



# CC612 EV charge controller

Charge controller for electric vehicle charging stations, wall boxes and street light charging points  
Software version: D0493





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## 1.1 How to use this manual

**Always keep this manual within easy reach for future reference.**


To make it easier for you to understand and revisit certain sections in this manual, we have used symbols to identify important instructions and information. The meaning of these symbols is explained below:




*This signal word indicates that there is a **high risk** of danger that will result in **electrocution** or serious injury if not avoided.*




*This signal word indicates a **medium risk of danger** that can lead to **death** or **serious injury** if not avoided.*



*This signal word indicates a **low risk of danger** that can lead to **minor or moderate injury** or damage to property if not avoided.*



*This symbol denotes information intended to assist the user in making **optimum use** of the product.*



*This manual is intended for **qualified personnel** working in electrical engineering and electronics!*

This manual has been compiled with great care. It might nevertheless contain errors and mistakes. Bender cannot accept any liability for injury to persons or damage to property resulting from errors or mistakes in this manual.

## 1.2 Technical support: Service and support

For commissioning and troubleshooting Bender offers you:

### 1.2.1 First level support

Technical support by phone or e-mail for all Bender products

- Questions concerning specific customer applications
- Commissioning
- Troubleshooting

<b>Telephone:</b>	+49 6401 807-760*
<b>Fax:</b>	+49 6401 807-259
In Germany only:	0700BenderHelp (Telephone and Fax)
<b>E-Mail:</b>	support@bender-service.de

### 1.2.2 Repair service

Repair, calibration, update and replacement service for Bender products

- Repairing, calibrating, testing and analysing Bender products
- Hardware and software update for Bender devices
- Delivery of replacement devices in the event of faulty or incorrectly delivered Bender devices
- Extended guarantee for Bender devices, which includes an in-house repair service or replacement devices at no extra cost

<b>Telephone:</b>	+49 6401 807-780** (technical)
	+49 6401 807-784**, -785** (sales)
<b>Fax:</b>	+49 6401 807-789
<b>E-Mail:</b>	repair@bender-service.de

Please send the devices for repair to the following address:

Bender GmbH, Repair-Service,  
Londorfer Str. 65,  
35305 Grünberg

### 1.2.3 Field service

On-site service for all Bender products

- Commissioning, configuring, maintenance, troubleshooting of Bender products
- Analysis of the electrical installation in the building (power quality test, EMC test, thermography)
- Training courses for customers

<b>Telephone:</b>	+49 6401 807-752** , -762** (technical)
	+49 6401 807-753** (sales)
<b>Fax:</b>	+49 6401 807-759
<b>E-Mail:</b>	fieldservice@bender-service.de
<b>Internet:</b>	www.bender.de

\*Available from 7.00 a.m. to 8.00 p.m. 365 days a year (CET/UTC+1)

\*\*Mo-Thu 7.00 a.m. - 8.00 p.m., Fr 7.00 a.m. - 13.00 p.m

### 1.3 Training courses

Bender is happy to provide training regarding the use of test equipment. The dates of training courses and workshops can be found on the Internet at [www.bender.de](http://www.bender.de) -> Know-how -> Seminars.

### 1.4 Delivery conditions

Bender sale and delivery conditions apply.

For software products the "Softwareklausel zur Überlassung von Standard-Software als Teil von Lieferungen, Ergänzung und Änderung der Allgemeinen Lieferbedingungen für Erzeugnisse und Leistungen der Elektroindustrie" (software clause in respect of the licensing of standard software as part of deliveries, modifications and changes to general delivery conditions for products and services in the electrical industry) set out by the ZVEI (Zentralverband Elektrotechnik- und Elektronikindustrie e. V.) (German Electrical and Electronic Manufacturer's Association) also applies.

Sale and delivery conditions can be obtained from Bender in printed or electronic format.

### 1.5 Inspection, transport and storage

Inspect the dispatch and equipment packaging for damage, and compare the contents of the package with the delivery documents. In the event of damage in transit, please contact Bender immediately. The devices must only be stored in areas where they are protected from dust, damp, and spray and dripping water, and in which the specified storage temperatures can be ensured.

### 1.6 Warranty and liability

Warranty and liability claims in the event of injury to persons or damage to property are excluded if they can be attributed to one or more of the following causes:

- Improper use of the device.
- Incorrect mounting, commissioning, operation and maintenance of the device.
- Failure to observe the instructions in this operating manual regarding transport, commissioning, operation and maintenance of the device.
- Unauthorised changes to the device made by parties other than the manufacturer.
- Non-observance of technical data.
- Repairs carried out incorrectly and the use of replacement parts or accessories not approved by the manufacturer.
- Catastrophes caused by external influences and force majeure.
- Mounting and installation with device combinations not recommended by the manufacturer.

This operating manual, especially the safety instructions, must be observed by all personnel working on the device. Furthermore, the rules and regulations that apply for accident prevention at the place of use must be observed.

### 1.7 Disposal

Abide by the national regulations and laws governing the disposal of this device. Ask your supplier if you are not sure how to dispose of the old equipment.

The directive on waste electrical and electronic equipment (WEEE directive) and the directive on the restriction of certain hazardous substances in electrical and electronic equipment (RoHS directive) apply in the European Community. In Germany, these policies are implemented through the "Electrical and Electronic Equipment Act" (ElektroG). According to this, the following applies:

- Electrical and electronic equipment are not part of household waste.
- Batteries and accumulators are not part of household waste and must be disposed of in accordance with the regulations.
- Old electrical and electronic equipment from users other than private households which was introduced to the market after 13 August 2005 must be taken back by the manufacturer and disposed of properly.

For more information on the disposal of Bender devices, refer to our homepage at [www.bender.de](http://www.bender.de) -> Service & support.

### 2.1 General safety instructions

Part of the device documentation in addition to this manual is the enclosed "Safety instructions for Bender products".

### 2.2 Work activities on electrical installations



#### **Risk of fatal injury from electric shock!**

*Touching live parts of the system carries the risk of:*

- An electric shock
- Damage to the electrical installation
- Destruction of the device

*Before installing and connecting the device, make sure that the installation has been de-energised. Observe the rules for working on electrical installations.*

If the device is being used in a location outside of Germany, the applicable local standards and regulations must be complied with. European standard EN 50110 can be used as a guide

### 2.3 Dangers dealing with the charge controller

The CC612 charge controller has been assembled in accordance with the latest state-of-the-art technology and recognized safety rules. Nevertheless, its use may result in injury to the user or a third party respectively, through interference or damage to the charge controller or material property. The charge controller must only be used for its intended purpose.

### 2.4 Precautions

Ensure the correct rated input voltage and supply voltage is applied. To check that the device has been properly connected, perform a functional test before commissioning the system. Refer to Chapter 6.2.

### 2.5 Intended use



*This manual is intended for **qualified personnel** working in electrical engineering and electronics!*

The CC612 charge controller, hereafter referred to as the charge controller, is the main component of a charging system and is designed for use in electric vehicle (EV) charging stations, wall boxes and street light charging points. The charge controller controls type 1 and type 2 plugs, and type 1 and -type 2 sockets. It enables a setup that is in accordance with current standards, such as IEC 62196, IEC 61851-1, IEC 61851-22 and IEC 60364-7-722.

### 3.1 Product features

- Charge controller acc. to IEC 61851-22 (mode 3)
- It can be configured as either a Master or Slave
- The charge controller can be integrated into a single or three-phase system up to 80 A
- Smart Grid enabled using standard OCPP functionality
- OCPP 1.5 and OCPP 1.6 compliant with JSON, SOAP and Binary implementation
- Supports 2.5G Edge and 3G UMTS mobile networks with an integrated 3G modem in all Master devices
- Two USB interfaces:
  - CONFIG for local configuration
  - Other is used an extension port for peripheral USB devices (Ethernet/WiFi home applications)
  - Master/slave hardware configuration
- Control-pilot and proximity signal management
- Universal charge plug control (support for different vendors of sockets)
- Configurable support for one additional household socket
- Can connect to eHZ or Modbus meters and to meters with an S0 interface
- User interface board for customer-specific applications
- Configurable 3-channel input/output extension interface for additional functionality
- An integrated DC sensor (only an external type A RCD is required). Various cable lengths can be selected.
- Internal temperature sensors
- A Peer Group Mechanism where a set current is shared between a group of charge controllers
- **Optional** integrated ISO/IEC 15118 power line communication (PLC) for plug & charge and load management systems
- Local and remote configuration

### 3.2 Product description

The charge controller monitors charging system internal hardware, such as the meter, the user interface board or the socket. It is characterized by its compact design and size that

in turn enables intelligent, small and cost effective charging systems. Several product variants are available and an overview of these variants is given in [Chapter 3.2.1](#).

To enable the charge controller to communicate, a backend system is required. Given that most backend providers strictly adhere to the OCPP communication protocol, the charge controller is OCPP compliant. All specified messages in OCPP are supported as well as some vendor-specific extensions based on the DataTransfer message. Integration tests with the backend implementations of providers such as Vattenfall, Bosch, NTT and DRIIVZ have been successfully carried out. The charge controller can be operated as an "always on" system that is always connected to a mobile network. The controller supports 2.5G Edge and 3G UMTS mobile networks. Connectivity for online operation requires a SIM card (which is not included in delivery). User interaction is facilitated using an RFID module, which consists of an RFID card reader and LEDs. Charging is initiated by holding a valid RFID card close to the reader. In offline operation, the charge controller can optionally allow charging without authorization or it can authorize users based on RFID and a local white list of authorized RFID cards.

#### 3.2.1 Product variant overview

Several product variants are available and the table below gives an overview of these variants. Some connect to a digital eHZ meter using an optical interface while others read Modbus meters. In general, variants can read meters with an S0 interface. Ordering details can be found on [Page 31](#).

