




SF4B SERIES

Related Information

- General terms and conditions..... P.1
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- Glossary of terms / General precautions..... P.983~/P.986~
- Korea's S-mark..... P.1034~



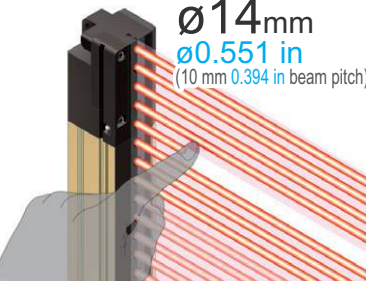
SUNX website <http://www.sunx.com>

 Conforming to Machine & EMC Directives	 Listing
Conforming to OSHA / ANSI	JIS
 Certified (Some models only)	GB Conforming to 4584-84

 Self-diagnosis	 Test input	 PNP output type available	 Interference prevention
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The SUNX light curtain uses new concepts and combines even greater safety with higher productivity

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

Finger protection type	SF4B-F□
Minimum sensing object ø14mm ø0.551 in (10 mm 0.394 in beam pitch)	
	

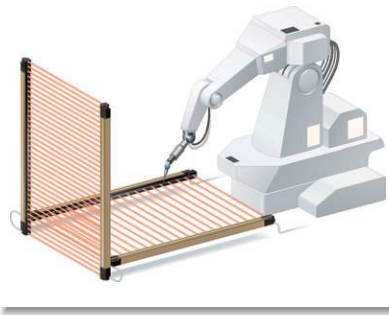
Hand protection type	SF4B-H□
Minimum sensing object ø25mm ø0.984 in (20 mm 0.787 in beam pitch)	
	

Arm / Foot protection type	SF4B-A□
Minimum sensing object ø45mm ø1.772 in (40 mm 1.575 in beam pitch)	
	

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APPLICATIONS

Detecting the intrusion and presence of a human being



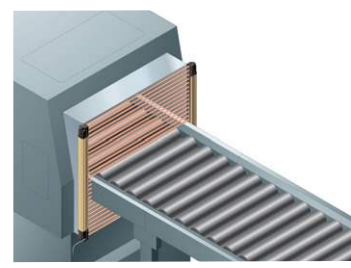
Detecting the intrusion of a human being: Example 1

The light curtains allow you to discriminate between a workpiece and a human being by performing muting control for each beam axis.



Detecting the intrusion of a human being: Example 2

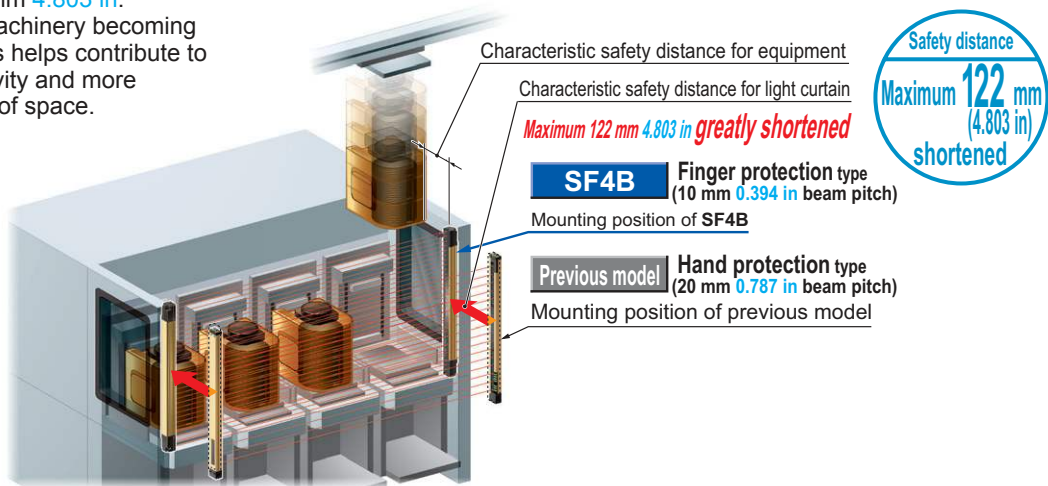
By using the fixed blanking function, obstacles that always exist are ignored.



Safety distance greatly shortened to improve productivity!

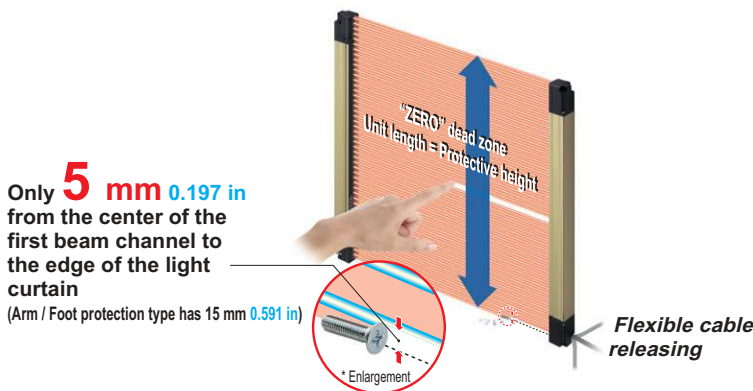
The finger protection type can detect very small objects with diameters of as small as 14 mm **0.551 in**, so that the safety distance based on the ISO 13855 international standard has been shortened from previous models to a maximum of 122 mm **4.803 in**.

With production machinery becoming more compact, this helps contribute to improved productivity and more efficient utilization of space.

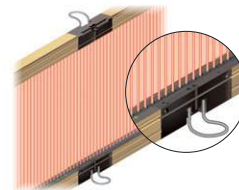


“ZERO” dead zone

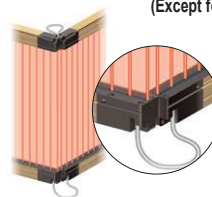
Unit length = protective height, so that no dead zone can occur in the interfaces between light curtains when units are connected in series. The equipment can be used with confidence because there are no dangerous openings resulting from dead zone.



“ZERO” dead zone when using series mounting

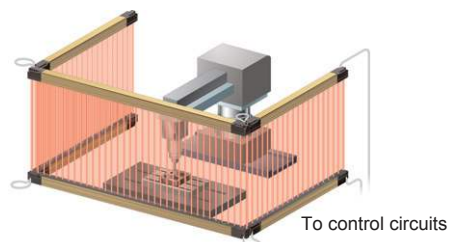


“ZERO” dead zone when using L-shaped setups (Except for finger protection type)



Up to a maximum 3 sets can be connected in series

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). Optional cable for series connection can be used to connect up to a maximum of 3 sets (maximum 192 beam channels) in series. The reduced amount of wiring needed lowers costs and also helps to prevent interference.



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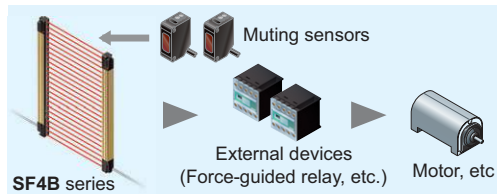
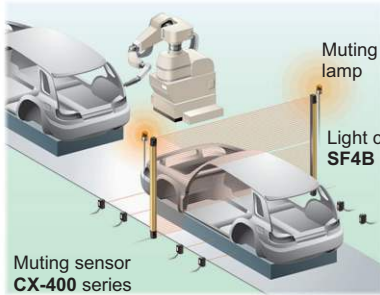
SW-101

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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 a workpiece passes through. The muting sensors and muting lamps can be connected directly to the light curtain, so that a special controller is not required for muting. This both reduces costs and increases safety and productivity.

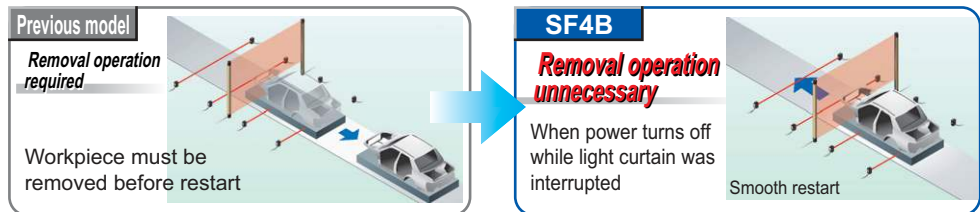


Avoiding line stoppages when a workpiece passes through

The light curtain has a built-in muting function that causes the light curtain to ignore workpiece when two or more of the four muting sensors are interrupted simultaneously as a result of a workpiece passing by. This prevents the line from stopping when a workpiece passes through the light curtain, thereby maintaining productivity. When a person passes through the light curtain, two or more of the muting sensors are not interrupted, and so the muting function is not activated.

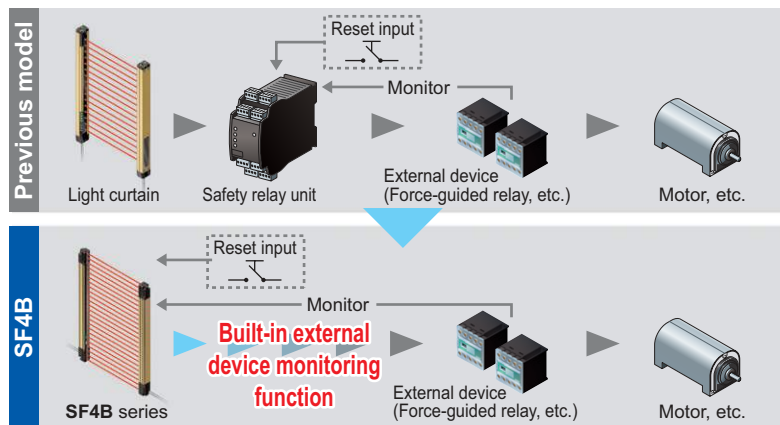
Override function allows the line to be restarted smoothly after it has stopped while muting control was active

In the case that the power turns off while the light curtain is being interrupted by a workpiece or in the case that the line stops before the muting conditions have been established (if only one muting sensor has been interrupted), the machinery can be restarted smoothly and safely without removing the workpiece.



Equipped with a safety circuit that does not require a 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 is also more compact, which both help contribute to lower costs.



No safety relay unit needed
Smaller control board

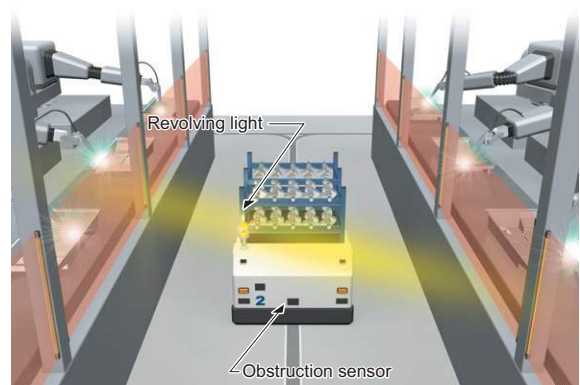
* Refer to p.491 for recommended safety relays and miniature contactors.

Mutual interference is reduced without need for interference prevention lines

The light curtain is equipped with the ELCA (Extraneous Light Check & Avoid) function which has already gained strong approval in the marketplace for its powerful suppression of mutual interference between light curtains. 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, so that the light curtains can be positioned with much greater flexibility.

Reducing the number of malfunctions caused by extraneous light

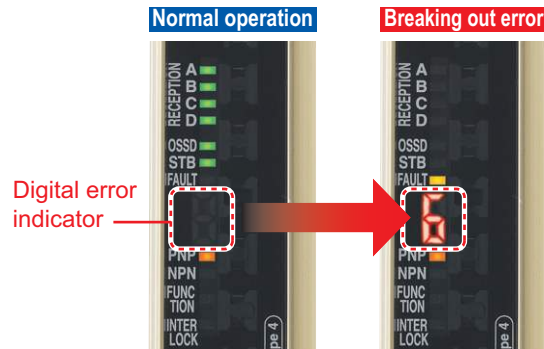
A double scanning method and retry processing are two new functions exclusive to SUNX that have been established in the workplace as being effective in eliminating the effects of momentary extraneous light from peripheral equipment. The reduction in operating errors caused by extraneous light reduces frequent stopping of machinery and helps to prevent losses in line operating efficiency.



Equipped with a digital error indicator so that error details can be understood at a glance!

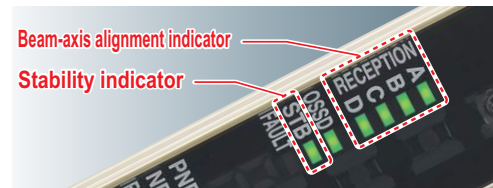
The system constantly checks the light curtain for problems such as incorrect cable wiring, disconnection and short-circuits, and also for internal circuit problems and incoming light problems. If a problem should occur, the same output (OFF signal) as when the object was detected is maintained in order to ensure safety, and the details of the error appear on the digital display.

The error details can be checked at a glance without the inconvenience of the previous method of counting the number of LED blinks, so that smooth support is possible if problems occur at startup and during maintenance operations, even if assistance is given via telephone.



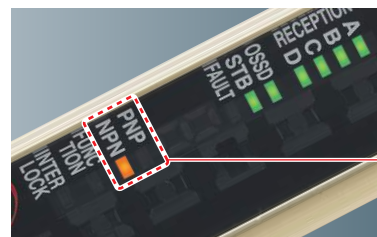
The beam-axis alignment indicators that incident light position can be seen at a glance

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) that is used as a reference for beam-axis alignments correctly aligned, the LED blinks red. After this, each block lights red as the beam axes successively become aligned, and 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 too.



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.



PNP / NPN polarity indicator

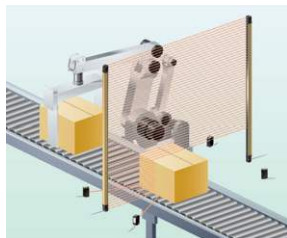
PNP or NPN side lights depending on which is selected.

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

Separate muting control function for each beam channel

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

While muting control is active (line operating)



Line stopped

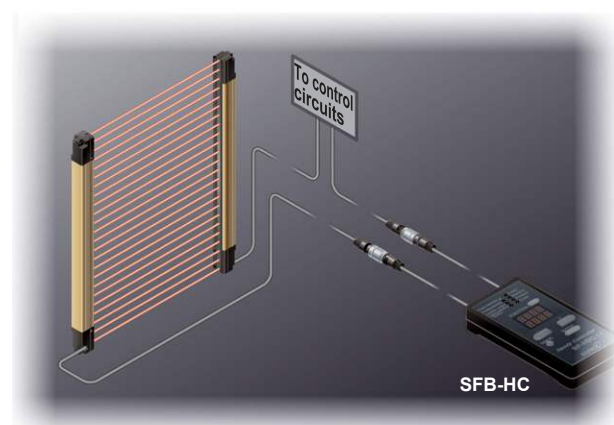


For example, depending on the height of the workpiece, the muting function can be activated for 10 beam channels starting from the bottom, so that if the 11th or subsequent beam channels are interrupted, it is judged that a person has entered the area and the line stops.

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 that 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 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.



* A Handy-controller cannot be used with the **SF4B-□-01** (refer to p.486) and the **SF-C14EX-01**. (refer to p.489)

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 that the positions of obstacles within the sensing area must be changed during workpiece rearrangement, or when workpiece go through the light curtain's sensing area.

