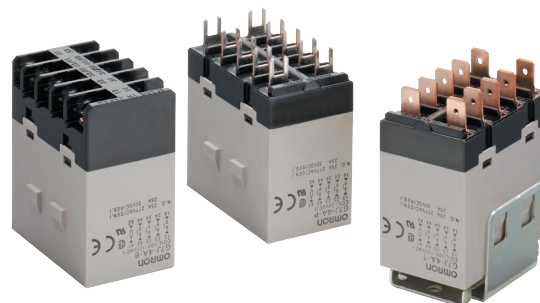


# General Purpose Relay

## G7J

- Ideal for 3-phase motor control applications and resistive and inductive loads.
- No contact chattering for momentary voltage drops up to 50% of rated voltage.
- Withstands more than 4 kV between contacts that are of different polarity and between the coil and contacts.
- Flame-resistant materials (UL94V-0) used for all insulation.
- Push-to-test button on all models lets user check contact operation.
- Class B coil insulation available.



## Ordering Information

To Order: Select the part number and add the desired coil voltage rating (e.g., G7J-3A1B-B-AC100/120).

| Type                    | Contact form    | Model                  |                   |                   |
|-------------------------|-----------------|------------------------|-------------------|-------------------|
|                         |                 | Quick-connect terminal | Screw terminal    | PCB terminal      |
| PCB mounting            | 4PST-NO         | —                      | —                 | <b>G7J-4A-P</b>   |
|                         | 3PST-NO/SPST-NC | —                      | —                 | <b>G7J-3A1B-P</b> |
|                         | DPST-NO/DPST-NC | —                      | —                 | <b>G7J-2A2B-P</b> |
| W-bracket<br>(see note) | 4PST-NO         | <b>G7J-4A-T</b>        | <b>G7J-4A-B</b>   |                   |
|                         | 3PST-NO/SPST-NC | <b>G7J-3A1B-T</b>      | <b>G7J-3A1B-B</b> |                   |
|                         | DPST-NO/DPST-NC | <b>G7J-2A2B-T</b>      | <b>G7J-2A2B-B</b> |                   |

**Note:** The G7J-B and G7J-T relays require a W-bracket for mounting. Order the bracket separately below. To order a relay and bracket packed together, add "-W1" to the part number before the coil voltage suffix. For example, G7J-2A2B-B-W1-AC100/120. Consult Omron for available versions.

## Accessories

| Types      | Applicable relays                                                  | Model                 |
|------------|--------------------------------------------------------------------|-----------------------|
| W-brackets | G7J-4A-B, G7J-3A1B-B, G7J-2A2B-B, G7J-4A-T, G7J-3A1B-T, G7J-2A2B-T | <b>R99-04-FOR-G5F</b> |

## Typical Applications

- Compressors for air conditioners and heater switching controllers.
- Switching controllers for power tools or motors.
- Lamp controls, motor drivers, and power supply switching controllers in copy machines, facsimile machines, and other office equipment.
- Power controllers for packers or food processing equipment.
- Power controllers for inverters.

## Specifications

### Contact Data

| Load                           | Resistive load (p.f. = 1)                                                |                                            |
|--------------------------------|--------------------------------------------------------------------------|--------------------------------------------|
|                                | NO                                                                       | NC                                         |
| <b>Rated load</b>              | 25 A, 220 VAC (24 A, 230 VAC), 25 A, 30 VDC                              | 8 A, 220 VAC (7.5 A, 230 VAC), 8 A, 30 VDC |
| <b>Rated carry current</b>     | 25 A                                                                     | 8 A                                        |
| <b>Max. switching voltage</b>  | 250 VAC, 125 VDC                                                         |                                            |
| <b>Max. switching current</b>  | 25 A                                                                     | 8 A                                        |
| <b>Max. switching capacity</b> | 5,500 VA, 750 W DC                                                       | 1,760 VA, 240 W DC                         |
| <b>Min. permissible load</b>   | 100 mA, 24 VDC at 60 operations/minute, 23°C (73°F) ambient temperature) |                                            |

