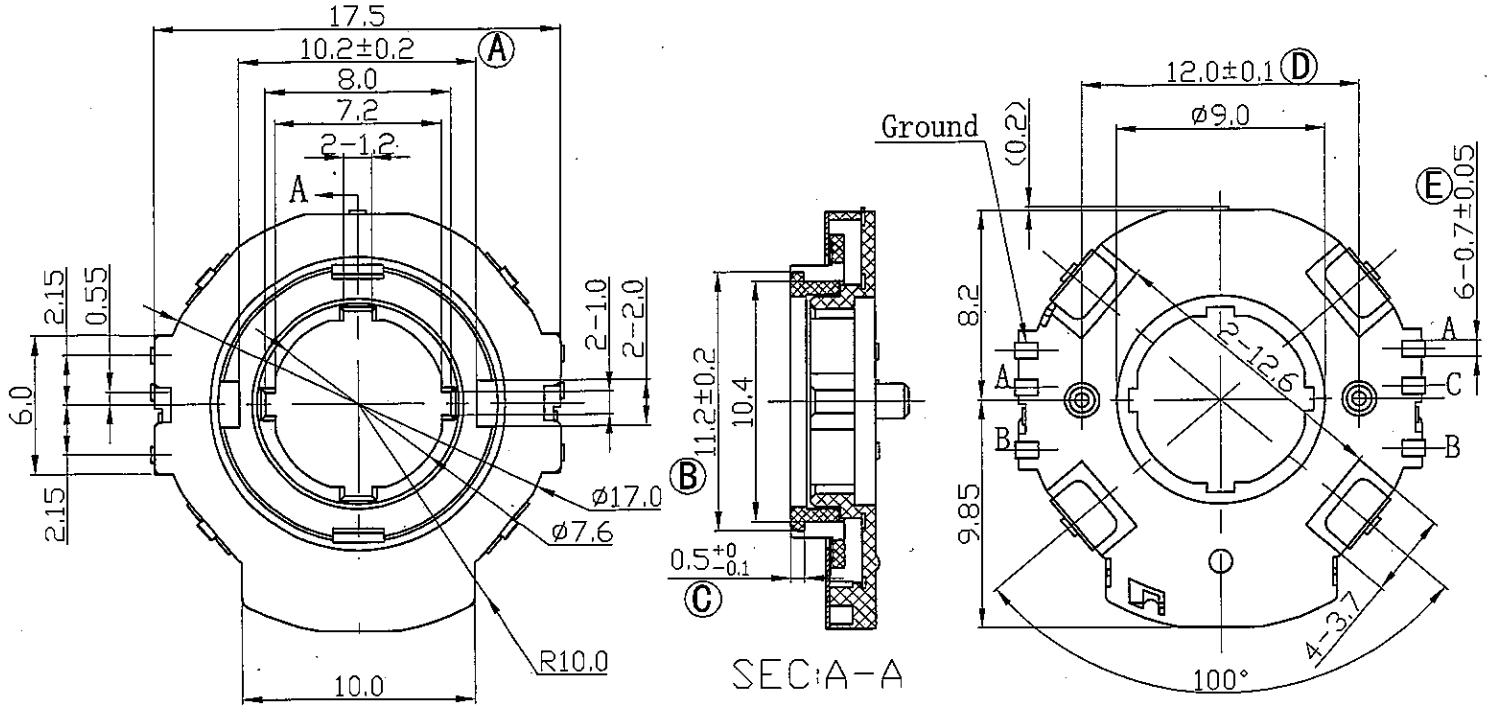
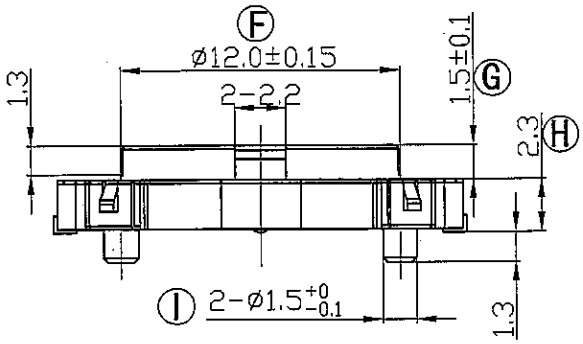
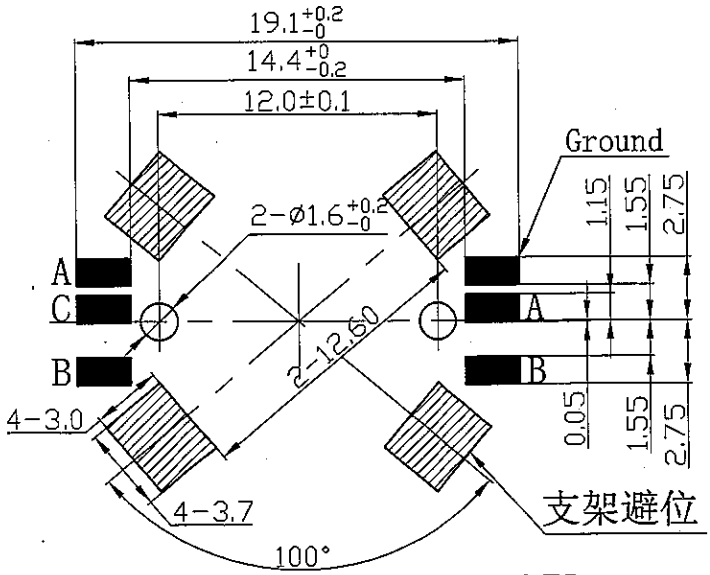






