

KeContact

KC-P30 Charging Station

Calibratable measurement device for electrical energy in accordance with § 46 of the German Measures and Verification Act (REA No. 6.8)

V 1.03

Translation of the original instructions

KEBA[®]

Automation by innovation.

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KEBA AG Headquarters: Gewerbepark Urfahr, 4041 Linz, Austria, Phone: +43 732 7090-0,
Fax: +43 732 7309-10, keba@keba.com

For information about our subsidiaries please look at www.keba.com.

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1 Introduction

This manual is valid for the KC-P30 variants with conformity assessment procedures in accordance with the German Measures and Verification Ordinance (MessEV)¹⁾.

The pictured devices used in this manual are visual examples. The figures and explanations contained in this manual refer to a typical device design. The devices used by you may differ in their appearance.

¹⁾ Calibratable measurement device for electrical energy in acc. with § 46 of the German Measures and Verification Act (REA No. 6.8)

Firmware assessed for conformity

This manual refers to devices with the following firmware, which has been assessed for conformity:

- Firmware version: 2.8.6
- Checksum: 0x976c
- Display: ME86#976c

1.1 Representation of safety instructions

At various points in this manual, you will see notes and precautionary warnings regarding possible hazards. The symbols used have the following meaning:



DANGER!

indicates an imminently hazardous situation, which will result in death or serious bodily injury if the corresponding precautions are not taken.



WARNING!

indicates a potentially hazardous situation, which can result in death or serious bodily injury if the corresponding precautions are not taken.



CAUTION!

means that if the corresponding safety measures are not taken, a potentially hazardous situation can occur that may result in slight bodily injury.

Caution

means that damage to property can occur if the corresponding safety measures are not taken.



ESD

This symbol reminds you of the possible consequences of touching electrostatically sensitive components.

Information

Identifies practical tips and useful information. No information that warns about potentially dangerous or harmful functions is contained.

1.2 Purpose of the document

This document describes the specific functions and features of the relevant variants of KC-P30. The document is intended for charging station operators, calibration authorities or similar institutions.

This document is an extension to the supplied manuals of the charging station.

You must comply with all instructions and safety notes in the supplied manuals!

1.3 Requirements

This document contains information for persons who meet the following requirements:

Target group	Required knowledge and abilities
Charge point operators (CPO) ¹⁾ , electro-mobility service providers (EMSP) ²⁾ , verification bodies and similar institutions	Persons who, due to their special training, expertise and experience as well as knowledge of current standards, are able to assess the work performed and the possible hazards. Knowledge about: <ul style="list-style-type: none"> • current valid safety information, • the mode of operation of the charging station, • the displays and operating elements of the charging station.

¹⁾ Charge Point Operator (CPO)

²⁾ ElectroMobility Service Provider (EMSP)

1.4 Notes on this document

The manual is part of the product. It is to be retained over the entire life cycle of the product and should be forwarded to any subsequent owners or users of the product.

The instructions contained in this manual must be followed precisely. Failure to do so could result in the creation of potential sources of danger or the disabling of safety devices. Apart from the safety instructions given in this manual, the safety precautions and accident prevention measures appropriate to the situation in question must also be observed.

1.4.1 Contents of the document

Description of the specific functions and properties of the KC-P30 variants with conformity assessment procedures in accordance with MessEV.

1.4.2 Not contained in this document

- Installation of the charging station
- Operation of the charging station
- Configuration of the charging station

1.5 Further documentation

Designation	Target group
Operating Instructions	<ul style="list-style-type: none"> • End customer • Electricians
Installation manual	<ul style="list-style-type: none"> • Electricians
P30 configuration manual x-series	<ul style="list-style-type: none"> • End customer • Electricians

Manuals and additional information are available on our website:

www.keba.com/emobility-downloads

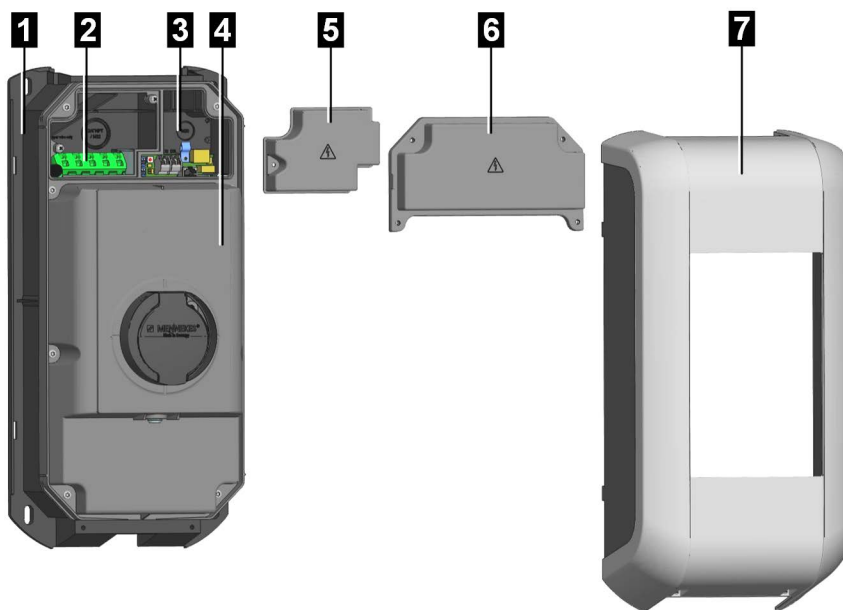
2 Description of the device

The variants with a calibratable measurement device for electrical energy in acc. with § 46 the German Measures and Verification Act (REA No. 6.8) were confirmed using conformity assessment procedures. These device variants feature an active power meter and an auxiliary device. These variants are specially marked on the type plate. The associated type examination refers to the complete unit.

The auxiliary device contains the following functions, the operation of which is described in the document:

- Generation of measurement data records for each charging session
- Local long-term memory for measurement data records
- Instant display of relevant information
- Remote transmission of measurement data records

2.1 Design



1 ... Lower unit	2 ... Terminal panel
3 ... Connection panel	4 ... Front part
5 ... Terminal cover	6 ... Connection panel cover
7 ... Housing cover	

2.2 Type plate

The variants with conformity assessment procedures in accordance with MessEV are specially marked as such on the type plate.

Position of the type plate

The type plate is located on the left at the top of the charging station.



