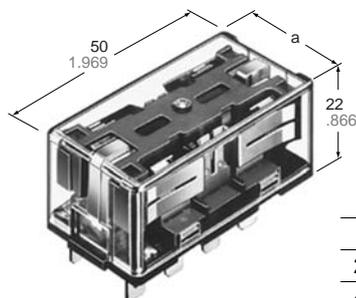


**Panasonic**  
ideas for life

# 15A (2C), 10A (4C) COMPACT POWER RELAYS WITH HIGH SENSITIVITY

# SP RELAYS



mm inch

	a
2C	25.6 1.008
4C	36.8 1.449

## FEATURES

- **High Vibration/Shock Resistance**  
Vibration resistance: 18 G, amplitude 3 mm (10 to 55 Hz)  
Shock resistance: 40 G (11 ms)
- **Latching types available**
- **High Sensitivity in Small Size 150 mW pick-up, 300 mW nominal operating power**
- **Wide Switching Range**  
From 1 mA to 15 A (2C) and 10 A (4C)

## SPECIFICATIONS

### Contacts

Arrangement	2 Form C, 4 Form C			
Initial contact resistance, max. (By voltage drop 6 V DC 1 A)	30 mΩ			
Initial contact pressure	2C: Approx. 0.392 N (40 g 1.41 oz) 4C: Approx. 0.196 N (20 g 0.71 oz)			
Contact material	Stationary contact: Gold flashed silver alloy Movable contact: Silver alloy			
Rating (resistive load)	Nominal switching capacity	2C: 15 A 250 V AC 10 A 30 V DC 4C: 10 A 250 V AC 10 A 30 V DC		
	Max. switching power	2C: 3,750 VA, 300 W 4C: 2,500 VA, 300 W		
	Max. switching voltage	2C, 4C: 250 V AC, 30 V DC		
	Max. switching current	2C: 15 A (AC) 10 A (DC), 4C: 10 A		
	Min. switching capacity <sup>#1</sup>	100 mA, 5 V DC		
Expected life (min. operations)	Mechanical (at 180 cpm)	5 × 10 <sup>7</sup>		
		Electrical (at 20 cpm) (resistive load)	2C	15 A 250 V AC
	10 A 30 V DC			10 <sup>5</sup>
	4C		10 A 250 V AC	10 <sup>5</sup>
			10 A 30 V DC	10 <sup>5</sup>

### Coil (polarized) at 20°C 68°F

Single side stable	Nominal operating power	300 mW
Latching	Minimum set and reset power	150 mW
	Nominal set and reset power	300 mW

### Characteristics (at 25°C 77°F 50% Relative humidity)

Max. operating speed (at rated load)	20 cpm	
Initial insulation resistance <sup>*1</sup>	1,000 MΩ at 500 V DC	
Initial breakdown voltage <sup>*2</sup>	Between open contacts	1,500 Vrms
	Between contact sets	3,000 Vrms
	Between contact and coil	3,000 Vrms
Operate time <sup>*3</sup> (at nominal voltage)	Max. 30 ms (Approx. 25 ms)	
Release time(without diode) <sup>*3</sup> (at nominal voltage)	Max. 20 ms (Approx. 15 ms)	
Temperature rise (at nominal voltage)	Max. 40°C with nominal coil voltage and at nominal switching capacity	
Shock resistance	Functional <sup>*4</sup>	Min. 392 m/s <sup>2</sup> {40 G}
	Destructive <sup>*5</sup>	Min. 980 m/s <sup>2</sup> {100 G}
Vibration resistance	Functional <sup>*6</sup>	176.4 m/s <sup>2</sup> {18 G}, 10 to 55 Hz at double amplitude of 3 mm
	Destructive	176.4 m/s <sup>2</sup> {18 G}, 10 to 55 Hz at double amplitude of 3 mm
Conditions for operation, transport and storage <sup>*7</sup> (Not freezing and condens- ing at low temperature)	Ambient temp.	-50°C to +60°C -58°F to +140°F
	Humidity	5 to 85% R.H.
Unit weight	2C: 50 g 1.76 oz ; 4C: 65 g 2.29 oz	

