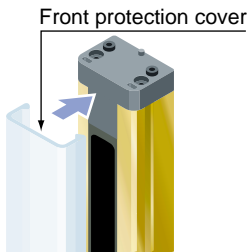


## Thorough sensor protection measures have also been implemented

### Front protection cover protects the sensing surface

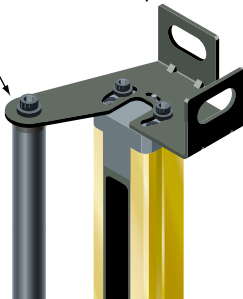
In the event that the SF4-AH series is installed in a harsh environment, the use of the front protection cover (FC-SF4A-H□, optional) will protect the sensing surface from damage.



### Impact protection for the sensing surface

A front protection unit is now available that will prevent damage to the sensing surface, due to impacts from objects sensed (optional).

Front protection unit



### Spatter protection for the sensing surface

The spatter protection hood type, now available, protects the sensing surface from welding machine spatter. Moreover, a front protection cover that can be installed within the sensor casing is also available, completely preventing spatter from adhering to the sensing surface.

In addition, even though sensed objects may contact the sensor, the sensing surface will be protected. As well, the ELCA function implements all possible measures to prevent malfunctions caused by spatter.

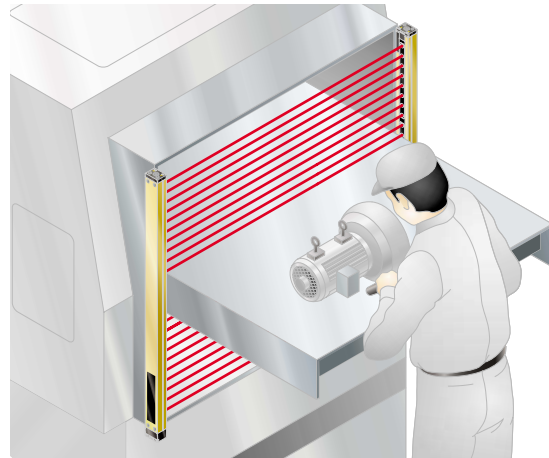


Our product line-up now includes a Handy-controller that enables the user to select a variety of settings. Function settings can be easily performed by anyone.

### Any valid beam channels can be selected!

### The SF4-AH series now incorporates a fixed blanking function.

The SF4-AH series is equipped with a fixed blanking function that allows specific beam channels to be selectively blocked, without causing the control output (OSSD) to output the OFF signal. This function is convenient for use with applications in which certain fixed obstacles always 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.



### Automatic blanking of beam channels!

### The SF4-AH series now 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 number of preset beam channels, then the control output (OSSD) will not output the OFF signal. This function is useful in the event that the positions of obstacles within the sensing area must be changed during work-piece re-arrangement, or when material must be thrown through the light curtain's sensing area.

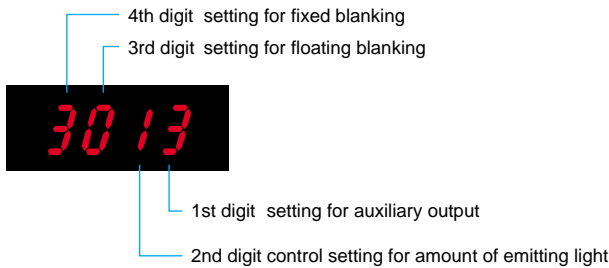


### ■ Minimum size of objects detected

When 1 beam channel has been preset:  $\phi$  50 mm  $\phi$  1.969 in  
 When 2 beam channels have been preset:  $\phi$  70 mm  $\phi$  2.756 in  
 When 3 beam channels have been preset:  $\phi$  90 mm  $\phi$  3.543 in

## Each function can be directly preset using numeric input! Code selection function

Each function can be selected directly by using only a 4-digit code (numeral) in accordance with the code table.



