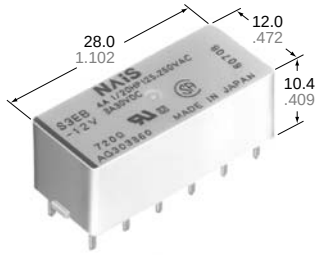
Panasonic
ideas for life

# 4 A CAPACITY, THE VARIETY OF CONTACT ARRANGEMENTS

# S RELAYS




mm inch

## FEATURES

- **The variety of contact arrangements 2 Form A 2 Form B, 3 Form A 1 Form B, 4 Form A**
- **Latching types available**
- **High sensitivity in small size 100 mW pick-up and 200 mW nominal operating power**
- **High shock and vibration resistance Shock: 50 G Vibration: 10 to 55 Hz at double amplitude of 3 mm .118 inch**
- **Wide switching range From 100μA 100 mV DC to 4 A 250 V AC**
- **Low thermal electromotive force Approx. 3 μV**
- **Dual-In-Line packaging arrangement**

## SPECIFICATIONS

### Contacts

| | | | |
|---|---|---|---|
| Arrangement | | | 2 Form A 2 Form B, 3 Form A 1 Form B, 4 Form A |
| Initial contact resistance, max. (By voltage drop 6 V DC 1 A) | | | 50 mΩ |
| Initial contact pressure | | | Approx. 12 g .42 oz |
| Contact material | | | Gold clad silver alloy |
| Electrostatic capacitance | | | Approx. 3pF |
| Thermal electromotive force (at nominal coil voltage) | | | Approx. 3μV |
| Rating (resistive) | Nominal switching capacity | | 4 A 250 V AC, 3 A 30 V DC |
| | Maximum switching power | | 1,000 VA, 90 W |
| | Maximum switching voltage | | 250 V AC, 30 V DC (48 VDC at less than 0.5 A) |
| | Max. switching current | | 4 A (AC), 3 A (DC) |
| | Min. switching capacity**1 | | 100μA 100 m V DC |
| Expected life (min. operations) | Mechanical (at 50 cps) | | $10^8$ |
| | Electrical (at 20 cpm) | 4 A 250 V AC | $10^5$ |
| | | 3 A 30 V DC | $2 \times 10^5$ |

### Coil (polarized) (at 20°C 68°F)

| | | |
|---|---|---|
| Single side stable | Minimum operating power | Approx. 100 mW |
| | Nominal operating power | Approx. 200 mW |
| Latching | Minimum set and reset | Approx. 100 mW |
| | Nominal set and reset | Approx. 200 mW |

**Notes:**

**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: 10mA
*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 (see catalog).

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

| | | | |
|---|---|---|---|
| Max. operating speed | | | 20 cpm for maximum load, 50 cps for low-level load (1 mA 1 V DC) |
| Initial insulation resistance*1 | | | 10,000 MΩ at 500 V DC |
| Initial breakdown voltage*2 | Between open contacts | | 750 Vrms |
| | Between contact sets | | 1,000 Vrms |
| | Between contacts and coil | | 1,500 Vrms |
| Operate time*3 (at nominal voltage)(at 20°C) | | | Max. 15 ms (Approx. 8 ms) |
| Release time (without diode)*3 (at nominal voltage)(at 20°C) | | | Max. 10 ms (Approx. 5 ms) |
| Set time*3 (latching) (at nominal voltage)(at 20°C) | | | Max. 15 ms (Approx. 8 ms) |
| Reset time*3 (latching) (at nominal voltage)(at 20°C) | | | Max. 15 ms (Approx. 8 ms) |
| Initial contact bounce, max. | | | 1 ms |
| Temperature rise (at nominal voltage)(at 20°C) | | | Max. 35°C with nominal coil voltage and at maximum switching current |
| Shock resistance | Functional*4 | | Min. 490 m/s² {50 G} |
| | Destructive*5 | | Min. 980 m/s² {100 G} |
| Vibration resistance | Functional*6 | | 176.4 m/s² {18 G}, 10 to 55 Hz at double amplitude of 3 mm |
| | Destructive | | 235.2 m/s² {24 G}, 10 to 55 Hz at double amplitude of 4 mm |
| Conditions for operation, transport and storage*7 (Not freezing and condensing at low temperature) | | Ambient temp. | –40°C to +65°C –40°F to +149°F |
| | | Humidity | 5 to 85% R.H. |
| Unit weight | | | Approx. 8 g .28 oz |

## TYPICAL APPLICATIONS

Telecommunications equipment, data processing equipment, facsimiles, alarm equipment, measuring equipment.

