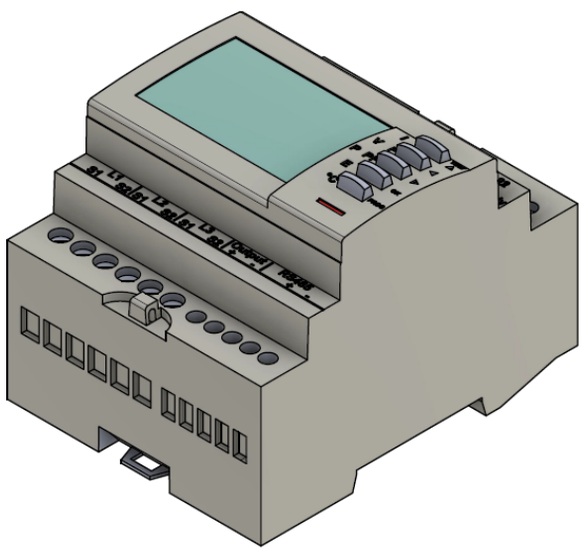

Installation and Configuration Manual — FEMS Package 3-Phase Sensor without Current Transformer (SOCOMEC DIRIS A-10)

Version:2023.7.1

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1. Introduction

1.1. Legal provisions

Unless stated otherwise, 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 accurate. They are intended solely as a summary of the original SOCOMEC manual. You can find the original manual at here.

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. Symbols used

	Attention
	Important information
	Danger

1.4. Dangers and safety instructions

The SOCOMEC DIRIS A-10 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:

- SOCOMEC DIRIS A-10 3-Phase Sensor
- Installation and Configuration Guide for the FEMS 3-Phase Sensor Package without Current Transformers
- Installation Instructions for SOCOMEC DIRIS A-10 (here)

2.2. Prerequisites

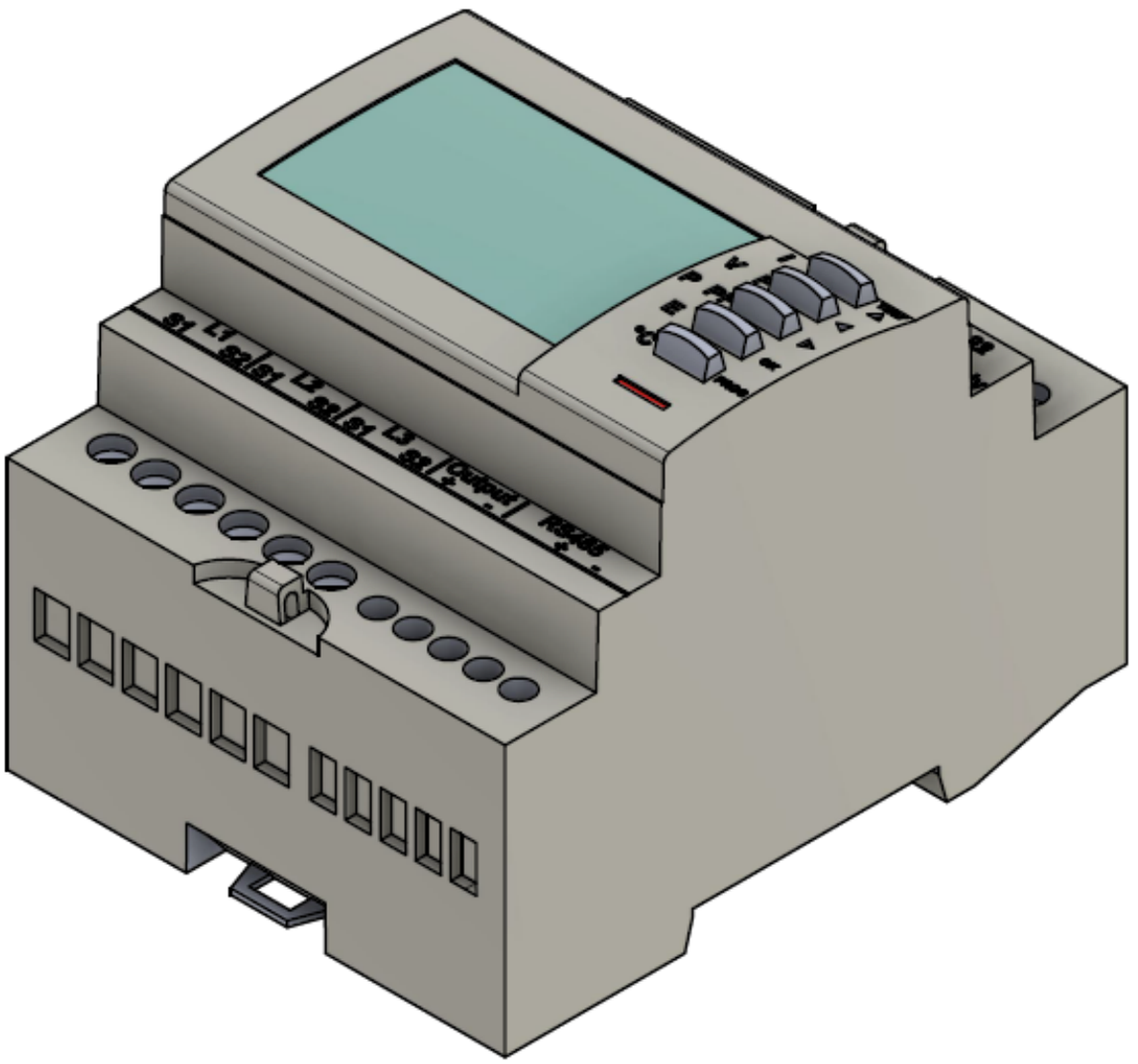
To use the 3-phase sensor, the following is required:

- Current transformer

> Please note! The current transformers are not included in the scope of delivery! In the example of the SOCOMEC meter, the transformer ratio is 5. You can read the transformer ratio on the current transformers installed on site (see type label, for example).

2.3. Model overview

The DIRIS A-10 is a modular active and reactive energy meter that can count and display the energy consumed. It is designed for three-phase grids and must be operated with current transformers. The meter is equipped with a MODBUS communication bus.



SOCOMEC DIRIS A-10

3. Connection

3.1. Voltage tap and power supply

The meter is electrically connected through the three phases and the neutral conductor in accordance with the original instructions. As this type of meter can only work with external current measurement sensors, this is a voltage tap of the three phases and the neutral conductor. In addition to the voltage tap, an additional auxiliary supply voltage (terminals 20 & 22) must be applied to the meter, which is referred to here as "Aux Supply", see

