

Panasonic

SENSORS

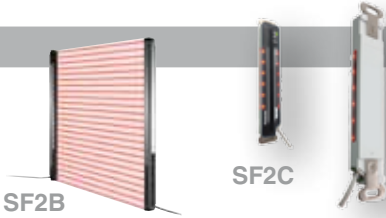
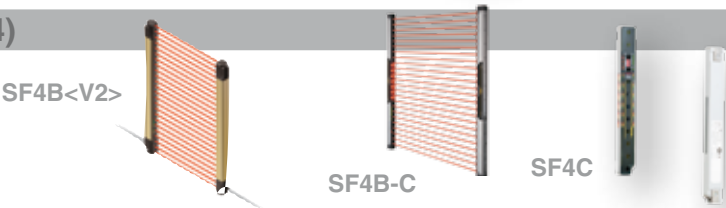
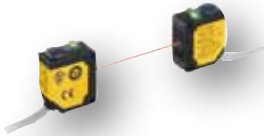


INDUSTRIAL SAFETY PRODUCTS





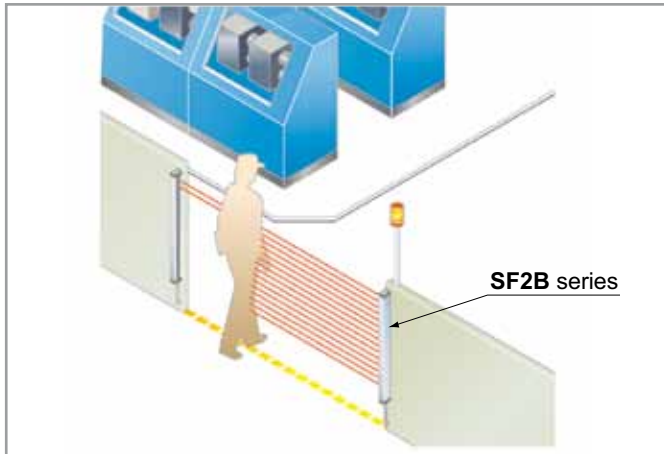
Panasonic safety sensors

(formerly sold under the brandname SUNX)

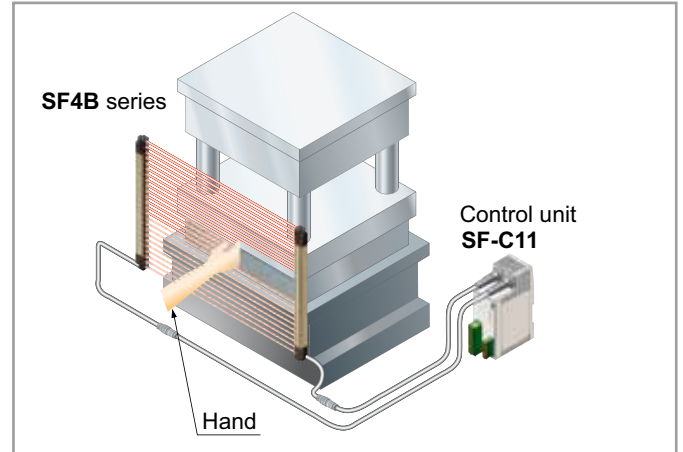
Safety first worldwide	
Page	From single beam sensors to a safety scanner system. With its four (six?) product categories, Panasonic ensures the safety of persons working with machines in industrial manufacturing. Without exception, Panasonic safety products fulfill all international safety regulations. For machine builders that export their products, this means a significant reduction in costs: country-specific device types no longer need to be considered during the design phase; rather one and the same device is approved for all countries, everywhere. Global safety from Panasonic.
5	Safety light curtains (type 2) SF2B SF2C NEW! 
10	Safety light curtains (type 4) SF4B<V2> SF4B-C NEW! SF4C 
24	Single beam sensor (type 4) ST4 
26	Safety laser scanner (type 3) SD3-A1 
28	Safety control units (type 4) SF-C10 
31	Other Panasonic safety products

Typical applications

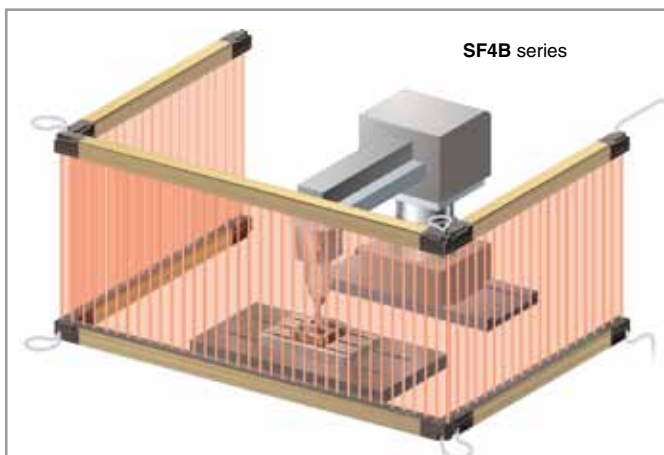
■ Detection of entry through the no-entry line



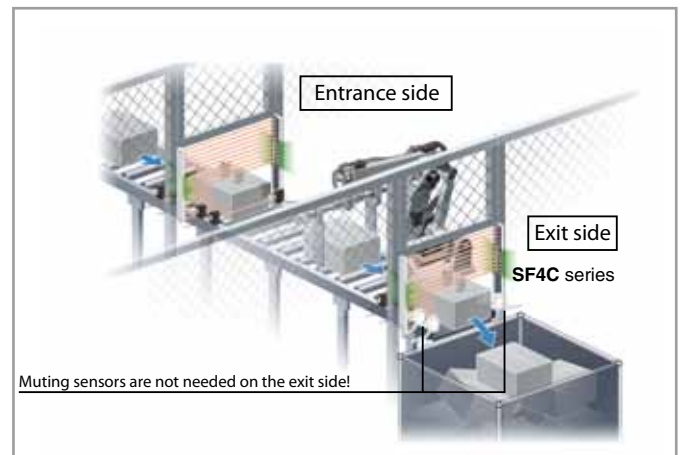
■ Safeguard for press machine



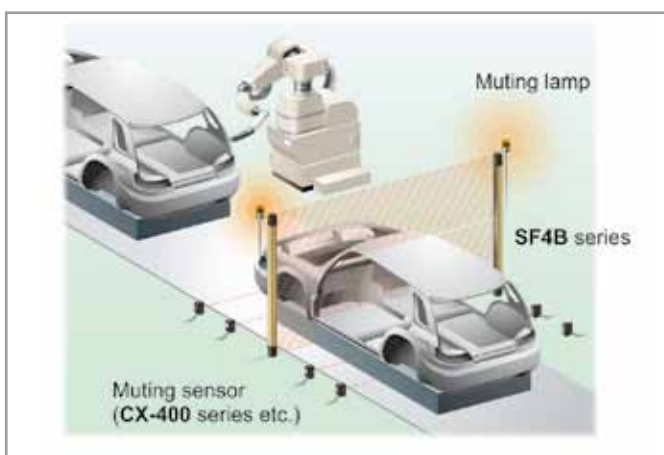
■ Safeguard for robots



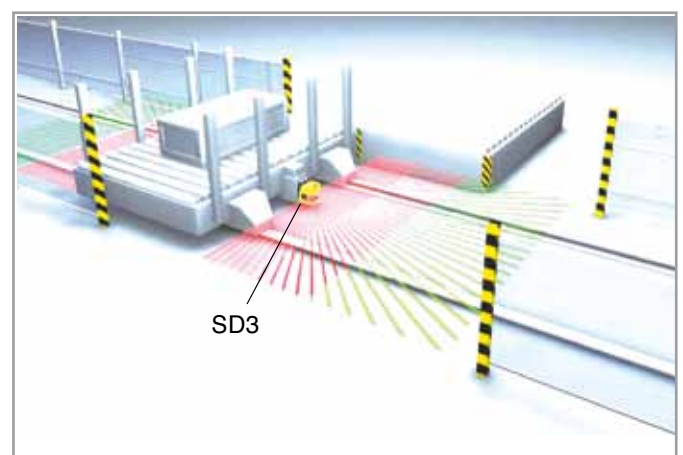
■ Safety measures when objects exit (exit muting control function)



■ Intrusion detection in areas with moving robots



■ Confirming safety around automatic guided vehicles



SF2B

Type 2 · PLd · SIL2



Achieving IP67 protection while keeping a slim body

Features

■ Safety designs for different risk levels at reasonable cost

- Degree of protection IP67
- Digital error indicator incorporated
- Strong against mutual interference and extraneous light
- Unified response time of 15ms for all models and heights
- Built-in external device monitoring function
- “ZERO” dead zone
Unit length = protective height, mounting with no dead zone



■ Hand protection type SF2B-H□

Minimum sensing object ø27mm
(20mm beam pitch)



■ A large number of variations to suit different needs

Abundant range of variations available with sensing widths from 168mm to 1,912mm.

Two types are available for different minimum sensing object sizes. Furthermore, sub-sensors for serial connection (optional) can be used to connect up to three sets of light curtains (up to a total maximum of 128 beam channels; however the **SF2B-A**□ allows up to 96 beam channels when two sets are connected, and up to 64 beam channels when three sets are connected).

■ Arm / Foot protection type SF2B-A□

Minimum sensing object ø47mm
(40mm beam pitch)

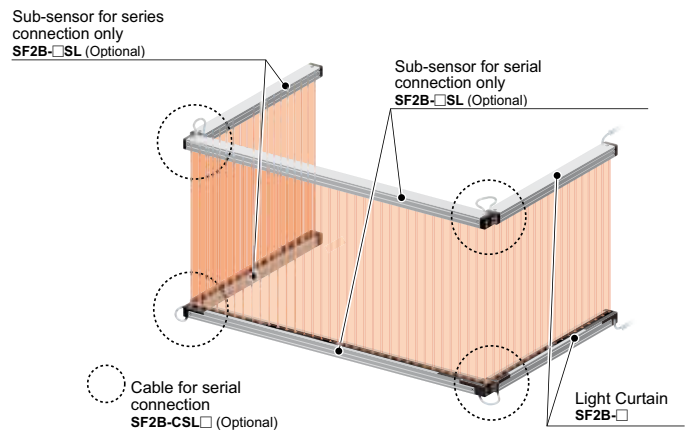


New concept **‘ZERO’ Dead zone**
Unit length = Protective height

Safety light curtain (type 2)

SF2B

- Hand protection type and arm / foot protection type can be used together

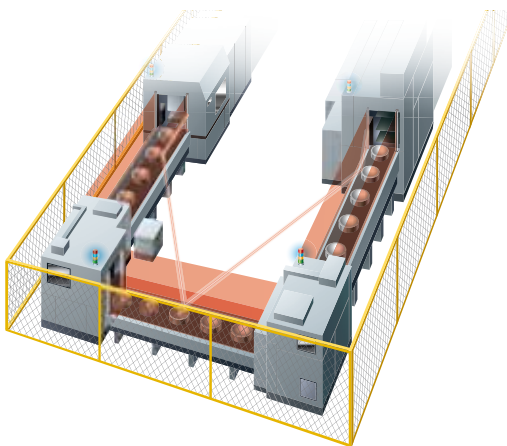


- ELCA function incorporated

The advanced ELCA function used in previous light curtains that has been widely acclaimed in the marketplace has been included again. It suppresses mutual interference and the effects of extraneous light.

