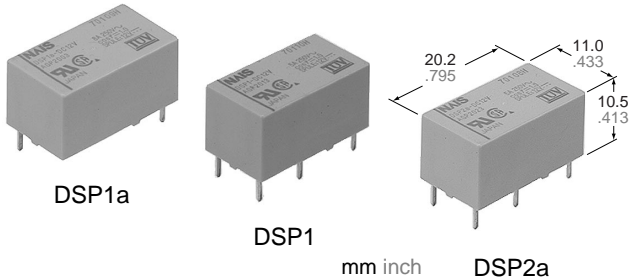


NAIS

MINIATURE POWER RELAY IN DS RELAY SERIES

DSP- RELAYS



FEATURES

- Power types added to DS relay series
- High switching capacity: 1a: 8 A 250 V AC / 1a1b, 2a: 5 A 250 V AC
- High sensitivity: 190 mW pick-up power
- High contact welding resistance
- Latching types available
- High breakdown voltage 3,000 Vrms between contacts and coil
1,000 Vrms between open contacts Meeting FCC Part 68
- Sealed types are standard

SPECIFICATIONS

Contact

| | | | |
|---|---------------------------------|-------------------------|-------------------|
| Arrangement | 1a | 1a1b | 2a |
| Contact material | Gold flash over silver alloy | | |
| Initial contact resistance, max. (By voltage drop 6 V DC 1A) | 30 mΩ | | |
| Nominal switching capacity | 8A 250 VAC 5A 30 VDC | 5A 250 VAC 5A 30 VDC | |
| | Max. switching power | 2,000 VA 150 W | 1,250 VA 150 W |
| Rating (resistive) | Max. switching voltage | 250 V AC, 30 V DC | |
| | Max. switching current | 8 A | 5 A |
| | Expected life (min. operations) | Mechanical (at 180 cpm) | 5×10 ⁷ |
| Electrical | | 10 ⁵ | |

Coil (polarized) (at 20°C 68°F)

| | | |
|-------------------------|--------------------|--------|
| Minimum operating power | Single side stable | 192 mW |
| | 2 coil latching | 192 mW |
| Nominal operating power | Single side stable | 300 mW |
| | 2 coil latching | 300 mW |

Note: All specifications are based on the condition of 25°C 77°F, 50% R.H. unless otherwise specified.

Characteristics

| | | |
|--|--|--|
| Max. operating speed | 30 cps. at rated load | |
| Initial insulation resistance*1 | Min. 1,000 MΩ at 500 V DC | |
| Initial breakdown voltage*2 | Between open contacts | 1,000 Vrms |
| | Between contact sets | 2,000 Vrms (1a1b, 2a) |
| | Between contacts and coil | 3,000 Vrms |
| Surge voltage between contacts and coil | Min. 5,000 V | |
| Set time*3 (at nominal voltage) | Max. 10 ms (Approx. 5 ms) | |
| Reset time*3 (at nominal voltage) | Max. 10 ms (Approx. 4 ms) | |
| Operate time*3 (at nominal voltage) | Max. 10 ms (Approx. 5 ms) | |
| Release time(without diode)*3 (at nominal voltage) | Max. 5 ms (Approx. 4 ms) | |
| Temperature rise | Max. 40°C (1a1b type) | |
| | Max. 55°C (1a, 2a types) | |
| Soldering temperature | 250°C (10 s) 300°C (5 s), 350°C (3 s) | |
| Shock resistance | Functional*4 | Min. 196 m/s ² {20 G} |
| | Destructive*5 | Min. 980 m/s ² {100 G} |
| Vibration resistance | Functional*6 | 117.6 m/s ² {12 G}, 10 to 55 Hz at double amplitude of 2 mm |
| | Destructive | 205.8 m/s ² {21 G}, 10 to 55 Hz at double amplitude of 3.5 mm |
| Conditions for operation, transport and storage*7 (Not freezing and condensing at low temperature) | -40°C to +65°C - 40°F 149°F | |
| Unit weight | Approx. 4.3 g .15 oz | |

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 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 61).

TYPICAL APPLICATIONS

- Office and industrial electronic devices
- Terminal devices of information processing equipment, such as printer, data recorder.
- Office equipment (copier, facsimile)
- Measuring instruments
- NC machines, temperature controllers and programmable logic controllers.

