

## E3AS Reflective Sensors

Designed to tackle all Food & Commodities challenges



## Three models to cover all targets and sensing distances

Manufacturers are diversifying their products and shortening their life cycles. Quick equipment design and stable operation are critical issues at manufacturing sites. The Omron E3AS Series addresses these issues by expanding the options for using reflective photoelectric sensors and helping to reduce and improve equipment commissioning.

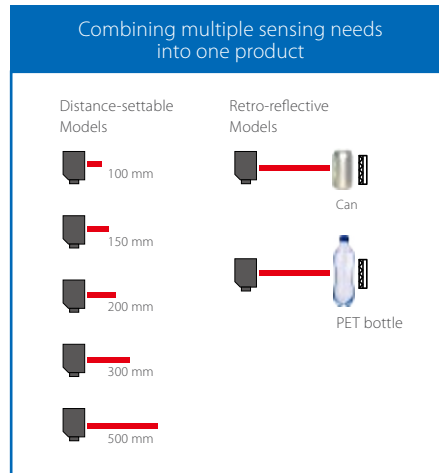


TOF Laser Sensor  
E3AS-F

CMOS Laser Sensor  
E3AS-HL

Distance-settable Sensor  
E3AS-L

## E3AS-HL: For small or challenging part detection



CMOS Laser Sensor  
E3AS-HL

Sensing distance Up to 500 mm

Glossy

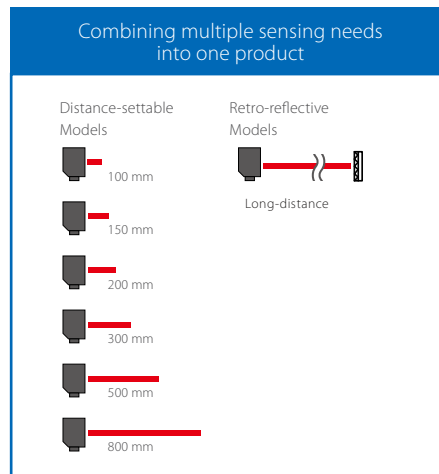
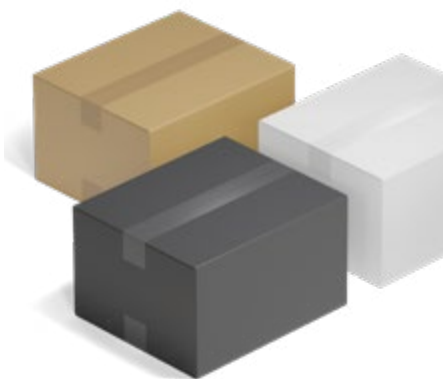
Curved

Uneven

Color, pattern

Transparent

## E3AS-F: For final packaging targets with simple shapes



TOF Laser Sensor  
E3AS-F

Sensing distance Up to 1,500 mm

Flat

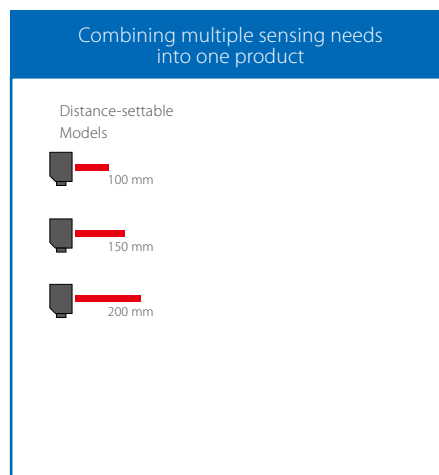
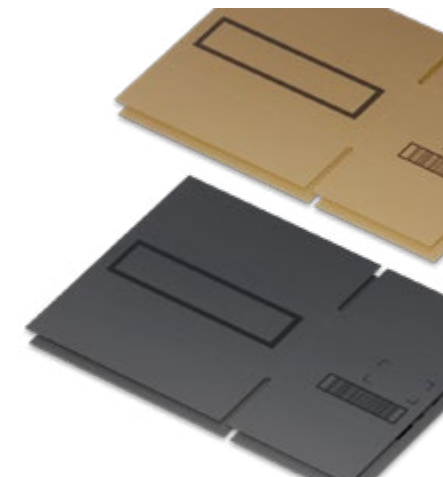
Large

