

# G5RL

PCB Power Relay

## Low-profile Relay with Various Models

- Low profile: 15.7 mm in height.
- Creepage distance 8mm between coil and contacts
- 10 kV Impulse withstand voltage
- Models with AC coil available.
- High-Inrush model available (Inrush peak currents up to 100 A)
- Low Noise models available (Approx. 10 to 20 dB less sound pressure than standard G5RL-Series Relays)
- TV8 Rating models available (TV8 for UL standard)



RoHS Compliant

### Model Number Legend

G5RL-□□-□-□  
1 2 3 4

#### 1. Number of poles

1: 1-pole

#### 3. Classification

None: Standard

E : High-capacity

#### 2. Contact Form

None: SPDT (1c)

A : SPST-NO (1a)

#### 4. Additional Models

None: Standard

HR: High-inrush

LN: Low Noise

TV8: TV8 rating

### Application Examples

- Housing equipments
- Audio-visual products
- Office automation machines
- Air-conditioners
- Lighting

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### Ordering Information

| Classification | Terminal Shape | Contact form | Enclosure rating | Model                     | Rated coil voltage                                  | Minimum packing unit |
|----------------|----------------|--------------|------------------|---------------------------|---|----------------------|
| Standard       | PCB terminals  | SPST-NO (1a) | Flux protection  | G5RL-1A-LN                | 5VDC, 12VDC, 24VDC                                  | 100 pcs/tray         |
| High-capacity  |                |              |                  | G5RL-1A-TV8               | 5VDC, 12VDC, 24VDC, 48VDC                           |                      |
|                |                |              |                  | G5RL-1A-E-HR              | 5VDC, 12VDC, 24VDC, 48VDC                           |                      |
|                |                |              |                  | G5RL-1A-E-LN              | 5VDC, 12VDC, 24VDC                                  |                      |
|                |                |              |                  | G5RL-1A-E-TV8             | 5VDC, 12VDC, 24VDC, 48VDC                           |                      |
|                |                |              |                  | G5RL-1-E                  | 24VAC, 100VAC, 115VAC/120VAC, 200VAC, 230VAC/240VAC |                      |
|                |                | G5RL-1-E-HR  |                  | 5VDC, 12VDC, 24VDC, 48VDC |   |                      |

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

Example: G5RL-1A-LN 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

#### Low Noise Models: G5RL-1A(-E)-LN

| Rated Voltage (VDC) | Rated current (mA) | Coil resistance (Ω) | Must operate voltage (V) | Must release voltage (V) | Max voltage (V) | Power consumption (mW) |
|---------------------|--------------------|---------------------|--------------------------|--------------------------|-----------------|------------------------|
|                     |                    |                     | % of rated voltage       |                          |                 |                        |
| 5                   | 106                | 47.2                | 70% max.                 | 10% min.                 | 110%            | Approx. 530            |
| 12                  | 44.2               | 272                 |                          |                          |                 |                        |
| 24                  | 22.1               | 1,086               |                          |                          |                 |                        |

Note 1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.

2. Be sure to use a diode for surge absorption for the coil.

3. The operating characteristics are measured at a coil temperature of 23°C.

4. The "Max. voltage" is the maximum voltage that can be applied to the relay coil.

## High-Inrush Models: G5RL-1(A)-E-HR, G5RL-1A(-E)-TV8

| Rated Voltage (VDC) | Rated current (mA) | Coil resistance (Ω) | Must operate voltage (V) | Must release voltage (V) | Max. voltage (V) | Power consumption (mW) |
|---------------------|--------------------|---------------------|--------------------------|--------------------------|------------------|------------------------|
|                     |                    |                     | % of rated voltage       |                          |                  |                        |
| 5                   | 80                 | 62.5                | 70% max.                 | 10% min.                 | 130%             | Approx. 400            |
| 12                  | 33.3               | 360                 |                          |                          |                  |                        |
| 24                  | 16.7               | 1,440               |                          |                          |                  |                        |
| 48                  | 8.96               | 5,358               |                          |                          |                  |                        |

- Note 1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.  
 2. The operating characteristics are measured at a coil temperature of 23°C.  
 3. The "Max. voltage" is the maximum voltage that can be applied to the relay coil.

