EC06 POSITIVE DIRECTION SERIES SPECIFICATION
EC06 正向系列规格书

1. 一般事项General

1-1：适用规格Scope

本规格书适用于电子设备用微小电流回路06型回转式编码器。

This specification applies to 6mm size low-profile rotary encoder (incremental type) for microscopic current circuits used in electronicequipment.

1-2： 标准状态 Standard atmospheric conditions

除另有规定外，测量应在以下状态下进行：

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

温 度 Ambient temperature ：15℃ to 35℃

相对湿度 Relative humidity ：25 % to 85%

气 压 Air pressure ：86KPa to 106 Kpa

1-3： 使用温度范围

Operating temperature range ： -30℃ to +80 ℃

1-4： 保存温度范围

Storage temperature range ： -40 ℃ to +85 ℃

2. 构造Construction

2-1：尺寸Dimensions

见所附成品图Refer to attached drawing

3. 额定值 Rating

3-1： 额定电压

Rated voltage ：DC. 5V

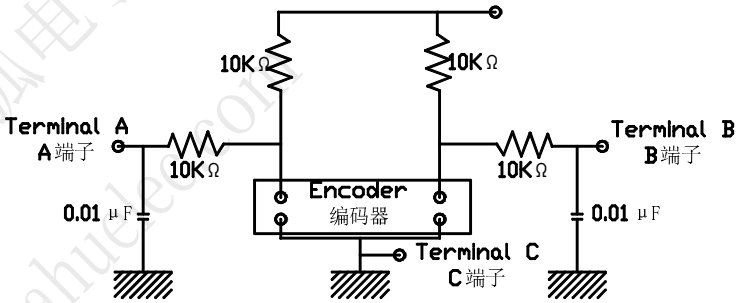
3-2 ：最大额定电流（阻抗负载）

Maximum operating current (resistive load)

各相导线 Each lead: 0.5mA(Max 5mA;Min 0.5mA)

公共导线 Common lead: 1mA(Max 10mA;Min 1mA)

图1 fig. 1



4. 使用注意事项 Application Notes

4-1：不要在高温、多湿及腐蚀性气体环境中保管。

During operation storage in high temperature and in corrosive gas.should be avoided.

4-2： 对编码器脈冲数的处理、设计时, 要充分考虑速度、脈冲调制时间和杂音干扰等因素。

As design of the pulse count process. Care should be taken with operational speed.

4-3：本制品在卡点上使A相在OFF 状态下比较安定,软件设计时以A相为标准

With this part detent positions we always be aligned with a-off phase.Therefore Make the a phase the reference at the soft ware design stage.

4-4： 编码器的脈冲数处理电路建议附加滤波电路（图1）。

The circuit of the pulsecount process should be adding filter as figure(fig.1).

4-5 ：本制品本体若接触水分则对脈冲波形能产生异常影响,避免直接接触水分。

This product when touching wet or water can be influence the pulse wave.