Low-reflective

Color, pattern

Uneven

## E3AS-L: For small or thin part detection



Distance-settable  
Photoelectric Sensor E3AS-L

Sensing distance Up to 200 mm

Small

Flat

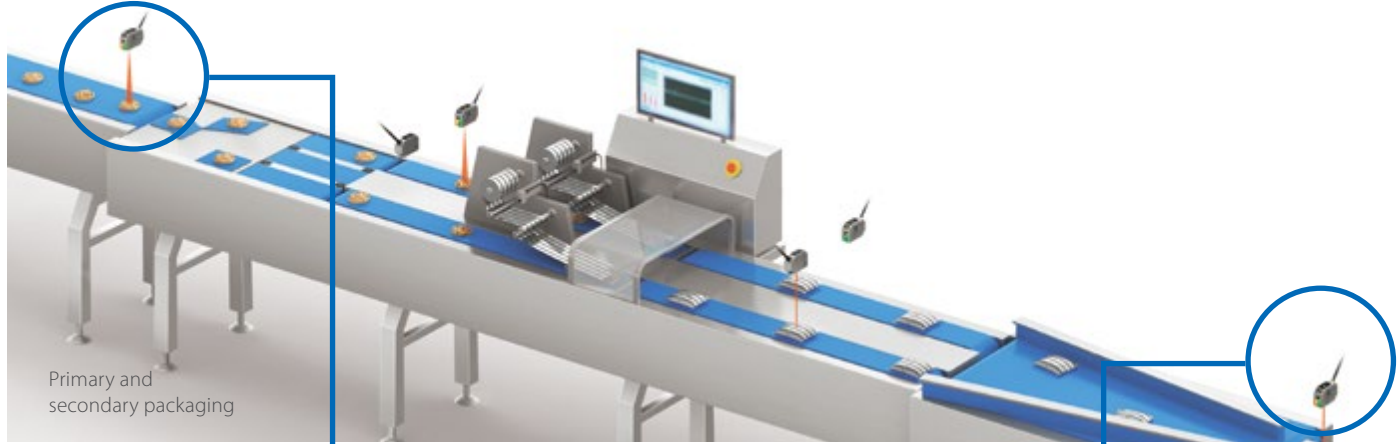
Thin

Low-reflective

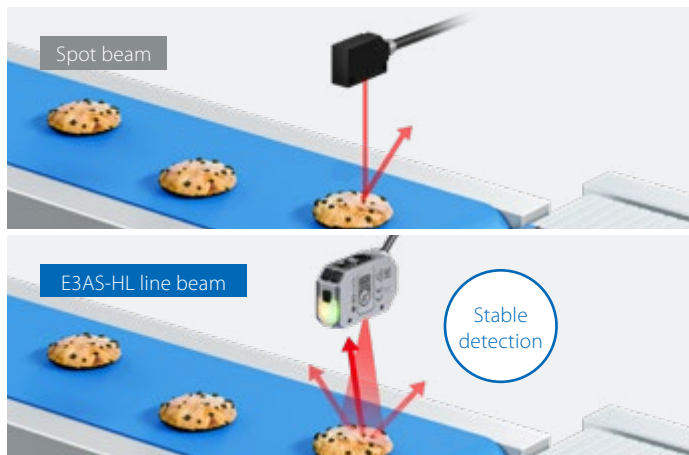
# Stable detection for variable targets

Conventional sensors must be reselected or reconfigured whenever the target's shape, color, pattern or reflectivity changes. The E3AS Series saves design time by reliably detecting targets without being overly influenced by target variation.

