

慈溪市浒山赫尔电子厂
CIXI HUSHAN HERE ELECTRONIC FACTORY

NO. : 20090316A

承认书
APPROVE SHEET

客户名称 Customer	
客户料号 Part No.	

型号 Model Name	
数量 Quantity	

客户承认

Customer Approval

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承办 Prepared By	核对 Checked By	批准 Approved

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EC12系列编码器规格书

EC12 SERIES ROTARY ENCODERS SPECIFICATION

1、一般事项General

1-1 适用规格Scope

本规格书适用于电子设备用微小电流回路的12mm型旋转式编码器。

This specification applies to 12mm size low-profile thin 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

1-3 使用温度范围：

Operating temperature range: -30℃ to +80℃

1-4保存温度范围：

Storage temperature range: -40℃ to + 85℃

2、额定值 Rating

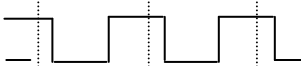
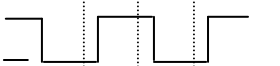
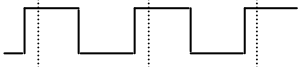
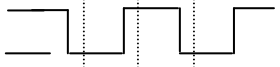
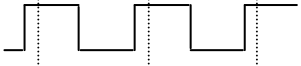
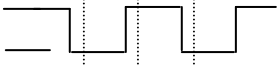

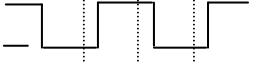
- 2-1 Rating voltage: DC 5V 10mA (1mA MIN)
- 2-2 Resistive load: MAX 5mA MIN 0.5mA (Common lead: MAX 10mA)

3、构造 Construction

3-1 尺寸 Dimensions

见所附成品图 Refer to attached drawing

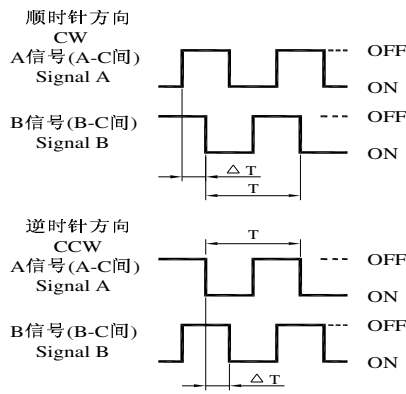
4、电气性能 Electrical characteristics

项目 ITEM	条件 CONDITIONS		规格 SPECIFICATIONS			
4-1 输出信号 Output Signal format	A、B两信号输出相位差, 输出波形详见图1/2(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.1/2> (The broken line shows detent position)					
	轴旋转方向 rotational diation	信号 Signal	输出波形 Output			
			图1		图2	
	顺时针方向 C. W	A (A-C端子间) A(Terminal A-C)	OFF ON		OFF ON	
		B (B-C端子间) B(Terminal B-C)	OFF ON		OFF ON	
	逆时针方向 C. C. W	A (A-C端子间) A(Terminal A-C)	OFF ON		OFF ON	
B (B-C端子间) B(Terminal B-C)		OFF ON		OFF ON		

<div>EC12系列编码器规格书</div> <div>EC12 SERIES ROTARY ENCODERS SPECIFICATION</div>		
项目 ITEM	条件 CONDITIONS	规格 SPECIFICATIONS
4-2 分解能力 Resolution	旋转一周输出的脉冲数 Number of pulses in 360° rotation	24脉冲/360° 图1 24 pulses/360° for each phase
		12脉冲/360° 图2 12 pulses/360° for each phase
4-3 开关特性 Switching Characteristics	<p>下图所示回路，轴以360° /S的速度旋转测定。 Measurement shall be made under the condition as follows. Shaft rotational speed: 360° /S Test circuit: <fig.3> 图3</p> <div> <div> 图二 < fig.2 > </div> <div> 图三 < fig.3 > </div> </div> <p>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 Note: Code-OFF area :The area which the voltage is 3.5V or more Code-ON area which the voltage is 1.5V less.</p>	
4-4 振荡 Chattering	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 Specified by the signal's passage time from 1.5V to 3.5V of each switching position (code OFF-ON or ON-OFF)	T1, T3≤3 ms
4-5 滑动杂音 (突跳) Sliding noise (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。 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(3.5V Min)
4-6 滑动噪音 Sliding noise	电压从高电位切换到低电位区间时 The voltage change in code-OFF area.	3.5V以上 3.5V MIN
4-7 接触电阻 Contact Resistance	信号处于ON时安定状态下测定 Measurement shall be stable condition which a output signal is ON.	最大 1Ω 1Ω Max

