ETREL

ELECTRIC VEHICLE CHARGING STATION

ETREL INCH DUO

PHYSICAL INSTALLATION

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1 BASIC DESCRIPTION

ABOUT THIS DOCUMENT

The safety and installation instructions "Quick Start Guide" that come with the charging station includes quick installation procedure should be read first:

- *Etrel_INCH_DUO_QuickStartGuide.pdf*
- *Etrel_INCH_DUO_QuickStartGuide_Figures.pdf*

The document in front of you contains information on the physical layout of the INCH DUO charging station. As it is necessary to think in advance about the accompanying electrical works, basic information about them is also included.

More information about electrical works is available in the document “Electrical Installation Specifics”:

- *Etrel_INCH_DUO_Electrical_Installation_Specifics.pdf*

All the documents are available in the installation manuals section, accessible from the INCH DUO product page, at the web page https://etrel.com/charging-solutions/inch-duo/

SITE PREPARATION

CONFIRMATION OF READINESS

Before carrying out the installation, the client must confirm his readiness usually with a statement, that all the requirements for the preparation of the location and additional image material are met, which allows remote checking of compliance.

ACCESS TO INSTALLATION SITE

An access to the location should be made possible to service vehicle for installation and servicing of charging stations.

SUPPORT DURING INSTALLATION

The responsible staff for both electricity installations and IT communications should be present on the location or available for immediate remote support.

EXTERNAL FACTORS

Installation cannot be carried out in the event of extremely rainy or snowy weather or other external factors that can prevent safe mounting,

installation, and commissioning of charging stations. The charging station installation should be cancelled under such circumstances.

INSTRUCTIONS VALIDITY

The client shall check with manufacturer for the latest valid version of instructions before the preparation of location(s) for installation of charging stations. Please make an inquiry with the point of contact at the retailer or manufacturer's support of your charging station to request the latest instructions version when necessary.

PERMITS

LOCATION AND BUILDING PERMIT

The charging station is a simple object and 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. Installations must be performed in accordance with possible additional requirements of the national regulation.

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. Installations must be performed in accordance with possible additional requirements of the national regulation.

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. Charging procedure usually takes between 30 minutes and up to 8 hours. Installations must be performed in accordance with possible additional requirements of the national regulation.

LOCATION

Charging station should be installed in the vicinity of the parking spot that will be used to park and charge electric vehicles. They can have charging socket located in various positions. Consequently, cable length to connect EV and charging station is important.

The sufficient cable length to easily connect the electric vehicle with the charging station, regardless of where the EV's charging socket is located,

should be between 3 and 7 m and depends on the charging station location in comparison to parking spot. Shorter length cables are recommended as they are easier to handle.

Make sure that in a typical connection scenario there are no obstructions in the way of the charging cable. When in use, the charging cable should be laid so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.

Charging station should be mounted so that the plug of the charging station is located approximately 120 cm above the ground. This height enables averagely high user the easiest operation of charging station and connection of charging cable. It also provides best view and operation of the LCD screen.

Etrel INCH charging station and its components (cable, casing, LCD screen...) are developed to be installed in the outside area meaning that charging station is resilient to the external actors (UV rays, rain, snow, cold etc.). Installing it in the closed-up area, for example in garage, will prolong the lifespan of the charging station and keep it in a pristine condition for longer.

THERE IS NO FUNCTION OF VENTILATION IMPLEMENTED IN THE CHARGING STATION.

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 - 25°C and + 65°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 65°C.
- Charging station must not be installed in explosion hazardous areas (EX zone).

REQUIRED SPACE

Basic installation of the charging station without arches requires an excavation of minimal dimensions of 550 mm x 420 mm (floor plan) and depth of 600 mm. If the charging station is installed together with two safety arches, dimensions of the required dimensions are approximately 800 mm x 550 mm. Please find more information in chapter Construction Works.

