

HIGH HEAT RESISTIVITY

DESCRIPTION

The new NEC TOKIN ET2F/ET1F series is PC-board mount type automotive relay suitable for various motor and heater control applications that require a high quality and performance. ET2F is a twin relay type and ET1F is a single relay type. The operate temperature range for ET2F/ET1F series is -40°C through $+125^{\circ}\text{C}$.

By this high heat resistivity, the contact carrying current of ET2F/ET1F series at 25°C increases 1.3 to 1.4 times compared with that of ET2/ET1 series.

FEATURES

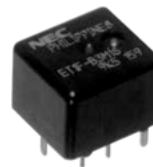
- Operating ambient temperature up to $+125^{\circ}\text{C}$ (ET2/ET1 : $+85^{\circ}\text{C}$)
- Suitable for motor and solenoid reversible control
- High performance and productivity by unique structure
- Flux tight housing

APPLICATIONS

- Motor control
- Heater control
- Solenoid control



Type ET2F



Type ET1F

For Proper Use of Miniature Relays

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 and damage to 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 relays applications.

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

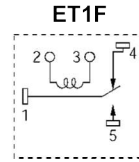
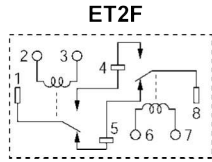
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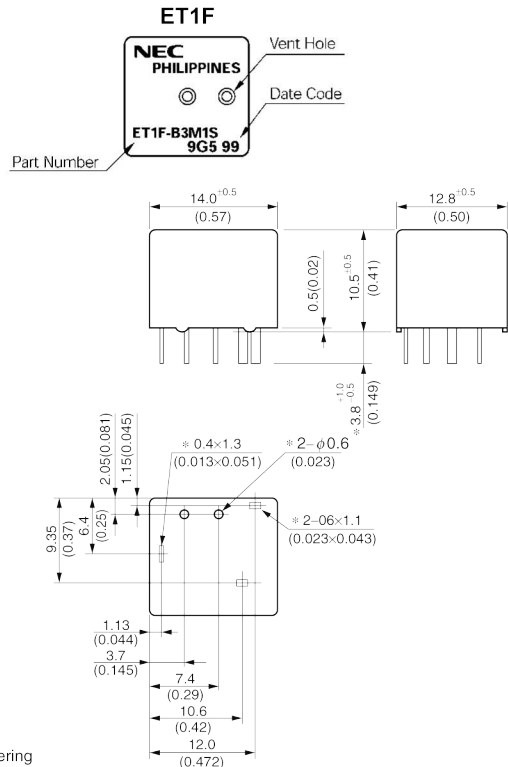
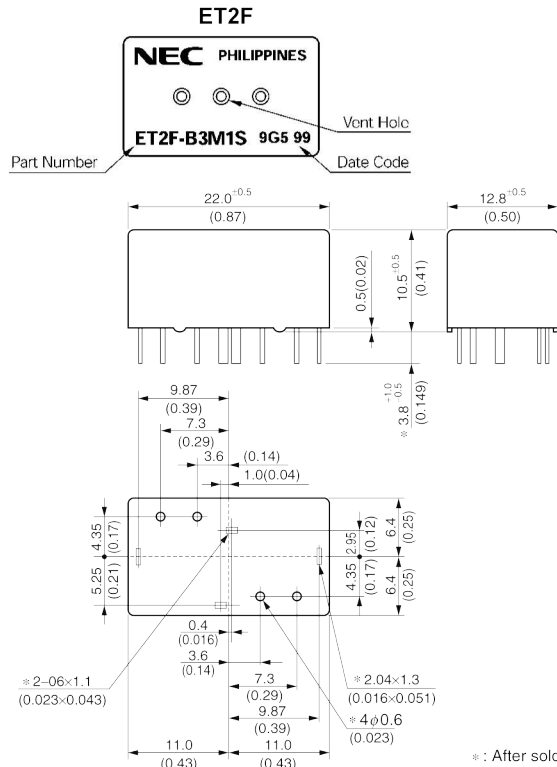