Type	Master/Slave	Modem	Meter	DC sensor	PLC* hardware	LEDs	User interface
CC612 -1M3PR	Master	3G	eHZ and S0 interface	✓	✓	Ready, Alarm, PLC	✓
CC612 -2M3PR	Master	3G	Modbus, and S0 interface	✓	✓	Ready, Alarm, PLC	✓
CC612 -1S0PR	Slave	---	eHZ and S0 interface	✓	✓	Ready, Alarm, PLC	✓
CC612 -2S0PR	Slave	---	Modbus, and S0 interface	✓	✓	Ready, Alarm, PLC	✓
CC612 -2M3R	Master	3G	Modbus, and S0 interface	✓	---	Ready, Alarm	✓
CC612 -2S0R	Slave	---	Modbus/S0	✓	---	Ready, Alarm	✓

\* Optional and enabled by a software update

### 3.3 Functional description

As well as the charge controller, a charging system also consists of a type A RCD, a relay contactor, which is directly connected to a type 1 or type 2 socket, or to an attached cable with a type 1 or type 2 plug. These essential components are shown in "[Chapter 3.3.2 Different ways of connecting the charge controller](#)".



*The relay in the charge controller used to control the contactor is rated for 30 V/1 A. An intermediate relay may be required if this rating is considered inadequate. A configuration example with an intermediate relay is shown in "[Chapter 3.3.2 Different ways of connecting the charge controller](#)".*

#### 3.3.1 General functions

- A charging system may also consist of a meter, and if the meter should be read digitally, either a smart digital meter (EMH eHZ) or a digital Modbus meter is required.
  - The charge controller reads the digital eHZ meter readings using a standard optical reader attached to the charge controller via an **RJ10 plug**.
  - If the Modbus version is used, the Modbus wires are attached directly to the charge controller.
  - Alternatively, any meter with an S0 interface can be attached to one of the available inputs.
- A 12 V power supply is needed to operate the charge controller and an RFID module is used to facilitate simple user interaction. The RFID module is a separate PCB and is connected to the charge controller using a standard **RJ45 cable**.
- Power flow toward the vehicle is controlled by the contactor (using a signal voltage of up to 30 V), which is itself controlled by the charge controller via a relay in the charge controller.
- The SIM card reader (available on charge controller Master variants only) is positioned on the charge controller front panel. The SIM card can have a PIN number which can be configured via an internal configuration web interface. The APN settings for the card can also be configured via an internal configuration web interface.
- Also positioned on the front panel are two USB interfaces:
  - The first known as **CONFIG** is used to configure the charge controller. Optionally, this interface can also be used to apply software updates.
  - The other USB interface allows the connection of peripheral USB devices.
  - Both USB interfaces are used to enable a Master/Slave connection. Master/Slave operation is configured by connecting the USB configuration interface (CONFIG) of the Master charge controller to the Ethernet/Wi-Fi® USB interface of the Slave device using a USB cable. Refer to [Page 17](#) for further information.

- Only the front panel of charge controller Master variants features a socket for a GSM/UMTS antenna.
- For AC charging system fault monitoring, the charge controller features an integrated DC sensor which uses an externally connected current transformer for fault monitoring of AC charging systems. With the integrated DC residual current monitoring function, only a type A RCD is required in the charging system.



*The charge controller only works in combination with the measuring current transformer (which must be ordered separately).*

- Data exchange between the EV and the charging system is possible via ISO 15118-1:2015 compliant Powerline Communication (PLC). This feature is optional and if purchased, will be enabled by a future software update.
  - If a malfunction occurs, a report is sent to the backend system using the OCPP protocol.
  - The data management and control functionality of the charge controller provides:
    - Remote restart after a residual current trip that is recognized by the CC612.
    - The smart sensor detects critical fault currents before the relays are tripped. This can be used as a prewarning for the vehicle owner.
    - Load current and cooling control (via a temperature sensor)
- The charge controller has internal temperature sensors (on the inside of the controller housing) that allow the temperature in the ambient environment of the charge controller to be estimated. Based on this estimation it is possible to dynamically reduce the charging current or even suspend charging. This feature can serve to maintain an ambient temperature within the permissible range of the components used in a charging system. Two temperature thresholds can be set on the manufacturer configuration page and are based on measurements in common housing scenarios. The first threshold reduces the charging current to the configured value if it is exceeded. The second threshold will suspend charging.



*The temperature measurement is an estimation based on temperature sensors positioned on the inside of the controller housing where the actual temperature is affected by heat generated by the controller itself. Because the threshold values are based on measurements in common housing scenarios, each charging system vendor should undertake practical measurement experiments to validate the correctness of these thresholds and add offsets if necessary.*

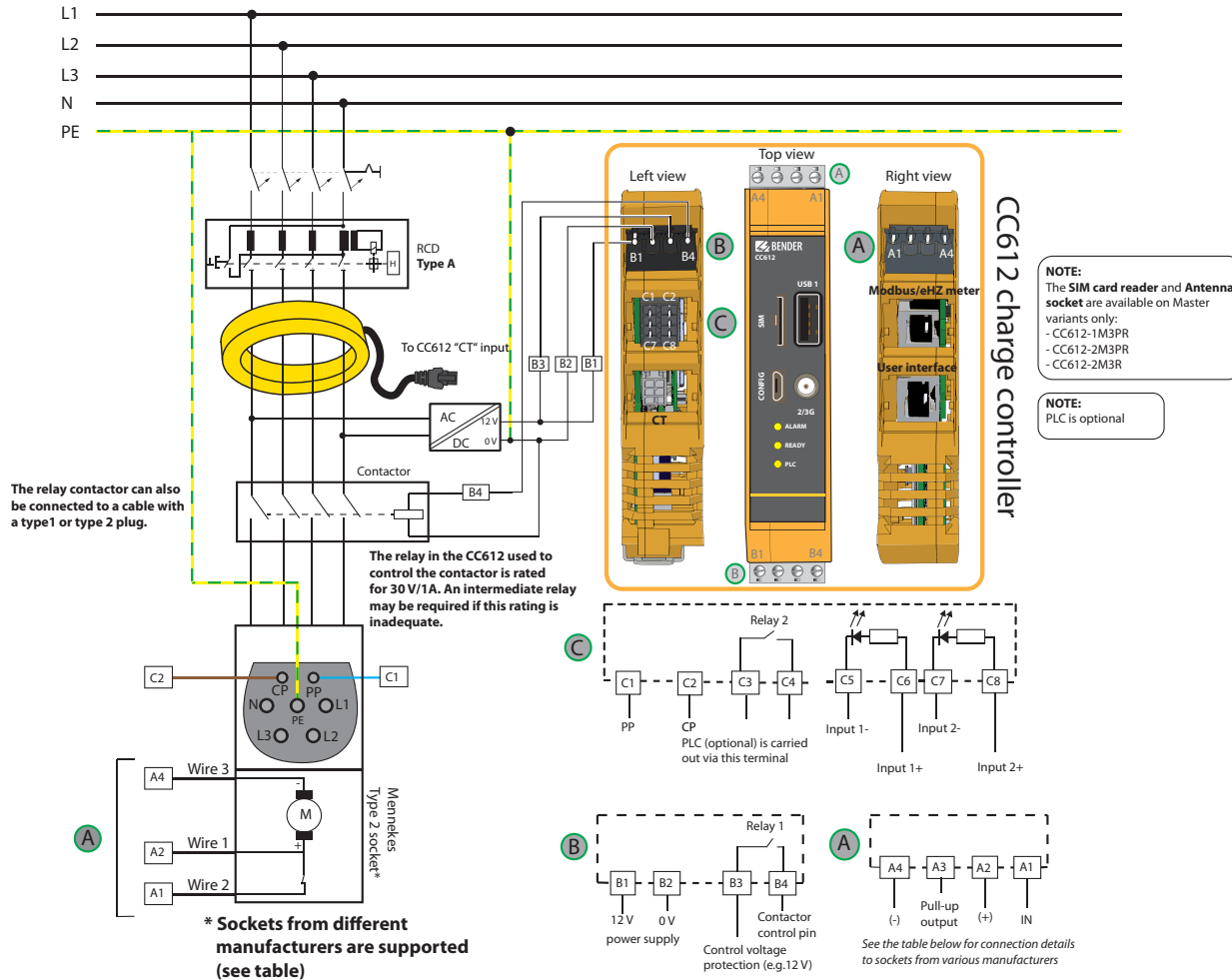
- Peer group mechanism  
With the help of a "peer group mechanism", it is possible to assign a current limit to a set of charge controllers to share. To use this feature, the charge controllers need to be connected in a way that enables them to establish TCP connections with each other. This is possible, for example, using a USB to Ethernet dongle or with a direct USB connection. In the operator web interface for each individual member of this peer group, the IP addresses of all other peer group members must be listed in the configuration parameter "Peer Group". In addition, all peer group members need to have the same "Peer group maximum current (A)" setting. Once configured the total current is available to one controller if only one controller is charging. This controller will however not exceed its maximum hardware current setting. As more controllers start charging, the current will be evenly shared by the peers. As controllers stop charging, the current is evenly distributed to those that are still charging.

In the event two charge controllers are used in a single charging system and the charge controllers are connected to a central charging system computer via their USB device ports, it is necessary to assign individual IP addresses to these controllers to enable TCP/IP connectivity between both. This is possible using the configuration parameters "USB additional fixed IP" and "USB additional fixed gateway". The central charging system computer could either use bridging or routing between the USB interface to enable connectivity.

