

CC613 charge controller

Charge controller for use in electric vehicle charging stations, wallboxes or street light charging points



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CC613

Certifications



Device features (depending on the variant)

- Charge controller in accordance with IEC 61851-1 (charging mode 3)
- Configurable master and slave operation
 - Setting up charging stations with two charging points:
 - 1 charge controller as data gateway with 4G modem
 - 1 charge controller as slave without 4G modem
- Dynamic load management to optimally distribute the available power among all charging points and signal the maximum power available in each case to the vehicle
- Residual direct current monitoring module (external RCD type A required), different cable lengths can be selected
- Integrated emergency opener for actuator control (locking/unlocking) and monitoring of the 12 V supply voltage
- Can be integrated in single- or three-phase systems up to 80 A
- OCPP 1.5 and OCPP 1.6 compliant with JSON, SOAP
- Supported mobile networks: 4G (LTE), 3G (UMTS) and 2G (GSM) with an integrated 4G modem
- 3 USB interfaces:
 - 1 CONFIG interface for local configuration and installation of software updates
 - 2 USB host interfaces
- Control Pilot and Proximity Pilot communication
- Configurable support for additional SCHUKO socket-outlets
- Meter interface: Modbus TCP and RTU
- External Modbus interface (second meter for dynamic load management)
- User interface modules for customer-specific applications (e.g. RFID, LED, antenna)
- Configurable 2-channel input/output extension interface for additional functionality
- Internal temperature sensor to reduce the charging current depending on the ambient temperature
- ISO 15118 Powerline Communication (PLC) for plug & charge and load management systems
- ISO 15118 Powerline Communication (PLC) for plug & charge or autocharge
- Ethernet interface

Product description

The charge controller primarily controls the charging process of an electric vehicle and monitors the internal hardware of charging systems such as the meter, the user interface module or the socket-outlet. It can be operated as an “always-on system” that is always connected to a mobile network. The master variant supports 4G mobile networks.

Communication with a backend system is possible via the OCPP application protocol. 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 (e.g. has-to-be, Virta and NewMotion) have been carried out successfully. See “Ordering information”.

Functional description

The charging system consists of an RCD type A and a contactor. These are directly connected to a type 1 or type 2 socket-outlet, or to a permanently mounted cable with a type 1 or type 2 plug (see "Wiring diagram").

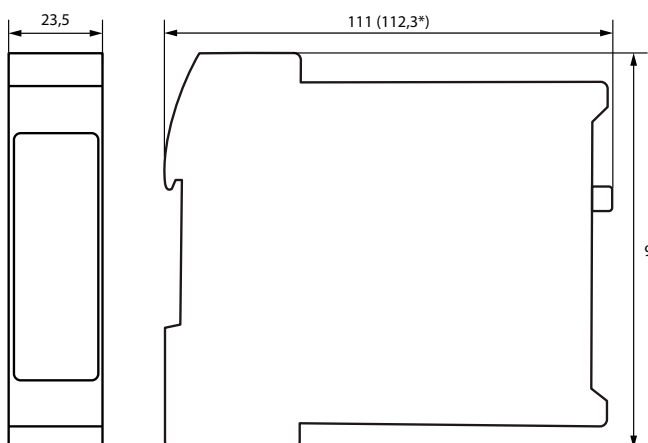
General functions (depending on the variant)

- The charging system can be equipped with a meter. A Modbus meter is required to digitally read the energy consumption. The Modbus RTU lines are attached directly to the device.
- A 12 V power supply is needed for operation.
- An RFID module can be used for easy user interaction.
- Current low toward the vehicle is released by enabling the contactor via an integrated 230 V control relay in the charge controller.
- 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 Operator tab. The APN settings for the SIM card can also be configured via the Operator tab.
- Data gateways with a 4G modem feature a connection for a 4G antenna on the front panel.
- For residual current detection in an AC charging system, the charge controller features an integrated residual direct current monitoring module (RDC-M) which uses an externally connected measuring current transformer. 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 software, 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. 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.
- External Modbus interface for advanced control of the controller via an energy management system, independent of a backend connection.

i The charge controller with residual direct current monitoring module (RDC-M) only works in combination with the measuring current transformer (to be ordered separately).

