CC613 charge controller

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

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CC613

Certifications

CE

Device features

- Charge controller in accordance with IEC 61851-1 (mode 3 charging)
- Master and slave operation configurable
  - Setting up charging stations with two charging points: 1 charge controller as data gateway with 4G modem and 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 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 (acc. to IEC 61851-1)
- Configurable support for additional domestic socket-outlets
- Meter interface: Modbus TCP and RTU
- External Modbus interface for remote control via energy management systems
- User interface modules for customer-specific applications (e.g. RFID, LED, antenna)
- Configurable 2-channel input/output extension interface for additional functionality
- Internal temperature sensors to reduce the charging current with regard of the ambient temperature
- ISO 15118 Powerline Communication (PLC) for plug & charge and load management systems

Product description

The charge controller 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.

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 an attached cable with a type 1 or type 2 plug.

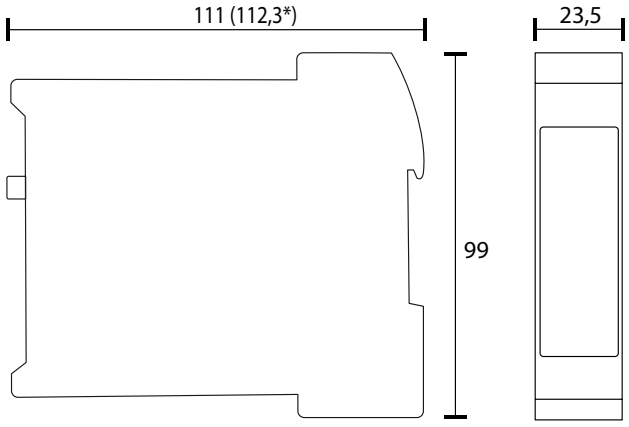
General functions

- The charging system can be equipped with a meter. For digital meter readings, a Modbus meter is required. The Modbus RTU wires are attached directly to the charge controller.
- A 12 V power supply is needed for operation.
- An RFID module can be used for easy user interaction.
- Power flow toward the vehicle is enabled 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 socket for a 4G antenna on the front panel.
- For fault 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 current transformer. With the integrated monitoring of the DC fault 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 a DLM software, which is fully usable independent of a backend connection. It detects which charging current is applied to which phase and thus avoids 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 of the residual current device (RCD) due to a residual current.
  - Detection of critical fault currents by RCM sensor. For the vehicle owner, this can be an early warning if the backend supports this function.
- External Modbus interface for advanced control of the controller via an energy management system, independent of a backend connection.

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

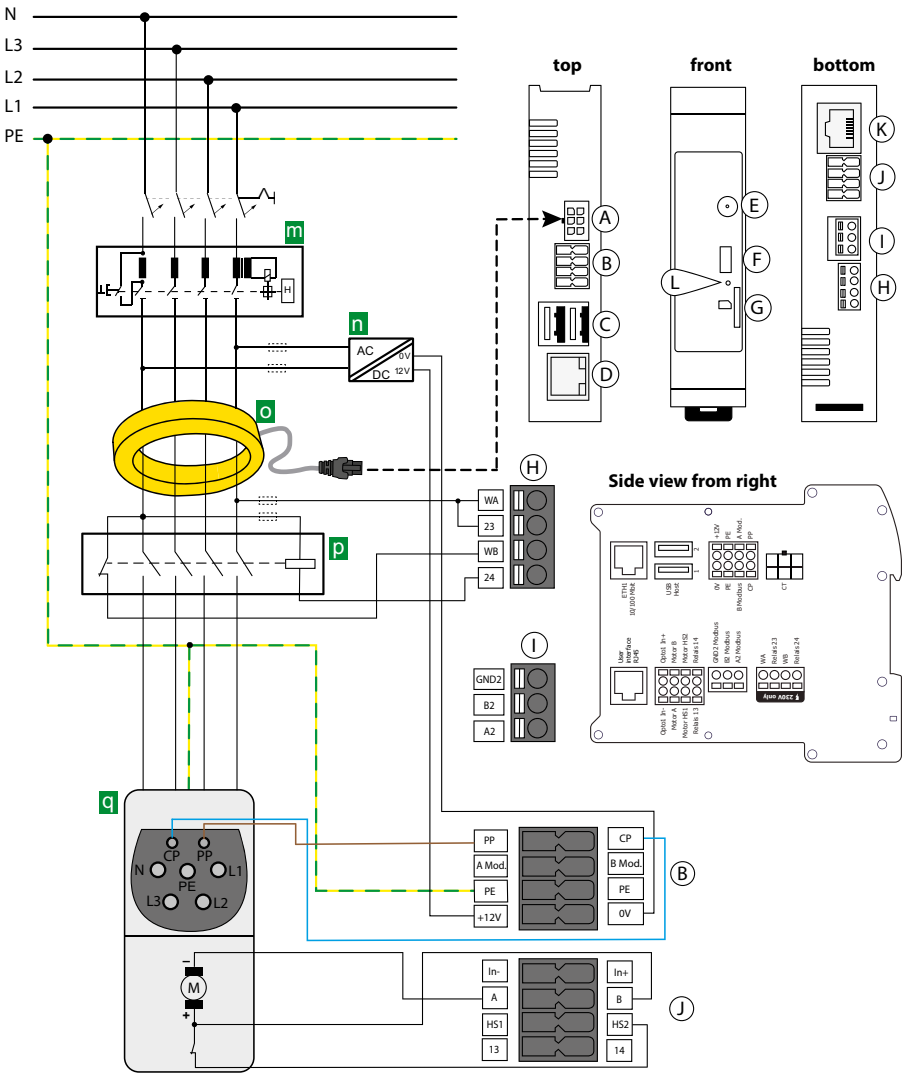
Dimension diagram

Dimensions in mm



** Dimensions with 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 modem[1])
F Configuration interface
G Micro SIM card slot (only available for variants with 4G modem[1])
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)
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 and CC613-ELM4PR-M

The external Modbus (terminal I) is only used for remote control of the CC613 via an energy management system and is not intended for connecting a meter.

