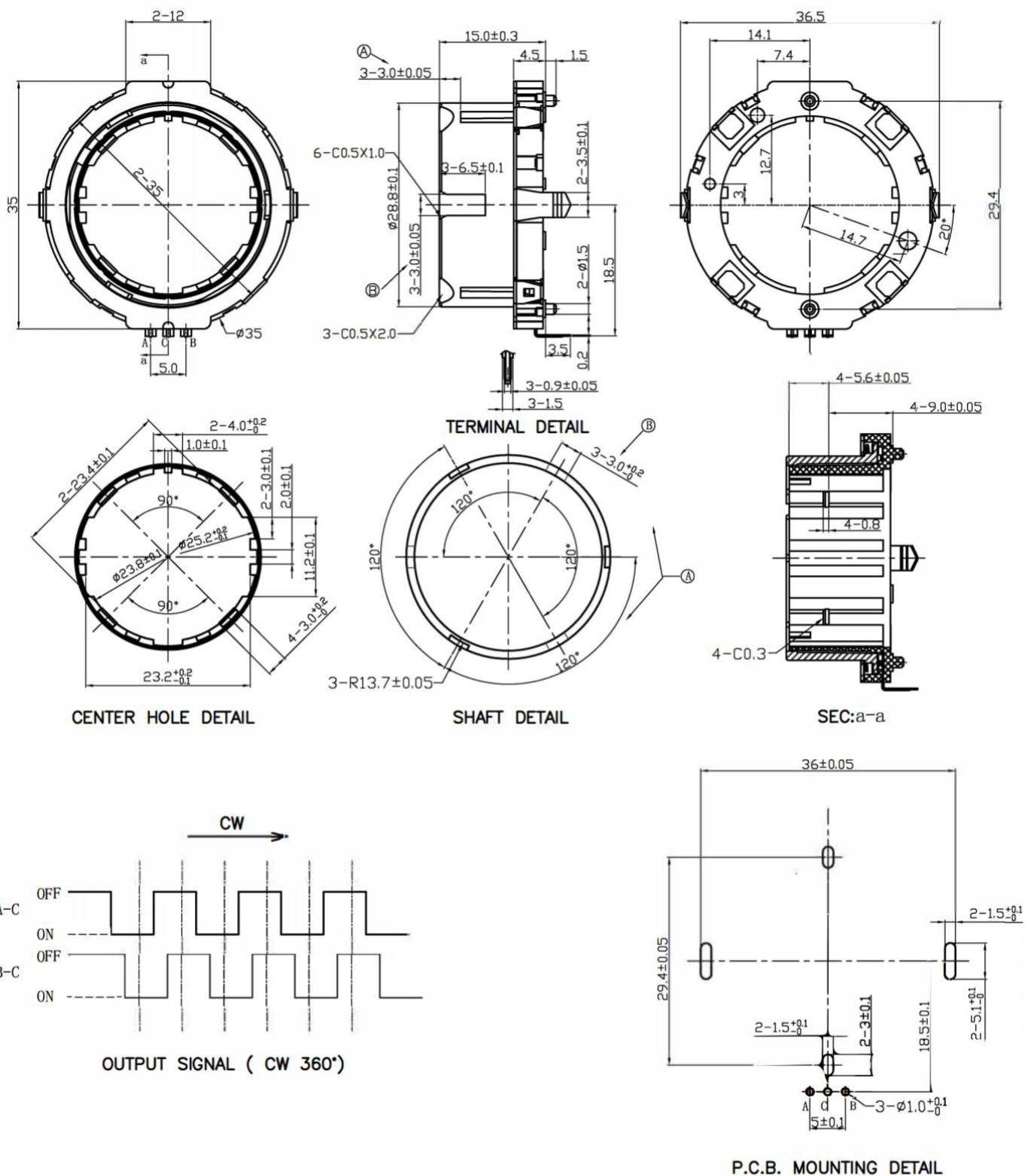
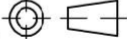


外形图 MECHANICAL DIMENSIONS



KH-EC351V15T302			TOL. UNLESS OTHERWISE SPEC.		ISSU.	DATE	REVISION		
			BASIC DIMENSIONS		TOL.	00	ORIGINAL DRAWING		
			L≤10		±0.3	01			
	SCALE	UNIT	10<L		±0.5	02			
			100≤L		±0.8	03			
			ANGLE		±5°	04			
	3:1		mm						
深圳市金航标电子有限公司					DSGD Z. J		CHKD F. Q		APPD

EC35系列规格书

1. 一般事项General

1-1. 适用规格 Scope

本规格书适用于微小电流回路的电子设备，属35型回转型编码器。

This specification applies to 35mm size low-profile rotary encoder(incremental type) for microscopic current circuits , used in electronic equipment.

