Safety Light Curtains



Safety Light Curtains

- Fast and easy installation
- Resolution: 25 mm (1.01 in.)
- Range: 7 m (23 ft.)
- Protected heights: 185 to 2065 mm (7.28 to 81.26 in.)
- Very compact size: 30 x 30 mm (1.18 x 1.18 in.)
- Cascaded designs possible 3 segments
- Simple muting
- Cross-talk prevention



Description

In addition to the simple functions inherited from the EASY type, such as global support, easy-to-view indicators, the BASIC type includes series connection and simple muting functions. This enables the BASIC type to satisfy installations that require multiple safety light curtains.

Up to three sets connected in a series

It is possible to connect up to three sets of safety light curtains in series. These sensors can be placed in a U-shaped or L-shaped pattern with a single power line, thus requiring less wiring.



Instant visibility of process trouble during muting

The BASIC type includes a muting function which temporarily disables the safety light curtain when a workpiece passes

through. In the event of any trouble occurring, the error can be instantly recognized from the pattern of the LED indicators, allowing for a fast solution.



Functions inherited from the EASY type

Simple functions such as universal power voltage specification, easy-to-view diagnostics, a fixed response time have been inherited from the EASY type, As a result, expect reduced work-hours at each stage of use, from design and installation to operation.







Specifications

Main Units

F3SJ-B

Sensor type		Type 4 safety light curtain			
Setting tool connection *1		Parameter settings: Not available			
Safety category		Safety purpose of category 4, 3, 2, 1, or B			
Detection capability		Opaque objects 25 mm in diameter			
Beam gap (P)		20 mm			
Number of beams (n)		8 to 102			
Protective height (PH)		185 to 2,065 mm			
Lens diameter		Diameter 5 mm			
Operating range *2		0.2 to 7 m			
Response time (under stable light	ON to OFF	15 ms max. (response time at 1 set connection, series connection of 2 sets or 3 sets)			
incident condition)	OFF to ON	70 ms max. (response time at 1 set connection, series connection of 2 sets or 3 sets)			
Startup waiting time		2 s max.			
Power supply voltage (Vs)	SELV/PELV 24 VDC±20% (ripple p-p 10% max.)			
Consumption current	Emitter	Up to 22 beams: 52 mA max., 26 to 42 beams: 68 mA max., 46 to 62 beams: 75 mA max., 66 to 82 beams: 88 mA max., 86 to 102 beams: 101 mA max.			
(no load)	Receiver	Up to 22 beams: 45 mA max., 26 to 42 beams: 50 mA max., 46 to 62 beams: 46 mA max., 66 to 82 beams: 61 mA max., 86 to 102 beams: 67 mA max.			
Light source (emitted v	vavelength)	Infrared LED (870 nm)			
Effective aperture angl		Based on IEC 61496-2. Within ±2.5° for both emitter and receiver when the detection distance is 3 m or over			
Safety outputs (OSSD)		Two PNP transistor outputs, load current 200 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension), Leakage current 1 mA max., load inductance 2.2 H max. *3 Maximum capacity load 1 µF *4			
Auxiliary output 1		Two PNP transistor outputs, load current 100 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension), leak current 1 mA max.			
Output operation mode		Safety output: On when receiving light Auxiliary output: – Reverse output of safety output for a basic system – ON when muting/override for a muting system			
Input voltage		ON voltage: Vs-3 V to Vs *5 OFF voltage: 0 V to 1/2 Vs or open			
Mutual interference pre	evention function	Mutual interference prevention algorithm prevents interference in up to 3 sets.			
Series connection		Time division emission by series connection Number of connections: up to 3 sets (between F3SJ-Bs only) Other models cannot be connected. Total number of beams: up to 192 beams Maximum cable length for 2 sets: no longer than 7 m 			
Test function		Self test (at power-ON and at power distribution) External test (emission stop function by test input)			
Safety-related functions		 Interlock (basic system) External device monitoring (basic system) Muting (muting system) Override (muting system) 			
Connection type		Connector method (M12, 8-pin)			
Protection circuit		Output short-circuit protection, and power supply reverse polarity protection			
Ambient temperature		Operating: -10 to 55°C (non-freezing), Storage: -25 to 70°C			
Ambient humidity		Operating: 35% to 85% (no condensation), Storage: 35% to 95% RH			
Operating ambient light intensity		Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max.			
Insulation resistance		20 MΩ min. (at 500 VDC)			
Dielectric strength		1,000 VAC 50/60 Hz, 1 min			
Degree of protection		IP65 (IEC 60529)			
Vibration resistance		Malfunction: 10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps in X, Y, and Z directions			
Shock resistance		Malfunction: 100 m/s2, 1,000 times each in X, Y, and Z directions			
Pollution degree		Manufiction. Too mysz, 1,000 times each m X, 1, and 2 directions			

