

INFORMATION



AUTOMOTIVE TWIN RELAY

EP2 SERIES TECHNICAL DATA

© EM Devices Corporation 2018



- 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.

CONTENTS

Initial Characteristics	
Coil Resistance Distribution	1
Operate and Release Voltage Distribution	2
Contact Resistance Distribution	3
Relay Characteristics	
Coil Temperature Rise	4
Operate and Release Time	5
Environmental Characteristics	
Shock Test (mis-operation)	6
Vibration Test (mis-operation)	7
Low Temperature Test	8
High Temperature Test	9
Thermal Shock Test	10
Moisture Resistance Test	11
Seal Test	12
Magnetic Interference (1)	13
Magnetic Interference (2)	14
Life Characteristics	
Mechanical Life Test	15
Actual Load Life Test (1)	16
Actual Load Life Test (2)	17
[Motor (22A/3A), 14VDC, Locked/Unlocked]	

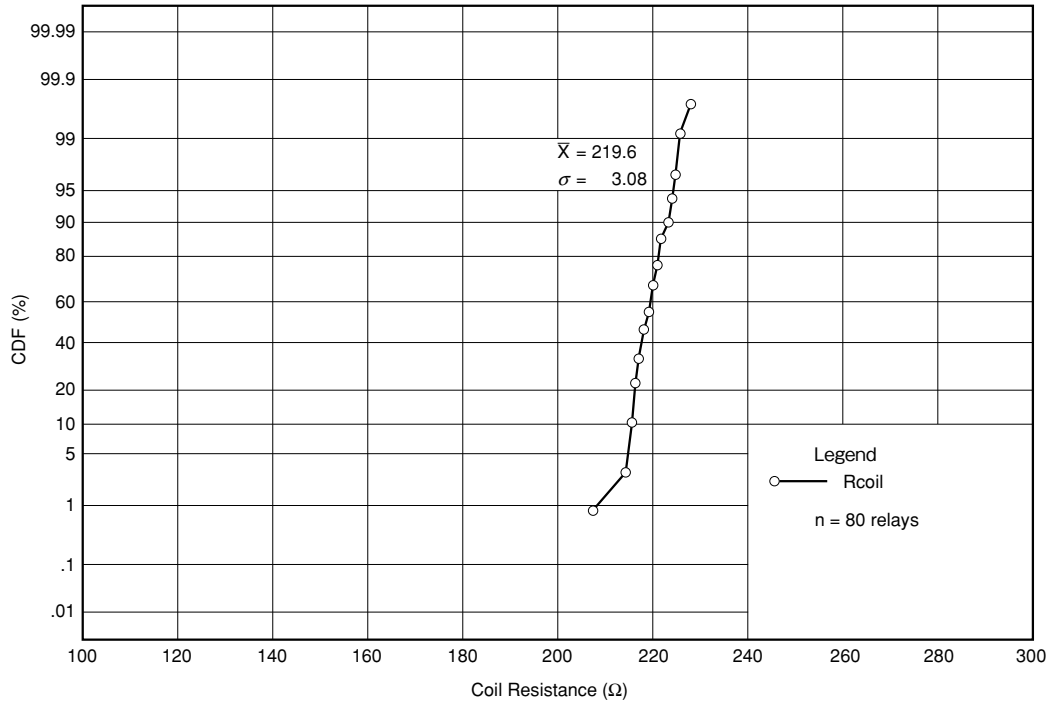


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "NOTES ON CORRECT USE" in the selection guide.

COIL RESISTANCE DISTRIBUTION

EM Devices Ref. No. GEP2IA01E

Test Items	Test Conditions	Samples
1. Coil Resistance	Ambient Temp.: 20 °C	EP2-3L2 80 pcs.



* CDF: Cumulative Distribution Function

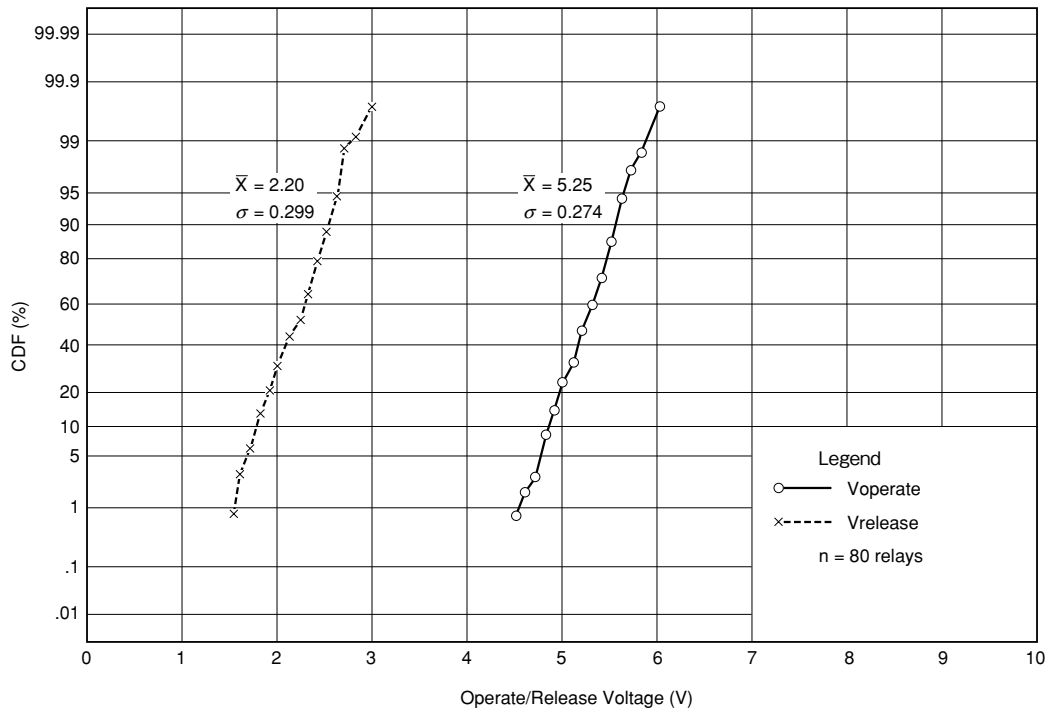


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "NOTES ON CORRECT USE" in the selection guide.

