Safety Light Curtains

F3SJ-B

Safety Light Curtains

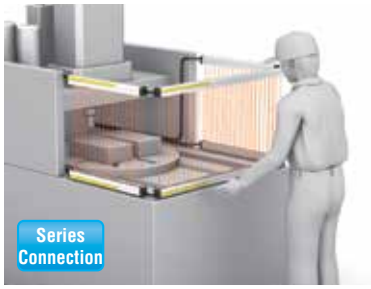
- Fast and easy installation
- Resolution: 25 mm (1.01 in.)
- Range: 7 m (23 ft.)
- Protected heights: 185 to 2065 mm (7.28 to 81.26 in.)
- Very compact size: 30 x 30 mm (1.18 x 1.18 in.)
- Cascaded designs possible – 3 segments
- Simple muting
- Cross-talk prevention

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.

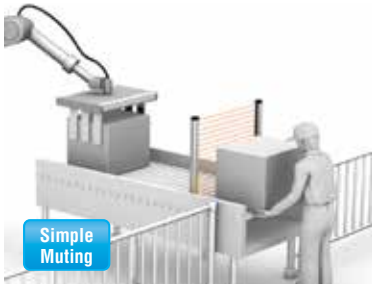


Functions inherited from the EASY type

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.

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.



Specifications

Main Units

F3SJ-B□□□□P25

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 incident condition)	ON to OFF	15 ms max. (response time at 1 set connection, series connection of 2 sets or 3 sets)
	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 (no load)	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.
	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 wavelength)		Infrared LED (870 nm)
Effective aperture angle (EAA)		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 prevention 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		Pollution degree 3 (IEC 60664-1)

(Continued on next page)

*1. Do not use the Support Software and Setting Console for F3SJ-A. Operation cannot be guaranteed.
*2. Use of the Spatter Protection Cover causes a 10% maximum sensing 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.
*4. These values must be taken into consideration when connecting elements including a capacitive load such as capacitor.
*5. The Vs indicates a voltage value in your environment.
*7. Mounting brackets are sold separately.

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Specifications (continued)

Main Units

F3SJ-B□□□□P25 (continued)

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

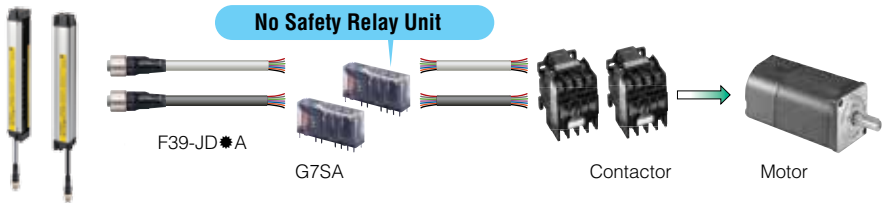
		F3SP-B1P
Applicable sensor		F3SJ-B/A (Only for PNP output type)*
Power supply voltage		24 VDC ±10%
Power supply consumption		DC1.7 W max. (not including sensor's current consumption)
Operation time		100 ms max. (not including sensor's response time)
Response time		100 ms max. (not including sensor's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

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

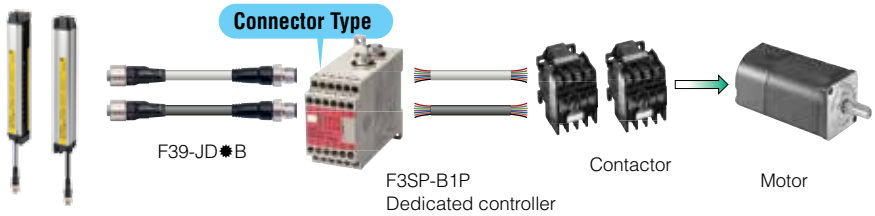
Applications

Selecting the Best Configuration

Space Efficient and Low Cost
The built-in external device monitoring function eliminates the need for a safety relay unit.