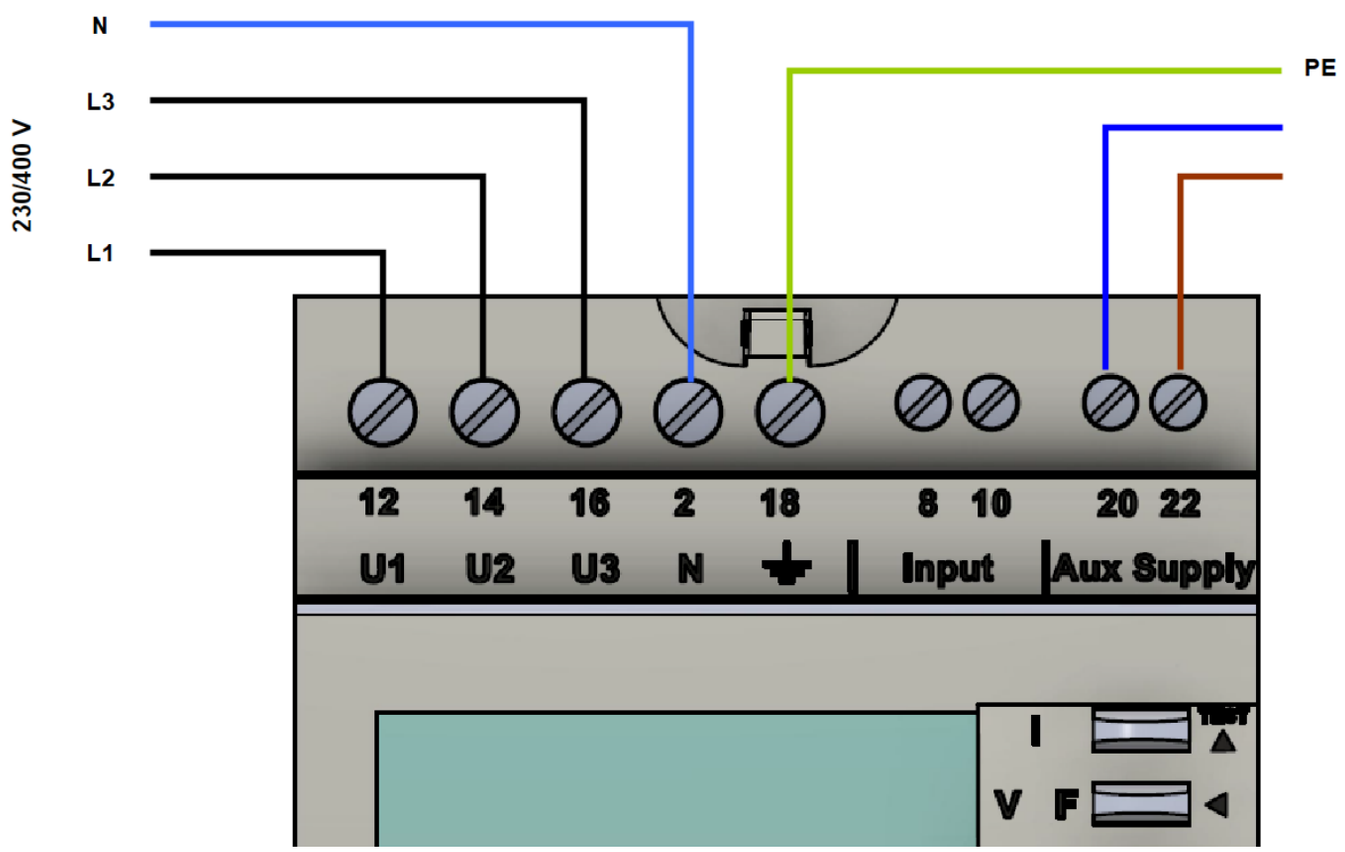


Image 1. Voltage tap and auxiliary supply voltage

Cross-section of measuring cable	Max. cable length of current transformer	Max. cable length of voltage tap
2.5 mm²	up to 3 m	15 m
4 mm²	up to 5 m	up to 25 m

Table 1. Recommended cross-sections for test leads on the SOCOMEC DIRIS A-10

3.2. Connection of current transformer to generator

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

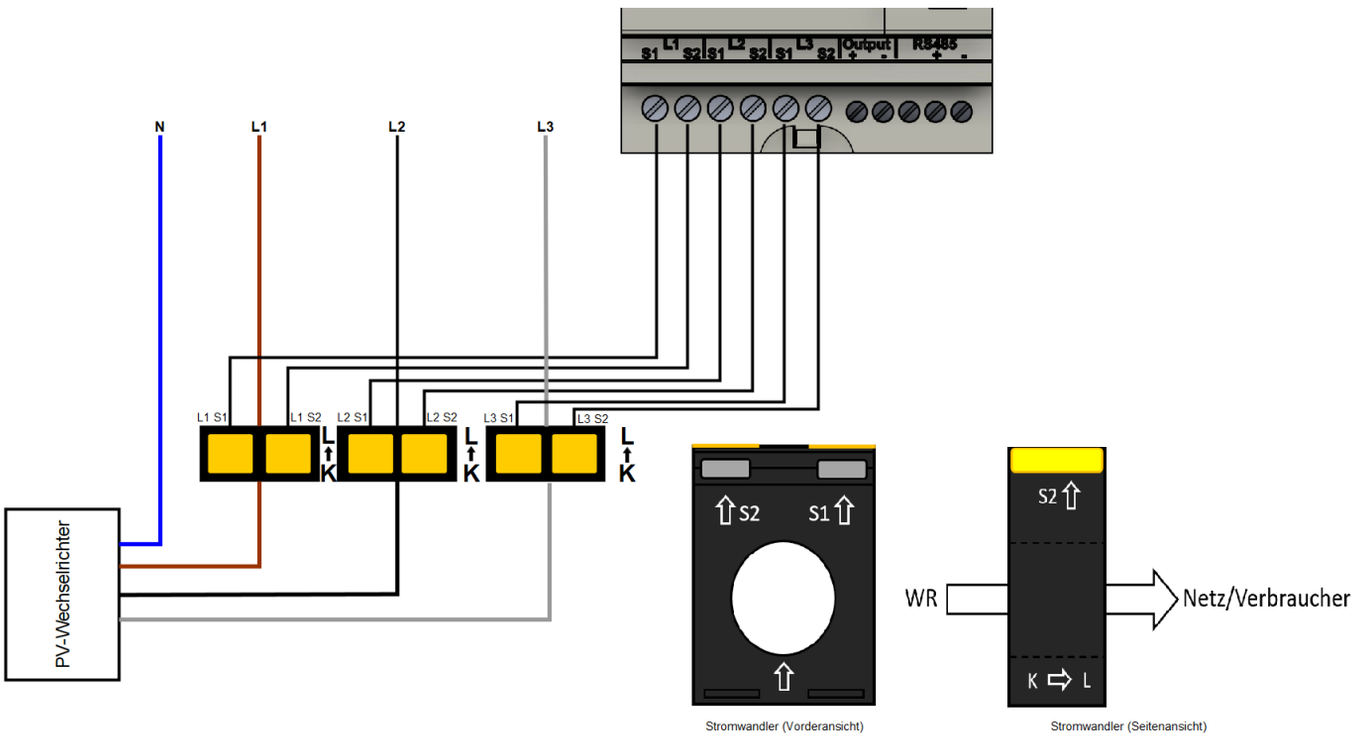


Image 2. Connection of the generator current transformer

Ensure that the transformers are aligned correctly from K to L!

3.3. Connection of current transformers to the meter of the metering point operator

The current transformers must be connected to the meter of the metering point operator as shown below:

