

ELECTRIC VEHICLE CHARGING STATION MODEL G6



■ TECHNICAL DOCUMENTATION, INSTALLATION AND MAINTENANCE INSTRUCTIONS

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Foreword

The public charging station for electric vehicles is a part of the integrated charging system that has been designed and developed by EtreL. The system consists of EV charging station(s) described in this manual and the accompanying multi-tier software for EV charging infrastructure operators, and end users. The system enables safe and simple EV charging for the user and gives a comprehensive oversight and control of the charging for the operator, including the data for billing of the consumed energy and service.

The manual with the installation instructions contains the latest information at the time of purchase. Any unauthorised modification or tampering with the product may void the product warranty. EtreL d.o.o. reserves the right to make changes to the product without further notice. EtreL d.o.o. customer support department will assist you with any further inquiries about the product.

Notes to the installer:

- Carefully read the installation instructions before installing the station. Follow all of the instructions and recommendations.
- After the installation is completed, make sure to leave these instructions with the customer.

Notes to the customer:

- Use the charging station only in accordance with instructions for use. Carefully read these instructions and make sure to keep them for further reference. Ensure that the charging station is installed by a licenced electrician and/or electrical contractor.

1 Safety precautions

1.1 Intended use

The charging station is intended only for electric vehicle charging and should not be used to charge any other appliances or devices or for any other purposes. No flammable materials or liquids should be used or stored in the direct vicinity of the charging station. The manufacturer accepts no responsibility for damage or injuries resulting from incorrect installation or inappropriate use of the product. When conducting maintenance work on the station, the power supply to the charging station needs to be turned off (see Chapter 8 Service and maintenance). Any interference with the interior of the charging station can pose life-threatening risks and may be conducted only by a certified and skilled professional.

1.2 Compatibility with electric vehicles

The charging station is compliant with the IEC 61851-1 international standard which defines conductive AC electric vehicle charging (Part 1, Part 21 and Part 23). Different types of charging connectors and converters are available as a part of optional equipment to allow safe charging of any standard electric vehicle.

1.3 Safety regulations

The owner and operator of the charging station are required:

- To operate the charging station only with the necessary protective devices installed. All safety components need to be properly installed and turned on after the installation or maintenance of the charging station is completed,
- To prepare the site where the charging station will be installed in accordance with the requirements and recommendations of this manual and the local regulation,
- To provide enough space around the charging station for needs of maintenance,
- To appoint a person responsible for the safe operation of the charging station and for the coordination of work.

2 Description of the product

2.1 Basic functionalities

The public charging station from Etreel is highly configurable and can be tailored to the client's specific needs. It allows simultaneous charging of two vehicles with power of up to 2x22 kW and can be equipped with any standard Type 2 - IEC 62196-2 sockets. Certified utility-grade meters as well as all optional utility feeder equipment are embedded in the station. The station is equipped with an RFID identification module, which prevents unauthorised use and is necessary to enable different billing and reservation processes and other advanced functionalities. The station also supports remote identification with SMS or other external identification means.

2.2 Overview of charging station components

The basic model of Etreel's G6 public charging station contains the following components:

- casing of the station,
- two charging spots (Type 2 - IEC 62196-2 sockets, single- or three-phase),
- main controller of the station,
- LCD display that guides users through the charging process,
- user identification module with RFID card reader,
- Ethernet communication connection point,
- Built-in smart energy meters for each charging spot,
- electrical protection of each socket,
- three-phase grid connection point, optionally equipped with standard safety protection required by local regulation.

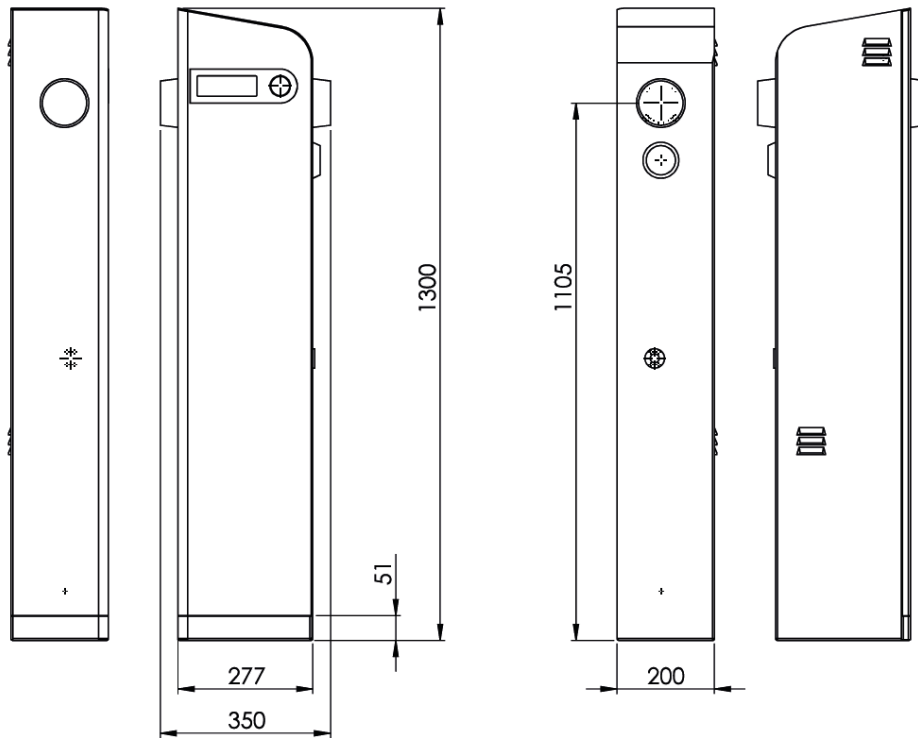


Figure 1: Exterior dimensions of the charging station's casing

The casing of the charging station is robust enough to withstand any unfavourable weather conditions and potential damage which may occur in open public areas. The compact dimensions of the charging station allow its installation on a small area, for example close to the edge of the pavement or roadside kerb. Modular design allows simple replacement of key components that can become damaged due to wear and tear or vandalism (especially the charging sockets). The station's service doors use a special single-point locking mechanism. The doors open outwards and to the side to simplify the work of maintenance staff.

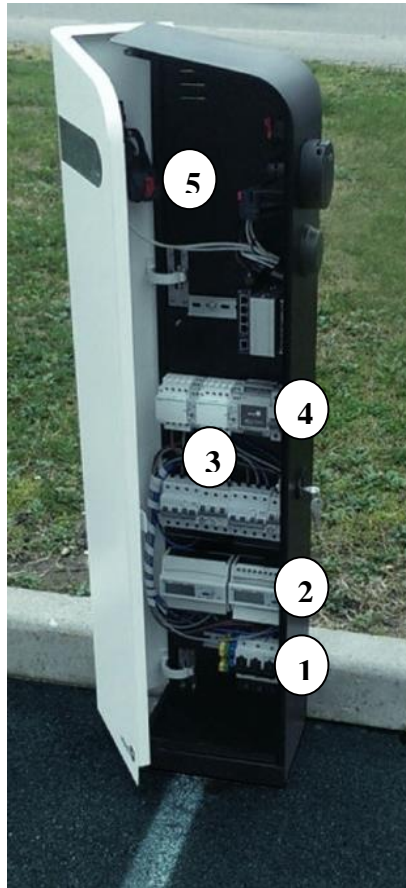


Figure 2: Arrangement of equipment inside the station

The figure above shows the general arrangement of equipment inside the charging station. The station comprises several different functional units:

1. Grid connection module of the charging station, which contains terminals for all supply wires (L1, L2, L3, PE, N);
2. Energy meters for each socket. For normal functioning of the station, a working communication connection between the main station controller and the energy meters is required;
3. Differential and overcurrent protection of each socket;
4. Module for communication with electric vehicle (compliant with the IEC 61851 standard), socket voltage monitoring components, socket contactors;
5. Main station controller with RFID reader, RFID antenna and LCD display, control circuit power supply, and communication modules (Ethernet or GPRS router).

2.3 Optional and extra equipment

The table below shows the optional and extra equipment that can be added to the G6 charging station:

Optional / Extra equipment	Use/Description
Sockets equipped with LED lights	LED lights allow the station to signal each charging spot availability (available, occupied, in fault)
Sockets equipped with extra lid locking mechanism	The locking mechanism locks the lid of the station which cannot be opened without prior user identification
GPRS router with network switch	GPRS router can be used for communication for several chargers on the same location (required for control centre connection when local connection via Ethernet is not possible). Network switch can be used to connect several stations on the same location with one router.
Safety arches (Protection railing)	Protects the station from vehicle collisions
Different graphical user interface languages	Based on user identification, the station can automatically adjust the language of the user interface
Visual customisation of the station	Custom labels with client's design, logotypes or promotions
Connection of supply wires with greater diameter (> 35 mm ²)	Special connection terminals are built into the station – can be used to connect several stations in a row
DSM (Demand Side Management) functionalities	Enables management of charging current based on settings in the control centre for management of charging infrastructure
Extra metallic plate for demo set-up	Can be used for temporary installation

3 Preparation before construction works and installation

3.1 Permits

Location and building permit:

The charging station is considered to be a simple object; therefore there is usually no need to acquire any building permits for its installation. If the installation site is a part of municipal property, consent of the relevant authorities must be acquired before the charging station can be installed.

Connection to the grid:

The charging station must be connected to the low-voltage electricity distribution network. No special permit is required to connect to an existing network behind the metering point. The connection can be done by any authorised electrician.

Parking permits:

Parking must be possible in the direct vicinity of the station and permitted by the operator or owner of the parking area. Estimated time for a full charge depends on the current state of the battery and the vehicle's charging power; it usually takes between 30 minutes and up to 8 hours.

The specially designated parking area for electric vehicles should be properly marked. When the municipal decrees do not determine otherwise, the parking spaces should be marked by a symbol denoting an electric vehicle, together with an explanatory sign that the parking space is reserved for electric vehicles only. The parking regime should be monitored to prevent other vehicles (with internal combustion engines) from parking on special EV parking places.

Connection to the station operator's communication network (charging infrastructure control centre):

The charging station requires a connection to the station operator's WAN network. To access the WAN network via an internet connection, some additional security requirements need to be observed. The charging station uses network connection to communicate with the Control centre in order to cyclically send information about its status, perform identification of users

(on the Control centre level), forward events that occur during its operation and execute billing for the services performed. The connection also enables communication from the Control centre towards the charging station, which enables remote access to the station for needs of maintenance or remote control. Network connection can be executed in several different ways:

- Direct connection to the station operator's WAN network. Connection can be established directly with a UTP cable or a fibre optic converter.
- Wireless connection. The station connects to an existing 2G/3G mobile network with an GPRS/UMTS router built into the station.

