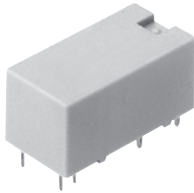




**Compliant with European standards
1a/2a/1a1b 10A/8A
polarized power relays**

DE RELAYS



Protective construction: Sealed type

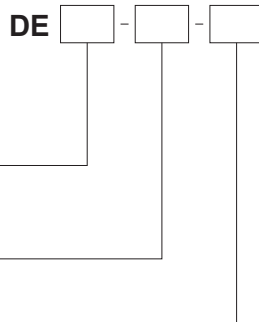
FEATURES

- 1. Conforms to European safety standard (VDE0700 and VDE0631)**
Insulating distance between coil and contacts:
Clearance Min. 8mm .315 inch
Creepage Min. 8mm .315 inch
- 2. Low operating power**
Nominal operating power at 200 mW (Single side stable, 2 coil latching)
- 3. Compact body saves space**
Size: 12.5(W)×25(L)×12.5(H) mm
.492(W)×.984(L)×.492(H) inch
- 4. Conforms to the various safety standards**
UL, C-UL and VDE approved

TYPICAL APPLICATIONS

1. Temperature controller
2. Automatic meter reading
3. OA equipment
4. FA equipment

ORDERING INFORMATION



Contact arrangement
1a: 1 Form A
2a: 2 Form A
1a1b: 1 Form A 1 Form B

Operating function
Nil: Single side stable
L2: 2 coil latching

Nominal coil voltage (DC)
5, 12, 24V

Note: This product is manufactured by lot after an order is received.

TYPES

Contact arrangement	Nominal coil voltage	Part No.	
		Single side stable type	2 coil latching type
1 Form A	5V DC	DE1a-5V	DE1a-L2-5V
	12V DC	DE1a-12V	DE1a-L2-12V
	24V DC	DE1a-24V	DE1a-L2-24V
1 Form A 1 Form B	5V DC	DE1a1b-5V	DE1a1b-L2-5V
	12V DC	DE1a1b-12V	DE1a1b-L2-12V
	24V DC	DE1a1b-24V	DE1a1b-L2-24V
2 Form A	5V DC	DE2a-5V	DE2a-L2-5V
	12V DC	DE2a-12V	DE2a-L2-12V
	24V DC	DE2a-24V	DE2a-L2-24V

Standard packing: Tube package: 20 pcs.; Case: 500 pcs.
Note: This product is manufactured by lot after an order is received.

RATING

1. Coil data

- Operating characteristics such as 'Operate voltage' and 'Release voltage' are influenced by mounting conditions, ambient temperature, etc. Therefore, please use the relay within $\pm 5\%$ of rated coil voltage.
- 'Initial' means the condition of products at the time of delivery.

1) Single side stable type

Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Nominal operating current [$\pm 10\%$] (at 20°C 68°F)	Coil resistance [$\pm 10\%$] (at 20°C 68°F)	Nominal operating power	Max. applied voltage (at 20°C 68°F)
5V DC	70%V or less of nominal voltage (Initial)	10%V or more of nominal voltage (Initial)	40 mA	125 Ω	200mW	130%V of nominal voltage
12V DC			16.6mA	720 Ω		
24V DC			8.3mA	2,880 Ω		

2) 2 coil latching type

Nominal coil voltage	Set voltage (at 20°C 68°F)	Reset voltage (at 20°C 68°F)	Nominal operating current [$\pm 10\%$] (at 20°C 68°F)		Coil resistance [$\pm 10\%$] (at 20°C 68°F)		Nominal operating power		Max. applied voltage (at 20°C 68°F)
			Set coil	Reset coil	Set coil	Reset coil	Set coil	Reset coil	
5V DC	70%V or less of nominal voltage (Initial)	70%V or less of nominal voltage (Initial)	40 mA	40 mA	125 Ω	125 Ω	200mW	200mW	130%V of nominal voltage
12V DC			16.6mA	16.6mA	720 Ω	720 Ω			
24V DC			8.3mA	8.3mA	2,880 Ω	2,880 Ω			