## E3AS-HL for complex-shaped, colored, patterned, or glossy targets

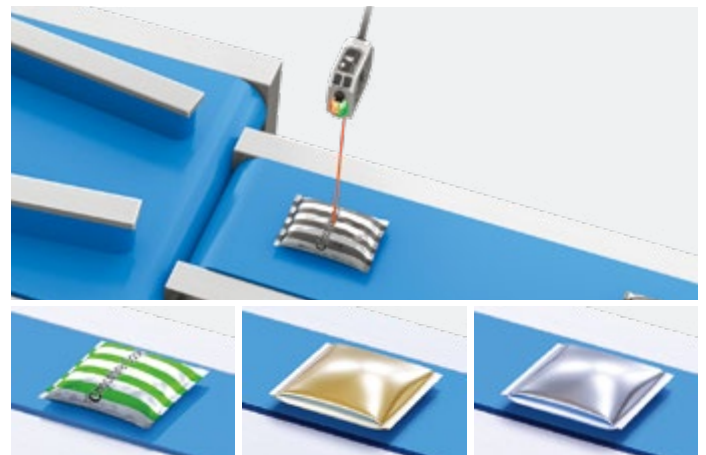


Stable detection for uneven surfaces



Surface variation causes unreliable light reception back to the sensor with a spot beam. The E3AS-HL line beam minimizes the impact of the surface profile by reflecting off more surface area.

Stable detection for diversely colored, patterned, or glossy targets

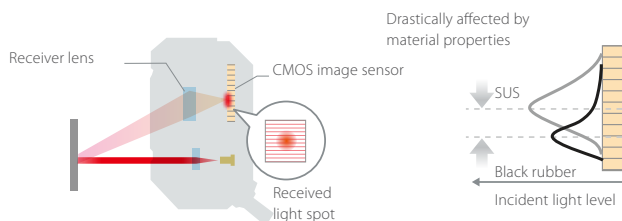


Detection is prone to instability because color, pattern, or reflectivity affects the sensing distance. Since the E3AS-HL is less likely to be affected by these characteristics, it provides stable detection even when packaging materials change.

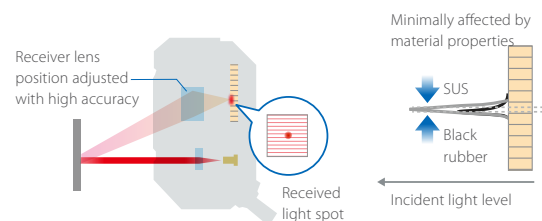
## CMOS sensing with built-in lens alignment technology minimizes the influence of material properties

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.



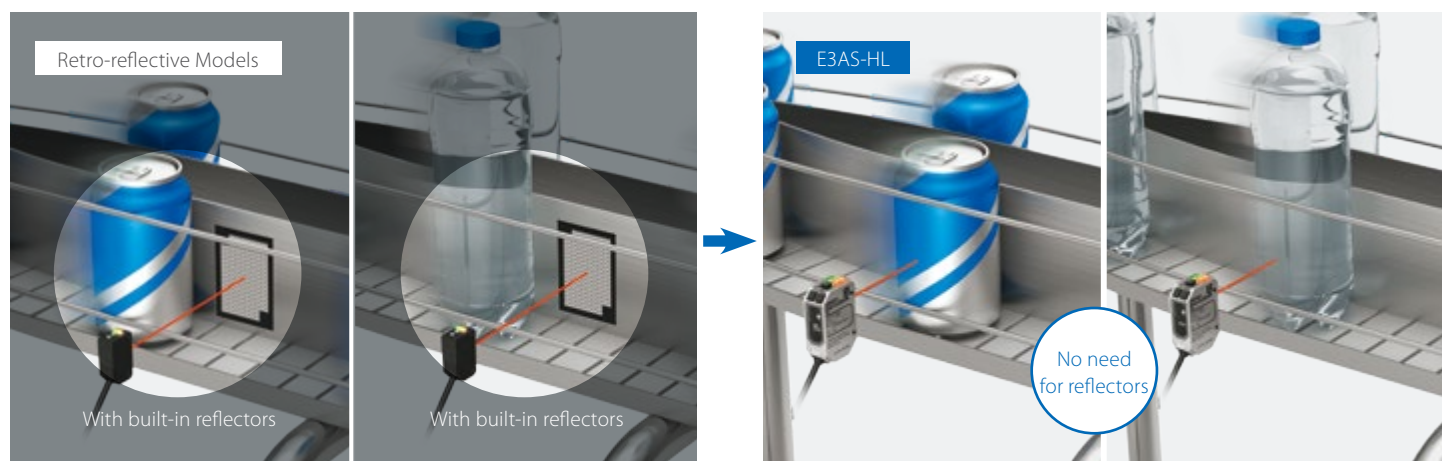
# Overcome space limitations and boost design flexibility

Retro-reflective sensors are used to detect difficult targets or where long sensing distance is needed due to the space constraints of installing more complex and sophisticated equipment. The E3AS Series increases flexibility by enabling a design without reflectors.

