

## HIGH ELECTRICAL & MECHANICAL NOISE IMMUNITY RELAY

# PQ RELAYS



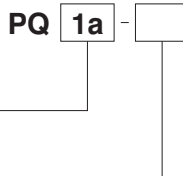
### FEATURES

- 1. Compact and slim**  
20 mm (L) × 10 mm (W) × 16 mm (H)  
.787 inch (L) × .394 inch (W) × .630 inch (H) slim type
- 2. Twin contact structure**  
Gold-clad twin contacts provide high reliability.
- 3. High capacity and small size**  
This small package can provide high 5 A capacity.
- 4. High sensitivity with 200 mW nominal operating power**
- 5. 8,000 V surge breakdown voltage**  
Despite the compact size, between contact and coil surge resistance of 8,000 V has been achieved. The relay has low susceptibility to noise.
- 6. Outstanding shock resistance.**  
Functional shock resistance:  
294 m/s<sup>2</sup> {Min. 30 G}
- 7. Most suitable for sequencer output and internal device output relays.**
- 8. Sealed type**

### TYPICAL APPLICATIONS

- 1. Programmable controllers**
- 2. Interface relays for Factory Automation and Communication equipment**
- 3. Output relays for measuring equipment, timers, counters and temperature controllers**

### ORDERING INFORMATION



Contact arrangement  
1a: 1 Form A (Bifurcated)

Coil voltage (DC)  
3, 5, 6, 9, 12, 18, 24 V

Notes: 1. UL/CSA, VDE, SEMKO approved type is standard.  
2. TUV approved type is available.

### TYPES

| Contact arrangement      | Nominal coil voltage | Part No. |
|--------------------------|----------------------|----------|
| 1 Form A<br>(Bifurcated) | 3V DC                | PQ1a-3V  |
|                          | 5V DC                | PQ1a-5V  |
|                          | 6V DC                | PQ1a-6V  |
|                          | 9V DC                | PQ1a-9V  |
|                          | 12V DC               | PQ1a-12V |
|                          | 18V DC               | PQ1a-18V |
|                          | 24V DC               | PQ1a-24V |

Standard packing: Tube: 100 pcs.; Case: 500 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 | Max. allowable voltage  |
|----------------------|---|--|---|---------------------------------------|-------------------------|---|
| 3V DC                | 75%V or less of nominal voltage (Initial) | 5%V or more of nominal voltage (Initial) | 66.7mA  | 45Ω                                   | 200mW                   | 180%V of nominal voltage (at 20°C 68°F)<br><br>130%V of nominal voltage (at 70°C 158°F) |
| 5V DC                |   |  | 40mA  | 125Ω                                  |                         |   |
| 6V DC                |   |  | 33.3mA  | 180Ω                                  |                         |   |
| 9V DC                |   |  | 22.2mA  | 405Ω                                  |                         |   |
| 12V DC               |   |  | 16.7mA  | 720Ω                                  |                         |   |
| 18V DC               |   |  | 11.1mA  | 1,620Ω                                |                         |   |
| 24V DC               |   |  | 8.3mA   | 2,880Ω                                |                         |   |

## 2. Specifications

| Characteristics                                | Item   | Specifications   |  |
|--|--|--|--|
| Contact  | Arrangement  | 1 Form A (Bifurcated)  |  |
|  | Initial contact resistance, max.                             | Max. 50 mΩ (By voltage drop 6 V DC 1A)   |  |
|  | Contact material   | Au-clad AgNi type  |  |
| Rating   | Nominal switching capacity (resistive load)                  | 5 A 250 V AC, 5 A 30 V DC  |  |
|  | Max. switching power (resistive load)                        | 1,250 VA, 150 W  |  |
|  | Max. switching voltage                                       | 250 V AC, 110 V DC (0.3 A)   |  |
|  | Max. switching current                                       | 5 A  |  |
|  | Nominal operating power                                      | 200 mW   |  |
|  | Min. switching capacity (Reference value) <sup>1</sup>       | 100μA 100mV DC   |  |
|  | Electrical characteristics                                   | Insulation resistance (Initial)  | Min. 1,000MΩ (at 500V DC)<br>Measurement at same location as "Initial breakdown voltage" section.            |
| Breakdown voltage (Initial)                    |  | Between open contacts  | 1,000 Vrms for 1min. (Detection current: 10mA.)  |
|  |  | Between contact and coil   | 4,000 Vrms for 1min. (Detection current: 10mA.)  |
| Surge breakdown voltage (Initial) <sup>2</sup> |  | Between contacts and coil  | 8,000 V  |
| Temperature rise                               |  |  | Max. 45°C (By resistive method, nominal voltage applied to the coil, contact carrying current: 5 A, at 70°C) |
| Operate time (at 20°C 68°F)                    |  |  | Max. 20 ms (Nominal voltage applied to the coil, excluding contact bounce time.)                             |
| Release time (at 20°C 68°F)                    |  |  | Max. 10 ms (Nominal voltage applied to the coil, excluding contact bounce time.) (without diode)             |
| Mechanical characteristics                     | Shock resistance   | Functional   | Min. 294 m/s <sup>2</sup> (Half-wave pulse of sine wave: 11 ms; detection time: 10μs.)                       |
|  |  | Destructive  | Min. 980 m/s <sup>2</sup> (Half-wave pulse of sine wave: 6 ms.)  |
|  | Vibration resistance   | Functional   | 10 to 55 Hz at double amplitude of 2.0 mm (Detection time: 10μs.)  |
|  |  | Destructive  | 10 to 55 Hz at double amplitude of 3.5 mm  |
| Expected life                                  | Mechanical   | Min. 2×10 <sup>7</sup> (at 180 cpm)  |  |
|  | Electrical (at 20 cpm)                                       | Min. 2×10 <sup>5</sup> (5 A 125 V AC), Min. 10 <sup>5</sup> (5 A 250 V AC), Min. 10 <sup>5</sup> (5 A 30 V DC)                 |  |
| Conditions                                     | Conditions for operation, transport and storage <sup>3</sup> | Ambient temperature: -40°C to 70°C -40°F to 158°F;<br>Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature) |  |
|  | Max. operating speed (at rated load)                         | 20 cpm   |  |
| Unit weight                                    |  | Approx. 7 g .25 oz   |  |

