ICC1314

Charge controller for charging systems for electric vehicle charging

Figure: depends on the variant

BENDER

Table of contents

1 General information

1.1 How to use the manual

ADVICE
This manual is intended for qualified personnel working in electrical engineering and electronics! Part of the device documentation in addition to this manual is the enclosed supplement "Safety instructions for Bender products".

ADVICE
Read the operating manual before mounting, connecting and commissioning the device. Keep the manual within easy reach for future reference.

1.2 Indication of important instructions and information

DANGER
Indicates a high risk of danger that will result in death or serious injury if not avoided.

WARNING
Indicates a medium risk of danger that can lead to death or serious injury if not avoided.

CAUTION
Indicates a low-level risk that can result in minor or moderate injury or damage to property if not avoided.

ADVICE
Indicates important facts that do not result in immediate injuries. They can lead to malfunctions if the device is handled incorrectly.

Information can help to optimise the use of the product.

1.3 Service and Support

Information and contact details about customer service, repair service or field service for Bender devices are available on the following website: Fast assistance | Bender GmbH & Co. KG.

1.4 Training courses and seminars

Regular face-to-face or online seminars for customers and other interested parties:

www.bender.de > know-how > seminars.

1.5 Delivery conditions

The conditions of sale and delivery set out by Bender GmbH & Co. KG apply. These can be obtained in printed or electronic format.

1.6 Inspection, transport and storage

Check the shipping and device packaging for transport damage and scope of delivery. In the event of complaints, the company must be notified immediately, see "www.bender.de > service & support.".

When storing the devices, observe the information under Environment / EMC in the technical data.

1.7 Warranty and liability

Warranty and liability claims for personal injury and property damage are excluded in the case of:

- 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.
- The use of accessories or spare parts that are not provided, approved or recommended by the manufacturer.
- Catastrophes caused by external influences and force majeure.
- Mounting and installation with device combinations not approved or recommended by the manufacturer.

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

1.8 Disposal of Bender devices

Abide by the national regulations and laws governing the disposal of this device.

Bender GmbH & Co. KG is registered in the waste from electrical and electronic equipment (WEEE) register under the WEEE number: DE 43 124 402. For more information on the disposal of Bender devices, refer to www.bender.de > service & support.

1.9 Safety

If the device is used outside the Federal Republic of Germany, the applicable local standards and regulations must be complied with. In Europe, the European standard EN 50110 applies.

DANGER Risk of fatal injury due to electric shock!
Touching live parts of the system carries the risk of:

- Risk of electrocution due to electric shock
- Damage to the electrical installation
- Destruction of the device

Before installing the device and before working on its connections, make sure that the installation has been de-energised. The rules for working on electrical systems must be observed.

2 Function

Detailed information on how the functions work is available in the Bender Charge Controller software documentation (https://www.bender.de/docs/charge-controller)

Local access to charge controller

Local access via USB CONFIG to the charge controller is possible either as the operator or as the manufacturer. Further details are described in chapter "Local configuration of parameters", page 21 Operator access is possible via the http://192.168.123.123:

- *User name: operator*
- *Password: yellow_zone*

The Manufacturer can access the manufacturer area via the URL http://192.168.123.123/legacy/manufacturer/manufacturer:

- *User name: manufacturer*
- *Password: orange_zone*

The default passwords should be changed to prevent unauthorised access. The login details for the user Manufacturer should not be shared with the operator.

2.1 Intended use

The ICC1314 charge controller, hereinafter referred to as "charge controller", is the main component of a charging system.

Charge controllers with G1 identification are operated together with the integrated power module IPM1300. Charge controllers without G1 identification can be operated with customer-specific power modules according to the Bender specification and with the Bender IPM1xx1 product family. The ICC1314 is connected to the power module via the 20-pin micromatch connector using a flat band cable.

It enables an installation in accordance with the requirements of current standards, e.g. IEC 61851-1 and IEC 62955.

Any other use than that described in this manual is regarded as improper.

Detailed descriptions and functions of the integrated power modules can be found in the relevant manuals.

2.2 Device features

- Charge controller in accordance with IEC 61851-1 (charging mode 3)
- integrated WiFi module for configuration and connection with other charging systems
- Suitable for single-phase or three-phase charging of electric vehicles up to 80 A, depending on the current carrying capacity of the integrated power module which is used
- integrated residual direct current monitoring module with residual current transformer for DC residual current monitoring (external RCD type A required)
- USB interfaces
  - 1 CONFIG interface (type B) for configuration and maintenance as well as for connecting two charge controllers for dual charging systems
  - 2 USB host interfaces (type A), one of them can be used as an alternative to the CONFIG interface