- Mutual interference is reduced without need for interference prevention lines

The scan timing of the light curtain is automatically shifted in order to reduce mutual interference.



- Light curtain is protected to prevent problems

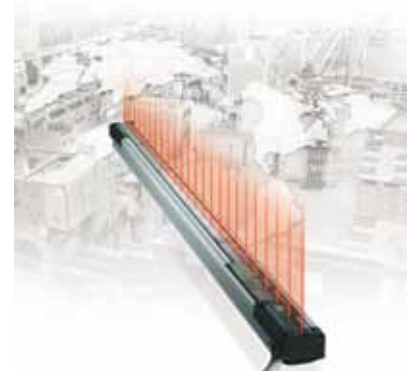
Front protection cover protects the sensing surfaces.

This can be used to protect the sensing surfaces even if the light curtain is set up in harsh environments such as places where oil and welding spatter occur (optional).



- IP67 protection

International standard safety compliance can be achieved with excellent basic functions and IP67 protection at a reasonable price.



Technical specifications

Type	Operating range	Model no.	PFHd	Number of beams	Protective height (mm)
Sensor hand type (20mm pitch)	0.3 to 13m	SF2B-H8-P	6.04E-09	8	168
		SF2B-H12-P	6.23E-09	12	232
		SF2B-H16-P	6.37E-09	16	312
		SF2B-H20-P	6.57E-09	20	392
		SF2B-H24-P	6.71E-09	24	472
		SF2B-H28-P	6.90E-09	28	552
		SF2B-H32-P	7.04E-09	32	632
		SF2B-H36-P	7.23E-09	36	712
		SF2B-H40-P	7.37E-09	40	792
		SF2B-H48-P	7.71E-09	48	952
		SF2B-H56-P	8.04E-09	56	1112
		SF2B-H64-P	8.37E-09	64	1272
		SF2B-H72-P	8.71E-09	72	1432
		SF2B-H80-P	9.04E-09	80	1592
		SF2B-H88-P	9.37E-09	88	1752
		SF2B-H96-P	9.71E-09	96	1912
Sensor arm/foot type (40mm pitch)	0.3 to 13m	SF2B-A4-P	5.90E-09	4	168
		SF2B-A6-P	6.03E-09	6	232
		SF2B-A8-P	6.10E-09	8	312
		SF2B-A10-P	6.22E-09	10	392
		SF2B-A12-P	6.29E-09	12	472
		SF2B-A14-P	6.41E-09	14	552
		SF2B-A16-P	6.48E-09	16	632
		SF2B-A18-P	6.61E-09	18	712
		SF2B-A20-P	6.68E-09	20	792
		SF2B-A24-P	6.87E-09	24	952
		SF2B-A28-P	7.07E-09	28	1112
		SF2B-A32-P	7.26E-09	32	1272
		SF2B-A36-P	7.46E-09	36	1432
		SF2B-A40-P	7.65E-09	40	1592
		SF2B-A44-P	7.84E-09	44	1752
		SF2B-A48-P	8.04E-09	48	1912

For NPN type please contact your local office.

Type	Hand protection		Arm / Foot protection	
	NPN output	PNP output	NPN output	PNP output
Model no.	SF2B-H□-N	SF2B-H□-P	SF2B-A□-N	SF2B-A□-P
MTTFd	100 years			
Applicable standards	IEC 61496 1/2 (type2), EN ISO 13849 (PLd), IEC 61508 (SIL2)			
Beam pitch	20mm		40mm	
Operating range	0.3 to 13m			
Protective height	168 to 1912mm			
Min. sensing object	Ø27mm opaque object		Ø47mm opaque object	
Supply voltage	24VDC ±10%			
Control output	NPN output type: NPN open collector transistor PNP output type: PNP open collector transistor			
Response time	OFF response: 15ms or less, ON response: 40 to 60ms			
Ambient temperature	-10 to +55°C			
Dimensions	W28×H protective height×D24mm			

Options

- Corner mirrors
- Front protection covers
- Mounting brackets
- Cables
- Control units (safety relays)
- Alignment tool



SF2C

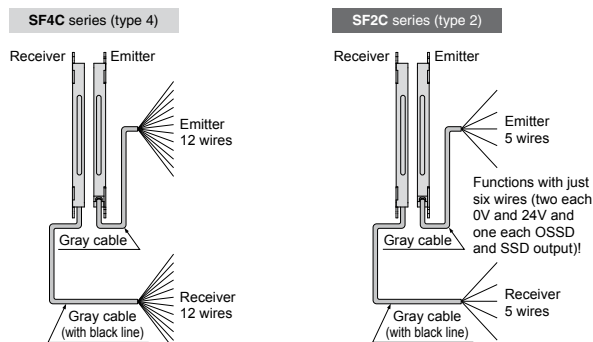
Type 2 · PLc · SIL1

Type 2 ultra-slim light curtains!
Featuring easy installation and
reduced wiring

Features

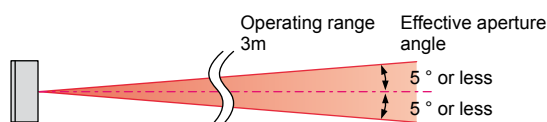
■ Dramatically less wiring work

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.



■ Beam-axis alignment made easy

The emitter has an effective aperture angle of $\pm 5^\circ$ or less for an operating range of 3m. Compared to type 4 light curtains (which have an effective aperture angle of $\pm 2.5^\circ$ or less), the SF2C series is easy to align and install.



■ 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.

■ Includes cables and mounting brackets

The SF2C series includes cables (3 m) for use with all models and standard mounting brackets.

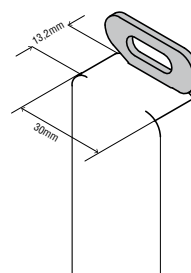
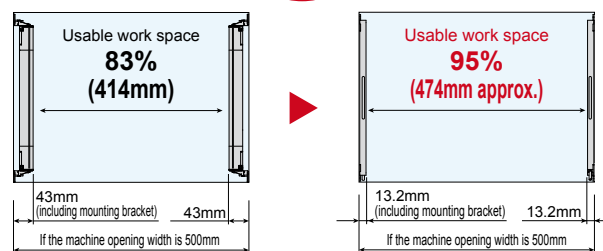
■ Protection structure IP67

Even if the housing is made by polycarbonate the IP67 (IEC) rating is achieved with an ultra-slim size for protection from environmental factors.

■ Slim size for efficient applications

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

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



Technical specification

Type	Operating range	Model no.	PFHd	Number of beams	Protective height (mm)
Hand type (20mm pitch)	0.1 to 3m	SF2C-H8-N	3.74E-09	8	160
		SF2C-H12-N	3.80E-09	12	240
		SF2C-H16-N	3.86E-09	16	320
		SF2C-H20-N	3.93E-09	20	400
		SF2C-H24-N	3.99E-09	24	480
		SF2C-H28-N	4.05E-09	28	560
		SF2C-H32-N	4.12E-09	32	640
		SF2C-H8-P	3.60E-09	8	160
		SF2C-H12-P	3.66E-09	12	240
		SF2C-H16-P	3.73E-09	16	320
		SF2C-H20-P	3.79E-09	20	400
		SF2C-H24-P	3.85E-09	24	480
		SF2C-H28-P	3.92E-09	28	560
		SF2C-H32-P	3.98E-09	32	640

The model no. with suffix "N" shown are NPN version, with suffix "P" are PNP versions.

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.

Type	SF2C cable type
Beam pitch	Hand protection type 20mm
MTTFd	100 years or more
Application standards	EN 61496-1 (type 2), EN ISO 13849-1 (category 2, PLc), EN 61508-1 to 7 (SIL1), EN 55011, EN 50178, EN 61000-6-2
Operation range	0.1 to 3m
Protective height	160mm to 640mm
Min. sensing object	Ø 25mm or more in opaque object
Supply voltage	24V DC (±20%)
Control output	OSSD1 and OSSD2 (2xPNP or 2xNPN), max. 200mA
Response time	OFF response: 20ms or less, ON response: 80 to 100ms
Dimensions	W30mm x protective height x D13.2mm

Options

Metal protection case (2 pcs. per set for emitter and receiver)

Applicable beam channels SF2C-H□	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)



SF4B<V2>

Type 4 · PLe · SIL3

New concepts combining greater safety and higher productivity!

Features

■ More safety with no loss in productivity

- Supports both NPN and PNP outputs in a single model
- Unified response time of 14ms for all models, easy design
- Degree of protection IP67
- Digital error indicator incorporated
- Built-in muting control circuit
- "ZERO" dead zone. Unit length = protective height, mounting with no dead zone



■ IP67 degree of protection despite slim body

Improved environmental resistance and easier new seam-less structure with the least seam area possible. The inner unit is protected by a cylindrical inner case. Particles such as oil mists and dust are prevented from getting in, rising its environmental resistance performance.

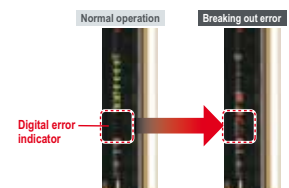


■ Error details can be understood at a glance. Equipped with a digital error indicator

The system constantly checks the light curtain for problems such as incorrect cable wiring, disconnection, short-circuits, internal circuit problems, and incoming light problems. Details of any electrical problems such as at equipment startup will appear on the digital display. The previous method of counting the number of LED blinks is no longer needed.



