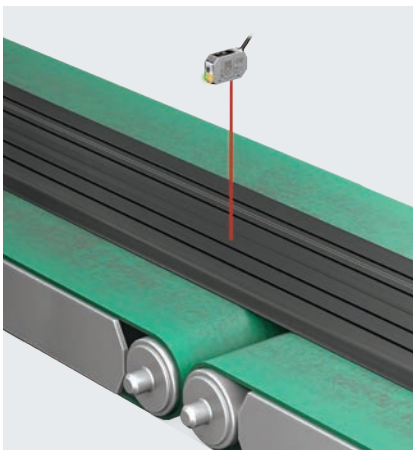
Presence detection of bumpers



Detection of remaining quantities of workpieces in parts feeder



Presence detection of pins



Presence detection of tires before building

Presence detection of green tires

MEMO

Distance-settable Photoelectric Sensors
E3AS-HL

E3AS-HL changes the “way of using” reflective photoelectric sensors

- Complete lineup of photoelectric sensors for various applications
- Teaching method allows anyone to set optimal threshold values
- Antifouling coating prevents contamination on the sensing surface
- Ecolab certified in addition to IP67/69K/67G protection
- All models with IO-Link connectivity (NPN type excluded)

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

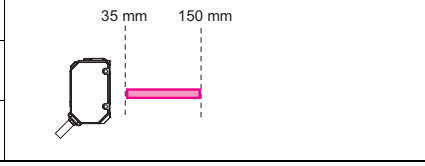
⚠ Refer to *Safety Precautions* on page 28.

Table of Contents

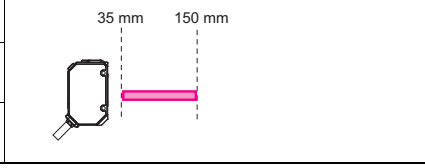
Ordering Information

Line beam type [Refer to *Dimensions* on page 30]

Red light

Connection method	Sensing distance (white paper)	Output	Model	
			NPN output	PNP output
		IO-Link baud rate	---	COM3 (230.4 kbps) *3
Pre-wired (2 m) *1			E3AS-HL500LMN 2M	E3AS-HL500LMT 2M
M8 Connector			E3AS-HL500LMN M3	E3AS-HL500LMT M3
M12 Pre-wired Smartclick Connector (0.3m) *2			E3AS-HL500LMN-M1TJ 0.3M	E3AS-HL500LMT-M1TJ 0.3M
Pre-wired (2 m) *1			E3AS-HL150LMN 2M	E3AS-HL150LMT 2M
M8 Connector			E3AS-HL150LMN M3	E3AS-HL150LMT M3
M12 Pre-wired Smartclick Connector (0.3m) *2			E3AS-HL150LMN-M1TJ 0.3M	E3AS-HL150LMT-M1TJ 0.3M

Spot type [Refer to *Dimensions* on page 30]

Connection method	Sensing distance (white paper)	Output	Model	
			NPN output	PNP output
		IO-Link baud rate	---	COM3 (230.4 kbps)
Pre-wired (2 m) *1			E3AS-HL500MN 2M	E3AS-HL500MT 2M
M8 Connector			E3AS-HL500MN M3	E3AS-HL500MT M3
M12 Pre-wired Smartclick Connector (0.3m) *2			E3AS-HL500MN-M1TJ 0.3M	E3AS-HL500MT-M1TJ 0.3M
Pre-wired (2 m) *1			E3AS-HL150MN 2M	E3AS-HL150MT 2M
M8 Connector			E3AS-HL150MN M3	E3AS-HL150MT M3
M12 Pre-wired Smartclick Connector (0.3m) *2			E3AS-HL150MN-M1TJ 0.3M	E3AS-HL150MT-M1TJ 0.3M

✻1. Models with 5-m cable length are also available with “5M” suffix. (Example: E3AS-HL500LMN 5M/E3AS-HL500MN 5M)
✻2. M8 Pre-wired Connector Models are also availavble. When ordering, add "-M3J 0.3M" to the end of the model number (e.g., E3AS-HL500LMN-M3J 0.3M/E3AS-HL500MN-M3J 0.3M).

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. It must be ordered separately as required.

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 robot cable	4 dia.	Straight	2	**XS3F-M421-402-R**
				5	**XS3F-M421-405-R**
Right-angle type 			Right-angle	2	**XS3F-M422-402-R**
				5	**XS3F-M422-405-R**

Note: 1. The XS3W (Socket and Plug on Cable Ends), Cable length 1m and 10m is also available. Refer to *XS3 Series Datasheet* (Cat. No. G147).
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

A Mounting Bracket is not enclosed with the Sensor. Order a Mounting Bracket separately if required.

[Refer to *Dimensions* on page 31]

Appearance	Model (material)	Pre-wired	M12 Pre-wired Smartclick Connector	M8 Connector
L-shaped Mounting Bracket 	E39-L221 (SUS304)	Yes	Yes	---
Horizontal Protective Cover Bracket 	E39-L222 (SUS304)	Yes	Yes	---
Rear Mounting Bracket 	E39-L223 (SUS304)	Yes	Yes	Yes *2
Robust Mounting Bracket 	E39-L224 (SUS304)	Yes	Yes	---
L-shaped Mounting Bracket 	E39-L231 (SUS304)	--- *1	--- *1	Yes *3
Horizontal Protective Cover Bracket 	E39-L232 (SUS304)	--- *1	--- *1	Yes *3
Robust Mounting Bracket 	E39-L234 (SUS304)	--- *1	--- *1	Yes *3
Front Protection Cover 	E39-E19	Yes	Yes	Yes

✻1. Can be used for Pre-wired 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.

A Mounting Bracket is not enclosed with the Sensor. Order a Mounting Bracket separately if required.
[Refer to *Dimensions* on page 35]

Appearance	Model (material)	Pre-wired	M12 Pre-wired Smartclick Connector	M8 Connector
Flexible Mounting Bracket 	**E39-L261 *1 (SUS304)**	Yes	Yes	Yes
Post 50 mm 	**E39-L262**	Yes	Yes	Yes
Post 100 mm 	**E39-L263**	Yes	Yes	Yes
Air Blow Unit 	**E39-E16 *2**	Yes	Yes	Yes

✻1. The Flexible Mounting Bracket is not provided with a Post (E39-L262/E39-L263). It must be ordered separately.
✻2. The tube for air is not included.