ORDERING INFORMATION

Ex. DSP 1 — L — DC12V — R

| Contact arrangement | Operating function | Coil voltage | Polarity |
|-----------------------------|--|-----------------------------|---|
| 1: 1a1b 1a: 1a 2a: 2a | Nil: Single side stable L2: 2 coil latching | DC: 3, 5, 6, 9, 12, 24 V | Nil: Standard polarity R: Reverse polarity |

(Note) Standard packing—Carton: 50 pcs.; Case: 500 pcs.
UL/CSA, VDE approved type is standard.

TYPES AND COIL DATA (at 20°C 68°F)

Single side stable

| Type | Part No. | Nominal voltage, V DC | Pick-up voltage, V DC (max.) | Drop-out voltage, V DC (min.) | Nominal operating current, mA | Nominal operating power, mW | Coil resistance, Ω (±10%) | Max. allowable voltage, at 50°C, V DC |
|--------------------|------------|-----------------------|------------------------------|-------------------------------|-------------------------------|-----------------------------|---------------------------|---------------------------------------|
| Single side stable | DSP□-DC3V | 3 | 2.4 | 0.3 | 100 | 300 | 30 | 3.9 |
| | DSP□-DC5V | 5 | 4.0 | 0.5 | 60 | 300 | 83 | 6.5 |
| | DSP□-DC6V | 6 | 4.8 | 0.6 | 50 | 300 | 120 | 7.8 |
| | DSP□-DC9V | 9 | 7.2 | 0.9 | 33.3 | 300 | 270 | 11.7 |
| | DSP□-DC12V | 12 | 9.6 | 1.2 | 25 | 300 | 480 | 15.6 |
| | DSP□-DC24V | 24 | 19.2 | 2.4 | 12.5 | 300 | 1,920 | 31.2 |

2 coil latching

| Type | Part No. | Nominal voltage, V DC | Set voltage, V DC (max.) | Reset voltage, V DC (max.) | Nominal operating current, mA | Nominal operating power, mW | Coil resistance, Ω (±10%) | Max. allowable voltage, at 50°C, V DC |
|-----------------|---------------|-----------------------|--------------------------|----------------------------|-------------------------------|-----------------------------|---------------------------|---------------------------------------|
| 2 coil latching | DSP□-L2-DC3V | 3 | 2.4 | 2.4 | 100 | 300 | 30 | 3.9 |
| | DSP□-L2-DC5V | 5 | 4.0 | 4.0 | 60 | 300 | 83 | 6.5 |
| | DSP□-L2-DC6V | 6 | 4.8 | 4.8 | 50 | 300 | 120 | 7.8 |
| | DSP□-L2-DC9V | 9 | 7.2 | 7.2 | 33.3 | 300 | 270 | 11.7 |
| | DSP□-L2-DC12V | 12 | 9.6 | 9.6 | 25.5 | 300 | 480 | 15.6 |
| | DSP□-L2-DC24V | 24 | 19.2 | 19.2 | 12.5 | 300 | 1,920 | 31.2 |

Note: Insert 1a, 1 or 2a in, 2 □ for contact form required.

DIMENSIONS

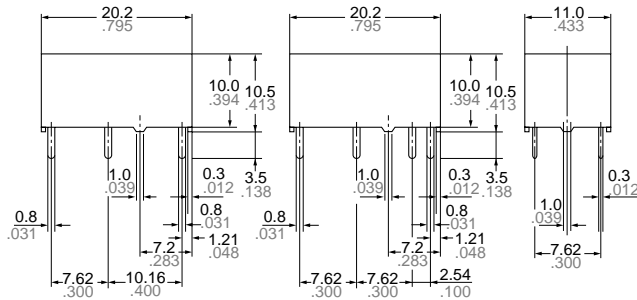
mm inch

1a type (DSP1a)



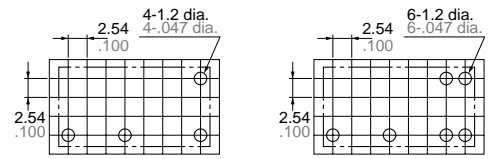
Single side stable
1 coil latching

2 coil latching



General tolerance: ±0.3 ± .012

PC board pattern (Copper-side view)
Single side stable 2 coil latching

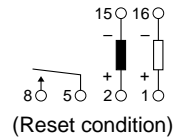
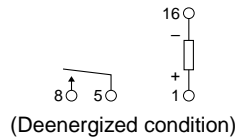


Tolerance: ±0.1 ± .004

Schematic (Bottom view)

