GREENFLUX DUAL SOCKET SMART CHARGING CONTROLLER

INSTALLATION MANUAL

(P/N: T2235-02)

2019-11-05; version 4.6

The award-winning GreenFlux Smart Charging Controller turns every charge point into a connected device.

www.greenflux.com

sMOVE 360° AWARD

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CONTENT

1 INTRODUCTION

This manual describes how to install the Smart Charging Controller in a safe and correct way. By following the instructions in this manual, the controller can be installed correctly in the charging station.

The functionality described in this document is made available by the current latest firmware, version **v4.3.2**.

The controller serves as central processor and controller for managing and controlling the charging station hardware. Using the controller, the charging station can connect to any charging station management platform via OCPP. It is also possible to use the controller in offline mode. This manual does not describe the configurations needed for the controller to function, for this we refer to the *GreenFlux Smart Charging Controller Configuration Manual*. Configuration changes can be executed either via OCPP by the charging station management platform or locally using the local management website tool provided with the controller (described in Section 5).

To give certain aspects more emphasis, the following two pictograms will be used in this document:

Warning! This text is important for the (personal) safety and/or the correct functioning of the system (charging station).

Informative. This text adds extra information to a certain subject.

In case of any questions not covered by this manual, please contact GreenFlux via info@greenflux.com.

2 THE SMART CHARGING CONTROLLER CONNECTIONS

The Smart Charging Controller can be connected to several components inside the charging station (refer to section 7.3 and section 8 for a schematic overview). To connect the controller with the different components, there are several connectors available. Depending on the desired configuration and the possibilities, all/some of the connectors must be connected. This section describes the different connectors and their functions. Besides this description, also an electrical wiring reference is available (*CCU wiring reference schematics*). This reference offers additional technical information necessary to install the smart charging controller in the charging station with minimum configuration and maximum safety.

2.1 GENERAL

Please refer to section 8 for the recommended connection diagram. Use this diagram for connecting the controller to your charging station hardware. Section 7.3 gives also information about the advised cable type to use for each connection.

2.2 IDENTIFICATION

At the bottom side of the housing the identification / product info label can be found. On this label, standard product and type information is given.

Serial number and ethernet MAC address are also available with a QRC, enabling automatic registration of the unit as part of an operational process of a charging station operator.

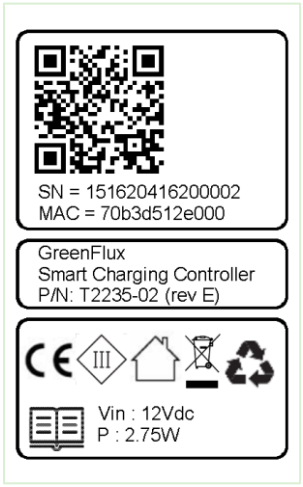


Figure 1 Product label

2.3 POWER SUPPLY AND RS485

For these connections, a standard Phoenix connector is used.

Type MC 1,5/4-ST-3,5

(PHOENIX CONTACT 1840382)

Figure 2 Standard screw Phoenix plug small

2.3.1 POWER

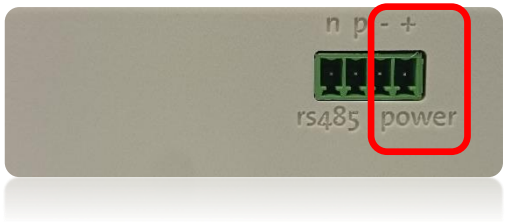


Figure 3 The 12V power connection

PIN	CONNECTION
+	The +12V connection of the external power supply
-	The Gnd (0V) connection of the external power supply

The controller must be connected to a stabilized 12V adapter (class III). The nominal power consumption of the controller is 2.75W, but peak power (steering of the servo locks) demands a 12V/2A power source. In the situation that a charging station with tethered cables is used (so no servo locks), the maximum power of the adaptor may be lower, depending on the power consumption of the other components powered by the controller.

The controller cannot be connected directly to 230V.

Make sure the power "- "connection is always connected to the Power Earth (PE) of the charging station itself. Failing to do this may result in damaging the controller!

When choosing the adapter, keep in mind that this adapter also needs to be able to power the charge connector switch relays and the connected LED signaling (for a longer period).

2.3.2 RS485

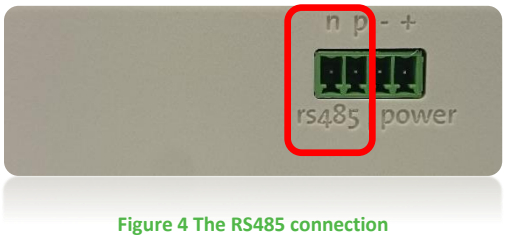


Figure 4 The RS485 connection

Functionalities for the external RS485 connection will become available in a future firmware release.

When using the external RS485 port to connect with a device outside the charging station, the cable must be shielded. The shield must be connected to the GND (-) pin of the controller.

Where appropriate, the cable ends may need termination by connecting 120 Ω resistors across N (-) and P (+) connections.

2.4 INTERNET CONNECTIVITY

The smart charging controller needs an internet connection to setup an OCPP connection to a charging station management platform. Depending on the location of the charging station, it could be preferable to use either a LAN ethernet connection or a GPRS wireless connection. To establish a connection to a charging station management platform, several configuration parameters need to be set correctly. This can be achieved using OCPP or the Local Management tooling (Section 5). It is also possible to use the smart charging controller in offline mode, when only limited functionality is required. Further details can also be found in the *GreenFlux Smart Charging Controller Configuration Manual.*

For connecting the LAN, mobile antenna and SIM card, following connectors / slots are available:

Figure 5 The LAN port, GPRS antenna and SIM card holder

2.4.1 LAN

PIN	CONNECTION
LAN	RJ45 Ethernet cable to router

The RJ45 cable needs to be connected to an external network. When using an ethernet cable for an outdoor charging station, the cable must be a shielded version (CAT6). The shielding of the cable must be connected to the cable connector ground signal (or connector housing).

When connecting the controller to a LAN environment (e.g. a company network) the network connection needs to be secured, both physically and by its network configuration thus assuring there is no unwanted/undesired intervention with the charging station and/or your LAN network.

It is advisable to always use a mobile connection as backup (antenna and SIM card installed) in addition to the LAN connection for robustness.

The LAN network requirements are:

- Allow incoming/outgoing traffic on port 80 (UDP/TCP).
- Have a DHCP server active (to receive an IP address and DNS information).
- Should not be placed behind a so-called proxy server.

If these conditions are not met, no Backoffice connection can be established using the LAN connection.

2.4.2 GPRS

PIN	CONNECTION
GPRS	On this SMA connector a GPRS antenna can be connected
SIM	A micro SIM card can be inserted with the chip point upwards.

Depending on the telecom operator, the area the charging station is installed and the frequency bands that are used, the charging station manufacturer needs to select an appropriate antenna. In selecting an antenna, local requirements regarding Telecom/FCC/CCC/… must be followed.

Inserting a SIM card is possible with the case closed. To remove a SIM card, the case needs to be opened. The SIM can then be removed carefully, by sliding it out of the socket.

Using GPRS is only necessary when there is no LAN connection available. A GPRS connection is however always recommended as a backup connection.

Instead of the standard SMA antenna an external antenna (outside the charge point) can be used, this in case of pore receiving circumstances.

Figure 6 Example of an external GPRS antenna

2.4.3 INTERNET (COMBINATION)

A combination of both network connections (LAN and GPRS) is also possible and adds robustness for connectivity. Depending on the used internet connections, the correct configuration also needs to be activated in the cloud platform. More information on how to do this can be found in the *GreenFlux Smart Charging Controller Configuration Manual*.

When both connections are activated, the secondary connection (the configuration parameters specify which connection is the primary/secondary) will automatically function as a fallback connection.

2.5 CHARGING RELAYS

For this connection, a standard screw/plug Phoenix connector is needed.

