

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

**Artisan Technology Group**
(217) 352-9330 | sales@artisantg.com | artisantg.com

**Full-service, independent repair center**
with experienced engineers and technicians on staff.

**We buy your excess, underutilized, and idle equipment**
along with credit for buybacks and trade-ins.

**Custom engineering**
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

**Expert team | Trust guarantee | 100% satisfaction**

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *NEC EB2-9NUH* at our website: *Click HERE*

NEC

# MINIATURE SIGNAL RELAY
# EB2 SERIES

## COMPACT AND LIGHT WEIGHT
## SURFACE MOUNTING TYPE

### DESCRIPTION

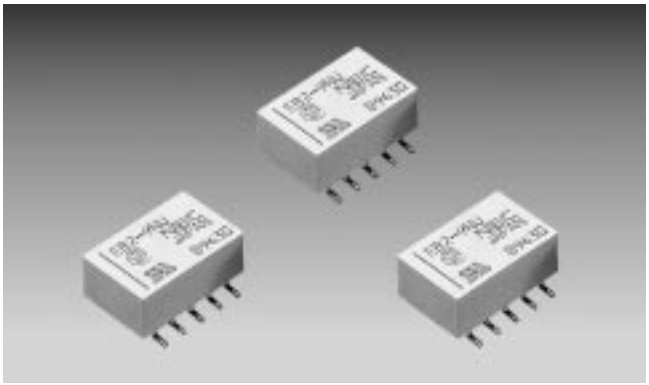
The EB2 series is a version of the EA2 series, suitable for surface mounting with infrared soldering (IRS) and vapor phase soldering (VPS). This series has three variations of high solder joint reliability type, and low profile type.

### FEATURES

- Compact and lightweight : 7.5 mm × 14.3 mm × 9.3 mm, 1.5 g
- 2 form c contact arrangement
- Low power consumption
- Low magnetic interference
- Breakdown voltage: 1 000 VAC (surge voltage 1 500 V), FCC Part 68 conformable
- UL recognized (E73266), CSA certified (LR 46266)
- Lineup in non-latch, single-coil latch and double-coil latch types
- Lineup in minimum footprint (9.3 × 14.3), and high solder joint reliability (20 years) types
- Lineup in low profile type (hight : 6.5 mm), and Ultra-low profile (hight : 5.6 mm)

### APPLICATIONS

Electronic switching systems, PBX, key telephone systems, automatic test equipment and other electronic equipment.



### ATTENTION

DO NOT EXCEED MAXIMUM RATINGS.

Do not use relays under exceeding conditions such as over ambient temperature, over voltage and over current. Incorrect use could result in abnormal heating, damage to related parts or cause burning.

READ CAUTIONS IN THE SELECTION GUIDE.

Read the cautions described in NEC's "Miniature Relays" (ER0046EJ∗) when you choose relays for your application.

The information in this document is subject to change without notice.

Document No. ER0016EJ5V0DS00 (5th edition)
Date Published February 1999 M
Printed in Japan

© NEC Corporation 1994

## PART NUMBER SYSTEM

EB2 - 5 S NUH - L

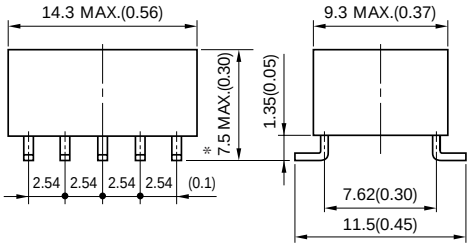
- EB2 series
- Nominal voltage: 3, 4.5, 5, 6, 9, 12, 24 volts
- Latch type
  - Nil : Non latch type
  - S : Single coil latch type
  - T : Double coil latch type
- Packaging code
  - Nil : Tube type
  - L : Embossd carrying type (L type)
  - R : Embossd carrying type (R type)
- Feature
  - Nil : Standard type
  - NU : UL recognized, CSA certified standard type
  - NUH : Minimum footprint type *
  - NUE : Low profile type *
  - NUL : Ultra-low profile type *