Ratings and Specifications

Item	Model	Sensing method	Triangulation			
		NPN Output	E3AS-HL500MN	E3AS-HL500LMN	E3AS-HL150MN	E3AS-HL150LMN
		PNP Output/COM3	E3AS-HL500MT	E3AS-HL500LMT	E3AS-HL150MT	E3AS-HL150LMT
Sensing distance *1			35 mm to the set distance		35 mm to the set distance	
Setting range *1			35 to 500 mm		35 to 150 mm	
Standard detectable difference *1			35 to 180 mm: 9 mm 180 to 300 mm: 18 mm 300 to 400 mm: 30 mm 400 to 500 mm: 45 mm at 10 m sec		35 to 50 mm: 1 mm 50 to 100 mm: 2 mm 100 to 150 mm: 4 mm at 10 m sec	
Display minimum unit value			1 mm		0.1 mm	
Spot size (reference value) *2			2.5 mm × 1.5 mm at distance of 500 mm	18 mm × 1.5 mm at distance of 500 mm	2.5 mm × 1.3 mm at distance of 150 mm	8 mm × 1.3 mm at distance of 150 mm
Light source (wavelength)			Red laser (660 nm)			
Laser class			Class 1 (JIS, IEC/EN, FDA, GB/T)			
Power supply voltage			10 to 30 VDC (including 10% ripple (p-p)), Class2			
Current consumption			100 mA max.			
Input/output	Control output		Load power supply voltage 30 VDC max. (Class2), the total load current of the two outputs is 100 mA max. Residual voltage (Load current 10 mA max.: 1 VDC max., Load current 10 to 100 mA: 2 VDC max.) Open-collector output (NPN/PNP output depending on model) N.O. (Normally Open) / N.C. (Normally Close) selectable			
		NPN	OUTPUT 1: NO (Normally open), OUTPUT 2: NC (Normally closed)			
		PNP/COM3	OUTPUT 1: NO (Normally open)/COM□, OUTPUT 2: NC (Normally closed)			
	External input		Laser OFF / Teaching / Zero reset selectable NPN ON time: 0 V short-circuit or 1.5 V or less, OFF time: Power supply voltage short-circuit or open PNP ON time: Power supply voltage short-circuit or within power supply voltage - 1.5 V, OFF time: 0 V short-circuit or open			
Indicators			OLED Display (White), Power/Communication indicator (Green*), Operation indicator (Orange) * IO-Link Communication mode: blinking			
Protection circuits			Power supply reverse polarity protection, Output short-circuit protection, and Output reverse polarity protection			
Response time			1.5 ms / 10 ms / 50 ms selectable			
Threshold setting method			Teaching method / Manual Operations / IO-Link communications			
Mutual interference prevention			4 units max. (when using the mutual interference prevention function)			
Ambient illumination			Receiver surface illuminance: Incandescent lamp: 20,000 lx max., Sunlight: 25,000 lx max. at distance of 250 mm Incandescent lamp: 5,000 lx max., Sunlight: 10,000 lx max. at distance of 500 mm		Receiver surface illuminance: Incandescent lamp: 8,000 lx max., Sunlight: 16,000 lx max.	
Ambient temperature range			Operating: -10 to 50°C, Storage: -25 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 *3 (JIS C 0920 Annex 1), IP69K (ISO20653)			
Connection method			Pre-wired (standard cable length: 2 m), M8 Connector, M12 Pre-wired Smartclick Connector (standard cable length: 0.3m)			
Weight (packed state/ Sensor only)	Pre-wired (2 m)		Approx. 180 g/approx. 110 g			
	M8 Connector		Approx. 120 g/approx. 50 g			
	M12 Pre-wired Smartclick Connector (0.3 m)		Approx. 150 g/approx. 80 g			
Materials	Case		Stainless steel (SUS316L)			
	Lens cover and Display		Methacrylic resin (PMMA) (Lens cover: Antifouling coating)			
	Indicator		Polyamide 11 (PA11)			
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, Restore Factory Settings, Key Lock (Unlock, Lock, Lock (No Button)), monitor output (Detection level, Incident light level)			
IO-Link Communication specifications	IO-Link specification		Ver. 1.1			
	Baud rate		COM3 (230.4 kbps)			
	Data length		PD size: 4 bytes, OD size: 1 byte (M-sequence type: TYPE_2_V)			
	Minimum cycle time		COM3: 1.2 ms			
Accessories			Instruction manual, compliance sheet, index list (attached for IO-Link type only) FDA certification label and Warning label Note: Mounting Brackets must be ordered separately.			

∗1. Measured with OMRON's standard workpiece (White ceramic).

∗2. Defined by D4σ method at the maximum sensing distance. Detection may be influenced if there is light leakage outside the defined region and the surroundings of the target object have a high reflectance in comparison to the target object. Also, when detecting a workpiece that is smaller than the spot size, a correct value may not be obtained.

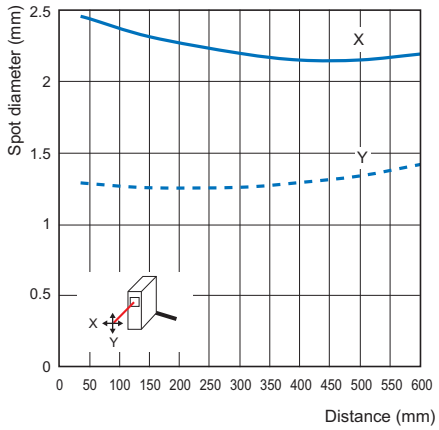
∗3. The IP67G is the degree of protection which is defined according to the JIS (Japanese Industrial Standards).
The IP67 indicates the same level of protection as defined by the IEC, and the G indicates that a device has resistance to oil.

Engineering Data (Reference Value)

