NEW

DC Control in a Relay

A Leader in Clean Energy with Compact, Quiet, Energy-efficient Designs

New Models

DC Power Relays

G9EA/G9EC

DC POWER RELAY

DC Power Relays that Interrupt High-capacity DC Loads and High-voltage DC Circuits in a Compact, Low-noise Design

In the endeavors to prevent global warming, air pollution, and the depletion of oil resources, much attention is being given to increasing the efficiency of AC-to-DC power conversion and distributed power generation. DC contactors and circuit-breakers, however, are disadvantaged by their noise and bulk.
OMRON has improved on the standard DC circuit that switches using a contactor or circuit-breaker by developing the G9EA/G9EC DC Power Relay Series. These Relays enable switching high-voltage and high-capacity loads. The switch's gas-filled construction allows a considerable reduction in the relay switch size, while also lowering the operating noise during load switching. Furthermore, the new design has decreased the power consumption of the coil and achieved long-term contact stability.

Features

OMRON DC Power Switching Technologies

- Sealed switching
- Gas-cooled arc
- Magnetic arc control

Space-saving No arc space needed

Quiet 50% lower operating noise

Compact 70% less volume

Power-saving 30% less power consumption

Safe, reliable design

*Compared with the same class (load switching) of G9EA contactor.

The G9EA is shown.

Applications

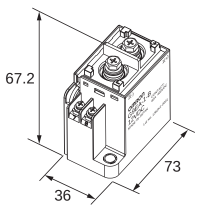
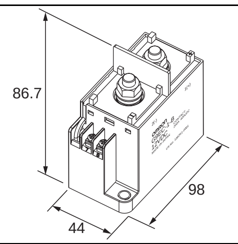
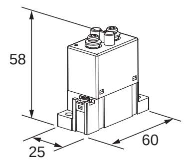
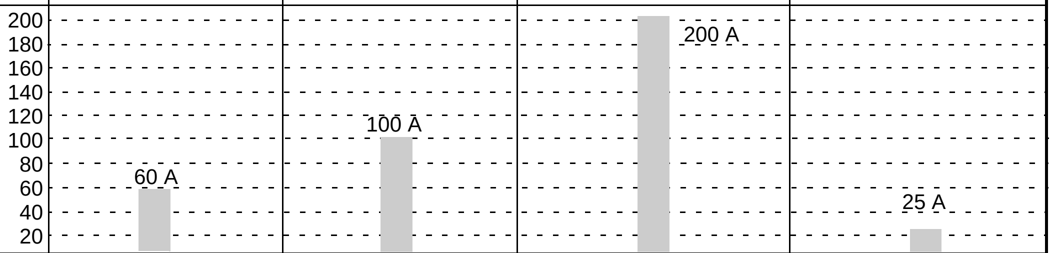
Smaller and quieter for a variety of DC applications

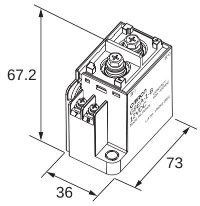
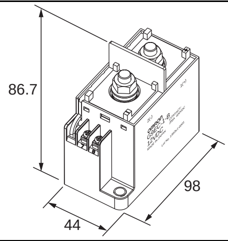
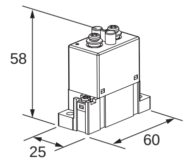
- **Automobiles**
  Hybrid cars, fuel-cell cars, compact electric passenger vehicles, etc.
- **Special vehicles**
  Battery-operated golf carts, forklifts, AGV (automated guided vehicles), battery-powered agricultural equipment, etc.
- **Electric Power and Distributed Power Generation**
  Wind-powered or photovoltaic power generation systems, fuel-cell cogeneration systems, etc.
- **General-purpose Industrial Equipment**
  Inverters, UPS, power supplies, robots, machining centers, elevators, escalators, medical equipment, testing equipment (batteries, fuel cells), etc.

DC Power Relays
Selection Guide

OMRON DC Power Relays Interrupt High-capacity DC Loads while Enabling Compact, Low-noise, Safe Applications

■ List of DC Power Relays

Model		G9EA		G9EC	G9EB (See note 1.)
		G9EA-1(-B)	G9EA-1(-B)-CA	G9EC-1(-B)	G9EB-1-B
Classification		Switching/current conduction	High-current conduction	Switching/current conduction	Switching/current conduction
Appearance					
Features		**Standard model** Compact, carries/ switches 400-V, 60-A loads	**Carries 100 A** Low contact resistance when carrying current	**Largest capacity in series** Carries/switches 400-V, 200-A loads	**Smallest in series** Carries/switches 250-V, 25-A loads
Contacts	Contact form	SPST-NO			
	Contact structure	Double-break, single			
	Contact resistance	30 mΩ max. (0.6 mΩ typical)	10 mΩ max. (0.3 mΩ typical)	30 mΩ max. (0.2 mΩ typical)	30 mΩ max.
	Switching voltage drop	0.1 V max. (for a carry current of 60 A)	0.1 V max. (for a carry current of 100 A)	0.1 V max. (for a carry current of 200 A)	0.5 V max. (for a carry current of 25 A)
	Electrical endurance	120 VDC, 100 A, 3,000 operations min.	400 VDC, 30 A, 1,000 operations min.	400 VDC, 200 A, 3,000 operations min.	250 VDC, 25 A, 30,000 operations min.
		400 VDC, 60 A, 3,000 operations min.	120 VDC, 30 A, 2,500 operations min.	---	---
		400 VDC, 30 A, 30,000 operations min.	---	---	---
	Maximum switching current	100 A	30 A	200 A	25 A
	Rated carry current 	60 A	100 A	200 A	25 A
	Short-time carry current	100 A (10 min)	150 A (10 min)	300 A (15 min)	50 A (5 min), 40 A (15 min)
	Maximum interruption current	600 A at 300 VDC (5 times)	---	1,000 A at 400 VDC (10 times)	100 A at 250 VDC (5 times)
	Overload interruption	180 A at 400 VDC (100 times min.)	100 A at 120 VDC (150 times min.)	700 A at 400 VDC (40 times min.)	50 A at 250 VDC (50 times min.)
	Reverse polarity interruption	–60 A at 200 VDC (1,000 times min.)	---	–200 A at 200 VDC (1,000 times min.)	---
Coil	Rated voltage	12, 24, 48, 60, and 100 VDC			
	Power consumption	Approx. 5 to 5.4 W		Approx. 11 W	Approx. 2 W
Mechanical endurance		200,000 operations min.			100,000 operations min.