## E3AS-HL for multi-lane conveyor lines of targets with curved surfaces



## Reliably detects cans and clear plastic bottles without reflectors



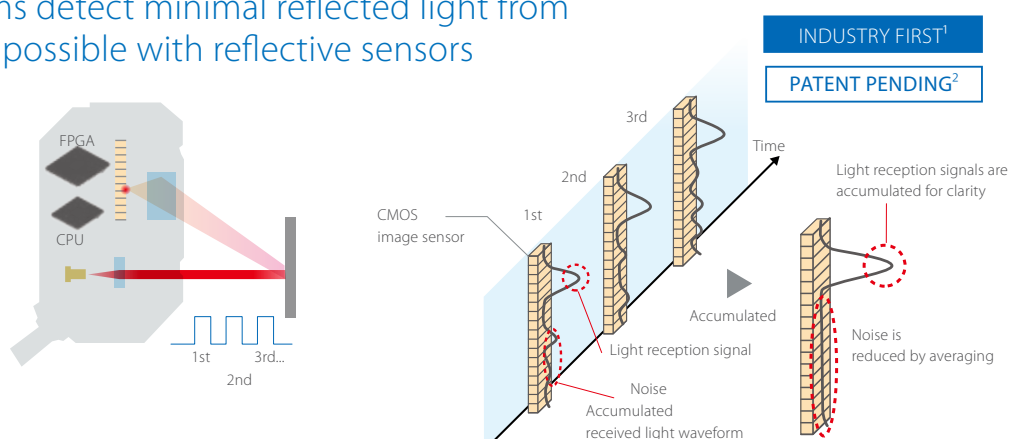
Retro-reflective sensors are used to detect curved surfaces of cans and transparent plastic bottles, but present installation issues when mounting reflectors on multi-lane conveyors.

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

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

E3AS-HL Sensors equipped with FPGA<sup>3</sup> use a sensing algorithm to perform high-speed sampling of received light waveforms at 10,000 times per second and unique Omron accumulation processing, significantly increasing its sensitivity. Together, they amplify the slightest amount of light to stably detect targets with glossy or uneven surfaces, or other targets from which it is difficult to receive reflected light.

Note: Not applicable to transparent objects.



1. Based on an Omron investigation in September 2019. 2. Patent pending in Japan. (As of September 2020) 3. FPGA = Field Programmable Gate Array

# Flexible design over a broad range of distances

E3AS-F and E3AS-L sensors use advanced technologies to accommodate flexible manufacturing lines and challenging targets.

## E3AS-F for long-distance sensing on converging and diverging lines



No reflector is required to design long-distance sensing target color or material



Although retro-reflective sensors are used for long-distance sensing in converging and diverging lines, space may be in a issue for mounting reflectors.

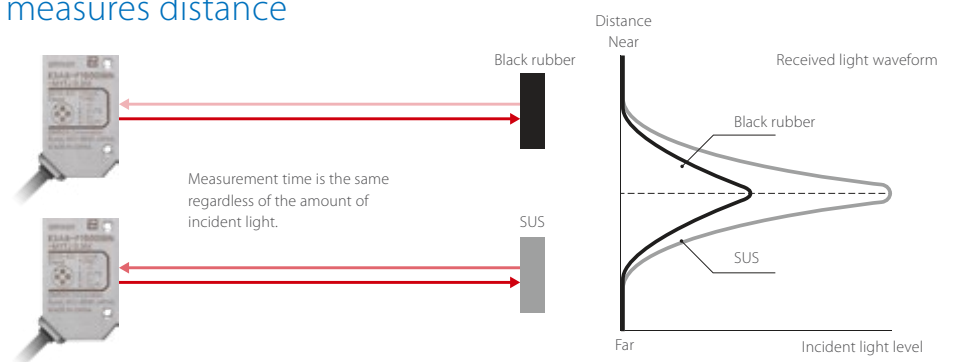


The E3AS-F Sensor, a reflective model with long sensing distance, does not require reflectors. Moreover, it is less likely to be affected by color even from long distances.