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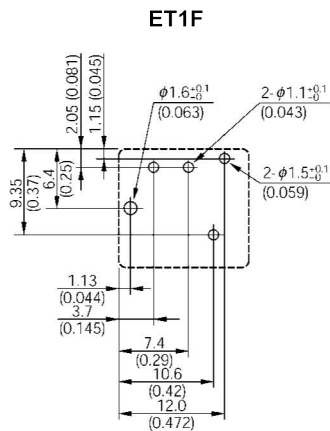
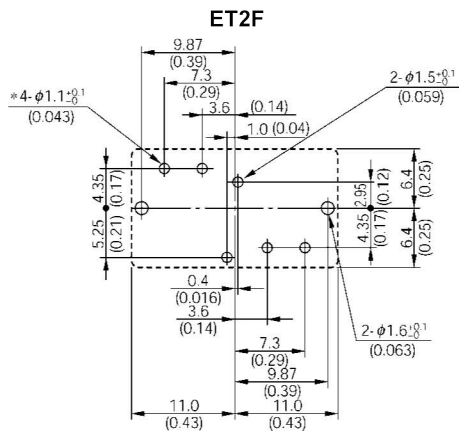
SCHEMATIC (BOTTOM VIEW)



DIMENSIONS mm (inch)



PCB PAD LAYOUT mm (inch) (BOTTOM VIEW)



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SPECIFICATIONS

(at 20°C)

Items		Type	Twin	Single	
			ET2F-B3M1/ET2F-B3M1S	ET1F-B3M1/ET1F-B3M1S	
Contact Form			1 Form c × 2 (H Bridge)	1 Form c	
Contact Ratings	Max. Switching Voltage	16 V dc			
	Max. Switching Current	25 A (at 16 Vdc)			
	Max. Carrying Current	25 A (2 minutes 12 Vdc at 125°C) 30 A (2 minutes 12 Vdc at 85°C) 35 A (2 minutes 12 Vdc at 20°C)	30 A (2 minutes 12 Vdc at 125°C) 35 A (2 minutes 12 Vdc at 85°C) 40 A (2 minutes 12 Vdc at 20°C)		
	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)			
Release Time (Excluding Bounce)		3 ms typical (at Nominal Voltage, with diode) Initial			
Nominal Operating Power		640 mW			
Insulation Resistance		100 MΩ at 500 Vdc			
Breakdown Voltage	Between Open Contacts	500 Vdc min. (for 1 minute)			
	Between Coil and Contacts	500 Vdc 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 to 300 Hz, 43 m/s ² (4.4 G)			
	Destructive Failure	10 to 500 Hz, 43 m/s ² (4.4 G) 200 hour			
Ambient Temperature		-40 to +125°C (-40 to +257°F)			
Coil Temperature Rise		70°C (158°F) / W (without contact carrying current)			
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	ET2F-B3M1S	12	225	6.5	0.9
Single	1 Form c	ET1F-B3M1S				

◆ **UNSEALED TYPE**

(at 20°C)

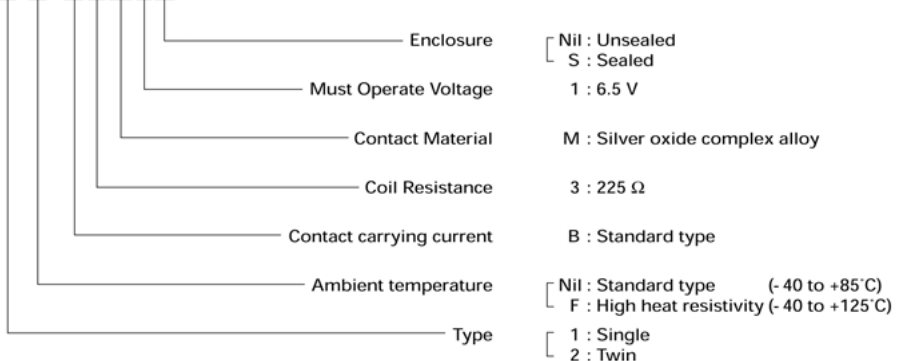
Contact Form		Part Number	Nominal Voltage (Vdc)	Coil Resistance (Ω ±10%)	Must Operate Voltage (Vdc)	Must Release Voltage (Vdc)
Twin	1 Form c × 2	ET2F-B3M1	12	225	6.5	0.9
Single	1 Form c	ET1F-B3M1				



