INFORMATION

NEXEM

AUTOMOTIVE RELAY

ET1 SERIES TECHNICAL DATA

⚠

●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 "NOTES ON CORRECT USE" in the selection guide.

2019.4.1 EMDPT2V0L02E1804H

[MEMO]

The information in this document is based on documents issued in March, 2018.

The information is subject to change without notice. For actual design-in refer to the latest publications of data sheet, etc., for the most up-date specifications of the device.

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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.

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(Note)
(1) EM Devices that is used in this statement means EM Devices Corporation and also includes its majority-owned subsidiaries.
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DE0102

⚠
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[MEMO]

2019.4.1 EMDPT2V0L02E1804H

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*** These characteristics are equivalent to those of ET2 Series.**
Please refer to ET2 Series Technical Data ER0518EJ1V0IF00.

1. PREFACE

NEXEM Miniature Power relays are mainly used in automotive electronics applications. This document gives the basic characteristics and test data of NEXEM's ET1 series miniature power relays.

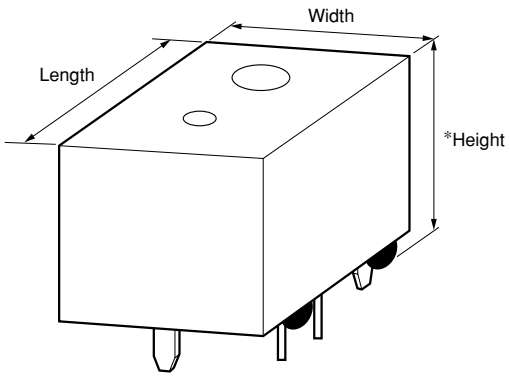
For Right Use of Miniature Relays

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 malfunctioning, abnormal heating, or cause burning.

READ CAUTIONS IN THE SELECTION GUIDE.
Read the cautions described in EM Devices' “Miniature Relays” when you choose relays for your application.

2. INITIAL CHARACTERISTICS

Dimension



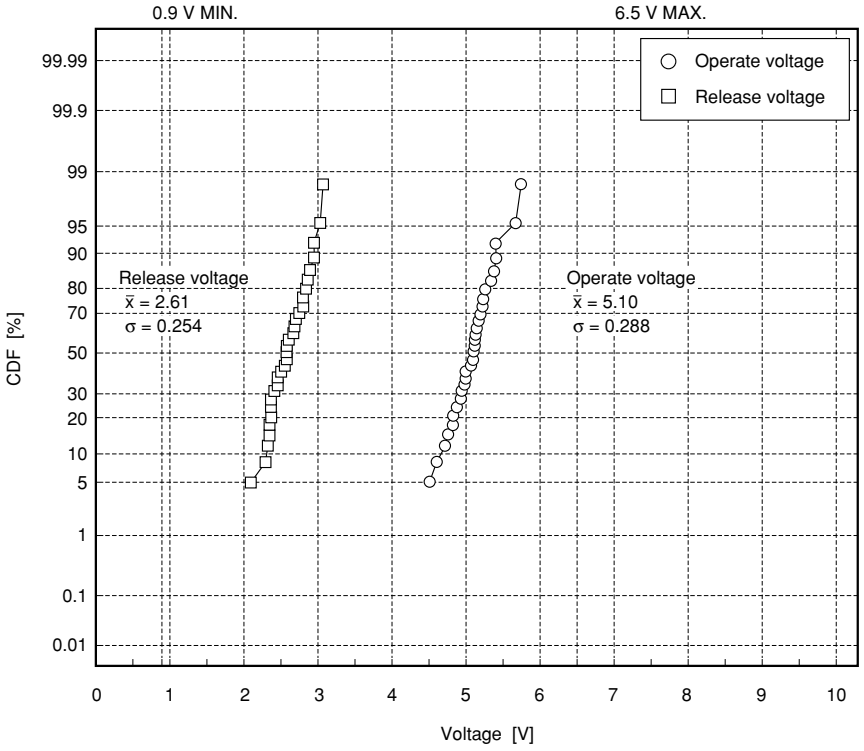
*Including Stand-Off height

No.	Length [mm]	Width [mm]	Height [mm]
Spec.	14.0 ±0.5	12.8 ±0.5	10.5 ±0.5
1	14.01	12.82	10.52
2	14.02	12.84	10.55
3	14.01	12.83	10.53
4	14.01	12.83	10.53
5	14.02	12.82	10.52
6	14.03	12.84	10.54
7	14.02	12.82	10.54
8	14.02	12.83	10.53
9	14.01	12.83	10.55
10	14.02	12.82	10.54
Max.	14.03	12.84	10.55
$\bar{x}$	14.02	12.83	10.54
Min.	14.01	12.82	10.52
σ	0.007	0.008	0.011

2. INITIAL CHARACTERISTICS

Operate / Release Voltage

Test items	Test conditions	Samples
1. Operate voltage 2. Release voltage	Ambient temperature : 20℃	ET1-B3M1S 30 pcs

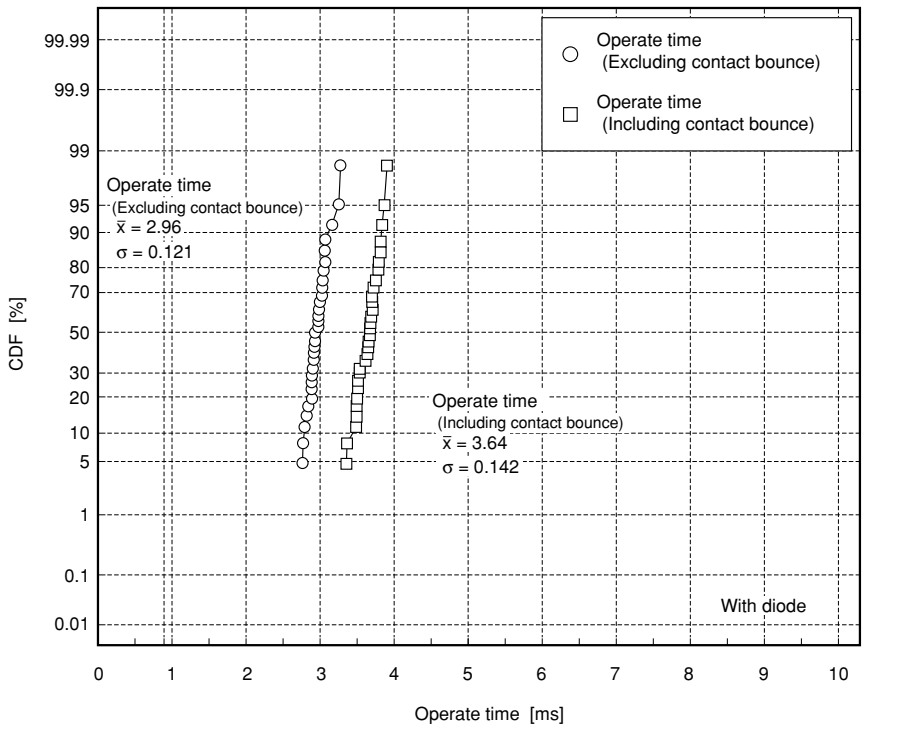


2. INITIAL CHARACTERISTICS

Operate Time

Test items	Test conditions	Samples
1. Operate time (Excluding contact bounce) 2. Operate time (Including contact bounce)	Ambient temperature : 20℃	ET1-B3M1S 30 pcs

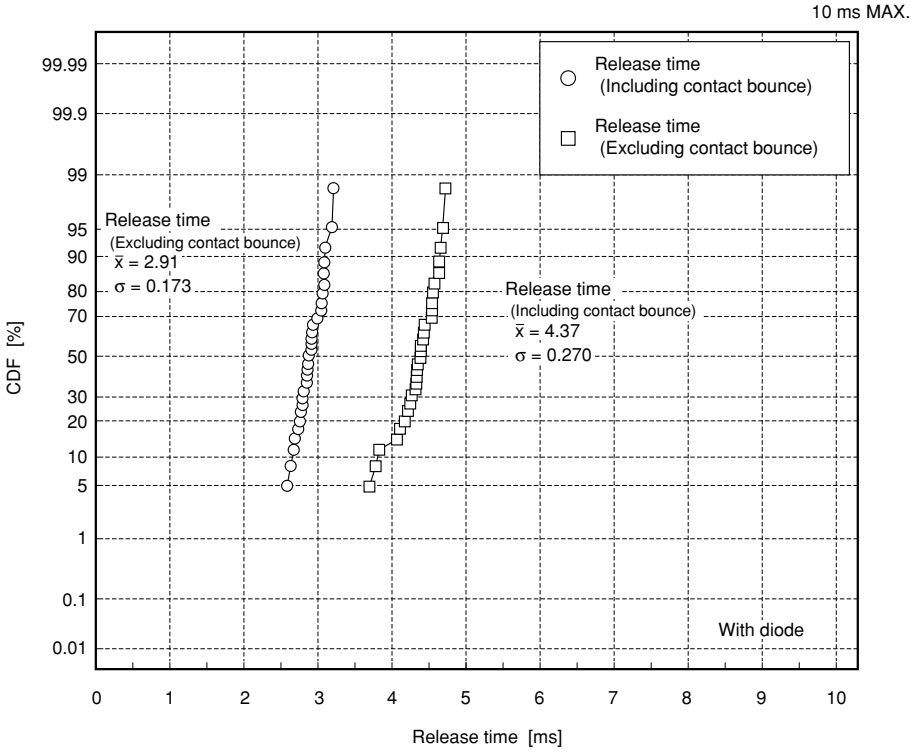
10 ms MAX.



