

MSE3600BPXX规格书  
MSE3600BPXX SERIES SPECIFICATION**1.一般事项General****1-1.适用规格 Scope**

本规格书适用于微小电流回路的电子设备，属4向开关编码模组。

This specification is applied for electronic components of low-current circuit, especially for 2-direction switch coding model.

**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°C to 35°C

相对湿度 Relative humidity : 25% to 85%

气压 Air pressure : 86kpa to 106kpa

如果对在上述所提到的条件中所做的实测值有疑问的话，应使用以下条件进行测量：

If doubts arises on the measured values under the above-mentioned conditions, the following conditions shall be employed:

温度 Ambient temperature : 20±1°C

相对湿度 Relative humidity : 63% to 67%

气压 Air pressure : 86kpa to 106kpa

**1-3.使用温度范围**

Operating temperature range : -40°C to 85°C

**1-4.保存温度范围**

Storage temperature range : -40°C to 85°C

**2.构造Construction****2-1.尺寸 Dimensions**

见所附成品图 Refer to attached drawing

**3.功能 Function****3-1.中央按压开关**

Center push switch

**3-2.4方向开关**

4 directional switch

**3-3.回转型编码器(28型)**

rotary encoder(28mm size)

**4.额定值 Rating****4-1.额定电压**

Rated voltage:DC 5V

**4-2.最大额定电流(阻抗负载)**

Rated current:10mA (Load Resistance)

**5.使用上的事项Application Notes**

5-1.a.产品以交货时的状态在常温、常湿，不受阳光直射照射，不产生腐蚀性气体的场所保管，自交货起6个月内使用为佳。

a. Please store it within the normal temperature、normal humidity、without the direct sunlight irradiation no corrosive gas place、and use it within the 6 month from the delivery date would be better.

b.包装被打开后未使用完的产品使用聚乙烯袋与空气隔断（例如：使用密封袋将其密封）请在a环境下保管与尽快使用。

b. Once opened, the unused products should be packed in polyethylene bag, and protected from the air (eg. Use the sealing bag to seal it), please store it under the environment a, and use it ASAP.

5-2.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。

The encoder pulses count method should be designed with taking operating speed,sampling time and esign of the microcomputer software into consideration.

5-2-1.此产品在定位点的输出波形参照（图2），因此在设计软件时请留意其状态，推荐以A相位为参考基准。

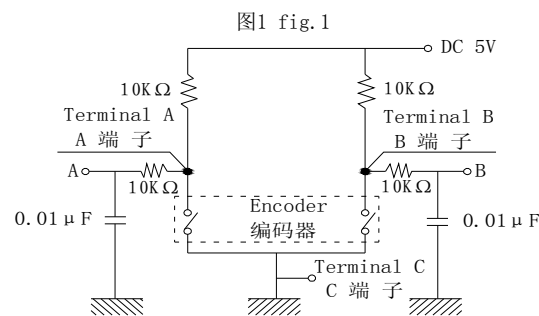
With this products the detent position output consult fig.2. Therefore make the A phase the reference at the soft ware design stage. Recommended that use A output signal for the reference.

5-2-2.在设计时要考虑到杂讯,建议使用R/C滤波电路,(图1)

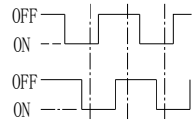
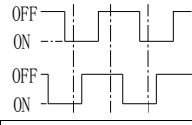
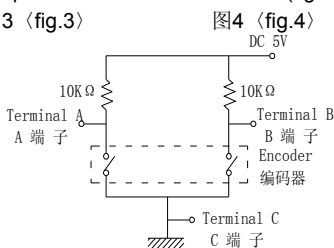
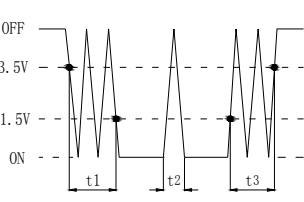
At design of the pulse count process. Using the C/R filter circuit is Recommended.(fig .1)

5-2-3.本产品请勿碰触到水,可能会导致输出波形的异常。

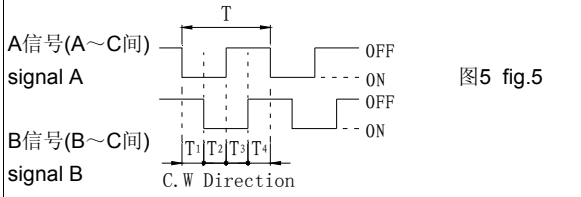
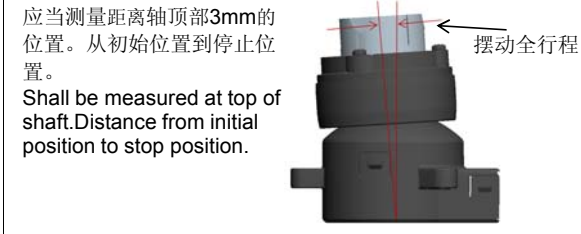
Care must be taken not to expose this product to water or dew to prevent possible problem in pluses output waveform.



