

Installation and Configuration Manual FEMS-Package 3-Phase Sensor 65 A (KDK 4PU)

Version:2026.08.1

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1. Introduction

1.1. Legal provisions

Unless otherwise stated, the information contained in these documents is the property of FENECON GmbH. Publication, in whole or in part, requires the written consent of FENECON GmbH.

These instructions do not claim to be complete or correct. It merely serves as an abridged version of the original instructions from KDK Dornscheidt.

Online: https://www.kdk-dornscheidt.de/produkte/420565pro20-u/

Subject to changes and printing errors!

1.2. Qualification of the installer

A qualified installer is a person who has the following experience and training:

- Setting up, switching on, switching off, disconnecting, earthing, short-circuiting and repairing circuits and devices
- Standard maintenance and use of protective devices in accordance with current safety standards
- First aid/emergency care
- Current knowledge of local regulations, standards and guidelines

1.3. Dangers and safety instructions

The meter must be installed by a qualified specialist.

The manufacturer’s installation and service instructions must be observed.

2. Product description

2.1. Scope of delivery

After you have received the delivery, check that all components have been included. Inspect the scope of delivery for damage. If anything is missing or damaged, please contact the supplier immediately. The following components are included in the delivery:

- KDK Dornscheidt 4PU
- Installation and Configuration Guide for the FEMS 3-Phase Sensor Package 65 A (KDK 4PU)
- Installation instructions for KDK Dornscheidt 4PU (Online, available in German: https://www.kdk-dornscheidt.de/wp-content/uploads/2021/08/KDK-Bedienungsanleitung_420565PRO20-U_4PU_052021V1.00.pdf)

2.2. Prerequisites

To use the 3-phase sensor, the following is required:

- FENECON Energy Management System (FEMS)

FEMS is being developed as an open source project under the name "OpenEMS" together with many other companies and institutes in the "OpenEMS Assocation e.V.". More information:

FEMS App: https://www.fenecon.com/fems-apps/

OpenEMS: https://www.openems.io

FEMS is a product component of the integrated FENECON power storage systems and other product combinations of battery inverters and batteries. You can find more information about this at https://fenecon.de/.

2.3. Model overview

The KDK meter is a modular active and reactive energy meter that can count and display the energy consumed. It is designed for three-phase grids and enables direct connection up to 65 A. The meter is equipped with a MODBUS communication bus.



Image 1. 1420565PRO20-U (4PU)

2.3. Model overview

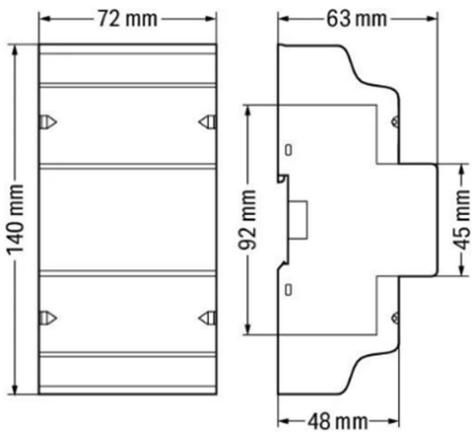


Image 2. Dimensions

Height without cover	95 mm
Height w. cover	140 mm
Width	72 mm
Depth	63 mm
Weight (net)	0.34 kg

3. Connection

The meter is electrically connected through the 3 phases and the neutral conductor in accordance with the original instructions. The meter has an input and output for connecting the phases. If these are connected incorrectly, the meter may later output a negative value in Online Monitoring.

3.1. Terminal designation

The push-in technique can be used for solid conductors, fine-stranded conductors and fine-stranded conductors with wire ferrule. For fine-stranded conductors, the levers must be opened for connection.

Cross-section of the connection terminals:

WAGO Series 2616 — Main terminal blocks:

Single-wire conductors

0.75 … 16 mm^2 / 18 … 4 AWG

Fine-stranded conductors

0.75 … 25 mm^2 / 18 … 4 AWG

Fine-stranded conductors with wire ferrule and plastic collar

0.75 … 16 mm^2

WAGO Series 2604 — Additional terminal blocks:

Single-wire conductors

0.2 … 4 mm^2 / 24 … 12 AWG

Fine-stranded conductors

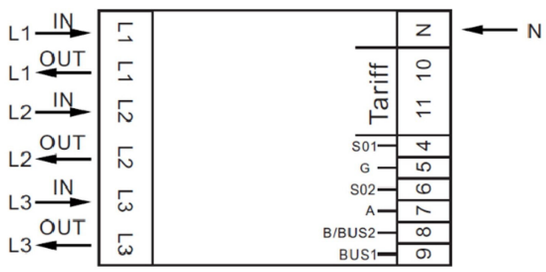
0.2 … 4 mm^2 / 24 … 12 AWG

Fine-stranded conductors with wire ferrule and plastic collar

0.25 … 2.5 mm^2

4PU — 3P4W

3.1. Terminal designation



IN L1: Input L1 — OUT L1: Output L1
IN L2: Input L2 — OUT L2: Output L2
IN L3: Input L3 — OUT L3: Output L3
N: Neutral
4: S0 output 1 () + 5: Ground for S0 (-) + 6: S0 output 2 ()
7: Modbus (A)
8: Ground for Modbus (B)/M-Bus (-)
9: M-Bus (+)
10, 11: Tariff (230 V AC)

3.2. Connection to a generator

The meter must be connected to the generator (inverter) as shown below:

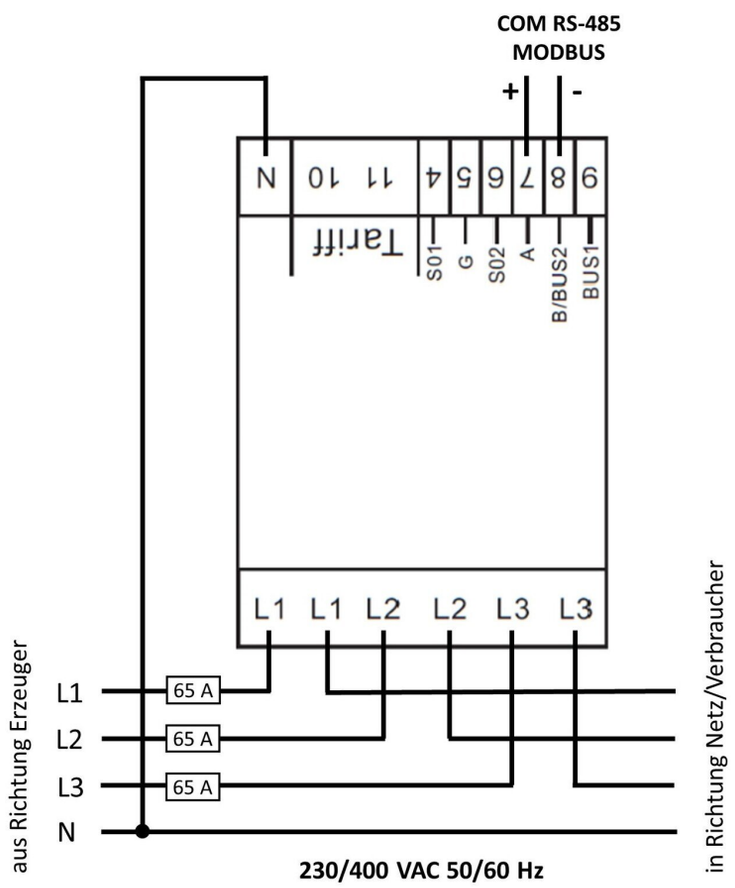


Image 3. Connection — Generator

3.3. Connection to the meter of the metering point operator

The meter must be connected to the metering point operator's meter as shown below:

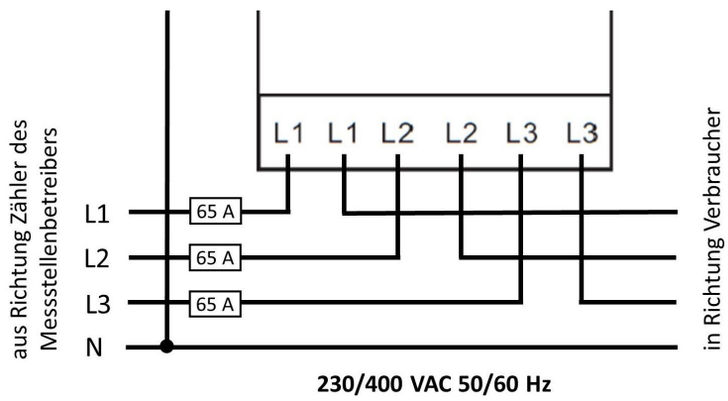


Image 4. Connection — Meter — Metering point operator

3.4. Connection to a consumer load

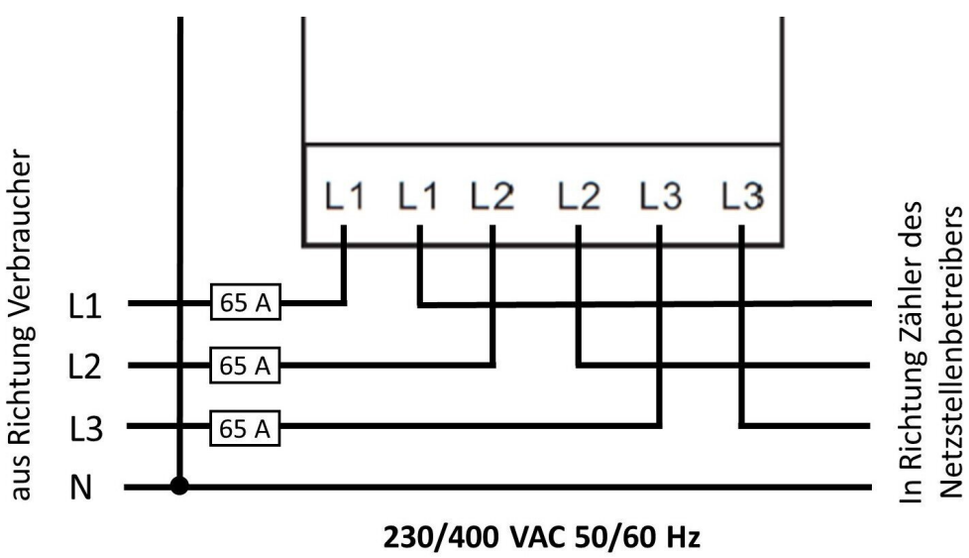


Image 5. Connection — Consumer load

4. Communication

The Modbus communication available with the 4PU takes place via a serial RS485 interface (2- or 3-wire), which enables the device to be operated from FEMS. In the standard configuration, 32 devices can be connected to a PC or a controller over a distance of 1,200 meters via an RS485 interface.

A twisted pair cable is recommended to protect against magnetic fields.

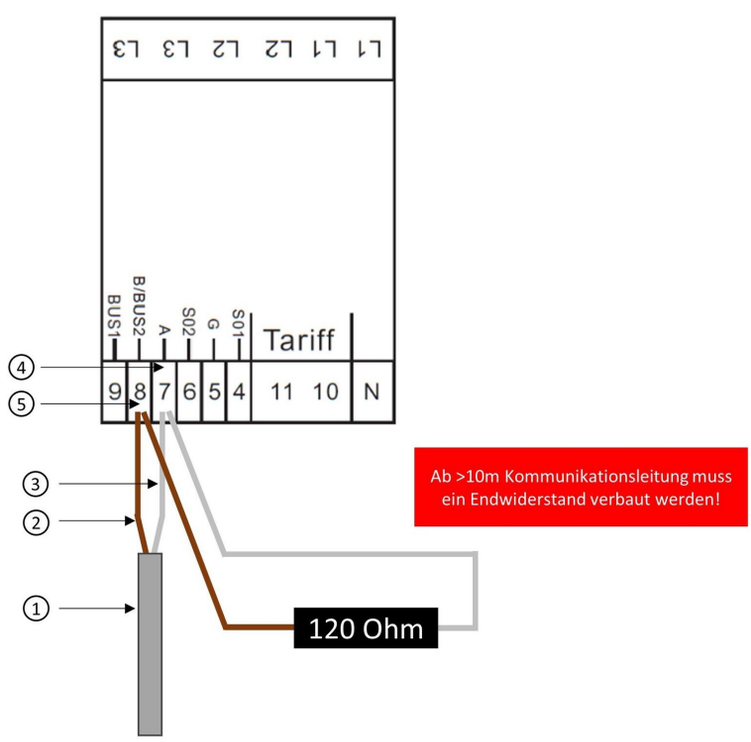


Image 6. Wiring — RS485

1. COM-RS485 connection from FEMS direction
2. Data conductor Positive (+) (A conductor)
3. Data conductor Negative (-) (B conductor)
4. Minus (-) contact
5. Plus (+) Contact

To connect several meters in series, the RS485 connection must be looped through, as shown in the figure below.

Note the connection of the terminating resistor (120 Ω/0.25 W)!

