Charge Control F Datasheet

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May 18, 2026

Contents

1 Introduction

Charge Control F adds DIN 70121 and ISO 15118 functionality to the EVSE side. It provides all core functionalities to enable chargers the communication with electric vehicles.
The controller is equipped with a QCA7006 and a powerful Cortex M4 running a state-of-the-art Real-Time Operating System with our complete SW stack included.
It is designed for charging stations equipped with a DIN rail mount and accepts a 12V to 24V power supply.

2 Intended Use

The CCF is intended to be used as a communication gateway of stationary Electric Vehicle Supply Equipment (EVSE). It is a communication gateway between CAN/RS232 and PLC. The CCF can be installed on a DIN-Rail mount within either an AC charging station or DC charging station and interfaces directly with a local host controller.

3 Key Features

- Dual mode ISO 15118 / DIN 70121 SW stack
- IEC 61851
- PP detection according to SAE J1772
- Plug-and-Charge
- Bidirectional charging
- CAN interface
- RS232 interface
- Multiple modules on same CAN interface
- UDS support for diagnostics and configuration

4 Operational

Parameter	Value
Weight	without DIN rail case: ~ 70 g with DIN rail case: ~ 115 g
Temperature range	-40 °C to +85 °C
RoHS / REACH	This product is manufactured RoHS / REACH compliant.
Power supply	12 V to 24 V
Power consumption	< 4 W

Table 1 Operational Parameter

5 Applications

- Generic charge communication controller for charging stations or wall boxes

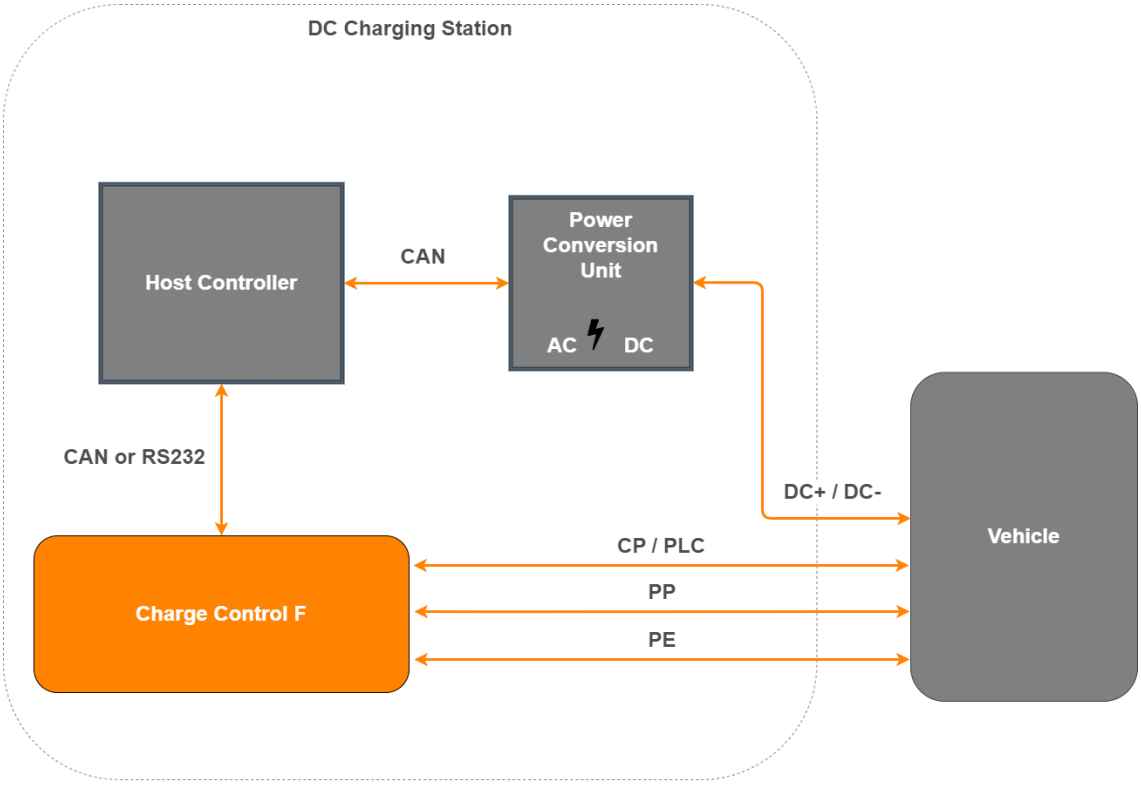

Figure 1 DC charging station with CCF

6 Interfaces

- CAN (no termination on board)
- RS232
- Charging connector for Control Pilot (CP), Proximity Pilot (PP) and Protective Earth (PE)
- GPIOs
- Power supply connector

