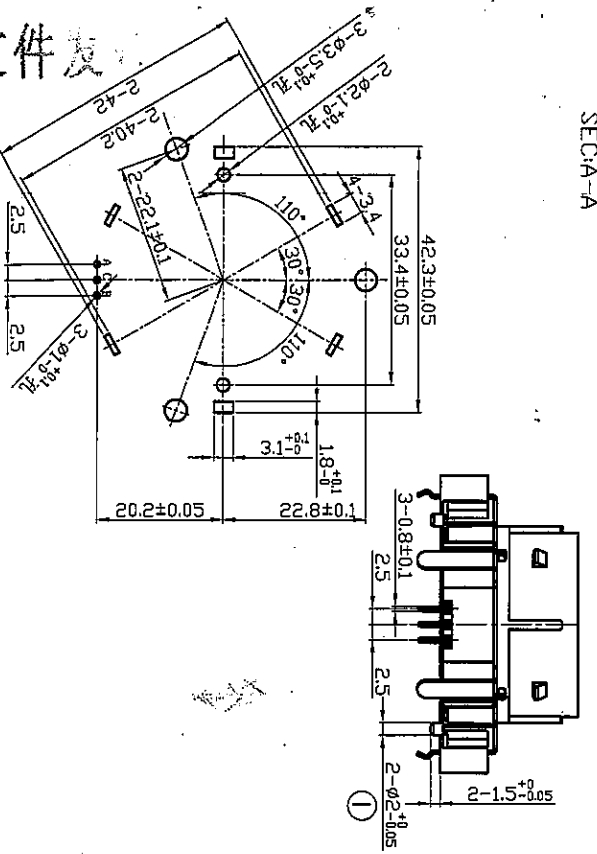
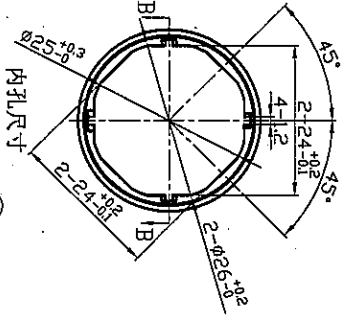
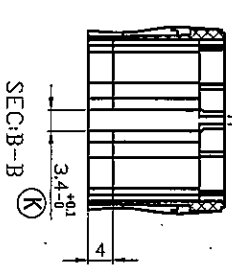
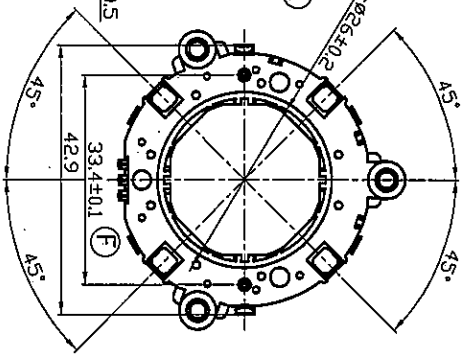
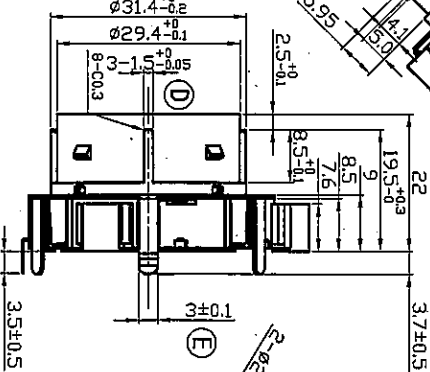
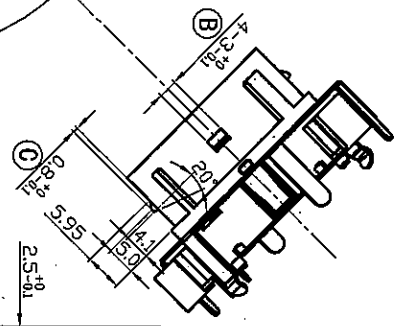
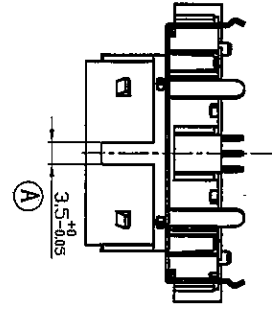
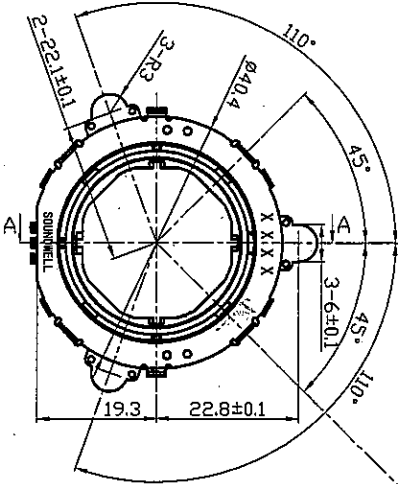
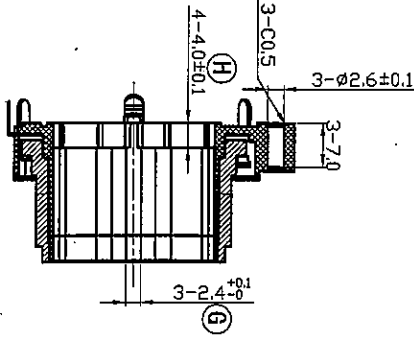


