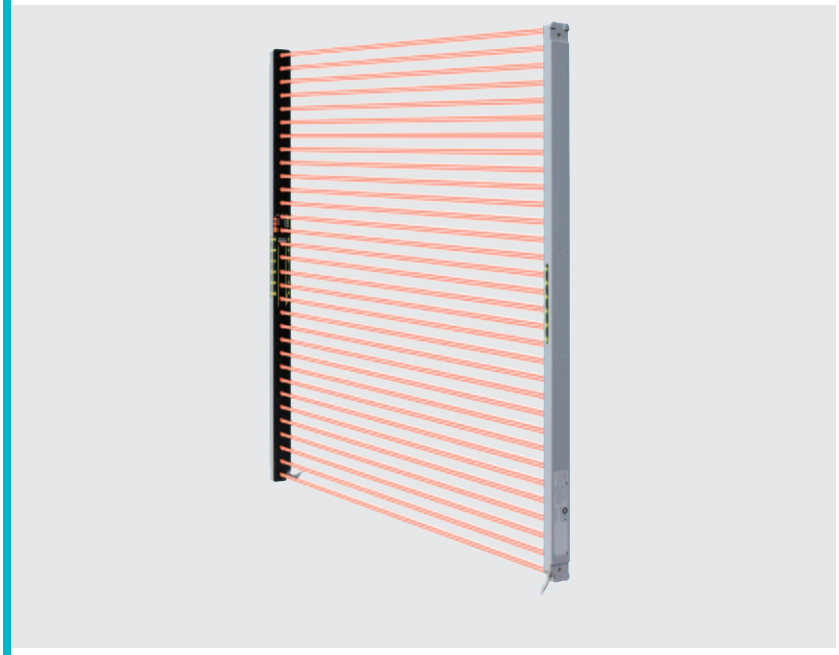
Ultra-slim Light Curtain Type 4

SF4C SERIES

Related Information
■ General terms and conditions F-17
■ SF-C10 ..... P.633~
■ General precautions P.1405
■ Sensor selection guide ..... P.511~
■ Glossary of terms ..... P.1359~
■ Korea's S-mark P.1410



Conforming to Machine & EMC Directive

Certified

Certified by NRTL

Conforming to OSHA / ANSI

Certified* [Excluding SF4C-F□]

* Effective from production in December, 2010.

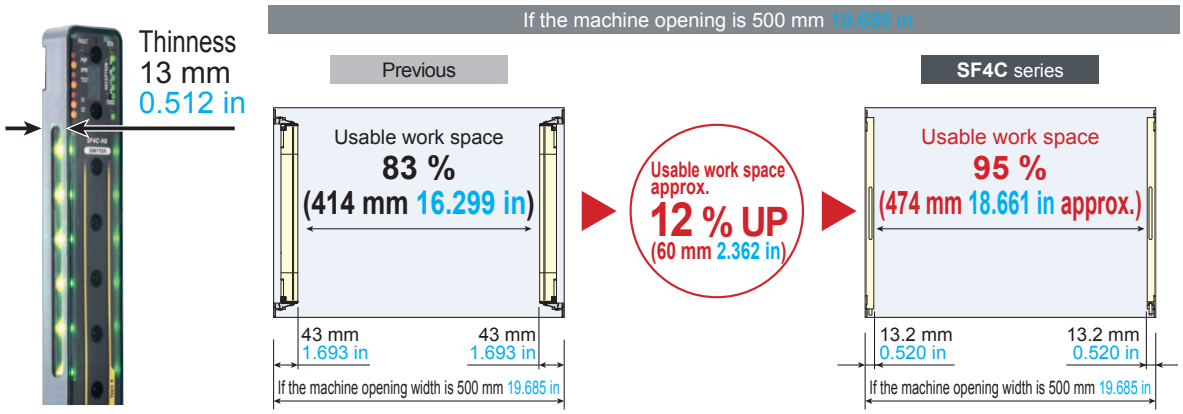
Self-diagnosis

PNP output type available

Machine safeguarding without sacrificing productivity

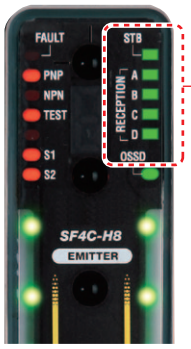
Slim size for efficient applications

Available work space is expanded from the previous model, and productivity is improved.



Beam-axis alignment indicators help to reduce startup time

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



Beam-axis alignment indicator

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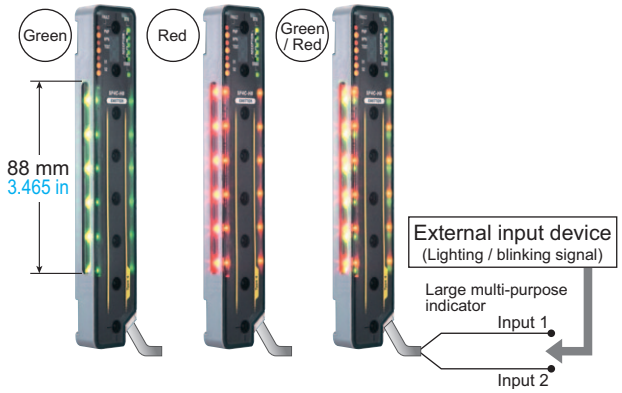
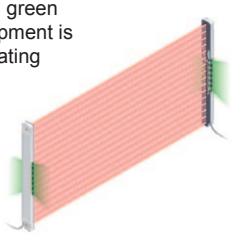
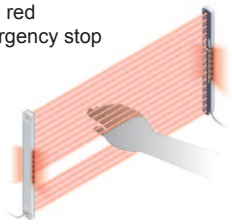
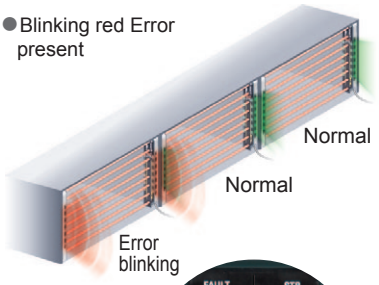
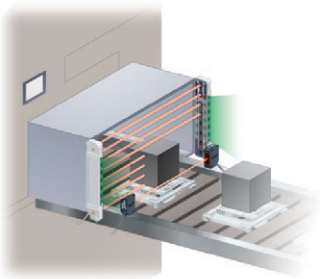
Rugghölzli 2
CH - 5453 Busslingen

Can be used in a variety of applications for simplified equipment [Large multi-purpose indicator]

The bright LED indicators located in the center of both sides of each light curtain can be illuminated green or red by using external inputs. There is no need for setting up a separate indicator, so that equipment is consolidated.



Use as an operation indicator	Use as an error indicator	Use as a muting lamp
● Solid green Equipment is operating  ● Solid red Emergency stop 	● Blinking red Error present   Confirm detail of error quickly on the digital display. * **SF4C-F15(-J05)** does not incorporate the digital display.	 * If a failure diagnosis of muting lamp is needed as by the result of risk assessment, use the handy-controller **SFC-HC** to change the setting, and connect the muting lamp output wire (red) of this light curtain to an incandescent lamp separately.
Use the handy-controller **SFC-HC** to change lighting conditions.		

A single model supports both PNP and NPN polarities reducing model numbers

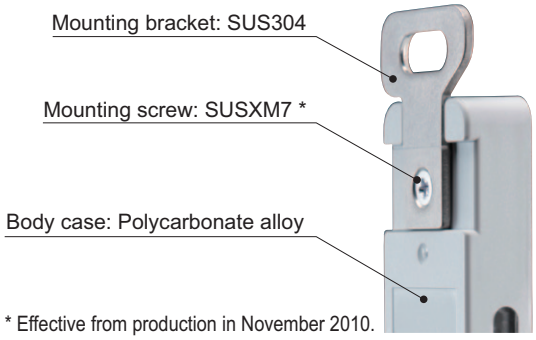
PNP transistor output and NPN transistor output are combined in a single model. Overseas equipment that uses PNP, replacement with NPN sensors, factories that are positively grounded, and transfer of equipment overseas are all situations where the control circuits for a single model are suitable for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

IP67 protection structure

An IP67 (IEC / JIS) rating is achieved with an ultra-slim size for protection from environmental factors.

Material suitable for manufacturing a secondary battery

SF4C body is made of resin and the mounting bracket is made of Stainless Steel (SUS), so materials used are limited. Suitable for manufacturing secondary batteries or for food production equipment.



* Effective from production in November 2010.

A fast response time of 7 ms* for all models

A fast response time of 7 ms* is unified for all models regardless of the number of beam channels.

* When connecting safety sensors (light curtains, etc) to the safety input, the response time will be the total time of connected units.

Mutual interference is reduced without needing for interference prevention lines

The light curtain is equipped with the ELCA (Extraneous Light Check & Avoid) function, which has been proven to be strong against mutual interference. It automatically shifts the scan timing of the light curtain in order to avoid interference.

Reducing the number of malfunctions caused by extraneous light

Double scanning method and retry processing are two new functions exclusive to Panasonic Electric Works SUNX Co., Ltd. which are effective in eliminating the effects of momentary extraneous light from peripheral equipment.

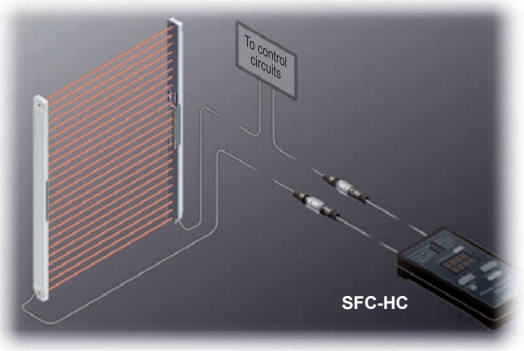
Handy-controller SFC-HC enables the user to select a variety of settings

Operation of the large multi-purpose indicators can be configured

Mode	Operation of large multi-purpose indicators (factory setting: mode 0)					
	Large multi-purpose indicator 1	Large multi-purpose indicator 2	Control outputs (OSSD 1 / OSSD 2)		Muting function	Override function
	High or Low	High or Low	ON	OFF	Enabled	Enabled
0	Solid red	Solid green	–	–	-	-
1	Blinking red	Blinking green	–	–	-	-
2	Solid red	Blinking green	–	–	-	-
3	Blinking red	Solid green	–	–	-	-
4 (Note 1)	Solid red	Blinking red	–	–	-	-
5 (Note 1)	Blinking green	Solid green	–	–	-	-
6 (Note 1)	–	–	Solid green	Solid red	Blinking green	-
7 (Note 1)	Solid red	Blinking red	–	–	Solid green	Blinking green

Notes: 1) The blinking condition is prioritized over the solid condition.
2) During lockout, it is possible to blink red.

Lockout blinking function	When lockout occurs
Enabled	Blinking red
Disabled	———



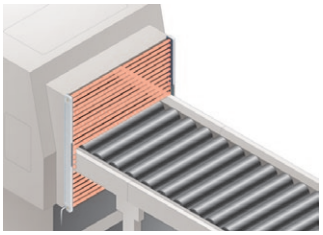
Fixed blanking function which allows selective beam channels to be activated improves productivity

The **SF4C** series is equipped with a fixed blanking function which allows specific beam channels to be selectively interrupted without causing the control output (OSSD) to output the OFF signal. This function is convenient for use with applications in which certain fixed obstacles tend to interrupt specific beam channels.

