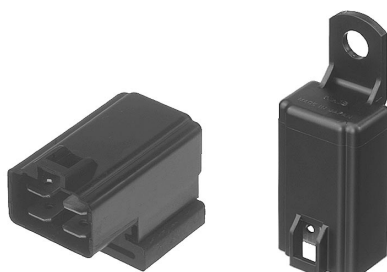


### FEATURES



#### 1. 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)

#### 2. Water tightness

Since the relays comply with the water tightness standards, JIS D 0203, water and dust will not enter the relay even if it is mounted in the engine area.

**3. Low operating power (1.4W) type is available (1 Form A, 1 Form B)**

**4. Since the terminal arrangement complies with JIS D5011 B4-M1, commercial connectors are available for these types of relays.**

### SPECIFICATIONS

#### Contact

| Contact                                                         |                                                |                             | 12 V DC                                                                                                                  |                                                                         |                                                                         | 24 V DC                                                                 |          |
|-----------------------------------------------------------------|------------------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|----------|
| Type                                                            |                                                |                             | 1 Form A                                                                                                                 |                                                                         | 1 Form B                                                                | 1 Form C                                                                | 1 Form C |
| Arrangement                                                     |                                                |                             |                                                                                                                          |                                                                         |                                                                         |                                                                         |          |
| Initial contact resistance, max.<br>(By voltage drop 6 V DC 1A) |                                                |                             | 50 m ohm                                                                                                                 |                                                                         |                                                                         |                                                                         |          |
| Contact material                                                |                                                |                             | silver alloy                                                                                                             |                                                                         |                                                                         |                                                                         |          |
| Contact voltage drop, max.                                      |                                                |                             | 0.3 V<br>After electrical life test,<br>by voltage drop<br>12 V DC 20 A<br>(1.4 W type),<br>12 V DC 30 A<br>(1.8 W type) | 0.3 V<br>After electrical life test,<br>by voltage drop<br>12 V DC 20 A | 0.4 V<br>After electrical life test,<br>by voltage drop<br>12 V DC 20 A | 0.4 V<br>After electrical life test,<br>by voltage drop<br>24 V DC 10 A |          |
| Rating                                                          | Nominal switching capacity<br>(resistive load) |                             | 20 A 12 V DC<br>(1.4 W type)<br>30 A 12 V DC<br>(1.8 W type)                                                             | 20 A 12 V DC                                                            |                                                                         | 10 A 24 V DC<br>(ON: 2s, OFF: 2s)                                       |          |
|                                                                 | Max. switching voltage                         |                             | 16 V                                                                                                                     |                                                                         | 15 V                                                                    | 30 V                                                                    |          |
|                                                                 | Max. switching current                         |                             | 120 A (1.4 W type)<br>150 A (1.8 W type)                                                                                 | 120 A                                                                   | 100 A                                                                   | 50 A (Inrush current)                                                   |          |
|                                                                 | Max. carrying current                          |                             | 20 A continuous<br>(1.4 W type)<br>30 A for 1 min<br>(1.8 W type)                                                        | 20 A continuous                                                         | 20 A continuous                                                         | 10 A continuous                                                         |          |
|                                                                 | Nominal operating power                        |                             | 1.4 W / 1.8 W                                                                                                            |                                                                         | 1.8 W                                                                   |                                                                         |          |
| Expected<br>life (min.<br>operations)                           | Mechanical (at 120 cpm)                        |                             | 10 <sup>6</sup>                                                                                                          |                                                                         | 5×10 <sup>5</sup>                                                       |                                                                         |          |
|                                                                 | Electrical                                     | 20 A<br>(1.4 W, 1.8 W type) | 10 <sup>5</sup><br>(ON: 2s, OFF: 2s)                                                                                     | 10 <sup>5</sup> (ON 2s, OFF 2s)                                         |                                                                         | 10 <sup>5</sup>                                                         |          |
|                                                                 |                                                | 30 A<br>(1.8 W type)        | 2×10 <sup>4</sup><br>(ON: 3s, OFF: 15s)                                                                                  |                                                                         |                                                                         |                                                                         |          |

