

# Miniature Power PCB Relay for Automotive and DC 12 V Applications

# G8NB Relay

## Standard Low Load Relay for Motor/Resistance Control Applications

- 30 A Switching Current
- Mid-sized 30 A Fuse
- Twin type (2 relays in 1 case) is available.
- Pin in paste reflow compliant relay
- Temperature range -40°C to +125°C



## Model Number Legend

G8NB-□□□□  
1 2 3 4

### 1. Number of Contact Poles/Structure

- 1: SPDT (1 Form C)
- 2: SPDT × 2 (1 Form C × 2)

### 2. Protective structure

- Blank: Plastic sealed (RT III IEC61810)
- 7 : Flux tight (Open vent hole) (RT II IEC61810)

### 3. Characteristics

- Blank: Standard
- S : Low operating voltage
- U : Ultralow operating voltage

### 4. Special function

- Blank: Standard
- R : Pin in paste compliant type

## Application Examples

- DC motor/resistive application control
- Automotive DC applications (Door lock, Power window, Wiper, Washer, Sunroof, etc.)

## Ordering Information (For the shipment time & other information, please inquire the local distributor)

Classification	Contact form	Protective structure	Rated coil		Model	Characteristics	Minimum Packing unit (Tube packing)
			Voltage (V)	Resistance (Ω)			
Single	SPDT (1 Form C)	Plastic sealed (RT III IEC61810)	DC12	225	<b>G8NB-1 DC12</b>	Standard	<b>Tube</b> 2,700 pcs. / box (75 pcs. × 36 tubes)
				180	<b>G8NB-1S DC12</b>	Low operating voltage	
				130	<b>G8NB-1U DC12</b>	Ultralow operating voltage	
		Flux tight (open vent hole) (RT II IEC61810)		225	<b>G8NB-17R DC12</b>	Standard	
				180	<b>G8NB-17SR DC12</b>	Low operating voltage	
				130	<b>G8NB-17UR DC12</b>	Ultralow operating voltage	
Twin	SPDT × 2 (1 Form C × 2)	Plastic sealed (RT III IEC61810)	DC12	225	<b>G8NB-2 DC12</b>	Standard	<b>Tube</b> 1,260 pcs. / box (35 pcs. × 36 tubes)
				180	<b>G8NB-2S DC12</b>	Low operating voltage	
				130	<b>G8NB-2U DC12</b>	Ultralow operating voltage	
		Flux tight (open vent hole) (RT II IEC61810)		225	<b>G8NB-27R DC12</b>	Standard	
				180	<b>G8NB-27SR DC12</b>	Low operating voltage	
				130	<b>G8NB-27UR DC12</b>	Ultralow operating voltage	

**Note.** Above models are not certificated for the safety standards of UL or CSA, etc.

## ■ Ratings

### ● Coil

Rated voltage (V)	Rated current (mA)	Coil resistance (Ω)	Must-operate voltage (V)	Must-release voltage (V)	Permissible voltage Range (V)	Rated Power consumption (mW)	Model	
							Single	Twin
DC12	53.3	225	7.2 Max.	1.0 Min.	10 to 16	640	<b>G8NB-1 DC12</b>	<b>G8NB-2 DC12</b>
							<b>G8NB-17R DC12</b>	<b>G8NB-27R DC12</b>
	66.7	180	6.5 Max.	0.8 Min.		800	<b>G8NB-1S DC12</b>	<b>G8NB-2S DC12</b>
							<b>G8NB-17SR DC12</b>	<b>G8NB-27SR DC12</b>
	92.3	130	5.5 Max.	0.8 Min.		1108	<b>G8NB-1U DC12</b>	<b>G8NB-2U DC12</b>
							<b>G8NB-17UR DC12</b>	<b>G8NB-27UR DC12</b>