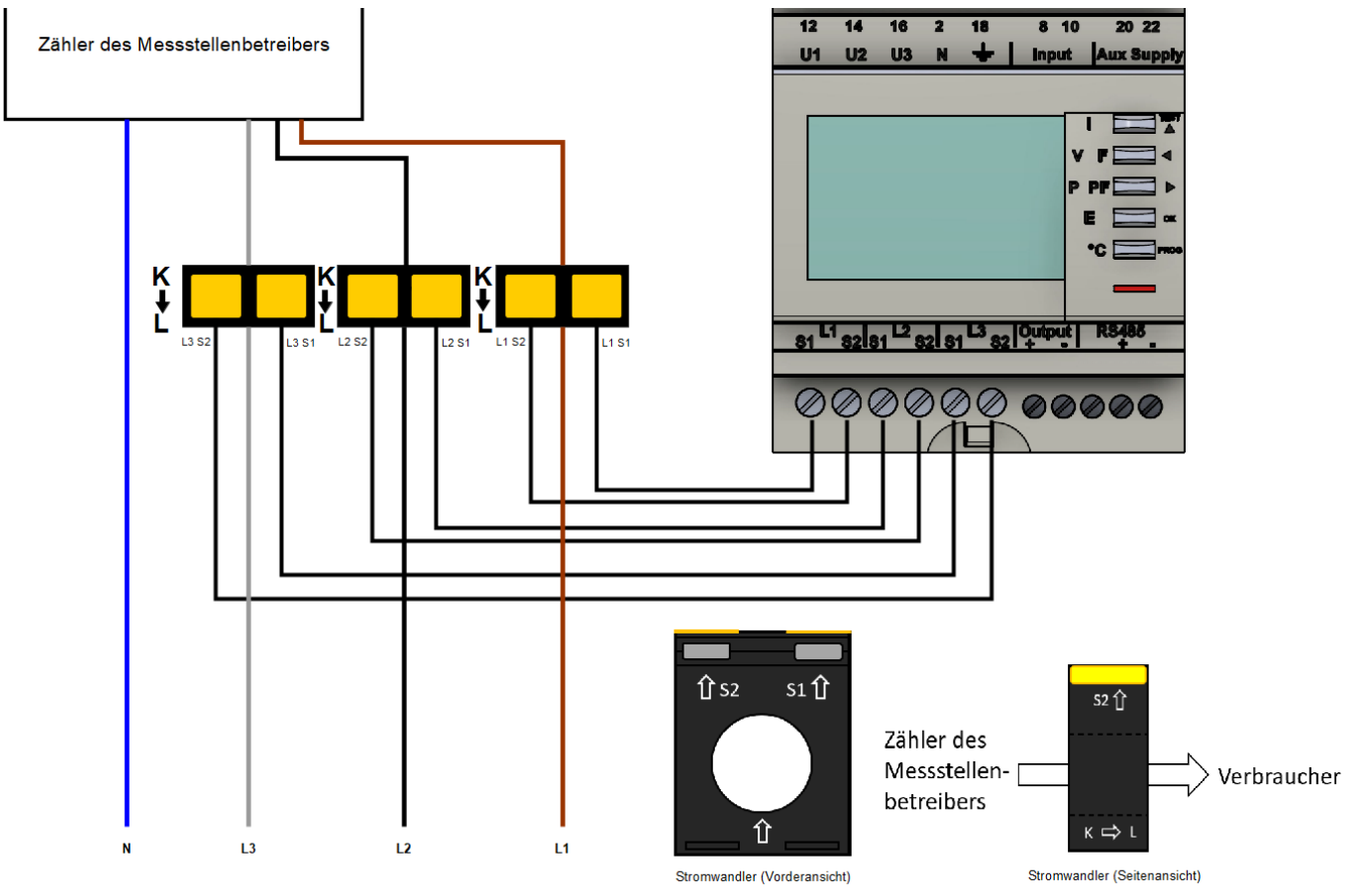


Image 3. Connection between current transformer, meter, and metering point operator

Ensure that the transformers are aligned correctly from K to L!

3.4. Connection of current transformer to consumer load(s)

The current transformers must be connected to a consumer load as shown below:

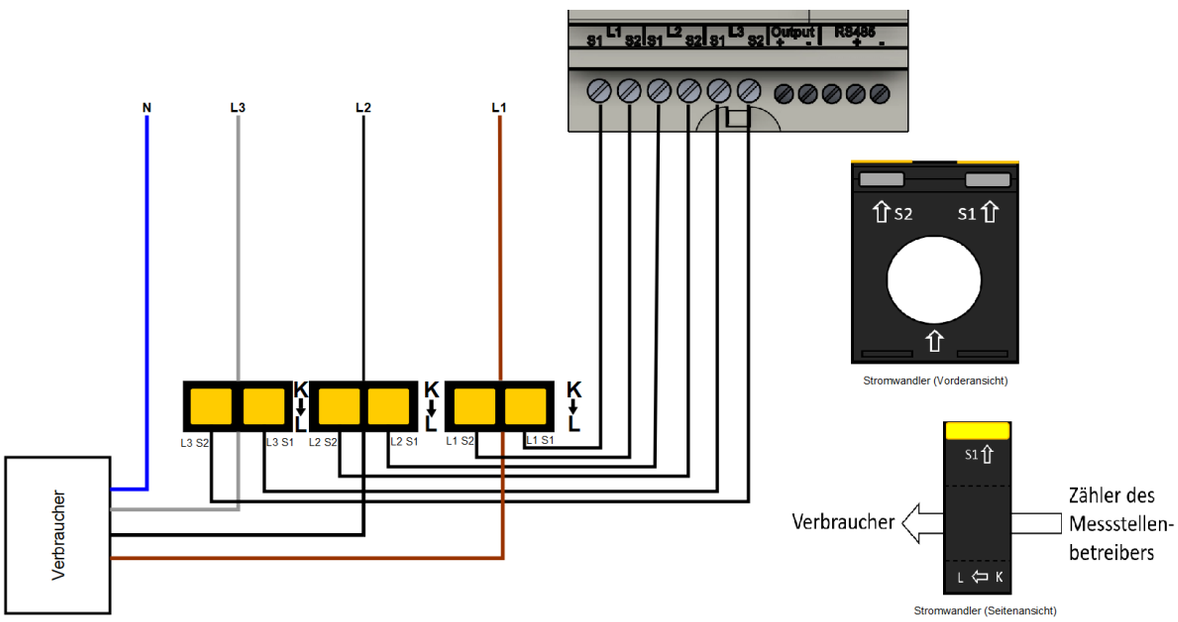


Image 4. Connection between current transformer and consumer load

Ensure that the transformers are aligned correctly from K to L!

In contrast to the connection to a generator or the meter of the metering point operator, the current transformers must be installed upside down here!

4. Communication

The Modbus communication available on the DIRIS A-10 is via a serial RS485 interface (2 or 3 wire), which allows the device to be operated from FEMS. In the standard configuration, 32 devices can be connected to a PC or a controller over 1200 meters using an RS485 interface.

