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



■Application Examples

- Home appliances
- OA equipment
- Industrial machinery

■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

■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
					G2RL-1A-PW1	5, 12, 24 VDC	
				Sealed	G2RL-1A4	5, 12, 24, 48 VDC	
			SPDT (1c)	Flux protection	G2RL-1		
					G2RL-1-PW1	5, 12, 24 VDC	
				Sealed	G2RL-14	5, 12, 24, 48 VDC	
			DPST-NO (2a)	Flux protection	G2RL-2A		
					G2RL-2A-PW1	5, 12, 24 VDC	
				Sealed	G2RL-2A4	5, 12, 24, 48 VDC	
			DPDT (2c)	Flux protection	G2RL-2		
					G2RL-2-ASI		
					G2RL-2-PW1	5, 12, 24 VDC	
				Sealed	G2RL-24	5, 12, 24, 48 VDC	
		High-capacity	SPST-NO (1a)	Flux protection	G2RL-1A-E		
					G2RL-1A-E-ASI		
					G2RL-1A-E-CV	5, 12, 24 VDC	
					G2RL-1A-E-PW1		
				Sealed	G2RL-1A4-E	5, 12, 24, 48 VDC	
			SPDT (1c)	Flux protection	G2RL-1-E		
					G2RL-1-E-ASI		
					G2RL-1-E-PW1	5, 12, 24 VDC	
				Sealed	G2RL-14-E	5, 12, 24, 48 VDC	
		High-sensitivity	SPST-NO (1a)	Flux protection	G2RL-1A-H	5, 12, 24 VDC	
			SPDT (1c)		G2RL-1-H		
	Home Application	Standard	SPDT (1c)		G2RL-1-HA		
			DPST-NO (2a)		G2RL-2A-HA		
			DPDT (2c)		G2RL-2-HA		
		High-capacity	SPST-NO (1a)		G2RL-1A-E-HA		
					G2RL-1A-E-CV-HA		
			SPDT (1c)		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) % of rated voltage	Must release voltage (V) % of rated voltage	Max. voltage (V) % of rated voltage	Power consumption (mW)
Standard, High-capacity 5 VDC	80.0	62.5	70% max.	10% min. 10 to 41%*	130% (at 85°C)	Approx. 400 Approx. 120*
Standard, High-capacity 12 VDC	33.3	360				
Standard, High-capacity 24 VDC	16.7	1,440				
Standard, High-capacity 48 VDC	8.96	5,358				Approx. 430
High-sensitivity 5 VDC	50	96	75% max.	10%		Approx. 250
High-sensitivity 12 VDC	20.8	576				
High-sensitivity 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 / Item / Model	Standard type (resistive load) 1-pole	Standard type (resistive load) 2-pole	High-capacity type (resistive load) 1-pole	High-sensitivity type (resistive load) 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

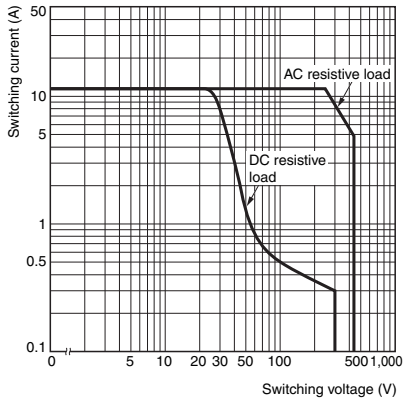
Item \ Classification		Standard type		High-capacity type	High-sensitivity type
Item	Number of poles	1-pole	2-pole	1-pole	
Contact resistance *1		100 mΩ max.			
Operate time		15 ms max.			
Release time		5 ms max.			
Insulation resistance *2		1,000 MΩ min.			
Dielectric strength	Between coil and contacts	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/s²			
	Malfunction	Energized: 100 m/s², De-energized: 100 m/s²			
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.

