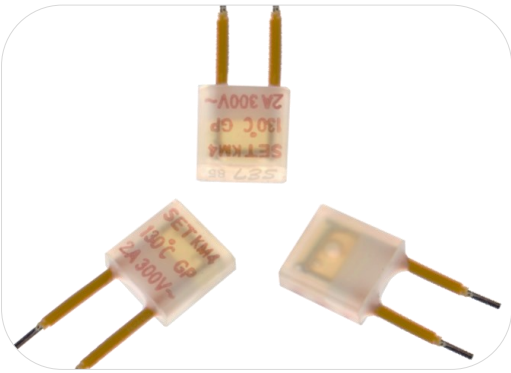
温度保险丝
Thermal-Link (ATCO)

XM 系列 Series I_r : 3 A



产品描述 Description

合金型温度保险丝是一次性动作而不可复位的装置。它广泛应用于电气设备的过温保护。其主要由低熔点的易熔合金、助熔断剂、外壳、封口树脂和引线组成。在正常工作情况下，易熔合金与两根引线保持连接，当合金型温度保险丝（引脚及外壳）感受到异常发热并达到预定的熔断温度时，易熔合金熔化，并在助熔断剂的作用下快速收缩至引线两端，从而断开电路。

Alloy Thermal-Link / Alloy Thermal Cutoff (ATCO) is defined as a non-resettable protective device functioning one time only. It is widely used in electrical equipment. ATCO is mainly consist of Fusible Alloy, Flux Resin, Case, Sealant and Lead Wires. Under abnormal conditions, when the Temp. reaches to the fusing Temp. of ATCO, the Fusible Alloy melts and quickly retracts to the two Lead Wire ends with the aid of the Flux Resin and disconnects the circuit completely.

特性 Features

- 动作温度精确 High Accuracy of Functioning Temp.
- 一次性动作而不可复位 Non-Resettable
- 环保型产品 RoHS & REACH Compliant

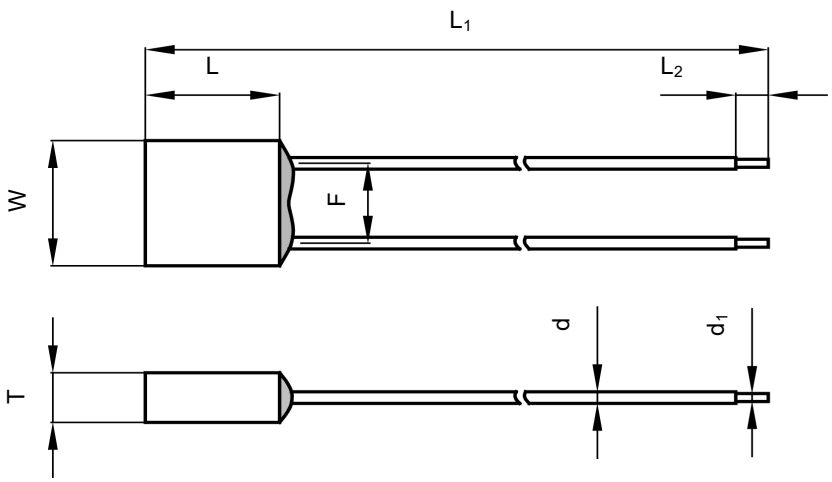
定制 Customization

- 温度 Temp.
- 引线长度 The Length of Lead Wires
- 可编带包装 Taping Packing Available
- 引线为绝缘线 Lead Wires Insulated
- 引线材质可选镀锡铜线或CP线 Tinned Copper Wires or CP Wires

应用 Applications

- 灯具 Lamps
- 开关电源 Switched-Mode Power Supplies
- 家用电器 Home Electrical Appliances
- 变压器 Transformers
- 电机 Motors
- 电池 Batteries

尺 寸 Dimen-



L	L_1	L_2	W	T	d	d_1	F
5.8 ± 0.5	70.0 ± 3.0	5.0 ± 1.0	5.8 ± 0.5	2.3 ± 0.2	0.8 ± 0.1	0.54 ± 0.05	3.7 ± 0.5

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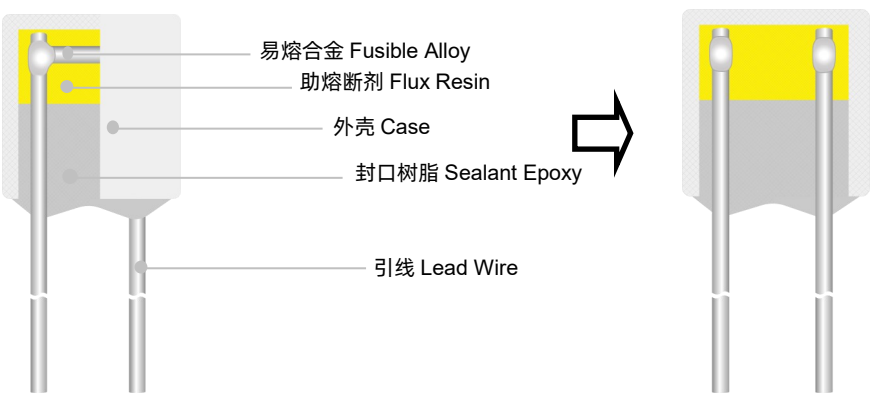
安规认证 Agency Approvals

