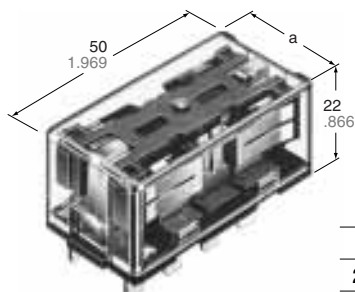


**Panasonic**  
ideas for life

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

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

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

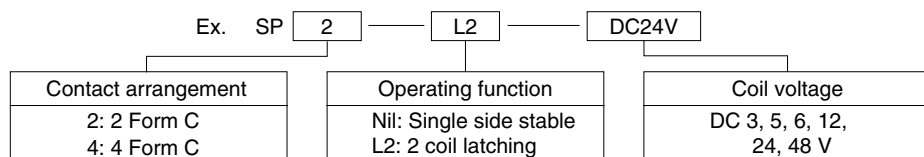
**Remarks**

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

**TYPICAL APPLICATIONS**

NC machines, remote control panels, sophisticated business equipment.

**ORDERING INFORMATION**



- (Notes) 1. PC board terminal types available as option. 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

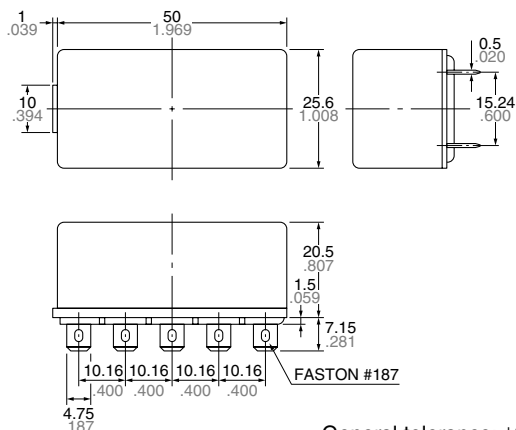
| Part No.     |              | Nominal voltage, V DC | Set and reset voltage, V DC (max.) | Nominal operating current, mA | Coil resistance, Ω (±10%) |         | Inductance, H (at 120 Hz) |              | Nominal operating power, mW | Maximum allowable voltage, V DC (40°C) |
|--------------|--------------|-----------------------|------------------------------------|-------------------------------|---------------------------|---------|---------------------------|--------------|-----------------------------|--|
| 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

mm inch

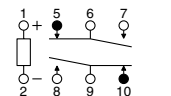
### 2 Form C

#### Plug-in terminal



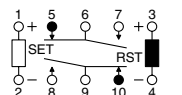
General tolerance:  $\pm 0.3 \pm 0.12$

#### Schematic (Bottom view) Single side stable



(Deenergized condition)

#### 2 coil latching

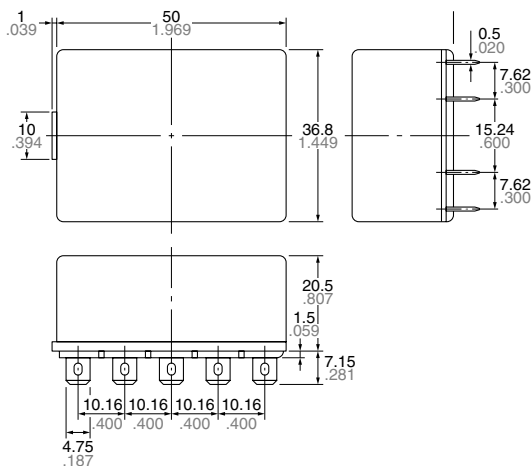


(Reset condition)

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

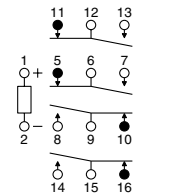
### 4 Form C

#### Plug-in terminal



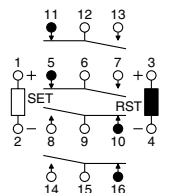
General tolerance:  $\pm 0.3 \pm 0.12$

#### Schematic (Bottom view) Single side stable



(Deenergized condition)