■ Error number notification means smooth support via telephone



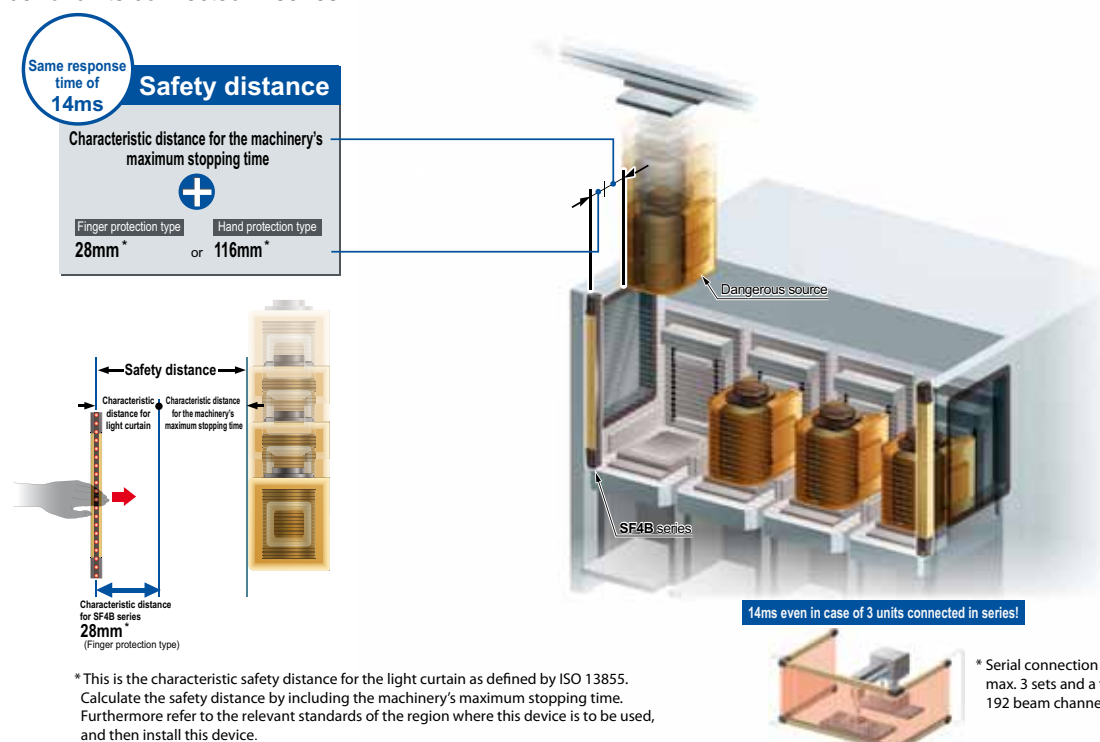
■ Achieving protection structure IP67 while keeping its slim body



New concept **'ZERO'** Dead zone
Unit length = Protective height

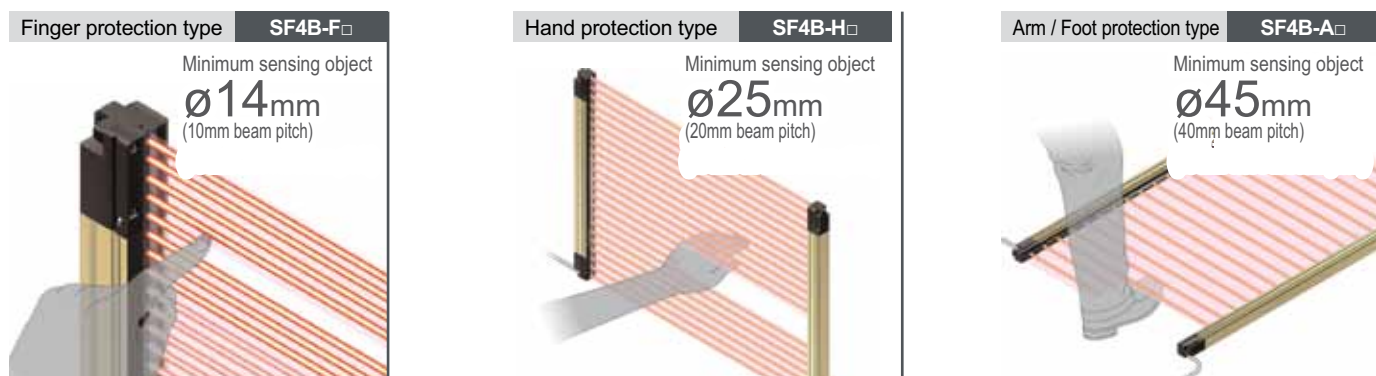
■ A unified response time of 14ms for all models makes setup easy

A fast response time of 14ms has been achieved regardless of the number of beam channels, the Beam-axis pitches and the number of units connected in series. This reduces calculation work required for the safety distance.



■ It is possible to select from among three types depending on the worksite

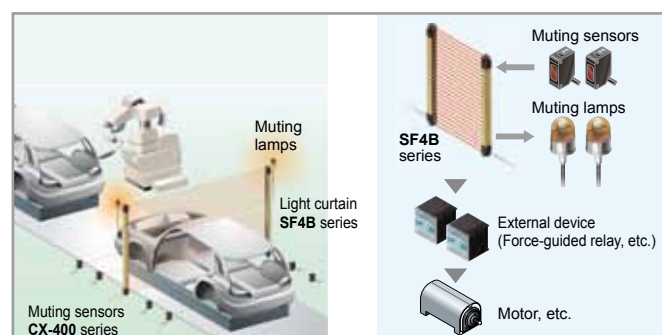
A wide range of variations are available with protective heights of 230 to 1,910mm (1,270mm for the finger protection type). Mixing three types in a serial connection is also possible.



The spatter protection hood type perfect for welding devices is also available.

■ Mutual interference is reduced without needing interference prevention lines

The light curtain is equipped with the ELCA (Extraneous Light Check & Avoid) function. Because it automatically shifts the scan timing of the light curtain in order to avoid interference, it is not necessary to wire interference prevention lines between machinery.



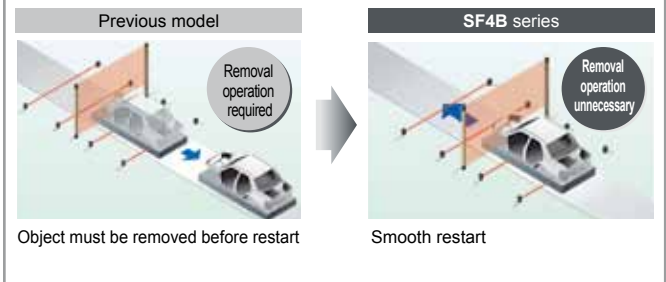
Safety light curtain (type 4)

SF4B<V2>

■ Override function

In case the power turns off while the light curtain has been interrupted by an object or in case the line stops before the muting conditions have been established (if only one muting sensor has been interrupted), the line can be restarted smoothly without having to remove the object that is interrupting the light curtain.

(e.g.) When power turns off while light curtain was interrupted



■ A muting control function is provided to increase both safety and productivity

The light curtain is equipped with a muting control function that causes the line to stop only when a person passes through the light curtain and does not stop the line when an object passes through. The muting sensors and muting lamps can be connected directly to the light curtain so that an exclusive controller is not required for muting. This both reduces costs and increases safety and productivity.

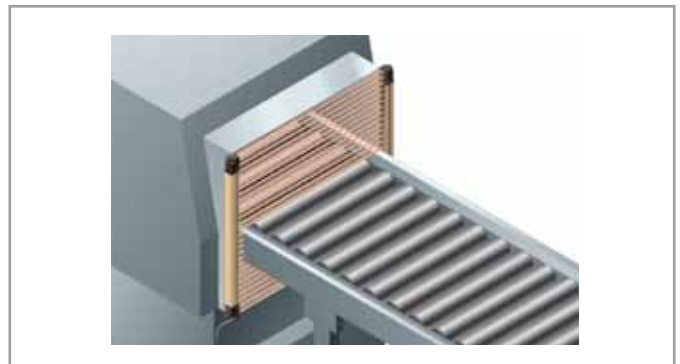
■ Reducing the number of malfunctions caused by extraneous light

Double scanning method and retry processing are two new functions exclusive to Panasonic, which are effective in eliminating the effects of momentary extraneous light from peripheral equipment. The reduction in operating errors caused by extraneous light reduces frequent stopping of machinery.

■ Any beam channels can be selected

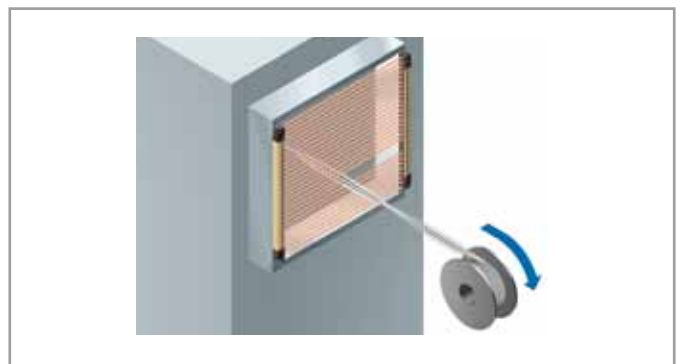
The SF4B series is equipped with a fixed blanking function which allows specific beam channels to be selectively interrupted without causing the control output (OSSD) to output the OFF signal. This function is convenient for applications in which certain fixed obstacles tend to block specific beam channels.

Furthermore, this function provides greater safety as the control output (OSSD) will automatically output the OFF signal if the fixed obstacles are subsequently removed from the sensing area.



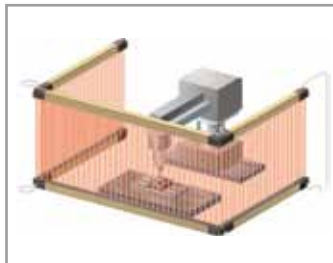
■ Non-specified beam channels can be deactivated

1, 2 or 3 non-specified beam channels can be deactivated. If the number of beam channels that are blocked is less than or equal to the set number of beam channels, then the control output (OSSD) will not output the OFF signal. This function is useful in the event when the positions of obstacles within the sensing area must be changed during object rearrangement, or when an object passes through the light curtain's sensing area.

