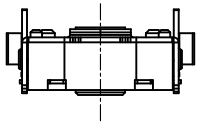
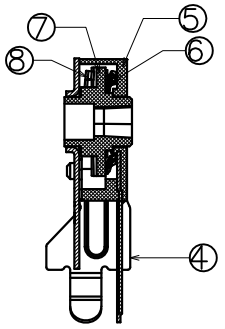
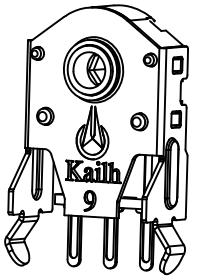
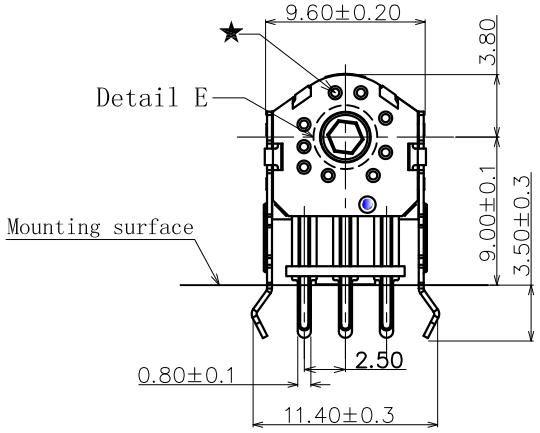
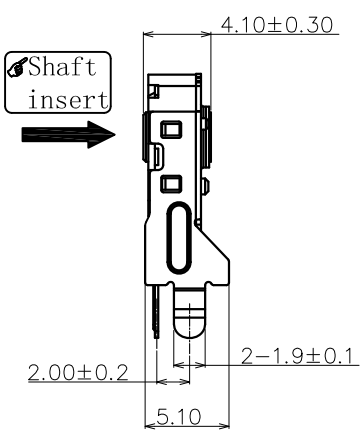
ABIDE BY ROHS

