Panasonic
INDUSTRY

To Be Discontinued
Last time buy: September 30, 2024

Signal Relays (2A or less)

HY RELAYS

Product Catalog

IN Your Future

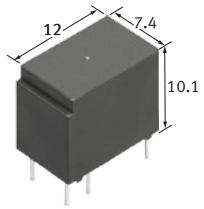
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HY RELAYS

To Be Discontinued
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Non-polarized compact 1Form C relay that achieves 150 mW power consumption

Protective construction：Sealed type



(Unit：mm)

FEATURES

- **150 mW rated operating power and high sensitivity**
  Non-polarized with a rated operating power of 150 mW and capable of 84 mW operating power and high sensitivity
- **Au clad twin contact**
  With Au clad twin contacts suited for signal control, high reliability is achieved from low levels up to 1 A.
- **Plastic sealed type for excellent environmental resistance**

TYPICAL APPLICATIONS

- **Telecommunications equipment**
- **Security**
- **Measurement equipment**
- **Household electrical appliance and Audio Visual equipment**

ORDERING INFORMATION (PART NO. : Ordering part number for Japanese market)

AHY 1 ☐ ☐

- Contact arrangement
  1:1 Form C
- Sensitivity
  0:150 mW
  2:200 mW
- Rated coil voltage (DC)*1
  0 : 1.5 V, 1 : 3 V, 2 : 6 V, 3 : 12 V,
  4 : 24 V, 6 : 4.5 V, 7 : 9 V, 9 : 5 V

*1: In case of 5 V drive circuit, it is recommended to use 4.5 V type relay.

ORDERING INFORMATION (TYPE NO. : Ordering part number for non Japanese market)

HY 1 ☐ - ☐

- Contact arrangement
  1:1 Form C
- Sensitivity
  Nil: High sensitivity 150 mW
  Z : Standard 200 mW
- Rated coil voltage (DC)*1
  1.5, 3, 4.5, 5, 6, 9, 12, 24 V

*1: In case of 5 V drive circuit, it is recommended to use 4.5 V type relay.

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TYPES

" Type No. " is ordering part number for non Japanese market. " Part No. " is ordering part number for Japanese market.

■PC board terminal

●Tube packing

Contact arrangement	Rated coil voltage	150 mW type		200 mW type		Standard packing	
		Part No.	Type No.	Part No.	Type No.	Carton (1 Tube packing)	Outer carton
1 Form C	1.5 V DC	HY1-1.5V	AHY100	HY1Z-1.5V	AHY120	50 pcs.	2,000 pcs.
	3 V DC	HY1-3V	AHY101	HY1Z-3V	AHY121		
	4.5 V DC	HY1-4.5V	AHY106	HY1Z-4.5V	AHY126		
	5 V DC	HY1-5V	AHY109	HY1Z-5V	AHY129		
	6 V DC	HY1-6V	AHY102	HY1Z-6V	AHY122		
	9 V DC	HY1-9V	AHY107	HY1Z-9V	AHY127		
	12 V DC	HY1-12V	AHY103	HY1Z-12V	AHY123		
	24 V DC	HY1-24V	AHY104	HY1Z-24V	AHY124		

RATING

■Coil data

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

Type	Rated coil voltage	Operate voltage (at 20°C)	Release voltage (at 20°C)	Rated operating current (±10%, at 20°C)	Coil resistance (±10%, at 20°C)	Rated operating power	Max. allowable voltage (at 70°C)
150 mW	1.5 V DC	Max. 75% V of rated coil voltage (Initial)	Min. 10% V of rated coil voltage (Initial)	100 mA	15 Ω	150 mW	140% V of rated coil voltage
	3 V DC			50 mA	60 Ω		
	4.5 V DC			33.3 mA	135 Ω		
	5 V DC			30 mA	166 Ω		
	6 V DC			25 mA	240 Ω		
	9 V DC			16.7 mA	540 Ω		
	12 V DC			12.5 mA	960 Ω		
	24 V DC			6.25 mA	3,840 Ω		
200 mW	1.5 V DC	Max. 75% V of rated coil voltage (Initial)	Min. 10% V of rated coil voltage (Initial)	133.3 mA	11.25 Ω	200 mW	120% V of rated coil voltage
	3 V DC			66.7 mA	45 Ω		
	4.5 V DC			44.5 mA	101.2 Ω		
	5 V DC			40 mA	125 Ω		
	6 V DC			33.3 mA	180 Ω		
	9 V DC			22.2 mA	405 Ω		
	12 V DC			16.7 mA	720 Ω		
	24 V DC			8.3 mA	2,880 Ω		

