Panasonic QUICK INSTRUCTION MANUA

Safety Light Curtain Type 4 **SF4D Series**

ME-SF4D No.0092-04\

Please read this Instruction Manual carefully and thoroughly for the correct and optimum use of this product.

Kindly keep this manual in a convenient place for quick reference.

Thank you very much for purchasing this Panasonic product.

- This document provides brief explanations of mounting and wiring. For detailed handling information, refer "our web site; https://panasonic.net/id/pidsx/global
- Instruction Manuals in the following languages are available on our Website. Japanese, English, Chinese, Korean (excludes the **SF4D**-□-**01**), French, German Spanish (excludes the **SF4D**-□-**01**), Polish

1 SAFETY CAUTIONS (Always observe)

- This section explains important rules that must be observed to prevent human injury and property damage
- The hazards that may occur if the product is used incorrectly are described and classified by level of harm.

⚠ WARNING	Risk of death or serious injury.

- ↑ CAUTION Risk of minor injury or property damage.
- Use this device as per its specifications. Do not modify this device since its functions and capabilities may not be maintained and it may malfunction.
- This device has been developed / produced for industrial use only.
- This device is suitable for indoor use only.

an environment

- Use of this device under the following conditions or environments is not presupposed. Please consult us if there is no other choice but to use this device in such
- 1) Operating this device under conditions or environments not described in this manual 2) Using this device in the following fields: nuclear power control, railroad, aircraft.
- auto mobiles, combustion facilities, medical systems, aerospace development, etc. • When this device is to be used for enforcing protection of a person from any dan-
- ger occurring around an operating machine, the user should satisfy the regulations established by national or regional security committees (Occupational Safety and Health Administration: OSHA, the European Standardization Committee. etc.). Contact the relative organization(s) for details.
- In case of installing this device to a particular machine, follow the safety regulations in regard to appropriate usage, mounting (installation), operation and maintenance. The users including the installation operator are responsible for the intro-
- duction of this device. • Note that this device may be damaged if it is subject to a strong shock (if it is dropped onto the floor for example)
- Use this device by installing suitable protection equipment as a countermeasure for failure, damage, or malfunction of this device. Before using this device, check whether the device performs properly with the
- functions and capabilities as per the design specifications. • In case of disposal, dispose this device as an industrial waste.
- **⚠ WARNING**

Machine designer, installer, employer and operator

- vice comply with safety regulations depends on the appropriateness of the apstaller, employer and operator are solely responsible for these items.

The engineer would be a person who is appropriately educated, has widespread knowledge and experience, and can solve various problems which may arise during work, such as a machine designer, installer or employer etc.

- manual for the correct operation of this device. In case this device does not perform properly, the operator should report this

- Do not use a mobile phone or a radio phone near this device. · If there exists a reflective surface in the place where this device is to be in-
- stalled, make sure to install this device so that reflected light from the reflective surface does not enter into the receiver, or take countermeasures such as painting, masking, roughening, or changing the material of the refle face, etc. Failure to do so may cause the device not to detect, re death or serious injury.
- Do not install this device in the following places:
- 1) Areas exposed to intense interference (extraneous) light such as high-frequency fluorescent lamp (inverter type), rapid starter fluorescent lamp, stroboscopic lights or direct sunlight
- 2) Areas with high humidity where condensation is likely to occur Areas exposed to corrosive or explosive gases
- A) Areas exposed to vibration or shock of levels higher than that specified
- 5) Areas exposed to contact with water
- 6) Areas exposed to too much steam or dust

- · Always keep the correctly calculated safety distance between this device and the dangerous parts of the machine.
 - Install extra protection structure around the machine so that the operator must pass through the sensing area of this device to reach the dangerous parts of
 - Install this device such that some part of the operator's body always remains in the sensing area when operator is done with the dangerous parts of the machine. Do not install this device at a location where it can be affected by wall reflection.
 - When installing multiple sets of this device, connect the sets and, if necessary, install some barriers such that mutual interference does not occur. For details, refer to " PREVENTING MUTUAL INTERFERENCE BY DEVICE PLACEMENT"
 - Do not use this device in a reflective configuration

Machine in which this device is installed When this device is used in "PSDI mode", an appropriate control circuit must

- be configured between this device and the machine. For details, be sure to refer to the standards and regulations applicable in each region or country.
- Do not install this device with a machine whose operation cannot be stopped immediately in the middle of an operation cycle by an emergency stop equipment.
- This device starts the performance after 2 seconds from the power ON. Have the control system started to function with this timing.

- Be sure to carry out the wiring in the power supply OFF condition. All electrical wiring should conform to the regional electrical regulations and laws.
- The wiring should be done by engineer(s) having the special electrical knowledge Do not run the wires together with high-voltage lines or power lines or put
- them in the same raceway. This can cause malfunction due to induction. In case of extending the cable of the emitter or the receiver, each can be extended up to 70m by using the exclusive cable (Total length 10.5m or less
- when source/sink current is 350mA.). To use in a series connection, refer to Do not apply stress such as excessive bending or pulling to a cable or the ex tracted part of a cable. In particular, the material becomes hard at low tem-
- perature and soft at high temperature, and thus caution is required as bending or pulling with excessive force may cause wires to break.
- Do not control the device only at one control output (OSSD 1 / 2). In order that the output is not turned to ON due to earth fault of the control output (OSSD 1 / 2) wires, be sure to ground to 0V side (PNP output) / +V
- side (NPN output). When using this device in Korea with KCs-mark, be sure to ground to 0V side (PNP output). (Applicable model: **SF4D-**□)

- · When replacement parts are required, always use only genuine supplied re placement parts. If substitute parts from another manufacturer are used, the device may not come to detect, result in death or serious injury.
- The periodical inspection of this device must be performed by an enginee having the special knowledge.
- After maintenance or adjustment, and before starting operation, test this device following the procedure specified in " MAINTENANCE." Clean this device with a clean cloth. Do not use any volatile chemicals.

