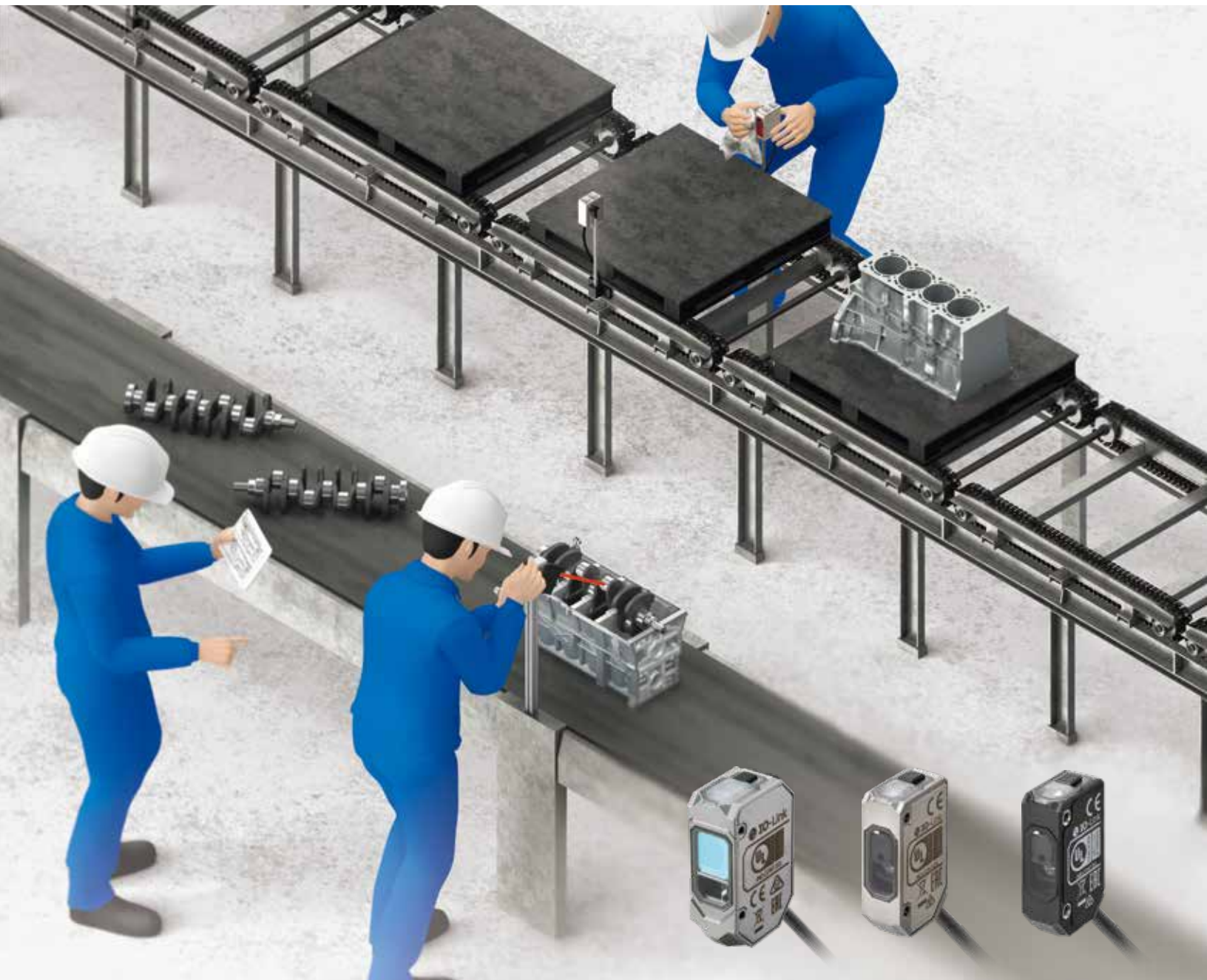


## E3AS Reflective Sensors

Reducing commission time  
and improving detection in automotive applications



# Reliable detection reduces equipment design and comm

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

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

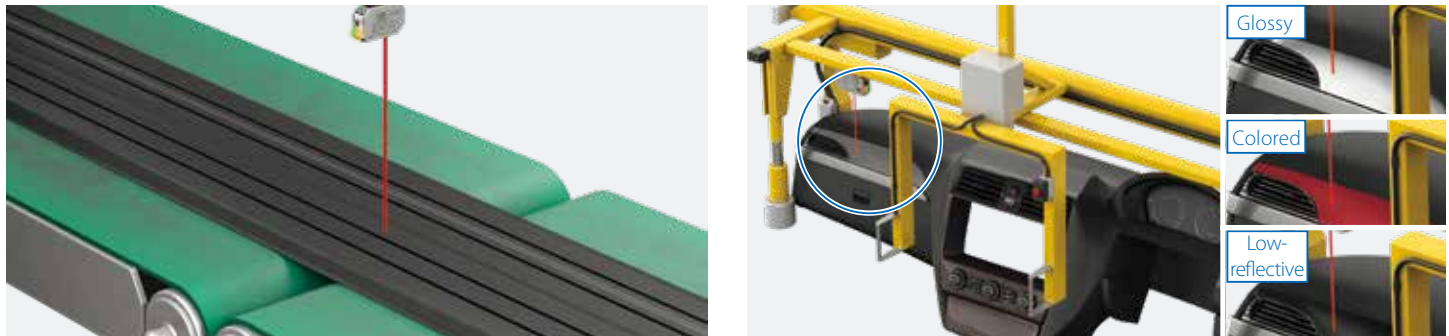
Reliable detection of metal workpieces with curved or irregular surfaces



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 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 and oily metal workpieces also minimally affect detection.

## Reliable detection of various colored or glossy workpieces



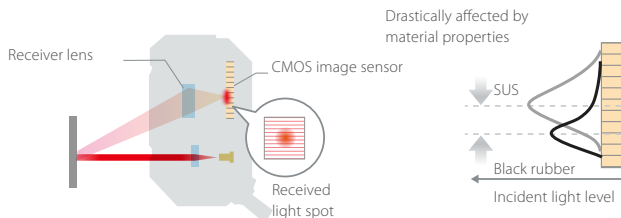
Level differences between low-reflective thin workpieces and the background sometimes cannot be detected. E3AS-HL Sensors, which are minimally affected by material type or color, can detect small level differences.