* UL recognized, CSA certified type

## OUTLINE DRAWINGS AND DIMENSIONS

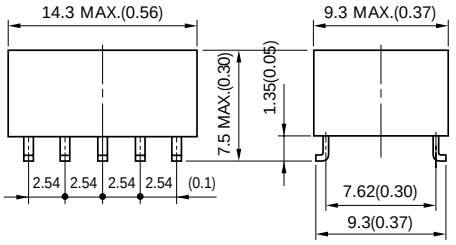
EB2-..
EB2-..NU
EB2-..NUE

Unit: mm (inch)

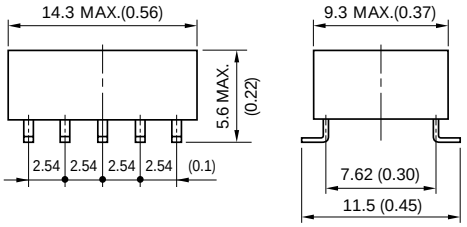



* Relay hight of NUE TYPE – 6.5 mm (0.26) MAX. (Initial)

EB2-..NUH




EB2-..NUL

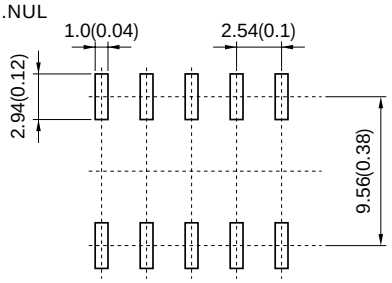



Note. General tolerance: ±0.2 (±0.008)

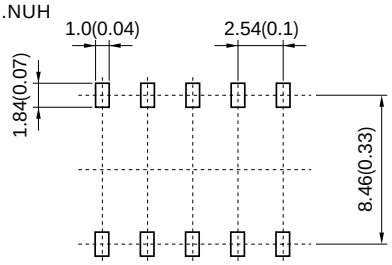
## PAD LAYOUTS (bottom view)

EB2-..
EB2-..NU
EB2-..NUE
EB2-..NUL

Unit: mm (inch)

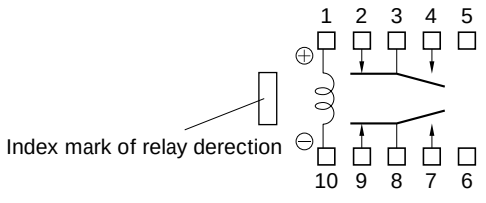



EB2-..NUH

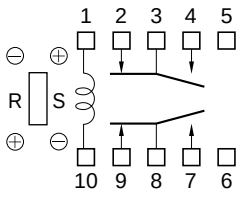



Note. General tolerance: ±0.1 (±0.004)

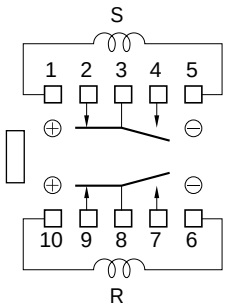
## PIN CONFIGURATIONS (bottom view)




Non-latch type
(not energized position)



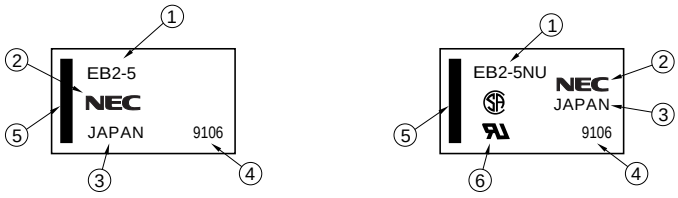

Single coil latch type
(reset position)




Double coil latch type
(reset position)

S : Coil polarity of set (operate)
R : Coil polarity of reset (release)

## MARKINGS (top view)




Standard type

UL recognized
CSA certified type

① Part number
② Manufacturer
③ Country of origin
④ Date code
⑤ Index mark of relay direction (pin No.1, 10)
⑥ UL, CSA Marking

## SAFETY STANDARD AND RATING

| UL Recognized (UL508)* File No E73266 | CSA Certificated (CSA C22.2 No14) File No LR46266 |
|---|---|
| 30 Vdc, 1 A (Resistive)<br>110 Vdc, 0.3 A (Resistive)<br>125 Vac, 0.5 A (Resistive) | |

