



Type 4
NEW LIGHT CURTAIN

SF4B SERIES Ver.2

CE
Conforming to Machine
& EMC Directive

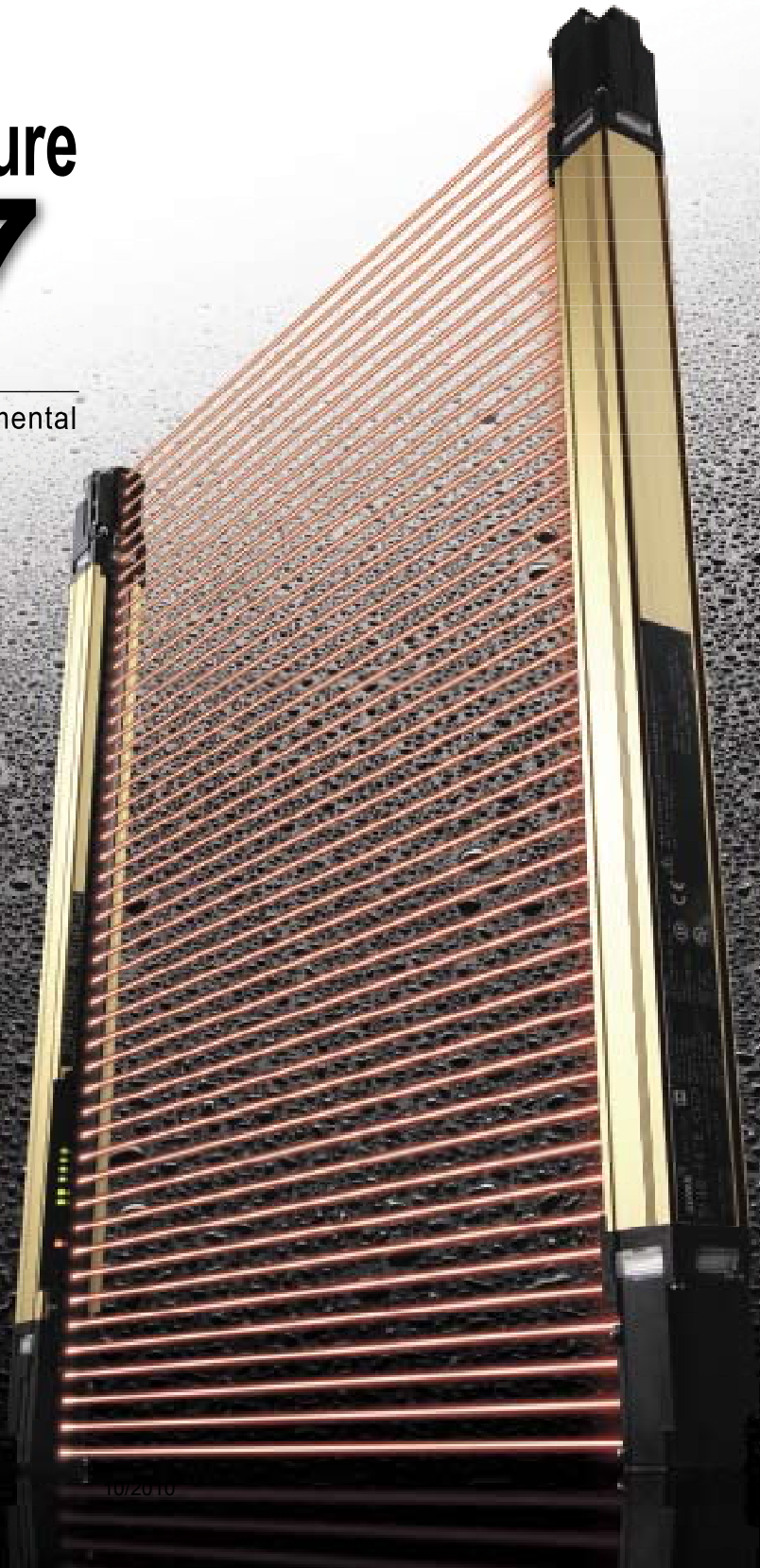
cULus
Approved Listing

Conforming to
OSHA / ANSI

JIS

Protection structure IP67

New version with improved environmental
resistance performance



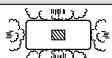

Advanced SUNX light curtains at the forefront of the industry

Protection structure IP67 is achieved in such size

Improved environmental resistance performance and easier operability New structure

A seamless structure with least seam area possible is newly developed. The inner unit is protected by a cylindrical inner case. Seams such as unit and lens surfaces have been greatly reduced, so that particles such as oil mists and dust are prevented from getting in, raising its environmental resistance performance.

SF4B series has passed the tests of IP65 and IP67 as specified by IEC / JIS standards. (Ver.2 only)

| IEC / JIS | Description | |
|-----------|---|--|
| IP65 | No harmful effect due to direct water jet from any direction |  |
| IP67 | No water penetration due to immersion in water under specified conditions |  |

* Refer to each standard for details of test conditions.

Inner case

Cylindrical inner case protects the internal unit.

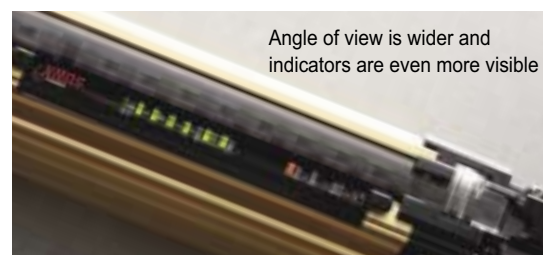
This new structure does not use adhesive or double-sided tape on the joints like with the previous models. There is no need to worry about water immersion or corrosion such as a coolant causing the adhesive to strip off.



Error details can be understood at a glance

Equipped with a digital error indicator

The system constantly checks the light curtain for problems such as incorrect cable wiring, disconnection, short-circuits, internal circuit problems, and incoming light problems. Details of any electrical problems such as at equipment startup will appear on the digital display. The inconvenience of counting the number of LED blinks is no longer needed.



Angle of view is wider and indicators are even more visible

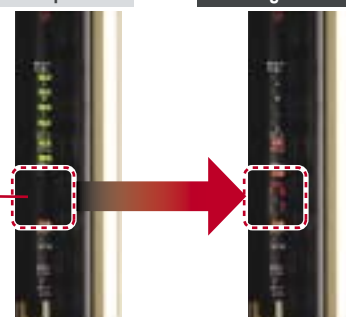
Error number notification means smooth support via telephone

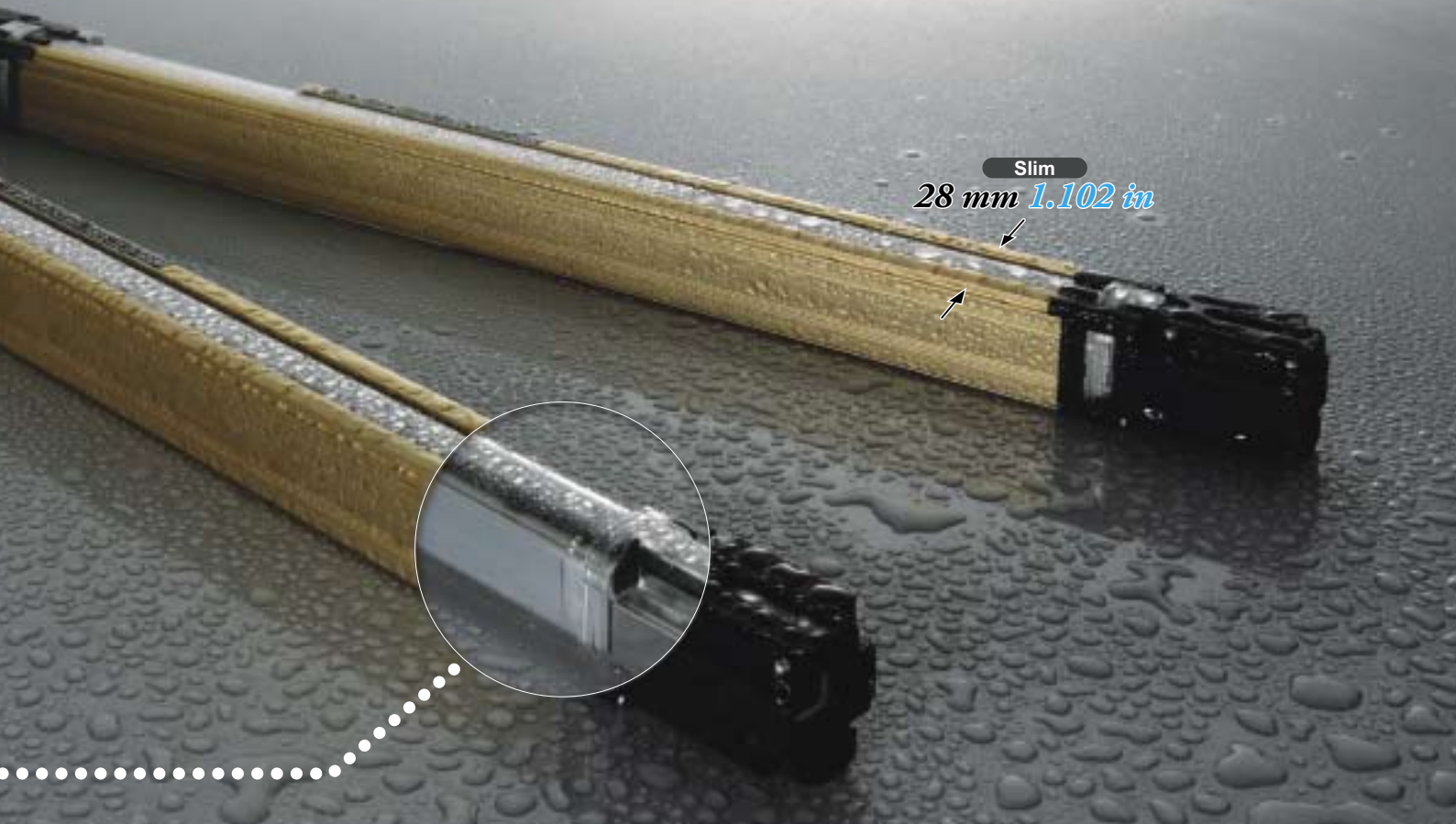


Normal operation

Breaking out error

Digital error indicator



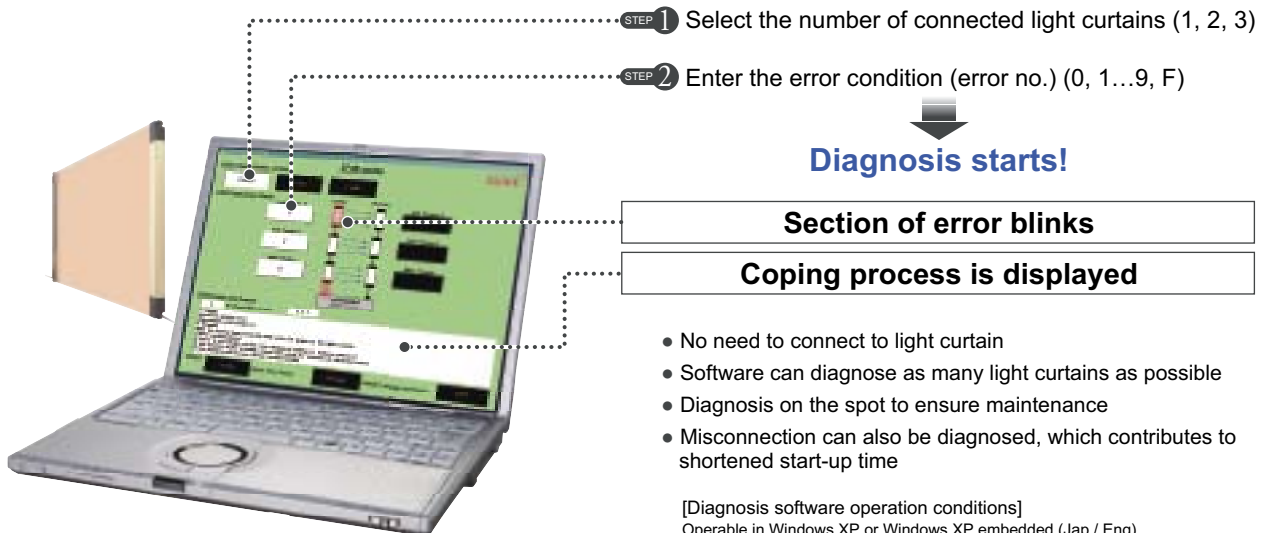


Achieving protection structure IP67 while keeping its slim body.

Locate problems easily and quickly

Light curtain diagnosis software

Simply select the error no. that is displayed on the light curtain on the PC screen, and the section of error will be displayed visually. Coping process is also displayed for a quick resolution of the problem.



* For those wishing to use the light curtain diagnosis software, contact nearby SUNX sales office.

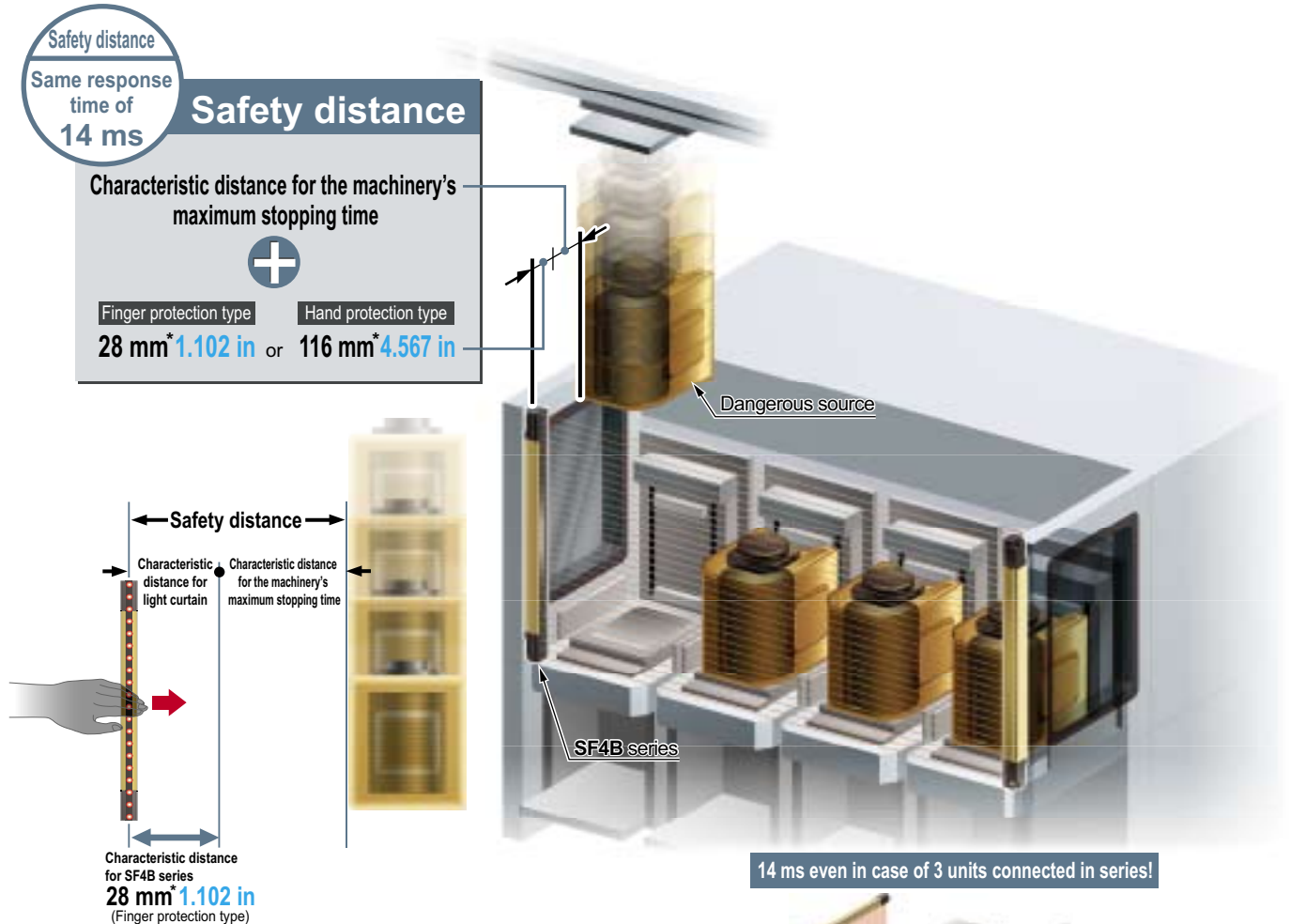
[Diagnosis software operation conditions]
 Operable in Windows XP or Windows XP embedded (Jap / Eng).
 Approx. 1.5 MB of free space is required. Installation is not required.
 Operates by executable file (EXE).

* Windows® is a registered trademark of Microsoft Corporation in the United States and other countries.

10/2010

A unified response time of 14 ms for all models makes setup easy

A fast response time of 14 ms has been achieved regardless of the number of beam channels, the beam axis pitches and the number of units connected in series. This reduces calculation work required for the safety distance.



* This is the characteristic safety distance for the light curtain as defined by ISO 13855. Calculate the safety distance by including the machinery's maximum stopping time. Furthermore refer to the relevant standards of the region where this device is to be used, and then install this device.



* Series connection allows max. 3 sets or a total of up to 192 beam channels.

It is possible to select from among three types according to the worksite

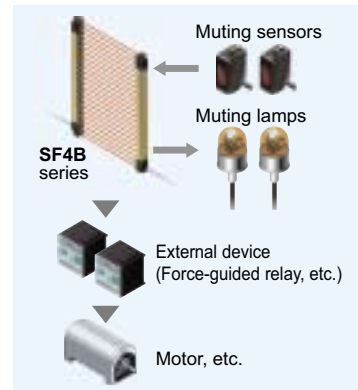
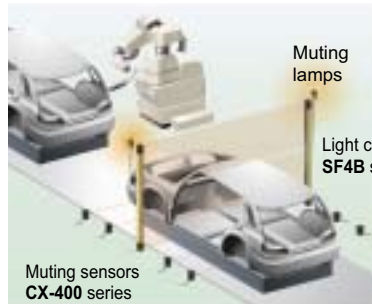
A wide range of variations are available with protective heights of 230 to 1,910 mm (9.055 to 75.197 in (1,270 mm 50.000 in for the finger protection type)). Mixing three types in a series connection is also possible.

| Finger protection type | SF4B-F□ | Hand protection type | SF4B-H□ | Arm / Foot protection type | SF4B-A□ |
|------------------------|--|----------------------|--|----------------------------|--|
| | Minimum sensing object ø14 mm ø0.551 in (10 mm 0.394 in beam pitch) | | Minimum sensing object ø25 mm ø0.984 in (20 mm 0.787 in beam pitch) | | Minimum sensing object ø45 mm ø1.772 in (40 mm 1.575 in beam pitch) |

Muting control function is built into light curtain Safety circuits are selectable

A muting control function is provided to increase both safety and productivity

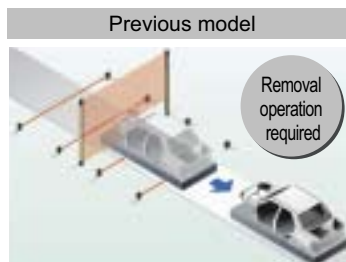
The light curtain is equipped with a muting control function that causes the line to stop only when a person passes through the light curtain, and does not stop the line when an object passes through. The muting sensors and muting lamps can be connected directly to the light curtain so that an exclusive controller is not required for muting. This both reduces costs and increases safety and productivity.



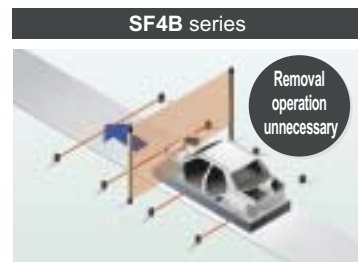
Override function allows the line to be restarted smoothly after it has stopped while muting control was active

In case the power turns off while the light curtain has been interrupted by an object or in case the line stops before the muting conditions have been established (if only one muting sensor has been interrupted), the line can be restarted smoothly without having to remove the object that is interrupting the light curtain.

(e.g.) When power turns off while light curtain was interrupted



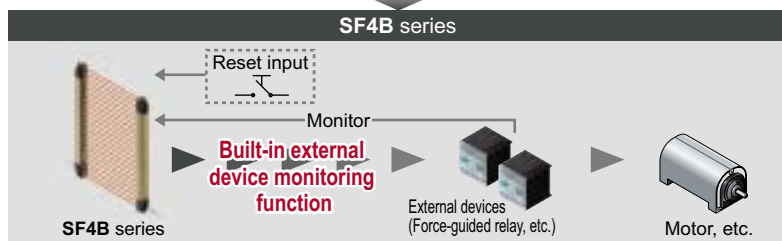
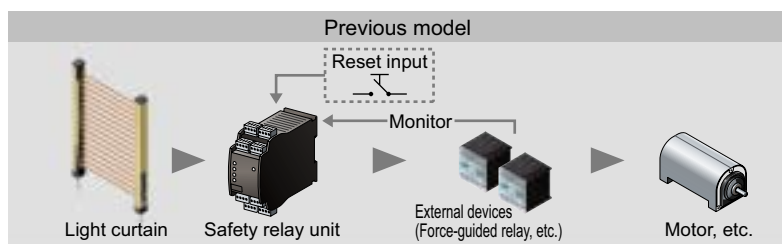
Object must be removed before restart



Smooth restart

Equipped with a safety circuit that does not require an exclusive safety relay unit

The light curtain has a built-in external device monitoring function (such as for fused relay monitoring) and an interlock function. The safety circuit is constructed so that a separate safety relay unit is not needed, and the control board has become smaller to help to contribute to lower costs.



No safety relay unit needed
Smaller control board

• Safety relay
Panasonic Electric Works Ltd.
SF series



• Miniature contactor
Panasonic Electric Works Ltd.
PC-5 series



Note: Contact the manufacturers for details on the recommended products.

A universal design that can be used anywhere in the world

In Europe, America and Japan
PNP output and NPN output
in a single model!



Europe IEC 61496-1/2, EN 55011, EN 61496-1

North America UL 61496-1/2, UL 1998, CSA, OSHA/ANSI

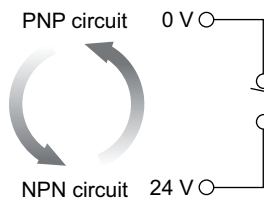
* We plan on acquiring Korea S-mark certification and China GB in near future.
In case such certification is required, please purchase the previous **SF4B** series.

Supports both PNP and NPN polarities in a single model

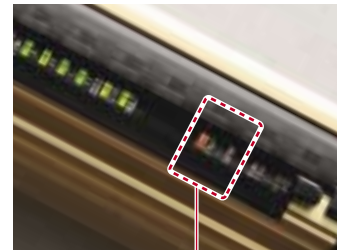
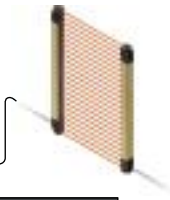
The **SF4B** series combines PNP transistor output and NPN transistor output in a single model. Overseas equipment that uses PNP, replacement with NPN sensors, factories that are positively grounded, and transfer of equipment overseas are all situations where the control circuits for a single model are suitable for use worldwide.

■ Polarity can be changed easily by changing wiring

When the output polarity setting wire (shielded) is connected to 0 V, PNP output is selected, and when it is connected to 24 V, it switches to NPN output.



| Output polarity setting wire (Shield) | Control output (OSSD) |
|---------------------------------------|-----------------------|
| Connect to 0 V | PNP output |
| Connect to 24 V | NPN output |
| Not connected / open | Error |

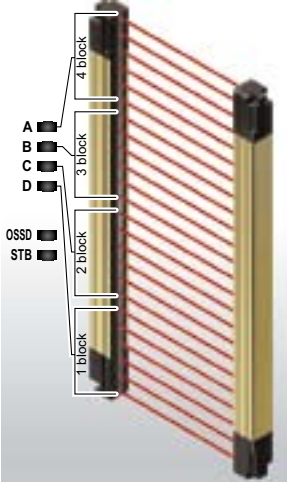

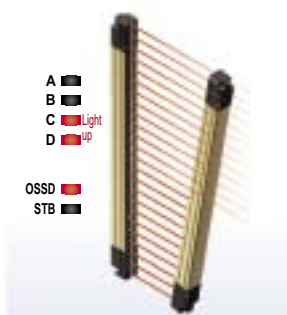
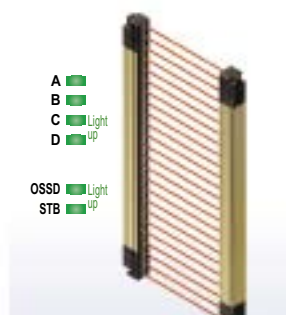


PNP / NPN polarity indicator
Either PNP or NPN side lights depending on which is selected.

A commitment to design that is easy to use

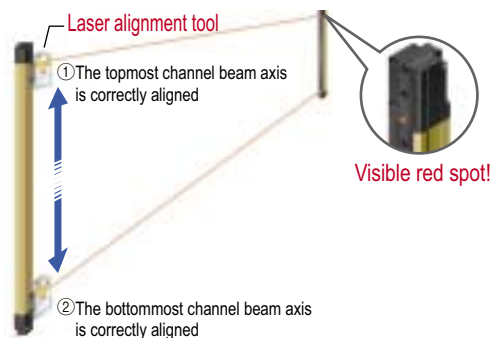
Beam-axis alignment indicators show the incident light position at a glance

Beam-axis alignment indicators display the beam channels of the light curtain in four blocks. When the beam channel at the bottommost channel (or topmost channel), which is used as a reference for beam-axis alignments, is correctly aligned, the LED blinks red. After this, each block lights red as the beam axes successively become aligned. When all channel beam axes are aligned, all LEDs light green. The display also has a stability indicator (STB) added so that setup can be carried out with greater stability.

| | | | |
|--|--|---|--|
| Beam channels are displayed in 4 blocks | The bottommost channel beam axis is aligned | Only the beam axes of the two lower blocks are aligned | All channel beam axes are aligned |
|  |  <p>The bottommost LED 'D' is blinking red</p> |  <p>The bottom two LEDs 'C, D' light up in red</p> |  <p>All LEDs 'A to D' light up in green</p> <p>Furthermore, STB display allows the most stable incident light status* to be confirmed.</p> <p>* 140 % or more incident light intensity of control output operation level</p> |

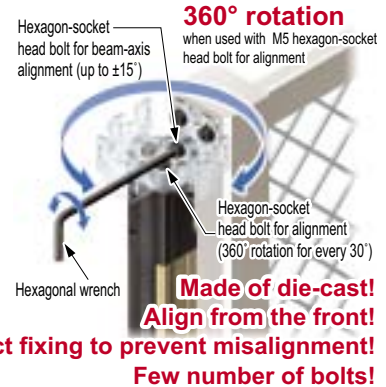
Laser alignment tool for easy installation

The tool performs beam-axis alignment using a laser beam spot. As the tool is battery-operated, it is possible to perform beam-axis alignment before actual powering on the equipment.



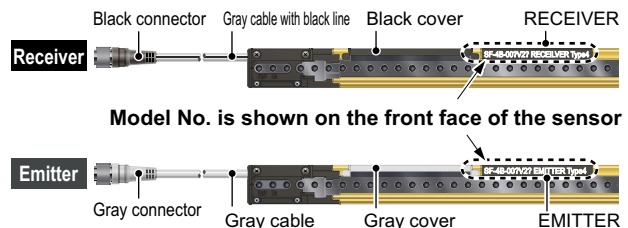
Greatly improved ease of installation

The hexagon-socket head bolts used for aligning the beam axis can be tightened from the front of the light curtain. Beam adjustment can be carried out easily while checking on the bolts. Also, the beam-axis alignment part is directly fixed by M5 bolts to prevent beam misalignment.



Easy to distinguish receiver and emitter

Emitter is in gray; receiver is in black. Whether during startup or maintenance, troubles due to incorrect wiring or false recognition can be greatly reduced. Moreover, model No. can be confirmed from the front face of the light curtain.



Mutual interference is reduced without needing for interference prevention lines

The light curtain is equipped with the ELCA (Extraneous Light Check & Avoid) function. Because it automatically shifts the scan timing of the light curtain in order to avoid interference, it is not necessary to wire interference prevention lines between machineries.

Reducing the number of malfunctions caused by extraneous light

Double scanning method and retry processing are two new functions exclusive to SUNX, which are effective in eliminating the effects of momentary extraneous light from peripheral equipment. The reduction in operating errors caused by extraneous light reduces frequent stopping of machinery.

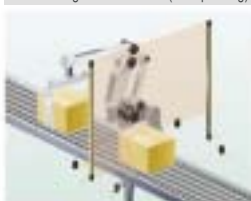
Options exclusive for light curtain are available for an easy construction of safety circuit

Handy-controller SFB-HC* that enables the user to select a variety of settings **SFB-HC**

Separate muting control function for each beam channel

The handy-controller **SFB-HC*** (optional) can be used to carry out muting control for specified beam channels only. Because individual beam channel can be specified to suit the object, separate guards to prevent entry do not need to be set up.

