

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.**

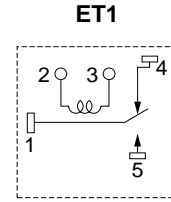
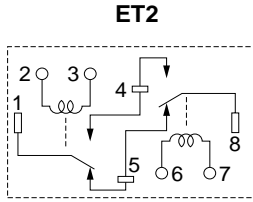
Do not use relay under excessive conditions such as over ambient temperature, over voltage and over current. Incorrect use could result in abnormal heating and damage to the relay or other parts.

READ CAUTIONS IN THE SELECTION GUIDE.

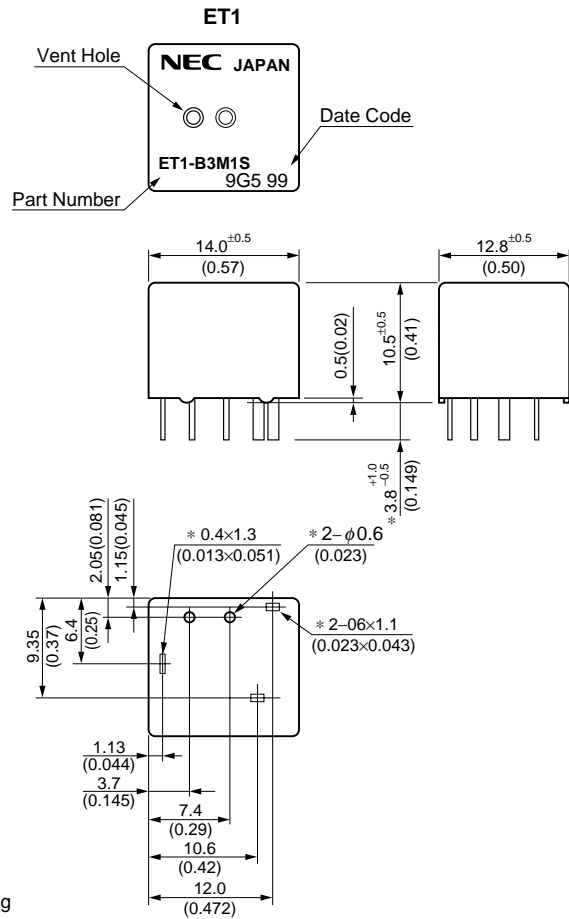
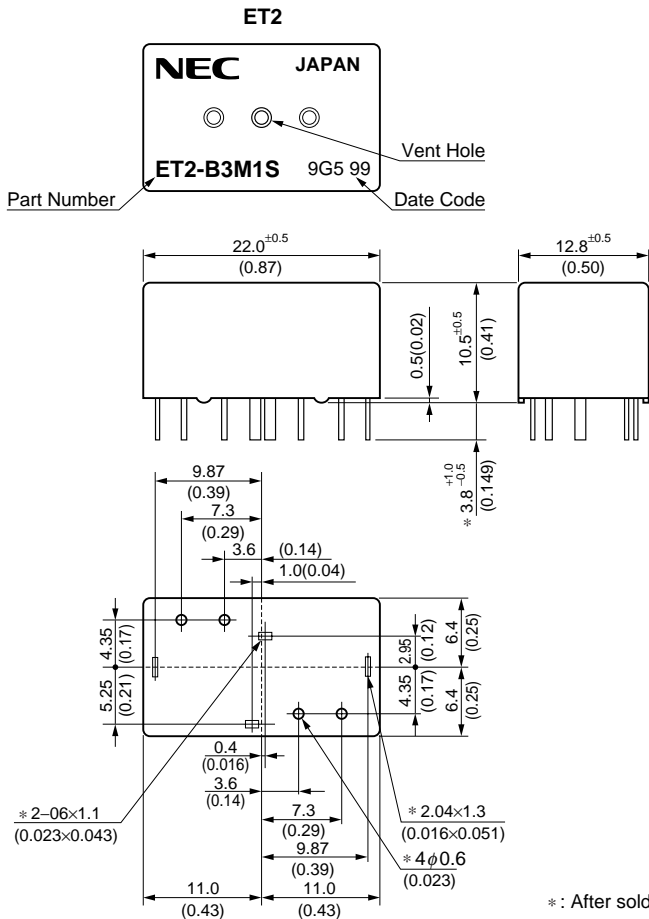
Read the cautions described in NEC's "Miniature Relays" (ER0046EJ*) before dose designing your relay applications.