# ORDERING INFORMATION

Ex. S — 2 — L2 — 48 V

| Product name | Contact arrangement | Operating function | Coil voltage, V DC |
|---|---|---|---|
| S | 2: 2 Form A 2 Form B<br>3: 3 Form A 1 Form B<br>4: 4 Form A | Nil: Single side stable<br>L: 1 coil latching<br>L2: 2 coil latching | 3, 5, 6,12, 24, 48 |

Notes: 1) Standard packing; Carton 50 pcs. Case 500 pcs.
2) UL/CSA approved type is standard.

# TYPES AND COIL DATA at 20°C 68°F

**Single side stable**

| Type | Nominal voltage, V DC | Pick-up voltage, V DC (max.) | Drop-out voltage, V DC (min.) | Nominal operating current, mA | Coil resistance, Ω (±10%) | Inductance, mH | Nominal operating power, mW | Maximum allowable voltage, V DC (40°C) |
|---|---|---|---|---|---|---|---|---|
| S❑-3V | 3 | 2.1 | 0.3 | 66.7 | 45 | 23 | 200 | 5.5 |
| S❑-5V | 5 | 3.5 | 0.5 | 38.5 | 130 | 65 | 192 | 9.0 |
| S❑-6V | 6 | 4.2 | 0.6 | 33.3 | 180 | 93 | 200 | 11.0 |
| S❑-12V | 12 | 8.4 | 1.2 | 16.7 | 720 | 370 | 200 | 22.0 |
| S❑-24V | 24 | 16.8 | 2.4 | 8.4 | 2,850 | 1,427 | 202 | 44.0 |
| S❑-48V | 48 | 33.6 | 4.8 | 5.6 | 8,500 | 3,410 | 271 | 75.0 |

**1 coil latching**

| Type | Nominal voltage, V DC | Pick-up voltage, V DC (max.) | Drop-out voltage V DC (min.) | Nominal operating current, mA | Coil resistance, Ω (±10%) | Inductance, mH | Nominal operating power, mW | Maximum allowable voltage, V DC (40°C) |
|---|---|---|---|---|---|---|---|---|
| S❑-L1-3V | 3 | 2.1 | 0.3 | 33 | 90 | 0.04 | 99 | 8.4 |
| S❑-L1-5V | 5 | 3.5 | 0.5 | 16 | 300 | 0.14 | 80 | 15.3 |
| S❑-L1-6V | 6 | 4.2 | 0.6 | 16 | 360 | 0.14 | 96 | 16.8 |
| S❑-L1-12V | 12 | 8.4 | 1.2 | 8 | 1450 | 0.6 | 96 | 33.7 |
| S❑-L1-24V | 24 | 16.8 | 2.4 | 4 | 5700 | 2.05 | 96 | 66.7 |
| S❑-L1-48V | 48 | 33.6 | 4.8 | 3 | 16,000 | 8.9 | 144 | 111 |

