ICC1324 charge controller

Charge controller for charging systems for electric vehicle charging

Image similar

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Charge controller for charging systems for electric vehicle charging

ICC1324

Certifications

CE UKCA

Product features (depending on the variant)

- Charge controller in accordance with IEC 61851-1 (mode 3 charging)
- Master and slave operation configurable
  - Setting up charging ssystems 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
- Patented residual direct current monitoring module (external RCD type A required), different cable lengths can be selected
- Integrated emergency opener for actuator control (locking/unlocking)
- Can be integrated in single- or three-phase systems up to 3x 32 A
- OCPP 1.5 and OCPP 1.6 compliant with JSON, SOAP
- Integrated 4G modem
- 3 USB interfaces:
  - 1 CONFIG interface (type B) for local configuration and installation of software updates
  - 2 USB host interfaces (type A)
- Control Pilot and Proximity Pilot communication (acc. to IEC 61851-1)
- Additional SCHUKO socket-outlet control
- Meter interface: Modbus TCP and RTU
- External Modbus interface for remote control via energy management systems
- Additional inputs and outputs for extended control of the charge controller
- Internal temperature sensor to reduce the charging current depending on the ambient temperature
- ISO 15118 Powerline Communication (PLC) for plug & charge, autocharge and load management systems
- Integrated WiFi module and two Ethernet interfaces
- Integrated DC 15 V voltage source for customer-specific applications
- Supply voltage AC 230 V

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 variants with a 4G modem support the 4G mobile phone standard.

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.

Refer to “Ordering details” for product variants.

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.

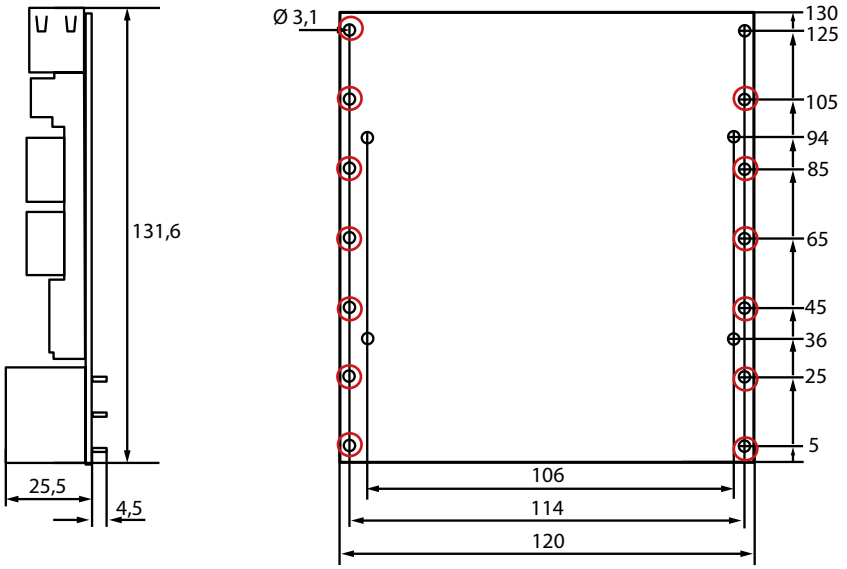
General functions

- The charging system can be equipped with a meter. A Modbus meter is required for digital reading of the energy consumption. The Modbus RTU wires are attached directly to the charge controller. Alternatively, a meter can be connected to an Ethernet interface via Modbus TCP.
- An AC 230 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 printed circuit board (terminal E) of the charge controller. 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 an SMA connector for a 4G antenna on the printed circuit board.
- 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 in the mains supply. 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 DC fault current ≥ 6 mA.
  - Detection of critical fault currents by the RCM sensor. For the vehicle owner, this can be an early warning, provided that the charge controller is connected to an energy management system and that it supports this function.

