



**标准&定制开关连接器产品制造商**  
DONG GUAN XI BANG ELECTRONICS CO., LTD.

# 规格书

## SPECIFICATION

CUSTOMER NAME 客户名称: \_\_\_\_\_  
 CUSTOMER NO. 客户编号: \_\_\_\_\_  
 SERIES 系列: 增量式全码无齿感 旋转编码开关4.8\*3.9\*2.86mm  
 MODEL NO. 型号: **XB-EN-01-FSF series**  
 DRAWING NO. 图形号: **Encoding Switch Rotary type**

If specification of this product meets your request, please confirm all the items of it and return to us with signature and stamp, it will be basis of our production and record. Thanks your cooperation in advance!

若此产品规格符合贵司要求，敬请确认此规格书内所有项目  
 并签名和盖章后回传给我司，以作我司产品制作之  
 依据和存档之用，多谢合作！

### EXAMINE & APPROVAL 审批

APPROVE 接受	NOT APPROVE 不接受
SIGNATURE 签署      STAMP 盖章      DATE 日期	

PREPARED BY.制表人	CHECKED BY.校对	APPROVED BY.审核	APPROVAL BY.批准
<div style="border: 1px solid red; padding: 2px;">研发部</div> <div style="border: 1px solid red; padding: 2px;">戴海明</div> <div style="border: 1px solid red; padding: 2px;">2022.06.08</div>	<div style="border: 1px solid red; padding: 2px;">品质部</div> <div style="border: 1px solid red; padding: 2px;">黄自清</div> <div style="border: 1px solid red; padding: 2px;">2022.06.08</div>	<div style="border: 1px solid red; padding: 2px;">工程部</div> <div style="border: 1px solid red; padding: 2px;">庞军</div> <div style="border: 1px solid red; padding: 2px;">2022.06.08</div>	<div style="border: 1px solid red; padding: 2px;">总经办</div> <div style="border: 1px solid red; padding: 2px;">吴量</div> <div style="border: 1px solid red; padding: 2px;">2022.06.08</div>

**东莞市溪榜电子有限公司**

**Dong guan Xi Bang Electronics Co., Ltd**

地址: 广东省东莞市黄江镇合路工业区

Address: He Lu Industrial Zone, Huangjiang Town, Dongguan City, Guangdong Province

Tel: (0769)82055138/82056828

Fax: (0769)83663452

邮箱: admin@alspr.com    switch@alspr.com

http://www.alspr.cn/    http://www.alspr.com/

**Dong Guan XB Electronics Co., Ltd**

Account Number: 705540238

Bank Name: Citibank N. A., Hong Kong Branch

Country/Region: Hong Kong

Bank Code: 006

Bank Address: 3 Garden Road, Central, Hong Kong

SWIFT/BIC: CITIHKHX (CITIHKHXXXX\*If 11 characters are required)

MAil: HK@ALPSR.CN    XB@ALPSR.CN    XB@ALPSR.COM

Quality core! Afterburner for Made in China!





# SPECIFICATION

Page

3/13

Version

A/0

MODEL

XB-EN series

Date

2024. 5. 8

## 1. General Characteristics 一般特性:

1.1 Application: This specification is applied to rotary encoder used for general.

通用范围: 该承认书适于通用旋转编码器。

### 1.2 Operating

Temperature Range: -40

°C to +85°C

使用温度范围: -40°C to +85°C

### 1.3 Operating Relative Humidity: ≤85% RH

使用相对湿度: ≤85%RH

### 1.4 Test Conditions: Unless otherwise specified, the atmospheric

conditions for making measurements and tests are as follows:

实验条件: 除非另有规定, 进行测试和实验的大气条件如下:

Environment Temperature: 5~35°C

环境温度: 5~35°C

Relative Humidity:

45~85%

相对湿度: 45~85%

Atmospheric Pressure: 86~106Kpa

(860~1060mbar)

大气压力: 86~106Kpa (860~1060mbar)

