

1、 General

1.1 Scope

The specification applies to model RA1150 type
mainly used for consumer products, Rotational(1shaft,2 dual).

1.2 Operating temperature range: $-10^{\circ}\text{C}\sim 70^{\circ}\text{C}$

1.3 Storage temperature range: $-10^{\circ}\text{C}\sim 70^{\circ}\text{C}$

1.4 Test conditions

Standard atmospheric conditions:

Unless otherwise specified, the standard range of atmospheric
conditions for making measurements and test is as follows:

Ambient temperature: $15^{\circ}\text{C}\sim 35^{\circ}\text{C}$ Relative humidity: $25\%\sim 75\%$

Air pressure: 86kpa to 106kpa .

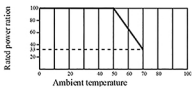
If there is any doubt about the results,measurements shall be

Made within the following limit:

(Ambient temperature: $20^{\circ}\text{C}\pm 1^{\circ}\text{C}$ Relative humidity: $63\%\sim 67\%$

Air pressure: 86kpa to 106kpa).

2 ELECTRICAL CHARACTERISTICS

Item	Conditions	Specifications
2.1、 Nominal total resistance and tolerance	The resistance between terminals 1 and 3 shall be measured	$10\text{K}\Omega$ $\sqrt{\pm 20\%}$
2.2、 Resistance law	Measurement shall be made by the resistance law method. For other procedures(refer JIS C5261 standard)	<u>B</u> Taper Refer to the attached
2.3、 Power rating	Power rating is based on continuum full load operation at the maximum voltage between terminals 1 and 3 . Power rating vs.ambient temperature shall be denoted on the following graph. 	0.05W
2.4、 Rated voltage	Rated voltage : $E = \sqrt{PR}$ Power rating P: (W) Nominal total resistance R: (Ω) When the rated voltage exceeds the maximum operating voltage. the maximum operating voltage shall be the rated voltage	Maximum operating voltage 50V AC / 20V DC

2、 ELECTRICAL CHARACTERISTICS

Item	Conditions		Specifications
2.5、 Residual resistance	The resistance at each end of the (A). Resistance between terminals 1 and 2, terminal 2 and 3 shall be measured. A: Angle of effective rotation		$R_{1,2}: \leq 10 \Omega$ less $R_{2,3}: \leq 20 \Omega$ less
2.6、 Rotational noise	Apply DC 20V between terminals 1-3 to measure noise voltage . (rated voltage $\leq 20V$. Apply by rated voltage). Shaft rotation : 1 rotation /3s		100mVp-p Less than
2.7、 Tracking error	The voltage of 2 V r.m.s. Shall be applied between terminals 1 and 3 and between terminals 1' to 3' by measuring frequency at 1KHz. The output voltage shall be measured between terminals 1 and 2 and between terminal 1' and 2'(for the 15C and 25C taper. the measurement shall be made between terminals 2 and 3 and between terminals 2' and 3') it should be the same standard with the first measuring result . If there is not any doubt about the results This DC. voltage shall be used as the test voltage. Input impedance of the voltmeter: 10M Ω or more For volume contract : -40-0dB		± 4 dB or less
2.8 Insulation resistance	Apply DC 250 V for 1 minute. DC250V	Between individual terminals and frame.	100M Ω or more
2.9 Dielectric strength	Measuring frequency : 50Hz~60Hz 250V AC for 1 minute.	Between individual terminals and frame	Electrical characteristics shall be satisfied with specification .

3. Application Notes

Avoid storing the products in a place at high humidity and in Corrosive gases. please use this product with 12 months limitation. If any remainder left after packing is opened, please store it with proper moistureproofing, gasproofing etc.

4 MECHANICAL CHARACTERISTICS

4.1 Total mechanical rotation	Angle of effective rotation		300° \pm 5°
4.2 Rotational torque	Rotational speed 1 / 3 S	standard atmospheric conditions 5°C 35°C	20gf.cm~ 200gf.cm
		-10°C	350gf.cm or less
		70°C	15gf.cm~ 150gf.cm

4 ENDURANCE CHARACTERISTICS

Item	Conditions	Specifications
4.3 Click slip out force	Rotation speed 60°/s, standard atmospheric 5°C to 35°C (center click)	60gf.cm ~ 120gf.cm
4.4 Number of Detents (Click)	<input type="checkbox"/> 1C (Center Detent) <input type="checkbox"/> 21C	
4.5 Shaft stop strength	The following torsion moment load of 3.5Kgf.cm shall be applied to the shaft for 5s at both ends (after fixation)	Electrical characteristics shall be satisfied.
4.6 Shaft push & pull strength	Push & pull static load of 8Kgf shall be applied to the shaft in perpendicular to axial directions for 10 s (After fixation)	Shaft without damage .rotational torque without abnormality .
	Push & pull static load of 2.5Kgf shall be applied to the shaft in perpendicular to axial directions for 10 s (After fixation)	Electrical characteristics shall be satisfied with specification
4.7 Shaft wobble	A momentary load of 500gf.cm shall be applied at the point 5 mm from the tip of the shaft in a direction perpendicular to the axis (after fixation).	0.7*L/20mm p-p or less L is the length between mounting surface and measuring points Electrical characteristics shall be satisfied with specification
4.8 Shaft eccentricity	The distance from the specified position to the root of the shaft shall be measured.	≤ 0.12mm
4.9 Nut strength	Nut tighten with 8.0kgf.cm	No excessive uneven rotation feeling occur