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 106kpa

1-3. 使用温度范围

Operating temperature range : -40℃ to +85℃

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. 额定电流

Maximum operating current 1mA

4. Application Notes 使用上的事项

4-1. 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。

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.

4-2. 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。

The encoder pulses count method should be designed with taking operating speed, sampling time and design of the microcomputer software into consideration.

4-3. 此产品在定位点的输出波形参照 (5-1) , 因此在设计软体时请留意其状态。

With this products the detent position output consult fig. 5-1. Therefore make the A phase the reference at the soft ware design stage.

4-4. 在设计时要考虑到杂讯, 建议使用C/R滤波电路, (图1) 。

At design of the pulse count process. Using the C/R filter circuit is Recommended. (fig. 1)

4-5. 本产品请勿碰触到水, 可能会导致输出波形的异常。

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

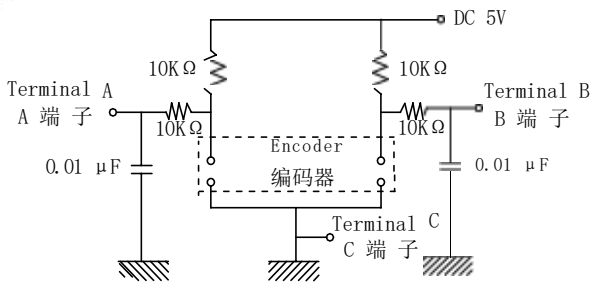
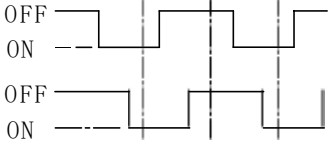
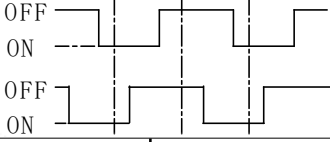
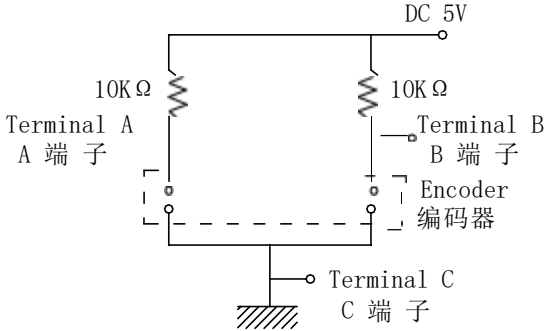
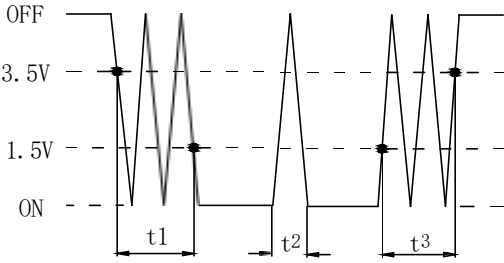
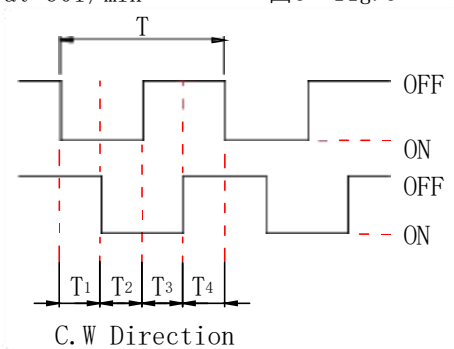


图1 (fig.1)

