

# General-purpose, Low-cost, **Two-pole Relays for Signal Circults**

- General-purpose DIL terminal layout.
- Wide switching power of 10 μA to 2 A.
- · Fully-sealed type Relays standardized with bifurcated crossbar contacts. Highly reliable in addition to its high environment resistance.
- Conforms to FCC Part 68 (impulse withstand voltage of 1,500 V for 10 x 160 µs between coil and contacts and between contacts of the same polarity).
- High dielectric strength at 1,000 VAC between coil and contacts, and 750 VAC between contacts of the same polarity.
- UL and CSA standard approved.

#### **RoHS Compliant**

2 1

## Model Number Legend

G5V-□-□

1. Number of Poles/ Contact form 2: 2-pole/DPDT (2c)

- 2. Classification None: Standard
- H1: High-sensitivity

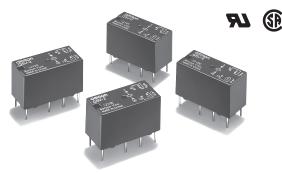
## Ordering Information

Classification	Enclosure rating	Contact form	Terminal shape	Model	Rated coil voltage	Minimum packing unit	
Standard					3 VDC	-	
					5 VDC		
					6 VDC		
			202	G5V-2	9 VDC		
					12 VDC		
	Fully sealed	DPDT (2c)	PCB terminals		24 VDC	25 pcs/tube	
	Sealeu	(20)	leminais		48 VDC	pcs/tube	
High- sensitivity						5 VDC	1
				G5V-2-H1	12 VDC	-	
					24 VDC		
					48 VDC		

Note: When ordering, add the rated coil voltage to the model number. Example: G5V-2 DC3.

Rated coil voltage

However, the notation of the coil voltage on the product case as well as on the packing will be marked as  $\Box\Box$  VDC.



# ■Application Examples

- Telecommunication equipment
- Security equipment

# Characteristics

Item	Classification	Standard	High-sensitivity	
Contact res	istance *1	50 m $\Omega$ max.	100 m $\Omega$ max.	
Operate tim	ne	7 ms max.		
Release tim		3 ms max.		
Insulation r	esistance *2	1,000 MΩ min. (at 500 VDC)		
	Between coil and contacts	1,000 VAC, 50/60 Hz for 1 min		
Dielectric strength	Between contacts of the same polarity	750 VAC, 50/60 Hz for 1 min	500 VAC, 50/60 Hz for 1 min	
	Between contacts of different polarity	1,000 VAC, 50/60 Hz for 1 min		
	Between coil and contacts	1,500 V	(10 x 160 μs)	
Impulse withstand voltage	Between contacts of the same polarity	1,500 V (10 x 160 μs)		
voltage	Between contacts of different polarity	1,500 V (10 x 160 μs)		
Vibration	Destruction	10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude)		
resistance	Malfunction	10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude)		
Shock	Destruction	1,000 m/s <sup>2</sup>		
resistance	Malfunction	200 m/s <sup>2</sup>	100 m/s <sup>2</sup>	
	Mechanical	15,000,000 operations min. (at 36,000 operations/hr)		
Durability	Electrical	100,000 operations min. (at 1,800 operations/hr)	AC: 100,000 operations min., DC: 300,000 operations min. (at 1,800 operations/hr	
Failure rate (P level) (reference value) *3		10 μA at 10 m VDC		
Ambient op	erating temperature	-25°C to 65°C (with no icing or condensation)	-25°C to 70°C (with no icing or condensation)	
Ambient op	erating humidity	5% to 85%		
Weight		Approx. 5 g		

Note: The above values are initial values. \*1. The contact resistance was measured The contact resistance was measured with 10 mA at 1 VDC with a voltage drop method.

\*2.

The insulation resistance was measured with a 500 VDC megohmmeter applied to the same parts as those used for checking the dielectric strength. This value was measured at a switching frequency of 120 operations/min and the criterion of contact resistance is 50  $\Omega$ . This value may vary \*3.

depending on the switching frequency and operating environment. Always double-check relay suitability under actual operating conditions.