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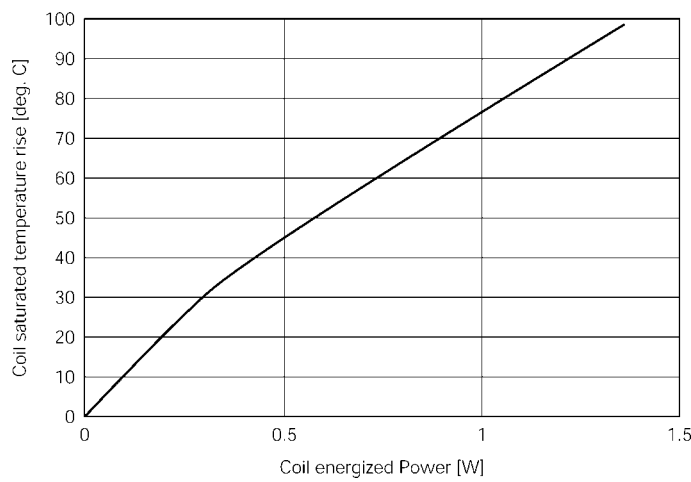
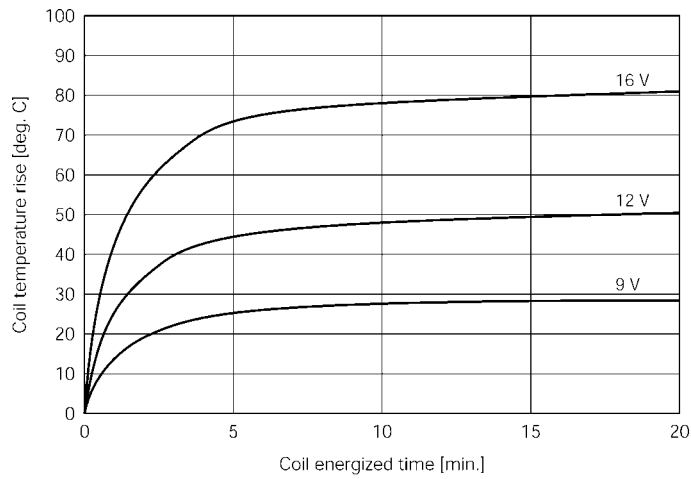
NUMBERING SYSTEM