Spot Diameter vs. Sensing Distance

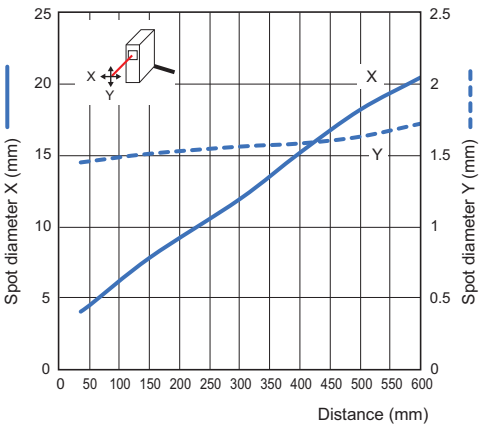
Spot type

E3AS-HL500□
E3AS-HL150□



Line beam type

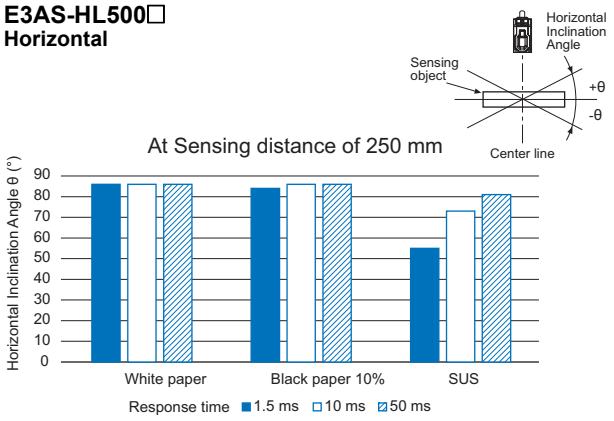
E3AS-HL500L□
E3AS-HL150L□

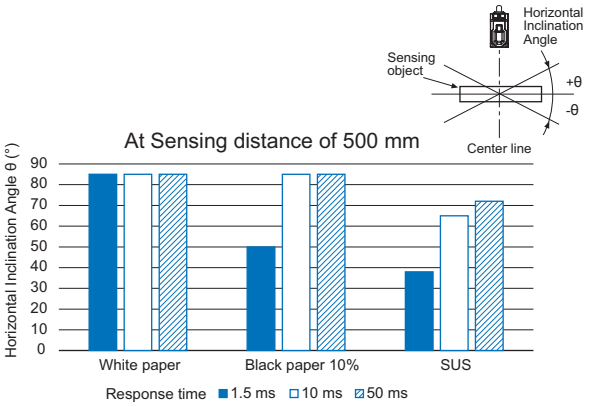


Sensing Object Angle Characteristics

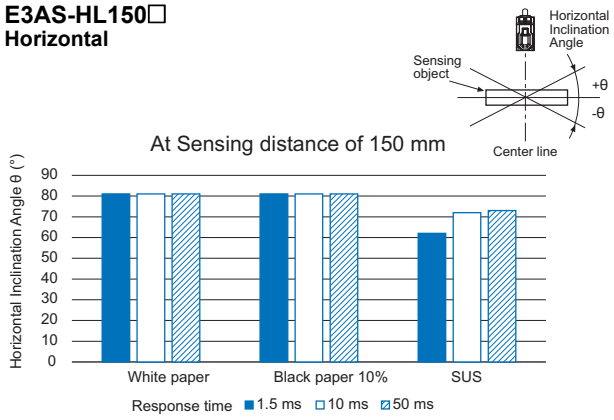
Spot type/Line beam type

E3AS-HL500□
Horizontal





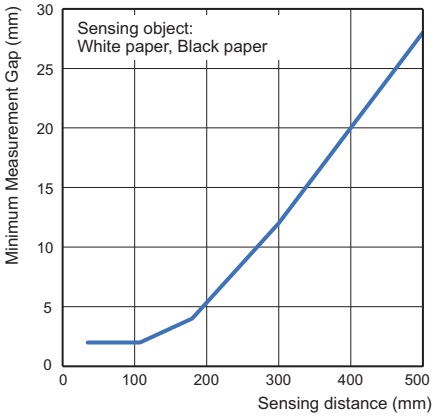
E3AS-HL150□
Horizontal



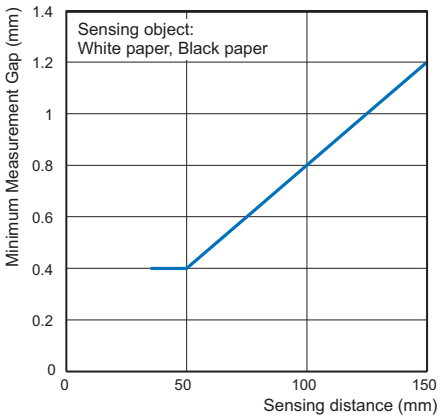
Minimum Measurement Gap Vs. Distance

Spot type/Line beam type

E3AS-HL500□

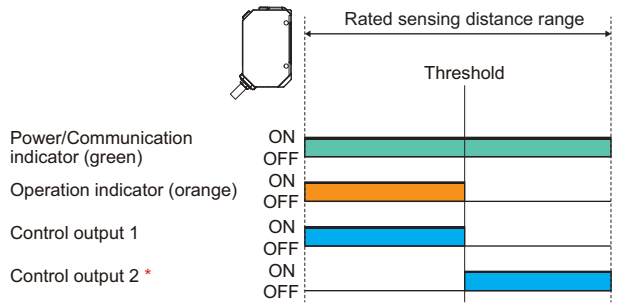
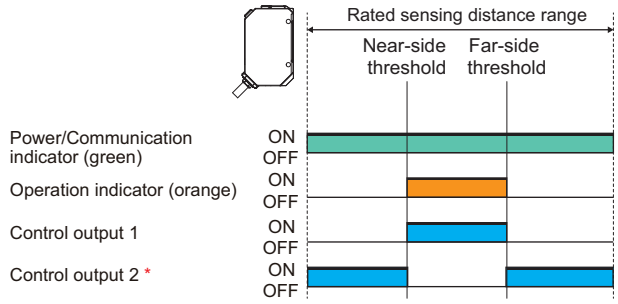
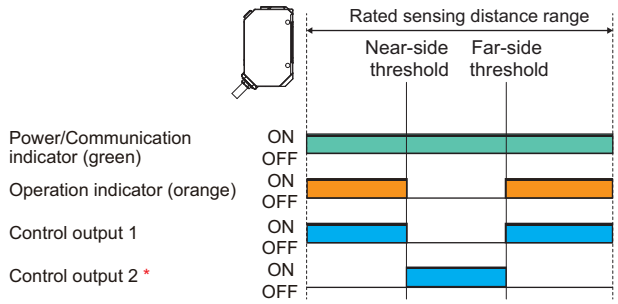
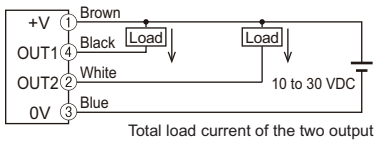
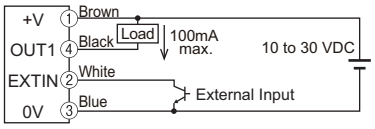


E3AS-HL150□



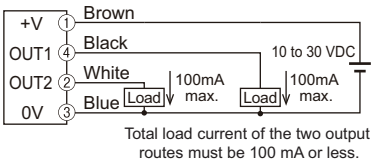
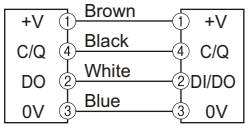
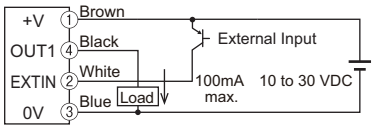
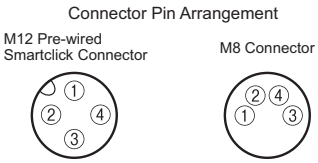
I/O Circuit Diagrams/ Timing Charts

NPN Output

Model	Timing chart	Output circuit
E3AS-HL500□N□ E3AS-HL150□N□	**Single Point Mode [Single]**  **Window BGS mode [Window BGS]**  **Window FGS mode [Window FGS]** 	**Using Pin2 (white wire) as output**  Total load current of the two output routes must be 100 mA or less. **Using Pin2 (white wire) as external input**  **External Input** / **NPN** **ON time**: 0V short-circuit or 1.5V or less **OFF time**: Power supply voltage short-circuit or open Connector Pin Arrangement M12 Pre-wired Smartclick Connector  M8 Connector 

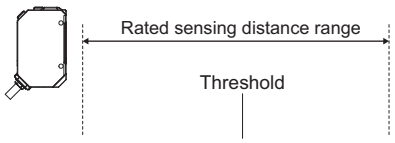
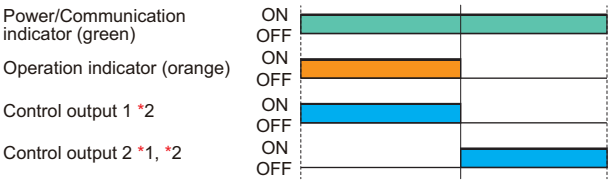
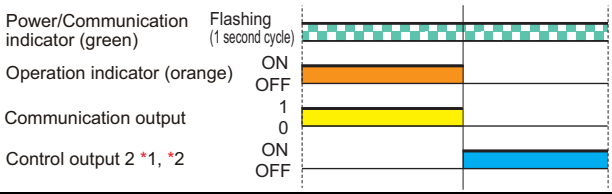
∗The initial value of control output 2 is reverse of control output 1.