# G5V-2

# ■Ratings

●Coil								
Classification	Rated voltage	Rated current (mA)	Coil resistance (Ω)	voltage (V)	Must release voltage (V) f rated v	Max. voltage (V) roltage	Power consumption (mW)	
	3 VDC	166.7	18	75% max.	5% min.	120% (at 23°C)		
	5 VDC	100	50					
	6 VDC	83.3	72				Approx. 500	
	9 VDC	55.6	162				Approx. 500	
	12 VDC	41.7	288					
	24 VDC	20.8	1,152					
	48 VDC	12	4,000				Approx. 580	
sensitivity	5 VDC	30	166.7	75% max.	5%	180% (at 23°C)	Approx. 150	
	12 VDC	12.5	960				Approx. 150	
	24 VDC	8.33	2,880			min.	(ui 20 0)	Approx. 200
	48 VDC	6.25	7,680				150% (at 23°C)	Approx. 300

Note 1. The rated current and coil resistance are measured at a coil

temperature of 23°C with a tolerance of ±10%.

 Operating characteristics are measured at a coil temperature of 23°C.
The maximum voltage is the highest voltage that can be imposed on the relay coil.

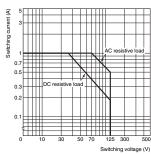
# ■Engineering Data

#### Maximum Switching Capacity Standard/G5V-2



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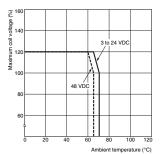
## High-sensitivity/G5V-2-H1



#### ●Ambient Temperature vs. Maximum Coil Voltage Standard/G5V-2 High-sensitivity/G5V-2-H1

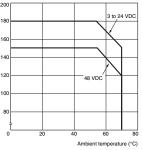
oltage

oltage (V)



50 10

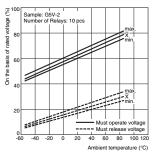
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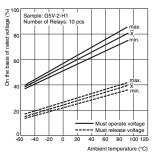
Note: The maximum coil voltage refers to the maximum value in a varying range of operating power voltage, not a continuous voltage.

# •Ambient Temperature vs. Must Operate or Must Release Voltage

# Standard/G5V-2



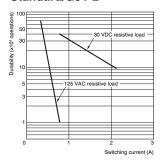
#### High-sensitivity/G5V-2-H1



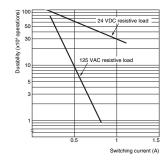
#### Contacts

Contacts					
Classification	Standard	High-sensitivity			
Load	Resistive load				
Contact type	Bifurcated crossbar				
Contact material	Ag + Au-alloy				
Rated load	0.5 A at 125 VAC; 2 A at 30 VDC	0.5 A at 125 VAC; 1 A at 24 VDC			
Rated carry current	2 A				
Max. switching voltage	125 VAC, 125 VDC				
Max. switching current	2 A	1 A			

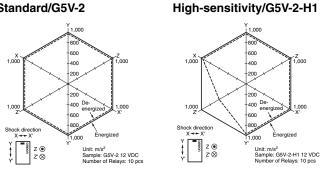
#### Durability Standard/G5V-2



#### High-sensitivity/G5V-2-H1



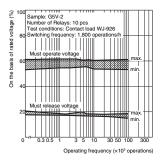
#### Shock Malfunction Standard/G5V-2



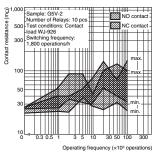
Conditions: Shock is applied in  $\pm X$ ,  $\pm Y$ , and  $\pm Z$  directions three times each with and without energizing the Relays to check the number of contact malfunctions.

# G5V-2

#### Dial Pulse Test (with Must Operate and Must Release Voltage) \*1 Standard/G5V-2



#### Dial Pulse Test (Contact Resistance) \*1



#### Contact Reliability Test \*1, \*2 Standard/G5V-2

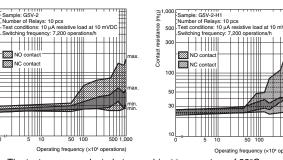
500

300

\*1.

