

**High sensitivity, 100 mW  
Nominal operating power,  
2 Form C and 2 A Compact  
flat body type relays**

## GQ RELAYS (AGQ)



**RoHS compliant**

### FEATURES

- High capacity: 2 A**
- Flat compact size**  
10.6 (L) × 7.2 (W) × 5.2 (H) mm  
.417 (L) × .283 (W) × .205 (H) inch
- High sensitivity single side stable type (Nominal operating power: 100mW) is available**
- Outstanding surge resistance.**  
1,500 V 10×160 μs (FCC part 68) (open contacts)  
2,500 V 2×10 μs (Telcordia) (contact and coil)
- The use of twin crossbar contacts ensures high contact reliability**  
AgPd contact is used because of its good sulfide resistance. Adopting low-gas molding material. Coil assembly molding technology which avoids generating volatile gas from coil.

### TYPICAL APPLICATIONS

- Telephone switchboard
- Telecommunications equipment
- Security
- Measurement equipment
- Consumer electronic and audio visual equipment

### ORDERING INFORMATION

|                           |   |          |  |          |  |  |  |  |
|---------------------------|---|----------|--|----------|--|--|--|--|
|                           | <b>AGQ</b>  | <b>2</b> |  | <b>0</b> |  |  |  |  |
| Contact arrangement       | 2: 2 Form C   |          |  |          |  |  |  |  |
| Operating function        | 0: Single side stable<br>1: 1 coil latching<br>6: High sensitivity single side stable type  |          |  |          |  |  |  |  |
| Type of operation         | 0: Standard type (B.B.M.)   |          |  |          |  |  |  |  |
| Terminal shape            | Nil: Standard PC board terminal<br>A: Surface-mount terminal A type<br>S: Surface-mount terminal S type                                 |          |  |          |  |  |  |  |
| Nominal coil voltage (DC) | 1H: 1.5V 03: 3V 4H: 4.5V 06: 6V 09: 9V<br>12: 12V 24: 24V   |          |  |          |  |  |  |  |
| Packing style             | Nil: Tube packing<br>X: Tape and reel packing (picked from 1/2/3/4 pin side)<br>Z: Tape and reel packing (picked from 5/6/7/8 pin side) |          |  |          |  |  |  |  |

## TYPES

### 1. Standard PC board terminal

| Nominal coil voltage | Single side stable | 1 coil latching | High sensitivity single side stable |
|----------------------|--------------------|-----------------|-------------------------------------|
|                      | Part No.           | Part No.        | Part No.                            |
| 1.5 V DC             | AGQ2001H           | AGQ2101H        | AGQ2601H                            |
| 3 V DC               | AGQ20003           | AGQ21003        | AGQ26003                            |
| 4.5 V DC             | AGQ2004H           | AGQ2104H        | AGQ2604H                            |
| 6 V DC               | AGQ20006           | AGQ21006        | AGQ26006                            |
| 9 V DC               | AGQ20009           | AGQ21009        | AGQ26009                            |
| 12 V DC              | AGQ20012           | AGQ21012        | AGQ26012                            |
| 24 V DC              | AGQ20024           | AGQ21024        | AGQ26024                            |

Standard packing: Tube: 50 pcs.; Case: 1,000 pcs.

### 2. Surface-mount terminal

#### 1) Tube packing

| Nominal coil voltage | Single side stable | 1 coil latching | High sensitivity single side stable |
|----------------------|--------------------|-----------------|-------------------------------------|
|                      | Part No.           | Part No.        | Part No.                            |
| 1.5 V DC             | AGQ200□1H          | AGQ210□1H       | AGQ260□1H                           |
| 3 V DC               | AGQ200□03          | AGQ210□03       | AGQ260□03                           |
| 4.5 V DC             | AGQ200□4H          | AGQ210□4H       | AGQ260□4H                           |
| 6 V DC               | AGQ200□06          | AGQ210□06       | AGQ260□06                           |
| 9 V DC               | AGQ200□09          | AGQ210□09       | AGQ260□09                           |
| 12 V DC              | AGQ200□12          | AGQ210□12       | AGQ260□12                           |
| 24 V DC              | AGQ200□24          | AGQ210□24       | AGQ260□24                           |

□: For each surface-mounted terminal identification, input the following letter. A type: A, S type: S

Standard packing: Tube: 50 pcs.; Case: 1,000 pcs.

