

eRange® IQ



Installation and configuration manual



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1. Safety information

Read this manual and "Wallbox eMH2 Quick Manual" before installing the eRange IQ. The manuals contain important instructions and warnings which must be followed. It is therefore important that these manuals are read carefully before beginning the installation. eRange IQ must be installed by a licensed electrician and done in accordance with national and local regulations. Please follow good installation practice.



Warning! Pay special attention! The red warning symbol is used where there is a danger of injury to personnel or damaged equipment if the warning is not heeded.

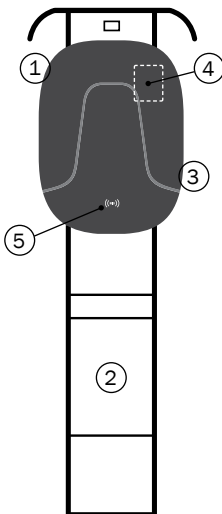


Note! The green information symbol is used where there is information important for the success of the installation.

The eRange IQ must be used exclusively for its intended purpose. DEFA cannot be held liable for any damage or inadequate outcome caused by incorrect configuration or use.

2. Terms

1. Charging station
2. Stand
3. Charge point
4. Charge controller
5. RFID reader



3. eRange IQ - general description

eRange IQ is the latest generation home charging station supplied by DEFA. As the name implies, eRange IQ is a smart charging station. With built-in full-dynamic load balancing, it measures how much current passes through the main fuse and distributes available surplus capacity for electric vehicle charging or plug-in hybrids.

eRange IQ offers great benefits:

- ▶ Protects the main fuse in the home when charging on full capacity.
- ▶ Provides faster charging when power consumption is low.
- ▶ Allows for charging with the existing electrical system without assigning a high fixed load of the available power.
- ▶ Enables the use of the existing electrical installation with limited capacity, without having to expand the system.

eRange IQ can control up to six DEFA charge points via Modbus RS485*. The configuration includes the number of charge points, main fuse size and the total charging current of the system.

4. System requirements & limitations

eRange IQ requires the following power supply:

- ▶ 230V AC and 400V AC TN-S, star topology three phase balanced system, hereafter called TN-grid.
- ▶ 230V AC IT delta topology, with 120 degrees between each phase (Norway only), hereafter called IT-grid.

Maximum size of the main fuse:

- ▶ 4x63A (TN) Norway / 3x63A (TN) Sweden & Finland
- ▶ 3x63A (IT)

* Several charge points connected to eRange IQ in a charging facility is a feature currently not enabled.

POWER LIMIT FOR CHARGING

The eRange IQ has a built-in safety margin of 10% of the main fuse. In order to start charging there must be minimum 6,6A available per phase beyond the safety margin. If this requirement is not met, the charging station will pause the charging process until enough current is available.

Example of calculation:

Main fuse size:		Safety margin:		Minimum power supply for charging:		Maximum load on the main fuse to be able to start charging:
63A	-	6,3A	-	6,6A	=	50,1A

MODE 3-CHARGING

eRange IQ is made for Mode 3-charging. The charging station is not designed for Mode 1- or Mode 2-charging. Mode changing adapters must not be used.

WIFI-CONNECTION

eRange IQ can connect to a WiFi network using 2,4 GHz frequency.

5. Installation planning

Check and evaluate the following before installing the eRange IQ:

- ▶ The total load of the facility per phase
- ▶ Main fuse size

i Note! eRange IQ must have a margin of safety of 10% of the main fuse, and minimum 6,6A available per phase to start charging.

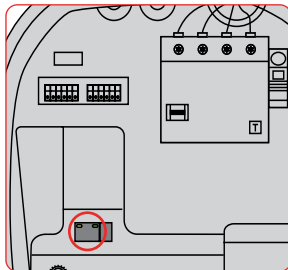
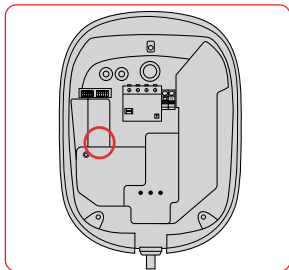
- ▶ Preferred total charging current per phase
- ▶ Available charging current per phase
- ▶ Type of installation network: TN- or IT-grid (if TT-grid; contact DEFA)
- ▶ Single-phase or three-phase charging
- ▶ Identify and tag the phases on the power cable going into the main fuse.
- ▶ Find corresponding phases between main fuse and charge point.

i Note! The system will not work as intended if the phases do not match.

- ▶ Available space on the DIN rail in the fuse box for installation of the current sensor.
- ▶ Method for online connection: LAN or WiFi

i Note! A separate Ethernet cable must be used for the LAN connection. (Not included)

When connecting the charging station online through a LAN connection, connect the network cable to the Ethernet-port, circled in red in the figures.



Warning! Make sure the power is turned off during the entire installation.

VERIFICATION AND CHANGES TO THE CONFIGURATION

eRange IQ comes fully configured from factory. The charging station is 'charge ready' once the installation is finished a change or verification is necessary to complete the installation of this product.

In cases where the preconfigured settings does not match the installation, or the conditions on the location change, settings in the configuration have to be changed. Go to chapter 7.2, page 26, for configuration of the load balancing unit, CLU. And chapter 9, page 35, for configuration of the control unit.

The following tools are required for configuration of CLU and charging station:

- ▶ Smartphone (Android or IOS), for verification or changes to CLU configuration.
- ▶ Android smartphone or PC, for configuration of the control unit.
- ▶ DEFA CPC (Chargpoint configurator) tool, downloaded on either the PC or Android smartphone.
- ▶ Adjustment kit (art. no.: 707824), for connecting the charge point to the CPC unit.
- ▶ Micro-USB/USB-C - USB-F adapter, for connecting smartphone to the adjustment kit.

TOOLS FOR TESTING

After the installation and commissioning of the product, it is required to test and verify the charging station operates as intended. This can be done using an EV or EV testing equipment.

The following tools are recommended for testing:

- ▶ DEFA test box (art. no.: 710253)
- ▶ Mode-3 charging cable
- ▶ An electric vehicle or plug in hybrid will be required for testing of the load balancing.

6. Installation

Installing eRange IQ is performed in the following three steps:

1. Install the charging station
2. Install the current sensor
3. Connect the BUS communication

6.1 INSTALLING THE CHARGING STATION

- ▶ Install charging station according to “Wallbox eMH2 Quick Manual”.
- ▶ Connect the power supply to the charging station according to the selected connection pattern (see “Connection alternatives” chapter 6.3, page 11).



Warning! All charging stations must be connected to the same ground point. Failure to do so may cause the communication failure or damage to the controller.

PE-wiring is intentionally not shown in the installation diagrams.

6.2 INSTALLING THE CURRENT SENSOR

- ▶ Make sure the power in the facility is turned off.
- ▶ Attach the current sensor to a DIN rail in the fuse box, as shown under “Connection alternatives” chapter 6.3, page 11.
- ▶ Connect the current sensor to the output of the main fuse.