Fig. 2-1: Top view: Position of the type plate

1 ... Type plate	
-------------------------	--

Information on the type plate



Fig. 2-2: Type plate (example)

1 ... Manufacturer	2 ... Manufacturer address
3 ... PN: Material number SN: Serial number	4 ... Product designation
5 ... Technical data	6 ... Marking of the approval
7 ... Type examination number	8 ... Accuracy class in accordance with EN 50470-1, -3
9 ... CE marking	10 ... Public key information
11 ... Production site	12 ... Production date

2.3 Overview of variants

The type and features of the charging station can be determined by the product designation on the type plate.

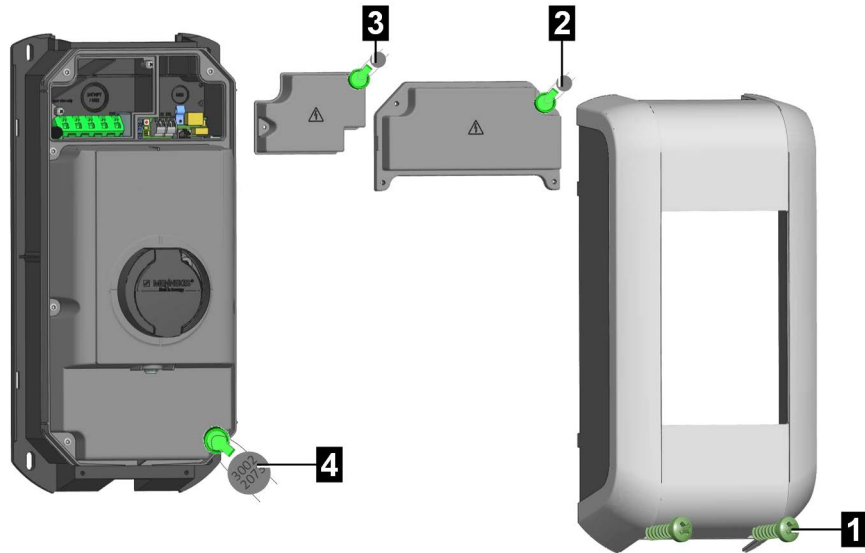
Charging stations with conformity assessment procedures in accordance with MessEV are permitted as active power meters in accordance with MID 2014/32/EU. These charging stations have an L in the product designation: KC-P30-xxxxxxx-Lxx-xx

Charging stations with conformity assessment procedures in accordance with MessEV are available in the following variants.

Product designation (example)	KC-P30-	E	S	2	4	00	2	2	-	L	0	0	-xx
Product and type	x												
Country version		x											
Europe IEC		E											
Cable / Socket			x	x	x								
Socket			S										
Cable			C										
Type 2				2									
Shutter				S									
16 A					2								
20 A					3								
32 A					4								
Cable type						x							
No cable						00							
4 m cable						01							
6 m cable						04							
Device series							x						
c-series							2						
x-series WLAN								B					
x-series WLAN, 3G								C					
x-series WLAN, 4G								E					
x-series 3G								G					
x-series 4G								H					
Switching element								x					
Contactors 3-phase								2					
Energy meter										x			
Calibratable measurement device for electrical energy in accordance with § 46 of the German Measures and Verification Act (REA No. 6.8)										L			
Authorization												x	
None												0	
RFID												R	

2.4 Access concept

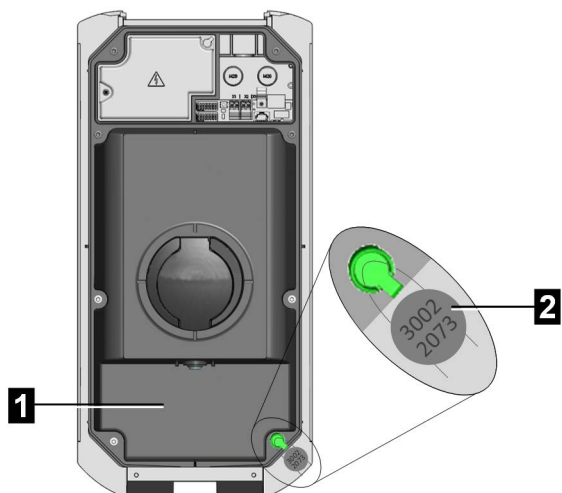
The charging station needs to be opened to differing extents depending on the interaction. Different authorizations are needed for this. All parts which can be opened feature access protection.



<p>1 ... Screws on the housing cover. The housing cover can only be removed using tools.</p>	<p>2 ... Seal on the connection panel cover (user seal). Protects the connection panel from access by unauthorized persons. For compliant operation, must be applied after installation.</p>
<p>3 ... Seal on the terminal cover (optional). Can be attached if required.</p>	<p>4 ... Meter seal on the front part (manufacturer seal). May only be attached and removed by the manufacturer.</p>

2.5 Meter seal

The meter seal is located on the lower right screw of the front part with the housing cover removed. The meter seal has the following number on it: 3002 2073



1 ... Front part	2 ... Meter seal
------------------	------------------

Information
If the meter seal is removed, you must assume that an attempt has been made to tamper with the meter. The charging station loses its conformity and may no longer be put into operation or used.

2.6 Display

The variants with conformity assessment procedures in accordance with MessEV feature an LED dot matrix display. For the validity of the calibration of the charging station, a correct display and sufficient readability are required.



Fig. 2-3: Display

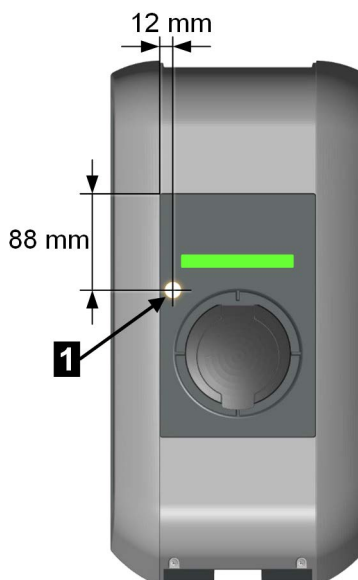
The display may show different information depending on the operating status (e.g. software version, IP address, authorization request). The main task, however, is to display the relevant data of a charging session. During periods of inactivity, the display brightness is reduced and switched off after a few minutes.

The preceding "MI" or "ME" indicates a notice relevant to calibration law. All other indications on the display are informative.

The display lights up through the housing and is only visible when the power supply is active. For further details on the display, see the "Operating Instructions."

