

Reliable detection of difficult workpieces helps reduce line commissioning time and contributes to better facility "operation rates".



E3AS Series changes the “way of using” reflective photoelectric sensors

Production lines have become more advanced and complex, and skilled production workers are hard to come by. In order to increase equipment design flexibility and reduce sensor installation time, there is a growing need for reflective photoelectric sensors that require no receivers or reflectors. OMRON's E3AS Series offers new ways of using reflective photoelectric sensors to reduce line commissioning time and increases uptime,



TOF Laser Sensor
E3AS-F

CMOS Laser Sensor
E3AS-HL

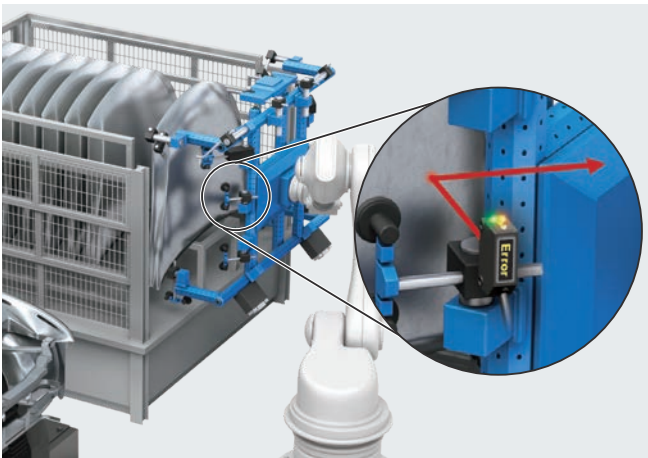
Curved, glossy, or irregular surfaces can be detected



Design, Commissioning

Reliable detection of difficult workpieces reduces equipment design and commissioning time P.4

Versatile installation allows flexible design



Design, Commissioning

Flexible installation saves design time P.6

Antifouling coated sensing surface reduces false detections



Mass production

Antifouling coating on sensing surface ensures stable operation even in harsh environments P.8

Reliable detection of difficult workpieces reduces equipment design

When difficult-to-detect workpieces (curved, glossy, or casting surfaces) cannot be detected correctly, sensors need to be reselected or adjusted. The E3AS Series provides reliable detection with less effect of curved, glossy, or casting surfaces, reducing design and commissioning time.

E3AS-HL for workpieces with curved or irregular surfaces and glossy workpieces

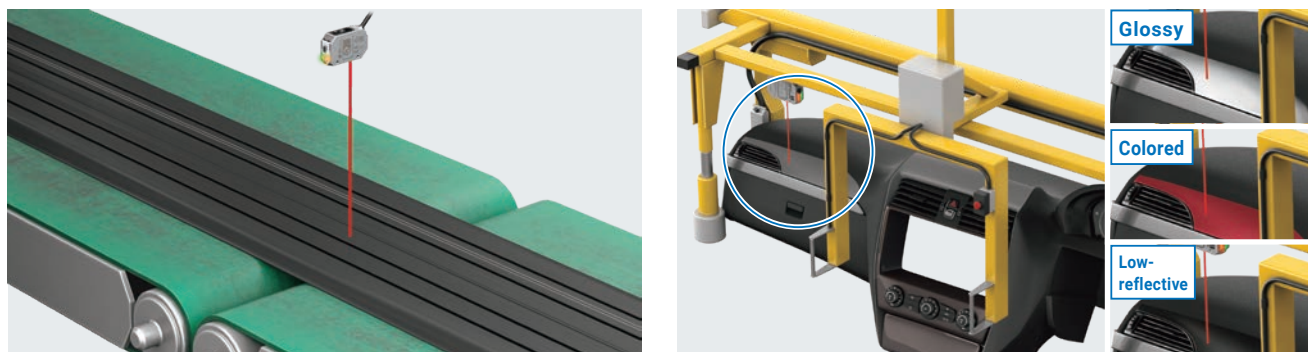
Reliable detection of metal workpieces with curved or irregular surfaces



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.

Reliable detection of various colored or glossy workpieces



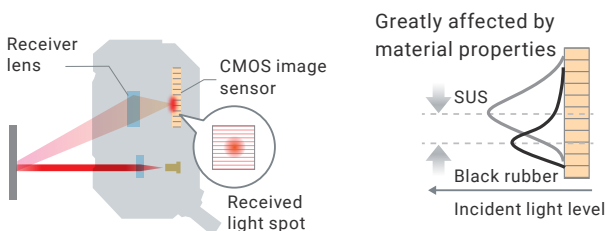
Level differences between low-reflective thin workpieces and the background sometimes cannot be detected. E3AS-HL Sensors, hardly affected by material type or color, can detect level differences.

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.

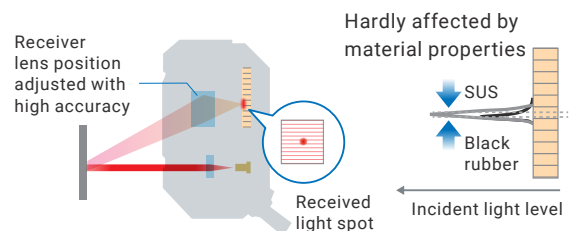
CMOS sensing with built-in lens alignment technology minimizes the influence of material properties

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.



