

# E3FA PHOTOELECTRIC SENSORS

A new generation in sensing performance



» Simplicity

» One family for all

» Non-stop detection



# A new generation in sensing performance!

*Producing more than a million per year, Omron is a world leader in photoelectric sensors. Backed by more than 40 years of experience, Omron is constantly enhancing its portfolio and has now completely redesigned and expanded its popular M18 cylindrical range. Renowned for its high quality and product reliability, Omron's new generation of photoelectric sensors represents one of the largest varieties of dependable and easy-to-use photoelectric sensors on the market. Regardless of your industry or application, the E3FA series has the right sensor for the job at the best price versus performance.*

## **Simplicity**

- Simple selection
- Simple installation

## **One family for all**

- All standard applications covered
- A wide variety of models
- Models designed for special applications

## **Non-stop detection**

- High quality and reliability
- High EMC protection
- High light immunity
- Robust and waterproof housing





361° - the perfect match

The new E3FA cylindrical PES portfolio follows the Omron 361° approach. Well known as a global manufacturer Omron offers the perfect match for your demands. Always get Omron's guaranteed quality from the Lite, Pro and Proplus line and select what you really need: not more, not less – simply comply.

Featuring	Lite	Pro	Pro <sup>plus</sup>
Quality	++	++	++
Range / Types / Model	O	++	Tailored
Specs	+	++	Tailored
Global availability	O	+	++
Customizable	N.A.	++	+++
Application	+	++	+++
Industry	O	+	+++
Service level	O	+	++

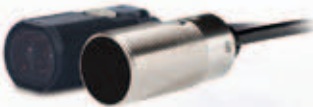
# One family for all

Typically installed in industrial plants ranging from food and beverage, pharmaceutical, textiles, ceramics and brick production, through to logistics, there's always an E3FA model to fit your application. This extensive photoelectric sensor series with high reliability and enhanced performance includes through-beam, retro-reflective and diffuse reflective types in straight and radial versions. Straight versions are also available with background-suppression, limited-reflective detection, and transparent object detection types for special applications. All models are available in plastic and metal housing.



## E3FA Pro Series (Straight)

Omron's well-known quality is built into this series, which exceeds market standards in terms of reliability and solves a wide range of applications in various industries.



Through-beam	20 m
Retro-reflective	0.1 to 4 m with E39-R1S
Coaxial Retro-reflective	0 to 500 mm with E39-R1S
Diffuse-reflective	100 mm
	300 mm
	1 m
BGS (background suppression)	100 mm
	200 mm



## E3RA Pro Series (Radial)

E3RA provides a full line-up of radial types that increases mounting flexibility to match specific requirements.



Through-beam	15 m
Retro-reflective	0.1 to 3 m with E39-R1S
Diffuse-reflective	100 mm
	300 mm
	700 mm



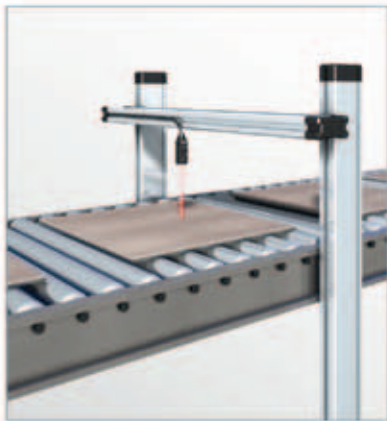
Application specific models



Limited-reflective types suitable for detecting transparent film to shiny, mirror film.



Transparent object detection types utilising Omron's unique technology for detecting objects with birefringent (double refraction) properties.

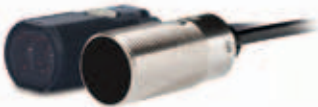


Background suppression types for the stable detection of different objects with various colours.



E3FA ProPlus Series

The E3FA series offers special models to solve demanding applications, for example, in the food and packaging industry. This includes the detection of transparent or structured objects. Further models are available or can be tailored for you. Please contact us for more details.



