OMRON

# G9KA

PCB Power Relays

## High Power and Temperature Type Power Relay with 800 VAC 260 A / 1,000 VAC 300 A Breaking and Ultra-Low Contact Resistance



- Ambient temperature 85°C
- High impulse withstand voltage, 10 kV
- Contact gap ≥4.0 mm (Conformed to VDE0126)
- Low initial contact resistance ≤0.2 mΩ
- Rises in board temperatures are suppressed by a low heat generation and high dissipation structure.
- Auxiliary contact option (High-capacity model) conformed to mirror contact structure defined in IEC/EN60947-4-1 Annex F7.2
- High Contact Reliability (Min. 5 VDC, 1 mA, reference value) by Bifurcated contacts

**As this relay is a high-voltage and high-current type, be sure to refer to the Precautions on page 7 before use.**

G9KA

## Model Number Legend

**G9KA-□□-□**
1 2 3

1. Main Contact Form
   1A: 1a contact
2. Auxiliary Contact Form
   None: No Auxiliary contact
   1B: 1b contact
3. Special specification
   None: Standard model
   E: High-capacity model

## Application Examples

- Power conditioner inverter
- EV Charger
- Industrial inverter
- UPS

## Ordering Information

| Classification | Contact form | Enclosure rating | Terminal Shape | Model | Rated coil voltage (V) | Minimum packing unit |
|---|---|---|---|---|---|---|
| Standard model | SPST-NO (1a) | Flux protection | PCB terminals | G9KA-1A | 12 VDC<br>24 VDC | 36pcs/box |
| High-capacity model | | | | G9KA-1A-E | | |
| | SPST-NO + SPST-NC (1a1b) | | | G9KA-1A1B-E | | |

Note. When ordering, add the rated coil voltage to the model number.

Example: G9KA-1A DC12
Rated coil voltage

Both the coil voltage on the product case and the packing will be marked as □□VDC.

## Ratings

● **Coil**

| Rated coil voltage (V) | Rated voltage | Rated current (mA) | Coil resistance (Ω) | Must operate voltage (V) | Must release voltage (V) | Max. voltage (V) | Power consumption (mW) |
|---|---|---|---|---|---|---|---|
| | | | | % of rated voltage | | | |
| G9KA-1A<br>G9KA-1A-E | 12 VDC | Approx. 417 | 28.8 | 75% max. | 5 to 35% | 120%<br>(at 23°C) | Approx. 5,000<br>Approx. 1,012 * |
| | 24 VDC | Approx. 208 | 115.2 | | | | |
| G9KA-1A1B-E | 12 VDC | Approx. 500 | 24 | | 5% min. | 110%<br>(at 23°C) | Approx. 6,000<br>Approx. 1,012 * |
| | 24 VDC | Approx. 250 | 96 | | | | |

Note 1. The rated current and resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.
Note 2. The operating characteristics are measured at a coil temperature of 23°C.
Note 3. The maximum permissible voltage is the maximum value of the fluctuation range for the relay coil operating power supply and was measured at an ambient temperature of 23°C.
Note 4. Use this relay with coil voltage reduction.
* Power consumption with holding voltage is approx. 1,012 mW (at 45% holding voltage for contact form 1a, at 41% holding voltage for contact form 1a1b). Please confirm the details on page 7, under ●Coil Voltage Reduction (holding voltage) after Relay Operation.