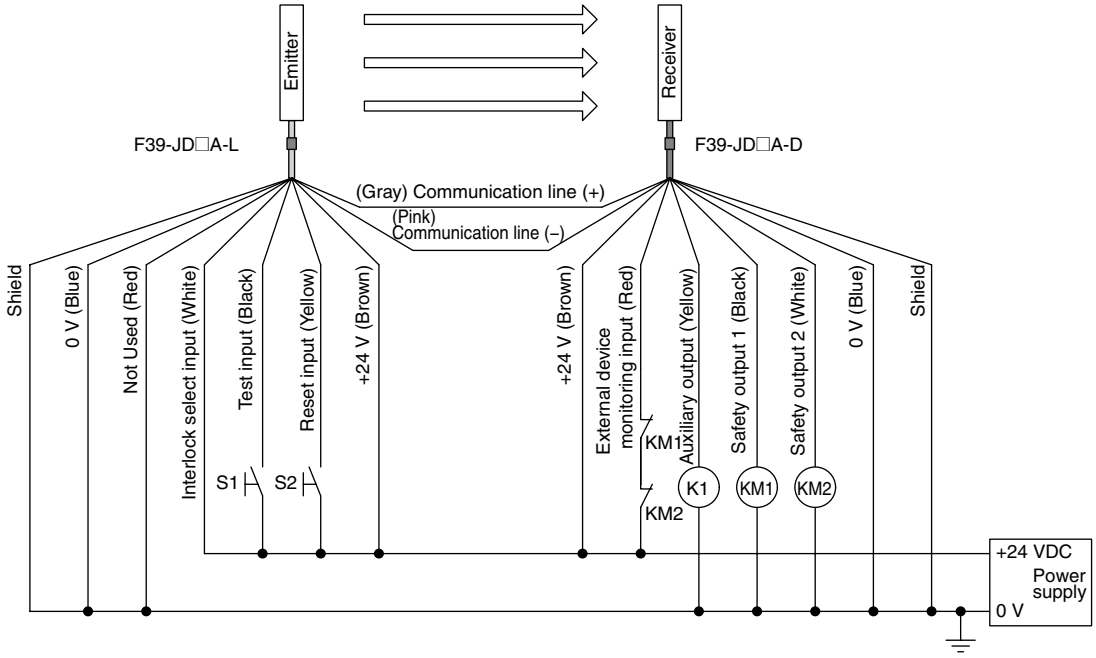
Reduced Wiring and Easy Maintenance
Cables with connectors on both ends simplify connections and prevent wiring errors.