安规 Agency Mark	标准 Standards	认证号 No.
	UL 60691	E214712
	CAN-CSA-E60691	E214712
	EN 60691	R50388884
	GB 9816.1	2023000205000009

ATCO

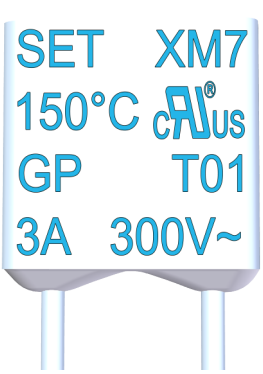
结构图 Structure Diagrams



动作前
Before Functioning

动作后
After Functioning

产品标识Marking



商标 Trademark
额定动作温度 Rated Functioning Temp.
环保 RoHS & REACH
额度电流 Rated Current
型号 Model
认证标志 Agency Mark
生产年份/季度 Year/Quarter of Production
额度电压 Rated Voltage

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型号说明 Part Numbering System

ATCO - XM 7 - A T Y A B - 001

流水号 Serial Number

包装 Packing

- B 散装 Bulk
- T 编带 Taping

引脚成型 Leads Forming

- A 直引脚 Straight Lead
- B 单脚折弯 Single Lead Bending
- C 双脚折弯 Leads Bending
- D 引脚打印子 Leads Kinking
- E 引脚折弯和打印子 Leads Bending

绝缘层颜色 Color of Insulation Tube

- W 白色 White
- Y 黄色 Yellow
- R 红色 Red
- K 黑色 Black
- N 无 None

绝缘层材质 Insulation Tube Material

- T 铁氟龙 Teflon
- P 聚酯 Polyester
- N 无 None

引线类型 Lead Wire Type

- A 镀锡铜线 Tinned Copper Wire
- B 镀锡铜包钢线 Tinned Copper Clad Steel Wire

额定动作温度 Rated Functioning Temp.

- 7 150 °C, 请参考技术参数表 Refer to specifications

系列 Series

- XM 系列, Series
  请参考技术参数表 Refer to specifications

产品类别 Product Category

- ATCO 温度保险丝 Thermal-Link

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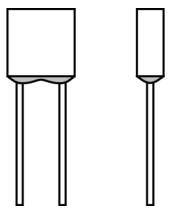
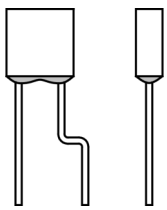
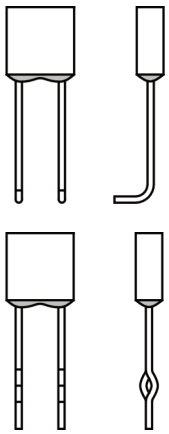
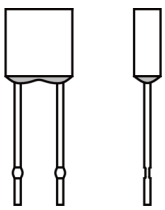
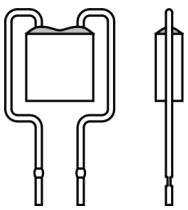
引脚成型形状Leads Forming Types

以下引脚成型仅供参考，还有更多成型方式可以定制。
The below leads forming is for reference, more leads forming can be customized.

A	B	C	D	E
直引脚 Straight Lead	单引脚折弯 Single Lead Bending	双引脚折弯 Leads Bending	引脚打扁 Leads Kinking	引脚折弯&打扁 Leads Bending and Kinking
				

