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Document No Pd_IM_0006	Description Installation and maintenance instruction CSR100		Directory PLM

## 1 Introduction

This document shows how to electrically install the Charge Station CSR100.



### **IMPORTANT**

*Only certified electricians are allowed to perform the installation described in this document.*

The estimated time for the installation and verification is less than 30 minutes per chargestation.

### **NOTE**

*The recommended installation height is 145-160cm from floor to top of the station.*

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## 2 Revision history

<i>Issue</i>	<i>Resp</i>	<i>Date</i>	<i>Compatibility / Comments</i>
0.1	SG	2012-03-26	First issue.
0.2	SG	2012-08-09	
0.3	SG	2013-01-21	Now with version 2 mechanics
0.4	SG	2013-01-27	Wall mount drafted
A.1	SG	2016-08-31	Migrated to new document management system
A.2	SG	2016-09-14	Updated after internal review
A.3	SG	2016-12-05	Added note that power wires shall be checked during installation

## 3 Prerequisites

### 3.1 Tools

Before performing the **installation**, verify that you have the following tools:

- ✓ Hex key 4 mm or torx key (T18)
- ✓ Hex key 5mm or a long torx key (T25).
- ✓ Hex key 3 mm or torx key (T15)
- ✓ Hex key 6 mm or torx key (T40)
- ✓ Flat head screw driver, head 3mm
- ✓ Flat head screw driver, head 6mm
- ✓ Philips screw driver
- ✓ Multimeter
- ✓ Ruler
- ✓ Peeling plier

*For wall mounting kit*

- ✓ Screw kit (3 screws ) for wall mounting
- ✓ Drill

*For software programming*

- ✓ Laptop with terminal application installed
- ✓ USB cable, extension cord with miniUSB type B connector for connecting to the CCU (and USB type A connector for connecting to the Laptop), see Figure 1.
- ✓ USB flash drive



**Figure 1 USB cable needed for installation**

### 3.1 Electrical wiring

Before performing installation of the charge station, verify the following:

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- ✓ Electrical wiring at installation site is dimensioned according to charge station specification
- ✓ Secure that the power is turned off during installation
- ✓ During installation, verify that the power wires to circuit breaking, relay and power terminals are securely connected.

### 3.2 Charge Portal configuration

The Charge Portal is preferably updated with the information for the charge stations to install before performing the installation on site. The charge station is identified by the Charge Portal via the Chargebox ID. The ChargeboxID must be configured identical in both system. For more information on how to configure the Charge Portal, see the Charge Portal User manual (Article number Pd\_UM\_0003).

## 4 Preparation

The following items should be prepared before starting the installation:

- Electrical schematics shall be available for the installation site

If the communication to the portal shall be set up during the installation must the following be prepared (This is most often handled by a Chargestorm representative):

- Software Portal Configuration
  - Create logical charge stations under correct site in portal and allocate chargeboxid for each station
- Internet access
  - If using GPRS/3G for internet access the SIM card must be mounted in the Charge Station. This is preferably done during final assembly and it is encouraged that the SIM card is sent to your contact person at Chargestorm in time.
  - If using Ethernet for internet access the Ethernet wiring must be in place. Further, IP address of the gateway and name server must be known as well as the IP address to use for the Charge Station.
- Authentication
  - If RFID is supposed to be used for user authentication make sure that RFID tags are available for testing

## 5 Abbreviations

CCU	Charge Communication Unit. The micro controller board in a Charge Station or grid communication unit running the communication applications.
GCU	Grid Communication Unit. Handles communication with several slave Charge Stations and the Charge Portal. Contains logic to prevent power overload in the local grid.
RFID	Radio Frequency Identification
USB	Universal Serial Bus

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## 6 Charge Station models

See CSR100 for a list and description of CSR100 models. It is important to know which model that is to be installed.

## 7 Main installation flow

There are three different recommended installation flows depending on whether the installation is of master Charge Stations, slave Charge Stations or unmanaged Charge Stations.

- **Master Charge Station** – A master Charge Station is a stand alone Charge Station and can thus be installed without any dependencies on other components.



- **Slave Charge Station** – For slave Charge Station installation shall the Master charge station or Grid Communication Unit be installed first since it is not possible to perform the final installation test until internet access is available via the Master or Grid Communication Unit.



- **Unmanaged Charge Station** – Charge Stations that have no internet access. Programmed via command line interface during installation. Unmanaged Charge Stations are not described further in this document. Unmanaged Charge Stations are always delivered with a default configuration that allows anyone to charge without RFID authentication. Installing unmanaged Charge Stations is simply a matter of mounting housing and connecting power.

## 8 Mounting types

There are two different ways of mounting the Charge Station:

- Wall mounted
- Pole mounted

## 9 Pole mounted installation

The diagram below illustrates the major steps needed to perform an installation.



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**Figure 2 Example of pole mount installation**

**9.1 Prepare wires**

**Objective:**

In this step are the power wires, phases (L1-3), neutral (N) and protective earth (PE) from the pole prepared to be ready for attaching in the charge station.