Characteristics (at 20°C 68°F )

| Type                                                                                            |                           | 12 V DC                                                                                                                                                               |                                  | 24 V DC                                            |
|-------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------------|
| Max. operating speed                                                                            |                           | 15 cpm ( 1.4 W type: at nominal load<br>1.8 W type: at 20 A )                                                                                                         | 15 cpm (at nominal load)         |                                                    |
| Initial insulation resistance                                                                   |                           | Min. 10 Ω at 500 V DC                                                                                                                                                 |                                  |                                                    |
| Initial breakdown voltage*1                                                                     | Between open contacts     | 500 V rms for 1 min.                                                                                                                                                  |                                  |                                                    |
|                                                                                                 | Between contacts and coil | 500 V rms for 1 min.                                                                                                                                                  |                                  |                                                    |
| Operate time*2 (at nominal voltage)                                                             |                           | Max. 10 ms at 20°C                                                                                                                                                    |                                  | Max. 10 ms                                         |
| Release time (without diode)*2 (at nominal voltage)                                             |                           | Max. 10 ms at 20°C                                                                                                                                                    |                                  | Max. 10 ms                                         |
| Shock resistance                                                                                | Functional                | Min. 200 m/s <sup>2</sup> {20 G}                                                                                                                                      | Min. 100 m/s <sup>2</sup> {10 G} | Min. 100 m/s <sup>2</sup> {10 G}*3                 |
|                                                                                                 | Destructive*4             | Min. 1,000 m/s <sup>2</sup> {100 G}                                                                                                                                   |                                  |                                                    |
| Vibration resistance                                                                            | Functional*5              | Rubber bracket A type: Min. 100 m/s <sup>2</sup> {10 G}, 50 to 500Hz<br>Direct coupling type or Screw-mounting type: Min. 44.1 m/s <sup>2</sup> {4.5 G}, 10 to 100 Hz |                                  | Min. 44.1 m/s <sup>2</sup> {4.5 G},<br>10 to 100Hz |
|                                                                                                 | Destructive               | Rubber bracket A type: Min. 100m/s <sup>2</sup> {10 G},50 to 500Hz<br>Direct coupling type or Screw-mounting type: Min. 44.1 m/s <sup>2</sup> {4.5 G}, 10 to 100 Hz   |                                  | Min. 44.1 m/s <sup>2</sup> {4.5 G},<br>10 to 500Hz |
| Conditions for operation, transport and storage*6 (Not freezing and condensing low temperature) | Ambient temp.             | -30°C to +80°C -22°F to +176°F                                                                                                                                        |                                  |                                                    |
|                                                                                                 | Humidity                  | 5 to 85% R.H.                                                                                                                                                         |                                  |                                                    |
| Water-proof standard                                                                            |                           | Plastic sealed type: JIS DO203S2, Dust cover type: JIS DO203R2                                                                                                        |                                  | JIS DO203S2                                        |
| Unit weight                                                                                     |                           | Rubber bracket A type : 23 g .81 oz<br>Direct coupling type or Screw-mounting type: 19 g .67 oz                                                                       | 31 g 1.09 oz                     |                                                    |

Electrical life (min. operation)

|                    |                            |                                                       |                                                               |
|--------------------|----------------------------|-------------------------------------------------------|---------------------------------------------------------------|
|                    | Nominal coil voltage, V DC | Motor load<br>(operating frequency ON: 2 s, OFF: 2 s) | Halogen lamp load<br>(operating frequency ON: 1 s, OFF: 14 s) |
| 1 Form A, 1 Form B | 12                         | 10 <sup>5</sup> , 20 A 12 V DC                        | 10 <sup>5</sup> , 20 A 12 V DC                                |
| 1 Form C           | 12                         | 10 <sup>5</sup> , 20 A 12 V DC                        | 10 <sup>5</sup> , 20 A 12 V DC                                |
|                    | 24                         | 10 <sup>5</sup> , 10 A 24 V DC                        | 10 <sup>5</sup> , 6 A 24 V DC                                 |

Remarks

- \* Specifications will vary with foreign standards certification ratings.