P.C.B. MOUNTINC DETAIL

符合产品环境品质管理标准与用途

注：重点管控尺寸 Ⓐ - Ⓘ .

01	修改成品名称	2015-09-21	03
00	ORIGINAL DRAWING	2013-04-08	02
. ISSU.	REVISION	DATE	. ISSU.

来文明			TOL. UNLESS OTHERWISE SPEC.		东莞市洋瀚实业有限公司
			BASIC DIMENSIONS	TOL.	TITLE: 编码器
			L≤10	±0.3	MODEL: EC180102X2X-VH1
DSGD.	CHKD.	APPD.	10<L	±0.5	
	SCALE		100≤L	±0.8	DRAWING NO: C-EC18XX-0001 NO:
	UNIT	mm	ANGLE	±5°	

EC18 SERIES SPECIFICATION

EC18 系列规格书

1、 General 一般事项

1-1、Scope 适用规格

This specification applies to Φ18mm size low-profile thin rotary encoder (incremental type) for microscopic current circuits, used in electronic equipment.

本规格书为Φ18mm小型回转式编码器（增量型），适用于电子设备内微小电子电路。

1-2、Standard atmospheric conditions标准状态

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

除另有规定外，测量应在以下状态下进行：

Ambient temperature温度：15℃ to 35℃

Relative humidity相对湿度：25% to 85%

Air pressure气压 ：86kPa to 106kPa

1-3、Operating temperature range

使用温度范围 ：-40℃ to 85℃

1-4、 Storage temperature range

保存温度范围 ：-40℃ to 85℃

2、Construction 构造

2-1 Dimensions 尺寸

Refer to the attached drawing 见所附成品图

3、 Rating 额定值

3-1、Rated voltage 额定电压: DC 5V

3-2、Maximum operating current (resistive load)最大额定电流（阻抗负载）

Each lead 各相导线 ：0.5mA(MAX 5mA; MIN 0.5mA)

Common lead 公共导线：1mA(MAX 10mA; MIN 0.5mA)

4、Application Notes 使用上的事项

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 any remainder left after packing is opened, please store it with proper moistureproofing, gasproofing etc.

避免储藏于高温,潮湿及腐蚀的场所. 产品购入后尽可能在6个月内使用完. 拆包装后未使用完的剩余产品需储藏于防潮防毒的 环境下。

4-2. The encoder pulses count method should be designed with taking operating speed, sampling time and design software into cosideration.

编码器信号的计算方法应将操作的速度,信号的取样时间及电子回路中的微电脑软体等考虑进去。

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.