Type MSTBT 2,5/4-ST

(PHOENIX CONTACT 1754481)

Figure 7 Standard screw/plug Phoenix plug big

Figure 8 Charging current relay connections

PIN	CONNECTION
(1)	Controls the AC Main contactor relay. for socket 1. The right pin (of relay control 1) will go to the positive connection of the 12V adapter. The left pin (of relay control 1) will go the A1 connection of the relay for socket 1 and carries the control signal. Activating this relay will enable energy delivery to the connected EV.
(2)	Controls the AC Main contactor relay. for socket 2. The right pin (of relay control 2) will go to the positive connection of the 12V adapter. The left pin (of relay control 2) will go the A1 connection of the relay for socket 2 and carries the control signal. Activating this relay will enable energy delivery to the connected EV.

The controller must only control relays with a 12-24V control signal (helper relays). **Using a directly 230V controlled relay is not allowed!**

Make sure the actual used contactor relays have at least the switching capacity value of the nominal value as defined for the charging station. These values should match controller configuration settings (please refer to the *GreenFlux Smart Charging Controller Configuration Manual*).

Please refer to section 8 (Connection diagram) for connecting the relays in the correct way.

The used power adapter (see Section 2.3.1) for feeding the relays must be able to deliver the additional necessary steering power during longer period.

2.6 RFID READER

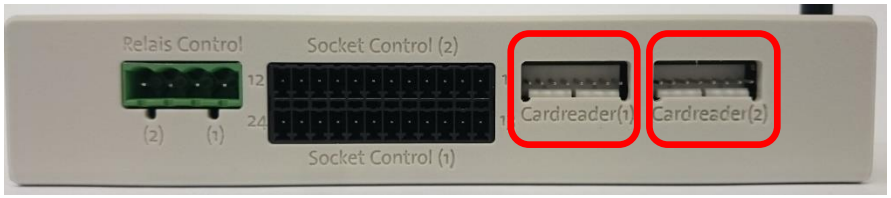


Figure 9 Card reader connections

It is possible to install one or two RFID readers. Regardless of how many RFID readers are connected, they need to be configured correctly for the controller. Please refer to the *GreenFlux Smart Charging Controller Configuration Manual* how to do this.

PIN	CONNECTION
Cardreader (1)	Connection for RFID card reader on socket 1 (and when configured, also for socket 2).
Cardreader (2)	Connection for RFID card reader on socket 2 (if applicable).

For a charging station without authentication, an RFID reader is not necessary. Please refer to the *GreenFlux Smart Charging Controller Configuration Manual*.

When a charge point with two sockets uses one RFID reader, only one reader should be installed (socket 1 / Card reader(1)).

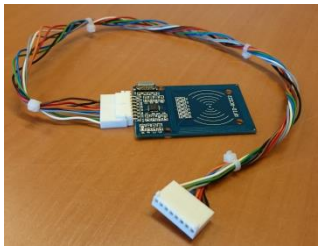


Figure 10 A RFID card reader

The detailed pinning of the RFId reader connector is defined as follows (for both connectors from left to right, refer to Figure 9):

PIN	CONNECTION
1	+3V3
2	RST
3	GND
4	IRQ

5	MISO
6	MOSI
7	SCK
8	SDA (SS0/chip select)

2.7 SOCKET CONTROL

For this connection, a standard push-in spring Phoenix connector is needed.

Type FMC 1,5/12-ST-3,5

(PHOENIX CONTACT 2776497)

Figure 11 Standard push-in spring Phoenix plug

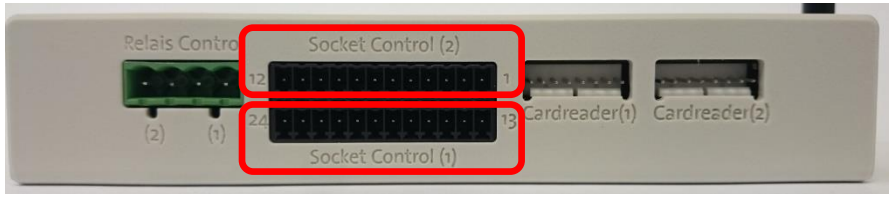


Figure 12 Socket Control connections

- **socket 1 : Pin 13 up to 24 must be used.**
- **socket 2 : Pin 1 up to 12 must be used.**

2.7.1 SOCKET 1

Pin 13 up to 24 must be used for controlling socket 1:

PIN	CONNECTION	INFO
13	PP (proximity pilot / plug presence)	Charge cable type detection
14	CP (control pilot)	Communication with (PH)EV
15	Temperature	Temperature sensor connection
16	Ground	Use with temperature sensor or attached cable model
17	LED red	Status of socket for user
18	LED green	Status of socket for user
19	LED blue	Status of socket for user

20	S0+ or RS485P	Measuring of charging (PH)EV
21	S0- or RS485N	Measuring of charging (PH)EV
22	Servo control	Servo pin 1 (must remain unconnected when outlet is a tethered cable)
23	Servo control	Servo pin 2 (must remain unconnected when outlet is a tethered cable)
24	Servo control	Servo pin 3 (must remain unconnected when outlet is a tethered cable)

When choosing a fixed cable setup, a PP-resistor with the correct cable value (IEC 61851-1 Ed. 2.0) must be connected between pin 13 and 16 for socket 1.

Resistor value	**Current capability of the cable assembly**
1,5 kΩ 0.5 W	13 A
680 Ω 0.5 W	20 A
220 Ω 0.5 W	32 A
100 Ω 0.5 W	63 A (3 phase) / 70 A (1 phase)

For a 1-phase charging station configuration, the usage of an S0 pulse meter is possible (though not recommended). For a 3-phase charging station configuration only an RS485 meter should be used.

When using a S0 pulse meter, make sure the pulse/kWh value is set properly in the charging station configuration. When this is not set up correctly, the overload protection does not function properly. Please refer to the *GreenFlux Smart Charging Controller Configuration Manual*.

The reason pulse meters are not recommended is that for optimal functioning of the GreenFlux Smart Charging controller, the charging current of the vehicle should be known. When a pulse meter is used, the controller calculates the current from the kWh-measurements coming from the S0-meter, assuming a fixed (configurable) voltage (e.g. 230V in Europe). Since the voltage can deviate in different locations, the calculated current may deviate from the actual current.

Only PT100 temperature sensors are supported.

Only Common Anode type power LEDs with integrated resistors must be used. For the correct connection of the LEDs see the schematic diagram attached at the end of this manual (section 8).

When the LEDs are powered using the default +12V LED power supply, make sure that the power adapter is suited to deliver this (extra) power to the LEDs (see Section 2.3.1).

A servo connector cable must be properly connected to the numbered servo pins on the controller. A servo will likely have these numbers inscribed near its ouputs or it can be found on the connector cable used with the servo.

In case of using a servo lock with inverted positioning signal support (pin2) , please refer to the *GreenFlux Smart Charging Controller Configuration Manual*. With the configuration item

"*InversedServo*" the signaling behavior can be adjusted to match the desired detection condition.

Both, two-stage and three-stage servo lock actuators are supported. Please refer to the *GreenFlux Smart Charging controller Configuration Manual*. With the configuration item "*3StageServo*" the correct servo lock type can be selected.

If a charging station uses tethered cables, the servo lock signals must not be used/connected.

2.7.2 SOCKET 2

Pin 1 up to 12 must be used for controlling socket 2:

PIN	CONNECTION	INFO
1	PP (proximity pilot / plug presence)	Charge cable type detection
2	CP (control pilot)	Communication with (PH)EV
3	Temperature	Temperature sensor connection
4	Ground	Use with temperature sensor or attached cable model
5	LED red	Status LED of socket for user
6	LED green	Status LED of socket for user
7	LED blue	Status LED of socket for user
8	S0+ or RS485P	Measuring of charging (PH)EV
9	S0- or RS485N	Measuring of charging (PH)EV
10	Servo control	Servo pin 1 (must remain unconnected when outlet is a tethered cable)
11	Servo control	Servo pin 2 (must remain unconnected when outlet is a tethered cable)
12	Servo control	Servo pin 3 (must remain unconnected when outlet is a tethered cable)

When choosing a fixed cable setup, a PP-resistor with the correct cable value (IEC 61851-1 Ed. 2.0) must be connected between pin 1 and 4 for socket 2.