**Note 1.** The rated current and coil resistance are measured at a coil temperature of 20°C with a tolerance of ±10%.

**Note 2.** The operating characteristics are measured at a coil temperature of 20°C.

### ● Contacts

Item	Classification Model	Standard		Low operating voltage		Ultralow operating voltage	
		<b>G8NB-17R DC12</b> <b>G8NB-27R DC12</b>	<b>G8NB-1 DC12</b> <b>G8NB-2 DC12</b>	<b>G8NB-17SR DC12</b> <b>G8NB-27SR DC12</b>	<b>G8NB-1S DC12</b> <b>G8NB-2S DC12</b>	<b>G8NB-17UR DC12</b> <b>G8NB-27UR DC12</b>	<b>G8NB-1U DC12</b> <b>G8NB-2U DC12</b>
Contact material		Ag-alloy (Cd-free)					
Rated carry current (N.O.)	at 20°C	5 A, DC14 V, Continuous/ 25 A, DC14 V, 30 mins	5 A, DC14 V, Continuous/ 25 A, DC14 V, 30 mins	5 A, DC14 V, Continuous/ 25 A, DC14 V, 30mins	5 A, DC14 V, Continuous/ 25 A, DC14 V, 30 mins	5 A, DC14 V, Continuous/ 25 A, DC14 V, 30 mins	5 A, DC14 V, Continuous/ 25 A, DC14 V, 30 mins
	at 105°C	5 A, DC14 V, Continuous/ 25 A, DC14 V, 30 mins	5 A, DC14 V, Continuous/ 25 A, DC14 V, 30 mins	5 A, DC14 V, Continuous/ 25 A, DC14 V, 30 mins	5 A, DC14 V, Continuous/ 25 A, DC14 V, 30 mins	5 A, DC14 V, Continuous/ 25 A, DC14 V, 30 mins	5 A, DC14 V, Continuous/ 25 A, DC14 V, 30 mins
	at 125°C	5 A, DC14 V, Continuous/ 25 A, DC14 V, 30 mins	-				
Max. switching current (N.O.)		30 A					
Min. switching current (N.O.)		DC12 V, 1A					

## ■ Characteristics

Item		Standard value	
		Single	Twin
Contact resistance (See *1.)		Typ. 5 mΩ max. 50 mΩ	
Operate time		10 ms max. (DC12V not including bounce time)	
Release time		5 ms max. (DC12V not including bounce time)	
Insulation resistance (See *2.)	Between coil and contacts	100 MΩ min.	
	Between contacts of the same polarity	100 MΩ min.	
Dielectric strength	Between coil and contacts	AC500V 1 min	
	Between contacts of the same polarity	AC500V 1 min	
Vibration resistance	Destruction	33 Hz, 45 m/s <sup>2</sup>	
	Malfunction	10 to 400 Hz, 45 m/s <sup>2</sup> (detection time: 10 μs)	
Shock resistance	Destruction	1,000 m/s <sup>2</sup> (pulse duration: 6 ms)	
	Malfunction	100 m/s <sup>2</sup> (pulse duration: 11 ms detection time: 10 μs)	
Mechanical endurance (See *3.)		1,000,000 ops. min.	
Electrical endurance (See *4.)	Resistive load	5 A DC14V, 1.0s ON/1.0s OFF, 100,000 ops	
	Lamp Load	50 A Inrush / 5 A Steady DC14V, 1.0s ON/9.0s OFF, 100,000 ops	
	Motor Load	25 A DC14V, 0.2s ON/9.8s OFF, 100k ops	
Ambient operating temperature (See *5.)		-40 to 125°C (without freezing or condensation)	
Ambient operating humidity		35% to 85% RH	
Weight		Approx. 4.0 g	Approx. 8.0 g

**Note.** The above values are initial values at an ambient temperature of +20°C unless otherwise specified.

\*1. The contact resistance was measured with 1 A at DC5V

\*2. The insulation resistance was measured with a DC500V megohmmeter.

\*3. The mechanical endurance was measured at a switching frequency of 18,000 operations/hr.