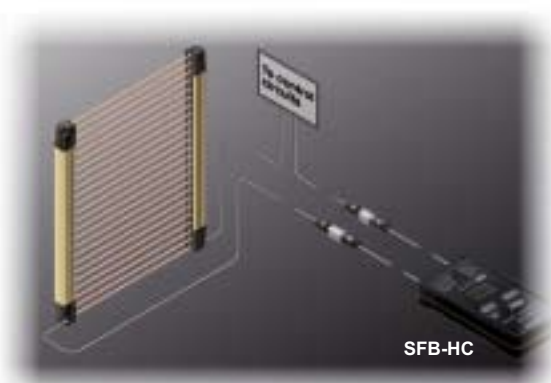
While muting control is active (line operating)



Line stopped



For example, depending on the height of the object, the muting function can be activated for 10 beam channels starting from the bottom, so that if the 11th or subsequent beam channels are interrupted, it is judged that a person has entered the area and the line stops.



* A handy-controller cannot be used with the **SF4B-□-01<V2>** and the **SF-C14EX-01**.

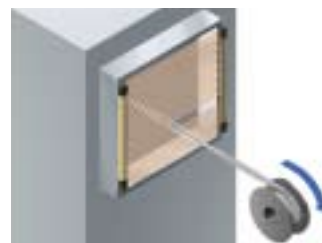
Any valid beam channels can be selected The SF4B series incorporates a fixed blanking function.

The **SF4B** series is equipped with a fixed blanking function which allows specific beam channels to be selectively interrupted without causing the control output (OSSD) to output the OFF signal. This function is convenient for use with applications in which certain fixed obstacles tend to block specific beam channels. Furthermore, this function provides greater safety as the control output (OSSD) will automatically output the OFF signal if the fixed obstacles are subsequently removed from the sensing area.



Non-specified beam channels can be deactivated The SF4B series incorporates a floating blanking function.

1, 2 or 3 non-specified beam channels can be deactivated. If the number of beam channels that are blocked is less than or equal to the set number of beam channels, then the control output (OSSD) will not output the OFF signal. This function is useful in the event when the positions of obstacles within the sensing area must be changed during object rearrangement, or when an object passes through the light curtain's sensing area.



Note: When the floating blanking function is used, the size of the min. sensing object is changed. Refer to "PRECAUTIONS FOR PROPER USE" (p.33) for details.

Auxiliary output has selectable output configuration

| Mode No. | Description |
|----------|---|
| 0 | Negative logic of the control output (OSSD 1, OSSD 2) (factory setting) |
| 1 | Positive logic of the control output (OSSD 1, OSSD 2) |
| 2 | For emission: output ON, For non-emission: output OFF |
| 3 | For emission: output OFF, For non-emission: output ON |
| 4 | For unstable incident beam: OFF (Note 1) |
| 5 | For unstable incident beam: ON (Note 1) |
| 6 | For muting: ON |
| 7 | For muting: OFF |
| 8 | For beam received: ON, For beam interrupted: OFF (Note 2) |
| 9 | For beam received: OFF, For beam interrupted: ON (Note 2) |

Notes: 1) The output cannot be used while the fix blanking function, floating blanking function or the muting function is activated.
2) This device outputs the beam received / interrupted state under activating the auxiliary output switching function using the handy controller irrespective of activating other functions, fixed blanking function, floating blanking function, and muting function.

A variety of other functions can be selected

Emission intensity control function

This function reduces the amount of emitting light. The two modes, normal mode and short mode, can be selected. The factory setting is set to the normal mode for the emission intensity control function.

Setting monitoring function

This function allows the user to confirm the details of each light curtain setting.

Protection function

Unless the password is not input, any setting change of the light curtain cannot be allowed. The factory setting is set to invalid for the protect function.

Copy function

Allows settings details to be copied into other light curtains. In the event that the same setting must be input into several different light curtains, this function will reduce the time required for the input of settings.

Muting lamp diagnosis setting

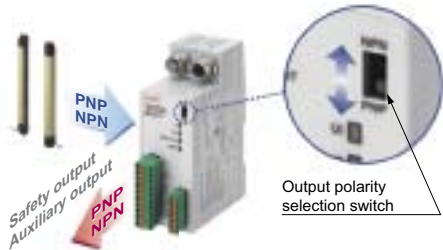
When the muting lamp diagnosis is disabled, the muting function will continue to operate even if the lamp is blown.

Lineup of exclusive control units



Supports both PNP and NPN polarities **SF-C10 series**

A single unit can be used for PNP / NPN input switching, reducing the number of parts that need to be registered.



Plug-in connector type control unit **SF-C11**

Connecting to the light curtain is done using plug-in connector connections, which shorten setup and replacement time.



Robust type control unit **SF-C12**

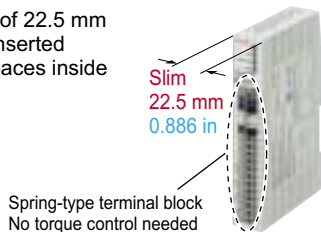
The strong metal enclosure has a built-in safety relay. It has an IP65 protection structure, so that it can be set up individually without the need to be inserted into a control panel.



Connecting to the light curtain is done using plug-in connector connections

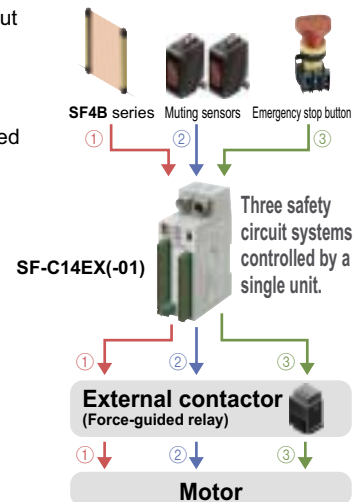
Slim type control unit **SF-C13**

Having a thickness of 22.5 mm **0.886 in**, it can be inserted even into narrow spaces inside panels.



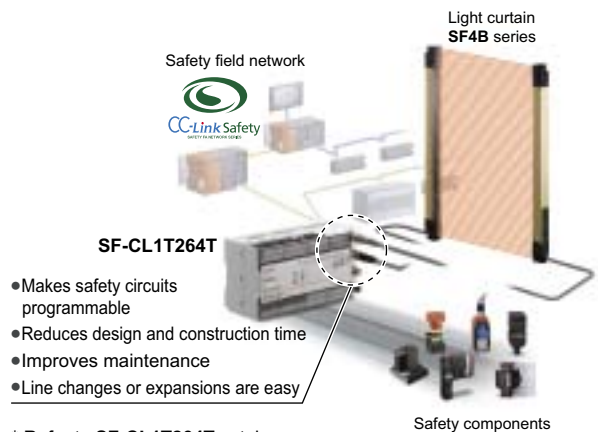
Application expansion unit **SF-C14EX(-01)**

- ① Light curtain output
 - ② Muting control
 - ③ Emergency stop button
- Three safety circuit systems are collected into a single unit.



Remote I/O unit **SF-CL1T264T**

Connect light curtain and safety components to the safety field network, CC-Link Safety, and a single network is complete while achieving wire-saving.



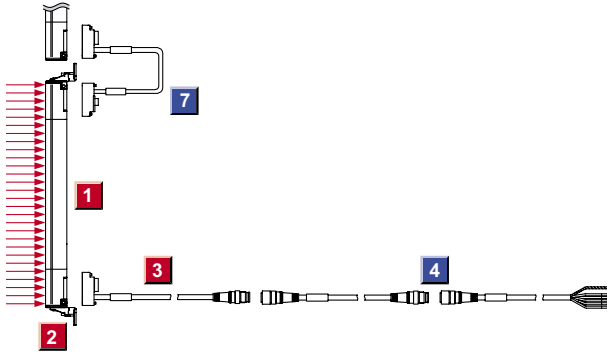
* Refer to **SF-CL1T264T** catalog or **SUNX** general catalog for details.

PRODUCT CONFIGURATION



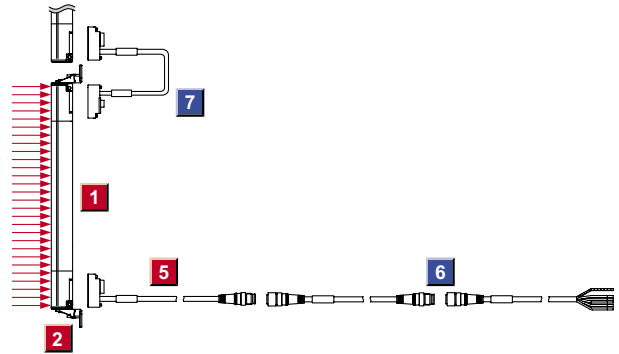
Mounting bracket and mating cable are optional.

Standard components (8-core cable)



| Component parts | |
|-----------------|---|
| Required | 1 Light curtain |
| | 2 Mounting bracket (Optional) |
| | 3 8-core bottom cap cable (Optional) |
| | 4 8-core extension cable (Optional, use for cable extension) |
| | 7 Cable for series connection (Optional, use for connection in series) |

Muting control components (12-core cable, with interference prevention wire)



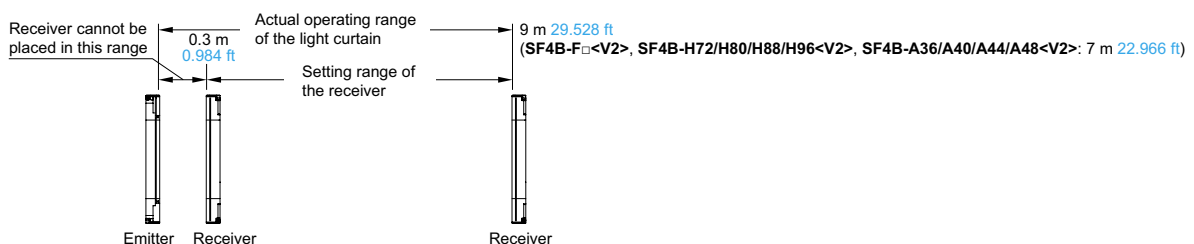
| Component parts | |
|-----------------|---|
| Required | 1 Light curtain |
| | 2 Mounting bracket (Optional) |
| | 5 12-core bottom cap cable (Optional) |
| | 6 12-core extension cable (Optional, use for cable extension) |
| | 7 Cable for series connection (Optional, use for connection in series) |

ORDER GUIDE

1 Light curtains Mounting bracket and bottom cap cable are not supplied with the light curtain. Be sure to order them separately.

| Type | Appearance | Operating range (Note 1) | Model No. (Note 2) | | Number of beam channels | Protective height (mm in) | | | |
|---|-----------------|-----------------------------|---|---|----------------------------|------------------------------|-----------------|----|------------|
| | | | | Handy-controller non-compatible type | | | | | |
| Finger protection type Min. sensing object $\phi 14$ mm $\phi 0.551$ in (10 mm 0.394 in beam pitch) | | | SF4B-F23<V2> | SF4B-F23-01<V2> | 23 | 230 9.055 | | | |
| | | | SF4B-F31<V2> | SF4B-F31-01<V2> | 31 | 310 12.205 | | | |
| | | | SF4B-F39<V2> | SF4B-F39-01<V2> | 39 | 390 15.354 | | | |
| | | | SF4B-F47<V2> | SF4B-F47-01<V2> | 47 | 470 18.504 | | | |
| | | | SF4B-F55<V2> | SF4B-F55-01<V2> | 55 | 550 21.654 | | | |
| | | | SF4B-F63<V2> | SF4B-F63-01<V2> | 63 | 630 24.803 | | | |
| | | | SF4B-F71<V2> | SF4B-F71-01<V2> | 71 | 710 27.953 | | | |
| | | | SF4B-F79<V2> | SF4B-F79-01<V2> | 79 | 790 31.102 | | | |
| | | | SF4B-F95<V2> | SF4B-F95-01<V2> | 95 | 950 37.402 | | | |
| | | | SF4B-F111<V2> | SF4B-F111-01<V2> | 111 | 1,110 43.701 | | | |
| | | | SF4B-F127<V2> | SF4B-F127-01<V2> | 127 | 1,270 50.000 | | | |
| | | | Hand protection type Min. sensing object $\phi 25$ mm $\phi 0.984$ in (20 mm 0.787 in beam pitch) | | | SF4B-H12<V2> | SF4B-H12-01<V2> | 12 | 230 9.055 |
| | | | | | | SF4B-H16<V2> | SF4B-H16-01<V2> | 16 | 310 12.205 |
| SF4B-H20<V2> | SF4B-H20-01<V2> | 20 | | | | 390 15.354 | | | |
| SF4B-H24<V2> | SF4B-H24-01<V2> | 24 | | | | 470 18.504 | | | |
| SF4B-H28<V2> | SF4B-H28-01<V2> | 28 | | | | 550 21.654 | | | |
| SF4B-H32<V2> | SF4B-H32-01<V2> | 32 | | | | 630 24.803 | | | |
| SF4B-H36<V2> | SF4B-H36-01<V2> | 36 | | | | 710 27.953 | | | |
| SF4B-H40<V2> | SF4B-H40-01<V2> | 40 | | | | 790 31.102 | | | |
| SF4B-H48<V2> | SF4B-H48-01<V2> | 48 | | | | 950 37.402 | | | |
| SF4B-H56<V2> | SF4B-H56-01<V2> | 56 | | | | 1,110 43.701 | | | |
| SF4B-H64<V2> | SF4B-H64-01<V2> | 64 | | | | 1,270 50.000 | | | |
| SF4B-H72<V2> | SF4B-H72-01<V2> | 72 | | | | 1,430 56.299 | | | |
| SF4B-H80<V2> | SF4B-H80-01<V2> | 80 | | | | 1,590 62.598 | | | |
| SF4B-H88<V2> | SF4B-H88-01<V2> | 88 | | | | 1,750 68.898 | | | |
| SF4B-H96<V2> | SF4B-H96-01<V2> | 96 | | | | 1,910 75.197 | | | |
| Arm / Foot protection type Min. sensing object $\phi 45$ mm $\phi 1.772$ in (40 mm 1.575 in beam pitch) | | | | | | SF4B-A6<V2> | SF4B-A6-01<V2> | 6 | 230 9.055 |
| | | | | | | SF4B-A8<V2> | SF4B-A8-01<V2> | 8 | 310 12.205 |
| | | | | | | SF4B-A10<V2> | SF4B-A10-01<V2> | 10 | 390 15.354 |
| | | | SF4B-A12<V2> | SF4B-A12-01<V2> | 12 | 470 18.504 | | | |
| | | | SF4B-A14<V2> | SF4B-A14-01<V2> | 14 | 550 21.654 | | | |
| | | | SF4B-A16<V2> | SF4B-A16-01<V2> | 16 | 630 24.803 | | | |
| | | | SF4B-A18<V2> | SF4B-A18-01<V2> | 18 | 710 27.953 | | | |
| | | | SF4B-A20<V2> | SF4B-A20-01<V2> | 20 | 790 31.102 | | | |
| | | | SF4B-A24<V2> | SF4B-A24-01<V2> | 24 | 950 37.402 | | | |
| | | | SF4B-A28<V2> | SF4B-A28-01<V2> | 28 | 1,110 43.701 | | | |
| | | | SF4B-A32<V2> | SF4B-A32-01<V2> | 32 | 1,270 50.000 | | | |
| | | | SF4B-A36<V2> | SF4B-A36-01<V2> | 36 | 1,430 56.299 | | | |
| | | | SF4B-A40<V2> | SF4B-A40-01<V2> | 40 | 1,590 62.598 | | | |
| | | | SF4B-A44<V2> | SF4B-A44-01<V2> | 44 | 1,750 68.898 | | | |
| | | | SF4B-A48<V2> | SF4B-A48-01<V2> | 48 | 1,910 75.197 | | | |

Notes: 1) The operating range is the possible setting distance between the emitter and the receiver. The light curtain can detect an object less than 0.3 m 0.984 ft away.



2) The model No. with suffix "E" shown on the label affixed to the product is the emitter, "D" shown on the label is the receiver. (e.g.) Emitter of SF4B-F23<V2>: SF4B-F23E<V2>, Receiver of SF4B-F23<V2>: SF4B-F23D<V2>.

ORDER GUIDE

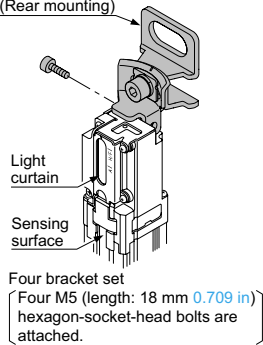
2 Mounting brackets Mounting bracket is not supplied with the light curtain. Be sure to order it separately.

| Designation | | Model No. | Description |
|--|-------------------------------------|--------------------|--|
| Rear / side mounting bracket (Material: Iron) | M8 rear mounting bracket | MS-SFB-7-T | For rear direction. Allows the light curtain to be mounted at the rear with one M8 hexagon-socket-head bolt. (4 pcs. per set for emitter and receiver) |
| | M8 side mounting bracket | MS-SFB-8-T | For side direction. Allows the light curtain to be mounted at the side with one M8 hexagon-socket-head bolt. (4 pcs. per set for emitter and receiver) |
| | M8 rear / side mounting bracket set | MS-SFB-1-T2 | Can be used as either a rear mounting bracket MS-SFB-7-T or a side mounting bracket MS-SFB-8-T depending on mounting direction. (4 pcs. per set for emitter and receiver) |
| 360° mounting bracket (Material: Die-cast zinc alloy) * Light curtain can revolve 360° horizontally. | Standard mounting bracket | MS-SFB-1 | Used to mount the light curtain on the rear surface and side surface. (4 pcs. per set for emitter and receiver) |
| | M8 mounting bracket | MS-SFB-1-T | Allows the light curtain to be mounted at the rear and side with one M8 hexagon-socket-head bolt. (4 pcs. per set for emitter and receiver) |
| | Pitch adapter bracket | MS-SFB-4 | Used as the mounting bracket when changing over a previous light curtain with a protective height of 200 mm 7.874 in or more to the SF4B series. It is installed using two M5 hexagon-socket-head bolts. (4 pcs. per set for emitter and receiver) |
| | M8 pitch adapter bracket | MS-SFB-4-T | Used as the mounting bracket when changing over a previous light curtain with a protective height of 200 mm 7.874 in or more to the SF4B series. It is installed using one M8 hexagon-socket-head bolt. (4 pcs. per set for emitter and receiver) |
| Dead zoneless mounting bracket (Material: Die-cast zinc alloy) | | MS-SFB-3 | Mounting with no dead zone is possible so that the mounting bracket does not project past the protective height. (4 pcs. per set for emitter and receiver) |

M8 rear mounting bracket

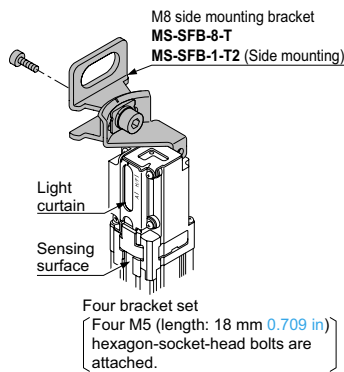
- **MS-SFB-7-T**
- **MS-SFB-1-T2 (Rear mounting)**

M8 rear mounting bracket
MS-SFB-7-T
MS-SFB-1-T2 (Rear mounting)



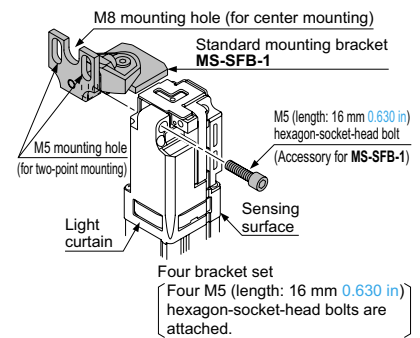
M8 side mounting bracket

- **MS-SFB-8-T**
- **MS-SFB-1-T2 (Side mounting)**



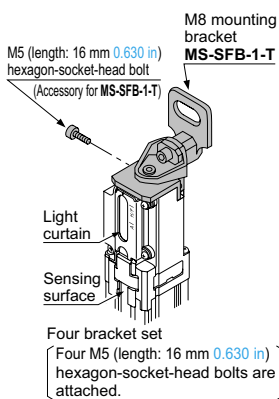
Standard mounting bracket

- **MS-SFB-1**



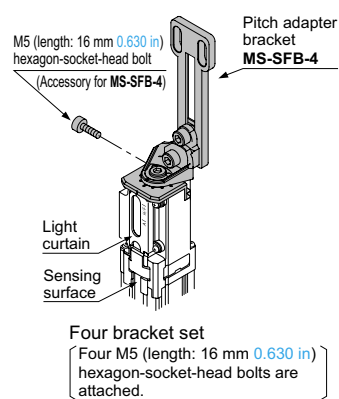
M8 mounting bracket

- **MS-SFB-1-T**



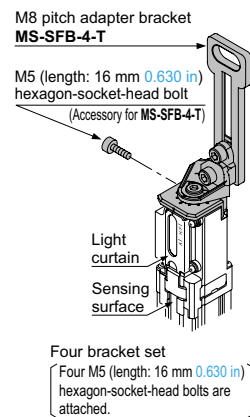
Pitch adapter bracket

- **MS-SFB-4**



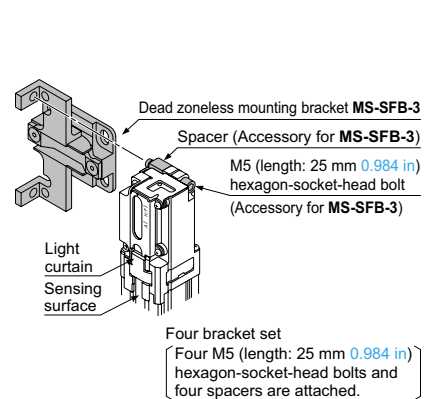
M8 pitch adapter bracket

- **MS-SFB-4-T**



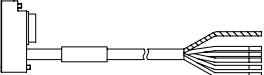

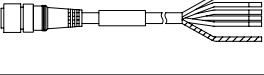
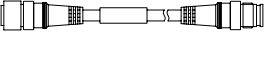
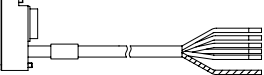
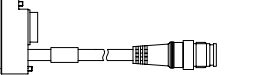
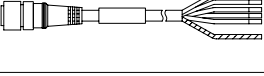
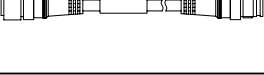
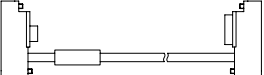
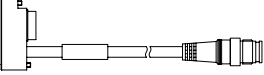
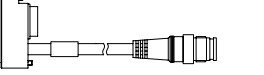
Dead zoneless mounting bracket

- **MS-SFB-3**



ORDER GUIDE

3 4 5 6 7 Mating cable / Extension cable / Cables for series connection Mating cable is not supplied with the light curtain. Be sure to order it separately.

| Type | | Appearance | Model No. | Description | | | |
|--|---|---|---|--|---|--|--|
| Standard components (8-core cable) | Bottom cap cable |  | SFB-CCB3 | Length: 3 m 9.843 ft Net weight: 370 g approx. (2 cables) | Used for connecting to the light curtain and to other cables or the SF-C13 control unit. Two cables per set for emitter and receiver Cable outer diameter: $\varnothing 6$ mm $\varnothing 0.236$ in Cable color: Gray (for emitter) Gray with black line (for receiver) The min. bending radius: R6 mm R0.236 in | | |
| | | | SFB-CCB7 | Length: 7 m 22.966 ft Net weight: 820 g approx. (2 cables) | | | |
| | | | SFB-CCB10 | Length: 10 m 32.808 ft Net weight: 1,160 g approx. (2 cables) | | | |
| | | | SFB-CCB15 | Length: 15 m 49.213 ft Net weight: 1,710 g approx. (2 cables) | | | |
| | Connector |  | SFB-CB05 | Length: 0.5 m 1.640 ft Net weight: 95 g approx. (2 cables) | Used for connecting to the light curtain and to an extension cable or the SF-C11 control unit. Two cables per set for emitter and receiver Cable outer diameter: $\varnothing 6$ mm $\varnothing 0.236$ in Connector outer diameter: $\varnothing 14$ mm $\varnothing 0.551$ in max. Cable color: Gray (for emitter), Gray with black line (for receiver) The min. bending radius: R6 mm R0.236 in | | |
| | | | SFB-CB5 | Length: 5 m 16.404 ft Net weight: 620 g approx. (2 cables) | | | |
| | | | SFB-CB10 | Length: 10 m 32.808 ft Net weight: 1,200 g approx. (2 cables) | | | |
| | | | SFB-CC3 | Length: 3 m 9.843 ft Net weight: 380 g approx. (2 cables) | | | |
| | Extension cable | With connector on one end |  | SFB-CC10 | Length: 10 m 32.808 ft Net weight: 1,200 g approx. (2 cables) | Used for cable extension or connecting to the SF-C13 control unit. Two cables per set for emitter and receiver, Cable outer diameter: $\varnothing 6$ mm $\varnothing 0.236$ in Connector outer diameter: $\varnothing 14$ mm $\varnothing 0.551$ in max. Cable color: Gray (for emitter), Gray with black line (for receiver) The min. bending radius: R6 mm R0.236 in | |
| | | | | SFB-CCJ10E | Length: 10 m 32.808 ft Net weight: 580 g approx. (1 cable) | | |
| | | With connectors on both ends | For emitter |  | SFB-CCJ10D | Length: 10 m 32.808 ft Net weight: 600 g approx. (1 cable) | Used for cable extension or connecting to the SF-C11 and the SF-C14EX control unit. One each for emitter and receiver, Cable outer diameter: $\varnothing 6$ mm $\varnothing 0.236$ in Connector outer diameter: $\varnothing 14$ mm $\varnothing 0.551$ in max. Cable color: Gray (for emitter), Gray with black line (for receiver) Connector color: Gray (for emitter), Black (for receiver) The min. bending radius: R6 mm R0.236 in |
| | | | | | SFB-CCJ10D | Length: 10 m 32.808 ft Net weight: 600 g approx. (1 cable) | |
| Mating control components (12-core cable, with interference prevention wire) | Bottom cap cable |  | SFB-CCB3-MU | Length: 3 m 9.843 ft Net weight: 420 g approx. (2 cables) | Used for connecting to the light curtain and to other cables or the SF-C13 control unit. Two cables per set for emitter and receiver, Cable outer diameter: $\varnothing 6$ mm $\varnothing 0.236$ in Cable color: Gray (for emitter), Gray with black line (for receiver) The min. bending radius: R6 mm R0.236 in | | |
| | | | SFB-CCB7-MU | Length: 7 m 22.966 ft Net weight: 930 g approx. (2 cables) | | | |
| | Connector |  | SFB-CB05-MU | Length: 0.5 m 1.640 ft Net weight: 110 g approx. (2 cables) | Used for connecting to the light curtain and to an extension cable or the SF-C12 control unit. Two cables per set for emitter and receiver, Cable outer diameter: $\varnothing 6$ mm $\varnothing 0.236$ in Connector outer diameter: $\varnothing 16$ mm $\varnothing 0.630$ in max. Cable color: Gray (for emitter), Gray with black line (for receiver) The min. bending radius: R6 mm R0.236 in | | |
| | | | SFB-CC3-MU | Length: 3 m 9.843 ft Net weight: 430 g approx. (2 cables) | | | |
| | Extension cable | With connector on one end |  | SFB-CC10-MU | Length: 10 m 32.808 ft Net weight: 1,300 g approx. (2 cables) | Used for connecting to an extension cable or the SF-C13 control unit. Two cables per set for emitter and receiver, Cable outer diameter: $\varnothing 6$ mm $\varnothing 0.236$ in Connector outer diameter: $\varnothing 16$ mm $\varnothing 0.630$ in max. Cable color: Gray (for emitter), Gray with black line (for receiver) The min. bending radius: R6 mm R0.236 in | |
| | | | | SFB-CCJ10E-MU | Length: 10 m 32.808 ft Net weight: 660 g approx. (1 cable) | | |
| | | With connectors on both ends | For emitter |  | SFB-CCJ10D-MU | Length: 10 m 32.808 ft Net weight: 680 g approx. (1 cable) | Used for connecting to an extension cable or the SF-C12 control unit. One each for emitter and receiver, Cable outer diameter: $\varnothing 6$ mm $\varnothing 0.236$ in Connector outer diameter: $\varnothing 16$ mm $\varnothing 0.630$ in max. Cable color: Gray (for emitter), Gray with black line (for receiver) Connector color: Gray (for emitter), Black (for receiver) The min. bending radius: R6 mm R0.236 in |
| | | | | | SFB-CCJ10D-MU | Length: 10 m 32.808 ft Net weight: 680 g approx. (1 cable) | |
| Cable for series connection |  | SFB-CSL01 | Length: 0.1 m 0.328 ft Net weight: 45 g approx. (2 cables) | Used to connect light curtains in series Two cables per set for emitter and receiver (common for emitter and receiver) Cable outer diameter: $\varnothing 6$ mm $\varnothing 0.236$ in Cable color: Gray (common for emitter and receiver) The min. bending radius: R6 mm R0.236 in | | | |
| | | SFB-CSL05 | Length: 0.5 m 1.640 ft Net weight: 95 g approx. (2 cables) | | | | |
| | | SFB-CSL1 | Length: 1 m 3.281 ft Net weight: 150 g approx. (2 cables) | | | | |
| | | SFB-CSL5 | Length: 5 m 16.404 ft Net weight: 630 g approx. (2 cables) | | | | |
| Exclusive mating cable for SF-C14EX |  | SFB-CB05-EX | Length: 0.5 m 1.640 ft Net weight: 95 g approx. (2 cables) | Used for connecting to the light curtain and to SF-C14EX control unit or 8-core extension cable with connectors on both ends (SFB-CCJ10E/CCJ10D) Two cables per set for emitter and receiver, Cable outer diameter: $\varnothing 6$ mm $\varnothing 0.236$ in Connector outer diameter: $\varnothing 14$ mm $\varnothing 0.551$ in max. Cable color: Gray (for emitter), Gray with black line (for receiver) The min. bending radius: R6 mm R0.236 in | | | |
| | | SFB-CB5-EX | Length: 5 m 16.404 ft Net weight: 620 g approx. (2 cables) | | | | |
| | | SFB-CB10-EX | Length: 10 m 32.808 ft Net weight: 1,200 g approx. (2 cables) | | | | |
| Adapter cable |  | SFB-CB05-A-P | Length: 0.5 m 1.640 ft Net weight: 110 g approx. (2 cables) | 8-core bottom cap cable specifications. Used to allow connector cables connected to previous light curtains (at the control circuit side) to be smoothly adapted to the SF4B series. Two cables per set for emitter and receiver, Cable outer diameter: $\varnothing 6$ mm $\varnothing 0.236$ in Connector outer diameter: $\varnothing 14$ mm $\varnothing 0.551$ in max. Cable color: Gray (for emitter), Gray with black line (for receiver) The min. bending radius: R6 mm R0.236 in | | | |
| | | SFB-CB05-A-N | | | | | |
| | | SFB-CB05-B-P | | | | | |
| | | SFB-CB05-B-N | | | | | |

For details of mating cable of CC-Link Safety system remote I/O unit with connectors for light curtain **SF-CL1T264T**, refer to SUNX website (sunx.com).

