# 承認書
# FOR APPROVAL

客戶名稱
Customer: 深圳零辰新材料有限公司

機　種
Product:

客戶料號
Part No.:

客戶確認回覆:
Customer Approval Status: 确认

簽　核:
Signature:

| 合格 PASSED | | 拒收 REJECTED | |
|---|---|---|---|

## 昇威資料 SOUNDWELL'S INFORMATION

機種類別
Product: ENCODER

品號
Part No.: EC110201M2D-HA1-507

規格
Specification.: 15P6-KV135A050-N1(送货单标签只写流水号)

樣辦批號
Samples lot No.: 22171911099G

圖號
Drawing No.: C-EC11XX-0051

摘要
Note:

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東南亞首家榮獲TUV & SQCC ISO9002証書之電位器製造商
The First Potentiometers Manufacturer in Sounth Eastern Asia Certified By ISO9000
ISO14001 TS16949認證企業
ISO14001 TS16949 Approved Company


SOUNDWELL®

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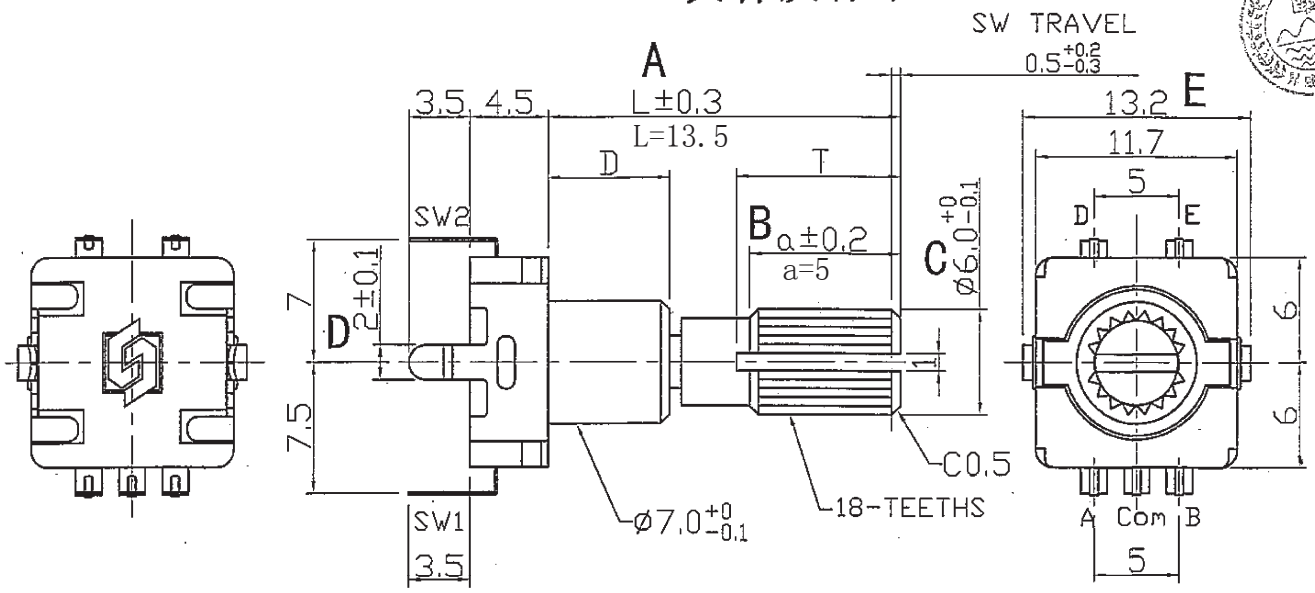
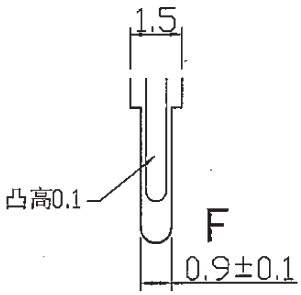
文件发行章



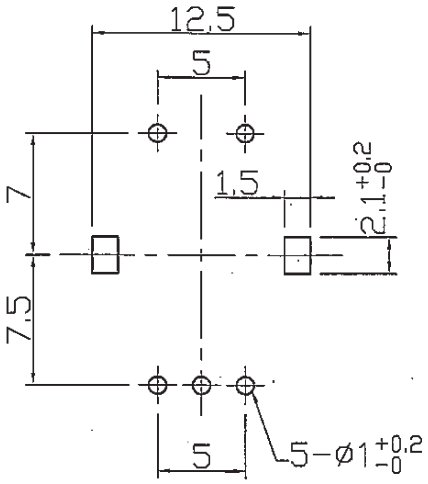

TERMINAL DETAIL (4:1)