2.7 Brightness sensor

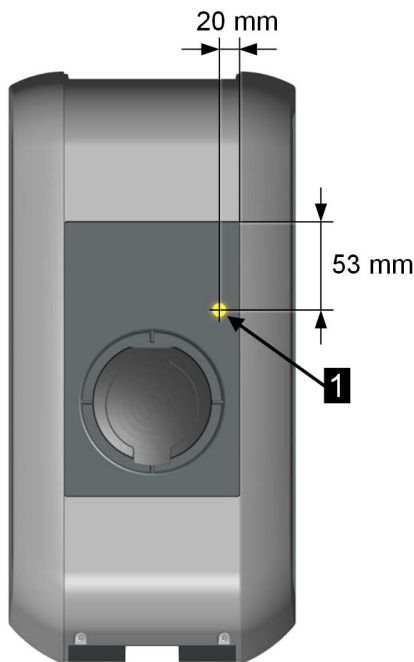
The brightness sensor is located on the front of the charging station on the left below the LED bar. The information display can be triggered via the brightness sensor.



1 ... Brightness sensor	
-------------------------	--

2.8 Pulse LED

The pulse LED is located on the front of the charging station on the right below the LED bar. In test mode, the pulses of the pulse LED indicate a conclusion about the transmitted energy.



1 ... Pulse LED	
-----------------	--

2.9 Active power meter

Information

The required energy for setting the charging station by the manufacturer and for the commissioning process are part of the total energy. For this reason, the meter reading will not have the value "0" after the installation has been completed.

Information

The maximum meter reading is 99 999, after reaching this value the meter starts from "0" again.

Counting register overflow is limited by the limitation of displayable points on the display. Within a measurement data record (start counter status – end counter status), there is no overflow. Resetting to "0" happens when starting the next charging session.

2.9.1 Measurement principle

The measurement of the transmitted energy takes place by means of passive transducers on all phases to be contacted.

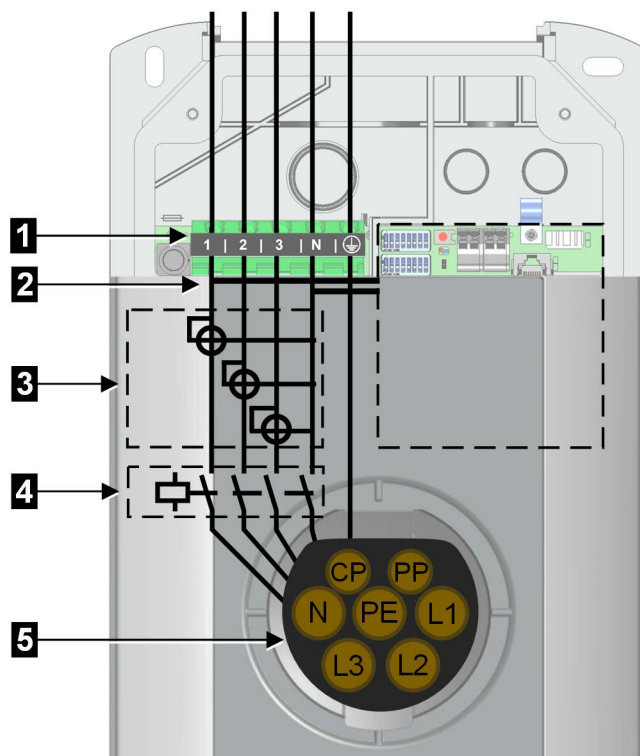


Fig. 2-4: Measurement scheme

1 ... Mains supply to the supply terminals	2 ... Power tap for internal supply: Before the active power meter
3 ... Power measurement/active power meter	4 ... Switching element
5 ... Charging socket	

2.9.2 Backstop

The meter has an electronic backstop.

2.9.3 Operational readiness

The active power meter is active in all available operating modes in which power can be delivered (including commissioning mode and test mode). For an overview of the operating modes, see 6.3.1 Test mode.

To guarantee that transmitted energy is complete in the data, a measurement data record is also formed in commissioning mode and test mode. These data records cannot be transmitted to an OCPP backend, but they can be read out remotely via the web interface (see 4.4 Remote transmission of data records).

3 Requirements

The following chapters describe the requirements for the proper operation of the charging station in compliance with calibration law.

In the following chapters, the following terms are used:

- User of the measurement device: The charge point operator (CPO), as defined by § 31 of the German Measures and Verification Act (MessEG), is the user of the measurement device.
- User of measured values: The electromobility service provider (EMSP), as defined by § 33 of the German Measures and Verification Act (MessEG), is the user of the measured values.

3.1 Rated operating conditions

Use:	Inside and outside area
Access limitations at set-up location:	Limited and unlimited access
Installation (stationary):	On the wall or on a floor-mounted column.
Operating temperature:	-25 °C to +40 °C (without direct sunlight)
Storage temperature:	-25°C to +80 °C
Relative air humidity:	5% to 95% (non-condensing)
Altitude:	max. 2000 m above sea level
Rate of temperature change:	max. 0.5 °C / min
Temperature behavior:	Automatic power reduction if overheating occurs

Further information can be found in the "Installation Manual."

3.2 Instructions for correct measurement in accordance with type examination certificate

I Requirements for the operator of the charging device, who must meet said requirements as a necessary prerequisite for the proper operation of the charging device.

The operator of the charging device, in the terms of § 31 of the German Measures and Verification Act, is the user of the measurement device.

- 1) The charging device shall only be used as intended for legal purposes and in accordance with legal requirements if it is not exposed to environmental conditions other than those for which its type examination certificate was issued.
- 2) When registering the charge points with the German Federal Network Agency, the user of this product must also register the PK specified on the charging device for the charge points in its registration form! Without this registration, it is not possible to operate the charging device in compliance with calibration law.

Web link:

https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen_Institutionen/HandelundVertrieb/Ladesaeulen/Anzeige_Ladepunkte_node.html

- 3) The user of this product must ensure that the period of validity for calibrating the charging device is not exceeded.
- 4) The user must (also) store the signed data packets read out from the charging device in its possession permanently and without gaps, according to the pagination, on hardware specifically dedicated to this purpose ("dedicated memory"), and keep this available for authorized third parties (duty of storage). "Permanently" means not only that the data must be stored until the conclusion of the business transaction, but also at least until the expiration of any legal periods for appeal for the business transaction. For non-existent data, replacement values must not be created for billing purposes.
- 5) The user of this product must provide an electronic form of the operating manual approved by the conformity assessment body to measured value users who receive measured values from this product and use them in the course of trade. In this process, the user of this product must refer to No. II "Requirements for the user of measured values from the charging device," in particular.
- 6) The user of this product is subject to the duty of disclosure in accordance with § 32 MessEG (excerpt, unofficial translation): *§ 32 Duty of disclosure (1) The use of new or renewed measurement devices is subject to disclosure to the responsible body in accordance with state law, at the latest six weeks after commissioning...*
- 7) If it is seen as necessary by the authorized bodies, the measurement device user must provide the total contents of the dedicated local memory or memory of the CPO, with all data packets of the billing period.

