



**FEATURES**

**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.**

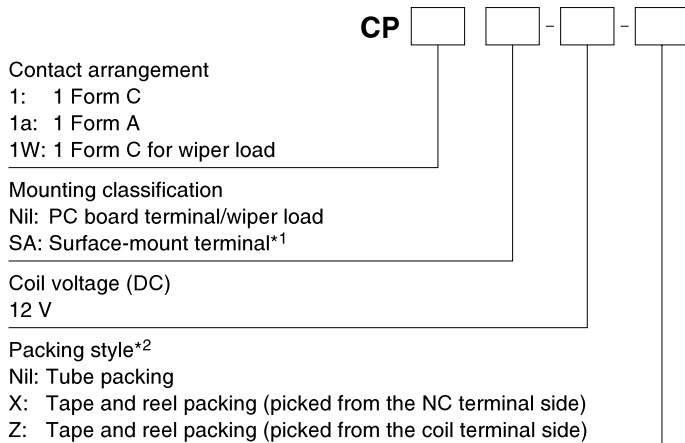
**TYPICAL APPLICATIONS**

**For automotive system**

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

Compliance with RoHS Directive

**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) 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} 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 *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) <Motor load*> Min. 2 $\times$ 10 <sup>5</sup> (N.O. side, Inrush 25A, steady 5A at 14V DC) Min. 10 <sup>5</sup> (N.O. side, 20A 14V DC at motor lock) Min. 2 $\times$ 10 <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 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 Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT

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.

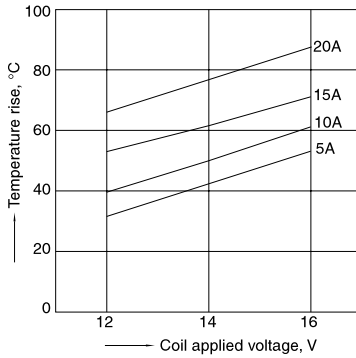
Characteristics	Item	Specifications
Rating	Max. carrying current (12V DC initial)* <sup>1</sup>	N.O.: 25A for 1 minutes, 15A for 1 hour (at 20°C 68°F)
Expected life	Electrical	<Wiper motor load (L = Approx. 1mH)> N.O. side: Min. 5 $\times$ 10 <sup>5</sup> (Inrush 25A, steady 6A at 14V DC) N.C. side: Min. 5 $\times$ 10 <sup>5</sup> (12A 14V DC at brake current) (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.

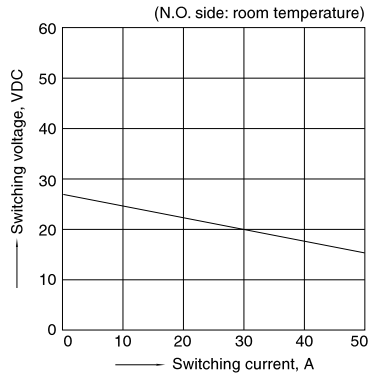
REFERENCE DATA

1. Coil temperature rise

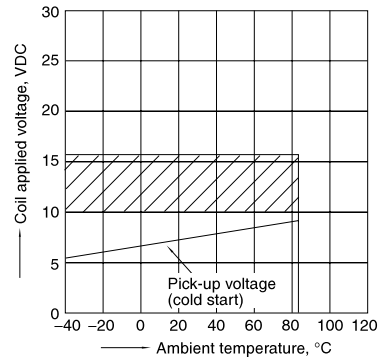
Sample: CP1-12V, 6pcs  
 Point measured: Inside the coil  
 Contact carrying current, 5A, 10A, 15A, 20A  
 Resistance method, ambient temperature 85°C 185°F



2. Max. switching capability (Resistive load)

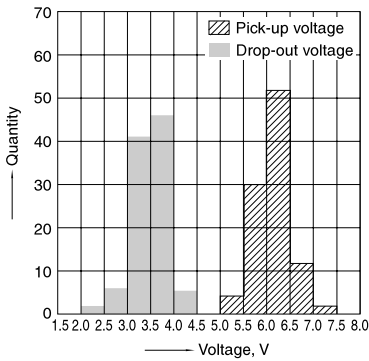


3. Ambient temperature and operating voltage range



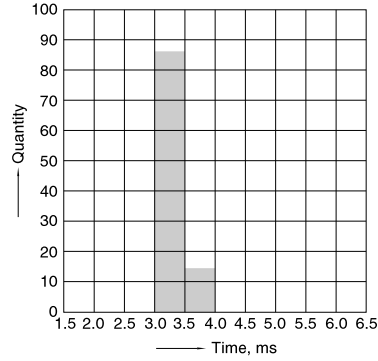
4. Distribution of pick-up and drop-out voltage

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



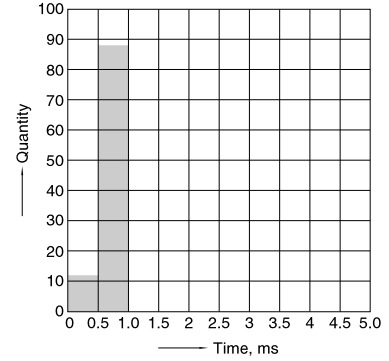
5. Distribution of operate time

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



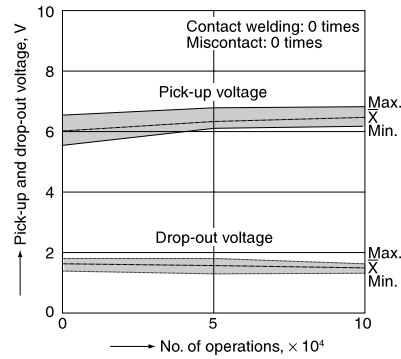
6. Distribution of release time

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



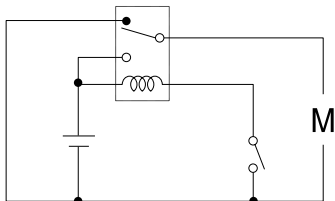
7.-(1) Electrical life test (at resistive load)