Notes:

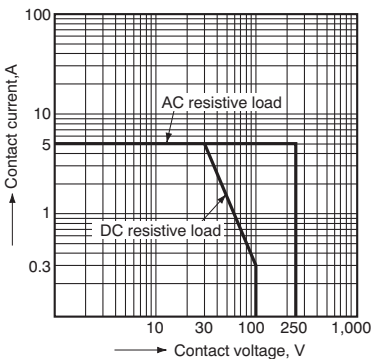
\*1 This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

\*2 Wave is standard shock voltage of ±1.2×50μs according to JEC-212-1981.

\*3 Refer to "6. Usage, Storage and Transport Conditions" in **AMBIENT ENVIRONMENT** section in **Relay Technical Information**.

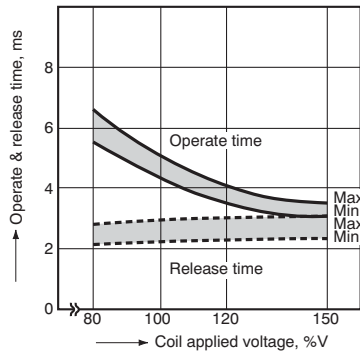
# REFERENCE DATA

### 1. Max. switching capacity



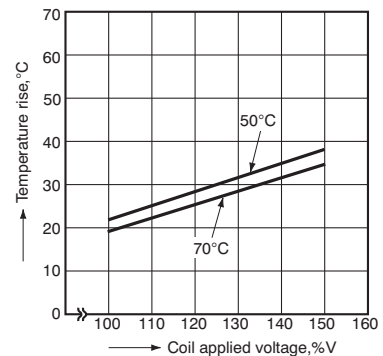
### 2. Operate & release time

Tested sample: PQ1a-24V, 25 pcs.



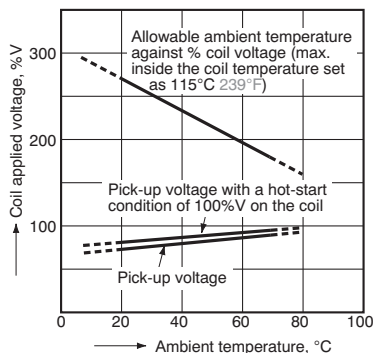
### 3. Coil temperature rise

Measured portion: Inside the coil  
Contact carrying current: 5 A



#### 4. Ambient temperature characteristics

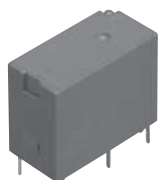
Tested sample: PQ1a-24V  
 Contact carrying current: 5 A



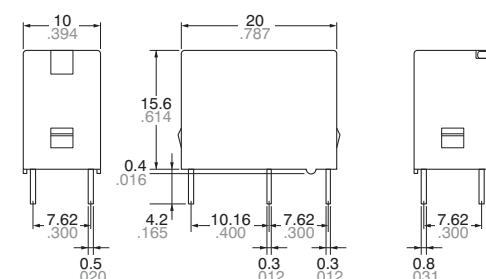
### DIMENSIONS(mm inch)

Download [CAD Data](#) from our Web site.

[CAD Data](#)



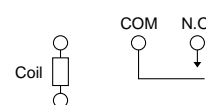
#### External dimensions



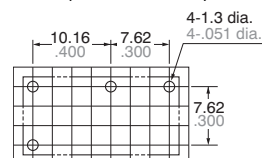
Dimension : General tolerance

Max. 1mm .039 inch ±0.2 ±.008  
 1 to 5mm .039 to .118 inch ±0.3 ±.012  
 Min. 5mm .118 inch ±0.4 ±.016

#### Schematic (Bottom view)



#### PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

### SAFETY STANDARDS

| UL/C-UL (Recognized) |  | CSA (Certified) |  | VDE (Certified) |  | TÜV (Certified)      |  | SEMKO (Certified) |                            |
|----------------------|--|-----------------|--|-----------------|--|----------------------|--|-------------------|----------------------------|
| File No.             | Contact rating   | File No.        | Contact rating   | File No.        | Contact rating                           | File No.             | Rating                                   | File No.          | Contact rating             |
| E43028               | 5A 277V AC<br>1/8HP 277V AC<br>5A 30V DC<br>0.3A 110V DC | LR26550<br>etc. | 5A 277V AC<br>1/8HP 277V AC<br>5A 30V DC<br>0.3A 110V DC | 40013088        | 5A 250V AC (cosφ=0.4)<br>5A 30V DC (0ms) | B 08 09<br>13461 253 | 5A 250V AC (cosφ=0.4)<br>5A 30V DC (0ms) | 817131            | 3(2)A 250V AC<br>5A 30V DC |

For Cautions for Use, see [Relay Technical Information](#).