CC612 EV charge controller

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

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Charge Controller CC612

CC612

Device 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 configuartion
- 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

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 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.

Please refer to the manual to check in which countries devices with an integrated 3G 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 RJ11 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:

- 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)

Certifications

CE

Product variant overview

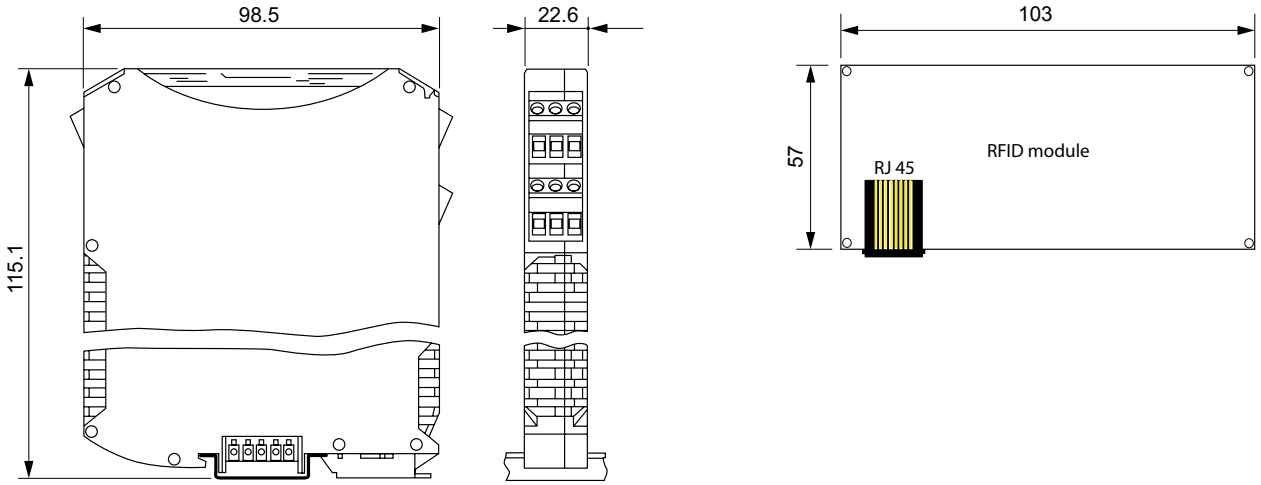
Several product variants are available and the table below gives an overview of these variants. Some connect to a digital eHZ meter using an optical interface while others read Modbus meters. In general, variants can read meters with an S0 interface.

Type	Master/Slave	Modem	Meter	DC sensor	PLC[1] 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	■