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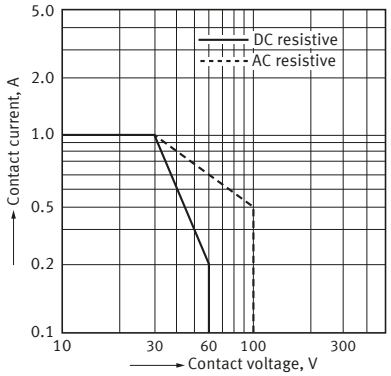
■ Specifications

Item			Specifications
Contact data	Contact arrangement		1 Form C
	Contact resistance (initial)		Max. 100 mΩ (by voltage drop 6 V DC 1 A)
	Contact material		Ag+Au clad
	Contact rating (resistive)		1 A 30 V DC
	Max. switching power (resistive)		30 W (DC)
	Max. switching voltage		60 V DC
	Max. carrying current		2 A
	Max. switching current (resistive load)		1 A 30 V DC
	Min. switching load (reference value)*1		1 mA 1 V DC
Insulation resistance (initial)			Min. 100 MΩ (at 500 V DC, Measured portion is the same as the case of dielectric strength.)
Electrical characteristics	Dielectric strength (initial)	Between open contacts	500 Vrms for 1 min (detection current: 10 mA)
		Between contact and coil	1,000 Vrms for 1 min (detection current: 10 mA)
	Operate time (at 20°C)		Max. 5 ms (at rated coil voltage, without bounce)
	Release time (at 20°C)		Max. 4 ms (at rated coil voltage, without bounce, without diode)
Mechanical characteristics	Shock resistance	Functional	98 m/s² [10G] (half-sine shock pulse: 11 ms, detection time: 10 μs)
		Destructive	980 m/s² [100G] (half-sine shock pulse: 6 ms)
	Vibration resistance	Functional	10 to 55 Hz (at double amplitude of: 1 mm, detection time: 10 μs)
		Destructive	10 to 55 Hz (at double amplitude of: 2 mm)
Expected life	Mechanical life		Min. 10×10^6 (Switching frequency: 180 times/min)
	Electrical life		Min. 100×10^3 (1 A 30 V DC resistive) (at 20 cpm)
Conditions	Conditions for usage, transport and storage *2		Ambient temperature: –40 to +70°C, Humidity: 5 to 85% RH (Avoid icing and condensation)
	Max. operating speed		20 cpm at rated load
Unit weight			Approx. 1.8 g

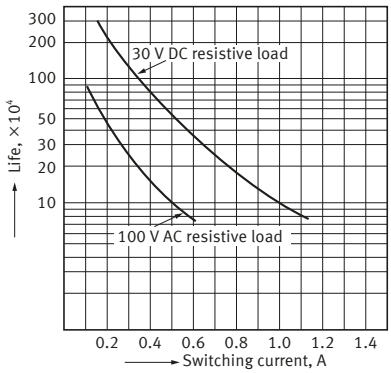
Notes: *1. This value is a rough indication of the lower limit at which switching is possible at micro load level.
This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.
*2. The ambient temperature upper limit is the highest temperature that can satisfy the coil temperature rise value. Please refer to “Regarding ambient temperature” in the “GUIDELINES FOR RELAY USAGE”.

