

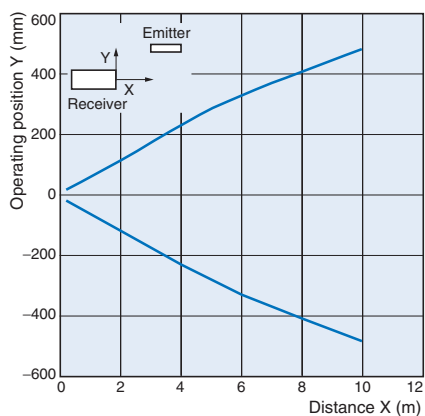
Rating and Performance

Sensors

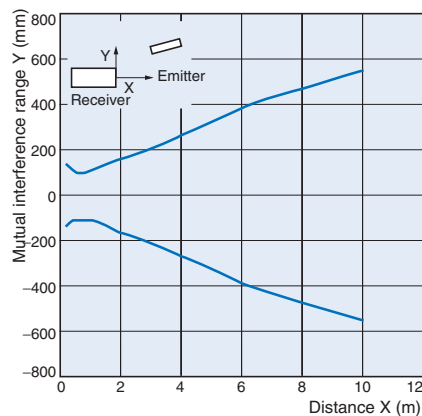
E3FS-10B4 series

Sensing method	Through-beam	
Controller	F3SP-U3P-TGR, F3SP-U5P-TGR	
Supply voltage	24 VDC ± 10% (ripple p-p 10% max.)	
Effective aperture angle (EAA)	±5° (at 3 m)	
Current consumption	Emitter:50 mA max. Receiver:25 mA max.	
Sensing distance	10 m	
Standard sensing object	Opaque object: 11 mm min. in diameter	
Response time	2.0 ms (E3FS only) Response time of controller = Response time of the system	
Control output	PNP transistor output, load current: 100 mA max., residual voltage: 2 V max. (Except for voltage drop due to cable extension)	
Test input (Emitter)	21.5 to 24 VDC: Emitter OFF (source current: 3 mA max.) Open or 0 to 2.5 V: Emitter ON (leakage current: 0.1 mA max.)	
Power supply reset time	100 ms	
Ambient light intensity	Incandescent lamp: 3,000 lx max. (light intensity on the receiver surface) Sunlight: 10,000 lx max. (light intensity on the receiver surface)	
Ambient temperature	Operating: -10 to 55°C, storage: -30 to 70°C (with no icing or condensation)	
Ambient humidity	Operating: 35% to 85%, storage: 35% to 95% (with no icing or condensation)	
Insulation resistance	20 MΩ min. (at 500 VDC)	
Dielectric strength	1,000 VAC 50/60 Hz 1 min	
Vibration resistance	Malfunction	10 to 55 Hz, double amplitude: 1.5 mm, 2 h each in the X, Y, and Z directions
	Operating limit	10 to 55 Hz, double amplitude: 0.7 mm, 50 min each in the X, Y, and Z directions
Shock resistance	Malfunction	500 m/s ² (approx. 50 G), 3 times each in the X, Y, and Z directions
	Operating limit	100 m/s ² (approx. 10 G), 1,000 times in the X, Y, and Z directions
Degree of protection	IP67 (IEC standard)	
Light source	Infrared LED	
Operation indicators	Emitter: Emitting (orange) Receiver: Output ON (green), Output OFF (red)	
Protection	Output short-circuit protection, reverse polarity protection	
Weight (in packaging)	E3FS-10B4 2M (ABS resin case): approx. 150 g for 1 set (weight without cable: approx. 55 g) E3FS-10B4-M1-M (metal case): approx. 125 g for 1 set	
Applicable standard	IEC61496-1, EN61496-1 Type 2 ESPE (Electro-Sensitive Protective Equipment) IEC61496-2, prEN61496-2 Type 2 AOPD (Active Opto-electronic Protective Devices)	
Accessories	Emitter, Receiver, four nuts for mounting, and an instruction manual	

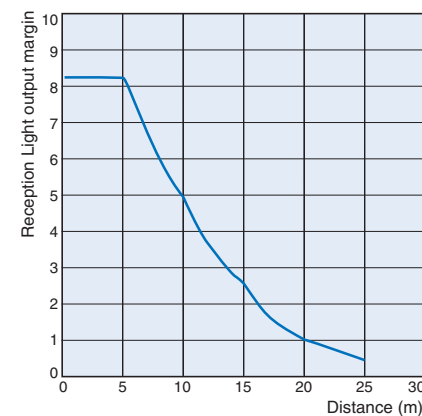
Parallel Operating Range



Mutual interference Range



Excess Gain Ratio



Controllers

F3SP-U series

	F3SP-U3P	F3SP-U5P
Number of sensors	1 to 2 Safety Single beam sensor	1 to 4 Safety Single beam Sensor
Width	22.5 mm	45 mm
Muting Input	2 Inputs	4 Inputs
Safety related function	Override function Muting Lamp Connection Interlock System (Automatic and manual reset)	
Power supply voltage	24 VDC $\pm 10\%$	
Power consumption	420 mA max.	
Output contacts	2 NO 2.5 A (protected by fuse), 115 V AC max.	2 NO 2.5 A (protected by fuse), 250 V AC max.
Indicators	6 LED for status and diagnostics	
Enclosure rating	IP20	
Terminal	16 screw terminals, Detachable blocks with '4pin'	32 screw terminals, Detachable blocks with '4pin'
Response time	≤ 30 ms	
Ambient temperature	Operation: -10°C $+55^{\circ}\text{C}$	
Housing material	Plastic; DIN rail mounting	
Weight	0.3 kg	

Operating Instructions

Output Circuit

Model	Connection method	Output transistor	Output circuit
E3FS-10DB4 2M E3FS-10DB4-P1 E3FS-10DB4-M 2M E3FS-10DB4-M1-M	Connect the pink and brown wire	ON when light is incident (Light-ON)	
Receiver circuit	Connect the pink and blue wire	ON when light is interrupted (Dark-ON)	
E3FS-10LB 2M E3FS-10LB-P1 E3FS-10LB-M 2M E3FS-10LB-M1-M		Emitter circuit	