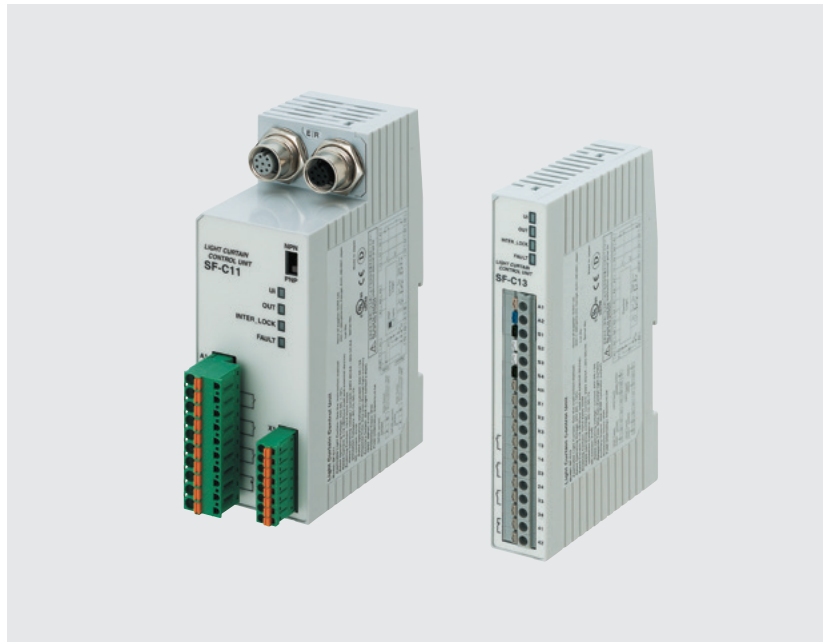


Type 4 Compatible with Up to Control Category 4, PLe and SIL3

Exclusive Control Unit for Safety Light Curtain

SF-C10 SERIES

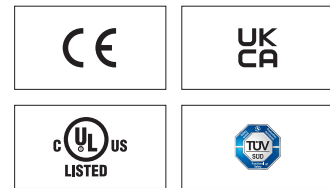


SF-C10 SERIES



Compatible with Up to Control Category 4, PLe and SIL3

The control category differs depending on the configuration and wiring of the external circuit.



Less setup time for safety circuits

Plug-in type control unit

SF-C11

Quick-connection

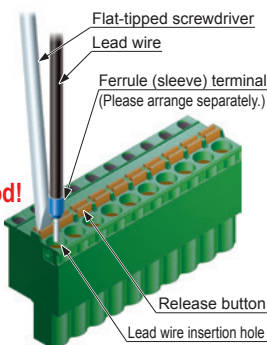
Connecting to the safety light curtain is done using plug-in connections, which shortens setup and replacement time.



Easy setup requiring no torque control

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

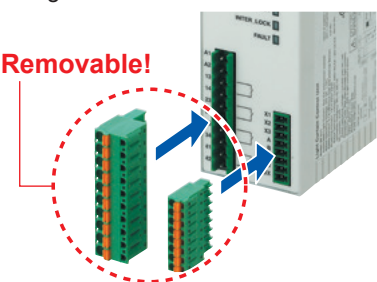
Uses a spring method!



Removable terminal blocks reduce maintenance time

Removable terminal blocks are used. This reduces the work required for reconnecting wiring during maintenance.

Removable!