* Spacing : UL114, UL478

## PERFORMANCE CHARACTERISTICS

| | | | |
|---|---|---|---|
| Contact Form | | 2 form c | |
| Contact rating | Maximum switching power | 30 W (resistive) | 62.5 VA (resistive) |
| | Maximum switching voltage | 220 Vdc | 250 Vac |
| | Maximum switching current | 1 A | |
| | Maximum carrying current | 2 A | |
| | Minimum carrying ratings | 10 mV.dc, 10mA *1 | |
| Initial contact resistance | | 50 mΩ typ. (Initial) | |
| Contact material | | Silver alloy with gold overlay | |
| Nominal operating Power | Non-latch type and double coil latch type | 140 mW (3 to 12 V)<br>200 mW (24 V) | |
| | Single coil Latch type | 100 mW (3 to 12 V)<br>150 mW (24 V) | |
| Minimum operating Power | Non-latch type and double coil latch type | 79 mW (3 to 12 V)<br>113 mW (24 V) | |
| | Single coil latch type | 56 mW (3 to 12 V)<br>85 mW (24 V) | |
| Operate time (excluding bounce) | | Approximately 2 ms without diode | |
| Release time (excluding bounce) | | Approximately 1 ms without diode | |
| Insulation resistance | | 1000 MΩ at 500 Vdc | |
| Breakdown voltage | Between open contacts | 1000 Vac (for one minute)<br>1500 V surge (10 × 160 μs *2) | |
| | Between adjacent contacts | | |
| | Between coil and contact | 1000 Vac (for one minute)<br>1500 V surge (10 × 160 μs *2) | |
| Shock resistance | | 735 m / s² (75 G) (misoperating)<br>980 m / s² (100 G) (destructive failure) | |
| Vibration resistance | | 10 to 55 Hz at double amplitude of 3 mm (20 G) (misoperating)<br>10 to 55 Hz, at double amplitude of 5 mm (30 G) (destructive failure) | |
| Ambient temperature | | –40°C to 85°C | |
| Coil temperature rise | | 18 degrees at nominal coil voltage | |
| Running specifications | Noload | 1 × 10⁸ operations (Non-latch type) *3 | |
| | | 1 × 10⁷ operations (latch type) | |
| | Load | 50 Vdc 0.1 A (resistive), 1 × 10⁶ operations at 85°C, 2 Hz | |
| | | 10 Vdc 10 mA (resistive), 1 × 10⁶ operations at 85°C, 2 Hz | |
| Weight | | Approximately 1.5 grams | |

*1 This value is a reference value in the resistance load.
Minimum capacity changes depending on seitching frequency and environment temperature and the load.
*2 Rise time : 10 μs, fall time : 160 μs
*3 This shows a number of operation where it can be running by which a fatal defect is not caused, and a number of operation by which a steady characteristic is maintained is 1 × 10⁷ times.

## PRODUCT LINEUP

### Non-latch Type

at 20˚C

| Nominal Coil Voltage (Vdc) | Coil Resistance (Ω) ±10 % | Must Operate Voltage (Vdc) | Must Release Voltage (Vdc) |
|---|---|---|---|
| 3 | 64.3 | 2.25 | 0.3 |
| 4.5 | 145 | 3.38 | 0.45 |
| 5 | 178 | 3.75 | 0.5 |
| 6 | 257 | 4.5 | 0.6 |
| 9 | 579 | 6.75 | 0.9 |
| 12 | 1028 | 9 | 1.2 |
| 24 | 2880 | 18 | 2.4 |

### Single-Coil Latch Type

at 20˚C

| Nominal Coil Voltage (Vdc) | Coil Resistance (Ω) ±10 % | Must Operate Voltage (Vdc) | Must Release Voltage (Vdc) |
|---|---|---|---|
| 3 | 90 | 2.25 | 2.25 |
| 4.5 | 202.5 | 3.38 | 3.38 |
| 5 | 250 | 3.75 | 3.75 |
| 6 | 360 | 4.5 | 4.5 |
| 9 | 810 | 6.75 | 6.75 |
| 12 | 1440 | 9 | 9 |
| 24 | 3840 | 18 | 18 |