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术语 Glossary

项目 Item	描述 Description
TCO	**温度保险丝 Thermal-Link** 一种装有热元件的不可复位的器件，当它被暴露在超过所设计的温度下达到一个足够长的时间时会将电路断开。 — (GB 9816.1) A non-resettable device incorporating a THERMAL ELEMENT which will open a circuit once only when exposed for a sufficient length of time to a temperature in excess of that for which it has been designed. — (IEC 60691)
ATCO	**合金型温度保险丝 Alloy Thermal-Link** 合金型温度保险丝，由易熔合金作为感温部件的热熔断体。 — (GB/T 9816.3) Alloy Type Thermal-Link, Alloy is the thermal element.
T_f	**额定动作温度 Rated Functioning Temp.** 在仅通以不超过10 mA的探测电流的条件下，测得的使热熔断体导电状态改变的温度。 — (GB 9816.1) The temperature of the Alloy Thermal-Link which causes it to change the state of conductivity with a detection current up to 10 mA as the only load. — (IEC 60691) 允许偏差 Tolerance: T_f + 0 / - 10 °C (GB 9816.1, EN 60691, K60691). 允许偏差 Tolerance: T_f ± 7 °C (J60691).
Fusing Temp.	**实测熔断温度 Fusing Temp.** 置于油池中，通10 mA以下的负载电流，每分钟升温0.5 °C ~ 1 °C，测断开温度。 — (GB 9816.1) The temperature of the Alloy Thermal-Link which causes it to change its state of conductivity is measured with silicone oil bath in which the temperature is increased at the rate of 0.5 °C to 1 °C / minute, with a detection current up to 10 mA as the only load. — (IEC 60691)
T_h	**保持温度 Holding Temp.** 热熔断体在规定的条件下，规定时间内不改变其导通状态的最高温度。 — (GB 9816.1) The maximum temperature at which a Alloy Thermal-Link will not change its state of conductivity when conducting rated current for 168 hours. — (IEC 60691)
T_m	**最高极限温度 Maximum Temp. Limit** 由制造厂规定的温度。在此温度下，热熔断体导电状态已改变，但其机械性能和电气性能在规定时间内不至于减弱。 — (GB 9816.1) The temperature of the Alloy Thermal-Link stated by the manufacturer, up to which the mechanical and electrical properties of the Alloy Thermal-Link having changed its state of conductivity, will not be impaired for a given time. — (IEC 60691)
I_r	**额定电流 Rated Current** 温度保险丝分类用，允许用于电路并安全断开的最大电流。 — (GB 9816.1) The current used to classify a Alloy Thermal-Link, which is the maximum current that Alloy Thermal-Link allows to carry and is able to cut off the circuit safely. — (IEC 60691)
U_r	**额定电压 Rated Voltage** 温度保险丝分类用，允许用于电路并安全断开的最高电压。 — (GB 9816.1) The voltage used to classify a Alloy Thermal-Link, which is the maximum voltage that Alloy Thermal-Link allows to carry and is able to cut off the circuit safely. — (IEC 60691)
I_n	**标称放电电流 Nominal Discharge Current** 能够承受15次波形为8/20μs的电流峰值，用于检测产品所能承受脉冲电流耐久性的能力。 Being able to withstand 15 peak currents of waveform 8 /20 μs to test the product's durability of withstanding pulse current. — (UL 1449)
I_{max}	**最大放电电流 Maximum Discharge Current** 能够承受1次波形为8/20μs的电流峰值，用于检测产品所能承受的最大脉冲电流 。 Being able to withstand 1 peak current of waveform 8 / 20 μs to test maximum pulse current that the product can withstand. — (UL 1449)

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ATCO

技术参数Specifications

型号 Model	额定动作温度 T_f	熔断温度 Fusing Temp.	保持温度 T_h	极限温度 T_m	额定电流 I_r	额定电压 U_r	UL	cUL	TUV	CCC	RoHS、REACH
	(°C)	(°C)	(°C)	(°C)	(A)	(V)					
XM3	125	121 ± 2	100	200	3	AC 300	○	○	○	●	●
						AC 320	●	●	○	○	●
XM4	130	125 ± 2	106	200	3	AC 300	●	●	●	●	●
						AC 320	●	●	○	○	●
XM5	135	130 ± 2	111	200	3	AC 300	●	●	●	●	●
						AC 320	●	●	○	○	●
XM7	150	145 ± 2	126	200	3	AC 300	●	●	●	●	●
						AC 320	●	●	○	○	●

备注 Note:
"●"表示产品已通过认证。Means certificated.
"○"表示产品未有认证。Means non-certificated.