\*1 Detection current: 10 mA

\*2 Excluding contact bounce time

\*3 Half-wave pulse of sine wave: 11ms; detection time: 10μs
- \*4 Half-wave pulse of sine wave: 6ms

\*5 Detection time: 10μs

\*6 Refer to 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 61)

ORDERING INFORMATION

CA

1a

F

S

12 V

A

5

| Contact arrangement                          | Protective construction                        | Nominal operating power                                                                   | Coil voltage (DC)            | Mounting method                                                                                       | Classification by type                      |
|----------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------------------------|---------------------------------------------|
| 1a: 1 Form A<br>1b: 1 Form B<br>1 : 1 Form C | Nil: Plastic sealed type<br>F: Dust cover type | Nil: Standard type (1.8 W)<br>S: Low operating power type (1.4 W)<br>(1 Form A, 1 Form B) | 12 V<br>24 V (1 Form C only) | A: Rubber bracket A type<br>(1 Form A, 1 Form B)<br>N: Screw mounting type<br>C: Direct coupling type | Nil: 1 Form C<br>5: 1 Form A or<br>1 Form B |

- Notes: 1. Type with resistor/diode inside are available as options. Please consult our sales office.
2. Standard packing: Carton: 20 pcs. Case: 200 pcs.

COIL DATA

1) Standard type

| Contact arrangement | Mounting type    | Plastic sealed type | Dust cover type | Nominal voltage, V DC | Pick-up voltage, V DC (max.) (at 20°C 68°F) | Drop-out voltage, V DC (min.) (at 20°C 68°F) | Nominal operating current, mA (±10%) (at 20°C 68°F) | Coil resistance, Ω (±10%) (at 20°C 68°F) | Nominal operating power, mW (at 20°C 68°F) | Usable voltage range, V DC |
|---------------------|------------------|---------------------|-----------------|-----------------------|---------------------------------------------|----------------------------------------------|-----------------------------------------------------|------------------------------------------|--------------------------------------------|----------------------------|
| 1 Form A            | Rabber bracket A | CA1a-12V-A-5        | CA1aF-12V-A-5   | 12                    | 8                                           | 0.6 to 6                                     | 150                                                 | 80                                       | 1.8                                        | 10 to 16                   |
|                     | Screw-mounting   | CA1a-12V-N-5        | CA1aF-12V-N-5   | 12                    | 8                                           | 0.6 to 6                                     | 150                                                 | 80                                       | 1.8                                        | 10 to 16                   |
|                     | Direct coupling  | CA1a-12V-C-5        | CA1aF-12V-C-5   | 12                    | 8                                           | 0.6 to 6                                     | 150                                                 | 80                                       | 1.8                                        | 10 to 16                   |
| 1 Form B            | Rabber bracket A | CA1b-12V-A-5        | CA1bF-12V-A-5   | 12                    | 8                                           | 0.6 to 6                                     | 150                                                 | 80                                       | 1.8                                        | 10 to 16                   |
|                     | Screw-mounting   | CA1b-12V-N-5        | CA1bF-12V-N-5   | 12                    | 8                                           | 0.6 to 6                                     | 150                                                 | 80                                       | 1.8                                        | 10 to 16                   |
|                     | Direct coupling  | CA1b-12V-C-5        | CA1bF-12V-C-5   | 12                    | 8                                           | 0.6 to 6                                     | 150                                                 | 80                                       | 1.8                                        | 10 to 16                   |
| 1 Form C            | Screw-mounting   | CA1-DC12V-N         | —               | 12                    | 8                                           | 0.6                                          | 150                                                 | 80                                       | 1.8                                        | 10 to 15                   |
|                     | Direct coupling  | CA1-DC12V-C         | —               | 12                    | 8                                           | 0.6                                          | 150                                                 | 80                                       | 1.8                                        | 10 to 15                   |
|                     | Screw-mounting   | CA1-DC24V-N         | —               | 24                    | 16                                          | 1.2                                          | 75                                                  | 320                                      | 1.8                                        | 20 to 30                   |
|                     | Direct coupling  | CA1-DC24V-C         | —               | 24                    | 16                                          | 1.2                                          | 75                                                  | 320                                      | 1.8                                        | 20 to 30                   |