**Step by step:**

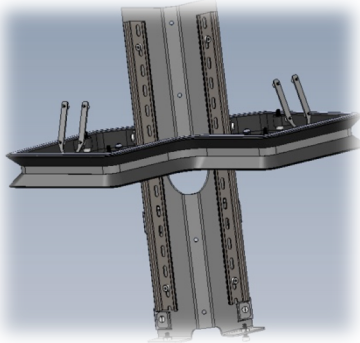
1. At least 20 cm of wires must be available above the top of the pole
2. Peel the wires 14 mm.

**9.2 Disassemble Charge Station**

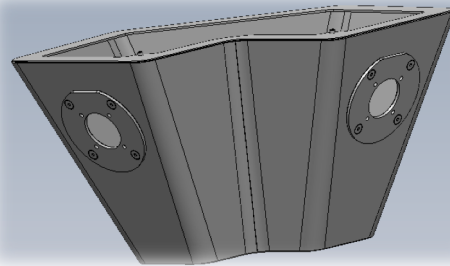
**Objective:**

In this step is the Charge Station bottom and top cover dismounted.

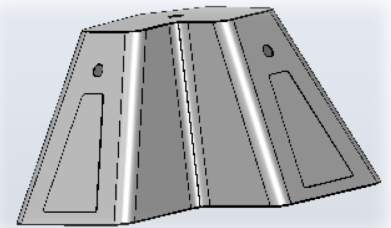
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**Parts:**

Mounting frame(431-00011)



Bottom cover (431-00023)



Top cover (431-00030)

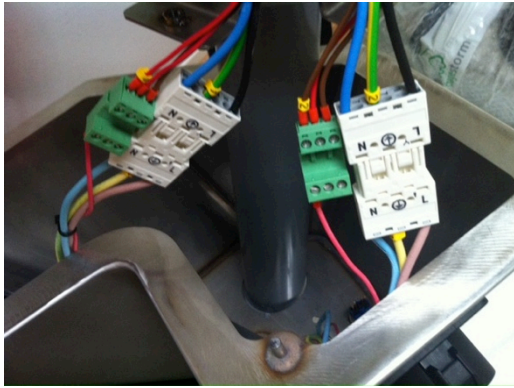
**Step by step:**

1. Unpack the chargestation from the packaging carbon box.
2. Unscrew the two screws in the bottom cover.



3. Pull the bottom cover downwards and disconnect the internal cables so that the bottom cover can be removed.

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4. Unscrew the four screws in the mounting frame attaching the top cover with the frame.



5. Disconnect eventual antenna cable connecting top cover with frame and remove the top cover
6. DONE

### 9.3 Mount frame on pole

**Objective:**

In this step the mount frame attached to the pole. Make sure that external power is off before connecting power to the charge station. Thereafter is the fuse and ground fault function tested.

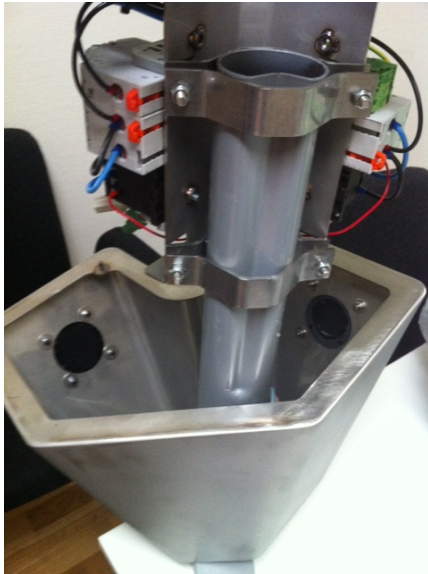


**Parts:** Same as in previous step

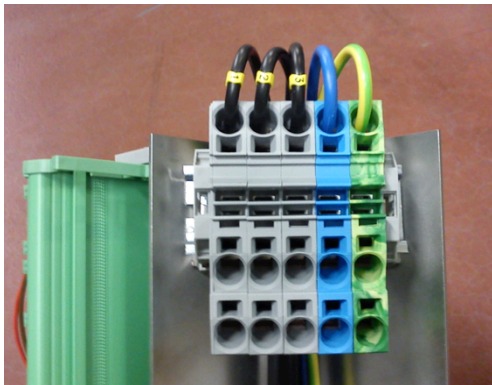
**Step by step:**

1. Gently put the bottom cover on the pole.
2. Put the mounting frame on the pole and tighten the four screws squeezing the frame to the pole

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3. Check that the internal power (L1-3) wire (coming from the pole) is matching the electrical drawings for the installation.
4. Attach the power wires to the terminal block on the mounting plate.



