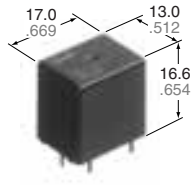
Panasonic
ideas for life

1 FORM C AUTOMOTIVE SILENT RELAY

CQ RELAYS



mm inch

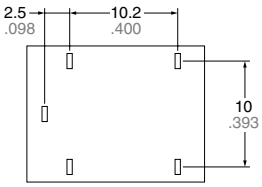
FEATURES

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

• 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.

• Sealed construction

• Next-generation standard terminal pitch employed
The terminal array used is identical to that used in JJM relays.



SPECIFICATIONS

Contact

Arrangement			1 Form C
Contact material			Silver alloy
Initial contact resistance (By voltage drop 6 V DC 1A)			Max. 100 mΩ
Contact voltage drop			Max. 0.2V (at 10 A)
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)
	Min. switching capacity#1		1 A 12 V DC
Expected life (min. operations)	Mechanical (at 120 cpm)		Min. 10^7
	Electrical	Resistive load	Min.10^{5}*1
		Motor load	Min. 3×10^{5}*2

Coil

Nominal operating power	640 mW

#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.

Remarks

*1 At nominal switching capacity, operating frequency: 1s ON, 9s OFF
*2 N.O.: at 5 A (steady), 30 A (inrush)/N.C.: at 20 A (brake) 14 V DC, operating frequency: 1s ON, 2s OFF
*3 Measurement at same location as "Initial breakdown voltage" section
*4 Detection current: 10mA
*5 Excluding contact bounce time
*6 Half-wave pulse of sine wave: 11ms; detection: 10μs
*7 Half-wave pulse of sine wave: 6ms
*8 Detection time: 10μs

Characteristics

Max. operating speed (at nominal switching capacity)		6 cpm
Initial insulation resistance*3		Min. 100 MΩ (at 500 V DC)
Initial breakdown voltage*4	Between open contacts	500 Vrms for 1 min.
	Between contacts and coil	500 Vrms for 1 min.
Operate time*5 (at nominal voltage)(at 20°C68°F)		Max. 10 ms (initial)
Release time*5 (at nominal voltage)(at 20°C68°F)		Max. 10 ms (initial)
Shock resistance	Functional*6	Min. 100 m/s² {10G}
	Destructive*7	Min. 1,000 m/s² {100G}
Vibration resistance	Functional*8	10 Hz to 100 Hz, Min. 44.1 m/s² {4.5G}
	Destructive*9	10 Hz to 500 Hz, Min. 44.1 m/s² {4.5G}
Conditions for operation, transport and storage*10 (Not freezing and condensing at low temperature)	Ambient temperature	–40°C to +85°C –40°F to +185°F
	Humidity	5% R.H. to 85% R.H.
Mass		Approx. 6.5g .23 oz

*9 Time of vibration for each direction;

X, Y, direction: 2 hours
Z direction: 4 hours

*10 Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT

TYPICAL APPLICATIONS

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

ORDERING INFORMATION

Ex. CQ [1] – [12 V]

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

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

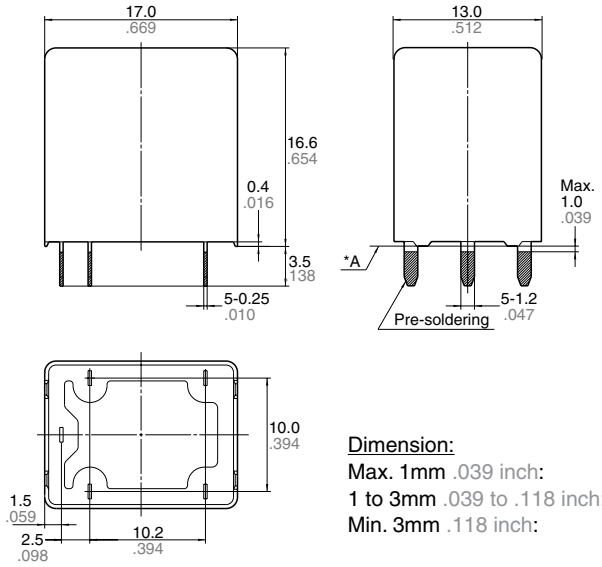
TYPES AND COIL DATA (at 20°C 68°F)

Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (Initial)*	Drop-out voltage, V DC (Initial)	Coil resistance, Ω	Nominal operating current, mA	Nominal operating power, mW	Usable voltage range, V DC
CQ1-12V	12	Max. 7.2	Min. 1.0	225±10%	53.3±10%	640	10 to 16

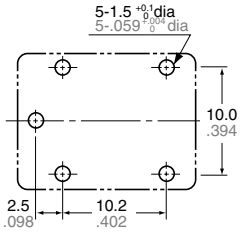
* Other pick-up voltage types are also available. Please contact us for details.