**OPERATE/RELEASE VOLTAGE DISTRIBUTION
(Initial Characteristics)**

EM Devices Ref. No. GEP2IB01E

Test Items	Test Conditions	Samples
1. Operate Voltage 2. Release Voltage	Ambient Temp.: 20 °C	EP2-3L2 80 pcs.

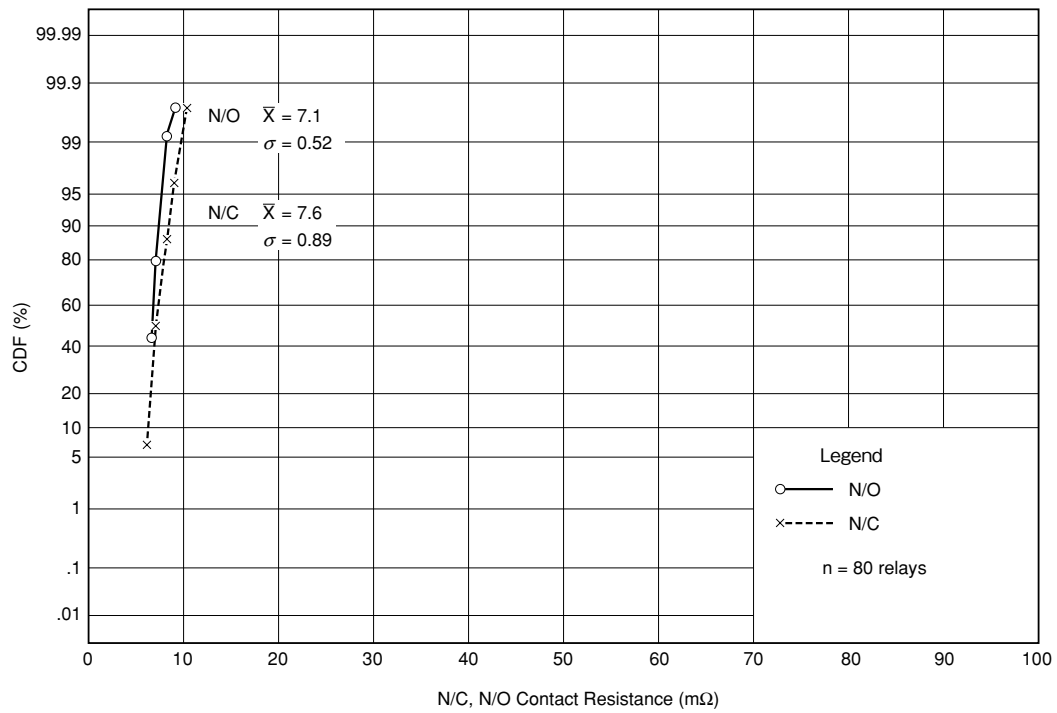


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "NOTES ON CORRECT USE" in the selection guide.

**CONTACT RESISTANCE DISTRIBUTION
(Initial Characteristics)**

EM Devices Ref. No. GEP2IC01E

Test Items	Test Conditions	Samples
1. Contact Resistance	Ambient Temp.: 20 °C Measured at 2A	EP2-3L2 80 pcs.



* N/C: Break Contact
N/O: Make Contact

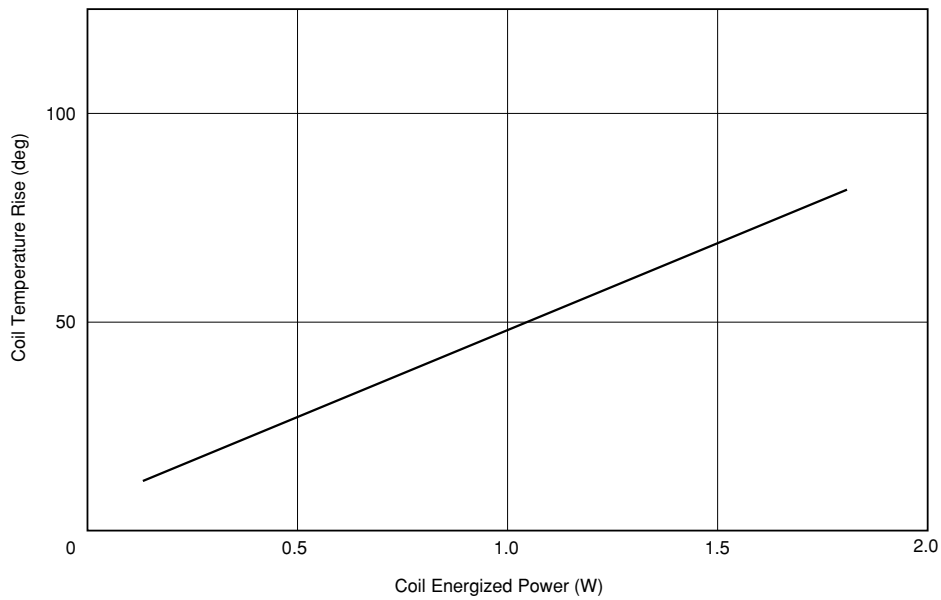
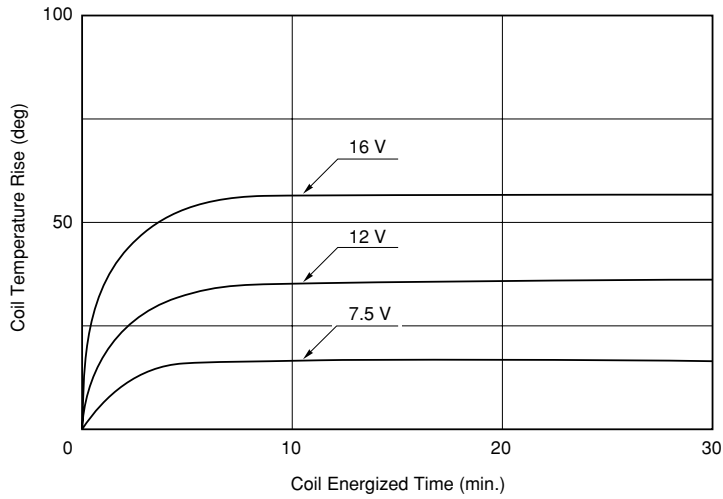


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "NOTES ON CORRECT USE" in the selection guide.

