

Safety Relay Terminal Blocks



SFT Series PRODUCT MANUAL

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Features

- Relays with force guided contacts for safe control system (IEC 61810-3)
- For driving various loads using PLC output signals
- Redundant circuits and signal feedback for safety
- Available in 4-pole and 6-pole models
- Compact, space-saving size
- Available in screw type and screwless type models
- Operation indicator (green LED) for easy status monitoring
- DIN rail mount and screw mount installation (varies by models)

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

⚠ Warning Failure to follow instructions may result in serious injury or death.

- 01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss.** (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)
Failure to follow this instruction may result in personal injury, economic loss or fire.
- 02. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present.**
Failure to follow this instruction may result in explosion or fire.
- 03. Do not connect, repair, or inspect the unit, remove connector, or change Relay while connected to a power source.**
Failure to follow this instruction may result in fire or electric shock.
- 04. Do not disassemble or modify the unit.**
Failure to follow this instruction may result in fire or electric shock.

⚠ Caution Failure to follow instructions may result in injury or product damage.

- 01. Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
- 02. Use a dry cloth to clean the unit, and do not use water or organic solvent.**
Failure to follow this instruction may result in fire or electric shock.
- 03. Keep the product away from metal chip, dust, and wire residue which flow into the unit.**
Failure to follow this instruction may result in fire or product damage.
- 04. Do not use the product when a screw of terminal is loosened.**
Failure to follow this instruction may result in fire or product damage.

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- Check the polarity of power or COMMON before connecting PLC or other controllers.
- Do not touch the unit immediately after the load power is supplied or cut. It may cause burn by high temperature.
- 24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Wire as short as possible and keep away from high voltage lines or power lines, to prevent surge and inductive noise. Do not use near the equipment which generates strong magnetic force or high frequency noise (transceiver, etc.). In case installing the product near the equipment which generates strong surge (motor, welding machine, etc.), use diode or varistor to remove surge.
- This unit may be used in the following environments.
 - Indoors (in the environment condition rated in 'Specifications')
 - Altitude max. 2,000 m
 - Pollution degree 2
 - Installation category II

Product Components

- Product
- Safety relay
- Instruction manual

Safety Relay

- Safety relays provided by the model are different.
- It is possible to purchase the safety relay separately.
For the detailed specification, refer to the materials from the manufacturer (PANASONIC).

Model	SFS2-DC24V	SFS3-DC24V	SFS4-DC24V	SFS5-DC24V	SFS6-DC24V
No. of pole	4		6		
Contact arrangement	2A2B	3A1B	4A2B	5A1B	3A3B
Applied models	SFTS-4P-24V-□ / SFTL-4P-24V-□		SFTS-6P-24V-□ / SFTL-6P-24V-□		

Ordering Information

This is only for reference, the actual product does not support all combinations. For selecting the specified model, follow the Autonics website.

SFT ① - ② - ③ - ④

① Terminal type

S: Screw type
L: Screwless type

② Number of pole

4P: 4-pole
6P: 6-pole

③ Power supply

24V: 24 VDC

④ Relay Contact

2A2B: 2A2B (4-pole)
3A1B: 3A1B (4-pole)
4A2B: 4A2B (6-pole)
5A1B: 5A1B (6-pole)
3A3B: 3A3B (6-pole)