- Vandalism detection (via a light sensor inside the housing)
- Remote:
  - Software updates
  - Temperature and residual current monitoring
  - Remote login allows for remote maintenance options that reduce the number of maintenance personal deployments per charger

### 3.3.2 Different ways of connecting the charge controller

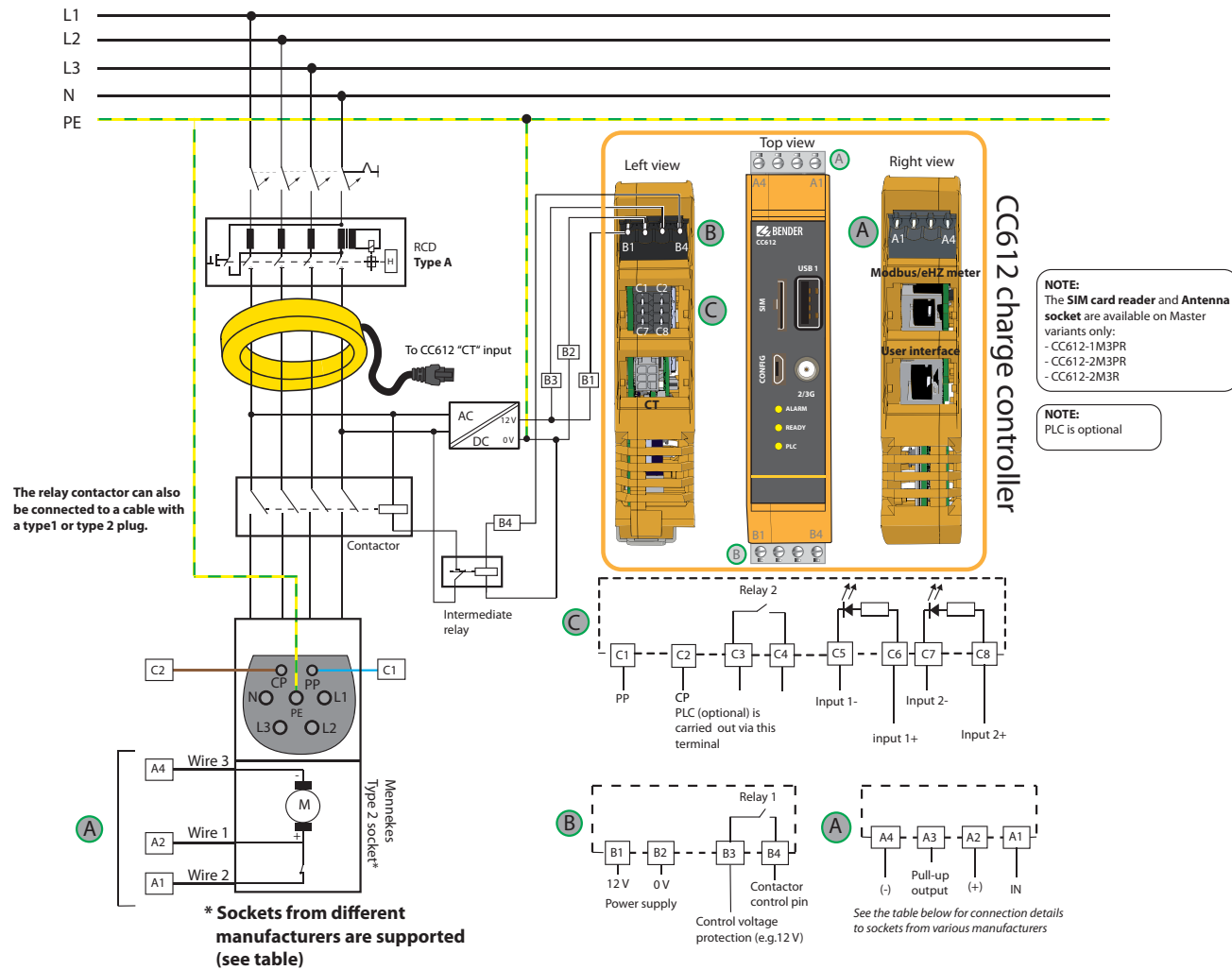
#### 3.3.2.1 Charging system with a type 2 socket



Type 2 sockets**	A4	A3	A2	A1
<ul style="list-style-type: none"> <li>• Mennekes (31016, 31023, 31024, 31038)</li> <li>• Bals (801191 - 801195, 80300, 9743205000, 9743211000)</li> <li>• Walther Werke (9743205000, 9743211000)</li> <li>• Harting</li> </ul>	Wire 3		Wire 1	Wire 2
Phoenix contact (1405213, 1405214, 1405215, 1405216, 1408171, 1408172)	BU/BN	BU/GN	BU/RD	BU/YE

\*\* Each type 2 socket can also be used in conjunction with lock release modules from Mennekes and Phoenix Contact.

### 3.3.2.2 Charging system with a type 2 socket and an intermediate relay

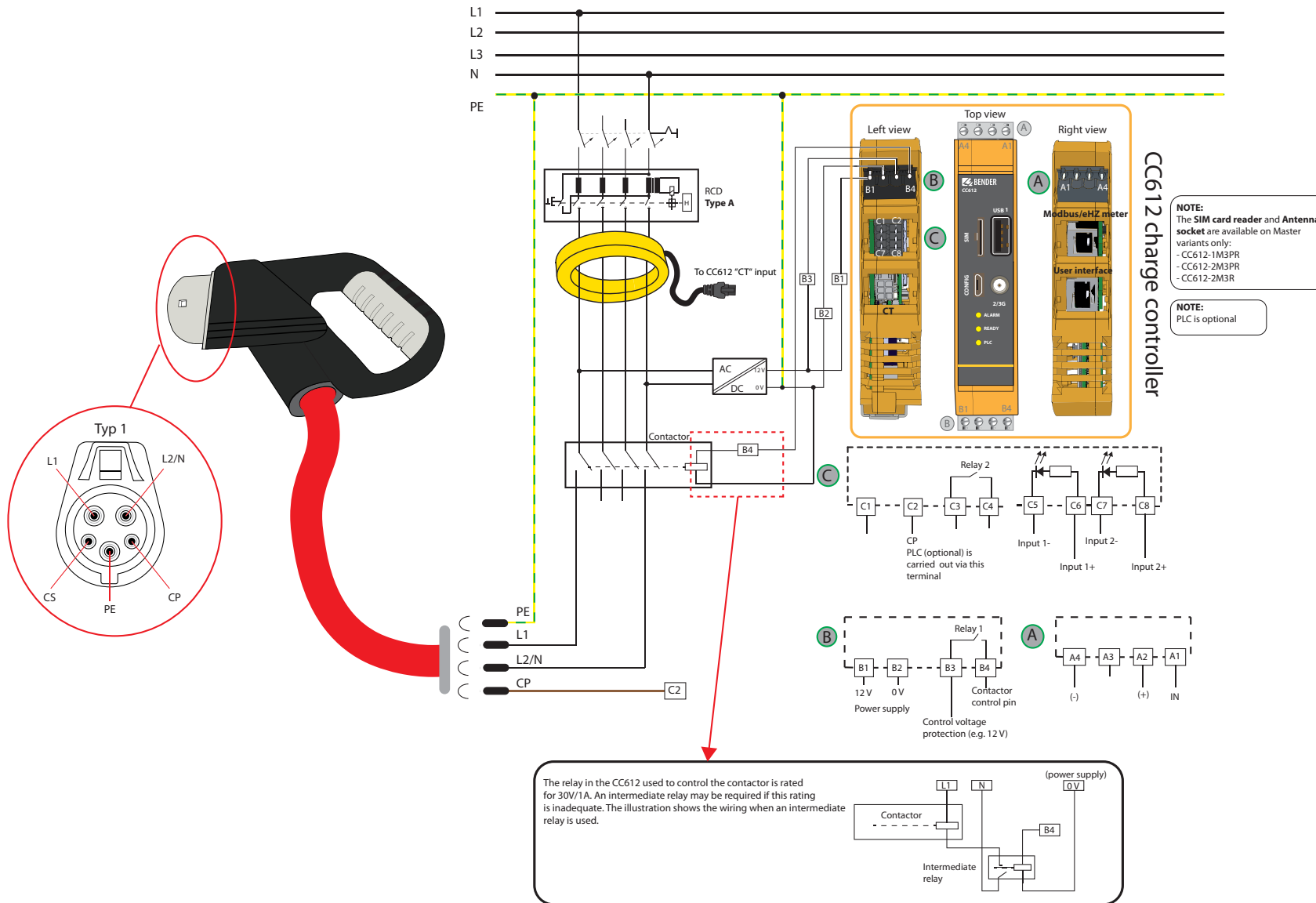


Type 2 sockets**	A4	A3	A2	A1
	<ul style="list-style-type: none"> <li>• Mennekes (31016, 31023, 31024, 31038)</li> <li>• Bals (801191 - 801195, 80300, 9743205000, 9743211000)</li> <li>• Walther Werke (9743205000, 9743211000)</li> <li>• Harting</li> </ul>	Wire 3		Wire 1
Phoenix contact (1405213, 1405214, 1405215, 1405216, 1408171, 1408172)	BU/BN	BU/GN	BU/RD	BU/YE

\*\* Each type 2 socket can also be used in conjunction with lock release modules from Mennekes and Phoenix Contact.

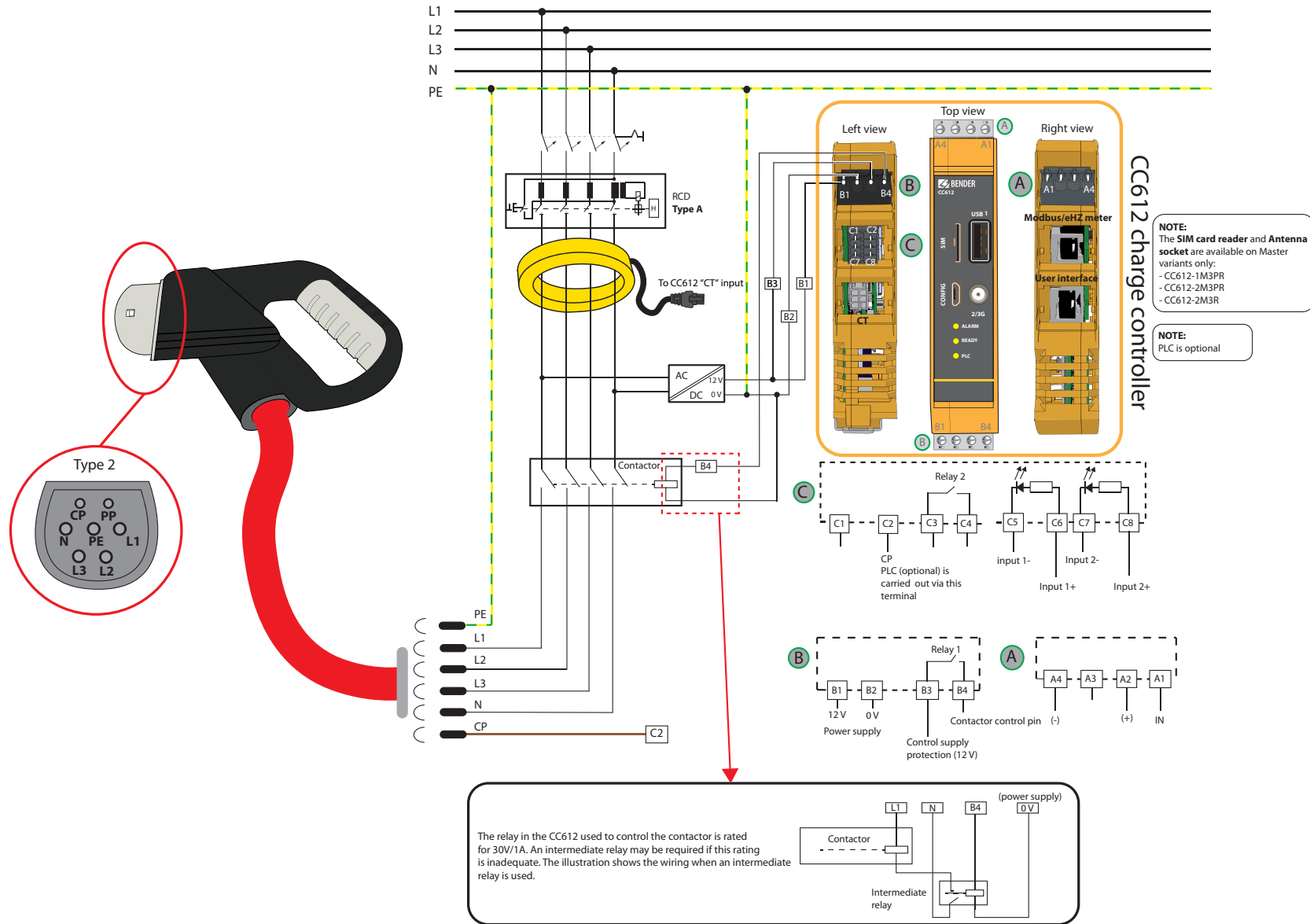
### 3.3.2.3 Charging system with a cable and type 1 plug:

#### Charging point



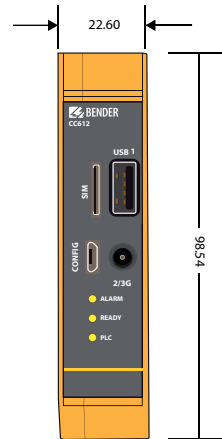
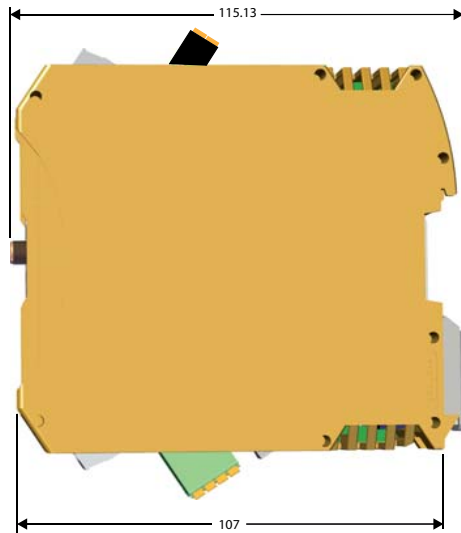
3.3.2.4 Charging system with a cable and type 2 plug:

Charging point



### 4.1 Dimensions

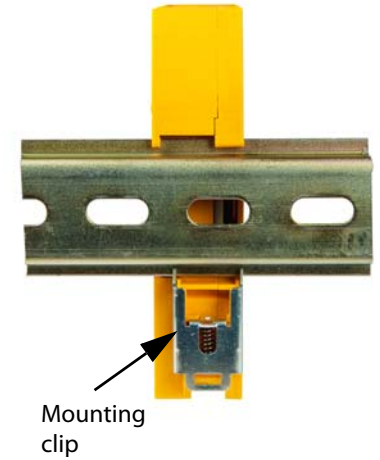
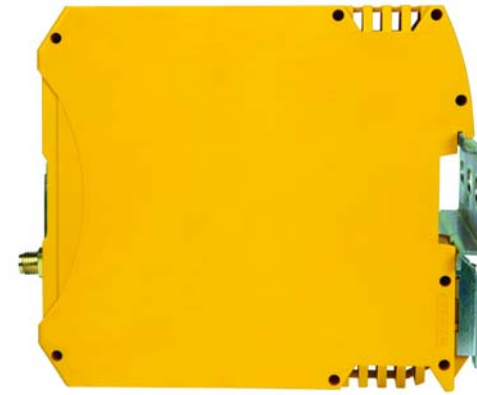
All dimensions are in mm



**Note:** Dimensions are according to ISO 2768 - m

### 4.2 DIN rail mounting

Fix the charge controller onto the DIN rail by pulling down the silver-coloured mounting clip (indicated in photos below). Position the charge controller and release the clip to allow the device to sit securely on the rail.



### 5.1 Connection conditions

**Risk of electric shock!**  
Even though the charge controller terminals have nominal voltages measuring up to 12 V, the charging system voltage is 230 V. Touching live parts of the system carries the risk of electric shock.

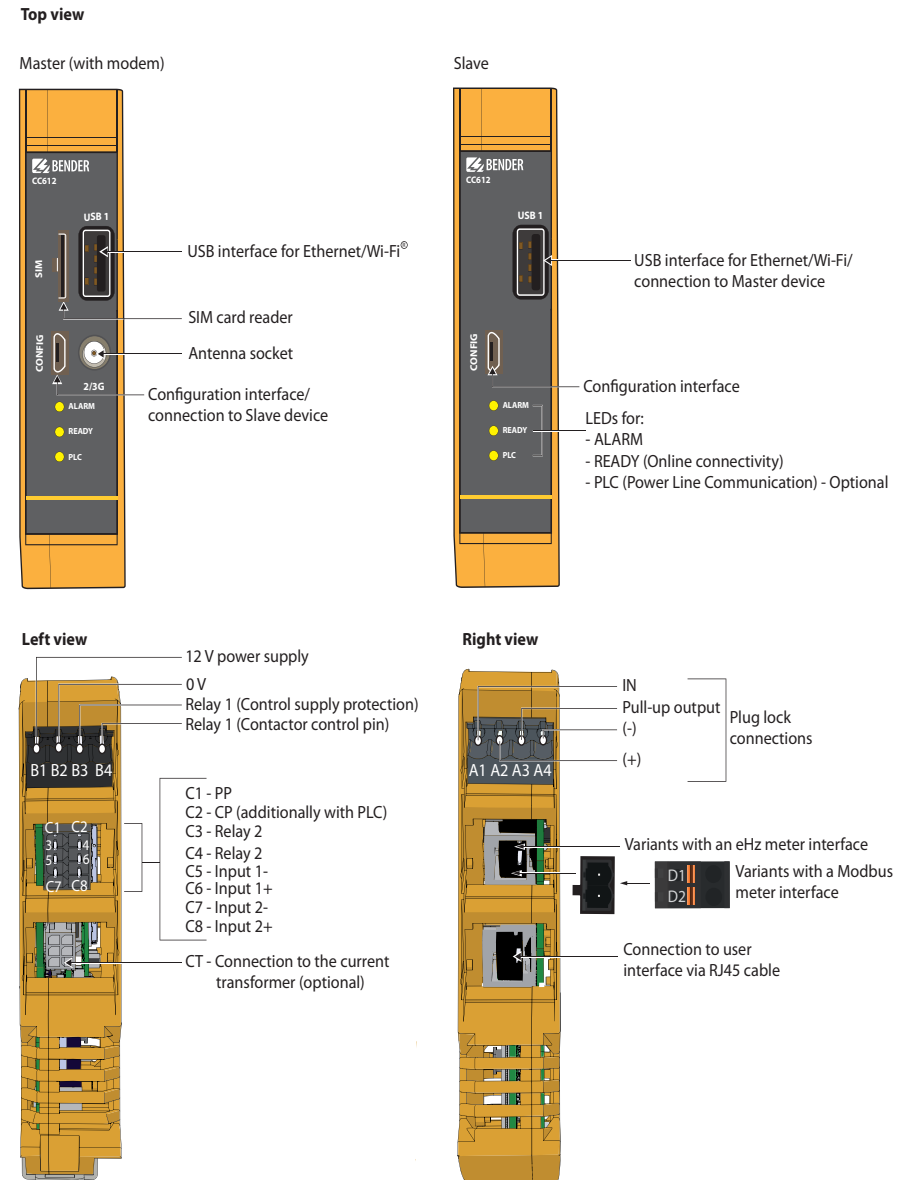
The IEC 61851 standard requires that the reference level of the CP communication is at same level as the power supply, i.e. protective earth (PE) must be connected to 0 V.

Risk of injury from sharp-edged terminals. Handle housing and terminals with care.

The wiring should be carried out in a way that prevents a short circuit from happening.

### 5.2 Connectivity

The charge controller connections for all device variants are shown below.



### 5.2.1 Master/Slave connections

The charge controller can function as a Master (the dedicated controller is switched into Master mode) or Slave. Master/Slave operation can be configured by connecting the USB configuration interface of one charge controller (Master device) to a USB interface for Ethernet/Wi-Fi® of the second charge controller (Slave device) using a USB cable. For each Master/Slave variant, there are connections common to both (these are described in the following sections) and there are differences, which are described in [Chapter 5.2.2](#).

Currently one (multiple from mid 2017) Slave can connect to the Master controller. The communication protocol is binary OCPP 1.6. Essentially the Master controller becomes the OCPP backend for the Slave controller. The Master controller exposes each Slave as an additional connector to the backend.

A charge controller is assigned the Master and Slave role on the **Manufacturer** page (See [Page 24](#)). Each Slave controller then needs to be assigned the IP address of the Master controller as its binary OCPP hostname and needs to use port 1600 as the binary OCPP port to connect to the Master. Multiple connectivity technologies to connect Master and Slave can be used, for example Ethernet and, where available, Wi-Fi®.

The **Master** is assigned an additional USB address of **192.168.125.124** on the operator configuration page without assigning a standard gateway. The **Slave** uses the IP **192.168.125.125** to connect to the Master. Using USB as the connection technology like this is more cost efficient than using multiple Ethernet dongles or Wi-Fi® but limits the distance of the controllers to a few meters as the maximum length of a USB cable is 5 meters. The Slave configuration web page (e.g. <http://192.168.123.123>) then offers links to access the Master and the Slave configuration.

#### 5.2.1.1 USB configuration interface (CONFIG)

The USB configuration interface (CONFIG) on the charge controller front panel is connected to a conventional laptop, PC or tablet computer with a normal USB host interface via a micro USB cable. This interface allows the device to be configured locally. In addition, it also enables software updates. Configuration details are outlined in [Chapter 6.1.1](#). In addition, Master/Slave operation can be configured by connecting the USB configuration interface of one charge controller (Master device) to a USB interface for Ethernet/Wi-Fi® of the second charge controller (Slave device) using a USB cable.

