



凱華電子
KAIHUA EEELETRONICS

Product Specification

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1. Scope/

- : This Product Specification covers the requirement of Encoder switch on product performance, test methods and quality assurance provisions.

2. Product Application/

The Switch is applied in all types of Computer mouse. Please let us know before using any of the products in the application not described above.

3. Technology Parameters/

Ambient Humidity	85% R.H.
Operating Temperature Range	-15 +70
Storage Temperature Range	-20 +80
Normal Condition	
Ambient temperature	20± 5
Relative humidity	65%± 5% R.H.
Air pressure	86~101KPa;
Contact Resistance	5 Max
Torque Force	
0-15gf.cm	245± 5 ,3± 1s
Withstand Soldering Temperature	260± 5 ,3± 1s
Pulse/Rotation	12Pulse/360°
Numbers of detent	24

4. Ratings/

Rating	DC5V / 1mA
Insulation Resistance	50M / DC 50V;
Withstand Voltage	50V AC 1 Minute;
Mechanical Life	300,000 Cycles.

5. Profile Dimensions /



6. Electrical Performance/

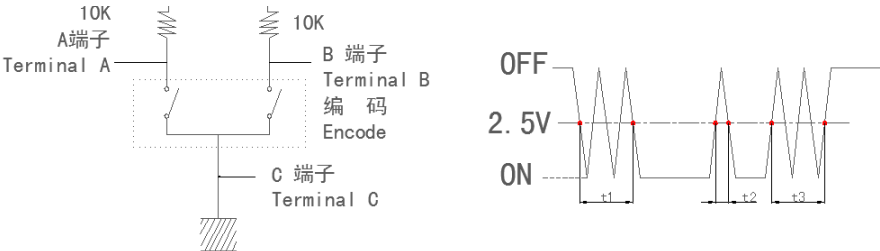
Item	Description	Test Condition		Requirement
6.1	Contact Resistance	Measured by a Voltage drop method at 1A, 5VDC. Any equipment with error not more than 5% can be used. Resistance after test in the average of 5 successive measurements(To measure after operated 5 to 10 times) 1A,5V 5% , 5 5-10		5 Max 5
6.2	Insulation Resistance	Apply a Voltage of DC 50 V for 1 minute, according to the below method. (1) Between terminals. (2) Between terminal and Body. 50V DC 1 (1) . (2) .		50M Min 50
6.3	Output signal Format	Shaft rotational Derection	Signal	Output
		C.W	A(A-C A(TerminalA-C B(B-C B(TerminalB-C	
		C.C.W	A(A-C A(TerminalA-C B(B-C B(TerminalB-C	



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Item	Description	Test Condition	Requirement
6.4	Resolution	Number of pulses in 360° rotation	12 pulses/360° for each phase 12 /360°
6.5	Switching Characteristics	Measurement shall be made under the condition as follows. Shaft rotational speed :360°/S 360°/S  NOTE) Code-ON area : The area which the voltage is 2.5V or less Code-OFF area : The area which the voltage is 2.5V or more ON 2.5V OFF 2.5V	
6.6	Chattering	Specified by the signal's passage time from 2.5V of each switching position(code OFF ON ON OFF) OFF ON ON OFF 2.5V	t1.t3 3ms
6.7	Bounce	Specified by the time of voltage change exceed 2.5V in code-ON area. When the bounce has code-ON time less than 1ms between chattering(t1 or t3),the voltage change shall be regarded as a part of chattering. When the code-ON time between 2 bounces is less than 1ms. They are regarded as 1 linked bounce. ON 2.5V t1.t3 1ms 2.5V ON 2.5V 1ms	t2 2ms

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Item	Description	Test Condition	Requirement
6.8	Phase-Difference	Measurement shaft be made under the Condition which the shaft is rotated in constant speed. . 360°/S) A A-C Signal A B B-C Signal B T1 T2 T3 T4 C.W direction	T1 T2 T3 T4 5ms
6.9	Dielectric withstanding voltage	Apply a Voltage of AC 50 V (50~60Hz) for 1 minute, according to the below method. (1) Between terminals. (2) Between terminal and Body. 50V AC 1 (1) . (2) .	No evidence of breakdown

7. Mechanical Performance/

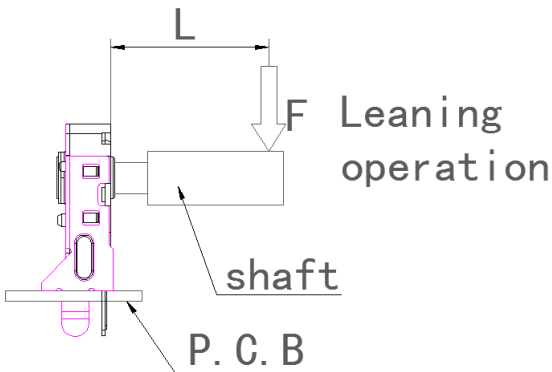
7.1	Detent torque	Account the test with the torque within the scope of at 5 -35 temperature. 5 -35	0-15gf.cm
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Item	Description	Test Condition	Requirement
7.2	Number and position of detent	N/A	24 detents(Step angle: $15^{\circ} \pm 3^{\circ}$ 24 ($15^{\circ} \pm 3^{\circ}$)
7.3	Push-pull strength of shaft	Mount the product to P.C.B and apply static force(F) of 50mN.m/5s as shown in the (fig5) P.C.B(5 FXL=50mN.m/5s  Leaning operation shaft P. C. B	Without damage to or excessive play in shaft no excessive abnormality in rotational feeling. And electrical characteristics shall be satisfied
7.4	Rotational life	The shaft of encoder shall be rotated to 300,000 cycles at a speed of 30 cycles per minute without electrical load after which measurements shall be made. 300 000 . 30 /	Please difference T1 T2 T3 T4 2.5ms Contact resistance:10 Max Shall meet : No. 6.1 to 6.9 No. 7.1 to 7.3 T1 T2 T3 T4 2.5ms 10 : No. 6.1 to 6.9 No. 7.1 to 7.3