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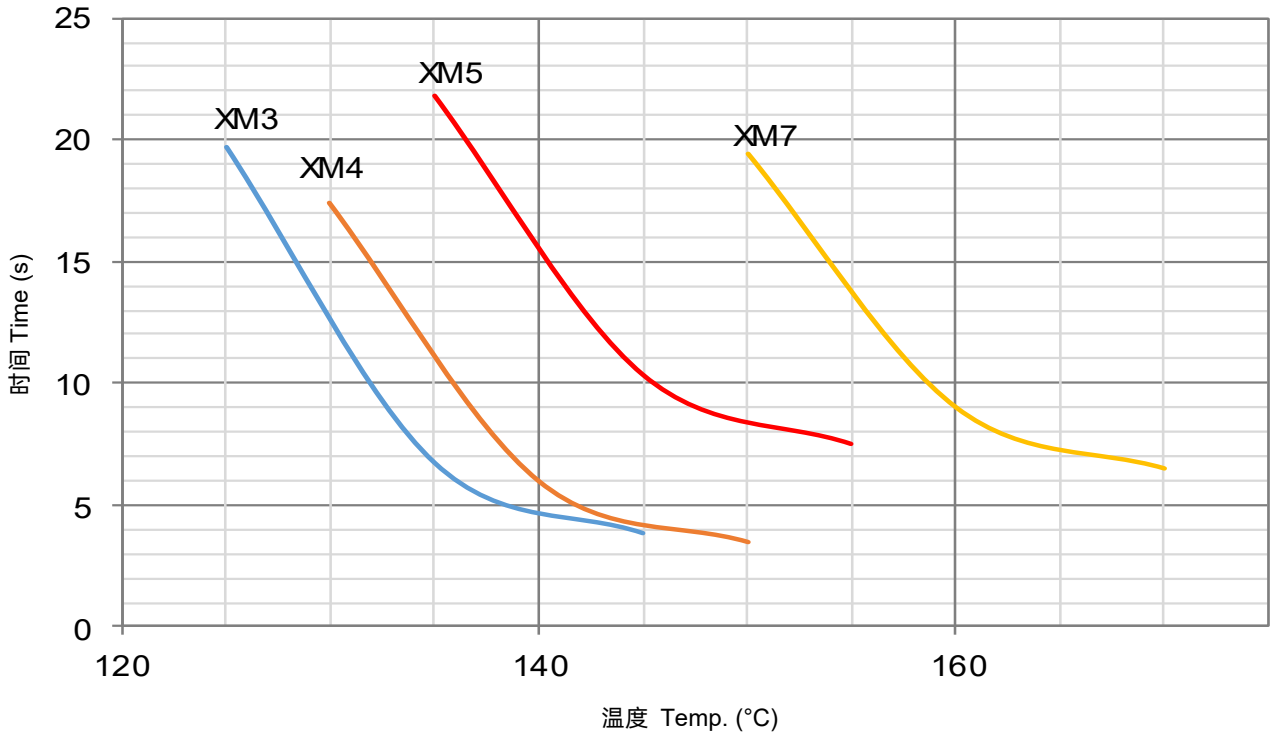
ATCO

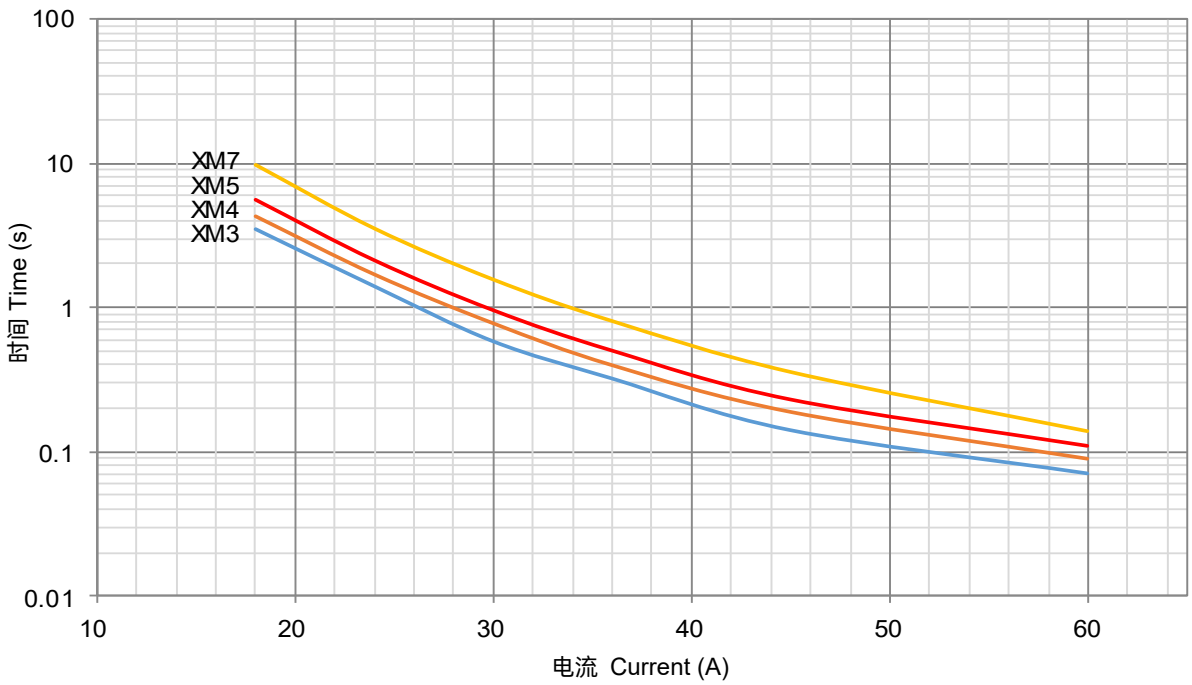
产品温度时间曲线图（仅供参考）
Product Temp.-Time Curve (For Reference Only)

温度保险丝在不同温度油浴中断开的温度时间曲线。
The Temp.-Time Curve of Thermal-Link in different Temp. oil baths.