5. Attach the Ethernet cable to the CCU board (if applicable)
6. Check that the ground fault detector and the fuse are on.
7. Enable external AC power and let the internal CCU boot up (LED strip turns green after less than 30 seconds.)
8. Push the ground fault test button
9. For each ground fault unit (one per outlet). Verify that the LED strip turns red. There after push the reset by flipping the toggle switch (see **Fel! Det går inrte att hitta någon referenskölla.**) and verify that the LED strip turns green

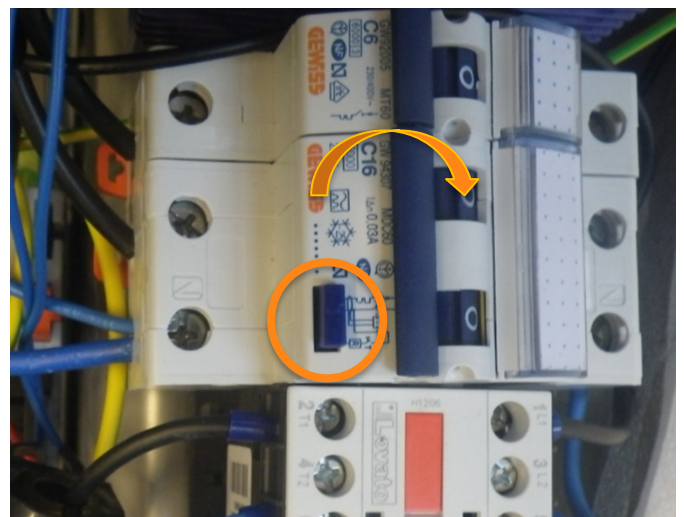


Figure 3 Ground fault unit, with the test button and the action to reset it using the toggle switch marked.

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### 9.4 Software Configuration

The software configuration step is only necessary to perform in case configuration on the CCU must be changed in order to establish connection to the Charge Portal. The CSR100 is always delivered with a default configuration that makes it work in stand alone mode. Often is a Chargestorm representative responsible for configuring the internet access. For more information about software configuration see chapter 11.



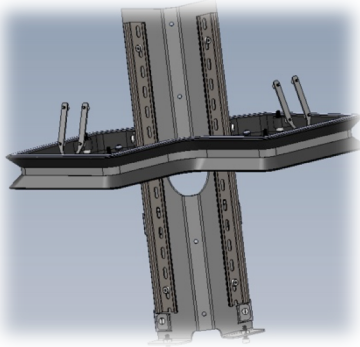
### 9.5 Mount covers

**Objective:**

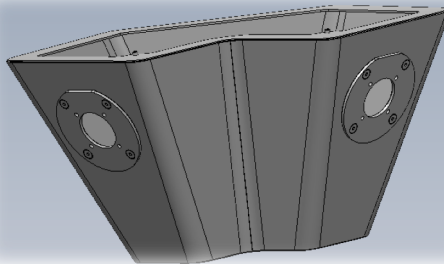
In this step is the top and bottom cover attached to the frame.



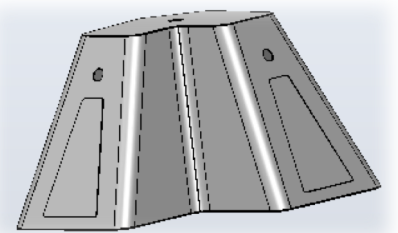
**Parts:**



Mounting frame(431-00011)



Bottom cover (431-00023)



Top cover (431-00030)

**Step by step:**

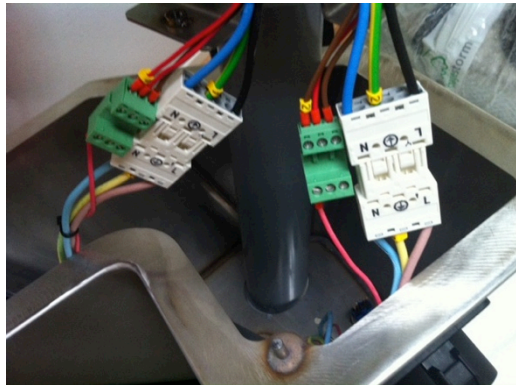
1. Re-attach the antenna cable (if any) and put back the top cover. Make sure the top cover fits the guiding screws and then fasten the four screws.



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2. Lift the bottom cover up to the mounting frame. Reconnect the internal cables on the way.



3. Finally tighten the screws in the bottom.

### 9.6 Final test

**Objective:**

In this step is the functionality of the Charge Station verified.

**Parts: -**



**Step by step:**

1. Document in the installation log (Pd\_CL\_0001) the outcome of the ground fault tests.
2. Check that the mounting looks solid and that there are no external damage on the Charge Station. Document result in installation log (Pd\_CL\_0001).
3. If an electrical vehicle is available test charging on all outlets. Document result in installation log (Pd\_CL\_0001).
4. Optionally, document the GPS coordinates of the installation and update the Charge Portal with that information for each Charge Station.

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**10 Wall mounted installation**

The diagram below illustrates the major steps needed to perform a wall mount installation.



Figure 4 Example of wall mounted installation

**10.1 Disassemble Charge Station**

**Objective:**

In this step the Charge Station covers dismantled. See chapter 9.2 for instruction.



**10.2 Prepare wires**

**Objective:**

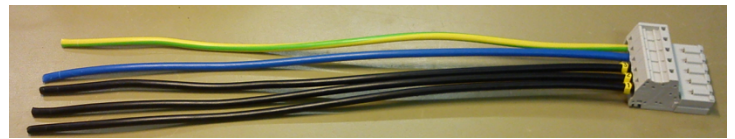
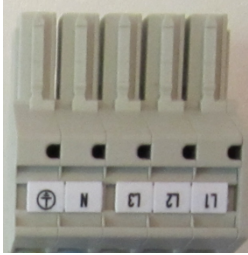
In this step, the power wires, phases (L1-3), neutral (N) and protective earth (PE) are connected to the power socket. The power socket is later attached to matching connector in the Charge Station.