出图
2014.09.25



| X | D |
|---|---|
| M | 5.0 |
| N | 7.0 |
| A | 10.0 |

| X |
|---|
| 2 |
| 6 |




P.C.B. MOUNTING DETAIL

注：1、重点管控尺寸A~F。

| | | | | | |
|---|---|---|---|---|---|
| 01 | | | 03 | | |
| 00 | ORIGINAL DRAWING | 11.10.15 | 02 | | |
| .ISSU. | REVISION | DATE | .ISSU. | SOUNDWELL ELECTRONIC | |

| | | | | | |
|---|---|---|---|---|---|
| | SOUNDWELL 2011-10-22 WU TIAN JING | SOUNDWELL 2011-10-24 HUNG KAM PU | TOL. UNLESS OTHERWISE SPEC. | | |
| | | | BASIC DIMENSIONS | TOL. | TITLE: 编码器 |
| | | | L≤10 | ±0.3 | MODEL: EC110201XXD-HA1-KVXXXAXXX |
| DSGD. | CHKD. | APPD. | 10<L | ±0.5 | |
| | SCALE | | 100≤L | ±0.8 | DRAWING NO: C-EC11XX-0051 NO: |
| | UNIT | mm | ANGLE | ±5° | |

# EC1102 SERIES SPECIFICATION
# EC1102 系列规格书



## 1、 General 一般事项

1-1、Scope 适用规格

This specification applies to 11mm size low-profile thin rotary encoder (incremental type) for microscopic current circuits， used in electronic equipment.

本规格书为11mm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℃ 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 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<br>项 目 | CONDITIONS<br>条 件 | | SPECIFICATIONS<br>规 格 |
|---|---|---|---|
| 5-1、Output signal format<br>输出信号 | Note: Output signal is 1 pulse per 2 detents. And terminal A-C is pulse ON or OFF at detent position. No specified output of termial B-C at detent position.<br>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ON或OFF状态，而B-C端子间不作特定要求。 | | 2 Phase-different signals (signal A, signal B)<br>Details shown in〈fig.1〉(The broken line shows detent position .)<br>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<br>轴回转方向 | Signal<br>信号 | Output 〈fig.1〉<br>输出波形 (图1) |
| | C.W.<br>顺时针方向 | A(Terminal A-C)<br>A( A-C端子间) | OFF<br>ON |
| | | B(Terminal B-C)<br>B( B-C端子间) | OFF<br>ON |
| | C.C.W<br>逆时针方向 | A(Terminal A-C)<br>A( A-C端子间) | OFF<br>ON |
| | | B(Terminal B-C)<br>B( B-C端子间) | OFF<br>ON |
| 5-2、Resolution<br>分解能力 | Number of pulses in 360° rotation。<br>回转360°的输出脉冲数。 | | 15 pulses/360° for each phase<br>15个脉冲/360° |
| 5-3、 Switching characteristics<br>开关特性 | Measurement shall be made under the condition as follows.<br>1)Shaft rotational speed : 360°/s<br>2)Test circuit : （fig.2）<br>下（图2）所示回路，轴以360°/s的速度回转测定。<br>fig.2<br>DC5V<br>10K Ω<br>10K Ω<br>Terminal A<br>A端子<br>Terminal B<br>B端子<br>Encoder<br>编码器<br>Terminal C<br>C端子<br>〈fig.3〉图3<br>OFF<br>工作电压5V<br>3.5V<br>1.5V<br>ON<br>t1<br>t2<br>t3<br>(Note) Code-OFF area :The area which the voltage is 3.5V or more.<br>Code-ON area :The area which the voltage is 1.5V or less.<br>（注）编码器OFF指输出电压3.5V以上的状态。<br>编码器ON指输出电压1.5V以下的状态。 | | |
| 5-3-1、Chattering<br>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)<br>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) | | 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。<br>t1,t3 ≤ 3 ms |
| 5-3-2、Sliding noise (Bounce)<br>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.<br>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≤2 ms |