2. Specifications

Characteristics	Item	Specifications		
		1 Form A	1 Form A 1 Form B	2 Form A
Contact	Arrangement	1 Form A		
	Contact resistance (Initial)	Max. 30 m Ω (By voltage drop 6 V DC 1A)		
	Contact material	AgSnO ₂ type		
Rating	Nominal switching capacity (resistive load)	10A 250V AC, 10A 30V DC	8A 250V AC, 8A 30V DC	
	Max. switching power (resistive load)	2,500VA, 300W	2,000VA, 240W	
	Max. switching voltage	250V AC, 30V DC	250V AC, 30V DC	
	Max. switching current	10A	8A	
	Min. switching capacity*1	100mA 5V DC		
Electrical characteristics	Insulation resistance (Initial)	Min. 1,000M Ω (at 500V DC) Measurement at same location as "Breakdown voltage" section.		
	Breakdown voltage (Initial)	Between open contacts	1,000 Vrms for 1 min. (Detection current: 10 mA)	
		Between contact sets	—	4,000 Vrms for 1 min. (Detection current: 10 mA)
		Between contact and coil	5,000 Vrms for 1 min. (Detection current: 10 mA)	
	Surge breakdown voltage*2 (Between contact and coil)	12,000 V (Initial)		
	Operate time [Set time] (at 20°C 68°F)	Max. 10 ms [Max. 10 ms] (Nominal coil voltage applied to the coil, excluding contact bounce time.)		
Release time [Reset time] (at 20°C 68°F)	Max. 5 ms [Max. 10 ms] (Nominal coil voltage applied to the coil, excluding contact bounce time.) (without diode)			
Mechanical characteristics	Shock resistance	Functional	Min. 196 m/s ² (Half-wave pulse of sine wave: 11 ms; detection time: 10 μ s.)	
		Destructive	Min. 980 m/s ² (Half-wave pulse of sine wave: 6 ms.)	
	Vibration resistance	Functional	10 to 55 Hz at double amplitude of 2 mm (Detection time: 10 μ s.)	
		Destructive	10 to 55 Hz at double amplitude of 3 mm	
Expected life	Mechanical	Min. 10 ⁷ (at 300 times/min.)		
Conditions	Conditions for operation, transport and storage*3 *4	Ambient temperature: -40°C to +70°C -40°F to +158°F; Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)		
Unit weight		Approx. 7 g .25 oz		

Notes: *1. This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

*2. Wave is standard shock voltage of $\pm 1.2 \times 50 \mu$ s according to JEC-212-1981

*3. The upper limit of the ambient temperature is the maximum temperature that can satisfy the coil temperature rise value. Refer to Usage, transport and storage conditions in NOTES.

*4. Allowable temperature range with our package form: -40°C to +60°C -40°F to +140°F.

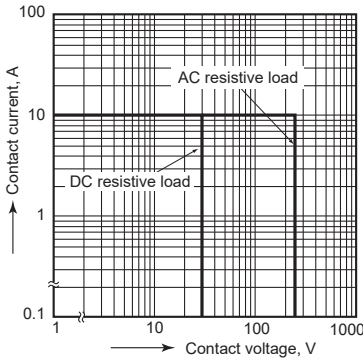
3. Electrical life

Condition: Resistive load, at 20 times/min.