#### 5.2.1.2 USB interface for Ethernet/Wi-Fi® adapter

The USB Ethernet/Wi-Fi® interface provides a way of connecting the charge controller to an existing Ethernet/Wi-Fi® network. Refer to [Chapter 6.2.2.2](#). In addition, Master/Slave operation can be configured by connecting the USB configuration interface of one char-

ge controller (Master device) to a USB interface for Ethernet/Wi-Fi® of the second charge controller (Slave device) using a USB cable.

#### 5.2.1.3 Front panel LEDs (ALARM, READY, PLC)

The LEDs located on the front panel are used to indicate:

An error has occurred (ALARM)

Online connectivity to a backend system (READY)

**Optional** Powerline communication (PLC) acc. to ISO 15118-1:2015  
(This LED is not shown on the front panel of variants which do not feature PLC.)

#### 5.2.1.4 12 V power supply

The charge controller is powered by a 12 V primary power supply on terminals **B1** (12 V) and **B2** (0 V). According to IEC 61851, the reference level of the CP communication must be at same level as the power supply, i.e. protective earth (PE) must be connected to 0 V.

#### 5.2.1.5 Contactor connection

The charge controller controls the contactor that in turn controls the power flow toward the vehicle. Contactor control is exercised by a relay in the charge controller whose contacts are rated up to 30 V/1 A. The actual power for the signal circuit has to be looped into the circuit by correct wiring. In other words, one pin of the charge controller relay 1 (**B3**) has to be connected to the 12 V power supply, the second charge controller relay 1 pin (**B4**) must be connected to the contactor control pin. The second contactor control pin must be connected to the other pole (**0 V**) of the power source.



*Relay 1 is rated for 30 V/1 A. An intermediate relay may be required if this rating is considered inadequate.*

If an intermediate relay is required, then the second charge controller relay 1 pin (**B4**) must be connected to the intermediate relay control pin instead of to the contactor control pin. The second intermediate relay control pin must be connected to the other pole (0 V) of the power source. The contactor control pin is then connected to the line voltage (e.g. 230 V) and the other pin is connected to the neutral line.

### 5.2.1.6 Control Pilot (CP) and Proximity Contact (PP) connections

The control pilot (CP) and proximity (PP) contacts connect the charge controller to the outlet, enabling it to communicate with the vehicle and the cable plug. The CP and PP allow the charge controller to determine whether a cord has been plugged into the socket (proximity) and to inform the vehicle about the amount of power it can draw (refer to IEC 61851). IEC 61851 requires that the reference level of the CP communication is at same level as the power supply, i.e. protective earth (PE) must be connected to 0 V.

*The CP terminal is used for Power Line Communication (PLC) in charge controller variants with this optional integrated feature.*

### 5.2.1.7 I/O extension

The CC612 has additional I/O interfaces available via a configurable 3-channel I/O interface (**connector C: C3-C8**) that can be used for multiple purposes, for example:

- Parking management interface (The supported communication protocol is proprietary to Scheidt & Bachmann and based on the available auxiliary relay and one available input)
- Additional household main socket outlet control
- Power outage monitoring (e.g. RCD trip monitoring)
- Cooling fan switch for over-temperature control
- Connection to a meter with an S0 interface

### 5.2.1.8 DC sensor

Current Transformer (CT) connection (device variant)

For AC charging system fault monitoring, a charge controller variant is available which features an integrated DC sensor which works with an external magnetically shielded measuring current transformer (CT) connected to the CC612. This allows the use of a type A RCD in the charging system instead of the more expensive type B RCD. The relays in the CC612 are triggered if, during charging, the fault current limit  $I_{\Delta n} \geq DC 6 \text{ mA}$ .

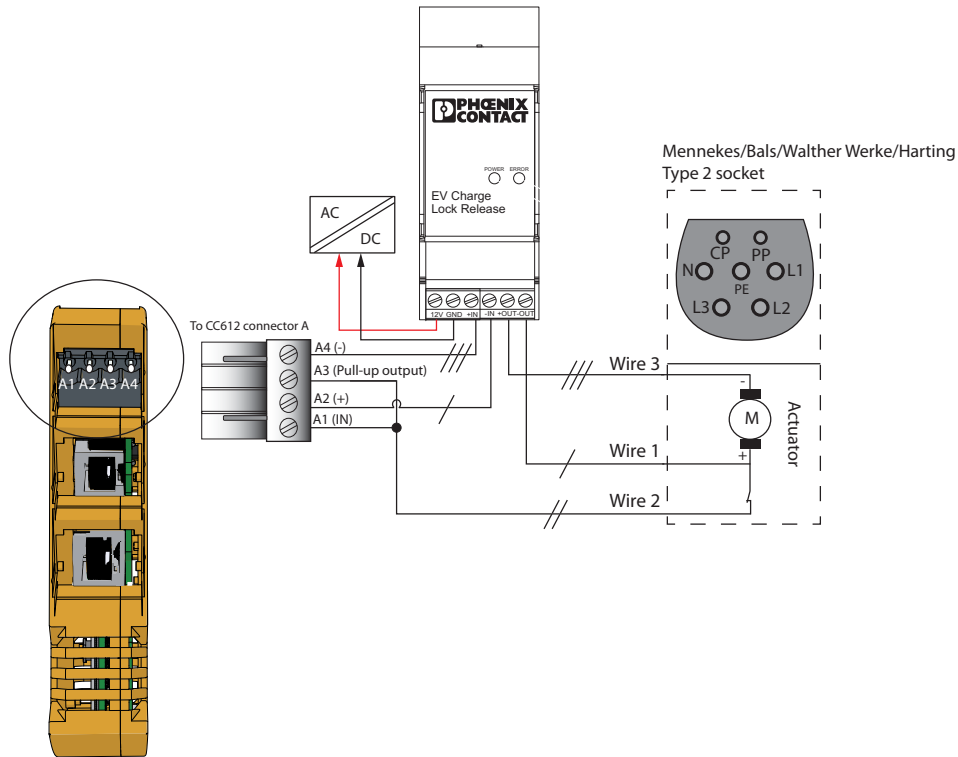
### 5.2.1.9 Plug lock connection

Under normal operating conditions, the type 2 socket automatically "locks" the plug connecting the charging system to a vehicle. The locking action can be heard. After disconnecting the plug from the vehicle, the charging system socket automatically unlocks the charging system socket and the cable can be removed. If both locking and unlocking work, the socket was correctly attached to the charging system controller. Via terminals **A1 ... A4** (i.e. plug lock connections), the charge controller can interface to different socket/actuator types. Type 2 sockets from various manufacturers and their corresponding connection to the charge controller are shown below:

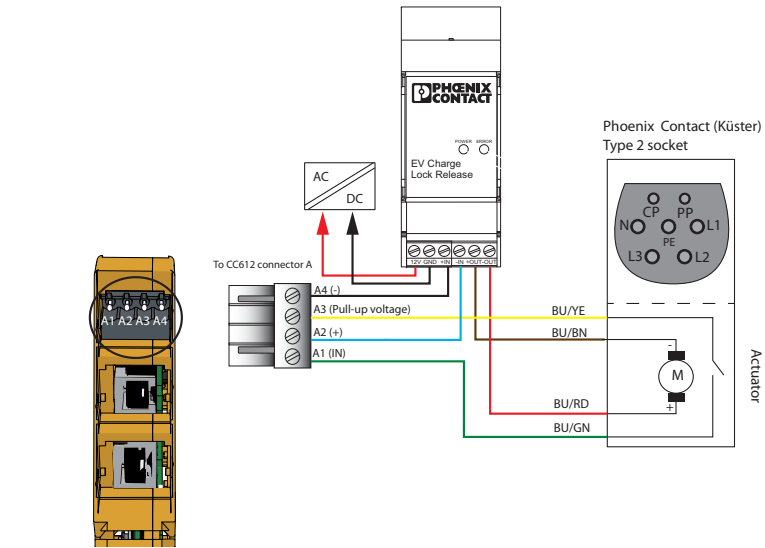
Type 2 socket (actuator type)	A4 (-)	A3	A2 (+)	A1 (IN)
	Socket actuator wiring			
<ul style="list-style-type: none"> <li>• Mennekes (31016, 31023, 31024, 31038)</li> <li>• Bals (801191-801195, 80300, 9743205000, 9743211000)</li> <li>• Walther Werke (9743205000, 9743211000)</li> <li>• Harting</li> </ul>	Wire 3		Wire 1	Wire 2
Phoenix contact (1405213, 1405214, 1405215, 1405216, 1408171, 1408172)	BU/BN	BU/GN	BU/RD	BU/YE

**5.2.1.10 Connection to lock release modules**

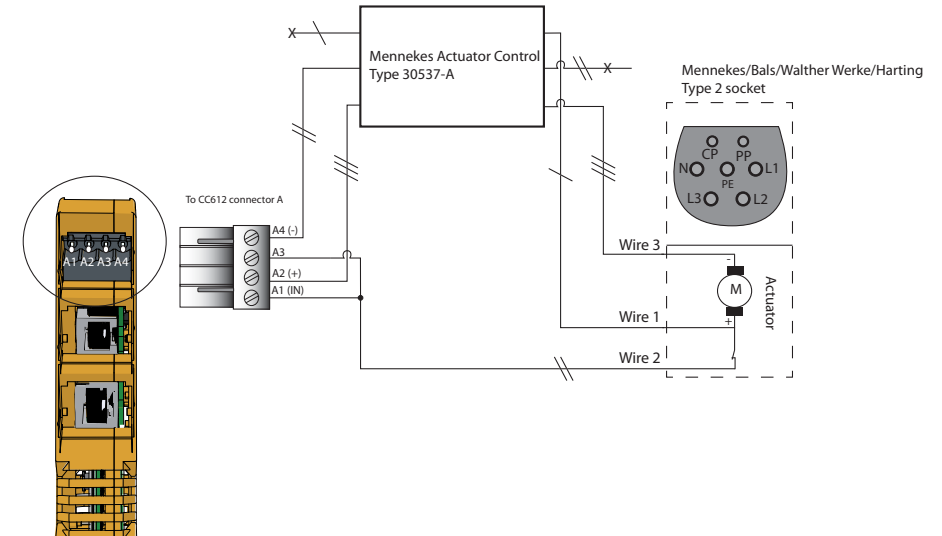
Each type 2 socket can also be used in conjunction with lock release modules from various manufacturers. A typical wiring diagram illustrating the connection between the charge controller, a Mennekes/Bals/Walther Werke/Harting socket actuator and a lock release module (EM-EV-CLR-12V) from Phoenix Contact is shown below:



A typical wiring diagram illustrating the connection between the charge controller, a Phoenix Contact socket actuator and a lock release module (EM-EV-CLR-12V) from Phoenix Contact is shown below:



A typical wiring diagram illustrating the connection between the charge controller, a Mennekes socket actuator and a lock release module from Mennekes is shown below:



### 5.2.1.11 Connectivity to eHZ or Modbus meters and (optionally) meters with an S0 interface

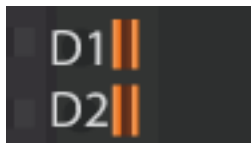
The use of a meter is not mandatory. However, a meter should be used when meter readings are required during normal operation. An EMH eHZ meter can be used if the meter should be digitally read. The meter is read by an optical reader attached to the mounting plate of the meter so that it can interface with the optical interface on the back of the meter. The optical reader is then connected to the charge controller with a RJ10 plug.

