



RoHS compliant

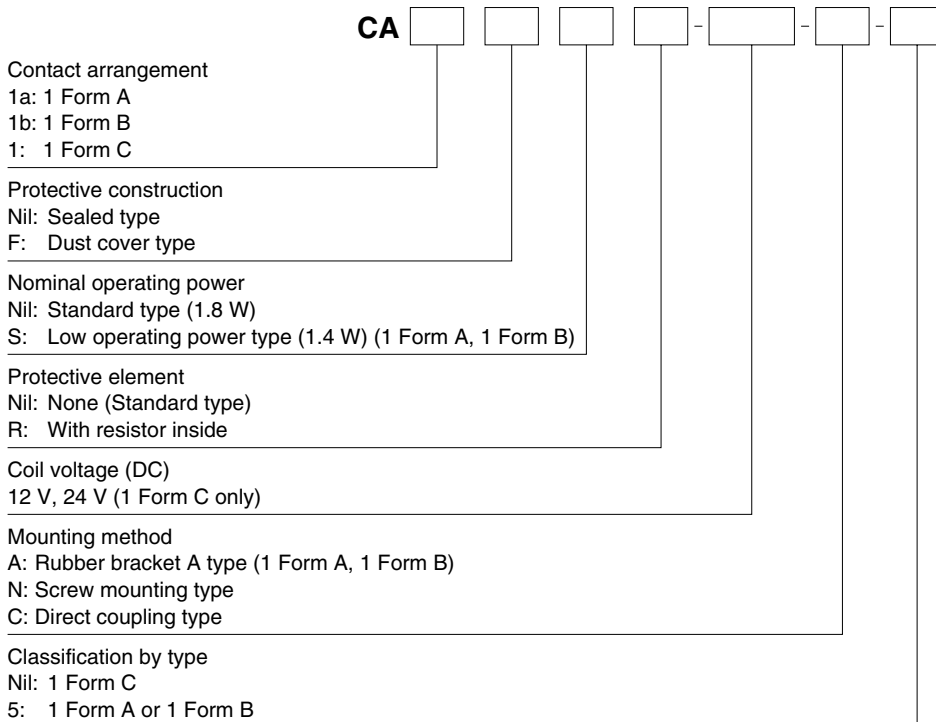
FEATURES

- **Small size and light weight**
For space saving, the outside dimensions of the main body are reduced to be 21.5 mm (length) × 14.4 mm (width) × 37 mm (height) (.846 × .567 × 1.457 inch) and the weight is also reduced to be approx. 19 g .67 oz (direct coupling 1 Form A, 1 Form B type)
- **Low operating power (1.4W) type is available (1 Form A, 1 Form B)**
- **Since the terminal arrangement complies with JIS D5011 B4-M1, commercial connectors are available for these types of relays.**
- **Superior inrush characteristics**
Despite its small size, 120A (max. 0.1 s) capacity has been achieved by using contacts that are good at withstanding inrush currents and because of an ingenious contacting mechanism. (1 Form A and 1 Form B)

TYPICAL APPLICATIONS

- **Motorcycles and automobiles**
Motorcycle cell motors, car air conditioners, halogen lamps, etc.
- **Agricultural equipment**
- **Battery equipped devices such as conveyance vehicles**

ORDERING INFORMATION



TYPES

| Contact arrangement | Coil voltage | Mounting type | Standard type | | Low operating power type | |
|---------------------|--------------|------------------|---------------|-----------------|--------------------------|-----------------|
| | | | Sealed type | Dust cover type | Sealed type | Dust cover type |
| | | | Part No. | Part No. | Part No. | Part No. |
| 1 Form A | 12 V DC | Rubber bracket A | CA1a-12V-A-5 | CA1aF-12V-A-5 | CA1aS-12V-A-5 | CA1aFS-12V-A-5 |
| | | Screw-mounting | CA1a-12V-N-5 | CA1aF-12V-N-5 | CA1aS-12V-N-5 | CA1aFS-12V-N-5 |
| | | Direct coupling | CA1a-12V-C-5 | CA1aF-12V-C-5 | CA1aS-12V-C-5 | CA1aFS-12V-C-5 |
| 1 Form B | 12 V DC | Rubber bracket A | CA1b-12V-A-5 | CA1bF-12V-A-5 | CA1bS-12V-A-5 | CA1bFS-12V-A-5 |
| | | Screw-mounting | CA1b-12V-N-5 | CA1bF-12V-N-5 | CA1bS-12V-N-5 | CA1bFS-12V-N-5 |
| | | Direct coupling | CA1b-12V-C-5 | CA1bF-12V-C-5 | CA1bS-12V-C-5 | CA1bFS-12V-C-5 |
| 1 Form C | 12 V DC | Screw-mounting | CA1-12V-N | — | — | — |
| | | Direct coupling | CA1-12V-C | — | — | — |
| | 24 V DC | Screw-mounting | CA1-24V-N | — | — | — |
| | | Direct coupling | CA1-24V-C | — | — | — |