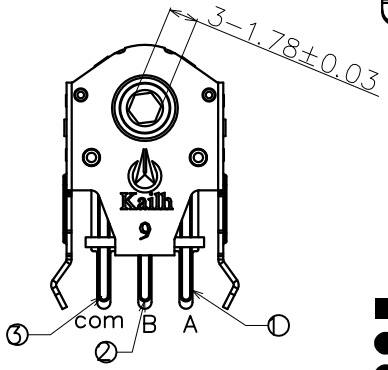


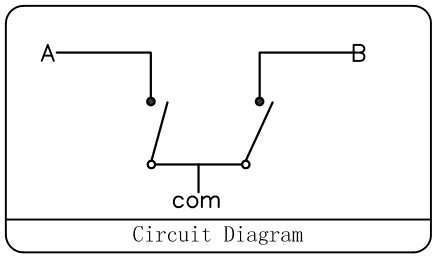










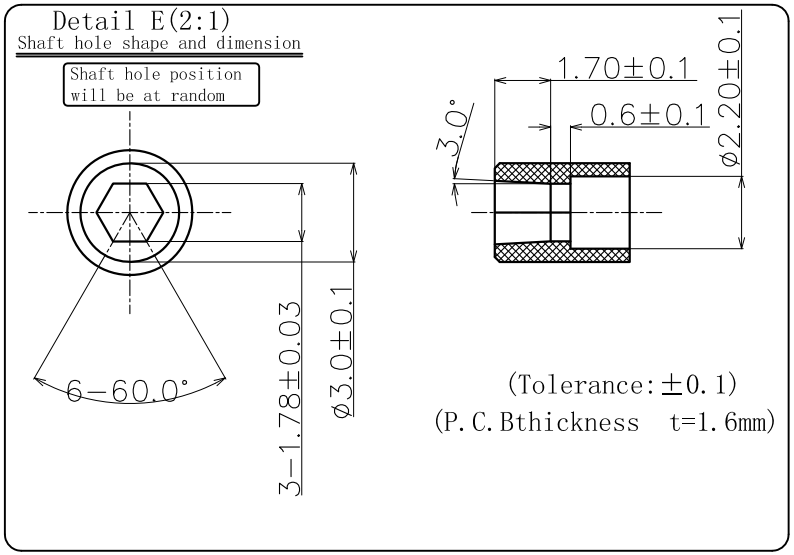


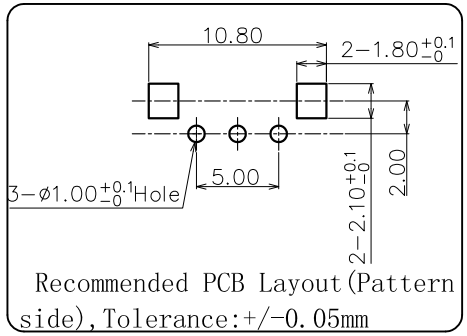
Circuit Diagram

A:Output signal A
B:Output signal B

■ Specification :

- 1. Rated voltage: D.C.5V
- 2. Maximum operating current(resistive load)
  Each load :1mA
- 3. Resolution: 12 pulses/360° for each phase
- 4. Contact Resistance: 5Ω(Max)
- 5. Insulation resistance: 50MΩ(Min) DC50V
- 6. Dielectric strength: AC50V(50-60Hz)for 1 minute
- 7. Detent torque: 15-30gf.cm
- 8. Life Test :300,000 Cycles(min)





Recommended PCB Layout(Pattern side),Tolerance:+/-0.05mm

备注：底座背面的压针孔★是根据产品模具成型要求而定的，其规格的大小与数量的多少对产品结构、功能及使用无任何影响。

⑧	Fixed Plate	——	1	Stainless Steel	——	——
⑦	Revolving Wheel	——	1	POM	Red	UL 94HB
⑥	Contact	——	1	Phosphor bronze	——	——
⑤	Base	——	1	PA66	Black	UL 94HB
④	Shell	——	1	Iron	Plating Nickel	
③	Terminal	3	1	Brass(0.2t)	Plating Silver	——
②	Terminal	2	1	Brass(0.2t)	Plating Silver	——
①	Terminal	1	1	Brass(0.2t)	Plating Silver	——
ITEM	PART NAME	TER'NO.	QTY.	MATERIAL	FINISHING	REMARK

APPROVALS		DATE	东莞市凯华电子有限公司 DONGGUAN CITY KAIHUA ELECTRONICS CO.,LTD			
DRAWN	WUYU	2019.05.08		TITLE:	EN9890 B Type Encoder	
CHECKED				PART NO.	CEN989012R10	
APPROVALS						
TOLERANCES ARE	30<L	±0.30	ANGLE	UNIT: mm	SCALE: 1:1	PROJ:
	10<L≦30	±0.20				
	5<L≦10	±0.15	±2°	DRAWING NO.	——	SHEET 1 OF 1
	L≦5	±0.10				

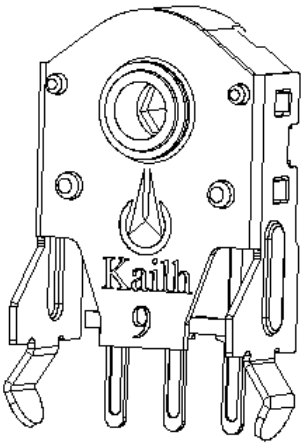
ECN NO.	REV.	DATE.	DESCRIPTION.	CHANGE.	CHECK.	APPRO.
——	A	——	NEW	——	——	——

凱華電子
KAIHUA EELETRONICS

Document Number:

KH-PS1712-17

Product Specification



P/N: CEN989012R10			Title : Encoder Switch		
Rev.	ECN	Release and Revision Description:	Prepared By/Date:	Checked By/Date:	Approved By/Date:
A	---	Revise format	WY 2019/05/08	LPH 2019/05/08	ZJJ 2019/05/08

