EN Manual

CC611 EV charge controller

Charge controller for electric vehicle charging stations, wall boxes and street light charging points
Software version: D0490

CC611_D00253_00_M_XXEN / 07.2015

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1. Effective use of this manual

1.1 Notes for the user

This manual is intended for experts in electrical engineering and electronics!

In order to make it easier for you to find specific text passages or references in this manual and for reasons of comprehensibility, important information is emphasized by symbols. The meaning of these symbols is explained below

*The 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 level risk** that can result in minor or **moderate injury** or **damage to property** if not avoided.*

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

2. Safety information

2.1 General safety information

In addition to these operating instructions, the leaflet "Safety instructions for Bender products", which is delivered with the product, is an integral part of the device documentation.

2.2 Work activities on electrical installations

- Only qualified and skilled personnel are permitted to install, commission and run a device or system.
- Compliance with the applicable regulations governing work on electrical installations and with the regulations derived and associated with them is mandatory. EN 50110 is of particular importance in this regard.

Risk of fatal injury from electric shock!
Any work on electrical installations which is not carried out properly can lead to death and injury! Only skilled persons are permitted to carry out the work necessary to install, commission and run a device or system.

- 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

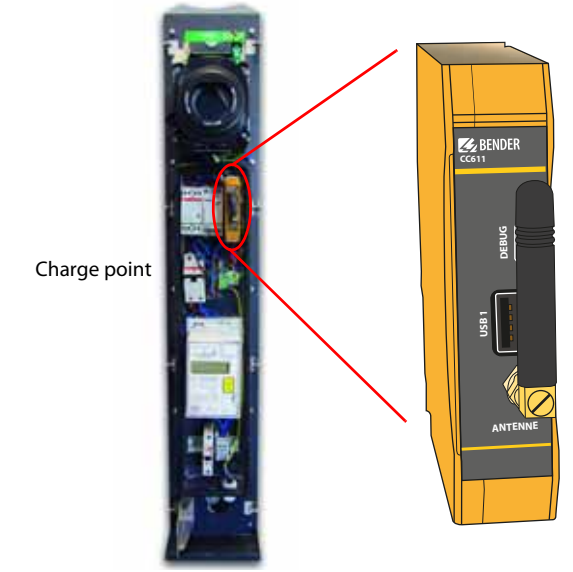
The CC611 charge controller has been assembled in accordance with the latest state-of-the-art technology and recognized safety rules. Nevertheless, its use may result in injury to the user or a third party respectively, through interference or damage to the charge controller or material property. The charge controller should 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

The Bender CC611 charge controller, hereafter referred to as the charge controller, is the main component of a charge point 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 2 sockets. It enables a setup that is in accordance with current standards, such as IEC 62196, IEC 61851-1 and IEC 61851-22.



3. Function

3.1 Device features

- Standard OCPP Implementation
- Full OCPP Remote functionality
- Binary OCPP implementation with band-width optimization and NAT network compatibility
- Smart Grid enabled using standard OCPP functionality
- Local and remote configuration
- Compatible with all electric vehicles on the market
- Optional display support

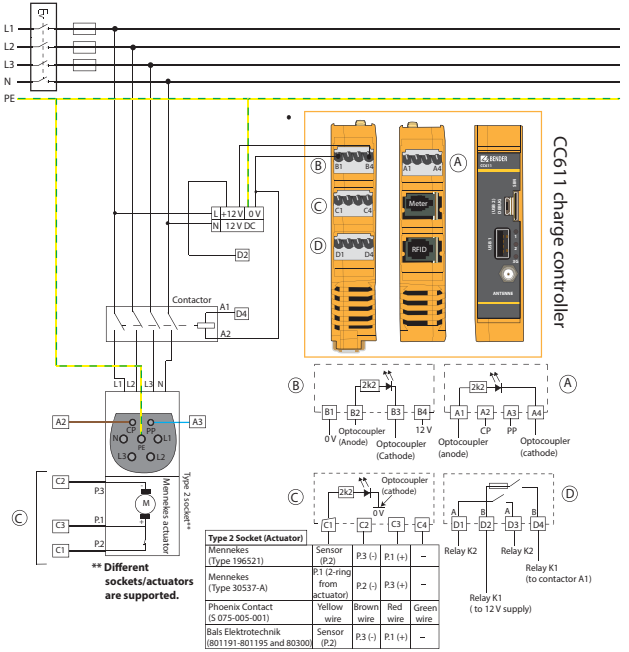
3.2 Product description

The charge controller is characterized by its compact design and size (114.5 mm x 22.5 mm x 99 mm) that in turn enables intelligent, small and cost effective charging points. To enable the charge controller to communicate, a backend system together with a well-known and trusted communication protocol is required. Given that most backend providers strictly adhere to the OCPP communication protocol, the charge controller is OCPP 1.5 complaint and compatible with all electric vehicles currently on the market. 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 either holding a valid RFID card close to the reader or remotely by the backend system via OCPP. 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.