此产品在定位点状态时A相波形是处于OFF或ON状态,因此在设计软体时请留意此现象。

4-4. At design of the pulse count process. Using the C/R filter circuit is recommended.

在设计时要考虑到杂讯,须使用C/R滤波电路。

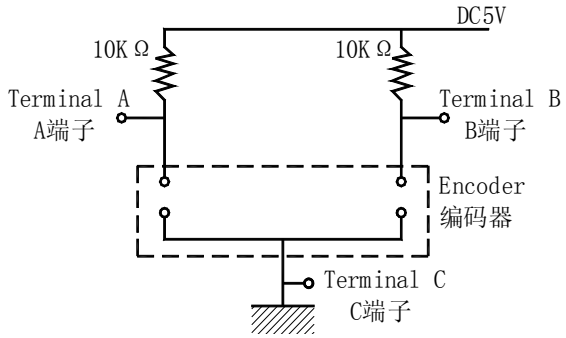
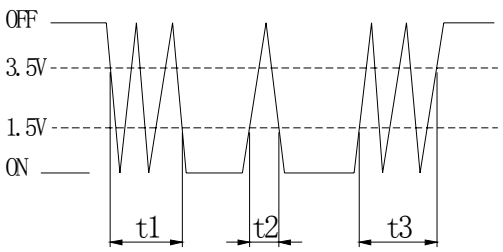
4-5. Care must be taken not to expose this product to water or dew to prevent possible problem in pluses output waveform.

本产品请勿碰触到水,可能会导致输出波形的异常。

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. Meanwhile, the slide contact in the inside of product can be divorced and can cause poor conatct.

在使用编码品时速度宜控制在360°/s内，转速过快会导致IC抓取不到信号及产品内部的接触刷会瞬间脱离产生接触不良。

5、 ELECTRICAL CHARACTERISTICS电气性能

ITEM 项 目	CONDITIONS 条 件		SPECIFICATIONS 规 格
5-1、Output signal format 输出信号	Note: Output signal is 1 pulse per 2 detents. And terminal A-C is pulse ON or OFF at detent positions. No specified output of termial B-C at detent positions. 注意事项：输出信号方式是2个定位1个脉冲。在定位点位置时A-C端子处于OFF状态，而B-C端子间不作特定要求。		2 Phase-different signals (signal A, signal B) Details shown in〈fig.1〉(The broken line shows detent positions .) A、B两信号输出相位差,输出波形详细见(图1)。虚线表示带卡点装置的卡点处位置。
	Shaft rotational direction 轴回转方向	Signal 信号	Output 输出波形
	C.W. 顺时针方向	A(Terminal A-C) A(A-C端子间)	OFF ON
		B(Terminal B-C) B(B-C端子间)	OFF ON
	C. C.W. 逆时针方向	A(Terminal A-C) A(A-C端子间)	OFF ON
		B(Terminal B-C) B(B-C端子间)	OFF ON
5-2、Resolution 分解能力	Number of pulses in 360° rotation。 回转360°的输出脉冲数。		9 pulses/360° for each phase 9个脉冲/360°
5-3、 Switching characteristics 开关特性	Measurement shall be made under the condition as follows. 1)Shaft rotational speed : 360°/s 2)Test circuit : （fig.2） 下（图2）所示回路，轴以360°/秒的速度回转测定。 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. （注）编码器OFF指输出电压3.5V以上的状态。 编码器ON指输出电压1.5V以下的状态。		〈fig.3〉 图3 
5-3-1、Chattering 振荡	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) 编码从OFF → ON 或 ON → OFF时，输出1.5V~3.5V通过的时间应符合规定。图三		t1,t3 ≤ 3ms
5-3-2、Sliding noise (Bounce) 滑动杂音(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 chatteri-ng. When the code-ON time between 2 bounces is less than 1mS, they are regarded as 1 linked bounce. 编码ON部分的1.5V以上的电压变动时间在振荡t1,t3之间会产生1毫秒以上1.5V以下的ON部分。另外,如果各突跳间1.5V以下的范围在1毫秒以上时，则判定为另一个突跳。		t2≤2ms
5-3-3、Sliding noise 滑动噪音	The voltage change in code - OFF area. 编码OFF部分的电压变动。		3.5V MIN 3.5V 以上

