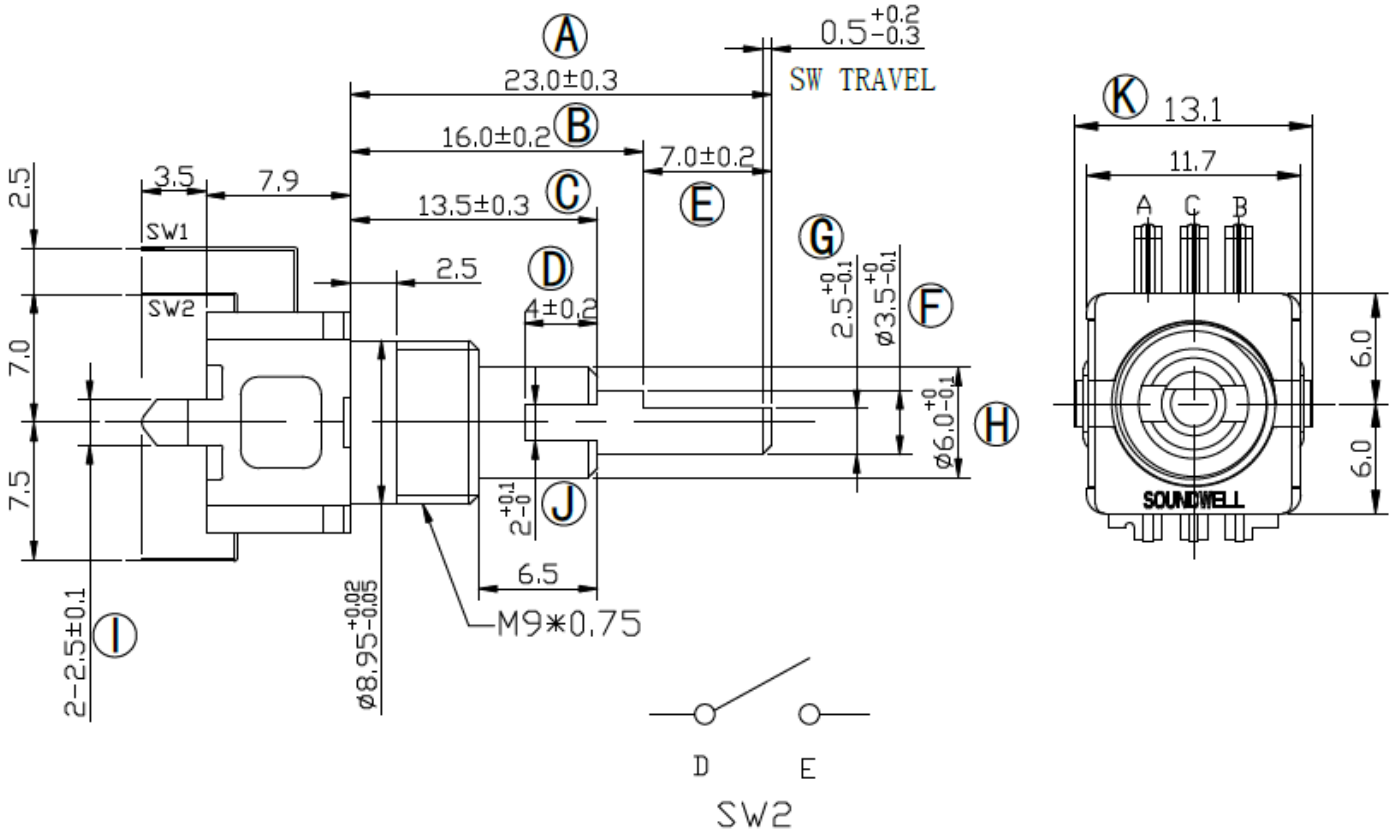
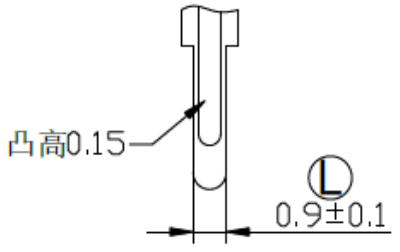
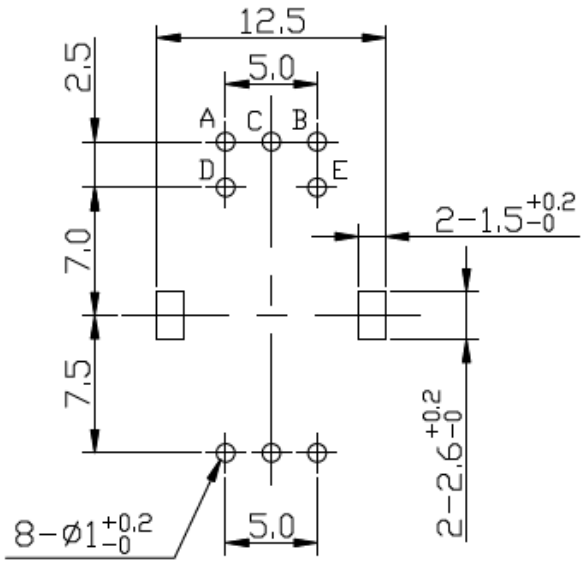