Resistor value	**Current capability of the cable assembly**
1,5 kΩ 0.5 W	13 A
680 Ω 0.5 W	20 A
220 Ω 0.5 W	32 A
100 Ω 0.5 W	63 A (3 phase) / 70 A (1 phase)

For a 1-phase charging station configuration, the usage of an S0 meter is possible (though not recommended). For a 3-phase charging station configuration only an RS485 meter should be used.

When using a S0 meter, make sure the pulse/kWh value is set properly in the charging station configuration. When this is not set up correctly, the overload protection does not function properly. Please refer to the *controller configuration manual*.

The reason pulse meters are not recommended is that for optimal functioning of the GreenFlux Smart Charging controller, the charging current of the vehicle should be known. When a pulse meter is used, the controller calculates the current from the kWh-measurements coming from the S0-meter, assuming a fixed (configurable) voltage (e.g. 230V in Europe). Since the voltage can deviate in different locations, the calculated current may deviate from the actual current.

Only PT100 temperature sensors are supported.

Only Common Anode type power LEDs with integrated resistors must be used. For the correct connection of the LEDs see the schematic diagram attached at the end of this manual (section 8).

When the LEDs are powered using the default +12V LED power supply, make sure that the power adapter is suited to deliver this (extra) power to the LEDs (see Section 2.3.1).

A servo connector cable must be properly connected to the numbered servo pins on the controller. A servo will likely have these numbers inscribed near its ouputs or it can be found on the connector cable used with the servo.

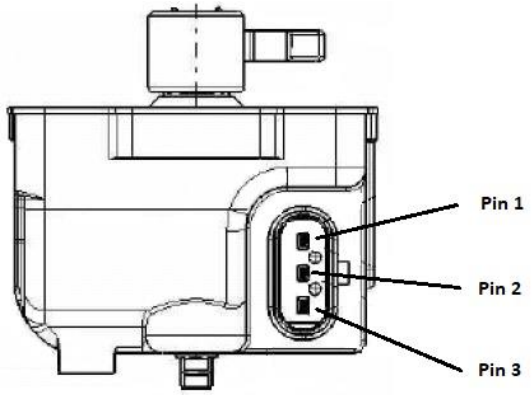
In case of using a servo lock with inverted positioning signal support (pin2) , please refer to the *controller configuration manual*. With the configuration item "*InversedServo*" the signaling behavior can be adjusted to match the desired detection condition.

Both, two-stage and three-stage servo lock actuators are supported. Please refer to the *GreenFlux Smart Charging controller Configuration Manual*. With the configuration item "*3StageServo*" the correct servo lock type can be selected.

If a charging station uses tethered cables, the servo lock signals must not be used/connected.

2.7.3 SUPPORTED SERVO LOCK ACTUATORS

The DSCU supports the usage of two-stage (Mennekens) and three-stage (Phoenix) actuators. For connecting the servo lock actuator to the controller there are 3 pins available on the controller, called **Pin1**, **Pin2** and **Pin3** (refer to 2.7.1and 2.7.2). Next pictures show the connection diagram for both type of actuators:



Mennekens lock and actuator

Greenflux reference

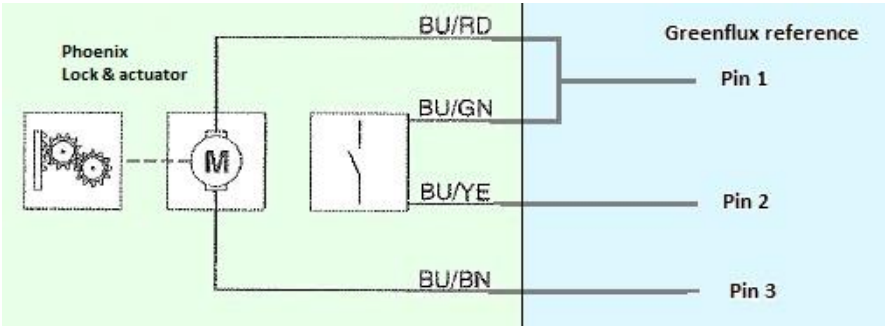


Figure 13 Actuator pinning for two- and 3-stage actuators

2.7.4 SUPPORTED KWH-METERS

Currently, the listed meters are supported. New meter drivers can be added, please contact GreenFlux about this via info@greenflux.com.

When connecting a meter to the controller, the controller must be updated regarding its meter configuration. This is done by setting the correct value for the configuration parameter 'MeterType'. The correct value can be found in the table below. For information on how to change configurations please use the *GreenFlux Smart Charging Controller Configuration Manual.*

TYPE	BRAND	INFO	'MeterType' configuration setting
RS485	ABB B23	Connect via Modbus. Meter is set up in the software.	**1**
RS485	Carlo Gavazzi EM24DIN	Connect via Modbus. Meter is set up in the software.	**2**
S0/puls	-	Pulses/kWh value must be configured. Please refer to the *controller configuration manual*. The use of a pulse meter is supported, but not recommended.	**3**
RS485	Eastron SDM630	Connect via Modbus. Meter is set up in the software.	**4**
RS485	Carlo Gavazzi EM340	Connect via Modbus. Meter is set up in the software.	**5**
RS485	Phoenix Contacts EEM350	Connect via Modbus. Meter is set up in the software.	**6**
RS485	Tele S6 XM50A 1000VM	Connect via Modbus. Meter is set up in the software.	**7**
RS485	Tele S9 XM300A 1000VM	Connect via Modbus. Meter is set up in the software.	**8**
RS485	EKM Omnimeter Pulse UL v.4 Modbus	Connect via Modbus. Meter is set up in the software.	**9**

RS485	EKM Metering Omnimeter Pulse UL v.4	Connect via Modbus. Meter is set up in the software. **Note** : special EKM serial communication is used.	**10**
RS485	Konect 1.4	Connect via Modbus. Meter is set up in the software.	**11**
RS485	CET PMC-340	Connect via Modbus. Meter is set up in the software.	**12**
RS485	Carlo Gavazzi EM111	Connect via Modbus. Meter is set up in the software.	**13**
RS485	Eastron SDM230	Connect via Modbus. Meter is set up in the software.	**14**
RS485	Iskra WM3-6	Connect via Modbus. Meter is set up in the software.	**15**
RS485	Schrack MGRZK465	Connect via Modbus. Meter is set up in the software.	**16**

Furthermore, the communication configuration settings on the meter itself need to be set to the correct value, please check the manual of the meter manufacturer for instructions on how to do this.

BRAND	BAUD RATE	BYTE SIZE	PARITY	STOP BITS	ADRES
ABB B23	19200	8	EVEN	**1**	**1**
Carlo Gavazzi EM24DIN	9600	8	NONE	**1**	**1**
Pulse (S0)	-	-	-	**-**	**-**
EASTRON SDM630	9600	8	NONE	**1**	**1**
Carlo Gavazzi EM340	9600	8	NONE	**1**	**1**
Phoenix Contacts EEM350	9600	8	NONE	**1**	**1**
Tele S6 XM50A 1000VM	9600	8	NONE	**1**	**1**
Tele S9 XM300A 1000VM	9600	8	NONE	**1**	**1**
EKM Omnimeter Pulse UL v.4 Modbus	9600	8	NONE	**1**	**1**

EKM Metering Omnimeter Pulse UL v.4	9600	7	EVEN	**1**	**1**
Konect 1.4	9600	8	NONE	**1**	**1**
CET PMC-340	9600	8	NONE	**1**	**1**
Carlo Gavazzi EM111	9600	8	NONE	**1**	**1**
Eastron SDM230	9600	8	NONE	**1**	**1**
Iskra WM3-6	9600	8	NONE	**2**	**1**
Schrack MGRZK465	9600	8	NONE	**2**	**1**

The reason pulse meters are not recommended is that for optimal functioning of the GreenFlux Smart Charging controller, the charging current of the vehicle should be known. When a pulse meter is used, the controller calculates the current from the kWh-measurements coming from the S0-meter, assuming a fixed (configurable) voltage (e.g. 230V in Europe). Since the voltage can deviate in different locations, the calculated current may deviate from the actual current.