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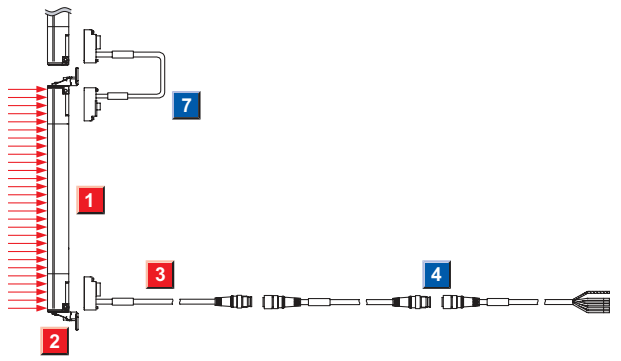
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 Mounting bracket and connecting cable are optional.

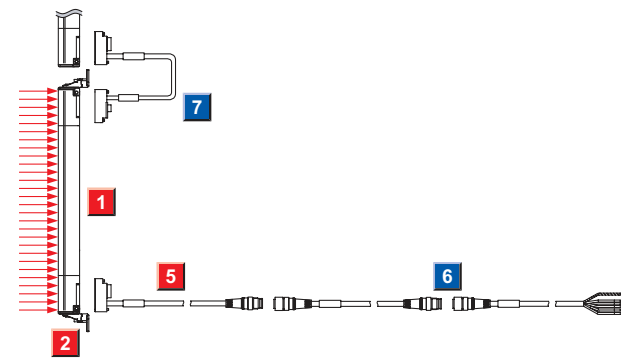
Standard components (8-core cable)



- | Component parts | |
|-----------------|---|
| 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 connect in series) |

Required

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



- | Component parts | |
|-----------------|---|
| 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 connect in series) |

Required

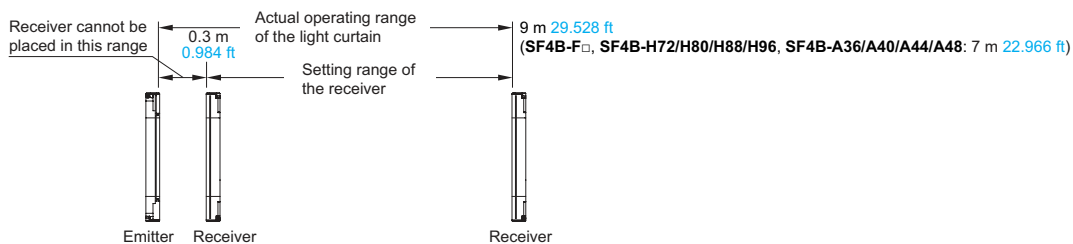
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1 Light curtains Mounting bracket and mating cable are not supplied with the light curtain. Be sure to order them separately.

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 0.551 in (10 mm 0.394 in beam pitch)		0.3 to 7 m 0.984 to 22.966 ft	SF4B-F23	SF4B-F23-01	23	230 9.055
			SF4B-F31	SF4B-F31-01	31	310 12.205
			SF4B-F39	SF4B-F39-01	39	390 15.354
			SF4B-F47	SF4B-F47-01	47	470 18.504
			SF4B-F55	SF4B-F55-01	55	550 21.654
			SF4B-F63	SF4B-F63-01	63	630 24.803
			SF4B-F71	SF4B-F71-01	71	710 27.953
			SF4B-F79	SF4B-F79-01	79	790 31.102
			SF4B-F95	SF4B-F95-01	95	950 37.402
			SF4B-F111	SF4B-F111-01	111	1,110 43.701
			SF4B-F127	SF4B-F127-01	127	1,270 50.000
Hand protection type Min. sensing object $\phi 25$ mm 0.984 in (20 mm 0.787 in beam pitch)		0.3 to 9 m 0.984 to 29.528 ft	SF4B-H12	SF4B-H12-01	12	230 9.055
			SF4B-H16	SF4B-H16-01	16	310 12.205
			SF4B-H20	SF4B-H20-01	20	390 15.354
			SF4B-H24	SF4B-H24-01	24	470 18.504
			SF4B-H28	SF4B-H28-01	28	550 21.654
			SF4B-H32	SF4B-H32-01	32	630 24.803
			SF4B-H36	SF4B-H36-01	36	710 27.953
			SF4B-H40	SF4B-H40-01	40	790 31.102
			SF4B-H48	SF4B-H48-01	48	950 37.402
			SF4B-H56	SF4B-H56-01	56	1,110 43.701
			SF4B-H64	SF4B-H64-01	64	1,270 50.000
			SF4B-H72	SF4B-H72-01	72	1,430 56.299
			SF4B-H80	SF4B-H80-01	80	1,590 62.598
			SF4B-H88	SF4B-H88-01	88	1,750 68.898
SF4B-H96	SF4B-H96-01	96	1,910 75.197			
Arm / Foot protection type Min. sensing object $\phi 45$ mm 1.772 in (40 mm 1.575 in beam pitch)		0.3 to 9 m 0.984 to 29.528 ft	SF4B-A6	SF4B-A6-01	6	230 9.055
			SF4B-A8	SF4B-A8-01	8	310 12.205
			SF4B-A10	SF4B-A10-01	10	390 15.354
			SF4B-A12	SF4B-A12-01	12	470 18.504
			SF4B-A14	SF4B-A14-01	14	550 21.654
			SF4B-A16	SF4B-A16-01	16	630 24.803
			SF4B-A18	SF4B-A18-01	18	710 27.953
			SF4B-A20	SF4B-A20-01	20	790 31.102
			SF4B-A24	SF4B-A24-01	24	950 37.402
			SF4B-A28	SF4B-A28-01	28	1,110 43.701
			SF4B-A32	SF4B-A32-01	32	1,270 50.000
			SF4B-A36	SF4B-A36-01	36	1,430 56.299
			SF4B-A40	SF4B-A40-01	40	1,590 62.598
			SF4B-A44	SF4B-A44-01	44	1,750 68.898
SF4B-A48	SF4B-A48-01	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 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: SF4B-F23E, Receiver of SF4B-F23: SF4B-F23D.

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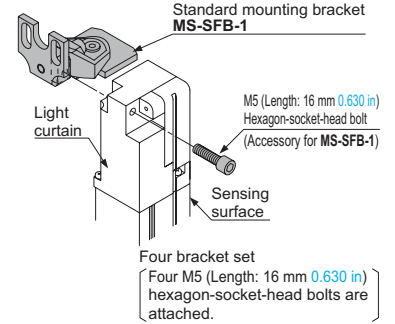
ORDER GUIDE

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

Designation	Model No.	Description
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)
Pitch adapter bracket	MS-SFB-4	Used as the mounting bracket when changing over a previous light curtain with a protective height of 200 to 750 mm 7.874 to 29.528 in to the SF4B series. It is installed using two M5 hexagon-socket-head bolts. (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)
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 to 750 mm 7.874 to 29.528 in to the SF4B series. It is installed using two M8 hexagon-socket-head bolts. (4 pcs. per set for emitter and receiver)
Dead zoneless mounting bracket	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)

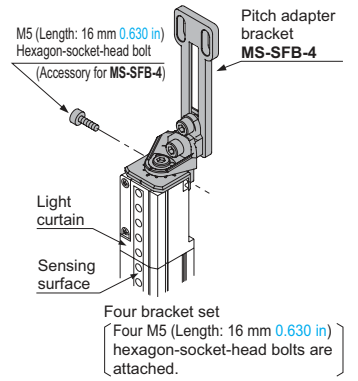
Standard mounting bracket

• **MS-SFB-1**



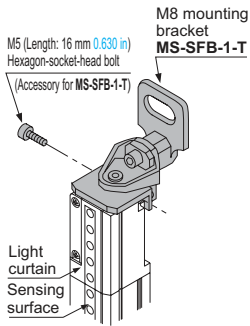
Pitch adapter bracket

• **MS-SFB-4**



M8 mounting bracket

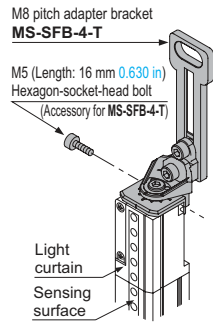
• **MS-SFB-1-T**



Four bracket set
Four M5 (Length: 16 mm 0.630 in) hexagon-socket-head bolts are attached.

M8 pitch adapter bracket

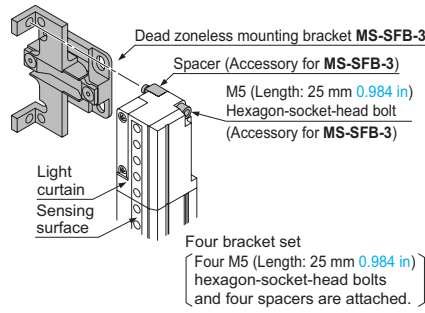
• **MS-SFB-4-T**



Four bracket set
Four M5 (Length: 16 mm 0.630 in) hexagon-socket-head bolts are attached.

Dead zoneless mounting bracket

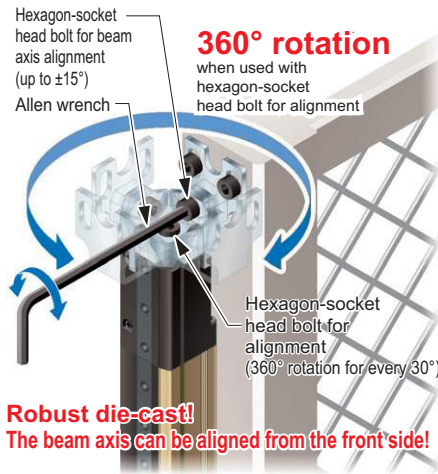
• **MS-SFB-3**



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

Mounting bracket

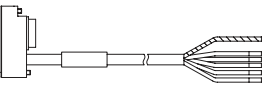
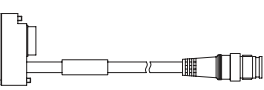
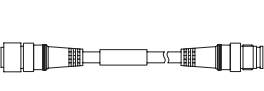
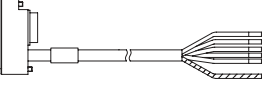
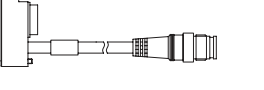
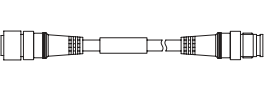
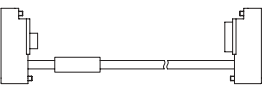
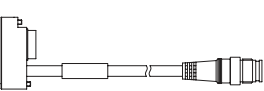
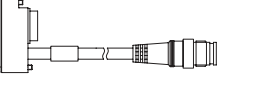
The hexagon-socket head bolts on the mounting brackets for aligning the beam axis can be tightened from in front of the light curtain, so that work can be carried out easily while checking the hexagon-socket head bolt positions. This makes it much easier to adjust the light curtain angles when carrying out beam-axis alignment and greatly improves ease of installation work.



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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)		
			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)		
	Extension cable	With connector on one end	SFB-CC3 Length: 3 m 9.843 ft Net weight: 380 g approx. (2 cables)		
			SFB-CC10 Length: 10 m 32.808 ft Net weight: 1,200 g approx. (2 cables)		
	Extension cable	With connectors on both ends			SFB-CCJ10E Length: 10 m 32.808 ft Net weight: 580 g approx. (1 cable)
					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)
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)		
Extension cable			With connector on one end	SFB-CC3-MU Length: 3 m 9.843 ft Net weight: 430 g approx. (2 cables)	
		SFB-CC10-MU Length: 10 m 32.808 ft Net weight: 1,300 g approx. (2 cables)			
Extension cable		With connectors on both ends		SFB-CCJ10E-MU Length: 10 m 32.808 ft Net weight: 660 g approx. (1 cable)	
	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 connection 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	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			

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Spare parts (Accessories for light curtain)

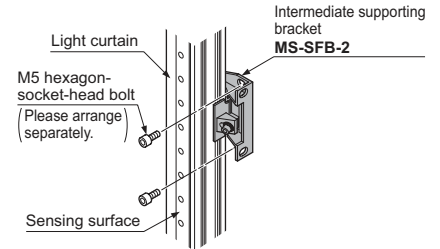
Designation	Model No.	Description
Intermediate supporting bracket (Note)	MS-SFB-2	Used to mount the light curtain on the intermediate position. Mounting is possible behind or at the side of the light curtain.
Test rod ø14	SF4B-TR14	Min. sensing object for regular checking (ø14 mm ø0.551 in), with finger protection type (min. sensing object ø14 mm ø0.551 in)
Test rod ø25	SF4B-TR25	Min. sensing object for regular checking (ø25 mm ø0.984 in), with hand protection type (min. sensing object ø25 mm ø0.984 in)

Note: The number of sets required varies depending on the product. Refer to "DIMENSIONS" on p.512 for further details.

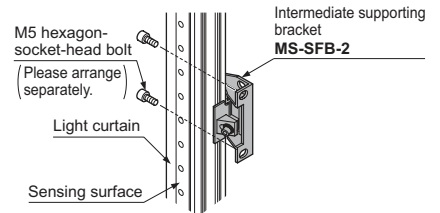
Intermediate supporting bracket

• 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-CB□(-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		SF-CL1T264T	Bottom cap cable: SFB-CB05-CL SFB-CB5-CL SFB-CB10-CL Extension cable: SFB-CCJ10E-CL SFB-CCJ10D-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 p.551~ for detailed specifications and connection diagrams of the special control unit.

SF-C12 spare relay set

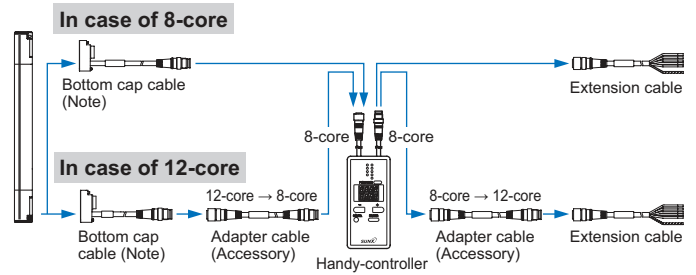
A set of spare relays (2 safety relays and 1 removal tool) is available for the safety relay that is built into the **SF-C12**.
Model No.: **SF-C12-RY**

OPTIONS

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** 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 the wiring.

Front protection cover / Protection bar set / Corner mirror

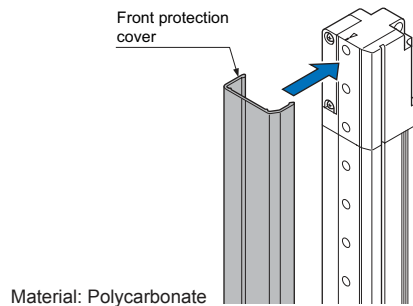
Applicable beam channels			Designation	Front protection cover	Protection bar set	Corner mirror
Finger	Hand	Arm / Foot	Model No. (Note)	Model No. (Note)	Model No. (Note)	Model No.
23	12	6	FC-SFBH-12	MC-SFBH-12	RF-SFBH-12	
31	16	8	FC-SFBH-16	MC-SFBH-16	RF-SFBH-16	
39	20	10	FC-SFBH-20	MC-SFBH-20	RF-SFBH-20	
47	24	12	FC-SFBH-24	MC-SFBH-24	RF-SFBH-24	
55	28	14	FC-SFBH-28	MC-SFBH-28	RF-SFBH-28	
63	32	16	FC-SFBH-32	MC-SFBH-32	RF-SFBH-32	
71	36	18	FC-SFBH-36	MC-SFBH-36	RF-SFBH-36	
79	40	20	FC-SFBH-40	MC-SFBH-40	RF-SFBH-40	
95	48	24	FC-SFBH-48	MC-SFBH-48	RF-SFBH-48	
111	56	28	FC-SFBH-56	MC-SFBH-56	RF-SFBH-56	
127	64	32	FC-SFBH-64	MC-SFBH-64	RF-SFBH-64	
-	72	36	FC-SFBH-72	MC-SFBH-72	RF-SFBH-72	
-	80	40	FC-SFBH-80	MC-SFBH-80	RF-SFBH-80	
-	88	44	FC-SFBH-88	MC-SFBH-88	RF-SFBH-88	
-	96	48	FC-SFBH-96	MC-SFBH-96	RF-SFBH-96	

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.

