

1 适用 Scope

本规格书适用于低压 TN 接地电源系统中的电涌保护器 SD05K277LMT。

The specification is available for the surge protective device which is used in low voltage TN grounding power system, the product model is SD05K277LMT.

(标称系统电压: Nominal System Voltage:UL 1449 4th: 277 Vac)。

2 术语 Glossary

2.1 浪涌 Surge

电路中电流、电势或能量的瞬态波。基于本标准，浪涌不包括在几个周期内因升高的工频电压所产生的瞬态过电压（TOV）。

A transient wave of current, potential or power in an electric circuit. For the purposes of this standard, surges do not include temporary over voltages (TOV) consisting of an increase in the power frequency voltage for several cycles.

2.2 电涌保护器 Surge Protective Device (SPD)

至少包含一个非线性元件，通过转移或抑制冲击电流来限制冲击电压的设备，且可以重复使用。

A device composed of at least one non-linear component and intended for limiting surge voltages on equipment by diverting or limiting surge current and is capable of repeating these functions as specified.

2.3 温度保险丝 Thermal-Link

热元件组成的不可恢复性设备，其可以断开长时间处于超过设计温度的电路。

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 which it has been designed.

2.4 状态指示器 Status Indicator

指示 SPD 或者 SPD 一个部件工作状态的设备。

Device that indicates the operational status of an SPD, or a part of an SPD.

2.5 1.2/50 电压波形 1.2/50 Voltage Wave

在开路情况下，视在波前时间为 1.2 μ s，且半峰值时间为 50 μ s 的冲击电压。

Voltage surge with a virtual front time of 1.2 μ s and a time to half-value of 50 μ s delivered across an open circuit.

2.6 8/20 电流波形 8/20 Current Wave

短路情况下，视在波前时间为 8 μ s 且半峰值时间为 20 μ s 的冲击电流。

Current surge with a virtual front time of 8 μ s and a time to half-value of 20 μ s delivered into a short circuit.

2.7 标称系统电压 Nominal System Voltage

参照 ANSI C84.1 表 1，指定系统电压等级所对应的标称值。

A nominal value assigned to designate a system of a given voltage class in accordance with ANSI C84.1, Table 1.

- 2.8** 最大持续工作电压 Maximum Continuous Operating Voltage (MCOV)
可持续施加在 SPD 保护模式上的最大工频电压的有效值。
The maximum designated root-mean-square (r.m.s.) value of the power frequency voltage that may be continuously applied to the mode of protection of an SPD.
- 2.9** 实测限制电压 Measured Limiting Voltage (MLV)
施加一个指定波形和幅值的脉冲，在端子引脚、插座连接处测试得电压最大幅值。
The maximum magnitude of voltage, measured at the lead terminals, receptacle contacts, and similar locations after the application of an impulse of specified wave shape and amplitude.
- 2.10** 电压保护水平 Voltage Protection Level (U_p)
由于施加规定陡度的冲击电压和规定幅值及波形的冲击电流而在 SPD 两端之间预期出现的最大电压。
Maximum voltage to be expected at the SPD terminals due to an impulse stress with defined voltage steepness and an impulse stress with a discharge current with given amplitude and wave shape.
- 2.11** 参考试验电压 Reference Test Voltage (U_{REF})
用于 SPD 测试的电压有效值。它取决于 SPD 的保护模式、系统标称电压、系统结构和系统内的电压调整。
The r.m.s. value of voltage used for testing which depends on the mode of protection of the SPD, the nominal system voltage, the system configuration and the voltage regulation within the system.
- 2.12** 标称放电电流 Nominal Discharge Current (I_n)
由厂家给出的，SPD 在经过 15 次 8/20 μ s 电流波形浪涌冲击后无损坏的电流峰值。
Peak value of the current, selected by the manufacturer, through the SPD having a current wave shape of 8/20 μ s where the SPD remains functional after 15 surges.
- 2.13** 最大放电电流 Maximum Discharge Current (I_{max})
流过 SPD，具有为 8/20 μ s 波形电流的峰值，其峰值大小由厂家规定。 I_{max} 等于或大于 I_n 。
Crest value of a current through the SPD having an 8/20 μ s wave shape and magnitude according to the manufacturers specification. I_{max} is equal to or greater than I_n .
- 2.14** 保护模式 Modes of Protection
在端子间保护保护元器件的电流路径，例如相对相、相对地、相对中线、中线对地。
An intended current path, between terminals that contains protective components, e.g. line-to-line, line-to-earth, line-to-neutral, neutral-to-earth.
- 2.15** 热稳定 Thermal Stability
在引起 SPD 温度上升的动作负载试验后，在规定的环境温度条件下，给 SPD 施加规定的最大持续工作电压，如果 SPD 的温度能随时间而下降，则认为 SPD 是热稳定的。
SPD is thermally stable if, after heating up during the operating duty test, its temperature decreases with time while energized at specified maximum continuous operating voltage and at specified ambient temperature conditions.
- 2.16** 外壳防护等级 (IP 代码) Degrees of Protection Provided by Enclosure (IP code)
外壳提供的防止触及危险的部件、防止外界固体异物进入和/或防止水的进入壳内的防护程度。
Classification preceded by the symbol IP indicating the extent of protection provided by an enclosure against access to hazardous parts, against ingress of solid foreign objects and possibly harmful