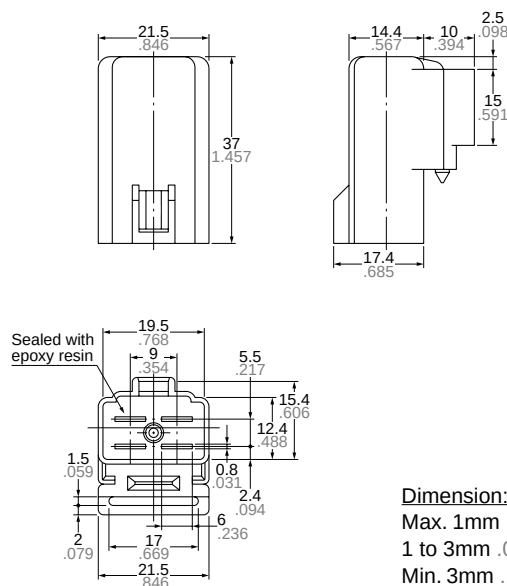
## 2) Low operating power type

| Contact arrangement | Mounting type    | Plastic sealed type | Dust cover type | Nominal voltage, V DC | Pick-up voltage, V DC (max.) (at 20°C 68°F) | Drop-out voltage, V DC (min.) (at 20°C 68°F) | Nominal operating current, mA (±10%) (at 20°C 68°F) | Coil resistance, Ω (±10%) (at 20°C 68°F) | Nominal operating power, mW (at 20°C 68°F) | Usable voltage range, V DC |
|---------------------|------------------|---------------------|-----------------|-----------------------|---------------------------------------------|----------------------------------------------|-----------------------------------------------------|------------------------------------------|--------------------------------------------|----------------------------|
| 1 Form A            | Rubber bracket A | CA1aS-12V-A-5       | CA1aFS-12V-A-5  | 12                    | 8                                           | 0.6 to 6                                     | 120                                                 | 100                                      | 1.4                                        | 10 to 16                   |
|                     | Screw-mounting   | CA1aS-12V-N-5       | CA1aFS-12V-N-5  | 12                    | 8                                           | 0.6 to 6                                     | 120                                                 | 100                                      | 1.4                                        | 10 to 16                   |
|                     | Direct coupling  | CA1aS-12V-C-5       | CA1aFS-12V-C-5  | 12                    | 8                                           | 0.6 to 6                                     | 120                                                 | 100                                      | 1.4                                        | 10 to 16                   |
| 1 Form B            | Rubber bracket A | CA1bS-12V-A-5       | CA1bFS-12V-A-5  | 12                    | 8                                           | 0.6 to 6                                     | 120                                                 | 100                                      | 1.4                                        | 10 to 16                   |
|                     | Screw-mounting   | CA1bS-12V-N-5       | CA1bFS-12V-N-5  | 12                    | 8                                           | 0.6 to 6                                     | 120                                                 | 100                                      | 1.4                                        | 10 to 16                   |
|                     | Direct coupling  | CA1bS-12V-C-5       | CA1bFS-12V-C-5  | 12                    | 8                                           | 0.6 to 6                                     | 120                                                 | 100                                      | 1.4                                        | 10 to 16                   |