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.



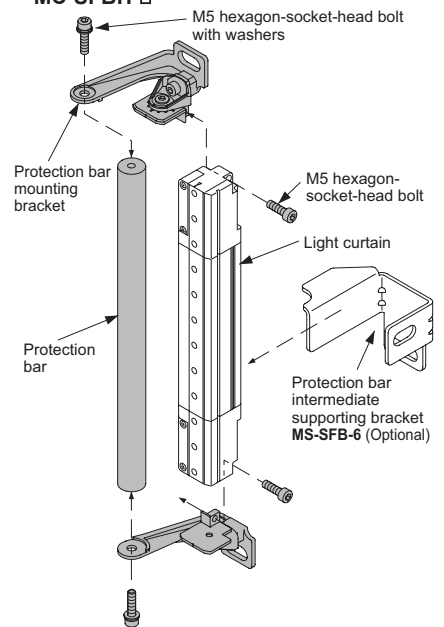
Sensing range

	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 less than 0.3 m **0.984 ft** away.

Protection bar set

• **MC-SFBH-□**



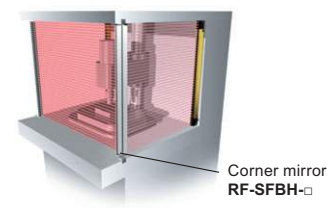
• **Parts List**

Designation	Number	Remarks
Protection bar	1 pc.	Material: Aluminum
Protection bar mounting bracket (For left side, for right side)	1 pc. each	Material: Die-cast zinc alloy
Hexagon-socket-head bolt with washers	2 pcs.	M5 (Length 20 mm 0.787 in)
Hexagon-socket-head bolt	2 pcs.	M5 (Length 16 mm 0.630 in)
Protection bar intermediate supporting bracket	1 pc.	Material: Cold rolled carbon steel (SPCC)

Note: The protection bar intermediate supporting bracket **MS-SFB-6** (optional) is installed to protection bars that are longer than the **MC-SFBH-48**. Use if there is much flexure bending in the protection bar. Please contact our office for details.

Corner mirror

• **RF-SFBH-□**



Percent decline of the sensing range

With 1 mirror	Declined to 90 %
With 2 mirror	Declined to 80 %

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MICRO PHOTO-ELECTRIC SENSORS

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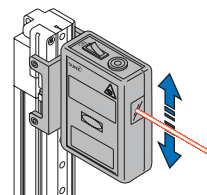
OPTIONS

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- LASER SENSORS
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- MICRO PHOTO-ELECTRIC SENSORS
- AREA SENSORS
- SAFETY COMPONENTS**
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Designation	Model No.	Description
Test rod $\phi 45$	SF4B-TR45	Min. sensing object for regular checking ($\phi 45$ mm $\phi 1.772$ in), with arm / foot protection type (min. sensing object $\phi 45$ mm $\phi 1.772$ 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 $+55$ °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><With PNP output type></p>

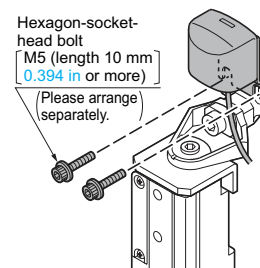
Laser alignment tool

- **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 and the 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.

DC 3-wire • Cylindrical Inductive Proximity Sensor
GX-N SERIES



- Cost effectiveness
- Easy-to-see operation indicator

Note: Check the specifications for the muting sensors before making a selection. Refer to **"PRECAUTIONS FOR PROPER USE"** (P.502) for details on specifications and installation conditions.

Recommended safety relays and miniature contactors

- Safety relay
Matsushita Electric Works Ltd.
SF relay



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



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

SPECIFICATIONS**Individual specifications****SF4B-F□(-01)**

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)	SF4B-F31(-01)	SF4B-F39(-01)	SF4B-F47(-01)	SF4B-F55(-01)	SF4B-F63(-01)
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)		570 g approx.	680 g approx.	800 g approx.	920 g approx.	1,030 g approx.	1,150 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)	SF4B-F79(-01)	SF4B-F95(-01)	SF4B-F111(-01)	SF4B-F127(-01)
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)		1,260 g approx.	1,380 g approx.	1,620 g approx.	1,850 g approx.	2,090 g approx.

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C +68 °C.
2) The models with the suffix "-01" cannot be used with the handy-controller **SFB-HC**.

SF4B-H□(-01)

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)	SF4B-H16(-01)	SF4B-H20(-01)	SF4B-H24(-01)	SF4B-H28(-01)	SF4B-H32(-01)
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)		570 g approx.	680 g approx.	800 g approx.	920 g approx.	1,030 g approx.	1,150 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)	SF4B-H40(-01)	SF4B-H48(-01)	SF4B-H56(-01)	SF4B-H64(-01)
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)		1,260 g approx.	1,380 g approx.	1,620 g approx.	1,850 g approx.	2,090 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)	SF4B-H80(-01)	SF4B-H88(-01)	SF4B-H96(-01)
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)		2,320 g approx.	2,540 g approx.	2,780 g approx.	3,010 g approx.

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C +68 °C.
2) The models with the suffix "-01" cannot be used with the handy-controller **SFB-HC**.

SF4B-A□(-01)

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)	SF4B-A8(-01)	SF4B-A10(-01)	SF4B-A12(-01)	SF4B-A14(-01)	SF4B-A16(-01)
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)		570 g approx.	680 g approx.	800 g approx.	920 g approx.	1,030 g approx.	1,150 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)	SF4B-A20(-01)	SF4B-A24(-01)	SF4B-A28(-01)	SF4B-A32(-01)
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)		1,260 g approx.	1,380 g approx.	1,620 g approx.	1,850 g approx.	2,090 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)	SF4B-A40(-01)	SF4B-A44(-01)	SF4B-A48(-01)
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)		2,320 g approx.	2,540 g approx.	2,780 g approx.	3,010 g approx.

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C +68 °C.
2) The models with the suffix "-01" cannot be used with the handy-controller **SFB-HC**.

FIBER
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SENSORSPHOTO-
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SENSORSAREA
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SENSORSINDUCTIVE
PROXIMITY
SENSORSPARTICULAR
USE
SENSORSSENSOR
OPTIONSWIRE-
SAVING
SYSTEMSMEASURE-
MENT
SENSORSSTATIC
CONTROL
DEVICESLASER
MARKERSSelection
GuideLight
Curtains**SF4B****SF2B****BSF4-AH80**Control
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SPECIFICATIONS

Common specifications

Type	Min. sensing object \varnothing 14 mm 0.551 in type	Min. sensing object \varnothing 25 mm 0.984 in type	Min. sensing object \varnothing 45 mm 1.772 in type
Item	Model No. (Note 2)	SF4B-F□(-01)	SF4B-H□(-01)
Applicable standards	ISO 13849-1 / JIS B 9705-1 (Category 4), EN 954-1 (Category 4), EN 61496-1 (Type 4), IEC 61496-1/2 (Type 4), UL 61496-1/2 (Type 4), JIS B 9704-1/2 (Type 4), UL 1998		
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 0.551 in opaque object	\varnothing 25 mm 0.984 in opaque object	\varnothing 45 mm 1.772 in opaque object
Effective aperture angle	\pm 2.5° 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: 2.5V 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: 2.5V 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	Incorporated		
Interlock function	Incorporated [Manual reset / Auto reset (Note 8)]		
External device monitoring function	Incorporated		
Override function	Incorporated (Note 7)		
Muting function	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	IP65 (IEC) (Refer to p.984 for details of standards.)	
	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		
Emitting element		Infrared LED (Peak emission wavelength: 870 nm 0.034 mil)	
Material		Enclosure: Aluminium, Upper / lower case: Zinc, Sensing surface: Polycarbonate, Cap: PBT	
Connecting method		Connector	
Cable length		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

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

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 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.506~).

5) The outputs are not “OFF” during 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.506~).

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** 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 with series connection, within 20 m **65.617 ft** when three light curtains are connected with series connection. 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□...**Light curtain with 79 to 111 beam channels, **SF4B-H□...**Light curtain with 40 to 56 beam channels,

SF4B-A□...Light curtain with 20 to 28 beam channels

2 sets: **SF4B-F127**, **SF4B-H□...**Light curtain with 64 to 80 beam channels, **SF4B-A□...**Light curtain with 32 to 40 beam channels

3 sets: **SF4B-H□...**Light curtain with 88 to 96 beam channels, **SF4B-A□...**Light curtain with 44 to 48 beam channels

SPECIFICATIONS**Handy-controller**

Item	Model No.	SFB-HC
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) / Interlock setting change (Factory setting: start / restart) / External device monitoring setting change (Factory setting: Enabled, 300 ms) / 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

Item	Model No.	SF-LAT-2N
Supply voltage		3 V (AA size battery \times 2 pcs.)
Battery		1.5 V (AA size battery) \times 2 pcs. (replaceable)
Battery lifetime		10 hours approx. of continuous operation (Manganese battery, at +25 °C +77 °F ambient temperature)
Light source		Red semiconductor laser: class 2 (IEC / JIS) (Max. output: 1 mW, Peak emission wavelength: 650 nm 0.026 mil)
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		AA size battery: 2 pcs.

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

Corner mirror

Item	Model No.	RF-SFBH-□
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 2.953 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)

FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

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SAFETY COMPONENTS

PRESSURE SENSORS

INDUCTIVE PROXIMITY SENSORS

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BSF4-AH80

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SF-C10

Optical Touch Switch

SW-101

Other Products

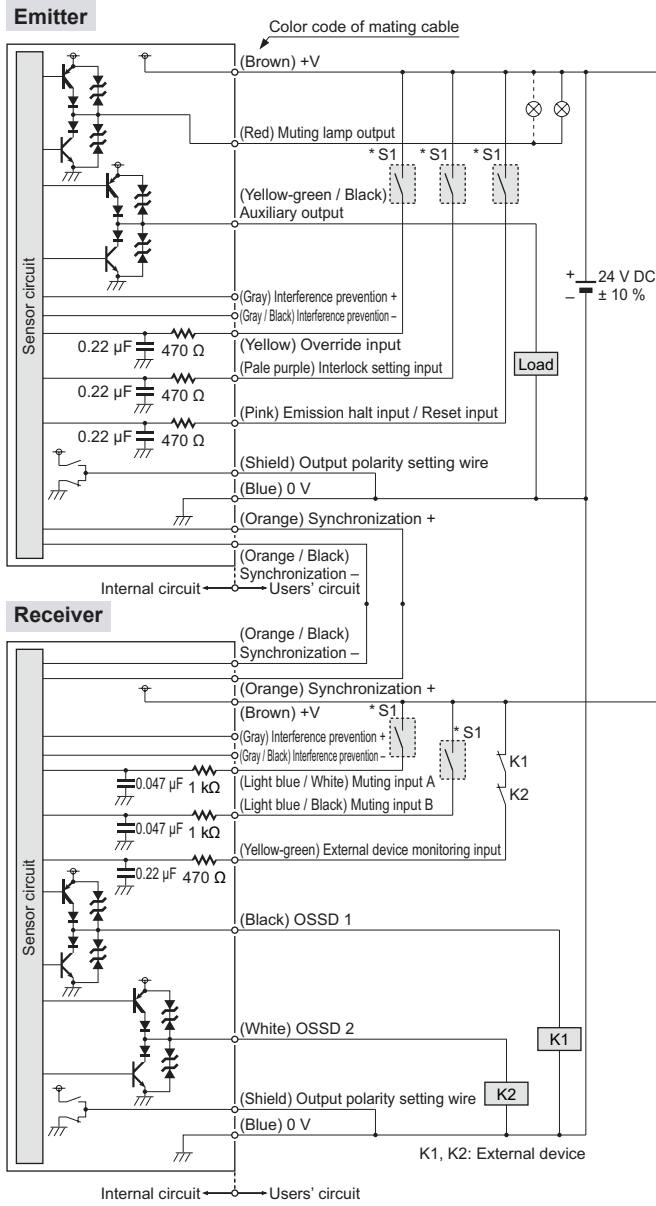
Definition of Sensing Heights

I/O CIRCUIT AND WIRING DIAGRAMS

- FIBER SENSORS
- LASER SENSORS
- PHOTO-ELECTRIC SENSORS
- MICRO PHOTO-ELECTRIC SENSORS
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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.

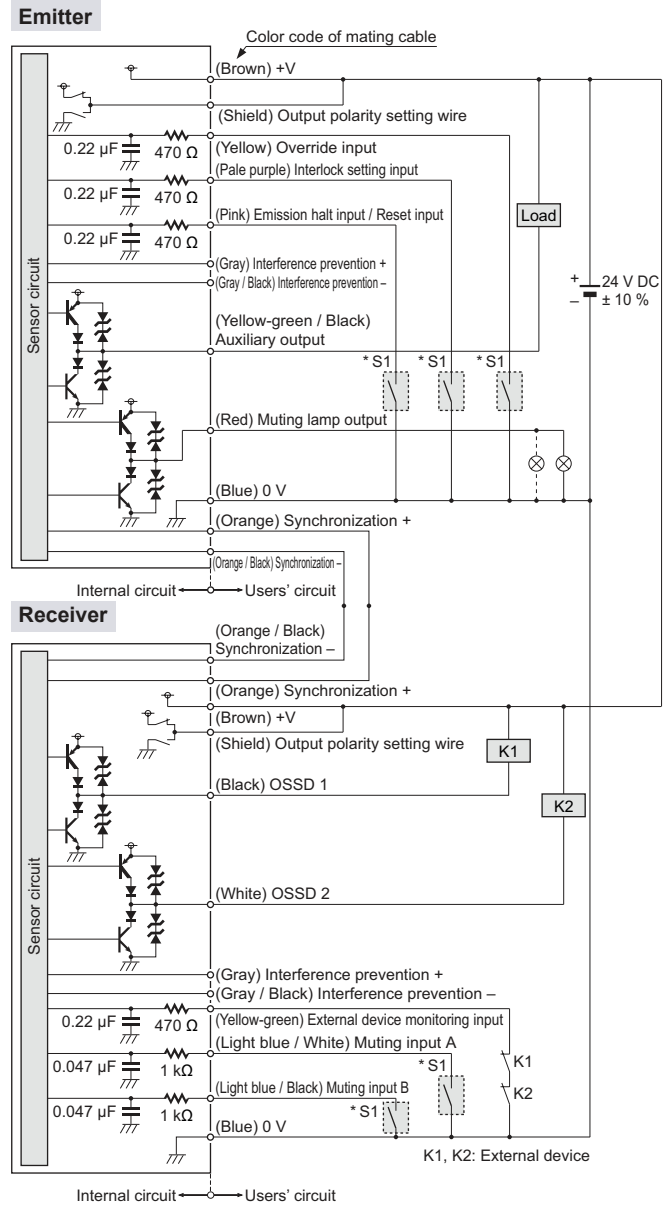
* S1

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 monitor input
Vs to Vs - 2.5 V (sink current 5 mA or less): Enable (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 monitor input
0 to +1.5 V (source current 5 mA or less): Enable
Open: Disabled

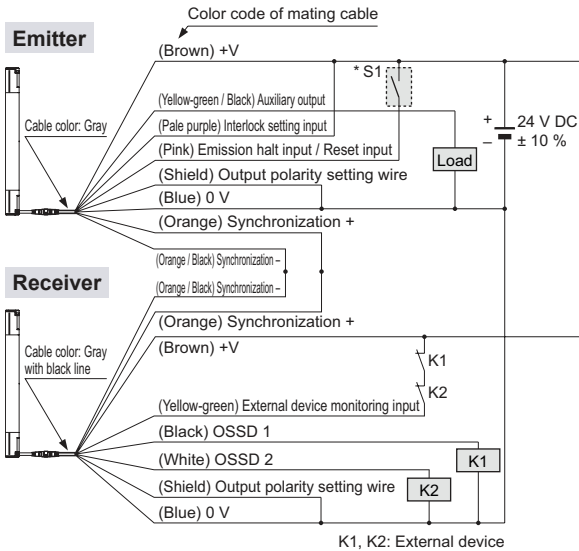
Note: Switch S1 can be connected to either "+V" or "0 V". The above diagram shows a connection to "0 V" as an example.