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

SCHEMATIC (BOTTOM VIEW)

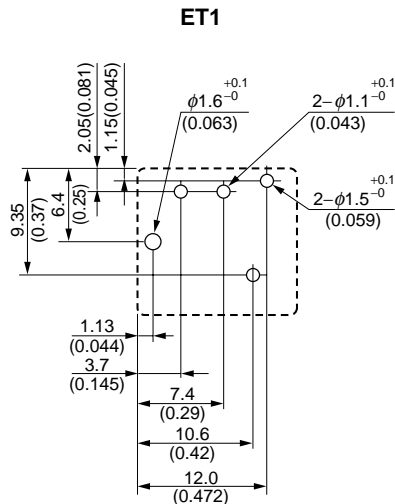
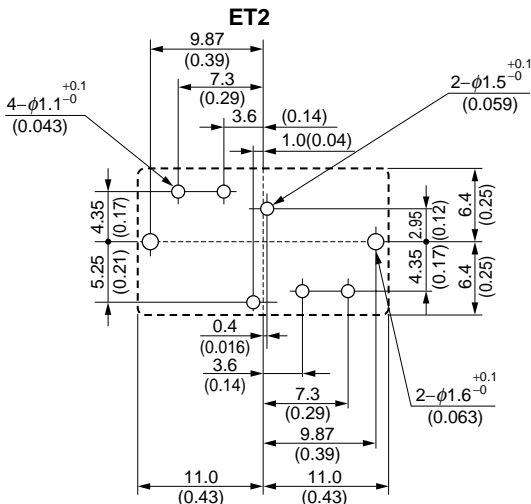


DIMENSIONS mm (inch)



* : After soldering

PCB PAD LAYOUT mm (inch) (BOTTOM VIEW)



