



标准&定制开关连接器产品制造商
DONG GUAN XI BANG ELECTRONICS CO., LTD.

规格书 SPECIFICATION

CUSTOMER NAME 客户名称: _____
 CUSTOMER NO. 客户编号: _____
 SERIES 系列: 鼠标编码开关
 MODEL NO. 型号: XB-GE04-01
 DRAWING NO. 图形号: Mouse encoding Switch

If specification of this product meets your request, please confirm all the items of it and return to us with signature and stamp, it will be basis of our production and record. Thanks your cooperation in advance!

若此产品规格符合贵司要求，敬请确认此规格书内所有项目
 并签名和盖章后回传给我司，以作我司产品制作之
 依据和存档之用，多谢合作！

EXAMINE & APPROVAL 审批

APPROVE 接受	NOT APPROVE 不接受
SIGNATURE 签署 STAMP 盖章 DATE 日期	

PREPARED BY. 制表人	CHECKED BY. 校对	APPROVED BY. 审核	APPROVAL BY. 批准
<div style="border: 1px solid red; padding: 2px;">研发部</div> <div style="border: 1px solid red; padding: 2px;">戴海明</div> <div style="border: 1px solid red; padding: 2px;">2022. 06. 08</div>	<div style="border: 1px solid red; padding: 2px;">品质部</div> <div style="border: 1px solid red; padding: 2px;">黄自清</div> <div style="border: 1px solid red; padding: 2px;">2022. 06. 08</div>	<div style="border: 1px solid red; padding: 2px;">工程部</div> <div style="border: 1px solid red; padding: 2px;">庞军</div> <div style="border: 1px solid red; padding: 2px;">2022. 06. 08</div>	<div style="border: 1px solid red; padding: 2px;">总经办</div> <div style="border: 1px solid red; padding: 2px;">吴量</div> <div style="border: 1px solid red; padding: 2px;">2022. 06. 08</div>

东莞市溪榜电子有限公司

Dong guan Xi Bang Electronics Co., Ltd

地址: 广东省东莞市黄江镇合路工业区
 Address: He Lu Industrial Zone, Huangjiang Town
 , Dongguan City, Guangdong Province
 Tel: (0769)82055138/82056828
 Fax: (0769)83663452

邮箱: admin@alspr.com switch@alspr.com
<http://www.alspr.cn/> <http://www.alspr.com/>

Dong Guan XB Electronics Co., Ltd

AccountNumber: 705540238
 BankName: Citibank N. A., HongKongBranch
 Country/Region: Hong Kong
 BankCode: 006
 BankAddress: 3GardenRoad, Central, Hong Kong
 SWIFT/BIC: CITIHKHX (CITIHKHXXXX*If11charactersare
 required)

MAil: HK@ALPSR.CN XB@ALPSR.CN XB@ALPSR.COM
 Quality core! Afterburner for Made in China!

东莞市溪榜电子有限公司 DONG GUAN XI BANG ELECTRONICS CO., LTD		FILE NO. 文件编号	
		DATE 发布日期	2023年5月19日
TYPE 类型	ENCODER PRODUCT SPECIFICATION 编码器产品承认书	VERSION: 版本	A版 第0次修订
NAME 名稱	04 SERIES SPECIFICATION 04 系列规格书	PART NO. 料號	

1、General 一般事项

1-1、Scope 适用规格

This specification applies to 04mm size low-profile thin rotary encoder (incremental type) for microscopic current circuits, used In electronic equipment.
本规格书为04mm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°C to 35°C
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°C to 85°C

1-4、Storage temperature range

保存温度范围：-40°C to 85°C

2、Construction 构造

2-1 Dimensions 尺寸

Refer to 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 10mA; 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.