<table>
<tr><th colspan="2" rowspan="2">Model</th><th colspan="2">G9EA</th><th>G9EC</th><th>G9EB (See note 1.)</th></tr>
<tr><th>G9EA-1(-B)</th><th>G9EA-1(-B)-CA</th><th>G9EC-1(-B)</th><th>G9EB-1-B</th></tr>
<tr><th colspan="2">Classification</th><th>Switching/current conduction</th><th>High-current conduction</th><th>Switching/current conduction</th><th>Switching/current conduction</th></tr>
<tr><th colspan="2">Appearance</th><td colspan="2"></td><td></td><td></td></tr>
<tr><th colspan="2">Features</th><td>Standard model
Compact, carries/ switches 400-V, 60-A loads</td><td>Carries 100 A
Low contact resistance when carrying current</td><td>Largest capacity in series
Carries/switches 400-V, 200-A loads</td><td>Smallest in series
Carries/switches 250-V, 25-A loads</td></tr>
<tr><td rowspan="2">Insulation resistance (See note 2.)</td><td>Between coil and contacts</td><td colspan="4">1,000 MΩ min.</td></tr>
<tr><td>Between contacts of the same polarity</td><td colspan="4">1,000 MΩ min.</td></tr>
<tr><td rowspan="2">Dielectric strength</td><td>Between coil and contacts</td><td colspan="4">2,500 VAC, 1 min</td></tr>
<tr><td>Between contacts of the same polarity</td><td colspan="4">2,500 VAC, 1 min</td></tr>
<tr><td colspan="2">Impulse withstand voltage (See note 3.)</td><td colspan="4">4,500 V</td></tr>
<tr><td colspan="2">Ambient operating temperature</td><td colspan="2">–40 to 70°C (with no icing or condensation)</td><td>–40 to 50°C (with no icing or condensation)</td><td>–40 to 70°C (with no icing or condensation)</td></tr>
<tr><td colspan="2">Ambient operating humidity</td><td colspan="4">5% to 85%</td></tr>
<tr><td rowspan="2">Terminals</td><td>Screw terminals</td><td colspan="2">Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Lead wire output</td><td colspan="2">Yes</td><td>Yes</td><td>---</td></tr>
<tr><td colspan="2">Weight</td><td colspan="2">Approx. 310 g</td><td>Approx. 570 g</td><td>Approx. 100 g</td></tr>
<tr><td colspan="2">Refer to page</td><td colspan="2">5</td><td>11</td><td>17</td></tr>
</table>

Note: 1. This product is under development. Provisional specifications for the product are provided in this document. The actual specifications at the time of sales release are subject to change without notice.

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).

DC Power Relays (60-A, 100-A Models)
G9EA-1

DC Power Relays Capable of Interrupting High-voltage, High-current Loads

NEW

- A compact relay (73 x 36 x 67.2 mm (L x W x H)) capable of switching 400-V 60-A/100-A DC loads. (Capable of interrupting 600 A at 300 VDC max.)
- The switching section and driving section are gas-injected and hermetically sealed, allowing these compact relays to interrupt high-capacity loads. The sealed construction also requires no arc space, saves space, and helps ensure safe applications.
- Downsizing and optimum design allow no restrictions on the mounting direction.
- Terminal Cover and DIN Track Adapters are also available for industrial applications.
- UL/CSA approval pending.

Note: Refer to *Precautions* on page 20.

Model Number Structure

■ Model Number Legend

G9EA-□-□-□-□
1 2 3 4

1. Number of Poles
1: 1 pole

2. Contact Form
Blank: SPST-NO

3. Coil Terminals
B: M3.5 screw terminals
Blank: Lead wire output

4. Special Functions
CA: High-current conduction (100 A)

Note: Power-saving Models (with auxiliary contacts function) are scheduled to be added to the lineup as special function models.

Ordering Information

■ List of Models

Models	Terminals		Contact form	Rated coil voltage	Model
	Coil terminals	Contact terminals			
Switching/current conduction models	Screw terminals	Screw terminals	SPST-NO	12 VDC 24 VDC 48 VDC 60 VDC 100 VDC	G9EA-1-B
	Lead wires				G9EA-1
High-current conduction models	Screw terminals				G9EA-1-B-CA
	Lead wires				G9EA-1-CA

Note: **1.** Relays come with two M5 screws for the main terminals (contacts).
2. Relays with coil terminals and screw terminals come with two M3.5 screws.

Specifications

■ Ratings

Coil

Rated voltage	Rated current	Coil resistance	Must-operate voltage	Must-release voltage	Maximum voltage (See note 3.)	Power consumption
12 VDC	417 mA	28.8 Ω	75% max. of rated voltage	8% min. of rated voltage	130% of rated voltage	Approx. 5 W
24 VDC	208 mA	115.2 Ω				
48 VDC	102 mA	469.3 Ω				
60 VDC	86.2 mA	695.7 Ω				Approx. 5.2 W
100 VDC	53.6 mA	1,864 Ω				Approx. 5.4 W

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%.
2. The figures for the operating characteristics are for a coil temperature of 23°C.
3. The figure for the maximum voltage is the maximum voltage that can be applied to the relay coil for period of 10 minutes at an ambient temperature of 23°C. It does not apply to continuous operation.

Contacts

Item	Resistive load	
	G9EA-1(-B)	G9EA-1(-B)-CA
Rated load	60 A at 400 VDC, 100 A at 120 VDC	30 A at 400 VDC
Rated carry current	60 A	100 A
Maximum switching voltage	400 V	400 V
Maximum switching current	100 A	30 A

■ Characteristics

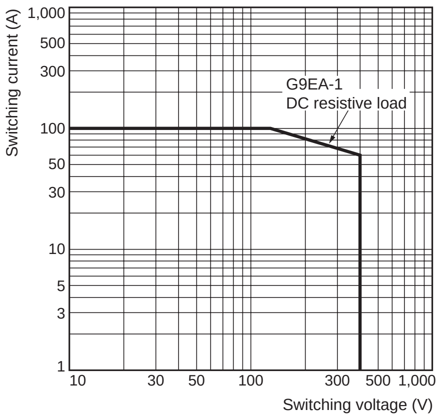
Item		G9EA-1(-B)	G9EA-1(-B)-CA
Contact resistance (See note 2.)		30 mΩ max. (0.6 mΩ typical)	10 mΩ max. (0.3 mΩ typical)
Contact voltage drop		0.1 V max. (for a carry current of 60 A)	0.1 V max. (for a carry current of 100 A)
Operate time		50 ms max.	
Release time		30 ms max.	
Insulation resistance (See note 3.)	**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 (See note 4.)		4,500 V	
Vibration resistance	**Destruction**	10 to 55 to 10 Hz, 0.75-mm single amplitude (Acceleration: 2.94 to 88.9 m/s^2)	
	Malfunction	10 to 55 to 10 Hz, 0.75-mm single amplitude (Acceleration: 2.94 to 88.9 m/s^2)	
Shock resistance	**Destruction**	490 m/s^2	
	Malfunction	196 m/s^2	
Mechanical endurance (See note 5.)		200,000 ops. min.	
Electrical endurance (See note 6.)		120 VDC, 100 A, 3,000 ops. min.	400 VDC, 30 A, 1,000 ops. min.
		400 VDC, 60 A, 3,000 ops. min.	120 VDC, 30 A, 2,500 ops. min.
		400 VDC, 30 A, 30,000 ops. min.	---
Short-time carry current		100 A (10 min)	150 A (10 min)
Maximum interruption current		600 A at 300 VDC (5 times)	---
Overload interruption		180 A at 400 VDC (100 times min.)	100 A at 120 VDC (150 times min.)
Reverse polarity interruption		–60 A at 200 VDC (1,000 times min.)	---
Ambient operating temperature		–40 to 70°C (with no icing or condensation)	
Ambient operating humidity		5% to 85%	
Weight		Approx. 310 g	

Note: 1. The above values are initial values at an ambient temperature of 23°C unless otherwise specified.
2. The contact resistance was measured with 1 A at 5 VDC using the voltage drop method.
3. The insulation resistance was measured with a 500-VDC megohmmeter.
4. The impulse withstand voltage was measured with a JEC-212 (1981) standard impulse voltage waveform (1.2 × 50 μs).
5. The mechanical endurance was measured at a switching frequency of 3,600 operations/hr.
6. The electrical endurance was measured at a switching frequency of 60 operations/hr.