Detection is prone to instability because the sensing distance varies depending on the workpiece material and color. E3AS-HL Sensors, require no adjustment for each workpiece.

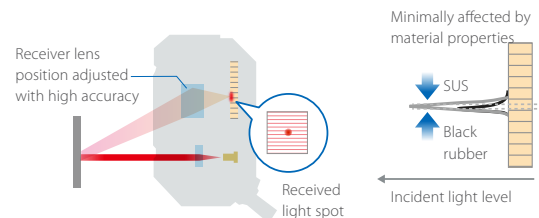
## CMOS sensing with built-in lens alignment technology minimizes the influence of material properties

PATENT PENDING<sup>1</sup>

**From** Material properties greatly affect detection because the receiver lens does not do a position adjustment resulting in a blurred spot on the CMOS image array.



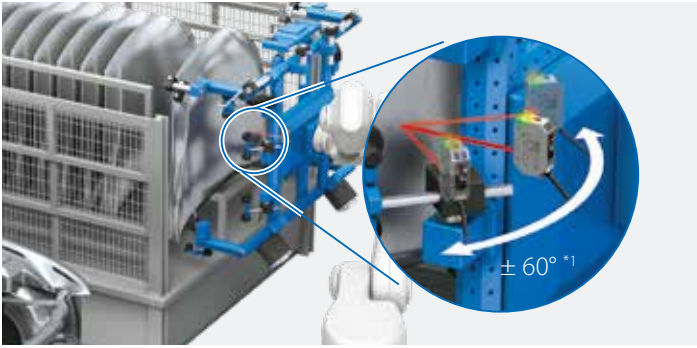
**To** Material properties minimally affect detection because the receiver lens position is automatically adjusted to the micrometer level to minimize the received light spot.



# Installation time

## E3AS-HL in inclined and close mounting scenarios

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.