PNP Output

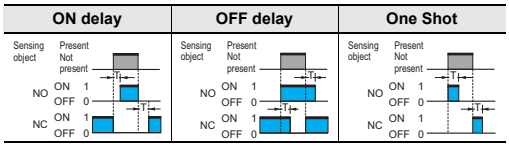
Model	Output circuit	
	Standard I/O mode (SIO mode) *1	IO-Link Communication mode (COM mode) *2
E3AS-HL500□T□ E3AS-HL150□T□	**Using Pin2 (white wire) as output**  Total load current of the two output routes must be 100 mA or less.	**Using Pin2 (white wire) as output**  IO-Link Master
	Using Pin2 (white wire) as external input  **External Input** / **PNP** **ON time**: Power supply voltage short-circuit or within power supply voltage - 1.5V **OFF time**: 0V short-circuit or open	---
	Connector Pin Arrangement  	

*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.

Single Point Mode [Single]

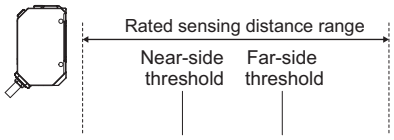
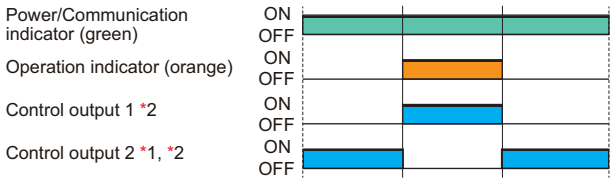
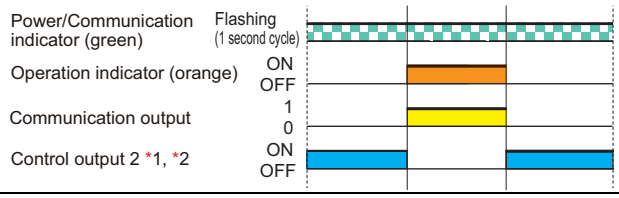
	Timing charts
Output mode	
Standard I/O mode (SIO mode)	
IO-Link Communication mode (COM mode)	

*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).)

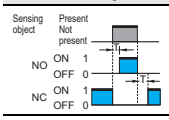
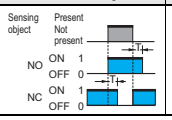
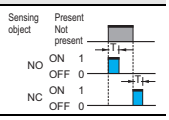


Please contact your OMRON sales representative regarding the IO-Link setup file (IODD file).

Window BGS mode [Window BGS]

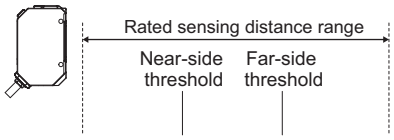
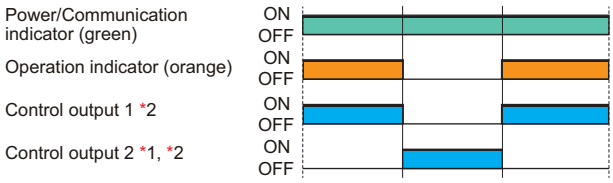
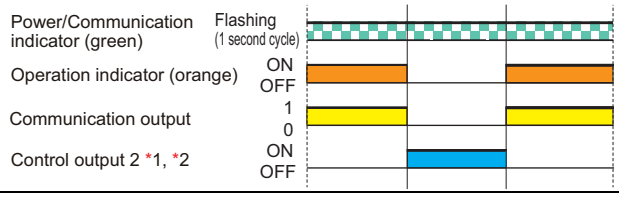
	Timing charts
Output mode	
Standard I/O mode (SIO mode)	
IO-Link Communication mode (COM mode)	

✻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).)

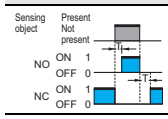
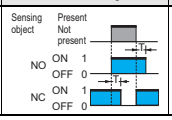
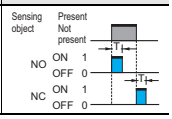
ON delay	OFF delay	One Shot
		

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

Window FGS mode [Window FGS]

	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).)

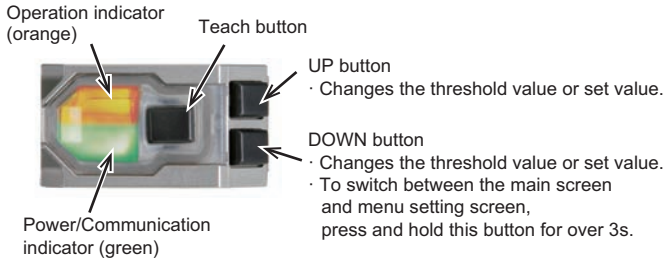
ON delay	OFF delay	One Shot
		

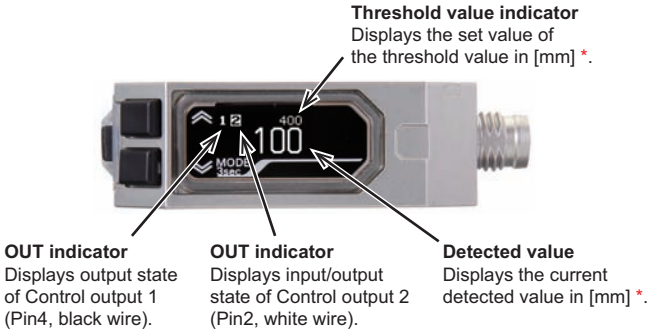
Please contact your OMRON sales representative regarding the IO-Link setup file (IODD file).

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-HL500□
E3AS-HL150□





✻ 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, fire** Indicates the possibility of fires under specific conditions.
	**General caution** Indicates unspecified general alert.
	**Caution, explosion** Indicates the possibility of explosion under specific conditions
	**Laser Caution** Indicates information related to laser safety
	**Disassembly prohibited** Prohibit the disassembly of a device because of the possibility of injuries due to electric shock.

⚠ WARNING

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

Do not use it exceeding the rated voltage. There is a possibility of failure and fire.

⚠ CAUTION

Its component may be damaged and/or degree of protection may be degraded. Please do not apply high pressure water intensively at one place during cleaning.

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.

Do not disassemble this product. Doing so may cause exposure to the built-in light source which can damage eyes and skin. Never disassemble it.

Laser safety measures for laser equipment are stipulated by the country of use. Follow the instructions described below categorized in four cases.

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.

This product is subjected to the U.S. FDA (Food and Drug Administration) laser regulations. This product is classified into Class 1 by the IEC 60825-1:2014 standard according to the regulations of Laser Notice No.56 of the FDA standard. This product is already reported to CDRH (Center for Devices and Radiological Health).

Accession Number: 1920014-001

When using a device equipped with the product in the U.S., attach an FDA certification label near the sensor mounted on customer equipment.

FDA certification label

This laser product complies with 21 CFR 1040. 10 and 1040. 11 except for deviations pursuant to Laser Notice No. 50, dated June 24,2007
OMRON Corporation
Shiokoji Horikawa,Shimogyo-ku,
Kyoto 600-8530 JAPAN
Place of manufacture:
Shanghai Factory,OMRON Corp.
Manufactured in

3. Usage in China

This product is classified into Class 1 by the GB/T 7247.1-2024 (IEC60825-1: 2014) standard.