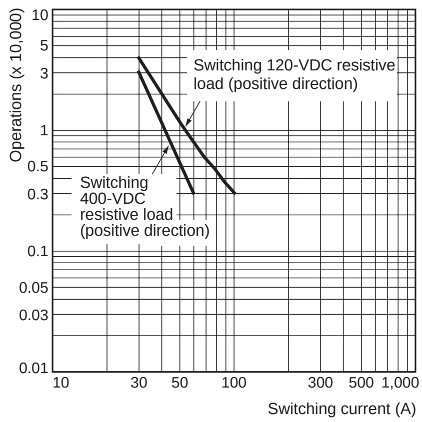
Engineering Data

■ G9EA-1(-B) Switching/Current Conduction Models

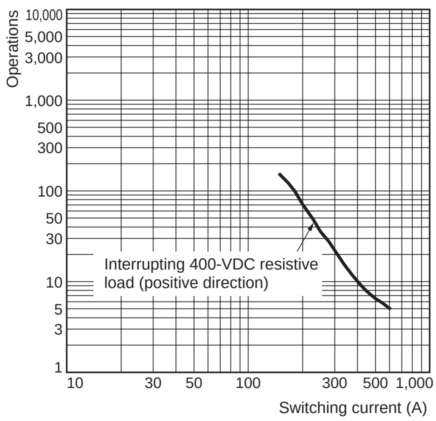
Maximum Switching Capacity



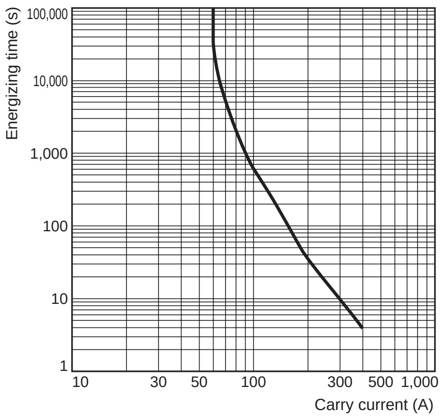
Electrical Endurance (Switching Performance)



Electrical Endurance (Interruption Performance)

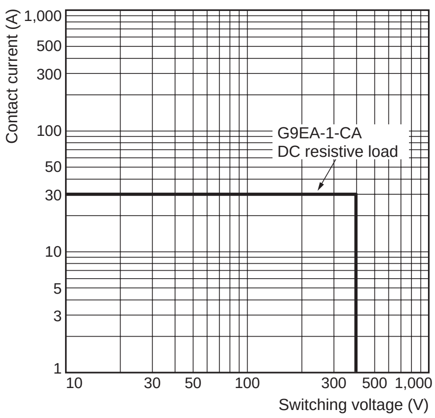


Carry Current vs Energizing Time

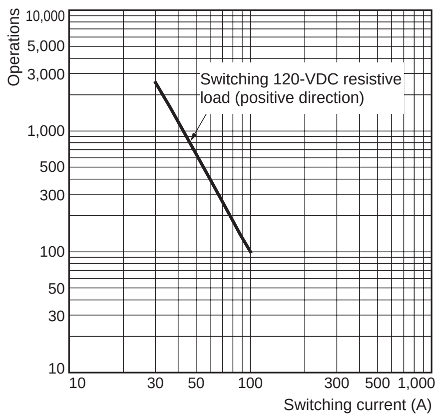


■ G9EA-1(-B)-CA High-current Conduction Models

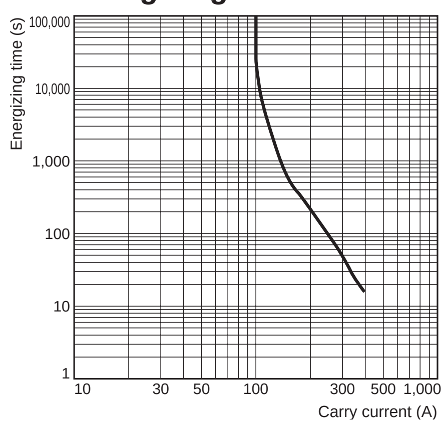
Maximum Switching Capacity



Electrical Endurance (Switching Performance)

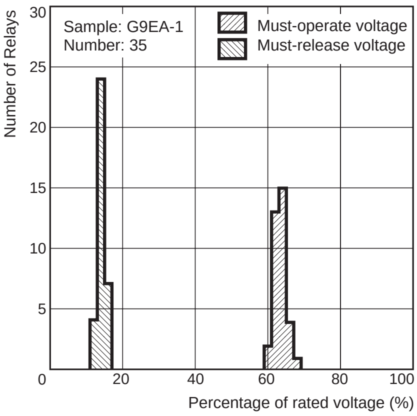


Carry Current vs Energizing Time

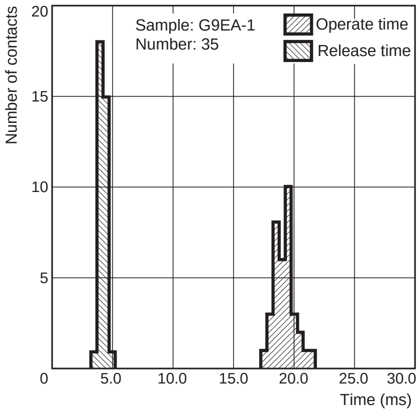


■ All G9EA-1 Models

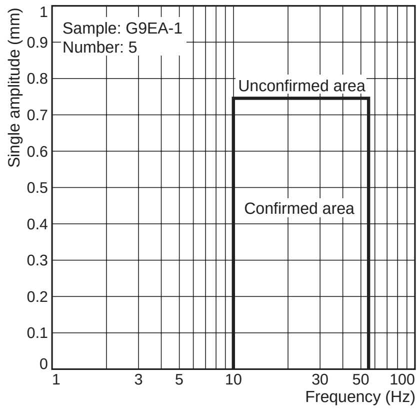
Must-operate Voltage and Must-release Voltage Distributions



