

# G9EB-1

DC Power Relays (25-A Models)

## DC Power Relays Capable of Interrupting High-voltage, High-current DC Load

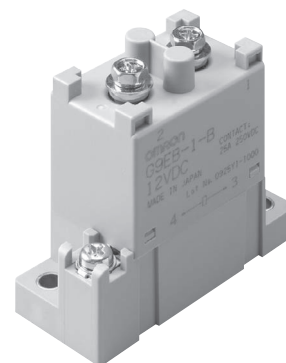
- Utilizes a unique gas-filled, fully sealed, non-ceramic construction achieved by using resin with a metal case. This reduces the need for special processing and materials that were required with previous models, resulting in a low-cost relay that is both compact and lightweight.
- Smallest and lightest in its class at 25 × 60 × 58 mm and approximately 135 g. This is approximately half the volume and a third of the weight of other DC Power Relays in the same class (400 VDC, 25 A).\*
- The unique design of the contact switching component and permanent magnet for blowing out the arc eliminates the need for polarity in the main circuit (contact terminal). This improves ease of wiring and installation, and contributes to providing failsafe measures against incorrect wiring.

\* Based on our investigation as of December 2004.

RoHS Compliant



Refer to "DC Power Relays Common Precautions".



### Model Number Legend

G9EB-□-□-□-□  
1 2 3 4

#### 1. Number of Poles

1: 1 pole

#### 3. Coil Terminals

B: M4 screw terminals

#### 2. Contact Form

Blank: SPST-NO

#### 4. Special Functions

### List of Models

| Models                              | Terminals       |                   | Contact form | Coil rated voltage                              | Model    |
|-------------------------------------|-----------------|-------------------|--------------|-------------------------------------------------|----------|
|                                     | Coil terminals  | Contact terminals |              |                                                 |          |
| Switching/current conduction models | Screw terminals | Screw terminals   | SPST-NO      | 12 VDC<br>24 VDC<br>48 VDC<br>60 VDC<br>100 VDC | G9EB-1-B |

Note 1. Two M4 screws are provided for the contact terminal connection.

Note 2. Two M4 screws are provided for the coil terminal connection.

### Ratings

#### Coil

| Rated voltage | Item | Rated current (mA) | Coil resistance (Ω) | Must-operate voltage (V)  | Must-release voltage (V)  | Maximum voltage (V)                                | Power consumption (W) |
|---------------|------|--------------------|---------------------|---------------------------|---------------------------|----------------------------------------------------|-----------------------|
| 12 VDC        |      | 166.7              | 72                  | 75% max. of rated voltage | 10% min. of rated voltage | 130% of rated volt-age (at 23°C within 10 minutes) | Approx. 2             |
| 24 VDC        |      | 83.3               | 288                 |                           |                           |                                                    |                       |
| 48 VDC        |      | 41.7               | 1,152               |                           |                           |                                                    |                       |
| 60 VDC        |      | 33.3               | 1,800               |                           |                           |                                                    |                       |
| 100 VDC       |      | 20                 | 5,000               |                           |                           |                                                    |                       |

Note 1. The figures for the rated current and coil resistance are for a coil temperature of 23°C and have a tolerance of ±10%.

Note 2. The figures for the operating characteristics are for a coil temperature of 23°C.

Note 3. The figure for the maximum voltage is the maximum voltage that can be applied to the relay coil.

#### Contacts

| Item                      | Resistive load  |
|---------------------------|-----------------|
|                           | G9EB-1(-B)      |
| Rated load                | 25 A at 250 VDC |
| Rated carry current       | 25 A            |
| Maximum switching voltage | 250 V           |
| Maximum switching current | 25 A            |

■Characteristics

| Item                                        |                                       | Model | G9EB-1(-B)                                                                                    |
|---------------------------------------------|---------------------------------------|-------|-----------------------------------------------------------------------------------------------|
| Contact resistance *1                       |                                       |       | 30 mΩ max.                                                                                    |
| Contact voltage drop                        |                                       |       | 0.1 V max. (for a carry current of 25 A)                                                      |
| Operate time                                |                                       |       | 30 ms max.                                                                                    |
| Release time                                |                                       |       | 15 ms max.                                                                                    |
| Insulation resistance *2                    | Between coil and contacts             |       | 1,000 MΩ min.                                                                                 |
|                                             | Between contacts of the same polarity |       | 1,000 MΩ min.                                                                                 |
| Dielectric strength                         | Between coil and contacts             |       | 2,500 VAC, 1 min                                                                              |
|                                             | Between contacts of the same polarity |       | 2,500 VAC, 1 min                                                                              |
| Impulse withstand voltage *3                |                                       |       | 4,500 V                                                                                       |
| Vibration resistance                        | Destruction                           |       | 10 to 55 to 10 Hz, 0.75-mm single amplitude<br>(Acceleration: 2.94 to 88.9 m/s <sup>2</sup> ) |
|                                             | Malfunction                           |       | 10 to 55 to 10 Hz, 0.75-mm single amplitude<br>(Acceleration: 2.94 to 88.9 m/s <sup>2</sup> ) |
| Shock resistance                            | Destruction                           |       | 490 m/s <sup>2</sup>                                                                          |
|                                             | Malfunction                           |       | 100 m/s <sup>2</sup>                                                                          |
| Mechanical endurance *4                     |                                       |       | 100,000 operations min.                                                                       |
| Electrical endurance (resistive load) *5 *6 |                                       |       | 250 VDC, 25 A, 30,000 ops. min.                                                               |
| Short-time carry current                    |                                       |       | 50 A (5 min), 40 A (10 min)                                                                   |
| Maximum interruption current *6             |                                       |       | 100 A at 250 VDC (5 times)                                                                    |
| Overload interruption *6                    |                                       |       | 50 A at 250 VDC (50 times min.)                                                               |
| Ambient operating temperature               |                                       |       | −40 to 70°C (with no icing or condensation)                                                   |
| Ambient operating humidity                  |                                       |       | 5% to 85% RH                                                                                  |
| Weight (including accessories)              |                                       |       | Approx. 135 g                                                                                 |