#### 2 coil latching

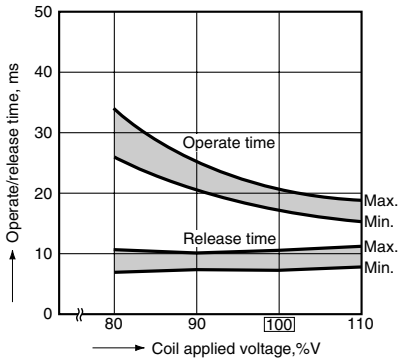


(Reset condition)

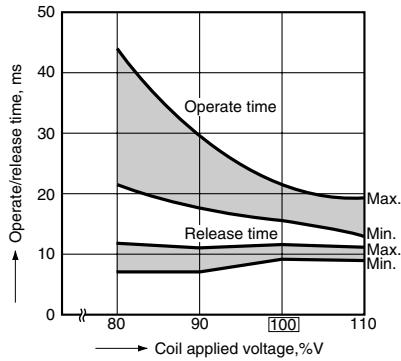
Diagram shows the "reset" position when terminals 3 and 4 are energized. Energize terminals 1 and 2 to transfer contacts.

# REFERENCE DATA

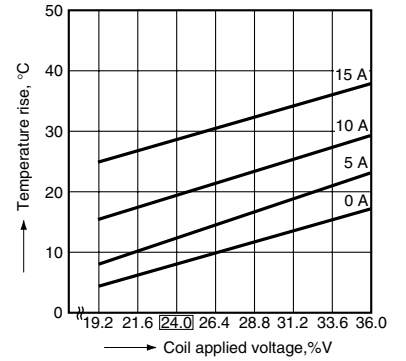
Operate and release time (Single side stable)  
SP2



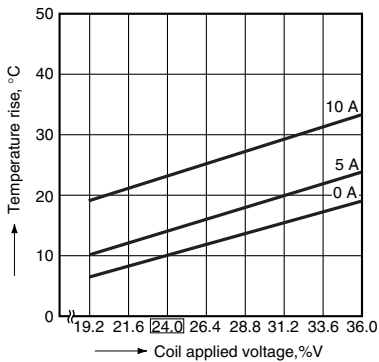
SP4



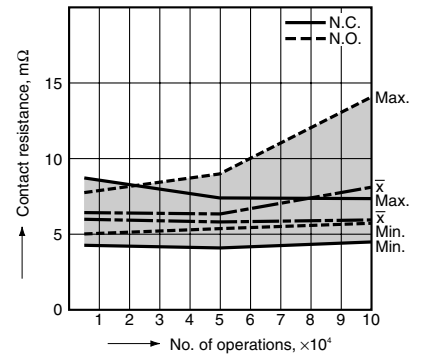
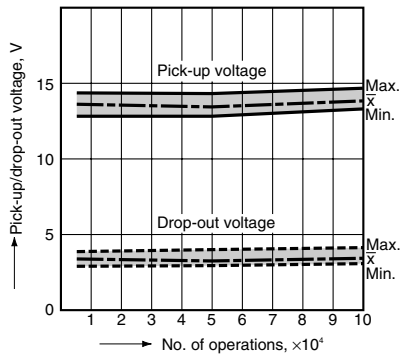
Coil temperature rise  
Sample: SP2-DC24V  
Ambient temperature: 20 to 22°C 68 to 72°F