## ■ Coil Data

### AC

| Coil voltage | Rated voltage (VAC) | Rated current (mA) | Coil resistance (Ω) | Must operate            | Must release | Max. voltage | Power consumption    |
|--------------|---------------------|--------------------|---------------------|-------------------------|--------------|--------------|----------------------|
|              |                     |                    |                     | % of rated voltage 23°C |              |              |                      |
| 24           | 24                  | 75                 | —                   | 75% max.                | 15% min.     | 110%         | Approx.1.8 to 2.6 VA |
| 50           | 50                  | 36                 | —                   |                         |              |              |                      |
| 100/120      | 100 to 120          | 18 to 21.60        | —                   |                         |              |              |                      |
| 200/240      | 200 to 240          | 9 to 10.80         | —                   |                         |              |              |                      |

### DC

| Coil voltage | Rated voltage (VDC) | Rated current (mA) | Coil resistance (Ω) | Must operate       | Must release | Max. voltage | Power consumption |
|--------------|---------------------|--------------------|---------------------|--------------------|--------------|--------------|-------------------|
|              |                     |                    |                     | % of rated voltage |              |              |                   |
| 12           | 12                  | 167                | 72                  | 75% max.           | 10% min.     | 110%         | Approx. 2.0 W     |
| 24           | 24                  | 83                 | 288                 |                    |              |              |                   |
| 48           | 48                  | 42                 | 1150                |                    |              |              |                   |
| 100          | 100                 | 20                 | 5000                |                    |              |              |                   |
| 110          | 110                 | 18                 | 6050                |                    |              |              |                   |

**Note:** 1. The rated current and coil resistance are measured at a coil temperature of 23°C (73°F) with tolerances of +15%/-20% for AC rated current and  $\pm 15\%$  for DC coil resistance. Performance characteristic data are measured at a coil temperature of 23°C (73°F).

2. The values given for AC rated current apply at 50 Hz or 60 Hz.

## ■ Characteristics

|                           |                        |                                                                         |
|---------------------------|------------------------|-------------------------------------------------------------------------|
| Contact resistance        |                        | 50 m $\Omega$ max.                                                      |
| Operating time            |                        | 50 ms max.                                                              |
| Release time              |                        | 50 ms max.                                                              |
| Operating frequency       | Mechanical             | 1,800 operations/hour max.                                              |
|                           | Electrical             | 1,800 operations/hour max.                                              |
| Insulation resistance     |                        | 1,000 M $\Omega$ minimum at 500 VDC                                     |
| Dielectric strength       |                        | 4,000 VAC, 50/60 Hz for 1 minute between coil and contacts              |
|                           |                        | 4,000 VAC, 50/60 Hz for 1 minute between contacts of different polarity |
|                           |                        | 2,000 VAC, 50/60 Hz for 1 minute between contacts of the same polarity  |
| Impulse withstand voltage |                        | 10,000 V between coil and contact with 1.2 x 50 $\mu$ s impulse wave    |
| Vibration                 | Mechanical durability  | 10 to 55 Hz, 1.50 mm double amplitude                                   |
|                           | Malfunction durability | NO: 10 to 55 Hz, 1.50 mm double amplitude                               |
|                           |                        | NC: 10 to 26 Hz, 1.50 mm double amplitude                               |
| Shock                     | Mechanical durability  | 1000 m/s <sup>2</sup> (Approx. 100 G)                                   |
|                           | Malfunction durability | NO: 100 m/s <sup>2</sup> (Approx. 10 G)                                 |
|                           |                        | NC: 20 m/s <sup>2</sup> (Approx. 2 G)                                   |
| Service life              | Mechanical             | 1 million operations minimum at 1,800 operations/hour                   |
|                           | Electrical (@ 23°C)    | 100,000 operations minimum at 1,800 operations/hour at rated load       |
| Ambient temperature       | Operating              | -25° to 60°C with no icing or condensation                              |
| Humidity                  | Operating              | 5% to 85% RH                                                            |
| Weight                    | PCB terminal           | Approx. 140 g                                                           |
|                           | Screw terminal         | Approx. 165 g                                                           |
|                           | Quick-connect terminal | Approx. 140 g                                                           |

**Note:** 1. Data shown are of initial value.

2. The contact resistance was measured with 1 A at 5 VDC using the voltage drop method.

3. The operate and release times were measured with the rated voltage imposed and with any contact bounce ignored at an ambient temperature of 23°C.

