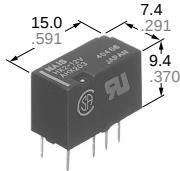


# NAIS

## Compact & Slim 2 Form C Non-polarized Relay

# HX-RELAYS



mm inch

### FEATURES

- **Compact size of (W) 7.4 × (L) 15.0 × (H) 9.4 mm (W) .291 × (L) .591 × (H) .370 inch.**
- **Surge withstand voltage of 1,500 V (between contact and coil)**  
Conforms to FCC Part 68.

- **High-density mounting is possible**
- **High reliability**  
The use of a gold-clad bifurcated structure for the movable contacts, and a low gas material for the forming materials and coil wiring ensures high contact reliability.

### SPECIFICATIONS

#### Contact

|                                                            |                                             |                                                            |
|------------------------------------------------------------|---------------------------------------------|------------------------------------------------------------|
| Arrangement                                                |                                             | 2 Form C                                                   |
| Initial contact resistance<br>(By voltage drop 6 V DC 1 A) |                                             | Max. 100 mΩ                                                |
| Contact material                                           |                                             | Gold-clad silver alloy                                     |
| Rating                                                     | Nominal switching capacity (resistive load) | 1 A 30 V DC, 0.3 A 125 V AC                                |
|                                                            | Max. switching power (resistive load)       | 30 W (DC), 37.5 VA (AC)                                    |
|                                                            | Max. switching voltage                      | 110 V DC, 125 V AC                                         |
|                                                            | Max. switching current                      | 1 A                                                        |
|                                                            | Min. switching capability ※1                | 1 mA 1 V DC                                                |
| Nominal operating power                                    |                                             | 320 mW                                                     |
| Expected life (min. operations)                            | Mechanical (at 180 cpm)                     | 10 <sup>7</sup>                                            |
|                                                            | Electrical (at 20 cpm)                      | 10 <sup>5</sup><br>(1 A 30 V DC, 0.3 A 125 V AC resistive) |

#### 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 By resistive method, nominal voltage applied to the coil; contact carrying current: 1A.
- \*3 Nominal voltage applied to the coil, 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 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 61)

#### Characteristics

|                                                   |                          |                                              |
|---------------------------------------------------|--------------------------|----------------------------------------------|
| Initial insulation*1 resistance                   |                          | Min. 1,000 MΩ (at 500 V DC)                  |
| Initial breakdown voltage                         | Between contacts         | 750 V rms for 1 min.                         |
|                                                   | Between contact and coil | 1,000 V rms for 1 min.                       |
|                                                   | Between contacts sets    | 1,000 V rms for 1 min.                       |
| Temperature rise*2                                |                          | Max. 60°C                                    |
| Operate time*3 (at 20°C 68°F)                     |                          | Max. 6 ms (Approx. 4 ms)                     |
| Release time(without diode)*3 (at 20°C 68°F)      |                          | Max. 5 ms (Approx. 3 ms)                     |
| Shock resistance                                  | Functional*4             | Min. 100 m/s <sup>2</sup> {10G}              |
|                                                   | Destructive*5            | Min. 1,000 m/s <sup>2</sup> {100G}           |
| Vibration resistance                              | Functional*6             | 10 to 55 Hz<br>at double amplitude of 1.0 mm |
|                                                   | Destructive              | 10 to 55 Hz<br>at double amplitude of 1.5 mm |
| Conditions for operation, transport and storage*7 | Ambient temperature      | -40 to +70°C<br>-40 to +158°F                |
|                                                   | Humidity                 | 5 to 85% R.H.                                |
|                                                   | Atmospheric pressure     | 86 to 106 kPa                                |
| Unit weight                                       |                          | Approx. 2g .07 oz                            |

### TYPICAL APPLICATIONS

- Telephone exchange, transmission equipment
- Communications devices
- Measurement devices
- Home appliances, and audio/visual equipment
- Office equipment

### ORDERING INFORMATION

|                     |   |                                |    |
|---------------------|---|--------------------------------|----|
| Ex. HX              | 2 | —                              | 3V |
| Contact arrangement |   | Coil voltage(DC)               |    |
| 2: 2 Form C         |   | 1.5, 3, 4.5, 5, 6, 9, 12, 24 V |    |

Note: 2,500V Surge (Bellcore) type is also available.  
Please consult us for details.