(Continued on next page)

*1. Do not use the Support Software and Setting Console for F3SJ-A. Operation cannot be guaranteed. *4. These values must be taken into consideration when connecting elements including a capacitive load such as capacitor.

- *2. Use of the Spatter Protection Cover causes a 10% maximum sensing distance attenuation. *5. The Vs indicates a voltage value in your environment. *7. Mounting brackets are sold separately.
- distance attenuation. *3. The load inductance is the maximum value when the safety output
- frequently repeats ON and OFF. When you use the safety output at 4 Hz or less, the usable load inductance becomes larger.





Specifications (continued)

Main Units

F3SJ-B

Power cable	Connection method: Prewired connector cable, cable length 0.3 m, connector type (M12, 8-pin), connector: IP67 rated (when mated) Number of wires: Emitter: 8 wires Cable diameter: Dia. 6 mm Allowable bending radius: R5 mm		
Extension cable	30 m max.		
Material	Case: Aluminum Cap: ABS resin, PBT Optical cover: PMMA resin (acrylic) Cable: Oil resistant PVC		
Weight (packed state)	Weight (g) = (protective height) x 2.7 + 500		
Accessories	Test rod, User's Manual (CD-ROM) *7		
Applicable standards	IEC 61496-1, EN 61496-1 UL 61496-1, Type 4 ESPE (Electro-Sensitive Protective Equipment) IEC 61496-2, CLC/TS 61496-2, UL 61496-2, Type 4 AOPD (Active Opto-electronic Protective Devices) IEC 61508-1 to -3, EN 61508-1 to -3 SIL3 IEC 13849-1: 2006, EN ISO 13849-1: 2008 (PLe, Cat.4) UL 508, UL 1998, CAN/CSA C22.2 No.14, CAN/ CSA C22.2 No.0.8		

Accessories

Control Unit

		F3SP-B1P	
Applicable sensor		F3SJ-B/A (Only for PNP output type)*	
Power suppl	y voltage	24 VDC ±10%	
Power suppl	y consumption	DC1.7 W max. (not including sensor's current consumption)	
Operation tir	ne	100 ms max. (not including sensor's response time)	
Response tir	ne	100 ms max. (not including sensor's response time)	
	Number of contacts	3NO + 1NC	
Relay output	Rated load	250 VAC 5 A (cos = 1), 30 VDC 5 A L/R = 0 ms	
	Rated current	5 A	
Connection	Between sensors	M12 connector (8-pin)	
type	Others	Terminal block	
Weight (pac	ked state)	Approx. 280 g	
Accessories		Instruction manual	

*NPN output type cannot be connected. Also, the system cannot be used as a muting system.

Applications

Selecting the Best Configuration

Space Efficient and Low Cost

The built-in external device monitoring function eliminates the need for a safety relay unit.



Reduced Wiring and Easy Maintenance

Cables with connectors on both ends simplify connections and prevent wiring errors.



