

Charging Infrastructure for Parking Garages

The charging infrastructure for parking garages is built on the successful VOLTDRIVE master-slave architecture. It takes advantage of the proven building components of this concept providing a modular infrastructure, which can be further modified and expanded according to the growing needs of electric vehicle users while keeping the initial investment to a necessary minimum.

The infrastructure building costs can be divided between the investor (power supply, switchboard, charging infrastructure management and preparation of charging station installation) and the user (charging stations and their installation), and thus utilize the custom modification concept.

The MASTER unit using the OCPP 1.6 protocol is connected to the data centre by a data cable. This enables remote management and control of the entire charging system including the recording of individual user consumption, invoicing and RDIF card management.

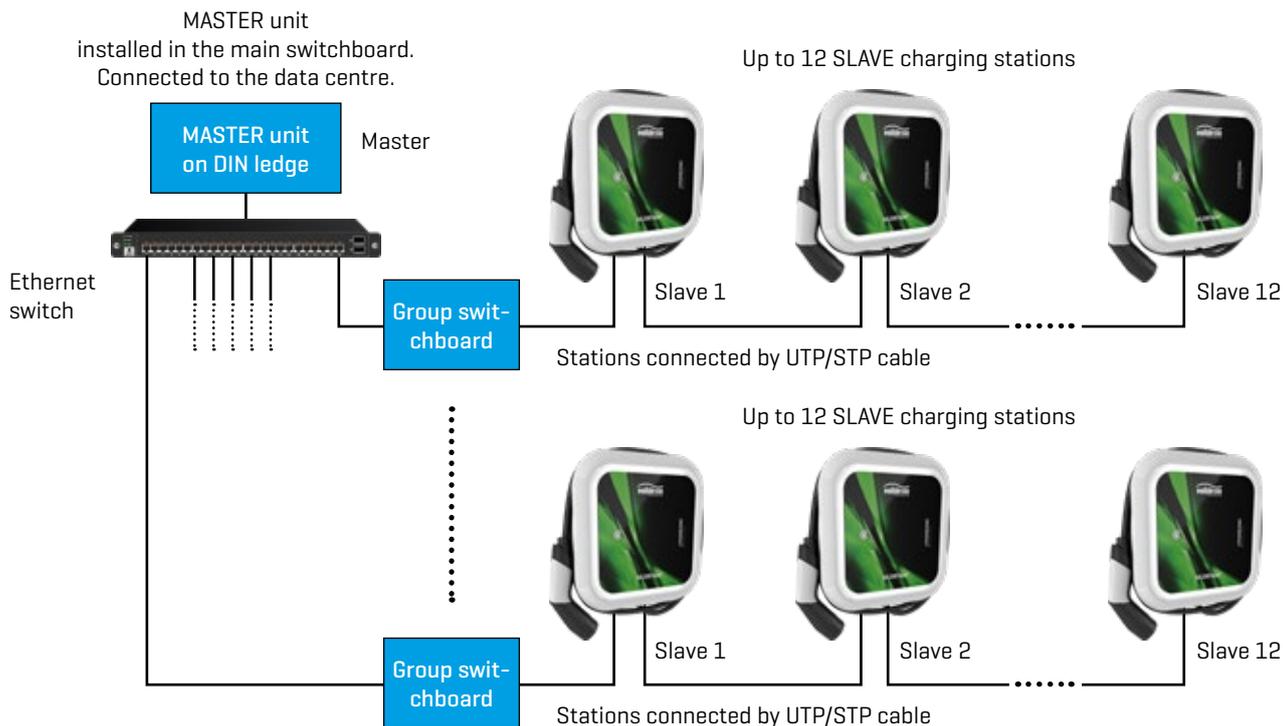
The MASTER unit installed in the main switchboard controls the entire charging system according to the current consumption and the instructions from the data centre. The charging stations (SLAVE) are connected in series to the MASTER unit and to each other through the RS485 industrial bus. This enables connection of up to 10 charging stations (SLAVE) to one MASTER unit.

JMASTER unit
installed in the main switchboard.
Connected to the data centre.

Up to 10 SLAVE charging stations



For large installations with a greater number of charging stations, the system can be expanded with group switchboards, which also include, apart from the power supply for charging, a group control unit. The control unit is connected to the MASTER unit by a data cable [Ethernet] and controls the group of charging stations via the RS485 industrial bus. Each group switchboard enables connection of up to 12 charging stations.



DESCRIPTION

The electric vehicle charging system represents one grid connection point with a distribution electricity meter and the electric vehicle distribution rate supporting Demand-Side Management (DSM). The electricity meter supports reading via MODBUS protocol and is installed after the main switchboard.

The system enables installation of switchboards for groups of charging points with respect to the spatial possibilities and the arrangement to reduce the costs to a minimum. The group switchboard provides power supply to the charging stations. It contains a circuit breaker of up to 3x 32A for each charging station and PE and N terminal blocks. It further contains components of group control electronics. The current carrying capacity of the cable into the group switchboard should correspond to the number of charging points x max. charging current of the station, but not more than up to the current capacity of the grid connection point. This enables dynamic charging control and guarantees the full use of the available power for charging.

The control system is installed before the first charging station is put into operation and enables remote monitoring via the web interface or the data centre using OCPP 1.6 JSON communication protocol.

MASTER

A device installed near the main switchboard to enable electric sub-meter reading. The Master unit controls the power of the charging points and provides communication via OCPP 1.6 JSON protocol.

GROUP CONTROL UNIT (CONVERTER)

A device controlling the group of SLAVE charging stations. The group converter enables connection of up to 12 charging points. It requires the power supply of 230 VAC + Ethernet (UTP). This converter is connected to the charging stations.

CHARGING STATION

The charging station is the slave type station with one charging cable, TYPE2 connector and the charging power of up to 22 kW, 32 A/400 VAC. Authorisation is carried out via 13.56 MHz MiFare RFID card reader. The charging station is fitted with a delayed start function (optional) shifting charging to low tariff periods (DSM).