文件表

P. C. B. MOUNTING DETAIL



SEC:A-A



符合产品环境品质管理标准与附录  
注: (A)-(K) 为重点管控尺寸。

生产日期

生产年份 XXXX  
生产月份 XX

01	修改本体底部压针孔位置	2016-10-31	03	
00	ORIGINAL DRAWING	2015-02-04	02	
ISSU.	REVISION	DATE	ISSU.	
黄家川	TOL. UNLESS OTHERWISE SPEC.		SOUNDWELL ELECTRONICS	
DSGD.	CHKD.	APPD.	BASIC DIMENSIONS	编码器
			L ≤ 10	± 0.3
			10 < L	± 0.5
			100 ≤ L	± 0.8
			ANGLE	± 5°
	SCALE		DRAWING NO:	EC400101X5A-HA1
	UNIT	mm	C-EC40XX-0001	NO:

# EC40 SERIES SPECIFICATION

## EC40系列规格书

1/6P

### 1、General 一般事项

#### 1-1、Scope 适用规格

This specification applies to  $\Phi 60$ mm size low-profile thin rotary encoder (incremental type) for microscopic current circuits, used in electronic equipment.

本规格书为 $\Phi 60$ mm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 ~ 35°C

Relative humidity 相对湿度：25% ~ 85%

Air pressure 气压：86 kPa ~ 106 kPa

#### 1-3、Operating temperature range 使用温度范围：-40°C ~ 85°C

#### 1-4、Storage temperature range 保存温度范围：-40°C ~ 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 5 V

#### 3-2、Maximum operating current (resistive load) 最大额定电流（阻抗负载）：0.5 mA

### 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 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件等考虑进去。

4-3、With this products, detent position will always be aligned with A-OFF or ON phase. Therefore make the A phase of the microcomputer the reference at the software design stage.

此产品在定位点状态时A相波形是处于OFF或ON状态，因此在设计软件时请留意此现象。

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 and can cause poor contact.

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。

文控编号：EC-173

编制时间

版本号：00

2015-2-2

变更记事：

变更时间



SOUNDWELL

ELECTRONIC

DSGD.主办

CHKD.审查

APPD.核准

TITLE 标题：

技术部

17-02-13

徐娜丽

技术部

17-02-13

欧阳昌雄

技术部

17-02-13

苏朝晖

ENCODER 编码器

EC40

# EC40 SERIES SPECIFICATION

## EC40系列规格书

### 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	Note: Output signal is 1 pulse per 2 detents. And terminal A-C is pulse ON or OFF at detent positions. No specified output of terminal B-C at detent positions. 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。			
	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。	15 pulses/360° for each phase 15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°/秒的速度回转测试。			
(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。				

