

# **KeContact**

**P40, P40 Pro MID**

**Charging Station**

**Manual for measuring point operators V 1.00**

**Translation of the original instructions**



Automation by innovation.

Document No.: 132017 | Published: 01.2025  
Document: V 1.00  
Pages: 24

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# 1 Introduction

This manual is valid for KeContact P40 variants with an installed MID<sup>1)</sup> meter (KC-P40-xxxxx-xxxxxMxx-...).

The components shown in this manual are example graphics. The figures and explanations refer to typical product designs. The design of your product may differ.

<sup>1)</sup> MID (Measuring Instruments Directive): European Measuring Instruments Directive 2014/32/EU

## 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 relevant functions, properties and device-specific requirements for compliant operation of relevant KeContact P40 variants with an MID energy meter and is geared toward measuring point operators.

## 1.3 Requirements

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

Target group	Required knowledge and abilities
Measuring point operator	<p>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.</p> <p>Knowledge about:</p> <ul style="list-style-type: none"> <li>• Currently valid safety regulations</li> <li>• The method of operation of the energy meter</li> <li>• The displays of the energy meter</li> <li>• The legal requirements for the operation of specific measuring points</li> </ul>

## 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.

All safety notes in other manuals of the product must be observed.

The instructions in this manual must be followed precisely for compliant use of the measurement device. Regardless of the device-specific information described in this manual, the general specifications for the operation of measuring points must be complied with.

## 1.5 Additional documentation

Designation	Target group
Operating instructions	<ul style="list-style-type: none"> <li>• End customer</li> <li>• Electricians</li> </ul>
Installation instructions	<ul style="list-style-type: none"> <li>• Electricians</li> </ul>
Brief instructions	<ul style="list-style-type: none"> <li>• End customer</li> <li>• Electricians</li> </ul>

Manuals and additional information are available on our website:  
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## 2 Description of the device

### 2.1 Charging station design



<b>1</b> ... Lower unit	<b>2</b> ... Terminals (supply)
<b>3</b> ... Terminal cover	<b>4</b> ... Protective cover
<b>5</b> ... Housing cover	<b>6</b> ... KC-MS10 module
<b>7</b> ... Connector panel (interfaces)	<b>8</b> ... Application module

The MID variants of KeContact P40 contain a KC-MS10 module, which is certified as an active power meter in accordance with the European Measuring Instruments Directive (MID) 2014/32/EU.

The following chapters describe the KC-MS10 module as an MID device exclusively.

### 2.2 Removing the KC-MS10 module

To remove the KC-MS10 module (MID device) from the charging station, proceed as follows:

- 1) De-energize the charging station and secure it from being switched on again.
- 2) Remove the housing cover.
- 3) Unscrew the 4 screws of the protective cover and remove the protective cover.
- 4) Remove the terminal cover and disconnect the supply line.
- 5) Terminate any control lines (LAN cable, etc.), if present.

- 6) Unscrew the 2 mounting screws of the KC-MS10 module on the underside.



- 7) Unlock the mounting unit of the charging cable and remove it from the charging station housing.
- 8) Lift the KC-MS10 module at the bottom and remove it from the housing.

## 2.3 Description of the MID device

The MID variants of KC-MS10 are certified as active power meters in accordance with the European Measuring Instruments Directive (MID) 2014/32/EU.

Special markings on the KC-MS10 type plate allow for clear identification. The associated type examination refers to the KC-MS10.

