DOC N° 1SDH002344A1002 - Rev. 1.1

C-kit

User manual

Summary

1 - General information

Document audience

This document is intended for system integrators. A system integrator is an experienced person who is perfectly familiar with how to physically and functionally connect different systems (hardware devices and/or software applications) and who works in compliance with the laws in force.

Purpose of the manual

The purpose of this manual is to guide the user step by step through the C-kit commissioning operations. The manual includes general information, including details on cyber security, a brief description of the product, instructions on how to connect the hardware, instructions on how to configure and use C-kit.

Rules for secure use

The Modbus and OCPP protocols do not provide encryption, authentication or integrity checking of the transmitted data. For these reasons, communication between C-kit and the other devices is not totally secure. To protect C-kit and to ensure it works as expected, connect C-kit to a reliable (i.e. strictly limited and controllable) network. In addition, restrict access to C-kit personnel authorized to make changes to the configuration. If communication between C-kit and a device is interrupted, the C-kit web interface activates an alarm to notify the fault.

For proper and safe use, check the changelog regularly (see "Other useful documentation" below) and update C-kit to the latest released version.

Other useful documentation

The following table provides links to access the documentation useful for installing C-kit

Document	Description
Changelog	List of functions introduced in the new releases.
List of supported charging points	List of charging point types supported by C-kit
Modbus map	Modbus map exhibited by C-kit
Guide to updates	List of procedures to update the firmware and the C-kit application system

Ports used by C-kit

The ports used by C-kit are outlined in the table below:

Protocol	Port	Description
ABB netConfig	UDP 24576	Port to perform device scanning by IP address and to change the IP address from software
Online access with drivers 3S UDP BlkDrvUdp (with scan)	UDP 1740	Communication port for ABB Automation Builder software
Online access with driver 3S TCP/IP BlkDrvTcp (no scan)	TCP 11740	Communication port for ABB Automation Builder software
Modbus TCP server	TCP 502	-
Web server	TCP 443	Https
OCPP server	TCP 9000	-

How to retrieve your credentials

If you lose or forget the password, send an e-mail to global-elsp.operations.digital@abb.com and provide the C-kit serial number to reset and choose a new password.

2 - Cyber security legal disclaimer

Disclaimer 1

C-kit is designed to be connected and to communicate information and data via a network interface, which should be connected to a secure network. Solely the user is responsible for continuously providing and guaranteeing a secure connection between the C-kit product and the network and for establishing and maintaining appropriate measures (for example: installation of firewalls, application of authentication measures, data encryption, installation of antivirus programs, etc.). The user must protect the C-kit product, the network, his/her system and his/her interfaces from all types of security breach, unauthorized access, interference, intrusion, loss and/or theft of data or information. ABB and its affiliates are not liable for damages and/or losses related to such security breaches, unauthorized accesses, interference, intrusion, loss and/or theft of data or information.

Disclaimer 2

To prevent network storm attacks and protect C-kit against excessive traffic, ABB S.p.A. recommends implementing network filters or firewalls to limit the data rate of the packages that reach C-kit. Below are the maximum rates recommended for various protocols:

- Ethernet: 12 Mbps (equivalent to 19048 packages per second)
- ARP (Address Resolution Protocol): 4 Mbps (equivalent to 5952 packages per second)
- IP (Internet Protocol): 5 Mbps (equivalent to 8333 packages per second)
- ICMP (Internet Control Message Protocol): 7 Mbps (equivalent to 10714 packages per second)
- TCP (Transmission Control Protocol): 2 Mbps (equivalent to 3571 packages per second)
- UDP (User Datagram Protocol): 5 Mbps (equivalent to 7143 packages per second)
- Implementing these limits can contribute to protect your network devices from excessive traffic and potential storm attacks.

Disclaimer 3

Network traffic management holds some intrinsic risks. To prevent problems related to poorly performing TCP packages, ABB S.p.A. recommends implementing network filters. Furthermore, it is good practice to validate input data to ensure network security, following industry guidelines.

3 - C-kit overview

Description of C-kit

C-kit is an ABB solution based on the AC500 hardware platform that enables monitoring and control of electric charging point loads to ensure efficient and safe use of charging infrastructures

C-kit is a local supervisor of electric vehicle meters and charging points. It manages and monitors their operation in real time and allows some of their settings to be changed.

Through a series of graphical pages, the web server allows summary and analytical information on the system to be represented.

Operation of C-kit

To monitor and regulate the flow of current delivered to the charging points, C-kit uses the following functions:

- Constant monitoring: C-kit receives the measurement of the current delivered by each charging point.
- Limit set by the user: C-kit intervenes if the sum of currents delivered and loads monitored through the meter exceeds the limit set for the area or zone.
- Automatic adjustment: C-kit automatically adjusts the charging power for each charging point to avoid overloading.
- Customizable algorithms: C-kit intervenes depending on the charging algorithm chosen by the user.

In this way, C-kit it ensures that the charging infrastructure is used optimally, avoiding overloads, untimely tripping of protection devices, and ensuring efficient distribution of available power.

For example, if two vehicles charge at the same time in an area with three charging points, each with a maximum power of 22 kW, with a current limit for the area set to 60 A and there are no other vehicles charging in the monitored area, C-kit dynamically adjusts the power of each charging point to avoid exceeding the overall limit of 60 A and the selected charging algorithm.

Operation of C-kit without meters

If there is no meter connected, C-kit reads the absorbed currents directly from the charging points. The value of these currents is in modulus, that is, without indication of phase shift. In this situation, C-kit considers the sum of the absolute value of the phase currents, and therefore could disconnect non-priority loads even if not necessary.

To improve accuracy in reading currents, a meter must be connected. To consult the list of meters directly compatible with C-kit, see "Manage meter models" on page 21.

Communication architecture

C-kit allows integration of:

- Up to 30 AC charging points of the ABB Terra AC Wallbox model, which communicate via OCPP
- Up to 13 Modbus TCP/RTU meters.

C-kit uses the OCPP protocol (version 1.6), a standard and open protocol for communication between charging points and the central system based on server-client architecture, where C-kit is the OCPP Server to which client charging points connect in order to use a particular service.

C-kit uses the Modbus protocol, a standard and open protocol for communication between meters and the central system, based on client-server (TCP) or master-slave (RTU) architecture. C-kit acts as a Modbus client/Master by querying the meters that act as Modbus server/slaves.

