



**1. Compact flat type**

Flat size enables it to be built-in switch units.

<Height>

PC board terminal type:

9.5 mm .374 inch

Surface-mount terminal type:

10.5mm .413inch

**2. High capacity**

CP Relay provides low profile spacesaving advantages while offering high continuous current of 25A (1 hour).

**3. Simple footprint pattern enables ease of PC board layout**

Arrangement of coil and contact terminals designed to withstand large capacity which ensures leeway and facilitates PC board design.

**4. Sealed construction**

Sealed construction suitable for harsh environments

**5. "PC board terminal" and "Surface mount terminal" types available**

SMD automatic mounting is possible for surface mount terminal types because tape and reel packaging is used.

**6. Model available for wiper load.**

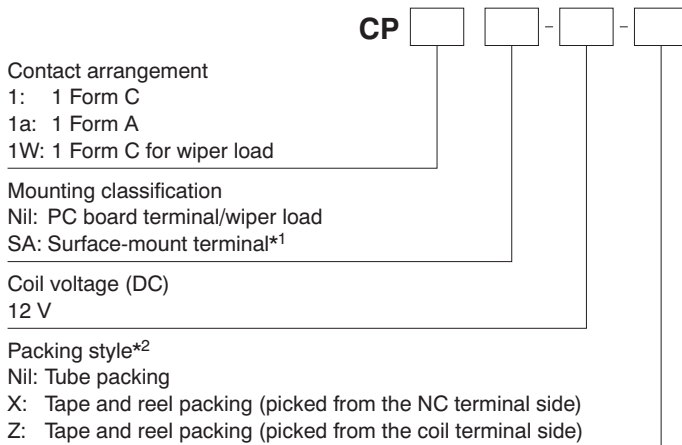
**TYPICAL APPLICATIONS**

**For automotive system**

Power windows, Auto door lock, Power sunroof, Memory seat, Wiper, Defogger, Blower fan, EPS, ABS etc.

**FEATURES**

**ORDERING INFORMATION**



**TYPES**

**1. PC board terminal type**

| Contact arrangement     | Coil voltage | Part No. |
|-------------------------|--------------|----------|
| 1 Form A                | 12V DC       | CP1a-12V |
| 1 Form C                |              | CP1-12V  |
| 1 Form C for wiper load |              | CP1W-12V |

Standard packing; Carton (tube): 40 pcs.; Case: 1,000 pcs.

**2. Surface mount terminal type**

| Contact arrangement | Coil voltage | Part No.    |
|---------------------|--------------|-------------|
| 1 Form C            | 12V DC       | CP1SA-12V-X |
|                     |              | CP1SA-12V-Z |

Standard packing; Carton (tape and reel): 300 pcs.; Case: 900 pcs.

Notes: \*1. Surface-mount terminal type is available only for 1 form C contact arrangement.

\*2. Surface mount terminal type is only supplied in tape and reel packaging. Tube packaging is only available for PC board type. Tape and reel packing symbol "-z" or "-x" are not marked on the relay.

# 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 (at 20°C 68°F) | Usable voltage range (at 85°C 185°F) |
|----------------------|--------------------------------|---------------------------------|---|---|--|--------------------------------------|
| 12V DC               | Max. 7.2V DC (Initial)         | Min. 1.0V DC (Initial)          | 53.3 mA   | 225 $\Omega$                                  | 640 mW                                 | 10 to 16V DC                         |

