

DC Power Relay G9EA-1

A Relay Capable of Interrupting High-voltage, High-current DC Loads

- A compact relay capable of switching 400-V 60-A DC loads.
- The sound made when switching loads is quiet compared to contactors of the same switching capacity.
- The switching section is hermetically sealed and so the arc space required with conventional switches and contactors is not necessary. This feature allows space savings.
- There are no restrictions on the mounting direction.
- UL/CSA approval pending.



Model Number Structure

■ Model Number Legend

G9EA-□-□-□
1 2 3

1. Number of Poles

1: 1 pole

2. Contact Form

Blank: SPST-NO

3. Coil Terminals

Blank: Lead wire output (production by order)

B: M3.5 screw terminals (standard)

Ordering Information

■ List of Models

Coil terminals	Contact terminals	Model	Contact form	Rated voltage
	Screw terminals	G9EA-1-B	SPST-NO	12 or 24 VDC

Note: 1. Models with coil voltages of 48, 60, and 100 VDC can also be produced.

2. The products come with 2 screws for the main terminals (contacts).

Specifications

■ Ratings

Coil

Rated voltage	Rated current	Coil resistance	Must-operate voltage	Must-release voltage	Maximum voltage (See note 3.)	Power consumption
12 VDC	416 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				

- Note:**
1. The figures for the 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 for period of 10 minutes at an ambient temperature of 23°C. It does not apply to continuous operation.

Contacts

Load	Resistive load
Rated load	60 A at 400 VDC
Rated carry current	60 A
Maximum switching voltage	400 VDC
Maximum switching current	60 A
Short-time carry current	100 A (10 min)
Maximum interruption current	600 A at 300 VDC (5 times)
Overload interruption	180 A at 400 VDC (100 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%

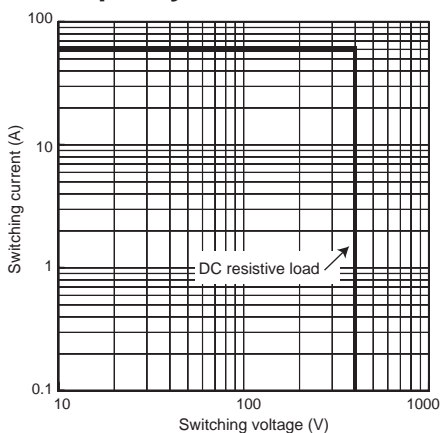
■ Characteristics

Item	Standard value	
Contact resistance (See note 1.)	30 mΩ max.	
Contact voltage drop	0.1 V max. (for a current of 60 A)	
Operate time (See note 2.)	50 ms max.	
Release time (See note 2.)	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.)	Between coil and contacts	4,500 VAC
Vibration resistance	Destruction	10 to 55 to 10 Hz, 0.75-mm single amplitude
	Malfunction	10 to 55 to 10 Hz, 0.75-mm single amplitude
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.)	400 VDC, 60 A (resistive load)	3,000 ops. min.
	400 VDC, 30 A (resistive load)	30,000 ops. min.
Weight	Approx. 310 g	

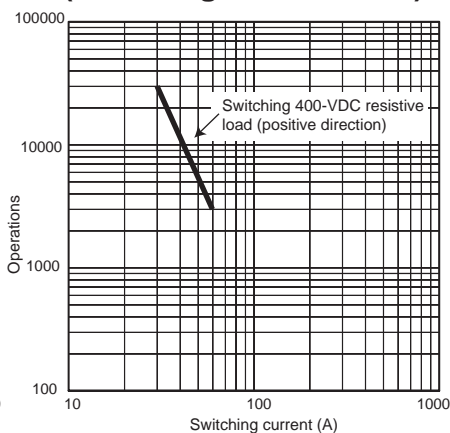
- Note:**
1. The contact resistance was measured with 1 A at 5 VDC using the voltage drop method.
 2. The operate and the release times were measured with the rated voltage imposed at an ambient temperature of 23°C.
 3. The insulation resistance was measured with a 500-VDC megohmmeter.
 4. The impulse 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 at an ambient temperature of 23°C.
 6. The electrical endurance was measured at a switching frequency of 60 operations/hr at an ambient temperature of 23°C.
 7. The values shown in the table at the left are initial values.

