

广州安的电子技术有限公司
SafTTY Electronic Technology Co., Limited

ST07/17AM 系列热保护器技术规格书
Technical Specifications for ST07/17AM Series Thermal Protector



编制 Draw up: 吴如洋

审核 Examine: 朱杰

批准 Approved: 朱俊

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Technical Specifications for ST17/17AM Series Thermal Protector

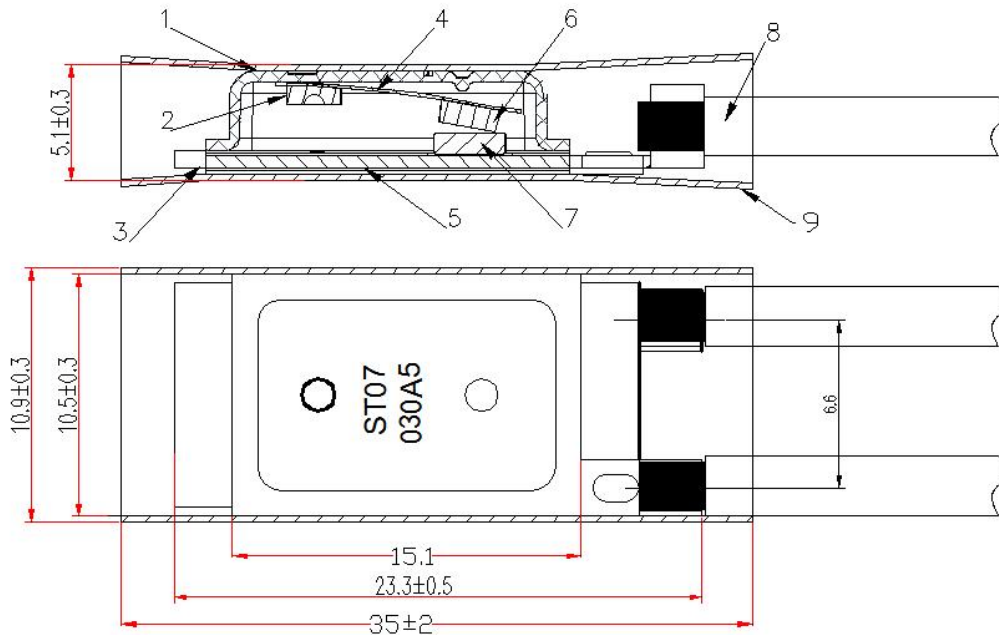
1 产品用途 Product application

ST07/17AM 系列热保护器是一种具有对温度和电流双重感应特性的开关。该产品具有体积小、感温速度快、动作灵敏、安全可靠、交直流特性好、寿命长等特点，产品广泛应用于电动工具、吸尘器、电加热器具（电热毯、电磁炉、直发器、电加热棒等）、分马力电机、水泵、镇流器、变压器、开关电源等产品。

The ST07/17AM series thermal protector is a switch with dual sensing characteristics of temperature and current. The product has the characteristics of small size, fast temperature sensitivity, sensitive action, safe and reliable, good AC and DC characteristics, long life, etc., and the products are widely used in electric tools, vacuum cleaners, electric heating appliances (electric blankets, induction cookers, hair straighteners, electric heating rods, etc.), split horsepower motors, water pumps, ballasts, transformers, switching power supplies and other products.

2 外形和结构: Shape and structure

a) 常规品外形和结构 Conventional shape and structure:



序号 No.	零件名称 Part name	序号 No.	零件名称 Part name	序号 No.	零件名称 Part name
1	金属外壳 Metal case	4	双金属片 Bimetal-disc	7	定触点 Stationary contact
2	铁钉 Iron nails	5	底板 Soleplate	8	导线 Lead wire
3	绝缘纸 Insulation paper	6	动触点 Movable contact	9	绝缘套管 Insulation shrink cap