## 2. Appearance, Structure and Dimensions 外观, 结构和尺寸:

2.1 Appearance: The encoder shall have good finishing, and no rust, crack or plating defects.

外观: 产品外观良好, 无锈蚀、裂纹和镀层缺陷。

2.2 Structure & Dimensions: See Product Specifications.

结构及尺寸: 参见产品规格图。

2.3 Markings: See Product Specifications.

标识: 参见产品规格图。

## 3. Ratings 额定负荷: 5VDC 0.5mA。



# SPECIFICATION

Page	4/13
Version	A/0
Date	2024.5.8

MODEL XB-EN series

## 4. Electrical Characteristics 电气特性:

NO.	项目 ITEM	试验条件 TEST CONDITONS	要求 REQUIREMENTS
4.1	接触电阻 Contact Resistance	Using the micro resistance tester with error less than 5% for testing. 使用误差小于 5% 的微电阻测试仪进行测试。	$\leq 100m\Omega$
4.2	绝缘电阻 Insulation Resistance	Using the insulation resistanc tester.setting parameters to DC50V, The insulation resistance between the terminal and the cover,the terminal and the terminal is test. 使用绝缘电阻测试仪, 设置参数为 DC50V, 测试端子与外壳, 端子与端子之间的绝缘阻抗,	50M $\Omega$ Min.
4.3	抗电强度 Dielectric Voltage	Using the voltage resistance tester, set the parameters to the AC50V, test the voltage resistance between the terminal and cover or terminal and terminal,time is 60s. 使用耐电压测试仪, 设置参数为 AC50V, 测试端子和外壳或端子与端子之间的耐电压,时间 60s。	AC50V test 60s, Nodielectric breakdown shall occur. AC50V 测试 60s 无击穿现象发生。



# SPECIFICATION

Page

5/13

Version

A/0

MODEL

XB-EN series

Date

2024. 5. 8

NO.

项目  
ITEM

试验条件  
TEST CONDITONS

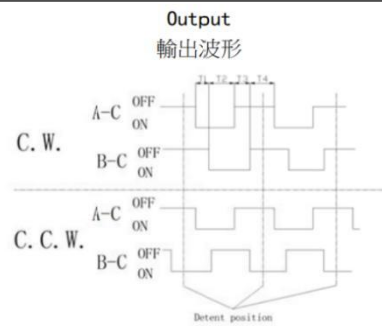
要求  
REQUIREMENTS

4.4

输出信号  
Output  
signal  
format

The encoder rotates 360 degrees per second, 2 Phase-different signals ( signalA, signalB ) Derails shown in ( The broken line shows detent position. ) 编码器每秒钟转动 360度, A、B两信号输出相位差, 输出波形详见图, 卡点位置如下图所示(虚线表示带卡点装置的上擎子处位置)

T1, T2, T3, T4 ≥ 4ms



Shaft rotational direction  
轴回转方向

Signal (Between terminals)  
信号 (端子之间)

C.W.

A(A~C)

B(B~C)

C.C.W.

A(A~C)

B(B~C)

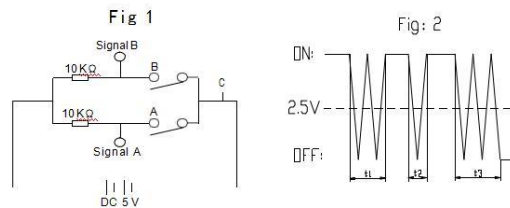
4.5

Switching characteristics  
切换特性

The encoder is connected to the circuit in Figure 1. The encoder rotates 360 degrees per second. When the circuit is switched from ON to OFF, At 2.5 v voltage , test circuit generates vibration time, when every times.

将编码器按图 1 的电路接在示波器一上, 编码器每秒钟转动 360 度, 当电路从 ON 到 OFF 的瞬间, 每次转换, 在电压 2.5V 时, 测试电路产生振动的时间.


Chattering  
振动 Fig.2  
t1, t3 < 3ms



The encoder is connected to the circuit in Figure 1. The encoder rotates 360 degrees per secon , when the circuit in the ON region, test circuit generation t me of jitter. Beating position acquisition should be in the N region of voltage at 2.5V voltage position. In the ON region, In the ON region, voltage at 2.5V phenomenon occurs more than 2 times, it is considered to be continuous beating.

