



**Non-polarized 1 Form C  
relay that realizes nominal  
operating power of 150 mW**

# HY RELAYS



**RoHS compliant**

### FEATURES

- Nominal operating power:  
High sensitivity of 150mW (Single  
side stable type)**  
A nominal operating power of 150 mW  
(minimum operating power of 84 mW)  
has been achieved.
- The use of gold-clad twin contacts  
ensures high contact reliability.**
- Sealed construction**

### TYPICAL APPLICATIONS

- Telecommunications equipment**
- Security equipment**
- Test and Measurement equipment**
- Consumer electronic and Audio  
visual equipment**

## ORDERING INFORMATION

HY 1 - -

Contact arrangement  
1: 1 Form C

Sensitivity  
Nil: High sensitivity 150 mW  
Z: Standard 200 mW

Nominal coil voltage (DC)  
1.5, 3, 4.5, 5, 6, 9, 12, 24 V

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

## TYPES

| Contact arrangement | Nominal coil voltage | 150mW type | 200mW type |
|---------------------|----------------------|------------|------------|
|                     |                      | Part No.   | Part No.   |
| 1 Form C            | 1.5V DC              | HY1-1.5V   | HY1Z-1.5V  |
|                     | 3V DC                | HY1-3V     | HY1Z-3V    |
|                     | 4.5V DC              | HY1-4.5V   | HY1Z-4.5V  |
|                     | 5V DC                | HY1-5V     | HY1Z-5V    |
|                     | 6V DC                | HY1-6V     | HY1Z-6V    |
|                     | 9V DC                | HY1-9V     | HY1Z-9V    |
|                     | 12V DC               | HY1-12V    | HY1Z-12V   |
|                     | 24V DC               | HY1-24V    | HY1Z-24V   |

Standard packing: Tube: 50 pcs.; Case: 2,000 pcs.

# RATING

## 1. Coil data

| Contact arrangement | 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 70°C 158°F) |
|---------------------|----------------------|---|---|---|---|-------------------------|--------------------------------------|
| 1 Form C            | 1.5V DC              | 75%V or less of nominal voltage (Initial) | 10%V or more of nominal voltage (Initial) | 100mA   | 15 $\Omega$                                   | 150mW                   | 140%V of nominal voltage             |
|                     | 3V DC                |   |   | 50mA  | 60 $\Omega$                                   |                         |                                      |
|                     | 4.5V DC              |   |   | 33.3mA  | 135 $\Omega$                                  |                         |                                      |
|                     | 5V DC                |   |   | 30mA  | 166 $\Omega$                                  |                         |                                      |
|                     | 6V DC                |   |   | 25mA  | 240 $\Omega$                                  |                         |                                      |
|                     | 9V DC                |   |   | 16.7mA  | 540 $\Omega$                                  |                         |                                      |
|                     | 12V DC               |   |   | 12.5mA  | 960 $\Omega$                                  |                         |                                      |
|                     | 24V DC               |   |   | 6.25mA  | 3,840 $\Omega$                                |                         |                                      |
|                     | 1.5V DC              | 75%V or less of nominal voltage (Initial) | 10%V or more of nominal voltage (Initial) | 133.3mA   | 11.25 $\Omega$                                | 200mW                   | 120%V of nominal voltage             |
|                     | 3V DC                |   |   | 66.7mA  | 45 $\Omega$                                   |                         |                                      |
|                     | 4.5V DC              |   |   | 44.5mA  | 101.2 $\Omega$                                |                         |                                      |
|                     | 5V DC                |   |   | 40mA  | 125 $\Omega$                                  |                         |                                      |
|                     | 6V DC                |   |   | 33.3mA  | 180 $\Omega$                                  |                         |                                      |
|                     | 9V DC                |   |   | 22.2mA  | 405 $\Omega$                                  |                         |                                      |
|                     | 12V DC               |   |   | 16.7mA  | 720 $\Omega$                                  |                         |                                      |
|                     | 24V DC               |   |   | 8.3mA   | 2,880 $\Omega$                                |                         |                                      |