ORDER GUIDE

Spare parts (Accessories for light curtain)

| Designation | Model No. | Description |
|--|------------------|---|
| Intermediate supporting bracket (Note) | MS-SFB-2 | Used to mount the light curtain on the intermediate position. (2 pcs. per set for emitter and receiver) Mounting is possible behind or at the side of the light curtain. |
| Test rod $\phi 14$ | SF4B-TR14 | Min. sensing object for regular checking ($\phi 14$ mm $\phi 0.551$ in), with finger protection type (min. sensing object $\phi 14$ mm $\phi 0.551$ in) |
| Test rod $\phi 25$ | SF4B-TR25 | Min. sensing object for regular checking ($\phi 25$ mm $\phi 0.984$ in), with hand protection type (min. sensing object $\phi 25$ mm $\phi 0.984$ in) |

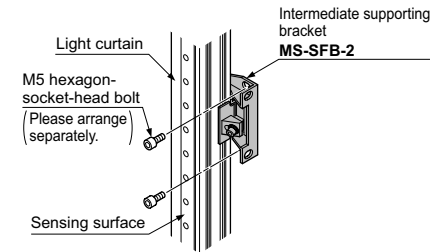
Note: The number of sets required varies depending on the product.

- 1 set: **SF4B-F□<V2>** Light curtain with 79 to 111 beam channels
- SF4B-H□<V2>** Light curtain with 40 to 56 beam channels
- SF4B-A□<V2>** Light curtain with 20 to 28 beam channels
- 2 sets: **SF4B-F127□<V2>**
- SF4B-H□<V2>** Light curtain with 64 to 80 beam channels
- SF4B-A□<V2>** Light curtain with 32 to 40 beam channels
- 3 sets: **SF4B-H□<V2>** Light curtain with 88 to 96 beam channels
- SF4B-A□<V2>** Light curtain with 44 to 48 beam channels

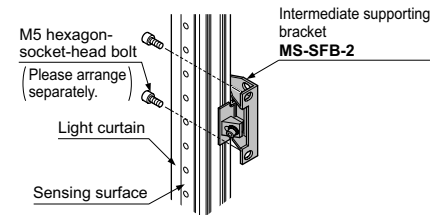
Intermediate supporting bracket

• **MS-SFB-2**

<In case of rear mounting>

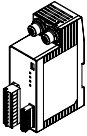
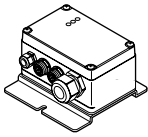
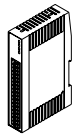
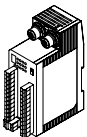
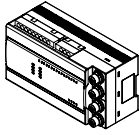


<In case of side mounting>



OPTIONS

Exclusive control units


| Designation | Appearance | Model No. | Application cable | Description |
|--|---|--------------------|--|--|
| Connector connection type control unit |  | SF-C11 | Bottom cap cable: SFB-CB□ Extension cable: SFB-CCJ10□ | Use 8-core cable with connector to connect to the light curtain. Compatible with up to Control Category 4. Interference prevention wires and muting function cannot be used. |
| Robust type control unit |  | SF-C12 | Bottom cap cable: SFB-CB05-MU Extension cable: SFB-CCJ10□-MU | Use 12-core cable with connector to connect to the light curtain. Interference prevention wires can be used. Compatible with up to Control Category 4. Muting function cannot be used. |
| Slim type control unit |  | SF-C13 | Bottom cap cable: SFB-CCB□(-MU) Extension cable: SFB-CC□(-MU) | Use a discrete wire cable to connect to the light curtain. Muting function and interference prevention wires can be used. Compatible with up to Control Category 4. |
| Application expansion unit for SF4B series |  | SF-C14EX | Bottom cap cable: SFB-CB□-EX Extension cable: SFB-CCJ10□ | The muting control function and emergency stop input expand the applications of the light curtains. Use exclusive cable to connect to the light curtain. Compatible with up to Control Category 4. The handy-controller SFB-HC cannot be used with SF-C14EX-01 . |
| Handy-controller non-compatible type | | SF-C14EX-01 | | |
| CC-Link Safety system remote I/O unit for light curtain (Note) |  | SF-CL1T264T | Bottom cap cable: SFB-CB□-CL Extension cable: SFB-CCJ10□-CL | This is a remote I/O unit that allows the safety field network "CC-Link Safety" to be connected to the light curtains or the safety components. Use exclusive cable to connect to the light curtain. Compatible with up to Control Category 4. Please contact our office for details. |

Note: Refer to the SUNX website (sunx.com) for details of the remote I/O unit **SF-CL1T264T**.

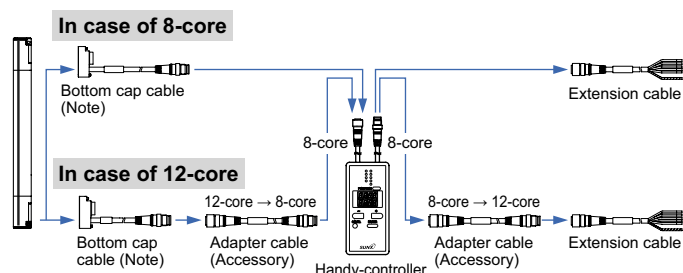
SF-C12 spare relay set

A set of spare relays (2 safety relays and 1 removal tool) is available for the safety relay that is built into the **SF-C12**.
Model No.: **SF-C12-RY**

Handy-controller

| Designation | Appearance | Model No. |
|------------------|--|---------------|
| Handy-controller |  * Includes 2 adapter cables | SFB-HC |

Note: A handy-controller cannot be used with the **SF4B-□-01<V2>** and the **SF-C14EX-01**.



Note: If using a bottom cap cable with discrete wire, please order the **SFB-CC3/CC10** separately. Refer to the instruction manual for the light curtain for details on wiring.

Light curtain diagnosis software

Simply input the error number of the light curtain on the screen, and the section of maintenance needed will be located and coping process will be displayed.

* Please contact SUNX sales office for more details.



Light curtain diagnosis software

OPTIONS

Front protection cover / Protection bar set / Corner mirror

| Applicable beam channels | | | Designation | Front protection cover | Protection bar set | Rear / side protection bar set | Corner mirror | |
|--------------------------|------|------------|-------------------|------------------------|---------------------|--------------------------------|------------------------------|-------------------|
| Finger | Hand | Arm / Foot | Model No. (Note) | Model No. (Note) | Model No. | Model No. | Effective reflective surface | |
| 23 | 12 | 6 | FC-SFBH-12 | MC-SFBH-12 | MC-SFBH-12-T | RF-SFBH-12 | 236 × 72 mm | 9.291 × 2.835 in |
| 31 | 16 | 8 | FC-SFBH-16 | MC-SFBH-16 | MC-SFBH-16-T | RF-SFBH-16 | 316 × 72 mm | 12.441 × 2.835 in |
| 39 | 20 | 10 | FC-SFBH-20 | MC-SFBH-20 | MC-SFBH-20-T | RF-SFBH-20 | 396 × 72 mm | 15.591 × 2.835 in |
| 47 | 24 | 12 | FC-SFBH-24 | MC-SFBH-24 | MC-SFBH-24-T | RF-SFBH-24 | 476 × 72 mm | 18.740 × 2.835 in |
| 55 | 28 | 14 | FC-SFBH-28 | MC-SFBH-28 | MC-SFBH-28-T | RF-SFBH-28 | 556 × 72 mm | 21.890 × 2.835 in |
| 63 | 32 | 16 | FC-SFBH-32 | MC-SFBH-32 | MC-SFBH-32-T | RF-SFBH-32 | 636 × 72 mm | 25.039 × 2.835 in |
| 71 | 36 | 18 | FC-SFBH-36 | MC-SFBH-36 | MC-SFBH-36-T | RF-SFBH-36 | 716 × 72 mm | 28.189 × 2.835 in |
| 79 | 40 | 20 | FC-SFBH-40 | MC-SFBH-40 | MC-SFBH-40-T | RF-SFBH-40 | 796 × 72 mm | 31.339 × 2.835 in |
| 95 | 48 | 24 | FC-SFBH-48 | MC-SFBH-48 | MC-SFBH-48-T | RF-SFBH-48 | 956 × 72 mm | 37.638 × 2.835 in |
| 111 | 56 | 28 | FC-SFBH-56 | MC-SFBH-56 | MC-SFBH-56-T | RF-SFBH-56 | 1,116 × 72 mm | 43.937 × 2.835 in |
| 127 | 64 | 32 | FC-SFBH-64 | MC-SFBH-64 | MC-SFBH-64-T | RF-SFBH-64 | 1,276 × 72 mm | 50.236 × 2.835 in |
| - | 72 | 36 | FC-SFBH-72 | MC-SFBH-72 | MC-SFBH-72-T | RF-SFBH-72 | 1,436 × 72 mm | 56.535 × 2.835 in |
| - | 80 | 40 | FC-SFBH-80 | MC-SFBH-80 | MC-SFBH-80-T | RF-SFBH-80 | 1,596 × 72 mm | 62.835 × 2.835 in |
| - | 88 | 44 | FC-SFBH-88 | MC-SFBH-88 | MC-SFBH-88-T | RF-SFBH-88 | 1,756 × 72 mm | 69.134 × 2.835 in |
| - | 96 | 48 | FC-SFBH-96 | MC-SFBH-96 | MC-SFBH-96-T | RF-SFBH-96 | 1,916 × 72 mm | 75.433 × 2.835 in |

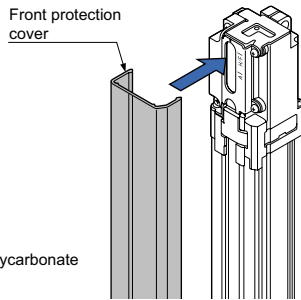
Note: The model Nos. given above denote a single unit, not a pair of units. 2 units are required for use in mounting to the emitter / receiver. (Except for corner mirror)

Front protection cover

• **FC-SFBH-□**

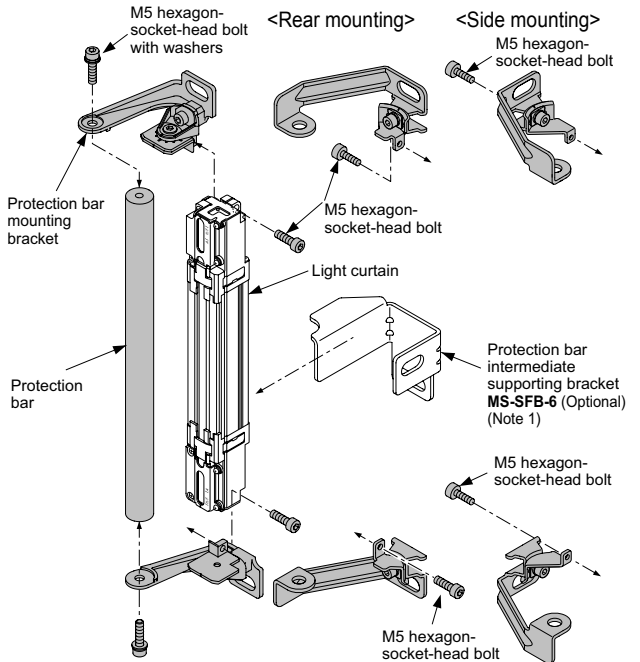
Protects sensing surface of the light curtain from flying objects such as welding spatter. The operating range reduces when the front protection cover is used.

Material: Polycarbonate



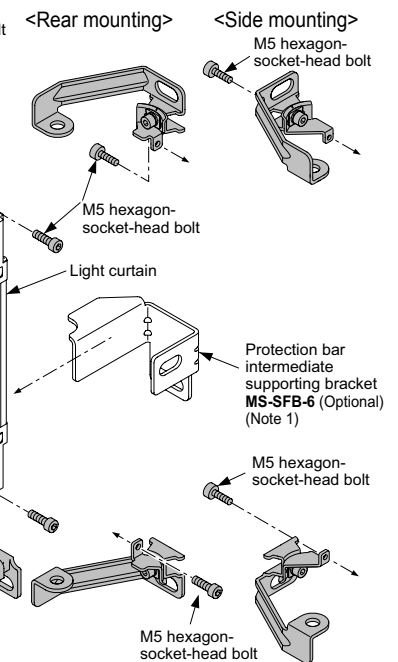
Protection bar set

• **MC-SFBH-□**



Rear / side protection bar set

• **MC-SFBH-□-T**



Sensing range

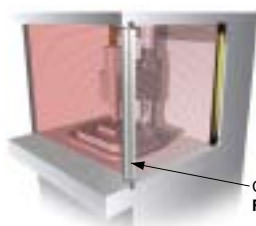
| | SF4B-F□ | SF4B-H□ | | SF4B-A□ | |
|-------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| | | 12 to 64 beam channels type | 72 to 96 beam channels type | 6 to 32 beam channels type | 36 to 48 beam channels type |
| Only emitter installed | 0.3 to 6 m 0.984 to 19.685 ft | 0.3 to 7.5 m 0.984 to 24.606 ft | 0.3 to 6 m 0.984 to 19.685 ft | 0.3 to 7.5 m 0.984 to 24.606 ft | 0.3 to 6 m 0.984 to 19.685 ft |
| Only receiver installed | 0.3 to 6 m 0.984 to 19.685 ft | 0.3 to 7.5 m 0.984 to 24.606 ft | 0.3 to 6 m 0.984 to 19.685 ft | 0.3 to 7.5 m 0.984 to 24.606 ft | 0.3 to 6 m 0.984 to 19.685 ft |
| Both emitter and receiver installed | 0.3 to 5.5 m 0.984 to 18.045 ft | 0.3 to 7 m 0.984 to 22.966 ft | 0.3 to 5.5 m 0.984 to 18.045 ft | 0.3 to 7 m 0.984 to 22.966 ft | 0.3 to 5.5 m 0.984 to 18.045 ft |

Note: The operating range is the possible setting distance between the emitter and the receiver. The light curtain can detect an object less than 0.3 m 0.984 ft away.

Corner mirror

• **RF-SFBH-□**

Normally for L-shaped or U-shaped installation, 2 or 3 sets of light curtains are needed. With the use of a corner mirror reflecting the light, one set of light curtain is possible for L-shaped or U-shaped installation.



Corner mirror RF-SFBH-□



Percent decline of the sensing range

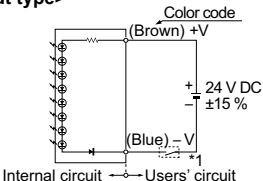
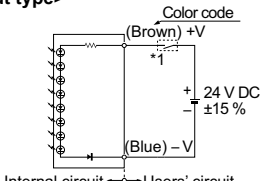
| | |
|----------------|------------------|
| With 1 mirror | Declined to 90 % |
| With 2 mirrors | Declined to 80 % |

• **Parts List**

| Designation | MC-SFBH-□ | | MC-SFBH-□-T | |
|---|------------|--|---------------------|--|
| | Number | Remarks | Number | Remarks |
| Protection bar | 1 pc. | Material: Aluminum | 1 pc. | Material: Aluminum |
| Protection bar mounting bracket (For left side, for right side) | 1 pc. each | Material: Die-cast zinc alloy | 1 pc. each (Note 1) | Material: Iron (Trivalent chrome plated) |
| Hexagon-socket-head bolt with washers | 2 pcs. | M5 (length: 20 mm 0.787 in) | 2 pcs. | M5 (length: 20 mm 0.787 in) |
| Hexagon-socket-head bolt | 2 pcs. | M5 (length: 16 mm 0.630 in) | 2 pcs. | M5 (length: 18 mm 0.709 in) |
| Protection bar intermediate supporting bracket MS-SFB-6 (Optional) (Note 2) | 1 pc. | Material: Iron (Trivalent chrome plated) | 1 pc. | Material: Iron (Trivalent chrome plated) |

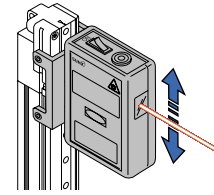
Notes: 1) Available as a spare part. Model No.: **MS-MCSFB-1-T**
 2) The protection bar intermediate supporting bracket **MS-SFB-6** (optional) is installed to protection bars that are longer than the **MC-SFBH-48(-T)**. Use if there is much flexure bending in the protection bar. Please contact our office for details.

OPTIONS

| Designation | Model No. | Description |
|--------------------------------------|------------------|--|
| Test rod ø45 | SF4B-TR45 | Min. sensing object for regular checking (ø45 mm ø1.772 in), with arm / foot protection type (min. sensing object ø45 mm ø1.772 in) |
| Laser alignment tool | SF-LAT-2N | Allows easy beam axis alignment using easy-to-see laser beam |
| Large display unit for light curtain | SF-IND-2 | <p>With the auxiliary output of the light curtain, the operation is easily observable from various directions.</p> <p>Specifications</p> <ul style="list-style-type: none"> Supply voltage: 24 V DC ±15 % Current consumption: 12 mA or less Indicators: Orange LED (8 pcs. used) [Light up when external contact is ON] Ambient temperature: -10 to +55 °C +14 to +131 °F (No dew condensation or icing allowed) Material: POM (Enclosure) Polycarbonate (Cover) Cold rolled carbon steel (SPCC) (Bracket) Cable: 0.3 mm² 2-core cabtyre cable, 3 m 9.843 ft long Weight: 70 g approx. (including bracket) <p>I/O circuit diagrams</p> <p><With NPN output type></p>  <p>*1 Non-voltage contact or NPN open-collector transistor</p> <p><With PNP output type></p>  <p>*1 Non-voltage contact or PNP open-collector transistor</p> |

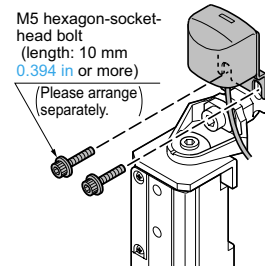
Laser alignment tool

- **SF-LAT-2N**



Large display unit for light curtain

- **SF-IND-2**



Attaches to top of light curtain. Tighten together the mounting bracket provided with the light curtain **MS-SFB-1/4** and the attached mounting bracket of **SF-IND-2**.

Introduction to SUNX sensors that can be used as muting sensors

**Compact Photoelectric Sensor
CX-400 SERIES**



- World standard size
- 116 types for a wide variation

**Ultra-slim Photoelectric Sensor
EX-10 SERIES**



- 3.5 mm 0.138 in thickness
- Long sensing range: 1 m 3.281 ft (Thru-beam type: **EX-19**)
- * The **EX-20** series that is compatible with M3 mounting screws is also available

**U-shaped Photoelectric Sensor
PM-64 SERIES**



- Built-in connector saves space
- Can be connected using commercially-available connectors for higher reliability

**Rectangular Inductive Proximity Sensor
GX-F/H SERIES**



- The longest stable sensing range in the industry
- 10 times the durability
- Protection structure IP68g

Note: Check the specifications for the muting sensors before making a selection. Refer to "PRECAUTIONS FOR PROPER USE" (P.28-) for details on specifications and installation conditions.

Recommended safety relays and miniature contactors

- Safety relay
Panasonic Electric Works Ltd.
SF series



- Miniature contactor
Panasonic Electric Works Ltd.
PC-5 series



Note: Contact the manufacturers for details on the recommended products.

SPECIFICATIONS

Light curtain individual specifications

SF4B-F□(-01)<V2>

| Type | | Min. sensing object \varnothing 14 mm \varnothing 0.551 in type (10 mm 0.394 in beam pitch) | | | | | |
|--|--------------------|---|-------------------|-------------------|---|-------------------|-------------------|
| Item | Model No. (Note 2) | SF4B-F23(-01)<V2> | SF4B-F31(-01)<V2> | SF4B-F39(-01)<V2> | SF4B-F47(-01)<V2> | SF4B-F55(-01)<V2> | SF4B-F63(-01)<V2> |
| No. of beam channels | | 23 | 31 | 39 | 47 | 55 | 63 |
| Protective height | | 230 mm 9.055 in | 310 mm 12.205 in | 390 mm 15.354 in | 470 mm 18.504 in | 550 mm 21.654 in | 630 mm 24.803 in |
| Current consumption | | Emitter: 80 mA or less, Receiver: 120 mA or less | | | Emitter: 100 mA or less, Receiver: 160 mA or less | | |
| Net weight (Total of emitter and receiver) | | 510 g approx. | 660 g approx. | 810 g approx. | 960 g approx. | 1,100 g approx. | 1,260 g approx. |

| Type | | Min. sensing object \varnothing 14 mm \varnothing 0.551 in type (10 mm 0.394 in beam pitch) | | | | |
|--|--------------------|---|---|---|--------------------|--------------------|
| Item | Model No. (Note 2) | SF4B-F71(-01)<V2> | SF4B-F79(-01)<V2> | SF4B-F95(-01)<V2> | SF4B-F111(-01)<V2> | SF4B-F127(-01)<V2> |
| No. of beam channels | | 71 | 79 | 95 | 111 | 127 |
| Protective height | | 710 mm 27.953 in | 790 mm 31.102 in | 950 mm 37.402 in | 1,110 mm 43.701 in | 1,270 mm 50.000 in |
| Current consumption | | Emitter: 100 mA or less, Receiver: 160 mA or less | Emitter: 115 mA or less, Receiver: 190 mA or less | Emitter: 135 mA or less, Receiver: 230 mA or less | | |
| Net weight (Total of emitter and receiver) | | 1,420 g approx. | 1,570 g approx. | 1,870 g approx. | 2,170 g approx. | 2,470 g approx. |

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C +68 °F.

2) The models with the suffix "-01" cannot be used with the handy-controller SFB-HC.

SF4B-H□(-01)<V2>

| Type | | Min. sensing object \varnothing 25 mm \varnothing 0.984 in type (20 mm 0.787 in beam pitch) | | | | | |
|--|--------------------|---|-------------------|-------------------|--|-------------------|-------------------|
| Item | Model No. (Note 2) | SF4B-H12(-01)<V2> | SF4B-H16(-01)<V2> | SF4B-H20(-01)<V2> | SF4B-H24(-01)<V2> | SF4B-H28(-01)<V2> | SF4B-H32(-01)<V2> |
| No. of beam channels | | 12 | 16 | 20 | 24 | 28 | 32 |
| Protective height | | 230 mm 9.055 in | 310 mm 12.205 in | 390 mm 15.354 in | 470 mm 18.504 in | 550 mm 21.654 in | 630 mm 24.803 in |
| Current consumption | | Emitter: 70 mA or less, Receiver: 95 mA or less | | | Emitter: 80 mA or less, Receiver: 115 mA or less | | |
| Net weight (Total of emitter and receiver) | | 510 g approx. | 660 g approx. | 810 g approx. | 960 g approx. | 1,110 g approx. | 1,260 g approx. |

| Type | | Min. sensing object \varnothing 25 mm \varnothing 0.984 in type (20 mm 0.787 in beam pitch) | | | | |
|--|--------------------|---|--|---|--------------------|--------------------|
| Item | Model No. (Note 2) | SF4B-H36(-01)<V2> | SF4B-H40(-01)<V2> | SF4B-H48(-01)<V2> | SF4B-H56(-01)<V2> | SF4B-H64(-01)<V2> |
| No. of beam channels | | 36 | 40 | 48 | 56 | 64 |
| Protective height | | 710 mm 27.953 in | 790 mm 31.102 in | 950 mm 37.402 in | 1,110 mm 43.701 in | 1,270 mm 50.000 in |
| Current consumption | | Emitter: 80 mA or less, Receiver: 115 mA or less | Emitter: 90 mA or less, Receiver: 140 mA or less | Emitter: 100 mA or less, Receiver: 160 mA or less | | |
| Net weight (Total of emitter and receiver) | | 1,420 g approx. | 1,570 g approx. | 1,870 g approx. | 2,170 g approx. | 2,470 g approx. |

| Type | | Min. sensing object \varnothing 25 mm \varnothing 0.984 in type (20 mm 0.787 in beam pitch) | | | |
|--|--------------------|---|--------------------|---|--------------------|
| Item | Model No. (Note 2) | SF4B-H72(-01)<V2> | SF4B-H80(-01)<V2> | SF4B-H88(-01)<V2> | SF4B-H96(-01)<V2> |
| No. of beam channels | | 72 | 80 | 88 | 96 |
| Protective height | | 1,430 mm 56.299 in | 1,590 mm 62.598 in | 1,750 mm 68.898 in | 1,910 mm 75.197 in |
| Current consumption | | Emitter: 110 mA or less, Receiver: 180 mA or less | | Emitter: 120 mA or less, Receiver: 200 mA or less | |
| Net weight (Total of emitter and receiver) | | 2,770 g approx. | 3,070 g approx. | 3,370 g approx. | 3,670 g approx. |

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C +68 °F.

2) The models with the suffix "-01" cannot be used with the handy-controller SFB-HC.

SF4B-A□(-01)<V2>

| Type | | Min. sensing object \varnothing 45 mm \varnothing 1.772 in type (40 mm 1.575 in beam pitch) | | | | | |
|--|--------------------|---|------------------|-------------------|---|-------------------|-------------------|
| Item | Model No. (Note 2) | SF4B-A6(-01)<V2> | SF4B-A8(-01)<V2> | SF4B-A10(-01)<V2> | SF4B-A12(-01)<V2> | SF4B-A14(-01)<V2> | SF4B-A16(-01)<V2> |
| No. of beam channels | | 6 | 8 | 10 | 12 | 14 | 16 |
| Protective height | | 230 mm 9.055 in | 310 mm 12.205 in | 390 mm 15.354 in | 470 mm 18.504 in | 550 mm 21.654 in | 630 mm 24.803 in |
| Current consumption | | Emitter: 65 mA or less, Receiver: 85 mA or less | | | Emitter: 70 mA or less, Receiver: 95 mA or less | | |
| Net weight (Total of emitter and receiver) | | 510 g approx. | 660 g approx. | 810 g approx. | 960 g approx. | 1,110 g approx. | 1,260 g approx. |

| Type | | Min. sensing object \varnothing 45 mm \varnothing 1.772 in type (40 mm 1.575 in beam pitch) | | | | |
|--|--------------------|---|--|--|--------------------|--------------------|
| Item | Model No. (Note 2) | SF4B-A18(-01)<V2> | SF4B-A20(-01)<V2> | SF4B-A24(-01)<V2> | SF4B-A28(-01)<V2> | SF4B-A32(-01)<V2> |
| No. of beam channels | | 18 | 20 | 24 | 28 | 32 |
| Protective height | | 710 mm 27.953 in | 790 mm 31.102 in | 950 mm 37.402 in | 1,110 mm 43.701 in | 1,270 mm 50.000 in |
| Current consumption | | Emitter: 70 mA or less, Receiver: 95 mA or less | Emitter: 75 mA or less, Receiver: 105 mA or less | Emitter: 80 mA or less, Receiver: 120 mA or less | | |
| Net weight (Total of emitter and receiver) | | 1,420 g approx. | 1,570 g approx. | 1,870 g approx. | 2,170 g approx. | 2,470 g approx. |

| Type | | Min. sensing object \varnothing 45 mm \varnothing 1.772 in type (40 mm 1.575 in beam pitch) | | | |
|---|--------------------|---|--------------------|--|--------------------|
| Item | Model No. (Note 2) | SF4B-A36(-01)<V2> | SF4B-A40(-01)<V2> | SF4B-A44(-01)<V2> | SF4B-A48(-01)<V2> |
| No. of beam channels | | 36 | 40 | 44 | 48 |
| Protective height | | 1,430 mm 56.299 in | 1,590 mm 62.598 in | 1,750 mm 68.898 in | 1,910 mm 75.197 in |
| Current consumption | | Emitter: 85 mA or less, Receiver: 130 mA or less | | Emitter: 95 mA or less, Receiver: 140 mA or less | |
| Net weight Total of emitter and receiver) | | 2,770 g approx. | 3,070 g approx. | 3,370 g approx. | 3,670 g approx. |

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C +68 °F.

2) The models with the suffix "-01" cannot be used with the handy-controller SFB-HC.