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项目 ITEM	条件 CONDITIONS	规格 SPECIFICATIONS
4-8 相位差 Phase difference	<p>以每秒旋转360° 的速度测定 Measurement shall be made under the condition which the shaft is rotated in 360° /sec. (constant speed)</p> 	T1, T3>3ms
4-9 绝缘电阻 Insulation resistance	<p>在端子和轴套之间施加 250V DC Measurement shall be made under the condition which a voltage of DC 250V is applied between individual terminals and bushing.</p>	<p>端子安装板间电阻100MΩ 以上 Between individual terminals and bushing 100MΩ MIN</p>
4-10 耐电压 Dielectric strength	<p>在端子和轴套间施加A.C 300V电压1分钟或A.C 360V 电压2秒钟。 (漏电流:1mA) A coltage of 300V AC shall be applied for 1min or a voltage of 360V AC shall be applied for 2 sec between indididual terminals and bracket. (leak current:1ma)</p>	<p>无短路及绝缘破损现象 Without damage to parts arcing or breakdown.</p>
5、机械性能 Mechanical characteristics		
项目 ITEM	条件 CONDITIONS	规格 SPECIFICATIONS
5-1 全回转角度 Total notational angle	<p>有效回转角度 Angle of effective rotation</p>	<p>360° (无止挡点) 360° (Endless)</p>
5-2 回转扭力 Rotational torque	<p>测试旋转力矩 Measure the rotation torque</p>	20~200 gf. cm
5-3 卡点脱出力矩 Detent torque	<p>只适用于附卡点装置 Only suitable for C.C, equipment</p>	30~200 gf. cm
5-4 定位点数及位置 Number and position of detent	<p>只适用于附卡点装置 Only suitable for C.C, equipment.</p>	<p>■ 24点定位 角度间隔15° ±2° 24 detents step angle:15° ±2°</p>
		<p>□ 12点定位 角度间隔30° ±2° 12 detents step angle:30° ±2°</p>
5-5 轴的拔拉强度 Push-pull strength of shaft	<p>在轴端沿轴向施加50N (5.1kgf) 的推力和拉力各10秒钟 (在PCB焊锡后)，不可有电气或机械上的异常。 Push and pull static load of 50N shall be applied to the shaft in the Axial direction for 10S. (After installing)</p>	<p>不可有电气或机械上的异常。 Without damage or excessive play in shaft. No excessive abnormality in rotational feeling.</p>

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5-6 端子强度 Terminal strength	端子前端的任意方向施加5N (0.51kgf) 的静负荷力1分钟 A static load of 5N shall be applied to the tip of terminals for 1min in any direction.	端子应无破损及明显松动, 但允许变形。 Without damage or excessive looseness terminals. Terminal bend is permitted.
5-7 主轴晃动 Shaft wobble	在轴前端5mm处, 沿径向瞬间施加0.51Kg•cm的力。摆动按以下计算 A momentary load of 50mN•m shall be applied at the tip of the shaft in a direction perpendicular to the axis of shaft. As right formula	0.7*L/30mm p-p以下 (L: 安装平面到轴顶端的距离) 0.7*L/30mm p-p MAX L: Distance between mounting surface and measuring point on the shaft
5-8轴的回转摆动 Shaft lay in rotational wobble	使用角度板测定 Measure with jip for rotational angle.	5° 以下 5° MAX

6、Endurance characteristics 耐久性能

6-1 旋转寿命 Rotational life	在无负荷条件下, 对轴以每小时500次往复的速度连续旋转30,000次后测定。 The shaft of encoder shall be rotated to 30,000 cycles at a speed of 500/h without electrical load	振荡chattering: $t_1 t_3 \leq 5ms$ 突跳Bounce: $t_2 \leq 3ms$ 其它符合4-1~4-9 和 5-1~5-4项目的相关规定 Specifications in clause 4-1~4-9 and 5-1~5-4
6-2 耐热特性 Heat resistance	温度 $80 \pm 3^\circ C$ 的恒温箱中放置 240 ± 10 小时, 常温常湿中放置1.5小时后测试 The potentiometers shall be stored at temperature of $80 \pm 3^\circ C$ for $240 \pm 10H$ in a thermostatic chamber. And the potentiometers shall be subjected to standard atmospheric conditions for 1.5H, After which measurements shall be made.	必须符合4-1~4-9 和 5-1~5-4项目的相关规定 Specifications in clause 4-1~4-9 and 5-1~5-4
6-3 耐寒特性 Low temperature resistance	温度 $-40 \pm 3^\circ C$ 的恒温箱中放置 240 ± 10 小时, 常温常湿中放置1.5小时后测试 The potentiometers shall be stored at temperature of $-40 \pm 3^\circ C$ for $240 \pm 10H$ in a thermostatic chamber. And the potentiometers shall be subjected to standard atmospheric conditions for 1.5H, After which measurements shall be made.	必须符合4-1~4-9 和 5-1~5-4项目的相关规定 Specifications in clause 4-1~4-9 and 5-1~5-4
6-4 耐湿特性 Moisture resistance	温度 $40 \pm 2^\circ C$, 湿度90~95%的恒温恒湿槽中放置 240 ± 10 小时, 在常温常湿中放置1.5小时后测试 The potentiometers shall be stored at temperature of $40 \pm 2^\circ C$ with relative humidity of 90% to 95% for $240 \pm 10H$ in a thermostatic chamber. And the potentiometers shall be subjected to standard atmospheric conditions for 1.5H, After which measurements shall be made.	必须符合4-1~4-9 和 5-1~5-4项目的相关规定 Specifications in clause 4-1~4-9 and 5-1~5-4