Standard packing: Carton: 20 pcs. Case: 200 pcs.

Note: Please use "CA**R-***" or CA**SR-***" built-in resistor type. (Asterisks "*" should be filled in from ORDERING INFORMATION.)

RATING

1. Coil data

| | Nominal coil voltage | Pick-up voltage (at 20°C 68°F) | Drop-out voltage (at 20°C 68°F) | Nominal operating current [$\pm 10\%$] (at 20°C 68°F) | Coil resistance [$\pm 10\%$] (at 20°C 68°F) | Nominal operating power | Usable voltage range |
|---|----------------------|--------------------------------|---------------------------------|---|---|-------------------------|----------------------|
| Standard type 1 Form A and 1 Form B | 12 V DC | Max. 8 V DC | 0.6 to 6 V DC | 150 mA | 80 Ω | 1.8 W | 10 to 16V DC |
| Low operating power type 1 Form A and 1 Form B | 12 V DC | Max. 8 V DC | 0.6 to 6 V DC | 120 mA | 100 Ω | 1.4 W | 10 to 16V DC |
| 1 Form C | 12 V DC | Max. 8 V DC | Min. 0.6 V DC | 150 mA | 80 Ω | 1.8 W | 10 to 15V DC |
| | 24 V DC | Max. 16 V DC | Min. 1.2 V DC | 75 mA | 320 Ω | 1.8 W | 20 to 30V DC |

Note: Other pick-up voltage types are also available. Please contact us for details.