# EC1102 SERIES SPECIFICATION
# EC1102系列规格书

## 5、 ELECTRICAL CHARACTERISTICS电气性能

| ITEM<br>项 目 | CONDITIONS<br>条 件 | SPECIFICATIONS<br>规 格 |
|---|---|---|
| 5-3-3、Sliding noise<br>滑动噪音 | The voltage change in code - OFF area.<br>编码OFF部分的电压变动。 | 3.5V Min<br>3.5V 以上 |
| 5-4、Phase difference<br>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。<br>(Fig.4)图4<br>C W<br>顺时针方向<br>A信号(A~C间)<br>Signal A<br>B信号(B~C间)<br>Signal B<br>T<br>OFF<br>ON<br>OFF<br>ON<br>△T<br>C C W<br>逆时针方向<br>A信号(A~C间)<br>Signal A<br>B信号(B~C间)<br>Signal B<br>T<br>OFF<br>ON<br>OFF<br>ON<br>△T | △T≥6 ms<br><br>In(fig.4) 见图4 |
| 5-5、Insulation resistance<br>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.<br>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<br>端子安装板间电阻100 MΩ以上。 |
| 5-6、Dielectric strength<br>耐电压 | A voltage of 300V AC shall be applied for 1 minute between individua terminals and bushing.<br>在端子和安装板间施加 AC 300V电压1分钟。 | Without arcing or breakdown.<br>不得有绝缘破坏。 |
| **6、 Mechanical characteristics 机械性能** | | |
| 6-1、Total ratational angle 全回转角度 | | 360°(Endless)<br>360°(无止挡点) |
| 6-2、Detent Torque<br>定位点力矩 | Only suitable for C.C, equipment.<br>只适用于附卡点装置 | 6± 3 mNm (60±30 gf.cm) |
| 6-3、Number and position of detent<br>定位点数及位置 | Only suitable for C.C, equipment.<br>只适用于附卡点装置 | 30 detents(Step angle:12°±3°)<br>30点定位（间隔角度 12°±3°） |
| 6-4、Push-pull strength of shaft<br>轴推拉强度 | Pull static load of 100 N(10 kgf) for 20s and push static load of 100 N （10 Kgf)for 10s shall be applied to the shaft in the axial direction .<br>(After soldering of the PC board)<br>在轴端，沿轴向施加100 N(10 kgf)的静负荷力拉力20秒钟和施加100 N（10 Kgf)推力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.<br>轴无破损，旋转、电气性能无异常。 |
| 6-5、Terminal strength<br>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.<br>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.<br>端子不得有明显松动及接触不良。 |
| 6-6、Shaft wobble<br>轴摆动 | A momentary load of 2N(200 gf) shall be applied at the point 2mm from the tip of the shaft in a direction perpendicular to the axis of shaft.<br>在轴前端2mm处,沿径向瞬间施加2N (200 gf)的力.<br>L:Distance between mounting surface and measuring point on the shaft. | Bushing length / 轴套长（mm）<br>☑ 5<br>☐ 7<br>☐ 10以上<br>Wobble / 摆动(mmp-p less)<br>0.3*L/20<br>0.25*L/20<br>0.2*L/20 |

## 6、 Mechanical characteristics 机械性能

| ITEM<br>项 目 | CONDITIONS<br>条 件 | SPECIFICATIONS<br>规 格 |
|---|---|---|
| 6-7、Side thrust strength of shaft<br>轴的垂直押引强度 | A load of 20N(2.04Kgf) shall be applied at the point 5mm from the tip of the shaft in a direction perpendicular to the axis of shaft for 10 s.<br>在轴前端5 mm处加20 N(2.04 Kgf)的静负荷力10 s. | Without excessive play of bending in shaft. No mechanical abnormally.<br>轴不得有明显松动及接触不良. |
| 6-8、Shaft play in rotational wobble<br>轴的回转方向摆动 | Testing by angle board.<br>用角度板测定. | 2° Max<br>2° 以下 |
| 6-9、Shaft play in axial direction<br>轴向间隙 | The pull / push load of 0.5N(51gf) shall be imposed on the shaft.<br>在轴上施加0.5N(51gf)的推力或拉力. | 0.2 mm Max.<br>0.2 mm以下. |

