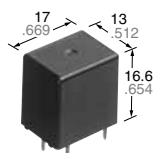


### 1 Form C Automotive Quiet Relay

# CQ RELAYS

<Protective construction>  
Sealed



(Unit: mm inch)

RoHS compliant

## FEATURES

- Sound pressure reduced by approx. 20 dB from that of the conventional non-quiet relays
- Space saving
- Adopting standard terminal pitch (for compact relays)
- Wiper load models are listed

## TYPICAL APPLICATIONS

- For intermittent wipers and applications requiring quiet operation

## ORDERING INFORMATION

ACQ  3

Contact arrangement  
1: 1 Form C  
W1: 1 Form C for wiper load

Protective construction  
3: Sealed

Rated coil voltage (DC)  
1: 12 V

## TYPES

Contact arrangement	Rated coil voltage	Part No.	Packing	
			Carton (tube)	Case
1 Form C	12V DC	ACQ131	40 pcs.	800 pcs.
1 Form C for wiper load		ACQW131		

## RATING

### 1. Coil data

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

Note: Other operate (set) voltage types are also available. Please inquire our sales representative for details.

# CQ (ACQ)

## 2. Specifications

### 1) Standard CQ relay

Item		Specifications
Contact data	Contact arrangement	1 Form C
	Contact resistance (initial)	Max. 100mΩ (N.O.: Typ. 7mΩ, N.C.: Typ. 8mΩ) (By voltage drop 1A 6V DC)
	Contact voltage drop (initial)	Max. 0.2V (at 10 A 12V DC)
	Contact material	Ag alloy
	Rated switching capacity (resistive)	N.O. side: 20A 14V DC, N.C. side: 10A 14V DC
	Max. carrying current (initial)*1 *4	N.O. side: 35A for 2 minutes, 25A for 1 hour (Coil applied voltage 12V DC, at 20°C 68°F) 30A for 2 minutes, 20A for 1 hour (Coil applied voltage 12V DC, at 85°C 185°F)
	Min. switching load (resistive)*2	1A 14V DC (at 20°C 68°F)
Insulated resistance (initial)		Min. 100 MΩ (at 500V DC, Measurement at same location as "Dielectric strength" section.)
Dielectric strength (initial)	Between open contacts	500 Vrms for 1 min. (Detection current: 10mA)
	Between contacts and coil	500 Vrms for 1 min. (Detection current: 10mA)
Time characteristics (initial)	Operate (Set) time (at Rated voltage)	Max. 10ms (at 20°C 68°F, without contact bounce time)
	Release (Reset) time (at Rated voltage)	Max. 10ms (at 20°C 68°F, without contact bounce time) (without diode)
Shock resistance	Functional	Min. 100 m/s <sup>2</sup> {approx. 10G} (Half-wave pulse of sine wave: 11ms; detection time: 10μs)
	Destructive	Min. 1,000 m/s <sup>2</sup> {approx. 100G} (Half-wave pulse of sine wave: 6ms)
Vibration resistance	Functional	10 to 100 Hz, Min. 44.1 m/s <sup>2</sup> {approx. 4.5G} (Detection time: 10μs)
	Destructive	10 to 500 Hz, Min. 44.1 m/s <sup>2</sup> {approx. 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*4	<Resistive load> Min. 10 <sup>5</sup> (at rated 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 usage, transport and storage*3	Ambient temperature: -40 to +85°C -40 to +185°F Humidity: 5 to 85% R.H. (Please avoid icing or condensation)
Weight		Approx. 6.5g .23 oz

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

\*2. 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.

\*3. The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. For details, please refer to the "Automotive Relay Users Guide".

\*4. For wiper motor load, please see the wiper load specifications, below.

### 2) For wiper load (ACQW131)

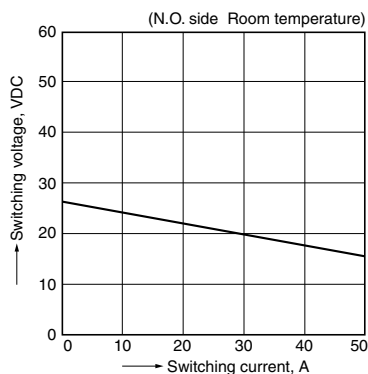
Anything outside of that given below complies with standard CQ relays.

