NEC

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's "Miniature Relays" (ER0046EJ∗) before dose designing your relay applications.

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

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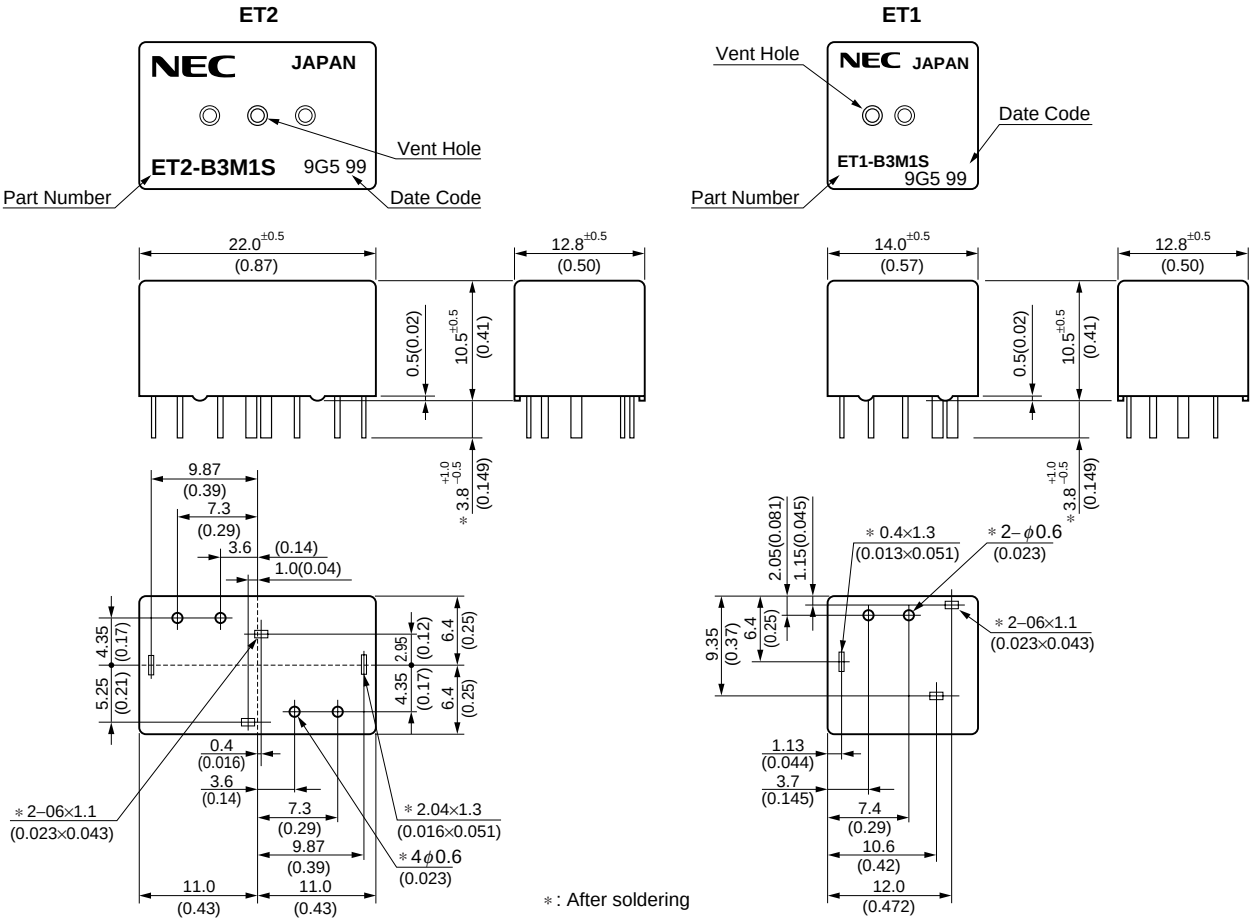
SCHEMATIC (BOTTOM VIEW)

