

温度保险丝
Thermal-Link (OTCO)



OTCO

OTCO

特征 Features

- | | |
|------------------|------------------------------------|
| ● 小尺寸 | Compact Size |
| ● 金属外壳 | Metal Case |
| ● 有机物型感温体 | Organic Thermal Pellet |
| ● 不可复位 | Non-Resettable |
| ● 断开温度精确 | High Accuracy of Functioning Temp. |
| ● 低阻抗 | Low Resistance |
| ● 符合RoHS & REACH | RoHS & REACH |

温度保险丝特性与型号概览
Thermal-Link (OTCO) Feature & Model List Overview

额定动作温度 Rated Functioning Temp. T_f (°C)	13		15		页码 Page
	型号 Model	额定电流 Rated Current	型号 Model	额定电压 Rated Voltage	
263	RS263	10	RT263	15 / 16	
257	RS257		RT257		
240	RS240		RT240		
229	RS229		RT229		
216	RS216		RT216		
192	RS192		RT192		
184	RS184		RT184		
172	RS172		RT172		
167	RS167		RT167		
152	RS152		RT152		
144	RS144		RT144		
134	RS134		RT134		
128	RS128		RT128		
121	RS121		RT121		
117	RS117		RT117		
110	RS110		RT110		
104	RS104		RT104		
99	RS99	RT99			
94	RS94	RT94			
84	RS84	RT84			
77	RS77	RT77			
72	RS72	RT72			

$I_{F(A)}$
额定电流 Rated Current

$U_{F(VAC)}$
额定电压 Rated Voltage

产品结构
Product Structure



温度保险丝

Thermal-Link (OTCO)

产品描述 Description

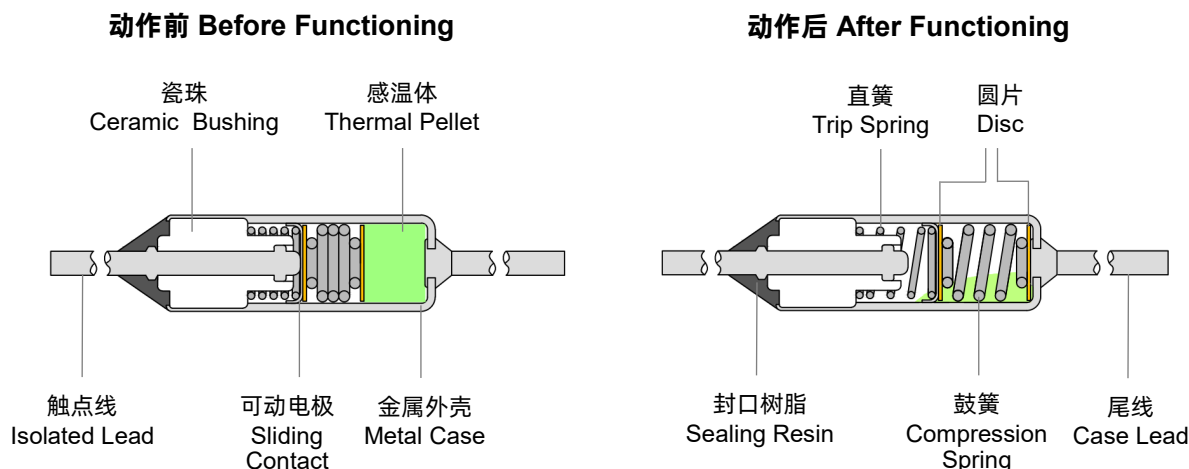
赛尔特公司 (SETsafe | SETfuse) 的有机物型温度保险丝 (OTCO) 是一次性动作不可复位的装置。它主要由金属外壳、弹簧、可动电极和感温体等组成。当有机物型感温体感受到异常发热并达到预定的熔断温度时, 感温体熔化, 可动电极在直簧的作用下与触点线脱离, 从而断开电路。

赛尔特公司 (SETsafe | SETfuse) 有机物型温度保险丝 (OTCO) 广泛应用于电气设备中起过温保护, 产品规格齐全, 额定动作温度从72 °C 到263 °C, 额定电流: 10 A, 15 A / 16 A, 安规认证包括: UL, cUL, VDE, CCC, KC, PSE, 同时符合 RoHS 和 REACH 环保法规。

SETsafe | SETfuse Organic Thermal-Link (OTCO) is a non-resettable protective device, functioning one time only. It mainly consists of metal case, spring, sliding contact and thermal pellet. When the Thermal-Link senses abnormal heat and temp. reaches the predetermined fusing temp., thermal pellet melts and the sliding contact separates from the isolated lead with the assistance of the trip spring, thereby the circuit is disconnected.

SETsafe | SETfuse Organic Thermal-Link (OTCO) is widely used in electrical equipment to provide over temp. protection, it has wide range of operating temp., from 72 °C to 263 °C, rated current includes: 10 A, 15 A / 16 A. With UL, cUL, VDE, CCC, KC, PSE certificates, comply with RoHS and REACH.

结构图 Structure



工作原理 Functioning Principle

在正常工作情况下, 触点线与可动电极保持接触, 当有机物型感温体感受到异常发热并达到预定的熔断温度时, 感温体熔化, 可动电极在直簧的作用下与触点线脱离, 从而断开电路。

Under normal operating temp., the solid thermal pellet keeps the isolated lead connected to the sliding contact. When the Thermal-Link senses abnormal heat and temp. reaches the predetermined fusing temp., thermal pellet melts and the sliding contact separates from the isolated lead with the assistance of the trip spring, thereby the circuit is disconnected.