Note. The above values are initial values at an ambient temperature of 23°C unless otherwise specified.

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

\*2. The insulation resistance was measured with a 500-VDC megohmmeter.

\*3. The impulse withstand voltage was measured with a JEC-212 (1981) standard impulse voltage waveform (1.2 × 50 μs).

\*4. The mechanical endurance was measured at a switching frequency of 3,600 operations/hr.

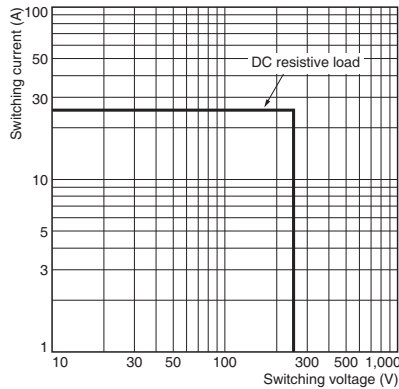
\*5. The electrical endurance was measured at a switching frequency of 60 operations/hr.

\*6. These values are for when a varistor is used as the protective circuit against reverse surge in the relay coil. Using a diode will reduce the switching characteristics.

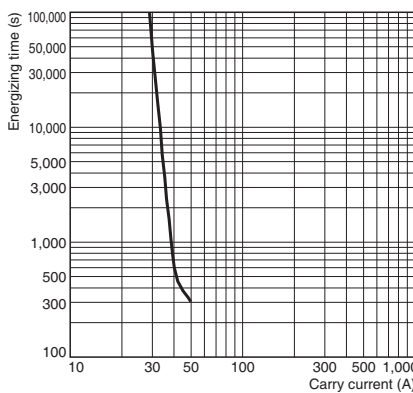
### Engineering Data

#### G9EB-1-B Switching/Current Conduction Models

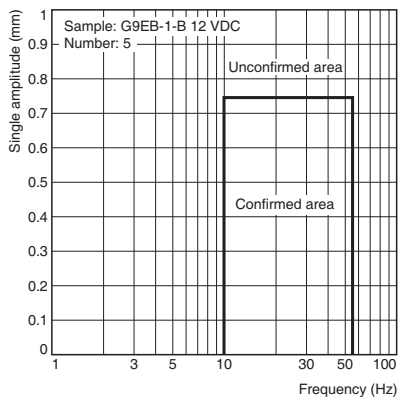
##### Maximum Switching Capacity



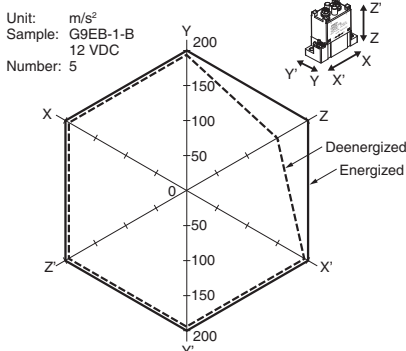
##### Carry Current vs Energizing Time



##### Vibration Malfunction

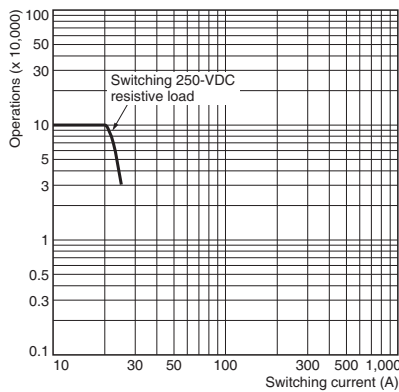


##### Shock Malfunction

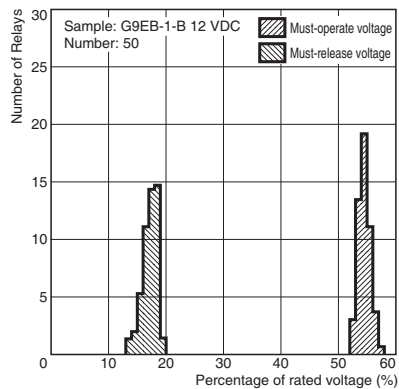


The value at which malfunction occurred was measured after applying shock to the test piece 3 times each in 6 directions along 3 axes.