Auxiliary output has selectable output configuration

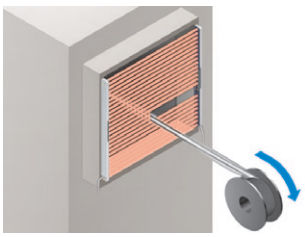
Mode No.	Description
0	Negative logic of the control outputs (OSSD 1, OSSD 2) (factory setting)
1	Positive logic of the control outputs (OSSD 1, OSSD 2)
2	For test input enabled: output OFF, For Disabled: output ON
3	For test input enabled: output ON, For Disabled: output OFF
4	For unstable incident beam: OFF (Note 1)
5	For unstable incident beam: ON (Note 1)
6	For muting: ON
7	For muting: OFF
8	For beam received: ON, For beam interrupted: OFF (Note 2)
9	For beam received: OFF, For beam interrupted: ON (Note 2)
A	For safety input enabled: ON, Disabled: OFF
B	For safety input enabled: OFF, Disabled: ON
C	For lockout: OFF
D	For lockout: ON

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



Floating blanking function which allows non-specified beam channels to be deactivated improves productivity

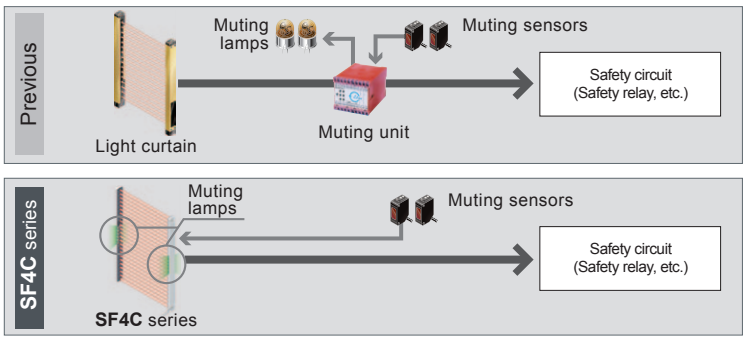
1, 2 or 3 non-specified beam channels can be deactivated. This function is useful in the event when an object passes through the light curtain's sensing area.



Note: When the floating blanking function is used, the size of the min. sensing object is changed.

Safety, productivity, and cost reduction [Muting control function]

The light curtain has a built-in muting control function that causes the line to stop only when a person passes through the light curtain, and does not stop the line when an object passes through. The muting sensors and muting lamps can be connected directly to the light curtain. Furthermore, the large multi-purpose indicators can be used as muting lamps, which contribute to less wiring troubles, improvement of safety and productivity, and cost reduction.



* If a failure diagnosis of muting lamp is needed as by the result of risk assessment, use the handy-controller **SFC-HC** to change the setting, and connect the muting lamp output wire (red) of this light curtain to an incandescent lamp separately.

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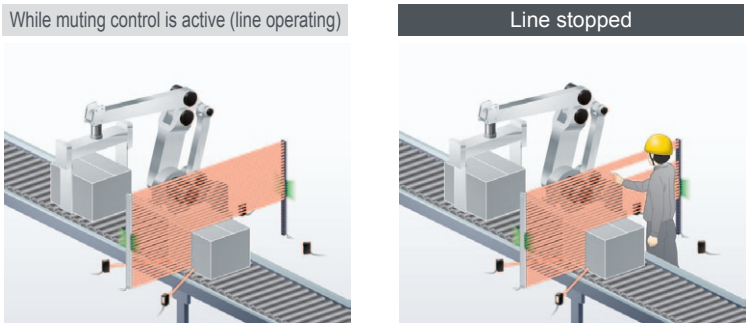
Selective muting area [Separate muting control function for each beam channel]

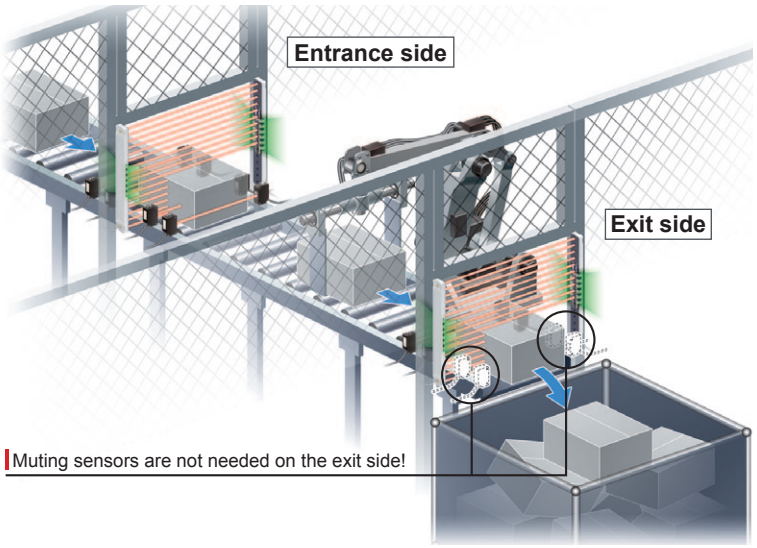
The handy-controller **SFC-HC** can be used to carry out muting control for specified beam channels only. Because individual beam channel can be specified to suit the object, separate guards to prevent entry do not need to be set up.



For example, depending on the height of the object, the muting function can be activated for 10 beam channels starting from the bottom most, 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.

Safety measures when objects exit [Exit muting control function]

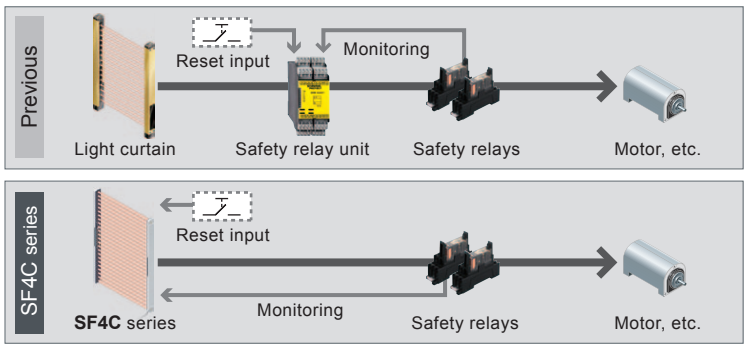
Muting at the exit of a machine is now possible using the handy-controller **SFC-HC**. Just set a Max. four sec. delay timer on the muting sensors located at the exit. This is efficient for places with no installation space for muting sensors and also reduces cost and wiring.



By installing muting sensors only within the dangerous zone and setting up a delay timer on the sensor, muting control is made possible even on the exit side where muting sensors cannot be installed.

Safety circuit is constructed without the need for a safety relay unit [External device monitoring function]

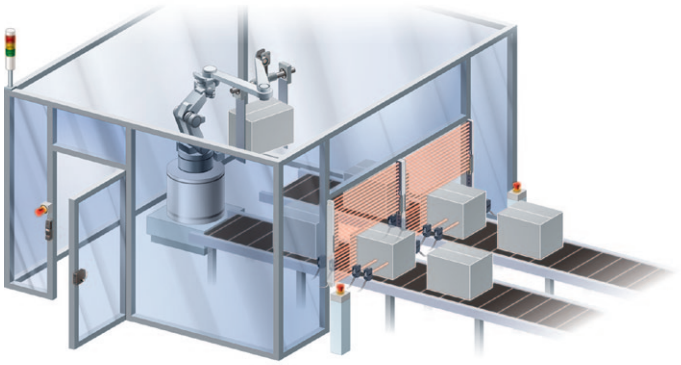
The light curtain has a built-in external device monitoring function (such as deposited relay monitoring) and an interlock function. This allows a safety circuit to be constructed so that a separate safety relay unit is not needed, and the control box has become smaller to help to achieve to lower costs.



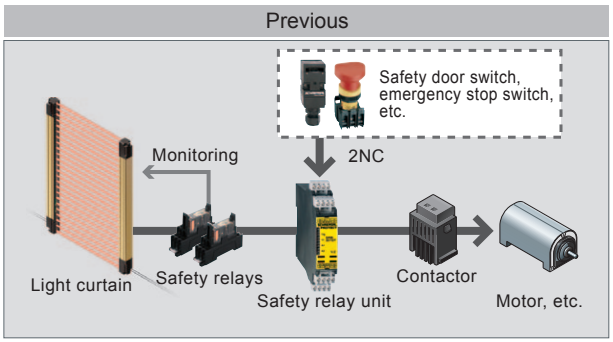
The light curtain can directly connect to external devices (safety relay, etc) without an exclusive control unit. This allows for simplified equipment, cost reduction, and error prevention.

Wire-saving when connecting to safety devices [Safety input function]

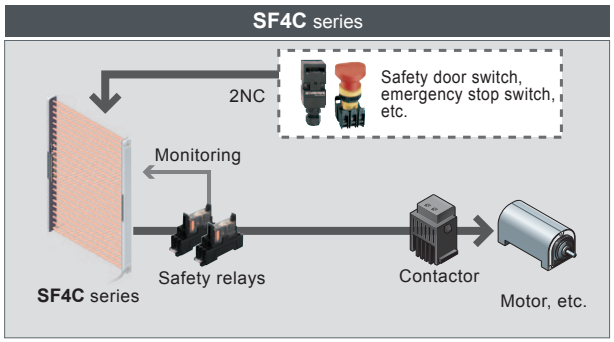
Contact outputs such as an emergency stop switches or a safety door switches can be connected to the light curtain. Also, by using the handy-controller **SFC-HC** up to three sets of light curtains can be cascade connected for a consolidated safety output.



Direct connection of safety devices

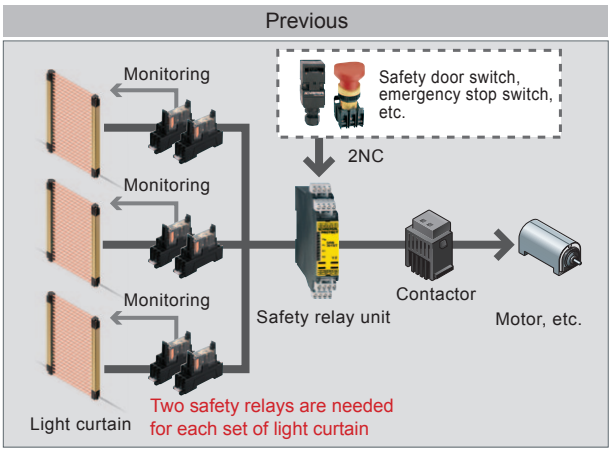


A safety relay unit is needed for connecting safety devices other than light curtain.

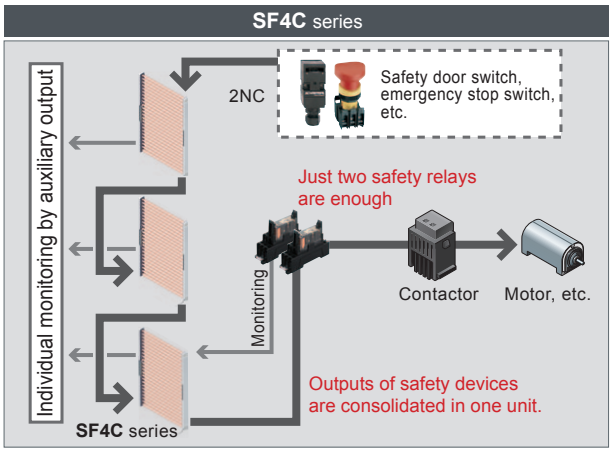


Direct connection of various safety devices is possible for a simplified safety circuit.

By using the handy-controller SFC-HC up to three sets of light curtains can be cascade connected for a consolidated safety output. (Note)



Three sets of light curtains require three sets of safety relays.