2. Specifications

1) 12 V DC type

| Characteristics | Item | Specifications | | |
|-----------------------------|--|--|--|---|
| | | 1 Form A type | 1 Form B type | 1 Form C type |
| Contact | Arrangement | 1 Form A | 1 Form B | 1 Form C |
| | Contact resistance (Initial) | Typ 3m Ω (By voltage drop 6V DC 1A) | | |
| | Contact voltage drop | Max. 0.3 V [(after electrical life test, by voltage drop 12 V DC 20 A (1.4 W type), 12 V DC 30 A (1.8 W type)] | Max. 0.3 V (after electrical life test, by voltage drop 12 V DC 20 A) | Max. 0.4 V (after electrical life test, by voltage drop 12 V DC 20 A) |
| | Contact material | Ag alloy (Cadmium free) | | |
| Rating | Nominal switching capacity (resistive load) | 20 A 12V DC (1.4 W type) 30 A 12V DC (1.8 W type) | 20 A 12 V DC | |
| | Max. carrying current (at coil applied voltage 14 V DC, 80°C 176°F) | 20 A continuous (1.4 W type) 30 A for 1 min. (1.8 W type) | 20 A continuous | 20 A continuous |
| | Nominal operating power | 1.4 W/1.8 W | | 1.8 W |
| | Min. switching capacity (resistive load)*1 | 1 A 12V DC | | |
| Electrical characteristics | Insulation resistance (Initial) | Min. 10 M Ω (at 500V DC) | | Min. 10 M Ω (at 500V DC) |
| | Breakdown voltage (Initial) | Between open contacts | 500 Vrms for 1 min. (Detection current: 10mA) | |
| | | Between contacts and coil | 500 Vrms for 1 min. (Detection current: 10mA) | |
| | Operate time (at 20°C 68°F) | Max. 10ms (at nominal voltage) (excluding contact bounce time) (Initial) | | |
| Release time (at 20°C 68°F) | Max. 10ms (at nominal voltage) (excluding contact bounce time) (Initial) | | | |
| Mechanical characteristics | Shock resistance | Functional | Min. 200 m/s ² {20G} (Half-wave pulse of sine wave: 11ms; detection time: 10 μ s) | Min. 100 m/s ² {10G} (Half-wave pulse of sine wave: 11ms; detection time: 10 μ s) |
| | | Destructive | Min. 1,000 m/s ² {100G} (Half-wave pulse of sine wave: 6ms) | |
| | Vibration resistance | Functional | Rubber bracket A type: 50 Hz to 500 Hz, Min. 100 m/s ² {10G} Screw-mounting and direct coupling type: 33 Hz, Min. 44.1 m/s ² {4.5G} (Detection time: 10 μ s) | |
| | | Destructive | Rubber bracket A type: 50 Hz to 500 Hz, Min. 100 m/s ² {10G} Screw-mounting and direct coupling type: 33 Hz, Min. 44.1 m/s ² {4.5G}, Time of vibration for each direction; X, Y direction: 2 hours, Z direction: 4 hours | |
| Expected life | Electrical (at nominal switching capacity) | Min. 10 ⁵ (operating frequency: 2s ON, 2s OFF) (1.4 W and 1.8 W type at 20 A) Min. 2 \times 10 ⁴ (operating frequency: 3s ON, 15s OFF) (1.8 W type at 30 A) | Min. 10 ⁵ (operating frequency: 2s ON, 2s OFF) | |
| | Mechanical | Min. 10 ⁶ (at 120 cpm) | | Min. 5 \times 10 ⁵ (at 120 cpm) |
| Conditions | Conditions for operation, transport and storage*2 | Ambient temperature: -30°C to +80°C -22°F to +176°F, Humidity: 5% R.H. to 85% R.H. (Not freezing and condensing at low temperature) | | |
| | Max. operating speed | 15 cpm (1.4 W type: at nominal load, 1.8 W type: at 20 A) | 15 cpm (at nominal switching capacity) | |
| Water-proof standard | Water-proof standard | Sealed type: JIS D 0203 S2, Dust cover type: JIS D 0203 R2 | | |
| Mass | | Rubber bracket A type: 23 g .81 oz, Screw-mounting and direct coupling type: 19 g .67 oz | | 31 g 1.09 oz |

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.

*2. The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. Please refer to "Usage ambient condition" in CAUTIONS FOR USE OF AUTOMOTIVE RELAYS.

2) 24 V DC type

| Characteristics | Item | Specifications | |
|--|--|--|--|
| | | 1 Form C type | |
| Contact | Arrangement | 1 Form C | |
| | Contact resistance (Initial) | Typ 3mΩ (By voltage drop 6V DC 1A) | |
| | Contact voltage drop | Max. 0.4 V (after electrical life test, by voltage drop 24 V DC 10 A) | |
| | Contact material | Ag alloy (Cadmium free) | |
| Rating | Nominal switching capacity (resistive load) (operating frequency: 2s ON, 2s OFF) | 10 A 24V DC | |
| | Max. carrying current | 10 A continuous (at coil applied voltage 28 V DC, 80°C 176°F) | |
| | Nominal operating power | 1.8 W | |
| | Min. switching capacity (resistive load)*1 | 1 A 24V DC | |
| Electrical characteristics | Insulation resistance (Initial) | Min. 10 MΩ (at 500V DC) | |
| | Breakdown voltage (Initial) | Between open contacts | 500 Vrms for 1 min. (Detection current: 10mA) |
| | | Between contacts and coil | 500 Vrms for 1 min. (Detection current: 10mA) |
| | Operate time (at nominal voltage) (at 20°C 68°F) | Max. 10ms (excluding contact bounce time) (Initial) | |
| Release time (at nominal voltage) (at 20°C 68°F) | Max. 10ms (excluding contact bounce time) (Initial) | | |
| Mechanical characteristics | Shock resistance | Functional | Min. 100 m/s ² {10G} (Half-wave pulse of sine wave: 11ms; detection time: 10μs) |
| | | Destructive | Min. 1,000 m/s ² {100G} (Half-wave pulse of sine wave: 6ms) |
| | Vibration resistance | Functional | 33 Hz, Min. 44.1 m/s ² {4.5G} (Detection time: 10μs) |
| | | Destructive | 33 Hz, Min. 44.1 m/s ² {4.5G}, Time of vibration for each direction; X, Y direction: 2 hours, Z direction: 4 hours |
| Expected life | Electrical (at nominal switching capacity) | Min. 10 ⁵ (operating frequency: 2s ON, 2s OFF) | |
| | Mechanical | Min. 5 × 10 ⁵ (at 120 cpm) | |
| Conditions | Conditions for operation, transport and storage*2 | Ambient temperature: -30°C to +80°C -22°F to +176°F, Humidity: 5% R.H. to 85% R.H. (Not freezing and condensing at low temperature) | |
| | Max. operating speed | 15 cpm (nominal switching capacity) | |
| Water-proof standard | Water-proof standard | JIS D 0203 S2 | |
| Mass | | 31 g 1.09 oz | |