#### 2) Tape and reel packing

| Nominal coil voltage | Single side stable | 1 coil latching | High sensitivity single side stable |
|----------------------|--------------------|-----------------|-------------------------------------|
|                      | Part No.           | Part No.        | Part No.                            |
| 1.5 V DC             | AGQ200□1HZ         | AGQ210□1HZ      | AGQ260□1HZ                          |
| 3 V DC               | AGQ200□03Z         | AGQ210□03Z      | AGQ260□03Z                          |
| 4.5 V DC             | AGQ200□4HZ         | AGQ210□4HZ      | AGQ260□4HZ                          |
| 6 V DC               | AGQ200□06Z         | AGQ210□06Z      | AGQ260□06Z                          |
| 9 V DC               | AGQ200□09Z         | AGQ210□09Z      | AGQ260□09Z                          |
| 12 V DC              | AGQ200□12Z         | AGQ210□12Z      | AGQ260□12Z                          |
| 24 V DC              | AGQ200□24Z         | AGQ210□24Z      | AGQ260□24Z                          |

□: For each surface-mounted terminal identification, input the following letter. A type: A, S type: S

Standard packing: Tape and reel: 900 pcs.; Case: 1,800 pcs.

Notes: 1. Tape and reel packing symbol "Z" is not marked on the relay. "X" type tape and reel packing (picked from 1/2/3/4-pin side) is also available.

2. Please inquire if you require a relay, between 1.5 and 24 V DC, with a voltage not listed.

## RATING

### 1. Coil data

#### 1) Single side stable type

| 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. applied voltage (at 20°C 68°F) |
|----------------------|--|--|---|---------------------------------------|-------------------------|-------------------------------------|
| 1.5 V DC             | 75%V or less of nominal voltage* (Initial) | 10%V or more of nominal voltage* (Initial) | 93.8 mA   | 16 Ω                                  | 140 mW                  | 150%V of nominal voltage            |
| 3 V DC               |  |  | 46.7 mA   | 64.2 Ω                                |                         |                                     |
| 4.5 V DC             |  |  | 31 mA   | 145 Ω                                 |                         |                                     |
| 6 V DC               |  |  | 23.3 mA   | 257 Ω                                 |                         |                                     |
| 9 V DC               |  |  | 15.5 mA   | 579 Ω                                 |                         |                                     |
| 12 V DC              |  |  | 11.7 mA   | 1,028 Ω                               |                         |                                     |
| 24 V DC              |  |  | 9.6 mA  | 2,504 Ω                               | 230 mW                  | 120%V of nominal voltage            |

#### 2) 1 coil latching type

| Nominal coil voltage | Set voltage (at 20°C 68°F)                 | Reset 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. applied voltage (at 20°C 68°F) |
|----------------------|--|--|---|---------------------------------------|-------------------------|-------------------------------------|
| 1.5 V DC             | 75%V or less of nominal voltage* (Initial) | 75%V or less of nominal voltage* (Initial) | 66.7 mA   | 22.5 Ω                                | 100 mW                  | 150%V of nominal voltage            |
| 3 V DC               |  |  | 33.3 mA   | 90 Ω                                  |                         |                                     |
| 4.5 V DC             |  |  | 22.2 mA   | 202.5 Ω                               |                         |                                     |
| 6 V DC               |  |  | 16.7 mA   | 360 Ω                                 |                         |                                     |
| 9 V DC               |  |  | 11.1 mA   | 810 Ω                                 |                         |                                     |
| 12 V DC              |  |  | 8.3 mA  | 1,440 Ω                               |                         |                                     |
| 24 V DC              |  |  | 5.0 mA  | 4,800 Ω                               | 120 mW                  |                                     |

\*Pulse drive (JIS C 5442-1996)

3) High sensitivity single side stable type

| Nominal coil voltage | Set voltage (at 20°C 68°F)                 | Reset 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. applied voltage (at 20°C 68°F) |
|----------------------|--|--|---|---------------------------------------|-------------------------|-------------------------------------|
| 1.5 V DC             | 80%V or less of nominal voltage* (Initial) | 10%V or more of nominal voltage* (Initial) | 66.7 mA   | 22.5 Ω                                | 100 mW                  | 150%V of nominal voltage            |
| 3 V DC               |  |  | 33.3 mA   | 90 Ω                                  |                         |                                     |
| 4.5 V DC             |  |  | 22.2 mA   | 202.5 Ω                               |                         |                                     |
| 6 V DC               |  |  | 16.7 mA   | 360 Ω                                 |                         |                                     |
| 9 V DC               |  |  | 11.1 mA   | 810 Ω                                 |                         |                                     |
| 12 V DC              |  |  | 8.3 mA  | 1,440 Ω                               |                         |                                     |
| 24 V DC              |  |  | 5.0 mA  | 4,800 Ω                               | 120 mW                  | 120%V of nominal voltage            |

\*Pulse drive (JIS C 5442-1996)