3 ZE/EV READY

The Smart Charging Controller contains all necessary functionalities to create a charging station that complies to the ZE and EV READY specifications. Some of these requirements also have an impact on other components in the charging station.

To set up a ZE Ready charging station, the requirements such as described in the '**ZE READY**' specification must be respected.

To set up an EV Ready charging station, the requirements such as described in the '**EV READY**' specification must be respected.

4 SERVICE AND SAFETY STATEMENT

Statement about Service and Safety regarding the smart charging controller.

4.1 SERVICE

The smart charging controller does not have any serviceable parts inside. It is for that reason that there is no specific service manual available for the controller. However, the controller is always a component used in an actual charging station. For all service-related issues, please refer to the service manual of the charging station.

4.2 SAFETY

The smart charging controller is not submitted to specific safety regulations. It is for that reason there is no safety manual available for the controller. However, the controller is always a component used in an actual charging station. For all safety related issues, please refer to the safety manual of the charging station.

5 LOCAL MANAGEMENT

5.1 GENERAL

The controller supports a locally hosted website that can be used for configuration, testing and analyzing purposes. Using e.g. a laptop, access can be gained by connecting the laptop to the Ethernet (LAN) port of the controller. An internet browser is used to start the local management website of the controller. The connected service device will have to be configured for setting up a connection with the charging stations ethernet LAN connection. In short:

- IP address needs to set to **10.1.0.111** (fixed IP).
- **IMCP (IP4);** "ping" support must be enabled (Firewall setting).

The Local Management local website is best viewed using Firefox® or Google Chrome® and is accessible on **URL: 10.1.0.110** when connected.

5.2 SERVICE DEVICE (LAPTOP) SET UP

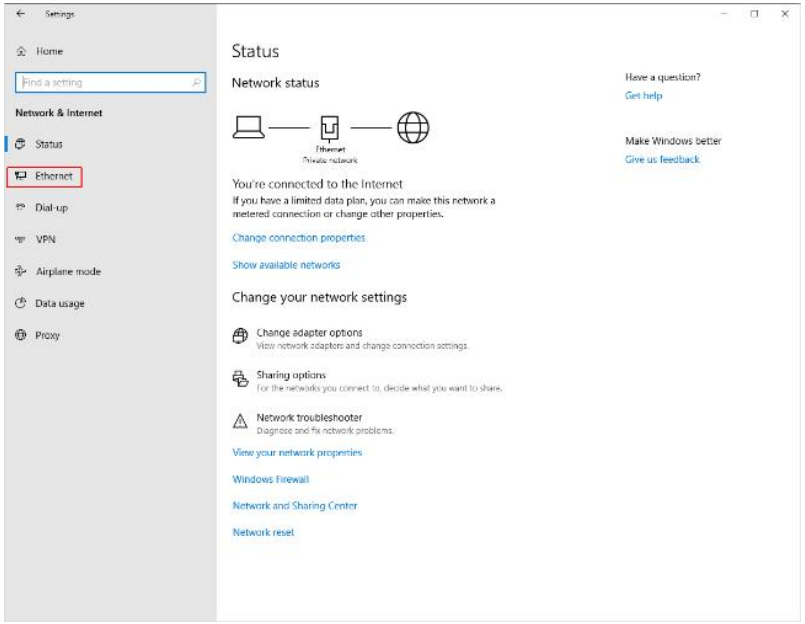
5.2.1 IP/SUBNET MASK SETTINGS ON SERVICE DEVICE (WINDOWS)

The service device (mostly a laptop) needs to be set up to make it ready for connecting with the local management website of the controller. Therefor some adjustments must be made to the laptop's configuration. The IP address and firewall need to be changed for gaining access to the website of the controller. The laptop needs a specific configuration setup to enable connecting to the charging station controller:

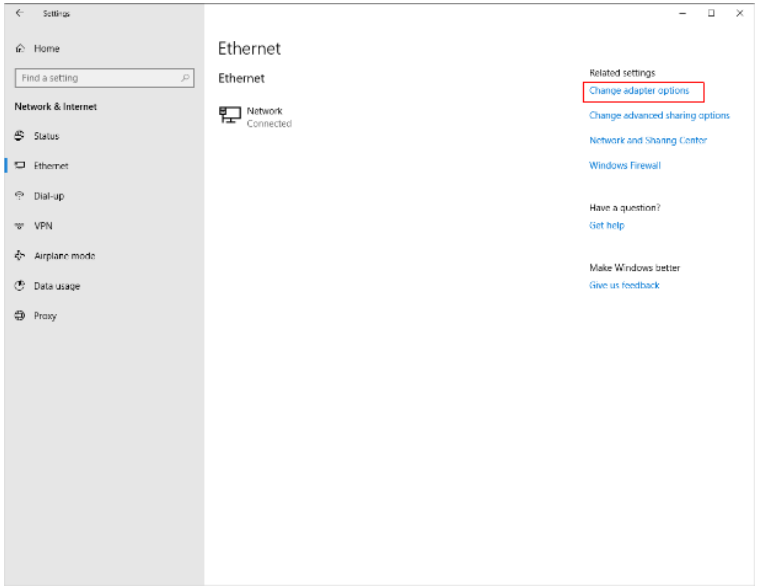
- IP address set to **10.1.0.111** (fixed IP).
- **IMCP (IP4);** "ping" support must be enabled for all domains (Firewall setting).

Follow the procedure below to set up the service device (Laptop) for use with local management for a **Windows 10®** operating system. Using other types of Operating systems (e.g. Linux® / MAC OS®) will have their own way of setting up the above given connection requirements. This manual will not elaborate on this.

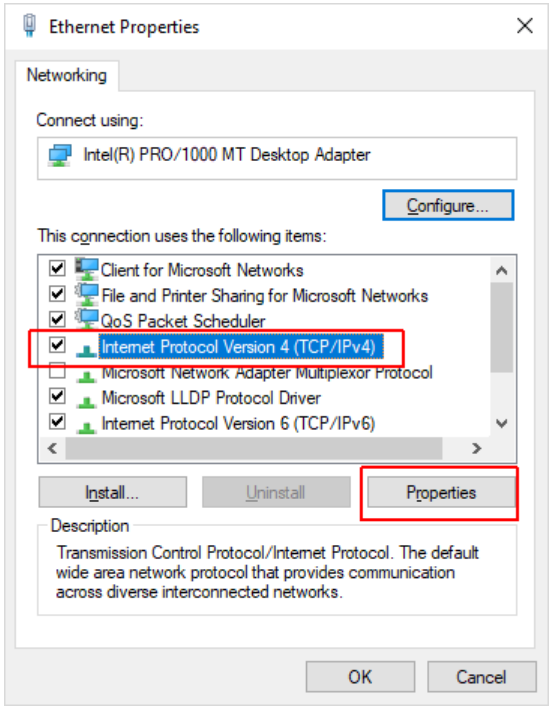
1. Click "Start", select "Settings" and open the "Network & Internet" settings.
2. In the left pane, select the topic "Ethernet".



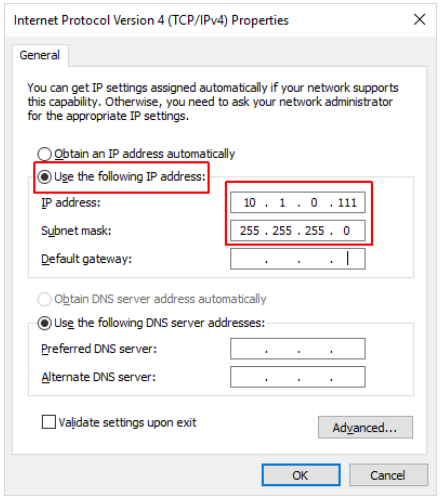
3. On the right, click on “Change adapter options”



4. Select the adapter to configure, then do a right-button click on it and select “Properties”.
5. In the appearing window, Select the Internet Protocol Version 4 (TCP/IPv4) setting and click properties.