Limited distance reflective	10 to 50 mm
Transparent detection with P-opaqing function	100 to 500 mm with E39-RP1
Transparent detection with P-opaqing function	0.1 to 2 m with E39-RP1



E3F1 Lite Series

For applications with standard requirements E3F1 Lite Series provides best value at a competitive price.



Through-beam	15 m
Retro-reflective	0.1 to 3 m with E39-R1S
Diffuse-reflective	100 mm
	300 mm

# Simplicity

Omron's compact E3FA series of photoelectric sensors is simple and quick to mount, as well as easy and intuitive to set-up. The large and robust adjuster makes life much easier for installers to adjust the sensor, as does the bright, high-power red LED, which is clearly visible for easy alignment, even over longer distances. Similarly, the sensor's LED status indicator can be viewed from long distances and wide angles.



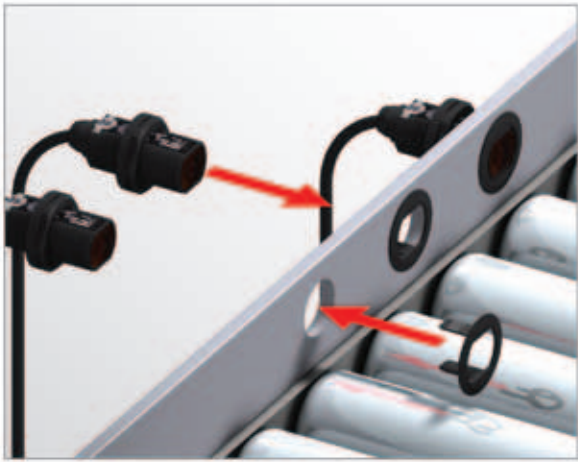
Compact size and shape. Can be installed almost anywhere.



Visible LED light for easy alignment.



Bright LED indicators for the easy operational status checking.



Flush mounting option for smooth installation.

## Non-stop detection

Especially designed for machines that never stop, the rugged E3FA series offers completely reliable sensing in a robust and waterproof housing that can withstand even high-pressure cleaning. Exceeding market standards, this series also has high EMC protection and light immunity. In addition, there is the added benefit of the high-power LED, which contributes to high sensing stability even in environments with dust or vibrations.



High power LED to compensate for dirt and misalignment.



Pulse synchronisation for high ambient light immunity.



Intensive shielding for high electromagnetic noise immunity.





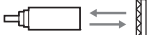


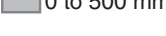




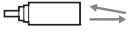


Tight housing construction for high-level water protection.

Ordering Information

For metal housing please exchange “A” with “B” in type name; e.g. E3FB-TN11 2M


E3FA Pro Series




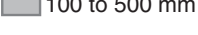
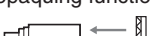

 Red light

Sensor type	Sensing distance	Connection method	Model	
			NPN output	PNP output
<b>Through-beam</b> <sup>*1</sup> 	 20 m	pre-wired	E3FA-TN11 2M	E3FA-TP11 2M
		M12 connector	E3FA-TN21	E3FA-TP21
<b>Retro-reflective</b> <sup>*2</sup> 	 0.1 to 4 m	pre-wired	E3FA-RN11 2M	E3FA-RP11 2M
		M12 connector	E3FA-RN21	E3FA-RP21
<b>Coaxial Retro-reflective</b> <sup>*2</sup> 	 0 to 500 mm	pre-wired	E3FA-RN12 2M	E3FA-RP12 2M
		M12 connector	E3FA-RN22	E3FA-RP22
<b>Diffuse-reflective</b> 	 100 mm	pre-wired	E3FA-DN11 2M	E3FA-DP11 2M
		M12 connector	E3FA-DN21	E3FA-DP21
	 300 mm	pre-wired	E3FA-DN12 2M	E3FA-DP12 2M
		M12 connector	E3FA-DN22	E3FA-DP22
	 1 m	pre-wired	E3FA-DN13 2M	E3FA-DP13 2M
		M12 connector	E3FA-DN23	E3FA-DP23
<b>BGS (background suppression)</b> 	 100 mm	pre-wired	E3FA-LN11 2M	E3FA-LP11 2M
		M12 connector	E3FA-LN21	E3FA-LP21
	 200 mm	pre-wired	E3FA-LN12 2M	E3FA-LP12 2M
		M12 connector	E3FA-LN22	E3FA-LP22


<sup>\*1</sup> Includes the emitter and receiver.  
<sup>\*2</sup> The Reflector is sold separately. Select the Reflector model most suited to the application.