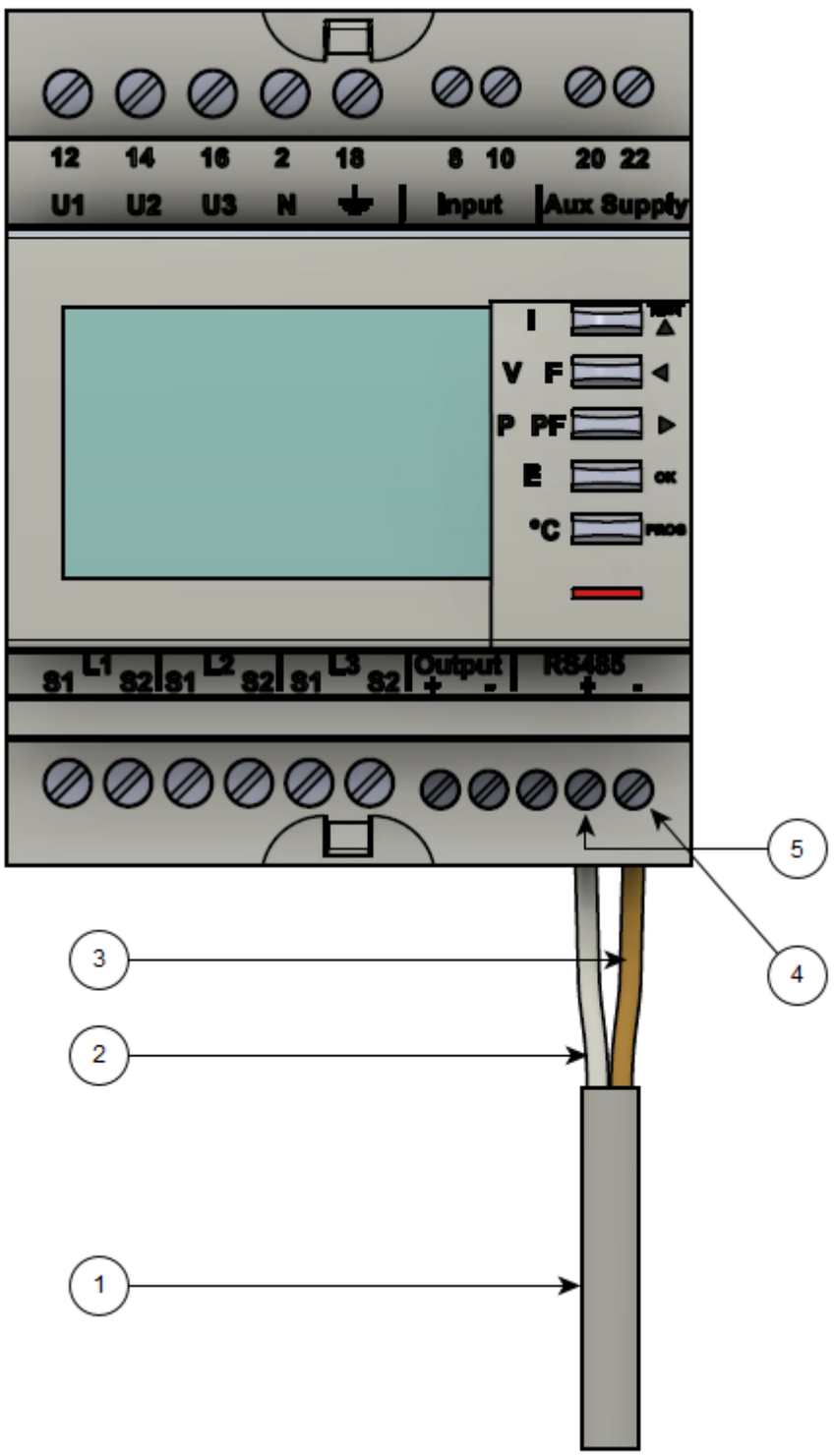


Image 5. RS-485 connection

4. Communication

1. COM RS-485 connection from FEMS
2. Data conductor plus (+) (A conductor)
3. Data conductor minus (-) (B conductor)
4. Minus (-) contact
5. Plus (+) Contact

To connect several meters in series, the RS-485 connection must be looped through, as shown in the figure below.

Note the connection of the terminating resistor (120 Ω)!

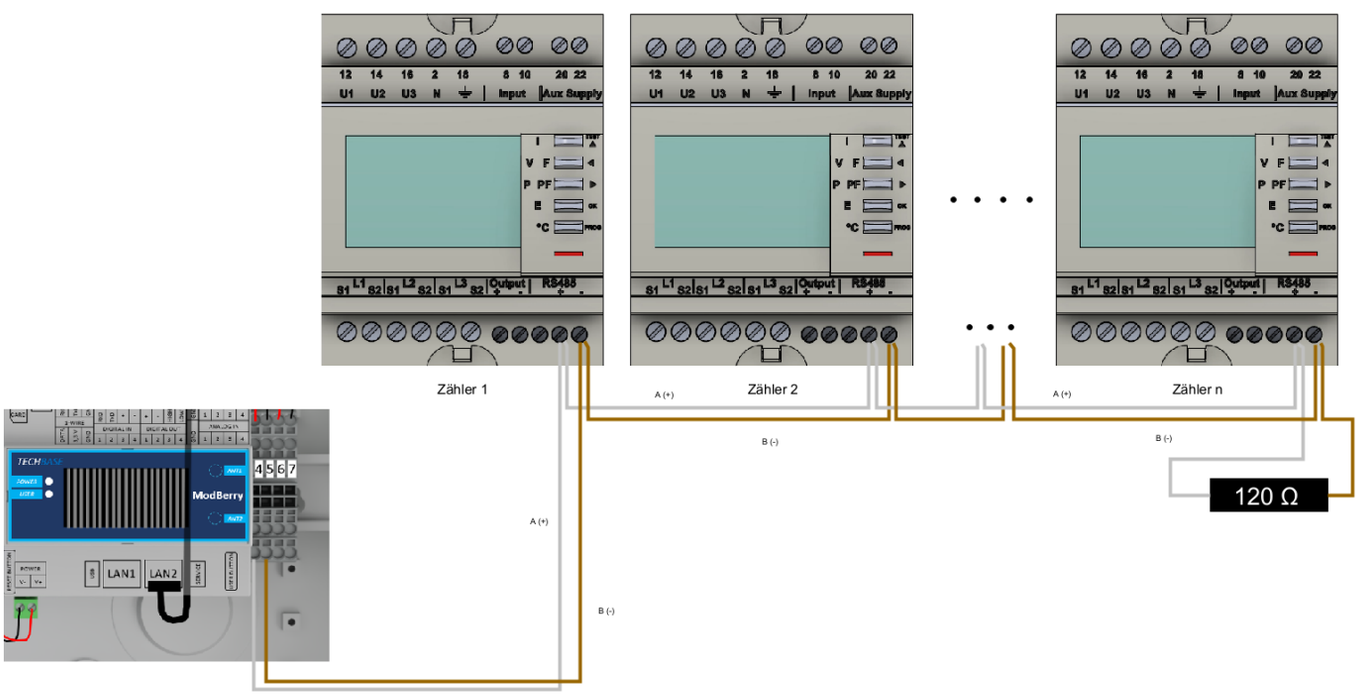


Image 6. Looping through RS-485 of several meters

If the supplied RS485 cable is not long enough, we recommend using a LiYCY with a cross-section of 0.5 mm². This is suitable for max. 500 m. In general, the manufacturer's specifications and recommendations must be observed.

5. Overview of controls

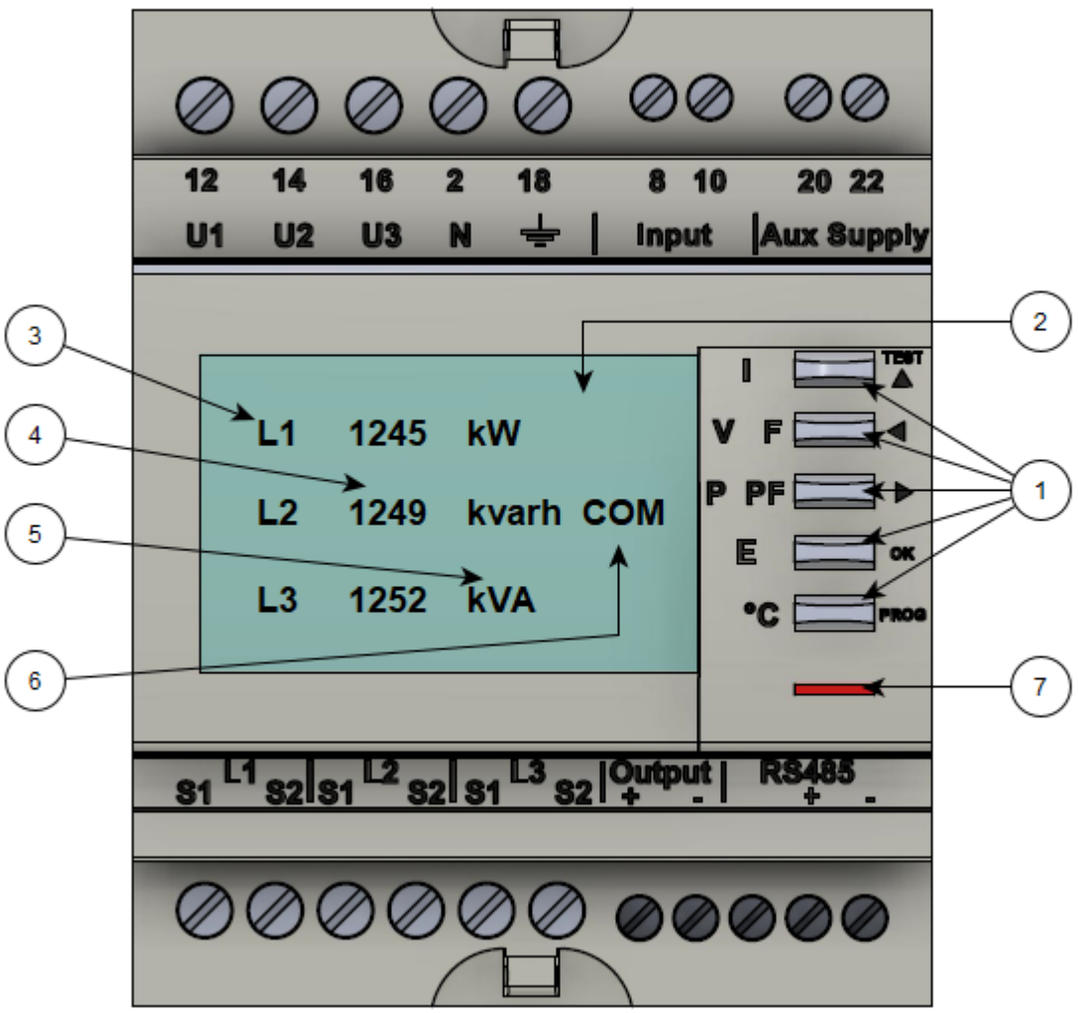


Image 7. Control elements

1. Five buttons with dual functionality (display or configuration)
2. Backlit LCD screen
3. Phase
4. Values
5. Unit
6. Activity display communication bus
7. Pointer for recording the active power