文控编号: EC-173	编制时间				
版本号: 00	2015-2-2	<b>SOUNDWELL ELECTRONIC</b>			
变更记事:	变更时间	DSGD.主办	CHKD.审查	APPD.核准	TITLE 标题:
					ENCODER 编码器 EC40

# EC40 SERIES SPECIFICATION

## EC40系列规格书

5、ELECTRICAL CHARACTERISTICS 电气性能		
ITEM 项目	CONDITIONS 条件	SPECIFICATIONS 规格
5-3-1、Chattering 振荡	Specified by the signal's passage time from 1.5V to 3.5 V of each switching position (code OFF~ON or ON~OFF) (Fig.3) 编码从OFF → ON 或 ON → OFF时, 输出1.5 V~3.5 V通过的时间应符合规定。图三	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。 $t1, t3 \leq 3 \text{ ms}$
5-3-2、Sliding noise (Bounce) 滑动杂音(突跳)	Specified by the time of voltage change exceed 1.5 V 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1.5 V以上的电压变动时间在振荡 $t1, t3$ 之间会产生1毫秒以上1.5 V以下的ON部分。另外如果各突跳间1.5 V以下的范围在1毫秒以上时, 则判定为另一个突跳。	$t2 \leq 2 \text{ ms}$
5-4、Phase difference 相位差	Measurement shall be made under the condition which the shaft is rotated in speed 360°/s. 以360°/s的速度操作轴进行回转。 (Fig.4)图4  C W 顺时针方向 A信号(A~C间) Signal A  B信号(B~C间) Signal B	
		$T1, T2, T3, T4 \geq 6 \text{ ms}$ In(fig.4) 见图4



文控编号: EC-173	编制时间	<b style="font-size: 1.2em;">SOUNDWELL ELECTRONIC</b>		
版本号: 00	2015-2-2			
变更记事:	变更时间			
		DSGD.主办	CHKD.审查	APPD.核准
		TITLE 标题: ENCODER 编码器 EC40		

# EC40 SERIES SPECIFICATION

## EC40系列规格书





4/6P

ITEM 项目	CONDITIONS 条件	SPECIFICATIONS 规格
5-5、Insulation resistance 绝缘电阻	Measurement shall be made under the condition which a voltage of DC 500 V 60s±5s is applied between individual terminals and bracket. 在端子和安装支架间施加电压 DC 500 V 60 s±5s。	Between individual terminals and bracket 10 MΩ Min. 端子与安装支架间电阻10 MΩ以上。
5-6、Dielectric strength 耐电压	A voltage of 500 V AC shall be applied for 60s±5s between individual terminals and bracket . 在端子和安装支架间施加 AC 500 V 电压60s±5s,	Without arcing or breakdown. Trip current is 1 mA. 不得有漏电、绝缘破坏,漏电流小于1mA.
<b>6、Mechanical characteristics 机械性能</b>		
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	20±10 mN.m (200 ±100gf.cm) □ _____mN.m±_____mN.m
6-3、Number of detent 定位点数	Only suitable for C.C, equipment. 只适用于附卡点装置	30 detents(Step angle:12°±3°) 30点定位 (间隔角度 12°±3°)
6-4、Push-pull strength of shaft 轴推拉强度	Pull static load of 100 N(10 kgf) for 10s and push static load of 100 N (10 Kgf) for 20s shall be applied to the shaft in the axial direction . (After soldering of the PC board) 在轴端,沿轴向施加100N(10 kgf)的静负荷力拉力10秒钟和施加100 N (10 Kgf)推力20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. 轴无破损,旋转、电气性能无异常。
6-5、Terminal strength 端子强度	A static load of 3 N(300 gf) shall be applied to the tip of terminals for 10s in any direction. 端子前端的任意方向施加3 N(300 gf)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。
6-6、Shaft wobble 轴摆动	A momentary load of 2 N(200 gf) shall be applied at the point 2 mm from the tip of the shaft in a direction perpendicular to the axis of shaft. 在轴前端2 mm处,沿径向瞬间施加2 N (200 gf)的力。	0.2 mm p-p Max 0.2 mm p-p 以下
6-7、Side thrust strength of shaft 轴的垂直押引强度	A load of 20 N(2 kgf) shall be applied at the point 5 mm from the tip of the shaft in a direction perpendicular to the axis of shaft for 10 s. 在轴前端5 mm处加20 N(2 kgf)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。
6-8、Shaft play in rotational wobble 轴的回转方向摆动	Testing by angle board. 用角度板测定。	2° MAX (Initial) 2° 以下(初期)
6-9、Shaft play in axial direction 轴向间隙	The pull / push load of 0.5 N(50 gf) shall be imposed on the shaft. 在轴上施加0.5 N(50 gf)的推力或拉力。	0.1 mm MAX. 0.1 mm以下