II Requirements for the user of measured values from the charging device (EMSP)

The user of measured values must observe § 33 of the MessEG:

§ 33 MessEG (quote, unofficial translation)

§ 33 Requirements for the use of measured values

(1) Values for measurands may only be specified or used in commercial or official transactions or in measurements in the public interest if they have been determined by a measurement device that has been used as intended and if the values can be traced back to the respective measurement result, if not otherwise defined in the ordinance according to § 41 Number 2. Other national regulations that serve comparable protective purposes shall still apply.

(2) Users of measured values shall ensure, within their means, that the measurement device fulfills the legal requirements and have the person using the measurement device confirm that they fulfill their obligations.

(3) Users of measured values shall

1. ensure that bills based on measured values for the party for whom the bills are intended can be traced by simple means in order to check the stated measured values and

2. provide suitable tools for the purposes named in Number 1 if necessary.

For the user of measured values, this regulation specifically results in the following duties for measured value use in compliance with calibration law:

- 1) The contract between EMSP and customers must clearly state that only the delivery of electrical energy, not the duration of charging service, is the object of the contract.
- 2) The time stamp on the measured values comes from a clock in the charging device that is not certified in accordance with German measurement and calibration law. Therefore, these times shall not be used for rating the measured values.
- 3) EMSP must ensure that the electromobility service is distributed based on charging devices that enable the monitoring of the ongoing charging process, provided that there is no corresponding local display on the charging device. At least at the beginning and end of a charging session, the measured values must be available to the customer in a way that is reliable in accordance with calibration law.
- 4) The EMSP must provide the data packets relevant for billing to the customer as a data file, including signature, at the time of billing, in a manner allowing them to be checked for authenticity using the transparency and display software. The provision can take place over channels not tested in accordance with calibration law.
- 5) The EMSP must provide the transparency and display software belonging to the charging device to the customer in order to check the data packets for authenticity.
- 6) The EMSP must be able to show, with verifiable evidence, which means of identification was used to initiate the charging process belonging to a certain measured value. This means that they must be able to prove that they have assigned the personal identification data correctly for each business transaction and billed measured value. The EMSP must inform their customers about this obligation in an appropriate form.
- 7) The EMSP may only use values for billing purposes that exist in dedicated memory, if present, in the charging device and/or in the storage of the charging device operator. Replacement values must not be created for billing purposes.
- 8) The EMSP must enter corresponding agreements with the operator of the charging device to ensure that the data packets used for billing purposes are saved for a sufficient length of time in order to be able to complete the associated business transactions in full.
- 9) The EMSP must enable the authentication on the individual models of the product associated with this operating manual being used by the EMSP, by providing suitable means of identification in the case of a justified requirement message for the purpose of performing calibrations, examinations and usage monitoring measures.

- 10) All of the duties listed above apply to the EMSP as the measured value user in the terms of § 33 MessEG even if they obtain measured values from the charging devices via a roaming service provider.

3.3 Additional requirements for the operator

The following additional requirements apply to the charge point operator:

- Selection of a suitable device variant (see 2.3 Overview of variants)
- Integrity of the charging station and associated components such as charging cable, charging plug or charging socket
- Correct installation according to the installation instructions in compliance with national and regional regulations
- Sufficient period of validity of the calibration according to the calibration stamp. The information is visible on the type plate or on the front part when calibrated.
- Correct function of the display and sufficient readability of the relevant information
- Visibility and readability of the type plate
- Intact meter seal on the front part with the number 3002 2073 (manufacturer seal)
- Intact seal on the connection panel cover (user seal)
- Sufficient protection of the operator infrastructure
- Cyclical reading of the signed measurement data in order to keep failures low

3.4 Additional recommendations

For proper charging station operation in compliance with calibration law, the following measures are also recommended:

Protection of the (network) infrastructure

Options for implementing protection of the (network) infrastructure (incomplete list):

Physical

- No openly accessible connection points (power connection and network)
- No openly accessible network cables
- Protection of network distributors

Digital

- Deactivate WLAN after installation
- Use of VPN/APN
- Use of PIN-protected SIM cards

- IMEI-dependent activation of SIM cards
- Protection of configuration interfaces (including web interface access)
- Use strong passwords for web interface, protection of password information
- Use of HTTPS
- Certificate-based communication

Connection to a network with a sufficient data rate and data volume

- ~400 kB per transaction/data record
- User-friendliness when reading out the measurement data
- Installing (security) updates

Keeping a list of measurement points

The list of measurement points should have at least the following content:

- Manufacturer material number (PN on the type plate of the charging station)
- Manufacturer serial number (SN on the type plate of the charging station)
- Public key (for the measurement capsule, pictured on the type plate of the charging station in the form of a QR code)
- Place of use

Clarity in the user-configurable display texts

Information relevant for calibration law is displayed by the charging station with a special label (ME). Additional informative texts must not confuse customers or suggest functions that are not supported by the device.

- No rating/pricing possible in the device
- Time-based rating not possible

4 Auxiliary device

The following functions are part of the type examination certificate and are tested as part of the conformity assessment procedure in accordance with MessEV:

- Instant display of relevant information
- Generation of measurement data records
- Generation of log data records
- Remote transmission of data records

4.1 Instant display of relevant information

At the start and end of the charging process, the following information is instantly displayed for the user on the charging station display:

- Identification data for the current charging process (user/transaction ID)
- Transmitted energy of the charging process

More specific information on the displays are described in the "Operating Instructions."

4.2 Generation of measurement data records

For each charging session and every other mode in which energy can be transmitted (e.g. commissioning mode or test mode), a measurement data record is generated and signed in the measurement capsule.

Even in an error mode in which the contactor contacts have been welded, incorrect operation with an adapter may still result in current being drawn. Therefore, a data record is also formed here and saved locally.

> 20.000 measurement data records are saved securely in the certified measurement capsule. The memory is implemented in the form of a ring buffer. After writing to the last storage space, the oldest data record is overwritten. The dimensioning of the memory permits the storage of data records for 10 years, at 5 charging sessions per day.