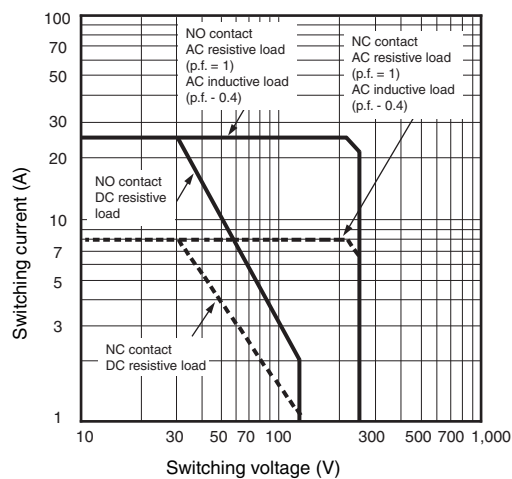
4. The insulation resistance was measured with a 500-VDC megger applied to the same places as those used for checking the dielectric strength.

## Motor Load

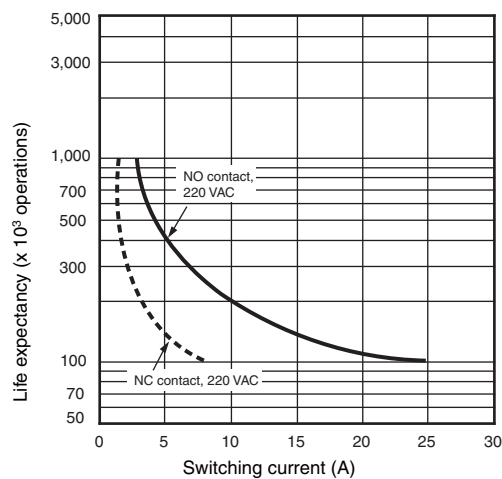
| Item      | G7J-4A-P, G7J-3A1B-P, G7J-4A-B, G7J-3A1B-B, G7J-4A-T, G7J-3A1B-T                          |
|-----------|-------------------------------------------------------------------------------------------|
| Load      | 3 $\phi$ , 220 VAC, 2.7 kW (with a inrush current of 78 A and a breaking current of 13 A) |
| Endurance | Electrical: 100,000 operations min.                                                       |

# Engineering Data

## Maximum switching capacity

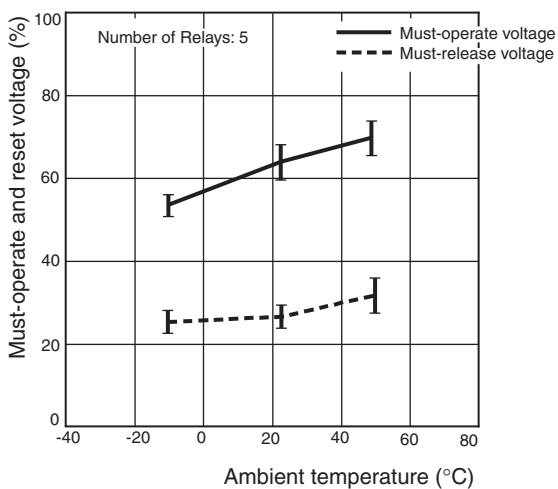


## Electrical service life



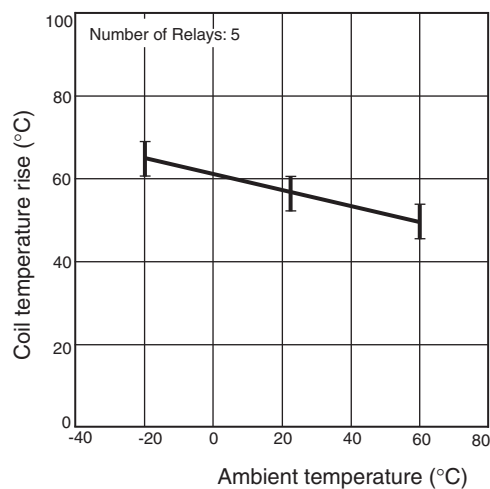
## Ambient Temperature vs. Must-operate and Must-Release Voltage