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				

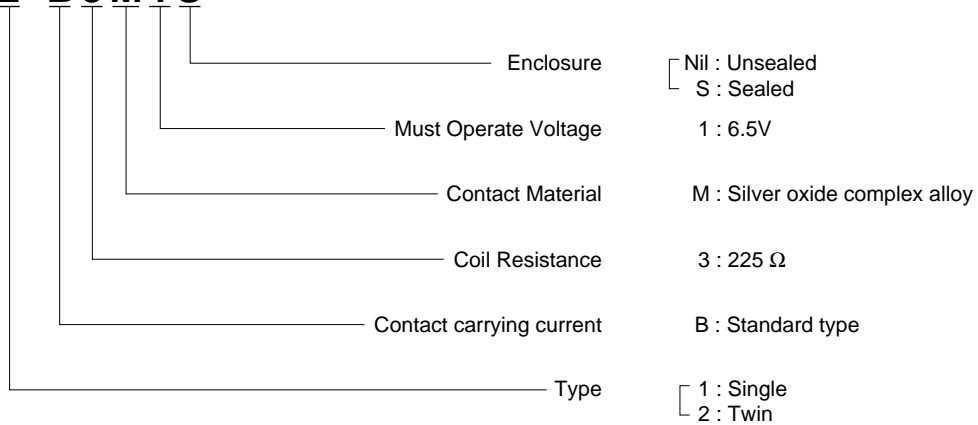
UNSEALED TYPE

(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				

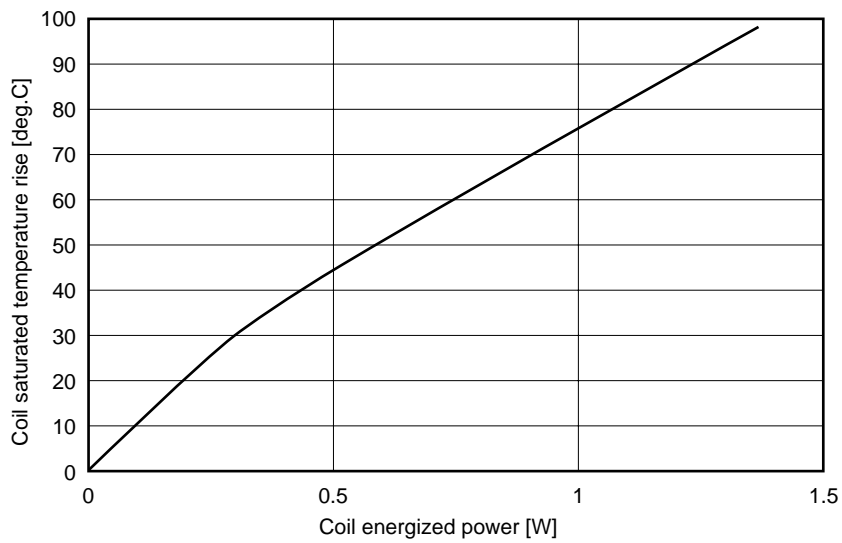
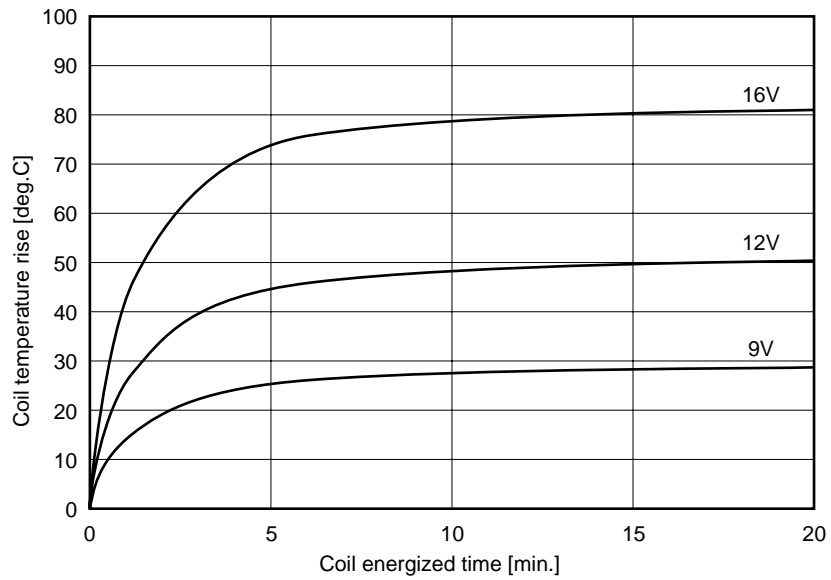
NUMBERING SYSTEM

