c SU us OVE

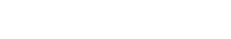


Compact Power Relay Capable of Switching 1,000 VDC Loads

- DC high capacity switching for both normal and reverse polarity is available with the addition of the reverse polarity specification.
- Two poles wired in series to break or switch 600 to 1,000 VDC.
- Contributes to a lower power consumption.
 (low power consumption of approx. 600 mW at 50% reduced coil voltage).
- · UL and EN conformed.
- Designed for safety with 6.0-mm contact gap (two-pole series wiring).
- A series of low contact resistance power relays with an initial contact resistance of 10 m Ω max. (with conditions of 5 VDC, 1 A).



Refer to the Precautions on page 5.



Model Number Legend

 $\begin{array}{c|c}
\mathbf{G7L-2} & \square - \mathbf{X} - \square \\
\hline
1 & 2 & 3 & 4
\end{array}$

- 1. Number of poles
 - 2: 2-poles
- 2. Contact Form
 - A: DPST-NO (2a)
- 3. Enclosure rating
 - Blank: Flux protection
- 4. Additional Models
 - None: Standard model
 - L: General purpose model
 - SI: Low contact resistance model

Application Examples

- Photovoltaic Power Systems
- · Energy Storage System
- Inverter
- UPS
- FA DC link

Ordering Information

| Classification | Contact Form | Enclosure rating | Terminal Shape | Model | Rated coil voltage | Minimum packing unit |
|--------------------------------|--------------|------------------|----------------|-------------|--------------------|----------------------|
| Standard model | | | | G7L-2A-X | | |
| General purpose model | DPST-NO*1 | Flux protection | PCB terminals | G7L-2A-X-L | 12 VDC, 24 VDC | 20 pcs/tray |
| Low contact resistance model*2 | ו סוייטו | | | G7L-2A-X-SI | | |

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

Example: G7L-2A-X DC24

Rated coil voltage

- However, the notation of the coil voltage on the product case as well as on the packing will be marked as [][] VDC.
- *1. It is assumed that the Relay will be used with 2-pole series wiring
- 2. The values given are initial values. Measurement conditions: 5 VDC, 1 A, voltage drop method.

Ratings

Coil

| | Item | Rated current | Coil resistance | Must operate voltage Must release voltage Max. voltage | | | Power |
|---------------|------|---------------|-----------------|--|--------------------|-------|--------------------|
| Rated Voltage | (V) | (mA) | (Ω) | | % of rated voltage | | consumption (W) |
| DC | 12 | 190 | 63 | 75% max. | 10% min. | 110% | Approx. 2.3 |
| DC | 24 | 96 | 250 | 7570 IIIAX. | 10 /0 111111. | 11070 | Approx. 0.6 * |

- Note 1. The rated current and coil resistance were measured at a coil temperature of 23° C with tolerances of \pm 15%.
- 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. For currents exceeding 30 A, use a Holding Voltage of 50 to 60%.

* Power consumption with Holding Voltage is 0.6 W. Please confirm the detail in page 5 Coil Voltage Reduction (Holding Voltage) during and after Relay Operation.

Contacts (Two-pole Series Wiring)

| Item | Classification | Standard model/Low contact resistance model | General purpose model | |
|-----------------------------|------------------------------|--|---------------------------------|--|
| Contact type | | Double break | | |
| Contact mat | erial | Ag a | alloy | |
| Rated load (resistive load) | | 600 VDC, 30 A / 1,000 VDC, 25 A / 500 VDC, 40 A / 1,000 VDC, make 1 A, carry 35 A, break 1A / 800 VDC, make 0.5 A, carry 35 A, break 0.5 A / 700 VDC, make 1 A, carry 35 A, break 1 A / 600 VDC, make 0.5 A, carry 35 A, break 0.5 A | 600 VDC, 20 A / 1,000 VDC, 20 A | |
| Rated carry | current | 40A * | 20 A | |
| Max. switchi | ng voltage | 1,000 VDC | | |
| Max. switchi | Max. switching current 40A * | | 20 A | |

For currents exceeding 30 A, use a Holding Voltage of 50 to 60%. Please confirm the detail in page 5 Safety Precautions.

