



## FEATURES

### 1. Silent

Noise has been reduced by approximately 20 dB, using our own silencing design.

### 2. Less space required

Measuring only 17(L) × 13(W) mm .669(L) × .512(W) inches, this product ranks first among automotive quiet relays in terms of saving space.

### 3. Next-generation standard terminal pitch employed

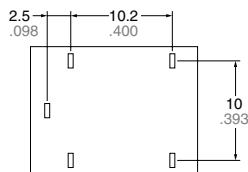
The terminal array used is identical to that used in JJM relays.

### 4. Sealed construction

### 5. Model available for wiper load

## TYPICAL APPLICATIONS

Intermittent wiper, Cruise control, Power windows, Auto door lock, Power supply of car stereo and car air-conditioner, Electrically powered seats, Electrically powered sunroof, etc.



Compliance with RoHS Directive

## TYPES

Contact arrangement	Coil voltage	Model No.	Part No.
1 Form C	12V DC	ACQ131	CQ1-12V
1 Form C for wiper load		ACQW131	CQ1W-12V

Standard packing; Carton (tube): 40 pcs.; Case: 800 pcs.

## 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 [±10%] (at 20°C 68°F)	Coil resistance [±10%] (at 20°C 68°F)	Nominal operating power (at 20°C 68°F)	Usable voltage range
12V DC	Max. 7.2V DC (Initial)	Min. 1.0V DC (Initial)	53.3 mA	225Ω	640 mW	10 to 16V DC

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

**2. Specifications**

**1) Standard CQ relay**

Characteristics	Item	Specifications	
Contact	Arrangement	1 Form C	
	Initial contact resistance (Initial)	N.O.: Typ7mΩ, N.C.: Typ8mΩ (By voltage drop 6V DC 1A)	
	Contact voltage drop	Max. 0.2V (at 10 A)	
	Contact material	Ag alloy (Cadmium free)	
Rating	Nominal switching capacity (resistive load)	N.O.: 20A 14V DC, N.C.: 10A 14V DC	
	Max. carrying current (12V DC initial)*3	N.O.: 35A for 2 minutes, 25A for 1 hour (at 20°C 68°F) 30A for 2 minutes, 20A for 1 hour (at 85°C 185°F)	
	Nominal operating power	640 mW	
	Min. switching capacity (resistive load)*1	1A 12V DC	
Electrical characteristics	Insulation resistance (Initial)	Min. 100 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)	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: 10μs)
		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: 10μs)
		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. 3×10 <sup>5</sup> (Inrush 30A, steady 5A, 20A 14V DC at brake current) (Operating frequency: 1s ON, 2s OFF)	
Conditions	Conditions for operation, transport and storage*2	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. 6.5g .23 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

\*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**

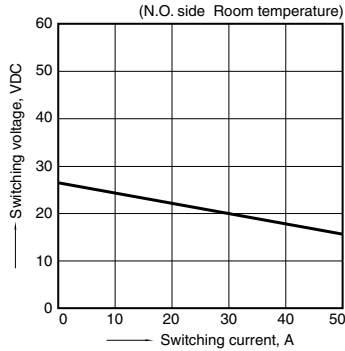
Anything outside of that given below complies with standard CQ relays.

Characteristics	Item	Specifications
Rating	Max. carrying current (12V DC initial)*1	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. 5×10 <sup>5</sup> (Inrush 25A, steady 6A at 14V DC) N.C. side: Min. 5×10 <sup>5</sup> (12A 14V DC at brake current) (Operating frequency: 1s ON, 9s OFF)

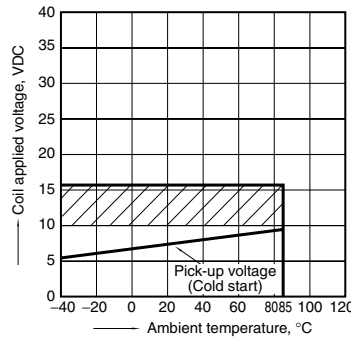
Note: \*1. Depends on connection conditions. Also, this does not guarantee repeated switching. We recommend that you confirm operation under actual conditions.

# REFERENCE DATA

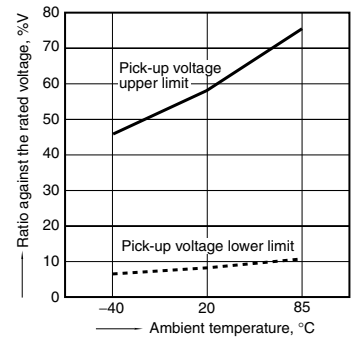
1. Max. switching capability (Resistive load, initial)



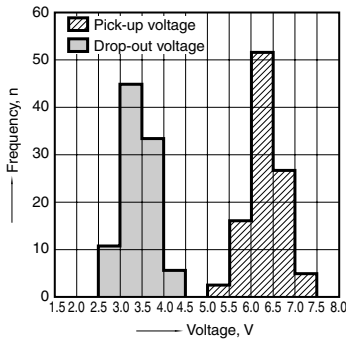
2. Ambient temperature and operating temperature range



