

1. 适用范围 / SCOPE

此份规格书涵盖 MSH2512-Series 金属板电流感测电阻组件相关规格。

This specification covers MSH2512-Series, which are Metal Strip Current Sensing Resistor.

2. 产品型号/TYPE NUMBER

MSH	2512	M/F	×W×	R×××	*	*
(1)	(2)	(3)	(4)	(5)	(6)	(6)

- (1) 产品系列号 / SERIES NUMBER : Ex.MSH2512 = 短电极/ Short electrode ; 两端子 / two terminal ; 有侧导 / side electrode / size "0.25×0.12"
- (2) 产品材质 / Material : M = 锰铜复合铜合金 / Complex alloy(MnCu,Cu) ; F = 铁铬铝复合铜合金 / Complex alloy(FeCrAl,Cu)
- (3) 产品瓦特数 / Power Rating : Ex. 1W0=1.0Watt ; 3W0=3.0Watt
- (4) 产品阻值 / Nominal Resistance Value : Ex. 1.5mΩ →1M50*I ; 3mΩ →R003
- (5) 组件电阻偏差值 / Resistance Tolerance : Ex. D=±0.5% ; F=±1% ; G=±2%
- (6) 產品碼/Product code:Ex. I →Non-standard electrode size; U →Special size.

3. 产品尺寸 / PRODUCT DIMENSIONS

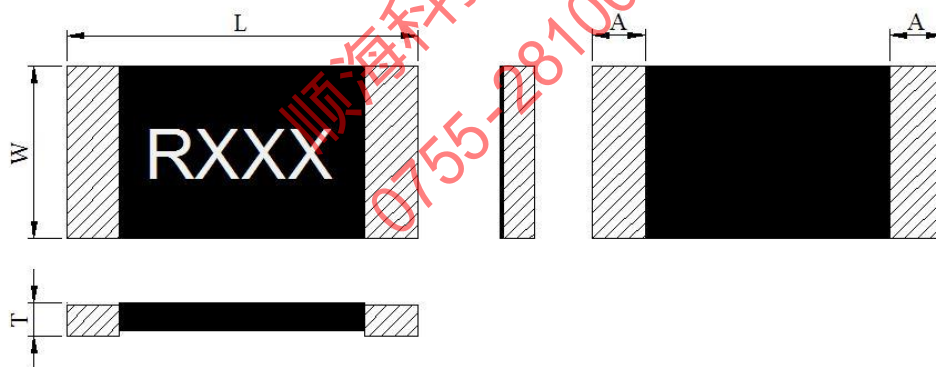


图 1 / Fig.1

Unit(mm)

Part Number	W	L	T	A
MSH2512M3W0-Series 0M50/0M75	3.20±0.30	6.40±0.30	1.05±0.20	1.90±0.25
MSH2512M3W0-Series R001~R003	3.20±0.30	6.40±0.30	1.10±0.20	0.80±0.25
MSH2512F3W0-Series R004				
MSH2512F3W0-Series R005*U~R056*U	3.20±0.30	6.40±0.30	0.90±0.20	0.80±0.25

MSH2512M2W0-Series 0M50/0M75	3.20±0.30	6.40±0.30	1.05±0.20	1.90±0.25
MSH2512M2W0-Series 1M50*I/R001*I	3.20±0.30	6.40±0.30	0.90±0.20	1.90±0.25
MSH2512M2W0-Series R002~R004	3.20±0.30	6.40±0.30	0.90±0.20	0.80±0.25
MSH2512F2W0-Series R005~R056				

4. 产品结构及使用材料说明(参考图 2) / STRUCTURE & MATERIAL (Ref to Fig.2)