3.2 Grid connection

The charging station can be connected directly to the electricity distribution network or to an existing electrical installation nearby. Supply power depends on the charging power of each socket (according to the configuration of the charging station). Current configurations require the following supply power:

- 14,8 kW:
 - 2x single-phase charging spots, maximum current 32 A per phase
- 29,4 kW:
 - 1x single-phase and 1x three-phase charging spots, maximum current 32 A per phase
- 44 kW:
 - 2x three-phase charging spots, maximum current 32 A per phase

Supply power of the charging station must be dimensioned appropriately to enable simultaneous charging of two vehicles. Charging power of each charging spot can be limited in the settings of the charging station on the scale between 6 A and 32 A. The charging station can also be set up to allow local power management so that when two vehicles are connected at the same time, the available maximum power is split in half between the two vehicles

In the execution phase of the grid connection project, the following requirements need to be met:

- Selectivity of the functioning of protection needs to be ensured;

- Overcurrent protection should be at least one class greater than the one used at the grid connection point of the charging station;
- Differential protection (RCD) which is used in the charging station operates at a low current (ΔI is 30 mA and without delay). The selectivity of this protection on the level of facility is achieved with a higher delay or a greater current differential.
- Five wires are routed to the station, including three phase wires, grounding wire, and the neutral wire (when connecting to an existing installation). For slow charging option, only one phase wire with sufficient diameter can be routed to the station. Dimensioning of the wires is determined in the project documentation. Grounding wire must be connected to the main grounding busbar.

Own consumption of the charging station depends on the station's configuration and should not exceed 20 W. Own consumption of the charging station is measured by energy meter 2.

3.3 Location

Location of the charging station must meet the following criteria:

- The charging station must not be submersed in water or any other fluid and should not be installed in flood risk areas;
- The operational temperature of the charging station is between -20 and +50°C;
 - For locations where the charging station will be exposed to direct sunlight and high ambient temperatures during the day, it is recommended to install protection from direct sunlight, otherwise the temperature inside the station may exceed 60°C.

3.4 Placement of the charging station in the environment

3.4.1 Required space

Basic installation of the charging station requires a space of approximately 650 mm x 390 mm. If the charging station is installed together with safety arches, dimensions of the required space are approximately 850 mm x 450 mm. Required dimensions are calculated as follows:

- Basic dimensions of the station's base: 350 mm x 200 mm.
- Free space:
 - 50 mm in the back
 - 150 mm on the left and right side
 - 140 mm at the front in order to open the station doors
- Two air vents are built into the station, one on the top of the back side and another in the middle of the back side. Air vents must not be blocked or obstructed by other items or objects. When applicable, air vents must be protected from being covered with snow.
- The height of the charging station is 1300 mm.

The charging station is equipped with standard sockets. Charging cables are not a part of the station's equipment, therefore it is expected that the users carry charging cables in their vehicles. EV parking places must be placed within the reach of the charging cable. Minimum length of the charging cable should be 1,5 m (in the case of the most optimal EV parking).

3.4.2 Possible charging station placements

The placement of charging station into its environment must allow easy access to all electric vehicles for which the station is intended. The charging station can be installed on the pavement, parking lot, in a parking garage or elsewhere, taking into account the specific conditions of each of these placements. In all these placement options, the station can also be installed together with the safety arches. Each different placement has its own requirements as described below. Due to the station's service doors opening outwards, the space in front of the station (approximately 50 cm) needs to be free of any obstacles which could prevent the opening of service doors. Safety arches or car park barriers can be used to prevent direct contact of vehicles with the charging station.

- **Street (pavement) placing**

The charging station must be placed so that it does not interfere with pedestrian mobility while providing EV charging services. When certain interference is unavoidable, the placement of the station should prioritise pedestrian safety and minimise the risks of tripping over charging cables or suffering collisions with the station. The charging station should be placed as close to the roadside kerb as possible. When the charging station is combined with safety arches, these need to be placed as close to the roadside kerb as possible, while the station is moved further back from the roadside so that its back edge is aligned with the front side of the rear arches of the safety arches (see Chapter 4.4.1 Excavation and foundation construction for safety arches). The safety arches should be removed at least 15 cm from both sides of the station to enable normal opening of the service doors.

- **Parking lot placement**

- Single station

A single charging station is usually placed on one of the sides of the parking lot. The station must be placed in a way to enable simple and practical charging of two electric vehicles at the same time. The station should be placed in a medial position between two parking spaces, as close to them as allowed by the kerb. It is recommended to install safety arches to prevent any collisions with the station while parking the vehicle. Safety arches should be placed as close to the kerb as possible and the back edge of the station should be aligned with the front side of the rear arches of the safety arches. The safety arches must be removed at least 15 cm from both sides of the charging station in order to simplify any maintenance. If several charging stations are installed on the same parking lot, the stations should optimally cover two parking spaces each.

- A pair of stations

Back-to-back placing of two charging stations can be used to place together a couple of charging stations, usually in the central position of the parking lot. Minimum distance between the rear sides of the two charging stations should be 50 mm. It is strongly recommended to add safety arches to this placement. In this case, both charging stations can be placed inside a single pair of safety arches. They can serve four electric vehicles at the same time.

- **Parking garage placement**

In the parking garage placement, the specific installation of supply cables needs to be considered. These cables are usually routed on the ceiling of the parking garage. A wall mount charging station is also available from the manufacturer. It can be equipped with one charging socket and mounted directly to a concrete wall or column.

3.4.3 Possible parking arrangements

The charging station enables two vehicles to charge at the same time, one on each charging spot. Accordingly, an appropriate number of parking places need to be maintained in the direct vicinity of the station.

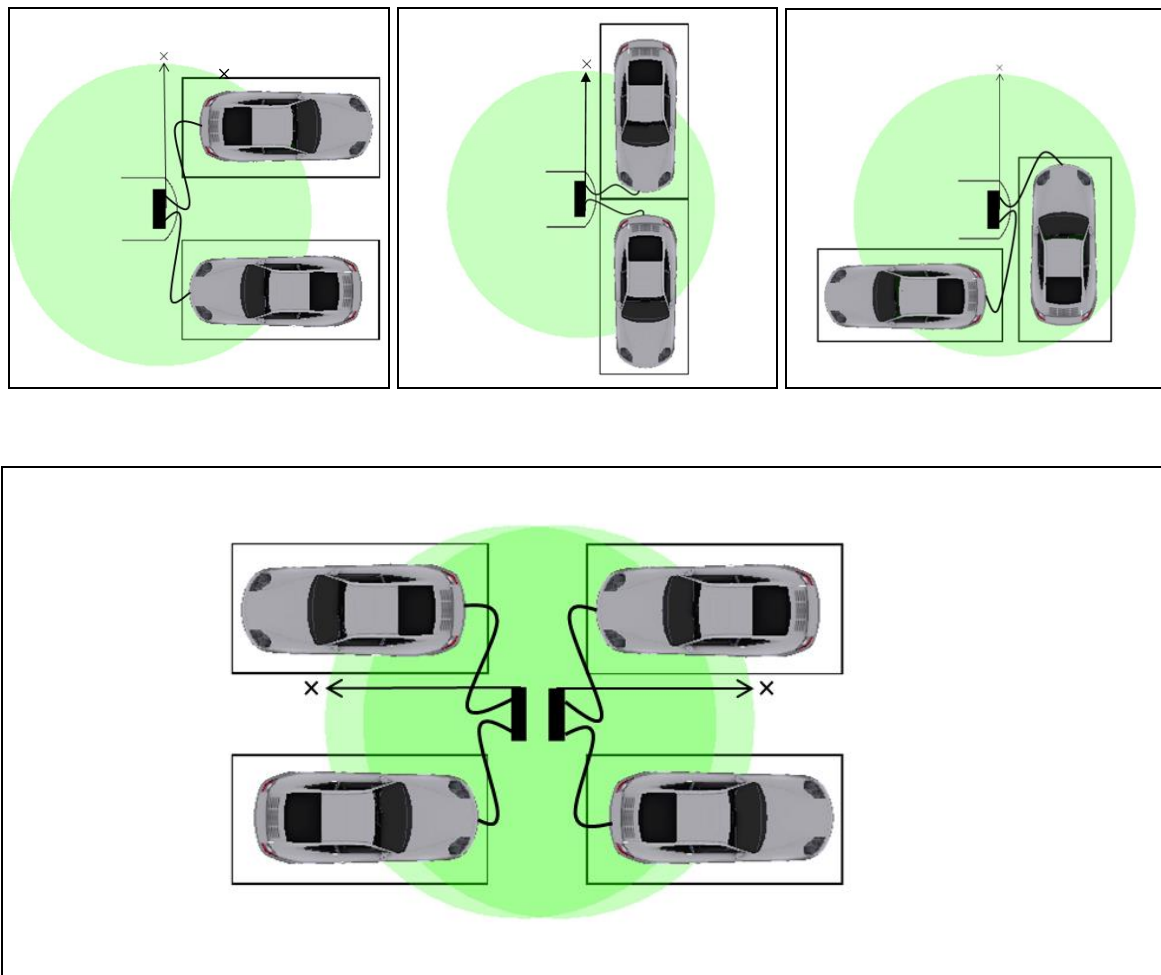


Figure 3: Possible parking arrangements

$X = \text{min. } 2,5 \text{ m (standard cable length)}$.

The figures above show some of the most often used parking arrangements. Both options (for the charging cable to be plugged at either the front or the rear end of the vehicle) are considered. The last figure shows the option of four EVs charging on two stations. Each charging station can serve more than two parking spaces, taking into account that only two vehicles can be actually plugged in at the same time.

3.4.4 Recommendations

- Use street signs or special marking to designate special EV parking places, which should be easily distinguishable from conventional parking places.
- Car park barriers can be installed between the station and the parking place to ensure extra protection of the charging station. It is also recommended to install safety arches, which can be supplied by the manufacturer as an additional option.
- The arrangement of parking places should be planned in a way to ensure simple use of the charging cable. Since there is yet no standard placement of the charging connector on the EV (it is usually placed either at the front or on one of the rear corners of the vehicle), each of these options must be taken into account. The user must be able to reach any of these positions with a standard length charging cable.
- To provide a secure environment for EV users and prevent vandalism or theft:
 - install the station in a location where it can be clearly seen and easily monitored;
 - maintain a 24-hour security control of the station (from the charging infrastructure Control centre);
 - install sufficient lighting in the vicinity of the charging station to ensure better safety and improved user experience;
 - allow charging only for identified users. This means that only users who identify themselves with their RFID card (or via SMS messages where applicable) can use the charging station.

3.5 Electrical engineering works

Electrical installation must be performed in accordance with local laws and safety regulations. The diameter of the electrical conductor (max. 35 mm²) depends on its length, method of installation, etc. This must be determined by the contractor.

The figure below shows a typical circuit diagram for the G6 charging station.