Single side stable

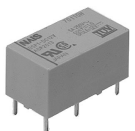
2 coil latching



(Deenergized condition)

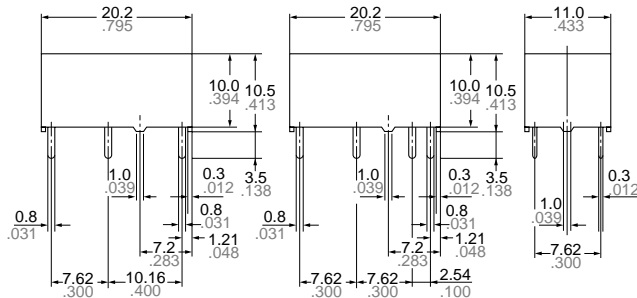
(Reset condition)

1a1b type (DSP1)



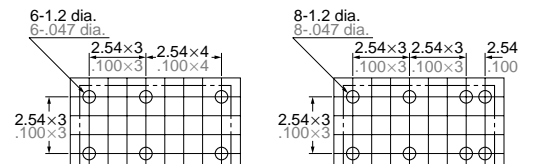
Single side stable
1 coil latching

2 coil latching



General tolerance: ±0.3 ± .012

PC board pattern (Copper-side view)
Single side stable 2 coil latching

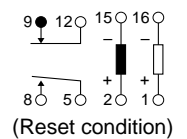
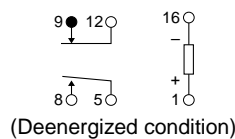


Tolerance: ±0.1 ± .004

Schematic (Bottom view)

Single side stable

2 coil latching

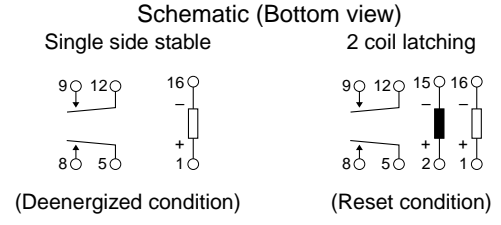
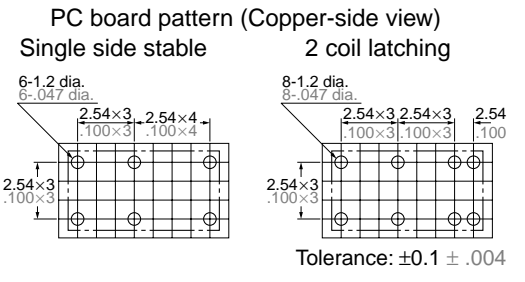
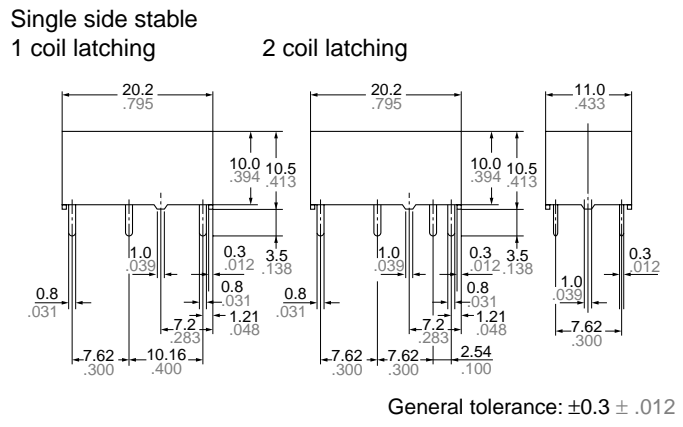
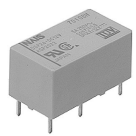


(Deenergized condition)

(Reset condition)

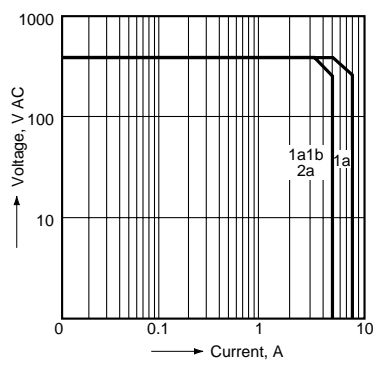
2a type (DSP2a)

