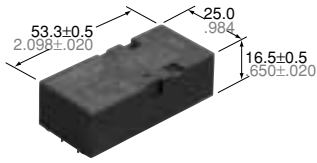


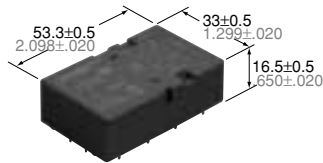
FEATURES

- **High contact reliability**
High contact reliability is achieved through the use of a double contact.
- **Forced operation contacts (2 Form A 2 Form B)**
N.O. and N.C. side contacts are connected through a card so that one interacts with the other in movement. In case of a contact welding, the other keeps a min. 0.5mm .020inch contact gap.
- **Independent operation contacts (4 Form A 4 Form B)**
There are 4 points of forced operation contacts. Each pair of contacts is free from the main armature and is independent from each other. So if a N.O. pair of contacts are welded, the other 3 N.O. contacts are not effected (operate properly) That enables to plan a circuit to detect welding or go back to the beginning condition.

- **Separated chamber structure (2 Form A 2 Form B, 4 Form A 4 Form B)**
N.O. and N.C. side contacts are put in each own space surrounded with a card and a body-separator. That prevents short circuit between contacts, which is caused by their springs welding or damaged.
- **High breakdown voltage 2,500 Vrms between contacts and coil**
- **High sensitivity**
Realizes thin shape and high sensitivity (500 mW nominal operating power) by utilizing high-efficiency polarized magnetic circuit with 4-gap balanced armature.
- **Complies with safety standards**
Standard products are UL, CSA, TÜV and SEV certified. Conform to European standards. TÜV certified (945/EL, 178/88). Complies with SUVA European standard.



2 Form A 2 Form B



4 Form A 4 Form B

mm inch

SPECIFICATIONS

Contact

| | | |
|--|----------------------------|---------------------------|
| Contact arrangement | 2 Form A 2 Form B | 4 Form A 4 Form B |
| Initial contact resistance, max. (By voltage drop 6 V DC 1 A) | 30 mΩ | |
| Contact material | Gold-flashed silver alloy | |
| Rating (resistive) | Nominal switching capacity | 6 A 250 V AC, 6 A 30 V DC |
| | Max. switching power | 1,500 VA, 180 W |
| | Max. switching voltage | 440 V AC, 30 V DC |
| | Max. carrying current | 6 A |
| Expected life (min. operations) | Mechanical (at 180 cpm) | 10 ⁷ |
| | Electrical (at 20 cpm) | 10 ⁵ |

Coil

| | |
|-------------------------|--------|
| Nominal operating power | 500 mW |
|-------------------------|--------|

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.

Characteristics (at 20°C 68°F)

| | | |
|--|--|---|
| Contact arrangement | 2 Form A 2 Form B | 4 Form A 4 Form B |
| Max. operating speed | 180 cpm (at nominal voltage) | |
| Initial insulation resistance*1 | Min. 1,000 MΩ at 500 V DC | |
| Initial breakdown voltage*2 | Between open contacts | 1,300 Vrms |
| | Between contact sets | 2,500 Vrms |
| | Between contact and coil | 2,500 Vrms |
| Operate time*3 (at nominal voltage) | Max. 30 ms | |
| Release time (without diode)*3 (at nominal voltage) | Max. 15 ms | |
| Temperature rise (at nominal voltage) (at 20°C) | Max. 45°C with nominal coil voltage and at 6 A carry current | |
| Shock resistance | Functional*4 | Min. 294 m/s ² {30 G} |
| | Destructive*5 | Min. 980 m/s ² {100 G} |
| Vibration resistance | Functional*6 | 10 to 55 Hz at double amplitude of 2 mm |
| | Destructive | 10 to 55 Hz at double amplitude of 2 mm |
| Conditions for operation, transport and storage*7 (Not freezing and condensing at low temperature) | Ambient temp. | -40°C to +70°C -40°F to +158°F |
| | Humidity | 5 to 85% R.H. |
| Unit weight | Approx. 38 g 1.34 oz | Approx. 47 g 1.66 oz |

ORDERING INFORMATION

TYPICAL APPLICATIONS

• Industrial equipment such as presses and machine tools

Ex. SF 2 D — DC 5 V

| Contact arrangement | Coil voltage |
|----------------------|------------------------|
| 2: 2 Form A 2 Form B | DC 5, 12, 24, 48, 60 V |
| 4: 4 Form A 4 Form B | |