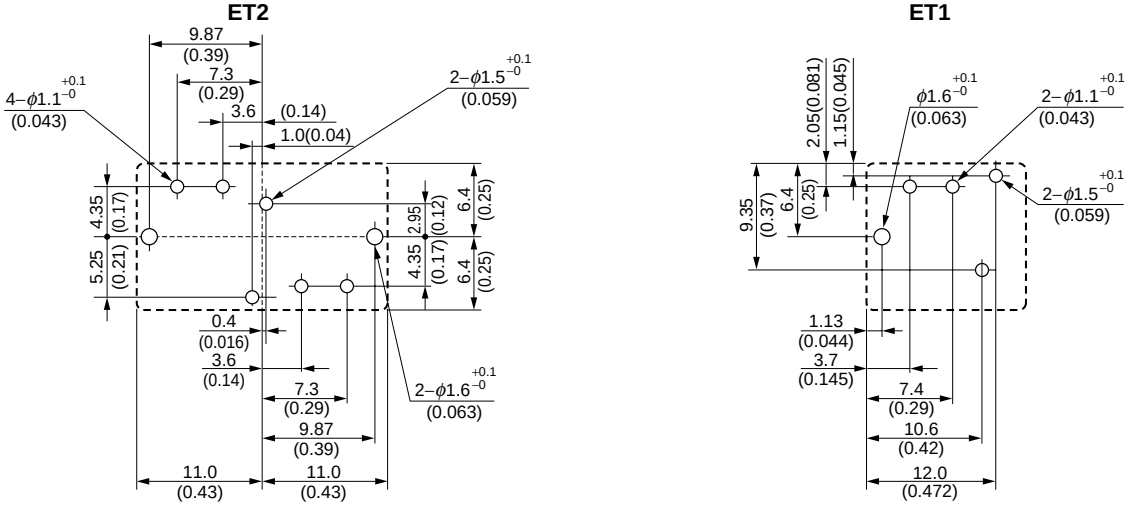


DIMENSIONS mm (inch)