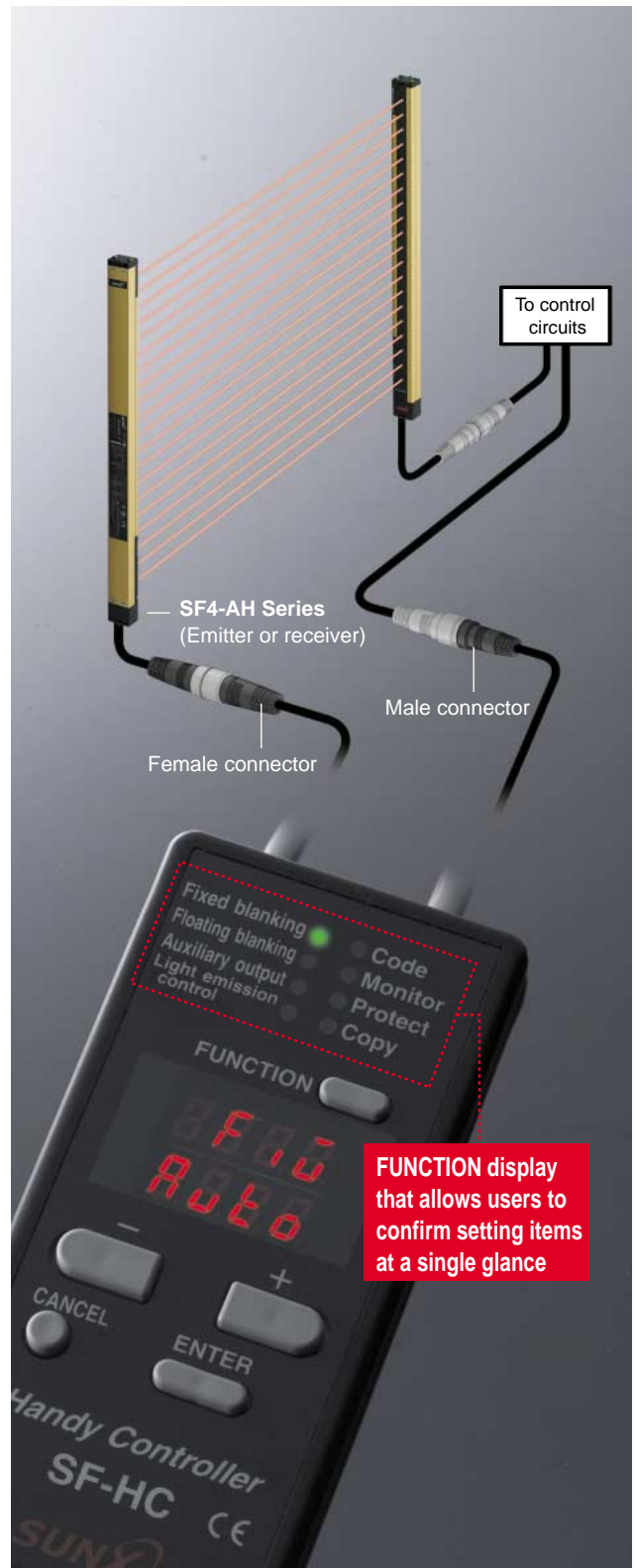
Code	4th digit	3rd digit	2nd digit	1st digit
	Fixed blanking	Floating blanking	Control for amount of emitting light	Auxiliary output
0	Invalid	Invalid	Invalid	Reverse action of control output
1	Valid / auto setting	Number of beam channel preset = 1 Invalid setting for both beam channel ends = invalid	Valid	Same action as control output
2	—	Number of beam channel preset = 2 Invalid setting for both beam channel ends = invalid	—	When light is not being emitted (at time of lockout): ON
3	—	Number of beam channel preset = 3 Invalid setting for both beam channel ends = invalid	—	When light is not being emitted (at time of lockout): OFF
1	—	Number of beam channel preset = 1 Invalid setting for both beam channel ends = valid	—	—
2	—	Number of beam channel preset = 2 Invalid setting for both beam channel ends = valid	—	—
3	—	Number of beam channel preset = 3 Invalid setting for both beam channel ends = valid	—	—

