

# G2RL

PCB Power Relay

## Low profile power relay with 15.7 mm height, ideal for incorporation in miniature equipments

- A wide variety of single pole, double pole, high-capacity (16 A) type and high-sensitivity type (250 mW) relays are available.
- IEC/EN 60335-1 conformed. (-HA Model)
- Satisfies ambient operating temperature requirement of 85°C and 105°C (-CV Model).
- Clearance and creepage distance: 8 mm / 8 mm min.
- G2RL-1(A)-E-ASI: TV3 rating models available.
- IEC/EN 60079-15 conformed (Except G2RL-1(A)-H, G2RL-1A-E-CV(-HA) Models).
- Reduced power consumption with voltage holding and pulse width modulation (PWM) control (only for G2RL-□-PW1 model).

RoHS Compliant

### Model Number Legend

G2RL-□□□-□-□-□-□-□

1 2 3 4 5 6 7 8

#### 1. Number of Poles

- 1 : 1 pole
- 2 : 2 pole

#### 2. Contact Form

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

#### 3. Enclosure Rating

- None : Flux protection
- 4 : Sealed

#### 4. Classification

- None : Standard
- E : High-capacity
- H : High-sensitivity

#### 5. Contact Material

- None : Standard (Ag-alloy, Cd free)
- ASI : AgSnIn

#### 6. Special Requirement 1

- None : Standard
- CV : 16 A, pinning 5 mm, switching at 105°C

#### 7. Market Code

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

#### 8. Special Requirement 2

- None : Standard
- PW1 : Coil holding voltage and PWM control type



### Application Examples

- Home appliances
- OA equipment
- Industrial machinery

## Ordering Information

Terminal Shape	Market Code	Classification	Contact Form	Enclosure Rating	Model	Rated Coil Voltage	Minimum Packing Unit	
PCB terminals	General Purpose	Standard	SPST-NO (1a)	Flux protection	G2RL-1A	5, 12, 24, 48 VDC	20 pcs/tube	
				Sealed	G2RL-1A4	5, 12, 24, 48 VDC		
			SPDT (1c)	Flux protection	G2RL-1	5, 12, 24 VDC		
				Sealed	G2RL-14	5, 12, 24, 48 VDC		
			DPST-NO (2a)	Flux protection	G2RL-2A	5, 12, 24 VDC		
				Sealed	G2RL-2A4	5, 12, 24 VDC		
		DPDT (2c)	Flux protection	G2RL-2	5, 12, 24, 48 VDC			
				G2RL-2-ASI	5, 12, 24 VDC			
			Sealed	G2RL-2-PW1	5, 12, 24 VDC			
				G2RL-24	5, 12, 24, 48 VDC			
		High-capacity	SPST-NO (1a)	Flux protection	G2RL-1A-E	5, 12, 24, 48 VDC		
					G2RL-1A-E-ASI	5, 12, 24 VDC		
				G2RL-1A-E-CV	5, 12, 24 VDC			
			Sealed	G2RL-1A4-E	5, 12, 24, 48 VDC			
				SPDT (1c)	Flux protection	G2RL-1-E		5, 12, 24, 48 VDC
					G2RL-1-E-ASI	5, 12, 24 VDC		
		Sealed	G2RL-1-E-PW1	5, 12, 24 VDC				
			G2RL-14-E	5, 12, 24, 48 VDC				
	High-sensitivity		SPST-NO (1a)	Flux protection	G2RL-1A-H	5, 12, 24 VDC		
		SPDT (1c)						
		SPDT (1c)	G2RL-1-H					
			G2RL-1-HA					
		Standard	G2RL-2A-HA					
			G2RL-2-HA					
High-capacity	SPST-NO (1a)	G2RL-1A-E-HA						
		G2RL-1A-E-CV-HA						
	SPDT (1c)	G2RL-1-E-HA						
		G2RL-1-E-HA						

Note 1. When ordering, add the rated coil voltage to the model number.