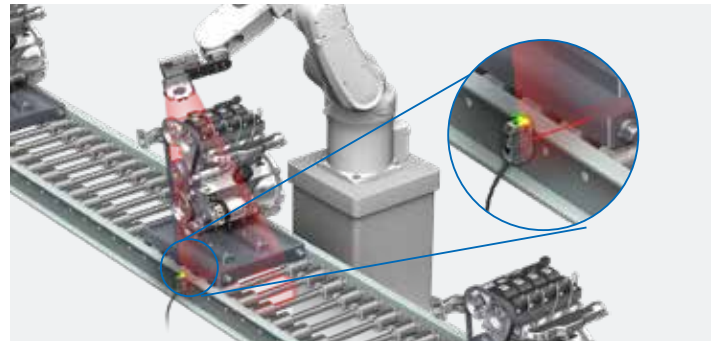


Curved surfaces of low-reflective workpieces affect consistent detection, E3AS-HL Sensors can be mounted at a wide angle without a need for a reflector.

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 for hole positions.

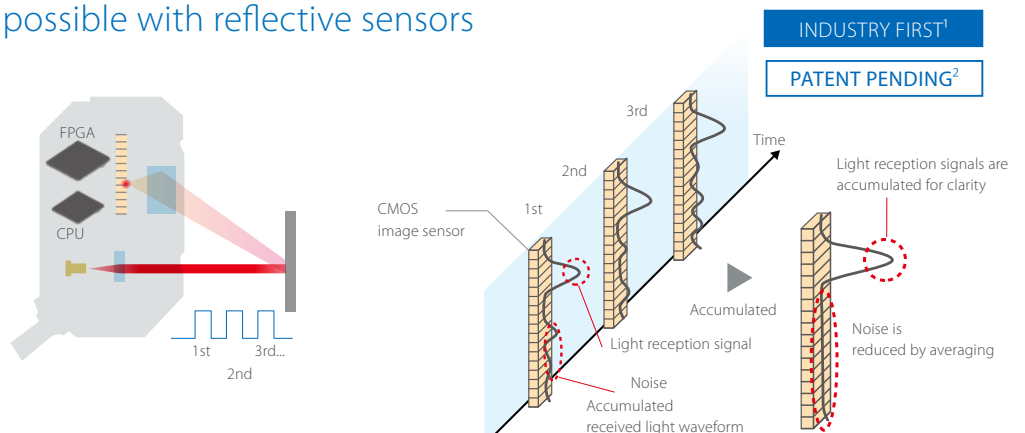


E3AS-HL Sensors can be operated under ambient illumination of 20,000 lx, which reaches the best in class level<sup>2</sup>.

## Advanced sensing algorithms detect minimal reflected light from curved surfaces, which is impossible with reflective sensors

The E3AS-HL Sensor is the industry's first CMOS laser sensor that comes equipped with an FPGA<sup>3</sup>. It performs high-speed sampling of received light waveforms at 10,000 times per second and unique Omron accumulation processing, significantly increasing its sensitivity. It amplifies the slightest amount of light to reliably detect 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 an Omron investigation in September 2019. 3. FPGA = Field Programmable Gate Array

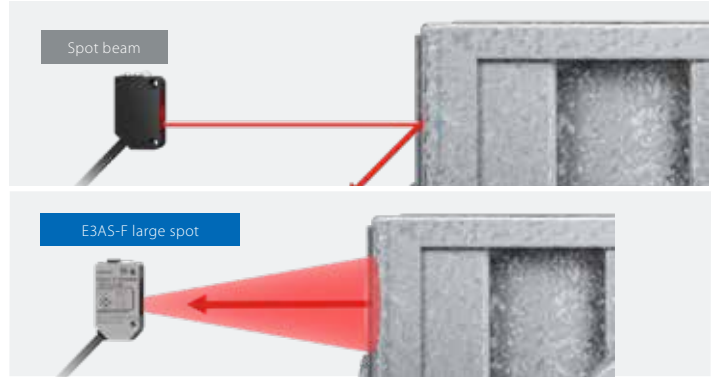
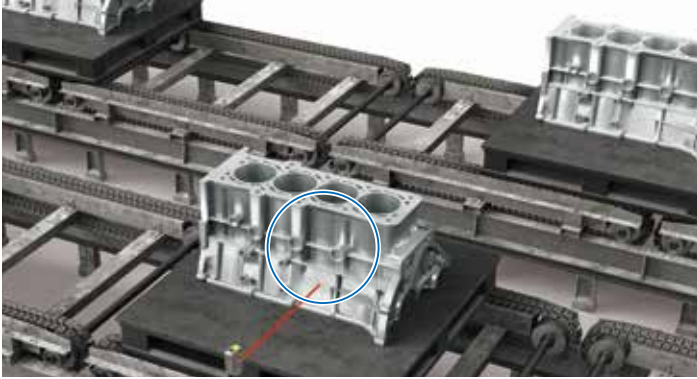


# Flexible installation saves design time

Sensor space limitations make equipment design and retrofit work complicated. The E3AS Series is small and has a wide angular displacement to allow for various mounting configurations.