CHARGING STATION DIMENSIONS

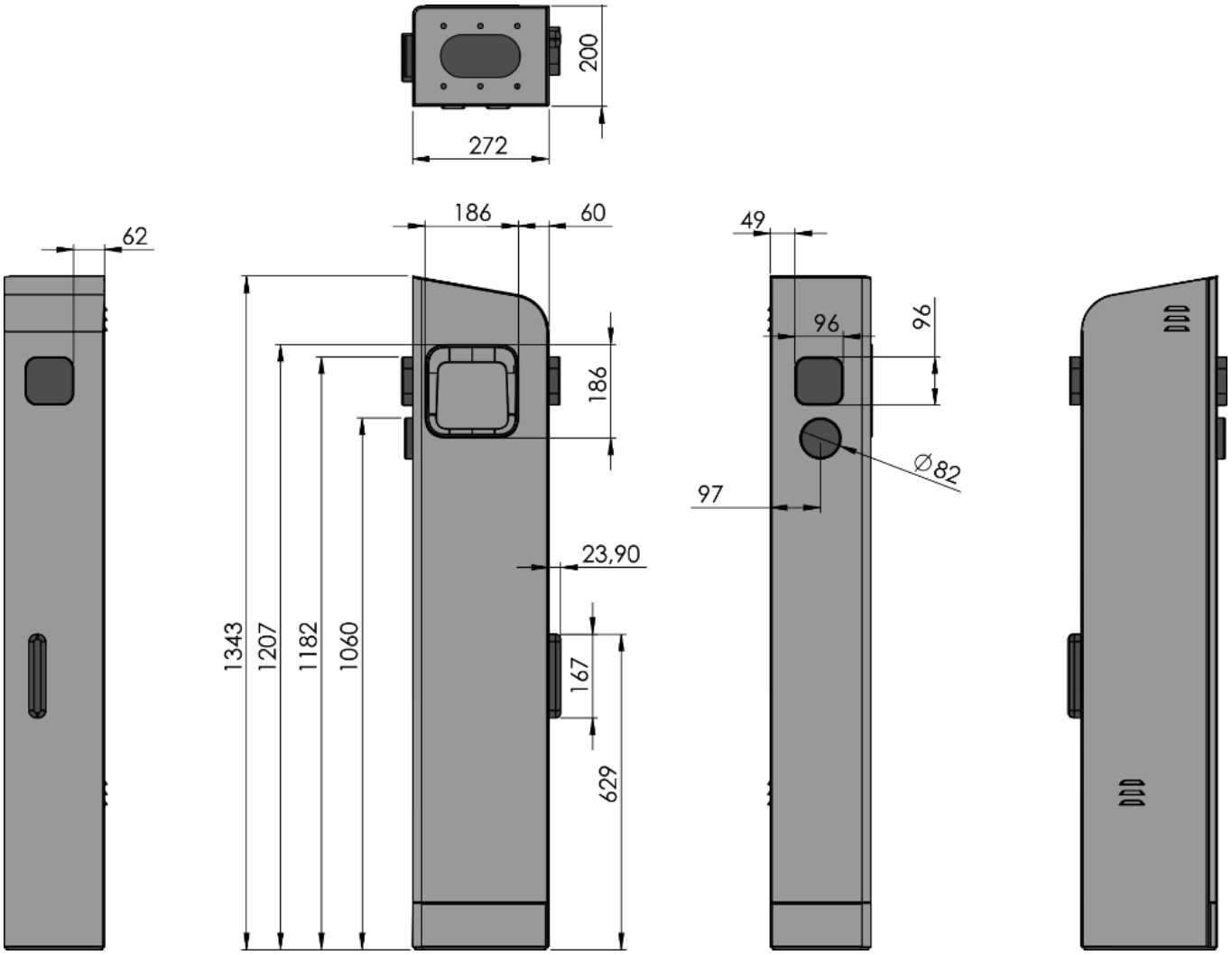

Figure 1: INCH DUO dimensions

Additional information of charging station dimensions:

- The height of the charging station is 1343 mm.
- Basic dimensions of the station's base: 272 mm x 200 mm.
- Free space needed:
  - 50 mm in the back.
  - 150 mm on the left and right side.
  - 500 mm at the front (140 mm for opening the station doors and additional space to enable simple maintenance).
- 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 charging station is equipped with standard sockets (Type 2 according to EN 61851 or EN 62196-2). Charging cables are not a part of the station's equipment. 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 2.5 m (in the case of the most optimal EV parking to charge on both sockets).

CONTENT, OPTIONAL AND EXTRA EQUIPMENT

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

Optional / Extra equipment	Use/Description
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 (Protective railing)	Protects the station from vehicle collisions.
Underground anchoring structure	For safe installation of charging station and safety arches.
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 two sets of supply wires	Special connection terminals can be used to connect several stations in a row.
Etrel Load Guard	Enables management of charging current based on settings in the control centre for management of charging infrastructure.
Etrel Ocean	Control centre for management of charging infrastructure.

TOOLS

To execute the installation of charging station multiple tools are needed:

- Utility knife,
- Screwdriver,
- Hex screwdriver,
- Self-adjusting crimping pliers for cables' end sleeves,
- Wire trippers and
- Cable rippers.

Figure 2: Equipment used for the installation of charging station

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, considering the specific conditions of each of these placements. In all these placement options, the station can also be installed together with the safety arches.

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 (or bollards) 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 curb as possible.

When the charging station is combined with safety arches, these need to be placed as close to the roadside curb 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. The safety arches should be mounted at least 15 cm away from both sides of the station.

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 curb.

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 curb as possible, and the back edge of the station should be aligned with the front side of the rear poles of the safety arches. The safety arches must be mounted at least 15 cm away from both sides of the charging station 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. The cables are routed to the charging station from the bottom. In case of clustering of larger number of charging stations, considerations about the needed cables cross-section must be made.

POSSIBLE PARKING ARRANGEMENTS

The charging station INCH Duo 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.

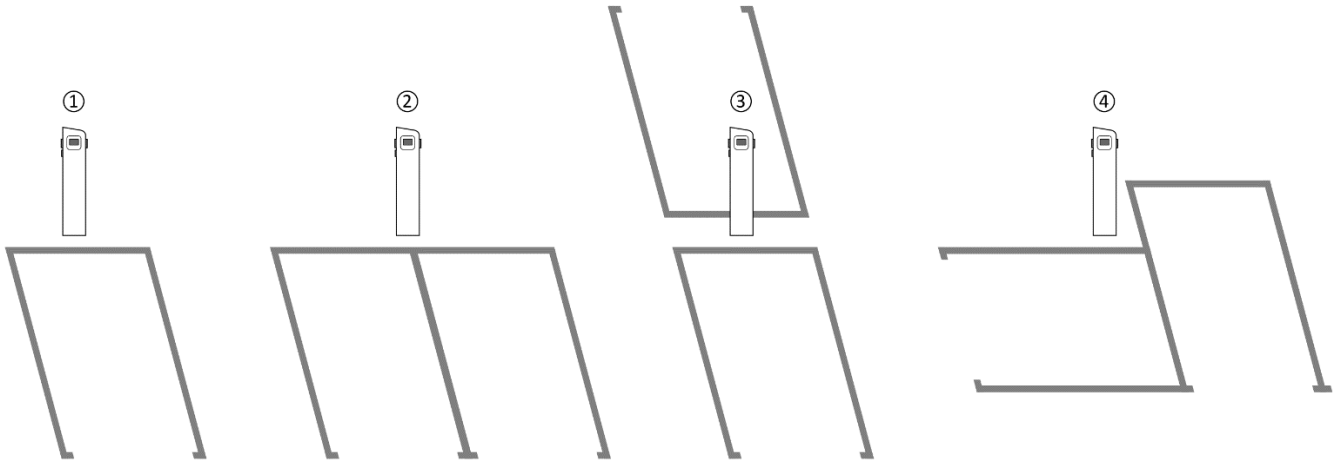

Figure 3: Possible parking arrangements

1: Although possible, it is not recommended to have only one parking spot reserved for INCH Duo. 2 and 3: Possible arrangement of INCH Duo with two dedicated parking spots. 4. Different arrangements dependent on the location are possible.

Charging station INCH Duo does not have a cable. Users need to have their own cable. Standard cable length of 2.5 m should be taken into consideration when determining correct placement of charging station and parking space.

Both options (for the charging cable to be plugged at either the front or the rear end of the vehicle) should be considered. Each charging station can serve more than two parking spaces, however only two vehicles can charge at the same time.

RECOMMENDATIONS

Use street signs or special marking to designate special EV parking places, which should be easily distinguishable from conventional parking places.

When the national or 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.

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 considered. The user must be able to reach any of these positions with a standard-length charging cable.

The parking regime should be monitored to prevent other vehicles (with internal combustion engines) from parking on special EV parking places.

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.
- Electrical work should be carried out by a professionally qualified person.

  Electrical installation must be performed in accordance with local laws and safety regulations. The diameter of the electrical conductor depends on its length, method of installation, etc. Up to 5 x 50 mm^2 cables can be used directly and customization with additional clamps is possible up to 5 x 95 mm^2. This must be determined by the contractor.

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).

