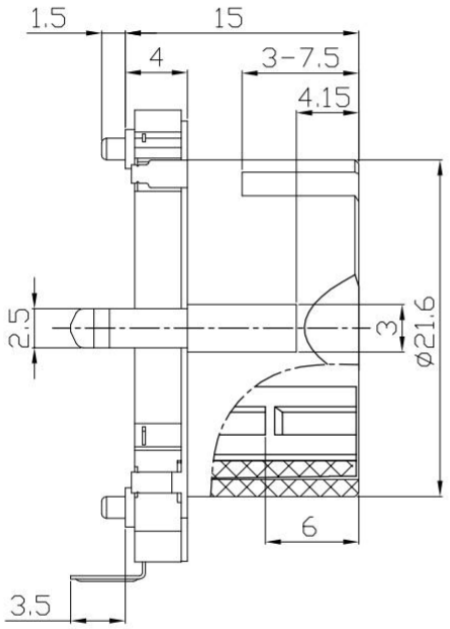
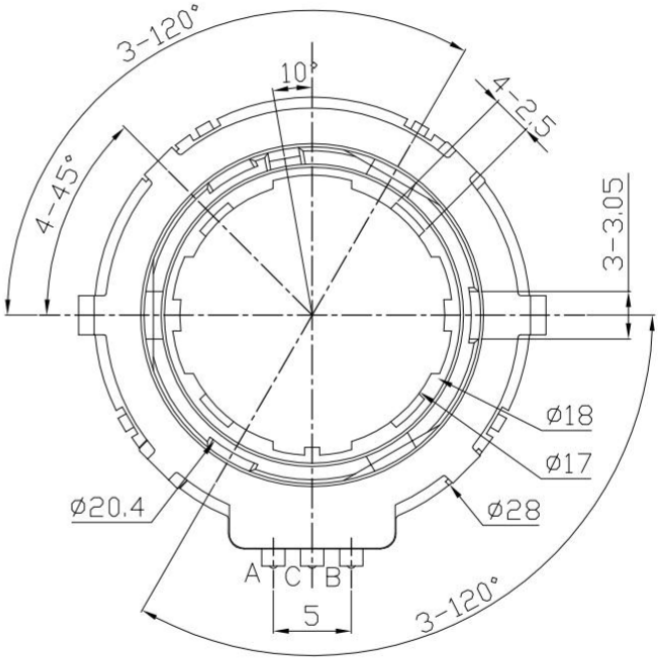
Kinghelm®

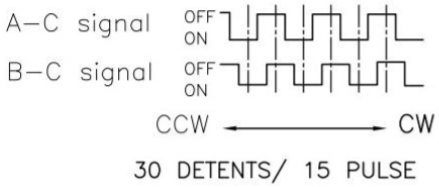
外形图 MECHANICAL DIMENSIONS



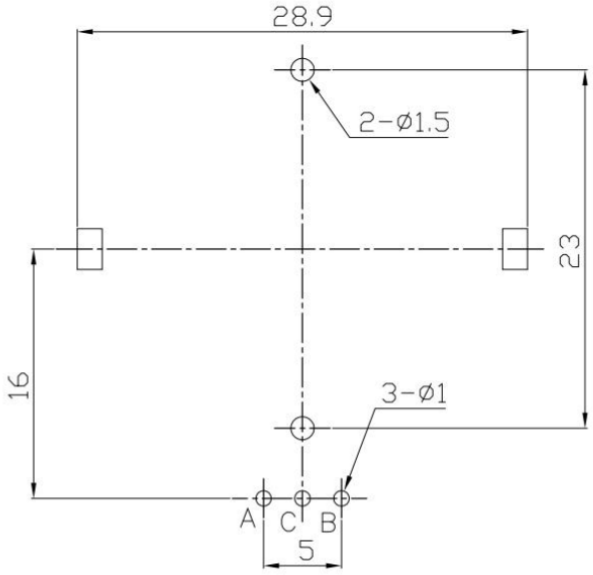


安装孔位图 Mounting Hole

TERMINAL DETAIL



30 DETENTS/ 15 PULSE



KH-EC281V15T302			TOL. UNLESS OTHRWISE 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		
	3:1	mm	ANGLE	±5°	04		
深圳市金航标电子有限公司			DSGD Z.J		CHKD F.Q		APPD