High-frequency Characteristics

### High-sensitivity/G5V-2-H1



The tests were conducted at an ambient temperature of 23°C. The contact resistance data are periodically measured reference values \*2. and are not values from each monitoring operation. Contact resistance values will vary according to the switching frequency and operating environment, so be sure to check operation under the actual operating conditions before use.

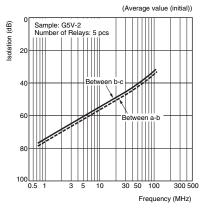
#### High-frequency Characteristics

• Measurement Conditions

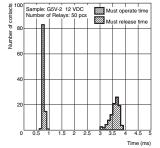
		G5V-2
HR 8502A Network analyzer B Storage normalizer B	HR 8502A Transmission reflection test-set	Terminator

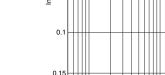
Terminals which were not being measured were terminated with 50  $\Omega.$  Measuring impedance: 50  $\Omega$ 

#### High-frequency Characteristics (Isolation) \*1, \*2



Must Operate and Must **Release Time Distribution \*1** Standard/G5V-2





loss (dB)

Sertion

0.2

Distribution of Bounce

. G5V-

12 VDC Number of Relays: 50 pcs

Time \*1

Jumber

0.5

Operating bounce tim

(Insertion Loss) \*1, \*2

Note: The high-frequency characteristics data were measured using a dedicated circuit board and actual values will vary depending on the usage conditions. Check the characteristics of the actual equipment being used.

# Sample: G5V-2 Number of Relays: 5 pcs 3 5 50 30 100 Frequency (MHz)

Must Operate and Must

High-sensitivity/G5V-2-H1

**Release Time Distribution \*1** 

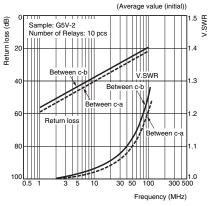
Must operate time

Time (me

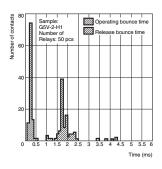
Mus

(Average value (initial))

High-frequency Characteristics (Return Loss, V.SWR) \*1, \*2



#### Distribution of Bounce Time \*1



The tests were conducted at an ambient temperature of 23°C.

\*2. High-frequency characteristics depend on the PCB to which the Relay is mounted. Always check these characteristics, including endurance, in the actual machine before use.

Time (ms)

oto

# G 5 V-2



(Bottom View)

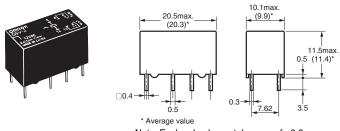
13 L

(No coil polarity)

4 6 6

# Dimensions

#### G5V-2



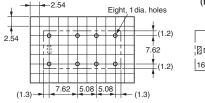
Note: Each value has a tolerance of ±0.3 mm.

# Approved Standards

#### UL recognized: 💫 (File No. E41515) CSA certified: (File No. LR31928)

Contact		Coil	Contac	Number of	
Model	form	ratings	G5V-2	G5V-2-H1	test operations
G5V-2	DPDT (2c)		2 A, 30 VDC at 40°C 0.6 A, 110 VDC at 40°C 0.6 A, 125 VAC at 40°C		

PCB Mounting Holes (Bottom View) Terminal Arrangement/ Internal Connections Tolerance: ±0.1 mm



Orientation marks are indicated as follows:

## Precautions

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

#### Correct Use

#### Long-term Continuously ON Contacts

Using the Relay in a circuit where the Relay will be ON continuously for long periods (without switching) can lead to unstable contacts because the heat generated by the coil itself will affect the insulation, causing a film to develop on the contact surfaces. Be sure to use a fail-safe circuit design that provides protection against contact failure or coil burnout.

#### • Relay Handling

When washing the product after soldering the Relay to a PCB, use a water-based solvent or alcohol-based solvent, and keep the solvent temperature to less than 40°C. Do not put the Relay in a cold cleaning bath immediately after soldering.

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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