Panasonic

Ultra-slim
LIGHT CURTAIN

Type 2 PLc SIL1

SF2C SERIES

Discover how the SF2C series Type 2 light curtain will enhance your machine safety while improving your productivity.
Contact Ramco today!

CE
Conforming to Machine & EMC Directive

TÜV
Certified

TÜV
Certified by NRTL

Conforming to OSHA / ANSI

Introducing Type 2
Ultra-slim Light Curtains!

Featuring easy installation
and reduced wiring

Large built-in multi-purpose indicators

Includes a large indicator that supports an extensive range of applications via external input.

13.2mm
SF2C (with mounting bracket)

Smart equipment

*The picture is an image.

Dramatically less wiring work

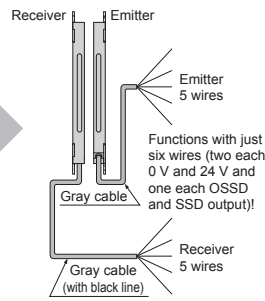Light curtain wiring consists of just five wires each for the emitter and receiver, allowing you to easily implement safety measures in about the same amount of time as with an area sensor.

SF4C Series (Type4)   **SF2C** Series (Type2)
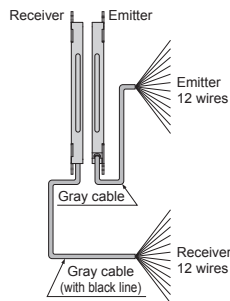
Receiver   Emitter   Receiver   Emitter

Emitter 12 wires   Emitter 5 wires

Functions with just six wires (two each 0 V and 24 V and one each OSSD and SSD output)!

Gray cable   Gray cable

Receiver 12 wires   Receiver 5 wires

Gray cable (with black line)   Gray cable (with black line)

Note: Requires a safety circuit architecture that complies with the desired control category implemented using either an **SF-C13** Control Unit, a safety relay, or other equipment.

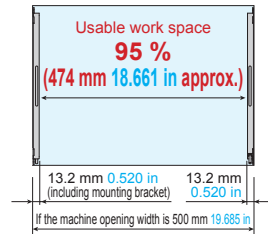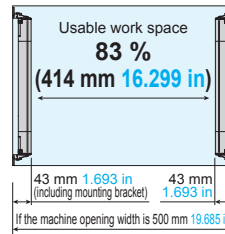## Slim size for efficient applications

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

If the machine opening is 500 mm 19.685 in
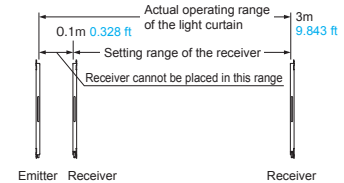
| Previous | SF2C Series |

Usable work space approx. **12 % UP** (60 mm 2.362 in)

Usable work space **83 %** (414 mm 16.299 in)

Usable work space **95 %** (474 mm 18.661 in approx.)

43 mm 1.693 in (including mounting bracket)   43 mm 1.693 in

13.2 mm 0.520 in (including mounting bracket)   13.2 mm 0.520 in

If the machine opening width is 500 mm 19.685 in

■ ORDER GUIDE

Light curtains

Type	Appearance	Operating range (Note 1)	Model No. (Note 2)		No. of beam Channels	Protective height (mm in)
			PNP output type	NPN output type		
Hand protection type — Min. sensing object ø25 mm ø0.984 in (20 mm 0.787 in beam pitch)	Beam channel No. 10 mm 0.394 in / Protective height / Beam pitch 20 mm 0.787 in 10 mm 0.394 in	0.1 to 3m 0.328 to 9.843 in	SF2C-H8-P	SF2C-H8-N	8	160 6.299
			SF2C-H12-P	SF2C-H12-N	12	240 9.449
			SF2C-H16-P	SF2C-H16-N	16	320 12.598
			SF2C-H20-P	SF2C-H20-N	20	400 15.748
			SF2C-H24-P	SF2C-H24-N	24	480 18.898
			SF2C-H28-P	SF2C-H28-N	28	560 22.047
			SF2C-H32-P	SF2C-H32-N	32	640 25.197

Actual operating range of the light curtain
0.1m 0.328 ft   3m 9.843 ft
Setting range of the receiver
Receiver cannot be placed in this range
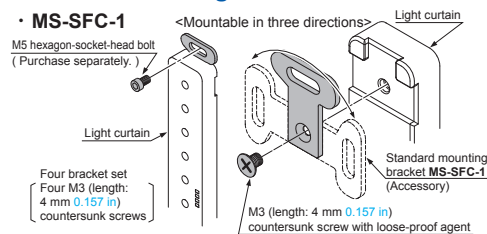Emitter Receiver   Receiver

Notes: 1) The operating range is the possible setting distance between the emitter and the receiver.
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.