G7J 100 to 120 VAC

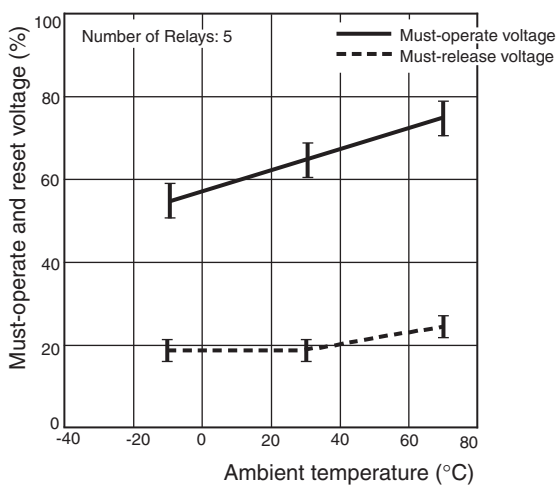


## Ambient Temperature vs. Coil Temperature Rise

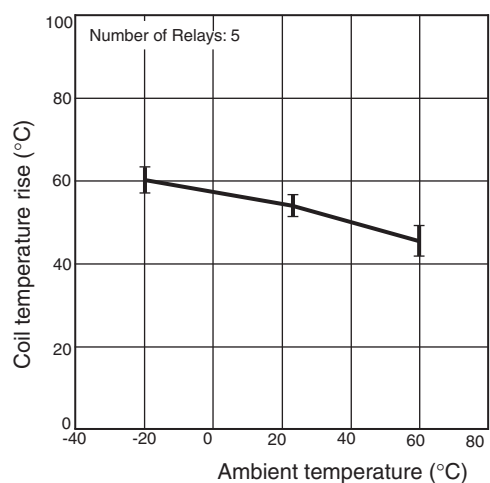
G7J-4A 100 to 120 VAC



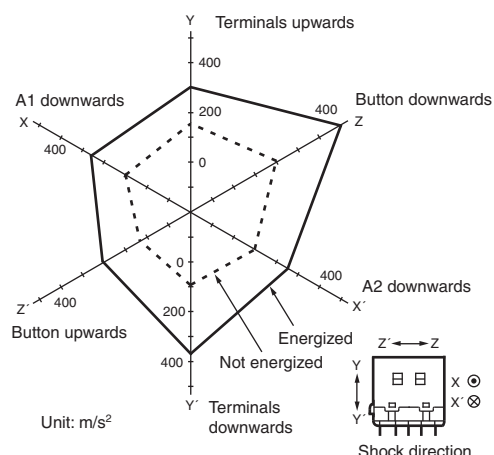
G7J 24 VDC



G7J-4A 24 VDC



## ■ Malfunctioning Shock



Number of samples: 5

Measurement conditions: Increase and decrease the specified shock gradually imposed in  $\pm X$ ,  $\pm Y$ , and  $\pm Z$  directions three times each with the Relay energized and not energized to check the shock values that cause the Relay to malfunction.

Criteria: There must not be any contact separation for 1 ms or greater with a shock of  $100 \text{ m/s}^2$  imposed when the coil is energized or with a shock of  $20 \text{ m/s}^2$  when the coil is not energized.