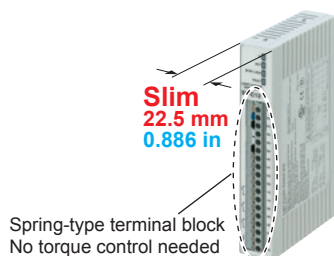


Slim type control unit

SF-C13

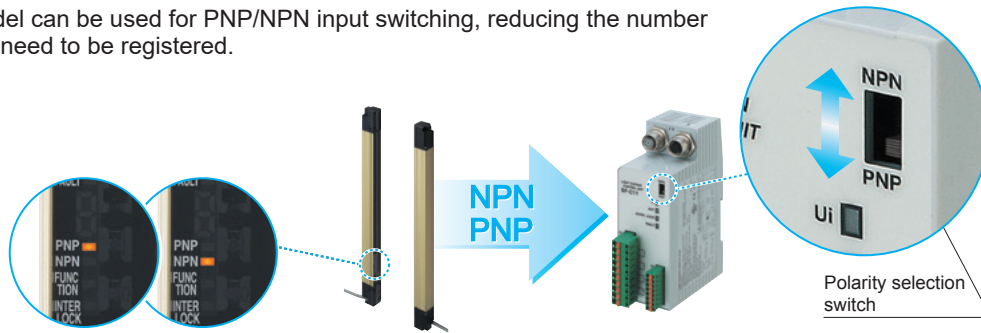
Slim design

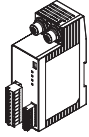
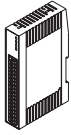
22.5 mm 0.886 in thickness, so can be inserted even into narrow spaces inside panels.



Supports both PNP and NPN polarities**All Models**

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

**ORDER GUIDE**

Designation	Appearance	Model No.	Applicable cable (Note)	Description
Connector connection type control unit (Supports presses used in Japan)		SF-C11	<For connecting safety light curtain SF4D series> Bottom cap cable: SFD-CB□ Extension cable: SFB-CCJ□ (M12 connector)	Use 8-core cable with connector to connect to the safety light curtain. Muting function cannot be used. Compatible with up to Control Category 4. Supports presses used in Japan when combined with SF4D-□-01 (shearing machines not supported)
Slim type control unit (Supports presses used in Japan)		SF-C13	<For connecting safety light curtain SF4D series> Bottom cap cable: SFD-CCB□ Extension cable: SFD-CC□	Use a discrete wire cable to connect to the safety light curtain. Muting function can be used. Compatible with up to Control Category 4. Supports presses used in Japan when combined with SF4D-□-01 (shearing machines not supported)

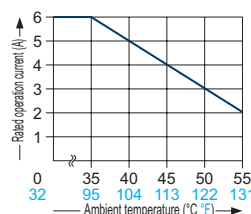
Note: Refer to instruction manual of safety light curtain to be connected.