ET2 F-B3M1S



COIL TEMPERATURE RISE

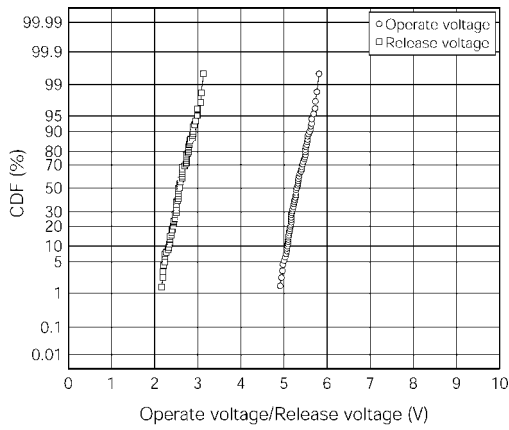
Test piece : ET1F-B3M1S



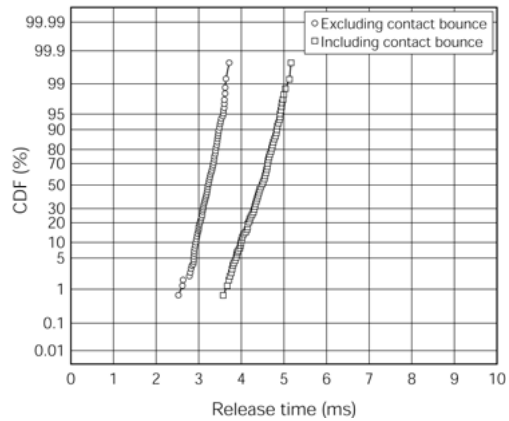
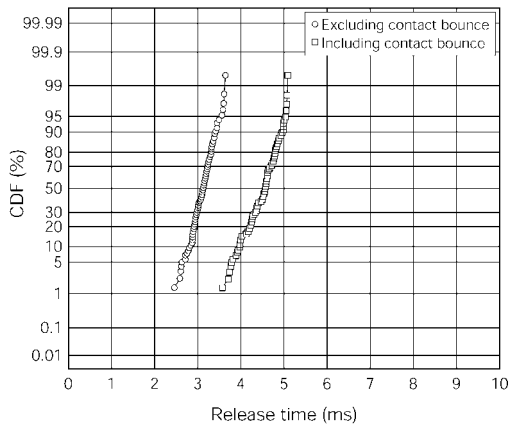
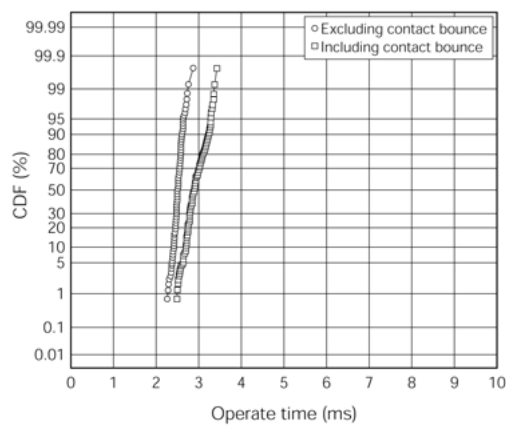
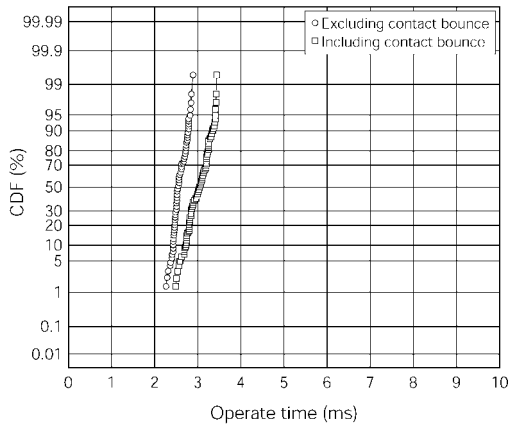
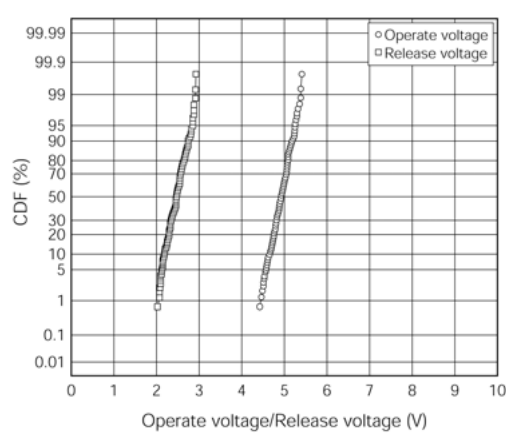
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RELAY CHARACTERISTICS DISTRIBUTION (INITIAL)