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**Parts:**Power Socket Connector, Internal power wire, Peeling Plier



**Figure 5 Power Socket Connector (Art No 125-00013), internal power wire power wire (840-00005)**

### Step by step:

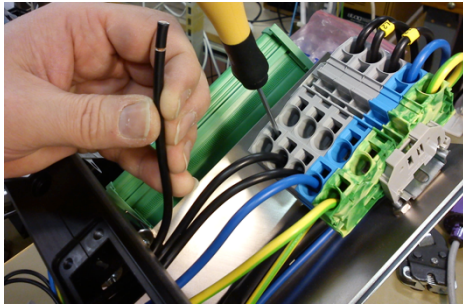
1. For incoming power: Peel the wires 14 mm. Note that the cable/wire diameter supported by the socket is 0.5-6mm<sup>2</sup>.
2. Push the peeled protective earth (PE) wire into the matching position in the socket until it snaps into place.
  - a. Test that the wire is fastened by gently pulling it backwards.
3. Push the peeled neural (N) wire into the matching position in the socket until it snaps into place.
  - a. Test that the wire is fastened by gently pulling it backwards.
4. Push the peeled phases (L1-3) wires into the matching positions in the socket until they snap into place.
  - a. Test that the wires are fastened by gently pulling it backwards.
5. If the installation uses Ethernet for communication connect a *female* Ethernet plug.



**Figure 6 Power Socket Connector when connected to incoming wires**

6. Connect the power wire (840-00005) that comes with the Charge station to the terminal block on the mounting frame. Note that the cable must be inserted in the frame whole (in the LED list) on the back side before the wires are attached to the terminal block.

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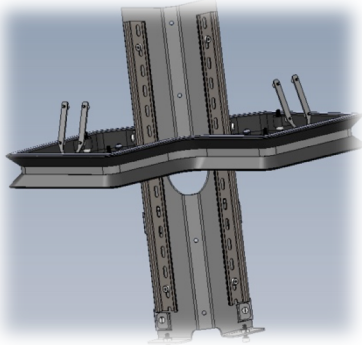
### 10.3 Mount wall plate

#### Objective:

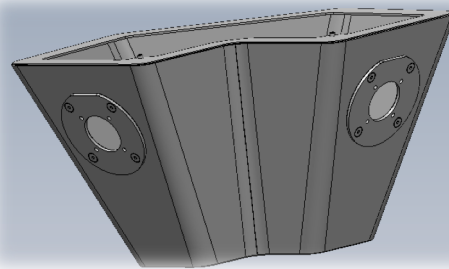
In this step, is the mounting frame attached to the wall plate and there after is the wall plate attached to the wall.



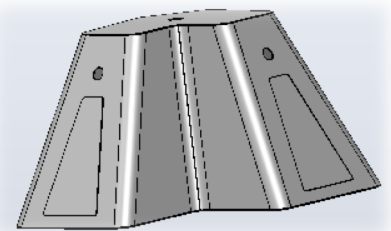
**Parts:** 4 mm Hex key and 1 or 2 hex socket screws (M5, 16 mm long, and 4 mm socket size) for securing the frame and the following main components



Mounting frame(431-00011)

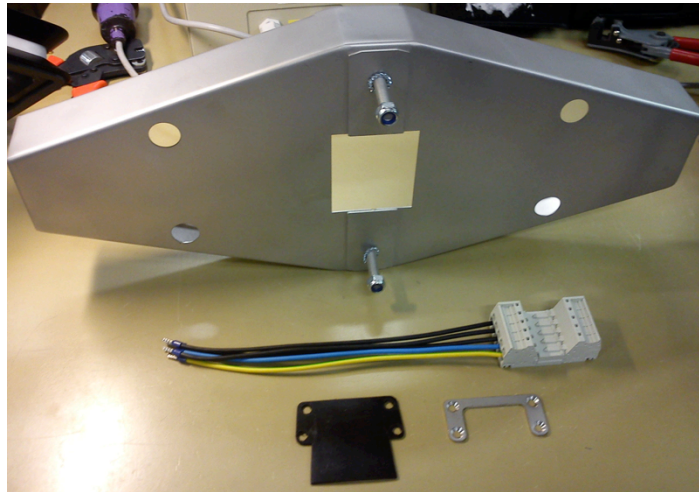
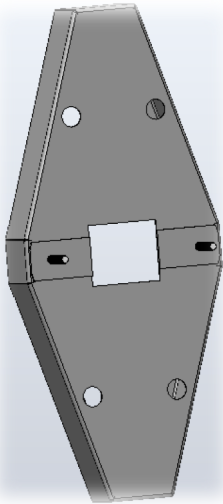


Bottom cover (431-00023)



Top cover (431-00030)