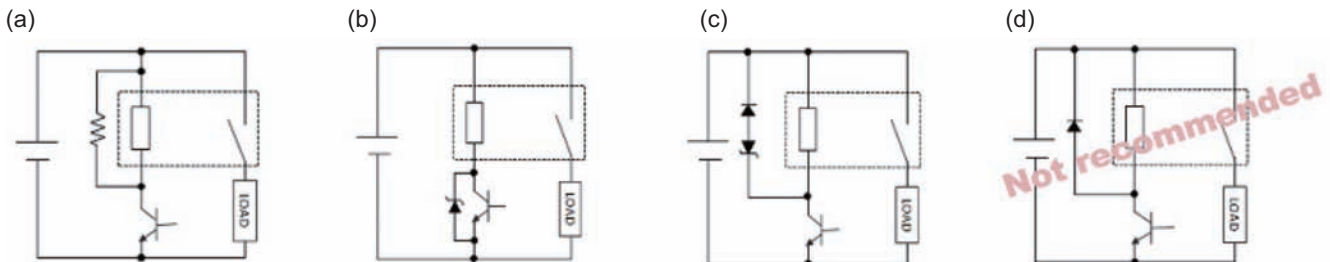
\*4. Please connect N.O. terminal to the +BATT side on Electrical use and connect surge suppression element in parallel with between coil based on recommended circuit.

Recommended circuit: (a), (b), (c)

Not-recommended circuit: (d)

Note:

OMRON recommends coil driver circuit (b) and (c) for coil surge suppression. However the circuit (d) is not recommended because it may negatively affect the durability performance.



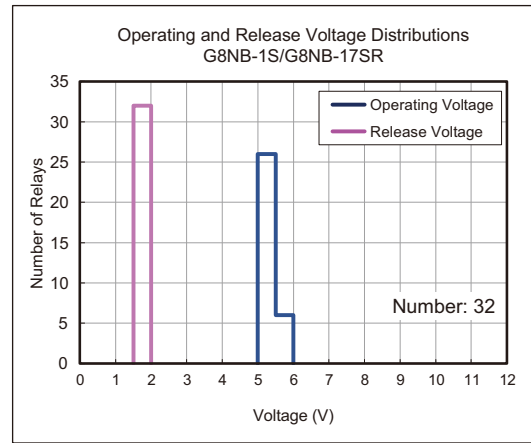
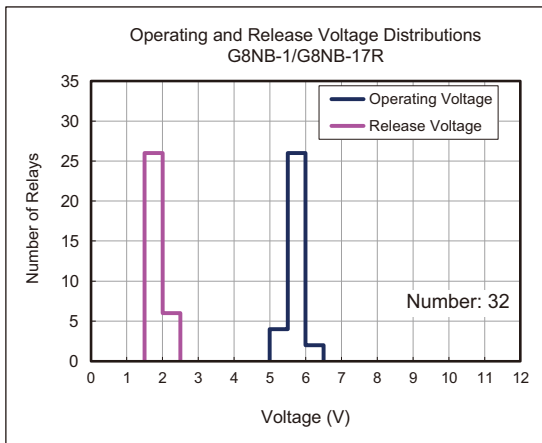
\*5. G8NB-17R/27R supports the current-carrying under 125°C, G8NB-1/1S/1U/17SR/17UR, G8NB-2/2S/2U/27SR/27UR supports until 105°C. Please refer to the condition of carrying current and derating curve if using under the maximum ambient temperature.