ET2-B3M1S

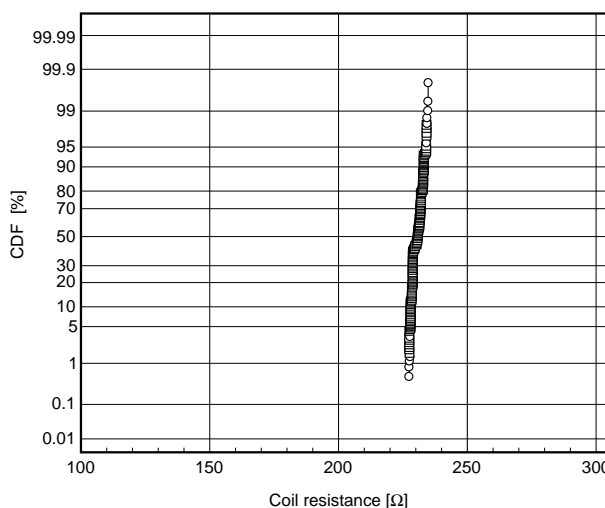
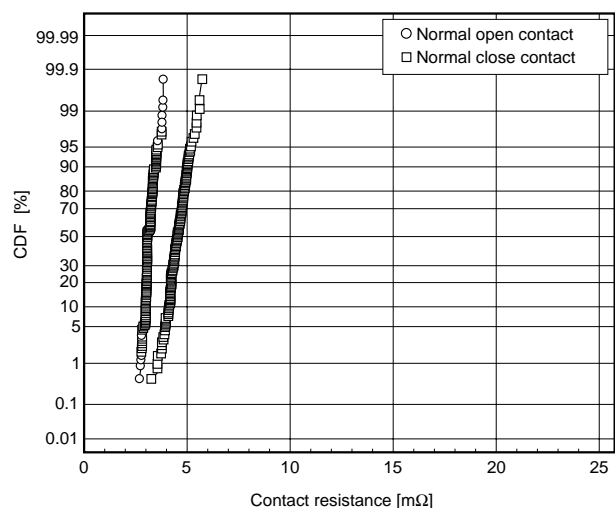
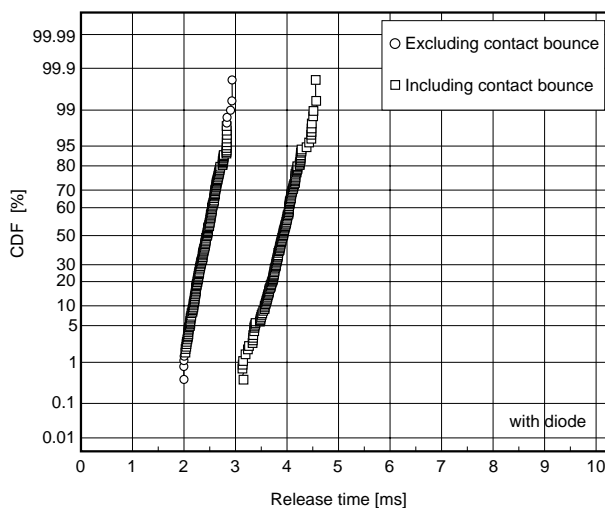
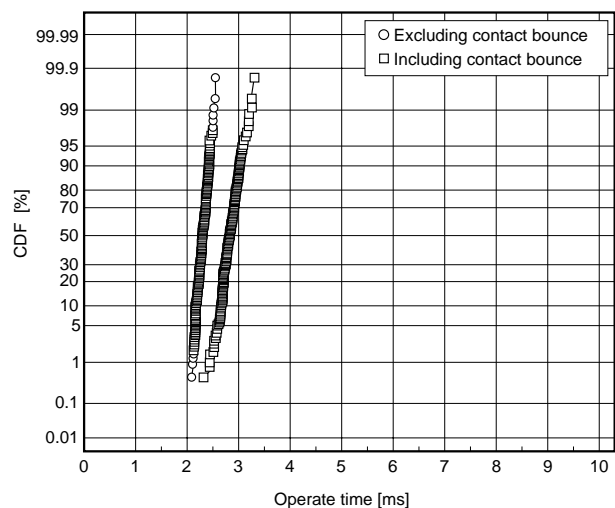
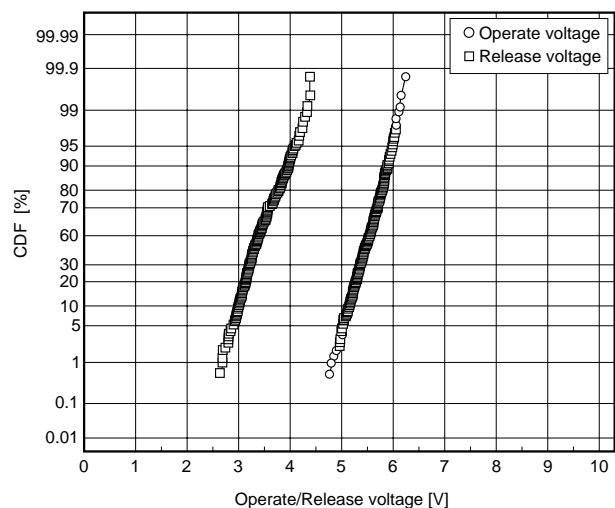