A measurement data record contains the following information:

```
OCMF |
{
  "EV": "1.0",
  "GI": "KEBA_KCP30",
  "GS": "1234",
  "GV": "2.8.3",

  "PG": "T108",

  "IS": true,
  "IL": "HEARSAY",
  "IF": ["RFID-PLAIN", "OCPP_NONE", "IS015118_NONE", "PLMN_NONE"],
  "IT": "IS014443",
  "ID": "DD34EE8F",
```

```

"RD": [
  {
    "TM": "2019-06-11T12:47:43, 000+000 I",
    "TX": "B",
    "EF": "",
    "ST": "G",
    "RI": "1530.6346",
    "RU": "kWh"
  },
  {
    "TM": "2019-06-11T17:09:45, 000+0000 R",
    "TX": "E",
    "EF": "",
    "ST": "G",
    "RV": "1550.8650",
    "RI": "1-b:1.8.0",
    "RU": "kWh"
  }
]
} |
{
  "SD": "3045022024BD092E86BB6EABA566A0EFBB5D4E7095693C882E5453F90984A1
E1A4D1C88C02210089D35386AE9431AFDCA446B79DD8B57DD031BA3ACE0455CF2F9
D4BD9CAF165D4"
}

```

Description of contents

Abbr.	Designation	Description/Possible values
Device information		
FV	Format and version	
GI	Meter manufacturer and designation of the charging station	
GS	Serial number of the meter	Where necessary, otherwise "0"
GV	Software version of the meter	
Local ID of the charging session		
PG	Serial number of the charging session (pagination)	"L" + serial number per device
Identification of the charging session		
IS	Status of the user assignment	true: User assigned successfully false: User unassigned (e.g. authorization is deactivated)
IL	Level of the user assignment ¹	NONE, HEARSAY, TRUSTED, VERIFIED, CERTIFIED, SECURE
IF	Details of the user assignment	Specification of which authorization procedure is used for assignment: RFID, OCPP, ISO15118 or PLMN (authorization via mobile network)
IT	Type of user assignment	
ID	Actual identification of the charging session	RFID UID, OCPP transaction ID, commissioning mode or test mode.
RD: Start register values (top block) + End register values (bottom block)		
TM	Time stamp ² for calculating the charging duration ³	Date:Time, synchronization state

Abbr.	Designation	Description/Possible values
TX	Reason for reading	B ... Start of the charging session E ... End of the charging session
EF	Error indicator ⁴	E ... Energy t ... Time
ST	State of the meter	
RV	Value of the reading	
RI	Identification of the value	In accordance with OBIS code
RU	Unit for RV	
Signature		
SD	Signing of the data record	Hash encrypted with a private key for the data for checking with the public key

¹ User assignment level

- **NONE:** No assignment has been made.
- **HEARSAY:** The assignment is unsecured, e.g. authorization using RFID card.
- **TRUSTED:** The assignment can be trusted under some conditions, e.g. authorization using OCPP backend.
- **VERIFIED:** The assignment was verified by the signature component and special measures.
- **CERTIFIED:** The assignment was certified by a cryptographic signature.
- **SECURE:** The assignment was established through a secure feature, e.g. secure RFID card.

² Time stamp

The time stamp of a signed measurement data record contains the system time represented in accordance with ISO 8601. It is followed by the synchronization state of the system clock to the legal time.

The following synchronization states are possible:

- **U ...** Unsynchronized
- **I ...** Time must be viewed as informative (absolutely and relatively)
- **R ...** Time must be viewed as exact (relatively)
- **S ...** Time is the legal time (in terms of calibration law)

The charging station only supports synchronization states **U** and **I**.

The time stamp on the measured values comes from a clock in the charging station that is not certified in accordance with German measurement and calibration law. Therefore, these times shall not be used for rating the measured values.

³ Charging duration

Since the charging station only supports synchronization states \cup and \cap , the charging duration must not be used for billing.

The charging duration describes the duration between defined states `[remote]StartTransaction` and `[remote]StopTransaction`. The states are defined by the OCPP backend. This means that the charging duration describes the duration of an OCPP transaction.

As a result, the charging duration also includes the following break states, which can either come from the vehicle, the charging station or the OCPP backend:

- Charging process was interrupted
- Charging process was paused by the vehicle or charging station due to a temperature violation
- Charging process is in the queue because of load management in the local charging network

The charging duration does not describe:

- Connection duration: The vehicle is typically connected to the charging station for longer than the charging process takes. The charging process does not begin until after authorization. The charging process can be ended by unplugging, although the vehicle may remain plugged in after the end of the charging process.
- Parking duration: The entire duration for which the vehicle is parked at the spot next to the charging station.

⁴ Error indicator

The error indicator indicates that an event occurred during a charging session, which is why the displayed variable cannot be used for billing.

- `E ...` Energy: The energy in the data record must not be used for billing.

4.3 Generation of log data records

In addition to a measurement data record, a log data record can also be generated and signed. Log data records are permanently stored in the measurement capsule.

A log data record contains the following information:

```
OCMF|
{
  "EV": "1.0",
  "GI": "KEBA_KCP30",
  "GS": "1234",
  "GV": "1.0",
  "PG": "L43",
```



```

"LG": [
  {
    "TM": "2019-07-01T13:22:04, 000+0000 |",
    "EV": "A",
    "CT": "5D091659.00000000.0001";
  }
]
} |
{
  "SD":
  "887FABF407AC82782WDDDD2220C2D856AE0BC22364BBCC6B
ED651D1A922BADA88818C9671AFEE7094D7F536"

```

Description of contents

Abbr.	Designation	Description/Possible values
Device information		
FV	Format and version	
GI	Meter manufacturer and designation of the charging station	
GS	Serial number of the meter	Where necessary, otherwise "0"
GV	Software version of the meter	
Local ID of the charging session		
PG	Serial number of the charging session (pagination)	"T" + serial number per device
Log entry		
TM	Time stamp	Date:Time, synchronization state
EV	Event ID ¹	A, C, E, I, L, M, O, R, S, T, B, P
CT	Error values	
Signature		
SD	Signing of the data record	Hash encrypted with a private key for the data for checking with the public key

¹ Event ID

Event ID	Description
A	Power failure
C	Update complete
E	Meter error
I	Update initialized
L	Memory usage (flash) in percent At the beginning, this is specified in increments of 10 (e.g. 10%, 20%, 30%); from memory usage of 90%, it is specified in increments of one (90%, 91%, 92%)
M	Start of commissioning mode or test mode
O	Counter overflow
R	Restart due to an update

Event ID	Description
S	System start
T	Change of the time
B	Bootloader update
P	Error

4.4 Remote transmission of data records

Measurement data records and the associated relevant log data records can be read out in signed form, which allows them to be securely transmitted to a downstream system remotely (e.g. web interface or OCPP backend). The downstream system can test the data for authenticity using the [transparency and display software](#).