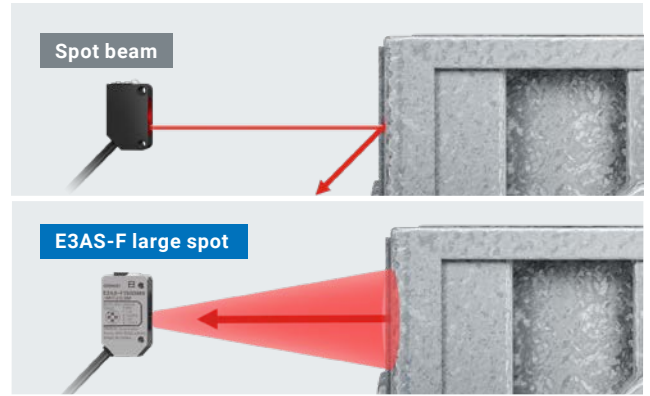
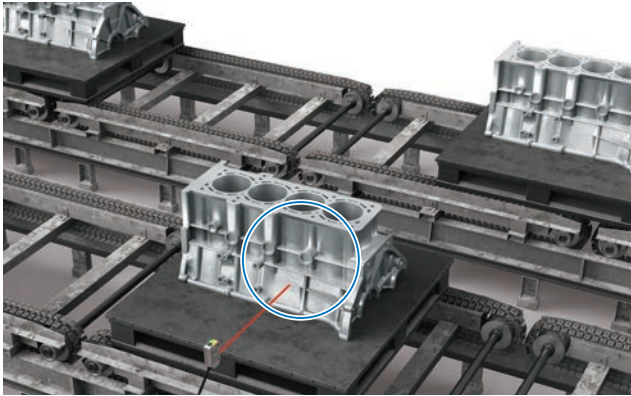
To Material properties hardly affect the detection since the receiver lens position is automatically adjusted to the micrometer level to minimize the received light spot.



and commissioning time

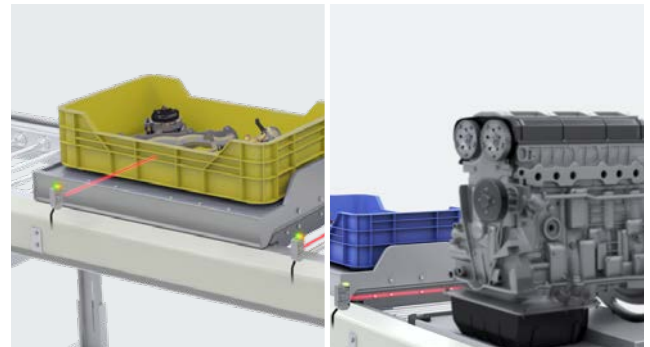
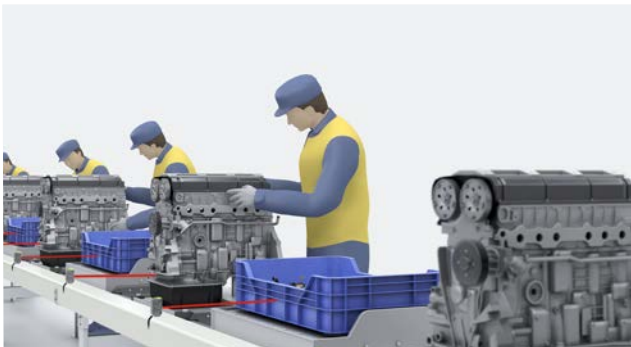
E3AS-F for large workpieces with various colors or rough surfaces

Reliable detection of metal workpieces with rough surfaces



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 large spot of the E3AS-F Sensor, detection is less affected by the surface roughness since the reflected light reaches the sensor.

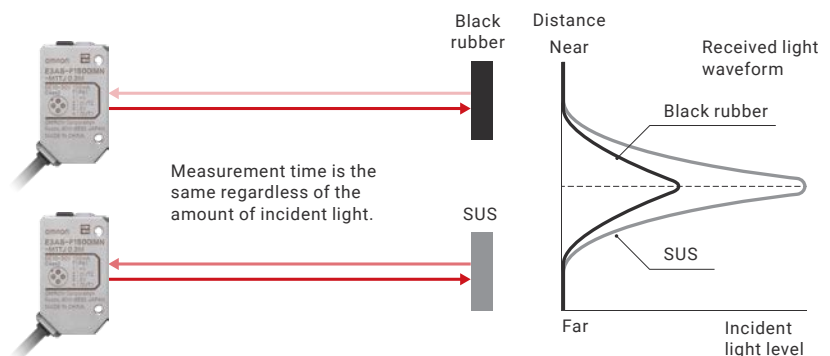
Reliable detection of workpieces in various colors



Detection is prone to be unstable because the sensing distance varies depending on the workpiece color. E3AS-F Sensors using the TOF technology is less likely to be affected by changes in color, providing stable detection for different colored containers or engine blocks without changing the set distance.

TOF detects varying workpieces and measures distance

In the TOF (Time of Flight) method, the distance is measured based on the elapsed time instead of the amount of incident light received. Measurements therefore are not affected by changes in the color or material of the workpiece. This means that low-reflective workpieces, such as black rubber, can be detected from the same set distances.



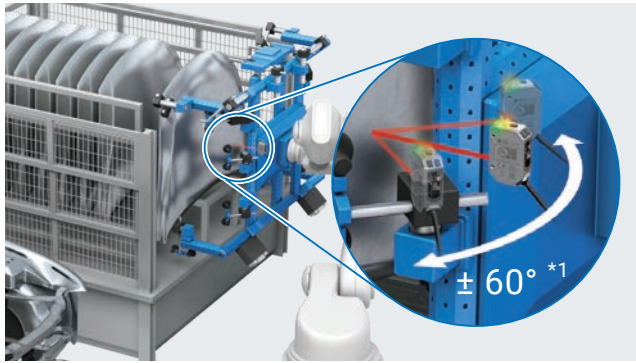
*1. "PATENT PENDING" means that we applied for a patent in Japan. (As of September 2020)

Flexible installation saves design time

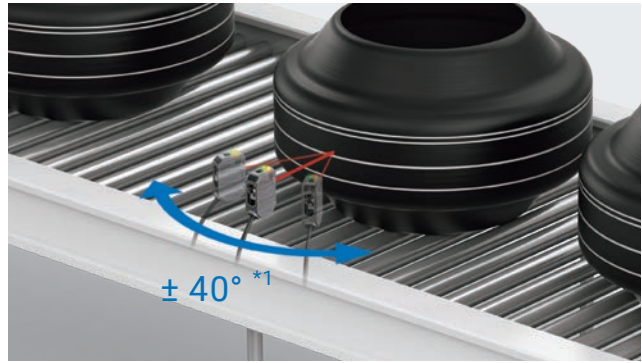
Sensor space limitations make equipment design and retrofit work complicated, resulting in time-consuming work. The E3AS Series can be installed in challenging locations, which reduces design and commissioning time.