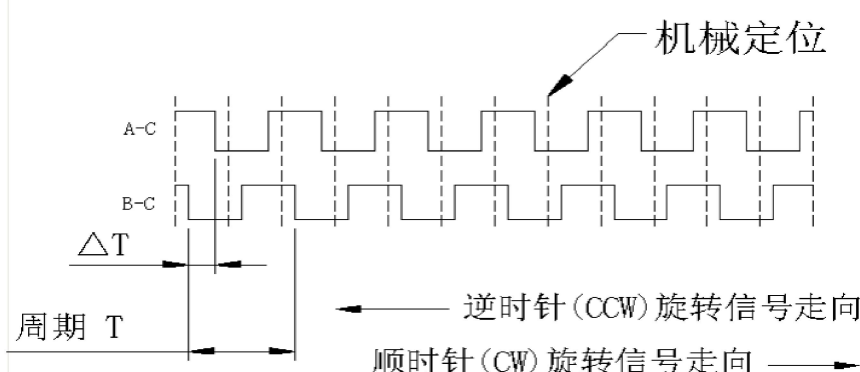
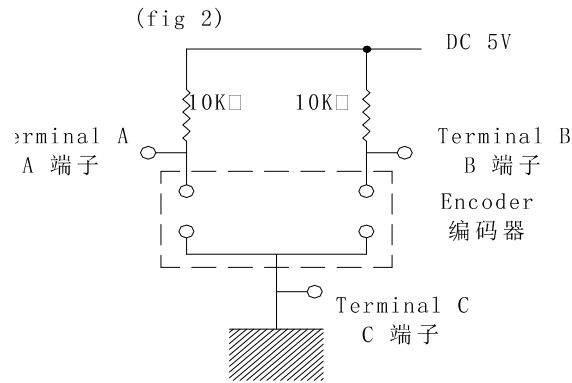
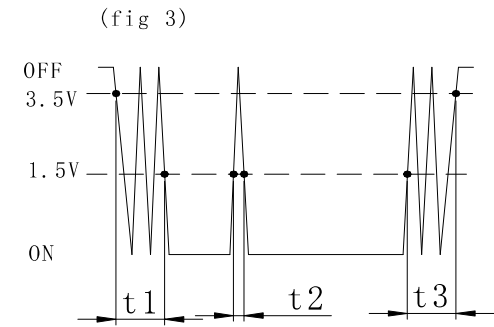
4-5. Care must be taken not to expose this product to water or dew to prevent possible problem in pluses output waveform.

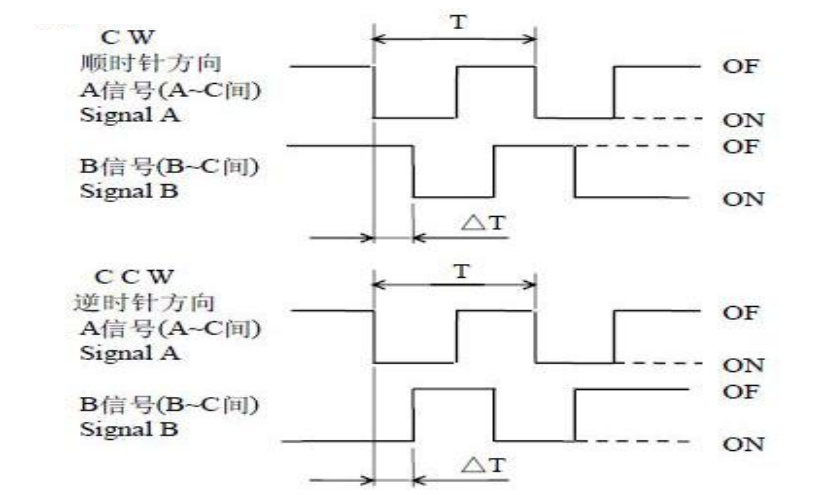
本产品请勿碰触到水,可能会导致输出波形的异常.

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.Mean while,the slide contact in the inside of product can be divorced form in order to be poor conatct.