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## ● Contacts

| Item | | Standard model | High-capacity model | |
|---|---|---|---|---|
| | | G9KA-1A | G9KA-1A-E | G9KA-1A1B-E |
| Contact type | Main contact | Double break | | |
| | Auxiliary contact | — | — | Bifurcated crossbar |
| Contact material | Main contact | Ag Alloy (Cd free) | | |
| | Auxiliary contact | — | — | Ag + AU Alloy (Cd free) |
| Rated load (resistive load) | Main contact | 800 VAC making 50 A, carrying 260 A, breaking 50 A/ 800 VAC making 150 A, carrying 260 A, breaking 260 A/200 A at 60 VDC | 1,000 VAC making 50 A, carrying 300 A, breaking 50 A/ 1,000 VAC making 150 A, carrying 300 A, breaking 300 A | |
| | Auxiliary contact | — | — | 1 A at 30 VDC |
| Rated carry current | Main contact | 260 A | 300 A | |
| | Auxiliary contact | — | — | 1A |
| Max. switching voltage | Main contact | 800 VAC, 60 VDC | 1,000 VAC | |
| | Auxiliary contact | — | — | 30 VDC |
| Max. switching current | Main contact | 260 A | 300 A | |
| | Auxiliary contact | — | — | 1A |

## Characteristics

| Item | model | Standard model | High-capacity model | |
|---|---|---|---|---|
| | | G9KA-1A | G9KA-1A-E | G9KA-1A1B-E |
| Contact resistance *1 | | 0.2 mΩ max. | | Main contact: 0.2 mΩ max.<br>Auxiliary contact:100 mΩ max. |
| Operate time *2 | | 30 ms max. | | |
| Release time *2 | | 10 ms max. | | 20 ms max. |
| Insulation resistance *3 | | 1,000 MΩ min. | | |
| Dielectric strength | Between coil and contacts | 5,000 VAC, 50/60 Hz for 1 min | | Main contact: 5,000 VAC, 50/60 Hz for 1 min<br>Auxiliary contact: 500 VAC, 50/60 Hz for 1 min |
| | Between contacts of the same polarity | 2,000 VAC, 50/60 Hz for 1 min | | Main contact: 2,000 VAC, 50/60 Hz for 1 min<br>Auxiliary contact: 400 VAC, 50/60 Hz for 1 min |
| | Between contacts of different polarity | — | | Between main contact and auxiliary contact: 5,000 VAC, 50/60 Hz for 1 min |
| Impulse withstand voltage | Between coil and contacts | 10 kV (1.2 × 50 μs) | | Main contact: 10 kV (1.2 × 50 μs)<br>Auxiliary contact: 0.8 kV (1.2 × 50 μs) |
| Vibration resistance | Destruction | 10 to 55 to 10 Hz, 0.5 mm single amplitude (1.0 mm double amplitude) | | |
| | Malfunction | Excitation: 10 to 55 to 10 Hz, 0.5 mm single amplitude (1.0 mm double amplitude) | | Excitation: 10 to 55 to 10 Hz, 0.5 mm single amplitude (1.0 mm double amplitude)<br>No Excitation: 10 to 55 to 10 Hz, 0.15 mm single amplitude (0.3 mm double amplitude) |
| Shock resistance | Destruction | 1,000 m/s² | | |
| | Malfunction | Excitation: 100 m/s² | | 100 m/s² *7 |
| Durability | Mechanical | 100,000 operations min. (at 7,200 operations/h) | | |
| | Electrical (Resistive) *4 | 800 VAC making 50 A, carrying 260 A, breaking 50 A; 30,000 operations min.<br>800 VAC making 150 A, carrying 260 A, breaking 260 A; 10 operations min.<br>200 A at 60 VDC; 2,000 operations min.<br><br>(Switching frequency:<br>1 second ON - 9 seconds OFF at 85°C) | 1,000 VAC making 50 A, carrying 300 A, breaking 50 A; 30,000 operations min.<br>1,000 VAC making 150 A, carrying 300 A, breaking 300 A; 10 operations min.<br><br>(Switching frequency:<br>1 second ON - 9 seconds OFF at 85°C) | Main contact:<br>1,000 VAC making 50 A, carrying 300 A, breaking 50 A; 30,000 operations min.<br>1,000 VAC making 150 A, carrying 300 A, breaking 300 A; 10 operations min.<br>Auxiliary contact: 1 A at 30 VDCA; 100,000 operations min.<br>(Switching frequency: 1 second ON - 9 seconds OFF at 85°C) |
| Failure rate (M level) (Reference value) *5 | | 1 A at 5 VDC | | Main contact: 1 A at 5 VDC<br>Auxiliary contact: 1 mA at 5 VDC |
| Use conditions | Coil holding voltage *6 | 45% to 60% of rated coil voltage | | 41% to 55% of rated coil voltage |
| | Ambient operating temperature | -40°C to +85°C (with no icing or condensation) | | |
| | Ambient operating humidity | 5% to 85% | | |
| Weight | | Approx. 220 g | Approx. 235 g | Approx. 240 g |