SPECIFICATIONS

Light curtain common specifications

| Type | | Min. sensing object \varnothing 14 mm \varnothing 0.551 in type | Min. sensing object \varnothing 25 mm \varnothing 0.984 in type | Min. sensing object \varnothing 45 mm \varnothing 1.772 in type |
|---|---|---|---|---|
| Item | Model No. (Note 2) | SF4B-F□(-01)<V2> | SF4B-H□(-01)<V2> | SF4B-A□(-01)<V2> |
| Applicable standards | International standard | IEC 61496-1/2 (Type 4), ISO 13849-1: 1999 (Category 4) | | |
| | Japan | JIS B 9704-1/2 (Type 4), JIS B 9705-1 (Category 4) | | |
| | Europe | EN 61496-1 (Type 4), EN 55011, EN 954-1: 1997 (Category 4) | | |
| | North America | UL 61496-1/2 (Type 4), UL 1998, CSA C22.2 No.14, CSA C22.2 No.0.8, OSHA 1910.212, OSHA 1910.217 (C), ANSI B11.1 to B11.19, ANSI/RIA 15.06 | | |
| Operating range (Note 3) | 0.3 to 7 m 0.984 to 22.966 ft | 12 to 64 beam channels type: 0.3 to 9 m 0.984 to 29.528 ft 72 to 96 beam channels type: 0.3 to 7 m 0.984 to 22.966 ft | 6 to 32 beam channels type: 0.3 to 9 m 0.984 to 29.528 ft 36 to 48 beam channels type: 0.3 to 7 m 0.984 to 22.966 ft | |
| Min. sensing object (Note 4) | \varnothing 14 mm \varnothing 0.551 in opaque object | \varnothing 25 mm \varnothing 0.984 in opaque object | \varnothing 45 mm \varnothing 1.772 in opaque object | |
| Effective aperture angle | $\pm 2.5^\circ$ or less [for an operating range exceeding 3 m 9.843 ft (conforming to IEC 61496-2 / UL 61496-2)] | | | |
| Supply voltage | 24 V DC $\pm 10\%$ Ripple P-P 10% or less | | | |
| Control outputs (OSSD 1, OSSD 2) | PNP open-collector transistor / NPN open-collector transistor (switching method) | | | |
| | <ul style="list-style-type: none"> When selecting PNP output: Max. source current 200 mA, When selecting NPN output: Max. sink current 200 mA Applied voltage: same as supply voltage (When selecting PNP output: between the control output and +V,) (When selecting NPN output: between the control output and 0 V) Residual voltage: 2.5 V or less (When selecting PNP output: source current 200 mA, when selecting NPN output: sink current 200 mA) (when using 20 m 65.617 ft length cable) | | | |
| | Operation mode | ON when all beam channels are received, OFF when one or more beam channels are interrupted (OFF also in case of any malfunction in the light curtain or the synchronization signal)(Note 5,6) | | |
| Protection circuit | Incorporated | | | |
| Response time | OFF response: 14 ms or less, ON response: 80 to 90 ms | | | |
| Auxiliary output (Non-safety output) | PNP open-collector transistor / NPN open-collector transistor (switching method) | | | |
| | <ul style="list-style-type: none"> When selecting PNP output: Max. source current 60 mA, When selecting NPN output: Max. sink current 60 mA Applied voltage: same as supply voltage (When selecting PNP output: between the auxiliary output and +V,) (When selecting NPN output: between the auxiliary output and 0 V) Residual voltage: 2.5 V or less (When selecting PNP output: source current 60 mA, when selecting NPN output: sink current 60 mA) (when using 20 m 65.617 ft length cable) | | | |
| | Operation mode | OFF when control outputs are ON, ON when control outputs are OFF (Factory setting, operating mode can be changed using the SFB-HC handy-controller). | | |
| Protection circuit | Incorporated | | | |
| Interference prevention function | Incorporated (Note 7) | | | |
| Emission halt function / Interlock function | Incorporated / Incorporated [Manual reset / Auto reset (Note 8)] | | | |
| External device monitoring function | Incorporated | | | |
| Override function / Muting function | Incorporated (Note 7) / Incorporated (Note 7) | | | |
| Optional functions (Note 9) | Fixed blanking, floating blanking, auxiliary output switching, interlock setting changing, external relay monitor setting changing, muting setting changing, protecting, light emitting amount control | | | |
| Environmental resistance | Degree of protection | IP67 / IP65 (IEC) | | |
| | Ambient temperature | -10 to $+55$ °C $+14$ to $+131$ °F (No dew condensation or icing allowed), Storage: -25 to $+70$ °C -13 to $+158$ °F | | |
| | Ambient humidity | 30 to 85 % RH, Storage: 30 to 95 % RH | | |
| | Ambient illuminance | Incandescent light: 3,500 lx or less at the light-receiving face | | |
| | Dielectric strength voltage | 1,000 V AC for one min. between all supply terminals connected together and enclosure | | |
| | Insulation resistance | 20 M Ω , or more, with 500 V DC megger between all supply terminals connected together and enclosure | | |
| | Vibration resistance | 10 to 55 Hz frequency, 0.75 mm 0.030 in amplitude in X, Y and Z directions for two hours each | | |
| | Shock resistance | 300 m/s ² acceleration (30 G approx.) in X, Y and Z directions for three times each | | |
| Emitting element | Infrared LED (Peak emission wavelength: 870 nm 0.034 mil) | | | |
| Material | Enclosure: Aluminium, Upper / lower case: Aluminium, Sensing surface: Polycarbonate • Polyester resin, Cap: PBT | | | |
| Connecting method / Cable length | Connector / Total length up to 50 m 164.042 ft is possible for both emitter and receiver, with optional mating cables (Note 10) | | | |
| Accessories | MS-SFB-2 (Intermediate supporting bracket): (Note 11) SF4B-TR14 (Test rod): 1 No | MS-SFB-2 (Intermediate supporting bracket): (Note 11) SF4B-TR25 (Test rod): 1 No | MS-SFB-2 (Intermediate supporting bracket): (Note 11) | |

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of $+20$ °C $+68$ °F.

2) The models with the suffix "-01" cannot be used with the handy-controller SFB-HC.

3) The operating range is the possible setting distance between the emitter and the receiver. The light curtain can detect an object less than 0.3 m 0.984 ft away.

4) When the floating blanking function is used, the size of the min. sensing object is changed. For details, refer to "Safety distance" (p.32~).

5) The outputs are not "OFF" when muting function is active even if the beam channel is interrupted.

6) In case the blanking function is valid, the operation mode is changed. For details, refer to "Safety distance" (p.32~).

7) Please use 12-core cable.

8) The manual reset and auto reset are possible to be switched depending on the wiring status.

9) In case of using optional function, the handy-controller (SFB-HC) (optional) is required. However, a handy-controller cannot be used with the SF4B-□(-01)<V2> and the SF-C14EX-01.

10) The cable can be extended within 30 m 98.425 ft (for emitter / receiver) when two light curtains are connected in series, within 20 m 65.617 ft when three light curtains are connected in series. Furthermore, when the muting lamp is used, the cable can be extended within 40 m 131.234 ft (for emitter / receiver).

11) The intermediate supporting bracket (MS-SFB-2) is enclosed with the following models. The quantity of the enclosed bracket differs depending on the model as follows:

1 set: SF4B-F□(-01)<V2> Light curtain with 79 to 111 beam channels, SF4B-H□(-01)<V2> Light curtain with 40 to 56 beam channels, SF4B-A□(-01)<V2> Light curtain with 20 to 28 beam channels

2 sets: SF4B-F127(-01)<V2>, SF4B-H□(-01)<V2> Light curtain with 64 to 80 beam channels, SF4B-A□(-01)<V2> Light curtain with 32 to 40 beam channels

3 sets: SF4B-H□(-01)<V2> Light curtain with 88 to 96 beam channels, SF4B-A□(-01)<V2> Light curtain with 44 to 48 beam channels

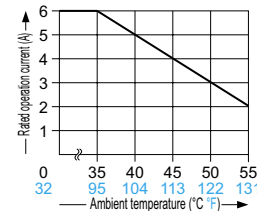
SPECIFICATIONS

Control units

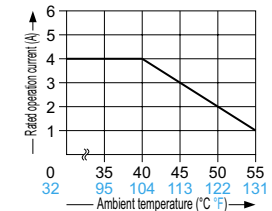
| Item | Model No. | SF-C11 | SF-C12 | SF-C13 |
|---|-----------|--|--|--|
| Connectable light curtains | | SF4B / SF2B series | SF4B series | Light curtains manufactured by SUNX |
| Applicable standards | | IEC 61496-1, UL 61496-1, JIS B 9704-1 | | |
| Control category | | ISO 13849-1: 1999 (EN 954-1: 1997, JIS B 9705-1) compliance up to Category 4 standards | | |
| Supply voltage / Current consumption | | 24 V DC $\pm 10\%$ Ripple P-P 10% or less / 100 mA or less (excluding light curtain) | | |
| Fuse (rating) | | Built-in electronic fuse, Triggering current: 0.5 A or more, Reset after power down | | |
| Enabling path | | NO contact $\times 3$ (13-14, 23-24, 33-34) | NO contact $\times 2$ (13-14, 23-24) | NO contact $\times 3$ (13-14, 23-24, 33-34) |
| Utilization category | | AC-15, DC-13 (IEC 60947-5-1) | | |
| Rated operation voltage (Ue) / Rated operation current (Ie) | | 30 V DC / 6 A, 230 V AC / 6 A, resistive load (For inductive load, during contact protection) Min. applicable load: 10 mA (at 24 V DC) (Note 2) | 24 V DC / 1 A, resistive load (For inductive load, during contact protection) Min. applicable load: 15 mA (at 24 V DC) | 30 V DC / 4 A, 230 V AC / 4 A, resistive load (For inductive load, during contact protection) Min. applicable load: 10 mA (at 24 V DC) (Note 2) |
| Contact resistance | | 100 m Ω or less (initial value) | 50 m Ω or less (initial value) | 100 m Ω or less (initial value) |
| Contact protection fuse rating | | 6 A (slow blow) | 3 A (slow blow) | 4 A (slow blow) |
| Pick-up delay (Auto reset / Manual reset) | | 80 ms or less / 90 ms or less | 30 ms or less / 30 ms or less | 80 ms or less / 90 ms or less |
| Response time | | 10 ms or less | 14 ms or less | 10 ms or less |
| Auxiliary output | | Safety relay contact (NC contact) $\times 1$ (41-42) (Related to enabling path) | Safety relay contact (NC contact) $\times 1$ (31-32) (Related to enabling path) | Safety relay contact (NC contact) $\times 1$ (41-42) (Related to enabling path) |
| Rated operation voltage / current | | 24 V DC / 2 A, Min. applicable load: 10 mA (at 24 V DC) | 30 V DC / 3 A, Min. applicable load: 15 mA (at 24 V DC) | 24 V DC / 2 A, Min. applicable load: 10 mA (at 24 V DC) |
| Contact protection fuse rating | | 2 A (slow blow) | 3 A (slow blow) | 2 A (slow blow) |
| Semiconductor auxiliary output (AUX) | | <Minus ground (Setting for PNP)> PNP open-collector transistor <Plus ground (Setting for NPN)> NPN open-collector transistor | — | PNP open-collector transistor |
| Output operation | | Related to auxiliary output of light curtain | — | ON when the light curtain is interrupted |
| Excess voltage category | | III | | |
| Polarity selection function (Note 3) | | Incorporated (Sliding switch allows selection of plus / minus ground) Minus ground: Correspond to PNP output light curtain Plus ground: Correspond to NPN output light curtain | — | Incorporated (Cable connection allows selection of plus / minus ground) Minus ground: Correspond to PNP output light curtain Plus ground: Correspond to NPN output light curtain |
| Pollution degree | | 2 | | |
| Protection | | Enclosure: IP40, Terminal: IP20 | IP65 | Enclosure: IP40, Terminal: IP20 |
| Ambient temperature | | -10 to +55 $^{\circ}\text{C}$ +14 to +131 $^{\circ}\text{F}$ (No dew condensation or icing allowed), Storage: -25 to +70 $^{\circ}\text{C}$ -13 to +158 $^{\circ}\text{F}$ | | |
| Enclosure material | | ABS | Die-cast aluminum | ABS |
| Weight | | Net weight: 320 g approx. | Net weight: 1 kg approx. | Net weight: 200 g approx. |

- Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 $^{\circ}\text{C}$ +68 $^{\circ}\text{F}$.
 2) If several SF-C11 or SF-C13 units are being used in a line together, leave a space of 5 mm 0.197 in or more between each unit. If the units are touching each other, reduce the rated operating current for safety output in accordance with the ambient operating temperature as shown in the graphs at right.
 3) Please switch the sliding switch to the PNP side for minus ground and to the NPN side for plus ground.
 4) For details of control unit SF-C11 (SF-C10 series), refer to the SUNX website (sunx.com) or SUNX general catalog.

(Dilating when SF-C11 units are mounted close together)



(Dilating when SF-C13 units are mounted close together)



| Item | Model No. | SF-C14EX(-01) (Note 2) |
|--|-----------|--|
| Connectable light curtains | | SF4B series |
| Applicable standards | | IEC 61496-1, UL 61496-1, EN 61496-1, JIS B 9704-1 |
| Control category | | Applicable to Category 4 based on ISO 13849-1: 1999 (EN 954-1: 1997, JIS B 9705-1) |
| Supply voltage / Current consumption | | 24 V DC $\pm 10\%$ Ripple P-P 10% or less / 0.2 A or less (Excluding light curtain and other external connecting device) |
| Enabling path (Enabling path 1, 2, 3) | | PNP open-collector transistor 2 outputs $\times 3$ or NPN open-collector transistor 2 outputs $\times 3$ (selectable using a slider switch) |
| Operation mode (Output operation) | | Enabling path 1: ON when the light curtain is in light receiving condition, OFF when the light curtain is in light interrupted condition (Note 3) Enabling path 2: ON when the light curtain is in light receiving condition or the muting function is valid OFF when the light curtain is in light interrupted condition and the muting function is invalid (Note 3) Enabling path 3: ON when the emergency stop is invalid, OFF when the emergency stop is valid |
| Response time | | OFF response: 14 ms or less (Enabling path 1 and 2: including the response time of the light curtain) ON response: 90 ms or less (auto-reset) / 140 ms or less (manual reset) (Note 4) |
| Auxiliary outputs (Auxiliary output 1, 2, 3, 4) (Note 5) | | PNP open-collector transistor $\times 3$ or NPN open-collector transistor $\times 3$ (selectable using a slider switch) <When PNP output is selected> • Maximum source current: 60 mA or less • Applied voltage: same as supply voltage (between the auxiliary output and +V) • Residual voltage: 2 V or less (at 60 mA source current) <When NPN output is selected> • Maximum sink current: 60 mA or less • Applied voltage: same as supply voltage (between the auxiliary output and 0 V) • Residual voltage: 2 V or less (at 60 mA sink current) |
| Operation mode (Output operation) | | Auxiliary output 1: ON when the muting function is invalid, OFF when the muting function is valid Auxiliary output 2: ON when the override function is invalid, OFF when the override function is valid Auxiliary output 3: ON when the muting lamp is normal, OFF when the muting lamp is error Auxiliary output 4: ON when the light curtain is in light interrupted condition, OFF when the light curtain is in light receiving condition (Note 5) |
| Muting lamp output | | Applicable muting lamp: 24 V DC, 3.6 to 30 W (L1, L2 of each unit) |
| Protection | | Enclosure: IP40, Terminal: IP20 |
| Ambient temperature | | -10 to +55 $^{\circ}\text{C}$ +14 to +131 $^{\circ}\text{F}$ (No dew condensation or icing allowed), Storage: -25 to +70 $^{\circ}\text{C}$ -13 to +158 $^{\circ}\text{F}$ |
| Material | | Enclosure: ABS |
| Connection terminal | | Detachable spring gauge terminal |
| Weight | | Net weight: 250 g approx. |

- Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 $^{\circ}\text{C}$ +68 $^{\circ}\text{F}$.
 2) SF-C14EX-01 is Handy-controller non-compatible type.
 3) Both enabling path 1 and 2 are OFF when the emergency stop is valid regardless of whether the light curtain is in the light receiving or light interrupted condition.
 4) The auto-reset cannot be used with enabling path 3.
 5) The auxiliary output incorporated in the SF4B series is outputed.

SPECIFICATIONS

Handy-controller

| Model No. | SFB-HC |
|--------------------------|--|
| Item | |
| Supply voltage | 24 V DC $\pm 10\%$ Ripple P-P10 % or less (common to light curtain power supply) |
| Current consumption | 65 mA or less |
| Communication method | RS-485 two-way communications (Specific procedure) |
| Digital display | 4-digit red LED display $\times 2$ (Selected beam channels, setting contents etc. are displayed.) |
| Function indicator | Green LED $\times 9$ (set function is displayed.) |
| Functions | Fixed blanking (Factory setting: Disabled) / Floating blanking (Factory setting: Disabled) / Auxiliary output change (Factory setting: Negative Logic of OSSD) / Light emitting amount control (Factory setting: Disabled) / Muting setting change [Factory setting: All beam channels enabled, A = B, Setting of the muting lamp diagnosis function enabled (Ver. 2 or later), Muting sensor output operation setting N.O. / N.O. (Ver. 2.1 or later)] / Interlock setting change (Factory setting: start / restart) / External device monitoring setting change (Factory setting: Enabled, 300 ms) / Override setting changing function 60 sec. (Ver. 2.1 only) / Setting detail monitoring / Protecting (Factory setting: Disabled)(Factory password setting: 0000) / Initialization / Copy |
| Ambient temperature | -10 to $+55$ °C $+14$ to $+131$ °F (No dew condensation or icing allowed), Storage: -25 to $+70$ °C -13 to $+158$ °F |
| Ambient humidity | 30 to 85 % RH, Storage: 30 to 85 % RH |
| Voltage withstandability | 1,000 V AC for one min. between all supply terminals connected together and enclosure |
| Insulation resistance | 20 M Ω , or more, with 500 V DC megger between all supply terminals connected together and enclosure |
| Cable | 8-core shielded cable, 0.5 m 1.640 ft long, with a connector at the end (2 cables) |
| Weight | Net weight: 200 g approx. |
| Accessories | Adapter cable: 2 cables |

Note: Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of $+20$ °C **$+68$ °F**.

Laser alignment tool

| Model No. | SF-LAT-2N |
|---------------------|---|
| Item | |
| Supply voltage | 3 V (LR6 battery $\times 2$ pcs.) |
| Battery | 1.5 V (LR6 battery) $\times 2$ pcs. (replaceable) |
| Battery lifetime | 30 hours approx. of continuous operation (LR6 battery, at $+25$ °C $+77$ °F ambient temperature) |
| Light source | Red semiconductor laser: Class 2 (IEC / JIS), Class II (FDA) (Max. output: 1 mW, Peak emission wavelength: 650 nm 0.026 mil) (Note 2) |
| Spot diameter | 10 mm 0.394 in approx. (at 5 m 16.404 ft distance) |
| Ambient temperature | 0 to $+40$ °C $+32$ to $+104$ °F (No dew condensation), Storage: 0 to $+55$ °C $+32$ to $+131$ °F |
| Ambient humidity | 35 to 85 % RH, Storage: 35 to 85 % RH |
| Material | Enclosure: ABS, Mounting part: Aluminum |
| Weight | Net weight: 200 g approx. (including batteries) |
| Accessories | LR6 battery: 2 pcs. |

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of $+20$ °C **$+68$ °F**.

2) As for FDA regulation, the product complies with 21 CFR 1040.10 and 1040.11 based on Laser Notice No. 50, dated June 24, 2007, issued by CDRH under the FDA.

Corner mirror

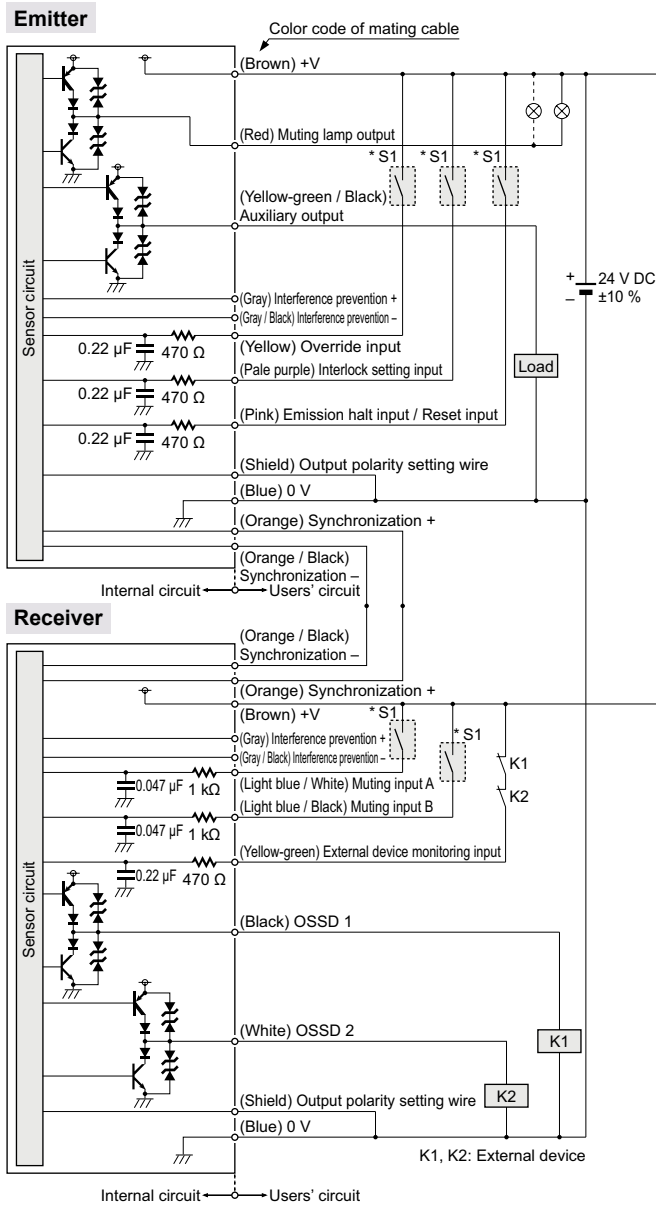
| Model No. | RF-SFBH-□ | |
|-----------------------------------|--|--|
| Item | | |
| Attenuation rate of sensing range | With one mirror: Declined to 90 %, With two mirrors: Declined to 80 % (When used in combination with the SF4B series) | |
| Environmental resistance | Ambient temperature | -10 to $+55$ °C $+14$ to $+131$ °F (No dew condensation or icing allowed), Storage: -25 to $+70$ °C -13 to $+158$ °F |
| | Ambient humidity | 30 to 85 % RH, Storage: 30 to 95 % RH |
| | Vibration resistance | 10 to 55 Hz frequency, 0.75 mm 0.030 in amplitude in X, Y and Z directions for two hours each |
| | Shock resistance | 300 m/s ² acceleration (30 G approx.) in X, Y and Z directions for three times each |
| Material | Enclosure: Aluminium, Mounting bracket: Stainless steel, Mirror (rear surface mirror): Glass, Side cover: EPDM | |
| Accessories | Intermediate supporting bracket: 1 set (RF-SFBH-40/48/56/64), 2 sets (RF-SFBH-72/80/88/96) | |

Note: Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of $+20$ °C **$+68$ °F**.

I/O CIRCUIT AND WIRING DIAGRAMS

I/O circuit diagram

<In case of using I/O circuit for PNP output>



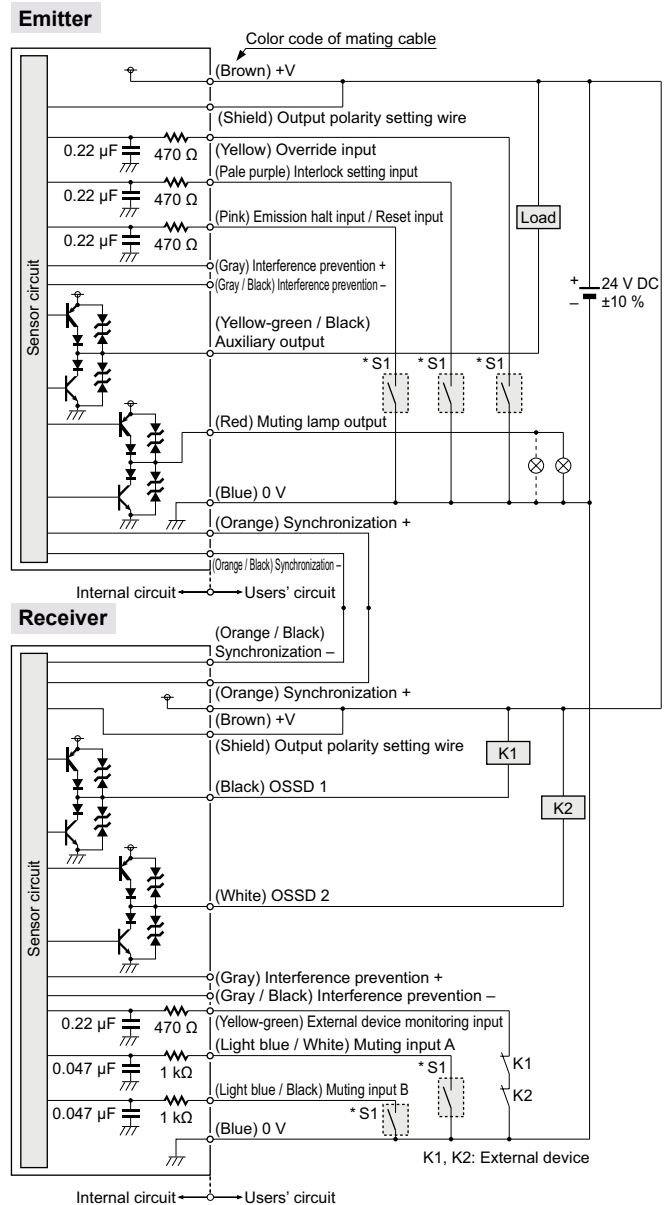
Note: The above diagram is when using a 12-core cable. If an 8-core cable is used, the red, yellow, gray, gray / black, light blue / white and light blue / black lead wires are absent.

* S1

- Switch S1
- Emission halt input / Reset input
For manual reset
Vs to Vs - 2.5 V (sink current 5 mA or less): Emission halt (Note 1)
Open: Emission
For automatic reset
Vs to Vs - 2.5 V (sink current 5 mA or less): Emission (Note 1)
Open: Emission halt
 - Interlock setting input, Override input, Muting input A / B, External device monitoring input
Vs to Vs - 2.5 V (sink current 5 mA or less): Enabled (Note 1)
Open: Disabled

Notes: 1) Vs is the applying supply voltage.
2) Switch S1 can be connected to either "+V" or "0 V". The above diagram shows a connection to "+V" as an example.

<In case of using I/O circuit for NPN output>



Note: The above diagram is when using a 12-core cable. If an 8-core cable is used, the red, yellow, gray, gray / black, light blue / white and light blue / black lead wires are absent.

* S1

- Switch S1
- Emission halt input / Reset input
For manual reset
0 to +1.5 V (source current 5 mA or less): Emission halt
Open: Emission
For automatic reset
0 to +1.5 V (source current 5 mA or less): Emission
Open: Emission halt
 - Interlock setting input, Override input, Muting input A / B, External device monitoring input
0 to +1.5 V (source current 5 mA or less): Enabled
Open: Disabled

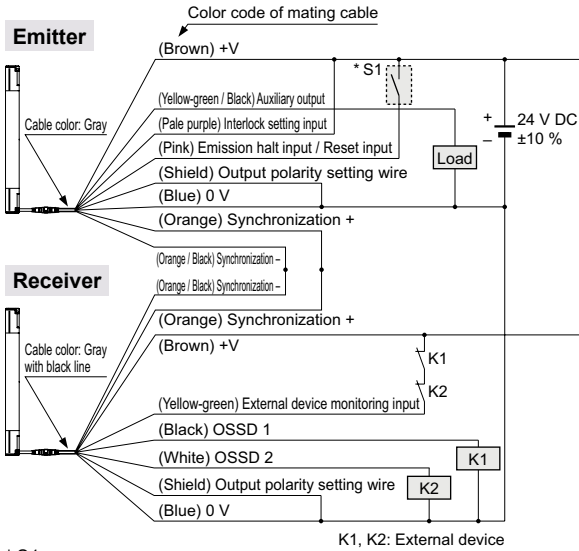
Note: Switch S1 can be connected to either "+V" or "0 V". The above diagram shows a connection to "0 V" as an example.

I/O CIRCUIT AND WIRING DIAGRAMS

Connection example

Standard components (8-core cable): Interlock function “enabled (manual reset)”, external device monitoring function “enabled”

<In case of using I/O circuit for PNP output>

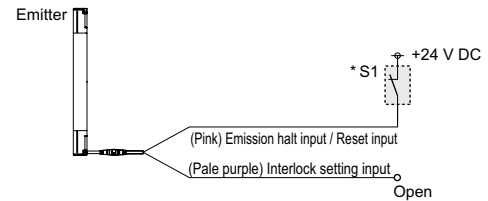


* S1
 Switch S1
 • Emission halt input / Reset input
 For manual reset
 Vs to Vs - 2.5 V (sink current 5 mA or less): Emission halt (Note)
 Open: Emission
 For automatic reset
 Vs to Vs - 2.5 V (sink current 5 mA or less): Emission (Note)
 Open: Emission halt

Note: Vs is the applying supply voltage.

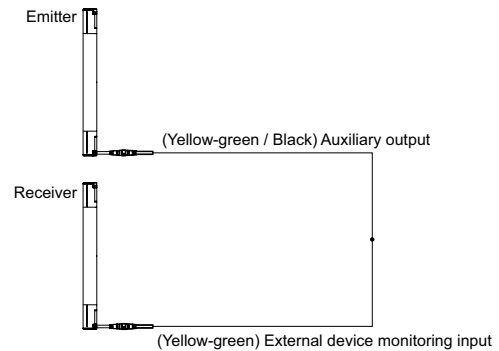
The diagram at left shows the configuration when using PNP output, interlock function “enabled (manual reset)” and external device monitoring function “enabled”.