Content

目录

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：	5Ω Max；
Torque Force：	15-30gf.cm；
Solder Ability ：	Tim-lead soldering ：245℃±5℃ 5s±0.5s； Lead-free welding ：255℃±5℃ 5s±0.5s
Withstand Soldering Temperature:	Wave soldering： 260±5℃ 5±0.5s
Pulse/Rotation:	12Pulse/360°
Numbers of detent ：	24

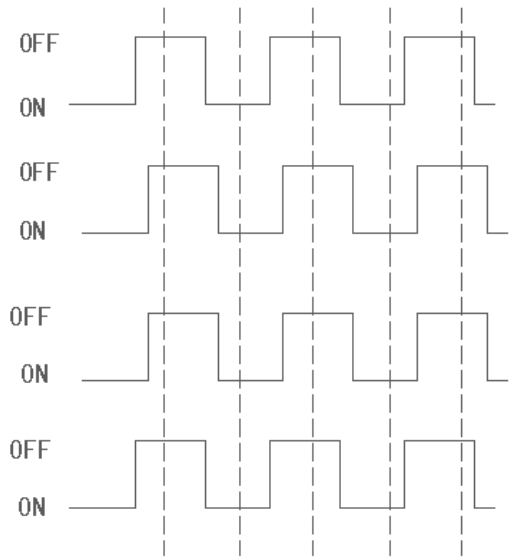
4. Rated Performance Requirements

Rating：	DC5V /1mA；
Insulation Resistance：	≥50MΩ/ DC 50V;
Withstand Voltage：	50V AC 1 Minute;
Mechanical Life：	300,000 Cycles.(without load)

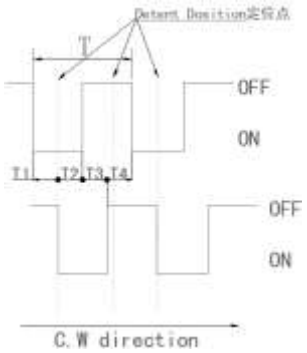
5. Profile Dimensions

See Product 2D Drawing

6. Electrical Performance

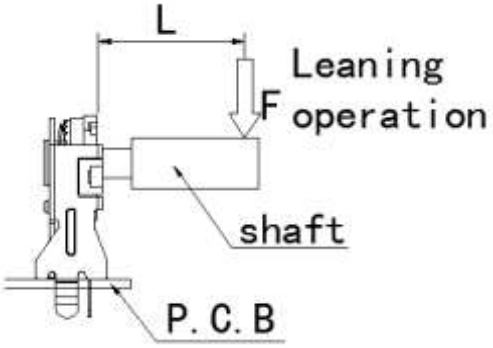
Item	Description	Test Condition		Requirement
6.1	Contact Resistance	Measured by instrument with tolerance less than 5%, at 1A , 5VDC. Take the average value of 5 times of resistance after measurements(measure after rotated 5 to 10 times)		5Ω Max
6.2	Insulation Resistance	Apply the voltage of 50 VDC for 1 minute, according to the below method. (1) Between terminals. (2) Between terminal and Housing.		50MΩ Min
6.3	Output signal Format	Shaft rotational Direction	Signal	Output
		C.W	A(Terminal A-C B(Terminal B-C)	
		C.C.W	A(Terminal A-C B(Terminal B-C)	
6.4	Resolution	Number of pulses in 360° rotation		12 pulses/360° for each phase

6.5	Switching Characteristics	Measurement shall be conducted under the condition as follows. Shaft rotational speed :360°/S  （NOTE) Encode-ON area : The area of voltage is 2.5V or less Encode-OFF area : The area of voltage is 2.5V or more	
6.6	Chattering	Specified by the signal's passage time shall be under spec apply 2.5V of switch position (code OFF→ON or ON→OFF)	t1.t3≤3ms
6.7	Bouncing	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	t2≤2ms