2. INITIAL CHARACTERISTICS

Release Time

Test items	Test conditions	Samples
1. Release time (Excluding contact bounce) 2. Release time (Including contact bounce)	Ambient temperature : 20℃	ET1-B3M1S 30 pcs

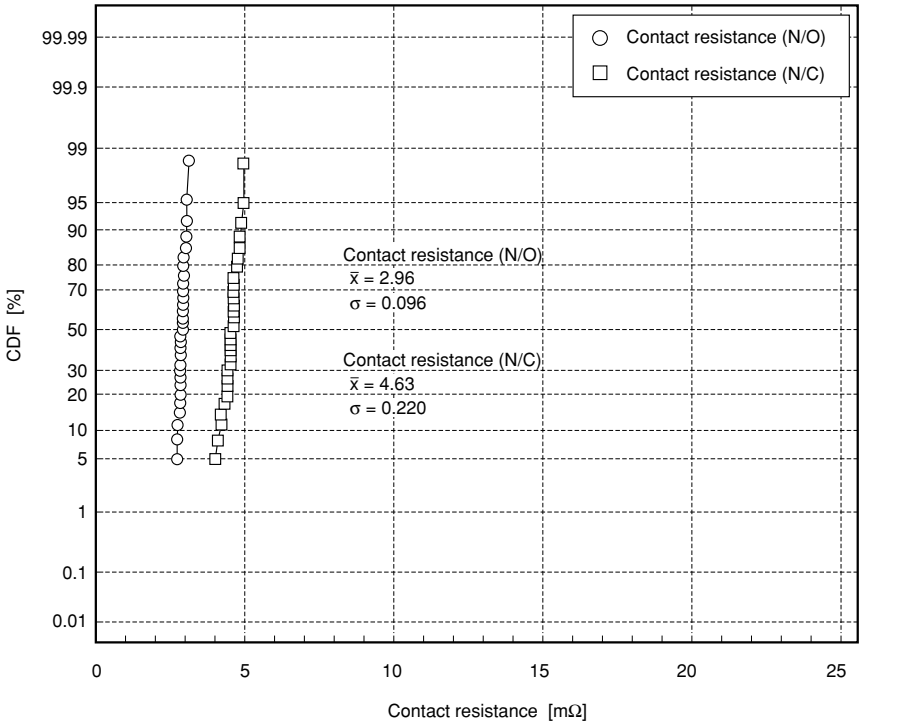


2. INITIAL CHARACTERISTICS

Contact Resistance

Test items	Test conditions		Samples
1. Contact resistance (N/O) 2. Contact resistance (N/C)	Ambient temperature Voltage drop method	: 20℃ : 6V, 7A	ET1-B3M1S 30 pcs

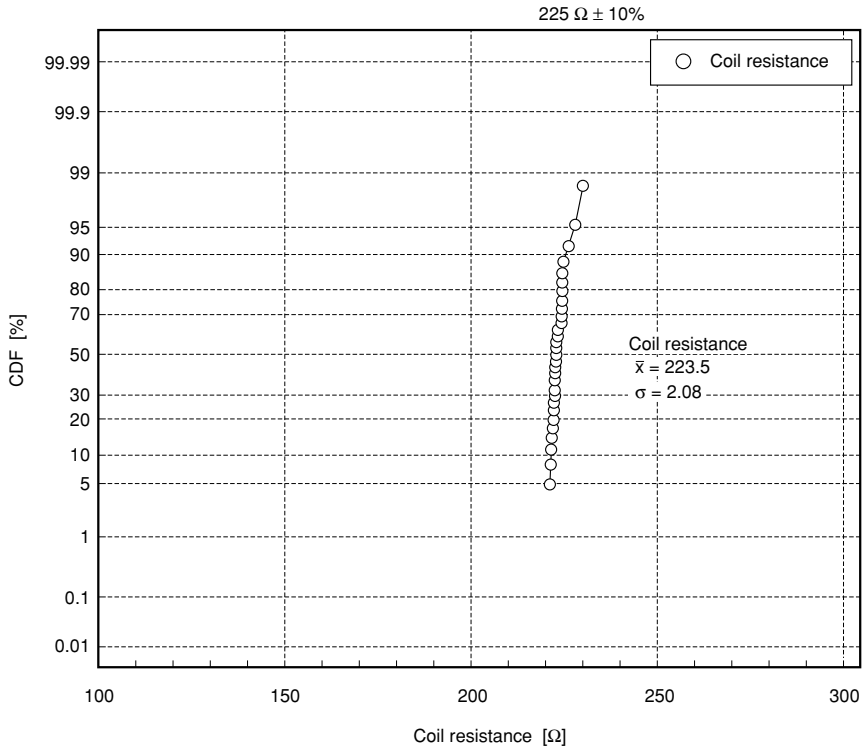
25 mΩ MAX.



2. INITIAL CHARACTERISTICS

Coil Resistance

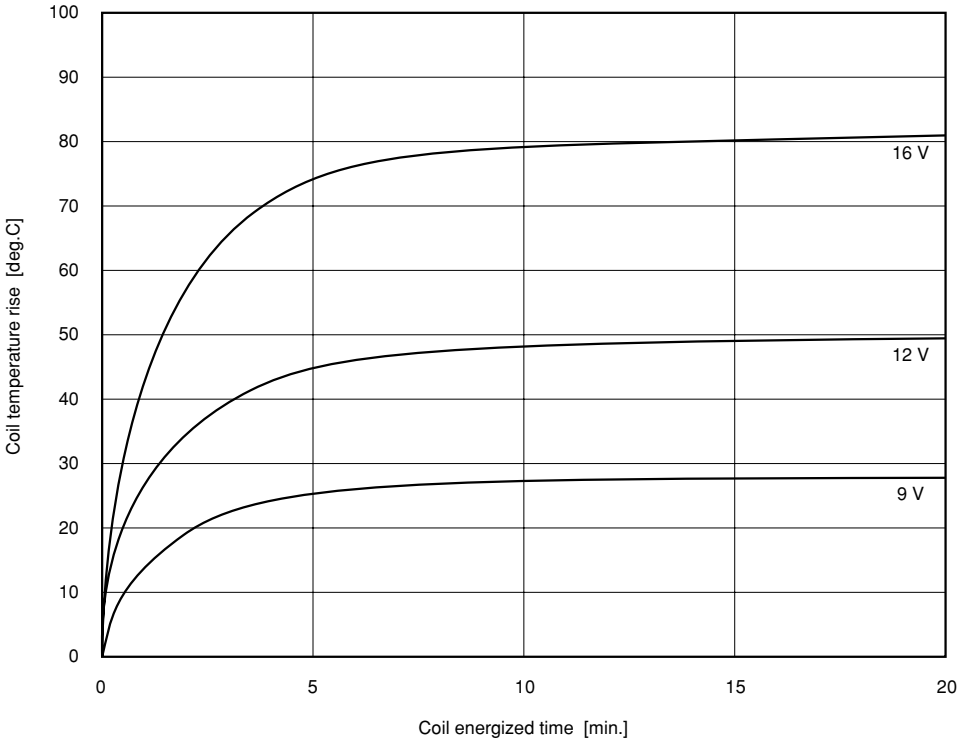
Test items	Test conditions	Samples
1. Coil resistance	Ambient temperature : 20℃	ET1-B3M1S 30 pcs

