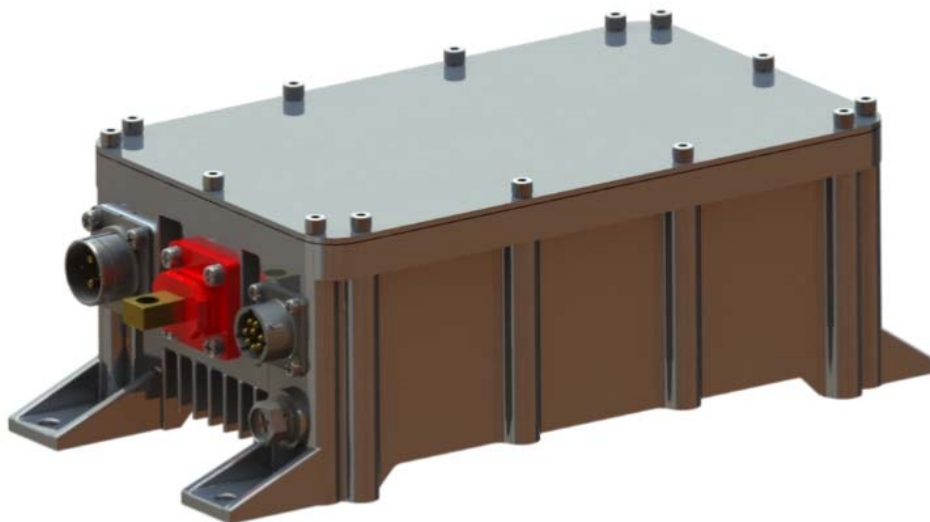

产品规格书

SPECIFICATION SHEET



型 号/Model No.: DE1K8S20-560S28RC

发布日期/Issued Date: 2024.04

版 本/Revision: V004.000

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| V004.000 | CAN 端子定义增加功能/CAN terminal definition Added function | 2024.04 |
| | | |


相关客户资料版本状态/Relevant customer information version status

| 类别 Category | 版本信息 Version information | 备注 Notes |
|--------------------------------------|-----------------------------|-------------|
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前言/Foreword

尊敬的客户！

使用这款电源转换器，您购买了一款高性能产品。该设备是一种使用危险电压和电流的电力电子产品，因此需要在处理和操作此类系统方面具有特殊专业知识！

在安装或对其进行任何其他操作之前，请仔细阅读本手册！

Dear Customer!

With the power supply converter, you have purchased a high-performance product. The device is a power electronics product which uses dangerous voltages and currents, thus special expertise with respect to handling and operation of such systems is required!

Read this manual – particularly before you install the switching power converter any other work on it!

信息/INFORMATION

下面简要介绍了这款开关电源变换器的性能和多功能性。在阅读本手册时，您会发现有关各个属性的详细信息。

Below there is a short overview of the performance and versatility of the switching power converter. You will find details on the individual properties as you read through this manual.

1.产品简介/Product introduction

DE1K8S20-560S28RC 是一款直流转换器，采用先进的调宽技术，效率高、功率大、体积小、工作可靠。具有输入过欠压保护、输出过流保护、过温保护等功能，能够实现恒压恒流自动转换。该款电源能把高压电池电压转换为低压电器所使用的电压、以及低压电池充电所使用的电压，专为新能源汽车设计。与国际一流汽车电源厂商完全同步，各项性能指标已达到或超越国际同行水平，无故障运行时间更长。该系列电源也可适用于需要恒压、恒流电源的各个领域。

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DE1K8S20-560S28RC is a DC/DC converter with features of high efficiency, big power, small volume and reliable working method, adopting advanced pulse width modulation technology. With functions of input over/under voltage protection, output over current protection, over temperature protection, etc. Achieving constant voltage and constant current automatic transfer. It could converter high voltage battery voltage to low voltage used for low voltage device and charge for low voltage battery, specially designed for electric vehicles. synchronizing with the world-class automobile manufacturers, the performance indicators have reached and even exceeded the international peer level, with longer fault free operation time, can be also applied to field needing constant voltage and constant current field.

2.安全和警告说明/Safety and warning instructions

在本章中，您可以找到适用于该设备的安全说明。这些说明涉及车辆的装配、启动和运行操作。务必阅读并遵守这些说明，以保护人们的安全和生命，避免损坏设备！

In this chapter, you will find safety instructions applying to this device. These instructions refer to the assembly, start-up and the running operation in the vehicle. Always read and observe these instructions in order to protect people's safety and lives and to avoid damage to the device!

2.1 符号及其含义/ symbols and meaning

在本手册中，使用了某些特定的符号。下表概述了这些缩写及其含义：



Throughout this manual, certain specific symbols are used. The following table provides an overview of these abbreviations and their meaning:

| 符号/symbol | 含义/meaning | 符号/Symbol | 含义/Meaning |
|---|-------------------------------|---|--|
|  | 一般禁令！ general prohibition! |  | 警告高压！请勿触摸！ Warning high voltage! Don't touch! |

| | | |
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|  | 请勿闭合! Do not close | | |
|---|---|---|--|
| 符号/Symbol | 含义/Meaning | 符号/ Symbol | 含义/meaning |
|  | 危险区域的一般警告! General warnings for hazardous areas! |  | 警告! 触电! Warn! Electric shock! |
|  | 警告! 爆炸性环境! Warn! Explosive environment! |  | 警告! 电池造成的危险! Warn! Danger from batteries! |
|  | 警告! 表面烫手! Warn! The surface is hot! |  | 警告! 高电压! Warn! High Voltage! |
|  | 警告! 高压/液体喷射! Warn! High pressure/liquid injection! |  | 警告! 火灾危险! Warn! Fire hazard! |

| 符号/Symbol | 含义/ Meaning | 符号/ Symbol | 含义/ meaning |
|---|---|---|---|
|  | 断开设备与电源的连接 Disconnect the device from the power source |  | 断开设备与电源的连接 Disconnect the device from the power source |

| 符号/Symbol | 含义/Meaning | 符号/Symbol | 含义/Meaning |
|---|---|---|-----------------------------|
|  | 关于避免可能的财产损失的重要信息 Important information to avoid possible property damage |  | 重要信息 Crucial Information |

2.2 一般适用的安全措施/Generally applicable safety measures

以下安全措施是根据制造商的经验制定的。它们是不完整的，但是它们可以由当地或国家特定的安全说明和事故预防指南来补充。

The following safety measures have been developed based on the experience of the manufacturer. They are incomplete but they can be supplemented by local or country's specific safety instructions and guidelines for accident prevention.

2.2.1 冷却水系统的安全说明/Safety instructions for liquid cooling systems



冷却液喷出! 有烧伤的危险! / Cooling fluid ejection! Danger of burns!

| | | |
|---|--|-----------------------------|
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- 检查冷却水系统的水密性，特别是管道、螺纹接头和压力罐。

Check the water tightness of the cooling liquid system, particularly the pipes, screw joints and pressure tanks.

- 立即修复任何可识别的泄露。

Repair any identifiable leaks immediately.

- 始终确保不超过冷却系统中的最大允许压力（例如，安装压力补偿阀）。

Ensure at all times that the maximum permissible pressure in the cooling system is not exceeded (e.g. by installation of pressure compensation valves).

- 始终确保不超过冷却水的最高冷却温度。

Ensure at all times that the maximum permissible cooling water temperature is not exceeded.

2.2.2 机械系统安全说明/Safety instructions for mechanical systems



爆炸性环境！生命危险！ / Explosive environment! Danger to life!

- 请勿将任何高度易燃物质或易燃液体直接存放在设备周围。设备连接处形成的火花可能会点燃并导致爆炸！

Do not store any highly flammable substances or combustible fluids in the direct surroundings of the device! Sparks forming at the device's connections can set these on fire and lead to explosions!



表面烫手！烧伤危险！ / Hot surfaces! Burn hazard!

- 该设备在运行时会产生高温！因此，在任何时候都要小心操作该设备！

The device produces high temperatures when in operation! Therefore, the device is to be handled with care and caution at all times!

2.2.3 搬运和操作安全说明/Safety instructions for handing and operation



高压电池损坏/ Damage to HV battery:

| | | |
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- 确保设备的电压范围符合高压电池的电压范围。

Make sure that the voltage range of the device complies with the voltage range of the HV battery.

- 只能使用技术上合适且高质量的电缆。

Only use technically suitable and high-quality cables.



设备损坏/ Damage to the device:

- 连接设备时，务必确保电源电压在允许范围内。

When connecting the device, always ensure that the voltage is within the permissible range.

- 冷却水温度或环境温度过高会缩短使用寿命。因此，请确保设备持续充分冷却。

A high cooling water temperature and/or ambient temperature reduces the life span. Therefore, ensure that the device is continuously cooled sufficiently.

- 请勿将设备安装在阳光直射和热源附近。

Do not install the device in direct sunlight and in direct proximity to heat sources.

- 即使设备具有高 IP 防护等级，也应避免与水（雨水、飞溅的水）和污垢直接接触。

Even though the device has a high IP protection class, direct contact with water (rain, splashing water) and dirt should be avoided.

- 在任何情况下，都不应在高压触点、外壳触点和低压触点之间设置低电阻连接。这将导致故障，并瞬时导致设备损坏。

Under no circumstances should you put a low-resistance connection between the HV contacts, the housing contacts and the LV contacts. This will lead to malfunctions and in time to the destruction of the device.

- 防止液体渗透到设备中（例如在装配工作中），液体进入会导致短路，进而损坏设备。

Prevent any penetration of fluids into the device (e.g. during assembly work), Fluid ingress will lead to a short circuit and subsequently to damage to the device.

- 如果有任何液体进入，请不要启动设备，并立即联系厂家。

In the case of any fluid ingress, do not start the device and immediately contact the factory.

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2.2.4 电气系统安全说明/Safety instructions for electrical systems



高电压！生命危险！ / High voltage! Danger to life!

- 在未事先确保无电压的情况下，切勿触摸高压电线或高压连接。

Never touch the HV wires or HV connections without ensuring the absence of voltage beforehand.

- 该设备只能由专业人员连接。

The device may only be connected by a professional.

- 绝不能绕过或规避安全装置。任何由此产生的故障都可能造成危及生命的后果！

Safety installations must never be by-passed or circumvented! Any resulting malfunctions could have life threatening consequences!

- 切勿将设备连接到没有保护接地导线的插座上。

Never connect the device to a socket without a protective earth conductor.

- 始终考虑在电源连接线上增加剩余电流保护装置。

Always consider adding residual current protection devices on the power connection line.



电缆损坏！火灾危险！ / Damage to the cable! Fire hazard!

- 如果将电缆护套用在电源连接的延长线上，它可能会因热量积聚而点燃！因此，请始终完全松开电缆护套。

If a cable sheath is used as an extension cord to the power supply connection, it might ignite due to heat accumulation! Therefore, please always unwind the cable sheath completely.



在高压系统上工作时，必须严格遵守以下 5 条安全规则：

When working on a HV system, the following 5 safety rules have to be strictly adhered to:

- 1) 断开系统电源。 / Disconnect system from power.

- 关闭点火开关。

Switch off the ignition.

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- 取下维修/保养插头，关闭主蓄电池开关。

Remove service / maintenance plug and/or turn off main battery switch.

- 拆下保险丝。

Remove fuse.

2)确保系统无法重新激活。/Ensure that the system cannot be reactivated.

- 保管点火钥匙，防止未经授权的人进入。

Keep ignition key safe to prevent unauthorized access.

- 保持维修/维护插头的安全，以防止未经授权的访问和使用可锁定的盖帽，以确保主蓄电池开关不会重新激活。

Keep the service/maintenance plug safe in order to prevent unauthorized access and use lockable cover cap to ensure that the main battery switch is not reactivated.

3)使用合适的电压测试仪确保设备断电 (注意电压范围)。

Ensure that the device is de-energized by using a suitable voltage tester (pay attention to the voltage range) .

4)接地并使系统短路。

Earth and short-circuit the system.

5)覆盖或隔离相邻带电部件。

Cover or isolate adjacent live parts.

3.主要规格/Power Supply Overview

| 峰值功率 Peak Power | 额定功率 Rated Power | 输入电压范围 Input Voltage Range | 输出电压范围 Output Voltage Range | 输出电流范围 Output Current Range | 效率 Efficiency |
|--------------------|---------------------|-------------------------------|--------------------------------|--------------------------------|--------------------------|
| 2KW±50W | 1.8KW±50W | 200 Vdc ~750 Vdc | 25.2 Vdc ~30.8Vdc | 10A~72A | ≥94% (η_{max}) |

| | | |
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4.电性能指标/Electrical performance

4.1 输入特性/ Input Electrical Characteristics

| 项目/Item | 指标/Index |
|--|---|
| 额定输入电压 Rated Input Voltage | 560 Vdc |
| 输入电压范围 Input Voltage Range | 200 Vdc ~750 Vdc |
| 最大输入电流 Maximum Input Current | 7.88A @Vin=270 Vdc (峰值功率/Peak power) |
| 启动冲击电流 Start Inrush Current | ≤6.25A@DC750 Vdc |
| 输入防反接 Input anti-reverse connecting | 有/Yes (注: 接反无法运行/Note: Anti- reversed, DC/DC will be unable to work) |

4.2 输出特性/Output Electrical Characteristics Overview

4.2.1 电性能参数/Electrical Characteristics Overview

| 项目/Item | 指标/Index |
|---|---|
| 输出防反接 Output anti-reverse connecting | 无/No (注: 接反永久损坏/Note: Anti- reversed, DC/DC will be damaged permanently) |
| 额定输出功率 Rated Output Power | 1KW(@200 Vdc ~270 Vdc) 1.8KW(@275 Vdc ~750 Vdc) |
| 输出电压与输出电流降额 The output voltage and output current derate | 输出电压/Output Voltage>28Vdc(@2000W 除设定电压 Divide set voltage) 输出电压/Output Voltage≤28Vdc (@72A) |
| 峰值功率 Peak power | 2KW±50W(@275Vdc~750Vdc) 工作 6 分钟后智能降额到 1.8 kw, 5 分钟后恢复峰值功率。(循环) Work for 6 minutes, then the intelligent power reduction will be 1.8kw,and after 5 minutes ,the peak power will be restored.(Circular) |
| 额定输出电压 Rated Output Voltage | 28Vdc |
| 输出电压范围 Output Voltage Range | 25.2 Vdc ~30.8Vdc |
| 额定输出电流 Rated Output Current | 64A |

| | | |
|---|--|-----------------------------|
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| | |
|---|---|
| 输出电流范围 Output Current Range | 10A~72A (65A~72A工作6分钟/Work for 6 minutes) |
| 稳压精度 Precision of Voltage Regulation | $\leq \pm 1\% V_o$ 输入275 Vdc ~750 Vdc, 输出10A ~64A 负载。 $\leq \pm 1\% V_o$ input 275 Vdc ~750 Vdc, output 10A ~64A load. |
| 稳流精度 Precision of Current Regulation | $\leq \pm 3A$ |
| 负载效应 Loading Effect | $\leq \pm 1\% V_o$ 额定输入、输出10%~50%~100%变化负载测试。 $\leq \pm 1\% V_o$ rated input, output 10% ~50%~100% changing load test. |
| 源效应 Source Effect | $\leq \pm 0.2\% V_o$ 输入275 Vdc ~750 Vdc 变化, 额定输出条件测试。 $\leq \pm 0.2\% V_o$ input 275 Vdc ~750 Vdc changing, rated output condition test. |

4.2.2 输出纹波和噪声/Output Ripple & Noise

| | |
|------------------------|--|
| 输出电压 Output Voltage | 纹波和噪声 (峰-峰值) Ripple & Noise (Peak-Peak value) |
| 28 Vdc | $\leq 300\text{mv}$ (20M 带宽, 双绞线加160V/10uF-CBB 电容) $\leq 300\text{mv}$ (20Mbandwidth, twisted pair wire plus 160V/10uF-CBB capacitor) |

注: 纹波和噪声测试: 纹波和噪音带宽设置在 20M 赫兹。

Note: Ripple and noise test: Ripple and noise bandwidth are set at 20M Hz.

4.2.3 输出电流特性/Output Current Characteristics

| | |
|-----------------------|-----------------------------|
| 充电模式 Charging Mode | 功能/Function |
| 恒压/Constant voltage | 自动切换 Automatic switching |
| 恒流/Constant current | |

4.2.4 开机输出延迟时间/Delay Time at Turn On

| | |
|------------------------|----------------------|
| 输出电压 Output Voltage | 时间/Time |
| 28 Vdc | 小于 4S/ less than 4S. |

| | | |
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4.3 保护功能/Protection function

4.3.1 输出过流保护/Output Over Current Protection

| 输出过流保护 Output Current Limited Protection | 功能/Function |
|---|---|
| $>72A$ | 先恒流，后关机。 Constant current firstly, then shut down. |

4.3.2 输出短路保护/Output Short Circuit Protection

| 输出短路保护 Output Short Circuit Protection | 功能/Function |
|--|---|
| 启动前输出短路 Output short circuit before starting | 启动前，输出端已出现短路时，收到工作指令后DCDC 将不启动，并上报告警；故障排除后，DCDC 能够自动恢复正常工作。 After receiving work instruction, DCDC will not start, and an alarm will be reported; after fault is removed, DCDC can automatically resume normal work. |
| 工作过程中输出短路 Output short circuit during operation | 在工作的过程中，输出端短路时，DCDC 自动关闭输出，并上报告警，短路故障消除后，能自动恢复正常工作。 DCDC automatically turns off the output and reports an alarm. After short-circuit fault is eliminated, DCDC can automatically resume normal work. |

4.3.3 输出过压保护/Output over Voltage Protection

| 输出过压保护点 Output over Voltage Protect Point | 功能/Function |
|--|--|
| $\geq 33 Vdc$ | 在输出端电压高于 33Vdc 时，DCDC 停止工作，并上报告警信息。输出电压回落至24 Vdc时，自动恢复正常工作。 When output voltage is higher than 33Vdc , DCDC will stop working and report an alarm. When output voltage drops to 24Vdc, it will automatically resume normal operation. |

4.3.4 输出欠压保护/Output under Voltage Protection

| 输出欠压保护点 Output under Voltage Protect Point | 功能/Function |
|---|--|
| $\leq 18.5 Vdc$ | 当输出端电压低于18.5Vdc 时,DC 上报故障,当输出电压高于21Vdc 后, DC 停止告警并自动恢复正常工作。 When output voltage is lower than 18.5Vdc , DCDC reports a fault. When output voltage is higher than 21Vdc, DCDC stops alarming and automatically resumes normal operation. |

| | | |
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4.3.5 输入过压保护/Input over Voltage Protection

| 输入过压保护点 Input over Voltage Protect Point | 功能/Function |
|---|--|
| ≥ 760 Vdc | 输入端电压超出 760Vdc 时，关闭输出，并上报告警信息；当输入电压低于 750Vdc 时，恢复正常工作，并停止告警。 When input voltage exceeds 760Vdc, DCDC will turn off output and report an alarm message; When input voltage is lower than 750Vdc, DCDC will resume normal operation and stop the alarm. |

4.3.6 输入欠压保护/Input under Voltage Protection

| 输入欠压点 Input under Voltage Protection Point | 功能/Function |
|---|--|
| ≤ 185 Vdc | 输入端电压低于185Vdc 时，关闭输出，并告警；输入电压高于200Vdc 后，恢复正常工作，并停止告警。 When input voltage is lower than 185Vdc, DCDC will turn off output and report an alarm; When input voltage is higher than 200Vdc, DCDC will resume normal operation and stop the alarm. |

4.3.7 CAN 通信故障/CAN Communication Fault

| CAN 通信故障 CAN Communication Fault | 功能/Function |
|---|---|
| 连续5s 未收到指令 No command received for 5 consecutive seconds | DCDC报通讯故障不关机，CAN通讯恢复正常后，取消报通讯故障。 DCDC does not shut down and report communication failure. After CAN communication returns to normal, communication failure report will be canceled. |

4.3.8 CAN 终端电阻/Terminal resistance

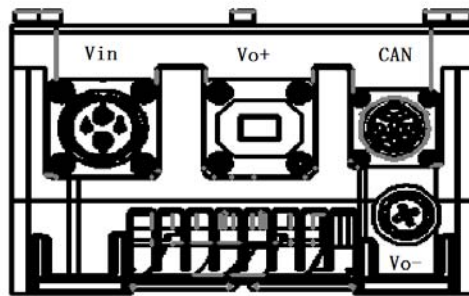
| CAN 终端电阻 CAN Terminal resistance | 功能/Function |
|-------------------------------------|---|
| 无 Without | CAN_H 与 CAN_L 之间阻值约 30k Ω The terminal resistance between CAN_H and CAN_L is 30k Ω |



4.3.9 过温保护/Over Temperature Protection

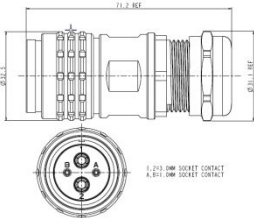
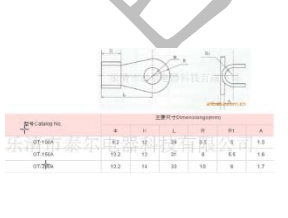
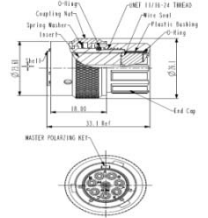
| 过温保护 Over Temperature Protection | 功能/Function |
|-------------------------------------|---|
| 95°C±2°C | <p>当机内温度大于95°C，DCDC关机并报过温故障。当机内温度降至75°C恢复开机并取消报过温故障。</p> <p>When DCDC internal temperature is greater than95°C, DCDC shuts down and reports an over-temperature fault. When internal temperature drops to 75°C, DCDC will resume normal operation and cancel the over-temperature fault report.</p> |

5. 接口定义/Interface Definition



| | | | |
|--|--|---|---|
| 图示 Illustration | | | |
| 插件制造厂商 Connectors Manufacturer | 科耐斯 Kolexam | 乐清南孚 Leqing Nanfu | 安菲诺 Amphenol |
| 端子名称 Terminal Name | VIN 高压输入端子 VIN HV Input Terminal | Vout 输出端子 Vout Output Terminal | CAN 控制端子 CAN Control Terminal |
| 产品端插件型号 Connector part NO. (Product end) | KVG1S-402MC KVG30M4 (针 pin) : 2 KVG20M1 (针pin) : 2 | DC05 | RT00128PN03 SP14M1F (针 pin) : 6 |
| 插件压接线径 Connector wire diameter | 压接 2.5 mm ² 线 Crimp wire diameter: 2.5 mm ² 互锁/Interlock :0.5 mm ² | 压接 16 mm ² 及以上线 Crimp wire diameter : 16 mm ² and above | 压接 0.5 mm ² 线 Crimp wire diameter : 0.5mm ² |

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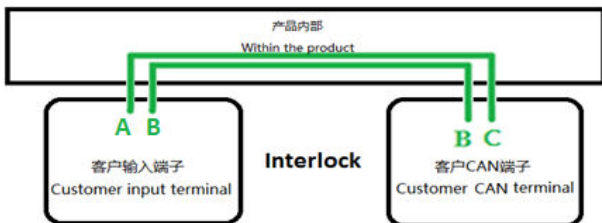
| | | | |
|--|--|--|--|
| 产品端插件定义 Connector Definitions (Product) | 1: HDC+ (高压输入正 HV Input +) 2: HDC- (高压输入负 HV Input -) A: Interlock1 B: Interlock2 | VO+ (低压输出正 LV output +) VO- (低压输出负接机壳 LV output -, connected to case) | A: CAN_H G: CAN_L E: Vcc+激活/activation (15Vdc ~32Vdc ≤800mA) F: EN+硬线使能 EN+ Hard-wire Enable (15Vdc ~32Vdc ≤5mA) C: Interlock1 B: Interlock2 H、D: NC 注: Vcc-、EN-连接 Vo-。 Note: Vcc-、EN- Link Vo-. |
| 线束端插件型号 Connector part NO. (Harness end) | KVG1P-402FC KVG30F4 (孔 hole):2 KVG20F1 (孔 hole):2 | M8 螺钉/screw 100A 及以上铜耳 100A and above copper ear | RT06128SNHEC03 SS14M1F(孔 hole): 6 AT13-204-200 水堵 (water blocking): 2 |
| 图示 Illustration |  |  |  |

注: CAN为250kbps 500kbps自适应波特率,CAN使能与EN硬线使能为或关系,两者均可开机。不建议两种方式同时使用,不使用的方,悬空即可。

Note: CAN 250kbps 500kbps adaptive baud rate CAN enable is OR relationship with EN enable, both method could turn on the DC-DC converter ,we do not recommend to use two method at the same time ,just suspend the one which is not used.

“A、B” “C、B引脚” 互锁用于判断接插件是否插接良好。客户可根据需求自行制定检测策略。

“Pin A、Pin B ” “Pin C、Pin B ” wire is used to judge whether the connector is well connected. Customers can customize their own detection policies according to requirements.



| DC/DC 工作状态 DC/DC Working Status | DC/DC 功能/DC/DC Function |
|--|--|
| DC/DC 激活与使能 DC/DC Activation And Enable | 1. “E脚” Vcc+ (15Vdc ~32Vdc ≤800mA) 加激活信号; "Pin E" Connect to Vcc+ (15Vdc ~32Vdc ≤800mA) activation signal; 2. CAN 使能或 EN 使能 / CAN Enable or EN Enable。 注: Vcc-、EN-连接 Vo-。 / Note: Vcc-、EN- Link Vo- |

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6. 动态响应时间/Transient Response Time

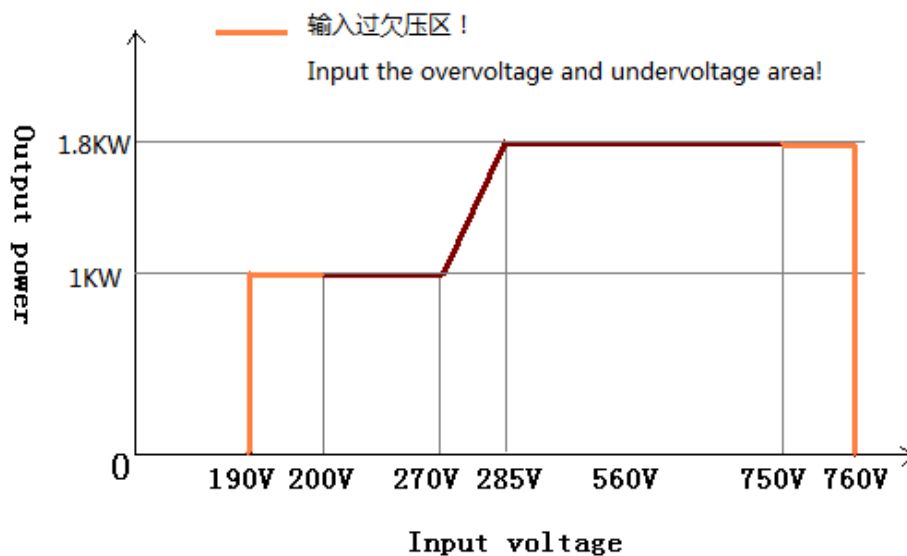
| 动态响应时间 Transient Response Time | 功能/Function |
|-----------------------------------|--|
| 功率切换/Power switching | 响应时间 $\leq 400\mu s$ 超调量 $\leq \pm 5\%$ (双绞线加 160V/10 μF -CBB 电容测试) Response time $\leq 400\mu s$ overshoot $\leq \pm 5\%$ (twisted pair cable plus 160V/10 μF -CBB capacitance test) |

7. 绝缘性能/Insulation Characteristics

| 项目/Item | | 技术指标/Index |
|-------------------------------|-------------------------|--|
| 绝缘耐压 Insulation voltage | 输入-输出 input - output | 2.8kVdc/1min |
| 绝缘电阻 Insulation resistance | | 25 $^{\circ}C$,70%RH 条件下, 各独立电路与机壳的绝缘电阻不低于 20M Ω 。无电气连接的各电路之间的绝缘电阻不低 20M Ω 。Under 25 $^{\circ}C$ and 70% RH condition, the insulation resistance of each independent circuit and chassis is not less than 20M Ω . The insulation resistance between the circuits without electrical connection is not less than 20M Ω . |

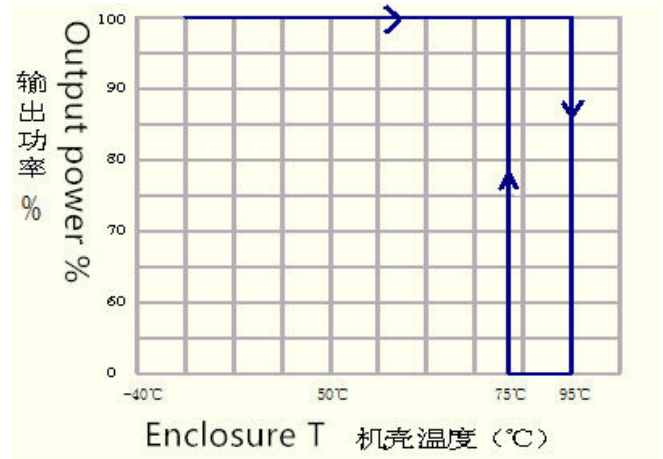
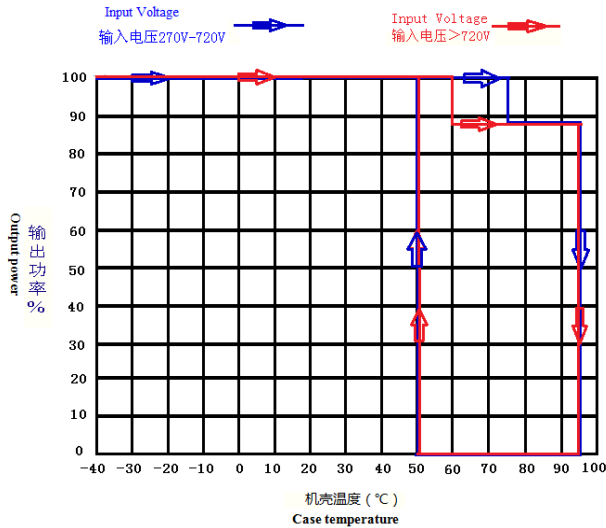
8. 降额/Derating

8.1 输入电压与输出功率降额曲线/Derating curve of Input voltage and output Power





8.2 温度降额曲线/Temperature Derating Curve



9. 安规标准/Safe Standard

GB4943-2011 IEC60950 GBT18384-2015

10. 电磁兼容性/EMC

| 电磁兼容性/EMC/EMI | 引用标准/Reference standard |
|---------------|-------------------------|
| 电磁抗扰性/EMC | EMC:GB/T17619-1998 |
| 电磁干扰性/EMI | EMI:GB/T18655-2002 |

11. 基本工作环境/Basic Environmental Requirement

| 工作环境/Working Environment | 项目/Item | 要求/Requirements |
|-----------------------------------|----------------------------|---------------------------------|
| 环境温度 Environmental Temperature | 工作环境温度 Operating T | -30°C ~ +60°C |
| | 贮存温度 Storage T | -40°C ~ +105°C |
| 环境湿度 Environmental Humidity | 工作湿度 Operating Humidity | 5% ~ 85%RH (不冷凝/Non-condensing) |
| | 存储湿度 Storage Humidity | 5% ~ 95%RH (不冷凝/Non-condensing) |

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| | | |
|-------------------------------|--------------------------|---|
| 海拔高度 Altitude Height | 工作高度 Operating Height | 0~3000m, 以 2000m 为基础, 海拔每升高 200 m, 规格最高温度降低 1℃。 0~3000m, based on 2000m, the maximum temperature of the specification decreases by 1℃ for every 200 m increasing in altitude. |
| | 存储高度 Storage Height | 0~3000m, 以 2000m 为基础, 海拔每升高 200 m, 规格最高温度降低 1℃ 0~3000m, based on 2000m, the maximum temperature of the specification decreases by 1℃ for every 200m increase in altitude. |
| 冷却方式 Cooling Method | 风冷 Wind Cooling | >55℃ 风机起转, <45℃ 风机停转。 >55℃ fan starts to spin, <45℃ fan stops to spin. |
| IP防护等级 IP Protection Grade | IP67 | 保证对接插件制作完线束后达到 IP67 防水等级的基础上才能保证整机达到 IP67。 Only on the basis of ensuring that the wiring harness reaches IP67 waterproof level after the docking plug-in is made, can the whole machine reach IP67 |
| 耐振动性能 Vibration Resistance | / | 满足 QC/T413-2002 中 3.12 的要求(其它部位)。 Satisfy the requirement in QC/T413-2002: 3.12. |
| 噪声/Noise | / | GB/T 24347—2009: 5.5 |
| 防盐雾性能 Salt fog Resistance | / | 满足 GB/T 24347-2009 中 5.1.3 要求。 Satisfy the requirement in GB/T 24347-2009 中 5.1.3. |

12. 冷却要求/Cooling Requirements

| 项目 Item | 要求 Requirements |
|--------------------|--|
| 风冷 Wind Cooling | 在本电源的周围要留出一定空间(与散热器>30mm 空间), 以利于散热。 Around the power supply to keep the space(distance with radiator > 30mm), in order to facilitate heat dissipation. |

注: 满功率运行机身温度较高, 电源四周留出空间, 以利于散热。

Note: The temperature of the fuselage is higher when running at full power , so leave space around the power supply for heat dissipation.



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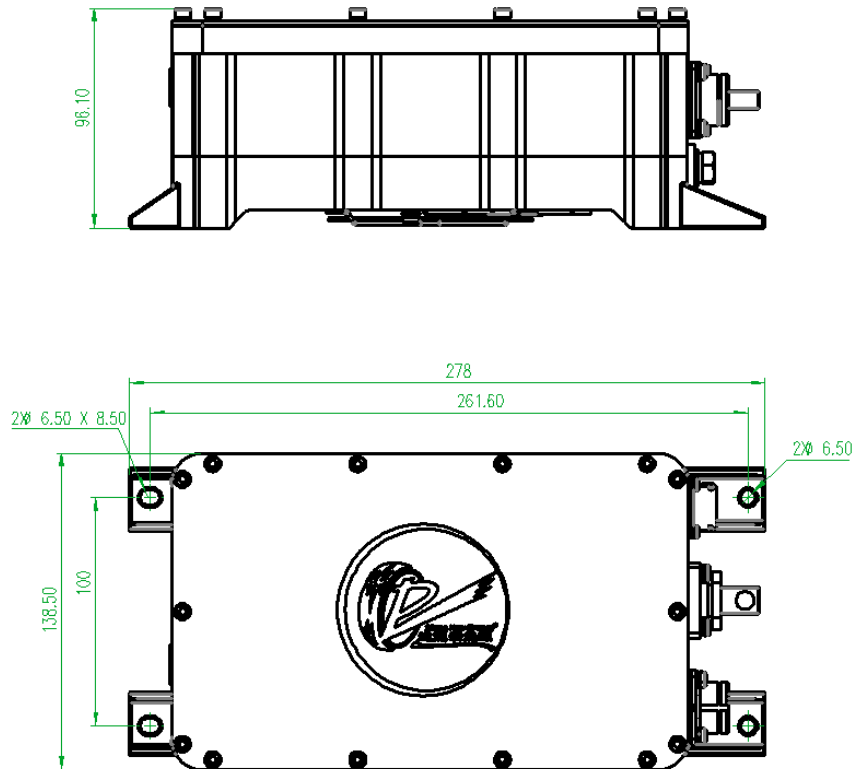
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13.物理尺寸/Dimension/mm



14.重量/Weight

$\leq 3.3\text{Kg} \pm 0.5\text{kg}$

15. 运输与存放/Transport & Store

15.1 储存和保管/Storage

产品的储存和保管应保持 5°C~40°C 的清洁、干燥及通风良好的环境。应避免日晒、火烤、水浸、与腐蚀性物质放在一起。

Storage of the product should be kept in a clean, dry and well ventilated environment of 5°C~40°C. Avoid sun exposure, fire roasting, water immersion, and corrosive substances.

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15.2 装卸、运输/Loading and Unloading & Transport

产品在搬运时所受到的冲击和振动应限制在最小程度。

The shock and vibration of the product during handling should be limited to minimum.

16. 其他/Others

| 项目/Items | 要求/Requirement |
|-----------------------------|--|
| 气味/smell | 不产生异味和有害健康的气味 Does not produce harmful odor |
| 元器件 Components and parts | 所有器件满足降额 All devices meet the derating |

17. 可靠性&MTBF/Reliability& MTBF

17.1 可靠性/Reliability

| 项目/ Items | 指标/ Index |
|-------------------|---|
| 质量担保期/Warranty | 依据双方协议/ According to mutual agreement |
| 使用寿命/Service life | 10年@环境温度50℃，每天工作12小时。 10 years @ambient temperature 50 °C, working 12 hours a day. |

17.2 MTBF :

3*10⁵h@ 25℃，额定输入，满载输出。

3*10⁵h@ 25℃, rated input, full load output.

17.3 可追溯性/Traceability

可追溯性的组织方式应确保在出现缺陷时，可随时识别以下特征：

Traceability shall be organized in such a way that in the event of a defect the following characteristics can be identified at any time:

- 制造商/Manufacturer
- 生产批次/ Production batch

| | | |
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18.用户指南/User Guide

18.1 说明/Guide to Use

本章内容包括如何拆卸包装和便于运输重新包装、最初的检查、使用前的准备以及操作指南等。

This chapter covers how to remove packaging and facilitate transportation, repackaging, initial inspection, preparation before use, and operating instructions.



注意/Attention

- 本电源是一种直流转换器，它产生的电磁场可能会影响其他设备的工作，如果设备受到干扰，请使其远离本电源。

The power is a DC/DC converter. The electromagnetic field generated by it may affect the work of other equipment. If the equipment is disturbed, please keep it away from this power supply.



警告/Notice

- 因电源内部即使在断电的情况下也可能有高压，非经过培训的本公司技术人员不得擅自打开机壳。

There may be high voltage in the power supply even in the case of power failure, person who are not trained can not open the shell without permission.

18.2 拆卸包装和重新包装/Disassemble Packing and Repacking

拆卸包装时螺丝刀等工具划开包装的纸箱，取出内部的包装材料，把电源取出，拆下的包装箱及包装材料要注意保存，以便于以后的运输。

When disassemble the packaging using screwdriver tools to open the packing carton, remove the internal packaging materials, take out charger. Preserve the packaging materials for future transportation.

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18.3 初次使用前的检查/Checking before First Use



从包装箱里拿出电源，首先对照装箱清单检查物品是否齐全，其次检查电源的外形是否有磕碰或挤压变形等情况，检查输入输出连接器等有无扭曲变形等异常情况，检查有无划伤扭曲变形损坏等情况，如有损伤请立即联系运输单位并通知迪龙营销中心。

Take power supply from the package carton box, firstly check the goods against the packing list is complete or not; then check if there is power supply form is bump or extrusion deformation on the surface of the charger; thirdly check the input and output connectors are distorted, etc.; lastly check whether there are scratches, distortion, deformation and damage. Any abnormal occurs please contact the shipping company immediately, and inform the sales department of Dilong New Energy Technology.

18.4 对直流转换器的要求/Request for DC/DC Converter



本转换器要求直流电源，电压范围为 200Vdc~750Vdc。要保证在重载情况下加到本转换器直流输入的电压不跌落到所允许的电压范围之外。

This converter supply requires a DC power supply with a voltage range of 200Vdc to 750Vdc. Make sure that the voltage applied to the input of this converter supply does not fall outside the allowable voltage range under heavy load.

18.5 直流转换器的连接/DC/DC Converter Connection



本 DC/DC 转换器 DC 输入应该通过一个具有保护装置（如空气开关，保险等）的设备连接直流电源。

The DC input of this DC/DC converter supply should be connected to the DC power supply through a device with a protective device (such as an air switch, fuse, etc.).

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保险管规格/Fuse specification

| 项目/Item | 电流范围/Current Range | 电压范围/Voltage Range |
|------------------|--------------------|--------------------|
| 输入熔断器/Input Fuse | 20A~40A | 900Vdc~1000Vdc |

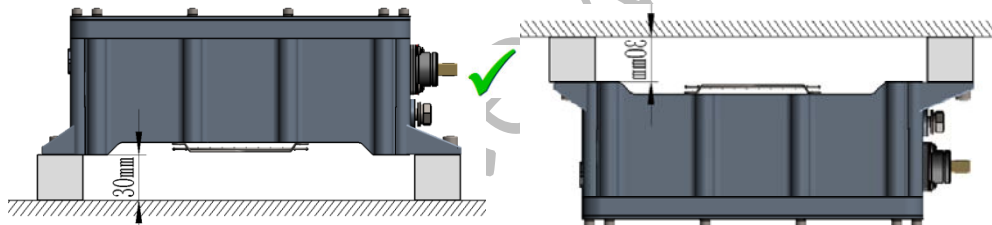
直流输入端连接导线截面积要 $\geq 2.5\text{mm}^2$ ，直流输出端连接导线截面积要 $\geq 16\text{mm}^2$ 。
CAN 通讯端连接导线应采用屏蔽导线，屏蔽层可靠连接机壳端。

The cross-sectional area of the connecting wire at input end must be greater than $\geq 2.5\text{mm}^2$, and cross-sectional area of the connecting wire at low-voltage DC output end must be greater than $\geq 16\text{mm}^2$. The connecting wire of the CAN communication terminal should be a shielded wire, and shielding layer should be reliably connected to the shell end.

18.6 设备安装方式/Equipment installation method

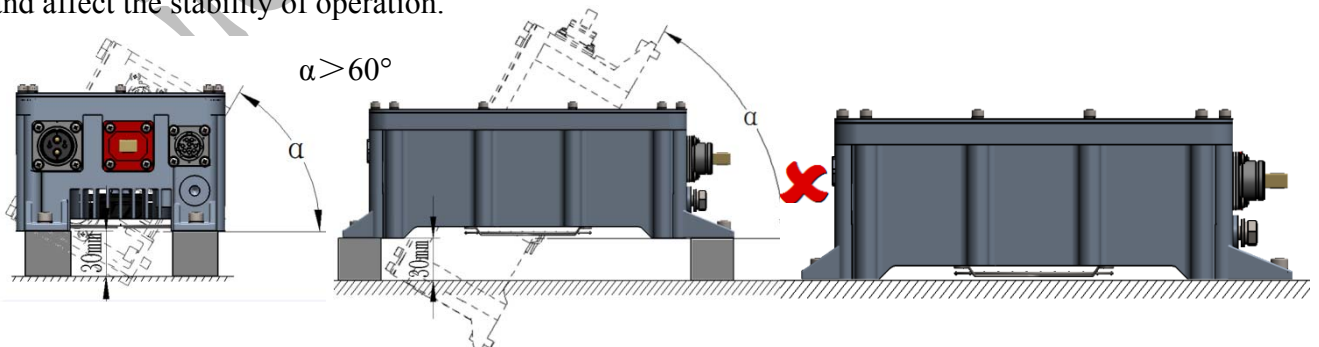
推荐安装方式：水平安装。

Recommended installation method: Horizontal installation.



特别注意：不建议的安装方式，吊装或倾斜角度超过 60 度的安装方式可能会造成电源散热不良，影响运行的稳定性。

Particular attention: The installation method is not recommended, The installation method with a lifting or tilting angle exceeding 60 degrees may cause poor heat dissipation of the power supply and affect the stability of operation.



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18.7 安装力矩/Installation Torque

安装时依据螺钉大小、连接方式等，使用合适的力矩进行安装，参照下表：

When installation apply suitable torque based on bolt screw and connection way, reference below table:

| 螺钉/Screw | 安装位置/Installation site | 力矩/Torque |
|--------------|------------------------|--------------|
| M6 | 固定产品/Fixed products | 50kgf.cm±10% |
| M8*12 /M8*16 | Vo+ / Vo- | 75kgf.cm±10% |

18.8 安装前注意事项/ Start-up

危险/DANGER



高压危险！ / High voltage! Danger to life!

1) 如果电源被激活，连接的高压电缆携带高压！因此，在未确保机组未通电的情况下，切勿连接电缆！

If the DC-DC converter is activated, connected HV cables carry high voltage! For this reason, never connect HV cables without ensuring that the unit is not live!

2) 如果电源在用，高压电缆携带高压！在任何情况下，在没有首先确保高压系统中没有电压的情况下，都不能对设备进行工作！

If the DC-DC converter is activated, HV cables carry high voltage! Under no circumstances carryout work on the device without first ensuring that there is no voltage in the HV system!

3) 断开电源和直流连接后，电源需要大约 2min 将电容器放电。在进行进一步的工作之前，必须始终遵守这个时间段，以避免触电！

After disconnecting the mains and DC connections, the charger requires approx. 2minutes to discharge its capacitors. This time period must always be observed before carrying out further work, in order to avoid electrical shocks!

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警告/WARNING

1) 在将设备吊出时，如果吊运设备操作不当，可能会坠落！

When lifting the device out, it may fall down if the lifting equipment does not operate properly!

2) 未经适当培训，请勿操作起重设备！

Do not operate lifting equipment without having received appropriate training!

3) 一定要小心行事，避免抽搐动作！

Always act carefully and avoid jerking movements!

4) 使用产品前请注意 20. 用户指南部分。不正确的操作可能导致电源电击受损或引起火灾。

Please pay attention to the part of 20. User Guide before using the product.

Improper operation may result in damage to the power supply or fire.

信息/INFORMATION

在安装之前，目视检查包装材料，特别是设备本身是否有损坏。每台设备销售前都经过严格的质量和功能测试。但是，我们对我们产品的搬运没有任何影响。

Prior to installation, visually check the packing material and particularly the device itself for damage. Each device undergoes a strict quality and function test before distribution. However, we do not have any influence on shipping and loading of our products.

18.9 安装/启动/Installation/ Start-up

1) 断开高压电源，确保高压系统不带电。

Disconnect the HV supply, Ensure that the HV system is not live.



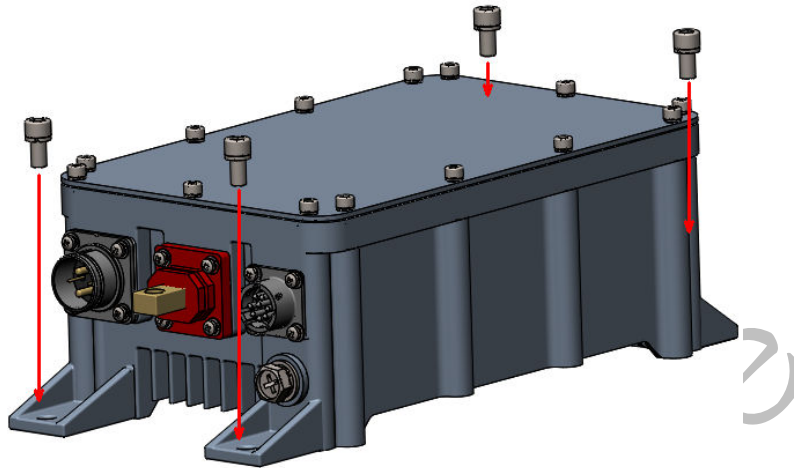
2) 使用适当的设备将电源从包装中取出。

Take out the DC-DC converter from package using proper equipment.



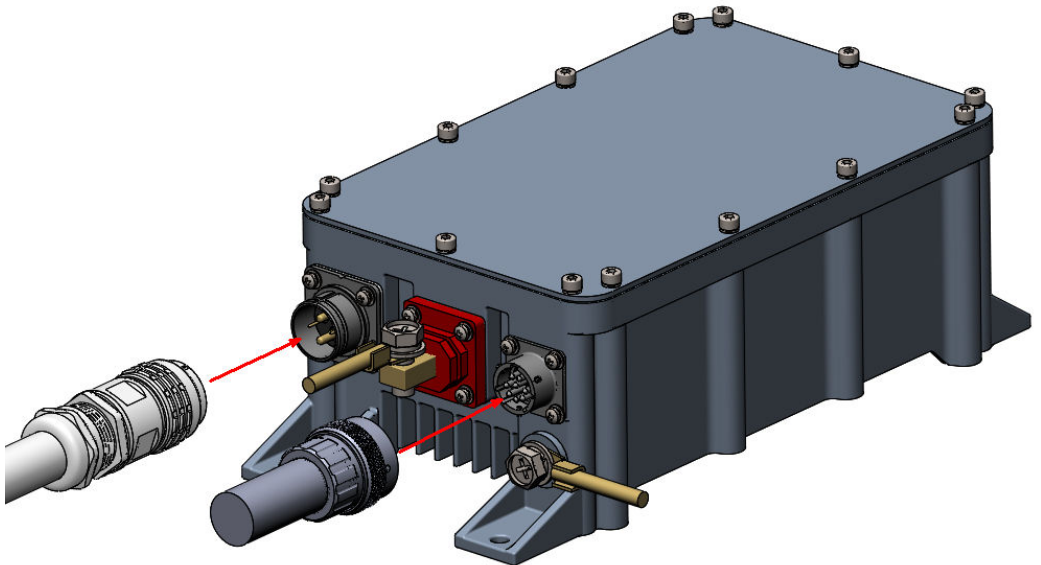
3) 小心地将充电器安装在其安装位置，紧固螺钉。

Carefully install the power at its installation location, Fasten screws specification .



4) 将连接插头连接到电源上，手动检查插头是否紧固。

Connect the plugs to the power. Manually check if the plugs are fastened securely.





18.10 拆卸电源/Removing the power

1) 断开高压电源。确保高压系统不带电！

Disconnect the HV supply. Ensure that the HV system is not live!

2) 确保系统不被其他人员重新启动！

Secure the system against restarting by other personnel!

3) 从电源上断开输出线。

Disconnect the output from the DCDC converter.

4) 断开电源插头。

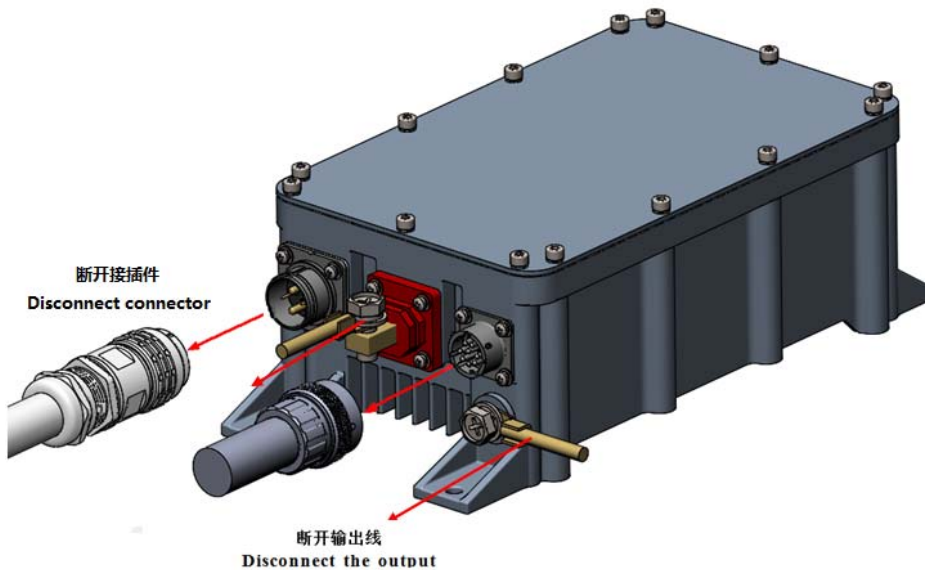
Disconnect the input plug.

5) 请至少等待 120 秒再执行以下操作（电容器放电）。

Wait at least 120 seconds before performing the following steps (Capacitors are discharged) .

6) 从电源上断开插头。

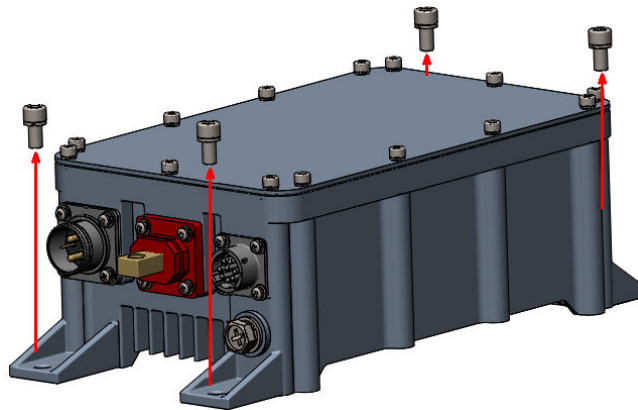
Disconnect the plugs from the power supply.





7) 拧下螺钉（如果在电源安装过程中使用了特定的安装板，则必须将其适当拆除）。

Unscrew the screws (If specific mounting plates are used during the installation of the power, they must be removed appropriately) .



8) 使用适当的设备将电源从其安装位置抬起。

Use appropriate equipment to lift the DC-DC converter out of its installation location.

9) 如果设备要送到厂家进行维修，请务必使用合适的包装。

If the device is to be sent to manufacturer for repairs, always use appropriate packaging.

18.11 使用前的准备/Preparation before Use

本电源正常工作需要连接合适的直流电源，直流电源的电压必须在输入电压范围之内，在阅读本章的 17.4 和 17.12 条之前先不要加电。

This power supply work correctly needing to connect to suitable DC power, DC power voltage must be in the allowed range; do not add to DC power before reading this chapter, the article 17.4 and 17.12.

请按表 18-1 的步骤做好加电之前的准备工作。

Please do the preparation work before connecting to DC power according to the procedure in table 18-1.

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表 18-1 加电前需要做的准备工作
Table 18-1 preparations work before connecting to DC power

| 步骤 Step | 项目/Item | 内容/Content | 参阅 Reference |
|------------|-------------------------------|---|-----------------|
| 1 | 检查 Inspect | 外观检查。/Appearance inspection. | 18.3 |
| 2 | 安装 Installation | 电源的前后上下应留出足够的通风空间。 There should be enough ventilation space around the power supply. | 18.6/18.9 |
| 3 | 连接直流电源 Connect to DC power | 把本电源连接到规定的直流电源。 Connect the power supply to the specified DC power supply. | 18.5 |
| 4 | 测试/Test | 开机测试。/Power on test. | 18.12 |

18.12 开机测试/Power On Test

进行下面的测试以确保电源工作正常：

Perform the following tests to ensure that the power supply is working properly:

1)确认转换器以按 18.4、18.5 条连接直流电源，直流电源处于“关断”的位置，确认转换器输出与蓄电池极性连接正确。

Confirm that the power supply is connected to the converter according to 18.4 and 18.5 and DC power is in the “OFF” position. Make sure that the converter supply output is properly connected to the battery polarity.

2)确认所有插头连线正确无误。

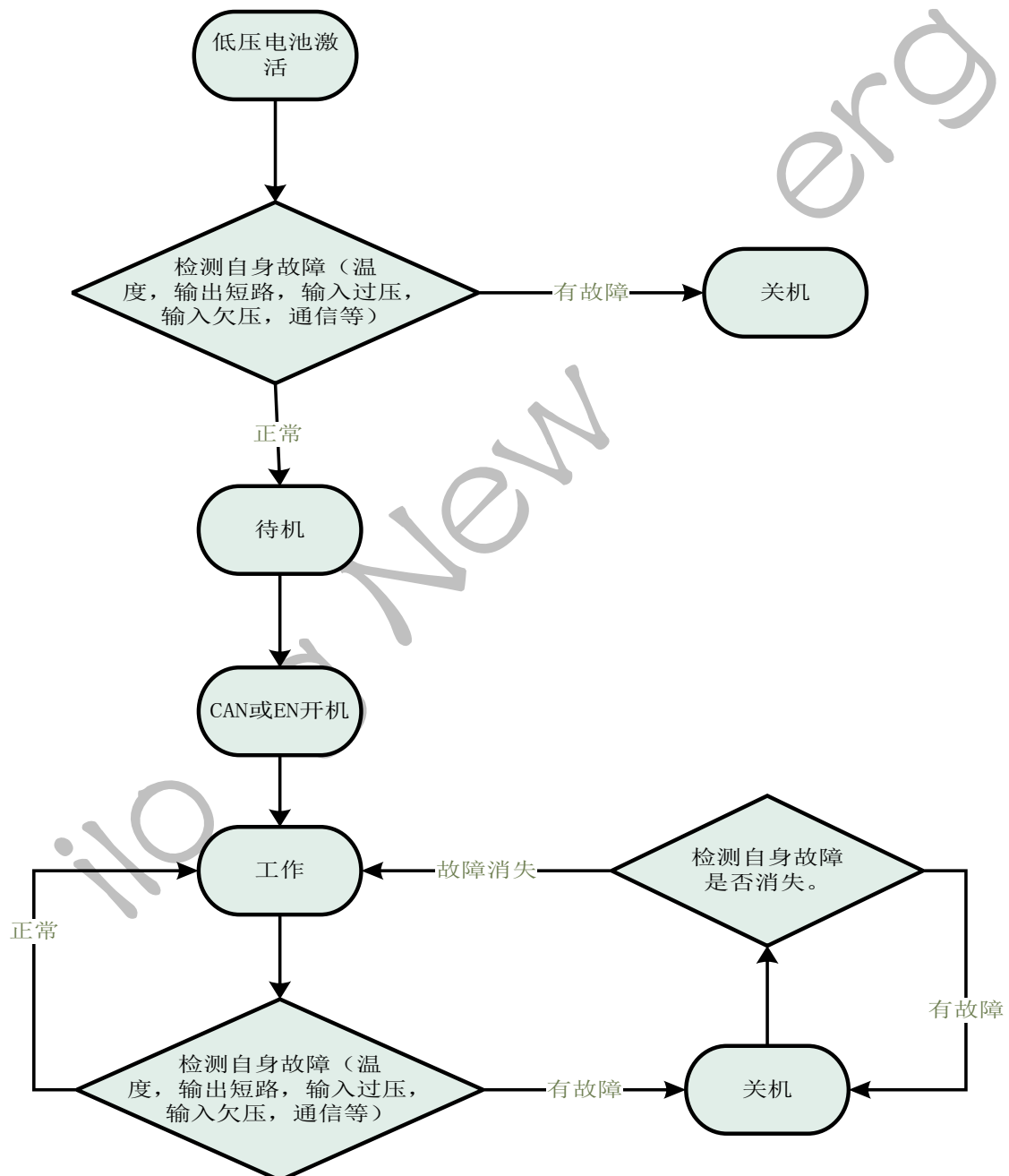
Make sure all the plug connections are correct.

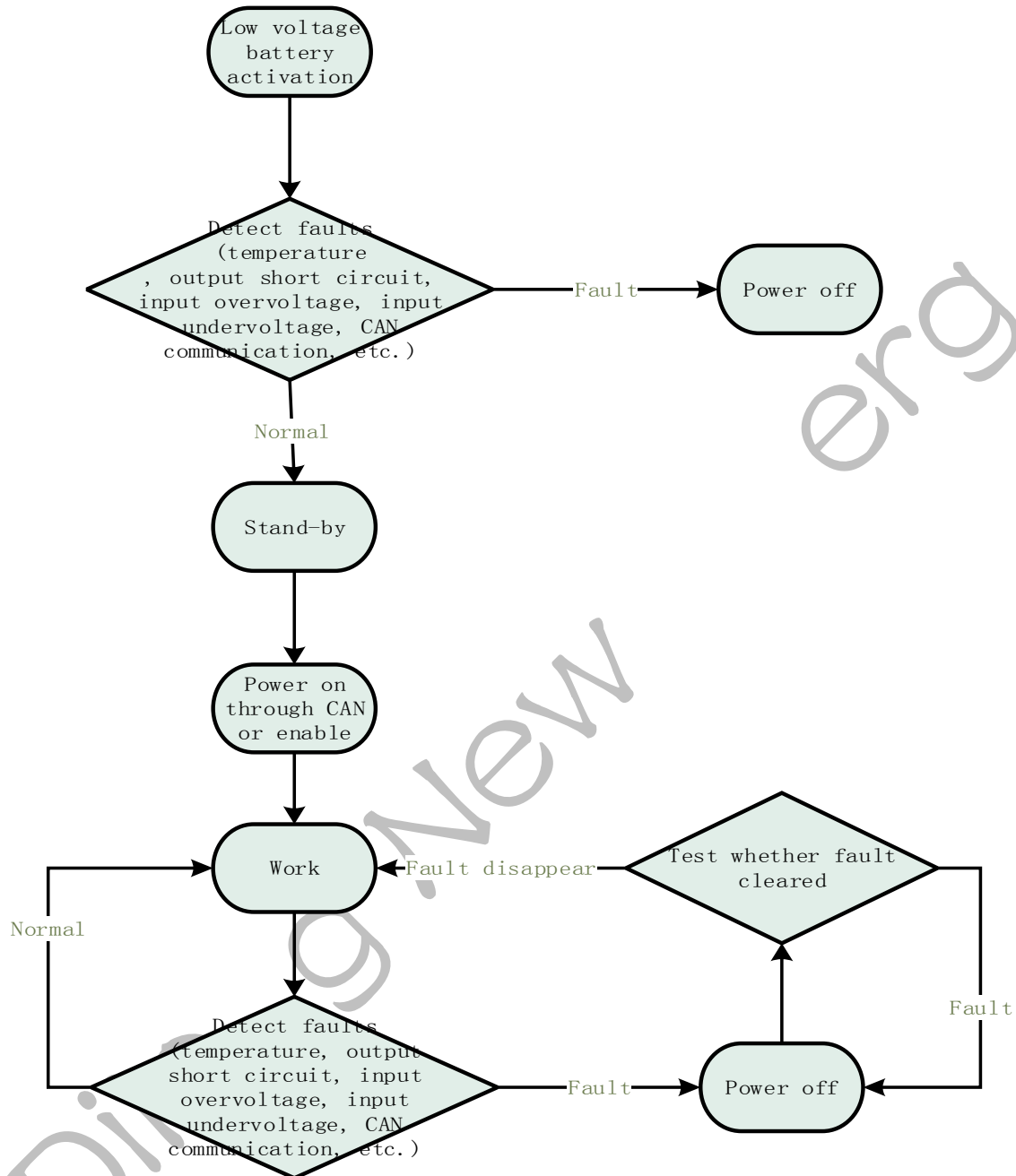
3)打开直流电源的开关。

Turn on the DC power switch.



19.上电流程/Power on process





20.用户须知/User Notice

请在上电前确保插件与对接元件接线无误，接反会瞬间造成无法修复的损坏！

Please ensure that the mating connectors are connected correctly before power on. The reverse connection will momentarily cause irreparable damage!

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使用产品前请注意告警和注意事项部分。不正确的操作可能导致电源电击受损或引起火灾。

使用产品前请确认已阅读告警和注意事项。

Please pay attention to the warnings and precautions before using the product. Improper operation may cause electric shock or damage to the power supply or cause a fire.

Please confirm that you have read the warnings and precautions before using the product.

21.在判定故障之前的确认/Confirm before Fault Determined

在认为电源有故障之前，请确认以下事项：

Please confirm the following items before the power failure is considered:

21.1 没有输出电压/No Output Voltage

1)所加输入电压是否在规定范围之内[输入电压是否进入过欠压保护范围]

Whether the input voltage is within the specified range (whether the input voltage is under or under voltage protection).

2)连接的导线极性是否正确，连接有无异常

Whether the connected wire polarity is correct and the connection is abnormal or not.

3) 蓄电池极性是否接反，或电池电压是否过放欠压

Whether the polarity of the battery is reversed, or whether the battery voltage is over-discharged.

21.2 过压过流保护/Over Voltage or Over Current Protection

蓄电池有无异常

Whether the battery is abnormal or not

21.3 输出电压低/Low Output Voltage

1)连接导线是否过细过长

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Whether the connecting wire is too long or too thin.

2)连接的蓄电池有无异常

Whether the battery connection is abnormal or not.

21.4 输出纹波电压高/Large Output Ripple Voltage

1)测定方法是否与应用手册规定的方法相同或等同

Whether the determination methods is same as stated in the manual.

2)输出线是否太长

Whether output wire is too long.

22.引用标准及规范/Quoted Standard & Rules

QC/T 413-2002 汽车电气设备基本技术条件

GB/T 2423.1-2008 电工电子产品环境试验第 2 部分：试验方法试验 A：低温

GB/T 2423.2-2008 电工电子产品环境试验第 2 部分：试验方法试验 B：高温

GB/T 18384.3-2015 电动汽车安全要求第 3 部分：人员触电防护

GB/T 24347-2009 电动汽车 DC/DC 变换器

GB 4208-2008 外壳防护等级（IP 代码）

Q/FT B102-2005 车辆产品零部件可追溯性标识规定

GB/T 2423.3-1993 电工电子产品基本环境试验规程—试验 Ca:恒定湿热试验方法；

GB/T 2423.4.1993 电工电子产品基本环境试验规程—试验 Db:交变湿热试验方法

GB/T 2423.5-1995 电工电子产品环境试验，第 2 部分：试验方法/试验 Ea 和导则：冲击

GB/T 2423.6-1995 电工电子产品环境试验，第 2 部分：试验方法/试验 Ea 和导则：碰撞

GB/T 2423.8-1995 电工电子产品环境试验，第 2 部分：试验方法/试验 Ed：自由跌落

GB/T 2423.10-1995 电工电子产品环境试验，第 2 部分：试验方法/试验 Fc 和导则：振动（正弦）

GB/T 2423.11-1997 电工电子产品环境试验，第 2 部分：试验方法/试验 Fd：宽频带随机振动--般要求

GB/T 2423.22-2002 电工电子产品环境试验，第 2 部分：试验 N：温度变化

GB/T 17626.3-2006 电磁兼容试验和测量技术射频电磁场辐射抗扰度试验

GB/T 17626.4-2008 电磁兼容试验和测量技术电快速瞬变脉冲群抗扰度试验

GB/T 17626.5-2008 电磁兼容试验和测量技术浪涌（冲击）抗扰度试验

GB 9254-2008 信息技术设备的无线电骚扰限值和测量方法



GB/T 17619 1998 机动车电子电器组件的电磁辐射抗扰性限值和测量方法
GB/T 18655-2010 测量、船和内燃机无线电骚扰特性用于保护车载接收机的限值和测量方法
GB/T 18487.1-2015 电动车辆传导充电系统通用要求
GB/T 18487.3-2001 电动车辆传导充电系统电动车辆交流直流 OBC（站）
GB 14023-2011 车辆、船和由内燃机驱动的装置无线电骚扰特性限值和测量方法
GB/T 18387-2008 电动车辆的电磁场发射强度的限值和测量方法,宽带,9kHz~30MHz
GB/T 21437.2-2008 道路车辆由传导和耦合引起的电骚扰第 2 部分：沿电源线的电瞬态传导
NB/T 33001-2010 电动汽车非车载传导式 OBC 技术条件
NB/T33008.1-2013 电动汽车充电设备检验试验规范第 1 部分
GB/T 2423.17-2008： 电工电子产品环境试验试验第 2 部分： 试验方法试验 Ka： 盐雾
QSQR E1-5-2012 禁用物质要求
GB/T 28382-2012 纯电动乘用车技术条件
SAE J1939-21:2006 商用车控制系统局域网 CAN 通信协议 第 21 部分： 数据链路层

QC/T 413-2002 Basic technical conditions for automotive electrical equipment

GB/T 2423.1-2008 Environmental testing of electric and electronic products Part 2: Test method Test A:

Low temperature

GB/T 2423.2-2008 Environmental testing of electric and electronic products Part 2: Test method Test B:

High temperature

GB/T 18384.3-2015 Electric Vehicle Safety Requirements Part 3: Personal Electric Shock Protection

GB/T 24347-2009 DC/DC converters for electric vehicles

GB 4208-2008 Enclosure protection grade (IP code)

Q/FT B102-2005 Traceability Marking Regulations for Parts and Components of Vehicle Products

GB/T 2423.3-1993 Basic environmental test procedures for electrical and electronic products—Test Ca:

Constant humidity test method;

GB/T 2423.4.1993 Basic environmental test procedures for electrical and electronic products-Test Db:

Alternating damp heat test method


GB/T 2423.5-1995 Environmental testing of electrical and electronic products, Part 2: Test methods/Test Ea and guidelines: Impact

GB/T 2423.6-1995 Environmental testing of electrical and electronic products, Part 2: Test methods/Test Ea and guidelines: Collision

GB/T 2423.8-1995 Environmental testing of electrical and electronic products, Part 2: Test method/Test Ed:

Free fall

GB/T 2423.10-1995 Environmental testing of electrical and electronic products, Part 2: Test methods/Test Fc and guidelines: Vibration (sinusoidal)

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GB/T 2423.11-1997 Environmental Testing of Electrical and Electronic Products, Part 2: Test Method/Test Fd: Broadband Random Vibration-General Requirements

GB/T 2423.22-2002 Environmental Testing of Electrical and Electronic Products, Part 2: Test N: Temperature Change

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GB/T 17626.5-2008 Electromagnetic compatibility test and measurement technology Surge (impact) immunity test

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GB/T 18487.1-2015 General requirements for conductive charging systems for electric vehicles

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GB/T 18387-2008 Limits and measurement methods of electromagnetic field emission intensity of electric vehicles, broadband, 9kHz~30MHz

GB/T 21437.2-2008 Road vehicles Electrical disturbance caused by conduction and coupling Part 2: Electrical transient conduction along power lines

NB/T 33001-2010 Electric Vehicle Off-board Conductive OBC Technical Conditions NB/T33008.1-2013 Electric Vehicle Charging Equipment Inspection and Test Specification Part1

GB/T 2423.17-2008: Environmental test of electrical and electronic products Part 2: Test method Test Ka: Salt spray

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