Engineering Data

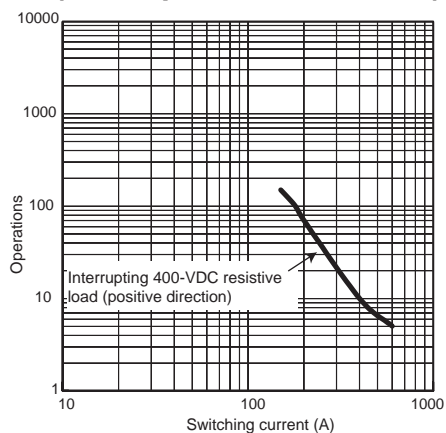
Maximum Switching Capacity



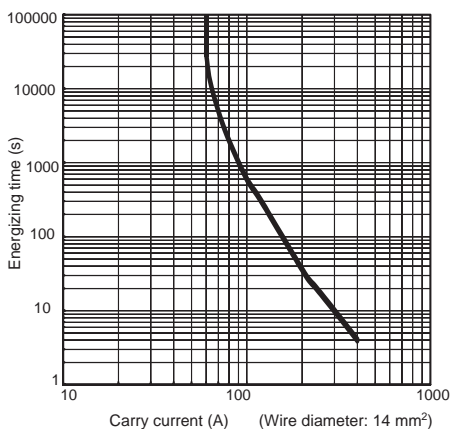
Electrical Endurance (Switching Performance)



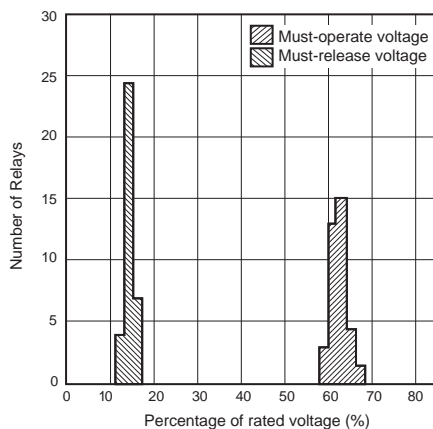
Electrical Endurance (Interruption Performance)



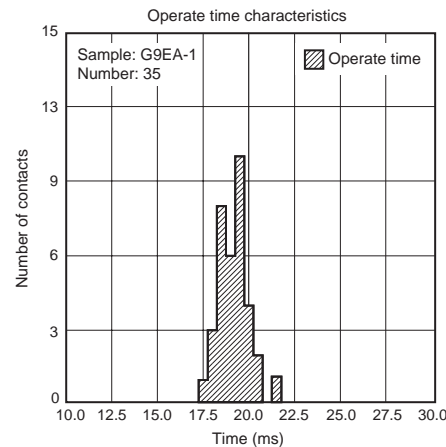
Carry Current vs Energizing Time



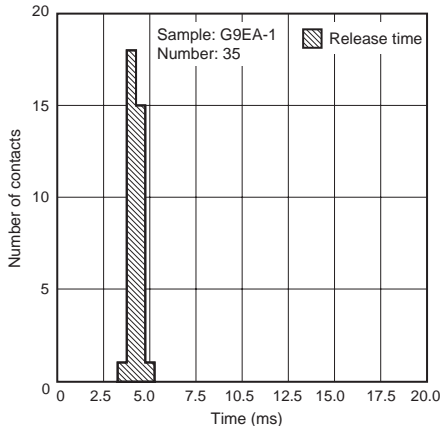
Must-operate Voltage and Must-release Voltage Distributions