E3AS-HL for inclined and close mounting

Install regardless of workpiece shape and angle



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.

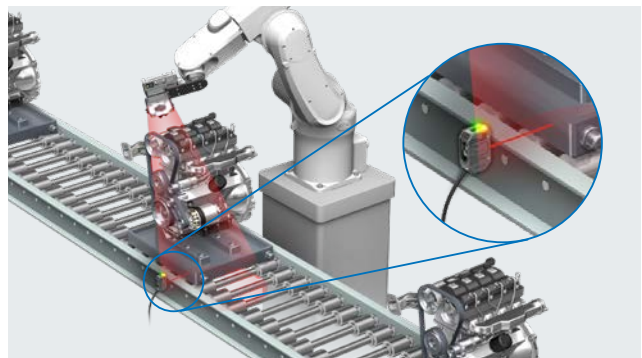


Curved surfaces of low-reflective workpieces tend to affect detection, and it is time consuming to design the mounting angle. E3AS-HL Sensors can be mounted at a wide angle, making setup easy.

Install in confined spaces or near lights



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.



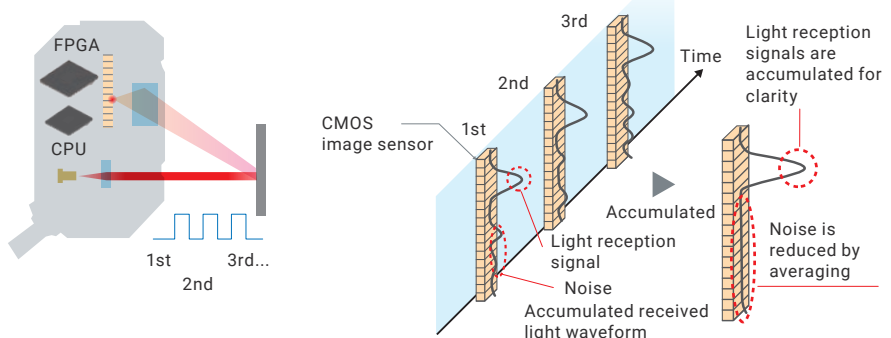
Effects of lights for cameras and sunlight must be considered during design. E3AS-HL Sensors can be operated under ambient illumination of 20,000 lx, which reaches the best in class level ^{*2}. This allows you to install the sensors in the vicinity of lights.

Sensing algorithm detects minimal reflected light from curved surface

Industry First ^{*1}

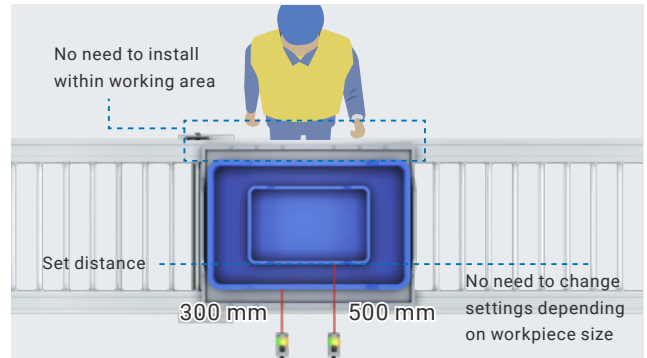
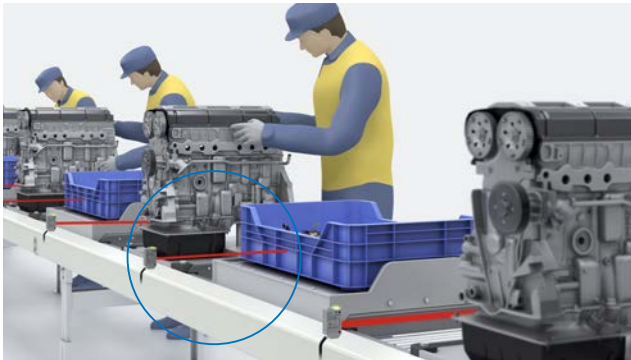
PATENT PENDING ^{*2}

The E3AS-HL Sensor is the industry-first laser Class 1 CMOS laser sensor that comes equipped with an FPGA. It performs high-speed sampling of received light waveforms at 10,000 times per second and OMRON's unique accumulation processing, significantly increasing its sensitivity. It amplifies the slightest amount of light to reliably detect workpieces with glossy surfaces, complex shaped workpieces, black rubber, or other workpieces from which it is difficult to receive reflected light.



E3AS-F for long-distance sensing

Install reflective sensors instead of through-beam sensors



Reflective E3AS-F Sensors for long-distance sensing can be installed outside the working area, which is difficult with through-beam sensors. They use the TOF method to detect workpieces only and ignore workers.