Samples : ET1F-B3M1S 100 pieces

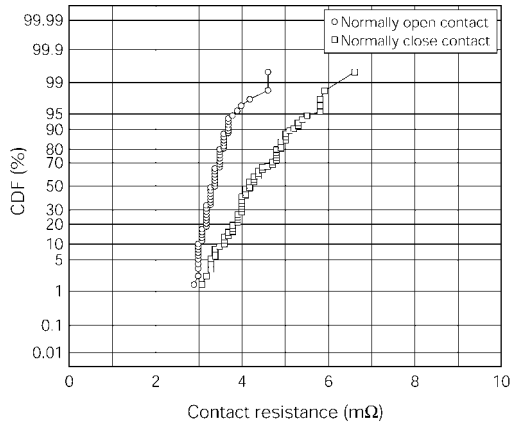


Samples : ET2F-B3M1S 100 pieces

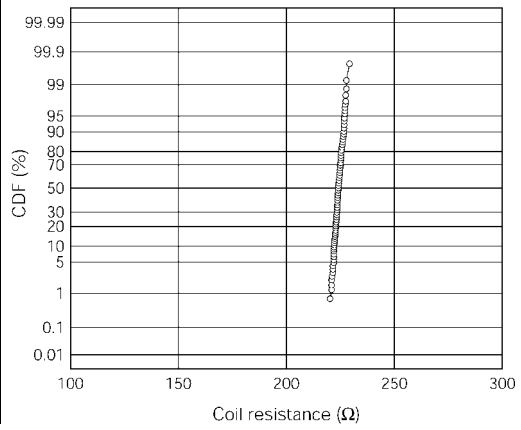
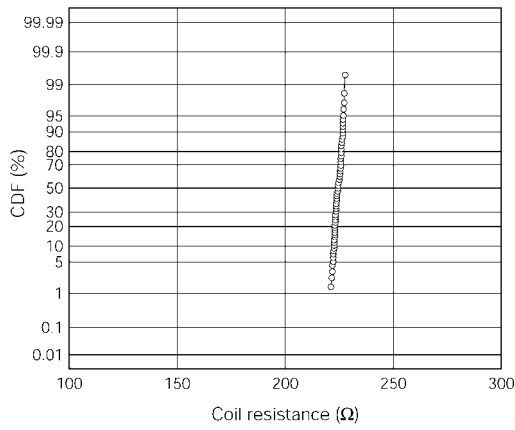
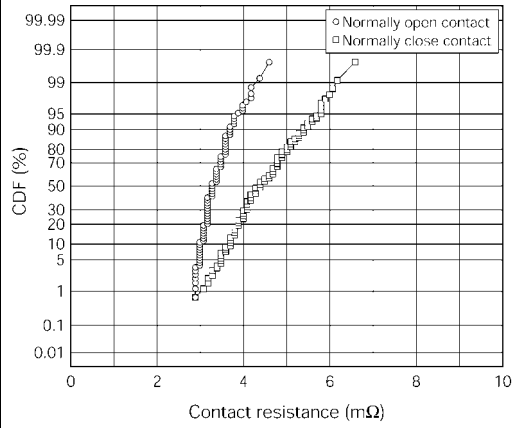


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Samples : ET1F-B3M1S 100 pieces



Samples : ET2F-B3M1S 100 pieces

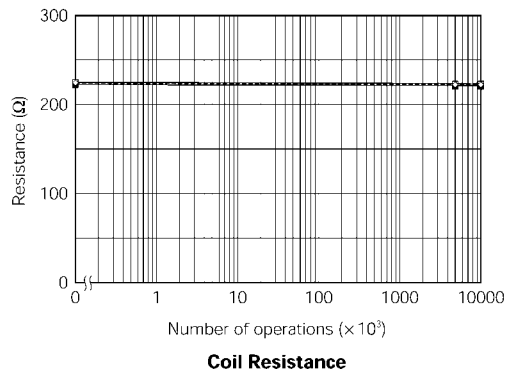
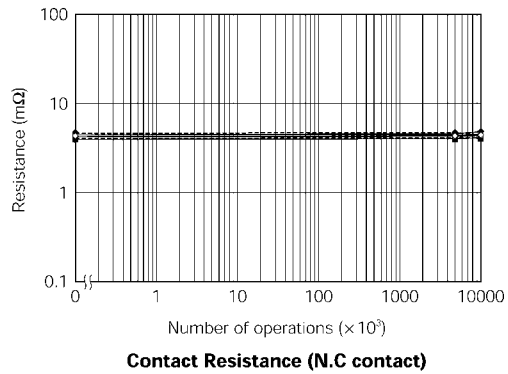
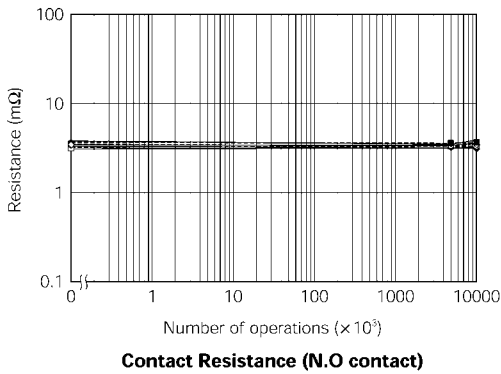
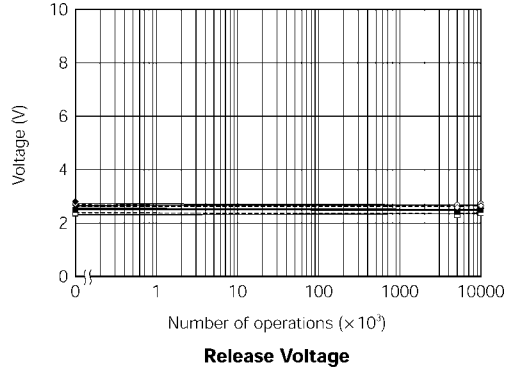
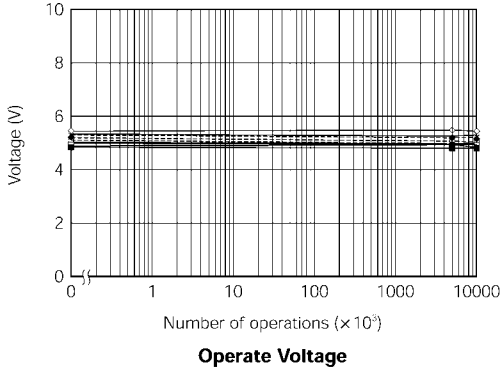