TYPES AND COIL DATA

| Contact arrangement | Coil rating, V DC | Part No.                               | Pick-up voltage, V DC (max.)<br>(at 20°C 68°F) | Drop-out voltage, V DC (min.)<br>(at 20°C 68°F) | Normal operating current, mA (±10%)<br>(at 20°C 68°F) | Coil Resistance, ohm (±10%)<br>(at 20°C 68°F) | Nominal operating power, mW | Max. allowable voltage, V DC<br>(at 70°C 158°F) |
|---------------------|-------------------|----------------------------------------|------------------------------------------------|-------------------------------------------------|-------------------------------------------------------|-----------------------------------------------|-----------------------------|-------------------------------------------------|
|                     |                   | Standard PC board terminal arrangement |                                                |                                                 |                                                       |                                               |                             |                                                 |
| 2 Form C            | 1.5               | HX2-1.5V                               | 1.13                                           | 0.15                                            | 214                                                   | 7.0                                           | 320                         | 1.65                                            |
|                     | 3                 | HX2-3V                                 | 2.25                                           | 0.3                                             | 107                                                   | 28.1                                          | 320                         | 3.3                                             |
|                     | 4.5               | HX2-4.5V                               | 3.38                                           | 0.45                                            | 71.1                                                  | 63.3                                          | 320                         | 4.95                                            |
|                     | 5                 | HX2-5V                                 | 3.75                                           | 0.5                                             | 64.0                                                  | 78.1                                          | 320                         | 5.5                                             |
|                     | 6                 | HX2-6V                                 | 4.5                                            | 0.6                                             | 53.6                                                  | 112                                           | 320                         | 6.6                                             |
|                     | 9                 | HX2-9V                                 | 6.75                                           | 0.9                                             | 35.6                                                  | 253                                           | 320                         | 9.9                                             |
|                     | 12                | HX2-12V                                | 9                                              | 1.2                                             | 26.7                                                  | 450                                           | 320                         | 13.2                                            |
|                     | 24                | HX2-24V                                | 18                                             | 2.4                                             | 13.3                                                  | 1,800                                         | 320                         | 26.4                                            |

Standard packing: Tube; 40 pcs.; Case : 1,000 pcs.

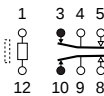
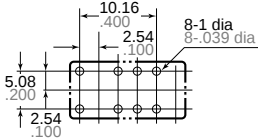
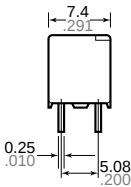
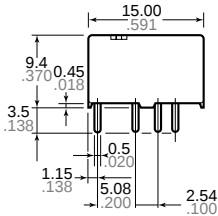
DIMENSIONS

mm inch

1. Standard PC board terminal type

PC board pattern (Bottom view)

Schematic (Bottom view)