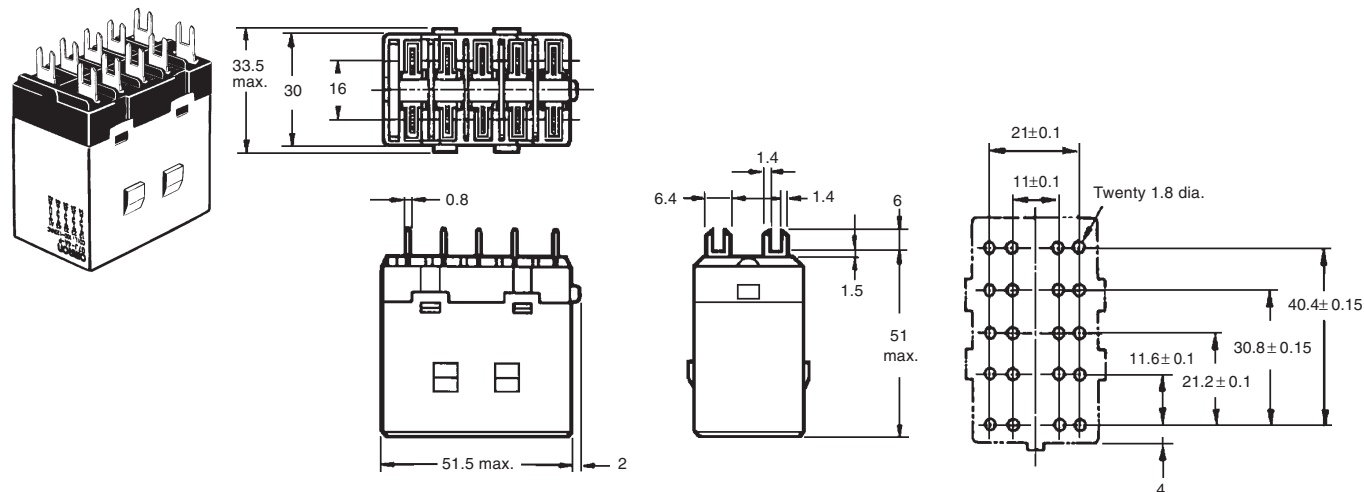
## Dimensions

Unit: mm

### ■ Relays

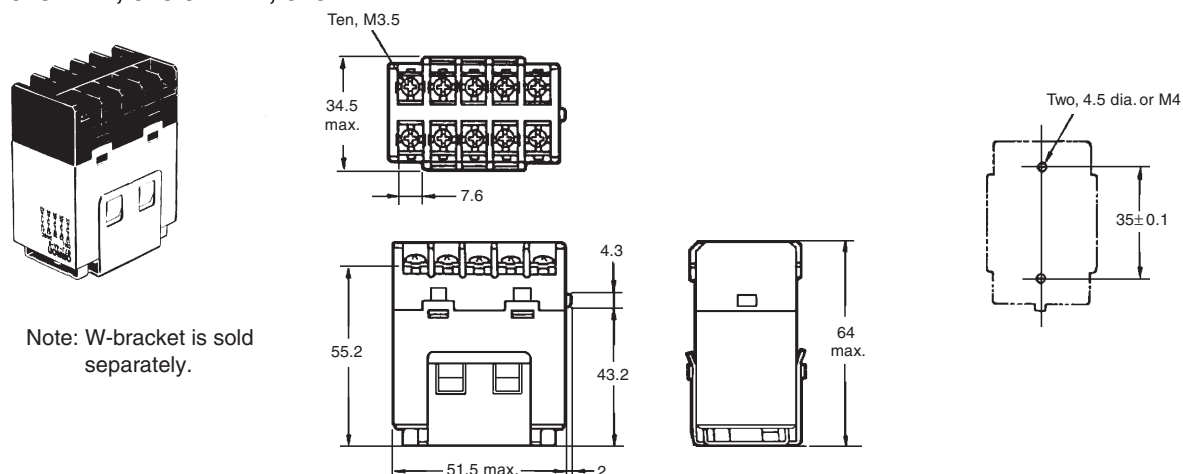
#### PCB Terminals with PCB Mounting

G7J-4A-P, G7J-3A1B-P, G7J-2A2B-P