- Never modify this device. Modification may cause the device not to detect ob-
- jects, resulting in death or serious injury.

 Do not use this device to detect objects flying over the detection area.

When using as a safety device for a press machine or paper shearing machine in Japar

(Applicable model: SF4D
-01)

⚠ WARNING

In Japan, this device can only be used as a safety device for press machines and

(Protection height - Die height) or less

Bolster width or less

SF4D-□-01

Do not use this device to detect transparent objects, translucent objects or objects smaller than the specified minimum object to be detected.

Machine designer, installer, employer and operator • The machine designer, installer, employer and operator are solely responsible	
to ensure that all applicable legal requirements relating to the installation and the use in any application are satisfied and all instructions for installation and	
maintenance contained in the instruction manual are followed.	CE o
· Whether this device functions as intended to and systems including this de-	UKCA o

plication, installation, maintenance and operation. The machine designer, in-

• The operator should read this instruction manual thoroughly, understand its contents, and perform operations following the procedures described in this

<Press machines to the person in charge and stop the machine operation immediately. The machine must not be operated until correct performance of this device has been Press machine with an emergency stop mechanism and restart Pressure capacity 50.000kN or less Emergency stop time

Mold size range

Press machine in Japan

flective sur-		Item	Specifications
resulting in		Machine type	Shearing machine with an emergency stop mechanism and restart prevention mechanism
resulting in	Shearing thickness	200mm or less	
		Shearing width	5,000mm or less
as high fro		Blade length	5,500mm or less

paper shearing machines that meet the specifications below.

When using as a safety device for a press machine or paper shearing machine in Japan

tandards for safety device mechanisms for press machines and shearing machines This device has passed, as indicated below, the "Type Examination" based on Article 44, 2 of the Industrial Safety and Health Law of Japan.

↑ WARNING

When using as a safety device for a press machine or paper shearing machine in Japan, always attach the protective tube SFPD-A10 (option) to the cable. The safety device cannot be used for a press machine or shearing machine unless a protective tube is attached to the cable.

Type Exam

<type examination="" nu<="" p=""></type>	imbers>			DIP switch 1 / 2 (Emitter / Receiver)	When optical synchronization is se-	One indicator lights	
Model	No.	Type Exami	nation Number	Synchronization	lected, you can set a different fre-	Optical synchronization, Frequency 2	Line synchroniz
Safety light curtain	Specified control unit	Press machine	Shearing machine	method	quency to reduce mutual interference.	DIP switch 1: OFF	
SF4D-F=-01, SF4D-H=-01	-	TA601	TA603		citios.	DIP switch 2: ON	
SF4D-A□-01	-	TA600	TA602			Frequency indicator (orange): Two indicators light	
SF4D-F=-01, SF4D-H=-01	SF-C11	TA605	-			Line synchronization	-
SF4D-A□-01	SF-C11	TA604	-			DIP switch 1: ON	
SF4D-F=-01, SF4D-H=-01	SF-C13	TA607	-			DIP switch 2: ON	
SF4D-A□-01	SF-C13	TA606	_			Frequency indicator (orange): Turns OFF Short mode	
Examination Numb are indicated on SF When only this dev the specified control	d on SF4D-F□-01 un ers TA600 (press ma '4D-A□-01 units. ice is used, or when ol unit, a different Typn with the specified of the control unit. pination with the spec	nits and SF4D-H□- achine) and TA602 this device is used be Examination Nur ontrol unit, the Type	•01 units, and Type (shearing machine) in combination with mber applies. When a Examination Num-	DIP switch 3 (Emitter) Light emission intensity control function	Controls the light from the emitter for the change of sensing range.	Sensing range SF4D-Fa(-91); 0.2 to 7m SF4D-Ha(-01); 0.2 to 9m • DIP switch 3: OFF Light emission intensity control indicator (orange): Turns OFF Long mode Sensing range SF4D-Fa(-91); 0.8 to 12m SF4D-Ha(-01); SF4D-Aa(-01); • DIP switch 3: ON Light emission intensity control indicator (orange): Lights	- Short mod

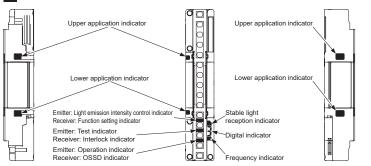
3 CONFIRMATION OF PACKED OBJECTS

☐ Main body: emitter and receiver One for each

SF4D-F-(-01): SF4B-TR14 (ø14 × 220mm SF4D-H_□(-01): SF4B-TR25 (ø25 × 220mm)

☐ Quick Instruction Manual (Japanese, English, Chinese, Korean) 1 pc. for each language General Information for Safety, Compliance, and Instructions (23 languages) 1 pc.

