



DC

iONiX Light 25 Wallbox

iONiX Medium 25 Wallbox

iONiX Supreme 25 Wallbox

Charging point for electric vehicles according to CCS2 standard



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1 General information

1.1 Indication of important instructions

**DANGER**

Indicates a high risk of danger that will result in death or serious injury if not avoided.

**WARNING**

Indicates a medium risk of danger that can lead to death or serious injury if not avoided.

**CAUTION**

Indicates a low-level risk that can result in minor or moderate injury or damage to property if not avoided.

**ADVICE**

Indicates important facts that are not associated with the risk of immediate injury. They can lead to malfunctions in situations in which the device is handled incorrectly, for example.



Information that can be helpful for optimal use of the product.

1.2 Signs and symbols



Disposal



Protect from wetness



Protect from dust



Temperature range



Recycling



RoHS directives

1.3 Manufacturer, service and scope of delivery

Manufacturer

Bender GmbH & Co. KG
Londorfer Strasse 65
35305 Gruenberg

Service



If service is needed, you can find the contact information of the installer who installed the DC Wallbox on the service sticker on the door.

Scope of delivery

The DC Wallbox is delivered as a complete device, upright, in a package on a pallet. Included in the scope of delivery:

- 1x DC Wallbox including cable cover
- 1x mounting rail
- 5x screws (8 x 60) according to DIN 571 (type 107 with associated plugs for mounting on a concrete wall)
- 1x key set with 3x keys
- 1x key tag
- 1x screw for the cable cover
- 1x TPE Uni insert (seal for power supply)
- 1x washer
- 1x nut
- 1x drilling template
- 1x Installation quick-start guide

1.4 Transport and storage

Please note:



After you receive the delivery, check the shipping and device packaging for transport damage. After you open the packaging, check the contents for damage and whether the scope of delivery is complete. In the event of a complaint, immediately notify the distributor named on the name plate.



Open the device packaging carefully, do not use sharp objects.



CAUTION

Exercise caution to prevent damage!

The DC Wallbox and additional material must be handled with extreme care and must not be thrown or dropped. When manoeuvring the DC Wallbox, take care not to bump or scratch corners and other objects. To prevent moisture from entering the DC Wallbox, do not open the outer and inner enclosure outdoors in precipitation or heavy fog.



CAUTION

Caution against damage during storage!

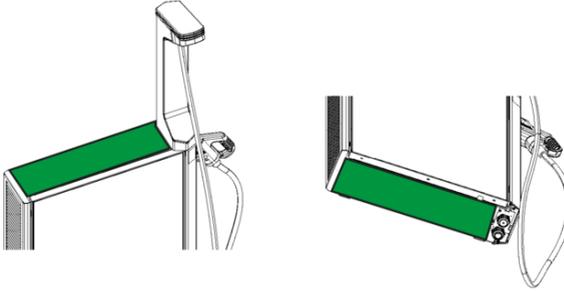
Ensure that no moisture can enter the interior. Do not store the device in a humid environment or outdoors.



WARNING

Do not transport or store the DC Wallbox when it is connected to the power supply.

Carrying and lifting



Surface	Colour	Enclosure element
Surfaces that may be touched	Green	Top and bottom
Surfaces that may not be touched	White	Door (glass) Side parts (plastic in some cases) Status and ambient lighting Status and lighting mast

1.5 Warranty and liability

The manufacturer guarantees the function described in the operating instructions.

Should mechanical or electrical changes be made to the DC Wallbox, its declaration of conformity becomes invalid. Further operation of the DC Wallbox is then no longer permitted.

Warranty and liability claims in the event of injury to persons or damage to property are excluded in case of:

- Improper use of the DC Wallbox
- Incorrect mounting, commissioning, operation and servicing of the DC Wallbox
- Failure to observe the instructions in this operating manual regarding transport, storage, commissioning, operation and servicing of the device
- Unauthorised changes to the DC Wallbox made by parties other than the manufacturer
- Non-observance of technical data
- Repairs carried out incorrectly
- The use of accessories and spare parts that are not approved by the manufacturer
- Catastrophes caused by external influences and force majeure

1.6 Responsibilities of the operator or the owner



All the work on the DC Wallbox, such as mounting, installation, servicing and demounting are to be carried out only by an electrically skilled person as per DIN VDE 1000-10 who is certified for working on the DC Wallbox.

Any type of operation that impairs the safety of the DC Wallbox must be refrained from.



During all work (mounting, commissioning, servicing, operation, repair and demounting), the instructions contained in this manual must be observed.

1.7 Disposal of devices

For disposal, the applicable directives and laws must be observed.



- WEEE: Directive 2012/19/EU
- RoHS Directive 2011/65/EU
- REACH: Regulation (EC) No. 1907/2006

1.8 Legal notice

1.8.1 Instructions for correct measurement in accordance with the CSA-type examination certificate

Obligations for operators of the charging equipment, which they have to meet as a precondition for operation of the charging equipment as intended.

The operator of the charging device is the user of the measuring instrument for the purposes of section 31 of the German Measurement and Calibration Act (MessEG).

1. Use of the charging device shall only be deemed compliant and in accordance with the calibration regulations if the meters installed in it are not exposed to ambient conditions other than those for which their type examination certificate was issued.
2. Use of the charging device shall only be deemed compliant and in accordance with the calibration regulations when the authentication methods listed under Section 1.3.2.3.2 of the currently valid TEC of these 6.8 devices are used.
3. When signing on the charging points with the German Federal Network Agency, the user of this product must also sign on the public key indicated for these charging points on the charging station! Without this sign-on procedure, operation of the station in compliance with the applicable calibration regulations is not possible. Weblink: https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen_Institutionen/E-Mobilitaet/start.html
4. The user of this product must ensure that the calibration validity periods for the components in the charging device and for the charging device itself are not exceeded.
5. The user of this product must ensure that charging devices are taken out of operation promptly if operation in compliance with the applicable calibration regulations is no longer possible due to error or fault messages on the display of the human-machine interface relevant under calibration law. The list of fault and error messages in these operating instructions must be taken into account.
6. The user must save the signed data packets that are read out from the charging device permanently and without gaps in accordance with the pagination and make them available to authorised third parties (obligation to maintain memory). The data packets must be saved (also) on hardware that is dedicated for this purpose and in the user's possession or on the basis of corresponding agreements at the E-Mobility service provider or in the backend system ("dedicated memory"). Permanently means that the data must be saved not only until the business transaction is completed, but at least until the expiry of any possible

legal time limits for taking legal action regarding the business transaction. No substitute values may be created for accounting purposes for data that is not available.

7. The user of this product shall provide an electronic form of CSA-approved operating instructions to users of measured values obtained from this product and used in commerce. In doing so, the user of this product must refer in particular to No. II "Obligations for the user of the measured values from the charging device".
8. The user of this product is obliged to notify the authorities according to section 32 MessEG (excerpt): *Section 32 Obligation to notify (1) Any person using new or renewed measuring instruments shall notify the competent authority according to national law no later than six weeks after putting into service...*
9. To the extent deemed necessary by authorised authorities, the full content of the dedicated local memory or memory at the EMSP's or the backend system including all data packets of the invoicing period shall be provided by the measuring instrument user.

1.8.2 Obligations for the user of the measured values from the charging device (EMSP)

The user of the measured values shall observe section 33 of the MessEG:

Section 33 German Measurement and Calibration Act (MessEG) (excerpt)

Section 33 Requirements for the use of measured values

(1) Unless otherwise specified in the statutory instrument pursuant to section 41 no. 2, values for measured quantities may only be indicated or used in commercial or official transactions or in measurements of public interest if a measuring instrument used for their determination was used for its intended purpose and the values are attributable to the respective measurement result. Other federal regulations with comparable protective purposes remain valid.

(2) Any person using measured values shall, as far as is within their power, ensure that the measuring instrument complies with the legal requirements and shall obtain confirmation from the person using the measuring instrument that they are complying with their obligations.

(3) Any person using measured values shall

- 1. ensure that invoices, insofar as they are based on measured values, can be easily understood by the person for whom the invoices are intended for the purpose of verifying specified measured values and*
- 2. if necessary, provide suitable aids for the purposes mentioned in number 1.*

This legal regulation establishes the following concrete obligations for the user of the measured values regarding the use of measured values in compliance with the calibration regulations:

1. The contract between EMSP and the customer must unambiguously regulate that only the supply of electrical energy and not the charging service duration is the subject of the contract.
2. The timestamps on the measured values originate from a clock in the charging station that is not certified according to the measurement and calibration regulations. Therefore, they must not be used for tariffing the measured values.
3. The EMSP must ensure that, after completion of the measurement and at the latest at the time when creating the invoice, the customer is automatically sent a receipt of the measurement which contains the information needed to identify the corresponding business transaction, as long as the customer does not expressly waive this. The information needed to identify the corresponding business transaction may be of the following type:
 - a) Name of the EMSP
 - b) Start and end time of the charging process

-
- c) Charged energy in kWh
 - d) Credit card number
4. If the customer requires proof of the correct transfer of the measurement results from the charging device to the invoice, the user of the measured value is obligated to provide this proof in accordance with section 33, para. (3) of the German Law regarding measuring instruments, their placing on the market and calibration (MessEG). If the customer requests a trusted permanent proof according to Annex 2 10.2 MessEV, the measurement value user is obligated to provide it (MessEG and MessEV both serve to implement the European MID in German law and define legal requirements for the calibration of measuring instruments). The EMSP shall inform its customers of these obligations in an appropriate manner. This can be effected e. g. in one of the following ways dependent on the authentication method to be employed:
- a) When charging with continuing obligation via written contract
 - b) When charging only occasionally (ad-hoc charging) via app or mobile phone and the internet combined with the receipt via E-mail or text message
 - c) When charging only occasionally (ad-hoc charging) via (contactless) money card combined with the receipt via bank statement
5. The EMSP must provide the customer with the invoice-relevant data packages automatically after measuring has been completed and at the latest at the time when creating the invoice, including the signature, as a data file such that they can be checked for correctness by means of the transparency and display software. The data packets can be made available via channels that have not been validated according to calibration regulations and in one of the following ways dependent on the authentication method employed:
- a) When charging on the basis of a continuing obligation, via E-mail or access to a backend system
 - b) When charging only occasionally (ad-hoc charging) via app or mobile phone and the internet, via E-mail or text message
 - c) When charging only occasionally (ad-hoc charging) via (contactless) money card via the bank statement and access to a backend system connected to the bank statement
- In addition, the EMSP shall make the transparency and display software associated with the charging device available to the customer to allow them to verify the integrity of the data packets. This can be done by referring to the source for obtaining this software in the operating manual provided to the customer or via one of the channels mentioned above.
6. The EMSP must be able to show, in a verifiable manner, which means of identification were used to initiate the charging process associated with a particular measured value. This means that for each business transaction and invoiced measured value, they must be able to prove that they have correctly assigned the personal identification data. The EMSP shall inform its customers of this obligation in an appropriate manner.
7. The EMSP shall only use values for invoicing purposes for which the data packets are contained in a dedicated memory in the charging device if available and/or the memory available at the EMSP or in the backend system. Substitute values may not be created for accounting purposes.
8. The EMSP must ensure, through appropriate agreements with the charging device operator, that the latter saves the data packets used for invoicing purposes for a sufficient period to allow the associated business transactions to be completed in full.