In order to function properly, C-kit and the charging points must therefore be connected to the same LAN/VLAN data network provided by the customer's enterprise infrastructure. The network must consist of at least the following devices:

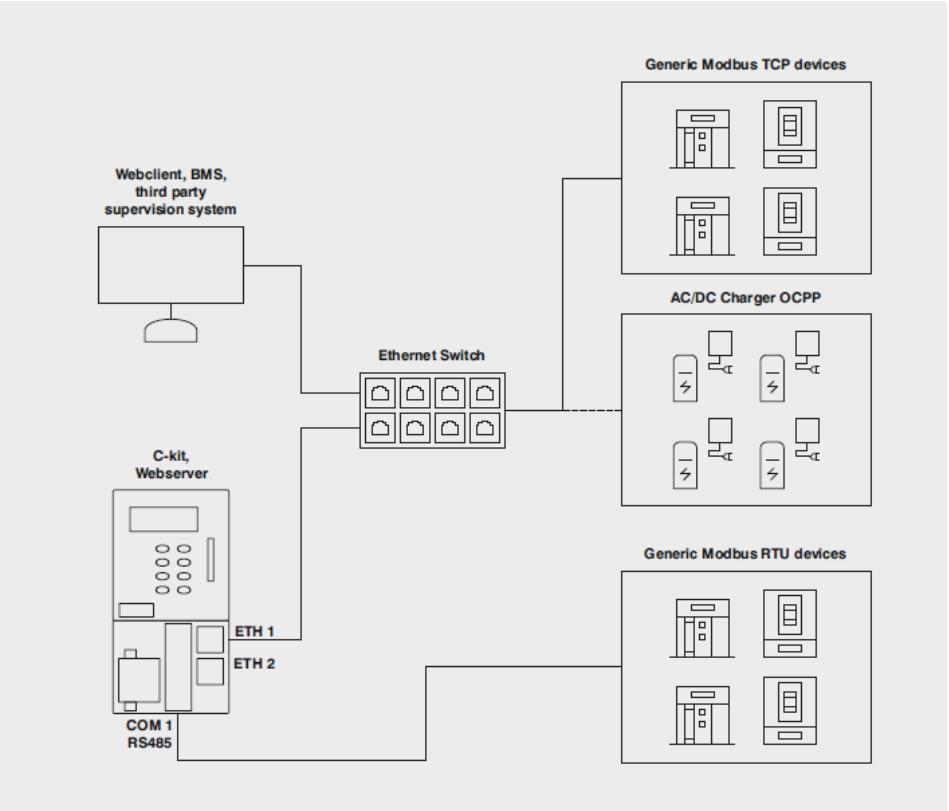
- Computer or other similar terminal to access the C-kit web interface (it must be connected via data cable in the same network/subnetwork as C-kit with IP address belonging to the same usage pool).
- Ethernet switch to physically connect the charging points with C-kit.

***IMPORTANT**: it is very important to analyze the IT infrastructure where you want to install C-kit, in order to understand which devices (and features) are needed.*

For a structured local network, the network administrator can set up a dedicated VLAN with Dynamic Host Configuration Protocol (DHCP), which is necessary to dynamically assign IP addresses to the charging points.

For a small, less complex computer network (e.g. A home network), it may be necessary to have devices capable of managing/directing data traffic and monitoring the network, such as managed or smart managed switches that necessarily have DHCP server function, for the reasons described above.

Note: from firmware version 1.8 onwards, ABB Terra AC charging points can be configured with a static IP address.



C-kit architecture

C-kit manages up to six areas and six zones of a *plant*.

The *plant* is the delivery point for the energy supplied by the user. C-kit reads and manages the measurements of a single plant.

An *area* identifies a general low-voltage circuit breaker from which it draws power for all loads in the plant (including switchgear to power the charging points).

A *zone* identifies a meter that supplies power exclusively to the charging points. The zone is supplied by the general meter in the area.

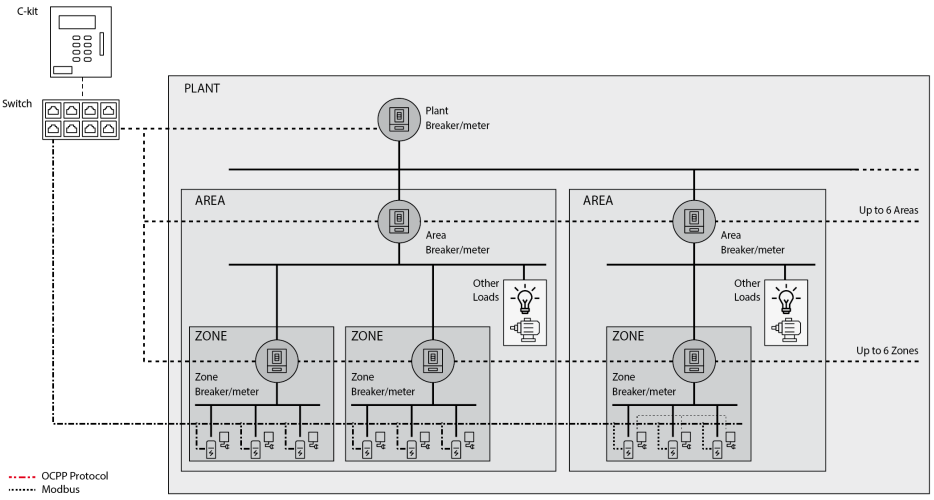
For example, in a system with a medium/low voltage substation and two main lines, the system is associated with the general meter installed upstream or downstream of the MV/LV transformer or, if the transformers are in parallel, to the common medium voltage point. The areas are associated with the meters of each main distribution board. The areas are associated with the sub-distribution board to which the charging points are connected.

Area and zone meters may be installed in the same switchgear or in separate switchgear if they provide C-kit with the electrical quantities required for power management via Modbus TCP/IP or RTU protocol..

During system design and installation of the charging points, consider phase rotation to ensure a balanced use of the network and plan zones where the charging points are of the same type (AC or DC).

To manage the current budget, apply the formula **[number of charging points (N) x minimum budget (B) x tolerance factor (F)]**, where F is 1.2 for the zone and 1.3 for the area and system.

In existing systems where circuit breakers without a communication protocol (old generation circuit breakers) are already installed, to avid having to replace the old circuit breakers, it is necessary to install smart meters equipped with Modbus TCP/IP or RTU protocol to provide the necessary quantities to C-kit for managing the loads.



Data managed by C-kit

The following are the data managed by C-kit depending on the type of communication and the device with which it communicates.