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

Dimension diagram

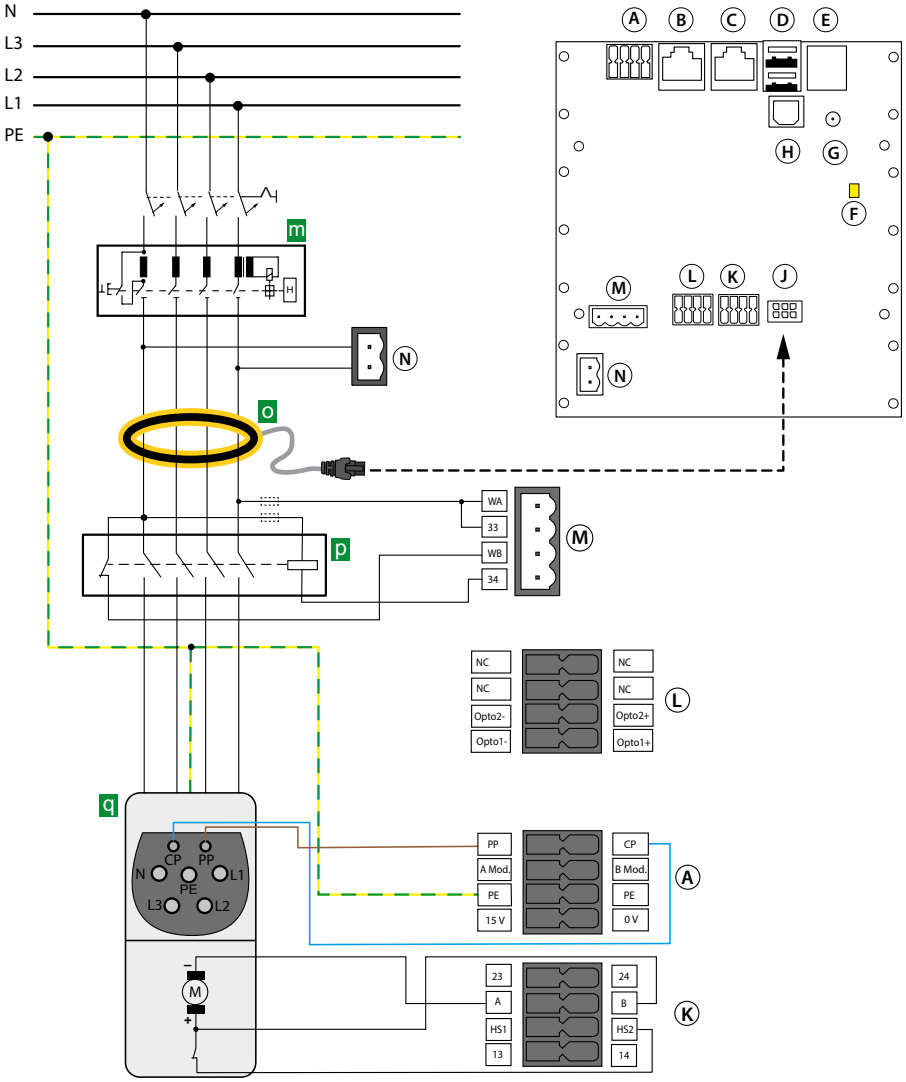
Dimensions in mm



Red marks: Possible fastening points

Fastening recommendation:
Fillister head screws: 4 x M 2.5
Torque specification: 0.36 Nm

Charging system with type 2 socket-outlet



A PE, Modbus meter, CP, PP
B Connection Ethernet (ETH2)
C Connection Ethernet (ETH1)
D 2x USB type A (1, 2)
E Micro SIM card slot (only available for variants with 4G modem)1
F LED service
G Antenna socket 4G (only available for variants with 4G modem1)
H Configuration interface USB type B
J Connection measuring current transformer (CT)
K Locking, control relay GPIO
L Optocoupler input
M Weld check, relay for contactor control rated for 230 V/4 A
N Power supply AC 230 V
m RCD type A
o Measuring current transformer (CT) with plug
p Contactor
q Type 2 socket-outlet

[1] *Data gateways with 4G modem: ICC1324-Connect Plus and ICC1324-Connect.*

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

Terminal assignment

A	0 V	DC 15 V voltage source for customer-specific application
	15 V	
	PE	Input PE
	PE	Input PE
	B Mod.	Modbus meter B
	A Mod.	Modbus meter A
	CP	Control Pilot
	PP	Proximity Pilot
M	WA	Weld check input L1
	33	Relay 33: Switching contact contactor
	WB	Weld check input N
	34	Relay 34: Switching contact contactor

K	23	Relay 23: Relay contacts GPIO (12 V)
	24	Relay 24: Relay contacts GPIO (12 V)
	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)

L	Opto1-	Optocoupler input 1 12 V negative
	Opto1+	Optocoupler input 1 12 V positive
	Opto2-	Optocoupler input 2 12 V negative
	Opto2+	Optocoupler input 2 12 V positive
N	N	Neutral conductor
	L1	230 V supply (phase 1)

The 230 V supply (terminal N), the weld check input (terminal M, WA) and the switching contact contactor (terminal M, 33) must be connected to the same phase (L1) to ensure protection against overvoltage!