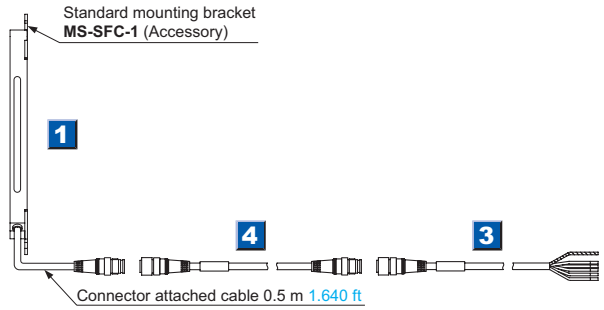


Individual monitoring on light curtains is possible while the outputs of three sets of light curtains and other safety devices are consolidated in one unit.

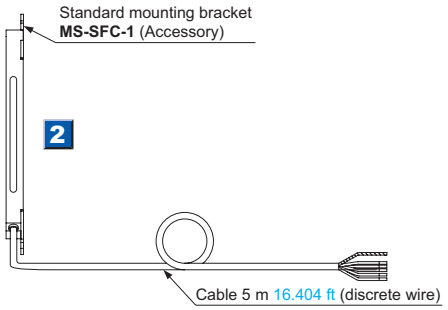
Note: This setting is possible with the use of handy-controller **SFC-HC** for **SF4C** series Ver.2.1 or later.

PRODUCT CONFIGURATION

Maintenance is prioritized
Pigtailed type (Mounting bracket, connector attached cable)

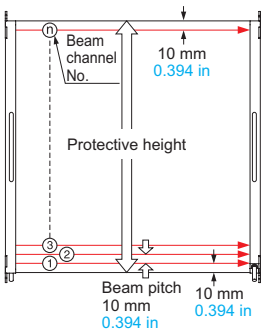
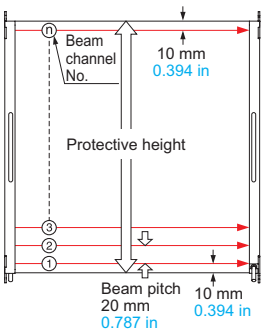


Basic set in one model No.
Cable type [Mounting bracket, with 5 m (16.404 ft) cable]

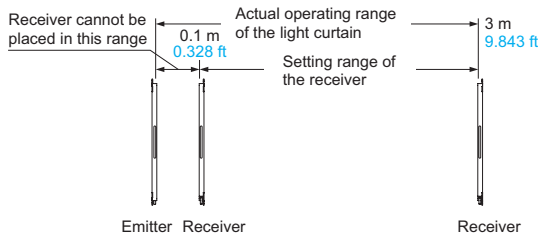


ORDER GUIDE

1 2 Light curtains

Type	Appearance	Operating range (Note 1)	Model No. (Note 2) 1 Pigtailed type	Model No. (Note 2) 2 Cable type	Number of beam channels	Protective height (mm in)
Finger protection type NEW Min. sensing object ø14 mm ø0.551 in (10 mm 0.394 in beam pitch)		0.1 to 3 m 0.328 to 9.843 ft	**SF4C-F15-J05**	**SF4C-F15**	15	160 mm 6.299 in
			SF4C-F23-J05	**SF4C-F23**	23	240 mm 9.449 in
			SF4C-F31-J05	**SF4C-F31**	31	320 mm 12.598 in
			SF4C-F39-J05	**SF4C-F39**	39	400 mm 15.748 in
			SF4C-F47-J05	**SF4C-F47**	47	480 mm 18.898 in
			SF4C-F55-J05	**SF4C-F55**	55	560 mm 22.047 in
			SF4C-F63-J05	**SF4C-F63**	63	640 mm 25.197 in
Hand protection type Min. sensing object ø25 mm ø0.984 in (20 mm 0.787 in beam pitch)		0.1 to 3 m 0.328 to 9.843 ft	**SF4C-H8-J05**	**SF4C-H8**	8	160 mm 6.299 in
			SF4C-H12-J05	**SF4C-H12**	12	240 mm 9.449 in
			SF4C-H16-J05	**SF4C-H16**	16	320 mm 12.598 in
			SF4C-H20-J05	**SF4C-H20**	20	400 mm 15.748 in
			SF4C-H24-J05	**SF4C-H24**	24	480 mm 18.898 in
			SF4C-H28-J05	**SF4C-H28**	28	560 mm 22.047 in
			SF4C-H32-J05	**SF4C-H32**	32	640 mm 25.197 in

Notes: 1) The operating range is the possible setting distance between the emitter and the receiver. The light curtain can detect an object less than 0.1 m 0.328 ft away.



2) The model No. with "**E**" shown on the label affixed to the product is the emitter, "**D**" shown on the label is the receiver.
(e.g.) Emitter of **SF4C-H8-J05**: **SF4C-H8E-J05**, Receiver of **SF4C-H8-J05**: **SF4C-H8D-J05.**

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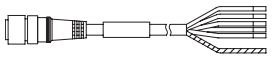
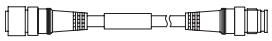
ORDER GUIDE

3 4 Mating cables

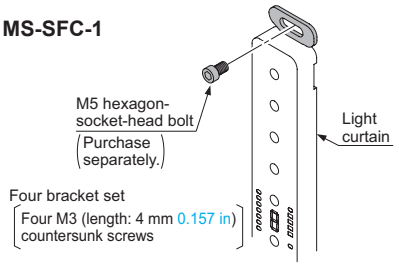
Type			Appearance	Model No.	Description	
Mating cables	With connector on one end 3			**SFB-CC3-MU**	Length: 3 m 9.843 ft Net weight: 430 g approx. (2 cables)	Cable with connector on one end for pigtailed type Two cables per set for emitter and receiver Cable color: Gray (for emitter), Gray with black line (for receiver) Connector color: Gray (for emitter), Black (for receiver) The min. bending radius: R6 mm R0.236 in
				SFB-CC7-MU	Length: 7 m 22.966 ft Net weight: 1,000 g approx. (2 cables)	
				SFB-CC10-MU	Length: 10 m 32.808 ft Net weight: 1,300 g approx. (2 cables)	
	With connectors on both ends 4	For emitter		**SFB-CCJ3E-MU**	Length: 3 m 9.843 ft Net weight: 190 g approx. (1 cable)	Cable with connectors on both ends for pigtailed type Cable color: Gray (for emitter), Gray with black line (for receiver) Connector color: Gray (for emitter), Black (for receiver) The min. bending radius: R6 mm R0.236 in
				SFB-CCJ10E-MU	Length: 10 m 32.808 ft Net weight: 660 g approx. (1 cable)	
		For receiver		**SFB-CCJ3D-MU**	Length: 3 m 9.843 ft Net weight: 210 g approx. (1 cable)	
				SFB-CCJ10D-MU	Length: 10 m 32.808 ft Net weight: 680 g approx. (1 cable)	

Spare parts (Accessories for light curtain)

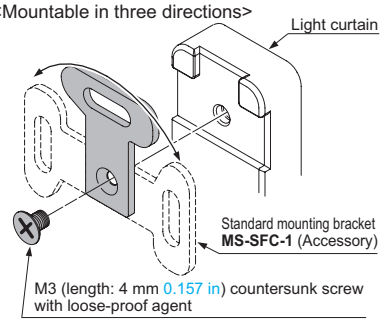
Designation	Model No.	Description
Standard mounting bracket	**MS-SFC-1**	Allows the light curtain to be mounted at the rear with one M5 hexagon-socket-head bolt. Mounting direction of the bracket can be selected between vertical or horizontal (no dead zone). (4 pcs. per set for emitter and receiver)
Test rod ø14	**SF4C-TR14**	Min. sensing object for regular checking (ø14 mm ø0.551 in)
Test rod ø25	**SF4C-TR25**	Min. sensing object for regular checking (ø25 mm ø0.984 in)

Standard mounting bracket

· **MS-SFC-1**



<Mountable in three directions>



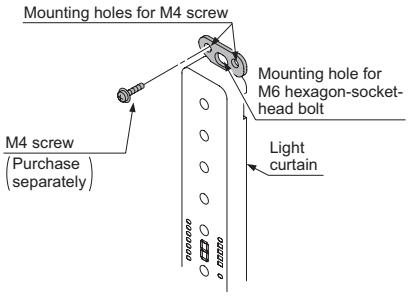
OPTIONS

Mounting brackets

Designation	Model No.	Description
NA2-N compatible mounting bracket	**MS-SFC-2**	Used when changing over area sensor **NA2-N** series to the **SF4C** series. The mounting holes of **NA2-N** series can continue to be used. Center mounting by a M6 hexagon-socket-head bolt is also possible. (4 pcs. per set for emitter and receiver)
Versatile bracket	**MS-SFC-3**	Two ways of mounting are possible. ① Rear mounting which enables beam adjustment ② Dead zoneless center mounting on aluminum frame (4 pcs. per set for emitter and receiver)
Intermediate supporting bracket for versatile bracket	**MS-SFC-4**	Used to support the light curtain in the middle. Be sure to purchase it when using **MS-SFC-3** on **SF4C-F55**(**-J05**) or **SF4C-F63**(**-J05**) or **SF4C-H28**(**-J05**) or **SF4C-H32**(**-J05**). (2 pcs. per set for emitter and receiver)

NA2-N compatible mounting bracket

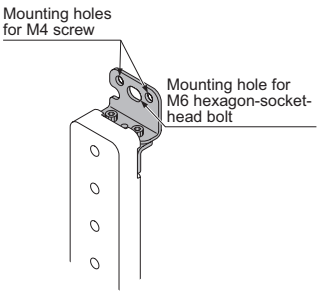
- **MS-SFC-2**



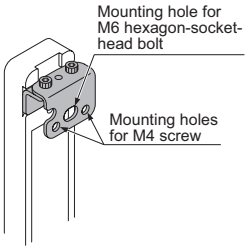
Versatile bracket

- **MS-SFC-3**

<Rear mounting>

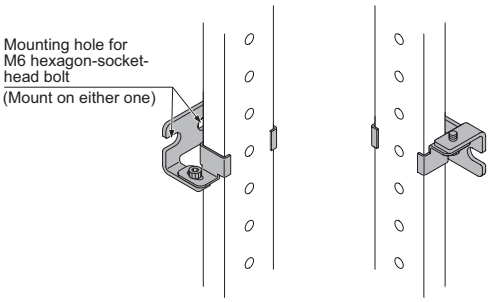


<Dead zoneless mounting>

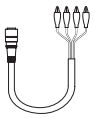


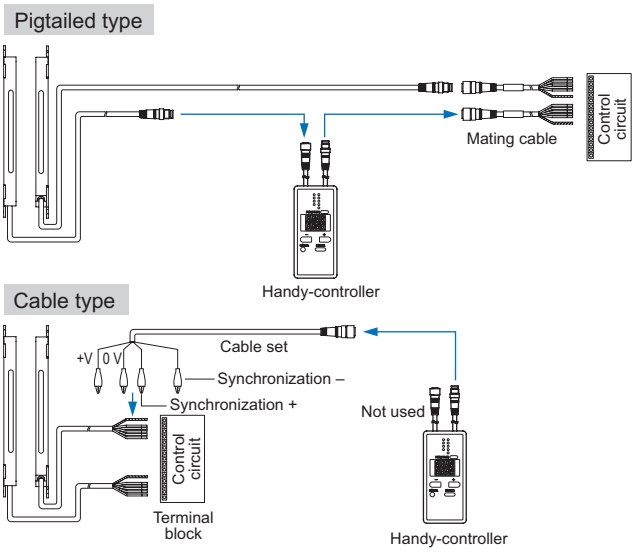
Intermediate supporting bracket for versatile bracket

- **MS-SFC-4**



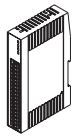
Handy-controller

Designation	Appearance	Model No.
Handy-controller		**SFC-HC**
Cable set for cable type connection		**SFC-WNC1**



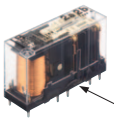
OPTIONS

Control unit

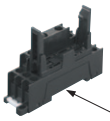
Designation	Appearance	Model No.	Description
Slim type control unit		**SF-C13**	Use a discrete wire cable to connect to the light curtain. Relay output. Compatible with up to Control Category 4.