2. Specifications

| Characteristics                          | Item  | Specifications   |   |
|--|---|--|---|
| Contact                                  | Arrangement                                       | 2 Form C   |   |
|  | Initial contact resistance, max.                  | Max. 100 mΩ (By voltage drop 6 V DC 1A)  |   |
|  | Contact material                                  | Stationary contact: AgPd+Au clad Movable contact: AgPd   |   |
| Rating                                   | Nominal switching capacity                        | 2 A 30 V DC, 1 A 30 V DC, 0.3 A 125 V AC (resistive load)  |   |
|  | Max. switching power                              | 60 W (DC), 30 W (DC), 37.5 V A (AC) (resistive load)   |   |
|  | Max. switching voltage                            | 110 V DC, 125 V AC   |   |
|  | Max. switching current                            | 2 A  |   |
|  | Min. switching capacity (Reference value)*1       | 10μA 10 mV DC  |   |
|  | Nominal operating power                           | Single side stable   | 140mW (1.5 to 12 V DC), 230mW (24 V DC)   |
| High sensitivity single side stable type |   | 100mW (1.5 to 12 V DC), 120mW (24 V DC)  |   |
| 1 coil latching                          |   |  |   |
| 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  | 750 Vrms for 1min. (Detection current: 10mA)  |
|  |   | Between contact and coil   | 1,500 Vrms for 1min. (Detection current: 10mA)  |
|  |   | Between contact sets   | 1,000 Vrms for 1min. (Detection current: 10mA)  |
|  | Surge breakdown voltage (Initial)                 | Between open contacts  | 1,500 V (10×160μs) (FCC Part 68)  |
|  |   | Between contacts and coil  | 2,500 V (2×10μs) (Telcordia)  |
| Temperature rise (at 20°C 68°F)          |   | Max. 50°C<br>(By resistive method, nominal coil voltage applied to the coil; contact carrying current: 1A.)  |   |
| Operate time [Set time] (at 20°C 68°F)   |   | Max. 4 ms [Max. 4 ms] (Nominal coil voltage applied to the coil, excluding contact bounce time.)   |   |
| Release time [Reset time] (at 20°C 68°F) |   | Max. 4 ms [Max. 4 ms] (Nominal coil voltage applied to the coil, excluding contact bounce time.) (without diode)   |   |
| Mechanical characteristics               | Shock resistance                                  | Functional   | Min. 750 m/s <sup>2</sup> (Half-wave pulse of sine wave: 6 ms; detection time: 10μs.) |
|  |   | Destructive  | Min. 1,000 m/s <sup>2</sup> (Half-wave pulse of sine wave: 6 ms.)                     |
|  | Vibration resistance                              | Functional   | 10 to 55 Hz at double amplitude of 3.3 mm (Detection time: 10μs.)                     |
|  |   | Destructive  | 10 to 55 Hz at double amplitude of 5 mm   |
| Expected life                            | Mechanical  | Min. 5 × 10 <sup>7</sup> (at 180 cpm)  |   |
|  | Electrical  | Min. 5 × 10 <sup>4</sup> (2 A 30 V DC resistive), Min. 10 <sup>5</sup> (1 A 30 V DC resistive),<br>Min. 10 <sup>5</sup> (0.3 A 125 V AC resistive) (at 20 cpm)   |   |
| Conditions                               | Conditions for operation, transport and storage*2 | Ambient temperature:<br>(Single side stable, 1 coil latching type) -40°C to +85°C -40°F to +185°F<br>(High sensitivity single side stable type) -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. 1 g .035 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 "AMBIENT ENVIRONMENT" in GENERAL APPLICATION GUIDELINES.

REFERENCE DATA

1. Max. switching capacity

\* Max. switching capacity is 2A 30V DC.



2. Life curve



3. Mechanical life

Tested sample: AGQ200A4H, 6 pcs.  
Operating speed: 180 cpm

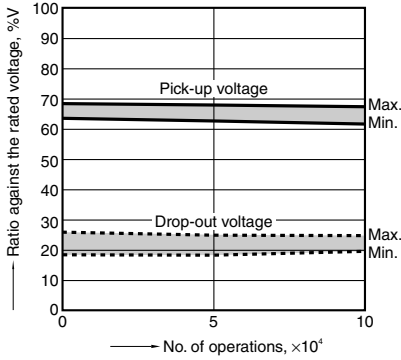


## 4. Electrical life (1A 30V DC resistive load)

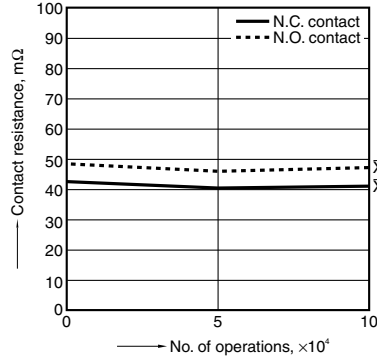
Tested sample: AGQ200A4H, 6 pcs.