3.3 Functional description

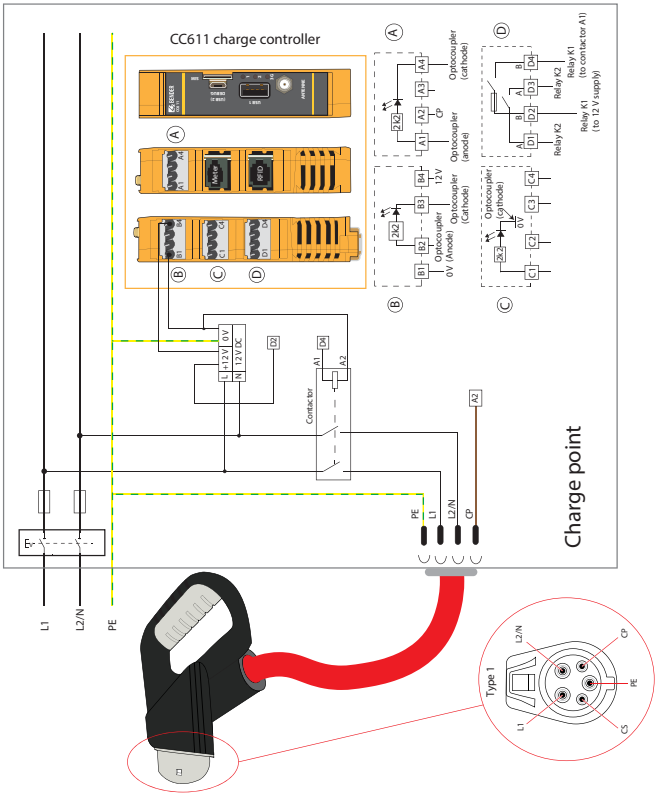
As well as the charge controller, a charge point also consists of a relay contactor, which is directly connected to a type 2 socket, or to an attached cable with a type 1 or type 2 plug. A 12 V power supply, e.g. a Phoenix Contact Step-PS/1 AC/12 DC/1.5 primary switched-mode power supply, is needed to operate the charge controller, and an optional RFID module is available to facilitate simple user interaction. A charge point may also consist of a meter, and if the meter should be read digitally, a smart digital meter (EMH eHZ) is required. The essential components of a charge point are shown in the following configurations:

- Charge point with type 2 socket:

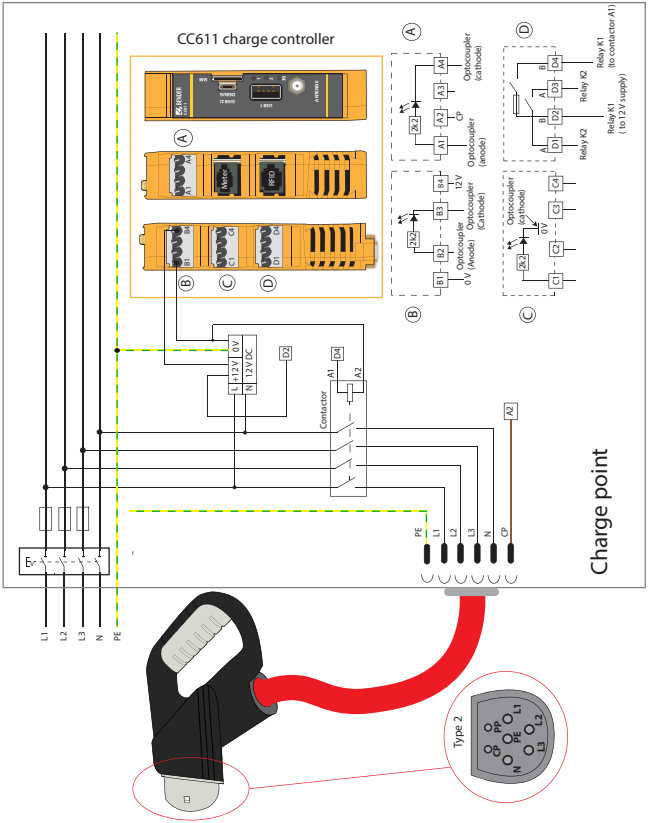


Type 2 Socket (Actuator)					
Mennekes (Type 196521)	Sensor (P.2)	P.3 (-)	P.1 (+)	–	
Mennekes (Type 30537-A)	P.1 (2-ring from actuator)	P.2 (-)	P.3 (+)	–	
Phoenix Contact (S 075-005-001)	Yellow wire	Brown wire	Red wire	Green wire	
Bals Elektrotechnik (801191-801195 and 80300)	Sensor (P.2)	P.3 (-)	P.1 (+)	–	

- Charge point with a cable and type 1 plug:



- Charge point with a cable and type 2 plug:

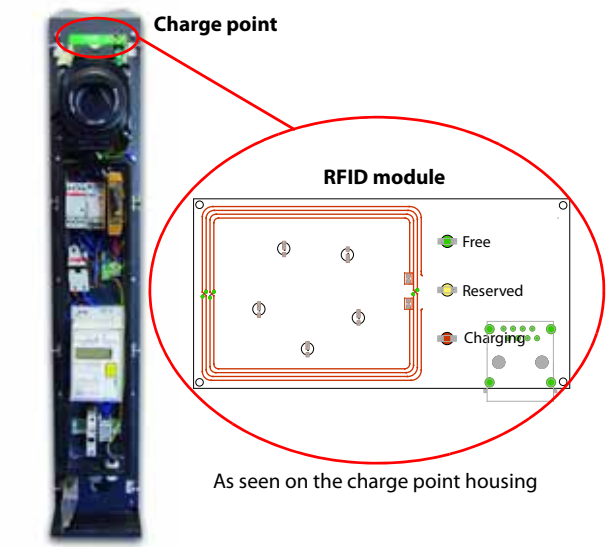


When viewed from its correct mounting position on a DIN rail, the charge controller has a total of 9 connectors - See Chapter 5. Power flow toward the vehicle is controlled by the contactor (using a signal voltage of up to 30 V), which is itself controlled by the charge controller via a relay in the controller. The charge controller reads the digital eHZ meter readings using a standard optical reader attached to the charge controller via an RJ11 plug. The optical reader interface is positioned on the back of the meter. The SIM card reader is positioned on the controller front panel, as are two USB interfaces, one of which (USB 2) is used to configure the charge controller. Optionally, this interface can also be used to apply software updates. The other USB interface (USB 1) allows the connection of peripheral USB devices.

According to IEC 60364-7-722, a Residual Current Device (RCD) needs to be present in the charger or installation.

3.3.1 RFID module

The charge controller facilitates simple user interaction with the RFID module, which consists of an RFID card reader and three charging status LEDs. The RFID module is a separate PCB that should ideally be placed under a semi-transparent part of the outside housing. It must be placed at a distance of at least 20 mm from any significant metal surface or metal parts to ensure optimum RFID reading performance. It is connected to the charge controller using a standard RJ45 cable. Optionally, a display can be attached to this module for more detailed user interaction.



As seen on the charge point housing

3.3.2 Normal operation

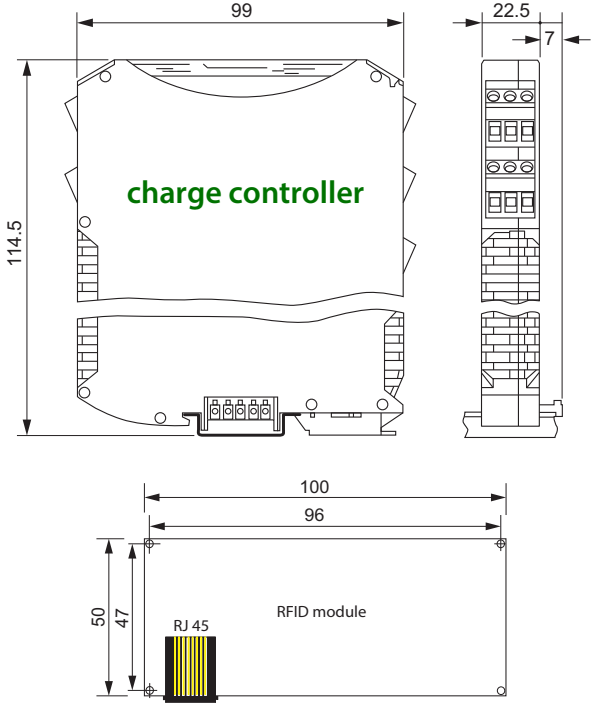
In normal operation, the boot-up sequence begins after 12 V is applied to the controller. After boot up, the system establishes a connection to the backend communication system if configured. When a vehicle is connected to the charge point via the type 2 socket, the charge controller automatically locks the plug.