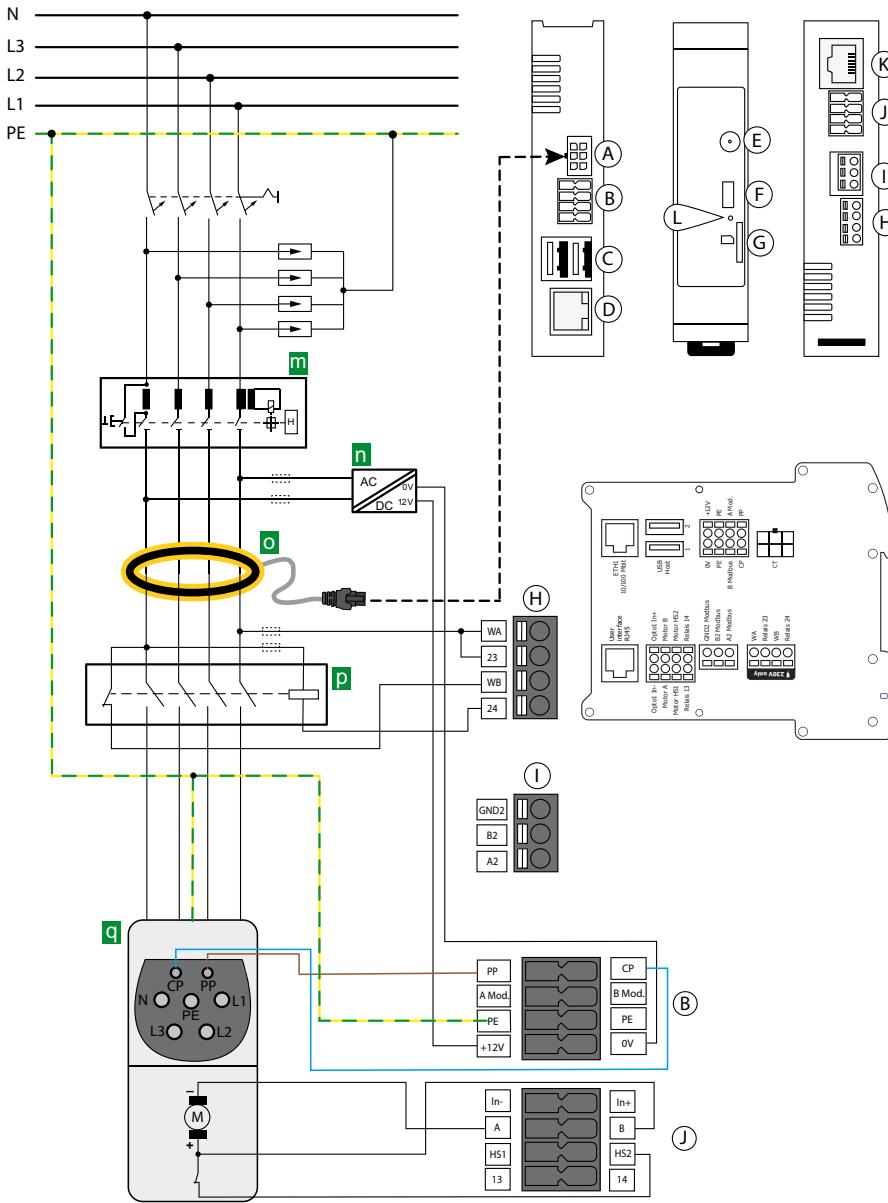
Dimension diagram

Dimensions in mm acc. to ISO 2768 - m



* Dimensions incl. antenna socket

Charging system with type 2 socket-outlet



- A Connection measuring current transformer (CT)
- B 12 V supply, PE, Modbus meter, CP, PP
- C 2x USB type A (1, 2)
- D Connection Ethernet (ETH1)
- E Antenna socket 4G (only available for variants with 4G modem¹)
- F Configuration interface
- G Micro SIM card slot (only available for variants with 4G modem¹)
- H Weld check, relay for contactor control rated for 230 V/4 A
- I External Modbus (galvanic separation)
- J Locking, control relay GPIO, optocoupler input
- K Connection user interface (HMI) (not available with HEM-X2 variant)
- L STATUS LED
- m RCD type A
- n Voltage supply DC 12 V
- o Measuring current transformer (CT) with plug
- p Contactor
- q Type 2 socket-outlet