Maximum conductor thickness and torque:

EM340

- ▶ Measuring inputs: 2,5 – 16mm² - Max. screw tightening torque: 2,8 Nm
- ▶ Digital/pulse terminal: max. 1,5mm² - Max. screw tightening torque: 0,4 Nm

EM112

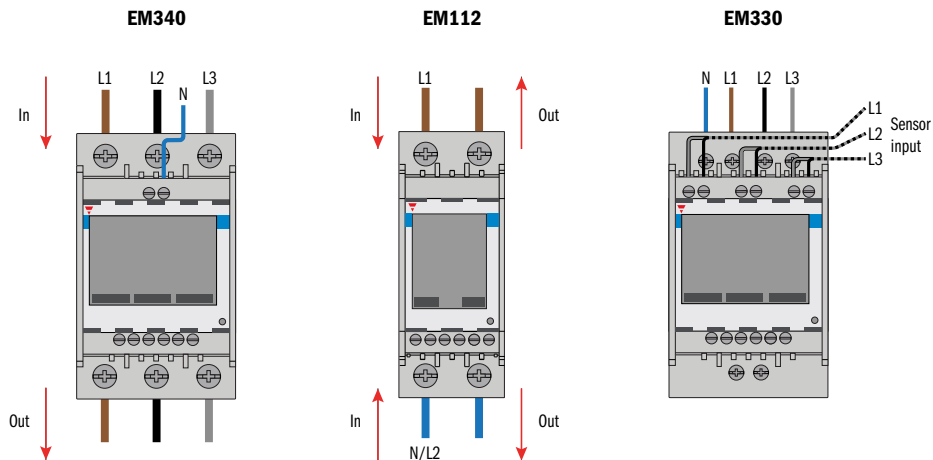
- ▶ Measuring inputs: 5 – 25mm² - Max. screw tightening torque: 2,8 Nm
- ▶ Digital/pulse terminal: max. 1,5mm² - Max. screw tightening torque: 0,5 Nm

EM330

- ▶ Measuring inputs: 1-4mm² - Max. screw tightening torque: 0,6 Nm
- ▶ Digital/pulse terminal: max. 1,5mm² - Max. screw tightening torque: 0,4 Nm

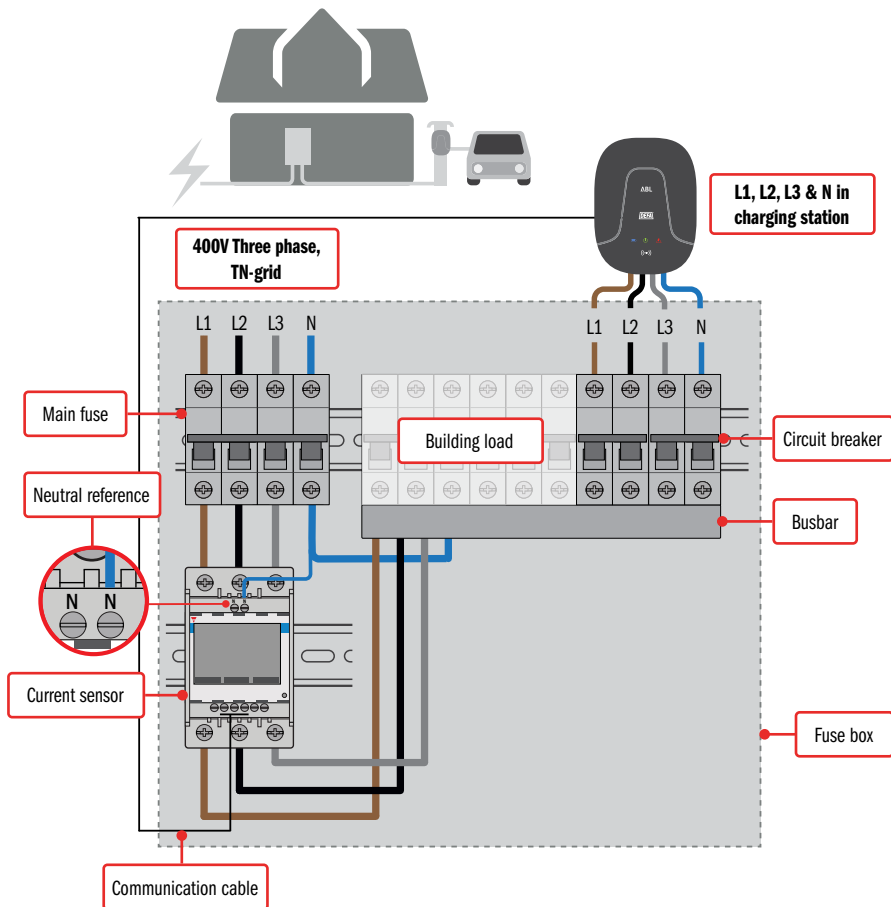
- Connect the selected phase(s) to the indicated points in the figure below.

Warning! Be sure to mount the current sensor on the phase(s) that match the selected connection pattern for the charging station. See “Connection alternatives”, chapter 6.3.