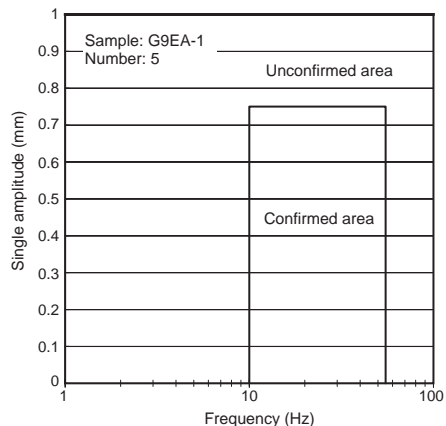
Time Characteristic Distributions



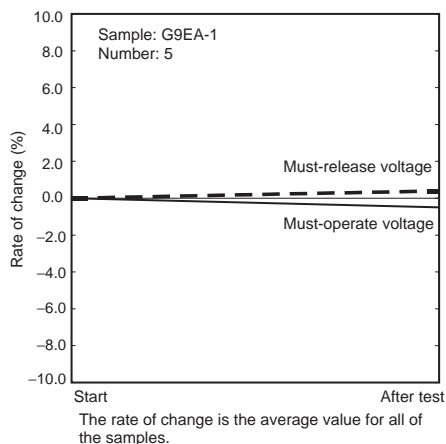
Release time characteristics



Vibration Malfunction

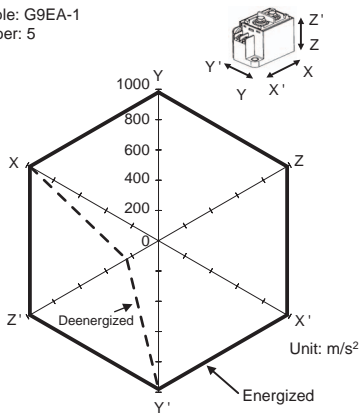


Vibration Resistance

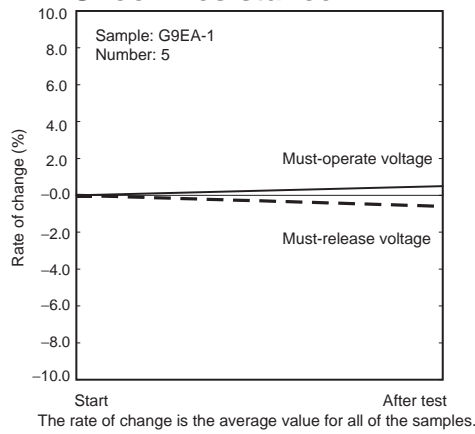


Shock Malfunction

Sample: G9EA-1
Number: 5



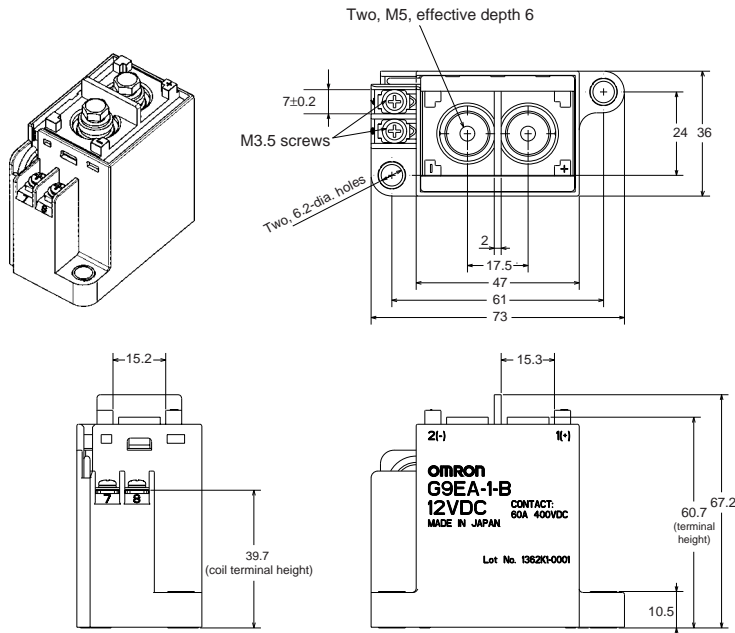
Shock Resistance



Dimensions

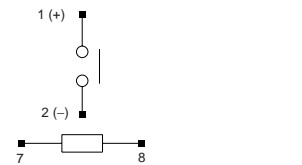
Note: All units are in millimeters unless otherwise indicated.

G9EA-1-B



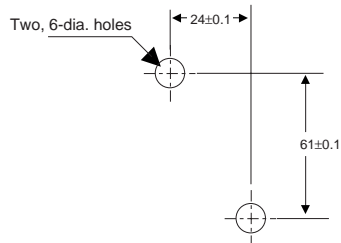
Note: Tolerance is ±0.5 mm unless otherwise specified.