4 NAMES AND FUNCTIONS OF INDICATORS



Emitter / receiver common

NI-	me	Fund	ction				
ina	me	Line synchronization Optical synchronization					
Upper applicati (Blue / Red / G		<when alignment="" axis="" beam="" is="" mode="" set=""> Control output (OSSD 1 / 2) ON: Lights blue, When top end beam channel receives light: Lights red, When top end beam channel is blocked: Turns OFF</when>					
Lower application (Blue / Red / Gr		<when alignment="" axis="" beam="" is="" mode="" set=""> Control output (OSSD 1 / 2) ON: Lights blue, When bottom end beam channel re- ceives light. Lights red, When bottom end beam channel is blocked: Turns OFF</when>					
Stable light rec (Green / Orang	eption indicator e)	When light reception is stable: Lights green When light reception is unstable: Lights orange When light is blocked: Turns OFF					
	Received light intensity (Green)	Light intensity / Level 3: Lights green "3", Light intensity / Level 2: Lights gree Light intensity / Level 1: Lights green "1", When light is blocked: Turns OFF					
Digital indicator (Green / Yellow)	Error (Yellow)	Normal operation: Turns OFF, Error: Num	ber blinks or lights yellow "0"				
(Green / Yellow)	Polarity (Yellow)	When PNP output is set: Lights yellow "P" When NPN output is set: Lights yellow "n"					
Frequency indicator (Orange)		-	When frequency 1 is set: One indicator lights orange When frequency 2 is set: Two indicators light orange				

Emitter

Name	Function				
Name	Line synchronization	Optical synchronization			
ight emission intensity control dicator (Orange) Short mode: Turns OFF, Long mode: Lights orange					
Test indicator (Orange)	During test: Lights orange, Normal operation: Turns OFF				
Operation indicator Red / Green)	Control output (OSSD 1 / 2) OFF: Lights red Control output (OSSD 1 / 2) ON: Lights green	Normal operation: Lights green Error: Lights red			

Name	Function					
Name	Line synchronization Optical synchronization					
setting indicator (Orange)	Communication module connected: Blinks orange Blanking function or parallel connection used: Lights orange (Applicable model: SF4D-D) (Note)					
k indicator (Yellow)	Interlock activated: Lights yellow, All other times: Turns OFF					
ndicator (Red / Green)	Control output (OSSD 1 / 2) OFF: Lights red Control output (OSSD 1 / 2) ON: Lights green					

Note: For details on the blanking function and parallel connection, refer to "SF4D Series Instruction Manual"

For detailed information on the functions of the device, refer "our web site: https://

Settings and ranges, indicator Factory default setting

DIP Switch Settings

panasonic.net/id/pidsx/global

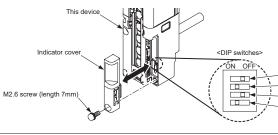
5 DIP SWITCH SETTINGS

<Changing settings using the DIP switches> Description

DIP switch 1 / 2 (Emitter / Receiver) Synchronization method	Selects the synchronization method. When optical synchronization is selected, you can set a different frequency to reduce mutual interference.	DIP switch 1: OFF DIP switch 2: OFF Frequency indicator (orange): Turns OFF Optical synchronization, Frequency 1 DIP switch 1: ON DIP switch 2: OFF Frequency indicator (orange): One indicator lights Optical synchronization, Frequency 2 DIP switch 1: OFF DIP switch 2: ON Frequency indicator (orange): Two indicators light	Line synchronization		
		DIP switch 1: ON DIP switch 2: ON Frequency indicator (orange): Turns OFF			
DIP switch 3 (Emitter) Light emission intensity control function	Controls the light from the emitter for the change of sensing range.	Short mode Sensing range \$F4D+F:(-01): 0.2 to 7m \$F4D+H:(-01), \$F4D-A:(-01): 0.2 to 9m DIP switch 3: OFF Light emission intensity control indicator (orange): Turns OFF Long mode Sensing range \$F4D-F:(-01): 0.8 to 12m \$F4D-H:(-01), \$F4D-A:(-01): 0.8 to 15m DIP switch 3: ON Light emission intensity control indicator (orange): Lights	Short mode		
DIP switch 3 (Receiver)	The upper application indicator and lower application indicator can be used as an beam axis alignment	Beam axis alignment mode • DIP switch 3: OFF Application mode	Beam axis alignment mode		
Indicator selector	mode or an application mode.	DIP switch 3: ON Normal mode (Allows illumination of some indicators) DIP switch 4: OFF			
DIP switch 4 (Emitter / Receiver) Power save mode	Turns OFF the indicators reduce power consumption.	Power save mode (Upper application indicator and lower application indicator, digital indicator / received light intensity are always turns OFF) • DIP switch 4: ON	Normal mode		

⚠ CAUTION

Make sure that the power is OFF when setting DIP switch 1 / 2 (emitter / receiver) and DIP switch 3 (emitter). If DIP switch settings are changed while the power is ON. the settings will not be reflected. The settings will be reflected after the power is turned OFF and then turned back ON.



↑ CAUTION

- · After setting the DIP switches, always reattach the indicator cover on the device.
- There is packing on the indicator cover. If the packing is not fitted on the cover

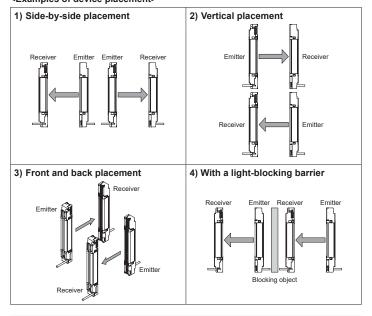
6 PREVENTING MUTUAL INTERFERENCE BY DEVICE PLACEMENT

• This section describes methods for placing 2 or more sets of emitters and receivers facing each other, rather than in a series or parallel connection. Consider these when there is a wiring problem or you need to test the system in conjunction with changes such as adding new equipment Use a test rod to perform an operation test

↑ WARNING

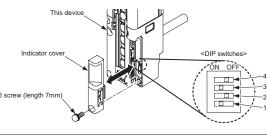
- Refer to and understand the examples of device placement given below before installing the devices. Risk of death or serious injury if the devices are not placed • When using multiple sets of the device, install so as to avoid mutual interference.
- Risk of death or serious injury if mutual interference occurs.