OTCO

OTCO

温度保险丝

Thermal-Link (OTCO)

应用 Applications

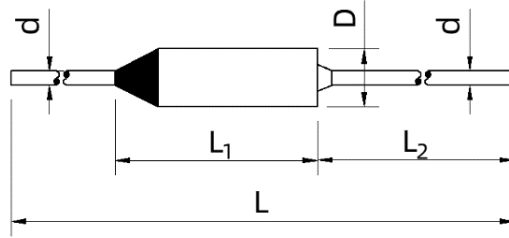
- 小型家用电器（电饭煲，面包机，咖啡机，豆浆机等）
Small Home Appliances (Such as Electric Cooker, Bread Maker, Coffee Machine, Soymilk Machine, etc.)
- 舒适家用电器（洗衣机，冰箱，空调等）
Comfort Home Appliances (Such as Washing Machine, Refrigerator, Air Conditioner, etc.)
- 个人护理电器（电吹风，直发器，电熨斗等）
Personal Care Appliances (Such as Hair Dryer, Hair Straightener, Electric Iron, etc.)
- 商业设备（打印机，扫描仪，传真机等）
Commercial Appliances (Such as Printer, Scanner, Fax Machine etc.)
- 车载设备（车载空调，加热座椅等）
Automobile Field (Such as Air Conditioner, Heated Seat, etc.)

定制 Customization

- 其他温度 Other Temp.
- 引线长度 The Length of Lead
- 引线裁切 Lead Cutting
- 引线成型 Lead Forming

温度保险丝
Thermal-Link (OTCO)

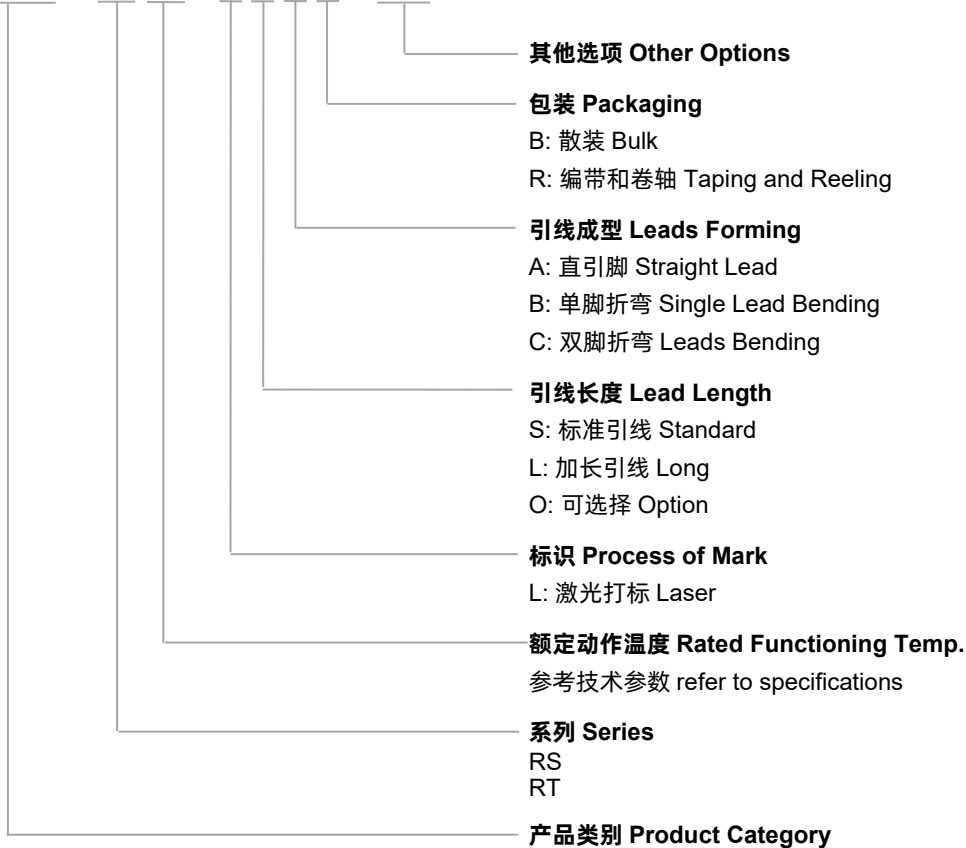
尺寸 Dimensions (mm)



引线长度 Lead Length	L	L ₁	L ₂	D	d
标准引线 Standard	65 ± 3	15 Max.	35 ± 2	Φ 4 ± 0.2	Φ 1 ± 0.1
加长引线 Long	81 ± 3	15 Max.	35 ± 2	Φ 4 ± 0.2	Φ 1 ± 0.1
可选择 Option	可定制 Customization	15 Max.	可定制 Customization	Φ 4 ± 0.2	Φ 1 ± 0.1