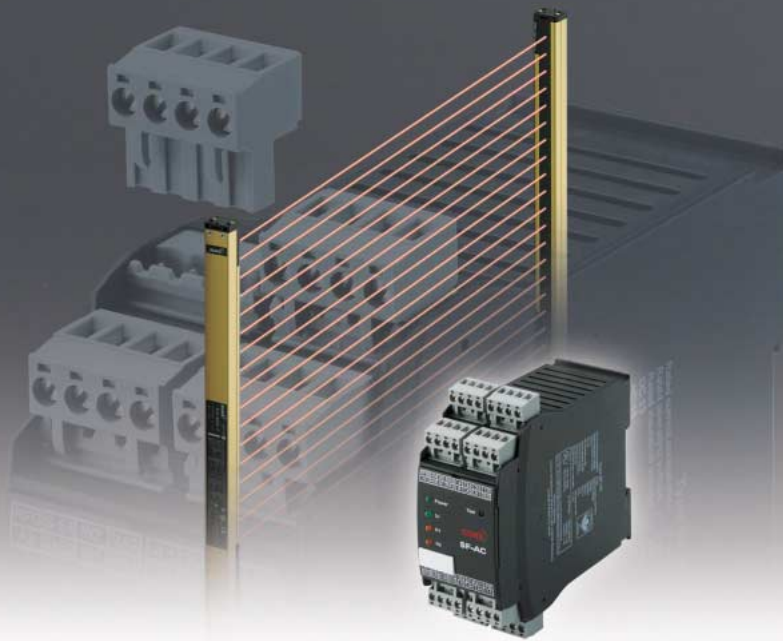
## Auxiliary output has selectable output configuration

The output configuration of the auxiliary output can be changed. The output is selectable from among the following configurations: same action as control output; reverse action of control output; ON when light is not being emitted (at time of lockout); and OFF when light is not being emitted (at time of lockout).

## A variety of other functions can be selected

- Control for amount of emitting light**  
 This function reduces the amount of emitting light. It is useful when the effects from emitted light on other equipment must be minimized. (operating range 5 m 16.404 ft)
- Monitoring function of settings details**  
 This function allows the user to confirm the details of each sensor setting.
- Protection function**  
 This function locks the sensor using a four-digit password. This function will not allow changes to sensor function settings unless the password is input, thus preventing third parties from accidentally changing the settings.
- Copy function**  
 Allows settings details to be copied into other sensors. In the event that the same setting must be input several times into different sensors, this function will reduce the time required for the input of settings.

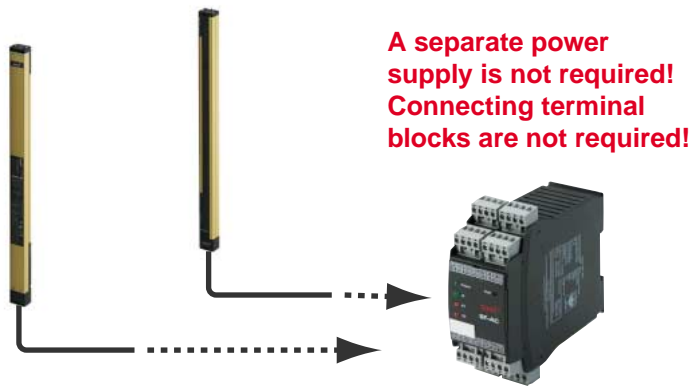




## The SF-AC, a exclusive safety relay unit for the light curtain, will be also available Safety will be enhanced even further

### A separate power supply and connecting terminal blocks are not needed

As **SF-AC** incorporates a power supply for the light curtain, as well as terminals for synchronization lines, neither a separate power supply nor terminal blocks are required.



