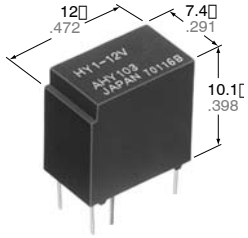
Panasonic
ideas for life

NON-POLARIZED
1 FORM C RELAY

HY RELAYS



mm inch

FEATURES

- **High sensitivity: 150 mW/200 mW**
- **A wide range of ambient temperature: –40°C to +70°C** –40°F to +158°F
- **Sealed construction**
- **Rating: 1 A 30 V DC**

SPECIFICATIONS

Contact

Arrangement		1 Form C
Initial contact resistance, max. (By voltage drop 6 V DC 1 A)		100 mΩ
Contact material		Gold-clad silver
Rating (resistive)	Nominal switching capacity	1 A 30 V DC
	Max. switching power	30 W
	Max. switching voltage	60 V DC
	Max. switching current	1 A
	Max. carrying current	2 A
	Min. switching capacity (Reference value)#1	1 mA, 1 V DC
Expected life (min. operations)	Mechanical (at 180 cpm)	10^7
	Electrical (at 20 cpm) 1 A 30 V DC	10^5

Coil

Nominal operating power	Standard type	200 mW
	High sensitivity type	150 mW

Note:

#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.

Remarks

* Specifications will vary with foreign standards certification ratings.
*1 Measurement at same location as “Initial breakdown voltage” section
*2 Detection current: 10mA
*3 Excluding contact bounce time
*4 Half-wave pulse of sine wave: 11ms; detection time: 10μs
*5 Half-wave pulse of sine wave: 6ms
*6 Detection time: 10μs
*7 Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (p. 19, Relay Technical Information).

Characteristics (at 25°C 77°F, 50% Relative humidity)

Max. operating speed		20 cpm (at nominal voltage)
Initial insulation resistance*1	Between contacts	Min. 100 MΩ at 500 V DC
	Between contact and coil	Min. 100 MΩ at 500 V DC
Initial breakdown voltage*2	Between open contacts	500 Vrms
	Between contacts and coil	1,000 Vrms
Operate time*3 (at nominal voltage)		Max. 5 ms
Release time (without diode)*3 (at nominal voltage)		Max. 4 ms
Temperature rise at nominal voltage Contact carrying current 1 A at 20°C		Max. 50°C
Shock resistance	Functional*4	Min. 98 m/s² (10 G)
	Destructive*5	Min. 980 m/s² (100 G)
Vibration resistance	Functional*6	58.8 m/s² {6 G}, 10 to 55 Hz at double amplitude of 1 mm
	Destructive	117.6 m/s² {12 G}, 10 to 55 Hz at double amplitude of 2 mm
Conditions for operation, transport and storage*7 (Not freezing and condensing at low temperature)	Ambient temp.	–40°C to +70°C –40°F to +158°F
	Humidity	5 to 85% R.H.
Unit weight		1.8 g .063 oz

TYPICAL APPLICATIONS

- Automotive: Switching to small motor
  1) Automirrow controller
  2)Retractable head light controller
- Push button device: Dial pulsing
- Low-voltage signal switching and motor control of small home appliances such as portable video tape recorders and audio devices.
- Operating of dish-control motors for PCs and word processors

ORDERING INFORMATION

Ex. HY [1] [Z] — [3V]

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

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

TYPES AND COIL DATA (at 20°C 68°F)

200 mW Standard type

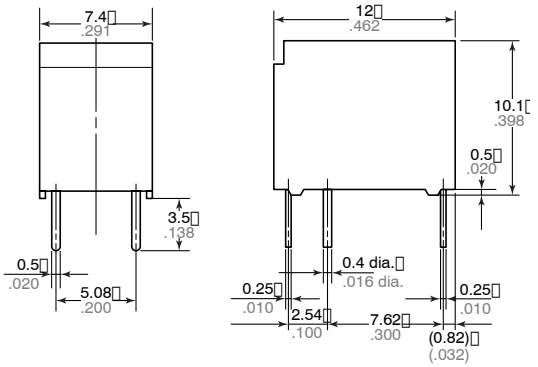
Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (max.)	Drop-out voltage, V DC (min.)	Coil resistance, Ω (±10%)	Nominal operating current, mA	Nominal operating power, mW	Max. allowable voltage, V DC (at 70°C 158°F)
HY1Z-1.5V	1.5	1.125	0.15	11.25	133.3	200	1.8
HY1Z-3V	3	2.25	0.3	45	66.7	200	3.6
HY1Z-4.5V	4.5	3.375	0.45	101.2	44.5	200	5.4
HY1Z-5V	5	3.75	0.5	125	40	200	6
HY1Z-6V	6	4.5	0.6	180	33.3	200	7.2
HY1Z-9V	9	6.75	0.9	405	22.2	200	10.8
HY1Z-12V	12	9	1.2	720	16.7	200	14.4
HY1Z-24V	24	18	2.4	2,880	8.3	200	28.8