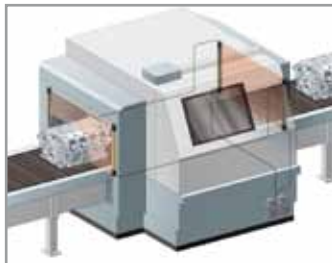


Typical applications

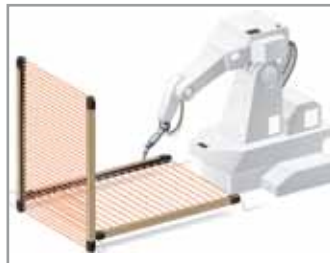
Blanking function



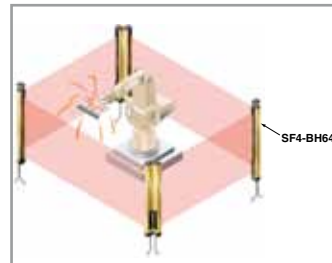
Muting function



Serial connection



Guarding space around welding robot



Technical specifications

Type	Operating range	Model no.	PFHd	Number of beams	Protective height (mm)
Sensor finger type (10mm pitch)	0.3 to 7m	SF4B-F23<V2>	2.56E-09	23	230
		SF4B-F31<V2>	2.96E-09	31	310
		SF4B-F39<V2>	3.36E-09	39	390
		SF4B-F47<V2>	3.75E-09	47	470
		SF4B-F55<V2>	4.15E-09	55	550
		SF4B-F63<V2>	4.55E-09	63	630
		SF4B-F71<V2>	4.95E-09	71	710
		SF4B-F79<V2>	5.35E-09	79	790
		SF4B-F95<V2>	6.15E-09	95	950
		SF4B-F111<V2>	6.94E-09	111	1110
		SF4B-F127<V2>	7.74E-09	127	1270
Sensor hand type (20mm pitch)	0.3 to 9m	SF4B-H12<V2>	2.01E-09	12	230
		SF4B-H16<V2>	2.21E-09	16	310
		SF4B-H20<V2>	2.41E-09	20	390
		SF4B-H24<V2>	2.61E-09	24	470
		SF4B-H28<V2>	2.81E-09	28	550
		SF4B-H32<V2>	3.01E-09	32	630
		SF4B-H36<V2>	3.21E-09	36	710
		SF4B-H40<V2>	3.41E-09	40	790
		SF4B-H48<V2>	3.80E-09	48	950
		SF4B-H56<V2>	4.20E-09	56	1110
		SF4B-H64<V2>	4.60E-09	64	1270
	0.3 to 7m	SF4B-H72<V2>	5.00E-09	72	1430
		SF4B-H80<V2>	5.40E-09	80	1590
		SF4B-H88<V2>	5.80E-09	88	1750
		SF4B-H96<V2>	6.20E-09	96	1910
		SF4B-A6<V2>	1.71E-09	6	230
Sensor arm/foot type (40mm pitch)	0.3 to 9m	SF4B-A8<V2>	1.81E-09	8	310
		SF4B-A10<V2>	1.91E-09	10	390
		SF4B-A12<V2>	2.01E-09	12	470
		SF4B-A14<V2>	2.11E-09	14	550
		SF4B-A16<V2>	2.21E-09	16	630
		SF4B-A18<V2>	2.31E-09	18	710
		SF4B-A20<V2>	2.41E-09	20	790
		SF4B-A24<V2>	2.61E-09	24	950
		SF4B-A28<V2>	2.81E-09	28	1110
		SF4B-A32<V2>	3.01E-09	32	1270
	0.3 to 7m	SF4B-A36<V2>	3.21E-09	36	1430
		SF4B-A40<V2>	2.41E-09	40	1590
		SF4B-A44<V2>	3.61E-09	44	1750
		SF4B-A48<V2>	3.80E-09	48	1910

Technical specifications

Type	Finger protection	Hand protection	Arm / Foot protection
Model no.	SF4B-F□□<V2>	SF4B-H□□<V2>	SF4B-A□□<V2>
MTTFd	100 years		
Applicable standards	IEC 61496 1/2 (type 4), EN ISO 13849 (PLe), IEC61508 (SIL3)		
Beam pitch	10mm	20mm	40mm
Operating range	0.3 to 7m	0.3 to 9m (72 beam channels or more: 0.3 to 7m)	0.3 to 9m (36 beam channels or more: 0.3 to 7m)
Protective height	230 to 1270mm	230 to 1910mm	230 to 1910mm
Min. sensing object	14mm or more for opaque object	25mm or more for opaque object	45mm or more for opaque object
Supply voltage	24VDC±10%		
Control output	PNP open collector transistor / NPN open collector transistor (selectable using wiring)		
Response time	OFF response: 14ms or less, ON response: 80 to 90ms		
Dimensions	W28×protective height×D30mm		

□□ Number of beams

Options

- Corner mirrors
- Front protection covers
- Mounting brackets
- Cables
- Control units (safety relays)
- Alignment tool
- Handy controller

NEW!

SF4B-C

Type 4 · PLe · SIL3

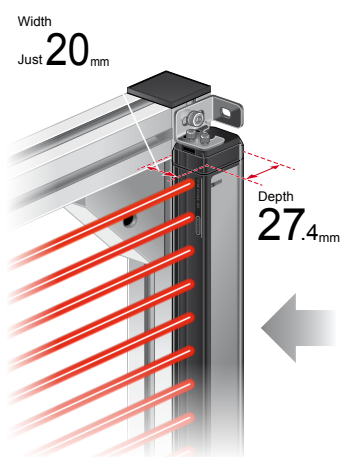
Type 4 compact light curtain
Mounts flush on aluminum frames

Features

■ Compact design

The SF4B-C series is designed to mount flush on an aluminum frame, allowing you to maximize the machinery opening. It can even be installed with zero dead zone.

- Side mounting
- The light curtain does not protrude beyond the frame.
- The light curtain's thin design allows protuberances to be minimized during mounting.



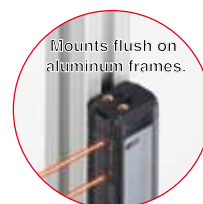
■ Extraneous light check & avoid (ELCA) function

The ELCA function reduces interference without the need for an interference prevention line.

■ Beam alignment indicator

A beam alignment indicator divides the light curtain beams into four equal displays, allowing you to see at a glance where light is being received.

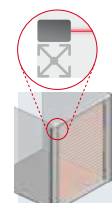
■ Easy mounting on aluminum frame



Buried mounting (side)

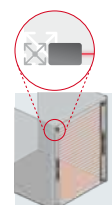
The light curtain mounts flush, even in embedded installations.

- The light curtain protrudes neither into the machinery opening nor outside the frame.
- There's no risk of workpieces bumping into the light curtain.



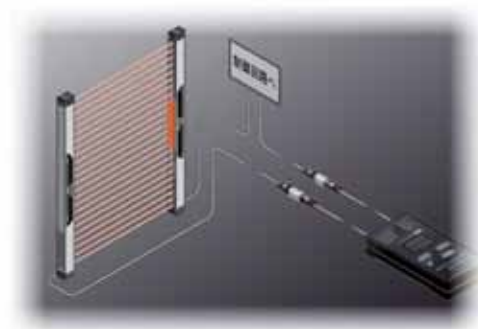
Rear mounting

- The light curtain fits onto a 20 × 20mm aluminum frame perfectly.
- It does not protrude from the frame.



■ The SFB-HC handy controller (optional)

Offers easy access to settings for a range of functionality.

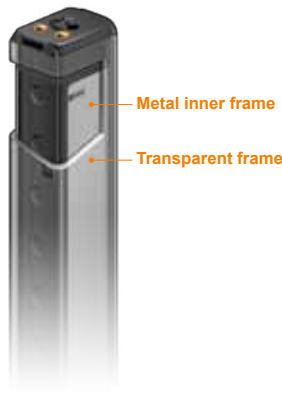


Safety light curtain (type 4)

SF4B-C

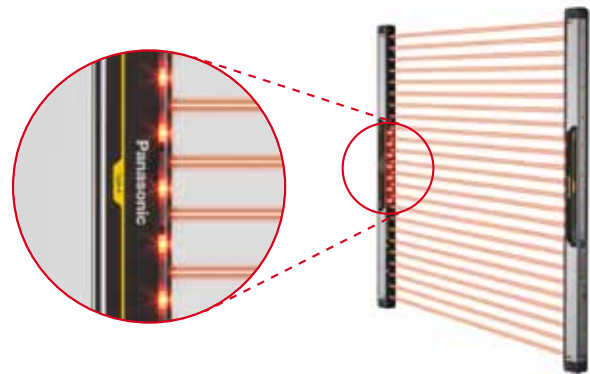
■ Plastic and metal

Double structure with light weight polycarbonate body & robust inner metal frame. Compared to conventional models the weight could be reduced by 45% (comparison models SF4B-H80<V2> & SF4B-H80CA-J05). Thanks to its plastic body, the SF4B-C series is 45% lighter than previous models with aluminum enclosures. The reduced weight is of great advantage when it comes to transport and shipping the system overseas.



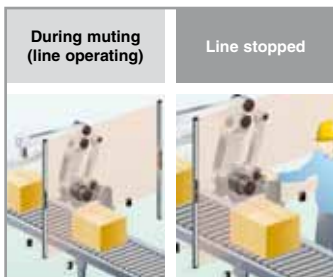
■ Large indicator is easy to see from the side at the pigtailed type

The SF4B-C series incorporates a large multi-purpose indicator (orange) positioned at workers' eye level. The indicator signals the presence of the light curtain, helping to prevent stoppages due to inadvertent interruption of its beams. The indicator can be used in a variety of applications, including as a muting indicator or operation indicator. The large multi-purpose indicator shines brightly through the plastic body to ensure exceptional visibility from the side.



Typical applications

Muting control function for individual beams: Limit the muting area



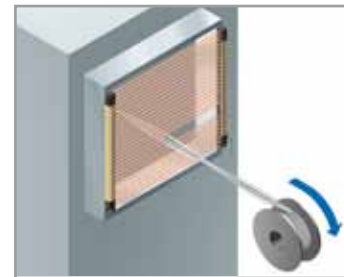
The SFB-HC handy controller (optional) allows you to perform muting control for certain beams only. Since you can specify the beams, there is no need to install a separate guard to prevent incursions. For example, if you use muting control from the lowermost beam to the 10th beam, the light curtain will detect any interruption of the 11th or higher beam as a person and stop the machinery.

Fixed blanking function: Choose active beams



The SFB-HC handy controller provides a fixed blanking function that prevents control output (OSSD) from turning off even if certain beams are interrupted. This capability is convenient in applications where an obstruction always interrupts certain beams. Additionally, a high level of safety is provided since control output (OSSD) is forcibly turned off in the event the obstruction moves outside the detection area.

Floating blanking function: Disable unspecified beams



The floating blanking function allows you to disable up to three unspecified beams. Control output (OSSD) will not turn off as long as the number of interrupted beams is less than the set number of beams. This capability is convenient when an obstruction must move inside the detection area during setup changes or when loading materials inside the light curtain's detection area.

Technical specification

Type	Operating range	Model no.*	PFHd	Number of beams	Protective height (mm)
Hand type (20mm pitch)	0.1 to 7m	SF4B-H12C(A-J05)	1.9E-09	12	263.4
		SF4B-H16C(A-J05)	2.1E-09	16	343.4
		SF4B-H20C(A-J05)	2.4E-09	20	423.4
		SF4B-H24C(A-J05)	2.6E-09	24	503.4
		SF4B-H28C(A-J05)	2.8E-09	28	583.4
		SF4B-H32C(A-J05)	3.0E-09	32	663.4
		SF4B-H36C(A-J05)	3.3E-09	36	743.4
		SF4B-H40C(A-J05)	3.5E-09	40	823.4
		SF4B-H48C(A-J05)	3.9E-09	48	983.4
		SF4B-H56C(A-J05)	4.4E-09	56	1143.4
		SF4B-H64C(A-J05)	4.8E-09	64	1303.4
		SF4B-H72C(A-J05)	5.3E-09	72	1463.4
		SF4B-H80C(A-J05)	5.7E-09	80	1623.4
Arm type (40mm pitch)	0.1 to 7m	SF4B-A8C(A-J05)	1.7E-09	8	343.4
		SF4B-A12C(A-J05)	1.9E-09	12	503.4
		SF4B-A16C(A-J05)	2.2E-09	16	663.4
		SF4B-A20C(A-J05)	2.4E-09	20	823.4
		SF4B-A24C(A-J05)	2.7E-09	24	983.4
		SF4B-A28C(A-J05)	2.9E-09	28	1143.4
		SF4B-A32C(A-J05)	3.2E-09	32	1303.4
		SF4B-A36C(A-J05)	3.4E-09	36	1463.4
		SF4B-A40C(A-J05)	3.7E-09	40	1623.4

*) All products are equipped with a 5m cable except those with the product number extension A-J05. They are equipped with a 5m cable and a connector.