## Models with AC Coil: G5RL-1-E

| Rated Voltage (VAC) | Rated current at 50Hz (mA) | Rated current at 60Hz (mA) | Coil resistance (Ω) | Must operate voltage (V) | Must release voltage (V) | Max. voltage (V) | Power consumption (mW) |
|---------------------|----------------------------|----------------------------|---------------------|--------------------------|--------------------------|------------------|------------------------|
|                     |                            |                            |                     | % of rated voltage       |                          |                  |                        |
| 24                  | 31.3                       | 28.3                       | 443                 | 75% max.                 | 15% min.                 | 110%             | Approx. 750            |
| 100                 | 7.5                        | 6.88                       | 8,220               |                          |                          |                  |                        |
| 115/120             | 5.85/6.25                  | 5.35/5.70                  | 11,600              |                          |                          |                  |                        |
| 200                 | 3.75                       | 3.45                       | 33,000              |                          |                          |                  |                        |
| 230/240             | 3.00/3.13                  | 2.76/2.88                  | 47,600              |                          |                          |                  |                        |

- Note 1. The rated current tolerance is +15%/-20%.  
 2. The operating characteristics are measured at a coil temperature of 23°C.  
 3. Coil resistances are provided as reference values.  
 4. The "Max. voltage" is the maximum voltage that can be applied to the relay coil.

## ●Contacts

### Low Noise Models: G5RL-1A(-E)-LN

| Load                   | Resistive load                    |                                   |
|------------------------|-----------------------------------|-----------------------------------|
|                        | Standard                          | High-capacity                     |
| Contact form           | SPST-NO (1a)                      |                                   |
| Contact Type           | Single                            |                                   |
| Contact material       | Ag Alloy                          |                                   |
| Rated load             | 12 A at 250 VAC<br>12 A at 24 VDC | 16 A at 250 VAC<br>16 A at 24 VDC |
| Rated carry current    | 12 A                              | 16 A                              |
| Max. switching voltage | 250 VAC, 24 VDC                   |                                   |
| Max. switching current | 12 A                              | 16 A                              |

### High-Inrush Models: G5RL-1(A)-E-HR, G5RL-1A(-E)-TV8

| Load                   | Resistive load                    |                                   |  |
|------------------------|-----------------------------------|-----------------------------------|--|
|                        | Standard                          | High-capacity                     |  |
| Contact form           | SPST-NO (1a)                      | SPST-NO (1a)                      | SPDT (1c)  |
| Contact Type           | Single                            |                                   |  |
| Contact material       | Ag Alloy                          |                                   |  |
| Rated load             | 12 A at 250 VAC<br>12 A at 24 VDC | 16 A at 250 VAC<br>16 A at 24 VDC | 16 A at 250 VAC, 24VDC (NO)<br>5 A at 250 VAC, 24 VDC (NC) |
| Rated carry current    | 12 A                              | 16 A                              | 16 A (NO), 5 A (NC)  |
| Max. switching voltage | 250 VAC, 24 VDC                   |                                   |  |
| Max. switching current | 12 A                              | 16 A                              | 16 A (NO), 5 A (NC)  |

### Models with AC Coil: G5RL-1-E

| Load                   | Resistive load  |  |
|------------------------|---|--|
|                        | High-capacity   |  |
| Contact form           | SPDT (1c)   |  |
| Contact Type           | Single  |  |
| Contact material       | Ag Alloy  |  |
| Rated load             | 16 A at 250 VAC, 24 VDC (NO)<br>5 A at 250 VAC, 24 VDC (NC) |  |
| Rated carry current    | 16 A (NO), 5 A (NC)   |  |
| Max. switching voltage | 250 VAC, 24 VDC   |  |
| Max. switching current | 16 A (NO), 5 A (NC)   |  |