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.

*2. The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. Please refer to "Usage ambient condition" in CAUTIONS FOR USE OF AUTOMOTIVE RELAYS.

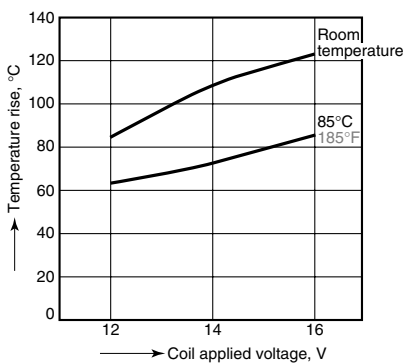
Electrical life

| | Nominal coil voltage | Motor load (operating frequency ON: 2 s, OFF: 2 s) | Halogen lamp load (operating frequency ON: 1 s, OFF: 14 s) |
|----------------------------|----------------------|---|---|
| 1 Form A and 1 Form B type | 12 V DC | Min. 10 ⁵ , 20 A 12 V DC | Min. 10 ⁵ , 20 A 12 V DC |
| 1 Form C type | 12 V DC | Min. 10 ⁵ , 20 A 12 V DC | Min. 10 ⁵ , 20 A 12 V DC |
| | 24 V DC | Min. 10 ⁵ , 10 A 24 V DC | Min. 10 ⁵ , 6 A 24 V DC |

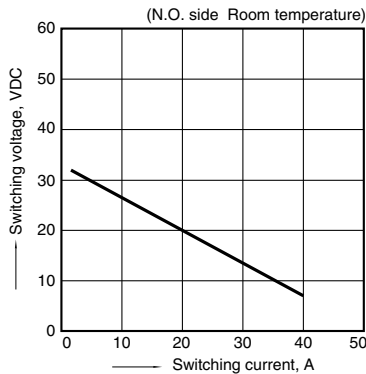
REFERENCE DATA

1. Coil temperature rise

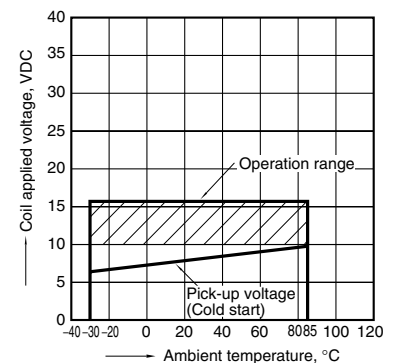
Samples: CA1aS-12V-N-5, 5pcs.
Measured portion: Inside the coil
Contact carrying current: 20A
Ambient temperature: Room temperature, 85°C
185°F



2. Max. switching capability (Resistive load, initial)

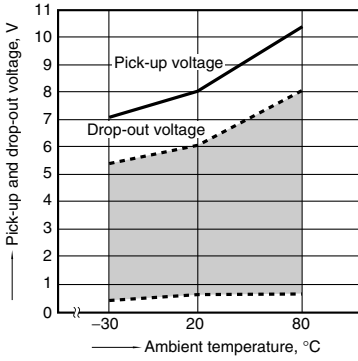


3. Ambient temperature and operating voltage range



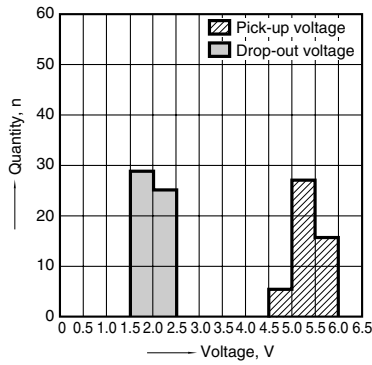
4. Ambient temperature characteristics (Cold start)

