Panasonic

NEW

Compact & Robust

Type4 PLe SIL3

Safety Light Curtain

SF4D SERIES

CE

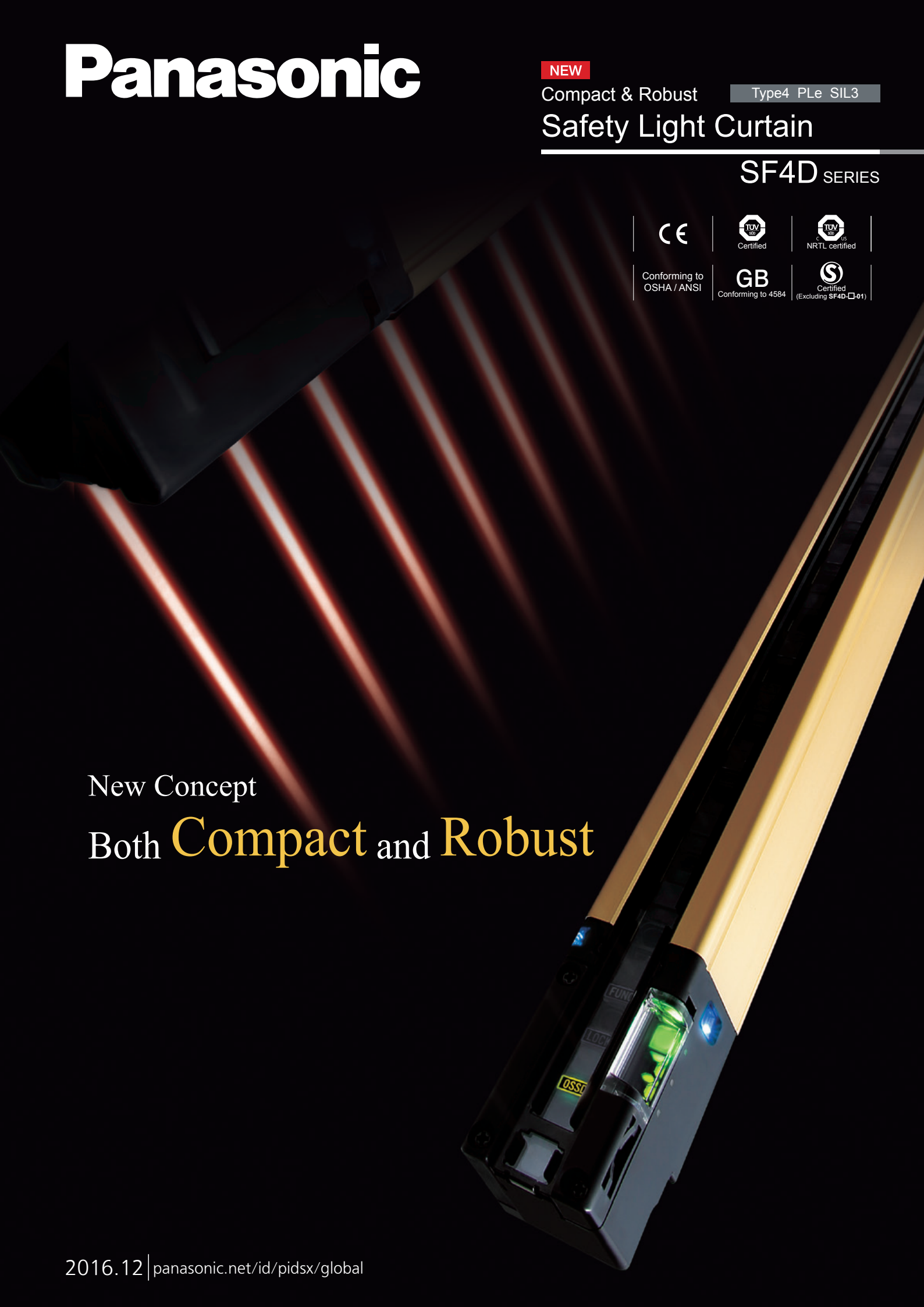
TÜV Certified

TÜV C US NRTL certified

Conforming to OSHA / ANSI

GB Conforming to 4584

Certified (Excluding SF4D-□-01)