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5. 电气性能 ELECTRICAL CHARACTERISTICS			
项目 ITEM	条件 CONDITIONS		规格 SPECIFICATIONS
5-1. 输出信号 Output signal format	A、B两信号输出相位差，输出波形详细见（图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.)		
	轴回转方向 Shaft rotational direction	信号 Signal	输出波形 Output 图2 fig.2
	顺时针方向 C. W	(A-C端子间) A(Terminal A-C) B(B-C端子间) B(Terminal B-C)	
	逆时针方向 C. C. W	A(A-C端子间) A(Terminal A-C) B(B-C端子间) B(Terminal B-C)	
5-2. 分解能力 Resolution	回转360° 的输出脉冲数。 Number of pulses in 360° rotation.		15 个脉冲/360°(图2) 15 pulses/360° (fig2)
5-3. 开关特性 Switching characteristics	下（图3）所示回路，轴以360° /S的速度转动测定。 Measurement shall be made under the condition as follows. Shaft rotational speed : 360° /S Test circuit : (fig.3) 图3 <fig.3>		
	  (注) 编码OFF指输出电压3.5V以上的状态(fig.4)。 Code-OFF area :The area which the voltage is 3.5V or more(fig.4). 编码ON指输出电压1.5V以下的状态fig.4). Code-ON area : The area which the voltage is 1.5V or less(fig.4).		
5-3-1. 振荡 Bouncing	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)		t1, t3 ≤5ms
5-3-2. 滑动杂音 (突跳) Sliding noise (Bounce)	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,1.5V以下的ON部份. 另外, 如果各突跳间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 1 linked bounce.		t2≤3ms

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5. 电气性能 ELECTRICAL CHARACTERISTICS		
项目 ITEM	条件 CONDITIONS	规格 SPECIFICATIONS
5-4. 相差位 Phase difference	下（图5）所示回路，轴以360° /S的速度转动测定。 Measurement shall be made under the condition which the shaft is rotated at 60r/min 图5 fig.5 	初始值, 见图5。 Initial phase difference. T1、T2、T3、T4≥8mS(fig. 5) 耐久后, 见图5。 After Life phase difference. T1、T2、T3、T4≥5mS(fig. 5)
5-5. 接触阻抗 Contact Resistance	在端子进行测定。 Measurement at between terminals	1 Ω 以下。 1 Ω Max.
5-6. 绝缘阻抗 Insulation Resistance	在端子和支架间施加DC250V 电压1分钟。 A voltage of DC 250V shall be applied for 1 minute	50MΩ 以上 50MΩ Min
5-7. 耐电压 Withstand Voltage	在端子和支架间施加AC300V电压1分钟。 A voltage of 300V AC shall be applied for 1 minute	不得有绝缘破坏。 Without arcing or breakdown.
6 机械性能 Mechanical characteristics		
6-1. 旋转角度 Angle of rotation	全回转角度。 Total ratational angle.	360°（无止档点）。 360°（Endless).
6-2. 旋转扭矩 Shaft rotation torque	峰值扭矩(在5℃~35℃环境中测定)，测定速度2±1rpm。 Perk torque(at5℃~35℃), Measurement speed 2±1rpm.	250±50%gf.cm
6-3. 定位点数及位置 Number and position of detent	只适用于附卡点装置。 Onlt suitable for C. C, equipment. 排除轴的旋转摆动。 Excluding shaft rotational play.	30点定位(间隔角度12° ±3°)。 30detents(Step angle:12°±3°)
6-4. 轴的推拉强度 Push-pull stren-gth of shaft	在轴端, 沿轴向施加 8Kg 的静负荷力推和拉各10秒钟。 (产品焊锡固定在PCB上) Push and pull static load of 8Kg shall be applied to the shaft in the axial direction for 10s. (After soldering of the PC board)	轴无破损, 接触性能无异常。 Without damage or excessive play in shaft no excessive abnormality in rotational feeling.
6-5. 轴晃动 Shaft free play	1. (横向)在轴前端3mm瞬间施加300gf.cm的力。 When a load 300gf.cm is applied at 3mm from tip lf shaft.	0.5mm以下。 0.5mm Max.
	2. (轴向)在轴向方向施加400gf.cm的力。 When 400gf.cm force is applied axially.	0.3mm 以下。 0.3mm Max.
	3. 旋转方向。 Rotational play	3° 以内。 Within 3° .