Item		Specifications
Contact data	Max. carrying current (initial)*1	N.O. side: 25A for 1 minutes, 15A for 1 hour (coil applied voltage 12V DC, at 20°C 68°F)
Expected life	Electrical	<Wiper motor load (L = Approx. 1mH) without capacitor> N.O. side: Min. 5×10 <sup>5</sup> (Inrush 25A, steady 6A 14V DC) N.C. side: Min. 5×10 <sup>5</sup> (12A 14V DC at brake current) (Operating frequency: 1s ON, 9s OFF)

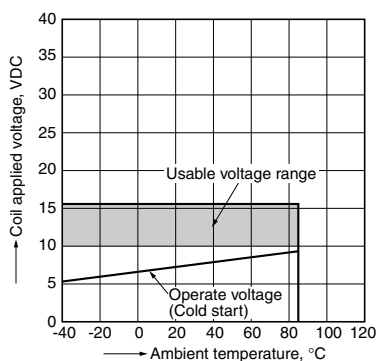
Note: \*1. Depends on connection conditions. Also, this does not guarantee repeated switching. We recommend that you confirm operation under actual conditions.

# REFERENCE DATA

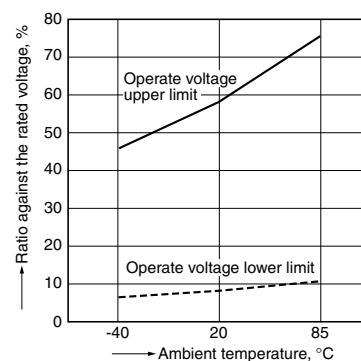
1. Max. switching capability (Resistive load, initial)



2. Ambient temperature and usable voltage range

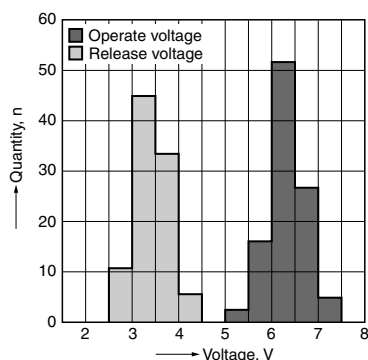


3. Ambient temperature characteristics



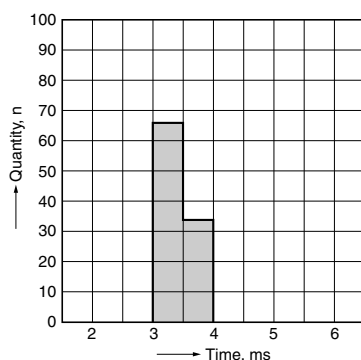
4. Distribution of operate (set) and release (reset) voltage

Sample: ACQ131, 100pcs



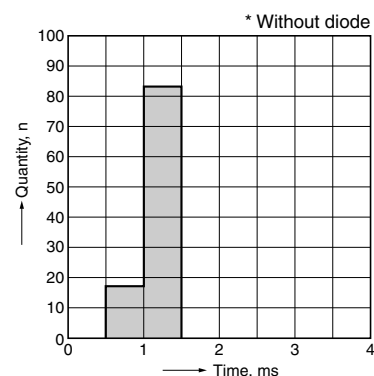
5. Distribution of operate (set) time

Sample: ACQ131, 100pcs



6. Distribution of release (reset) time

Sample: ACQ131, 100pcs



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

Sample: ACQW131

Quantity: n = 3

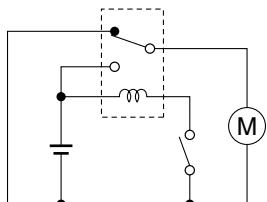
Load: N.O. side: Inrush 25A, steady 6A 14V DC