Example: G2RL-1A DC5

Rated coil voltage

However, the notation of the coil voltage on the product case will be marked as □□VDC.

Note 2. Place your order in tube (20 pcs/tube) units.

Note 3. Contact your OMRON sales representative for sealed models.

## Ratings

### Coil

Item	Rated voltage	Rated current (mA)	Coil resistance (Ω)	Must operate voltage (V)	Must release voltage (V)	Max. voltage (V)	Power consumption (mW)
				% of rated voltage			
Standard, High-capacity	5 VDC	80.0	62.5	70% max.	10% min. 10 to 41%*	130% (at 85°C)	Approx. 400 Approx. 120*
	12 VDC	33.3	360				
	24 VDC	16.7	1,440				
	48 VDC	8.96	5,358				
High-sensitivity	5 VDC	50	96	75% max.	10%	130% (at 85°C)	Approx. 250
	12 VDC	20.8	576				
	24 VDC	10.42	2,304				

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

Note 2. The operating characteristics are measured at a coil temperature of 23°C.

Note 3. The "max. voltage" is the maximum voltage that can be applied to the relay coil.

\* These numbers are only for -PW1 type. Power consumption with holding voltage is approx. 120mW. Please confirm the detail in page 8 coil voltage reduction (holding voltage).

### Contacts: Flux Protection Type

Classification	Standard type (resistive load)		High-capacity type (resistive load)	High-sensitivity type (resistive load)
	Model		1-pole	
Item	1-pole	2-pole	1-pole	
Contact type	Single			
Contact material	Ag-alloy (Cd free)			
Rated load	12 A at 250 VAC 12 A at 24 VDC (See note)	8 A at 250 VAC 8 A at 30 VDC (See note)	16 A at 250 VAC 16 A at 24 VDC (See note)	10 A at 250 VAC (See note)
Rated carry current	12 A (See note)	8 A (70°C)/5 A (85°C) (See note)	16 A (See note)	10 A (See note)
Max. switching voltage	440 VAC, 300 VDC			
Max. switching current	12 A	8 A	16 A	10 A
Failure rate (P level) (reference value*)	40 mA at 24 VDC			

\* This value was measured at a switching frequency of 120 operations/min.

Note: Contact your OMRON representative for the ratings on sealed models.

## ■ Characteristics

### ● Flux Protection Type

Item	Classification Number of poles	Standard type		High-capacity type	High-sensitivity type
		1-pole	2-pole	1-pole	
Contact resistance *1		100 mΩ max.			
Operate time		15 ms max.			
Release time		5 ms max.			
Insulation resistance *2		1,000 MΩ min.			
Dielectric strength	Between coil and contacts	5,000 VAC, 50/60 Hz for 1min			
	Between contacts of the same polarity	1,000 VAC, 50/60 Hz for 1min			
	Between contacts of different polarity	–	2,500 VAC, 50/60 Hz for 1min		–
Impulse withstand voltage		10 kV (1.2 x 50 μs)			
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	Energized: 100 m/s <sup>2</sup> , De-energized: 100 m/s <sup>2</sup>			
Durability	Mechanical	20,000,000 operations (at 18,000 operations/hr)			
	Electrical *3 (resistive load)	G2RL-1A, G2RL-1(-HA, -PW1): 50,000 operations at 250 VAC, 12 A 30,000 operations at 24 VDC, 12 A	G2RL-2(A)(-HA, -PW1), G2RL-2-ASI: 30,000 operations at 250 VAC, 8 A 30,000 operations at 30 VDC, 8 A	G2RL-1A-E(-ASI, -HA, -PW1), G2RL-1-E(-ASI, -HA, -PW1): 30,000 operations at 250 VAC, 16 A 30,000 operations at 24 VDC, 16 A G2RL-1A-E-CV(-HA): 50,000 operations at 250 VAC, 16 A at 105°C	G2RL-1(A)-H: 50,000 operations at 250 VAC, 10 A
Ambient operating temperature		-40°C to 85°C (with no icing or condensation) -40°C to 105°C (with no icing or condensation) by G2RL-1A-E-CV			
Ambient operating humidity		5% to 85% (with no icing or condensation)			
Weight		Approx. 12 g			

Note 1. Values in the above table are the initial values at 23°C.