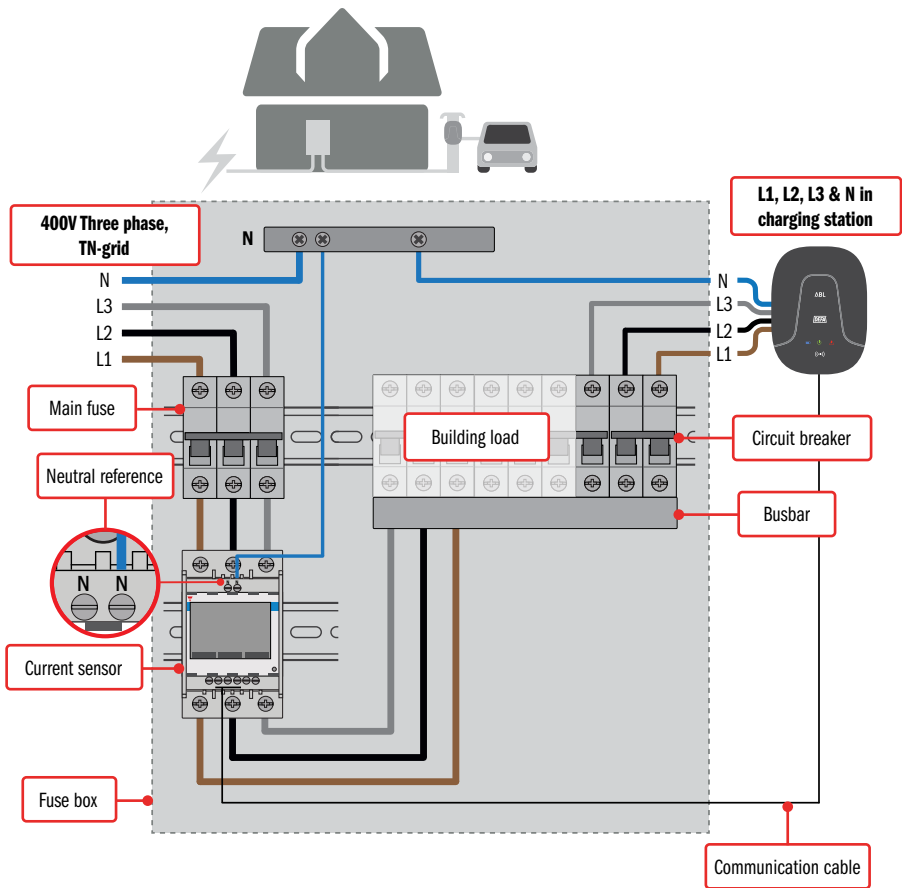


6.3 CONNECTION ALTERNATIVES

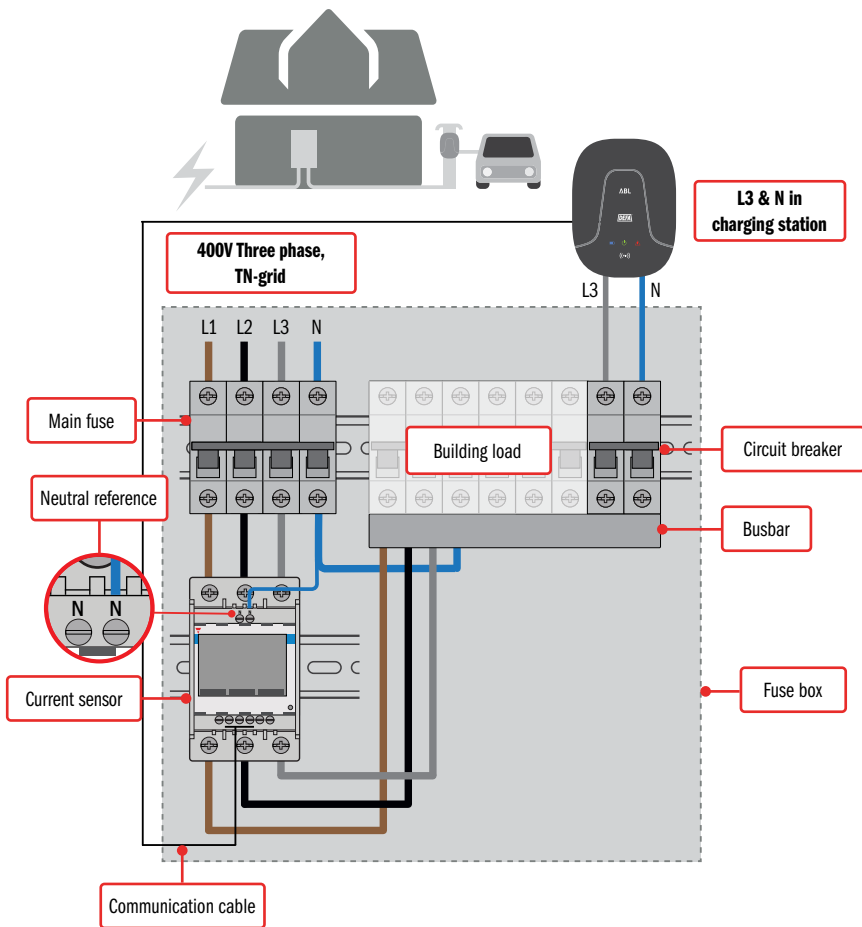
6.3.1 TN-GRID | THREE PHASES IN | THREE PHASE CHARGING | NORWAY



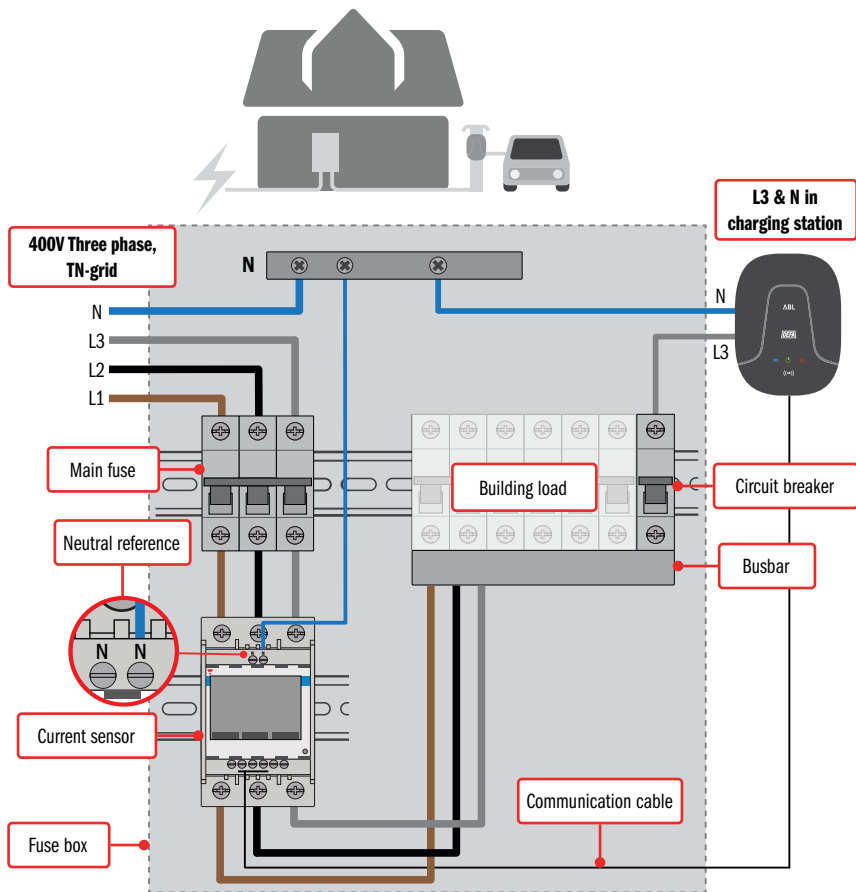
6.3.2 TN-GRID | THREE PHASES IN | THREE PHASE CHARGING | SWEDEN & FINLAND



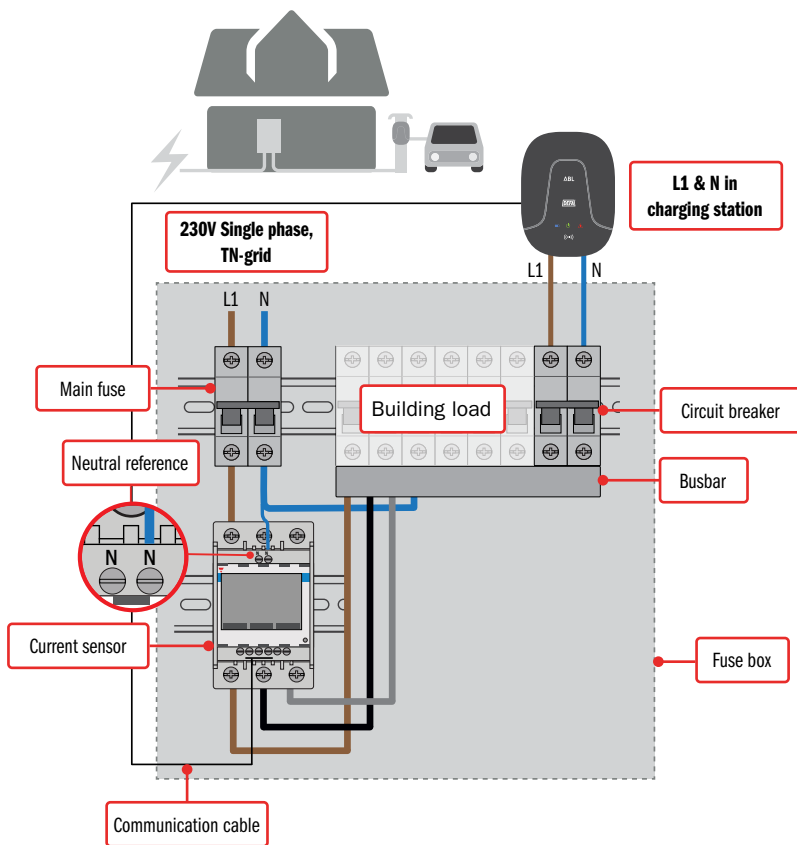
6.3.3 TN-GRID | THREE PHASES IN | SINGLE PHASE CHARGING | NORWAY