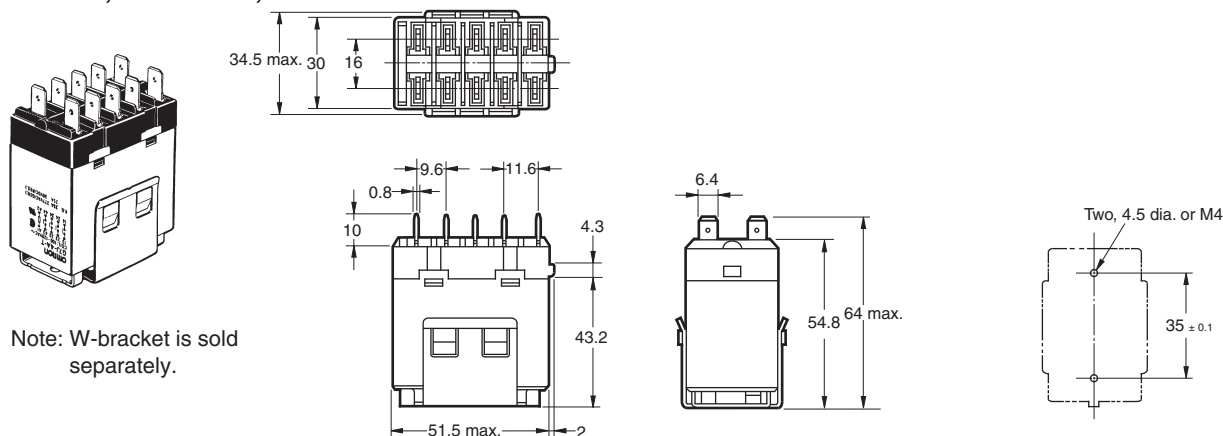
#### Screw Terminals (requires W-bracket for mounting)

G7J-4A-B, G7J-3A1B-B, G7J-2A2B-B



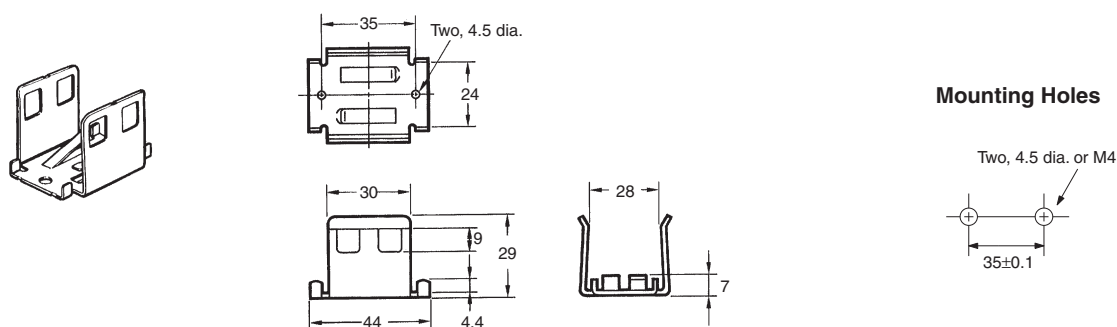
Note: W-bracket is sold separately.