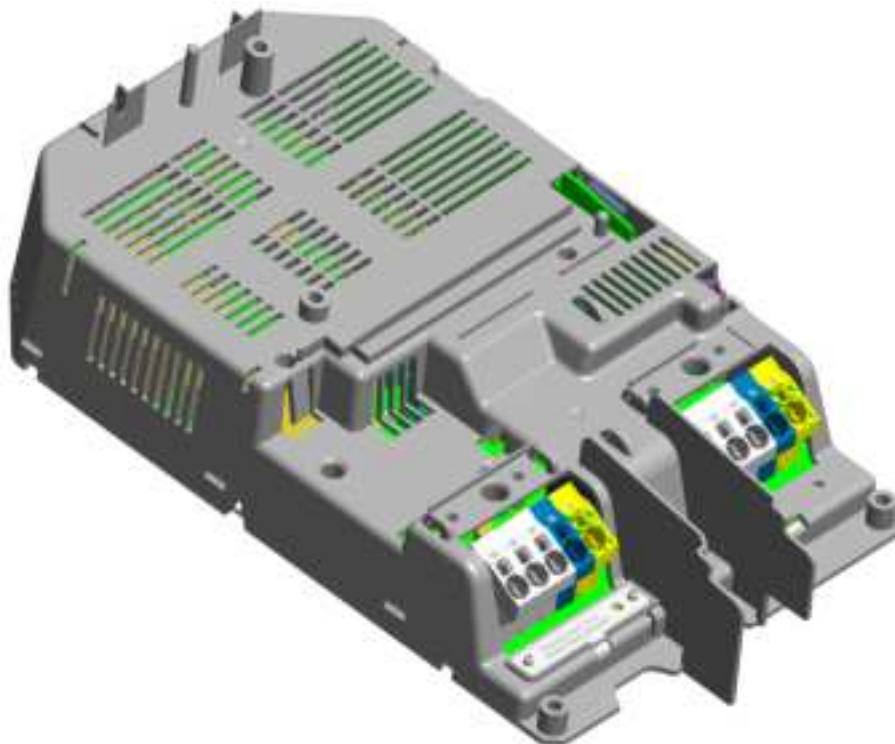
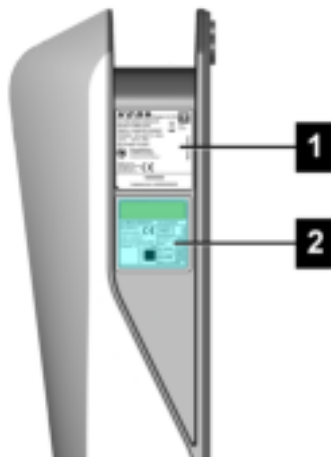


Fig. 2-1: Overview of KC-MS10

## 2.4 Type plate



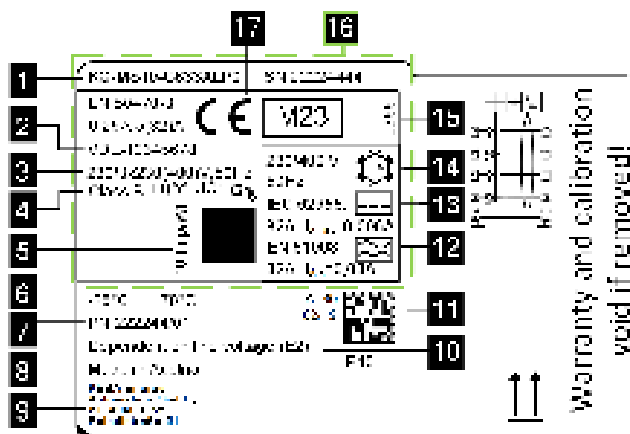
**1** ... Type plate of the charging station

**2** ... Type plate of the installed KC-MS10 module

The two type plates are located on the right side of the charging station.

The type plate shown is an example. The actual data on the type plate depends on the device variant.