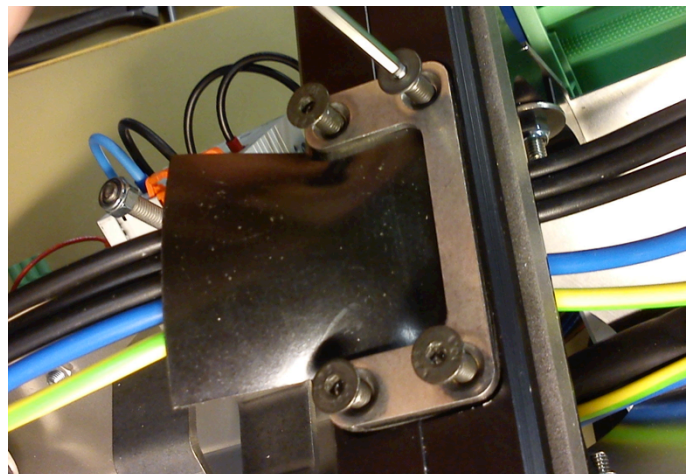
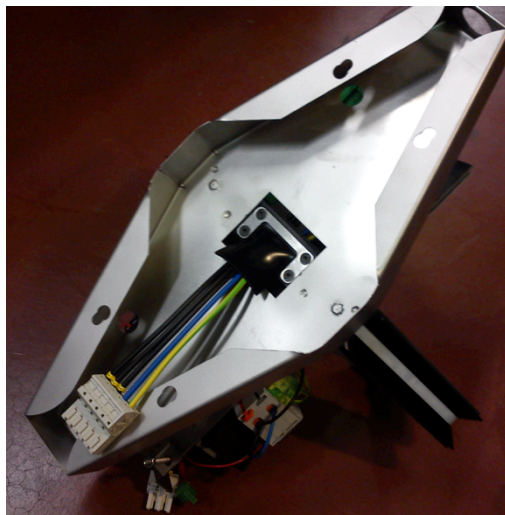
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Wall mounting plate(431-00036), power connector with wire

#### Step by step:

1. Identify the location on the wall where the Charge Station is to be mounted:
  - a. Make sure the power cables and possible Ethernet cable is available just under or above the wall plate. It is also possible to connect the power wiring from behind. Note that a gasket must be used to make the unit waterproof.
2. Drill four screw holes for the wall plate
3. Slide the mounting frame on the on the two guiding screws on the wall mounting kit while the cables are inserted through frame hole. Fastened the mounting frame with the two nuts.
4. Fasten the gasket with help of the metal frame and four screws

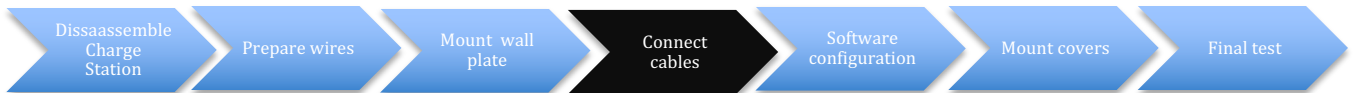


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## 10.4 Connect Cables

### Objective:

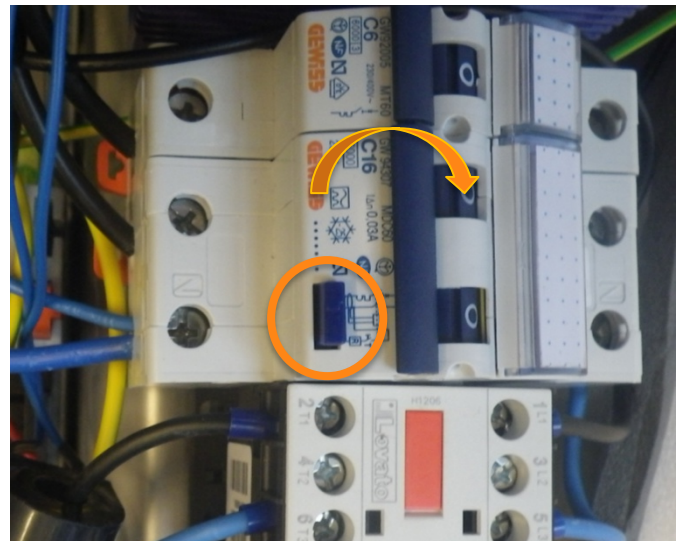
In this step is the power cables connected, ethernet cable optionally connected and ground fault tested.



**Parts:** -

### Step by step:

1. Make sure external power is off.
2. Check that the internal power (L1-3) wire is matching the electrical drawings for the installation.
3. Attach the external and internal power connectors to each other.
4. Attach the Ethernet cable (if applicable)
5. Fasten the wall plate with four screws (the screws are not included).
6. Check that the ground fault detector and the fuse are on.
7. Enable external AC power and let the internal CCU boot up (LED strip turns green after less than 30 seconds.)
8. Push the ground fault test button
9. For each ground fault unit (one per outlet). Verify that the LED strip turns red. There after push the reset by flipping the toggle switch (see **Fel! Det går inrte att hitta någon referenskölla.**) and verify that the LED strip turns green



**Figure 7** Ground fault unit, with the test button and the action to reset it using the toggle switch marked.

## 10.5 Software Configuration

The software configuration step is only necessary to perform in case configuration on the CCU must be changed in order to establish connection to the Charge Portal. The CSR100 is always delivered with a default configuration that makes it work in stand alone mode. Often is a Chargestorm representative



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responsible for configuring the internet access. For more information about software configuration see chapter 11.