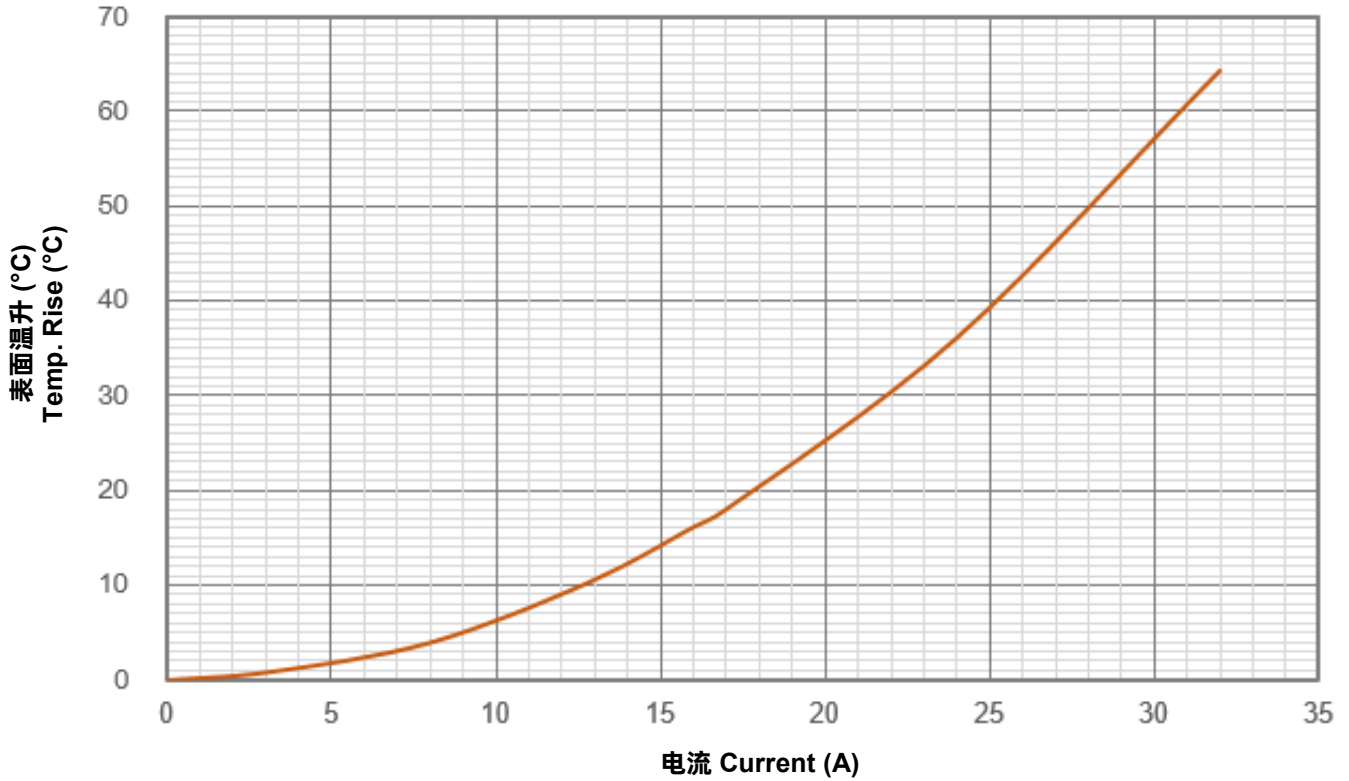
物料号描述 Part Numbering System

OTCO - RT72 - L S A B - 001

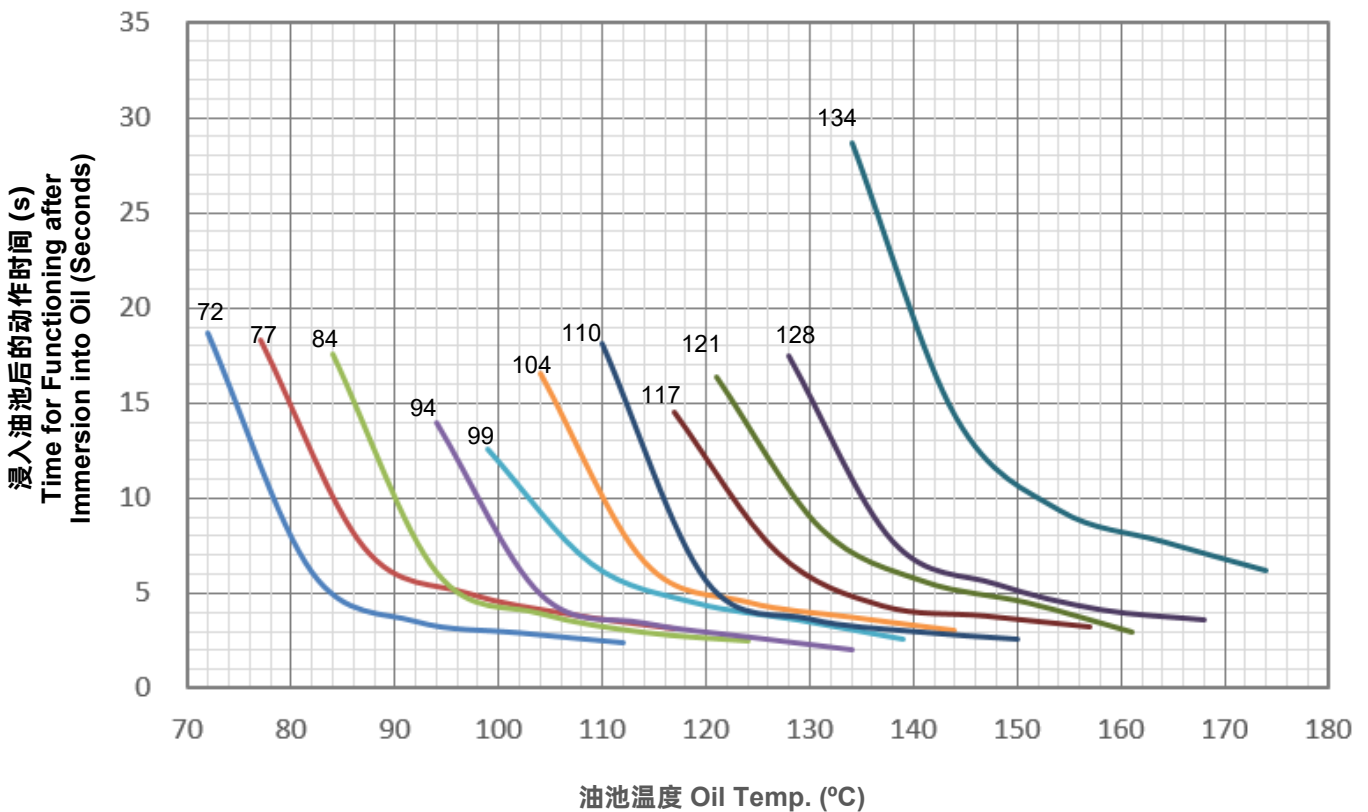


温度保险丝
Thermal-Link (OTCO)