The following supply power is required:

- **44 kW (64 A):** 2 x three-phase charging spots, for each Type 2 socket is the 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 divided between the two vehicles. Power management can also be setup for a cluster of charging stations.

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

- Selectivity of the functioning of protection devices needs to be ensured:
    - The main overcurrent protection should be at least one class greater than the one used for the protection of the charging station or have a higher delay.
    - Differential protection (RCD) which is used in the charging station operates at a low current (ΔI 30 mA, 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 single phase connection (slow charging option), only one phase wire with sufficient diameter can be routed to the station, together with neutral and earthing conductor. 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 is dependent on the charging station configuration and is not higher than 20 W.

CONNECTION TO THE STATION OPERATOR'S COMMUNICATION NETWORK

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.

The charging station could require a connection to the station operator's WAN network (charging infrastructure control centre). To access the WAN network via an internet connection, some additional security requirements need to be observed. 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/4G mobile network with an GPRS/UMTS router built into the station.

2 CONSTRUCTION WORKS

GROUND SURFACE REQUIREMENTS

- A solid base (concrete) allowing secure fastening with screws; asphalt surface is not suitable as screws will not hold unless there's concrete beneath the asphalt.
- The level of the solid base should not be lower than the surrounding area to prevent water from pooling around the station.
- Ensure that there is no soil or debris covering the solid base.
- The surface should be as smooth and level as possible to ensure proper alignment of the station; otherwise, the station may appear crooked, or water and moisture may seep in.
- Ideally, when preparing a new location, use anchors inserted into fresh concrete for significantly easier and faster installation.

UNDERGROUND ANCHOR

The underground anchoring structure is built into concrete foundation and is made of stainless steel. The preparation of the foundation depends on the structure of the ground on the designated location. The underground anchoring structure can be combined with reinforcing steel.

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

- It supports the weight of the charging station.
- It prevents tilting of the charging station.

Figure 4: Assembled underground anchoring element

The dimensions of the underground anchoring element are:

- Width: 390 mm.
- Length: 477 mm.
- Basic depth without reinforcing steel and concrete base: 504 mm.

CONSTRUCTION OF UNDERGROUND ANCHORING ELEMENT

The underground anchoring element is made of stainless steel and 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. Construction steel with diameter of up to FI 12 can be used. 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 an enough bending radius is placed into the foundation. 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.

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. There are six rods in the anchor package. Be careful to observe the nut positions on the rod as pictured below:

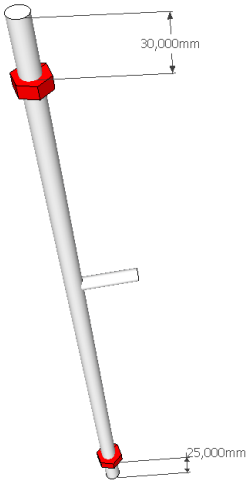

Figure 5: Anchor rod with initial screw positions

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.

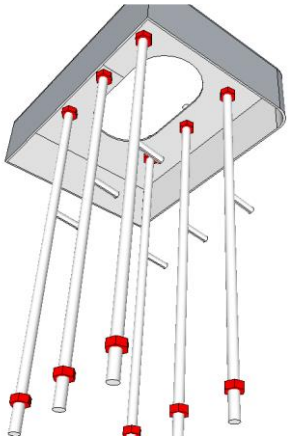

Figure 6: Insertion of anchor rods into the upper frame (bottom view)

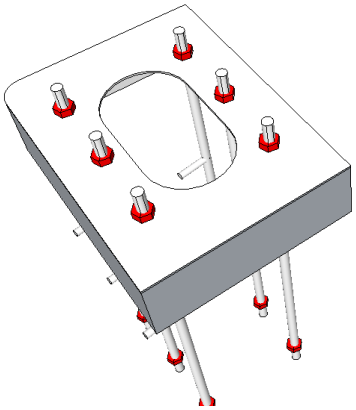

Figure 7: Insertion of anchor rods into the upper frame (top view)

3. Place the L profile on the bottom of the anchor. Place all tree 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 and other three rods.

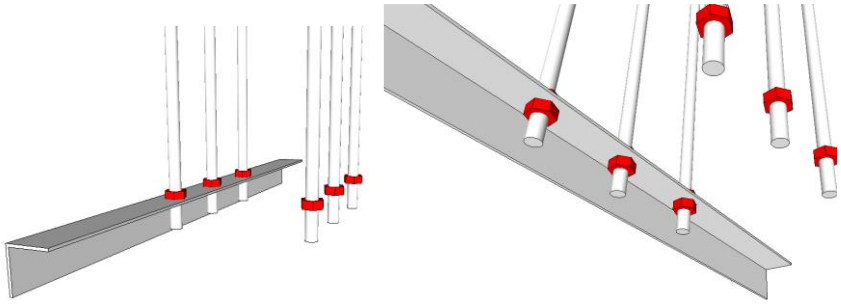

Figure 8: Insertion of anchor rods into the bottom L profile

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.

EXCAVATION

The first step of the construction work is to prepare an excavation with the minimum basic dimensions of 550 mm x 420 cm and at least 600 mm in depth. If the charging station is combined with safety arches, a larger excavation is needed. 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.