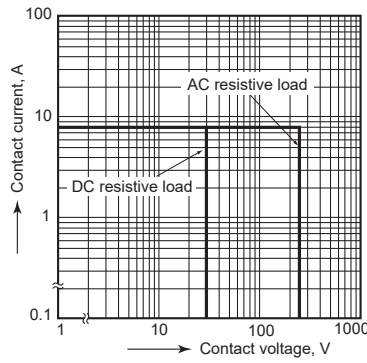
Type	Switching capacity	No. of operations
1 Form A	10A 250V AC 10A 30V DC	min. 1 $\times 10^5$
1 Form A 1 Form B	8A 250V AC 8A 30V DC	min. 1 $\times 10^5$
2 Form A	8A 250V AC 8A 30V DC	min. 1 $\times 10^5$ min. 5 $\times 10^4$

REFERENCE DATA

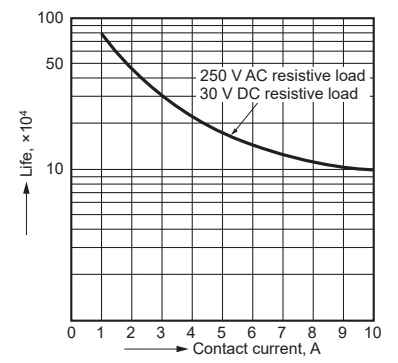
1.-(1) Maximum switching power (1 Form A)



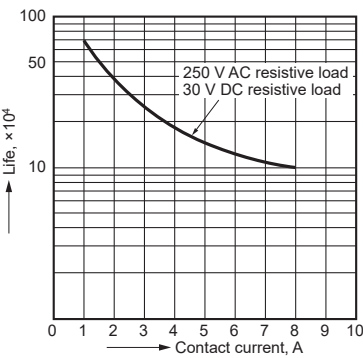
1.-(2) Maximum switching power (1 Form A 1 Form B, 2 Form A)



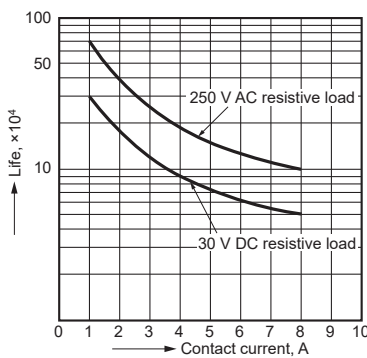
2.-(1) Life curve (1 Form A)



2.-(2) Life curve (1 Form A 1 Form B)

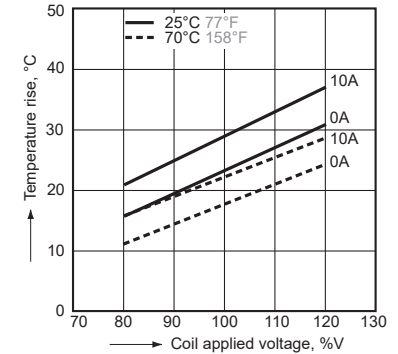


2.-(3) Life curve (2 Form A)



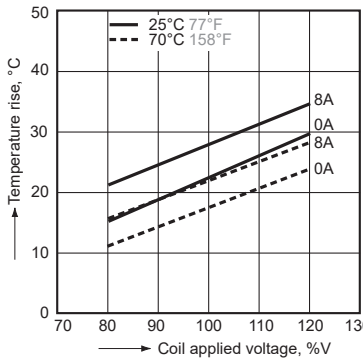
3.-(1) Coil temperature rise (1 Form A)

Tested sample: DE1a-5V
Quantity: n=6
Ambient temperature: 25°C to 70°C 77°F to 158°F



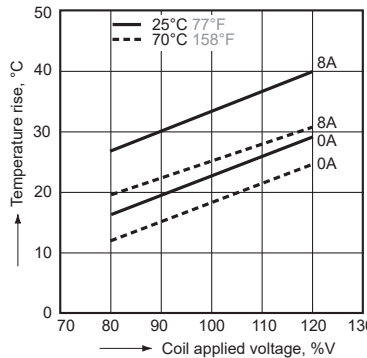
3.-(2) Coil temperature rise (1 Form A 1 Form B)

Tested sample: DE1a1b-5V
Quantity: n=6
Ambient temperature: 25°C to 70°C 77°F to 158°F



