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规格书
SPECIFICATION FOR APPROVAL

文件号 Document No.	SET-2003-SD10K-016
版本 Version	2.0
页数 Page	13 页 Pages
发行日期 Date of Issue	November 1, 2023
类别 Classification	☑**参考阶段** Reference ☐**样品阶段** Sample ☐**正式承认** Qualified ☐**工程变更** Changed

产品名称 Product Name	电涌保护器 Surge Protective Device
产品型号 Product Model	SD10K277D303-T
产品编码 Product Code	1100000015731
产品描述 Product Description	SD10K277D303-T_320 VAC_150 mm
最大连续工作电压，标称放电电流 Maximum Continuous Operating Voltage & Nominal Discharge Current	U_C: 320 VAC, I_n: 10 kA (8/20 μs)
认证 Agency Approval	NA
制造商 Manufacturer	厦门赛尔特电子有限公司 Xiamen SET Electronics Co.,Ltd.
产地 Country of Origin	中国 China

	2023/11/1		2023/11/1		2023/11/1
拟制 Prepared By		**技术审核 Reviewed By**		**品保核准 Approved By**	

客户批准 CUSTOMER APPROVAL

客户名称 Customer Name	
客户料号 Customer P/N	
结论 Conclusion	☐合格（承认）Qualified ☐不合格 Unqualified 不合格原因：Root Cause:
生效日期 Effective Date	

经办 Prepared By		**审核 Reviewed By**		**核准 Approved By**	

1、 如果本规格获得您们的批准，请签名并拷贝一份副本给我们。
IF YOU APPROVE THIS SPECIFICATION, PLEASE SIGN AND RETURN ONE COPY TO SETsafe | SETfuse.

2、 给赛尔特下订单时，请在订单中列出上述表格中的：产品型号、产品编码对应的内容。
PLEASE WRITE THE RELATED PRODUCT MODEL, PRODUCT CODE SHOWN IN THE ABOVE SPECIFICATION INTO THE PURCHASING ORDER(PO) THAT YOU PROVIDE TO SETsafe | SETfuse.

目录 Catalogue

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 SD10K277D303。
The specification is available for the surge protective device which is used in low voltage TN grounding power system, the product model is SD10K277D303.
(标称系统电压：Nominal System Voltage: EN 61643-11:2011: 277 VAC，UL 1449 5th：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 μs 电压波形 1.2/50 μs Voltage Wave

在开路情况下，视在波前时间为 1.2 μs，且半峰值时间为 50 μs 的冲击电压。
Voltage surge with a virtual front time of 1.2 μs and a time to half-value of 50 μs delivered across an open circuit.

2.6 8/20 μs 电流波形 8/20 μs Current Wave

短路情况下，视在波前时间为 8 μs 且半峰值时间为 20 μs 的冲击电流。
Current surge with a virtual front time of 8 μs and a time to half-value of 20 μs 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 (U_c)

可连续地施加在 SPD 上的最大工频电压的有效值。

Maximum r.m.s. voltage, which may be continuously applied to the SPD's mode of protection.

2.9 实测限制电压 Measured Limiting Voltage (MLV)

施加规定波形和幅值的冲击时，在 SPD 端子处测得最大电压峰值。

Highest value of voltage that is measured across the terminals of the SPD during the application of impulses 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 μs 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 μs 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 μs 波形电流的峰值，其峰值大小由厂家规定。Imax 等于或大于 In。

Crest value of a current through the SPD having an 8/20 μs wave shape and magnitude according to the manufacturers specification. Imax is equal to or greater than In.

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、防止外界的固体异物进入和/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。

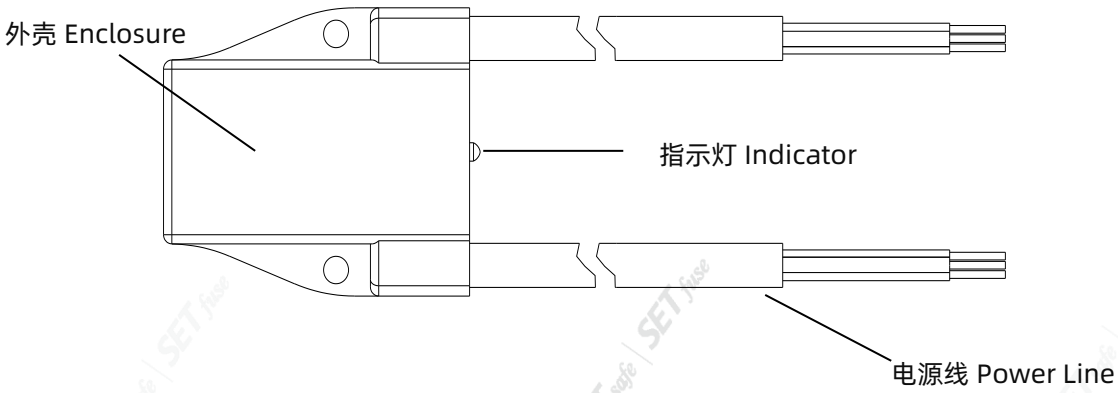
Open circuit voltage of the combination wave generator at the point of connection of the device under test.

3 结构尺寸 Structure and Dimension

3.1 结构图 Structure Diagram

产品结构：内置低熔点脱离装置与气体放电管、压敏电阻串联，高阻燃黑色外壳封装，LED 指示电路等。

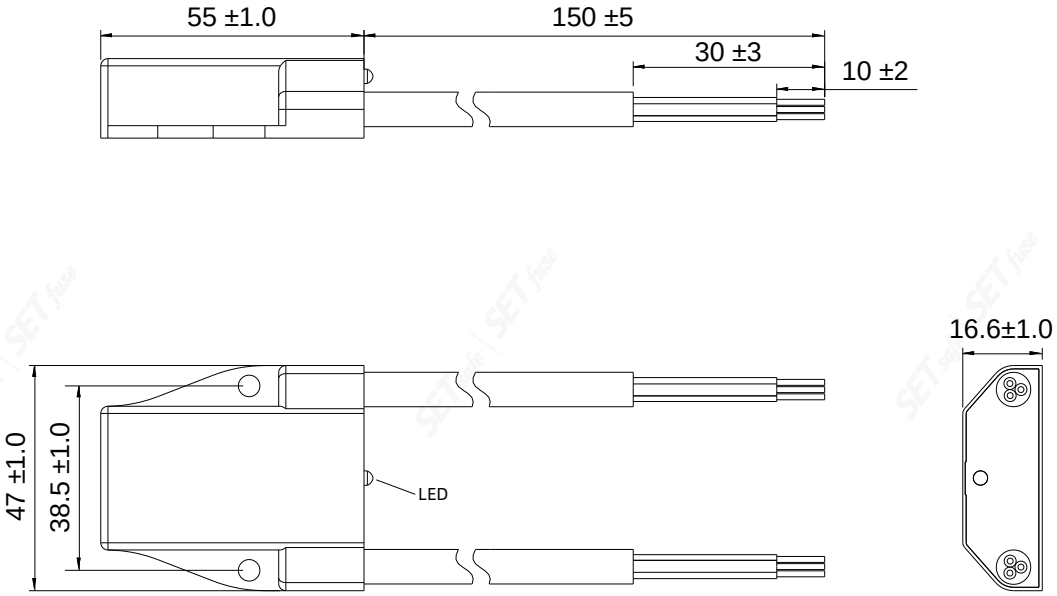
Product Structure：Built-in a low melting point disconnecting device is connected in series with GDT and MOV, with the remote signaling function and packed by high flame-resistant black enclosure, LED indication circuit and so on.



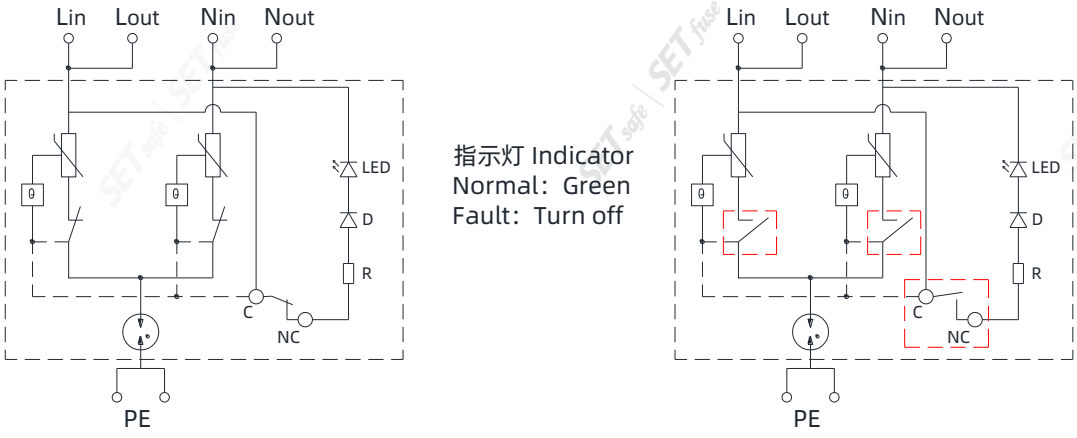
3.2 主要原材料明细 Main Material List

编号 No.	零件名 Part Name	材质 Materials
1	外壳 Enclosure	高阻燃性塑料 PC+ABS
2	电源线 Power Line	VDE H05V2V2-F 3G 1 mm²
3	压敏电阻 Varistor	氧化锌 Zinc oxide
4	印刷电路板 Printed Circuit Board	环氧树脂覆铜板 Epoxy resin copper clad board
5	气体放电管 Discharge Tube	陶瓷、稀有气体 Ceramic, Noble Gases
6	灌封材料 Embedding Material	硅橡胶 Silicone rubber

3.3 尺寸 Dimensions (mm)



3.4 电路图 Circuit Diagram



正常 Normal 失效 Fault

4 安规认证 Agency Approvals

认证机构 Agency		标准 Standards	认证号 File NO.	类别 Category
NA	NA	NA	NA	NA

5 环保 Environment

环保 Environment	指令号 Order No.	指令 Order
RoHS	2015/863/EU	满足 RoHS 指令 Meet the RoHS
REACH	2006/1907/EC	满足 REACH 法规 Meet the REACH

6 技术参数 Specifications

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 - 85) °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 ≤95%RH	IEC 60068-2-1 IEC 60068-2-2
标称系统电压 Nominal System Voltage (U_n)	277 VAC	IEC/EN 61643-11 UL 1449 5th
最大连续工作电压 Maximum Continuous Operating Voltage(U_c)	320 VAC	IEC/EN 61643-11
标称放电电流 Nominal Discharge Current(I_n) (8/20 μs)	10 kA	IEC/EN 61643-11
最大放电电流 Maximum Discharge Current(I_{max})(8/20 μs)	20 kA	IEC/EN 61643-11
开路电压 Open Circuit Voltage(U_{oc})	20 kV	IEC/EN 61643-11 T3
电压保护水平 Voltage Protection Level (U_p)	L-N:2.3 kV(ref.) L-PE:1.5 kV(ref.) N-PE:1.5 kV(ref.)	IEC/EN 61643-11
保护模式 Protection Mode	L-N, L/N-PE	IEC/EN 61643-11

外壳防护等级 Degrees of Protection Provided by Enclosure	IP66	IEC 60529
重量 Weight(/PCS)	TBD	-
海拔 Altitude	≤ 4000 m	IEC/EN 61643-11
额定负载电流 Rated Load Current (I_L)	8 A	IEC/EN 61643-11
供电侧过电流保护装置最大值 Max. Mains-side Overcurrent Protection	C 16 A	IEC/EN 61643-12
最大供电侧过电流保护装置下额定短路电流 Short-circuit Current Rating for Max. Mains-side Overcurrent Protection (I_{SCCR})	1.5 kA	IEC/EN 61643-11

7 检验方法和标准 Inspection Method & Standards

7.1 常规检验项目 General Test Items

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 SET 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 caliper to measure the product size, and the size range please reference to the table 3.3.	企业标准 SET Standard	S-2 AQL=0.65
3	状态指示 Status	U_n 的标称工作电压通过 SPD，检测状态指示灯是否正常。 The SPD was connected to U_n, the state lights work.	企业标准 SET Standard	G- II AQL=0.25
4	绝缘耐压 Dielectric Voltage	在引线和外壳间施加工频电压≥2200 V，持续 1 分钟。 Apply the voltage between the lead and enclosure no less than 2200 V, last for 1 min.	UL 1449 IEC 61643-11	S-2 AQL=1.0

7.2 8/20 冲击电流残压测试 Residual Voltage with 8/20 Current Impulses Test

执行标准：EN 61643-11:2011 之 8.3.3.1

Reference Standard: EN 61643-11:2011 8.3.3.1

测试方法：

a) 在 L_{in}-N_{in} 间施加峰值为 0.1I_n、0.2I_n、0.5I_n、I_n 的 8/20 μs 冲击电流并测量和记录残压；
b) 在 L_{in}-N_{in} 间一个正极性和负极性的序列；
c) 每次冲击间隔时间足以使试品冷却至室温；
d) 残压值为 I_n 电流范围内最高电压值且≤U_p；
e) 新试品 L_{in}-PE 按上述步骤 a)至 d)测试；
f) 另一个新试品 N_{in}-PE 按上述步骤 a)至 d)测试；

Test Method:

a) Apply current impulse with a sequence of crest values of approximately 0.1I_n, 0.2I_n, 0.5I_n, I_n to L_{in}-N_{in}, the residual voltage shall be measured and recorded;
b) One sequence of positive polarity and one sequence of negative polarity apply to L_{in}-N_{in};
c) The interval between individual impulses shall be long enough for the sample to cool down to ambient temperature;
d) The value for limiting voltage is the highest residual voltage measured at I_n and its value less than U_p;
e) N_{in}-PE test procedure a), b), c), d) shall be followed;
f) New SPD, between L_{in}-PE test procedure a) to d) shall be followed;
g) Another new SPD, between N_{in}-PE test procedure a) to d) shall be followed.

7.3 动作负载试验 Operating Duty Test

执行标准：EN 61643-11:2011 之 8.3.4

Reference Standard: EN 61643-11:2011 8.3.4

测试方法：

a) 试品 L_{in}-N_{in} 之间施加 U_c，施加 15 次 8/20 μs 正极性冲击电流 I_n，分成 3 组，每组 5 次冲击，两次冲击之间间隔 60 s，两组之间间隔 30 min，两组冲击之间不需施加电压；
b) 每次冲击应与电源频率同步，从 0°角开始，同步角应以 30°± 5°的间隔逐级增加；
c) 新试品 L_{in}-PE 间按上述步骤 a)和 b)测试；
d) 另一个新试品 N_{in}-PE 间按上述步骤 a)和 b)测试.

Test Method:

a) The SPD shall be energized at U_c, three groups of five impulses of 8/20 μs current impulses I_n with positive polarity shall be applied. The interval between the impulses is 60 s, the interval between the groups is 30 min. It is not required that the test sample is energized between the groups;
b) Each impulse shall be synchronized to the power frequency. Starting from 0° the synchronization angle shall be increased in steps of 30° with a tolerance of ±5° for each synchronization angle;
c) New SPD, between L_{in}-PE test procedure a) and b) shall be followed;
d) Another new SPD, between N_{in}-PE test procedure a) and b) shall be followed.

判定标准：

a) 电压和电流波形图及目测应没有击穿或闪络的现象；
b) 试验过程中不应发生可见损害；
c) 试验后所测量的限制电压值小于等于 U_p；
d) 试验后，不应有过量的泄漏电流；
e) 试验时，制造厂规定的外部脱离器不应动作；试验后，脱离器应处在正常工作状；
f) 不应有对人员或设备产生的爆炸或其他危险。

Pass Criteria:

a) Voltage and current records and visual inspection shall show no indication of puncture or flashover;
b) No visible damage shall occur during the test;
c) Values for measured limiting voltage after the test shall be below or equal to U_p;
d) No excessive leakage currents shall occur after the test;
e) External disconnectors as specified by the manufacturer shall not operate during the test and shall be in working order after the test;
f) There shall be no explosion or other hazard to either personnel or the facility.

8 安全预防措施 Safety Precautions

8.1 安装前阅读并理解所有说明。
Read and understand all instructions before installation.

8.2 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.

8.3 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.

8.4 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.

8.5 安装位置：室内或室外防护罩内。
Installation location: Indoors or within the outdoors shield.

8.6 系统电压波动范围小于 10%。
Fluctuation range of system voltage shall be less than 10%.

8.7 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.

8.8 SPD 正常工作指示灯显示绿色，如果产品失效，指示灯显示将关闭。
SPD normal working indicator is green, if the product fails, the indicator will turn off.

9 标示及包装 Marks and Package

9.1 产品本体标识 Marking on Product

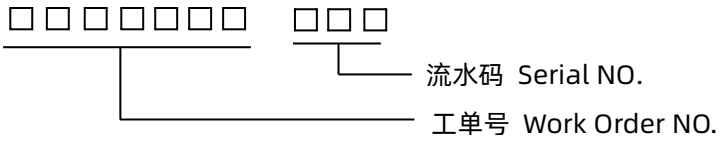
TBD

9.2 包装 Packaging

包装示意图 Packaging Drawing:
TBD

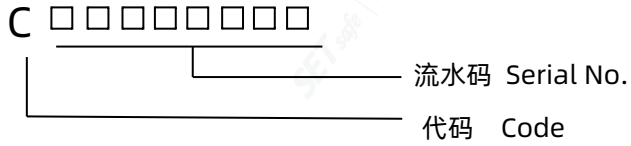
10 产品批号&追溯号识别 Lot No. & Tracking No. System

10.1 产品批号识别 Lot No. System



10.2 产品追溯号识别 Tracking No. System

大包装追溯号:
Tracking No. on the Outer Package:



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

a) 推荐长期存储条件：存储温度：(-10 - 40) ℃，存储湿度：≤75%RH。
Recommend Long-term Storage Condition: Storage Temperature: (-10 - 40) ℃, Storage Humidity ≤75%RH.

b) 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 store the products in the environment that with corrosive gas or under direct sunlight.

c) 存储期限：2 年。
Storage Period: 2 years.

12 规格书之有效性 Validity

12.1 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.

12.2 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未签回规格书时，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.

-以下无正文 END-

13 履历 Revision History

修订版本 Revision Version	描述 Description	页码 Page	日期 Date
1.0	新发行 New Issue	1-14 页 Pages	Aug. 10, 23
1.1	更新产品型号，更新海拔高度为 4000 m， 更正负载电流为 I_L 8A，等。 Update altitude up to 4000 m Max, Correct loading current to I_L 8A，etc.	1-14 页 Pages	Aug. 17, 23
1.2	更新电路原理图 Update Circuit Diagram	第 6 页 Pages	Sep. 5, 23
1.3	更新参考 Up 值 Update Up(ref.)	第 7 页 Pages	Oct. 12, 23
1.4	更正产品尺寸 Correct product dimensions.	第 5-6 页 Pages	Oct. 13, 23
2.0	变更产品型号 Change product model.	第 1-13 页 Pages	Nov. 1, 23