Note. The values given above are initial values at 23°C. (Except Electrical Durability)

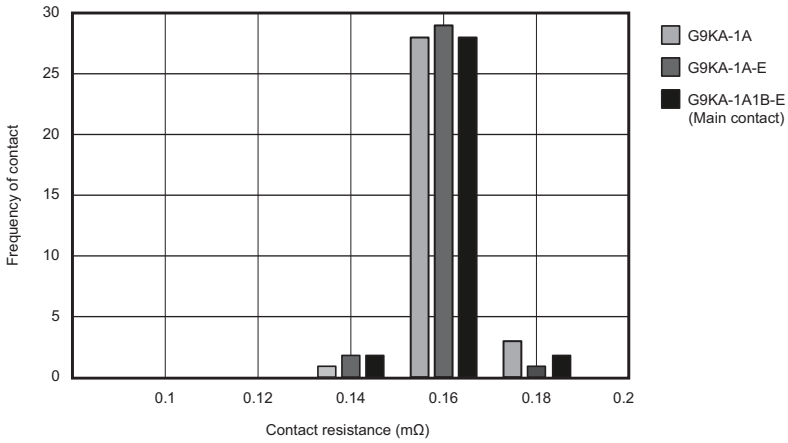
*1. Measurement conditions: Main contact 200 A at 6 VDC (after 30 minutes) using the voltage drop method. Auxiliary contact 1 A at 5 VDC using the voltage drop method.
*2. Measurement conditions: Applied rated coil voltage, no contact bouncing.
*3. Measurement conditions: Measured with a 1,000 VDC megohmmeter at the same point as the dielectric strength was measured.
*4. This specification is when diode and zener diode are used. For relay coil, please connect diode and zener diode.
For more detail, please refer to ●Diode Connection for Operating Coil on page 7.
*5. The value was measured at a switching frequency of 180 operations/ minute (60 operations/ minute for G9KA-1A1B-E).
*6. For the detail regarding holding voltage usage, please refer to ●Coil Voltage Reduction (holding voltage) after Relay Operation on page 7.
*7. No excitation, shock in the Y+ direction excluded. No excitation, standard value in the Y+ direction is 25 m/s².



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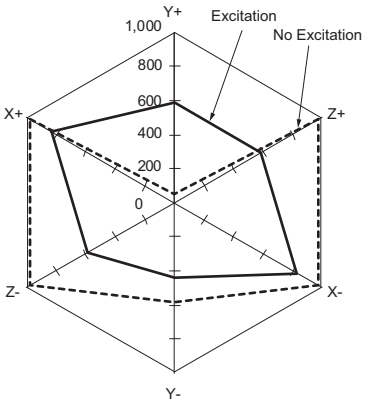
## Engineering Data

### ● Contact resistance




### ● Malfunction shock resistance

G9KA-1A
G9KA-1A-E

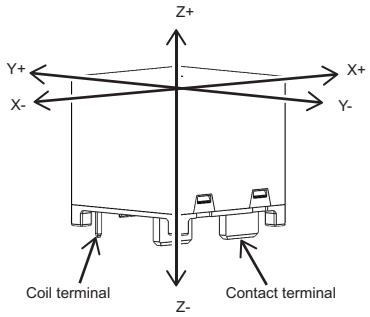



Measurement:
Measure the value of contact malfunction happening by applying 3 axes with 6 direction 3 times each.
The energized voltage is within the range of the rated holding voltage.