Note 2. Contact your OMRON sales representative for sealed models.

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

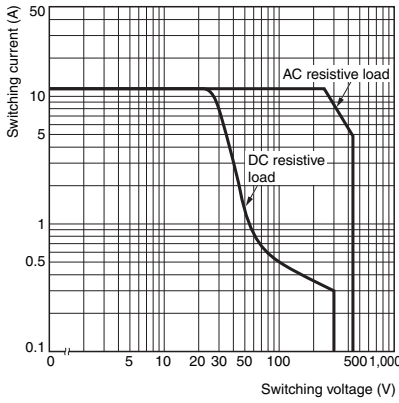
\*2. Measurement conditions: Measured at the same points as the dielectric strength using a 500 VDC ohmmeter.

\*3. 1,800 operations per hour.

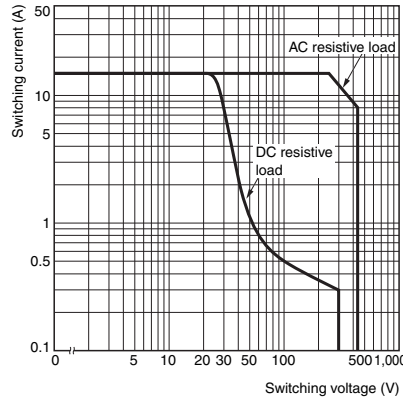
## Engineering Data

### Maximum Switching Capacity

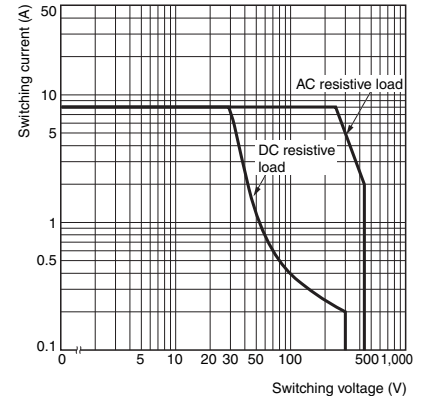
#### 1-pole Standard Type



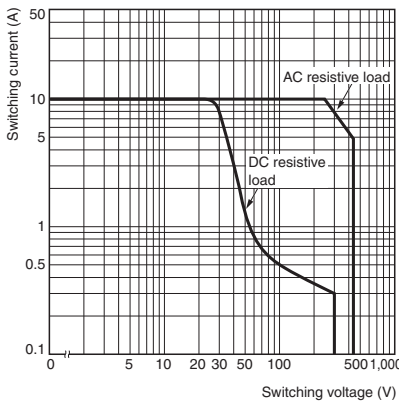
#### 1-pole High-capacity Type



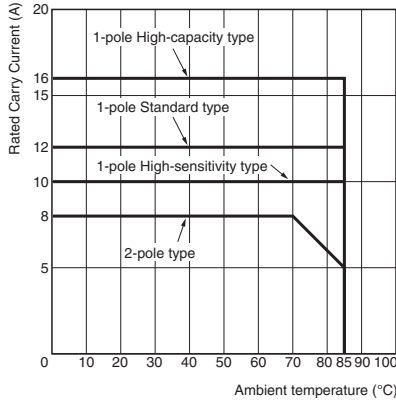
#### 2-pole Type



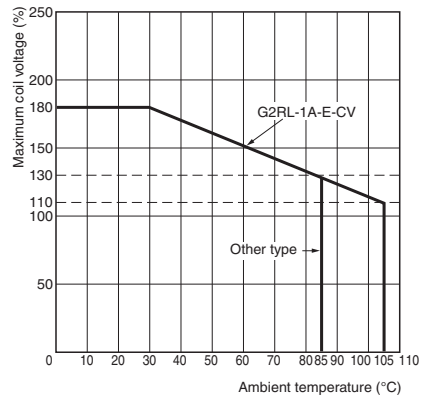
#### High-sensitivity Type



### Ambient Temperature vs. Rated Carry Current

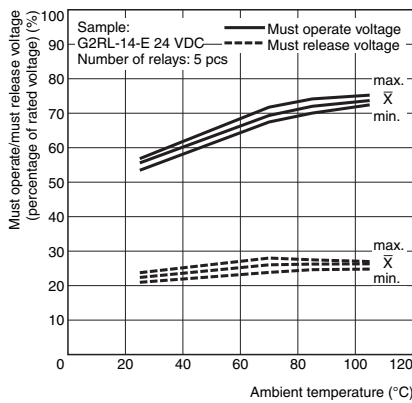


### Ambient Temperature vs. Maximum Coil Voltage



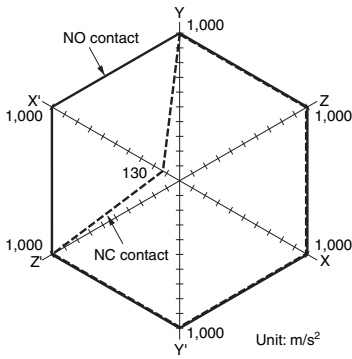
Note. The maximum coil voltage refers to the maximum value in a varying range of operating power voltage, not a continuous voltage.

### Ambient Temperature vs. Must Operate and Must Release Voltages

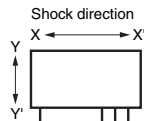


## ●Shock Malfunction

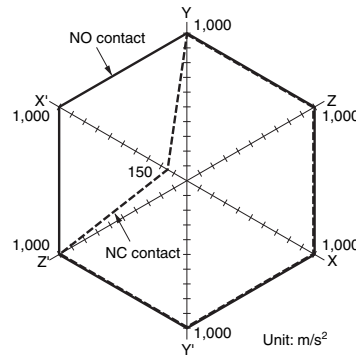