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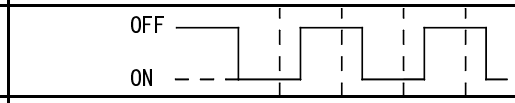
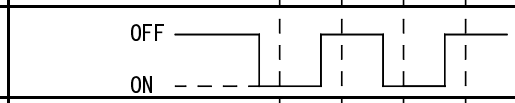
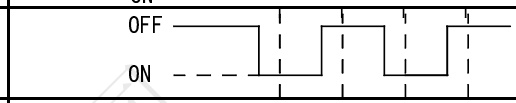
<table>
<tr><th colspan="2">项　目
Item</th><th colspan="3">条　件
Conditions</th><th>规　格
Specifications</th></tr>
<tr><td rowspan="5">5-1</td><td rowspan="5">输出信号
Output signal forma</td><td colspan="4">AB两个信号的相位差输出波型详见Fig.2;虚线表示带卡点装置的上擎子处位置
2 phase-different signals (signal A,signal B)Details shown in fig.2;The broken line shows detent position</td></tr>
<tr><td>轴的回转方向
Shaft rotational direction</td><td>信号
signal</td><td colspan="2">输 出 波 型
Output
Fig.2</td></tr>
<tr><td rowspan="2">顺时针方向
C.W.</td><td>A(A~C端子间)
A(Terminal A~C)</td><td colspan="2">  </td></tr>
<tr><td>B(B~C端子间)
B(Terminal B~C)</td><td colspan="2">  </td></tr>
<tr><td rowspan="2">逆时针方向
C.C.W.</td><td>A(A~C端子间)
A(Terminal A~C)</td><td colspan="2">  </td></tr>
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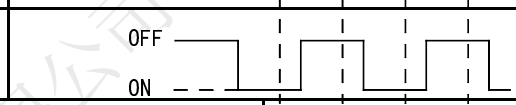
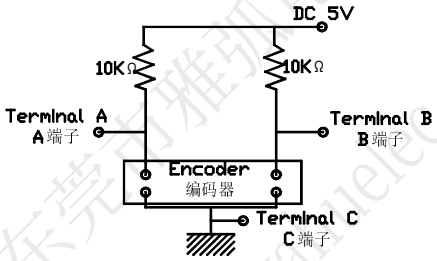
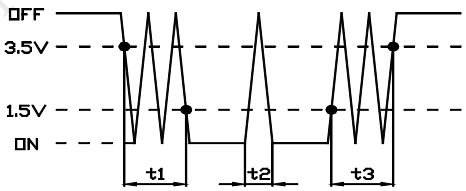
B(Terminal B~C)</td><td colspan="2">  </td></tr>
<tr><td>5-2</td><td>分解能力
Resolution</td><td colspan="3">回转360° 的输出脉冲数
Number of pulses in 360°rotation</td><td>6个脉冲/360°(Fig.2)
6 pulses/360°for each phase</td></tr>
<tr><td>5-3</td><td>开关特性
Switching Characteristics</td><td colspan="4">下图Fig.3所示回路，轴以360°/s的速度回转测定
Measurement shall be made under the condition as follows Shaft rotational speed：360°/s Test circuit：Fig.3
图3 fig.3
 
图4fig.4
 
(注)编码器 ON 指输出电压1.5V以下的状态。
Code-ON area :The area which the voltage is 1.5V or less(Fig.4)
编码器OFF指输出电压3.5V以上的状态。
Code-OFF area :The area which the voltage is 3.5V or more(Fig.4)</td></tr>
<tr><td>5-3-1</td><td>振荡
Chattering</td><td colspan="3">编码从OFF→ON或ON→OFF时,输出1.5V~3.5V
的通过时间应符合规定
Specified by the signal's passage time from 1.5V to 3.5V
of each switching position(code OFF~ON or ON~OFF)</td><td>t1,t3 ≦ 3ms
带卡点时,在卡点位置上的B信号振荡
无规定 On the case within detent,B
Signal will be irregular oscillation.</td></tr>
<tr><td>5-3-2</td><td>滑动杂音
(突跳)
Sliding noise
(Bounce)</td><td colspan="3">编码 ON 部份的1.5V以上的电压变动时间在振荡t1,t3之间会产生
1ms以上1.5 V以下的ON部份。另外，如果各突跳1.5V以下的范围
在1ms以上时，则判定为另一个突跳。
Specified by the time of voltage change exceed 1.5V 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 l linked bounce.</td><td>t2 ≦ 2ms</td></tr>
</table>