### Double-Coil Latch Type ** (Can not be driven by revese po;arity for reverse operation.)

at 20˚C

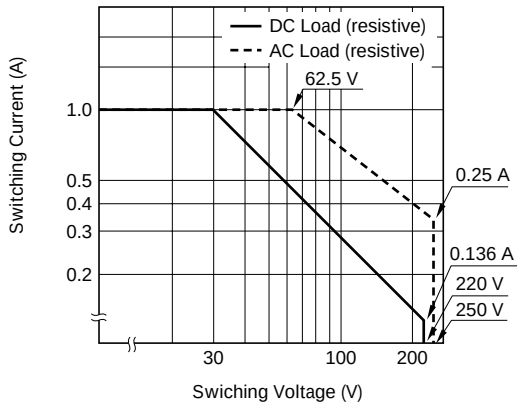
| Nominal Coil Voltage (Vdc) | Coil Resistance (Ω) ±10 % | | Must Operate Voltage (Vdc) | Must Release Voltage (Vdc) |
|---|---|---|---|---|
| 3 | S | 64.3 | 2.25 | – |
| | R | 64.3 | – | 2.25 |
| 4.5 | S | 145 | 3.38 | – |
| | R | 145 | – | 3.38 |
| 5 | S | 178 | 3.75 | – |
| | R | 178 | – | 3.75 |
| 6 | S | 257 | 4.5 | – |
| | R | 257 | – | 4.5 |
| 9 | S | 579 | 6.75 | – |
| | R | 579 | – | 6.75 |
| 12 | S | 1028 | 9 | – |
| | R | 1028 | – | 9 |
| 24 | S | 2880 | 18 | – |
| | R | 2880 | – | 18 |

Note * Test by pulse voltage

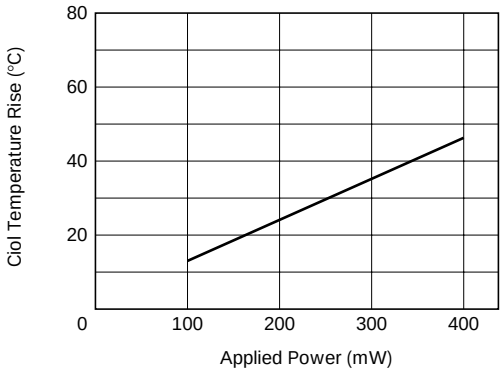
** S : Set coil (pin No.1...⊕, pin No.5...⊖) R: Reset coil (pin No.10...⊕, pin No.6...⊖)
The latch type relays should be initalized at appointed position before using, and should be enegized to specific polanity by a bone polabity to avoid wrong operation.
Any special coil requirement, please contact NEC for availability.