9. In the event of a justified notification of the need to conduct calibrations, check results and carry out usage monitoring measures, the EMSP shall enable authentication of the products used by the EMSP pertaining to these operating instructions by providing suitable means of identification.
10. All of the aforementioned obligations shall apply to the EMSP as a user of measured values for the purposes of section 33 of the MessEG also if it obtains the measured values from the charging device via a roaming service provider.

2 List of abbreviations

Abbreviation	Description
ALM	Ambient Light Module (ALM113): Printed circuit board at the upper end of the status and lighting mast
TEC	Type examination certificate
BNetzA	German Federal Network Agency
CAN	Controller Area Network
CCS2	Combined Charging System 2
CPO	Charge point operator
DCC	DC charge controller (DCC613)
DC Wallbox	iONiX (Light, Medium, Supreme) 25 Wallbox
DLM	Dynamic load management
DMC	Data matrix code
EMSP	E-mobility service provider
EVSE	Electric Vehicle Supply Equipment
HMI	Human Machine Interface (HMI180): Communication module: printed circuit board for controlling the display, lighting and antennas
NFC	Near-field communication
PK	Public key: The public key is a technical identifier which has been allocated directly to the DC Wallbox during production. It is sent to the German Federal Network Agency (BNetzA) during registration and is used for traffic routing, cross-network data communication for addressing purposes and for the invoicing of interconnection services.
PU	Power Unit: AC/DC converter in the DC Wallbox
RCD	Residual current device: Residual current circuit breaker
RFID	Radio-frequency identification
SLS	Selective circuit breaker
SU	Safety unit (SU621)
USB	Universal Serial Bus
UID	Unique identifier



In the following the abbreviations are mostly used in this manual.

3 Design and operation



ADVICE

Some of the functions described in the following chapters depend on the selected variant (see chapter "Ordering information", page 55) and are not available in all DC wallboxes.

3.1 Intended use

The DC Wallbox is intended for DC charging of electric vehicles in charging mode 4, in accordance with IEC 61851-1 and IEC 61851-23. It has been designed for use outdoors and in enclosed rooms, provided that the occurrence of direct lightning current can be excluded. Its design for use in continuous operation and its optionally available compliance with calibration regulations make it suitable for both use in private and public spaces.

In accordance with its intended use, operation requires compliance with the conditions of the connected network (grid code) in accordance with chapter "Network connection", page 26. When operating in enclosed spaces, fresh air supply must be ensured. Only vehicles with a CCS2 charging connection that support the standards in chapter "Standards and approvals", page 54, may be charged. The use of extension cables or plug adaptors is expressly not permitted and, in accordance with the applicable standards, not allowed.

Any other use than that described in this manual is regarded as improper.

3.1.1 Device-specific safety instructions



DANGER *Electric shock!*

When the DC Wallbox is connected to the power supply, a DC voltage of up to 1000 V may be present at the DC output of the PU.

When no maintenance work is carried out by an electrically skilled person, the DC Wallbox must always be locked and secured against opening.

After charging has completed (plug has been disconnected from the vehicle), wait until the minimum discharging time has passed before opening the wallbox. After opening the DC Wallbox, verify that the AC and the DC circuits are de-energised.



WARNING *Heat generation!*

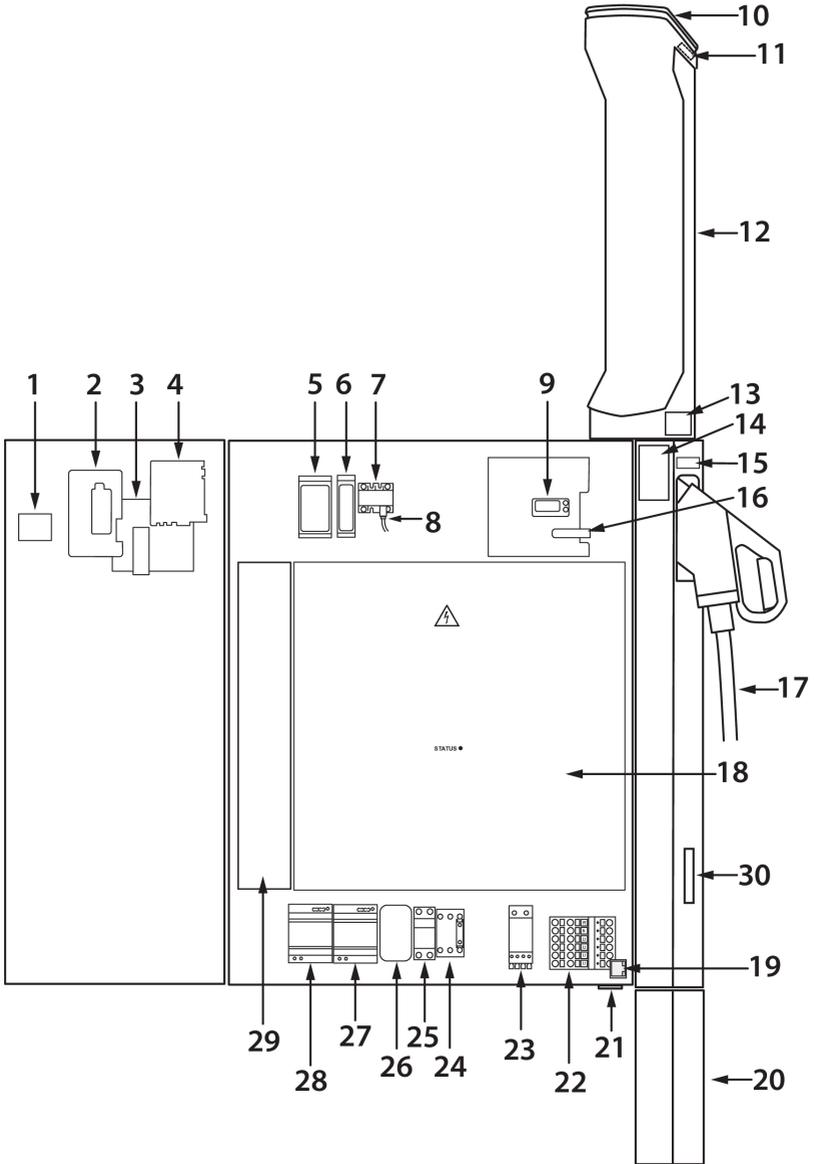
Due to possible high temperatures inside the DC Wallbox, there is the danger of burns when the door is opened.

Before opening the door, check the temperature of the DC Wallbox and, if necessary, take into account that the DC Wallbox needs to cool down.

3.2 Design

3.2.1 Device view

Front view with the door open



Legend

No.	Component designation	Description
1	-	Service label (see chapter "Manufacturer, service and scope of delivery", page 4)
2	KE103	RFID card reader: RFID 105 (dependent on the variant)
3	PH101	Display
4	KF101	Communication module: HMI180
5	KF1	Safety unit: SU621
6	KF2	DC charge controller: DCC613
7	BC2	DC current sensor: 4647-X050
8	FC2	DC NH fuse (low-voltage high-performance fuse): Siba NH0 125A - 2058521.125
9	BC301	DC energy meter (compliant with the applicable calibration laws): GSH01 (dependent on the variant)
10	KF201	Status and ambient-lighting module: ALM113
11	-	Charging cable designation
12	-	Upper status and lighting mast
13	-	Name plate
14	-	Charging infrastructure designation
15	-	Calibration notice designation
16	-	Manufacturer securing mechanism
17	XD202	CCS2 charging cable
18	TB3	Power unit (AC/DC): PU-10900346090-00
19	XG14	Keystone RJ45 adaptor for Ethernet TCP/IP (incl. Modbus TCP)
20	-	Cable cover
21	-	Operator securing mechanism
22	XD1	Network connection
23	BA1	Surge protection device: Citel DAC40CS-31-275
24	QA2	Load contactor: Benedict & Jäger K3-32A00 190R with auxiliary contact block HN01 and interference suppression block RC-K3NW 230
25	FC1	Circuit breaker: Eaton PXL-C6/1N
26	RB1	EMC filter
27	TB2	Voltage supply 230 V AC / 24 V DC for the electronics of the AC/DC converter: Mean Well HDR-100-24

No.	Component designation	Description
28	TB1	Voltage supply 230 V AC / 12 V DC for the charging electronics: Mean Well HDR-100-12
29	-	Air baffle
30	-	Locking mechanism

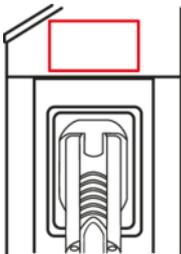
i Via the circuit breaker (25) the DC Wallbox can be switched on and off.

3.2.2 Designations

The DC Wallbox variants that are in compliance with the applicable legal regulations on calibration are listed in chapter "Ordering information", page 55.

Name plate

Located on the enclosure above the socket
View from the right



Depiction

iONiX Light 25 Wallbox

Part number: B94060200
Serial number: 220127000001
Power supply: 3 (N) AC 230/400 V, 50Hz, 43 A
DC output: DC 200 ... 1.000 V, 6,5 ... 65 A
Prot. class/degree of prot.: I / IP54
Production date: 01/2022
Weight: 90 kg
Temperature: -25°C ... 40°C
Product standard: IEC 61851-23/IEC 61439-7



Bender GmbH & Co. KG
Londorfer Straße 65
35305 Grünberg



iONiX Medium 25 Wallbox

Part number: B94060201
Serial number: 220127000001
Power supply: 3 (N) AC 230/400 V, 50Hz, 43 A
DC output: DC 200 ... 1.000 V, 6,5 ... 65 A
Prot. class/degree of prot.: I / IP54
Production date: 01/2022
Weight: 90 kg
Temperature: -25°C ... 40°C
Product standard: IEC 61851-23/IEC 61439-7



Accuracy class A
DE-M <YY> 1948
DE CSA 23 B 016 M

Bender GmbH & Co. KG
Londorfer Straße 65
35305 Grünberg



iONiX Supreme 25 Wallbox

Part number: B94060202
Serial number: 220127000001
Power supply: 3 (N) AC 230/400 V, 50Hz, 43 A
DC output: DC 200 ... 1.000 V, 6,5 ... 65 A
Prot. class/degree of prot.: I / IP54
Production date: 01/2022
Weight: 90 kg
Temperature: -25°C ... 40°C
Product standard: IEC 61851-23/IEC 61439-7



Accuracy class A
DE-M <YY> 1948
DE CSA 33B XXX M

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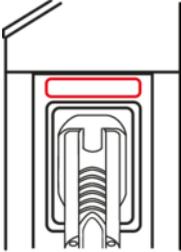


i The QR code on the left side of the name plate contains the public key and that on the right-hand side the manual. The QR codes shown here are examples and may differ from the originals.