Terminal assignment

B	0V	Input 0 V
	+ 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	Motor A: Locking motor output negative
	B	Motor B: Locking motor output positive
	HS2	Motor HS2: Locking input motor switch
	HS1	Motor HS1: Locking 12 V output motor switch
	14	Relais 14: Relay contacts GPIO (12 V)
	13	Relais 14: Relay contacts GPIO (12 V)

Technical data

Insulation coordination acc. to IEC 60664-1/IEC 60664-3	
Rated voltage	250 V
Overvoltage category	II (within terminal H)
Overvoltage category	III (terminal H and all other terminals)
Rated impulse voltage	6 kV (terminal H and all other terminals)
Rated impulse voltage	2.5 kV (within terminal H)
Double insulation acc. to OVC III between	terminal H and all other terminals
Basic insulation acc. to OVC II	within terminal H
Operating altitude	≤ 2000 m AMSL

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

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 max. USB load	750 mA

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

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

SMA 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

LED indications

STATUS (front panel)	orange: power on/system not ready for operation blue: system is starting green: system started, not ready for operation yet flashing green: system running, system ready for operation red: system error
Ethernet (terminal D)	off: no Ethernet connection steady green: Ethernet connection at 100 Mbit/s flashing green: data exchange at 100 Mbit/s steady yellow: Ethernet connection at 10 Mbit/s flashing yellow: data exchange at 10 Mbit/s

Data interface

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 (terminal K)	internal
Modbus meter (terminal B)	9.6 kBit
Modbus external (terminal I)	9.6 kBit
Control Pilot (terminal B (CP))	acc. to IEC 61851
Proximity Pilot (terminal B (PP))	acc. to IEC 61851

Inputs

Optocoupler (terminal J (Opto 1 In+, Opto 1 In-))	
Input voltage	DC 11.4…25.2 V
Input current	2.3…6.4 mA
Weld check (terminal (WB, WA))	
Input voltage	AC 180…277 V
Input current	0.6…1.3 mA
Input PE (terminal B (PE, PE))	

Outputs

Contact data acc. to IEC 60947-5-1:	
Relay (12 V) (terminal J (Relais 13, Relais 14))	
Rated operational voltage U_e	DC 24 V
Rated operational current I_e	DC 1 A
Minimum contact rating	1 mA at ≥ 10 V
Switching contact for contactor (terminal (Relais 23, Relais 24))	
Rated operational voltage U_e	AC 230 V
Rated operational current I_e	AC 4 A
Minimum contact rating	50 mA at ≥ 10 V (AC)

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

HMI (terminal K)	
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 mm² (AWG 24…16)
flexible with ferrule without plastic sleeve	0.25…1.5 mm² (AWG 24…16)
flexible with ferrule with plastic sleeve	0.14…0.75 mm² (AWG 26…18)
Stripping length	10 mm
Max. connection cable length	2 m
Cross-section	≥ 0.5 mm²
Max. connection cable length (PE)	4 m
Cross-section (PE)	≥ 1 mm²
Connection type (terminal block I)	**push-wire terminal**
Connection specifications:	
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…18)
Stripping length	10 mm
Max. connection cable length	250 m

Technical data

Connection type (terminal block H)	push-wire terminal
Connection specifications:	
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…18)
Stripping length	10 mm
Max. connection cable length	2 m
Cross-section	≥ 0.75 mm²

Other	
Operating mode	continuous operation
Mounting position	front panel orientated, air must pass through cooling slots vertically
Degree of protection	IP20
DIN rail	IEC 60715
Weight	max. 500 g (depends on variant)

Ordering information

Interface	RDC-M	LED	PLC [1]	User interface	Modem	External Modbus	Type	Art. No.
Modbus, Ethernet	■	STATUS	■	■	4G	–	CC613-ELM4PR	B94060026
						■	CC613-ELM4PR-M	B94060020
					–	–	CC613-ELPR	B94060027
						■	CC613-ELPR-M	B94060021

[1] Powerline Communication acc. ISO/IEC 15118

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

Accessory

Description	Art. No.
RFID110-L1 with RJ45 cable (length 500 mm)	B94060110
RFID114 with RJ45 cable (length 500 mm)	B94060114
RFID117-L1 with RJ45 cable (length 500 mm)	B94060117
Current transformer W15BS (cable length 1450 mm)[1]	B98080065
Current transformer W15BS-02 (cable length 180 mm)[1]	B98080067
Current transformer W15BS-03 (cable length 300 mm)[1]	B98080068
Current transformer CTBC17 (PCB variant)[2]	B98080070
Connection cable CTBC17-Cable1470 incl. clip housing (cable length 1470 mm)	B98080542
Connection cable CTBC17-Cable325 incl. clip housing (cable length 325 mm)	B98080541
Connection cable CTBC17-Cable180 incl. clip housing (cable length 180 mm)	B98080540
DPM2x16FP (display module)	B94060120

[1] Internal diameter: 15 mm
[2] Internal diameter: 17 mm

Plug kit	Content / Quantity	Art. No.
Plug kit (to be ordered separatly)	3-pole (1 x), 4-pole (1 x), 8-pole (2 x)	B94060129
Plug kit bulk pack, ELM4PR-M, ELPR-M	3-pole (50 x), 4-pole (50 x), 8-pole (100 x)	B94060128
Plug kit bulk pack, ELM4PR, ELPR	4-pole (50 x), 8-pole (100 x)	B94060126

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