Photoelectric sensors in M18 stainless steel housing

E3FC

Best durability for wash-down applications

- High grade steel housing (SUS316L)
- Withstands heat shock conditions
- Epoxy resin preventing water ingress if connector is not fixed properly
- Proven with various industrial detergents of Ecolab and Diversey (Details see page 10)
- Bright visible red LED enabling easy alignment

Ordering Information

Sensors

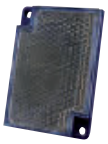
Red light Infrared light

Sensor type	Sensing distance	Connection method	Model	
			NPN output	PNP output
Through-beam	20 m	pre-wired	**E3FC-TN11 2M** *1	**E3FC-TP11 2M** *1
		M12 connector	**E3FC-TN21** *1	**E3FC-TP21** *1
Retro-reflective with MSR function *2	0.1 to 4 m with E39-R1S	pre-wired	**E3FC-RN11 2M**	**E3FC-RP11 2M**
		M12 connector	**E3FC-RN21**	**E3FC-RP21**
Diffuse-reflective *3	300 mm	pre-wired	**E3FC-DN12 2M**	**E3FC-DP12 2M**
		M12 connector	**E3FC-DN22**	**E3FC-DP22**
	1 m	pre-wired	**E3FC-DN13 2M**	**E3FC-DP13 2M**
		M12 connector	**E3FC-DN23**	**E3FC-DP23**
	300 mm	pre-wired	**E3FC-DN15 2M**	**E3FC-DP15 2M**
		M12 connector	**E3FC-DN25**	**E3FC-DP25**
	1 m	pre-wired	**E3FC-DN16 2M**	**E3FC-DP16 2M**
		M12 connector	**E3FC-DN26**	**E3FC-DP26**
BGS *3 (background suppression)	100 mm	pre-wired	**E3FC-LN11 2M**	**E3FC-LP11 2M**
		M12 connector	**E3FC-LN21**	**E3FC-LP21**
	200 mm	pre-wired	**E3FC-LN12 2M**	**E3FC-LP12 2M**
		M12 connector	**E3FC-LN22**	**E3FC-LP22**
Transparent object detection (co-axial retro-reflective with MSR*2)	100 to 500 mm with E39-RP1	pre-wired	**E3FC-BN11 2M**	**E3FC-BP11 2M**
		M12 connector	**E3FC-BN21**	**E3FC-BP21**

*1. The set type includes the emitter and receiver.
*2. The Reflector is sold separately. Select the Reflector model most suited to the application.
*3. L-On fixed output available for Diffuse reflective and BGS models. Please add "A" in order code (e.g. E3FC-DP11A 2M)

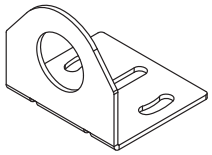
Reflectors [Refer to *Dimensions on page 12.*]

Reflectors required for Retro-reflective Sensors: A Reflector is not provided with the Sensor. Be sure to order a Reflector separately.

Sensing distance	Appearance	Model	Material	Remarks
0.1 to 4 m		**E39-R1S**	ABS, PMMA	IP67
0.1 to 4 m		**E39-R50**	PET	IP67, IP69K Ecolab tested plastic material
0 to 500 mm		**E39-RP1**	ABS, PMMA	for E3FC-B, enhanced PET detection, IP67
0.1 to 2 m		**E39-R16**	SUS316L, glass (window)	enhanced chemical resistance for pharma industry IP67, IP68, IP69K

Mounting brackets [Refer to *Dimensions on page 12.*]

A Mounting Bracket is not enclosed with the Sensor. Order a Mounting Bracket separately if required.

Sensor	Appearance	Model (Material)	Material	Remarks
all types		**E39-L183**	SUS304	Mounting bracket
		**E39-EL16**	SUS316L	M18 Flush mounting nut

Sensor I/O connectors

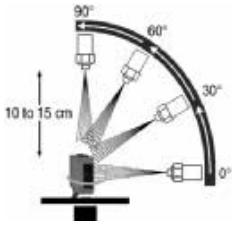
Models for Connectors: A Connector is not provided with the Sensor. Be sure to order a Connector separately.