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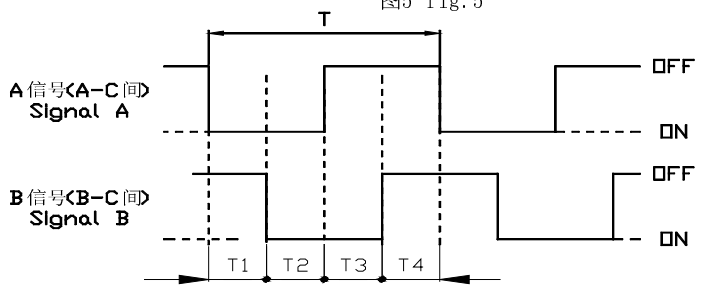
5-3-3	滑动杂音 Sliding noise	编码OFF部份的电压变动 The voltage change in code-OFF area.	3.5V以上 3.5V Min
5-4	相位差 Phase difference	以固定的速度(360°/s)操作轴进行回转。 Measurement shaft be made under the condition which the shaft is rotated in constant speed. 图5 fig.5 	见(Fig.5) in (Fig.5) T1、T2、T3、T4≥6ms
5-5	耐电压 Dielectric strength	在端子和支架间施加AC.300V电压1分钟。 A voltage of 300VAC. shaft be applied for 1min between individual terminals and frame.	不得有绝缘破坏 Without arcing or breakdown.
5-6	绝缘阻抗 Insulation resistance	在端子和支架间施加DC.250V 1mA Measurement shaft be made under the condition which a voltage of 250V DC. is applied between individual terminals and frame.	端子和轴间电阻50MΩ以上 Between individual terminals and bushing:50MΩ Min.
6. 机械性能 Mechanical characteristics			
6-1	全回转角度 Total rotational angle		360°(无止挡点) 360°(Endless)
6-2	卡点出脱力矩 Detent torque	只适用于附卡点装置 Only suitable for C.C, equipment.	1~4mN.m(10~40gf.cm)
6-3	定位点数及位置 Number and Position of detent	只适用于附卡点装置 Only suitable for C.C, equipment.	12点定位(间隔角度30°±3°) 12 detents(Step angle: 30°±3°)
6-4	轴的推拉强度 Push-pull strength of shaft	在轴端，沿轴向施加20N(2kgf)的推力和拉力各5秒钟。 (在PCB焊锡后) Push and pull static load of 20N shall be applied to the shaft in the axial direction for 5s.(After installing)	产品不可散开，轴向虚位间隙0.4mm以 The product can not be disperse, Shaft play in axial direction 0.4mmMax ;
6-5	端子强度 Terminal strength	端子前端的任意方向施加3N(0.3Kgf)的静负荷力1分钟。 A static load of 3N shall be applied to the tip of terminals for 1 min in any direction.	端子不得有明显松动及接触不良， 但允许变形。 Without excessive play in terminal or poor contact.
6-6	轴摆动 Shaft wobble	在轴前端2mm处，沿径向瞬间施加3N (0.3 Kgf)的力。 A momentary load of 50N shall be applied at the point 5mm from the tip of the shaft in a direction perpendicular to the axis of shaft.	1*L/30mm p-p 以下（L：指安装平面到轴的柄端的距离.） 1* L/30mm p-p Max L:Distance between mounting surface and measuring pointon the shaft
6-7	轴的回转方向摆动 Shaft play in rotational wobble	用角度板测定 Testing by angle board.	5°以下 5°Max
6-8	轴向间隙 Shaft play in axial direction	在轴上施加5N(50gf)的推力或拉力. The pull / push load of 5N(50gf) shall be imposed on the shaft.	0.3mm 以下 0.3mm Max.

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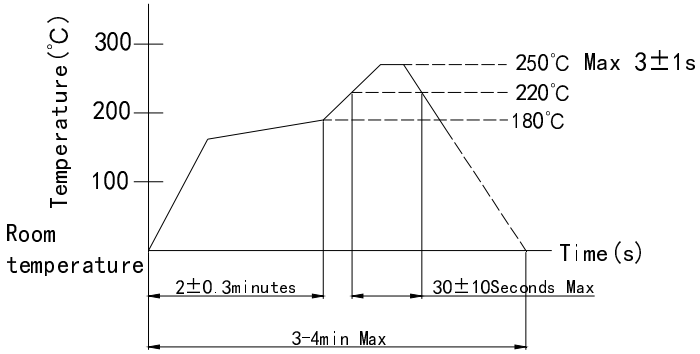
7. 耐久性能 Endurance characteristics

项 目 Item		条 件 Conditions	规 格 Specifications
7-1	回转寿命 Rotational life	在无负荷条件下轴以600~1000/h速度回转30,000周。 The shaft of encoder shall be rotated to 30,000 cycles at a speed of 600~1000/h without electrical load, after which measurements shall be made.	振荡：t1,t2≦3ms Chattering t1,t2≦3ms 卡点出脱力矩-30%~+10% Detent torque -30%~+10%
7-2	耐湿性 Damp heat	温度40±2℃、湿度90~95%的恒温恒湿槽中放置96±4小时后，在常温、常湿中放置1.5小时后测试。 The encoder shall be stored at temperature of 40±2℃ with relative humidity of 90% to 95% for 96±4 in a thermostatic chamber .And then the encoder shall be subjected to standard atmospheric conditions for 1.5H. After which measurements shall be made.	应满足初期规格。 Specifications in clause
7-3	耐热性 Dry heat	温度85±3℃的恒温箱中放置96±4小时，常温、常湿放置1.5小时后测量。 The encoder shall be stored at a temperature of 85±3℃ for 96±4H in a thermostatic chamber. And then the encoder shall be subjected to standard atmospheric conditions for 1.5H. After witch measurement shaft be made.	应满足初期规格。 Specifications in clause
7-4	低温特性 Cold	温度-40±3℃的恒温箱中放置96±4小时，常温、常湿放置1.5小时后测量 The encoder shall be stored at a temperature of -40±3℃ for 96±4H in a thermostatic chamber. And then the encoder shall be subjected to standard atmospheric conditions for 1.5H. After witch measurement shaft be made.	应满足初期规格。 Specifications in clause
7-5	预先加热 Preheat	预热：PBC板表面温度180±3℃以下，时间2分钟以内. Preating must be finished within 2 minutes to reach Max.180±3℃ of copper foil surface after a PCB is placed a reflow soldering furnance.	
7-6	焊接加热 Soldering Heat	焊接温度250℃以下,仅允许时间3±1秒以内. Soldering temperature is only allowed within 3±1s at Max.250℃ of copper foil surface after preheating. 	
7-7	允许焊锡过程次数 Allowable frequency of Soldering Process	2次以下 2 times max	