UL/CSA, TÜV, SEV approved type is standard

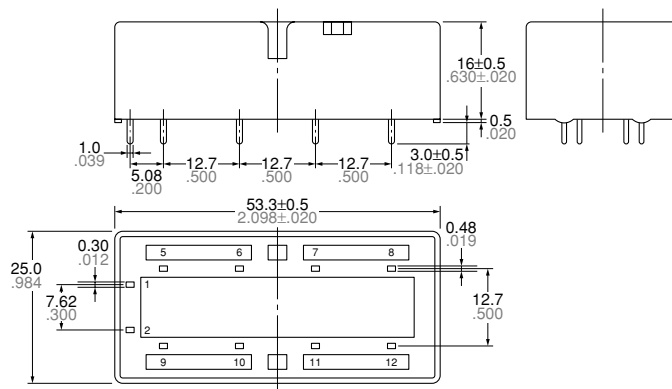
TYPES AND COIL DATA (at 20°C 68°F)

| Contact arrangement | Part No. | Nominal voltage, V DC | Pick-up voltage, VDC (max.) | Drop-out voltage, V DC (min.) | Coil resistance Ω ($\pm 10\%$) | Nominal operating current, mA ($\pm 10\%$) | Nominal operating power, mW | Max. allowable voltage, V DC |
|----------------------|------------|-----------------------|-----------------------------|-------------------------------|---|--|-----------------------------|------------------------------|
| 2 Form A 2 Form B | SF2D-DC5V | 5 | 3.75 | 0.5 | 50 | 100 | 500 | 6 |
| | SF2D-DC12V | 12 | 9 | 1.2 | 288 | 41.7 | 500 | 14.4 |
| | SF2D-DC24V | 24 | 18 | 2.4 | 1.152 | 20.8 | 500 | 28.8 |
| | SF2D-DC48V | 48 | 36 | 4.8 | 4.608 | 10.4 | 500 | 57.6 |
| | SF2D-DC60V | 60 | 45 | 6.0 | 7.200 | 8.3 | 500 | 72 |
| 4 Form A 4 Form B | SF4D-DC5V | 5 | 3.75 | 0.75 | 50 | 100 | 500 | 6 |
| | SF4D-DC12V | 12 | 9 | 1.8 | 288 | 41.7 | 500 | 14.4 |
| | SF4D-DC24V | 24 | 18 | 3.6 | 1.152 | 20.8 | 500 | 28.8 |
| | SF4D-DC48V | 48 | 36 | 7.2 | 4.608 | 10.4 | 500 | 57.6 |
| | SF4D-DC60V | 60 | 45 | 9.0 | 7.200 | 8.3 | 500 | 72 |

DIMENSIONS

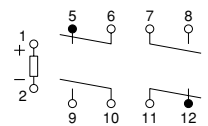
1. 2 Form A 2 Form B

mm inch

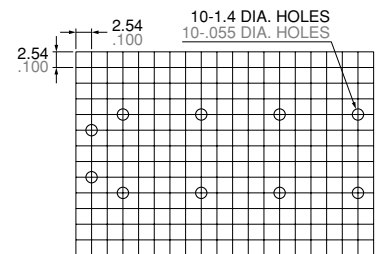


General tolerance: $\pm 0.3 \pm 0.12$

Schematic (Bottom view)

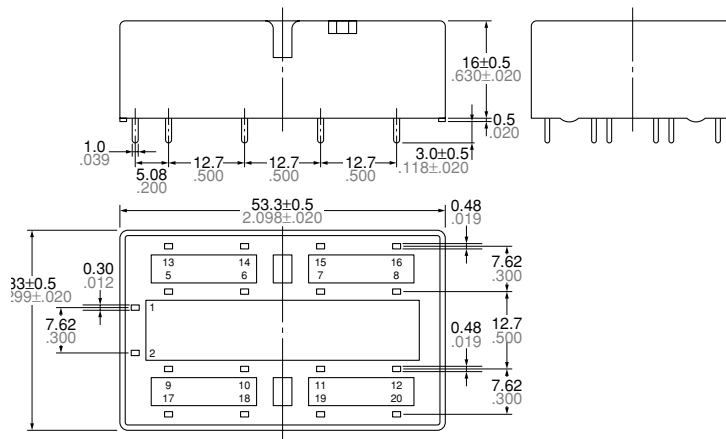
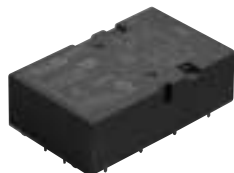


PC board pattern (Bottom view)



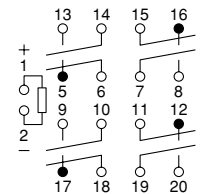
Tolerance: $\pm 0.1 \pm 0.004$

2. 4 Form A 4 Form B

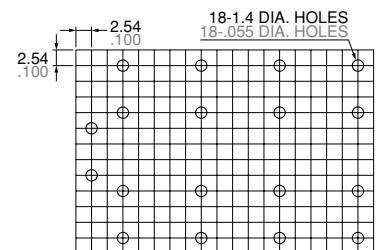


General tolerance: $\pm 0.3 \pm 0.12$

Schematic (Bottom view)



PC board pattern (Bottom view)



Tolerance: $\pm 0.1 \pm 0.004$