Samples: CA1bS-12V-N-5



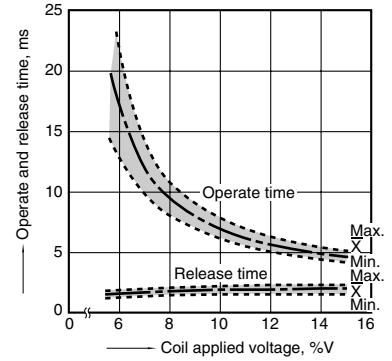
5. Distribution of pick-up and drop-out voltage

Quantity: 50pcs.



6. Operate and release time characteristics

Sample: CA1a-12V-N-5, 10pcs.

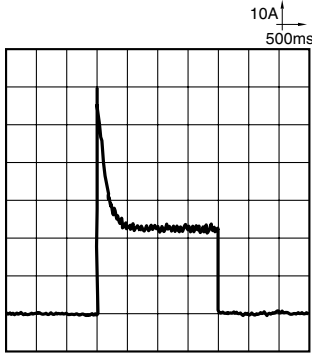


7-(1). Electrical life test (Motor load)

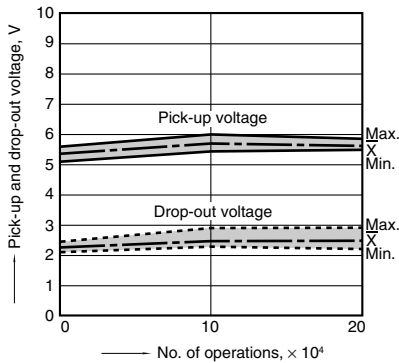
Sample: CA1a-12V-C, 3pcs.
 Load: Inrush current: 63A, steady current: 23A
 Blower fan motor actual load (motor free)
 Operating frequency: ON 2s, OFF 2s
 Ambient temperature: Room temperature

Load current waveform

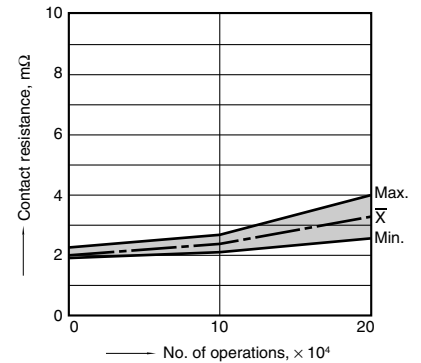
Load: Inrush current: 63A, steady current: 23A,



Change of pick-up and drop-out voltage



Change of contact resistance

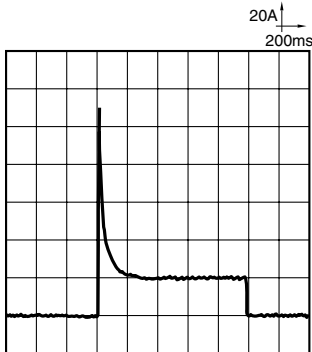


7-(2). Electrical life test (Lamp load)

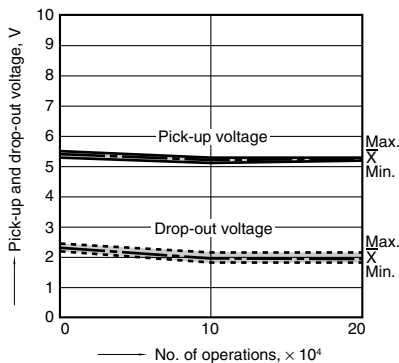
Sample: CA1a-12V-C, 3pcs.
 Load: 60Wx4, Inrush current: 110A, steady current: 20A
 Halogen lamp actual load
 Operating frequency: ON 1s, OFF 14s
 Ambient temperature: Room temperature