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推动开关部份 Push Switch Portion

备注：以下规格适用于EC06编码器带开关系列

Note:The following specification is only suitable for the one type with switch of EC06 encoder series

1. 额定值 Rating

1-1: 额定电压

Rated voltage : DC 5V

1-2: 最大额定电流（阻抗负载）

Maximum operating current (resistive load): 10 mA Max

2. 电气性能Electrical characteristics

项 目 Item		条 件 Conditions	规 格 Specifications
2-1	接触电阻 Contact resistance	用DC 5V 1mA 电压测定 Voltage test at DC 5V 1mA.	100mΩMax
2-2	振荡 Bouncing	以1秒钟1往复(OFF-ON-OFF)回转运转 shaft shall be Rotated at 1 cycles/sec(OFF-ON-OFF)	10ms以下 10ms Max
2-3	绝缘电阻 Insulation resistance	在端子与安装板间施加DC.250V 1mA Measurement shall be made under the Condition which a voltage 250V DC 1mA Is applied between individual Terminals and tracked	在端子安装板间50MΩ以上 Between individual Terminals and bracket 50MΩ Min.
2-4	耐电压 Dielectric strength	在端子和安装板间施加AC300V电压1分钟 A voltage of 300V AC shall be applied for 1 minute between individual terminals and bushing and plank.	不得有绝缘破坏 Without arcing or Breakdown.

3. 机械性能Mechanical characteristics

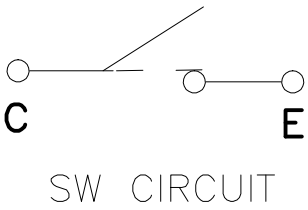
3-1	开关电路、接点数 Switch circuit and Number of pulse		单极单投(推ON) Single pole and single throw(push on)
3-2	开关移动量 Travel of switch		0.1+0.1/-0mm
3-3	开关动作力 Operating force of switch	在轴方向施加的按压力 Push static load to the shaft in the axial direction	70±30gf

4. 耐久性能 Endurance characteristics

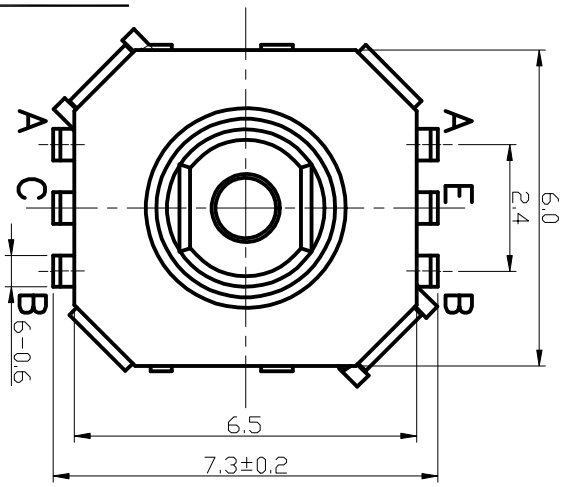
4-1	寿命特性 Operating life	在无负荷条件下沿轴向施以200gf以下的力，以600次/小时的速度按压， 连续运转20, 000往复。 The encoder's shall shall be rotated to 20,000 cycles at a speed of 600/h without electrical load.	接触电阻:200mΩ以下 Contact resistance: 200mΩ Max. 开关动作力:-30%~+10%。 Operating force of switch:-30% +10%