6. Configuration

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

Measuring transformer current ratio	.../5 e. g. 500/5 = 500 *A*.
Baud rate for communication	9.6
RS485 Modbus address grid connection point	005
RS485 Modbus address PV generation	006
RS485 Modbus address — other generators/consumers	007...246

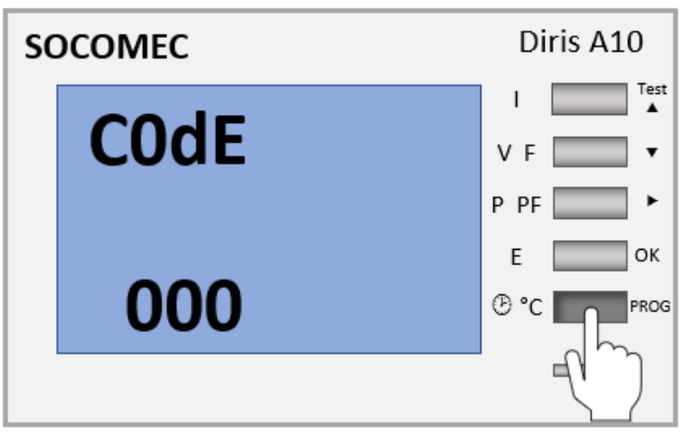


Follow the installation and service instructions for the meter installed to make the settings. The following steps are for simplification purposes only.

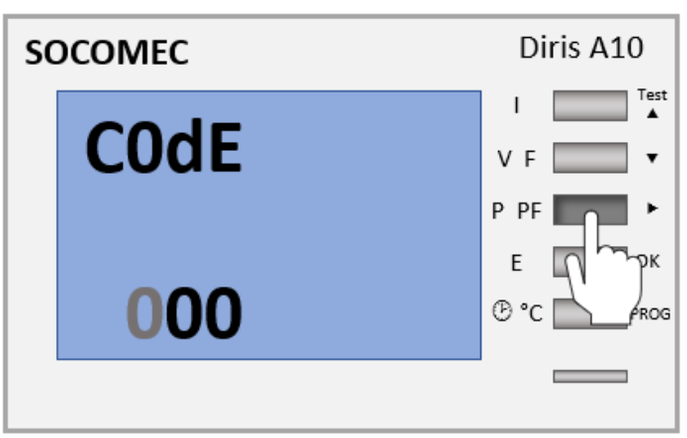
6.1. Password entry

The following steps describe the procedure for entering the password.

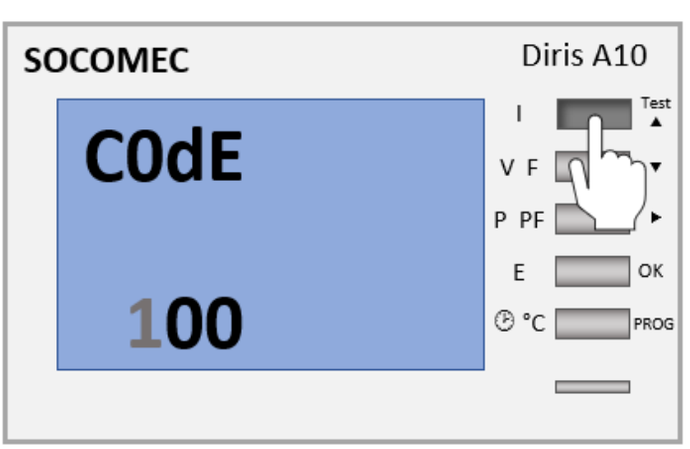
1. Press and hold the PROG button for 3 seconds.



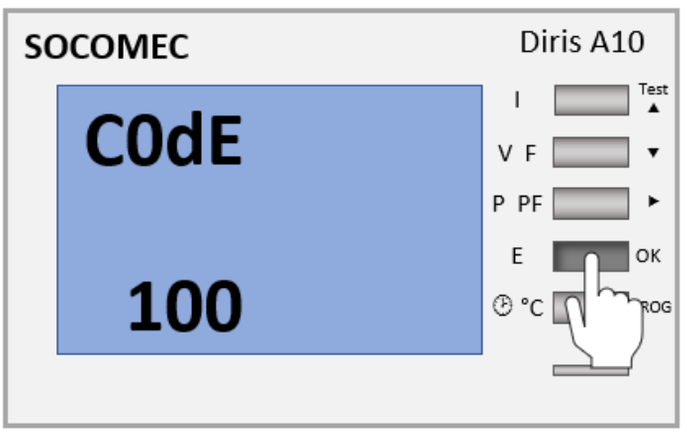
2. Press the button. Then, the first digit flashes.



3. Press the ^ button. Then, 100 is displayed.



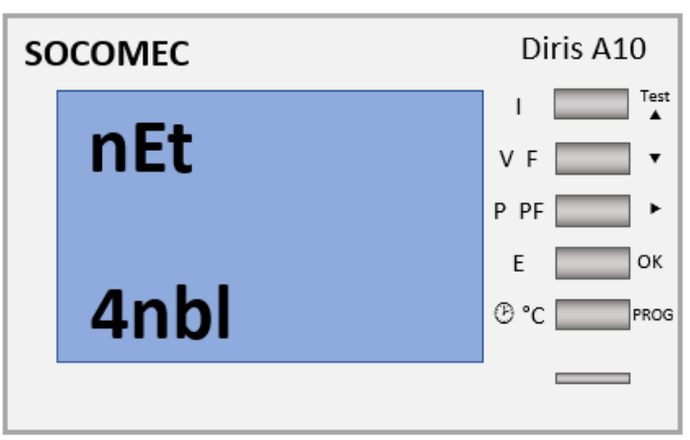
4. Press the OK button to confirm the entry.



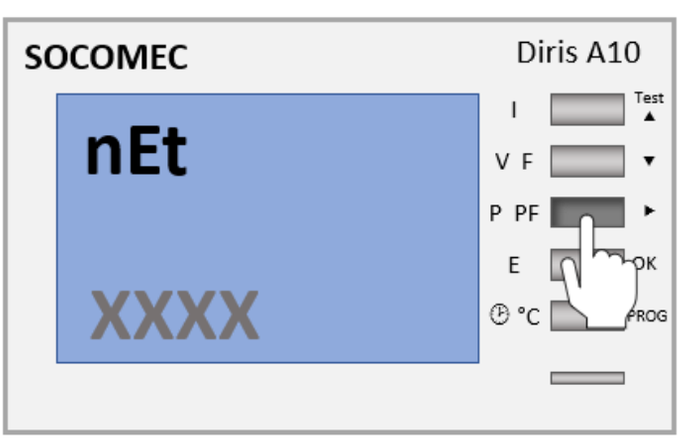
6.2. Input — Measurement method

The following steps describe the procedure for configuring the measurement method.