Load current waveform

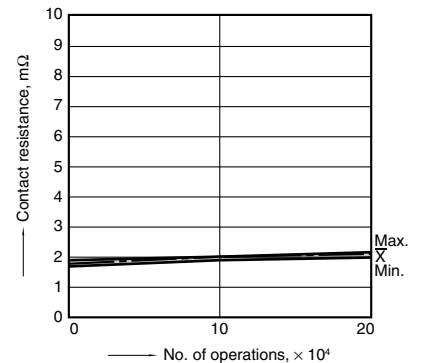
Load: Inrush current: 110A, steady current: 20A,



Change of pick-up and drop-out voltage



Change of contact resistance



DIMENSIONS (mm inch)

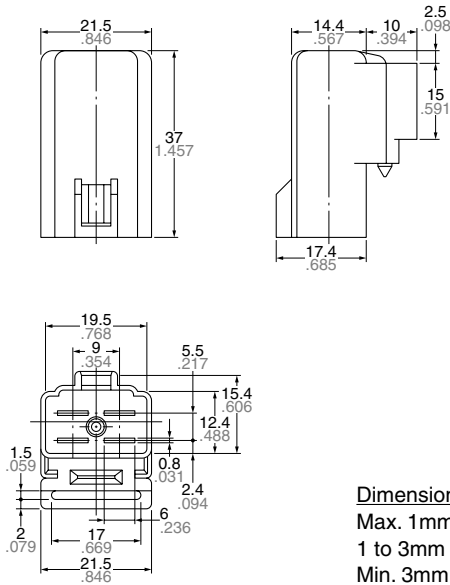
The CAD data of the products with a **CAD Data** mark can be downloaded from: <http://industrial.panasonic.com/ac/e/>

**1. 1 Form A/1 Form B
Rubber bracket A type**

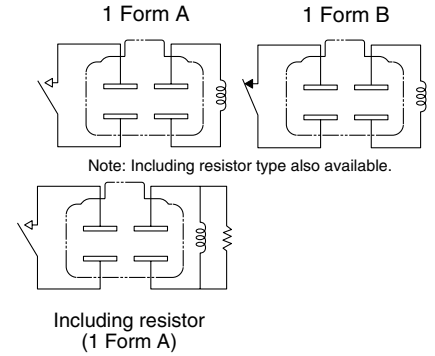
CAD Data



External dimensions



Schematic (Bottom View)



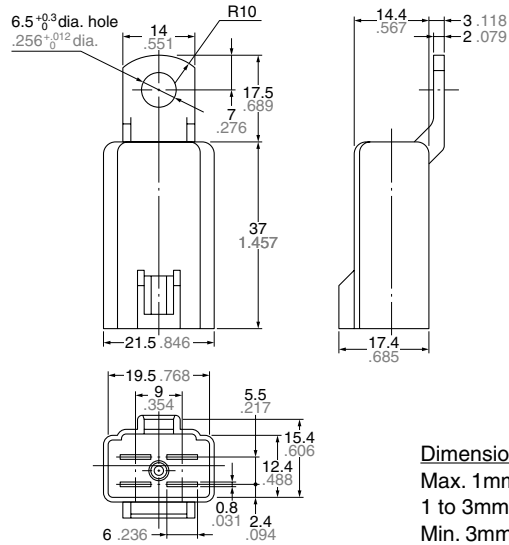
| <u>Dimension:</u> | <u>General tolerance</u> |
|-----------------------------|--------------------------|
| Max. 1mm .039 inch: | ±0.1 ±.004 |
| 1 to 3mm .039 to .118 inch: | ±0.2 ±.008 |
| Min. 3mm .118 inch: | ±0.3 ±.012 |

**2. 1 Form A/1 Form B
Screw-mounting type**

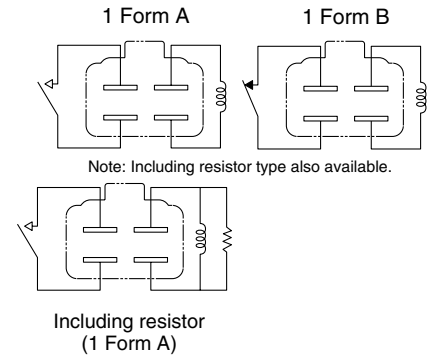
CAD Data



External dimensions



Schematic (Bottom View)



| <u>Dimension:</u> | <u>General tolerance</u> |
|-----------------------------|--------------------------|
| Max. 1mm .039 inch: | ±0.1 ±.004 |
| 1 to 3mm .039 to .118 inch: | ±0.2 ±.008 |
| Min. 3mm .118 inch: | ±0.3 ±.012 |