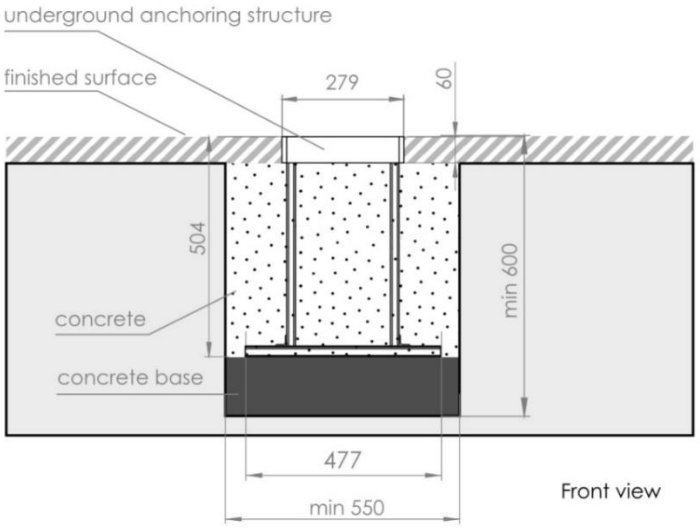

Figure 9: Basic excavation – longitudinal section

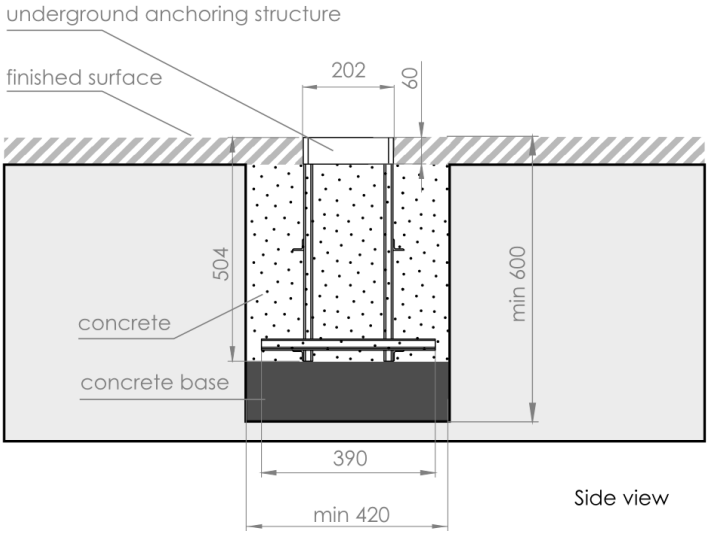

Figure 10: Basic excavation – transversal section

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. 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.

CONSTRUCTION OF THE 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

Important: Make sure that

Important: When inserting the anchoring structure be

and used to connect the charging station to the network. It is recommended that the installation pipe ends over the foundation and not beneath the foundation. The bending radius of the power cables must be considered when placing the installation pipe. The dimension of the pipe depends on the number and diameter of power cables which will be inserted. In the case of clustering of charging stations in the same area, it must be considered 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 that are used when the clustering of charging stations is executed.

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 curb). 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 (with less cement than water).
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.

INSTALLATION OF SAFETY ARCHES

The charging station manufacturer supplies optional safety arches:

- Safety arches prevent mechanical damage to the charging station which may result from collisions with vehicles.

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.

EXCAVATION AND FOUNDATION CONSTRUCTION FOR SAFETY ARCHES

If safety arches are added to the charging station, the foundation needs to be enlarged accordingly (as presented on the following figures). Safety arches are placed in the same foundation together with the charging station.

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

- 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).
- 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.
- 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 must be installed at the edge of the roadside curb and the charging station must be placed away from the roadside curb 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 that can be placed at both sides of the station (2 arches) or only at the front (1 arch).

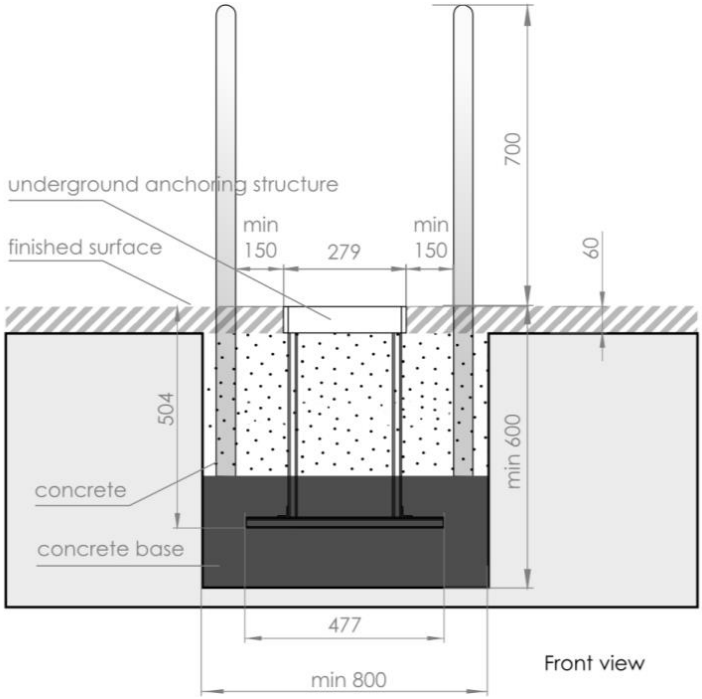

Figure 11: Longitudinal section of the excavation with two safety arches

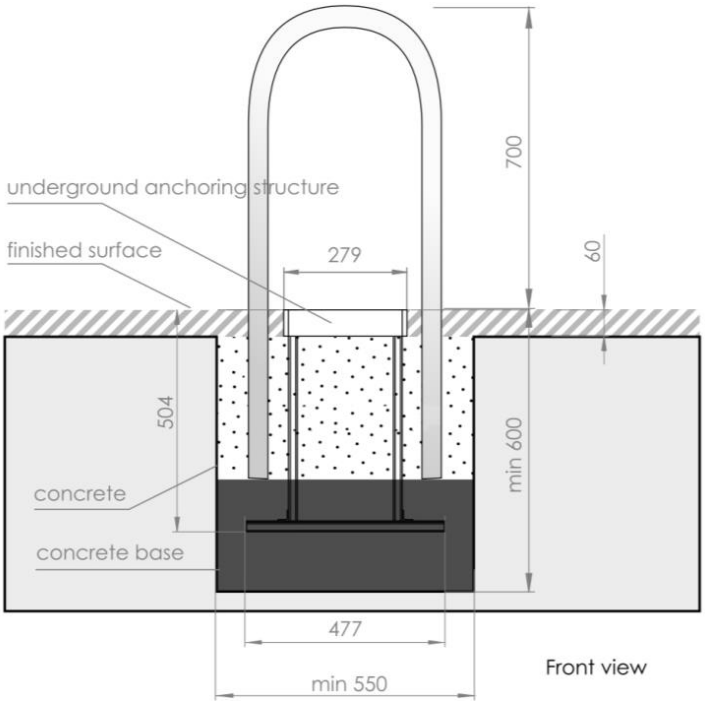

Figure 12: Longitudinal section of the excavation with one safety arch

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 tilting.