In case of setting the interlock function to “disabled (automatic reset)”



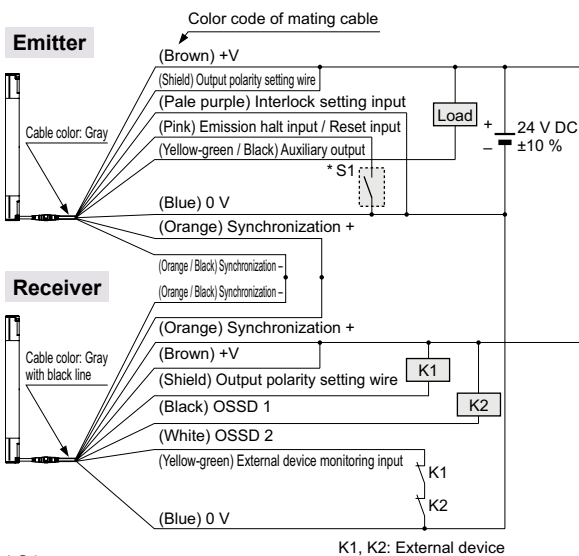
* Refer to p.27 for details of the interlock function.

In case of setting the external device monitoring function to “disabled”



* Refer to p.28 for details of the external device monitoring function.

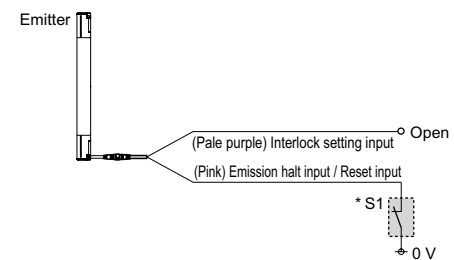
<In case of using I/O circuit for NPN output>



* S1
 Switch S1
 • Emission halt input / Reset input
 For manual reset
 0 to +1.5 V (source current 5 mA or less): Emission halt
 Open: Emission
 For automatic reset
 0 to +1.5 V (source current 5 mA or less): Emission
 Open: Emission halt

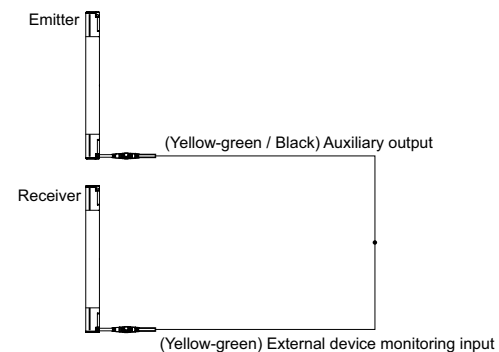
The diagram at left shows the configuration when using NPN output, interlock function “enabled (manual reset)” and external device monitoring function “enabled”.

In case of setting the interlock function to “disabled (automatic reset)”



* Refer to p.27 for details of the interlock function.

In case of setting the external device monitoring function to “disabled”



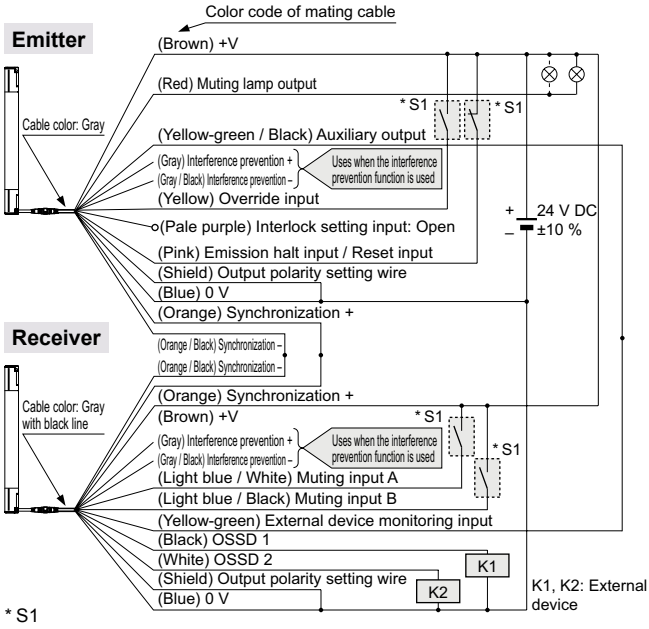
* Refer to p.28 for details of the external device monitoring function.

I/O CIRCUIT AND WIRING DIAGRAMS

Connection example

Muting control components (12-core cable, with interference prevention wires): Interlock function “disabled (automatic reset)”, external device monitoring function “disabled”

<In case of using I/O circuit for PNP output>



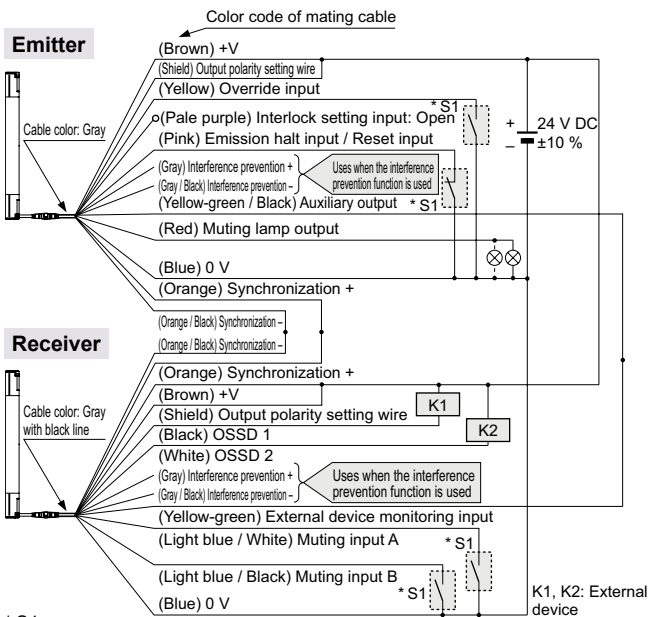
* S1

Switch S1

- Emission halt input / Reset input
For manual reset
Vs to Vs - 2.5 V (sink current 5 mA or less): Emission halt (Note), Open: Emission
For automatic reset
Vs to Vs - 2.5 V (sink current 5 mA or less): Emission (Note), Open: Emission halt
- Override input, Muting input A / B, External device monitoring input
Vs to Vs - 2.5 V (sink current 5 mA or less): Enabled (Note), Open: Disabled

Note: Vs is the applying supply voltage.

<In case of using I/O circuit for NPN output>



* S1

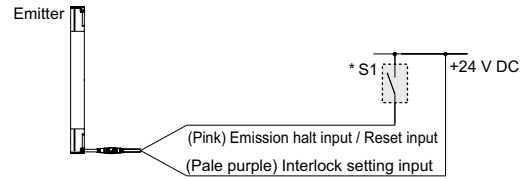
Switch S1

- Emission halt input / Reset input
For manual reset
0 to +1.5 V (source current 5 mA or less): Emission halt, Open: Emission
For automatic reset
0 to +1.5 V (source current 5 mA or less): Emission, Open: Emission halt
- Override input, Muting input A / B, External device monitoring input
0 to +1.5 V (source current 5 mA or less): Enabled, Open: Disabled

The diagram at left shows the configuration when using PNP output, interlock function “disabled (automatic reset)” and external device monitoring function “disabled”.

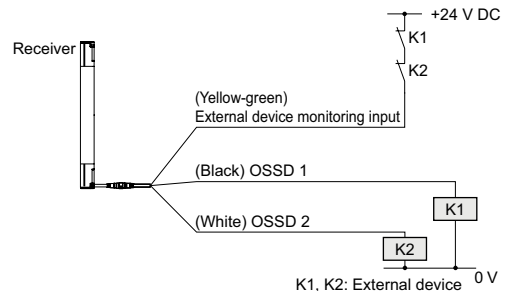
In case of setting the interlock function to “enabled (manual reset)”

- When the interlock function is “enabled (manual reset)”, the override function cannot be used.



* Refer to p.27 for details of the interlock function.

In case of setting the external device monitoring function to “enabled”

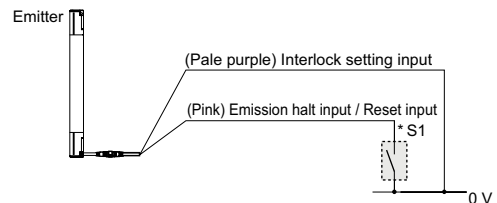


* Refer to p.28 for details of the external device monitoring function.

The diagram at left shows the configuration when using NPN output, interlock function “disabled (automatic reset)” and external device monitoring function “disabled”.

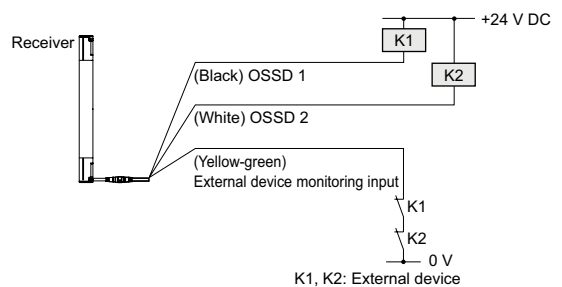
In case of setting the interlock function to “enabled (manual reset)”

- When the interlock function is “enabled (manual reset)”, the override function cannot be used.



* Refer to p.27 for details of the interlock function.

In case of setting the external device monitoring function to “enabled”



* Refer to p.28 for details of the external device monitoring function.

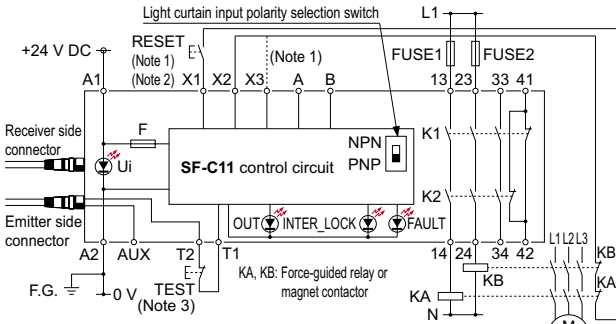
I/O CIRCUIT AND WIRING DIAGRAMS

SF-C11

SF4B series wiring diagram (Control Category 4)

For PNP output (minus ground)

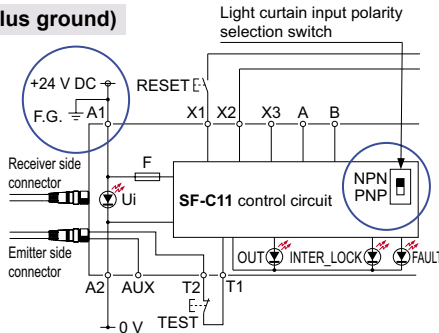
- Set the light curtain input polarity selection switch to the PNP side and ground the 0 V line.



- Notes:
- The above diagram is when using manual reset. If automatic reset is used, disconnect the lead from X2 and connect it to X3. In this case, a reset (RESET) button is not needed.
 - Use a momentary-type switch as the reset (RESET) button.
 - Emission halt occurs when the test (TEST) button is open, and emission occurs when the test (TEST) button is short-circuited. If not using the test (TEST) button, short-circuit T1 and T2.

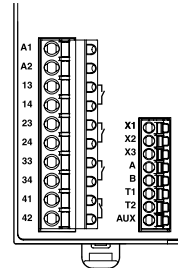
For NPN output (plus ground)

- In the above diagram, set the light curtain input polarity selection switch to the NPN side and ground the + side.



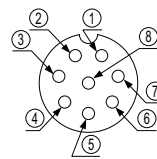
When SF-C11 is connected to the light curtain, be sure to use the following mating cable.
SFB-CB□, SFB-CCJ10□

Terminal arrangement diagram



| Terminal | Function |
|---------------------|-----------------------------------|
| A1 | +24 V DC |
| A2 | 0 V |
| 13-14, 23-24, 33-34 | Enabling path (NO contact × 3) |
| 41-42 | Auxiliary output (NC contact × 1) |
| X1 | Reset output terminal |
| X2 | Reset input terminal (Manual) |
| X3 | Reset input terminal (Automatic) |
| A | Not used |
| B | |
| T1 | Test output terminal |
| T2 | Test input terminal |
| AUX | Semiconductor auxiliary output |

Pin layout for light curtain connectors



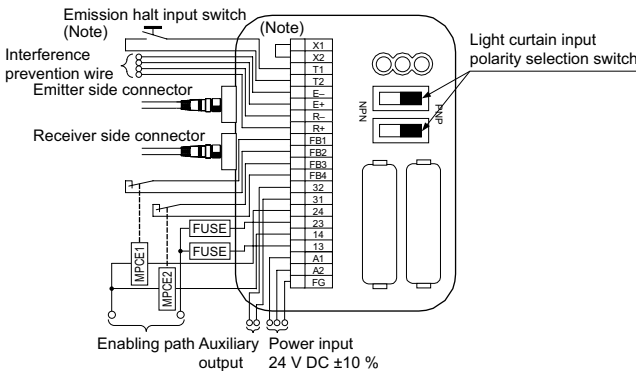
| Connector pin No. | Emitter side connector | Receiver side connector |
|-------------------|------------------------|------------------------------|
| ① | Interlock | OSSD 2 |
| ② | +24 V DC | +24 V DC |
| ③ | Emission halt | OSSD 1 |
| ④ | Auxiliary output | EDM (External relay monitor) |
| ⑤ | Synchronization wire + | Synchronization wire + |
| ⑥ | Synchronization wire - | Synchronization wire - |
| ⑦ | 0 V | 0 V |
| ⑧ | Shield wire | Shield wire |

SF-C12

SF4B series wiring diagram (Control Category 4)

For PNP output (minus ground)

- Set the two light curtain input polarity select switches to the PNP side and connect the FG terminal to the 0 V line.



- Note: The above diagram is when using manual reset. If automatic reset is used, connect a normally closed type pushbutton switch between T1 and T2 and leave between X1 and X2 open.

For NPN output (plus ground)

- In the above diagram, set the two light curtain input polarity selection switches to the NPN side and connect the F.G. terminal to the + side.

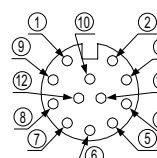
When SF-C12 is connected to the light curtain, be sure to use the following maing cable.
SFB-CB05-MU, SFB-CCJ10□-MU

Terminal arrangement diagram



| Terminal | Function | Terminal | Function |
|--------------|-----------------------------------|----------|---|
| FG | Frame ground (F.G.) terminal | R+ | Interference prevention wire - (Receiver side) |
| A2 | 0 V | R- | Interference prevention wire + (Receiver side) |
| A1 | +24 V DC | E+ | Interference prevention wire - (Emitter side) |
| 13-14, 23-24 | Enabling path (NO contact × 2) | E- | Interference prevention wire + (Emitter side) |
| 31-32 | Auxiliary output (NC contact × 1) | T2 | Emission halt input terminal |
| FB4 | External relay monitor terminal 2 | T1 | Emission halt input terminal |
| FB3 | External relay monitor terminal 1 | X2 | Automatic reset / manual reset selection terminal |
| FB2 | External relay monitor terminal 1 | X1 | Manual reset: X1 - X2 short-circuited |

Pin layout for light curtain connectors



- Note: Input and output for pin Nos. ⑪ and ⑫ are not used by this product.

| Connector pin No. | Emitter side connector | Receiver side connector |
|-------------------|--------------------------------|--------------------------------|
| ① | Interlock | OSSD 2 |
| ② | +24 V DC | +24 V DC |
| ③ | Emission halt | OSSD 1 |
| ④ | Auxiliary output | EDM (External relay monitor) |
| ⑤ | Synchronization wire + | Synchronization wire + |
| ⑥ | Synchronization wire - | Synchronization wire - |
| ⑦ | 0 V | 0 V |
| ⑧ | Shield wire | Shield wire |
| ⑨ | Interference prevention wire + | Interference prevention wire + |
| ⑩ | Interference prevention wire - | Interference prevention wire - |
| ⑪ | (Muting lamp output) | (Muting input 1) |
| ⑫ | (Override input) | (Muting input 2) |

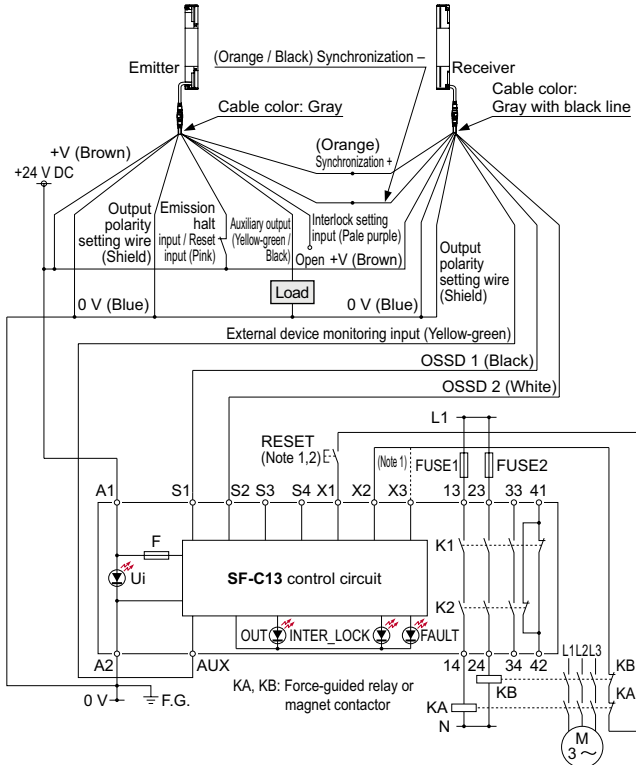
I/O CIRCUIT AND WIRING DIAGRAMS

SF-C13

SF4B series wiring diagram (Control Category 4)

For PNP output (minus ground)

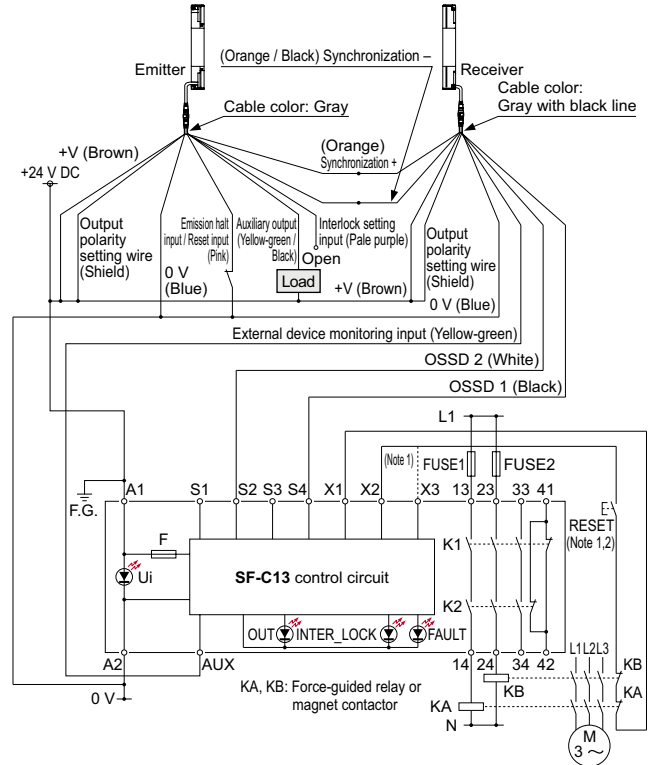
- Connect the light curtain control outputs OSSD 1 and OSSD 2 to S1 and S2 respectively.



- Notes: 1) The above diagram is when using manual reset. If automatic reset is used, disconnect the lead from X2 and connect it to X3. In this case, a reset (RESET) button is not needed.
 2) Use a momentary-type switch as the reset (RESET) button.

For NPN output (plus ground)

- Connect the light curtain control outputs OSSD 1 and OSSD 2 to S4 and S2 respectively and ground the + side.



- Notes: 1) The above diagram is when using manual reset. If automatic reset is used, disconnect the lead from X2 and connect it to X3. In this case, a reset (RESET) button is not needed.
 2) Use a momentary-type switch as the reset (RESET) button.

Terminal arrangement diagram

| Terminal | Function |
|---------------------|--|
| A1 | +24 V DC |
| A2 | 0 V |
| S1 to S4 | Light curtain control output (OSSD) input terminal |
| AUX | Semiconductor auxiliary output |
| X1 | Reset output terminal |
| X2 | Reset input terminal (Manual) |
| X3 | Reset input terminal (Automatic) |
| 13-14, 23-24, 33-34 | Enabling path (NO contact × 3) |
| 41-42 | Auxiliary output (NC contact × 1) |

Use a separate terminal block to carry out wiring for light curtains that cannot be connected to the SF-C13.

When SF-C13 is connected to the light curtain, be sure to use the following discrete wire mating cable. **SFB-CCB(-MU), SFB-CC(-MU)**

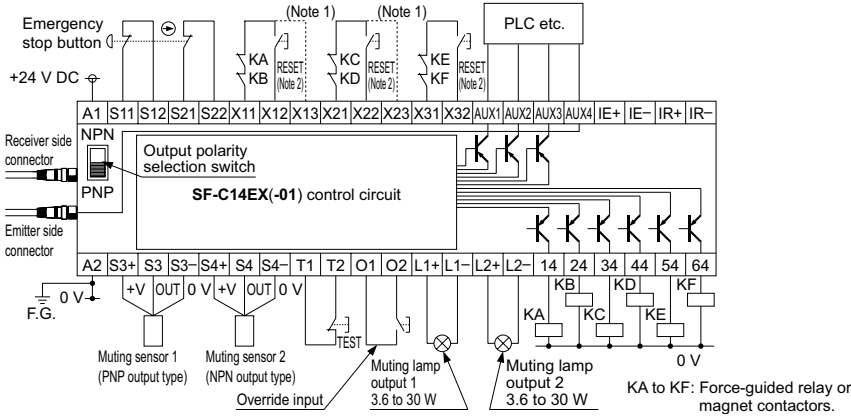
I/O CIRCUIT AND WIRING DIAGRAMS

SF-C14EX(-01)

SF4B series wiring diagram (Control Category 4)

For PNP output (minus ground)

• Set the output polarity selection switch to the PNP side and ground the 0 V line.



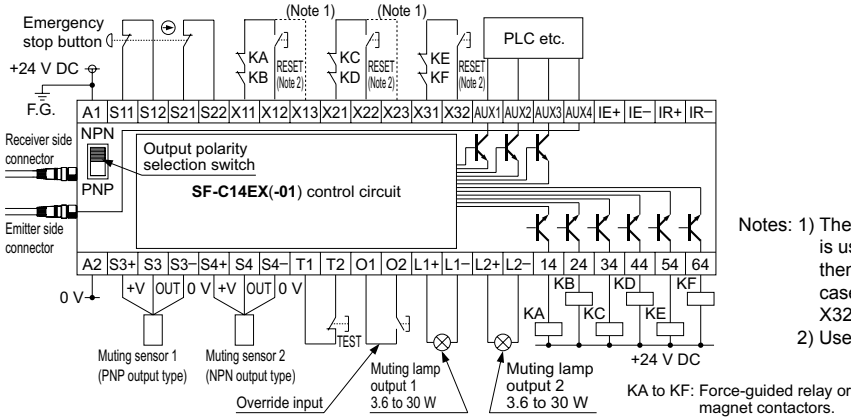
Notes: 1) The above diagram is when using manual reset. If automatic reset is used, disconnect the lead from X12 and X22, and connect them to X13 and X23, as shown by the dotted lines. In this case, a reset (RESET) button is not needed. Terminals X31 to X32 are for manual reset only.
2) Use a momentary-type switch for the reset (RESET) button.

- When SF-C14EX is connected to the light curtain, be sure to use the following mating cable. **SFB-CB□-EX, SFB-CCJ10□**
- If the NO (Normally Open) contact switch is used as a muting sensor, wire it as shown in the figure below.

- If the emergency stop button is not used, short-circuit between the terminals S11 to S12 and S21 to S22 directly.

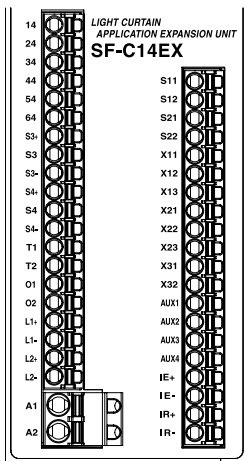
For NPN output (plus ground)

• Set the output polarity selection switch to the NPN side and ground the side of the power supply input.



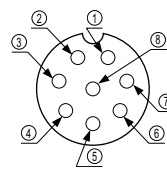
Notes: 1) The left diagram is when using manual reset. If automatic reset is used, disconnect the lead from X12 and X22, and connect them to X13 and X23, as shown by the dotted lines. In this case, a reset (RESET) button is not needed. Terminals X31 to X32 are for manual reset only.
2) Use a momentary-type switch for the reset (RESET) button.

Terminal arrangement diagram



| Terminal | Function | Terminal | Function |
|----------|---|----------|--|
| 14 | Enabling path 1, Beam received / Beam interrupted output of the light curtain | S11 | Emergency stop contact input |
| 24 | | S12 | 2 NC input |
| 34 | Enabling path 2, light curtain output including the muting function | S21 | Between S11 and S12 |
| 44 | | S22 | Between S21 and S22 |
| 54 | Enabling path 3 | X11 | Enabling path 1 reset input |
| 64 | Emergency stop output | X12 | X11 - X12: Manual reset |
| S3+ | Muting sensor input 1 (PNP output type) | X13 | X11 - X13: Automatic reset |
| S3- | S3+, S3-: Power supply | X21 | Enabling path 2 reset input |
| S3- | S3: Sensor output | X22 | X21 - X22: Manual reset |
| S4+ | Muting sensor input 2 (NPN output type) | X23 | X21 - X23: Automatic reset |
| S4- | S4+, S4-: Power supply | X31 | Enabling path 3 reset input |
| S4- | S4: Sensor output | X32 | X31 - X32: Manual reset |
| T1 | Test input terminal Open: Test mode Short-circuit: Normal operation | AUX1 | Auxiliary output 1, Muting output |
| T2 | Override input terminal Open: Invalid Short-circuit: Valid | AUX2 | Auxiliary output 2, Override output |
| O1 | Override input terminal | AUX3 | Auxiliary output 3, Blown lamp output |
| O2 | Override input terminal | AUX4 | Auxiliary output 4, Light curtain auxiliary output |
| L1+ | Muting lamp output 1 | IE+ | Interference prevention terminal, Emitter side + |
| L1- | | IE- | Interference prevention terminal, Emitter side - |
| L2+ | Muting lamp output 2 | IR+ | Interference prevention terminal, Receiver side + |
| L2- | | IR- | Interference prevention terminal, Receiver side - |
| A1 | +24 V DC | | |
| A2 | 0 V | | |

Pin layout for light curtain connectors



| Connector pin No. | Emitter side connector | Receiver side connector |
|-------------------|--------------------------------|--------------------------------|
| ① | Interference prevention wire + | Interference prevention wire + |
| ② | +24 V DC | +24 V DC |
| ③ | Interference prevention wire - | Interference prevention wire - |
| ④ | Auxiliary output | Not used |
| ⑤ | Synchronization wire + | Synchronization wire + |
| ⑥ | Synchronization wire - | Synchronization wire - |
| ⑦ | 0 V | 0 V |
| ⑧ | Shield wire | Shield wire |

PRECAUTIONS FOR PROPER USE

Interlock function

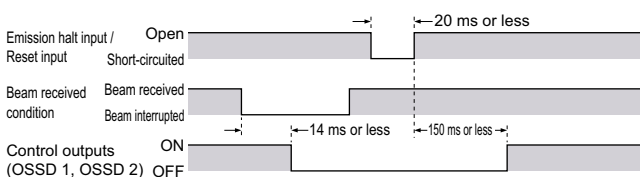
- When the light curtain has been interrupted and control outputs (OSSD 1, OSSD 2) is OFF, the interlock function keeps the control outputs at OFF until a reset signal is input.
- You can select whether interlock is enabled (manual reset) or disabled (automatic reset) by the way in which the interlock setting input line (pale purple) is connected.

| Interlock function | Reset operation | Interlock setting input (pale purple) |
|--------------------|-----------------|---------------------------------------|
| Enabled | Manual reset | Connected to 0 V or +V |
| Disabled | Automatic reset | Open |

Interlock enabled (manual reset)

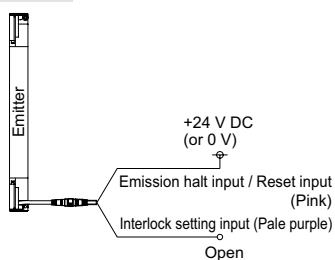
- When the light curtain has been interrupted and control outputs (OSSD 1, OSSD 2) are OFF, the control outputs (OSSD 1, OSSD 2) are kept at OFF and does not automatically turn back ON even if the incoming light status is restored.
If a reset signal is input when incoming light is being received by the light curtain (emission halt input / reset input changes from "open" to "0 V" or the +V side changes from "short-circuited" to "open"), control outputs (OSSD 1, OSSD 2) turns ON.
(Refer to p.21~ for wiring diagrams.)

<Time chart>



Interlock disabled (automatic reset)

- When the light curtain has been interrupted and control outputs (OSSD 1, OSSD 2) are OFF, the control outputs turn ON automatically when the incoming light status is restored.