产品电流时间曲线图（仅供参考）
Product Current-Time Curve (For Reference Only)

温度保险丝在室温25 ± 2 °C条件下，测试数倍过载电流下的断开时间曲线。
The Current-Time Curve shows functioning time at multi-times rated current at room temperature 25 ± 2 °C.



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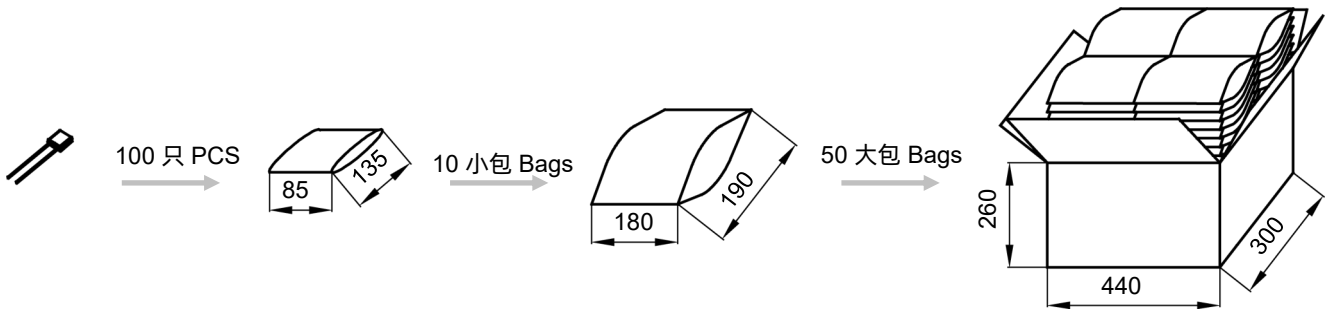
包装信息 Packaging Information

散装 Bulk

项目 Item	PE 袋 Bag	PE 袋 Bag	包装箱 Carton
尺寸 Dimensions (mm)	135 × 85	190 × 180	440 × 300 × 260
数量 Quantity (PCS)	100	1000	50000
毛重 Gross Weight (kg)			21.0 ± 10%



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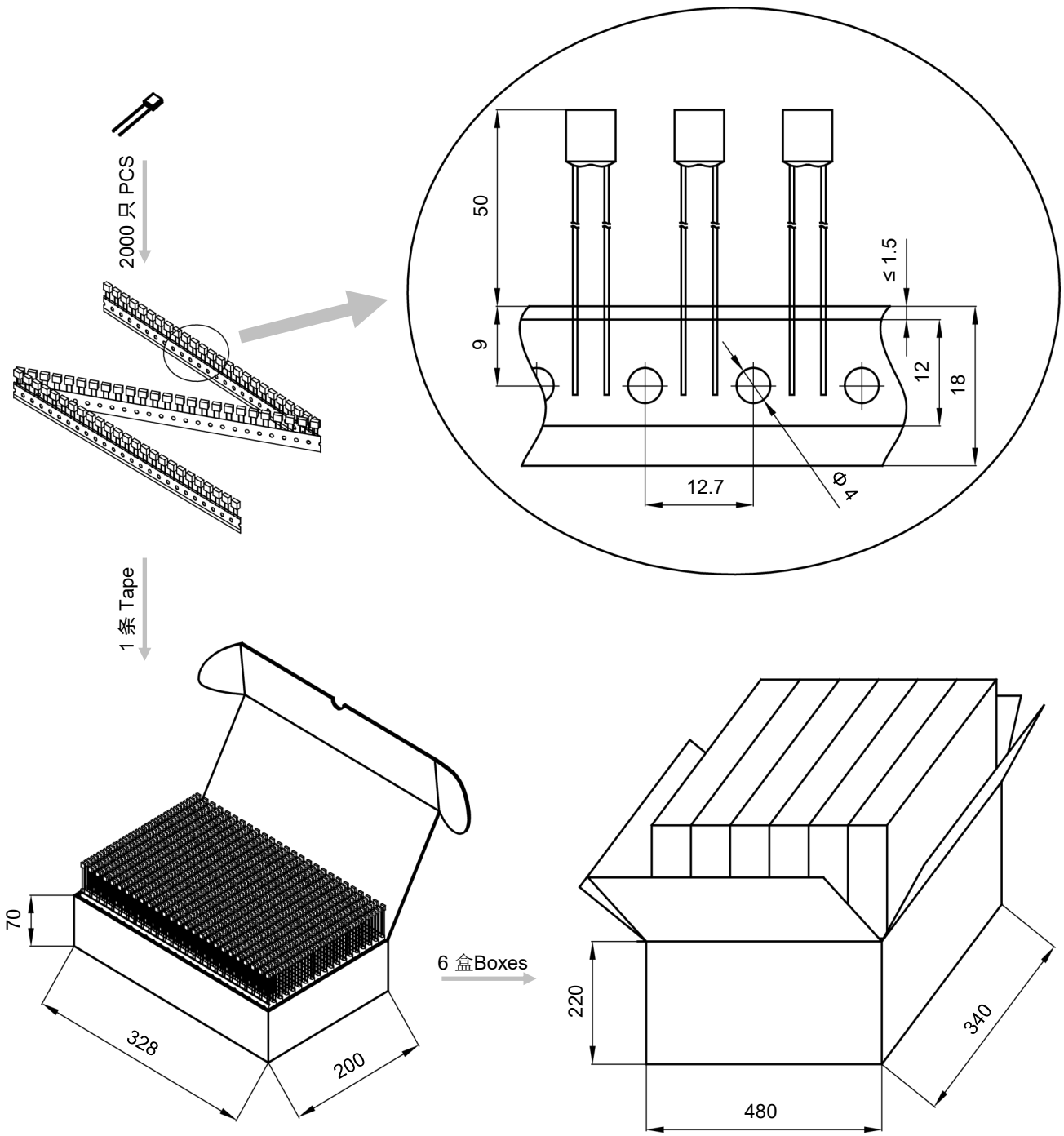
ATCO