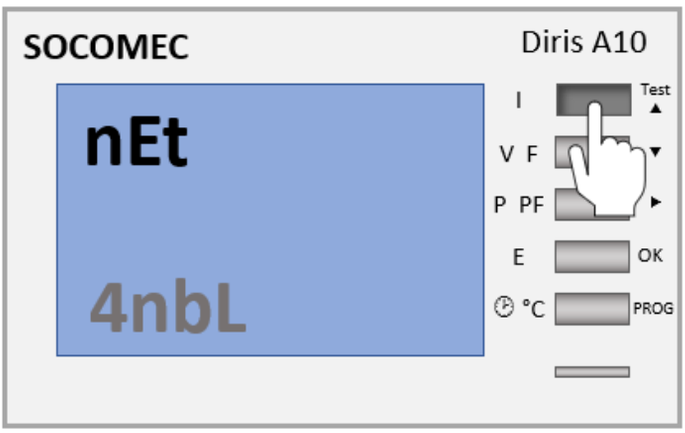
1. After entering the password, the menu item "nEt" appears with the value "4nbl".



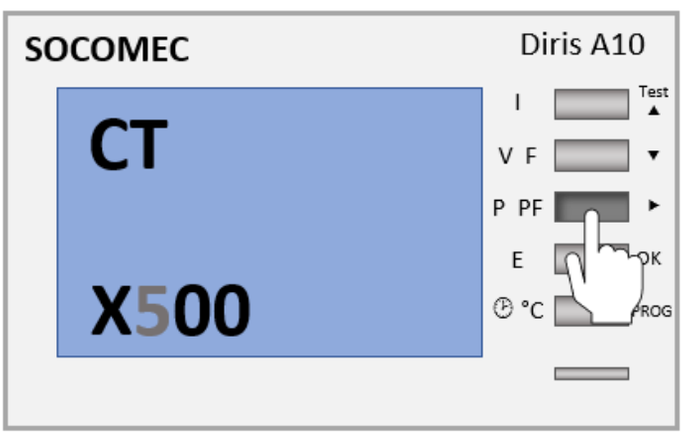
2. If "4nbl" is not set, press the button. The selection then flashes.



3. Press the ^ button several times until "4nbl" appears.



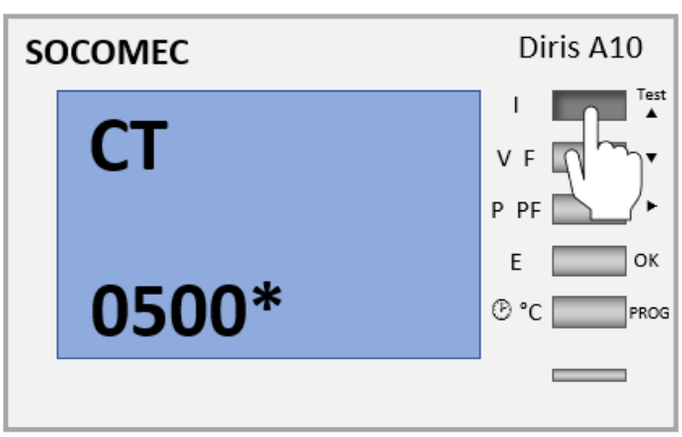
4. Press the OK button to confirm the entry.



6.3. Input — Measuring transformer — Current ratio

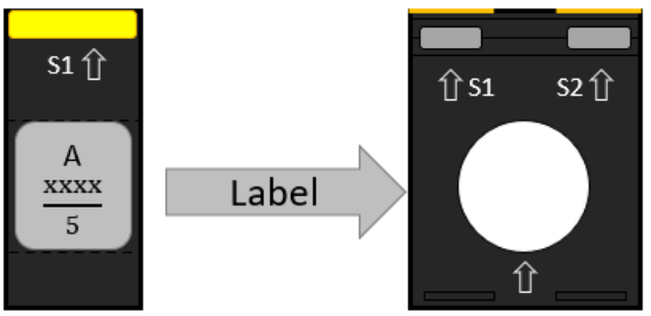
The following steps describe the procedure for configuring the measuring transformer current ratio.

1. Press ^. Then, the menu item "CT" appears.

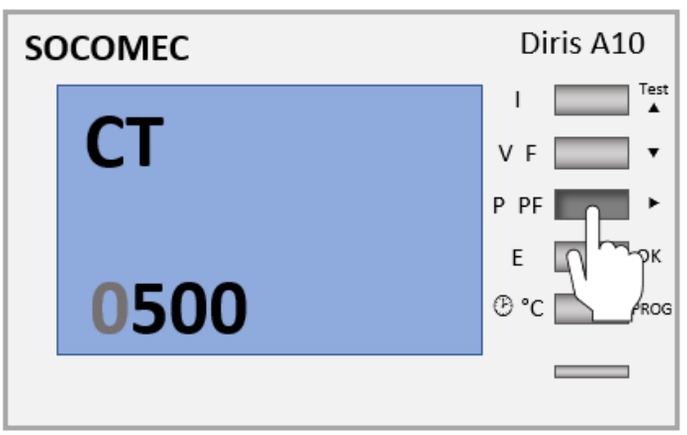


The transformer ratio is displayed in the form **XXXX/5**. You can read the transformer ratio on site (e.

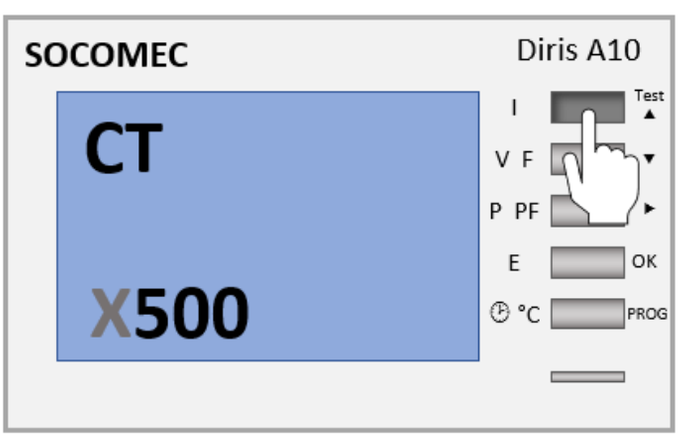
g. on the type label)



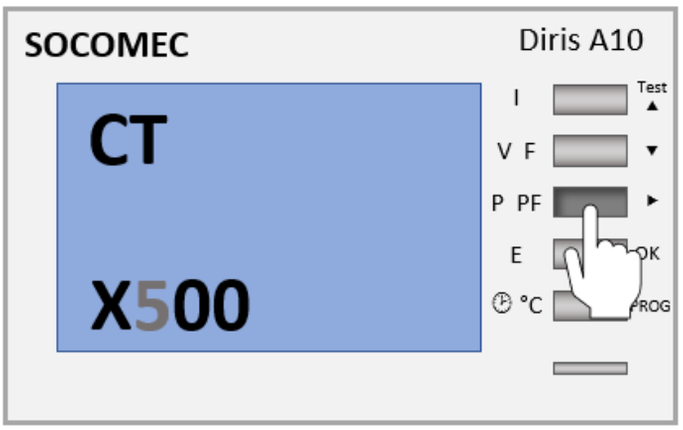
2. Press the button. Then, the first digit flashes.