表面温升 Temp. Rise

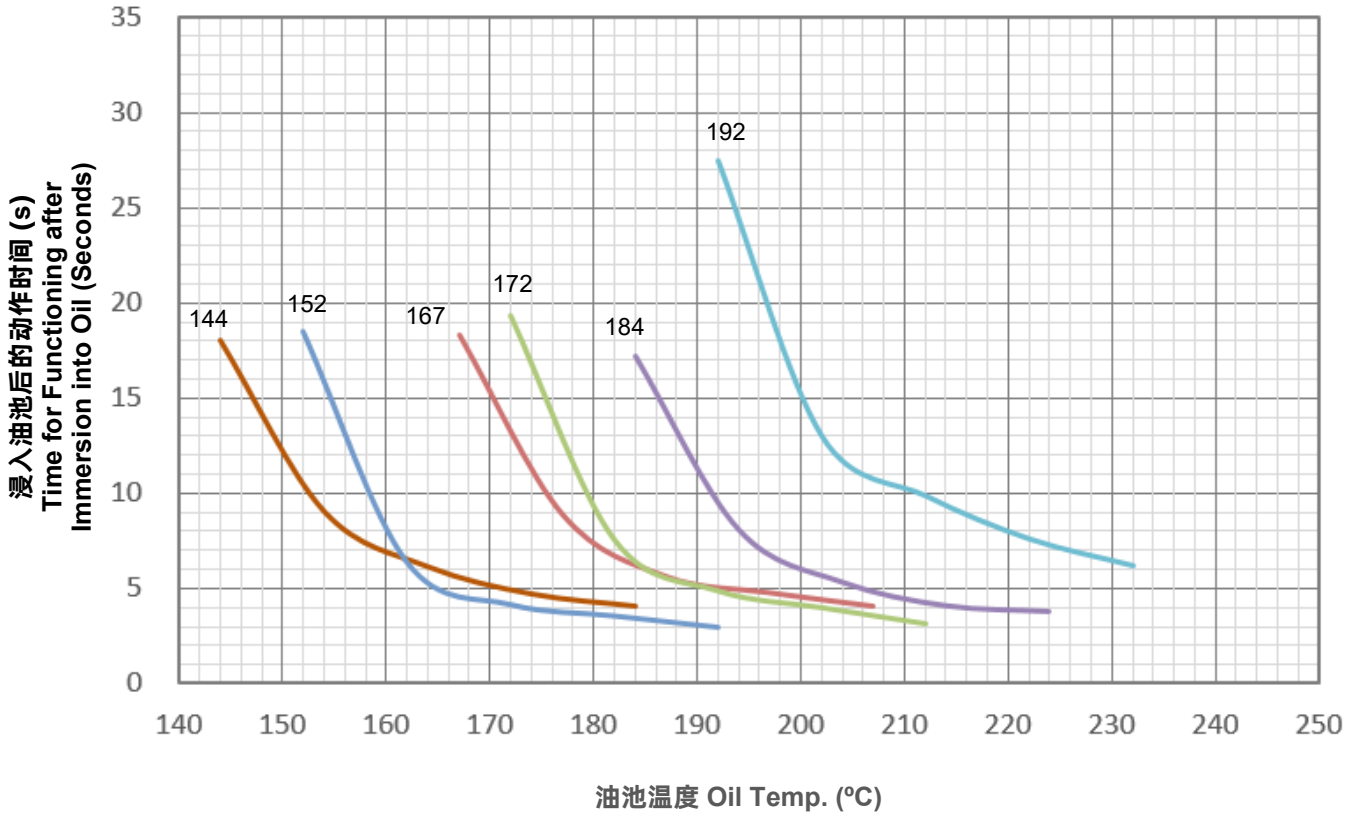


响应时间 Response Time

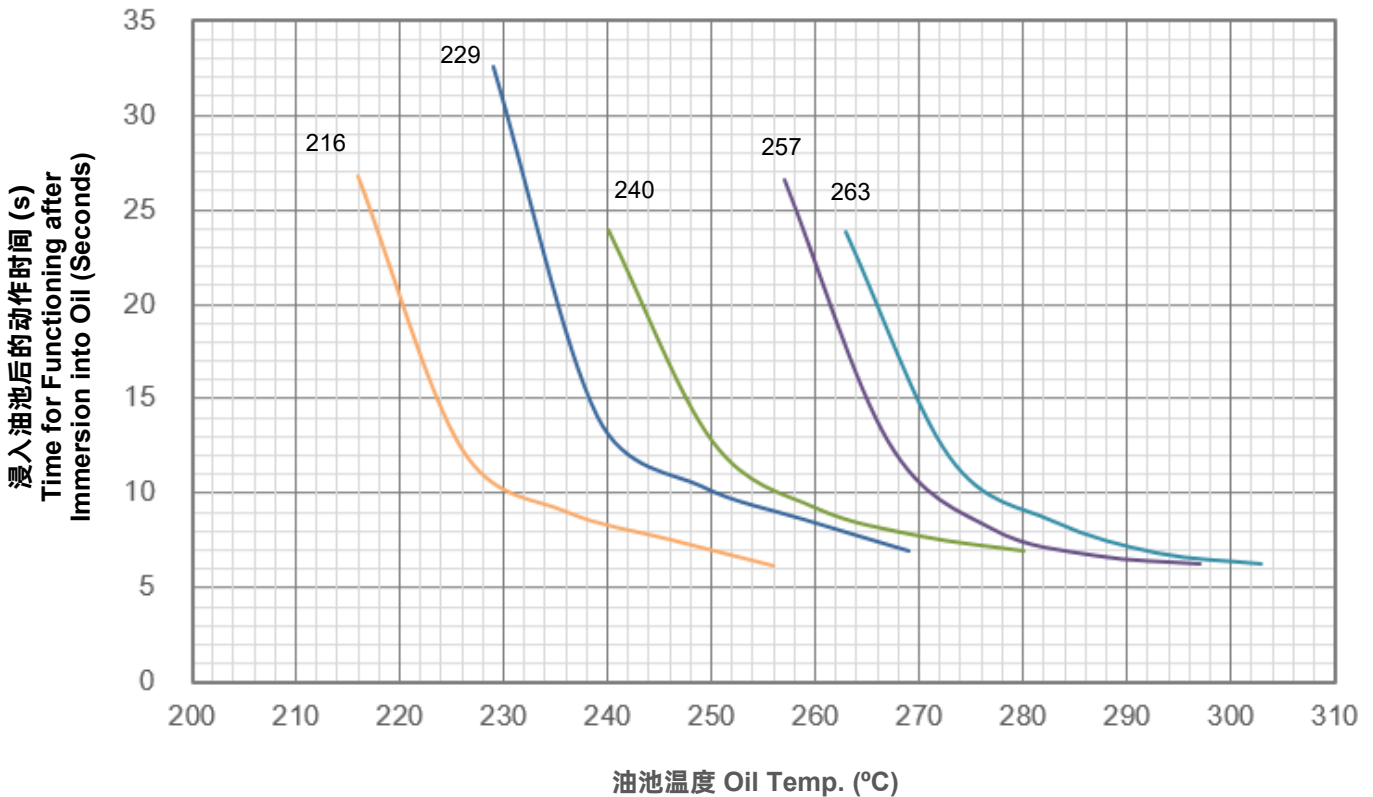


温度保险丝
Thermal-Link (OTCO)