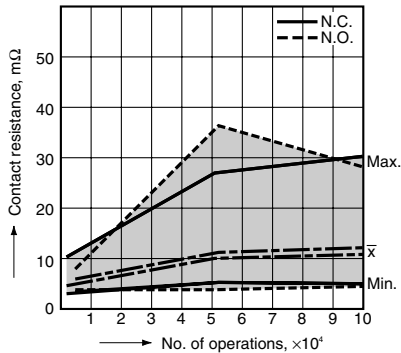
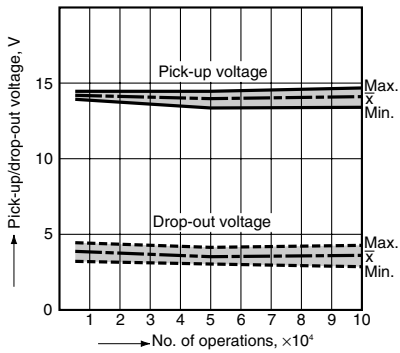
Sample: SP4-DC24V  
Ambient temperature: 27 to 29°C 81 to 84°F



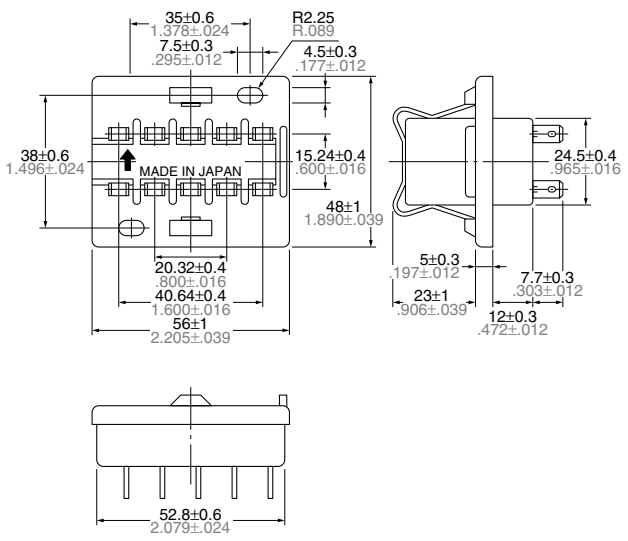
Electrical life (SP2, 15 A 250 V AC resistive load)



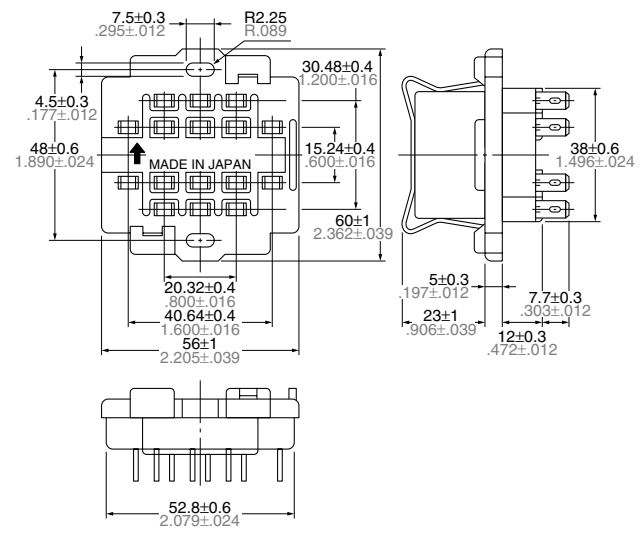
Electrical life (SP4, 10 A 250 V AC resistive load)