Calibration notice designation

Located on the enclosure between the name plate and the socket
View from the right

Depiction

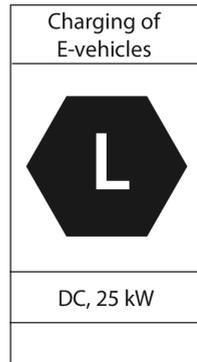
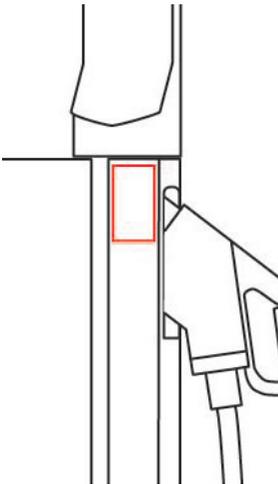


Calibration-compliant charging in the range 6.5 - 65 A, minimum output 1 kWh. The visual display cuts off decimal places. The charging energy is determined and billed internally with a higher resolution than is shown on the visual display.

Charging infrastructure designation

Located on the enclosure to the left of the socket
View from the front

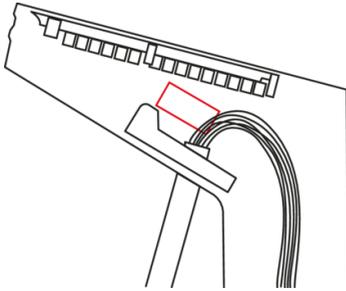
Depiction



Charging cable designation

On the charging cable behind the cord anchorage in the ALM
View: Section through the status and lighting mast

Depiction



Cable type: EVC 07BZ5-F
Cable length: 4.75 m
Resistance: 0.0114466 Ω

3.2.3 Securing mechanisms for the DC Wallbox

i This chapter is only relevant for DC Wallboxes that comply with calibration regulations. In order to maintain compliance with the applicable calibration regulations, the manufacturer securing mechanism must not be damaged or removed.

3.2.3.1 Manufacturer securing mechanism

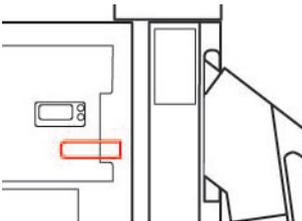
The DC energy meter is secured in the upper area of the DC Wallbox with a manufacturer securing mechanism. Since the permanently installed charging cable is connected directly to the DC energy meter, this secures the vehicle supply line with the DC energy meter, which together with the charging cable constitutes the measuring capsule.

Position of the securing mechanism

Front view with the door open

Depiction

Dimensions 60 x 20 mm



3.2.3.2 Operator securing mechanism

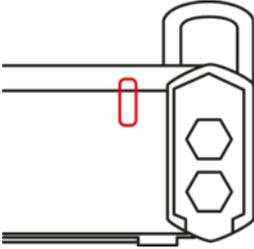
The entire DC Wallbox is secured via a locking device on the door. In order to trace unauthorised opening of the Wallbox, the door is secured to the enclosure with the operator securing mechanism.

Position of the securing mechanism

Bottom view
with the door closed

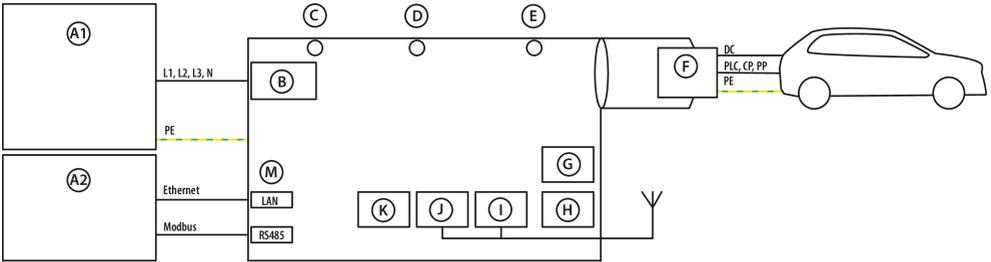
Depiction*

Dimensions 60 x 20 mm



* Depending on the operator, the operator securing mechanism may differ from the one depicted here.

3.3 System overview



Legend

	Description	
A1	Public power-supply grid	
A2	Local communication network	
B	AC supply	HV supply (L1, L2, L3, N)
C	Ambient lighting	Optical interfaces
D	Status indicator	
E	Connection indicator	
F	CCS2 vehicle inlet	HV supply (DC) Communication (PLC, CP, PP)
G	USB (service)	
H	Display	
I	GSM / LTE (optional)	

	Description	
J	Wi-Fi	
K	RFID / app	Authorisation methods
M	Communication	Ethernet TCP/IP (incl. Modbus TCP)


ADVICE

Parallel operation of Wi-Fi and mobile phone network is not possible.

3.4 Functional and procedural description

The incoming current from the low-voltage distribution system is conducted via a contactor to the AC/DC converter (PU), which generates the DC voltage requested by the vehicle. Furthermore, mains parts (PS1, PS2) are supplied, which provide extra-low voltages (as per IEC 60449) for other necessary electronic components (power unit, HMI180, ALM, display, DC energy meter, charge controller, safety unit).

The charge controller, the safety unit and the DC energy meter are located inside the DC Wallbox in the space above the PU. The HMI180, the display and the optional RFID card reader are attached to the door.

The two mains parts (PS1, PS2), the contactor (Q2), the circuit breaker, and the surge protection device are located in the space below the PU.

The charge controller provides communication with the vehicle and the E-mobility backend and it reads out the signed data of the DC energy meter.

The permanently attached charging cable serves as the interface to the electric vehicle.



For a depiction of the components, see chapter "Device view", page 13

Dynamic load management (DLM)¹

A DLM function that can be used independently of a connection to the backend is integrated in the DC Wallbox. The available electric power is distributed optimally among the charging points, which are configured as an interconnected system. The vehicle communication informs the electric vehicle which amount of electric power can be maximally provided.

¹ With future software updates this function is activated or its functions are expanded.

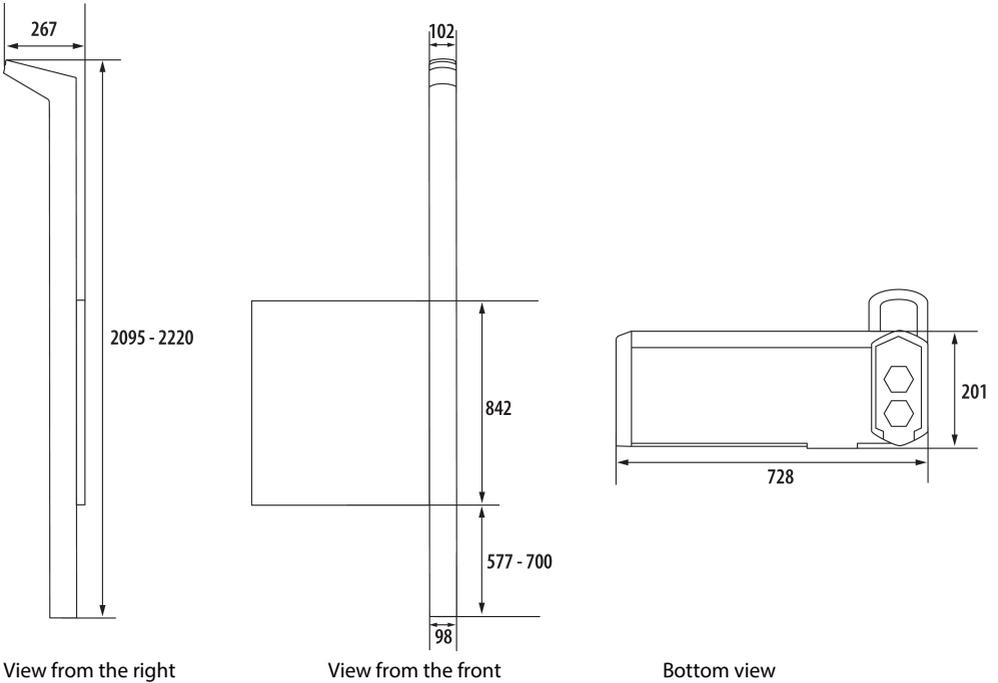
4 Dimensions and mounting

i The video with the mounting instructions can be called up here: "https://share.gm-w.de/d/e8ed06600de04af4a131/files/?p=/bender_ionix_de.mp4".

4.1 Dimensions

Device dimensions

Dimensions in mm



View from the right

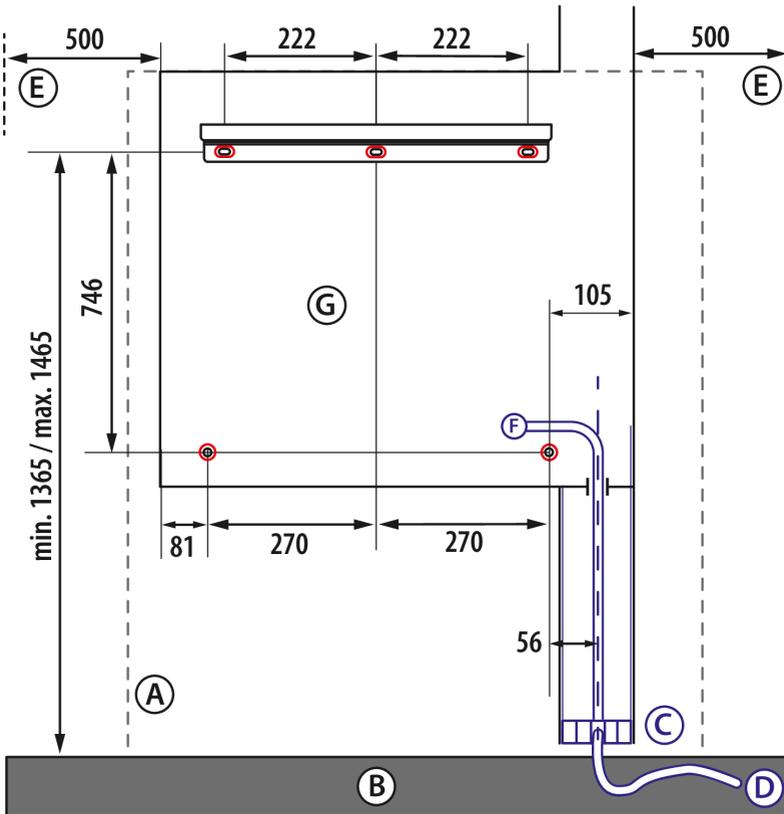
View from the front

Bottom view

4.2 Mounting

Mounting dimensions

Dimensions in mm



View on mounting surface and mounting rail

- A Wall
- B Floor
- C Interface area
- D Infrastructure cable (cable length above ground at least 1000 mm)
- E Clearance of at least 500 mm on the left and right
- F Network connection (see chapter "Network connection", page 26)
- G Outline of DC Wallbox with mounting rail, cable cover and upper status and lighting mast (cut off)
- Red Drilling holes (top)
Attachment points (bottom)
- Blue Positioning area for the network connection

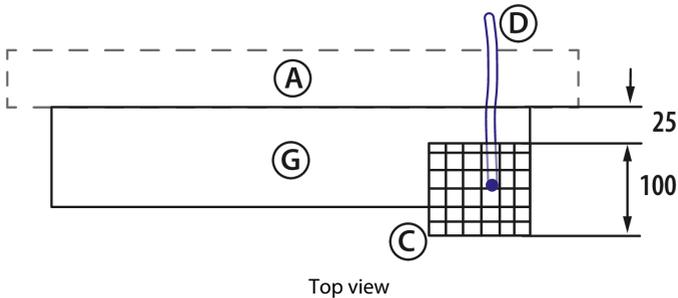


ADVICE

The installation location must be chosen such that the supply and venting of cooling air at the sides of the DC Wallbox is guaranteed.