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

## 2. Specifications

### 1) Standard CP relay

| Characteristics            | Item   | Specifications  |   |
|----------------------------|--|---|---|
|                            |  | 1 Form A  | 1 Form C  |
| Contact                    | Arrangement  |   |   |
|                            | Initial contact resistance (Initial)                                 | N.O.: Typ6m $\Omega$ , N.C.: Typ8m $\Omega$ (By voltage drop 6V DC 1A)  |   |
|                            | Contact material   | Ag alloy (Cadmium free)   |   |
| Rating                     | Nominal switching capacity (resistive load)                          | 20A 14V DC  | N.O.: 20A 14V DC, N.C.: 10A 14V DC  |
|                            | Max. carrying current (12V DC initial)* <sup>3</sup>                 | N.O.: 40A for 2 minutes, 30A for 1 hour (at 20°C 68°F)<br>35A for 2 minutes, 25A for 1 hour (at 85°C 185°F)   |   |
|                            | Nominal operating power  | 640 mW  |   |
|                            | Min. switching capacity (resistive load)* <sup>1</sup>               | 1A 12V DC   |   |
| Electrical characteristics | Insulation resistance (Initial)                                      | Min. 100 M $\Omega$ (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)                                    | Max. 10ms (at 20°C 68°F, excluding contact bounce time) (Initial)   |   |
|                            | Release time (at nominal voltage)                                    | Max. 10ms (at 20°C 68°F, excluding contact bounce time) (Initial)   |   |
| Mechanical characteristics | Shock resistance   | Functional  | Min. 100 m/s <sup>2</sup> {10G} (Half-wave pulse of sine wave: 11ms; detection: 10 $\mu$ s)   |
|                            |  | Destructive   | Min. 1,000 m/s <sup>2</sup> {100G} (Half-wave pulse of sine wave: 6ms)  |
|                            | Vibration resistance   | Functional  | 10 Hz to 100 Hz, Min. 44.1 m/s <sup>2</sup> {4.5G} (Detection time: 10 $\mu$ s)   |
|                            |  | Destructive   | 10 Hz to 500 Hz, Min. 44.1 m/s <sup>2</sup> {4.5G}<br>Time of vibration for each direction; X, Y direction: 2 hours, Z direction: 4 hours |
| Expected life              | Mechanical   | Min. 10 <sup>7</sup> (at 120 cpm)   |   |
|                            | Electrical<br>*Motor load does not apply to wiper load applications. | <Resistive load> Min. 10 <sup>5</sup> (At nominal switching capacity, operating frequency: 1s ON, 9s OFF)<br><Motor load*><br>Min. 2x10 <sup>5</sup> (N.O. side, Inrush 25A, steady 5A at 14V DC)<br>Min. 10 <sup>5</sup> (N.O. side, 20A 14V DC at motor lock)<br>Min. 2x10 <sup>5</sup> (N.C. side, 20A 14V DC at brake current) (Operating frequency: 0.5s ON, 9.5s OFF) |   |
| Conditions                 | Conditions for operation, transport and storage* <sup>2</sup>        | Ambient temp: -40°C to +85°C -40°F to +185°F<br>Humidity: 5% R.H. to 85% R.H. (Not freezing and condensing at low temperature)  |   |
|                            | Max. operating speed   | 6 cpm (at rated load)   |   |
| Mass                       |  | Approx. 4g .14 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. Refer to "6. Usage, Storage and Transport Conditions" in [AMBIENT ENVIRONMENT](#) section in [Relay Technical Information](#).

Please inquire if you will be using the relay in a high temperature atmosphere (110°C 230°F).

\*3. Depends on connection conditions. Also, this does not guarantee repeated switching. We recommend that you confirm operation under actual conditions.

### 2) For wiper load

Anything outside of that given below complies with standard CP relays.

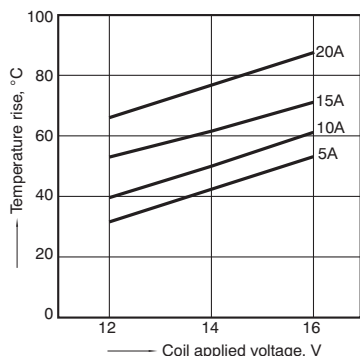
| Characteristics | Item                                   | Specifications   |
|-----------------|--|--|
| Rating          | Max. carrying current (12V DC initial) | N.O.: 25A for 1 minutes, 15A for 1 hour (at 20°C 68°F)   |
| Expected life   | Electrical                             | <Wiper motor load (L = Approx. 1mH)><br>N.O. side: Min. 5x10 <sup>5</sup> (Inrush 25A, steady 6A at 14V DC)<br>N.C. side: Min. 5x10 <sup>5</sup> (12A 14V DC at brake current)<br>(Operating frequency: 1s ON, 9s OFF) |

Note:\*1. Depends on connection conditions. Also, this does not guarantee repeated switching. We recommend that you confirm operation under actual conditions.

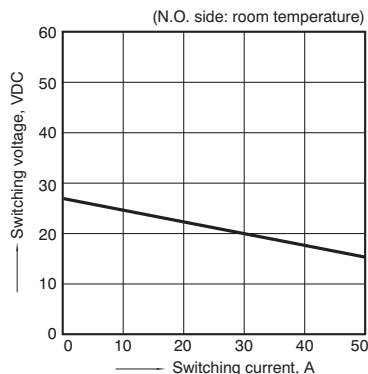
# REFERENCE DATA

## 1. Coil temperature rise

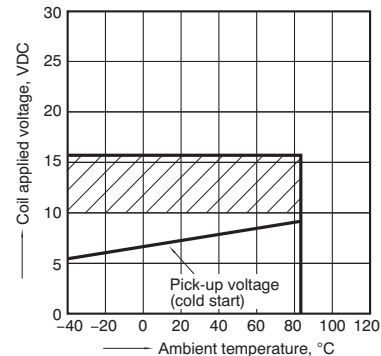
Sample: CP1-12V, 6pcs  
 Point measured: Inside the coil  
 Contact carrying current, 5A, 10A, 15A, 20A  
 Resistance method, ambient temperature 85°C 185°F