Installation almost unaffected by background

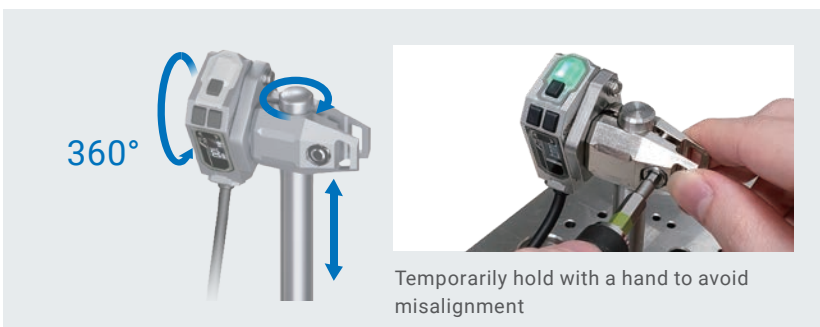


Reflectors are required behind workpieces to avoid effects of the background.



The TOF method that measures distance based on the elapsed time is hardly affected by the background, making design easy.

More flexible mounting with flexible mounting bracket PATENT PENDING *2



Optical axis can be easily adjusted in three directions: vertical, horizontal, and angular. This bracket can be mounted to any photoelectric sensor with a 25.4 mm mounting hole pitch as well as the E3AS Sensors.

*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. (As of September 2020) 7

No special safety measures required for Class 1 laser



The E3AS Series is classified as Class 1, so laser safety measures are not required.

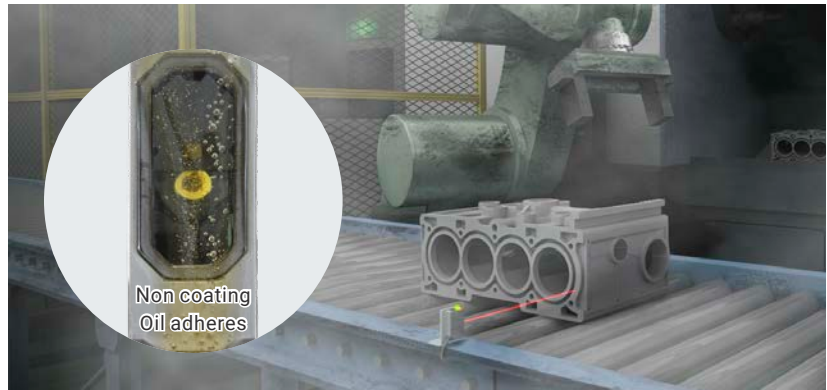
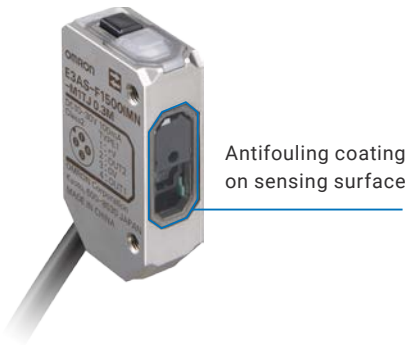
Antifouling coating on sensing surface ensures stable operation even

When a sensor malfunction or breakage due to the environment causes a line stoppage during mass production, it can take a long time to restart. With the protected sensing surface, the E3AS Series helps minimize line downtime and maximize uptime.

Antifouling coating on sensing surface reduces false detection and cleaning frequency

Industry First *1 **PATENT PENDING** *2

A dirty sensing surface can cause false detection due to the principle of photoelectric sensors. The E3AS Series has an industry-first antifouling coating on the sensing surface which prevents soot and dust from sticking to the sensing surface and keeps the lens from fogging as well. This reduces false detection and sensing surface cleaning frequency.



Water



Cutting oil



Dust

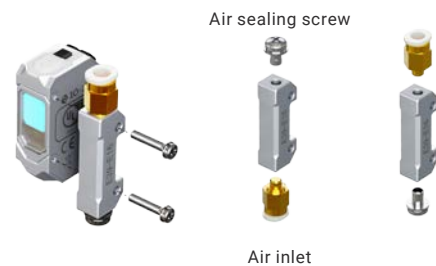


Water vapor

Air blow unit enhances the effectiveness of antifouling coating

PATENT PENDING *2

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.



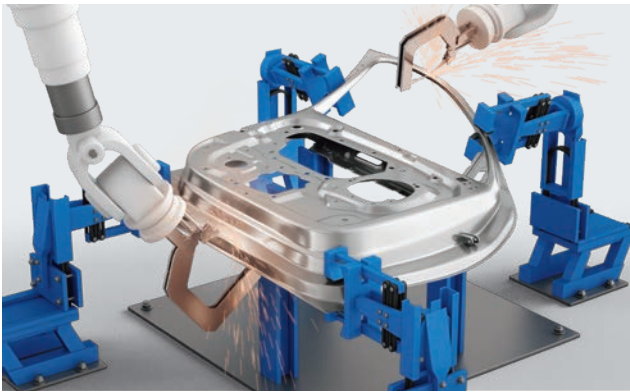
Can be mounted on either side of the sensor

Air inlet position can be inverted

in harsh environments




Front protection cover reduces sensor failures

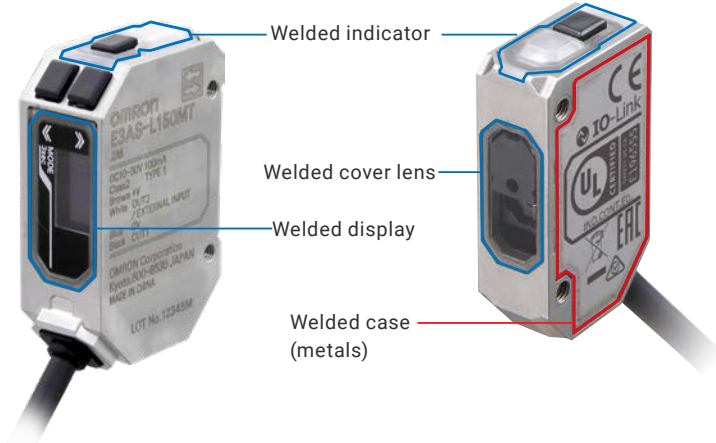
Welding spatter on the sensing surface or collision during operation can cause a sensor failure, and the sensor sometimes need to be replaced. Mounting the front protection cover prevents sensor failures. When any problems occur with the front protection cover, just replace it. There is no need to replace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