Characteristics

| Item | Item Classification | | Low contact resistance model | General purpose model | | |
|--|--|---|--|--|--|--|
| Contact resistance *1 | | 100 mΩ max 10 mΩ max. 100 mΩ max. | | | | |
| Operate time *2 | | 30 ms max. | | | | |
| Release time *2 *5 | | 30 ms max. | | | | |
| Insulation resistance *3 | | 1,000 M Ω min. | | | | |
| | Between coil and contacts | 4,000 VAC, 50/60 Hz for 1 min | | | | |
| Dielectric strength | Between contacts of the same polarity | 2,000 VAC, 50/60 Hz for 1 min | | | | |
| | Between contacts of different polarity | 2,000 VAC, 50/60 Hz | for 1 min | | | |
| Impulse withstand voltage *4 | Between coil and contacts | 10 kV | | | | |
| Vibration resistance | Destruction | 10 to 55 to 10 Hz, 0.7 | 75 mm single amplitude (1.5 mr | n double amplitude) | | |
| Vibration resistance | Malfunction | 10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude) | | | | |
| Shock resistance | Destruction | 1,000 m/s ² | | | | |
| Shock resistance | Malfunction | 100 m/s ² | | | | |
| Mechanical durability *5 | | 1,000,000 operations min. (at 1,800 operations/h) | | | | |
| | Normal polarity | 1,000 VDC, 25 A, 10 600 VDC, 30 A, 6,00 500 VDC, 40 A, 3,00 | 0 operations | 1,000 VDC, 20 A, 100 operations 600 VDC, 20 A, 6,000 operations | | |
| Electrical durability *5 *6 | Reverse polarity | 600 VDC, -30 A, 5,000 operations 500 VDC, -40 A, 3,000 operations | | 400 VDC, -20 A, 5,000 operations | | |
| (Resistive load, for two-pole series wiring.) (ON for 1 s and OFF for 9 s, at 85°C) | Normal polarity / Reverse polarity *7 | 20,000 operations 800 VDC, make 0.5 20,000 operations 700 VDC, make 1 A, 50,000 operations | A, carry 35 A, break 1 A, A, carry 35 A, break 0.5 A, carry 35 A, break 1 A, A, carry 35 A, break 0.5 A, | | | |
| Ambient operating temperature | | −40° to 85°C (with no icing or condensation) | | | | |
| Ambient operating humid | ity | 5% to 85% | | | | |
| Weight | | Approx. 100 g | | | | |

Note. The values given above are initial values.

- Measurement conditions: 5 VDC, 1 A, voltage drop method.

 Measurement conditions: Rated operating voltage applied, not including contact bounce. Ambient temperature: 23°C
- Arthorn temperature. 23 G
 Measurement conditions: The insulation resistance was measured with a 1,000-VDC megohmmeter at the same locations as the dielectric strength was measured.

 JEC-212 (1981) Standard Impulse Wave Type (1.2×50µs).

 A diode and zener diode are connected to the relay coil.

 The polarity can not be changed every switching. Refer to *Polarity change when switching* on the page 5.

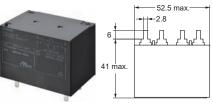
 Only Connected in series can be used. (Check circuit diagrams Picture 1. and Picture 2.)

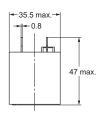
Dimensions

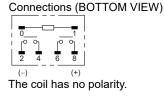
CAD Data marked products, 2D drawings and 3D CAD models are available. For CAD information, please visit our website, which is noted on the last page.

(Unit: mm)

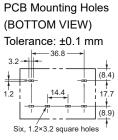
G7L-2A-X G7L-2A-X-SI G7L-2A-X-L







Terminal Arrangement/Internal



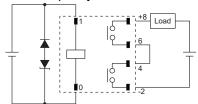
CAD Data

X-175

Circuit Diagrams

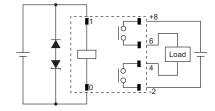
Connected in series

Picture 1. Normal polarity

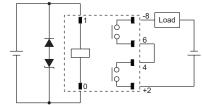


Break all lines

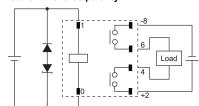
Picture 3. Normal polarity



Picture 2. Reverse polarity



Picture 4. Reverse polarity



Note. The switching part has polarity. Exercise caution.