Modbus RTU can be used instead of an RS-485 based eHZ interface to connect to Modbus meters. Various Modbus meters are currently supported, including:

- ABB B23 series
- Eastron SDM630 series
- GARO GNM3D

Additional Modbus meters can be added upon customer request and may be added with each software release. Supported Modbus meters are listed on the webserver **Operator** page.

The Modbus meter interface on the charge controller is shown below:



The system periodically queries the relevant registers of the Modbus meters and uses the meter values to fulfill the charge controller functionality. Depending on support by the meter, current, voltage and power are also obtained directly from the meter as opposed to being calculated based on the increasing energy amounts reported.

The charge controller can optionally read meters with an S0 interface. These meters can be attached to one of the available inputs (see [Page 18](#)).

### 5.2.1.12 User interface connection

The charge controller features a simple user interface for customer-specific applications. This interface can connect to the:

- **RFID module RFID110-L1** - The RFID module is a separate PCB and is designed according to ISO14443A/MIFARE. It is connected to the charge controller using a standard RJ45 cable.



The RFID module is described in a separate operating manual (document number D00283), which can be downloaded from [www.bender.de/manuals](http://www.bender.de/manuals).

- **Display module DPM2x16FP** - The display module is also a separate PCB that is used to indicate the charge controller status information as well as the charging status. It features two RJ45 cable sockets, one which connects to the charge controller and the other which can connect to the RFID module.



The display module is described in a separate operating manual (document number D00296), which can be downloaded from [www.bender.de/manuals](http://www.bender.de/manuals).


### 5.2.2 Master device features

Only Master devices feature a SIM card/SIM card reader and an antenna socket.

#### 5.2.2.1 SIM card and SIM card reader

- The charge controller supports 2.5G Edge and 3G UMTS mobile networks and an integrated modem is included. It uses the MU609 wireless module, which supports all UMTS and GSM frequency bands worldwide:
  - HSPA+/UMTS quad-band 850/900/1900/2100 MHz
  - GSM/GPRS quad-band 850/900/1800/1900 MHz
- The charge controller can be operated as an "always-on" system when connected to a mobile phone data network,
- Connection is only possible when a SIM card is inserted into the SIM card reader located on the charge controller front panel. SIM must be provided in micro SIM format.
- The SIM card can have a PIN number which can be configured via the **Operator** configuration web interface - See [Page 22](#).
- The APN settings for the card can also be configured via the **Operator** configuration web interface - See [Page 22](#).

Connection to the mobile network (and subsequently the backend system) usually lasts between 6 to 48 hours after which the connection may be terminated by the mobile network. The charging system detects this disconnection and automatically reconnects.



*The SIM card is not included within the scope of delivery.*


### Geographical application

The charge controller variants with an integrated 3G modem may be operated in the following countries only:

Austria, Andorra	Latvia, Liechtenstein, Lithuania, Luxembourg
Belgium, Bulgaria	Malta, Monaco, Martinique, Madeira
Croatia, Cyprus, Czech Republic, Canary Islands, Canada	Norway
Denmark	Poland, Portugal
Estonia	Romania, Réunion
Germany, Great Britain, Greece, Guadeloupe	Slovakia, Slovenia, Spain, Sweden, Switzerland, San Marino, Saint Martin
Finland, France, French Guyana	Turkey, The Azores
Holland, Hungary	USA
Iceland, Ireland, Italy	

#### 5.2.2.2 Antenna socket

An antenna socket connects to a GSM/UMTS antenna.



*The following approved antenna must be used in order to receive GSM and UMTS signals: Phoenix Contact PSI-GSM/UMTS-QB-ANT antenna.*

### 6.1 Configuration

The charging system can be configured:

- Locally whereby the charge controller provides a **web interface** (i.e. Charge Point Control Interface) via the USB configuration interface (CONFIG)
- USB Ethernet/WLAN interface via a USB Ethernet dongle, USB Wi-Fi® (USB 1) or via the 3G Modem
- Remotely by utilizing the ChangeConfiguration command of the OCPP protocol

#### 6.1.1 Local configuration and parameters

To locally configure the charging system via the charge controller, connection with a micro USB cable to a laptop, PC or tablet computer with a normal USB host interface is required. Once connected, the charge controller is recognised as a USB network adapter.



*The charge controller USB configuration interface (CONFIG) emulates a Remote Network Driver Interface Specification (RNDIS) network when it is plugged into Windows, Linux or Mac OS computers. In a Linux and Mac OS, this virtual network interface is automatically detected and a driver is not necessary. On a Windows host machine, however, the driver for the RNDIS network adapter needs to be manually selected. Details on how to do this are given in [Chapter 7.1.1](#).*

The charge controller uses the local IP address **192.168.123.123** with a subnet mask of 255.255.255.0 on the virtual network interface corresponding to the USB configuration interface. The PC (or target) is automatically assigned a corresponding IP address via the Dynamic Host Configuration protocol (DHCP) once it is connected and communication with the charging system is based on this IP address.

An example of a local configuration Charge Point Control Interface **State, Manufacturer and Operator page** is shown on the following pages. Each of the parameters to be set is adequately described on the respective web interface pages. Please refer to these pages for further information:

- The Charging System Control Interface **State page** is accessed using the URL `http://192.168.123.123` and shows status information only.
- The Charging System Control Interface **Operator page** is accessed using the URL `http://192.168.123.123/operator`. As well as showing status information, operator parameters can be set. To access this page, a username and password are required:
  - Username: operator
  - Password: yellow\_zone
- The Charging System Control Interface **Manufacturer page** is accessed using the URL `http://192.168.123.123/manufacturer`. As well as showing status information, operator and manufacturer parameters can be set. To access this page, a username and password are required:
  - Username: manufacturer
  - Password: orange\_zone

These default passwords can be changed. The manufacturer can also change the user passwords and operating parameters.



*The manufacturer URL should not be given to the operator.*

6.1.1.1 Example of a typical Web interface State page:

ChargePoint ID (OCPP)	+49*839*00000000001	OCPP Charge Point ID that is used to identify towards the backend system
OCPP State (connector 1)	IDLE	State of OCPP at connector 1.
Type2 State (connector 1)	(A) Vehicle not connected	State of TYPE2 socket at connector 1.
Signaled current	0	The current in Ampere that is signaled to the vehicle via PWM.
Schuko State (connector 1)	IDLE	State of Schuko socket at connector 1.
Connection State (Backend)	NOT CONNECTED	The current state of the backend connection on TCP level
Connection State (Modem)	OFF	Show at which state in the connection sequence the modem is currently operating. Show OK when connected.
Free charging	Off	This mode allows charging without authorization via RFID or the backend. Charging is started immediately after a vehicle is connected
ChargePoint Geo Location	Not Available	Link to a map showing the geographical location of the charge point.
3G Network operator	UNKNOWN	The name of the network operator the built-in 3G modem is currently connected to.
Network registration mode	Disable	The current network registration mode of the 3G modem which informs about the technology (2G, 3G) and about the registration (home network, roaming...)
Network registration state	Not Registered and Not Searching	The registration state to the mobile network.
Modem access technology	GSM	Shows which access technology (2G, 3G) the modem is currently using.
Scan network operators at boot	Off	Determines whether upon boot a search for available network operators is carried out. The result can then be requested as separate parameter. The value is automatically set to off after boot.
Operator Selection Mode	Automatic	Operator Selection Mode, Auto or Manual...
Mobile country code (MCC)	0	Mobile country code as determined from the SIM card. This tells you which country your SIM card comes from
Mobile Network Code (MNC)	0	Mobile Network code as determined from the SIM card. This tells you which country your SIM card comes from
Location area code (LAC)	0	Location area code as reported by the built-in 3G modem, this value can be used to determine the location of the charge point

6.1.1.2 Typical Web interface Manufacturer page:

The screenshot shows a web browser window with the URL `192.168.123.123/manufacturer/manufacturer`. The page title is "Charge Point Control Interface" and features the BENDER logo. On the left, there are three tabs: "State", "Operator", and "Manufacturer". The main content area contains a configuration table with the following settings:

Meter configuration	eHZ Meter	The type of meter used for the charging socket and its connector
Pulses per kWh (S0 meter)	1000	S0 Meter Pulses per Kwh
LED Type	LED (default)	The type of led device connected to the charge controller if any.
Type of Display	Display not configured	The type of display connected to the charge controller if any
HMI Pattern On Relay 2 (K2)	DISABLE	The behavior for the relay 2 (K2) to be used for an external indicator light such as an LED or blinking light. Use option On while vehicle connected for integration with parking management system by Scheidt&Bachmann. To use two contactors in series that are to be controlled separately use the function ON while charging.
Maximum Current (A)	16	The maximal current of this charge point in Ampere.
Fixed cable attached	Off	Setting this to on indicates that the charger has a fixed cable attached and does NOT need to lock a cable in a socket. ATTENTION: This is safety relevant!
Redetect actuator	Off	Set this value to on if you want to request a redetection of the connected type 2 socket locking actuator upon the next boot
Schuko Socket	DISABLE	Use auxiliary input/output to support additional Schuko Socket
Schuko Switch Off Delay	Protect socket (Switch off immediately)	This delay determines whether the schuko socket should switch off immediately when an unplug is detected in this case the socket is protected but the contactor switches under load, or whether it should switch with a delay. In this case the socket is disconnected under load but the contactor is protected
Power Watchdog	DISABLE	This option monitors whether the power supply to the charging station or the charging socket is monitored. The time of interruption is safely stored and if still