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DURABILITY LIFE

Mechanical life test

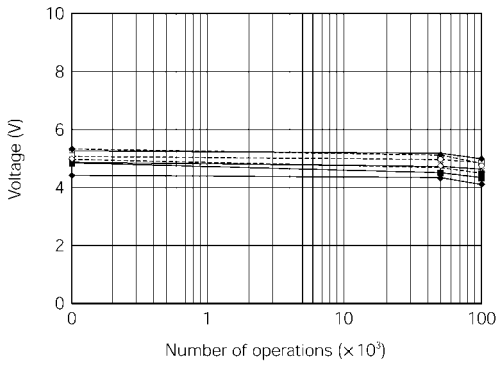
- Ambient temperature : 20°C
- Frequency : 15 Hz (50% duty)
- Contact load : No load
- Number of operations : 10×10^6
- Samples : ET2F-B3M1S 10 pieces



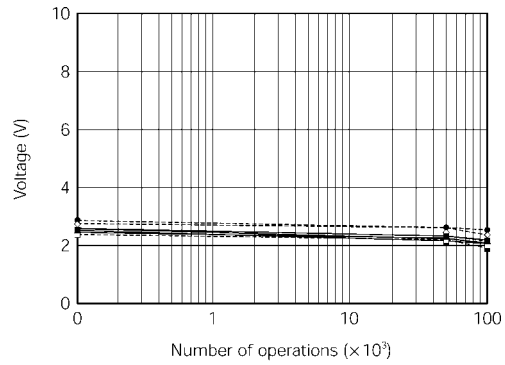
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Electrical life test (1)

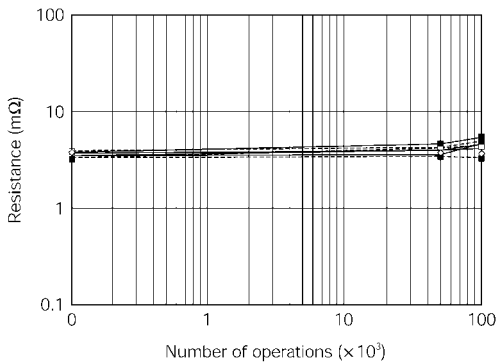
- Ambient temperature : 125°C
- Frequency : 0.2s ON/9.8s OFF, 0.1 Hz
- Contact load : 14 Vdc, 20 A, Power window motor load, locked
- Number of operations : 100×10^3
- Samples : ET2F-B3M1S 10 pieces



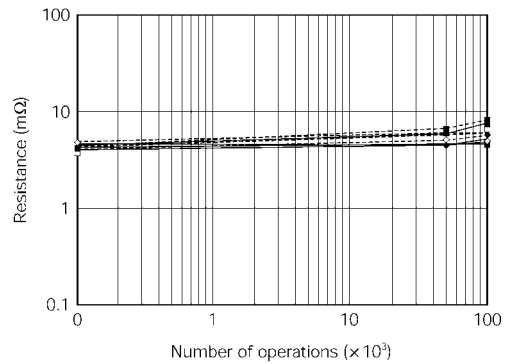
Operate Voltage



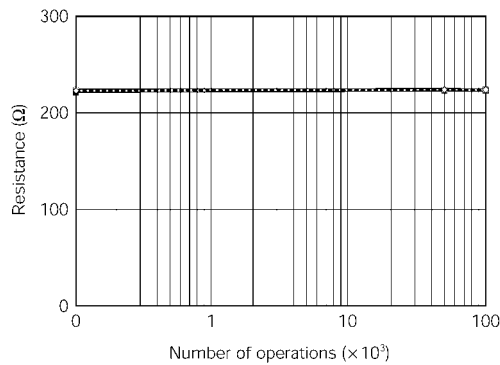
Release Voltage



Contact Resistance (N.O contact)