#1 This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

### Remarks

- \* Specifications will vary with foreign standards certification ratings.
- \*<sup>1</sup> Measurement at same location as "Initial breakdown voltage" section
- \*<sup>2</sup> Detection current: 10 mA
- \*<sup>3</sup> Excluding contact bounce time
- \*<sup>4</sup> Half-wave pulse of sine wave: 11ms; detection time: 10μs
- \*<sup>5</sup> Half-wave pulse of sine wave: 6ms
- \*<sup>6</sup> Detection time: 10μs
- \*<sup>7</sup> Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (see catalog).

## TYPICAL APPLICATIONS

NC machines, remote control panels, sophisticated business equipment.

## ORDERING INFORMATION

Ex. SP	2	P	L2	DC24V
Contact arrangement	Mounting classification		Operating function	Coil voltage
2: 2 Form C 4: 4 Form C	NIL: standard type with FASTON terminals P: PC board type Standard - 1.4 mm x 0.5 mm (without UL/CSA marking) Optional - 2.0 x 0.5 mm (with UL/CSA marking)		Nil: Single side stable L2: 2 coil latching	DC 3, 5, 6, 12, 24, 48 V

- (Notes) 1. For PC board terminal types, please consult us for details.  
2. 2 Form C: Carton: 20 pcs., Case: 200 pcs.  
4 Form C: Carton: 10 pcs., Case: 100 pcs.  
3. UL/CSA, TÜV approved type is standard.  
4. 1 coil latching type available.

# TYPES AND COIL DATA (at 20°C 68°F)

## Single side stable

Part No.		Nominal voltage, V DC	Pick-up voltage, V DC (max.)	Drop-out voltage, V DC (min.)	Nominal operating current, mA	Coil resistance, Ω (±10%) 20°C	Inductance, H (at 120 Hz)	Nominal operating power, mW	Maximum allowable voltage, V DC (40°C)
2 Form C	4 Form C								
SP2-DC3V	SP4-DC3V	3	2.1	0.3	100.0	30	Approx. 0.05	300	4.5
SP2-DC5V	SP4-DC5V	5	3.5	0.5	60.2	83	0.1	300	7.5
SP2-DC6V	SP4-DC6V	6	4.2	0.6	50.0	120	0.2	300	9
SP2-DC12V	SP4-DC12V	12	8.4	1.2	25.0	480	0.7	300	18
SP2-DC24V	SP4-DC24V	24	16.8	2.4	12.5	1,920	3.0	300	36
SP2-DC48V	SP4-DC48V	48	33.6	4.8	6.2	7,700	11.2	300	72

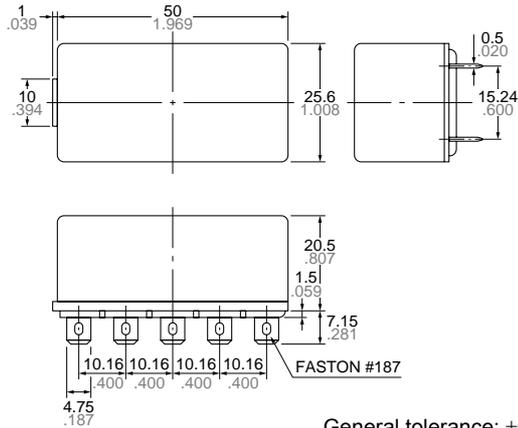
## 2-coil latching

Part No.		Nominal voltage, V DC	Set and reset voltage, V DC (max.)	Nominal operating current, mA	Coil resistance, Ω (±10%)		Inductance, H (at 120 Hz)		Nominal operating power, mW	Maximum allowable voltage, V DC (40°C)
2 Form C	4 Form C				Coil I	Coil II	Coil I	Coil II		
SP2-L2-DC3V	SP4-L2-DC3V	3	2.1	100.0	30	30	Approx. 0.03	Approx. 0.03	300	4.5
SP2-L2-DC5V	SP4-L2-DC5V	5	3.5	60.2	83	83	0.07	0.07	300	7.5
SP2-L2-DC6V	SP4-L2-DC6V	6	4.2	50.0	120	120	0.1	0.1	300	9
SP2-L2-DC12V	SP4-L2-DC12V	12	8.4	25.0	480	480	0.4	0.4	300	18
SP2-L2-DC24V	SP4-L2-DC24V	24	16.8	12.5	1,920	1,920	1.4	1.4	300	36
SP2-L2-DC48V	SP4-L2-DC48V	48	33.6	6.2	7,680	7,680	5.6	5.6	300	72