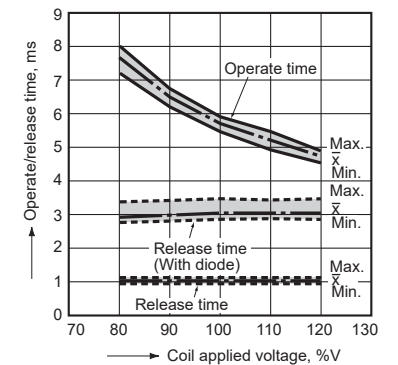
3.-(3) Coil temperature rise (2 Form A)

Tested sample: DE2a-5V
Quantity: n=6
Ambient temperature: 25°C to 70°C 77°F to 158°F



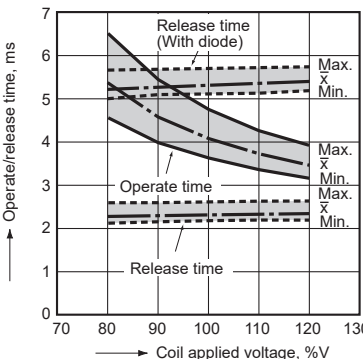
4.-(1) Operate/release time (1 Form A)

Tested sample: DE1a-5V
Quantity: n=5



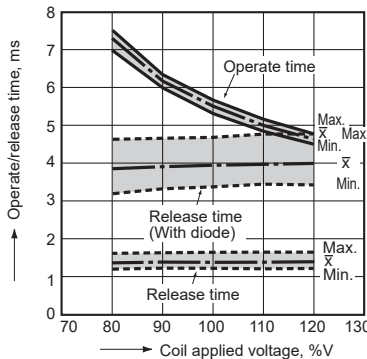
4.-(2) Operate/release time (1 Form A 1 Form B)

Tested sample: DE1a1b-5V, Quantity: n=5



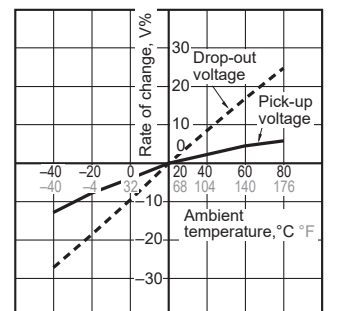
4.-(3) Operate/release time (2 Form A)

Tested sample: DE2a-5V, Quantity: n=5



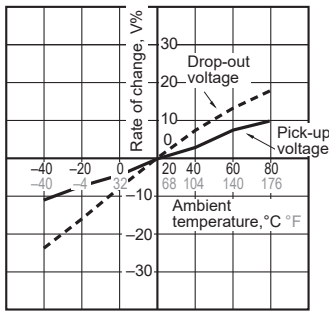
5.-(1) Ambient temperature characteristics (1 Form A)

Tested sample: DE1a-5V, Ambient temperature: -40°C to 80°C -40°F to 176°F, Quantity: n=6



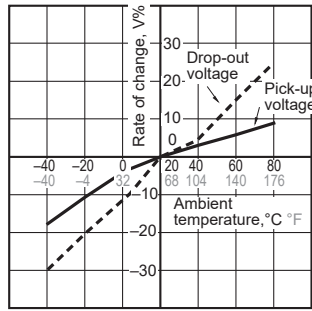
5.-(2) Ambient temperature characteristics
(1 Form A 1 Form B)

Tested sample: DE1a1b-5V, Ambient temperature:
-40°C to 80°C -40°F to 176°F, Quantity: n=6



5.-(3) Ambient temperature characteristics
(2 Form A)

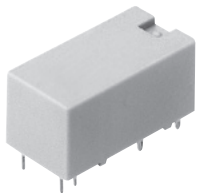
Tested sample: DE2a-5V, Ambient temperature:
-40°C to 80°C -40°F to 176°F, Quantity: n=6



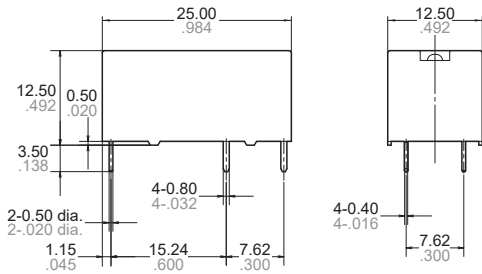
DIMENSIONS (mm inch)

CAD The CAD data of the products with a "CAD" mark can be downloaded from our Website.