**Reference Technical Data** (The data shown below are reference values and are not guaranteed.)

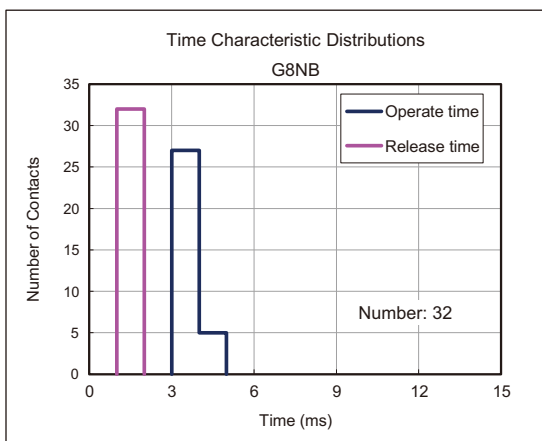
● **Actual Electrical performance (reference)**

Model	Application	Load voltage	Inrush	Steady state	Switching off	Inductance	Ambient temperature	Switching frequency		Required cycles (Min.)
		(V)	(A)	(A)	(A)			(mH)	(°C)	On (s)
G8NB-1S DC12	Battery saver	14.0	54	8.6	-	-	-40 to 85	2.0	13.0	180,000
G8NB-1S DC12	Sterring Lock	14.0	-	-	11	-	-40 to 105	1.0	2.0	800,000
G8NB-1S DC12	Rear Wiper	14.0	15	3.2	20	-	-40 to 85	5.0	5.0	250,000
G8NB-17R DC12	Engine Cooling Pump	14.0	8	-	3	1	-40 to 125	2.0	2.0	700,000
G8NB-17R DC12	HID Headlamps	14.5	100	-	10	-	-40 to 125	2.0	2.0	100,000
G8NB-17R DC12	WIPER	13.5	20.7	1.4	-	-	-40 to 125	0.7	3.3	1,000,000
G8NB-17R DC12	HORN	14.5	13.8	11.3	-	-	-40 to 125	1.0	3.0	1,000,000
G8NB-17R DC12	HORN	14.5	38	-	19	-	-40 to 125	2.0	2.0	97,000

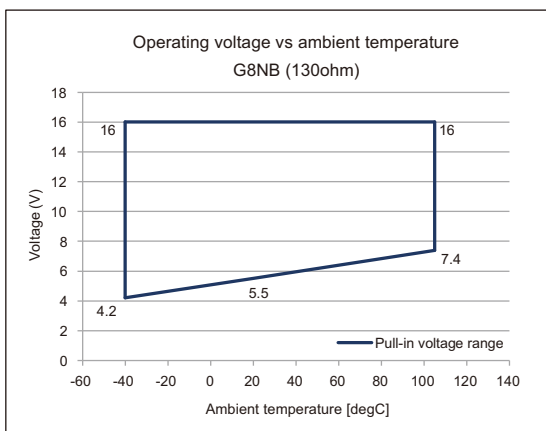
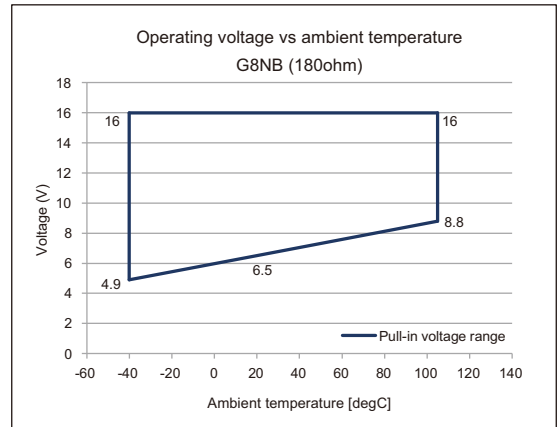
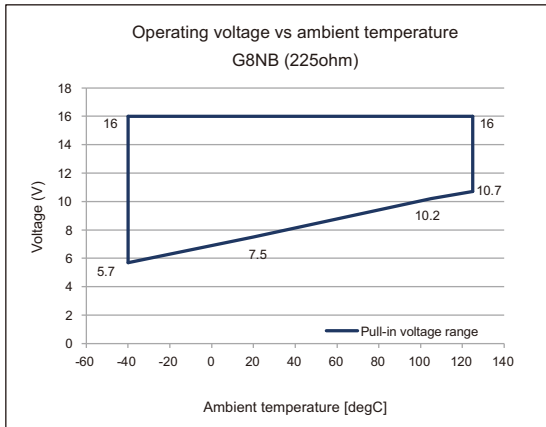
● **Operating Voltage and Release Voltage Distributions (Number of Relays x Voltage)**