## TYPICAL PERFORMANCE DATA

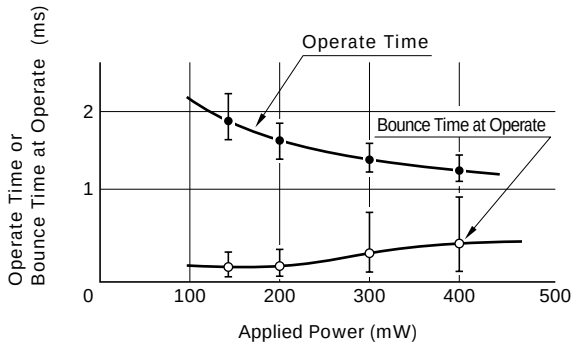
### SWITCHING CAPACITY



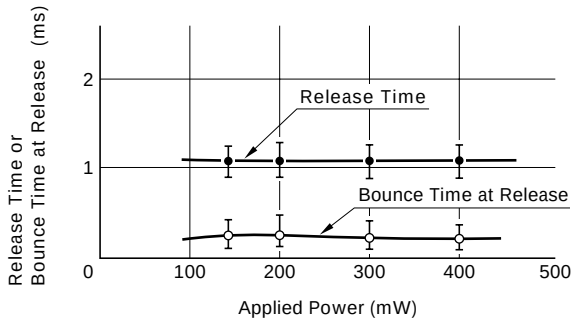

### COIL TEMPERATURE RISE



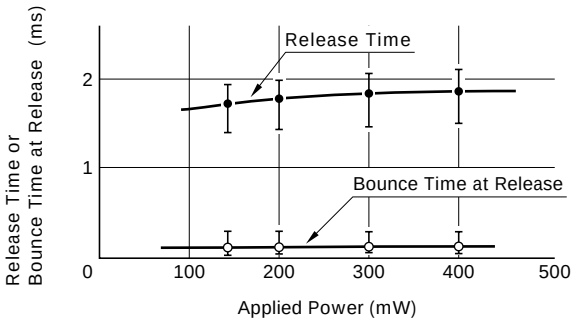

### OPERATE TIME



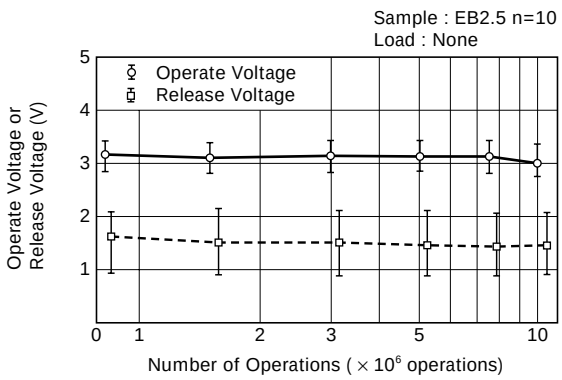

### RELEASE TIME WITHOUT DIODE

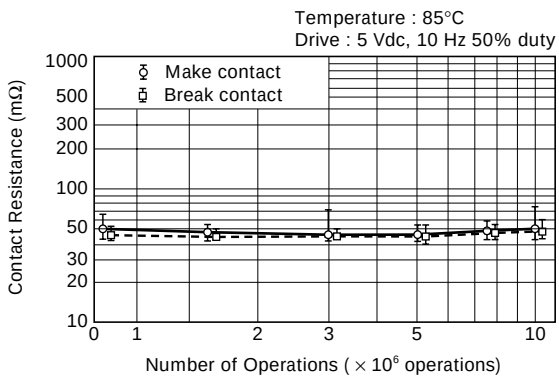



### RELEASE TIME WITH DIODE

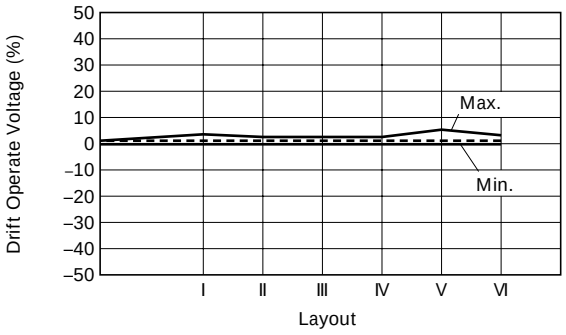


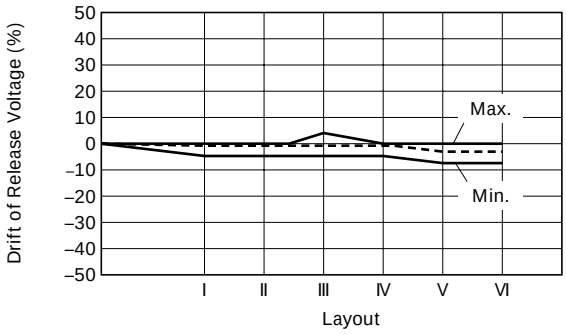

### RUNNING SPECIFICATIONS (Nonload)

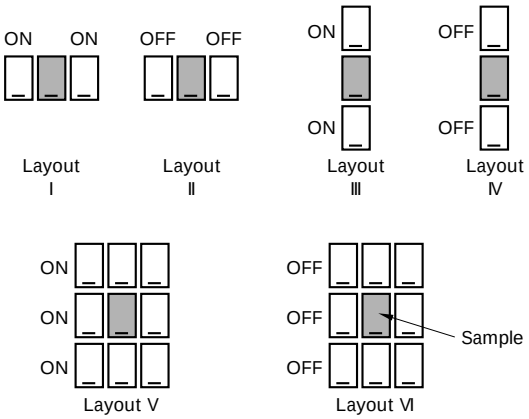


