

G5RL-U/-K

PCB Power Relay

Small-Size and Low-Back High Performance Latching Relay that Realizes a 16-A High Inrush Switching Current

- Creepage distance 8 mm between coil and contacts.
- 10 kV Impulse withstand voltage.
- Ambient Operating Temperature 85°C
- Suitable for TV-8 rating. (SPST-NO (1a))
- In-rush resistant and supports illumination load
- Compatible with capacitor load (IEC60669-1) (*)
- Compatible with the International Safety Standard for Electrical/Electronic Household Appliances (IEC60335-1) (*)

* G5RL-K1A-EL-HA type

RoHS Compliant

Model Number Legend

G5RL- - -
1 2 3 4 5

1. Relay Function

U : Single-winding latching
 K : Double-winding latching

2. Number of poles

1 : 1-Pole

3. Contact Form

None: SPDT (1c)
 A : SPST-NO (1a)

4. Classification

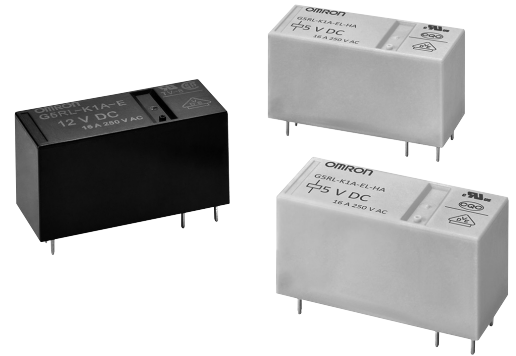
E : High-capacity
 EL: In-rush resistance

5. Market Code

None: General purpose
 HA: Home Appliance according to IEC/EN60335-1

Application Examples

- Housing equipment
- Building Automation
- UPS, FA equipment
- Electric power meter
- Illumination control
- Smart home



Note. The actual product is marked differently from the image shown above.

Ordering Information

| Classification | Terminal shape | Contact form | Enclosure rating | Single-winding latching | | Double-winding latching | | Minimum packing unit |
|--------------------|----------------|--------------|------------------|-------------------------|-------------------------|-------------------------|---------------------------|----------------------|
| | | | | Model | Rated coil voltage | Model | Rated coil voltage | |
| High-capacity | PCB terminals | SPST-NO (1a) | Flux protection | G5RL-U1A-E | 3 VDC 5 VDC 6 VDC | G5RL-K1A-E | 5 VDC 12 VDC 24 VDC | 100 pcs/tray |
| | | SPDT (1c) | | G5RL-U1-E | 12 VDC 24 VDC | G5RL-K1-E | | |
| In-rush resistance | | SPST-NO (1a) | | --- | --- | G5RL-K1A-EL-HA | | |

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

Example: G5RL-U1A-E DC5

— 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.

■ Ratings

● Coil

Single-Winding Latching Type

| Rated voltage | Rated current (mA) | Coil resistance (Ω) | Must set voltage | Must reset voltage | Max voltage | Power consumption (W) |
|---------------|--------------------|---------------------|--------------------|--------------------|-------------|-----------------------|
| | | | % of rated voltage | | | |
| 3 VDC | 200 | 15 | 70% max. | 70% max. | 130% | Approx. 0.6 |
| 5 VDC | 120 | 41.7 | | | | |
| 6 VDC | 100 | 60 | | | | |
| 12 VDC | 50 | 240 | | | | |
| 24 VDC | 25 | 960 | | | | |

Double-Winding Latching Type

| Rated Voltage | Rated current (mA) | | Coil resistance (Ω) | | Must set voltage | Must reset voltage | Max voltage | Power consumption (W) | |
|---------------|--------------------|------------|---------------------|------------|--------------------|--------------------|-------------|-----------------------|------------|
| | Set coil | Reset coil | Set coil | Reset coil | % of rated voltage | | | Set coil | Reset coil |
| 5 VDC | 150 | | 33.3 | | 70% max. | 70% max. | 130% | Approx. 0.75 | |
| 12 VDC | 62.5 | | 192 | | | | | Approx. 0.84 | |
| 24 VDC | 35 | | 686 | | | | | | |

Note. The rated current and resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.