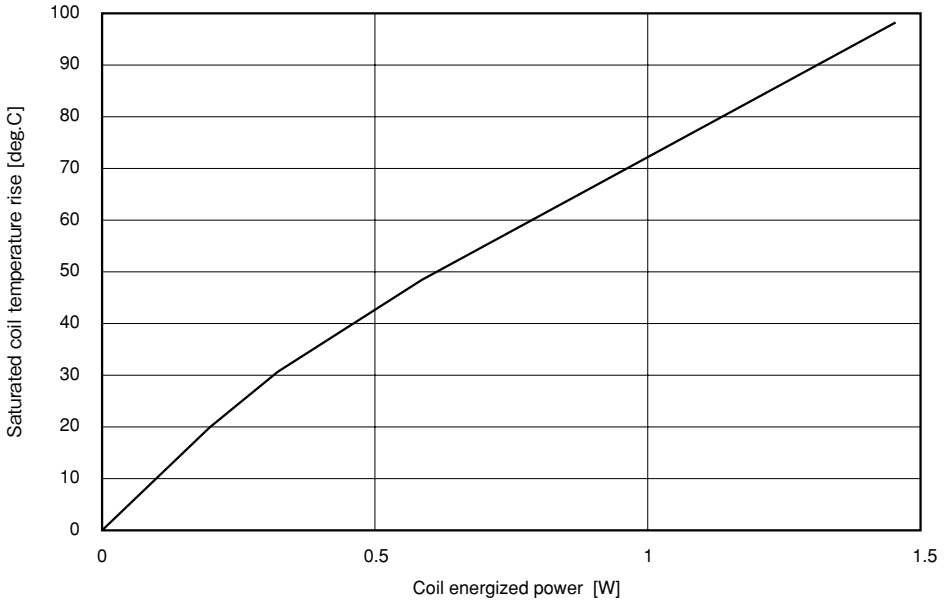


2. INITIAL CHARACTERISTICS

Coil Temperature Rise

Test items	Test conditions	Samples
1. Coil temperature rise	Ambient temperature : 20℃ Contact carrying current : 0 (A) Coil resistance measuring method	ET1-B3M1S 3 pcs

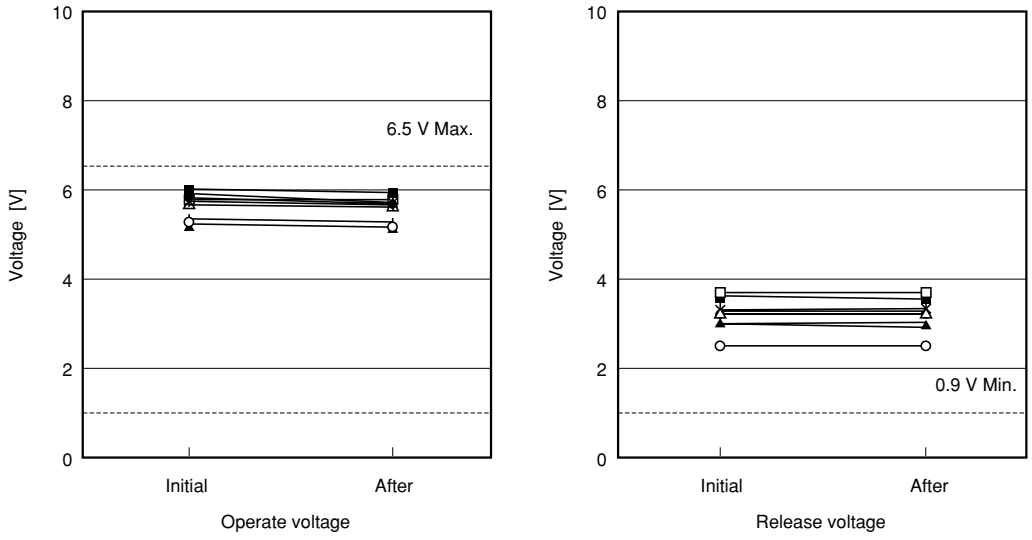


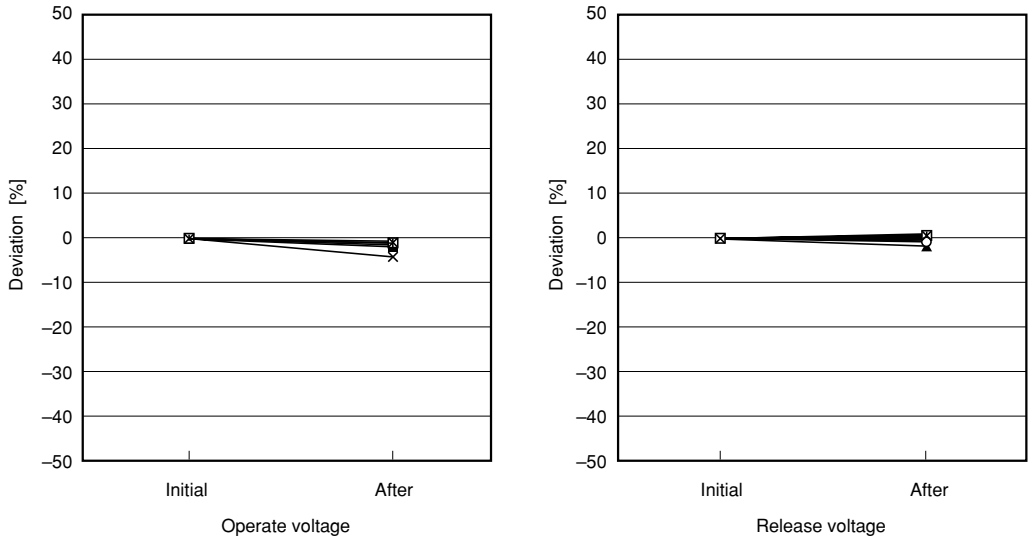


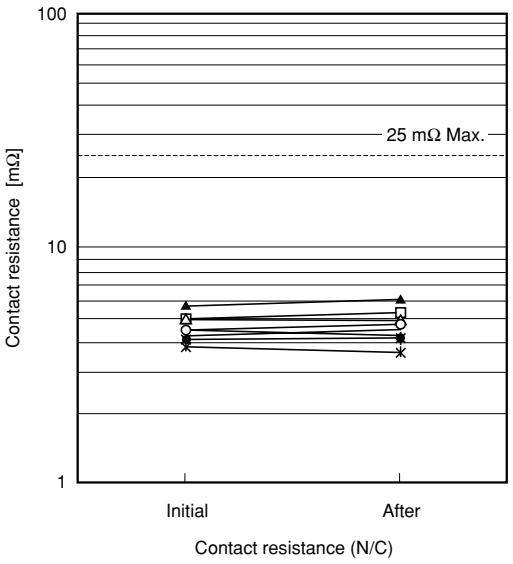
3. ENVIRONMENTAL CHARACTERISTICS

High Temperature Test

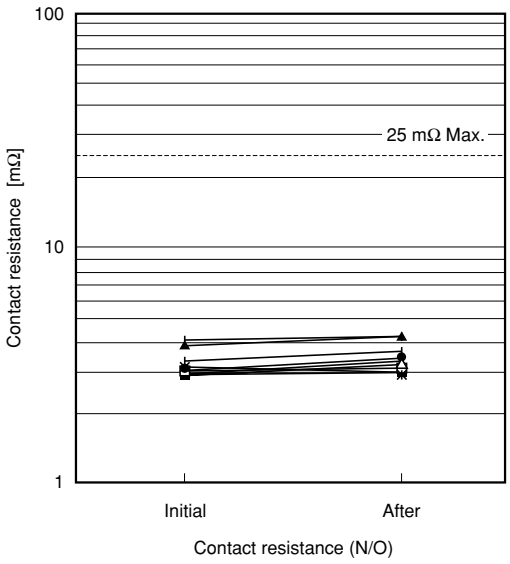
Test items	Test conditions		Samples
1. Operate voltage 2. Release voltage 3. Contact resistance 4. Coil resistance	Temperature Duration time	: 85°C ±2°C : 192 Hours	ET1-B3M1S 10 pcs