工作原理：

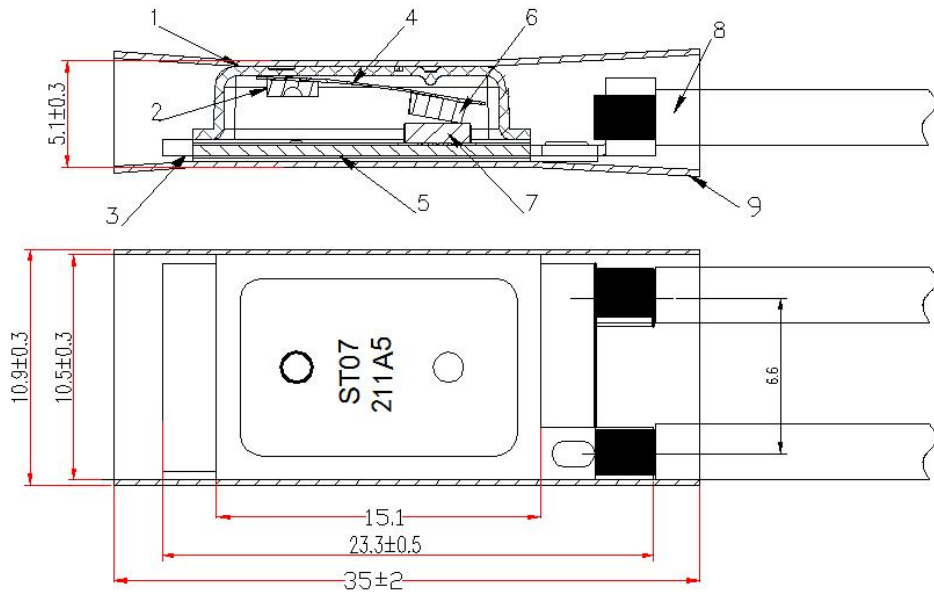
电流通过外壳端子、双金属片，然后由底板端子连接电器（如电机、变压器等）形成回路，当电器发生不正常工作使周围温度过高时，热量传至双金属片达到校正过的跳脱温度使电气触点迅速断开切断电路，当温度下降到复位温度时，双金属片复位又迅速闭合电气触点连通电路，继续循环动作。

Working principle:

Current through the shell terminals, bimetallic sheet, and then by the base plate terminals connected to the electrical appliances (such as motors, transformers, etc.) to form a loop, when the electrical appliances do not work properly so that the surrounding temperature is too high, the heat transfer to the bimetallic sheet to reach the corrected trip temperature so that the electrical contacts quickly disconnect and cut off the circuit, when the temperature drops to the reset temperature, the Bimetal-disc reset and quickly close the electrical contact connection circuit, continue the cycle action.

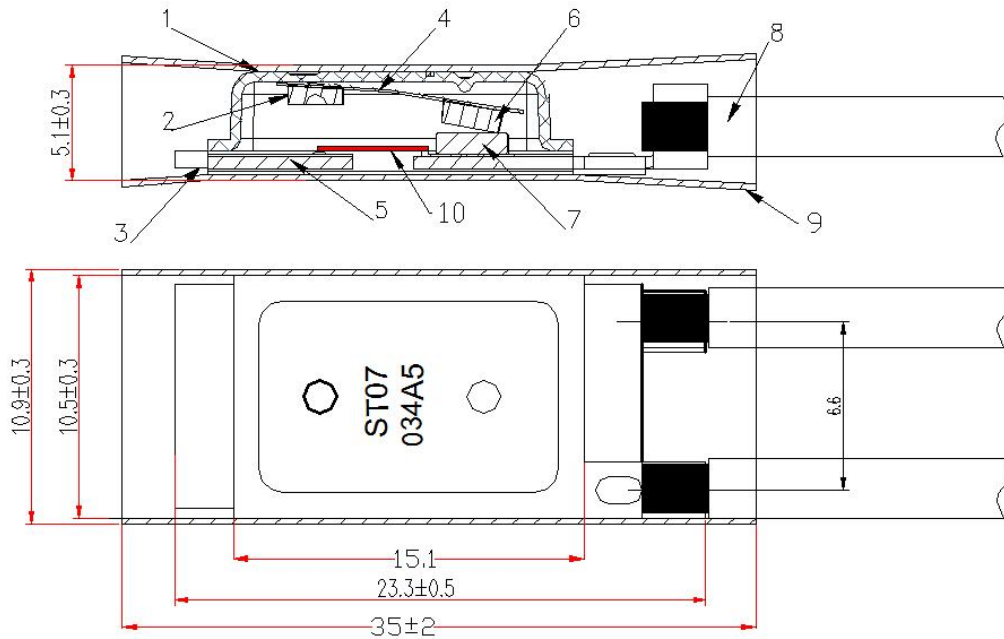
b) 温度电流型 Temperature and current type:

