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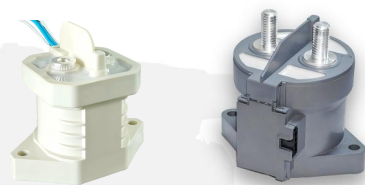
行业解决方案

Industry Solution

直流充电设备

DC Charging Equipment

直流接触器 DC Contactor



For more product and industry information, please visit our company website.

Google www.alq-dccontactor.com



www.zgalq.com

苏州安来强电子科技有限公司
SuZhou ALQ Electronic Technology CO.,LTD.

直流充电设备描述 Description of DC Charging Equipment

■ 直流充电设备类别 Types of DC Charging Equipment



■ 直流充电设备的核心特点 Core Features of Industrial Vehicles

直流充电设备的工况复杂多样，涵盖高电压大电流、频繁启停、宽温环境等严苛条件，这对核心开关器件直流接触器提出了针对性要求，具体如下：

1、高电压大电流持续运行

- (1) 输出电压覆盖 200V-1000Vdc（未来将提升至 1500Vdc），额定电流常规 $\geq 250\text{A}$ ，大功率设备可达 600A，部分超充设备输出电流甚至高达 1000A，需长期承载满负荷电流，直流接触器主触点温升需严格控制。
- (2) 充电过程中电流随电池 SOC（充电状态）动态调整，从预充阶段的小电流逐步升至额定电流，再到充电末期的平稳回落，存在持续的电流波动。

2、频繁启停与短时冲击

- (1) 运营场景中需高频次响应车辆充电需求，每日通断次数可达数十次甚至上百次，接通瞬间需承受一定电流冲击（标准要求峰值 $\leq 20\text{A}$ ），分断时需在电流降至 5A 以下后完成断开动作。
- (2) 预充电、故障保护、紧急停机等场景下存在短时通断循环，要求器件在短时间内多次完成闭合 / 断开动作，且性能稳定。

3. 宽温与复杂环境

- (1) 户外部署场景需耐受 $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$ 的宽温范围，部分地区极端环境温度可能超出常规范围，同时需应对湿度变化、昼夜温差带来的凝露问题。
- (2) 面临雨水、尘土、振动等侵蚀，防护等级需达到 IP54 及以上，部分关键部件需满足 IP67 防护要求，以适配高速公路服务区、露天充电站等复杂环境。

The operating conditions of DC charging equipment are complex and diverse, encompassing harsh conditions such as high voltage, large current, frequent start-stop cycles, and wide temperature ranges. This imposes targeted requirements on the DC contactor, a core switching component. The details are as follows:

1. Continuous Operation Under High Voltage and Large Current

- (1) The output voltage ranges from 200V to 1000Vdc (and will be increased to 1500Vdc in the future). The rated current is generally $\geq 250\text{A}$ for conventional equipment, reaching up to 600A for high-power equipment, and even as high as 1000A for some ultra-fast charging equipment. The equipment must carry full-load current for a long time, so the temperature rise of the main contacts of the DC contactor must be strictly controlled.
- (2) During the charging process, the current is dynamically adjusted according to the battery's State of Charge (SOC). It gradually increases from a small current in the pre-charging stage to the rated current, and then drops steadily in the final stage of charging, resulting in continuous current fluctuations.

2. Frequent Start-Stop Cycles and Short-Term Impacts

- (1) In operational scenarios, the equipment needs to respond to vehicle charging demands at high frequencies, with the number of daily on-off cycles reaching dozens or even hundreds. It must withstand a certain level of current impact at the moment of closure (the standard requires a peak current $\leq 20\text{A}$), and complete the disconnection action only after the current drops below 5A during breaking.
- (2) In scenarios such as pre-charging, fault protection, and emergency shutdown, there are short-term on-off cycles. This requires the component to complete multiple closing/breaking actions stably within a short period.

3. Wide Temperature Ranges and Complex Environments

- (1) For outdoor deployment, the equipment must withstand a wide temperature range of -40°C to $+85^{\circ}\text{C}$. In some regions, extreme ambient temperatures may exceed this conventional range. At the same time, it must cope with condensation caused by humidity changes and day-night temperature differences.
- (2) It is exposed to erosion from rain, dust, vibration, etc. Therefore, its protection level must reach IP54 or above, and some key components must meet the IP67 protection requirement to adapt to complex environments such as highway service areas and open-air charging stations.