## 2. Max. switching capability (Resistive load)

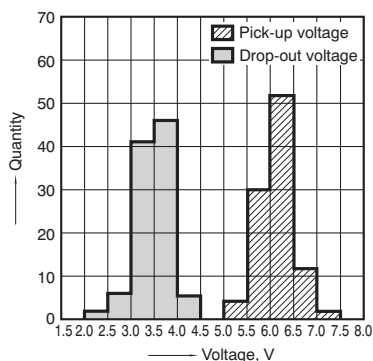


## 3. Ambient temperature and operating voltage range



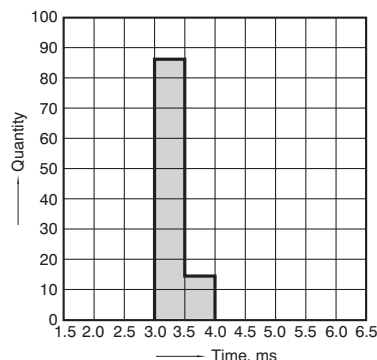
## 4. Distribution of pick-up and drop-out voltage

Sample: CP1-12V, 100pcs  
 Ambient temperature: 20°C 68°F



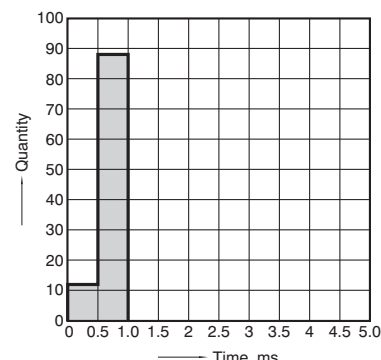
## 5. Distribution of operate time

Sample: CP1-12V, 100pcs  
 Ambient temperature: 20°C 68°F



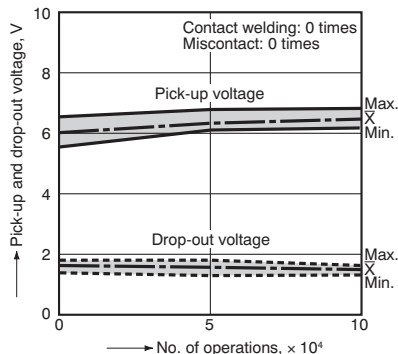
## 6. Distribution of release time

Sample: CP1-12V, 100pcs  
 Ambient temperature: 20°C 68°F  
 \* Without diode



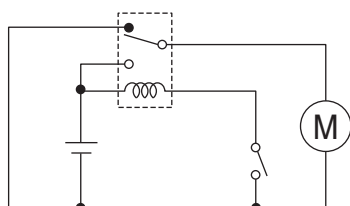
## 7.-(1) Electrical life test (at resistive load)

Sample: CP1-12V  
 Quantity: n = 4 (N.C. = 2, N.O. = 2)  
 Load: Resistive load (N.C. side: 10A 14V DC, N.O. side: 20A 14V DC)  
 Operating frequency: ON 1s, OFF 9s  
 Ambient temperature: Room temperature

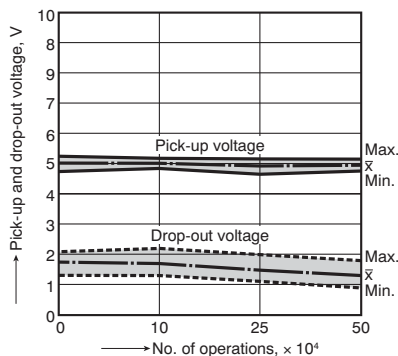


## 7.-(2) Electrical life test for wiper load (motor free)

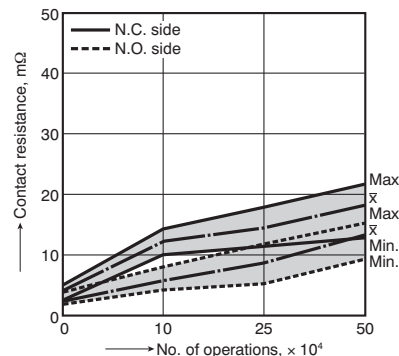
Sample: CP1W-12V  
 Quantity: n = 5  
 Load: N.O. side: Inrush 25A, steady 6A 14V DC  
 Load: N.C. side: Brake current 12A 14V DC  
 Operating frequency: ON 1s, OFF 9s  
 Ambient temperature: Room temperature  
 Circuit