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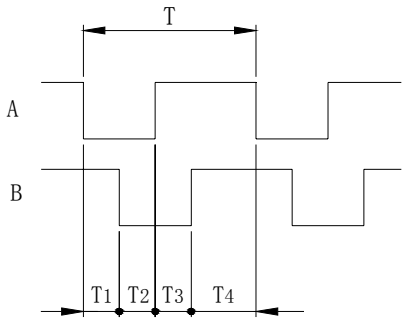
5-4、Phase difference 相位差	Measurement shall be made under the condition which the shaft is rotated at 360°·S-1 (Constant speed).以360°/s 的速度操作轴转动。 (Fig.4)图4 	T1.T2.T3.T4≥8 ms
5-5、Insulation resistance 绝缘电阻	Measurement shall be made under the condition which a voltage of 250V DC 1min is applied between individual terminals and bracket. 在端子和安装板间施加电压 250V DC 1分钟。	Between individual terminals and bracket 50MΩ MIN. 端子安装板间电阻50MΩ以上。
5-6、Dielectric strength 耐电压	A voltage of 250V AC shall be applied for 1 minute between individual terminals and bracket. 在端子和安装板间施加 AC 250V电压1分钟。	Without arcing or breakdown. 不得有绝缘破坏。

6、 Mechanical characteristics 机械性能

ITEM 项 目	CONDITIONS 条 件	SPECIFICATIONS 规 格
6-1、Total ratational angle 全回转角度		360°(Endless) 360°(无止挡点)
6-2、Detent Torque 定位力矩		5±2 mN.m (50±20 gf.cm)
6-3、Number and position of detent 定位点数及位置	Only suitable for C.C equipment. 只适用于附卡点装置	18 detents(Step angle:20°±3°) 18点定位（间隔角度20°±3°）
6-4、Push-pull stren-gth of shaft 轴推拉强度	Push and pull static load of 5 kgf shall be applied to the shaft in the axial direction for 10s.(After soldering of the PC board) 在轴端,沿轴向施加 5 kgf 的静负荷力推和拉各10秒钟 (焊锡固定在PCB上）。	Without damage or excessive play in shaft No excessive abnormality in rotational feeling. And electrical characteristics shaft be satisfied. 轴无破损，回转无异常，电气性能无异常。
6-5、Shaft wobble 轴摆动	A momentary load of 30mN(300gf) shall be applied at the top of the shaft in a direction perpendicular to the axis of shaft. 在轴顶端沿径向瞬间施加30mN (300gf)的力。	0.2 mm MAX 0.2 mm最大
6-6、Shaft play in rotational wobble 轴的回转方向摆动	Testing by angle board. 用角度板测定。	4° MAX 4° 以下
6-7、Surface evenness 平整度	The gap between the contact pins and PCB. 端子与PCB之间的间隙.	0.1mm MAX. 0.1mm以下.

7、Endurance characteristics耐久性能

7-1、Rotational life 旋转寿命	The shaft of encoder shall be rotated to 50,000 cycles at a speed of 600~800 cycles/h without electrical load, after which measurements shall be made. 在无负荷条件下轴以600~800周/小时速度旋转 50,000 周。 1 cycle: rotate 360° CCW rotate 360° CW 1周指顺时针转360°逆时针转360°	Chattering t1,t3≤5ms 振荡 t1,t3≤5ms Bounce t2≤3ms 突跳 t2≤3ms Rotation torque change shall be within ±50% of its initial value. 旋转力矩的变化量在初期值的±50%以内.
7-2、Damp heat 耐湿性	The encoder shall be stored at temprature of 40℃±2℃ with relative humidity of 90% to 95% for 240h±10h in a thermostatic chamber. And the encoder shall be subjected to standard atmospheric conditions for 1.5h, after which measurements shall be made. 温度40℃±2℃, 湿度90%~95%的恒温恒湿槽中放置 240±10小时后, 在常温、常湿中放置1.5小时后测试。	Specifications in clause all items is shall be satisfied. 所有项应满足初期规格