*: 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				

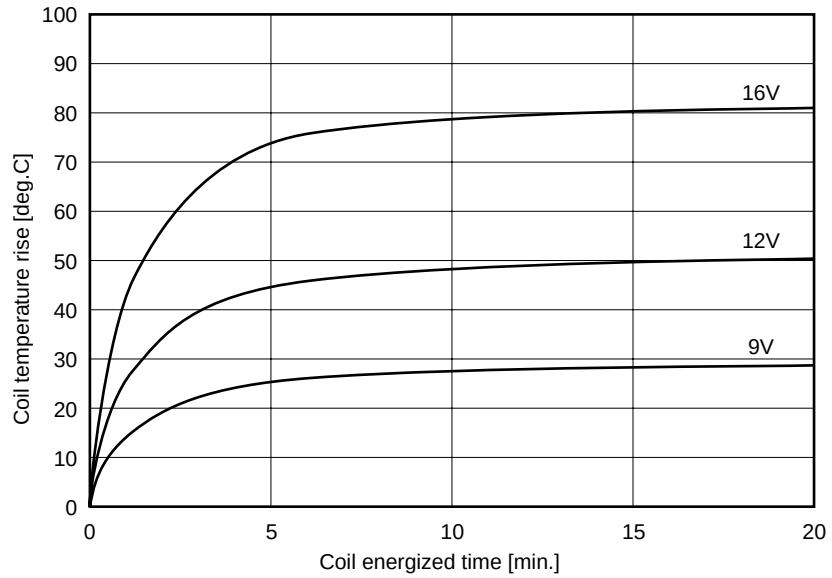
NUMBERING SYSTEM

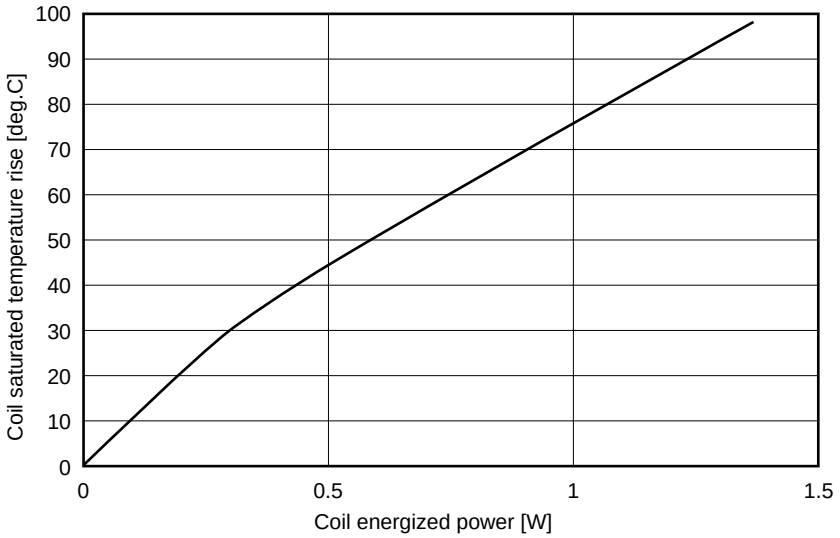
ET2-B3M1S

Enclosure	Nil : Unsealed S : Sealed
Must Operate Voltage	1 : 6.5V
Contact Material	M : Silver oxide complex alloy
Coil Resistance	3 : 225 Ω
Contact carrying current	B : Standard type
Type	1 : Single 2 : Twin