Protocol	Data managed	Device
OCPP	• Charging power set point • Acquisition of power output • Display of charging point status • Detection of field equipment communication alarms • Detection of field equipment status alarms • Display of power output totalizer	Charging points
Modbus TCP/RTU	• Currents (L1, L2, L3) • Voltages (L1-N, L2-N, L3-N) • Active power (total net*, P1, P2, P3) • Reactive power (total net*, Q1, Q2, Q3) • Power factor • Frequency	Meters

***IMPORTANT**: C-kit can read these measurements from any Modbus meter only if it is properly configured (see dedicated section).*

Note: total active power and total reactive power are calculated by the meter and therefore no reference should be provided for these measurements.*

Structure of C-kit

C-kit consists of a CPU with a COM1 serial port, two Ethernet ports (in mirror mode, both set to the same IP address). An SD card is also provided with C-kit.

C-kit an integrated web server with web interface to view all the statuses of connected devices, to configure them, and to run commands.

Clock function

The “Clock” function of C-kit allows the date and time to be set, which are essential to ensure proper communication with the charging points. The “Clock” function requires a battery that is not provided and can be purchased separately as an accessory.

Access to the web interface

The web interface can be accessed via web browser by entering the IP address set during configuration (see "Setting the static IP address" on page 14) in the address bar.

SD card functions

The SD card supplied inC-kit allows the following operations to be performed:

- Update the C-kit software. Operation to be performed by ABB. To request support, send an email to global-elsp.operations.digital@abb.com.
- Backup the configuration created.
- Update the catalog of models supported by C-kit.

4 - Power supply

Introduction

C-kit Must be supplied at 24 V DC. The power connection is via a 5-pin removable terminal box. Due to the replication of the L+/M pins, C-kit it can power, for example, external sensors (up to 8 A max. with 1.5 mm2 conductors).

Warnings

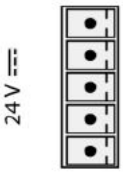
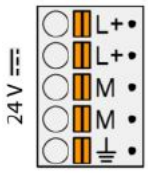
***WARNING**: **Risk of damage to the CPU and base of the terminals!**. The system could be damaged irreparably.*

***WARNING**: **Risk of malfunction!** To ensure reliable and correct operation, the supply voltage must increase from 0 to 24 V within 2.5 s maximum.*

***WARNING**: **Risk of damage to base of terminal and power supply!** Short-circuits could damage the base of the terminal and power supply. Make sure that the four L+ e M terminals (two of each) have not been connected in the wrong way.*

***WARNING**: **Risk of damage to base of terminal!** A high current could damage the terminal and base of the terminal. Make sure that the current which flows through the removable terminals is never higher than 8 A (with 1.5 mm of conductor).*

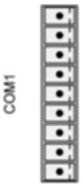
Description of terminal box

Pin allocation		Label	Function	Description
 Terminal block removed	 Terminal block plugged-in	L+	+24 VDC	Positive pin of supply voltage
		L+	+24 VDC	Positive pin of supply voltage
		M	0 V	Negative pin of supply voltage
		M	0 V	Negative pin of supply voltage
		⏚	FE	Ground connection

5 - RS-485 serial communication interface (COM1 port)

Description of terminal box

C-kit is provided with a **COM1** port with 9-pin removable terminal box for communication with the Modbus RTU protocol.

Interface		Pins	Signal	Interface	Description
 Terminal box removed	 Terminal box plugged in	1	Termination P	RS-485	Termination P
		2	Modbus +	RS-485	Receive/Transmit, +
		3	Modbus -	RS-485	Receive/Transmit, -
		4	Termination N	RS-485	Termination N
		5	RTS	RS-232	Request to send (output) Not used
		6	TxD	RS-232	Transmit data (output) Not used
		7	SGND	Ground signal	Ground signal Not used
		8	RxD	RS-232	Receive data (input) Not used
		9	CTS	RS-232	Clear to send (input) Not used

WARNING: Connector not used! *Make sure that the terminal block is always plugged into the terminals, even when there are no cables connected.*

Connection ports

A Modbus RS-485 network connects a Master device to one or more Slave devices.

Each device has a communication port with two terminals, conventionally called A and B. The communication cable is connected in these two terminals so that all the devices taking part in the communication are connected in series.

All “M+” terminals must be connected to each other and all “M-” terminals must be connected to each other, respectively.

If connections “M+” and “M-” of a device are inverted, besides making them incapable of communicating, the entire communication system may not function owing to the incorrect direct current (bias) voltage values on the terminals of the badly connected device.

To prevent errors when several devices are connected, it is advisable to use cables of the same color for all connections to the M+ terminals and cables of the same color for all connections to the M- terminals of the different devices (e.g. white for M+ and red for M-). This makes it much easier to identify cabling errors.

Termination resistors

To avoid signal reflection, a 120 Ohm termination resistor must be fitted

to each end of the main cable. Installation of termination resistors can only be omitted if the main cable is less than 50 m in length.

Note*: internal termination resistors are not included in ABB SACE new Emax, X1 air and Tmax molded-case devices and in the majority of ABB devices.*

Communication parameters

All of the devices in the same Modbus RTU network must have the same communication parameters. On C-kit, parameters are set by default and cannot be changed. The Master C-kit can acquire data only when the parameters have been correctly set on all devices. The following are the values to be set on the devices:

- data transmission speed, known as baud rate: 9600 bps;
- data bits (number of bits): 8;
- parity bit: Even;
- stop bit: 1;
- address of each slave

6 - Ethernet communication interface (ports ETH1 and ETH2)

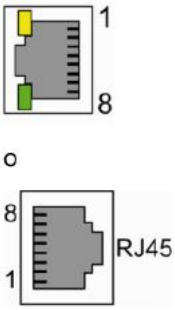
Introduction

C-kit is provided with two network interfaces which function like switches.
The following is the default configuration:

- IP address: 192.168.0.10
- Subnet Mask: 255.255.255.0
- Gateway address: 0.0.0.0

Description of terminal box

The connector for Ethernet communication is the RJ45 type. Pin allocation is given in the next table:

Interface	Pins	Signal	Description
	1	TxD+	Data Transmitted +
	2	TxD-	Data Transmitted -
	3	RxD+	Data Received +
	4	NU	Not used
	5	NU	Not used
	6	RxD-	Data Received -
	7	NU	Not used
	8	NU	Not used
	Shield	Shielded cable	Ground signal

Type of cable required

Use braided twisted pair cables (TP cables) of at least category 3 (IEA / TIA 568-A-5 Cat3) or class C (according to the European standards) for 10 Bit/s (10Base-T) Ethernet.
Use category 5 (cat5) or class D or higher braided twisted pair cables (TP cables) for 100 Mbit/s (fast) (100BarexTX) Ethernet.