OTCO



OTCO



温度保险丝

Thermal-Link (OTCO)

术语 Glossary

项目 Item	描述 Description
TCO	热熔断体 Thermal-Link 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。 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 temp. in excess of that for which it has been designed.
OTCO	有机物型热熔断体 Organic Thermal-Link 以有机化合物作为感温部件的热熔断体。 Organic type Thermal-Link, organic 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。 The temp. of the Thermal-Link which causes it to change its state of conductivity with a detection current up to 10 mA as the only load. 允许偏差 Tolerance: $T_f + 0 / - 10$ K (GB/T 9816, EN60691, UL60691, KC60691). 允许偏差 Tolerance: $T_f \pm 7$ K (J60691).
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 K ~1 K，测得的断开温度。 The temp. of the Thermal-Link which causes it to change its state of conductivity is measured with silicone oil bath in which the temp. is increased at the rate of 0.5 K/min to 1 K/min, with a detection current up to 10 mA as the only load.
T_h	保持温度 Holding Temp. 热熔断体持续通额定电流168小时不改变其导通状态的最高温度。 The max. temp. of the Thermal-Link at which it will not change its state of conductivity during 168 hours at the rated current.
T_m	最高极限温度 Max. 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。 The temp. of the Thermal-Link stated by the manufacturer, up to which the mechanical and electrical properties of the Thermal-Link, having changed its state of conductivity, will not be impaired for a given time.
I_r	额定电流 Rated Current 用来对热熔断体进行分类的电流。 The current used to classify a Thermal-Link.
U_r	额定电压 Rated Voltage 用来对热熔断体进行分类的电压。 The voltage used to classify a Thermal-Link.
I_n	标称放电电流 Nominal Discharge Current 能够承受15次波形为8/20 μ s 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 μ s to test the product's durability of withstanding pulse current.
I_{max}	最大放电电流 Max. Discharge Current 能够承受1次波形为8/20 μ s 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 μ s to test max. pulse current that the product can withstand.

OTCO

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温度保险丝

Thermal-Link (OTCO)



注意

ATTENTION

使用方法 Usage

1. 请在不超过额定电流和额定电压的状态下使用温度保险丝。
Please use OTCO without exceeding the rated current and voltage.
2. 不要在标准范围外的环境中使用温度保险丝，如含有二氧化硫、氮氧化物气体、氨气或甲酸的环境。也不适合在高湿环境下使用或浸泡在液体中。
Do not use the OTCO in environments out of the standard specifications, such as those containing sulfur dioxide gas, nitrogen oxide gas, ammonia gas or formic acid. It is also not suitable for using in high humidity environment or immersed in liquid.

更换 Replace

温度保险丝是不可修复的产品。基于安全原因，替换时应使用同一厂商同型号的温度保险丝并且严格按照同样的方法正确安装。
OTCO is a non-repairable product. For safety aspect, it shall be replaced by an equivalent OTCO from the same manufacturer, and mounted in the same way.

存贮 Storage

1. 温度保险丝必须避免日光照射及腐蚀性的环境，且在温度 $-10^{\circ}\text{C} \sim 30^{\circ}\text{C}$ 、湿度 $30\% \sim 75\%$ 的条件下保存。温度保险丝的保存期为购买后12个月。
OTCO must be kept in a place with no sunshine or corrosive gas, the temperature shall be within $-10^{\circ}\text{C} \sim 30^{\circ}\text{C}$ and humidity within $30\% \sim 75\%$. The validity storage period of OTCO is 12 months after purchase.
2. 温度保险丝的外壳和触点线都是镀银的。因此为了避免硫化，温度保险丝不应放在会产生亚硫酸气体的材料周围，比如纸板或橡胶等。
The case and isolated lead of OTCO are silver-plated. Therefore, to avoid vulcanization, the OTCO shall not be kept around materials such as cardboard or rubber etc. which generate sulfurous acid gas.

温度保险丝

Thermal-Link (OTCO)

引线加工 Lead Process

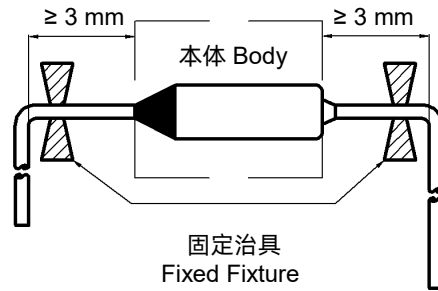


图1 FIGURE

1. 如果一定要弯折引线，那么不要对引线根部施加过大的压力。施加在引线上的拉力不应超过15.7 N，施加在引线上的推力不应超过3.9 N。
If lead wires has to be bent, it is important not to apply excessive pressure to the root of the lead wires. The tensile forces applied to the lead wires shall not exceed 15.7 N, and the thrust force applied to the lead wires shall not exceed 3.9 N.
2. 引线应在距离温度保险丝本体3 mm或以上的地方弯折（参考图1）。
The lead wires should be bent at a distance 3 mm or above from the body of OTCO (see Fig.1).
3. 为避免损坏温度保险丝，在折弯引线时，请使用钳子或类似工具固定温度保险丝。
To avoid damaging the OTCO, when bending lead wires, please use pincher or similar tools to fix the OTCO.