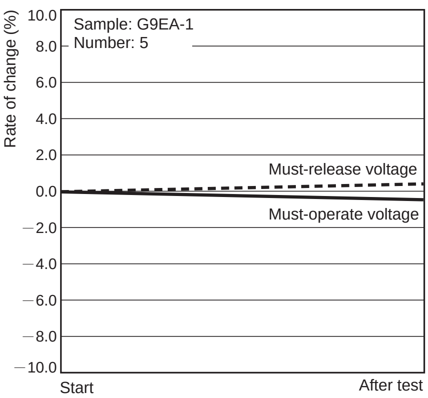
Time Characteristic Distributions



Vibration Malfunction

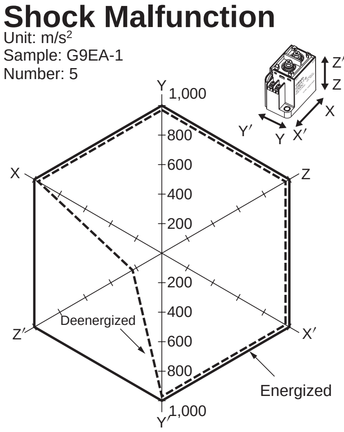


Vibration Resistance



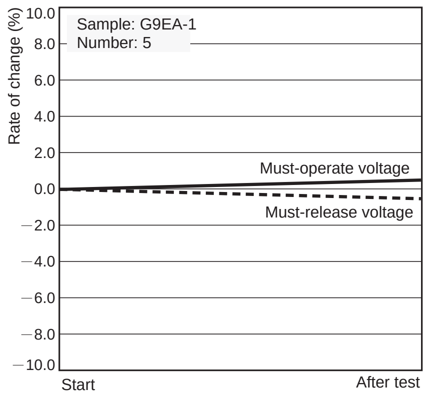
Characteristics were measured after applying vibration at a frequency of 10 to 55 Hz (single amplitude of 0.75 mm) to the test piece (not energized) for 2 hours each in 3 directions. The percentage rate of change is the average value for all of the samples

Shock 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.

Shock Resistance



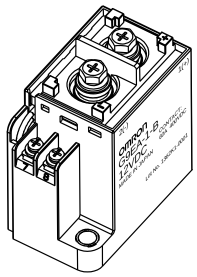
Characteristics were measured after applying a shock of 490 m^2/s to the test piece 3 times each in 6 directions along 3 axes. The percentage rate of change is the average value for all of the samples.

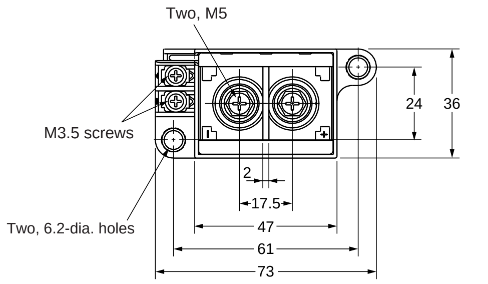
Dimensions

Note: All units are in millimeters unless otherwise indicated.

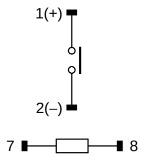
Models with Screw Terminals

G9EA-1-B(-CA)

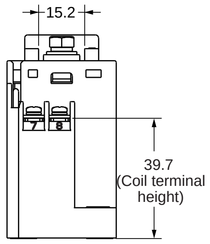


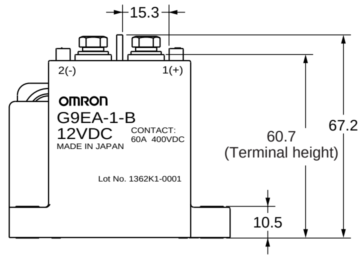


Terminal Arrangement/ Internal Connections
(TOP VIEW)

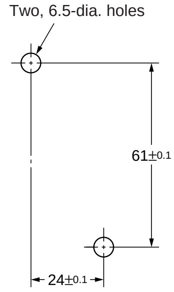


Note: Be sure to connect terminals with the correct polarity. Coils do not have polarity.





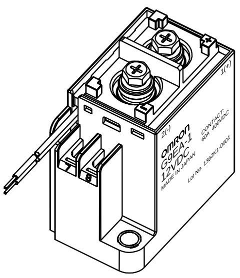
Mounting Hole Dimensions
(TOP VIEW)

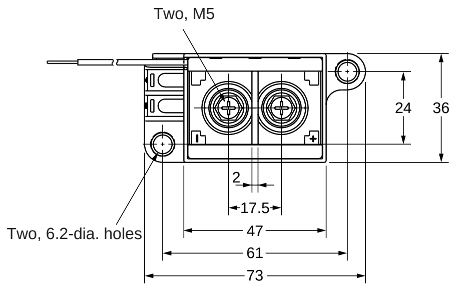


Dimension (mm)	Tolerance (mm)
10 or lower	±0.3
10 to 50	±0.5
50 or higher	±1

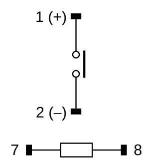
Models with Lead Wires

G9EA-1(-CA)

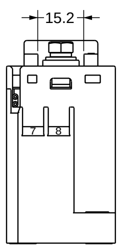


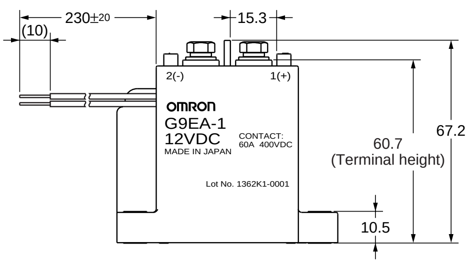


Terminal Arrangement/ Internal Connections
(TOP VIEW)

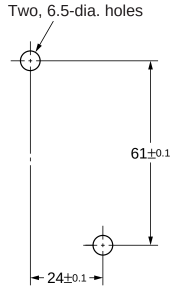


Note: Be sure to connect terminals with the correct polarity. Coils do not have polarity.





Mounting Hole Dimensions
(TOP VIEW)

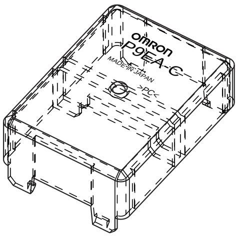


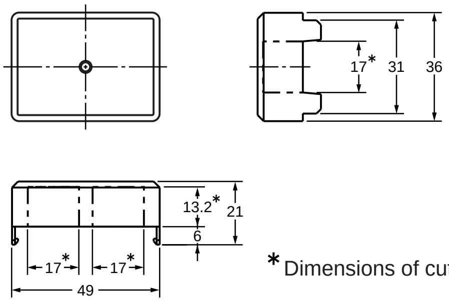
Dimension (mm)	Tolerance (mm)
10 or lower	±0.3
10 to 50	±0.5
50 or higher	±1

■ Options (Available Soon)

Terminal Cover

P9EA-C



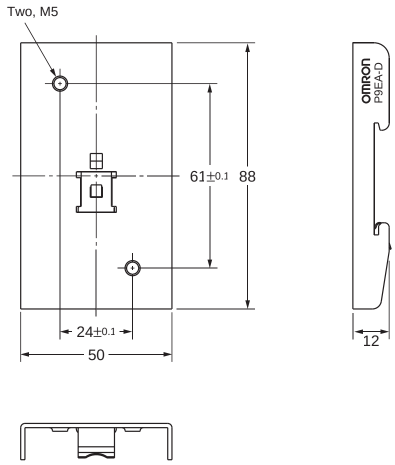


* Dimensions of cutouts for wiring.