I/O CIRCUIT AND WIRING DIAGRAMS

Connection example

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

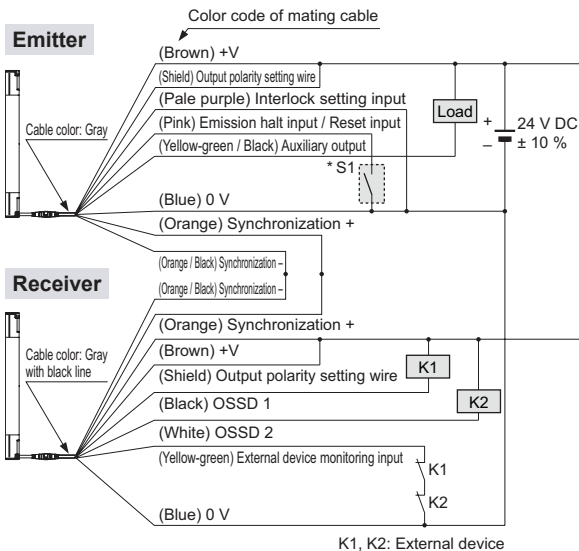
<In case of using I/O circuit for PNP output>



* 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.

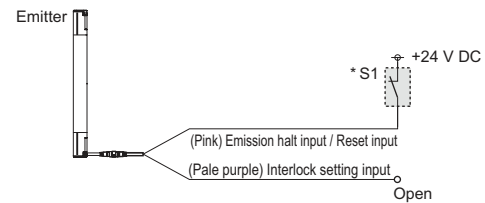
<In case of using I/O circuit for NPN output>



* 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

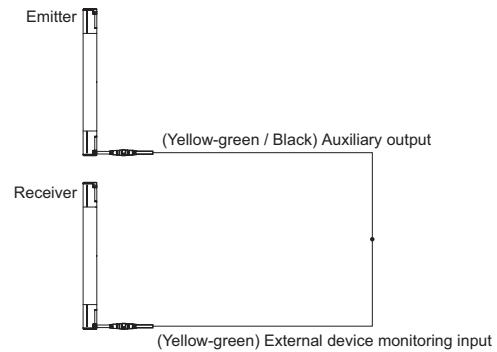
The diagram at left shows the configuration when using PNP output, interlock function "enabled (manual reset)" and external device monitoring function "enabled".

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



* Refer to p.501 for details of the interlock function.

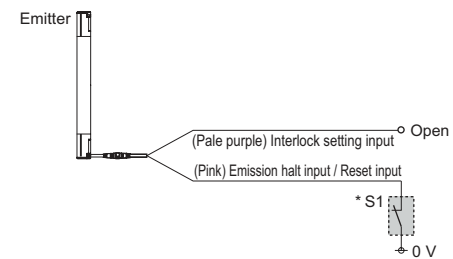
In case of setting the external device monitoring function to "disabled"



* Refer to p.502 for details of the external device monitoring function.

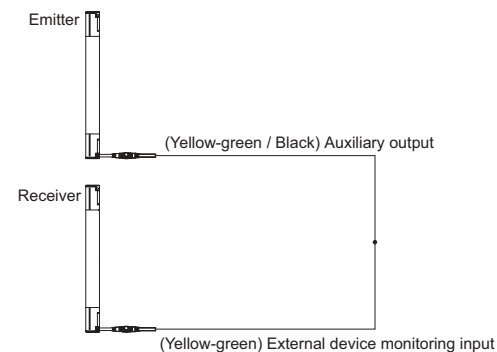
The diagram at left shows the configuration when using NPN output, interlock function "enabled (manual reset)" and external device monitoring function "enabled".

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



* Refer to p.501 for details of the interlock function.

In case of setting the external device monitoring function to "disabled"



* Refer to p.502 for details of the external device monitoring function.

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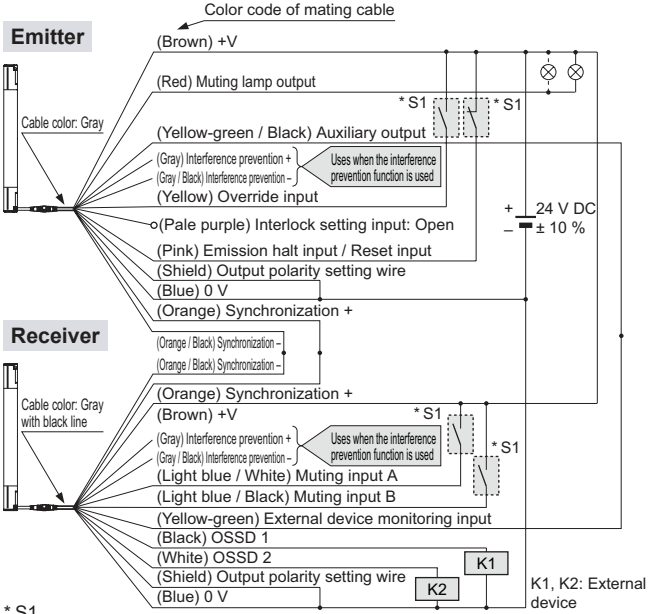
Definition of Sensing Heights

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"

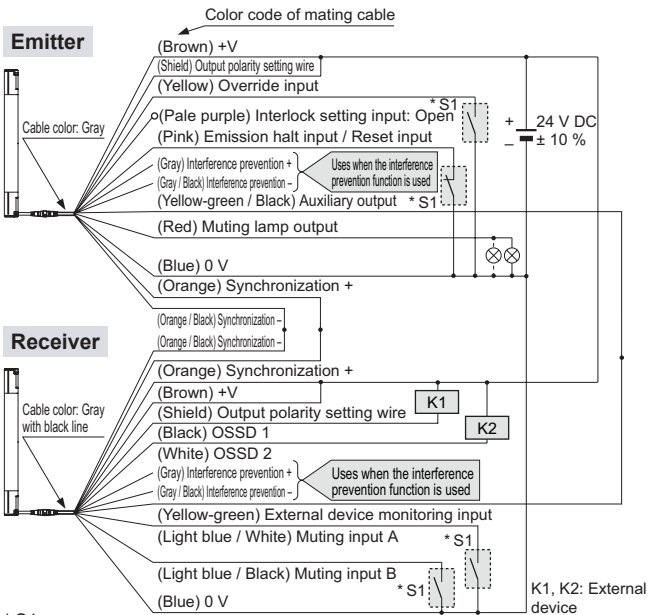
<In case of using I/O circuit for PNP output>



* 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>

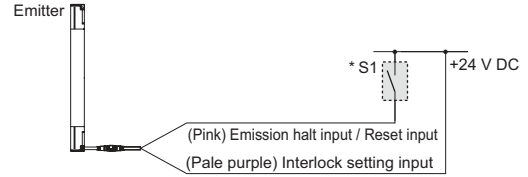


* S1
 Switch S1
 • Emission halt input / Reset input
 For manual reset
 0 to +1.5 V (source current 5 mA or less): Emission halt, Open: Emission
 For automatic reset
 0 to +1.5 V (source current 5 mA or less): Emission, Open: Emission halt
 • Override input, Muting input A / B, External device monitoring 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".

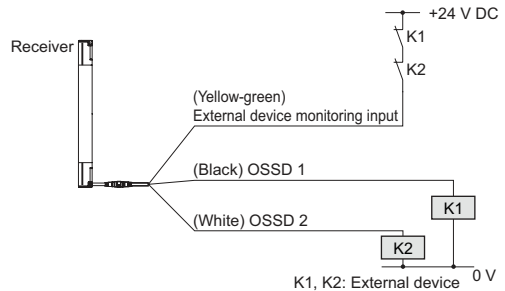
In case of setting the interlock function to "enabled (manual reset)"

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



* Refer to p.501 for details of the interlock function.

In case of setting the external device monitoring function to "enabled"

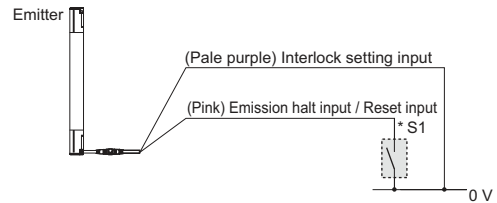


* Refer to p.502 for details of the external device monitoring function.

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

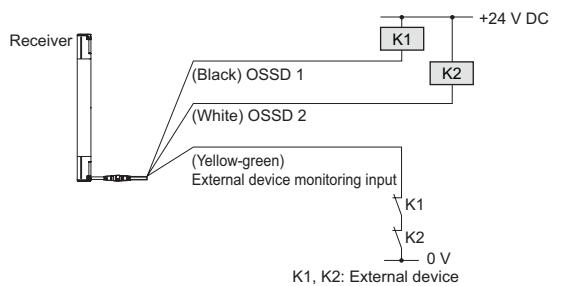
In case of setting the interlock function to "enabled (manual reset)"

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



* Refer to p.501 for details of the interlock function.

In case of setting the external device monitoring function to "enabled"



* Refer to p.502 for details of the external device monitoring function.

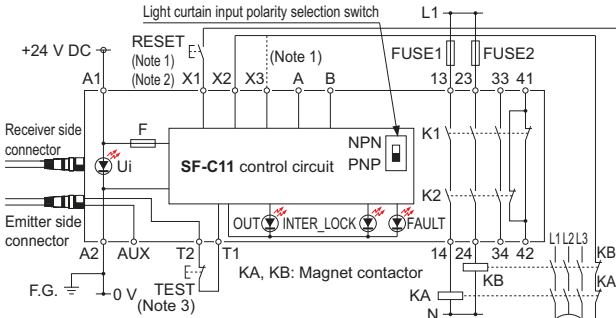
I/O CIRCUIT AND WIRING DIAGRAMS

SF-C11

SF4B series wiring diagram (Control category 4)

For PNP output (minus ground)

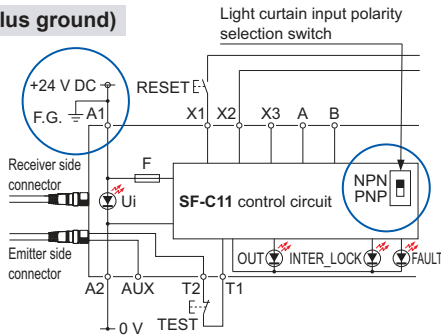
- Set the light curtain input polarity selection switch to the PNP side and ground the 0 V line.



- Notes: 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.
 3) 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.

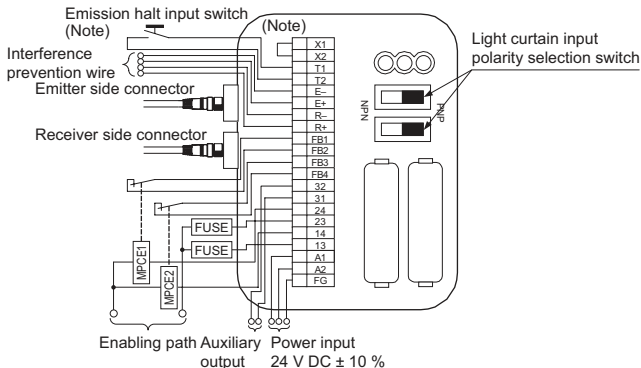


SF-C12

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.



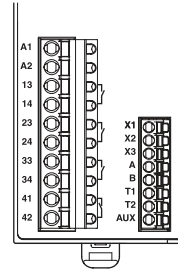
- Note: The above diagram is when using manual reset. If automatic reset is used, connect a normal close-type pushbutton switch between T1 and T2 and leave between X1 and X2 open.

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 FG terminal to the + side.

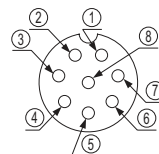
When SF-C11 is connected to the light curtain, be sure to use the following mating cable.
SFB-CB□, SFB-CCJ10□

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	Not used
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

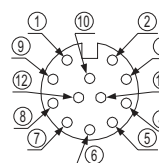
When SF-C12 is connected to the light curtain, be sure to use the following maing cable.
SFB-CB05-MU, SFB-CCJ10□-MU

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)

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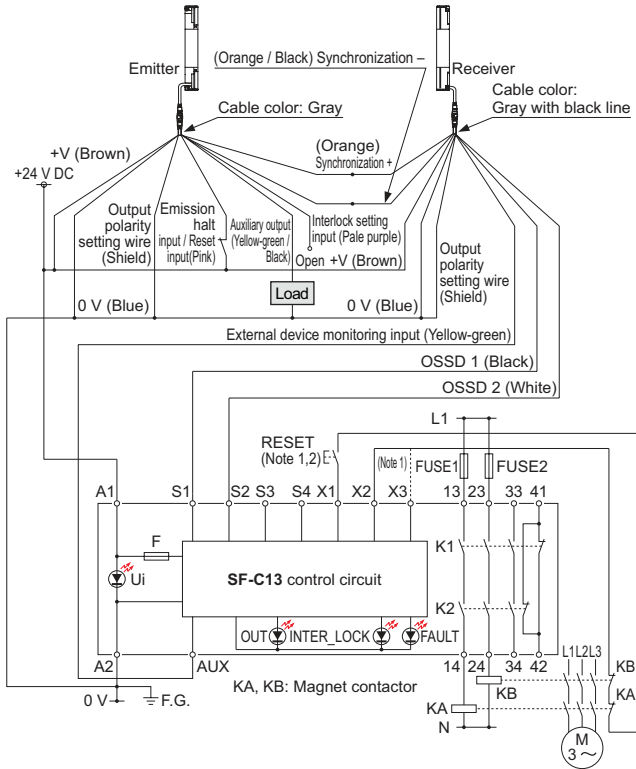
I/O CIRCUIT AND WIRING DIAGRAMS

SF-C13

SF4B series wiring diagram (Control category 4)

For PNP output (minus ground)

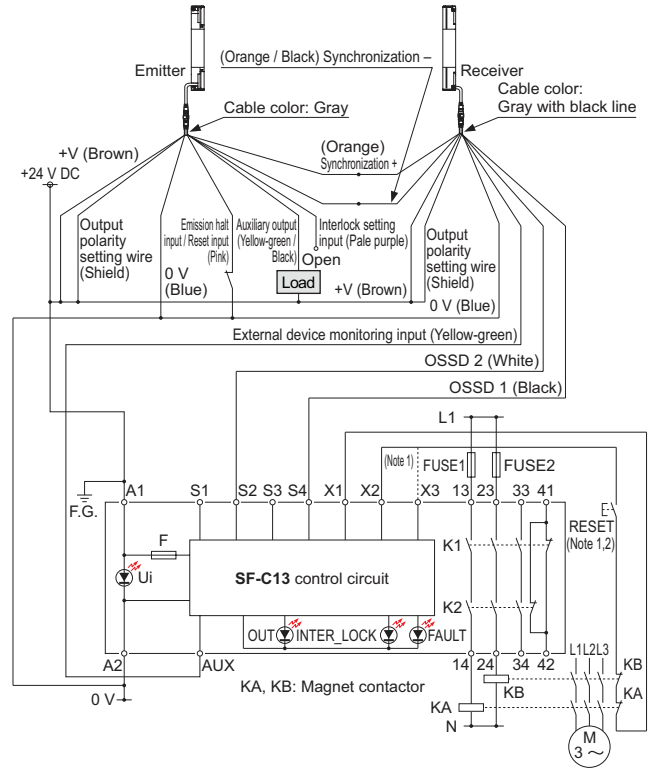
- Connect the light curtain control outputs OSSD 1 and OSSD 2 to S1 and S2 respectively.