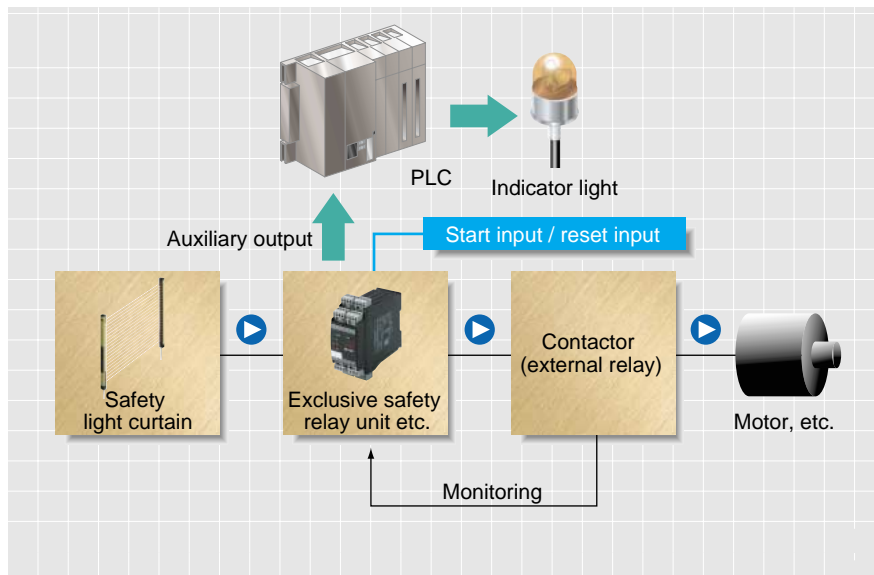
### Installation time and labor can be saved due to the usage of detachable terminal blocks

As wiring can be performed with the terminal blocks removed, it is not necessary to detach the controller from the control panel when performing maintenance, thus reducing the number of installation procedures required.



### Incorporates a 2-channel auxiliary output

**SF-AC** incorporates both an auxiliary output that operates together with the light curtain's OSSD, and an alarm output that functions together with the light curtain's auxiliary output (non-safety output). These features allow for monitoring of light curtain activity.



### Maintenance free

As **SF-AC** employs hybrid fuses, fuse replacement is not necessary.

### 10 ms high-speed response

The fastest response time for a relay output, 10 ms, has now been achieved. **SF-AC**, together with the fast-responding the **SF4-AH** series, further improves sensor safety.

### A contact point mechanical lifetime of 10 million operations has now been achieved

Longer usage is possible due to the long contact point lifetime.

ORDER GUIDE

**Sensors** Mating cable is not supplied with the sensor. Please order it separately.

Type	Appearance	Operating range	Model No.	Number of beam channels	Protective height (mm) (in)
Normal case			SF4-AH8	8	190 7.48
			SF4-AH12	12	270 10.63
			SF4-AH16	16	350 13.78
			SF4-AH20	20	430 16.929
			SF4-AH24	24	510 20.079
			SF4-AH28	28	590 23.228
			SF4-AH32	32	670 26.378
			SF4-AH36	36	750 29.528
			SF4-AH40	40	830 32.677
			SF4-AH48	48	990 38.976
			SF4-AH56	56	1,150 45.276
			SF4-AH64	64	1,310 51.575
			SF4-AH72	72	1,470 57.874
			SF4-AH80	80	1,630 64.173
			SF4-AH88	88	1,790 70.472
			With spatter protection hood		0.3 to 7 m 0.984 to 22.966 ft
SF4-AH12-H	12	270 10.63			
SF4-AH16-H	16	350 13.78			
SF4-AH20-H	20	430 16.929			
SF4-AH24-H	24	510 20.079			
SF4-AH28-H	28	590 23.228			
SF4-AH32-H	32	670 26.378			
SF4-AH36-H	36	750 29.528			
SF4-AH40-H	40	830 32.677			
SF4-AH48-H	48	990 38.976			
SF4-AH56-H	56	1,150 45.276			
SF4-AH64-H	64	1,310 51.575			
SF4-AH72-H	72	1,470 57.874			
SF4-AH80-H	80	1,630 64.173			
SF4-AH88-H	88	1,790 70.472			
SF4-AH96-H	96	1,950 76.772			