4. Usage in countries other than U.S. and China

This product is classified into Class 1 by the IEC60825-1: 2014/ EN60825-1: 2014+A11: 2021 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.
7. Do not touch the metal surface with your bare hands when the temperature is low. Touching the surface may result in a cold burn.
8. Burn injury may occur. The product surface temperature rises depending on application conditions, such as the ambient temperature and the power supply voltage. Attention must be paid during operation or cleaning.

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. In case of M12 smartclick connector, manually tighten the connector.
3. Tightening torque for the mounting hole is 0.6 N·m or less (M3 screw).
4. Do not use the product in any atmosphere or environment that exceeds the ratings.
5. 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.
6. Use an extension cable less than 100 m long for Standard I/O mode and less than 20 m for IO-Link Communication mode.
7. Do not pull on the cable with excessive strength.
8. Be sure to turn off the power supply when connecting or disconnecting the cable.
9. Please wait for at least 600 ms after turning on the product's power until it is available for use.
10. Though this is type IP67, do not use in the water, rain or outdoors.
11. 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.
12. Do not use the product in locations subject to direct sunlight.
13. Do not use the product where humidity is high and dew condensation may occur.
14. Do not use the product where corrosive gases may exist.
15. If high-pressure washing water and so on hits the button, it might lead to malfunctioning. So, consider use of the key lock function.
16. 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.
17. Do not use the product at a location subject to shock or vibration.
18. To use a commercially available switching regulator, FG (frame ground) must be grounded.
19. Do not use organic solvents (e.g. paint thinner and alcohol) for cleaning. Otherwise optical properties and protective structure may deteriorate.
20. Be sure to check the influence caused by surrounding environments such as background objects and LED lighting before using the product.
21. Do not exceed 100,000 writing operations of the EEPROM (non-volatile memory). Setting information is written to the EEPROM when a threshold value change, teaching, or zero reset is executed.
22.  Please dispose in accordance with applicable regulations.

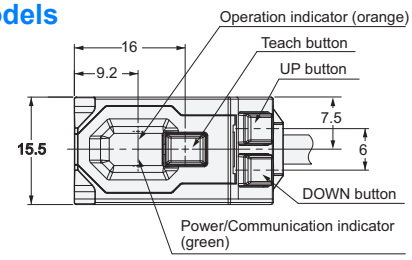
Dimensions

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

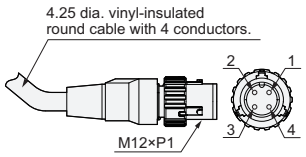
Sensors

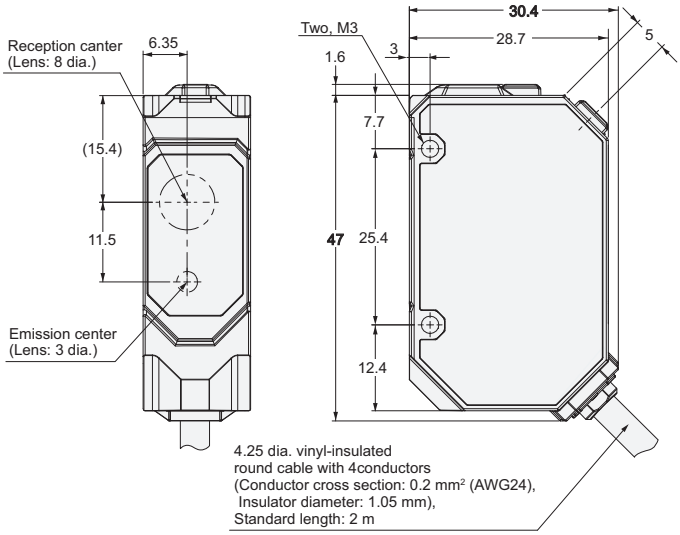
Pre-wired Models/Pre-wired Connector Models

E3AS-HL500☐ (-M1TJ)
E3AS-HL150☐ (-M1TJ)

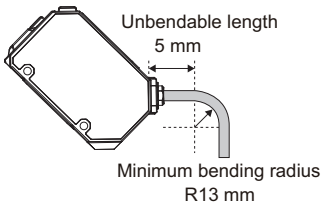


Pre-wired Connector Models
E3AS-HL500☐-M1TJ
E3AS-HL150☐-M1TJ



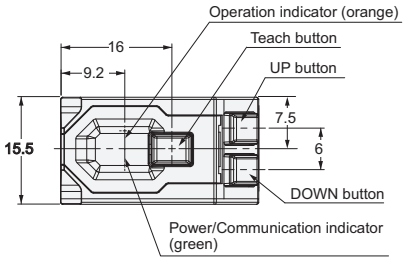


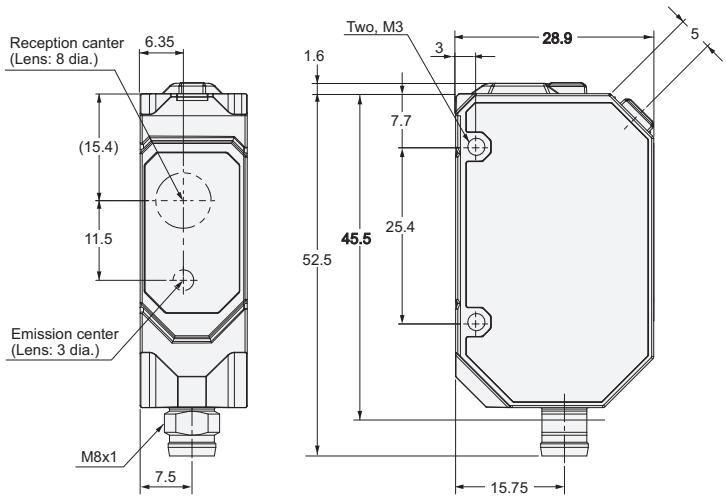
Minimum bending radius/unbendable length of cord



Connector Models

E3AS-HL500☐ M3
E3AS-HL150☐ M3

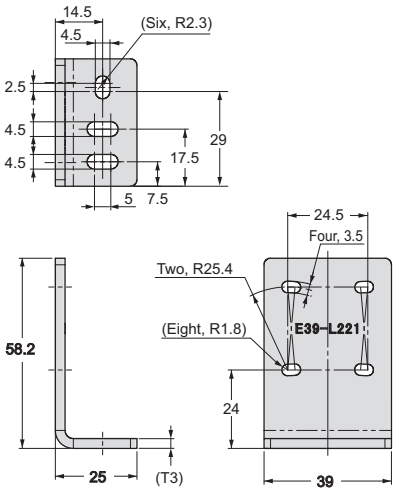




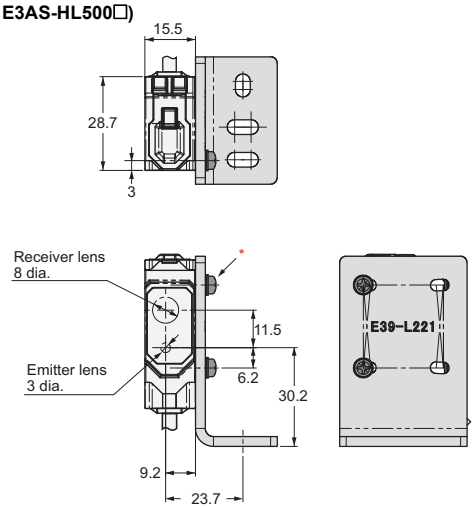
Accessories (Sold Separately)