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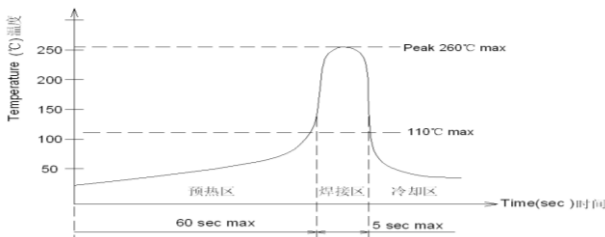
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8. Environmental Performance/

Item	Description	Test Condition	Requirement															
8.1	Cold test	(1) Temperature : - 20± 2 - 20± 2 (2) Duration of test: 96h 96 (3) Take off a drop water (4) Standard conditions after test : 1h 1	Contact resistance: 5 Max Shall meet : No. 6.1 to 6.9 No. 7.1 to 7.3 5 : No. 6.1 to 6.9 No. 7.1 to 7.3															
8.2	Heat test	(1) Temperature : 80± 2 80± 2 (2) Duration of test: 96h 96 (3) Take off a drop water (4) Standard conditions after test : 1h 1	Contact resistance: 5 Max Shall meet : No. 6.1 to 6.9 No. 7.1 to 7.3 5 : No. 6.1 to 6.9 No. 7.1 to 7.3															
8.3	Temperature cycle	(1) Test cycles: 5 cycles 5 (2) Standard condition after test:1h 1 <table><tr><td></td><td>Temperature</td><td>Duration of test</td></tr><tr><td>1 cycle</td><td>20± 2</td><td>1h</td></tr><tr><td></td><td>-20± 2</td><td>1h</td></tr><tr><td></td><td>20± 2</td><td>1h</td></tr><tr><td></td><td>80± 2</td><td>1h</td></tr></table>		Temperature	Duration of test	1 cycle	20± 2	1h		-20± 2	1h		20± 2	1h		80± 2	1h	Contact resistance: 5 Max Shall meet : No. 6.1 to 6.9 No. 7.1 to 7.3 5 : No. 6.1 to 6.9 No. 7.1 to 7.3
	Temperature	Duration of test																
1 cycle	20± 2	1h																
	-20± 2	1h																
	20± 2	1h																
	80± 2	1h																
8.4	Soldering heat test	Soldering area: T/2 of PCB thickness. (PCB: T=1.6mm) 1/2 Soldering temperature: 260± 5 Soldering time: 3± 1s 260± 5 3± 1	Appearance: No abnormality.															



Item	Description	Test Condition	Requirement
8.5	Solderability	1. Hand soldering Please practice according to below condition: (1) Soldering Temperature : 350 ± 5 350 ± 5 (2) Continual soldering time: 3 ± 1 3 ± 1 (1) Capacity of soldering iron: 20w 20 2. Automatic PIP soldering For the product of T/H, according to below condition: 	At least 95% of surface area of immersed portion shall be covered by solder. 95%
8.6	Humidity test	(1) Temperature : 60 ± 2 60 ± 2 (2) relative humidity: 90~95% R.H. : 90~95% R.H. (3) Duration of test: 96h 96 (4) Take off a drop water (5) Standard conditions after test: 1h 1	Contact resistance: 5 Max Shall meet : No. 6.1 to 6.9 No. 7.1 to 7.3 5 : No. 6.1 to 6.9 No. 7.1 to 7.3
8.7	Salt Spray	Apply the following environment to test: (1) Temperature : 35 ± 5 : 35 ± 5 (2) Salt water density: 5 ± 1 % : 5 ± 1 % (3) Duration: 8 hours : 8 (4) After test, the salt deposit shall be removed by running water.	Appearance: No corrosion spot, no crack, no base plate naked. Contact Resistance: 5 Max 5



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11. Precaution

11.1 Immersion Soldering condition

ITEM	CONDITION
Preheat temperature	110 Max (Ambient temperature of soldering surface of P.W.B) 110 ()
Preheat time	60s, Max 60
Area of flux	1/2 Max of PWB Thickness 1/2
Temperature of solder	260± 5 260± 5
Time of immersion	Within 5s 5
Number of soldering	2time Max (But should down heat of the first soldering) 2
Printed wiring board	Single side copper-clad laminates

(1) After switches were soldered, please be careful not to clean switches with solvent

(2) Under the condition of using soldering iron, soldering temperature shall be 350 max with
350 , 3 .

11.2 Notes

(1) Please be cautious not to give excessive static load or shock to switches.

(2) Please be careful not to stack up P. W. B. after switches were soldered.

(3) Preservation under high temperature and high humidity or corrosive gas should be avoided
Especially. When you need to preserve for a long period, do not open the carton.

(4) Products meet the ROHS & REACH environmental management substances control standards

[ROHS & REACH](#)