将编码器按图 1 的电路接在示波器上, 编码器每秒钟转动 360 度, 当电路在 ON 区域时, 测试电路产生跳动的的时间. 跳动位置的获取应在 ON 区域, 电压在 2.5V 的位置. 在 ON 区域, 电压在 2.5V 的现象出现 2 次以上的, 被认为是连续跳动。

Sliding noise (Bounce)  
跳动 Fig.2  
t2 < 2ms

	<h1 style="margin: 0;">SPECIFICATION</h1>		Page	6/13
			Version	A/0
	MODEL	XB-EN series		Date
NO.	项目 ITEM	试验条件 TEST CONDITIONS	要求 REQUIREMENTS	
<h2 style="margin: 0;">5.Mechanical Characteristics 机械特性</h2>				
5.1	Detent points 执子点数与位置		12 detent points each detent angle:30° ±5° 12 点执子 每点角度: 30° ±5°	
5.2	Output waves 输出波形数	Oscilloscope test available。可使用示波器测试。	12pulse/360° 12 脉波/360°	
5.3	Rotational force 旋转力矩	Use of torsion gauges , The test head is inserted into the rotating shaft , rotates according to the rotation direction of the shaft, and the experiment is carried out with the uniform rotation force, Read maximum. 使用扭力计, 把测试头插入转轴中, 沿轴的转动方向, 使用均匀的旋转力进行测试, 读取最大值。	10±5gf.cm	
5.4	Terminal Strength 端子强度	A static load of 3N shall be applied to the tip of terminals for 10s in any direction. 任意方向施加 1N作用于接线端末端, 持续时间 10s.	Shall be free from terminal looseness, damage and insulator breakage. The electrical performance requirements specified shall be satisfied. 端子无松动, 损坏及绝缘层的破裂。电气性能应符合第 4 项要求。	



# SPECIFICATION

Page

7/13

Version

A/0

MODEL

XB-EN series

Date

2024. 5. 8

NO	项目 ITEM	试验条件 TEST CONDITIONS	要 求 REQUIREMENTS
5.5	Vibration Proof  振动	<p>Encoder shall be secured to a testing machine by a normal mounting device and method. Encoder shall be tested according to the following request::</p> <ol style="list-style-type: none"> <li>(1) Vibration frequency range = 10~55 Hz</li> <li>(2) Total amplitude =1.5mm</li> <li>(3) Sweep ratio: 10~55~10Hz Approx. 1 min</li> <li>(4) Method of changing the sweep vibration frequency: linear</li> <li>(5) Direction of vibration: Three perpendicular directions including actuating direction.</li> <li>(6) Duration: 2 hours (6 hours in total)</li> </ol> <p>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：</p> <ol style="list-style-type: none"> <li>(1) 振频=10-55Hz</li> <li>(2) 振 幅 1.5mm</li> <li>(3) 振动变化速率：10-55-10Hz 大约 1 分钟</li> <li>(4) 变频方法：线性型式</li> <li>(5) 振动方向：三个相互垂直的方向，其中一个方向应是促动元件运动的方向。</li> <li>(6) 时间：每个方向 2小时（共 6小时）</li> </ol>	<p>After test, Contact resistance:5Ω Max.Insulation resistance:10MΩ Min. The electrical performance requirements specified shall be satisfied. No abnormalities shall be recognized in appearance and construction.</p> <p>实验后： 接触电阻：5 Ω Max. 绝 缘电阻：10M Ω Min. 电气性能应符合要求。 表面及结构无明显变形。</p>
5.6	Mechanical Shock 耐冲击	<p>Encoder shall be tested according to the following request:</p> <ol style="list-style-type: none"> <li>(1) Mounting Method: Normal</li> <li>(2) Acceleration: 490m/s<sup>2</sup> (50G)</li> <li>(3) Duration: 11ms</li> <li>(4) Test Direction: 6 directions</li> </ol> <div data-bbox="523 1444 790 1630" style="text-align: center;"> </div> <p>(5) Number of shocks: 3 times per direction (18 times in total)</p> <p>编码器在下述参数条件下进行试验：</p> <ol style="list-style-type: none"> <li>(1) 安装方法：常规方法</li> <li>(2) 加 速 度：490m/ s<sup>2</sup> (50G)</li> <li>(3) 时间：11ms</li> <li>(4) 实验方向：图示 6 方向</li> <li>(5) 冲击次数：每个方向 3次（总共 18次）</li> </ol>	<p>After test, Contact resistance: 5Ω Max. Insulation resistance:10MΩ Min. The Electrical performance requirements specified shall be satisfied. Shall be free from mechanical abnormalities.</p> <p>实验后： 接触电阻：5 Ω Max. 绝缘电阻：10M Ω Min. 电气性能应符合要求。 表面无变形且操作无异常</p>