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.

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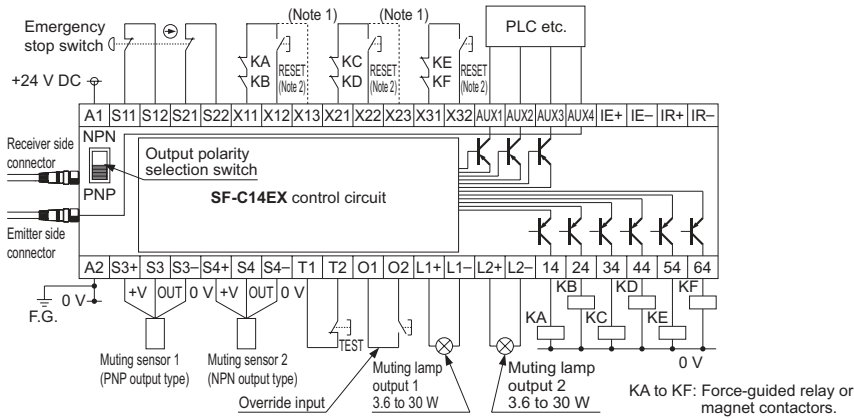
I/O CIRCUIT AND WIRING DIAGRAMS

SF-C14EX

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.



• When **SF-C14EX** is connected to the light curtain, be sure to use the following mating cable.
SFB-CB05-EX (Cable length 0.5 m **1.640 ft**)
SFB-CB5-EX (Cable length 5 m **16.404 ft**)
SFB-CB10-EX (Cable length 10 m **32.808 ft**)

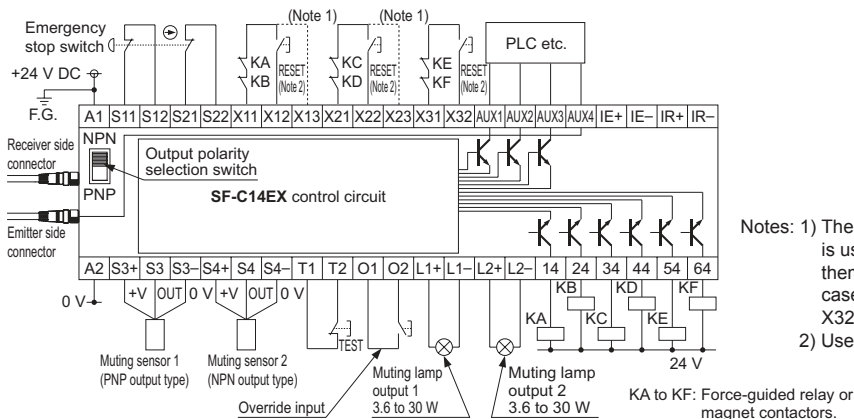
• If the NO (Normally Open) contact switch is used as a muting sensor, wire it as shown in the figure below.

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

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.

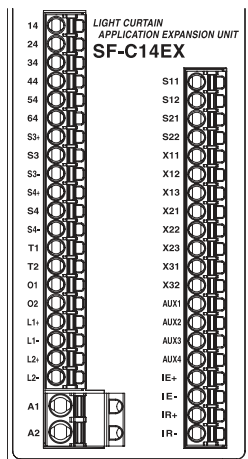
For NPN output (plus ground)

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



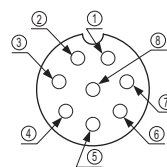
Notes: 1) The left diagram is when using manual reset. If automatic reset is used, disconnect the lead from X12 and X22, and connect them to X13 and X23, as shown by the dotted lines. In this case, a reset (RESET) button is not needed. Terminals X31 to X32 are for manual reset only.
 2) Use a momentary-type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

Terminal arrangement diagram



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

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Interlock function

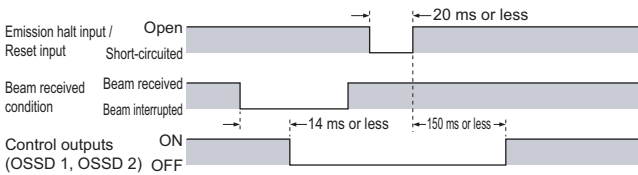
- When the light curtain has been interrupted and control output (OSSD 1, OSSD 2) is OFF, the interlock function keeps the control output at OFF until a reset signal is input.
- You can select whether interlock is enabled (manual reset) or disabled (automatic reset) by the way in which the interlock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

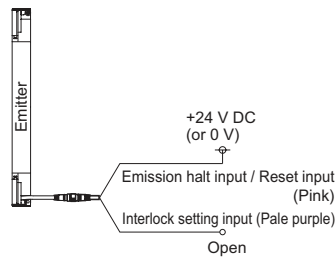
- When the light curtain has been interrupted and control outputs (OSSD 1, OSSD 2) are OFF, the control outputs (OSSD 1, OSSD 2) are kept at OFF and does not automatically turn back ON even if the incoming light status is restored.
- If a reset signal is input when incoming light is being received by 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.495~ 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)

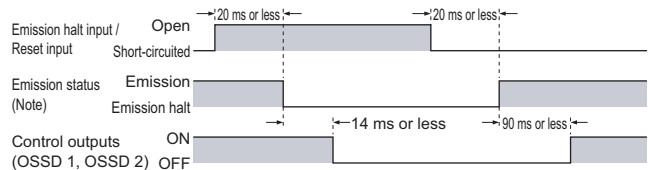
Emission halt function

- 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)]>



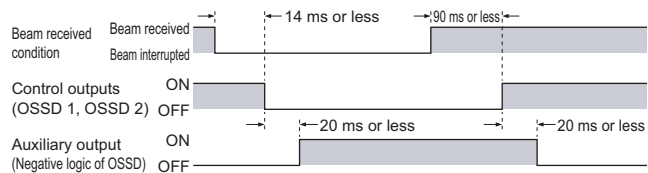
Note: This time chart shows the operation in automatic reset. In manual reset, the light curtain performs emission under open status and performs emission halt under short-circuit status.

Auxiliary output (Non-safety output)

- This light curtain incorporates the auxiliary output for the non-safety output. The auxiliary output is incorporated with the emitter.

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

Refer to p.986~ for general precautions.

External device monitoring function

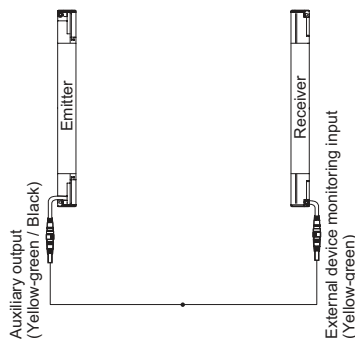
- This is the function for checking whether the external safety relay connected to the control outputs (OSSD 1, OSSD 2) perform normally in accordance with the control outputs (OSSD 1, OSSD 2) or not. Monitor the contacting point "b" of the external safety relay, and if any abnormality such as deposit 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

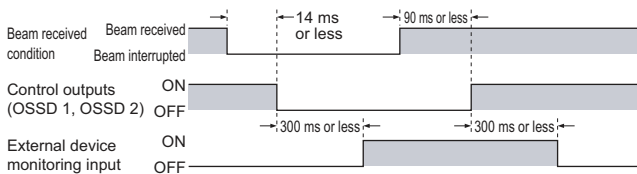
- Connect the external device monitoring input (yellow-green) to the external safety relay connected the control outputs (OSSD 1, OSSD 2). Refer to p.495~ for wiring diagrams.

In case of not using the external device monitoring function

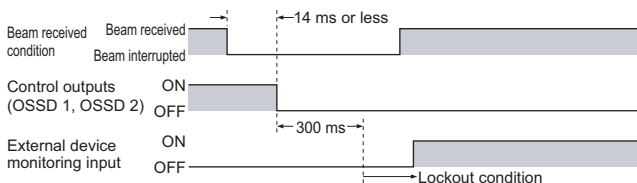
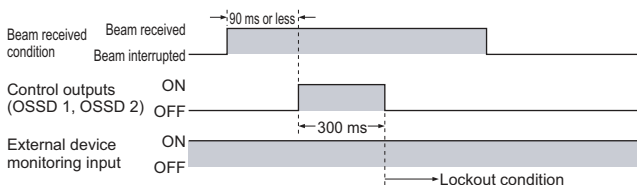
- Connect the external device monitoring input (yellow-green) to the auxiliary output (yellow-green / black). At this time, set the auxiliary output as [negative logic of control outputs (OSSD 1, OSSD 2)] (factory setting).



- 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** (refer to p.486) and the **SF-C14EX-01** (refer to p.489).

<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** and the **SF-C14EX-01**.

<Time chart (Error ①)>**<Time chart (Error ②)>****Muting function**

- Incorrect using of the muting control may cause any accident. Please understand the muting control fully, and use it. As for the muting control, the following international standards define the requirements.

ISO 13849-1 (EN 954-1 / JIS B 9705-1):

"Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design, Article 5.9 Muting"

IEC 61496-1 (UL 61496 / JIS B 9704-1):

"Safety of machinery – Electro sensitive protective equipment – Part 1: General requirements and tests" Annex A, A.7 Muting

IEC 60204-1 (JIS B 9960-1):

"Safety of machinery – Electrical equipment of machines – Part 1: General requirements, 9.2.4 Overriding safeguards"

EN 415-4:

"Safety of packaging machines part 4. Palletizers and depalletizers" Annex A, A2.2 Muting"

ANSI B11.19-1990:

"for Machine Tools-Safeguarding When Referenced by the Other B11 Machine Tool Safety Standards- Performance Criteria for the Design, Construction, Care, and Operation" 4.2.3 Presence-Sensing Devices: Electro-Optical and Radio Frequency (R.F.)

ANSI / RIA R15.06-1999:

"for Industrial Robots and Robot Systems – Safety Requirements, 10.4.5 Muting"



- 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).

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.

- The following devices, photoelectric sensor with semiconductor output, inductive proximity sensor, position switch on N.O. (Normal Open) contact, etc. are available for applying to the muting sensor.

- In case of using the muting function, please order 12-core cable.

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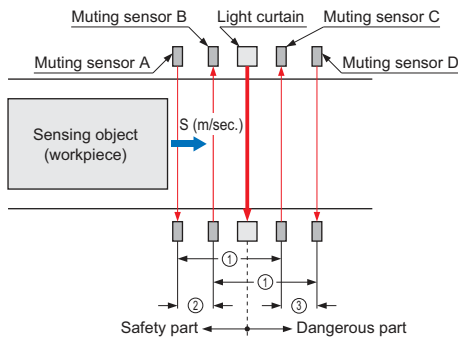
Specification for muting sensor

	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



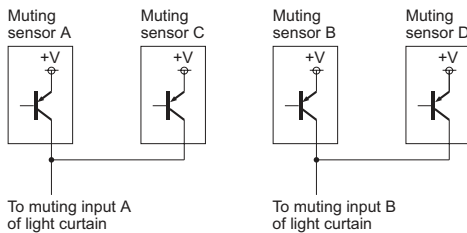
- Be sure to use the muting sensor that satisfies the "Specification for muting sensor" above. If the other muting sensor not satisfying the specification above, the muting function might become enabled with the timing that the machine designer cannot expect and could result in serious injury or death.
- The muting lamp shall be connected without fail. The muting function is invalid for activating with the muting lamp not connected.

Installation condition of muting sensor

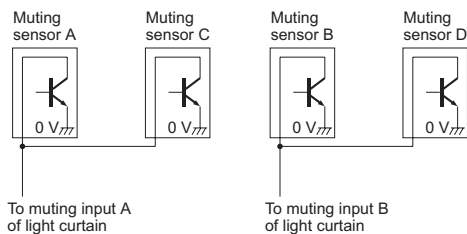


- ① Shorten the distances between muting sensors A to C and between B to D than the whole length of the sensing object.
- ② The transit time of the sensing object to be passed through the muting sensors A to B shall be 30 ms to less than 3 sec. S (m/sec.) is the moving speed of the sensing object, then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

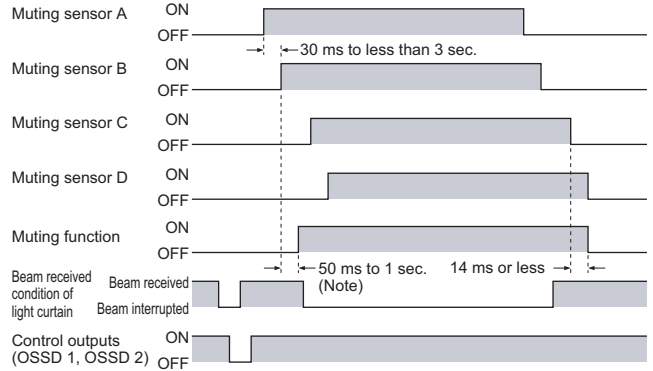
<In case of PNP output>



<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 and the SF-C14EX-01.
- It is recommended that two muting lamps should be connected in parallel. However, take care not to exceed 10 W.

Note: If the muting lamp does not light within 1 sec., the muting function is disabled.

Override function

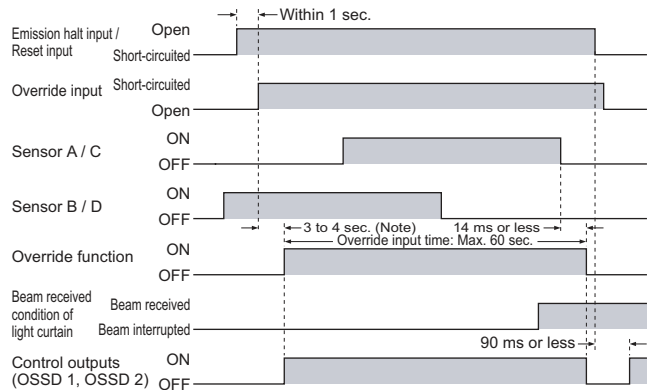
- This function sets the safety function of this light curtain enabled forcibly. When using the muting function, the override function can be used to start the machinery at times such as when the control outputs (OSSD 1 and OSSD 2) are OFF or when the muting sensors are ON when the line is to be started.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

<Time chart>



Note: If the muting lamp does not light within 4 sec., the override function is disabled.