● Contacts

| Load Classification | Resistive load | | |
|------------------------|-----------------------------------|--|--|
| | High-capacity | | In-rush resistance |
| Contact form | SPST-NO (1a) | | SPDT (1c) |
| Contact type | Single | | |
| Contact material | Ag Alloy (Cd free) | | |
| Rated load | 16 A at 250 VAC 16 A at 24 VDC | | 16 A at 250 VAC (NO) 5 A at 250 VAC (NC) 16 A at 24 VDC (NO) 5 A at 24 VDC (NC) |
| Rated carry current | 16 A | | 16 A (NO), 5 A (NC) |
| Max. switching voltage | 250 VAC, 24 VDC | | 250 VAC |
| Max. switching current | 16 A | | 16 A (NO), 5 A (NC) |

■ Characteristics

| Item | Classification Relay function Contact form | High-capacity | | In-rush resistance |
|-------------------------------|--|---|--|--------------------------------|
| | | Single-winding latching, Double-winding latching | | Double-winding latching |
| | | SPST-NO (1a), SPDT (1c) | | |
| Contact resistance *1 | | 100 mΩ max. | | |
| Set time | | 10 ms max. | | |
| Reset time | | 10 ms max. | | |
| Minimum pulse width *2 | | 30 ms | | |
| Maximum pulse width *2 | | 1 min | | |
| Insulation resistance *3 | | 1,000 MΩ min. | | |
| Dielectric strength | Between coil and contacts | 6,000 VAC, 50/60 Hz for 1 min | | 1,250 VAC, 50/60 Hz for 1 min. |
| | Between contacts of the same polarity | 1,000 VAC, 50/60 Hz for 1 min | | |
| Impulse withstand voltage | Between coil and contacts | 10 kV (1.2 × 50 μs) | | |
| Insulation distance | Between coil and contacts | Clearance: 6.4 mm, Creepage: 8 mm | | |
| Vibration resistance | Destruction | 10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude) | | |
| | Malfunction | 10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude) at set status 10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude) at reset status (Except SPST-NO) | | |
| Shock resistance | Destruction | 1,000 m/s ² | | |
| | Malfunction | 150 m/s ² at Set status 50 m/s ² at Reset status (Except SPST-NO) | | |
| Durability | Mechanical *4 | 5,000,000 operations min. | | 20,000 operations min. |
| | Electrical *4 | 50,000 operations min. | | |
| Ambient operating temperature | | -40° to 85°C (with no icing or condensation) | | |
| Ambient operating humidity | | 5% to 85% | | |
| Weight | | Approx. 10 g | | |

Note. Values in the above table are initial values.

*1. The contact resistance is measured with 1 A applied at 5 VDC using a fall-of-potential method.

*2. These are measured at a coil temperature of 23°C and rated coil voltage.

Pulse duty factor should be 10% MAX.

*3. The insulation resistance is measured between coil and contacts and between contacts of same polarity at 500 VDC.

*4. Operated with input pulse width "30 ms".

Engineering Data

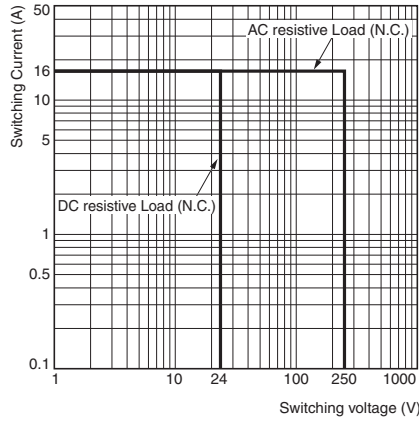
In-Rush Resistant Performance (IEC60669-1 Certified Switching Frequency)

G5RL-K1A-EL-HA

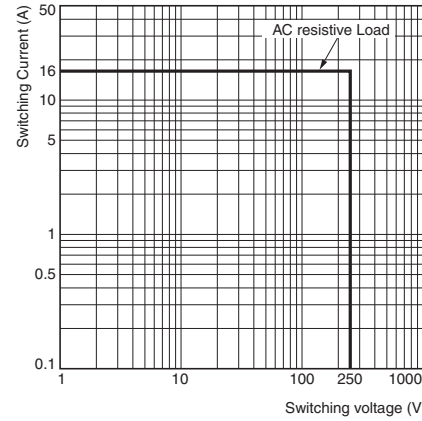
| Contact form | Operation coil rating | Contact ratings | Number of test operations |
|--------------|-----------------------|--|---------------------------|
| SPST-NO (1a) | 5 to 24 VDC | IEC60669-1 16A 250VAC Capacitor 140 μF room temperature | 20,000 |