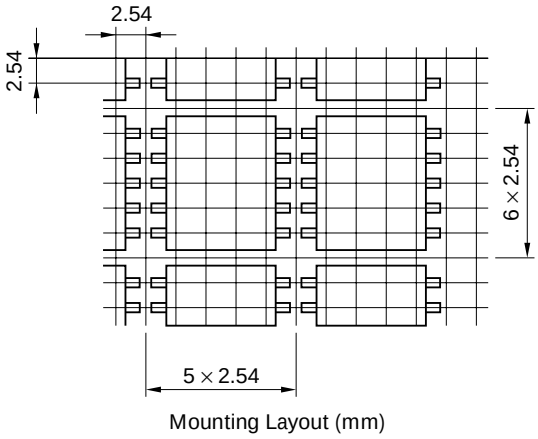



MAGNETIC INTERFERENCE



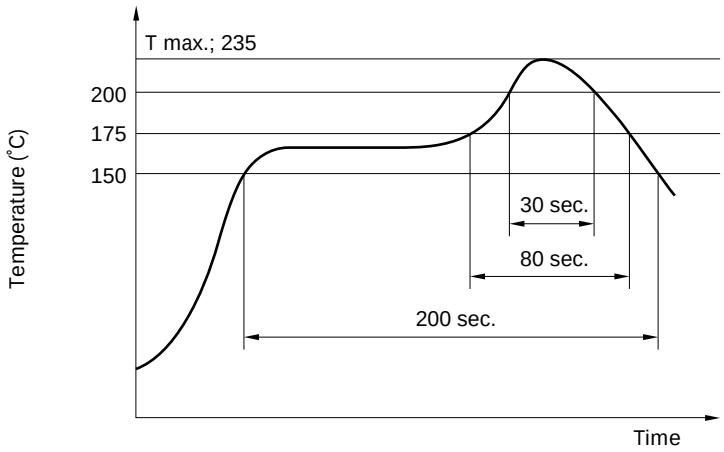



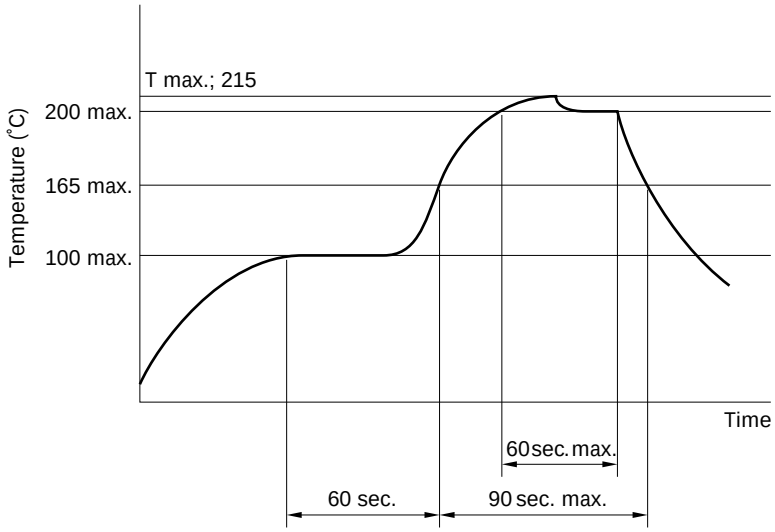

Mounting Layout (mm)

## SOLDERING CONDITION

### IRS Method




### VPS Method

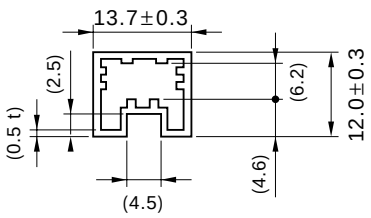



Note:

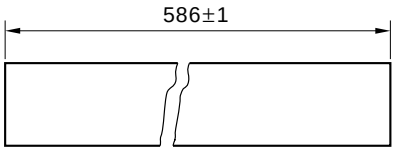
1. Temperature profile shows printed circuit board surface temperature on the relay terminal portion.
2. Check the actual soldering condition to use other method except above mentioned temperature profiles.