In case that this light curtain is used under automatic reset mode, set the system not to be auto reset by the safety relay unit, etc. (conforming to EN 60204-1)

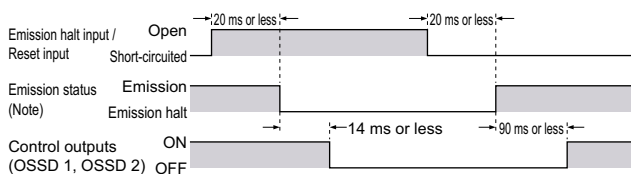
Emission halt function

- This function stops the emission process of the emitter. You can select whether emission is on or halted by means of the connection status for the emission halt input / reset input wire (pink).

| Setting status of interlock function | Emission halt input / reset input | Emission status |
|--------------------------------------|-----------------------------------|-----------------|
| Enabled (manual reset) | Open | Emission |
| | Connected to 0 V or +V | Emission halt |
| Disabled (automatic reset) | Open | Emission halt |
| | Connected to 0 V or +V | Emission |

- During emission halt, the control outputs (OSSD 1, OSSD 2) become OFF status.
- By using this function, malfunction due to extraneous noise or abnormality in the control outputs (OSSD 1, OSSD 2) and the auxiliary output can be determined even from the machinery side.
- When the interlock function is disabled (automatic reset), normal operation is restored when the emission halt input / reset input wire (pink) is connected to 0 V or +V.

<Time chart [when interlock function is disabled (automatic reset)]>



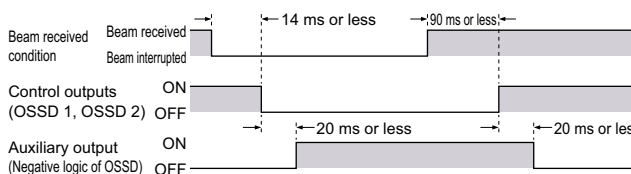
Note: This time chart shows the operation in automatic reset. In manual reset, the light curtain performs emission under open status and performs emission halt under short-circuit status.

Auxiliary output (Non-safety output)

- This light curtain incorporates the auxiliary output (yellow-green / black) for the non-safety output. The auxiliary output is incorporated with the emitter.

| Auxiliary output setting | Normal mode | | | Lockout |
|--|---------------|--|----|---------|
| | Emission halt | Control outputs (OSSD 1, OSSD 2) status | | |
| Negative logic of OSSD (Factory setting) | ON | Beam received: OFF Beam interrupted: ON | ON | ON |

<Time chart>



Do not use the auxiliary output for the purpose of stopping the device. Failure to do so could result in serious injury or death.

PRECAUTIONS FOR PROPER USE

External device monitoring function

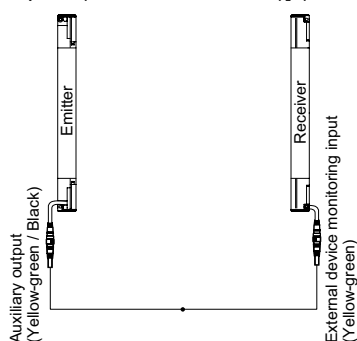
- This is the function for checking whether the external safety relay connected to the control outputs (OSSD 1, OSSD 2) perform normally in accordance with the control outputs (OSSD 1, OSSD 2) or not. Monitor the contacting point “b” of the external safety relay, and if any abnormality such as deposit of the contacting point, etc. is detected, change the status of the light curtain into lockout one, and turn OFF the control outputs (OSSD 1, OSSD 2).

In case of setting the external device monitoring function to enabled

- Connect the external device monitoring input (yellow-green) to the external safety relay connected the control outputs (OSSD 1, OSSD 2). Refer to p.20~ for wiring diagrams.

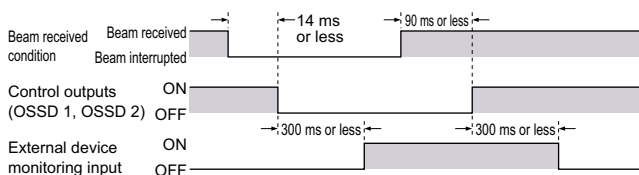
In case of not using the external device monitoring function

- Connect the external device monitoring input (yellow-green) to the auxiliary output (yellow-green / black). At this time, set the auxiliary output as [negative logic of control outputs (OSSD 1, OSSD 2)] (factory setting).



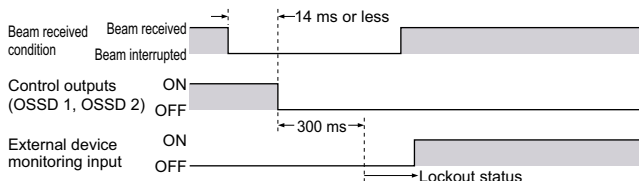
- It is also possible to set the external device monitoring function into invalid by using the handy-controller **SFB-HC** (optional). However, a handy-controller cannot be used with the **SF4B-□-01<V2>** and the **SF-C14EX-01**.

<Time chart (normal)>

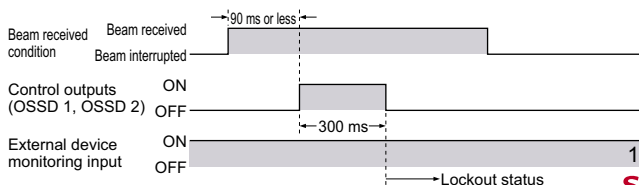


- The time set for external device monitoring is 300 ms or less. Exceeding 300 ms turns the device into lockout status. It can be set within 100 to 600 ms (in units of 10 ms) by using the handy-controller (**SFB-HC**)(optional). However, a handy-controller cannot be used with the **SF4B-□-01<V2>** and the **SF-C14EX-01**.

<Time chart (Error ①)>



<Time chart (Error ②)>



Muting function



- Incorrect use of the muting control may cause accidents. Please understand the muting control fully, and use it. As for the muting control, the following international standards define the requirements.
ISO 13849-1: 1999 (EN 954-1: 1997 / JIS B 9705-1)
IEC 61496-1 (UL 61496 / JIS B 9704-1)
IEC 60204-1 (JIS B 9960-1)
EN 415-4
ANSI B11.19-1990
ANSI / RIA R15.06-1999
- Use the muting control while the machine cycle is not in danger mode. Maintain safety with the other measure while the muting control is activated.
- For the application that the muting control is activated when a workpiece passes through the sensor, place the muting sensor so that the conditions for the muting control cannot be satisfied by intrusion of personnel when the workpiece is passing through the sensor or the workpiece is not passing through it.
- The muting lamp should be installed in a position where it can always be seen by operators who set or adjust the machine.
- Be sure to check the operation of the muting function before its use. Furthermore, check the state of the muting lamp (cleanliness or brightness etc.).

- This function turns the safety function of this light curtain into disabled temporarily. When the control outputs (OSSD 1, OSSD 2) are ON, this function is available for passing the workpiece through the sensing area of the light curtain without stopping the machinery. The muting function becomes valid when all the conditions listed below are satisfied:

- ① The control outputs (OSSD 1, OSSD 2) shall be ON.
- ② The incandescent lamp with 3 to 10 W shall be connected to the muting lamp output (red) (Note 1).
- ③ The output of the muting sensors A, B, C, and D shall be changed from OFF (open) to ON. At this time, the time difference occurred by changing the output of the muting sensors A, B, C, and D into ON status shall be within 0.03 to 3 sec. (Note 2)

- The following devices, photoelectric sensor with semiconductor output, inductive proximity sensor, position switch on N.O. (Normally open) contact, etc. are available for applying to the muting sensor.
- In case of using the muting function, please order 12-core cable.

- Notes: 1) Using handy-controller (**SFB-HC**) (optional) Ver.2 or later can configure muting lamp diagnosis function. If setting muting lamp diagnosis function to ineffective, muting function continues even when the lamp is out or not connected.
- 2) By using handy-controller (**SFB-HC**) (optional) Ver.2.1 or later, and connecting normally open (N.O.) type muting sensor to muting input A, and normally closed (N.C.) type muting sensor to muting input B, then muting function can be used for 0 to 3 sec.

Specification for muting sensor

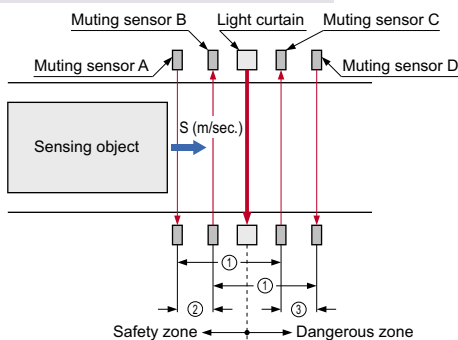
| | Operation when sensor is ON | Operation when sensor is OFF |
|--|-----------------------------|------------------------------|
| ON with "Dark-On" condition (photoelectric sensor, etc.) ON with "Normally open" condition (inductive proximity sensor, etc.) ON with object contacted condition (position switch, etc.) | Output 0 V or +V | Open |

PRECAUTIONS FOR PROPER USE



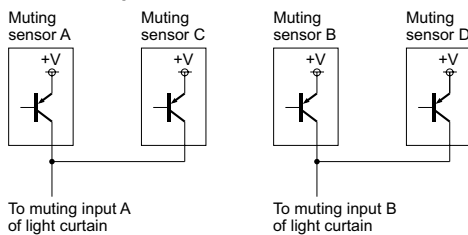
- Be sure to use the muting sensor that satisfies the previous table "Specification for muting sensor". If the other muting sensor not satisfying the specification above, the muting function might become enabled with the timing that the machine designer cannot expect and could result in serious injury or death.
- The muting lamp shall be connected without fail. The muting function is invalid for activating with the muting lamp not connected.
- It is recommended that two muting lamps should be connected in parallel. However, take care not to exceed 10 W in total.

Installation condition of muting sensor

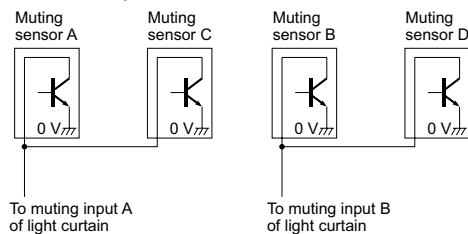


- ① Shorten the distances between muting sensors A to C and between B to D than the whole length of the sensing object.
- ② The transit time of the sensing object to be passed through the muting sensors A to B shall be 30 ms to less than 3 sec. S (m/sec.) is the moving speed of the sensing object, then distance (m) between A and B: less than $S \times 3$ (sec.)
- ③ The transit time of the sensing object to be passed through the muting sensors C to D shall be under 3 sec. S (m/sec.) is the moving speed of the sensing object, then distance (m) between C and D: less than $S \times 3$ (sec.)

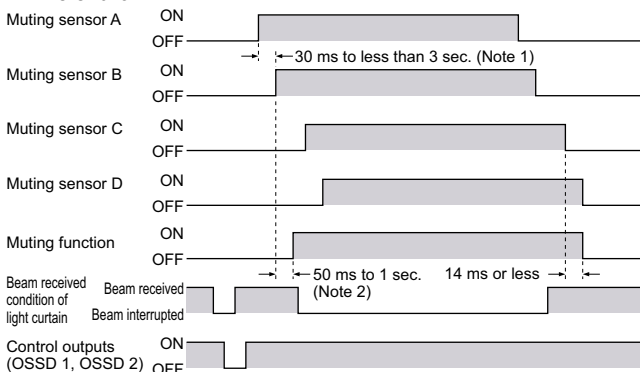
<In case of PNP output>



<In case of NPN output>



<Time chart>



- It is possible to set the muting function into disabled per beam channel respectively and to specify the output order of the muting sensor to be set into enabled by using the handy-controller (SFB-HC)(optional). However, a handy-controller cannot be used with the SF4B-□01<V2> and the SF-C14EX-01.

Notes: 1) By using handy-controller (SFB-HC) (optional) Ver.2.1 or later, and connecting normally open (N.O.) type muting sensor to muting input A, and normally closed (N.C.) type muting sensor to muting input B, then muting function can be used for 0 to 3 sec.
2) If the muting lamp does not light within 1 sec., the muting function is disabled.

Override function

- This function sets the safety function of this light curtain enabled forcibly. When using the muting function, the override function can be used to start the machinery at times such as when the control outputs (OSSD 1 and OSSD 2) are OFF or when the muting sensors are ON when the line is to be started.

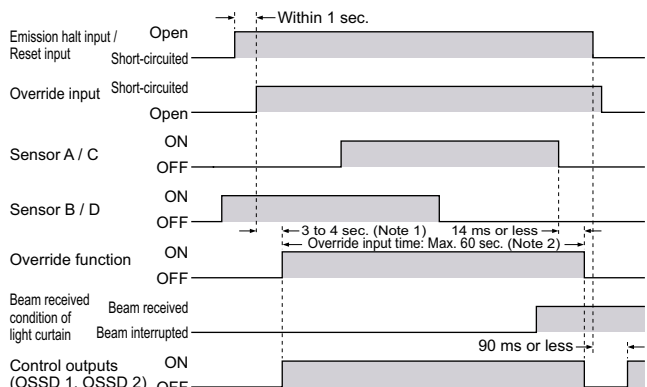
The override function becomes valid when all the conditions listed below are satisfied:

- ① The incandescent lamp with 3 to 10 W shall be connected to the muting lamp output (red) (Note 1).
- ② The signal shall be input to either muting sensor A, B, or A and B.
- ③ The override input (yellow) shall be short-circuited to 0 V or +V, and the emission halt input / reset input (pink) shall be opened. (3 sec. continuously)

If one of the three conditions above becomes enabled or timing exceeds 60 sec. (Note 2), the override function becomes enabled.

- The override function only operates when the interlock function is disabled (automatic reset).
 - For using the override function, please order 12-core cable.
- Notes: 1) Using handy-controller (SFB-HC) (optional) Ver.2 or later can configure muting lamp diagnosis function. If setting muting lamp diagnosis function to ineffective, muting function continues even when the lamp is out or not connected.
2) By using handy-controller (SFB-HC) (optional) Ver.2.1 or later, a change between 60 and 600 sec. by 10 sec. per unit is possible.

<Time chart>



Notes: 1) If the muting lamp does not light within 4 sec., the override function is disabled.
2) By using handy-controller (SFB-HC) (Optional) Ver.2.1 or later, a change between 60 and 600 sec. by 10 sec. per unit is possible.




The emission halt input / reset input button and the override input button should be installed outside the danger area, and in a place where the danger area is clearly visible.

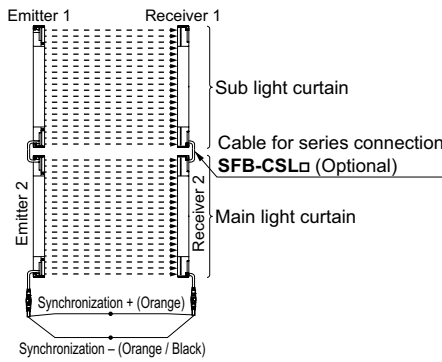
PRECAUTIONS FOR PROPER USE

Series connection

Connectable up to 3 sets of light curtains (however, 192 beam channels max.)

- This is the configuration for connecting multiple sets of emitters and receivers facing each other in series. It is used when the dangerous part can be entered from two or more directions. The control outputs (OSSD 1, OSSD 2) turn OFF if any of the light curtain is interrupted.


 For series connection, connect the emitter and emitter, receiver and receiver respectively using the exclusive cable (SFB-CSL□) for series connection. Wrong connection could generate the non-sensing area, resulting in serious injury or death.

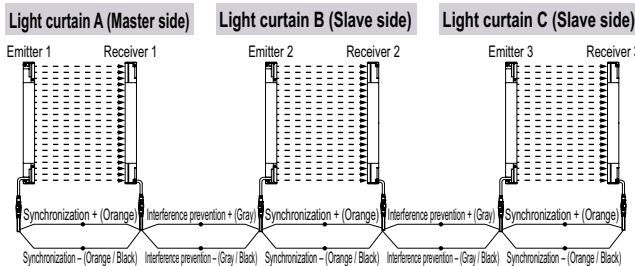


Parallel connection

Connectable up to 3 sets of light curtains

- This is the configuration for connecting multiple sets of emitter and receiver facing each other in parallel. It is used when there are two dangerous parts and each dangerous part can be entered from only one direction. By connecting the interference prevention wire, up to three sets of the light curtains can be connected. The control outputs (OSSD 1, OSSD 2) turn only its output to OFF if the light curtain is interrupted.

 For parallel connection, connect the one receiver to the other connection using the interference prevention wire as shown in the figure below. Wrong connection could generate the non-sensing area, resulting in serious injury or death.




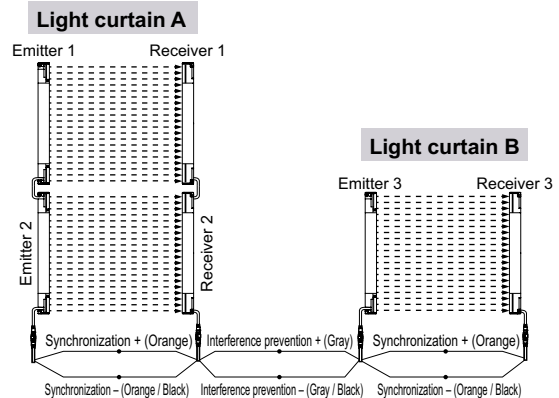
- Notes: 1) Because of using the interference prevention wire, please order 12-core cable.
2) If the interference prevention wire is extended, use a 0.2 mm², or more, shielded twist pair-cable.

Series and parallel mixed connection

Connectable up to 3 sets of light curtains (however, 192 beam channels max.)


- This is the configuration for connecting multiple sets of emitter and receiver facing each other in mixed series and parallel combination. It is used when there are two or more dangerous parts that can be entered from two or more directions. Up to three sets of light curtains in total of the series connection and parallel connection can be connected in combination. However, the total number of beam channels is a maximum of 192. The control outputs (OSSD 1, OSSD 2) turn only its output to OFF if the light curtain is interrupted.

 For parallel connection, connect the one receiver to the other connection using the interference prevention wire as shown in the figure below. Wrong connection could generate the non-sensing area, resulting in serious injury or death.



- Notes: 1) Because of using the interference prevention wire, please order 12-core cable.
2) If the interference prevention wire is extended, use a 0.2 mm², or more, shielded twist pair-cable.

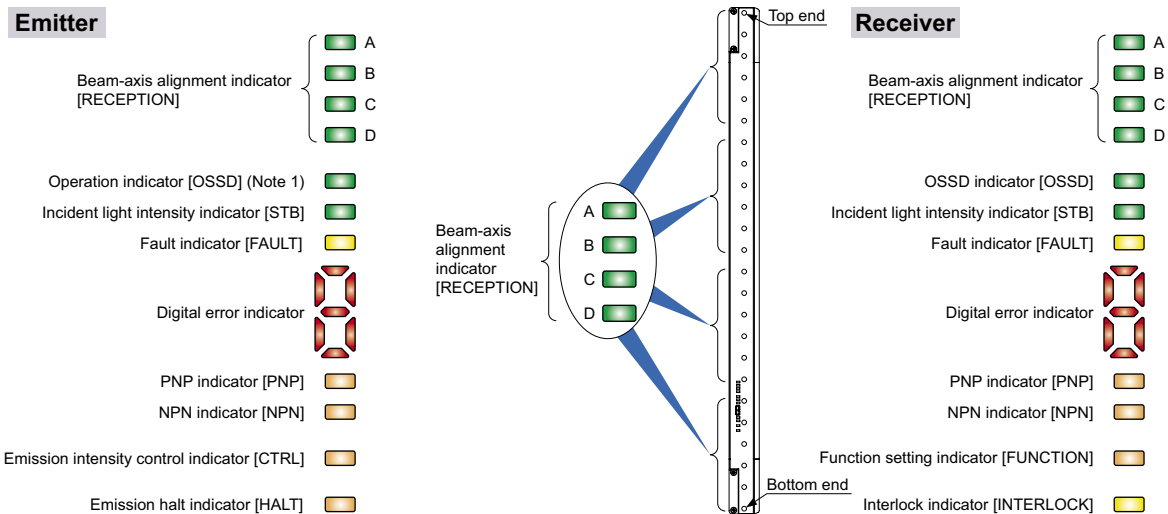
Wiring

 Refer to the applicable regulations for the region where this device is to be used when setting up the device. In addition, make sure that all necessary measures are taken to prevent possible dangerous operating errors resulting from earth faults.

- Make sure to carry out the wiring in the power supply off condition.
- Verify that the supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this sensor, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.

PRECAUTIONS FOR PROPER USE

Part description and function



| Description | Function |
|---|---|
| Beam-axis alignment indicator (Red / Green) [RECEPTION] | A When light curtain top receives light: lights up in red When light curtain top end receives light: blinks in red When control output is ON: lights up in green |
| | B When light curtain upper middle receives light: lights up in red When control output is ON: lights up in green |
| | C When light curtain lower middle receives light: lights up in red When control output is ON: lights up in green |
| | D When light curtain bottom receives light: lights up in red When light curtain bottom end receives light: blinks in red When control output is ON: lights up in green |
| Operation indicator (Red / Green) [OSSD] (Note 1) | Lights up while light curtain operation is as follows [sequential operation]: When control output is OFF: lights up in red When control output is ON: lights up in green |
| Incident light intensity indicator (Orange / Green) [STB] | When sufficient light is received (incident light: 130 % or more) (Note 2): lights up in green When stable light is received (incident light: 115 to 130 %) (Note 2): OFF When unstable light is received (incident light: 100 to 115 %) (Note 2): lights up in orange When light is interrupted: OFF (Note 3) |
| Fault indicator (Yellow) [FAULT] (Note 4) | When fault occurs in the light curtain: lights up or blinks |
| Digital error indicator (Red) (Note 4) | When device is lockout: lights up for incident error content |
| PNP indicator (Orange) [PNP] | When PNP output is set: lights up |
| NPN indicator (Orange) [NPN] | When NPN output is set: lights up |
| Emission intensity control indicator (Orange) [CTRL] | When light is emitted under short mode: lights up When light is emitted under normal mode: lights off |
| Emission halt indicator (Orange) [HALT] | When light emission is halt: lights up When light is emitted: OFF |

| Description | Function |
|---|---|
| Beam-axis alignment indicator (Red / Green) [RECEPTION] | A When light curtain top receives light: lights up in red When light curtain top end receives light: blinks in red When control output is ON: lights up in green |
| | B When light curtain upper middle receives light: lights up in red When control output is ON: lights up in green |
| | C When light curtain lower middle receives light: lights up in red When control output is ON: lights up in green |
| | D When light curtain bottom receives light: lights up in red When light curtain bottom end receives light: blinks in red When control output is ON: lights up in green |
| OSSD indicator (Red / Green) [OSSD] | When control output is OFF: lights up in red When control output is ON: lights up in green |
| Incident light intensity indicator (Orange / Green) [STB] | When sufficient light is received (incident light: 130 % or more) (Note 2): lights up in green When stable light is received (incident light: 115 to 130 %) (Note 2): OFF When unstable light is received (incident light: 100 to 115 %) (Note 2): lights up in orange When light is interrupted: OFF (Note 3) |
| Fault indicator (Yellow) [FAULT] (Note 4) | When fault occurs in the light curtain: lights up or blinks |
| Digital error indicator (Red) (Note 4) | When device is lockout: lights up for incident error content |
| PNP indicator (Orange) [PNP] | When PNP output is set: lights up |
| NPN indicator (Orange) [NPN] | When NPN output is set: lights up |
| Function setting indicator (Orange) [FUNCTION] | When blanking function is used: lights up (Note 5) When handy-controller is connected: blinks |
| Interlock indicator (Yellow) [INTERLOCK] | When device is interlocked: lights up Other cases: OFF |


- Notes: 1) Since the color of the operation indicator changes according to the ON / OFF status of the control outputs (OSSD 1, OSSD 2), the operation indicator is marked as "OSSD" on the light curtain.
 2) The threshold value where the control outputs (OSSD 1, OSSD 2) change from OFF to ON is applied as 100 % incident light intensity.
 3) The status when light is interrupted refers to the status that the some obstacle is existed in the sensing area.
 4) Refer to instruction manual enclosed with this product for details.
 5) The blanking function is set by using the handy-controller **SFB-HC** (optional). Please order the handy-controller separately. However, a handy-controller cannot be used with the **SF4B-□-01<V2>** and the **SF-C14EX-01**.
 6) The description given in [] is marked on the light curtain.

Others

- Do not use during the initial transient time (2 sec.) after the power supply is switched on.
- Avoid dust, dirt and steam.
- Take care that the light curtain does not come in direct contact with water, oil, grease, or organic solvents, such as, thinner, etc.

- Take care that the light curtain is not directly exposed to fluorescent light from a rapid-starter lamp or a high frequency lighting device, as it may affect the sensing performance.

PRECAUTIONS FOR PROPER USE




- When this device is used in the “PSDI mode”, an appropriate control circuit must be configured between this device and the machinery. For details, be sure to refer to the standards or regulations applicable in each region or country.
- To use this product in the U.S.A., refer to OSHA 1910. 212 and OSHA 1910. 217 for installation, and in Europe, refer to EN 999 as well. Observe your national and local requirements before installing this product.

- This catalog is a guide to select a suitable product. Be sure to read instruction manual attached to the product prior to its use.
- Both emitter and receiver are combined adjusted on factory setting, please apply both emitter and receiver with the same serial No. The serial No. is indicated on the plates of both emitter and receiver. (Indicated under model No.)

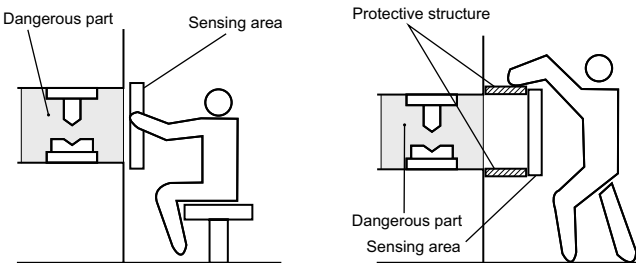
- Make sure to carry out the test run before regular operation.
- This safety system is for use only on machinery in which the dangerous parts can be stopped immediately, either by an emergency stop unit or by disconnecting the power supply. Do not use this system with machinery which cannot be stopped at any point in its operation cycle.

Sensing area

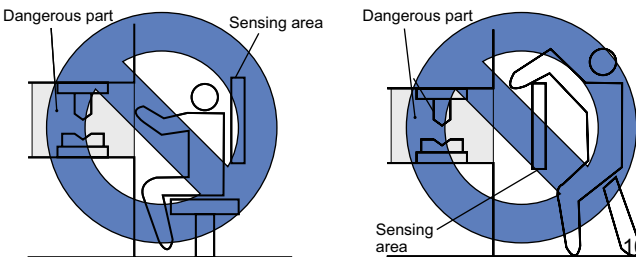


- Make sure to install this product such that any part of the human body must pass through its sensing area in order to reach the dangerous parts of the machinery. If the human body is not detected, there is a danger of serious injury or death.
- Do not use any reflective type or retroreflective type arrangement.
- Emitter and receiver that face each other should be from the same model No. (with same beam axis pitch and number of beam channels) and aligned in the vertical direction. If units from different sets are connected together, it may cause blind spots in the sensing area, and death or serious injury may result.
- Furthermore, facing several receivers towards one emitter, or vice versa, could produce a non-sensing area or cause mutual interference, which may result in serious injury or death.


Correct mounting method



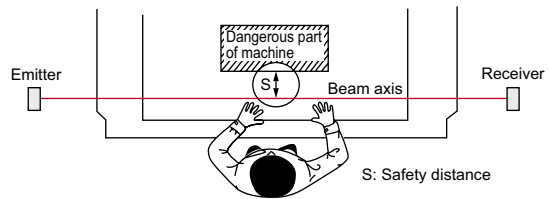

Wrong mounting method



Safety distance



- Calculate the safety distance correctly, and always maintain a distance which is equal to or greater than the safety distance, between the sensing area of this light curtain and the dangerous parts of the machinery. (Please check the latest standards for the equation.) If the safety distance is miscalculated or if sufficient distance is not maintained, there is a danger of serious injury or death.
- Before designing the system, refer to the relevant standards of the region where this device is to be used and then install this device.

The sizes of the minimum sensing objects for this device vary depending on whether or not the floating blanking function is being used. The equation differs depending on the case whether the minimum sensing object is larger than ø40 mm ø1.575 in or not. Calculate the safety distance with the proper size of the minimum sensing object and appropriate equation.

Size of minimum sensing object when applying floating blanking function

| | Min. sensing object when applying floating blanking function | | | |
|--|--|------------------|-------------------|-------------------|
| | Invalid | Setting (Note) | | |
| | | 1 beam channel | 2 beam channels | 3 beam channels |
| SF4B-F□ (Min. sensing object ø14 mm ø0.551 in) | ø14 mm ø0.551 in | ø24 mm ø0.945 in | ø34 mm ø1.339 in | ø44 mm ø1.732 in |
| SF4B-H□ (Min. sensing object ø25 mm ø0.984 in) | ø25 mm ø0.984 in | ø45 mm ø1.772 in | ø65 mm ø2.559 in | ø85 mm ø3.346 in |
| SF4B-A□ (Min. sensing object ø45 mm ø1.772 in) | ø45 mm ø1.772 in | ø85 mm ø3.346 in | ø125 mm ø4.921 in | ø165 mm ø6.496 in |

Note: Refer to p.7 for details of the floating blanking function. However, the floating blanking function cannot be used with the SF4B-□-01<V2> and SF-C14EX-01.