6.8	Phase-Difference	Rotate the measure shaft at constant speed（360°/S) CW Signal A（A-C） Signal B（B-C） 	T1、T2、T3、T4≥5ms
6.9	Withstand Voltage	Input 50V AC (50~60Hz) for 1 minute, according to the below method. (1) Between terminals. (2) Between terminal and Body.	No breakdown

7. Mechanical Performance

7.1	Detent torque	Account the test with the torque within the scope of at 5℃-35℃ temperature.	15-30gf.cm
7.2	Number and position of detent	N/A	24 detents(Step angle: 15°±3°)

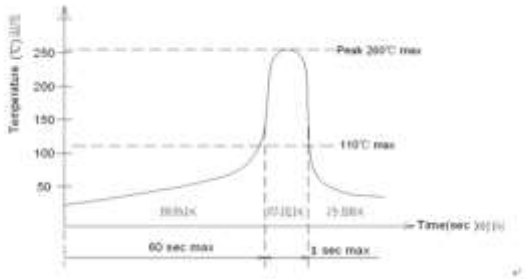
7.3	Push-pull strength of shaft	Mount the product to P.C.B and apply static force(F) of 50mN.m/5s as shown in the fig5  	Without damage to or excessive play in shaft no excessive abnormality in rotational feeling. And electrical characteristics
7.4	Rotational life	The shaft of encoder shall be rotated meet 300,000 cycles at a speed of 30 cycles per minute without electrical load.	Phase difference T1、T2、T3、T4≥ 2.5ms

8. Environmental Performance

Item	Description	Test Condition	Requirement
8.1	Cold Resistance test	(1) Temperature : - 20±2℃ (2) Duration of test: 96h (3) Take off drop water (4) Storage time after test : 1h	Contact resistance: 5Ω Max Shall meet : No. 6.1 to 6.9 No. 7.1 to 7.3
8.2	Heat Resistance test	(1) Temperature : 80±2℃ (2) Duration of test: 96h (3) Take off drop water (4) Storage time after test : 1h	Contact resistance: 5Ω Max Shall meet : No. 6.1 to 6.9 No. 7.1 to 7.3

<table>
<tr>
<td>8.3</td>
<td>Temperature cycle</td>
<td>(1) Test cycles: 5 cycles
(2) Storage time after test:1h

<table>
<tr><td></td><td>Temperature</td><td>Duration of test</td></tr>
<tr><td rowspan="4">1 cycle</td><td>20±5℃</td><td>1h</td></tr>
<tr><td>-20±2℃</td><td>1h</td></tr>
<tr><td>20±5℃</td><td>1h</td></tr>
<tr><td>80±5℃</td><td>1h</td></tr>
</table>
</td>
<td>Contact resistance:
5Ω Max
Shall meet :
No. 6.1 to 6.9
No. 7.1 to 7.3</td>
</tr>
<tr>
<td>8.4</td>
<td>Soldering heat Resistance</td>
<td>Soldering area: T/2 of PCB thickness.
(PCB: T=1.6mm)
Soldering temperature: 260±5℃
Soldering time: 5±0.5s

 
</td>
<td>Appearance:
No abnormality.</td>
</tr>
<tr>
<td>8.5</td>
<td>Solderability</td>
<td>Soldering area: T/2 of PWB thickness.
(PWB: T=1.6mm):
(Soldering temperature: 255±5℃
Soldering time: 5±0.5s</td>
<td>At least 95% of surface area of immersed portion shall be covered by solder.</td>
</tr>
<tr>
<td>8.6</td>
<td>Humidity test</td>
<td>(1) Temperature : 60±2℃
(2) relative humidity: 90~95% R.H.
(3) Duration of test: 96h
(4) Take off drop water
(5) Storage time after test: 1h</td>
<td>Contact resistance:
5Ω Max
Shall meet :
No. 6.1 to 6.9
No. 7.1 to 7.3</td>
</tr>
<tr>
<td>8.7</td>
<td>Salt Spray Test</td>
<td>Apply the following method to test:
(1) Temperature : 35±5℃