● **Time Characteristic Distributions (Number of Contacts x Time (ms))**

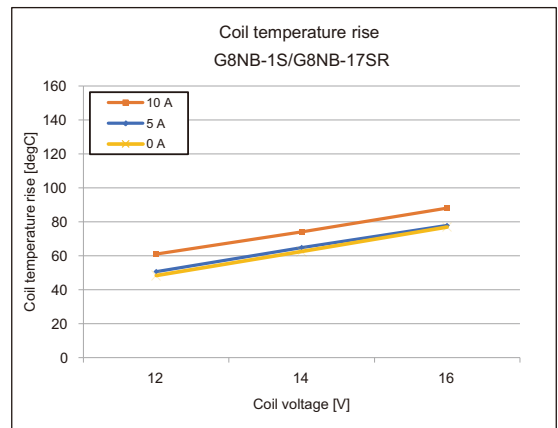
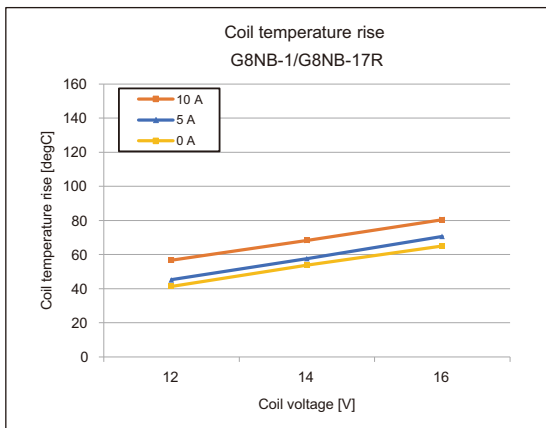


● Operating voltage vs ambient temperature (Cold start)

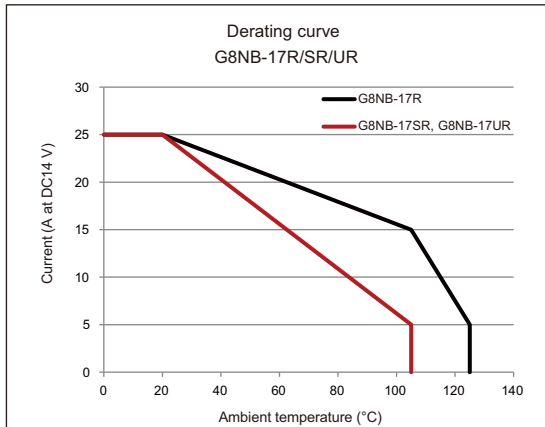


● Coil temperature rise [degC] at 20°C

(For using under a higher ambient temperature, please select the proper current carrying condition to avoid a possible excessive temperature rising.)



● Derating curve



Item	Classification Model	Standard		Low operating voltage		Ultralow operating voltage	
		G8NB-17R DC12 G8NB-27R DC12	G8NB-1 DC12 G8NB-2 DC12	G8NB-17SR DC12 G8NB-27SR DC12	G8NB-1S DC12 G8NB-2S DC12	G8NB-17UR DC12 G8NB-27UR DC12	G8NB-1U DC12 G8NB-2U DC12
Max. carry current (N.O.) *1	at 20°C	25 A, DC14 V, Continuous/ 33.8 A, DC14 V, 1 Hours	10 A, DC14 V, Continuous/ 33.8 A, DC14 V, 1 Hours	25 A, DC14 V, Continuous/ 33.8 A, DC14 V, 1 Hours	10A, DC14 V, Continuous/ 33.8 A, DC14 V, 1 Hours	25 A, DC14 V, Continuous/ 33.8 A, DC14 V, 1 Hours	10 A, DC14 V, Continuous/ 33.8 A, DC14 V, 1 Hours
	at 105°C	15 A, DC14 V, Continuous/ 20.3 A, DC14 V, 1 Hours/ 30 A, DC12 V, 5 mins	20.3 A, DC14 V, 1 Hours/ 30 A, DC12 V, 5 mins	20.3 A, DC14 V, 1 Hours	20.3 A, DC14 V, 1 Hours	13.5 A, DC14 V, 1 Hours	13.5 A, DC14 V, 1 Hours
	at 125°C	14 A, DC14 V, 1 Hours/ 25 A, DC12 V, 5 mins	-				