mm inch

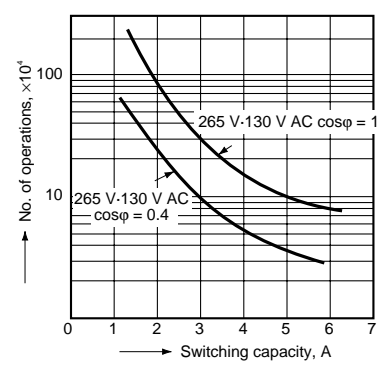


REFERENCE DATA

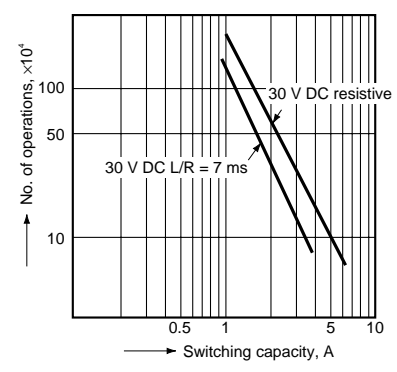
1. Max. switching capacity



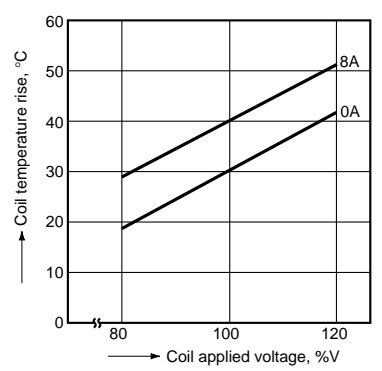
2.-(1) Life curve (1a1b type)



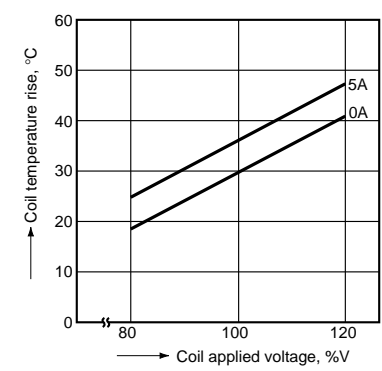
2.-(2) Life curve (1a1b type)



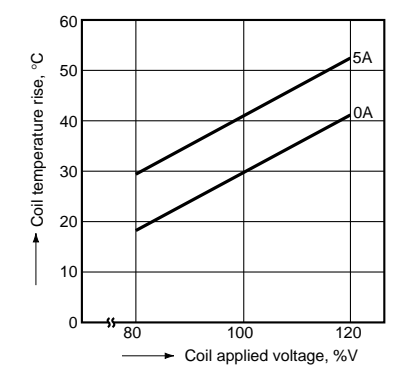
3.-(1) Coil temperature rise (1a type)
Sample: DSP1a-DC12V, 5 pcs.



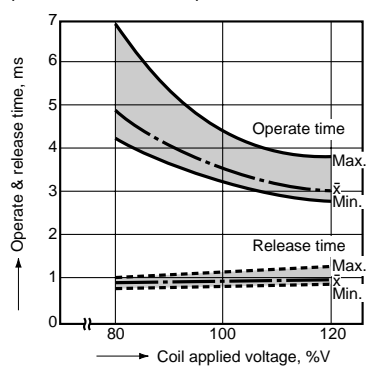
3.-(2) Coil temperature rise (1a1b type)
Sample: DSP1-DC12V, 5 pcs.



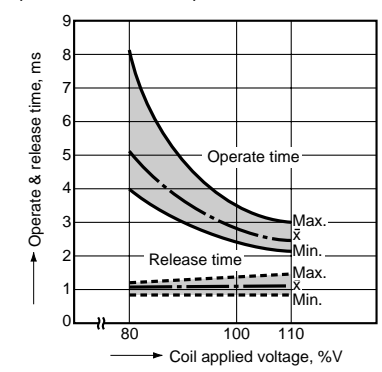
3.-(3) Coil temperature rise (2a type)
Sample: DSP2a-DC12V, 5 pcs.



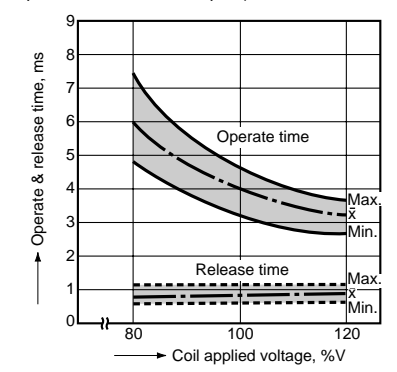
4.-(1) Operate & release time (without diode, 1a type)
Sample: DSP1a-DC12V, 5 pcs.