### Type plate of the KC-MS10 (MID)



**1** ... Product key / Serial number

**2** ... Type examination number

**3** ... Electrical data

**4** ... Accuracy class

**5** ... Meter constant

**6** ... Operating temperature range

**7** ... Material number

**8** ... Country of manufacture

**9** ... Manufacturer address

**10** ... Production location and date

**11** ... Serial number as a QR code

**12** ... Electrical data of RCD (residual current detection)

**13** ... Electrical data of RDC (DC residual current monitoring)

**14** ... Electrical data of RCD+RDC

**15** ... Marking of the approval

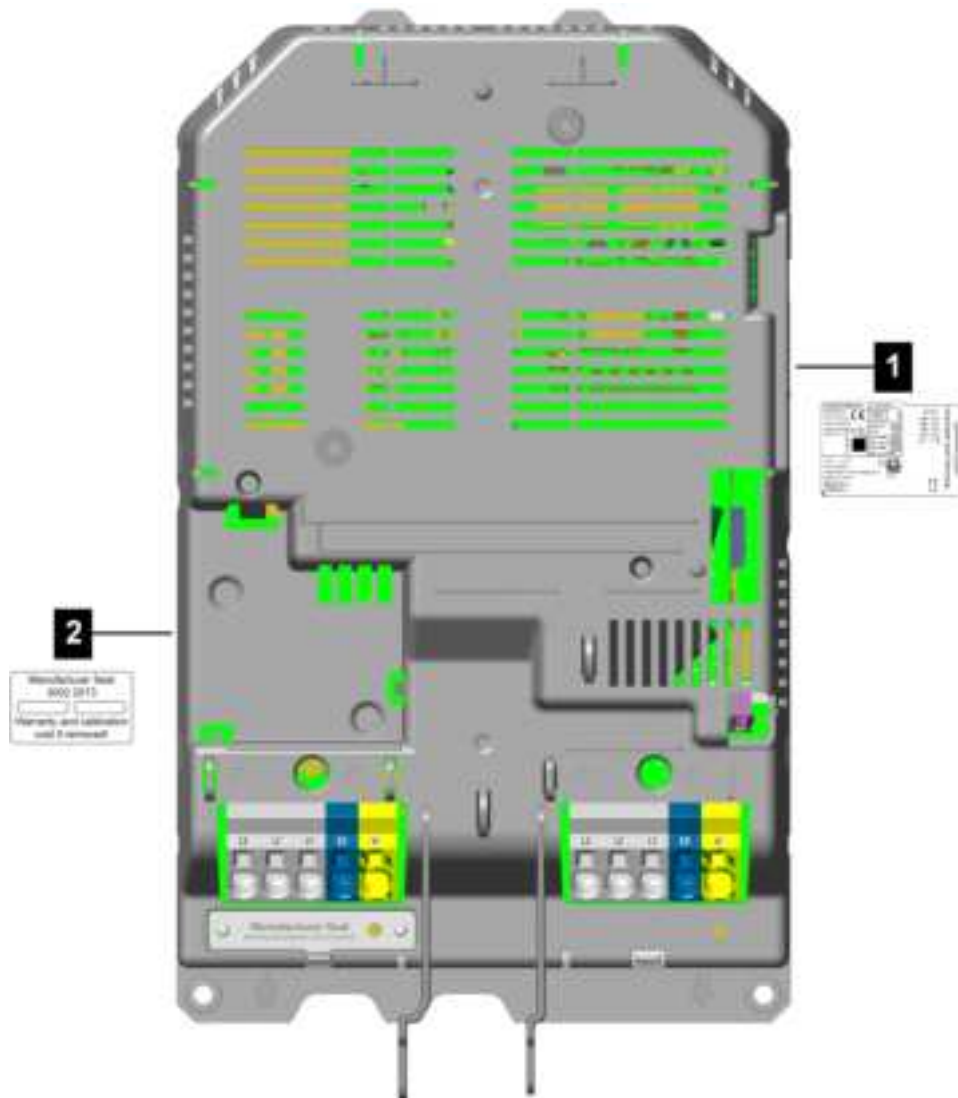
**16** ... Portion of the type plate visible through the window in the outer housing

**17** ... CE mark



## 2.5 Manufacturer's seal

### Position of seal



**1** ... Type plate (sticker)

**2** ... SaMC Manufacturer Seal (sticker)

The manufacturer's seal consists of the following elements:

- Type plate (sticker) on the right side of the KC-MS10.
- SaMC Manufacturer Seal (sticker) on the left side of the KC-MS10.