N.C. side: Brake current 12A 14V DC

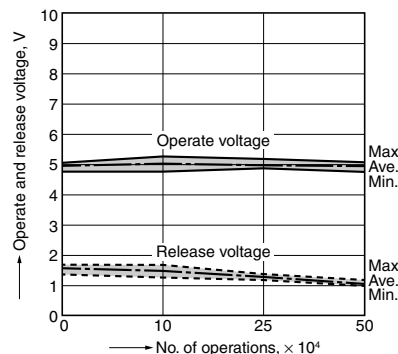
Operating frequency: ON 1s, OFF 9s

Ambient temperature: Room temperature

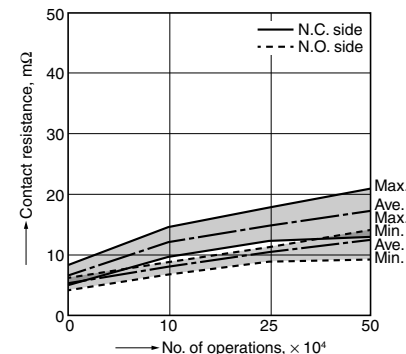
Circuit:



Change of operate (set) and release (reset) voltage

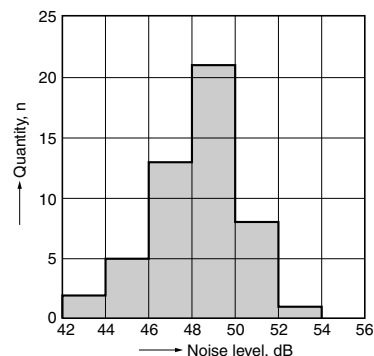


Change of contact resistance



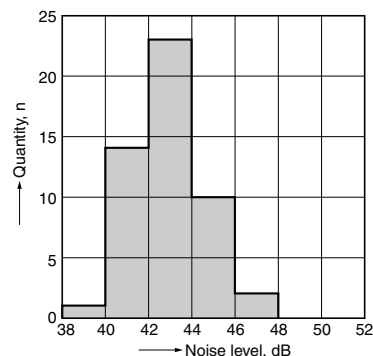
8.-(1) Operation noise distribution

When operate



8.-(2) Operation noise distribution

When release



Measuring conditions

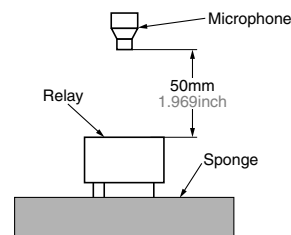
Sample: ACQ131, 50 pcs.

Equipment setting: "A" weighted, Fast, Max. hold

Coil voltage: 12V DC

Coil connection device: Diode

Background noise: Approx. 20dB



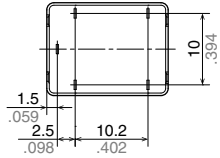
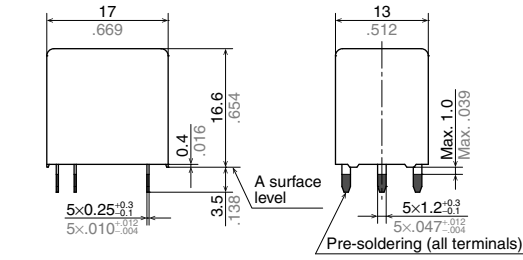
**DIMENSIONS** (mm inch)

The CAD data of the products with a **CAD** mark can be downloaded from: <http://industrial.panasonic.com/ac/e/>

**CAD**

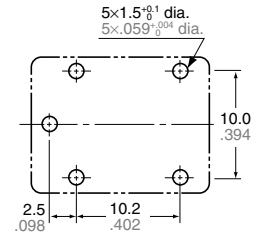


**External dimensions**



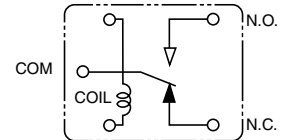
Dimension:	Tolerance
Max. 1mm .039 inch:	$\pm 0.1 \pm 0.04$
1 to 3mm .039 to .118 inch:	$\pm 0.2 \pm 0.08$
Min. 3mm .118 inch:	$\pm 0.3 \pm 0.12$

**PC board pattern (Bottom view)**



Tolerance:  $\pm 0.1 \pm 0.04$

**Schematic (Bottom view)**



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

**For general cautions for use, please refer to the “Automotive Relay Users Guide”.**

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Please contact .....

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