Spare parts (Accessories for light curtain)

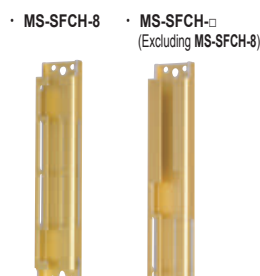| Designation	Model No.	Description
Standard mounting bracket	**MS-SFC-1**	Allows the light curtain to be mounted at the rear with one M5 hexagon-socket-head bolt. Mounting direction of the bracket can be selected between vertical or horizontal (no dead zone). (4 pcs. per set for emitter and receiver)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

Standard mounting bracket

・ **MS-SFC-1**   <Mountable in three directions>   Light curtain

M5 hexagon-socket-head bolt (Purchase separately.)

Light curtain

Four bracket set Four M3 (length: 4 mm 0.157 in) countersunk screws

M3 (length: 4 mm 0.157 in) countersunk screw with loose-proof agent

Standard mounting bracket **MS-SFC-1** (Accessory)

■ OPTIONS

Mounting bracket

Designation	Model No.	Description
NA2-N compatible mounting bracket	**MS-SFC-2**	Used when changing over area sensor **NA2-N** series to the **SF2C** 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 **SF2C-H28-P**, **SF2C-H28-N**, **SF2C-H32-P**, **SF2C-H32-N**. (2 pcs. per set for emitter and receiver)

Metal protection case

Applicable beam channels / Designation **SF2C-H□**	Metal protection case (2 pcs. per set for emitter and receiver) Model No.
8	**MS-SFCH-8**
12	**MS-SFCH-12**
16	**MS-SFCH-16**
20	**MS-SFCH-20**
24	**MS-SFCH-24**
28	**MS-SFCH-28**
32	**MS-SFCH-32**

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

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 (control category 2 when used together with the **SF2C** series).

Beam axis alignment made easy

The emitter has an effective aperture angle of ±5° or less for an operating range of 3 m 9.843 ft. Compared to Type 4 light curtains (which have an effective aperture angle of ±2.5° or less), the **SF2C** series is easy to align and install.

Operating range 3m 9.843 ft | Effective aperture angle
5° or less
5° or less
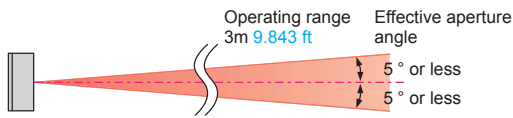
Includes cables and mounting brackets

The **SF2C** series includes cables (3 m 9.843 ft) for use with all models and standard mounting brackets (**MS-SFC-1**).

Simple Safety Distance Calculations

The response time of all finger protection light curtains in the finger type is 20 ms or less. Recalculation of the safety distance is unnecessary for each time light curtain length is changed.

Light weight!

The **SF2C** series is made of resin that is lighter than the conventional aluminum case type*.
Its lightweight body eases the burden on the mounting surface of the equipment and contributes to overall reduced weight during equipment transportation or overseas shipment.

*Except the cable part

Protection structure IP67

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

SPECIFICATIONS

Light curtain common specifications

Item / Type / Model No.	PNP output type **SF2C-H□-P**	NPN output type **SF2C-H□-N**
Operating range	0.1 to 3 m 0.328 to 9.843 ft	
Beam pitch	20 mm 0.787 in	
Min. sensing object	ø25 mm ø0.984 in opaque object	
Effective aperture angle	±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 ± 20 % Ripple P-P 10 % or less	
Control output (OSSD)	Max. source current: 200 mA	Max. sink current: 200 mA
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)	
Protection circuit	Incorporated	
Response time	OFF response: 20 ms or less, ON response: 80 to 100 ms	
Lockout output (SSD)	Max. source current: 60 mA	Max. sink current: 60 mA
Operation mode	ON during normal operation, OFF during lockout (Note2)	
Protection circuit	Incorporated	
Pollution degree	3	
Operating altitude	2,000 m 6561.680 ft or less (Note3)	
Environmental resistance — Degree of protection	IP65, IP67 (IEC)	
Environmental resistance — 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	
Environmental resistance — Ambient humidity	30 to 85 % RH, Storage: 30 to 85 % RH	
Emitting element	Infrared LED (Peak emission wavelength: 850 nm 0.034 mil)	
Cable	0.16 mm² 5-core heat-resistant PVC cable, 3 m 9.842 ft long	
Material	Enclosure: Polycarbonate alloy, Sensing surface: Polycarbonate alloy, **MS-SFC-1** (Standard mounting bracket) : Stainless steel (SUS)	
Accessories	**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) If the emitter enters a lockout state, and light from the emitter enters the receiver, lockout information will be transmitted and lockout output (SSD) will turn OFF.
3) Do not use or storage in environment of more than atmospheric pressure at sea level.