- Meter interface
  - Modbus RTU for internal energy meters, suitable for Eichrecht-compliant billing
  - Modbus TCP for connecting meters for load management
- Up to two Ethernet interfaces
- suitable for the installation of dual charging systems using two charge controllers
- suitable for the installation of charging systems with two alternatively usable plug systems (e.g. type 2 and protective contact sockets)
- integrated emergency opener of the charging socket actuator in the case of a power blackout
- integrated 2G / 4G modem with router function
- 2 optocoupler inputs and 2 relay outputs for additional functions
- integrated DC 12 V voltage supply with a maximum current carrying capacity of 400 mA for customised applications
- Support for RFID reader
- Support for OCPP 1.6-J
- ISO 15118 Powerline Communication (PLC) with support of plug & charge authorisation, load management and autocharge
- Dynamic load management for optimised distribution of the available power to connected vehicles, including PV charging optimisation and prioritisation function
- Support for the EEBUS profiles overload protection, optimisation of PV charging, cost-optimised charging and load specification by electricity grid operators
- Support for the Bender app for home loading and API for customer-specific apps
- Tool support for configuring and testing charging systems in production
- configurable support for additional Schuko socket-outlet
- Control Pilot and Proximity Pilot communication
- Internal temperature sensor to reduce the charging current depending on the ambient temperature

2.3 Product description

The charge controller controls and monitors all functions of private, industrial or public charging stations. Core function is the release and regulation of the charging current. The charge controller can be integrated into a variety of energy management systems and OCPP backends and is operated as an always-on system. The compatibility of the charge controller with backends, vehicles or energy management systems is ensured in periodic integration tests.

2.4 Functional description

The charging system consists of a charge controller in combination with an integrated power module (IPM). The IPM is connected to a charging socket or to a permanently mounted cable with a type 1 or type 2 plug. More details see chapter “Local configuration of parameters”, page 21)

2.4.1 General functions (depending on the variant)

- The charging system can be equipped with an electricity meter. Modbus RTU meters can be connected directly to the device. In addition, a second meter can be connected for energy management via Modbus TCP using an Ethernet or WiFi interface.
- A DC 12 V power supply via integrated power module is needed for operation.
- Option to use an HMI module with RFID reader and LED field allow easy user interaction.
- Current flow toward the vehicle is released by enabling the main relay on the integrated power module.

- Using a Micro SIM card (not included in the scope of delivery):
  The SIM card slot (available on data gateways with a 4G modem only) is located on the charge controller front panel. The SIM card can have a PIN number which can be configured via the **Network** tab.
- For charge controllers with a 4G modem, there is an SMA connector and, depending on the variant, a U.FL connector for an external 4G antenna on the circuit board (see chapter "Gateway variants with modem (depends on the variant)", page 19).
- For residual current detection in an AC charging system, the charche controller IPM combination features an integrated residual direct current monitoring module (RDC-M). With integrated monitoring of the DC residual current, only an RCD type A is required in the charging system.
- Data exchange between the electric vehicle and the charging system is possible via ISO 15118 compliant Powerline Communication (PLC).
- Dynamic load management (DLM):
  – The charge controller comes with DLM function, which can be fully used, independent of a backend connection. It detects which charging current is applied to which phase and thus prevents the occurrence of peak loads and unbalanced loads. It is also possible to control the system based on the solar feed-in and prioritise charging points in the DLM. Maximum number of charging points in a network: 250.
- Data management and control functionality of the charge controller:
  – Termination of the charging process after tripping the residual current protective device (RCD) due to a residual current.
  – Detection of critical residual currents by the RCM sensor. For the vehicle owner, this can serve as an early warning, provided that the charge controller is connected to an energy management system and that it supports this function.

2.5 Temperature monitoring - Load current and cooling monitoring

The charge controller is equipped with a temperature sensor, which allows the temperature in the 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 the temperature inside the enclosure within the permissible range for the components used in a charging system. Basic settings can be made via the **Manufacturer** tab.

The actual temperature is affected by heat generated by the charge controller itself.

2.6 LED indications

Status LED (F)

PCB

Blue	System is starting
Fast flashing blue	Software update is running
Green	System started, not yet ready for operation
Flashing green	System running, system ready for operation
Red (10 s or longer)	System error

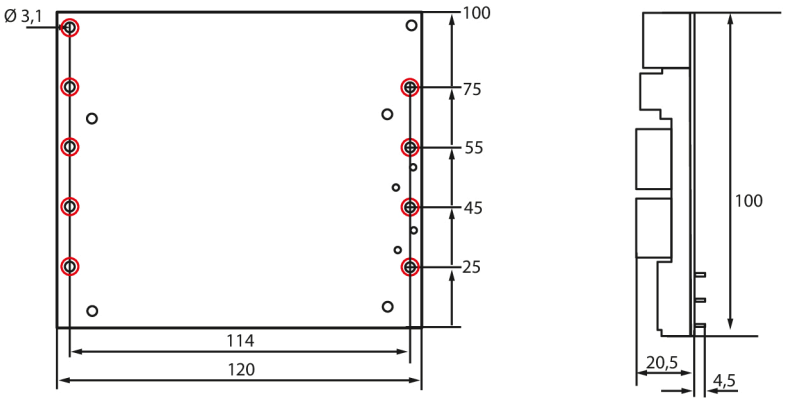
Ethernet

Terminal B, C (Status LEDs R, Q)