New Concept

Both Compact and Robust

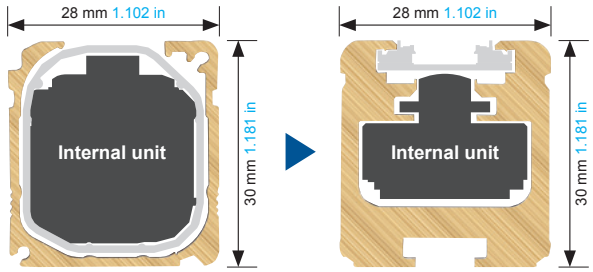
Compact - High rigidity frame and wire-saving system

High rigidity case with the same dimensions as our conventional models.* Greater wiring freedom.

Compact & Robust
SF4D
SERIES

* **SF4B** series **Ver. 2** (excluding robust type **SF4B-□G□ <V2>**)

High rigidity with the same dimensions as our conventional models*



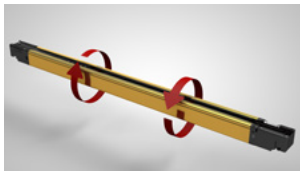
Conventional model | SF4D series

Internal unit volume is more than 60% smaller!

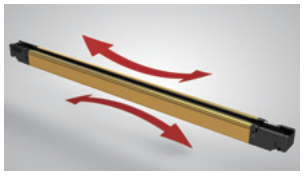
Dimensions are 100 % compatible. Dramatically strengthened case rigidity!

New and thoroughly downsized internal unit. While achieving even greater performance, we succeeded in reducing the volume of the internal unit by more than 60 % over conventional models. At the same time, we optimized the case structure to produce high rigidity without changing the dimensions. High rigidity is achieved while maintaining installation and wiring compatibility.

* **SF4B** series **Ver. 2** (excluding robust type **SF4B-□G□ <V2>**)



Resists twisting!



Resists bending!

Resists shock!

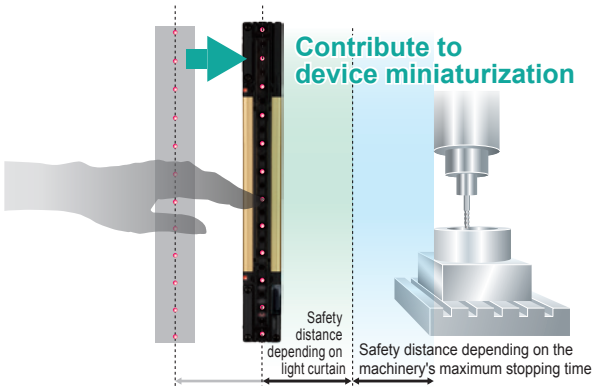
Significantly reduces deformation and damage due to contact with the workpiece and twisting caused by screw fastening of brackets and mounting surface misalignment.

Response time is the fastest class in the industry*

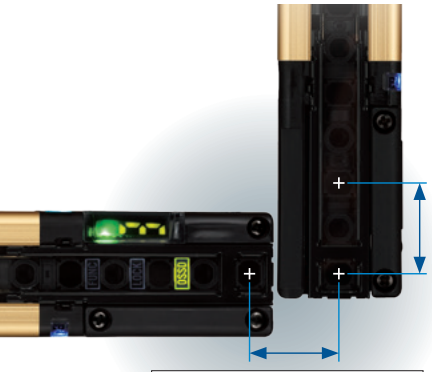
The OFF response time of the control outputs (OSSD1, OSSD2) of the **SF4D** series is 10 ms or less, the fastest class in the industry*. [Not connected in serial / parallel. Connected in serial / parallel: 18 ms or less]

*As of November 2016 (survey by our company)

Not connected in serial / parallel	Connected in serial / parallel
10 ms or less	18 ms or less



No-deadspace design enables easy calculation of safe distance

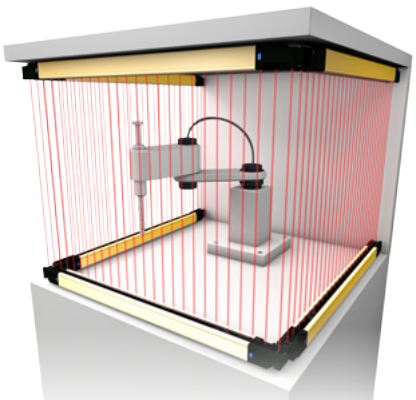


Beam pitch
Hand protection type SF4D-H□(-01)