Recommended safety relay

Safety relay
Panasonic Electric Works Co., Ltd.
SF series



Safety relay
SFS3-L-DC24V
SFS4-L-DC24V

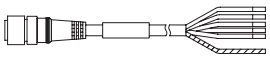


DIN terminal block
SFS4-SFD

Note: Contact Panasonic Electirc Works Co., Ltd. for details on the recommended products.

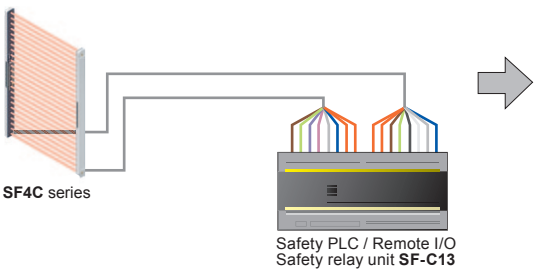
Item \ Type / Model No.	With LED indicator	
	SFS3-L-DC24V	SFS4-L-DC24V
Contact arrangement	3a1b	4a2b
Rated nominal switching capacity	6 A / 250 V AC, 6 A / 30 V DC	
Min. switching capacity	1 mA / 5 V DC	
Coil rating	15 mA / 24 V DC	20.8 mA / 24 V PC
Rated power consumption	360 mW	500 mW
Operation time	20 ms or less	
Release time	20 ms or less	
Ambient temperature	-40 to +85 °C -40 to +185 °F (Humidity: 5 to 85 % RH)	
Applicable standards	UL, C-UL, TÜV	

Y-shaped connectors

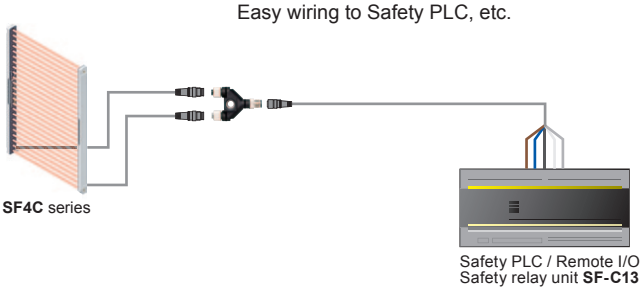
Type	Appearance	Model No.	Description	
Wire-saving Y-shaped connector		**SFC-WY1**	Wire-saving connector for **SF4C-□-J05**. Cables of emitter and receiver are consolidated into one cable for wire-saving. Wiring has +24 V, 0 V, OSSD 1, OSSD 2, output polarity setting wire (shield), large multi-purpose indicator input 1, and large multi-purpose indicator input 2 only. [Power wire and synchronization wire are connected inside the connector. Interlock is disabled (automatic reset).]	
Cable with connector on one side		**WY1-CCN3**	Cable length: 3 m 9.843 ft Net weight: 200 g approx. (1 cable)	Mating cable for Y-shaped connector Cable color: Gray (with black line) Connector color: Black The min. bending radius: R6 mm R0.236 in
		WY1-CCN10	Cable length: 10 m 32.808 ft Net weight: 620 g approx. (1 cable)	

By using the Y-shaped connector, the least required wires such as power or safety output are consolidated into one cable. Man-hours taken for wiring is eliminated to the minimum. Construction times as well as wiring mistakes are greatly reduced.

Previous A total of 24 wires



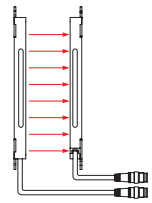
Y-shaped connector Only 7 wires
Less wiring mistakes! Reduced wiring time!
Easy wiring to Safety PLC, etc.



OPTIONS

Product configuration

Emitter Receiver



Pigtailed type
0.5 m 1.640 ft

Extension cable (1 cable for receiver)

SFB-CCJ3D-MU (3 m 9.843 ft for receiver)
SFB-CCJ10D-MU (10 m 32.808 ft for receiver)

Extension cable (1 cable for emitter)

SFB-CCJ3E-MU (3 m 9.843 ft for emitter)
SFB-CCJ10E-MU (10 m 32.808 ft for emitter)

Y-shaped connector
SFC-WY1

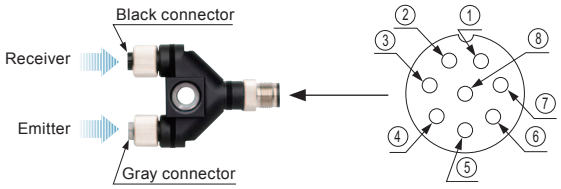
Extension cable

SFB-CCJ3D (3 m 9.843 ft)
SFB-CCJ10D (10 m 32.808 ft)

Cable with connector on one side (Common for all models)

WY1-CCN3 (3 m 9.843 ft)
WY1-CCN10 (10 m 32.808 ft)

Connector pin layout

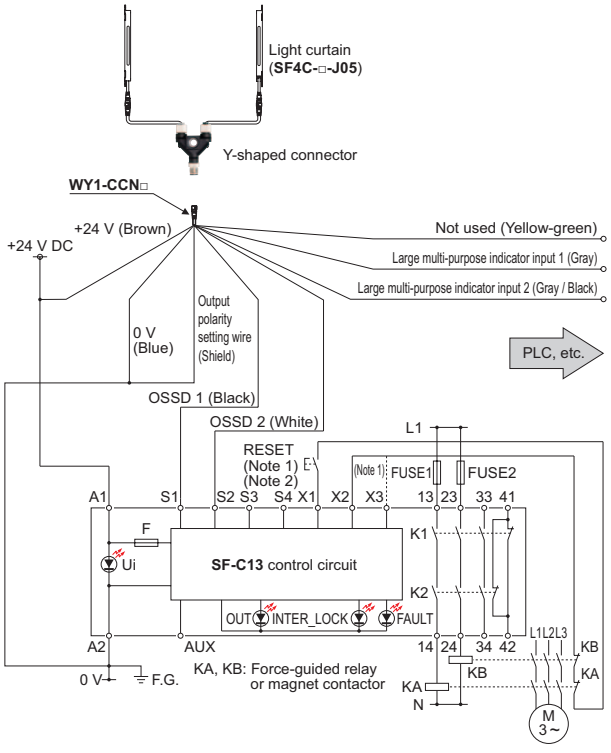


Connector pin No.	Description
①	OSSD 2
②	+24 V
③	OSSD 1
④	Not used
⑤	Large multi-purpose indicator input 1
⑥	Large multi-purpose indicator input 2
⑦	0 V
⑧	Output polarity setting wire (Shield)

Wiring diagram of control unit SF-C13

<For PNP output (minus ground)>

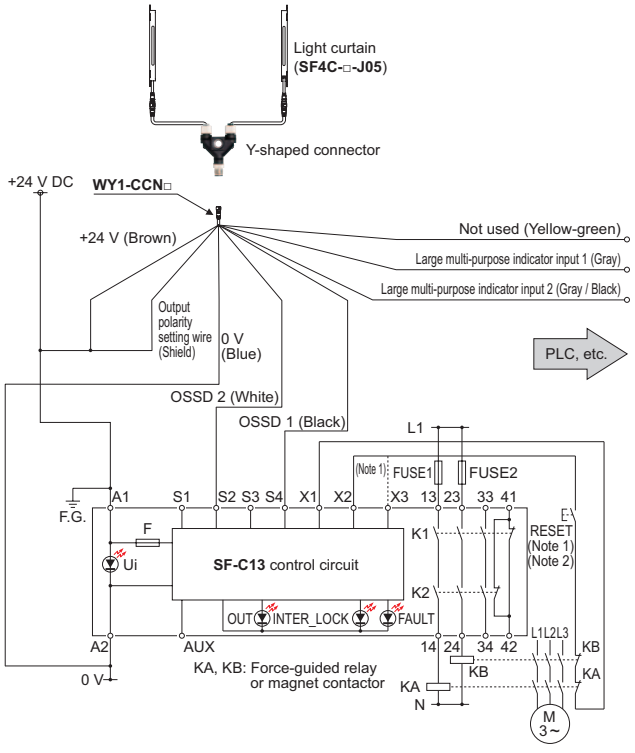
- Connect the light curtain control outputs OSSD 1 and OSSD 2 to S1 and S2 respectively.



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.
3) Unused wires must be insulated.

<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.



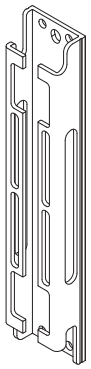
Notes: 1) The above diagram is when using manual reset. If automatic reset is used, disconnect the lead from X2 and connect it to X3. In this case, a reset (RESET) button is not needed.
2) Use a momentary-type switch as the reset (RESET) button.
3) Unused wires must be insulated.

OPTIONS

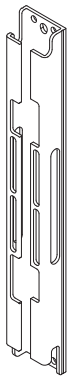
Metal protection case

Applicable beam channels / Designation		Metal protection case (2 pcs. per set for emitter and receiver)
Finger protection type	Hand protection type	Model No.
15	8	**MS-SFCH-8**
23	12	**MS-SFCH-12**
31	16	**MS-SFCH-16**
39	20	**MS-SFCH-20**
47	24	**MS-SFCH-24**
55	28	**MS-SFCH-28**
63	32	**MS-SFCH-32**

• **MS-SFCH-8**



• **MS-SFCH-□**
(Excluding **MS-SFCH-8**)



SPECIFICATIONS

Light curtain individual specifications

SF4C-F□(-J05)

Item	Model No.	Type	Min. sensing object ø14 mm ø0.551 in type (10 mm 0.394 in beam pitch)						
		Pigtailed type	**SF4C-F15-J05**	**SF4C-F23-J05**	**SF4C-F31-J05**	**SF4C-F39-J05**	**SF4C-F47-J05**	**SF4C-F55-J05**	**SF4C-F63-J05**
		Cable type	**SF4C-F15**	**SF4C-F23**	**SF4C-F31**	**SF4C-F39**	**SF4C-F47**	**SF4C-F55**	**SF4C-F63**
No. of beam channels			15	23	31	39	47	55	63
Protective height			160 mm 6.299 in	240 mm 9.449 in	320 mm 12.598 in	400 mm 15.748 in	480 mm 18.898 in	560 mm 22.047 in	640 mm 25.197 in
Current consumption	Large multi-purpose indicator lights off		Emitter: 70 mA or less Receiver: 80 mA or less	Emitter: 75 mA or less Receiver: 85 mA or less		Emitter: 80 mA or less Receiver: 90 mA or less		Emitter: 85 mA or less Receiver: 95 mA or less	
	Large multi-purpose indicator lights up		Emitter: 105 mA or less Receiver: 110 mA or less	Emitter: 110 mA or less Receiver: 115 mA or less		Emitter: 115 mA or less Receiver: 120 mA or less		Emitter: 120 mA or less Receiver: 125 mA or less	
PFHD			2.29×10^{-9}	2.73×10^{-9}	3.18×10^{-9}	3.62×10^{-9}	4.06×10^{-9}	4.50×10^{-9}	4.95×10^{-9}
MTTFd			100 years or more						
Net weight (Total of emitter and receiver)		Pigtailed type	210 g approx.	270 g approx.	340 g approx.	400 g approx.	470 g approx.	540 g approx.	600 g approx.
		Cable type	600 g approx.	670 g approx.	730 g approx.	800 g approx.	860 g approx.	930 g approx.	1,000 g approx.