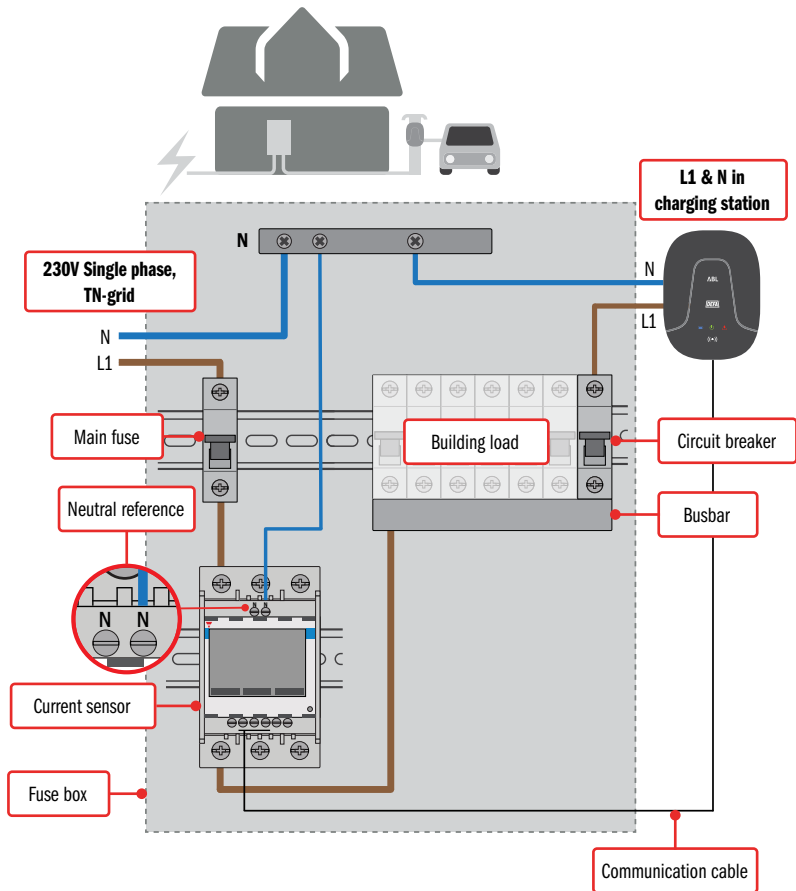
6.3.4 TN-GRID | THREE PHASES IN | SINGLE PHASE CHARGING | SWEDEN & FINLAND



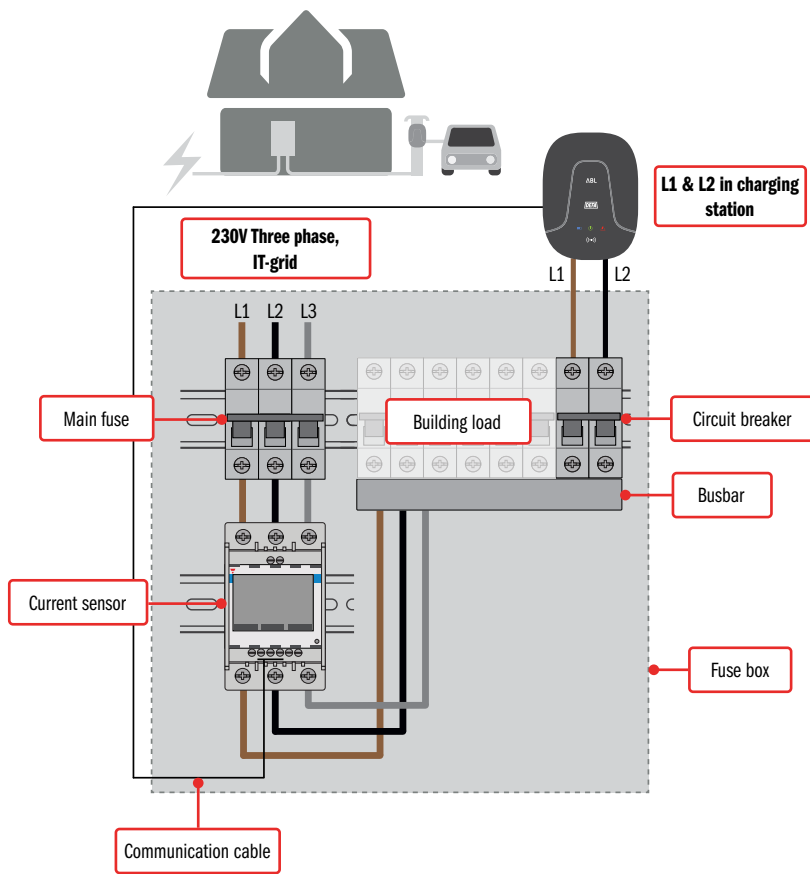
6.3.5 TN-GRID | SINGLE PHASE IN | SINGLE PHASE CHARGING | NORWAY



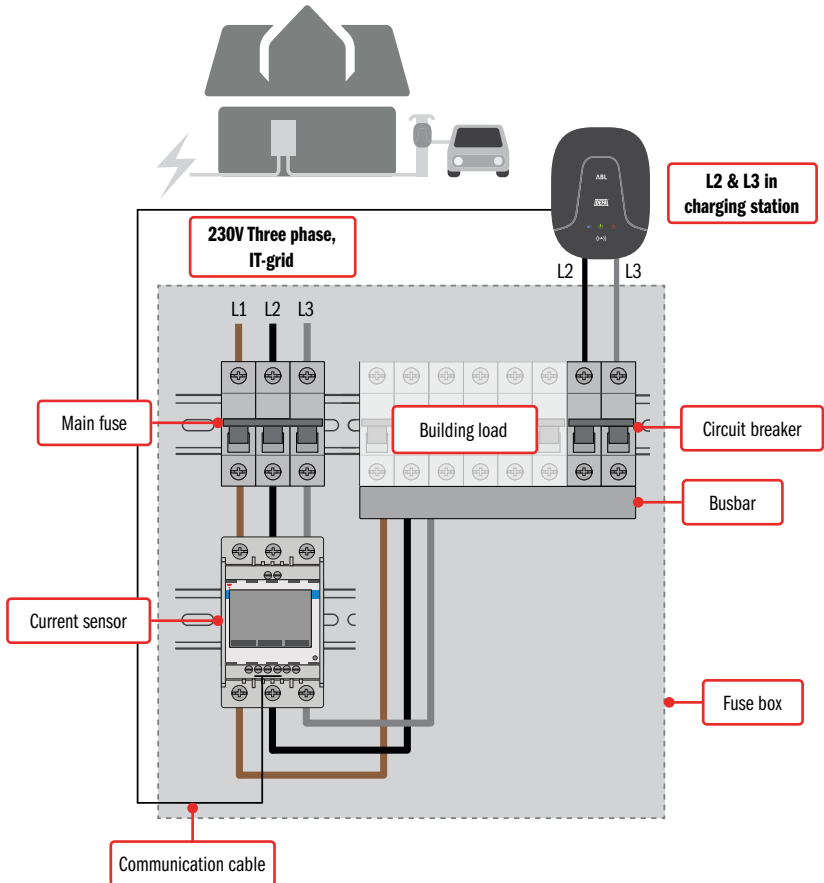
6.3.6 TN-GRID | SINGLE PHASE IN | SINGLE PHASE CHARGING | SWEDEN & FINLAND



