

# 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

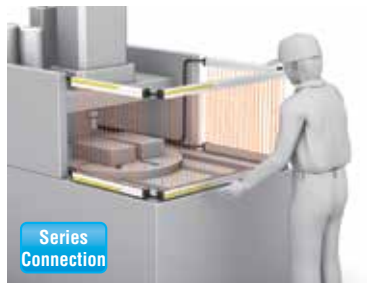


## Description

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.

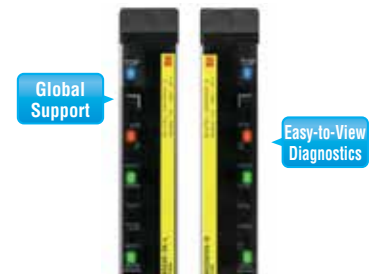
### Up to three sets connected in a series

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.



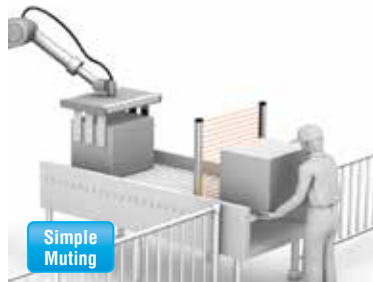
### Functions inherited from the EASY type

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<br>(under stable light<br>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<br>(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<br>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<br>Auxiliary output:<br>– Reverse output of safety output for a basic system<br>– ON when muting/override for a muting system   |  |
| Input voltage   | ON voltage: Vs-3 V to Vs *5<br>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<br>• Number of connections: up to 3 sets (between F3SJ-Bs only) Other models cannot be connected.<br>• Total number of beams: up to 192 beams<br>• Maximum cable length for 2 sets: no longer than 7 m |  |
| Test function   | • Self test (at power-ON and at power distribution)<br>• External test (emission stop function by test input)  |  |
| Safety-related functions                                    | • Interlock (basic system)<br>• External device monitoring (basic system)<br>• Muting (muting system)<br>• 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/s <sup>2</sup> , 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.

## 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)<br>Number of wires: Emitter: 8 wires<br>Cable diameter: Dia. 6 mm<br>Allowable bending radius: R5 mm  |
| Extension cable       | 30 m max.  |
| Material              | Case: Aluminum<br>Cap: ABS resin, PBT<br>Optical cover: PMMA resin (acrylic)<br>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)<br>IEC 61496-2, CLC/TS 61496-2, UL 61496-2, Type 4 AOPD (Active Opto-electronic Protective Devices)<br>IEC 61508-1 to -3, EN 61508-1 to -3 SIL3<br>IEC 13849-1: 2006, EN ISO 13849-1: 2008 (PLe, Cat.4)<br>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

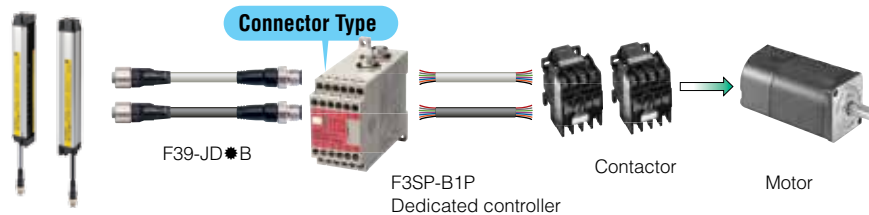
#### Space Efficient and Low Cost

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 (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



Side mounting



Quick mount M6 bracket



Quick mount M8 bracket



## 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    |    | <ul style="list-style-type: none"> <li>Nodes: 4</li> <li>Contact type: 2A2B</li> <li>Rated switch load: 250 VAC 6A, 30 VDC 6A</li> </ul>        | G7SA-2A2B  |  For information on the G7SA, contact Omron or visit website.     |
|  |   | <ul style="list-style-type: none"> <li>Nodes: 4</li> <li>Contact type: 3NO+1NC</li> <li>Rated switch load: 250 VAC 6A, 30 VDC 6A</li> </ul>     | G7SA-3A1B  |  |
| G7S-□-E Relays with Forcibly Guided Contacts |  | <ul style="list-style-type: none"> <li>Nodes: 6</li> <li>Contact type: 4NO+2NC</li> <li>Rated switch load: 250 VAC 10 A, 30 VDC 10 A</li> </ul> | G7S-4A2B-E |  For information on the G7S-□-E, contact Omron or visit website |
|  |   | <ul style="list-style-type: none"> <li>Nodes: 6</li> <li>Contact type: 3NO+3NC</li> <li>Rated switch load: 250 VAC 10 A, 30 VDC 10 A</li> </ul> | 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,<br>2 for the receiver,<br>total of 4 per set |
|    | Intermediate bracket        | F39-LJB2 *1 *2  | In combination use with top/bottom bracket for F3SJ-E/B<br>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<br>Supports M6 slide nut for aluminum frame.                    | 1 set with 2 pieces   |
|   |                             | F39-LJB3-M8 *2  | Quick mount bracket for F3SJ-E/B<br>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,<br>2 for the receiver,<br>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       | <ul style="list-style-type: none"> <li>• 2 light curtain brackets</li> <li>• 4 mounting brackets</li> <li>• 0 to 4 intermediate brackets for backside mounting (quantity required for the sensing width)</li> <li>• 0 to 4 intermediate brackets for mounting to the sides (quantity required for the sensing width)</li> </ul> |
|   | F39-PB□□□□-S *1 *2 | <ul style="list-style-type: none"> <li>• 1 light curtain bracket</li> <li>• 2 mounting brackets</li> <li>• 0 to 2 intermediate brackets for backside mounting (quantity required for the sensing width)</li> <li>• 0 to 2 intermediate brackets for mounting to the sides (quantity required for the sensing width)</li> </ul>  |

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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