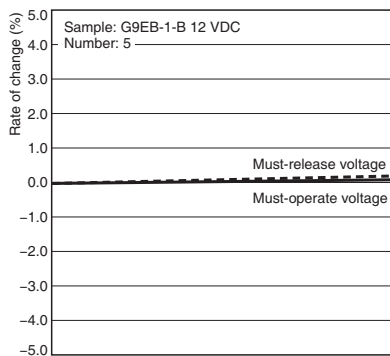
##### Electrical Endurance (Switching Performance)



##### Must-operate Voltage and Must-release Voltage Distributions

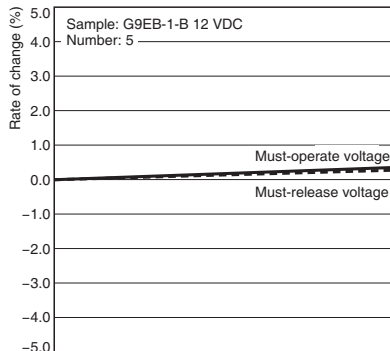


##### Vibration Resistances



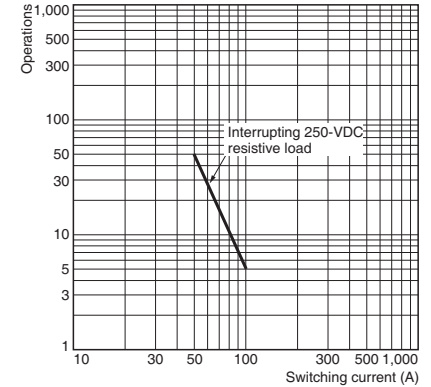
Start After test  
Characteristics were measured after applying vibration at a frequency of 10 to 55 Hz (single amplitude of 0.75 mm) to the test piece (not energized) for 2 hours each in 3 directions. The percentage rate of change is the average value for all of the samples.

##### Shock Resistance

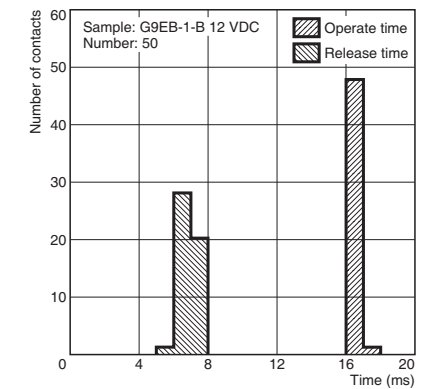


Start After test  
Characteristics were measured after applying a shock of  $490 \text{ m/s}^2$  to the test piece 3 times each in 6 directions along 3 axes. The percentage rate of change is the average value for all of the samples.

##### Electrical Endurance (Interruption Performance)

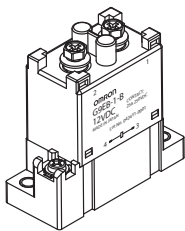


##### Time Characteristic Distributions

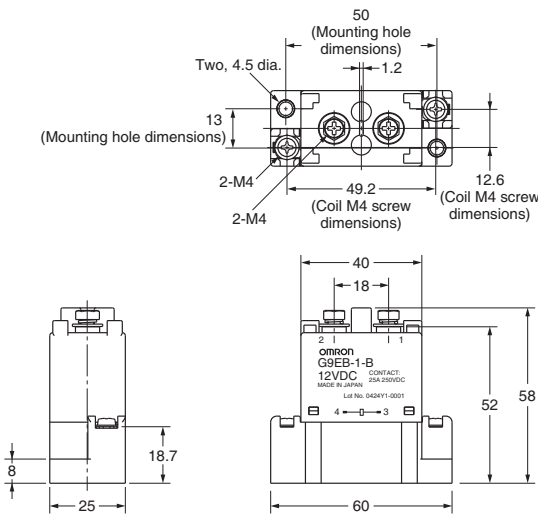


■Dimensions (Unit: mm)

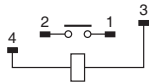
● Screw Terminal Type  
G9EB-1-B



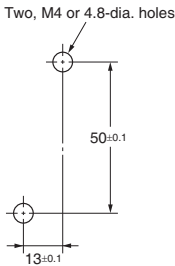
| Dimension (mm) | Tolerance (mm) |
|----------------|----------------|
| 10 or lower    | ±0.3           |
| 10 to 50       | ±0.5           |
| 50 or higher   | ±1             |



Terminal Arrangement/  
Internal Connections  
(TOP VIEW)



Mounting Hole Dimensions  
(TOP VIEW)



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Note: Do not use this document to operate the Unit.