Specifications

Model	SFTS-4P-24V-□	SFTS-6P-24V-□	SFTL-4P-24V-□	SFTL-6P-24V-□
No. of pole	4	6	4	6
Applied relay ⁽⁰¹⁾	4-pole - SFS2-DC24V: 2A2B, SFS3-DC24V: 3A1B 6-pole - SFS4-DC24V: 4A2B, SFS5-DC24V: 5A1B, SFS6-DC24V: 3A3B			
Power supply	24 VDC ± 10 %			
Rated load voltage	250 VAC ~ 50/60 Hz, 30 VDC =			
Continuous current	6 A ⁽⁰²⁾			
Indicator	Operation indicator: green			
Terminal type	Screw		Screwless	
Applicable wire - solid	Ø 0.3 to Ø 1.2 mm		Ø 0.6 to 1.25 mm ⁽⁰³⁾	
Applicable wire - stranded	AWG 22-16 (0.30 to 1.25 mm ²)		AWG 22-18 (0.30 to 0.80 mm ²) ^{(03) (04)}	
Crimp terminal connection tensile strength	≥ 30 N		-	
Tightening torque	0.5 to 0.6 N m		-	
Stripped length	-		8 to 10 mm	
Insulation resistance	≥ 1,000 MΩ (500 VDC = megger)			
Dielectric strength (coil-contact)	4,000 VAC ~ 50/60 Hz for 1 minute			
Dielectric strength (different poles contact)	2,500 VAC ~ 50/60 Hz for 1 minute			
Dielectric strength (same polarity contact)	2,500 VAC ~ 50/60 Hz for 1 minute			
Vibration	0.75 mm amplitude at frequency 10 to 55 Hz in each X, Y, Z direction for 2 hours			
Vibration (malfunction)	0.75 mm amplitude at frequency 10 to 55 Hz in each X, Y, Z direction for 10 minutes			
Shock	300 m/s ² (≈ 30 G) in each X, Y, Z direction for 3 times			
Shock (malfunction)	150 m/s ² (≈ 15 G) in each X, Y, Z direction for 3 times			
Ambient temperature	-25 to 70 °C, storage: -30 to 80 °C (no freezing or condensation)			
Ambient humidity	25 to 85 % RH, storage: 25 to 85 % RH (no freezing or condensation)			
Protection structure	IP20 (IEC standard)			
Material	CASE, BASE, COVER: PC Terminal: C2680		CASE, BASE: PC, Terminal: PA66, Copper, Stainless Steel	
Certification	CE, RoHS, REACH			
Unit weight (packaged)	≈ 37.8 g (≈ 85.8 g)	≈ 51.2 g (≈ 99.2 g)	≈ 39.8 g (≈ 88 g)	≈ 51.2 g (≈ 99.2 g)

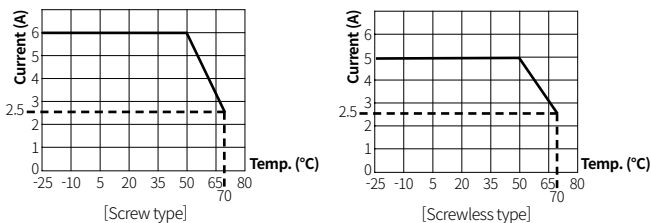
(01) For the detailed specification, refer to the materials from the manufacturer (PANASONIC).

(02) Continuous current is the maximum current at each contact and must not exceed the total current depending on the number of contacts.

(03) Use the cable of copper conductor in 60°C temperature class.

(04) When using the stranded wire, use End Sleeve (Ferrule Terminal).

Ambient Temperature depending on Contact Current

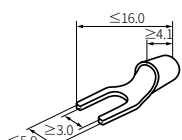


- The current in the graph is max. total current, based on the max. current at each contact.
Ex) Max. total current is 25 A and max. current at each contact is 5 A, when the safety relay SFS5-DC24V (6-pole, 5A1B) is inserted into the safety screwless terminal block SFTL-6P-24V.
- Max. current are not guaranteed when the ambient temperature is above 50°C. Refer to the graph to use it by reducing the current.

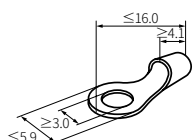
Terminal Specification

• Unit: mm, Use the UL approved crimp terminal (screw) and wire ferrule (screwless).

■ Screw

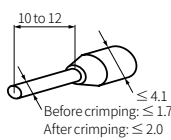


Fork crimp terminal



Round crimp terminal

■ Screwless



Wire ferrule

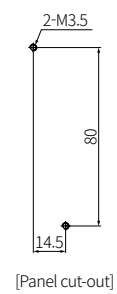
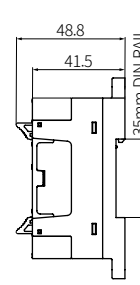
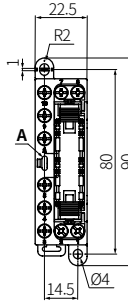
Dimensions

• Unit: mm, For the detailed drawings, follow the Autonics website.