6.3.7 IT-GRID | THREE PHASES IN | SINGLE PHASE CHARGING (L1-L2) | NORWAY

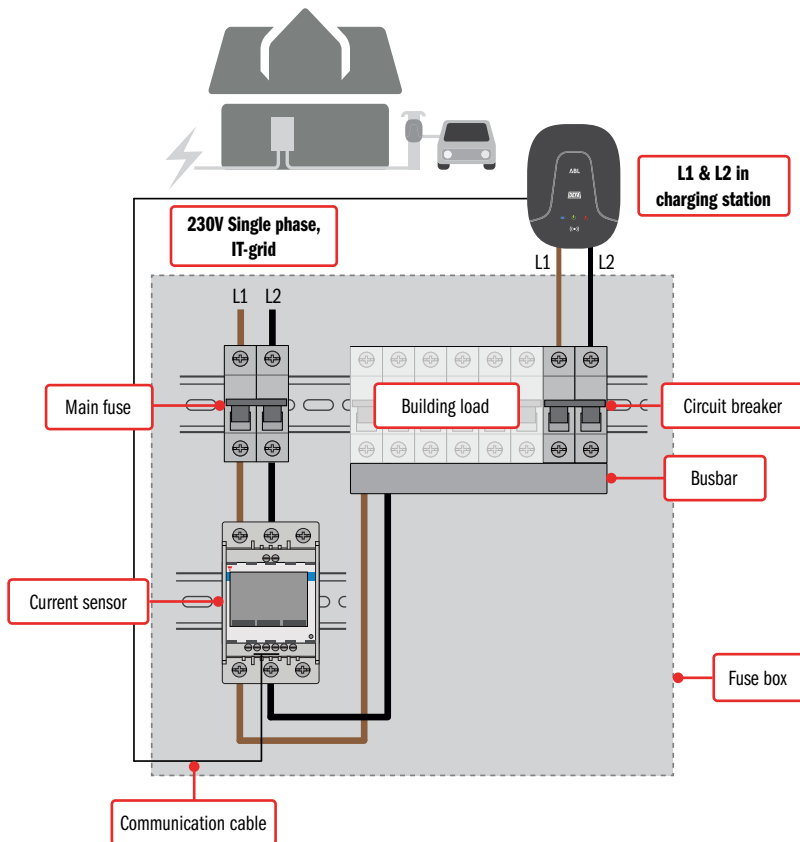


6.3.8 IT-GRID | THREE PHASES IN | SINGLE PHASE CHARGING (L2-L3) | NORWAY



6.3.9 IT-GRID | SINGLE PHASE IN | SINGLE PHASE CHARGING | NORWAY

 **Warning!** The eRange IQ 22kW (art. no.: 710477) must be connected to L1 and N when connected to single phase IT-grid.



6.4 CONNECT THE BUS COMMUNICATION

In order for eRange IQ to communicate with the current sensor installed in the fuse box, a communication cable must be connected between the devices.



NB! Use a communication cable with at least two twisted pairs, such as CAT5/6 cable.

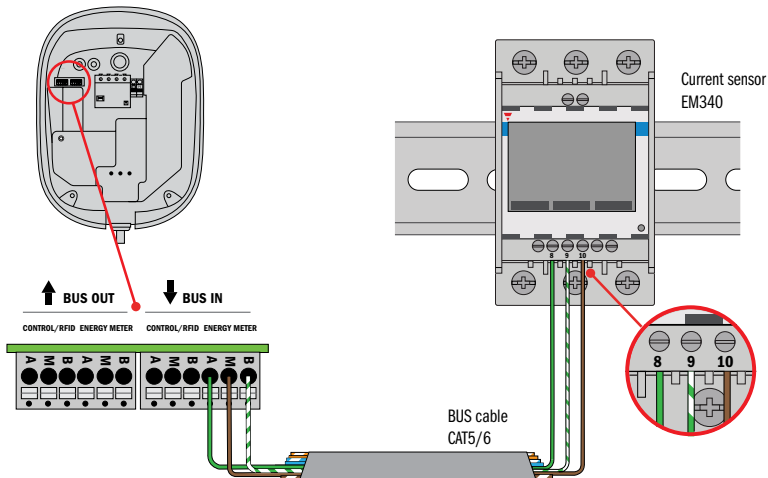
- ▶ Connect communication cable between the current sensor in fuse box and eRange IQ, as shown in the figures in chapter 6.4.1.

Communication cables should not be wired together with power cables. Attach the communication cables with nylon strips to appropriate mounting points.

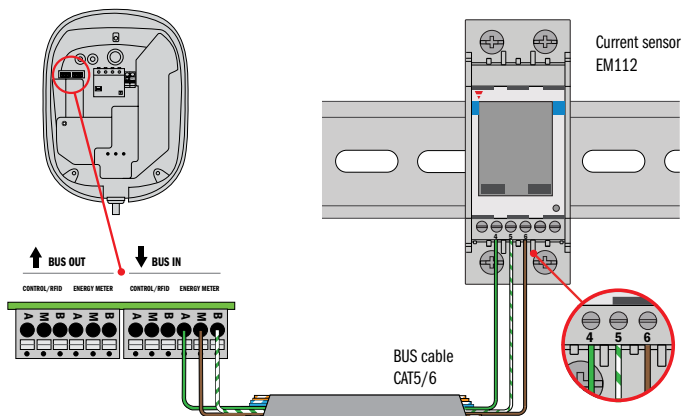
If the charging station is to be connected to a LAN network with an Ethernet cable, it is recommended to set it up simultaneously with the communication cable.

6.4.1 CONNECT THE CURRENT SENSOR

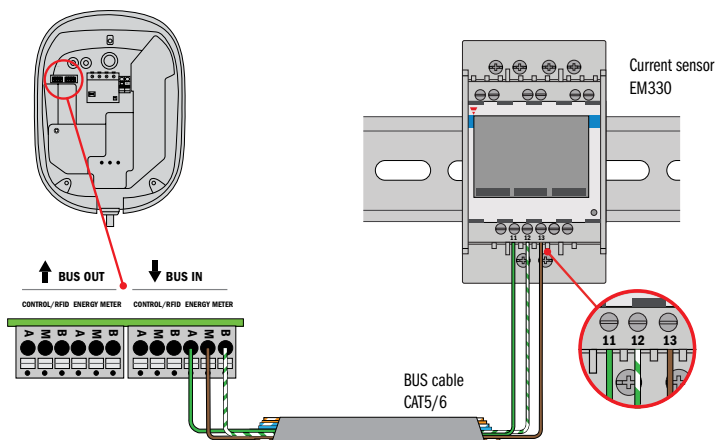
EM340



EM112



EM330



► The main fuse can now be turned on.



Warning! Check all connections before turning on the power.

7. Configuration

eRange IQ is delivered with a preconfigured load management unit - CLU. Depending on model, the following parameters are set from factory (see figure). If any of the preconfigured settings do not match the installation, these settings must be changed.

Preconfigured settings for CLU				
Article number	710476 710474	710490 712763	712431	710477
Charge point distribution	IT-grid	TN-grid	TN-grid	TN-grid
Charge point connection pattern	Single phase with rotation	Single phase with rotation	Three phases	Three phases
Current sensor	EM340	EM340	EM340	EM340
Main fuse size	50A	20A	20A	32A
Total charge current per phase	32A	16A	16A	32A
Max. charging current for charging station with addr. 1	30A	16A	16A	30A
Plug & Charge	Enabled	Enabled	Enabled	Enabled
Phases of charge point with addr. 1	L1-L2	L1	L1, L2, L3	L1, L2, L3

If no changes to the CLU configuration are required, verify that all CLU settings are correct before proceeding to network connection configuration.

7.1 CONNECT TO CLU HOTSPOT

Connecting to the load management unit, CLU, this can either be done by using a PC, tablet or a smartphone (Android or iOS). A hotspot will be activated. There are two alternative methods for connecting to the hotspot, either by using the QR code (A) or by selecting a network (B). Do the following:

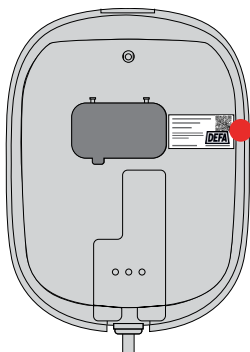
1. Turn off the 6A fuse mounted besides the RCD inside the charging station. Wait for 20 seconds, and then turn the power on.
2. A hotspot, a local area network, will be activated after one minute, allowing you to configure CLU and network connection wirelessly.