## 7、Endurance characteristics耐久性能

| | | |
|---|---|---|
| 7-1、Rotational life<br>回转寿命 | The shaft of encoder shall be rotated to 30,000 cycles at a speed of 600~800 cycles/H without electrical load,after which measurements shall be made.<br>在无负荷条件下轴以600~800周/小时速度回转 30,000 周。<br>1 cycle: rotate 360° CCW rotate 360° CW<br>1周指顺时针转360°逆时针转360°。 | Chattering t1,t3≤5ms Bounce t2≤3ms<br>振荡：t1,t3≤5ms；突跳：t2≤3ms<br>Detent torque:Relative to the previously specified value 50%.<br>定位力矩：为原始规格值的50%<br>Shaft wobble should be within 150% of the specifications.<br>轴摆动为原始规格值的150%以内<br>Shaft play in rotational wobble:4º Max.<br>轴的回转方向摆动：4º以内 |
| 7-2、Damp heat<br>耐湿性 | The encoder shall be stored at temprature 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.<br>温度40±2°C,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. | SW Contact resistance:200 mΩ max.<br>Encoder characteristics item:<br>5-1、5-5、5-6、6-2<br>Push switch characteristics item:<br>1-2-3、1-2-4、1-3-2、1-3-3<br>The same as the initial specfications.<br>开关接触阻抗小于200 mΩ。<br>编码器特性项目：5-1、5-5、5-6、6-2<br>按压开关特性项目：1-2-3、1-2-4、1-3-2、1-3-3应同原规格值相同。 |
| 7-3、Dry heat<br>耐热性 | 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.温度80±3°C的恒温箱中放置240±10小时,常温、常湿放置1.5小时后测试. | |
| 7-4、Cold<br>低温特性 | 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 .温度-40±3°C的恒温箱中放置240±10小时,常温、常湿放置1.5小时后测试。 | |
| 7-5、Solder ability<br>焊锡性 | The terminals shall be immersed into solder bath at 260°C±5°C for 3s±1s in the same manner as para.<br>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.<br>浸渍面须有75%以上焊锡附着 |
| 7-6、Resistance to Soldering heat<br>耐焊接热 | Manual soldering手工焊接<br>Bit temperature of soldering iron： 350°C less than<br>Application time of soldering iron：within 3s<br>温度350°C以下，时间3秒以内。<br>Dip soldering槽焊<br>Printed wiring board : copper clad laminate board with thickness of 1.6mm.<br>使用基板：t=1.6㎜的覆铜板。<br>Preheating : 1、Surface temperature of board: 100°C or less.<br>2、Preheating time : within 1 min.<br>预热：基板表面温度100℃以下,时间1分钟以内。<br>Soldering : Solder temperature : 260±5°C or less<br>Immersion time :within 3 s<br>焊接：温度260±5°C或以下，时间3秒以内。 | Electrical characteristics shall be satisfied<br>No mechanical abnormality.<br>不得有绝缘体的破损、变形、接触无异常。 |

# EC1102 SERIES SPECIFICATION
# EC1102 系列规格书

**Push switch portion 推动开关部分**

Note: The following specification is only suitable for the one type with switch construction of EC11 encoder series.
注：以下规格只适用于此EC11编码器系列带开关结构。

**1-1**、Rated capacity (Resistance load ): DC 5V 10 mA (1 mA Min)
额定容量（电阻负荷）: DC 5V 10 mA (1 mA 以上)

## 1-2 Electrical characteristics电气性能

| ITEM<br>项 目 | CONDITIONS<br>条 件 | SPECIFICATIONS<br>规 格 |
|---|---|---|
| 1-2-1、Contact resistance接触电阻 | Voltage step-down test at DC 5V 1mA<br>用DC 5V 1mA 电压降下法测定. | 100 mΩ Max<br>100 mΩ 以下 |
| 1-2-2、Bouncing<br>振荡 | Shaft shall be rotated at 1 cycles/S (OFF-ON-OFF)<br>以1秒钟1往返（OFF-ON-OFF）回转运转 | 10 ms Max<br>10 ms 以下 |
| 1-2-3、Insulation resistance绝缘电阻 | Measurement shall be made under the condition which a voltage 250V DC 1min±5S is applied between individual terminals and tracked<br>在端子与安装板间施加电压DC 250V 1分钟±5秒。 | Between individual terminals and bracket 100 MΩ Min.<br>在端子安装板间100 MΩ以上 |
| 1-2-4 Dielectric strength<br>耐电压 | A voltage of 250V AC /min or300 V AC /2S( leak current 1mA) be applied between individual terminals and bracket.在端子与安装板间施加AC 250V 1分钟或AC 300V 2秒钟（漏电流1mA） | Without arcing or breakdown.<br>不得有绝缘损坏。 |

## 1-3 Mechanical characteristics机械性能

| | | |
|---|---|---|
| 1-3-1、Switch circuit and number of pulse<br>开关电路、接点数 | | Single pole and single throw (push on)<br>单极单投（推ON） |
| 1-3-2、Travel of switch开关移动量 | | $0.5^{+0.2}_{-0.3}$ mm |
| 1-3-3、Operating force of switch开关作动力 | | 5±3 N (500±300gf) |

## 1-4 Endurance characteristics耐久性能

| | | |
|---|---|---|
| Push operating life<br>寿命特性 | The encoder's shall be pushed to 20,000 cycles at a speed of 1800±300/H without electrical load.(shaft push load: 1 kgf Max.)<br>在无负荷条件下,对轴以每小时1800±300次的速度推动20,000次，（轴按压力1 kgf以下）. | Contact resistance : 200mΩ max.<br>Specification in clause 1-2-2~4,1-3-1~2 shall be satisfied.<br>Operating force:Before test 50%.<br>接触电阻 : 200mΩ以下.<br>1-2-2~4,1-3-1~2 满足初期规格.<br>开关动作力为寿命前的50%. |

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|---|---|---|---|---|---|
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| 版本号：00 | 2014-2-12 | | | | |
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