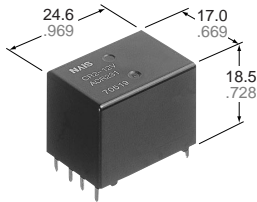


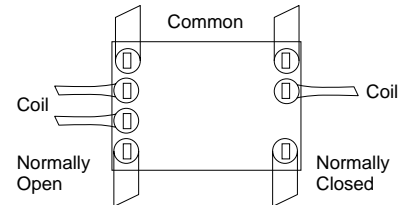
### FEATURES

- **Quiet**  
Noise has been reduced by approximately 20 dB, using our own silencing design.
- **Twin (1 Form C × 2)**  
Forward/reverse motor control is possible with a single relay.
- **Sealed construction**

- Simple footprint enable ease of PC board layout



mm inch



### SPECIFICATIONS

#### Contact

Arrangement	1 Form C × 2 (H bridge)	
Contact material	Silver alloy	
Initial contact resistance, max. (By voltage drop 6 V DC 1A)	100 mΩ	
Contact voltage drop, max.	0.2V (at 10 A switching)	
Rating	Nominal switching capacity	N.O.: 20 A 14 V DC N.C.: 10 A 14 V DC
	Max. carrying current	35 A for 2 minutes, 25 A for 1 hour (12 V, at 20°C/68°F) 30 A for 2 minutes, 20 A for 1 hour (12 V, at 85°C/185°F)
Expected life (min. operations)	Mechanical (at 120 cpm)	Min. 10 <sup>7</sup>
	Electrical	Resistive load
Motor load		Min. 2×10 <sup>5*2</sup> Min. 10 <sup>5*3</sup>

#### Coil

Nominal operating power	640 mW
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#### Remarks

- \* Specifications will vary with foreign standards certification ratings.
- \*1 At nominal switching capacity, operating frequency: 1s ON, 9s OFF
- \*2 N.O.: at 5 A (steady), 25 A (inrush)/N.C.: at 20 A (brake) 14 V DC, operating frequency: 0.5s ON, 9.5s OFF
- \*3 At 20A 14 V DC (Motor lock), operating frequency: 0.5s ON, 9.5s OFF
- \*4 Measurement at same location as "Initial breakdown voltage" section
- \*5 Detection current: 10mA
- \*6 Excluding contact bounce time
- \*7 Half-wave pulse of sine wave: 11ms; detection: 10μs
- \*8 Half-wave pulse of sine wave: 6ms
- \*9 Detection time: 10μs

#### Characteristics

Max. operating speed (at nominal switching capacity)	6 cpm	
Initial insulation resistance*4	Min. 100 MΩ (at 500 V DC)	
Initial breakdown voltage*5	Between open contacts	500 Vrms for 1 min.
	Between contacts and coil	500 Vrms for 1 min.
Operate time*6 (at nominal voltage)(at 20°C/68°F)	Max. 10 ms (initial)	
Release time (without diode)*6 (at nominal voltage)(at 20°C/68°F)	Max. 10 ms (initial)	
Shock resistance	Functional*7	Min. 100 m/s <sup>2</sup> {10G}
	Destructive*8	Min. 1,000 m/s <sup>2</sup> {100G}
Vibration resistance	Functional*9	10 to 100 Hz, Min. 44.1 m/s <sup>2</sup> {4.5G}
	Destructive*10	10 to 500 Hz, Min. 44.1 m/s <sup>2</sup> {4.5G}
Conditions for operation, transport and storage*11 (Not freezing and condensing at low temperature)	Ambient temperature	-40 to +85°C -40 to +185°F
	Humidity	5 to 85% R.H.
Unit weight	Approx. 12.5g, 44 oz	

- \*10 Time of vibration for each direction;  
X, Y direction: 2 hours  
Z direction: 4 hours



- \*11 Refer to 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 61)

### TYPICAL APPLICATIONS

- Power windows
- Auto door lock
- Power sunroof
- Electrically powered mirror

### ORDERING INFORMATION

Ex. CR 2 - 12 V

Contact arrangement	Coil voltage(DC)
1 Form C × 2	12 V

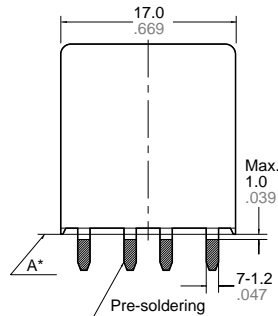
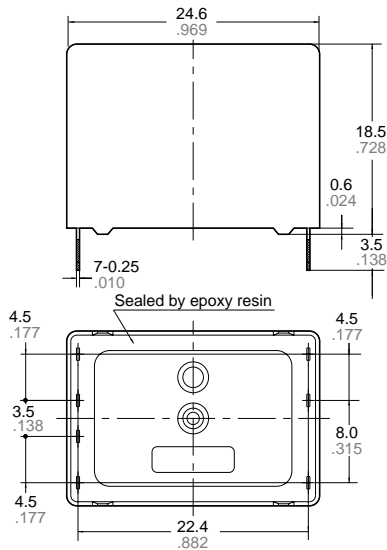
Standard packing: Carton(tube package) 32pcs. Case: 800pcs.