Charging is initiated by holding an RFID card, which is registered with the backend system, close to the RFID module. After ensuring the vehicle is connected and ready to charge, the contactor is then switched on to provide power flow. Once charging has completed and the plug on the vehicle side is disconnected by the user, the charge point socket automatically unlocks the plug on the charge-point side.

4. Device overview

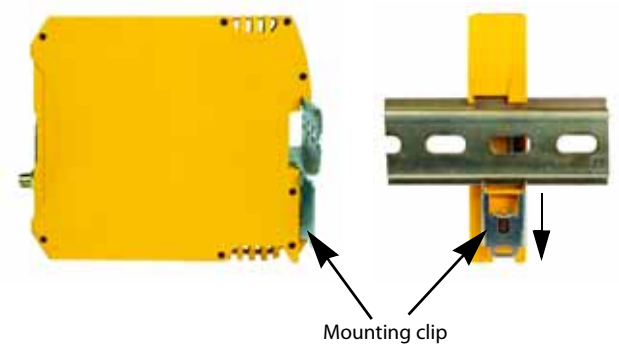
4.1 Dimensions

All dimensions in mm



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. Connection

5.1 Connection conditions

DANGER

Risk of electric shock!
Even though the charge controller terminals have nominal voltages measuring up to 12 V, the charge point voltage is 230 V. Touching live parts of the system carries the risk of electric shock. Therefore, the device is only to be operated with mounted and locked terminal covers.

CAUTION

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.

CAUTION

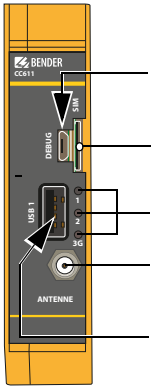
Risk of injury from sharp-edged terminals. Handle housing and terminals with care .

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

5.2 Connectivity

The charge controller connections are shown below.

Charge controller front panel



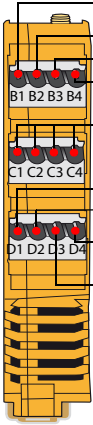
USB configuration interface (USB 2)

SIM card reader

LEDs for bootup sequence/online connectivity/connectivity to backend

Antenna

USB interface for Ethernet/WiFi adapter (USB 1)



0 V supply

Optocoupler (Anode)

Optocoupler (Cathode)

12 V supply

Plug lock connection to the outlet (See table in Chapter 5.2.7)

Relay K2

Relay K1 (to 12 V supply)

Relay K1 (to contactor A1)

Relay K2

Optocoupler (Anode)

Control Pilot (CP)

Proximity contact (PP)

Optocoupler (Cathode)

Connection to EMH eHz smart meter (via RJ11 cable)

Connection to RFID module (via RJ45 cable)

5.2.1 USB configuration interface

The USB configuration interface (USB 2) 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 and it enables software updates.

5.2.2 SIM card and SIM card reader

The charge controller can be operated as an "always-on"system when connected to a mobile phone data network, and 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 charge controller supports 2.5G Edge and 3G UMTS mobile networks. 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.
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 charge point detects this disconnection and automatically reconnects.

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

5.2.3 Antenna

The antenna is used for 3G communication and it should cover most, if not all connectivity conditions. In case of minimal reception conditions, a bigger antenna, preferably one mounted externally to the charging station, is recommended.

5.2.4 USB interface for Ethernet/WiFi adapter

The USB Ethernet/WiFi interface (USB 1) provides a way of connecting the charge controller to an existing Ethernet/WiFi network. USB Ethernet dongles from Apple and Digitus are supported.

5.2.5 Front panel LEDs

The LEDs located on the front panel are used as indicators during boot-up, online connectivity to a backend system and charging. More detailed information about what they signify is described in Chapter 6.2.