## DIMENSIONS

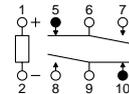
### 2 Form C

#### Plug-in terminal



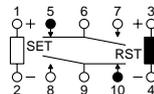
#### Schematic (Bottom view)

##### Single side stable



(Deenergized condition)

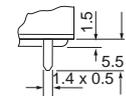
##### 2 coil latching



(Reset condition)

Diagram shows the "reset" position when terminals 3 and 4 are energized. Energize terminals 1 and 2 to transfer contacts.

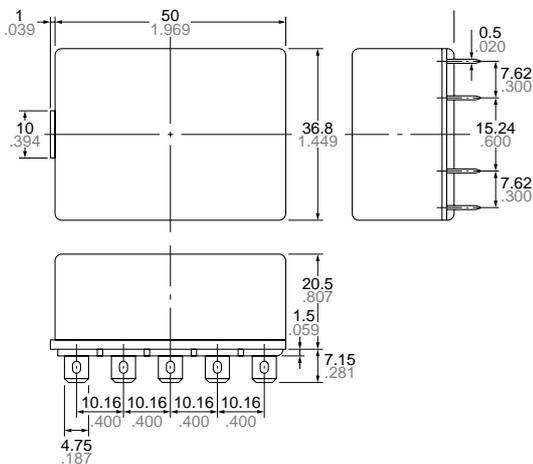
#### PC board terminal



With UL/CSA approval:  
pin 2 mm x 0.5 mm  
standard type:  
pin 1.4 mm x 0.5 mm

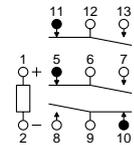
### 4 Form C

#### Plug-in terminal



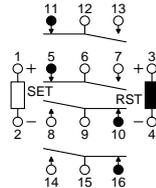
#### Schematic (Bottom view)

##### Single side stable



(Deenergized condition)

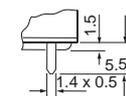
##### 2 coil latching



(Reset condition)

Diagram shows the "reset" position when terminals 3 and 4 are energized. Energize terminals 1 and 2 to transfer contacts.

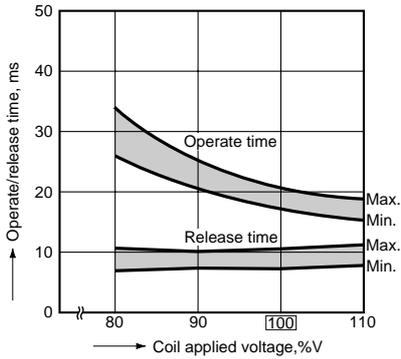
#### PC board terminal



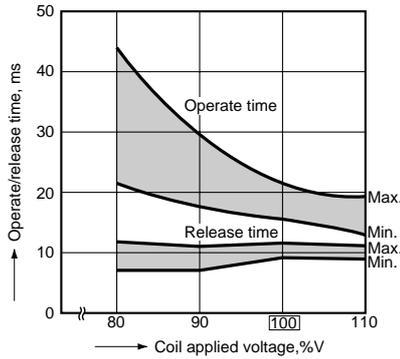
With UL/CSA approval:  
pin 2 mm x 0.5 mm  
standard type:  
pin 1.4 mm x 0.5 mm

# REFERENCE DATA

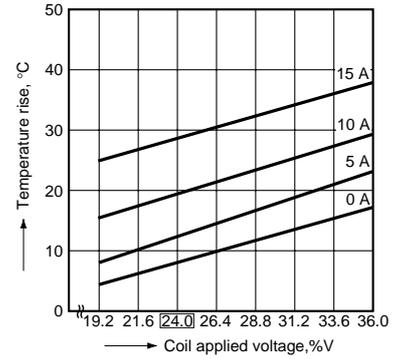
Operate and release time (Single side stable)  
SP2