Light curtain individual specifications

Item / Type	Min. sensing object ø25 mm ø0.984 in (20 mm 0.787 in beam pitch)						
PNP output type	SF2C-H8-P	SF2C-H12-P	SF2C-H16-P	SF2C-H20-P	SF2C-H24-P	SF2C-H28-P	SF2C-H32-P
NPN output type	SF2C-H8-N	SF2C-H12-N	SF2C-H16-N	SF2C-H20-N	SF2C-H24-N	SF2C-H28-N	SF2C-H32-N
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: 25 mA or less Receiver: 25 mA or less	Emitter: 30 mA or less Receiver: 30 mA or less		Emitter: 35 mA or less Receiver: 35 mA or less			
Current consumption — Large multi-purpose indicator lights up	Emitter: 35 mA or less Receiver: 30 mA or less	Emitter: 35 mA or less Receiver: 35 mA or less	Emitter: 40 mA or less Receiver: 35 mA or less	Emitter: 40 mA or less Receiver: 40 mA or less	Emitter: 45 mA or less Receiver: 40 mA or less	Emitter: 45 mA or less Receiver: 45 mA or less	Emitter: 50 mA or less Receiver: 45 mA or less
PFHD (Note) — PNP output type	$3.60×10^{-9}$	$3.66×10^{-9}$	$3.73×10^{-9}$	$3.79×10^{-9}$	$3.85×10^{-9}$	$3.92×10^{-9}$	$3.98×10^{-9}$
PFHD (Note) — NPN output type	$3.74×10^{-9}$	$3.80×10^{-9}$	$3.86×10^{-9}$	$3.93×10^{-9}$	$3.99×10^{-9}$	$4.05×10^{-9}$	$4.12×10^{-9}$
MTTFd (Note)	100 years or more						
Net weight (Total of emitter and receiver)	280 g approx.	340 g approx.	400 g approx.	460 g approx.	520 g approx.	580 g approx.	640 g approx.

Note: PFHD; Probability of dangerous failure per hour, MTTFd; Mean time to dangerous failure.
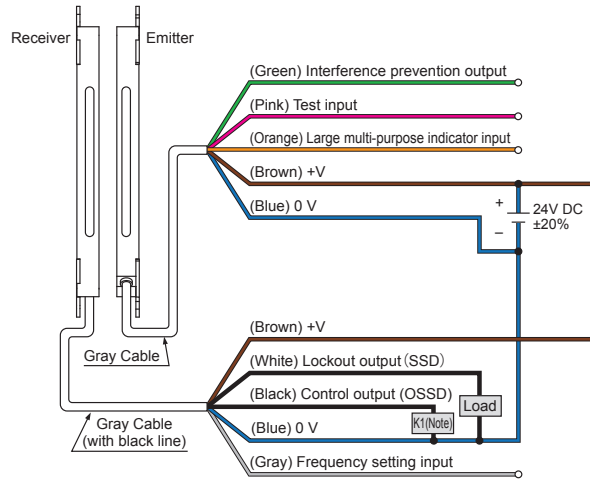
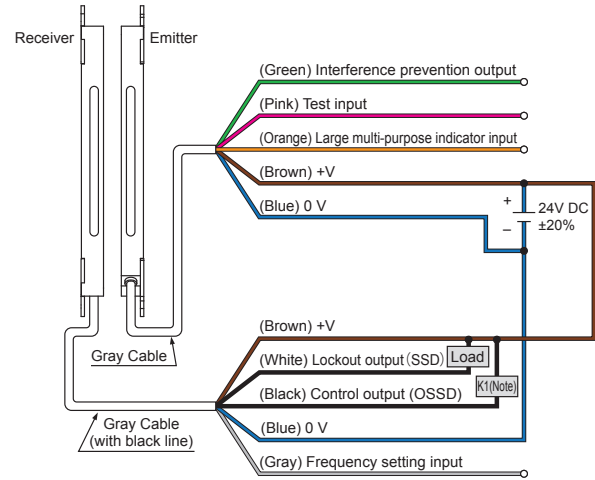## ■ I/O CIRCUIT AND WIRING DIAGRAMS

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 output (OSSD) turns OFF if the light is interrupted, while it automatically turns ON if receive the light.