安装 Installation

安装位置的选择 Selection of Installation Location

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 OTCO in a place where severe vibration always occurs.
2. 应该考虑使用红外线温度探测器或多个热电偶来检测正常和故障情况下的环境温度，一般来说，能实现正常和故障条件下最大温升差异的位置是最理想的安装位置。
The infrared thermography or multiple thermocouples should be considered to detect the ambient temp. under normal and abnormal situation. The point that provides the biggest temp. rise between these two situations is the best installation location.

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

1. 温度保险丝通电时，其本体会发热，导致本体温度高于环境温度，设计时需考虑温升的影响，以确定合适的温度保险丝规格。
The body of OTCO will generate heat as current flows through it, resulting the body temp. higher than ambient temp. The influence of temp. rise shall be considered in the design to determine the appropriate OTCO model.
2. 应确保温度保险丝的本体温度和安装位置的环境温度不超过其对应的保持温度 T_h 。
It shall be ensured that the body temp. of OTCO and the ambient temp. at the installation position do not exceed the corresponding holding temp. T_h .
3. 需对最终产品进行测试，以确保潜在的异常状况不会导致环境温度超过温度保险丝的最高极限温度 T_m 。
The end product should be tested to ensure that potential abnormal conditions do not cause ambient temp. to exceed the T_m of the OTCO.

温度保险丝

Thermal-Link (OTCO)

安装 OTCO Mounting OTCO

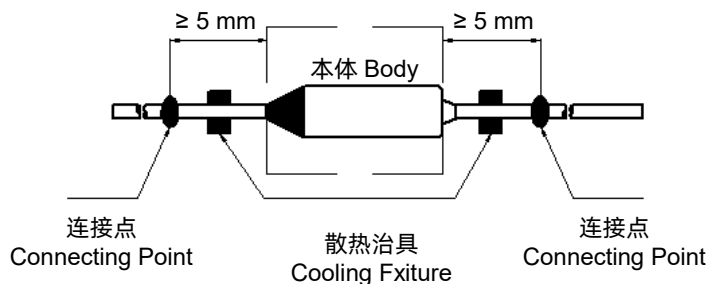


图2 FIGURE 2

- 温度保险丝可以通过钎焊、点焊、铆接或压接来安装。在安装过程中和安装后，请不要拉动、推动或扭曲温度保险丝本体和引线。
OTCO can be installed by soldering, welding, riveting or crimping. During and after installation, please do not pull, push or twist OTCO body or lead wires.
- 引线上的连接点距离温度保险丝本体应 $\geq 5\text{ mm}$ (参考图2)。
The connection point of the lead shall be no less than 5 mm away from the OTCO body (see Fig.2).
- 尽量确保温度保险丝均匀受热。如果温差不可避免，确保封口树脂密封一侧靠近热源。
Try to ensure that the body of the OTCO is evenly heated. If the temp. difference is inevitable, make sure that the sealing resin side is connected close to the heat source.

钎焊 Soldering

- 钎焊应根据下表条件进行，如果需要二次钎焊，应该等温度保险丝冷却至室温后再进行。
Soldering should be carried out according to below table. If secondary soldering is required, wait until the OTCO cools to room temp.
- $T_f \leq 110\text{ }^\circ\text{C}$ 的温度保险丝不建议使用钎焊，推荐使用压接、铆接等非加热工艺。
Soldering is not recommended for Thermal-Link with $T_f \leq 110\text{ }^\circ\text{C}$, while non heating processes such as crimping and riveting are recommended.
- 在钎焊过程中，焊点与温度保险丝之间应使用散热装置 (参考图2)。
In the process of soldering, cooling fixture should be used between soldering point and OTCO body (see Fig.2).
- 钎焊后建议拍X光，确认钎焊后感温体无收缩。
It is recommended to take X-ray after soldering, to confirm that the thermal pellet has no shrinkage after soldering.

表1: 不同焊点距离温度保险丝本体长度的最大允许钎焊时间

TABLE 1: Max. Allowable Soldering Time for Different Length of Soldering Point from OTCO Body

额定动作温度 Rated Functioning Temp. (T_f)	长度 Length	时间 Time	长度 Length	时间 Time	长度 Length	时间 Time	最高钎焊温度 Max. Soldering Temp.
($^\circ\text{C}$)	(mm)	(s)	(mm)	(s)	(mm)	(s)	($^\circ\text{C}$)
≤ 110	5	N / A	15	N / A	25	N / A	400
111 ~ 150	5	N / A	15	1	25	2	
151 ~ 190	5	1	15	2	25	3	
≥ 191	5	1	15	3	25	5	

温度保险丝

Thermal-Link (OTCO)

点焊 Welding

1. 必须避免点焊电流流入温度保险丝内部。点焊电流将使温度保险丝内部部件焊接在一起，导致不能动作。
Avoid welding current flowing into the inside of the OTCO. The welding current will cause the internal parts to be welded together, resulting in the failure function of OTCO.
2. 点焊过程中必须支撑温度保险丝的引线，以避免温度保险丝的损坏。
During the welding process, the lead wires of the OTCO must be supported to avoid the damage of the OTCO.
3. 在点焊过程中，焊点与温度保险丝之间应使用散热装置（参考图2）。
In the process of welding, cooling fixture should be used between welding point and OTCO body (See Fig.2).
4. 点焊后建议拍X光，确认点焊后感温体无收缩。
It is recommended to take X-ray after welding, to confirm that the thermal pellet has no shrinkage after welding.

铆接或压接 Riveting or Crimping

1. 选择低电阻的材料（比如铜）进行铆接或压接。
Select materials with low resistance (such as copper) for riveting and crimping.
2. 接触电阻应尽量小，接触电阻过大会导致温升过高，使温度保险丝提前动作。
Contact resistance shall be as small as possible. Large contact resistance will cause high temp. to make OTCO open in advance.
3. 最好将温度保险丝引线和多股线压接，而不是单股线，因为在温度循环时，多股线能卡得更紧，能保持更好的电接触。
It is better to crimp OTCO leads to stranded lead wires rather than solid wires as the stranded wire may be crimped tighter and maintain better electrical contact during temp. cycling.
4. 铆接或压接过程中，应确保引线不会被扭转，封口树脂不会被破坏。
During the riveting and crimping process, ensure that the lead wires shall not be reversed, sealing resin shall not be destroyed.
5. 当工作温度超过150 °C时，铆接或压接后建议使用钎焊加固。
When the working temp. exceeds 150°C, soldering reinforcement is recommended after riveting and crimping.