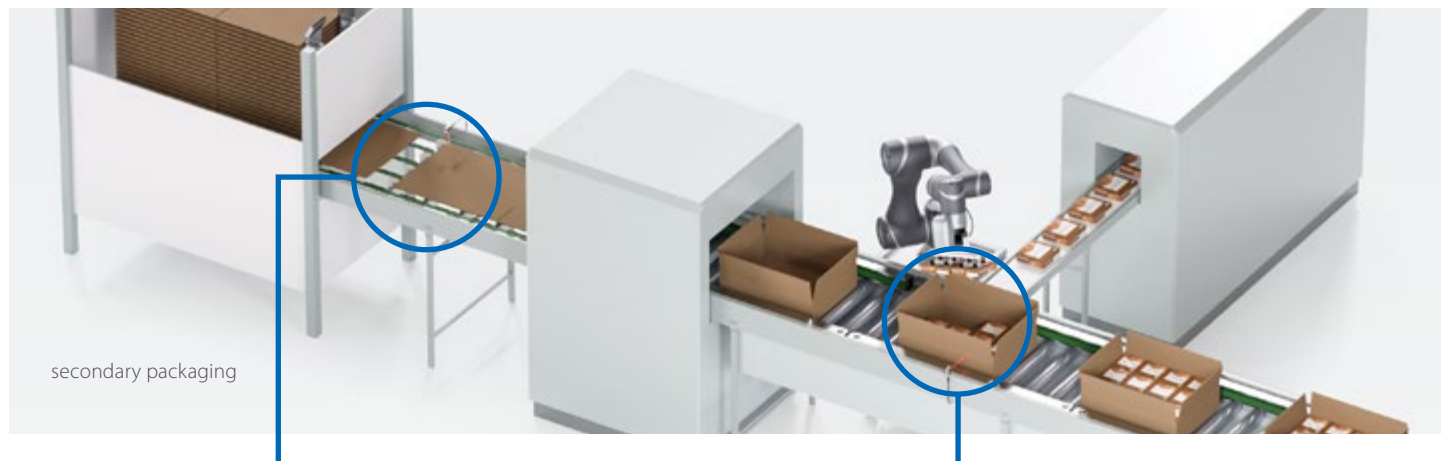


## TOF detects varying targets and measures distance

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.