Mounting Brackets

E39-L221

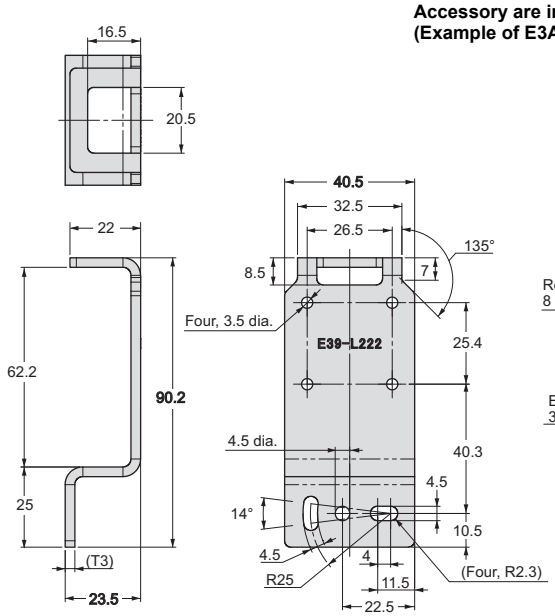


Photoelectric Sensor Accessory are installed (Example of E3AS-HL500☐)

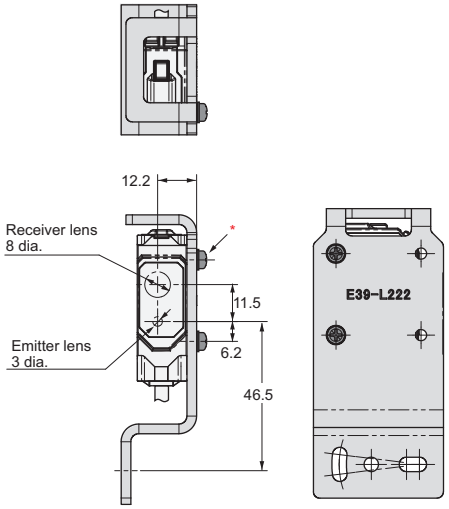


Material: Stainless steel (SUS304)
✻ Accessories
2-M3-L10 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

E39-L222

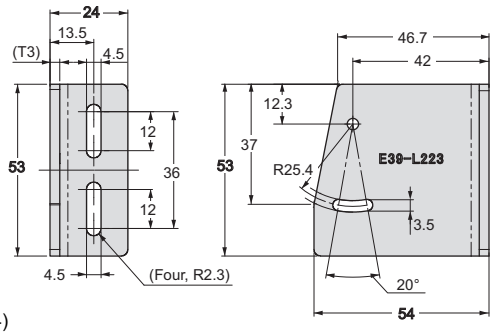


Photoelectric Sensor Accessory are installed (Example of E3AS-HL500☐)

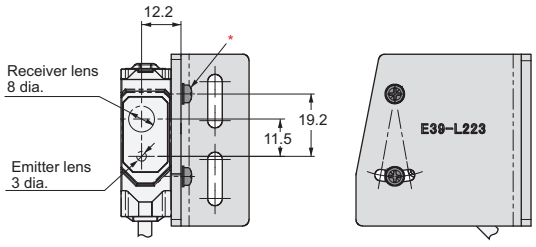


Material: Stainless steel (SUS304)
✻ Accessories
2-M3-L10 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

E39-L223

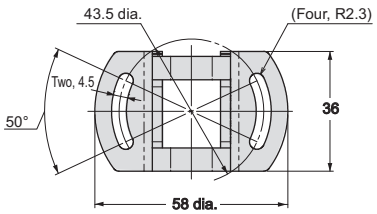


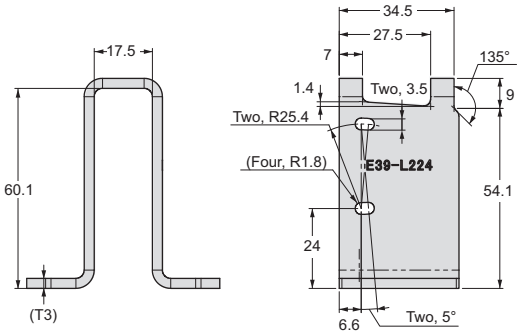
Photoelectric Sensor Accessory are installed (Example of E3AS-HL500☐)



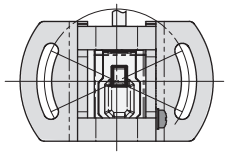
Material: Stainless steel (SUS304)
✻ Accessories
2-M3-L10 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

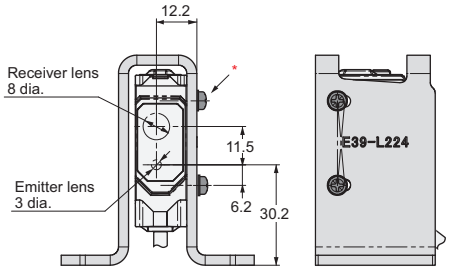
E39-L224





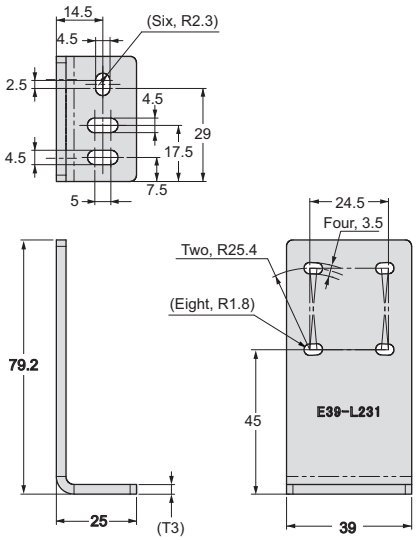
Photoelectric Sensor Accessory are installed (Example of E3AS-HL500□)



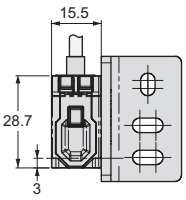


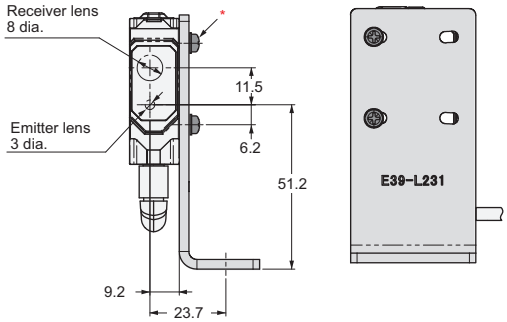
Material: Stainless steel (SUS304)
✻ Accessories
2-M3-L10 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

E39-L231



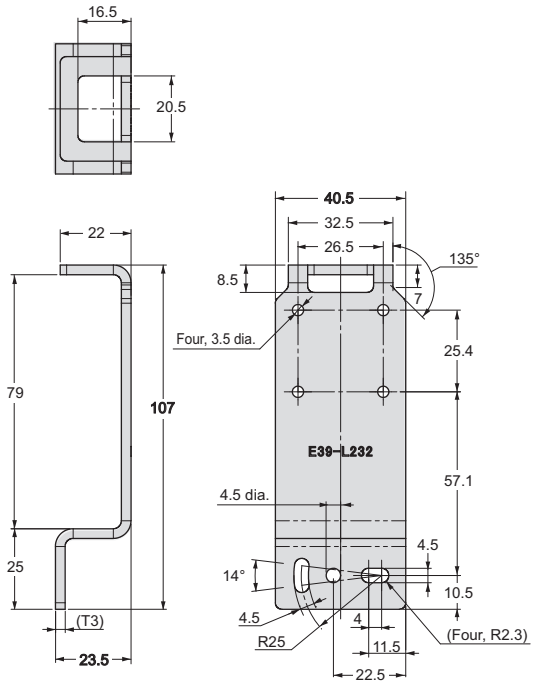
Photoelectric Sensor Accessory are installed (Example of E3AS-HL500□)