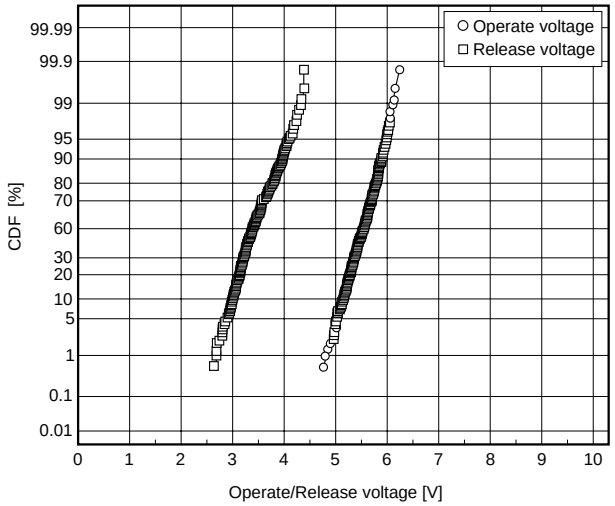
COIL TEMPERATURE RISE

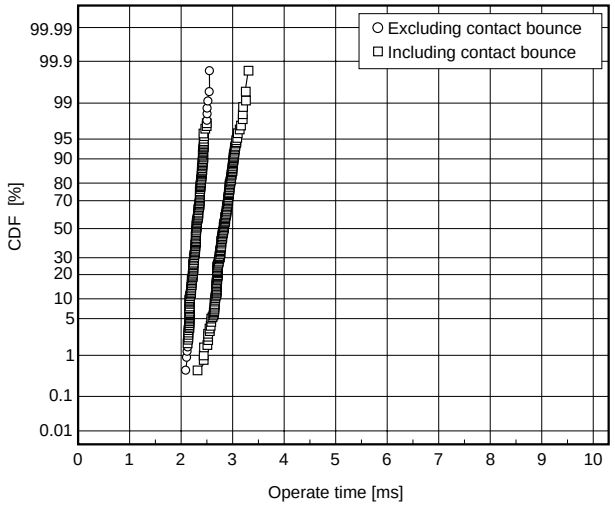
Test piece : ET1-B3M1S

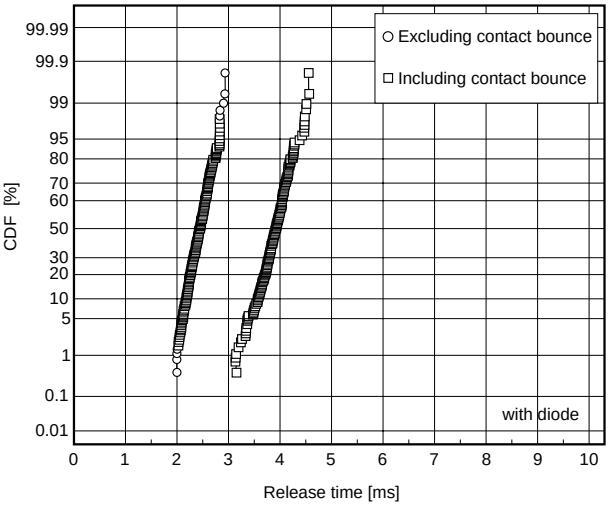


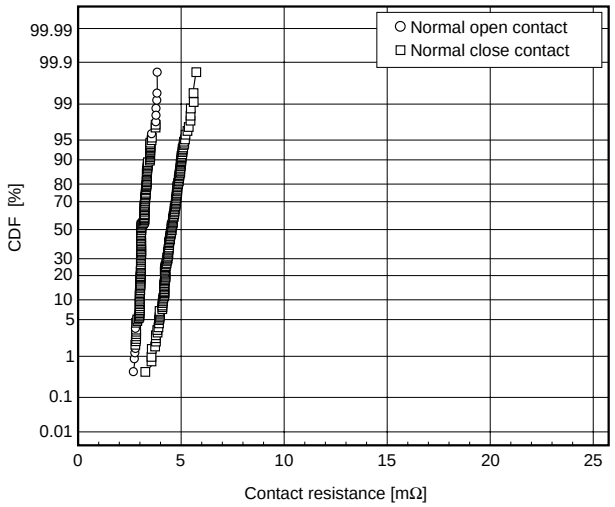


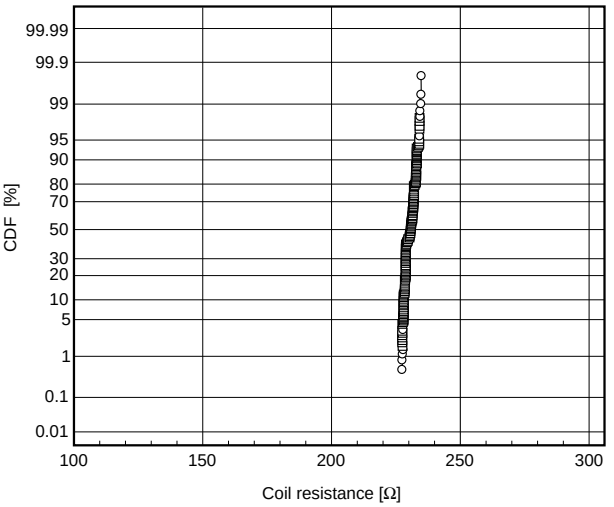
RELAY CHARACTERISTICS DISTRIBUTION (INITIAL)