5.2.6 12 V power supply

The charge controller is powered by a 12 V primary power supply, for example a Phoenix Contact Step-PS/1 AC/12 DC/1.5 switched-mode power supply, on terminals B4 (12 V) and B1 (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.

5.2.7 Plug lock connection

Under normal operating conditions, the type 2 socket automatically "locks" the plug connecting the charge point to a vehicle. The locking action is visually indicated by the status LEDs and is loud enough to be heard. After disconnecting the plug from the vehicle, the charge point socket automatically unlocks the charge point socket and the cable can be removed. If both locking and unlocking work, the socket was correctly attached to the charge point controller. Via terminals C1 . . . C4 (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)	**Charge controller terminal**			
	C1	**C2**	**C3**	**C4**
Mennekes (Type 196521)	P.2 (sensor)	P.3 (-)	P.1 (+)	---
Mennekes (Type 30537-A)	P.1 (2-ring from actuator	P.2 (-)	P.3 (+)	---
Phoenix Contact (S 075-005-001)	yellow wire	brown wire	red wire	green wire
Bals Elektrotechnik (80191-80195 and 80300)	P.2 (sensor)	P.3 (-)	P.1 (+)	---

5.2.8 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 using DC voltages up to 30 V. 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 (D2) has to be connected to the power source, the second charge controller relay pin (D4) must be connected to the contactor control pin (A1), and the second contactor control pin (A2) must be connected to the other pole of the power source.

5.2.9 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). 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.

5.2.10 Meter connection

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 is required 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 RJ11 plug.

5.2.11 Connection to the RFID module

The charge controller is connected to the RFID module via a standard RJ45 cable.

6. Configuration and testing

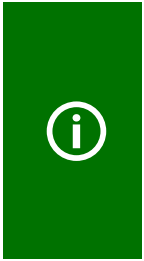
6.1 Configuration

The charge point can be configured:

- Locally whereby the charge controller provides a web interface via the USB configuration interface (USB 2)
- Remotely by utilizing the *ChangeConfiguration* command of the OCPP protocol

6.1.1 Local configuration and parameters

To locally configure the charge point 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 (USB 2) 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 USB configuration interface".

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 charge point is based on this IP address.

An example of a local configuration web interface is shown on the following page. The information shows that the charge point has successfully connected to the backend and is not currently charging. The web page can be divided into two sections:

- Status information (under the heading "ChargePointState")
- Configurable parameters (under the heading "ChargePointConfiguration")

The configurable parameters are:

- ChargePointId
- Communication Interface
- BinaryOCPPHostname
- BinaryOCPPPort
- OCPPBackendURL
- APN
- APN-Username
- APN-Password
- SIM-PIN Number

Any backend system can be used. The example used in this manual is based on the ebee backend system.

Ebee Charge Point Control Interface Refresh

ChargePointState	
Connector 1 State	IDLE
Connector 1 OCPP State	IDLE
NetworkState	CONNECTED
IMSI	262011201852415
IMEI	3526780145067559
ICCID	89490200001094332619
ATCOPS	0,1,"TMO D",0
ATCREG	0,1,1406,9D26
ATCSQ	24,99
Network	TMO D
ChargePointUUID	f45420c5-2daa-4656-ae4c-2050312ff7f2
MeterSerial	No Id read yet
MeterValue Wh	0
MeterPower W	0
ChargePointOCPPURL	http://10.25.12.88:6080/Ocpp/ChargePointService/
HeartbeatInterval	1200

ChargePointConfiguration	
ChargePointId	+49*839*678014506759
Communication Interface	GSM
BinaryOCPPHostname	elinc.de
BinaryOCPPPort	444
OCPPBackendURL	http://elinc.de:8080/OCPPSoapServerIndigo/services/Centra
APN	
APN-Username	
APN-Password	
SIM-PIN Number	

6.1.1.1 ChargePointId

ChargePointId is used by the charge point to identify itself to the backend system. Factory set, this number is derived from the International Mobile Equipment Identity (IMEI) number of the built-in 3G modem and the operator id registered for ebee. In general this number needs to be changed to a number that is recognized by the backend system.

6.1.1.2 Communication Interface

The communication interface selects either 3G or Ethernet via the USB to communicate with the backend.