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

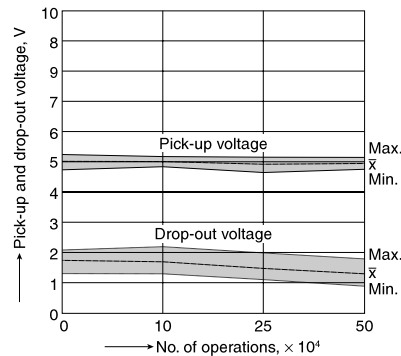


7.-(2) Electrical life test for wiper load (motor free)

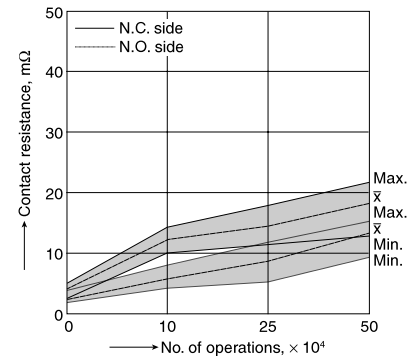
Sample: CP1W-12V  
 Quantity: n = 5  
 Load: N.O. side: Inrush 25A, steady 6A 14V DC  
 Load: N.C. side: Brake current 12A 14V DC  
 Operating frequency: ON 1s, OFF 9s  
 Ambient temperature: Room temperature  
 Circuit



Change of pick-up and drop-out voltage

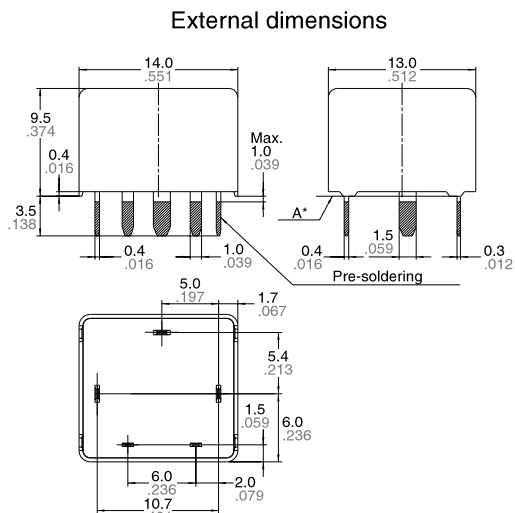


Change of contact resistance



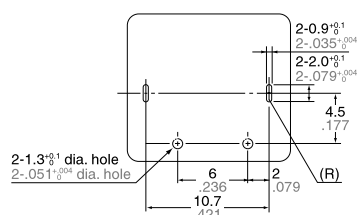
# DIMENSIONS (Unit: mm inch)

## 1. PC board terminal type

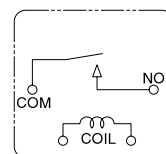


Dimension:	Tolerance
Max. 1mm .039 inch:	$\pm 0.1 \pm .004$
1 to 3mm .039 to .118 inch:	$\pm 0.2 \pm .008$
Min. 3mm .118 inch:	$\pm 0.3 \pm .012$

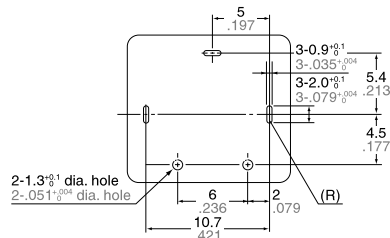
### PC board pattern (Bottom view)



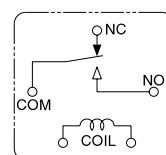
### Schematic (Bottom view)



### 1 Form C

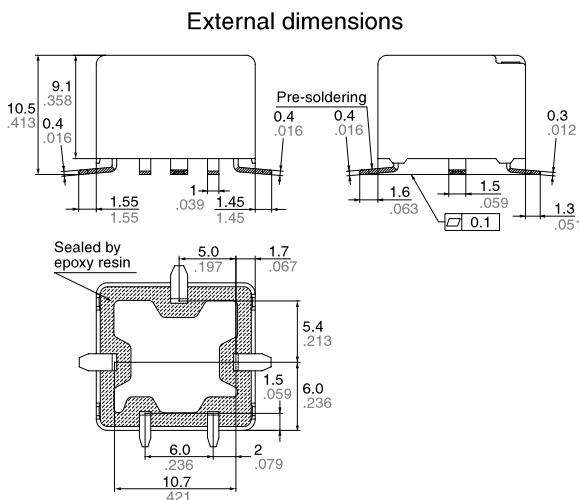


### 1 Form C



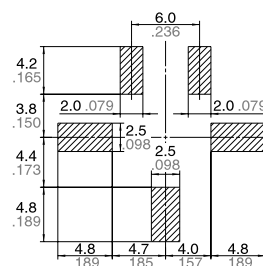
\* Dimensions (thickness and width) of terminal specified in this catalog is measured before pre-soldering.  
Intervals between terminals is measured at A surface level.

## 2. Surface mount terminal type

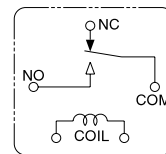


Dimension:	Tolerance
Max. 1mm .039 inch:	$\pm 0.1 \pm .004$
1 to 3mm .039 to .118 inch:	$\pm 0.2 \pm .008$
Min. 3mm .118 inch:	$\pm 0.3 \pm .012$

### Recommendable mounting pad (Top view)



### Schematic (Top view)



**For Cautions for Use, see Relay Technical Information.**