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**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) 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 (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.) (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 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	

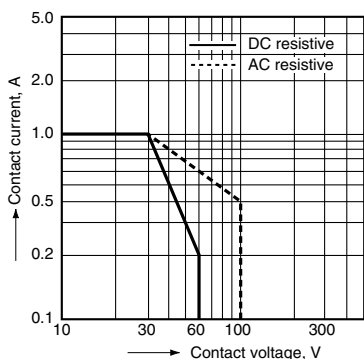
Notes: \*1 This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

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

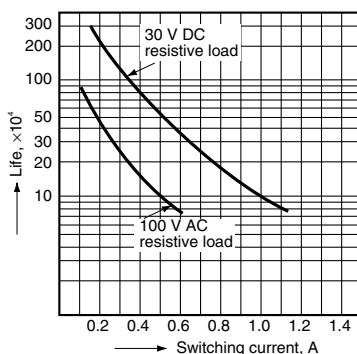


# REFERENCE DATA

## 1. Maximum switching power

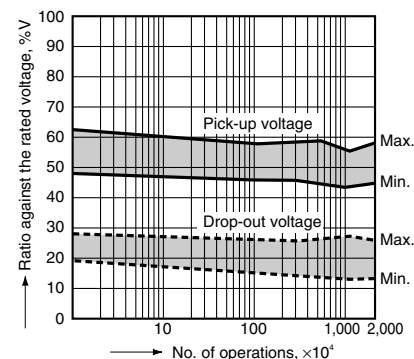


## 2. Life curve



## 3. Mechanical life

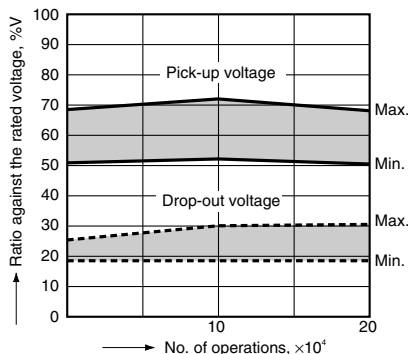
Tested sample: HY1Z-12V, 10 pcs.  
Ambient temperature: 20°C to 25°C 68°F to 77°F



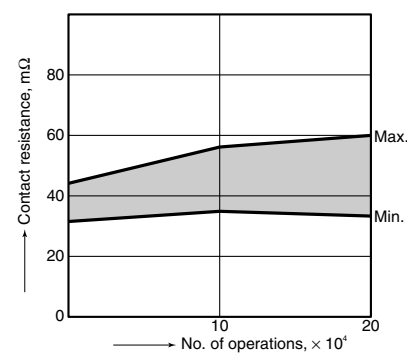
## 4. Electrical life

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

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

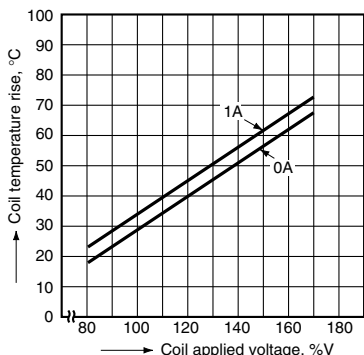


## Change of contact resistance



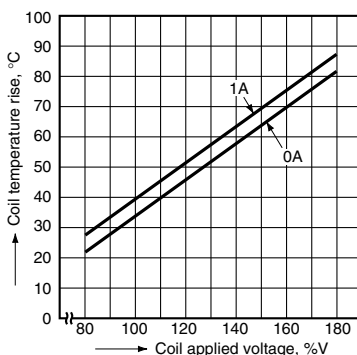
## 5-(1). Coil temperature rise (150 mW high sensitivity type)

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



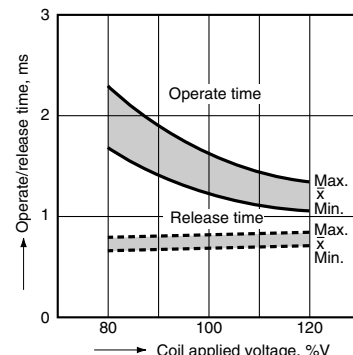
## 5-(2). Coil temperature rise (200 mW Standard type)

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



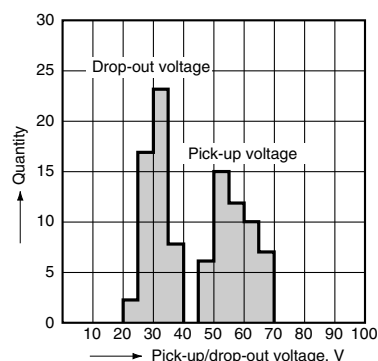
## 6. Operate/release time characteristics

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



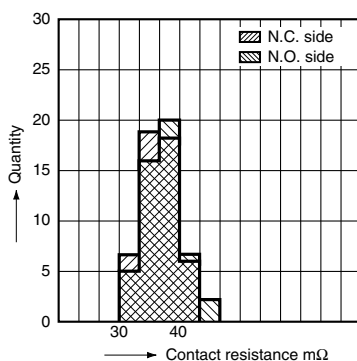
## 7. Distribution of pick-up and drop-out voltages

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



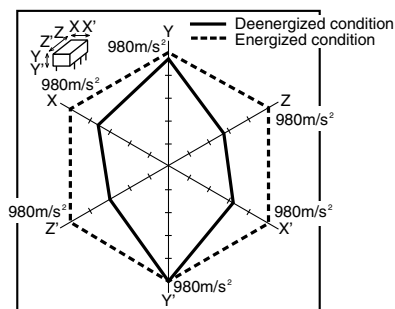
## 8. Distribution of contact resistance

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



## 9. Malfunction shock

Tested sample: HY1Z-12V, 6 pcs.



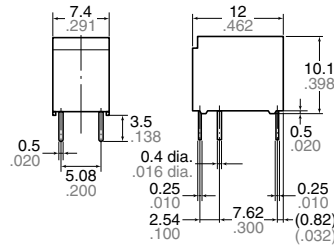
**DIMENSIONS** (mm inch)

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

**CAD Data**

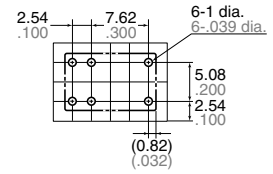


**External dimensions**



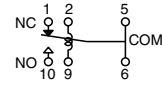
General tolerance:  $\pm 0.3 \pm 0.12$

**PC board pattern (Bottom view)**



Tolerance:  $\pm 0.1 \pm 0.04$

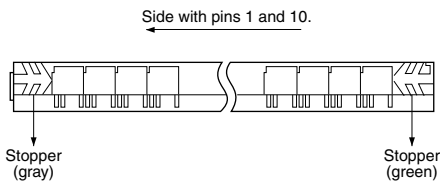
**Schematic (Bottom view)**



**NOTE**

**1. Packing style**

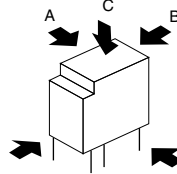
1) As shown in the diagram below, the relays are presented in tube packages with pins 1 and 10 on the left. Be sure to maintain relays in the correct orientation when mounting on PC boards.



**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".**