DIMENSIONS

mm inch

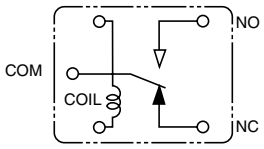


PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)

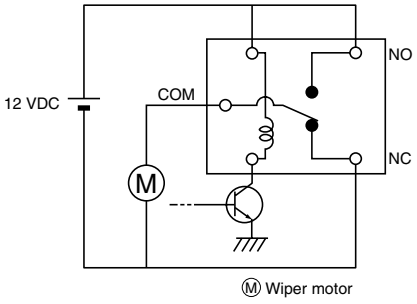


Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

* 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

Control circuit for intermittent wiper motor

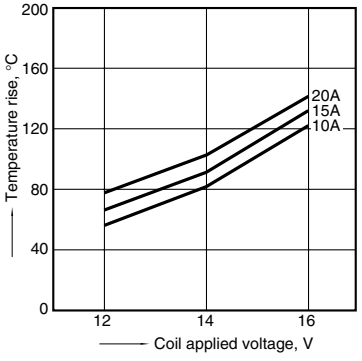


Ⓜ Wiper motor

REFERENCE DATA

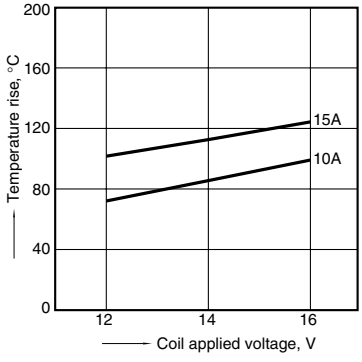
1-(1). Coil temperature rise (at room temperature)

Sample: CQ1-12V, 5pcs
Contact carrying current: 10A, 15A, 20A
Ambient temperature: Room temperature

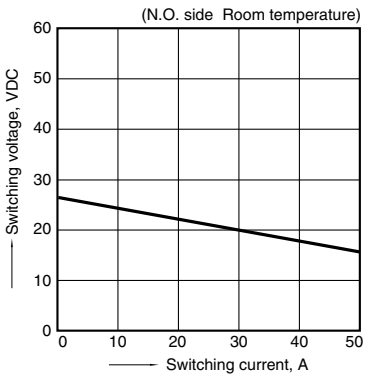


1-(2). Coil temperature rise (at 85°C 185°F)

Sample: CQ1-12V, 5pcs
Contact carrying current: 10A, 15A
Ambient temperature: 85°C 185°F

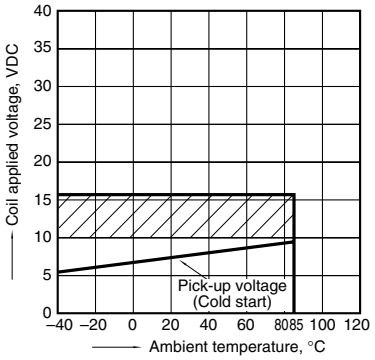


2. Max. switching capability (Resistive load)

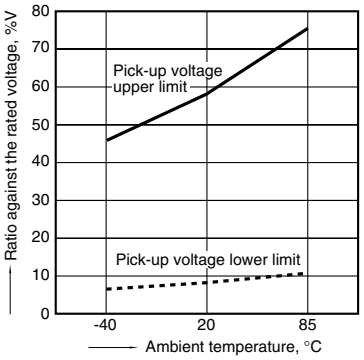


CQ

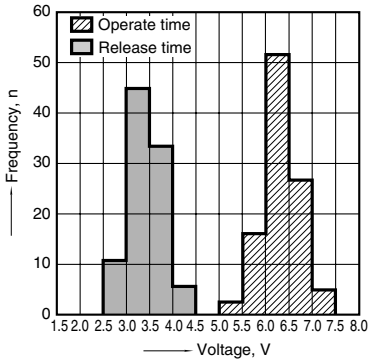
3. Ambient temperature and operating temperature range