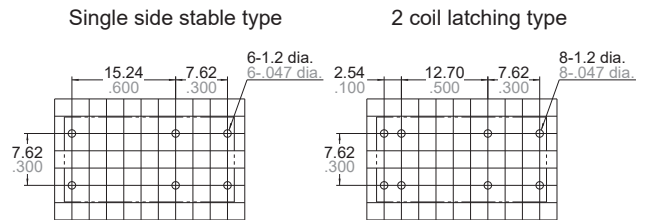
CAD



External dimensions
Single side stable type

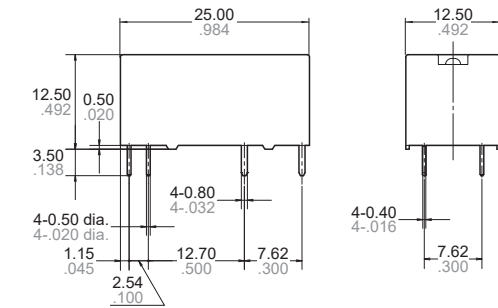


PC board pattern (Bottom view)



Tolerance: $\pm 0.1 \pm .004$

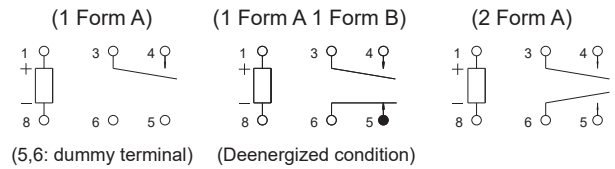
2 coil latching type



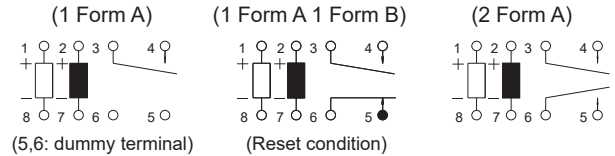
Tolerance: $\pm 0.3 \pm .012$

Schematic (Bottom view)

Single side stable type



2coil latching type



SAFETY STANDARDS

Types	UL/C-UL (Recognized)			VDE (Certified)			
	File No.	Contact rating	Cycles	File No.	Contact rating	Temperature	Cycles
1 Form A	E120782	8A 120V AC Lamp Load	3×10^4	115944	8A 250V AC ($\cos\phi = 1.0$)	70°C 158°F	15×10^4
		12A 120V AC General use	3×10^4		16A 250V AC ($\cos\phi = 1.0$)	70°C 158°F	6×10^3
		8A 277V AC General use	–		–	–	–
		10A 277V AC Ballast	–		–	–	–
		2A 480V AC Resistive	10^5		–	–	–
		1HP 277V AC	–		–	–	–
		6A 347V AC General use	3×10^4		–	–	–
		PILOT DUTY B300,R300	–		–	–	–
1 Form A 1 Form B	E120782	6A 120V AC Lamp Load	3×10^4	115944	8A 250V AC ($\cos\phi = 1.0$)	70°C 158°F	15×10^4
		8.5A 120V AC General use	3×10^4		16A 250V AC ($\cos\phi = 1.0$)	70°C 158°F	5×10^3
		6A 277V AC General use	3×10^4		–	–	–
		2A 480V AC Resistive	10^5		–	–	–
		0.7HP 277V AC	–		–	–	–
		4.5A 347V AC General use	3×10^4		–	–	–
		PILOT DUTY B300,R300	–		–	–	–
2 Form A	E120782	8A 120V AC Lamp Load	3×10^4	115944	8A 250V AC ($\cos\phi = 1.0$)	70°C 158°F	–
		12A 120V AC General use	3×10^4		–	–	–
		8A 277V AC General use	–		–	–	–
		10A 277V AC Ballast	–		–	–	–
		2A 480V AC Resistive	10^5		–	–	–
		1HP 277V AC	–		–	–	–
		6A 347V AC General use	3×10^4		–	–	–
		PILOT DUTY B300,R300	–		–	–	–