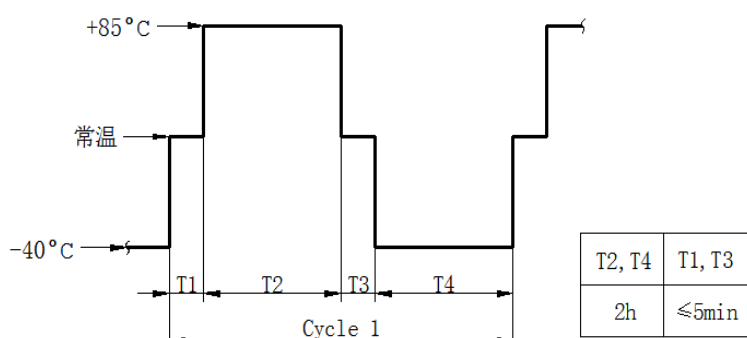
在使用编码器时速度宜控制在360°/s 内, 转速过快会导致IC抓取不到信号及产品内部的接触刷会瞬间脱离产生接触不良.

5、 ELECTRICAL CHARACTERISTICS 电气性能

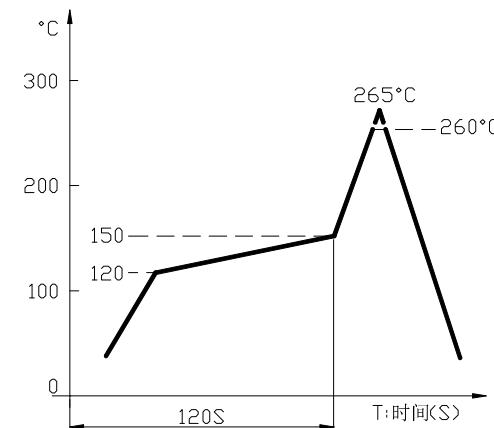
ITEM 项目	CONDITIONS 条件	SPECIFICATIONS 规格
5-1、 Output signal format 输出信号	<p>Note: Output signal is 1 pulse per 1 detents. At the positioning point, the a-c terminal and the B-C terminal are both off 注意事项：输出信号方式是1个定位1个脉冲。在定位点位置时A-C端子B-C端OFF状态</p>	<p>2 Phase-different signals (signal A, signal B) Details shown in (fig.1) (The broken line shows detent position .) 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。</p>
	Output (fig.1) 输出波形 (图1)	
		
5-2、 Resolution 分解能力	Number of pulses in 360° rotation. 回轉360°的输出脈衝數。	6个脉冲 / 360° 6 pulses/360°
5-3、 Switching characteristics 开关特性	<p>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</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="367 1153 941 1534"> <p>(fig 2)</p>  </div> <div data-bbox="1005 1153 1500 1478"> <p>(fig 3)</p>  </div> </div> <p>(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。</p>	
5-3-1、 Chattering 振荡	<p>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3)</p>	<p>On the case within detent, B signal will be irregular oscillation. 带卡点时,在卡点位置上的B信号振荡无规定。 $t_1, t_3 \leq 3ms$</p>
5-3-2、 Sliding noise (Bounce) 滑动杂音 (突跳)	<p>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. 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。</p>	$t_2 \leq 2ms$