ingress of water.

2.17 开路电压 Open Circuit Voltage (U_{oc})

在复合波发生器连接试品端口处的开路电压。

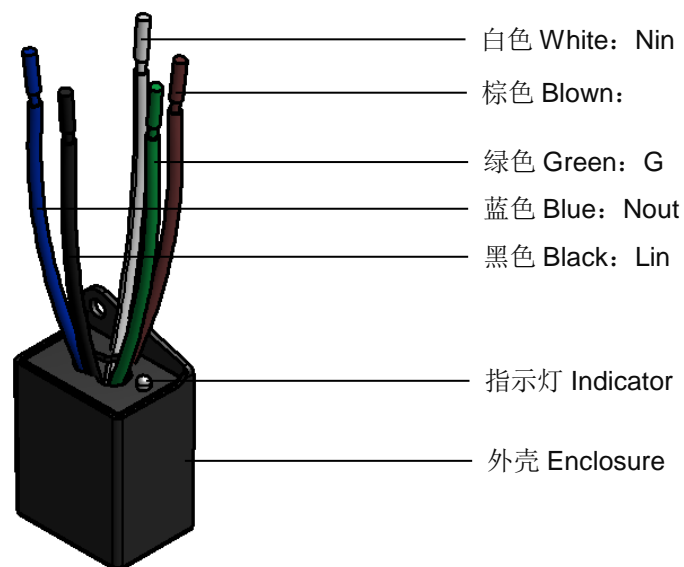
Open circuit voltage of the combination wave generator at the point of connection of the device under test.

3 结构尺寸 Structure and Dimension

3.1 结构图 Structure Diagram

产品结构：内置 3 只设有合金型温度保险丝的压敏电阻、1 个气体放电管、LED 指示电路等。

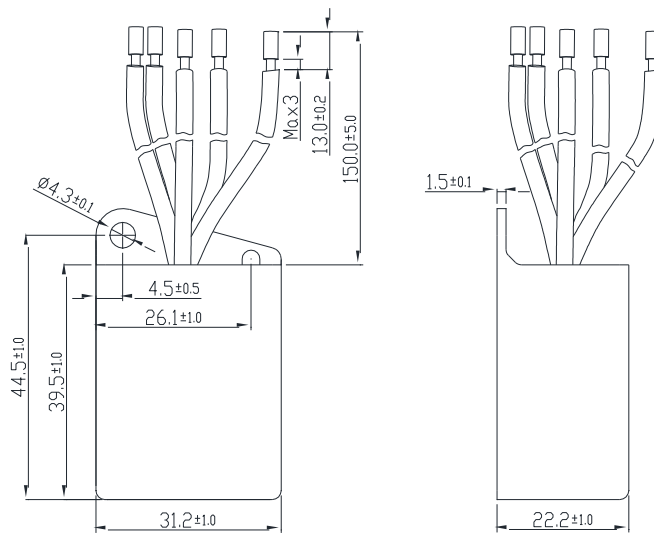
Product Structure: Built in with three combinations of alloy Thermal-Links and varistor, one discharge tube, LED indicator circuit and so on.



