SPECIFICATION FOR CHARGING STATION CONTROL

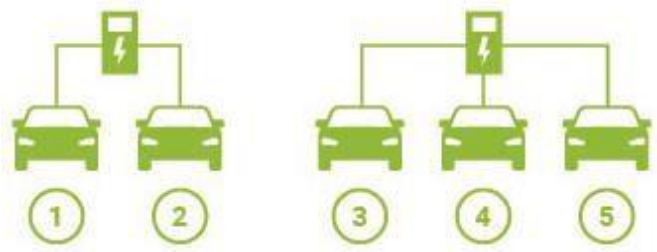
Glossary

Charging point

A charging point is an interface that communicates with the Tesvolt Energy Manager as the central energy management system. Only one electric vehicle can be charged at a charging point at any one time.

Charging station (e.g. wall box, charging column or quick charging station)

A charging station can feature several charging points to allow for charging in parallel.



Common charging connectors ("charging sockets")

Type 2 connector

This three-phase connector is the most widespread in Europe and has been set as the standard. Charging power up to 22 kW (400 V, 32 A) is common in private settings, while public charging stations offer charging power up to 43 kW (400 V, 63 A).

Type 2 connector

Combo connector (Combined Charging System, CCS)

The CCS connector (European standard EN 62196) adds a quick charging feature to the type 2 connector through two additional power contacts and supports AC and DC charging (alternating and direct current charging) up to 170 kW.

CCS combo connector

CHAdeMO connector

This quick charging system allows charging processes of up to 100 kW.

CHAdeMO charging connector

Individual charging points vs. master/slave control

There are several options for controlling charging points, depending on the charging technology used and the function required. All options require an interface that is compatible with the *TESVOLT Energy Manager* to ensure local load management on the part of the charging technology used. Provided the charging technology has its own energy meters, these can usually be read via the local interface. Otherwise, additional energy meters need to be used to visualise individual charging powers.

Individual control: provided each charging point has an interface for local load management, the TESVOLT Energy Manager allows individual control of up to 25 charging points, each with its own charge set point. In this case, distribution of the available power to the charging points is determined by the TESVOLT Energy Manager and is configured in the TESVOLT Energy Manager's configuration interface.

Master/slave system: provided the charging technology used features a master/slave system, a charge set point can be assigned to the master by the TESVOLT Energy Manager. The available power is then distributed via the master's controls, with distribution being configured in the charging technology's interface.

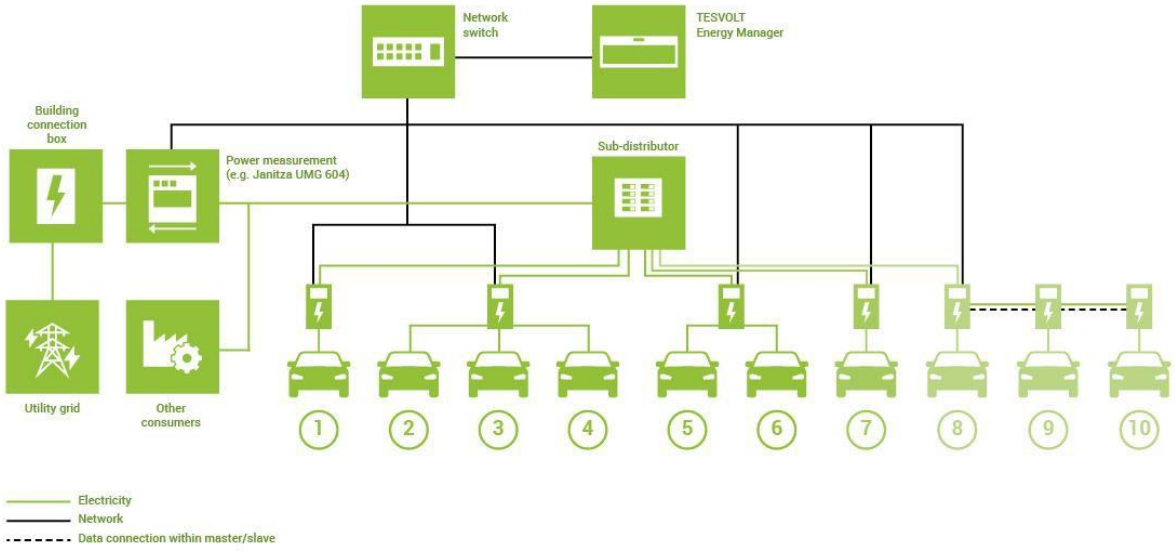
These two options can also be combined. This allows individual charging points to be controlled straight from the TESVOLT Energy Manager, while at the same time distributing some of the available power to a group of other charging points through a master/slave system. The total number of charge set points involved may not exceed 25.