How measurement data records and log data records are read out using web interface and OCPP backend is described below.

Remote transmission using the web interface

The measurement and log data records can be read out in the charging network as follows using the device's own web interface:

- 1) Enter the device web interface for the master charging station of the charging network (for further information, see "Configuration Manual").
- 2) In the "System" area, select either "Signed measurement data export" (for measurement data records) or "Signed log data export" (for log data records).
- 3) Then, select the desired device in the charging network using the serial number.
- 4) The data records are downloaded as a *.csv file.

Information

*Opening the *.csv file with a text editor is recommended. Opening the file in a spreadsheet program can cause compatibility problems during validation by the transparency and display software.*

Remote transmission using the OCPP backend

When connecting a charging station to an OCPP backend (1.5 or 1.6), the corresponding signed measurement and log data record is provided to the OCPP backend automatically at the end of a charging session.

In this process, a "transactionData" field with four "sampledValues" is sent in "StopTransaction.req". Two of those are raw values and two are signed. Sending four values guarantees compatibility with the different backends.

Signed "sampledValue" elements have the following structure:

```
value = signed OCMF Data  
context = "Transaction.Begin | Transaction.End"  
format = "SignedData"
```

Forwarding data records to customers

Forwarding data records to customers is the job of the charge point operator and is not within the scope of influence of the charging station manufacturer.

5 Using the device

5.1 Triggering the display of relevant data

In addition to the instant display for users, other information can also be shown on the display of the charging station.

- Data of the last charging process
- Sum of total transmitted energy (total counter reading of the charging station)
- Version of the calibration-related software and checksum

More specific information on the displays are described in the "Operating Instructions."

The display of this information can be triggered as follows:

- Start or restart of the charging station
- Using the brightness sensor (see below)

Trigger information display via brightness sensor

To trigger the information display, the brightness sensor (see 2.7 Brightness sensor) must be covered ("dark") and illuminated ("light") in a defined sequence. Each state ("dark" or "light") must last between 1 and 5 seconds.

Sequence: Dark > Light > Dark > Light > Dark

The states ("dark" or "light") can be generated using a flashlight. The flashlight is placed directly in front of the sensor and switched on and off in the defined sequence.

5.2 Billing

The certification of the charging station makes it possible to generate billing-related information for the transmitted energy of a charging session, including a user assignment.

Information

The conformity assessment of the charging station (measurement device and auxiliary device) provides for the use of measured values from the instant display and of remotely transmittable, signed data records. Only specifically marked information on the display and the information from the signed measurement data records may be used for billing.

Pricing is not possible on the device.

Information relevant for billing

- User/Transaction ID

- Difference of measured values (end – start)
The error indicator (EF) "E" must not be set

The following requirements must be fulfilled here:

- For the calibration validity of the installation, see 3 Requirements
- For a look at error indicators (EF), see 4.2 Generation of measurement data records

5.3 Resuming charging after a power failure

The web interface can be used to set how the charging station should behave after a power failure with a vehicle (still) plugged in. The setting is located in the following menu in the web interface: **Configuration ► Charging Parameters ► Resume After Power Cut**

The following settings are possible:

- **True:** After a power failure, the charging session is continued again with a "predefined token." This kind of charging session cannot be assigned to any customer.
- **False:** After a power failure, if a vehicle is plugged in, a new charging session does not start automatically. Renewed authorization by the user is necessary.

Information

False is set by default.

5.4 Verification of measurement data using the transparency and display software

Using the [transparency and display software](#), users can check whether the measurement data comes from a certain charging station and whether its integrity/authenticity has been maintained.

During production, the charging station gets a key pair consisting of one private key and one public key. The private key is only known to the charging station. The public key is openly available and indicated on the type plate of the charging station in the form of a QR code.

For each charging process, the charging station creates a measurement data record in the measurement capsule. The measurement capsule signs this measurement data record with the aid of the private key.

The charge point operator then uses the signed measurement data record to create the bill. Both the signed measurement data and the public key, in a format that is compatible with the transparency and display software, must be provided on the bill or in a customer portal.

After receiving the bill, the consumer can input the digitally signed measured values along with the public key into the transparency and display software. The signature verification enables the consumer to check the accuracy of the measured values. To do so, the consumer compares the values displayed in the transparency and display software with the contents of the bill. If the result of this comparison is positive, this confirms that the data record was not changed between its creation and this review.

The transparency and display software checks the following data:

- Public key, as identifier of the charging station. The public key can also be read on the type plate of the charging station.
- Correct measured energy value
- Correct user/transaction ID

Checking the signed measurement data record

To check the measurement data record, proceed as follows:

- 1) Download and install a Java Runtime Environment (available for all operating systems, usually already present, e.g. Oracle).
- 2) Download the transparency and display software from <https://transparenz.software/>
- 3) Input the following data into the transparency and display software:
 - Signed measurement data record
 - Selection of the "OCMF" format
 - Public key of the corresponding charging station

The screenshot shows a web-based interface with the following elements:

- Datensatz:** A text input field containing a signed measurement data record in OCMF format. The text is:


```
OCMF | { "FV": "1.0", "GI": "KEBA_KCP30", "GS": "19356984", "GV": "2.8.3", "PG": "T108", "IS": true, "IL": "HEARSAY",
      "IF": "RFID-PLAIN", "OCPP_NONE", "ISO15118_NONE", "PLMN_NONE", "IT": "ISO14443", "ID": "DD34EE8F", "RD": [
      { "TM": "2019-06-11T12:47:43,000+000 I", "TX": "B", "EF": "", "ST": "G", "RI": 1530.6346, "RU": "kWh" }, {
      "TM": "2019-06-11T17:09:45,000+000 R", "TX": "E", "EF": "", "ST": "G", "RV": 1550.8650, "RI": "1-b:1.8.0", "RU": "kWh" }
      ] } | { "SD": "3045022024BD092E86BB6EABA566A0EFBB5D4E7095693C882E5453F90984A1
      E1A4D1C88C02210089D35386AE9431AEDCA446B79DD8B57DD031BA3ACE0455CE2F9D4BD9CAE165D4" }
```
- Format:** A dropdown menu currently set to "OCMF".
- Öffentlicher Schlüssel:** A text input field containing a public key:


```
3059301306072A8648CE3D020106082A8648CE3D030107034200047D159DA66E79EB3E68EFE3A7CA5679203
      63145B897222F7876A2B95DEF88A7CF853669EEA6A3EE451949DE0E85FC89FA7C$E1902F738D66BF8AC69A2
      AB4D2C6
```
- Überprüfen:** A black button with white text at the bottom center.