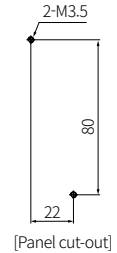
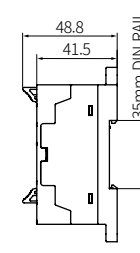
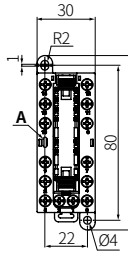
A Operation indicator (green)

■ Screw type

• 4-pole

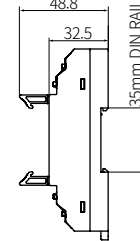
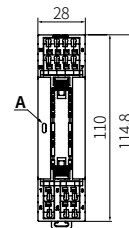
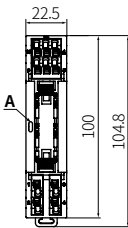


• 6-pole



■ Screwless type

• 4-pole

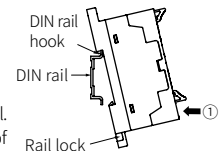


Installation

■ DIN Rail

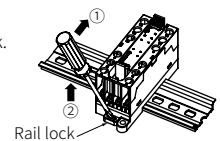
• Mounting

- Hang the DIN rail hook on the rear of the product onto the DIN rail.
- Push the product to the direction ①, and fix onto the DIN rail.
- Install DIN rail stoppers (sold separately) on both sides of the product for use.



• Removing

- Insert a tool such as screwdriver into the hole of Rail lock.
- Push the tool to the direction ① and pull the Rail lock.
- Lift bottom of the product to the direction ② and remove the product from DIN rail.



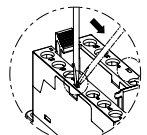
■ Panel (Screw type)

It is recommended to use M3.5×12 mm of spring washer screws. Tighten the screw with the tightening torque of 0.7 to 1.0 N m.

Wiring

■ Cover Removing (Screw Type)

- Insert the (-) screwdriver into the hole as indicated. (SFTS-6P-24V: 2-hole / SFTS-4P-24V: 1-hole)
- Remove the terminal block cover by pushing the screwdriver to the middle of the product.

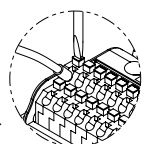


■ Connecting (Screwless Type)

Insert the wire ferrule into the terminal hole.

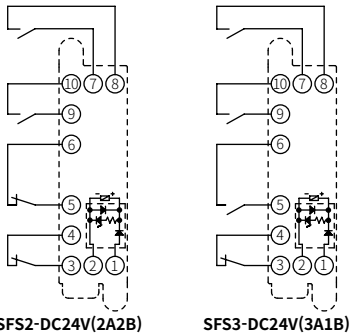
■ Removing (Screwless Type)

- Put the (-) screwdriver at the groove on the clamp lever and press it.
- Pull the cable to disassemble.

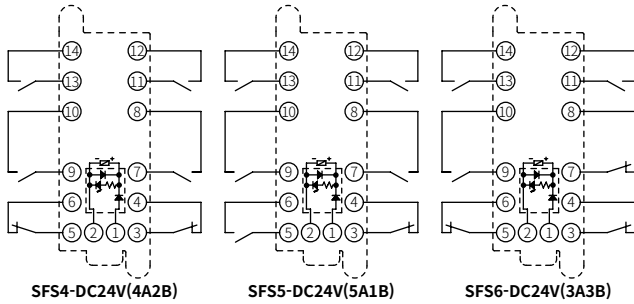


Relay Installed Wire Connection

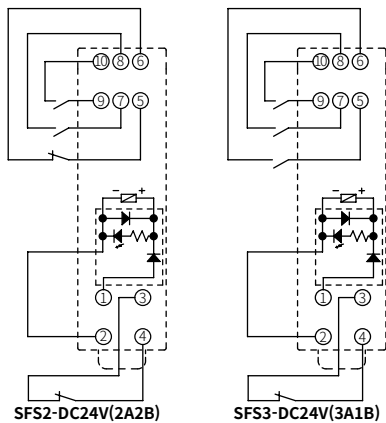
■ Screw type: 4-pole



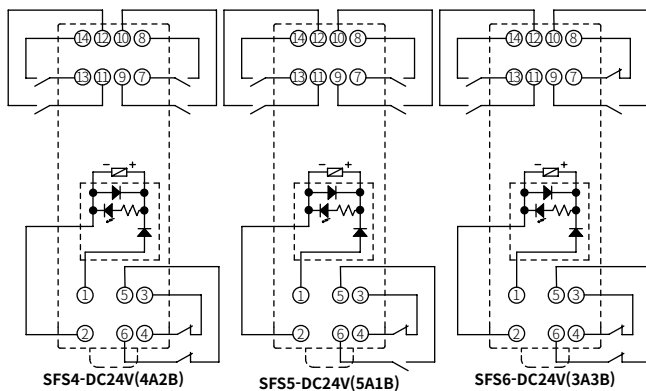
■ Screw type: 6-pole



■ Screwless type: 4-pole



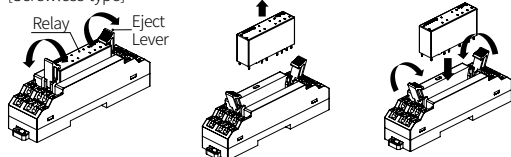
■ Screwless type: 6-pole



Replacing Relay

1. Remove the relay by pushing the eject Lever in the direction of the arrow.
2. After checking the direction of the relay lead pin, insert the relay to be replaced to return the eject Lever to the initial position.