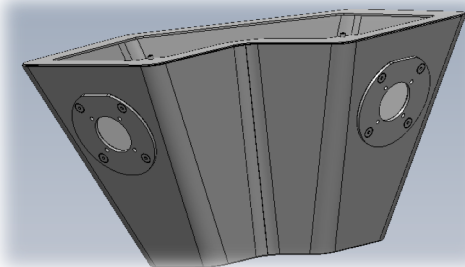
### 10.6 Mount covers

**Objective:**

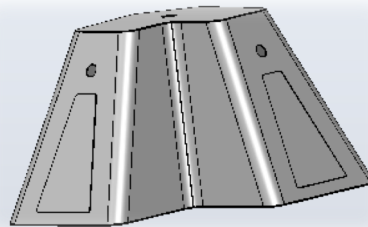
In this step is the bottom cover attached to the frame and some ground fault and fuse tests performed.



**Parts:** 4 mm Hex key



Bottom cover (431-00023)



Top cover (431-00030)

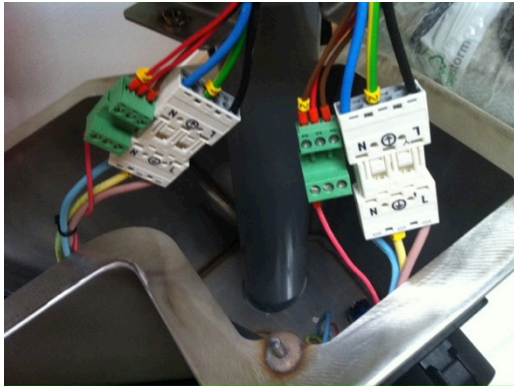
**Step by step:**

1. Re-attach the antenna cable (if any) and put back the top cover. Make sure the top cover fits the guiding screws and then fasten the four screws.



2. Lift the bottom cover up to the mounting frame.

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3. Finally tighten the two screws in the bottom.

### 10.7 Final test

#### Objective:

In this step the functionality of the Charge Station is verified.

**Parts:** - checklist



#### Step by step:

1. Document in the installation log (Pd\_CL\_0001) the outcome of the ground fault tests.
2. Check that the mounting looks solid and that there are no external damage on the Charge Station. Document result in installation log (Pd\_CL\_0001).
3. If an electrical vehicle is available test charging on all outlets. Document result in installation log (Pd\_CL\_0001).
4. Optionally, document the GPS coordinates of the installation and update the Charge Portal with that information for each Charge Station

## 11 Software Configuration

The software configuration step is only necessary to perform in case configuration on the CCU must be changed in order to establish connection to the Charge Portal. The CSR100 is always delivered with a default configuration that makes it work in stand alone mode. Often is a Chargestorm representative responsible for configuring the internet access.

#### Objective:

In this step is the Charge Station configuration information copied from the Charge portal to the flash in the Charge Station. A communication test to the Charge Portal is also part of this step

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**Pre-requisites:**

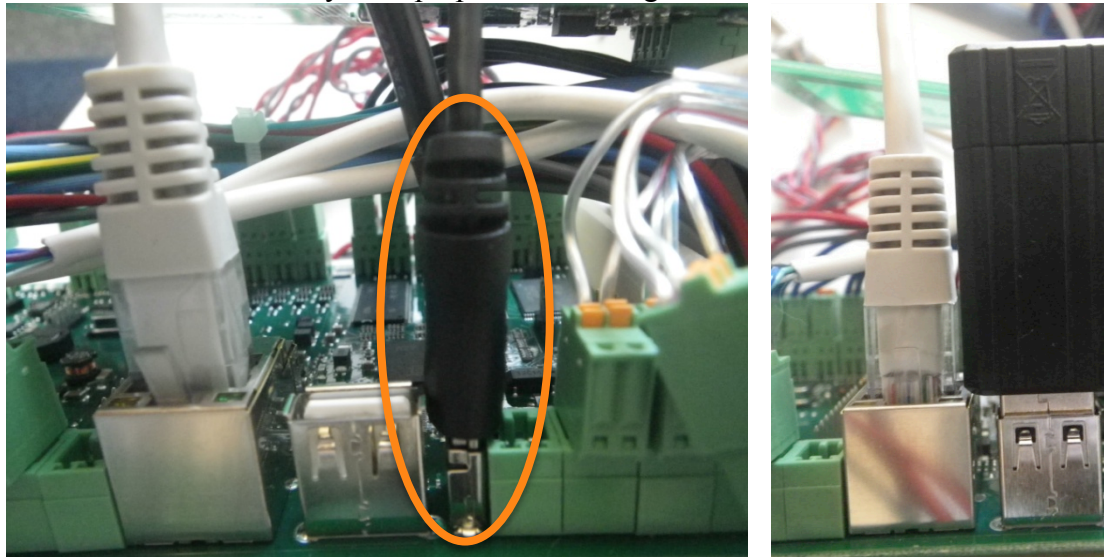
Before starting the software configuration should the Charge Portal be configured and a mini USB cable be available in order to connect to the CCU from the lap top.



**Parts:** USB cable, see Figure 1., USB flash drive, and laptop with terminal software.

**Step by step:**

1. Boot up Charge Station (external power must be enabled)
2. Attach the USB cable to your laptop and the Charge Station



**Figure 8** USB cable connected to the Charge Station CCU (and marked) in the image to the left, and USB flash drive inserted in the image to the right (To the left is an ethernet cable connected).