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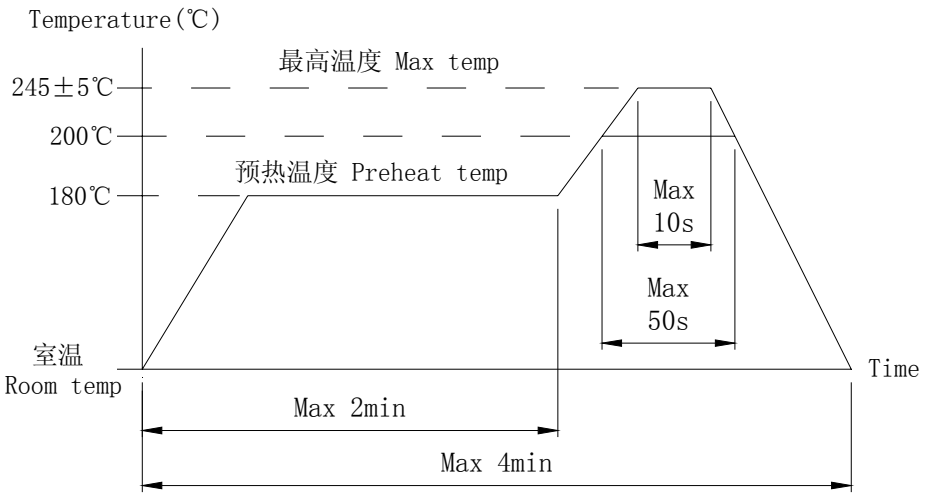
7、Endurance characteristics 耐久性能

ITEM 项 目	CONDITIONS 条 件	SPECIFICATIONS 规 格
7-3、Dry heat 耐热性	The encoder shall be stored at a temperature of 80℃±3℃ for 240h±10h in a thermostatic chamber.And then the encoder shall be subjected to standard atmospheric conditions for 1.5h .After which measurement shall be made.温度80℃±3℃的恒温箱中放置240±10小时,常温、常湿放置1.5小时后测试。	Specifications in clause all items is shall be satisfied. 所有项应满足初期规格
7-4、Cold 低温特性	The encoder shall be stored at a temperature of -40℃±3℃ for 240h±10h in a thermostatic chamber. And then the encoder shall be subjected to standard atmospheric conditions for 1.5h, after which measurement shall be made .温度-40℃±3℃的恒温箱中放置 240±10小时,常温、常湿放置1.5小时后测试。	Specifications in clause all items is shall be satisfied. 所有项应满足初期规格
7-5、Solder ability 焊锡性	The terminals shall be immersed into solder bath at 260℃±5℃ for 3s±1s in the same manner as para. 端子在260℃±5℃温度的焊锡槽内浸锡3秒±1秒。	A new uniform coating of solder shall cover 75% minimum of the surface being immersed.浸渍面须有75%以上焊锡附着
7-6、Refolw soldering 回流焊	Manual soldering:手工焊接 Bit temperature of soldering iron： Below 350℃ Application time of soldering iron：within 3s 温度350℃以下，时间3秒以内。 Refolw soldering :回流焊 Preheat: Temperature on the copper foil surface should reach 180℃, 2 minutes after the P.W.B entered into the soldering equipment. Soldering heat: Temperature on the copper foil surface should reach the peak temperature of 245℃±5℃ within 10s after the P.W.B entered into soldering heat zone. 预热:在P.W.B板进入焊接装备之后,铜铂表面温度为180℃,时间为2分钟。 浸锡:在P.W.B板浸锡时,铜箔表面温度最高将达到245℃±5℃时间为10秒。	Electrical characteristics shall be satisfied No mechanical abnormality. 不得有绝缘体的破损、变形、接触无异常。

Copper foil surface temperature(℃)



Time inside soldering equipment

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		技术部 16-09-22 徐娜丽	技术部 16-09-22 欧阳昌雄	技术部 16-09-22 苏朝晖	