

## DESCRIPTION

The new NEXEM 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 NEXEM 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 EM Devices' "Miniature Relays" before dose designing your relay applications.

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

© EM Devices Corporation 2017

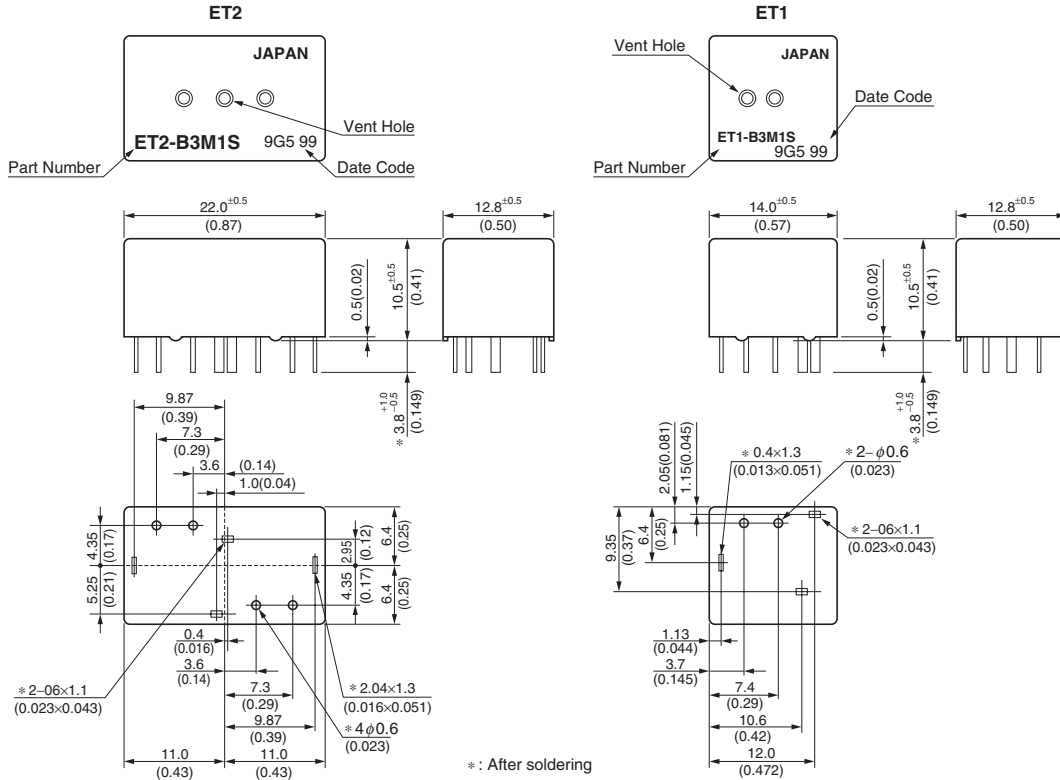


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.

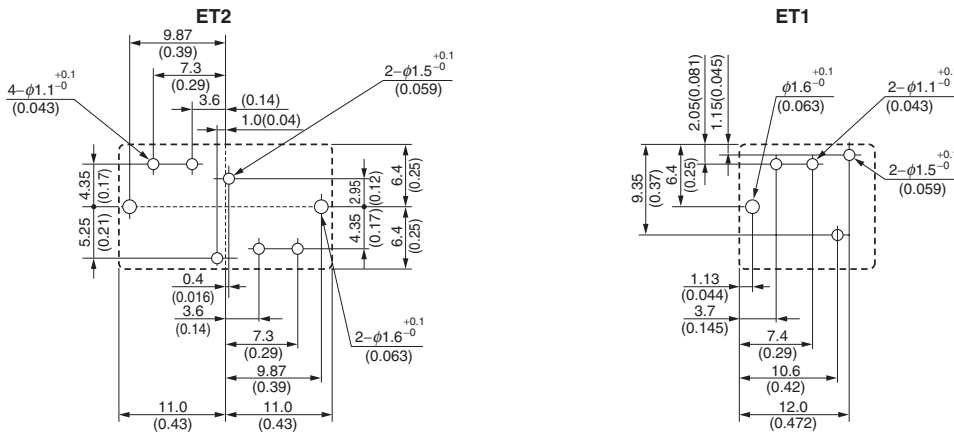
**SCHEMATIC (BOTTOM VIEW)**



**DIMENSIONS mm (inch)**



**PCB PAD LAYOUT mm (inch) (BOTTOM VIEW)**



- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.