Exclusive safety relay unit

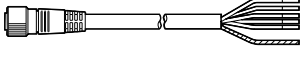
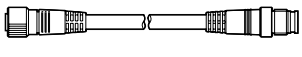
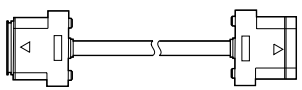
Designation	Appearance	Model No.
Safety relay unit		SF-AC

Handy-controller

Designation	Appearance	Model No.
Handy-controller		SF-HC

## ORDER GUIDE

### Mating cables

Designation	Appearance	Model No.	Description
Cable with connector on one end		<b>SF4A-CC3</b>	Length: 3 m <b>9.843 ft</b> Weight: 190 g <b>6.702 oz</b> approx. (one cable)
		<b>SF4A-CC7</b>	Length: 7 m <b>22.966 ft</b> Weight: 400 g <b>14.11 oz</b> approx. (one cable)
		<b>SF4A-CC10</b>	Length: 10 m <b>32.808 ft</b> Weight: 570 g <b>20.106 oz</b> approx. (one cable)
Cable with connector on both ends		<b>SF4A-CCJ10</b>	Length: 10 m <b>32.808 ft</b> Weight: 590 g <b>20.812 oz</b> approx. (one cable)
Cable for series connection		<b>SF4A-CSL02</b>	Length: 200 mm <b>7.874 in</b> Weight: 35 g <b>1.235 oz</b> approx. (one cable)
		<b>SF4A-CSL05</b>	Length: 500 mm <b>19.685 in</b> Weight: 50 g <b>1.764 oz</b> approx. (one cable)
		<b>SF4A-CSL10</b>	Length: 1 m <b>3.281 ft</b> Weight: 80 g <b>2.822 oz</b> approx. (one cable)
		<b>SF4A-CSL30</b>	Length: 3 m <b>9.843 ft</b> Weight: 190 g <b>6.702 oz</b> approx. (one cable)

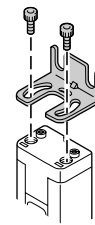
Note: Note that the dimensions of the SF4-AH series will change when using the cable for series connection (SF4A-CSL□). Refer to 'DIMENSIONS' on P.20 and P.22.

### Spare parts (Accessories for sensor)

Designation	Model No.	Description
Rear mounting bracket	<b>MS-SF2N-1</b>	Used to mount the sensor on the rear surface (1 set for emitter and receiver)
U-shaped rear mounting intermediate supporting bracket (Note)	<b>MS-SF2N-2</b>	For SF4-AH□ Used to hold the sensor at the intermediate position for protection against vibration (for rear surface mounting) (1 set for emitter and receiver)
	<b>MS-SF4A-H2</b>	For SF4-AH□-H
L-shaped intermediate supporting bracket (Note)	<b>MS-SF2N-L</b>	Used to install the intermediate supporting bracket on the wall side, etc. (1 set for emitter and receiver)
Test rod	<b>SF4-AH-TR</b>	Used for standard sensing to detect the smallest objects (φ30 mm φ1.181 in), with 20 mm 0.787 in beam pitch

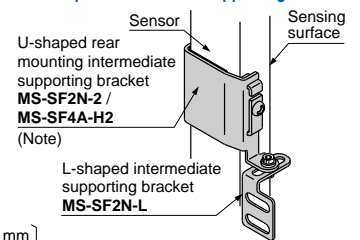
Note: The number of sets required varies depending on the product. Refer to 'DIMENSIONS' on P.23 and P.24 for further details.

### Rear mounting bracket



Four bracket set  
Eight M3 (length 5 mm 0.197 in) hexagon-socket-head bolts are attached.

### U-shaped rear mounting intermediate supporting bracket L-shaped intermediate supporting bracket



Note: The above diagram is only applicable to the MS-SF2N-2. The MS-SF4A-H2 has a different shape.

- **MS-SF2N-2 / MS-SF4A-H2**  
Set of 2 Nos. each of U-shaped rear supporting bracket and retaining plate

- **MS-SF2N-L**  
Two L-shaped bracket set  
Two M3 (length 10 mm 0.394 in) pan head screws, two M4 (length 10 mm 0.394 in) hexagon-socket-head bolts and two nuts are attached.