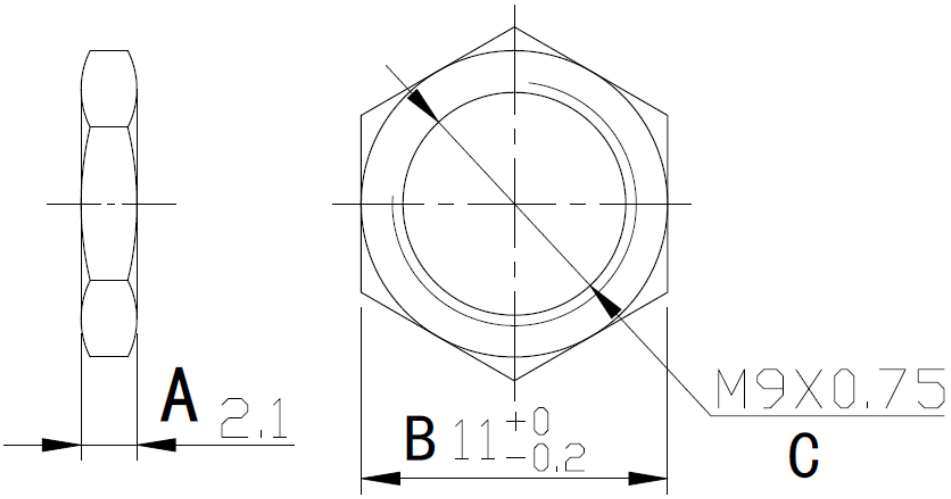


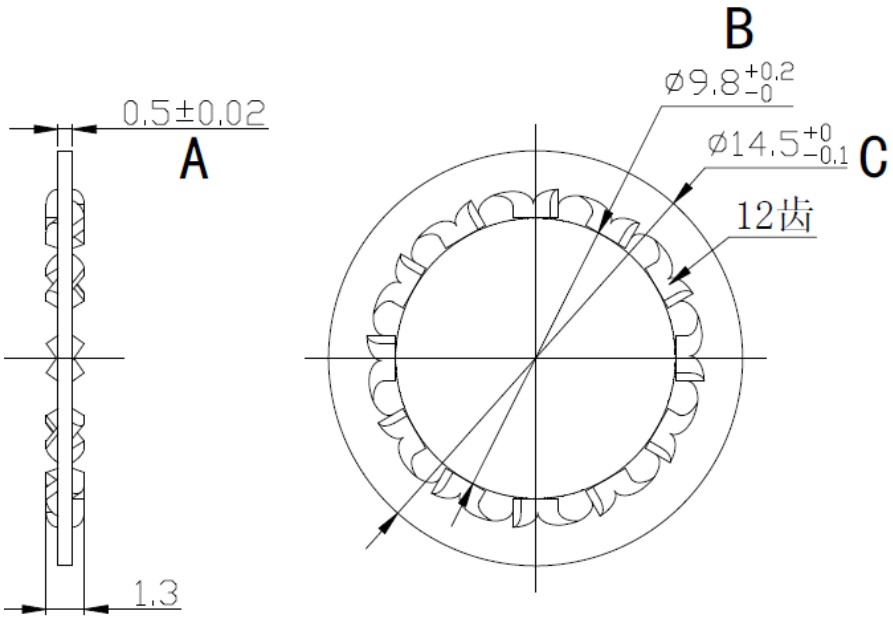
TERMINAL DETAIL (4:1)