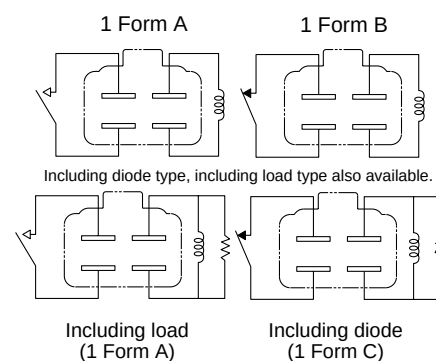
## DIMENSIONS

mm inch

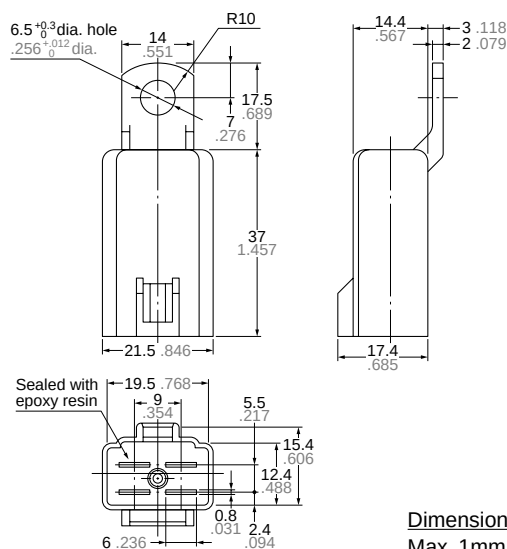
### 1. 1 Form A/1 Form B Rubber bracket A type



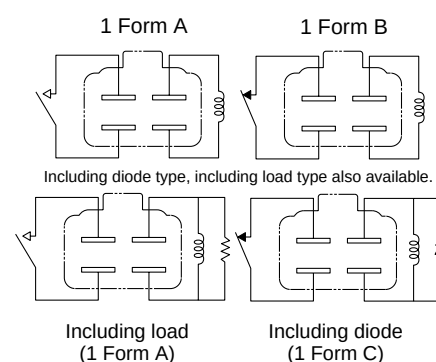
### SCHEMATIC (Bottom View)



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

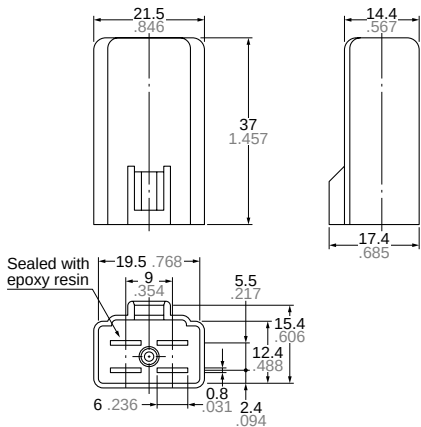


### SCHEMATIC (Bottom View)

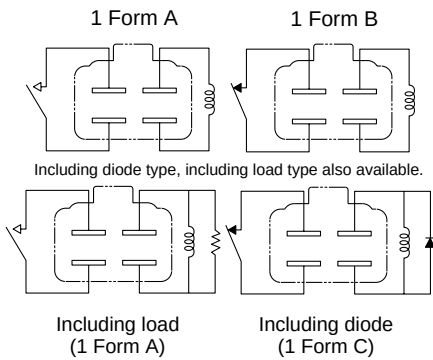


3. 1 Form A/1 Form B  
Direct coupling type

mm inch

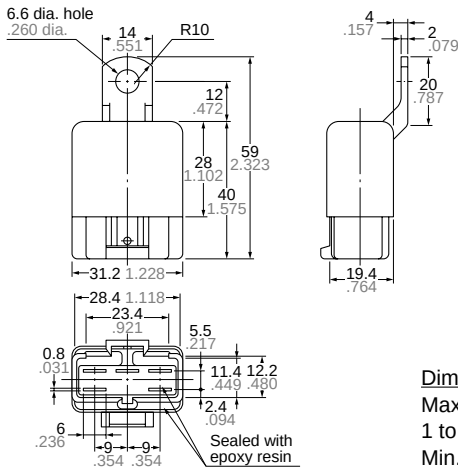


SCHEMATIC (Bottom View)