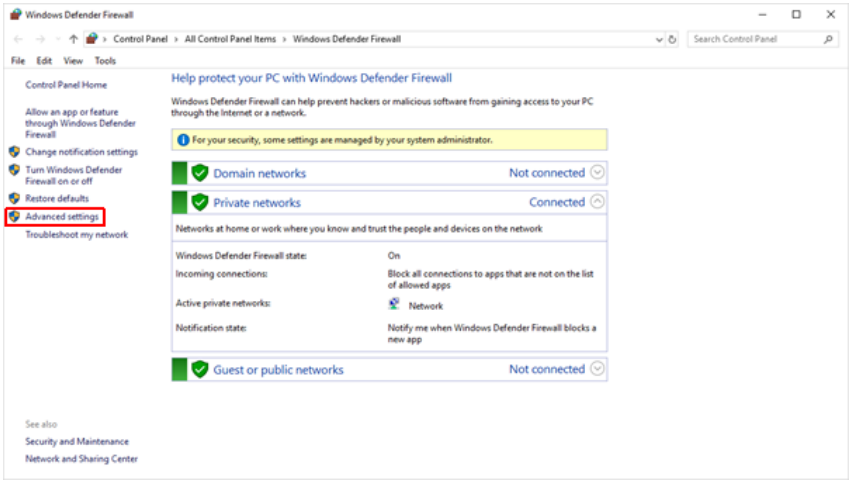
6. In the new screen, adjust the IP address and the subnet-mask of the adapter as shown below. Make sure:
   - Use **10.1.0.111** as the IP address and
   - Set the subnet mask to **255.255.255.0**

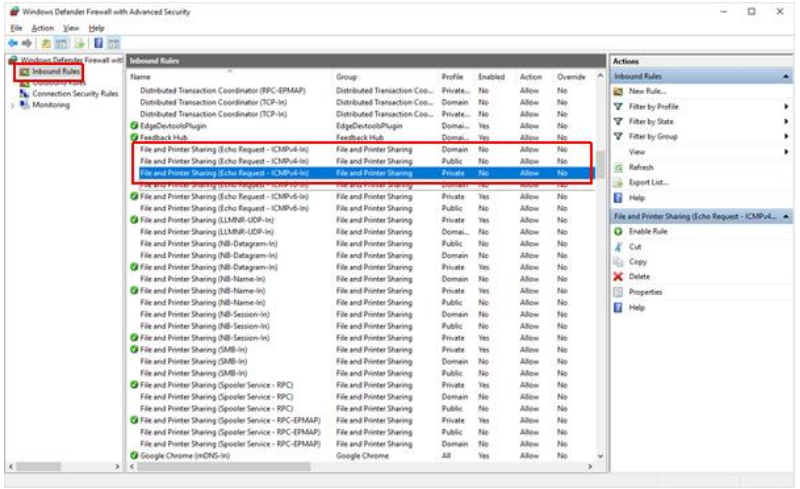


7. Click “OK”, close all windows.
8. For the configuration to work properly the adapter needs to be reset by unplugging and re-plugging the LAN cable.

5.2.2 FIREWALL SETTINGS (“PING” SUPPORT)

1. Click “Start” and search for “Windows Defender Firewall” (simply type in the start menu). Click on the “Windows Defender Firewall” icon that appears.
2. Select “Advanced Settings” on the left.





3. In the appearing window, in the left pane select “Inbound Rules”.

4. In the middle pane look for the rules titled “File and Printer Sharing (*Echo Request - ICMPv4-In*)”.
5. Make sure that all rules above rules for all profiles (Domain, private and Public) are **enabled** (by selecting the rule and clicking “enable rule” in the right pane). A green checkmark must be shown.

At this point your service device is setup and can be used to access the Local Management functionality provided by the controller.

5.3 USING THE LOCAL MANAGEMENT WEBSITE

5.3.1 CONNECTING

To gain access to the Local Management website of the controller make sure the charging station is up and running and use a standard LAN cable to connect your service device (laptop) with the controller using the LAN port of both the controller and the service device.

Please allow 2 minutes after starting up the charging controller before connecting the service device. Also, after disconnecting the LAN cable, allow 2 minutes before reconnecting again.

For using the local management functionality, it is **not needed** to remove the SIM card.

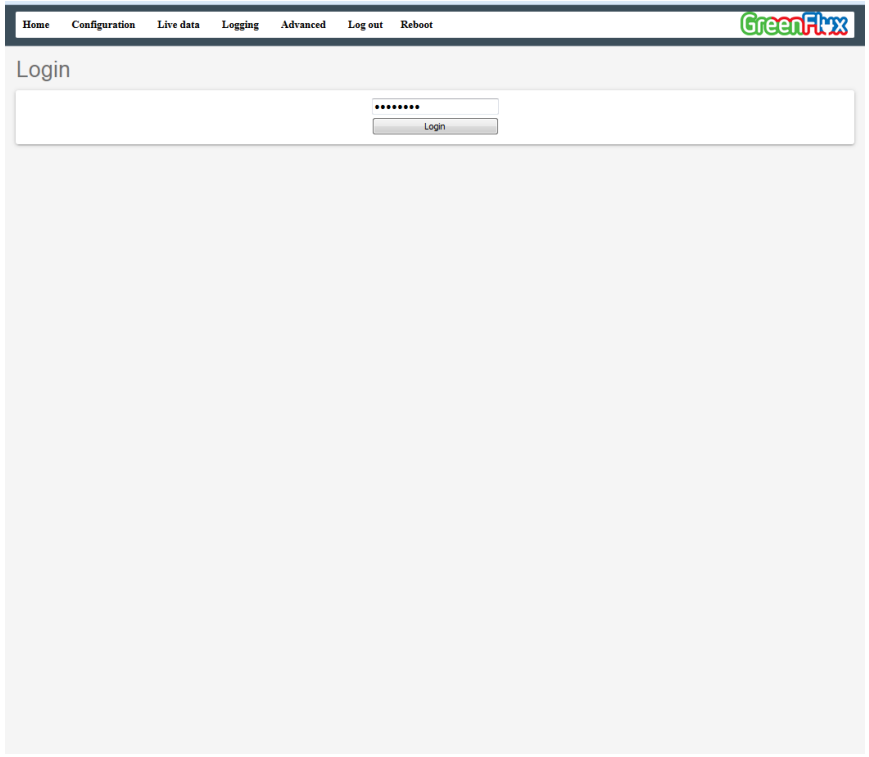
A positive “ping” response of the charging controller when pinging it from a laptop is <u>not</u> a good indication whether the Local Management website is available! Only disconnecting and reconnecting the ethernet cable after 2 minutes will make the website available.

5.3.2 LOGIN

Start your internet browser and enter next IP address in the URL address bar:

10.1.0.110

The Local Management login page will now be shown:



5.3.3 PASSWORD

The Smart Charging Controller is delivered with a default password for the local management website is. To prevent unwanted access, the password is randomly changed every time the controller receives a "*getConfiguration*" OCPP-command from the charging station management platform. After such a "*getConfiguration*" command the new password is sent to and can be viewed in the charging station management platform.