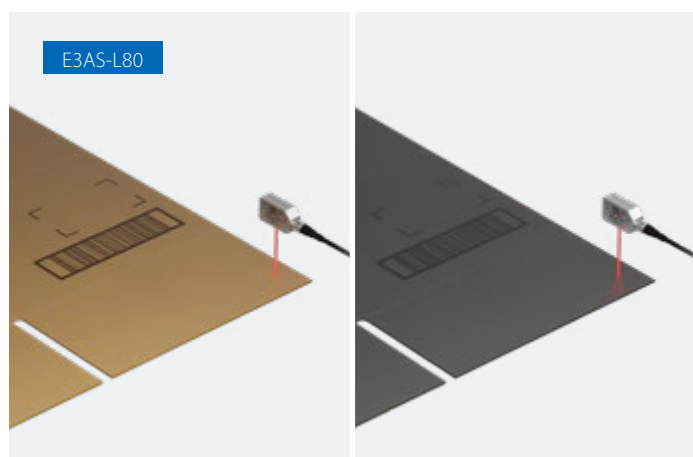


## E3AS-L for thin and low-reflective targets

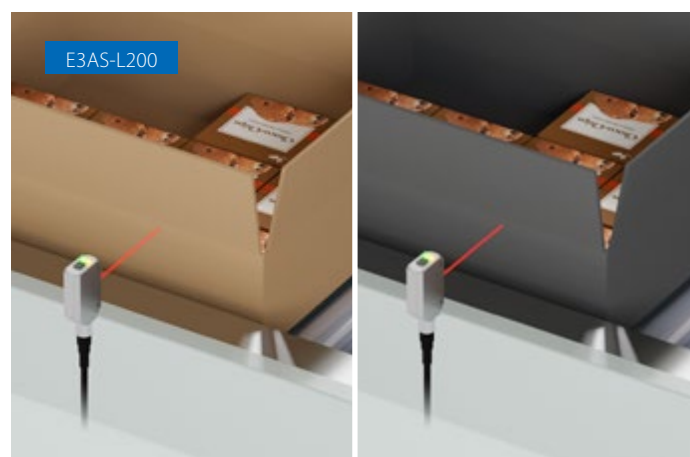


Stable detection for thin targets with varying colors

Stable detection for differently colored boxes at longer range



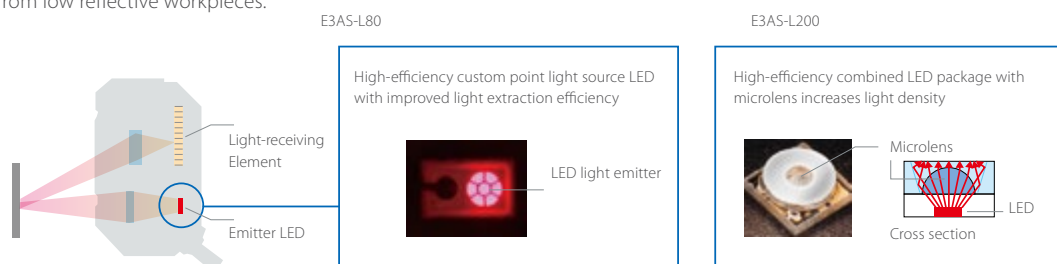
Detection may become unstable as differential travel varies depending on the target color. The E3AS-L80 Sensor can reliably detect level difference regardless of color since its differential travel<sup>2</sup> for black paper is 5%.



When the target is low-reflective black paper, detection may become unstable due to insufficient sensing distance. The E3AS-L200 Sensor can stably detect at the same distance regardless of color since its sensing distance for both white paper and black paper is 200 mm.

## Omron-unique LED package reliably detects low-reflective targets

The E3AS-L Sensor is equipped with an emitter 6 times more powerful than those of conventional models<sup>1</sup>, allowing it to receive light from low reflective workpieces.



1. Comparison with E3Z-LS products. 2. Differential travel is the minimum distance away from the background an object must be to be detected

## Quick and easy configuration

The E3AS Series' simple teaching method allows easy implementation of the optimal settings and eliminates unnecessary rework due to problems during commissioning.

### Single teach button prevents setting inconsistencies

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).

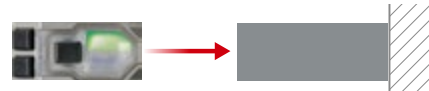
Hold teach button



#### Two-point teaching

Set the threshold level at a value halfway between 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.

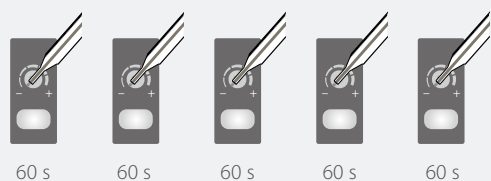
## Fast and easy setup when setting a large number of sensors

Sensitivity adjustment using the conventional adjuster method requires experience, finesse and time since the threshold level must be adjusted one unit at a time.

With the E3AS Series, simply press the teach button to automatically set the threshold level.

#### 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.



Adjustment  
time reduced by  
95 %

3 s x 5 units = 15 s in total

## Background Reference Teaching (sensitive) for easy setup of transparent object detection

PATENT PENDING<sup>1</sup>

CMOS E3AS-HL

The E3AS-HL Sensor detects presence of targets from the variation (correlation) of background distance information and incident light level information.