REFERENCE DATA

1. Max. switching capacity

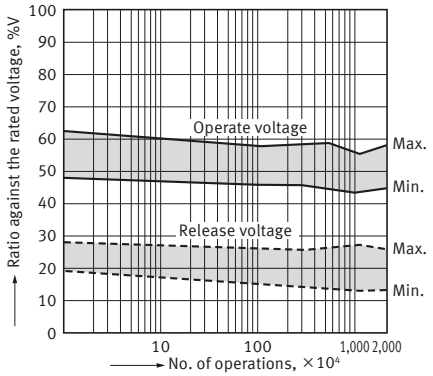


2. Life curve



3. Mechanical life

Tested sample: HY1Z-12V, 10 pcs.
Ambient temperature: 20˚C to 25˚C

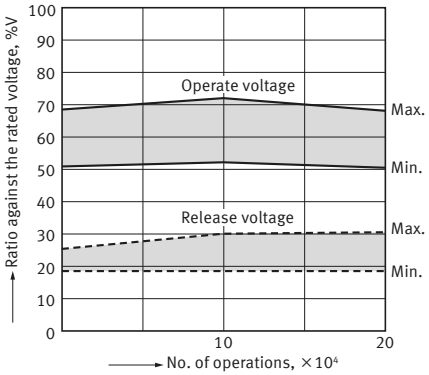


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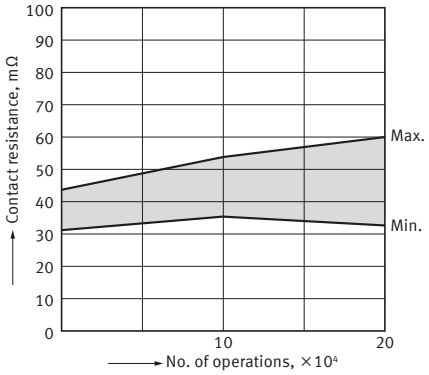
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4. Electrical life (1 A 30 V DC resistive load)

Tested sample: HY1-12V, 6 pcs.
Condition: 1 A 30 V DC resistive load, 30 cpm

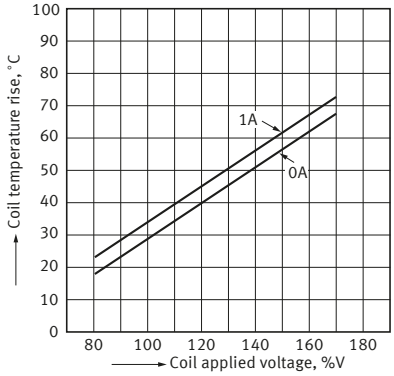


Change of contact resistance



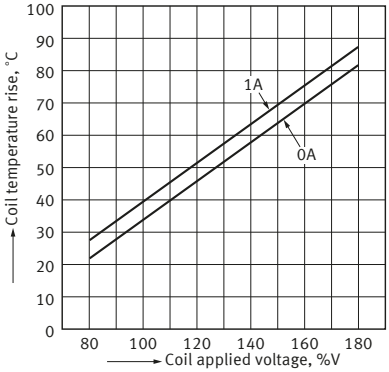
5-1. Coil temperature rise value (150 mW)

Tested sample: HY1-9V, 5 pcs.
Ambient temperature:24˚C



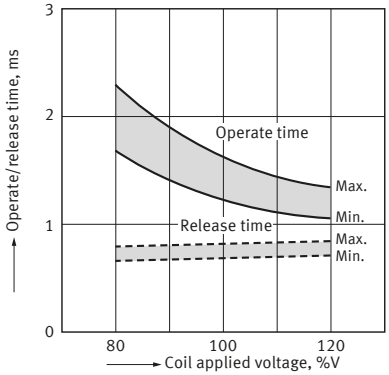
5-2. Coil temperature rise value (200 mW)

Tested sample: HY1Z-12V, 5 pcs.
Ambient temperature: 23˚C



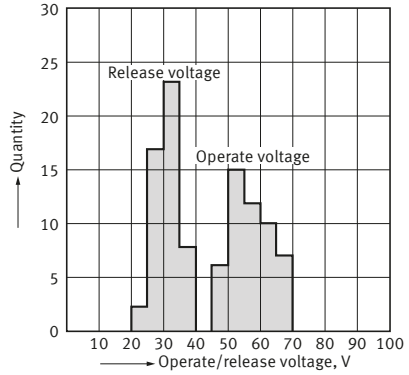
6. Operate and release time

Tested sample: HY1Z-12V, 5 pcs.
Ambient temperature: 25˚C



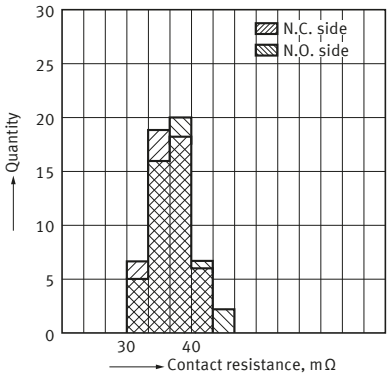
7. Distribution of operate and release voltage