### 1-pole type



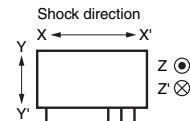
Sample: G2RL-14 12 VDC  
 Number of relays: 5 pcs  
 Test conditions: Shock is applied in  $\pm X$ ,  $\pm Y$ , and  $\pm Z$  directions three times each with without energizing the relays to check the number of malfunctions.  
 Requirement: None malfunction  
 100 m/s<sup>2</sup>



### 2-pole type



Sample: G2RL-24 12 VDC  
 Number of relays: 5 pcs  
 Test conditions: Shock is applied in  $\pm X$ ,  $\pm Y$ , and  $\pm Z$  directions three times each with without energizing the Relays to check the number of malfunctions.  
 Requirement: None malfunction  
 100 m/s<sup>2</sup>



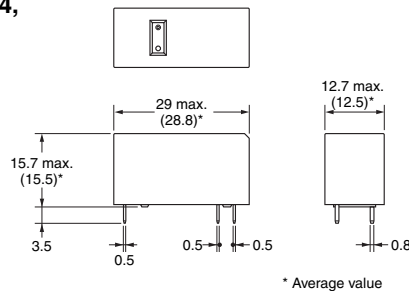
## ■Electrical Endurance Data (Reference Value)

G2RL-1-E	8 A 250 VAC (cos $\phi$ =0.4) 8 A 30 VDC (L/R=7 ms)	200,000 operation min. (NO) 10,000 operation min. (NO)
G2RL-1	5 A 250 VAC (cos $\phi$ =0.4) 5 A 30 VDC (L/R=7 ms)	150,000 operation min. (NO) 10,000 operation min. (NO)
G2RL-2	8 A 250 VAC (cos $\phi$ =1) 8 A 30 VDC	30,000 operation min. 10,000 operation min.
G2RL-1A-E	Pilot duty (A300), 250 VAC Pilot duty (A300), 125 VAC	250,000 operation min. 150,000 operation min.