6.1.1.3 BinaryOCPPHostname / BinaryOCPPPort

If the charge point is operated in "Binary OCPP" mode, it uses a very efficient variant of the Open Charge Point Protocol (OCPP). Therefore it needs only a host name and port number to connect to the backend system running the "Binary OCPP proxy". If this mode is used, which is highly recommended, the paramters *BinaryOCPPHostname* needs to be set to the backend DNS hostname. Alternatively an IP address can be used. The *BinaryOCPPPort* parameter needs to be set to the TCP port number where the proxy can be reached.
In default factory settings, the parameters are set accordingly so that the charge point can contact the Ebee backend system (which is run on the public internet). This allows basic testing of the charge point functionality to be performed.

6.1.1.4 OCPPBackendURL

If the charge point is operated using conventional OCPP, the *OCPPBackendURL* needs to be configured to contain a full URL, including the hostname, port number and sub-URL of the backend system.

6.1.1.5 APN/APN-Username/APN-Password/SIM-PIN Number

The parameters *APN, APN-Username, APN-Password and SIM-PIN Number* must be set to match the SIM card settings. These settings are only necessary when 3G operation configured.

If the SIM card does not request a PIN number, the charge point will automatically try to detect the correct Access Point Name (APN) settings based on the network name of the operator to which the charge point connects. If a PIN number is requested by the SIM card or a non-standard APN must be used, the four parameters must be configured manually.

6.1.1.6 Application of changed parameters

Parameters changes are not always applied after submission. To submit all changed parameters, click the "Submit and reboot" button at the bottom of the page.

6.1.1.7 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 back-end system cannot be obtained and no vehicle is currently charging. This behavior 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 behavior.

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

6.1.2 Remote configuration and parameters

The charge point or charge point 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.

The parameters configured are:

- Hostname and Port
- WSATO
- HeartBeatInterval
- ConnectionTimeOut
- MeterDefaultSampleInterval
- ClockAlignedDataInterval
- FreeCharging
- EffectiveAmps
- TempDelta
- NetworkType
- BinaryOCPP
- AUTH_STOP_CHARGE
- UseCache

6.1.2.1 Hostname/Port

Parameters *Hostname* and *Port* are identical to the locally configured *BinaryOCPPHostname* and *BinaryOCPPPort* parameters respectively. If the charge point is operated in Binary OCPP mode (highly recommended), it uses a very efficient variant of the OCPP protocol. In this case only a host name and port number are needed to connect to the backend system running the "Binary OCPP proxy":

- The paramter *BinaryOCPPHostname* must be set to the backend DNS hostname. Alternatively an IP address can be used.
- The *BinaryOCPPPort* parameter must be set to the TCP port number where the proxy can be reached.

In default factory settings the parameters are set accordingly so that the charge point can contact the Ebee Backend system too enable basic testing of the charge point functionality.
Default (Hostname): elinc.de
Default (Port): 4040

6.1.2.2 WSATO

WSATO is identical to the locally configured *OCPPBackendURL* parameter. If the charge point is operated using conventional OCPP, the *OCPPBackendURL* parameter needs to be configured to contain a full URL, including the hostname, port number and sub-URL of the backend system.
Default: http://elinc.de:8080/OCPPSoapServerIndigo/services/CentralSystemService

6.1.2.3 HeartBeatInterval

The *HeartBeatInterval* parameter determines how often the charge point sends a "heartbeat" message to the backend system. This parameter is set by the backend system at the start of each connection as part of the *BootNotification* message. *HeartBeatInterval* can be changed during an ongoing connection.
Default: Determined by the backend using the *BootNotification* message

6.1.2.4 ConnectionTimeOut

This parameter determines how long the charge point waits for a response from the backend system until it considers the backend communication link broken and attempts to re-establish another mobile network communication. The default is 20 seconds. In cases of repeatedly broken connections due to poor mobile network conditions, increasing this parameter to 60 seconds or above can be helpful.
Default: 20 (seconds)

6.1.2.5 MeterDefaultSampleInterval

This parameter determines how often meter values are transmitted to the backend system during an ongoing charging transaction. Meter values are transmitted together with the values sent as part of the *StartTransaction* and *StopTransaction* messages and enable the energy consumption during different charging phases to be determined. Setting this parameter value to 0 disables the sending of values.
Default: 0 (seconds)

6.1.2.6 ClockAlignedDataInterval

This parameter determines how often meter values are sent to the backend system regardless of whether or not a transaction is ongoing. These meter values enable the total energy consumption of the charge point - information which is important for the grid operator - to be determined. Setting this parameter value to 0 disables the transmission of meter values.
Default: 0 (seconds)