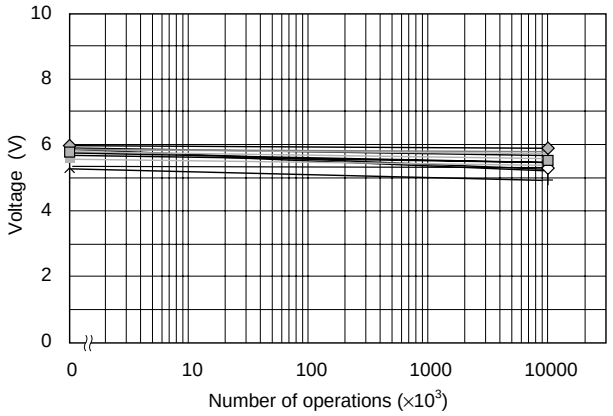




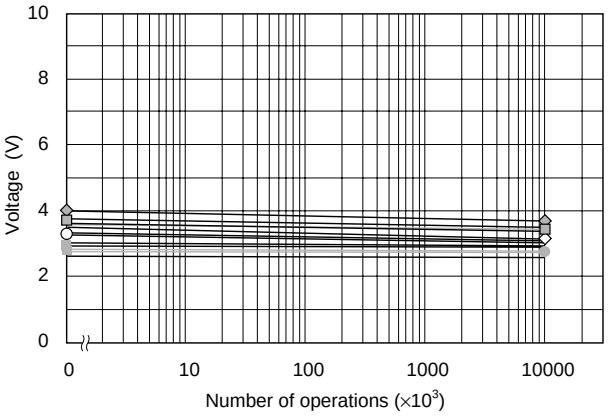
DURABILITY LIFE

Mechanical life test

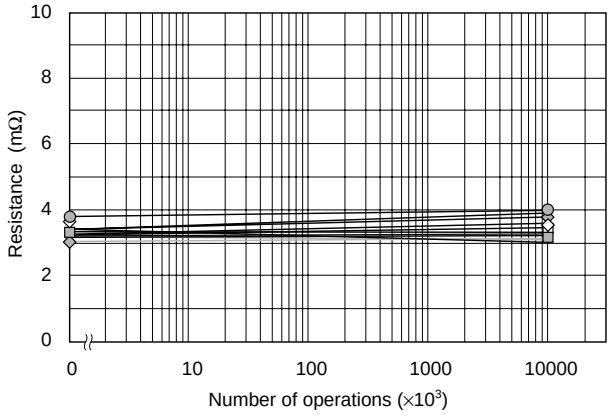
- Ambient temperature : 20 °C
- Frequency : 15 Hz (50 % duty)
- Contact load : No load
- Number of operations : 10×10^6
- Samples : ET2-B3M1S 10 pieces



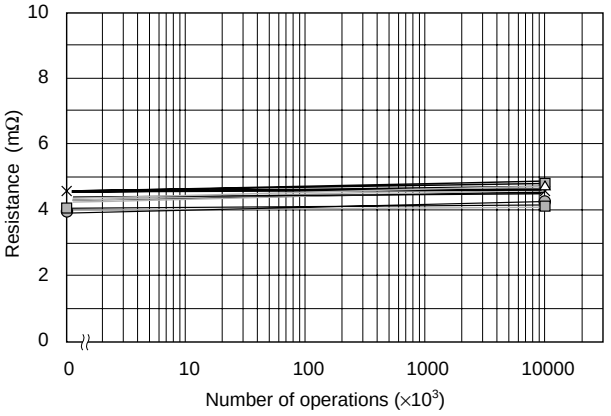
Operate Voltage



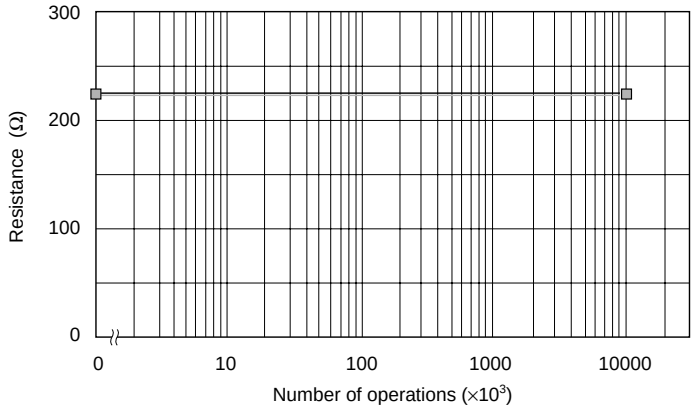
Release Voltage



Contact Resistance (N.O contact)



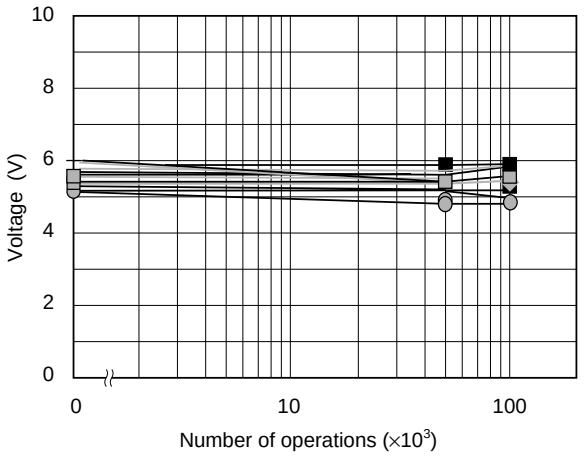
Contact Resistance (N.C contact)



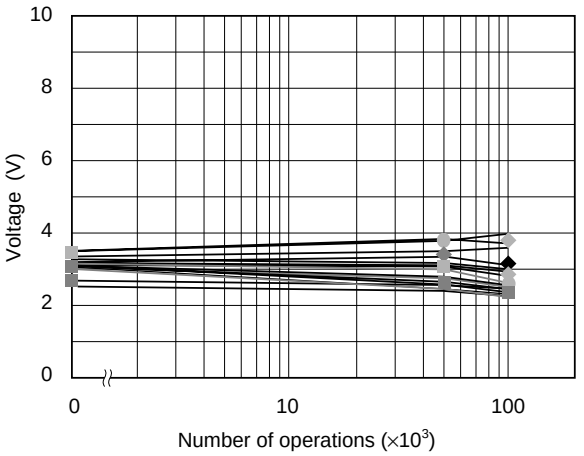
Coil resistance

Electrical life test (1)