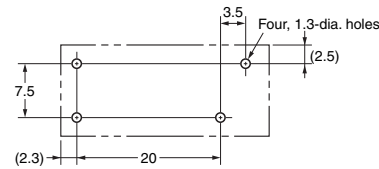
Note. The results shown reflect values at ambient temperature 23°C. Electrical endurance will vary depending on the test conditions.  
 Contact your OMRON representative if you require more detailed information for the electrical endurance under your test condition.

## ■Dimensions (Unit: mm)

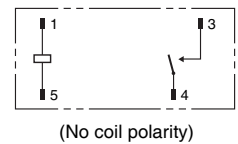
### G2RL-1A(-PW1), G2RL-1A4, G2RL-1A-H



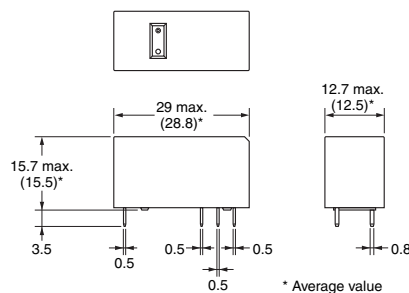
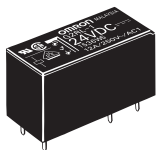
#### PCB Mounting Holes (Bottom View)



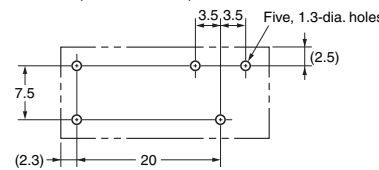
#### Terminal Arrangement/ Internal Connections (Bottom View)



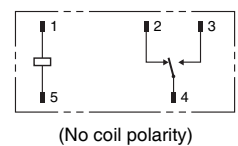
### G2RL-1(-PW1), G2RL-14, G2RL-1-H, G2RL-1-HA



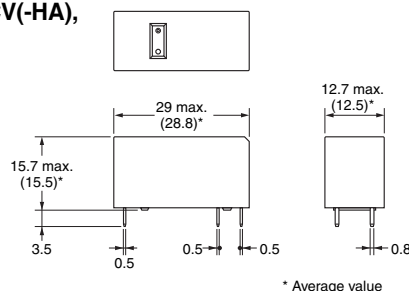
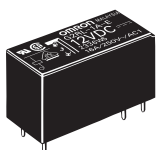
#### PCB Mounting Holes (Bottom View)



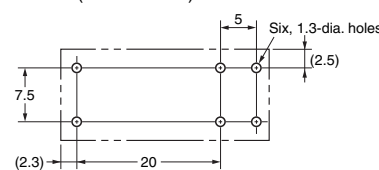
#### Terminal Arrangement/ Internal Connections (Bottom View)



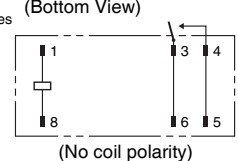
### G2RL-1A-E(-HA, -PW1), G2RL-1A4-E, G2RL-1A-E-CV(-HA), G2RL-1A-E-ASI



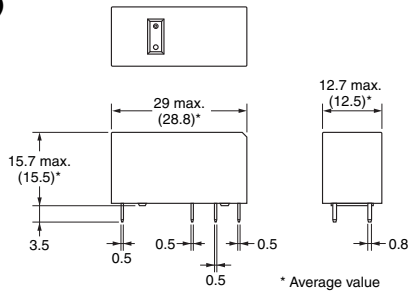
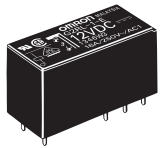
#### PCB Mounting Holes (Bottom View)



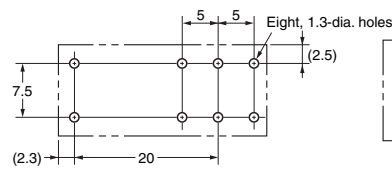
#### Terminal Arrangement/ Internal Connections (Bottom View)