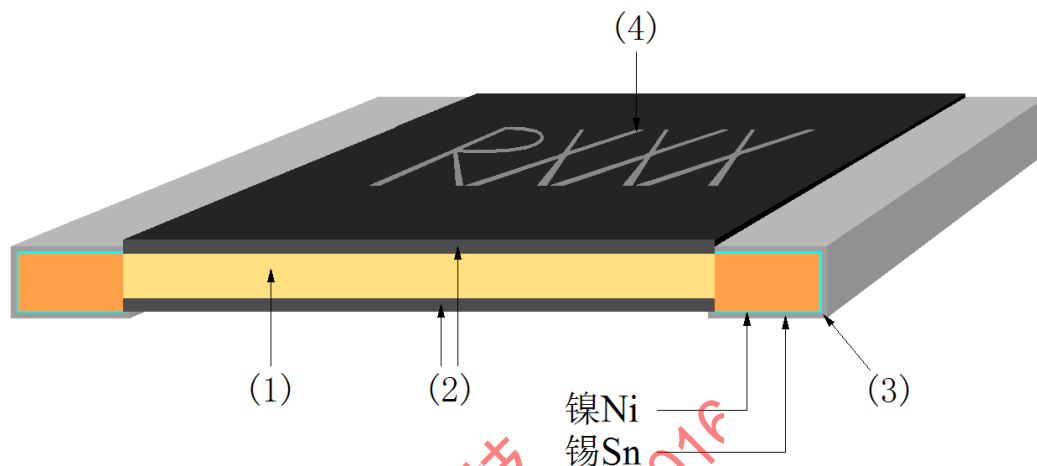


图 2 / Fig 2

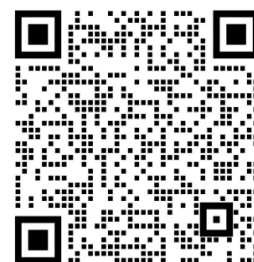
4.1 电阻本体 / Resistive element(1): M = 锰铜复合铜合金 / Complex alloy(MnCu,Cu) ;

F = 铁铬铝复合铜合金 / Complex alloy(FeCrAl,Cu)

4.2 保护防焊层 / Protective coating(2) : 防火级环氧树脂,符合 UL- 94-V0 要求(黑色) /
Flame-retardant epoxy, meets UL- 94-V0 requirements (black)

4.3 电镀层 / Plating layer(3) : 锡、镍/ Sn、Ni

4.4 文字标记 / Marking (4) : 镭射打标 / Laser marking



5. 电气特性 / ELECTRICAL CHARACTERISTICS

Part Number	Power Rating (Watt)	Material	Resistance Value (mΩ)	TCR (ppm/°C)	Resistance Tolerance (%)
MSH2512M3W0-Series 0M50/0M75	3.0	M	0.50/0.75	±150	±1%(F)

MSH2512M3W0-Series R001	3.0	M	1	±100	±1%(F)、 ±0.5%(D)
MSH2512M3W0-Series R002~R003	3.0	M	2~3	±50	±1%(F)、 ±0.5%(D)
MSH2512F3W0-Series R004	3.0	F	4	±50	±1%(F)、 ±0.5%(D)
MSH2512F3W0-Series R005*U~R056*U	3.0	F	5~50	±50	±1%(F)、 ±0.5%(D)
MSH2512M2W0-Series 0M50/0M75	2.0	M	0.50/0.75	±150	±1%(F)
MSH2512M2W0-Series 1M50*I/R001*I	2.0	M	1/1.5	±100	±1%(F)、 ±0.5%(D)
MSH2512M2W0-Series R002~R004	2.0	M	2~4	±50	±1%(F)、 ±0.5%(D)
MSH2512F2W0-Series R005~R056	2.0	F	5~50	±50	±1%(F)、 ±0.5%(D)

6. 产品特性及信赖性测试规范 / PRODUCT CHARACTERISTICS AND RELIABILITY TEST STANDARD

测试方法 Parameter	条件 Conditions	允收标准 Requirements
瞬间过载测试 / Short Time Over Load	$P = 5.0P_r$; $T = 25 \pm 2^\circ\text{C}$, $t = 5\text{sec}$	$\pm(1.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.13
高温测试 / High Temp. Exposure	$T = +170 \pm 2^\circ\text{C}$; $t = 1000\text{h}$	$\pm(1.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.25
低温测试 / Low Temp. Storage	$T = -55 \pm 2^\circ\text{C}$; $t = 1000\text{h}$	$\pm(1.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.25
湿度负载寿命测试 / Moisture Load Life (60°C、95%RH)	$V_{\text{test}} = V_{\text{max}}$; $T = 60 \pm 2^\circ\text{C}$; $\text{RH} = 95\%$; $t = 90\text{min ON} , 30\text{min OFF} , 1000\text{h}$	$\pm(2.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.25