Type	SF4B-C pigtailed type (with muting function)		SF4B-C cable type	
Beam pitch	Hand protection type 20mm	Arm protection type 40mm	Hand protection type 20mm	Arm protection type 40mm
MTTFd	100 years or more			
Application standards	EN 61496-1 (type 4), EN ISO 13849-1 (category 4, PLe), EN 61508-1 to 7 (SIL3), EN 55011, EN 50178, EN 61000-6-2			
Operation range	0.1 to 7m			
Protective height	263.4mm to 1,634.4mm			
Min. sensing object	Ø 25mm or more for opaque object	Ø 45mm or more for opaque object	Ø 25mm or more for opaque object	Ø 45mm or more for opaque object
Supply voltage	24V DC ±10%			
Control output	OSSD1 and OSSD2 (2xPNP or 2xNPN, switchable), max. 200mA			
Response time	OFF response: 14ms or less, ON response: 80 to 90ms			
Dimensions	W20mm x protective height x D27.4mm			

Safety light curtain (type 4)

SF4C

40th
Anniversary
MODEL

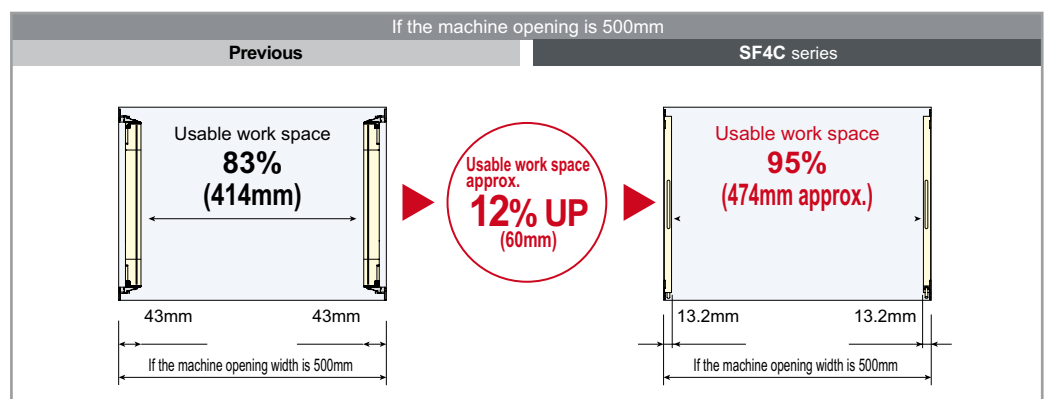
SF4C

Type 4 · PLe · SIL3

Ultra-slim light curtain

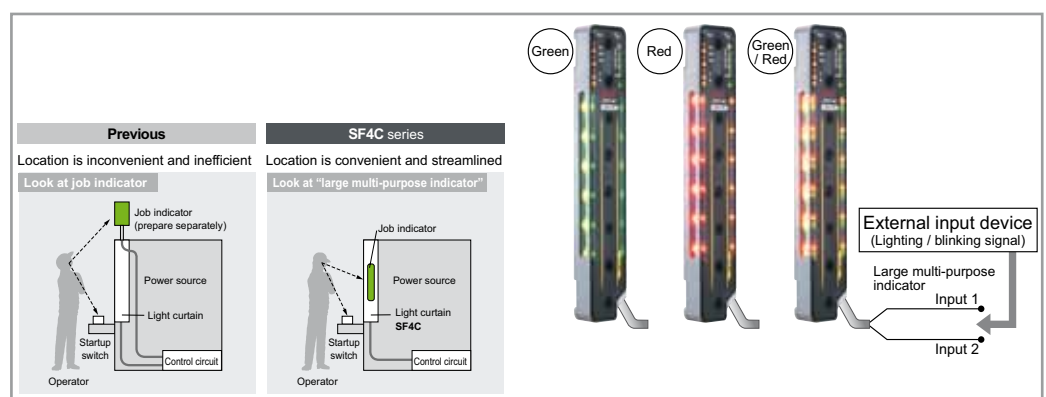
Features

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



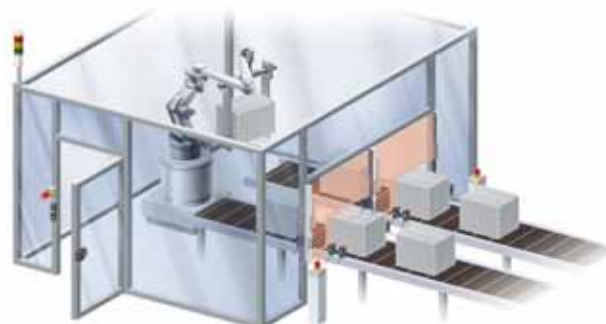
Large multi-purpose indicators for external inputs

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 to set up a separate indicator e. g. muting lamp.



■ Wire-saving when connecting to safety devices (safety input functions)

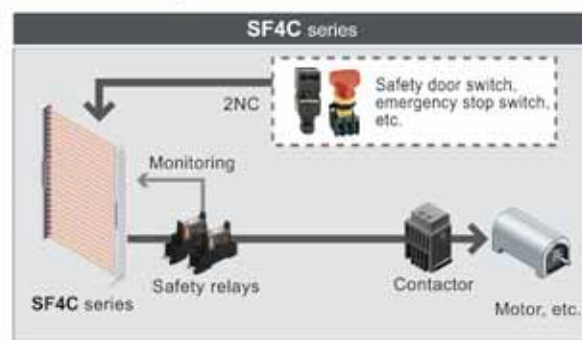
Contact outputs such as emergency stop switches or safety door switches can be connected to the light curtain. Also, by using the handy controller **SFC-HC**, up to three sets of light curtains can be connected in cascade to consolidate safety outputs.



■ Direct connection of safety devices

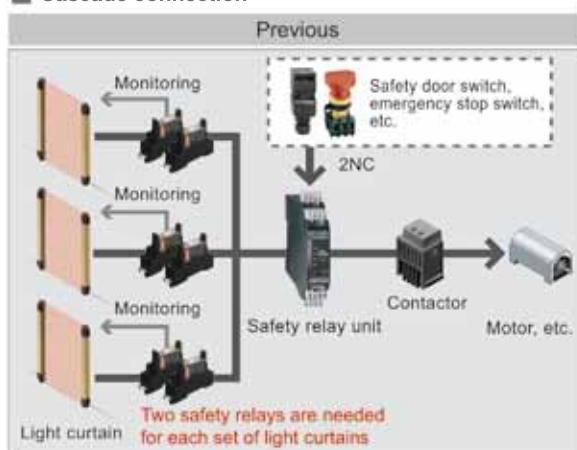


A safety relay unit is needed to connect safety devices other than light curtains.

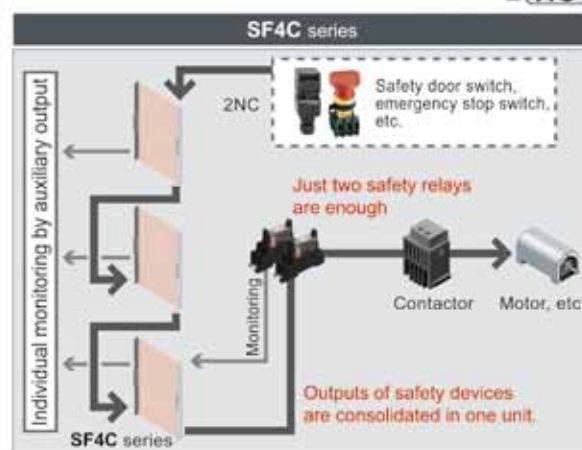


Direct connection of various safety devices is possible for a simplified safety circuit.

■ Cascade connection



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.



Safety light curtain (type 4)

SF4C

■ IP67 protection structure

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

■ Mutual interference is reduced without needing 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. Because it automatically shifts the scan timing of the light curtain in order to avoid interference, it is not necessary to wire interference prevention lines between machinery.

■ 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.

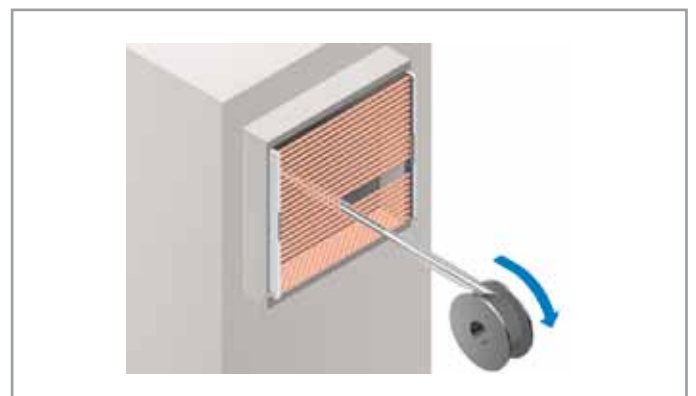
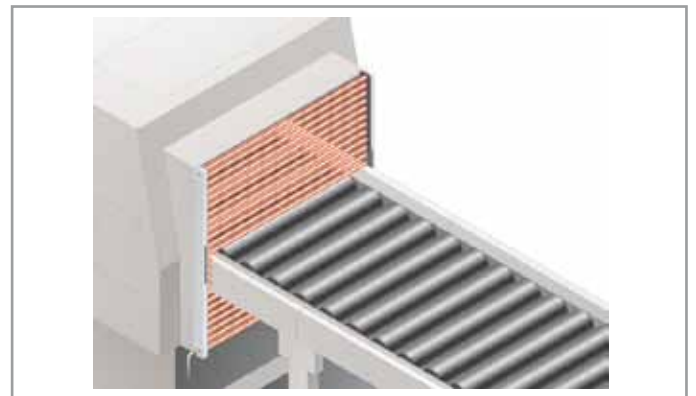
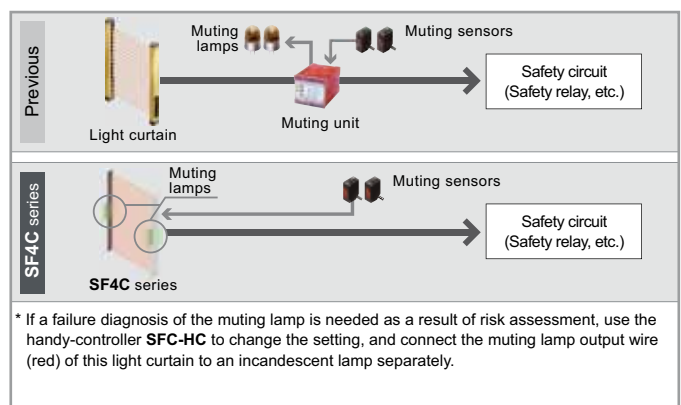
■ Fixed blanking function which allows selective beam channels to be activated improves productivity

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

■ A fast response time of 7ms* for all models

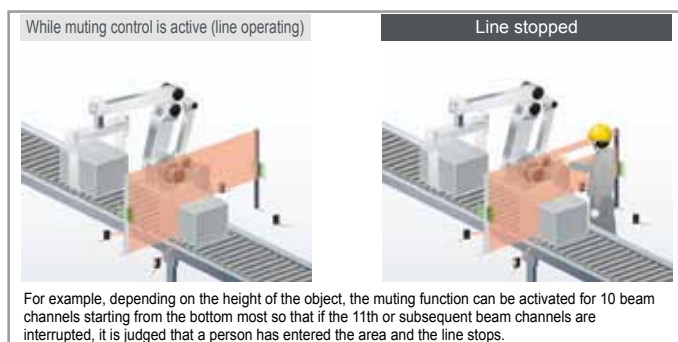
A fast response time of 7ms* for all models regardless of the number of beam channels. This reduces the safety distance as well as the calculation work required for the safety distance among models with different beam channels.