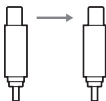



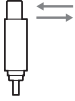



E3FA Pro<sup>plus</sup> Series

 Red light

Sensor type	Sensing distance	Connection method	Model	
			NPN output	PNP output
<b>Limited distance reflective</b> 	 10 to 50 mm	pre-wired	E3FA-VN11 2M	E3FA-VP11 2M
		M12 connector	E3FA-VN21	E3FA-VP21
<b>Transparent detected with P-opaqing function</b> <sup>*2</sup> 	 100 to 500 mm	pre-wired	E3FA-BN11 2M	E3FA-BP11 2M
		M12 connector	E3FA-BN21	E3FA-BP21
<b>Transparent detected with P-opaqing function</b> <sup>*2</sup> 	 0.1 to 2 m	pre-wired	E3FA-BN12 2M	E3FA-BP12 2M
		M12 connector	E3FA-BN22	E3FA-BP22

E3RA Pro Series


 Red light








Sensor type	Sensing distance	Connection method	Model	
			NPN output	PNP output
<b>Through-beam</b> <sup>*1</sup> 	 15 m	pre-wired	E3RA-TN11 2M	E3RA-TP11 2M
		M12 connector	E3RA-TN21	E3RA-TP21
<b>Retro-reflective</b> <sup>*2</sup> 	 0.1 to 3 m	pre-wired	E3RA-RN11 2M	E3RA-RP11 2M
		M12 connector	E3RA-RN21	E3RA-RP21
<b>Diffuse reflective</b> 	 100 mm	pre-wired	E3RA-DN11 2M	E3RA-DP11 2M
		M12 connector	E3RA-DN21	E3RA-DP21
	 300 mm	pre-wired	E3RA-DN12 2M	E3RA-DP12 2M
		M12 connector	E3RA-DN22	E3RA-DP22
	 700 mm	pre-wired	E3RA-DN13 2M	E3RA-DP13 2M
		M12 connector	E3RA-DN23	E3RA-DP23

<sup>\*1</sup> Includes the emitter and receiver.  
<sup>\*2</sup> The Reflector is sold separately. Select the Reflector model most suited to the application.




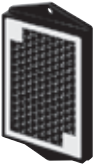
E3F1 Lite Series

 Red light

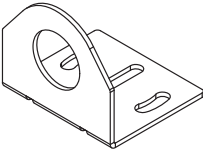

Sensor type	Sensing distance	Connection method	Model	
			NPN output	PNP output
<div>Through-beam<sup>*1</sup></div> <div></div>	<div></div> 15 m	pre-wired	E3F1-TN11 2M	E3F1-TP11 2M
		M12 connector	E3F1-TN21	E3F1-TP21
<div>Retro-reflective<sup>*2</sup></div> <div></div>	<div></div> 0.1 to 3 m	pre-wired	E3F1-RN11 2M	E3F1-RP11 2M
		M12 connector	E3F1-RN21	E3F1-RP21
<div>Diffuse-reflective</div> <div></div>	<div></div> 100 mm	pre-wired	E3F1-DN11 2M	E3F1-DP11 2M
		M12 connector	E3F1-DN21	E3F1-DP21
	<div></div> 300 mm	pre-wired	E3F1-DN12 2M	E3F1-DP12 2M
		M12 connector	E3F1-DN22	E3F1-DP22

<sup>\*1</sup> Includes the emitter and receiver.  
<sup>\*2</sup> The Reflector is sold separately. Select the Reflector model most suited to the application.