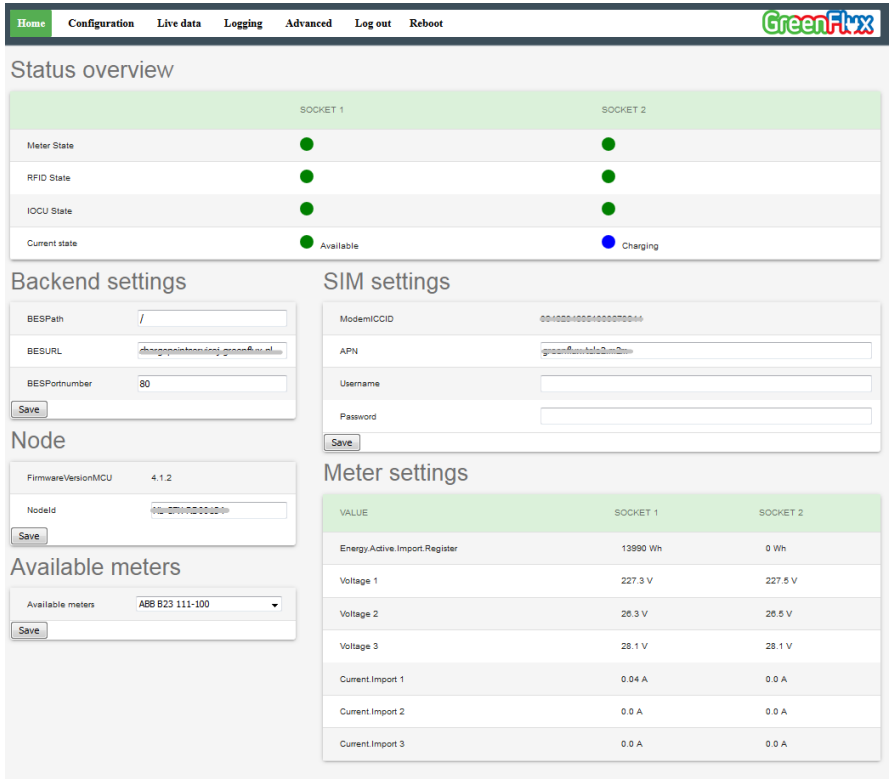
The local management password for first time use is $r33nFl^x

After receiving a "getConfiguration" command, the active local management password can be found in the charging station management portal

Please refer to the *GreenFlux Smart Charging Controller Configuration Manual* on how to obtain the active password of the controller.

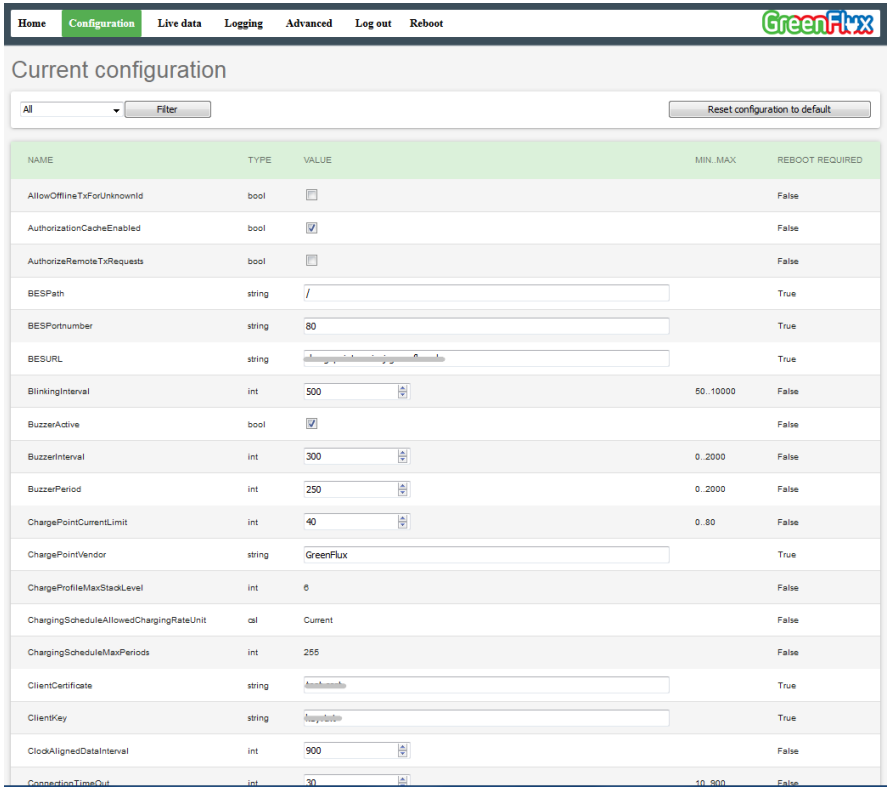
5.3.4 HOME PAGE

The home page provides access to the most important and required settings and an overview of the most commonly used live data.



5.3.5 CONFIGURATION PAGE

Configuration page provides access to all configurable items of the controller. The list of items is sorted alphabetically and can be filtered to meet certain search patterns. Item that are read-only cannot be modified.



It is possible to modify one or multiple values at once. The whole list of items is applied after clicking the “save” button at the end of the page.

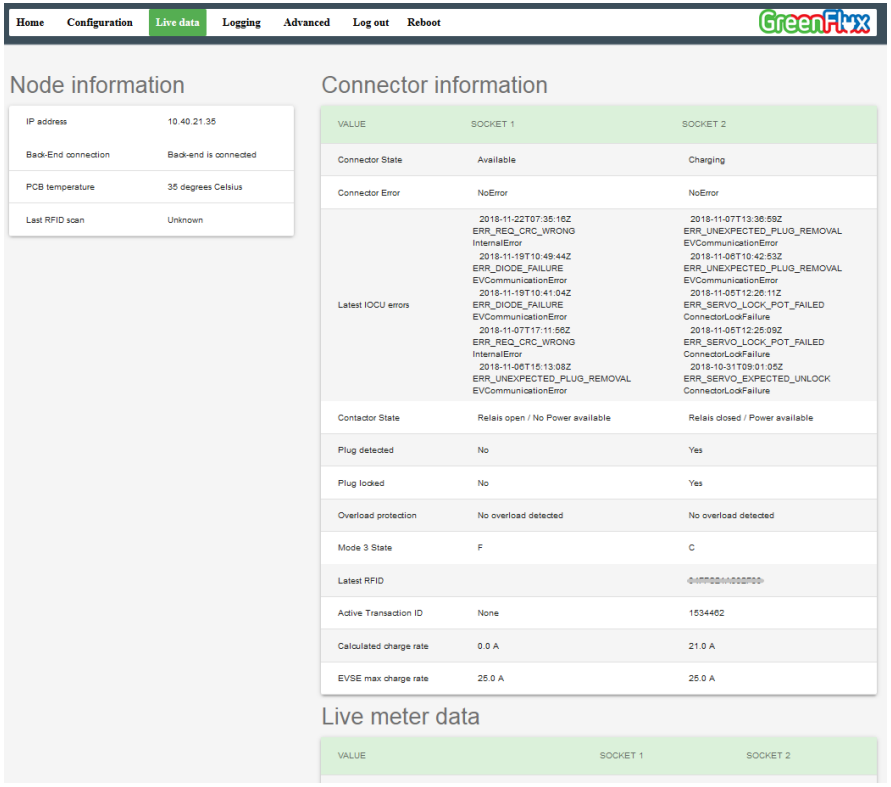
Several items require a device-restart (so-called hard-reset) in order to become active. If that is the case for a modified item, the website will show that a restart is required in a pop-up message after “save” was clicked. A reboot button can be found at the top of the page at the right end of the menu bar. Note that after the controller is restarted, the user needs to establish the local management connection again (refer to section 5.3.1)

Though it is possible to enter invalid values, it is not possible to set up a configuration item with an invalid value, when saving, the controller will, prior to changing, verify that the applied value is valid and not out of boundaries. An error message will be shown in case of invalid value(s).

Clicking the “*Reset configuration to default*” button restores the factory defaults and overwrites all prior applied changes. Note that also SIM and back-end settings / configurations will be lost, as well the *NodeID*. Therefore, use this function with extreme care!