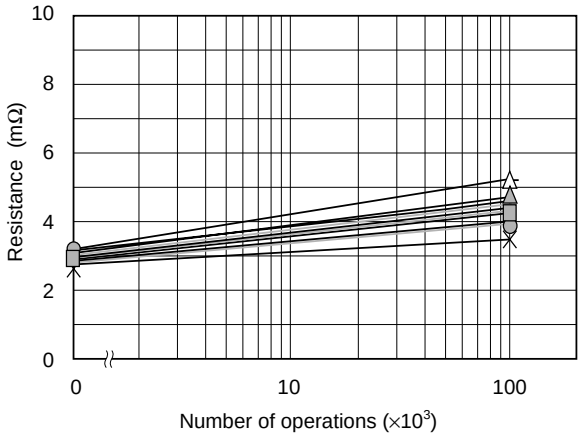
- Ambient temperature : 20 °C
- Frequency : 0.2s ON/9.8s OFF, 0.1 Hz
- Contact load : 14 VDC, 20A, Power window motor load, locked
- Number of operations : 100×10^3
- Samples : ET2-B3M1S 10 pieces



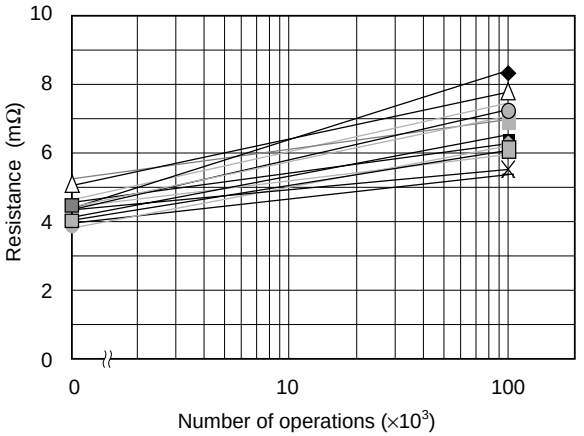
Operate Voltage



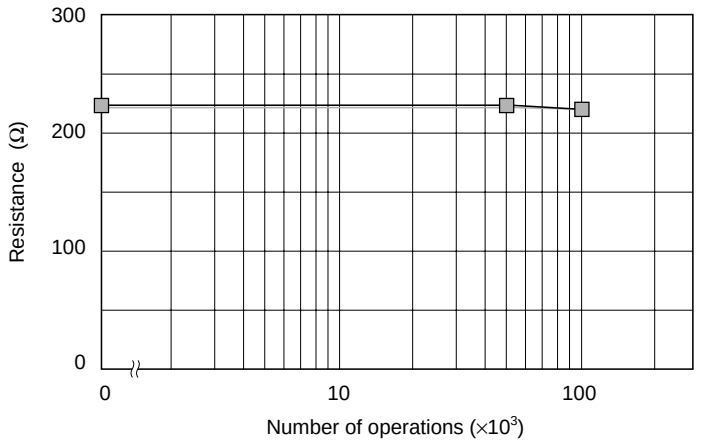
Release Voltage



Contact Resistance (N.O contact)



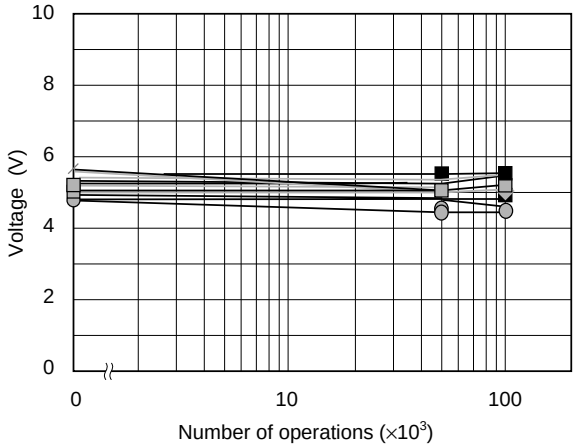
Contact Resistance (N.C contact)



