NEC

MINIATURE SIGNAL RELAY
EB2 SERIES

COMPACT AND LIGHT WEIGHT
SURFACE MOUNTING TYPE

DESCRIPTION

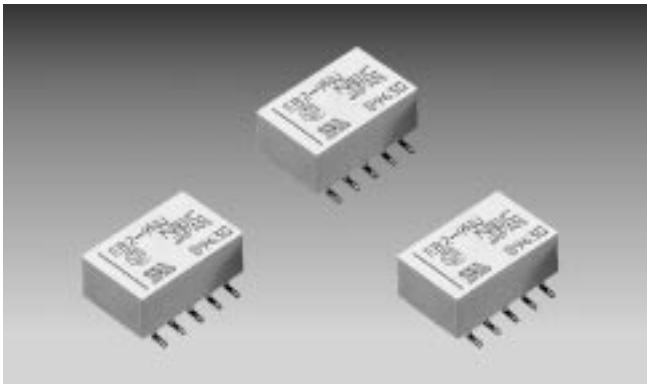
The EB2 series is a version of the EA2 series, suitable for surface mounting with infrared soldering (IRS) and vapor phase soldering (VPS). This series has three variations of high solder joint reliability type, and low profile type.

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.

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PART NUMBER SYSTEM

EB2 - 5 S NUH - L

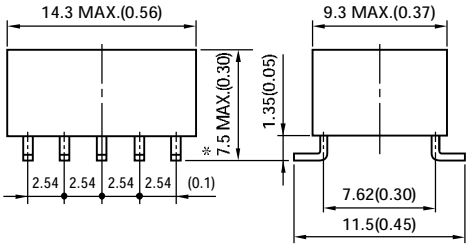
- EB2 series
- Nominal voltage: 3, 4.5, 5, 6, 9, 12, 24 volts
- Latch type
  - Nil : Non latch type
  - S : Single coil latch type
  - T : Double coil latch type
- Feature
  - Nil : Standard type
  - NU : UL recognized, CSA certified standard type
  - NUH : Minimum footprint type *
  - NUE : Low profile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

* UL recognized, CSA certified type

OUTLINE DRAWINGS AND DIMENSIONS

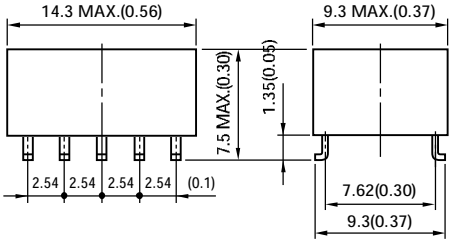
EB2-..
EB2-..NU
EB2-..NUE

Unit: mm (inch)

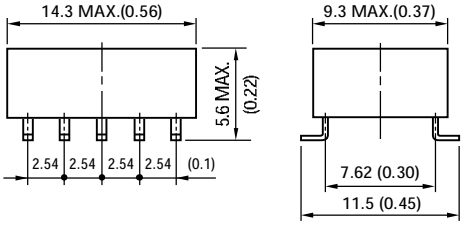


* Relay hight of NUE TYPE – 6.5 mm (0.26) MAX. (Initial)

EB2-..NUH



EB2-..NUL

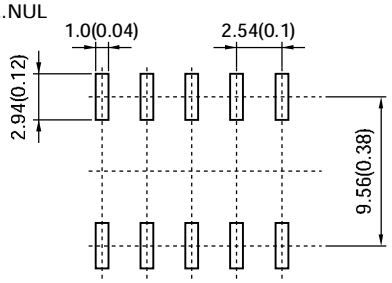


Note. General tolerance: ±0.2 (±0.008)

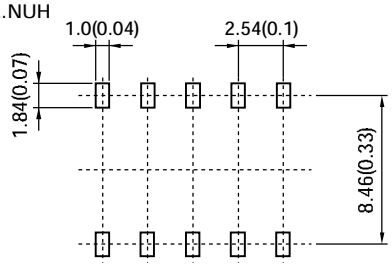
PAD LAYOUTS (bottom view)

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

Unit: mm (inch)

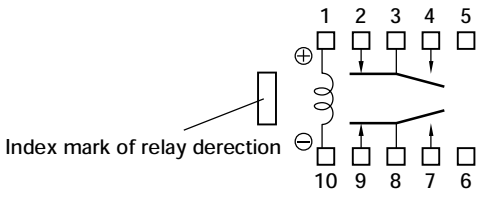


EB2-..NUH

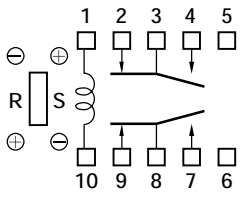


Note. General tolerance: ±0.1 (±0.004)

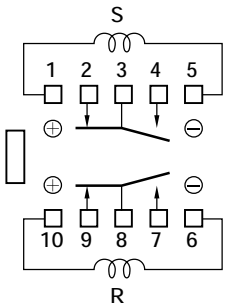
PIN CONFIGURATIONS (bottom view)



Non-latch type
(not energized position)



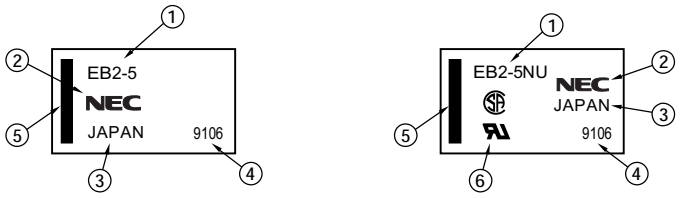
Single coil latch type
(reset position)



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) 110 Vdc, 0.3 A (Resistive) 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) 200 mW (24 V)	
	Single coil Latch type	100 mW (3 to 12 V) 150 mW (24 V)	
Minimum operating Power	Non-latch type and double coil latch type	79 mW (3 to 12 V) 113 mW (24 V)	
	Single coil latch type	56 mW (3 to 12 V) 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) 1500 V surge (10 × 160 μs *2)	
	Between adjacent contacts		
	Between coil and contact	1000 Vac (for one minute) 1500 V surge (10 × 160 μs *2)	
Shock resistance		735 m/s² (75 G) (misoperating) 980 m/s² (100 G) (destructive failure)	
Vibration resistance		10 to 55 Hz at double amplitude of 3 mm (20 G) (misoperating) 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	1×10^8 operations (Non-latch type) *3	
		1×10^7 operations (latch type)	
	Load	50 Vdc 0.1 A (resistive), 1×10^6 operations at 85°C, 2 Hz	
		10 Vdc 10 mA (resistive), 1×10^6 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 1×10^7 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

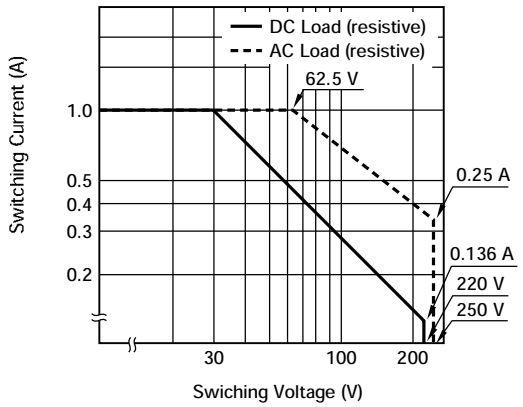
Nominal Coil Voltage (Vdc)	Coil Resistance (Ω) ±10 %		Must Operate Voltage (Vdc)	Must Release Voltage (Vdc)
3	S	64.3	2.25	–
	R	64.3	–	2.25
4.5	S	145	3.38	–
	R	145	–	3.38
5	S	178	3.75	–
	R	178	–	3.75
6	S	257	4.5	–
	R	257	–	4.5
9	S	579	6.75	–
	R	579	–	6.75
12	S	1028	9	–
	R	1028	–	9
24	S	2880	18	–
	R	2880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

Note * Test by pulse voltage

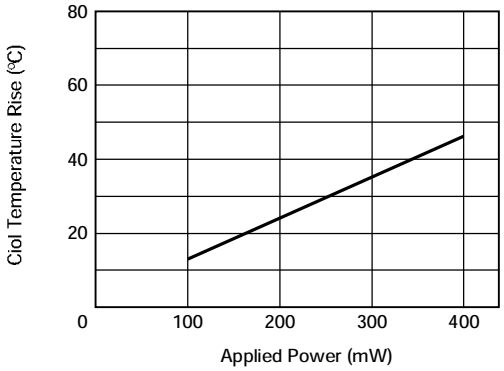
** S : Set coil (pin No.1...⊕, pin No.5...⊖) R: Reset coil (pin No.10...⊕, pin No.6...⊖)
The latch type relays should be initalized at appointed position before using, and should be enegized to specific polanity by a bone polabity to avoid wrong operation.
Any special coil requirement, please contact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

TYPICAL PERFORMANCE DATA

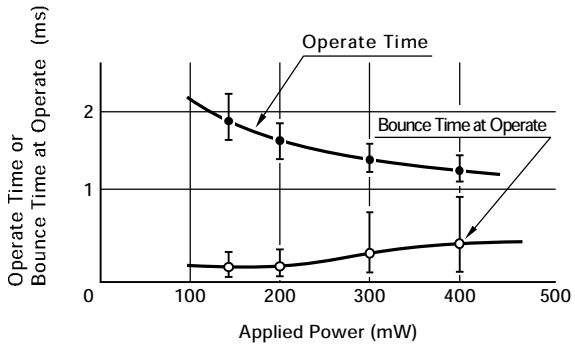
SWITCHING CAPACITY



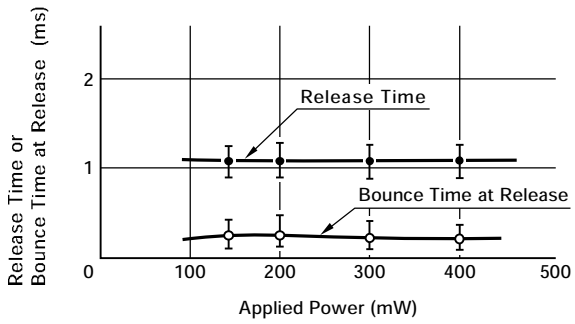
COIL TEMPERATURE RISE



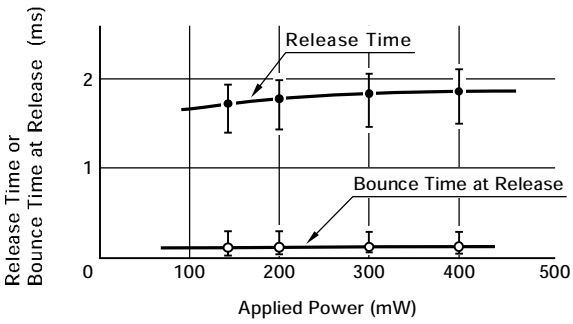
OPERATE TIME



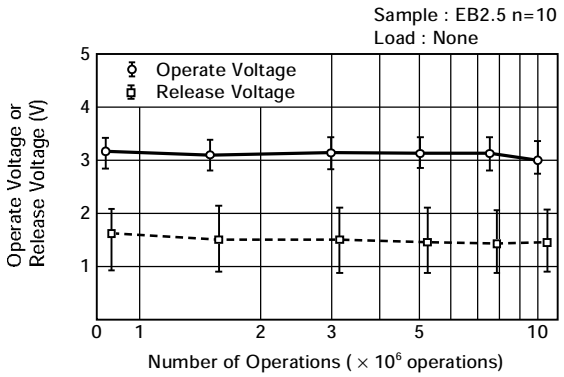
RELEASE TIME WITHOUT DIODE

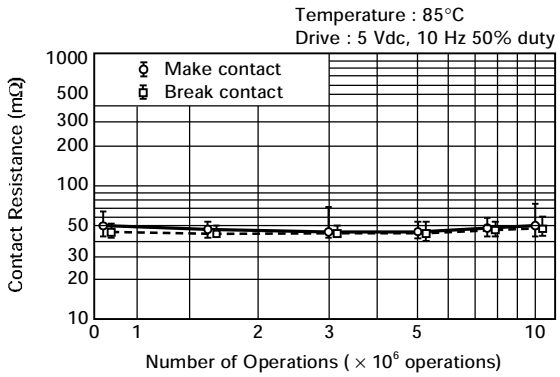


RELEASE TIME WITH DIODE

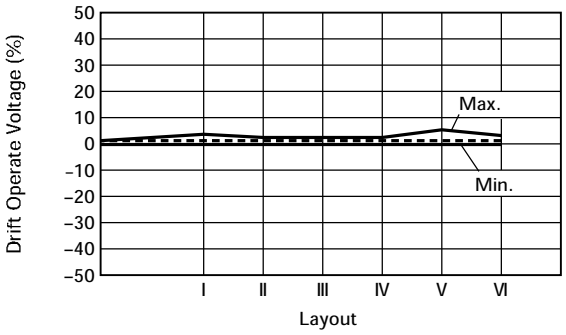


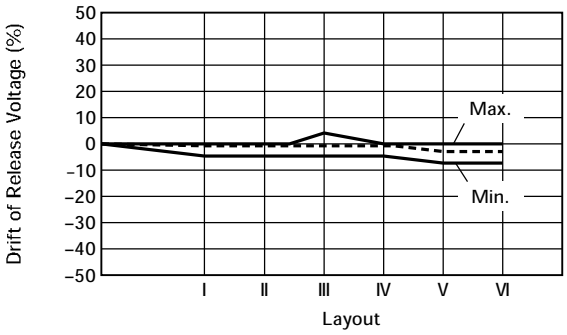
RUNNING SPECIFICATIONS (Nonload)

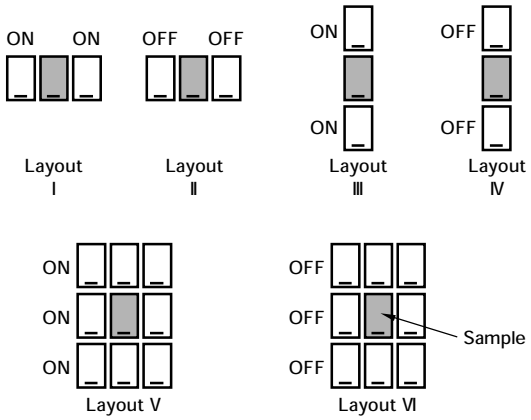


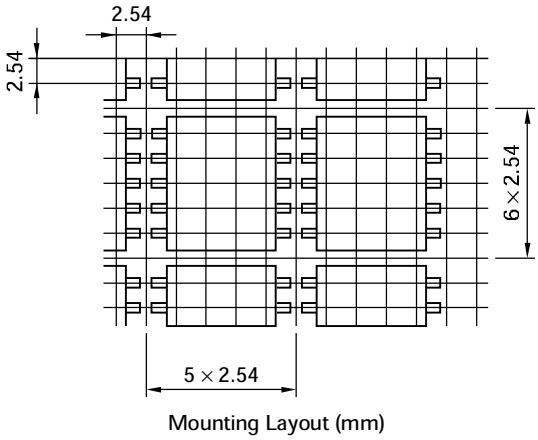


MAGNETIC INTERFERENCE





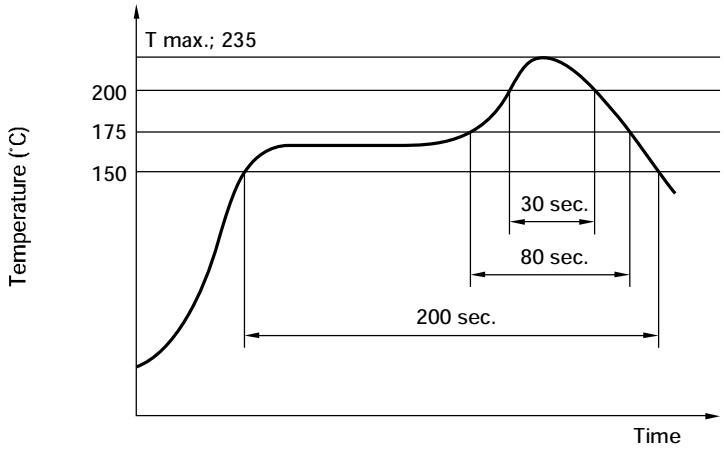




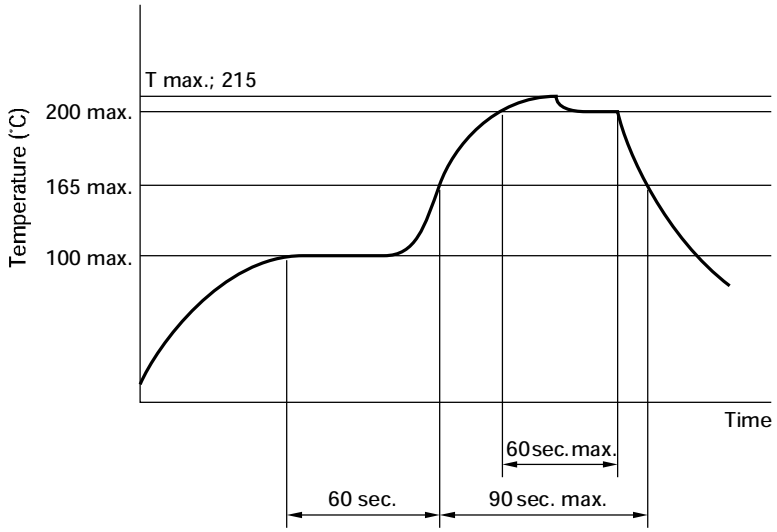
Mounting Layout (mm)