SPECIFICATIONS

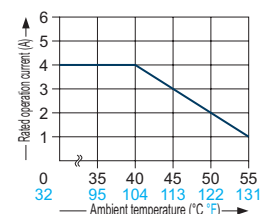
Item	Model No.	SF-C11	SF-C13
Connectable safety light curtains		SF4D series	Safety light curtain manufactured by Panasonic Industry
Applicable standards		EN 61496-1 (Type 4), EN 55011, EN ISO 13849-1: 2015 (Category 4, PL _e), IEC 61496-1 (Type 4), ISO 13849-1: 2015 (Category 4, PL _e), JIS B 9704-1 (Type 4), JIS B 9705-1 (Category 4), ANSI/UL 61496-1 (Type 4), UL 1998 (Class 2)	
Applicable regulations and certifications		CE Marking (Machinery Directive, EMC Directive, RoHS Directive), UKCA Marking [Supply of Machinery (Safety) Regulations, EMC Regulations, RoHS Regulations], UL/c-UL Listing certification, TÜV SÜD certification	
Supply voltage / Current consumption		24 V DC $\pm 10\%$ Ripple P-P 10 % or less / 100 mA or less (without safety light curtain)	
Fuse rating		Built-in electronic fuse, Triggering current: 0.5 A or more, Reset after power down	
Safety output		NO contact $\times 3$ (13-14, 23-24, 33-34)	
Utilization		AC-15, DC-13 (IEC 60947-5-1)	
Rated operation voltage (U _e) / Rated operation current (I _e)		30 V DC / 6 A, 230 V AC / 6 A, resistive load (For inductive load, during contact protection) Min. applicable load: 10 mA (at 24 V DC) (Note 2)	30 V DC / 4 A, 230 V AC / 4 A, resistive load (For inductive load, during contact protection) Min. applicable load: 10 mA (at 24 V DC) (Note 2)
Contact material / contacts		AgSnO, self cleaning, positively driven	
Contact resistance		100 m Ω or less (initial value)	
Contact protection fuse rating		6 A (slow blow)	4 A (slow blow)
Mechanical lifetime		10,000,000 times or more (open / close frequency of 180 times / min.) (Note 3)	
Electrical lifetime		100,000 times or more (open / close frequency of 20 times / min., 230 V AC, 3 A, using resistance load) (Note 3)	
Pick-up delay (Auto reset / Manual reset)		80 ms or less / 90 ms or less	
Response time (Drop-out delay)		10 ms or less	
Auxiliary output		Safety relay contact (NC contact) $\times 1$ (41-42) (Related to enabling path)	
Rated operation voltage / current		24 V DC / 2 A, Min. applicable load: 10 mA (at 24 V DC)	
Contact protection fuse rating		2 A (slow blow)	
Semiconductor auxiliary output (AUX)		<Minus ground (Setting for PNP)> PNP open-collector transistor • Max. source current: 60 mA • Applied voltage: same as supply voltage (between the semiconductor auxiliary output and +V) • Residual voltage: 2.3 V or less (at source current 60 mA) • Leakage current: 2 mA or less	<Plus ground (Setting for NPN)> NPN open-collector transistor • Max. sink current: 60 mA • Applied voltage: same as supply voltage (between the semiconductor auxiliary output and 0 V) • Residual voltage: 1.5 V or less (at sink current 60 mA) • Leakage current: 2 mA or less
Output operation		Related to auxiliary output of safety light curtain	ON when the safety light curtain is interrupted
Indicators		Green LED (lights up when the power is ON)	
Power supply (U _i)		Green LED (lights up when safety output is closed)	
Safety output [OUT]		Yellow LED (lights up when safety output is opened)	
Interlock (INTER_LOCK)		Yellow LED (blinks when fault occurs)	
Fault (FAULT)			
External relay monitor function		Incorporated	
Trailing edge function		Incorporated	
Polarity selection function (Note 4)		Incorporated (Sliding switch allows selection of plus / minus ground) Minus ground: Correspond to PNP output safety light curtain Plus ground: Correspond to NPN output safety light curtain	Incorporated (Cable connection allows selection of plus / minus ground) Minus ground: Correspond to PNP output safety light curtain Plus ground: Correspond to NPN output safety light curtain
Excess voltage category / Pollution degree		II / 2	
Environmental resistance		Enclosure: IP40, Terminal: IP20	
Protection		-10 to +55 °C +14 to +131 °F (No dew condensation or icing allowed), Storage: -25 to +70 °C -13 to +158 °F	
Ambient temperature		30 to 85 % RH, Storage: 30 to 95 % RH	
Ambient humidity		Resistance / malfunction 10 to 55 Hz frequency, 0.35 mm 0.014 in amplitude in X, Y, and Z directions for twenty times each	
Vibration resistance		Minimum load: 20,000,000, Maximum load: 400,000	
B _{10D} (Note 5)		20 years	
Mission time		Detachable spring-cage terminal	Spring-cage terminal
Connection terminal		ABS	
Enclosure material		Net weight: 320 g approx.	
Weight		Net weight: 200 g approx.	

- Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C +68 °F.
 2) If several **SF-C11** or **SF-C13** units are being used in line together, leave a space of 5 mm **0.197 in** or more between each unit. If the units are touching each other, reduce the rated operating current for safety output in accordance with the ambient operating temperature as shown in the graphs at right.
 3) The life expectancy of the relay varies depending on the type of load, open / close frequency, ambient conditions and others.
 4) Please switch the sliding switch to the PNP side for minus ground and to the NPN side for plus ground.
 5) Mean cycle time that 10% of parts reach dangerous failure.