Off	No Ethernet connection
Steady green	Ethernet connection
Flashing green	Ethernet connection, data transfer is running
Glowing orange	Ethernet connection with 100 Mbit/s
Orange off	Ethernet connection with 10 Mbit/s

3 Dimensions and mounting

Dimension diagram



Dimensions in mm

Red markings: possible fixing points

Recommendation for fastening:

- *Pan head screws: 4 x M 2.5*
- *Torque: 0.36 Nm*

CAUTION **Wrong mounting of the PCB**

Mechanical stress (tilting) of the PCB

When mounting, ensure that the PCB is flush-mounted.

4 Connection

4.1 Connection conditions

DANGER **System parts may be live**
(integrated power module and charging station up to 230 V / 400 V)
Electric shock
Before touching system parts, ensure that it has been de-energised.

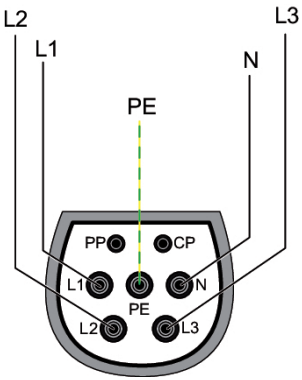
CAUTION **Sharp-edged terminals**
Cut injuries
Handle enclosure and terminals with care.

Information:

- *PE is connected to "0 V"; reference level for Control Pilot (CP communication) must be at the same level as the power supply (IEC 61851 series of standards)*
- *Lay lines only inside the charging system*
- *do not lay lines parallel to power lines*
- *Cable lengths (except Modbus, Ethernet, Power IN, measuring current transformer and charging cable): < 3 m*
- *maximum cable length Ethernet / Fast Ethernet: 100 m*
- *maximum cable length for connecting the integrated power module: 0.3 m*
- *maximum cable length Modbus: 250 m*
- *the ground shield of the Ethernet connection at the RJ45 socket is directly connected to PE*

4.2 Connection plug connections

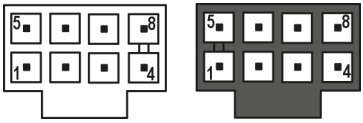
Type 2 plug



4.3 Charging system with type 2 socket-outlet

ADVICE

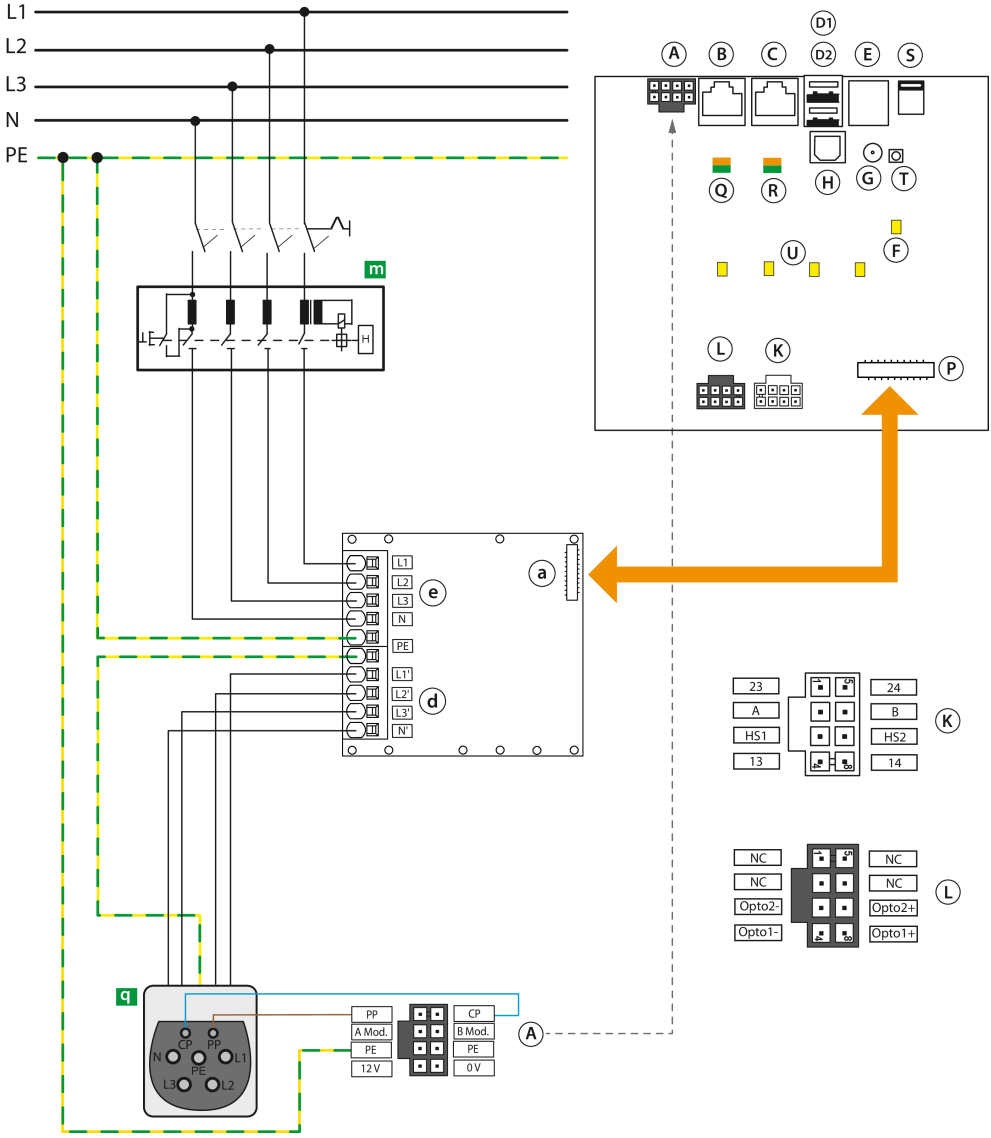
For the connections A, L and K a Molex Nano- Fit, series 105310, 8-pin, plating: tin (Sn) is used. For the connector assemblies, models with plating tin (Sn) are also to be used. The A and L connections are colour-coded black, the K connection is colour-coded natural (beige). The pins are numbered as shown in the following diagram:



Klemmenzuordnung

A4	12V	DC 12 V voltage source for customer-specific application
A8	0V	
A3	PE	Input PE
A7	PE	Input PE
A2	A Mod.	Modbus meter A
A6	B Mod.	Modbus meter B
A1	PP	Proximity Pilot
A5	CP	Control Pilot
K4	13	Relay 13: relay output 1 (12 V)
K8	14	Relay 14: relay output 1 (12 V)
K3	HS2	Actuator HS2: Locking input actuator switch
K7	HS1	Actuator HS1: Locking 12 V output actuator switch
K2	A	Actuator A: Locking actuator output negative
K6	B	Actuator B: Locking actuator output positive
K1	23	Relay 23: relay output 2 (12 V)
K5	24	Relay 24: relay output 2 (12 V)
L4	Opto1-	Optocoupler input 1 (12 V negativ)
L8	Opto1+	Optocoupler input 1 (12 V positiv)
L3	Opto2-	Optocoupler input 2 (12 V negativ)
L7	Opto2+	Optocoupler input 2 (12 V positiv)

Wiring diagram



Legend

A	12 V, PE, Modbus meter, CP, PP (Molex Nano-Fit 105310-3508)	L	Optocoupler input (Molex Nano-Fit 105310-3508)
B	Connection Ethernet (ETH2)	P	Connection integrated power module (IPM) 20-pole
C	Connection Ethernet (ETH1)	Q	LED activity Ethernet 2
D1, D2	Extension connection (USB type A)	R	LED activity Ethernet 1
E	SIM card holder (3FF, micro)	S	integrated WiFi antenna
F	LED status charge controller	T	Antenna socket 4G modem (U.FL)
G	Antenna socket 4G modem (SMA)	U	4x RGB LED (status charging system)
H	Configuration interface (USB type B)	m	RCD type A
K	Connector locking device, control relay (Molex Nano-Fit 105310-4508)	q	Type 2 socket-outlet

ADVICE

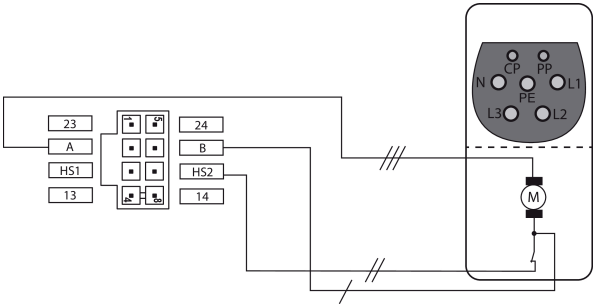
Usage variants of the USB type A interfaces (D)

1. both USB type A sockets (D1 and D2)
2. external USB type A socket with the USB type B configuration interface (D1 and H)