Technical data

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

Rated voltage / Pollution degree	250 V / 2
Overvoltage category	II (within terminal M)
Overvoltage category	III (terminal M and all other terminals)
Rated impulse voltage	6 kV (terminal M and all other terminals)
Rated impulse voltage	2.5 kV (within terminal M)
Double insulation acc. to OVC III between	terminal M and all other terminals
Basic insulation acc. to OVC II	within terminal M
Operating altitude	≤ 2000 m AMSL

Supply voltage AC 230 V (terminal N (L1, N))

Supply voltage range U_s	184 V … 264 V
Frequency of U_s	50 Hz
maximum Power consumption	12 W
average Power consumption	6 W
External circuit breaker recommended	B6A

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

Measuring range	100 mA
Response values:	
Residual current I_{dc}	DC 6 mA
Response tolerance I_{dc}	-50…0 %
Measuring current transformer:	
Max. Length of the connection cable	≤1,47 m
Restart sequence value:	
DC 6 mA	< 3 mA

* patented 6 mA DC fault current tripping
(Patents: EP 2 571 128 / US 9,397,494 / ZL 201210157968.6 / CN 103001175, EP 2 813 856)

SMA connector for 4G antenna (for ICC1324-Connect Plus variant only, terminal G)

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: 33dBm DCS1800/PCS1900: 30dBm WDMA: 24dBm LTE: 23dBm

SMA connector for LTE-M1 antenna & LTM-NB1/2 antenna (for ICC1324-Connect variant only, terminal G)

Modem LTE CAT M1/NB1 & GSM

Frequency bands	Cat M1/Cat NB1: LTE FDD: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26*/B28 LTE TDD: B39 (For Cat M1 Only)
Impedance	50 Ω
Data rate	GSM: 850/900/1800/1900MHz GPRS: UL 85,6 kBit/s; DL 107 kBit/s GSM: UL 236,8 kBit/s; DL 296 kBit/ LTE-M1: Max. 375Kbps (DL), max. 375Kbps (UL) LTE-NB: Max. 32Kbps (DL), max. 70Kbps (UL)
Recommended antenna	TC ANT MOBILE WALL 0.5M - 2702274
Max. length of the antenna cable	< 3 m
Max. output power	GSM850/EGSM900: 33dBm DCS1800/PCS1900: 30dBm LTE: 23dBm

WiFi

Standards	IEEE 802.11b/g/n
Frequency bands	2.4 GHz Kanäle 1-13 (2.412 GHz - 2.472)
Channel band width	20 MHz
Data rate	802.11b1, 2, 5.5 and 11 Mbps 802.11g 6, 9, 12, 18, 24, 36, 48 and 54 Mbps 802.11n MCS0-MCS7 (max 72.2Mbps)
max. output power:	19 dBm EIR

LED indications

Service	blue: system is starting green: system started, not ready for operation yet flashing green: system running, system ready for operation red: system error
Ethernet (terminals B, C)	off: no Ethernet connection steady green: active Ethernet connection flashing green: data exchange steady yellow: transmission rate 100 Mbit/s yellow off: transmission rate 10 Mbit/s

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 (terminal A)	9.6 kBit
Control Pilot (terminal A (CP))	acc. to IEC 61851
Proximity Pilot (terminal A (PP))	acc. to IEC 61851

Technical data

Inputs

Optocoupler 1 (terminal L (Opto 1 In+, Opto 1 In-))

Input voltage (HIGH)	DC 11.4 V…25.2 V
Input voltage (LOW)	DC 0 V
Input current	2.3 mA…6.4 mA

Optocoupler 2 (terminal L (Opto 2 In+, Opto 2 In-))

Input voltage (HIGH)	DC 11.4 V…25.2 V
Input voltage (LOW)	DC 0 V
Input current	2.3 mA…6.4 mA
Potential difference to PE/GND	max. 100 V*

Weld check (terminal M (WB, WA))

Input voltage	AC 184 V…264 V
Input current	0.6 mA…1.3 mA
Potential difference to PE/GND	max. 100 V*

* The potential difference between the optocoupler inputs and other inputs/outputs must be less than 100 V.