The hotspot will be active (possible to connect to) for 2 minutes. Once in the hotspot configuration menu, it will be active for one hour before logging off.

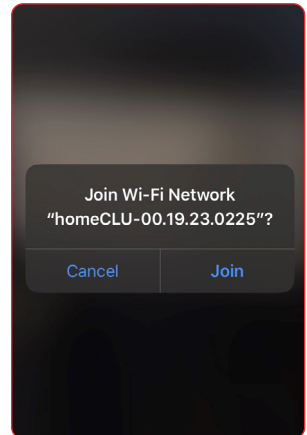
OPTION A - CONNECT TO THE HOTSPOT USING QR CODE

When using a smartphone, connection to the hotspot can be done by scanning the QR code attached on the plate behind the front cover, or to the outside above the outlet.

1. Use a QR scanner on your smartphone to scan the QR code.

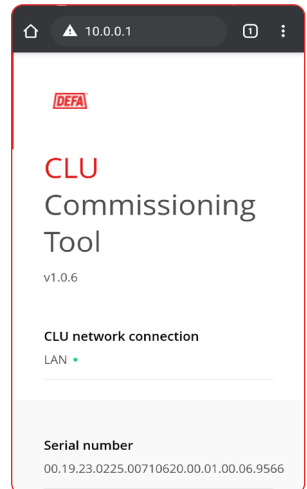


2. You will then be prompted to connect to the CLU network. When your mobile is connected to this network, a WiFi symbol appears on the phone as normal.



3. Open your browser, then enter **“10.0.0.1”** in the address bar and press search.
 - ▶ If the hotspot is disabled, you will receive a notification that your mobile phone failed to connect to the **“homeCLU network”**. Go back to chapter 7.1 and perform the process again.
 - ▶ If an Android phone is used for the connection, it may be necessary to disable mobile data in order for the phone to contact the hotspot.

Once connected, go to chapter 7.2 for CLU configuration.

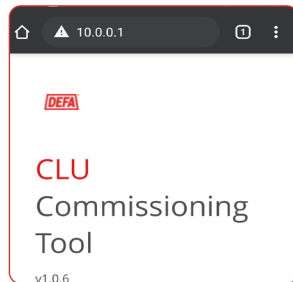
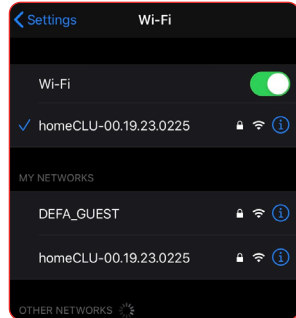


OPTION B – CONNECT TO HOTSPOT BY SELECTING A NETWORK

The hotspot can also be entered by using a PC, smartphone or tablet. Keep the device in close proximity to the charging station when connecting to the hotspot.

Follow this procedure:

1. Enter the network settings on the device, and access the **"homeCLU-network"**.
2. Network ID and password are attached to the plate behind the front cover, inside the charging station.
3. Open the browser, type **"10.0.0.1"** in the address bar and then press search.
 - ▶ If the hotspot is disabled, you will receive a notification that your mobile phone failed to connect to the **"homeCLU network"**. Go to chapter 7.1 and perform the process again.
 - ▶ If an Android phone is used for the connection, it may be necessary to disable mobile data be in order for the phone to contact the hotspot.



7.2 CLU CONFIGURATION

After entering “**10.0.0.1**”, this page will be displayed in your browser. To verify or make changes to the settings, do the following:

1. Press “**CLU configuration**” to enter the configuration page.

CLU

Commissioning Tool

v1.0.6

CLU network connection

LAN •

Serial number

00.19.23.0225.00710620.00.01.00.06.9566

CLU Type

homeCLU®

Last configured

Time

10:06:17

Date

11-03-2020

Name

Michael

Company

DEFA

 Network configuration

 CLU configuration

CLU configuration must be performed by a licensed electrician, the configuration page is therefore password protected.

2. Enter the default password: **"123456"**, then press **"OK"**.
3. On the CLU configuration page the following settings can be selected:

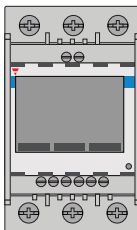
Type of distribution network: Select type of grid that supplies the sites location.

Charge point type: Select the charging system the charging station is connected to. See Connection alternatives, chapter 6.3 from page 11.

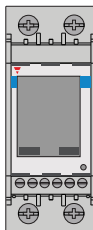
- ▶ **Single phase:** Connection alternatives 6.3.5, 6.3.6 and 6.3.9.
- ▶ **Single phase with rotation:** Connection alternatives 6.3.3, 6.3.4, 6.3.7 and 6.3.8.
- ▶ **Three phase:** Connection alternative 6.3.1 and 6.3.2.

Current sensor: Select the current sensor mounted in the fuse box:

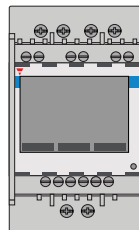
EM340



EM112



EM330



×

CLU configuration

Warning, to enter here you need to be a certified CLU installer.

Enter your installer password

.....|

Ok

homeCLU

Configuration

Main settings

Type of distribution network ?

☒ IT 230V ☐ TN 400V

Charge point connection pattern ?

Single-phase with rotation ▾

Current sensor in fuse box ?

CGEM340 ▾

Main fuse size: Select the size of the fuse measured by the current sensor.

Total charging current per phase: Select the charging current dedicated to each phase.

- ▶ For more information on the different settings press the “?” symbol for details.
- 4. When the main settings for the facility is verified, press the field with “**Address 1**” to view or edit charge point settings.

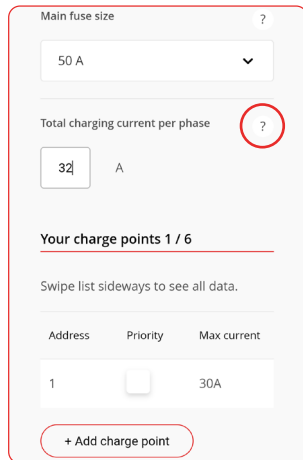
- 5. Make sure that “Address”, “Max current” and charge point features are set according to the installation settings.

Charge controller type: “eRange” is the control unit inside the charging station.

Plug & Charge: Enable setting for charging without authentication.

 **Note! If the charging station is not connected to Internet, “Plug & Charge” must be enabled. RFID authentication is only possible when CLU is connected online.**

- 6. Press “**Save Configuration**” when all features are checked and verified.



Main fuse size ?

50 A

Total charging current per phase ?

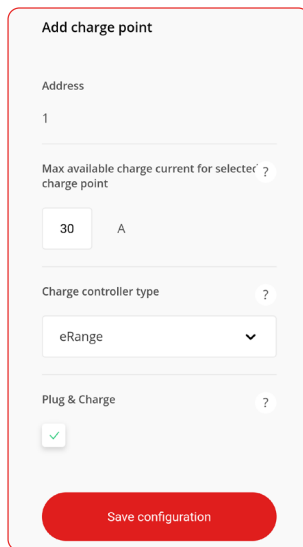
32 A

Your charge points 1 / 6

Swipe list sideways to see all data.

Address	Priority	Max current
1		30A

+ Add charge point



Add charge point

Address

1

Max available charge current for selected charge point ?

30 A

Charge controller type ?

eRange

Plug & Charge ?