## TUBE PACKAGE

Dimension of Package (Unit : mm)

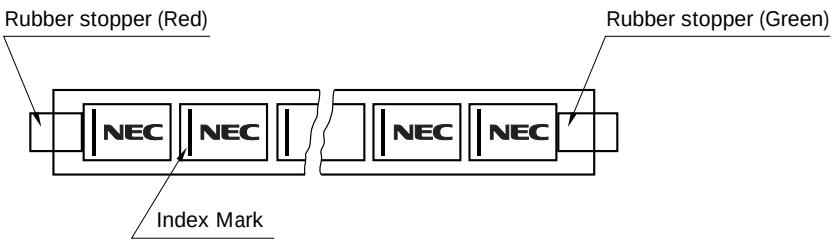



40 pieces / Tube
Material : Polyvinyl chloride
(anti-static treated)



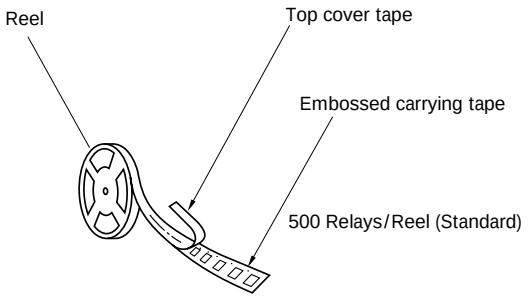

( ) Reference

Outline of Package

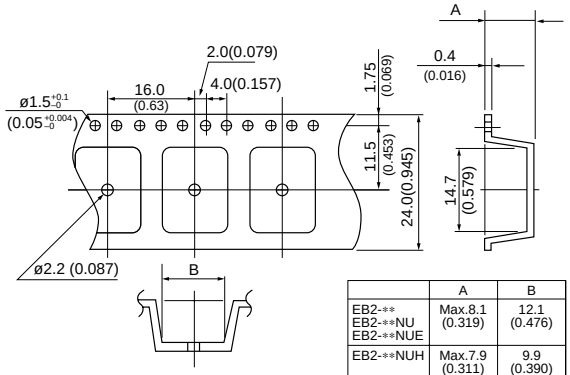


## TAPE PACKAGE

Appearance

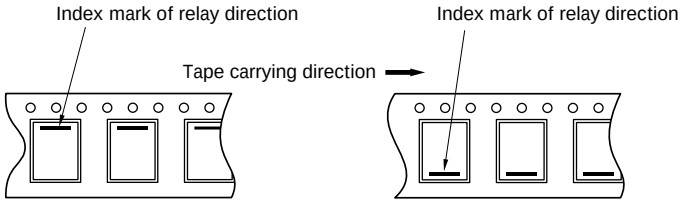



Tape Dimensions Unit : mm (inch)




| | A | B |
|---|---|---|
| EB2-**<br>EB2-**NU<br>EB2-**NUE | Max.8.1<br>(0.319) | 12.1<br>(0.476) |
| EB2-**NUH | Max.7.9<br>(0.311) | 9.9<br>(0.390) |
| EB2-**NUL | Max.6.5<br>(0.256) | 12.1<br>(0.476) |

Relay orientation mark and tape carrying direction.




## GUIDE TO APPLICATIONS

1. When connecting coils, refer to the pin configuration to prevent misoperation or malfunction.
2. The latch type relay should be initialized at the appointed position (set or reset position) when using, and should be energized or deenergized to the specified polarity to avoid wrong operations by reversed contact state.
3. Ultrasonic cleaning is not recommended to keep contact performance reliable. Alcohol-based solvents are available as proper solvents.
4. Pressurized stress on the relay cover may affect reliable operation.
5. Minimum contact load of the relay is 10 mV, 10 $\mu$A. This value is a reference value in the resistance load. Minimum capacity changes depending on swiching frequency and environment temperature and the load.

No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Corporation. NEC Corporation assumes no responsibility for any errors which may appear in this document.
NEC Corporation does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from use of a device described herein or any other liability arising from use of such device. No license, either express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Corporation or others.
While NEC Corporation has been making continuous effort to enhance the reliability of its electronic components, the possibility of defects cannot be eliminated entirely. To minimize risks of damage or injury to persons or property arising from a defect in an NEC electronic component, customers must incorporate sufficient safety measures in its design, such as redundancy, fire-containment, and anti-failure features.
NEC devices are classified into the following three quality grades:
"Standard", "Special", and "Specific". The Specific quality grade applies only to devices developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.

Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots
Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)
Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

The quality grade of NEC devices is "Standard" unless otherwise specified in NEC's Data Sheets or Data Books.
If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact an NEC sales representative in advance.
Anti-radioactive design is not implemented in this product.

**Artisan Technology Group** is an independent supplier of quality pre-owned equipment

## Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

## We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

## Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP