

AUTOMOTIVE RELAYS ET2/ET1 SERIES

DESCRIPTION

The new NEC ET2/ET1 series is PC-board mount type automotive relay suitable for various motor and heater control applications that require a high quality and performance. The ET2/ET1 series is the relay that succeeds fundamental structure and performance of the NEC EP2/EP1 series that has the high share with a motor control usage of the automobile of the world. Besides the ET2/ET1 series is succeeding in about 50% of miniaturization in comparison with the EP2/EP1 series.

FEATURES

- PC board mounting
- Approx. 50% relay volume of EP2/EP1
- Approx. 75% relay space of EP2/EP1
- Approx. 70% relay height of EP2/EP1
- Approx. 50% relay weight of EP2/EP1

APPLICATIONS

- Motor control
- Heater control
- Solenoid control



Type ET2



Type ET1

For Proper Use of Miniature Relays

DO NOT EXCEED MAXIMUM RATING.

Do not use relay under excessive conditions such as over ambient temperature, over voltage and over current. Incorrect use could result in abnormal heating and damage to the relay or other parts.

READ CAUTIONS IN THE SELECTION GUIDE.

Read the cautions described in NEC/TOKIN's "Miniature Relays" (0123EMDD03VOL01E) before dose designing your relay applications.

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

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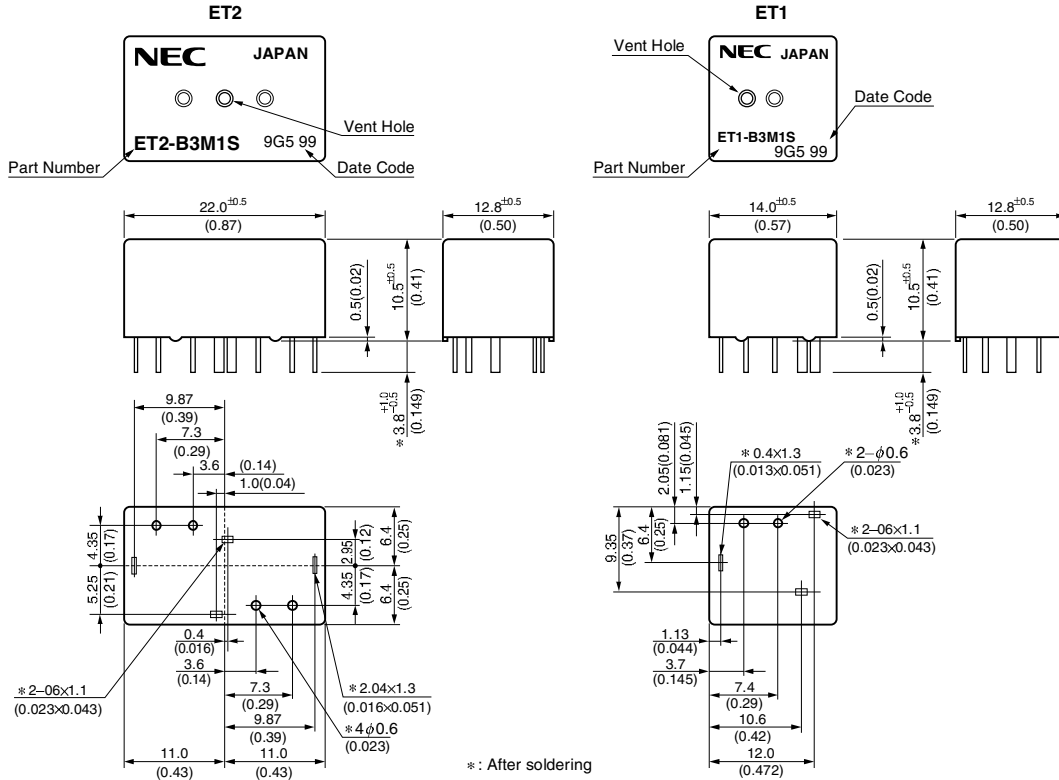


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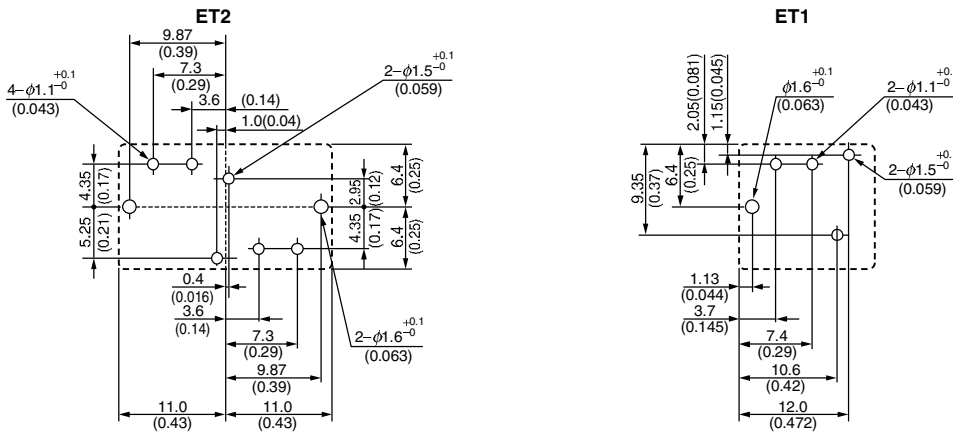
SCHMATIC (BOTTOM VIEW)



DIMENSIONS mm (inch)



PCB PAD LAYOUT mm (inch) (BOTTOM VIEW)



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SPECIFICATIONS

(at 20 °C)

| Items | | Types | |
|---------------------------------|--------------------------|-------------------------------------------------------|----------------------------------|
| | | Twin | Single |
| | | ET2-B3M1/ET2-B3M1S | ET1-B3M1/ET1-B3M1S |
| Contact Form | | 1 Form c × 2 (H Bridge) | 1 Form c |
| Contact Rating | Max. Switching Voltage | 16 V dc | |
| | Max. Switching Current | 25 A (at 16 Vdc) | |
| | Min. Switching Current | 1 A (at 5 Vdc) | |
| | Contact Resistance | 4 mΩ typical (measured at 7 A) Initial | |
| Contact Material | | Silver oxide complex alloy | |
| Operate Time (Excluding Bounce) | | 2.5 ms typical (at Nominal Voltage) Initial | |
| Release Time (Excluding Bounce) | | 3 ms typical (at Nominal Voltage, with diode) Initial | |
| Nominal Operate Power | | 640 mW | |
| Insulation Resistance | | 100 MΩ at 500 V dc | |
| Breakdown Voltage | Between Open Contact | 500 V ac min. (for 1 minute) | |
| | Between Coil and Contact | 500 V ac min. (for 1 minute) | |
| Shock Resistance | Misoperation | 98 m/s ² (10 G) | |
| | Destructive Failure | 980 m/s ² (100 G) | |
| Vibration Resistance | Misoperation | 10 ~ 300 Hz, 43 m/s ² (4.4 G) | |
| | Destructive Failure | 10 ~ 500 Hz, 43 m/s ² (4.4 G) 200 hour | |
| Ambient Temperature | | -40 to +85 °C (-40 to +185 °F) | |
| Coil Temperature Rise | | 70 °C (158 °F)/W | |
| Life Expectancy | Mechanical | | 1 × 10 ⁶ operations |
| | Electrical | Power Window Motor (14 V, 20 A, Locked) | 100 × 10 ³ operations |
| | | Power Window Motor (14 V, 20 A /3 A, Unlocked) | 100 × 10 ³ operations |
| Weight | | Approx. 7.5 g (0.26 oz) | Approx. 4.5 g (0.16 oz) |

COIL RATING

SEALED TYPE

(at 20 °C)

| Contact Form | | Part Number | Nominal Voltage (Vdc) | Coil Resistance (Ω±10%) | Must Operate Voltage (Vdc) | Must Release Voltage (Vdc) |
|--------------|--------------|-------------|-----------------------|-------------------------|----------------------------|----------------------------|
| Twin | 1 Form c × 2 | ET2-B3M1S | 12 | 225 | 6.5 | 0.9 |
| Single | 1 Form c | ET1-B3M1S | | | | |

UNSEALED TYPE

(at 20 °C)

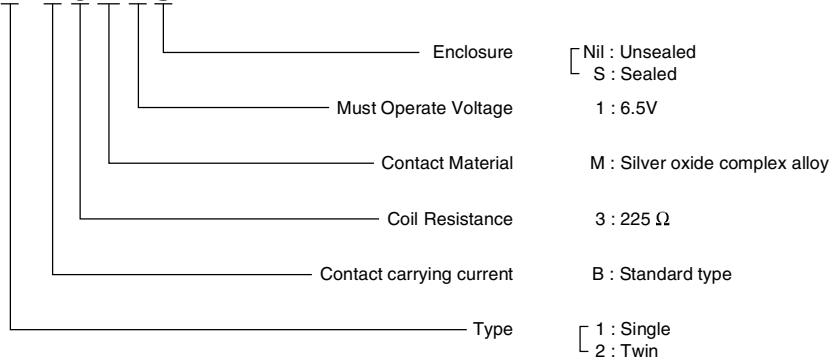
| Contact Form | | Part Number | Nominal Voltage (Vdc) | Coil Resistance (Ω±10%) | Must Operate Voltage (Vdc) | Must Release Voltage (Vdc) |
|--------------|--------------|-------------|-----------------------|-------------------------|----------------------------|----------------------------|
| Twin | 1 Form c × 2 | ET2-B3M1 | 12 | 225 | 6.5 | 0.9 |
| Single | 1 Form c | ET1-B3M1 | | | | |



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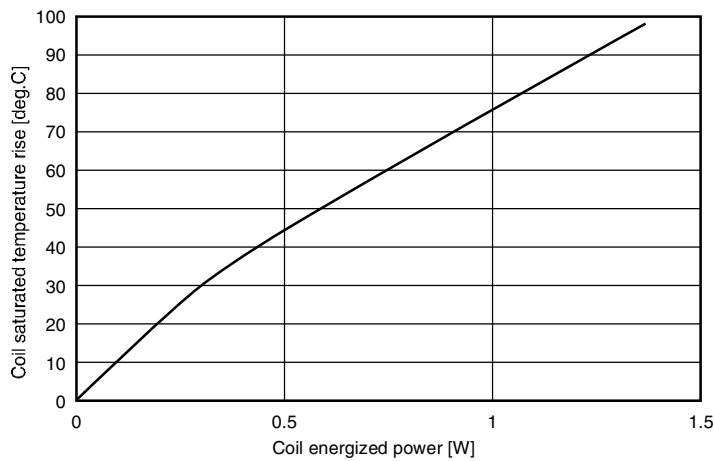
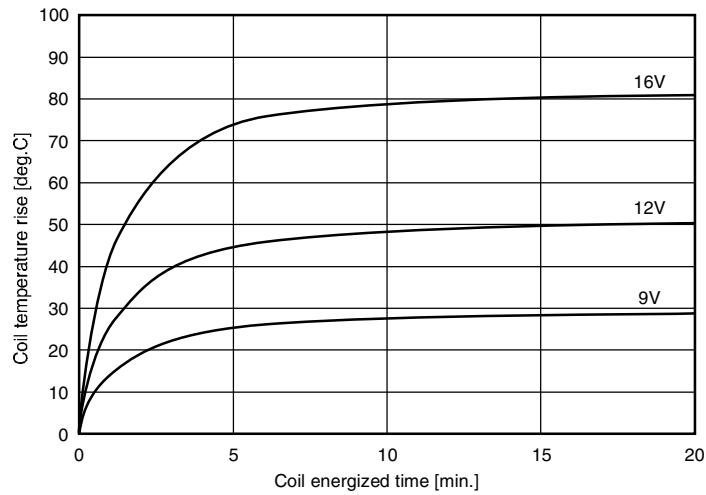
NUMBERING SYSTEM

ET2-B3M1S



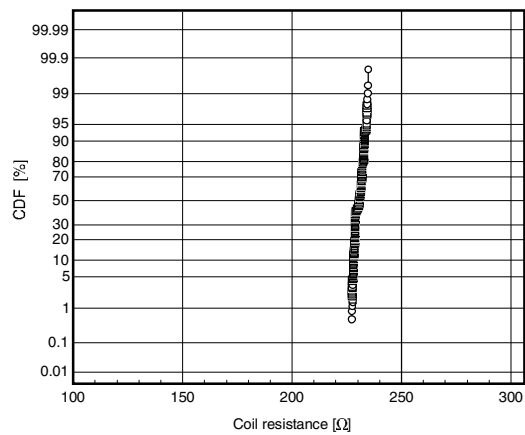
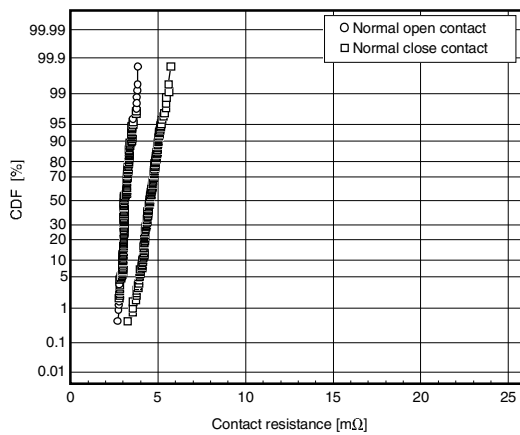
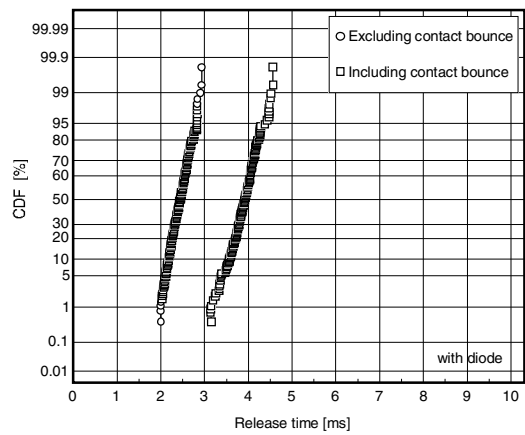
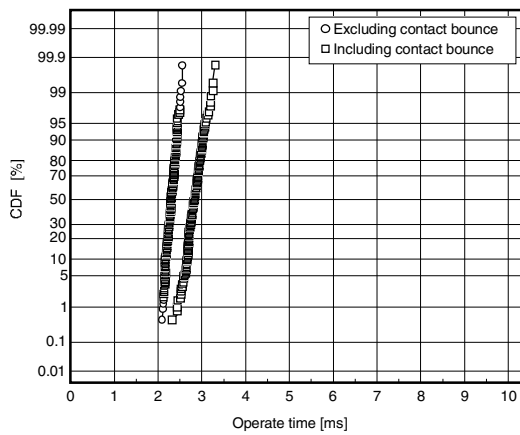
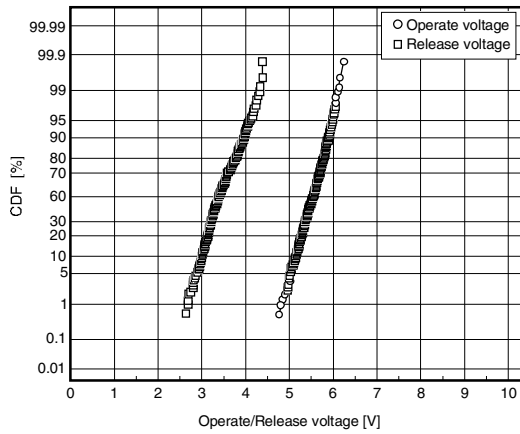
COIL TEMPERATURE RISE