Terminal Arrangement/ Internal Connections (TOP VIEW)



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

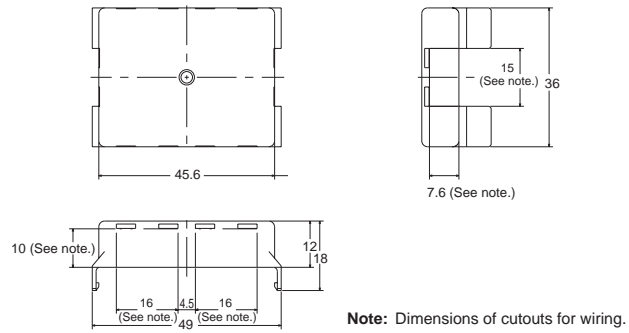
Mounting Hole Dimensions (TOP VIEW)



■ Options (Available Soon)

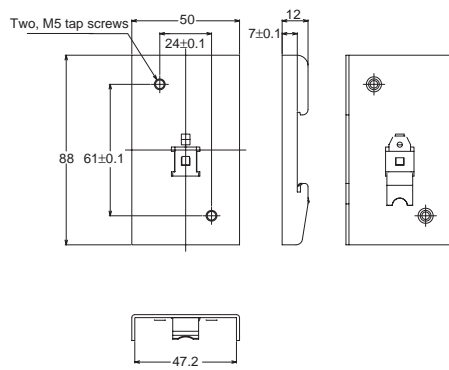
Terminal Cover

P9EA-C



DIN Adapter

P9EA-D



DC Power Relay G9EA-1-100

- 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.
- **Now shipping samples:** Visual samples and operational samples are available. Consult your OMRON representative for details.



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. Rated Carry Current**
100: 100 A
- 4. Coil Terminals**
B: M3.5 screw terminals (standard)

Ordering Information

■ List of Models

Coil terminals	Contact terminals	Model	Contact form	Rated voltage
Screw terminals		G9EA-1-100-B	SPST-NO	12 or 24 VDC

- Note:**
1. Models with coil voltages of 48, 60, and 100 VDC can also be produced.
 2. The products come with 2 screws for the main terminals (contacts).

Specifications

■ Ratings

Coil

Rated voltage	Contact form	Rated current	Coil resistance	Must-operate voltage	Must-release voltage	Maximum voltage (See note 3.)	Power consumption
12 VDC	SPST-NO	416 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				

- Note:** 1. The figures for the 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 for period of 10 minutes at an ambient temperature of 23°C. It does not apply to continuous operation.

Contacts

Load	Resistive load
Rated load	100 A at 120 VDC, 50 A at 240 VDC
Rated carry current	100 A
Maximum switching voltage	400 VDC
Short-time carry current	150 A (10 min)

Ambient operating temperature	-40 to 70°C (with no icing or condensation)
Ambient operating humidity	5% to 85%

■ Characteristics

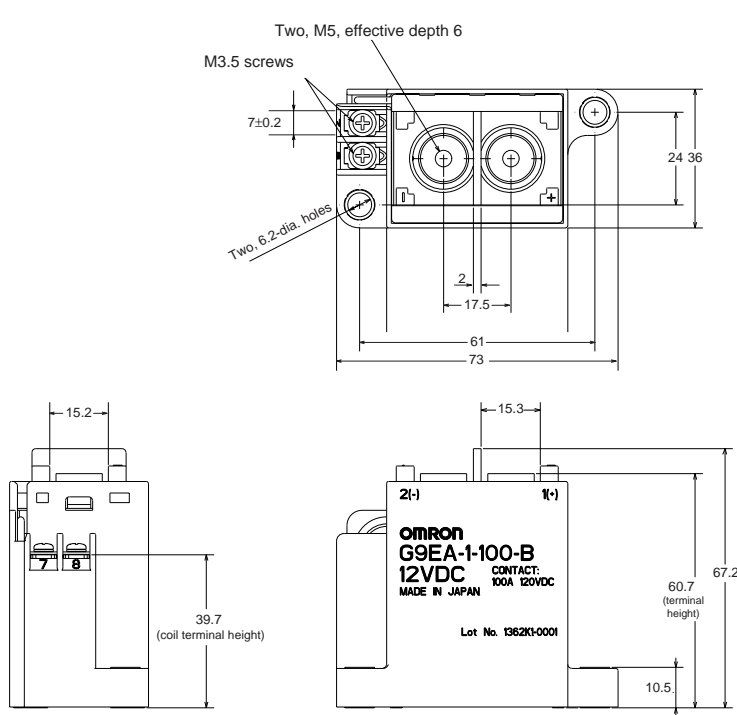
Item	Standard value	
Contact resistance (See note 1.)	30 mΩ max.	
Switching voltage drop	0.1 V max. (for a carry current of 100 A)	
Operate time (See note 2.)	50 ms max.	
Release time (See note 2.)	30 ms max.	
Insulation resistance (See note 3.)	Between coil and contacts	1,000 MΩ min.
	Between contacts 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.)	Between coil and contacts	4,500 VAC
Vibration resistance	Destruction	10 to 55 to 10 Hz, 0.75-mm single amplitude
	Malfunction	10 to 55 to 10 Hz, 0.75-mm single amplitude
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 (resistive load)	1,000 ops. min.
	240 VDC, 50 A (resistive load)	
Weight	Approx. 310 g	