5、 ELECTRICAL CHARACTERISTICS 电气性能		
ITEM 项目	CONDITIONS 条件	SPECIFICATIONS 规格
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
5-4、 Phase difference 相位差	Measurement shall be made under the condition which the shaft is rotated in 360°-S-1 (constant speed).以360°/s的速度测量。 (Fig.4)图4 	$\Delta T \geq 4ms$ In(fig.4) 见图4
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 bushing. 在端子和安装板间施加电压 250V DC 1分钟。	Between individual terminals and bushing 100 MΩ Min 端子安装板间电阻100 MΩ以上。
5-6、 Dielectric strength 耐电压	A voltage of 300V AC shall be applied for 1 minute between individual terminals and bushing. 在端子和安装板间施加 AC 300V电压1分钟。	Without arcing or breakdown. 不得有绝缘破坏。
6、 Mechanical characteristics 机械性能		
6-1、 Total rotational angle 全回转角度		360°(Endless) 360°(无止挡点)
6-2、 Detent Torque 定位点力矩	Only suitable for C.C, equipment. 只适用于附卡点装置	$1 \pm 0.5mN.m.$ ($10 \pm 5 gf.cm$)
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	12detents(Step angle: $30^\circ \pm 2^\circ$) 12点定位 (间隔角度 $30^\circ \pm 2^\circ$)
6-3、 Operating Force 按压操作力	Apply a tension load on the midpoint of the actuator (or 1mm to the tip of the shaft) to supply a pressure vertically from its free position to operating position. 在操作元件中间(或在离操作元件末端1mm 处)沿操作方向均匀施加静载荷, 使操作元件转换到动作位置。	$150 \pm 50gf$
6-4、 Releasing Force 按压回复力	The value to which the force in the actuator midpoint (or 1mm to the tip of the shaft) must be reduced to allow the contact to the normal position. 在操作元件末端沿操作方向均匀减少静载荷, 使操作元件从动作位置转换到自由位置。	Min50gf
6-5、 Terminal strength 端子强度	A static load of 3N(0.31kgf) shall be applied to the tip of terminals for 10 s in any direction. 端子前端的任意方向施加3N(0.31kgf)的静负荷力10秒钟。	Without excessive play in terminal or poor contact. 端子不得有明显松动及接触不良。

7、Endurance characteristics 耐久性能

<p>7-1-1、Mechanical Life 機械壽命</p>	<p>100,000 cycles of operation shall be performed continuously at a rate of 10-30 cycles per minute without load. Each rotated 360 ° for a cycle. 在不帶負荷的條件下，速度為10-30次/分，在壽命試驗設備上連續轉換100,000次，每旋轉360度為一個周期。</p>	<p>After test: (measurement shall be made within 48 hours) Contact resistance: 5ΩMax. Insulation resistance: 100MΩ Min. 實驗後：測量需在48小時內完成 接觸電阻：5Ω Max. 絕緣電阻：10MΩ Min. 旋轉力矩：衰變為初始轉矩的±30%</p>				
<p>7-1-2、Electronics Life 電氣壽命</p>	<p>Under the condition of the following load,100,000 cycles of operation shall be performed continuously at a rate of 10-30 cycles per minute without load. Each rotated 360 ° for a cycle. 在不帶負荷的條件下，速度為10-30次/分，在壽命試驗設備上連續轉換100,000次，每旋轉360度為一個周期。</p>	<p>After test: (measurement shall be made within 48 hours) Contact resistance: 5ΩMax. Insulation resistance: 100MΩ Min.the electrical properties should meet the requirements of Article 5. 實驗後：測量需在48小時內完成 接觸電阻：5Ω Max. 絕緣電阻：10MΩ Min. 旋轉力矩：衰變為初始轉矩的±30% 電氣性能應符合第5條的要求。</p>				
<p>7-2、Damp heat 耐濕性</p>	<p>The encoder shall be stored at temperature of 40±2°C with relative humidity of 90% to 95% for 240±10H in a thermostatic chamber .And the encoder shall be subjected to standard atmospheric conditions for 1.5H, After which measurements shall be made. 溫度40±2°C,濕度90~95%的恒温恒濕槽中放置240±10小時後,在常溫、常濕中放置1.5小時後測試</p>					
<p>7-3、Dry heat 耐熱性</p>	<p>The encoder shall be stored at a temperature of 80±3°C for 240±10H in a thermostatic chamber.And then the encoder shall be subjected to standard atmospheric conditions for 1.5H .After witch measurement shall be made.溫度85±3°C的恒温箱中放置240±10小時,常溫、常濕放置1.5小時後測試.</p>					
<p>7-4、Cold 低溫特性</p>	<p>The encoder shall be stored at a temperature of -40±3°C for 240±10H in a thermostatic chamber.And then the encoder shall be subjected to standard atmospheric conditions for 1.5H .After witch measurement shall be made .溫度-40±3°C的恒温箱中放置240±10小時,常溫、常濕放置1.5小時後測試。</p>					
<p>7-5、Thermal Shock 冷熱衝擊</p>	<p>Place the product in the cold and hot shock test box,set the temperature and holding to the time as shown in the figure,and then conduct the temperature impact test after setting the temperature and holding time.The tests for 30 cycles,and then it is restored at room temperature test after 1.5h 將產品放置在冷熱衝擊試驗箱中，按如圖所要求的时间进行温度及保持时间设置后进行温度冲击试验，试验进行30个周期，试验后置于室温下恢复1.5H后测试</p>  <table border="1" data-bbox="981 2016 1149 2128"> <tr> <td>T2, T4</td> <td>T1, T3</td> </tr> <tr> <td>2h</td> <td>≤5min</td> </tr> </table>	T2, T4	T1, T3	2h	≤5min	<p>Specifications in clause all items is shall be satisfied. 所有項應滿足初期規格。</p>
T2, T4	T1, T3					
2h	≤5min					