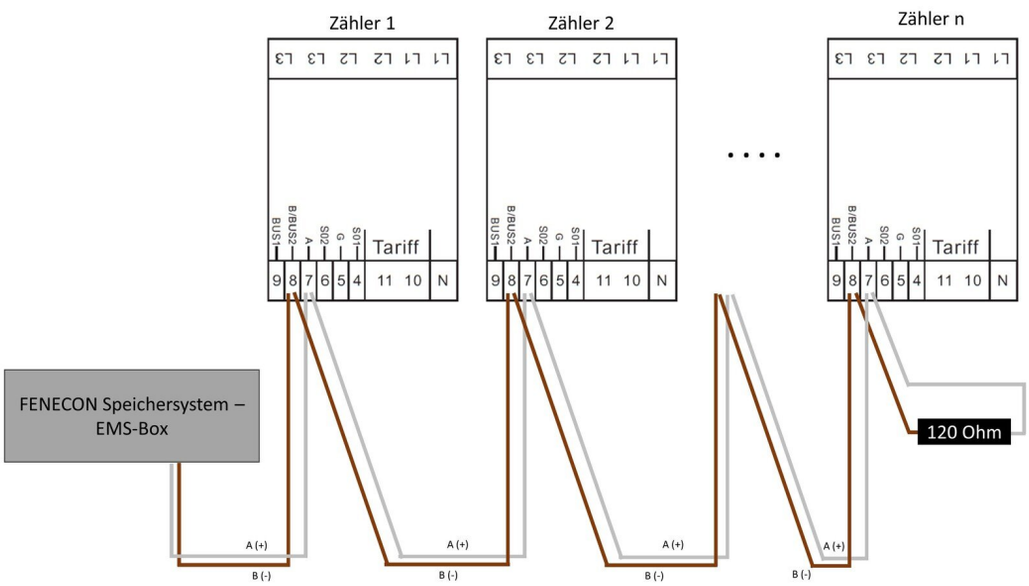


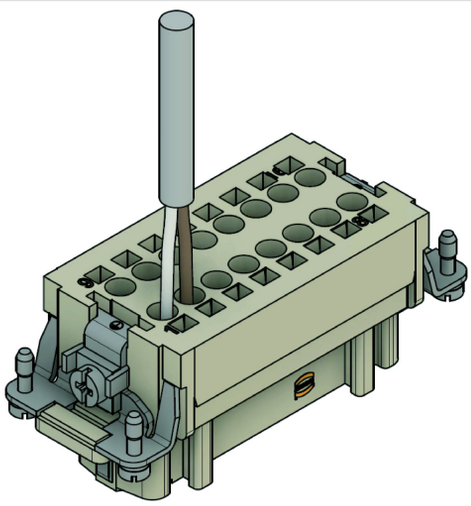
Image 7. Looping through several meters

If the length of the included RS485 cable is insufficient, we recommend using a LiYCY cable with a cross-sectional area of 0.5 mm^2. This cable is suitable for a maximum length of 500 m. In general, the manufacturer's specifications and recommendations should be followed.

4.1. Connection — Meter at FENECON Home 10 with 2.2 kWh per battery module

For the FENECON Home 10, the meter on the EMS Box is connected to pins 1 and 2 of the 16-pin connector.

See also the storage system manual in the section at Additional AC Meter.



1. Instead of connecting the inverter's communication line directly to pin 1/2, the communication line to the meter must be connected to pin 1/2.
2. white to 1; brown to 2

3. The connection from the meter to the inverter is then established. This means that two cores must be connected to each terminal on the meter.

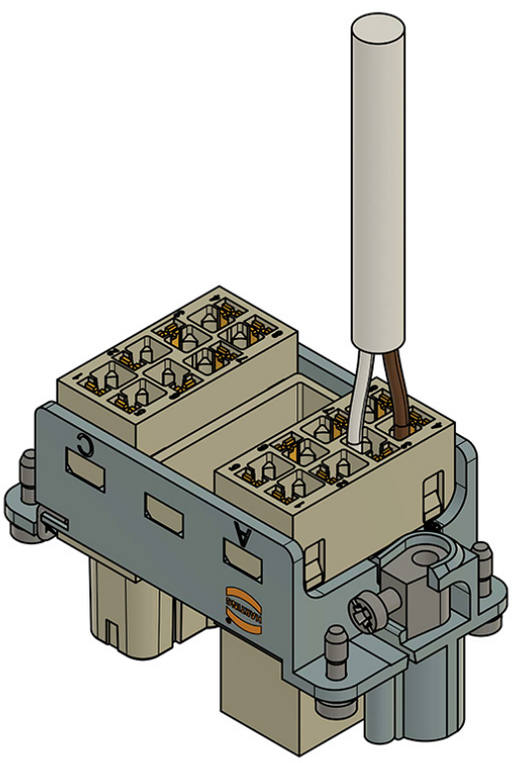
from the battery tower	white to 7
	brown to 8
to the inverter	white to 7
	orange to 8

4.2. Connection — Meter for FENECON Home 6, 10 & 15 and 20 & 30 with 2.8 kWh/battery module

For the FENECON Home 6, 10 & 15 and 20 & 30, the meter on the FEMS box is connected to pins 3/4 of the 16-pin A connector.

You can also find this information in the storage system manual under the section at the following Additional AC Meter.

The installation is the same for all of these systems.



1. Connect the cores from the Harting plug (16-pin — A) to pins 3 and 4.
2. Connect the white core (alternate colors are possible) to terminal 3.
3. Connect the brown core (alternative color possible) to terminal 4.

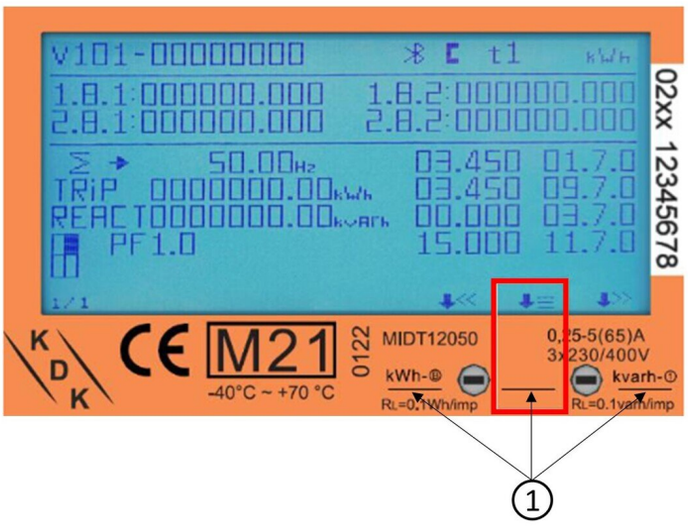
5. Overview — Operating elements

There are three push-buttons on the front of the meter in the bottom right-hand corner, marked with a line. To access the menu, press and hold the middle button for ≥ 3 seconds.