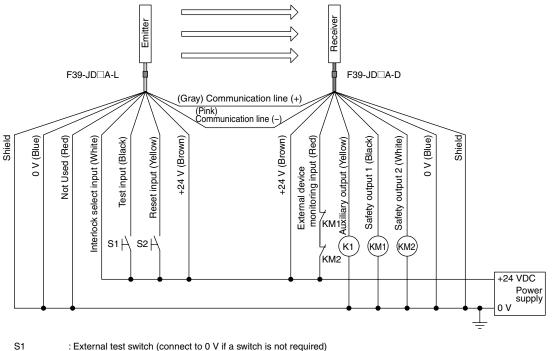




Wiring

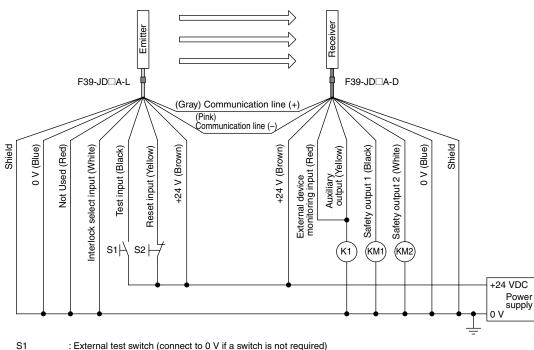
Basic Wiring Diagram

Wiring when using manual reset mode, external device monitoring



S2 : Interlock/lockout reset switch KM1, KM2 : Safety relay with force-guided contact (G7SA) or magnetic contactor : Load or PLC, etc. (for monitoring) K1

Wiring for auto reset mode and deactivated external device monitoring



: External test switch (connect to 0 V if a switch is not required)

S2 : Lockout reset switch

KM1, KM2 : Safety relay with force-guided contact (G7SA) or magnetic contactor

: Load or PLC, etc. (for monitoring)



K1



Dimensions

(mm)

F3SJ-B/F3SJ-E Dimensions

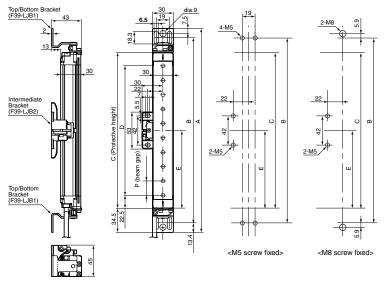
The dimensions of the F3SJ-B and F3SJ-E are the same except for connector cables and cable leads.

Main Units

Mounting Top/Bottom and Intermediate Brackets

Backside mounting

Mounting screw holes



C (protective height): 4-digit number in the table A = C + 69, B = C + 42.2 D = C - 45, E = See table below, P = 20

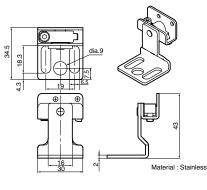
Protective height	Number of intermediate brackets	E
185 to 1,105	0	—
1,185 to 1,345	1	C/2 max.
1,425 to 2,065	2	C/3 max.

C (protective height): 4-digit number in the table A = C + 69, B = C + 42.2

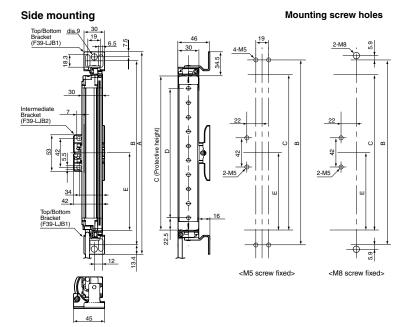
	D :	= C -	45, I	Ε=	See	table	below,	Ρ	=	20
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Protective height	Number of intermediate brackets	E
185 to 1,105	0	—
1,185 to 1,345	1	C/2 max.
1,425 to 2,065	2	C/3 max.

Dimensions of top/bottom bracket for F39-LJB1



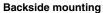
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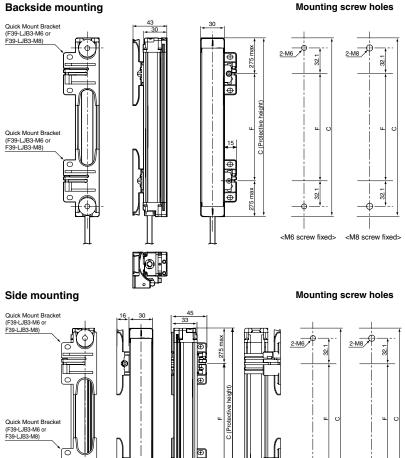


Dimensions (continued)

Main Units

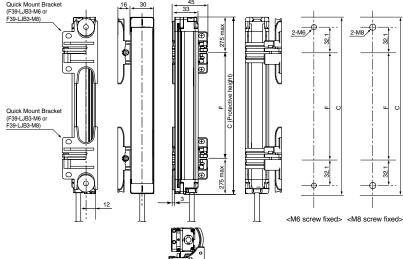
When Using Quick Mount Brackets





C (protective height): 4-digit number in the table F = See the table below.