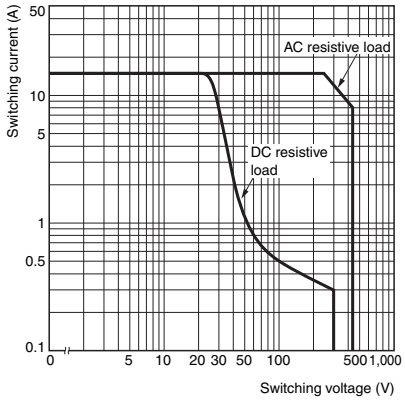
■Engineering Data

●Maximum Switching Capacity

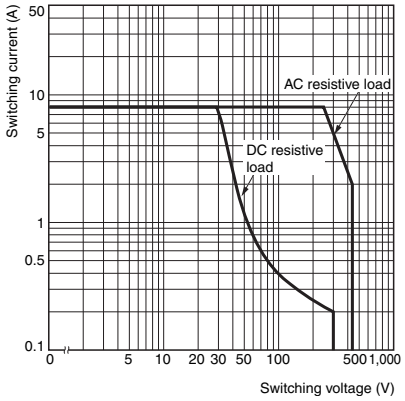
1-pole Standard Type



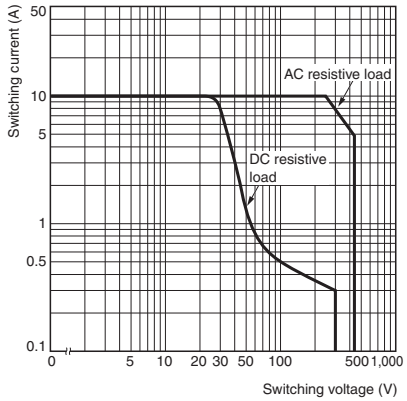
1-pole High-capacity Type



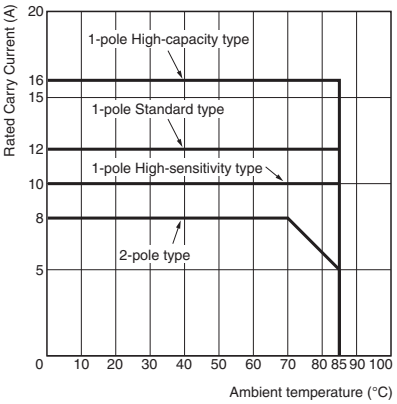
2-pole Type



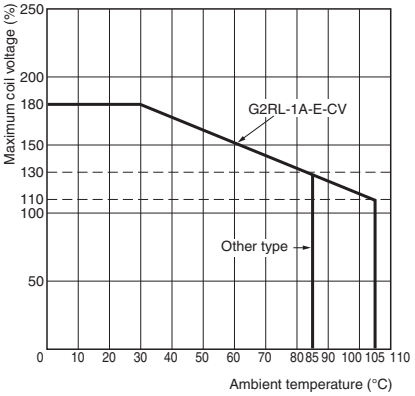
High-sensitibity Type



●Ambient Temperature vs. Rated Carry Current

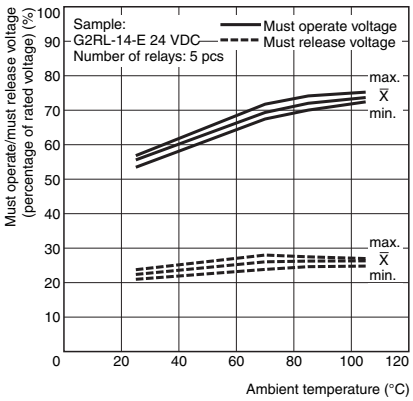


●Ambient Temperature vs. Maximum Coil Voltage



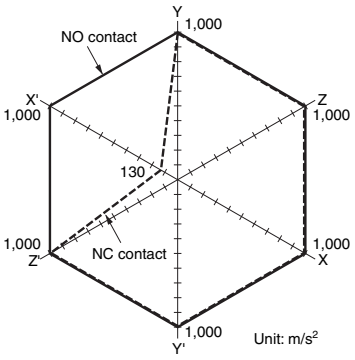
Note. The maximum coil voltage refers to the maximum value in a varying range of operating power voltage, not a continuous voltage.

●Ambient Temperature vs. Must Operate and Must Release Voltages

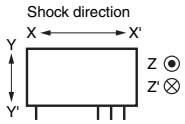


●Shock Malfunction

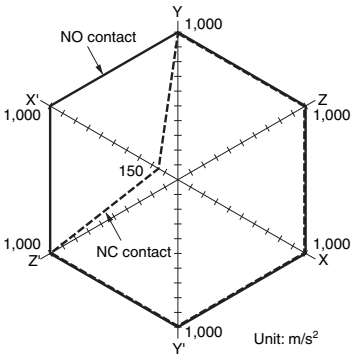
1-pole type



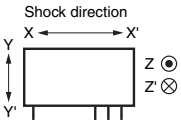
Sample: G2RL-14 12 VDC
Number of relays: 5 pcs
Test conditions: Shock is applied in ±X, ±Y, and ±Z directions three times each with without energizing the relays to check the number of malfunctions.
Requirement: None malfuction
100 m/s²



2-pole type



Sample: G2RL-24 12 VDC
Number of relays: 5 pcs
Test conditions: Shock is applied in ±X, ±Y, and ±Z directions three times each with without energizing the Relays to check the number of malfunctions.
Requirement: None malfuction
100 m/s²



■Electrical Endurance Data (Reference Value)

