## 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: $30 \times 30 \mathrm{~mm}(1.18 \times 1.18 \mathrm{in}$.)
- Cascaded designs possible -3 segments
- Simple muting
- Cross-talk prevention



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## 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 $\square \square \square \square$ 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 $2,065 \mathrm{~mm}$ |
| Lens diameter |  | Diameter 5 mm |
| Operating range *2 |  | 0.2 to 7 m |
| Response time (under stable light incident condition) | ON to OFF | $15 \mathrm{~ms} \mathrm{max}$. (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 $\pm 20 \%$ (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 $\pm 2.5^{\circ}$ 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 $1 \mu \mathrm{~F}$ *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 OFF voltage: 0 V to $1 / 2 \mathrm{Vs}$ 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 $55^{\circ} \mathrm{C}$ (non-freezing), Storage: -25 to $70^{\circ} \mathrm{C}$ |
| Ambient humidity |  | Operating: 35\% to 85\% (no condensation), Storage: 35\% to 95\% RH |
| Operating ambient light intensity |  | Incandescent lamp: 3,000 Ix max., Sunlight: 10,000 Ix max. |
| Insulation resistance |  | $20 \mathrm{M} \Omega \mathrm{min}$. (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 $0.7 \mathrm{~mm}, 20$ sweeps in $\mathrm{X}, \mathrm{Y}$, and Z directions |
| Shock resistance |  | Malfunction: $100 \mathrm{~m} / \mathrm{s} 2,1,000$ times each in $\mathrm{X}, \mathrm{Y}$, 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 $\square \square \square \square$ 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: R 5 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) $\times 2.7+500$ |
| 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, <br> 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 $\pm 10 \%$ |
| Power supply consumption | DC1.7 W max. (not including sensor's <br> current consumption) |
| Operation time | 100 ms max. (not including sensor's <br> response time) |
| Response time | 100 ms max. (not including sensor's <br> response time) |
| Relay <br> output | Number of <br> contacts |
|  | Rated load |
|  | Rated current |
| 3NO + 1NC |  |
| Connection <br> type | Between sensors |
|  | Others |
| Weight (packed state) | M12 connector (8-pin) |
| Accessories | Approx. 280 g |

*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


Wiring for auto reset mode and deactivated external device monitoring


## 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



Side mounting

$C$ (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 <br> height | Number of <br> intermediate <br> brackets | E |
| :---: | :---: | :---: |
| 185 to 1,105 | 0 | - |
| 1,185 to 1,345 | 1 | $\mathrm{C} / 2$ max. |
| 1,425 to 2,065 | 2 | $\mathrm{C} / 3$ max. |

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 <br> height | Number of <br> intermediate <br> brackets | E |
| :---: | :---: | :---: |
| 185 to 1,105 | 0 | - |
| 1,185 to 1,345 | 1 | $\mathrm{C} / 2$ max. |
| 1,425 to 2,065 | 2 | $\mathrm{C} / 3$ max. |

Dimensions of top/bottom bracket for F39-LJB1


Dimensions (continued)

## Main Units

When Using Quick Mount Brackets

(20)

Side mounting


C (protective height): 4-digit number in the table $\mathrm{F}=$ See the table below.

| Protective <br> height | Number of <br> intermediate <br> 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 | $555 \mathrm{~mm} \max$. |

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

| Protective <br> height | Number of <br> intermediate <br> brackets | $\mathbf{F}$ |
| :---: | :---: | :---: |
| 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



Quick mount M6 bracket


Material : Zinc die-cast
Quick mount M8 bracket


Side mounting


F3SJ－B Safety Light Curtains

## Ordering

## Main Units

## Safety Light Curtains

|  |  |  |  | Model |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Application | Detection capability | Beam gap | Operating range | Protective height <br> （mm） | PNP output |
| Hand protection | Dia． 25 mm | 20 mm | 0.2 to 7 m | 185 to 2,065 | F3SJ－B口ロด口 |

## Safety Light Curtain Model List

Please contact our sales representatives．
F3SJ－B Series（20 mm pitch）

| Model | Number of beams | Protective height <br> ［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 <br> ［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 |

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## Ordering (continued)

Accessories (sold separately) (continued)
Series-connection Cable (2 cables per set, for emitter and receiver)

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

*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 <br> - Contact type: 2A2B <br> - Rated switch load: 250 VAC 6A, 30 VDC 6A | G7SA-2A2B | For information on the G7SA, contact Omron or visit website. |
|  |  | - Nodes: 4 <br> - Contact type: 3NO+1NC <br> - Rated switch load: 250 VAC 6A, 30 VDC 6A | G7SA-3A1B |  |
| G7S- $\square$-E Relays with Forcibly Guided Contacts |  | - Nodes: 6 <br> - Contact type: $4 \mathrm{NO}+2 \mathrm{NC}$ <br> - Rated switch load: 250 VAC 10 A, 30 VDC 10 A | G7S-4A2B-E | - For information on $\begin{aligned} & \text { the G7S- } \square \text {-E, contact } \\ & \text { Omron or visit website }\end{aligned}$ |
|  |  | - Nodes: 6 <br> - Contact type: $3 \mathrm{NO}+3 \mathrm{NC}$ <br> - 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 |  |

## Ordering (continued)

Accessories (sold separately) (continued)
Sensor Mounting Bracket (sold separately)


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 |
| :---: | :---: |
|  |  |

*1. The same 4-digit numbers as the protective heights ( $\square \square \square \square$ 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 $\square \square \square \square * 1$ | - 2 light curtain brackets <br> - 4 mounting brackets <br> - 0 to 4 intermediate brackets for backside mounting (quantity required for the sensing width) <br> - 0 to 4 intermediate brackets for mounting to the sides (quantity required for the sensing width) |
|  | F39-PB $\square \square \square \square-\mathrm{S}^{* 1}$ *2 | - 1 light curtain bracket <br> - 2 mounting brackets <br> - 0 to 2 intermediate brackets for backside mounting (quantity required for the sensing width) <br> - 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 ( $\square \square \square \square$ ) are used in the part of the Protector model number.
*2. Purchase the F39-PB $\square \square \square \square$ (which contains two sets of brackets) to use Protective Bars for both the Emitter and Receiver.

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[^0]:    ＊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．