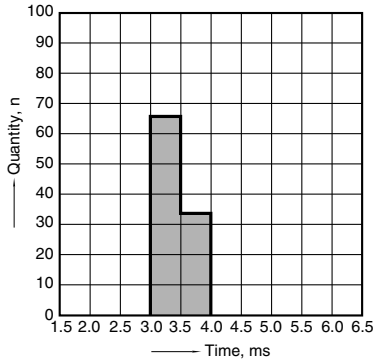
4. Ambient temperature characteristics



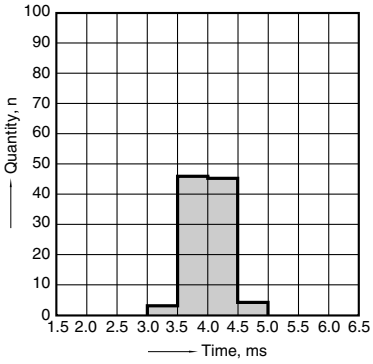
5. Distribution of pick-up and drop-out voltage
Sample: CQ1-12V, 100pcs



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

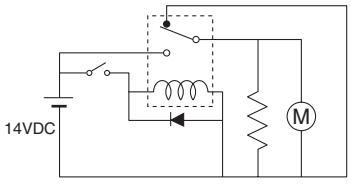


7. Distribution of release time
Sample: CQ1-12V, 100pcs
* With diode

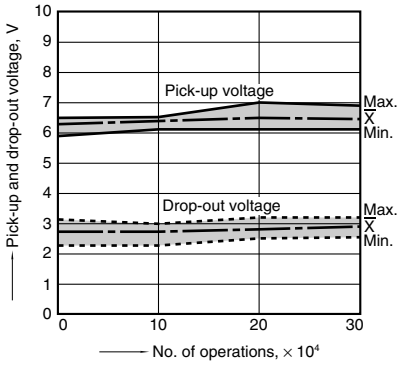


8. Electrical life test (Motor free)
Sample: CQ1-12V, 3pcs
Load: Inrush current: 30A, Steady current: 5A,
Brake current: 17A,
wiper motor actual load (free condition)
Tested voltage: 14V DC
Switching frequency: (ON:OFF = 1s:2s)
Ambient temperature: Room temperature

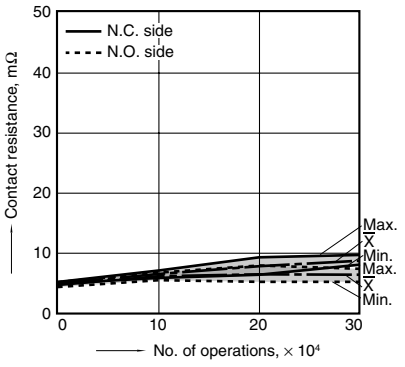
Circuit



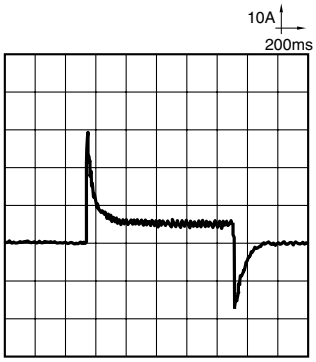
Change of pick-up and drop-out voltage



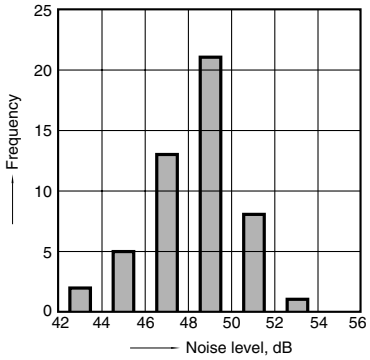
Change of contact resistance



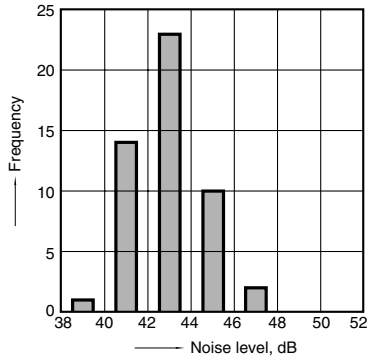
Load current waveform
Inrush current: 30A, Steady current: 5A,
Brake current: 17A



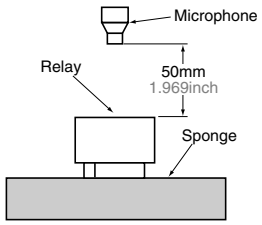
9-(1). Operation noise distribution
When operate



9-(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



For Cautions for Use, see Relay Technical Information