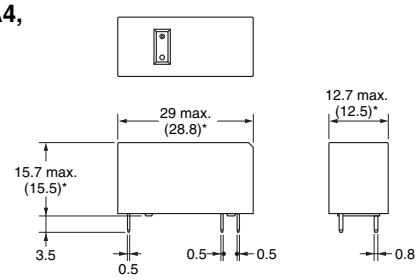
G2RL-1-E	8 A 250 VAC (cosϕ=0.4) 8 A 30 VDC (L/R=7 ms)	200,000 operation min. (NO) 10,000 operation min. (NO)
G2RL-1	5 A 250 VAC (cosϕ=0.4) 5 A 30 VDC (L/R=7 ms)	150,000 operation min. (NO) 10,000 operation min. (NO)
G2RL-2	8 A 250 VAC (cosϕ=1) 8 A 30 VDC	30,000 operation min. 10,000 operation min.
G2RL-1A-E	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)

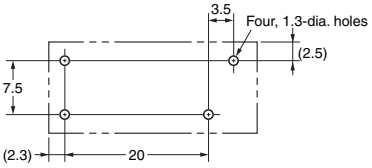
G2RL-1A(-PW1), G2RL-1A4, G2RL-1A-H





* Average value

PCB Mounting Holes
(Bottom View)

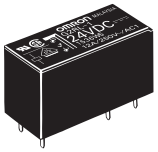


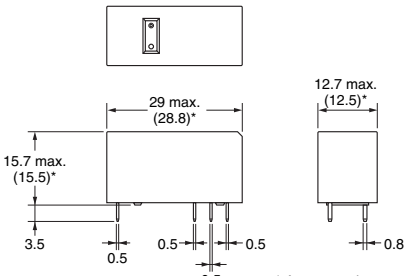
Terminal Arrangement/ Internal Connections
(Bottom View)



(No coil polarity)

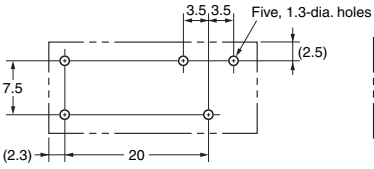
G2RL-1(-PW1), G2RL-14, G2RL-1-H, G2RL-1-HA



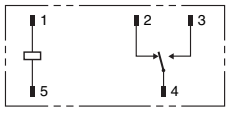


* Average value

PCB Mounting Holes
(Bottom View)

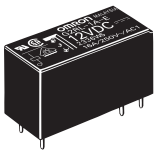


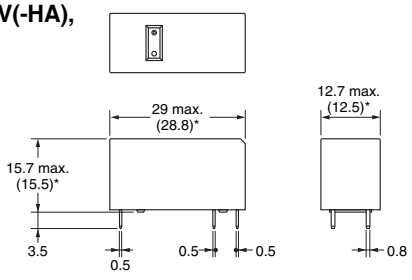
Terminal Arrangement/ Internal Connections
(Bottom View)



(No coil polarity)

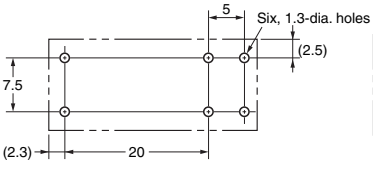
G2RL-1A-E(-HA, -PW1), G2RL-1A4-E, G2RL-1A-E-CV(-HA), G2RL-1A-E-ASI



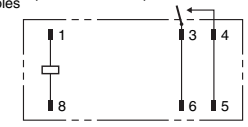


* Average value

PCB Mounting Holes
(Bottom View)

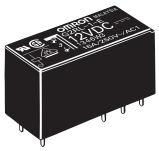


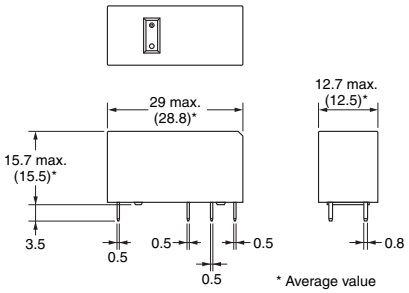
Terminal Arrangement/ Internal Connections
(Bottom View)



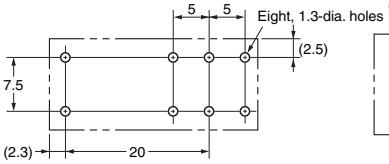
(No coil polarity)

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

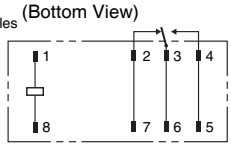




PCB Mounting Holes
(Bottom View)



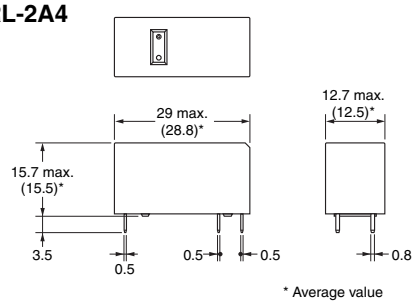
Terminal Arrangement/ Internal Connections
(Bottom View)