**Quick-connect Terminals (requires W-bracket for mounting)**  
**G7J-4A-T, G7J-3A1B-T, G7J-2A2B-T**



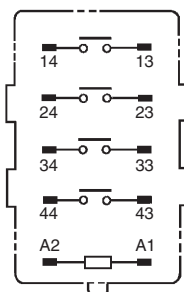
■ **Accessories**

**W-Bracket for G7J-B Relays with Screw Terminals**  
**R99-04-FOR-G5F**

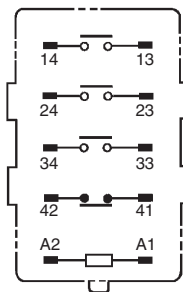


■ **Terminal Arrangement – Internal Connections**

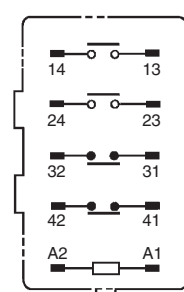
**G7J-4A-P(B)(T)**



**G7J-3A1B-P(B)(T)**



**G7J-2A2B-P(B)(T)**



## ■ Approvals

**UL Recognized (File No. E41643) / CSA Certified (File No. LR 35535) - - Ambient Temp = 40°C**

| Contact arrangement | Load type   | Contact ratings                               |
|---------------------|-------------|-----------------------------------------------|
| Normally Open       | Resistive   | 25 A, 277 VAC, 30,000 cycles                  |
|                     |             | 25 A, 30 VDC, 30,000                          |
|                     | General use | 25 A, 120 VAC, 30,000 cycles                  |
|                     |             | 25 A, 277 VAC, 30,000 cycles                  |
|                     |             | 25 A, 240 VAC, 100,000 cycles                 |
|                     |             | 1.5 kW, 120 VAC, 6,000 cycles                 |
|                     | Motor load  | 1.5 HP, 120 VAC, 1,000 cycles                 |
|                     |             | 3 HP, 240/265/277 VAC, 1,000 cycles           |
|                     |             | 3-phase, 3 hp, 240/265/277 VAC, 30,000 cycles |
|                     |             | 3-phase, 5 hp, 240/265/277 VAC, 30,000 cycles |
|                     |             | 20 FLA/120 LRA, 120 VAC, 30,000 cycles        |
|                     |             | 17 FLA/102 LRA, 277 VAC, 30,000 cycles        |
|                     | TV          | TV-10, 120 VAC, 25,000 cycles                 |
| Normally Closed     | Resistive   | 8 A, 277 VAC, 30,000 cycles                   |
|                     |             | 8 A, 30 VDC, 30,000 cycles                    |
|                     | General use | 8 A, 120 VAC, 30,000 cycles                   |
|                     |             | 8 A, 277 VAC, 30,000 cycles                   |

**Note:** 1. The rated values approved by each of the safety standards may be different from the performance characteristics individually defined in this catalog.  
 2. In the interest of product improvement, specifications are subject to change without notice.  
 3. CE marking is provided only on non-PCB terminal versions

## VDE (File No. 5381UG)

| Model                                                   | Coil ratings                                                 | Contact ratings                                                                          |                                                                                       |
|---------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                                         |                                                              | NO contact                                                                               | NC contact                                                                            |
| G7J-4A-B(P) (T)<br>G7J-2A2B(P) (T)<br>G7J-3A1B-B(P) (T) | 6, 12, 24, 48, 100 VDC<br>24, 50, 100 to 120, 200 to 240 VAC | 25 A 240 VAC $\cos\phi = 0.4$<br>25 A 240 VAC $\cos\phi = 1$<br>25 A 30 VDC $L/R \geq 1$ | 8 A 240 VAC $\cos\phi = 0.4$<br>8 A 240 VAC $\cos\phi = 1$<br>8 A 30 VDC $L/R \geq 1$ |

**Note:** Add the suffix “-KM” to the model number when ordering.

### Reference

VDE approval: EN60255-1-00: 1997  
 EN60255-23: 1996

## KEMA (File No. 2001291.02)

| Model                                  | Coil ratings                                                 | Contact ratings                                          |
|----------------------------------------|--------------------------------------------------------------|----------------------------------------------------------|
|                                        |                                                              | NO contact                                               |
| G7J-4A-B(P) (T) (Z)<br>G7J-2A2B(P) (T) | 200 to 240 VAC                                               | Class AC1: 25 A at 220 VAC<br>11.5 A at 380 to 480 VAC   |
| G7J-3A1B-B(P) (T) (Z)                  | 6, 12, 24, 48, 100 VDC<br>24, 50, 100 to 120, 200 to 240 VAC | Class AC3: 11.5 A at 220 VAC and 8.5 A at 380 to 480 VAC |

**Note:** Add the suffix “-KM” to the model number when ordering.

### Reference

KEMA approval: EN60947-4-1 for contacts

# Precautions

## ■ Handling

- To preserve performance, do not drop or otherwise subject the G7J relay to shock.
- The case is not designated to be removed during normal handling and operation. Doing so may affect performance.
- Use the power relay in a dry environment free from excessive dust, SO<sub>2</sub>, H<sub>2</sub>S, or organic gas.
- Do not allow a voltage greater than the maximum allowable coil voltage to be applied continuously.
- Do not use the relay outside of specified voltages and currents.
- Do not allow the ambient operation temperature to exceed the specified limit.

## ■ Microloads

The G7J is used for switching power loads. Do not use the G7J for switching minute loads, such as signals.

## ■ Installation

Although there are not specific limits on the installation site, it should be as dry and dust-free as possible.

PCB terminal-equipped relays weigh approximately 140 g. Be sure that the PCB is strong enough to support them. OMRON recommends dual-side through-hole PCBs to reduce solder cracking from heat stress.