编带 Taping

项目 Item	盒子 Box	包装箱 Carton
尺寸 Dimensions (mm)	328 × 200 × 70	480 × 340 × 220
数量 Quantity (PCS)	2000	12000
毛重 Gross Weight (kg)		6.5 ± 10%



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注意
ATTENTION

使用 Usage

1. 气压：80 kPa 到106 kPa，对应海拔：+2000 m 到- 500 m。
   When atmosphere pressure is from 80 kPa to 106 kPa, the related altitude shall be from 2000 meter to - 500 meter.
2. 工作电压不超过温度保险丝的额定电压；工作电流不超过额定电流。
   Operating voltage should be less than rated voltage of ATCO, operating current should be less than rated current of ATCO.
3. 通电情况下请勿用人体直接触碰本体或引脚，防止烫伤或触电。
   Do not touch the ATCO body or lead wires directly when power is on, to avoid burning or electric shock.

更换 Replacement

温度保险丝是不可修复的产品。基于安全原因，替换时应使用同类别、同型号的温度保险丝并且严格按照同样的方法正确安装。
ATCO is a non-repairable product. For safety sake, it shall be replaced by an equivalent ATCO from the same manufacturer, and mounted in the same way.

贮存 Storage

温度保险丝的贮存应避免高温、高湿、日光直射和腐蚀性气体的场合，避免影响引线可焊性，产品购入后请于1年内使用完毕。
Do not store the ATCO at the high Temp., high humidity or corrosive gas environment, avoid influencing the solder-ability of the lead wires, the product shall be used up within 1 year after receiving the goods.

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安装 Installation

安装位置的温度确定 Make Sure the Temp. of Installation Position.

1. 建议采用内置热电偶式的仿真温度保险丝来确定适合的温度要求。
   It is recommended that a dummy ATCO with inbuilt thermo-couple shall be used to determine the proper Temp.
2. 需对终端产品进行测试，以确保潜在的异常状况不会导致温度保险丝超过其极限温度。
   The terminal product should be tested to ensure that potential abnormal conditions do not cause ambient Temp. to exceed the T_m of the ATCO.
3. 将温度保险丝安装在可使其温度平稳上升的部位。
   Mount the ATCO at the location where Temp. rises evenly.
4. 温度保险丝本体表面的温度不超过温度保险丝的保持温度。
   The surface Temp.of ATCO less than the holding temp of ATCO.
5. 保险丝的封口及主体不能烧伤或者过度受热。
   The seal or body of TCO must not be burned or over heated.

安装位置的机械性能要求 Installation position of mechanical performance requirements.

1. 勿将温度保险丝安装在可能经常出现剧烈振动的地方。
   Do not locate the ATCO in a place where severe vibration always occurs.
2. 确保引线足够长，且其安装方法不会造成强行按压、拉伸及扭转引线之现象。
   Ensure that the lead wire is long enough, and avoid actions such as press, tensile or twist.
3. 温度保险丝的封口及主体不能受损。
   The seal or body of ATCO must not be damaged.