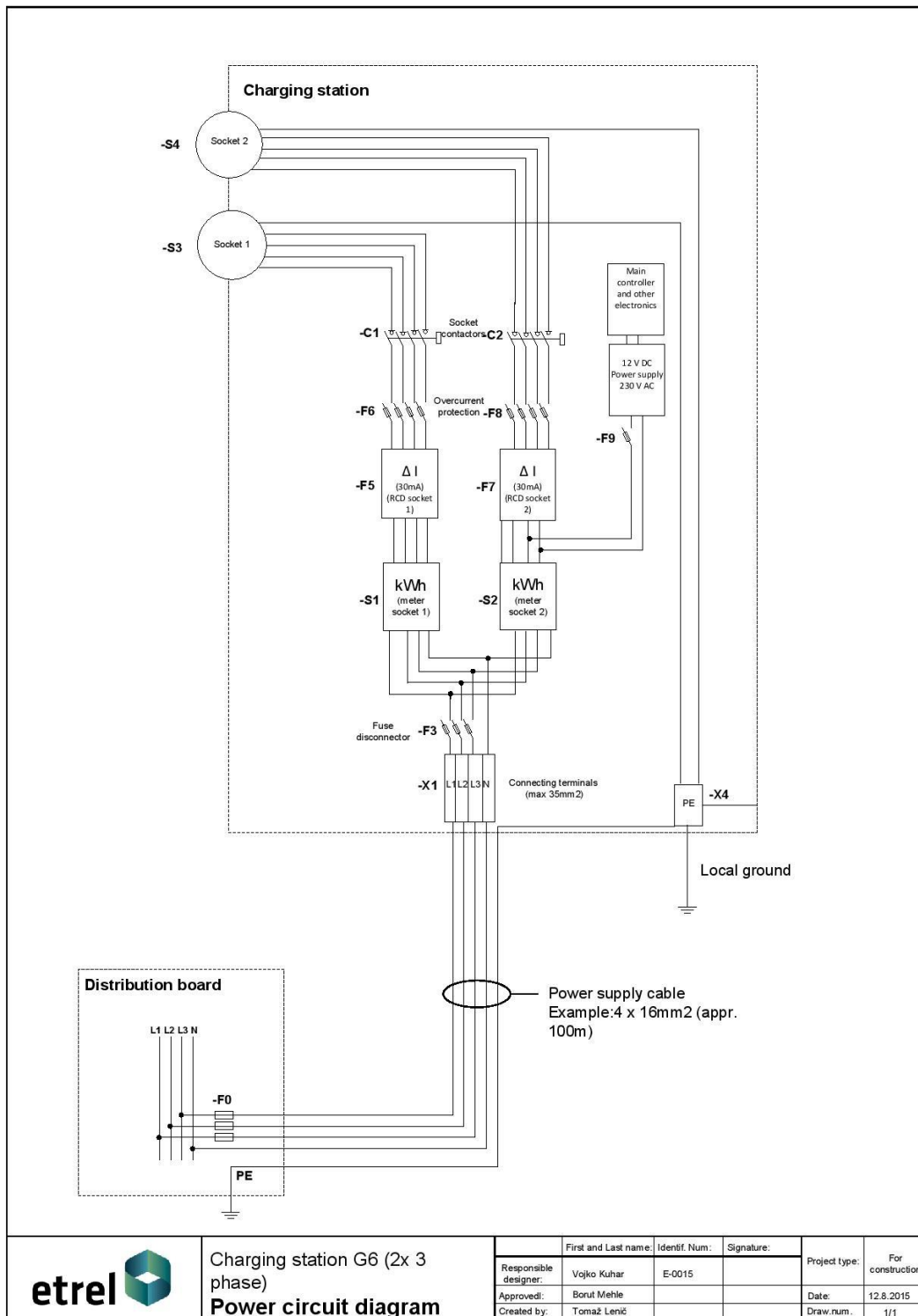


Figure 4: G6 power circuit diagram

4 Construction works before installation

4.1 Underground anchor



Figure 5: Assembled underground anchoring element

The self-standing charging station set contains an underground anchoring element which has a double function:

- it supports the weight of the charging station, and
- it prevents any vertical incline of the charging station.

The dimensions of the underground anchoring element are:

- Width: 190 mm,
- Length: 470 mm,

- Basic depth without reinforcing steel: 380 mm.

The underground anchoring element is made of stainless steel.

The underground anchor is optimised for shipping and needs to be assembled before construction by following the steps below:

1. Screw nuts on each anchor rod. You have six (6) rods in the anchor package. Be careful to observe the nut positions on the rod as pictured below:

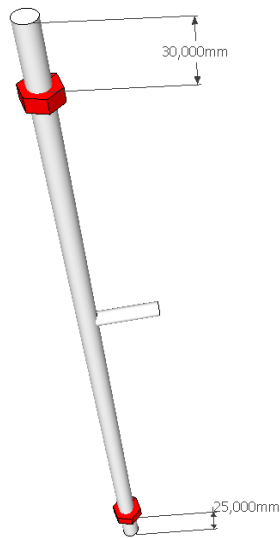


Figure 6: Anchor rod with initial screw positions

2. Place the rods into the anchor frame holes. Screw nuts on the other side at the top of the frame, where the rod enters through the frame. Tighten upper and lower nut firmly. Repeat for all 6 rods.

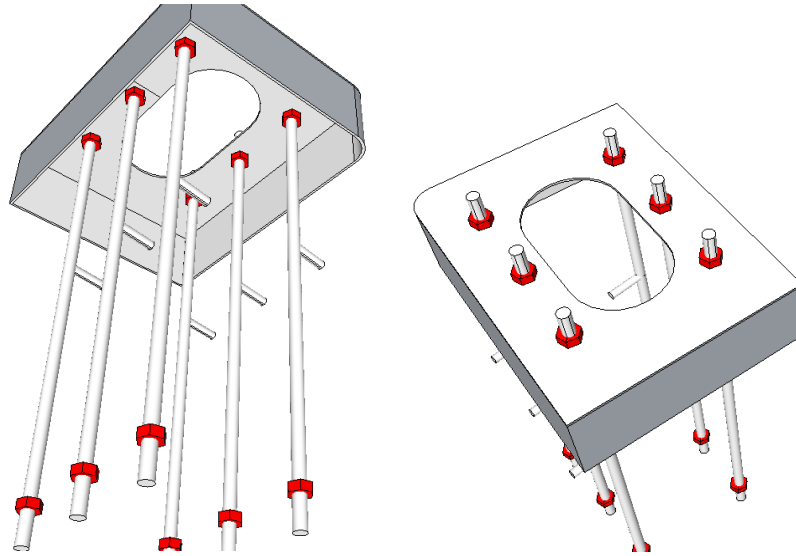


Figure 7: Insertion of anchor rods into the upper frame

3. Place the L profile on the bottom of the anchor. Place all three rods in one line into the L profile holes and screw nuts also on the bottom of the L profile, where the rod enters through the L profile. Tighten upper and lower nut firmly. Repeat for the second L profile.

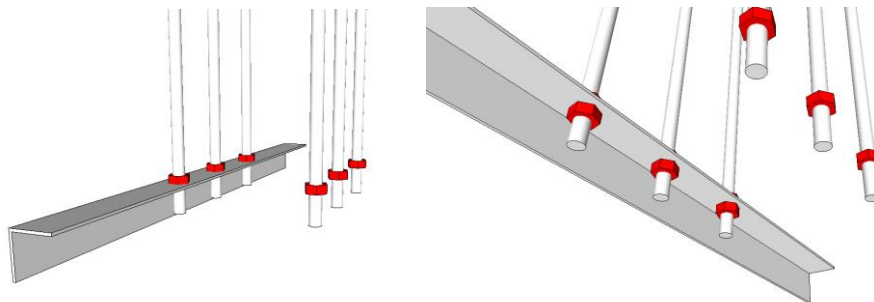


Figure 8: Insertion of anchor rods into the bottom L profile

The underground anchoring element is built into concrete foundation. The preparation of the foundation (its dimensions) depends on the structure of the ground on the designated location. The underground anchoring element can be combined with reinforcing steel. It is recommended to add construction steel into the L profile side holes to strengthen the anchor. You can use up to FI 12 construction steel.

Please note that the upper part of the underground anchoring element has a rounded corner at its front left side. **It should therefore be installed so that this round corner is matched by the front left side of the charging station in final installation set-up.**

The upper plate of the foundation has an opening for the insertion of supply cables. During installation, a pipe with a sufficient bending radius is placed into the foundation (see Figure 15). The pipe is later used for the insertion and connection of supply cables.

The upper part of the foundation is equipped with a frame with the height of 60 mm. The frame enables concreting of the foundation to its final height and placement of finishing tiles or paving stones on the surface surrounding the charging station.

During final mounting, the charging station is attached to the six protruding bolts of the underground anchoring element. The screws on each of the six bolts need to be removed first and are later used to fix the casing of the charging station to the foundation once it has been placed in the correct final position.

4.2 Excavation

The first step of the construction work is to prepare an excavation with the minimum basic dimensions of 42 cm x 55 cm and at least 60 cm in depth. If the charging station is combined with safety arches, a larger excavation is needed (see Chapter 4.4.1 Excavation and foundation construction for safety arches). If necessary, the dimensions of the foundation can be enlarged by adding reinforcing steel to the concrete foundation to enable construction of a larger foundation.

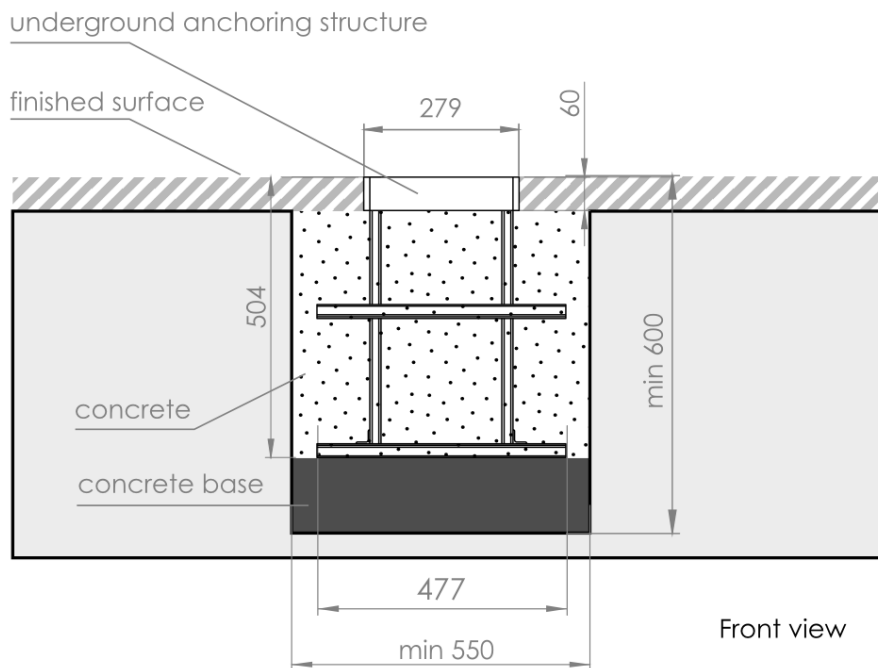


Figure 9: Basic excavation – longitudinal section

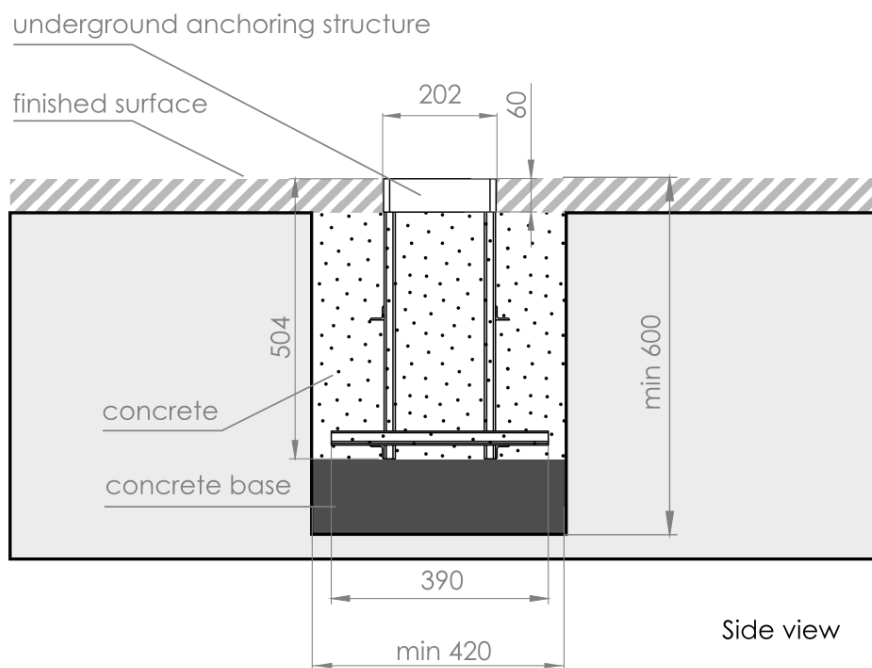


Figure 10: Basic excavation – transversal section

The two figures above show a longitudinal and transversal section of the basic excavation, together with the dimensions of the underground anchoring element which is concreted into

the foundation. The basic excavation is suitable for installation of charging station without safety arches. Dimensions of the basic excavation are 42 cm x 55 cm, with the minimum depth of 60 cm. One of the requirements of basic installation is to carefully observe that the height of the upper edge of foundation is precisely aligned with the height of surface finish in the area around the charging station.