## 2. Specifications

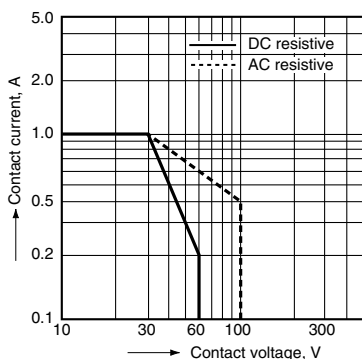
| Characteristics                          | Item  | Specifications  |   |
|--|---|---|---|
| Contact                                  | Arrangement   | 1 Form C  |   |
|  | Initial contact resistance, max.  | Max. 100 m $\Omega$ (By voltage drop 6 V DC 1A)   |   |
|  | Contact material  | Ag+Au clad  |   |
| Rating                                   | Nominal switching capacity  | 1 A 30 V DC (resistive load)  |   |
|  | Max. switching power  | 30 W (DC) (resistive load)  |   |
|  | Max. switching voltage  | 60 V DC   |   |
|  | Max. carrying current   | 2 A   |   |
|  | Max. switching current  | 1 A (30 V DC)   |   |
|  | Min. switching capacity (Reference value)*1   | 1mA 1 V DC  |   |
|  | Nominal operating power   | 150/200mW   |   |
| Electrical characteristics               | Insulation resistance (Initial)   | Min. 100M $\Omega$ (at 500V DC)<br>Measurement at same location as "Initial breakdown voltage" section.                         |   |
|  | Breakdown voltage (Initial)   | Between open contacts   | 500 Vrms for 1min. (Detection current: 10mA)  |
|  |   | Between contact and coil  | 1,000 Vrms for 1min. (Detection current: 10mA)  |
|  | Temperature rise (at 20°C 68°F)   | Max. 50°C<br>(By resistive method, nominal coil voltage applied to the coil, nominal switching capacity.)                       |   |
|  | Operate time [Set time] (at 20°C 68°F)  | Max. 5 ms (Nominal coil voltage applied to the coil, excluding contact bounce time.)  |   |
| Release time [Reset time] (at 20°C 68°F) | Max. 4 ms (Nominal coil voltage applied to the coil, excluding contact bounce time.)<br>(without diode) |   |   |
| Mechanical characteristics               | Shock resistance  | Functional  | Min. 98 m/s <sup>2</sup> (Half-wave pulse of sine wave: 11 ms; detection time: 10 $\mu$ s.) |
|  |   | Destructive   | Min. 980 m/s <sup>2</sup> (Half-wave pulse of sine wave: 6 ms.)                             |
|  | Vibration resistance  | Functional  | 10 to 55 Hz at double amplitude of 1 mm (Detection time: 10 $\mu$ s.)                       |
|  |   | Destructive   | 10 to 55 Hz at double amplitude of 2 mm   |
| Expected life                            | Mechanical  | Min. 10 <sup>7</sup> (at 180 cpm)   |   |
|  | Electrical  | Min. 10 <sup>5</sup> (1 A 30 V DC resistive) (at 20 cpm)  |   |
| Conditions                               | Conditions for operation, transport and storage*2   | Ambient temperature: -40°C to +70°C -40°F to +158°F<br>Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature) |   |
|  | Max. operating speed (at rated load)  | 20 cpm  |   |
| Unit weight                              |   | Approx. 1.8 g .063 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.

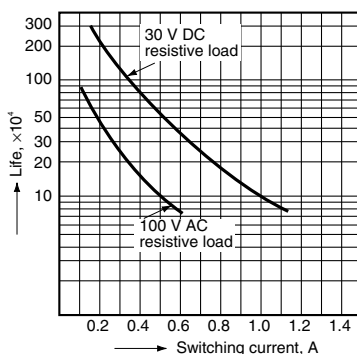
\*2 Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT.

# REFERENCE DATA

## 1. Maximum switching power

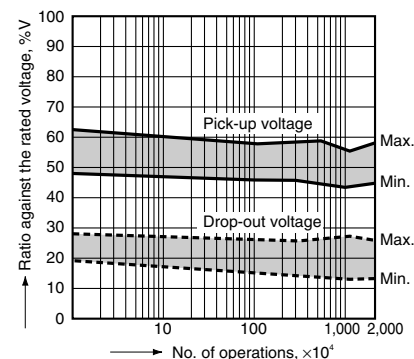


## 2. Life curve



## 3. Mechanical life

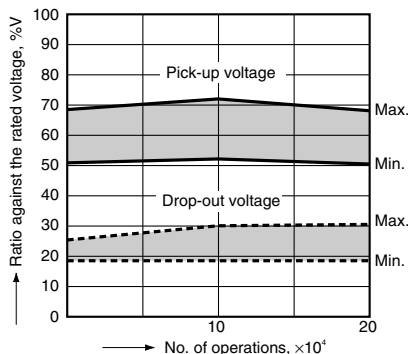
Tested sample: HY1Z-12V, 10 pcs.  
Ambient temperature: 20°C to 25°C 68°F to 77°F



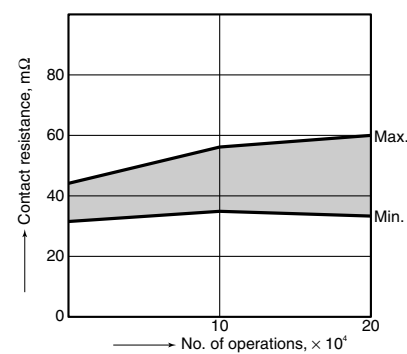
## 4. Electrical life

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

## Change of pick-up and drop-out voltage

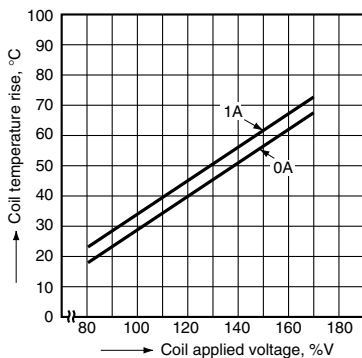


## Change of contact resistance



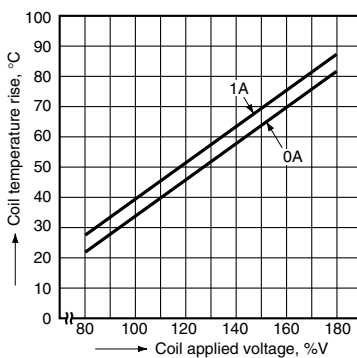
## 5-(1). Coil temperature rise (150 mW high sensitivity type)