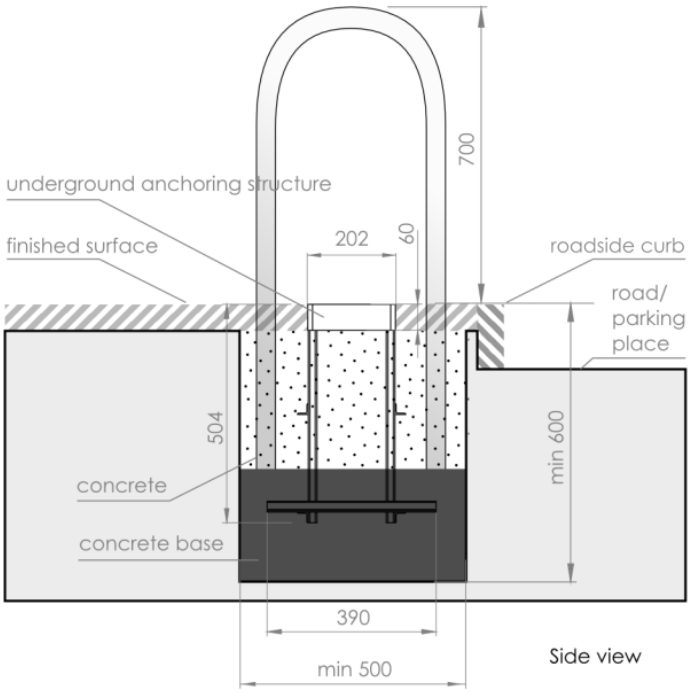

Figure 13: Transversal section of the excavation and safety arches on the curb with two safety arches

The figures 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 curb 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.

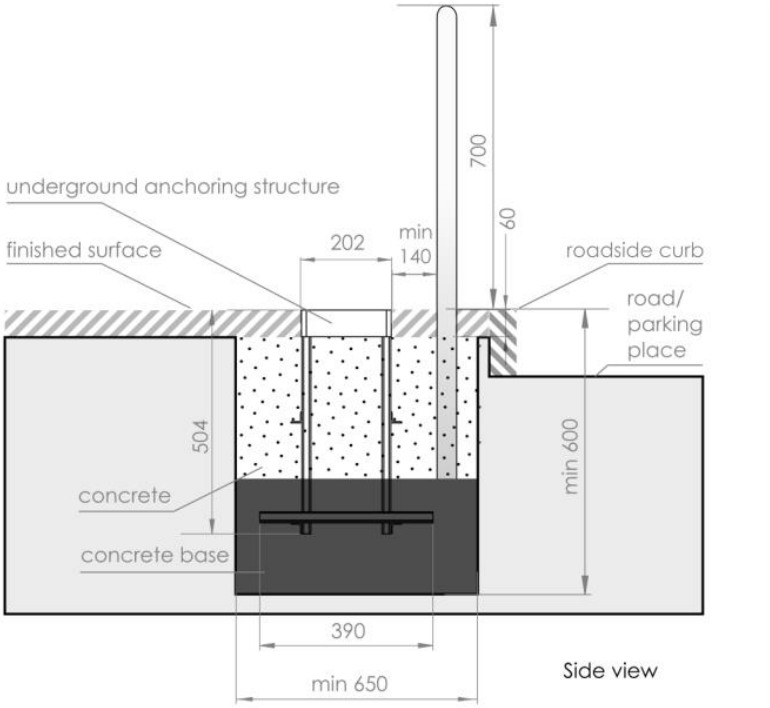

Figure 14: Transversal section of the excavation and safety arches on the curb with one safety arch

3 INSTALLATION

INSTALLATION ON THE FOUNDATION

The inserted installation pipe must be secured with wire so that it does not sink into the concrete. In addition, it needs to be temporarily clogged with paper or similar material at both ends so that the concrete cannot enter the pipe.

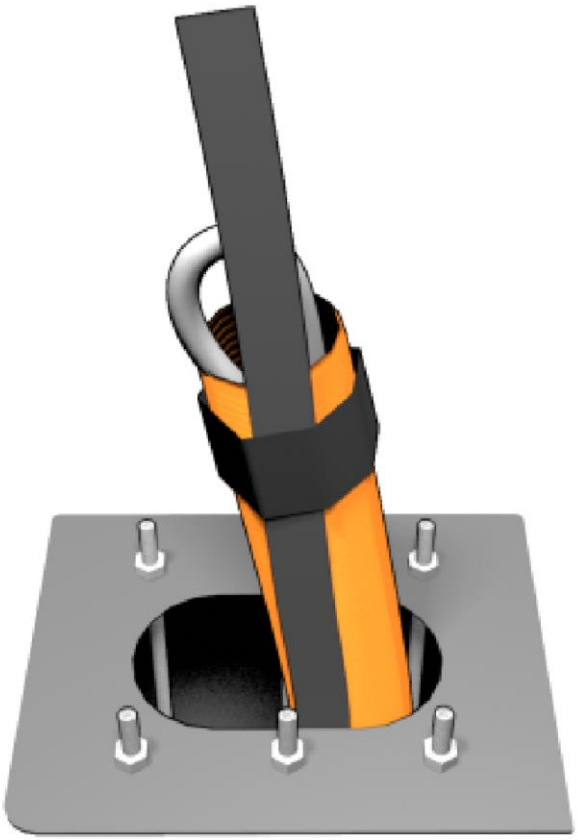

Figure 15: Securing the installation pipe

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.

Once the foundation is dry and the power cables are introduced into the installation pipe, the installation of the charging station can begin.

- Clean the foundation, its surroundings and anchor bolts.
- Cut the installation pipe containing the power cables.
- Shorten the earthing strip to the appropriate length and drill a hole in it.

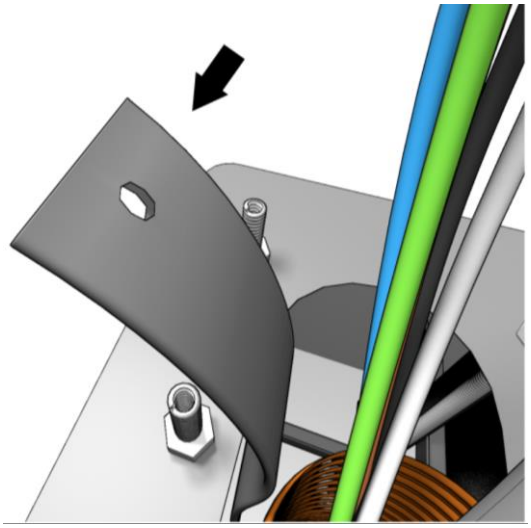

Figure 16: Earthing strip with a hole

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 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.

Figure 17: Mounting INCH Duo on prepared foundation

4 CABLE MANAGEMENT

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.