SF4C-H□(-J05)

Item	Model No.	Type	Min. sensing object ø25 mm ø0.984 in type (20 mm 0.787 in beam pitch)						
		Pigtailed type	**SF4C-H8-J05**	**SF4C-H12-J05**	**SF4C-H16-J05**	**SF4C-H20-J05**	**SF4C-H24-J05**	**SF4C-H28-J05**	**SF4C-H32-J05**
		Cable type	**SF4C-H8**	**SF4C-H12**	**SF4C-H16**	**SF4C-H20**	**SF4C-H24**	**SF4C-H28**	**SF4C-H32**
No. of beam channels			8	12	16	20	24	28	32
Protective height			160 mm 6.299 in	240 mm 9.449 in	320 mm 12.598 in	400 mm 15.748 in	480 mm 18.898 in	560 mm 22.047 in	640 mm 25.197 in
Current consumption	Large multi-purpose indicator lights off		Emitter: 70 mA or less Receiver: 85 mA or less	Emitter: 70 mA or less Receiver: 90 mA or less		Emitter: 70 mA or less Receiver: 95 mA or less		Emitter: 70 mA or less Receiver: 100 mA or less	
	Large multi-purpose indicator lights up		Emitter: 120 mA or less Receiver: 135 mA or less	Emitter: 120 mA or less Receiver: 140 mA or less		Emitter: 120 mA or less Receiver: 145 mA or less		Emitter: 120 mA or less Receiver: 150 mA or less	
PFHD			1.66×10^{-9}	1.90×10^{-9}	2.10×10^{-9}	2.33×10^{-9}	2.54×10^{-9}	2.77×10^{-9}	2.98×10^{-9}
MTTFd			100 years or more						
Net weight (Total of emitter and receiver)		Pigtailed type	240 g approx.	300 g approx.	360 g approx.	420 g approx.	490 g approx.	550 g approx.	610 g approx.
		Cable type	630 g approx.	700 g approx.	760 g approx.	820 g approx.	880 g approx.	950 g approx.	1,000 g approx.

SPECIFICATIONS

Light curtain common specifications

Item		Type	Min. sensing object ø14 mm ø0.551 in type (10 mm 0.394 in beam pitch)	Min. sensing object ø25 mm ø0.984 in type (20 mm 0.787 in beam pitch)
		Model No. Pigtailed type	**SF4C-F□-J05**	**SF4C-H□-J05**
		Cable type	**SF4C-F□**	**SF4C-H□**
Applicable standards	International standard		IEC 61496-1/2 (Type 4), ISO 13849-1 (Category 4, PLe), IEC 61508-1 to 7 (SIL 3)	
	Japan		JIS B 9704-1/2 (Type 4), JIS B 9705-1 (Category 4), JIS C 0508-1 to 7 (SIL 3)	
	Europe (EU) (Note 2)		EN 61496-1 (Type 4), EN ISO 13849-1 (Category 4, PLe), EN 61508-1 to 7 (SIL 3), EN 55011, EN 50178, EN 61000-6-2	
	North America (Note 3)		ANSI/UL 61496-1/2 (Type 4), ANSI/UL 508, UL 1998 (Class 2), CAN/CSA 61496-1/2 (Type 4), CAN/CSA C22.2 No.14, OSHA 1910.212, OSHA 1910.217(C), ANSI B11.1 to B11.19, ANSI/RIA 15.06	
Operating range (Note 4)			0.1 to 3 m 0.328 to 9.843 ft	
Min. sensing object (Note 5)			ø14 mm ø0.551 in opaque object	ø25 mm ø0.984 in opaque object
Effective aperture angle			±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 $^{+10}_{-15}$ % Ripple P-P 10 % or less	
Control outputs (OSSD 1, OSSD 2)			PNP open-collector transistor / NPN open-collector transistor (switching method) <When selecting PNP output> • Max. source current: 200 mA • Applied voltage: same as supply voltage (between the control output and +V) • Residual voltage: 2.5 V or less (source current 200 mA, when using 10 m 32.808 ft length cable) • Leakage current: 200 µA or less (including power supply OFF condition) • Max. load capacity: 1 µF (No load to Max. source current) • Load wiring resistance: 3 Ω or less	<When selecting NPN output> • Max. sink current: 200 mA • Applied voltage: same as supply voltage (between the control output and 0 V) • Residual voltage: 2.5 V or less (sink current 200 mA, when using 10 m 32.808 ft length cable) • Leakage current: 200 µA or less (including power supply OFF condition) • Max. load capacity: 1 µF (No load to Max. sink current) • Load wiring resistance: 3 Ω or less
	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 6,7)	
	Protection circuit		Incorporated	
Response time			OFF response: 9 ms or less, ON response: 90 ms or less	OFF response: 7 ms or less, ON response: 90 ms or less
Auxiliary output (Non-safety output)			PNP open-collector transistor / NPN open-collector transistor (switching method) <When selecting PNP output> • Max. source current: 100 mA • Applied voltage: same as supply voltage (between the auxiliary output and +V) • Residual voltage: 2.5 V or less (source current 100 mA, when using 10 m 32.808 ft length cable)	<When selecting NPN output> • Max. sink current: 100 mA • Applied voltage: same as supply voltage (between the auxiliary output and 0 V) • Residual voltage: 2.5 V or less (sink current 100 mA, when using 10 m 32.808 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 handy-controller **SFC-HC**).	
	Protection circuit		Incorporated	
ELCA function			Incorporated (reducing mutual interference automatically)	
Test / reset input function			Incorporated	
Interlock function			Incorporated [Manual reset / Automatic reset (Note 8)]	
External device monitoring function			Incorporated	
Safety input function			Incorporated (safety contact)	
Muting function / Override function			Incorporated / Incorporated	
Optional functions (Note 9)			Fixed blanking, floating blanking, auxiliary output change, safety input (safety sensor), large multi-purpose indicator setting change, interlock setting change, external relay monitoring setting change, muting setting change, override setting change, protecting	
Environmental resistance	Degree of protection		IP67 / IP65 (IEC)	
	Ambient temperature		–10 to +55 °C +14 to +131 °F (No dew condensation or icing allowed), Storage: –25 to +60 °C –13 to +140 °F	
	Ambient humidity		30 to 85 % RH, Storage: 30 to 85 % RH	
	Ambient illuminance		Incandescent light: 5,000 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 MΩ, or more, with 500 V DC megger between all supply terminals connected together and enclosure	
	Vibration resistance		10 to 55 Hz frequency, 0.75 mm 0.030 in amplitude in X, Y and Z directions for two hours each	
	Shock resistance		300 m/s² acceleration (30 G approx.) in X, Y and Z directions for three times each	
Emitting element			Infrared LED (Peak emission wavelength: 855 nm 0.034 mil)	
Material			Enclosure: Polycarbonate alloy, Sensing surface: Polycarbonate alloy	
Cable			0.15 mm² 12-core heat-resistant PVC cable, 0.5 m 1.640 ft long with connector (cable type: 5 m 1.640 ft long)	
Cable extension			Extension up to 40.5 m 132.874 ft is possible for both emitter and receiver, with 0.2 mm² or more cable. (Note 10)	
Accessories			**MS-SFC-1** (Standard mounting bracket): 1 set, **SF4C-TR14** (Test rod): 1 No.	**MS-SFC-1** (Standard mounting bracket): 1 set, **SF4C-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 °F.
2) Regarding EU Machinery Directive, a Notified Body, TÜV SÜD, has certified with the type examination certificate.
3) With regards to the standards in the US, under the US regulation 29 CFR 1910.7, TÜV SÜD, a Nationally Recognized Testing Laboratory (NRTL) certified by OSHA, has certified with the safety certificate based on UL / ANSI standards.
With regards to the standards in Canada, under the safety regulations based on CEC (Canadian Electric Code), TÜV SÜD, a Certification Body accredited by SCC, has certified with the safety certificate based on CSA standards.
4) The operating range is the possible setting distance between the emitter and the receiver.
5) When the floating blanking function is used, the size of the min. sensing object is changed.
6) The outputs are not “OFF” when muting function is active even if the beam channel is interruped.
7) In case the blanking function is valid, the operation mode is changed.
8) The manual reset and automatic reset are possible to be switched depending on the wiring status.
9) In case of using optional function, the handy-controller **SFC-HC** is required.
10) When the muting lamp is used, the cable can be extended within 30.5 m 100.066 ft (for emitter / receiver).

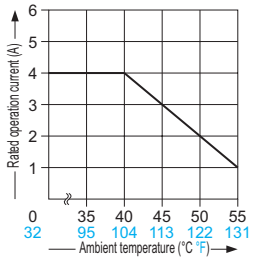
SPECIFICATIONS

Control unit

Item \ Model No.	SF-C13
Connectable light curtains	Light curtain manufactured by Panasonic Electric Works SUNX
Applicable standards	IEC 61496-1, UL 61496-1, JIS B 9704-1
Control category	ISO 13849-1 (JIS B 9705-1) compliance up to Category 4, PLe standards
Supply voltage / Current consumption	24 V DC ±10 % Ripple P-P 10 % or less / 100 mA or less (without light curtain)
Fuse (power supply)	Built-in electronic fuse, Triggering current: 0.5 A or more, Reset after power down
Enabling path	NO contact × 3 (13-14, 23-24, 33-34)
Application category	AC-15, DC-13 (IEC 60947-5-1)
Rated operation voltage (Ue) / Rated operation current (Ie)	30 V DC / 4 A, 230 V AC / 4 A, resistive load (For inductive load, during contact protection) Min applicable load: 10 mA (at 24 V DC) (Note 2)
Contact resistance	100 mΩ or less (initial value)
Contact protection fuse rated	4 A (slow blow)
Pick-up delay (Auto reset / Manual reset)	80 ms or less / 90 ms or less
Response time (Recovery time)	10 ms or less
Auxiliary output	Safety relay contact (NC contact) × 1 (41-42) (Related to enabling path)
Rated operation voltage / current	24 V DC / 2 A, Min. applicable load: 10 mA (at 24 V DC)
Contact protection fuse rated	2 A (slow blow)
Semiconductor auxiliary output (AUX)	PNP open-collector transistor • Max. source current: 60 mA
Output operation	On when the light curtain is interrupted
Excess voltage category	II
Polarity selection function	Incorporated (Cable connection allows selection of plus / minus ground) Minus ground: Correspond to PNP output light curtain Plus ground: Correspond to NPN output light curtain
Pollution degree	2
Protection	Enclosure: IP40, Terminal IP20
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
Enclosure material	ABS
Weight	Net weight: 200 g approx.

Notes: 1) Where measurement conditions have not been specifed precisely, the conditions used were an ambient temperature of +20 °C +68 °F
2) If several **SF-C13** units are being used in line together, leave a space of 5 mm 0.197 in or more between each unit. If the units are touching each other, reduce the rated operating current for safety output in accordance with the ambient operating temperature as shown in the graphs at right.
3) Refer to our website for details of specifications.