禁止触点线直接接触温度保险丝本体，以避免短路（参考图3）

The isolated lead is forbidden to contact OTCO body directly to avoid short circuit (See Fig.3).

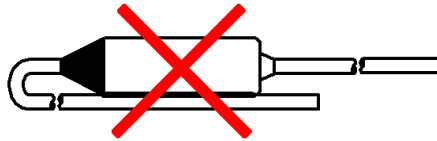
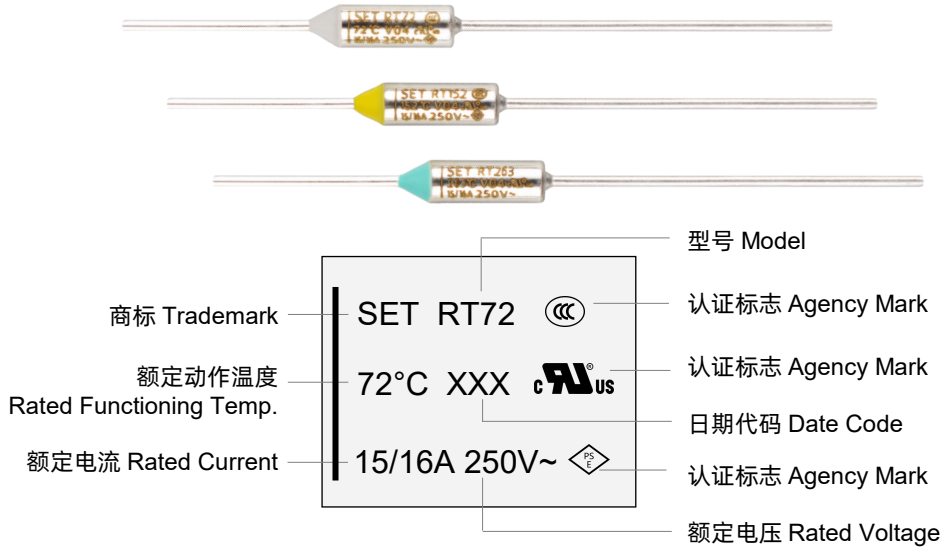


图3 FIGURE 3

标识 Marking



备注：日期代码首字母代表年份，字母A代表2000年，字母B代表2001年，以此类推。后面两位数字代表季度，季度代码由01、02、03、04表示，代表一年的四季。

Note: The first letter of date code represents the year, letter A represents 2000, letter B represents 2001, and so on. The last two digits represent the quarter, the quarter code is represented by 01, 02, 03 and 04, representing the four quarters of the year.

安规认证 Agency Approvals

安规 Agency	标准 Standards	认证号 File No.
	UL60691	E214712
	CAN-CSA-E60691	E214712
	EN60691	40052266
	J60691	JET2121-32001-2011 JET2121-32001-2012 JET2121-32001-2013 JET2121-32001-2014 JET2121-32001-2015 JET2121-32001-2016 JET2121-32001-2017 JET2121-32001-2018 JET2121-32001-2019 JET2121-32001-2020
	KC60691	SU05023-19006A SU05023-19007A SU05023-19008A SU05023-19009B SU05023-19010A
	GB/T 9816	2020980205000192

温度保险丝

Thermal-Link (OTCO)

RT系列 RT Series I_r : 15 / 16 A

技术参数 Specifications

型号 Model	额定动作温度 T_f	实测熔断温度 Fusing Temp.	保持温度 T_h	保持温度 T_h (UL/cUL)	最高极限温度 T_m	额定电流 I_r	额定电压 U_r	标称放电电流 I_n	最大放电电流 I_{max}							RoHS & REACH
	(°C)	(°C)	(°C)	(°C)	(°C)	(A)	(VAC)	(kA)	(kA)	UL	cUL	VDE	PSE	KC	CCC	
RT72	72	69 ± 2	42	57	180	15 / 16	250	1.5	3	●	●	●	●	N / A	●	●
RT77	77	74 ± 2	50	62	300	15 / 16	250	1.5	3	●	●	●	●	N / A	●	●
RT84	84	82 ± 2	54	69	200	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT94	94	89 ± 2	64	79	300	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT99	99	95 ± 2	69	84	200	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT104	104	102 ± 2	74	89	250	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT110	110	108 ± 2	82	95	240	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT117	117	114 ± 2	88	102	200	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT121	121	118 ± 2	93	106	300	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT128	128	124 ± 2	98	113	200	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT134	134	131 ± 2	104	119	250	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT144	144	141 ± 2	114	129	300	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT152	152	149 ± 2	122	137	205	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT167	167	164 ± 2	137	152	220	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT172	172	170 ± 2	143	157	260	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT184	184	181 ± 2	154	169	250	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT192	192	190 ± 2	162	177	300	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT216	216	213 ± 2	186	200	450	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT229	229	227 ± 2	200	200	450	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT240	240	236 ± 2	200	205	450	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT257	257	254 ± 2	200	220	480	15 / 16	250	1.5	3	●	●	●	●	●	●	●
RT263	263	261 +2 / -4	N / A	220	480	15 / 16	250	1.5	3	●	●	○	○	○	○	○