①高阻双金属片 High resistance bimetallic disc



序号 No.	零件名称 Part name	序号 No.	零件名称 Part name	序号 No.	零件名称 Part name
1	金属外壳 Metal case	4	动触点 Movable contact	7	环氧树脂 Epoxy resin
2	底板 Soleplate	5	固定座 Fixed seat	8	导线 Lead wire
3	高阻双金属片 High resistance bimetal-disc	6	静触片 Stationary contact	9	绝缘套管 Insulation shrink cap

②高阻发热丝型 Heating resistance filament type:



序号 No.	零件名称 Part name	序号 No.	零件名称 Part name	序号 No.	零件名称 Part name
1	金属外壳 Metal case	5	固定座 Fixed seat	9	绝缘套管 Insulation shrink cap
2	底板 Soleplate	6	静触片 Stationary contact	10	发热丝 Heating resistance wire
3	双金属片 bimetal-disc	7	环氧树脂 Epoxy resin		
4	动触点 Movable contact	8	导线 Lead wire		

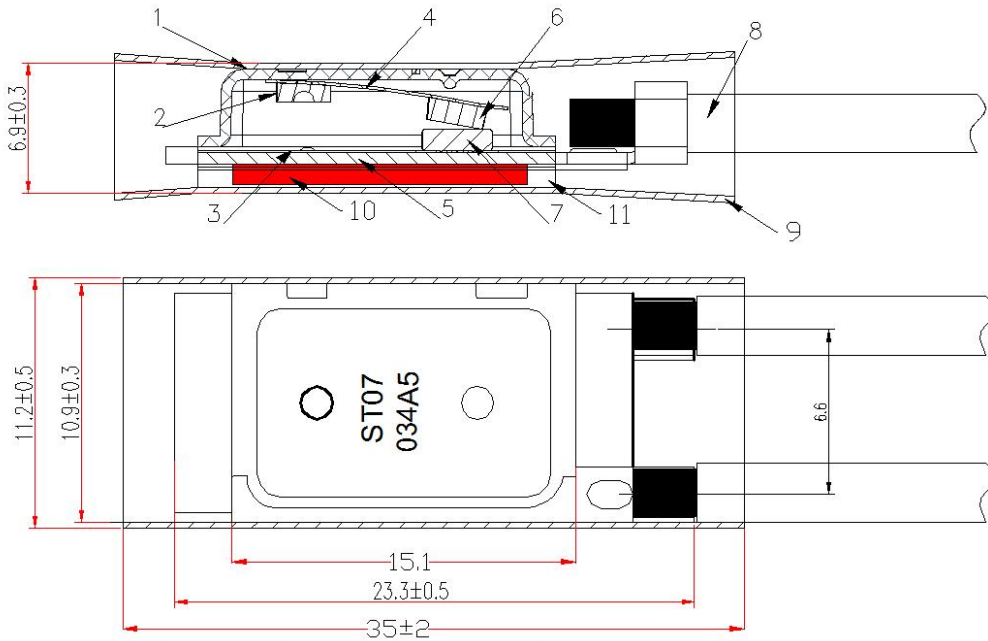
工作原理:

电流通过外壳端子、双金属片或辅助发热丝（与底板静触点连接在一起），然后由底板端子连接电器（如电机、变压器等）形成回路，当电器发生电流过大或堵转电流超过保护器设定的跳脱值时，保护器会在设定的时间内切断电源，使电器得到保护；

Working principle:

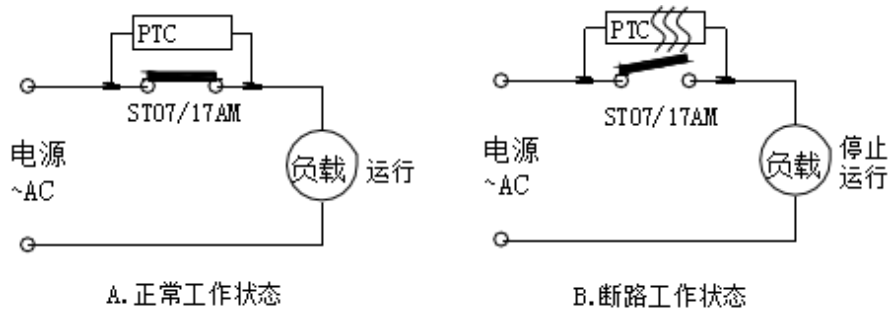
The current is connected to the electrical appliance (such as a motor, transformer, etc.) through the housing terminals, bimetallic sheet or auxiliary heating wire (connected together with the static contact of the base plate), and then the circuit is formed by the backplane terminals, when the electrical appliance is too large or the stall current exceeds the trip value set by the protector, the protector will cut off the power supply within the set time, so that the appliance is protected.

c) 手动（断电）复位型 Manual (power-off) reset type:



序号 No.	零件名称 Part name	序号 No.	零件名称 Part name	序号 No.	零件名称 Part name
1	金属外壳 Metal case	5	固定座 Fixed seat	9	绝缘套管 Insulation shrink cap
2	底板 Soleplate	6	静触片 Stationary contact	10	PTC
3	双金属片 bimetal-disc	7	环氧树脂 Epoxy resin	11	PTC 钢卡 PTC steel card slot
4	动触点 Movable contact	8	导线 Lead wire		

工作原理 Working principle:



ST07/17AM 手动复位型热保护器在原热保护器基础集成了 PTC 陶瓷发热元件, 该发热元件与保护器触点形成并联电路, 负载正常运行时, PTC 不会产生高温 (如图 A)。当负载异常时产生的高温或大电流会使 ST07/17AM 保护器断路, 此时 PTC 元件会产生高温及高阻值, PTC 产生的高温会使 ST07/17AM 热保护器一直保持于断路状态, 负载维持停止运行状态 (如图 B)。

当主机切断电源后, PTC 发热元件停止发热, 保护器经过一定时间的降温后可自动复位, 再次接通电源, 负载运行。

The ST07/17AM manual reset thermal protector integrates a PTC ceramic heating element on the base of the primary thermal protector, which forms a parallel circuit with the protector contacts, and the PTC does not generate high temperatures during normal load operation (Figure A). When the load is abnormal, the high temperature or large current generated will make the ST07/17AM protector disconnect, at this time the PTC element will produce high temperature and high resistance, and the high temperature generated by PTC will keep the ST07/17AM thermal protector in an open circuit state, and the load will maintain a stopped operating state (Figure B). When the host disconnects the power supply, the PTC heating element stops heating, and the protector can automatically reset after a certain period of cooling, turn on the power again, and the load runs.

3 性能 Capabilities

3.1 额定交流电压 Rated AC voltage: 270V;

额定直流电压 Rated DC voltage: 16V;

额定电流/寿命 Rated current/lifetime (COS Φ =1.0)

AC10A-10000cycles

DC20A-10000cycles

3.2 动作特性: Performance

3.2.1 额定断开温度 45°C~180°C (详见附表)。

Rated open temperature: 45°C~180°C (details as per attached list)

3.2.2 复位温度 (详见附表)。

Reset temperature: (details as per attached list)

3.3 电气强度 Electric strength:

测试仪器为耐压测试仪 the test instrument is high voltage tester.

a. 产品在断开时的引线之间应能承受 AC500V, 历时 1min 而无击穿闪络现象;

When the product is in the breaking state, the lead wires should be able to withstand AC500V lasting for 1min without breakdown or flash-over;

b. 产品引线与绝缘外壳之间能承受 AC1500V, 历时 1min 而无击穿闪络现象。

The part between the lead wires and the case should be able to withstand AC500V lasting for 1min without breakdown or flash-over;

3.4 绝缘电阻 Insulation resistance:

在正常条件下, 引线与绝缘外壳之间的绝缘电阻在 100M Ω 以上。(所用表计为 DC500V 兆欧表)

Under normal conditions, the insulation resistance between leads (terminal) and case should be more than 100M Ω measured by ohmmeter of DC500V.