(Dilating when SF-C11 units are mounted close together)



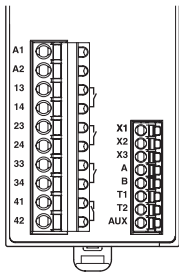
(Dilating when SF-C13 units are mounted close together)



TERMINAL ARRANGEMENT

Terminal arrangement of SF-C11

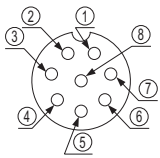
Terminal arrangement diagram



Terminal	Function
A1	+24 V DC
A2	0 V
13-14, 23-24, 33-34	Safety output (NO contact × 3)
41-42	Auxiliary output (NC contact × 1)
X1	Reset output terminal
X2	Reset input terminal (Manual)
X3	Reset input terminal (Automatic)
A	Not used
B	
T1	Test output terminal
T2	Test input terminal
AUX	Semiconductor auxiliary output

When connecting the **SF-C11** to the safety light curtains, make sure to use the 8-core connection cable with a connector. Refer to the instruction manual of safety light curtain to be connected for details.

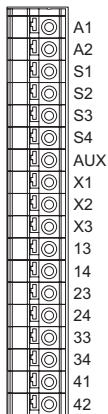
Pin layout for safety light curtain connectors



Connector pin No.	Emitter side connector	Receiver side connector
①	Interlock	OSSD2
②	+24 V DC	+24 V DC
③	Emission halt	OSSD1
④	Auxiliary output	EDM (External relay monitor)
⑤	Synchronization wire +	Synchronization wire +
⑥	Synchronization wire -	Synchronization wire -
⑦	0 V	0 V
⑧	Shielded wire	Shielded wire

Terminal arrangement of SF-C13

Terminal arrangement diagram



Terminal	Function
A1	+24 V DC
A2	0 V
S1 to S4	Safety light curtain control output (OSSD) input terminal
AUX	Semiconductor auxiliary output
X1	Reset output terminal
X2	Reset input terminal (Manual)
X3	Reset input terminal (Automatic)
13-14, 23-24, 33-34	Safety output (NO contact × 3)
41-42	Auxiliary output (NC contact × 1)

When connecting the **SF-C13** to the safety light curtains, make sure to use a discrete wire connection cable. Refer to the instruction manual of safety light curtain to be connected for details.

When wiring the safety light curtain side, prepare a terminal block separately.

PRECAUTIONS FOR PROPER USE

- This device has been developed / produced for industrial use only.
- When connecting this product to a product other than the connectable input device, the system does not conform to the control category 4 based on ISO 13849-1: 2015 (EN ISO 13849-1: 2015, JIS B 9705-1).
- The power supply unit of **SF-C10** series uses the electronic fuse which does not require any replacement.
- When the electronic fuse trips, turn off the power supply and eliminate the cause for the overcurrent. After that, turn the power back on.
- The electronic fuse is not meant to be used for equipment that is operated continuously. Note that the specification may not be satisfied by continuous operation.
- Make sure to carry out the wiring in the power supply off condition.
- Wrong wiring will damage the product.
- Verify that the supply voltage variation is within the rating. Note that if a voltage exceeding the rated range is applied, or if an AC power supply is directly connected, the unit may get burnt or damaged.
- The DC power supply unit must satisfy the conditions given below:
 - 1) Power supply unit authorized in the region where this device is to be used.
 - 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 conformity with EMC Regulations and Low Voltage Regulations.
 - 4) The frame ground (F.G.) terminal must be connected to ground when using a commercially available switching regulator.
 - 5) Power supply unit with an output holding time of 20 ms or more.
 - 6) If surges are likely to occur, take countermeasures such as connecting a surge absorber to the origin of the surge.
 - 7) Power supply unit corresponding to CLASS 2 (only for requiring cULus Mark conformation)
- 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.
- Avoid dust, dirt and steam.
- Take care that the product does not come in direct contact with oil, grease, or organic solvents, such as, thinner, etc.
- When using the product as a unit in compliance with CE Marking and UKCA Marking, make sure that the wires connected to the product do not exceed 30 m **98.43 ft** in length.
- Note that this equipment is applicable only in the control circuit grounded in accordance with IEC 60204-1 and JIS B 9960-1, or in the control circuit in which the insulation monitor unit (ground fault detection unit) is included.
- This unit is suitable for indoor use only.
- The seal as shown in the drawing on the below is stuck to the engagement point of unit. If the seal is peeled off or broken, **SF-C10** series will not be certified as "Safety equipment" and will not be covered by our guarantee.