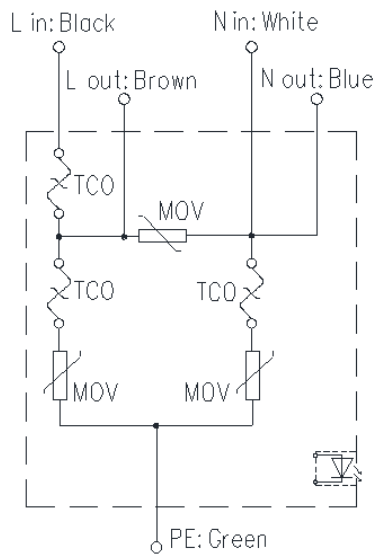
3.2 主要原材料明细 Main Material List

编号 No.	1	2	3	4	5	6
零件名 Part Name	外壳 Enclosure	电源线 Power Line	温度保险丝 Thermal-Links	压敏电阻 Varistor	印刷电路板 Printed Circuit Board	灌封材料 Embedding Material
材质 Materials	高阻燃性塑料 PA6-94-V0	AWG 18 PVC	易熔合金 Fusible alloy	氧化锌 Zinc oxide	环氧树脂覆铜板 Epoxy resin copper clad board	环氧树脂、硅橡胶 Silicone rubber Epoxy resin


3.3 尺寸 Dimension (mm)



3.4 电路图 Circuit Diagram



4 安规认证 Agency Approvals

认证机构 Agency	标准 Standards	认证号 File NO.	类别 Category
 UL	UL 1449 4 th	E322662	VZCA2
 cUL	CSA C22.2 NO.8 13 CSA ECN 516	E322662	VZCA8
 TUV	EN 61643-11	R 50434690	T2
 CE	EN 61643-11	AN 50426133001	T2

5 技术参数 Specification

技术特性 Technical Feature	技术参数 Technical Parameters	执行标准 Reference Standards
工作温度 Operational Temperature Range	(-40 - 50) °C	GB/T 10193 IEC 61051
极限存储温度及湿度 (24 小时) Storage Temperature and Humidity Range (24 hours)	(-40 - 85) °C $\leq 95\%RH$	IEC 60068-2-1 IEC 60068-2-2
标称系统电压 Nominal System Voltage (U_n)	277 Vac	UL 1449 4 th
最大连续工作电压 Maximum Continuous Operating Voltage(MCOV)	320 Vac	UL 1449 4 th EN 61643-11:2011
标称放电电流 Nominal Discharge Current(I_n) (8/20 μ s)	5 kA	UL 1449 4 th
	5 kA	IEC 61643-11 T2
开路电压 Open Circuit Voltage(U_{oc})	10 kV	EN 61643-11 T3
最大放电电流 Maximum Discharge Current(I_{max})(8/20 μ s)	10 kA	EN 61643-11: 2011
电压保护水平 Voltage Protection Rating (U_p)	1500 V	EN 61643-11: 2011
保护模式 Protection Mode	L-N L/N-G	UL 1449 4 th EN 61643-11: 2011
外壳防护等级 Degrees of Protection Provided by Enclosure	IP66	IEC 60529
重量 Weight	(60 \pm 10) g / PCS	-
海拔 Altitude	≤ 2000 m	EN 61643-11: 2011