**TYPES AND COIL DATA (at 20°C 68°F)**

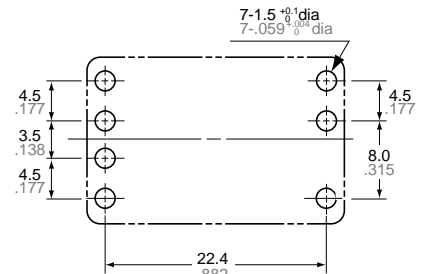
Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (max.)	Drop-out voltage, V DC (min.)	Coil resistance, Ω (±10%)	Nominal operating current, mA (±10%)	Nominal operating power, mW	Usable voltage range, V DC
CR2-12V	12	(Initial) 7.2	(Initial) 1.0	225	53.3	640	10 to 16

**DIMENSIONS**

mm inch

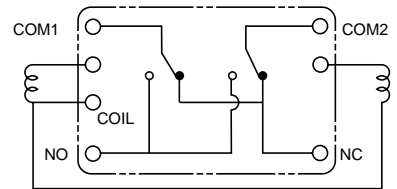


PC board pattern (Bottom view)



Tolerance: ±0.1±.004

Schematic (Bottom view)

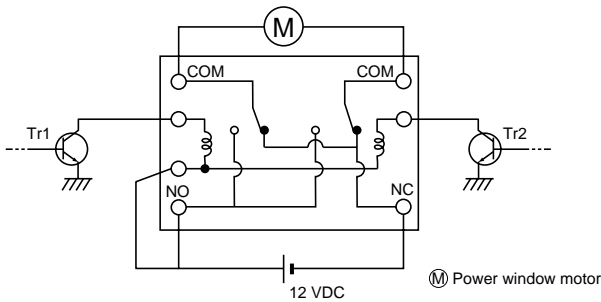


**Dimension:**  
 Max. 1mm .039 inch: ±0.1 ± .004  
 1 to 3mm .039 to .118 inch: ±0.2 ± .008  
 Min. 3mm .118 inch: ±0.3 ± .012

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

**EXAMPLE OF CIRCUIT**

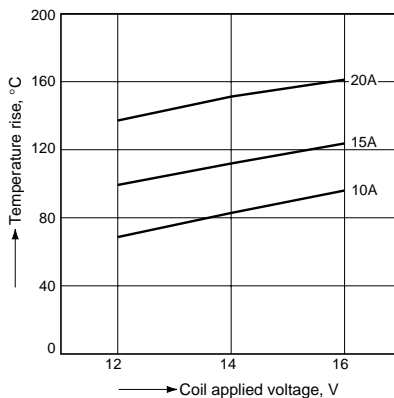
Forward/reverse control circuits of DC motor for power window



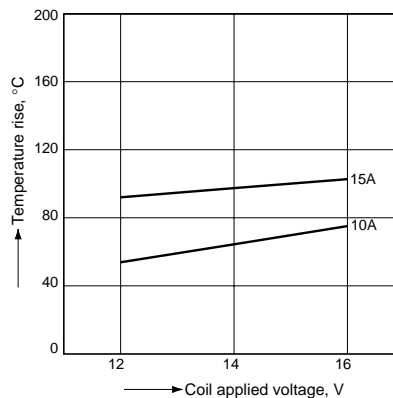
Tr1	Tr2	Motor
OFF	OFF	Stop
ON	OFF	Forward
OFF	ON	Reverse

**REFERENCE DATA**

1-(1). Coil temperature rise (at 20°C 68°F)  
 Sample: CR2-12V, 5pcs  
 Contact carrying current: 10A, 15A, 20A

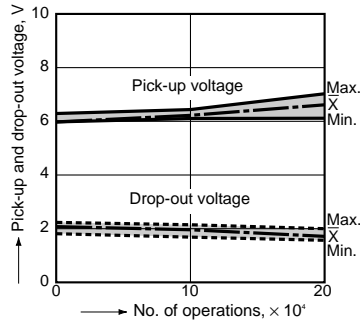
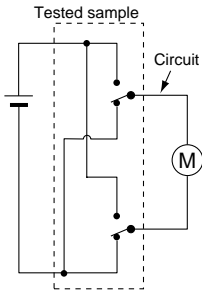


1-(2). Coil temperature rise (at 85°C 185°F)  
 Sample: CR2-12V, 5pcs  
 Contact carrying current: 10A, 15A



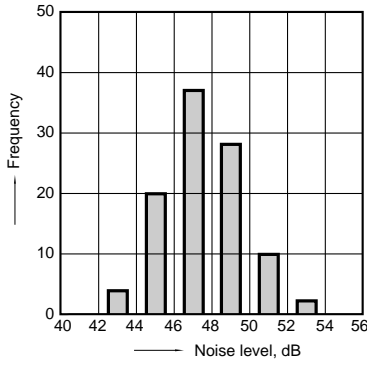
2. Electrical life test (Motor load)

Tested sample: CR2-12 V, 3pcs.  
 Load: 5A steady, Inrush 25A, 14V DC  
 Operating frequency: ON 0.5s, OFF 9.5s

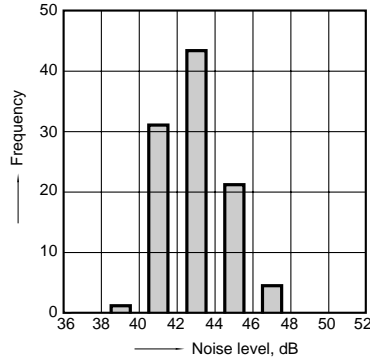


Contact welding: 0 time  
 Miscontact: 0 time

5-(1). Operation noise distribution  
 When operate

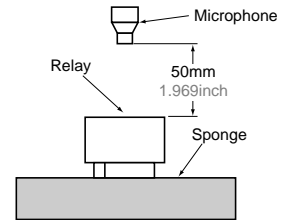


5-(2). Operation noise distribution  
 When release



Measuring conditions

Tested sample: CR2-12 V, 50 pcs.(No. of data: 100)  
 Equipment setting: " A " weighted, Fast, Max. hold  
 Coil voltage: 12V DC  
 Coil connection device: Diode  
 Background noise: Approx. 20dB



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