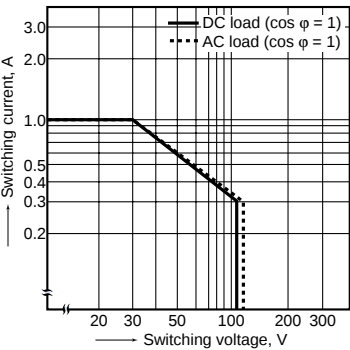


General tolerance: ±0.3 ±.012

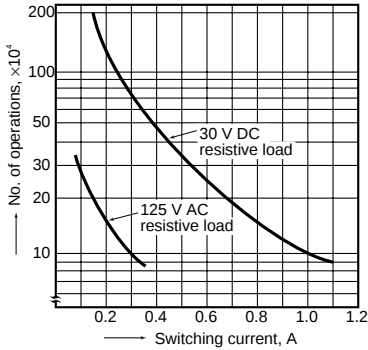
Tolerance: ±0.1 ±.004

REFERENCE DATA

1. Maximum switching capacity

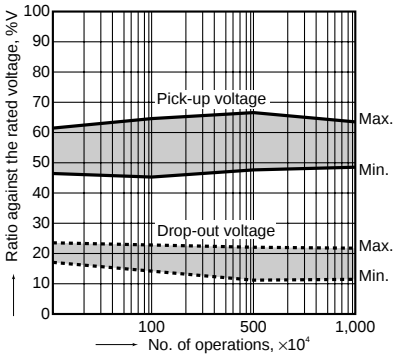


2. Life curve



3. Mechanical life

Tested sample: HX2-12 V, 10 pcs.

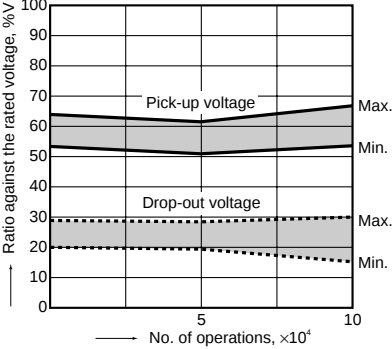


4. Electrical life (1 A 30 V DC resistive load)

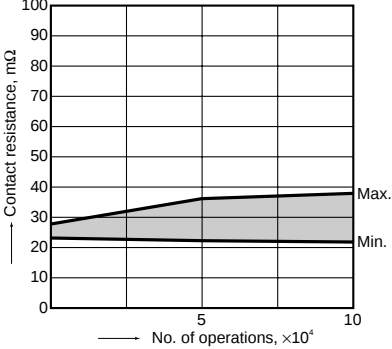
Tested sample: HX2-12 V, 6 pcs.

Operating frequency: 20 cpm

Change of pick-up and drop-out voltage



Change of contact resistance

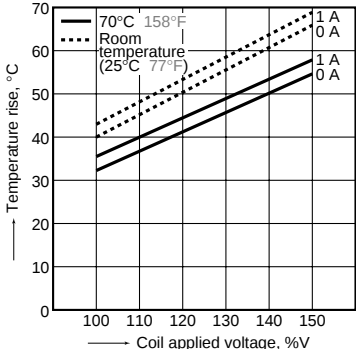


5. Coil temperature rise

Tested sample: HX2-12 V

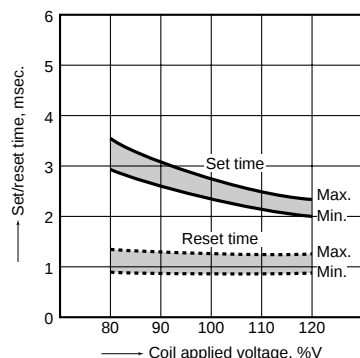
Measured portion: Inside the coil

Ambient temperature: 25°C 77°F, 70°C 158°F



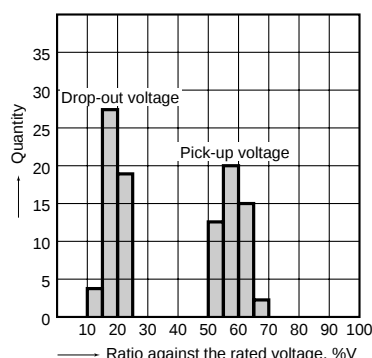
## 6. Operate/release time characteristics

Tested sample: HX2-12V, 10 pcs.



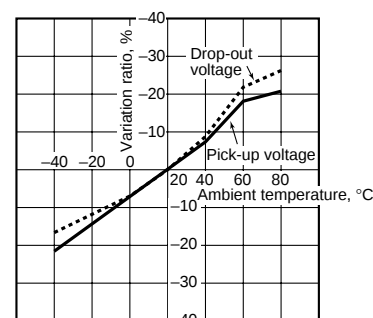
## 7. Distribution of pick-up and drop-out voltage

Tested sample: HX2-12V, 50 pcs.