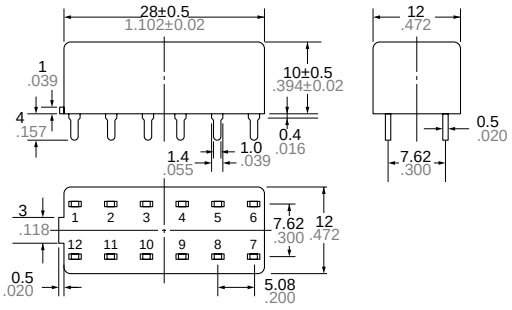
**2 coil latching**

| Type | Nominal voltage, V DC | Set and reset voltage, V DC (max.) | Nominal operating current, mA | Coil resistance, Ω (±10%) | | Inductance, mH | | Nominal operating power, mW | Maximum allowable voltage, V DC (40°C) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Coil I | Coil II | Coil I | Coil II | | |
| S❑-L2-3V | 3 | 2.1 | 66.7 | 45 | 45 | 10 | 10 | 200 | 5.5 |
| S❑-L2-5V | 5 | 3.5 | 38.5 | 130 | 130 | 31 | 31 | 192 | 9.0 |
| S❑-L2-6V | 6 | 4.2 | 33.7 | 180 | 180 | 40 | 40 | 200 | 11.0 |
| S❑-L2-12V | 12 | 8.4 | 16.7 | 720 | 720 | 170 | 170 | 200 | 22.0 |
| S❑-L2-24V | 24 | 16.8 | 8.4 | 2,850 | 2,850 | 680 | 680 | 202 | 44.0 |
| S❑-L2-48V | 48 | 33.6 | 7.4 | 6,500 | 6,500 | 1,250 | 1,250 | 355 | 65.0 |

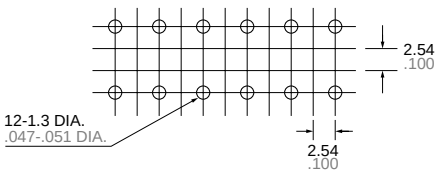
Note: Insert 2, 3 or 4 in ❑ for contact form required.

# DIMENSIONS

mm inch




PC board pattern (Copper-side view)



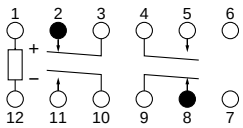

General tolerance: ±0.3 ±.012

Tolerance: ±0.1 ±.003

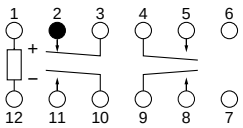
## Schematic (Bottom view)

**Single side stable**
**Deenergized position**

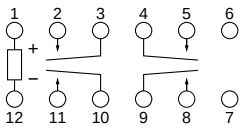
2a2b




3a1b

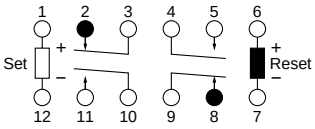



4a

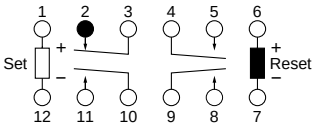



**2 coil latching**
Diagram shows the "reset" position when terminals 6 and 7 are energized. Energize terminals 1 and 12 to transfer contacts.