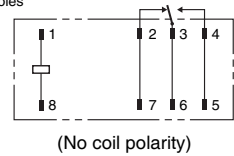
## G2RL-1-E(-ASI, -HA, -PW1) G2RL-14-E



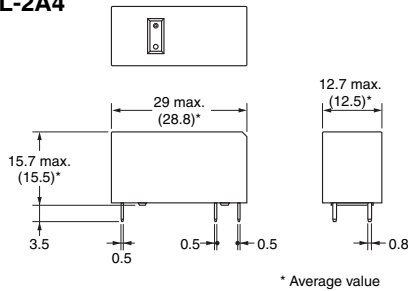
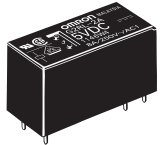
### PCB Mounting Holes (Bottom View)



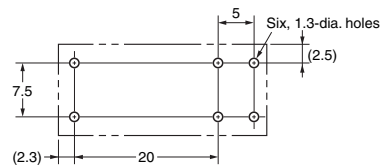
### Terminal Arrangement/ Internal Connections (Bottom View)



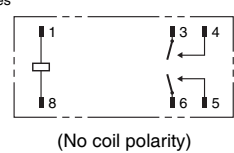
## G2RL-2A(-HA, -PW1), G2RL-2A4



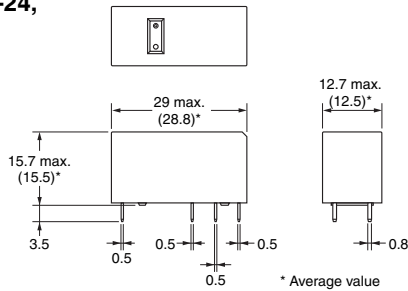
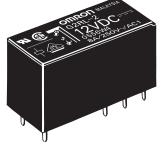
### PCB Mounting Holes (Bottom View)



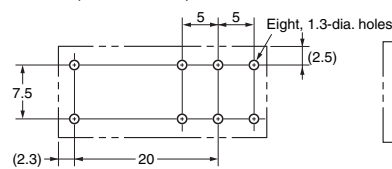
### Terminal Arrangement/ Internal Connections (Bottom View)



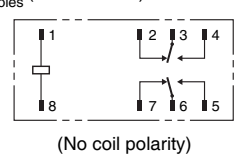
## G2RL-2(-HA, -PW1), G2RL-24, G2RL-2-ASI



### PCB Mounting Holes (Bottom View)



### Terminal Arrangement/ Internal Connections (Bottom View)



## Approved Standards

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

**UL Recognized:**  (File No. 41643)

**CSA Certified:**  (File No. LR31928)

Model	Contact form	Coil ratings	Contact ratings	Number of test operations
G2RL-1A(-PW1)	SPST-NO (1a)	3 to 48 VDC	12 A, 250 VAC (General Use) 40°C	100,000
G2RL-1(-HA, -PW1)	SPDT (1c)		12 A, 24 VDC (Resistive) 40°C	
G2RL-1A-E(-HA, -PW1)	SPST-NO (1a)	3 to 48 VDC	16 A, 250 VAC (General Use) 40°C	100,000
G2RL-1-E(-HA, -PW1)	SPDT (1c)		16 A, 24 VDC (Resistive) 40°C	
G2RL-1A-E-ASI	SPST-NO (1a)	3 to 48 VDC	16 A, 250 VAC (Resistive) 85°C	30,000
G2RL-1-E-ASI	SPDT (1c)		TV-3 40°C	
G2RL-1A-E-CV(-HA)	SPST-NO (1a)	3 to 48 VDC	16 A, 250 VAC (Resistive) 105°C	100,000
G2RL-1A-H	SPST-NO (1a)	3 to 48 VDC	10 A, 250 VAC (General Use) 40°C	50,000
G2RL-1-H	SPDT (1c)		10 A, 24 VDC (Resistive) 40°C	
G2RL-2A(-HA, -PW1)	DPST-NO (2a)	3 to 48 VDC	8 A, 277 VAC (General Use) 40°C	100,000
G2RL-2(-HA, -PW1)	DPDT (2c)		8 A, 30 VDC (Resistive) 40°C	
G2RL-2-ASI	DPDT (2c)	3 to 48 VDC	8 A, 250 VAC (Resistive) 85°C	15,000
			8 A, 30 VDC (Resistive) 85°C	15,000