[Screwless type]



Safety Relay_4-pole: SFS2-DC24V / SFS3-DC24V

■ Coil Data

Model	SFS2-DC24V	SFS3-DC24V
Contact arrangement	2A2B	3A1B
Operate voltage	≥ 75 % of rated voltage	
Release voltage	≤ 10 % of rated voltage	
Rated consumption current	15 mA	
Coil resistance	1,600 Ω	
Max. allowable voltage	110 % of rated voltage	

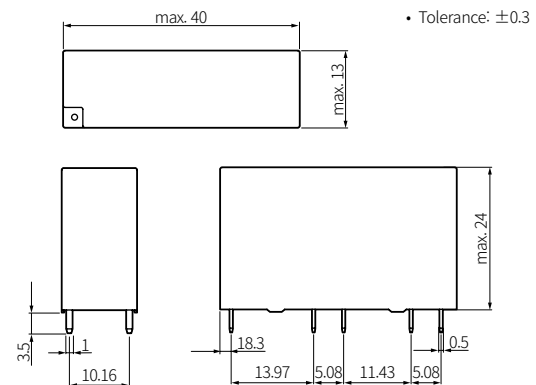
■ Specifications

Model	SFS2-DC24V	SFS3-DC24V
Manufacture	Panasonic	
Contact arrangement	2A2B	3A1B
Contact material	Au flashed AgSnO ₂ type	
Contact resistance (initial)	Max. 100 mΩ (6 VDC≒ 1 A)	
Rated switching capacity (resistive load)	6 A 250 VAC~, 6 A 30 VDC≒	
Max. switching power (resistive load)	1,500VA, 180W	
Max. switching voltage (resistive load) ⁰¹⁾	250 VAC~, 125 VDC≒	
Max. switching current (resistive load)	6A	
Min. switching capacity (resistive load)	1 mA 5 VDC≒	
Rated power consumption	≈ 360 mW	
Insulation resistance	≥ 1,000 MΩ (500 VDC≒ megger)	
Max. operating frequency	20 times/min.	
Dielectric strength (Between open contacts)	1,500 VAC~ / 50/60 Hz for 1 min.	
Dielectric strength (Between contacts sets)	2,500 VAC~ / 50/60 Hz for 1 min.	
	- 7-8 / 9-10 between open contacts	
	4,000 VAC~ / 50/60 Hz for 1 min	
	- 3-4 / 5-6 between open contacts - 3-4 / 7-8 between open contacts - 5-6 / 9-10 between open contacts	
Dielectric strength (Between contact and coil)	4,000 VAC~ / 50/60 Hz for 1 min.	
Operation time (at 20 °C)	≤ 20 ms	
Response time (at 20 °C)	≤ 10 ms	
Release time (at 20 °C)	≤ 20 ms	
Vibration	1.5 mm amplitude at frequency of 10 to 55 Hz	
Vibration (malfunction)	1.5 mm amplitude at frequency of 10 to 55 Hz	
Shock	200 m/s ²	
Shock (malfunction)	1,000 m/s ²	
Mechanical life expectancy	≥ 10,000,000 (at 180 operations/min)	
Electrical life expectancy	≥ 100,000 (at 30 operations/min)	
Ambient temperature	-40 to 85 °C (a non freezing or condensation environment)	
Ambient humidity	5 to 85 %RH (a non freezing or condensation environment)	
Weight	≈ 20 g	

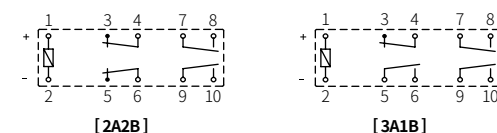
01) Check the actual load, as this value may vary depending on the switching frequency, environmental factors, and reliability.

