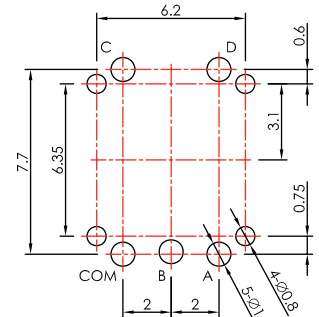
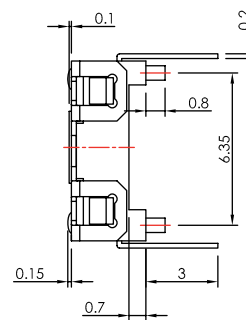
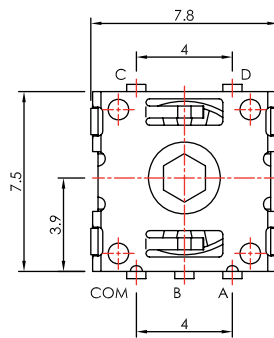


P.C.B LAYOUT

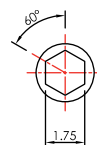
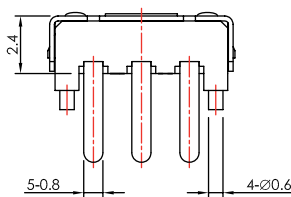
SHAFT HOLE SHAPE AND DIMENSION

EC64S...83 Surface Mount Type Terminals

公差 TOLERANCE .X=±0.3mm, .XX=±0.2mm



P.C.B LAYOUT



SHAFT HOLE SHAPE AND DIMENSION

EC64H...83 Thru Hole Type Terminals

公差 TOLERANCE .X=±0.3mm, .XX=±0.2mm

How to order:

EC64 1 2 3

1 TYPE OF TERMINALS: **S** SMT Terminals **H** THT Terminals
2 PACKAGING: **TB** Tube **TR** Tape & Reel (Only for SMT Terminals)

3 ROHS: **83** RoHS Compliant

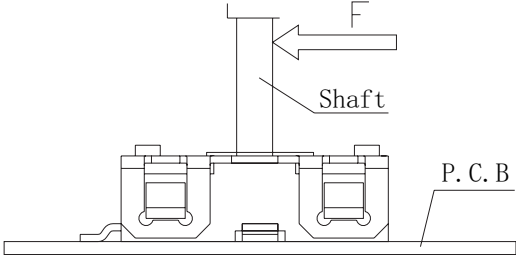
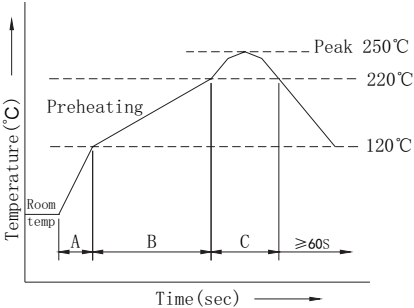
General Specifications:

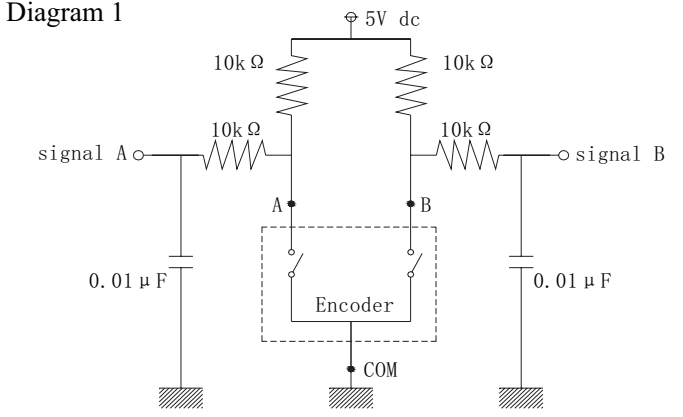
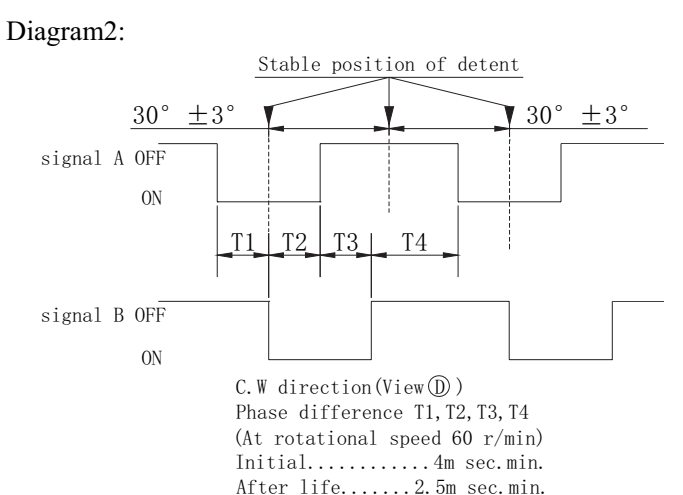
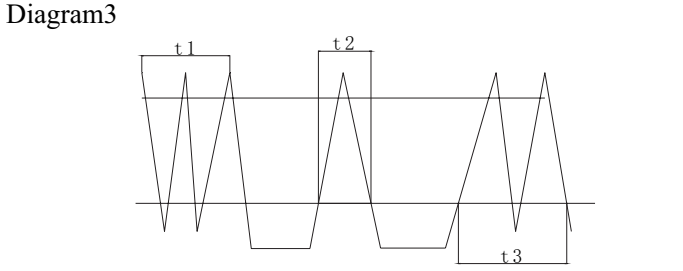
- Rating:** 10mA 10V DC.
- Contact resistance:** ≤10Ω. (initial)
- Insulation resistance:** ≥50MΩ 50V DC.
- Withstand voltage:** 50V AC 1 minute.
- Operating temperature:** -10°C ~ +60°C.
- Ambient humidity:** <85%RH.
- Operating force:** 25±10g.
- Minimum load:** 10mA 3.3V DC. (reference only)
- Mechanical life:** 300,000 Cycles. (each upright and opposite rotate 150,000 cycles)
- Electrical life:** 300,000 Cycles. (each upright and opposite rotate 150,000 cycles)
- Soldering temperature:** 250°C Max for 3 Sec.
- Soldering time:** 1 time only.
- Note:** Not washable, don't immerge into epoxy and organic solvent.

All specifications are restricted to QA test criteria. DRW: D.L. JIN, CHK: D.F. LEE, APP: H.Z. QIU

SPECIFICATIONS OF EC64S...83

1、General(一般特性) :			
1.1 Switch rating:	DC10V 10mA	(规格: DC10V 10mA)	
1.2 Operating temperature range	-10°C~60°C	(操作温度范围: -10°C~60°C)	
1.3 Preservative temperature range	-15°C~+65°C	(储存温度: -15°C~+65°C)	
1.4 Storage humidity range	<85% RH	(储存湿度:<85% RH)	
2.Performance 功能参数			
2.1 Electrical characteristics(电气特性)			
Items 项目		Test conditions 测试条件	Criteria 标准
2.1.1	Contact resistance 接触电阻	Measured by the Contact Resistance Apparatus or mΩ meter at 0.1A DC5V. The result is the average of 5 successive measurements. 在电压为 5 V, 直流电流为 0.1A 时, 用接触电阻测量仪或 mΩ 表测量。结果取测量 5 次后的平均值。	Refer to individual product drawing 参考规格图纸
2.1.2	Insulation resistance 绝缘电阻	Spec. voltage (Refer to the 2.3 item of spec. drawing) is applied between each pair of terminals and between the terminal and the metal frame for 60±5s. 在相互绝缘的所有端子之间及各接线端子与外露的非载流金属零件之间加载规格电压(参见规格图纸 2.3 项),持续时间 60±5s.	Refer to individual product drawing 参考规格图纸
2.1.3	Dielectric withstand in voltage 耐压强度	Spec. voltage (Refer to the 2.4 item of spec. drawing) is applied between each pair of terminals and between the terminal and the metal frame for 60±5s. 在相互绝缘的所有端子之间及各接线端子与外露的非载流金属零件之间加载规格电压(参见规格图纸 2.4 项),持续时间 60±5s.	There shall be no breakdown 无电击穿等异常。
3.Mechanical characteristics 机械特性			
3.1	Number and position of segment points 段点数及位置		12 segment points(each segment angle: 30° ±3°) 12 段点 (每段为 30° ±3°)
3.2	Output resolution 分解能力		6 pulse/360° 6 脉冲/360°
3.3	Torsion 转矩	Apply a tension meter on the midpoint of the actuator (or tip of the shaft)to supply a pressure vertically from its free position to operating position 在操作元件末端沿操作方向均匀施加静载荷, 使操作元件转换到动作位置。	Refer to individual product drawing 参考规格图纸