冷热冲击测试 / Thermal Shock	[-55 °C 30min. → R.T. 3min. → +155 °C 30min → R.T. 3min], 100个连续循环 / 100Cycles	±(1.0%+0.5mΩ) IEC60115-1 4.19
在 70°C 下负载寿命测试 / Load Life at 70°C	Vtest = Vmax ; T=70±2°C ;t= 90min ON , 30min OFF,1000h	±(2.0%+0.5mΩ) IEC60115-1 4.25
可焊性测试 / Solderability	浸入锡炉 / Dip into solder at T = 245±5°C , t = 3±0.5sec	锡 涵 盖 面 积 /The covered area >95% IEC60115-1 4.17
抗焊热性测试 / Resistance to Solder Heat	经三次热风式回焊炉 / Through Reflow,3times T= 260±5°C , t =20±1sec	±(1.0%+0.5mΩ) IEC60115-1 4.18
机械冲击测试 / Mechanical Shock	加速度 a =100G , 振幅时间t =6ms a =100G , t =6ms	±(1.0%+0.5mΩ) IEC60115-1 4.21
基板弯曲测试 / Substrate Bending	两支撑点间距 / Span between fulcrums : 90mm ; 振幅 / Bend Width: 2mm ; 测试板/Test board: 玻璃纤维板/ Glass-Epoxy Board ;厚度 / Thickness =1.6mm	±(1.0%+0.5mΩ) IEC60115-1 4.33

7. 环境特性 / ENVIRONMENTAL CHARACTERISTIC

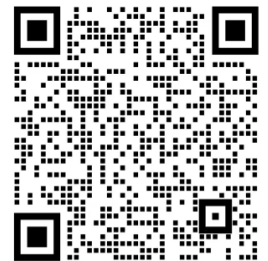
7.1 操作温度范围: -55°C ~ 170°C / Operating Temperature:-55°C ~ 170°C

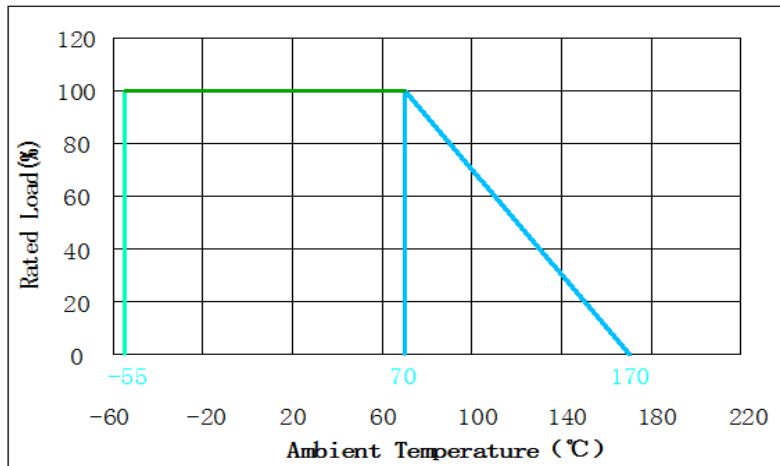
额定功率温度衰变曲线 / Typical Thermal Derating Curve

额定功率乃指于 70 °C 以内可连续满额功率使用的术语。

下图为当操作温度高于 70°C 时的可使用功率衰减曲线。

Power rating is based on continuous full load operation at rated ambient temperature of 70 °C. For resistors operated at ambient temp. in excess of 70 °C, the max. load shall be derated in accordance with the following curve.





7.2 存储条件 / STORAGE CONDITIONS

在温度+10°C ~ 40°C、相对湿度≤75%的密闭条件下可存放2年。

在温度+10°C ~ 60°C、相对湿度为95%的非露天下最多可存放30天。 /

Under airtight in temperature+10°C ~ 40°C、relative humidity ≤75% can store 2 years. Without dew in temperature+10°C ~ 60°C relative humidity be 95% maximum value for 30days.