Dilating when SF-C13 units are mounted close together



Handy-controller

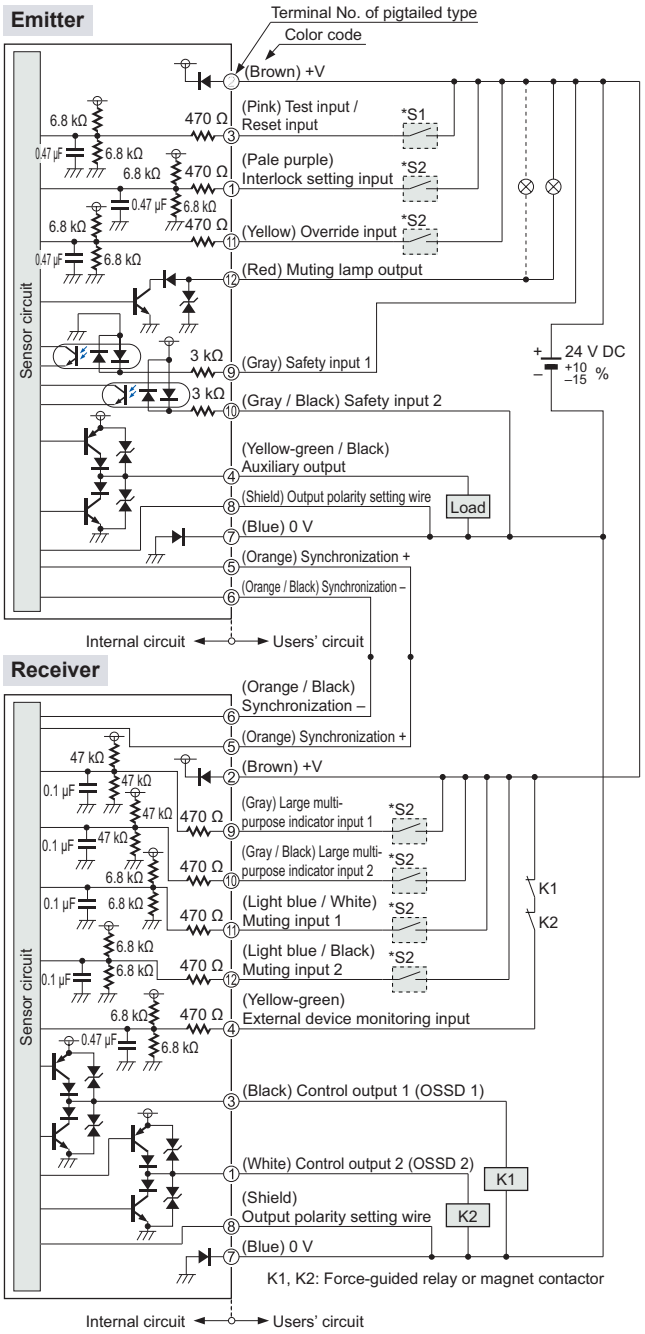
Item \ Model No.	SFC-HC
Supply voltage	24 V DC $^{+10}_{-15}$ % Ripple P-P 10 % or less (common to light curtain power supply)
Current consumption	65 mA or less
Communication method	RS-485 two-way communications (Specific procedure)
Digital display	4-digit red LED display × 2 (Selected beam channels, setting contents etc. are displayed.)
Function indicators	Green LED × 9 (Set function is displayed.)
Functions	Fixed blanking / Floating blanking / Auxiliary output change / Satety input setting change / Large multi-purpose indicator setting change / Muting setting change / Interlock setting change / External device monitoring setting change / Override setting changing function 60 sec. / Protecting
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 MΩ, or more, with 500 V DC megger between all supply terminals connected together and enclosure
Cable	12-core shielded cable, 0.5 m 1.640 ft long, with a connector at the end (2 cables)
Weight	Net weight: 200 g approx.

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

I/O CIRCUIT AND WIRING DIAGRAMS

I/O circuit diagram

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



* S1, S2

Switch S1
- Test input / Reset input
  For manual reset
  Vs to Vs – 3.5 V (sink current 5 mA or less): OFF (Note)
  Open: ON

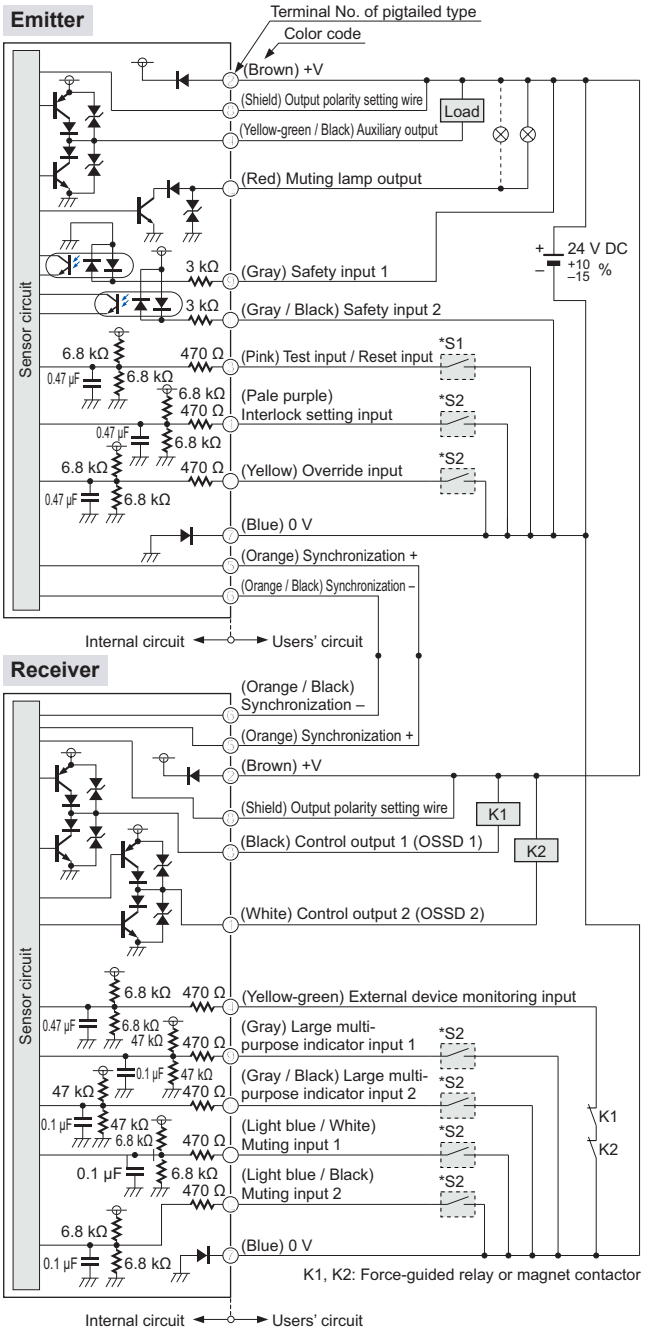
  For automatic reset
  Vs to Vs – 3.5 V (sink current 5 mA or less): ON (Note)
  Open: OFF

Switch S2
- Interlock setting input, Override input, Muting input 1 / 2, Large multi-purpose indicator input 1 / 2,
  Vs to Vs – 3.5 V (sink current 5 mA or less): Valid (Note)
  Open: Invalid

Note: Vs is the applying supply voltage.

I/O circuit diagram

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



* S1, S2

Switch S1
- Test input / Reset input
  For manual reset
  0 to +2.5 V (source current 5 mA or less): OFF
  Open: ON

  For automatic reset
  0 to +2.5 V (source current 5 mA or less): OFF
  Open: ON

Switch S2
- Interlock setting input, Override input, Muting input 1 / 2, Large multi-purpose indicator input 1 / 2,
  0 to +2.5 V (source current 5 mA or less): Valid
  Open: Invalid

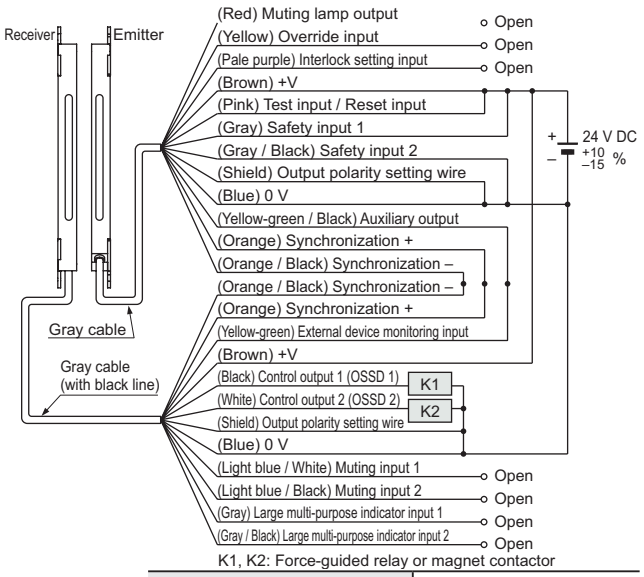
I/O CIRCUIT AND WIRING DIAGRAMS

Connection example

Basic wiring: Min. operation only

This is the general configuration using one set of the emitter and receiver facing each other. The control outputs (OSSD 1 / OSSD 2) turn OFF if the light is interrupted, while they automatically turn ON if receive the light.
The auxiliary output is used to invalid the external device monitoring function. The auxiliary output cannot be connected to external devices.

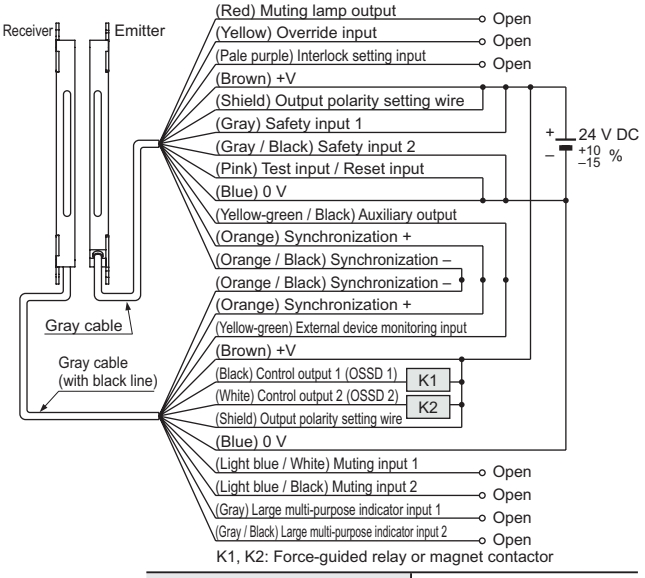
<In case of using I/O circuit for PNP output>



K1, K2: Force-guided relay or magnet contactor

Interlock function	Disabled (Automatic reset)
External device monitoring function	Disabled
Auxiliary output	Not used
Output polarity setting wire	PNP
Safety input	Invalid

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



K1, K2: Force-guided relay or magnet contactor

Interlock function	Disabled (Automatic reset)
External device monitoring function	Disabled
Auxiliary output	Not used
Output polarity setting wire	NPN
Safety input	Invalid

PRECAUTIONS FOR PROPER USE

Refer to General precautions.

- When this light curtain is used in the “PSDI mode”, an appropriate control circuit must be configured between this light curtain and the machinery. For details, be sure to refer to the standards or regulations applicable in each region or country.

- 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 adjusted in combination at 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.
- Do not install this light curtain with a machine whose operation cannot be stopped immediately in the middle of an operation cycle by an emergency stop equipment.

Others

- Do not use during the initial transient time (2 sec.) after the power supply is switched on.

DIMENSIONS (Unit: mm in)

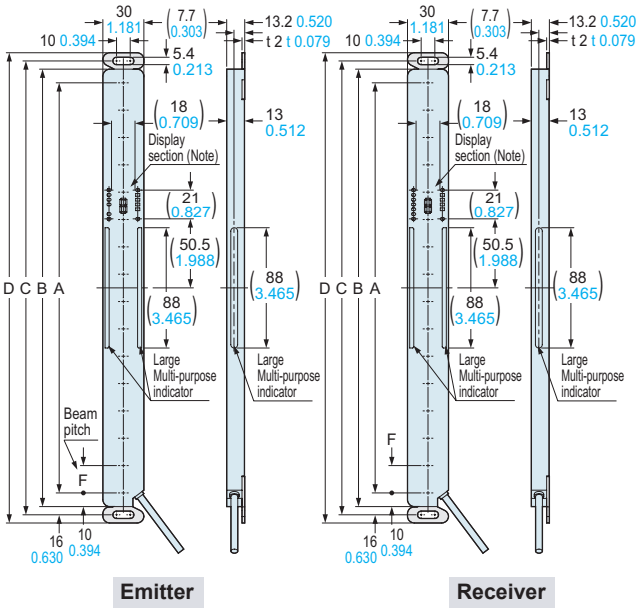
The CAD data in the dimensions can be downloaded from our website.