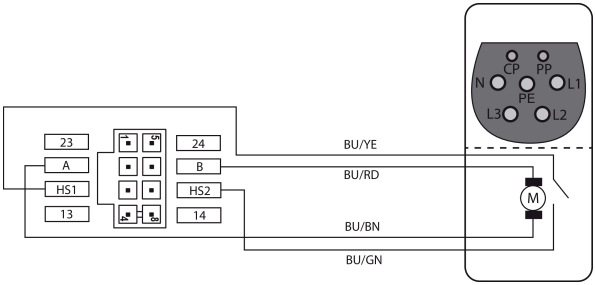
4.4 Connection locking actuators

Type 2 socket-outlets (actuator type)	Actuator	A	HS1	B	HS2
		Socket-outlet actuator wiring			
• Mennekes (31016, 31023, 31024, 31038) • Bals (801191-801195, 80300, 9743205000, 9743211000) • Walther Werke (9743211000) • Harting	Hella	Wire 3 (///)		Wire 1 (/)	Wire 2 (//)
• Walther Werke Eco Slim 32 A (9743205180) with connection cable (790000001)		Wire 1 (black)		Wire 3 (blue)	Wire 2 (red)
• Phoenix Contact (1624129)	Küster	BU/BN	BU/YE	BU/RD	BU/GN
• Phoenix Contact (EV-T2M3SM-E-LOCK12V)	Phoenix Contact	BU/BN	BU/YE	BU/RD	BU/GN
• any type 2 socket-outlet	Küster LSV Gen2	BU/BN	BU/YE	BU/RD	BU/GN

Example Hella actuator



Example Küster



4.5 Connectivity

4.5.1 Master/slave connection

For dual charging systems two charge controllers of the variants Connect Plus or one Connect Plus (as the master controller) and one Companion (as the slave controller) can be combined.

One charge controller is configured as the master and coordinates the communication with an OCPP backend or with connected energy management systems. The second charge controller is configured as a slave and communicates with the master charge controller.

For data communication between the master and slave charge controllers, a USB connection must be used between the USB-CONFIG interface of the master charge controller and the USB type A interface of the slave charge controller. The necessary settings for dual charging systems can be made with the manufacturer role on the configuration interface.

4.5.2 Interfaces (depending on the variant)

USB configuration interface (CONFIG)

The USB configuration interface (CONFIG) can be connected to a conventional laptop, PC or tablet computer via a USB type B cable. This interface allows local configuration of the charge controller. In addition, it enables software updates to be installed. The web interface can be accessed via the IP address 192.168.123.123.

Ethernet interface

The charge controller can be connected to an existing Ethernet network via an Ethernet interface.

WiFi interface

With the help of the integrated WiFi module, it is possible to integrate the charge controller into a local WiFi network and configure the charge controller via the hotspot function.

For further information on configuration descriptions and interfaces, see chapter “Configuration and testing”, page 21.

4.5.3 Control Pilot (CP) and Proximity Pilot connections (PP)

The PP contact identifies the connected charging cable and limits the maximum possible charging current. The CP contact enables communication with the vehicle (see IEC 61851 series of standards).

PP is not required if the charging cable is permanently installed.

4.5.4 I/O extension

The charge controller features a configurable, two-channel I/O interface consisting of up to two optocoupler (terminal L) and up to two relay outputs (terminal K).

- Parking management interface (the supported communication protocol is proprietary to Scheidt & Bachmann and is based on the available auxiliary relay and one available input)
- additional control for Schuko socket-outlets
- Power outage monitoring function (e.g. RCD trip monitoring)
- Heating switch/cooling fan switch for overheating protection
- Enclosure opening detection

4.5.5 Emergency opener

The emergency opener is integrated as a circuit group in the charge controller. In the event of a power failure, the type 2 socket lock is automatically opened so that the charging cable plug can be removed.

4.5.6 Residual direct current monitoring module (RDC-M) (depends on the variant)

For residual current detection in an AC charging system, an integrated residual direct current monitoring module (RDC-M) is used.

This module uses an magnetically shielded measuring current transformer on the power module.

This allows the use of a residual current protective device (RCD) type A.

The relay in the power module is de-energised if, during the charging process, a residual current $I_{\Delta n} \geq$ DC 6 mA flows.

4.5.7 Connectivity with Modbus RTU meters

The use of a meter is not mandatory. It is necessary if measured values are required during normal operation. The meter is connected to the Modbus meter interface (terminal A) of the charge controller. Various Modbus meters are currently supported: https://www.bender.de/docs/charge-controller/Metering/

Meter Slave ID	Baud rate	Parity	Data bit	Stop bit
1	9600	N (none)	8	1

Additional Modbus meters can be included in future software updates upon customer request. Refer to the **Manufacturer** tab on the web server for a list of supported Modbus meters.
The Modbus meter interface is terminated with a terminating resistor of 120 Ω.

4.5.8 Gateway variants with modem (depends on the variant)

The charge controller has a router function that makes the mobile data connection available to other charging systems or other devices.

- For the connection a micro SIM card must be inserted in the SIM card holder component E.
- The SIM card can have a PIN number which can be configured via the **Network** tab.
- The APN settings for the SIM card can also be configured via the **Network** tab.