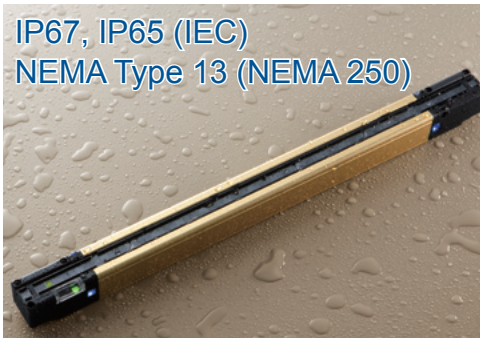
20 mm
0.787 in

Inherits the no-deadspace design of the **SF4B** series. Even in an L-shaped layout or a U-shaped layout, the beam pitch does not change*, making calculation of the safe distance easier.

* Excluding the finger protection type **SF4D-F□(-01)**



Shuts out liquids and dust



This product complies with NEMA Type 13 that is a type of enclosures for indoor non-hazardous location, described in NEMA 250 "Enclosures for Electrical Equipment (1000 volts Maximum)".
NEMA: National Electrical Manufacturers Association
Type 13: Enclosures constructed for indoor use to provide a degree of protection against following conditions.
Access to hazardous parts, ingress of solid foreign objects (falling dirt and circulating dust, lint, fibers, and flyings), ingress of water (dripping and light splashing) and the spraying, splashing, and seepage of oil and non-corrosive coolants.

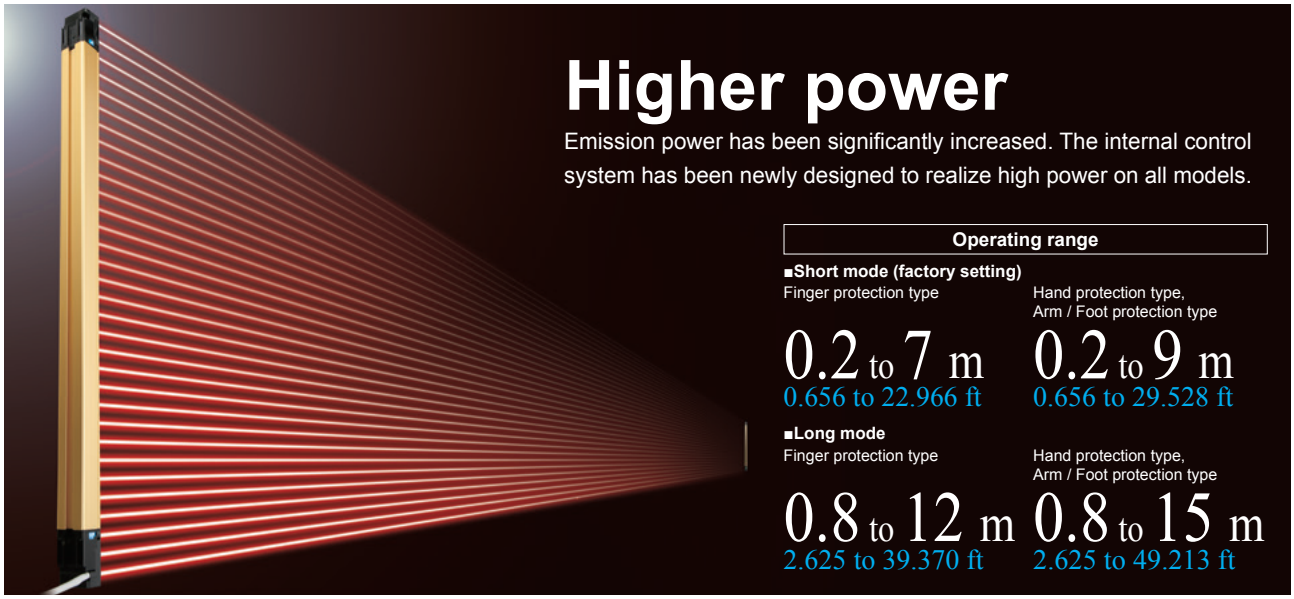
Easy beam adjustment

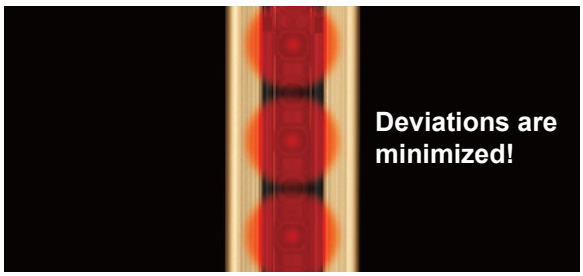
Labor is reduced and stable operation is achieved in all phases of work, from installation and adjustment to daily operation and maintenance.