SF4C-□ Light curtain

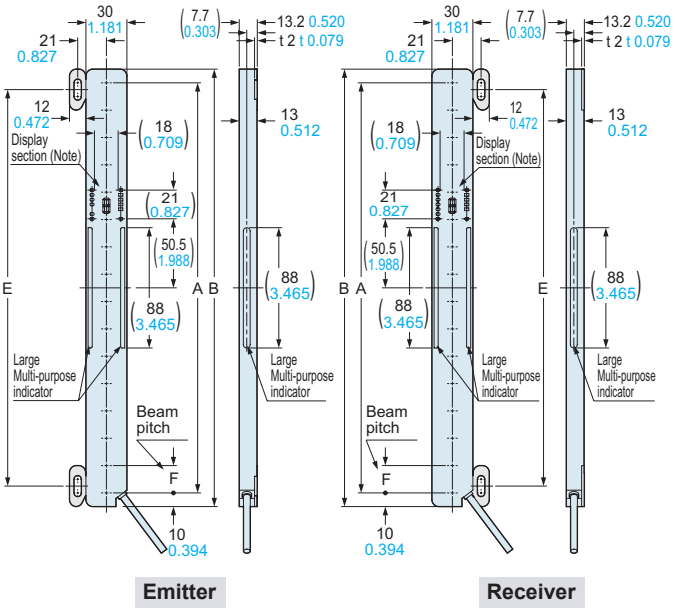
Assembly dimensions

Mounting drawing for the light curtains using the standard mounting brackets **MS-SFC-1** (accessory).

<Center mounting>



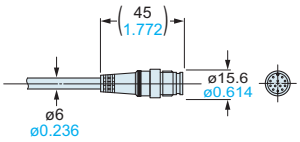
<Dead zoneless mounting>



Model No.		A	B	C	D	E
SF4C-F15(-J05)	SF4C-H8(-J05)	140 5.512	160 6.299	172 6.772	184 7.244	130 5.118
SF4C-F23(-J05)	SF4C-H12(-J05)	220 8.661	240 9.449	252 9.921	264 10.394	210 8.268
SF4C-F31(-J05)	SF4C-H16(-J05)	300 11.811	320 12.598	332 13.071	344 13.543	290 11.417
SF4C-F39(-J05)	SF4C-H20(-J05)	380 14.961	400 15.748	412 16.220	424 16.693	370 14.567
SF4C-F47(-J05)	SF4C-H24(-J05)	460 18.110	480 18.898	492 19.370	504 19.842	450 17.717
SF4C-F55(-J05)	SF4C-H28(-J05)	540 21.260	560 22.047	572 22.520	584 22.992	530 20.866
SF4C-F63(-J05)	SF4C-H32(-J05)	620 24.409	640 25.197	652 25.669	664 26.142	610 24.016

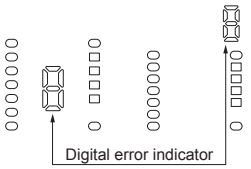
Note: Measurement of drawing above is display section of **SF4C-H□**
In case of **SF4C-F□**, the position of digital indicator (red) is different as right figure.
Also, digital indicator (red) is not incorporated in **SF4C-F15□**.

<Connector of the pigtailed type SF4C-□-J05>



Model No.	F
SF4C-F□	10 0.394
SF4C-H□	20 0.787

<SF4C-H□> <SF4C-F□>



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DIMENSIONS (Unit: mm in)

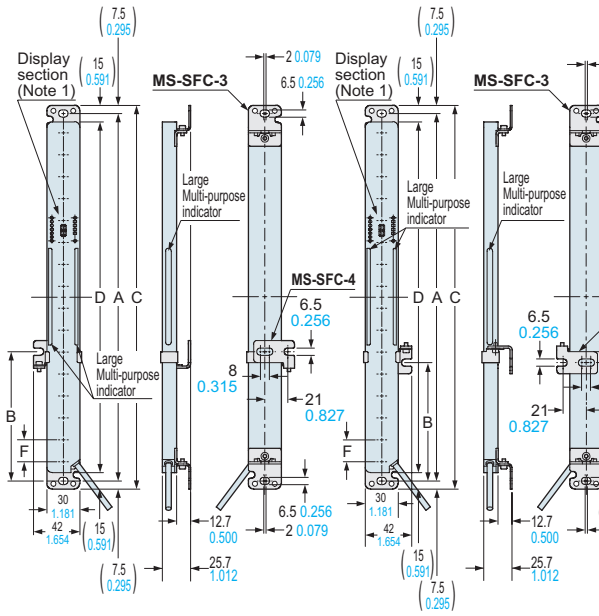
The CAD data in the dimensions can be downloaded from our website.

SF4C-□ Light curtain

Assembly dimensions

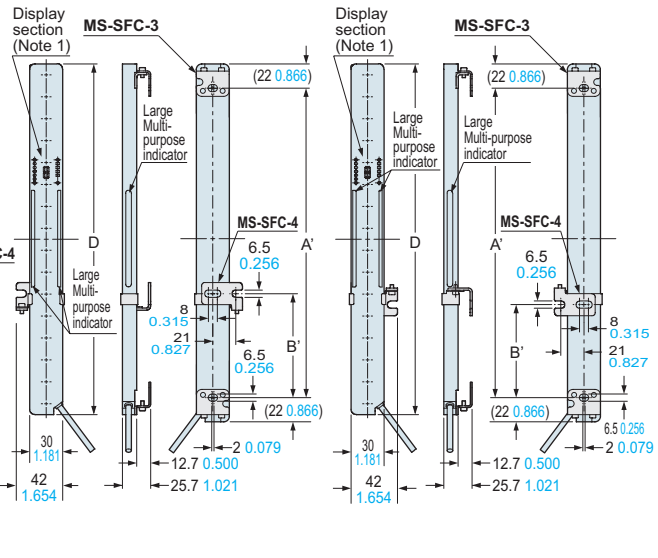
Mounting drawing for the light curtains using the versatile brackets **MS-SFC-C3** (optional) and intermediate supporting bracket for versatile brackets **MS-SFC-F4** (optional).

<Rear mounting>



Emitter Receiver

<Dead zoneless mounting>



Emitter Receiver

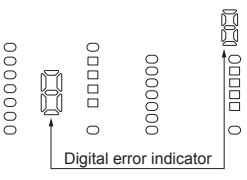
Model No.		Inter mediate supporting bracket	A	B	C	D
SF4C-F15(-J05)	SF4C-H8(-J05)	–	175 6.890	–	190 7.480	160 6.299
SF4C-F23(-J05)	SF4C-H12(-J05)	–	255 10.039	–	270 10.630	240 9.449
SF4C-F31(-J05)	SF4C-H16(-J05)	–	335 13.189	–	350 13.780	320 12.598
SF4C-F39(-J05)	SF4C-H20(-J05)	–	415 16.339	–	430 16.929	400 15.748
SF4C-F47(-J05)	SF4C-H24(-J05)	–	495 19.488	–	510 20.079	480 18.898
SF4C-F55(-J05)	SF4C-H28(-J05)	○	575 22.638	238 to 338 9.370 to 13.307	590 23.228	560 22.047
SF4C-F63(-J05)	SF4C-H32(-J05)	○	655 25.787	278 to 378 10.945 to 14.882	670 26.378	640 25.197

Model No.		Inter mediate supporting bracket	A'	B'	D
SF4C-F15(-J05)	SF4C-H8(-J05)	–	116 4.567	–	160 6.229
SF4C-F23(-J05)	SF4C-H12(-J05)	–	196 7.717	–	240 9.449
SF4C-F31(-J05)	SF4C-H16(-J05)	–	276 10.866	–	320 12.598
SF4C-F39(-J05)	SF4C-H20(-J05)	–	356 14.016	–	400 15.748
SF4C-F47(-J05)	SF4C-H24(-J05)	–	436 17.165	–	480 18.898
SF4C-F55(-J05)	SF4C-H28(-J05)	○	516 20.315	209 to 309 8.228 to 12.165	560 22.047
SF4C-F63(-J05)	SF4C-H32(-J05)	○	596 23.465	249 to 349 9.803 to 13.740	640 25.197

Model No.	F (Beam pitch)
SF4C-F□	10 0.394
SF4C-H□	20 0.787

Notes: 1) Measurement of drawing above is display section of **SF4C-H□**
In case of **SF4C-F□**, the position of digital indicator (red) is different as right figure.
Also, digital indicator (red) is not incorporated in **SF4C-F15□**.
2) Be sure to mount **MS-SFC-4** when using **SF4C-F55/F63/H28/H32□**.

<SF4C-H□> **<SF4C-F□>**



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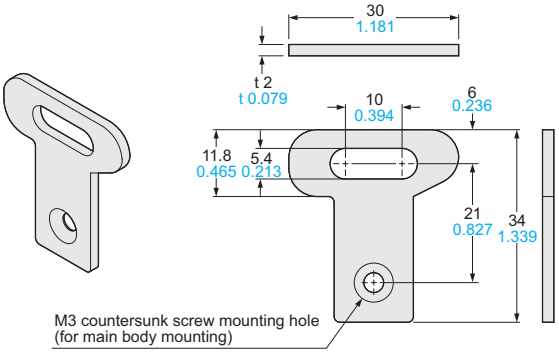
DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from our website.

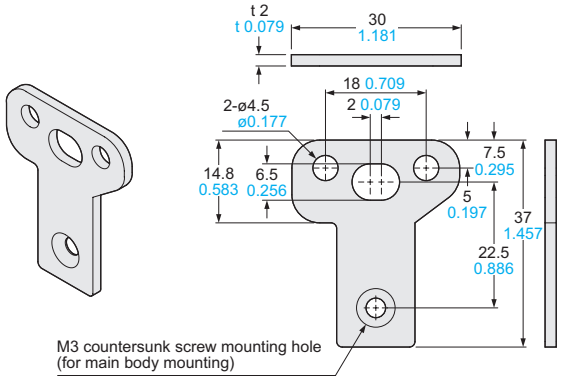
MS-SFC-1 Standard mounting bracket (Accessory)



Material: Stainless steel (SUS304)
Net weight: 32 g approx. (4 pcs.)
Package weight: 35 g appox.

Four bracket set
[Four M3 (length 4 mm 0.157 in) countersunk screws are attached.]

MS-SFC-2 NA2-N compatible mounting bracket (Optional)

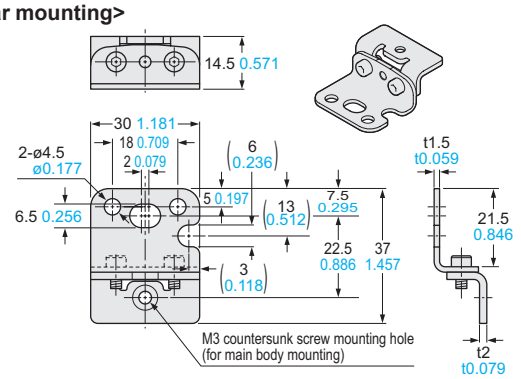


Material: Stainless steel (SUS304)
Net weight: 36 g approx. (4 pcs.)
Package weight: 40 g appox.

Four bracket set
[Four M3 (length 4 mm 0.157 in) countersunk screws are attached.]