COIL TEMPERATURE RISE

Test piece : ET1-B3M1S



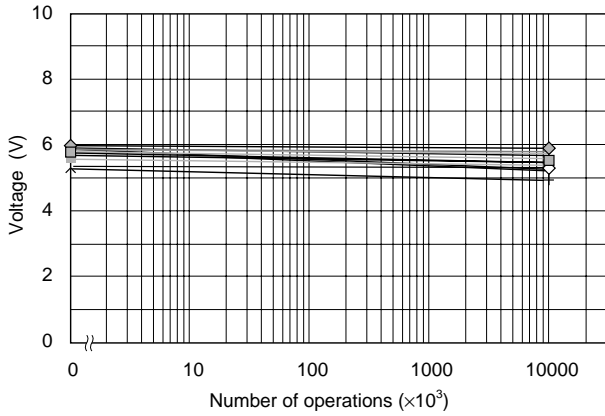
RELAY CHARACTERISTICS DISTRIBUTION (INITIAL)



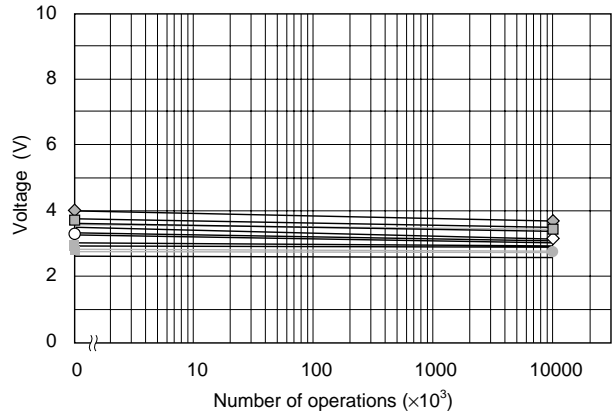
DURABILITY LIFE

Mechanical life test

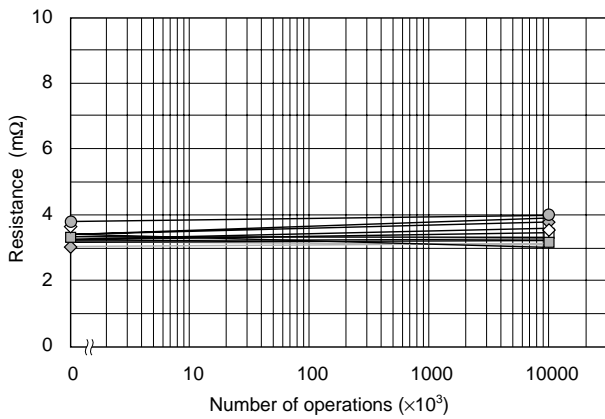
- Ambient temperature : 20 °C
- Frequency : 15 Hz (50 % duty)
- Contact load : No load
- Number of operations : 10×10^6
- Samples : ET2-B3M1S 10 pieces