## ■ Characteristics

### ● Low Noise Models: G5RL-1A(-E)-LN

| Item                                | Classification                        | Standard   | High-capacity |
|-------------------------------------|---------------------------------------|--|---------------|
| Contact resistance                  |                                       | 100 mΩ max.  |               |
| Operate time                        |                                       | 15 ms max.   |               |
| Release time                        |                                       | 15 ms max.   |               |
| Insulation resistance               |                                       | 1,000 MΩ min.  |               |
| Dielectric strength                 | Between coil and contacts             | 6,000 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: 8 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)                              |               |
| Shock resistance                    | Destruction                           | 1,000 m/s <sup>2</sup>   |               |
|                                     | Malfunction                           | 100 m/s <sup>2</sup>   |               |
| Durability                          | Mechanical                            | 1,000,000 operation min. (at 18,000 operations/hr)   |               |
|                                     | Electrical                            | 100,000 operations min. (at 1,800 operations/hr)   50,000 operations min. (at 1,800 operations/hr) |               |
| Failure rate (P level) (reference ) |                                       | 100 mA at 5 VDC  |               |
| Ambient operating temperature       |                                       | -40°C to 85°C (with no icing or condensation)  |               |
| Ambient operating humidity          |                                       | 5% to 85%  |               |
| Weight                              |                                       | Approx. 10 g   |               |

Note 1. Values in the above table are initial values.

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

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

4. The release time is value with a diode attached.

5. Failure rate (P level) was measured at a switching frequency of 120 operations/min.

### ● High-Inrush Models: G5RL-1(A)-E-HR, G5RL-1A(-E)-TV8

| Item                                | Classification                        | Standard   | High-capacity |
|-------------------------------------|---------------------------------------|--|---------------|
| Contact resistance                  |                                       | 100 mΩ max.  |               |
| Operate time                        |                                       | 15 ms max.   |               |
| Release time                        |                                       | 5 ms max.  |               |
| Insulation resistance               |                                       | 1,000 MΩ min. (at 500 VDC)   |               |
| Dielectric strength                 | Between coil and contacts             | 6,000 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: 8 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)                              |               |
| Shock resistance                    | Destruction                           | 1,000 m/s <sup>2</sup>   |               |
|                                     | Malfunction                           | 100 m/s <sup>2</sup>   |               |
| Durability                          | Mechanical                            | 10,000,000 operation min. (at 18,000 operations/hr)  |               |
|                                     | Electrical                            | 100,000 operations min. (at 1,800 operations/hr)   50,000 operations min. (at 1,800 operations/hr) |               |
| Failure rate (P level) (reference ) |                                       | 100 mA at 5 VDC  |               |
| Ambient operating temperature       |                                       | -40°C to 85°C (with no icing or condensation)  |               |
| Ambient operating humidity          |                                       | 5% to 85%  |               |
| Weight                              |                                       | Approx. 10 g   |               |

Note 1. Values in the above table are initial values.

2. The contact resistance is measured with 1 A applied at 5 VDC using voltage drop method.

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

4. The resistive load ratings for NO contact apply when there is no load on NC contact.

5. Failure rate (P level) was measured at a switching frequency of 120 operations/min.

### ● Models with AC Coil: G5RL-1-E

| Item                                | Classification                        | High-capacity   |
|-------------------------------------|---------------------------------------|---|
| Contact resistance                  |                                       | 100 mΩ max.   |
| Operate time                        |                                       | 20 ms max.  |
| Release time                        |                                       | 20 ms max.  |
| Insulation resistance               |                                       | 1,000 MΩ min. (at 500 VDC)  |
| Dielectric strength                 | Between coil and contacts             | 6,000 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: 8 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) |
| Shock resistance                    | Destruction                           | 1,000 m/s <sup>2</sup>  |
|                                     | Malfunction                           | 100 m/s <sup>2</sup>  |
| Durability                          | Mechanical                            | 10,000,000 operation min. (at 18,000 operations/hr)                   |
|                                     | Electrical                            | 50,000 operations min. (at 720 operations/hr)                         |
| Failure rate (P level) (reference ) |                                       | 40 mA at 24 VDC   |
| Ambient operating temperature       |                                       | -40°C to 70°C (with no icing or condensation)                         |
| Ambient operating humidity          |                                       | 5% to 85%   |
| Weight                              |                                       | Approx. 10 g  |

Note 1. Values in the above table are initial values.