**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 <sup>2</sup> (10 G)                            |                                  |
|                                 | Destructive Failure      | 980 m/s <sup>2</sup> (100 G)                          |                                  |
| Vibration Resistance            | Misoperation             | 10 ~ 300 Hz, 43 m/s <sup>2</sup> (4.4 G)              |                                  |
|                                 | Destructive Failure      | 10 ~ 500 Hz, 43 m/s <sup>2</sup> (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 <sup>6</sup> operations   |
|                                 | Electrical               | Power Window Motor (14 V, 20 A, Locked)               | 100 × 10 <sup>3</sup> operations |
|                                 |                          | Power Window Motor (14 V, 20 A /3 A, Unlocked)        | 100 × 10 <sup>3</sup> 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)

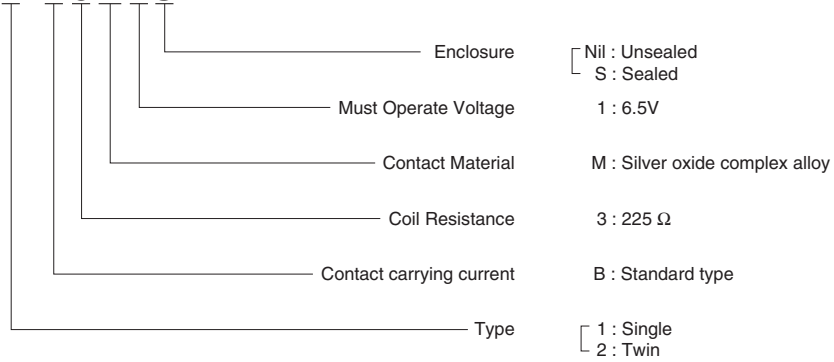
| Contact Form |              | Part Number | Nominal Voltage (Vdc) | Coil Resistance (Ω±10%) | Must Operate Voltage (Vdc) | Must Release Voltage (Vdc) |
|--------------|--------------|-------------|-----------------------|-------------------------|----------------------------|----------------------------|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



- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.

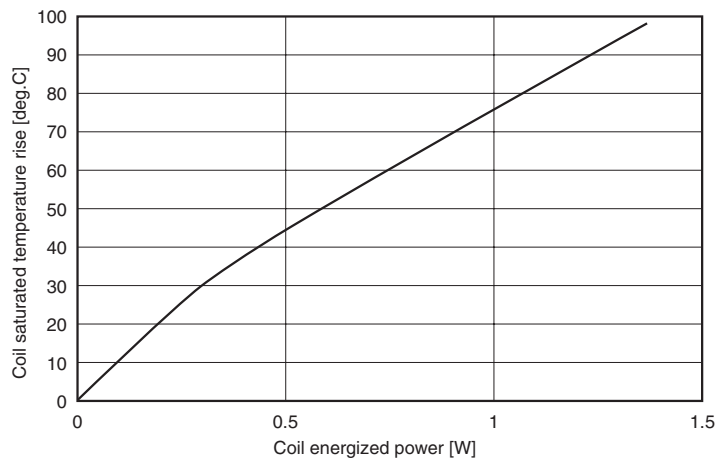
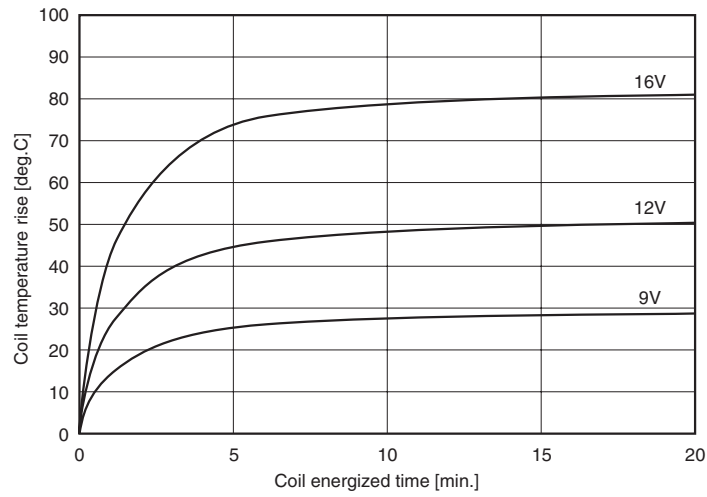
NUMBERING SYSTEM