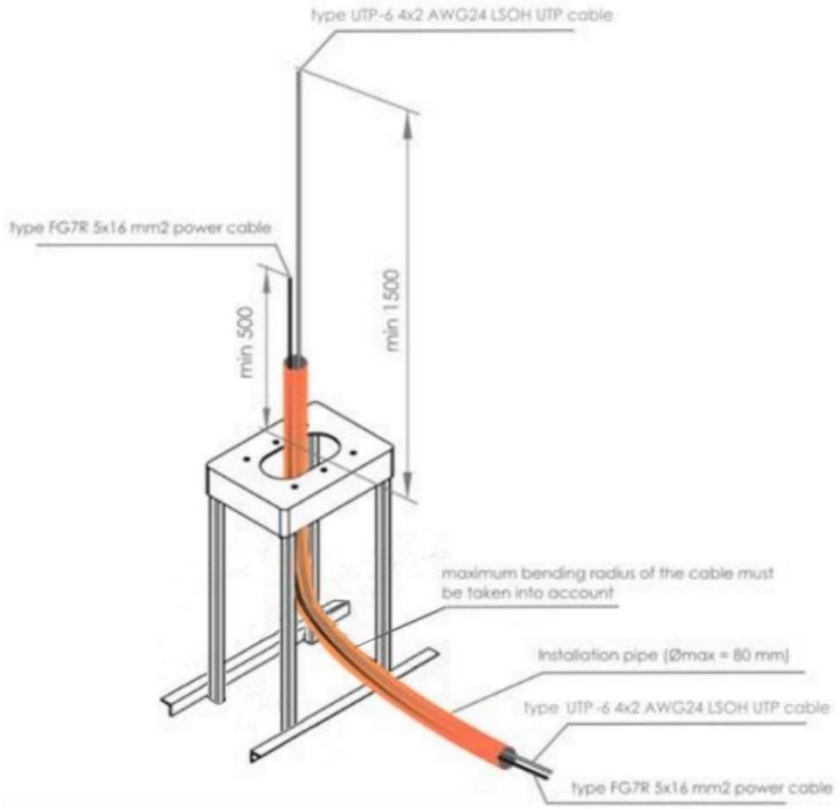

Figure 18: Placing of installation pipe and insertion of cables

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 considered.

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 / UTP cable (if the station's mode of communication does not use a wireless 2G/3G/4G connection) must reach through the upper opening of the anchoring structure.

These minimum lengths of cables must be strictly observed to enable later effortless connection of the charging station.

PREPARATION OF CABLES

Remove 20 mm of insulation from all cables and attach and compress the appropriate crimp tubes on all cables. To prevent cables from getting in the way of mounting the charging station, twist them into an installation pipe.

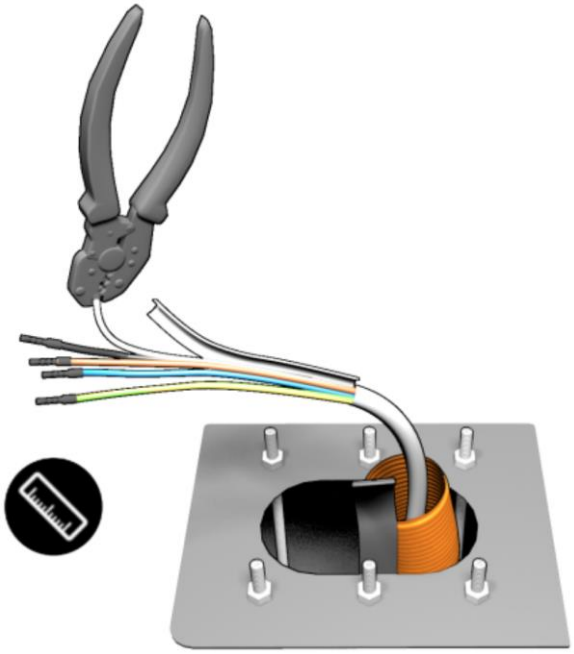

Figure 19: Preparation of cables

POWER SUPPLY COMPARTMENT

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 three-phase 5-wire power cable is used for the connection, based on the type of connection. Standard terminals enable connection of cables of up to 50 mm^2 diameter. Customization with additional clamps is possible up to 95 mm^2.

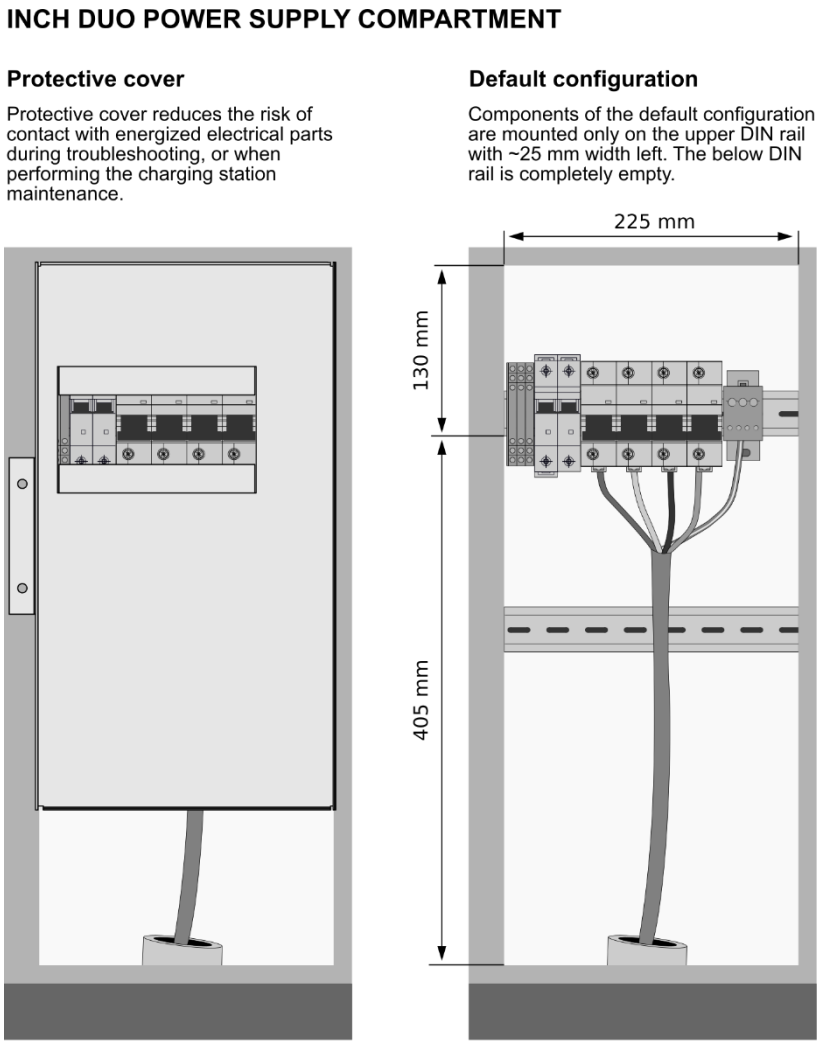

Figure 20: Overview of the power supply compartment

The configuration of the charging station depends also on the type of grid connection. The charging station is usually connected to an existing installation.