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6.电气性能 Electrical Characteristics			
项目 ITEM	条件 CONDITIONS	规格 SPECIFICATIONS	
6-1.额定功率 Rated Power		DC 5V 10mA	
6-2.初期接触电阻 Initial Contact Resistance	出力信号处于ON时安定状态条件下测定. Measurement shall be done on stable ON condition.	200mΩ Max	
6-3.绝缘阻抗 Insulation resistance	在端子和塑胶外壳间施加电压 300V DC. Measurement shall be made under the condition A voltage of 300V DC shall be applied between individual terminals and Plastic shell.	100MΩ 以上 100MΩ Min	
6-4.耐电压 Dielectric strength	在端子和塑胶外壳间施加AC 300V电压1分钟 A voltage of 300V AC shall be applied for 1 minute between individual terminals and Plastic shell.	不得有绝缘破坏 Without arcing or breakdown.	
6-5.编码器电气性能 Encoder electrical Characteristics			
6-5-1.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.2> (The broken line shows detent position.)		
	轴回转方向 Shaft rotational direction	信号 Signal	
	顺时针方向 C.W	A(A-C端子间) A(TerminalA-C)	
		B(B-C端子间) B(TerminalB-C)	
逆时针方向 C.C.W	A(A-C端子间) A(TerminalA-C)		
	B(B-C端子间) B(TerminalB-C)		
6-5-2.分解能力 Resolution	回转360°的输出脉冲数. Number of pulses in 360°rotation.	15个脉冲/360°（图2） 15 pulses/360°(fig.2)	
6-5-3.特性 characteristics	下（图3）所示回路，轴以360°/s的速度转动测定。 Measurement shall be made under the condition as follows. Shaft rotational speed : 360°/s Test circuit : (fig.3)		
	  <p>（注）编码OFF指输出电压2.5V以上的状态(fig.4). Code-OFF area :The area which the voltage is 2.5V or more(fig.4). 编码ON指输出电压2.5V以下的状态(fig.4). Code-ON area : The area which the voltage is 2.5V or less(fig.4).</p>		
6-5-3-1.振荡 Chattering	编码从OFF→ON或ON→OFF时,通过时间.应符合规定. Specified by the signal's passage time of each switching position(code OFF~ON or ON~OFF)	t1,t3 ≤5ms	