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



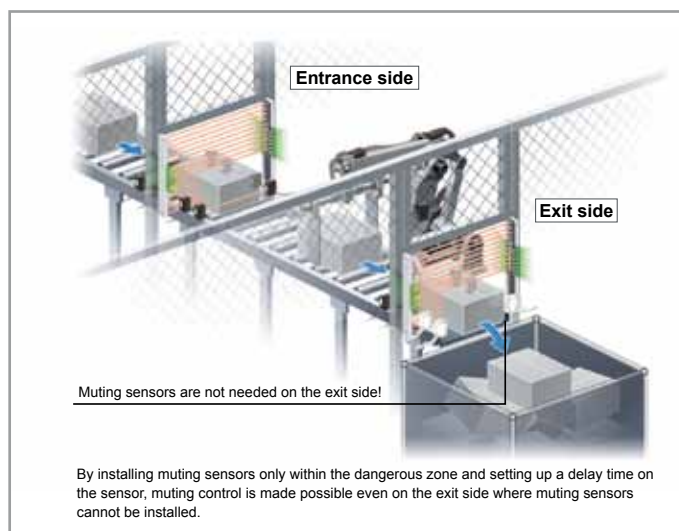
■ Selective muting area (Separate muting control function for each beam channel) **HC**

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.



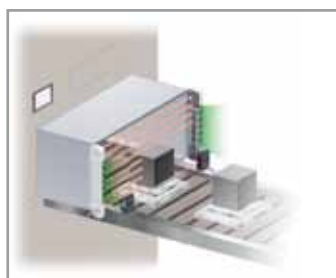
■ Safety measures when objects exit (Exit muting control function) **HC**

Muting at the exit of a machine is now possible using the handy controller SFC-HC. Just set a delay time to the muting sensor to 4s (max.).

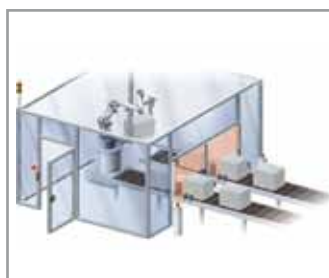


Typical applications

Use indicators as a muting lamp Selective muting area



Direct connection of safety
devices



SF4C Technical specifications

Type	Operating range	Model no.*	PFHd	Number of beams	Protective height CA (mm)
Finger type CA (10mm pitch)	0.1 to 3m	SF4C-F15(-J05)	2.29E-09	15	160
		SF4C-F23(-J05)	2.73E-09	23	240
		SF4C-F31(-J05)	3.18E-09	31	320
		SF4C-F39(-J05)	3.62E-09	39	400
		SF4C-F47(-J05)	4.06E-09	47	480
		SF4C-F55(-J05)	4.50E-09	55	560
		SF4C-F63(-J05)	4.95E-09	63	640
Hand type (20mm pitch)	0.1 to 3m	SF4CH8(-J05)	1.66E-09	8	160
		SF4CH12(-J05)	1.90E-09	12	240
		SF4CH16(-J05)	2.10E-09	16	320
		SF4CH20(-J05)	2.33E-09	20	400
		SF4CH24(-J05)	2.54E-09	24	480
		SF4CH28(-J05)	2.77E-09	28	560
		SF4CH32(-J05)	2.98E-09	32	640

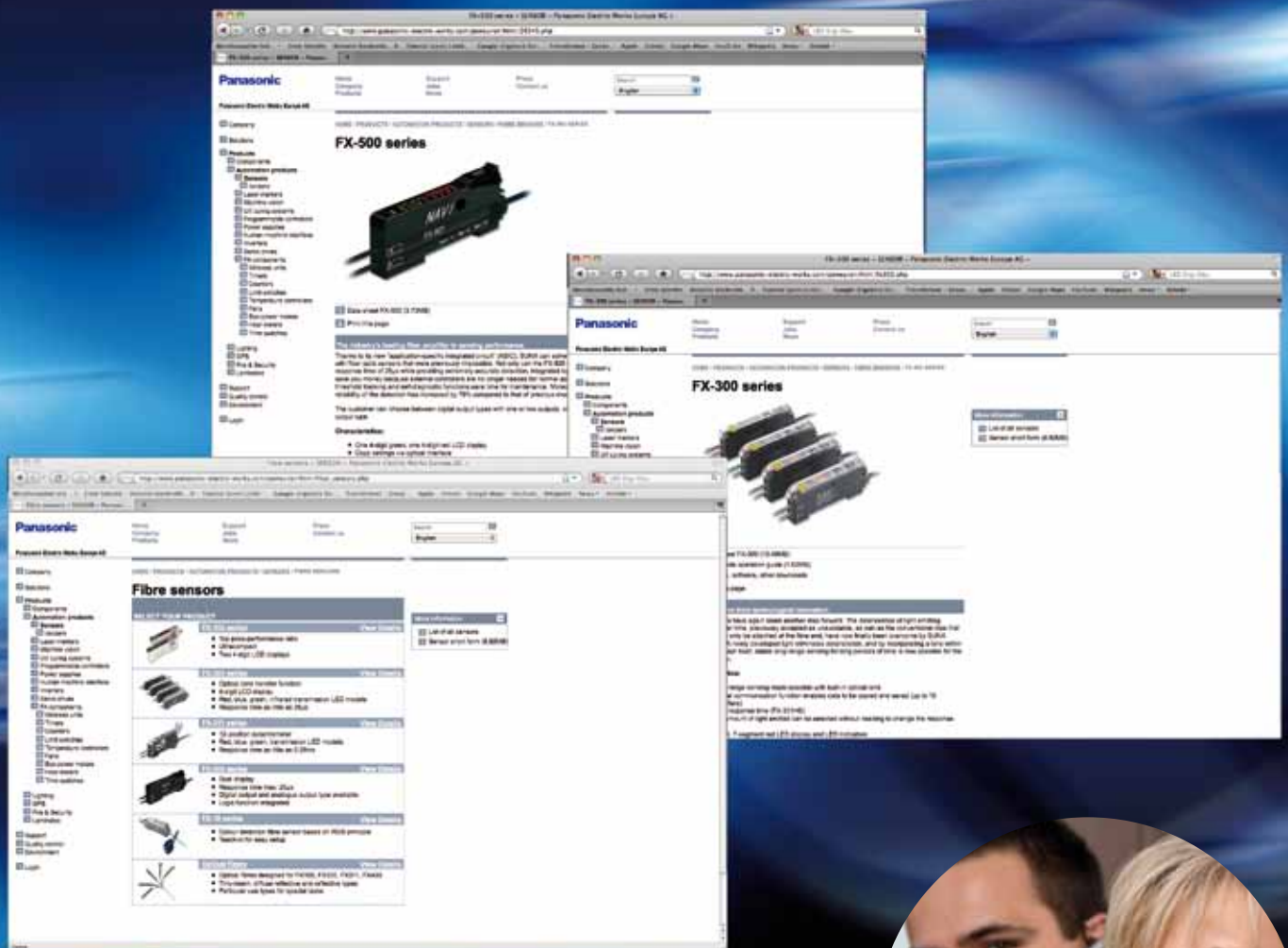
*) All products are equipped with a 5m cable except those with the product number extension A-J05. They are equipped with a 5m cable and a connector.

Type	SF4C pigtailed type	SF4C cable type	SF4C pigtailed type	SF4C cable type
Beam pitch	Finger protection type 10mm		Hand protection type 20mm	
MTTFd	100 years			
Application standards	IEC 61496-1 (type 4), ISO 13849-1 (category 4, PLe) EN 61508-1 bis 7 (SIL 3), EN 55011, EN 50178, EN 61000-6-2			
Operating range	0.1 to 3m			
Protective height	160mm to 640mm			
Min. sensing object	ø14mm or more for opaque object		ø25mm or more for opaque object	
Supply voltage	24V DC +10/-15%			
Control output	OSSD1 and OSSD2 (2xPNP or 2xNPN, switchable), max. 200mA			
Response time	OFF response: 9ms or less / ON response: 90ms or less		OFF response: 7ms or less / ON response: 90ms or less	
Dimensions	W13.2 x protective height x D30mm			

Options

- Metal protection case
- Mounting brackets
- Cables
- Wire-saving connectors
- Control units (safety relay)
- Handy controller

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ST4

Type 4 · PLe · SIL3

Single-beam sensors with several muting patterns

Features

- Serial connection of 6 sets of sensor heads to 1 controller

Panasonic's new concept of connecting 6 sets of sensor heads to 1 controller in series offers you maximum flexibility to solve your safety application.

- Beam-axis alignment and operation confirmation

The beam interruption indicator is incorporated in both the emitter and receiver. This indicator can be used not only to confirm operation but also to align the Beam-axis.

- Compact sensor head saves space

The size of the type 4 long sensing range type is similar to general purpose photoelectric sensors.

- IP67 degree of protection

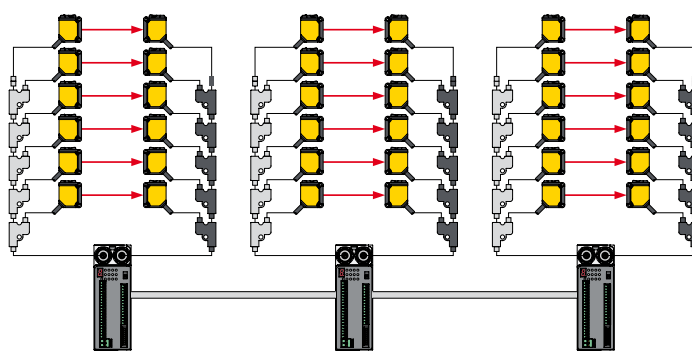
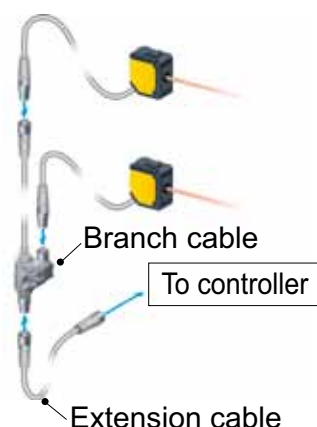
The sensor heads can be used safely even on lines where water splashes.