### 6.1.1.3 Typical Web interface Operator page

The screenshot shows a web browser window with the URL `192.168.123.123/operator/operator`. The page title is "Charge Point Control Interface" and features the BENDER logo. On the left, there are two tabs: "State" and "Operator", with "Operator" selected. The main content area displays a configuration table with the following fields and descriptions:

ChargePoint ID (OCPP)	<input type="text" value="+49*839*0000000001"/>	OCPP Charge Point ID that is used to identify towards the backend system
Connection Type	<input type="text" value="No Backend"/>	The type of data connection to be used to connect to the backend system, if any. Use this option to disable backend communication completely
OCPP Mode	<input type="text" value="OCPP-S 1.5"/>	This parameter determines whether backend communication is done using the standard OCPP SOAP/JSON variant or the proprietary Binary OCPP variant of Ebee Smart Technologies. The Binary OCPP variant is working across NAT networks and therefore does not require a private APN for remote messages to arrive at the charge point. Also Binary OCPP uses much less data (factor 20 to 50) than standard OCPP. Binary OCPP however requires a Binary OCPP proxy on the backend side.
SOAP OCPP URL of Backend (Standard OCPP)	<input type="text" value="http://elinc.de:8080/OCPPSoapServerIndigoQA/service"/>	The HTTP URL of the OCPP backend system. This URL must be the SOAP endpoint. This parameter is only used if OCPP-S 1.5 or 1.6, the standard OCPP mode is used. If this mode is used a SIM card with a private APN must be used if the charge point should receive remote commands from the backend system as most 3G networks use NAT for normal SIM cards which prevents connections from the backend to the charge point
SSL Strictness as client	<input type="text" value="Encrypt only - No authentication"/>	Allows to set how strict SSL authentication is, from no authentication (encryption only) to full authentication
SOAP OCPP Server Port of ChargePoint (Standard OCPP)	<input type="text" value="8090"/>	The TCP server port on which the charge point accepts incoming connections from the backend system. Many backends require a specific port as only one port is allowed to be used by the backend firewall configuration
SSL mode as server	<input type="text" value="No SSL, Plain HTTP"/>	Allows to set whether and how to use SSL as a server, from no authentication (encryption only) to full authentication
Hostname (Binary OCPP)	<input type="text" value="elinc.de"/>	The DNS hostname or IP address of the binary ocpp proxy server for the backend system. This parameter is only used if Binary OCPP is selected for the TCP/IP mode
Portnumber (Binary OCPP)	<input type="text" value="444"/>	The TCP port of the proxy server for binary OCPP communication with the backend system.
WS/WSS URL of Backend (Binary OCPP)	<input type="text"/>	The WS/WSS URL of the OCPP backend system. This URL must be the WS/JSON endpoint. This parameter is only used if OCPP-J 1.5 or 1.6, the Binary OCPP mode is used. This parameter is only used if a SIM card with a private APN is used.

#### 6.1.1.4 Application of changed parameters

Parameters changes are not always applied after submission. To submit all changed parameters, click the "**Save & Restart**" button at the bottom of the page.

#### 6.1.1.5 Automatic charge controller resets

As part of the normal automatic recovery, the charge controller carries out system resets to recover from situations in which connectivity with the backend system cannot be obtained and no vehicle is currently charging. This behaviour is intentional and serves to ensure that the charge controller recovers from as many situations as possible without intervention. In a situation in which no SIM card is inserted or the configuration does not yet match the SIM card, a system reset can be easily mistaken for erroneous behaviour.



*After the web configuration interface has been accessed or while a vehicle is connected, the charging system will suppress system resets for at least 2 minutes to enable all parameters to be configured.*

#### 6.1.2 Remote configuration and parameters

The charging system or charging system controller enables the configuration of many parameters using the OCPP GetConfiguration and ChangeConfiguration commands. With these commands, locally configured communication parameters can be changed. The exception is the SIM parameters, which require local intervention when the SIM card is replaced.



*Any backend system can be used.*

## 6.2 Testing

Once configuration has been completed, the charge controller needs to be tested for operability. Testing ensures that:

- A successful boot-up has taken place
- Connectivity to the backend has been established
- Meter connectivity is possible
- Plug locking and unlocking are working
- Charging is possible

#### 6.2.1 Successful boot-up

The boot-up process begins once 12 V is supplied to the charge controller. After about 30 s, the ALARM and READY LEDs - and the PLC LED when available - on the front panel light up. After some time, the LEDs are turned off and only the "READY" LED blinks, indicating a successful boot-up. At the same time, the "Free LED" on the RFID module (if configured) lights continuously, marking the end of the boot up sequence.

#### 6.2.2 Connectivity to the backend

##### 6.2.2.1 via 2.5/3G modem

The system should be able to establish an online connection to the backend system after another 20 to 120 s. In addition, the SIM card, inserted into the charge controller SIM card reader, is activated. If a SIM card PIN number is required, it needs to be configured on the Charging System Control Interface operator page otherwise a backend connection will not be possible. With a data network connection established, the charging system is now available.

##### 6.2.2.2 via a USB Ethernet adapter or USB Wi-Fi® (USB 1)

If Ethernet is connected to a valid network during boot-up of the charge controller, and a DHCP Server exists in this network, the charge controller obtains an IP address from the DHCP server. The IP address provided to the charge controller can be influenced by assigning a fixed IP address for the charge controller at the DHCP server in your network. This IP address can then be used to make a connection.

In addition, the charge controller always uses a second IP address: 192.168.124.123 in the subnet 255.255.255.0 - on the Ethernet interface.



*If there is no DHCP server in your network or it was connected during boot-up or you have no means of determining the IP address assigned via DHCP, then assign an IP address from the 192.168.124.x subnet to your PC, connect it to the same Ethernet subnet and connect to the charging system using the 192.168.124.123 IP address.*

#### 6.2.3 eHZ/Modbus/S0 meter connectivity

Refer to the webserver **State** page to check if the eHz and Modbus meters have been successfully connected. In the case of meters with an S0 interface, values are only displayed when charging takes place.

### 6.2.4 Plug locking and unlocking

After boot-up and a successful online connection, plug locking and unlocking can be tested to see if the type 2 socket was correctly attached to the charge controller.

- First insert a plug that connects the charging system with a vehicle into the type 2 socket. The socket should automatically lock the plug. This locking action can normally be heard. Test by gently pulling on the plug.
- To unlock the plug, first disconnect the plug from the vehicle. This action automatically unlocks the charging system socket, allowing the cable to be removed.

### 6.2.5 Charging

After ensuring that a vehicle has been successfully connected to the charging system, charging is initiated by holding an RFID card, registered with the backend system, close to the RFID module. Charging starts when the contactor is switched on to provide power flow. The charge controller enables two modes of operation:

- **Authorisation BEFORE connecting**


Initial state: The green LED lights continuously meaning the charging system is free.

Step 1	Hold the RFID card close to the RFID reader. The charging system will then display "Authorisation in progress". In parallel, the yellow LED blinks slowly and the white LEDs are illuminated to show a circular light pattern.
Step 2	If authorisation is successful, the blue charging system LED will blink quickly, indicating that the vehicle can now be connected.
Alternative step 2:	If authorisation is not successful, all three charging system LEDs blink briefly to indicate an error. The display then changes to show that the charging system is „Free“ and the green LED lights continuously.
Step 3	The vehicle is connected to the charging system within 45 seconds. A slow blinking blue LED indicates that the vehicle is charging.
Alternative step 3	The vehicle is not connected to the charging system within 45 seconds. The display changes to indicate that the charging system is „Free“ and the green LED lights continuously.

- **Authorisation AFTER connecting**

Initial state: The green LED lights continuously meaning the charging system is free.

Step 1	The vehicle is connected to the charging system. The green LED blinks slowly to indicate that the vehicle has been identified but not yet authorised.
Step 2	The user holds an RFID card close to the card reader. The yellow LED blinks and the white LEDs are illuminated in the form of a circular light pattern to indicate that authorisation is being sought.
Step 3	If authorisation is successful, the blue charging system LED blinks slowly and the current charging status is shown.
Alternative Step 3	If authorisation is not successful, all three charging system LEDs blink briefly. The green LED then blinks to indicate that the vehicle has been recognised but has not yet been granted authorisation.



*The connection to the mobile phone data network and subsequently the backend system usually lasts anywhere between 6 and 48 hours. It is normal that after this period, a connection may be terminated by the mobile network. The charging system detects this disconnection and automatically reconnects. During the reconnect, all three LEDs on the charge controller front panel flash frequently.*

The charge controller runs the Linux operating system (OS). The easiest way to connect to the system is to connect through a TCP/IP network connection. This can be done by establishing a network connection.

### 7.1 Establishing a network connection to the charge controller

Establishing a network connection with the USB configuration interface (CONFIG). This interface can be found on the charge controller front panel.

#### 7.1.1 USB configuration interface

The USB configuration interface, CONFIG, emulates a so-called Remote Network Driver Interface Specification (RNDIS) network when it is plugged into Windows, Linux or Mac OS computers. In a Linux and Mac OS, this virtual network interface is automatically detected and a driver is not necessary. On a Windows host machine, however, the driver for the RNDIS network adapter usually needs to be manually selected. To do this:

- Open the device manager from the control panel
- Right click the "*RNDIS/Ethernet Gadget*" menu item located under "*Other devices*" and select "*Update Driver Software*"
- Select the option "*Browse my computer for driver software*".
- Then click on the option "*Select from a list of device drivers on my computer*".
- From the list presented, select the "*Network adapters*" category.
- In the window that appears, select the manufacturer Microsoft Corporation and the network adapter "*Remote NDIS Compatible Device*". The device driver is then installed and the system recognises the charge controller as a network adapter.

