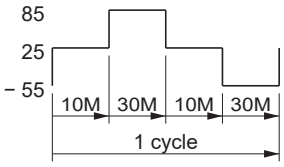
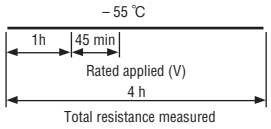
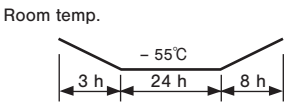
ENVIRONMENTAL TEST

Series / Test item	J series	
	Test conditions	**Specifications**
Temperature cycle	Performed 5 cycles 	1. Change in total resistance of less than 5 %. 2. No mechanical damage.Doing 5 cycles.
Resistor temperature characteristics	With 25°C as a standard, the resistance was measured after 30 to 40 min in a constant temperature chamber of 0, − 25, − 55, 50 and 80 °C and the tem-perature coefficient to 25°C was taken in each case.	Under the test temperature range, a resistance temperature coefficient of less than ± 50 ppm/°C (0.005 %/°C)
Rotational life	The shafts are rotated at 90 % effective electrical angle with no load at room temperature. (Refer to STANDARD SPECIFICATIONS)	1. Change in total resistance of less than 5 %. 2. More than 1.5 times of rated independent linearity. 3. Peak noise less than 50Ω . 4. Less than 1.5 times rated torque.
Low temp. operation	The wiper output is set at about 40%, and testing performed under the above conditions. 	1. Change in total resistance of less than 5 %. 2. Less than double rated torque. 3. No electrical or mechanical connection problem.
Low temp. exposure	After testing under the above con-ditions, the device is left at room temperature for 2 h. 	1. Change in total resistance of less than 5 %. 2. No mechanical damage.
High temp. exposure	The device is left at 85 °C for 1000 h.	Same as the low temp. exposure
Shock	Shocks of 981 m/s^2 {100 G}/6 ms are applied from 6 directions, including directions to pull the wiper away from the resistor, with each shock being applied 3 times (total of 18 times). The shaft is fixed.	1. No mechanical damage. 2. No momentary loss of continuity.
High frequency vibration	Amplitude: 1.52 mm (10 ~ 70 Hz) Acceleration: 147 m/s^2 {15 G} (70 ~ 2000 Hz) Frequency: 10 ~ 2000 Hz. Scanning time: 10 ~ 2000 Hz, 10 min.Performed under the above conditions 12 times each (Total 36 times). Shaft is fixed.	1. Change in total resistance of less than 5 %. 2. No electrical loss of continuity or mechanical damage. 3. No momentary loss of continuity.
Humidity resistance	25 °C to 65 °C, Relative humidity 95 % Performed for 10 cycles, each cycle being 24 h.	1. Change in total resistance of less than 5 %. 2. Insulation resistance of more than 10 MΩ.
Salt spray	The device is placed in a chamber at 35 °C, relative humidity 95 ~ 99 % and subjected to a 5 % salt water mist for 96 h.	No signs of corrosion.
Terminal strength	Terminals are subjected to 9.81 N {1kgf} pulling and pressing for 5 to 10 s.	No electrical or mechanical damage.

ENVIRONMENTAL TEST
POTENTIOMETERS

Series / Test item	M series	
	Test conditions	**Specifications**
Temperature cycle	Upper test temperature limit is 85 °C, lower limit is – 40 °C. Others are same as for J series.	Same as for J series.
Resistor temperature characteristics	Same as for J series, except that measurement temperatures are 0, –15, – 40, 50, 75 and 85 °C.	Same as for J series.
Rotational life	The shafts are rotated at 95% effective electrical angle with no load at room temperature. (Refer to STANDARD SPECIFICATIONS)	Same as J series. But peak noise of the M22L10 series is less than 200Ω.
Low temp. operation	Same as for J series. But test temperature is – 40 °C.	Same as for J series.
Low temp. exposure	Same as for J series. But test temperature is – 40 °C.	1. 2. Same as for J series. 3.The independent linearity standard is less than 1.5 times.
High temp. exposure	Same as for J series.	Same as the low temp.exposure
Shock	Same as for J series.	Same as for J series.
High frequency vibration	Same as for J series.	Same as for J series.
Humidity resistance	Same as for J series.	1. 2. Same as for J series. 3. No mechanical damage.
Salt spray	Same as for J series.	Same as for J series.
Terminal strength	Same as for J series.	Same as for J series.