Sensor	Model	Material	Appearance	Cable type		Model
M12 connector types	Detergent resistant connector cable	Cable: Detergent resistant PVC Connector: SUS316L	Straight 	2 m	4-wire	**Y92E-S12PVC4S2M-L**
				5 m		**Y92E-S12PVC4S5M-L**
			Angle 	2 m		**Y92E-S12PVC4A2M-L**
				5 m		**Y92E-S12PVC4A5M-L**

Ratings and Specifications

Item			Through-beam	Retro-reflective with MSR function
Model	Sensing method			
	NPN output	Pre-wired	E3FC-TN11 2M	E3FC-RN11 2M
		M12 Connector	E3FC-TN21	E3FC-RN21
	PNP output	Pre-wired	E3FC-TP11 2M	E3FC-RP11 2M
		M12 Connector	E3FC-TP21	E3FC-RP21
Sensing distance			20 m	0.1 to 4 m (with E39-R1S)
Spot diameter (reference value)			—	
Standard sensing object			Opaque: 7 mm dia.min.	Opaque: 75 mm dia.min.
Differential travel			—	
Directional angle			2° min.	
Light source (wavelength)			Red LED (624 nm)	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 *1.	
Indicator			Operation indicator (orange) Stability indicator (green) Power indicator (green): only Emitter of Through-beam	
Protection circuits			Power supply reverse polarity protection, Output short-circuit protection, and Output reverse polarity protection	
Response time			0.5 ms	
Sensitivity adjustment			Fixed	
Ambient illumination (Receiver side)			Incandescent lamp: 3,000 lx max./ Sunlight: 10,000 lx max.	
Ambient temperature range			Operating: -25 to 55°C/ Storage: -30 to 70°C (with no icing or condensation)	
Ambient humidity range			Operating: 35 to 85%/ Storage: 35 to 95% (with no condensation)	
Insulation resistance			20 MΩ min. at 500 VDC	
Dielectric strength			1,000 VAC at 50/60 Hz for 1 min. between current-carrying parts and case	
Vibration resistance			Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y and Z directions	
Shock resistance			Destruction: 500 m/s^2 3 times each in X, Y and Z directions	
Degree of protection			IEC: IP67, IP68 *2., DIN 40050-9: IP69K *3.	
Weight	Pre-wired cable (2M)		152 g	76 g
	Connector		44 g	22 g
Material	Case		SUS 316L (1.4404)	
	Lens and Display		PMMA	
	Adjuster		–	
	Nut		SUS 316L (1.4404)	
Accessories			Instruction sheet M18 nuts (4 pcs)	Instruction sheet M18 nuts (2 pcs)

*1. L-On fixed output available for Diffuse reflective and BGS models. Please add "A" in order code (e.g. E3FC-DP11A 2M)
*2. IP68 Degree of Protection Specifications
IP68 is defined by heat shock resistance with 20 test cycles of 30 min. changing between 3° and 60° surface tensioned water.
*3. 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.