**The removal or destruction of one of the calibration seals indicates that inner parts of the KC-MS10 have been accessed and results in the loss of calibration validity.**

A gap effect makes tampering evident, as a checkerboard pattern is left behind when the label seal is removed.

## 2.6 Sealing (charge point operator)

The lead seal of the charge point operator is applied in the field after successful installation of the charging station and serves to protect the supply terminals from unwanted access. The following options are available:

### Sealing the protective cover



The lead seal of the protective cover makes unauthorized access to the interior of the device visible. This secures access to the power supply connection, basic electrical settings and changes to the components, among other things.

The lead seal, which can be selected by the operating company of the charging station, is applied to the protective cover of the housing and is used to protect the installed measurement device from unwanted access.

## 2.7 Product key (overview of variants)

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

Devices that are approved as active power meters in accordance with MID 2014/32/EU, accuracy class B, have an **M** in the product designation:

KC-MS10-xxxxx**M**xx.

<div>KC-MS10 - C 6 3 3 A M P 0</div> <div>I V VI VII VIII IX X XI XII</div>		
Designation system (example)		
<i>I</i>	<i>Device series</i>	<b>KC-MS10</b> ...Device generation
<i>V</i>	<i>Connector</i>	<b>C</b> ...type 2 cable <b>P</b> ...type 2 cable with protective cap <b>T</b> ...type 2 cable with shutter <b>N</b> ...cable variant, no cable attached
<i>VI</i>	<i>Cable</i>	<b>0</b> ...no cable <b>4</b> ...cable 4m <b>6</b> ...cable 6m
<i>VII</i>	<i>Phases</i>	<b>1</b> ...1 phase <b>3</b> ...3 phases <b>S</b> ...3 phases→1 phase (phase switching)
<i>VIII</i>	<i>Maximum Charging Current</i>	<b>1</b> ...16 A <b>3</b> ...32 A
<i>IX</i>	<i>RCD functionality</i>	<b>A</b> ...RCCB Type A + RDC-DD <b>D</b> ...RDC-DD
<i>X</i>	<i>Metering</i>	<b>0</b> ...not equipped <b>E</b> ...functional, not calibrated <b>M</b> ...MID (Measuring Instruments Directive) certified <b>L</b> ...MessEV (Mess- und Eichverordnung) certified
<i>XI</i>	<i>PLC</i>	<b>0</b> ...not equipped <b>P</b> ...PLC communication
<i>XII</i>	<i>Future options</i>	<b>0</b> ...none

## 2.8 Display for energy meters

All KC-MS10 variants with a calibrated energy meter have an LCD display. It enables visualization of all relevant information, including that of the energy meter.

Outside of the sleep state, the relevant information is displayed permanently. For improved readability, the backlighting of the display is activated in case of relevant charge events.

Relevant events are:

- Start of a charging session
- Plugging in the charging cable
- End of the charging session
- Unplugging the charging cable

### Display for calibrated energy meters



**1** ... LCD display (two lines)

Variants with an installed calibrated energy meter have an LCD display on the right side. This display shows the status of the energy meter and additional information.

2.8.1 Information on the display

<div>99999.9999 kWh</div> <div>01.00.00 AB12</div>	Normal operation
<div>99999.9999 kWh</div> <div>01.00.00 ERROR</div>	Relevant error Counter still valid
<div>----- kWh</div> <div>01.00.00 ERROR</div>	Relevant error Counter not valid
<div>99999.9999 kWh</div> <div>01.00.00 AB12 *</div>	Normal operation New log entry

Fig. 2-2: MID displays

If the device is in the sleep state, no information is displayed. In the sleep state, the system prohibits the transmission of energy (for details, see "3.2 Operational readiness").