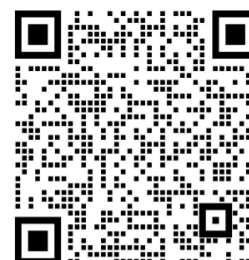
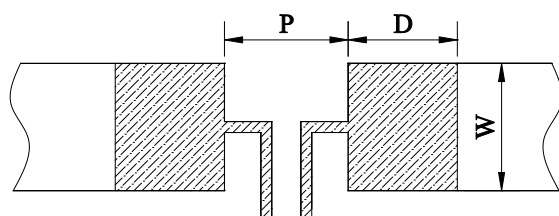
8. 焊锡垫尺寸及焊接条件 / SOLDER PAD SIZE AND WELDING CONDITIONS

8.1 建议如下图焊接方式焊接，并满足所要求的尺寸。 / Propose that the following picture installation way is installed, and satisfied the required size.

Part Number	P	W	D	Loading
MSH2512M3W0-Series 0M50/0M75	1.50mm	3.57mm	2.95mm	3.0w
MSH2512M3W0-Series R001~R003	3.18mm	3.57mm	2.11mm	3.0w
MSH2512F3W0-Series R004				
MSH2512F3W0-Series R005*U~R056*U				

MSH2512M2W0-Series 1M50*/I/R001*I	1.50mm	3.57mm	2.95mm	2.0w
MSH2512M2W0-Series 0M50/0M75				
MSH2512M2W0-Series R002~R004	3.18mm	3.57mm	2.11mm	2.0w
MSH2512F2W0-Series R005~R056				

loading : 适用于本司建议焊垫设计并使用于限定稳定电流下。 /
suit for specific pad layout and specific steady current.



8.2 建议客户焊接参数 / Recommended Customer Soldering Parameters

8.2.1 波峰焊温度曲线 / Wave solder Temperature condition (图 3 / Fig.3)

预热段 / Preheating : 100°C~130°C, max.100 sec.

焊锡段 / Soldering: 250°C~265°C max. 10 sec.

允许最高温度 / Maximum temperature : 260±5°C, max. 10sec.

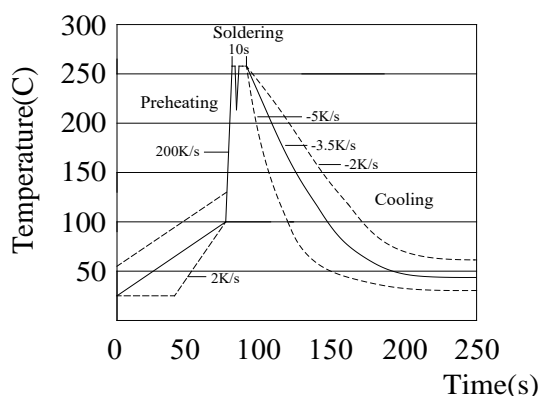


图 3 / Fig.3

8.2.2 回流焊温度曲线 / Solder reflow Temperature condition (图 4 / Fig.4)

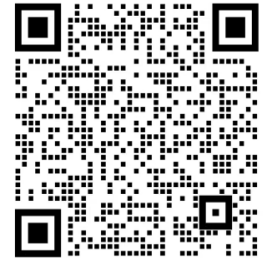
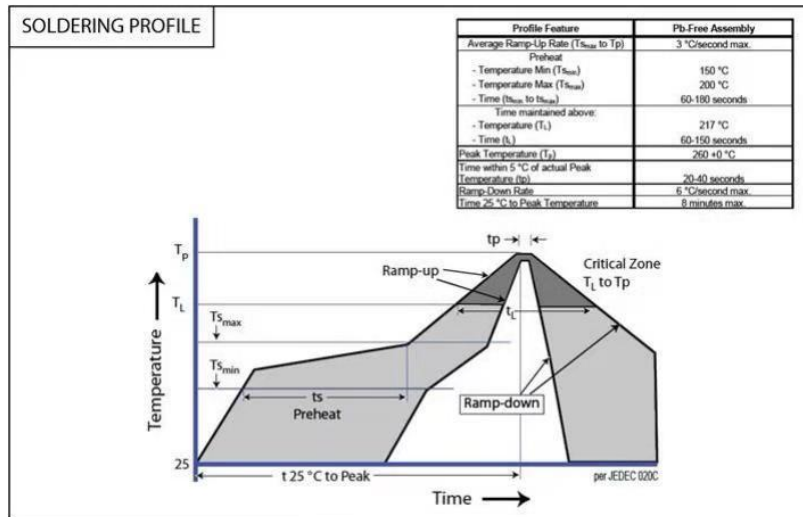