**ET2-B3M1S**



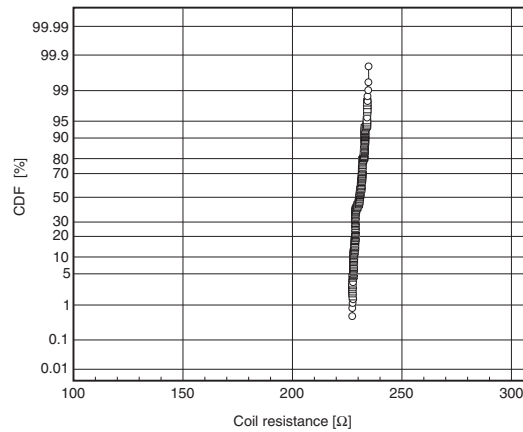
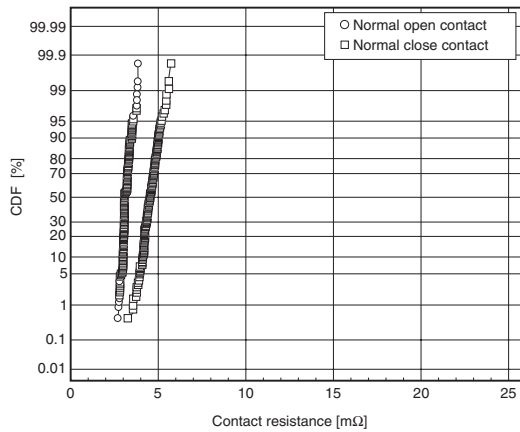
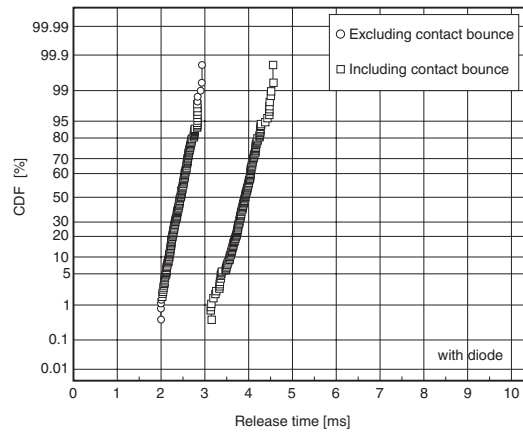
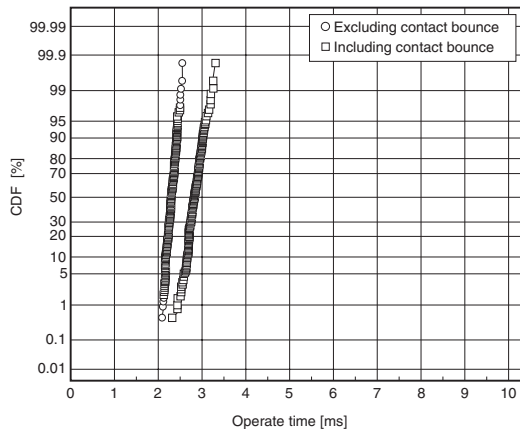
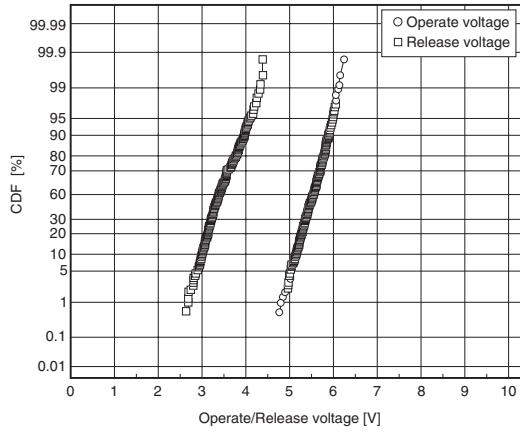
COIL TEMPERATURE RISE

Test piece : ET1-B3M1S



- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.