3.5 接触电阻 Contact resistance

标准引线长度 55mm 产品的接触电阻应不大于 50mΩ。

The contact resistance of standard lead wire length 55mm products should be lower than 50mΩ.

3.6 抗拉力试验 Tensile resistance test

产品的引线端应能承受大于或等于 50N 静拉力并保持 1 分钟, 导线不断裂或松动。

Terminal & leads should endure more than 50N axes direction pull lasting for 1 minute without break or looseness.

3.7 耐高温试验 High temperature test

产品置于高于额定动作温度 30°C 的空气环境中保持 16h, 取出放置 2 小时后, 检测其温度变化不超过初始值的 ±5°C 或 ±5%, 取最大值。

Keep the thermal protector in an incubator which temp. is 30°C higher than its rated switching temperature for sixteen hours, and test it two hours later after taking out from the incubator, while the temperature change does not exceed the initial value of ± 5 °C or ± 5%, returns the maximum value.

3.8 耐低温试验 Low temperature resistance test

产品置于 -40°C 空气环境中保持 2h, 取出放置 2 小时后, 检测其温度变化不超过初始值的 ±5°C 或 ±5%, 取最大值。

Keep the thermal protector in a -40°C incubator for ninety six hours, and test it two hours later after taking out from the incubator, while the temperature change does not exceed the initial value of ± 5 °C or ± 5%, returns the maximum value.

3.9 抗振试验 Anti-Vibration test:

热保护器应能承受振幅 1.5mm, 频率变化 10~55Hz, 扫描变化周期 3~5 次/min, 振动方向 X、Y、Z, 每个方向各连续振动 2h, 检测其温度变化不超过初始值的 ±5°C 或 ±5%, 取最大值。

Thermal protector should be able to withstand the amplitude 1.5mm, frequency 10-55Hz, scanning change cycles of 3-5 times /min. The vibration direction X, Y, Z and each direction vibrates on a continuous basis for 2 hours while the temperature change does not exceed the initial value of ±5°C or ±5%, returns the maximum value.

3.10 极限短路试验 Short-circuit limit test

产品在串接 RL1-15A 熔断器的电路中承受 200A 的极限短路电流时, 应不引起包裹在保护器上的棉花燃烧。

When the thermal protector is in series connection with RL1-15A fuse to withstand short circuit current limit of 200A, it should not cause the cotton burned which is wrapped on the thermal protector.

3.11 跌落试验 Drop test

将产品从 700mm 的高度, 自由跌落在水泥平面或其它坚固的水平面上, 产品的温度性能不应超过初始值的 $\pm 5^{\circ}\text{C}$ 或 $\pm 5\%^{\circ}\text{C}$ (两者值取最大值)。

Let the thermal protector fall free in the cement or other solid surface from a height of 700mm, its temperature performance should not exceed the initial value of $\pm 5^{\circ}\text{C}$ or $\pm 5\%^{\circ}\text{C}$ (take the larger from the two values).

4 产品断开弹跳时间 Product disconnection bounce time

Bounce Time < 1ms.

5 其它事项:Others

5.1 断开温度检测的升温速率应控制为 $1^{\circ}\text{C}/1\text{min}$, 用指示灯显示通断状态, 允许通过产品的电流不超过 0.01A。