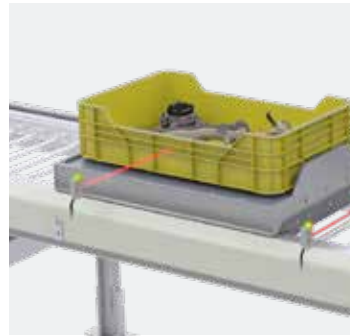
## E3AS-F for large workpieces with various colors or rough surfaces

Reliable detection of metal workpieces with rough surfaces



With a spot beam, detection can be unstable if 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.

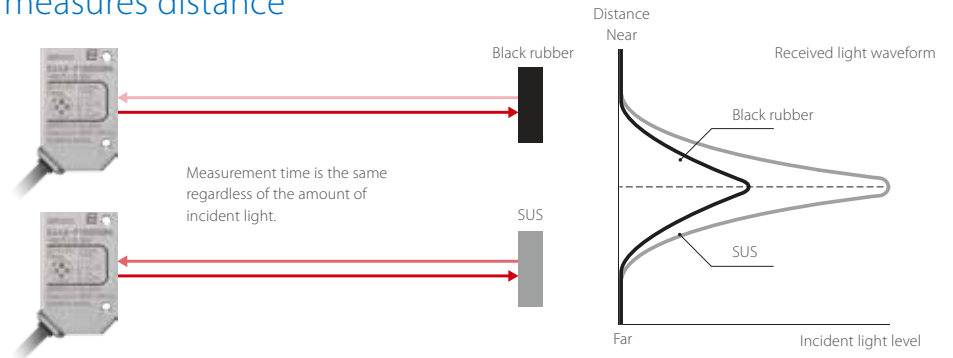
## Reliable detection of workpieces in various colors



E3AS-F Sensors use TOF technology reducing the effects of changes in color on detection distance providing stable detection for different colored containers or engine blocks without changing the set distance.

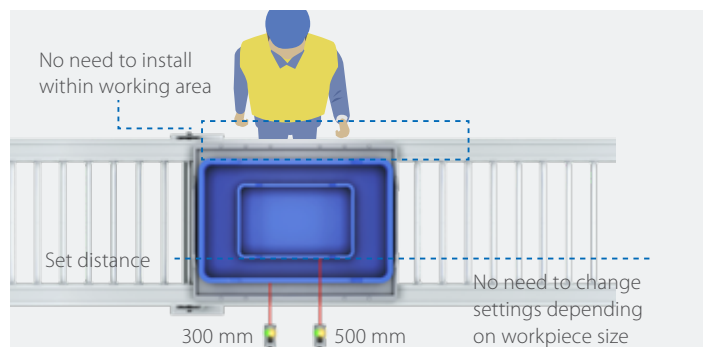
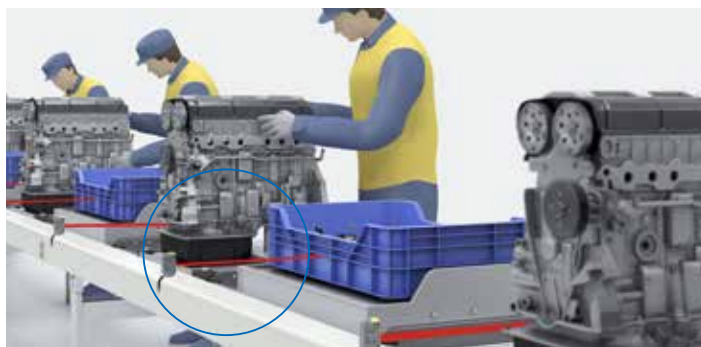
## TOF detects varying targets and measures distance

In the time-of-flight method, distance is calculated based on the time elapsed between the light emission and its reception by the sensor once it is reflected off the target. Detection is therefore not affected by changes in the color or material of the target.