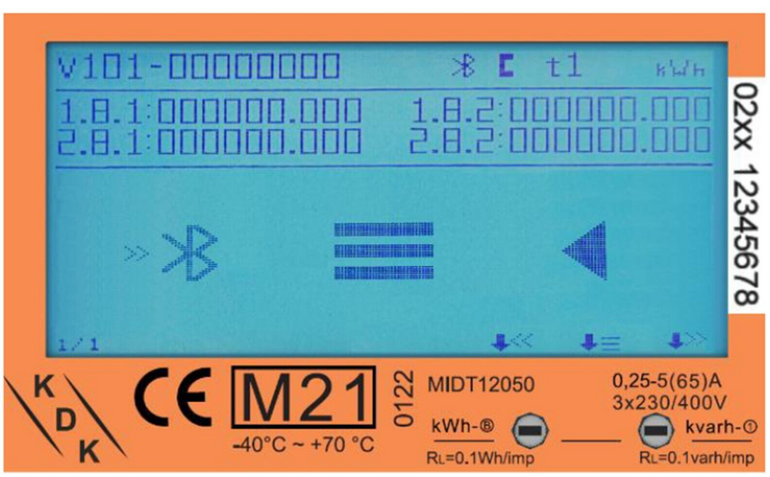
The following display appears:

① Tasten

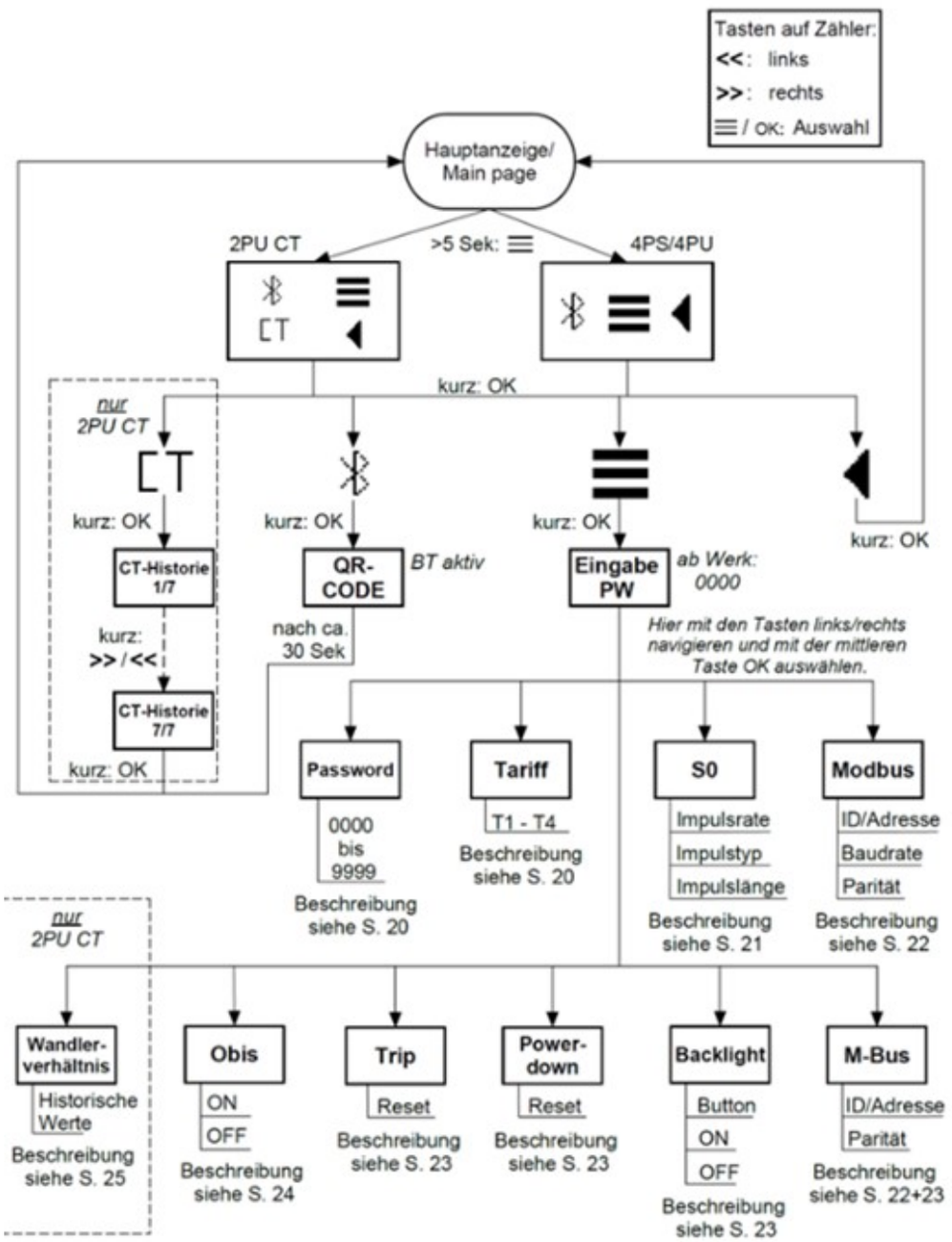
Tasten auf Zähler:
<<: links
>>: rechts
≡ / OK: Auswahl



Here you have the option of activating the meter's Bluetooth, on the far left in the picture. The symbol in the middle, three dashes, takes you to the actual menu where you can make adjustments to the meter settings. The arrow to the left, on the right in the picture, takes you back to the measured values.



5.1. Structure of the menu structure



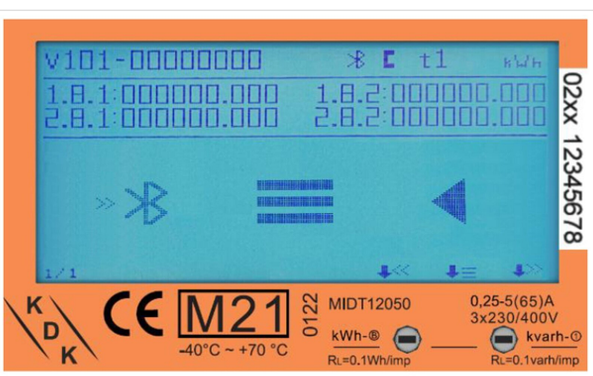
6. Adjust configuration via buttons on the meter

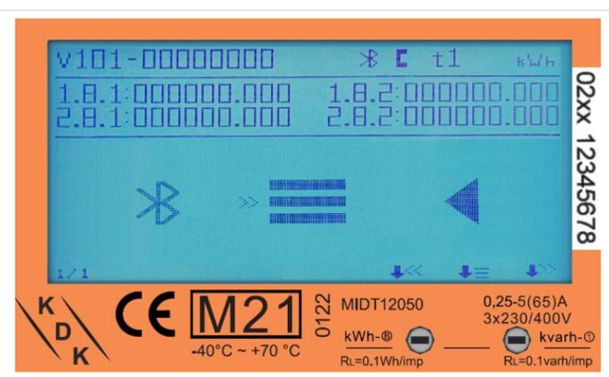
6.1. Configuration parameters

The following configuration settings must be used for use with FEMS:

RS485 Modbus address grid connection point	005
RS485 Modbus address PV generation	006
RS485 Modbus address — other generators/consumers	007… 246
Baud rate for communication	9600
Parity	None

The symbol in the display, with three dashes, takes you to the actual menu where you can make adjustments to the counter settings. The arrow to the left, on the right in the picture, takes you back to the measured values.