<Examples of device placement>



If you have questions or problems, please contact our office.

Remove the indicator cover from the device to access the DIP switches.



- properly, fit as shown below before attaching to the device

7 MOUNTING

↑ CAUTION

⚠ WARNING

The emitter and receiver cables must be oriented in the same direction. Risk of

- The minimum bending radius of the cables is R6mm. Keep the minimum bending
- radius of the cables in mind during installation • Do not apply stress such as excessive bending or pulling to the extracted part of
- After installing this device, be sure to adjust the beams so that the device's stable light reception indicator lights green and the number "3" lights green on the

When using as a safety device for a press machine or paper shearing machine in Japan (Applicable model: SF4D -01)

digital indicator. To adjust the beams, refer to the manual on our website.

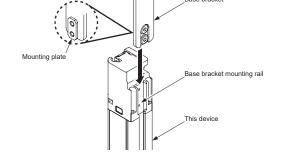
↑ WARNING

 When using as a safety device for a press machine or paper shearing machine
in Japan, always attach the protective tube SFPD-A10 (option) to the cable. The minimum bending radius of the cable with the protective tube SFPD-A10 attached is 55mm. Take into consideration the minimum bending radius of the cable with the protective tube **SFPD-A10** attached.

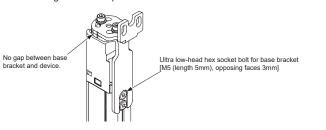
Mount the emitter and the receiver at the same level and parallel to each other The effective aperture angle of the device is ±2.5° or less for a sensing range of 3m

<using beam adjustment mounting bracket MS-SFD-1-5 (Option)>

1. Insert the mounting plate of the base bracket into the base bracket mounting rail



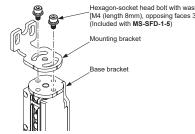
2. With the base bracket in firm contact with the device, tighten the two ultra lowhead hex socket bolts [M5 (length 5mm), opposing faces 3mm] that fasten the base bracket. Tighten to a torque of 3N·m or less.



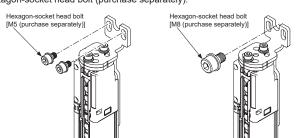
<Side mounting>

Loosen the two hexagon-socket head bolts with washers [M4 (length 8mm), opposing faces 3mml and remove the bracket. Change the orientation of the mounting bracket, and tighten the two hexa-

gon-socket head bolts with washers [M4 (length 8mm), opposing faces 3mm]. ghten to a torque of 1.5N·m or less.

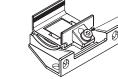


3. Install the beam adjustment mounting bracket on the mounting surface with a hexagon-socket head bolt (purchase separately).

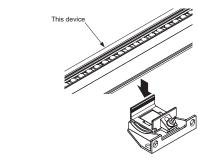


Susing intermediate supporting bracket MS-SFB-2 (Option)>

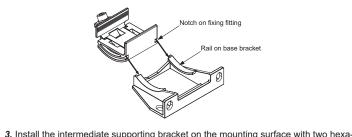
1. Loosen the hexagon-socket head bolt [M4 (length 12mm), opposing faces 3mm] on the intermediate supporting bracket.



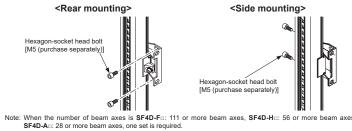
2. Fit the intermediate supporting bracket onto the side of the device, and fasten with the hexagon-socket head bolt [M4 (length 12mm), opposing faces 3mm]. Tighten to a torque of 1.2N·m or less.



Slide and remove the fixing fitting of the intermediate supporting bracket from the base bracket. Change the direction of the fixing fitting, and engage the notches on the fixing fitting with the rails on the base bracke



gon-socket head bolts [M5 (purchase separately)].

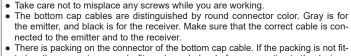


SF4D-A :: 28 or more beam axes, one set is required.

↑ CAUTION

↑ CAUTION

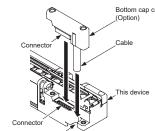
<Installing the bottom cap cables (Option)>



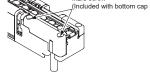
ted on the connector properly, fit as shown below before connecting to the device.



1. Insert the connector of the bottom cap cable (option) into the connector on the device. When inserting the connector, fit the cable into the groove on the device.



2. Tighten the two M2.6 screws. Tighten to a torque of 0.3N·m or less.



⚠ WARNING

- Ground the machine or support on which the device is installed to frame ground
- (F.G.). If not grounded properly, there is a risk of death or serious injury from malfunctioning caused by noise. Enclose the wiring in a metal wiring box con-
- nected to frame ground (F.G.). Design the system that uses the device so that dangerous operation will not be caused by a grounding failure. Risk of death or serious injury if the system can-
- not be stopped. • If you are extending the synchronization + wire (orange) and synchronization wire (orange / black) using a cable other than the special-use cable, use 0.2mm²
- or more twisted-pair cable, and extend 0V as well. For other than synchronization + wire (orange) and synchronization - wire (orange / black), use 0.3mm² or more cable.
- In the case of line synchronization, emitter and receiver 0V should be common. Always verify that nobody is in the danger zone before using the interlock function. Risk of death or serious injury
- Install the reset switch in a location that allows operation from outside the danger zone and which provides a clear view of the entire danger zone • Do not use the test input function and auxiliary output to stop a machine that is
- connected to this device. Risk of death or serious injury. Always operate the device that starts the override function manually. Install the device for override function startup in a location that allows operation from outside the danger zone and which provides a clear view of the entire dan-
- Always verify that no one is in the danger zone before using the override function. Risk of death or serious injury.