Short description of the displays

Line 1:	99999.9999 kWh	Total sum of the energy registered by the device in [kWh] for all charging sessions to date.
Line 2:	01.00.00	Firmware version
	AB12	Checksum
	*	New log entry present.
	Error	Relevant error on the KC-MS10, the module is out of operation. Operation can only be restored by replacing the charging station or the KC-MS10 module. If an energy meter reading is displayed, this count value is correct despite the error.

## 3 Active power meters

### Information

The maximum meter reading is 99999.9999 kWh. If this value is exceeded, the meter starts at "0" again.

### 3.1 Non-return device

The measurement device has an integrated non-return device. Energy is only recorded if it flows from the supply terminals to the output terminals (charging cable).

### 3.2 Operational readiness

The meter function is active in every operating mode in which energy is flowing through the device. If the KC-MS10 module is in the sleep state, the main relay is open, which prevents the transmission of energy.

### 3.3 Measurement principle

The transmitted energy is measured in all active phases.

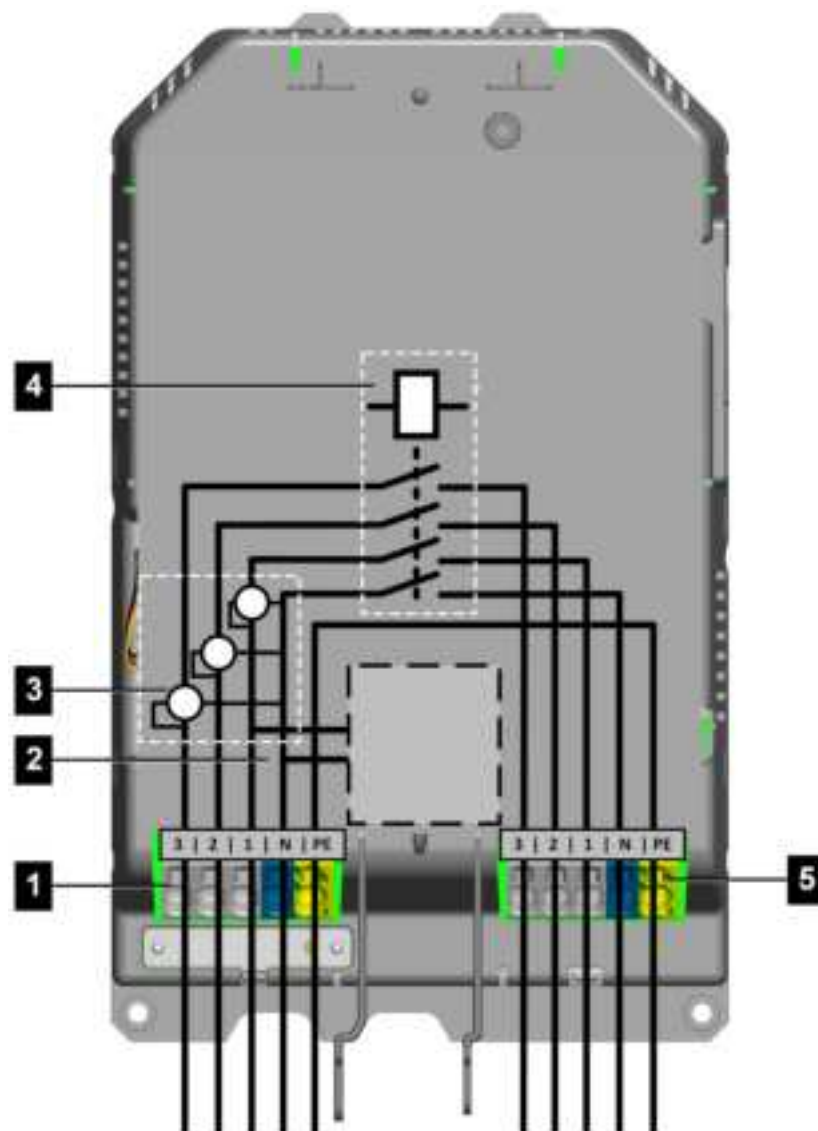


Fig. 3-3: Measurement scheme

<b>1</b> ... Power supply to the supply terminals	<b>2</b> ... Power tap for internal supply: Before the active power meter
<b>3</b> ... Power measurement/active power meter	<b>4</b> ... Switching element
<b>5</b> ... Outlet for charging cable	

The switching element (4) refers to the additional function of the KC-MS10 and is not part of the meter function.