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

DIN Track Adapter

P9EA-D



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

OMRON

DC Power Relays (200-A Models)
G9EC-1

DC Power Relays Capable of Interrupting High-voltage, High-current Loads

NEW

- A compact relay (98 x 44 x 86.7 mm (L x W x H)) capable of switching 400-V 200-A DC loads. (Capable of interrupting 1,000 A at 400 VDC max.)
- The switching section and driving section are gas-injected and hermetically sealed, allowing these compact relays to interrupt high-capacity loads. The sealed construction also requires no arc space, saves space, and helps ensure safe applications.
- Downsizing and optimum design allow no restrictions on the mounting direction.
- Terminal Cover is also available for industrial applications.
- UL/CSA approval pending.

Note: Refer to “Precautions” on page 20.

Model Number Structure

■ Model Number Legend

G9EC-□-□-□-□
1 2 3 4

1. Number of Poles
1: 1 pole

2. Contact Form
Blank: SPST-NO

3. Coil Terminals
B: M3.5 screw terminals (standard)
Blank: Lead wire output

4. Special Functions

Note: Power-saving Models (with auxiliary contacts function) are scheduled to be added to the lineup as special function models.

Ordering Information

■ 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 24 VDC 48 VDC 60 VDC 100 VDC	G9EC-1-B
	Lead wire				G9EC-1

Note: 1. Relays come with two M8 nuts for the main terminals (contacts).
2. Relays with coil terminals and screw terminals come with two M3.5 screws.

Specifications

■ Ratings

Coil

Rated voltage	Rated current	Coil resistance	Must-operate voltage	Must-release voltage	Maximum voltage (See note 3.)	Power consumption
12 VDC	938 mA	12.8 Ω	75% max. of rated voltage	8% min. of rated voltage	110% of rated voltage	Approx. 11 W
24 VDC	469 mA	51.2 Ω				
48 VDC	234 mA	204.8 Ω				
60 VDC	188 mA	320.0 Ω				
100 VDC	113 mA	888.9 Ω				

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%.
2. The figures for the operating characteristics are for a coil temperature of 23°C.
3. The figure for the maximum voltage is the maximum voltage that can be applied to the relay coil for period of 10 minutes at an ambient temperature of 23°C. It does not apply to continuous operation.

Contacts

Item	Resistive load
	G9EC-1(-B)
Rated load	200 A at 400 VDC
Rated carry current	200 A
Maximum switching voltage	400 V
Maximum switching current	200 A

■ Characteristics

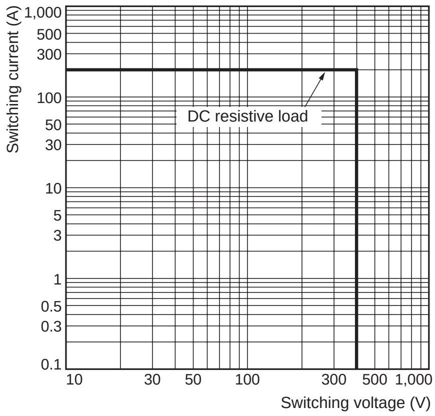
Item		G9EC-1(-B)
Contact resistance (See note 2.)		30 mΩ max. (0.2 mΩ typical)
Contact voltage drop		0.1 V max. (for a carry current of 200 A)
Operate time		50 ms max.
Release time		30 ms max.
Insulation resistance (See note 3.)	**Between coil and contacts**	1,000 MΩ min.
	Between contacts of the same 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 (See note 4.)		4,500 V
Vibration resistance	**Destruction**	10 to 55 to 10 Hz 0.75-mm single amplitude (Acceleration: 2.94 to 88.9 m/s^2)
	Malfunction	10 to 55 to 10 Hz 0.75-mm single amplitude (Acceleration: 2.94 to 88.9 m/s^2)
Shock resistance	**Destruction**	490 m/s^2
	Malfunction	196 m/s^2
Mechanical endurance (See note 5.)		200,000 operations min.
Electrical endurance (resistive load) (See note 6.)		400 VDC, 200 A, 3,000 operations min.
Short-time carry current		300 A (15 min)
Maximum interruption current		1,000 A at 400 VDC (10 times)
Overload interruption		700 A at 400 VDC (40 times min.)
Reverse polarity interruption		–200 A at 200 VDC (1,000 times min.)
Ambient operating temperature		–40 to 50°C (with no icing or condensation)
Ambient operating humidity		5% to 85%
Weight		Approx. 570 g

Note: 1. The above values are initial values at an ambient temperature of 23°C unless otherwise specified.
2. The contact resistance was measured with 1 A at 5 VDC using the voltage drop method.
3. The insulation resistance was measured with a 500-VDC megohmmeter.
4. The impulse withstand voltage was measured with a JEC-212 (1981) standard impulse voltage waveform (1.2 × 50 µs).
5. The mechanical endurance was measured at a switching frequency of 3,600 operations/hr.
6. The electrical endurance was measured at a switching frequency of 60 operations/hr.

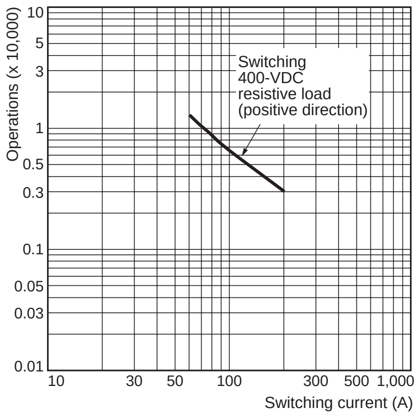
Engineering Data

■ G9EC-1(-B) Switching/Current Conduction Models

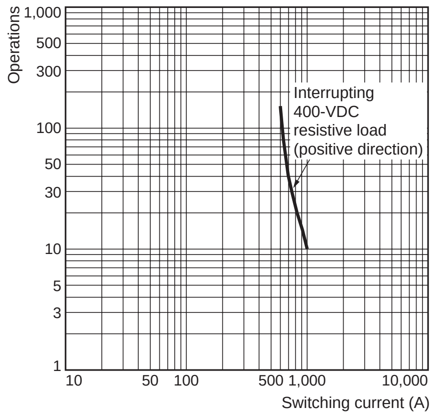
Maximum Switching Capacity



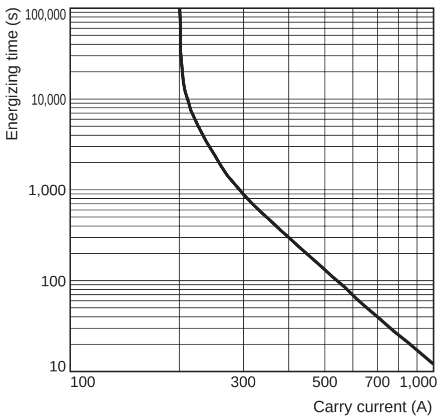
Electrical Endurance (Switching Performance)