直流接触器选型指南 DC Contactor Selection Guide



EVQ2H

直流接触器 DC Contactor

- 尺寸（长×宽×高）：
Dimensions(L×W×H):
53.8×40.2×59.4 mm
- 额定电流(可选):
Rated Current (Optional):
100/135 A
- 最大切换电压:
Max. Switching Voltage:
1500 Vdc

■ 应用场景

- ✓ 小直流充电桩（直流输出电路）

■ Application Scenarios

- ✓ Small DC charging pile (DC output circuit).

■ 产品特点

- ✓ 小体积，长寿命，低温升，高电压
- ✓ 运行可靠

■ Product Features

- ✓ Compact size, long service life, low temperature rise, and high voltage.
- ✓ Reliable operation.



EVQ4G

直流接触器 DC Contactor

- 尺寸（长×宽×高）：
Dimensions(L×W×H):
80×54.5×74.3 mm
- 额定电流(可选):
Rated Current (Optional):
150 A
- 最大切换电压:
Max. Switching Voltage:
1500 Vdc

■ 应用场景

- ✓ 分体式直流充电桩（群充）（功率分配电路）

■ Application Scenarios

- ✓ Split DC charging pile (group charging) (power distribution circuit).

■ 产品特点

- ✓ 小体积，长寿命，低温升，高电压
- ✓ 运行可靠
- ✓ 线圈导线为侧面引出

■ Product Features

- ✓ Compact size, long service life, low temperature rise, and high voltage.
- ✓ Reliable operation.
- ✓ The coil wire is led out from the side.



EVQ5K

直流接触器 DC Contactor

- 尺寸（长×宽×高）：
Dimensions(L×W×H):
80.0×62.9×72.4 mm
- 额定电流(可选):
Rated Current (Optional):
200/250/300/350 A
- 最大切换电压:
Max. Switching Voltage:
1000 Vdc

■ 应用场景

- ✓ 充电机（直流输出电路）
- ✓ 单体式直流充电桩（直流输出电路）
- ✓ 分体式直流充电桩（群充）（直流输出电路）
- ✓ 分体式直流充电桩（群充）（功率分配电路）

■ Application Scenarios

- ✓ Charger (DC Output Circuit).
- ✓ Monolithic DC charging pile (DC output circuit)
- ✓ Split DC charging pile (group charging) (DC output circuit).
- ✓ Split DC charging pile (group charging) (power distribution circuit).

■ 产品特点

- ✓ 线圈启动电流小
- ✓ 安装便捷
- ✓ 长寿命，低温升、运行可靠

■ Product Features

- ✓ Small starting current of the coil.
- ✓ Convenient installation.
- ✓ Long service life, low temperature rise and reliable operation.



EVQ7A

直流接触器 DC Contactor

- 尺寸（长×宽×高）：
Dimensions(L×W×H):
88.0×72.7×103.0 mm
- 额定电流(可选):
Rated Current (Optional):
400/500/600 A
- 最大切换电压:
Max. Switching Voltage:
1000 Vdc

■ 应用场景

- ✓ 重卡直流一体式充电桩（直流输出电路）
- ✓ 超级快充充电桩（直流输出电路）

■ 产品特点

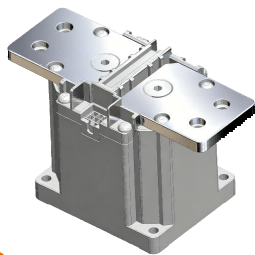
- ✓ 线圈启动电流小
- ✓ 安装便捷
- ✓ 长寿命，低温升、运行可靠

■ Application Scenarios

- ✓ Heavy-duty DC integrated charging pile (DC output circuit)
- ✓ Super Fast Charging Station (DC Output Circuit)

■ Product Features

- ✓ Small starting current of the coil.
- ✓ Convenient installation.
- ✓ Long service life, low temperature rise and reliable operation.