Dimensions of infrastructure of network connection

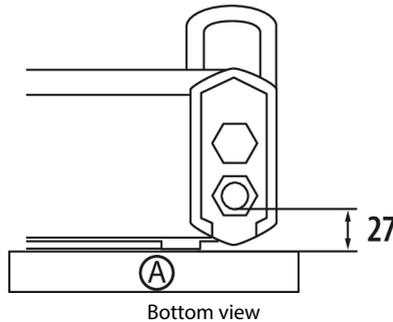
Dimensions in mm



- A Wall
- C Interface area
- D Infrastructure cable (cable length above ground at least 1000 mm)
- G Outline DC Wallbox

Dimensions of network connection wiring

Dimensions in mm



- A Wall

Mounting instructions



ADVICE

Standards and legal regulations to be observed during mounting, installation and protective earthing are listed in chapter "Standards and approvals", page 54.

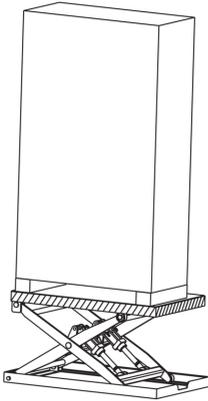


When mounting, ensure:

- that a sufficient soundproofing distance to quiet zones is guaranteed (Quiet night mode of the Wallbox: 52.4 dB(A)).
- that the operator securing mechanism is accessible. This mechanism is located on the bottom and secures the door to the DC Wallbox enclosure.
- that there is no temperature rise from external heat sources.

**CAUTION** *Exercise caution to avoid damage to the device!*

The installation location must be chosen such that no direct lightning strike can occur.



The DC Wallbox must be lifted onto the wall using a lifting table!

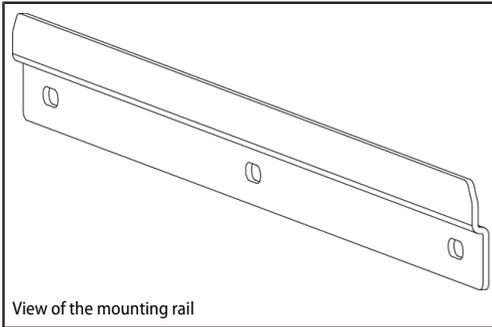
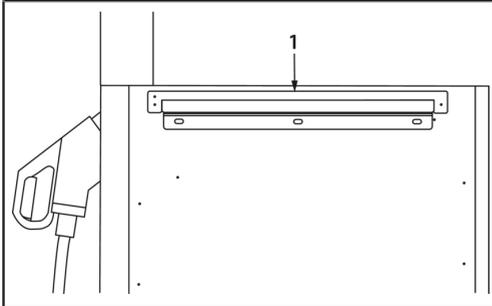
The enclosure is attached to a wall when open. The DC Wallbox is hung on the wall via the mounting rail and screwed on at the bottom.

**ADVICE**

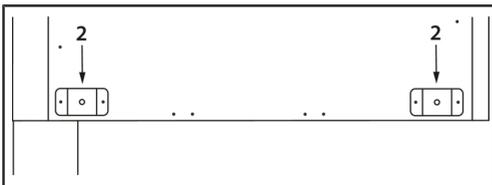
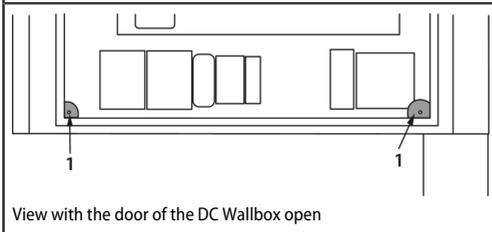
For a concrete wall, use the screws supplied. If the wall is not a concrete wall, the appropriate screws must be used.

To guarantee safe mounting and to avoid concentrated loads on the wall, the specified five attachment points (see chapter "Mounting", page 21 Mounting dimensions) must be used.

Mounting, top

 <p>View of the mounting rail</p>		<p>Mounting rail for attachment to the wall</p>
		<p>1: Retaining lug, top (outside)</p>

Mounting, bottom

		<p>2: Spacer for attachment points, bottom (outside)</p>
 <p>View with the door of the DC Wallbox open</p>		<p>1: Attachment points, bottom (inside)</p>

4.3 Removal

Procedure for removal

- De-energise the DC Wallbox and secure it against reconnection of the power supply. The five safety rules as per DIN EN 50110-1 shall be observed!
- Before opening the DC Wallbox, wait until the minimum discharging time has passed and after opening, verify that the AC and the DC circuits are de-energised
- Loosen fastenings (bottom attachment points)
- Use a lifting table to lift the DC Wallbox and unhook it from the mounting rail, then remove it from the wall towards the front
- If necessary, pull the power-supply cable out of the opening

i *The DC Wallbox can be given or sent to the distributor for disposal (for the address refer to the name plate).*

5 Connection

5.1 Network connection



DANGER *Electric shock*

Danger to life

The electrical supply line, which is supplied from the sub-distribution, must be de-energised during the entire mechanical mounting process and electrical installation. The galvanic connection to the low-voltage network may only be established after the mounting process and electrical installation have been completed.

All prescribed safety regulations, the technical connection conditions (TAB) of the responsible power supply company (PSC) and the regulations of the German Association for Electrical, Electronic & Information Technologies VDE must be observed during installation and operation of the DC Wallbox.



ADVICE

Only installation companies registered in the installation directory of the respective system operator are allowed to connect the DC Wallbox to the power supply (Section 13 of Germany's Low-Voltage Connection Ordinance – NAV).

Only trained personnel are authorised to commission the device. To be able to carry out work on the IONIX Wallbox, the installer needs to obtain the certification issued by the Bender Academy or a system partner.

Installation guidelines of the respective grid operator must be observed.

To protect against overvoltage, the DC Wallbox is equipped with a type 2 surge protection device in the power supply and in the information technology system. It is therefore suitable for use in lightning protection zone (LPZ) 0B (see DIN VDE 0100-443, DIN EN 62305), provided the necessary protective measures are taken.

Before carrying out installation, servicing or commissioning work on the DC Wallbox, the following steps must be taken:

- Disconnect the power supply line from the power supply
- Secure against reconnection
- Verify that the device is de-energised



ADVICE

Never open the enclosure when the device is live

In particular, the following protective measures must be implemented:

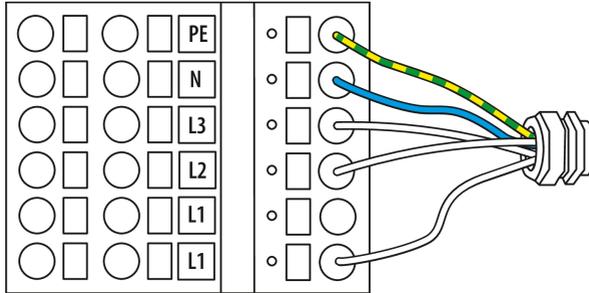
- Residual current circuit breaker (RCD type A)
- Surge protection device, type 1 (SPD type 1, normally part of the building power supply)
- ≤ 50A circuit breaker
- Earth terminal at least 10 mm² Cu

Connection is only allowed on the following network types:

- TN-S
- TN-C-S
- TT

A qualified electrically skilled person inserts the network connection cable into the cable cover and feeds it into the enclosure of the DC Wallbox through a cable gland with PG thread. The lines must be attached according to the marking.

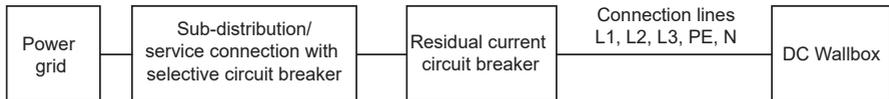
Before starting work on the electrical installation or performing disassembly, repair or replacement of components of the DC Wallbox, disconnect the device from the power supply and verify that it is de-energised. The five safety rules according to DIN EN 50110-1 must be observed!



Phoenix PT 10-TWIN terminals max. 10mm² flexible (with ferrule); max. 16mm² rigid conductor

The DC Wallbox is connected at the sub-distribution. The connection is three-phase with 400 V, with N and PE at the terminal.