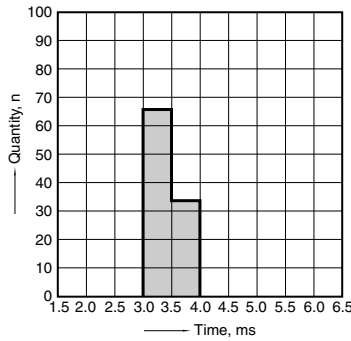
3. Ambient temperature characteristics



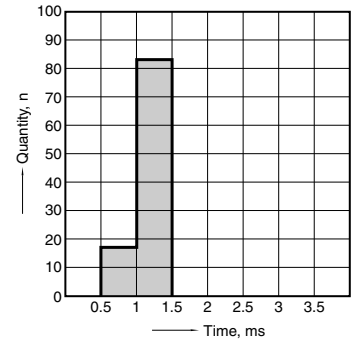
4. Distribution of pick-up and drop-out voltage  
Sample: CQ1-12V, 100pcs



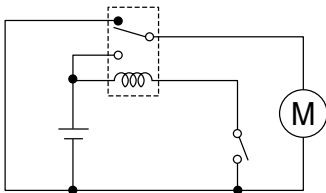
5. Distribution of operate time  
Sample: CQ1-12V, 100pcs



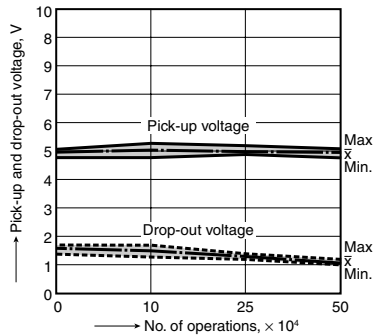
6. Distribution of release time  
Sample: CQ1-12V, 100pcs  
\* Without diode



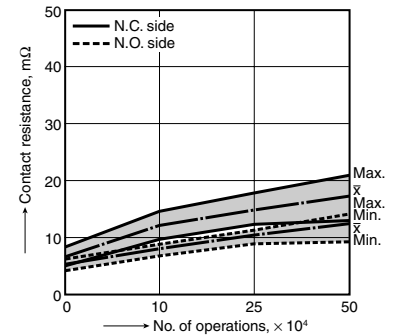
7. Electrical life test for wiper load (motor free)  
Sample: CQ1W-12V  
Quantity: n = 3  
Load: N.O. side: Inrush 25A, steady 6A 14V DC  
Load: N.C. side: Brake current 12A 14V DC  
Operating frequency: ON 1s, OFF 9s  
Ambient temperature: Room temperature  
Circuit



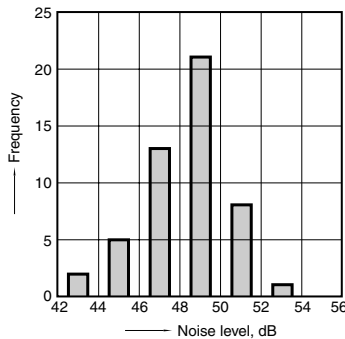
Change of pick-up and drop-out voltage



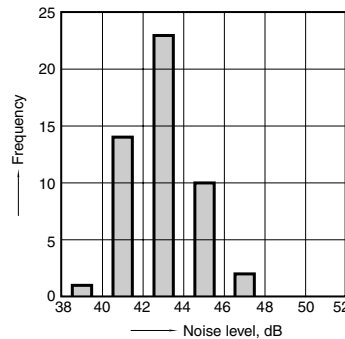
Change of contact resistance



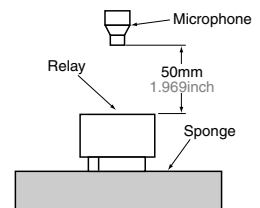
8.-(1) Operation noise distribution  
When operate



8.-(2) Operation noise distribution  
When release



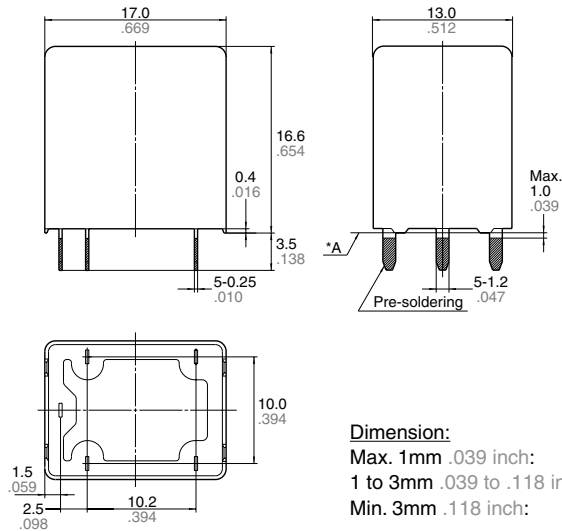
Measuring conditions  
Sample: CQ1-12 V, 50 pcs.  
Equipment setting: "A" weighted, Fast, Max. hold  
Coil voltage: 12V DC  
Coil connection device: Diode  
Background noise: Approx. 20dB



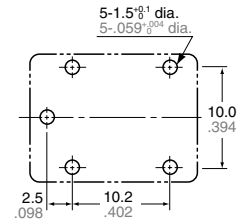
CQ

## DIMENSIONS (Unit: mm inch)

### External dimensions

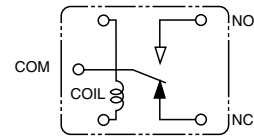


### PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

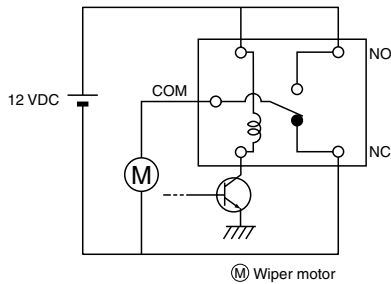
### Schematic (Bottom view)



\* 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

### Control circuit for intermittent wiper motor



For Cautions for Use, see Relay Technical Information.