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6-5 焊锡性 Solder ability	端子在260℃±5℃温度的焊锡槽内浸锡3秒±0.5秒 Ther terminals shall be immersed into solder bath at 260℃±5℃ for 3s±0.5s in the same manner as para.	浸渍面75%以上 A new uniform coating of solder shall cover 75% minimum of the surface being immersed.
6-6 耐焊接热 Resistance to Soldering heat	手工焊接Manual soldering 温度300℃以下，时间3秒以内。 Bit temperature of soldering iron: 300℃ or less. Application time of soldering iron: within 3S. 自动焊接Dip soldering 使用基板: t =1.6的两面铜泊积层板 Printed wiring board: Both-sided copper clad laminate board with thickness of 1.6mm. 预热: 基板表面温度100℃以下，时间1分钟以内。 Preheating: Surface temperature of board: 100℃ or less. Preheating time: Within 1 min. 焊接: 温度260℃以下, 时间3秒以内。 Soldering: Solder temperature: 260℃ or less. Immersion time: Within 3S.	不得有绝缘体的破损、变形、接触无异常 Electrical characteristics shall be satisfied.No mechanical abnormality.
按压开关部分Push-on switch specification 备注: 以下规格适用于EC12编码器带按压开关系列 Note: The following specification is only suitable for the one type with switch construction of EC12 encoder series. 1、额定值 Rated capacity 5V DC 10mA (1mA MIN) 2、电气性能 Electrical characteristics		
项目 ITEM	条件 CONDITIONS	规格 SPECIFICATIONS
2-1 接触电阻 Contact resistance	用DC 5V 1mA电压降法测定, Measured by the D.C 5V 10mA voltage drop method.	100mΩ 以下。 100mΩ MAX.
2-2 绝缘电阻 Insulation resistance	在端子与轴套间施加D.C 250V 1mA, Measurement shall be made under the condition, which a voltage 250V D.C 1mA is applied between individual Terminals and bushing.	100MΩ 以上。 100MΩ MIN.
2-3 震荡杂音 Chattering	以1秒钟一周周期动作 (OFF-ON-OFF) Switch is operated at the rate of 1 cycle 1 sec. The 1 cycle shall be OFF-ON-OFF.	震荡杂音小于10ms。 Chattering less than 10ms.
2-4 耐电压 Dielectric strength	端子与轴套间施加A.C 300V 1分钟 (漏电电流:1mA) A voltage of 300V A.C shall be applied for 1min between individual terminals and bushing. (Leak current: 1mA)	无短路及绝缘破损现象。 Without damage to parts arcing or breakdown.

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3、机械性能 Mechanical characteristics		
项目 ITEM	条件 CONDITIONS	规格 SPECIFICATIONS
3-1 开关电路、接点数 Switch circuit and number of pulse		单极单投（推‘通’） Single pole and single throw (push on)
3-2 开关行程 Travel of switch		0.3~0.7mm
3-3 开关动作力 Operating force of switch	在轴端，沿轴向施加的按压力 Push static load to the shaft in the axial direction	200~1000gf
4、Endurance characteristics 耐久性能		
4-1 动作寿命 Operation life	在无负荷条件下, 对轴以每小时500次往复的速度连续动作25,000次后测定。但在每进行5,000次时测定一次。（轴按压力1kgf.cm以下） The shaft of switch shall be 25,000 times at a speed of 500 times per hour without electrical load. After which measurements shall be made. However, an interim measurement shall be made immediately after 5,000 times. (shaft push load: 1kgf.cm MAX)	接触电阻200mΩ以下，其它项目满足初始规格。 Switch contact resistance: 200mΩ MAX. Except above items, specifications shall be satisfied.
使用方面的注意事项 Precautions in use		
<p>* 不要在高温、潮湿及有腐蚀性气体的环境中保管。</p> <p>As design of the pulse count process. Care should be taken with operational speed.</p> <p>* 本制品本体若接触水分则对脉冲波形会产生异常影响，应避免直接接触水分。</p> <p>This product when touching wet or water can be influence the pulse wave.</p> <p>* 本制品对轴不能施加横向压力，为避免造成制品机能损伤，应事先设计好设备旋钮的方向。</p> <p>The shaft can' t be over pressure, For avoided damaged the function, please Pre-setting the button direction.</p> <p>* 本制品对轴不要施加过大的力，以免造成产品机能受损。</p> <p>Please don' t shocking the shaft. To avoided damaged the function</p> <p>* 对编码器脉冲数的设计处理时，要充分考虑速度、脉冲调制时间和杂音干扰等因素，在实际确认后再使用。</p> <p>During operation storage in high temperature and in corrosive gas should be avoided.</p> <p>* 编码器的脉冲数处理电路最好按右图附加滤波器。</p> <p>The circuit of the pulse count process should be adding filter a right figure.</p>		