What is a charge set point?

A charge set point is a signal input that is used to communicate a power limit to the charging technology. A charge set point can be conveyed to a single charging point or as an overall set point to the master/slave controls for a group of charging points.

Product description

Where a user has only a limited grid connection, they can dynamically control the output of the charging infrastructure. The minimum requirement for this is a TESVOLT Energy Manager and power measurement (e.g. Janitza UMG 604). The power measurement gauges the power at the limited grid connection. The TESVOLT Energy Manager establishes the power available to the charging infrastructure, while allowing for other consumers and generators. It conveys the available power to individual charging points and/or the master/slave controls for charging point groups in the form of set points. This can control up to 25 charge set points.

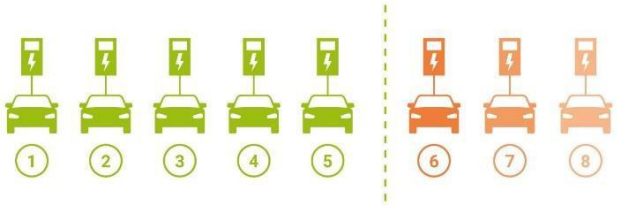


Where power needs to be distributed intelligently in the network rather than simply being limited, then each charging station needs to have a master/slave management or its own charging management.

What is the difference between the Basic and Pro versions?

The Basic version of the TESVOLT Energy Manager includes charge controls for one charging point. A master/slave arrangement of the charging technology also allows several charging points to be controlled via one charge set point, but only via general power controls and not separately from one another.

The Pro version has all the features of the Pro package, while also permitting dynamic load management of up to 25 charging points with one Energy Manager. It also offers the option of prioritising different members of the charging system, for example hard or soft prioritisation according to charging point number, or first come – first serve and last come – first serve (see below).



Where there are six or more charge (set) points being controlled, an additional EUR 21/charge (set) point is payable per year (see diagram above). More than 25 charge set points can be operated with the use of additional TESVOLT Energy Managers.

Where is it worthwhile to have a charge set point in the Basic version?

Having high charging power makes sense for charging electric vehicles as quickly as possible. The cost of extending the grid connection to supply the higher currents required for this is, however, very high. Increasing the connected load normally costs grid operators sums into the mid-to-high five figures. Higher demand rates also need to be added to this.

Where outputs of more than 11 kW (from the second charging station) need to be obtained at the grid connection, the grid operator also requires there to be an energy management system in place before the corresponding system can be approved. They do this to avoid supply disruptions that could be triggered by fuses being tripped.

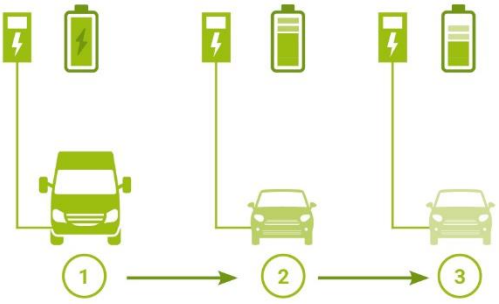
An effective energy management system ensures that, even when only low currents are available, several electric vehicles can easily be charged at maximum current without the grid connection fuse being triggered or the threshold being passed.

Types of prioritisation

VIP distribution

VIP distribution means that the charging points with VIP priority receive the required power without restrictions. The charging power is automatically allocated so that the VIP charging points are given maximum priority. Surplus power is distributed according to the order of priority, with each subsequent charging point receiving the power available.

Sample application: long-distance vehicle plus city car



Prioritised distribution

This type of distribution prioritises the available charging power so that the charging point with the highest priority is assigned the maximum charging power, while all other charging points are considered according to their priority. Surplus power is distributed according to the order of priority, with each subsequent charging point receiving the power available. If additional power is left over, it will be allocated to the highest priority charging point first of all before the next charging point in the priority list is considered.

Sample application: Electric fleet of a delivery service

Fair distribution

Fair distribution means that all charging points receive an equal allocation of power at the same time. The first charging point in the priority list is first to start the charging process with a minimum charging power of 6 A. The charging point with the next highest priority then begins to charge. Surplus power is distributed to the charging points according to the order of priority, with each subsequent charging point also receiving the minimum charging power to begin with. As soon as all charging points are active, surplus power is distributed evenly across all remaining charging points.

Sample application: shopping centres or multi-storey car parks