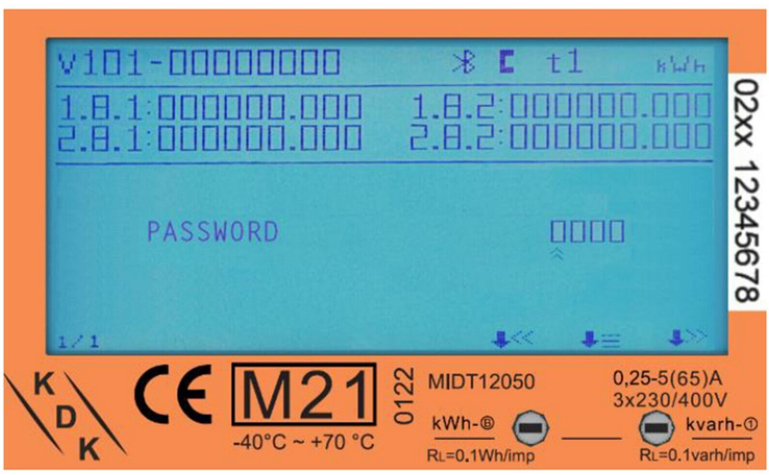




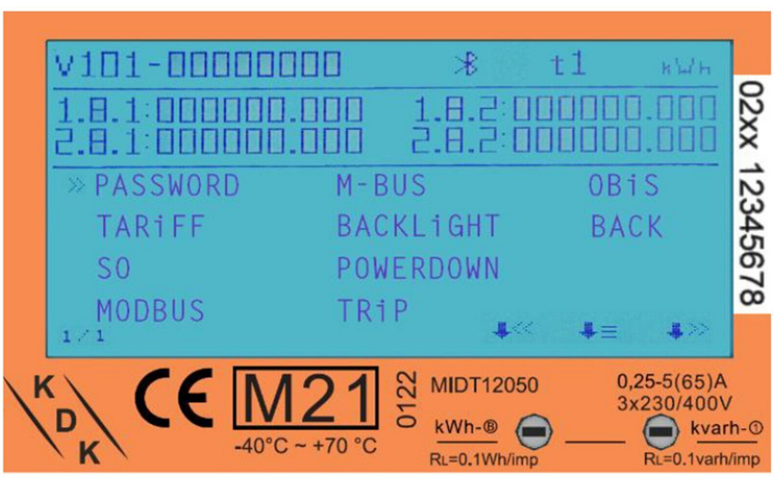
6.2. Password entry

The settings can be made using the sensitive push-buttons on the front of the meter. Use the left and right buttons to scroll through the options. Confirm the setting with the middle button. Select the menu symbol (3 horizontal lines) to access the settings menu:

To access the settings menu, enter the 4-digit password (factory set to 0000). Confirm each digit (0-9) by pressing the middle button:



Once the password has been entered correctly, the settings menu appears:



6.3. Input — RS485 Modbus address

To do this, use the sensitive touch buttons to go to the settings menu and select Modbus. Then navigate to Modbus ID and press the middle push-button; you can now use the right and left push-buttons to lock the values. When the desired Modbus address is displayed, press the middle push-button to confirm it.

The factory-set Modbus address is "001". The following addresses are required for communication.

RS485 Modbus address grid connection point

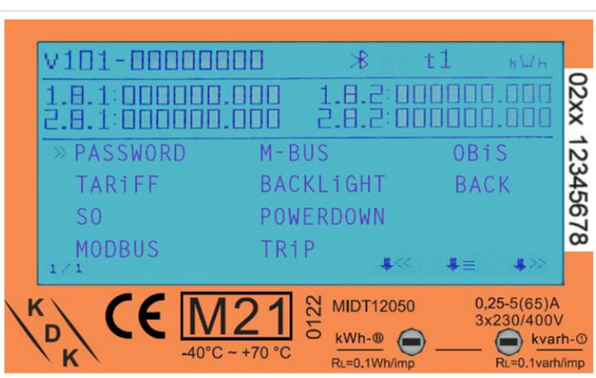
005

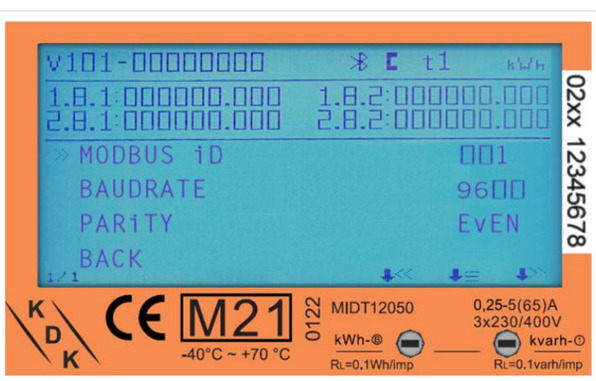
RS485 Modbus address PV generation

006

RS485 Modbus address — other generators/consumers

007... 246





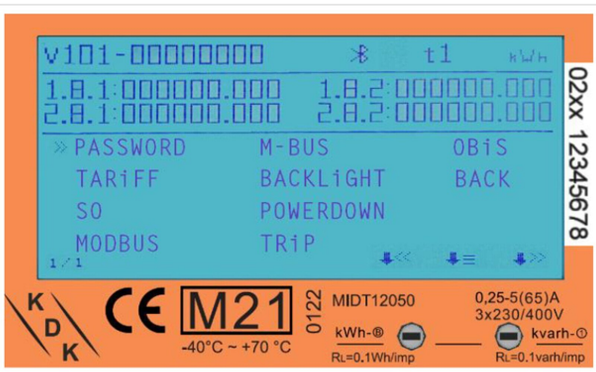
6.4. Input — Communication speed (baud rate)

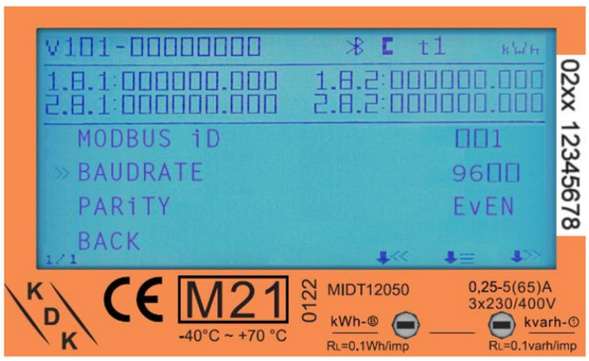
To do this, use the sensitive touch buttons to go to the settings menu and select Modbus. Then navigate to Baud rate and press the middle push-button; you can now lock the values using the right and left push-buttons. When the desired baud rate is displayed, press the middle push-button to confirm it.