Unique case design reduces the frequency of replacements caused by failure

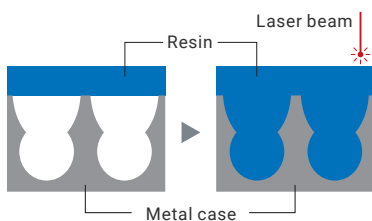
The sensor case is made of stainless steel (SUS316L). OMRON's unique laser welding technology for different materials enhances the sealing and adhesion between the stainless steel and resin. The laser welding technology for metals are used to weld the case and cover of the E3AS-F Sensor for secure sealing and adhesion between the stainless steel.

-  **IP69K**
High temperatures/
high water pressure
-  **IP67G**
Oil resistance
-  **ECOLAB**
Detergent
resistance



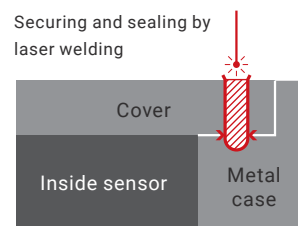
Laser welding technology for different materials PATENTED *2

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.



Laser welding technology for different materials TOF E3AS-F

The metal case and cover are welded by a laser beam to seal the gaps. This ensures higher airtightness compared to adhesives, keeping out water and oil to reduce failures.



*1. Based on OMRON investigation in September 2019.

*2. "PATENT PENDING" means that we applied for a patent in Japan, and "PATENTED" means that we obtained a patent in Japan. (As of September 2020)

OLED display and teaching enable easy, quick, and optimal setting

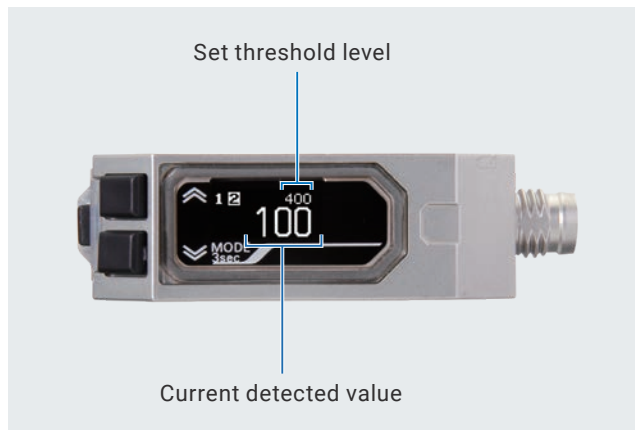
E3AS Sensors allow virtually anyone to set optimal settings on the easy-to-read OLED display using the teaching method. Moreover, easy-to-standardize operability makes remote instructions simple.

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

CMOS E3AS-HL

Displaying the threshold level and detected value on the same screen makes threshold level setting easy. In addition, 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



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).

Hold teach button



Two-point teaching

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

Press the teach button each time with or without workpiece in place

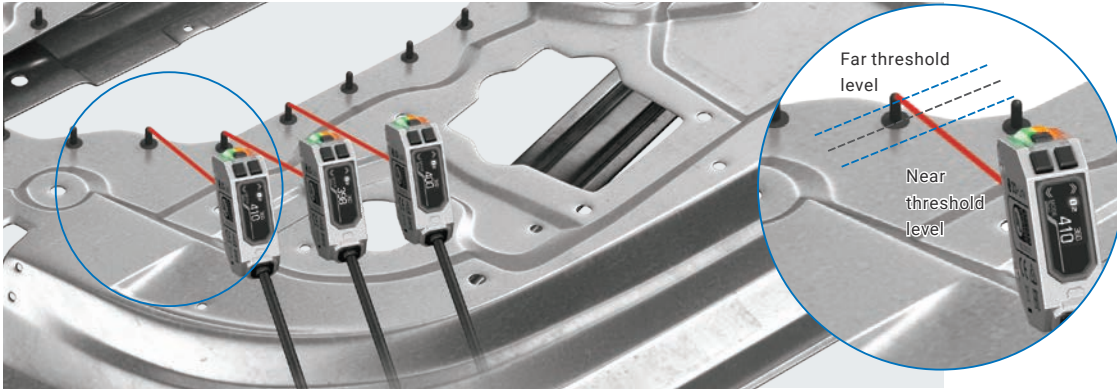


Key locking

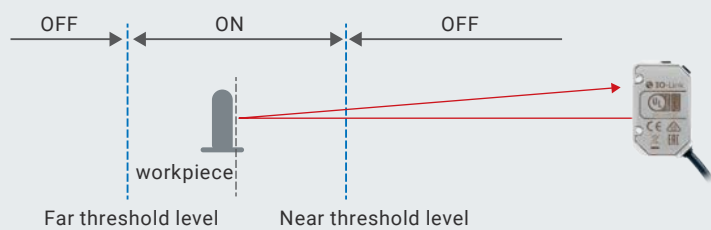
The key locking function prevents operation mistakes after setting.

Object teaching for easy setting to detect workpieces within specified range CMOS E3AS-HL

Object teaching allows you to easily set upper and lower threshold levels just by holding the button. This teaching is ideal for presence detection of workpieces without the background or within the specified distance range.