Compact & Robust
SF4D
SERIES

Optical properties that make beam adjustment easy

We note only emphasized stable action while in operation, but also good workability. These strengths are particularly apparent in long-distance detection.





Minimization of deviations among elements

We incorporated the unique element alignment technology in the safety light curtain. This minimizes curves due to emitter and receiver mounting deviations and quality deviations due to differences in individual elements.

Digital indicator for verification of light incidence margin

The light incidence margin is indicated by the “stable light incidence indicator” and “digital indicator”. This function enables appropriate beam adjustment and work quality control during installation of the device.
The indicators also show whether there is dirt on the detection surface or beam misalignment due to play. This enables the indicators to be used for startup inspection and preventative maintenance.

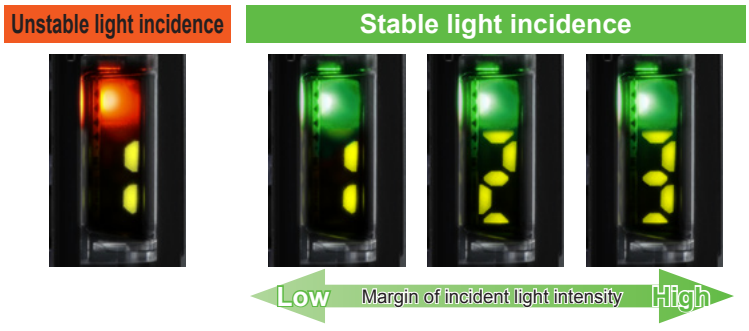
* When optical synchronization is set, only the indicator on the receiver lights up.

Stable light incidence indicator

- Stable light incidence: Lights green
- Unstable light incidence: Lights orange
- Light blocked: Off

Digital indicator

- Incident light level 3: Lights green “3”
- Incident light level 2: Lights green “2”
- Incident light level 1: Lights green “1”
- Light blocked: Off



Supports both PNP and NPN polarities in a single model

The **SF4D** series combines PNP transistor output and NPN transistor output in a single model. It contributes to reductions of model numbers and costs.

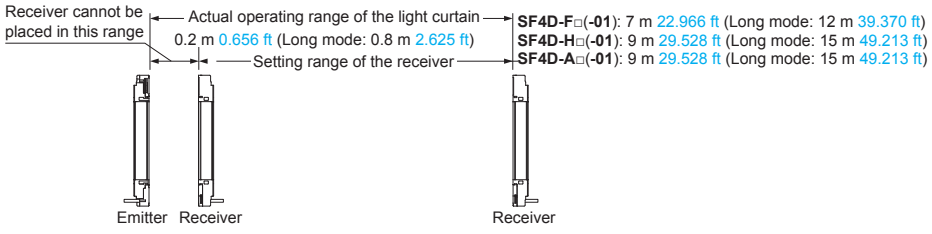
ORDER GUIDE

Safety light curtain

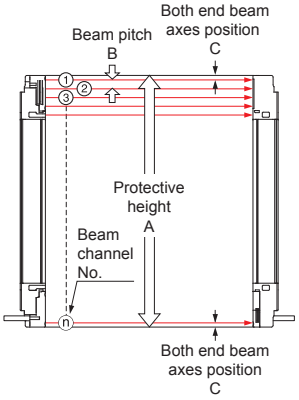
Mounting bracket and bottom cap cable are not supplied with the safety light curtain. Be sure to order them separately.