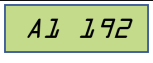
Maximum distance between devices

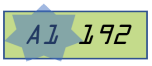
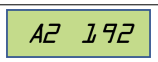
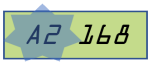
The maximum length of a truck, i.e. The maximum distance between two network components, is limited to 80 m owing to the electrical properties of the cable.

Setting the static IP address

Configuration is via keypad, where the IP address is expressed in the form A1.A2.A3.A4, with mask N1.N2.N3.N4 and network gateway G1.G3.G4. For example, in the following case:

IP 192.168.0.113	→	A1=192, A2=168, A3=0, A4=113
mask 255.255.255.0	→	N1=255, N2=255, N3=255, N4=0
gateway 192.168.0.1	→	G1=192, G2=168, G3=0, G4=1

		Power up C-kit and press the CFG button to access the configuration screen.
		Press the arrow key to select interface Eth1
		The CFG button allows you to set the mode with static address
		Pressing the CFG button again allows the first parameter to be displayed

CFG		The parameter indicator starts flashing. The arrow keys can then be used to change the parameter.
OK		Pressing the OK key allows the second parameter to be displayed.
CFG		Pressing the CFG key allows you to change the parameter. The value can be changed using the arrow keys.
-	-	Repeat these steps to configure parameters A3, A4, N1, N2, N3, N4, G1, G2, G3, G4
OK		Pressing the OK key allows you to finish the configuration
OK		Pressing the OK key again allows you to confirm the change
OK		Pressing the OK key a third time will implement the changes. Shut down the CPU and then power-up again to make the change effective

C-kit In the TCP/IP network

Local network

Within the local network, C-kit can be accessed via web or web browser application from all PCs, tablets and operator panels. For access via Wi-Fi network, an access point is required within the building to which Wi-Fi tablets and PCs can be connected.

Outside the local network

To make C-kit outside the local network, there are two possible solutions:

- (recommended) implement a VPN (Virtual Private Network) so only authorized personnel who have the encryption key can access the internal network securely, with no possibility of access from unauthorized personnel.
- map port 443 (HTTPS) in the company router to make it externally accessible.

  ***IMPORTANT**: with this solution, the local network is exposed to the outside without any protection.*

7 - C-kit commissioning

Power-on

When supplied correctly, C-kit powers up automatically. At power-on, the message C-kit appears on the display.

Firmware upgrade

New firmware can be requested if the following situations arise:

- web interface malfunctions
- availability of a major version that introduces new functionality

Send an e-mail to: global-elsp.operations.digital@abb.com

The support center will check the validity of the request and will provide help and guide you through the C-kit firmware upgrade.

8 - C-kit User Interface

Users

There are two types of users:

- Guest: basic level that allows the user to view the status of the entire system without changing configurations or sending commands.
- Admin: level that allows the user to view the system and also to set parameters and send commands.

The Guest user is the user with whom you initially log in to C-kit. It does not require an access password

The Admin user requires an access password. The default password is “Admin” and can be changed via web interface.

It is possible to log in simultaneously on multiple browsers with the same user. However, only one is active while the others (up to 14) are read-only.

***IMPORTANT**: set a new password when logging in for the first time. To ensure account security, reset the password at least once every 6 months.*

It is recommended to choose a password consisting of a minimum of 8 and a maximum of 20 characters. The password must contain alphanumeric characters, uppercase and lowercase letters, and special characters such as €, £, ¥, ©,!, ?, \, |, ^, (,), /, [,], #, @.

Password reset

If you lose or forget your password, send an e-mail to global-elsp.operations.digital@abb.com and provide the C-kit serial number. ABB support will arrange a remote call with screen sharing and perform a password reset.

***Note**: an Internet connection is required for the remote call.*

Accessing the web interface

To access the C-kit integrated web server, open the browser and type “https://IP address” in the address bar where the IP address is the one set during configuration.

Dashboard

The main screen (dashboard) shows a summary of the main plant quantities and the charging algorithm set (1).

In particular, the following information is displayed:

- for the Plant: name, description, power and total energy of the system, read from the plant meter, and the contracted power, set by the user (2).
- for each configured area or zone: name, description, number of busy charging points, active power, charging current limit, and the percentage value of available energy use for the area/zone. By selecting the area/zone, you can view the charging points belonging to that area/zone (3).

The logged-in user is displayed in the dashboard and at the top right of all the C-kit screens. The **Guest**/**Admin** button allows login, logout and password change.

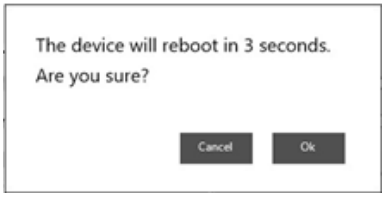
The bar at the bottom left contains the following button and messages:

1. Button to restart the system
2. Saving status of the settings
3. Date and time

The C-kit version is displayed on the right.

After a new operation, the save icon becomes red after clicking on **Save**, and when the save procedure is completed, the icon is displayed again.

The button allows you to restart the system when prompted by the “Reboot required” message at the center of the bottom bar. In particular, the operation is requested when the identifier of a charging point (**Identity** parameter) is changed.



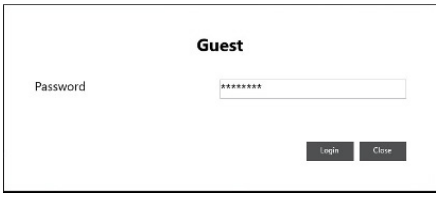
The left-hand menu provides access to the detail pages of the monitored devices (charging points and meters), to the token manager ( ), to the settings ( ) and to the alarms page ( ). The icon flashes if there is at least one active alarm.

8 - Basic operations in C-kit

Access as Admin user

When logging in for the first time, you need to log in as Admin user in order to configure the web interface

1. In the homepage header, click on **Login**, enter the Admin user password ("Admin" by default) and click on **Login**.



Entering the Admin user password accesses the system with administrator rights and opens the window below.

2. To change the password, enter the new password chosen in **Password** and click on **Change password**. After this operation, the message "Password changed" will appear under the button.