5 ENDURANCE CHARACTERISTICS

5.1 Solder ability	The terminals shall be stored at a temperature of 40°C with relative humidity of 90%~95% and measured in 168h. The terminals shall be immersed into solder bath at 245°C±5°C for	A new uniform coating of solder shall cover a minimum of 95% of the surface being immersed.
5.2 Resistance to soldering heat	Soldering method (60W); Bit temperature: 350°C±10°C Application time of soldering: 3 s±1s Wave soldering Printed wiring board : single-sided copper clad laminate board with thickness of 1.6mm. Preheating : 1、 Surface temperature of board: 100°C or less. 2、 Preheating time : within 1 min. Soldering: Solder temperature 265°C±5°C or less, Immersion time: within 5s±1s	Change in total resistance is relative to the value before test : ±5% Without deformation of case or terminals loosening .Electrical characteristics shall be satisfied with . specification
5.3 Resistance to heat	The potentiometer shall be stored at a temperature of 70°C±2°C for 96h±4h in a thermostatic chamber. Then the potentiometer shall be measured after maintaining at standard atmospheric conditions for 1h in order to remove surface moisture.	Change in total resistance is relative to the value before test : ±20%

5 ENDURANCE CHARACTERISTICS

Item	Conditions	Specifications															
5.4 Resistance to Cold	The potentiometer shall be stored at a temperature of $-25^{\circ}\text{C}\pm 2^{\circ}\text{C}$ for $96\text{h}\pm 4\text{h}$ in a thermostatic chamber. Then the potentiometer shall be taken out of the chamber and its surface moisture shall be removed. And measure the potentiometer which shall be subjected to standard atmospheric conditions for 1h .	Change in total resistance is relative to the value before test : $\pm 20\%$															
5.5 Damp heat	The potentiometer shall be stored at a temperature of $40^{\circ}\text{C}\pm 2^{\circ}\text{C}$, with relative humidity of 90% to 95% for $96\text{h}\pm 4\text{h}$ in a thermostatic chamber. Then the potentiometer shall be taken out of the chamber and its surface moisture shall be removed. and measure the potentiometer which shall be subjected to standard atmospheric conditions for 1h.. shall be made.	Change in total resistance is relative to the value before test : $+35\%-5\%$ Insulation resistance: $20\text{M}\Omega$ or more Rotational Noise: 150mV p-p less than															
5.6 Change of temperature	The potentiometer shall be subjected to 5 successive change of temperature cycles, each as shown in table below. surface moisture shall be removed. And measure the potentiometer which shall be subjected to standard atmospheric conditions for 1hour.	Change in total resistance is relative to the value before test : $\pm 30\%$ Insulation resistance: $100\text{M}\Omega$ or more Dielectric strength : Without damage to parts arcing or breakdown etc.															
	<table border="1"> <thead> <tr> <th></th> <th>Temperature</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>$-10^{\circ}\text{C}\pm 3^{\circ}\text{C}$</td> <td>30 min</td> </tr> <tr> <td>2</td> <td>standard atmospheric conditions</td> <td>10 to 15 min</td> </tr> <tr> <td>3</td> <td>$70^{\circ}\text{C}\pm 2^{\circ}\text{C}$</td> <td>30 min</td> </tr> <tr> <td>4</td> <td>standard atmospheric conditions</td> <td>10 to 15 min</td> </tr> </tbody> </table>		Temperature	Duration	1	$-10^{\circ}\text{C}\pm 3^{\circ}\text{C}$	30 min	2	standard atmospheric conditions	10 to 15 min	3	$70^{\circ}\text{C}\pm 2^{\circ}\text{C}$	30 min	4	standard atmospheric conditions	10 to 15 min	Appearance: There shall be no deformation or cracks of molded part.
		Temperature	Duration														
	1	$-10^{\circ}\text{C}\pm 3^{\circ}\text{C}$	30 min														
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3	$70^{\circ}\text{C}\pm 2^{\circ}\text{C}$	30 min															
4	standard atmospheric conditions	10 to 15 min															
5.7 Endurance	The moving contact without electrical load shall be rotated from one end stop to the other and returned to its original position exceeds 90% of effective angle. This procedure constitutes 1 cycle. And the moving contact shall be subjected to 600 cycles per hour. total 10000 ± 200 cycles. (5000 to 8000 continuous cycles for 24h).	Change in total resistance is relative to the value before test : $\pm 15\%$ Rotational Noise: 150mV p-p less than Rotational torque shall not deviate from the previously specified value. Residual resistance of R1,2 is relative to twice less than value before test : R2,3 is 1% less than total resistance (relative to less than the value before test, when total resistance $\leq 2\text{K}$) .															