* CSA standard: Certified by C-UL

EN/IEC VDE Certified INSULATION CHARACTERISTIC (IEC61810-1)

Item	Characteristics
Clearance/Creepage distance (IEC61810-1)	Min. 8.0/8.0mm
Category of protection (IEC61810-1)	RT III
Tracking resistance (IEC60112)	PTI 175
Insulation material group	III a
Over voltage category	III
Rated voltage	250V
Pollution degree	3
Type of insulation (Between contact and coil)	Reinforced insulation
Type of insulation (Between open contacts)	Micro disconnection

NOTES

1. For cautions for use, please read "GENERAL APPLICATION GUIDELINES".

Please refer to "the latest product specifications" when designing your product.
 • Requests to customers :
<https://industrial.panasonic.com/ac/e/salespolicies/>

GUIDELINES FOR POWER RELAYS AND HIGH-CAPACITY DC CUT OFF RELAYS USAGE

For cautions for use, please read “GUIDELINES FOR RELAY USAGE”.

https://industrial.panasonic.com/ac/e/control/relay/cautions_use/index.jsp

Precautions for Coil Input

■ Long term current carrying

A circuit that will be carrying a current continuously for long periods without relay switching operation. (circuits for emergency lamps, alarm devices and error inspection that, for example, revert only during malfunction and output warnings with form B contacts) Continuous, long-term current to the coil will facilitate deterioration of coil insulation and characteristics due to heating of the coil itself.

For circuits such as these, please use a magnetic-hold type latching relay. If you need to use a single stable relay, use a sealed type relay that is not easily affected by ambient conditions and make a failsafe circuit design that considers the possibility of contact failure or disconnection.

■ DC Coil operating power

Steady state DC current should be applied to the coil. The wave form should be rectangular. If it includes ripple, the ripple factor should be less than 5%.

However, please check with the actual circuit since the electrical characteristics may vary. The rated coil voltage should be applied to the coil and the set/reset pulse time of latching type relay differs for each relays, please refer to the relay's individual specifications.

■ Coil connection

When connecting coils of polarized relays, please check coil polarity (+,-) at the internal connection diagram (Schematic). If any wrong connection is made, it may cause unexpected malfunction, like abnormal heat, fire and so on, and circuit do not work. Avoid impressing voltages to the set coil and reset coil at the same time.

Ambient Environment

● Usage, Transport, and Storage Conditions

During usage, storage, or transportation, avoid locations subjected to direct sunlight and maintain normal temperature, humidity and pressure conditions.

● Temperature/Humidity/Pressure

When transporting or storing relays while they are tube packaged, there are cases the temperature may differ from the allowable range. In this case be sure to check the individual specifications. Also allowable humidity level is influenced by temperature, please check charts shown below and use relays within mentioned conditions. (Allowable temperature values differ for each relays, please refer to the relay's individual specifications.)

1) Temperature:

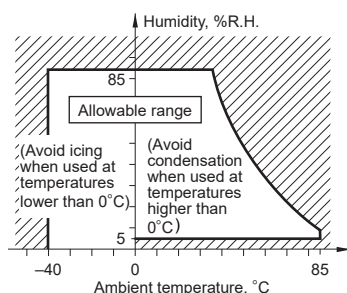
The tolerance temperature range differs for each relays, please refer to the relay's individual specifications

2) Humidity:

5 to 85 % RH

3) Pressure:

86 to 106 kPa



■ Maximum allowable voltage and temperature rise

Proper usage requires that the rated coil voltage be impressed on the coil. Note, however, that if a voltage greater than or equal to the maximum continuous voltage is impressed on the coil, the coil may burn or its layers short due to the temperature rise. Furthermore, do not exceed the usable ambient temperature range listed in the catalog.