- Note:** 1. The contact resistance was measured with 1 A at 5 VDC using the voltage drop method.
 2. The operate and the release times were measured with the rated voltage imposed at an ambient temperature of 23°C.
 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 at an ambient temperature of 23°C.
 6. The electrical endurance was measured at a switching frequency of 60 operations/hr at an ambient temperature of 23°C.
 7. The values in the table at the left are initial values.

Dimensions

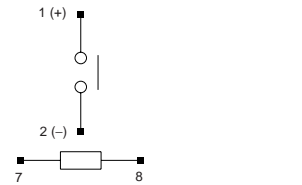
Note: All units are in millimeters unless otherwise indicated.

G9EA-1-100



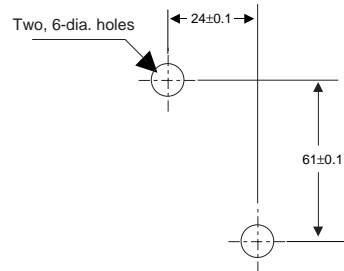
Note: Tolerance is ±0.5 mm unless otherwise specified.

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)



DC Power Relay G9EC

- 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.
- **Now shipping samples:** Visual samples and operational samples are available. Consult your OMRON representative for details.



Note: The terminal cover is sold separately.

Model Number Structure

Model Number Legend

G9EC-□-□-□
1 2 3

1. Number of Poles

- 1: 1 pole
- 2: 2 poles

2. Contact Form

Blank: SPST-NO

3. Coil Terminals

- B: M3.5 screw terminals (standard)

Ordering Information

List of Models

Coil terminals	Contact terminals	Model	Contact form	Rated voltage
Screw terminals		G9EC-1-B	SPST-NO	12 or 24 VDC
		G9EC-2-B	DPST-NO	12 or 24 VDC

Note: 1. Models with coil voltages of 48, 60, and 100 VDC can also be produced.

2. The products come with two M8 nuts for the main terminals (contacts).

Specifications

■ Ratings

Coil

Rated voltage	Contact form	Rated current	Coil resistance	Must-operate voltage	Must-release voltage	Maximum voltage (See note 3.)	Power consumption
12 VDC	SPST-NO	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				

- Note:**
1. The figures for the 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 for period of 10 minutes at an ambient temperature of 23°C. It does not apply to continuous operation.

Contacts

Load	Resistive load
Rated load	200 A at 400 VDC
Rated carry current	200 A
Maximum switching voltage	400 VDC
Short-time carry current	250 A (5 min)
Maximum interruption current	2,500 A, 300 VDC (1 time min.)

Ambient operating temperature	With Power-saving Unit	-40 to 70°C (with no icing or condensation)
	Without Power-saving Unit	-40 to 30°C (with no icing or condensation)
Ambient operating humidity		5% to 85%