EC28 SERIES SPECIFICATION
EC28系列规格书

1. 一般事项General

1-1 适用范围 Scope

本规格书适用于28mm旋转编码器微小电流回路的电子设备。

This specification applies to 11mm 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

在判定是否符合时，如有问题产生，则应按以下条件进行测试：

If there is any doubt about the results, measurements shall be made within the following limits :

温 度 Ambient temperature : 20℃±1℃

相对湿度 Relative humidity : 63% to 67%

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 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 0.5mA)

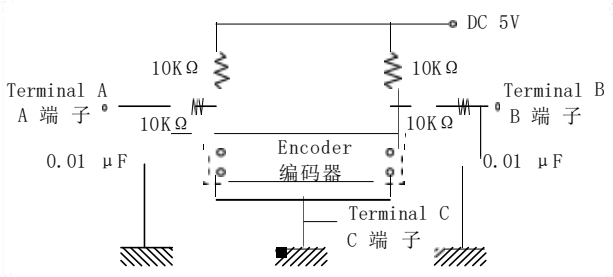


图1 (fig.1)

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、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.

4-3、在编码器脉冲计数处理设计中，动作速度，取样时间，屏蔽时间等应予以考虑。出于安全原因回路中首先应确认以上事项。

In case of pulse count process design, operational speed, sampling time, and masking time etc should be taken into the consideration. Please check above matter at first on your circuit for the secure reason.

4-4、在设计时要考虑到杂讯,须使用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、在使用编码器时速度宜控制在360度/秒内，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生产接触不良。

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 divorrced

form in order to be poor conatct

4-6、在切断面可能存在生锈，但对焊接无明显影响。

There can be rust on the cutting side. But, the thing that there is no remarkable hindrance in soldering.

4-7、要将所有金属插入物如端子和固定脚均焊入基板。

Solder all metal inserted fixing including terminals & metal lugs into a substrate.

4-8、带开关编码器包装或储存时开关被挤压会导致开关失效，要注意包装和储存的条件。

Encoder equipped with a push-on switches are packaged or stored with their shafts being pushed-in, the switch part may be out of order and pay attention when you package or store them.

5.电气性能 ELECTRICAL CHARACTERISTICS

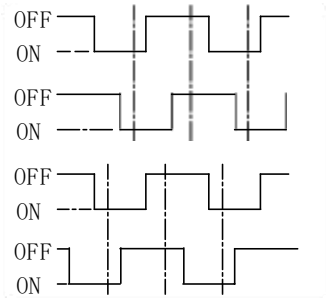
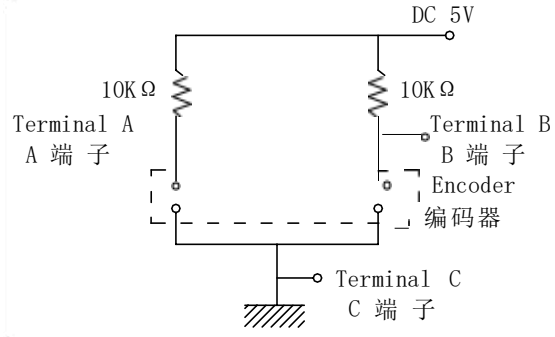
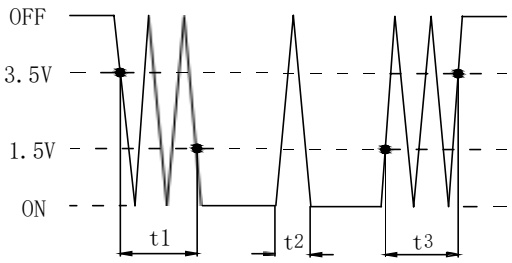
<table>
<tr><th>项目
ITEM</th><th colspan="2">条件
CONDITIONS</th><th>规格
SPECIFICATIONS</th></tr>
<tr><td rowspan="3">5-1. 输出信号
Output signal format</td><td colspan="3">A、B两信号输出相位差，输出波形详细见（图2）（虚线表示带卡点装置的上擎子处位置）
2 Phase-different signals （signal A, signal B） Details shown in 〈fig.2〉
（The broken line shows detent position.）</td></tr>
<tr><td>轴回转方向
Shaft rotati-onal direction</td><td>信号
Signal</td><td>输出波形
Output
图2 fig.2</td></tr>
<tr><td>顺时针方向
C.W</td><td>(A-C端子间)
A(Terminal A-C)
B(B-C端子间)
B(Terminal B-C)</td><td rowspan="2"> 
</td></tr>
<tr><td>逆时针方向
C.C.W</td><td>A(A-C端子间)
A(Terminal A-C)
B(B-C端子间)
B(Terminal B-C)</td></tr>
<tr><td>5-2. 开关特性
Switching characteristics</td><td colspan="3">如下（图3）所示回路，轴以360°/S的速度转动测定回路。
Measurement shall be made under the condition as follows.
Shaft rotational speed : 360°/S Test circuit : (fig.3)
图3〈fig.3〉
 