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



Without target  
(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 target  
(Example: Correlation is 40%)

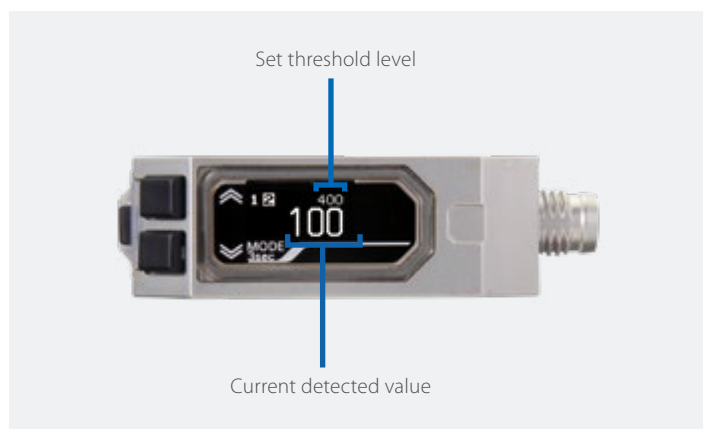


## Easy-to-read, easy-to-understand OLED display

CMOS E3AS-HL

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



### Detection display switching based on purpose

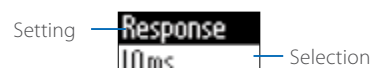
Bar display to grasp detection margin at a glance



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

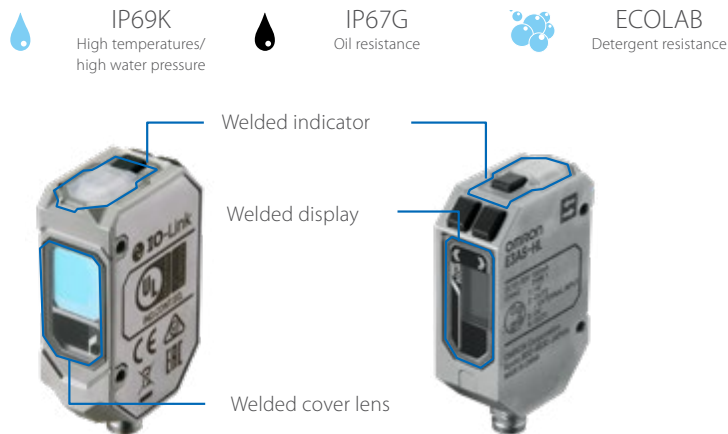


# Robust design minimizes downtime and maintenance

When a sensor malfunctions due to the environment and causes a line stoppage during mass production, it can take a long time to restart. With enhanced environmental resistance, the E3AS Series minimizes line downtime and maximizes uptime.

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

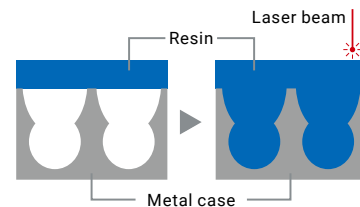
The sensor case is made of stainless steel (SUS316L). The unique Omron laser welding technology for mixed materials enhances the sealing and adhesion between stainless steel and resin.



PATENTED<sup>1</sup>

### Laser welding technology for mixed materials

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

CMOS E3AS-HL

False detection may occur due to the effects of lights for vision sensors or nearby sensors after the production line layout is changed.

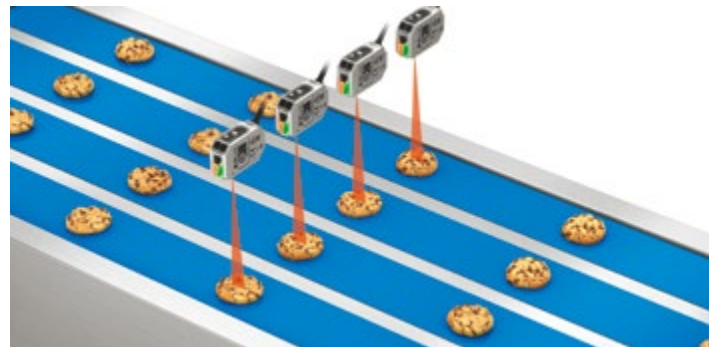
E3AS-HL Sensors can be operated in high ambient illumination conditions and have the mutual interference prevention function, reducing the frequency of false detections when mounting near other sensors.

### 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<sup>2</sup>, preventing false detections caused by camera lights or sunlight.

### Mutual interference prevention



The mutual interference prevention function includes up to 4 units, allowing users to limit false detections when using multiple sensors on the same line.