COIL TEMPERATURE RISE

EM Devices Ref. No. GEP2IJ01E

Test Items	Test Conditions	Samples
1. Coil Temperature Rise	Ambient Temp.: 20 °C Contact Carrying Current: 0 (A) Coil Resistance Measuring Method	EP2-3L2 3 pcs.

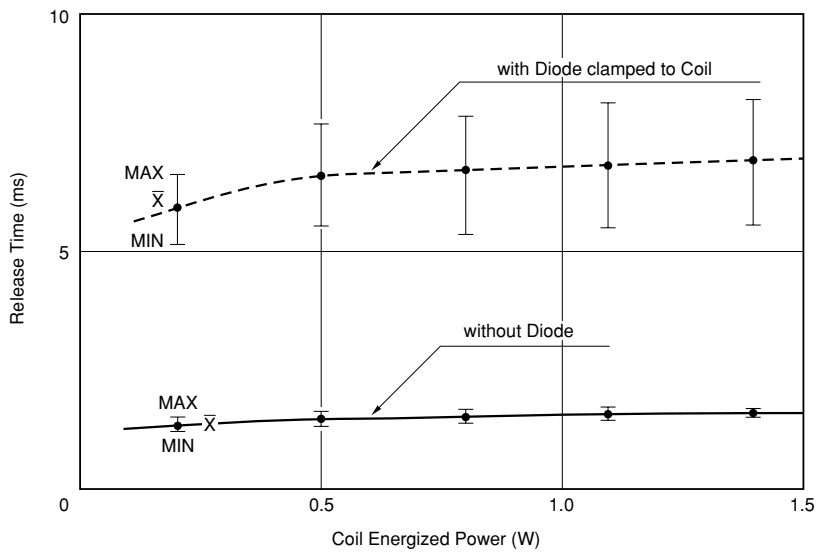
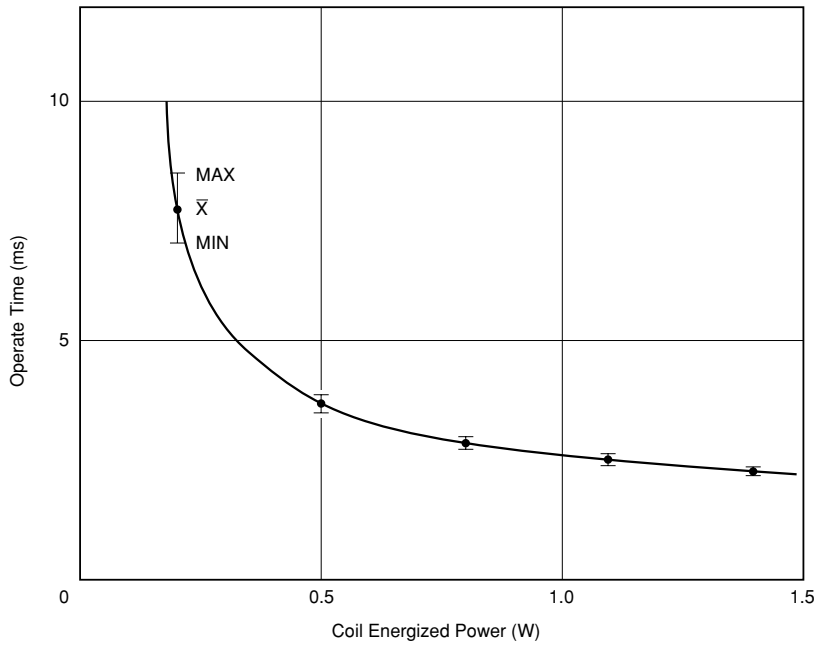


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "NOTES ON CORRECT USE" in the selection guide.

OPERATE/RELEASE TIME

EM Devices Ref. No. GEP2ID01E

Test Items	Test Conditions	Samples
1. Operate Time 2. Release Time	Ambient Temp.: 20 °C Except for Chattering Time	EP2-3L2 5 pcs.

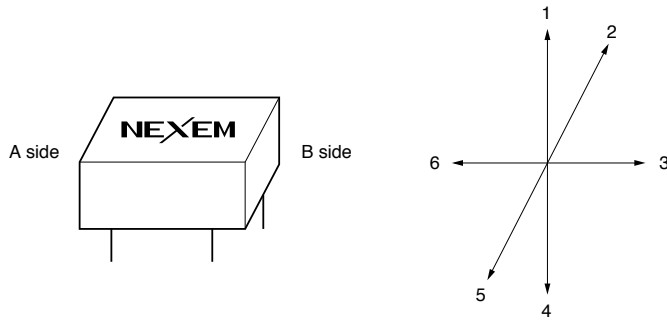


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "NOTES ON CORRECT USE" in the selection guide.

SHOCK TEST (mis-operation)

EM Devices Ref. No. GEP2IIB01E

Test Items	Test Conditions	Samples
1. Open time of contact 0.1 ms	Coil not carrying current 6 Directions (A, B side)	EP2-3L2 5 pcs.