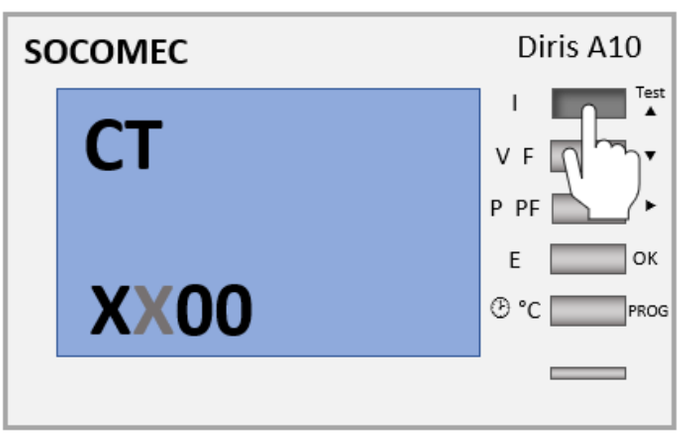
3. Press the ^ button several times until the desired value is displayed.



4. Press the button. Then, the next digit flashes.

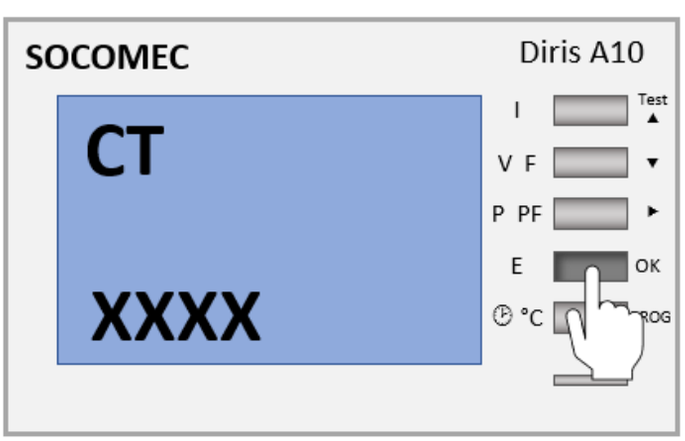


5. Press the ^ button several times until the desired value is displayed.



6. Carry out the above steps until the desired value is set.

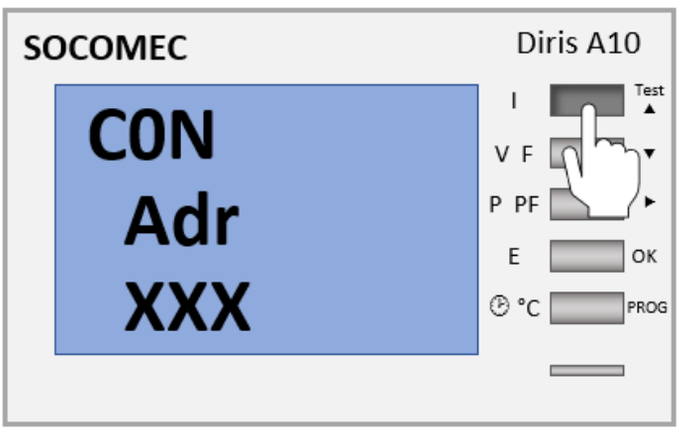
7. Press the OK button to confirm the entry.



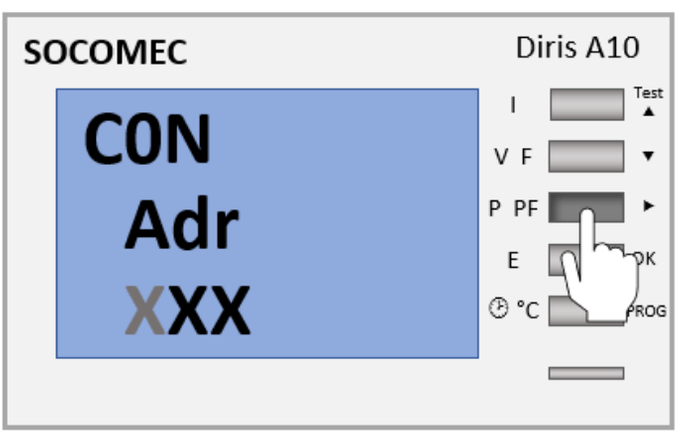
6.4. Input RS485 Modbus address

The following steps describe the procedure for configuring the RS485 Modbus addresses.

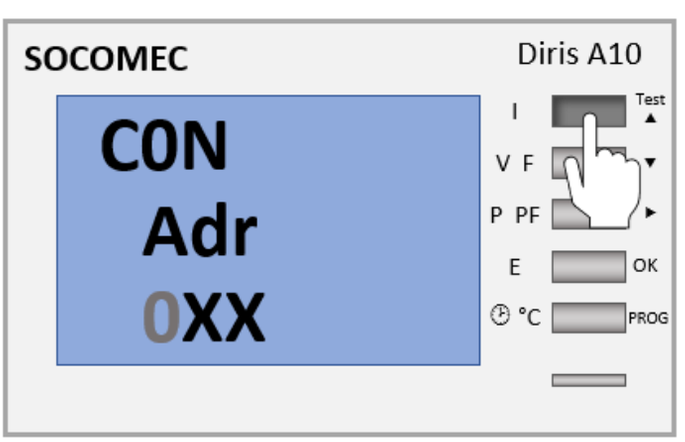
1. Press the ^ button several times until the menu item "C0N Adr" appears.



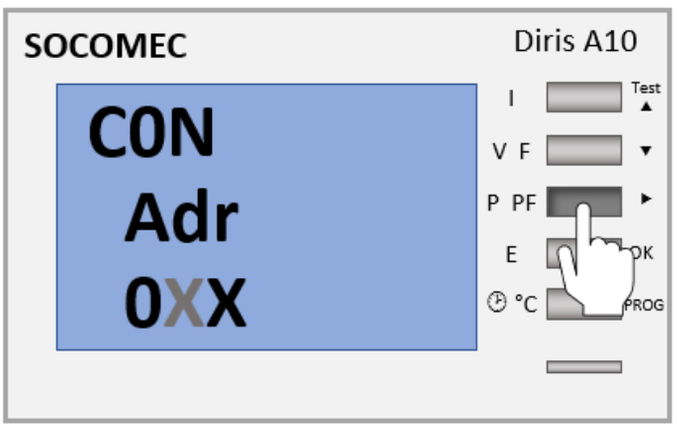
2. Press the button. Then, the first digit flashes.



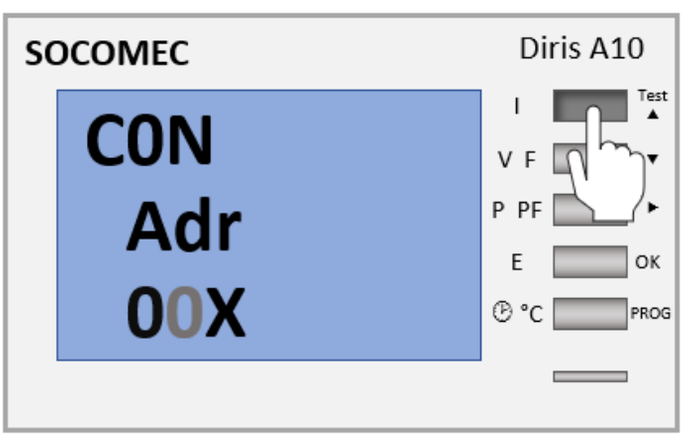
3. Press the ^ button several times until the desired value is displayed.