Maximum Switching Power

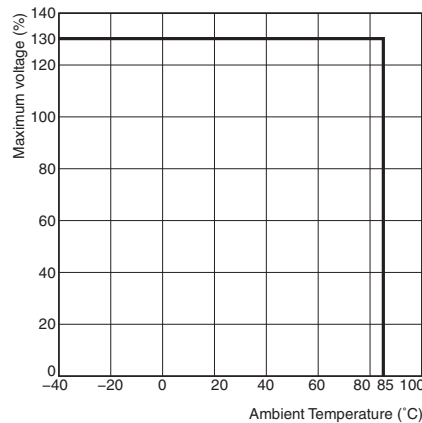
High-Capacity



In-Rush Resistance

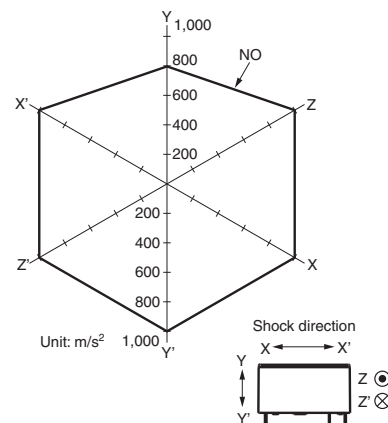


Ambient Temperature vs. Maximum Coil Voltage



Note. Maximum voltage of set pulse and reset pulse at duty factor 10%.

Malfunction Shock

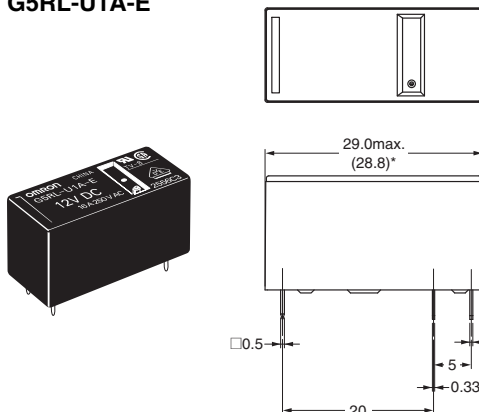


Sample: G5RL-K1A-E 12VDC
 No. of relays: 5 pcs
 Test conditions: Shock is applied in $\pm X$, $\pm Y$, and $\pm Z$ directions three times each with set and reset status to check the number of contact malfunctions.
 Standard value: 50 m/s² with set status
 100 m/s² with reset status

Dimensions

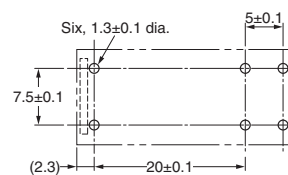
(Unit: mm)

G5RL-U1A-E

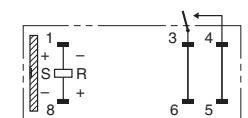


* Average value

PCB Mounting Holes (BOTTOM VIEW)



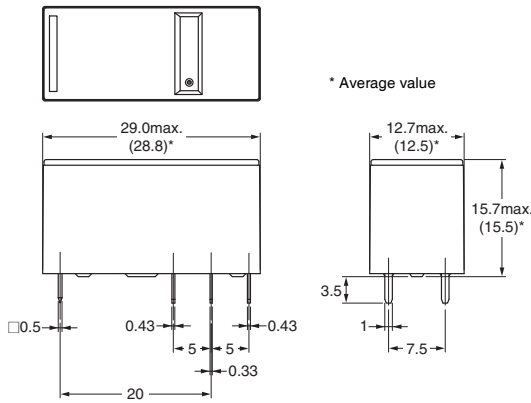
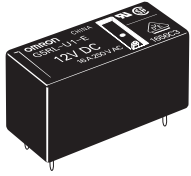
Terminal Arrangement/ Internal Connections (BOTTOM VIEW)



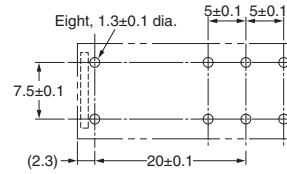
Note. Check carefully the coil polarity of the relay.

Note. Orientation marks are indicated as follows:

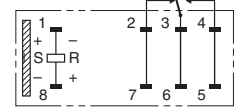
G5RL-U1-E



PCB Mounting Holes (BOTTOM VIEW)



Terminal Arrangement/ Internal Connections (BOTTOM VIEW)



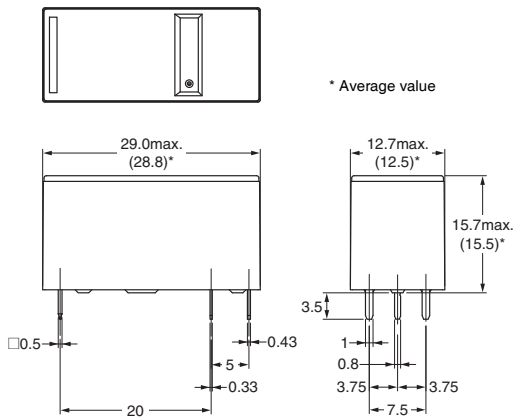
Note. Check carefully the coil polarity of the relay.