Test piece : ET1-B3M1S



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RELAY CHARACTERISTICS DISTRIBUTION (INITIAL)

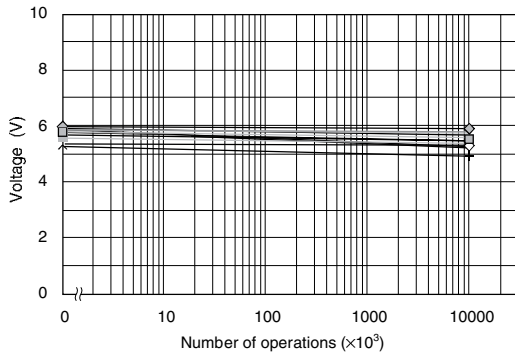


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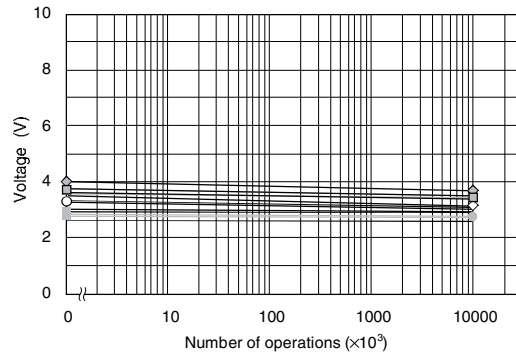
DURABILITY LIFE

Mechanical life test

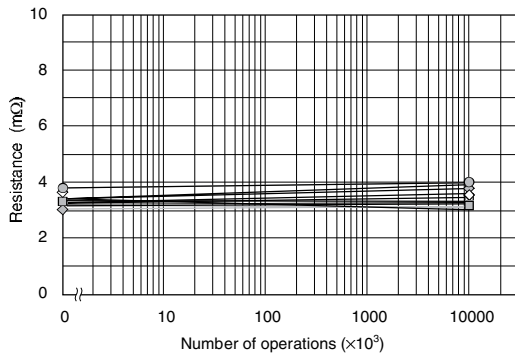
- Ambient temperature : 20 °C
- Frequency : 15 Hz (50 % duty)
- Contact load : No load
- Number of operations : 10×10^6
- Samples : ET2-B3M1S 10 pieces



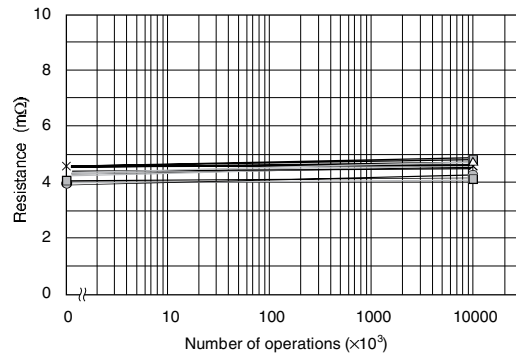
Operate Voltage



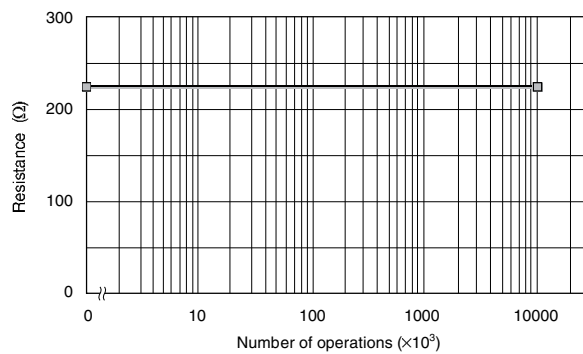
Release Voltage



Contact Resistance (N.O contact)



Contact Resistance (N.C contact)