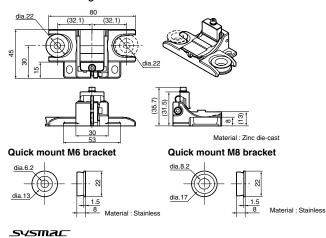
Protective height	Number of intermediate brackets	F
185 to 1,105	2	555 mm max.
1,185 to 1,585	3	555 mm max.
1,665 to 2,065	4	555 mm max.



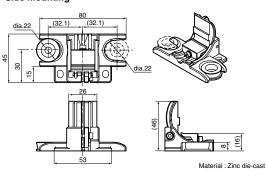
C (protective height): 4-digit number in the table F = See the table below.

Protective height	Number of intermediate brackets	F
185 to 1,105	2	555 mm max.
1,185 to 1,585	3	555 mm max.
1,665 to 2,065	4	555 mm max.

Dimensions of quick mount bracket for F39-LJB3 Backside mounting



Side mounting





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SAFETY, TECHNOLOGY & INNOVATION

Ordering

Main Units

Safety Light Curtains

				Protective height	Model
Application	Detection capability	Beam gap	Operating range	(mm)	PNP output
Hand protection	Dia. 25 mm	20 mm	0.2 to 7 m	185 to 2,065	F3SJ-BDDDDP25

Safety Light Curtain Model List

Please contact our sales representatives.

F3SJ-B Series (20 mm pitch)

Model	Number of beams	Protective height [mm] *
F3SJ-B0185P25	8	185
F3SJ-B0225P25	10	225
F3SJ-B0305P25	14	305
F3SJ-B0385P25	18	385
F3SJ-B0465P25	22	465
F3SJ-B0545P25	26	545
F3SJ-B0625P25	30	625
F3SJ-B0705P25	34	705
F3SJ-B0785P25	38	785
F3SJ-B0865P25	42	865
F3SJ-B0945P25	46	945
F3SJ-B1025P25	50	1,025
F3SJ-B1105P25	54	1,105

		Protective height
Model	Number of beams	[mm] *
F3SJ-B1185P25	58	1,185
F3SJ-B1265P25	62	1,265
F3SJ-B1345P25	66	1,345
F3SJ-B1425P25	70	1,425
F3SJ-B1505P25	74	1,505
F3SJ-B1585P25	78	1,585
F3SJ-B1665P25	82	1,665
F3SJ-B1745P25	86	1,745
F3SJ-B1825P25	90	1,825
F3SJ-B1905P25	94	1,905
F3SJ-B1985P25	98	1,985
F3SJ-B2065P25	102	2,065

*Protective height (mm) = Total sensor length

Accessories (sold separately)

Single-end Connector Cable (2 cables per set, for emitter and receiver)

For wiring with safety circuit such as single safety relay, safety relay unit, and safety controller.

Appearance	Cable length	Specifications	Model
	3 m		F39-JD3A
	7 m	M12 connector (8-pin)	F39-JD7A
	10 m		F39-JD10A
	15 m		F39-JD15A
	20 m		F39-JD20A

Double-end Connector Cable (2 cables per set, for emitter and receiver)

Control unit for connection with F3SP-B1P, to extend the length under series connection.*

Appearance	Cable length	Specifications	Model
	0.5 m	M12 connector (8-pin)	F39-JDR5B
	1 m		F39-JD1B
	3 m		F39-JD3B
	5 m		F39-JD5B
	7 m		F39-JD7B
	10 m		F39-JD10B
	15 m		F39-JD15B
	20 m		F39-JD20B

*To extend the cable length under series connection, use F39-JBR2W and F39-JDDB in combination. Also, the cable length 10 to 20 m cannot be used.





Ordering (continued)

Accessories (sold separately) (continued)

Series-connection Cable (2 cables per set, for emitter and receiver)

Туре	Appearance	Cable length	Model	Application
Series connection cable for extension	al and a second se	0.2 m	F39-JBR2W *1	For series connection *2
Extension cable	LIT BY	0.5 to 7 m	F39-JD□B	To change series connection length in combination with F39-JBR2W

*1. This product is for F3SJ-B only.
*2. Total cable length of series connection is 0.5 m to connect to connector cable of the main sensor unit.