Type		Model No.	Japanese press machine or paper shearing machine compliant	Operating range (Note 1)	Number of beam channels	Protective height (Note 2) A	When using as safety equipment for Chinese press machine or when using **SF4D-□-01** for Japanese press machine or paper shearing machine	Beam pitch B	Both end beam axes position C
Finger protection type	Min. sensing object ø14 mm ø0.551 in (10 mm 0.394 in beam pitch)	**SF4D-F15**	**SF4D-F15-01**	0.2 to 7 m 0.656 to 22.966 ft (Short mode) / 0.8 to 12 m 2.625 to 39.370 ft (Long mode) (selectable by DIP switch)	15	150 mm 5.906 in	140 mm 5.512 in	10 mm 0.394 in	5 mm 0.197 in
		SF4D-F23	**SF4D-F23-01**		23	230 mm 9.055 in	220 mm 8.661 in		
		SF4D-F31	**SF4D-F31-01**		31	310 mm 12.205 in	300 mm 11.811 in		
		SF4D-F39	**SF4D-F39-01**		39	390 mm 15.354 in	380 mm 14.960 in		
		SF4D-F47	**SF4D-F47-01**		47	470 mm 18.504 in	460 mm 18.110 in		
		SF4D-F55	**SF4D-F55-01**		55	550 mm 21.654 in	540 mm 21.260 in		
		SF4D-F63	**SF4D-F63-01**		63	630 mm 24.803 in	620 mm 24.409 in		
		SF4D-F71	**SF4D-F71-01**		71	710 mm 27.953 in	700 mm 27.559 in		
		SF4D-F79	**SF4D-F79-01**		79	790 mm 31.102 in	780 mm 30.708 in		
		SF4D-F95	**SF4D-F95-01**		95	950 mm 37.402 in	940 mm 37.007 in		
		SF4D-F111	**SF4D-F111-01**		111	1,110 mm 43.701 in	1,100 mm 43.306 in		
		SF4D-F127	**SF4D-F127-01**		127	1,270 mm 50.000 in	1,260 mm 49.606 in		
Hand protection type	Min. sensing object ø25 mm ø0.984 in (20 mm 0.787 in beam pitch)	**SF4D-H8**	**SF4D-H8-01**	0.2 to 9 m 0.656 to 29.528 ft (Short mode) / 0.8 to 15 m 2.625 to 49.213 ft (Long mode) (selectable by DIP switch)	8	150 mm 5.906 in	140 mm 5.512 in	20 mm 0.787 in	5 mm 0.197 in
		SF4D-H12	**SF4D-H12-01**		12	230 mm 9.055 in	220 mm 8.661 in		
		SF4D-H16	**SF4D-H16-01**		16	310 mm 12.205 in	300 mm 11.811 in		
		SF4D-H20	**SF4D-H20-01**		20	390 mm 15.354 in	380 mm 14.960 in		
		SF4D-H24	**SF4D-H24-01**		24	470 mm 18.504 in	460 mm 18.110 in		
		SF4D-H28	**SF4D-H28-01**		28	550 mm 21.654 in	540 mm 21.260 in		
		SF4D-H32	**SF4D-H32-01**		32	630 mm 24.803 in	620 mm 24.409 in		
		SF4D-H36	**SF4D-H36-01**		36	710 mm 27.953 in	700 mm 27.559 in		
		SF4D-H40	**SF4D-H40-01**		40	790 mm 31.102 in	780 mm 30.708 in		
		SF4D-H48	**SF4D-H48-01**		48	950 mm 37.402 in	940 mm 37.007 in		
		SF4D-H56	**SF4D-H56-01**		56	1,110 mm 43.701 in	1,100 mm 43.306 in		
		SF4D-H64	**SF4D-H64-01**		64	1,270 mm 50.000 in	1,260 mm 49.606 in		
		SF4D-H72	**SF4D-H72-01**		72	1,430 mm 56.299 in	1,420 mm 55.905 in		
		SF4D-H80	**SF4D-H80-01**		80	1,590 mm 62.598 in	1,580 mm 62.205 in		
		SF4D-H88	**SF4D-H88-01**		88	1,750 mm 68.898 in	1,740 mm 68.503 in		
		SF4D-H96	**SF4D-H96-01**		96	1,910 mm 75.197 in	1,900 mm 74.803 in		
Arm / Foot protection type	Min. sensing object ø45 mm ø1.772 in (40 mm 1.575 in beam pitch)	**SF4D-A4**	**SF4D-A4-01**	0.2 to 9 m 0.656 to 29.528 ft (Short mode) / 0.8 to 15 m 2.625 to 49.213 ft (Long mode) (selectable by DIP switch)	4	150 mm 5.906 in	120 mm 4.724 in	40 mm 1.575 in	15 mm 0.591 in
		SF4D-A6	**SF4D-A6-01**		6	230 mm 9.055 in	200 mm 7.874 in		
		SF4D-A8	**SF4D-A8-01**		8	310 mm 12.205 in	280 mm 11.024 in		
		SF4D-A10	**SF4D-A10-01**		10	390 mm 15.354 in	360 mm 14.173 in		
		SF4D-A12	**SF4D-A12-01**		12	470 mm 18.504 in	440 mm 17.323 in		
		SF4D-A14	**SF4D-A14-01**		14	550 mm 21.654 in	520 mm 20.472 in		
		SF4D-A16	**SF4D-A16-01**		16	630 mm 24.803 in	600 mm 23.622 in		
		SF4D-A18	**SF4D-A18-01**		18	710 mm 27.953 in	680 mm 26.772 in		
		SF4D-A20	**SF4D-A20-01**		20	790 mm 31.102 in	760 mm 29.921 in		
		SF4D-A24	**SF4D-A24-01**		24	950 mm 37.402 in	920 mm 36.220 in		
		SF4D-A28	**SF4D-A28-01**		28	1,110 mm 43.701 in	1,080 mm 42.520 in		
		SF4D-A32	**SF4D-A32-01**		32	1,270 mm 50.000 in	1,240 mm 48.819 in		
		SF4D-A36	**SF4D-A36-01**		36	1,430 mm 56.299 in	1,400 mm 55.118 in		
		SF4D-A40	**SF4D-A40-01**		40	1,590 mm 62.598 in	1,560 mm 61.417 in		
		SF4D-A44	**SF4D-A44-01**		44	1,750 mm 68.898 in	1,720 mm 67.716 in		
		SF4D-A48	**SF4D-A48-01**		48	1,910 mm 75.197 in	1,880 mm 74.016 in		