Reflectors (order separately)

Sensor	Sensing distance	Appearance	Model	Quantity	Remarks
E3FA-R□1	0.1 to 4 m		E39-R1S	1	for E3FA-R□ and E3RA-R□
E3FA-R□2	0 to 500 mm				
E3FA-B□1	100 to 500 mm		E39-RP1	1	for E3FA-B□
E3FA-B□2	0.1 to 2 m				

Mounting brackets (order separately)

Sensor	Appearance	Model (Material)	Quantity	Remarks
all types		E39-L183 (SUS304)	1	Mounting bracket
		E39-L182 (POM)	1	Flush mounting bracket

Sensor I/O connectors

Sensor	Size	Cable	Appearance	Cable type		Model
M12 connector types	M12	Standard	Straight 	2 m	4-wire	XS2F-M12PVC4S2M-EU
				5 m		XS2F-M12PVC4S5M-EU
			Angle 	2 m		XS2F-M12PVC4A2M-EU
				5 m		XS2F-M12PVC4A5M-EU

Specifications

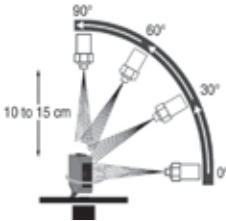
E3FA Series

Sensing method		Through-beam	Retro-reflective	Coaxial Retro-reflective	Diffuse-reflective		
					100 mm models	300 mm models	1 m models
Sensing distance		20 m	0.1 to 4 m	0 to 500 mm (with E39-R1S)	100 mm (white paper: 300 × 300 mm)	300 mm (white paper: 300 × 300 mm)	1 m (white paper: 300 × 300 mm)
Light source (wavelength)		Red LED (624 nm)					
Power supply voltage		10 to 30 VDC (include voltage ripple of 10%(p-p) max.)					
Current consumption		40 mA max. (Emitter 25 mA max. Receiver 15 mA max.)	25 mA max.				
Control output		NPN/PNP (open collector) Load current: 100 mA max. (Residual voltage: 3 V max.), Load power supply voltage: 30 VDC max.					
Operation mode		Light-ON/Dark-ON selectable by wiring					
Indicator		Operation indicator (orange) Stability indicator (green) Power indicator (green): only Emitter of Through-beam					
Protection circuits		Reversed power supply polarity protection, Output short-circuit protection and Reversed output polarity protection, Mutual interference prevention (not Through-beam types)					
Response time		0.5 ms					
Sensitivity adjustment		One-turn adjuster					
Degree of protection		IEC: IP67, DIN 40050-9: IP69K *					
Material	Case/Nut	ABS (Plastic models) Nickel plated brass (metal models)					
	Lens and Display	PMMA					

E3FA Series

Sensing method		BGS (Background suppression)		Limited distance reflective	Transparent detected with P-opaqing function	
		100 mm models	200 mm models		500 mm models (coaxial)	2 m models
Sensing distance		100 mm (white paper: 300 × 300 mm)	200 mm (white paper: 300 × 300 mm)	10 to 50 mm (glass(t = 1.0 mm): 150 × 150 mm)	100 to 500 mm (with E39-RP1)	0.1 to 2 m (with E39-RP1)
Light source (wavelength)		Red LED (624 nm)				
Power supply voltage		10 to 30 VDC (include voltage ripple of 10%(p-p) max.)				
Current consumption		25 mA max.				
Control output		NPN/PNP (open collector) Load current: 100 mA max. (Residual voltage: 3 V max.), Load power supply voltage: 30 VDC max.				
Operation mode		Light-ON/Dark-ON selectable by wiring				
Indicator		Operation indicator (orange) Stability indicator (green) Power indicator (green): only Emitter of Through-beam				
Protection circuits		Reversed power supply polarity protection, Output short-circuit protection and Reversed output polarity protection, Mutual interference prevention				
Response time		0.5 ms				
Sensitivity adjustment		Fixed			One-turn adjuster	
Degree of protection		IEC: IP67, DIN 40050-9: IP69K *				
Material	Case/Nut	ABS (Plastic models) Nickel plated brass (metal models)				
	Lens and Display	PMMA				