RELAY CHARACTERISTICS DISTRIBUTION (INITIAL)

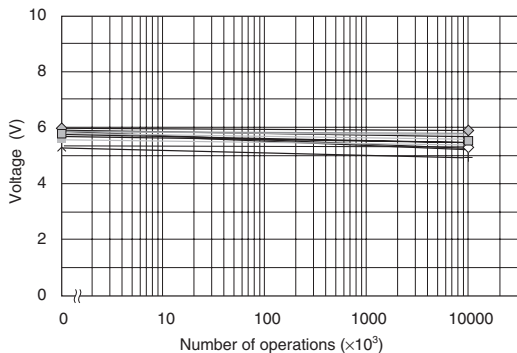


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.

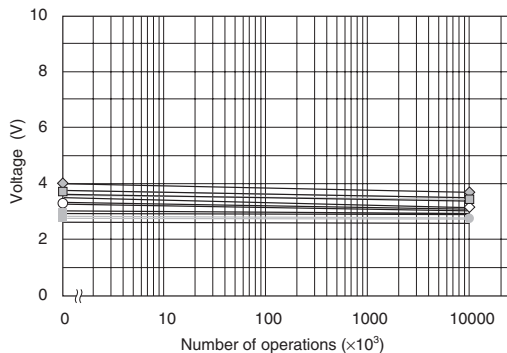
**DURABILITY LIFE**

Mechanical life test

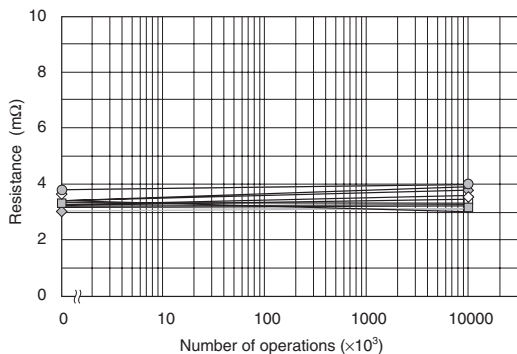
- Ambient temperature : 20 °C
- Frequency : 15 Hz (50 % duty)
- Contact load : No load
- Number of operations :  $10 \times 10^6$
- Samples : ET2-B3M1S 10 pieces