☒

Save configuration

- Once the charge point settings are saved, the remaining configuration settings can be selected:

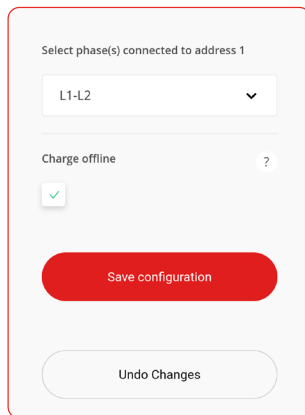
Phase(s) of charge point with address 1: Select the phase(s) connected to the charge point.

Charge offline: Allows for charging even if online connection is broken, check to enable.

- Press **“Save configuration”** once all settings are verified, or required settings have been selected.

- Before completing the configuration, type the name of the electrician and installer, then press **“Save configuration”**.

- Only authorized personnel should have access to the CLU configuration page. Change the password, do not share it with the charging station owner.



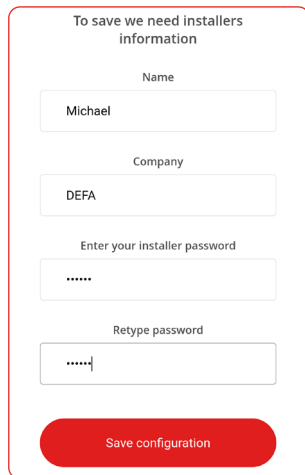
Select phase(s) connected to address 1

L1-L2

Charge offline ?

Save configuration

Undo Changes



To save we need installers information

Name

Michael

Company

DEFA

Enter your installer password

.....

Retype password

.....

Save configuration

7.3 NETWORK CONFIGURATION

1. If an online connection method other than LAN (factory default) is selected, or if the charging station is to operate in offline mode, press **“Network configuration”**.

Confer with the owner of the charging station regarding which type of online connection to use.

The owner can also perform network configuration. Information about this is provided to the owner in the Welcome eRange IQ | Get started - brochure.

2. Type default PIN, **“1234”**, to enter the network configuration.
 - ▶ The PIN code can be changed by pressing **“Change PIN code”**.

Last configured

Time
10:06:17

Date
11-03-2020

Name
Michael

Company
DEFA

 **Network configuration**

 **CLU configuration**

×

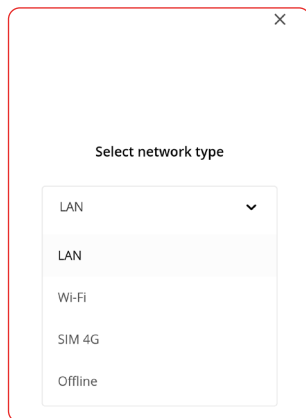
Type your PIN code

4 digits

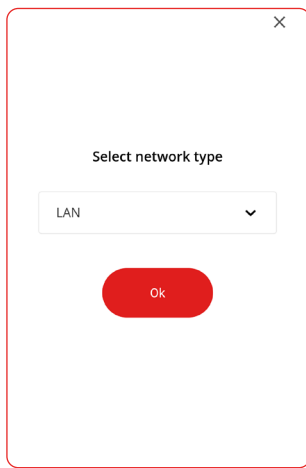
Ok

Change PIN code

3. Choose between **“LAN”** and **“WiFi”** for charging station connected online, or **“Offline”** if it is not connected online.



4. When the network type is selected, press **“OK”** to save



- ▶ If **"WiFi"** is selected, the following tab will appear. Select WiFi network, enter the password of the chosen network, then press **"OK"**.



Note! The WiFi network must be password protected for the charging station to connect to it.

5. The following tab will appear when network connection is selected and saved. Press **"OK"**. You will be then be taken back to the start menu, and the hotspot will be deactivated.

×

Connect to Wi-Fi

DEFA  

Enter password

.....

Ok

×

Network connection saved

Hotspot will turn off in 5 minutes.

Ok

7.4 CONCLUDE THE CONFIGURATION

- ▶ If the charging station is configured for online connection, contact DEFA support to verify connection to the back-end system. For contact information, see chapter 11, page 44.

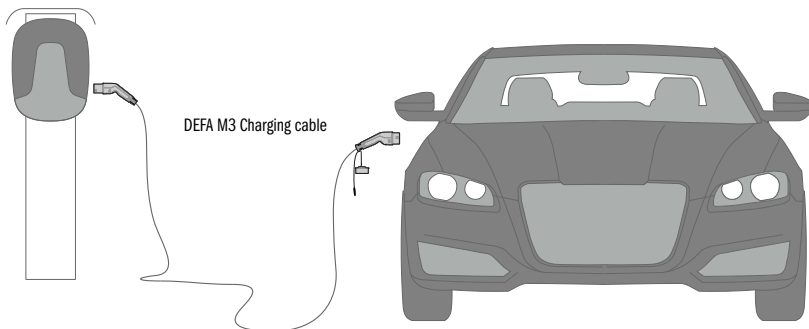
Once the installation and configuration of the charging station is completed, perform a test to verify the charging station operates as intended. See chapter 8 for testing and verification.

8. Testing and verification

- ▶ Check that the charging station LEDs indicate correct status. Connect a DEFA test box to the charging station. Set state to “C” (Charge), the charging station should either indicate a steady blue light - vehicle charging, or steady green - awaiting authentication. If authentication is required, test the planned authentication method. Authentication is indicated by a pulsating blue LED. Verify that charging starts. If charging does not start, authentication is denied or a failure is indicated, scan QR code, or visit defa.com for description of failure indications and troubleshooting.



- ▶ To test that load balancing is in operation, connect an electric vehicle to the charging station while other loads in the electric installation are in use. Verify by measuring that the main fuse load does not exceed the safety margins.



9. Information to the owner

Once the eRange IQ configured and tested, the installation of the charging station is complete. A welcome brochure for the owner of the charging station is included in the package. Please inform the customer to follow the instructions in the brochure.



Should there be any questions, contact DEFA support. See chapter 11 for contact information.

The labels (5 pcs.) are only used if the charging facility is extended by several charge points*.

When expanding the facility, the labels are placed near the outlet according to the corresponding address of the charge point.



* Several charge points connected to eRange IQ in a charging facility is a feature currently not enabled.

10. Controller configuration

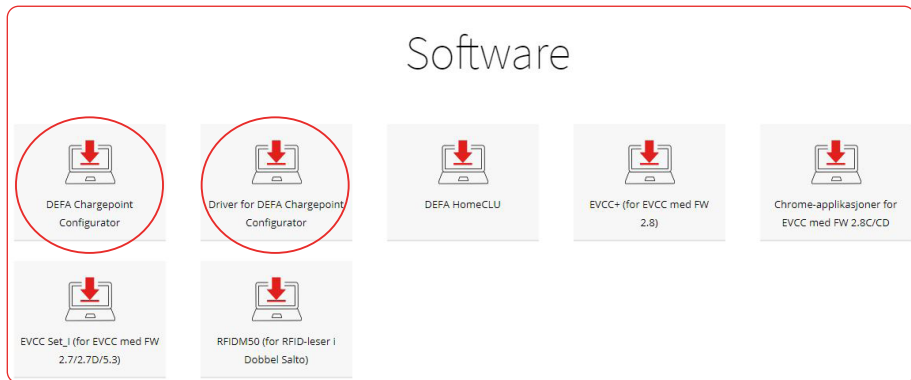
This chapter contains information of how to perform changes to the charging stations controller settings.