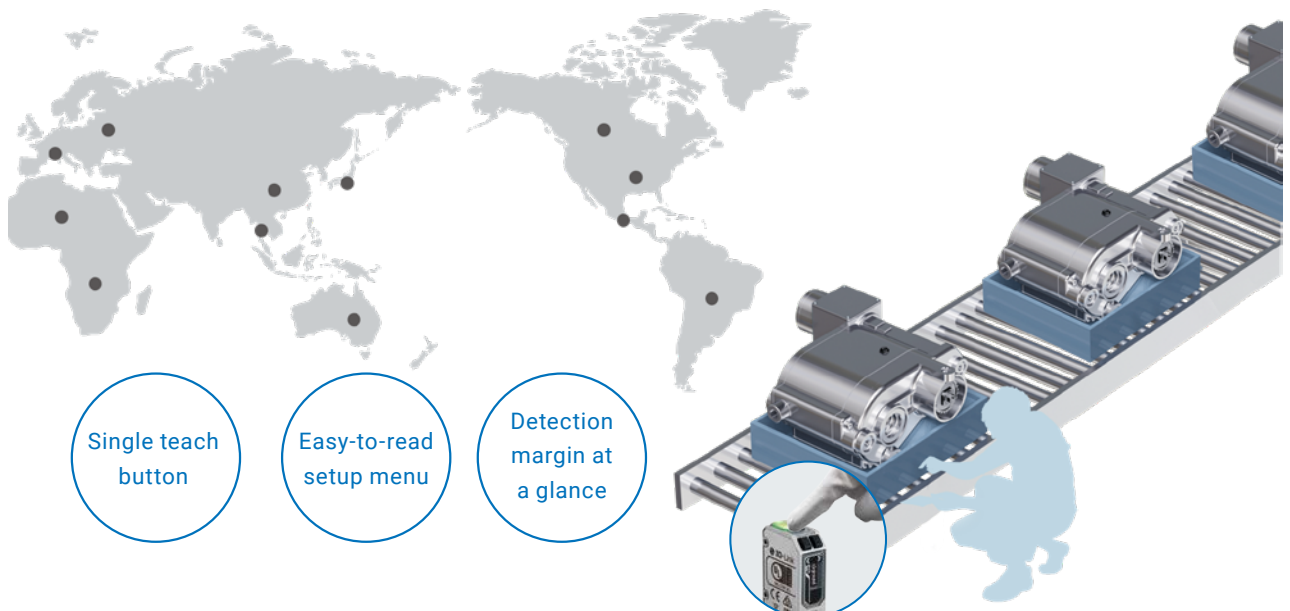


Just hold the button to set the threshold levels on the near and far sides of the workpiece position (reference position) at the same time. This teaching is used for presence detection of workpieces in the predetermined position.



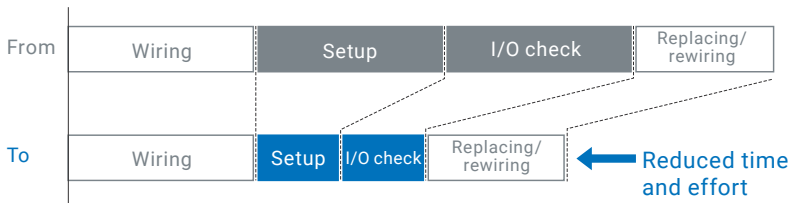
Easy-to-standardize operations reduce commissioning time

When manufactures set up local production lines, the setup of sensors sometimes requires the experience and finesse of skilled workers and on-site instruction. The teaching method common to the E3AS Series enables you to standardize the operation procedures, facilitating remote instruction easier.



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.