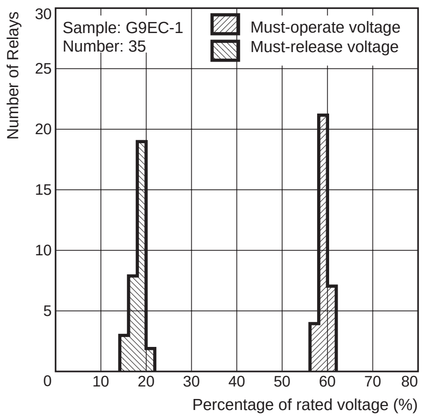
Electrical Endurance (Interruption Performance)



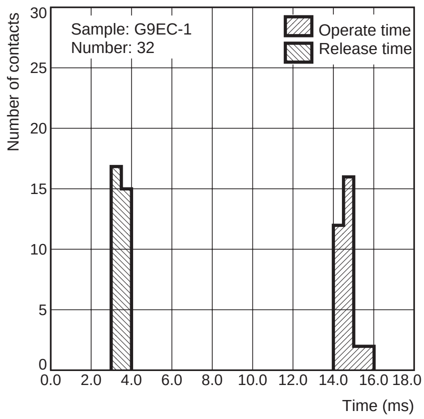
Carry Current vs Energizing Time



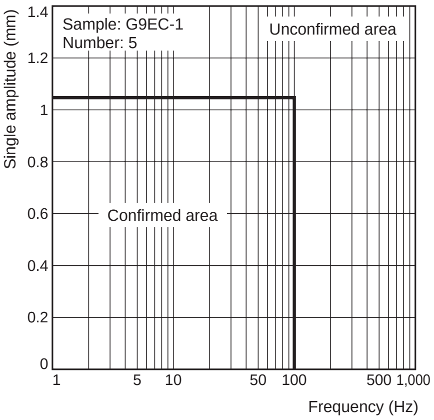
Must-operate Voltage and Must-release Voltage Distributions



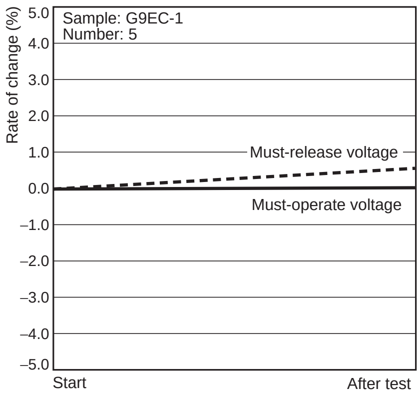
Time Characteristic Distributions



Vibration Malfunction

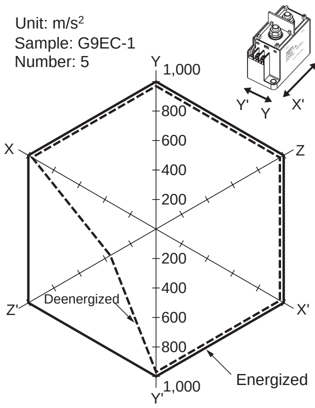


Vibration Resistance



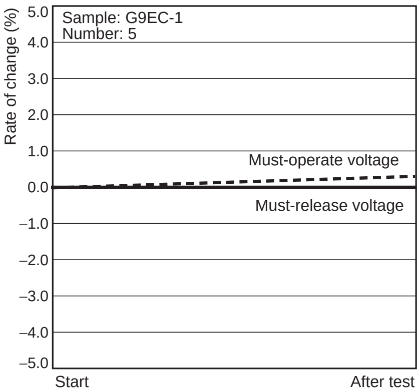
Characteristics were measured after applying vibration at a frequency of 10 to 55 Hz (single amplitude of 0.75 mm) to the test piece (not energized) for 2 hours each in 3 directions. The percentage rate of change is the average value for all of the samples

Shock 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.

Shock Resistance



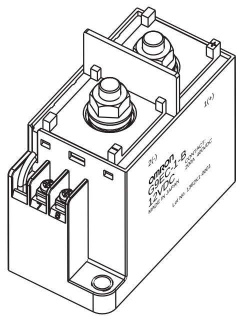
Characteristics were measured after applying a shock of 490 m^2/s to the test piece 3 times each in 6 directions along 3 axes. The percentage rate of change is the average value for all of the samples.

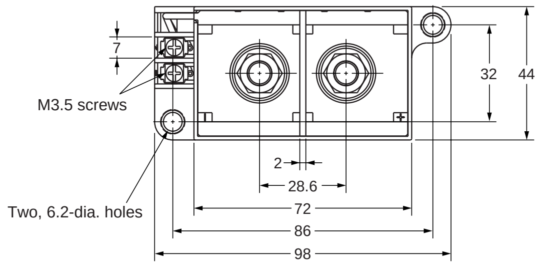
Dimensions

Note: All units are in millimeters unless otherwise indicated.

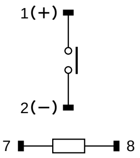
Models with Screw Terminals

G9EC-1-B



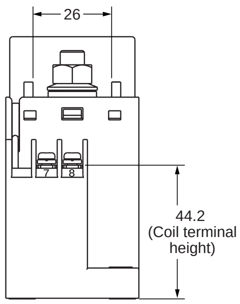


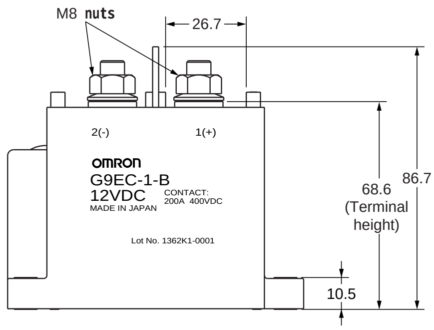
Terminal Arrangement/ Internal Connections
(TOP VIEW)



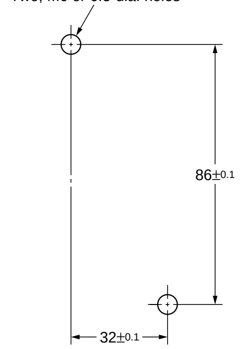
Note: Be sure to connect terminals with the correct polarity. Coils do not have polarity.