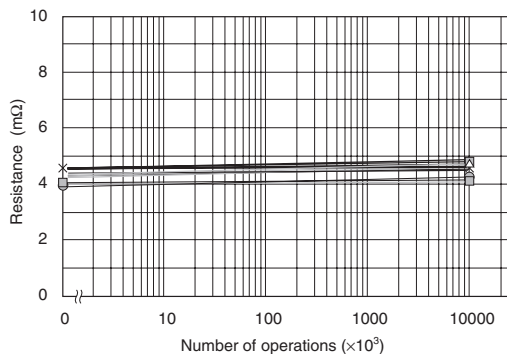
**Operate Voltage**



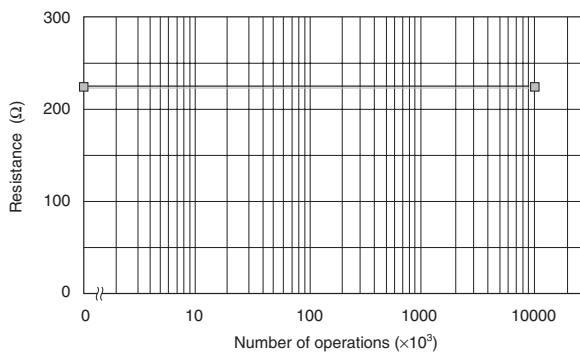
**Release Voltage**



**Contact Resistance (N.O contact)**



**Contact Resistance (N.C contact)**



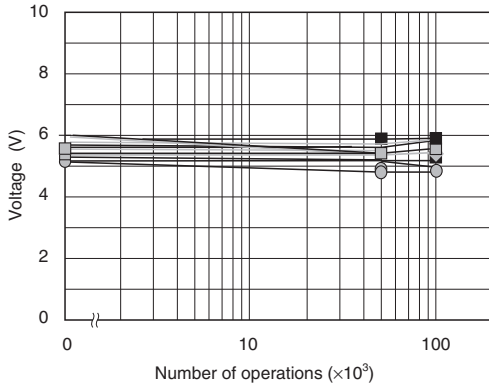
**Coil resistance**



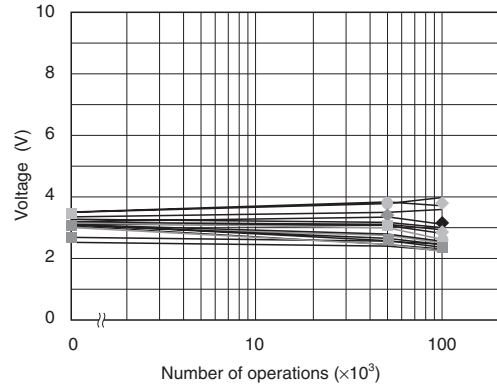
● All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.  
 ● Please request for a specification sheet for detailed product data prior to the purchase.  
 ● Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.

Electrical life test (1)

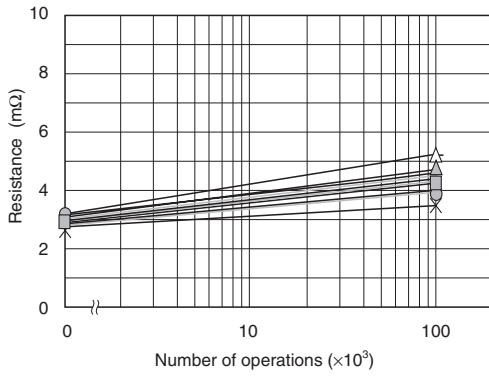
- Ambient temperature : 20 °C
- Frequency : 0.2s ON/9.8s OFF, 0.1 Hz
- Contact load : 14 VDC, 20A, Power window motor load, locked
- Number of operations :  $100 \times 10^3$
- Samples : ET2-B3M1S 10 pieces



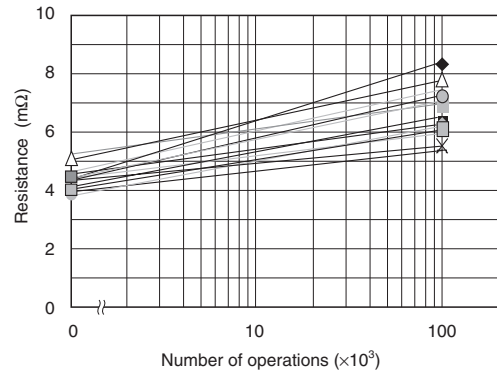
Operate Voltage



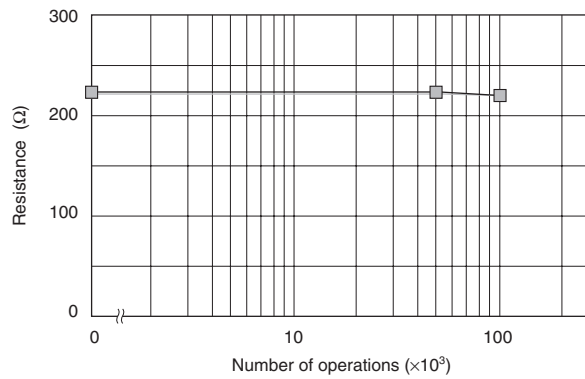
Release Voltage



Contact Resistance (N.O contact)



Contact Resistance (N.C contact)