ADVICE
The SIM card holder is only suitable for micro SIM cards in 3FF format. Nano SIM cards in the adapter or nano/micro combination cards are not suitable due to their smaller thickness.

To remove the SIM card, the holder must be unlocked in the direction of the SMA antenna and opened using the lever mechanism. After inserting the SIM card, the holder must be closed and locked.

Use in the EU and other countries

Operation of device variants with an integrated 4G modem is only possible in member states of the European Union, Liechtenstein, Iceland, Norway, Switzerland, Andorra, Monaco, San Marino, and the United Kingdom.

If 4G mobile networks are not supported, GSM mobile networks may also be used.

Antenna socket

The antenna socket enables connection to a 4G antenna (not included in the scope of delivery).

Approved or recommended antenna types can be found in the tabular data (see chapter "Tabular data", page 25).

ADVICE
Safeguard the antenna socket against ESD discharges!
If the antenna socket can be touched during operation, suitable measures must be implemented to protect against ESD discharges.

5 Configuration and testing

Cybersecurity
If cybersecurity vulnerabilities are identified in the software, they can be reported here: https://www.bender.de/cert

5.1 Configuration

The following options are available for configuring the charging system:

Access to web interface via the following interfaces:

- USB type B configuration interface
- WiFi interface
- Ethernet interface
- 4G modem
- Remote access - the ChangeConfiguration command of the OCPP protocol is used (depending on the backend system)

For more information on how to configure the charge controller, visit https://www.bender.de/docs/charge-controller/

5.1.1 Local configuration of parameters

In order to locally configure the charging system via the charge controller, it is necessary to connect a USB cable with type B socket to a laptop, PC or tablet computer with a standard USB host interface. Once connected, the charge controller is recognised as a USB network adapter. The charge controller can be automatically configured and updated with a newer software version via the CONFIG interface.

CAUTION **Damage to the charge controller software when using automated configuration systems and software updates.**

Note the following:

- After copying the configuration files to the charge controller and before restarting/shutting down the charge controller, the *sync* command must be executed. This writes the configuration files to read-only memory without any loss of process reliability.
- When installing new charge controller software via the *opkg* command, the update script must be run completely. The charge controller can be restarted or switched off directly afterwards.
- Avoid restarting or switching off the charge controller during start-up. Shutdown is possible as soon as the controller can be accessed via the CONFIG interface or as soon as the LED indicator flashes green.

The web interface for configuration can be accessed with an ordinary browser. The charge controller uses the local IP address 192.168.123.123 with the subnet mask 255.255.255.0 via the configuration interface. The connected device automatically receives a corresponding IP address via the Dynamic Host Configuration Protocol (DHCP) after the connection has been established. The communication with the charging system is based on this IP address.

Every parameter accessible to the user operator in the web interface is described by an explanatory text in the tooltip.

The menu item **Documentation** in the web interface for the user operator contains:

- Information on OCPP status display error messages (e.g. codes, activation and resolution messages, instructions and corrective measures)
- OCPP configuration key for OCPP 1.6 (e.g. key name and description)

Application of changed parameters

Parameter changes are not necessarily applied after submission. To submit all changed parameters, click the "Save & Restart" button in the web interface. A message indicating a necessary restart may appear.

ADVICE
Automatic reboot of the charge controller!
In order to ensure perfect functionality, the charge controller carries out a regular system reboot at 30-day intervals outside of charging processes.

After accessing the web interface, the charge controller will not perform a system reboot for at least two minutes to allow all parameters to be successfully configured.

5.1.2 Remote configuration of parameters

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

5.1.3 Factory settings

Resetting to factory settings deletes all settings except the serial number.

Menu item Operator

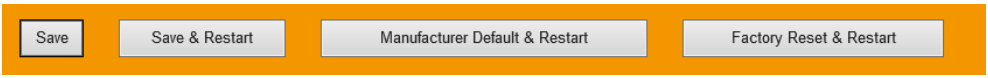
Clicking on the web interface "Operator Default & Restart" on the menu item **Operator** resets changed parameters of the operator configuration to default.

Menu item Settings

Clicking on the web interface "Settings Default & Restart" on the menu item **Settings** resets changed parameters to default.

Menu item Manufacturer

Clicking on the web interface "Manufacturer Default & Restart" on the menu item **Manufacturer** resets changed parameters of the manufacturer configuration to default. Clicking the web interface "Factory Reset & Restart" resets the charge controller to factory settings.



Views of the web interface vary

5.1.4 Testing and system boot process

After completing the configuration, the charge controller must be tested for operability. This can be done using a vehicle simulator. The following must be checked:

- successful boot process (for variants with OCPP: OCPP state - IDLE)
- if a backend connection is to be established, that this has been carried out (only for variants with OCPP: Connection State - CONNECTED)
- Connection to meter possible (meter configuration)
- Plug locking and unlocking functions properly.