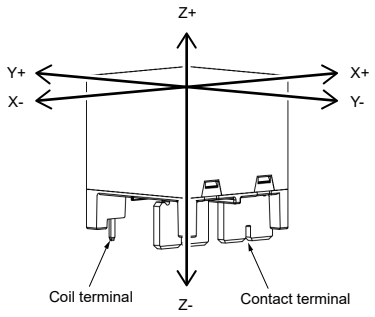
Standard value:
Excitation 100 m/s²

Shock direction

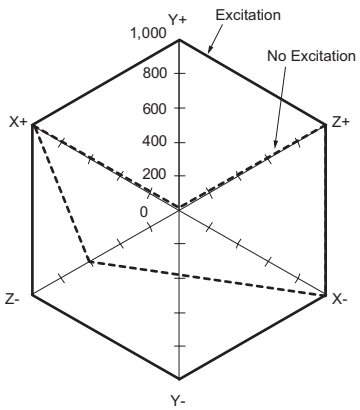
G9KA-1A




G9KA-1A-E



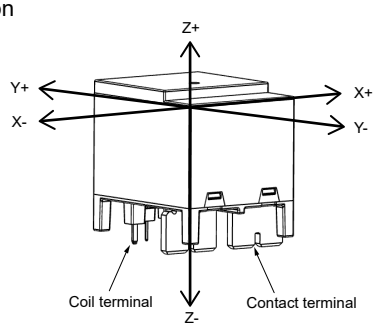

G9KA-1A1B-E




Measurement:
Measure the shock value of contact malfunction happening by applying 3 axes with 6 directions, 3 times each.
The energized voltage is within the range of the rated holding voltage.

Standard value:
100 m/s² (No excitation, in the Y+ direction excluded)
No excitation, in the Y+ direction: 25 m/s²

Shock direction







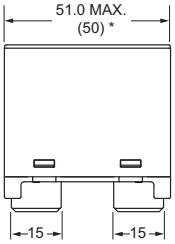

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## Dimensions

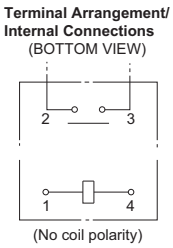
CAD Data marked products, 2D drawings and 3D CAD models are available.
For CAD information, please visit our website, which is noted on the last page.

(Unit:mm)

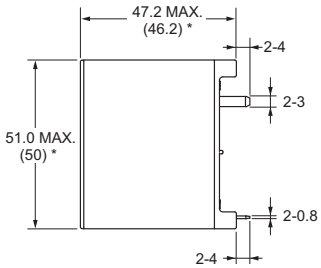
### G9KA-1A

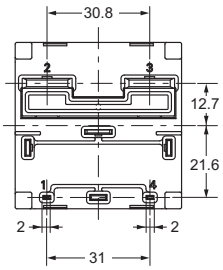


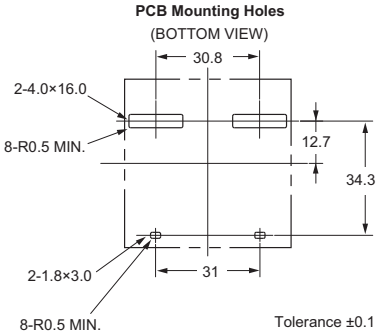

*Average value




(No coil polarity)