机械连接 Mechanical Connection

铆接Riveting

1. 选用电阻率小的铆接材料和被铆接材料。
   Choose small resistivity riveting material and be riveted.
2. 采用柔韧的、易弯曲的引线来与温度保险丝铆接。
   A flexible lead or lead with low resistance should be used to rivet the ATCO.
3. 应确保铆接后的接触电阻为最小值，过大的接触电阻会产生较高的温升，造成温度保险丝提前熔断。
   Contact resistance should be minimal, large contact resistance will lead to higher Temp., ATCO Functioning in advance.

压接 Crimping

1. 选用电阻率小的压接材料和被压接材料。
   Choose small resistivity crimping material and be riveted.
2. 压接过程中，确保引线不会被扭转、封口树脂不会被破坏。
   Crimping process, to ensure that the lead will not be reversed, sealing resin will not be destroyed.
3. 应确保压接后的接触电阻为最小值，过大的接触电阻会产生较高的温升，造成温度保险丝提前熔断。
   Contact resistance should be minimal, large contact resistance will lead to higher Temp.rising, ATCO Functioning in advance.

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焊接 Soldering

手工焊接 Hand-Soldering

1. 焊接必须在表T-1所列的条件下进行。
   Soldering should be carried out according to Table T-1.
2. 由于温度保险丝中与引线连接的感温体是低熔点的合金，因此不正确的焊接操作（例如：温度过高、焊接时间过长、引线过短等）可能导致感温体被引线传递的过高热量所影响，从而使得温度保险丝提前断开。
   The thermal element of ATCO is fusible alloy with low melting point, which is jointed with ATCO Lead Wires. Improper soldering operation (too high soldering Temp. , too long soldering time, too short lead wire etc.) may transfer more heat to the thermal element and ATCO may open in advance.
3. 若需要在表T-1规定更为严苛环境下进行焊接时，应在焊接点和温度保险丝主体间的引线上使用散热装置。
   When soldering conditions are more severe than those listed in Table T-1, a heat sink fixture should be used between soldering point and ATCO body.
4. 焊接时应小心，以避免温度保险丝主体和引线遭受到推 / 拉力以及扭力。
   When soldering,please do not pull / push or twist ATCO body or lead wires.
5. 焊接后应让其自然冷却20s以上，在冷却期间，勿移动温度保险丝本体和引线。
   After soldering, let it naturally cool for more than 20 seconds. During cooling, donot move the ATCO body or Lead Wires.

波峰焊接 Wave Soldering

波峰焊参数如表T-2，仅供参考，实际使用时应做相关的试验进行验证,如在波峰焊后通过X-ray观察来判断温度保险丝的感温合金是否受损。
The wave soldering parameters as Table T-2, for reference only, when ATCO is for practice use, you need to do some validation experiments. For example, using X-RAY to see the fusible alloy of ATCO whether damage after wave soldering.

表 T-1：手工焊接时间 TABLE T-1 Hand-Soldering Time

额定动作温度 Rated Functioning Temp. (T_f)	不同引线长度对应的最大允许焊接时间 Max. Allowable Soldering Time for Different Lead Wire Length (Fig.T-1)									最高焊接温度 Max. Soldering Temp.
	L_s长度 Length	时间 Time		L_s长度 Length	时间 Time		L_s长度 Length	时间 Time		
		镀锡铜线 Tinned Copper Wire	CP线 CP Wire		镀锡铜线 Tinned Copper Wire	CP线 CP Wire		镀锡铜线 Tinned Copper Wire	CP线 CP Wire	
(°C)	(mm)	(s)	(s)	(mm)	(s)	(s)	(mm)	(s)	(s)	(°C)
76 to 101	10	1[a]	4	20	2	5	30	3	6	400
102 to 115	10	1[a]	4	20	2	5	30	3	6	
116 to 135	10	1[a]	4	20	3	6	30	5	8	
136 to 150	10	3	6	20	5	8	30	5	8	
151 to 230	10	4	7	20	6	9	30	7	10	

a：为防止温度保险丝被焊断，焊接时视需要增加辅助散热装置。 Auxiliary heat sink fixture is required to avoid ATCO cutting off unexpectedly.