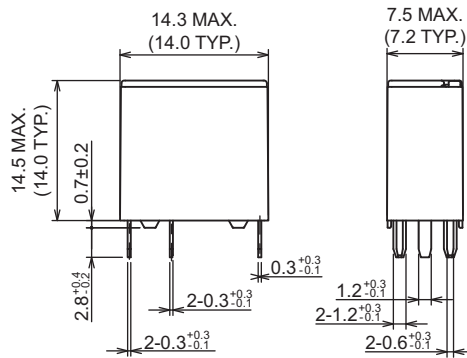
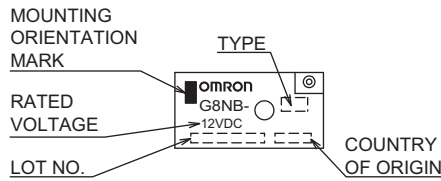
\*1. Measured with reference connection conditions as below,  
 T1.6 mm FR4 epoxy PCB (Double-sided), Trace: T140 um x L50 mm x W3.76 mm, Cable: 2 mm<sup>2</sup>  
 The time limitation doesn't guarantee repeated current carrying. Please confirm the performance with the specific conditions.

■ Dimensions

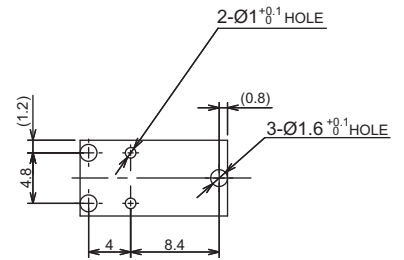
CAD Data Please visit our website, which is noted on the last page.

(Unit: mm)

G8NB Single

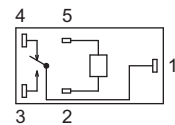


FOR REFERENCE:PCB MOUNTING HOLES (BOTTOM VIEW)



\*Please study & choose other appropriate hole diameters if confirmed the diameter values recommended above don't work with the soldering process.

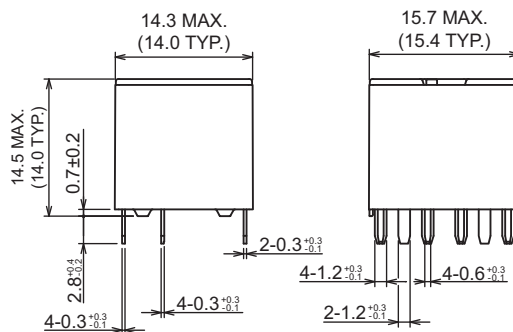
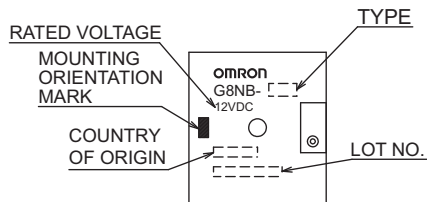
TERMINAL ARRANGEMENT/ INTERNAL CONNECTIONS (BOTTOM VIEW)