OPTIONS

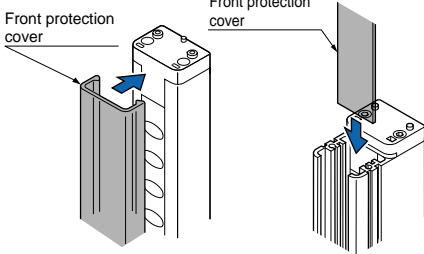
Applicable beam channels		8 beam channels	12 beam channels	16 beam channels	20 beam channels	24 beam channels	28 beam channels	32 beam channels	36 beam channels	40 beam channels	48 beam channels	56 beam channels	64 beam channels	72 beam channels	80 beam channels	88 beam channels	96 beam channels
Front protection cover	For SF4-AH□	Model No. FC-SF4A-H8	FC-SF4A-H12	FC-SF4A-H16	FC-SF4A-H20	FC-SF4A-H24	FC-SF4A-H28	FC-SF4A-H32	FC-SF4A-H36	FC-SF4A-H40	FC-SF4A-H48	FC-SF4A-H56	FC-SF4A-H64	FC-SF4A-H72	FC-SF4A-H80	FC-SF4A-H88	FC-SF4A-H96
	For SF4-AH□-H	Model No. FC-SF4A-H8-H	FC-SF4A-H12-H	FC-SF4A-H16-H	FC-SF4A-H20-H	FC-SF4A-H24-H	FC-SF4A-H28-H	FC-SF4A-H32-H	FC-SF4A-H36-H	FC-SF4A-H40-H	FC-SF4A-H48-H	FC-SF4A-H56-H	FC-SF4A-H64-H	FC-SF4A-H72-H	FC-SF4A-H80-H	FC-SF4A-H88-H	FC-SF4A-H96-H
Slit mask	For SF4-AH□	Model No. OS-SF4A-H8	OS-SF4A-H12	OS-SF4A-H16	OS-SF4A-H20	OS-SF4A-H24	OS-SF4A-H28	OS-SF4A-H32	OS-SF4A-H36	OS-SF4A-H40	OS-SF4A-H48	OS-SF4A-H56	OS-SF4A-H64	OS-SF4A-H72	OS-SF4A-H80	OS-SF4A-H88	OS-SF4A-H96
	For SF4-AH□-H	Model No. OS-SF4A-H8-H	OS-SF4A-H12-H	OS-SF4A-H16-H	OS-SF4A-H20-H	OS-SF4A-H24-H	OS-SF4A-H28-H	OS-SF4A-H32-H	OS-SF4A-H36-H	OS-SF4A-H40-H	OS-SF4A-H48-H	OS-SF4A-H56-H	OS-SF4A-H64-H	OS-SF4A-H72-H	OS-SF4A-H80-H	OS-SF4A-H88-H	OS-SF4A-H96-H
Front protection unit	Model No.	MC-SF4AH-8	MC-SF4AH-12	MC-SF4AH-16	MC-SF4AH-20	MC-SF4AH-24	MC-SF4AH-28	MC-SF4AH-32	MC-SF4AH-36	MC-SF4AH-40	MC-SF4AH-48	MC-SF4AH-56	MC-SF4AH-64	MC-SF4AH-72	MC-SF4AH-80	MC-SF4AH-88	MC-SF4AH-96

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

Front protection cover

• FC-SF4A-H□

• FC-SF4A-H□-H

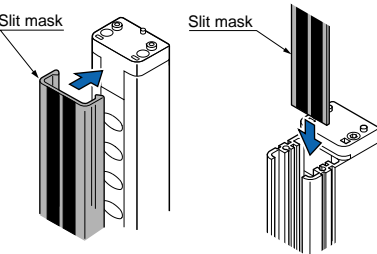


It protects sensing surface

Slit mask

• OS-SF4A-H□

• OS-SF4A-H□-H



The slit mask restrains the amount of beam emitted or received and hence reduces the interference between neighbouring sensors. However, the operating range reduces when the slit mask is used.