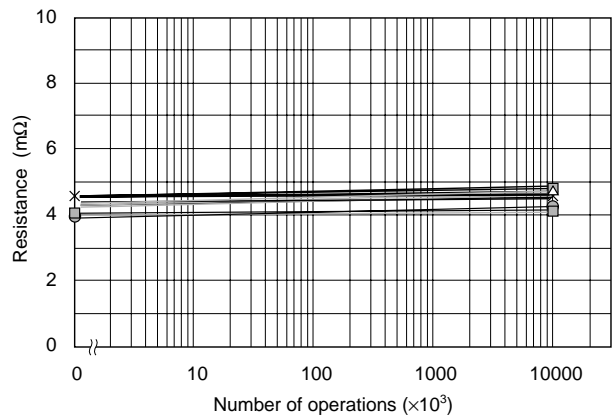
Operate Voltage



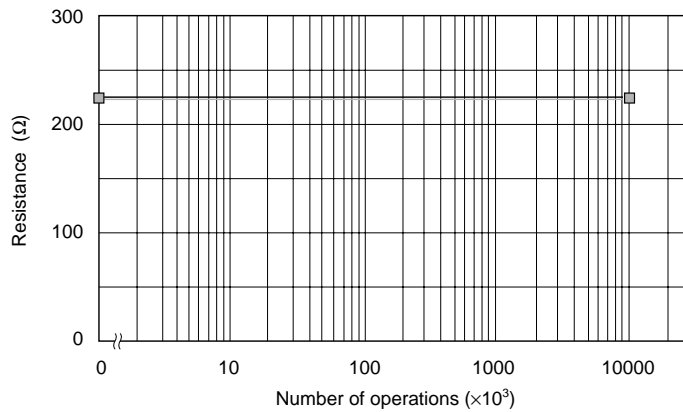
Release Voltage



Contact Resistance (N.O contact)



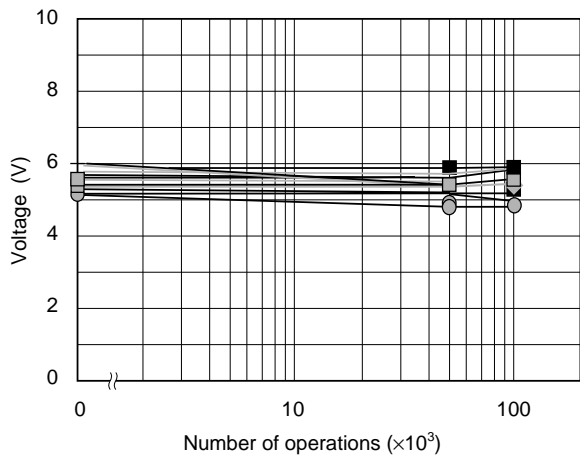
Contact Resistance (N.C contact)



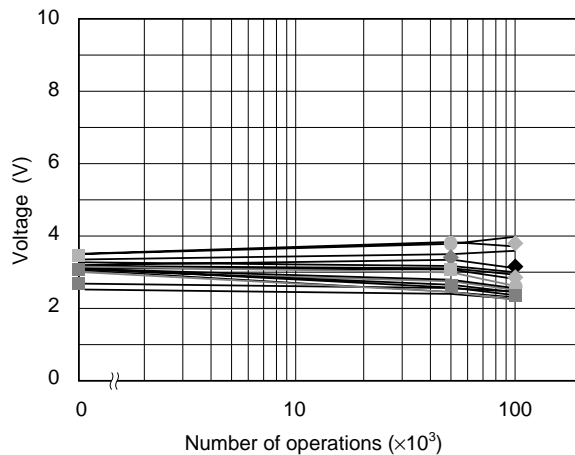
Coil resistance

Electrical life test (1)