Wiring

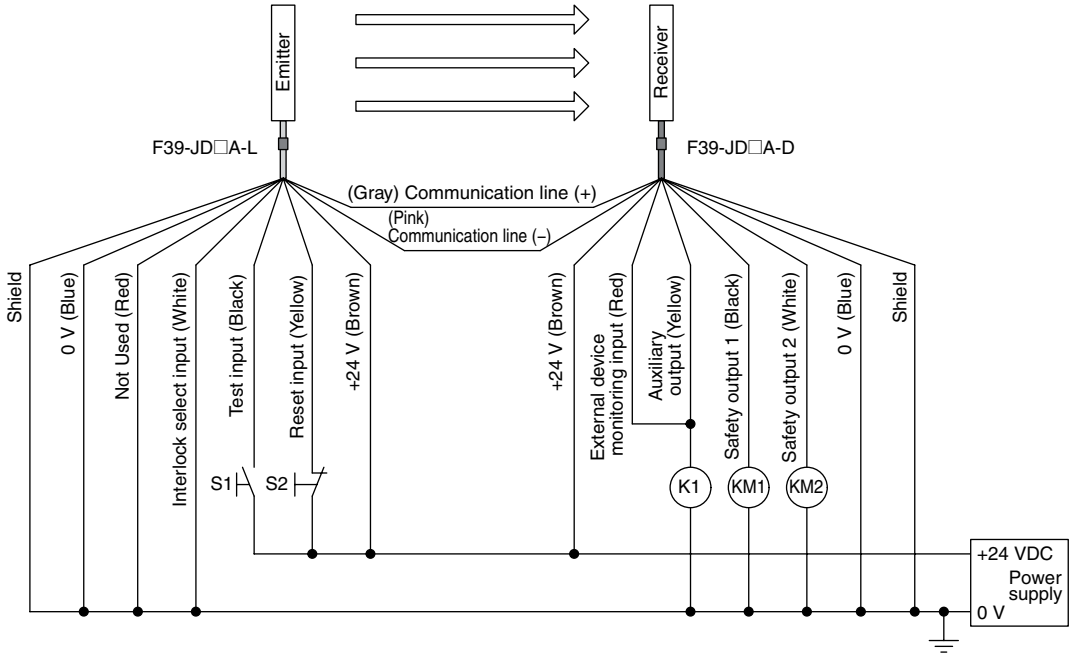
Basic Wiring Diagram

Wiring when using manual reset mode, external device monitoring



S1 : External test switch (connect to 0 V if a switch is not required)
S2 : Interlock/lockout reset switch
KM1, KM2 : Safety relay with force-guided contact (G7SA) or magnetic contactor
K1 : Load or PLC, etc. (for monitoring)

Wiring for auto reset mode and deactivated external device monitoring



S1 : 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
K1 : Load or PLC, etc. (for monitoring)

Dimensions

(mm)

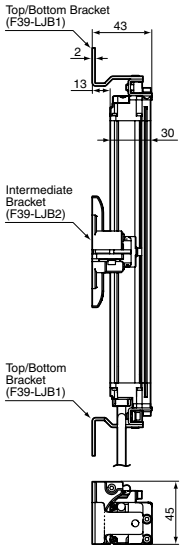
F3SJ-B/F3SJ-E Dimensions

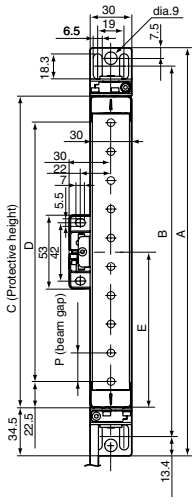
The dimensions of the F3SJ-B and F3SJ-E are the same except for connector cables and cable leads.

Main Units

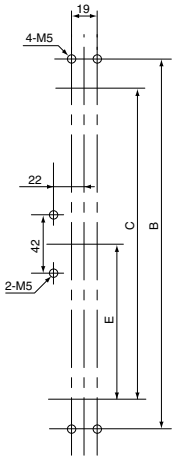
Mounting Top/Bottom and Intermediate Brackets

Backside mounting

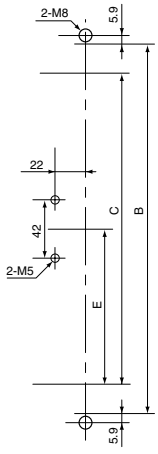




Mounting screw holes



<M5 screw fixed>

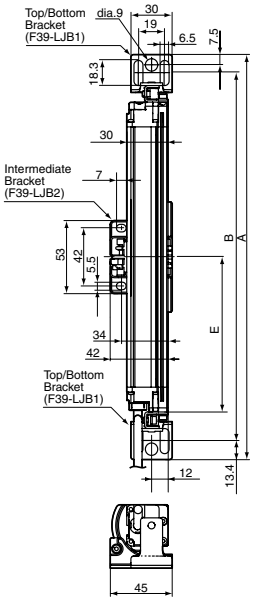


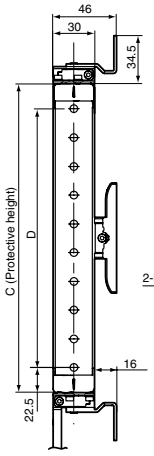
<M8 screw fixed>

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

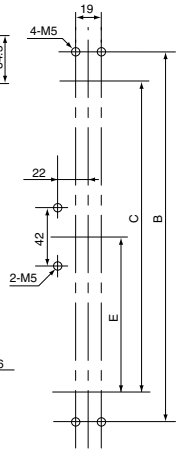
Protective height	Number of intermediate brackets	E
185 to 1,105	0	—
1,185 to 1,345	1	C/2 max.
1,425 to 2,065	2	C/3 max.