Item						
Model	Sensing method		Diffuse-reflective			
	NPN output	Pre-wired	E3FC-DN12 2M	E3FC-DN13 2M	E3FC-DN15 2M	E3FC-DN16 2M
		M12 Connector	E3FC-DN22	E3FC-DN23	E3FC-DN25	E3FC-DN26
	PNP output	Pre-wired	E3FC-DP12 2M	E3FC-DP13 2M	E3FC-DP15 2M	E3FC-DP16 2M
		M12 Connector	E3FC-DP22	E3FC-DP23	E3FC-DP25	E3FC-DP26
Sensing distance			300 mm (white paper: 300 × 300 mm)	1 m (white paper: 300 × 300 mm)	300 mm (white paper: 300 × 300 mm)	1 m (white paper: 300 × 300 mm)
Spot diameter (reference value)			40 × 50 mm Sensing distance of 300 mm	120 × 150 mm Sensing distance of 1 m	40 × 50 mm Sensing distance of 300 mm	120 × 150 mm Sensing distance of 1 m
Standard sensing object			—			
Differential travel			20% max.			
Directional angle			—			
Light source (wavelength)			Red LED (624 nm)		Infrared LED (850 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 *3.			
Indicator			Operation indicator (orange) Stability indicator (green)			
Protection circuits			Power supply reverse polarity protection, Output short-circuit protection, and Output reverse polarity protection			
Response time			0.5 ms			
Sensitivity adjustment			One-turn adjuster			
Ambient illumination			Incandescent lamp: 3,000 lx max./ Sunlight: 10,000 lx max.			
Ambient temperature range			Operating: -25 to 55°C/ Storage: -30 to 70°C (with no icing or condensation)			
Ambient humidity range			Operating: 35 to 85%/ Storage: 35 to 95% (with no condensation)			
Insulation resistance			20 MΩ min. at 500 VDC			
Dielectric strength			1,000 VAC at 50/60 Hz for 1 min. between current-carrying parts and case			
Vibration resistance			Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y and Z directions			
Shock resistance			Destruction: 500 m/s^2 3 times each in X, Y and Z directions			
Degree of protection			IEC: IP67, IP68 *2., DIN 40050-9: IP69K *3.			
Weight	Pre-wired cable (2M)		76 g			
	Connector		22 g			
Material	Case		SUS 316L (1.4404)			
	Lens and Display		PMMA			
	Adjuster		POM			
	Nut		SUS 316L (1.4404)			
Accessories			Instruction sheet M18 nuts (2 pcs)			

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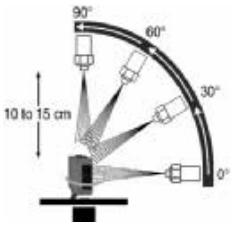

Model / Item	Sensing method		BGS (Background suppression)		Transparent detected with P-opaquing function
	NPN output	Pre-wired	E3FC-LN11 2M	E3FC-LN12 2M	E3FC-BN11 2M
		M12 Connector	E3FC-LN21	E3FC-LN22	E3FC-BN21
	PNP output	Pre-wired	E3FC-LP11 2M	E3FC-LP12 2M	E3FC-BP11 2M
		M12 Connector	E3FC-LP21	E3FC-LP22	E3FC-BP21
Sensing distance			100 mm (white paper: 300 × 300 mm)	200 mm (white paper: 300 × 300 mm)	100 to 500 mm (with E39-RP1)
Spot diameter (reference value)			10 × 10 mm Sensing distance of 100 mm	10 × 15 mm Sensing distance of 200 mm	—
Standard sensing object			—		glass (t = 1.0 mm): 150 × 150 mm
Differential travel			20% max.		—
Directional angle			—		
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 *1.		
Indicator			Operation indicator (orange) Stability indicator (green)		
Protection circuits			Power supply reverse polarity protection, Output short-circuit protection, and Output reverse polarity protection		
Response time			0.5 ms		
Sensitivity adjustment			Fixed		One-turn adjuster
Ambient illumination			Incandescent lamp: 3,000 lx max./ Sunlight: 10,000 lx max.		
Ambient temperature range			Operating: -25 to 55°C/ Storage: -30 to 70°C (with no icing or condensation)		
Ambient humidity range			Operating: 35 to 85%/ Storage: 35 to 95% (with no condensation)		
Insulation resistance			20 MΩ min. at 500 VDC		
Dielectric strength			1,000 VAC at 50/60 Hz for 1 min. between current-carrying parts and case		
Vibration resistance			Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y and Z directions		
Shock resistance			Destruction: 500 m/s^2 3 times each in X, Y and Z directions		
Degree of protection			IEC: IP67, IP68 *2., DIN 40050-9: IP69K *3.		IEC: IP67, DIN 40050-9: IP69K *3
Weight (packed state/only sensor)	**Pre-wired cable (2M)**		76 g		Approx. 95 g/Approx. 65 g
	Connector		22 g		Approx. 50 g/Approx. 20 g
Material	**Case**		SUS316L (1.4404)		
	Lens and Display		PMMA		
	Adjuster		–		POM
	Nut		SUS316L (1.4404)		
Accessories			Instruction sheet M18 nuts (2 pcs)		

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