Wiring

- The following solid wire and twisted wires (lead wire) are recommended.

SF-C11

Power supply and output line connector: 0.2 to 2.5 mm²
(AWG24 to 12)

Signal line connector: 0.2 to 1.5 mm² (AWG24 to 16)

SF-C13

Single wire: $\varnothing 0.4$ to $\varnothing 1.2$ mm **$\varnothing 0.016$ to $\varnothing 0.047$ in**
(AWG26 to 16)

Twisted wire (lead wire): 0.3 to 1.25 mm² (AWG22 to 16)

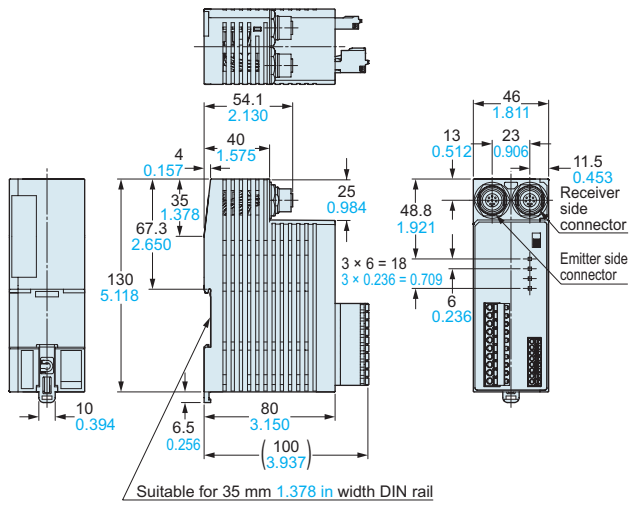
Do not open!

If this seal is removed or damaged,
the units are not recognized as safety product.

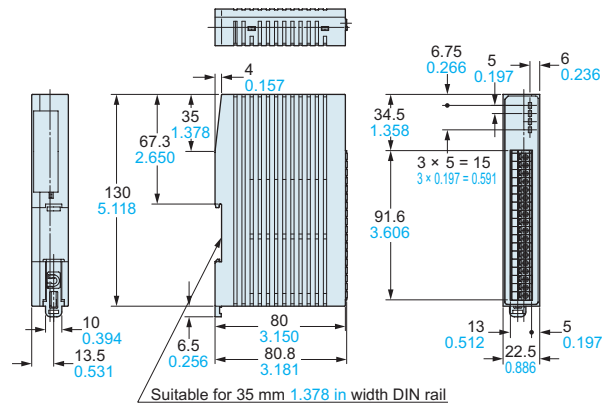
DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.

SF-C11 Control unit



SF-C13 Control unit



Disclaimer

The applications described in the catalog are all intended for examples only. The purchase of our products described in the catalog shall not be regarded as granting of a license to use our products in the described applications. We do NOT warrant that we have obtained some intellectual properties, such as patent rights, with respect to such applications, or that the described applications may not infringe any intellectual property rights, such as patent rights, of a third party.

Panasonic
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