文控编号: EC-173	编制时间				<b>SOUNDWELL</b>	<b>ELECTRONIC</b>
版本号: 00	2015-2-2					
变更记事:	变更时间					
		 DSCD 办 17-02-13 徐娜丽	 CHKD 查 17-02-13 欧阳昌雄	 APPL 核 17-02-13 苏朝晖	TITLE 标题: ENCODER 编码器 EC40	

# EC40 SERIES SPECIFICATION

## EC40系列规格书

项 目	条 件	规 格		
<b>7、Endurance characteristics耐久性能</b>				
7-1、Rotational life 旋转寿命	The shaft of encoder shall be rotated to 30 000 cycles at a speed of 600~1000 cycles/h without electrical load, after which measurements shall be made. 在无负荷条件下轴以600~800周/小时速度回转 30 000 周。 1 cycle: rotate 360° CCW rotate 360° CW 1周指顺时针转360°逆时针转360°。	Chattering t1,t3≤4 ms 振荡 t1,t3≤4 ms Bounce t2≤3 ms 突跳 t2≤3 ms Detent torque: Initial torque 50%. 定位力矩: 不低于初期规格值的50%。 Phase-difference: 5ms Min.相位差大于5ms. Shaft play in rotational wobble: 3° Max.		
7-2、Damp heat 耐湿性	The encoder shall be stored at temperature of 40±2°C with relative humidity of 90% to 95% for 240±10 h in a thermostatic chamber. And the encoder shall be subjected to standard atmospheric conditions for 1.5 h, after which measurements shall be made. 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。	Encoder characteristics item: 5-1、5-5、5-6、6-2 The same as the initial specifications. 编码器特性项目: 5-1、5-5、5-6、6-2, 应同原规格值相同。		
7-3、Dry heat 耐热性	The encoder shall be stored at a temperature of 85±3°C for 240±10 h 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±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 低温特性	The encoder shall be stored at a temperature of -40±3°C for 240±10 h 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 焊锡性	The terminals shall be immersed into solder bath at 260±5°C for 3s±1s in the same manner as para. 端子在260±5°C温度的焊锡槽内浸锡3秒±1秒。		A new uniform coating of solder shall cover 90% minimum of the surface being immersed. 浸渍面须有90%以上焊锡附着	
7-6、Resistance to Soldering heat 耐焊接热	<input type="checkbox"/> Manual soldering手工焊接 Bit temperature of soldering iron: below 350°C Application time of soldering iron: within 3 s. 温度350°C以下, 时间3秒以内。 <input type="checkbox"/> Dip soldering槽焊 1. Printed wiring board : copper clad laminate board with thickness of 1.6mm; 使用基板: t=1.6mm的覆铜板。 2. Solder flux: Specific gravity: 0.82 or more. Flux shall be applied to the board using a bubble foaming type fluxer. The board shall be soaked in the flux bubble only to the middle of its thickness. up on substrate surface; 助焊剂: 使用发泡式比重0.82以上的焊剂, 发泡面高大致在基板厚度一半的位置, 而且助焊剂不可流入基板表面上。	Electrical characteristics shall be satisfied No mechanical abnormality. 不得有绝缘体的破损、变形、接触无异常。		
文控编号: EC-173	编制时间			
版本号: 00	2015-2-2			
变更记事:	变更时间			
	 17-02-13 徐娜丽	 17-02-13 欧阳昌雄	 17-02-13 苏朝晖	TITLE 标题: ENCODER 编码器 EC40