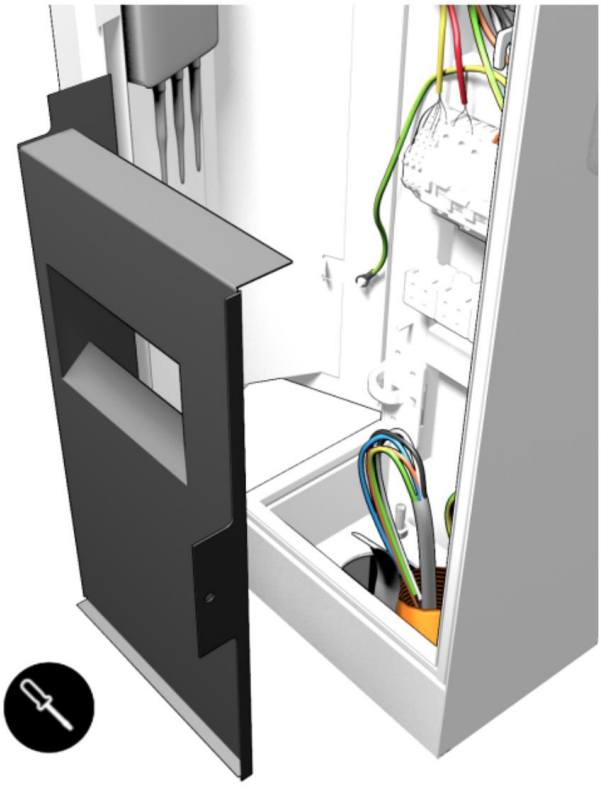

Figure 21: Power supply compartment cover

To enable access to the power supply compartment first unscrew and remove the protective cover.

There is a sticker on main connection element showing the correct designation of phases and neutral conductor. Remove the sticker and make sure that screws inside the main miniature circuit breaker (MCB) in which wires will be connected are unscrewed.

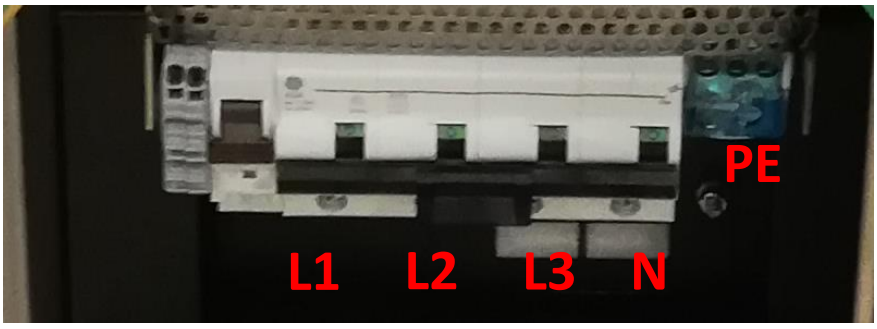

Figure 22: Connection of charging station to the power grid

To the main circuit breaker of the charging station, three supply phase conductors are connected in right order of phases. Normally, this would mean connecting from left to right, phase 1 (L1, brown), phase 2 (L2, black), phase 3 (L3, grey).

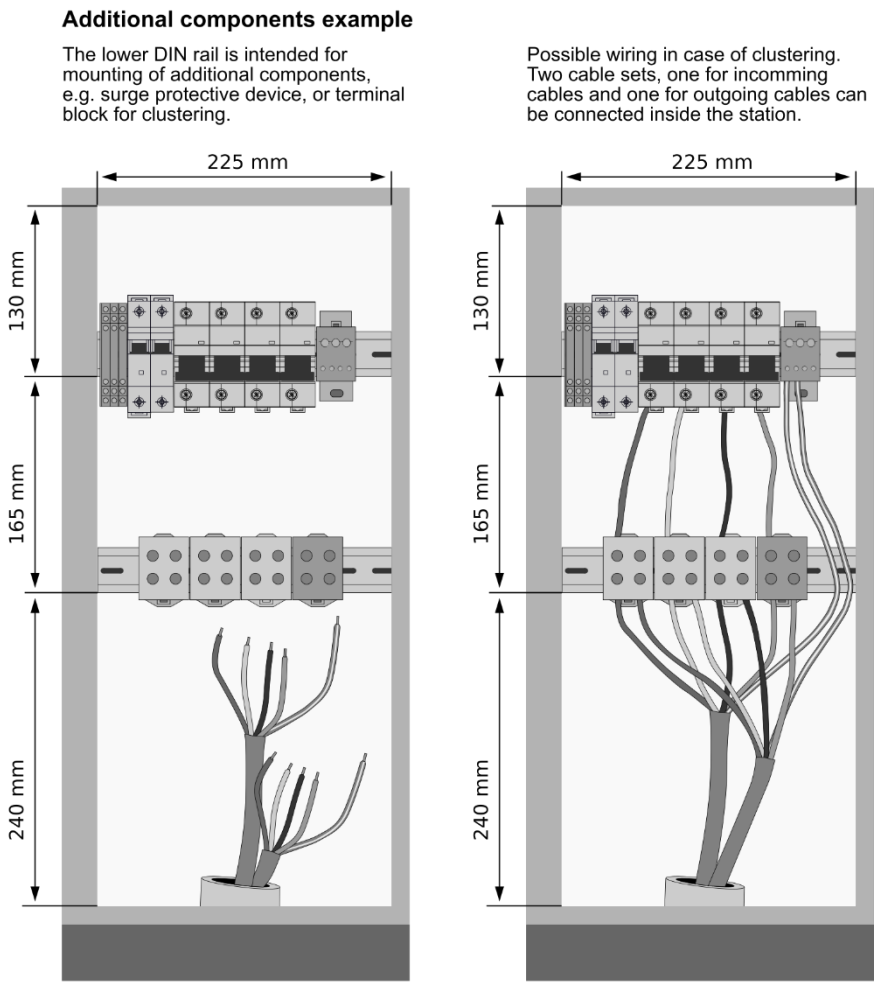

Figure 23: Example of the power supply compartment additional components

Also, the neutral conductor (N, blue) must be connected to the neutral pole of miniature circuit breaker and PE conductor (PE, yellow/green) to the earthing clamp.

The order of phase conductors could be different in case of clustering of more charging stations. The reason is avoidance of current and voltage asymmetry in case of possible charging of one phase electric vehicles.

This means that if three charging stations are installed, the first phase of first station would connect to L1 of the system, the first phase of the second station would connect to L2 of the system and the first phase of the third stations would connect to L3 of the system. The sequence of phases must be kept (L1, L2, L3).