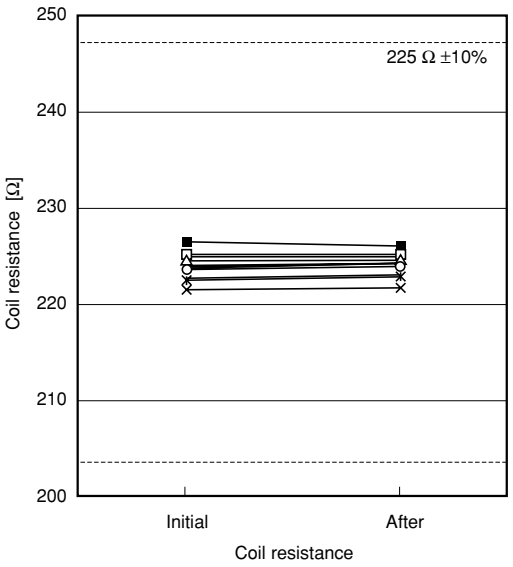




Contact resistance (N/C)



Contact resistance (N/O)

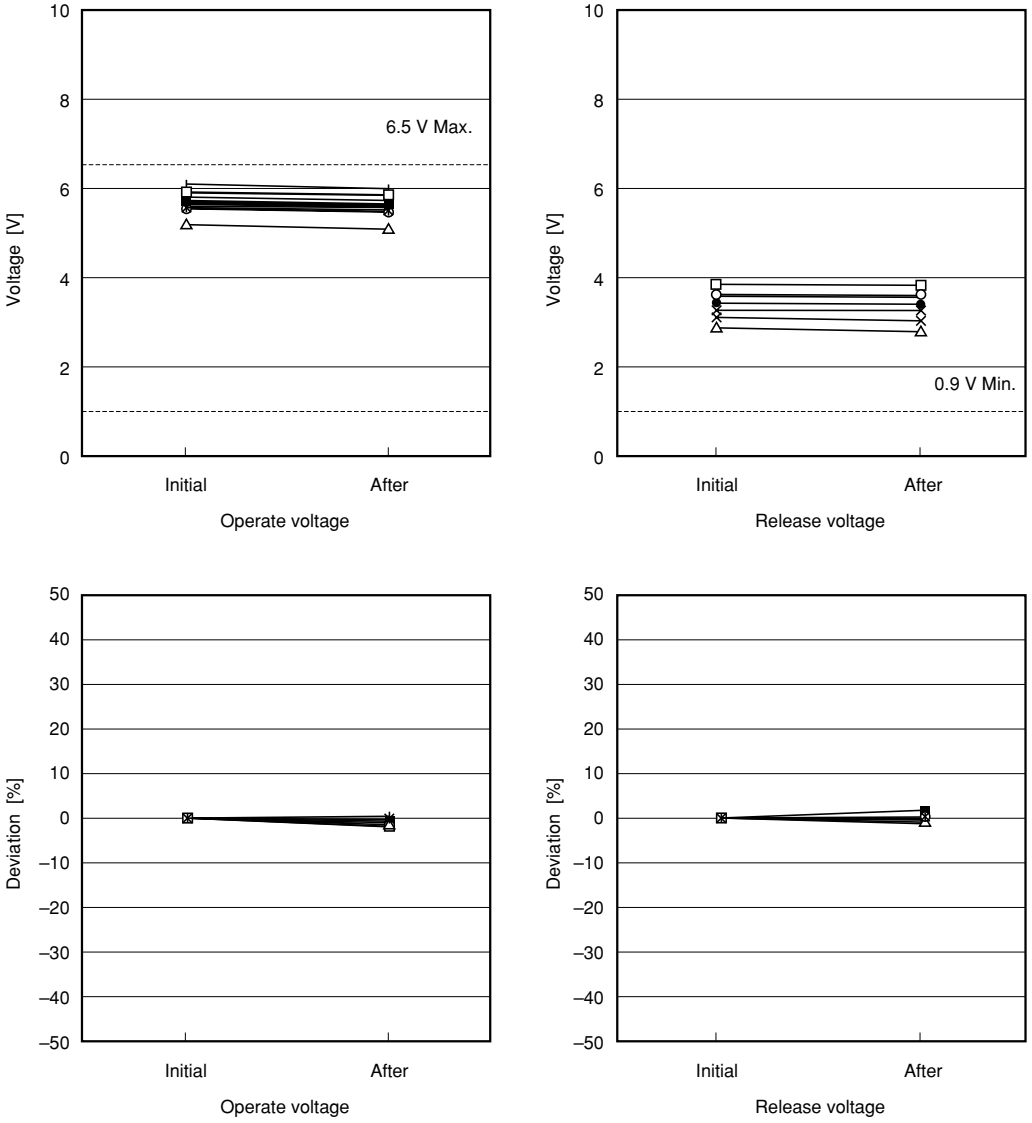


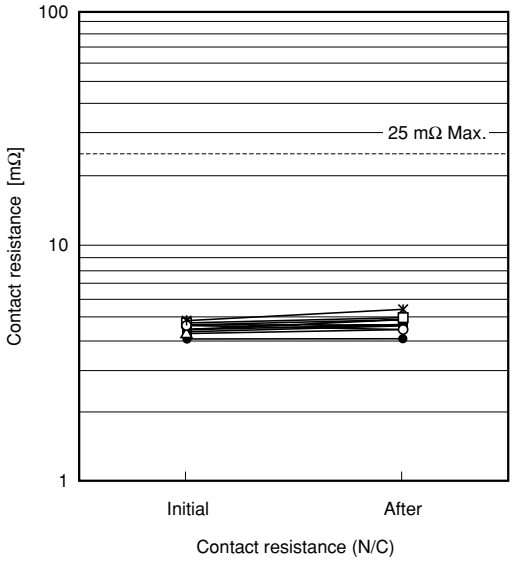
Coil resistance

3. ENVIRONMENTAL CHARACTERISTICS

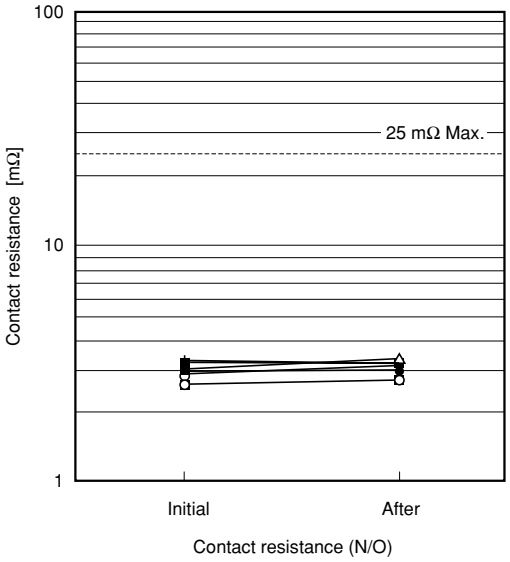
Low Temperature Test

Test items	Test conditions	Samples
1. Operate voltage 2. Release voltage 3. Contact resistance 4. Coil resistance	Temperature : –40°C ±2°C Duration time : 192 Hours	ET1-B3M1S 10 pcs

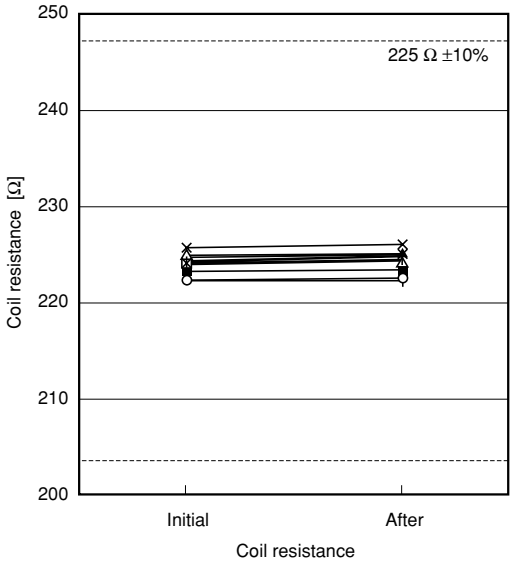




Contact resistance (N/C)



Contact resistance (N/O)