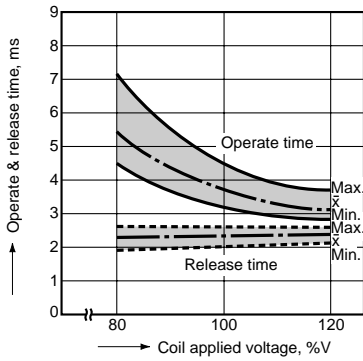
4.-(2) Operate & release time (without diode, 1a1b type)
Sample: DSP1-DC12V, 5 pcs.



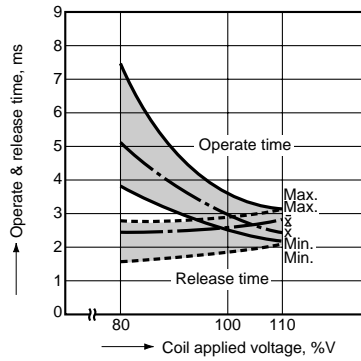
4.-(3) Operate & release time (without diode, 2a type)
Sample: DSP2a-DC12V, 5 pcs.



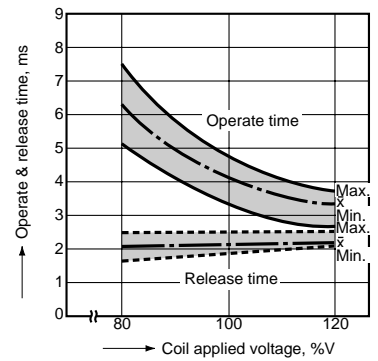
4.-(4) Operate & release time
(with diode, 1a type)
Sample: DSP1a-DC12V, 5 pcs.



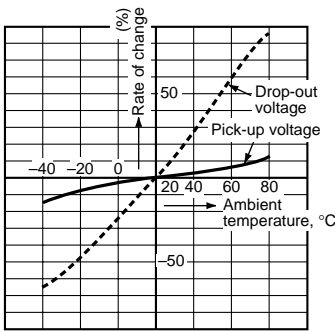
4.-(5) Operate & release time
(with diode, 1a1b type)
Sample: DSP1-DC12V, 5 pcs.



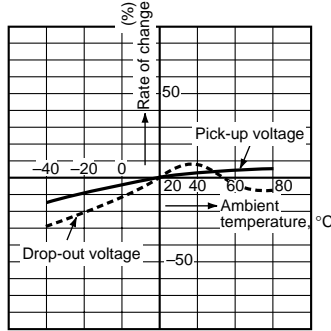
4.-(6) Operate & release time
(with diode, 2a type)
Sample: DSP2a-DC12V, 5 pcs.



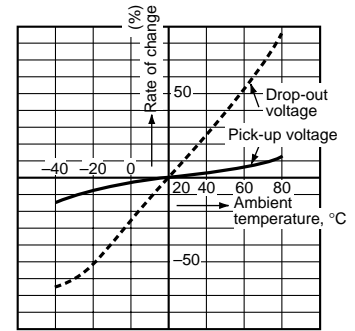
5.-(1) Change of pick-up and drop-out voltage
(1a type)
Sample: DSP1a-DC12V, 5 pcs.



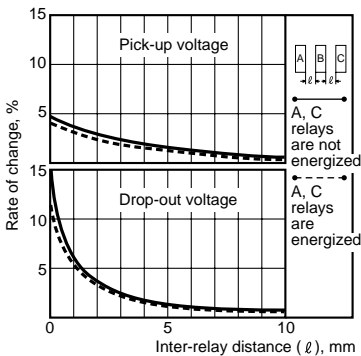
5.-(2) Change of pick-up and drop-out voltage
(1a1b type)
Sample: DSP1-DC12V, 5 pcs.



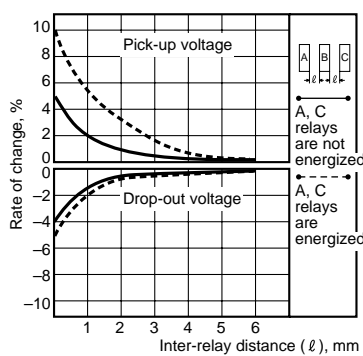
5.-(3) Change of pick-up and drop-out voltage
(2a type)
Sample: DSP2a-DC12V, 5 pcs.