Use a power supply unit that conforms to the laws and regulations (code) of the re-

↑ CAUTION

The intermediate supporting bracket MS-SFB-2 is not intended to secure the device. Power supply unit

↑ CAUTION

Always insulate the ends of lead wires that are not used

gion where the device is to be used, and connect correctly. Risk of device damage and malfunctioning if a non-compliant unit is used or the wiring is incorrect.

Wiring work must only be done by a qualified electrician or technician The power supply unit must satisfy the following requirements

- The power unit must be certified for use in your region. 2) Use of the product as a unit in compliance with CE Marking: SELV (safety extra low voltage) / PELV (protected extra low voltage) power supply unit in conformity
- with EMC Directive and Low Voltage Directive. 3) Use of the product as a unit in compliance with UKCA Marking: SELV (safety extra low voltage) / PELV (protected extra low voltage) power supply unit in confor-
- mity with EMC Regulations and Low Voltage Regulations.) When using a commercial switching regulator, the frame ground (F.G.) terminal must be connected to ground.
- 5) The power supply unit must have an output holding time of 20ms or more. 6) If surges occur, take countermeasures such as connecting a surge absorber to the source of the surges. T) The power unit must be a CLASS 2 compliant unit. (When cTÜVus mark compli-

Using optical synchronization setting and 5-core cable



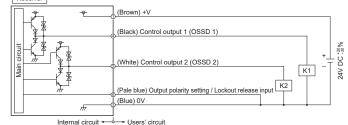
When using the 5-core cable, set the synchronization method to optical synchroni-

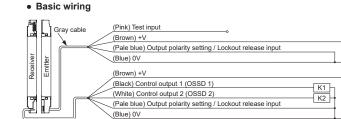
zation. For the setting of optical synchronization, refer to " DIP SWITCH SET-

TINGS." <Using PNP output>

ance is required.)

• I/O circuit diagrams ale blue) Output polarity setting / Lockout release input





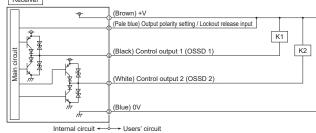
Vs to Vs – 2.5V (sink current 5mA or less): Emission halt, Open: Emission (Note) Note: Vs is the supply voltage.

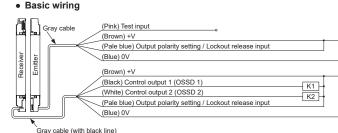
K1, K2: Safety relay unit, etc

<Using NPN output> I/O circuit diagrams

(Pale blue) Output polarity setting / Lockout release input (Pink) Test input

Internal circuit + Users' circuit





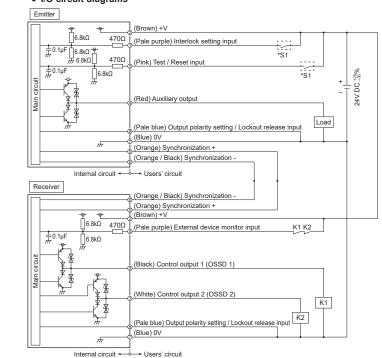
0 to +2.5V (source current 5mA or less): Emission halt, Open: Emission

K1, K2: Safety relay unit, etc.

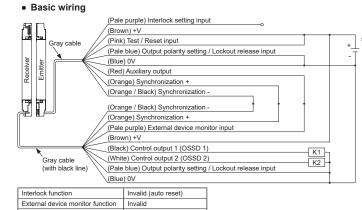
Using line synchronization setting and 8-core cable

<Using PNP output>

• I/O circuit diagrams



K1, K2: External device (forcible guide relay or magnetic contactor)



Auxiliary output

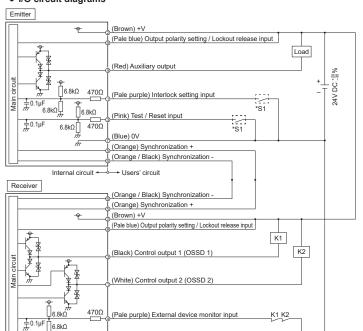
K1, K2: Safety relay unit, etc.

 Test / Reset input Manual reset ...Vs to Vs –2.5V (sink current 5mA or less): Emission halt (Note), Open: Emission Auto reset ... Vs to Vs –2.5V (sink current 5mA or less): Emission (Note), Open: Emission halt

Interlock setting input, External device monitor input

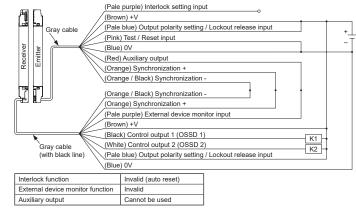
<Using NPN output>

• I/O circuit diagrams



K1, K2: External device (forcible guide relay or magnetic contactor) Basic wiring

Internal circuit - Users' circuit



K1, K2: Safety relay unit, etc.

· Test / Reset input

- Manual reset ...0 to +2.5V (source current 5mA or less): Emission halt, Open: Emission
- Auto reset ...0 to +2.5V (source current 5mA or less): Émission, Open: Emission halt
 Interlock setting input, External device monitor input 0 to +2.5V (source current 5mA or less): Valid, Open: Invalid

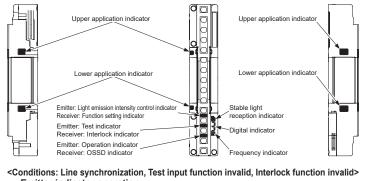
Using line synchronization setting and 12-core cable

• Refer to the manual on "our web site: https://panasonic.net/id/pidsx/global".

Vs to Vs –2.5V (sink current 5mA or less): Valid (Note), Open: Invalid

Cannot be used

Note: Vs is the supply voltage.