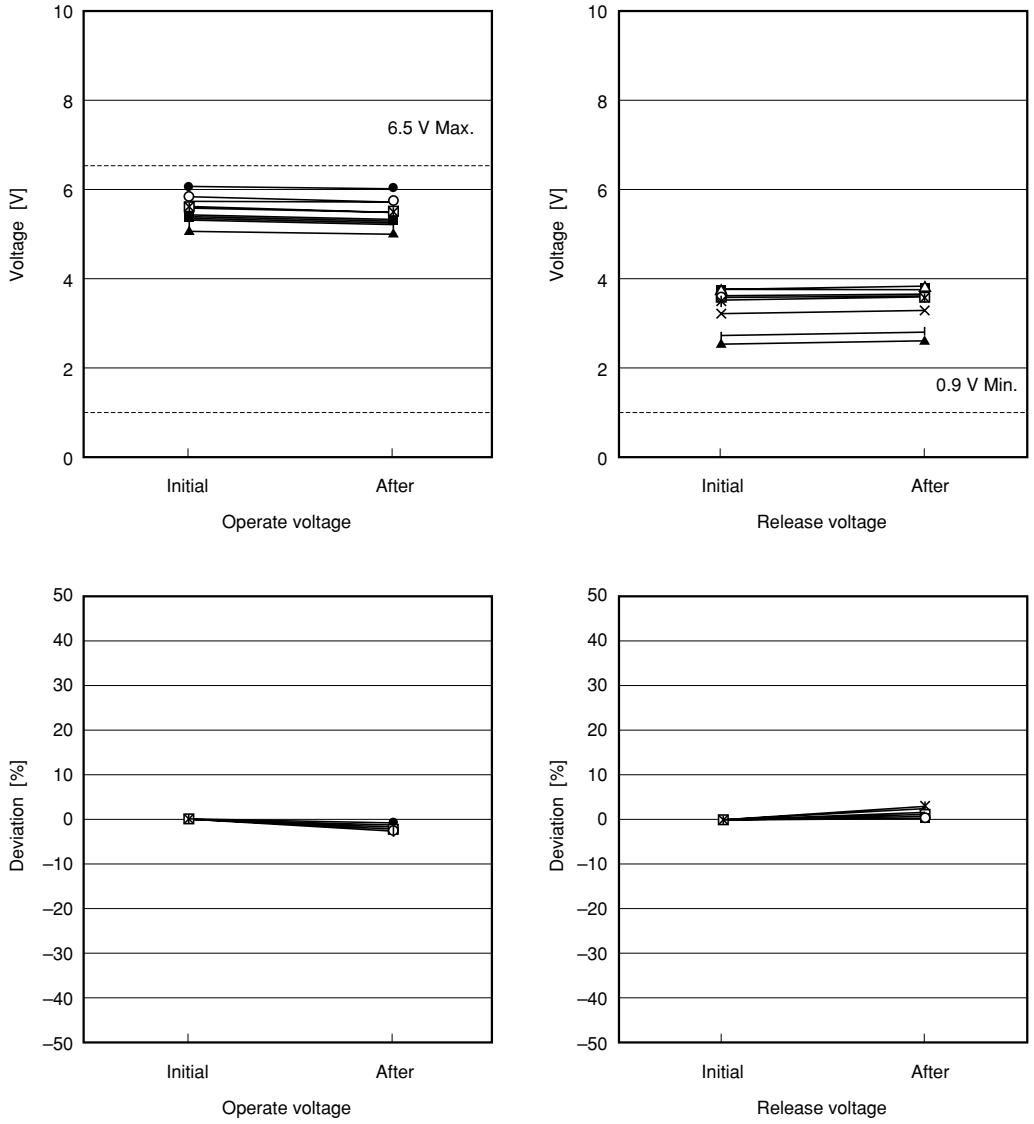


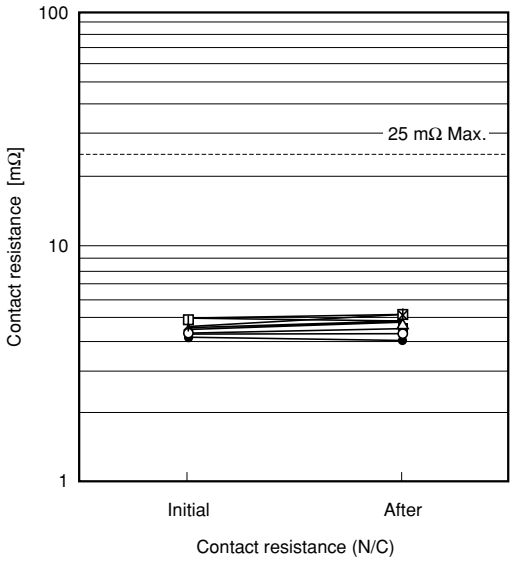
Coil resistance

3. ENVIRONMENTAL CHARACTERISTICS

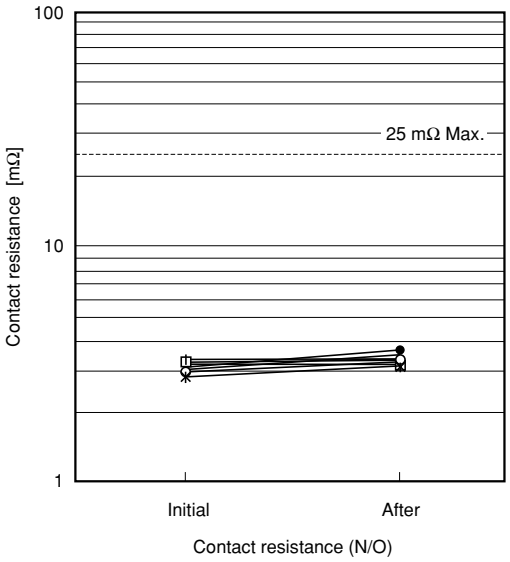
High Temperature And High Humidity Test

Test items	Test conditions	Samples
1. Operate voltage 2. Release voltage 3. Contact resistance 4. Coil resistance	Temperature : 85°C Humidity : 85%RH Duration time : 192 Hours	ET1-B3M1S 10 pcs

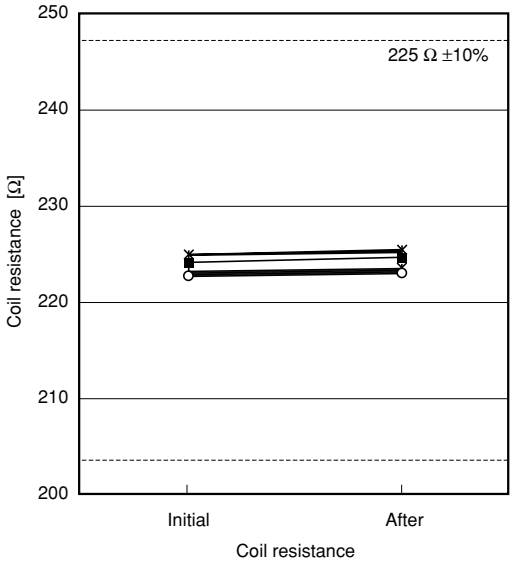




Contact resistance (N/C)



Contact resistance (N/O)