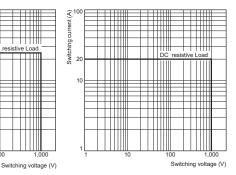
The diode and zener diode absorb coil surge. (The coil has no polarity.)

Engineering Data (Two-pole Series Wiring)

- Normal polarity
- Maximum Switching Capacity

G7L-2A-X G7L-2A-X-SI

G7L-2A-X-L



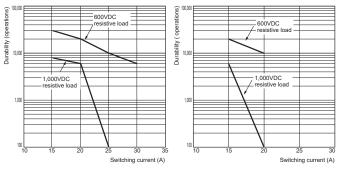
Durability

G7L-2A-X G7L-2A-X-SI

L-2A-X

Note: Ambient temperature: 85°C

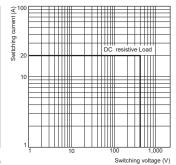
G7L-2A-X-L



- **■**Reverse polarity
- Maximum Switching Capacity

G7L-2A-X G7L-2A-X-SI

G7L-2A-X-L

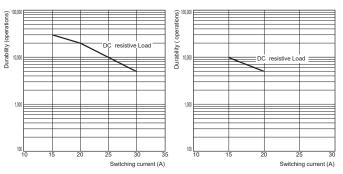


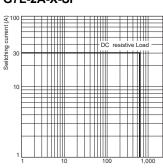
Durability

Note: Ambient temperature: 85°C

G7L-2A-X G7L-2A-X-SI

G7L-2A-X-L





Approved Standards

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

UL Recognized CALus (File No. E41515)

| Model | Coil ratings | Contact ratings | Number of test operations |
|-------------|----------------|--|---------------------------|
| | 12 VDC, 24 VDC | 15 A at 1,000 VDC (Resistive) 85°C, Connected in series or Break all lines | |
| | | 20 A at 1,000 VDC (Resistive) 85°C, Connected in series | 6,000 |
| | | 25 A at 600 VDC (Resistive) 85°C, Connected in series or Break all lines | |
| G7L-2A-X | | 30 A at 600 VDC (Resistive) 85°C, Connected in series or Break all lines | |
| G7L-2A-X-SI | | Make 1 A, carry 35 A, break 1 A, 1,000 VDC, 85°C, Connected in series | 20,000 |
| | | Make 0.5 A, carry 35 A, break 0.5 A, 800 VDC, 85°C, Connected in series | 20,000 |
| | | Make 1 A, carry 35 A, break 1 A, 700 VDC, 85°C, Connected in series | 50,000 |
| | | Make 0.5 A, carry 35 A, break 0.5 A, 600 VDC, 85°C, Connected in series | 30,000 |
| | 12 VDC, 24 VDC | 15 A at 1,000 VDC (Resistive) 85°C, Connected in series or Break all lines | |
| G7L-2A-X-L | | 20 A at 1,000 VDC (Resistive) 85°C, Connected in series | 6,000 |
| | | 20 A at 600 VDC (Resistive) 85°C, Connected in series or Break all lines | 1 |

● EN/IEC and VDE Approval (Approval No.40045061)

| Model | Coil ratings | Contact ratings | Number of test operations |
|-------------|----------------|--|---------------------------|
| | | 25 A at 1,000 VDC (Resistive) 85°C, Connected in series or Break all lines | 50 |
| G/L-ZA-X-SI | 12 VDC, 24 VDC | 15 A at 1,000 VDC (Resistive) 85°C, Connected in series or Break all lines | 8,000 |
| | 12 VDC, 24 VDC | 25 A at 600 VDC (Resistive) 85°C, Connected in series or Break all lines | 10,000 |
| | | 32 A at 600 VDC (Resistive) 85°C, Connected in series or Break all lines | 3,000 |
| | 12 VDC, 24 VDC | 20 A at 1,000 VDC (Resistive) 85°C, Connected in series or Break all lines | 50 |
| | | 15 A at 1,000 VDC (Resistive) 85°C, Connected in series or Break all lines | 6,000 |
| | | 20 A at 600 VDC (Resistive) 85°C, Connected in series or Break all lines | 10,000 |

| Creepage distance (required value) | | 16 mm min. (IEC/UL) | | |
|-------------------------------------|----------------------|--|--|--|
| Clearance (required value) | | 8 mm min. (IEC/UL) | | |
| Insulation material group | | III | | |
| Type of insulation | coil-contact circuit | Basic (1,000 V, OV-cat III, up to 2,000 m above sea level) | | |
| Type of insulation | open contact circuit | Micro disconnection | | |
| Rated insulation voltage | | 1,000 | | |
| Pollution degree | | 2 | | |
| Rated voltage system | | 1,000 | | |
| Category of protection (IEC61810-1) | | RT II | | |
| Flammability class (UL94) | | V-0 | | |
| Coil insulation system (UL) | | Class F | | |