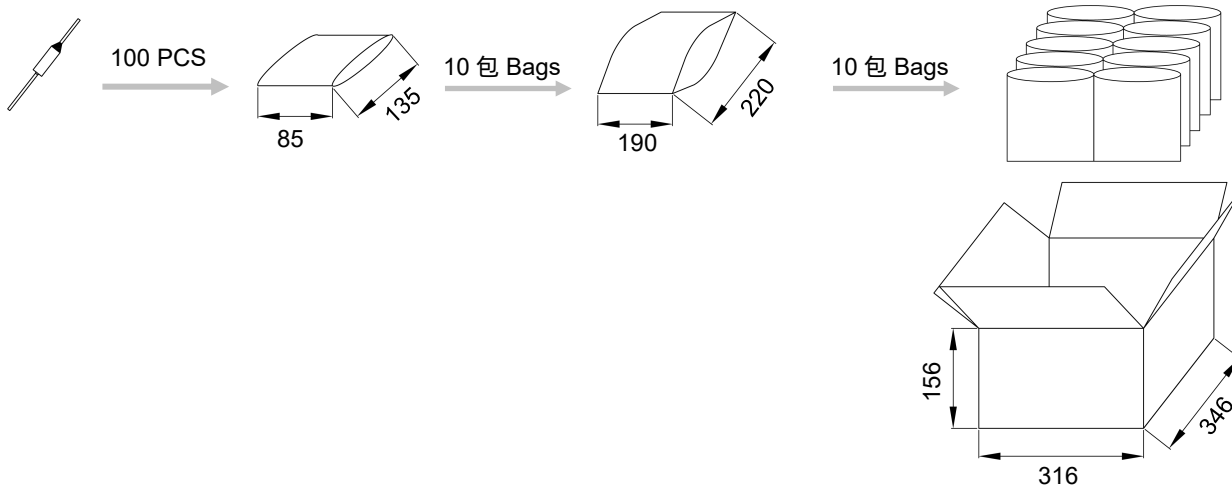
备注 Note:

- "●" 表示产品已通过认证。Means OTCO has gained the certification.
"○" 表示产品还未通过认证。Means OTCO hasn't gained the certification.
- T_h 测试, UL / cUL 建议监控产品本体温度, 其它标准建议监控烘箱内环境温度。
For T_h test, UL / cUL standard recommends the thermocouples to monitor the temp. of OTCO body, while other standards recommend the thermocouples to monitor the environment temp. in the oven.
- OTCO RT 系列 $T_r \geq 175^\circ\text{C}$ 的产品, 符合UL的导热老化试验 (CHAT) 要求。
OTCO RT series with a T_r rating 175°C and above comply with UL conductive heat aging (CHAT) requirements.
- RT263符合RoHS要求, 但不符合REACH要求。

包装信息 Packaging Information (以标准引线长度的产品为例 Take standard lead length for example)

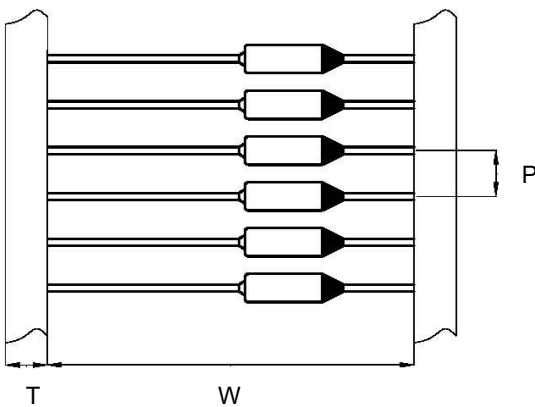
1. 散装 Bulk Packaging

项目 Item	塑料袋 PE Bag	塑料袋 PE Bag	卡通箱 Carton
尺寸 Dimensions (mm)	135 x 85	220x 190	346 x 316 x 156
数量 Quantity (PCS)	100	1,000	10,000
毛重 Gross Weight (kg)			11 ± 10%



2. 编带和卷轴 Taping and Reel Packaging

编带 Taping

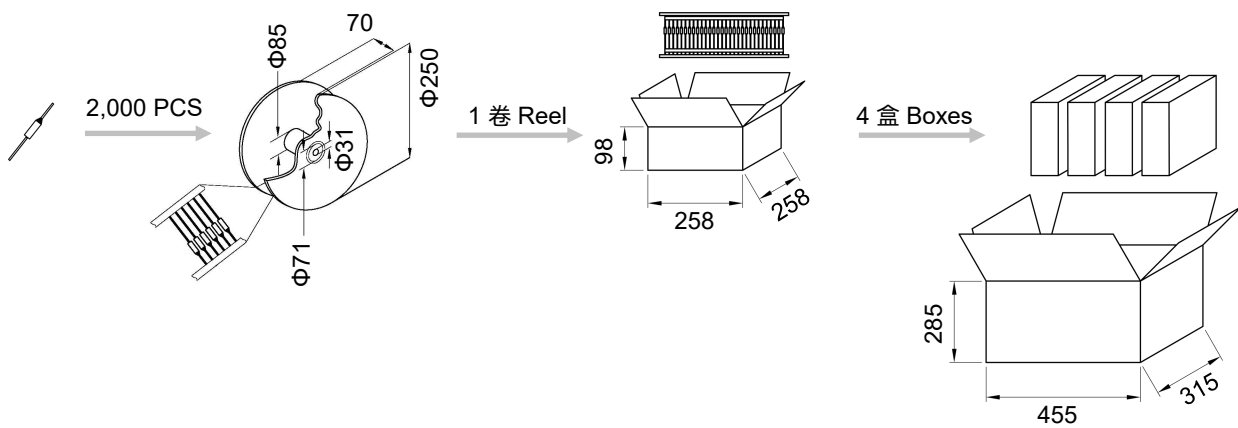


项目 Item	尺寸 Dimensions (mm)
W	53 ± 2
T	6 ± 1
P	5 ± 0.5

温度保险丝
Thermal-Link (OTCO)

卷轴 Reel

项目 Item	卷轴 Reel	盒子 Box	卡通箱 Carton
尺寸 Dimensions (mm)	Φ 250 x Φ 85 x 70	258 x 258 x 98	455 x 315 x 285
数量 Quantity (PCS)	2,000	2,000	8,000
毛重 Gross Weight (kg)			10.3 ± 10%



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