Direction	Acceleration (G)	
	A side	B side
	N/C contact open / N/O contact close	N/C contact open / N/O contact close
1	more than 150 / more than 150	more than 150 / more than 150
2	more than 150 / more than 150	more than 25 / more than 35
3	more than 150 / more than 150	more than 150 / more than 150
4	more than 150 / more than 150	more than 150 / more than 150
5	more than 25 / more than 35	more than 150 / more than 150
6	more than 150 / more than 150	more than 150 / more than 150



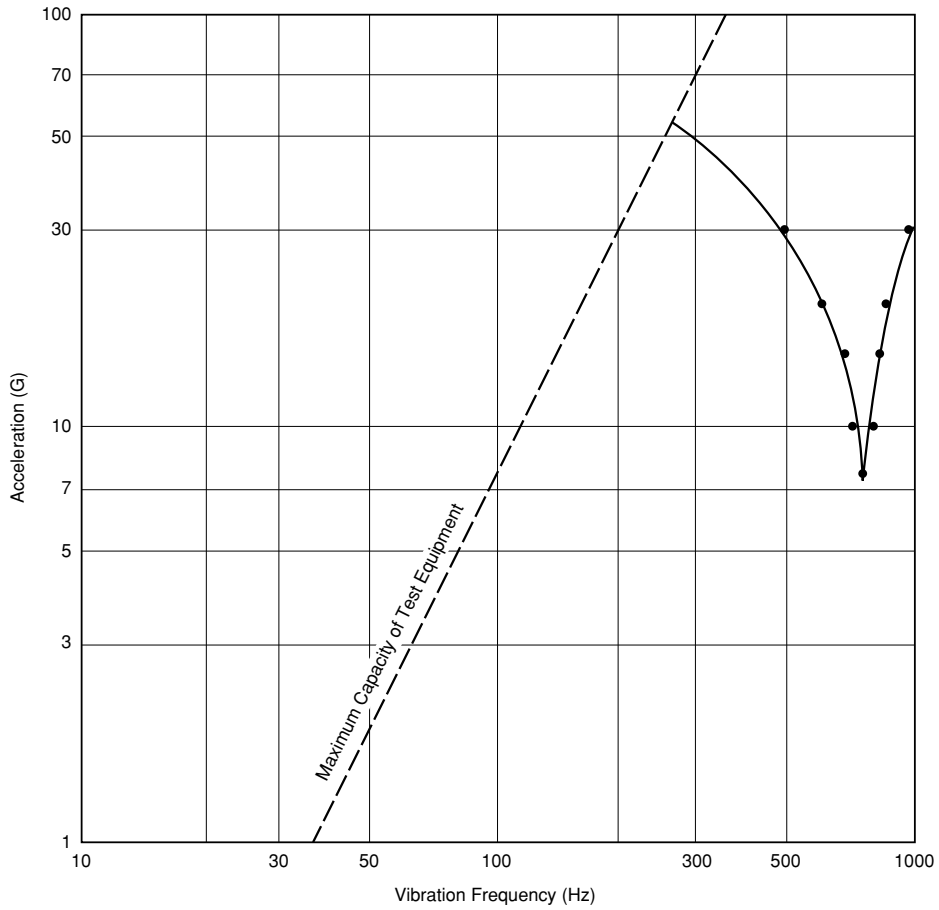
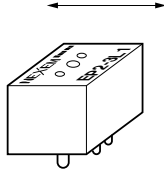
- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "NOTES ON CORRECT USE" in the selection guide.

VIBRATION TEST (mis-operation)

EM Devices Ref. No. GEP2IIIA01E

Test Items	Test Conditions	Samples
1. Open Time of N/C Contact 0.1 ms	Direction: as follows Coil not carrying current	EP2-3L2 5 pcs.

Direction of Vibration

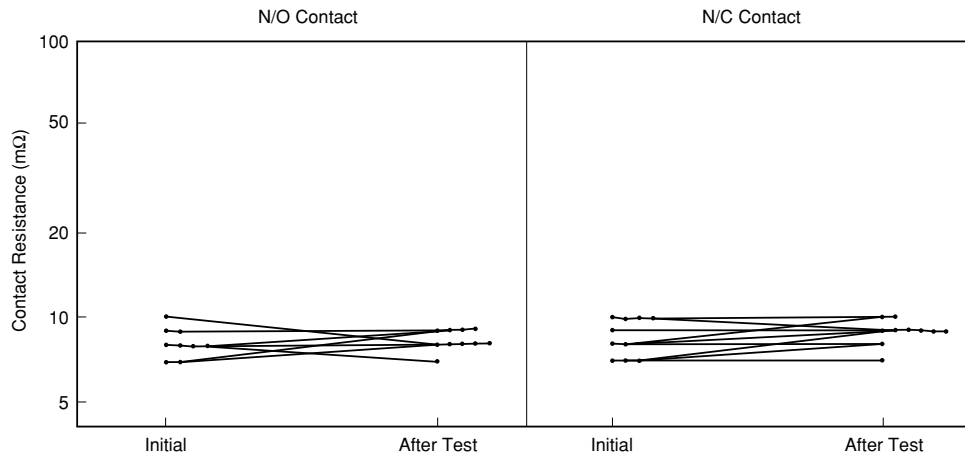
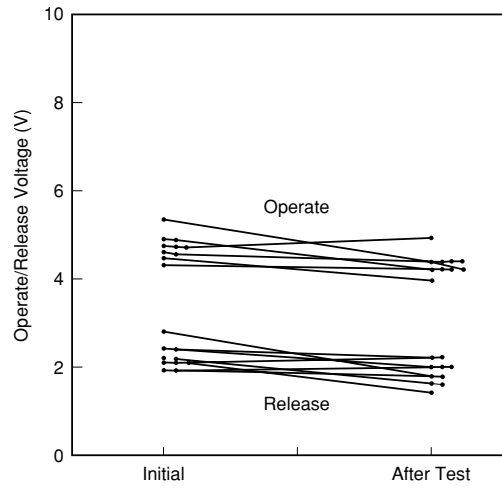


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "NOTES ON CORRECT USE" in the selection guide.

LOW TEMPERATURE TEST

EM Devices Ref. No. GEP2IIB01E

Test Items	Test Conditions	Samples
1. Operate Voltage 2. Release Voltage 3. Contact Resistance	Test Temp.: $-40\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ Test Time : 192 hours	EP2-3L2 5 pcs.