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



2) When using as a safety device for a press machine in China or when using **SF4D-□-01** as a safety device for a press machine or paper shearing machine in Japan, the length from the center of the first beam channel to the center of the last beam channel become to be protective height.



ORDER GUIDE

Mounting brackets

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

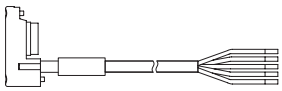
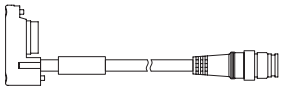
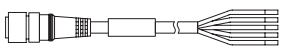
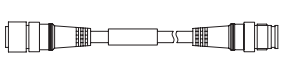
Designation	Model No.	Description	
Beam adjustment mounting bracket	**MS-SFD-1-5**	For mounting with M5 / M8 hexagon-socket head bolt	Mounting bracket for rear or side installation of safety light curtain. (4 pcs./set for emitter and receiver) Material: Cold rolled carbon steel (SPCC)
	MS-SFD-1-6	For mounting with M6 hexagon-socket head bolt	
	MS-SFD-1-8	For mounting with M8 hexagon-socket head bolt	
Dead zoneless beam adjustment mounting bracket (Note 1)	**MS-SFD-3-6**	No deadspace mounting is possible in which mounting brackets do not extend beyond the protective height. (4 pcs./set for emitter and receiver) Material: Die-cast zinc alloy	
Intermediate supporting bracket (Note 2)	**MS-SFB-2**	This bracket holds the safety light curtain at the middle. (2 pcs./set for emitter and receiver) Use when installing the safety light curtain in a location subject to vibration. Material: Die-cast zinc alloy	
SF4B-G compatible mounting bracket	**MS-SFD-4BG**	Mounting bracket for replacement of previous **SF4B-□G□<V2>** model with this device. (4 pcs./set for emitter and receiver) There is no need to change the mounting hole pitch. Material: Cold rolled carbon steel (SPCC)	

Notes: 1) The required number for emitter and receiver varies depending on the number of beam channels.
2) When the number of beam channels is **SF4D-F□(-01)**: 111 or more beam channels, **SF4D-H□(-01)**: 56 or more beam channels, **SF4D-A□(-01)**: 28 or more beam channels, one set is required.