3. Follow the CCU configuration manual (Pd\_CM\_002).

## 12 Charge Portal

The Charge Portal is a web portal providing access to the Charge Stations owned by the operator, over the Internet. The portal shows usage and alarms of the Charge Stations and is also used for configuration of the Charge Stations.

The diagram below illustrates the major steps that needs to performed in the Charge Portal before an installation.



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**NOTE**

*For unmanaged Charge Stations, i.e. stations that do not have any Internet access via Ethernet or 3G is no configuration in the Charge Portal needed.*

**Internet access**

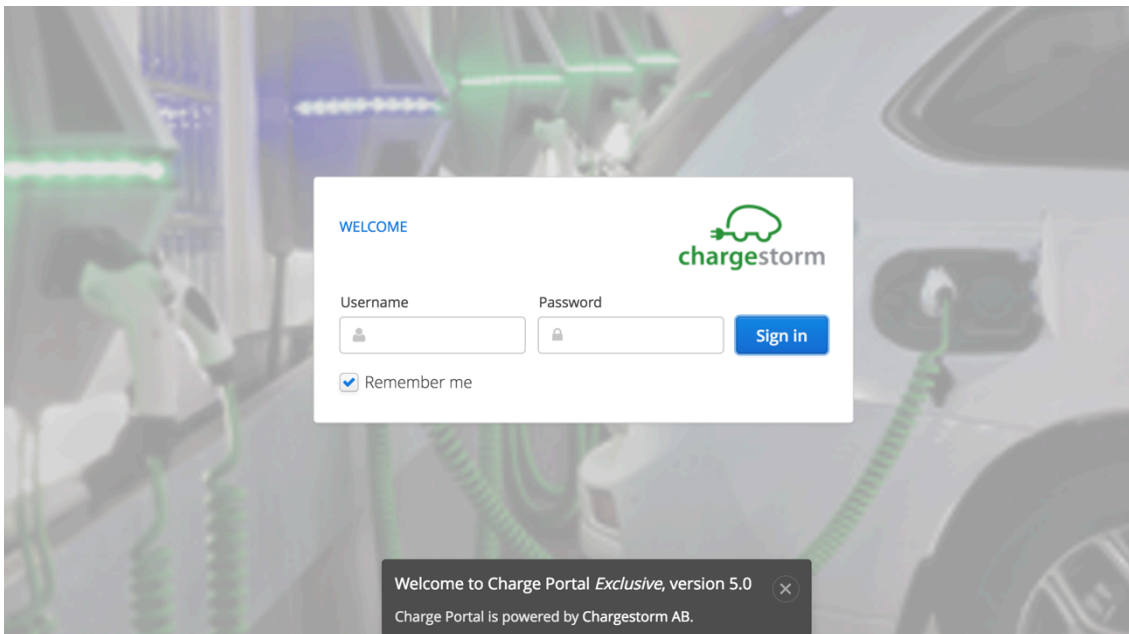
Our Charge Stations are equipped with an Ethernet interface and optionally a 3G/GPRS modem.

*Ethernet interface*

Customers using Ethernet to access the web portal must assign static IP addresses to Master Charge Stations and Grid Communication Units. The IP address can be either public or private (sitting behind a firewall). The importance is that Charge Stations have access to the Charge Portal URL, which is unique per customer. The traffic is only web based and is using the http or https ports depending on configuration.

*3G/GPRS*

In order to use 3G/GPRS as carrier, the customer is requested to purchase the SIM-cards that are to be mounted in the Charge Station. It is very much preferred that the SIM-cards are sent to Chargestorm before final assembly since it simplifies the installation. Configuration parameters required to establish IP communication from the modem must be provided by our customer (who in turn should ask the wireless operator/provider of SIM cards for that information).



**Figure 9 Example of the log in page for the Charge Portal**

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### 12.1 Request portal log in parameters

#### Objective:

The first time a new customer purchases Charge Stations from Chargestorm, a customer unique portal is created. The portal can be accessed from any modern web browser with Internet access.

In order to log in to the portal the following parameters must be retrieved:

- **URL** – the web address of the portal
- **User name** – an email address used to log in to the portal
- **Password** – a password needed to log in to the portal



#### **NOTE**

*It is only the first time you order Charge Stations that you need to request the portal log in parameters.*

#### Pre-requisites:

There are different levels of customization of the Charge Portal that can be arranged based on different customer needs, such as coloring schemes, logotypes etcetera. Therefore, check your specific contract so that you are aware of what is included in your service.

#### Step by step:

1. Contact your sales person and ask for portal log in parameters.
2. The sales person will generate an email containing:
  - a. URL to portal typically in format `http://<companyname>.oamportal.com`
  - b. Email address and password for administrator account
3. Log in to the portal with the information in step 2. A log in page similar to the figure below should be shown in the web browser.