Items 项目		Test conditions 测试条件	Criteria 标准																													
3.4	Mechanical Shock 冲击	Mount the product to P.C.B. and apply static force of 300gf.cm. Min for 5 seconds, as shown in the plan. 试件焊接于 P.C.B 施加静载荷 300gf .cm Min. “F”如图所 示; 	The faces and configuration not have the distinct distortion. 表面及结构无明显变形																													
3.5	Hand soldering 手工焊	Use a soldering iron of 30 watts, controlled at 350-360°C approximately 3 seconds 1time while applying solder. 焊接时需在 30 瓦烙铁, 控制于 350-360°C, 大约 3 秒钟 1 次条件下进行。	A new uniform coating of solder shall cover a minimum of 90% of the surface being immersed. There shall be no defects in appearance or in the mechanical functions. 覆锡性能达到浸入表面的 90%以上。 没有出现任何外观和机械功能上的损伤。																													
3.6	Reflow soldering 回流焊	When applying reflow soldering, the peak temperature of the reflow Oven should be set to 250°C max. 当使用回焊炉进行焊接时, 最高温度设置为 250°C。 Condition for soldering (Reflow & Non-washable Type) Temperature Profile 焊接温度曲线图如下:  <table border="1" data-bbox="432 1787 1066 2063"> <thead> <tr> <th></th> <th>Components size 温区组成部分</th> <th></th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Temp. rise gradient 温度上升时间</td> <td>40S</td> <td>sec 秒</td> </tr> <tr> <td rowspan="2">B</td> <td>Heating time 升温时间</td> <td>60-120S</td> <td>sec 秒</td> </tr> <tr> <td>Heating temperature 升温温度</td> <td>120-220°C</td> <td>°C</td> </tr> <tr> <td rowspan="3">C</td> <td>Time over 220°C 超过220°C的时间</td> <td>60S</td> <td>sec 秒</td> </tr> <tr> <td>Peak temperature 峰值温度</td> <td>250°C</td> <td>°C</td> </tr> <tr> <td>Peak-temp. hold time 最高温度保持时间</td> <td>3S</td> <td>sec 秒</td> </tr> <tr> <td colspan="2">Soldering 焊接</td> <td>1</td> <td>times 次</td> </tr> </tbody> </table>		Components size 温区组成部分		Unit	A	Temp. rise gradient 温度上升时间	40S	sec 秒	B	Heating time 升温时间	60-120S	sec 秒	Heating temperature 升温温度	120-220°C	°C	C	Time over 220°C 超过220°C的时间	60S	sec 秒	Peak temperature 峰值温度	250°C	°C	Peak-temp. hold time 最高温度保持时间	3S	sec 秒	Soldering 焊接		1	times 次	There shall be no defects in appearance or in the mechanical functions. 没有出现任何外观和机械功能上的损伤。
	Components size 温区组成部分		Unit																													
A	Temp. rise gradient 温度上升时间	40S	sec 秒																													
B	Heating time 升温时间	60-120S	sec 秒																													
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Soldering 焊接		1	times 次																													