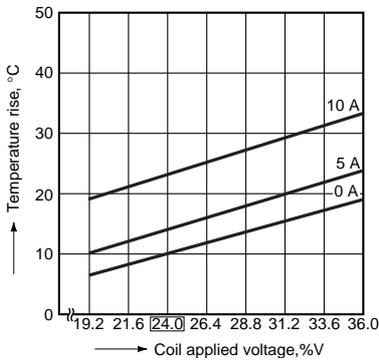
SP4



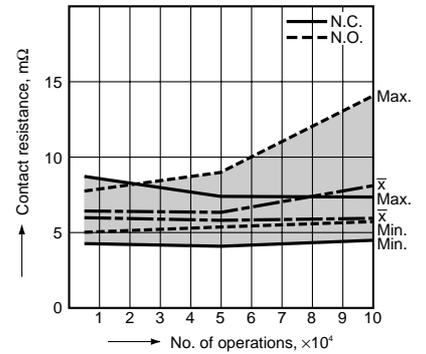
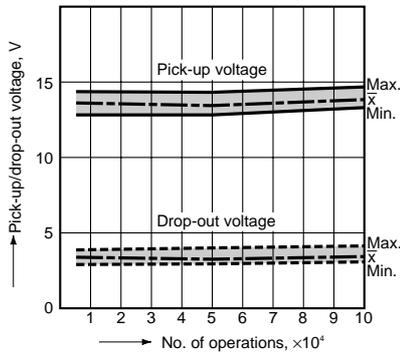
Coil temperature rise  
Sample: SP2-DC24V  
Ambient temperature: 20 to 22°C 68 to 72°F



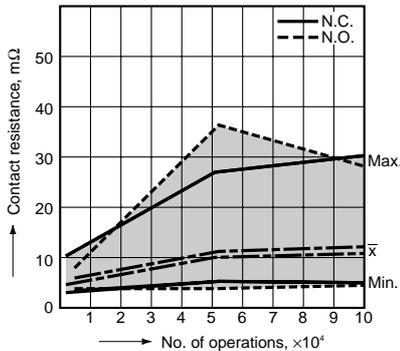
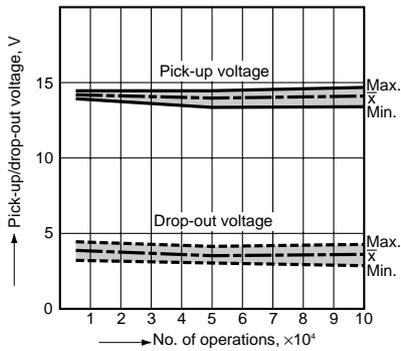
Sample: SP4-DC24V  
Ambient temperature: 27 to 29°C 81 to 84°F



Electrical life (SP2, 15 A 250 V AC resistive load)

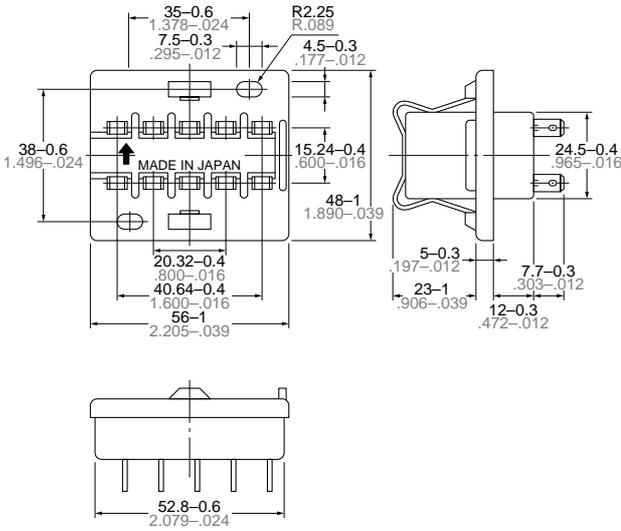


Electrical life (SP4, 10 A 250 V AC resistive load)

