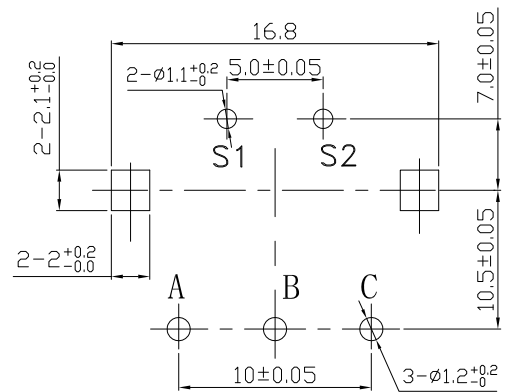


Frame View:A



P. C. B MOUNTING HOLES

注：重点管控尺寸 A ~ H。

| | | | | |
|-------|------------------|--------------|---|-------|
| 01 | | | 03 | |
| 00 | ORIGINAL DRAWING | 2022-05-11 | 02 | |
| ISSU. | REVISION | DATE | ISSU. | |
| 吴亮亮 | HUNG KAM PIU | HUNG KAM PIU | TOL. UNLESS OTHERWISE SPEC. | |
| DSGD. | CHKD. | APPD. | BASIC DIMENSIONS | TOL. |
| | | | L ≤ 10 | ± 0.3 |
| | | | 10 < L | ± 0.5 |
| | | | 100 ≤ L | ± 0.8 |
| | | | ANGLE | ± 5° |
| | | | SOUNDWELL® SOUNDWELL ELECTRONICS | |
| | | | TITLE: ENCODER | |
| | | | MODEL: EC162101C1B-HA1-010 | |
| | | | SPECIFICATION: 12P2-FA250B120 | |

EC16 SERIES SPECIFICATION(WITH DETENT)

EC16 系列规格书(带定位)

1/5P

1、General 一般事项

1-1、Scope 适用规格

This specification applies to 16mm size low-profile thin rotary encoder (incremental type) for microscopic current circuits, used in electronic equipment.

本规格书适用于电子设备用微小电流回路16型薄型回转式编码器。

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 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, gas-proofing 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 consideration.

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、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.

4-4、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.

4-5、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 contact.

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.

EC16 SERIES SPECIFICATION(WITH DETENT)

EC16 系列规格书 (带定位)

| 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 | | 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,输出波型详见(图1) 附卡点时,卡点位置如下图所示:(虚线表示带卡点装置的上端子处位置。) | | |
| | 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. | <input checked="" type="checkbox"/> 12 <input type="checkbox"/> 24 pulses/360° for each phase <input checked="" type="checkbox"/> 12 <input type="checkbox"/> 24 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) 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 | If the product is with 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。 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 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. | t2 ≤ 2mS | | |

EC16 SERIES SPECIFICATION(WITH DETENT)

EC16 系列规格书 (带定位)