Error messages are shown in the "Error list" on the menu item **Diagnostics**.

The boot process starts once the charge controller is supplied with voltage (12 V) and is complete when the status LED (F) on the circuit board flashes green. Further status LED displays see chapter “LED indications ”, page 11.

5.1.5 Connectivity to the backend

Connection of the charge controller to the backend

The settings for connecting to a backend are configured by the user operator via the web interface in the Backend menu.

The Connection Type must be set to the network interface that enables the connection to the OCPP backend.

Next, in the OCPP section, the OCPP ChargeBoxIdentity, the URL of the Backend, and, if necessary, the Basic Authorization password are configured.

After saving the settings, the charge controller must be restarted to establish the connection to the backend.

Depending on the Connection Type, additional settings may be required in the Network menu before restarting.

GSM (for variants with 4G modem)

The name of the access point (APN) of the mobile network to be used is required when a connection to the backend system is made via the integrated 4G modem.

A user name ("APN Username") and password ("APN Password") and a SIM-PIN may be required to authenticate the access point.

APN information such as user name, password and PIN is provided by the selected mobile network operator. The system should be able to establish an online connection to the backend system after 20-120 seconds. In case of connection problems, the received signal strength (RSSI) can be checked via the menu item **Diagnostics**.

The connection to the mobile network (and thus to the backend system) usually lasts from 6 to 48 hours. After that, the connection may be terminated by the mobile network. The charge controller detects the disconnection and automatically reconnects.

Ethernet

If the charge controller will be connected to a valid network via Ethernet and there is a DHCP server in the network, the charge controller obtains an IP address from the DHCP server. This IP address, which is assigned to the charge controller, can be determined by assigning a fixed IP address at the DHCP server in your network. This IP address can then be used to establish a connection.

In addition, the charge controller uses a second IP address: 192.168.124.123 in the subnet mask 255.255.255.0 (at the Ethernet interface).

If required, it is possible to assign a host address from the subnet 192.168.124.x. to the PC.

The main settings for Ethernet/WLAN are made via the menu item **Network** and include:

- Network configuration mode (e.g. automatic or manual configuration with DHCP)
- static IP address for network configuration (of the charging station)
- static subnet mask for network configuration (i.e. 255.255.255.0)

5.1.6 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-outlet is correctly connected to the charge controller.

- Insert the plug of a vehicle charging system into the type 2 socket-outlet. The socket-outlet 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 socket-outlet of the charging system, allowing the cable to be removed.

ADVICE
Ensure the correct selection of the locking actuator used according to the table in chapter “Connection locking actuators”, page 16.

CAUTION Removal of the already locked plug by force if the vehicle is not to be charged.
Damage to the plug or the charging system socket
The plug should only be locked by the locking actuator after authorisation.

5.1.7 Authorisation and charging

The charging process can be initiated by holding an RFID card registered with the backend system or included in the whitelist close to the HMI module; the contactor is switched on and a current flow takes place. The charge controller enables two modes of operation.

- Authorisation BEFORE connecting
- Authorisation AFTER connecting

The modes of operation are briefly described in the respective module manual, which can be downloaded from https://www.bender.de/en/service-support/download-area/

6 Technical data

6.1 Tabular data

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

Rated voltage	12.5 V / 24 V
Overvoltage category (terminal e)	III
Pollution degree	2
Rated impulse voltage	800 V
Operating altitude AMSL	≤ 2000 m

Supply voltage DC 12 V (Terminal P)

Supply voltage range U_s	DC 11.4 V…12.6 V
max. power consumption	12 W
Average power consumption	6 W

SMA plug connector(terminal G) or U.FL plug connector for 4G antenna

Modem LTE Cat 1 & GSM

Frequency bands	800 MHz/850 MHz/900 MHz/1800 MHz/2100 MHz/2600 MHz LTE-FDD: B1/B3/B7/B8/B20/B28; WCDMA: B1/B8; GSM: B3/B8
Impedance	50 Ω
Data rate	**GSM:**
	GPRS: UL 85.6 kBit/s; DL 107 kBit/s
	EDGE: UL 236.8 kBit/s; DL 296 kBit/s
	UMTS:
	WCDMA: UL 384 kBit/s; DL 384 kBit/s
	DC-HSDPA: DL 42 MBit/s
	HSUPA: UL 5.76 MBit/s
	LTE:
	LTE FDD: UL 5 MBit/s; DL 10 MBit/s
	LTE TDD: UL 3.1 MBit/s; DL 8.96 MBit/s
recommended antenna	TC ANT MOBILE WALL 0,5M - 2702274
max. length of the antenna cable	< 3 m
max. output power	GSM850/EGSM900: 33 dBm DCS1800/PCS1900: 30 dBm WDMA: 24 dBm LTE: 23 dBm

recommended torque*	1 Nm

* for SMA plug connector

Data interface

USB-Host 1 (terminal D1)	USB port type A; USB 2.0 max. 250 mA
USB-Host 2 (terminal D2)	USB port type A; USB 2.0 max. 250 mA
Ethernet (terminal B, C)	10/100 Mbit
CONFIG (configuration interface, terminal H)	USB port type B
SIM card (only with 4G modem, terminal E)	micro SIM
Modbus meter	9.6 kBit
Control Pilot (terminal (CP))	acc. to IEC 61851
Proximity Pilot (terminal (PP))	acc. to IEC 61851