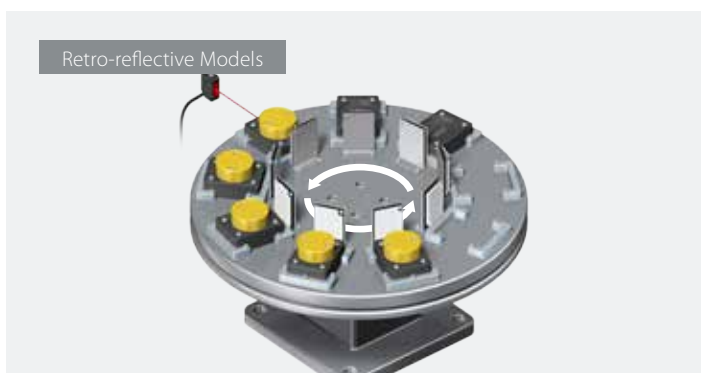
## E3AS-F for long-distance sensing

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. The TOF method ensures that only the desired range is detected.

Installation minimally affected 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.

## 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.



Flexible Mounting Bracket

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

1. Patent pending in Japan and patented in Japan. (As of May 2020)



Air Blow Unit

Blows paper dust and cleaning solutions off the sensing surface.



Front Protection Cover³

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

# OLED display and teach button enhance ease of use

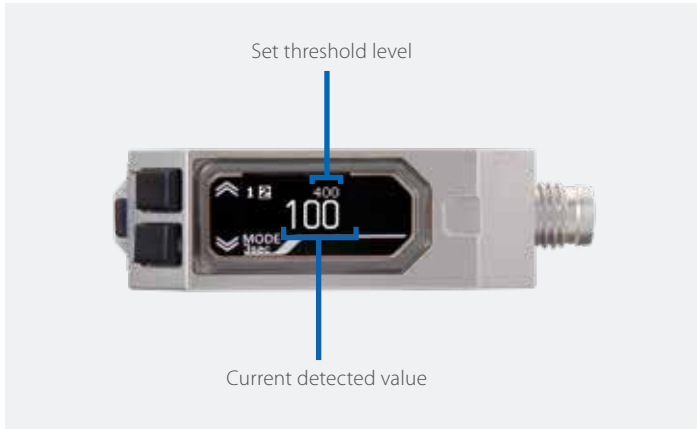
E3AS Sensors allow virtually anyone to set optimal settings on the easy-to-read OLED display using the teaching method. Moreover, easy-to-standardize operability makes remote instructions simple.

CMOS E3AS-HL

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

Threshold level and detected value display on the same screen making 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



Wide viewing angle allows reading from an angle



## Single teach button prevents setting inconsistencies

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



Detection display switching based on purpose

Bar display to see detection margin at a glance



ON/OFF display to easily check control output status



Easy-to-read setup menu display



Invert display depending on sensor installation orientation

Inverting: Disabled



Inverting: Enabled



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 that when a workpiece is present and when one is not.

Place a target in position and press the teach button



Press the teach button without the target in place



Key locking

The key locking function prevents malfunction after setting.

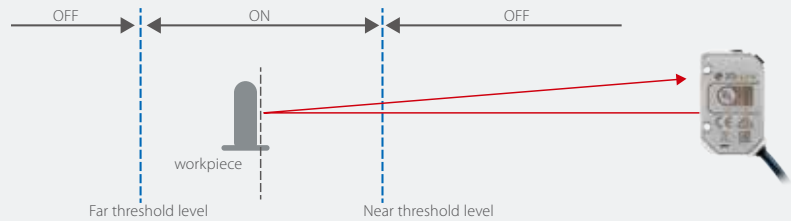
## Object teaching for detecting workpieces within specified range

CMOS E3AS-HL

Object teaching allows you to easily set upper and lower threshold levels just by holding the teach button. Ideal for presence detection of workpieces within a specified distance range.