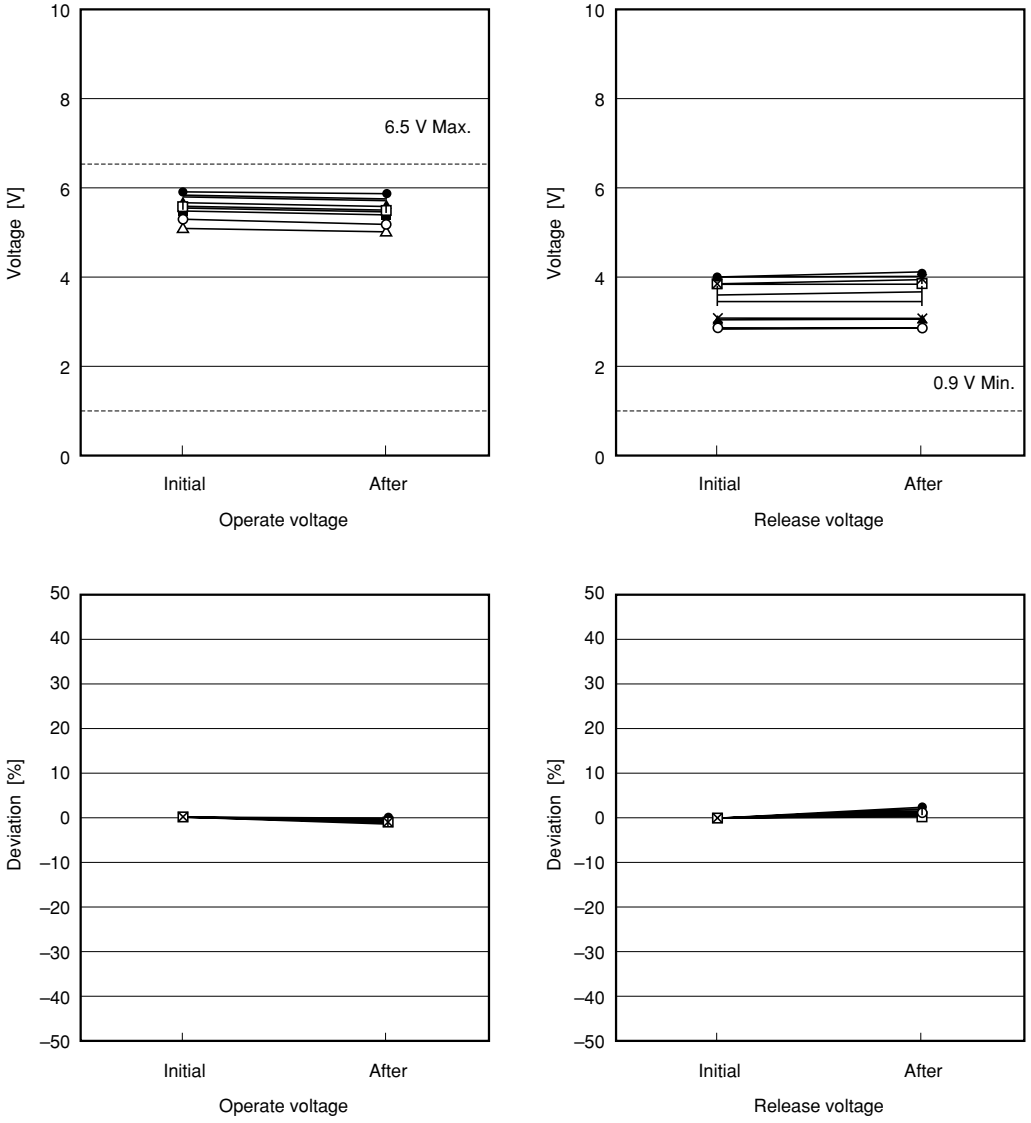


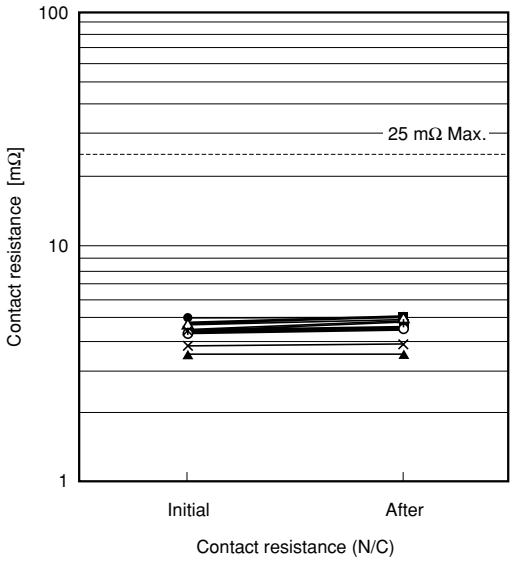
Coil resistance

3. ENVIRONMENTAL CHARACTERISTICS

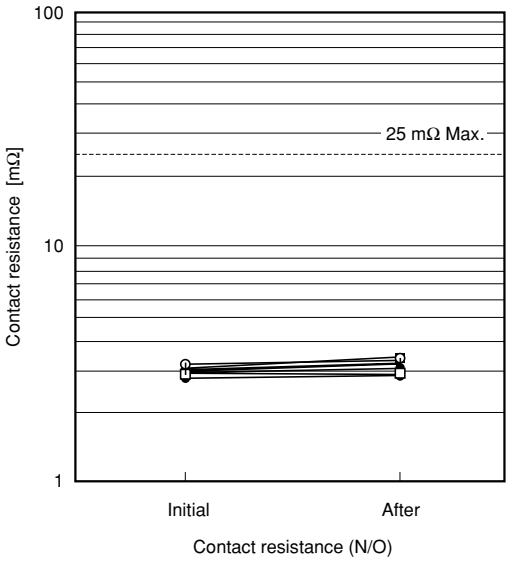
High Temperature And High Humidity Cycle Test

Test items	Test conditions	Samples
1. Operate voltage 2. Release voltage 3. Contact resistance 4. Coil resistance	MIL-STD-202F-106E Temperature : 25°C ~ 65°C ~ 25°C ~ 65°C ~ –10°C Humidity : 95%RH Number of cycles : 10 cycles	ET1-B3M1S 10 pcs

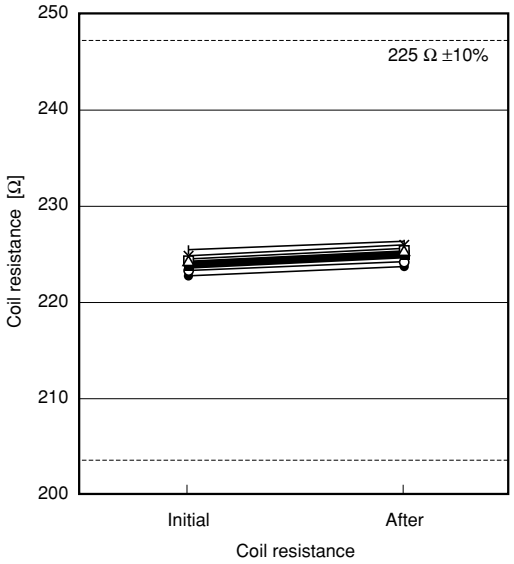




Contact resistance (N/C)



Contact resistance (N/O)