The charging system controller uses the local IP address **192.168.123.123** with a subnet mask of 255.255.255.0 on the virtual network interface corresponding to the USB configuration interface. A DHCP server is running on the target and automatically assigns a corresponding IP address to the host machine once it is connected. Therefore, communication with the charge controller is based on this IP address.



*The charge controller must be powered with 12 V when the CONFIG interface is being used.*

## 8.1 Tabular data

### Insulation coordination acc. to IEC 60664-1/IEC 60664-3

Rated voltage .....	12.5 V
Overtoltage category/Pollution degree .....	III/3
Rated impulse withstand voltage .....	800 V
Altitude .....	≤ 2000 m AMSL

### Supply voltage

Nominal voltage .....	DC 12 V
Operating range of the supply voltage .....	DC 11.4 . . . 12.6
Nominal current .....	1 A

### Measuring DC sensor

Measuring range .....	100 mA
-----------------------	--------

### Response values:

Residual current $I_{\Delta n}$ .....	DC 6 mA
Response tolerance $I_{\Delta n}$ .....	-50 . . . 0 %

### Restart sequence value:

DC 6 mA .....	< 3 mA
---------------	--------

### Wireless parameters (Optional for Master devices only)

Frequency bands .....	850/900/1800/1900/2100 MHz
Antenna gain .....	≤ 2.5 dBi
Impedance .....	50 Ω
Data rate .....	GPRS: UL 85.6 kBit/s; DL 85.6 kBit/s
.....	EDGE: UL 236.8 kBit/s; DL 236.8 kBit/s
.....	WCDMA PS: UL 384 kBit/s; DL 384 kBit/s
.....	HSPA: UL 5.76 MBit/s; DL 14.4 MBit/s
Specified antenna .....	Phoenix Contact model PSI-GSM /UMTS-QB-ANT-2313371

### Inputs/outputs and display

LED ALARM .....	yellow
LED READY .....	green
LED PLC (Optional) .....	green
USB Extension interface (Ethernet, Wi-Fi®, . . .) .....	USB socket type A
CONFIG (Configuration interface) .....	Micro socket type AB
SIM card (For Master devices only) .....	micro SIM

### Terminal A:

A1 .....	Actuator IN
A2 .....	Actuator +
A3 .....	Actuator pul-up output
A4 .....	Actuator -

### Terminal B:

B1 .....	+12 V IN
B2 .....	0 V IN
B3 .....	Relay 1 NO
B4 .....	Relay 1 NO

### Terminal C:

C1: .....	Proximity PP
C2: .....	Control Pilot (Optional Powerline Communication PLC acc. to ISO/IEC 15118)
C3 .....	Relay 2 NO
C4 .....	Relay 2 NO
C5 .....	Input 1-
C6 .....	Input 1+
C7 .....	Input 2-
C8 .....	Input 2+

CT .....	Current transformer
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### Input 1 and Input 2:

Input voltage .....	DC 11.4 V . . . 25.2 V
Input current .....	1.7 . . . 3.8 mA

Meter .....	Meter interface
-------------	-----------------

User interface .....	User interface RJ45
----------------------	---------------------

### Switching elements

Relay 1 .....	configurable
Relay 2 .....	charging contactor
Switching elements .....	2 x 1 N/O contacts
Operating principle .....	N/C operation
Electrical service life .....	10,000 switching cycles

### Contact data acc. to IEC 60947-5-1:

Rated operational voltage $U_e$ .....	30 V
Rated operational current $I_e$ .....	1 A
Minimum contact rating .....	1 mA ≥ 10 V
Rated voltage $U_i$ .....	32 V

### Environment/EMC

EMC .....	EN 61851-22
.....	EN 301 489-1, EN 301 489-7 for Master variants only
Operating temperature .....	-30 . . . +70°C

**Climatic conditions acc. to IEC 60721:**

Stationary use (IEC 60721-3-3) .....	3K5 (except condensation, water and formation of ice)
Transport (IEC 60721-3-2) .....	2K2
Long-term storage (IEC 60721-3-1) .....	1K2

**Mechanical conditions acc. to IEC 60721:**

Stationary use (IEC 60721-3-3) .....	3M4
Transport (IEC 60721-3-2) .....	2M2
Long-term storage (IEC 60721-3-1) .....	1M3

**Connection**

**Connection type (terminal block C)..... push-in terminal**

Connection properties:

rigid/flexible .....	0.2 .. 1.5 mm <sup>2</sup> (AWG 24 .. 16)
flexible with ferrule without plastic sleeve .....	0.25 .. 1.5 mm <sup>2</sup> (AWG 24 .. 16)
flexible with ferrule with plastic sleeve .....	0.25 .. 0.75 mm <sup>2</sup> (AWG 24 .. 20)
Stripping length .....	10 mm
Opening force .....	0.5 - 0.6 Nm (4 - 5 lb-in)

**Connection type (terminal blocks A and B)..... screw terminal**

Connection properties:

rigid/flexible .....	0.2 .. 2.5 mm <sup>2</sup> (AWG 24 .. 12)
flexible with ferrule without plastic sleeve .....	0.25 .. 2.5 mm <sup>2</sup> (AWG 24 .. 14)
flexible with ferrule with plastic sleeve .....	0.25 .. 1.5 mm <sup>2</sup> (AWG 24 .. 16)
Stripping length .....	7 mm

**Other**

Operating mode .....	continuous operation
Degree of protection .....	IP20
DIN rail mounting .....	IEC 60715
Weight.....	160 g

**8.2 Standards, approvals, certification**

The charge controller has been developed in compliance with the following standards:

- DIN EN ISO 15118:2015 (Option with PLC only)
- EN 61851-1:2011
- EN 61851-22:2002
- EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + AC:2011 + A2:2013
- EN 62020:1998 + A1:2005 (Option Master only)
- EN 301 511:2003-032015-06 (Option Master only)
- EN 301 489-1 V1.9.2 (Option Master only)
- EN 301 489-7 V1.3.1 (Option Master only)

**8.3 Declaration of Conformity**

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**EG-Konformitätserklärung**  
*EC-Declaration of Conformity*

**Hersteller:** Bender GmbH & Co. KG  
*Manufacturer:*

erklärt in alleiniger Verantwortung, dass das Produkt  
*declare under our sole responsibility that the product*

**Produktbezeichnung:** Laderegler CC61x (siehe Anlage)  
*Product name:* Charge controller CC61x (see annex)

auf das sich diese Erklärung bezieht, mit den Vorschriften  
 folgender Europäischen Richtlinien übereinstimmt.  
*to which this declaration relates, is in conformity with the  
 following European directives.*

<b>Richtlinien:</b>	<b>2011/65/EU</b>	<b>RoHS-Richtlinie</b>	<i>RoHS directive</i>
<i>Directives:</i>	<b>2014/30/EU</b>	<b>EMV-Richtlinie</b>	<i>EMC directive</i>
	<b>2014/53/EU</b>	<b>RED-Richtlinie</b>	<i>RED directive</i>

Zur Beurteilung der Konformität wurden folgende Normen herangezogen:  
*The assessment of this product has been based on the following standards:*

*Angewandte Normen / Applied standards:*

<b>EN 60950-1</b>	<b>:2006 ... A2:2013</b>
<b>EN 61851-1</b>	<b>:2011</b>
<b>EN 61851-22</b>	<b>:2002</b>
<b>EN 62020</b>	<b>:1998 + A1:2005</b>
<b>ETSI EN 301 489-1</b>	<b>V1.9.2</b>
<b>ETSI EN 301 489-7</b>	<b>V1.3.1</b>
<b>ETSI EN 301 511 O</b>	<b>:2003-032015-06</b>

**Ort, Datum:** Grünberg, den 14.03.2017  
*place, date:* **Unterschrift:**

(Winfried Möll)  
 (Geschäftsführer Technologie / CTO)

*Anmerkung:* Die Anlagen sind Bestandteil dieser EG-Konformitätserklärung.  
 \*Evtl. Normen Einschränkungen sind gerätespezifisch in der Typenliste gekennzeichnet.

*Remark:* *The annexes are part of this declaration.*  
 \*Limitation of standards are marked with a sign in the attached type list.

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### 8.4 Ordering information\*

Anlage - Typenliste der EG-Konformitätserklärung CC61x Annex - Typelist of EC-declaration CC61x		
Produktgruppe <i>Product group</i>	Art.-Nr. <i>Art.-no.</i>	Gerätebezeichnung <i>Device type</i>
CC61x	B94060001	CC612-1M3PR
CC61x	B94060001C	CC612-1M3PR customized
CC61x	B94060001L	CC612-1M3PR
CC61x	B94060003	CC612-2M3PR
CC61x	B94060005	CC612-1S0PR
CC61x	B94060007	CC612-2S0PR
CC61x	B94060009	CC612-2M3R
CC61x	B94060009L	CC612-2M3R
CC61x	B94060010	CC612-2S0R
CC61x	B94060010L	CC612-2SR

Type	Master /Slave	Modem	Meter	DC sensor	PLC** hardware	User interface	LEDs	Art. No.
CC612 -1M3PR	Master	3G	eHZ, S0 interface	✓	✓	✓	Ready Alarm PLC	B94060001
CC612 -2M3PR	Master	3G	Modbus, S0 interface	✓	✓	✓	Ready Alarm PLC	B94060003
CC612 -1S0PR	Slave	---	eHZ, S0 interface	✓	✓	✓	Ready Alarm PLC	B94060005
CC612 -2S0PR	Slave	---	Modbus, S0 interface	✓	✓	✓	Ready Alarm PLC	B94060007
CC612 -2M3R	Master	3G	Modbus, S0 interface	✓	---	✓	Ready Alarm	B94060009
CC612 -2S0R	Slave	---	Modbus, S0 interface	✓	---	✓	Ready Alarm	B94060010

\* The charge controller only works in combination with the measuring current transformer, which must be ordered separately. Various cable lengths are available (see table below).

\*\* Optional and enabled by a software update

#### Accessories

Type	Art. No.
RFID110-L1 with RJ45 cable (length 500 mm)	B94060110
Measuring current transformer** W15BS ( Cable length 1,500 mm)	B98080065
Measuring current transformer** W15BS-02 (Cable length 180 mm)	B98080067
Measuring current transformer** W15BS-03 (Cable length 320 mm)	B98080068
DPM2x16FP	B94060120

\*\* The measuring current transformer has an internal diameter of 15 mm



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