Tested sample: HY1-12V, 50 pcs.
Ambient temperature: 23˚C



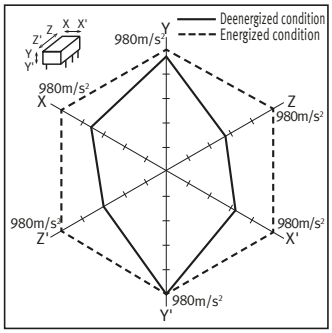
8. Distribution of contact resistance

Tested sample: HY1-12V, 50 pcs.
N.C. side N.O. side



9. Functional shock

Tested sample: HY1Z-12V, 6 pcs.



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DIMENSIONS

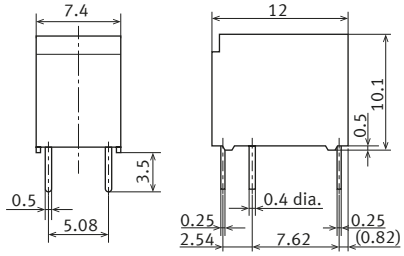
CAD The CAD data of the products with a "CAD" mark can be downloaded from our Website.

Unit: mm

CAD

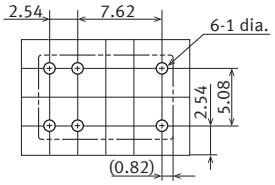


External dimensions



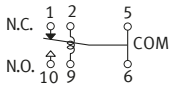
General tolerance: ±0.3

Recommended PC board pattern
(BOTTOM VIEW)



Tolerance: ±0.1

Schematic
(BOTTOM VIEW)

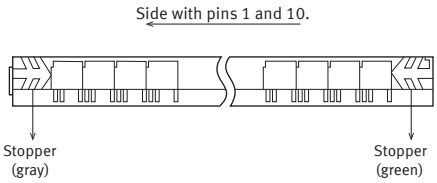


PACKING STYLE

Unit: mm

■Tube packing

1. The relays are presented in tube packages with pins 1 and 10 on the left.
   Be sure to maintain relays in the correct orientation when mounting on PC boards.



2. Conditions for operation, transport and storage : –40 to 60°C.

SAFETY STANDARDS

Each standard may be updated at any time, so please check our Website for the latest information.

■UL (Recognized)

File No.	Contact rating	Operations	Ambient temperature
E43149	1 A 30 V DC General Use	100 × 10^3	40°C

■CSA (Recognized)

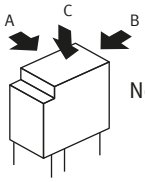
File No.	Contact rating	Operations	Ambient temperature
LR26550 etc.	1 A 30 V DC	100 × 10^3	40°C

GUIDELINES FOR USAGE

■For cautions for use, please read "GUIDELINES FOR SIGNAL RELAYS USAGE" and "GUIDELINES FOR RELAY USAGE".

■Cautions for usage of HY relay

●Precautions for usage of automatic insertion machine
Set the chucking pressure of the pick-up mechanism by the automatic mounting machine with the pressure shown in below to maintain the internal function of the relay.



Note. Avoid chucking the center of the relay.
In addition, excessive chucking pressure to the pinpoint of the relay should be avoided.

Table 1: Chucking pressure

A to C direction	Max. 4.9 N (500 gf)

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GUIDELINES FOR SIGNAL 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.

■ 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 operate 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 operate voltage and the operate voltage rises in accordance with the increase in the resistance value.

However, for some polarized relays, this rate of change is considerably smaller.