2. The contact resistance is measured with 1 A applied at 5 VDC using voltage drop method.

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

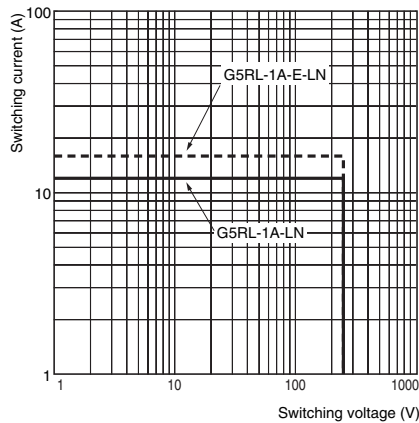
4. The resistive load ratings for NO contact apply when there is no load on NC contact.

5. Failure rate (P level) was measured at a switching frequency of 120 operations/min.

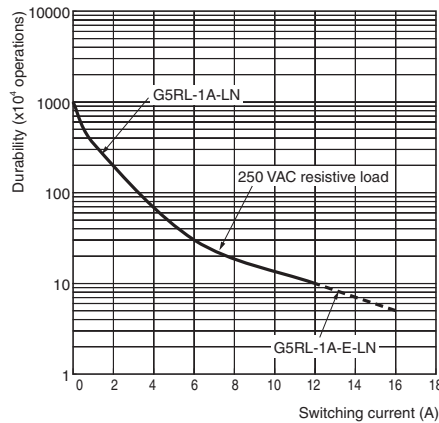
## Engineering Data

### Low Noise Models: G5RL-1A(-E)-LN

#### Maximum Switching Capacity

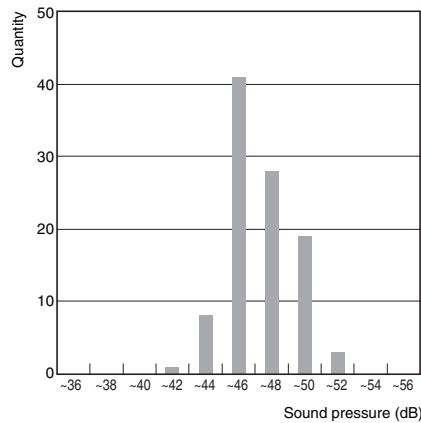


#### Durability

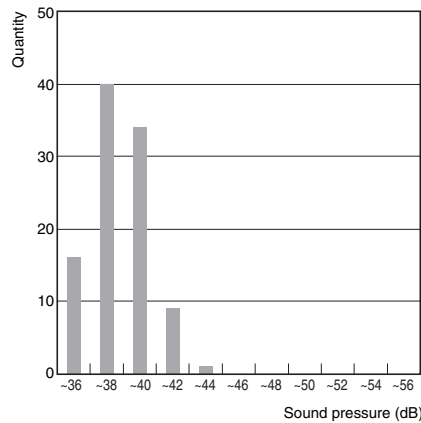


#### Distribution of Sound Pressure

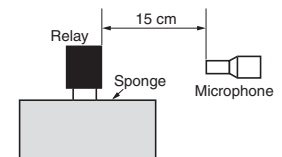
##### 1. When Operating



##### 2. When Releasing



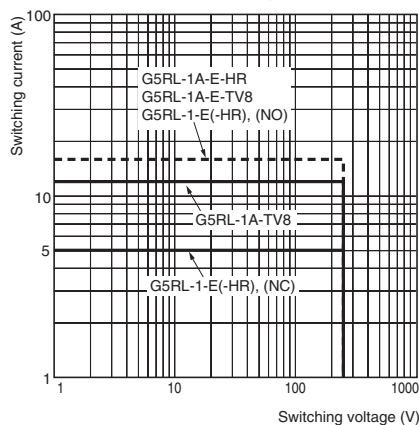
Sample: G5RL-1A-LN 12 VDC  
 Number of relays: 100 pcs  
 Range: A weighted sound pressure level,  
 Fast, Max. hold  
 Device connected to coil: Diode  
 Testing environment: Room temperature and  
 humidity  
 Background noise: Approx. 30 dB max.