- 4) After entering the necessary data, the check can be started.
- 5) After this check is complete, it must be checked whether the results of the signature verification match the information on the bill.



Ihre Daten wurden verifiziert

Zählerstand

start
1530,6346 kWh
11.06.2019 12:47:43 (lokal) (informativ)

stop
1550,8650 kWh
11.06.2019 17:09:45 (lokal)

Differenz:
20,2304 kWh
4h 22m 02s

[Details anzeigen](#)

Schließen

6 Calibrating the device

6.1 Calibration

After module B and module D, the device is assessed for conformity in accordance with MessEG in compliance with calibration law. The manufacturer puts the device on the market in compliance with calibration law.

The charging station must be calibrated exclusively by a specifically authorized institution. Calibration may only be performed on a charging station with an intact meter seal on the front part. This seal also must not be removed during or after calibration.

A calibration seal and stamp are placed as described in Chapter 6.4 Applying the calibration stamp and seal after a complete calibration.

Maintenance

The device is maintenance free. The applicable periods for the validity of calibration must be observed. Compliance with the points listed under 3 Requirements must be guaranteed over the entire service life.

6.2 Inspection of commissioned devices

In this section, the tests are described that must be performed as part of the inspection of commissioned devices. All tests must be performed for each charge point.

The tests described here depict a permitted procedure. Analogous alternatives may be permitted at the discretion of the parties performing the inspections.

Essentially, the tests include the following categories:

- Condition inspections
- Functional tests, including accuracy checks
- Billing control

6.2.1 Condition inspection

The charging station must be tested for agreement with the type examination certificate:

- Physical structure of the charging station
- Meter and auxiliary module used
- Type plate inscriptions
- Stamps/seals

6.2.2 Functional tests, including accuracy checks

The following testing devices and test software are required for testing:

1. Electrical test load that simulates an electric vehicle with at least two different current levels, which can be used to draw energy from the charging device.
2. A cable adapter that simulates an electric vehicle that is plugged into the dispensing point of the charging device.
3. A normal performance measuring device that is connected between the adapter mentioned in Point 2 and the test load mentioned in Point 1. The normal performance measuring device must be metrologically traceable, in the terms of § 47 MessEG.
4. Means of identification in order to be able to initiate a charging process at the charging device.

For testing, at least two complete charging processes must be performed with the charging station. In doing so, different means of identification (e.g. RFID card and remote start) must be used.

To check the function and accuracy, proceed as follows:

- 1) Connect the cable adapter that simulates the electric vehicle to the charging station.
- 2) Connect the normal performance measuring device between the cable adapter and test load that simulate the electric vehicle.
- 3) Initiate the charging process using the means of identification selected first (e.g. RFID card).
- 4) Watch the energy output over the display. The transmitted energy shown on the display increases with current flow.
- 5) End the charging process by unplugging the plug.
- 6) Repeat the steps above with the second means of identification (e.g. remote start).

It is assumed that the accuracy of the measurement of the energy output by the charging station is primarily determined by the electricity meter, in compliance with calibration law, and the corresponding declaration of conformity of the charging station manufacturer. It is therefore sufficient to measure the accuracy at a singular operating point and perform a no-load test for each charging station.

The measurement deviation of the charging station is determined using what is known as the continuous activation method, by comparing the work measured within the same time period for the charging station on the one hand, and for the normal performance measuring device on the other. The length of time must be allotted so that the smallest digit of the kWh value that is displayed remotely, in compliance with calibration law, changes value at least 100 times between the start and end of the measurement and at least 500 Wh of energy are transmitted.

The remote display, in compliance with calibration law, must be checked as follows:

- Take the signed measurement data records from the auxiliary device of the charging station and check the signature using the transparency and display software.
- During the charging process, the progressing kWh display is shown on the display of the calibration law-compliant charging station.
- The measurement deviation of the charging station must not exceed the value specified by DIN EN 50470-3 for class A meters.

6.2.3 Billing control

To perform the billing control, proceed as follows:

- 1) Obtain the data record consisting of multiple data packets with signatures from the charging station. The EMSP provides this data record to the customer over their portal along with the bill. For additional information, see 4.4 Remote transmission of data records.
- 2) Take the signed data packets from the EMSP software.
- 3) Check the signature using the transparency and display software, see 5.4 Verification of measurement data using the transparency and display software.

6.3 Testing in test mode

In order to activate test mode, the seal on the connection panel cover (user seal) must be removed. This may only be done in consultation with the operator.

6.3.1 Test mode

In test mode, the charging station behaves as follows:

- The contactor is switched on for 3 hours to allow power transmission for test purposes.
- The CP "Control Pilot" communication cable is fixed at 12 V to prevent a vehicle from charging. The power must be drawn off by means of a special load.
- DC residual current detection is deactivated. This is necessary to enable a measurement despite poor synchronization of the current sources of the test device (≥ 6 mA direct current).
- Monitoring of the contactor function (weld detection and read-back contact) is deactivated. This is necessary due to the special behavior of the energy source in the test device.
- The pulse LED (see 2.8 Pulse LED) flashes with 10.000 light pulses per transmitted kilowatt hour. With a special testing device, the energy transmitted by the charging station can be compared with the light pulses of the pulse LED. This comparison allows conclusions to be drawn about the accuracy of the energy detection and energy display.

- The display shows the total energy in 0.1 Wh ("Σ Wh").
- Segment S3 on the LED bar lights up orange and segment S1 flashes green.
- Test mode starts with a counter that is incremented by one every second. This function allows for the timekeeping of the device to be checked. Once energy is flowing, this is also indicated.

Information

In test mode, there is no change in the mode of operation or measurement accuracy of the active power meter. Only the resolution of the display is changed.

The transmitted energy in test mode is saved in a measurement data record.

In the following table, the behavior of the charging station is compared for modes "operation", "error", "commissioning" and "test mode."