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



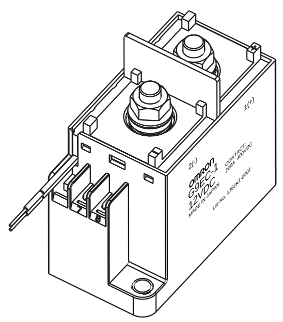


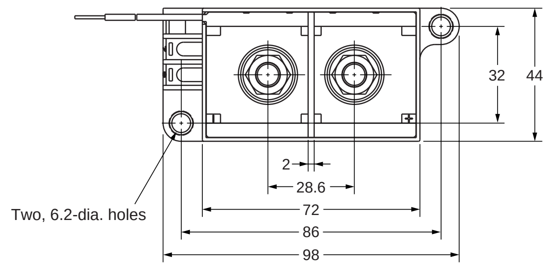
Mounting Hole Dimensions
(TOP VIEW)



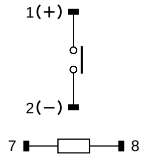
Models with Lead Wires

G9EC-1



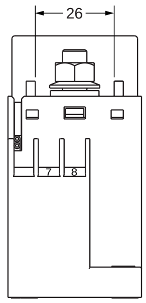


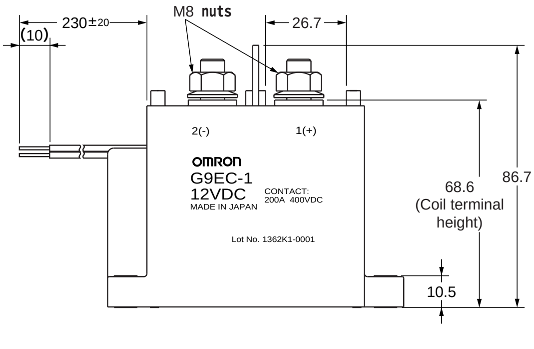
Terminal Arrangement/ Internal Connections
(TOP VIEW)



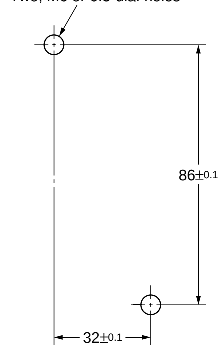
Note: Be sure to connect terminals with the correct polarity. Coils do not have polarity.

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





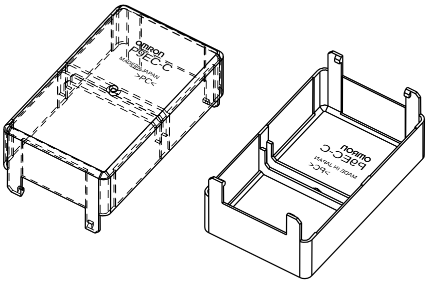
Mounting Hole Dimensions
(TOP VIEW)

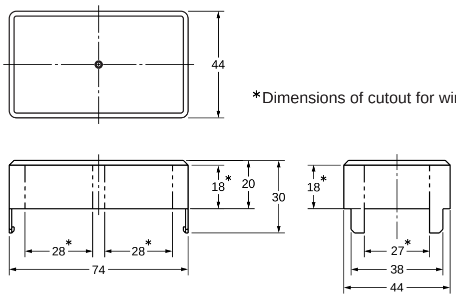


■ Options (Available Soon)

Terminal Cover

P9EC-C





*Dimensions of cutout for wiring.

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

DC Power Relays (25-A Models)
G9EB-1

- This product is under development. Provisional specifications for the product are provided in this document. The actual specifications at the time of sales release are subject to change without notice.

Note: Refer to “Precautions” on page 20.

Model Number Structure

■ Model Number Legend

G9EB-□-□-□-□
1 2 3 4

1. **Number of Poles**
   1: 1 pole
2. **Contact Form**
   Blank: SPST-NO
3. **Coil Terminals**
   B: M3.5 screw terminals
4. **Special Functions**

Ordering Information

■ 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 24 VDC 48 VDC 60 VDC 100 VDC	G9EB-1-B

Note: 1. Relays come with two M4 screws for the main terminals (contacts).
2. Relays with coil terminals and screw terminals come with two M3.5 screws.

Specifications

■ Ratings

Coil

Rated voltage	Rated current	Coil resistance	Must-operate voltage	Must-release voltage	Maximum voltage (See note 3.)	Power consumption
12 VDC	166.7 mA	72 Ω	75% max. of rated voltage	10% min. of rated voltage	130% of rated voltage	Approx. 2 W
24 VDC	83.3 mA	288 Ω				
48 VDC	41.7 mA	1,152 Ω				
60 VDC	33.3 mA	1,800 Ω				
100 VDC	20 mA	5,000 Ω				

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%.
2. The figures for the operating characteristics are for a coil temperature of 23°C.
3. The figure for the maximum voltage is the maximum voltage that can be applied to the relay coil for period of 10 minutes at an ambient temperature of 23°C. It does not apply to continuous operation.

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		G9EB-1-B
Contact resistance (See note 2.)		30 mΩ max.
Contact voltage drop		0.5 V max. (for a carry current of 25 A)
Operate time		50 ms max.
Release time		30 ms max.
Insulation resistance (See note 3.)	**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 (See note 4.)		4,500 V
Vibration resistance	**Destruction**	10 to 55 to 10 Hz, 0.75-mm single amplitude (Acceleration: 2.94 to 88.9 m/s^2)
	Malfunction	10 to 55 to 10 Hz, 0.75-mm single amplitude (Acceleration: 2.94 to 88.9 m/s^2)
Shock resistance	**Destruction**	490 m/s^2
	Malfunction	150 m/s^2
Mechanical endurance (See note 5.)		100,000 operations min.
Electrical endurance (resistive load) (See note 6.)		250 VDC, 25 A, 30,000 ops. min.
Short-time carry current		50 A (5 min), 40 A (15 min)
Maximum interruption current		100 A at 250 VDC (5 times)
Overload interruption		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%
Weight		Approx. 100 g

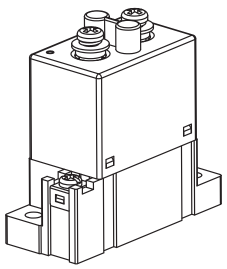
Note: 1. The above values are initial values at an ambient temperature of 23°C unless otherwise specified.
2. The contact resistance was measured with 1 A at 5 VDC using the voltage drop method.
3. The insulation resistance was measured with a 500-VDC megohmmeter.
4. The impulse withstand voltage was measured with a JEC-212 (1981) standard impulse voltage waveform (1.2 × 50 µs).
5. The mechanical endurance was measured at a switching frequency of 3,600 operations/hr.
6. The electrical endurance was measured at a switching frequency of 60 operations/hr.