Safety Precautions

Please refer to "PCB Relays Common Precautions" for correct use.

Correct Use

Installation

- Contacts are polarized, and durability is the different by polarity. Failure to observe correct DC load connection will result in reduced durability and may risk failure in application.
- The Relay is designed and manufactured under the assumption that it will be used with 2-pole series wiring. Do not use just one pole only.
- Install the Relays in locations that are as dry as possible and have as little dust, dirt, and harmful gas.
- 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.
- The Relay weighs approx. 100 g. Be sure that the PCB is strong enough to support it.
 We recommend dual-side through-hole PCBs to reduce solder cracking from heat stress.

Micro Loads

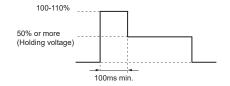
 These Power Relays are suitable for switching and breaking high-capacity DC. For switching applications of less than 1 A, switching characteristics may become unstable depending on voltage, etc. Please consult us or check using the actual machine in advance.

Soldering PCB Terminals

- Do not perform automatic soldering. Always solder the terminals manually. When performing automatic soldering, please consult us separately.
- Solder with the following conditions: Soldering iron temperature (max.) 380°C, Soldering time within 10 seconds.
- The G7L-X is not sealed. Do not wash the G7L-X with water or detergent.

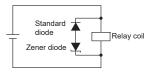
●Coil Voltage Reduction (Holding Voltage) during and after Relay Operation

- Use in the applied voltage and time ranges indicated in the figure below. Do not exceed this range due to coil voltage change and so on.
- A voltage of at least 50% of the rated voltage is required for the coil holding voltage. However, for currents exceeding 30 A, use a Holding Voltage of 50 to 60%. Do not allow voltage fluctuations to cause the coil holding voltage to fall below this level.



●Connection of Diodes to the Operation Coil

- Connect the standard diode and zener diode (or varistors) to the relay coil. (Refer to the following figure.)
 The diode absorbs coil surge. Switching performance may be affected if only a diode is used, so use in combination with a zener diode.
- The coil has no polarity. Connect the diodes in the reverse polarity of the voltage applied to the coil.
- The recommended zener voltage of the zener diode is one to two times the rated coil voltage.
- Use a diode with a reverse breakdown voltage at least 10 times the rated voltage of the coil, and a forward current equal to or greater than the rated current of the coil.



PCB Mounting Interval (When Using Multiple Items)

• Use a mounting interval of 10 mm or more.

● Relay Service Life

- These Relays must be used for high DC voltages. The final failure mode is failure to break the circuit. In a worst-case scenario, burning may extend to surrounding components. Do not use these Relays outside of the specified ratings and service life, or for any application other than high DC voltages. Implement safety circuits and other safety measures to minimize the risk in case of the unlikely event of a failure.
- The electrical durability of these Relays is specified as the number of load switching operations under a resistive load and OMRON-specified standard testing conditions.
 The coil drive circuit, ambient environment, switching frequency, or load conditions (e.g., inductive load or capacitor load) may reduce the service life and possibly lead to failure to break. Always confirm the service life in the actual equipment.
- The service life may change due to high-voltage and highcurrent switching in low-humidity or low (minus)-temperature atmospheres. Always confirm the service life in the actual equipment
- The service life may change due to high-voltage and highcurrent switching in low-humidity or low (minus)-temperature atmospheres. Always confirm the service life in the actual equipment.

Polarity change when switching

 During switching operation in application should the polarity change it will reduce switching lifetime performance. Please contact Omron for further information.

Please check each region's Terms & Conditions by region website.

OMRON Corporation
Device & Module Solutions Company

Regional Contact

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