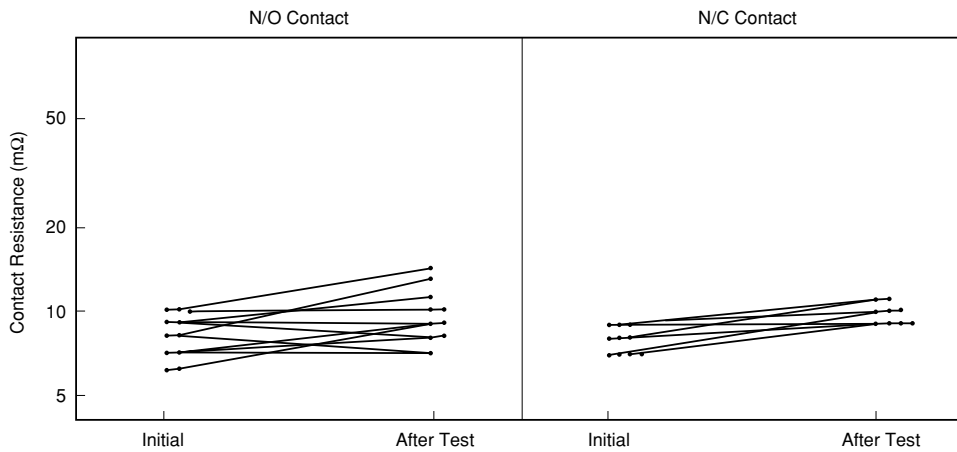
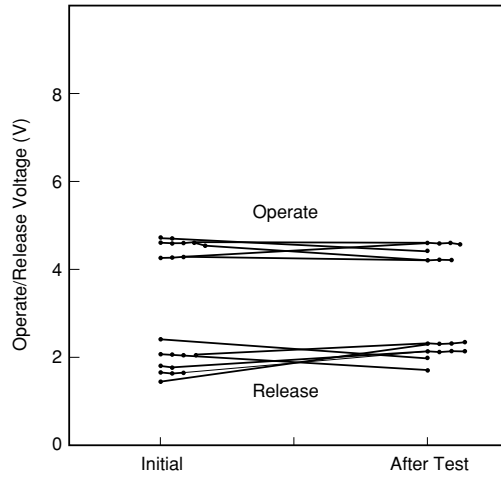


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "NOTES ON CORRECT USE" in the selection guide.

HIGH TEMPERATURE TEST

EM Devices Ref. No. GEP2IIA01E

Test Items	Test Conditions	Samples
1. Operate Voltage 2. Release Voltage 3. Contact Resistance	Test Temp.: $+85\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ Test Time : 192 hours	EP2-3L2 5 pcs.

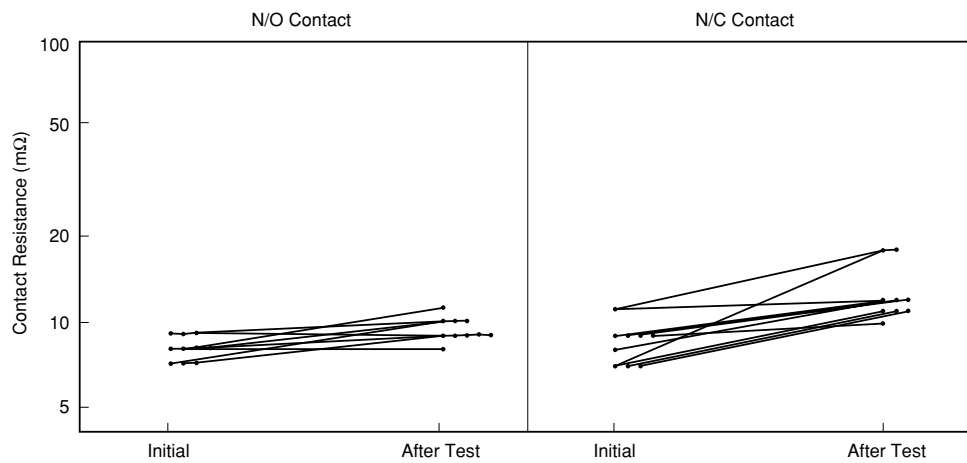
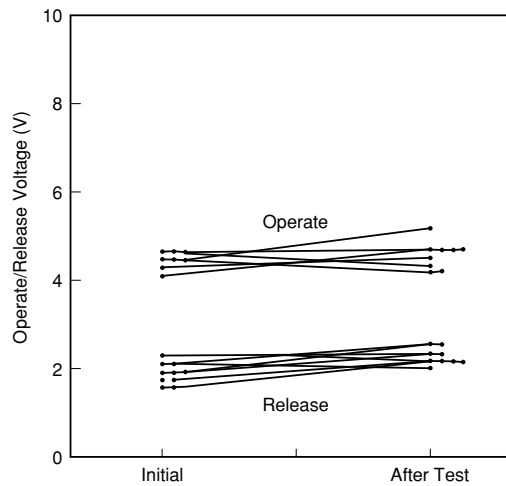


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "NOTES ON CORRECT USE" in the selection guide.

THERMAL SHOCK TEST

EM Devices Ref. No. GEP2IID01E

Test Items	Test Conditions	Samples
1. Operate Voltage 2. Release Voltage 3. Contact Resistance	1 cycle: -40 °C, 1 hour +85 °C, 1 hour 25 cycles (1,000 cycles)	EP2-3L2 5 pcs.