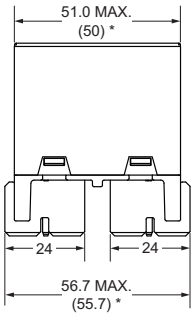



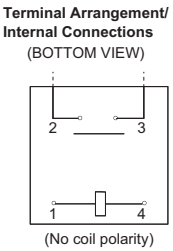

Tolerance ±0.1

CAD Data

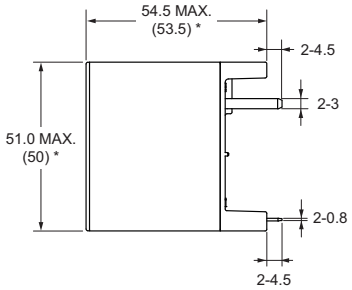
### G9KA-1A-E

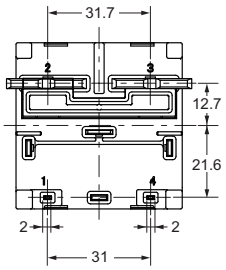


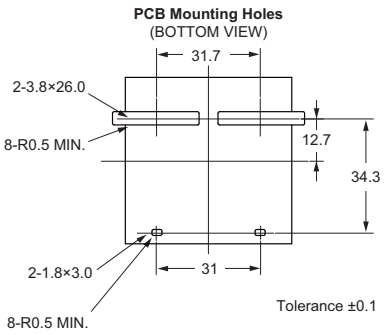

* Average value




(No coil polarity)