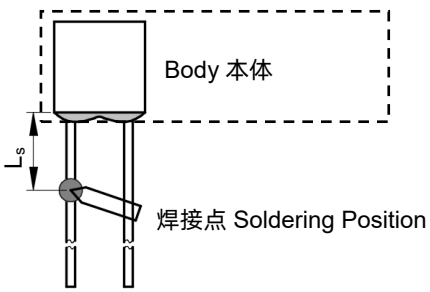

图 FIGURE T-1

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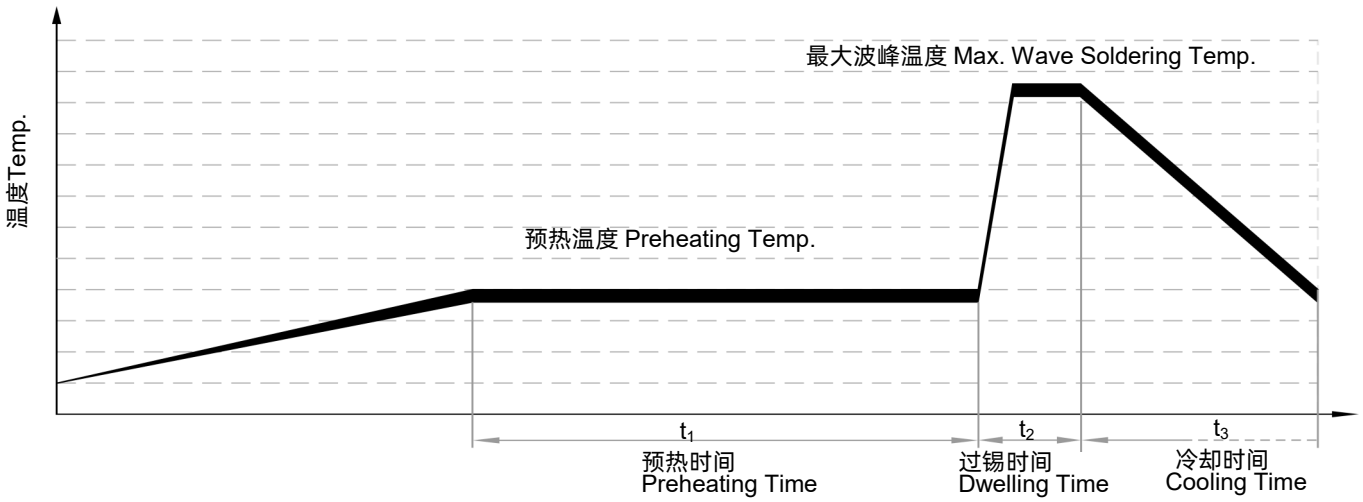
ATCO

表T-2 波峰焊参数设置 TABLE T-2 Wave Soldering Parameters Setting

额定动作温度 Rated Functioning Temp. (T_f)	不同引线长度对应的最大允许焊接时间 Max. Allowable Preheating Temp. When the Length of Lead Wire is Different(Fig.T-1)				预热时间 Preheating Time (t_1)	最大波峰温度 Max. Wave Soldering Temp.	过锡时间 Dwelling Time (t_2)	冷却时间 Cooling Time (t_3)
	L_s长度 Length	预热温度 Preheating Temp.	L_s长度 Length	预热温度 Preheating Temp.				
(°C)	(mm)	(°C)	(mm)	(°C)	(s)	(°C)	(s)	(s)
76 to 130	建议手工焊接 Recommend Hand-Soldering							
131 to 150	20	80	30	90	< 60	≤ 260	≤ 3	≤ 10
151 to 230	20	90	30	100	< 60	≤ 260	≤ 3	≤ 10



引线成型 Lead Wire Forming

1. 如果一定要弯折引线，那么应确保弯折处与主体间的距离,如表T-3。
   If lead wire has to be bent, please pay attention to the distance between body and bending point. Refer to Table T-3.
2. 弯折引线时请使用钳子或其它工具固定（如图T-2所示），以免损坏产品。
   When bending leads, please use pincher or similar tools to fix the product as shown in Fig.T-2, to avoid damaging the product.
3. 成形和安装过程中，对引线进行裁切、切割、弯折时，请勿用力过猛，以免造成产品断裂或本体损伤。
   During forming and mounting, lead wire should not be cut, nicked, bent sharply, to avoid breaking the product.
4. 避免直接对引线根部施加外力（比如与温度保险丝主体成一定角度推或拉），以免损坏温度保险丝封口。
   Tangential forces on the leads must be avoided (i.e. pushing or pulling on the leads at angle to ATCO body) as such forces may damage the seal of ATCO.

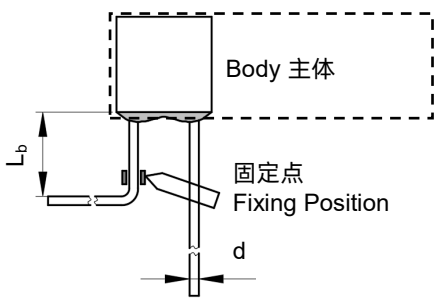


图 FIGURE T-2

表T-3 本体与折弯处之间的距离
TABLE T-3 Distance between Body and Bending Point

圆形引线 Round Lead Wire	d	(mm)	<1.0	1.0 - 1.2	> 1.2
	L_b	(mm)	≥ 3	≥ 5	≥ 10

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