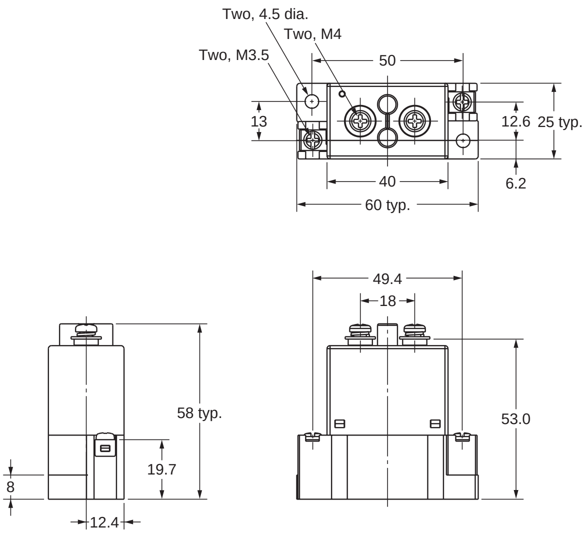
Dimensions

Note: All units are in millimeters unless otherwise indicated.

Screw Terminal Type

G9EB-1-B





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

Precautions

⚠ **WARNING**

Take measures to prevent contact with charged parts when using the Relay for high voltages.

Correct Use

Refer to the relevant catalog for common precautions.

1. Be sure to tighten all screws to the appropriate torque given below. Loose screws may result in burning due to abnormal heat generation during energization.
- M8 screws: 8.82 to 9.80 N·m
- M6 screws: 3.92 to 4.90 N·m
- M5 screws: 1.57 to 2.35 N·m
- M4 screws: 0.98 to 1.37 N·m
- M3.5 screws: 0.75 to 1.18 N·m

2. The G9EA and G9EC Relays' contacts have polarity. Be sure to perform connections with the correct polarity. If the contacts are connected with the reverse polarity, the switching characteristics specified in this document cannot be assured.

3. Do not drop or disassemble this Relay. Not only may the Relay fail to meet the performance specifications, it may also result in damage, electric shock, or burning.

4. Do not use these Relays in strong magnetic fields of 800 A/m or higher (e.g., near transformers or magnets). The arc discharge that occurs during switching may be bent by the magnetic field, resulting in flashover or insulation faults.

5. This Relay is a device for switching high DC voltages. If it is used for voltages exceeding the specified range, it may not be possible to interrupt the load and burning may result. In order to prevent fire spreading, use a configuration in which the current load can be interrupted in the event of emergencies.

In order to ensure safety of the system, replace the Relay on a regular basis.

6. If the Relay is used for no-load switching, the contact resistance may increase and so confirm correct operation under the actual operating conditions.

7. These Relays contain pressurized gas. Even in applications with low switching frequencies, the ambient temperature and heat caused by arc discharge in the contacts may allow permeation of the sealed gas, resulting in arc interruption failure.

In order to ensure safety of the system, replace Relays on a regular basis.

8. Do not use or store the Relay in a vacuum. Doing so will accelerate deterioration of the sealing.

9. With this Relay, if the rated voltage (or current) is continuously applied to the coil and contacts, and then turned OFF and immediately ON again, the coil temperature, and consequently the coil resistance, will be higher than usual. This means that the must-operate voltage will also be higher than usual, exceeding the rated value ("hot start"). In this case, take the appropriate countermeasures, such as reducing the load current or restricting the energizing time or ambient operating temperature.

10. The ripple percentage for DC relays can cause fluctuations in the must-operate voltage or humming. For this reason, reduce the ripple percentage in full-wave rectified power supply circuits by adding a smoothing capacitor. Ensure that the ripple percentage is less than 5%.

11. Ensure that a voltage exceeding the specified maximum voltage is not continuously applied to the coil. Abnormal heating in the coil may shorten the lifetime of the insulation coating.

12. Do not use the Relay at a switching voltage or current greater than the specified maximum values. Doing so may result in arc discharge interruption failure or burning due to abnormal heating in the contacts.

13. The contact ratings are for resistive loads. The electrical endurance with inductive loads is inferior to that of resistive loads. Confirm correct operation under the actual operating conditions.

14. Do not use the Relay in locations where water, solvents, chemicals, or oil may come in contact with the case or terminals. Doing so may result in deterioration of the case resin or abnormal heating due to corrosion or contamination of the terminals. Also, if electrolyte adheres to the output terminals, electrolysis may occur between the output terminals, resulting in corrosion of the terminals or wiring disconnections.

15. Be sure to turn OFF the power and confirm that there is no residual voltage before replacing the Relay or performing wiring.

16. The distance between crimp terminals or other conductive parts will be reduced and insulation properties will be lowered if wires are laid in the same direction from the contact terminals. Use insulating coverings, do not wire in the same direction, and take other measures as required to maintain insulation properties.

The coil's power consumption can be reduced by using in combination with a semiconductor circuit. Consult your OMRON representative for details.

Recommended Wire Size

Model	Size
G9EA-1(-B)	14 to 22 mm^2
G9EA-1(-B)-CA	22 to 38 mm^2
G9EC-1(-B)	38 to 60 mm^2
G9EB-1-B	Consult your OMRON representative.

Note: Use flexible leads.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

In the interest of product improvement, specifications are subject to change without notice.

Certain Terms and Conditions of Sale

1. Offer; Acceptance. These terms and conditions (these "Terms") are deemed part of all catalogs, manuals or other documents, whether electronic or in writing, relating to the sale of goods or services (collectively, the "Goods") by Omron Electronics LLC and its subsidiary companies ("Seller"). Seller hereby objects to any terms or conditions proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms. Please contact your Omron representative to confirm any additional terms for sales from your Omron company.
2. Prices. All prices stated are current, subject to change without notice by Seller. Buyer agrees to pay the price in effect at time of shipment.
3. Discounts. Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (i) the invoice is paid according to Seller's payment terms and (ii) Buyer has no past due amounts owing to Seller.
4. Orders. Seller will accept no order less than $200 net billing.
5. Governmental Approvals. Buyer shall be responsible for, and shall bear all costs involved in, obtaining any government approvals required for the importation or sale of the Goods.
6. Taxes. All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Seller or required to be collected directly or indirectly by Seller for the manufacture, production, sale, delivery, importation, consumption or use of the Goods sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Seller.
7. Financial. If the financial position of Buyer at any time becomes unsatisfactory to Seller, Seller reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Seller may (without liability and in addition to other remedies) cancel any unshipped portion of Goods sold hereunder and stop any Goods in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
8. Cancellation; Etc. Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Seller fully against all costs or expenses arising in connection therewith.
9. Force Majeure. Seller shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
10. Shipping; Delivery. Unless otherwise expressly agreed in writing by Seller:
    a. Shipments shall be by a carrier selected by Seller;
    b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
    c. All sales and shipments of Goods shall be FOB shipping point (unless otherwise stated in writing by Seller), at which point title to and all risk of loss of the Goods shall pass from Seller to Buyer, provided that Seller shall retain a security interest in the Goods until the full purchase price is paid by Buyer;
    d. Delivery and shipping dates are estimates only.
    e. Seller will package Goods as it deems proper for protection against normal handling and extra charges apply to special conditions.
11. Claims. Any claim by Buyer against Seller for shortage or damage to the Goods occurring before delivery to the carrier must be presented in writing to Seller within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Goods from Seller in the condition claimed.
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