Items 项目	Test conditions 测试条件	Criteria 标准
<p>3.7</p> <p>Bouncing 切换特性</p>	<p>Diagram 1</p>  <p>Diagram2:</p>  <p>C.W direction (View ①) Phase difference T1, T2, T3, T4 (At rotational speed 60 r/min) Initial..... 4m sec.min. After life..... 2.5m sec.min.</p> <p>Diagram3</p> 	<p>Measurement circuit Diagram 1 N=60N/min</p> <p>t1,t3 : 5ms Max</p> <p>t2 : 5ms Max .</p> <p>T1,T2,T3,T4 : 4ms Min</p> <p>测试电路如图 1 N=60N/min t1, t3 : 5ms Max.</p> <p>t2 : 5ms Max</p> <p>T1,T2,T3,T4 : 4ms Min.</p>
<p>4. Durability characteristic:耐久性能</p>		
<p>4.1</p>	<p>Mechanical life 机械寿命</p> <p>300,000 cycles Min of operation shall be performed continuously at a rate of 15~20 cycles(each upright and opposite rotate 150,000/cycles). 在速度为15~20次/分的寿命试验设备上连续转换 300,000 次以上(正反转各 150,000 次).</p> <p>Electrical life 电气寿命</p> <p>300,000 cycles Min of operation shall be performed continuously at a rate of 15~20 cycles per 10mA 10VDC (each upright and opposite rotate 150,000/cycles). 在 10mA ,10VDC 条件下,速度为15~20次/分,在寿命试验设备上连续转换 300,000 次以上(正反转各 150,000 次).</p>	<p>After test:</p> <p>Contact resistance: 10Ω Max</p> <p>Operating force: 10gf. cm Min</p> <p>The Encoder shall be free from abnormalities in appearance construction. 实验后: 接触电阻:10Ω Max 操作力范围: 10gf. cm Min 开关外观及结构应无损坏</p>

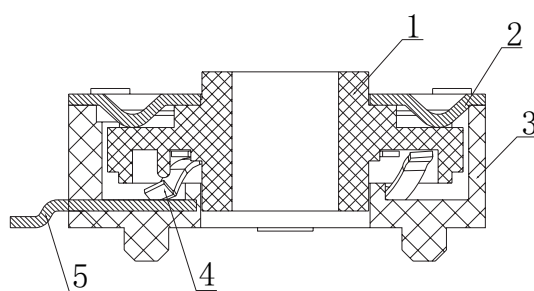
5. Packing explanation 包装说明		
Items 项目	Test conditions 测试条件	Criteria 标准
5.1 Packing 包装	<p>(1) The products are packed in the taping packaging. 产品使用料带包装</p> <p>(2) The number of the reels: 数量为一盘</p> <p>(3) Fine(5)reels at maximum shall be packed in a package. 包装一般在 5 卷以下</p> <p>(4) The number of the switches: 开关数量:</p> <p>(5) 1200 switches shall be packed in a reel. 1200 个开关包装为 1 卷</p> <p>(6) It should be noted that we Regard two cartons mentioned above as on package for export. 注意包装产品两侧硬胶之间不允许外露。</p> <p>(7) Tape form and dimensions: 料带形状及尺寸</p>	<p>There shall be no defects in appearance or in the mechanical functions in the process of shipping. 在包装运输过程中没有出现任何外观和机械功能上的损伤。</p>
6. Special Requirements 特别要求		
<p>6.1 Hazardous Substance Management: Follow environmental requirements. 有害物质管理: 遵循环境物质规范</p>		
7. Application Notes: 注意事项		
<p>7.1 Avoid storing the products in a place at high temperature, high humidity and in corrosive gases. 避免储藏于高温、潮湿及腐蚀的场所。</p> <p>7.2 Avoid excessive force when inserting into P.C.B so as to avoid deformation of terminals. 当插入 P.C.B 避免使用过分的外力, 以防端子变形。</p> <p>7.3 Influence for the characteristics by something dust or foreign articles. There is a possibility something dust or foreign articles put into click of brush plate and it should cause abnormal rotation feeling. 避免灰尘或外物会掉入开关内影响其接触性能。</p>		