7 Electrical Characteristics

7.1 Absolute maximum ratings

Symbol	Maximum parameter	Min	Max	Unit
V_{DD}	DC supply voltage	-0.3	+28	V
V_{DIO}	GPIO input voltage	-0.3	+3.3	V
T_{STORE}	Storage temperature	-40	+85	°C
R_{AH}	Relative air humidity (not condensing)	10	90	%

Table 2 Absolute Maximum Ratings

7.2 Recommended operating conditions

7.2.1 Supply parameter

Symbol	Supply Parameter	Min	Typ	Max	Unit
V_{DD}	DC supply voltage	+11.5		+26.4	V
I_{DD}	Current for V_{DD} = 12 V		110		mA
I_{DD}	Current for V_{DD} = 24 V		55		mA
I_{GPIO}	GPIO current	-15		+15	mA

Table 3 Supply Parameter

7.2.2 GreenPHY powerline communication parameter

PLC on Control pilot parameter	Min	Typ	Max	Unit
Reach			300	m
Data rate			10	Mbit/s

Table 4 GreenPHY Powerline Communication Parameter

8 Module Pinout

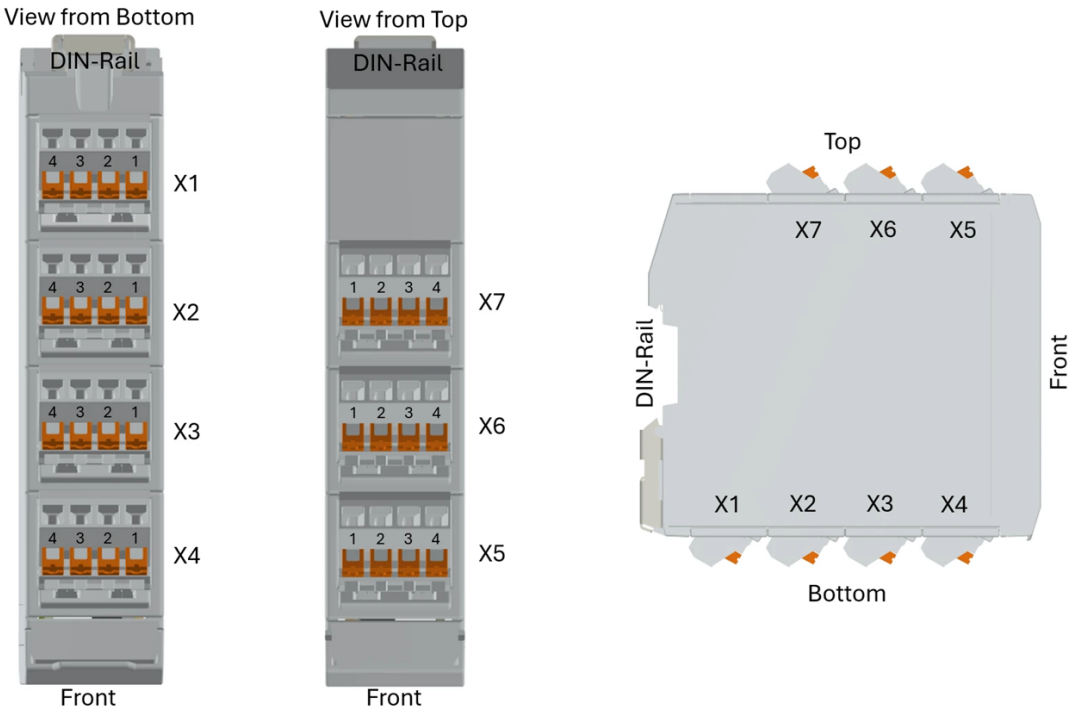

Figure 2 Module Pinout

Pin	Name	Direction	Description	Function
X1-1	GND	SUPPLY	Ground connection	GND potential, negative connection for power supply
X1-2	GND	SUPPLY	Ground connection	GND potential, negative connection for power supply
X1-3	GND	SUPPLY	Ground connection	GND potential, negative connection for power supply
X1-4	V_{DD}	SUPPLY	Supply voltage for the device	Power supply for the device, +12 V or +24 V
X2-1	JP_1		CAN / RS232 bootstrap connection	Connect X2-1 and X2-2 with a jumper to enable RS232 interface instead of the default CAN interface.
X2-2	JP_2		CAN / RS232 bootstrap connection	Connect X2-1 and X2-2 with a jumper to enable RS232 interface instead of the default CAN interface.
X2-3	NC		Reserved, do not connect	
X2-4	NC		Reserved, do not connect	
X3-1	PP	IN	Proximity Pilot connection	Connection for Proximity Pilot resistor
X3-2	GND		Ground connection	
X3-3	DIR		Reserved, do not connect	