Operating range

In case of mounting OS-SF4A-H□

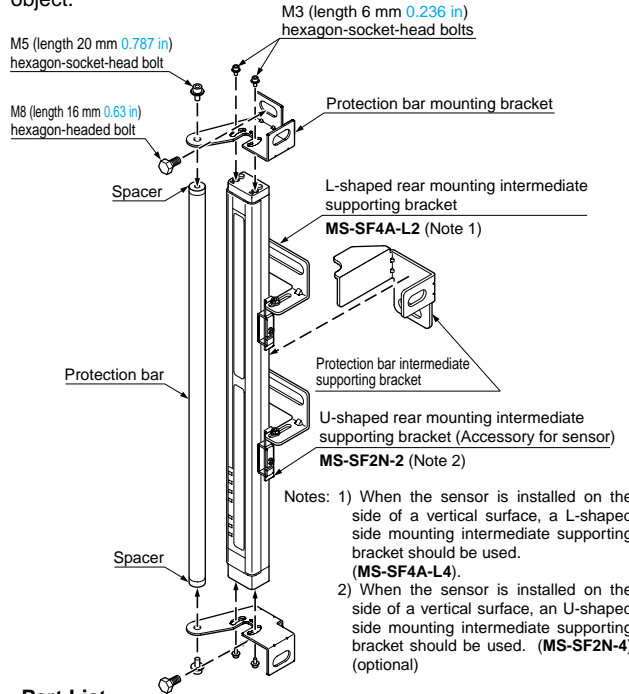
- Slit on the emitter side: 4 m 13.123 ft
- Slit on the receiver side: 3 m 9.843 ft
- Slit on both sides: 2 m 6.562 ft

In case of mounting OS-SF4A-H□-H

- Slit on the emitter side: 3 m 9.843 ft
- Slit on the receiver side: 3 m 9.843 ft
- Slit on both sides: 1.5 m 4.921 ft

Front protection unit

It protects sensing surface from damage due to striking of an object.



Notes: 1) When the sensor is installed on the side of a vertical surface, a L-shaped side mounting intermediate supporting bracket should be used. (MS-SF4A-L4).  
2) When the sensor is installed on the side of a vertical surface, an U-shaped side mounting intermediate supporting bracket should be used. (MS-SF2N-4) (optional)

• Part List

Designation	Model No.	Number	Remarks
Protection bar	—	1 No.	Material: Aluminum
Protection bar mounting bracket	—	2 Nos.	Material: Cold rolled carbon steel (SPCC)
Protection bar intermediate supporting bracket	—	1 No. (Note 1)	Material: Cold rolled carbon steel (SPCC)
L-shaped rear mounting intermediate supporting bracket	MS-SF4A-L2	0 to 5 Nos. (Note 2)	Material: Cold rolled carbon steel (SPCC)
L-shaped side mounting intermediate supporting bracket	MS-SF4A-L4	0 to 5 Nos. (Note 2)	Material: Cold rolled carbon steel (SPCC)
Spacer	—	2 Nos.	Material: Aluminum
M5 hexagon-socket-head bolt	—	2 Nos.	Length 20 mm 0.787 in
M3 hexagon-socket-head bolt	—	4 Nos.	Length 6 mm 0.236 in
M8 hexagon-headed bolt	—	2 to 8 Nos. (Note 2)	Length 16 mm 0.63 in

Notes: 1) The protection bar intermediate supporting bracket is attached with the front protection unit for 40 beam channels or more.

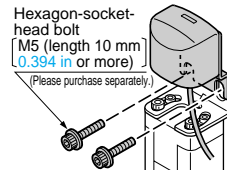
2) The number of accessories varies depending on the product. Refer to 'DIMENSIONS' on P.26 for further details.