Inputs

Input voltage (HIGH)	DC 11.4 V…25.2 V
Input voltage (LOW)	DC 0 V
Input current	2.3…6.4 mA
max. potential difference to PE/GND	50 V*
Input PE (Terminal A (PE, PE))	

* The potential difference between the optocoupler inputs and other inputs/outputs must be less than 50 V.

Outputs

Contact data acc. to IEC 60947-5-1:	
DC 12 V voltage source (Terminal A (12 V, 0 V))	
Output voltage	DC 12 V
max. load capacity	400 mA
Tolerance	DC ± 0.75 V
Relay 1 and 2 (12 V) (Terminal K: Relay 13/14 and Relay 23/24)	
rated operational voltage U_e	DC 24 V
rated operational current I_e	DC 1 A
minimum contact rating	DC 1 mA at ≥ 10 V

Environment / EMC

EMC	see CE declaration
operating temperature	-25...+65 °C
Classification of climatic conditions acc. to IEC 60721:	
stationary use (IEC 60721-3-3)	3K23 (except condensation and formation of water and ice)
Transport (IEC 60721-3-2)	2K11
Long-term storage (IEC 60721-3-1)	1K21
Classification of mechanical conditions acc. to IEC 60721:	
stationary use (IEC 60721-3-3)	3M11
Transport (IEC 60721-3-2)	2M4
Long-term storage (IEC 60721-3-1)	1M12

Cable lengths /cable types

	Ethernet (Terminal B, C)*
Cable	shielded on one side, shield to PE
Connection cable	CAT 6 or higher, shielded
max. connection cable length	100 m

* • Integrated surge protection for indoor applications
• An additional surge protection device (SPD) is required for outdoor applications.

Flat band cable connection	
Permissible connection plug/ connector system	Micromatch W+P 6990-5-20-1-PPTR
Flat band cable length	< 0.3 m

* can be ordered separately (see chapter "Ordering information", page 28)
• The plug-in system on the IPM board and on the charge controller can withstand 5 plugging cycles
• The plug on the flat band cable is intended for single insertion

Other

Operating mode	continuous operation
Mounting position	standing
Degree of protection	IP20
Weight (depends on the variant)	max. 110 g

6.2 Declaration of conformity

Hereby, Bender GmbH & Co. KG declares that the device covered by the Radio Directive complies with Directive 2014/53/EU. The full text of the EU Declaration of Conformity is available at the following Internet address:

https://www.bender.de/fileadmin/content/Products/CE/CEKO_ICC1314.pdf

6.3 Standards and approvals

CE UKCA

6.4 Ordering information

Type	4G modem	Interface	WiFi	PLC*	insulated input	12 V relay output	Article no.	Manual no.
ICC1314-Connect-Plus	✓ (CAT1)	USB, Modbus meter, Ethernet, IPM	✓	✓	2x	2x	B94060073	D00520
ICC1314-Connect-Plus-G1	✓ (CAT1)	USB, Modbus meter, Ethernet, IPM	✓	✓	2x	2x	B94060030	
ICC1314- Companion-G1	---	USB, Modbus meter, IPM	---	✓	2x	2x	B94060031	

* Powerline Communication acc. to ISO/IEC 15118

Accessory type	Article no.	Manual no.
IPM1300 (integrated power module for ICC1314-Connect-Plus-G1 and ICC1314-Companion-G1)	B94060198	D00462
IPM1301 (integrated power module for ICC1314-Connect-Plus)	B94060062	on request
IPM1401 (integrated power module with phase control for ICC1314-Connect-Plus)	B94060065	on request
HMI150 (RFID reader, 11x RGB-LED, 2-Port USB Hub, buzzer and WiFi)	B94060150	D00481
HMI145 (RFID reader, 11x RGB-LED, 2-port USB Hub and buzzer)	B94060151	
HMI140 (RFID reader and 11x RGB-LED)	B94060152	

Connection kit	Content/Quantity	Article no.
Flat band cable for connecting the IPM	Lenght 0.3 m, 20-pole (1 x)	on request
Cable set Connect Plus and Companion	8-pole, 0.5 m (3 x)	on request

Bender GmbH & Co. KG

Londorfer Straße 65
35305 Grünberg
Germany

Tel.: +49 6401 807-707
emobility@bender.de
www.bender.de