

CC612 EV charge controller

Charge controller for electric vehicle charging stations, wall boxes and street light charging points



Charge Controller CC612



CC612


Device features

- Charge controller acc. to IEC 61851-1 (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 4G (LTE), 3G (UMTS) und 2G (GSM) mobile networks with an integrated 4G modem in all data gateways with 4G modem
- 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 Pilot 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
- Only an external RCD type A is required.
- Internal temperature sensors
- A Peer Group Mechanism or Dynamic Load Management 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

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.

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 4G 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.

 Please refer to the manual to check in which countries devices with an integrated 4G modem may be operated.

Functional description

As well as the charge controller, a charge point also consists of 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. 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, either a smart digital meter (EMH eHZ) or a digital Modbus meter is required.

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 CC612 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 controller. Alternatively, an S0 meter can be attached to one of the available inputs. The SIM card reader is positioned on the controller front panel, as are two USB interfaces, one of which (CONFIG) 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.

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.

The CC612 may feature an optional integrated DC sensor which uses an external current transformer for fault monitoring of AC charging stations. Monitoring of the charging station takes place via an externally connected and shielded current transformer which is connected to the CC612.

Data exchange between the EV and the charge point is possible via ISO/IEC 15118 compliant Powerline Communication (PLC). This feature is optional.

The RFID module consists of an RFID card reader and three charging status LEDs. The module is a separate PCB that should ideally be placed under a semi-transparent part of the outside housing at a distance of at least 20 mm from any significant metal surface or metal parts to ensure optimum 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.

Standards

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

- EN 50581: 2012
- EN 61851-1: 2011
- EN 301 489-1: V2.2.0 Draft
- EN 301 511 V12.5.1
- EN 301 908-13 V11.1.2
- EN 62311: 2008
- EN 61851-22: 2002
- EN 301 489-52 V1.1.0 Draft
- EN 301 908-1 V11.1.1
- EN 301 908-2 V11.1.2