P.C.B. MOUNTING DETAIL

VENDOR:	SIMFLIGHT SERVICES	MODEL:	EC110703P6C-HA1
PRODUCT:	DOUBLE SHAFT ENCODER	SPECIFICATION:	15P6-135C040/230A070





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1	**General**
1,1,	**Scope** This specification applies to 11mm size low-profile thin rotary encoder (incremental type) for microscopic current circuits , used in electronic equipment.
1,2,	Standard atmospheric conditions Unless otherwise specified ,the standard range of atmospheric conditions for making measurements and test is as following limits: Ambient temperature : 15°C to 35°C Relative humidity : 25% to 85% Air pressure : 86kPa to 106kPa
1,3,	Operating temperature range: -40°C to 85°C
1,4,	Storage temperature range : -40°C to 85°C
2	**Construction**
2,1	Dimensions: Refer to attached drawing
3	**Rating**
3,1	Rated voltage DC 5V
3,2	Maximum operating current (resistive load) Each lead : 0.5mA(MAX 10mA; MIN 0.5mA) Common lead : 1mA(MAX 10mA; MIN 0.5mA)
4	**Application Notes**
4,1,	Avoid storing the products in a place at high temperature, high humidity and in corrosive gases. Please use this product as soon as possible with 6 months limitation . If there's any remainder left after packing is opened, please store it with proper moistureproofing, gasproofing etc
4,2,	The encoder pulses count method should be designed with taking operating speed ,sampling time and design software into cosideration.
4,3,	With this products ,detent positon will always be aligned with A-OFF or ON phase. Therefore make the A phase of the microcomputer the reference at the soft ware design stage.
4,4,	At design of the pulse count process. Using the C/R filter circuit is Recommended.
4,5,	Care must be taken not to expose this product to water or dew to prevent possible problem in pluses output waveform.
4,6,	When encoder are used, the speed is suitable for controlling with 360°/s. The highest speed will lead that IC doesn't obtain signal. Mean while,the slide contact in the inside of product can be divorced form in order to be poor conatct.

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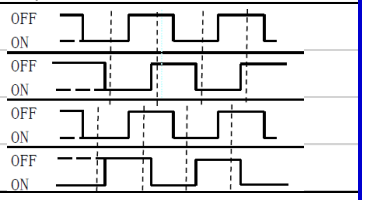
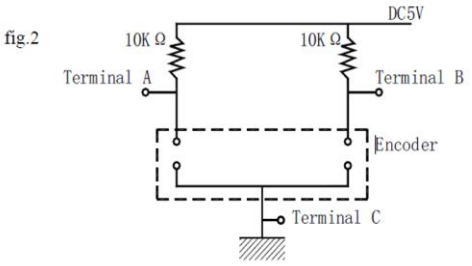
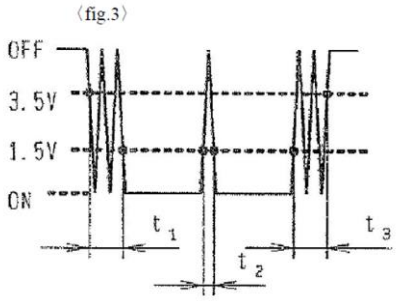
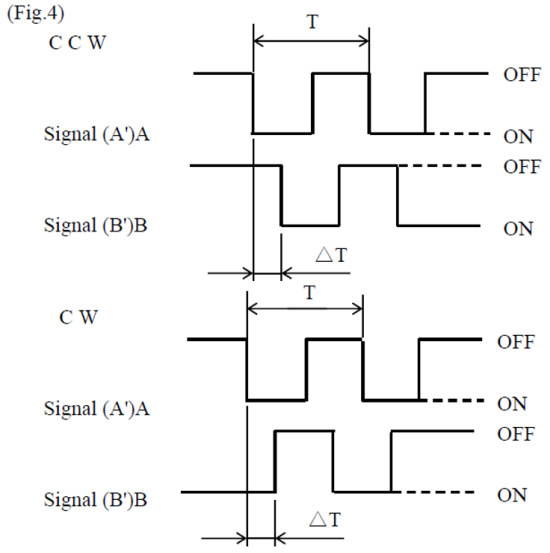
5 ELECTRICAL CHARACTERISTICS