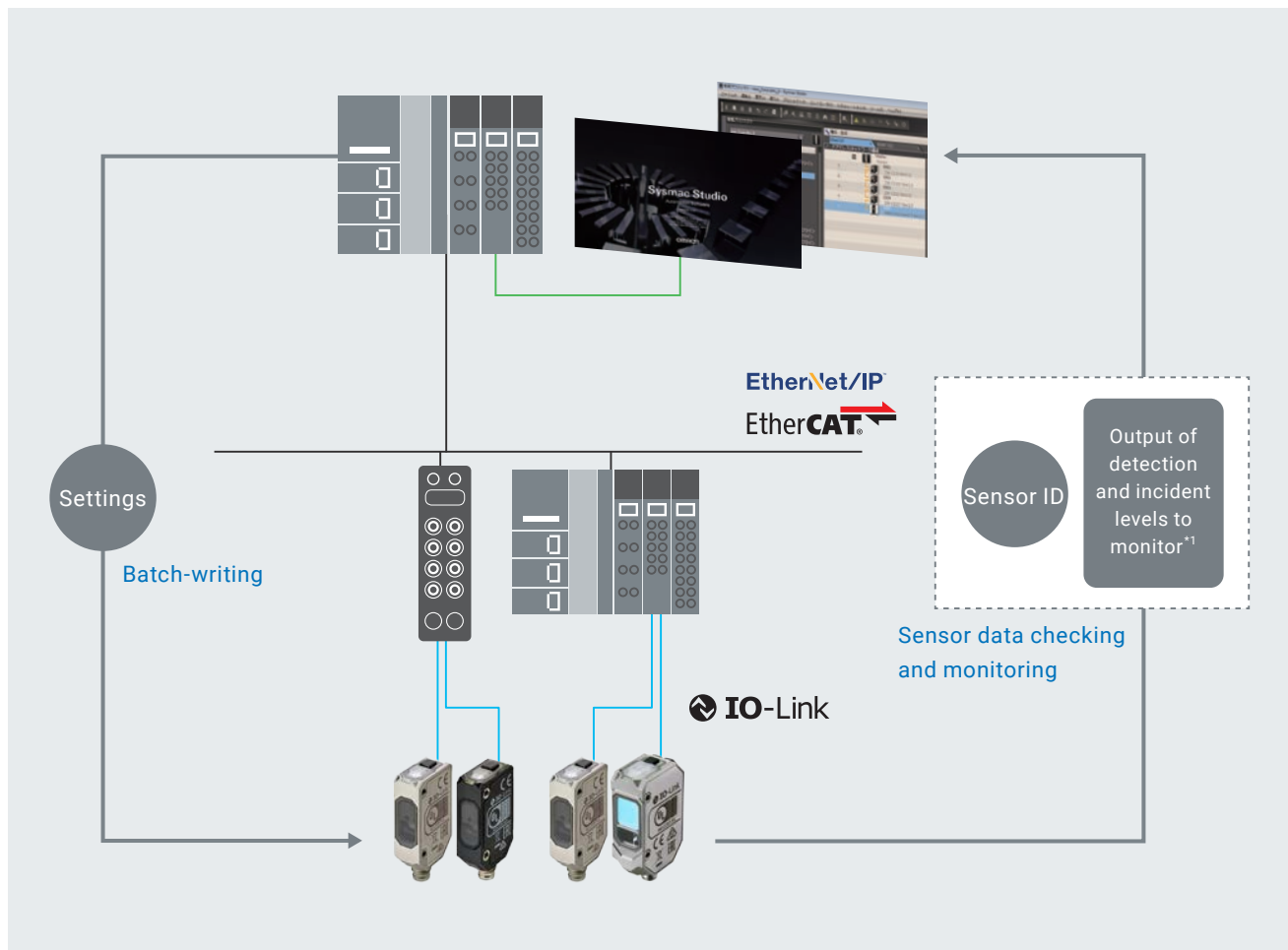
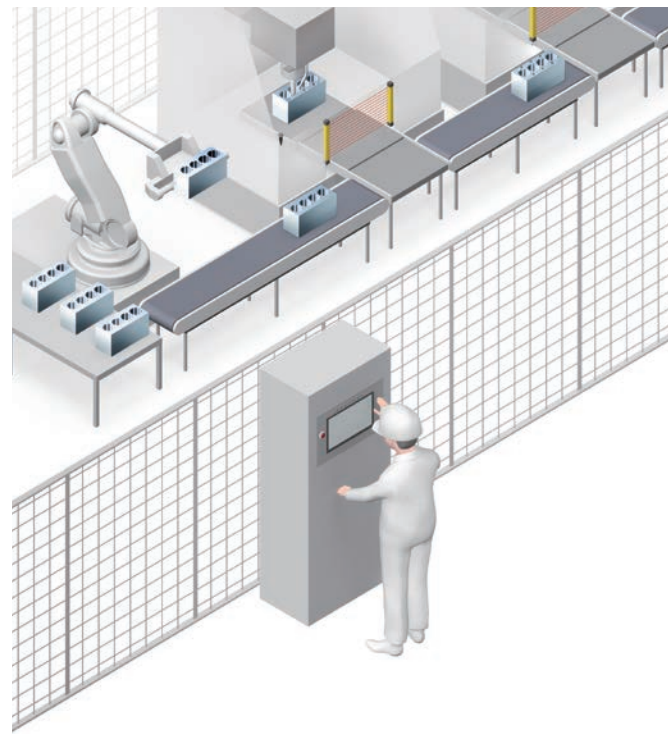


Reduce commissioning time by batch-writing settings from IO-Link device configuration tool

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.



Model lineup

	E3AS-HL		E3AS-F	
Appearance				
Case	SUS316L		SUS316L	PBT/PC
Sensing distance	35 to 500 mm 35 to 150 mm		50 to 1500 mm 50 to 1000 mm	50 to 1500 mm 50 to 1000 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)		15% max.	15% max.
Setting method of threshold level	Teaching method/ Manual operation		Teaching method	
OLED display	✓		—	—
Antifouling coating	✓		✓	✓
Mutual interference prevention function	Up to 4 units		—	—
Degree of protection	IP67/69K/67G/Ecolab			

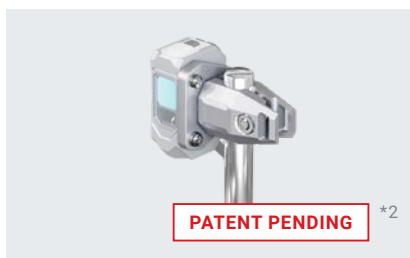
Short-distance sensing models also available
OMRON's unique light emitting element for stable detection of workpieces with low reflectivity



Distance-settable Photoelectric Sensors E3AS-L
Sensing range: 10 to 80 mm/10 to 200 mm

Accessories enhance sensor usability

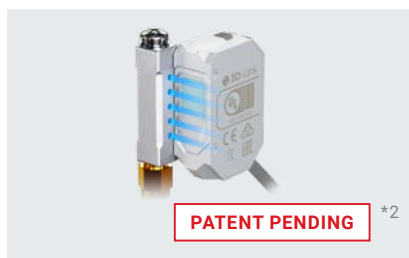
The E3AS Series comes with a lineup of accessories that shorten sensor adjustment time upon commissioning and reduce the frequency of false detections during production. They can be used with non-E3AS sensors with a standard mounting hole pitch of 25.4 mm as well.



PATENT PENDING *2

Flexible Mounting Bracket

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



PATENT PENDING *2

Air Blow Unit

Blows soot and dust off the sensing surface.



Front Protection Cover^{*3}

Protects the sensing surface from welding spatter and collisions with robot arms.