6 检验项目 Test Items

6.1 常规检验项目 General Test Item

序号 No.	项目 Items	试验要求 Test Requirement	执行标准 Reference Standards	抽样频率和 接受标准 AQL
1	外观 Appearance	外壳无穿孔、无飞边、标示清晰。 The case without perforation and fins, the mark is clear.	企业标准 Enterprise Standard	G-II AQL=1.0
2	尺寸 Dimension	用游标卡尺测量产品尺寸，尺寸范围参照 3.3。 Use the vernier calipers to measure the product size, and the size range please reference to the table 3.3.	企业标准 Enterprise Standard	S-2 AQL=0.65
3	状态指示 Status	U_n 的标称工作电压通过 SPD，检测状态指示等是否正常。 The SPD was connected to U_n , the state lights work.	企业标准 Enterprise Standard	G-II AQL=0.25
4	绝缘电压 Dielectric Voltage	在引线和外壳间施加工频电压 $\geq 1640 \text{ V}$ ，1min。 Apply the voltage between the lead and enclosure no less than 1840 V, last for 1 min.	UL1449 4 th	S-2 AQL=1.0

6.2 标称放电电流试验 Nominal Discharge Current Test

参考标准：UL 1449 第四版本 章节 40

Reference Standard: UL 1449 4th Section 40

测试方法：

- 未通电下，在 $L_{in}-N_{in}$ 间施加 5 kA 以 8/20 μs 的电流冲击，并记录测得的限制电压；
- 在 1 秒内在 $L_{in}-N_{in}$ 间加上 MCOV，持续时间 60 秒；
- 上述步骤 a)、b)重复 5 次；
- 每组期间样品休息 30 分钟（5 次为一组，共三组）；
- 重复上述步骤 a)~ d)重复 3 次；
- 15 次冲击结束后，样品测试脚间施加 MCOV 时间不少于 15 分钟；
- L-G、N-G 重复上述步骤。

Test Method:

- While the sample is unenergized, apply the 8/20 μs 5 kA current surge to $L_{in}-N_{in}$, per mode, at the Nominal Discharge Current specified through the sample. The limiting voltage that results from the impulse shall be measured and recorded after application of the specified surge;
- Within 1 second following the previous surge application, the MCOV shall be applied for 60 seconds (± 5 seconds);
- Steps a) and b), above, shall be repeated for a total of 5 cycles;
- The samples shall be allowed to rest for 30 minutes (± 5 minutes), five impulses as a group, three groups total;
- Steps a) through d), above, shall be repeated for a total of 3 cycles;
- Following the 15th surge, the MCOV shall be re-applied for at least 15 minutes;
- Repeat the above test at $L_{in}-G$, $N_{in}-G$.

判定标准：

- 不能发出火焰，熔化金属，或通过产品上的任何孔隙有炽热火燃着的小颗粒溅出；
- 不能使支撑面、薄纸或者纱布碳化或起火；

- c) 外壳不能点燃;
- d) 不能在外壳上造成开孔, 导致导电部件被触及;
- e) 内部或外部的辅助设备不能断开。

Pass Criteria:

- a) There was no emission of flame, molten metal, glowing, or flaming particles through an opening in the product;
- b) There was no charring, glowing or flaming of the supporting surface or tissue paper;
- c) There was no ignition of the enclosure;
- d) No openings were created in the enclosure that resulted in the accessibility of live parts;
- e) Supplementary protective devices, internal or external to the sample, did not open.

6.3

限制电流异常过电压测试 Limited Current Abnormal Overvoltage Test

参考标准: UL 1449 第四版本 章节 44.4

Reference Standard: UL 1449 4th section 44.4

测试方法:

- a) 试验在新的试品上进行;
- b) 在 Lin-Nin 间施加测试电压 480 V;
- c) 电流值 10 A、5 A、2.5 A、0.5 A 施加于试品上, 每个电流值测试 1 个样品;
- d) 产品过压时间超过 7 小时或电流/温度达到平衡或者试品与测试电源断开为实验停止;

Test Method:

- a) Untested samples for this test.
- b) Apply test voltage 480 V at L-N;
- c) The sample shall be subjected to short circuit current as follows: 10 A, 5 A, 2.5 A, 0.5 A. Each current rate need three samples to be tested;
- d) In the case, the SPD module did not disconnect itself from the circuit for 7 hours test, the temperatures within the SPD module attain equilibrium or SPD disconnected from the ac supply, stop testing.