6.1.2.7 FreeCharging

This parameter determines if the charge point allows free charging (parameter value = 1) or charging is allowed only after successful authorization (parameter value = 0).
Default: 0

6.1.2.8 EffectiveAmps

This parameter allows controlled charging in order to balance the strain the charge point imposes on the grid. In other words, it reduces the maximum amp value signalled to the vehicle to an arbitrary value between 6 A and the maximum value the charge point is rated for (usually 16 A).
Default: 16 (A)

6.1.2.9 TempDelta

This parameter sets the difference in temperature allowed before the charge point sends a temperature update using a *StatusNotification* message.
Default: 2 (°C)

6.1.2.10 NetworkType

This sets the preferred network type that the built-in 3G modem uses. Possible values are "AUTO", "2G" and "3G".
Default: AUTO

6.1.2.11 BinaryOCPP

The charge point operating mode can be set using this parameter. Two modes are possibe:

- Binary OCPP (parameter value set to 1)
- Conventional plain OCPP (parameter value set to 0).

Default: 1

Binary OCPP has a capacity of 5 MB per month whereas conventional plain OCPP has a capacity of between 50 MB and 200 MB per month.

6.1.2.12 AUTH_STOP_CHARGE

If, during an authorized charging session using one RFID token, the charge controller is suddenly presented with a different RFID token, the value set for this parameter determines if the controller immediately rejects the second RFID token (parameter value set to 0) or if it sends a separate OCPP Authorize message to determine whether the second token may be authorized to stop the charging transaction (parameter value set to 1).
Default: 0

6.1.2.13 UseCache

This parameter enables or disables the caching of UID of RFID cards. A parameter value of 0 disables the cache while a value of 1 enables it.
Default: 0

Many parameters are applicable immediately after they have been set. However, parameters related to network connectivity are applicable only when the next connection attempt is made. In addition, these parameters do not automatically trigger a reconnect if they are changed. The advantage of this is that multiple parameters can be changed together, as would be the case when reconfiguring a charge point to connect to a new backend hostname and a new port. To trigger a reconnect, the OCPP *Reset* command with the property "Soft" can be used. To ensure all parameters are applied, the property of the *Reset* command should be set to "Hard" or a charge point power cycle is required.

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. LED "2", visible on the front panel, steadily lights up. After some time (i.e. approximately 40 s), the three LEDs on the RFID module begin to flash steadily and frequently, marking the end of the boot up sequence.

6.2.2 Connectivity to the backend

The system should be able to establish an online connection to the backend system after another 20 to 120 s. This is indicated when the three LEDs on the RFID module stop blinking and the green LED lights uninterrupted. 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 configuration web page otherwise a backend connection will not be possible. With a data network connection established, the charge point is now available and no vehicle is connected.

6.2.3 Meter connectivity

After the system has established a successful connection to the backend system, a sufficient time base is available to switch the eHZ meter into EDL40 mode. The meter displays the "E40" symbol instead of "E21" to indicate:

- The meter is powered and has been properly connected to the charge controller.
- EDL40 mode has been successfully set by the charge controller.
- Two-way communication between meter and controller is possible.

Digital and signed meter values are now available.

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 charge point 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 charge point socket, allowing the cable to be removed.

6.2.5 Charging

After ensuring that a vehicle has been successfully connected to the charge point, charging is initiated by holding an RFID card, registered with the back-end system, close to the RFID module. Charging starts when the contactor is switched on to provide power flow. This is indicated by a slow blinking red LED on the module.

Reconnecting to the mobile network

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 that period a connection may be terminated by the mobile network. The charge point detects this disconnection and automatically reconnects. During the reconnect, all three LEDs flash frequently.

7. Connecting to the charge controller

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

Establishing a network connection can be done using one of following alternatives:

- The USB configuration interface (USB 2)
- The USB Ethernet/WiFi interface via a USB Ethernet dongle (USB 1)

Both these interfaces can be found on the charge controller front panel.

7.1.1 USB configuration interface

The USB configuration interface 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 gadget device" located in "Other devices" and select "Update Driver Software"
- 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 recognizes the charge controller as a network adapter.

The charge point 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.

7.1.2 USB Ethernet interface via a USB Ethernet dongle

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.