■ Characteristics

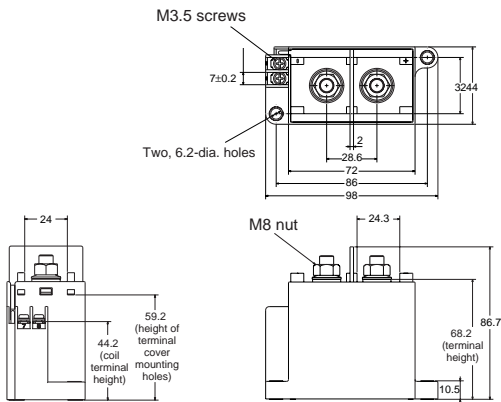
Item	Standard value	
Contact resistance (See note 1.)	30 mΩ max.	
Switching voltage drop	0.1 V max. (for a carry current of 100 A)	
Operate time (See note 2.)	50 ms max.	
Release time (See note 2.)	30 ms max.	
Insulation resistance (See note 3.)	Between coil and contacts	1,000 MΩ min.
	Between contacts 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.)	Between coil and contacts	4,500 VAC
Vibration resistance	Destruction	10 to 55 to 10 Hz, 0.75-mm single amplitude
	Malfunction	10 to 55 to 10 Hz, 0.75-mm single amplitude
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.)	400 VDC, 200 A (resistive load)	1,000 ops. min.

- Note:**
1. The contact resistance was measured with 1 A at 5 VDC using the voltage drop method.
 2. The operate and the release times were measured with the rated voltage imposed at an ambient temperature of 23°C.
 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 at an ambient temperature of 23°C.
 6. The electrical endurance was measured at a switching frequency of 60 operations/hr at an ambient temperature of 23°C.

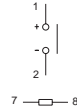
Dimensions

Note: All units are in millimeters unless otherwise indicated.

G9EC-1-B

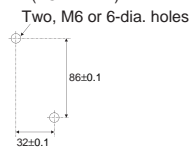


**Terminal Arrangement/
Internal Connections
(TOP VIEW)**



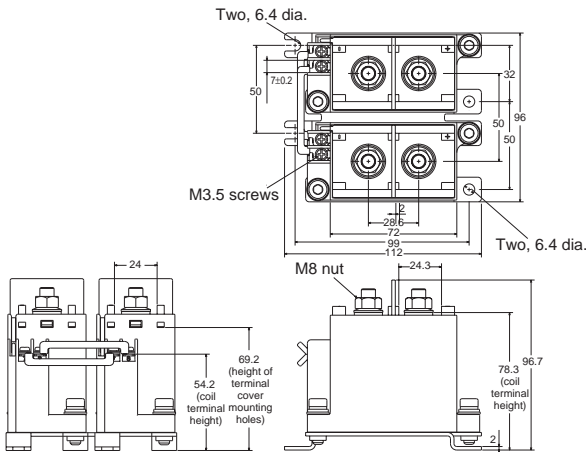
Note: Be sure to connect terminals with the correct polarity. The coil has no polarity.

**Mounting Hole Dimensions
(TOP VIEW)**

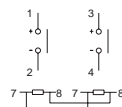


Note: Tolerance is ±0.3 mm unless otherwise specified.

G9EC-2-B

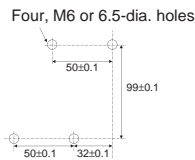


**Terminal Arrangement/
Internal Connections
(TOP VIEW)**



Note: Be sure to connect terminals with the correct polarity. The coil has no polarity.

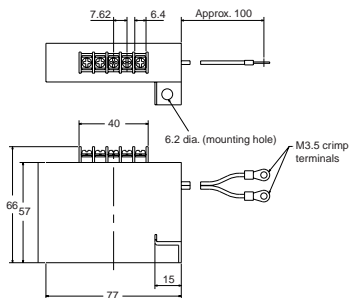
**Mounting Hole Dimensions
(TOP VIEW)**



Note: Tolerance is ±0.3 mm unless otherwise specified.

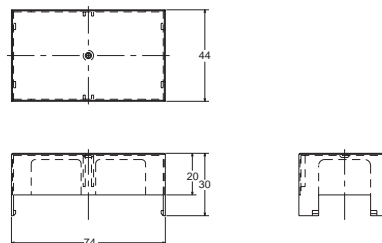
Options

Power-saving Unit (Model also available for Answer-back Contact Unit)



Terminal Cover

P9EC-C



DC Power Relay G9EB

- 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.



Ordering Information

List of Models

Coil terminals	Contact terminals	Model	Contact form	Rated voltage
Screw terminals		G9EB-1-B	SPST-NO	12 or 24 VDC

- Note:** 1. Models with coil voltages of 48, 60, and 100 VDC can also be produced.
2. The products come with 2 screws for the main terminals (contacts).