Mount the G7J with its test button facing downwards. The relay may malfunction due to shock if the test button faces upwards. Be careful not to press the test button by mistake, because the contacts will actuate (ON) if the test button is pressed.

If the normal mounting direction is not used, carbides or powder from contact abrasion that results from load switching will accumulate inside the relay. If the relay is used past its endurance in this state, insulation failure between circuits of different polarity or relay burning may occur.

Be sure to use the test button for test purposes only. The test button is used for relay circuit tests, such as a circuit continuity test. Do not attempt to switch the load with the test button.

If a voltage is applied to the coil, the test button will retract in an ON state (i.e., an excited state).

## ■ Soldering PCB Terminals

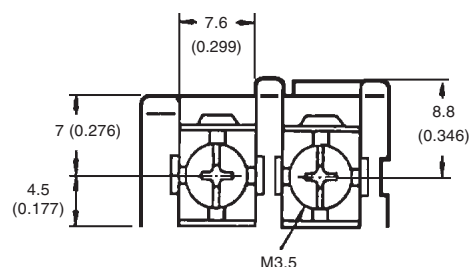
Be sure to solder the PCB terminals manually only. In the case of automatic soldering, some flux may stick to the test button and the relay. As a result, the G7J may malfunction.

## ■ Cleaning PCB Terminals

PCB terminals have semi-sealed construction which prevents flux from penetrating into the relay base housing due to capillary action. This type of relay cannot be immersed for cleaning. Do not wash with any water or detergent.

## ■ Connection

Refer to the diagram below when connecting a wire to the screw terminals on G7J.



Allow suitable slack on leads when wiring, and do not subject the terminals to excessive force. Tighten the screw terminals to a torque of 0.78 to 1.18 N·m.

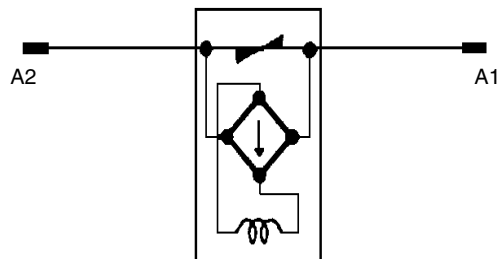
## ■ Quick-connect Terminals

Do not impose excessive external force on the G7J in the horizontal or vertical directions when inserting the G7J to the quick-connect terminals or when removing the terminals from the G7J. Do not attempt to insert or pull out more than one terminal at a time.

## ■ Coil Internal Circuit

If a transistor drives the G7J, then check the leakage current and connect a bleeder resistor if necessary.

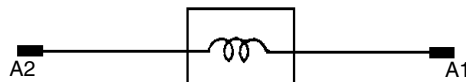
### AC operating coil



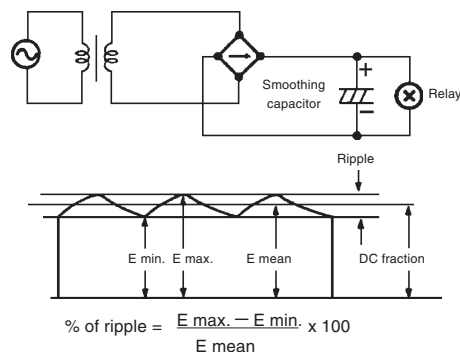
The G7J incorporates a bridge rectifier circuit in the AC coil versions that prevents contact chatter or dropout during a voltage drop. This circuit allows the relays to withstand, with no vibration or shock, voltage drops to the coil of up to 50% of the rated coil voltage for one second maximum.

If a triac, such as an SSR, drives the G7J, the G7J may not release. Use a Power MOS FET in this case.

### DC operating coil



As a rule, either a DC battery or a DC power supply with a maximum of 5% ripple must be used for the operating voltage for DC relays. Before using a rectified AC supply, confirm that the ripple is not greater than 5%. Ripple greater than this can lead to variations in the operating and reset voltages. As excessive ripple can generate pulses, the insertion of a smoothing capacitor is recommended as shown below.



E max.:Maximum ripple

E min.:Minimum ripple

E mean:Mean DC voltage value

When driving the coil with a transistor, check the leakage current and connect a bleeder resistor if necessary.