4.3 Construction of foundation

The procedure for the construction of foundation and placement of the underground anchoring element into concrete is as follows:

1. According to the alignment of the power cable, the location of the installation pipe is determined. The pipe is placed into the foundation and used to connect the charging station to the network (see Figure 15). It is recommended that the installation pipe ends on the lateral side of the foundation and not beneath the foundation. The bending radius of the power cables must be taken into account when placing the installation pipe. The dimension of the pipe depends on the number and diameter of power cables which will be inserted into the pipe. In the case of clustering of charging stations in the same area, it must be taken into account that two power cables will be inserted into the installation pipe. The size of the opening at the top of foundation enables the installation of two installation pipes when the clustering of charging stations is executed in the opposite direction to the location of the current connection,
2. The concrete base is placed into the construction pit to the level that enables the top of the underground anchoring element to reach the desired final height. The final height in this case is the level of surface finish after completed works (for example the top level of paving stones, tiles or kerb). The concrete base is levelled so that the anchoring element can be vertically aligned. It is of utmost importance that the anchoring element is aligned very precisely. Lean concrete mix should be used for the concrete base,
3. The installation pipe is inserted through the opening of the underground foundation anchor and attached with a wire to prevent it from slipping into the foundation during concrete works. The installation pipe, which has been cut to its final length, must be clogged on both ends with paper or similar material, so that the concrete cannot enter the pipe,

4. The concrete works can be started at this point. First the area around the installation pipe is concreted, where the pipe must remain accessible after the concrete works are finished.
5. Once the concrete reaches the level of the frame, the concrete works continue through the upper opening of the underground anchoring element, where the installation pipe is placed. The entire space inside the frame must be filled with concrete. In the case of low temperatures, the concrete must contain anti-icing additives,
6. The next step is precise levelling of the foundation and the concrete around the frame, where the finishing tiles will be placed. Precise levelling of the underground anchoring element is important for later installation of the charging station. After the construction of the foundation is finished, the charging station can be aligned only with the use of washers, placed on the bolts of the underground anchoring element,
7. The concrete must be left to dry for at least 48 hours (two days) before the cables are inserted into the foundation and the charging station is installed on the foundation.

4.4 Installation of safety arches

The charging station manufacturer supplies optional safety arches. The safety arches have a double function:

- they prevent mechanical damage to the charging station which may result from collisions with vehicles, and
- they enable bikes and scooters to be chained to the arches while charging.

The manufacturer normally supplies a set of safety arches (1 or 2 pieces), which are installed either at both sides of the charging station (2 arches) or in front of the charging station (1 arch).

If safety arches are added to the charging station, the foundation needs to be prepared in advance, to add the safety arches to the same foundation as for the underground anchor.

4.4.1 Excavation and foundation construction for safety arches

If safety arches are added to the charging station, the foundation needs to be enlarged accordingly (with the minimum dimensions of L: 80 cm x W: 50 cm x D: 60 cm).

There are several guidelines that need to be observed when installing safety arches:

1. The safety arches protect the front side of the charging station, therefore the arch must be aligned with the rear side of the station (underground anchoring structure),
2. The safety arches on the left and right side of the charging station must be placed at a distance at least 15 cm from the station,
3. The height of the installed arches is 70 cm above the final level of the foundation.

If the charging station is located on the pavement, the two front ends of the safety arches on one side must be installed at the edge of the roadside kerb and the charging station must be placed away from the roadside kerb so that its rear end is aligned with the two rear ends of the safety arches.

The station can be protected by one or two safety arches (see below) that can be placed at both sides (2 arches) or at the front (1 arch) of the station.

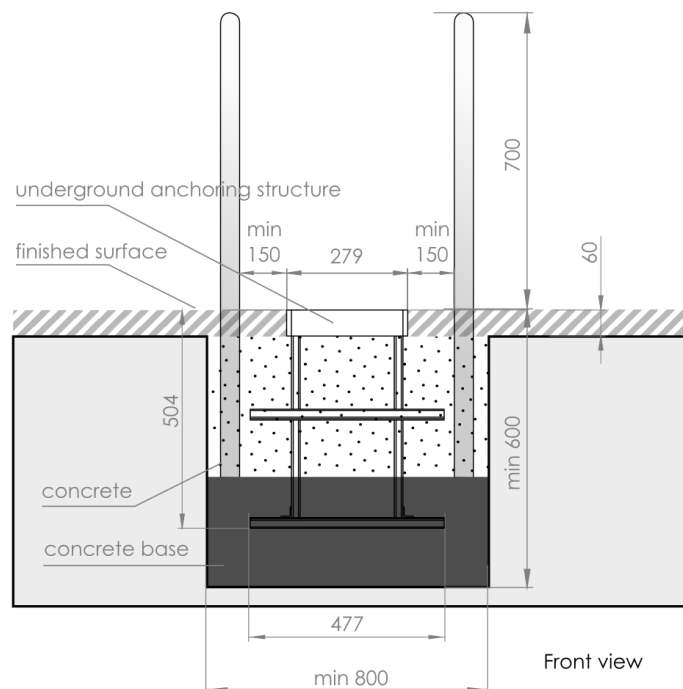


Figure 11: Longitudinal section of the excavation with two safety arches

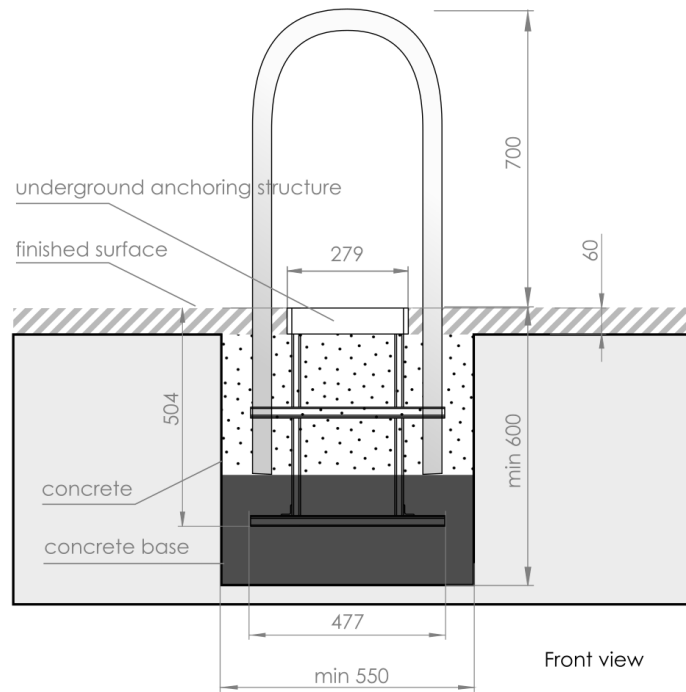


Figure 12: Longitudinal section of the excavation with one safety arch

The figures above show a longitudinal section of the excavation in all cases where the charging station is combined with safety arches. The arches must be removed at least 15 cm from the sides of the charging station to enable normal opening of station's maintenance doors. The height of the concrete base must reach such a level that the height of the safety arches will be exactly 70 cm above the surface finish. Safety arches need to be precisely levelled during the concrete works to prevent any later vertical inclines.

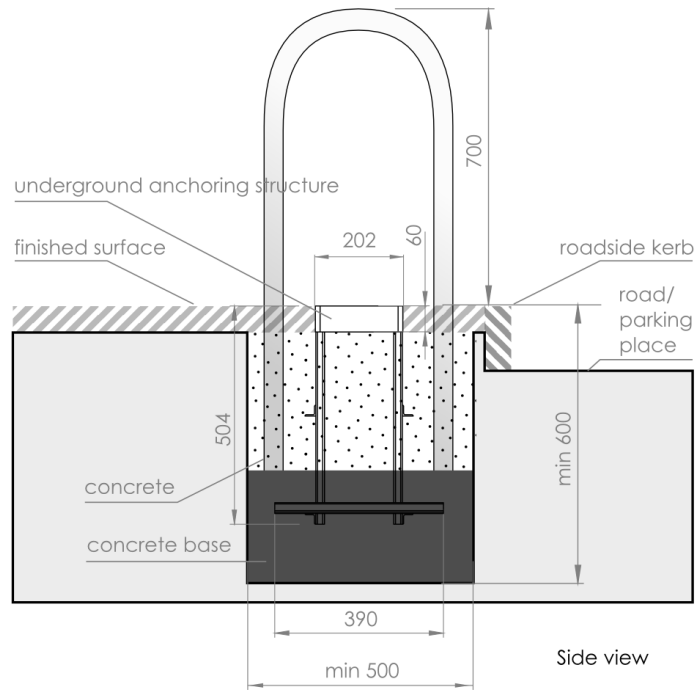


Figure 13: Transversal section of the excavation and safety arches on the kerb with two safety arches

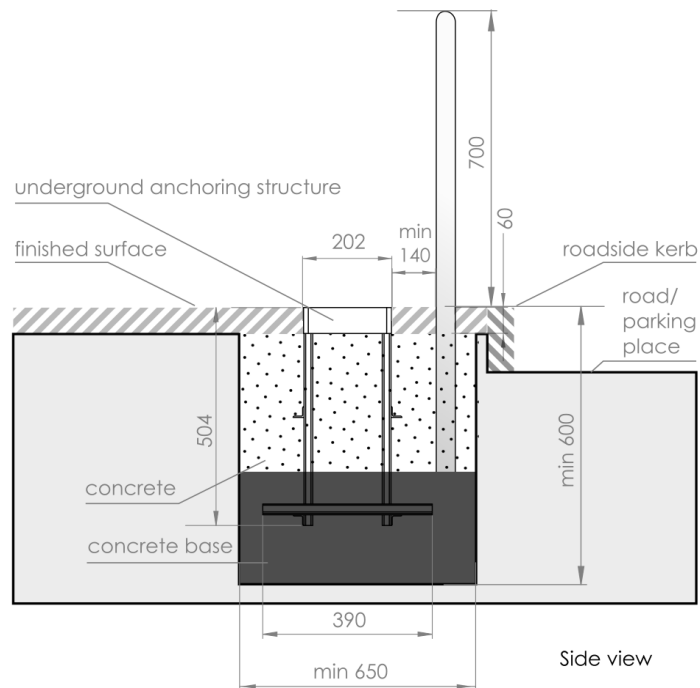


Figure 14: Transversal section of the excavation and safety arches on the kerb with one safety arch

The figures above show a transversal section of the excavation when the charging station is placed on the pavement and combined with safety arches. The safety arches need to be placed as close to the roadside kerb as possible. The underground anchoring element is moved back

accordingly, so that the rear side of the charging station (anchoring element) is aligned with the front side of the rear arches of the safety arches.