Mating cable / Extension cable

Mating cable is not supplied with the safety light curtain. Be sure to order it separately.

When using **SF4D-□-01** as a safety device for a press machine or paper shearing machine in Japan, always attach the protective tube **SFPD-A10** (tube length 10 m 32.808 in) (option) to the cable.

Type				Appearance	Model No.	Description (Note 1)	
Standard components (8-core cable)	Bottom cap cable	Discrete wire			**SFD-CCB3**	Length: 3 m 9.843 ft Net weight: 290 g approx. (2 cables)	Used for connecting to the safety light curtain and to other cables or the **SF-C13** / **SF-C21** control unit. 2 pcs./set for emitter and receiver
					SFD-CCB7	Length: 7 m 22.966 ft Net weight: 620 g approx. (2 cables)	
					SFD-CCB10	Length: 10 m 32.808 ft Net weight: 900 g approx. (2 cables)	
					SFD-CCB15	Length: 15 m 49.213 ft Net weight: 1,300 g approx. (2 cables)	
		Connector			**SFD-CB05**	Length: 0.5 m 1.640 ft Net weight: 80 g approx. (2 cables)	Used for connecting to the light curtain and to an extension cable or the **SF-C11** control unit. 2 pcs./set for emitter and receiver Connector outer diameter: ø14 mm ø0.551 in max.
					SFD-CB5	Length: 5 m 16.404 ft Net weight: 480 g approx. (2 cables)	
					SFD-CB10	Length: 10 m 32.808 ft Net weight: 950 g approx. (2 cables)	
	Extension cable	With connector on one end			**SFD-CC3**	Length: 3 m 9.843 ft Net weight: 290 g approx. (2 cables)	Used for connecting to the safety light curtain and to an extension cable or the **SF-C13** / **SF-C21** control unit. 2 pcs./set for emitter and receiver Connector outer diameter: ø14 mm ø0.551 in max.
					SFD-CC10	Length: 10 m 32.808 ft Net weight: 900 g approx. (2 cables)	
		With connectors on both ends	For emitter		**SFB-CCJ3E**	Length: 3 m 9.843 ft Net weight: 190 g approx. (1 cable)	1 pc. for emitter Connector color: Gray	Used for connecting to an extension cable or the **SF-C11** control unit. Connector outer diameter: ø14 mm ø0.551 in max.
					SFB-CCJ10E	Length: 10 m 32.808 ft Net weight: 580 g approx. (1 cable)	
			For receiver		**SFB-CCJ3D**	Length: 3 m 9.843 ft Net weight: 210 g approx. (1 cable)	1 pc. for receiver Connector color: Black
					SFB-CCJ10D	Length: 10 m 32.808 ft Net weight: 600 g approx. (1 cable)	

Notes: 1) Where the cable color has not been specified, it is black for emitter, gray with black line for outer diameter is ø5.7 mm ø0.224 in or ø6 mm ø0.236 in, min. bending radius is R6 mm R0.236 in. However, the minimum bending radius of the cable with the protective tube **SFPD-A10** attached is R55 mm R2.165 in.
2) 5-core cables, 12-core cables and cables for series connection are available. Please contact our sales office for details.