图 4 / Fig.4

8.2.3 允许烙铁焊接条件(热风设备) / Rework temperature (hot air equipment) : 350°C, 3~5seconds

8.2.4 焊接方法建议 / Recommended reflow methods

焊接热源方式可用红外线, 热蒸气, 热风. / IR, vapor phase oven, hot air oven
如果焊锡温度超过允许最高温度, 则产品本身会有功能损坏的疑虑。 / If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

9. 批量生产后出货测试项目 / Lot ACCEPTANCE TEST REQUIREMENTS

每一批生产均须作入库检验, 每一批生产单量不可超过500Kpcs。 /

Qualification shall consist of passing a program of following tests. Parts shall be pulled from each lot and maximum lot quantity shall be within 500Kpcs.

9.1 外观 / Visual

方法 / Procedure : 利用放大镜进行检查 / Visual

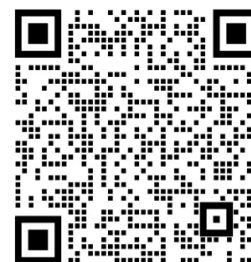
标准 / Acceptance Criteria : 不能有脏污、不洁、文印错误、破损等 / No parts are outstandingly stained

9.2 尺寸 / Dimensions

方法 / Procedure : 使用合适且经校正的标尺 / As appropriate, calipers, micrometers,

optical comparator, or approved gages

标准 / Acceptance Criteria : 尺寸均在規定標準範圍內 / No parts outside specific dimensions



9.3 单体组件电阻(Ro) / Resistance (Ro)

方法 / Procedure : 在 25°C 下利用四线量测技术量测之 / Resistance shall be measured with 25°C in the 4-wire resistance test

标准 / Acceptance Criteria : 电阻值均在規定標準範圍內 / The resistance of the test device shall be within the limits specified

9.4 电阻温度系数 / TCR

方法 / Procedure : 利用四线法量测出组件分别在 25°C 及 125°C 下的电阻值, 并将其带入下面公式中即可得出 TCR 值 / Getting the sampling device resistance values measured in 25°C and 125°C and put them in to the following equation to calculate the TCR

标准 / Acceptance Criteria : 温度系数值均在規定標準範圍內 / All parts must within the specific

$$TCR = (R_b - R_a) / R_a \times 1 / (T_b - T_a) \times 10^6$$

9.5 绝缘电阻 / Insulation resistance (Ri)

方法 / Procedure : 利用绝缘测试仪量测 / Resistance between protective layer and resistive shall be measured by high ohm meter

标准 / Acceptance Criteria : 防焊层与电阻本体绝缘电阻至少高于 100MΩ / The resistance of the test device shall over 100MΩ

10. 包装讯息 / PACKAGING INFORMATION

10.1 包装数量、重量 / QUANTITY & WEIGHT

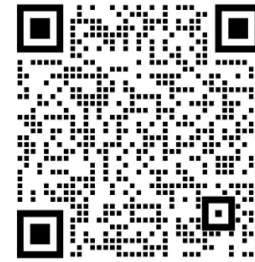
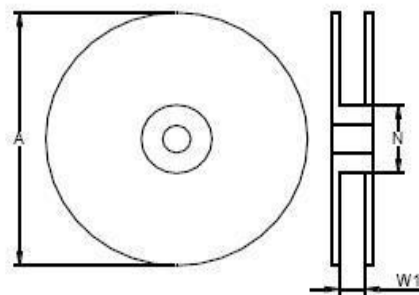
型号 / Type Number	数量 / Quantity (pcs)	重量 / Weight (g)
MSH2512M3W0-Series 0M50/0M75	3,000	550±50

MSH2512M3W0-Series R001~R003		
MSH2512F3W0-Series R004		
MSH2512F3W0-Series R005*U~R056*U	4,000	450±50
MSH2512M2W0-Series 0M50/0M75	3,000	550±50
MSH2512M2W0-Series 1M50*I/R001*I	4,000	500±50
MSH2512M2W0-Series R002~R004	4,000	450±50
MSH2512F2W0-Series R005~R056		