MS-SFC-3 Versatile bracket (Optional)

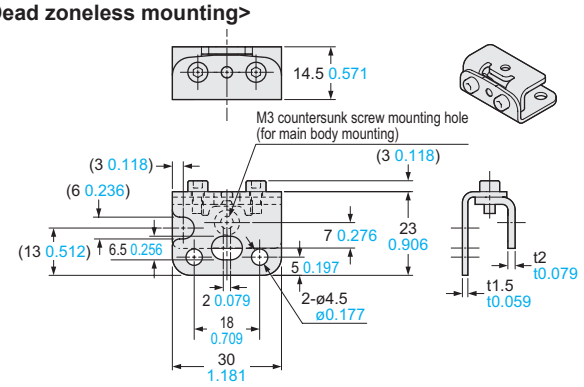
<Rear mounting>



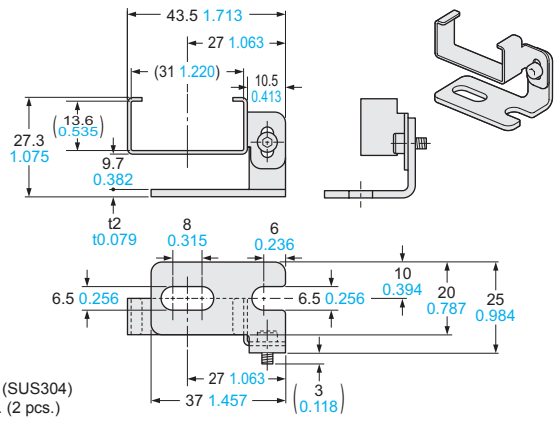
Material: Stainless steel (SUS304)
Net weight: 75 g approx. (4 pcs.)
Package weight: 90 g appox.

Four bracket set
[Four M3 (length 4 mm 0.157 in) countersunk screws are attached.]

<Dead zoneless mounting>



MS-SFC-4 Intermediate supporting bracket for versatile bracket (Optional)



Material: Stainless steel (SUS304)
Net weight: 40 g approx. (2 pcs.)
Package weight: 60 g appox.

Two bracket set

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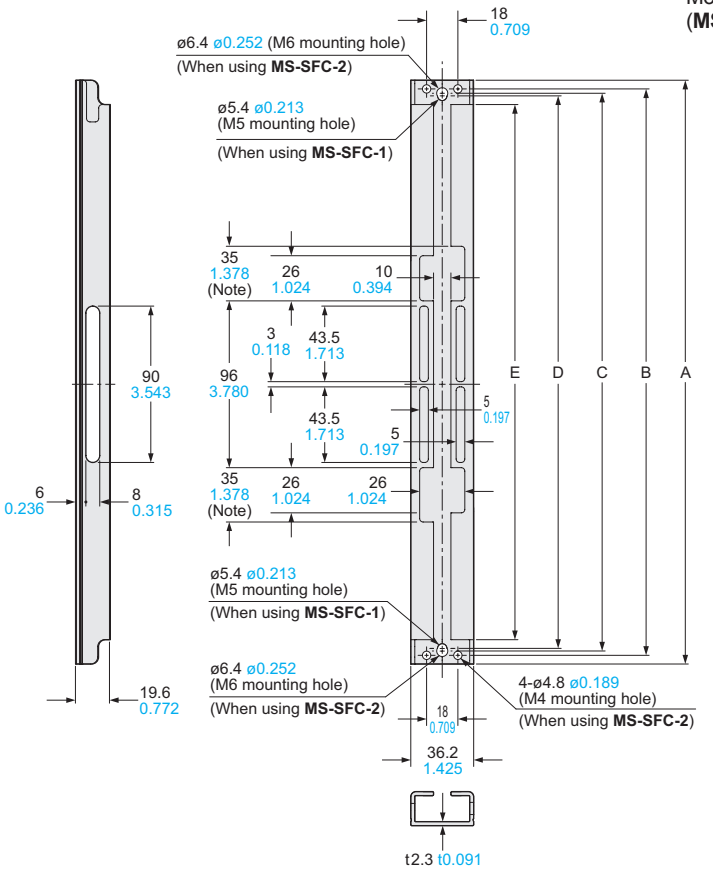
DIMENSIONS (Unit: mm in)

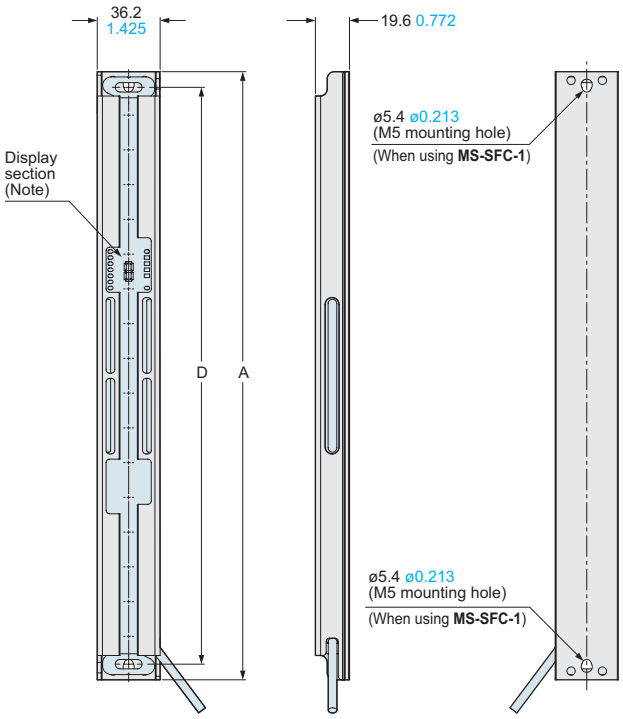
The CAD data in the dimensions can be downloaded from our website.

MS-SFCH-□ | Metal protection case (Optional)



Assembly dimensions

Mounting drawing for the light curtains using the metal protection case (**MS-SFCH-□**).



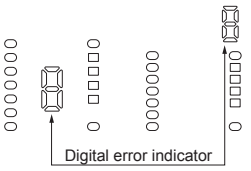
Model No.	A	B	C	D	E	Net weight (2 pcs.)
MS-SFCH-8	190 7.480	180 7.087	175 6.890	172 6.772	162 6.378	160 g approx.
MS-SFCH-12	270 10.630	260 10.236	255 10.039	252 9.921	242 9.528	240 g approx.
MS-SFCH-16	350 13.780	340 13.386	335 13.189	332 13.071	322 12.677	340 g approx.
MS-SFCH-20	430 16.929	420 16.535	415 16.339	412 16.220	402 15.827	420 g approx.
MS-SFCH-24	510 20.079	500 19.685	495 19.488	492 19.370	482 18.976	520 g approx.
MS-SFCH-28	590 23.228	580 22.835	575 22.638	572 22.520	562 22.126	600 g approx.
MS-SFCH-32	670 26.378	660 25.984	655 25.787	652 25.669	642 25.276	700 g approx.

Note: Dimension of **MS-SFCH-8** is 26 mm 1.024 in

Model No.	A	D
MS-SFCH-8	190 7.480	172 6.772
MS-SFCH-12	270 10.630	252 9.921
MS-SFCH-16	350 13.780	332 13.071
MS-SFCH-20	430 16.929	412 16.220
MS-SFCH-24	510 20.079	492 19.370
MS-SFCH-28	590 23.228	572 22.520
MS-SFCH-32	670 26.378	652 25.669

Note: Measurement of drawing above is display section of **SF4C-H□**
In case of **SF4C-F□**, the position of digital indicator (red) is different as right figure.
Also, digital indicator (red) is not incorporated in **SF4C-F15□**.

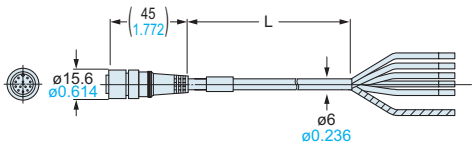
<SF4C-H□> **<SF4C-F□>**



DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from our website.

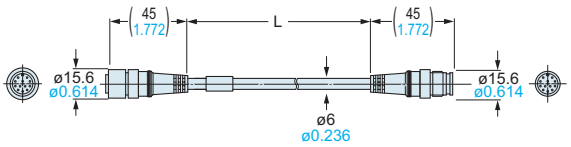
SFB-CC□-MU — Mating cable with connector on one end (Optional)



• Length L

Model No.	Length L
SFB-CC3-MU	3,000 118.110
SFB-CC7-MU	7,000 275.590
SFB-CC10-MU	10,000 393.700

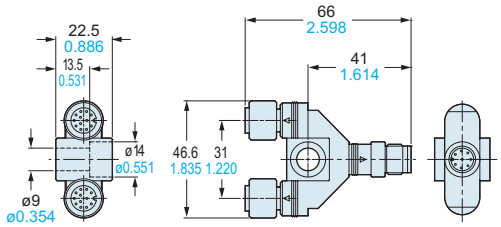
SFB-CCJ□-MU — Mating cable with connectors on both ends (Optional)



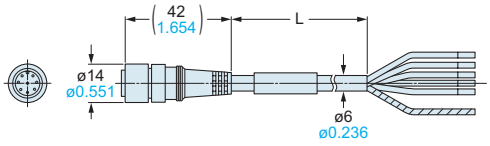
• Length L

Model No.	Length L
SFB-CCJ3D-MU	3,000 118.110
SFB-CCJ3E-MU	
SFB-CCJ10D-MU	10,000 393.700
SFB-CCJ10E-MU	

SFC-WY1 — Y-shaped connector (Optional)

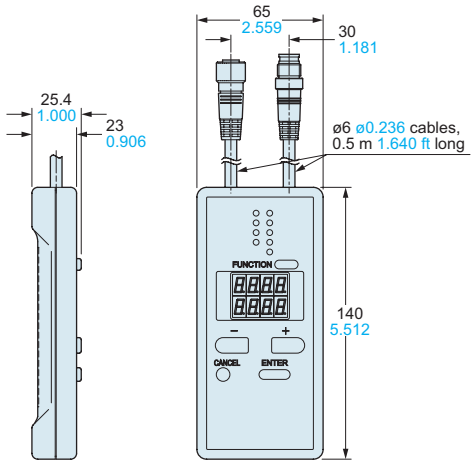


WY1-CCN3 WY1-CCN10 — Mating cable (Optional)

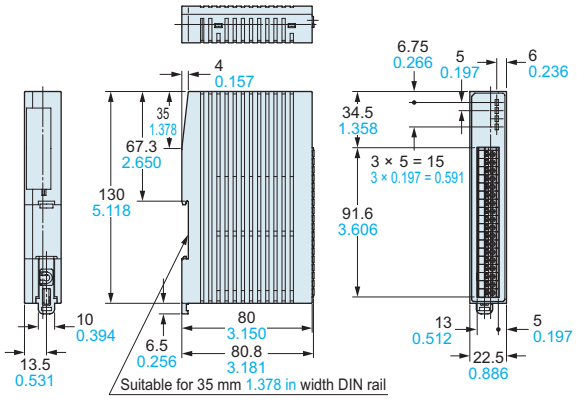


Model No.	Length L
WY1-CCN3	3,000 118.110
WY1-CCN10	10,000 393.700

SFC-HC — Handy-controller (Optional)

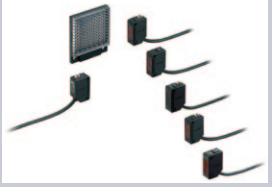


SF-C13 — Control unit (Optional)



Introduction to Panasonic Electric Works SUNX sensors that can be used as muting sensors

Compact Photoelectric Sensor CX-400 SERIES



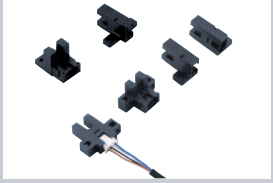
- World standard size
- 148 types for a wide variation

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 Micro Photoelectric Sensor PM-64 SERIES



- Extremely compact and space saving
- A lineup of quick fitting-up connector type

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

- Industry longest in stable sensing range
- 10 times the durability (Compared to previous models)
- IP68g protective construction

* Check the specifications for the muting sensors before making a selection.