判定标准:

- a) 不能发出火焰, 熔化金属, 或通过产品上的任何孔隙有炽热火燃着的小颗粒溅出;
- b) 不能使支撑面、薄纸或者纱布碳化或起火;
- c) 外壳不可以被点燃;
- d) 不能在外壳上造成开孔, 是导电部件可以被触及;

Pass Criteria:

- a) There is no emission of flame, molten metal, glowing or flaming particles through an opening in the product;
- b) There is no charring, glowing or flaming of the supporting surface, tissue paper or cheesecloth;
- c) There is no ignition of the enclosure;
- d) No openings were created in the enclosure that resulted in the accessibility of live parts.

7 安全预防措施 Safety Precautions

7.1 安装前阅读并理解所有说明。

Read and understand all instructions before installation.

7.2 装配时不要用丙酮等溶剂清洗本产品，以免破坏本产品的封装层。

Avoiding to destroy enclosure, solvent such as acetone is forbidden for cleaning products when assembly.

7.3 装配时应避免出现如敲击等作业方式，避免造成本产品出现机械损伤。

Avoiding making mechanical damage on products, improper operation such as knocking when assembly is not allowed.

7.4 应用本产品的设备必须有可靠的接地线与大地相连，地线长度应小于 0.5 米。

Equipment on the use of the products must have reliable grounding to the earth, the length of the grounding wire less than 0.5 m.

7.5 未遵守操作说明可能导致电气系统或相关设备损坏。

If you do not obey the instructions, the electric system or associated equipment may be breakdown.

7.6 安装位置：室内或室外防护罩内。

Installation location: Indoors or within the outdoors shield.

7.7 产品安装位置非技术人员不得触碰，或者是被置于安装后只能用工具打开的外壳内；产品安装除了规定的安装表面，产品与任何接地导电层间距不得小于 150 mm。

The SPD shall be installed to the place where unskilled person cannot touch or within enclosures which can only be opened by using tool. The distance between SPD and any grounding conductive surface, except the prescriptive mounting surface, shall be greater than 150 mm.

7.8 系统电压波动范围小于 10%。

Fluctuation range of system voltage shall be less than 10%.

7.9 如果热保护装置断开，指示将关闭。

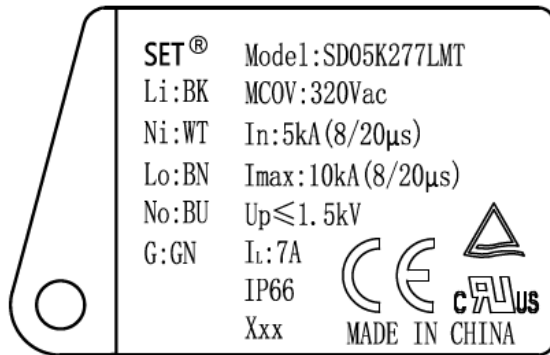
If the Thermal-Links break, the indicator will be off.

7.10 实际应用中，推荐使用额定电流 10 A 的后备保护装置。

In practice, recommended backup protect device with the Rated Current of 10 A.

8 标示及包装 Marks and Package

8.1 产品本体标示 Marking on Product



8.2 包装箱标示以下事项 Marking on Packaging

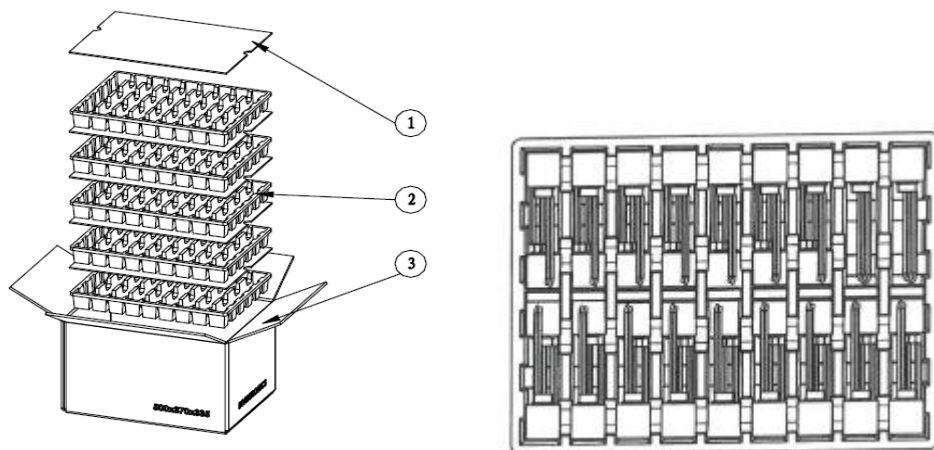
- a) 箱号 Carton NO.
- b) 追溯号 Tracking NO.
- c) 产品编码 Product Code
- d) 产品型号 Product Model
- e) 产品描述 Product Desc.
- f) 批号 Lot NO.
- g) 数量 Q'TY
- h) 净重 N.W.
- i) 毛重 G.W.
- j) 备注 Note
- k) 检验 QA