¹ Data gateways with 4G modem: CC613-ELM4PR-M and CC613-ELM4PR

Terminal assignment

B	0V	Input 0V
	+ 12 V	Supply voltage +12 V
	PE	Input PE
	PE	Input PE
	B Mod.	Modbus meter B
	A Mod.	Modbus meter A
	CP	Control Pilot
	PP	Proximity Pilot

H	WA	Weld check input L1
	23	Relais 23: Switching contact contactor
	WB	Weld check input N
	24	Relais 24: Switching contact contactor
I	GND2	External Modbus GND (shield connected on one side)
	B2	External Modbus B (galvanic separation)
	A2	External Modbus A (galvanic separation)

J	In-	Opto 1 In-: Optocoupler input 12 V negative
	In+	Opto 1 In+: Optocoupler input 12 V positive
	A	Actuator A: Locking actuator output negative
	B	Actuator B: Locking actuator output positive
	HS2	Actuator HS2: Locking input actuator switch
	HS1	Actuator HS1: Locking 12 V output actuator switch
	14	Relay 14: Relay contacts GPIO (12 V)
	13	Relay 13: Relay contacts GPIO (12 V)



ADVICE

CAUTION! Switching contact contactor and weld check at terminal H are only suitable for mains voltage (230 V)! Not permitted for SELV/PELV voltages.

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

Rated voltage	250 V
Pollution degree	2
Overvoltage category within terminal H	II
Overvoltage category, terminal H and all other terminals	III
Rated impulse voltage, terminal H and all other terminals	6 kV
Rated impulse voltage within terminal H	2.5 kV
Double insulation between terminal H and all other terminals	OCV III
Basic insulation within terminal H	OCV II
Operating altitude AMSL	≤ 2000 m

Supply voltage (terminal B (0CV, +12CV))

Nominal voltage	DC 12 V
Operating range of the nominal voltage	DC 11.4...12.6 V
Max. nominal current	750 mA
Max. nominal current without USB load	400 mA
Max. nominal current with USB load	750 mA

Residual direct current monitoring module* (RDC-M, terminal A)

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 %

Measuring current transformers

Max. connection cable length	≤ 1.47 m
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Restart sequence value:

DC 6 mA	< 3 mA
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* Patented 6 mA DC residual current trip
(Patent: EP 2 571 128/US 9,397,494/ZL 201210157968.6/CN 103001175, EP 2 813 856)

SMA plug connector* for 4G antenna (optionally with 4G modem, terminal E)

Frequency bands	800 MHz/850 MHz/900 MHz/1800 MHz/2100 MHz/2600 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
Specified antenna	PSI-GSM/UMTS-QB-ANT

* SMA plug connector must be safeguarded against ESD discharges by the customer

Data interfaces

USB host 1 (terminal C1)*	USB port type A; USB 2.0 max. 250 mA
USB host 2 (terminal C2)*	USB port type A; USB 2.0 max. 250 mA
Ethernet (terminal D)	10/100 Mbit
CONFIG (configuration interface, terminal F)	micro USB port type AB
SIM card (only with 4G modem, front panel)	micro SIM
HMI (user interface, terminal K)	internal
Modbus meter (terminal B)	9.6 kBit
External Modbus (terminal I)	9.6 kBit
Control Pilot (terminal B (CP))	acc. to IEC 61851
Proximity Pilot (terminal B (PP))	acc. to IEC 61851

* USB host 1 and USB host 2: in total 500 mA

Inputs (depending on the variant)
Optocoupler (terminal J (Opto 1 In+, Opto 1 In-))

Input voltage	DC 11.4 V...25.2 V
Input current	2.3...6.4 mA

Weld check (terminal H (WB, WA))