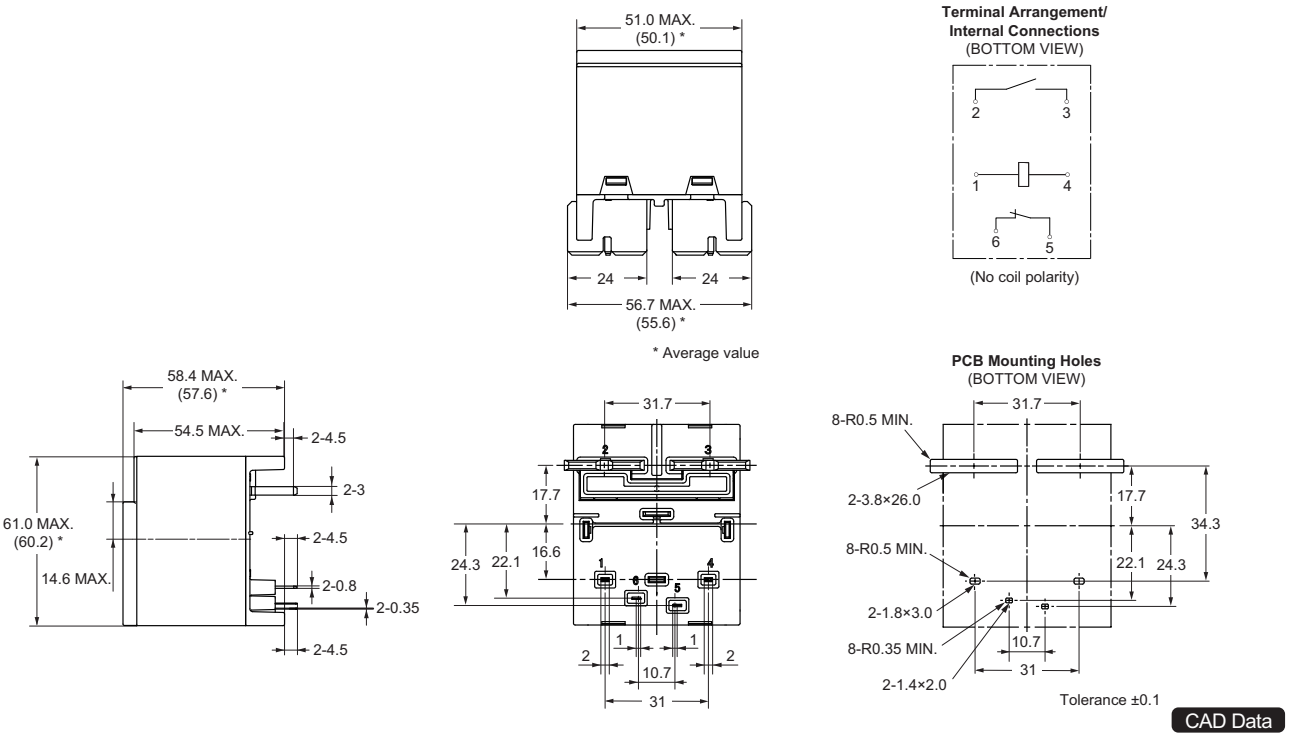

Tolerance ±0.1

CAD Data



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### G9KA-1A1B-E




CAD Data

## Approval Standard

**The approval rating values for overseas standards are different from the performance values determined individually confirm the values before use.**

### UL/C-UL Recognized: (File No. E41515)

| Model | Contact form | Coil ratings | Contact ratings | Number of test operations |
|---|---|---|---|---|
| G9KA-1A | SPST-NO (1a) | 12, 24 VDC | 800 VAC 50 A (Resistive) at 85°C | 30,000 |
| | | | 800 VAC making 50 A, carrying 260 A, breaking 50 A at 85°C | 30,000 |
| | | | 60 VDC 200 A (Resistive) at 85°C | 2,000 |
| G9KA-1A-E | SPST-NO (1a) | 12, 24 VDC | 1,000 VAC making 50 A, carrying 300 A, breaking 50 A at 85°C | 30,000 |
| | | | 1,000 VAC making 150 A, carrying 300 A, breaking 300 A at 85°C | 10 |
| | | | 50 VDC 300 A (Resistive) at 85°C | 2,000 |
| G9KA-1A1B-E | SPST-NO (1a) | 12, 24 VDC | 1,000 VAC making 50 A, carrying 300 A, breaking 50 A (Resistive) (N.O.) at 85°C | 30,000 |
| | | | 1,000 VAC making 150 A, carrying 300 A, breaking 300 A (Resistive) (N.O.) at 85°C | 10 |
| | SPST-NC (1b) | | 30 VDC 1 A (Resistive) (N.C.) at 85°C | 100,000 |

### EN/IEC, TÜV Certificated:

| Model | Contact form | Coil ratings | Contact ratings | Number of test operations | Certificate No. |
|---|---|---|---|---|---|
| G9KA-1A | SPST-NO (1a) | 12, 24 VDC | 800 VAC making 50 A, carrying 260 A, breaking 50 A at 85°C | 30,000 | R50459726 |
| G9KA-1A-E | SPST-NO (1a) | 12, 24 VDC | 1,000 VAC making 50 A, carrying 300 A, breaking 50 A at 85°C | 30,000 | |
| | | | 1,000 VAC making 150 A, carrying 300 A, breaking 300 A at 85°C | 10 | |
| G9KA-1A1B-E | SPST-NO (1a) | 12, 24 VDC | 1,000 VAC making 50 A, carrying 300 A, breaking 50 A (Resistive) (N.O.) at 85°C | 30,000 | R50675502 |
| | | | 1,000 VAC making 150 A, carrying 300 A, breaking 300 A (Resistive) (N.O.) at 85°C | 10 | |
| | SPST-NC (1b) | | 30 VDC 1 A (Resistive) (N.C.) at 85°C | 100,000 | |

### CQC Certificated:

| Model | Contact form | Coil ratings | Contact ratings | Number of test operations | Certificate No. |
|---|---|---|---|---|---|
| G9KA-1A | SPST-NO (1a) | 12, 24 VDC | 800 VAC making 50 A, carrying 260 A, breaking 50 A at 85°C | 30,000 | CQC20002275617 |
| G9KA-1A-E | SPST-NO (1a) | 12, 24 VDC | 1,000 VAC making 50 A, carrying 300 A, breaking 50 A at 85°C | 30,000 | |
| | | | 1,000 VAC making 150 A, carrying 300 A, breaking 300 A at 85°C | 10 | |
| G9KA-1A1B-E | SPST-NO (1a) | 12, 24 VDC | 1,000 VAC making 50 A, carrying 300 A, breaking 50 A (Resistive) (N.O.) at 85°C | 30,000 | CQC25002471904 |
| | | | 1,000 VAC making 150 A, carrying 300 A, breaking 300 A (Resistive) (N.O.) at 85°C | 10 | |
| | SPST-NC (1b) | | 30 VDC 1 A (Resistive) (N.C.) at 85°C | 100,000 | |