箱号 Carton NO.	
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批号 Lot NO.	
数量 Q'TY	
净重 N.W.	
毛重 G.W.	
备注 Remark	
检验 QA	

8.3 包装 Packaging

包装尺寸 Dimensions (mm)	纸托盘 (Paper Plate)	纸箱 Carton
	470×350×57	500×370×335
数量 Quantity (PCS)	每托盘 (Every Plate)	每箱 (Every Carton)
	72	5×72

包装示意图 Packaging Drawing:

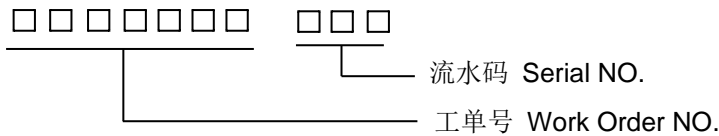


① —卡板 Cardboard ②—纸托盘 Paper Plate ③—纸箱 Carton

净重 Net Weight: 21.5±1.0 kg 毛重 Gross Weight: 24.5±1.0 kg

9 产品批号&追溯号识别 Lot No. & Tracking No. System

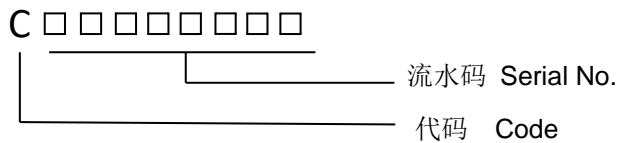
9.1 产品批号识别 Lot No. System



9.2 产品追溯号识别 Tracking No. System

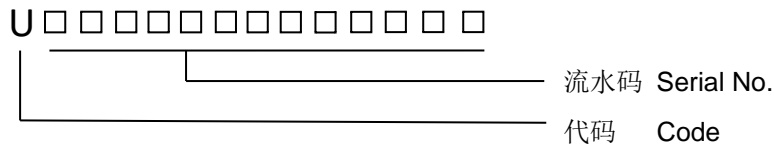
大包装追溯号:

Tracking No. on the Outer Package:



小包装追溯号:

Tracking No. on the Casket:



10 储存条件和有效日期 Store Conditions and Effective Date

- 推荐长期存储条件: 存储温度: (-10 - 40) °C, 存储湿度: ≤75%RH。
Recommend Long-term Storage Condition: Storage Temperature: (-10 - 40) °C, Storage Humidity ≤75%RH.
- 不要将本产品存放在有腐蚀性气体或阳光直接照射的环境中。
Do not use this products in corrosive gas or direct sunlight environment.
- 存储期限: 2 年。
Storage Period: 2 years.

11 规格书之有效性 Validity

11.1 有关修订之协议 Agreement of Revision

本规格书的内容若有不充分或需要修订时, 得由两公司协议后再行修订。

If the content of the specifications is inadequate or need revising, it will be revised after agreement by both parties.

11.2 有效性 Validity

本规格书提出后, 于贵公司承认期间, 可暂时使用, 若经过 1 个月后贵公司无异议或无签回规格书时, 则视同有效文件运用。

The specifications can be used temporarily during the period of approval. If you have no any objection or not return one hardcopy to us within 1 month, the specifications will be operated as a valid document.

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