Emitter indicator operation

\		Light bloc	ked state		Light received state (all beam channels)				
		Top end be	am channel		Unstable light	Stable	light receptio	n state	
	Light blocked	Light received	Light blocked	Light received	reception state	Stable	iigni receptio	III State	
		Bottom end b	eam channe	l		Donnivad li	ght intensity		
	Light blocked	Light blocked	Light received	Light received		received ii	gint interisity		
		Other bear	n channels						
	Light received / Light blocked	Light received / Light blocked	Light received / Light blocked	Light blocked	Level 1	Level 1	Level 2	Level	
Control output (OSSD 1 / 2)	OFF	OFF	OFF	OFF	ON	ON	ON	ON	
Upper application indicator	Turns OFF	Lights red	Turns OFF	Lights red	Lights blue	Lights blue	Lights blue	Lights bl	
Lower application indicator	Turns OFF	Turns OFF	Lights red	Lights red	Lights blue	Lights blue	Lights blue	Lights bl	
Stable light reception indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Lights orange	Lights green	Lights green	Lights gre	
Digital indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Green 1 lights	Green 1 lights	Green 2 lights	Green 3 lig	
Frequency indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns O	
Light emission intensity control indicator		Wh	en short mod	le is selected	by DIP switc	h: Lights ora	nge		
Test indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns O	
Operation indicator	Lights red	Lights red	Lights red	Lights red	Lights green	Lights green	Lights green	Lights gre	

• Receiver indicator operation

9 INDICATOR OPERATION

		Light bloc	ked state	Light received state (all beam channels)					
		Top end be	am channel		Unstable light	Stable light reception		n state	
	Light blocked	Light received	Light blocked	Light received	reception state	Stable	light receptio	II State	
		Bottom end b	eam channe			Pacaivad li	ght intensity		
	Light blocked	Light blocked	Light received	Light received		received ii	gint interisity		
		Other bear	m channels						
	Light received / Light blocked	Light received / Light blocked	Light received / Light blocked	Light blocked	Level 1	Level 1	Level 2	Level	
Control output (OSSD 1 / 2)	OFF	OFF	OFF	OFF	ON	ON	ON	ON	
Upper application indicator	Turns OFF	Lights red	Turns OFF	Lights red	Lights blue	Lights blue	Lights blue	Lights b	
Lower application indicator	Turns OFF	Turns OFF	Lights red	Lights red	Lights blue	Lights blue	Lights blue	Lights b	
Stable light reception indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Lights orange	Lights green	Lights green	Lights gr	
Digital indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Green 1 lights	Green 1 lights	Green 2 lights	Green 3 li	
Frequency indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns C	
Function setting indicator					n is used: Lights yellow (Applicable model: SF4D otion) is connected: Blinks orange				
Interlock indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns C	
OSSD indicator	Lights red	Lights red	Lights red	Lights red	Lights green	Lights green	Lights green	Lights gr	

<Conditions: Optical synchronization (frequency 1), Test input function invalid, Interlock function invalid>

Lillittei	illulcato	Operau	OII					
$\overline{}$		Light bloo	ked state	Light received state (all beam channels				
		Top end be	am channel		Unstable light	Ctable	light reception	n atata
	Light blocked	Light received	Light blocked	Light received	reception state	Stable	light receptio	n state
		Bottom end b	eam channe	l		Deseived II	ght intensity	
	Light blocked	Light blocked	Light received	Light received		Received II	giit iiiterisity	
		Other bear	n channels					
	Light received / Light blocked		Light received / Light blocked	Light blocked	Level 1	Level 1	Level 2	Lev
Control output (OSSD 1 / 2)	OFF	OFF	OFF	OFF	ON	ON	ON	0
Upper application indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns
Lower application indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns
Stable light reception indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns
Digital indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns
Frequency indicator	Lights orange	Lights orange	Lights orange	Lights orange	Lights orange	Lights orange	Lights orange	Lights
Light emission intensity control indicator		Wh	en short mod	le is selected	by DIP switch	h: Lights ora	nge	
Test indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns
Operation indicator	Lights green	Lights green	Lights green	Lights green	Lights green	Lights green	Lights green	Lighte

Peceiver indicator operation

		Light bloc	ked state		Light received state (all beam channels)				
		Top end be	am channel		Unstable light	Ct-bl-			
	Light blocked	Light received	Light blocked	Light received	reception state	Stable	light receptio	n state	
		Bottom end b	eam channe	I		Deseived II			
	Light blocked	Light blocked	Light received	Light received		Received II	ght intensity		
		Other bear	n channels						
	Light received / Light blocked	Light received / Light blocked	Light received / Light blocked	Light blocked	Level 1	Level 1	Level 2	Level 3	
Control output (OSSD 1 / 2)	OFF	OFF	OFF	OFF	ON	ON	ON	ON	
Upper application indicator	Turns OFF	Lights red	Turns OFF	Lights red	Lights blue	Lights blue	Lights blue	Lights blue	
Lower application indicator	Turns OFF	Turns OFF	Lights red	Lights red	Lights blue	Lights blue	Lights blue	Lights blue	
Stable light reception indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Lights orange	Lights green	Lights green	Lights green	
Digital indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Green 1 lights	Green 1 lights	Green 2 lights	Green 3 lights	
Frequency indicator	Lights orange	Lights orange	Lights orange	Lights orange	Lights orange	Lights orange	Lights orange	Lights orange	
Function setting					is used: Ligh			el: SF4D-a)	
indicator	When the o	communication	n module SF	4D-TM1 (opt	ion) is conne	cted: Blinks o	range		
Interlock indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF	
OSSD indicator	Lights red	Lights red	Lights red	Lights red	Lights green	Lights green	Lights green	Lights green	