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### G9KA-1A

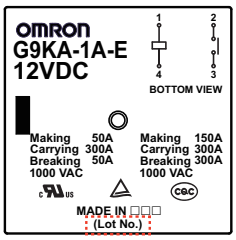
| | | IEC | GB | UL |
|---|---|---|---|---|
| Creepage distance (required value) | | 12.5 mm min. | | |
| Clearance (required value) | | 10.32 mm min. | 8 mm min. | |
| Insulation material group | | IIIa | | |
| Type of insulation | Coil-contact circuit | Basic (800 V, OV-cat. III, up to 2,000 m above sea level)<br>Basic (800 V, OV-cat. III, up to 4,000 m above sea level) | Basic (800 V, OV-cat. III, up to 2,000 m above sea level) | |
| Type of interruption | | Micro disconnection | | |
| Rated insulation system | | 800 V | | |
| Pollution degree | | 3 | | |
| Rated voltage system | | 800 V | | |
| Category of protection (IEC61810-1) | | RTII | | — |
| Flammability class (UL94) | | — | — | V-0 |
| Coil insulation system (UL1446) | | — | — | Class F |

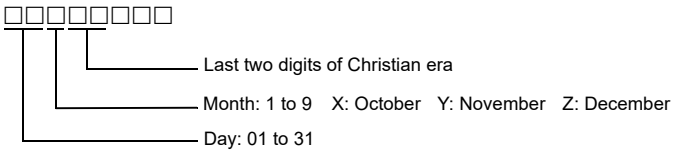
### G9KA-1A-E

| | | IEC | GB | UL |
|---|---|---|---|---|
| Creepage distance (required value) | | 16 mm min. *1 | 16 mm min. | |
| Clearance (required value) | | 10.32 mm min. | 8 mm min. | |
| Insulation material group | | IIIa | | |
| Type of insulation | Coil-contact circuit | Basic (1,000 V, OV-cat. III, up to 2,000 m above sea level)<br>Basic (1,000 V, OV-cat. III, up to 4,000 m above sea level) | Basic (1,000 V, OV-cat. III, up to 2,000 m above sea level) | |
| Type of interruption | | Micro disconnection | | |
| Rated insulation system | | 1,000 V | | |
| Pollution degree | | 3 | | |
| Rated voltage system | | 1,000 V | | |
| Category of protection (IEC61810-1) | | RTII | | — |
| Flammability class (UL94) | | — | — | V-0 |
| Coil insulation system (UL1446) | | — | — | Class F |

*1. Recertification applies to products manufactured from July 1, 2025.
The production date can be confirmed by the Lot No.

<Lot No. Naming Rules>




### G9KA-1A1B-E

| | | IEC | GB | UL |
|---|---|---|---|---|
| Creepage distance (required value) | | 16 mm min. (Between main contacts and coil) | | |
| Clearance (required value) | | 10.32 mm min. (Between main contacts and coil) | 8 mm min. (Between main contacts and coil) | |
| Insulation material group | | IIIa | | |
| Type of insulation | Coil-contact circuit | Basic (1,000 V, OV-cat. III, up to 4,000 m above sea level) (Main contact) | Basic (1,000 V, OV-cat. III, up to 2,000 m above sea level) (Main contact) | |
| Type of interruption | | Micro disconnection | | |
| Rated insulation system | | 1,000 V (Main contact) | | |
| Pollution degree | | 3 | | |
| Rated voltage system | | 1,000 V (Main contact) | | |
| Category of protection (IEC61810-1) | | RTII | | — |
| Flammability class (UL94) | | — | — | V-0 |
| Coil insulation system (UL1446) | | — | — | Class F |



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## Precautions

● **Refer to *PCB Relays Common Precautions* for general precautions.**

### ⚠Warning

As this relay is a high-voltage and high-current type, there is a risk of abnormal heat generation, smoke generation or fire if you use the relay with a contact voltage, current, or for a number of times beyond the specified range. Use only within the specified ranges.