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The screenshot shows the Chargestorm Dashboard interface. On the left is a dark sidebar with a user profile for 'admin admin' and a 'Navigator' menu with options like 'Humlegården', 'Dashboard', 'Diagrams', 'Statistics', 'Service', 'Provisioning', and 'Configuration'. The main dashboard area is titled 'Dashboard' and features the Chargestorm logo and a notification bell. Below the title are four summary cards: 'Alarm history' (0), 'Network loss / Day' (0), 'Charge duration' (0h), and 'Sessions / Day' (1). Each card includes a small line graph and 'High'/'Low' values. At the bottom, there are two charts: 'WEEKLY ENERGY (KWH) PER CHARGE STATION' (a bar chart with a legend for stations like HARDEN-15-182, HARDEN-15-185, STENHOGA-1G-194, HARDEN-15-180, HARDEN-15-184, and Kakenhuset-St1) and 'CHARGE STATION SITES' (a map of Stockholm showing station locations marked with 'P' icons).

### 12.2 Create installation site in portal

**Objective:**

In this step the installation site is created in the *System configuration* -> *topology* tab of the portal. The individual Charge Stations are added to the installation site in the next step, chapter 12.3 Add Charge Stations.



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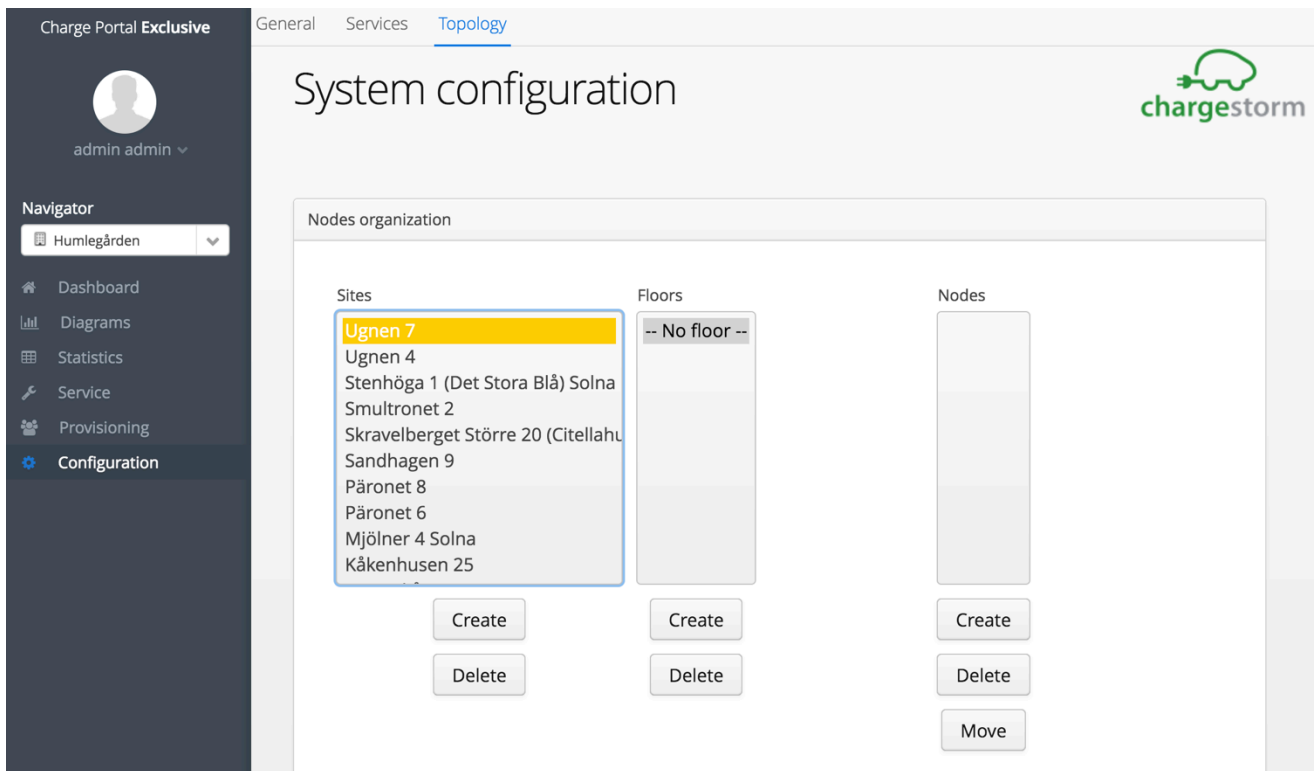


Figure 10 Installation and configuration application under the System configuration tab

### Step by step:

1. Log in to the portal with information from 12.1
2. Click on *configuration* and thereafter the *Topology*.
3. Click on create site and follow the wizard
4. Click *Finish*
5. The new installation site is now displayed in the tree view.

## 12.3 Add Charge Stations

### Objective:

In this step, the Charge Stations are added to the installation site created in the previous step.



### Step by step: Create a master station

1. Click on *configuration* and thereafter the *Topology*.
2. Select the installation site and thereafter click the create node button.
3. Select the correct station model and click *Next* and fill in the information requested by the wizard

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## **13 Maintenance**

The CSR100 required maintenance needs are restricted to a yearly test of the ground fault breaker. There is one circuit breaker per outlet and both must be tested. It is recommended that the unit is examined and tested at the same occasion and that eventual new software releases are installed. Preferably is the test cases in the installation log (Pd\_CL\_0001) executed again and the result stored and documented.