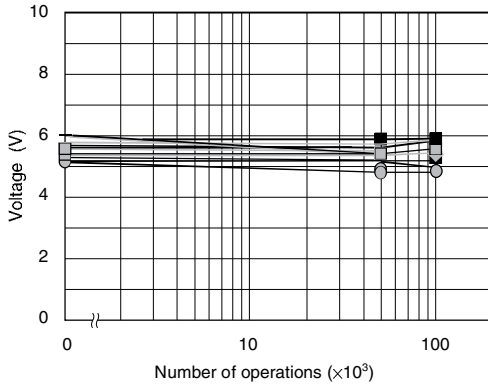
Coil resistance



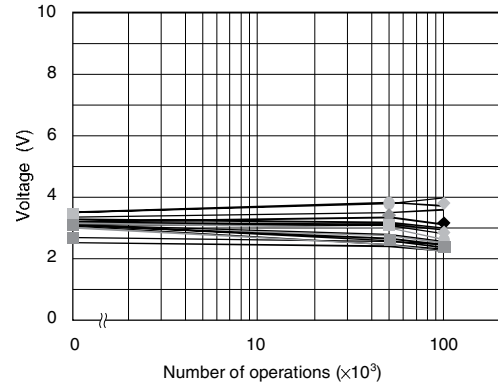
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Electrical life test (1)

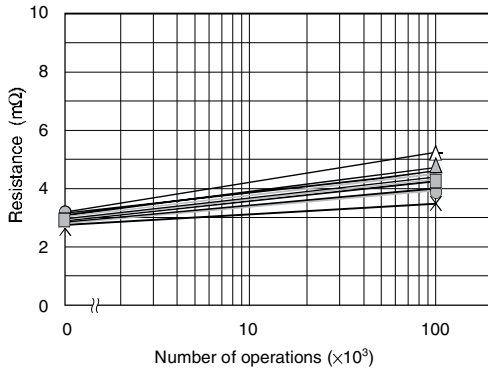
- Ambient temperature : 20 °C
- Frequency : 0.2s ON/9.8s OFF, 0.1 Hz
- Contact load : 14 VDC, 20A, Power window motor load, locked
- Number of operations : 100×10^3
- Samples : ET2-B3M1S 10 pieces



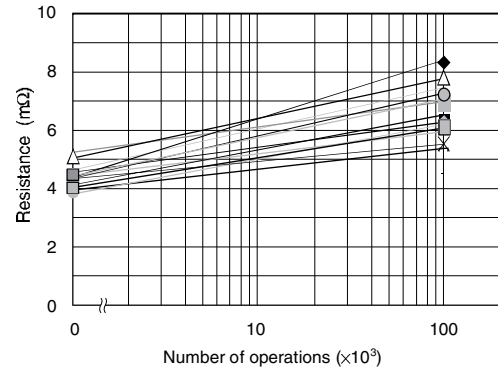
Operate Voltage



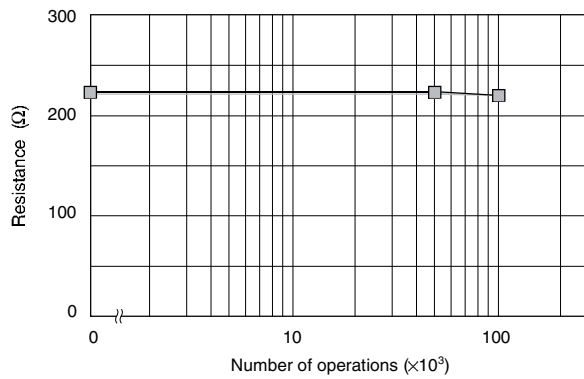
Release Voltage



Contact Resistance (N.O contact)



Contact Resistance (N.C contact)