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<p>6-5-3-2.滑动杂讯 (突跳)Sliding noise (Bounce)</p>	<p>编码ON部份的2.5V以上的电压变动时间在振荡t1,t3之间会产生1ms以上,2.5V以下的ON部份.另外,如果各突跳2.5V以下的范围在1ms以上时,则判定为另一个突跳.</p> <p>Specified by the time of voltage change exceed 2.5V 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-ONtime between 2 bounces is less than 1ms. they are regarded as 1 linked bounce.</p>	<p><math>t2 \leq 3ms</math></p>
<p>6-5-4.相位差 Phase difference</p>	<p>下(图5)所示回路,轴以360°/s的速度转动测定。 Measurement shall be made under the condition which the shaft is rotated in 360°/s.</p>  <p>图5 fig.5</p>	<p>Initial:T1、T2、T3、T4 ≥ 4ms 见图5 (fig.5) After Life:T1、T2、T3、T4 ≥ 4ms</p>
<p><b>7.机械性能 Mechanical Characteristics</b></p>		
<p>项目 ITEM</p>	<p>条件 CONDITIONS</p>	<p>规格 SPECIFICATIONS</p>
<p>7-1. 按压机械性能 Mechanical Characteristics of center push</p>		
<p>7-1-1. 按压操作力 Push operation force</p>	<p>在轴端,沿轴向施加的按压力。 Push static load to the shaft in the axial direction</p>	<p>60±15N.mm</p>
<p>7-1-2. 按压全行程 Push traveling</p>	<p>在轴端,沿轴向运动。 Except thrust free play.Distance from initial position to ON position</p>	<p>1.4±0.5mm</p>
<p>7-1-3. 轴操作强度 Push shaft strength</p>	<p>在轴端,沿轴向施加8Kgf的静负荷推和拉各10秒钟。 Push and pull static load of 8Kgf shall be applied to the shaft in the axial direction for 10 s</p>	<p>电气和机械性能没有异常 No abnormality in electric and Mechanical characteristics</p>
<p>7-1-4. 按压限位力 limit force of push shaft</p>	<p>轴芯摆动后,在按压方向施加力量6KG,持续作用10 s。 The axial swing,Push the direction force 6kg, lasting effect to 10 s.</p>	<p>电气和机械性能没有异常 No abnormality in electric and Mechanical characteristics</p>
<p>7-2. 4向摆动机械性能 Mechanical Characteristics of 4 directions</p>		
<p>7-2-1.操作力 Operation force</p>	<p>在距离编码器顶端3mm处施加60±15N.mm力,垂直轴的方向施加。 At the top of the range encoder 3 mm 60±15N.mm force, on the vertical axis direction.</p>	<p>60±15N.mm</p>
<p>7-2-2.开关全行程 Total Travel of switch</p>	<p>应当测量距离轴顶部3mm的位置。从初始位置到停止位置。 Shall be measured at top of shaft.Distance from initial position to stop position.</p> 	<p>3.0±0.5 mm (3.5±0.5°)</p>
<p>7-2-3.轴的摆动强度 strength of shaft</p>	<p>在轴端,垂直轴向施加 0.8N.mm 的静负荷力推和拉各10秒钟 Push and pull static load of 0.8N.mm shall be applied to the shaft in the verticality axial direction for 10s.(After soldering of the PC board)</p>	<p>电气和机械特性没有异常 No abnormality in electric and Mechanical characteristics</p>
<p>7-2-4.4向摆动限位力 Limit force of 4 directions</p>	<p>轴芯按压后,在任意4个摆动方向施加力量6KG,持续作用10s。 After the shaft Push,in any of 4 swing direction force 6kg,lasting effect to 10 s.</p>	<p>电气和机械特性没有异常 No abnormality in electric and Mechanical characteristics</p>

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7-3.轴向间隙 Shaft play in axial direction	沿轴向按压方向施加5N.mm力. When 5N.mm force is applied axially.	虚位间隙±0.3 以下 Shaft play in ±0.3mm Max
7-4.轴摆动间隙 Shaft wobble	在距离轴心顶端3mm处, 垂直轴方向施加5N.mm力. when a load 5N.mm is applied at 3mm from tip of shaft.	虚位间隙±0.3 以下 Shaft play in ±0.3mm Max
7-5.轴的回转方向摆动 Shaft play in rotational wobble	用角度板测定. Testing by angle board.	3°以下 3°Max
<b>7-6.编码器机械性能 Encoder Mechanical Characteristics</b>		
7-6-1.全回转角度 Total rotational angle		360°(无止档点) 360°(Endless)
7-6-2.定位点力矩 Detent torque	只适用于附卡点装置 Only suitable for C.C,equipment.	30±10N.mm
7-6-3.定位数及位置 Number and position of detent	只适用于附卡点装置 Only suitable for C.C,equipment.	30点定位间隔角度12°±2° 30 detents Step angle:12°±2°
7-7.耐振性 Vibration Resistance	编码器采用常规的安装方法牢固地安装在试验设备上, 并在下述参数条件下进行试验: (1)典型的随机振动条件: 扫引周期频率:(8.3±1)Hz→(200±4)Hz→(8.3±1)Hz 扫引对数的方法: 最大速度43.2m/s²; 最大摆幅10mm (2)振动方向: 三个相互垂直的方向, 其中一个方向应该促动元件运动的方向; (3)周期: 每个方向12个周期 (1个周期的比率扫引20分钟) Install the encoder to the test equipment with conventional installation methods, do test under the following specification conditions: (1)Typical random vibration conditions:Cyle frequency sweep cited(8.3±1)Hz→(200±4)Hz→(8.3±1)Hz Logarithmic sweep cited methods:maximum speed 43.2m/s²; Maximum amplitude:10mm (2)Direction of vibration: Three mutually perpendicular directions, one of them should be to motivate the direction of movement components. (3)Time:12 cycles in every direction(Sweep rate of 1 cycle at least 20 minutes)	力矩变化率为初始值的±30%; 其它性能符合第6-2---6-4; Rotation torque change rate shall be within ±30% against initial value; The performance requirments specified in item 6-2---6-4 shall be satisfied
<b>8. 耐久性能 Endurance Characteristics</b>		
项目 ITEM	条件 CONDITIONS	规格 SPECIFICATIONS
8-1.操作寿命 Operating-life	在无负荷条件下施以60N.mm以下的操作力, 以300次循环/小时的速度操作。 no-load conditions,and with a speed of 300 cycles/hour.	30,000±200次循环. 30,000±200cycles.
8-1-1.按压开关 Center push-on switch		端子间接触阻抗50mΩ以下; 力矩变化率为初始值的±50%; 其它性能符合第5-1 --- 5-4; Contact resistance 50mΩMax; Rotation torque change rate shall be within ±50% against initial value;
8-1-2. 4方向开关 4 directional switch		The performance requirements specified in item 5-1 --- 5-4 shall be satisfied