## 4 Operation of the KC-MS10 as a measuring point

During the setting and calibration of the energy meter by the manufacturer as well as during commissioning, energy flows through the device. For this reason, the energy meter reading on the display is not "0" after completing installation.

### 4.1 Checking the compliant state of the device

To get a valid reading on the energy meter value, the following points must be checked:

- The integrity of the energy meter and its associated components must be checked.
- The device must be within the calibration period. The information can be found on the type plate of the device and is marked with the letter "M", followed by the last two digits of the calibration year.
- Use of a suitable device type.
- Correct function and readability of the display.
- Display of the correct firmware version according to the type examination certificate on the display.
- All calibration seals must be present and undamaged.
- Correct installation of the device and energy meter in compliance with national and regional regulations.
- Operation according to the operating conditions.

### 4.2 Permitted MID software version

A device with an installed KC-MS10 measurement device includes conformity-relevant and non-relevant software parts:

#### Firmware assessed for conformity

- Firmware version: 01.02.02
- Checksum: 89A1

### 4.3 Periodic checking

To minimize damage due to failures, it is recommended that you read the meter and thus check the compliant state of the device in reasonable intervals.

If the device is in a non-compliant state during the check, it must be assumed that the meter reading is invalid back to the last valid reading.

### 4.4 Correctly reading the energy meter

All KC-MS10 variants with a calibrated energy meter have an LCD display. It enables visualization of all relevant information, including that of the energy meter.

Outside of the sleep state, the relevant information is displayed permanently. For improved readability, the backlighting of the display is activated in case of relevant charge events.



Relevant events are:

- Start of a charging session
- Plugging in the charging cable
- End of the charging session
- Unplugging the charging cable

## **4.5 Displays of calibratable energy meters**

For details on the display, see chapter "[2.8.1 Information on the display](#)."

## **4.6 Firmware update**

KeContact P40 supports updates to the legally relevant firmware. An update is triggered through the connected gateway (application module). Only firmware versions approved by the notified authority are installed on the device.

Updates to the relevant firmware may require additional approval by the local authorities.

## 5 Calibrating the device

The calibration of the energy meter must be performed by an authorized authority. The calibration requires a successfully passed condition inspection.

To perform the calibration, the energy meter must be set to calibration mode. In this mode, all functions required to perform calibration that are deactivated in normal operation are activated. The accuracy of the installed energy meter can be checked by comparing the energy output displayed by the optical test output (pulse LED) with the value of the reference meter used by the calibration authority.

### 5.1 Calibration mode

If you set KC-MS10 to calibration mode, the functions required for the calibration are enabled:

- Main relay is closed.
- Pulse LED is active and flashes at 10000 pulse/kWh.
- Additional functions<sup>1)</sup> of KC-MS10 are deactivated.

In calibration mode, neither the mode of operation nor the measurement accuracy of the active power meter change. The energy transmitted in calibration mode is therefore added to the total energy meter.

<sup>1)</sup>...KC-MS10 is capable of executing charging sessions in accordance with IEC 61851. In calibration mode, the Control Pilot voltage is set so that the device cannot execute any charging processes in accordance with IEC 61851.

KC-MS10 has integrated functions of an RCD and RDC device. In this mode, these functions are disabled. This prevents the RCD function of the device from being triggered unintentionally during the test.

Monitoring of the contactor function (weld detection and read-back contact) is deactivated.

### 5.2 Activating calibration mode

For calibration mode, a specific test firmware is required as a software update; this can be provided by the manufacturer on request. To activate calibration mode, proceed as follows:

- Install the specific test firmware using the normal software update process.