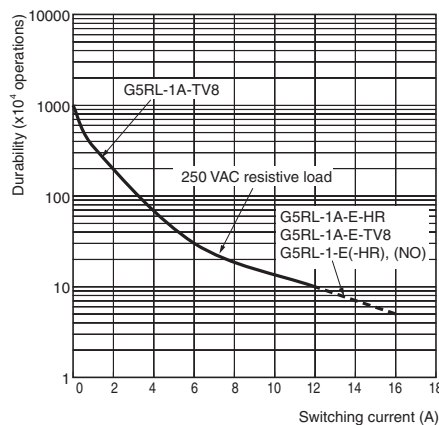
### High-Inrush Models : G5RL-1(A)-E-HR, G5RL-1A(-E)-TV8

### Models with AC Coil : G5RL-1-E

#### Maximum Switching Capacity



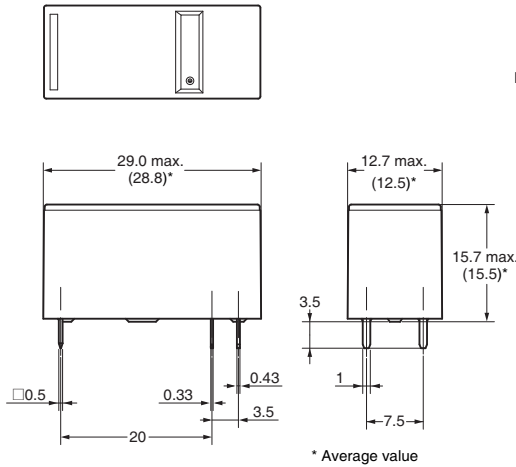
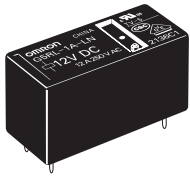
#### Durability



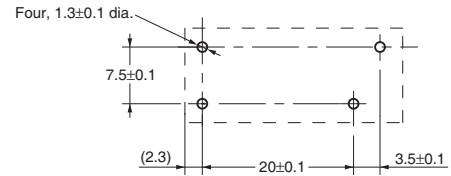
## ■Dimensions

(Unit: mm)

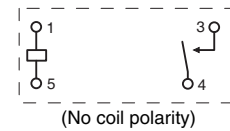
G5RL-1A-LN  
G5RL-1A-TV8



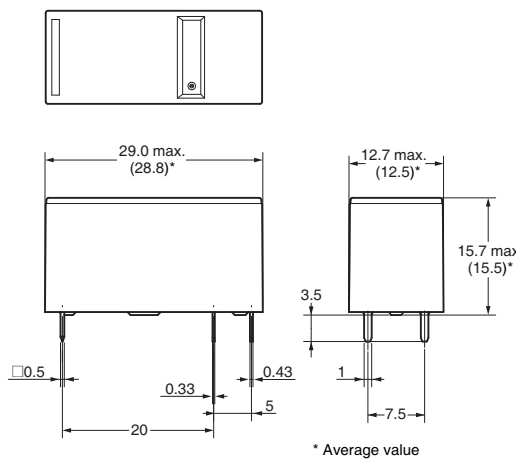
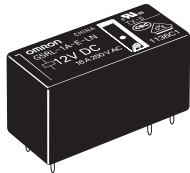
PCB Mounting Holes  
(BOTTOM VIEW)



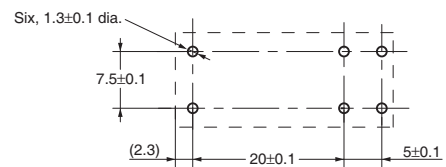
Terminal Arrangement/  
Internal Connections  
(BOTTOM VIEW)



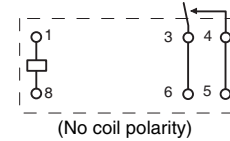
G5RL-1A-E-LN  
G5RL-1A-E-HR  
G5RL-1A-E-TV8