■ Operate voltage change due to coil temperature rise (Hot start)

In DC relays, after continuous passage of current in the coil, if the current is turned OFF, then immediately turned ON again, due to the temperature rise in the coil, the pick-up voltage will become somewhat higher. Also, it will be the same as using it in a higher temperature atmosphere. The resistance/temperature relationship for copper wire is about 0.4% for 1°C, and with this ratio the coil resistance increases. That is, in order to operate of the relay, it is necessary that the voltage be higher than the pick-up voltage and the pick-up voltage rises in accordance with the increase in the resistance value. However, for some polarized relays, this rate of change is considerably smaller.

● Dew condensation

Condensation occurs when the ambient temperature drops suddenly from a high temperature and humidity, or the relay is suddenly transferred from a low ambient temperature to a high temperature and humidity. Condensation causes the failures like insulation deterioration, wire disconnection and rust etc. Panasonic Corporation does not guarantee the failures caused by condensation.

The heat conduction by the equipment may accelerate the cooling of device itself, and the condensation may occur.

Please conduct product evaluations in the worst condition of the actual usage. (Special attention should be paid when high temperature heating parts are close to the device. Also please consider the condensation may occur inside of the device.)

● Icing

Condensation or other moisture may freeze on relays when the temperature become lower than 0°C. This icing causes the sticking of movable portion, the operation delay and the contact conduction failure etc. Panasonic Corporation does not guarantee the failures caused by the icing.

The heat conduction by the equipment may accelerate the cooling of relay itself and the icing may occur. Please conduct product evaluations in the worst condition of the actual usage.

● Low temperature and low humidity

The plastic becomes brittle if the switch is exposed to a low temperature, low humidity environment for long periods of time.

● High temperature and high humidity

Storage for extended periods of time (including transportation periods) at high temperature or high humidity levels or in atmospheres with organic gases or sulfide gases may cause a sulfide film or oxide film to form on the surfaces of the contacts and/or it may interfere with the functions. Check out the atmosphere in which the units are to be stored and transported.

GUIDELINES FOR POWER RELAYS AND HIGH-CAPACITY DC CUT OFF RELAYS USAGE

●Package

In terms of the packing format used, make every effort to keep the effects of moisture, organic gases and sulfide gases to the absolute minimum.

●Silicon

When a source of silicone substances (silicone rubber, silicone oil, silicone coating materials and silicone filling materials etc.) is used around the relay, the silicone gas (low molecular siloxane etc.) may be produced.

This silicone gas may penetrate into the inside of the relay. When the relay is kept and used in this condition, silicone compound may adhere to the relay contacts which may cause the contact failure. Do not use any sources of silicone gas around the relay (Including plastic seal types).

●NOx Generation

When relay is used in an atmosphere high in humidity to switch a load which easily produces an arc, the NOx created by the arc and the water absorbed from outside the relay combine to produce nitric acid. This corrodes the internal metal parts and adversely affects operation. Avoid use at an ambient humidity of 85%RH or higher (at 20°C). If use at high humidity is unavoidable, please contact our sales representative.

Others

■Cleaning

- 1) Although the environmentally sealed type relay (plastic sealed type, etc.) can be cleaned, avoid immersing the relay into cold liquid (such as cleaning solvent) immediately after soldering. Doing so may deteriorate the sealing performance.
- 2) Cleaning with the boiling method is recommended(The temperature of cleaning liquid should be 40°C or lower).
Avoid ultrasonic cleaning on relays. Use of ultrasonic cleaning may cause breaks in the coil or slight sticking of the contacts due to ultrasonic energy.

Please refer to "**the latest product specifications**" when designing your product.

•Requests to customers:

<https://industrial.panasonic.com/ac/e/salespolicies/>

Please contact

Panasonic Corporation

Electromechanical Control Business Division

■ 1006, Oaza Kadoma, Kadoma-shi, Osaka 571-8506, Japan
industrial.panasonic.com/ac/e/

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