4.5 Cabling

4.5.1 Insertion of cables through the installation pipe

After the installation pipe is built into the concrete foundation, it is used for cabling and connection of the charging station. The concrete foundation must be left to dry for at least two days before the cables can be inserted in the installation pipe.

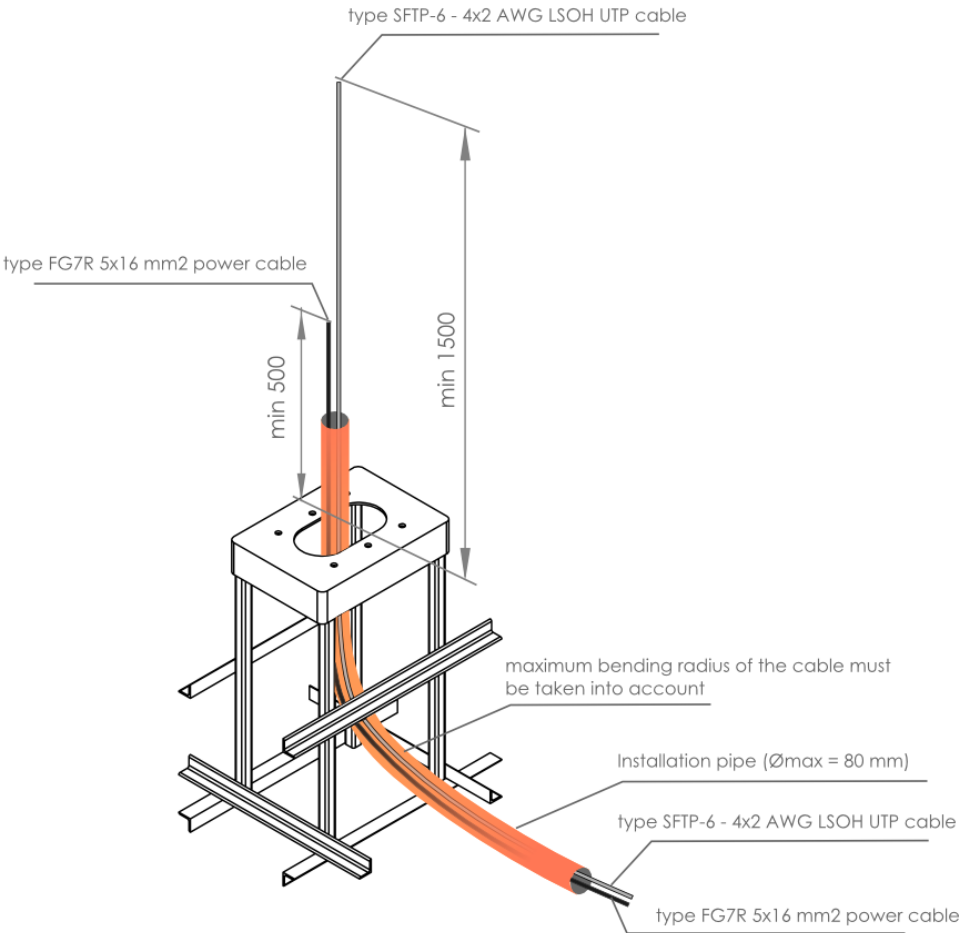


Figure 15: Placing of installation pipe and insertion of cables

Supply cables are routed through the underground anchoring structure with the use of installation pipe as shown in the figure above. The exact way of cable routing depends on the

type of cables used and their diameter (which is determined in the project documentation). When dealing with cables with larger diameters, their bending radius must be taken into account.

Appropriate length of cables must reach through the upper opening for later connection of the charging station. At least 50 cm of the power cable and at least 150 cm of the optical / SFTP cable (if the station's mode of communication does not use a wireless 2G/3G connection) must reach through the upper opening of the anchoring structure. These minimum lengths of cables must be strictly observed to enable effortless connection of the charging station.

4.5.2 Cable types

Appropriate cables for underground installation must be used when routing cables below ground.

- Power cable
 - 5-wire cable for connection to an existing installation (e.g. FG7R 5x16 mm²), 3-wire cable for connections to a distribution network,
 - The cable diameter depends on the length of the cable, way of routing, etc. The contractor must determine appropriate cable diameters,
 - The choice of the power cable depends also on the type of connection. When charging stations are clustered together, it is important that the cable diameter does not change. This means that it needs to be dimensioned according to the total supply power of all charging stations, connected within a cluster.
 - Standard configuration of charging stations enables power cables with the diameter of 50 mm² to be used for connection. If power cables with larger diameters are needed, the charging station can be upgraded with larger terminals.
- Grounding
 - The charging station needs to be properly grounded:
 - If the station is connected to an existing installation, grounding is executed with the grounding busbar of the existing installation,
 - If the station is connected to an electricity distribution network, grounding of the station needs to be executed separately. In this case,

the grounding strip is inserted in the station through the opening in the underground anchoring structure and connected to the grounding busbar of the station.

- Communication cable
 - There are several options to connect to the station operator's WAN network, based on the station's location:
 - Ethernet cable: use of type SFTP-6 shielded cable (which is not affected by the interference from nearby power cables) is recommended;
 - Optical cable;
 - Telephone copper pair, using an ADSL connection. Secure connections should be used to direct data traffic to the station operator's Control centre.

4.6 Communication and Internet connection

There are several ways to physically execute the communication connection with the charging infrastructure Control centre:

- Direct connection to the station operator's WAN network, which can be executed directly with a UTP (SFTP) cable or with the use of a fiber optic converter or ADSL router. For the direct connection with the UTP cable inside the station, no additional communication is needed. The appropriate port of the network switch is used for the connection. For the optical cable connection, a fiber optic converter needs to be installed inside the station. If ADSL connection is used, ADSL router needs to be installed in the station. Regardless of the physical execution of connection, the station operator is responsible to ensure adequate security of all data traffic. It is presupposed that the WAN network is regulated by station operator's own security policy. When ADSL connection is used, the appropriate security policy needs to be established in cooperation with the station operator or additional network equipment installed inside the station to ensure a safe two-way data traffic. In the case of clustering of charging stations, only the first station in the cluster can be equipped with a fiber optic converter, while the other stations can be connected to it with a UTP/SFTP cable.

- Wireless connection – the station connects to a 2G/3G mobile network with the use of additionally built-in router. The contracting entity signs a contract with the mobile network operator to acquire a unique APN (private network in the mobile operator's network). The contracting entity and the mobile operator must properly direct data traffic between the station operator's network and the mobile operator's network with the use of firewalls. In the case of clustering of charging stations, only the first charging station needs to be equipped with a router, while the other stations can be connected to it with a UTP/SFTP cable.
- Connection to an existing network in the facility on the location of the charging station. In this case, the data traffic is directed through the existing internet connection and the contractor must install proper network equipment (router/firewall) to ensure the safety of data traffic.

Recommended minimum bandwidth in all cases:

- upload: 115 kb/s
- download: 115 kb/s.
- Recommended minimum availability: 95 %.

5 Installation and connection of the charging station

5.1 Installation of the station on the foundation

After the foundation with the built-in anchoring structure and installation pipe is constructed, the charging station can be installed on the foundation. The foundation must be left to dry for at least two days before the cable routing and installation works can begin.

The casing of the station is fixed to the bolts on the underground anchoring structure after the screws on these same bolts have been temporarily removed. After the charging station is placed on the foundation, all of the bolts must extend through the bottom plate of the casing. A ring spanner is used to fix the station to the foundation using the previously removed screws. Some of the bolts may require the use of a ring spanner with an offset handle. Care must be taken not to damage the thread of the bolts on the foundation while fixing the charging station. After the installation of the casing on the bolts, one of the bolts is used to attach the grounding cable shoe.

5.1 Cabling route for the connection of multiple charging stations

The charging station can be installed independently or combined in connection with other stations (the so called clustering of charging stations).

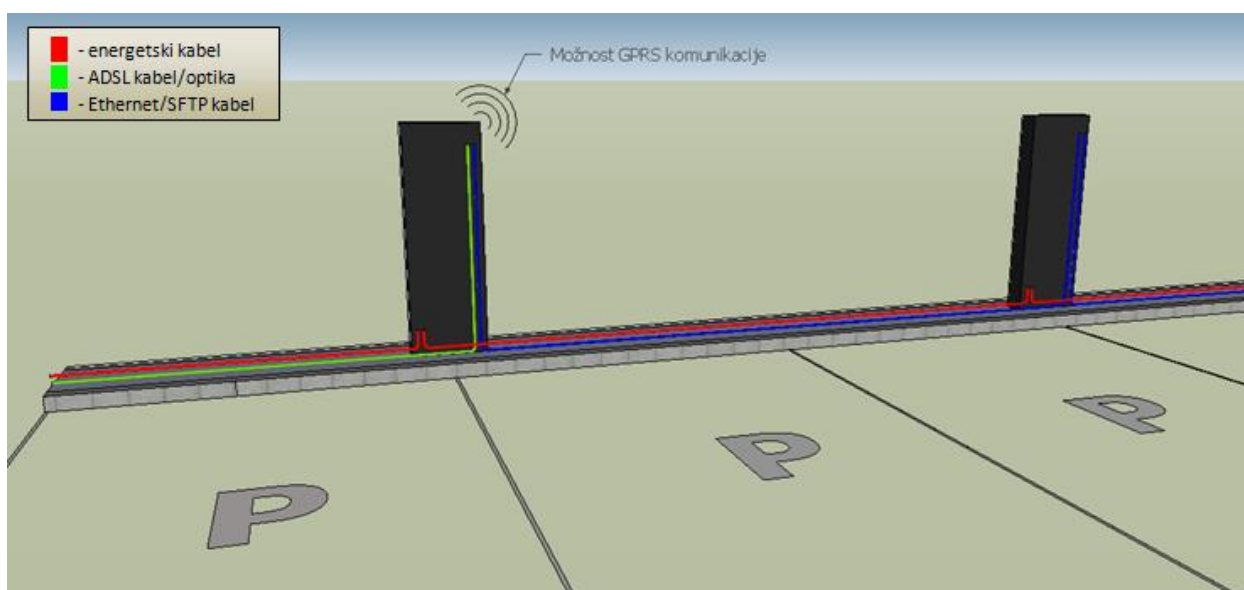


Figure 16: Cabling route for multiple charging stations

When multiple charging stations are installed in a single area, the cables can be routed in several different ways. The figure above shows an example where the first charging station serves as a starting point for other stations. Power cables and any type of communication cables are routed to this first station, which is then connected to the next station with a separate power cable and a separate communication cable. Each additional station is then connected in the same way with its preceding station. The first station which serves as a starting point can also use GPRS communication.