1,000 cycles : no problem

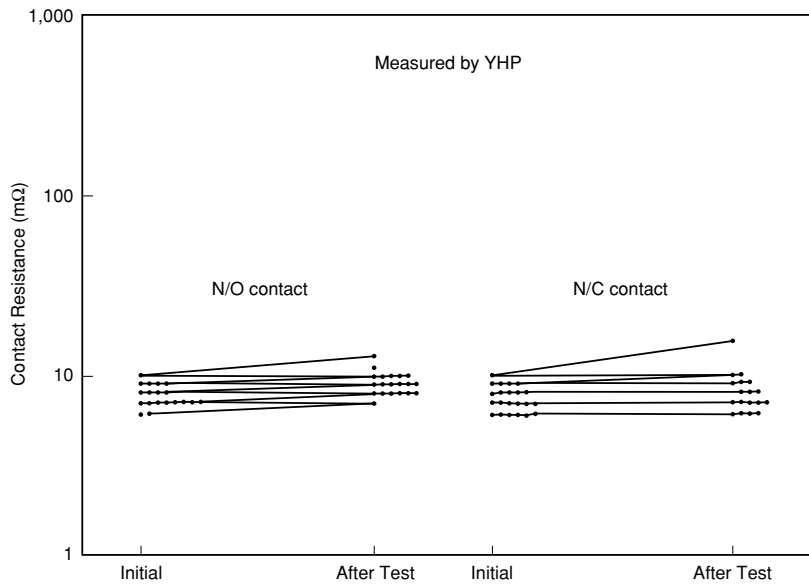
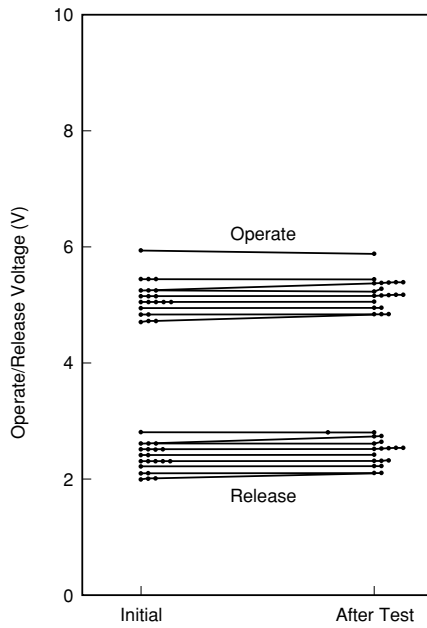


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "NOTES ON CORRECT USE" in the selection guide.

MOISTURE RESISTANCE TEST

EM Devices Ref. No. GEP2IIG01E

Test Items	Test Conditions	Samples
1. Operate Voltage 2. Release Voltage 3. Contact Resistance	Spec. : MIL-STD-202F-106E Cycles: 10 cycles	EP2-3N2S 10 pcs.



- 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.

SEAL TEST

EM Devices Ref. No. GEP2IL01E

Test Items	Test Conditions	Samples
Visual inspection	As per below	EP2-3N2S 10 pcs.

Test Method

1. 10 cycles of thermal shock between $-40\text{ }^{\circ}\text{C}$ for 1 hour and $+85\text{ }^{\circ}\text{C}$ for 1 hour.
2. Dipping the relays into solder bath for 10 sec. at $260\text{ }^{\circ}\text{C}$.
3. Dipping the relays into special ink bath for 60 sec. at $25\text{ }^{\circ}\text{C}$.
4. Check invasion of ink inside relay.

Test Result

No invasion of ink was found in the samples.

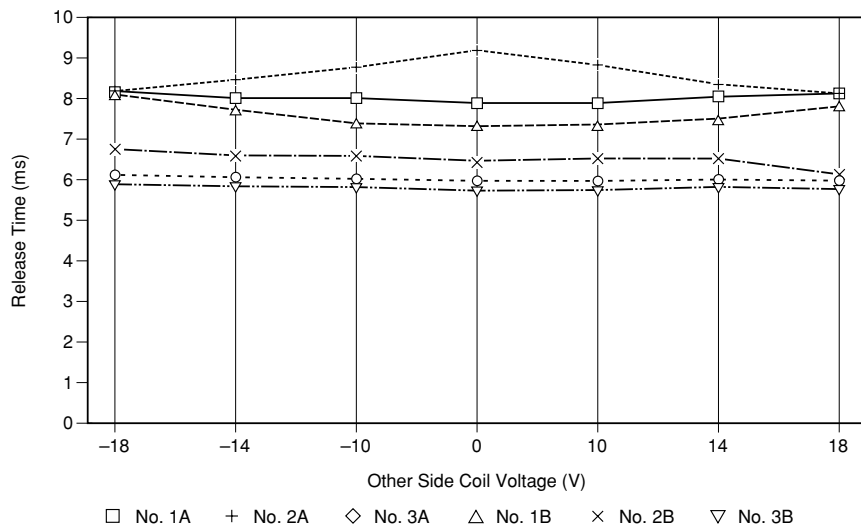
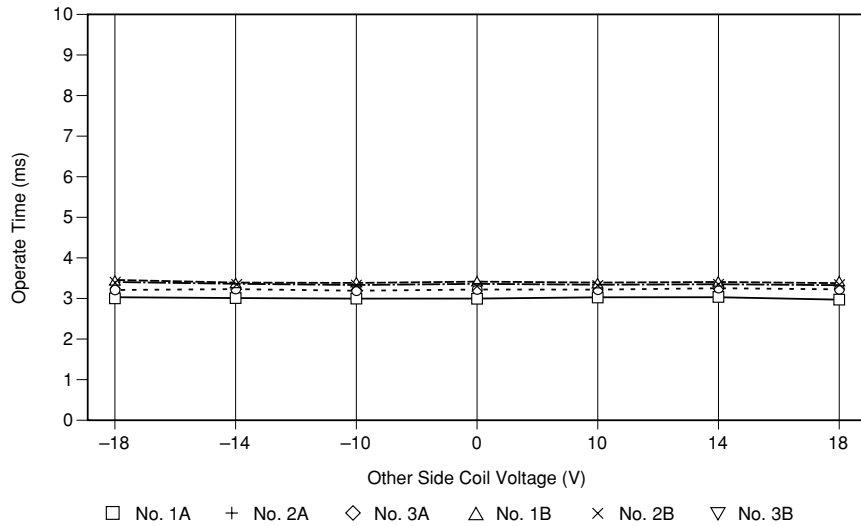


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "NOTES ON CORRECT USE" in the selection guide.

MAGNETIC INTERFERENCE (1)

EM Devices Ref. No. GEP2IR01E (1/2)

Test Items	Test Conditions	Samples
1. Operate Time 2. Release Time	Characteristics of A side (B side) on B side (A side) operated V coil = -18 to +18 VDC	EP2-3L2 3 pcs.