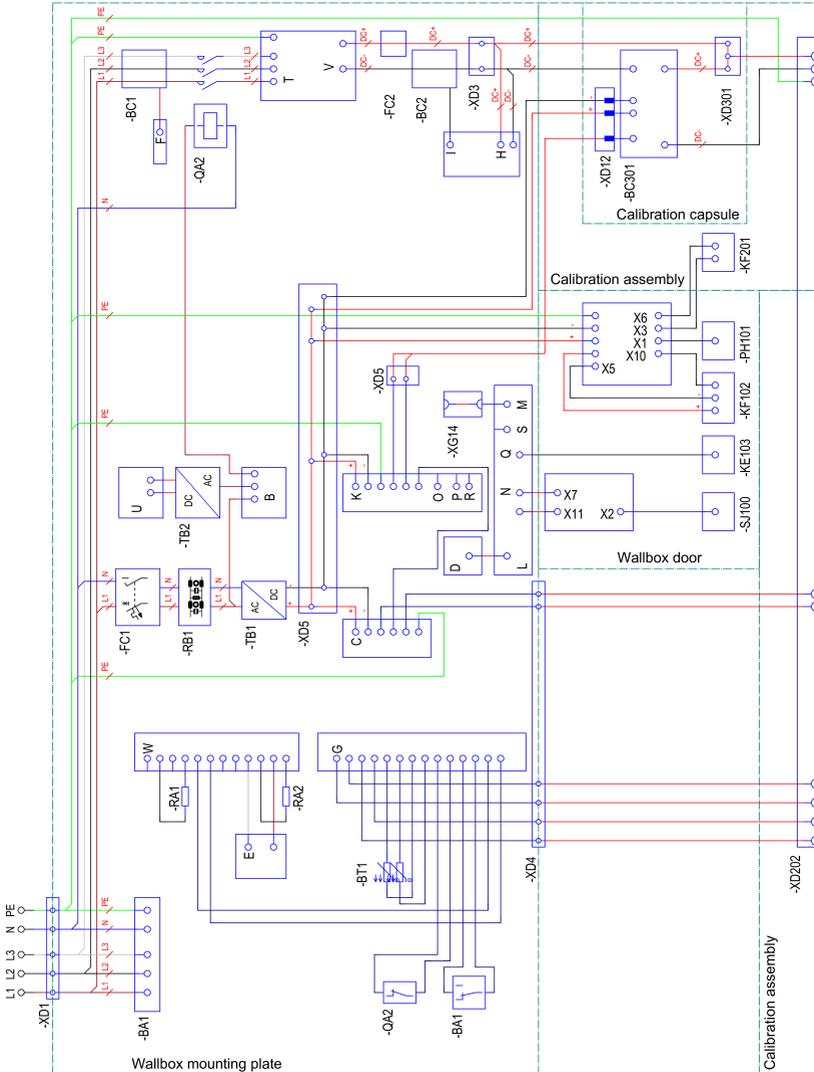
At the sub-distribution, the power supply line are protected by a selective circuit breaker and a residual current circuit breaker.



5.2 Connection of components

Wiring diagram

For the devices DCC613, SU621, HMI180, and the PU only the terminal allocation to their respective functions is shown.



Component designation	Designation
XD1	Network connection
BA1	Surge protection device: Citel DAC40CS-31-275
FC1	Circuit breaker: Eaton PXL-C6/1N
RB1	EMC filter
TB2	Voltage supply 230 V AC / 24 V DC for the electronics of the AC/DC converter: Mean Well HDR-100-24
TB1	Voltage supply 230 V AC / 12 V DC for the charging electronics: Mean Well HDR-100-12
BC1	Residual current sensor
QA2	Load contactor: Benedict & Jäger K3-32A00 190R with auxiliary contact block HN01 and interference suppression block RC-K3NW 230
FC2	DC NH fuse (low-voltage high-performance fuse): Siba NH0 125A - 2058521.125
BC2	DC current sensor: 4647-X050
PH101	Display
KE103	RFID card reader: RFID105
SJ100	Touch controller
KF201	Status and ambient-lighting module: ALM113
BC301	DC energy meter (compliant with calibration regulations): GSH01
XD301	Terminal DC output
XD202	CCS2 charging cable
XD3	Terminal DC output
RA1	Terminating resistor CAN
RA2	Terminating resistor CAN
BT1	Double temperature sensors on mounting plate
XD4	Output terminal signal
XD5	12 V distribution board
XD12	RJ12 connection DC meter
XG14	Keystone RJ45 adaptor for Ethernet TCP/IP (incl. Modbus TCP)

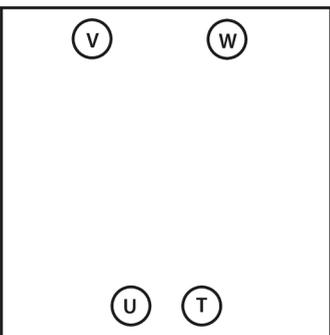
SU621

View: top, front, bottom	Terminal	Designation
	B	Relay contacts
	C	12 V supply CP, PP, FE
	D	USB interface
	E	CAN interface
	F	Residual current transformer connection
	G	Temperature sensors, SPD alarm contact, weld check,
	H	Isometer DC+/DC-
	I	DC load-current sensor connection
	LED	Status LED

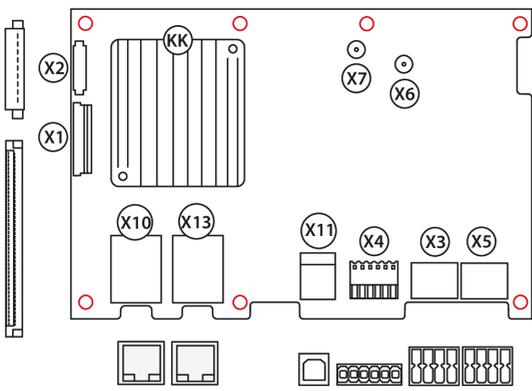
DCC613

View: top, front, bottom	Terminal	Designation
	K	12 V supply, Modbus, CP, PE
	L	2x USB type A
	M	Ethernet
	N	Antenna socket
	O	Configuration interface
	P	Micro SIM card slot
	Q	Modbus, external
	R	Optocoupler input (-, -, IN+, IN-)
	S	User interface (HMI)
Z	Relay for contactor control	
LED	Status LED	

PU

View: front	Terminal	Designation
	T	X10 – AC input
	U	X12 – 24 V supply
	V	X20 – DC output
	W	X30 - 2x CAN interface, control contact for active discharging

HMI180

View: front	Terminal	Designation
	X1	Display and LED backlight interface
	X2	USB touch control interface, display (10 pole)
	X3	Ambient lighting, temperature sensor and operating status indicator (8 pole)
	X4	LED output (6 pole)
	X5	Supply and plug lighting (8 pole)
	X6	LTE/WiFi antenna input
	X7	LTE antenna output
	X10	Ethernet interface (RJ45)
	X11	USB type B interface for charge controller
	X13	Ethernet interface for service interface (RJ45)
KK	Heat sink	

6 Initial commissioning



ADVICE

If invoicing is carried out in accordance with calibration law, the DC Wallbox must be approved by the responsible calibration authority or by a repairer if components relevant under calibration law are modified (e.g. CCS2 charging cable, DC energy meter or DC charge controller).

When establishing the electrical connection, ensure that the back-up circuit breaker of the low-voltage connection is "OFF".



ADVICE

Before establishing the electrical connection, ensure that the device is dry (e.g. no condensation). If necessary, the device can be dried using an external hot air blower ($T_{\max}=50^{\circ}$).



ADVICE

The conditions in which condensation occurs in the device are detected by the control electronics. As a countermeasure, part of the PU is activated for drying.

After establishing the electrical connection, ensure that no vehicle is connected to the charging cable when the system is first switched on via the back-up circuit breaker.

After the system has been switched on for the first time, system parameters can be configured if necessary. Configuration is carried out via a standard PC or laptop with Linux, Mac or Windows operating system.

Access to configuration interface

The computer can be connected to the DC Wallbox via the USB interface of the DC charge controller (terminal O, micro USB, see chapter "Connection of components", page 28 Description of the DCC613 terminals) or via the Ethernet interface (no. 19 (XG14, see chapter "Device view", page 13)) of the DC charge controller. During initial installation, the connection to the configuration interface must be established by browser via the USB interface of the DC charge controller by visiting the address <http://192.168.123.123>. The configuration interface provides online help regarding the setting options for the individual parameters.



You must read and understand the explanations on the configuration interface BEFORE modifying a parameter.



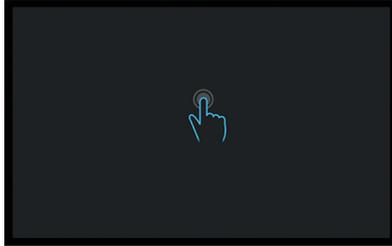
ADVICE

After initial commissioning, carry out an initial verification in accordance with DIN VDE 0100-600. After this, the DC Wallbox should only be switched off for servicing purposes.

Functional test

After the initial commissioning, it must be verified that

- the charging process works properly and
- invoicing is carried out correctly.

Display screen before charging begins

Touching the display will display further instructions for charging. Carry out the charging process as described in chapter “Charging”, page 37 with a vehicle or a vehicle tester that complies with IEC 61851-23. Before starting the charging process, read the start meter on the DC energy meter.

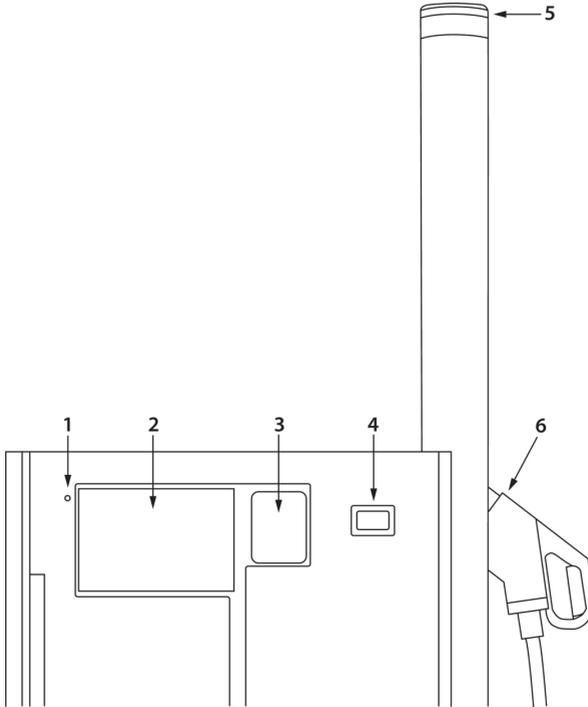
After the charging process is complete, the user’s charging information may be requested from the EMSP for verification by the user: identification of the charging station (charging point), identification of the user (ID tag), charging start and end time and corresponding meter reading (for further information on invoicing, see chapter “Invoicing verification”, page 41).

When the verification has shown that there are no errors, the display screen shown above appears again.

7 Operation

i The DC Wallbox can be used intuitively by users without special training. Additional markings or drawings can be attached to make first-time use easier.

Depiction of operating elements (exterior view from the front)



Legend

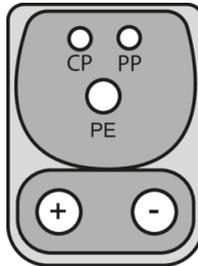
	Designation	Description
1	Light sensor	The light sensor is used to adjust the brightness of the display and of the status indicator to the brightness of the surroundings.
2	Display	The touchscreen visualises the interaction between the user and the control of the DC Wallbox. It enables the user to select the desired function and to start or stop the charging process.
3	RFID card reader	The RFID card reader permits authentication.
4	Meter window	The built-in DC energy meter is visible through the meter window. It allows the end user to check the amount of energy supplied to the vehicle.

	Designation	Description
5	Lighting and status indicator	The charging status is indicated on the ALM at the end of the status and lighting mast by LEDs and additionally on the RFID reader (see chapter "Status indications on the ALM", page 35).
6	CCS2 vehicle inlet	The charging cable with its charging coupling is a fixed operating element. The DC Wallbox detects when a vehicle is plugged in or unplugged. The charging voltage can only be switched on when a vehicle is connected.