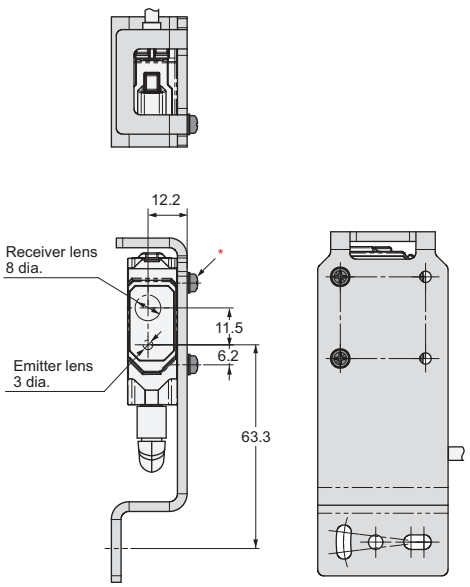


Material: Stainless steel (SUS304)
✻ Accessories
2-M3-L10 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

E39-L232

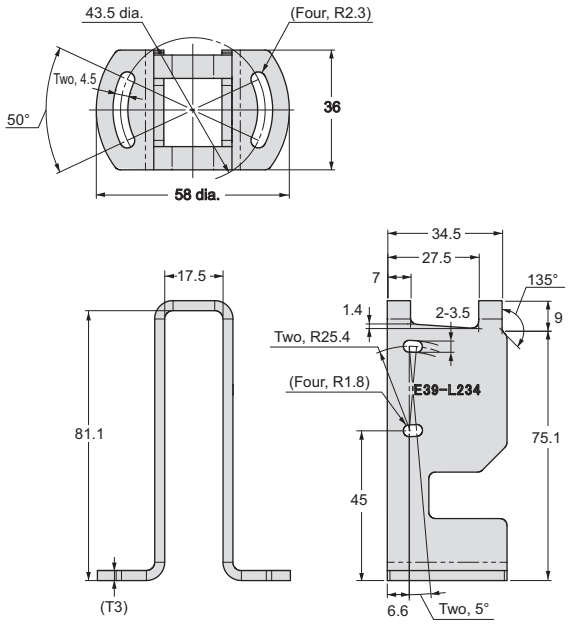


Photoelectric Sensor Accessory are installed (Example of E3AS-HL500☐)

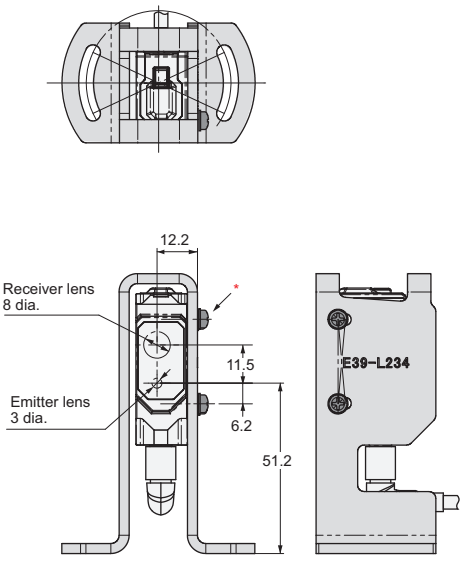


Material: Stainless steel (SUS304)
✻ Accessories
2-M3-L10 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

E39-L234

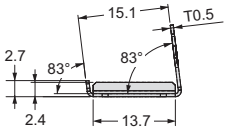


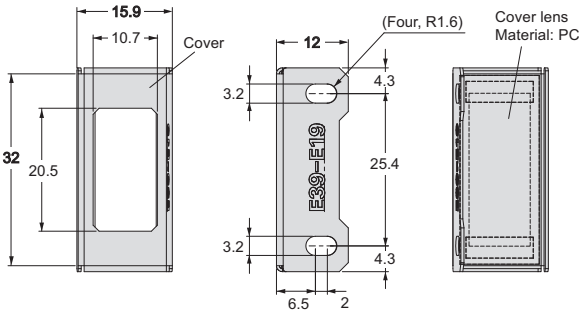
Photoelectric Sensor Accessory are installed (Example of E3AS-HL500☐)



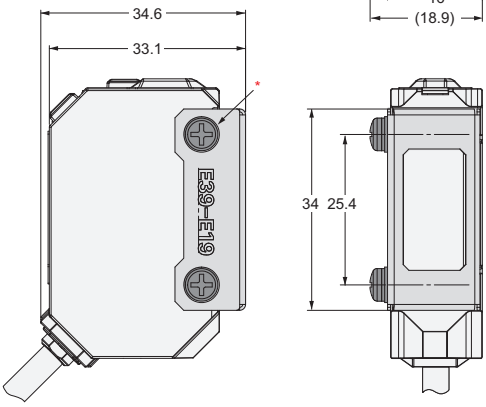
Material: Stainless steel (SUS304)
✻ Accessories
2-M3-L10 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

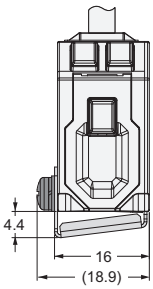
E39-E19





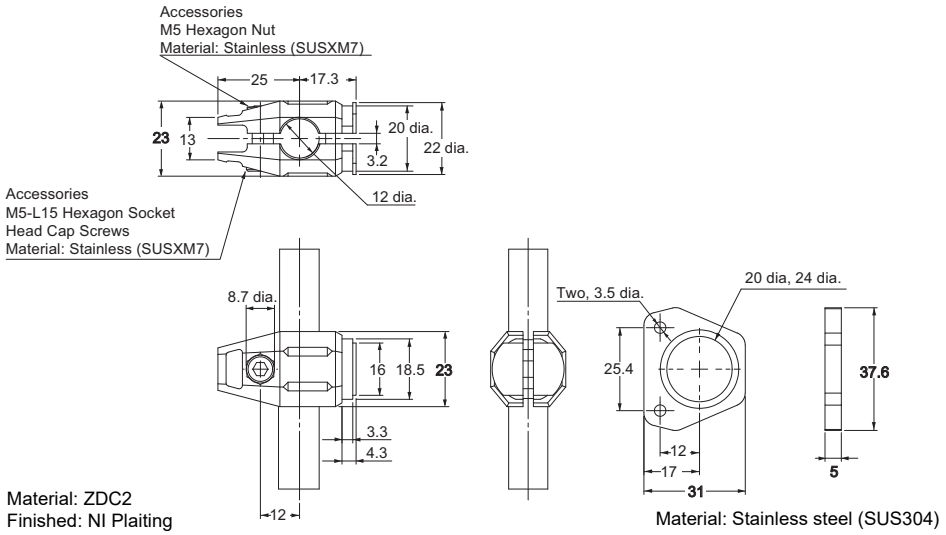
Photoelectric Sensor Accessory are installed (Example of E3AS-HL500□)