MATERIALS

NO.	Part Name 品名	Q'TY 数量	Generic Class 材质
1	Stem 型物	1	PA6T
2	Case 外壳	1	SUS304
3	Base 底座	1	PA6T
4	Spring Plate 弹片	1	C5210
5	Terminals 端子	5	C2680

Structure chart:

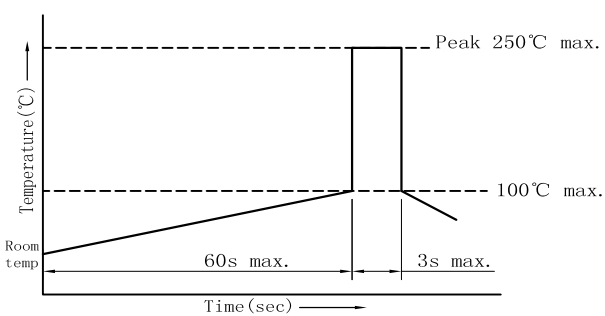
结构示意图:

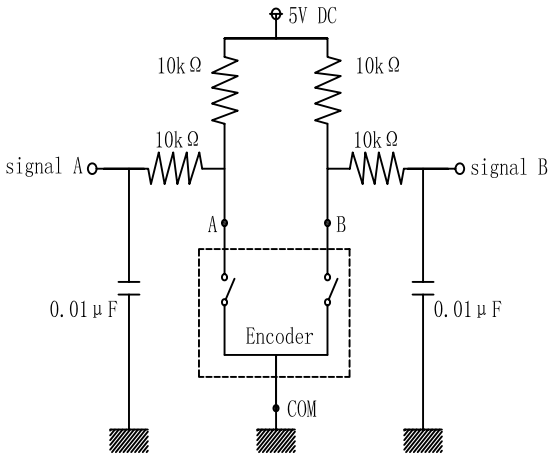
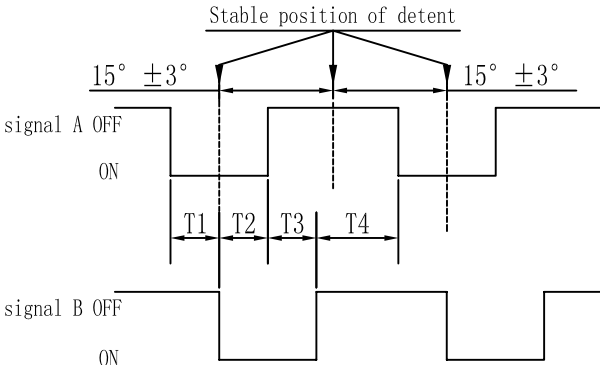
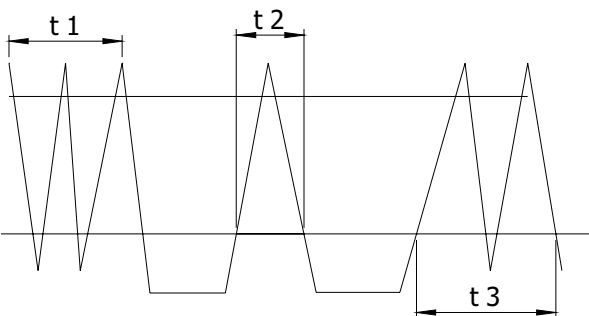