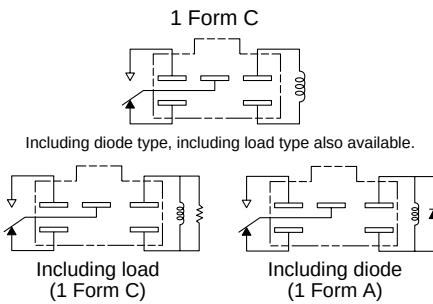


| Dimension:                  | General tolerance |
|-----------------------------|-------------------|
| Max. 1mm .039 inch:         | ±0.1 ±.004        |
| 1 to 3mm .039 to .118 inch: | ±0.2 ±.008        |
| Min. 3mm .118 inch:         | ±0.3 ±.012        |

4. 1 Form C  
Screw-mounting type

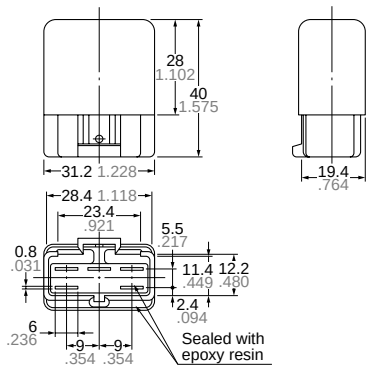


SCHEMATIC (Bottom View)

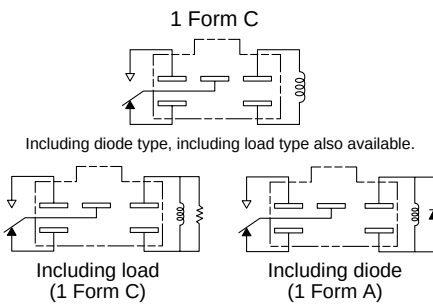


| Dimension:                  | General tolerance |
|-----------------------------|-------------------|
| Max. 1mm .039 inch:         | ±0.1 ±.004        |
| 1 to 3mm .039 to .118 inch: | ±0.2 ±.008        |
| Min. 3mm .118 inch:         | ±0.3 ±.012        |

5. 1 Form C  
Direct coupling type



SCHEMATIC (Bottom View)



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

## REFERENCE DATA

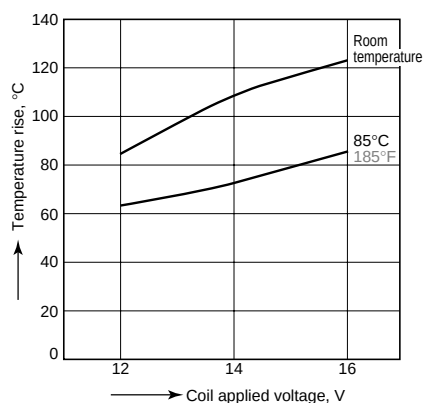
### 1. Coil temperature rise

Tested sample: CA1aS-12V-N-5, 5 pcs.

Point measured: Inside the coil

Contact carrying current: 20A

Ambient temperature: Room temperature,  
85°C 185°F



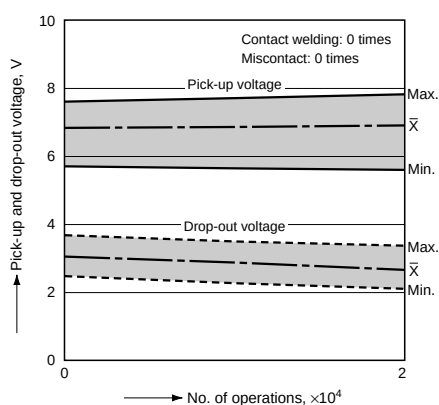
### 2. Electrical life test (Motor load)

Tested sample: CA1a-12V-N-5, 5 pcs.

Load: Steady 30A, Inrush 150A, 12V DC

Operate frequency: ON 3s, OFF 15s

Ambient temperature: Room temperature



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