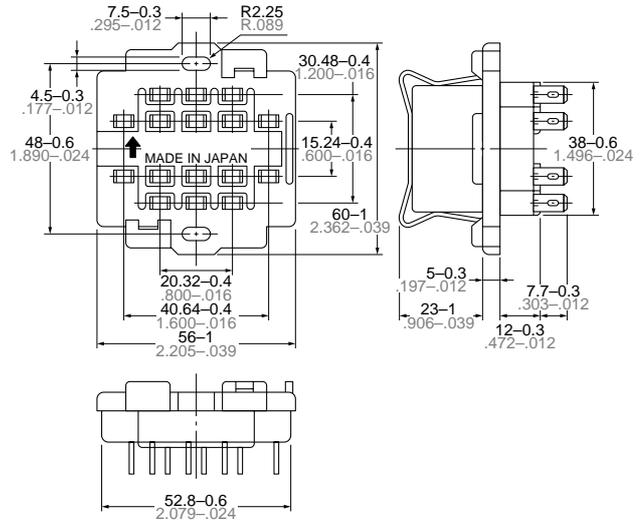


Soldering socket

SP2-SS

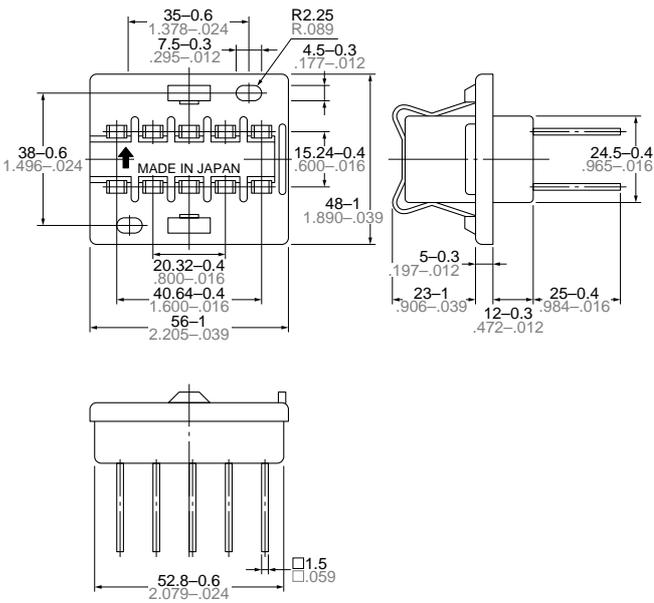


SP4-SS

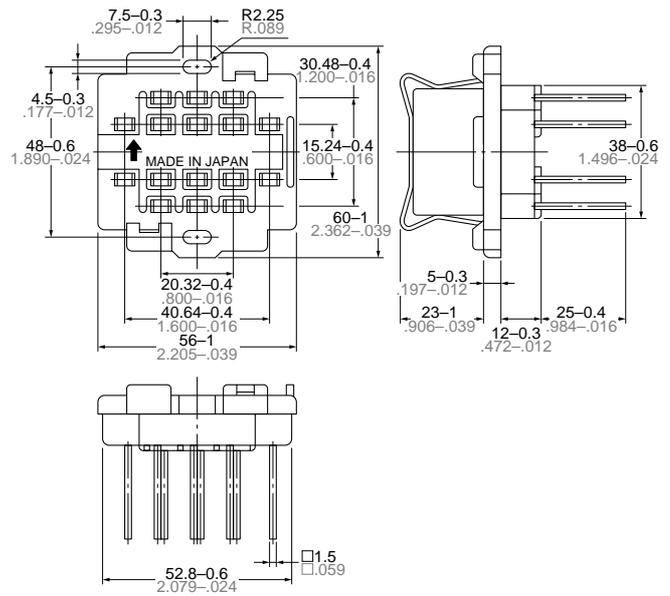


Wrapping socket

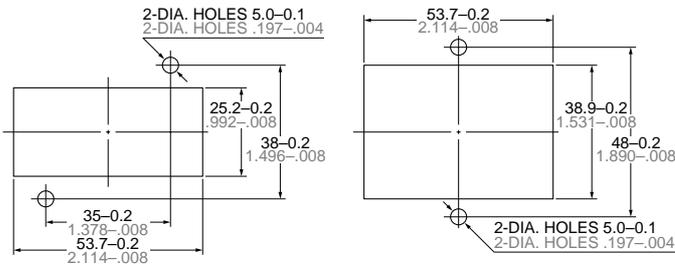
SP2-WS



SP4-WS



Mounting hole drilling diagram



Performance profile

Item	SP2, socket with solder	SP4, socket with solder	SP2, wrap- ping socket	SP4, wrap- ping socket
Withstand voltage	AC 3,000V, 1 min., between each terminal			
Insulation resistance	1,000 MΩ min			
Ambient working temperature	-50 to +60°C -58 to +140°F			
Maximum current, ON current	15 A	10 A	12 A	10 A

Note: Do not remove the relay while it is ON.

Notes:

- (1) Mounting screws and the fastening bracket are included in the package.
- (2) Mount the relay with the proper mounting direction — i.e. with the direction of the NAiS mark on top of the

relay case matching the direction of the NAiS mark on the terminal block. (The ; direction of the terminal block is the upward direction of the relay.)

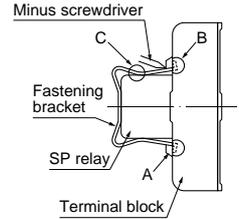
**Mounting and removal of fastening bracket**

**1. Mounting**

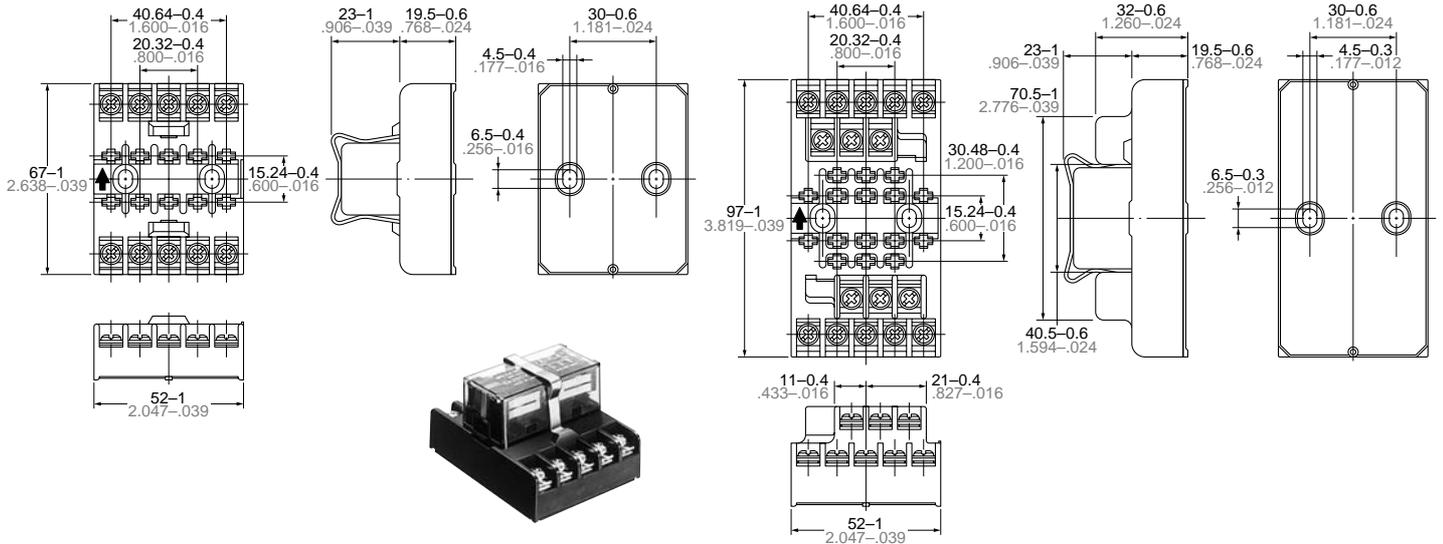
Insert the A part of the fastening bracket into the mounting groove of the socket, and then fit the B part into groove, while pressing with the tip of a minus screwdriver.