Input voltage	AC 180...277 V
Input current	0.6...1.3 mA

Input PE (terminal B (PE, PE))
Outputs (depending on the variant)
Contact data acc. to IEC 60947-5-1:

Relays (12 V) (terminal J (relay 13, relay 14))	
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

Switching contact for contactor (terminal H (relay 23, relay 24))

Rated operational voltage U_e	AC 230 V
Rated operational current I_e	AC 4 A
Minimum contact rating	AC 50 mA at ≥ 10 V

Environment/EMC

EMC	see CE declaration
Operating temperature	-30...70 °C

Classification of climatic conditions acc. to IEC 60721:

Stationary use (IEC 60721-3-3)	3K23 (except condensation and formation of 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

Cable	Shielded, one end of shield connected to PE
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HMI (user interface, terminal K) (depending on the variant)

Connection cable RJ45, shielded	
Max. connection cable length	internal 2 m

Ethernet (terminal D)

Connection cable	CAT 6
Max. connection cable length	100 m

Connection type (terminal blocks B and J)

push-wire terminal	
Connection specifications:	
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	0.14...0.75 mm ² (AWG 26-18)
Stripping length	10 mm
Max. connection cable length	2 m
Cross-section	≥ 0.5 mm ²
Max. connection cable length (PE)	4 m
Cross-section (PE)	≥ 1 mm ²

Connection type (terminal blocks I) push-wire terminal

Connection specifications:	
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)
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Max. connection cable length	2 m
Cross-section	≥ 0.5 mm ²
Max. connection cable length (PE)	4 m
Cross-section (PE)	≥ 1 mm ²

Other

Operating mode	Continuous operation
Mounting position	Orientated to front panel; air must pass through cooling slots vertically
Degree of protection	IP20
DIN rail	IEC 60715
Documentation number	D00381
Weight (depends on the variant)	max. 500 g

Ordering information

Type	Modem	Interface	RDC-M	External Modbus	OCCP-capable	PLC*	User interface	I/O extension	Art. No.
CC613-ELM4PR-M	4G	Modbus, Ethernet	✓	✓	✓	✓	✓	✓	B94060020
CC613-ELPR-M	–			✓	✓		✓	B94060021	
CC613-ELM4PR	4G			–	✓		✓	B94060026	
CC613-ELPR	–			–	✓		✓	B94060027	
CC613-HEM-X2	–			–	–		–	B94060028	

* Powerline Communication acc. to ISO/IEC 15118

i The charge controller with residual direct current monitoring module (RDC-M) only works in combination with a measuring current transformer (to be ordered separately). Different cable lengths are available.

Accessory

Description	Art. No.	Plug kit	Content/Quantity	Art. No.
RFID105-L1	B94060105	Plug kit (can be ordered separately)	3-pole (1 x), 4-pole (1 x), 8-pole (2 x)	B94060129
RFID114 with RJ45 cable (length 500 mm)	B94060114			
Measuring current transformer CTBC17P-03-K0325 (cable variant, cable length 325 mm) ¹⁾	B98080071	Plug kit bulk pack, ELM4PR-M, ELPR-M	3-pole (50 x), 4-pole (50 x), 8-pole (100 x)	B94060128
Measuring current transformer CTBC17P-03 (PCB variant) ^{1), 2)}	B98080070			
Connection cable CTBC17-Cable 1470 incl. clip housing (cable length 1470 mm)	B98080542	Plug kit bulk pack, ELM4PR, ELPR, HEM-X2	4-pole (50 x), 8-pole (100 x)	B94060126
Connection cable CTBC17-Cable 600 incl. clip housing (cable length 600 mm)	B98080543			
Connection cable CTBC17-Cable 325 incl. clip housing (cable length 325 mm)	B98080541			
Connection cable CTBC17-Cable 180 incl. clip housing (cable length 180 mm)	B98080540			
DPM2x16FP (display module)	B94060120			

¹⁾ Internal diameter: 17 mm

²⁾ The PCB-variant can be combined with the connection cables of different lengths.



Bender GmbH & Co. KG

Londorfer Straße 65 • 35305 Grünberg • Germany
Tel.: +49 6401 807-0 • info@bender.de • www.bender.de



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