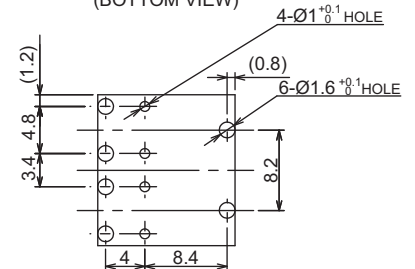
TOLERANCE UNLESS OTHERWISE SPECIFIED  
 LESS THAN 1mm: ±0.1mm  
 1 to 3mm : ±0.2mm  
 3mm OR MORE : ±0.3mm

CAD Data

G8NB Twin

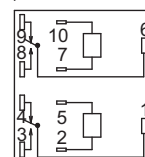


FOR REFERENCE:PCB MOUNTING HOLES (BOTTOM VIEW)



\*Please study & choose other appropriate hole diameters if confirmed the diameter values recommended above don't work with the soldering process.

TERMINAL ARRANGEMENT/ INTERNAL CONNECTIONS (BOTTOM VIEW)



TOLERANCE UNLESS OTHERWISE SPECIFIED  
 LESS THAN 1mm: ±0.1mm  
 1 to 3mm : ±0.2mm  
 3mm OR MORE : ±0.3mm

CAD Data

## ■Precautions

●Please refer to “Safety Precautions for ALL Automotive and DC small power relay” for correct use.

### Precautions for Safe Use

#### ●Notice to ensure safety

- Refer to the specification and confirm that the relay meets the application before using any relay from this catalog.
- Confirm acceptability for safety critical applications by appropriate testing or contact Omron.
- Do not use the relay for loads which exceed the rated values given in the data sheet. Failure to do so may result in unforeseen consequences such as insulation failure, smoking, breakdown of operation, etc.
- Do not apply over-voltage to the relay coil. Do not apply AC power to a DC relay coil. Be careful not to exceed the temperature ratings of the relay.
- Do not make incorrect connections to the relay terminals.
- Endurance (Lifetime) is significantly affected by changes to the load and switching condition. When using the relay, check the relay behavior with an actual product under actual conditions. Use the relay within timing characteristics it can meet according to the data sheet.
- Carry out the proper number of confirmation tests with an actual product for each application or contact Omron.
- A relay is a precision part. Do not apply vibration and shock beyond the specified value. Do not drop the relay. Do not use a relay that has been dropped.
- Do not remove the case of a relay or modify the terminals in any way.
- Do not touch the relay terminal or opposing mating terminal while applying current. Electric shock may occur.
- Do not use a relay under any environment that contains flammable or explosive gas. Fire or an explosion may result.

#### ●When using a relay

- As with all technologies, relays may not always behave as expected. Therefore, evaluation under actual application conditions is always best.
- Each performance rating in this catalog is based on the value under controlled conditions (i.e. temperature, humidity, etc 86 to 106 kPa) unless otherwise specified. Confirm not only load condition but also actual environmental conditions for actual use.
- Reference data in the catalog is based on measurement values from sampling of production. The values are as accurate as possible and believed to be correct at the time of publication. Due to production necessity or other reasons, specifications may change without notice.
- When a relay is used outside the recommended conditions, there is no way for Omron to predict the failure mode or results of the failure. Omron will remain blameless for the results of applying relays outside of the recommended parameters described in this catalog.

### Storage and Usage Environment

When using, storing and transporting relays, avoid direct sunlight and keep normal temperature, humidity and pressure.

- Oxides or sulfurized films may accumulate on the contact surface if the relay is exposed to high temperature and humidity for long periods of time. That could be a root cause of failure like contact defect.
- Condensation may occur inside the relay if the ambient temperature changes sharply from a high temperature and humidity to a lower temperature. Condensation should be avoided because it may cause insulation failure. Furthermore, bluish-green compounds may be generated inside of the relay due to relatively strong arc discharge associated with contact switching at high humidity. Best overall relay performance is attained at low humidity.
- When relays have been stored for a long period of time, it is possible for various oxides to form on the terminals and contacts. Therefore, if such a situation were to occur, it is necessary to evaluate the readiness of relays for use.



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Device & Module Solutions Company

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