150 mW High sensitivity type

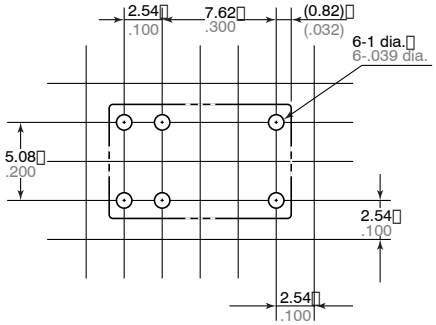
Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (max.)	Drop-out voltage, V DC (min.)	Coil resistance, Ω (±10%)	Nominal operating current, mA	Nominal operating power, mW	Max. allowable voltage, V DC (at 70°C 158°F)
HY1-1.5V	1.5	1.125	0.15	15	100	150	2.1
HY1-3V	3	2.25	0.3	60	50	150	4.2
HY1-4.5V	4.5	3.375	0.45	135	33.3	150	6.3
HY1-5V	5	3.75	0.5	166	30.1	150	7
HY1-6V	6	4.5	0.6	240	25	150	8.4
HY1-9V	9	6.75	0.9	540	16.7	150	12.6
HY1-12V	12	9	1.2	960	12.5	150	16.8
HY1-24V	24	18	2.4	3,840	6.25	150	33.6

DIMENSIONS

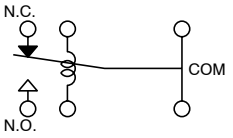
mm inch



PC board pattern (Copper-side view)



Schematic (Bottom view)

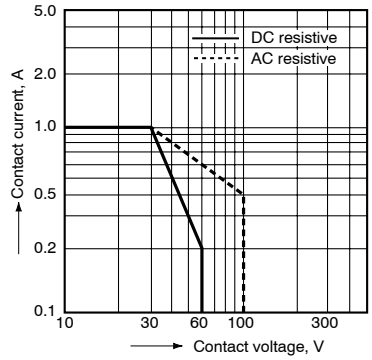


General tolerance: ±0.3 ±.012

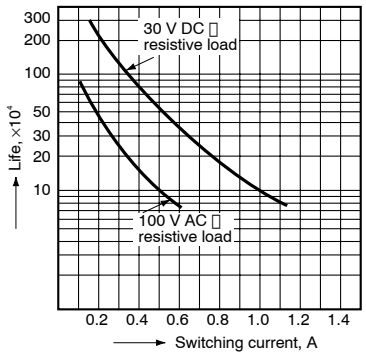
Tolerance: ±0.1 ±.004

REFERENCE DATA

1. Maximum switching power

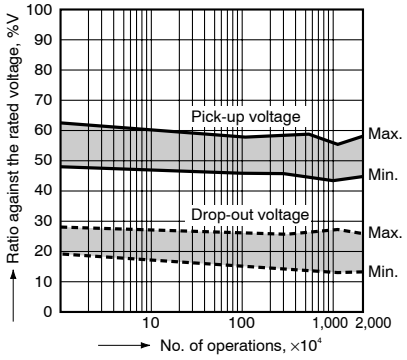


2. Life curve



3. Mechanical life

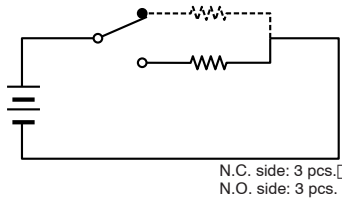
Tested sample: HY1Z-12V, 10 pcs.
Ambient temperature: 20°C to 25°C 68°F to 77°F