SPECIFICATIONS

Safety light curtain common specifications

Item		Type	Min. sensing object ø14 mm ø0.551 in (10 mm 0.394 in beam pitch)	Min. sensing object ø25 mm ø0.984 in (20 mm 0.787 in beam pitch)	Min. sensing object ø45 mm ø1.772 in (40 mm 1.575 in beam pitch)
		Model No.	**SF4D-F□**	**SF4D-H□**	**SF4D-A□**
		Japanese press machine or paper shearing machine compliant	**SF4D-F□-01**	**SF4D-H□-01**	**SF4D-A□-01**
Applicable standards	International standards		IEC 61496-1/2 (Type 4), ISO 13849-1 (Category 4, PLe), IEC 61508-1 to 7 (SIL3)		
	Japan		JIS B 9704-1/2 (Type 4), JIS B 9705-1 (Category 4), JIS C 0508-1 to 7 (SIL3)		
	Europe (EU)		EN 61496-1/2 (Type 4), EN ISO 13849-1 (Category 4, PLe), EN 55011, EN 61000-6-2, EN 50178		
	North America		ANSI/UL 61496-1/2 (Type 4), CAN/CSA C22.2 No.14, CAN/CSA E61496-1/2		
	South Korea (S-Mark)		S1-G-1-2009, S2-W-5-2009 (excluding **SF4D-□-01**)		
	China (GB)		GB 4584		
Applicable CE marking directive			Machinery Directive, EMC Directive, RoHS Directive		
Operating range (Note 2)			Short mode: 0.2 to 7 m 0.656 to 22.966 ft Long mode: 0.8 to 12 m 2.625 to 39.370 ft (selectable by DIP switch)	Short mode: 0.2 to 9 m 0.656 to 29.528 ft Long mode: 0.8 to 15 m 2.625 to 49.213 ft (selectable by DIP switch)	
Min. sensing object (Note 3)			ø14 mm ø0.551 in opaque object	ø25 mm ø0.984 in opaque object	ø45 mm ø1.772 in opaque object
Effective aperture angle			±2.5° or less at a sensing range of 3 m 9.843 ft or longer (based on IEC 61496-2)		
Supply voltage			24 V DC $^{+20}_{-30}$ % Ripple P-P 10 % or less (excluding voltage drop due to cable)		
Control outputs (OSSD 1, OSSD 2)			PNP open-collector transistor / NPN open collector transistor (selectable) <PNP output selected> • Maximum source current: 350 mA • Applied voltage: Same as supply voltage (between control output and +V) • Residual voltage: 2 V or less (source current 350 mA) (excluding voltage drop due to cable) • Leakage current: 0.2 mA or less (including power OFF state) • Maximum load capacity: 2.2 µF • Load wiring resistance: 3 Ω or less	<NPN output selected> • Maximum sink current: 350 mA • Applied voltage: Same as supply voltage (between control output and 0 V) • Residual voltage: 2 V or less (sink current 350 mA) (excluding voltage drop due to cable) • Leakage current: 0.2 mA or less (including power OFF state) • Maximum load capacity: 2.2 µF • Load wiring resistance: 3 Ω or less	
	Operation mode		ON when all beams are received, OFF when one or more beams are blocked (Also OFF when internal sensor error or synchronization signal error occurs)		
	Protection circuit		Incorporated		
	Response time		OFF response: 10 ms or less (not connected in series / parallel), 18 ms or less (connected in series / parallel) ON response: 50 ms or less (Note 4) (Note 5)		
Auxiliary output (AUX) (Non-safety output)			PNP open-collector transistor / NPN open collector transistor (selectable)		
Synchronization method			Line synchronization / optical synchronization (selectable by DIP switch)		
Interference prevention function			<Not connected in series / parallel> • Line synchronization: 2 units or less (auto) • Optical synchronization: 2 units or less (selectable by DIP switch)	<Connected in series / parallel> • Series connection: 5 units or less (total number of beam channels 256 or less) • Parallel connection: 3 units or less (total number of beam channels 192 or less) • Series / parallel connection mixed: 5 units or less (total number of beam channels 144 or less)	
Test input function			Incorporated		
Interlock function			Incorporated [Manual reset / auto reset (selectable by wiring)] (use 8-core cable or 12-core cable)		
Lockout release function			Incorporated		
External device monitor function			Incorporated (use 8-core cable or 12-core cable)		
Muting function			Incorporated (use 12-core cable)		
Override function			Incorporated (use 12-core cable)		
Degree of protection			IP67, IP65 (IEC), NEMA Type 13 (NEMA 250)		
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		
Accessories			**SF4B-TR14** (Test rod): 1 pc.	**SF4B-TR25** (Test rod): 1 pc.	————

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C +68 °F.
2) The operating range is the possible setting distance between the emitter and the receiver.
3) When the floating blanking function is used, the size of the min. sensing object is changed.
4) Because the control output (OSSD 1 / 2) must be OFF for at least 80 ms, the ON response will be delayed more than 50 ms when the light blocked time is less than 30 ms.
5) When optical synchronization is selected, if the beam axes of both the top end and bottom end are blocked, the ON response speed decreases by as much as 1 sec.

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No. CE-SF4DSIM-12 December, 2016