Tested sample: HY1-9V, 5 pcs.  
Ambient temperature: 24°C 75°F



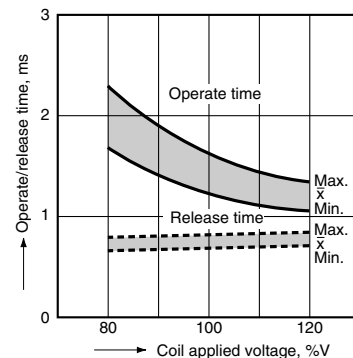
## 5-(2). Coil temperature rise (200 mW Standard type)

Tested sample: HY1Z-12V, 5 pcs.  
Ambient temperature: 23°C 74°F



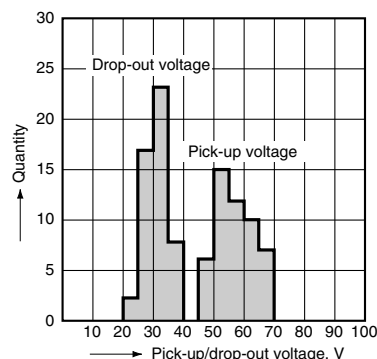
## 6. Operate/release time characteristics

Tested sample: HY1Z-12V, 5 pcs.  
Ambient temperature: 25°C 77°F



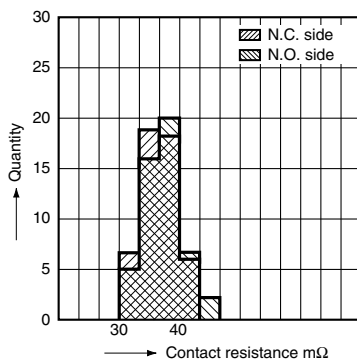
## 7. Distribution of pick-up and drop-out voltages

Tested sample: HY1-12V, 50 pcs.  
Ambient temperature: 23°C 74°F



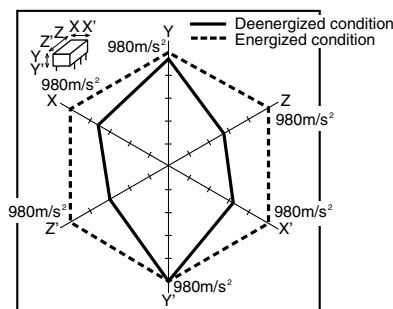
## 8. Distribution of contact resistance

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



## 9. Malfunction shock

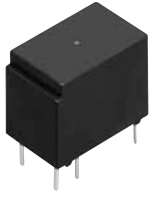
Tested sample: HY1Z-12V, 6 pcs.



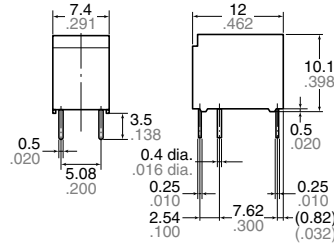
**DIMENSIONS** (mm inch)

The CAD data of the products with a **CAD Data** mark can be downloaded from: <http://industrial.panasonic.com/ac/e/>

**CAD Data**

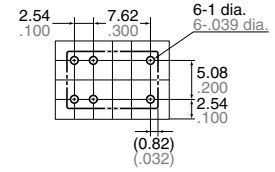


**External dimensions**



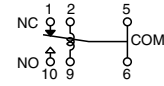
General tolerance:  $\pm 0.3 \pm 0.12$

**PC board pattern (Bottom view)**



Tolerance:  $\pm 0.1 \pm 0.04$

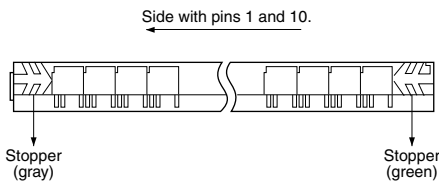
**Schematic (Bottom view)**



**NOTE**

**1. Packing style**

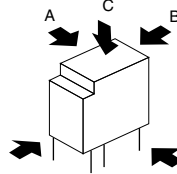
1) As shown in the diagram below, the relays are presented in tube packages with pins 1 and 10 on the left. Be sure to maintain relays in the correct orientation when mounting on PC boards.



**2. Automatic insertion**

To maintain the internal function of the relay, the chucking pressure should not exceed the values below.

- Chucking pressure in the direction A: 4.9 N {500gf} or less
- Chucking pressure in the direction B: 4.9 N {500gf} or less
- Chucking pressure in the direction C: 4.9 N {500gf} or less



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

**For general cautions for use, please refer to the "Cautions for use of Signal Relays" or "General Application Guidelines".**