7、Endurance characteristics 耐久性能

<p>7-6、Vibration Proof 振動</p>	<p>Encoder shall be secured to a testing machine by a normal mounting device and method. Encoder shall be tested according to the following request::</p> <p>(1) Vibration frequency range = 10~55 Hz (2) Total amplitude =1.5mm (3) Sweep ratio: 10~55~10Hz Approx. 1 min (4) Method of changing the sweep vibration frequency: linear (5) Direction of vibration: Three perpendicular directions including actuating direction. (6) Duration: 2 hours (6 hours in total)</p> <p>編碼器採用常規的安裝方法牢固地安裝在試驗設備上，並在下述參數條件下進行試驗：</p> <p>(1) 振頻=10-55Hz (2) 振幅1.5mm (3) 振動變化速率：10-55-10Hz 大約1分鐘 (4) 變頻方法：線性型式 (5) 振動方向：三個相互垂直的方向，其中一個方向應是促動元件運動的方向。 (6) 時間：每個方向2小時（共6小時）。</p>	<p>After test,Contact resistance:5Ω Max.Insulation resistance:10MΩ Min.The electrical performance requirements specified shall be satisfied.No abnormalities shall be recognized in appearance and construction.</p> <p>實驗後：接觸電阻：5Ω Max. 絕緣電阻：10MΩ Min. 電氣性能應符合要求。 表面及結構無明顯變形。</p>
<p>7-7、solder Ability 可焊性</p>	<p>The crucible is tested under the following patameters</p> <p>(1)solder:tin paste containing more than 3% silver (2)Welding temperature:245°C min (3)Welding time:3s min</p> <p>編碼器在下述參數條件下進行試驗：</p> <p>(1) 焊料：含銀3%以上錫膏 (2) 焊接溫度：245°CMin (3) 熔焊時間：3s Min</p>	<p>Melting surface area should exceed 95% of the total 熔錫面面積應該超過95%</p>
<p>7-8、Solder Heat Resistance 耐焊接熱</p>	<p>No abnormalities shhall be observed in appearance and operation 無外觀、熔膠變形不良，扭力衰變 Max 30%。電訊性能符合第 5項。</p> 	<p>No abnormalities shhall be observed in appearance and operation 無外觀、熔膠變形不良，扭力衰變 Max 30%。電訊性能符合第 4項。</p>
<p>7-9、Salt Mist 鹽霧實驗</p>	<p>The encoder shall be checked after the following test:</p> <p>(1) Temperature: 35± 2°C (2) Salt Solution: 5±1% (Solids by mass). (3) Salt deposit shall be removed by running water. (4) Duration: 48 hours</p> <p>試件在下述實驗後測量：</p> <p>(1) 溫度：35±2°C (2) 鹽溶液濃度：5±1%（品質百分比）。 (3) 鹽沉積物用水沖掉。 (4) 時間：48小時</p>	<p>After the test is dried, there are no corrosion spots on the metal parts that affect the performance of the product, and the electrical properties should meet the requirements of Article 5.</p> <p>試驗乾燥後，在金屬件上沒有影響產品性能的腐蝕斑點，電氣性能應符合第5條的要求。</p>