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.


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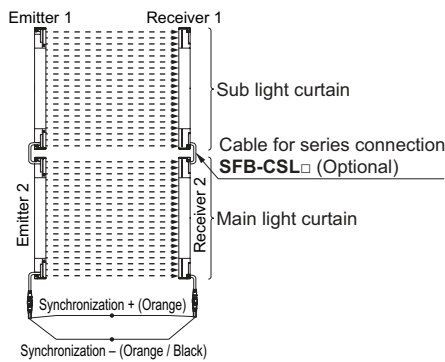
Refer to p.986 ~ for general precautions.

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.

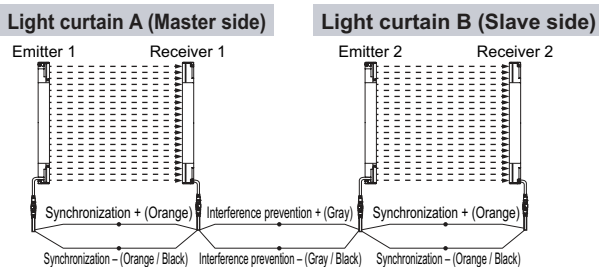
 For series connection, connect the emitter and emitter, receiver and receiver respectively using the exclusive cable (SFB-CSL□) for series connection. Wrong connection could generate the non-sensing area, resulting in serious injury or death.



Parallel connection

- 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.

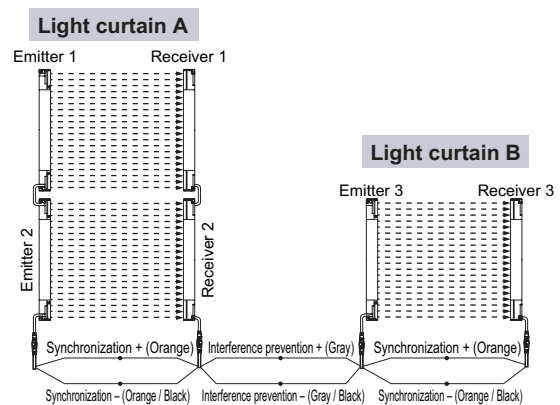


- Notes: 1) In case of using the interference prevention wire, please order 12-core cable.
 2) If the interference prevention wire is extended, use a $\phi 0.2$ mm², or more, shielded twist pair-cable.

Series and parallel mixed connection


- 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) In case of using the interference prevention wire, please order 12-core cable.
 2) If the interference prevention wire is extended, use a $\phi 0.2$ 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.

- FIBER SENSORS
- LASER SENSORS
- PHOTO-ELECTRIC SENSORS
- MICRO PHOTO-ELECTRIC SENSORS
- AREA SENSORS
- SAFETY COMPONENTS
- PRESSURE SENSORS
- INDUCTIVE PROXIMITY SENSORS
- PARTICULAR USE SENSORS
- SENSOR OPTIONS
- WIRE-SAVING SYSTEMS
- MEASUREMENT SENSORS
- STATIC CONTROL DEVICES
- LASER MARKERS

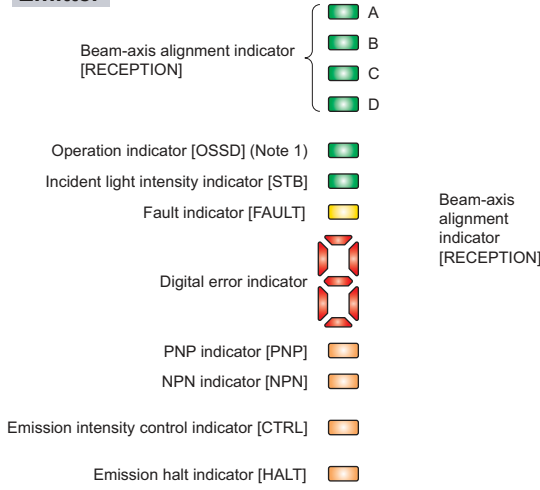
- Selection Guide
- Light Curtains
- SF4B**
- SF2B
- BSF4-AH80
- Control Units
- SF-C10
- Optical Touch Switch
- SW-101
- Other Products
- Definition of Sensing Heights

PRECAUTIONS FOR PROPER USE

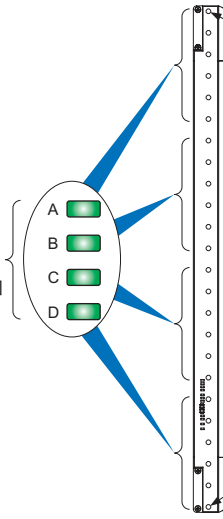
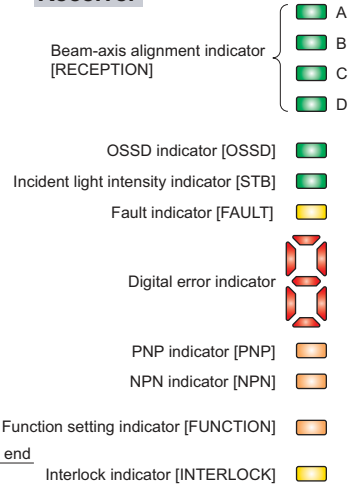
Refer to p.986~ for general precautions.

Part description and function

Emitter



Receiver



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 blink
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 blink
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 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

Refer to p.986~ for general precautions.

FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

SAFETY COMPONENTS

PRESSURE SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

WIRE-SAVING SYSTEMS

MEASUREMENT SENSORS

STATIC CONTROL DEVICES

LASER MARKERS

Selection Guide

Light Curtains

SF4B

SF2B

BSF4-AH80

Control Units


SF-C10

Optical Touch Switch

SW-101

Other Products

Definition of Sensing Heights




- 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.)

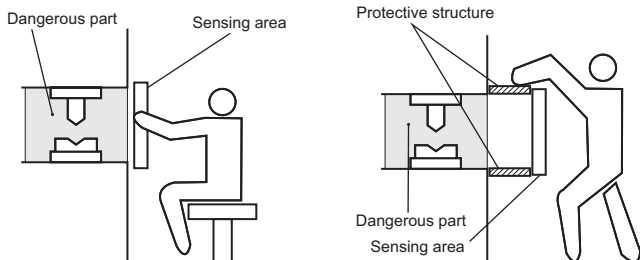
- Make sure to carry out the test run before regular operation.
- This safety system is for use only on machinery in which the dangerous parts can be stopped immediately, either by an emergency stop unit or by disconnecting the power supply. Do not use this system with machinery which cannot be stopped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

Sensing area

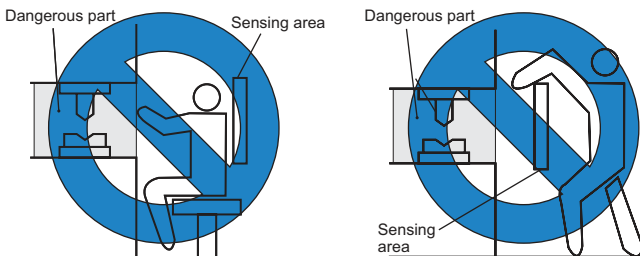


- Make sure to install this product such that any part of the human body must pass through its sensing area in order to reach the dangerous parts of the machinery. If the human body is not detected, there is a danger of serious injury or death.
- Do not use any reflective type or retroreflective type 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



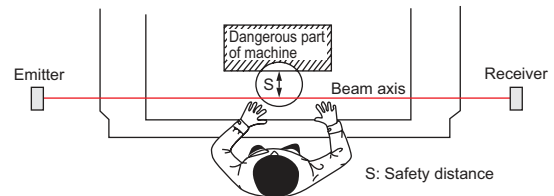

Wrong mounting method



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 $\varnothing 40$ mm $\varnothing 1.575$ 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 $\varnothing 14$ mm $\varnothing 0.551$ in)	$\varnothing 14$ mm $\varnothing 0.551$ in	$\varnothing 24$ mm $\varnothing 0.945$ in	$\varnothing 34$ mm $\varnothing 1.339$ in	$\varnothing 44$ mm $\varnothing 1.732$ in
SF4B-H□ (Min. sensing object $\varnothing 25$ mm $\varnothing 0.984$ in)	$\varnothing 25$ mm $\varnothing 0.984$ in	$\varnothing 45$ mm $\varnothing 1.772$ in	$\varnothing 65$ mm $\varnothing 2.559$ in	$\varnothing 85$ mm $\varnothing 3.346$ in
SF4B-A□ (Min. sensing object $\varnothing 45$ mm $\varnothing 1.772$ in)	$\varnothing 45$ mm $\varnothing 1.772$ in	$\varnothing 85$ mm $\varnothing 3.346$ in	$\varnothing 125$ mm $\varnothing 4.921$ in	$\varnothing 165$ mm $\varnothing 6.496$ in

Note: Refer to p.484~ for details of the floating blanking function. However, the floating blanking function cannot be used with the SF4B-□-01 (refer to p.486) and SF-C14EX-01 (refer to p.489).

- 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)

For intrusion direction perpendicular to the sensing area
<In case that the minimum sensing object is $\varnothing 40$ mm $\varnothing 1.575$ 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 0 or less.
 $C = 8 \times (d - 14)$
 d: Minimum sensing object diameter (mm)

PRECAUTIONS FOR PROPER USE

Refer to p.986~ for general precautions.

- 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.)
- 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)
- 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.
- T_s: Halting time calculated from the operation time of the control element (air valve, etc.) (sec.)
- T_c: Maximum response time of the control circuit required for functioning the brake (sec.)
- T_{SF4B}: Response time of light curtain (sec.)
- T_{bm}: Additional halting time tolerance for the brake monitor (sec.)
- The following equation holds when the machine is equipped with a brake monitor.
- $T_{bm} = T_a - (T_s + T_c)$
- T_a: 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.
- D_{pf}: 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**

$$D_{pf} = 3.4 \times (d - 0.276) \text{ (inch)}$$

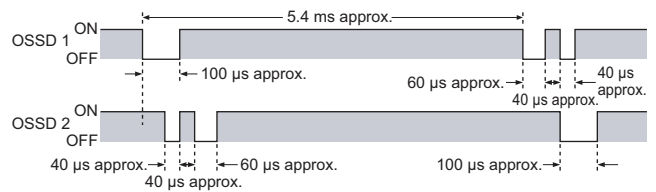
$$\approx 3.4 \times (d - 7) \text{ (mm)}$$

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**
 However, the value of D_{pf} cannot be 0 or less.

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.

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

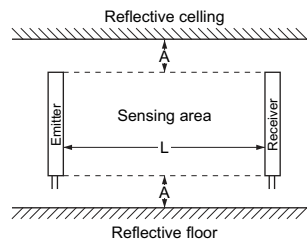


Influence of reflective surfaces

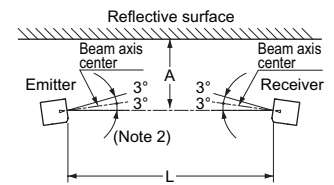
! Install the light curtain by considering the effect of nearby reflective surfaces, and take countermeasures such as painting, masking, or changing the material of the reflective surface, etc. Failure to do so may cause the light curtain not to detect, resulting in serious body injury or death.

- 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.

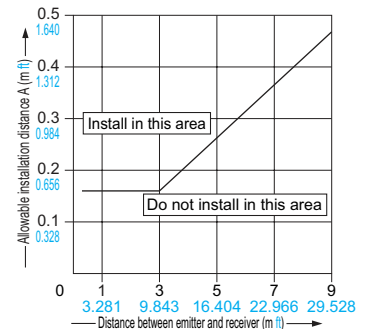
Side view



Top view



Distance between emitter and receiver (Setting distance L)	Allowable installation distance A
0.3 to 3 m 0.984 to 9.843 ft	0.16 m 0.525 ft
3 to 9 m 9.843 to 29.528 ft (Note 1)	$L/2 \times \tan 2\theta$ $\theta = 3^\circ$ $= L \times 0.053$ (m) 0.174 (ft)



- Notes: 1) The setting distance “L” varies depending on the type of unit. Refer to “ORDER GUIDE” on p.486 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

Refer to p.986~ for general precautions.

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** 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).

Corner mirror

- Be sure to carry out maintenance while referring to the instruction manual for the **SF4B** series of light curtains.
- 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.
- 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.
- 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.
- When adjusting beam channels with a laser alignment tool, etc., take sufficient care that the laser beam reflected by this product is not entered the eyes.
- Failure to follow the above items may result in death or serious injury.
- Please download the instruction manuals from our website (<http://www.sunx.com>).

Troubleshooting quick reference sheet

Digital error indicator	Possible cause
	Affected by noise. Handy-controller setting error.
	Incorrect combination of emitter and receiver (e.g. number of beam channels) Output polarity setting wires (shield) connected incorrectly.
	Series connection cable connected incorrectly. Problem with upper light curtain connected in series.
	The number of light curtains connected in series and the total number of beam channels is outside the specification range.
	<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.
	<Emitter side lights up> Muting lamp output connected incorrectly. <Receiver side lights up> Control output (OSSD1, OSSD2) connected incorrectly.
	Output polarity setting wires (shield) connected incorrectly.
	External device monitoring input connected incorrectly. Malfunction with connection relay.
	Synchronizing wires connected incorrectly. <Emitter side lights up> Problem at receiver side. <Receiver side lights up> Problem at emitter side.
	Affected by noise. Power supply-related problem. Light curtain malfunction. * Please contact our office.
	Drop in incident light intensity due to dirty sensing surface or beam axis misalignment. (Beam axis input is erratic.)
	Light emitting halted.
	Interlock active.
	Control output is set to PNP output.
	Control output is set to NPN output.

* Refer to the instruction manual for details.