3. Click on **Logout** to return to the Guest user mode.

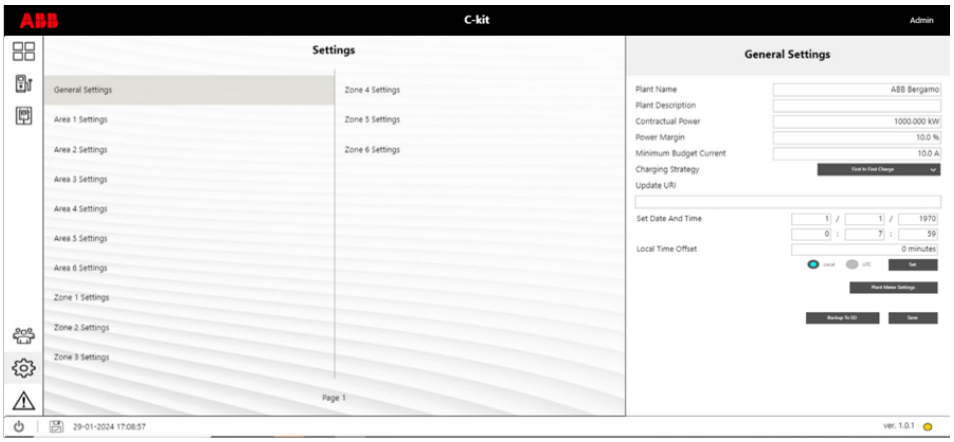
> ***Note**: after 30 minutes of inactivity, the system will automatically log out from Admin user to Guest user*

4. Click on **Close** to access the web interface as Admin user.

Save changes

The C-kit configuration can be saved in the following ways:

- with a backup on the SD card provided, to avoid losing the information saved on C-kit (> **General Settings** > **Backup TO SD**)
- locally on C-kit (> **General Settings** > **Save**)



9 - Configure **C-kit**

Configure the plant

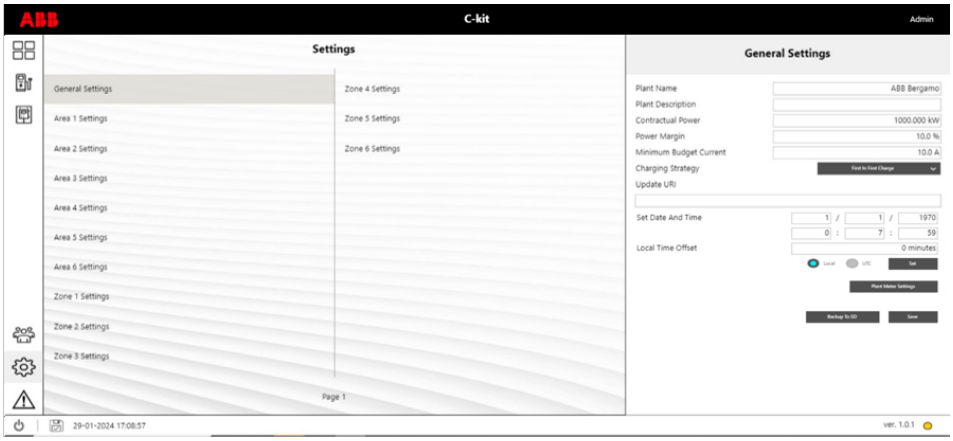
***Note**: function only available for Admin users.*

1. Click on ⚙ and then on **General Settings**.
2. Set the parameters for the plant.
3. Click on **Save**.

Plant parameters

The following are the parameters for a plant:

- Name of the Plant, shown on the Dashboard
- Description of the Plant, shown on the Dashboard
- The contracted power of the plant in kW, shown on the Dashboard
- The safety margin, which is the percentage current margin that the system does not allocate to charging for safety reasons
- The minimum current budget, i.e. the minimum current allocated to a vehicle being charged
- Choice of charging algorithm, shown on the Dashboard
- The address of the server from which the charging points can retrieve the firmware update (**Update URI**)
- Date and time



Configure an area

1. Click on ⚙ and then on **Area X settings**, where X is the number of the area to be configured.
2. Set the parameters for the area.
3. Click on **Save**.
4. To configure the meters as well, click on **Meter settings** (see "Meter page" on page 26).

Area parameters

The parameters for an area are listed below:

- Name of the area, shown on the Dashboard
- Current limit of the area, shown on the Dashboard
- The safety margin, which is the percentage current margin that the system does not allocate to charging for safety reasons

Configure a zone

***Note**: an area is enabled if there is at least one charging point belonging to it.*

1. Click on ⚙ and then on **Zone X settings**, where X is the number of the zone to be configured.
2. Set the parameters for the zone.
3. Click on **Save**.
4. To configure the meters as well, click on **Meter settings** (see "Meter page" on page 26).

Zone parameters

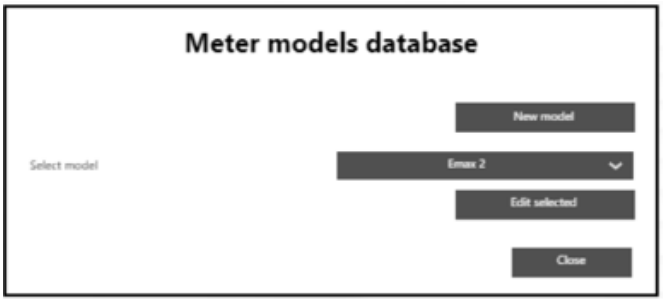
The parameters for a zone are listed below:

- The name of the zone, also displayed on the dashboard
- The area to which it belongs, also displayed on the dashboard
- The online current limit, expressed in A, which is the current limit for the zone's consumption when C-kit is connected to the meters, also displayed on the dashboard
- The offline current limit, expressed in A, i.e. the current limit for the zone's consumption to be considered when there is no connection to the meter or if this connection is lost, also displayed on the dashboard
- The safety margin, which is the percentage current margin that the system does not allocate to charging for safety reasons

Manage meter models

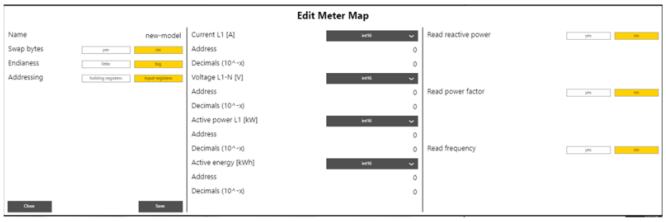
Models can be created and managed that allow C-kit to read data from meters connected to the network. By default, the model for XT-series meters is available. To see the full list of available templates, see Available Models.
To access the function, on the **Settings** screen, ⚙ click on the **Open** button next to the **Meter models database** field: a pop-up appears that allows the following actions to be performed:

- create a new model from the template
- select a model that is already in the database
- edit an existing model



Create a new model from the template

If you choose to create a new model from the template, the following screen is accessed:



To fill in a model, the user must perform the following actions:

- Choose the name of the model by clicking on the **new-model** field and typing in your choice
- Select the Modbus configurations of the meter:
  - Byte inversion
  - Endianess
  - Modbus function to be used to query the meter registers (input or holding)
- For each quantity presented, select:
  - the data type
  - the source register
  - the decimals with which the data read from the meter is to be treated (mathematically, this corresponds to the exponent of the power in base 10 by which the raw data is to be divided. For example, if I enter 2, C-kit will divide the data read by 10^2=100)
- For the following quantities, listed in the third column of the screen, you can indicate whether you want them read or not:
  - **Reactive Power**
  - **Power Factor**
  - **Frequency**

  If they are included in the model (**Yes**), the parameters to be set will appear as for the other quantities.