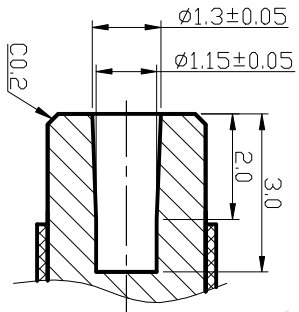
版本	变 更 记 录	日 期	承 办 Prepared By	审 核 Reviewed By	批 准 Approved By
			R & D 2013.07.23 Lisa	R & D 2020.08.16 Lucky	R & D 2020.08.16 Lucky

外 形 圖
Mechanical Dimensions

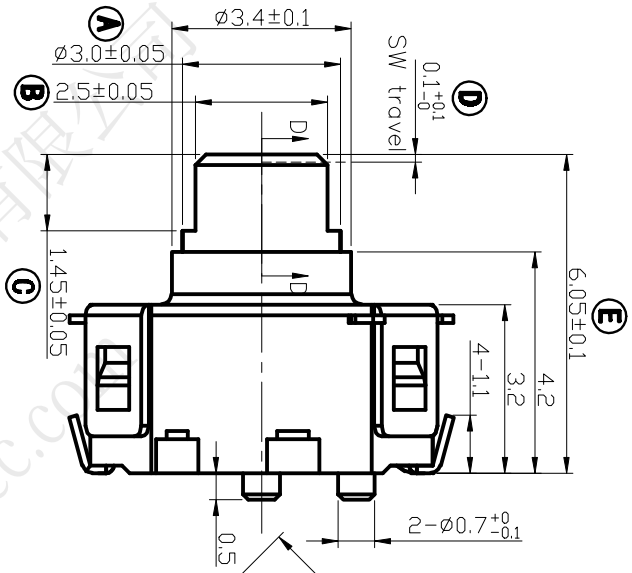


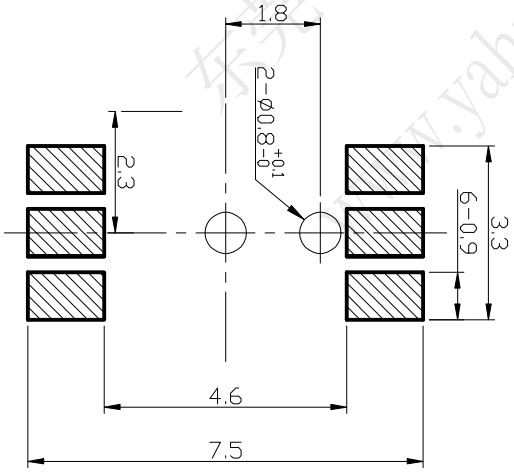
SW CIRCUIT



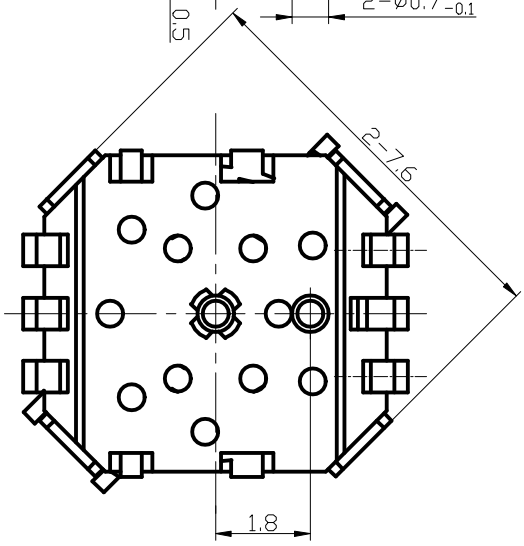


SEC D–D





P.C.B MOUNTING DETAIL



YaHu DongGuan YaHu Electronic Co.,Ltd.				PRODUCT NAME	Encoders	
2						
1		注：Ⓐ–Ⓔ为重点管控尺寸。		MODEL NAME	EC0601S-6TV1-12C6P-T1.45	
NO	DATE	DESCRIPTION				
DIMENSION	TOLERANCE	SCALE		APPROVED BY	CHECKED BY	DRAWN BY
$l \leqslant 10$	±0.2	UNIT	mm	R & D 2020.08.16 Lucky	R & D 2020.08.16 Lucky	R & D 2013.07.23 Lisa
$10 < l \leqslant 30$	±0.5	VER.				
$30 < l \leqslant 100$	±1.0	DATE	08/07/07			