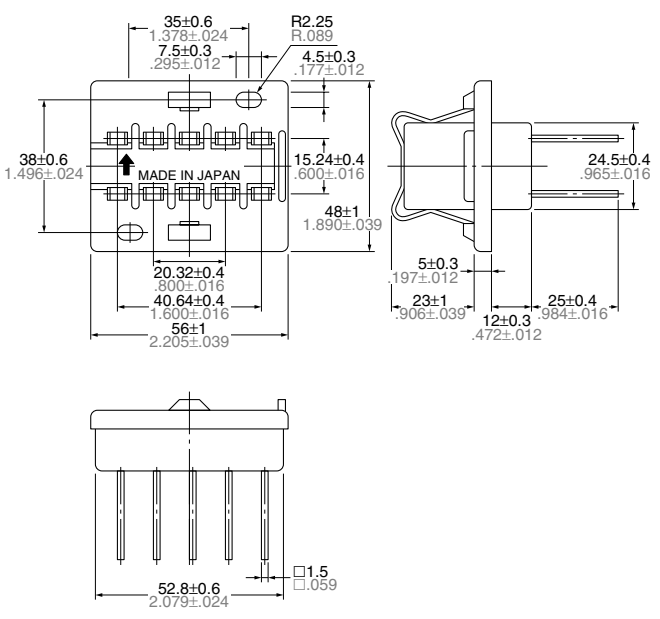
Soldering socket  
SP2-SS



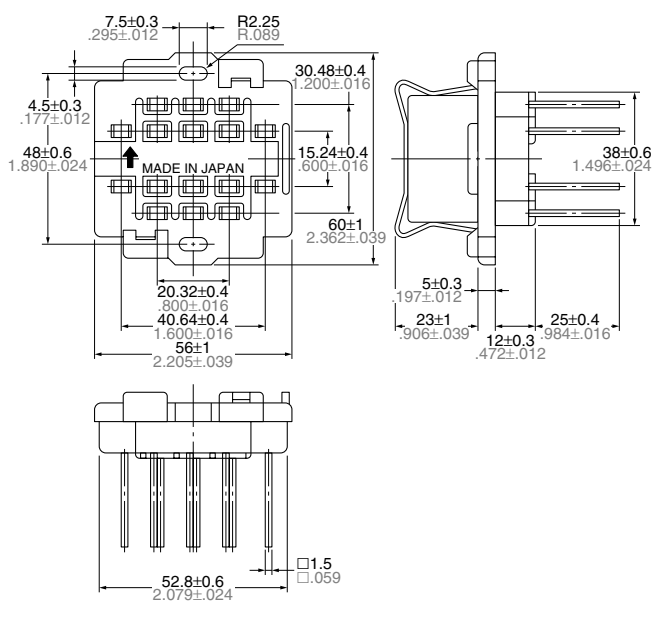
SP4-SS



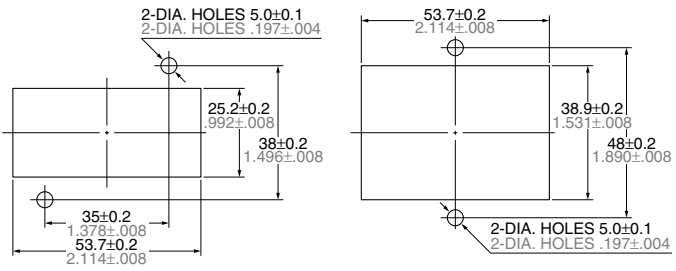
Wrapping socket  
SP2-WS



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.)

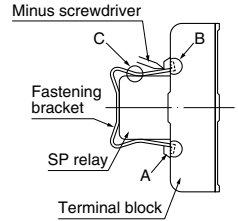
**Mounting and removal of fastening bracket**