\<PNP output type SF2C-H□-P\>

Receiver Emitter

(Green) Interference prevention output
(Pink) Test input
(Orange) Large multi-purpose indicator input
(Brown) +V
(Blue) 0 V

+ 24V DC
− ±20%

Gray Cable
(Brown) +V
(White) Lockout output (SSD)
(Black) Control output (OSSD) Load
Gray Cable
(with black line) K1(Note)
(Blue) 0 V
(Gray) Frequency setting input

\<NPN output type SF2C-H□-N\>

Receiver Emitter

(Green) Interference prevention output
(Pink) Test input
(Orange) Large multi-purpose indicator input
(Brown) +V
(Blue) 0 V

+ 24V DC
− ±20%

Gray Cable
(Brown) +V
(White) Lockout output (SSD) Load
(Black) Control output (OSSD)
K1(Note)
Gray Cable
(with black line)
(Blue) 0 V
(Gray) Frequency setting input

Note: Requires a safety circuit architecture that complies with the desired control category implemented using either an **SF-C13** Control Unit, a safety relay, or other equipment.

■ DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from our website.
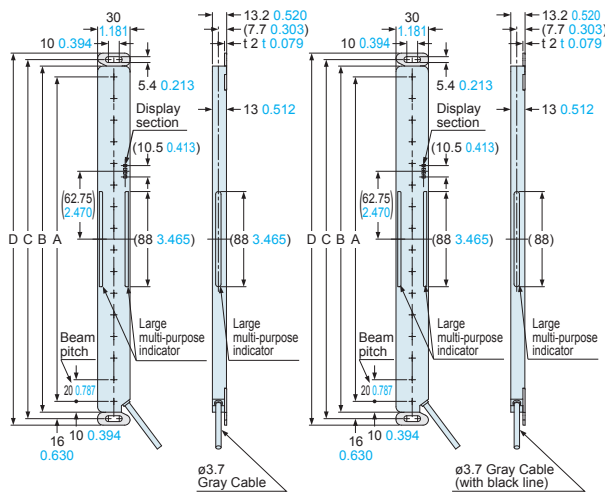Refer to our web site for the dimensions of mounting bracket etc.

SF2C-H□	Light curtain

Mounting bracket assembly dimensions

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

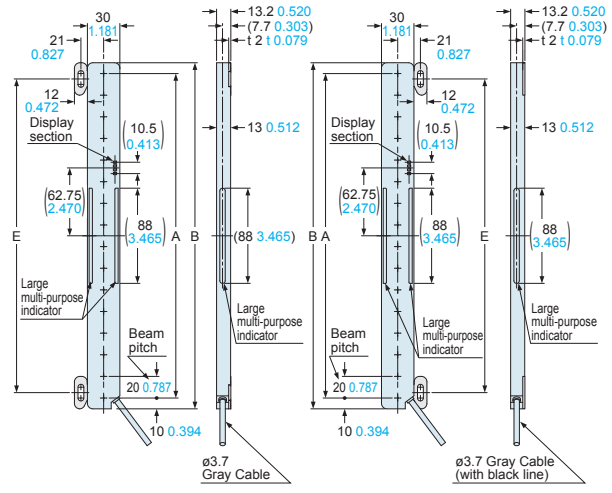**\<Center mounting\>**

Emitter Receiver

\<Dead zoneless mounting\>

Emitter Receiver

Model No.	A		B		C		D		E	
SF2C-H8□	140	5.512	160	6.299	172	6.772	184	7.244	130	5.118
SF2C-H12□	220	8.661	240	9.449	252	9.921	264	10.394	210	8.268
SF2C-H16□	300	11.811	320	12.598	332	13.071	344	13.543	290	11.417
SF2C-H20□	380	14.961	400	15.748	412	16.220	424	16.693	370	14.567
SF2C-H24□	460	18.110	480	18.898	492	19.370	504	19.842	450	17.717
SF2C-H28□	540	21.260	560	22.047	572	22.520	584	22.992	530	20.866
SF2C-H32□	620	24.409	640	25.197	652	25.669	664	26.142	610	24.016