Relays with Forcibly Guided Contacts

Туре	Appearance	Specifications	Model	Remarks
G7SA Relays with Forcibly Guided Contacts		 Nodes: 4 Contact type: 2A2B Rated switch load: 250 VAC 6A, 30 VDC 6A 	G7SA-2A2B	For information on the
		 Nodes: 4 Contact type: 3NO+1NC Rated switch load: 250 VAC 6A, 30 VDC 6A 	G7SA-3A1B	G7SA, contact Omron or visit website.
G7S-⊡-E Relays with Forcibly Guided Contacts		Nodes: 6 Contact type: 4NO+2NC Rated switch load: 250 VAC 10 A, 30 VDC 10 A	G7S-4A2B-E	Eor information on
		 Nodes: 6 Contact type: 3NO+3NC Rated switch load: 250 VAC 10 A, 30 VDC 10 A 	G7S-3A3B-E	the G7S-D-E, contact Omron or visit website

Laser Pointer

Appearance	Description	Model
	Laser Pointer for F3SJ	F39-PTJ

Key Cap for Muting

Appearance	Description	Model
	Muting key cap for F3SJ-B	F39-CN10





Ordering (continued)

Accessories (sold separately) (continued)

Sensor Mounting Bracket (sold separately)

Appearance	Specifications	Model	Application	Remarks
	Top/bottom bracket	F39-LJB1	Top/bottom bracket for F3SJ-E/B	2 for the emitter, 2 for the receiver, total of 4 per set
	Intermediate bracket	F39-LJB2 *1 *2	In combination use with top/bottom bracket for F3SJ-E/B Can be used as free-location bracket.	1 set with 2 pieces
O -O		F39-LJB3-M6 *1	Quick mount bracket for F3SJ-E/B Supports M6 slide nut for aluminum frame.	
	Quick mount bracket	F39-LJB3-M8 *2	Quick mount bracket for F3SJ-E/B Supports M8 slide nut for aluminum frame.	1 set with 2 pieces
i))m	M6 slide nut	F39-LJB3-M6K *1	Spare slide nut for use with Quick	Hexagon socket head cap screws (M6 x 10) are included.
9	M8 slide nut	F39-LJB3-M8K *2	mount bracket.	Hexagon socket head cap screws (M8 x 14) are included.
	Compatible mounting bracket	F39-LJB4	Mounting bracket used when replacing existing area sensors (F3SJ-A or F3SN) with the F3SJ-E/B.	2 for the emitter, 2 for the receiver, total of 4 per set

Note: All the sensor mounting brackets for the F3SJ-E are sold separately.

*1. Combining F39-LJB2 and F39-LJB3-M6K makes F39-LJB3-M6.

*2. Combining F39-LJB2 and F39-LJB3-M8K makes F39-LJB3-M8.

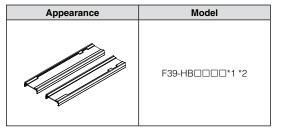




Ordering (continued)

Accessories (sold separately) (continued)

Spatter Protection Cover (2 cables per set, common for emitter/receiver)



*1. The same 4-digit numbers as the protective heights (

*2. It cannot be mounted to the models with the suffix "-02TS".

Protective Bar

Appearance	Model	Remarks
	F39-PB□□□□*1	 2 light curtain brackets 4 mounting brackets 0 to 4 intermediate brackets for backside mounting (quantity required for the sensing width) 0 to 4 intermediate brackets for mounting to the sides (quantity required for the sensing width)
	F39-PB□□□-S *1 *2	 1 light curtain bracket 2 mounting brackets 0 to 2 intermediate brackets for backside mounting (quantity required for the sensing width) 0 to 2 intermediate brackets for mounting to the sides (quantity required for the sensing width)

Note: The following are not provided with the protective bars: Safety Light Curtain, Safety Light Curtain Top/Bottom Brackets, Wall Mounting Screw Unit *1. The same 4-digit numbers indicating the protective height that is used in the Sensor model number ($\Box\Box\Box\Box$) are used in the part of the Protector model number.

*2. Purchase the F39-PB





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