| 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 | <p>Measurement shall be made under the condition which the shaft is rotated in contant speed.以固定的速度操作轴进行回转. (Fig.4)图4</p> <p>C W 顺时针方向 A信号(A~C间) Signal A</p> <p>B信号(B~C间) Signal B</p> <p>C C W 逆时针方向 A信号(A~C间) Signal A</p> <p>B信号(B~C间) Signal B</p> | $\Delta T=0.15T\pm 0.1T$ |
| 5-5、 Insulation resistance 绝缘电阻 | Measurement shall be made under the condition which a voltage of 50V DC 1 minute is applied between individual terminals and bracket. 在端子和安装板间施加电压 50V DC 1分钟. | Between individual terminals and bracket 10MΩ MIN. 端子安装板间电阻10MΩ以上. |
| 5-6、 Dielectric strength 耐电压 | A voltage of 50V AC shall be applied for 1 min between individual terminals and bracket. 在端子和安装板间施加 AC 50V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 ratational angle 全回转角度 | | 360°(Endless) 360°(无止档点) |
| 6-2、 Rotate Torque 定位力矩 | Only suitable for C.C, equipment. 只适用于附卡点装置 | 20 ± 10 mNm (200±100 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 | <input checked="" type="checkbox"/> 12 detents(Step angle:30°±3°) 12点定位 (间隔角度 30°±3°) <input type="checkbox"/> 24 detents(Step angle: 15°±3°) 24点定位 (间隔角度 15°±3°) |
| 6-4、 Nut strength 螺母紧固强度 | Nut tighten with 8.0kgf.cm 螺母紧固强度为8.0kgf. cm. | No excessive uneven rotation feeling 不可有回转发生 (打滑)。 |
| 6-5、 Push-pull strength of shaft 轴推拉强度 | Push and pull static load <input type="checkbox"/> of shall be applied to the shaft in the axial direction for 10S. (after installing) 在轴端,沿轴向施加 <input type="checkbox"/> 的静负荷力推和拉各10秒钟(在安装固定后)。 <input checked="" type="checkbox"/> With switch 5.1Kgf <input checked="" type="checkbox"/> 带开关为5.1Kgf <input type="checkbox"/> On Without switch 10Kgf <input type="checkbox"/> 不带开关为10Kgf | Without damage or excessive play in shaft. No excessive abnormality in rotational feeling. And electrical characteristics shall be satisfied. 端子不得有明显松动及接触不良. 电气性能无异常。 |
| 6-6、 Terminal strength 端子强度 | A static load of 3N(0.31kgf) shall be applied to the tip of terminals for 10S 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. |
| 6-7、 Shaft wobble 轴摆动 | A momentary load of 2N(200gf) shall be applied at the point 5mm from the tip of the shaft in a direction perpendicular to the axis of shaft. 在轴前端5mm处,沿径向瞬间施加2N (200gf)的力. | 1.0x L / 30mm p-p MAX(L:shaft length) 1.0 x L / 30mm p-p 以下 (L:安装长度) |

EC16 SERIES SPECIFICATION(WITH DETENT)

EC16 系列规格书(带定位)


4/5P

| 6 Mechanical characteristics 机械性能 | | |
|---|---|--|
| ITEM 项目 | CONDITIONS 条件 | SPECIFICATIONS 规格 |
| 6-8、Side thrust strength of shaft 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 10s. 在轴前端5mm处加20N(2.04Kgf)的静负荷力10秒钟. | Without excessive play of bending in shaft. No mechanical abnormally. 轴不得有明显松动及接触不良. |
| 6-9、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 |
| 7 Endurance characteristics 耐久性能 | | |
| 7-1、Rotational life 回转寿命 | The shaft of encoder shall be rotated to 30,000cycles at a speed of 600 cycles/H without electrical load, after which measurements shall be made. 在无负荷条件下轴以600周/小时速度回转30,000周. | Chattering t1,t3≤5ms 振荡 t1, t3≤5ms Bounce t2≤3ms 突跳 t2≤3ms |
| 7-2、Damp heat 耐湿性 | The encoder shall be stored at temprature of 40°C±2°C with relative humidity of 90% to 95% for 96h±4h 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°C±2°C,湿度90~95%的恒温恒湿槽中放置96h±4h后,在常温、常湿中放置1.5h后测试. | Specifications in clause all items is shall be satisfied. 所有项应满足初期规格 |
| 7-3、Dry heat 耐热性 | The encoder shall be stored at a temperature of 85°C±3°C 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85°C±3°C的恒温箱中放置240h±10h,常温、常湿放置1.5h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°C±3°C for 96h±4h 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°C±3°C的恒温箱中放置96h±4h小时,常温、常湿放置1.5h后测试. | Specifications in clause all items is shall be satisfied. 所有项应满足初期规格 |
| 7-5、Vibration 耐振性 | The following vibration shall be applied to the encoder, after which measurement shall be made: The entire frequency range: from 10Hz to 55Hz and return to 10Hz. (total excursion: 1.5mm.) This motion shall be applied for a period of 2h in each of 3 mutually perpendicular axes(A total of 6h). 10~55~10Hz 变振动(1开闭1分钟/振幅1.5mm),在X.Y.Z.3个座标方向上各2小时(共6小时). | Specifications in clause all items is shall be satisfied. 所有项应满足初期规格 |
| 7-6、Solder ability 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. 端子在260°C±5°C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 |
| 7-7、Resistance to Soldering heat 耐焊接热 | Manual soldering手工焊接 Bit temperature of soldering iron: below 350°C Application time of soldering iron: within 3s 温度350°C以下,时间3秒以内. Dip soldering槽焊 Printed wiring board : copper clad laminate board with thickness of 1.6mm. 使用基板: t=1.6mm的覆铜板. Preheating : 1、Surface temperature of board: 100°C or less. 2、Preheating time : within 1 min. 预热: 基板表面温度100°C以下,时间1分钟以内. Soldering : Solder temperature : 260°C±5°C less Immersion time :within 3s 焊接: 温度260°C±5°C或以下,时间3秒以内. | Electrical characteristics shall be satisfied. No mechanical abnormality. 不得有绝缘体的破损、变形、接触无异常. |