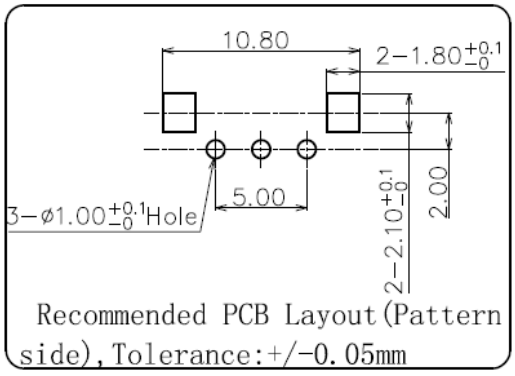
(2) Salt water density: 5±1%
(3) Duration: 8hours
(4) After test, the salt deposit shall be removed by running water.</td>
<td>Appearance:
No corrosion spot, no crack, no base plate naked.

Contact Resistance:
5Ω Max</td>
</tr>
</table>

8.8	Withstand K_2S Test	Apply the following method to test: (1) Temperature: 35±5℃ (2) K_2S Density: 2%； (3) Duration: 2 minute.	Appearance: No corrosion spot, no crack, no base plate naked. Contact Resistance: 5Ω Max

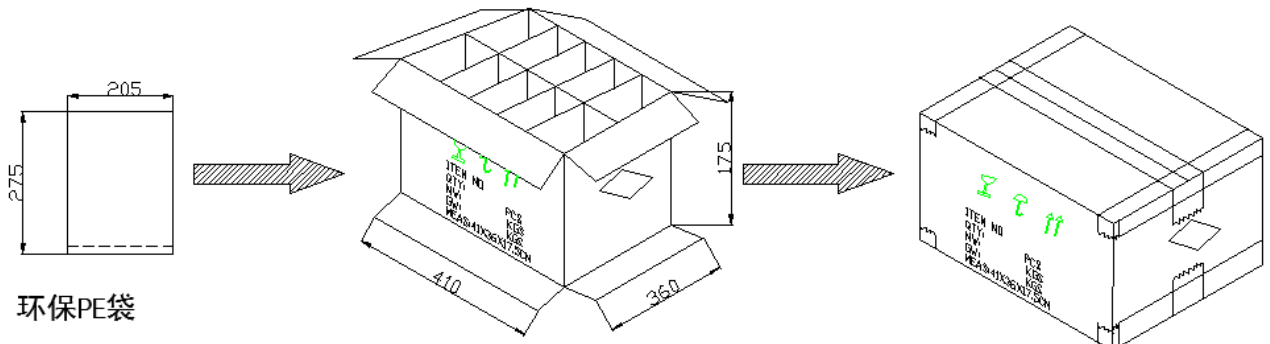
9. Recommended PCB Layout

(Top View)
(Single face board T=1.6mm)



10. Packaging

Packaging type: PE Bag, 1000Pcs/Bag, 1000*10Pcs/Carton.



11.Precaution

11.1 Immersion Soldering condition

ITEM	CONDITION
Preheat temperature	110℃ Max (Ambient temperature of soldering surface of P.W.B)
Preheat time	60s, Max
Area of flux	1/2 Max of PWB Thickness
Temperature of solder	260±5℃
Time of immersion	Within 5s
Number of soldering	2times Max (But should down heat of the first soldering)
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 within 3 sec.

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) The standard storage period is 3 months, with maximum up to 6months, preferably to be used as soon as possible. After opening the package, you should put the remaining switches in a plastic bag to prevent from damp and corrosive gas.

(5) This Product Specification is considered as the technical agreement on product between the receiving customer and Kailh. Any information on Product Catalogue which is in conflict with or different from the corresponding information of this document is considered as invalid.

(6) If customer issue purchase orders without confirmation by signature of this specification after receipt, such confirmation will be considered as granted upon receipt of the first purchase order.

(7) If there is no order or no request for new specification after 1 year upon this specification is issued, the specification will be regarded as invalid.

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