Specifications

Ratings

Coil

Rated voltage	Contact form	Rated current	Coil resistance	Must-operate voltage	Must-release voltage	Maximum voltage (See note 3.)	Power consumption
12 VDC	SPST-NO	250 mA	48 Ω	75% max. of rated voltage	10% min. of rated voltage	130% of rated voltage	Approx. 3 W
24 VDC		125 mA	192 Ω				

- Note:** 1. The figures for the 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 for period of 10 minutes at an ambient temperature of 23°C. It does not apply to continuous operation.

Contacts

Load	Resistive load
Rated load	25 A at 400 VDC
Rated carry current	25 A
Maximum switching voltage	400 VDC
Short-time carry current	50 A (10 min)
Maximum interruption current	250 A, 300 VDC

Ambient operating temperature	-40 to 70°C (with no icing or condensation)
Ambient operating humidity	5% to 85%

■Characteristics

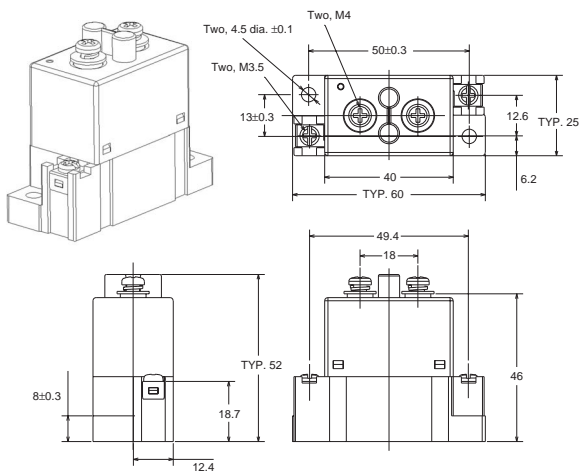
Item	Initial value	
Contact resistance (See note 2.)	10 mΩ max.	
Operate time (See note 3.)	50 ms max.	
Release time (See note 3.)	30 ms max.	
Insulation resistance (See note 4.)	Between coil and contacts	1,000 MΩ min.
	Between contacts of the same polarity	1,000 MΩ min.
Dielectric strength	Between coil and contacts	2,500 VAC, 1 min
	Between contacts of the same polarity	2,500 VAC, 1 min
Impulse withstand voltage (See note 5.)	Between coil and contacts	4,500 VAC
Vibration resistance	Destruction	10 to 55 to 10 Hz, 0.75-mm single amplitude
	Malfunction	10 to 55 to 10 Hz, 0.75-mm single amplitude
Shock resistance	Destruction (See note 6.)	490 m/s ²
	Malfunction (See note 7.)	490 m/s ²
Electrical endurance (See note 8.)	200,000 ops. min.	
Electrical endurance (See note 9.)	400 VDC, 25 A (resistive load)	50,000 ops. min.

- Note:**
1. Unless specified otherwise, the above values are for an ambient temperature of 23°C.
 2. The contact resistance was measured with 1 A at 5 VDC using the voltage drop method.
 3. The operate and the release times were measured with the rated voltage imposed.
 4. The insulation resistance was measured with a 500-VDC megohmmeter.
 5. The impulse withstand voltage was applied between the coil and the contacts and was measured with a JEC-212 (1981) standard impulse voltage waveform (1.2 × 50 μs).
 6. The shock resistance for destruction was measured in the deenergized state.
 7. The shock resistance for malfunction was measured in the energized state.
 8. The mechanical endurance was measured at a switching frequency of 3,600 operations/hr at an ambient temperature of 23°C.
 9. The electrical endurance was measured at a switching frequency of 60 operations/hr at an ambient temperature of 23°C.

Dimensions

Note: All units are in millimeters unless otherwise indicated.

G9EB-1



Note: Tolerance is ±0.5 mm unless otherwise specified.

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 9.8 N·m
 - M5 screws: 1.57 to 2.35 N·m
 - M4 screws: 0.98 to 1.38 N·m
 - M3.5 screws: 0.78 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 this Relay in strong magnetic fields (near transformers or magnets). The arc discharge that occurs during switching may be bent by the magnetic field, resulting in flashover or faulty insulation.
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. This Relay contains 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 the Relay 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.

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-1-100-B	22 mm ²
G9EC-1-B G9EC-2-B	60 to 100 mm ²
G9EB-1-B	5.5 mm ²

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.