The software configuration must be properly made in charging station web interface and in the charging management platform (e.g., Etrel Ocean).

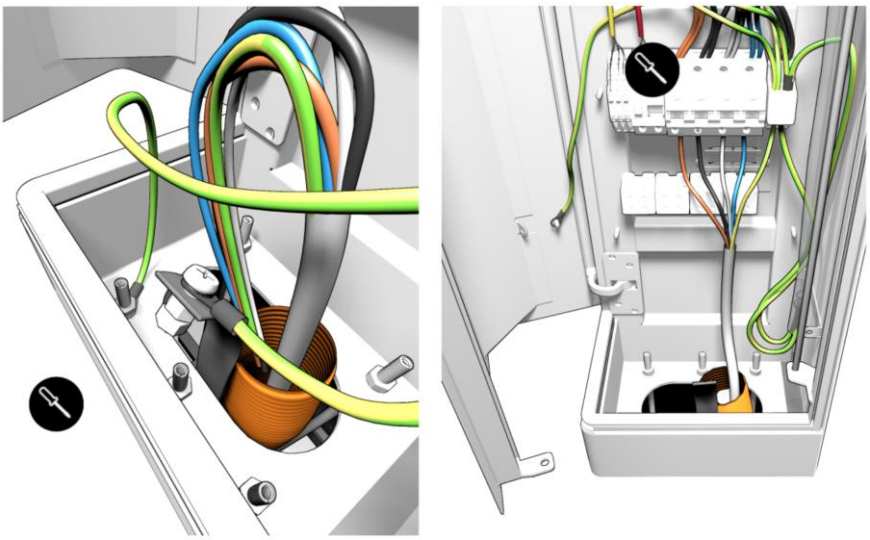

Figure 24: Connecting the cables

CONNECTION OF THE PROTECTIVE EARTHING (PE)

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.

CONNECTION OF THE POWER CABLE

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

Required tools: Allen key (Hex key), wire stripper pliers (for stripping of insulation and for fine-core cables), crimping pliers.

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 MCB terminals (all phase conductors and the neutral conductor N).

4. Loosen the bolts on PE clamp.
5. Insert all wires into their terminals and tighten the bolts.

CONNECTION OF THE COMMUNICATION CABLE (UTP)

Required when wireless GPRS communication is not used.

Required tools: network cable pliers, RJ45 connector.

Procedure:

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.

Figure 25: Connecting the UTP cables

FINISHING WORK

Before closing the station, check the condition of the over-current protection elements and the residual current devices. Switches must be set to ON position.

The charging station has built-in overcurrent protection with miniature circuit breakers (MCBs) and leakage circuit breakers (RCD).

Check that all circuit breakers are on:

- There is a main circuit breaker and an electronics power circuit breaker at the bottom of the station. Check the condition of both.
- Each of the component's baskets contains a branch circuit breaker and a residual current protection switch.

Check the condition of all four elements.

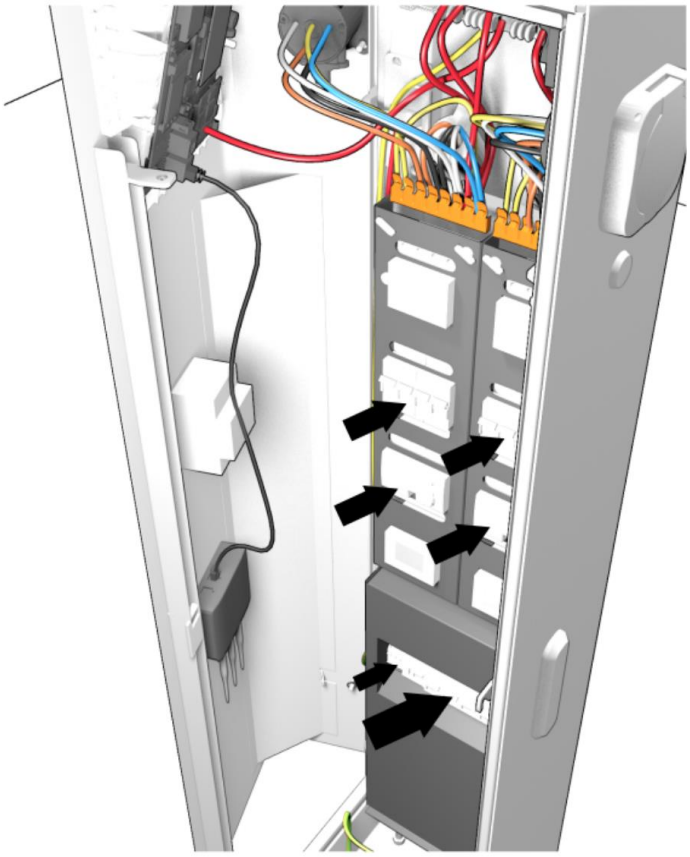

Figure 26: Positions of MCBs and RCDs

To ensure a longer life of the device and its operation, at the end of the installation, be sure to seal the inlet pipe for the power cable and the opening in the lower inner part of the station.

Fill the inlet pipe and the opening with a polyurethane foam filler (or similar material).

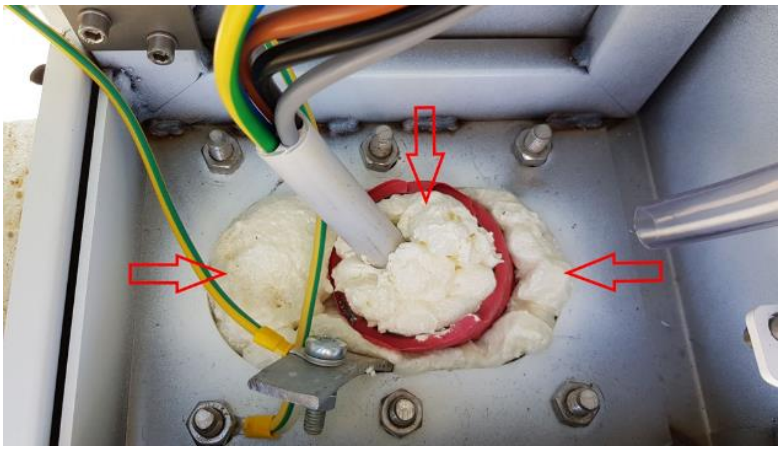

Figure 27: Filled inlet pipe and opening

After all previous steps are done, close the charging station door and lock it.

Connect the charging station to the power supply in the electrical cabinet. Turn on the power supply where the station is connected.

5 CONTACT INFORMATION

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