The Modbus® baud rate set at the factory is "9600 Bd". Please check the baud rate.

Baud rate for communication

9600

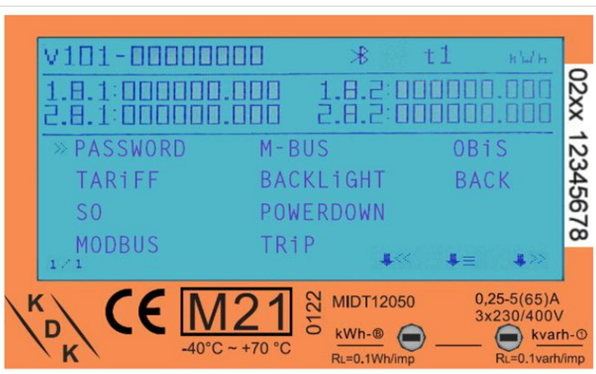


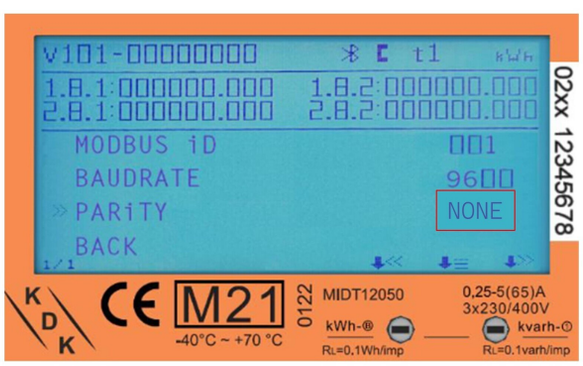


6.5. Input — Communication parity

To do this, use the sensitive touch buttons to go to the settings menu and select Modbus. Then navigate to Parity and press the middle button; you can now use the right and left buttons to adjust the setting. When the desired parity is displayed, press the middle button to confirm it.

The factory-set parity is **EVEN**. This must be changed to **NONE**.





7. Bluetooth smartphone app

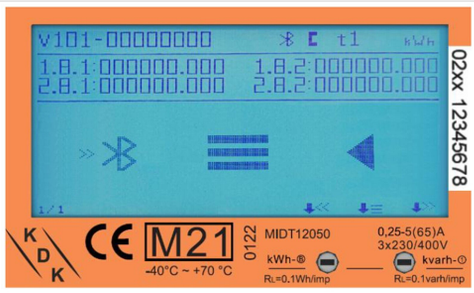
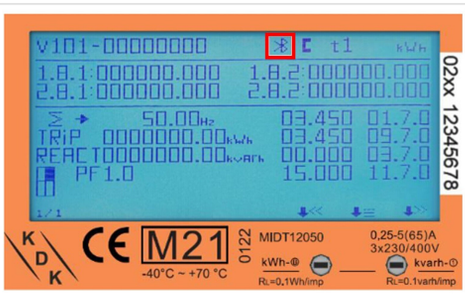


All Push-in-CAGE CLAMP® meters can be read and configured via Bluetooth®. The standard used is BLE 4.2. You can download the smartphone app for Android and IOS free of charge from the respective stores. The smartphone app can be found under the name "KDK Meter Configurator".

iOS

Below you will find a QR code for the explanatory video on how to activate Bluetooth and the options via the app:

7.1. Activating the BT interface on the meter

When the arrows >> point to the Bluetooth® icon, briefly press the middle button:	
The Bluetooth® interface of the meter is now activated and ready for communication with the KDK Meter Configurator app. To establish the connection with the meter, scan the QR code via the camera of your smartphone or browse the Bluetooth® environment by selecting the corresponding menu item in the app.	
When a Bluetooth® connection is established, the Bluetooth® symbol is shown at the top right of the display.	

7.2. Bluetooth connection with the meter

1. Start the smartphone app. The desired language can be set in the settings menu (cogwheel) at the top right of the display.

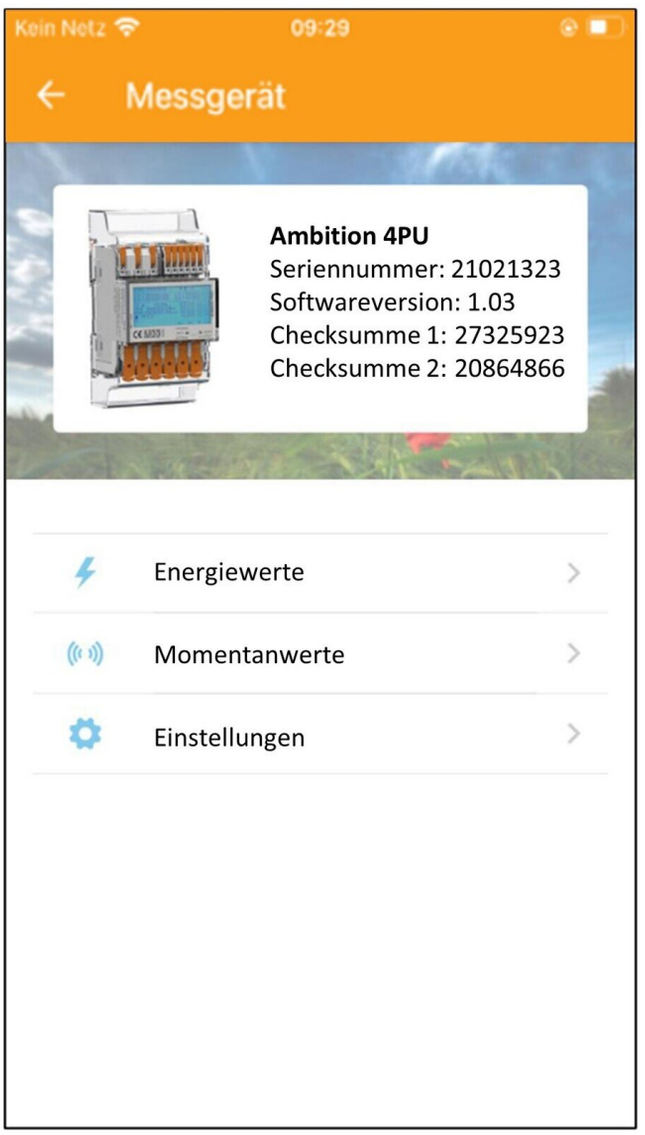




2. The energy meter can be connected with the *Scan Bluetooth* or *Scan QR* function.
   a. *Scan Bluetooth*: The app scans for all Bluetooth measuring devices in the vicinity. Select the correct serial number for the connection.
   b. *Scan QR*: The app opens the camera of the cell phone to scan the QR code on the meter display. As soon as the code has been scanned, the meter is connected.