	Operation	Error	Commissioning	Test mode
ON time of contactor	-	x	10 minutes	3 hours
CP signal (Control Pilot)	on	specific	12 V	12 V
DC residual current detection	on	x	off	off
Contactor monitoring	on	x	on	off
Pulse LED	off	x	off	on
Resolution of the total energy display	0.1 kWh	x	0.1 Wh	0.1 Wh
Active power meter (energy meter)	on	x	on	If energy = 0: off (only charging duration is displayed) If energy > 0: on (energy is displayed)
Generation of measurement data records	on	on	on	on

x ... State not known in case of error

6.3.2 Schematic measurement setup

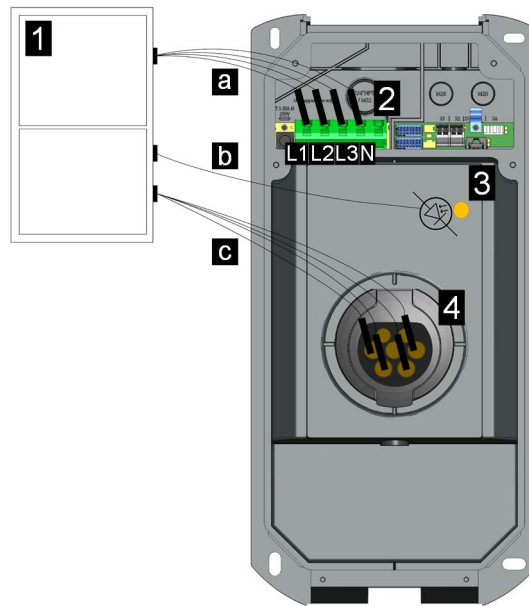


Fig. 6-5: Schematic measurement setup

1 ... Test device	2 ... Supply terminals (L1, L2, L3 and N)
3 ... Pulse LED	4 ... Charging socket
a ... Test probes (energy source)	b ... Evaluation unit for pulse LED
c ... Test probes (sink)	

A test device is connected to the charging station for the measurement. On the input side, the test probes are connected to the supply terminals. On the output side, the test probes are inserted into the contacts of the charging socket. The pulse LED is evaluated with the evaluation unit.

6.3.3 Activate/deactivate test mode

Test mode is activated and deactivated in the charging station connection panel. To access the connection panel, the housing cover and the connection panel cover must be removed. For a description of how to remove the covers, see "Operating Instructions".

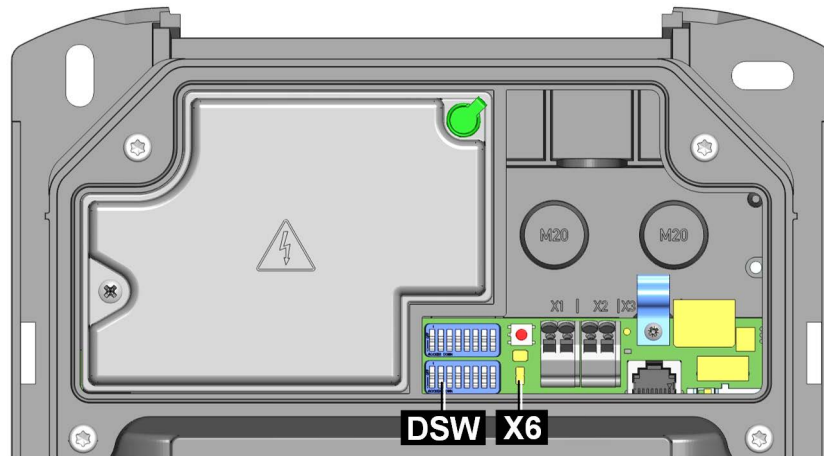


Fig. 6-6: Connection panel: Elements for activating/deactivating the test mode

DSW ... DIP switch

X6 ... Pin strip for jumpers

Activate test mode

Information

Before the test mode is activated, the current setting of the DIP switches should be noted so that the DIP switches can then be set back to their original values.

Necessary aids: Jumper

To activate the test mode, proceed as follows:

- 1) Switch off the supply voltage of the charging station.
- 2) Set the jumper on the pin strip for the jumper **X6**.
- 3) Set the DIP switches for the charging current to 32 A:
DSW1.6 to ON
DSW1.7 to OFF
DSW1.8 to ON
- 4) Set the DIP switch for commissioning mode **DSW2.8 to ON**.
- 5) Switch on the supply voltage of the charging station.

Test mode is activated.

Deactivate test mode

To deactivate the test mode, proceed as follows:

- 1) Switch off the supply voltage of the charging station.
- 2) Remove the jumper from the pin strip **X6**.
- 3) Set the DIP switch for commissioning mode **DSW2.8 to OFF**.
- 4) Set the DIP switches for the charging current back to the original value.

- 5) Switch on the supply voltage of the charging station.
Test mode is deactivated.

6.4 Applying the calibration stamp and seal

Calibration stamp

The calibration stamp must be affixed so that it is clearly visible at the bottom right of the front part.



1 ... Calibration stamp	
--------------------------------	--

Calibration seal

If a calibration seal is needed as additional protection for the meter seal (manufacturer seal), it must be applied on one of the positions marked below. The calibration seal must be applied on the left or right bottom corner between the front part **1** and the lower unit **2** with the housing cover removed.

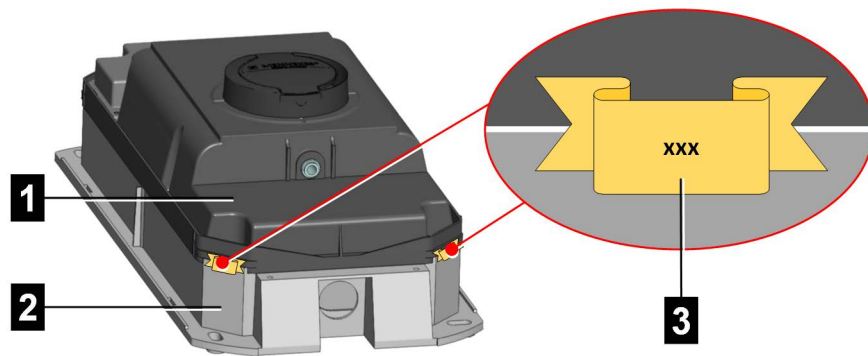


Fig. 6-7: Positions of the calibration seal

1 ... Front part	2 ... Lower unit
3 ... Calibration seal	

7 Disposal

General information on the disposal of the charging station can be found in the "Installation Manual."

It must be ensured that the data from the measurement capsule is permanently available despite disassembly/disposal. "Permanently" means not only that the data must be stored until the conclusion of the business transaction, but also at least until the expiration of any legal periods for appeal for the business transaction. For non-existent data, replacement values must not be created for billing purposes.