- Safety distance is calculated based on the following equation when a person moves perpendicular (normal intrusion) to the sensing area of the light curtain. In case the intrusion direction is not perpendicular to the sensing area, be sure to refer to the relevant standard (regional standard, specification of the machine, etc.) for details of the calculation. (Please check the latest standards for the equation.)

For use in Europe (EU) (as EN 999)] (Also applicable to ISO 13855 / JIS B 9715)

For intrusion direction perpendicular to the sensing area
 <In case that the minimum sensing object is ø40 mm ø1.575 in or less>

- Equation ① $S = K \times T + C$
 S: Safety distance (mm)
 Minimum required distance between the sensing area surface and the dangerous parts of the machine
 K: Intrusion velocity of operator's body or object (mm/sec.)
 Normally taken as 2,000 (mm/sec.) for calculation
 T: Response time of total equipment (sec.)
 $T = T_m + T_{SF4B}$
 T_m : Maximum halting time of machinery (sec.)
 T_{SF4B} : Response time of the SF4B series 0.014 (sec.)
 C: Additional distance calculated from the size of the minimum sensing object of the light curtain (mm)
 However, the value of "C" cannot be less than 0.
 $C = 8 \times (d - 14)$
 d: Minimum sensing object diameter (mm)

PRECAUTIONS FOR PROPER USE

- For calculating the safety distance “S”, there are the following five cases.
First calculate by substituting the value $K = 2,000$ (mm/sec.) in the equation above. Then, classify the obtained value of “S” into three cases, 1) $S < 100$, 2) $100 \leq S \leq 500$, and 3) $S > 500$. For Case 3) $S > 500$, recalculate by substituting the value $K = 1,600$ (mm/sec.). After that, classify the calculation result into two cases, 4) $S \leq 500$ and 5) $S > 500$. For details, refer to the instruction manual enclosed with this product. For calculating “Tm” (maximum halt time of the machinery), use a special device called a “brake monitor”.
When this device is used in the “PSDI mode”, an appropriate safety distance “S” must be calculated. For details, be sure to refer to the standards or regulations applicable in each region or country.

In the case that the minimum sensing object is $\varnothing 40$ mm $\varnothing 1.575$ in or more

- Equation $S = K \times T + C$
S: Safety distance (mm)
K: Intrusion velocity of operator’s body or object (mm/sec.)
Taken as 1,600 (mm/sec.) for calculation
T: Response time of total equipment (sec.)
 $T = T_m + T_{SF4B}$
Tm: Maximum halting time of machinery (sec.)
TSF4B: Response time of the SF4B series 0.014 (sec.)
C: Additional distance calculated from the size of the minimum sensing object of the light curtain (mm)
 $C = 850$ (mm) (Constant)

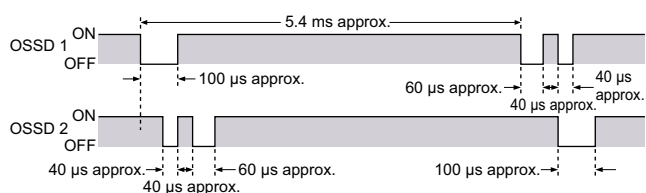
For use in the United States of America (as per ANSI B11.19)

- Equation ② $S = K \times (T_s + T_c + T_{SF4B} + T_{bm}) + D_{pf}$
S: Safety distance (mm)
Minimum required distance between the sensing area surface and the dangerous parts of the machine
K: Intrusion velocity {Recommended value in OSHA is 63 (inch/sec.) \approx 1,600 (mm/sec.)}
ANSI B11.19 does not define the intrusion velocity “K”. When determining “K”, consider possible factors including physical ability of operators.
Ts: Halting time calculated from the operation time of the control element (air valve, etc.) (sec.)
Tc: Maximum response time of the control circuit required for functioning the brake (sec.)
TSF4B: Response time of light curtain (sec.)
Tbm: Additional halting time tolerance for the brake monitor (sec.)
The following equation holds when the machine is equipped with a brake monitor.
 $T_{bm} = T_a - (T_s + T_c)$
Ta: Setting time of brake monitor (sec.)
When the machine is not equipped with a brake monitor, it is recommended that 20 % or more of $(T_s + T_c)$ is taken as additional halting time.
Dpf: Additional distance calculated from the size of the minimum sensing of the
SF4B-F□: $D_{pf} = 23.8$ mm **0.937 in**
SF4B-H□: $D_{pf} = 61.2$ mm **2.409 in**
SF4B-A□: $D_{pf} = 129.2$ mm **5.087 in**
 $D_{pf} = 3.4 \times (d - 0.276)$ (inch)
 $\approx 3.4 \times (d - 7)$ (mm)
d: Minimum sensing object diameter 0.552 (inch) \approx 14 (mm) SF4B-F□
Minimum sensing object diameter 0.985 (inch) \approx 25 (mm) SF4B-H□
Minimum sensing object diameter 1.772 (inch) \approx 45 (mm) SF4B-A□

Output waveform [Control outputs (OSSD 1, OSSD 2) ON]

- Since the receiver performs the self-diagnosis of the output circuit when the light curtain is in beam receiving status (ON status), the output transistor becomes OFF status periodically. (Refer to the figure below.)
When the OFF signal is fed back, the receiver judges the output circuit as normal. When the OFF signal is not fed back, the receiver judges either the output circuit or wiring as error, and the control outputs (OSSD 1, OSSD 2) maintain OFF status.

Warning: Since the OFF signal of this device might cause malfunction, perform the connection paying attention to the input response time of the machine to be connected to this device.

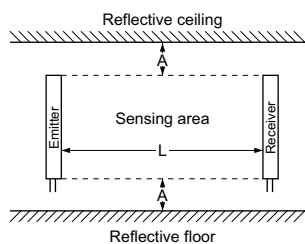


Influence of reflective surfaces

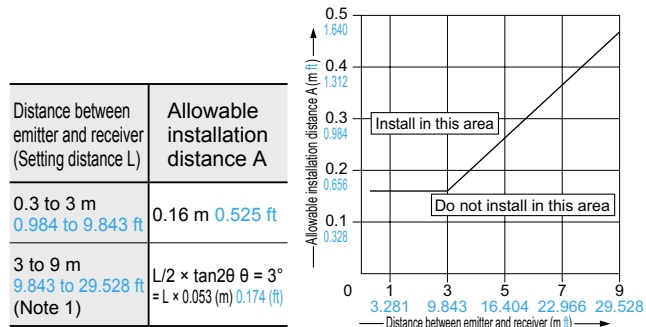
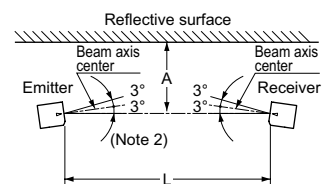
Warning: Install the light curtain by considering the effect of nearby reflective surfaces, and take countermeasures such as painting, masking, or changing the material of the reflective surface, etc. Failure to do so may cause the light curtain not to detect, resulting in serious body injury or death.

- Install this device at a distance of at least A (m) (given below) away from reflective surfaces such as metal walls, floors, ceilings, workpiece, covers, panels or glass surfaces.

Side view



Top view



- Notes: 1) The setting distance “L” varies depending on the type of unit. Refer to “ORDER GUIDE” on p.10 for details.
2) The effective aperture angle for this device is $\pm 2.5^\circ$ or less (when $L > 3$ m 9.843 ft) as required by IEC 61496-2 / UL 61496-2. However, install this device away from reflective surfaces considering an effective aperture angle of $\pm 3^\circ$ to take care of beam misalignment, etc. during installation.

PRECAUTIONS FOR PROPER USE

Handy-controller



This device enables to set each function using the handy-controller **SFB-HC** (optional). (However, a handy-controller cannot be used with the **SF4B-□-01<V2>** and the **SF-C14EX-01**.) Among the functions, the contents related to the safety distance such as the size of the minimum sensing object and response time are varied depending on the setting condition. When setting each function, re-calculate the safety distance, and make enough space larger than the calculated safety distance. Failure to do so might cause the accident that the device cannot stop quickly before reaching the dangerous area of the machinery, resulting in the serious injury or death.

- Refer to the instruction manual enclosed with the handy-controller for details of the function settings for using handy-controller **SFB-HC** (optional).

Troubleshooting quick reference sheet

| Digital error indicator | Possible cause |
|-------------------------|---|
| 0 | Affected by noise. Handy-controller setting error. |
| 1 | Incorrect combination of emitter and receiver (e.g. number of beam channels) Output polarity setting wires (shield) connected incorrectly. |
| 2 | Series connection cable connected incorrectly. Problem with upper light curtain connected in series. |
| 3 | The number of light curtains connected in series and the total number of beam channels is outside the specification range. |
| 4 | <Emitter side lights up> Interlock setting input or emission halt input / reset input connected incorrectly. <Receiver side lights up> Affected by extraneous light, or mutual interference occurring. |
| 5 or 9 | <Emitter side lights up> Muting lamp output connected incorrectly. <Receiver side lights up> Control outputs (OSSD1, OSSD2) connected incorrectly. |
| 6 | Output polarity setting wires (shield) connected incorrectly. |
| 7 | External device monitoring input connected incorrectly. Malfunction with connection relay. |
| 8 | Synchronizing wires connected incorrectly. <Emitter side lights up> Problem at receiver side. <Receiver side lights up> Problem at emitter side. |
| F | Affected by noise. Power supply-related problem. Light curtain malfunction. * Please contact our office. |
| [STB] | Drop in incident light intensity due to dirty sensing surface or beam axis misalignment. (Beam axis input is erratic.) |
| [HALT] | Light emission halted. |
| [INTERLOCK] | Interlock active. |
| [PNP] | Control output is set to PNP output. |
| [NPN] | Control output is set to NPN output. |

Corner mirror



- Be sure to carry out maintenance while referring to the instruction manual for the **SF4B** series of light curtains.
- Do not use if dirt, water, or oil, etc. is attached to the reflective surface of this product. Appropriate sensing range may not be maintained due to diffusion or refraction.
- Make sure that you have read the instruction manual for the corner mirror thoroughly before setting up the corner mirrors and light curtains, and follow the instructions given. If the equipment is not set up correctly as stipulated in the instruction manual, incident light errors may result in unexpected situations which may result in serious injury or death.
- Please download the instruction manuals from our website (sunx.com).
- Light curtain **SF4B** series cannot be used as a retroreflective type. Avoid installing the light curtain as a retroreflective type when this product is applied.
- The mirror part of this product is made of glass. Note that if it is broken, the glass shards may fly apart.
- Do not use if crack or breakage appears on the reflective surface of this product. Proper sensing range may not be maintained due to diffusion or refraction.
If crack or breakage appears on the reflective surface of this product, replace the product.
- When adjusting beam channels with a laser alignment tool, etc., take sufficient care that the laser beam reflected by this product does not enter the eyes.
- Failure to follow the above items may result in death or serious injury.

* Refer to the instruction manual for details.

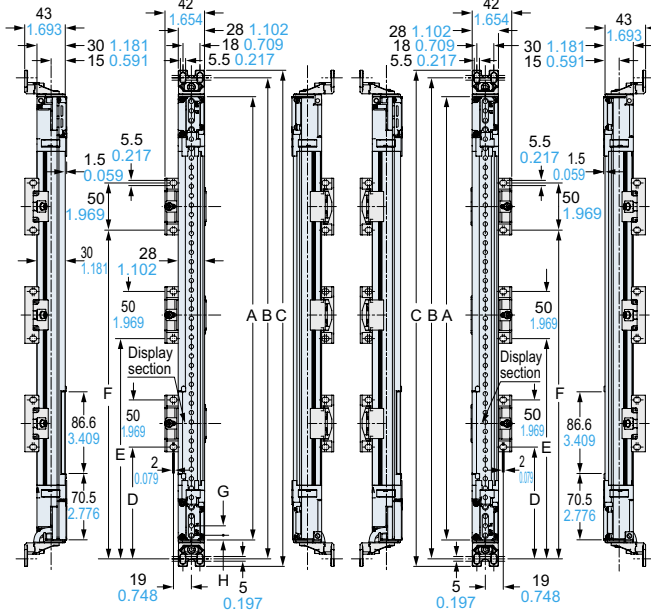
SF4B-□<V2>

Light curtain

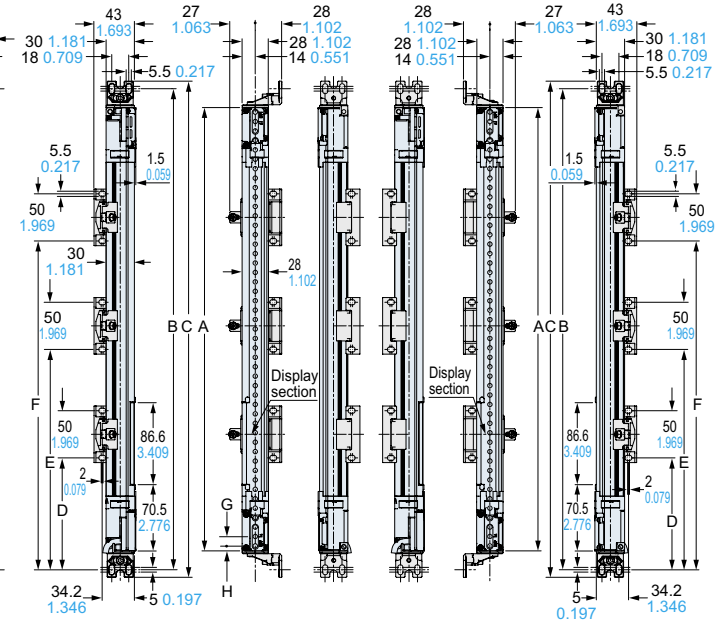
Assembly dimensions

Mounting drawing for the light curtain on which the standard mounting brackets **MS-SFB-1** (optional) and the intermediate supporting brackets are mounted.

<Rear mounting>



<Side mounting>



Emitter

Receiver

Emitter

Receiver

| Model No. | | | Protective height (Main body) length | Mounting pitch | Total length | Intermediate supporting bracket mounting pitch | | |
|----------------|---------------|---------------|--|-------------------|-----------------|---|-----------------|-----------------|
| | | | | | | A | B | C |
| SF4B-F23□<V2> | SF4B-H12□<V2> | SF4B-A6□<V2> | 230 9.055 | 270 10.630 | 286 11.260 | — | — | — |
| SF4B-F31□<V2> | SF4B-H16□<V2> | SF4B-A8□<V2> | 310 12.205 | 350 13.780 | 366 14.406 | — | — | — |
| SF4B-F39□<V2> | SF4B-H20□<V2> | SF4B-A10□<V2> | 390 15.354 | 430 16.929 | 446 17.559 | — | — | — |
| SF4B-F47□<V2> | SF4B-H24□<V2> | SF4B-A12□<V2> | 470 18.504 | 510 20.079 | 526 20.709 | — | — | — |
| SF4B-F55□<V2> | SF4B-H28□<V2> | SF4B-A14□<V2> | 550 21.654 | 590 23.228 | 606 23.858 | — | — | — |
| SF4B-F63□<V2> | SF4B-H32□<V2> | SF4B-A16□<V2> | 630 24.803 | 670 26.378 | 686 27.008 | — | — | — |
| SF4B-F71□<V2> | SF4B-H36□<V2> | SF4B-A18□<V2> | 710 27.953 | 750 29.528 | 766 30.157 | — | — | — |
| SF4B-F79□<V2> | SF4B-H40□<V2> | SF4B-A20□<V2> | 790 31.102 | 830 32.677 | 846 33.307 | 390 15.354 | — | — |
| SF4B-F95□<V2> | SF4B-H48□<V2> | SF4B-A24□<V2> | 950 37.402 | 990 38.976 | 1,006 39.606 | 470 18.504 | — | — |
| SF4B-F111□<V2> | SF4B-H56□<V2> | SF4B-A28□<V2> | 1,110 43.701 | 1,150 45.276 | 1,166 45.905 | 550 21.654 | — | — |
| SF4B-F127□<V2> | SF4B-H64□<V2> | SF4B-A32□<V2> | 1,270 50.000 | 1,310 51.575 | 1,326 52.505 | 418 16.457 | 842 33.150 | — |
| — | SF4B-H72□<V2> | SF4B-A36□<V2> | 1,430 56.299 | 1,470 57.874 | 1,486 58.504 | 472 18.583 | 948 37.323 | — |
| — | SF4B-H80□<V2> | SF4B-A40□<V2> | 1,590 62.598 | 1,630 64.173 | 1,646 64.803 | 525 20.669 | 1,055 41.535 | — |
| — | SF4B-H88□<V2> | SF4B-A44□<V2> | 1,750 68.898 | 1,790 70.472 | 1,806 71.102 | 433 17.047 | 870 34.252 | 1,308 51.496 |
| — | SF4B-H96□<V2> | SF4B-A48□<V2> | 1,910 75.197 | 1,950 76.772 | 1,966 77.401 | 473 18.622 | 950 37.402 | 1,428 56.220 |

| Model No. | Beam pitch | First beam channel position |
|-------------|---------------|--------------------------------------|
| | G | H |
| SF4B-F□<V2> | 10 0.394 | 5 0.197 |
| SF4B-H□<V2> | 20 0.787 | 5 0.197 |
| SF4B-A□<V2> | 40 1.575 | 15 0.591 |

DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from the SUNX website: <http://www.sunx.com>

SF4B-□<V2>

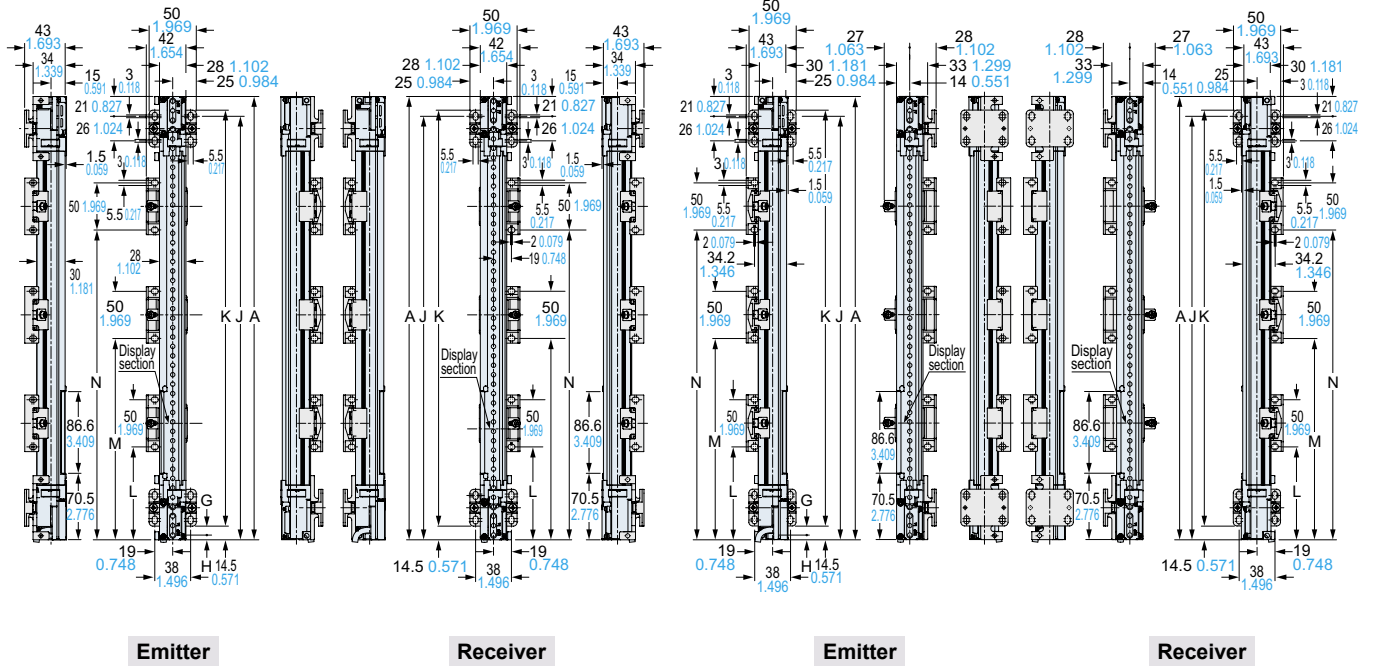
Light curtain

Assembly dimensions

Mounting drawing for the light curtain on which the dead zoneless brackets **MS-SFB-3** (optional) and the intermediate supporting brackets are mounted.

<Rear mounting>

<Side mounting>



| Model No. | | | Protective height (Main body length) | Mounting pitch | Total length | Intermediate supporting bracket mounting pitch | | |
|----------------|---------------|---------------|---|-----------------|-----------------|--|-----------------|-----------------|
| | | | | | | A | J | K |
| SF4B-F23□<V2> | SF4B-H12□<V2> | SF4B-A6□<V2> | 230 9.055 | 209 8.228 | 201 7.913 | — | — | — |
| SF4B-F31□<V2> | SF4B-H16□<V2> | SF4B-A8□<V2> | 310 12.205 | 289 11.378 | 281 11.063 | — | — | — |
| SF4B-F39□<V2> | SF4B-H20□<V2> | SF4B-A10□<V2> | 390 15.354 | 369 14.528 | 361 14.213 | — | — | — |
| SF4B-F47□<V2> | SF4B-H24□<V2> | SF4B-A12□<V2> | 470 18.504 | 449 17.677 | 441 17.362 | — | — | — |
| SF4B-F55□<V2> | SF4B-H28□<V2> | SF4B-A14□<V2> | 550 21.654 | 529 20.827 | 521 20.512 | — | — | — |
| SF4B-F63□<V2> | SF4B-H32□<V2> | SF4B-A16□<V2> | 630 24.803 | 609 23.976 | 601 23.661 | — | — | — |
| SF4B-F71□<V2> | SF4B-H36□<V2> | SF4B-A18□<V2> | 710 27.953 | 689 27.126 | 681 26.811 | — | — | — |
| SF4B-F79□<V2> | SF4B-H40□<V2> | SF4B-A20□<V2> | 790 31.102 | 769 30.276 | 761 29.961 | 370 14.567 | — | — |
| SF4B-F95□<V2> | SF4B-H48□<V2> | SF4B-A24□<V2> | 950 37.402 | 929 36.575 | 921 36.260 | 450 17.717 | — | — |
| SF4B-F111□<V2> | SF4B-H56□<V2> | SF4B-A28□<V2> | 1,110 43.701 | 1,089 42.874 | 1,081 42.559 | 530 20.866 | — | — |
| SF4B-F127□<V2> | SF4B-H64□<V2> | SF4B-A32□<V2> | 1,270 50.000 | 1,249 49.173 | 1,241 48.858 | 398 15.669 | 822 32.362 | — |
| — | SF4B-H72□<V2> | SF4B-A36□<V2> | 1,430 56.299 | 1,409 55.472 | 1,401 55.157 | 452 17.795 | 928 36.535 | — |
| — | SF4B-H80□<V2> | SF4B-A40□<V2> | 1,590 62.598 | 1,569 61.772 | 1,561 61.457 | 505 19.882 | 1,035 40.748 | — |
| — | SF4B-H88□<V2> | SF4B-A44□<V2> | 1,750 68.898 | 1,729 68.071 | 1,721 67.756 | 413 16.260 | 850 33.465 | 1,288 50.709 |
| — | SF4B-H96□<V2> | SF4B-A48□<V2> | 1,910 75.197 | 1,889 74.370 | 1,881 74.055 | 453 17.835 | 930 36.614 | 1,408 55.433 |

| Model No. | Beam pitch | First beam channel position |
|-------------|-------------|-----------------------------|
| | G | H |
| SF4B-F□<V2> | 10 0.394 | 5 0.197 |
| SF4B-H□<V2> | 20 0.787 | 5 0.197 |
| SF4B-A□<V2> | 40 1.575 | 15 0.591 |

SF4B-□

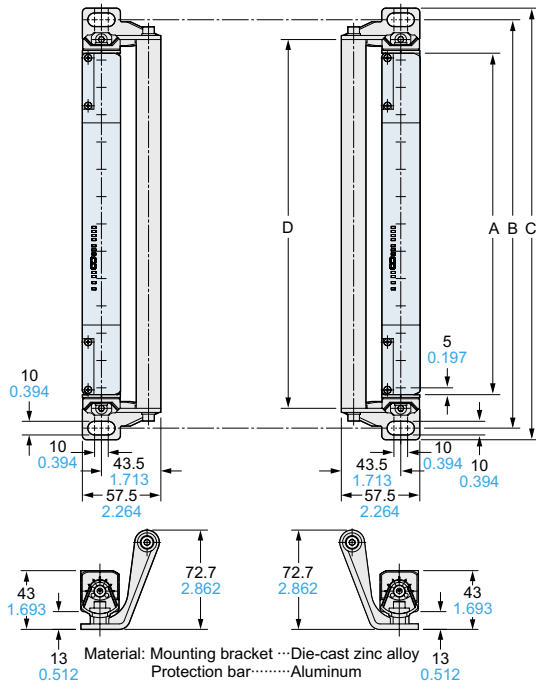
Light curtain

Protection bar set MC-SFBH-□ assembly dimensions

Mounting drawing for the light curtain on which the front protection unit (MC-SFBH-□) is mounted.

<MC-SFBH-□(L)>

<MC-SFBH-□(R)>



Material: Mounting bracket ...Die-cast zinc alloy
Protection bar.....Aluminum
Two brackets (one pc. each of R type and L type),
one protection bar
Two pcs. each of M5 (length 16 mm 0.630 in)
hexagon-socket-head bolts, M5 (length 20 mm 0.787 in)
hexagon-socket-head bolt are attached.

| Model No. | Applicable light curtain model No. | | | A | B | C | D |
|----------------|------------------------------------|---------------|---------------|-----------------|-----------------|-----------------|-----------------|
| MC-SFBH-12(-T) | SF4B-F23□<V2> | SF4B-H12□<V2> | SF4B-A6□<V2> | 230 9.055 | 279 10.984 | 296 11.654 | 250 9.843 |
| MC-SFBH-16(-T) | SF4B-F31□<V2> | SF4B-H16□<V2> | SF4B-A8□<V2> | 310 12.205 | 359 14.134 | 376 14.803 | 330 12.992 |
| MC-SFBH-20(-T) | SF4B-F39□<V2> | SF4B-H20□<V2> | SF4B-A10□<V2> | 390 15.354 | 439 17.283 | 456 17.953 | 410 16.142 |
| MC-SFBH-24(-T) | SF4B-F47□<V2> | SF4B-H24□<V2> | SF4B-A12□<V2> | 470 18.504 | 519 20.433 | 536 21.102 | 490 19.291 |
| MC-SFBH-28(-T) | SF4B-F55□<V2> | SF4B-H28□<V2> | SF4B-A14□<V2> | 550 21.654 | 599 23.583 | 616 24.252 | 570 22.441 |
| MC-SFBH-32(-T) | SF4B-F63□<V2> | SF4B-H32□<V2> | SF4B-A16□<V2> | 630 24.803 | 679 26.732 | 696 27.402 | 650 25.591 |
| MC-SFBH-36(-T) | SF4B-F71□<V2> | SF4B-H36□<V2> | SF4B-A18□<V2> | 710 27.953 | 759 29.882 | 776 30.551 | 730 28.740 |
| MC-SFBH-40(-T) | SF4B-F79□<V2> | SF4B-H40□<V2> | SF4B-A20□<V2> | 790 31.102 | 839 33.031 | 856 33.701 | 810 31.890 |
| MC-SFBH-48(-T) | SF4B-F95□<V2> | SF4B-H48□<V2> | SF4B-A24□<V2> | 950 37.402 | 999 39.331 | 1,016 40.000 | 970 38.189 |
| MC-SFBH-56(-T) | SF4B-F111□<V2> | SF4B-H56□<V2> | SF4B-A28□<V2> | 1,110 43.701 | 1,159 45.630 | 1,176 46.299 | 1,130 44.488 |
| MC-SFBH-64(-T) | SF4B-F127□<V2> | SF4B-H64□<V2> | SF4B-A32□<V2> | 1,270 50.000 | 1,319 51.929 | 1,336 52.598 | 1,290 50.787 |
| MC-SFBH-72(-T) | — | SF4B-H72□<V2> | SF4B-A36□<V2> | 1,430 56.299 | 1,479 58.228 | 1,496 58.898 | 1,450 57.087 |
| MC-SFBH-80(-T) | — | SF4B-H80□<V2> | SF4B-A40□<V2> | 1,590 62.598 | 1,639 64.527 | 1,656 65.197 | 1,610 63.386 |
| MC-SFBH-88(-T) | — | SF4B-H88□<V2> | SF4B-A44□<V2> | 1,750 68.898 | 1,799 70.827 | 1,816 71.496 | 1,770 69.685 |
| MC-SFBH-96(-T) | — | SF4B-H96□<V2> | SF4B-A48□<V2> | 1,910 75.197 | 1,959 77.126 | 1,976 77.795 | 1,930 75.984 |

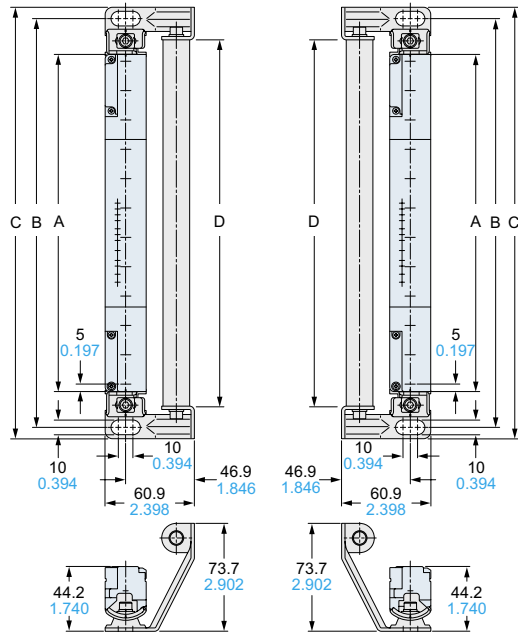
Protection bar set for rear / side mounting MC-SFBH-□-T assembly dimensions

Mounting drawing for the light curtain on which the front protection unit (MC-SFBH-□-T) is mounted.