■ Dimensions

- unit: mm



- Circuit diagram



It was written based on the data provided by each manufacturer, but these is room for change, so be sure to check the manufacturer's data

Safety Relay_6-pole: SFS4-DC24V / SFS5-DC24V / SFS6-DC24V

Coil Data

Model	SFS4-DC24V	SFS5-DC24V	SFS6-DC24V
Contact arrangement	4A2B	5A1B	3A3B
Operate voltage	≥ 75 % of rated voltage		
Release voltage	≤ 10 % of rated voltage		
Rated consumption current	20.8 mA		
Coil resistance	1,152 Ω		
Max. allowable voltage	110 % of rated voltage		

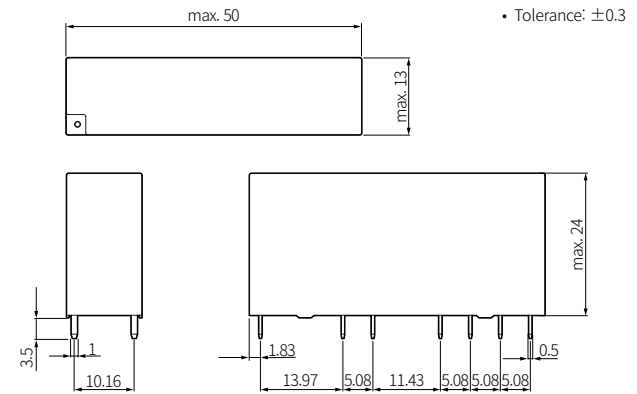
Specifications

Model	SFS4-DC24V	SFS5-DC24V	SFS6-DC24V
Manufacture	Panasonic		
Contact arrangement	4A2B	5A1B	3A3B
Contact material	Au flashed AgSnO ₂ type		
Contact resistance (initial)	Max. 100 mΩ (6 VDC≡ 1 A)		
Rated switching capacity (resistive load)	6 A 250 VAC~, 6 A 30 VDC≡		
Max. switching power (resistive load)	1,500VA, 180W		
Max. switching voltage (resistive load) ⁰¹⁾	250 VAC~, 125 VDC≡		
Max. switching current (resistive load)	6 A		
Min. switching capacity (resistive load)	1 mA 5 VDC≡		
Rated power consumption	≈ 500 mW		
Insulation resistance	≥ 1,000 MΩ (500 VDC≡ megger)		
Max. operating frequency	20 times/min.		
Dielectric strength (Between open contacts)	1,500 VAC~ 50/60 Hz for 1 min		
Dielectric strength (Between contacts sets)	2,500 VAC~ 50/60 Hz for 1 min - 7-8 / 11-12 between open contacts - 9-10 / 13-14 between open contacts - 11-12 / 13-14 between open contacts 4,000 VAC~ 50/60 Hz for 1 min - 3-4 / 5-6 between open contacts - 3-4 / 7-8 between open contacts - 5-6 / 9-10 between open contacts - 7-8 / 9-10 between open contacts		
Dielectric strength (Between contact and coil)	4,000 VAC~ 50/60 Hz for 1 min.		
Operation time (at 20 °C)	≤ 20 ms		
Response time (at 20 °C)	≤ 10 ms		
Release time (at 20 °C)	≤ 20 ms		
Vibration	1.5 mm amplitude at frequency of 10 to 55 Hz		
Vibration (malfunction)	1.5 mm amplitude at frequency of 10 to 55 Hz		
Shock	200 m/s ²		
Shock (malfunction)	1,000 m/s ²		
Mechanical life expectancy	≥ 10,000,000 (at 180 operations/min)		
Electrical life expectancy	≥ 100,000 (at 30 operations/min)		
Ambient temperature	-40 to 85 °C (a non freezing or condensation environment)		
Ambient humidity	5 to 85 %RH (a non freezing or condensation environment)		
Weight	≈ 23 g		

01) Check the actual load, as this value may vary depending on the switching frequency, environmental factors, and reliability.

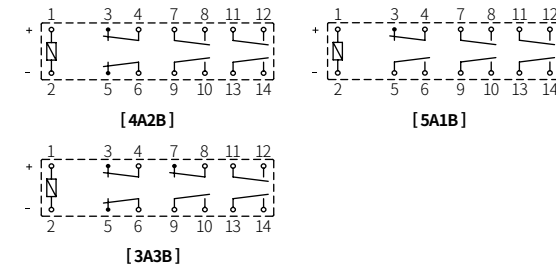
Dimensions

• unit: mm



• Tolerance: ±0.3

• Circuit diagram



It was written based on the data provided by each manufacturer, but there is room for change, so be sure to check the manufacturer's data