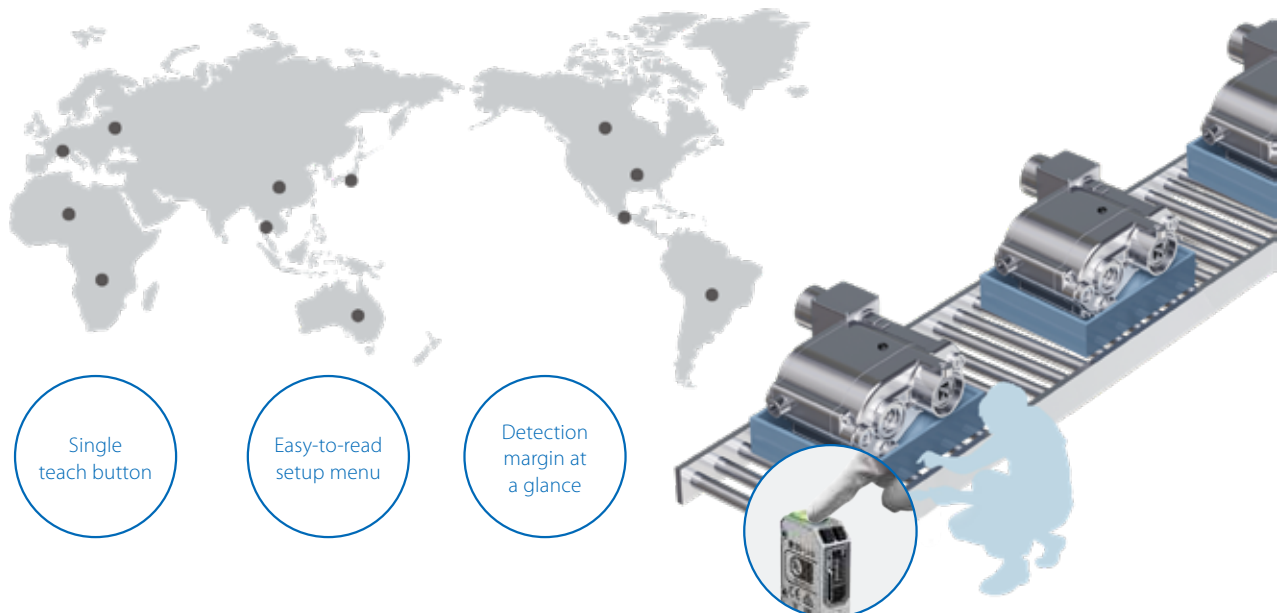


Simply hold the button to set the threshold levels on the near and far sides of the workpiece position (reference position) at the same time. This teaching is used for presence detection of workpieces in the predetermined position.



## Easy-to-standardize operations reduce commissioning time

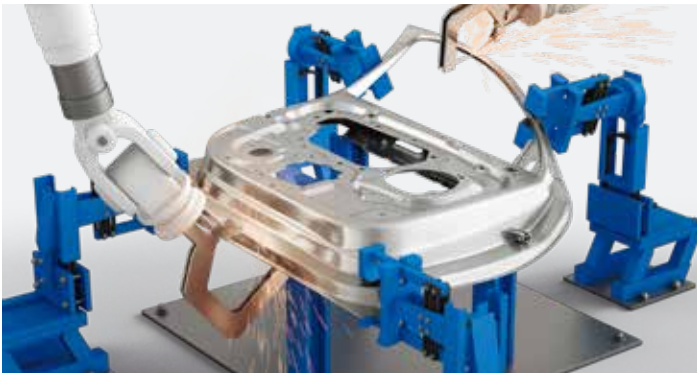
The teaching method common to the E3AS Series enables you to standardize the operation procedures, facilitating remote instruction.



# Antifouling coating on sensing surface ensures stable operation even in harsh environments


## Front protection cover reduces sensor failures


Welding spatter on the sensing surface or collision during operation can cause a sensor failure. Mounting the front protection cover prevents sensor failures. When any problems occur with the front protection cover, just replace it.



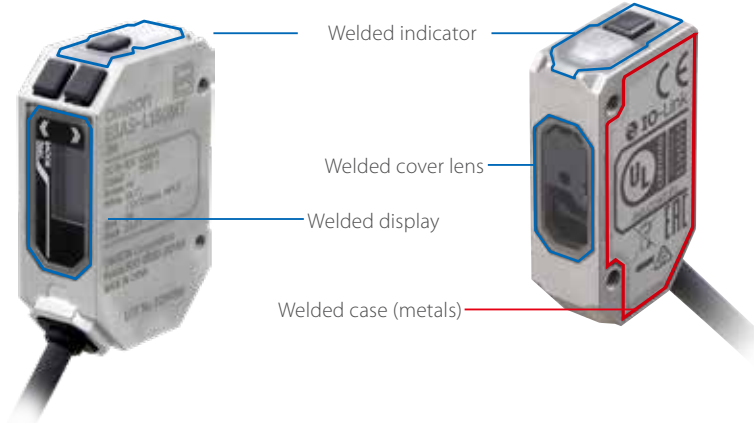
## Unique case design reduces the frequency of replacements caused by failure