## OPTIONS

Designation	Model No.	Description
Large display unit for light curtain	<b>SF-IND-2</b>	<p>With the large indicators put on the light curtain, the operation is easily observable from various directions.</p> <p><b>Specifications</b></p> <ul style="list-style-type: none"> <li>Supply voltage: 24 V DC <math>\pm 15\%</math></li> <li>Current consumption: 12 mA or less</li> <li>Indicators: Orange LED (8 Nos. used) [Light up when external contact is ON]</li> <li>Ambient temperature: <math>-10</math> to <math>+55</math> °C <b>+14 to +55 °F</b> (No dew condensation or icing allowed)</li> <li>Material: POM (Base) Polycarbonate (Cover) Cold rolled carbon steel (SPCC) (Bracket)</li> <li>Cable: 0.3 mm<sup>2</sup> 2-core cabtyre cable, 3 m <b>9.843 ft</b> long</li> <li>Weight: 70 g <b>2.469 oz</b> approx. (including bracket)</li> </ul> <p><b>I/O circuit diagrams</b></p> <p>&lt;In case of connection to NPN output type&gt;</p> <p>&amp;#226;1 Non-voltage contact or NPN open-collector transistor</p> <p>&lt;In case of connection to PNP output type&gt;</p> <p>&amp;#226;1 Non-voltage contact or PNP open-collector transistor</p>
Side mounting bracket	<b>MS-SF2N-3</b>	Used for side-mounting of sensors (four bracket set for emitter and receiver)
U-shaped side mounting intermediate supporting bracket (Note 1)	<b>MS-SF2N-4</b> <b>MS-SF4A-H4</b>	For <b>SF4-AH</b> □ Used to hold the sensor at the intermediate position for protection against vibration (for side mounting) For <b>SF4-AH</b> □-H (1 set for emitter and receiver)
Center sensor mounting bracket (Note 2)	<b>MS-SF2N-5</b>	Used for one-point rear mounting Convenient for mounting on an aluminum frame (four bracket set for emitter and receiver)
Laser alignment tool (Note 3)	<b>SF-LAT-2N</b>	Easy to align the beam axis with the visible laser beam

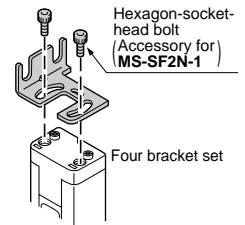
- Notes: 1) The number of sets required varies depending on the product. Refer to 'DIMENSIONS' on P.25 for further details.  
 2) Multiple beam channel sensors requiring the intermediate supporting bracket (36 beam channels or more) cannot mount on an aluminum frame with the center sensor mounting bracket.  
 3) Refer to the **SF-LAT-2N** catalog for further details about the laser alignment tool.

### Large display unit for area sensor

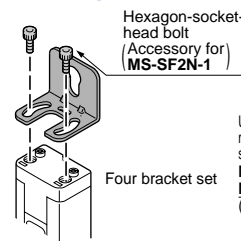


Attaches to upper edge of light curtain.  
Tighten together the mounting bracket provided with the area sensor and the mounting bracket of **SF-IND-2**.

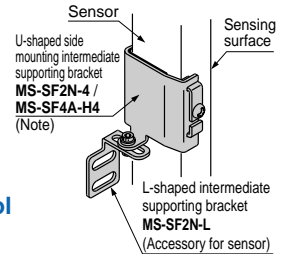
### Side mounting bracket



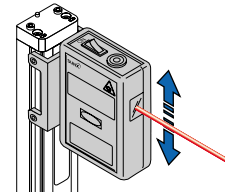
### Center sensor mounting bracket



### U-shaped side mounting intermediate supporting bracket L-shaped intermediate supporting bracket



### Laser alignment tool



Note: The above diagram is only applicable to the **MS-SF2N-4**. The **MS-SF4A-H4** has a different shape.

- MS-SF2N-4 / MS-SF4A-H4**  
Set of 2 Nos. each of U-shaped side supporting bracket and retaining plate
- MS-SF2N-L** (Accessory for sensor)  
Two L-shaped bracket set  
Two M3 (length 10 mm **0.394 in**) pan head screws, two M4 (length 10 mm **0.394 in**) hexagon-socket-head bolts and two nuts are attached.