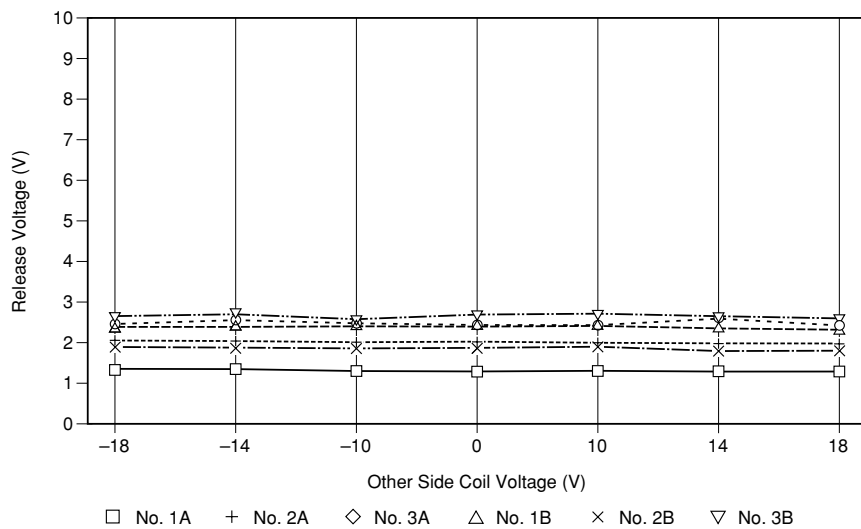
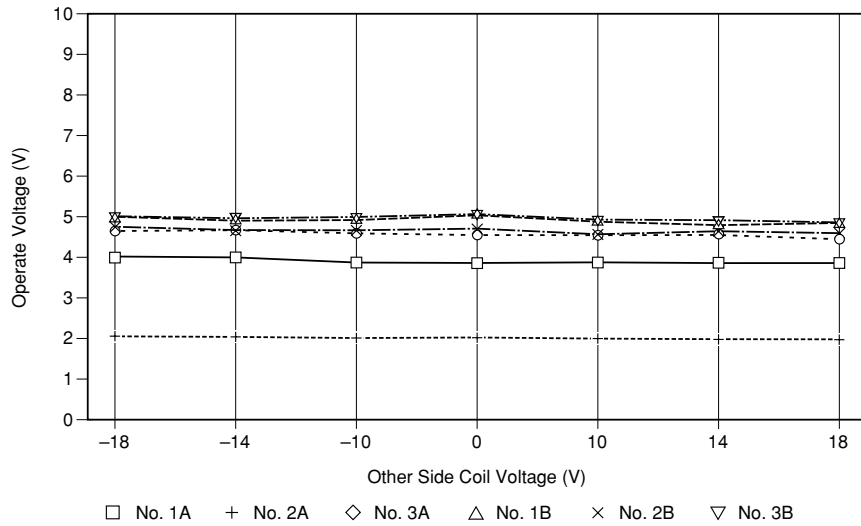


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "NOTES ON CORRECT USE" in the selection guide.

MAGNETIC INTERFERENCE (2)

EM Devices Ref. No. GEP2IR01E (2/2)

Test Items	Test Conditions	Samples
1. Operate Voltage 2. Release Voltage	Characteristics of A side (B side) on B side (A side) operated V coil = -18 to +18 VDC	EP2-3L2 3 pcs.

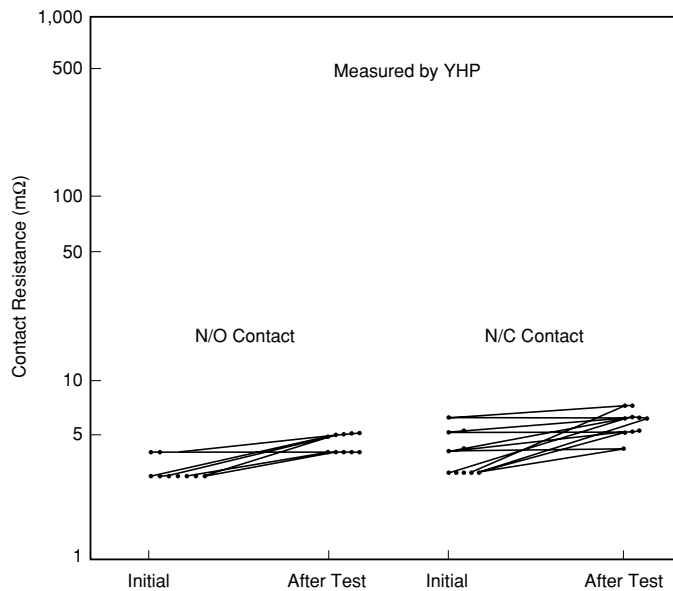
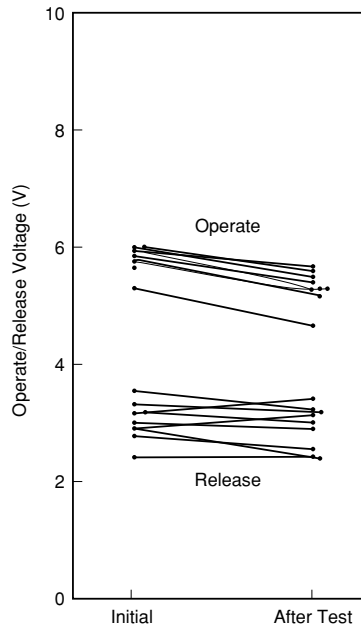


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "NOTES ON CORRECT USE" in the selection guide.

MECHANICAL LIFE TEST

EM Devices Ref. No. GEP2IVA01E

Test Items	Test Conditions	Samples
1. Operate Voltage 2. Release Voltage 3. Contact Resistance	Frequency: 15 Hz (50 % duty) No Load V coil = 14 VDC Number of Operation: 1×10^7 operations	EP2-3L2 5 pcs.