The sensor case is made of stainless steel (SUS316L). OMRON's unique laser welding technology for mixed 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



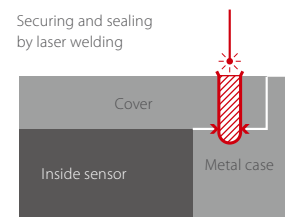
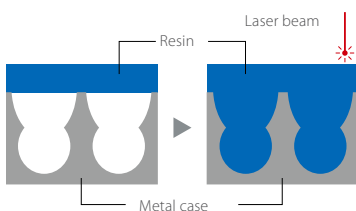
## Laser welding technology for mixed materials

**PATENTED<sup>1</sup>**

TOF E3AS-F

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

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



1. "PATENTED" means that we obtained a patent in Japan. (As of September 2020)



When a sensor malfunction 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<sup>1</sup>

PATENT PENDING<sup>2</sup>

A dirty sensing surface can cause false detection. 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



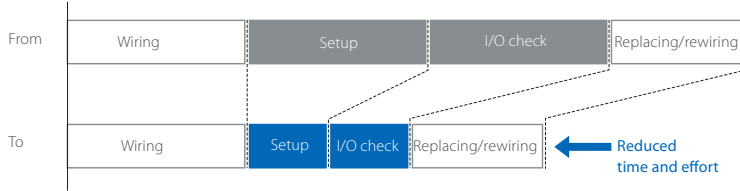
Water vapor

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)

# IO-Link speeds up line commissioning and reduces maintenance

Reduce commissioning time by batch-setting the sensors and cut troubleshooting time during mass production by utilizing field data.