Certifications



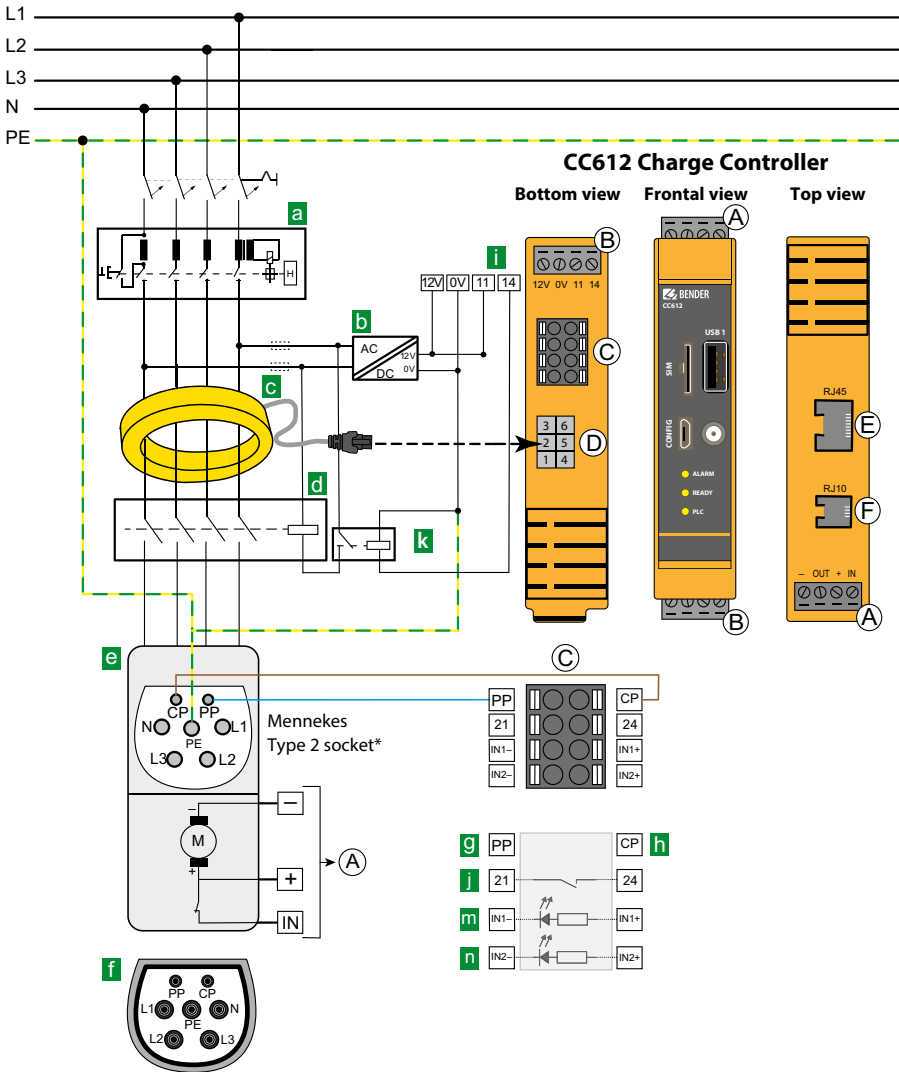
Product variant overview

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.

Type	Modem	Meter	RDC-MD ¹⁾	PLC ¹⁾ hardware	LEDs	User interface
CC612-1M4PR	4G	eHZ and S0 interface	■	■	Ready, Alarm, PLC	■
CC612-2M4PR	4G	Modbus and S0 interface	■	■	Ready, Alarm, PLC	■
CC612-1S0PR	–	eHZ and S0 interface	■	■	Ready, Alarm, PLC	■
CC612-2S0PR	–	Modbus and S0 interface	■	■	Ready, Alarm, PLC	■
CC612-2M4R	4G	Modbus and S0 interface	■	–	Ready, Alarm	■
CC612-2S0R	–	Modbus and S0 interface	■	–	Ready, Alarm	■

¹⁾ Optional and enabled by a software update

Charging system with a type 2 socket and an intermediate relay



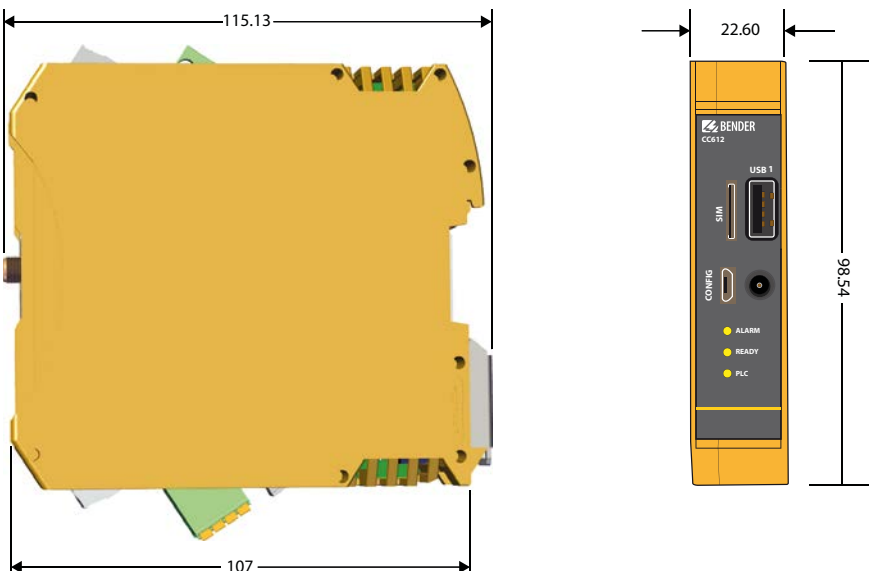
- A Connection locking engine
- B Connection socket User Interface
- C Connection socket
- D Connection Current Transformer (CT)
- E Terminal User Interface (RJ45)
- F Terminal Modbus/eHZ meter (RJ10)
- a RCD Type A
- b Voltage supply DC 12 V
- c Current Transformer (CT) with plug
- d Contactor
- e Type 2 socket *
- f Type 2 plug *
- g Connection Proximity Pilot
- h Connection Control Pilot
- i Relay 1: Control pin intermediate relay
- j Output relay 2
- k Intermediate relay
- m Optocoupler input 1
- n Optocoupler input 2