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NOTES

■ Usage, Storage, and Transport Conditions

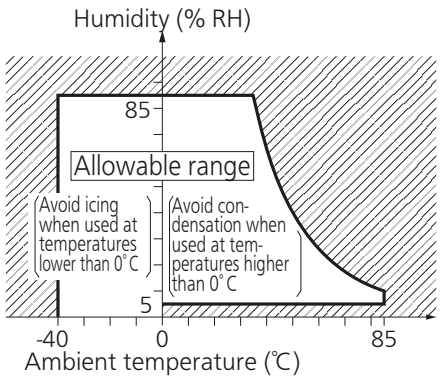
During usage, storage, or transportation, avoid locations subject to direct sunlight and maintain normal temperature, humidity, and pressure conditions.

The allowable specifications for environments suitable for usage, storage, and transportation are given below.

1) Temperature: The allowable temperature range differs for each relay, so refer to the relay's individual specifications. In addition, when transporting or storing relays while they are tube packaged, there are cases when the temperature may differ from the allowable range. In this situation, be sure to consult the individual specifications.

2) Humidity: 5 to 85% RH

The humidity range varies with the temperature.
Use within the range indicated in the graph.
(The allowable temperature depends on the relays.)



3) Pressure: 86 to 106 kPa

● Condensation

Condensation occurs when the ambient temperature drops suddenly from a high temperature and humidity, or the relay and microwave device 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 Industry Co., Ltd. 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 Industry Co., Ltd. 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.

● 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.

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● Storage requirements

Since the surface-mount terminal type is sensitive to humidity it is packaged with tightly sealed anti-humidity packaging. However, when storing, please be careful of the following.

1) Please use promptly once the anti-humidity pack is opened. (within 72 hours, Max. 30°C / 70% RH).
If left with the pack open, the relay will absorb moisture which will cause thermal stress when reflow mounting and thus cause the case to expand. As a result, the seal may break.

2) If relays will not be used within 72 hours, please store relays in a humidity controlled desiccator or in an anti-humidity bag to which silica gel has been added.
* If the relay is to be soldered after it has been exposed to excessive humidity atmosphere, cracks and leaks can occur.
Be sure to mount the relay under the required mounting conditions.

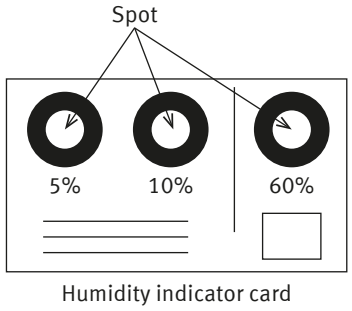
3) When relays (which is packaged with humidity indicator and silica gel) meeting one of below criteria, please bake (dry) before use.
- When the storage conditions specified in 1) are exceeded.
- When humidity indicator is in Ⅲ or Ⅳ status according to judgement standard.

<How to judge>

Please check humidity indicator color and decide if baking is necessary or not.

● : indicate brown, ○ : Other than brown (blueish color)

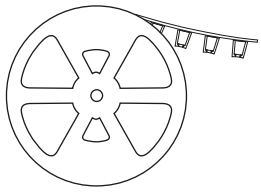
	5%	10%	60%	Bake treatment necessity judgment
Ⅰ	●	●	●	No need to bake
Ⅱ	○	●	●	No need to bake
Ⅲ	○	○	●	Need to bake
Ⅳ	○	○	○	Need to bake



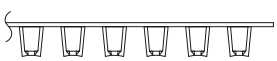
Humidity indicator card

<Baking (Drying) conditions>

- With reel : 45°C, 96 hours or more.



- Without reel (including relay only) : 60°C, 35 hours or more.



4) The following cautionary label is affixed to the anti-humidity pack.

Caution

This vacuum-sealed bag contains

Moisture Sensitive Products

After this bag is opened, the product must be used

within 72 hours

If product is not used within 72 hours, baking is necessary.

For baking conditions please contact us.

● 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.

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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) Surface-mount terminal type relay is sealed type and it can be cleaned by immersion.
   Use pure water or alcohol-based cleaning solvent.
3) 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 the ultrasonic energy.

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

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INDUSTRY

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Electromechanical Control Business Division
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