EVH9A

直流接触器 DC Contactor

- 尺寸（长×宽×高）：
Dimensions(L×W×H):
168×86×104.4 mm
- 额定电流(可选):
Rated Current (Optional):
800/1000 A
- 最大切换电压:
Max. Switching Voltage:
1500 Vdc

■ 应用场景

- ✓ 重卡直流一体式充电桩（直流输出电路）
- ✓ 超级快充充电桩（直流输出电路）

■ 产品特点

- ✓ 长寿命，低温升，高电压
- ✓ 运行可靠

■ Application Scenarios

- ✓ Heavy-duty DC integrated charging pile (DC output circuit)
- ✓ Super Fast Charging Station (DC Output Circuit)

■ Product Features

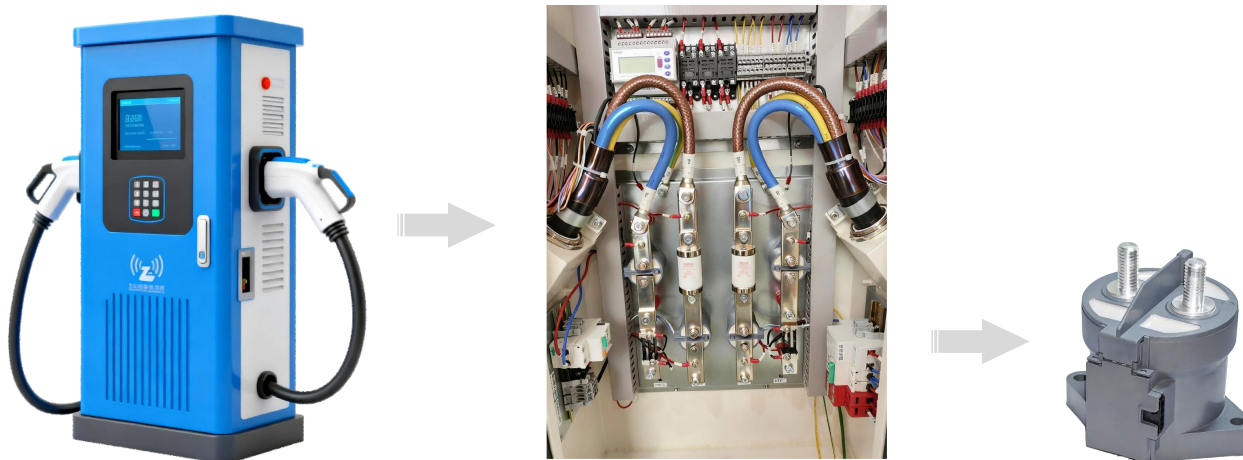
- ✓ Long service life, low temperature rise, high voltage.
- ✓ Reliable operation.

本文列出了适用于直流充电设备的直流接触器，用户可根据需要自行选择。如果本文中找不到合适的产品，请及时联系安来强以获得更多技术支持。安来强可以根据用户需求定制产品。

This article lists DC contactors suitable for DC charging equipment, from which users can choose according to their needs. If no suitable product is found in this article, please contact ALQ in a timely manner for further technical support. ALQ can customize products according to user requirements.