**2. Removal**

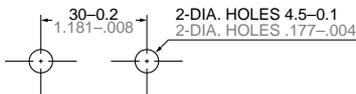
Slide the B part of the fastening bracket from the groove in the socket, while pressing with the tip of a minus screwdriver. While the bracket is in this position, keep pressing the C part of the bracket to the relay side with your finger, and lift up to the left side and remove from the groove, as in the diagram at right.



**Screw terminal socket**



**Mounting hole drilling diagram**



**Notes:**

- (1) Mounting screws and the fastening bracket are included in the package.
- (2) Mount the relay with the proper mounting direction — i.e. with the direction of the NAIS mark on top of the relay case matching the direction of the NAIS mark on the terminal block. (The ; direction of the terminal block is the upward direction of the relay.)

**Fastening bracket mounting and removal**

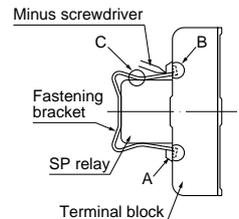
**1. Mounting**

Insert the A part of the fastening bracket into the mounting groove of the terminal block, and then fit the B part into groove, while pressing with the tip of a minus screwdriver.

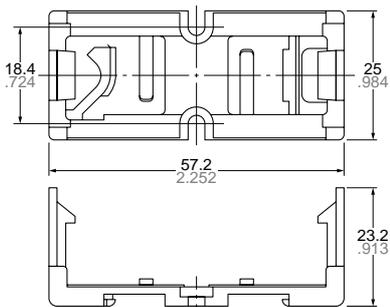
**2. Removal**

Slide the B part of the fastening bracket from the groove in the terminal block, while pressing with the tip of a minus screwdriver. While the bracket is in this position, keep pressing the C part of the bracket to the relay side with your finger,

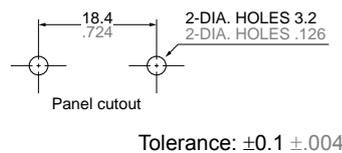
and lift up to the left side and remove from the groove, as in the diagram at right.



**Mounting plate**



The SP-Relay with SP-MA attached



Direct chassis mounting possible, and applicable to DIN rail. [DIN 46277 (35 mm width) is applicable.]

## Use method

- Both the SP relay 2c and 4c can be mounted to the mounting slats.
- Use the mounting slats either by attaching them directly to the chassis, or by mounting with a DIN rail.

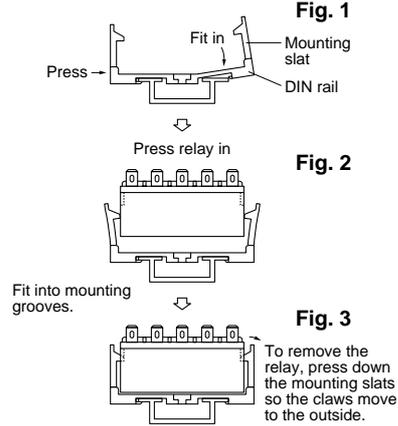
(A) When attaching directly to chassis  
Use two M3 screws.

For the mounting pitch, refer to the specification diagram.

(B) When mounting on a DIN rail  
Use a 35mm 1.378inch wide DIN rail (DIN46277).

The mounting method should be as indicated in the diagram at right.

## Method for mounting on DIN rail



- First fit the arc shaped claw of the mounting slat into the DIN rail.
- Press on the side as shown in the diagram below.
- Fit in the claw part on the opposite side.

### Precautions for use

When mounting to a DIN rail, use a commercially available fastening bracket if there is a need to stop sliding of the mounting slat in the rail direction.

**For Cautions for Use, see Relay Technical Information (see catalog).**