If the power is switched on when the connections are insufficient, there is a risk of abnormal heat generation. Do not connect and use clips and sockets on individual relays.



If the power is switched on when the connections are insufficient, there is a risk of abnormal heat generation. Please install and use relays under recommended conditions.



### Precautions for Safe Use

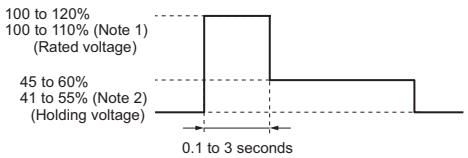
**●Drop**

- Do not use relays that have been dropped as they may not function properly.

### Precautions for Correct Use

**●Coil Voltage Reduction (holding voltage) after Relay Operation**

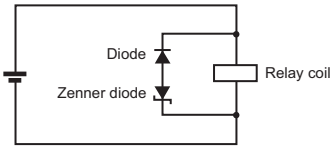
- Use this relay with coil voltage reduction.
- Apply the rated voltage for 0.1 to 3 seconds to the coil first.
- The range of coil rated voltage must be set as 100 to 120% (100 to 110% for the G9KA-1A1B-E only), and holding voltage must be 45 to 60% (41 to 55% for G9KA-1A1B-E only). Do not exceed the ranges due to the change of coil voltage change and so on.




Note 1.100 to 110% for G9KA-1A1B-E only.
Note 2.41 to 55% for G9KA-1A1B-E only.

**●Diode Connection for Operating Coil**

- Connect diode and zener diode (or varistor) to the coil (refer to the picture below).
  Diode is for coil surge absorption. Ensure to include zener diode as there is a possibility of any influence for switching capability when only using diodes.
- Coil has no polarity. Connect the diodes in the reverse polarity of the voltage applied to the coil.
- The recommended zener diode voltage is 2 times that of the rated coil voltage.
- Use diodes with reverse dielectric strength 10 times or more that of coil rated voltage, and with forward current more than coil rated current.




**●PCB Terminal Soldering**

- Perform soldering under the following conditions.
  G9KA-1A: Preheat at 120°C for 60 seconds and dip in solder bath at 290°C for up to 20 seconds.
  G9KA-1A-E, G9KA-1A1B-E: Preheat at 120°C for 300 seconds and dip in a solder bath at 290°C for up to 30 seconds.
- It is not possible to wash relay as this is not fully sealed type.

**●Assembly**

- To reduce the risk of specification deterioration, assemble relays in a dust free, low humidity and non-corrosive gas environment.
- Using the relay under high temperature, high humidity, or harmful gas may deteriorate its performance characteristics due to condensation or corrosive materials, resulting in failure or burn damage to the relay.
- This product weight is about 220 to 240 g. Be careful of the strength of PCB. To reduce soldering crack due to heat stress, use both sides through hole PCB.

**●Electrical Endurance**

- This relay's electrical endurance specification is based on our company's standard test procedure with resistive loads. Relays intended for use with remove; types of drive circuits PWM, capacitive, resistive dropper etc.), types of loads (e.g. capacitive or inductive), and switching cycles (duty and operation timing) must be tested to confirm suitability to the actual intended application.
- The final failure mode is failure to break the circuit. In such a case, burning may extend to surrounding components. Implement safety circuits and other measures to minimize the risk of mechanical failure.

**●Micro Load**

- This is a power relay for high power switching. Do not use for micro loads such as signal switching.





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