# SPECIFICATION

Page	8/13
Version	A/0
Date	2024. 5. 8

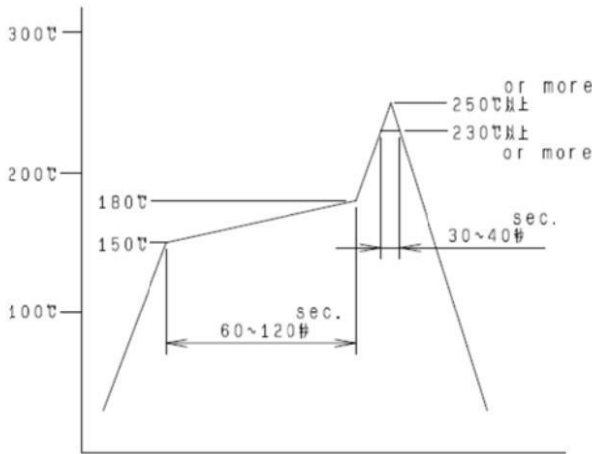
MODEL	XB-EN series
-------	--------------

NO.	项目 ITEM	试验条件 TEST CONDITIONS	要求 REQUIREMENT
-----	------------	-------------------------	-------------------

## 6.Soldering Characteristics 焊接性能

6.1	Solder Ability 可焊性	<p>The crucible is tested under the following parameters :</p> <p>(1) solder: ti paste containing more than 3 silver.</p> <p>(2) Welding te perature :245°Cmin.;</p> <p>(3) Welding ti e :3 s min.</p> <p>编码器在下述参数条件下进行试验:</p> <p>(1) 焊料: 含银 3 以上锡膏。</p> <p>(2) 焊接温度: 245°C Min。</p> <p>熔焊时间: 3 s Min.</p>	<p>Melting surface area should xceed 95 % of the total</p> <p>熔锡面面积应该超过 95%</p>
-----	-----------------------	--	---

6.2	Solder Heat Resistance 耐焊接热	<p>The filter is tested under the following parameters: e of welding: SMT</p> <p>ding temperature and time:</p> <p>g :250°C above 3-5 S: 230°C above 30-40 S: nual</p> <p>welding :°CMax 3s Max 350</p> <p>编码器在下述参数条件下进行试验:</p> <p>(1) 焊接方式: SMT</p> <p>(2) 焊接温度及时间:</p> <p>自动焊接: 250°C以上 3-5S; 230°C以上 30-40S;</p> <p>(3) 手工焊接: 350°C Max 3s Max</p>	<p>No abnormalities shall be observed in appearance and operation.</p> <p>无外观、熔胶变形不良, 扭力衰变 Max 30 。</p> <p>电讯性能符合第 4 项。</p>
-----	--------------------------------	---	---







# SPECIFICATION

Page

9/13

Version

A/0

MODEL

XB-EN series

Date

2024. 5. 8

## 7. Durability characteristics 耐久性能

NO.	项目 ITEM	试验条件 TEST CONDITIONS	要求 REQUIREMENT
7.1	Mechanical Life 机械寿命	<p>Under the condition of no load, the speed is 30 times per minute, and the life test equipment is continuously converted on the life test equipment. the working mode of the life test equipment is to rotate 360 degrees counterclockwise immediately after rotating 360 degrees clockwise for the test once..</p> <p>在不带负荷的条件下，速度为 30 次/分钟，在寿命试验设备上连续转换，寿命试验设备工作方式是顺时针方向旋转 360 度后立即逆时针方向旋转 360 度为试验 1 次</p>	<p>After testContact resistance: 5Ω Max. Insulation resistance:10MΩ Min. The decay of the operating force should be within + 50 % .The electrical performance requirements specified in item 4.3-4.5 shall be satisfied.</p> <p>实验后： 接触电阻：5 Ω Max. 绝缘电阻：10M Ω Min. 操作力衰变应在 ±30 以内。机械性能应符合第 5.1、5.3 条的要求</p>
7.2	Electronics Life 电气寿命	<p>Under the condition of the following load, the speed is 30 times / min, and the life test equipment is continuously converted on the life test equipment. The working mode of the life test equipment is to rotate 360 degrees counterclockwise immediately after the clockwise rotation 360 degrees for the test once. . Load :0.1 mA 5VDC.</p> <p>在带以下负荷的条件下，速度为 30 次/分，在寿命试验设备上连续转换，寿命试验设备工作方式是顺时针方向旋转 360 度后立即逆时针方向旋转 360 度为试验 1 次。 .</p> <p>负载：0.1mA 5VDC.</p>	<p>After the experiment: Contact resistance :5ΩMax .Electrical resistance :10 MΩMin. No pulse number increases or decreases badly. . The telecommunication performance shall meet the requirements of Sections 4.4 and4.5</p> <p>实验后： 接触电阻：5 Ω Max. 绝缘电阻：10M Ω Min. 无脉冲数增加或减少不良。 . 电讯性能应符合第 4.4、4.5 条的要求。</p>