EN/IEC, VDE Certified  (Certificate No. 119650)

Model	Contact form	Coil ratings	Contact ratings	Number of test operations
G2RL-1A(-PW1) G2RL-1(-HA, -PW1)	SPST-NO (1a) SPDT (1c)	5, 12, 24, 48 VDC	12 A, 250 VAC (cosφ=1) 85°C	100,000
			12 A, 24 VDC (L/R=0 ms) 85°C	
G2RL-1A-E(-HA, -PW1) G2RL-1-E(-HA, -PW1)	SPST-NO (1a) SPDT (1c)	5, 12, 24, 48 VDC	AC15: 3 A at 240 VAC at room temperature	6,000
			DC13: 2.5 A at 24 VDC, 50ms at room temperature	
G2RL-1A-E(-HA, -PW1) G2RL-1-E(-HA, -PW1)	SPST-NO (1a) SPDT (1c)	5, 12, 24, 48 VDC	16 A, 250 VAC (cosφ=1) 85°C	30,000
			16 A, 24 VDC (L/R=0 ms) 85°C	15,000
G2RL-1A-E(-ASI) G2RL-1-E(-ASI)	SPST-NO (1a) SPDT (1c)	5, 12, 24, 48 VDC	AC15: 3 A at 240 VAC (NO) at room temperature, 1.5 A at 240V AC (NC) at room temperature	6,000
			DC13: 2.5 A at 24 VDC (NO), 50ms at room temperature	
G2RL-1A-E-ASI G2RL-1-E-ASI	SPST-NO (1a) SPDT (1c)	5, 12, 24, 48 VDC	16 A, 250 VAC (cosφ=1) 85°C	30,000
G2RL-1A-E-CV(-HA)	SPST-NO (1a)	5, 12, 24, 48 VDC	16 A, 250 VAC (cosφ=1) 105°C	100,000
G2RL-1A-H G2RL-1-H	SPST-NO (1a) SPDT (1c)	5, 12, 24 VDC	10 A, 250 VAC (cosφ=1) 85°C	50,000
			10 A, 250 VAC (cosφ=1) 40°C	100,000
			10 A, 24 VDC (L/R=0 ms) 85°C	50,000
G2RL-2A (-HA, -PW1) G2RL-2 (-HA, -PW1)	DPST-NO (2a) DPDT (2c)	5, 12, 24, 48 VDC	8 A, 250 VAC (cosφ=1) 85°C	30,000
			8 A, 30 VDC (L/R=0 ms) 85°C	15,000
G2RL-2(-HA, -PW1) G2RL-2-ASI	DPST-NO (2a) DPDT (2c)	5, 12, 24, 48 VDC	AC15: 1.5 A at 240VAC at room temperature	6,000
			DC13: 2 A at 30 VDC, 50ms at room temperature	
G2RL-2-ASI	DPDT (2c)	5, 12, 24, 48 VDC	8 A, 250V AC (Resistive) 85°C	15,000
			8 A, 30V DC (Resistive) 85°C	15,000

CQC Certified  (Certificate No. CQC17002171904)