Calibration mode is activated.

### 5.3 Optical test output (pulse LED)



**1** ... Optical test output

The optical test output is a pulse LED located behind the type plate, which is visible from the outside through a corresponding opening.

## 5.4 Schematic measurement setup

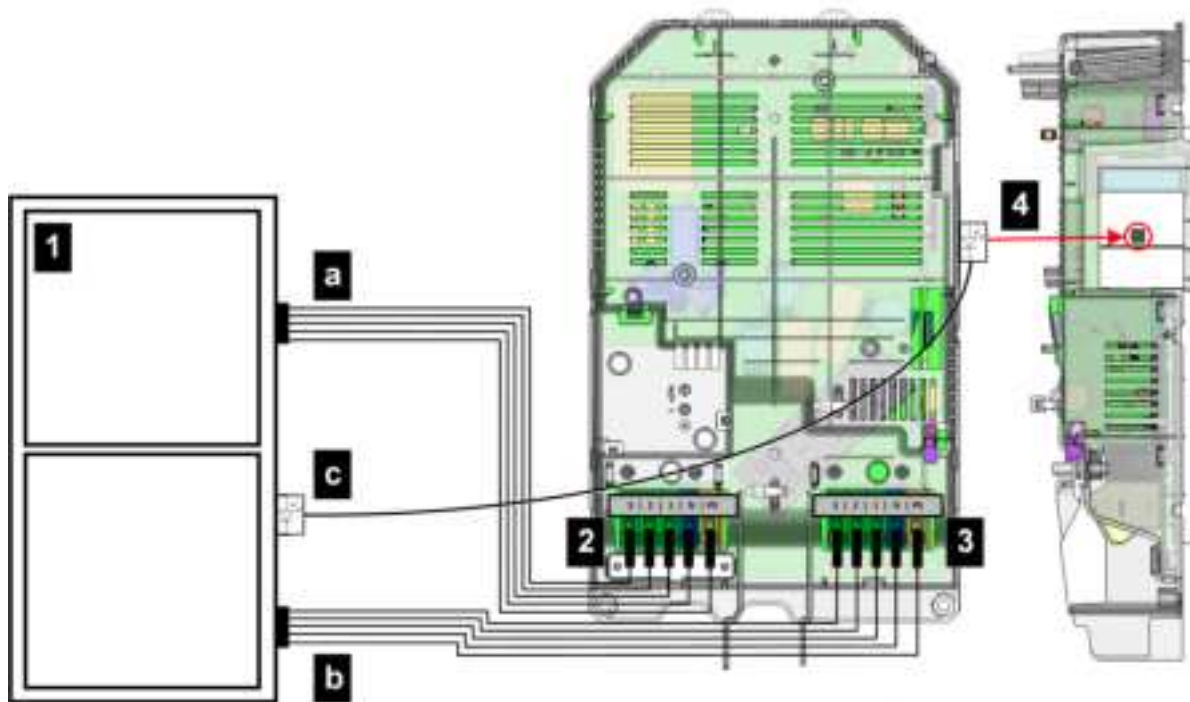


Fig. 5-4: Schematic measurement setup

<b>1</b> ... Calibration test system	<b>2</b> ... Supply terminals
<b>3</b> ... Output terminals (charging cable)	<b>4</b> ... Optical test output (pulse LED)
<b>a</b> ... Connection lines (source including voltage measurement)	<b>b</b> ... Connection lines (sink)
<b>c</b> ... Evaluation unit for pulse LED	

The calibration test system is connected to the energy meter. The voltage is tapped according to the evaluation point at the supply connection on the supply terminals. The test probes are connected to the output terminals on the output side. The optical test output must face the counterpart of the calibration test system.

## 6 Maintenance

The KC-MS10 module is inherently maintenance free. However, periodically reading the meter is still recommended.

In case of error, the KC-MS10 module must be replaced.

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