# SPECIFICATION

Page

10/13

Version

A/0

MODEL

XB-EN series

Date

2024. 5. 8

## 8. Weather Proof Characteristics 耐候性能:

NO.	项目 ITEM	试验条件 TEST CONDITIONS	要求 REQUIREMENT
8.1	Cold Proof 低温	<p>The test piece shall remain free for 240 hours in a temperature control box of <math>-40 \pm 2^{\circ}\text{C}</math>, and then recover for 1 hour at normal temperature and humidity. The test piece shall be measured within 1 hour thereafter.</p> <p>The water droplets shall disappear.</p> <p>试件在<math>-40 \pm 2^{\circ}\text{C}</math>的温控箱内无工作静态保持 240 小时，然后在正常温度和湿度下恢复 1 小时，并在此后 1 小时内对试品进行测量，水滴应消失。</p>	<p>After test,</p> <p>Contact resistance: <math>5 \Omega</math> Max.      Insulation resistance: <math>10\text{M} \Omega</math> Min.</p> <p>The Electrical performance requirements specified shall be satisfied.</p> <p>实验后： 接触电阻：<math>5 \Omega</math> Max. 绝缘电阻：<math>10\text{M} \Omega</math> Min. 电气性能应符合第 4 项要求。</p>
8.2	Hot Proof 高温	<p>The test piece is kept at 240hours without working pressure in the temperature control box of <math>85 \pm 2^{\circ}\text{C}</math>, then recovered at normal temperature and humidity for 1 hour, and measured within 1 hour after that, the water droplets should disappear.</p> <p>试件在 <math>85 \pm 2^{\circ}\text{C}</math>的温控箱内无工作静态保持保持 240 小时，然后在正常温度和湿度下恢复 1 小时，并在此后 1 小时内对试品进行测量，水滴应消失。</p>	