## Antifouling coating on sensing surface reduces false detection and cleaning frequency

INDUSTRY FIRST<sup>1</sup>

PATENT PENDING<sup>2</sup>

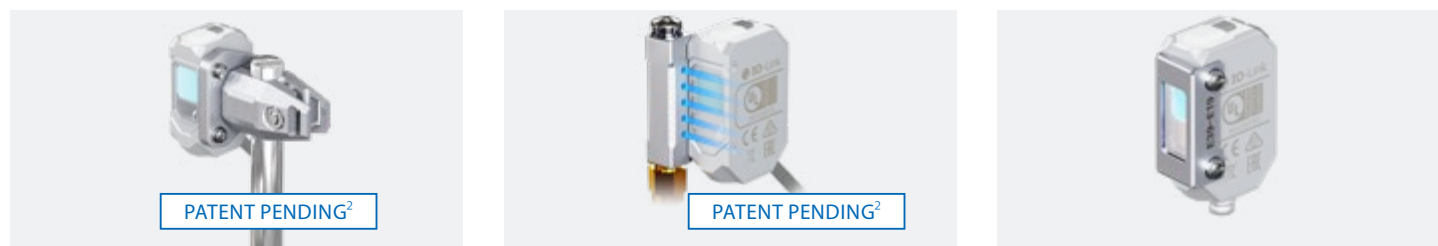
A dirty sensing surface can cause false detection. The E3AS Series has an antifouling coating on the sensing surface which prevents water droplets and paper dust from sticking to the sensing surface and keeps the lens from fogging.



## 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.

### Air Blow Unit

Blows paper dust and cleaning solutions off the sensing surface.

### Front Protection Cover<sup>3</sup>

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

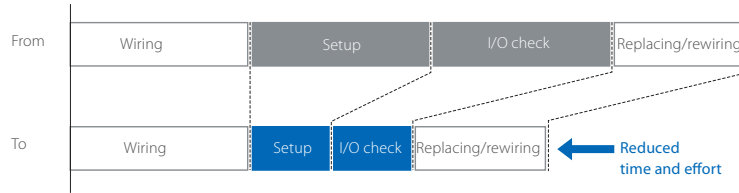
1. Based on an Omron investigation in September 2019.

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

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

# 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.



1

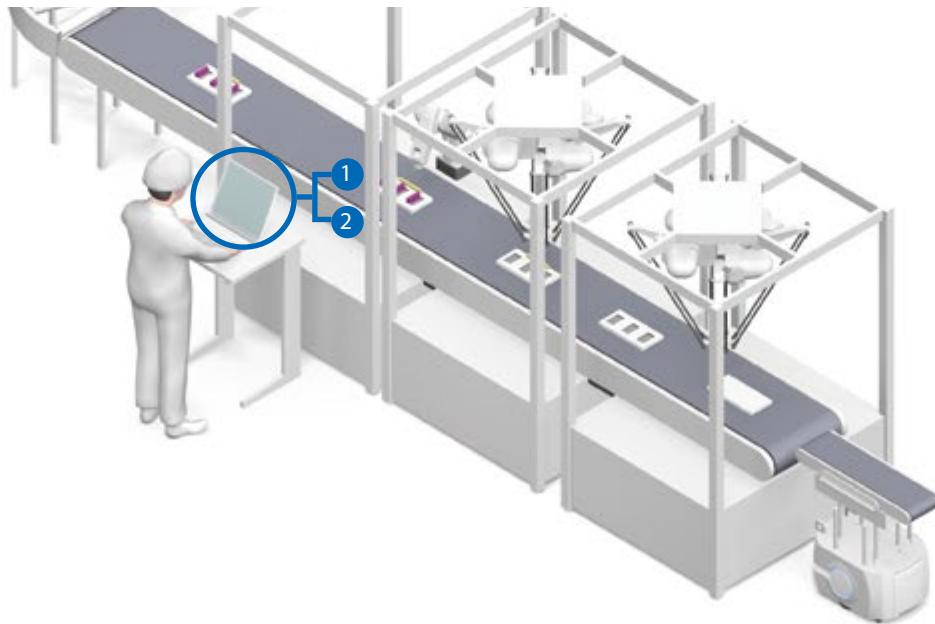
## Sensor data monitoring improves predictive maintenance and supports quick recovery

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

2

## 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.



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