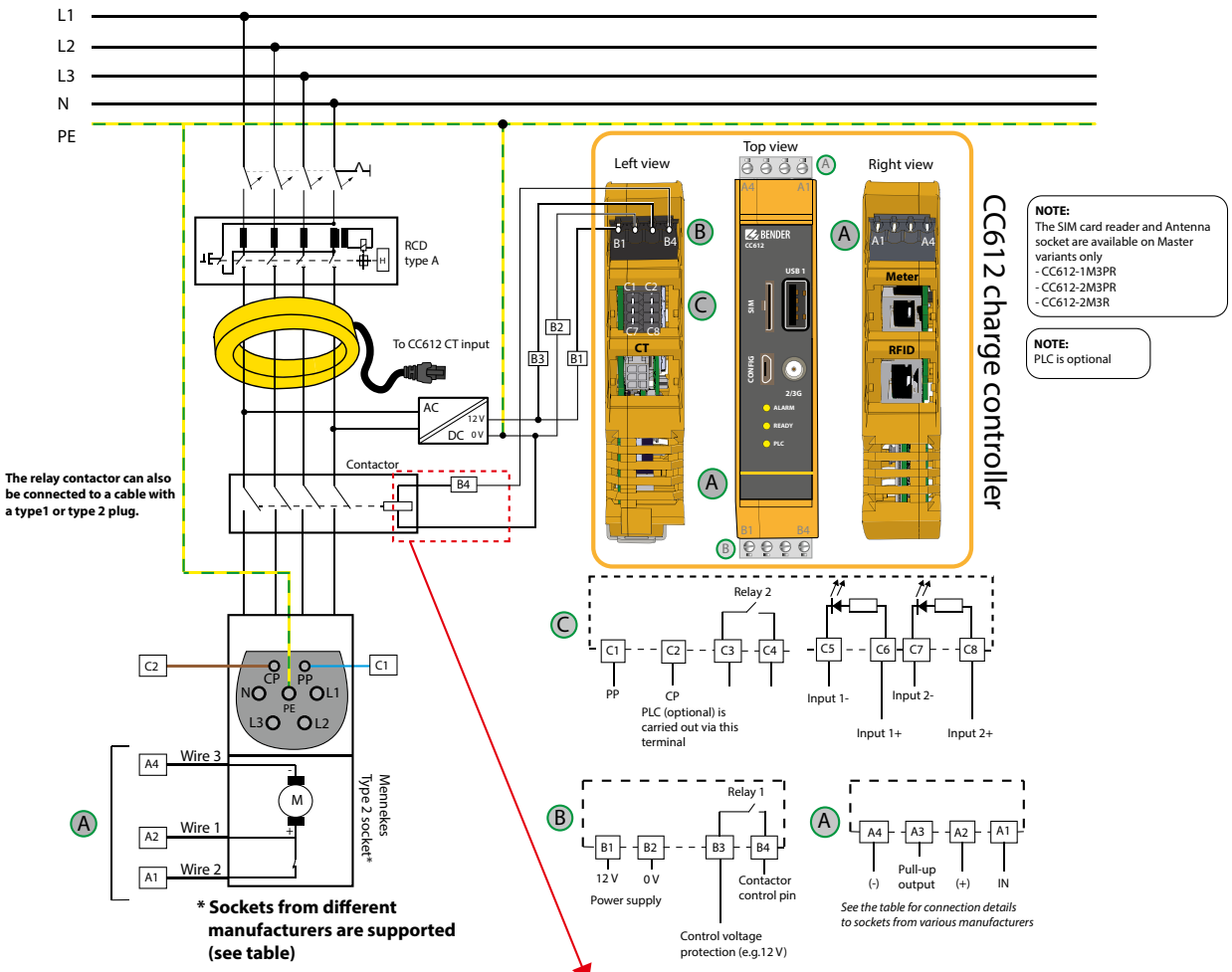
[1] Optional and enabled by a software update

Dimension diagram

Dimensions in mm



Wiring diagram for a charge point with a type 2 socket



Type 2 sockets**	A4	A3	A2	A1
	Socket actuator wiring			
• Mennekes (31016, 31023, 31024, 31038) • Bals (801191 - 801195, 80300, 9743205000, 9743211000) • Walther Werke (9743205000, 9743211000) • Harting	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. Please refer to wiring diagrams in the CC612 operating manual for connection details.

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…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
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 mm² (AWG 24…16)
flexible with ferrule without plastic sleeve	0.25…1.5 mm² (AWG 24…16)
flexible with ferrule with plastic sleeve	0.25…0.75 mm² (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 mm² (AWG 24…12)
flexible with ferrule without plastic sleeve	0.25…2.5 mm² (AWG 24…14)
flexible with ferrule with plastic sleeve	0.25…1.5 mm² (AWG 24…16)
Stripping length	7 mm

Other

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

Ordering information[1)]

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

[1)] The charge controller only works in combination with the measuring current transformer, which must be ordered separately.

[2)] Optional and enabled by a software update

Accessories

Designation	Art. No.
RFID110-L1 with RJ45 cable (length 500 mm)	B94060110
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	B94060120

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

BENDER
The Power in Electrical Safety©

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