Achieving "innovations in distance" for reflective-type photoelectric sensors
Use reflective photoelectric sensors in entirely new ways.

Conventional reflective photoelectric sensors have issues that may limit their range of application, such as their short sensing distances, possible false detection due to the effect of workpiece colors, and their large sizes. The E3AS-F Series adopts the TOF method, which effectively resolves these issues for increased versatility. E3AS-F Sensors can be used, for example, in high-mix conveyor lines carrying products of various colors and shapes, and assembly lines with restricted space for sensor installation.

Wider sensing range of 50 to 1,500 mm
Free users from selecting sensors depending on sensing distance.

Stable detection for various workpieces
Reduce evaluation and adjustment time.

Compact body
Eliminate restrictions on installing locations.

TOF method to stably detect various workpieces

TOF method
In the TOF ("Time of Flight") method, the distance is calculated from the time elapsed between the light emission and its reception by the sensor, after it is reflected off the workpiece.

Why TOF method enables stable detection
In the TOF method, the distance is measured based on the elapsed time. Measurements therefore are not affected by changes in the color or material of the workpiece. This allows for stable detection without adjustment for each workpiece. This method also enables sensors to detect objects even when the incident level is small. This means that workpieces with low reflectivity, such as black rubber, can be detected from longer distances.

Why triangulation method needs adjustment
The distance is measured from the light receiving position in a triangulation method. The position varies due to changes in the received light waveform, which is affected by the reflectance properties (regular or diffuse) of the workpiece color or material. This means that the sensor needs to be adjusted for each workpiece. Workpieces with low reflectivity, such as black rubber, can only deliver a small amount of light, and thus can only be detected within shorter distances.

E3AS-F Application

Note: Pre-wired Models and M8/M12 Pre-wired Connector Models will be coming soon.
Design diverging and converging conveyor lines with a single model

E3AS-F Sensors can detect workpieces by the set distance regardless of their colors or materials, reducing the time required for evaluation and adjustment of each workpiece. Compared to through-beam and retro-reflective models, they take half the work to install, significantly saving setup time.

Wide sensing range for various conveyor line widths

Previously, users had to select sensors depending on the required sensing distance. With E3AS-F Sensors, which have a wide sensing range of 50 to 1,500 mm, there is no need to select a different sensor for each application.

TOF method enables detection of various workpieces on the conveyor line

With conventional photoelectric sensors, prior evaluation was required for each workpiece to be detected. E3AS-F Sensors detect workpieces varying in colors and materials by the set distance. This helps reduce evaluation and adjustment time. Also, they do not detect workers working near the line by mistake.

Small enough to be installed in AGVs

Because of their large sizes, conventional long-distance reflective sensors were limited in where they could be installed. E3AS-F Sensors have been significantly downsized, allowing them to be installed in various locations, providing more design flexibility.
Free from installation restrictions on assembly lines

Previously, installing sensors in the assembly area ran the risk of their colliding with tools and workpieces, causing sensor failures or optical axis misalignment, both of which would lead to false detections. E3AS-F Sensors, with their long sensing distances, can detect objects from outside the assembly area, effectively reducing the frequency of line stoppages caused by unnecessary problems. Their compact size allows them to be installed in various locations.

Wide sensing range to address changes in workpiece sizes

Conventional photoelectric sensors needed to be moved or replaced when the distance between the sensor and the workpiece changed. E3AS-F Sensors, with their 50 to 1,500 mm sensing range, can be used without replacement even if a new workpiece is added for detection.

TOF method to detect various workpieces

With conventional photoelectric sensors, prior evaluation was required for each workpiece to be detected. E3AS-F Sensors detect workpieces varying in colors and materials by the set distance, help reduce evaluation and adjustment time. They are unaffected by color variations that may be caused by workpiece contamination, and do not detect workers working near the line by mistake.

Small enough to be added to confined spaces

Conventional photoelectric sensors, because of their large sizes, could not be newly added to a line without modifying the line itself. E3AS-F Sensors can be installed in various locations, making sensor addition easier.
The sensor case is made of stainless steel (SUS316L). Omron’s two unique technologies, laser welding technology for different materials and laser welding technology for metals, enhanced the sealing and adhesion between the stainless steel and resin.

**IP69K**
- High temperatures/high water pressure

**IP67G**
- Oil resistance

**ECOLAB**
- Detergent resistance

Antifouling coating prevents contamination on the sensing surface

Dirty sensing surface can cause false detection due to the principle of photoelectric sensors. E3AS Series with the antifouling coating on the sensing surface, which is the industry’s first, prevents water droplets, oil, and dust from sticking to the sensing surface, and keeps the lens from fogging as well. Therefore, the coating prevents contamination on the sensing surface in environments where oil or dust scatters, or steam generates. False detection and cleaning frequency are also reduced.

Reduces sensor cleaning time and replacement frequency

Two types to choose from, according to installation environments

Offered in two types of cases: metal or resin. Their sensing ranges are the same.

![Metal type](image)

![Plastic type](image)

**Actual size**
- W 11.5 x D 21 x H 38 mm

Short-distance sensing models also available

Equipped with OMROH’s unique light emitting element for stable detection of workpieces with low reflectivity. Ideal for detecting small, thin workpieces.

Distance-settable Photoelectric Sensors E3AS-L Series

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<tr>
<th>Model</th>
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One-touch teaching to prevent inconsistent settings

Anyone can easily and consistently set the optimal threshold value just by pressing the teaching button.

**Teaching without a workpiece**

Set the threshold between the sensor and background (reference surface), at approximately 15% point of the distance closer to the background.

- Long press of the teach button
- Threshold level

**Two-point teaching**

Sets the threshold at a value halfway between that when a workpiece is present and that when one is not. Settings can be done with the workpiece present first or in the reverse way.

- Place a workpiece in position and press the teach button
- Press the teach button without a workpiece in place
- Threshold level

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Laser welding technologies for different materials/metals for increased environmental resistance

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Laser welding technology for different materials

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

Laser welding technology for metals

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

*1. “Patented pending” means that we applied for a patent in Japan, and “Patented” means that we obtained a patent in Japan. (As of August 2019)
IO-Link dramatically reduces commissioning time

IO-Link enables batch-writing of sensor setting information, effectively reducing commissioning time and inconsistent settings. It also enables users to check sensor IDs, allowing them to efficiently perform I/O checks on the thousands of sensors installed on the line.

<table>
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<th>I/O check</th>
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**Set up** Setting all sensors from a host device at the same time

Sensor setting information can be batch-written, eliminating the need to set a large number of sensors one by one at sites.

**I/O check** ID check prevents installation mistakes

Sensor IDs can be collectively checked, making it easy for users to check disconnected or unconnected sensors, and installation mistakes.

Note: Setting of the IO-Link master or programming for the PLC is required.

Note: Screen is a conceptual illustration.

1. E3AS-F only

HMI

An incorrect sensor is installed for No. 5!

That isn’t the sensor for No. 5... I could find that out before commissioning!
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