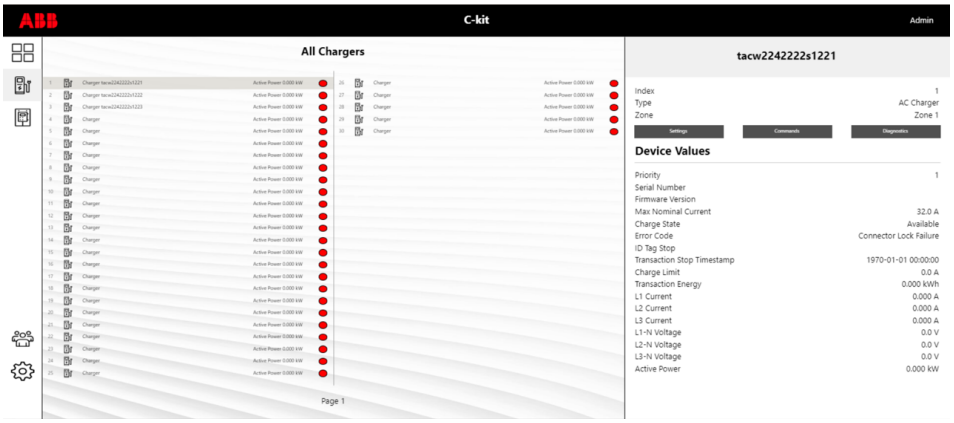
The following are the measurements read from C-kit:

- Current phase 1, phase 2, phase 3
- Voltage phase-neutral 1, phase-neutral 2, phase-neutral 3
- Active power phase 1, phase 2, phase 3
- Reactive power phase 1, phase 2, phase 3
- Total active energy (net)
- Power factor
- Frequency

Charger page

On the **Charger** screen, you can monitor status, consult parameters, and send commands to the configured charging points. If there is more than one screen page, they can be navigated using arrows at the bottom.

***Note**: to find out the list of supported charging points, refer to the list of supported charging points. See "Other useful documentation" on page 5*



An Admin user can also edit parameters, send commands to the charging points, and view charging points that have not yet been configured.

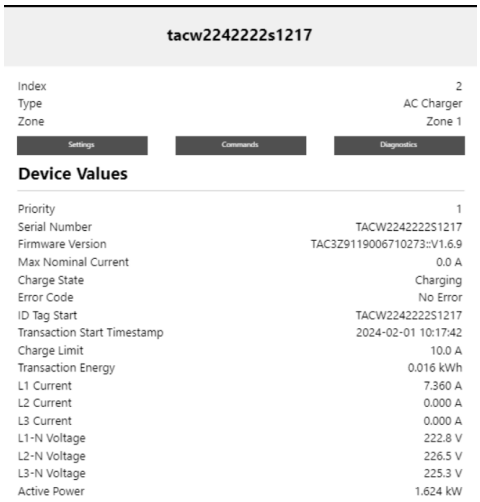
For each charging point, the central part of the screen shows the identifier, instantaneous active power, and status.

The possible statuses of a charging point are as follows:

Symbol	Description	Charging status
	The charging point connector is available for a new user	**Available**
	The charging point connector is no longer available to a new user, but the charging session is not yet active or has been stopped	**Preparing**
	The charging point is charging the vehicle	**Charging**
	Charging is paused on the charging point side	**Suspended EVSE**
	Charging is paused on the vehicle side	**Suspended EV**
	The connector of the charging point is not available or is faulty	Fault code detected
	No communication with the charging point	Last available status

If a charging point is selected, the following information is displayed in the right-hand section:

- the index and type
- The server and the zone to which it belongs.
- the **Priority** value, used only if the charging algorithm for the charging point is set as **Manual** or **TOKEN PRIORITIZATION**. The value ranges from 1 to 4, where 1 indicates the highest priority.
- parameters and quantities



The **Diagnostics** button opens the **Charger Diagnostics** window, showing the date and time (Timestamp) that a specific message was received by the charging point. In the example below, Transaction Start Timestamp indicates when the last message regarding the start of a charging operation was received.

The **Commands** button opens the **Charger Command** window.

***Note**: button enabled only for Admin users.*

The commands that can be performed on a charging point are as follows:

1. **Remote Stop**: stops the current charging session (if active)
2. **Remote Start**: starts a charging session (if a vehicle is connected and there is no active charging session)
3. **Unlock Connector**: unlocks the connector on the charging point side (if present and if locked)

4. **Soft Reset** and **Hard Reset**: reset the charging point (see charging point manual)
5. **Update Firmware**: updates the firmware of the charging point. To request support, send an email to global-elsp.operations.digital@abb.com.
6. **Change Availability Inoperative** and **Change Availability Operative**: enable and disable the charging point

For each command, the status and the date and time (timestamp) of the last command performed is shown. For example, **Unlock Status** indicates the status of the **Unlock Connector** command and the **Unlock Status** indicates the date and time of the last **Unlock Connector** command performed.

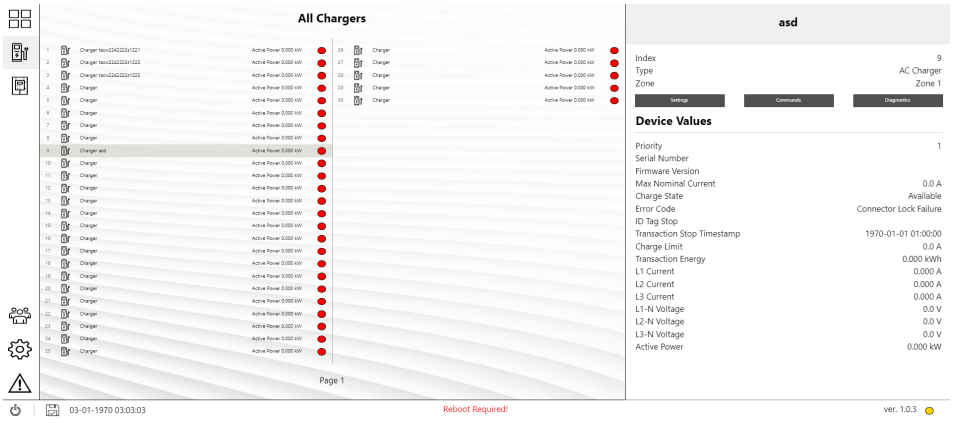
The **Settings** button opens the **Charger Settings** window.