EC64S...83

SPECIFICATIONS OF EC64H...83

1、General(一般特性)：			
1.1 Switch rating:		DC10V 10mA	(规格: DC10V 10mA)
1.2 Operating temperature range		-10°C~60°C	(操作温度范围: -10°C~60°C)
1.3 Preservative temperature range		-15°C~+65°C	(储存温度: -15°C~+65°C)
1.4 Storage humidity range		<85% RH	(储存湿度: <85% RH)
2.Performance 功能参数			
2.1 Electrical characteristics(电气特性)			
Items 项目		Test conditions测试条件	Criteria 标准
2.1.1	Contact resistance 接触电阻	Measured by the Contact Resistance Apparatus or mΩ meter at 0.1A DC5V. The result is the average of 5 successive measurements. 在电压为 5 V, 直流电流为 0.1A 时, 用接触电阻测量仪或 m Ω 表测量。结果取测量 5 次后的平均值。	Refer to individual product drawing 参考规格图纸
2.1.2	Insulation resistance 绝缘电阻	Spec. voltage (Refer to the 2.3 item of spec. drawing) is applied between each pair of terminals and between the terminal and the metal frame for 60 ±5s. 在相互绝缘的所有端子之间及各接线端子与外露的非载流金属零件之间加载规格电压(参见规格图纸 2.3 项), 持续时间 60±5s.	Refer to individual product drawing 参考规格图纸
2.1.3	Dielectric withstand in voltage 耐压强度	Spec. voltage (Refer to the 2.4 item of spec. drawing) is applied between each pair of terminals and between the terminal and the metal frame for 60 ±5s. 在相互绝缘的所有端子之间及各接线端子与外露的非载流金属零件之间加载规格电压(参见规格图纸 2.4 项), 持续时间 60±5s.	There shall be no breakdown 无电击穿等异常.
3.Mechanical characteristics机械特性			
3.1	Number and position of segment points 段点数及位置		24 segment points(each segment angle: 15° ±3°) 24 段点 (每段为 15° ±3°)
3.2	Output resolution 分解能力		12 pulse/360° 12 脉冲/360°
3.3	Torsion 转矩	Apply a tension meter on the midpoint of the actuator (or tip of the shaft) to supply a pressure vertically from its free position to operating position 在操作元件末端沿操作方向均匀施加静载荷, 使操作元件转换到动作位置。	Refer to individual product drawing 参考规格图纸

Items 项目		Test conditions 测试条件	Criteria 标准												
3.4	Mechanical Shock 冲击	Mount the product to P.C.B. and apply static force of 300gf.cm. Min for 5 seconds. 试件焊接于 P.C.B 施加静载荷 300gf .cm Min.	The faces and configuration not have the distinct distortion. 表面及结构无明显变形												
3.5	Hand soldering 手工焊	Use a soldering iron of 30 watts, controlled at 380°C approximately 3 seconds 1 time while applying solder. 焊接时需在 30 瓦烙铁，控制于 380°C，大约 3 秒钟 1 次条件下进行。	A new uniform coating of solder shall cover a minimum of 90% of the surface being immersed. There shall be no defects in appearance or in the mechanical functions. 覆锡性能达到浸入表面的 90%以上。 没有出现任何外观和机械功能上的损伤。												
3.6	Wave soldering 波峰焊	When applying wave soldering, the peak temperature of the wave Oven should be set to 250°C max. 当使用低波炉进行焊接时，最高温度设置为 250°C。 Condition for soldering (Wave & Non-washable Type) Temperature Profile 焊接温度曲线图如下：  <table border="1" data-bbox="454 1881 1093 2049"> <thead> <tr> <th>Items</th> <th>Condition</th> </tr> </thead> <tbody> <tr> <td>Preheating temperature</td> <td>Ambient temperature of the soldered surface of PC board. 100°C max.</td> </tr> <tr> <td>Preheating time</td> <td>60s max.</td> </tr> <tr> <td>Soldering temperature</td> <td>250°C max.</td> </tr> <tr> <td>Continuous dipping time</td> <td>3s max.</td> </tr> <tr> <td>Number of soldering</td> <td>1 times max.</td> </tr> </tbody> </table>	Items	Condition	Preheating temperature	Ambient temperature of the soldered surface of PC board. 100°C max.	Preheating time	60s max.	Soldering temperature	250°C max.	Continuous dipping time	3s max.	Number of soldering	1 times max.	There shall be no defects in appearance or in the mechanical functions. 没有出现任何外观和机械功能上的损伤。
Items	Condition														
Preheating temperature	Ambient temperature of the soldered surface of PC board. 100°C max.														
Preheating time	60s max.														
Soldering temperature	250°C max.														
Continuous dipping time	3s max.														
Number of soldering	1 times max.														