Note. Orientation marks are indicated as follows: □ ▨

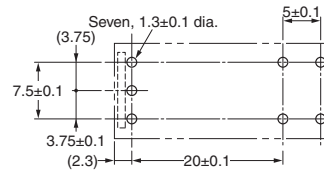
G5RL-K1A-E



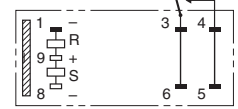
G5RL-U/-K



PCB Mounting Holes (BOTTOM VIEW)



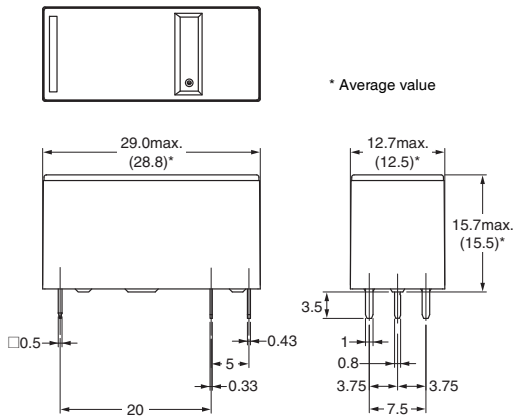
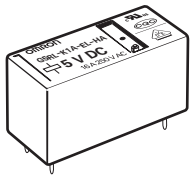
Terminal Arrangement/ Internal Connections (BOTTOM VIEW)



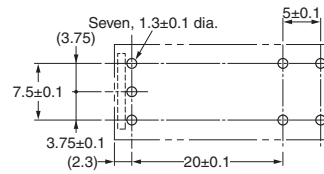
Note. Check carefully the coil polarity of the relay.

Note. Orientation marks are indicated as follows: □ ▨

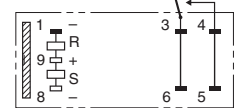
G5RL-K1A-EL-HA



PCB Mounting Holes (BOTTOM VIEW)



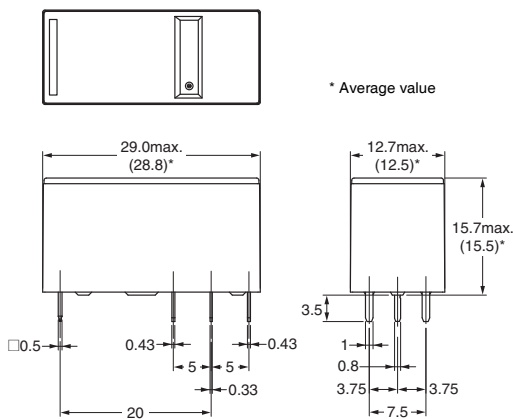
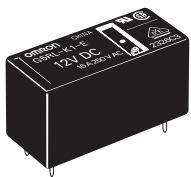
Terminal Arrangement/ Internal Connections (BOTTOM VIEW)



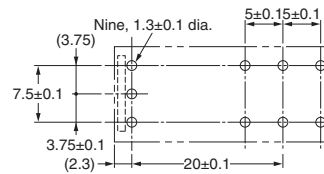
Note. Check carefully the coil polarity of the relay.

Note. Orientation marks are indicated as follows: □ ▨

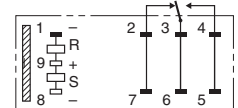
G5RL-K1-E



PCB Mounting Holes (BOTTOM VIEW)



Terminal Arrangement/ Internal Connections (BOTTOM VIEW)



Note. Check carefully the coil polarity of the relay.

Note. Orientation marks are indicated as follows: □ ▨

Approved Standards

UL Recognized (File No. E41643) and CSA Certified (File No. LR31928)

| Model | Contact form | Coil ratings | Contact ratings | Number of test operations |
|--------------------------|--------------|--|--------------------------------------|---------------------------|
| G5RL-U1A-E G5RL-K1A-E | SPST-NO (1a) | 5 to 24 VDC (“-U” models: 3 to 24 VDC) | 16 A 277 VAC (Resistive) - NO 85°C | 50,000 |
| | | | TV-5 - NO 40°C | 25,000 |
| | | | TV-8 - NO 40°C | 25,000 |
| | | | 8 A 250 VAC (Ballast) - NO 40°C | 6,000 |
| G5RL-U1-E G5RL-K1-E | SPDT (1c) | 5 to 24 VDC (“-U” models: 3 to 24 VDC) | 2,000 W 250 VAC (Tungsten) 70°C | 6,000 |
| | | | 16 A 277 VAC (Resistive) - NO 85°C | 50,000 |
| | | | 8 A 250 VAC (Ballast) - NO 40°C | 6,000 |
| | | | 2,000 W 250 VAC (Tungsten) - NO 40°C | 6,000 |
| | | | 5 A 250 VAC (General) - NC 40°C | 50,000 |