# SPECIFICATION

Page

11/13

Version

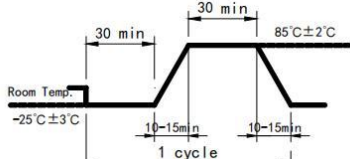
A/0

MODEL

XB-EN series

Date

2024. 5. 8

NO.	项目 ITEM	试验条件 TEST CONDITIONS	要求 REQUIREMENT
8.3	Moisture Resistance 恒定湿热	<p>After testing at <math>40 \pm 2^\circ \text{C}</math>, <math>90 \sim 95\% \text{RH}</math> for 240 hours, the encoder shall be allowed to stand under normal temperature and humidity conditions for 1 hour, and measurement shall be made within 1 hour after that. Water drops shall be eliminated.</p> <p>试件在 <math>40 \pm 2^\circ \text{C}</math>, <math>90\text{-}95\text{RH}</math> 的温控箱内无工作静态保持 240 小时, 然后在正常温度和湿度下恢复 1 小时, 并在此后 1 小时内对试品进行测量, 水滴应消失。</p>	<p>After test, Contact resistance: <math>5 \Omega \text{ Max.}</math> Insulation resistance: <math>10 \text{M} \Omega \text{ Min.}</math> The Electrical performance requirements specified in item 4.3-4.5 shall be satisfied.</p> <p>实验后: 接触电阻: <math>5 \Omega \text{ Max.}</math> 绝缘电阻: <math>10 \text{M} \Omega \text{ Min.}</math> 电气性能应符合第 4.3-4.5 条的要求。</p>
8.4	Temperature Cycling 温度转换	<p>After 5 cycles of following conditions, the encoder shall be allowed to stand under normal temperature and humidity conditions for 1 hour, and measurement shall be made within 1 hour after that. Water drops shall be eliminated.</p> <p>试件按下述实验条件试验 5 次, 然后在正常温度和湿度下恢复 1 小时, 并在此后 1 小时内对试品进行测量, 水滴应消失。</p> 	<p>After test, Contact resistance: <math>5 \Omega \text{ Max.}</math> Insulation resistance: <math>10 \text{M} \Omega \text{ Min.}</math> The electrical performance requirements specified in item 4.3-4.5 shall be satisfied.</p> <p>实验后: 接触电阻: <math>5 \Omega \text{ Max.}</math> 绝缘电阻: <math>10 \text{M} \Omega \text{ Min.}</math> 电气性能应符合第 4.3-4.5 条的要求。</p>
8.5	Salt Mist 盐雾实验	<p>The encoder shall be checked after the following test:</p> <ol style="list-style-type: none"> <li>(1) Temperature: <math>35 \pm 2^\circ \text{C}</math></li> <li>(2) Salt Solution: <math>5 \pm 1\%</math> (Solids by mass).</li> <li>(3) Salt deposit shall be removed by running water.</li> <li>(4) Duration: 48 hours</li> </ol> <p>试件在下述实验后测量:</p> <ol style="list-style-type: none"> <li>(1) 温度: <math>35 \pm 2^\circ \text{C}</math></li> <li>(2) 盐溶液浓度: <math>5 \pm 1\%</math> (质量百分比)。</li> <li>(3) 盐沉积物用水冲掉。</li> <li>(4) 时间: 48 小时</li> </ol>	<p>After the test is dried, there are no corrosion spots on the metal parts that affect the performance of the product, and the electrical properties should meet the requirements of Article 4.</p> <p>试验干燥后, 在金属件上没有影响产品性能的腐蚀斑点, 电气性能应符合第 4 条的要求。</p>
8.6	Vulcanization test 硫化试验	<p>The specimens were tested under the following conditions:</p> <ol style="list-style-type: none"> <li>(1) Temperature : <math>35 \pm 2^\circ \text{C}</math></li> <li>(2) Potassium sulfide solution concentration 2% (mass percentage). Time : 2 minutes.</li> </ol> <p>试件按下述条件实验:</p> <ol style="list-style-type: none"> <li>(1) 温度: <math>35 \pm 2^\circ \text{C}</math></li> <li>(2) 硫化钾溶液浓度: 2% (质量百分比)。</li> <li>(3) 时间: 2 分钟。</li> </ol>	<p>After the test is dried, there are no corrosion spots on the metal parts that affect the performance of the product, and the electrical properties should meet the requirements of Article 4.</p> <p>试验干燥后, 在金属件上没有影响产品性能的腐蚀斑点, 电气性能应符合第 4 条的要求。</p>



# SPECIFICATION

Page

12/13

Version

A/0

MODEL

XB-EN series

Date

2024.5.8

## 9. Management of environmental hazardous substances 环境危害物质管理

This product complies with the "√" hook under the environmental hazardous substances management standard selection.

本产品符合下方“√”勾选的环境危害物质管理标准。

√

本产品符合欧盟 ROHS 2.0 标准要求.

本产品符合 HF 标准要求.

√

本产品符合 REACH 标准要求.

## 10. Storage condition 贮存条件:

10.1 In order to protect the switch performance and the soldering conditions, it should keep the

switch under the following conditions:

为防止本产品的性能劣化和耐焊性等性能受到影响, 请保管在以下的条件和环境下:

10.1.1. Temperature of  $-30^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$ , with humidity lower than 85%RH;

温度  $-30^{\circ}\text{C}$  以上,  $+80^{\circ}\text{C}$  以下, 湿度 85% 以下的环境。

10.1.2. Avoid storing in the environment containing corrosive gas;

避免保存在含有腐蚀性气体等的空气中。

10.1.3. Avoid keeping it in the location with direct sunlight.

避免保存在日光能直射的场所。

10.1.4. Store using the standard packing without exerting force.

在不施加负重外力的包装状态下进行保管。

10.2 The standard storage period is 12 months before opening the package. Preferably to be used

as soon as possible. After opening the package, you should put the remaining switches in a plastic

bag to prevent from damp and corrosive gas with maximum up to 3 months.

产品未打开包装的保存标准期限为 12 个月。打开包装后有剩余品时, 应将剩余部分以胶袋包装好以同外界隔离, 请进行合适的防湿, 防腐蚀气体等处理后进行保管, 保存期限为 3 个月。