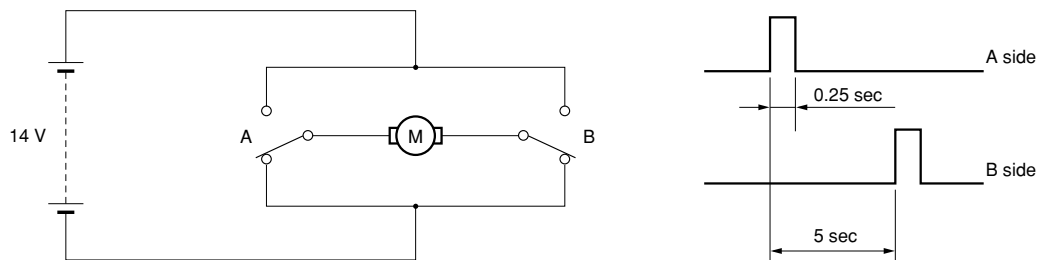
- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "NOTES ON CORRECT USE" in the selection guide.

ACTUAL LOAD LIFE TEST (1)

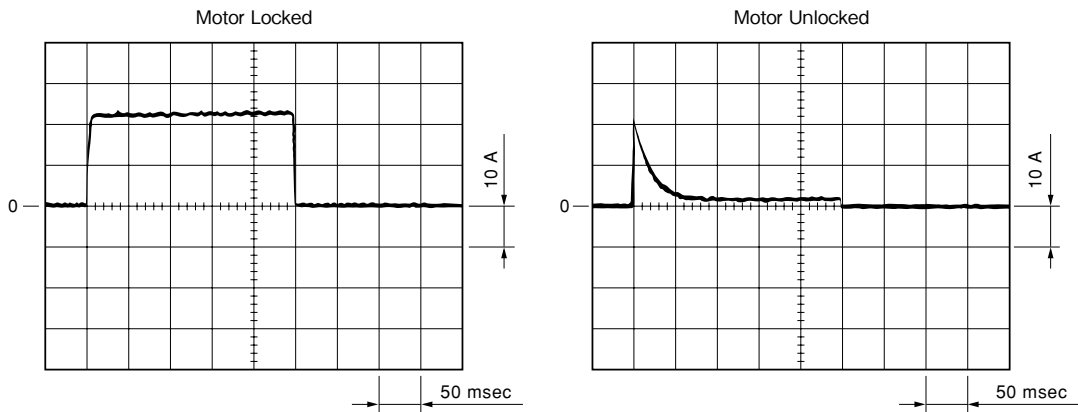
EM Devices Ref. No. GEP2IVB01E (1/2)

Test Items	Test Conditions	Samples
1. Operate Voltage 2. Release Voltage 3. Contact Force 4. Contact Resistance	Load: Power Window Motor (22A: Peak, /3A) (Rotor Locked, Unlocked) Number of Operation: 2×10^5 operations	EP2-3L2 5 pcs.

1. Test Condition



2. Current Wave Form of Motor

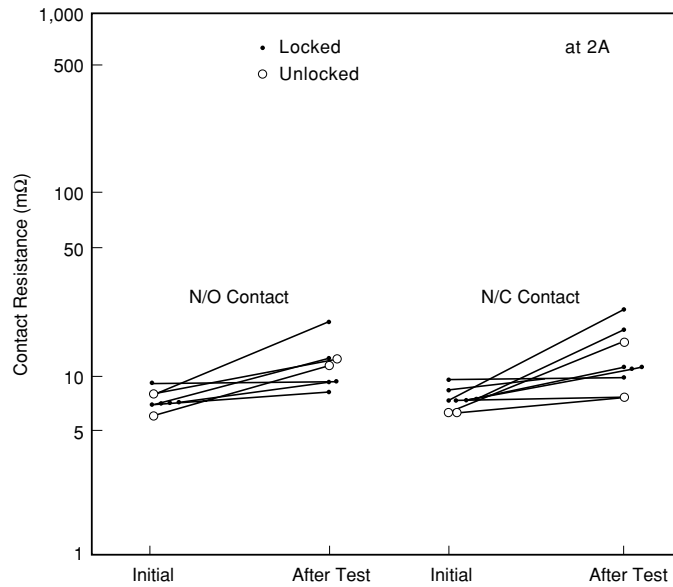
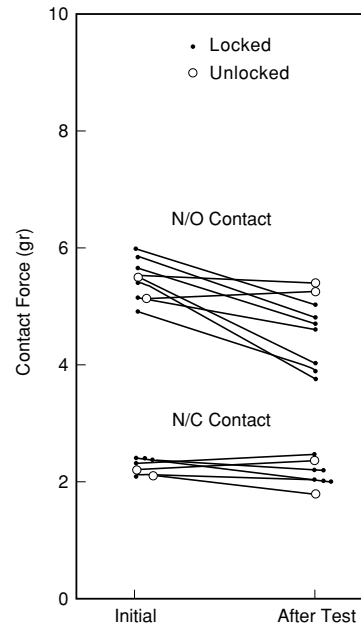
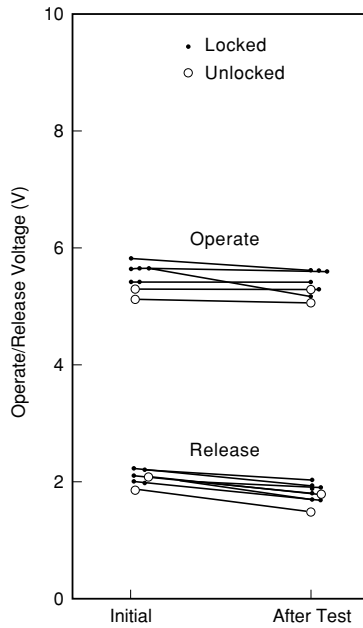


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact EM Devices for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "NOTES ON CORRECT USE" in the selection guide.

ACTUAL LOAD LIFE TEST (2)

EM Devices Ref. No. GEP2IVB01E (2/2)

Test Items	Test Conditions	Samples
1. Operate Voltage 2. Release Voltage 3. Contact Force 4. Contact Resistance	Load: Power Window Motor (22A/3A) (Rotor Locked, Unlocked) Number of Operation: 2×10^5 operations	EP2-3L2 5 pcs.



- 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.