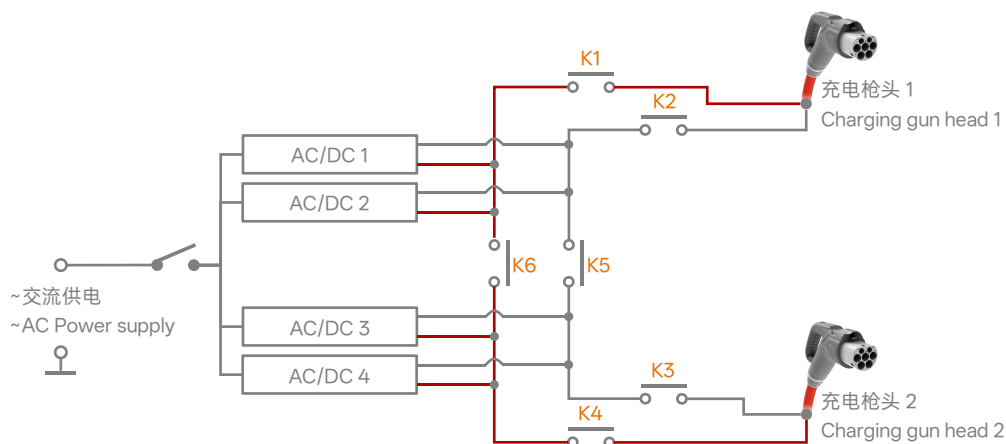
单体式直流充电桩 Monolithic DC Charging Pile

■ 应用案例 Application Cases



■ 单体式直流充电桩典型控制电路示意图

Typical Schematic Diagram of Control Circuits for Monolithic DC Charging Piles



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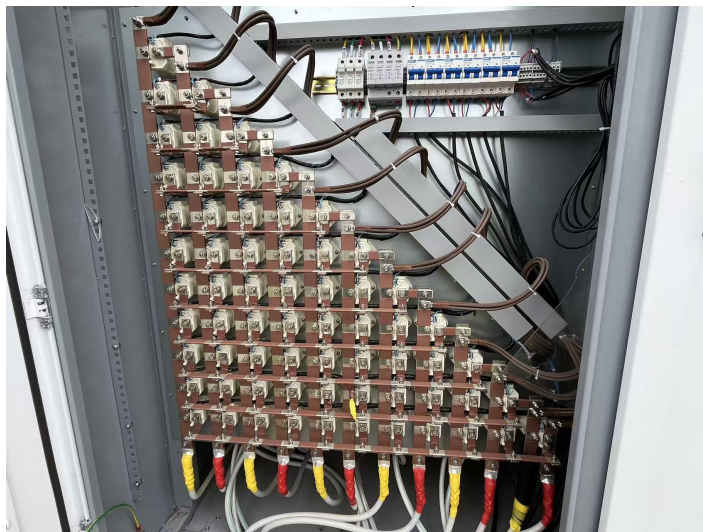
- ✓ K1、K2 闭合，K5、K6、K3、K4 断开，AC/DC 1 和 AC/DC 2 的电能经 K1、K2 输送至充电枪头 1。
- ✓ K3、K4 闭合，K1、K2、K5、K6 断开，AC/DC 3 和 AC/DC 4 的电能经 K3、K4 输送至充电枪头 2。
- ✓ K1、K2、K5、K6 闭合，K3、K4 断开，4 个功率模块（AC/DC）的电能经 K1、K2 输送至充电枪头 1，从而实现高功率充电。
- ✓ K1、K2、K3、K4、K5、K6 均闭合，可实现双枪均分功率充电。

Note:

- ✓ When K1 and K2 are closed, and K5, K6, K3, K4 are open, the electric energy from AC/DC 1 and AC/DC 2 is transmitted to charging gun head 1 through K1 and K2.
- ✓ When K3 and K4 are closed, and K1, K2, K5, K6 are open, the electric energy from AC/DC 3 and AC/DC 4 is transmitted to charging gun head 2 through K3 and K4.
- ✓ When K1, K2, K5, K6 are closed, and K3, K4 are open, the electric energy from the four power modules (AC/DC) is transmitted to charging gun head 1 through K1 and K2, thus realizing high-power charging.
- ✓ When K1, K2, K3, K4, K5, K6 are all closed, dual-gun equal power distribution charging can be achieved.