5.3.6 LIVE DATA PAGE

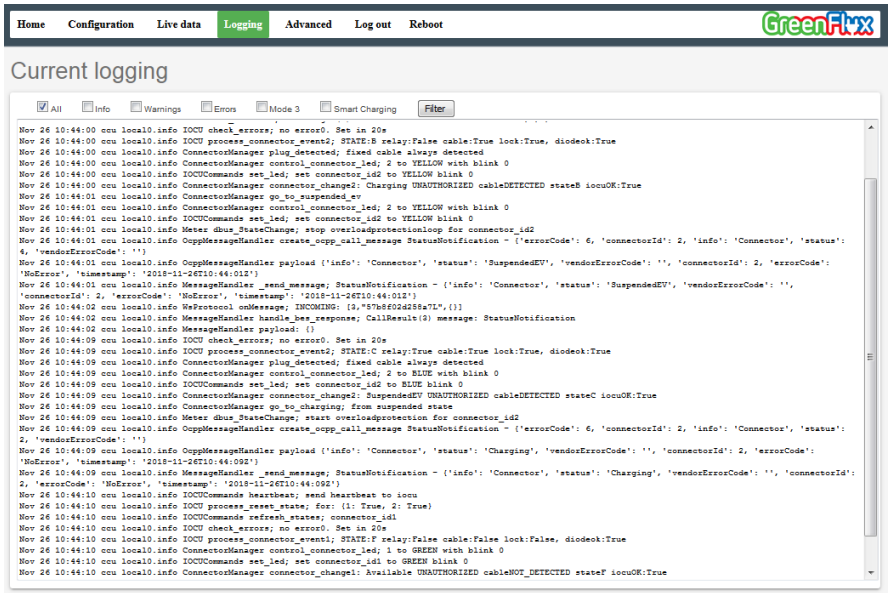
The live data page shows details of the EVSE (current IP address, back-end connection, etc.) and real-time status of the connector(s) and power meter(s). The latter is depending on the enabled registers from the configuration.



5.3.7 LOGGING PAGE

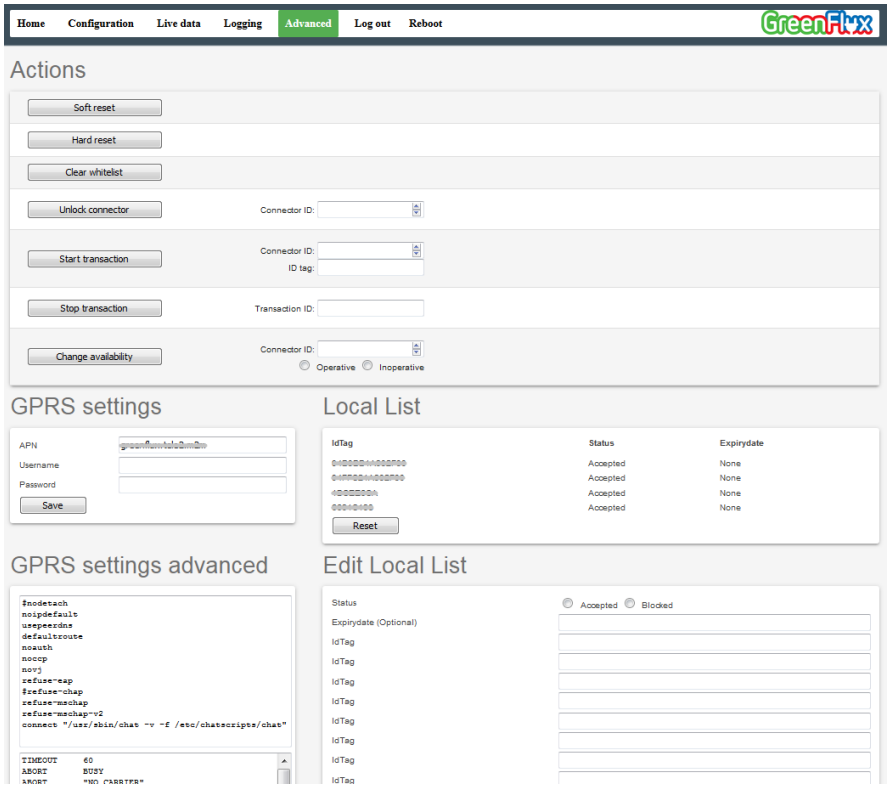
The logging page shows real-time logging as it is created/written to the file-system of the controller. This is the same logging that is made accessible when requesting diagnostics from the controller.

In order to test/view certain functionality it is possible to filter the logging for specific purposes. Multiple filters can be applied. Note that when filter “all” is applied, all other filters automatically will be disabled.



5.3.8 ADVANCED PAGE

The advanced page allows a more in-depth access to configuration items, such as the GPRS detailed connection settings.



Also, the local authentication list can be edited in this screen and all standard OCPP Backoffice remote functionality (e.g. “unlock connector”) can be executed.

Modifications to settings on this page will affect the EVSE connection behavior! In worst case situations, the connection with the Backoffice might be lost. Only change settings when familiar with the actual consequences changing them.

6 INSTALLATION OF THE SMART CHARGING CONTROLLER

6.1 INSTALLATION PREREQUISITES

The following checklist is a basis for connecting the smart charging controller properly and safely:

The controller must be installed by a certified electrician/installer.

The controller must be installed in a water-resistant environment (e.g. inside the charging station).

The 12V adapter needs to be stabilized and be able to supply the minimum power necessary. To determine the power of the 12V adapter, the excitation current of the controlling relays and LEDs must be taken into consideration.

Use the recommended Phoenix connectors to connect the cabling between charging station and the controller.

It is advised that the controller is not placed in direct proximity of high-power switching parts (min. 30cm distance).

When using a GPRS internet connection, the quality of the GPRS signal must be high enough to secure a stable internet connection. If necessary, a suitable outdoor antenna needs to be used.

When using an IP LAN connection, enough attention must be paid to protecting this connection and prevent infringement on the own (LAN) network. This must consist of physical measures (no access to the actual ethernet connections) and a correct network configuration of the connections the charging station is installed on.

6.2 INSTALLATION DESCRIPTION SMART CHARGING CONTROLLER

Secure the controller with DIN rail (25mm) holders in the charging station.

Use the connection diagram information in section 8 for the correct installation.

Consult with Backend support during installation for the correct configurations

Always test an installed charging station at least with an EV simulator

6.3 INSTALLATION ROADMAP

With this short roadmap the Smart Charging Controller is connected in a charging station. A summary of the connections is described in section 8.

1. Insert SIM card.
2. Attach (GPRS) SMA antenna.
3. Secure controller with DIN rail holder in the charging station.
4. Connect power supply (optional the RS485) with Phoenix plug.
5. Connect LAN cable (if applicable).
6. Connect the power relay(s).
7. Connect RFID reader.
8. Connect socket control.

In case of a connected charger:

9. Indicate charging station ID to charging station management platform support team.
10. Wait for support team to confirm charging station is ready to use (on-line).

Start charging station

11. Turn on the charging station, the RGB LED's will start a standard flashing sequence indicating the system in starting up :
    - very fast flashing RED LED for 2 seconds, followed by
    - fast flashing GREEN LED for 2 seconds, followed by
    - slow flashing BLUE LED for 2 seconds
    This sequence is repeated until the software is up-n-running.
12. Within two minutes, the LED(s) will turn green, indicating the startup sequence is finished and the charging station is ready.
13. Test the charger.

6.4 LED INDICATIONS DURING OPERATION

By default, next color scheme is used for the LED indications reflecting the state of a Charge Point. The desired color scheme can be changed by setting the appropriate configuration parameters (*LEDcolor_xxx*).

	LED COLOR	MEANING
	Green LED	Socket available.
	Short white flash	The RFID card read is read, authentication in progress.
	Flashing green LED	A charge cable can now be inserted (ready for charging).
	Blue LED	Charging station is charging.
	Yellow LED	EVSE is communicating to EV or charge session is paused (suspended mode).
	Red LED	During Startup; When an error is detected; socket is remotely disabled; authentication failed.
	Magenta LED	The usage of the socket is reserved and is only available for charging by the person who booked the timeslot.