FIBER
SENSORSLASER
SENSORSPHOTO-
ELECTRIC
SENSORSMICRO
PHOTO-
ELECTRIC
SENSORSAREA
SENSORSSAFETY
COMPONENTSPRESSURE
SENSORSINDUCTIVE
PROXIMITY
SENSORSPARTICULAR
USE
SENSORSSENSOR
OPTIONSWIRE-
SAVING
SYSTEMSMEASURE-
MENT
SENSORSSTATIC
CONTROL
DEVICESLASER
MARKERSSelection
GuideLight
Curtains**SF4B****SF2B**

BSF4-AH80

Control
Units**SF-C10**Optical Touch
Switch**SW-101**Other
ProductsDefinition of
Sensing Heights

DIMENSIONS (Unit: mm in)

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

SF4B-□ (-01)

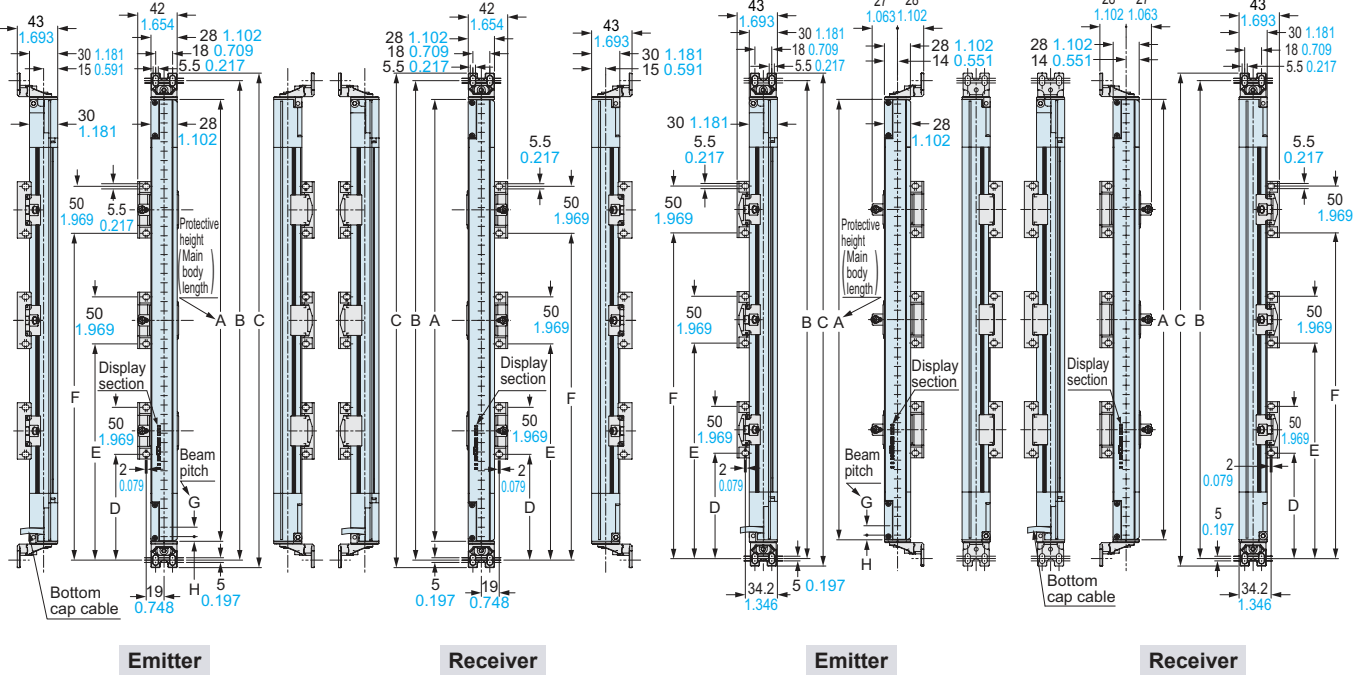
Light curtain

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.

<Back mounting>

<Side mounting>



Emitter

Receiver

Emitter

Receiver

Model No.			A	B	C	D	E	F
SF4B-F23(-01)	SF4B-H12(-01)	SF4B-A6(-01)	230 9.055	270 10.630	286 11.260	—	—	—
SF4B-F31(-01)	SF4B-H16(-01)	SF4B-A8(-01)	310 12.205	350 13.780	366 14.406	—	—	—
SF4B-F39(-01)	SF4B-H20(-01)	SF4B-A10(-01)	390 15.354	430 16.929	446 17.559	—	—	—
SF4B-F47(-01)	SF4B-H24(-01)	SF4B-A12(-01)	470 18.504	510 20.079	526 20.709	—	—	—
SF4B-F55(-01)	SF4B-H28(-01)	SF4B-A14(-01)	550 21.654	590 23.228	606 23.858	—	—	—
SF4B-F63(-01)	SF4B-H32(-01)	SF4B-A16(-01)	630 24.803	670 26.378	686 27.008	—	—	—
SF4B-F71(-01)	SF4B-H36(-01)	SF4B-A18(-01)	710 27.953	750 29.528	766 30.157	—	—	—
SF4B-F79(-01)	SF4B-H40(-01)	SF4B-A20(-01)	790 31.102	830 32.677	846 33.307	390 15.354	—	—
SF4B-F95(-01)	SF4B-H48(-01)	SF4B-A24(-01)	950 37.402	990 38.976	1,006 39.606	470 18.504	—	—
SF4B-F111(-01)	SF4B-H56(-01)	SF4B-A28(-01)	1,110 43.701	1,150 45.276	1,166 45.905	550 21.654	—	—
SF4B-F127(-01)	SF4B-H64(-01)	SF4B-A32(-01)	1,270 50.000	1,310 51.575	1,326 52.505	418 16.457	842 33.150	—
—	SF4B-H72(-01)	SF4B-A36(-01)	1,430 56.299	1,470 57.874	1,486 58.504	472 18.583	948 37.323	—
—	SF4B-H80(-01)	SF4B-A40(-01)	1,590 62.598	1,630 64.173	1,646 64.803	525 20.669	1,055 41.535	—
—	SF4B-H88(-01)	SF4B-A44(-01)	1,750 68.898	1,790 70.472	1,806 71.102	433 17.047	870 34.252	1,308 51.496
—	SF4B-H96(-01)	SF4B-A48(-01)	1,910 75.197	1,950 76.772	1,966 77.401	473 18.622	950 37.402	1,428 56.220

Model No.	G	H
SF4B-F□(-01)	10 0.394	5 0.197
SF4B-H□(-01)	20 0.787	5 0.197
SF4B-A□(-01)	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-□(-01)

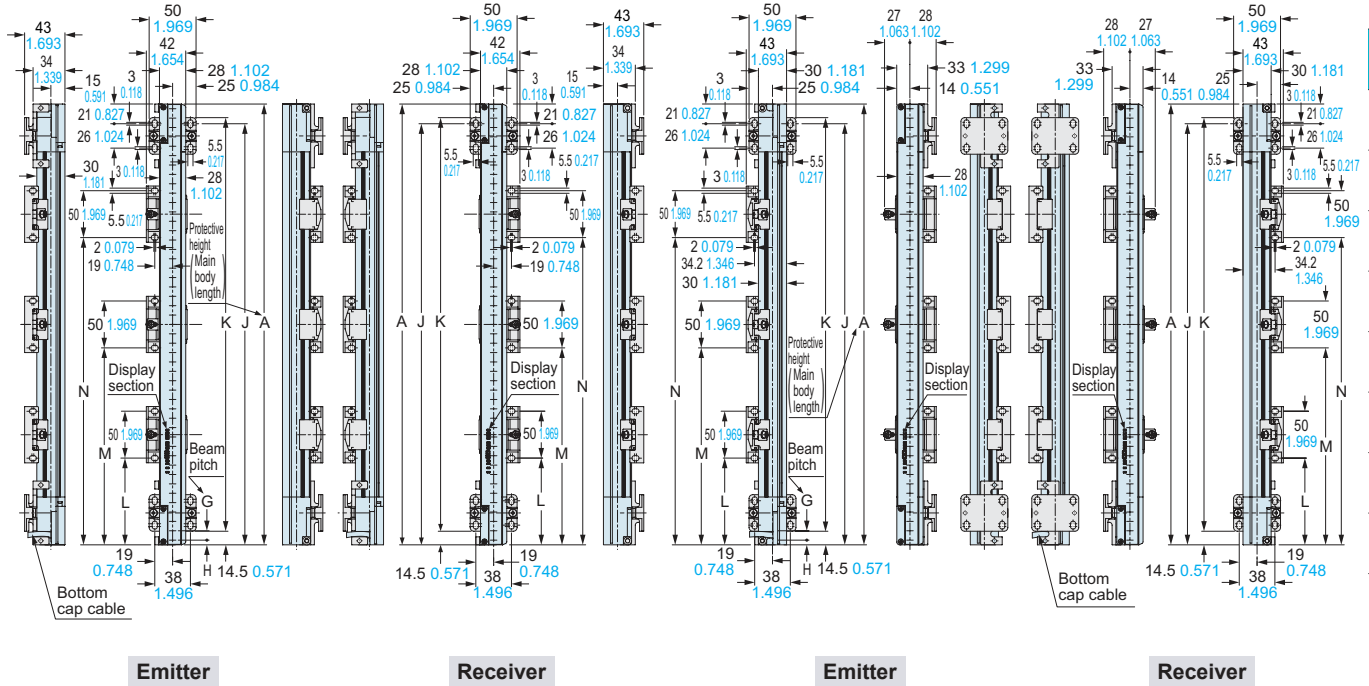
Light curtain

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.

<Back mounting>

<Side mounting>



Model No.			A	J	K	L	M	N
SF4B-F23(-01)	SF4B-H12(-01)	SF4B-A6(-01)	230 9.055	209 8.228	201 7.913	—	—	—
SF4B-F31(-01)	SF4B-H16(-01)	SF4B-A8(-01)	310 12.205	289 11.378	281 11.063	—	—	—
SF4B-F39(-01)	SF4B-H20(-01)	SF4B-A10(-01)	390 15.354	369 14.528	361 14.213	—	—	—
SF4B-F47(-01)	SF4B-H24(-01)	SF4B-A12(-01)	470 18.504	449 17.677	441 17.362	—	—	—
SF4B-F55(-01)	SF4B-H28(-01)	SF4B-A14(-01)	550 21.654	529 20.827	521 20.512	—	—	—
SF4B-F63(-01)	SF4B-H32(-01)	SF4B-A16(-01)	630 24.803	609 23.976	601 23.661	—	—	—
SF4B-F71(-01)	SF4B-H36(-01)	SF4B-A18(-01)	710 27.953	689 27.126	681 26.811	—	—	—
SF4B-F79(-01)	SF4B-H40(-01)	SF4B-A20(-01)	790 31.102	769 30.276	761 29.961	370 14.567	—	—
SF4B-F95(-01)	SF4B-H48(-01)	SF4B-A24(-01)	950 37.402	929 36.575	921 36.260	450 17.717	—	—
SF4B-F111(-01)	SF4B-H56(-01)	SF4B-A28(-01)	1,110 43.701	1,089 42.874	1,081 42.559	530 20.866	—	—
SF4B-F127(-01)	SF4B-H64(-01)	SF4B-A32(-01)	1,270 50.000	1,249 49.173	1,241 48.858	398 15.669	822 32.362	—
—	SF4B-H72(-01)	SF4B-A36(-01)	1,430 56.299	1,409 55.472	1,401 55.157	452 17.795	928 36.535	—
—	SF4B-H80(-01)	SF4B-A40(-01)	1,590 62.598	1,569 61.772	1,561 61.457	505 19.882	1,035 40.748	—
—	SF4B-H88(-01)	SF4B-A44(-01)	1,750 68.898	1,729 68.071	1,721 67.756	413 16.260	850 33.465	1,288 50.709
—	SF4B-H96(-01)	SF4B-A48(-01)	1,910 75.197	1,889 74.370	1,881 74.055	453 17.835	930 36.614	1,408 55.433

Model No.	G	H
SF4B-F□(-01)	10 0.394	5 0.197
SF4B-H□(-01)	20 0.787	5 0.197
SF4B-A□(-01)	40 1.575	15 0.591

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DIMENSIONS (Unit: mm in)

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

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SF4B-□(-01)

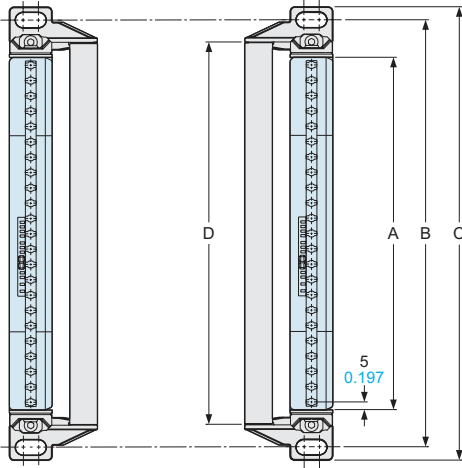
Light curtain

Protection bar assembly dimensions

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

<Protection bar left side>

<Protection bar right side>

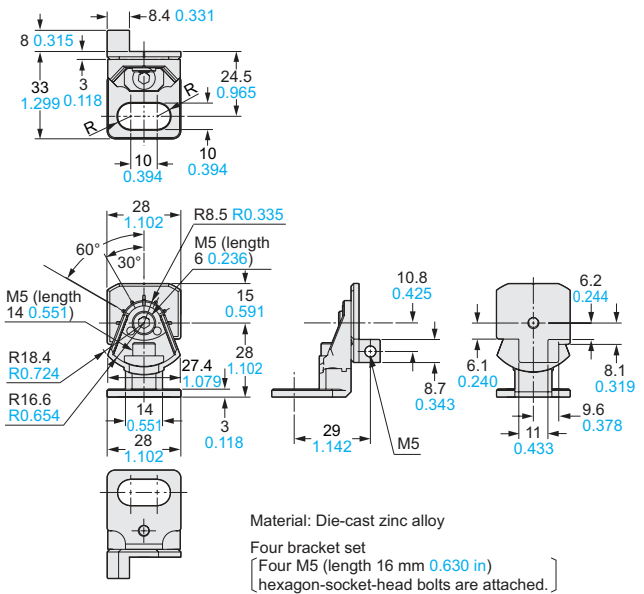
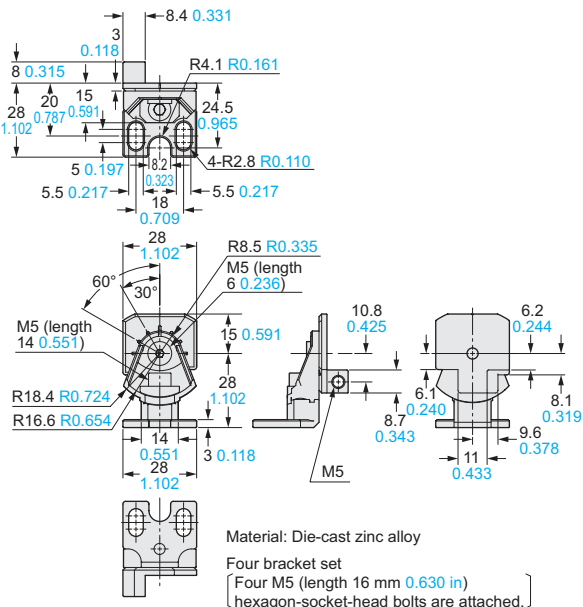


Model No.	Applicable light curtain model No.			A	B	C	D
MC-SFBH-12	SF4B-F23(-01)	SF4B-H12(-01)	SF4B-A6(-01)	230 9.055	279 10.984	296 11.654	250 9.843
MC-SFBH-16	SF4B-F31(-01)	SF4B-H16(-01)	SF4B-A8(-01)	310 12.205	359 14.134	376 14.803	330 12.992
MC-SFBH-20	SF4B-F39(-01)	SF4B-H20(-01)	SF4B-A10(-01)	390 15.354	439 17.283	456 17.953	410 16.142
MC-SFBH-24	SF4B-F47(-01)	SF4B-H24(-01)	SF4B-A12(-01)	470 18.504	519 20.433	536 21.102	490 19.291
MC-SFBH-28	SF4B-F55(-01)	SF4B-H28(-01)	SF4B-A14(-01)	550 21.654	599 23.583	616 24.252	570 22.441
MC-SFBH-32	SF4B-F63(-01)	SF4B-H32(-01)	SF4B-A16(-01)	630 24.803	679 26.732	696 27.402	650 25.591
MC-SFBH-36	SF4B-F71(-01)	SF4B-H36(-01)	SF4B-A18(-01)	710 27.953	759 29.882	776 30.551	730 28.740
MC-SFBH-40	SF4B-F79(-01)	SF4B-H40(-01)	SF4B-A20(-01)	790 31.102	839 33.031	856 33.701	810 31.890
MC-SFBH-48	SF4B-F95(-01)	SF4B-H48(-01)	SF4B-A24(-01)	950 37.402	999 39.331	1,016 40.000	970 38.189
MC-SFBH-56	SF4B-F111(-01)	SF4B-H56(-01)	SF4B-A28(-01)	1,110 43.701	1,159 45.630	1,176 46.299	1,130 44.488
MC-SFBH-64	SF4B-F127(-01)	SF4B-H64(-01)	SF4B-A32(-01)	1,270 50.000	1,319 51.929	1,336 52.598	1,290 50.787
MC-SFBH-72	—	SF4B-H72(-01)	SF4B-A36(-01)	1,430 56.299	1,479 58.228	1,496 58.898	1,450 57.087
MC-SFBH-80	—	SF4B-H80(-01)	SF4B-A40(-01)	1,590 62.598	1,639 64.527	1,656 65.197	1,610 63.386
MC-SFBH-88	—	SF4B-H88(-01)	SF4B-A44(-01)	1,750 68.898	1,799 70.827	1,816 71.496	1,770 69.685
MC-SFBH-96	—	SF4B-H96(-01)	SF4B-A48(-01)	1,910 75.197	1,959 77.126	1,976 77.795	1,930 75.984