Assigning another IP address
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 charge point using the 192.168.124.123 IP address.

8. Technical data

( )* = Factory settings

8.1 Tabular data

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

Rated voltage ..... 12 V
Overvoltage category/Pollution degree III/3
Rated impulse withstand voltage ..... 500 V
Application range ..... ≤ 2000 m above sea level

Supply voltage

Nominal supply voltage U_S ..... DC 12 V
Operating range of the supply voltage ..... DC 11.4 . . . 12.6 V
Power consumption without modem ..... < 5 VA
Power consumption with modem / short-term peak ..... < 11 VA

Inputs/outputs and operation

LED 1 ..... green
LED 2 ..... green
LED 3G ..... green
USB host ..... Extension interface (Ethernet, WiFi, ...)
USB device ..... Configuration interface
SIM card ..... micro SIM
Control pilot, proximity and optocoupler input (terminal block A) ..... input/output
Meter (RJ11 plug) ..... external
RFID interface (RJ45 cable) ..... external
Power supply and optocoupler input (terminal block B) ..... input
Plug lock (terminal block C) ..... input/output
Relay K1/K2 (terminal block D) ..... output

Switching elements

Alarm relay K1 ..... charging contactor
Alarm relay K2 ..... configurable
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 ..... 30 V
Rated operational current ..... 1 A
Minimum contact rating ..... 1 mA at AC/DC ≥ 10 V

Environment/EMC

EMC ..... IEC 61326
Operating temperature ..... -25 . . . +75°C
Climatic class acc. to IEC 60721:
Stationary use (IEC 60721-3-3) 3K5
Transport (IEC 60721-3-2) 2K3
Long-term storage (IEC 60271-3-1) 1K4
Classification of mechanical conditions acc. to IEC 60271:
Stationary use (IEC 60721-3-3) ..... 3M4 (except condensation and formation of ice)
Transport (IEC 60721-3-2) 2M3
Long-term storage (IEC 60271-3-1) 1M3

Connection

Connection type ..... Screw terminal
Connection properties:
rigid ..... 0.2 . . . 2.5mm² (AWG 24-14)
flexible without ferrule ..... 0.2 . . . 2.5mm² (AWG 24-14)
flexible with ferrule ..... 0.2 . . . 1.5mm² (AWG 24-16)
Stripping length ..... 7 mm
Opening force ..... 0.5-0.6 Nm (4 -5 lb-in)
Test opening, diameter ..... 2.1 mm
RJ 45 ..... RFID reader
RJ 11 ..... optical meter interface

Other

Operating mode ..... continuous operation
Degree of protection ..... IP 30
Degree of protection terminals ..... IP 20
DIN rail mounting ..... IEC 60715

8.2 Standards, approvals, certification

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

- IEC 61851-1
- IEC 61851-22
- RFID acc. to MIFARE

CE

8.3 Ordering information

Type	Version	Art. No.
CC611 -1P3 (DC 12 V) which includes the RFID module, RJ45 cable (length 500 mm) for the RFID module and connector plugs		B 9406 0000

9. Transport and malfunction

9.1 Inspection and transport

Inspect the dispatch packaging and equipment packaging for damage, and compare the contents of the package with the delivery documents. In the event of damage in transit, please inform the Bender company immediately:
Bender GmbH & Co.KG
Londorfer Straße 65
35305 Grünberg
06401 807-0

9.1.1 Support

For additional support, please contact Bender Service at:
Tel.: +49 6401 807-760 oder 0700BENDERHELP
Fax: +49 6401 807-259;
E-Mail: info@bender-service.com

9.2 Disposal

Please observe national regulations on the disposal of the device. Ask your supplier if you are not sure how to dispose of the old unit.

Within the European Community, Directive 2002/96/EC on waste electrical and electronic equipment, and Directive 2002/95/EC on the restriction of hazardous substances in electrical and electronic equipment apply. In Germany these policies are implemented through the "Electrical and Electronic Equipment Act" of 16 March 2005. After that, the following applies:

- Electrical and electronic equipment do not belong in household waste. This is indicated by the following symbol:

- Batteries or accumulators do not belong in household waste but should be disposed of in accordance with the statutory provisions.
- Old Equipment from users other than private households, which was bought new after 13 August 2005 can be returned to the manufacturer for disposal.

More information on the disposal of Bender devices can be found at www.bender-de.com under Service and Support.

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BENDER Group

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