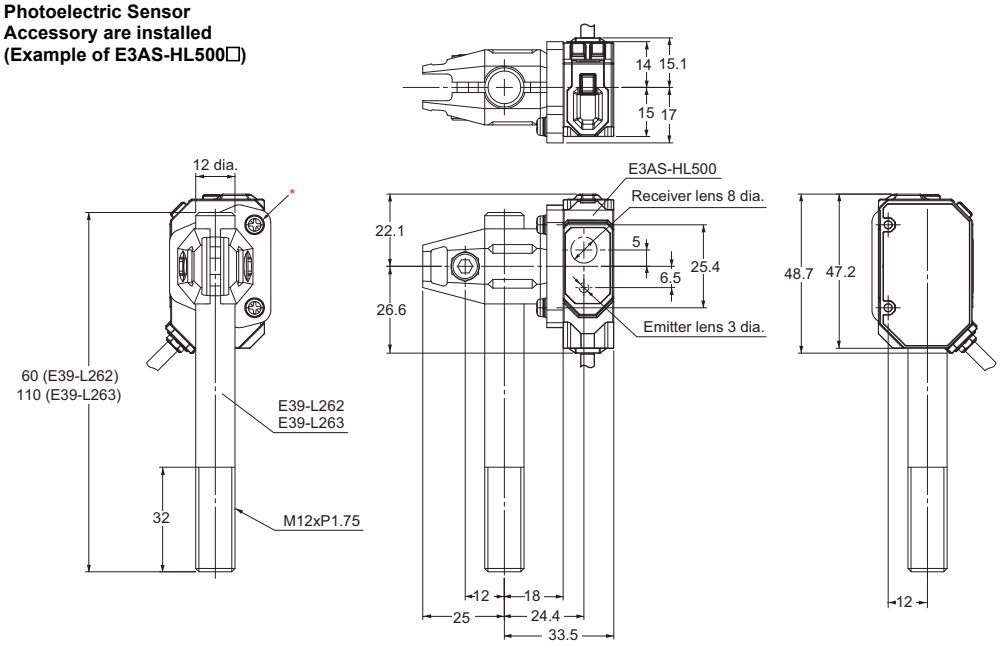


Material: Stainless steel (SUS304)
✻ Accessories
2-M3-L10 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

Flexible Mounting Bracket
E39-L261

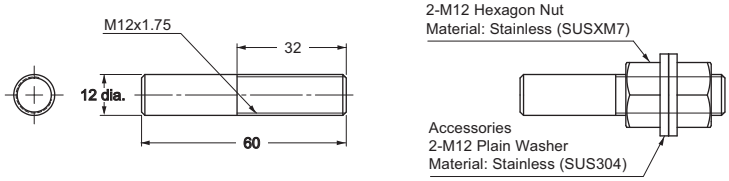


Photoelectric Sensor
Accessory are installed
(Example of E3AS-HL500□)



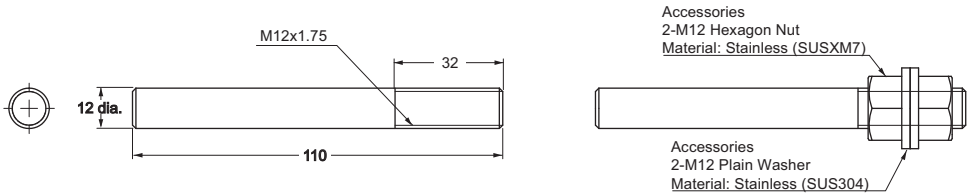
✻ Accessories 2-M3-L10 Cross Recessed Pan Head Screws (Attached to SW+JIS)

Post 50 mm
E39-L262



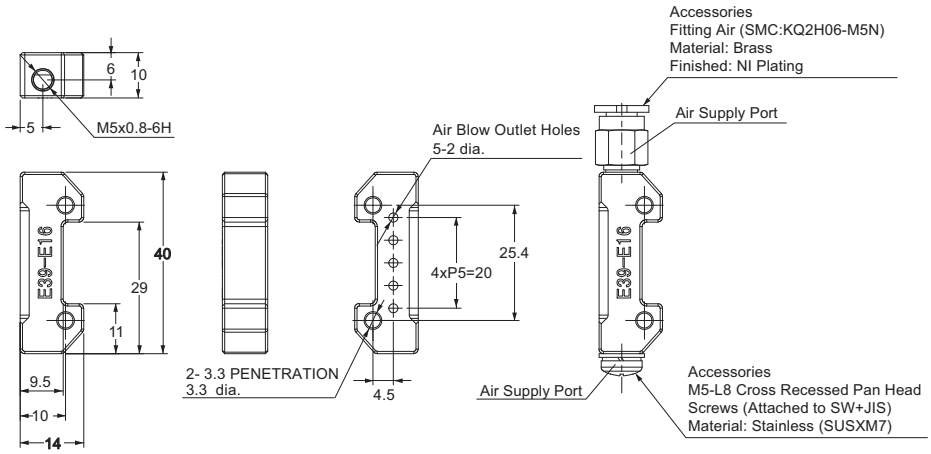
Material: Stainless steel (SUS304)

Post 100 mm
E39-L263

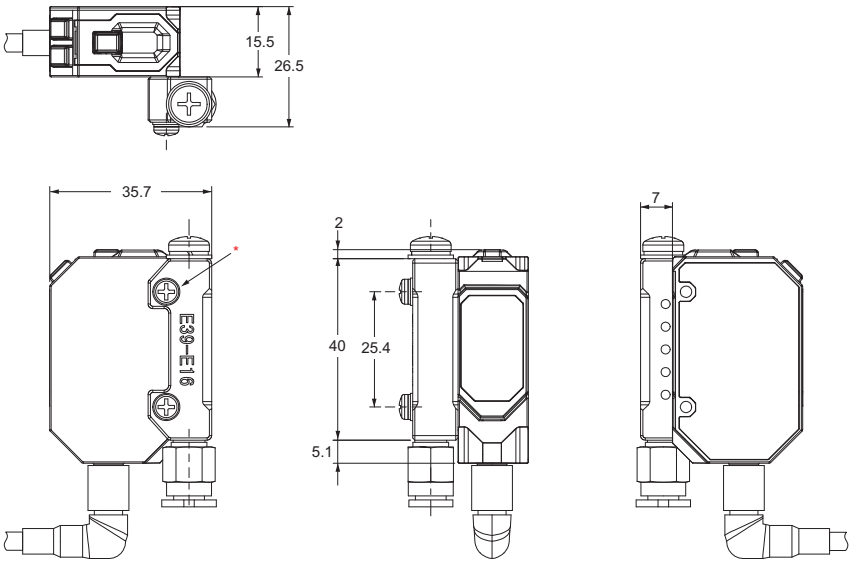


Material: Stainless steel (SUS304)

Air Blow Unit
E39-E16



Photoelectric Sensor
Accessory are installed
(Example of E3AS-HL500☐)



Material: ZDC2
Finished: NI Plaiting
✻ Accessories 2-M3-L16 Cross Recessed Pan Head Screws (Attached to SW+JIS)

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