- Selection Guide
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MS-SFB-1 Standard mounting bracket (Optional)

MS-SFB-1-T M8 Mounting bracket (Optional)

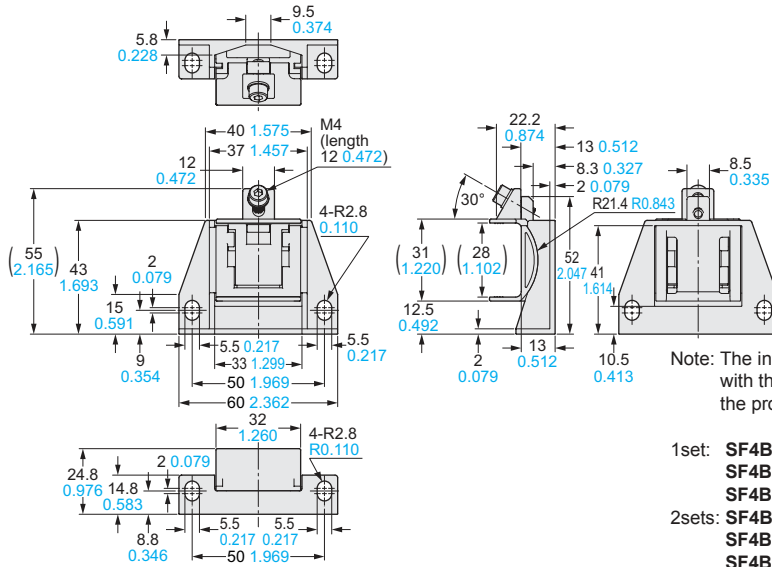


DIMENSIONS (Unit: mm in)

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MS-SFB-2

Intermediate supporting bracket (Accessory for light curtain)



Material: Die-cast zinc alloy

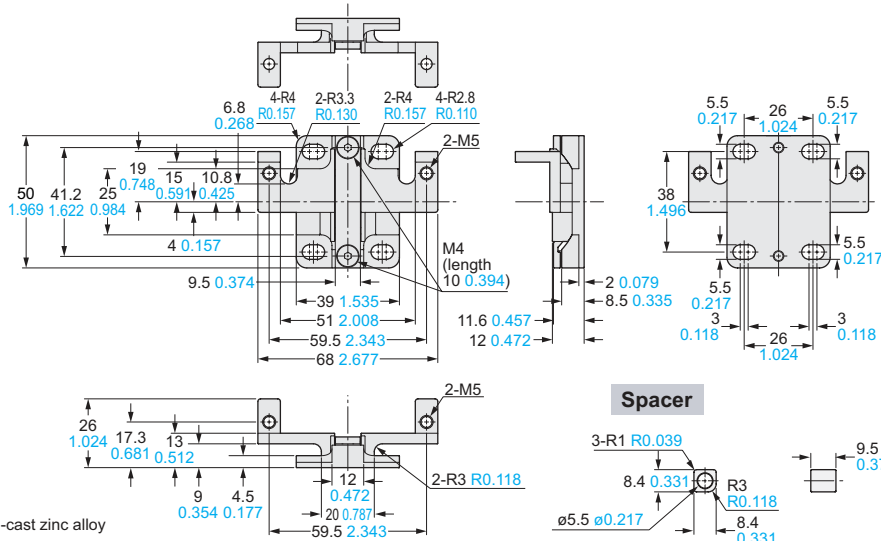
Note: The intermediate supporting bracket (**MS-SFB-2**) is enclosed with the following products. The quantity differs depending on the product as shown below:

- 1set: **SF4B-F□(-01)** ... Light curtain with 79 to 111 beam channels
- SF4B-H□(-01)** ... Light curtain with 40 to 56 beam channels
- SF4B-A□(-01)** ... Light curtain with 20 to 28 beam channels
- 2sets: **SF4B-F127(-01)**
- SF4B-H□(-01)** ... Light curtain with 64 to 80 beam channels
- SF4B-A□(-01)** ... Light curtain with 32 to 40 beam channels
- 3sets: **SF4B-H□(-01)** ... Light curtain with 88 to 96 beam channels
- SF4B-A□(-01)** ... Light curtain with 44 to 48 beam channels

MS-SFB-3

Dead zoneless mounting bracket (Optional)

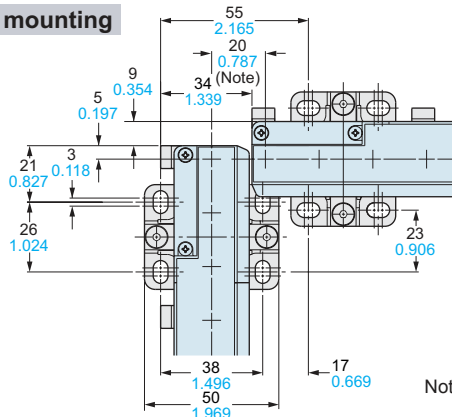
Main body



Material: Die-cast zinc alloy

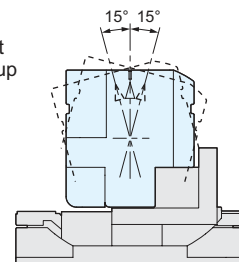
Four bracket set
 (Four M5 (length 25 mm 0.984 in) hexagon-socket-head bolts and four spacers are attached.)

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.

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Other Products

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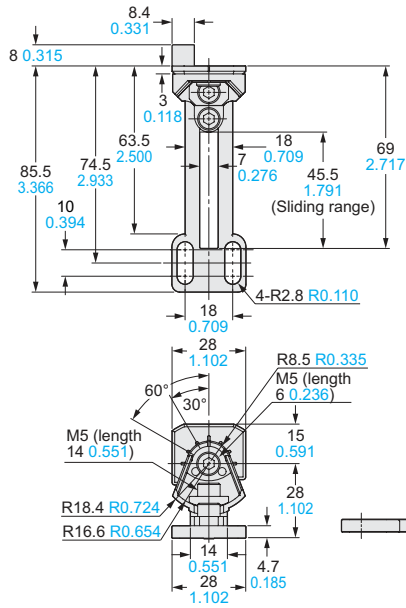
DIMENSIONS (Unit: mm in)

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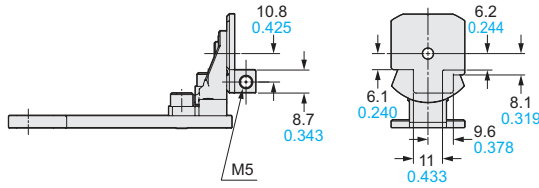
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MS-SFB-4

Pitch adapter bracket (Optional)

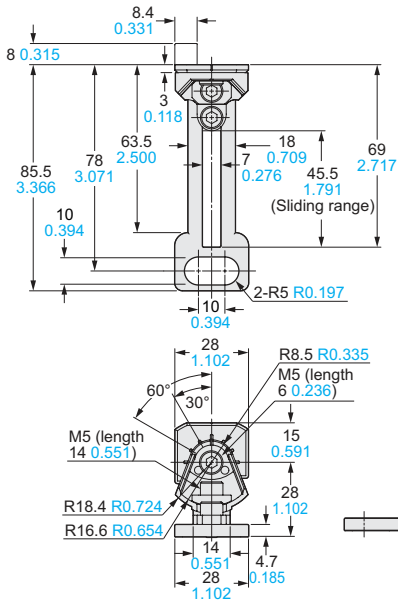


Material: Die-cast zinc alloy
 Four bracket set
 [Four M5 (length 16 mm 0.630 in) hexagon-socket-head bolts are attached.]

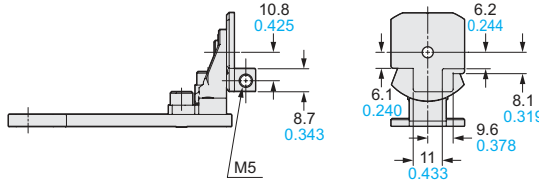


MS-SFB-4-T

M8 pitch adapter bracket (Optional)

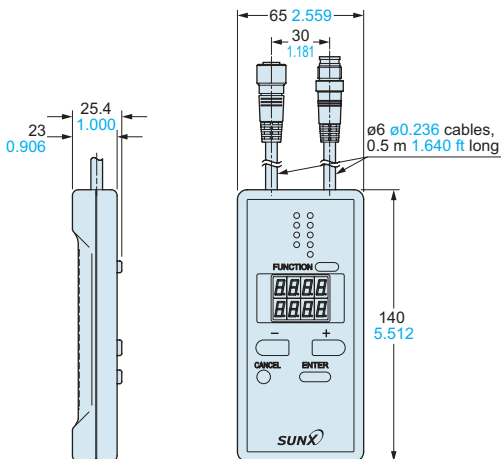


Material: Die-cast zinc alloy
 Four bracket set
 [Four M5 (length 16 mm 0.630 in) hexagon-socket-head bolts are attached.]



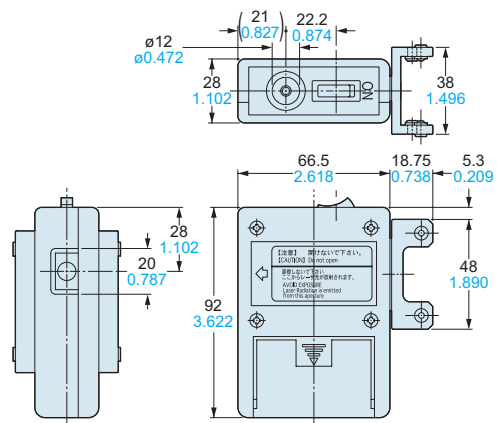
SFB-HC

Handy-controller (Optional)



SF-LAT-2N

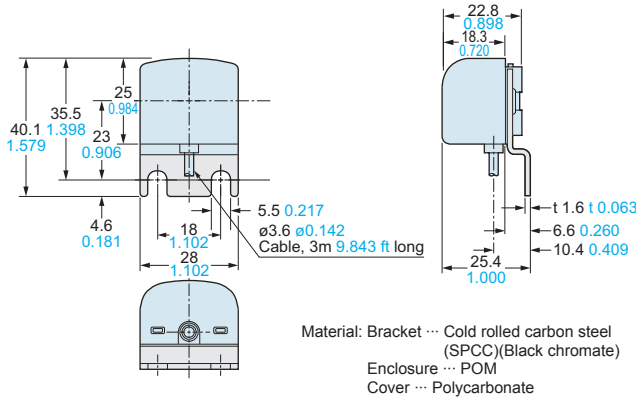
Laser alignment tool (Optional)



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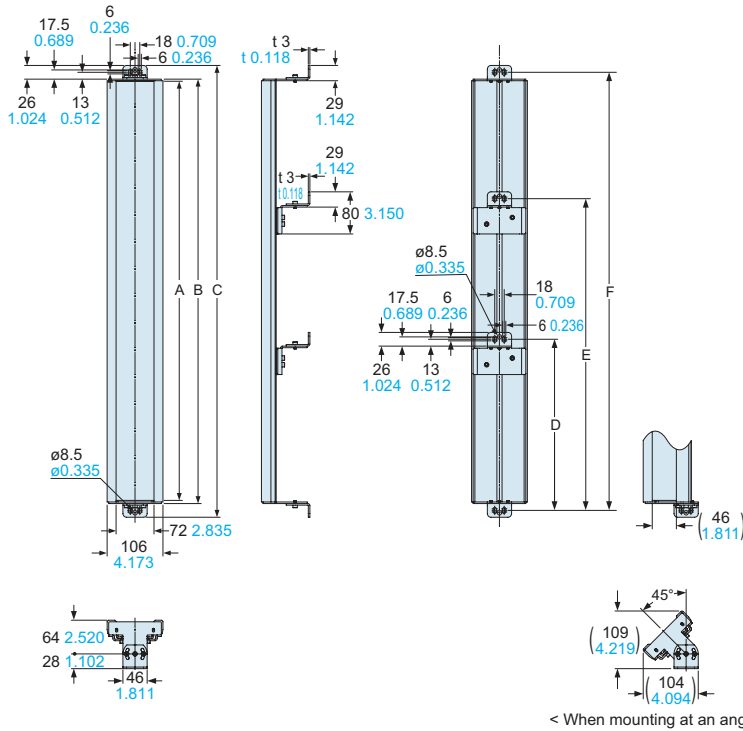
SF-IND-2

Large display unit for light curtain (Optional)



RF-SFBH-□

Corner mirror (Optional)



Model No.	A	B	C	D	E	F	Dimensions of effective reflective surface	Net weight
RF-SFBH-12	236 9.291	246 9.685	298 11.732	—	—	272 10.709	236 × 72 mm 9.291 × 2.835 in	970 g approx
RF-SFBH-16	316 12.441	326 12.835	378 14.882	—	—	352 13.858	316 × 72 mm 12.441 × 2.835 in	1,170 g approx
RF-SFBH-20	396 15.591	406 15.984	458 18.031	—	—	432 17.008	396 × 72 mm 15.591 × 2.835 in	1,370 g approx
RF-SFBH-24	476 18.740	486 19.134	538 21.181	—	—	512 20.157	476 × 72 mm 18.740 × 2.835 in	1,570 g approx
RF-SFBH-28	556 21.890	566 22.283	618 24.331	—	—	592 23.307	556 × 72 mm 21.890 × 2.835 in	1,770 g approx
RF-SFBH-32	636 25.039	646 25.433	698 27.480	—	—	672 26.457	636 × 72 mm 25.039 × 2.835 in	1,970 g approx
RF-SFBH-36	716 28.189	726 28.583	778 30.630	—	—	752 29.606	716 × 72 mm 28.189 × 2.835 in	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	796 × 72 mm 31.339 × 2.835 in	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	956 × 72 mm 37.638 × 2.835 in	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	1,116 × 72 mm 43.937 × 2.835 in	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	1,276 × 72 mm 50.236 × 2.835 in	3,890 g approx
RF-SFBH-72	1,436 56.353	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	1,436 × 72 mm 56.535 × 2.835 in	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	1,596 × 72 mm 62.835 × 2.835 in	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	1,756 × 72 mm 69.134 × 2.835 in	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	1,916 × 72 mm 75.433 × 2.835 in	5,750 g approx

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