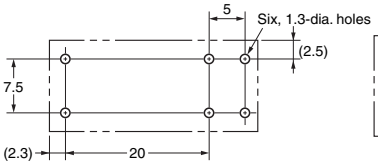
(No coil polarity)

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





PCB Mounting Holes
(Bottom View)

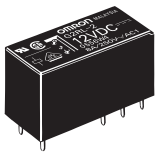


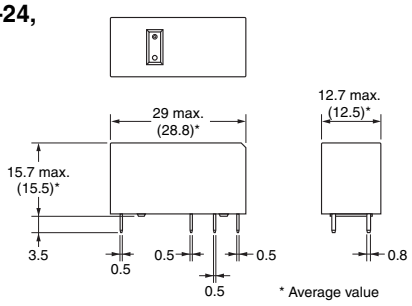
Terminal Arrangement/ Internal Connections
(Bottom View)



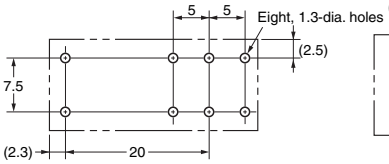
(No coil polarity)

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

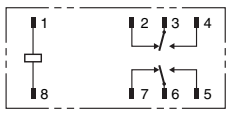




PCB Mounting Holes
(Bottom View)



Terminal Arrangement/ Internal Connections
(Bottom View)



(No coil polarity)

G2RL

■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) G2RL-1(-HA, -PW1)	SPST-NO (1a) SPDT (1c)	3 to 48 VDC	12 A, 250 VAC (General Use) 40°C	100,000
			12 A, 24 VDC (Resistive) 40°C	50,000
G2RL-1A-E(-HA, -PW1) G2RL-1-E(-HA, -PW1)	SPST-NO (1a) SPDT (1c)	3 to 48 VDC	16 A, 250 VAC (General Use) 40°C	100,000
			16 A, 24 VDC (Resistive) 40°C	50,000
G2RL-1A-E-ASI G2RL-1-E-ASI	SPST-NO (1a) SPDT (1c)	3 to 48 VDC	16 A, 250 VAC (Resistive) 85°C	30,000
			TV-3 40°C	25,000
G2RL-1A-E-CV(-HA)	SPST-NO (1a)	3 to 48 VDC	16 A, 250 VAC (Resistive) 105°C	100,000
G2RL-1A-H G2RL-1-H	SPST-NO (1a) SPDT (1c)	3 to 48 VDC	10 A, 250 VAC (General Use) 40°C	50,000
			10 A, 24 VDC (Resistive) 40°C	
G2RL-2A(-HA, -PW1) G2RL-2(-HA, -PW1)	DPST-NO (2a) DPDT (2c)	3 to 48 VDC	8 A, 277 VAC (General Use) 40°C 8 A, 30 VDC (Resistive) 40°C	100,000
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 12 A, 24 VDC (L/R=0 ms) 85°C	100,000
			AC15: 3 A at 240 VAC at room temperature DC13: 2.5 A at 24 VDC, 50ms at room temperature	6,000
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
			AC15: 3 A at 240 VAC (NO) at room temperature, 1.5 A at 240V AC (NC) at room temperature DC13: 2.5 A at 24 VDC (NO), 50ms at room temperature	6,000
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)	DPST-NO (2a)	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)	DPDT (2c)		AC15: 1.5 A at 240VAC at room temperature DC13: 2 A at 30 VDC, 50ms at room temperature	6,000
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
			12 A, 24 VDC (L/R=0 ms) at room temperature	30,000
G2RL-1(-HA, -PW1)	SPDT (1c)		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-1A-E(-ASI, -HA, -PW1) G2RL-1A-E-CV(-HA)	SPST-NO (1a)	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-1-E(-ASI,-HA, -PW1)	SPDT (1c)		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	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)		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 open contact circuit	Reinforced 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) / GWFI 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.

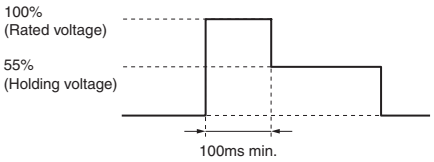
● Using Relays in an Atmosphere Containing Corrosive Gas

• 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) 1,440Ω (24 VDC)	Approx. 400 mW
Holding voltage	55%		Approx. 120 mW

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

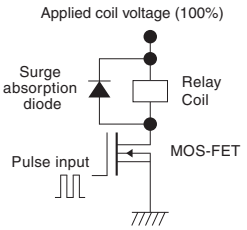
●Power consumption reduction of coil with pulse width modulation (PWM)

• 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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