<Conditions: Line synchronization, Test input function invalid, Interlock function invalid> Emitter indicator operation when error occurs

		Top end be	am channel]
	Light blocked	Light received	Light blocked	Light received]
		Bottom end b	eam channel		Light received
	Light blocked	Light blocked	Light received	Light received	(all beam chai
\		Other bear	m channels		1
	Light received / Light blocked	Light received / Light blocked	Light received / Light blocked	Light blocked	
Control output (OSSD 1 / 2)	OFF	OFF	OFF	OFF	OFF
Upper application indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OF
Lower application indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OF
Stable light reception indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OF
Digital indicator	Blinking or lights yellow number	Blinking or li yellow num			
Frequency indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OF
Light emission intensity control indicator		When short mode	is selected by DIP sw	vitch: Lights orange	
Test indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OF
Operation indicator	Lights red	Lights red	Lights red	Lights red	Lights re

Receiver indicator operation when error occurs

		Light bloc	ked state		
	Top end beam channel				
	Light blocked Light received Light blocked Light received				
		Light received sta			
	Light blocked Light blocked Light received Light received		(all beam channel		
	Other beam channels				
	Light received / Light blocked	Light received / Light blocked	Light received / Light blocked	Light blocked	
Control output (OSSD 1 / 2)	OFF	OFF	OFF	OFF	OFF
Upper application indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF
Lower application indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF
Stable light reception indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF
Digital indicator	Blinking or lights yellow number	Blinking or lights yellow number	Blinking or lights yellow number	Blinking or lights yellow number	Blinking or lights yellow number
Frequency indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF
Function setting			connection is used: Li		
indicator	When the commun	ication module SF4D	D-TM1 (option) is con	nected: Blinks orang	e
Interlock indicator	Turns OFF	Turns OFF	Turns OFF	Turns OFF	Turns OFF
OSSD indicator	Lights red	Lights red	Lights red	Lights red	Lights red

10 MAINTENANCE

If you notice an abnormal condition, refer "our web site: https://panasonic.net/id/pidsx/global If you are unsure what action to take, contact our office. Make a copy of the checklist, enter a checkmark after checking each item, and retain the list.

Daily inspection

↑ WARNING

Before starting work, inspect the items below and verify that there are no abnormalities. Risk of death or serious injury if inspection is neglected or the device is operated with an abnormal condition.

Check column	Inspection item
	Dangerous parts of the machine cannot be reached without passing through the sensing area of the device.
	Some part of the operator's body remains in the sensing area when working with dangerous parts of the machine.
	The device is installed at a distance that is equal to or greater than the calculated safety distance.
	No safety guard or protective structure damage.
	No damaged, defective, or bent wires.
	All connectors are firmly connected.
	No dirt or scratches on the light emitting surface.
	Test rods are not deformed or defective.
	When no objects are present in the sensing area, the operation indicator (green) of the emitter and the OSSD indicator (green) of the receiver are lit. The control output (OSSD 1/2) is ON. You can check for effects of external noise in this state. If external noise affects operation, remove the cause and reinspan.
	When moved at a speed of 1,600mm/sec or less, it should be possible to detect the test of [e14mm for SF4D+E(-01), e25mm for SF4D+E(-01), ad5mm for SF4D+E(-01), different for for for the emitter, midway between the emitter and the receiver, and directly in front of the receiver (3 positions). When the test rod is in the sensing area, the OSSD indicator (red) of the receiver and the operation indicator (red) of the emitter remain lit.
	When the machine is in the operating state, dangerous parts operate normally (do not stop) when no objects are present in the sensing area.
	When the machine is in the operating state, dangerous parts stop immediately when the test rod is inserted directly in front of the emitter, midway between the emitter and the receiver, and directly in front of the receiver (3 positions).
	Dangerous parts remain stopped as long as the test rod is present in the sensing area.
	Dangerous parts stop immediately when the power of the device is turned OFF.
	Be sure to test operation before using the muting function. Check the condition of the muting indicator (dirt, brightness, etc.).

Periodic inspection (every six months)

! WARNING

Be sure to inspect the following items every six months and verify that there are no abnormalities. Risk of death or serious injury if inspection is neglected or the device is operated with an abnormal condition.

neck column	Inspection item
	The structure of the machine does not obstruct any safety mechanisms for stopping operation.
	No modification has been made in the machine control system that obstructs the safety mechanisms
	Output from the device is correctly detected.
	Wiring from the device is correct.
	The response time of the overall system is equal to or less than the calculated value.
	The current number of operation cycles (time) of parts with a limited service life is less than the nur
	ber of service life cycles (time).
	No screws or connectors related to the device are loose.
	No objects that scatter or reflect light have been added near the device.

• Inspection after maintenance

1. When any parts of the device are replaced.

2. When an abnormal condition is noticed during operation. 3. After aligning the beam axes of the emitter and receiver.

4. When the installation site or environment of the device is changed. 5. When the wiring method or wiring layout is changed.

6. When a safety relay unit or external device (forcible guide relay or magnetic contactor) part has been replaced. 7. When safety controller or safety PLC settings are changed.

When using as a safety device for a press machine in Japan

When using as a safety device for a press machine in Japan, press machine work supervisors and personnel in charge of the matters described in No. 1, No. 2, and No. 4 of Article 134 of the Occupational Safety and Health Act are required to perform inspection prior to the start of work and perform periodic inspection. Press machine work supervisors, etc. must inspect the items below prior to the start of work and record/retain the results.