# EC40 SERIES SPECIFICATION

## EC40 系列规格书

ITEM	CONDITIONS	SPECIFICATIONS												
项目	条件	规格												
<b>7、Endurance characteristics耐久性能</b>														
接上页 7-6、Resistance to Soldering heat 耐焊接热	3. Preheating : Surface temperature of board: 100°C or less; Preheating time : within 2 min. 预热：基板表面温度100°C以下，时间2分钟以内。 4. Soldering : Solder temperature : 260°C±5°C less Immersion time:within 5±1 s 焊接：温度260°C±5°C，时间5±1 s。 Apply the above soldering process for 1 or 2 times. 以上工程适用1至2次。	Electrical characteristics shall be satisfied No mechanical abnormality. 不得有绝缘体的破损、变形、接触无异常。												
7-7、Vibration 耐振性	The entire frequency range, from 10 Hz to 55 Hz and return to 10 Hz, shall be transverse in 1 min. Amplitude(total excursion):1.5 mm. This motion shall be applied for a period of 2 h in each of 3 mutually perpendicular axes(A total of 6 h). 频率范围：10 Hz~55Hz~10 Hz，1分钟1个周期；振幅1.5 mm。 振动方向:XYZ三个相互垂直的方向，每方向各2小时，共计6小时。	Specifications in clauses 5-1、5~5-6、6-1 must be satisfied. No abnormalities shall be recognized in appearance or construction. 试验后5-1、5~5-6、6-1应符合要求。 表面无变形且操作无异常。												
7-8、brine test 盐雾试验	The encoder shall be Stored at condition of brine gas 5% as volumetric concentration,temperature of 35±2°C for 24±2 h in a thermostatic chamber. And the encoder shall be subjected to standard atmospheric conditions for 1.5 h, after which measurements shall be made. 温度 40±3°C，在装有浓度为5%的盐水气体的恒温恒湿槽中放置24小时后，在常温、常湿中放置1.5小时后测试。	No substantial abnormality observed , the original metal is not exposed. 外观无明显异常，无底金属裸露。												
7-9、Free falling 耐落性	The encoder shall be fallen freely of any pasture from 60 cm height to the concrete floor covered with vinyl-file after that measurement shall be made. 从60 cm高处自由落在铺有乙烯类材料的混凝土上。	No excessive deformation or damage (except the deformation of terminal). Specifications in clause 5-1 and 6-1 shall be satisfied. 无过度变形及损坏（端子变形除外）；5-1和6-1应满足初期规格。												
7-10、Temperature cycling test 温度循环试验	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">Temperature</td> <td style="text-align: center;">Duration of test</td> </tr> <tr> <td style="text-align: center;">-40 °C</td> <td style="text-align: center;">0.5 hour</td> </tr> <tr> <td style="text-align: center;">85 °C</td> <td style="text-align: center;">0.5 hour</td> </tr> <tr> <td colspan="2">Transition time: More than 5 min</td> </tr> <tr> <td colspan="2">1 cycle</td> </tr> <tr> <td colspan="2">test cycle: 240 cycles</td> </tr> </table> <p style="margin-top: 10px;">After leaving in the normal temprature and humidity for 1.5 hours. 按上述条件试验后置于常温常湿环境下1.5小时后测试。</p>	Temperature	Duration of test	-40 °C	0.5 hour	85 °C	0.5 hour	Transition time: More than 5 min		1 cycle		test cycle: 240 cycles		Specifications in clause 5-1、5~5-6 and 6-1~2 shall be satisfied. 5-1、5~5-6和6-1~2 应满足初期规格。
Temperature	Duration of test													
-40 °C	0.5 hour													
85 °C	0.5 hour													
Transition time: More than 5 min														
1 cycle														
test cycle: 240 cycles														
文控编号: EC-173	编制时间													
版本号: 00	2015-2-2													
变更记事:	变更时间													
		DSGD.主办	CHKD.审查	APPD.核准	TITLE 标题: ENCODER 编码器 EC40-15P6									