X3-4	GND		Ground connection	

Pin	Name	Direction	Description	Function
X4-1	CP	IN / OUT	Control Pilot connection	Connection for Control Pilot signal, ± 12V max
X4-2	PE		Protective Earth connection	GND potential, connect charging cable PE lead here for optimal PLC signal quality
X4-3	NC		Reserved, do not connect	
X4-4	GND		Ground connection	
X5-1	GPIO_2	IN / OUT	Customer GPIO	Main controller GPIO, 3.3V interface, 220 Ohm series resistor included
X5-2	GPIO_4	IN / OUT	Customer GPIO	Main controller GPIO, 3.3V interface, 220 Ohm series resistor included
X5-3	GPIO_5	IN / OUT	Customer GPIO	Main controller GPIO, 3.3V interface, 220 Ohm series resistor included
X5-4	GND		Ground connection	GND potential, use as GPIO signal ground
X6-1	NC		Reserved, do not connect	
X6-2	GND		Ground connection	GND potential, use as RS232 signal ground
X6-3	RS232_TX	OUT	RS232 Transmit connection	Connection for RS232 Transmit signal, ±14V max
X6-4	RS232_RX	IN	RS232 Receive connection	Connection for RS232 Receive signal, ±30V max
X7-1	CAN_H	IN / OUT	CAN High connection	Connection for CAN High signal, 5V interface (no termination on board)
X7-2	CAN_L	IN / OUT	CAN Low connection	Connection for CAN Low signal, 5V interface (no termination on board)
X7-3	GND		Ground connection	GND potential, use as CAN signal ground
X7-4	GND		Ground connection	GND potential, use as CAN signal ground

Table 5 Pin Description

To create a connection to the connectors X1 to X7, the correct connectors from Phoenix Contact must be used. chargebyte provides you with this connector with the follwing part number.

Connector	chargebyte order code	Manufacturer order code
DIN rail 4-Pin connector, male, PSPT 2,5/ 4-ST BK	CBDRCON-4-M-B	PSPT 2,5/ 4-ST BK