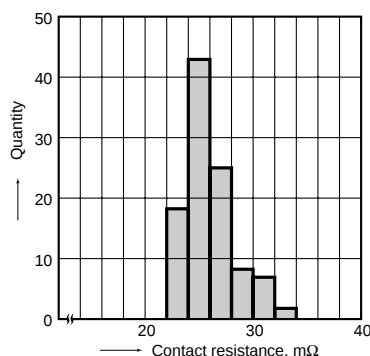
## 8. Ambient temperature characteristics

Tested sample: HX2-12V, 5 pcs.



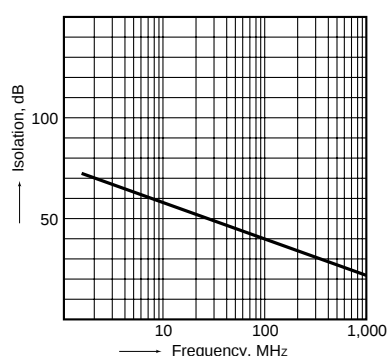
## 9. Distribution of contact resistance

Tested sample: HX2-12V, 25 pcs. (25 × 4 contacts)



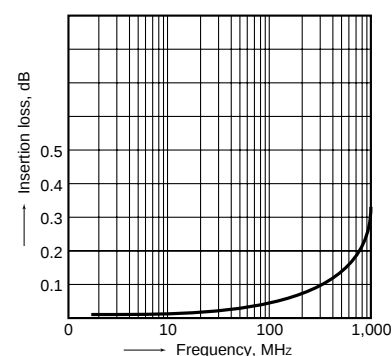
## 10.-(1) High frequency characteristics

Isolation characteristics



## 10.-(2) High frequency characteristics

Insertion loss characteristics



## NOTES

## 1. Coil operating power

Pure 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, check it with the actual circuit since the characteristics may be slightly different. The nominal operating voltage should be applied to the coil for more than 10 ms to set/reset the latching type relay.

## 2. Cleaning

In automatic cleaning, cleaning with the boiling method is recommended. Avoid ultrasonic cleaning which subject the relay to high frequency vibrations. It may cause the contacts to stick.

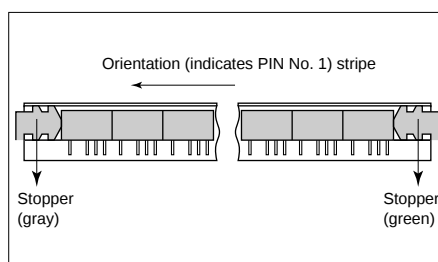
It is recommended that a fluorinated hydrocarbon or other alcoholic solvent be used.

## 3. Packing style

## • Packing direction

The relay is packed in a tube with the relay orientation mark on the left side, as shown in the figure below.

Take note of the relay orientation when mounting relays on the printed circuit board.



The temperature range is  $-40$  to  $+70^{\circ}\text{C}$   
 $-40$  to  $+158^{\circ}\text{F}$

## 4. Automatic insertion

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

Chucking pressure in direction A:

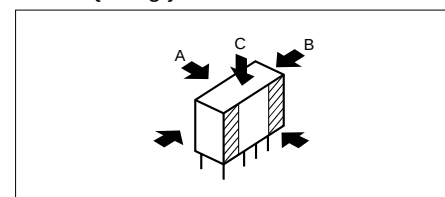
9.8 N {1 kgf} or less

Chucking pressure in direction B:

9.8 N {1 kgf} or less

Chucking pressure in direction C:

4.9 N {500 gf} or less



Please chuck the  portion.  
 Avoid chucking the center of the relay.

**For Cautions for Use, see Relay Technical Information (Page 48 to 76).**