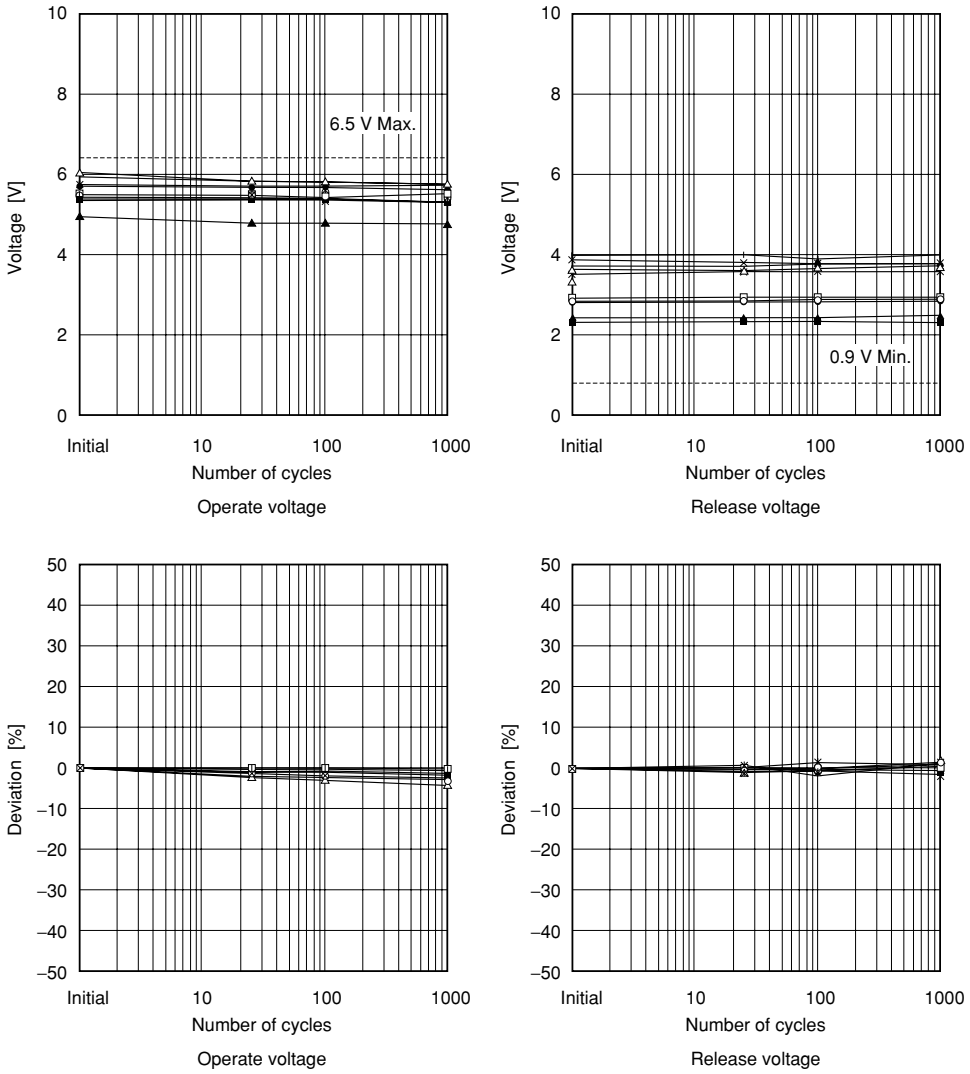


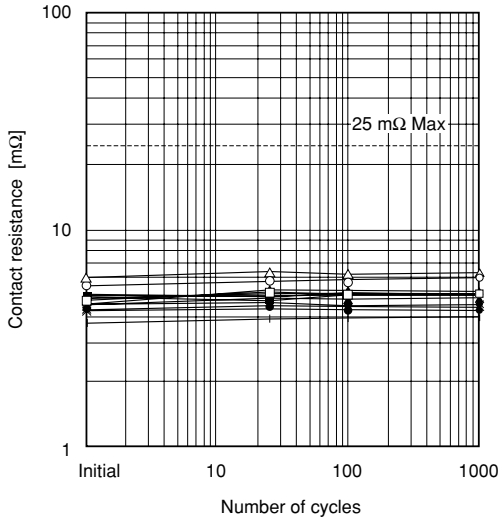
Coil resistance

3. ENVIRONMENTAL CHARACTERISTICS

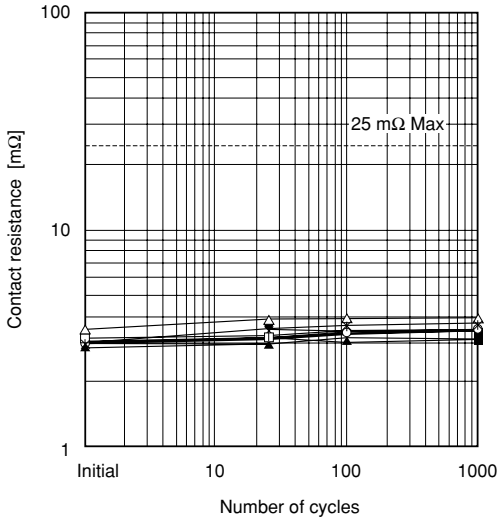
Thermal Shock Test

Test items	Test conditions	Samples
1. Operate voltage 2. Release voltage 3. Contact resistance 4. Coil resistance	+85°C +20 +10 −5 °C −40°C 30 min 30 min 1 Cycle	ET1-B3M1S 10 pcs

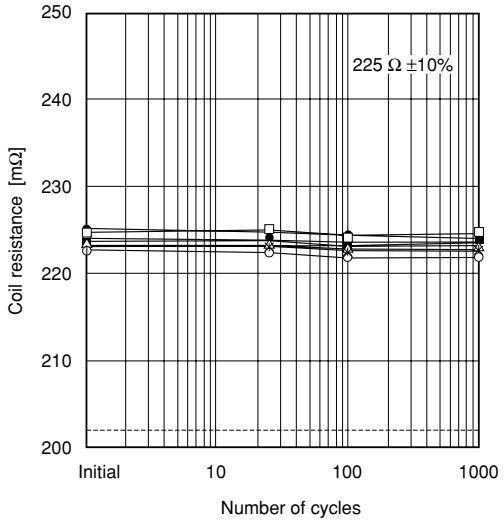




Contact resistance (N/C)



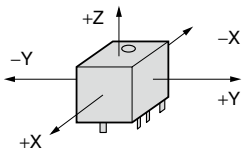
Contact resistance (N/O)



Coil resistance

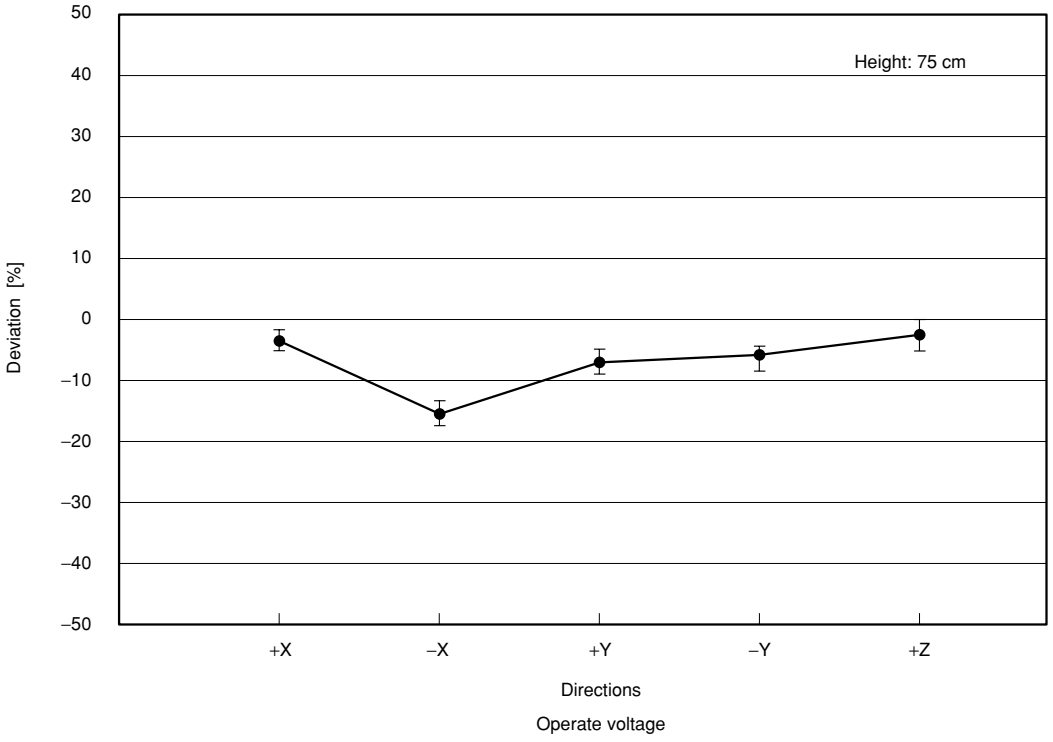
3. ENVIRONMENTAL CHARACTERISTICS

Drop Test (1)

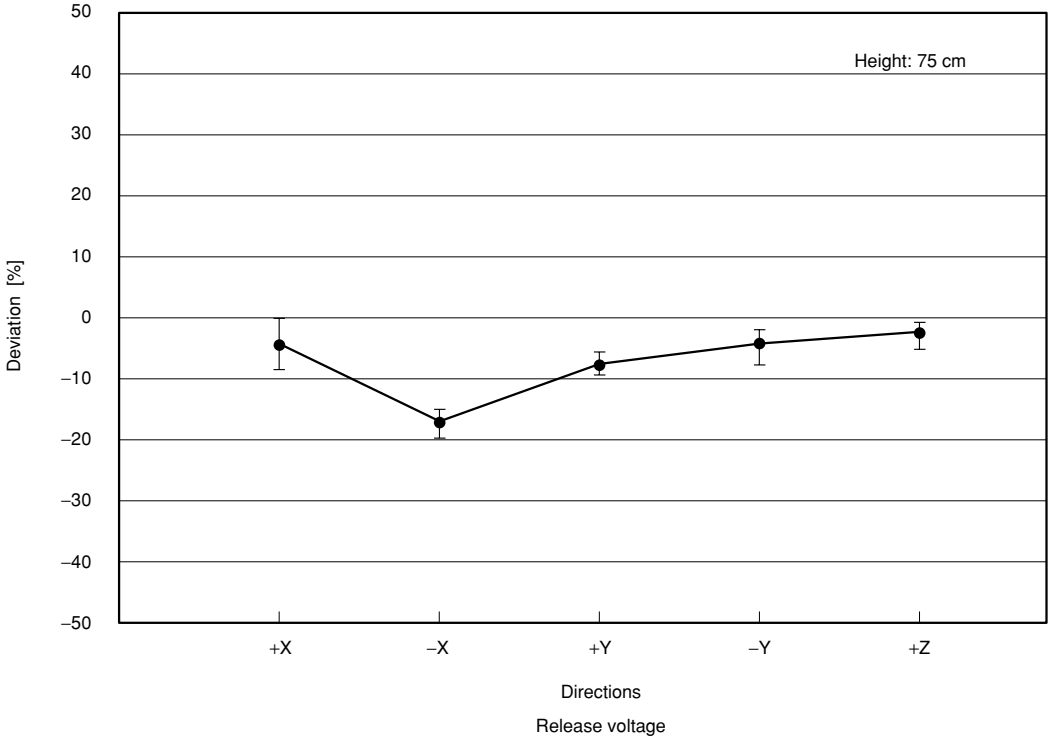
Test Items	Test Conditions	Samples
1. Operate Voltage 2. Release Voltage	Dropping unmber : 1 times Direction : 5 direction as follows Height : 75 cm 	ET1-B3M1S 15 pcs (each directions : 3 pcs)