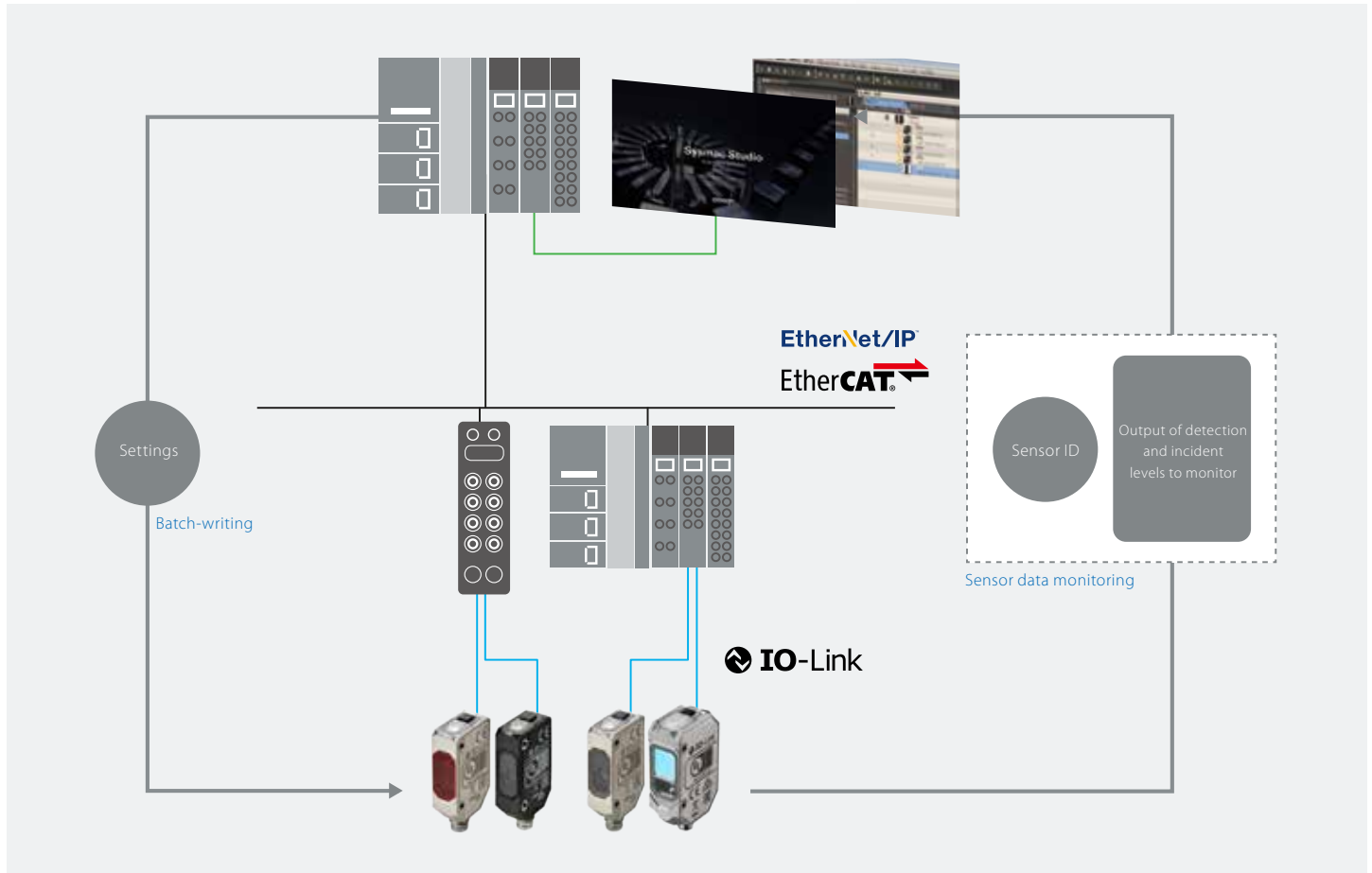
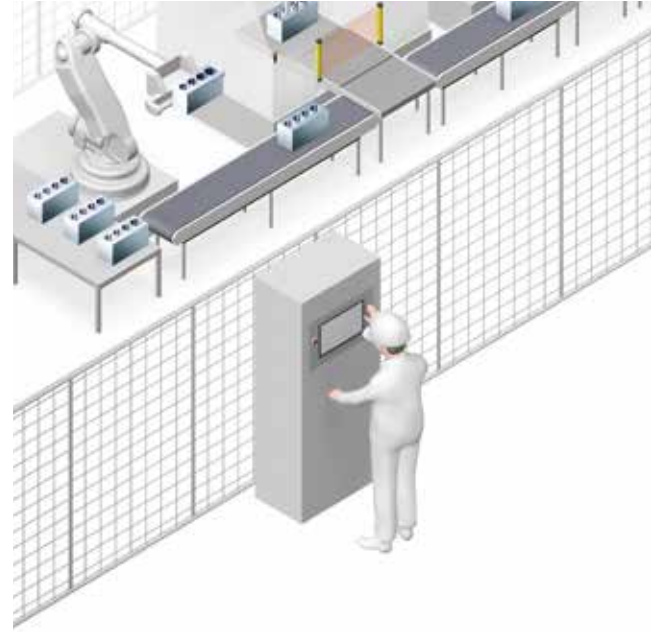


## Sensor data monitoring improves predictive maintenance and supports quick recovery

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 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		50 to 1500 mm	50 to 1500 mm
	35 to 150 mm		50 to 1000 mm	50 to 1000 mm
Standard detectable difference (mm)/ differential travel (%)	35 to 50 mm: 1 mm		15% max.	15% max.
	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		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

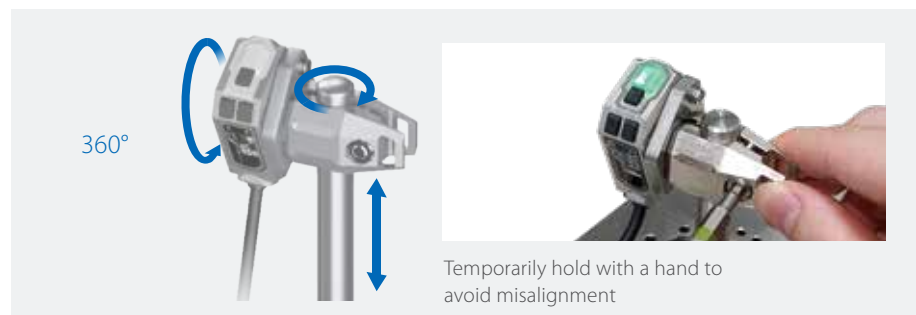


Distance-settable Photoelectric Sensors E3AS-L  
Sensing range: 10 to 80 mm/10 to 200 mm

More flexible mounting with flexible mounting bracket

PATENT PENDING<sup>1</sup>

No special safety measures required for Class 1 laser



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.

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

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

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