UL/C-UL-approved models (File No. E41643)

| Model | Contact form | Coil ratings | Contact ratings | Number of test operations |
|----------------|--------------|--------------|-----------------------------|---------------------------|
| G5RL-K1A-EL-HA | SPST-NO (1a) | 5 to 24 VDC | 16 A 250 VAC (General) 85°C | 6,000 |

VDE Certified (EN61810-1) (License No. 40007172)

| Model | Contact form | Coil ratings | Contact ratings | Number of test operations |
|--------------------------|--------------|--|--|---------------------------|
| G5RL-U1A-E G5RL-K1A-E | SPST-NO (1a) | 5, 12, 24 VDC (“-U” models: 3, 5, 6, 12, 24 VDC) | 16 A 250 VAC (cosφ=1) - NO 85°C | 30,000 |
| | | | 240 VAC 100 A (0-P) Steady 10 A (rms) - NO 85°C | 50,000 |
| G5RL-U1-E G5RL-K1-E | SPDT (1c) | 5, 12, 24 VDC (“-U” models: 3, 5, 6, 12, 24 VDC) | 16 A 250 VAC (cosφ=1) - NO 85°C | 30,000 |
| | | | 5 A 250 VAC (cosφ=1) - NC 85°C | 30,000 |
| G5RL-K1A-EL-HA | SPST-NO (1a) | 5, 12, 24 VDC | 16 A 250 VAC (cosφ=1) 85°C | 6,000 |
| | | | IEC60669-1: 16 A 250 VAC Capacitor 140 μF room temperature | 20,000 |

CQC Certified (File No. CQC21002283993)

| Model | Contact form | Coil ratings | Contact ratings | Number of test operations |
|----------------|--------------|--------------|----------------------------|---------------------------|
| G5RL-K1A-EL-HA | SPST-NO (1a) | 5 to 24 VDC | 16 A 250 VAC (cosφ=1) 85°C | 6,000 |

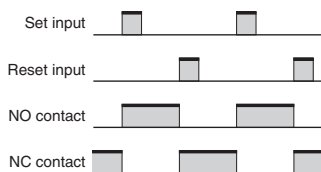
Precautions

Please refer to “PCB Relays Common Precautions” for correct use.

Correct Use

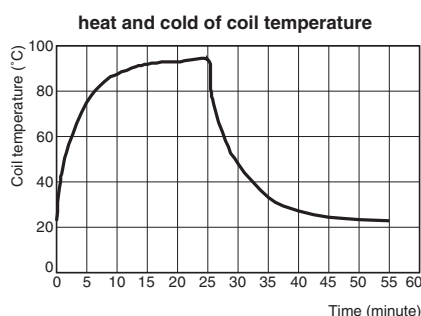
Basic Operation of Latching Relays

- In these relays, the input pulse of the set coil causes the operating condition to be maintained magnetically or mechanically, whereas the input pulse to the reset coil side puts the relay into the reset condition.



Coil Temperature Rise of Long Time Continuous Current to the Coil

- When the coil is applied continuous current for a long time, the coil would be heated too much. Please decide the coil Input pulse width by “heat and cold of coil temperature.”



Wiring of High-Capacity Models (-E)

- High-capacity models (-E) have a structure that connects two terminals from one contact. When designing the circuit, use both terminals. If you use only one terminal, the relay may be unable to satisfy specified performance.

Precautions for Correct Use

- This product is not suitable for vehicles such as automobiles (including two-wheeled vehicles).
- If the product is used in the following applications, consult your OMRON sales representative to check the necessary items according to the specification sheets. Also make sure the product is used within the specified ratings and performance ranges with an ample margin and implement safety measures, such as designing a safety circuit, to minimize danger should the product fail.
 - Outdoor use, uses involving potential chemical contamination or electrical interference.
 - Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, safety equipment, and equipment that could present a risk to human life or body.
 - Equipment requiring a high level of reliability, such as gas, water, or electrical supply systems.

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

OMRON Corporation

Electronic and Mechanical Components Company

Regional Contact

Americas

<https://www.components.omron.com/>

Asia-Pacific

<https://ecb.omron.com.sg/>

Korea

<https://www.omron-ecb.co.kr/>

Europe

<http://components.omron.eu/>

China

<https://www.ecb.omron.com.cn/>

Japan

<https://www.omron.co.jp/ecb/>