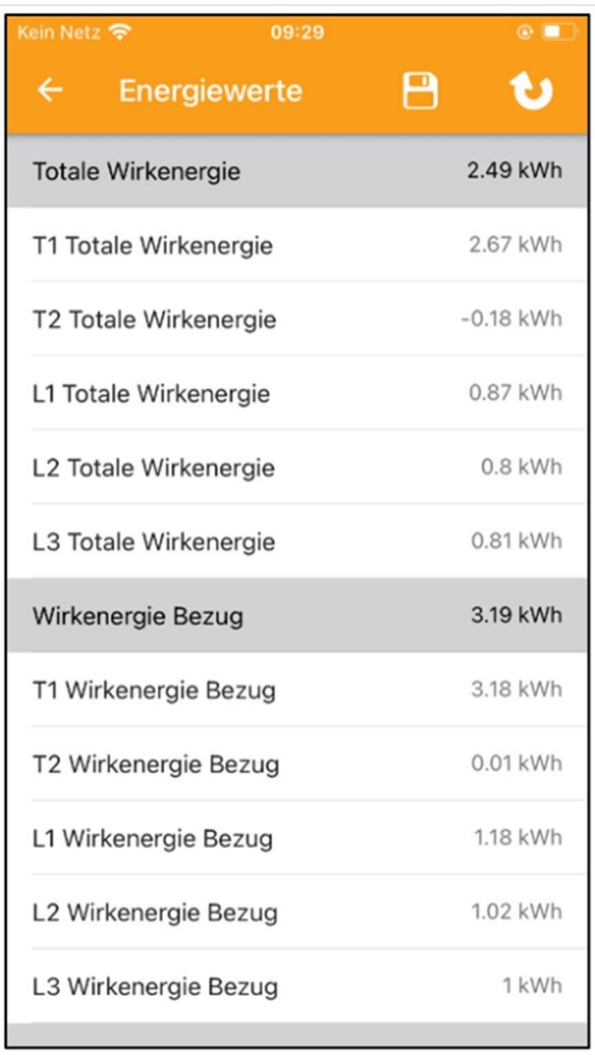
7.3. App — Device page

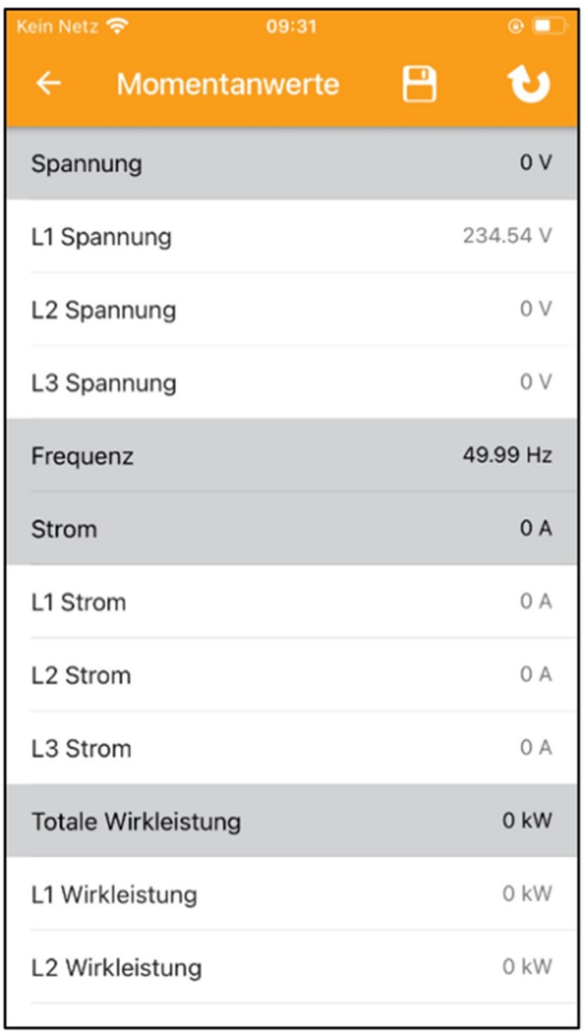
The energy meter is now connected to the smartphone app. The meter type, serial number, software version and checksums are displayed on the device page.



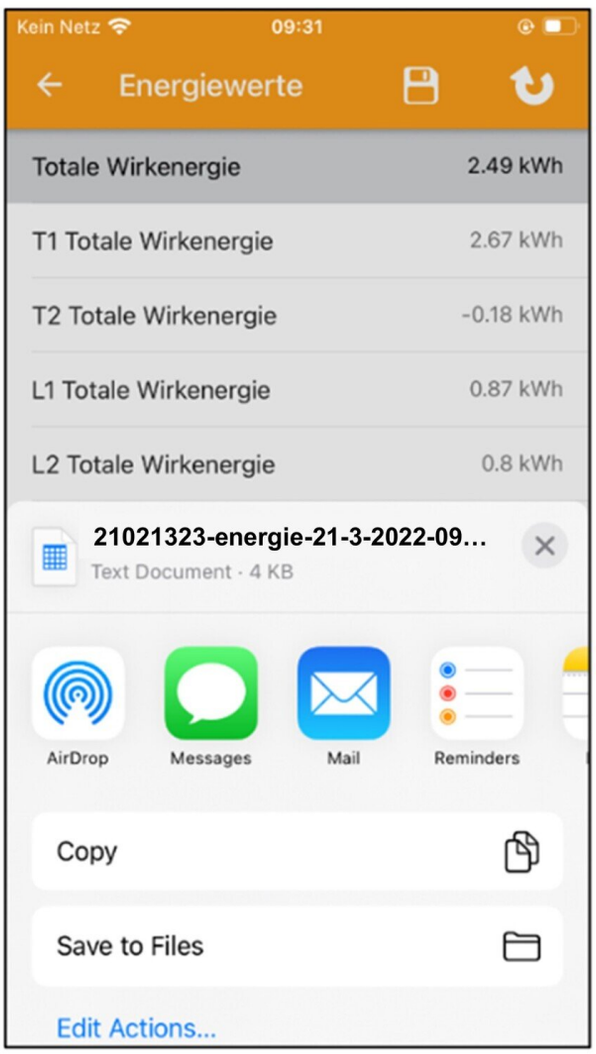
7.4. App — Read out the meter data

All energy values can be found under "Energy" and all instantaneous values under "Instantaneous". Refresh the data using the refresh arrow in the top right-hand corner.