Side mounting

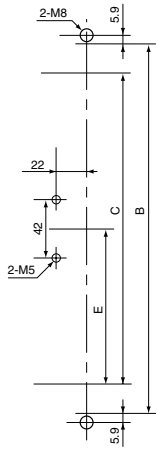




Mounting screw holes



<M5 screw fixed>

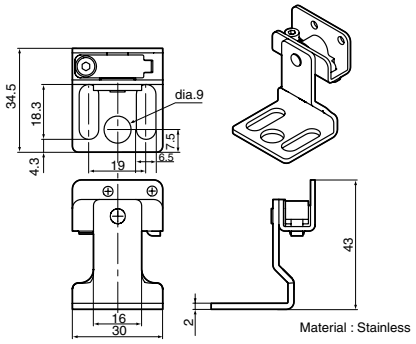


<M8 screw fixed>

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.

Dimensions of top/bottom bracket for F39-LJB1



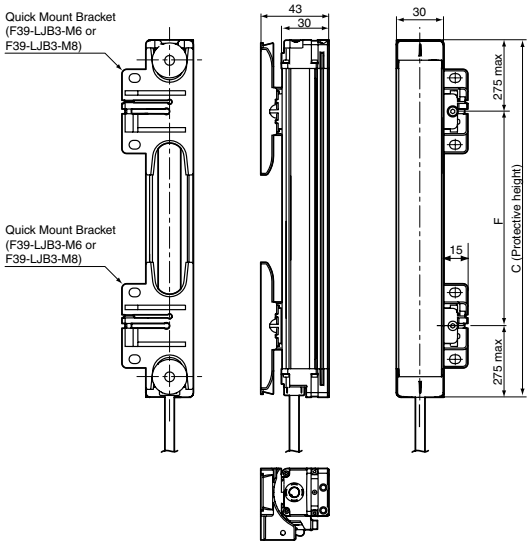
Dimensions (continued)

(mm)

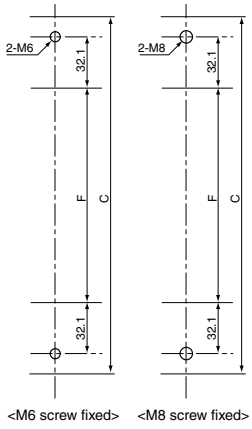
Main Units

When Using Quick Mount Brackets

Backside mounting



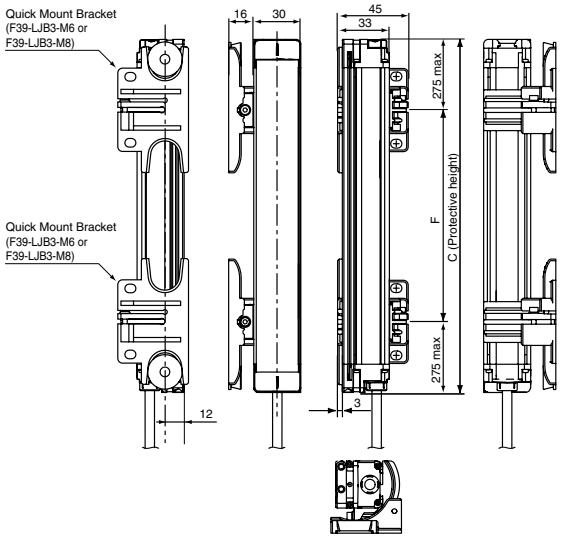
Mounting screw holes



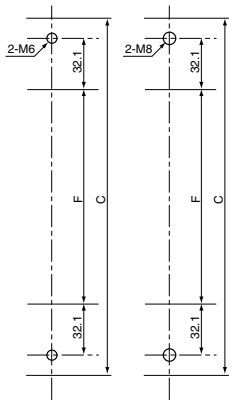
C (protective height): 4-digit number in the table
F = See the table below.

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.