SOLDERING CONDITION

IRS Method



VPS Method

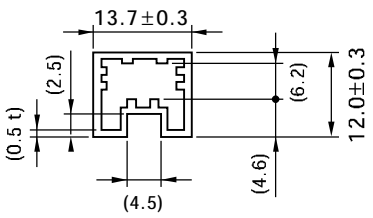


Note:

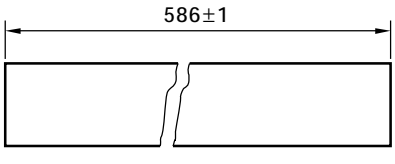
1. Temperature profile shows printed circuit board surface temperature on the relay terminal portion.
2. Check the actual soldering condition to use other method except above mentioned temperature profiles.

TUBE PACKAGE

Dimension of Package (Unit : mm)

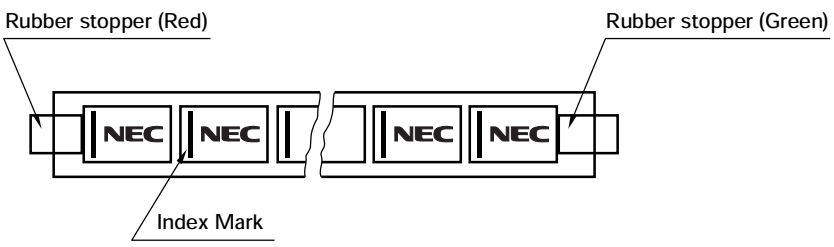


40 pieces / Tube
Material : Polyvinyl chloride
(anti-static treated)



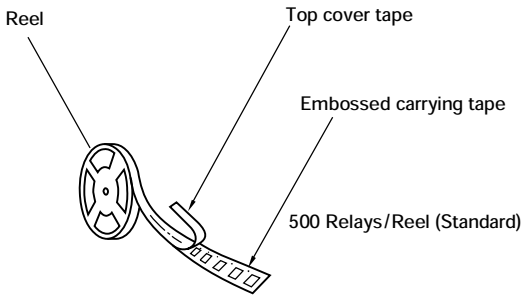
( ) Reference

Outline of Package

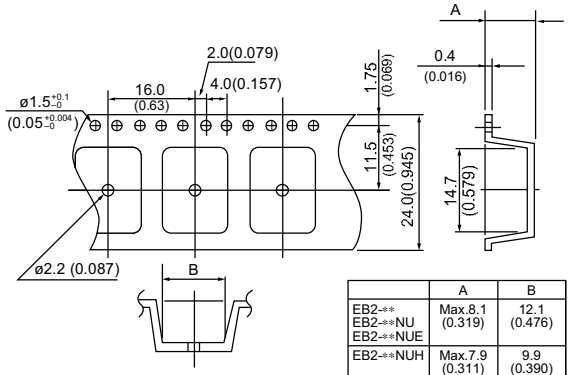


TAPE PACKAGE

Appearance

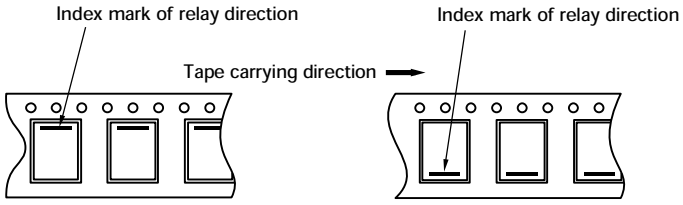


Tape Dimensions Unit : mm (inch)



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

Relay orientation mark and tape carrying direction.



EB2.....-L EB2.....-R

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 μA. This value is a reference value in the resistance load. Minimum capacity changes depending on swiching frequency and environment temperature and the load.