5.2 Connection of charging station to the grid

The power and communication cables are routed through the foundation after the casing of the charging station is installed. Care must be taken not to damage the equipment inside the charging station.

According to the dimensions of the power cable, the contracting entity chooses the proper configuration of the charging station with the appropriate terminals. A 3- or 5-wire power cable is used for the connection, based on the type of connection. Standard terminals enable connection of cables of up to 35 mm² diameter.

The configuration of the charging station depends also on the type of grid connection. The charging station is usually connected to an existing installation. In such case, the supply wires, neutral wire and grounding wire are brought to the station's terminals as shown below:

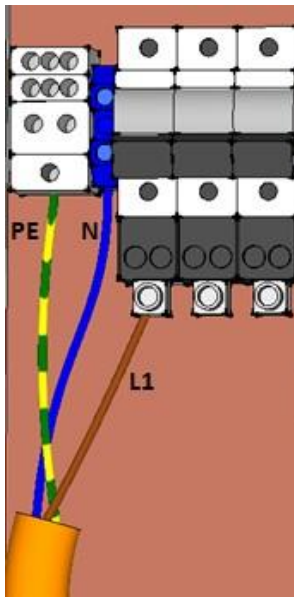


Figure 17: Single-phase connection

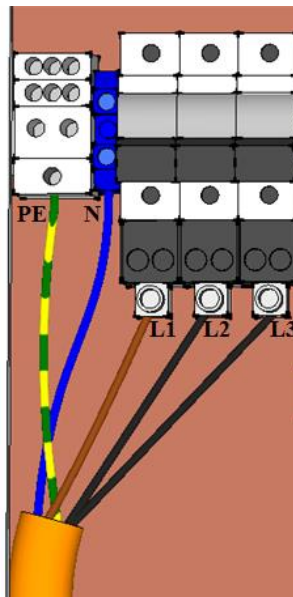


Figure 18: Three-phase connection

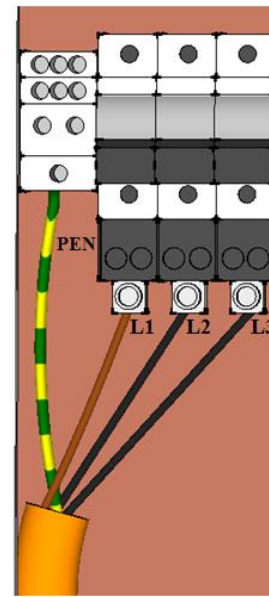


Figure 19: Three-phase PEN connection

5.2.1 Connection of the PE (ground) wire

If the charging station is grounded locally, the grounding strip needs to be connected to the grounding busbar of the charging station.

The connection is performed as follows:

1. A hole is drilled into the grounding strip;
2. The grounding wire which connects the grounding busbar inside the station with the grounding strip is equipped with a cable shoe on one end and a hollow connector on the other end;
3. The cable shoe is fixed to the grounding strip on one end;
4. The grounding wire is fixed to the grounding busbar on the other end.

5.2.2 Connection of the power cable

Prior to the beginning of work make sure that the main power supply is turned off.

Required tools: Wire stripper pliers, allen key.

1. Cut off three (five) wires of the power cable to the appropriate length to reach the connectors. Do not make the wire routing too tight or too loose;
2. Use wire stripper pliers to remove 20 mm of the insulation from the end of all wires (L1, L2, L3, N, PE);

3. Loosen the bolts on the terminals – fuse switch disconnectors (and the N and PE terminals);
4. Insert all wires into their terminals and tighten the bolts (see figures in Chapter 5.2 above).

5.3 Connection of the communication (SFTP/UTP) cable

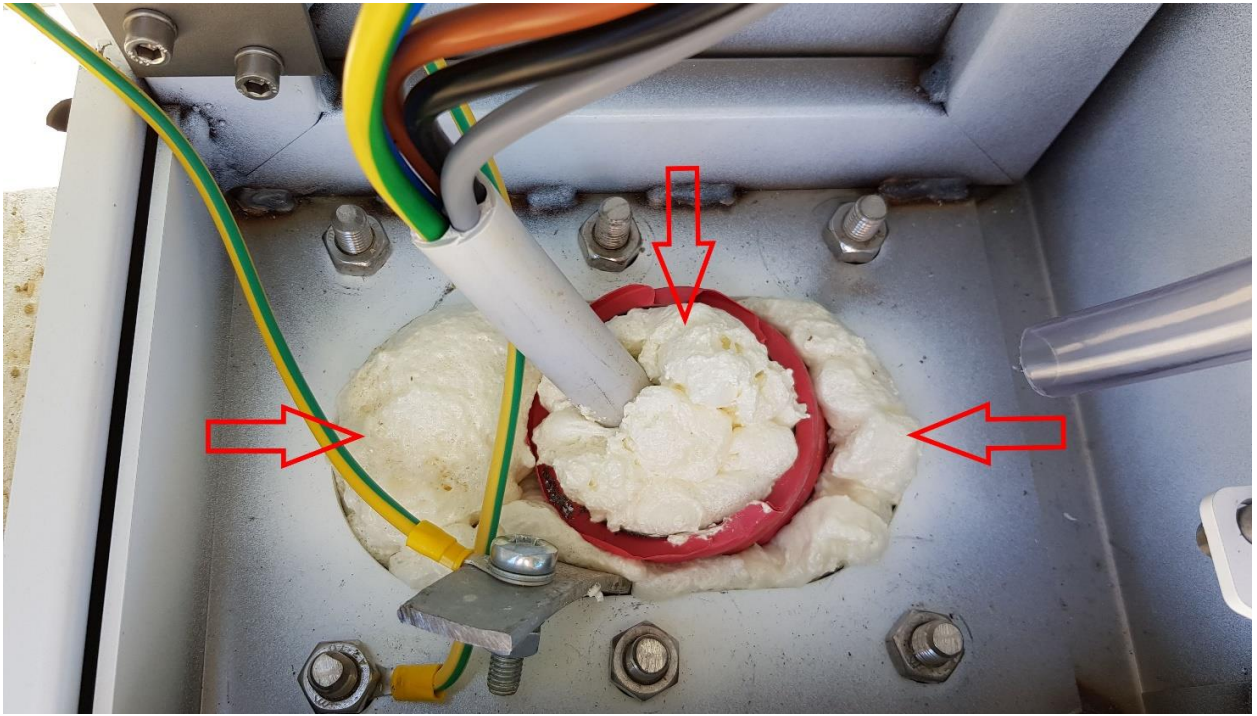
Required when wireless GPRS/3G communication is not used.

Required tools: network cable pliers, RJ45 connector.

1. Cut off the network cable to the appropriate length to reach the Ethernet connector. Do not make the wire routing too tight or too loose;
2. Use the network cable pliers to attach the RJ45 connector to the network cable;
3. Insert the RJ45 connector into the Ethernet connector;
4. If a network switch is installed in the station, the UTP cable is connected to its Port 4 (for means of clustering or DLMS communication with the meters). When there is no network switch installed, the network cable is connected directly to the Ethernet port of the main controller of the charging station, located on the station's doors. Ethernet port is located on the lower left side.

5.4 Insulation of the charging station

Due to the heat coming from the cable tube from which the cables are drawn, condensation can accumulate inside the charging station. This is prevented by filling the cable tube and openings at the bottom of the charging station with polyurethane foam.



6 Initialisation of the charging station

6.1 Safety check of individual components

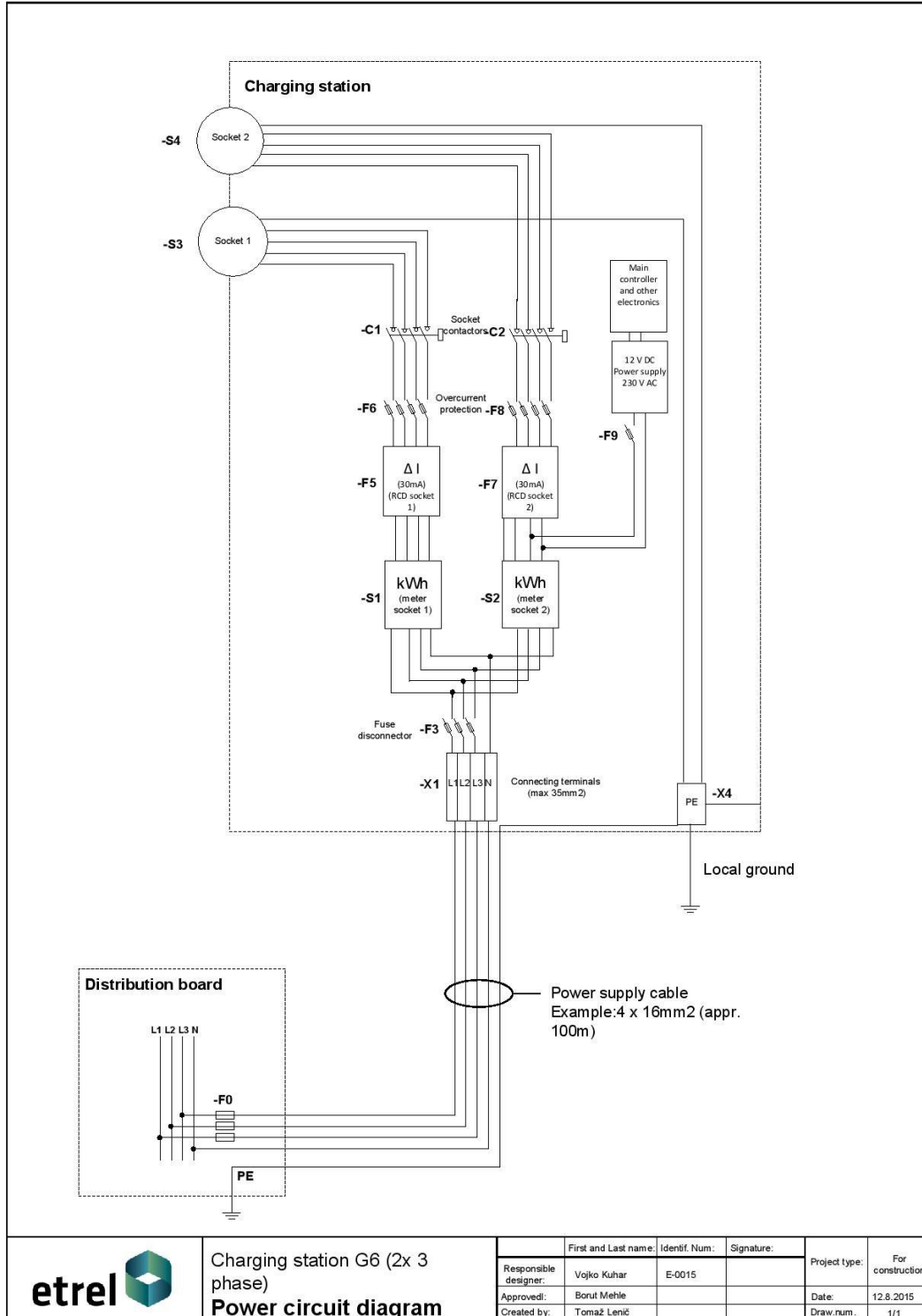


Figure 20: G6 three-phase reference power circuit diagram

Step-by-step initialisation of the charging station:

1. Before the main power supply to the station is turned on, make sure that all safety elements are turned off:
 - a. Socket 1 fuse switch disconnecter – F3
 - b. Socket 1 differential protection (FID) – F5,
 - c. Socket 1 overcurrent protection – F6,
 - d. Socket 2 fuse switch disconnecter – F3,
 - e. Socket 2 differential protection (FID) – F7,
 - f. Socket 2 overcurrent protection – F8,
 - g. Overcurrent protection of the main controller – F9.
2. Turn on the main power supply switch. Examine the casing of the station for any phase voltage that might be present as a result of improper installation or damage caused by the transport of the station. Check the supply voltage on the terminals. The voltage is measured between individual phases on one side and the »ground«/»neutral« on the other side.
3. Turn on socket 1 and socket 2 fuse switch disconnecter (F3) Both energy meters (S1, S2) should initiate at this point. If they do not initiate, contact the manufacturer's technical support service.
4. Turn on the differential and overcurrent protection of both sockets (F5, F6, F7, F8),
5. Turn on the overcurrent protection of the main controller (F9). After the protection is turned on, the following devices turn on as well:
 - a. main controller of the charging station,
 - b. LED display,
 - c. GPRS router and network switch (if installed),
 - d. IEC 61851 module.
6. After the controller protection is turned on, the initialisation of the main controller begins. This process takes approximately 30 seconds. Exact duration depends on the current state of the communication connection with a) the IEC 61851 module, b) energy meters read modules, and c) the control centre. During initialisation of the station, the LED display should show the message: » Please wait...«.

7. After the initialisation of the station is successfully completed, the LCD display should show the message: » CHARGING STATION AVAILABLE Log in to start charging". In the event that the station is not properly configured or the main controller fails to establish the connection with some of the modules or the Control centre, the status of the station changes to » Station is not working«. If the station fails to initialise after following the above procedure, contact the manufacturer's technical support service.
8. Test the functioning of the station. Plug in a cable into socket 1, after which the station should request identification. Identify with a test RFID card. The card needs to be registered in the user database. After successful identification, the charging should start automatically. If the RFID test card is not a part of the user database, the charging station will return the message »Unknown user«. If the identification process takes longer than usual and the station returns the message » Error occurred while logging in. Please try again.«, this indicates that the connection with the Control centre could not be established and the user could not be identified. The cause of a non-functioning connection can be one of the following: a) incorrectly configured communication connections between the charging station and the Control centre, b) incorrectly set up connection to the Control centre in the station's configuration, c) malfunctioning of the communication interface in the Control centre. The status of a socket can change to »Socket is not working« if the communication between the energy meter and the main controller is not functioning. The same status can be reported if there is no voltage in the socket after the command to turn on the contactor has been given or vice versa (if there is voltage even when no command to turn on the contactor has been given).
9. Following the same procedure, test the functioning of the second socket.
10. After the station has been initialised and tested, the electrician should contact the Control centre operator to verify the state of the charging station, list of charging events and the list of charging sessions.

6.2 Configuration of the charging station

Every newly installed charging station requires an appropriate configuration. According to the manufacturer's recommendations, the configuration should be performed in the station

operator's warehouse or testing facilities. This simplifies the procedure compared to field configuration on certain locations, especially in case of unfavourable weather conditions.

The configuration of the charging station is performed with the communication interface of the station, which runs as a web application.

It is recommended that for first few cases, the configuration is performed by the manufacturer of with their direct help. English translations of all of the configuration tools are forthcoming.

Step-by-step instructions on how to access the communication interface:

- Connect your computer with an UTP cable to Port 4 of the network switch (if installed) or directly to the Ethernet connector of the main controller of the charging station.
- The default IP address of the station is 192.168.1.240, which means you have to change your computer's IP address, for example to: 192.168.1.20. The default subnet mask is: 255.255.255.0.
- Enter the following address into your web browser:
`http://192.168.1.240:8002/config/login.html`.
- The configuration's interface login window should appear on the screen. The default login name is: MobilnaElektrika, and the default password is: MobilnaElektrika11.
- Click on the »Login« button which redirects you to the status window.
- In the above navigation bar select the option »Configuration«.

The configuration interface can also be accessed remotely, for example from the Control centre server. In this case, it is necessary to establish a working communication connection between the Control centre and the charging station. It is also required to know the IP address of the station and the TCP port, which uses NAT to redirect the traffic to the TCP port 8002, where the web application is running.

mobilna elektrika

Status
Konfiguracija

ID postaje: **SI03002**

Generalne nastavitve: 📄

ID postaje:

CV WS naslov:

Komunikacija: 📄

IP naslov postaje:

Maska podomrežja postaje:

Privzeti prehod postaje:

Vtičnica 1: 📄

Tip vtičnice:

Način komunikacije s števcem:

IP naslov števca:

TCP COM Vrata števca:

Serijska številka števca:

Licenca: No Licence!

Vtičnica 2: 📄

Tip vtičnice:

Način komunikacije s števcem:

Naslov števca:

TCP COM Vrata števca:

Serijska številka števca:

Licenca: No Licence!

Časovne konstante: 📄

Čakaj na vklop vtiča po prijavi: s

Vtičnica nedosegljiva pred pričetkom rezervacije: min

Čakaj na osebo, ki je rezervirala vtičnico: min

Čas pošiljanja podatkov o statusu med polnjenjem: s

Čas pošiljanja podatkov o statusu ko ni polnjenja: s

Čakaj na pošiljanje dogodkov, po novem dogodku: s

Čas pred rezervacijo, ko začnemo opozarjati na prihajajočo rezervacijo: s

Figure 21: Example configuration screen (depicted in Slovenian language)

Configuration settings of the station are divided into several sections:

1. General settings of the station:

- Station's ID number: a unique number of the charging station, which is defined by the application in the charging infrastructure Control centre. The ID number consists of CountryCode, ServiceProviderNumber and StationSerialNumber (for example SI060001). Charging station's ID number is needed to establish communication with the Control centre,

- Control centre WS address: contains the URL address of the Control centre server, as it is visible from the charging station's location. Usually the communication interface is accessible through TCP port 10006. Example: <http://10.84.15.2:10006/service.asmx>,
2. Communication settings:
 - IP address of the station
 - Subnet mask of the station
 - Default gateway of the station
 3. Preset time intervals (**these parameters can be modified as factory settings only**):
 - Wait for the charging cable to be plugged in after identification [s]: After the user is identified, the charging station waits for a predetermined period of time for the user to plug in the charging cable. If the user does not plug in the charging cable in the preset time interval, the station automatically logs the user off. The default setting is 300 s,
 - Socket unavailable before the start of reservation [min]: The setting makes the reserved socket unavailable to use for a certain period of time before the start of the reservation. On more frequented locations, the preset time interval should be shorter. The default setting is 60 minutes,
 - Wait for the user with a reservation [min]: Defines how long the charging station should wait for the user after the planned starting time of the reservation. The default setting is 30 minutes,
 - Time interval for sending the status data while charging [s]: Defines the interval of sending the status data to the Control centre during EV charging on any of the sockets. The default setting is 300 s,
 - Time interval for sending the status data when no charging takes place [s]: Defines the interval of sending the status data to the Control centre when both sockets are available. Based on these cyclically received data, the current status of the charging station is determined in the Control centre. The default setting is 600 s,
 - Wait before sending the events after a new event is registered [s]: Enables the events that occur within a short timespan to be sent forward in one transfer. All

events contain a timestamp. The time of the station is synced with the time of the Control centre. The default setting is 10 s,

- Time interval for notifications to users before a new reservation starts [min]:
Defines the time interval in which the station notifies the users who wish to start charging, of an upcoming reservation.

The station operator can change network settings, back office connection parameters and station code. To change other (factory) setting, an xml file with station settings should be downloaded, edited, and uploaded back onto the station.

The settings are saved by pressing the »Save« button in any of the configuration sections. When editing certain data (charging station's ID number, IP address, network gateway), the configuration interface will require a reboot of the charging station. A »Reboot« button will appear in the top part of the interface.

6.3 Configuration of the GPRS interface

If the station is using GPRS communication for data transfer towards the control centre, a GPRS module is installed inside the station.

GPRS module in the first station can serve as the communication gateway for other stations (in case of clustering). In that case, the GPRS module is joined by a network switch.

To install the GPRS module, the following is needed:

- SIM card, which is inserted into the module,
- private APN with a username and password,
- UTP cable, which can be used for a direct connection to the Ethernet port of the GPRS module or to the network switch of the charging station (port 4),
- Web browser, which is used to access the configuration interface of the station.

7 Instructions for use

The EV owner uses the charging station in the following way:

1. The charging cable is plugged into the vehicle,
2. The charging cable is plugged into available charging socket of the right type,
3. The charging station notifies the user through the LCD display to proceed with the identification before charging. Identification is not required for »plug and charge« charging stations which begin charging as soon as the cable is plugged into the socket.

Based on user settings in the database, the desired language for the user interface is selected automatically. User identification can be performed in two ways:

- a. With the use of an RFID card. The charging service provider issues smart identification cards. The service provider can also provide support for cards, issued by other providers in case of roaming. If the system fails to recognise the identification card, LCD display will show the message: » Could not login. No such user«. After the user has been successfully identified, the charging can start. In some cases identification can be interrupted due to an expired contract, blocked card, limit overdraft, etc. In all these cases, the charging station will notify the users of their status. If the charging station can not communicate with the control centre and thus perform authorisation, it will allow charging to any identification and only later send over the charging session and billing data to the control centre, once the communication is re-established
- b. With the use of SMS service. Some service providers enable SMS identification of their users. The user sends an SMS message to the number, printed on the instructions label (on the station's face plate). The message must contain the right keyword, the ID of the station, and the ID of the socket, for example: "START SI06001 1". The result of the identification is returned in the confirmation message. If the identification is successful, the charging of the plugged-in vehicle can start. If the vehicle is not yet plugged in, the LCD display will show the message: »Plug the vehicle into socket x«. If identification is successful and the user does not plug in the vehicle in the next 5 minutes, the identification expires and the user needs to repeat the procedure,

4. The charging starts in the socket where the charging cable was plugged in. The plug is locked into the socket while charging,
5. The LCD display shows the current status of the socket in which a vehicle is charging. The display also shows the current energy consumption during charging,
6. The user can finish the charging by logging off (with the RFID card or SMS message) or unplugging the cable on the EV side. If the user logs off but forgets to unplug the charging cable, the station will notify the user through the LCD display with a warning to unplug the cable.