Items 项目		Test conditions 测试条件	Criteria 标准
3.7	Bouncing 切换特性	<p>Diagram 1</p>  <p>Diagram2:</p>  <p>C. W direction (View ①) Phase difference T1, T2, T3, T4 (At rotational speed 60 r/min) Initial.....4m sec.min. After life.....2.5m sec.min.</p> <p>Diagram3</p> 	<p>Measurement circuit Diagram 1 N=60N/min</p> <p>t1,t3 : 5ms Max . t2 : 5ms Max .</p> <p>T1,T2,T3,T4 : 4ms Min</p> <p>测试电路如图 1 N=60N/min t1, t3 : 5ms Max.</p> <p>t2 : 5ms Max</p> <p>T1,T2,T3,T4 : 4ms Min.</p>

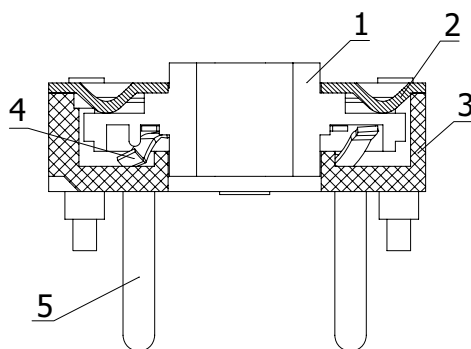
4. Durability characteristic:耐久性能		
Items 项目	Test conditions测试条件	Criteria 标准
4.1	<p>Mechanical life 机械寿命</p> <p>300,000 cycles Min of operation shall be performed continuously at a rate of 15~20 cycles(each upright and opposite rotate 150,000/cycles). 在速度为15~20次/分的寿命试验设备上连续转换300,000次以上(正反转各 150,000 次).</p>	<p>After test: Contact resistance: 10Ω Max Operating force: 10gf. cm. Min The Encoder shall be free from abnormalities in appearance construction. 实验后: 接触电阻 10Ω Max 操作力范围: 10gf. cm. Min 开关外观及结构应无损坏</p>
	<p>Electrical life 电气寿命</p> <p>300,000 cycles Min of operation shall be performed continuously at a rate of 15~20 cycles per 10mA 10VDC(each upright and opposite rotate 150,000/cycles). 在10mA,10VDC条件下,速度为15~20次/分,在寿命试验设备上连续转换 300,000 次以上(正反转各 150,000 次).</p>	<p>After test: Contact resistance: 10Ω Max Operating force: 10gf. cm. Min The Encoder shall be free from abnormalities in appearance construction. 实验后: 接触电阻: 10Ω Max 操作力范围: 10gf. cm. Min 开关外观及结构应无损坏</p>
5. Special Requirements特别要求		
5.1 Hazardous Substance Management Follow environmental requirements 有害物质管理: 遵环境物质规范。		
6. Quality records of delivered goods 出货证明记录		
6.1 Package boxes or package bags should be attached labels or identifiers of Model No., Quantity and Quality No. 成品包装箱或包装袋上应附有产品型号、数量及质量追踪号的标签或标识。		
6.2 There shall be quality records of inspection and test in package boxes. 出货产品包装批、出货批应附有产品检验、试验之质量证明记录。		
7. Application Notes: 注意事项		
7.1 Avoid storing the products in a place at high temperature, high humidity and in corrosive gases. 避免储藏于高温、潮湿及腐蚀的场所。		
7.2 Avoid excessive force when inserting into P. C. B so as to avoid deformation of terminals. 当插入 P.C 板时, 避免使用过分的外力, 以防端子变形。		
7.3 Influence for the characteristics by something dust or foreign articles. There is a possibility something dust or foreign articles put into click of brush plate and it should cause abnormal rotation feeling. 灰尘或外物会影响产品特性, 当灰尘或外物掉入开关内会影响回转手感特性。		

MATERIALS

NO.	Part Name 品名	Q'TY 数量	Generic Class 材质
1	Stem 型物	1	PA6T
2	Case 外壳	1	SUS304
3	Base 底座	1	PA6T
4	Spring Plate 弹片	1	C5210
5	Terminals 端子	5	C2680

Structure chart:

结构示意图:



EC64H...83