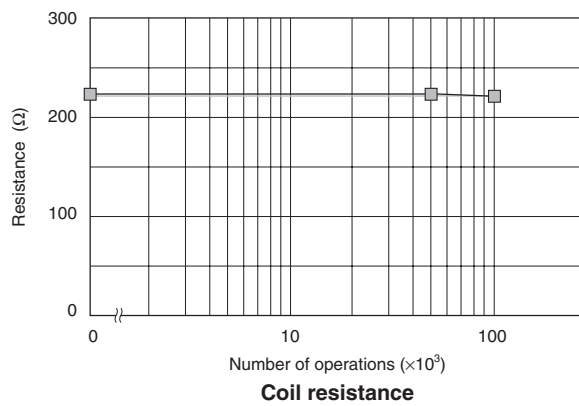
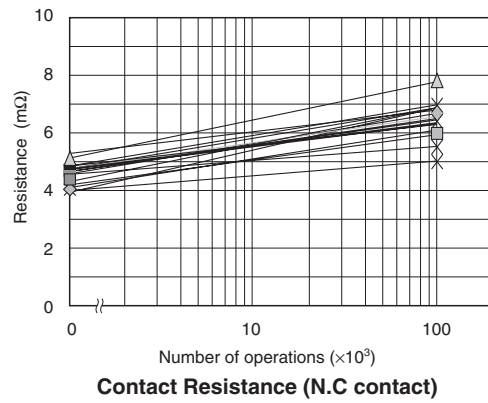
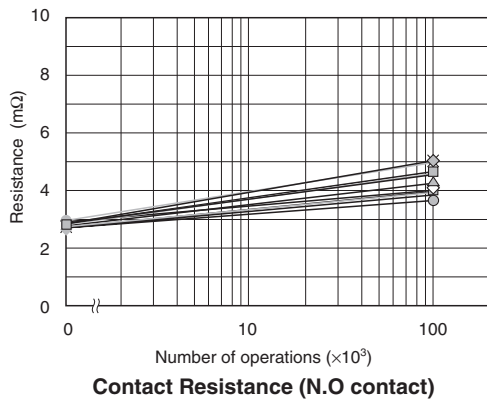
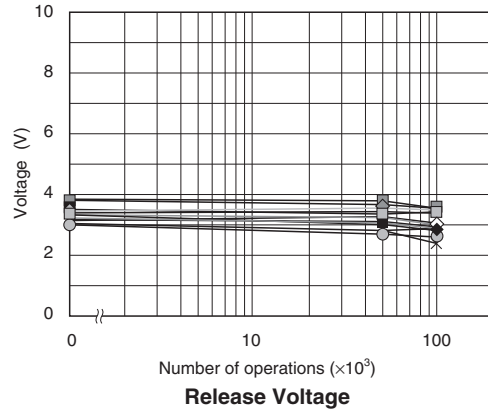
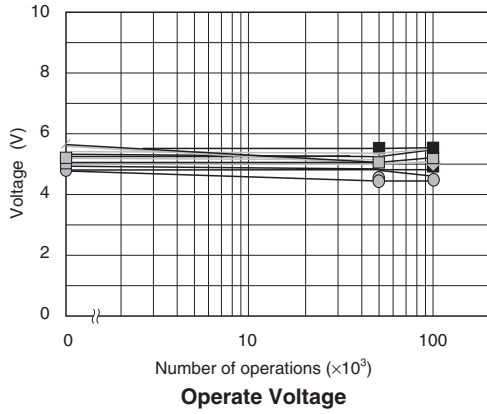
Coil resistance



● All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.  
 ● Please request for a specification sheet for detailed product data prior to the purchase.  
 ● Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.

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 :  $100 \times 10^3$
- Samples : ET2-B3M1S 10 pieces



● All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.  
 ● Please request for a specification sheet for detailed product data prior to the purchase.  
 ● Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.



No part of this document may be copied or reproduced in any form or by any means without the prior written consent of EM Devices Corporation. EM Devices Corporation assumes no responsibility for any errors which may appear in this document.

EM Devices 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 EM Devices Corporation or others.

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

(Note)

- (1) "EM Devices" as used in this statement means EM Devices Corporation and also includes its majority-owned subsidiaries.
- (2) "EM Devices electronic component products" means any electronic component product developed or manufactured by or for EM Devices (as defined above).

DE0202



19654 Eighth Street East, P.O. Box 517, Sonoma, CA 95476 (707) 996-5201  
[www.worldproducts.com](http://www.worldproducts.com) [sales@worldproducts.com](mailto:sales@worldproducts.com)



- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.