Model	Contact form	Coil ratings	Contact ratings	Number of test operations
G2RL-1A(-PW1)	SPST-NO (1a)	5 to 48 VDC	12 A, 250 VAC (cosφ=1) at room temperature	50,000
G2RL-1(-HA, -PW1)	SPDT (1c)		12 A, 24 VDC (L/R=0 ms) at room temperature	30,000
G2RL-1A-E(-ASI, -HA, -PW1) G2RL-1A-E-CV(-HA)	SPST-NO (1a)	5 to 48 VDC	12 A, 250 VAC (cosφ=1) at room temperature	50,000
			12 A, 24 VDC (L/R=0 ms) at room temperature	30,000
G2RL-1-E(-ASI, -HA, -PW1)	SPDT (1c)	5 to 48 VDC	16 A, 250 VAC (cosφ=1) at room temperature	30,000
			16 A, 24 VDC (L/R=0 ms) at room temperature	30,000
G2RL-2A (4)(-HA, -PW1)	DPST-NO (2a)	5 to 48 VDC	16 A, 250 VAC (cosφ=1) at room temperature	30,000
			16 A, 24 VDC (L/R=0 ms) at room temperature	30,000
G2RL-2(-ASI, -HA, -PW1)	DPDT (2c)	5 to 48 VDC	8 A, 250 VAC (cosφ=1) at room temperature	30,000
			8 A, 30 VDC (L/R=0 ms) at room temperature	30,000
G2RL-2(-ASI, -HA, -PW1)	DPDT (2c)	5 to 48 VDC	3 A, 250 VAC (cosφ=1) at room temperature	30,000
			3 A, 30 VDC (L/R=0 ms) at room temperature	30,000

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 / Sealed)
Rated voltage system	250 V / 400 V (Flux protection)
Over voltage category	III
Category of protection according to IEC 61810-1	RT II (Flux protection) / RT III (Sealed)
Glow wire according to IEC 60335-1	<HA Models only> GWT 750°C min. (IEC 60695-2-11) / GWF1 850°C min. (IEC 60695-2-12)
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 Position Compared to G2R Model

- Although the G2RL model and the G2R model are both low profile relays, their characteristics such as switching capacity are different. Be sure to check operation under the actual operating conditions before use.

#### ● Cleaning

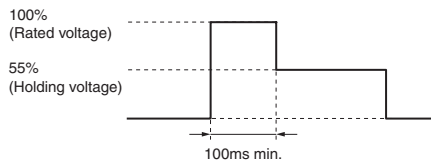
- The G2RL model is flux-resistant with two sealing holes on the case. Thus, do not clean the relay by boiling or soaking in water. Consult your Omron sales representative for sealed type relay.

#### ● Using Relays in an Atmosphere Containing Corrosive Gas

- Do not use relays in an atmosphere containing corrosive gas (sulfuric or organic gas). Otherwise, connection failure due to corrosion on the contact surface may lead to functional faults.

#### ● Coil Voltage Reduction (Holding Voltage) after Relay Operation

- If the coil voltage is reduced to the holding voltage after relay operation, first apply the rated voltage to the coil for at least 100 ms, as shown below.
- A voltage of at least 55% of the rated voltage is required for the coil holding voltage. Do not allow voltage fluctuations to cause the coil holding voltage to fall below this level.



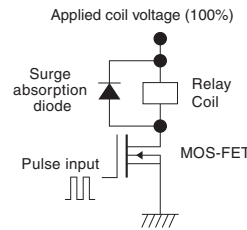
	Applied coil voltage	Coil resistance*	Power consumption
Rated voltage	100%	62.5Ω (5 VDC) 360Ω (12 VDC)	Approx. 400 mW
Holding voltage	55%	1,440Ω (24 VDC)	Approx. 120 mW

\* The coil resistance were measured at a coil temperature of 23°C with tolerances of ± 10%.

#### ● Power consumption reduction of coil with pulse width modulation (PWM)

- Models with PWM drive capability (-PW1) can reduce coil holding current with PWM control. This function reduces power consumption by reducing the current held by coil.
- Apply the rated voltage for at least 100 ms at the time of relay operation.
- The following are our verification conditions. When using, it be sure to check the actual machine under the actual usage conditions.

#### ■ Example of drive circuit



#### ■ Conditions of validation carried out by OMRON

- Applied voltage: rated voltage
- Duty: 60% or more
- Frequency: 10 kHz or more
- Diode Vf: 0.4 V or less

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Electronic and Mechanical Components Company

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