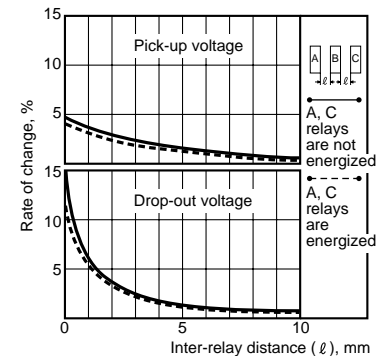
6.-(1) Influence of adjacent mounting
(1a type)
Sample: DSP1a-DC12V, 5 pcs.



6.-(2) Influence of adjacent mounting
(1a1b type)
Sample: DSP1-DC12V, 5 pcs.



6.-(3) Influence of adjacent mounting
(2a type)
Sample: DSP2a-DC12V, 5 pcs.



NOTE

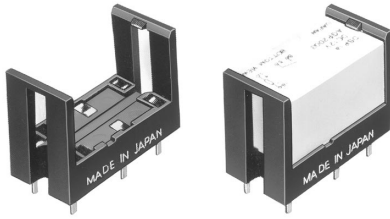
Soldering should be done under the following conditions:

- 250°C 482°F within 10 s
- 300°C 572°F within 5 s
- 350°C 662°F within 3 s

For Cautions for Use, see Relay Technical Information (Page 48 to 76).

SOCKETS FOR DSP RELAYS

TYPES AND APPLICABLE RELAYS



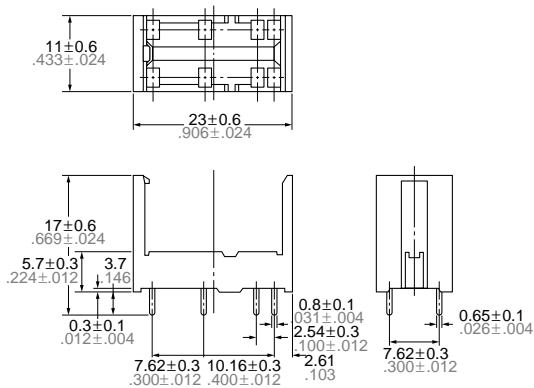
| Applicable relays | Type No. | For DSP1a | | For DSP1a, DSP1, DSP2a | |
|-------------------|----------|-----------|------------|------------------------|------------|
| | | DSP1a-PS | DSP1a-PSL2 | DSP2a-PS | DSP2a-PSL2 |
| DSP1a relays | | OK | OK | OK | OK |
| DSP1a-L2 relays | | | OK | | OK |
| DSP1 relays | | | | OK | OK |
| DSP1-L2 relays | | | | | OK |
| DSP2a relays | | | | OK | OK |
| DSP2a-L2 relays | | | | | OK |

SPECIFICATIONS

| Item | Specifications |
|-------------------------|---|
| Breakdown voltage | 3,000 Vrms between terminals (Except for the portion between coil terminals) |
| Insulation resistance | 1,000 MΩ between terminals at 500 V |
| Heat resistance | 150°C for 1 hour |
| Max. continuous current | 1a: 8 A 2a: 5 A |

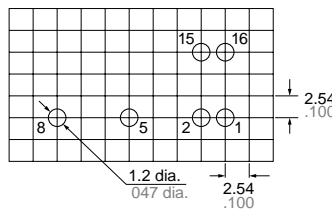
DIMENSIONS

mm inch



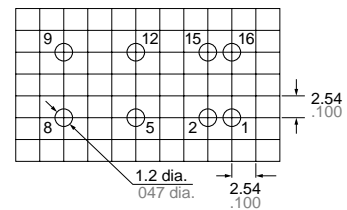
PC board pattern (Copper-side view)

DSP1a-PS, DSP1a-PSL2



Terminal No.2 and 15 are for DSP1a-PSL2 only.

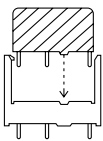
DSP2a-PS, DSP2a-PSL2



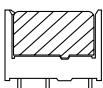
Terminal No.2 and 15 are for DSP2a-PSL2 only.

FIXING AND REMOVAL METHOD

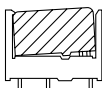
1. Match the direction of relay and socket.



2. Both ends of relays are fixed so surely that the socket hooks on the top surface of relays.

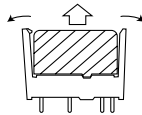


Good



No good

3. Remove the relay, applying force in the direction shown below.



4. In case there is not enough space for finger to pick relay up, use screw drivers in the way shown below.