Table 6 Required Connector

9 Module Dimensions

9.1 PCB

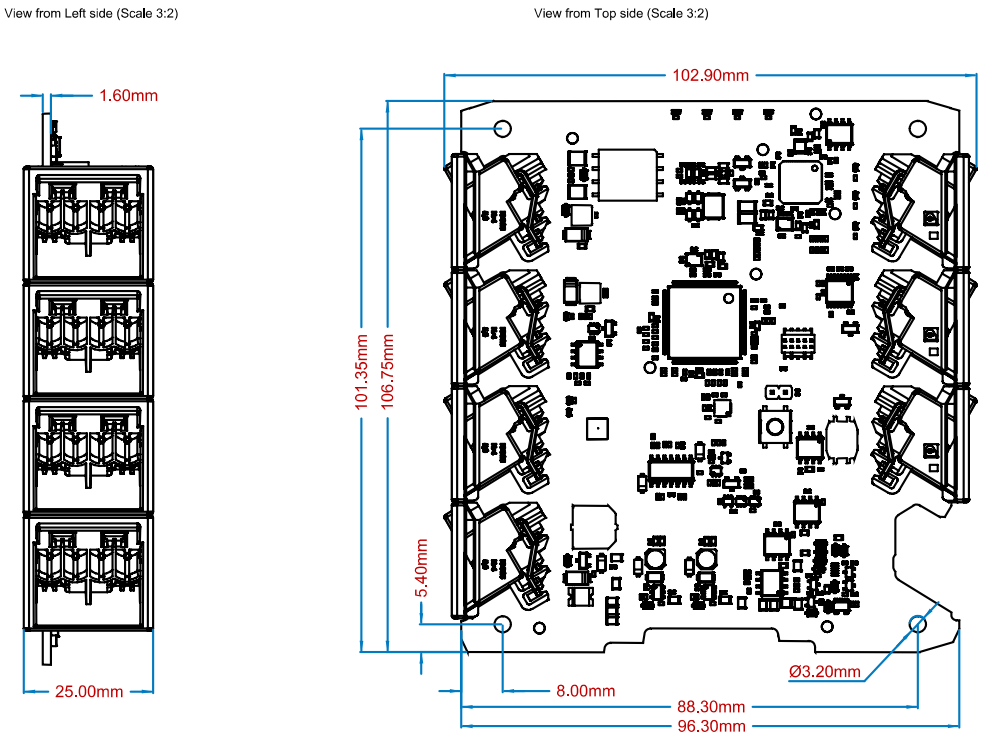

Figure 3 PCB Dimensions

9.2 DIN Rail Case

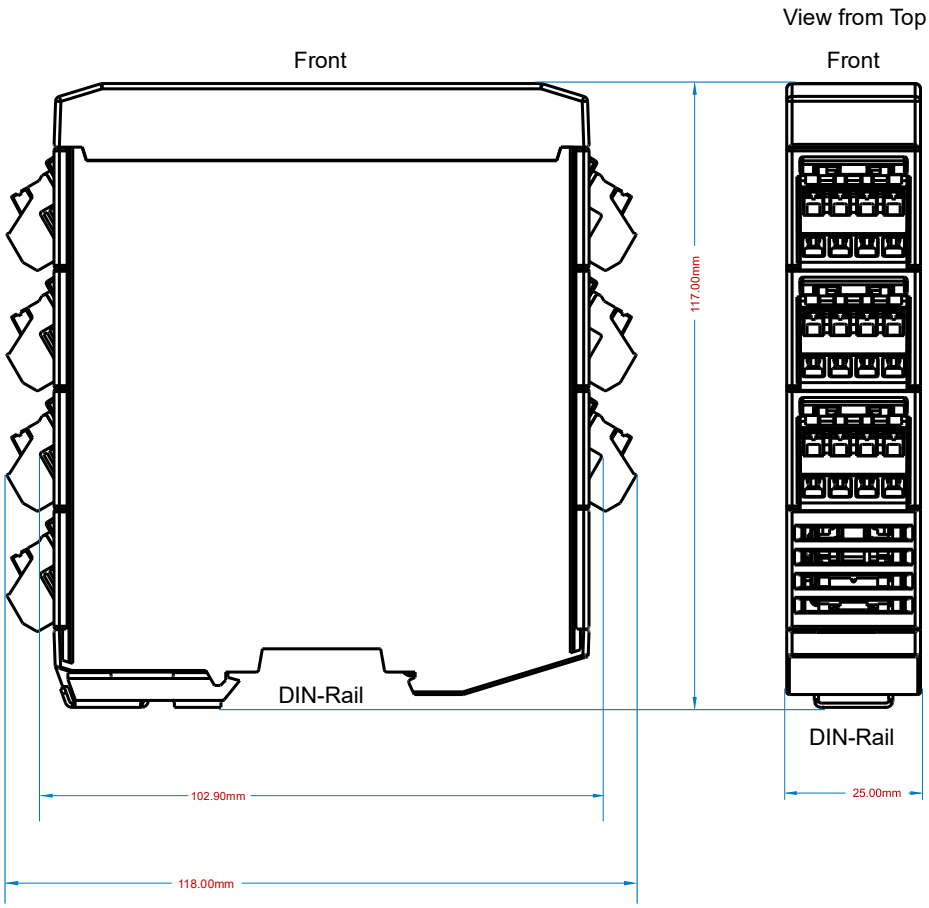

Figure 4 DIN Rail Case Dimensions

10 Module Marking

10.1 PCB

Each PCB is marked with a label on it's main MCU containing the following data:

- Data Matrix Code with following Information (space separated Values):
  - Order Code
  - MAC Address QCA
  - MAC Address Host
  - Serial Number

10.2 DIN Rail Case

Each case is marked with a label containing the following data:

1. chargebyte Banner
2. Controller Name
3. Order Code
4. Serial Number
5. PLC chip MAC Address (printed with a separating colon every two digits, the data matrix code contains the digits without separator)
6. 2D data matrix code containing the above information as a list of space separated values

An example is shown in the following figure.