Device emitter Device receiver Firmness of installation Firmness of installation

 Suitability of installation position
 Suitability of installation position (safe distance and vertical position) (safe distance and vertical position) Existence of damage

 Existence of external wire abnormal- Existence of external wire abnormal Existence of dirt on emitter Existence of dirt on emitter Certainty of detection states Certainty of detection states

Specified control unit SF-C11, SF-C13 External wiring

 Indicator Abnormal operation of switches, etc. Firmness of installation

For details, refer to "Press Machine Safety Device Control Policy" of the Ministry of Health, Labour and Welfare.

11 SPECIFICATIONS

Туре	10mm pitch type	20mm pitch type	40mm pitch type
Model No.	SF4D-F□(-01)	SF4D-H□(-01)	SF4D-A□(-01)
Number of beam channels	15/23/31/39/47/55/63/71/ 79/95/111/127	8/12/16/20/24/28/32/36/40 /48/56/64/72/80/88/96	4/6/8/10/12/14/16/18/2 24/28/32/36/40/44/48
Detection width (protection height)	150 (15 beam channels) to 1,270mm (127 beam channels)	150 (8 beam channels) to 1,910mm (96 beam channels)	150 (4 beam channels) to 1,910mm (48 beam chann
When using as safety equipment for press machines in Japan and China	140 (15 beam channels) to 1,260mm (127 beam channels)	140 (8 beam channels) to 1,900mm (96 beam channels)	120 (4 beam channels) to 1,880mm (48 beam chann
Sensing range (effective)	Short mode: 0.2 to 7m Long mode: 0.8 to 12m (selectable by DIP switch)		Long mode: 0.8 to 15m y DIP switch)
Minimum sensing object	ø14mm opaque object	ø25mm opaque object	ø45mm opaque objec
Supply voltage	24V DC +20 (excluding voltage drop due to cable)		
Control output (OSSD 1 / 2)	Maximum source (PNP) / sink (NPN) current: 350mA, Residual voltage: 2V or let Leakage current: 0.2mA or less, Maximum load capacity: 2.2μF Load wiring resistance: 3Ω or less		
Response time	OFF response: 10ms or less (not connected in serial / parallel) 18ms or less (connected in serial / parallel) (Refer to <response (note="" (off="" 1,="" 2)<="" 50ms="" beam="" by="" channels="" less="" number="" of="" on="" or="" response)="" response:="" td="" time=""></response>		
Auxiliary output (AUX)	Maximum source (PNP) / sink (NPN) current: 60mA, residual voltage: 2V or les		
Response time	OFF response	e: 60ms or less, ON response	: 60ms or less
Ambient temperature	-10	to +55°C, Storage: -25 to +6	90°C
Ambient humidity	30 to	85% RH, storage: 30 to 95%	6 RH
	utput (OSSD 1 / 2) must be the light blocked time is less nization is selected, if the bea	than 30ms.	

the ON response speed decreases by as much as 1 sec.

<Response time by number of beam channels (OFF response)>

Control output (OSSD 1 / 2)

		Main sensor		Sub s	ensor	
	lumber of units in eries connection	1 unit	1 unit	2 units	3 units	4 units
S	4 to 48 beam channels	6ms	10ms	10ms	12ms	12ms
channels	49 to 96 beam channels	8ms	10ms	10ms	12ms	12ms
beam c	97 to 127 beam channels	10ms	12ms	12ms	14ms	14ms
₽	128 to 144 beam channels	-	12ms	12ms	14ms	14ms
Number	145 to 192 beam channels	_	14ms	14ms	16ms	16ms
ž	193 to 256 beam channels	_	16ms	16ms	18ms	18ms

12 CE MARKING DECLARATION OF CONFORMITY

Itemized Essentials of EU Declaration of Conformity Manufacturer's Name: Panasonic Industrial Devices SUNX Co., Ltd

Manufacturer's Address: 2431-1, Ushiyama-cho, Kasugai, Aichi 486-0901, Japan **EU Representative's Name:** Panasonic Marketing Europe GmbH Panasonic Testing Centre EU Representative's Address: Winsbergring 15, 22525 Hamburg, Germany

Product: Active Opto-electronic Protective Device (Light Curtain) Model Name: SF4D Series Trade Name: Panasonic

Application of Council Directive: 2006/42/EC Machinery Directive 2014/30/EU EMC Directive 2011/65/EU RoHS Directive

Applicable Standard(s): - EN ISO 13849-1:2015

FN 61000-6-2 FC 61508-1 EN IEC 63000 - IEC 61508-3 - IEC 61508-4

Type Examination: Certified by TÜV SÜD Product Service GmbH Ridlerstrasse 65 80339 München Germany

13 UKCA MARKING DECLARATION OF CONFORMITY

Itemized Essential	s of UK Declaration of Conformity
Manufacturer's Address: 243 Authorized Representative: Panasonic Testing Centre on b Panasonic UK, a branch of Par Maxis 2, Western Road, Brackr	nasonic Marketing Europe GmbH nell, Berkshire, RG12 1RT ectronic Protective Device (Light Curtain) nery (Safety) Regulations 2008 Compatibility Regulations 2016
Designated Standards: - EN ISO 13849-1:2015 - EN 55011	- IEC 61496-1 - IEC 61496-2
- EN 61000-6-2 - EN IEC 63000	- IEC 61508-1 - IEC 61508-2

- IEC 61508-3

- IEC 61508-4

Approved Body: Certified by TÜV SÜD Product Service GmbH, No.0123

Panasonic Industry Co., Ltd. Panasonic Industrial Devices SUNX Co., Ltd. https://panasonic.net/id/pidsx/global

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