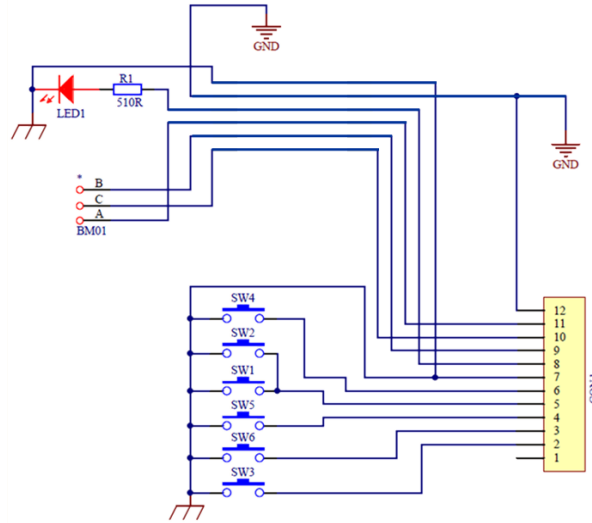
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<p>8-2.编码器回转寿命 Encoder rotational life</p>	<p>在无负荷条件下轴以600~1000周/小时速度回转，一日连续5000~8000次。 The shaft of encoder shall be rotated at a speed of 600~1000cycles/H without electrical load,after with measurements shall be made. (5000 to 8000 continuous cycles for 24 hours.)</p>	<p>30,000±200周 振荡 t1,t3≤5ms.突跳 t2≤3ms. 力矩变化在初始值的±50%以内 端子间接触阻抗200Ω以下 50,000±200 cycles Chattering t1,t3≤5ms.Bounce t2≤3ms. Rotation torque change shall be within ±50% against initial value. Contact resistance 200ΩMax</p>									
<p>8-3.耐湿性 Damp heat</p>	<p>温度60±2℃,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。 The encoder shall be stored at temperature of 60±2℃ 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.</p>	<p>端子间接触阻抗1Ω以下; 力矩变化率为初始值的±50%; 其它性能符合第6-2 --- 6-4; Contact resistance 1ΩMax; Rotation torque change rate shall be within ±50% against initial value; The performance requirements specified in item 6-2 --- 6-4 shall be satisfied</p>									
<p>8-4.耐热性 Dry heat</p>	<p>温度90±3℃的恒温箱中放置240±10小时,常温、常湿放置1.5小时后测试。 The encoder shall be stored at a temperature of 90±3℃ for 240±10H in a thermostatic chamber.And then the encoder.shall be subjected to standard atmospheric conditions for 1.5H,After which measurements shall be made.</p>										
<p>8-5.低温特性 Cold</p>	<p>温度-40±3℃的恒温箱中放置240±10小时,常温、常湿放置1.5小时后测试。 The encoder shall be stored at a temperature of -40±3℃ for 240±10H in a thermostatic chamber.And then the encoder.shall be subjected to standard atmospheric conditions for 1.5H,After which measurements shall be made.</p>										
<p>8-6.温度循环特性 Change of temperature</p>	<p>在下表条件中5次温度循环后去除表面湿气，在常温常湿中放置1.5小时后再进行测量。</p> <table border="1" data-bbox="459 1272 890 1391"> <thead> <tr> <th>STEP</th> <th>TEMPERATURE</th> <th>TIME</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40℃ ± 2℃</td> <td>30 MINUTES</td> </tr> <tr> <td>2</td> <td>85℃ ± 2℃</td> <td>30 MINUTES</td> </tr> </tbody> </table> <p>The potentiometer shall be subjected to 5 successive change of temperature cycles,each as shown in table and then the potentiometer shall be subjected to standard atmospheric conditions for 1.5 hours,after which measurement shall be made.</p>	STEP	TEMPERATURE	TIME	1	-40℃ ± 2℃	30 MINUTES	2	85℃ ± 2℃	30 MINUTES	<p>端子间接触阻抗1Ω以下; 力矩变化率为初始值的±50%; 其它性能符合第6-2 --- 6-4; Contact resistance 1ΩMax; Rotation torque change rate shall be within ±50% against initial value; The performance requirements specified in item 6-2 --- 6-4 shall be satisfied</p>
STEP	TEMPERATURE	TIME									
1	-40℃ ± 2℃	30 MINUTES									
2	85℃ ± 2℃	30 MINUTES									