图4〈fig.4〉
 

（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).</td></tr>
<tr><td>5-3. 振荡
Chattering</td><td colspan="2">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</td></tr>
</table>

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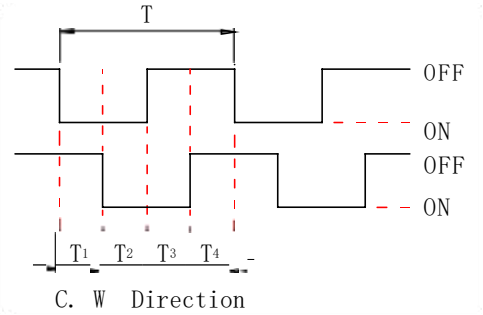
5-4滑动杂音 (突跳) Sliding noise (Bounce)	编码ON部份的1.5V以上的电压变动时间在振荡t1,t3之间会产生1ms以上,1.5V以下的ON部份.另外,如果各突跳间1.5V以下的范围在1ms以上时,则判定为另一个突跳. Specified by the time of voltage change exceed 1.5V in code-ON area . When the bounce has code-ON time less than 1ms between chattering (t1 or t3).the voltage change shall be regarded 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≤2ms
5-5. 滑动噪音 Sliding noise	编码OFF部份的电压变动。 The voltage change in code-OFF area.	3.5V以上 3.5Vmin
5-6.相差位 Phase difference	如下 (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  注意事项： 以上规格 (图5) 是可变的，当手工操作时输出波形会随着轴的旋转速度的变化而变化的，回路设计安装时确认此点。 Not: Above specification(fig6) is changeable. When operate by manual. Please check performance using actual circuit and knob.	T1、T2、T3、T4≥0.08T 见图5 (fig.5)
5-7. 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) for each phase
5-8. 绝缘阻抗 Insulation resistance	在端子和支架间施加电压 250V DC。 Measurement shall be made under the condition which a voltage of 250V DC is applied between individual terminals and frame.	100MΩ 以上 100MΩ Min
5-9. 耐电压 Dielectric strength	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 between individual terminals and frame.	不得有绝缘破坏 Without damage to parts arcing or breakdown.
5-10.端子间接触阻抗 Contact resistance	出力信号处于ON时安定状态条件下测定. Measurement shall be stable condition which a output signal is ON.	100mΩ以下 100mΩMax
6 机械性能 Mechanical characteristics		
6-1. 全回转角度 Total ratational angle		360° (无止档点) 360° (Endless)