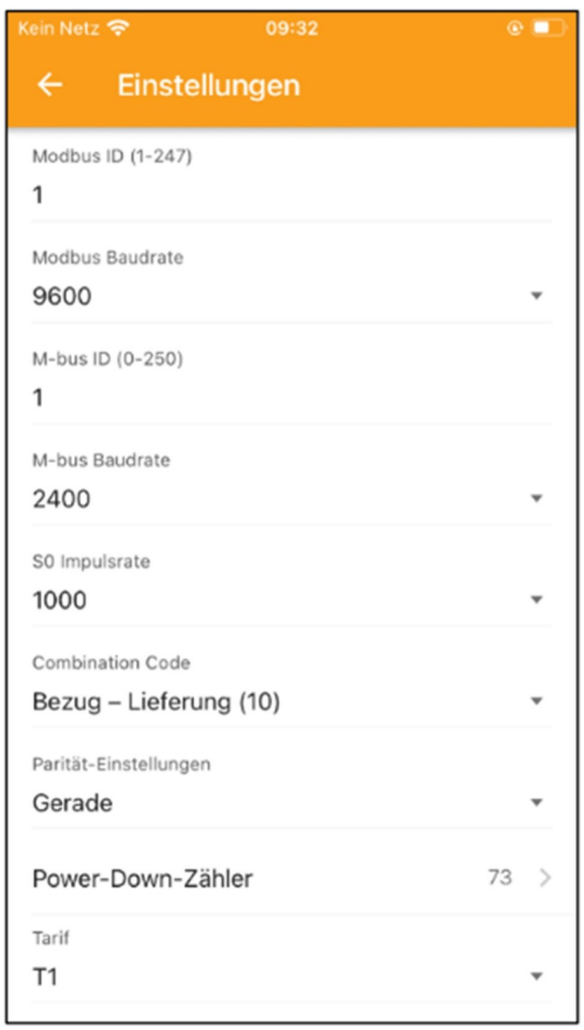
Save the data using the electrical energy storage icon in the top right-hand corner. The data can be saved locally on the smartphone or forwarded via various channels such as e-mail, Bluetooth or other programs.

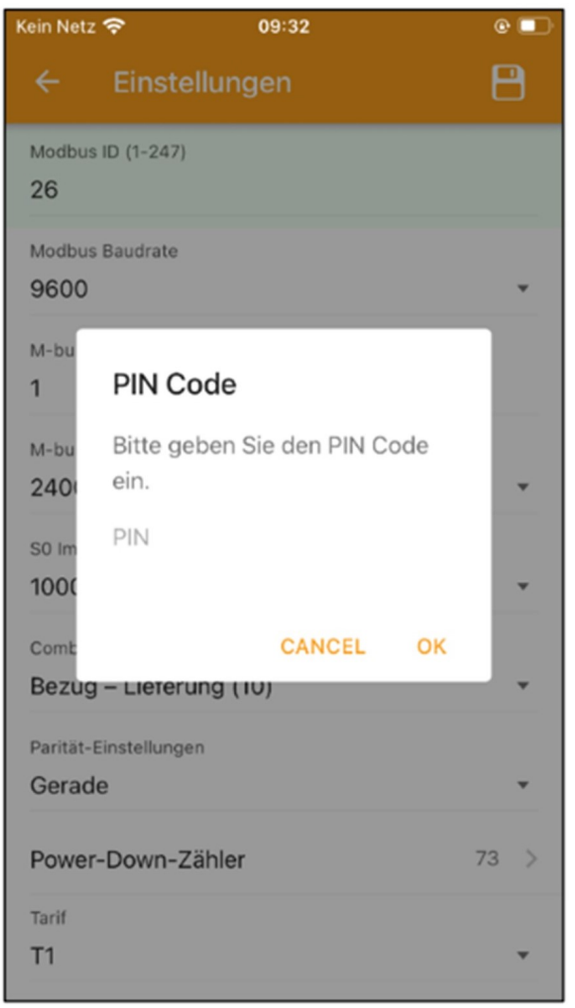

Kein Netz
09:31
Energiewerte
Totale Wirkenergie
2.49 kWh
T1 Totale Wirkenergie
2.67 kWh
T2 Totale Wirkenergie
-0.18 kWh
L1 Totale Wirkenergie
0.87 kWh
L2 Totale Wirkenergie
0.8 kWh
21021323-energie-21-3-2022-09…
Text Document · 4 KB
AirDrop
Messages
Mail
Reminders
Copy
Save to Files
Edit Actions...

7.5. App — Change meter parameters

Settings can be selected individually and/or saved all at once.

1. Select the settings you want to change. The changed settings are highlighted in green.
2. Save the values via the storage disk in the top right-hand corner.
3. A pop-up menu for the password appears first. By default, the password is always 0000.
4. The password can only be changed on the meter using the buttons. After entering the correct password, the new settings are saved in the meter.





7.5. App — Change meter parameters

The following configuration settings must be used for use with FEMS:

RS485 Modbus address grid connection point

005

RS485 Modbus address PV generation

006

RS485 Modbus address further
Generator/Consumer load:: 007... 246

Baud rate for communication

9600

Parity

None

8. Troubleshooting

Problem	Possible cause	Check/solution
The red consumption LED on the front is not flashing or the meter is not counting up.	There is no load connected to the meter or the load on the line is very low.	Connect a consumer load to the meter and use a measuring device e. g. ammeter to measure whether the load is present and the LED is flashing.
The S0 pulse output is not working.	The pulse output is not connected correctly (polarity) or is not supplied with DC voltage.	Use a measuring device to check whether the external voltage source (Ui) is 5-27 V DC. Check whether the connection is correct: The 5-27 V DC should be connected to the collector connection (pin 4 or 6 (+)) and the signal line (S) to the emitter connection (pin 5 (-)).
If none of the above points have led to a solution, please contact technical support. Phone: 02244/91994-47; E-mail: support@kdk-dornscheidt.com		

The configuration is now complete.

9. Contact us

For support, please contact:

FENECON GmbH
Gewerbepark 6
94547 Iggensbach

Phone — Service: +49 (0) 9903 6280 0
E-mail — Service: service@fenecon.de

10. Directories

10.1. List of illustrations

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Image 2. Dimensions
Image 3. Connection — Generator
Image 4. Connection — Meter — Metering point operator
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Image 6. Wiring — RS485
Image 7. Looping through several meters