1. RFID reader
2. Control unit (EVCC2)
3. Energy meter in charging station and current sensor in fuse box

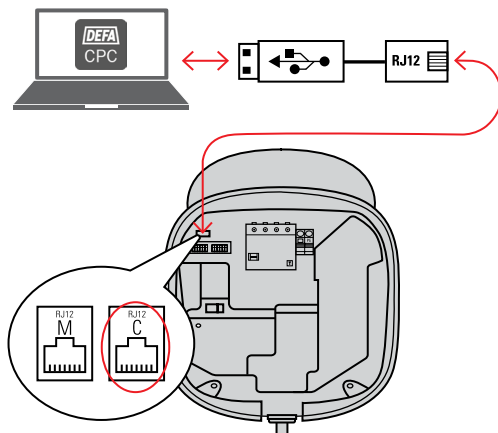
9.1 DOWNLOAD SOFTWARE AND CONNECT TO CPC

The DEFA chargepoint configurator (CPC) and Configuration kit (art. no.: 707824) are required to configure of the charging station. Do the following to download and connect the DEFA CPC to the charging station.

1. To install the CPC on a PC enter the **“Installer portal”** on **“defa.com”**. To be able to download from defa.com you must be a registered installer with DEFA. Enter the **“Software”** page in the installer portal and download both **“Driver for DEFA Chargepoint Configurator”** and **“DEFA Chargepoint Configurator”**. The driver must be installed before installing the DEFA CPC.



2. Connect the configuration kit to the RJ12-contact marked “C” and the USB-plug to the PC or Android phone.



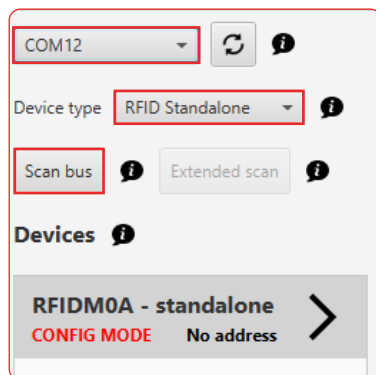
9.1.1 RFID READER CONFIGURATION



Note! If the charging station is to be used with load balancing, RFID reader must be configured for online mode whether this feature is in use or not.

Do the following to configure the RFID-reader:

1. Open the DEFA CPC program, select the highest COM-port and then “**RFID-standalone**” under device type and press “**Scan bus**”. Click “**RFID - standalone**” to enter the RFID settings.



2. When inside the “**RFID settings**” click on “**Set to online**”. - The window will update.

Device type RFIDM0A

Device mode Standalone

Load balancing ☐

iHigh 15

iLow 6

Locked ☐

RFID Authentication ☒

RFID Whitelist Edit

Current teach-in tag 04C3CB1A175F80 Edit

Device specification

Firmware: 1.1.65543

Set to online Leave config mode

3. Verify that it says “**RFIDM0A - online**
Address 1” in the device field.

COM12 ↻ i

Device type RFID Online i

Scan bus i Extended scan i

Devices i

RFIDM0A - online >
Address: 1

- ▶ If the address is not set to 1, click on **"RFIDMOA - online"** to enter RFID Settings. Change address to **"1"** and click **"Write"** to save the new address.

RFID Settings

Device type: RFIDMOA
Device type: Online
Address: 1

Device specification

Firmware: 1.1.263

Set to standalone

Undo changes Read Write **Write**

9.1.2 CONFIGURATION OF CONTROL UNIT

1. To configure the control unit, set device type to **"EVCC2"** and click **"Scan bus"**. Then click **"EVCC2, Address 1"** to enter the controller settings.

COM12

Device type: EVCC2

Scan bus Extended scan

Devices

EVCC2 Address: 1

- When inside the controller settings select the following parameters to put the control unit in CLU mode:

Mode	CLU
Address	1
Max Current	Set maximum charging current for the installation

- Click **"Write"** to save the new settings.

Controller settings

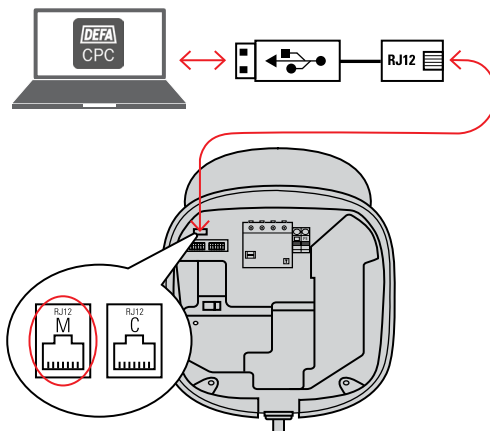
Device type: EVCC2
Mode: **CLU**
Address: **1**
Max Current: **32** A
State: A1
State description: Waiting for EV – no vehicle connected
Phase imbalance detection: ☐

Device specification
Firmware: 2.1
Rated current: 32A

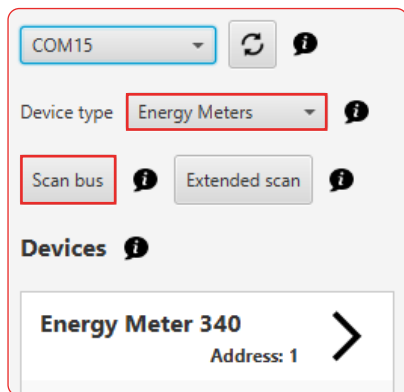
Undo changes Read **Write**

9.1.3 CONFIGURATION OF ENERGY METER AND CURRENT SENSOR

- Connect the configuration kit to the RJ12-contact marked **"M"** and the USB-plug to the PC or Android phone.



2. Set device type to “Energy meters” and click “Scan bus”.

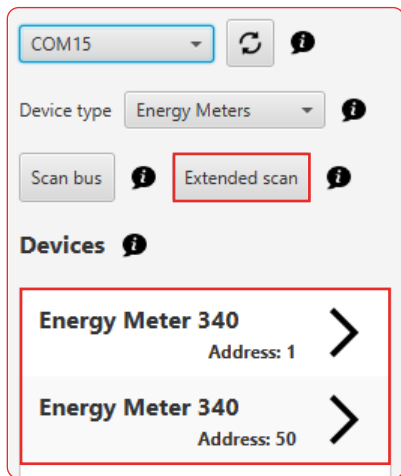


If the BUS is connected properly, both energy meter and current sensor will appear in the device list.

3. Click both “Energy meter 340, Address 1” and “Energy meter 340, Address 50” to enter device settings.

Failure to connect to either the energy meter (Adr. 1) or current sensor (Adr. 50) may be due to incorrect connection of the communication cable, or that one or both units are misconfigured.

- ▶ Try clicking “Extended scan” to find the missing unit(s).



4. When inside the energy meter settings, make sure the following parameters are correctly set for both units:

Address	1 - for energy meter in charging station 50 - for current sensor in fuse box
Baudrate	38400
Parity	NONE
Stop Bit	1

Select COM port  

Device type

Energy Meters 

Scan bus 

Extended scan 

Devices 

Energy Meter 340
Address: 1 

Energy Meter 340
Address: 50 

Energy meter settings

Device type CGEM340

Address

50 

Baudrate

38400 

Parity

NONE 

Stop bits:

1 

Undo changes

Read

Write

DEFA CPC can now be closed and the configuration kit can be disconnected from the charging station.

11. Contact information

If you have any questions, contact DEFA support:

Phone (Norway): +47 32 06 77 00

Phone (Sweden): +46 10 498 38 00

Phone (Finland): +358 (0)20 152 72 00

Keep the serial number and SSID ready. The type plate with serial number is located on the underside of the charging station. The SSID is located on the plate behind the front cover.



If you have any feedback on how the system or support can be improved, feel free to give us your input at connect@defa.com

Thank you for your cooperation!