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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周/小时速度回转30000周。 The shaft of encoder shall be rotated to 30000 cycles at a speed of 600cycles/H without electrical load, after with measurements shall be made.	旋转力度相对初期值: ±50%以内。 端子接触阻抗在50Ω以内。 Rotation torque change shall be within ±50% against initial value. Contact resistance 50Ω Max
7-2. 耐湿性 Damp heat	将产品置于温度60±2℃,湿度90~95%的恒温恒湿槽中240±10小时后,取出去除表面水分在常温、常湿放置1.5小时后测试。 The encoder shall be stored at temperature of 60±2℃ with relative humidity of 90% to95% for240±10H in a thermostatic chamber. And the encoder shall be subjected to standard atmospheric conditions for 1.5H, After which measurements shall be made	电气性能所有项应满足初期规格。 The product shall satisfy all item under Electrical Specification.
7-3. 耐热性 Dry heat	将产品置于温度85±3℃的恒温箱中240±10小时后,取出去除表面水分在常温、常湿放置1.5小时后测试。 The encoder shall be stored at a temperature of 85±3℃ for 240±10H in a thermostatic chamber. And then theencoder shall be subjected to standard atmospheric conditions for 1.5H, After which measurements shall be made.	电气性能所有项应满足初期规格。 The product shall satisfy all item under Electrical Specification.
7-4. 低温特性 Low temperature	将产品置于温度-40±3℃的恒温箱中240±10小时后,取出去除表面水分在常温、常湿放置1.5小时后测试。 The encoder shall be stored at a temperature of -40±3℃ for 240±10H in a thermostatic chamber. And then the encoder shall be subjected to standard atmospheric conditions for 1 5H After which measurements shall be made	电气性能所有项应满足初期规格。 The product shall satisfy all item under Electrical Specification.
7-5. 温度循环 Temperature cycle	将产品置于以下设置环境中进行100次连续循环后,取出去除表面水分在常温、常湿环境中放置1.5小后测试。 The encoder shall be subjected to 100 successive change of temperature cycls, each as shown in table below. Then its surface moisture shall be removed. And then the encoder shall be subjected to standard atmospheric conditions for 1.5 hour. after which measurements shall be made.	电气性能所有项应满足初期规格。 The product shall satisfy all item under Electrical Specification.
	阶段 Step	
	温度 Temperature	
	放置时间 Durationure	
	1	
	2	
	3	
	4	
7-6. 耐硫化性 Sulfurization (H ₂ S)	将产品置于温度40℃±2℃、湿度75%~85%、H ₂ S浓度为2±1ppm在恒温箱中96小时后,取出置于常温、常湿环境中放置1.5小后测试。 40℃±2℃、75%~85RH、2±1ppmH ₂ S, for 96 hours. Then keep in normal room temperature and humidity conditions for 1.5 hours before inspection.	电气性能所有项应满足初期规格。 The product shall satisfy all item under Electrical Specification.

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8. 耐焊接热

Resistance to soldering heat

8-1. 在低于指定的焊接条件下进行焊接，产品不可出现变形或是破损，产品旋转手感不可有异常。

At the specified by the soldering conditions below.

There shall be no deformation or cracks, in molded part.

No excessive abnormality in rotational feeling.

8-2手工焊接 Manual soldering

温度350℃以内，焊接时间控制在3秒内。

Bit temperature of soldering iron:350℃ or less.

Application time of soldering iron:Within 3s.

8-3. 浸焊 Dip soldering

使用基板：双面覆铜板厚度为1.6 mm。

Printed wiring board:Both-sided copper clad laminate board with thickness of 1.6 mm.

当浸渍在焊锡槽内时，应该满足以下条件：

When dipping in solder, apply the flux by the foaming method under the conditions mentioned below :

焊剂比重：0.83±0.05 Specific gravity of flux: 0.83±0.05.

浸焊时间:5秒内 Flux foaming time : within 5s.

浸焊高度:基板厚度1/2以下。 Flux foaming level:1/2t or less.

在焊接过程中，应按以下条件进行预热处理。

After flux application, sufficiently dry the flux by preheating under the conditions mentioned below :

焊接时温度需控制在260℃以内，时间控制在3S以内。最多允许2次。

Soldering should be performed at 260℃ or less within 3s, and soldering can be allowed twice only.

请避免焊接后再进行清洗，可能会导致电气性能接触不良。

Please avoid cleaning after soldering ;it may cause electrical contact failure by flux.

如果满足上述8-3条件，上锡后产品电气性能及接触性能不会有异常。但要注意线路与产品间如果有锡膏会引起短路。

If the conditions 8-3 are satisfied, there will be no problems such as flux sucked up from terminals and electrical contact. But, care should be taken in the case of wiring such as jumper wire near the product body where flux is remained.

注明：

各项试验均为无负载试验，有特殊要求另行提出。

Note : no load test, the test results for special requirement put forward separately.

本产品符合RoHS指令要求。（指令2002/95 / EC）。

This product complies with the RoHS Directive(Restriction of the use of certain Hazardous Substance in electrical and electronic equipment) (DIRECTIVE 2002/95/EC)

次数	变更原因	变更日期						
			制 作	Z. J	审 核	L. J. J	核准	F. Q