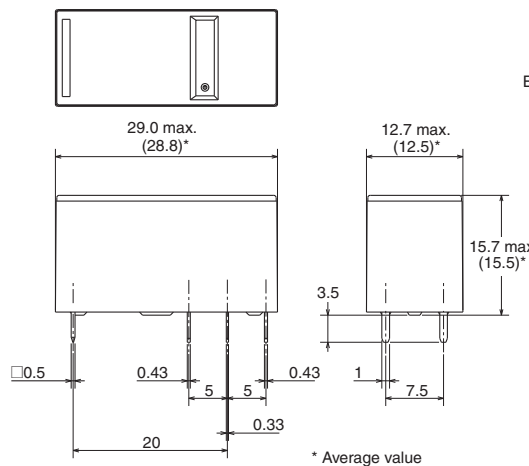
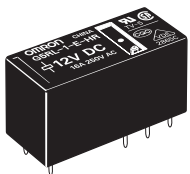
PCB Mounting Holes  
(BOTTOM VIEW)



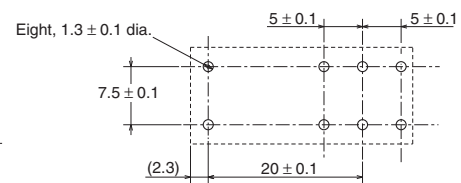
Terminal Arrangement/  
Internal Connections  
(BOTTOM VIEW)



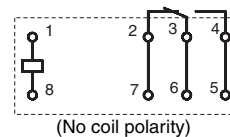
G5RL-1-E  
G5RL-1-E-HR



PCB Mounting Holes  
(BOTTOM VIEW)



Terminal Arrangement/  
Internal Connections  
(BOTTOM VIEW)



## Approved Standards

### UL/C-UL Recognized (File No.E41643)

| Model        | Contact form | Coil ratings | Contact ratings               | Number of test operations |
|--------------|--------------|--------------|-------------------------------|---------------------------|
| G5RL-1A-LN   | SPST-NO (1a) | 5 to 24 VDC  | 12 A, 250 VAC Resistive, 40°C | 100,000                   |
|              |              |              | 12 A, 24 VDC Resistive, 40°C  |                           |
|              |              |              | TV-5, 120 VAC, 40°C           | 25,000                    |
| G5RL-1A-E-LN | SPST-NO (1a) | 5 to 24 VDC  | 16 A, 250 VAC Resistive, 40°C | 50,000                    |
|              |              |              | 16 A, 24 VDC Resistive, 40°C  |                           |
|              |              |              | TV-5, 120 VAC, 40°C           | 25,000                    |

Note. CSA standards: Certified by C-UL.

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

| Model          | Contact form | Coil ratings                               | Contact ratings                        | Number of test operations |
|----------------|--------------|--|--|---------------------------|
| G5RL-1A-TV8    | SPST-NO(1a)  | 5 to 48 VDC                                | 12 A, 277 VAC General, 40°C            | 80,000                    |
|                |              |  | TV-8, 120 VAC, 40°C                    | 25,000                    |
|                |              |  | A300 Pilot Duty, 720 VA, 240 VAC, 40°C | 30,000                    |
|                |              |  | 1/2 Hp, 120 VAC, 40°C                  | 6,000                     |
|                |              |  | 60 LRA/10 FLA, 250 VAC, 40°C           | 6,000                     |
| G5RL-1A-E-TV8  | SPST-NO(1a)  | 5 to 48 VDC                                | 16 A, 277 VAC General, 40°C            | 50,000                    |
|                |              |  | TV-8, 120 VAC, 40°C                    | 25,000                    |
|                |              |  | A300 Pilot Duty, 720 VA, 240 VAC, 40°C | 30,000                    |
|                |              |  | 1/2 Hp, 120 VAC, 40°C                  | 6,000                     |
|                |              |  | 60 LRA/10 FLA, 250 VAC, 40°C           | 6,000                     |
| G5RL-1(A)-E-HR | SPST-NO (1a) | 5 to 48 VDC                                | 16 A, 277 VAC General, 40°C            | 50,000                    |
|                |              |  | TV-5, 120 VAC, 40°C                    | 25,000                    |
| G5RL-1-E       | SPDT-NO (1a) | 24 to 240 VAC<br>(G5RL-1-E)                | A300 Pilot Duty, 720 VA, 240 VAC, 40°C | 30,000                    |
|                |              |  | 1/2 Hp, 120 VAC, 40°C                  | 6,000                     |
|                | SPDT-NC (1b) | 5 to 48 VDC<br>24 to 240 VAC<br>(G5RL-1-E) | 5 A, 250 VAC General, 40°C             | 50,000                    |
|                |              |  | 5 A, 24 VDC Resistive, 40°C            | 50,000                    |