< 75 cm drop height >

1. Deviation of operate/release voltage : 20% max.
2. No constructive failure



Operate voltage



Release voltage

3. ENVIRONMENTAL CHARACTERISTICS

Drop Test (2)

Test items	Test conditions	Samples
1. Operate Voltage 2. Release Voltage	Shown in Fig.1	ET1-B3M1S 8 pcs

- Drop height : 100 cm
- Relay : as shown below figure
- Drop direction : +X ➡ –X ➡ +Y ➡ –Y ➡ +Z ➡ –Y
  (Total 6 times / relay)

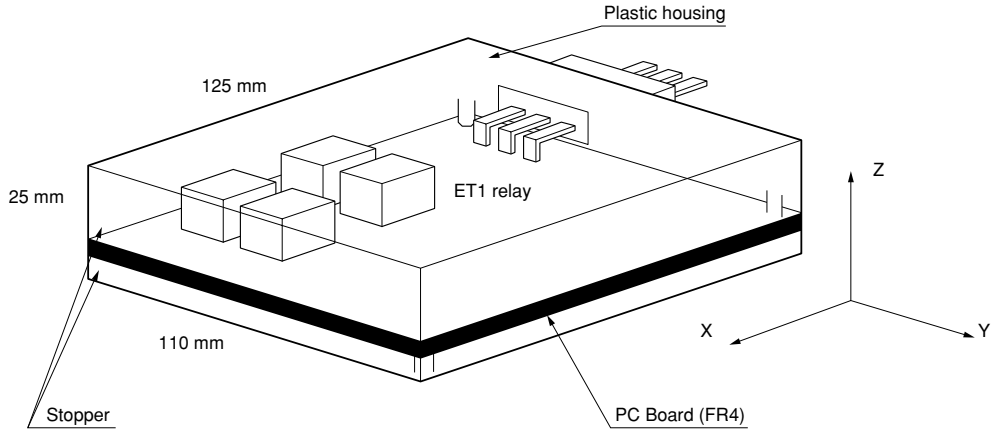
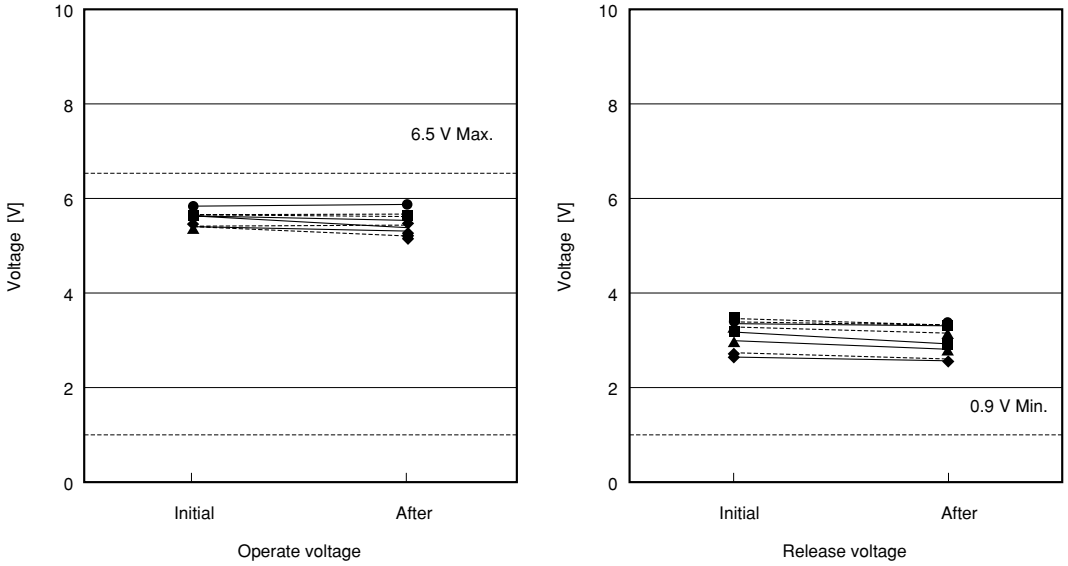
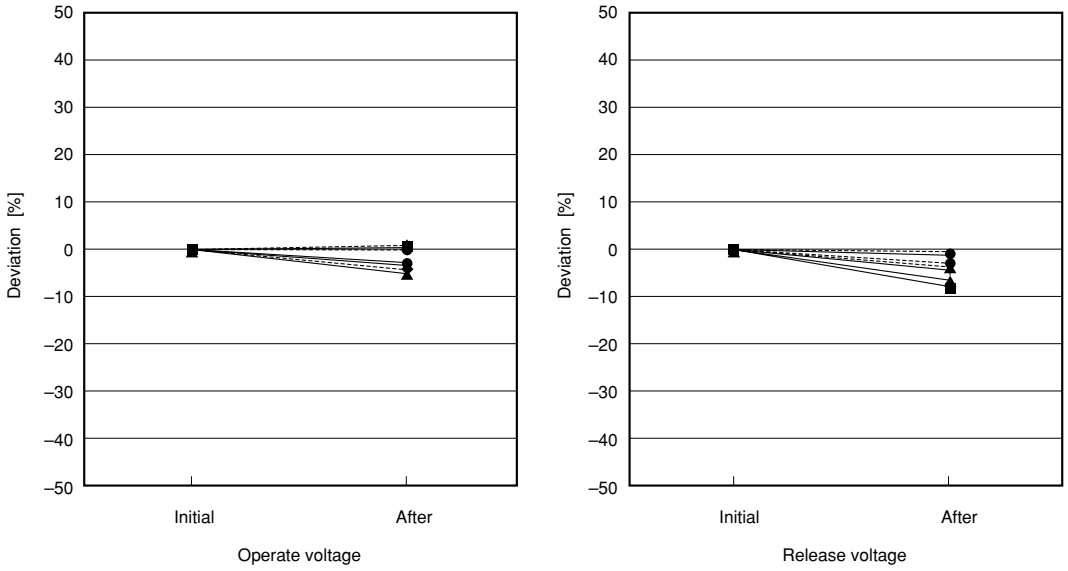


Fig.1 Module for drop test





3. ENVIRONMENTAL CHARACTERISTICS

Seal Test

Test items	Test conditions	Samples
	Shown in Fig.1	ET1-B3M1S 1. 10 pcs 2. 5 pcs

1. Air tightness

Test Method

Samples soaked in Liquid (SC-75) for 20 min at 85℃
Show in Fig.1

Test Result

No bubbles occurred under the above condition

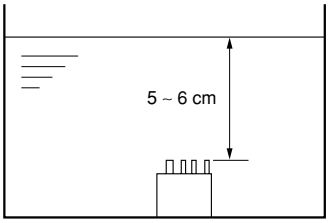


Fig.1 Sealing test method

2. Sealing

Test Method

1) 10 cycles of thermal shock between -40℃ for 30 min and +85℃ for 30 min.
2) Dipping the relays into solder bath for 10 sec. at 260℃
3) Dipping the relays into special ink bath for 60 sec. at 25℃
4) Check invasion of ink inside relay

Test Result

No invasion of ink was found in the samples.

3. ENVIRONMENTAL CHARACTERISTICS

Carrying Current Test

Test Items	Test Conditions	Samples
Carrying current	• Sealed type • Coil wattage: 0.87 W (225 Ω, 14 VDC) • Relay is connected directly to wire (10 AWG) with solder, not mounted on PC board • Temperature: 20°C, 85°C • Failure mode: Spool (Coil bobbin) melting	ET1-B3M1S 10 pcs