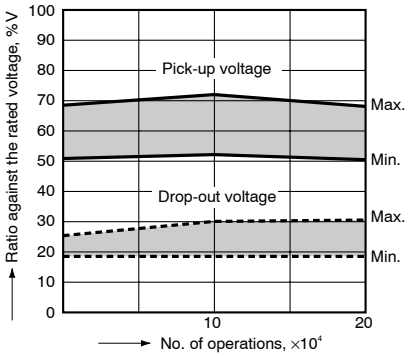
4. Electrical life

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

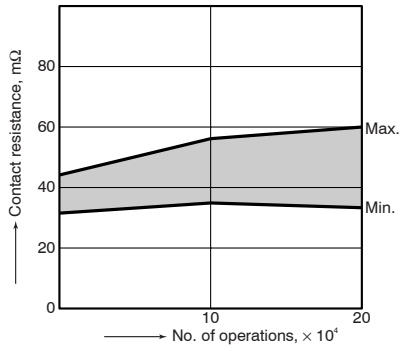
Circuit:



Change of pick-up and drop-out voltage

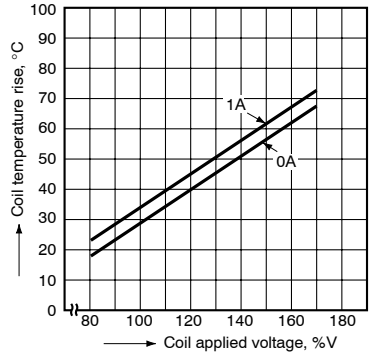


Change of contact resistance



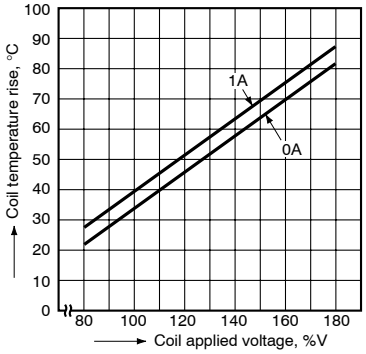
5-(1). Coil temperature rise
(150 mW high sensitivity type)

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



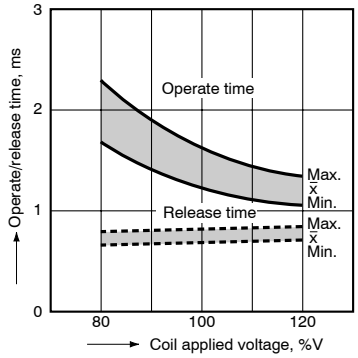
5-(2). Coil temperature rise
(200 mW Standard type)

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



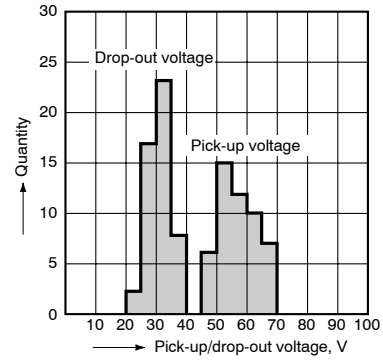
6. Operate/release time characteristics

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



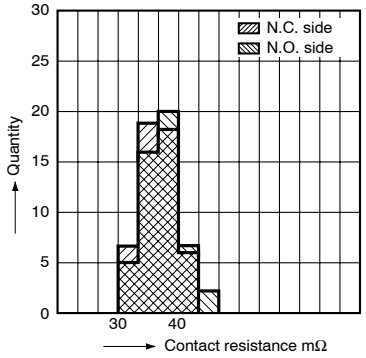
7. Distribution of pick-up and drop-out voltages

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



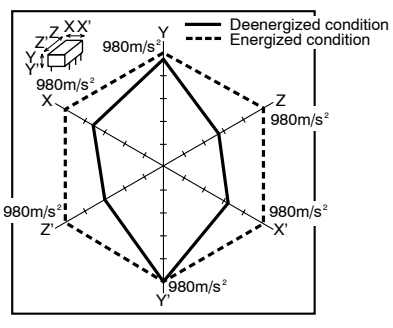
8. Distribution of contact resistance

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



9. Malfunction shock

Tested sample: HY1Z-12V, 6 pcs.



NOTE

Soldering and cleaning

HY relays have the sealed construction. It is possible to do automatic soldering and automatic cleaning, but avoid the ultrasonic cleaning.

For cleaning, it is recommended that a fluorinated hydrocarbon or other alcoholic solvent be used.

For Cautions for Use, see Relay Technical Information.