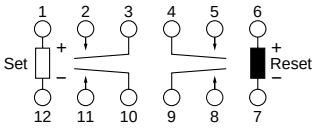
2a2b




3a1b

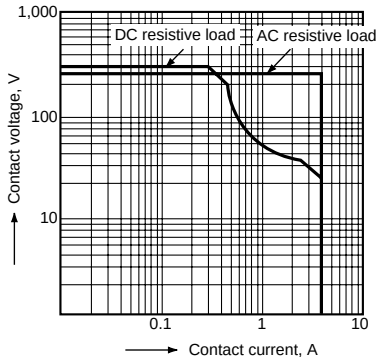



4a

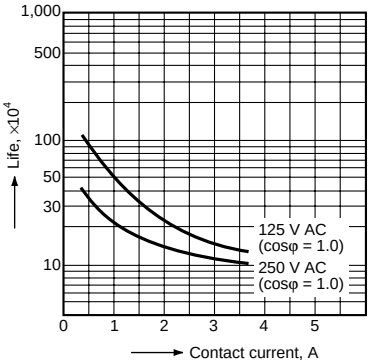



# REFERENCE DATA

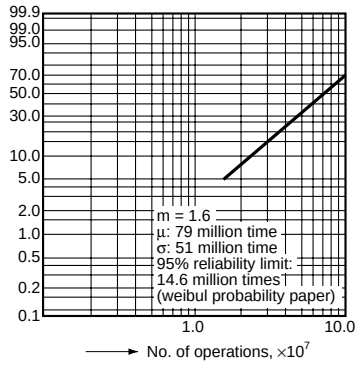
1. Maximum switching power



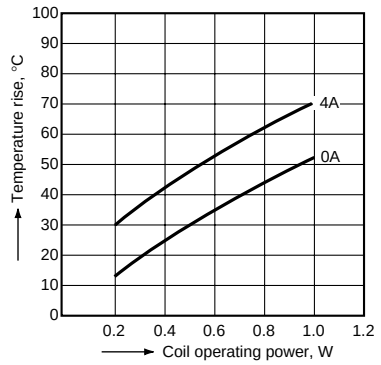

2. Life curve



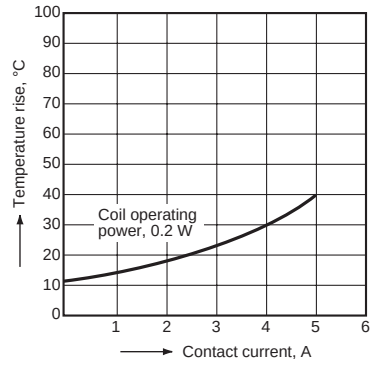

3. Contact reliability
Condition: 1V DC, 1mA
Detection level 10 Ω
Tasted Sample: S4-24V, 10pcs



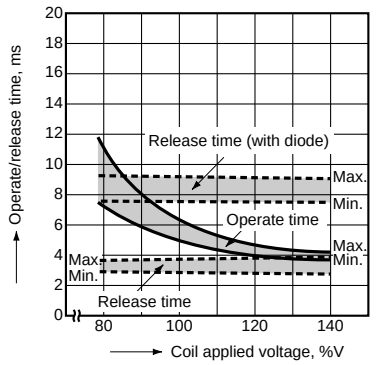

4.-(1) Coil temperature rise
Tested Sample: S4-24V, 4 Form A



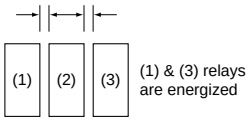

4.-(2) Coil temperature rise
Tested Sample: S4-24V, 4 Form A



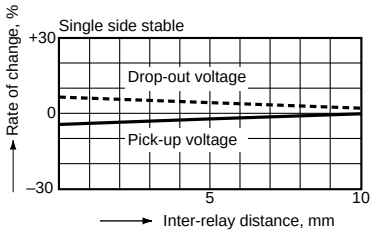

5. Operate and release time
(Single side stable type)
Tested Sample: S4-24V, 10pcs

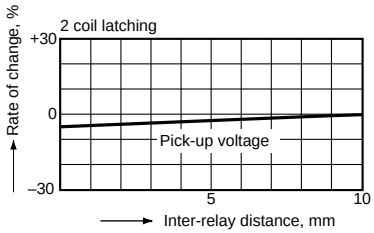



6. Influence of adjacent mounting

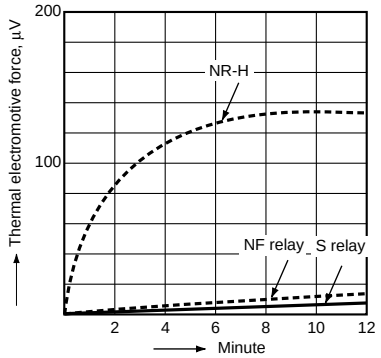



Note: When installing an S-relay near another, and there is no effect from an external magnetic field, be sure to leave at least 10 mm .394 inch between relays in order to achieve the performance listed in the catalog.