EC16 SERIES SPECIFICATION(WITH DETENT)

EC16 系列规格书(带定位)

5/5P

| ITEM 项目 | | CONDITIONS 条件 | SPECIFICATIONS 规格 | | |
|--|---|---|--|-----------------|----------------------------|
| Push switch portion 推动开关部分 | | | | | |
| Note: The following specification is only suitable for the EC16 encoder series with push-on switch. 注: 以下规格只适用于此EC16编码器系列带开关结构。 | | | | | |
| 1-1、Rated capacity (Resistance load): DC 5V 10mA (1mA MIN) 额定容量 (电阻负荷) : DC 5V 10mA (1mA 以上) | | | | | |
| 1-2 Electrical characteristics 电气性能 | | | | | |
| 1-2-1、Contact resistance 接触电阻 | Voltage step-down test at DC 5V 1mA 用DC 5V 1mA 电压降下法测定. | | 100mΩ MAX 100mΩ 以下 | | |
| 1-2-2、Bouncing 振荡 | Shaft shall be rotated at 1 cycles/s(OFF-ON-OFF) 以1秒钟1往返 (OFF-ON-OFF) 回转运转 | | 10ms MAX 10ms 以下 | | |
| 1-2-3、Insulation resistance 绝缘电阻 | Measurement shall be made under the condition which a voltage 50V DC is applied between individual terminals and bracketed 在端子与安装板间施加电压DC 50V. | | Between individual terminals and bracket 10MΩ MIN. 在端子安装板间10MΩ以上 | | |
| 1-2-4 Dielectric strength 耐电压 | A voltage of 50V AC /min or 60 V AC /2s(leak current 1mA) be applied between individual terminals and bracket.在端子与安装板间施加AC 50V 1分钟或AC 60V 2秒钟 (漏电流1mA) | | Without arcing or breakdown. 不得有绝缘损坏. | | |
| 1-3 Mechanical characteristics 机械性能 | | | | | |
| 1-3-1、Switch circuit and number of pulse 开关电路、接点数 | | | Single pole and single throw (push on) 单极单投 (推ON) | | |
| 1-3-2、Switch Travel 开关工作行程 | | | 0.5 ^{+0.4} _{-0.3} mm | | |
| 1-3-3、Switch Operating Force 开关作动力 | | | 5±3 N (500±300 gf) | | |
| 1-4 Endurance characteristics 耐久性能 | | | | | |
| Operating life 寿命特性 | The encoder's shall be rotated to 20,000 cycles at a speed of 1800±300cycles/ h without electrical load. The measurement is done at 5000 cycles(shaft push load: 1kgf MAX.) 在无负荷条件下,对轴以每小时1800±300次的速度连续运转20,000次往返. 在5000次往返时进行中间测定(轴按压力小于1kgf). | | Contact resistance : 200mΩ MAX. Specification in clause 1-2-2~4,1-3-1~2 shall be satisfied. Operating force: 80% of its intial value. 接触电阻 : 200mΩ 以下. 1-2-2~4,1-3-1~2 满足初期规格. 开关动作力为寿命前的80%. | | |
| Document control No. 文控编号 : EC-001 | 编制时间 2010/6/5 |  SOUNDWELL ELECTRONIC | | | |
| Version number 版本号: 04 | | | | | |
| REVISION 变更记事: 更改时间 | DSGD.主办 | CHKD.审查 | APPD.核准 | TITLE 标题: | |
| 5、增加使用事项 | 2010/6/5 | 技术部 22-05-11 | 技术部 22-05-11 | 技术部 22-05-11 | ENCODER 编码器 |
| 2、修改轴推拉强度 | 2005/12/26 | 李苗 | 欧阳昌雄 | 苏朝晖 | DOCUMENT No.文号: EC16-01 |
| 3、增加寿命测试条件 | 2006/8/28 | | | | |
| 4、增加螺母紧固强度 | 2006/12/1 | | | | |