The user is advised to follow the instructions for use, printed on the instructions label on the face plate of the charging station, and the instructions which are provided by the LCD display of the station during the charging process.

8 Service and maintenance

8.1 General inspection of the station

The charging infrastructure operator should perform regular inspections of the charging stations (preventive maintenance). Public charging stations are often exposed to harsh climate conditions and mechanical damage. Critical damage of the casing or other components of the charging station can affect user safety.

The duty of the maintenance service is to:

- examine every socket for potential damage. Access to the sockets must be enabled at all times and any foreign objects that might be lodged in must be removed as soon as possible,
- examine the casing of the charging station for potential damage. The internal components of the charging station can be examined by unlocking and opening the service doors of the station. The maintenance staff should look for mechanical damage of individual components and examine the interior for potential presence of water or moisture. The equipment installed in the upper part of the station (LCD, RFID) is the most delicate and should be examined thoroughly,
- examine the functioning of ground protection of each socket, by using the »test« button on the protection,
- examine the functioning of the charging station:
 - Plug in the cable into socket 1,
 - Perform RFID identification to start the charging. In the case of IEC 62196-2 Type 2 socket, the plug should be locked into the socket.
 - To conduct an optimal test, some energy consumption should be induced. Amount of energy consumed is shown on the LCD display,
 - Log off with the RFID card,
 - Charging should stop with the plug unlocked from the socket (when testing the IEC 62196-2 Type 2 socket).
 - Repeat the procedure for socket 2.

For testing purposes, the maintenance staff should use a test cable with a IEC 62196-2 Type 2 plug, where a connection with a IEC 61851 standard vehicle can be simulated.

The service doors of the station can be opened by lifting unlocked doors and slightly opening them at the same time, then slightly lifting them once more and opening them completely. The handle next to the lock should be used to lift the doors.

8.2 Diagnostics of the functioning of the station

The maintenance staff can access and view archived events and statuses with the use of recorded logs. Overview of logs and monitoring of the functioning of the station can be done through the configuration interface of the station, which runs as a web application in the station itself. The configuration interface of each individual station can be accessed remotely from the charging infrastructure Control centre.

Local access to the configuration interface requires the following:

- computer with a web browser,
- network cable, used to connect directly to the charging station or to the port 4 of the network switch in the station,
- the maintenance staff needs to know the local IP address of the station,
- after the maintenance staff sets the local IP address and connects to the charging station's network, the following address: `http://ip_address_of the station:8002/config/login.html` must be entered in the browser,
- the configuration interface with the login window should now be displayed. The default username is: MobilnaElektrika, and the default password is: MobilnaElektrika11
- after logging in, the Status screen is displayed. It enables an overview of the following:
 - current software version of the charging station,
 - current status of the charging station (status files),
 - Webservice logs (web application of the station),
 - Operations logs (main software logic of the station),
 - Service Starter logs (startup application of the station),

- the station keeps logs for the last 7 days, which means that the logs should be downloaded and saved locally as soon as possible after a malfunction is detected,
- if the station malfunctions, the logs and a detailed description of the malfunction should be sent to the manufacturer.

mobilna elektrika Status Konfiguracija ID postaje: **S103002**

Splošno:

Verzija programske opreme 1.0.0.8i
 Trenuten čas na strežniku (sinhroniziran ob prenosu te strani) November 30, 2011 10:23:44
 Normalen ponovni zagon (s pomočjo Operations.exe)
 Nujni ponovni zagon - uporabite le, če se postaja ne odziva na normalen ponovni zagon.

Datoteka stanja:

CurrentState.xml Vsebuje podatke, ki se ohranjajo tudi med izklopom postaje.

Log datoteke:

\program files\webservice\logs

2011-11-09.webservice.txt	9.11.2011 18:37:50
2011-11-10.webservice.txt	10.11.2011 18:54:28
2011-11-11.webservice.txt	11.11.2011 19:34:08
2011-11-14.webservice.txt	14.11.2011 15:36:00
2011-11-15.webservice.txt	15.11.2011 16:35:36
2011-11-16.webservice.txt	16.11.2011 23:55:04
2011-11-17.webservice.txt	17.11.2011 18:36:04
2011-11-18.webservice.txt	18.11.2011 18:03:38
2011-11-21.webservice.txt	21.11.2011 23:51:28
2011-11-22.webservice.txt	22.11.2011 11:54:16
2011-11-23.webservice.txt	23.11.2011 17:15:20
2011-11-24.webservice.txt	24.11.2011 9:38:52
2011-11-25.webservice.txt	25.11.2011 19:03:44
2011-11-29.webservice.txt	29.11.2011 23:59:02
2011-11-30.webservice.txt	30.11.2011 10:23:30

\program files\operations\logs

2011-11-09.operations.txt	9.11.2011 23:59:48
2011-11-10.operations.txt	10.11.2011 19:03:02
2011-11-11.operations.txt	11.11.2011 19:39:02
2011-11-14.operations.txt	14.11.2011 15:41:18
2011-11-15.operations.old.txt	15.11.2011 14:13:00
2011-11-15.operations.txt	15.11.2011 16:37:40
2011-11-16.operations.txt	16.11.2011 18:23:34
2011-11-17.operations.txt	17.11.2011 18:40:02

Figure 22: Charging station's status and logs screen (depicted in Slovenian language)

8.3 Installing new versions of charging station's firmware

New firmware versions are installed through the application in the charging infrastructure Control centre. The system administrator manages new firmware versions and their distribution to individual charging stations.

New firmware versions cannot be installed while charging is in progress. Installing of new firmware versions is performed in a few steps:

1. Application in the Control centre notifies the charging station that a new firmware version is ready to be installed,
2. When it becomes available, the station begins downloading the new firmware version,
3. After the firmware is successfully downloaded, the install process is started,
4. After the firmware is installed, the station is automatically restarted.

8.4 Communication with the control centre

For its normal operation, the charging station requires an active connection with the Control centre. The communication is required mainly to perform central user identification, transfer billing data and charging detail records, and to exercise remote control over the charging process.

If there is no communication connection with the Control centre, user identification is not possible and therefore no charging can be started on stations that require identification of EV users.

The charging station communicates even when it is »Available«. It cyclically sends its general status to the Control centre for means of communication control.

If it is diagnosed that the charging station does not have a reliable communication connection with the Control centre, alternative communication solutions need to be considered (new GPRS service provider, upgrade of the antenna, different communication channel – ADSL, WAN network).

8.5 Locking the charging plug into the socket

For IEC 62196-2 Type 2 type sockets, the plug of the charging cable is locked into the socket while charging. The locking mechanism of the plug is motorised, which means that the electronics of the station control the locking and unlocking of the plug. This fact may present a problem if the station (and consequently the electronics) loses its power supply. The plug remains locked in the socket and is automatically unlocked once the power is restored. If the power is out for a longer period of time, the maintenance staff needs to intervene to safely remove the plug.

9 Troubleshooting

TROUBLESHOOTING	
PROBLEM	SOLUTION
LCD screen on the station is inactive	Check the power supply. Check the state of safety elements, especially the main controller protection. Check the output voltage of the 12VDC power supply unit.
The station has collapsed or is damaged and easily exposed to water	Cut the power supply immediately. The station must be dismantled and power supply cables secured. The station can then be replaced.
The user completed the identification and plugged the cable into the IEC 62196-2 Type 2 socket, yet the station doesn't register that the cable has been plugged in	The user should first check if the cable is plugged in properly. The next step is to determine with the help of the maintenance staff whether the user's vehicle supports the IEC6181 standard on which the station's operation is based.
The user tries to perform the identification, but the LCD display shows only »Unknown user«	The smart card that was used for identification is not part of the system or the user is not a registered user.
The user is unable to perform the identification with a verified smart card	The user should hold the smart card against the RFID card reader and wait for a few seconds for the beep
The user tries to perform the identification which takes much longer than usual and results in a » Error occurred while logging in.« message	Check if the Control centre is operating normally and if the communication between the charging station and the Control centre is functioning properly
The charging stations fails to send the cyclic message to the Control centre (it failed to do so for over two hours)	The maintenance staff should examine the functioning of the station (e.g. LCD screen is active). If the station is functioning, the cause of the problem is probably in the communication connection. If the station is not functioning (e.g. LCD screen is inactive), the station might be without power or some protection equipment has been activated.

10 Technical data

Electrical data	
Input phases from grid or installation	one or three (depends on the configuration)
Connection terminals	35 mm ²
Nominal voltage	230 V / 400 V +5 %,-5 %
Input power	Depends on the configuration, max. 44 kW
Input current	Depends on the configuration, max. 3 x 64 A
Number of charging spots (sockets)	2
Charging socket type	62196-2 "Type 2"
Socket physical protection	Lid cover (optional locking when not in use)
Charging coupler protection	Socket locking mechanism during charging
Charging socket max. output power (current)	Depends on the configuration; max 22 kW (3 x 32 A)
Simple shutdown for maintenance	fuse switch disconnecter on input
Overcurrent protection of each socket	40 A - Type C
Additional thermal/logical protection of the socket, based on deviations from PWM setting	* I/Ipwm >105 % during T>1000s * I/Ipwm>110 % during T>100s * I/Ipwm>120 % during T>10s
Standby energy consumption	Depends on the configuration: max. 20 W with network switch and GPRS modem installed
Differential protection of the socket – RCD (ground leakage current)	Type A or Type B 30 mA compliant with IEC 61008
Energy metering	Embedded smart energy meters
Contactors	Disconnecting all phases and neutral line
Voltage monitoring	Monitors voltage on the socket level to detect contactor welding or other power supply faults
Overvoltage protection of the station (optional)	Station can be equipped with Type B2 if connected to the electricity distribution network; Type C if connected to an existing installation.
Overcurrent protection of the overvoltage protection (optional)	63 A (fuse)
EVSE standards compliance	IEC 61851-1 – supports Mode 3 charging
RFID identification data	
Standards	ISO/IEC 14443A and ISO/IEC 15693
Supported cards	Mifare® Classic 1K (1KByte), Mifare®

	Classic 4K (4KByte) and Mifare® Ultralight (512 bit).
Communication data	
Local charging station connection	Ethernet port on station's main controller – connected with SFTP cable
GPRS communication device (optional)	Industrial rate GPRS/EDGE Router (supports VPN, NAT, ...)
Network switch (optional)	Industrial rate 5 port unmanaged switch
Mechanical data	
Dimensions (HxWxD)	1300 mm x 277 mm x 200 mm
Weight (depends on configuration)	45 kg (full configuration)
Socket installation height	1105 mm
Installation	Ground installation only. A steel underground anchor is included in the price of the charging station.
Casing	Stainless steel, powder coated in RAL colour (optional anti-graffiti coating). A set of keys to open the casing is included in every order.
Environment – operating range	
Ingression protection	IP54, IK10
Temperature range – operation	From -20°C to +50°C
Temperature range – storage	From -20°C to +50°C
Humidity	Up to 95 % RH, non-condensing

Specifications are subject to change without prior notice.

11 Contact information

11.1 Technical support department

e-mail: support@etrel.com
phone: +386 1 601 0077

11.2 Customer support department

e-mail: sales@etrel.com
phone: +386 1 601 0078

11.3 Authorised service centres (as of 28.9.2018)

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