Operating speed: 20 cpm

Change of pick-up and drop-out voltage



Change of contact resistance



## 5. Coil temperature rise

Tested sample: AGQ200A4H, AGQ200A24, 6 pcs.

Point measured: Inside the coil

Ambient temperature: Room temperature



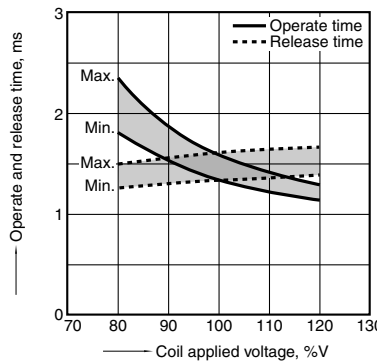
## 6-(1). Operate and release time (without diode)

Tested sample: AGQ200A4H, 10 pcs.



## 6-(2). Operate and release time (with diode)

Tested sample: AGQ200A4H, 10 pcs.



## 7. Ambient temperature characteristics

Tested sample: AGQ200A4H, 6 pcs.



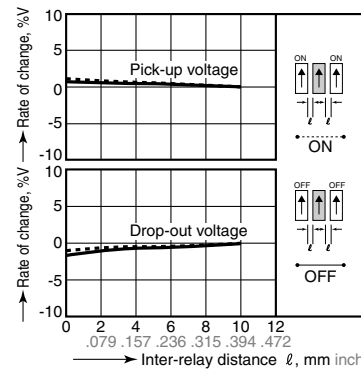
## 8. Malfunctional shock

Tested sample: AGQ200A4H, 6 pcs.



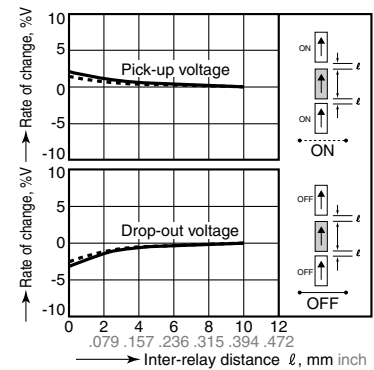
## 9-(1). Influence of adjacent mounting

Tested sample: AGQ20012, 6 pcs.



## 9-(2). Influence of adjacent mounting

Tested sample: AGQ20012, 6 pcs.



## DIMENSIONS (mm inch)

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

### 1. PC board terminal

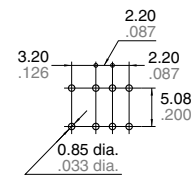
**CAD Data**



External dimensions



PC board pattern

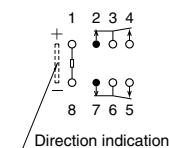


Tolerance:  $\pm 0.1 \pm 0.04$

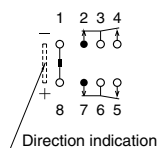
Schematic (Bottom view)

Single side stable  
High sensitivity  
high side stable

1 coil latching



(Deenergized condition)



(Reset condition)

2. Surface-mount terminal

CAD Data



| Type   | External dimensions  |  | Suggested mounting pad (Tolerance: $\pm 0.1 \pm .004$ )                |
|--------|--|--|--|
|        | Single side stable/1 coil latching/High sensitivity single side stable |  | Single side stable/1 coil latching/High sensitivity single side stable |
| A type |  |  |  |
| S type |  |  |  |

Schematic (Top view)

Single side stable

High sensitivity single side stable



(Deenergized condition)

1 coil latching



(Reset condition)

NOTES

1. Packing style

1) The relay is packed in a tube with the relay orientation mark on the left side, as shown in the figure below.



2) Tape and reel packing

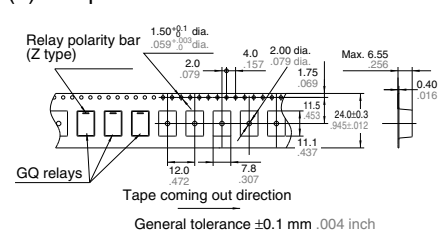
(A type)

(1)-1 Tape dimensions



(S type)

(1)-2 Tape dimensions



(2) Dimensions of plastic peel



2. Automatic insertion

To maintain the internal function of the relay, the chucking pressure should not exceed the values below.

- Chucking pressure in the direction A : 9.8 N {1 kgf} or less
- Chucking pressure in the direction B : 9.8 N {1 kgf} or less
- Chucking pressure in the direction C : 9.8 N {1 kgf} or less



Please chuck the portion. Avoid chucking the center of the relay. In addition, excessive chucking pressure to the pinpoint of the relay should be also avoided.

**For general cautions for use, please refer to the “Cautions for use of Signal Relays” or “General Application Guidelines”.**

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