***Note**: button enabled only for Admin users.*

The parameters for configuring a charging point are listed below:

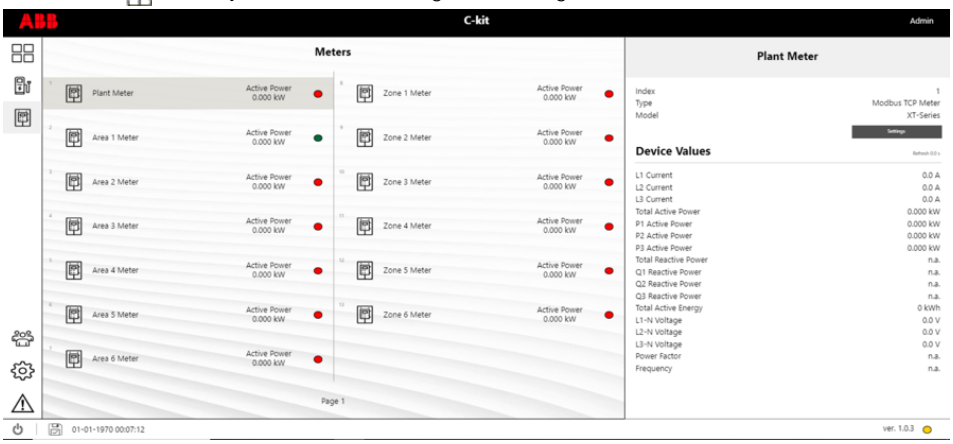
- identifier. Refer to the identifier on the label of the charging point.
- the zone to which it belongs
- the priority. Only if the charging algorithm is set as **Prioritization**
- the phase sequence and rated current
- the current limit to be considered for recharging the charging point in the event of loss of communication with the system (parameter **Offline Current Limit**).
- the charging point type. Indicate the charging point type connected: in DC or AC.
- the connector. Only for DC charging points: indicate the number of connectors.

After configuring the charging point, the system displays the message 'Reboot required' to establish the connection with the charging point. You can reboot directly from the C-kit web server interface.



Meter page

On the **Meter** screen, you can view the settings of the configured meters.



An Admin user can also view unconfigured meters and add a device to the plant and set its parameters.

For each meter, the middle part of the screen shows the zone/area to which it belongs, the instantaneous active power and the status.

If the meter is communicating correctly, the green dot is displayed next to the active power. The dot turns red if communication is lost or if the meter has not been configured.

If a meter is selected, the following information is displayed in the right-hand section:

- the name
- the index, type and model
- the quantities and their values.

To change the parameters or to add the meter to the plant, click on **Settings**.

To add the meter to the plant, click on **On** in **Device used**. In addition, you can set its IP address, TCP port (default 512), Unit ID and model.

To save the changes, click on **Save and Close**, otherwise click on **Close** to close the window without saving the changes.

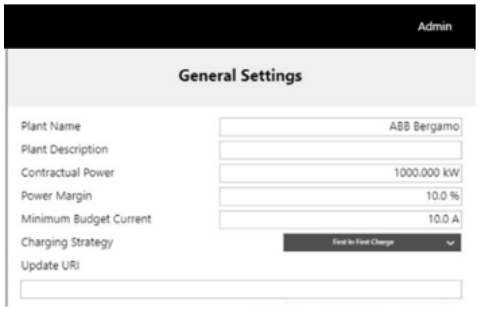
Charging algorithms

During configuration of C-kit, on the **Settings** > **General Settings** screen, you can choose which charging algorithm you want to use.

C-kit will then apply different load management logic to the charging points configured in its network

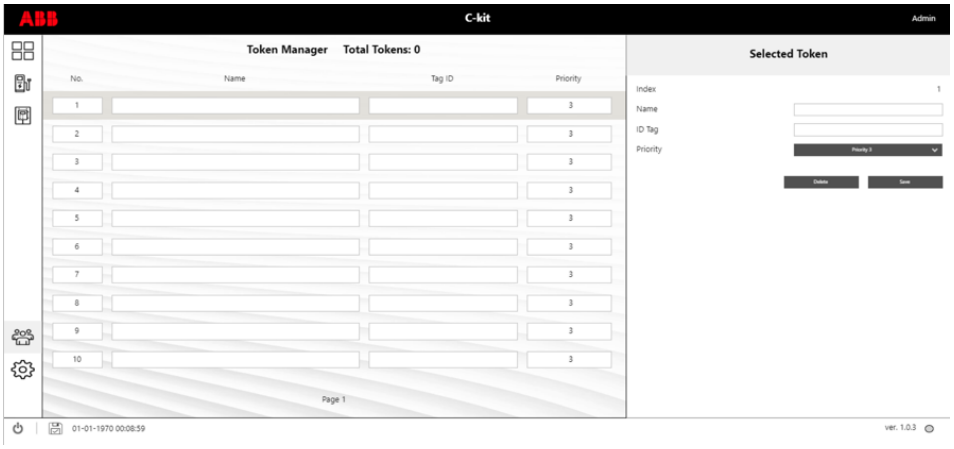
C-kit manages 4 different charging algorithms:

- **FIRST IN, FIRST CHARGE**: Assigns charging priority based on the chronological order of requests. On the first request, all the available power is allocated; on the next request, a current budget is reserved to avoid exceeding the defined area or zone limits. If the minimum charging rate can no longer be guaranteed, the last request is put on hold until sufficient power is available.
- **EQUAL SHARE**: Based on equal allocation of available current according to the defined area or zone limits. If the minimum charging rate cannot be guaranteed, the last request is put on hold until sufficient power is available
- **MANUAL PRIORITIZATION**: Manages 4 priority levels, where level 1 indicates the highest priority. Each charging point has a priority level set by the user. If the minimum charging rate is guaranteed, all charging requests are met, otherwise priority is given to the highest priority level(s) until the available power is sufficient
- **TOKEN PRIORITIZATION**: Manages 4 priority levels, where level 1 indicates the highest priority. The priority levels are set on the Token Manager screen, see "Token Manager page" below. If the minimum charging rate is guaranteed, all charging requests are met, otherwise priority is given to the highest priority level(s) until the available power is sufficient.