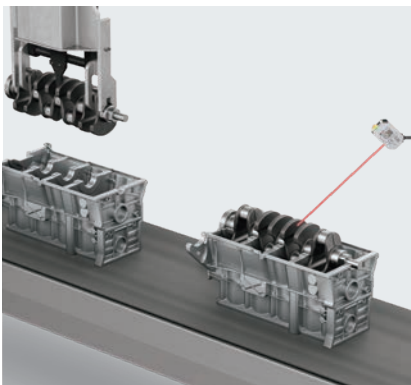
*1. E3AS-HL and E3AS-F only *2. "PATENT PENDING" means that we applied for a patent in Japan. (As of September 2020)

*3. E3AS-HL only. Note: For details on ratings and specifications, refer to the *Ratings and Specifications* in this catalog.

Applications and target workpieces



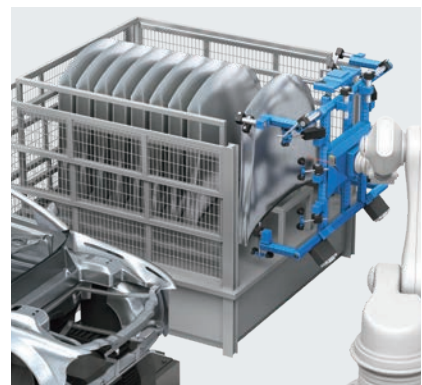
For workpieces with curved or irregular surfaces and Low-reflective, glossy workpieces
CMOS Laser Sensor E3AS-HL



Presence detection of crankshafts



Presence detection of needle bearings



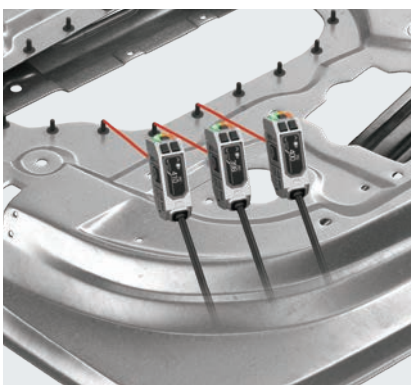
Presence detection of hoods



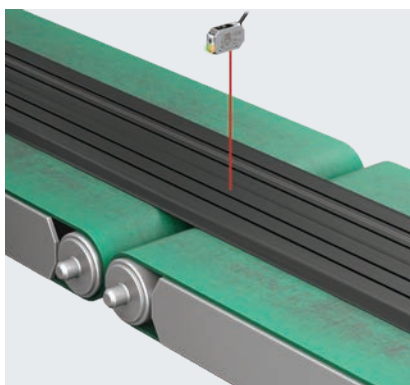
Parts identification using hole positions



Presence detection of interior decoration parts



Presence detection of pins



Presence detection of tires before building

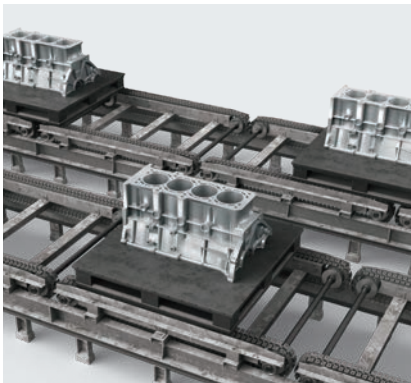


Presence detection of green tires



For large workpieces in various colors or with rough surfaces

TOF Laser Sensor E3AS-F



Presence detection of engine blocks

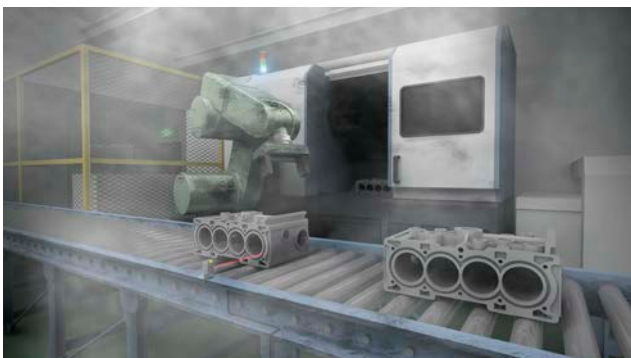


Presence detection of pallets



Presence detection of parts

Reliable operation even in harsh environments such as soot and dust



Environment with oily smoke and dust



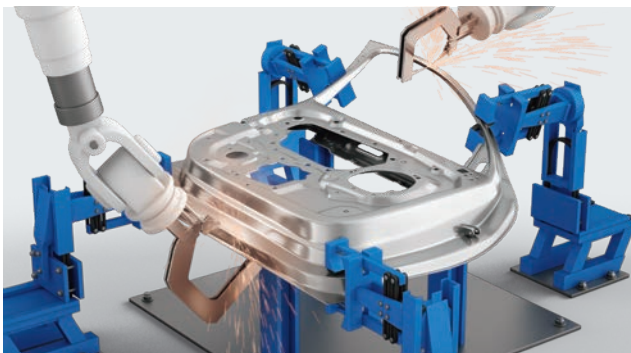
Antifouling coating

Cutting oil



Antifouling coating

Dust

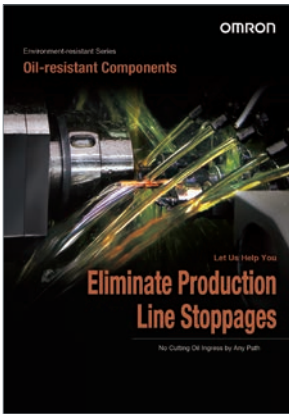


Environment with welding spatter scatters



Reduce cost by replacing only the dirty cover

Related Products



Environment-resistant Series Oil-resistant Components

Cat. No. Y215-E1



IO-Link Series

Cat. No. Y229-E1

Note: Do not use this document to operate the Unit.

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Cat. No. E594-E1-01

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