Contact Resistance (N.C contact)



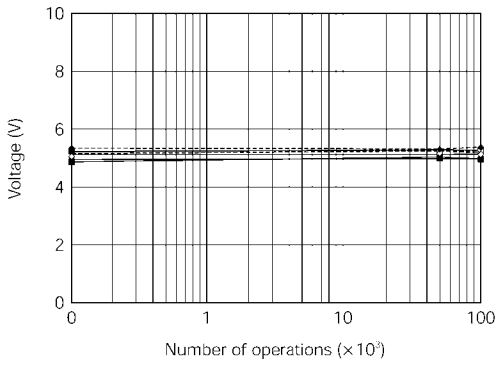
Coil Resistance



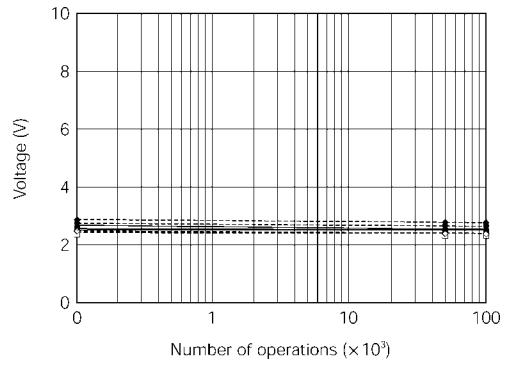
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Electrical life test (2)

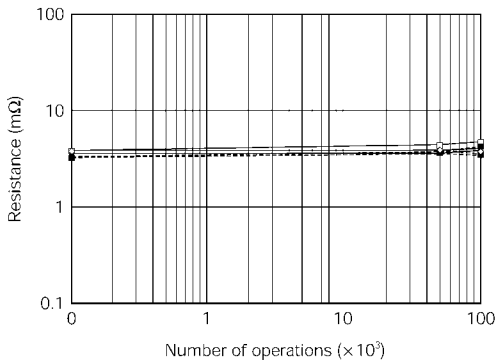
- Ambient temperature : 125°C
- Frequency : 0.2s ON/9.8s OFF, 0.1 Hz
- Contact load : 14 Vdc, 20 A, Power window motor load, unlocked
- Number of operations : 100×10^3
- Samples : ET2F-B3M1S 10 pieces



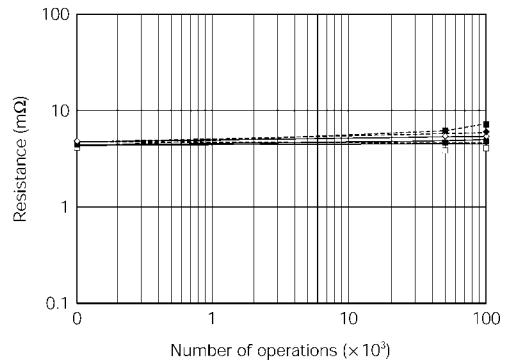
Operate Voltage



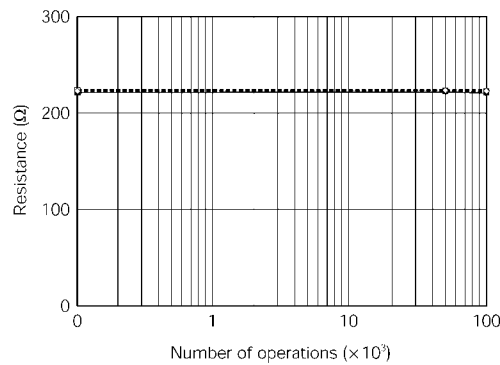
Release Voltage



Contact Resistance (N.O contact)



Contact Resistance (N.C contact)



Coil Resistance



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"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.

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DE0202

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