Token Manager page

On the **Token Manager** screen, you can look up the parameters of the tokens for charging point cards, make changes to parameters already set, and add or delete tokens.



The top of the page shows the number of registered tokens.

In the main window, you can navigate between the screen pages of configured tokens using the arrows. An Admin user can view all available tokens and he/she can select one to edit its parameters in the right-hand section. For each token, you can set its the name, the Tag ID on the card and the priority, which is valid only if the parameter **Charger Strategy** is set as **TOKEN PRIORITIZATION**. There are 4 priority levels, where 4 indicates lowest priority and 1 highest priority.

To make the changes effective, click on **Save**.

To delete the selected token, click on **Delete**.

9 - Diagnostics and updates

Alarms page

The system monitors and records the presence of alarms in the system.
The alarms that are recorded are as follows:

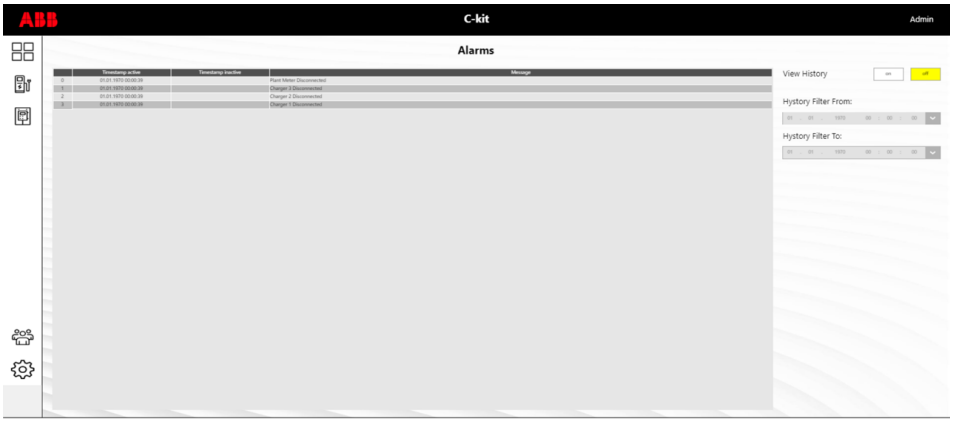
- Charging point not connected
- Charging point not available
- Charging point faulty
- Meter not connected

Alarms recorded are visible on the screen **Alarms** ⚠. In the main menu, the ⚠ icon flashes if at least one alarm is detected by the system.

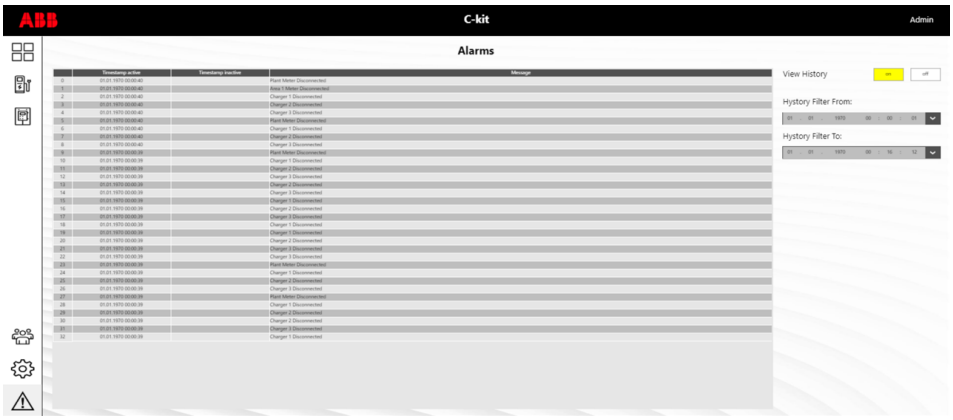
The following information is displayed for each alarm:

- Date and time when the alarm was detected
- Date and time when the alarm was deactivated, visible only if the the **View History** option is active
- Description of the type of alarm and the individual device affected

If the **View History** option is disabled, only active alarms can be displayed.



If the **View History** option is active, all alarms are displayed, even those that have already been deactivated. In addition, a time filter can be set to quickly search for particular issues in the system. By default, alarms that occurred in the last week are displayed.



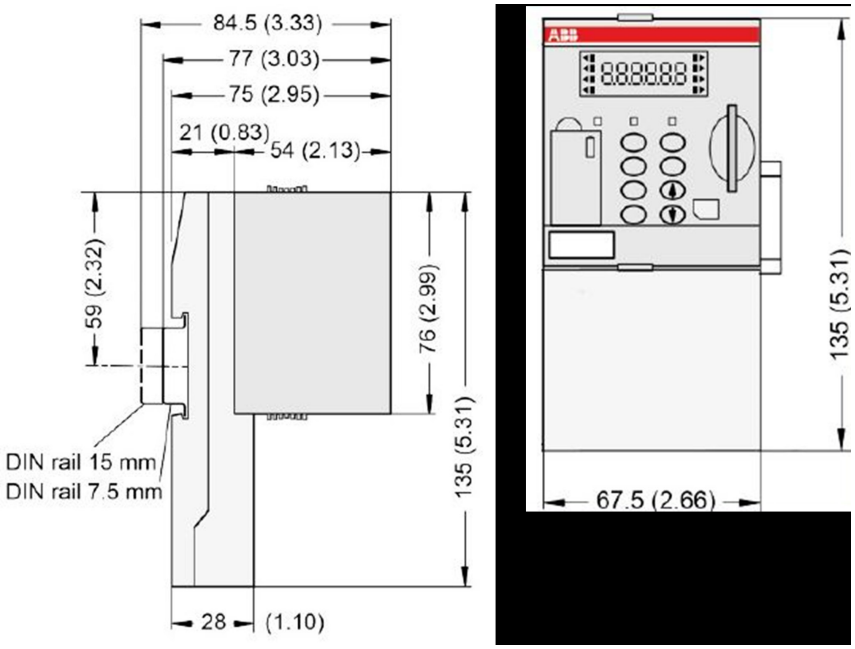
Update charging point firmware

To update the firmware, send a support request to ABB via e-mail to global-elsp.operations.digital@abb.com.

10 - Technical specifications

Dimensions

The dimensions of C-kit are indicated below in millimeters. Dimensions in inches are shown in round brackets.



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