- Interference prevention

The emission amount adjuster can be used to prevent interference to the surrounding sensors.

- Supports both PNP and NPN polarities

A single unit supports both PNP and NPN polarities, easing stock management.



Typical applications

Protection for long sensing ranges



Protection for small openings



Protection against non-authorized entry



Technical specifications

Sensor heads	Cable length 0.2m		Cable length 1m	
	-	With emission amount adjuster	-	With emission amount adjuster
Model no.	ST4-A1-J02	ST4-A1-J02V	ST4-A1-J1	ST4-A1-J1V
Applicable standards*	EN 61496-1/2 (type 4), ISO 13849-1 (PLe), JEC 61508 (SIL3)			
Operating range	0.1 to 15m			
Sensing object	ø9mm or more for opaque objects			
Supply voltage	Supplied from controller			
Current consumption	Emitter: 11mA or less, receiver: 9mA or less			
Protection	IP67			
Weight	45g		100g	
Usable ambient temperature	-10 to +55°C (no dew condensation or icing allowed), Storage: -25 to +70°C			
Emitting element	Infrared LED (peak emission wavelength: 870nm)			
Material	Enclosure: PBT, lens: acrylic, indicator cover: acrylic			
Cable	Shielded cable with connector, 0.2m long		Shielded cable with connector, 1m long	

Sensor type	Controller						High-functional controller					
	ST4-C11						ST4-C12EX					
	Number of ST4-A(V) in use						Number of ST4-A(V) in use					
	1	2	3	4	5	6	1	2	3	4	5	6
PFHd	1.19X10 ⁻⁹	1.35X10 ⁻⁹	1.50X10 ⁻⁹	1.66X10 ⁻⁹	1.82X10 ⁻⁹	1.97X10 ⁻⁹	1.55X10 ⁻⁹	1.71X10 ⁻⁹	1.86X10 ⁻⁹	2.02X10 ⁻⁹	2.18X10 ⁻⁹	2.33X10 ⁻⁹
MTTFd	100 years											
Applicable standards*	IEC 61496 1/2 (type 4), EN ISO 13849 (PL _e), IEC 61508 (SIL 3)											
Supply voltage	24VDC +10/-15% ripple P-P 10% or less											
Current consumption	max. 100mA (excluding sensor heads)						max. 120mA (excluding sensor heads)					
Output transistors	OSSD1 and OSSD2 (PNP or NPN, switchable), max. 200mA											
Response time	ON -> OFF: 25ms or less OFF -> ON: 90ms or less (auto reset) 140ms or less (manual reset)											
Protection	Enclosure: IP40 (IEC), terminal: IP20 (IEC)											
Ambient temperature	-10 to +55°C (no dew condensation or icing allowed) Storage: -25 to +70°C											
Material	Enclosure: ABS											
Weight	180g						240g					

* Complies with those standards only when the sensor head is used in combination with the controller ST4-C11 or ST4-C12EX

SD3-A1

Type 3 · PLd · SIL2

Monitor dangerous areas for unauthorized entry using flexible detection zones!

Features

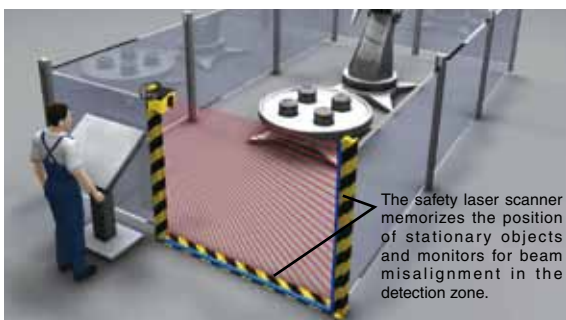
■ Freely configurable zones

Two zones can be monitored with the **SD3-A1**: the warning zone within a radius of 15m, and the protection zone within a radius of 4m. You can configure the contours of these zones to perfectly accommodate any application. You can configure up to eight zone patterns and switch between them at any given time, even during operation. This flexible zone configuration can be done by PC.



■ Monitors beam misalignment after installation of safety laser scanner

By activating the reference boundary function which enables constant detection of stationary objects, the safety laser scanner memorizes the position of stationary objects and checks for beam misalignment after installation.



■ Adjustment of response times enables interference prevention

The response time can be adjusted from 80 to 640ms. Mutual interference can be prevented by adjusting the response time when setting up multiple safety laser scanners in close vicinity.



■ Memorized configurations make post-maintenance recovery easy (optional)

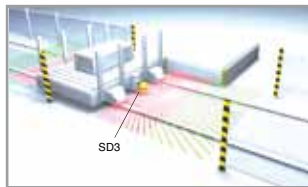
Configurations can be saved in the optional configuration plug's built-in memory and reloaded after maintenance or exchanging safety laser scanners.

Typical applications

Detecting entry into dangerous areas at processing machines



Confirming safety around automatic guided vehicles



Detecting presence in a defined field



Guarding the sides of automatic guided vehicles (AGV)



Detecting entry into dangerous areas of circular cycle tables



Detecting entry into areas with robots



Technical specifications

Type		Safety laser scanner				
Model no.		SD3-A1				
MTTFd		100 years				
Applicable standards		IEC 61496 1/2 (Type 3), EN ISO 13849 (PLd), IEC 61508 (SIL2)				
PFHd		1.5X10 ⁻⁷ 1/h				
Detection zone	Min. sensing object setting	ø150mm	ø70mm	ø50mm	ø40mm	ø30mm
	Sensing range (radius)	0 to 4.0m	0 to 4.0m	0 to 2.8m	0 to 2.2m	0 to 1.6m
Warning zone	Min. sensing object setting	Min. sensing object setting	ø150mm (fixed)			
	Sensing range (radius)	Sensing range (radius)	0 to 15m			
Scanning angle		190° / 180° (by setting)				
Measurement zone		Max. measurement range (radius) 50m (fixed)				
Number of zone settings		Max. 7 + 1 (without detection zone)				
Min. zone setting range		200mm				
Supply voltage		24V DC +20/-30%				
Current consumption		300mA approx. (excluding external connection load)				
Control outputs (OSSD 1, OSSD 2)		PNP open-collector transistor 2 outputs Rated operating voltage: supply voltage (UB) -3.2V Max. source current: 250mA Residual voltage: 3.2V or less				
Laser protection class		Class 1 (IEC 60825)				
Degree of protection		IP65				
Ambient temperature		0 to +50°C, storage: -20 to + 60°C				
Material		Main body: die-cast aluminium, scanner window: thermoplastic resin				
Accessories		· SD3-PS (exclusive 15-pin connector): 1 pc., · SD3-RS232 (exclusive 9-pin connector): 1 pc., · Mounting screws M5 (length 20 mm) hexagon-socket-head bolt: 2 pcs., · Mounting screws M5 (length 16mm) hexagon-socket-head bolt: 2 pcs., attached to SD3-PS: 1 set, · Simplified instruction manual: 1 copy, installation CD-ROM (includes detailed instruction manual data): 1 CD				
Weight		Net weight: 2.1kg approx., gross weight: 2.9kg approx.				

SF-C10

Type 4 · PLe

Less setup time for safety light curtains

Features

■ Plug-in type control unit

Quick connection

Connecting to the light curtain is done using plug-in connections, which shortens setup and replacement time.

Easy setup requiring no torque control

A spring method is used for the terminal blocks for connections other than to the light curtain. There is no need to control tightening torques for these terminal blocks.

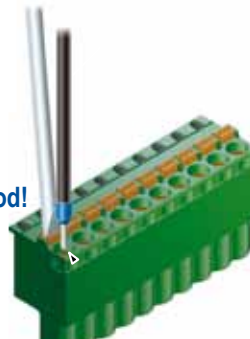
SF-C11 / SF-C14EX

Removable terminal blocks reduce maintenance time

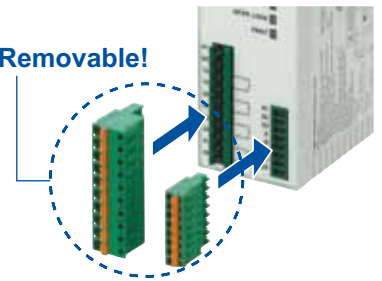
Removable terminal blocks are used. This reduces the work required for re-connecting wiring during maintenance.



Uses a spring method!



Removable!

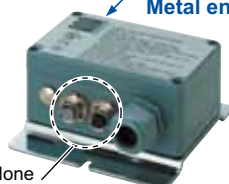


■ Robust type control unit

Metal enclosure with a IP65 protective structure

The strong metal enclosure has a built-in safety relay. It has an IP65 protective structure so that it can be set up individually without needing to be inserted into a control panel.

IP65
Metal enclosure



Connecting to the light curtain is done using plug-in connectors

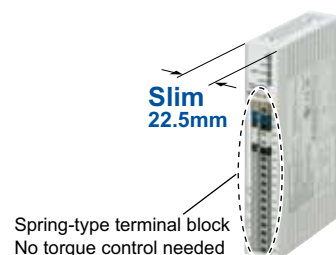
SF-C12

■ Slim type control unit

Slim design

22.5mm thickness, so can be inserted even into narrow spaces inside panels.

Slim
22.5mm



Spring-type terminal block
No torque control needed

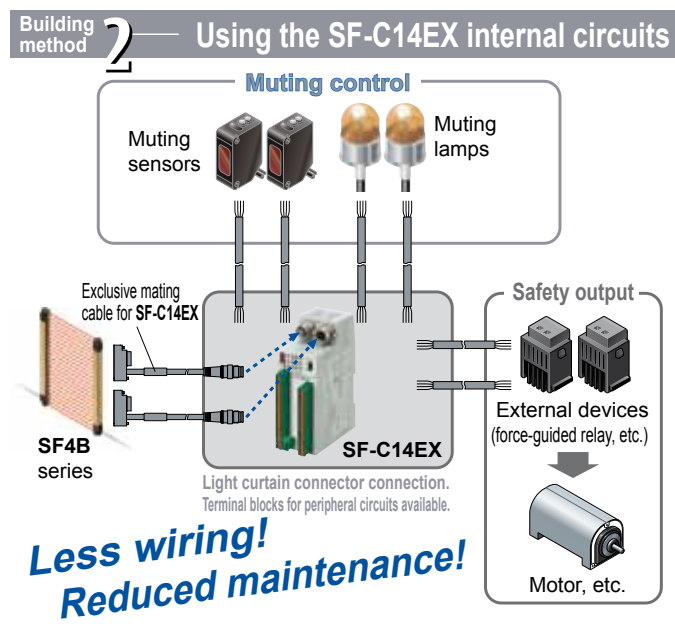
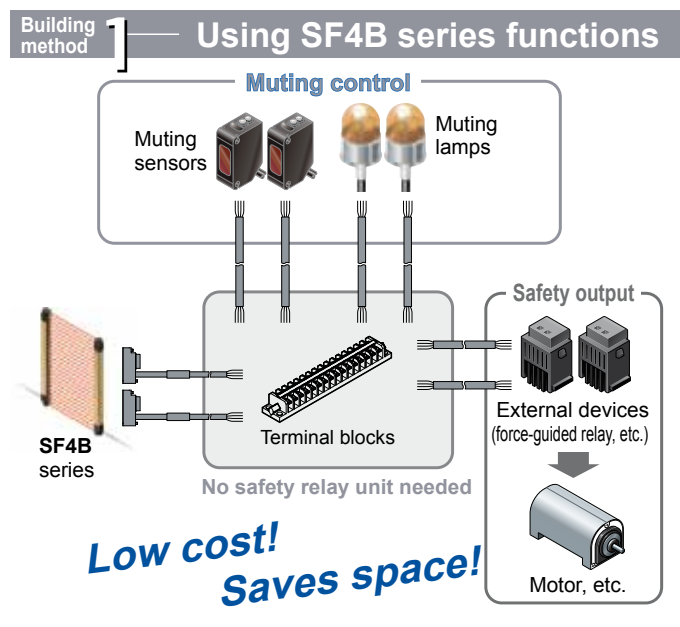
SF-C13

■ Building of muting control circuits is easy

SF-C14EX

The method used to build the safety circuit is selectable

It is possible to build muting control circuits using a stand-alone light curtain from the **SF4B** series. The newly-released **SF-C14EX** application expansion unit allows the light curtain, muting sensors and muting lamps to be connected together directly so that muting control circuits can be built very easily.