Input PE (terminal A (PE, PE))

Outputs

Contact data acc. to IEC 60947-5-1:

DC 15 V voltage source (terminal A (15 V, 0 V))

Output voltage	DC 15 V
maximum load capacity	0,4 A / 4,8 VA
Tolerance	DC ± 0,75 V

Relay 1 (12 V) (terminal K (relay 13, relay 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

Relay 2 (12 V) (terminal K (relay 23, relay 24))

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 M (relay 33, relay 34))

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	-25…+65 °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

Ethernet (terminals B, C)

Cable	shielded on one side, shield on charge controller side to PE
Connection cable	CAT 6
Max. connection cable length	100 m
Connection type (terminal blocks A, K and L)	**push-wire terminal**
Connection specifications:	
rigid /flexible	0.2 mm²…1.5 mm² (AWG 24…16)
flexible with ferrule without plastic sleeve	0.25 mm²…1.5 mm² (AWG 24…16)
flexible with ferrule with plastic sleeve	0.14 mm²… 0.75 mm² (AWG 26…18)
Stripping length	10 mm
Max. connection cable length	< 3 m
Cable (Modbus)	shielded and twisted in pairs, shield on both sides to PE
Max. connection cable length (Modbus)	250 m
Cross section (Modbus)	≥ 0.5 mm²
Max. connection cable length (PE)	< 3 m
Cross-section (PE)	≥ 1 mm²
Connection type (terminal block M)	**push-wire terminal**
Connection specifications:	
rigid /flexible	0.75 mm²…2.5 mm² (AWG 24…16)
flexible with ferrule without plastic sleeve	0.75 mm²…2.5 mm² (AWG 24…16)
flexible with ferrule with plastic sleeve	0.75 mm²…2.5 mm² (AWG 24…18)
Stripping length	10 mm
Max. connection cable length	< 3 m
Connection type (terminal block N)	**push-wire terminal**
Connection specifications:	
rigid /flexible	0.2 mm²…2.5 mm² (AWG 24…12)
flexible with ferrule without plastic sleeve	0.25 mm²…2.5 mm² (AWG 24…12)
flexible with ferrule with plastic sleeve	0.25 mm²…2.5 mm² (AWG 24…12)
Stripping length	10 mm

Other

Operating mode	continuous operation
Mounting position	standing
Degree of protection	IP20
Documentation number	D00436
Weight	max. 500 g (depends on variant)

Ordering information

Interface	4G modem	WiFi	PLC [1]	Insulated input	12 V relay output	Type	Art. No.
USB, Modbus meter, Ethernet, RFID	■ (Cat 1)	■	■	2x	2x	ICC1324-Connect Plus	B94060080
	■ (Cat M1/NB1)	–	■	1x	–	ICC1324-Connect	B94060079
	–	■	■	1x	1x	ICC1324-Connect SP	B94060074
	–	■	■	1x	–	ICC1324-Home Plus	B94060078
USB	–	–	–	1x	–	ICC1324-Home	B94060077

[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.
HMI150	B94060150
HMI145	B94060151
HMI140	B94060152
Current transformer CTBC17 (cable variant, cable length 325 mm)[1]	B98080071
Current transformer CTBC17 (PCB variant)[1, 2]	B98080070
Connection cable CTBC17-Cable1470 incl. clip housing (cable length 1470 mm)	B98080542
Connection cable CTBC17-Cable600 incl. clip housing (cable length 600 mm)	B98080543
Connection cable CTBC17-Cable325 incl. clip housing (cable length 325 mm)	B98080541
Connection cable CTBC17-Cable180 incl. clip housing (cable length 180 mm)	B98080540

[1] Internal diameter: 17 mm

[2] The PCB-variant can be combined with the connection cables of different lengths

Plug kit	Content / Quantity	Art. No.
Plug kit (can be ordered separately)	2-pole (1 x), 4-pole (1 x), 8-pole (3 x)	B94060125
Plug kit bulk pack Connect Plus, Connect, Connect SP, Home Plus	2-pole (50 x), 4-pole (50 x), 8-pole (150 x)	B94060124
Plug kit bulk pack Home	2-pole (50 x), 4-pole (50 x), 8-pole (100 x)	B94060123

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