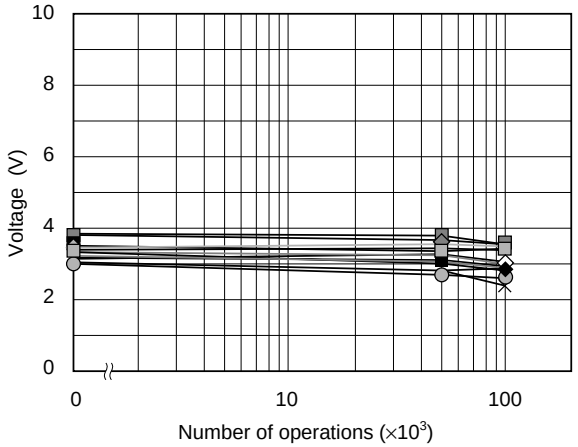
Coil resistance

Electrical life test (2)

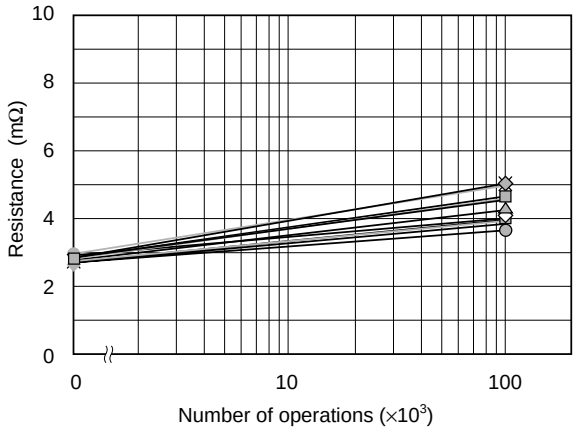
- Ambient temperature : 20 °C
- Frequency : 0.2s ON/9.8s OFF, 0.1 Hz
- Contact load : 14 VDC, 20A, Power window motor load, Unlocked
- Number of operations : 100×10^3
- Samples : ET2-B3M1S 10 pieces



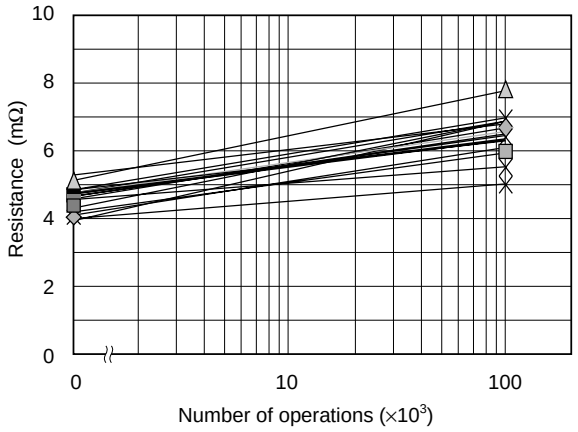
Operate Voltage



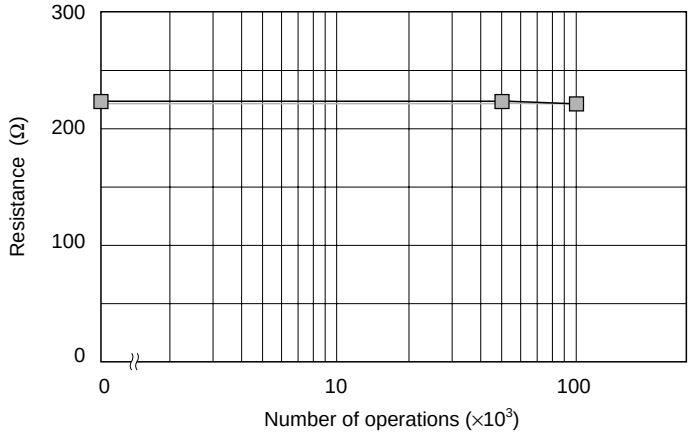
Release Voltage



Contact Resistance (N.O contact)



Contact Resistance (N.C contact)



Coil resistance

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