## Change of pick-up and drop-out voltage



## Change of contact resistance

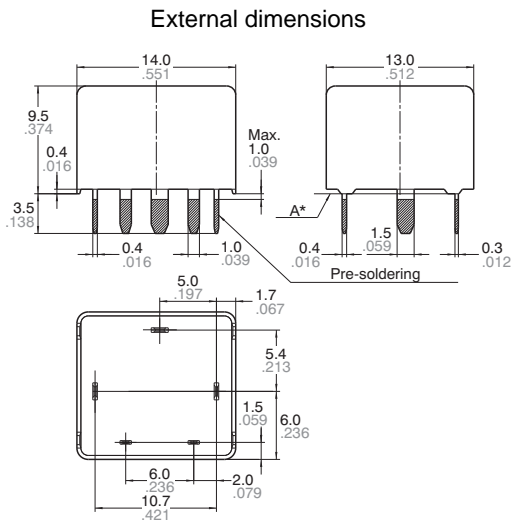


**DIMENSIONS**(mm inch)

Download [CAD Data](#) from our Web site.

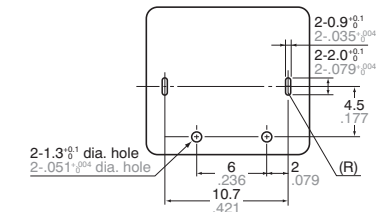
**1. PC board terminal type**

[CAD Data](#)

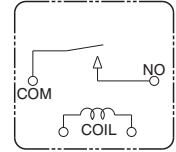


| <u>Dimension:</u>           | <u>Tolerance</u> |
|-----------------------------|------------------|
| Max. 1mm .039 inch:         | ±0.1 ±.004       |
| 1 to 3mm .039 to .118 inch: | ±0.2 ±.008       |
| Min. 3mm .118 inch:         | ±0.3 ±.012       |

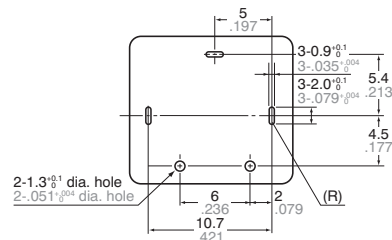
**PC board pattern  
(Bottom view)  
1 Form A**



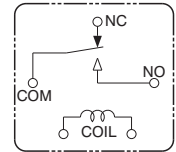
**Schematic  
(Bottom view)  
1 Form A**



**1 Form C**



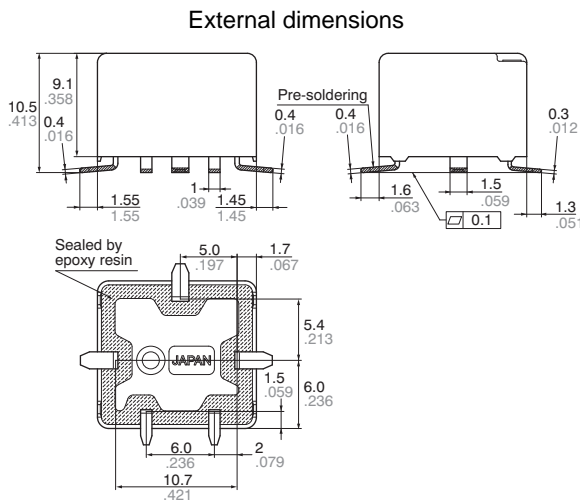
**1 Form C**



\* Dimensions (thickness and width) of terminal specified in this catalog is measured before pre-soldering.  
Intervals between terminals is measured at A surface level.

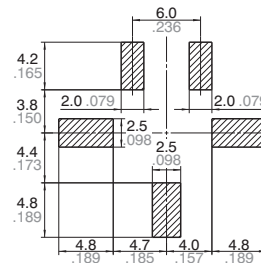
**2. Surface mount terminal type**

[CAD Data](#)

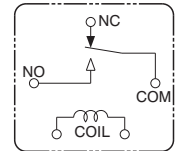


| <u>Dimension:</u>           | <u>Tolerance</u> |
|-----------------------------|------------------|
| Max. 1mm .039 inch:         | ±0.1 ±.004       |
| 1 to 3mm .039 to .118 inch: | ±0.2 ±.008       |
| Min. 3mm .118 inch:         | ±0.3 ±.012       |

**Recommendable mounting pad  
(Top view)**



**Schematic  
(Top view)**



**For Cautions for Use, see [Relay Technical Information](#).**