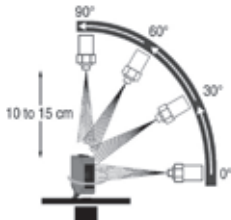
\* IP69K Degree of Protection Specifications  
IP69K is a protection specification stipulated by DIN 40050 Part 9 of the German standards.  
The test item is sprayed with 80°C water from a nozzle of a specified shape at a water pressure of 80 to 100 bar. The amount of water is 14 to 16 liters per minute.  
The distance between the test item and the nozzle is 10 to 15 cm. The water is discharged at angles of 0°, 30°, 60°, and 90° from the horizontal plane for 30 seconds at each angle while the test item is rotated horizontally.



E3RA Series (radial optics)

Sensing method		Through-beam	Retro-reflective	Diffuse-reflective		
				100 mm model	300 mm model	700 mm model
Sensing distance		15 m	0.1 to 3 m (with E39-R1S)	100 mm (white paper: 300 × 300 mm)	300 mm (white paper: 300 × 300 mm)	700 mm (white paper: 300 × 300 mm)
Light source (wavelength)		Red LED (624 nm)				
Power supply voltage		10 to 30 VDC (include voltage ripple of 10%(p-p) max.)				
Current consumption		40mA max. (Emitter 25 mA max. Receiver 15 mA max.)	25 mA max.			
Control output		NPN/PNP (open collector) Load current: 100 mA max. (Residual voltage: 2 V max.), Load power supply voltage: 30 VDC max.				
Operation mode		Light-ON/Dark-ON selectable by wiring				
Indicator		Operation indicator (orange) Stability indicator (green) Power indicator (green): only Emitter of Through-beam				
Protection circuits		Reversed power supply polarity protection, Output short-circuit protection and Reversed output polarity protection, Mutual interference prevention (not Through-beam types)				
Response time		0.5 ms				
Sensitivity adjustment		One-turn adjuster				
Degree of protection		IEC: IP67, DIN 40050-9: IP69K *				
Material	Case/Nut	ABS (Plastic models) Nickel plated brass (metal models)				
	Lens and Display	PMMA				

\* IP69K Degree of Protection Specifications  
IP69K is a protection specification stipulated by DIN 40050 Part 9 of the German standards.  
The test item is sprayed with 80°C water from a nozzle of a specified shape at a water pressure of 80 to 100 bar. The amount of water is 14 to 16 liters per minute.  
The distance between the test item and the nozzle is 10 to 15 cm. The water is discharged at angles of 0°, 30°, 60°, and 90° from the horizontal plane for 30 seconds at each angle while the test item is rotated horizontally.



E3F1 Series

Sensing method		Through-beam	Retro-reflective	Diffuse-reflective	
				100 mm models	300 mm models
Sensing distance		15 m	0.1 to 3 m	100 mm (white paper: 300 × 300 mm)	300 mm (white paper: 300 × 300 mm)
Spot diameter (typical)		—	—	40 × 45 mm Sensing distance of 100 mm	40 × 50 mm Sensing distance of 300 mm
Light source (wavelength)		Red LED (624 nm)			
Power supply voltage		10 to 30 VDC (include voltage ripple of 10%(p-p) max.)			
Current consumption		40 mA max. (Emitter 25 mA max. Re- ceiver 15 mA max.)	25 mA max.		
Control output		NPN/PNP (open collector) Load current: 100 mA max. (Residual voltage: 3 V max.), Load power supply voltage: 30 VDC max.			
Operation mode		Light-ON/Dark-ON selectable by wiring			
Indicator		Operation indicator (orange) Stability indicator (green) Power indicator (green): only Emitter of Through-beam			
Protection circuits		Reversed power supply polarity protection, Output short-circuit protection and Reversed output polarity protection, Mutual interference prevention (not Through-beam types)			
Response time		0.5 ms			
Sensitivity adjustment		One-turn adjuster			
Degree of protection		IEC: IP66			
Material	Case/Nut	ABS			
	Lens and Display	PMMA			



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  - Limit switches • Pushbutton switches • Low voltage switch gear
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