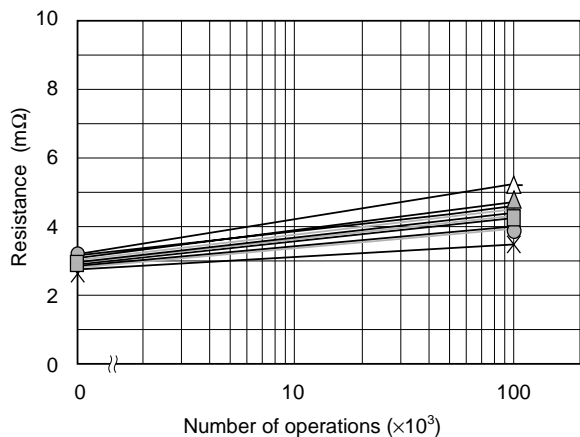
- Ambient temperature : 20 °C
- Frequency : 0.2s ON/9.8s OFF, 0.1 Hz
- Contact load : 14 VDC, 20A, Power window motor load, locked
- Number of operations : 100×10^3
- Samples : ET2-B3M1S 10 pieces



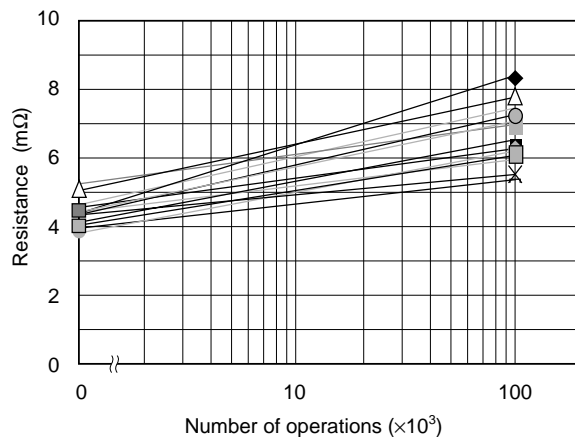
Operate Voltage



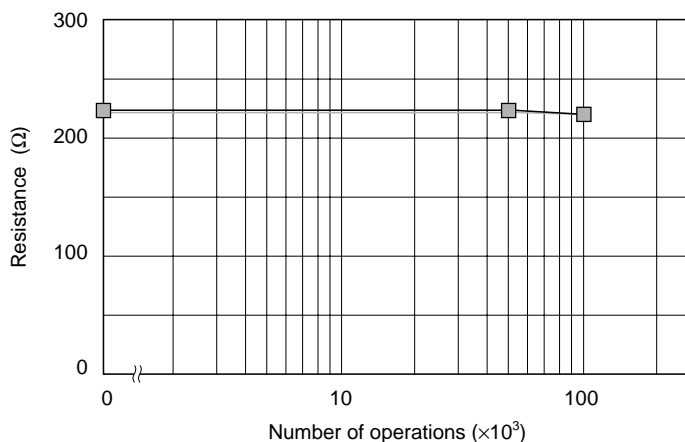
Release Voltage



Contact Resistance (N.O contact)



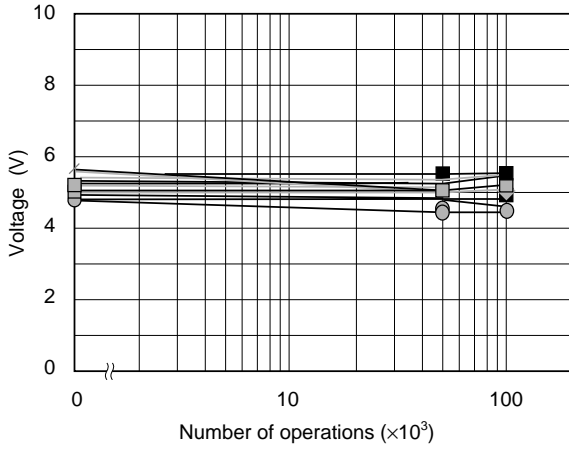
Contact Resistance (N.C contact)