**1. Mounting**

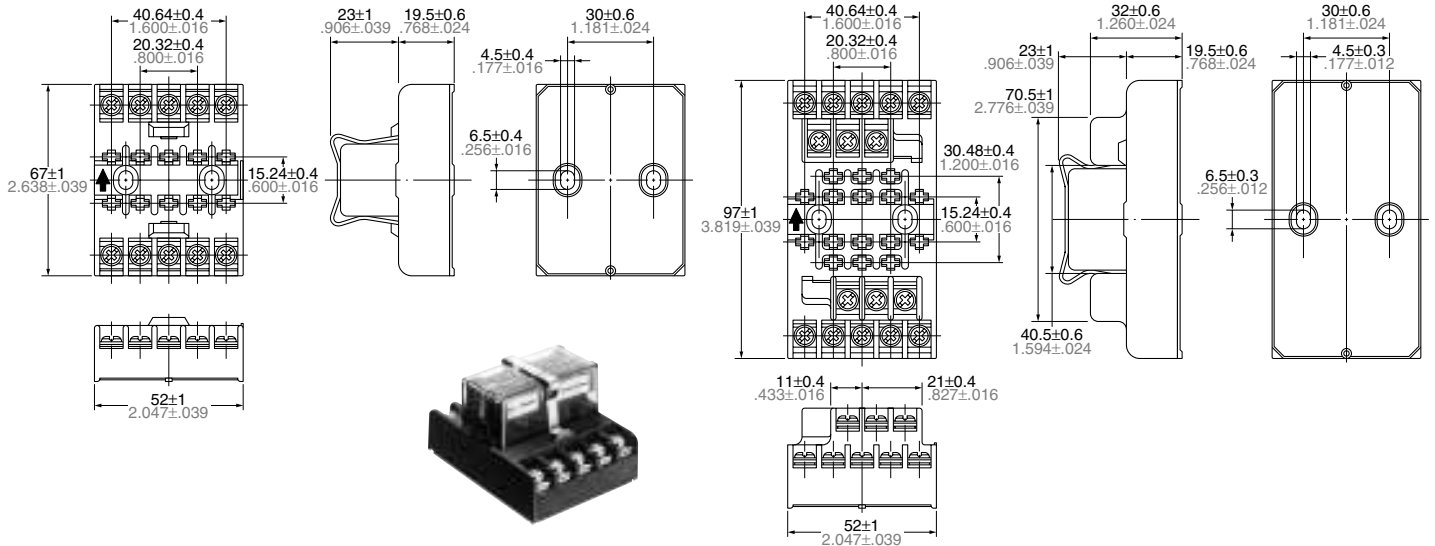
Insert the A part of the fastening bracket into the mounting groove of the socket, and then fit the B part into groove, while pressing with the tip of a minus screwdriver.

**2. Removal**

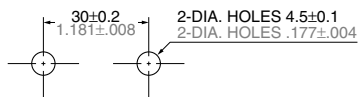
Slide the B part of the fastening bracket from the groove in the socket, while pressing with the tip of a minus screwdriver. While the bracket is in this position, keep pressing the C part of the bracket to the relay side with your finger, and lift up to the left side and remove from the groove, as in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

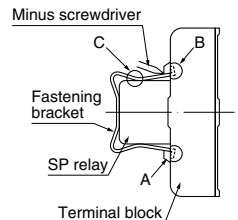
**1. Mounting**

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.

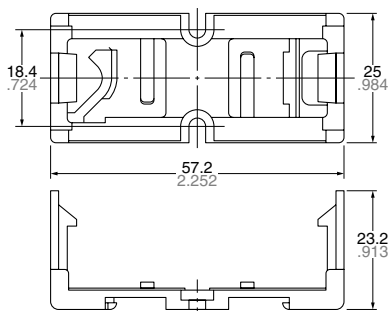
**2. Removal**

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,

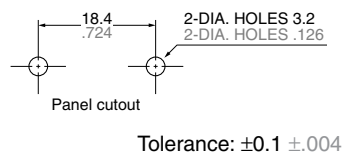
and lift up to the left side and remove from the groove, as in the diagram at right.



**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.

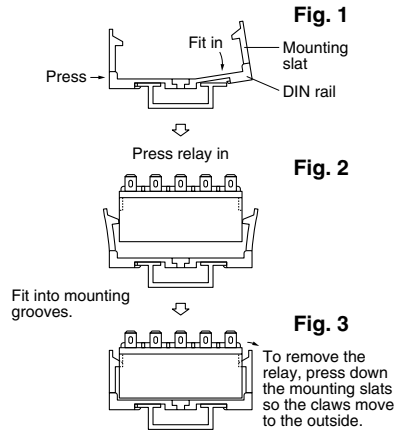
(A) When attaching directly to chassis  
Use two M3 screws.

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**