Corresponding standards are listed in chapter "Standards and approvals", page 54.

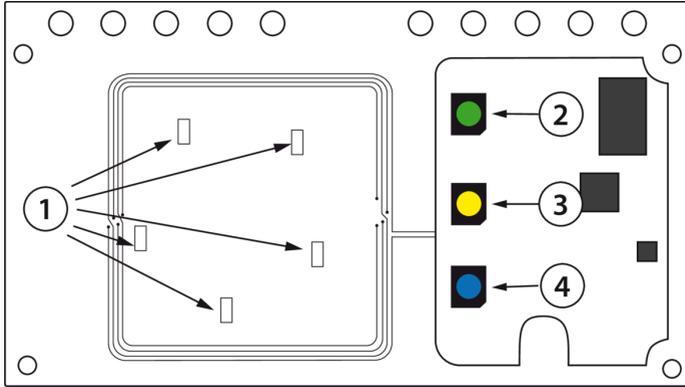
CCS2 vehicle inlet



7.1 Status indications on the ALM

LED	Description
Green	Charging point is available
Yellow	Charging point is reserved
Blue	Charging point is occupied (ready to charge or charging)
Red	Charging point has error status

7.2 Status indications on the RFID display field



Similar as depicted

LED	Status	
1	lights up in parallel to 3	<ul style="list-style-type: none"> • Authorisation process is ongoing • The current authorisation is signalled by circular light patterns
2	lights continuously	<ul style="list-style-type: none"> • Charging system is available • No vehicle connected
	slowly flashing	<ul style="list-style-type: none"> • Charging system is available • Vehicle connected
3	lights continuously	<ul style="list-style-type: none"> • Charging system is reserved • No vehicle connected
	slowly flashing	<ul style="list-style-type: none"> • Charging system is reserved • Vehicle connected
	quickly flashing	<ul style="list-style-type: none"> • Exchange of data from the backend • Waiting for authorisation
4	slowly flashing	<ul style="list-style-type: none"> • Charging is authorised • Vehicle is being charged
	quickly flashing	<ul style="list-style-type: none"> • Charging system is authorised • Vehicle not yet connected or separated from the charging system
2, 3, 4*	quickly flashing	<ul style="list-style-type: none"> • Authorisation declined • Error in the charging system • Backend not available

* For error-correction measures, refer to the manual of the DC charge controller.

7.3 Modes of operation

The DC Wallbox enables two modes of operation:

- Authorisation **before** the vehicle is plugged in
- Authorisation **after** the vehicle is plugged in

Authorisation can be carried out in different ways:

- via RFID MiFare card
 - the card's UID is used for authorisation
- via remote access from the backend (APP)

7.4 Charging

The left or the right column of the following overview applies, dependent on whether the charge plug was plugged into the vehicle before or after the display was touched. The middle column applies to both modes of operation.

The authorisation status is indicated both on the ALM and by the LEDs on the RFID display field. Both modes of operation are described in the following next to the depicted display screen.

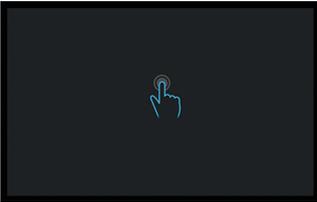
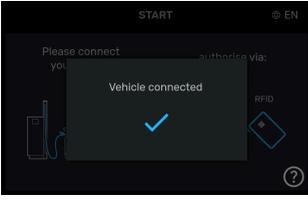
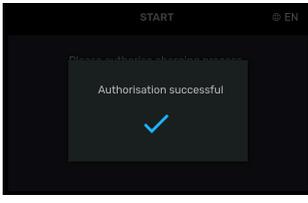
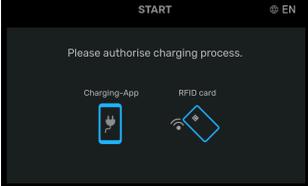
Notes

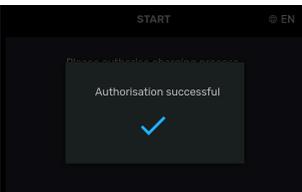
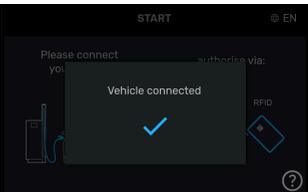
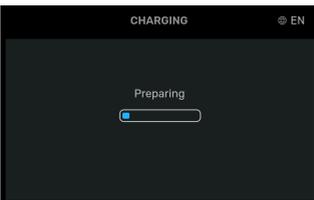
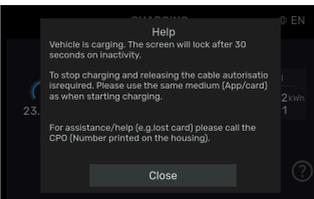
i *While authorisation is in progress, the LEDs at the top of the ALM light up blue and the LEDs of the RFID card reader white as a circle.*

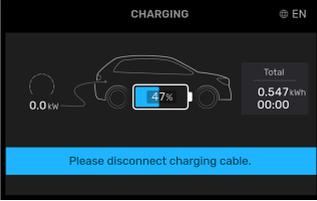
The display screen returns to "Available" if

- *authorisation was not successful. All 3 LEDs of the DC Wallbox flash briefly to signal the error.*
- *the vehicle was not plugged in within 45 seconds.*

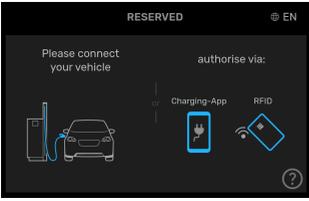
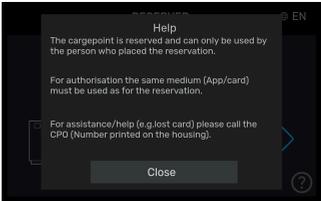
Authorisation - display screens

Authorisation after plugging in		Authorisation before plugging in
	 <p>ALM and RFID display: continuously green</p>	
	 <p>ALM and RFID display: continuously green</p>	
 <p>ALM: continuously blue RFID display: (slowly) flashing green</p>		 <p>ALM: continuously green RFID display: (quickly) flashing blue</p>
 <p>ALM: continuously blue RFID display: (slowly) flashing green</p>		 <p>ALM: continuously green RFID display: (quickly) flashing blue</p>

Authorisation after plugging in		Authorisation before plugging in
 <p>ALM: continuously blue RFID display: (slowly) flashing blue</p>		 <p>ALM: continuously blue RFID display: (slowly) flashing blue</p>
	 <p>ALM: continuously blue RFID display: flashing blue</p>	
	 <p>ALM: continuously blue RFID display: (slowly) flashing blue</p>  <p>ALM: continuously blue RFID display: (slowly) flashing blue</p>	

Authorisation after plugging in		Authorisation before plugging in
	 <p>ALM: continuously blue RFID display: continuously blue</p>	

Display screens: charging station reserved

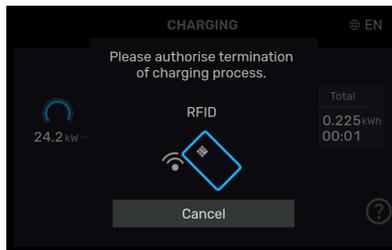
7.4.1 End charging

End charging with a command from the vehicle

End charging by initiating the end of charging in the controls in/on the vehicle. The DC Wallbox detects this and gives the user a period of 3 seconds to reconnect the plug and continue charging. It then switches to the "Available" state and lights up continuously green.

End charging by RFID or backend

Charging can be ended by holding the RFID card used to authorise charging up to the RFID card reader of the DC Wallbox again. Charging ends immediately in this case. The DC Wallbox flashes green to indicate that a vehicle has been detected but the DC Wallbox is "Available".



End charging using the display

In the freecharge mode (i. e. charging without having to pay, which can be set via the configuration interface) charging can be ended by pressing the "Stop" field on the display.

7.5 Display screens on the DC energy meter

On the right-hand side of the DC energy meter display different values are displayed in rotation, with the values changing every 5 s. What these values refer to can be identified via the codes shown on the left side of the display in a somewhat smaller font. The following codes are relevant for customers when they are checking their invoices:

- 1.8.0: Overall current import from the grid (relevant under calibration law)
- 152.8.0: Overall transaction of the energy imported into the vehicle (relevant under calibration law)
- 140.7.0: Line loss resistance (relevant under calibration law)
- 0.9.1: Device time (information)
- 0.9.2: Device date (information)

For the meaning of the remaining codes and all the details on the display and the DC energy meter (among others the nominal operating conditions), see the information made available online:

<https://download.dzg-metering.de/DCMeter/manual/DZG-gsh-manual.pdf>

The accuracy of the charging device at its delivery point corresponds at least to that of a Class A energy meter as defined in the Measuring Instruments Directive (see specification on the name plate in chapter "Designations", page 15).

7.6 Invoicing verification

If charging at the DC Wallbox is not only authorised but also billed according to the authorisation, end customers can rule out that the invoicing data is incorrect.

Currently, invoicing in compliance with calibration regulations is only supported based on energy (kWh).

The verification possible for the customer is based on functions of the DC energy meter used, which has been approved by the measurement and calibration authorities for this purpose.

In the range between 6.5 A and 65 A the user can carry out charging in compliance with calibration regulations as defined by the MessEV. The minimum supplied energy quantity for charging in compliance with calibration regulations is 1 kWh.

The DC energy meter generates electronic signatures for each charging process at least at the start and end of charging. These signatures include the customer identification, the identification of the DC energy meter, the current time and the total active energy that has flowed through the DC energy meter since installation.

For reliable verification, the end customer must complete several steps:

1. Before charging begins, it must be ensured that the time stored in the DC energy meter is sufficiently correct so that the charge can be allocated correctly at the end of an invoicing period. This means that the day must be correct and the time roughly correct. The time is indicated in the meter's display in rotation with other information and should be verified by the end user before charging.
2. The signatures for the start and end meter value of each charging process are generated automatically and require no further interaction from the user.