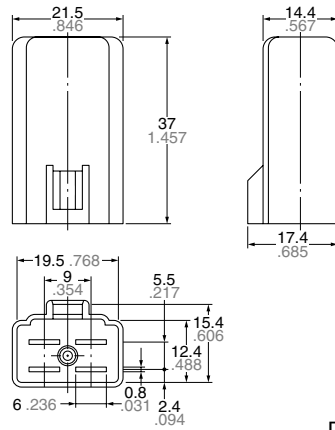
CA

3. 1 Form A/1 Form B Direct coupling type

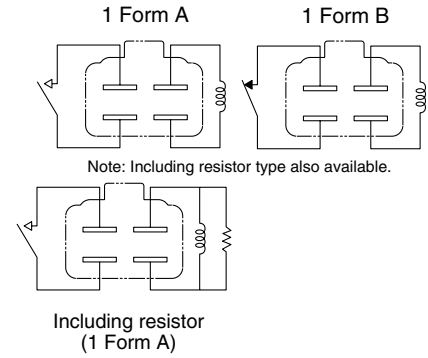
CAD Data



External dimensions



Schematic (Bottom View)



Dimension:

Max. 1mm .039 inch:

1 to 3mm .039 to .118 inch: $\pm 0.2 \pm .008$

Min. 3mm .118 inch:

General tolerance

$\pm 0.1 \pm .004$

$\pm 0.2 \pm .008$

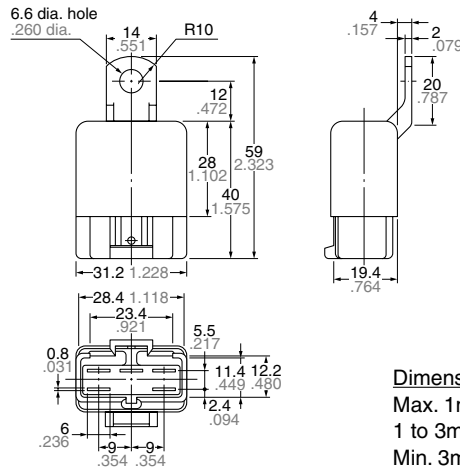
$\pm 0.3 \pm .012$

4. 1 Form C Screw-mounting type

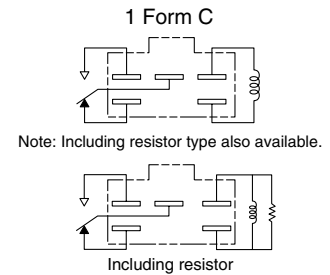
CAD Data



External dimensions



Schematic (Bottom View)



Dimension:

Max. 1mm .039 inch:

1 to 3mm .039 to .118 inch: $\pm 0.2 \pm .008$

Min. 3mm .118 inch:

General tolerance

$\pm 0.1 \pm .004$

$\pm 0.2 \pm .008$

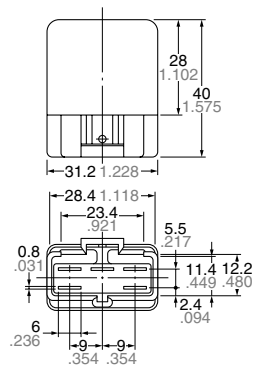
$\pm 0.3 \pm .012$

5. 1 Form C Direct coupling type

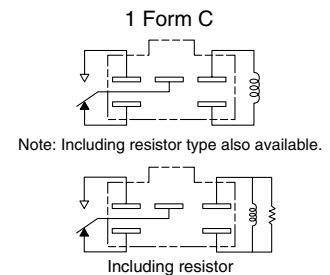
CAD Data



External dimensions



Schematic (Bottom View)



Dimension:

Max. 1mm .039 inch:

1 to 3mm .039 to .118 inch: $\pm 0.2 \pm .008$

Min. 3mm .118 inch:

General tolerance

$\pm 0.1 \pm .004$

$\pm 0.2 \pm .008$

$\pm 0.3 \pm .012$

For Cautions for Use, see Relay Technical Information.