ENVIRONMENTAL TEST
POTENTIOMETERS

Series / Test item	JC series	
	Test conditions	**Specifications**
Temperature cycle	Upper test temperature limit is 85 °C, lower limit is − 40 °C. Others are same as for J series.	1. Change in total resistance of less than 10 %. 2. No mechanical damage or damage to the element.
Resistor temperature characteristics	Same as for J series, but lower temperature limit is − 40 °C.	Less than ± 400 ppm/°C (0.04 %/°C)
Roational life	<Rotational life> Rotated under same conditions as for J series. (Refer to STANDARD SPECIFICATIONS) <Dither life> Shafts are rotated for 50 h at room temperature without load at 60 ± 5 Hz in a range of 5 ± 3°.	1. Change in total resistance of less than 10 %. 2. The independent linearity standard is less than 1.5 times. 3. Output smoothness standard is less than 1.5 times. 4. The rotational torque standard is less than 1.5 times.
Low temp. operation	Same as J series	1. Change in total resistance of less than 10 %. 2. 3. are the same as for the J series.
Low temp. exposure	Same as J series	1. Less than the change in the output ratio, the linearity tolerance, or 0.5 % whichever is smallest. 2. No mechanical damage or damage to the element.
High temp. exposure	Same as J series	Same as the low temp. exposure
Shock	Same as J series	Same as J series
High frequency vibration	Same as J series	1. Change in total resistance of less than 2 %. 2. 3. are the same as for the J series.
Humidity resistance	Same as J series	Change in total resistance of less than 10 %.
Salt spray	Same as J series	Same as J series
Terminal strength	Same as J series	Same as J series

ENVIRONMENTAL TEST
POTENTIOMETERS

Series / Test item	JP-30		JP-30B	
	Test conditions	Specifications	Test conditions	Specifications
Temperature cycle	5 cycles at − 65 to 85 °C.	1. Change in total resistance of less than 1 %. 2. No mechanical damage.	5 cycles at − 65 to 85 °C.	1. Change in total resistance of less than 1 %. 2. No mechanical damage.
Resistor temperature characteristics	Same as for the J series, except that the lower temperature limit is − 55 °C, and the upper tempera-ture limit is 85 °C.	1. ±150 10^{-6}/°C Less than (0.015 %/°C)	Same as for the J series, except that the lower temperature limit is − 55 °C, and the upper tempera-ture limit is 85 °C.	1. ±150 10^{-6}/°C Less than (0.015 %/°C)
Roational life	Shafts are rotated at room temp. no load at 80 r/min for 3 million revolutions (10000 revolutions in reverse).	1. Change in total resistance of less than 5 %. 2. The independent linearity standard is less than 2 times of standard value. 3. Rotation noise at 4 r/min is less than 2 times. 4. Rotational torque Less than 1.5 times of standard value	Shafts are rotated at room temp. no load at 80 r/min with an effective electrical angle of about 90 % for 100000 cycles.	1. Change in total resistance of less than 5 %. 2. The independent linearity standard is less than 2 times of standard value. 3. Rotation noise at 4 r/min is less than 2 times. 4. Rotational torque Less than 1.5 times of standard value
Low temp. operation	− 65 °C for 3 h	1. Change in total resistance of less than 1 %. 2. No mechanical damage.	− 65 °C for 3 h	1. Change in total resistance of less than 1 %. 2. No mechanical damage.
Low temp. exposure	− 65 °C for 24 h	1. Chamge in total resistanceof less than 1 %. 2. No mechanical damage.	− 65 °C for 24 h	1. Chamge in total resistance of less than 1 %. 2. No mechanical damage.

ENVIRONMENTAL TEST
POTENTIOMETERS

Series / Test item	JP-30		JP-30B	
	Test conditions	Specifications	Test conditions	Specifications
High temp. exposure	85 °C for 1000 h	1. Change in total resistance is less than 2 %. 2. No mechanical damage.	85 °C for 1000 h	1. Change in total resistance is less than 2 %. 2. No mechanical damage.
Shock	3 times in 6 directions at 490 m/s^2 {50 G}, 11 ms. Same as J series for other specifcations.	1. No mechanical or electrical damage. 2. No momentary loss of continu-ity.	3 times in 6 directions at 490 m/s^2 {50 G}, 11 ms. Same as J series for other specifcations.	1. No mechanical or electrical damage. 2. No momentary loss of continu-ity.
High frequency vibration	147 m/s^2 {15 G} or 1.52 mm amplitude, 70 ~ 2000 Hz. Same as J series for other specifcations.	1. Change in total resistance of less than 2 %. 2. No mechanical damage	147 m/s^2 {15 G} or 1.52 mm amplitude, 70 ~ 2000 Hz. Same as J series for other specifcations.	1. Change in total resistance of less than 2 %. 2. No mechanical damage
Humidity resistance	Same as J series	1. Change in total resistance of less than 2 %. 2. Insulation resistance over 10 MΩ.	Same as J series	1. Change in total resistance of less than 2 %. 2. Insulation resistance over 10 MΩ.
Terminal strength	Tensile strength:8.89 N {0.907 kgf}	No mechanical damage.	Tensile strength: 8.89 N {0.907 kgf}	No mechanical damage.