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6-2. 定位点力矩 Detent torque	只适用于附卡点装置 Onlt suitable for C.C,equipment.	■ 5~15mN.m. (50~150gf.cm) □ 15~25mN.m. (150~250gf.cm)
6-3. 定位点数及位置 Number andposition of detent	只适用于附卡点装置 Onlt suitable for C.C,equipment.	30点定位(间隔角度12° ±2°) 30detents(Step angle :12° ±2°)
6-4. 轴的推拉强度 Push-pull stren-gth of shaft	静态下在轴端,沿轴向施加 10Kg 的静负荷力推和拉各10秒钟,产品焊锡固定在PCB上。(避免瞬间力冲击) Push and pull static load of 10Kg shall be applied to the shaft in the axial direction for 10s.After soldering of the PC board。 (Avoid instant impact force)	轴无损坏或游间过量。旋转手感无异常。 Without damage or excessive play in shaft.No excessive abn-ormality in rotationalfeeling.
6-5.轴摆动 Shaft wobble	在轴前端5mm处,沿径向瞬间施加50mN.m(500gf.cm)的力. Bending moment of 50mN.m(500gf.cm)to be applied to the shaft at 20mm from the mounting surface.	0.7*L/20mm p-p 以下 (L：指安装平面到轴的柄端的距离。) 0.7*L/20mm p-p MAX L:Distance between mounting surface and measuring point on the shaft
6-6.轴的回转方向摆动Shaft play in rotational wobble	用角度板测定. Testing by angle board.	3° 以下 3° MAX
6-7.端子强度 Terminal strenth	端子根部的任意方向施加5N (500kgf)的静负荷力10秒钟。 A static load of 3N(0.31kgf) shall be applied to the tip of terminals for 10S in any direction.	端子不得有明显松动及接触不良。 Without excessive play in terminal or poor contact.
6-8.轴的垂直押引强度 Side thrust stre-ngth of shaft	在轴前端5mm处加20N (2.04Kgf)的静负荷力10秒钟。 A load of 20N(2.04Kgf)shall be applied at the point 5mm from the tip of the shaft in a direction perpendicular direction perpendicular to the axis of shaft for 10s.	端子不得有明显松动及接触不良。 Without excessive play of bending in shaft.NO mechanical abnormally.
6-9.轴向间隙 Shaft play in axial direction	在轴上施加0.5N (51gf)的推力或位力。 The pull/push load of 0.5N(51gf)shall be imposed on the shaft	0.4mm以下 0.4mm MAX

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周/小时速度回转30000周。 The shaft of encoder shall be rotated to 30000 cycles at a speed of 600~1000 cycles/H without electrical load,after with measurements shall be made. 1周指顺时针转360度，逆时针转360度。 1 cycle :rotate 360° CCW rotate 360° CW 注：除上述条件还必须满足5.1~6和6.1~3 Except above items,specifications in clause 5.1~5.6and 5.1~5.6 and 6.1~6.3 shall be satisfied.	振荡t1,t3 ； 突跳 t2≤3mS 旋转力矩为寿命前的70%。 端子间接触阻抗10Ω以下。 Chattiring t1,t3≤5mS Bounce t2≤3mS Detent torque:Before test70% Contact resistance :10Ω Max

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7-2.耐湿性 Damp heat	编码器无负载置于温度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% to95% for 96±4H in a thermostatic chamber. And the encoder shall be subjected to standard atmospheric conditions for 1.5H, After which measurements shall be made.	必须满足焊接后的扭力要求，满足或超过其他初始规格要求。 Must meet after soldered specification for detent torque. Must meetor exceed the initial specifications for other items.
7-3.耐热性 Dry heat	编码器无负载置于温度85±3℃的恒温箱中放置96±4小时,常温、常湿放置1.5小时后测试. 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 which measurements shall be made.	必须满足焊接后的扭力要求，满足或超过其他初始规格要求。 Must meet after soldered specification for detent torque. Must meetor exceed the initial specifications for other items.
7-4. 低温特性 Cold	编码器无负载置于温度-40±3℃的恒温箱中放置96±4小时,常温、常湿放置1.5小时后测试. 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 which measurements shall be made.	必须满足焊接后的扭力要求，满足或超过其他初始规格要求。 Must meet after soldered specification for detent torque. Must meetor exceed the initial specifications for other items.
8 焊接性能 SOLDERING CONDITIONS		
8-1.上锡性 Solder ability	端子在260℃±5℃温度的焊锡槽内浸锡3秒±1秒. The terminals shall be immersed into solder bath at 260℃ for 3s±0.5s in the same manner as para.	浸渍面须有90%以上焊锡附着 A new uniform coating of solder shall cover 90% minimum of the urface being immersed. s
8-2. Resistance to Soldering heat 耐焊接热	焊接条件 Solder conditions 1) 手工焊接 Manual soldering 温度350±20℃ ,时间3 +1/0s。 Bit temperature of soldering iron:350±20℃ Application time of soldering iron:within 3 +1/0s	满足电器性能，外壳（本体）无变形端子无明显松动。 Electrical characteristics shall be satisfied. Without deformation of case or excessive looseness of terminals.
10 包装方式 PACKING PORTION		
10-1.包装方式 Packing	使用吸塑盒和纸箱包装,每盘75PCS，每箱20盘。	共计：1500pcs
10-2.耐跌落性 Solder ability	将整箱编码器打包发后，以一角，三边，六面从80cm高度自由落下至乙稀基板覆盖的水泥地板上。	纸箱及包装盒无明显破损，编码器无散落。

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