■ Both safety and productivity can be obtained by stopping only one part of the device

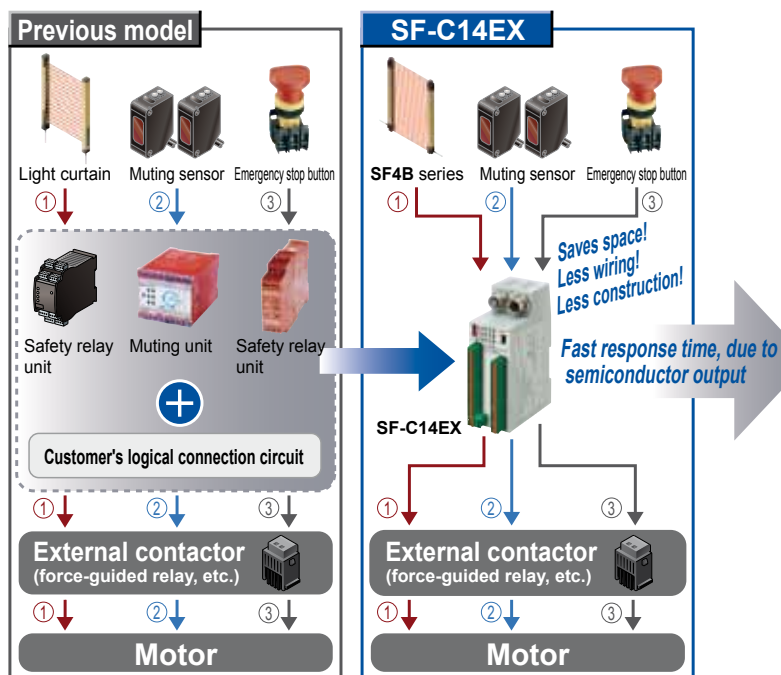
SF-C14EX

Three safety circuit systems combined in a single unit!

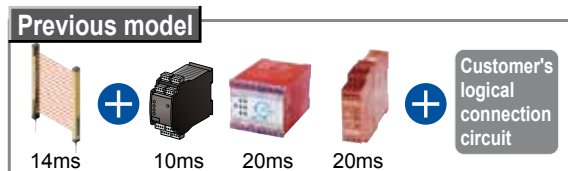
Three safety circuit systems ① Light curtain output circuit, ② Muting control circuit, and ③ Emergency stop circuit are packaged into a single unit. Functions that require multiple safety relay units and muting control units can be concentrated into a single unit, which results in large space savings, less wiring and less installation work.

High-speed response 14ms (Including light curtain)

High-speed response has been achieved due to the adoption of the semiconductor output. Avoids the response delays that occur when using more than one safety relay unit, and greatly reduces the light curtain safety distance and improves ease of working. Of course, it is not necessary to exchange the safety relays within the unit anymore, which reduces running costs.



Including light curtain response time
High response speed of 14ms!
Greatly reduced safety distance!



① Light curtain output circuit ② Muting control circuit
③ Emergency stop circuit

■ Three safety circuit systems can be controlled independently

SF-C14EX

Controls motors that use muting control (robots) and motors that do not use a single unit.

Safety circuit ①: Linked to light curtain beam received / interrupted status (partial stop)

When the light curtain is interrupted, this circuit switches off the safety output and stops the turntable.

Safety circuit ②: Linked to muting control (partial stop)

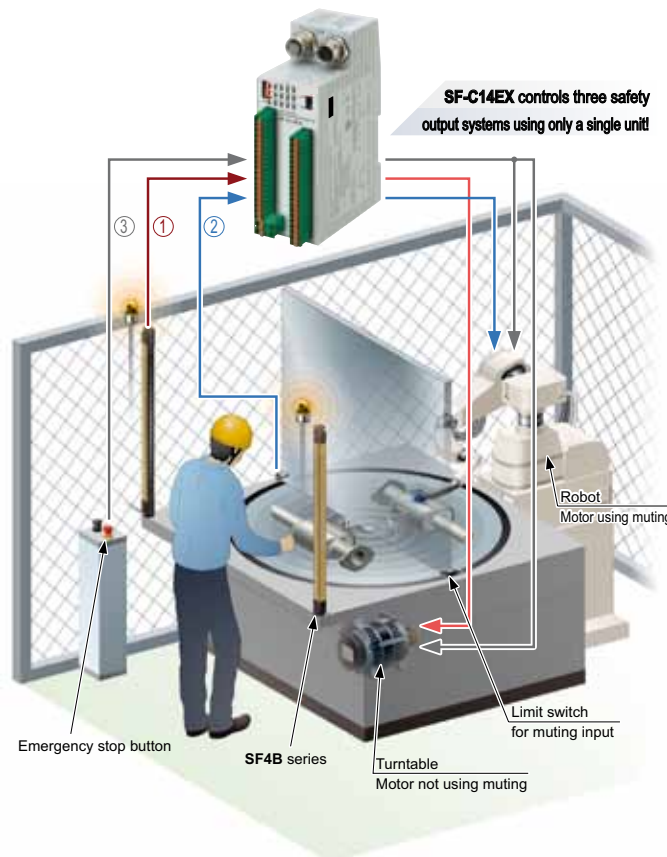
If a workpiece enters when the turntable has stopped normally, (muting conditions met), this circuit allows the robot to operate. If an workpiece enters while the turntable is turning (muting conditions are not met), this circuit switches off the safety output and stops the robot.

Safety circuit ③: Linked to emergency stop input (all stop)

When the emergency stop button is pressed, this circuit switches off the safety output and stops all equipment.

Equipped with blown-lamp output for muting lamp

If one of the two muting lamps blows, a warning is output. It is possible to replace the lamp before both lamps blow and the equipment stops. In addition, an auxiliary output, that is linked to the muting function, override function and light curtain control output is also available.



■ Supports both PNP and NPN polarities

A single model can be used for PNP / NPN input switching, reducing the number of parts that need to be registered.

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



Technical specifications

Model no.	SF-C11	SF-C12	SF-C13	SF-C14EX
Designation	Connector control unit	Robust type control unit	Slim type control unit	Application expansion type*
Connectable light curtains	SF4B/SF2B series	SF4B series	Light curtains manufactured by Panasonic (included SD3-A1)	SF4B series
MTTFd	100 years			
Applicable standards	IEC 61496/1 (Type 4), EN ISO 13849 (PLe)			
PFHd	4.17 E-7			6.82 E-10
Control category	ISO 13849-1 (EN 954-1, JIS B 9705-1) compliance up to category 4 standards			
Supply voltage	24V DC \pm 10% Ripple P-P 10% or less			
Current consumption	100mA or less (excluding light curtain and other external connecting device)			200mA or less (excluding light curtain and other external connecting device)
Response time (off response)	10ms or less	14ms or less	10ms or less	14ms or less
Protection	IP40, terminal IP20	IP65	IP40, terminal IP20	IP40, terminal IP20

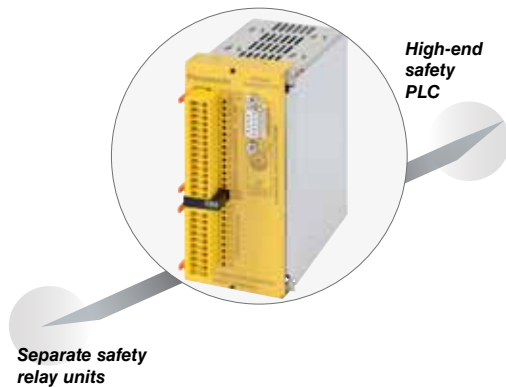
* This type is equipped with muting control function and emergency stop input. It can be connected to SF4B safety light curtains.

Other Panasonic safety products

FP-Safe

■ Compatibility with all FP series PLCs

- All Panasonic FP series PLCs are extendable with FP-Safe controllers. The result is an integrated solution featuring both standard PLC and safety-related functions.
- Simple diagnostics and easy communication are the key benefits of this solution package.

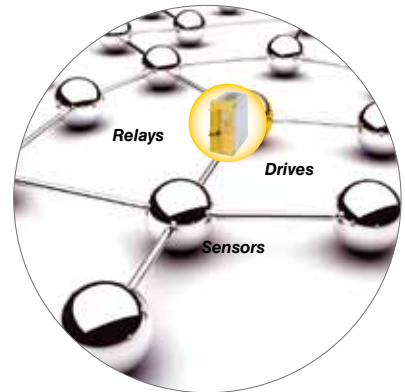


■ Flexibility and cost-effectiveness

- Compared to a set of separate safety relays, FP-Safe controllers are freely configurable – which provides for flexible system design, easy wiring, and smooth communication with the PLC.
- Compared to complex solutions where standard and safety-related controlling are processed by two redundant CPUs, the integration of FP-Safe with FP series PLCs is much more cost-effective and offers more expansion options.

■ Safety and multiple functionality

- Up to 5 safety-related functions can be configured by a single compact FP-Safe controller with no expansion units required.
- With the intuitive configurator software, programming and configuration are a snap.
- All status information regarding the safety I/Os on FP-Safe is monitored by the PLCs.
- A function block for reading diagnostic data to FP series PLCs is available in Control FPWIN Pro.



MINAS A5 series servo drives

■ Servo drives for all motion control applications

EN 61508/62061, SIL CL2
EN ISO 13849-1, PLd
EN 61800-5-2, STO
IEC 61326-3-1



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