3. The signed meter values are automatically transmitted to the backend systems of the charging point operator and the invoicing partner. The invoicing partner is obligated to list the meter values including the signature for each transaction on the invoice.
4. Customers use the so-called transparency software to check their invoices. Together with the public key and the signed invoicing data, the software enables them to check that the invoicing data have not been falsified. The signed invoicing data is sent by E-mail to the end customers, the public key is located at the top left of the name plate as QR code. The software and the instructions for its installation and use can be found at <https://safe-ev.org/en/transparency-software/e-mobilists/> or it is made available by the invoicing partner. Version 1.1.0 shall be used.

i *Descriptions of the displays that are relevant under calibration law and their registers as well as the description of the verification via public key can be found in the corresponding manual: <https://download.dzg-metering.de/DCMeter/manual/DZG-gsh-manual.pdf>.*

i *For the checking of the public key, see chapter "Identification", page 47*

i *For mobile phones several apps are offered with which bar codes and DMC / QR codes can be read. How a bar code is scanned on an Android device using the app "QR & Barcode Scanner" by Simple Design Ltd. is described in the following. First the app from the Playstore must be installed on the smartphone. The DMC of the DC energy meter's public key can be found on the name plate of the wallbox (see chapter "Designations", page 15). To determine the public key as alphanumeric information, the DMC is scanned with the installed app. If scanning does not start automatically, you can touch the arrow pointing to the left that you can find on the app's start screen at the very top. During scanning, the camera frame must be positioned so that it captures the DMC. The output window of the app then shows the decoded DMC. By clicking on a corresponding icon in the app the alphanumeric text can be copied to the clipboard or sent as text message or by E-mail.*

7.7 Decommissioning

The DC Wallbox is designed for continuous operation. After initial commissioning it should only be switched off for servicing purposes. For decommissioning, the power supply outside the DC Wallbox is interrupted. It must be ensured that prior to that the vehicle has been disconnected from the charging station.

8 Troubleshooting and diagnostics

Error state detection

Errors can be diagnosed using the LEDs of the user interface and the servicing and configuration interface of the DC Wallbox (see chapter “Initial commissioning”, page 32, Access to configuration interface).

Problem	Possible cause(s)	Remedy	Responsible for remedy
No backend connection, coloured LEDs flashing	Incorrect configuration of the mobile phone interface	Correction of the configuration of the mobile phone interface	Operator service
	No reception or mobile telephone network overloaded	Change the position of the DC Wallbox or install a different antenna; change the provider if necessary, install an additional WiFi repeater	Operator service
	No internet connection on Ethernet or WiFi		
	Ethernet or WiFi not connected	Configuration correction	Operator service
Wrong backend file server configured			
No meter values; no charging	RS485 interface of the meter not connected to charge controller	Connect RS485 interface correctly or replace it	Manufacturer service
No display; LEDs completely off	No power supply, back-up circuit breaker or residual current circuit breaker have tripped	Switch on the tripped circuit breakers again and observe	Operator service
No full charging power	Vehicle requests less charging power than available	-	-
	AC current is limited by energy management	-	-
	AC limits configured too low	Adjust configuration	Operator service
	Poor air supply	Remove objects at the inlet and/or outlet of the DC Wallbox	Customer, operator service if applicable
	Clogged filters	Notify Service: filter change	Operator service
	Ambient temperature too high	-	-
	Too much sunlight	Shading	Operator service

Problem	Possible cause(s)	Remedy	Responsible for remedy
Status LED lights red	Internal or external error	Observe error indication on the display. If necessary, end charging and restart it	Customer
Status LED lights red	Internal or external error	Consult error code and error countermeasure on the configuration interface	Customer service of the operator or the manufacturer

Diagnostics

The user is shown the following error messages on the display:

No.	Status	Information/ instruction
1	Error	The vehicle requests ventilation during charging. This charging station model is not equipped with a fan. Please use a different charging station!
2	Error	The charging process has been stopped. Please reconnect the charge plug with the vehicle and restart charging! The charging fees incurred up to this time will be invoiced.
3	Error	The charging process has been stopped. Please try again! The charging fees incurred up to this time will be invoiced.
4	The charging station is malfunctioning	The charging process has been stopped. Please try again! The charging fees incurred up to this time will be invoiced.
5	Severe vibrations	Please use a different charging station!
6	Charging station is askew	Please use a different charging station!
7	Charging station is too hot	Ventilation is running. Please wait or use a different charging station!
8	Poor data connection	Please wait or use a different charging station!
9	System time not yet available	Please wait or use a different charging station!
10	Problem with the USB memory	Please remove the USB memory and plug it in again!
11	Software update ongoing	Please wait or use a different charging station!
12	High air humidity	Drying ongoing. Please wait (for approx. 15 minutes)!
13	Charging station is too cold	Heating is on. Please wait or use a different charging station!
14	Charging station is out of service	Please use a different charging station!

No.	Status	Information/ instruction
15	Status	Too hot: charging power is reduced.
16	Status	Poor data connection: Charging fees will be will be invoiced later.

Information to the operator

The operator receives the following information by e-mail:

- Service request: The EVSE is still in operation, but it requires servicing
- Error & Service request: the EVSE is defective and requires servicing
- Communication problem: the EVSE has a communication problem; no authorisation via backend



The operator's e-mail is configured in the charge controller's configuration interface during initial commissioning.

9 Testing

9.1 Test instructions for tests relevant under calibration law in the context of production and during inspections of devices in operation

This section describes the tests to be carried out as part of the inspection of devices in operation. All tests shall be carried for each charging point.

The tests mentioned describe a permitted procedure to be followed. Alternatives that pursue the same objectives correspondingly are allowed at the discretion of the qualified technical staff carrying out the work.

The tests cover the following categories:

- a) Characteristics test
- b) Functional tests including accuracy tests

a. Characteristics test

The device must be tested for correspondence with the type examination certificate:

- Physical structure of the charging device
- DC energy meter / measuring capsules used
- Name plate text
- Circuit breaker

b. Functional tests including accuracy tests

As part of the functional tests, one complete charging process is to be carried out with the charging device. Finally, the use case “invoice verification” must be tested. The test includes the following main steps:

1. Charging process 1: accuracy test of electrical work and functional test of remote display via WAN; authentication with RFID transponder
2. Charging process 2: accuracy test of electrical work and functional test of remote display via WAN; authentication via remote access from the backend
3. Invoice verification

Accuracy tests and functional tests are carried out as follows:

1. Start the charging process by connecting the vehicle simulator and authenticating the customer (testing person) at the charging station with means of identification
2. Observe the energy output via the live display. In case of current flow, the meter reading increases
3. End the charging process by initiating the end of charging via the vehicle

The accuracy test of electrical work is carried out with the first charging process as described below:

A DC working standard and power quality analyser is connected between the charging point and the vehicle simulator. It is assumed that the accuracy of the measurement of the energy delivered via the charging point is essentially determined by the energy meters that comply with calibration regulations and the associated declaration of conformity from the meter manufacturer. It is therefore sufficient to perform the accuracy test at a single operating point as well as an idle test for each charging point.

The measurement deviation of the charging device is determined by means of the so-called “continuous switched-on procedure” by comparing the work measured by the charging device and by the DC working standard and power quality analyser within the same period of time.

The length of time must be such that the lowest digit of the kWh value indicated by remote display that complies with calibration regulations performs at least 100 digit increments (taking into account the internal accuracy of the meter (3 decimal places)) between the beginning and the end of the measurement. Remote

display in compliance with calibration regulations must be implemented as follows: Extract the measured value data packets provided with the charging device signature via the Internet portal of the EMSP that issued the means of identification to authorise the charging process and verify the signature by means of the transparency and display (signature verification) software.

During the charging process, the progressing kWh display can also be observed through the window at the front of the charging station on the display of the energy meter which complies with calibration regulations.

The measurement deviation of the charging device shall not exceed the value specified by the Measuring Instruments Directive (MID), Annex V (MI003), Table 2, for DC energy meters of accuracy class A.

Invoice verification is tested as follows:

Obtain a record (consisting of several data packets with charging device signatures) that the EMSP makes available to the customer via its portal together with the invoice; extract the data packets provided with the charging device signature from the EMSP software, and verify the signature using the transparency and display (signature verification) software.

The procedure for testing and invoice verification is described in further detail in the operating manual for the customer.

9.1.1 Special test devices or test software

The following is required for testing the 6.8 devices covered by this TEC:

1. An electrical test load simulating an electric vehicle with which energy can be drawn from the charging device with at least two different current intensity levels.
2. A cable adaptor simulating an electric vehicle that is plugged into the delivery point of the charging station.
3. A DC working standard and power quality analyser connected between the adaptor referred to in point 2 and the test load referred to in point 1. The DC working standard and power quality analyser must be metrologically traceable for the purposes of section 47 MessEG.
4. A computer connected to the internet to access the portal via which the EMSP makes the signed data packets available to the customer (remote display). When the devices are tested prior to placing them on the market (module D or F), a charging device operator and an EMSP may need to be emulated. The computer must have an operating system that allows the use of the transparency and display software to verify the signature of the data packets. The computer must be guaranteed to be free of malware and the operating system must not be compromised. This can be done, for example, by booting the computer for testing with a "live operating system" from a USB stick, for which it can be assumed with confidence that the memory is not compromised because of its known origin and history. The Microsoft Windows operating system is used as the lead operating system because of its widespread use.
5. The transparency and display (signature verification) software for visually checking the integrity of transmitted data.
6. Means of identification to initiate the charging process at the charging device.

9.1.2 Identification

The software version of the charge controller is made available to the user via signed data packets by remote display.

Checking the public key



ADVICE

Optionally the public key can be found directly at the front of the energy meter. It is visible when the wallbox door is opened.

Note: When the door is opened, the operator securing mechanism is destroyed and must be replaced.

9.1.3 Calibration and adjustment procedure

Calibration and adjustment as part of the checking of devices in operation are not necessary.

9.2 Maintenance and servicing

Every operator is advised to log all inspection and servicing work in a servicing record book.

Servicing essentially includes the following:

- Testing the residual current circuit breaker in the wiring box or distribution box of the mains supply
- Cleaning the enclosure
- Checking for damage from vandalism
- Checking the CCS2 plug face
- Check for sufficient holding force of the charge plug in its socket at the DC Wallbox
- Testing the filters
- Testing the surge protection device
- Checking the function of the residual direct current sensor
- Testing the PE conductor of the mains supply for continuity

i *The outer enclosure of the DC Wallbox is secured with the operator securing mechanism and a lock.*

The following equipment or materials are required for inspection and servicing work: key, operator securing mechanism, vehicle or vehicle simulator, circuit breaker tester.

After the work, a new operator securing mechanism must be applied!

9.2.1 Inspection and servicing plan

Periodic verification shall be performed in accordance with DIN IEC 60364-6:2016. The test results shall be stored for a trend analysis.

The following intervals are recommendations. Deliberate deviations from them that are based on past experience are permissible and shall be documented.

Work to be executed	m	6 m	y
Testing the residual current circuit breaker		x	
Cleaning the DC Wallbox from the outside and inside			x
Checking for damage from vandalism	(x)	(x)	x
Checking for free movement of the charging socket lock/functional test			x
Checking for sufficient holding force of the charge plug in its socket			x

Work to be executed	m	6 m	y
Testing the surge protection device		x	
PE conductor test			x
Checking the insulation resistance			x
Checking the filter for soiling and replacing it, if necessary			x
Visual inspection: For defects on the cable and terminals, blackened areas, humidity, animal damage			x

m = monthly, 6 m = half-yearly, y = yearly

9.3 Description of the inspection and servicing work



DANGER *Caution current!*

Danger to life

Before starting work, switch off the DC Wallbox.