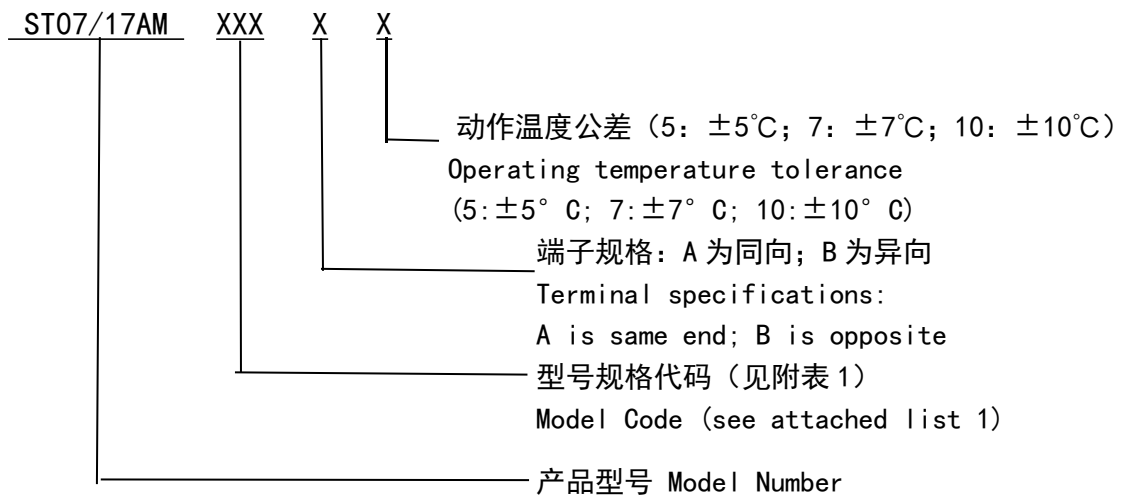
For action temperature testing, temperature rising rate should be controlled at $1^{\circ}\text{C}/\text{min}$ and use indicator light to show the on/off state. The testing current should be no more than 0.01A.

5.2 使用过程中产品不能承受强烈冲击力及压迫力。

In your production, the thermal protectors could not withstand a big impact and stress.

5.3 型号规格说明: Model Code System explanation

ST07 027 A5



注: 标准品引线为 UL3135, AWG18, 黑色, 引线长 55/55mm, 半剥 6mm。接线方式有同向、反向两种类型, 可依客户要求制定规格或铆接线材和端子;

Standard lead wire is UL3135, AWG18, Black, 55/55mm and semi-stripped 6mm. There are two types of wiring methods: co-directional and reverse, and specifications can be formulated or riveted wires and terminals according to customer requirements;

5.4 认证 Certifications

ISO9001, RoHS

CERTIFICATION	File No.
UL	E336150
VDE	40041853
CQC	CQC21002310553
CB	CN54760
KC	ZU02132-21001

5.5 包装、储存、运输 Packing, storage and transportation

① 产品包装采用透明塑料自封袋，每个小包装袋含 100pcs，每个大包装包含 10 小包，发货均采用纸箱包装，尺寸为 32*26*25CM；如果总数量偏少，我司会采用其他规格纸箱。

Product packaging using transparent plastic self-sealing bags, each small packaging bag contains 100pcs, each large package contains 10 small packets, the delivery is packed in cartons, the size is 32 * 26 * 25CM; if the total quantity is small, our company will use other specifications of cartons.

② 储存时放于湿度 40~80%、温度-5~40°C环境中 12 个月无变化；

The product should be stored at the -5~40°C environment with the relative humidity of 40~80% for 12 months without changes.

③ 直接运输或托运，应轻拿轻放，避免碰撞或受潮。

Direct transportation or shipment, it should be handled carefully and avoid collision or damp.

④ 如有防浸漆要求请在报价前向我司销售人员说明具体要求。

If you products need to suitable for impregnation process, please explain the specific requirements to our sales before quoting.

附表: Attached list

型号代码 (低阻双金属片) Model number code (Low resistance bimetal disc)	型号代码 (高阻双金属片) Model number code (High resistance bimetal disc)	动作温度 (°C) Operating temperature (°C)	复位温度 (°C) Reset temperature (°C)
016	-	45	32 ± 10
017	-	50	35 ± 15
018	-	55	40 ± 15
019	-	60	45 ± 15
020	-	65	50 ± 15
021	201	70	50 ± 15
022	202	75	55 ± 15
023	203	80	55 ± 15
024	204	85	60 ± 15
025	205	90	60 ± 15
026	206	95	65 ± 15
027	207	100	65 ± 15
028	208	105	70 ± 15
029	209	110	70 ± 15
030	210	115	75 ± 15
031	211	120	75 ± 15
032	212	125	80 ± 15
033	213	130	85 ± 15
034	214	135	85 ± 15
035	215	140	90 ± 15
036	216	145	95 ± 15
037	217	150	95 ± 15
038	218	155	100 ± 15
039	219	160	105 ± 15
040	-	165	110 ± 15
041	-	170	115 ± 15
042	-	175	120 ± 15
043	-	180	125 ± 15