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**9.电路及输出说明 Circuit and the output explain**

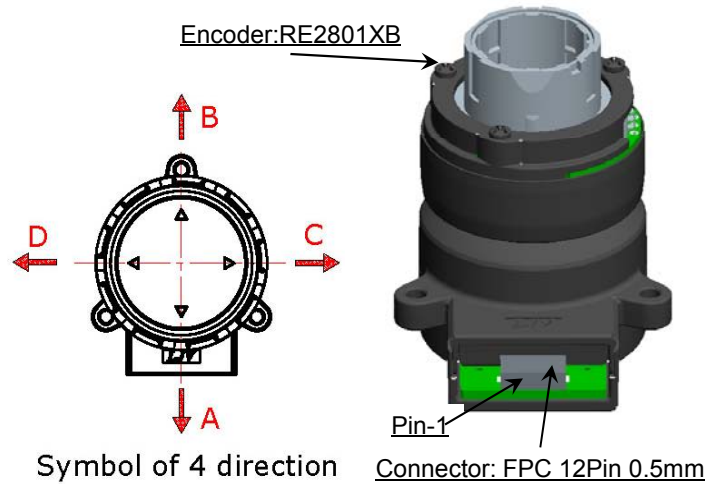
9-1.内部电路 Internal circuit



9-2.引脚分配 Pin assignment

Pin no:

- 1. 空位 Empty
- 2. 输出-A方向 Output-A
- 3. 输出-D方向 Output-D
- 4. 输出-B方向 Output-B
- 5. 输出-中央按压 Output-Center push
- 6. 输出-C方向 Output-C
- 7. 输入 Input
- 8. 输出-LED Output-LED
- 9. 编码器B端口 Encoder Terminal-B
- 10. 编码器C端口 Encoder Terminal-C
- 11. 编码器A端口 Encoder Terminal-A
- 12. 接地 Earth electrode



**10-1.环保要求: 产品所含零件都符RoHS标准**

**10-1.environmental requirement:products comply RoHS**

**11-1包装方式Packing**

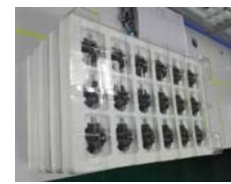
使用吸塑盒和纸箱包装。

Packed in plastic tray and carton.

- 1、一层吸塑盒装18PC成品  
a layer of blister box 18 PCS finished products
- 2、一个PE袋装入五层, 共90PC成品。  
a PE bags into five layers, a total of 90 PCS finished products.
- 3、一个纸箱装入五层, 共90PC成品。  
a carton into five layers, a total of 90 PCS finished products.
- 4、纸箱上层放入一层泡沫板。  
carton top into a layer of foam board.
- 5、纸箱用封箱胶纸封箱。  
carton sealing tape sealing.



吸塑盒  
plastic tray



纸箱 carton

受控编号 Document No	修订 Revision	日期 Date	经办 Designed	审核 Check	批准 Approved
SOP-MSE360-013	初始发行	2016-10-20			
文号 File No.					
MSE36					
版本 VERSION: A1					
签收: 含部门代码/份数	GC1/1:	PZ1/2:			
回收: 勾选处理结果	<input type="checkbox"/> 回收 <input type="checkbox"/> 遗失	<input type="checkbox"/> 回收 <input type="checkbox"/> 遗失			