	ITEM	CONDITIONS	SPECIFICATIONS
5,1,	Output signal format	Note: Output signal is 1 pulse per 2 detents. And terminal(A'-C') A-C is pulse ON or OFF at detent position. No specified output of termial(B'-C') B-C at detent position.	2 Phase-different signals (signal (A')A, signal(B') B) Details shown in〈fig.1〉(The broken line shows detent position .)
		Shaft rotational direction / Signal	Output
		C. C.W. — A(TerminalA-C) OFF	
		C. C.W. — (B')B(Terminal B-C)	
		C. W. — A(TerminalA-C)	
		C. W. — B(TerminalB-C)	
5,2,	Resolution	Number of pulses in 360° rotation	15 pulses/360° for each phase
5,3,	Switching characteristics	Measurement shall be made under the condition as follows. 1)Shaft rotational speed : 360°/S 2)Test circuit : （fig.2） (Note) Code-OFF area :The area which the voltage is 3.5V or more. Code-ON area :The area which the voltage is 1.5V or less. fig.2  〈fig.3〉 	
5,3,1,	Chattering	Specified by the signal's passage time from 1.5V to 3.5V of each switching position (code OFF~ON or ON~OFF) (Fig.3)	On the case within detent, B signal will be irregular oscillation.
5,3,2,	Sliding noise (Bounce)	Specified by the time of voltage change exceed 1.5 V 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≤2 ms
5,3,3	Sliding noise	The voltage change in code - OFF area.	3.5V MIN
5,4,	Phase difference	Measurement shall be made under the condition which the shaft is rotated in aptotic speed. (Fig.4) 	△T≥0.08T In(fig.4)
5,5,	Insulation resistance	Measurement shall be made under the condition which a voltage of 250V DC 1min is applied between individual terminals and bushing	Between individual terminals and bushing 10MΩ MIN.
5,6,	Dielectric strength	A voltage of 300V AC shall be applied for 1 minute between individual terminals and bushing.	Without arcing or breakdown.

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6	**MECHANICAL CHARACTERISTICS**		
6,1,	Total ratational angle		360°(Endless)
6,2,	Detent Torque	Only suitable for C.C, equipment.	11.5 ± 8.5 mNm (115±85 gf.cm)
6,3,	Number and position of detent	Only suitable for C.C, equipment.	30 detents(Step angle:12°±3°)
7	**ENDURANCE CHARACTERISTICS**		
7,1,	Rotational life	The shaft of encoder shall be rotated to 30,000 cycles at a speed of 600~1000 cycles/H without electrical load,after which measurements shall be made. 1 cycle: rotate 360° CCW rotate 360° CW	Chattering t1,t3≤5mS Bounce t2≤3mS Detent torque:Relative to the previously specified value:-
7,2,	Solder ability	The terminals shall be immersed into solder bath at 260°C±5°C for 3s±1s in the same manner as para.	A new uniform coating of solder shall cover 75% minimum of the surface being immersed.
	Push switch portion		
	Note: The following specification is only suitable for the one type with switch construction of EC1107 encoder series.		
1,1	Rated capacity (Resistance load): DC 5V 10mA (1mA MIN)		
1,2,	**ELECTRICAL CHARACTERISTICS**		
	ITEM	**CONDITIONS**	**SPECIFICATIONS**
1,2,1	Contact resistance	Voltage step-down test at DC 5V 1mA	100mΩ MAX
1,3,	**MECHANICAL CHARACTERISTICS**		
1,3,1,	Switch circuit and number of pulse		Single pole and single throw (push on)
1,3,2,	Travel of switch		0.5 (+0.2, -0.3)mm
1,3,3	Operating force		6±2N (600±200gf)
1,4	**ENDURANCE CHARACTERISTICS**		
	Push operating life	The encoder's shall be pushed to 20,000 cycles at a speed of 1800±300 without electrical load.(shaft push load: 1kgf.cm max.)	Contact resistance : 200m max. Specification in clause 1-2-2~4,1-3-1~2 shall be satisfied. Operating force:Before test 80%.

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