11 Packaging Information

The single CCF modules are wrapped in bubble wrap bags. CCF multiple-item packaging contains 20 modules per ESD cardboard box, with the dimensions of 376 x 391 x 160mm.

Figure 5 CCF ESD cardboard box example

For shipment, chargebyte cardboard packaging can contain up to 5 ESD boxes, with maximum dimensions of 440 x 370 x 810 mm.

Figure 6 Cardboard packaging example

12 Order Code Compilation

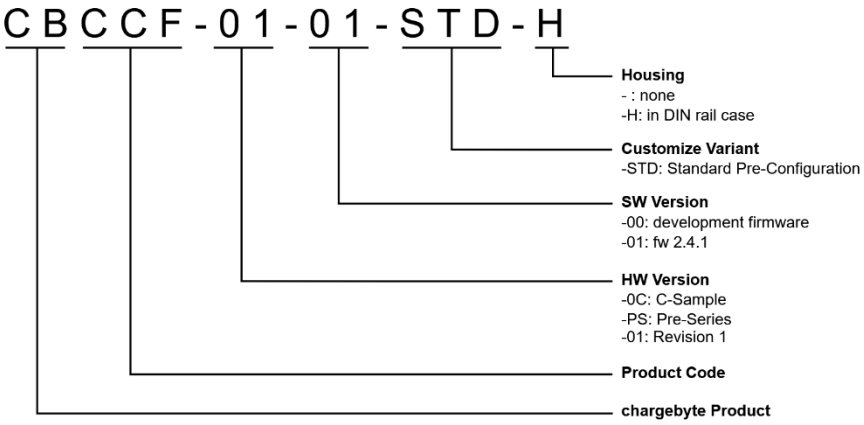

Figure 7 Order Code Compilation

13 Order Information

The following table provides an overview of the available Charge Control F variants.

Order Code	Hardware Version	Software Version	Customize Variant	Software Pre-Configuration
CBCCF-01-01-STD-H	Series Revision 1 in DIN rail case	2.4.1	Standard	Type 2 DC charging DIN and ISO Native GPIO
CBCCF-01-01-STD	Series Revision 1 without DIN rail case	2.4.1	Standard	Type 2 DC charging DIN and ISO Native GPIO
CBCCF-01-01-PLC-H	Series Revision 1 in DIN rail case Only PLC without CP and PP	2.4.1	Only PLC without CP generation and monitoring and PP monitoring	Type 2 AC charging By Customer
CBCCF-01-01-PLC	Series Revision 1 without DIN rail case Only PLC without CP and PP	2.4.1	Only PLC without CP generation and monitoring and PP monitoring	Type 2 AC charging By Customer

Table 7 Charge Control F Order Codes

14 Handling

Please handle the component accordingly. The component has to be handled by a skilled / instructed person.

Be aware of potentially dangerous voltages in an EVSE cabinet when working on / installing this component.

The component itself does not have any accessible conductive parts.

Safety considerations encompass the product interface boundaries, be advised to follow your local rules and regulations regarding the EVSE system level.

Only the electronic component without the DIN rail case is sensitive to **electrostatic discharge (ESD)**.

14.1 Protection Class

The CCF is classified as **protection class III** equipment with **PELV** (Protected Extra-Low Voltage) connection.

The CCF must only be operated with a suitable AC/DC power supply for Protected Extra-Low Voltage. The power supply must comply with applicable standards and the requirements of this specific application.

15 Revisions

Revision	Release Date	Changes
5	18 May 2025	Added information about protection class Adapted Orde Code Compilation and Order Information Adapted Intended Use
4	12 December 2025	Updated Order Code in production from firmware version 2.2.0 to 2.3.1 according to PCN-30 Updated Key Features
3	19 September 2025	Added information about CAN termination Added order code for connector Added product weight Added Relative air humidity Added I_{DD} Added Storage temperature Updated Order Information Updated Order Code Compilation Updated Module Marking DIN Rail Case Added packaging information
2	02 May 2025	Adapted pictures of chapter Module Pinout Added PCB dimensions Added DIN rail case dimensions Added chapter Module Marking
1	14 August 2024	Initial release

Table 8 Revision Table

16 Contact

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