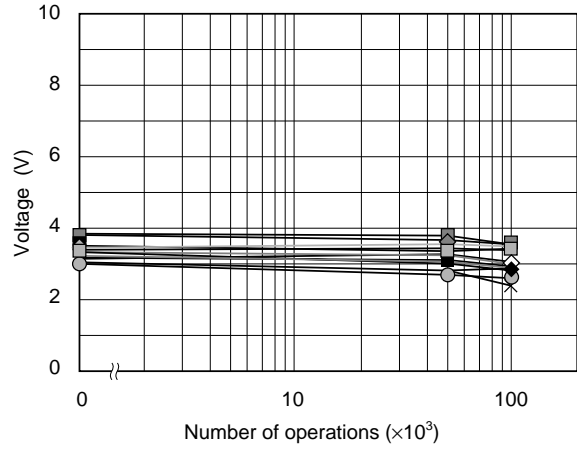
Coil resistance

Electrical life test (2)

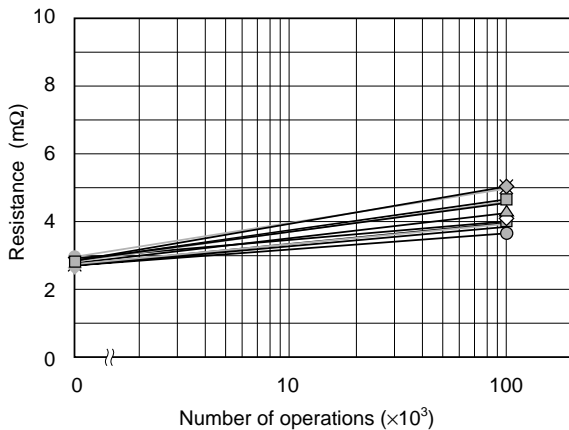
- Ambient temperature : 20 °C
- Frequency : 0.2s ON/9.8s OFF, 0.1 Hz
- Contact load : 14 VDC, 20A, Power window motor load, Unlocked
- Number of operations : 100×10^3
- Samples : ET2-B3M1S 10 pieces



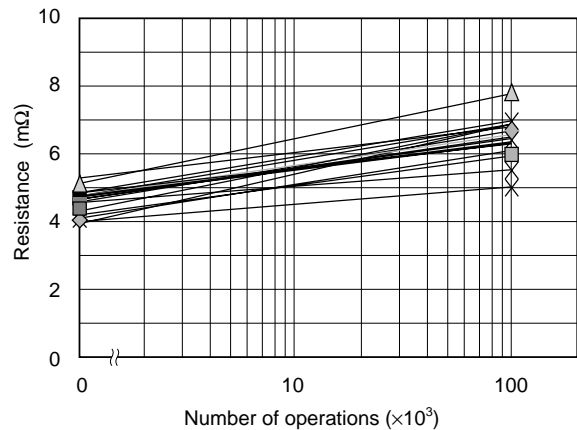
Operate Voltage



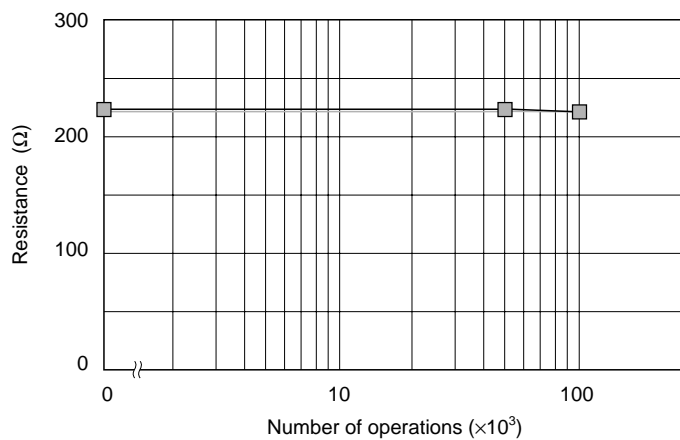
Release Voltage



Contact Resistance (N.O contact)



Contact Resistance (N.C contact)



Coil resistance

[MEMO]

[MEMO]

[MEMO]

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 Components, 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.