Assignment of the terminals

A1	IN	C1	PP
A2	+	C2	CP
A3	OUT	C3	21
A4	-	C4	24
B1	12V	C5	IN1-
B2	0V	C6	IN1+
B3	11	C7	IN2-
B4	14	C8	IN2+

Dimension diagram

Dimensions in mm



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

Rated voltage	12.5 V
Overvoltage 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 V...12.6 V
Nominal current	1 A

RDC-MD

Measuring range	100 mA
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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
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Wireless parameters (Optional for data gateways with 4G modem only)

Frequency bands	800 MHz/850 MHz/900 MHz/1,800 MHz/2,100 MHz/2,600 MHz
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

Required antenna	Panorama Antennas B4BE-7-27-05SP
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Inputs/outputs and display

LED ALARM	yellow
LED READY	green
LED PLC (Optional)	green
USB Extension interface (Ethernet, WLAN, ...)	USB socket type A
CONFIG (Configuration interface)	Micro socket type AB
SIM card (For data gateways with 4G modem only)	micro SIM

Terminal A:

IN	Actuator IN
+	Actuator +
OUT	Actuator pul-up output
-	Actuator -

Terminal B:

12V	+12 V IN*
OV	0 V IN
11	Relay 1 NO
14	Relay 1 NO

Terminal C:

PP	Proximity Pilot
CP	Control Pilot (Optional Powerline Communication PLC acc. to ISO/IEC 15118)
Maximum cable length (PP, CP)	< 15 m
21	Relay 2 NO
24	Relay 2 NO
IN1-	Input 1-
IN1+	Input 1+
IN2-	Input 2-
IN2+	Input 2+
CT	Current transformer

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 61851-1, IEC 61851-21-2 FDIS:2017-09 EN 301 489-1, EN 301 489-52
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)	1M12

Connection

Connection cable	RJ45
Maximum cable length	< 3 m

Connection type (terminal block C)
push-in terminal

Connection properties:	
rigid/flexible	0.2...1.5 mm ² (AWG 24...16)
flexible with ferrule without plastic sleeve	0.25...1.5 mm ² (AWG 24...16)
flexible with ferrule with plastic sleeve	0.25...0.75 mm ² (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 ² (AWG 24...12)
flexible with ferrule without plastic sleeve	0.25...2.5 mm ² (AWG 24...14)
flexible with ferrule with plastic sleeve	0.25...1.5 mm ² (AWG 24...16)
Stripping length	7 mm

Other

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

*) Surge test is carried out at Phoenix power supply STEP-PS/1AC/12DC/1.5.
The 12V cable length is less than 1 meter.

Ordering information

User interface	RDC-MD ¹⁾	Modem	PLC ²⁾ hardware	LEDs	Meter	Type	Art. No.
■	■	4G	■	Ready, Alarm, PLC	eHZ- and SO interface	CC612 -1M4PR	B94060011
					Modbus and SO interface	CC612 -2M4PR	B94060013
			-	Ready, Alarm	Modbus and SO interface	CC612 -2M4R	B94060015
		-	■	Ready, Alarm, PLC	eHZ- and SO interface	CC612 -1S0PR	B94060005
					Modbus and SO interface	CC612 -2S0PR	B94060007
			-	Ready, Alarm	Modbus and SO interface	CC612 -2S0R	B94060010

¹⁾ The charge controller with optional RDC-MD only works in combination with the measuring current transformer, which must be ordered separately. Various cable lengths are available (see table below).

²⁾ Optional and enabled by a software update

Accessories

Designation	Art. No.
RFID110-L1 with RJ45 cable (length 500 mm)	B94060110
RFID114 with RJ45 cable (length 500 mm)	B94060114
Measuring current transformer ¹⁾ W15BS (Cable length 1500 mm)	B98080065
Measuring current transformer ¹⁾ W15BS-02 (Cable length 180 mm)	B98080067
Measuring current transformer ¹⁾ W15BS-03 (Cable length 320 mm)	B98080068
DPM2x16FP (display module)	B94060120

¹⁾ The measuring current transformer has an internal diameter of 15 mm.



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