7 SPECIFICATIONS OF THE SMART CHARGING CONTROLLER

7.1 TECHNICAL SPECIFICATIONS

SPECIFICATION	VALUE(S)
Adapter voltage	10 – 15V DC
Power	Nominal < 3 Watt
Processor	Freescale iMX28 @ 454 MHz with 128MB DDR2 and 512MB Flash; ATXMEGA32A4U-MH @ 32MHz with 4K SRAM and 32K Flash
Charge mode	Mode 3 according to IEC 61851-1
Dimensions cables	16-28AWG
Socket control	Supports 2 sockets with servo lock with automatic unlock in case of a power failure
Temperature control	PCB temperature sensor for reading ambient temperature; For every socket a double wired PT100 temperature sensor can be connected
Relay control	Connections for 2 relays controls 12..24V 1A
RFID connection	2 RFID readers with SPI interface on basic 0.1” 8-pin headers
Status information	3 LEDs per socket max 30VDC (open drain) 2 controller status LEDs in housing
Sound indication	4kHz 80dB buzzer (PCB mounted)
kWh-meter interface	Possibility to read max 2 kWh-meters through S0 and RS485 connection
External communication	GPRS with SMA antenna connection 850/ 900 MHz: 31.81 dBm 1800/ 1900 MHz: 29.48 dBm 10/100Mbit RJ45 Ethernet connection RS485
Working temperature	-25 ◦C to +70 ◦C
Humidity	5% until 95% (not condensing)
Temperature storage	0 .. 50 °C

7.2 PHYSICAL CHARACTERISTICS

SPECIFICATIONS	VALUE(S)
Certification	CE Certified RED certified European Type Examination Certificate IEC 61851-1 (2010)
Protection	Housing IP20
Housing	High quality FR-ABS (fireproof ABS plastic) with optional DIN-rail clips for easy assembly.
Dimensions housing in mm	170 x 86 x 35 (L x W x H)
Default color	Black or grey

7.3 CONNECTOR LAYOUT AND WIRING SPECIFICATION

This section provides a summary of all the pins, grouped by connector. For more detailed information please refer to Section 2. Also, the advised cable types (AWG dimension) for connecting to other devices or charging station parts are given.

7.3.1 SOCKET CONTROL

Pin connection Socket control for both sockets (1/2).

PIN		CONNECTION INFO	CABLE TYPE/ DESCR.
Socket control 1	**Socket Control 2**		
13	**1**	PP; Charge cable detection	AWG 24/18
14	**2**	CP; Communication with (PH)EV	AWG 24/18
15	**3**	Temperature sensor connection	AWG 24
16	**4**	Ground; Use with temp sensor or fixed cable resistor	AWG 24
17	**5**	LED red; Status of socket for user	AWG 18
18	**6**	LED green; Status of socket for user	AWG 18
19	**7**	LED blue; Status of socket for user	AWG 18
20	**8**	S0+ or RS485 P (+); Energy measuring of (PH)EV	AWG 24 (twisted pair)
21	**9**	S0- or RS485 N (-); Energy measuring of (PH)EV	AWG 24 (twisted pair)
22	**10**	Servo control; Servo Pin 1	AWG 24/18

23	**11**	Servo control; Servo Pin 2	AWG 24/18
24	**12**	Servo control; Servo Pin 3	AWG 24/18

7.3.2 RELAY CONTROL

Pin connection definition for the controlling relays.

PIN	CONNECTION	CABLE TYPE/ DESCR.
(1)	Relays controlling signal socket 1	AWG 18
(2)	Relays controlling signal socket 2	AWG 18

7.3.3 CARD READERS

Both card reader connectors have the same pin connection definition for connecting a (SPI) RFID reader.

PIN	CONNECTION	CABLE TYPE/ DESCR.
1	+3V3	AWG 24
2	RST	AWG 24
3	GND	AWG 24
4	IRQ	AWG 24
5	MISO	AWG 24
6	MOSI	AWG 24
7	SCK	AWG 24
8	SDA (SS0/chip select)	AWG 24

7.3.4 ADAPTER / RS485

Pin connection definition for the Power supply unit and optional RS485 communication.

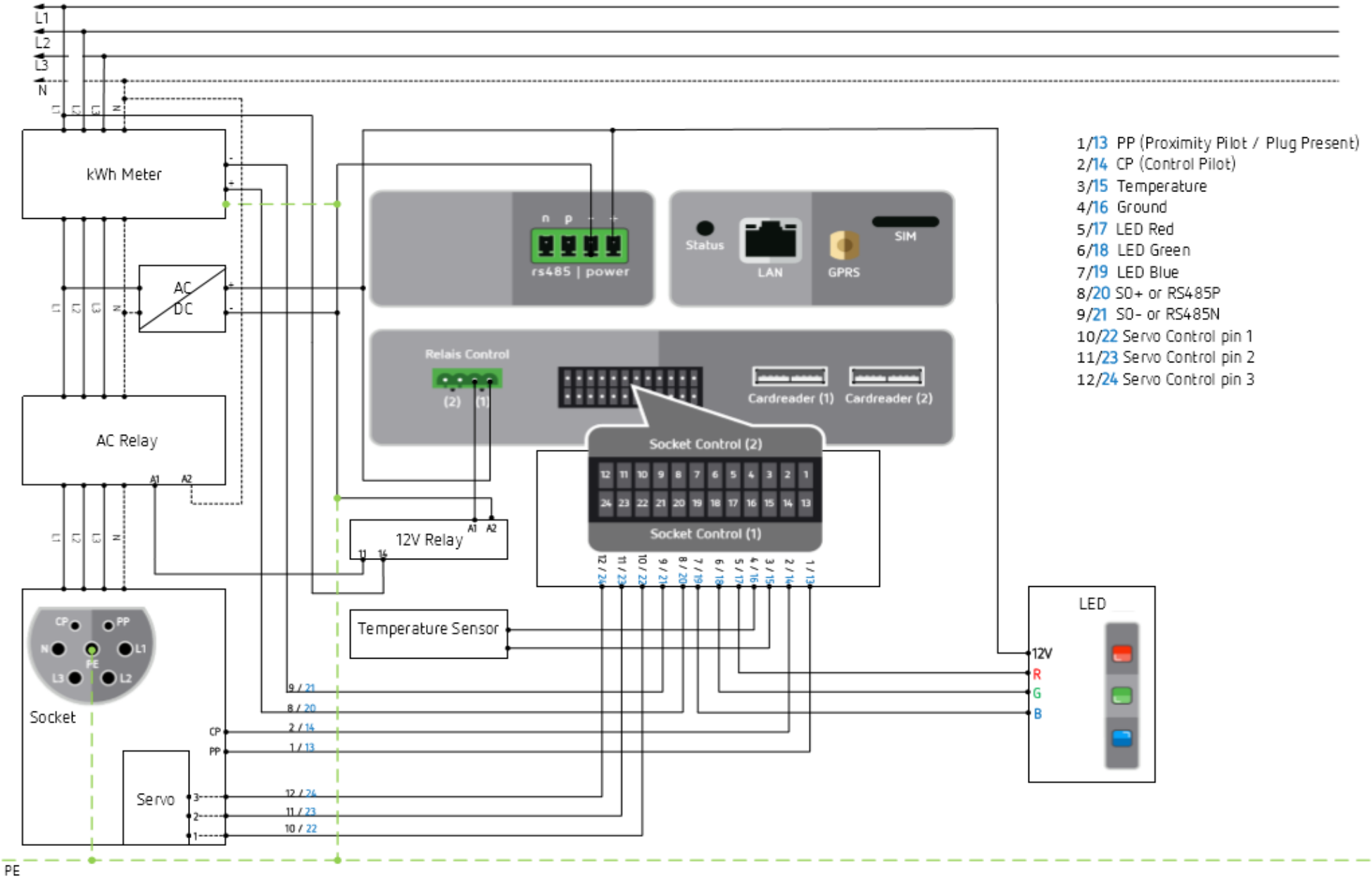
PIN	CONNECTION	CABLE TYPE/ DESCR.
N	RS485 N (-) data line	AWG 24 (shielded UTP)
P	RS485 P (+) data line	AWG 24 (shielded UTP)
+	The +12V connection of the power supply	AWG 18
-	The GND (0V) connection of the power supply	AWG 18

7.3.5 INTERNET

Available connectors for Internet connection.

PIN	CONNECTION	CABLE TYPE/ DESCR.
LAN	RJ45 Ethernet cable to router	RJ45
GPRS	A GPRS antenna can be connected	SMA connector
SIM	Here a Micro SIM card can be inserted, with the chip up	SIM card holder

8 CONNECTION DIAGRAM



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