9.3.1 Testing the residual current circuit breaker

Proper functioning of the residual current circuit breaker is of utmost importance. It is the last resort for safeguarding human life and is only used if a series of errors has previously caused accessible parts of the DC Wallbox to be under voltage.

The residual current circuit breaker shall be located in the wiring box or in the distribution board of the mains supply. No residual current circuit breaker is integrated in the DC Wallbox.

When operating the DC Wallbox for the first time in previously unknown environments, a monthly test interval is recommended. Based on documented experience, this interval can be extended to up to 12 months if no known malfunctions have previously occurred in devices of the same age and under similar use conditions.

For a positive test, the residual current circuit breaker must switch off. Alternatively, an RCD tester can be used. This tester makes contact with the upper contacts of the residual current circuit breaker.

9.3.2 Cleaning the enclosure

The outer enclosure should be cleaned with a hand brush or vacuum cleaner. Coarser soiling can be removed with a damp cloth if necessary with the aid of normal household cleaner.



CAUTION *Device damage!*

High pressure can cause damage.

Do not use air or water pressure cleaners inside the enclosure.

9.3.3 Checking for damage from vandalism

Depending on the operating environment, regular inspections at least once a year are recommended.

9.3.4 Functional test

The DC Wallbox must be checked regularly with a functional test. For this, the DC Wallbox must run through a complete charging cycle without any error messages (see chapter “Initial commissioning”, page 32). The test can be carried out with an electric vehicle or optionally with a vehicle tester that conforms to IEC 61851-23.

During the functional test of the DC Wallbox the enclosure must be closed.

9.3.5 Testing and replacing the air filter

The air filters at the inlet and outlet of the Wallbox must be checked regularly for soiling and proper permeability (see chapter “Inspection and servicing plan”, page 48). Depending on the pollution of the ambient air, this can also be conducted at shorter intervals.

A soiled filter will let the temperature inside the DC Wallbox rise unnecessarily. At high outside temperatures, a reduced maximum charging power may be the result.

Procedure:

1. Disconnect the DC Wallbox from the power supply and secure it against being switched on again
2. Before opening the DC Wallbox, wait until the minimum discharging time has passed and after opening, verify that the AC and the DC circuits are de-energised
3. After opening the door, remove the filter on the right side by disengaging the clip; to inspect the left filter, the air baffle must be removed
4. Visually check to evaluate the soiling degree
5. If necessary, install a new, clean filter
6. Finally, remount the air baffle
7. Ensure that all the plugs are plugged in securely at the DC613 and the SU621 and that no cables have been pinched or damaged
8. Close the DC Wallbox
9. Reconnect the power supply

9.3.6 Testing the surge protection device

The surge protection device safeguards the DC Wallbox against mains-side, line-borne overvoltages.

Procedure:

1. Disconnect the DC Wallbox from the power supply and secure it against being switched on again
2. Before opening the DC Wallbox, wait until the minimum discharging time has passed and after opening, verify that the AC and the DC circuits are de-energised
3. Inspect the viewing window on the surge protection device
4. Window, red: The surge protection device is defective and must be replaced



ADVICE

Following inspection and servicing work, the DC Wallbox and all circuit breakers must be switched on again. The enclosure must be closed and secured again correctly.

A functional test (see chapter “Initial commissioning”, page 32) shall be performed.

10 Technical data

10.1 Tabular data

General

Dimensions (H x W x D)	
with cable cover	2.095 mm × 726 mm × 270 mm
without cable cover	1.540 mm × 726 mm × 270 mm
Weight	approx. 90 kg
Efficiency at nominal power	> 95 %
Noise emissions*	54.6 dB(A)**
Displays	10" touch display LED status indicators
Brightness of ambient lighting	< 1000 lm
Enclosure materials	Powder coated steel, anodised aluminium, powder coated surfaces, plastic elements
Power consumption when not charging***	approx. 40 W

* Max. sound pressure level at a distance of 1 m

** At 25 kW power and 18 °C ambient temperature

*** When the dehumidifying function is not activated

Charging

Charging point	1 x DC
Max. charging power	25 kW
Charging voltage	200 V _{DC} ... 1000 V _{DC}
Charging current I_{\max}	up to 65 A
Supported charging mode according to DIN EN 17186 (2019-10)	"L"
Charging mode as per IEC 61861-1, VDE 0122-1:2019-12	4
Charging cable length	3.3 m
Vehicle inlet	CCS2
Configuration of the vehicle inlet	FF
DC metering compliant with calibration regulations	6.5 A... I_{\max}

Installation

Network type	TT, TN-S, TN-C-S
Short-circuit current to the EVSE	50 kA
Characteristic of the upstream 3-phase circuit breaker	B
Trigger threshold of the upstream 3-phase circuit breaker	≤ 50 A
Power supply system	3NAC 230/400 V
Conductor cross-section L1, L2, L3, N	6 mm ² to 16 mm ² (10 mm ²)*
Conductor cross-section PE	10 mm ² to 16 mm ² (10 mm ²)*
Stripping length of L1, L2, L3, N, PE	18 mm to 20 mm
Nominal frequency	50 Hz
Nominal current (with max. reactive power compensation)	AC 43 A
THD/I (harmonic content according to DIN EN 61000-3-12)	13 %
Active cooling	air cooling
Cable feed	bottom
Mounting type	wall mounting
Overvoltage category according to DIN EN 60664-1	III
Rated insulation voltage of network connection	AC 400 V
Rated voltage of network connection phase to N	AC 230 V
Rated voltage and rated insulation voltage of charging connection	DC 1000 V
Minimum discharging time**	70 s

* Cables rigid or flexible (with ferrule)

** The minimum discharging time is the time needed for the output filters in the PU to discharge so that no dangerous DC voltage may be present at the output of the PU.

Operating conditions

Ambient temperature	-25 °C to 40 °C *
Relative ambient humidity	5% to 95%, condensing
Protection class	I
Degree of protection IEC 60529:1989 + A1:1999 + A2: 2013	IP54
Radiant heat	< 1090 W/m ²
UV index	< 10
EMC according to IEC 61851-21-2, edition 1.0 (2018)	
Interference sensitivity class	A
Interference emission class	B

Impact resistance in accordance with IEC 62262:2002-02	IK 10
Installation height	< 2000 m AMSL

* up to 50 °C with power reduction

Classification of climatic conditions acc. to IEC 60721

Operation (IEC 60721-3-4)	4K26, 4Z14, 4B2, 4C3, 4M11
Transport (IEC 60721-3-2)	2K12, 2B1, 2C1, 2S1, 2M4*
Long-term storage (IEC 60721-3-1)	1K22, 1Z2, 1B1, 1C1, 1S12, 1M10*

- * Restrictions (the letters refer to the letters of the respective standard):
- b) Non-stationary vibration load as per ASTM D 880
 - d) No toppling
 - e) No rotation around horizontal axes
 - f) No stationary acceleration
 - g) No static loads

Transport and storage conditions

Ambient temperature	-25 °C to 70 °C
Relative ambient humidity	5% to 95%, non-condensing

Communication

Supported mobile phone networks	2G (GSM/GPRS/EDGE) 3G (UMTS with HSDPA) 4G (LTE)
---------------------------------	--

Interfaces

Ethernet	
(IEEE: 802.3i, 1990)	10 Mbit/s
(IEEE: 802.3u, 1995)	100 Mbit/s
Max. connection cable length	100 m
Plug connection	Keystone RJ45 jack
<hr/>	
WiFi	
(IEEE: 802.11b, 1999)	
(IEEE: 802.11g, 2003)	2.4 GHz
(IEEE: 802.11n, 2009)	
<hr/>	
Modbus	9.6 kbit
<hr/>	
Connectivity	Ethernet GSM/LTE WiFi
<hr/>	
Authentication	NFC / RFID (13.56 MHz)
<hr/>	
Backend communication protocol	OCPP-J 1.6 Edition 2

Energy management interfaces*	EEdbus SEMP Modbus TCP
DLM max. number of charging points*	250

* With future software updates this function is activated or its functions are expanded.

DC energy meter

Mechanical ambient conditions	M1
Electromechanical ambient conditions	E2
Accuracy class	A

10.2 Standards and approvals

The DC Wallbox complies with the following regulations and standards:

- Low Voltage Directive: 2014/35/EU
- EMC Directive: 2014/30/EU
- RoHS Directive: 2011/65/EU
- REACH Regulation: (EC) No 1907/2006
- RED Directive 2014/53/EU
- Protective earthing:
 - IEC 60364-4-41 (DIN VDE 0100-410)
 - IEC 60364-4-43 (DIN VDE 0100-430)
 - IEC 60364-5-54 (DIN VDE 0100-540)
- IEC 61851-1, Ed. 2.0
- IEC 61851-23, Ed. 1.0
- IEC 61851-24, Ed. 1.0
- IEC 62196-1
- IEC 62196-3, Ed. 1.0
- IEC 61439-1
- IEC 61439-7, Ed.1.0
- IEC 62477-1
- ISO 15118-1
- ISO 15118-2
- ISO 15118-3
- ISO/IEC 14443-1
- DIN SPEC 70121
- VDE-AR-N 4100
- REA document 6-A, PTB requirements 50.7 and 50.8



10.3 Declarations of conformity

EU declaration of conformity

Hereby, Bender GmbH & Co. KG declares that the device covered by the Radio Directive complies with Directive 2014/53/EU. The full text of the EU Declaration of Conformity is available at the following Internet address:

https://www.bender.de/fileadmin/content/Products/CE/CEKO_iONiX-25.pdf

10.4 Ordering information

Type	Colour	compliant with calibration law	DC energy meter	Payment terminal	NFC / RFID card reader	Article number	Manual No.
iONiX Light 25 Wallbox	RAL7046	-	-	-	✓	B94060200	D00461
iONiX Medium 25 Wallbox		✓	✓	-	✓	B94060201	D00461
iONiX Supreme 25 Wallbox		✓	✓	✓	✓ ¹	B94060202	D00461

¹ The card reader function is integrated into the payment terminal.

10.5 Document revision history

Date	Document version	Status/changes
08/2023	00	New
12/2023	01	<i>Changes</i> Terms "manufacturer securing mechanism" and "operator securing mechanism" Chapter 3.2.2: Type examination certificate no. added to name plate Chapter 3.2.3: dimensions of the operator securing mechanism Chapter 4.1: device dimensions updated Chapter 7.3: "via remote access from the backend" added to authorisation method Chapter 7.4: display screens updated (via app) Chapter 9.1 b. "via remote access from the backend" added to functional tests including accuracy tests Chapter 10.2: UKCA deleted



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