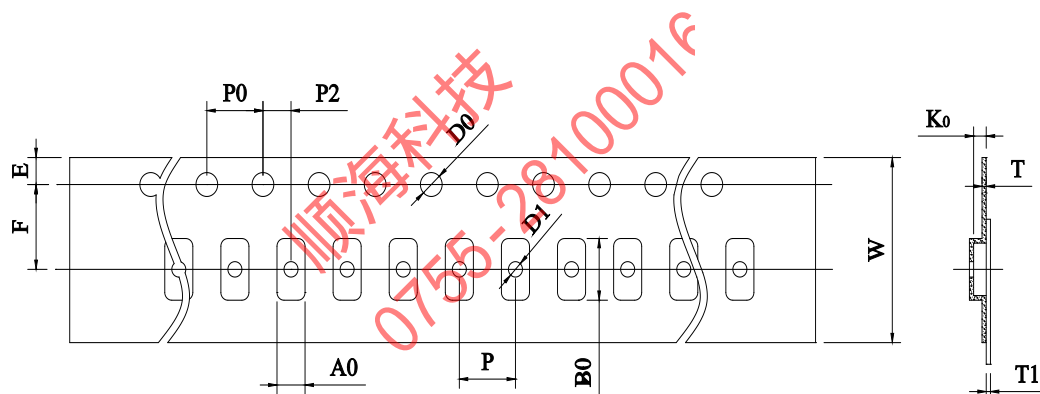
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 0755-28100016

10.2 卷轮规格 / Reel & Tape specifications



Unit(mm)

型号 / Type Number	A±5 (mm)	N±2 (mm)	W1±1 (mm)
MSH2512-Series	178	60	13



MSH2512M3W0-Series R001~R003/MSH2512F3W0-Series R004							
W	12.00 ± 0.30	P0	4.00 ± 0.10	P	4.00 ± 0.10	P2	2.00 ± 0.10
A0	3.40 ± 0.20	B0	6.75 ± 0.20	D0	1.55 ± 0.10	F	5.50 ± 0.10
E	1.75 ± 0.10	T	0.20 ± 0.10	T1	Max. 0.1	K0	1.30 ± 0.20

MSH2512-2W0 Series R001*I/1M50*I/R002~R004/ MSH2512F3W0-Series R005*I, R056*I							
W	12.00 ± 0.30	P0	4.00 ± 0.10	P	4.00 ± 0.10	P2	2.00 ± 0.10
A0	3.40 ± 0.20	B0	6.75 ± 0.20	D0	1.55 ± 0.10	F	5.50 ± 0.10
E	1.75 ± 0.10	T	0.20 ± 0.10	T1	Max. 0.1	K0	1.00 ± 0.20

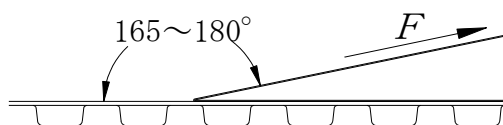
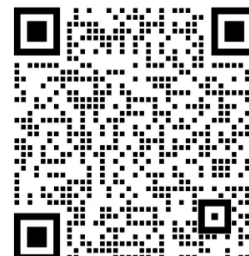
MSH2512M2W0-Series 0M50/0M75 / MSH2512M3W0-Series 0M50/0M75							
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W	12.00 ± 0.30	P0	4.00 ± 0.10	P	4.00 ± 0.10	P2	2.00 ± 0.10
A0	3.40 ± 0.20	B0	6.75 ± 0.20	D0	1.55 ± 0.10	F	5.50 ± 0.10
E	1.75 ± 0.10	T	0.20 ± 0.10	T1	Max. 0.1	K0	1.30 ^{+0.2} _{-0.1}

10.3 密封胶膜剥离强度要求 / Peeling Strength of Seal Tape

F = 剥离强度 : 0.1 – 1.0N (10 - 100gf)

F = Peeling Strength: 0.1 – 1.0N (10 - 100gf)



11. 其他 / OTHERS

11.1 如果在使用中有超出本规格书的要求，必须经由双方协商确认。 / In the event that an impropriety is found beyond this specification, it shall be fixed by mutual agreement between the parties.

11.2 如果本规格书有不适当的情况，必须通过双方协商并由本公司修改。 / In the event that an impropriety is found in this specification, Juneway Electronic Technology Co., Ltd. shall amend it by mutual agreement between the parties.