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

| Model          | Contact form | Coil ratings                                  | Contact ratings                             | Number of test operations |
|----------------|--------------|---|---|---------------------------|
| G5RL-1A-LN     | SPST-NO (1a) | 5, 12, 24VDC                                  | 12 A, 250 VAC $\cos\phi=1$ , 85°C           | 60,000                    |
| G5RL-1A-E-LN   | SPST-NO (1a) | 5, 12, 24VDC                                  | 16 A, 250 VAC $\cos\phi=1$ , 85°C           | 30,000                    |
| G5RL-1A-TV8    | SPST-NO (1a) | 5, 12, 24, 48 VDC                             | 12 A, 250 VAC $\cos\phi=1$ , 85°C           | 40,000                    |
|                |              |   | 230 VAC 70 A (0-P) Steady 1 A (rms), 85°C   | 20,000                    |
| G5RL-1A-E-TV8  | SPST-NO (1a) | 5, 12, 24, 48 VDC                             | 16 A, 250 VAC $\cos\phi=1$ , 85°C           | 15,000                    |
|                |              |   | 240 VAC 100 A (0-P) Steady 10 A (rms), 85°C | 50,000                    |
|                |              |   | 240 VAC 50 A (0-P) Steady 5 A (rms), 85°C   | 100,000                   |
| G5RL-1(A)-E-HR | SPST-NO (1a) | 5, 12, 24, 48 VDC                             | 16 A, 250 VAC $\cos\phi=1$ , 85°C           | 15,000                    |
|                |              |   | 240 VAC 100 A (0-P) Steady 10 A (rms), 85°C | 50,000                    |
| G5RL-1-E       | SPDT-NO (1a) | 24, 100, 115/120, 200,<br>230/240 VAC (50 Hz) | 240 VAC 50 A (0-P) Steady 5 A (rms), 85°C   | 100,000                   |
|                |              |   | 16 A, 250 VAC $\cos\phi=1$ , 70°C           | 15,000                    |

|   |                      |                                |
|---|----------------------|--------------------------------|
| Creepage distance                               |                      | 8 mm min.                      |
| Clearance distance                              |                      | 8 mm min.                      |
| Insulation material group                       |                      | IIIa                           |
| Type of insulation                              | coil-contact circuit | Reinforced                     |
|   | open contact circuit | Micro disconnection            |
| Rated Insulation voltage                        |                      | 250 V                          |
| Pollution degree                                |                      | 3 (Flux protection)            |
| Rated voltage system                            |                      | 250 V                          |
| Over voltage category                           |                      | III                            |
| Category of protection according to IEC 61810-1 |                      | RT II (Flux protection)        |
| Tracking Index of relay base                    |                      | PTI 250 V min. (housing parts) |

## ■Precautions

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

### Correct Use

#### ●Mounting

- When mounting a G5RL-LN Relay (Silent Relay) on a PCB, use a diode for surge absorption for the coil.

#### ●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.

#### ●Others

- Do not decrease coil voltage after operation and do not use a pulse wave drive.

#### ●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.

▪ Application examples provided in this document are for reference only. In actual applications, confirm equipment functions and safety before using the product.  
 ▪ Consult your OMRON representative before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems or equipment that may have a serious influence on lives and property if used improperly. Make sure that the ratings and performance characteristics of the product provide a margin of safety for the system or equipment, and be sure to provide the system or equipment with double safety mechanisms.

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

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