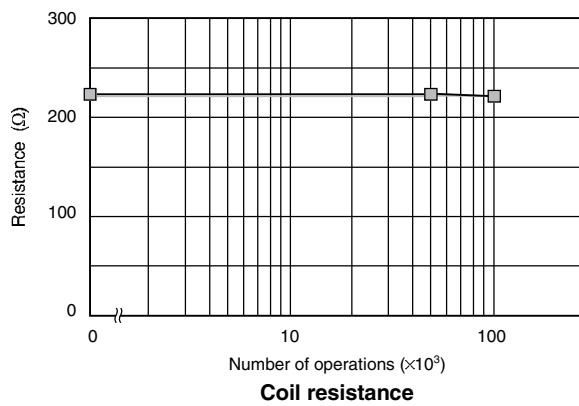
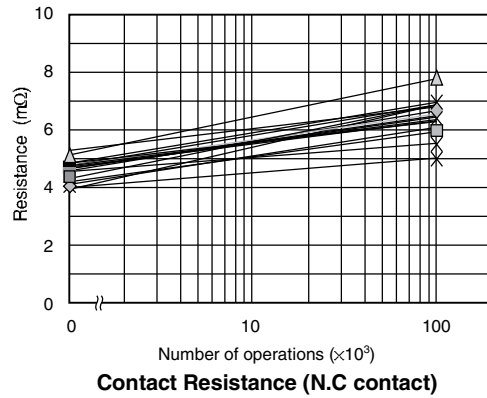
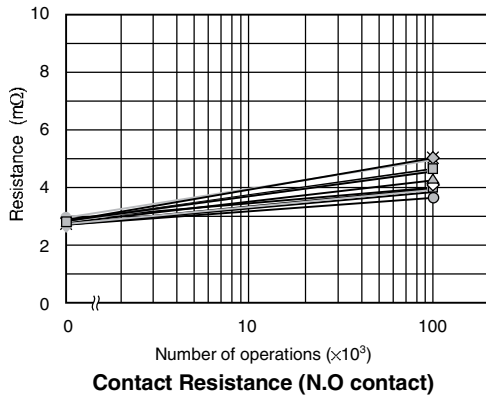
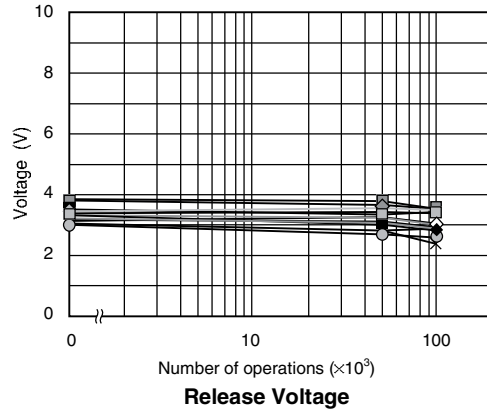
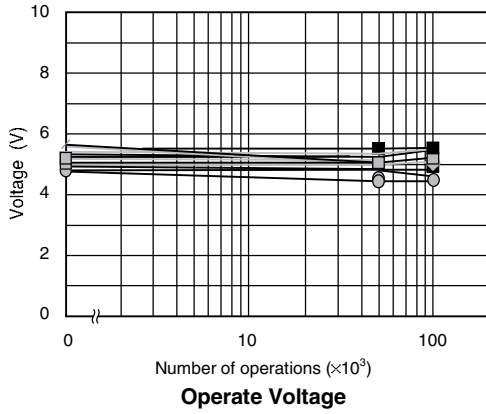
Coil resistance



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Electrical life test (2)

- Ambient temperature : 20 °C
- Frequency : 0.2s ON/9.8s OFF, 0.1 Hz
- Contact load : 14 VDC, 20A, Power window motor load, Unlocked
- Number of operations : 100×10^3
- Samples : ET2-B3M1S 10 pieces



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[MEMO]



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While NEC/TOKIN 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/TOKIN electronic component, customers must incorporate sufficient safety measures in its design, such as redundancy, fire-containment, and anti-failure features. NEC/TOKIN 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/TOKIN devices is "Standard" unless otherwise specified in NEC/TOKIN's Data Sheets or Data Books. If customers intend to use NEC/TOKIN devices for applications other than those specified for Standard quality grade, they should contact an NEC/TOKIN sales representative in advance.

(Note)

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DE0202



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