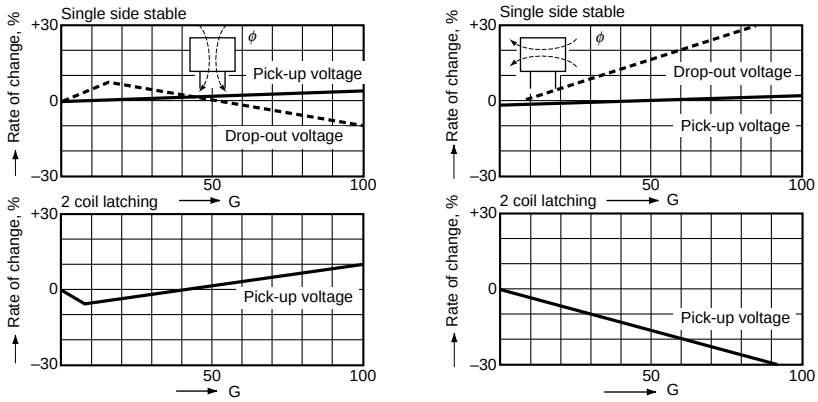


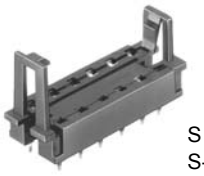

7. Thermal electromotive force



8. Effect from an external magnetic field




# ACCESSORIES



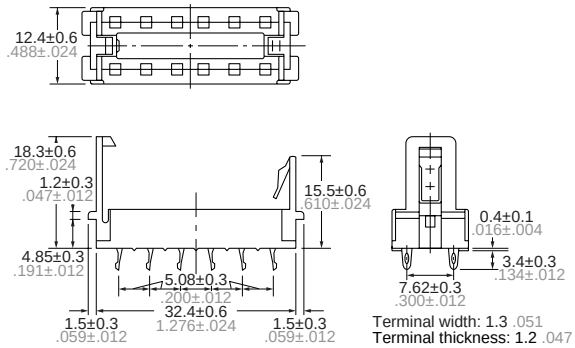
S Relay Socket, S-PS

**Specifications**

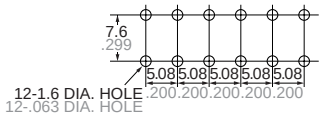
| | |
|---|---|
| Breakdown voltage | 1,500 Vrms between terminals |
| Insulation resistance | More than 100 MΩ between terminals at 500 V DC Mega |
| Heat resistance | 150 ±3°C (302 ±5.4°F) for 1 hour. |
| Maximum continuous current | 4 A |

(Note: Don't insert or remove relays while in the energized condition.)

**Dimensions** mm inch




PC board pattern (Copper-side view)




**Inserting and removing method**

Inserting method: Insert the relay as shown in Fig. 1 unit the rib of the relay snaps into the clip of the socket.

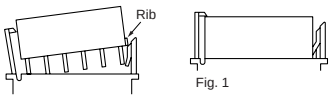



Fig. 1

Removing method:
(1) Remove the relay straight from the socket holding the shaded portion of the relay as shown in Fig. 2.

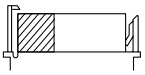


Fig. 2

(2) When sockets are mounted in close proximity, use a slotted screw driver as shown in Fig. 3.

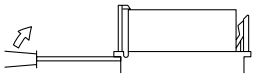
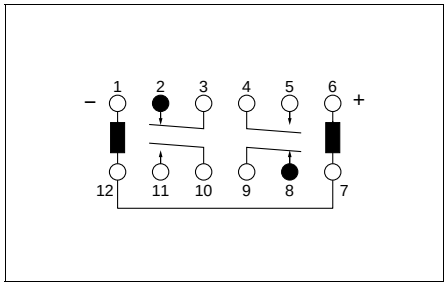


Fig. 3

## NOTES

1. Special use of 2 coil latching types: 2 ways can be considered if 2 coil latching types are used as 1 coil latching types.
(A) Reverse polarity is applied to the set coil of 2 coil latching type.
(B) By shorting terminals 12 and 7, apply plus to 1, minus to 6 at set and plus to 6, minus to 1 at reset. Applied coil voltage should be the same as the nominal. Operating power will be reduced to one-half.

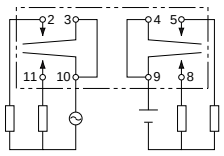
Reset position of 2a2b type




2. Soldering operations should be accomplished as quick as possible; within 10 seconds at 250°C 482°F solder temperature or 3 seconds at 350°C 662°F. The header portion being sealed with epoxy resin, undue subjection to heat may cause loss of seal. Solder should not be permitted to remain on the header.

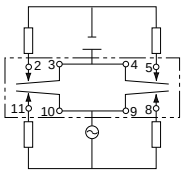
## CAUTIONS FOR USE

Based on regulations regarding insulation distance, there is a restriction on same-channel load connections between terminals No. 2, 3 and 4, 5, as well as between No. 8, 9 and 10, 11. See the figure below for an example.




● Between 2, 3 and 4, 5: different channels, therefore not possible
● Between 10, 11 and 8, 9: different channels, therefore not possible

**No good**




● Between 2, 3 and 4, 5: same channels, therefore possible
● Between 10, 11 and 8, 9: same channels, therefore possible

**Good**

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