Rear mounting

<MC-SFBH-□-T(L)>

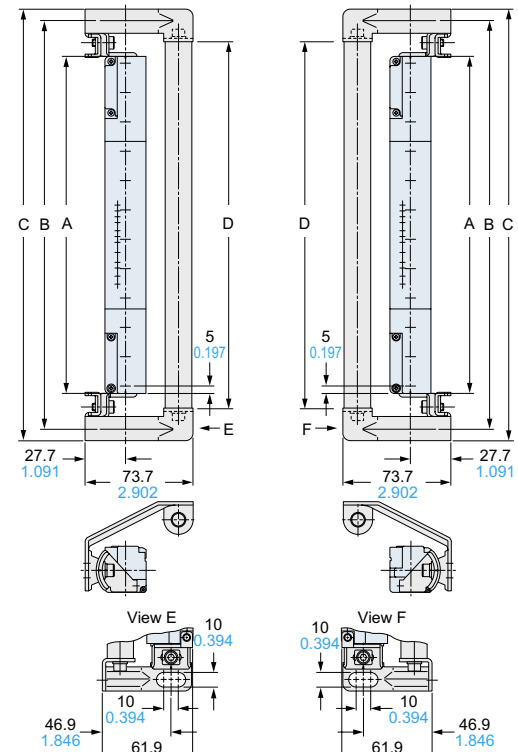
<MC-SFBH-□-T(R)>



Side mounting

<MC-SFBH-□-T(L)>

<MC-SFBH-□-T(R)>



Material: Mounting bracket ...Iron (Trivalent chrome plated)
Protection bar.....Aluminum

Two brackets (one pc. each of R type and L type),
one protection bar

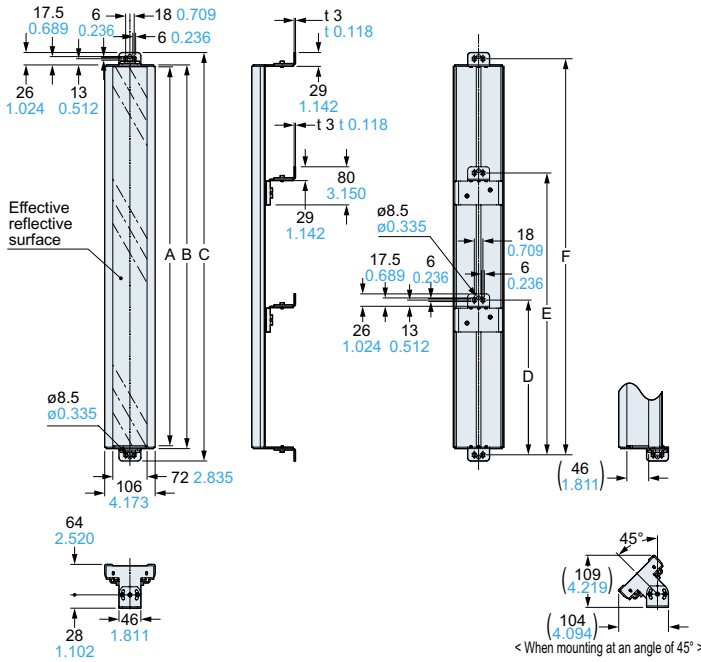
Two pcs. each of M5 (length 18 mm 0.709 in)
hexagon-socket-head bolts, M5 (length 20 mm 0.787 in)
hexagon-socket-head bolt are attached.

DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from the SUNX website: <http://www.sunx.com>

RF-SFBH-□

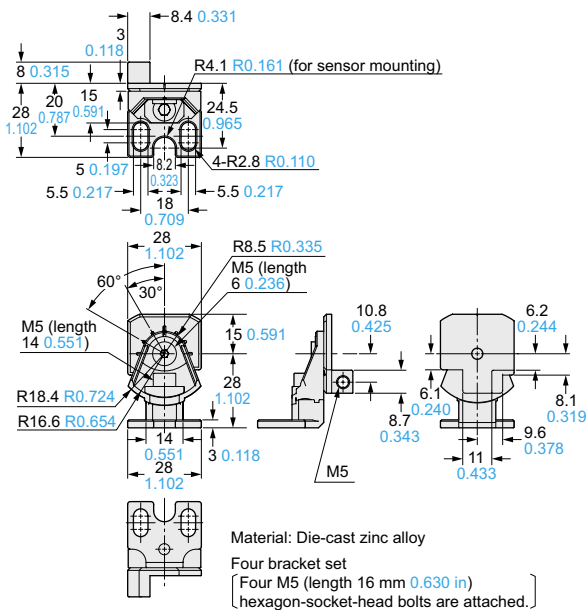
Corner mirror (Optional)



| Model No. | A | B | C | D | E | F | Net weight |
|-------------------|-----------------|-----------------|-----------------|--------------------------|----------------------------|-----------------|-----------------|
| RF-SFBH-12 | 236 9.291 | 246 9.685 | 298 11.732 | — | — | 272 10.709 | 970 g approx. |
| RF-SFBH-16 | 316 12.441 | 326 12.835 | 378 14.882 | — | — | 352 13.858 | 1,170 g approx. |
| RF-SFBH-20 | 396 15.591 | 406 15.984 | 458 18.031 | — | — | 432 17.008 | 1,370 g approx. |
| RF-SFBH-24 | 476 18.740 | 486 19.134 | 538 21.181 | — | — | 512 20.157 | 1,570 g approx. |
| RF-SFBH-28 | 556 21.890 | 566 22.283 | 618 24.331 | — | — | 592 23.307 | 1,770 g approx. |
| RF-SFBH-32 | 636 25.039 | 646 25.433 | 698 27.480 | — | — | 672 26.457 | 1,970 g approx. |
| RF-SFBH-36 | 716 28.189 | 726 28.583 | 778 30.630 | — | — | 752 29.606 | 2,170 g approx. |
| RF-SFBH-40 | 796 31.339 | 806 31.732 | 858 33.779 | 458 ±50 18.031 ±1.969 | — | 832 32.756 | 2,660 g approx. |
| RF-SFBH-48 | 956 37.638 | 966 38.031 | 1,018 40.079 | 538 ±50 21.181 ±1.969 | — | 992 39.055 | 3,060 g approx. |
| RF-SFBH-56 | 1,116 43.937 | 1,126 44.331 | 1,178 46.378 | 618 ±50 24.331 ±1.969 | — | 1,152 45.354 | 3,460 g approx. |
| RF-SFBH-64 | 1,276 50.236 | 1,286 50.630 | 1,338 52.677 | 698 ±50 27.480 ±1.969 | — | 1,312 51.653 | 3,890 g approx. |
| RF-SFBH-72 | 1,436 56.535 | 1,446 56.929 | 1,498 58.976 | 538 ±50 21.181 ±1.969 | 1,018 ±50 40.079 ±1.969 | 1,472 57.953 | 4,550 g approx. |
| RF-SFBH-80 | 1,596 62.835 | 1,606 63.228 | 1,658 65.275 | 591 ±50 23.268 ±1.969 | 1,125 ±50 44.291 ±1.969 | 1,632 64.252 | 4,950 g approx. |
| RF-SFBH-88 | 1,756 69.134 | 1,766 69.527 | 1,818 71.575 | 645 ±50 25.394 ±1.969 | 1,231 ±50 48.464 ±1.969 | 1,792 70.551 | 5,350 g approx. |
| RF-SFBH-96 | 1,916 75.433 | 1,926 75.827 | 1,978 77.874 | 698 ±50 27.480 ±1.969 | 1,338 ±50 52.677 ±1.969 | 1,952 76.850 | 5,750 g approx. |

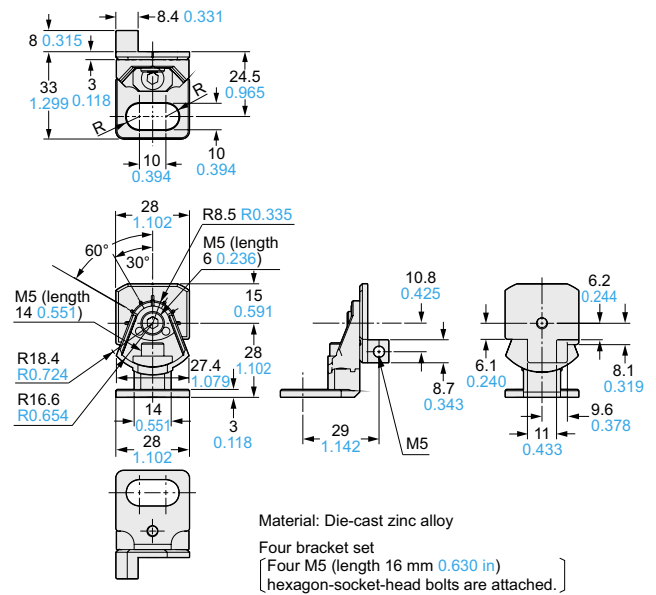
MS-SFB-1

Standard mounting bracket (Optional)



MS-SFB-1-T

M8 mounting bracket (Optional)

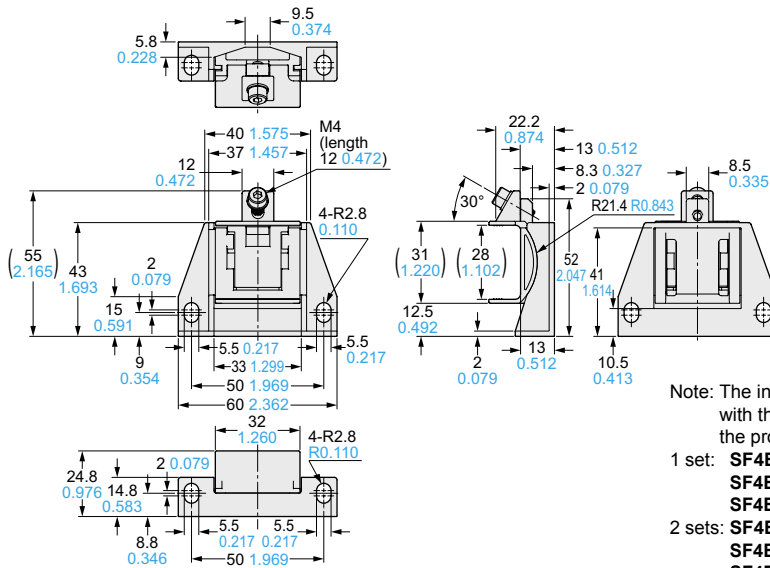


DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from the SUNX website: <http://www.sunx.com>

MS-SFB-2

Intermediate supporting bracket (Accessory for light curtain)



Material: Die-cast zinc alloy

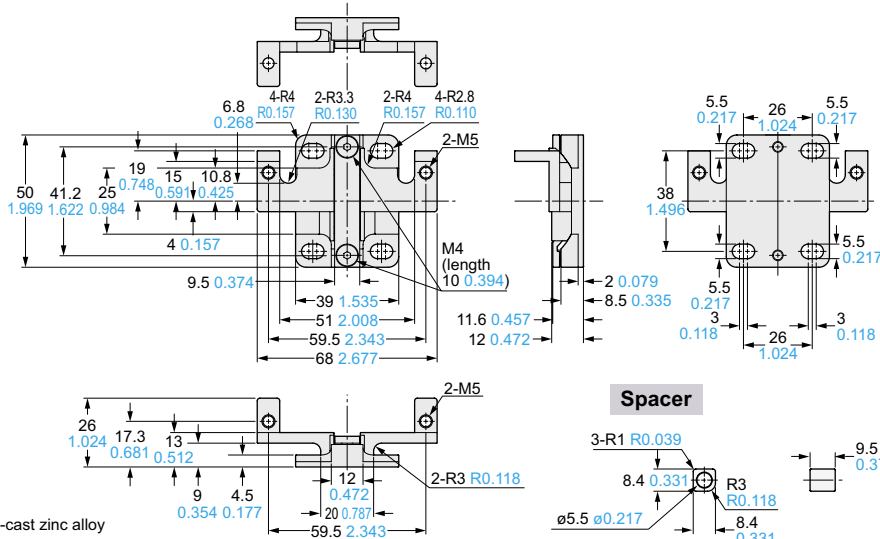
Note: The intermediate supporting bracket (MS-SFB-2) is enclosed with the following products. The quantity differs depending on the product as shown below:

- 1 set: SF4B-F□<V2> ... Light curtain with 79 to 111 beam channels
- SF4B-H□<V2> ... Light curtain with 40 to 56 beam channels
- SF4B-A□<V2> ... Light curtain with 20 to 28 beam channels
- 2 sets: SF4B-F127<V2>
- SF4B-H□<V2> ... Light curtain with 64 to 80 beam channels
- SF4B-A□<V2> ... Light curtain with 32 to 40 beam channels
- 3 sets: SF4B-H□<V2> ... Light curtain with 88 to 96 beam channels
- SF4B-A□<V2> ... Light curtain with 44 to 48 beam channels

MS-SFB-3

Dead zoneless mounting bracket (Optional)

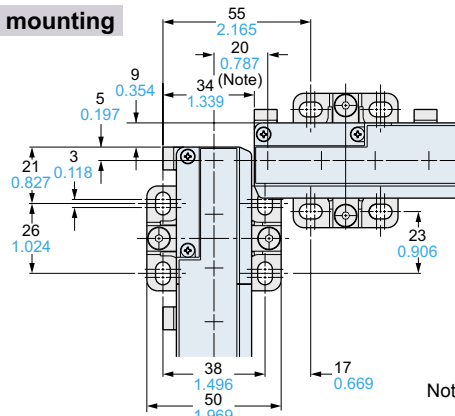
Main body



Material: Die-cast zinc alloy

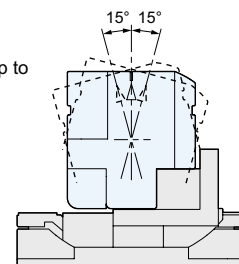
Four bracket set
 Four M5 (length 25 mm 0.984 in) hexagon-socket-head bolts and four spacers are attached.

L-shaped mounting



Mounting adjustment range

The adjustment range of the light curtain angle is up to ±15 degrees.



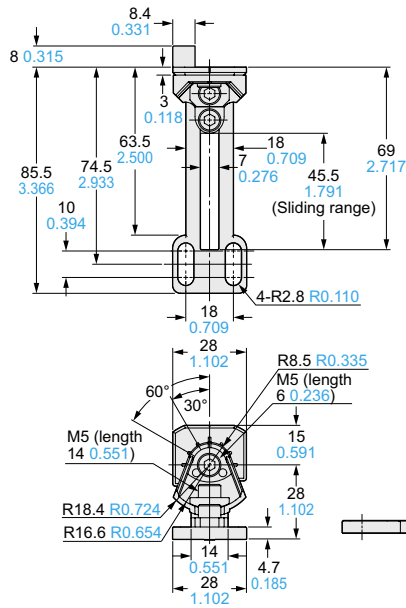
Note: The finger protection type has a beam pitch of 10 mm 0.394 in, which produces a dead zone. Additional measures will be required, such as using a protection cover.

DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from the SUNX website: <http://www.sunx.com>

MS-SFB-4

Pitch adapter bracket (Optional)

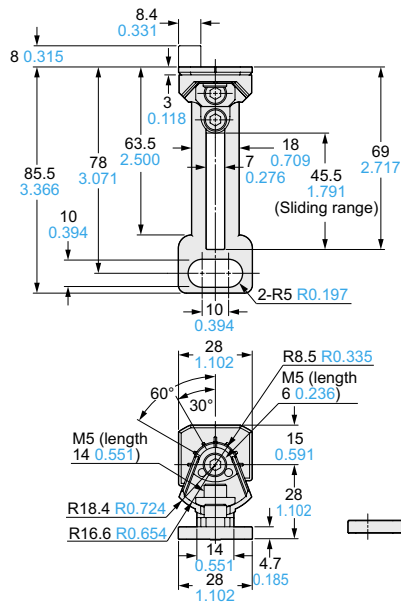


Material: Die-cast zinc alloy

Four bracket set
 [Four M5 (length 16 mm 0.630 in)
 hexagon-socket-head bolts are attached.]

MS-SFB-4-T

M8 pitch adapter bracket (Optional)

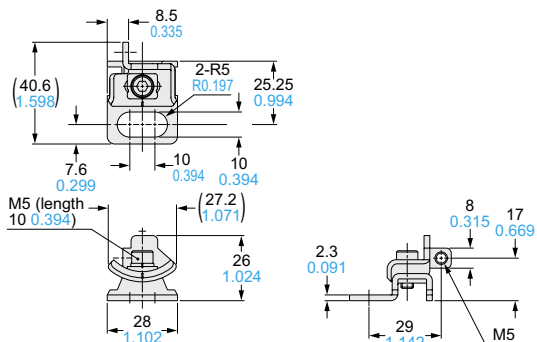


Material: Die-cast zinc alloy

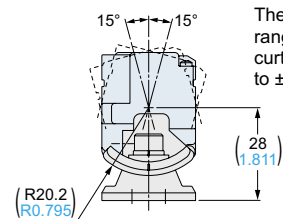
Four bracket set
 [Four M5 (length 16 mm 0.630 in)
 hexagon-socket-head bolts are attached.]

MS-SFB-7-T MS-SFB-1-T2 (Rear mounting)

M8 rear mounting bracket (Optional) M8 rear / side mounting brackets set (Optional)



Mounting adjustment range



The adjustment range of the light curtain angle is up to ±15 degrees.

Material: Iron (Trivalent chrome plated)

Four bracket set
 [Four M5 (length 18 mm 0.709 in)
 hexagon-socket-head bolts are attached.]

DIMENSIONS (Unit: mm in)

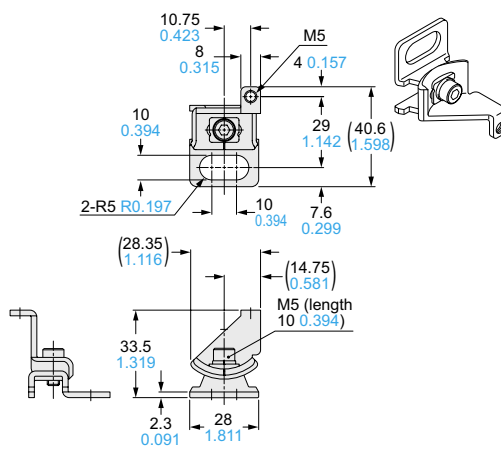
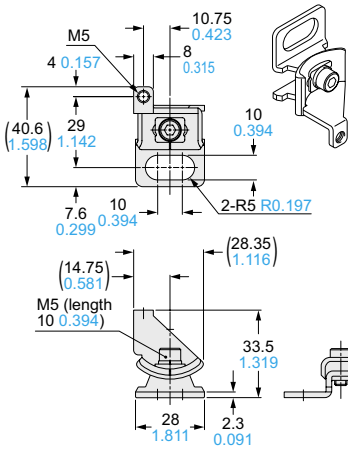
The CAD data in the dimensions can be downloaded from the SUNX website: <http://www.sunx.com>

MS-SFB-8-T MS-SFB-1-T2 (Side mounting)

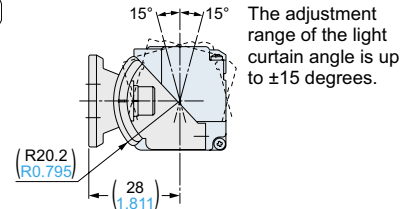
M8 side mounting bracket (Optional) M8 rear / side mounting brackets set (Optional)

<MS-SFB-8-T(R)>

<MS-SFB-8-T(L)>



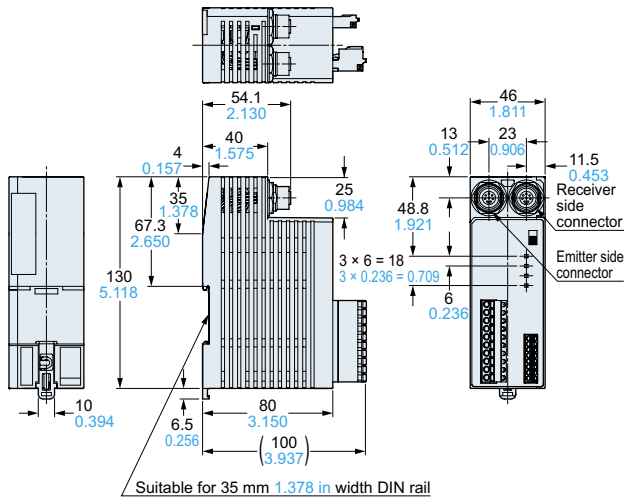
Mounting adjustment range



Material: Iron (Trivalent chrome plated)
 Four bracket (two pcs. each of R type and L type set)
 [Four M5 (length 18 mm 0.709 in) hexagon-socket-head bolts are attached.]

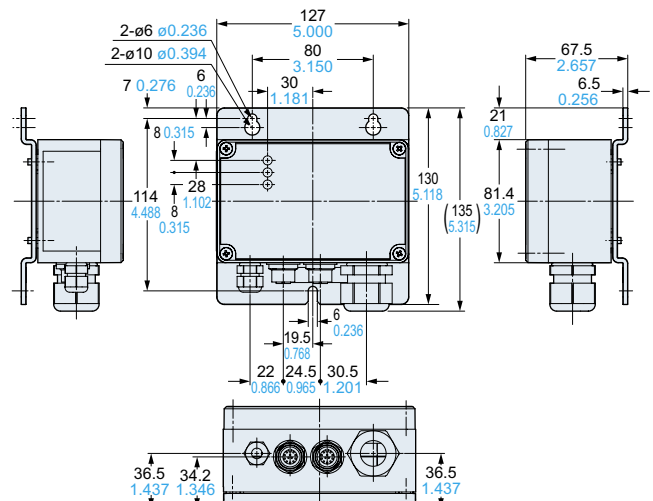
SF-C11

Control unit (Optional)



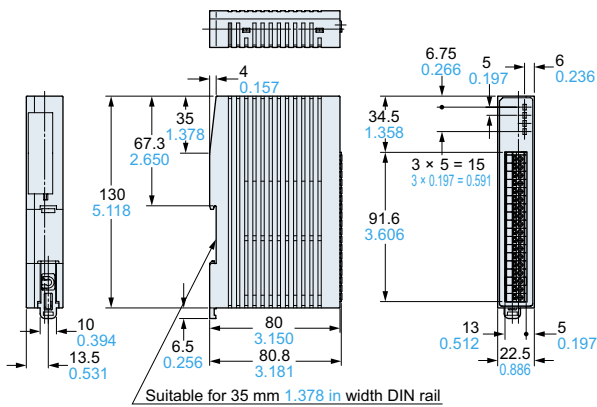
SF-C12

Control unit (Optional)



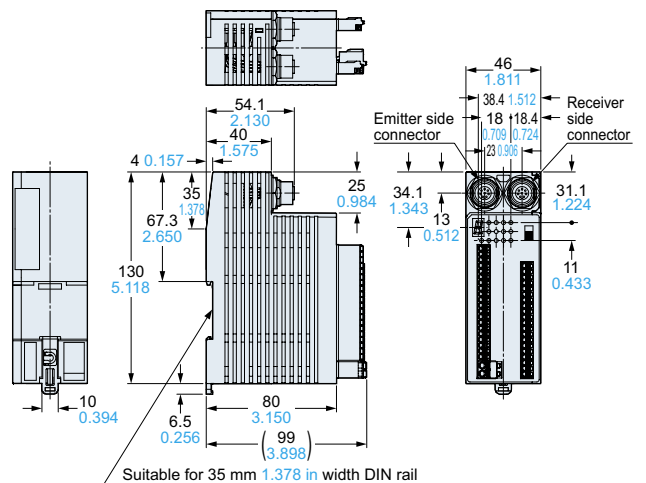
SF-C13

Control unit (Optional)



SF-C14EX(-01)

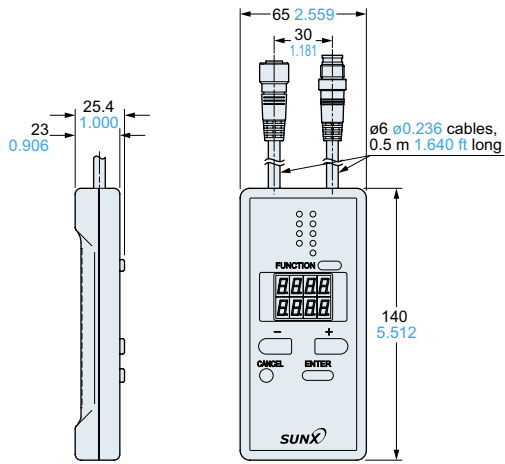
Application expansion unit (Optional)



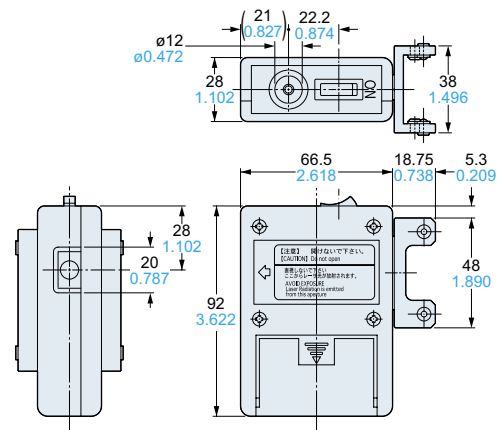
DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from the SUNX website: <http://www.sunx.com>

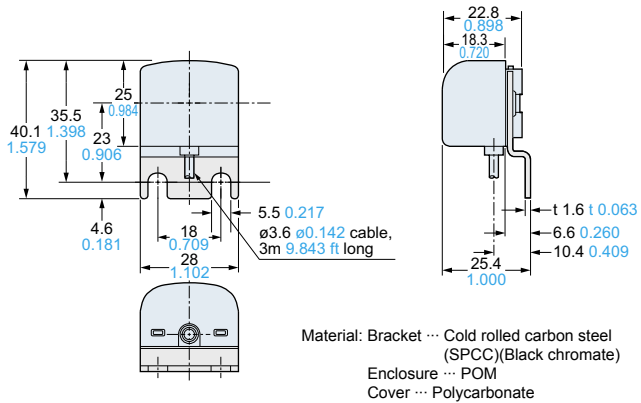
SFB-HC Handy-controller (Optional)



SF-LAT-2N Laser alignment tool (Optional)



SF-IND-2 Large display unit for light curtain (Optional)



Main points of difference from previous model

Other than the following items, there are no changes in specifications and prices, etc.

[Degree of protection]: IP65, IP67 (IEC)
(Previous model has IP65 only)

[Appearance]: Adopting the seamless structure of improved environmental resistance performance, there is a minor change in appearance, but there is no change in usage such as mounting.

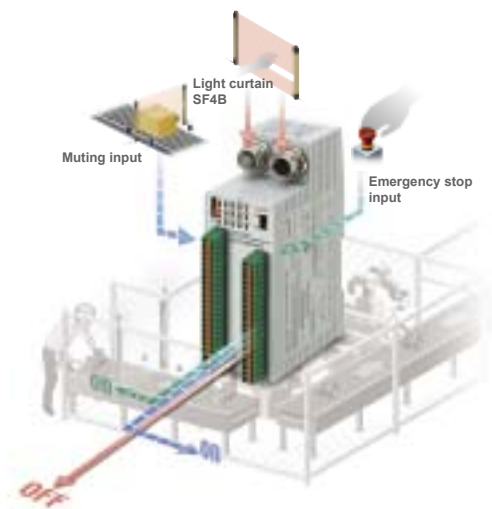
[Model No.]: Model Nos. are added with a suffix <V2>
(e.g.) SF4B-F23 becomes "SF4B-F23<V2>"
SF4B-F23-01 becomes "SF4B-F23-01<V2>"

* Caution

We plan on acquiring the China safety regulation (GB: Technical requirements for light type safety device used for the presses) and Korea S-mark certification in near future. Previous models will continue for sale, so please purchase the previous SF4B series when used as a press machine in China or when used in Korea.

Expanding the possibilities for light curtains

Muting & Emergency stop & Semi-conductor output



APPLICATION EXPANSION UNIT FOR SF4B SERIES

SF-C14EX SERIES

Building of muting control circuits is easy

- The method used to build the safety circuit is selectable

Three safety circuit systems can be controlled independently so that equipment can be stopped all together or partially

- Motors that use muting control and those that do not use it can be controlled independently!
- Three safety circuit systems packaged into a single unit!
- High-speed response 14 ms (Including light curtain)

Detailed functions that support easier installation and maintenance

- Semiconductor output reduces running costs!
- Supports both PNP and NPN polarities
- Equipped with a digital indicator so that error details can be understood at a glance!

All information is subject to change without prior notice.



<http://www.sunx.com>

SUNX Limited

2431-1 Ushiyama-cho, Kasugai-shi, Aichi,
486-0901, Japan
Phone: +81-568-33-7211
FAX: +81-568-33-2631

Overseas Sales Division

Phone: +81-568-33-7861
FAX: +81-568-33-8591