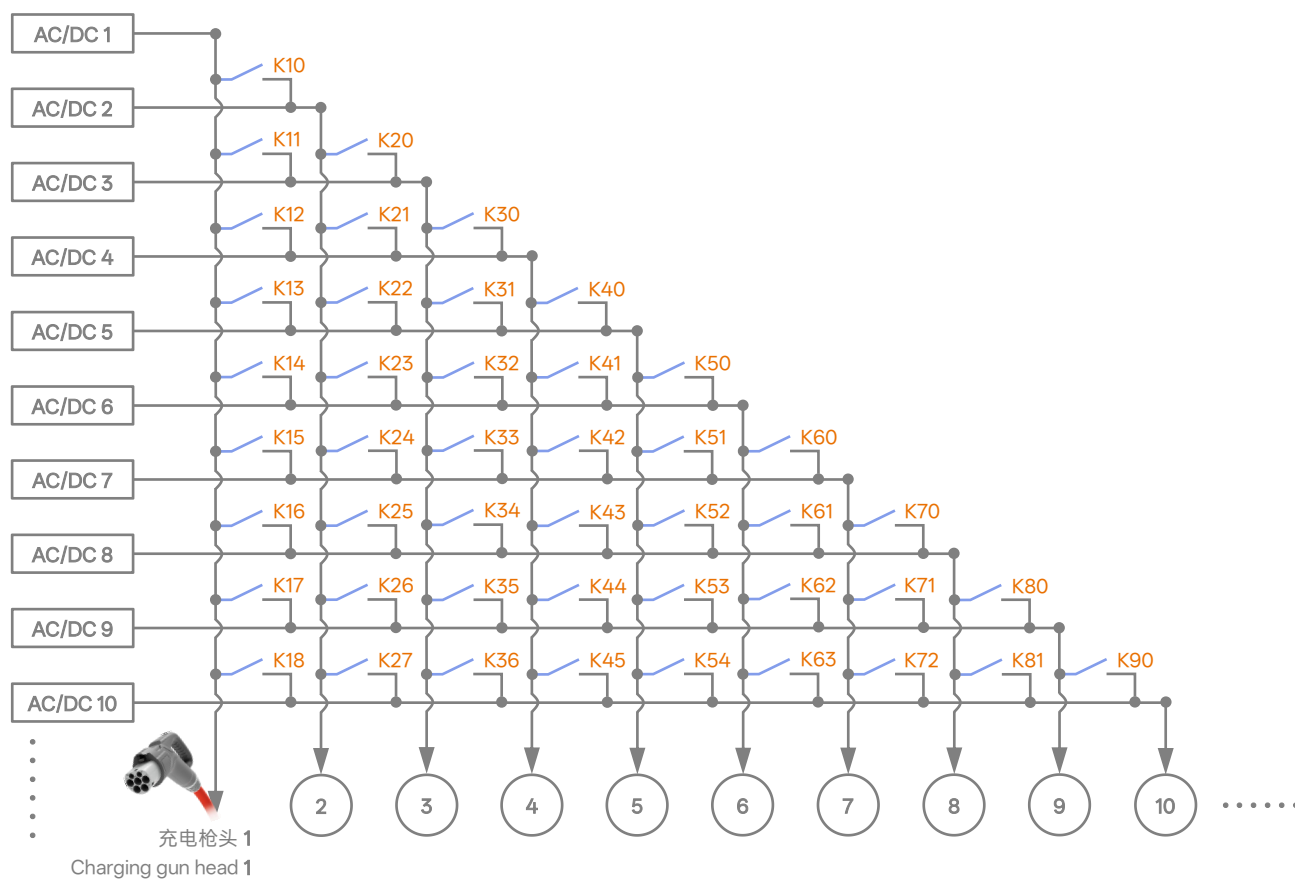
分体式直流充电桩（群充） Split DC Charging Pile (Group Charging)

■ 应用案例 Application Cases



■ 分体式直流充电桩（群充）典型控制电路示意图

Typical Schematic Diagram of Control Circuits for Split-type DC Charging Piles (Group Charging)



说明：

- ✓ 功率分配矩阵在充电桩的内部结构中扮演着至关重要的角色，它是对功率模块单组（AC/DC）进行调配的实现路径，它的核心作用是合理分配功率模块的输出。
- ✓ 在实际的充电场景中，不同的电动汽车可能具有不同的充电需求，有的车辆需要快速充电，有的则可以接受较慢的充电速度。功率分配矩阵系统通过控制直流接触器的通断，将相应的功率模块连接到该充电枪上，从而提高充电桩的使用效率，实现对多个充电枪的高效供电。

Note:

- ✓ The power distribution matrix plays a crucial role in the internal structure of charging piles. It serves as the implementation path for allocating a single group of power modules (AC/DC) and its core function is to reasonably distribute the output of power modules.
- ✓ In actual charging scenarios, different electric vehicles may have different charging requirements. Some vehicles need fast charging, while others can accept a slower charging speed. By controlling the on-off state of DC contactors, the power distribution matrix system connects the corresponding power modules to the charging gun. This not only improves the efficiency of the charging pile but also enables efficient power supply to multiple charging guns.

■ 声明：

- ✓ 需了解产品详情，请联系安来强或浏览安来强官网以获取相应的产品说明书。
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■ Statement

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