Side mounting



Mounting screw holes

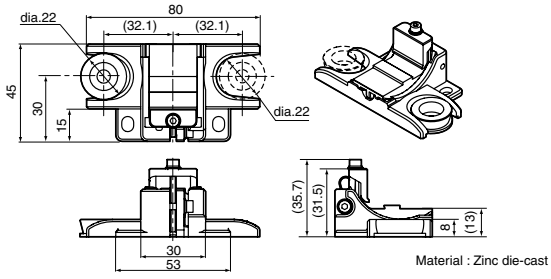


C (protective height): 4-digit number in the table
F = See the table below.

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.

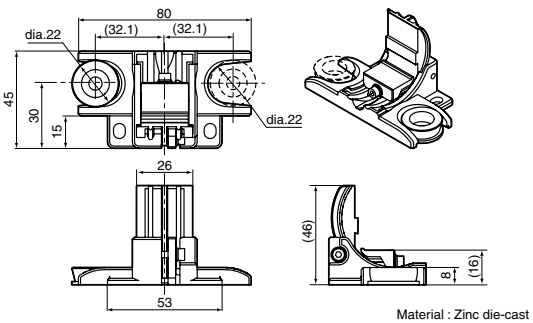
Dimensions of quick mount bracket for F39-LJB3

Backside mounting



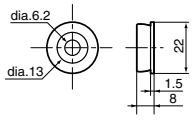
Material : Zinc die-cast

Side mounting



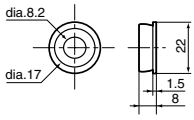
Material : Zinc die-cast

Quick mount M6 bracket



Material : Stainless

Quick mount M8 bracket



Material : Stainless

Ordering

Main Units

Safety Light Curtains

Application	Detection capability	Beam gap	Operating range	Protective height (mm)	Model
					PNP output
Hand protection	Dia. 25 mm	20 mm	0.2 to 7 m	185 to 2,065	F3SJ-B□□□□P25

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

Model	Number of beams	Protective height [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	M12 connector (8-pin)	F39-JD3A
	7 m		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-JD□B 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)

Type	Appearance	Cable length	Model	Application
Series connection cable for extension		0.2 m	F39-JBR2W *1	For series connection *2
Extension cable		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

Type	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 G7SA, contact Omron or visit website.
		• Nodes: 4 • Contact type: 3NO+1NC • Rated switch load: 250 VAC 6A, 30 VDC 6A	G7SA-3A1B	
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	For information on the G7S-□-E, contact Omron or visit website
		• Nodes: 6 • Contact type: 3NO+3NC • Rated switch load: 250 VAC 10 A, 30 VDC 10 A	G7S-3A3B-E	

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)

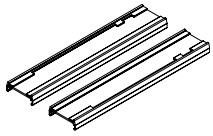
Appearance	Specifications	Model	Application	Remarks
	Top/bottom bracket	F39-LJB1	Top/bottom bracket for F3SJ-E/B	2 for the emitter, 2 for the receiver, total of 4 per set
	Intermediate bracket	F39-LJB2 *1 *2	In combination use with top/bottom bracket for F3SJ-E/B Can be used as free-location bracket.	1 set with 2 pieces
	Quick mount bracket	F39-LJB3-M6 *1	Quick mount bracket for F3SJ-E/B Supports M6 slide nut for aluminum frame.	1 set with 2 pieces
		F39-LJB3-M8 *2	Quick mount bracket for F3SJ-E/B Supports M8 slide nut for aluminum frame.	
	M6 slide nut	F39-LJB3-M6K *1	Spare slide nut for use with Quick mount bracket.	Hexagon socket head cap screws (M6 x 10) are included.
	M8 slide nut	F39-LJB3-M8K *2		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)

Appearance	Model
	F39-HB□□□□*1 *2

*1. The same 4-digit numbers as the protective heights (□□□□ in the light curtain model names) are substituted in the model names.
*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 (□□□□) are used in the part of the Protector model number.
*2. Purchase the F39-PB□□□□ (which contains two sets of brackets) to use Protective Bars for both the Emitter and Receiver.

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Электронная почта: ocean@oceanchips.ru
Web: http://oceanchips.ru/
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А