4. Press the button. Then, the next digit flashes.

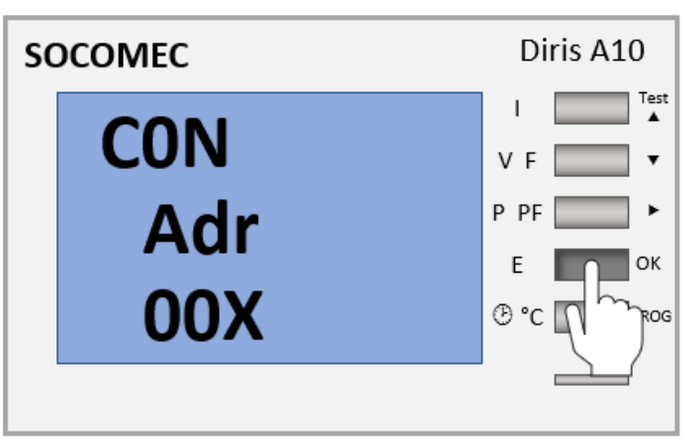


5. Press the ^ button several times until the desired value is displayed.



6. Carry out the above steps until the desired value is set.

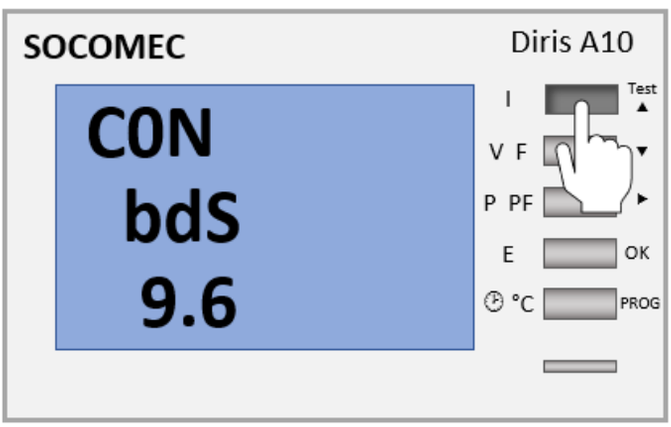
7. Press the OK button to confirm the entry.



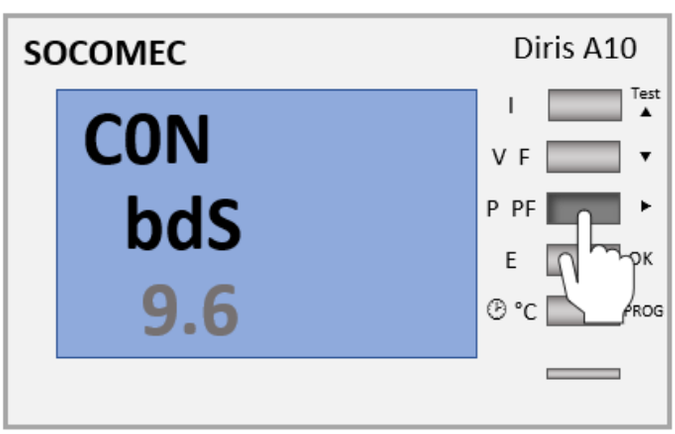
6.5. Communication speed input (baud rate)

The following steps describe the procedure for configuring the baud rate.

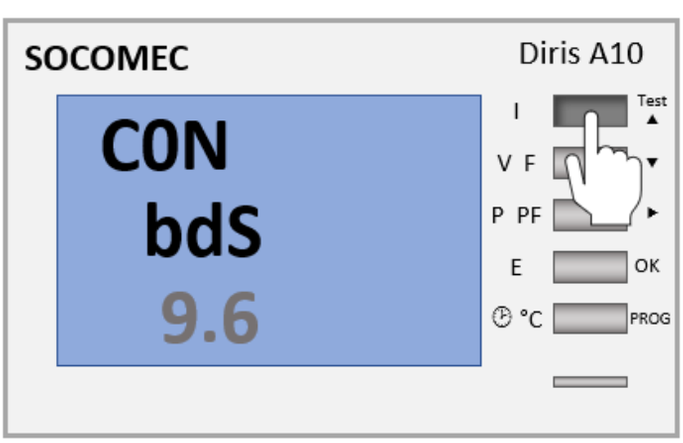
1. Press the ^ button several times until the menu item "CON bdS" appears.



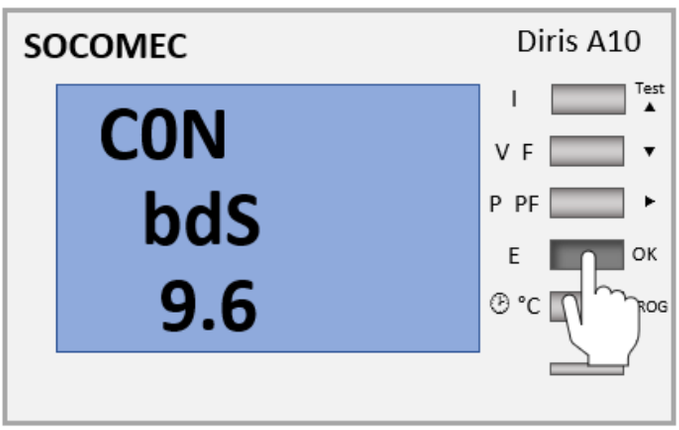
2. Press the button. Then, the first digit flashes.



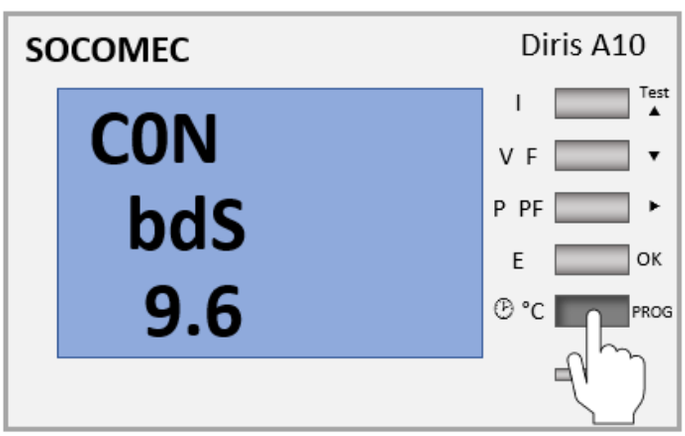
3. Press the ^ button several times until the value 9.6 is displayed



4. Press the OK button to confirm the entry.



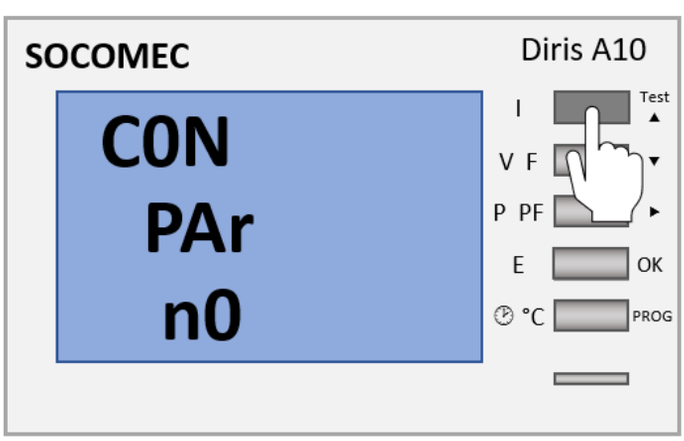
5. Press the PROG button to save the entries. The commissioning can then be continued.



6.6. Communication parity input

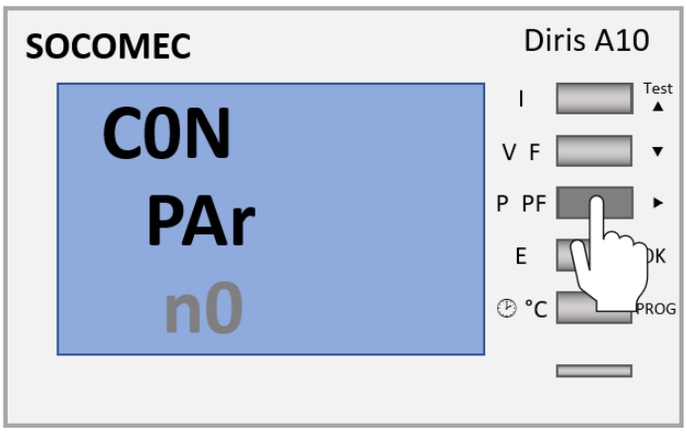
The following steps describe the procedure for configuring the communication parity.

1. Press the ^ button several times until the menu item "CON PAr" appears.

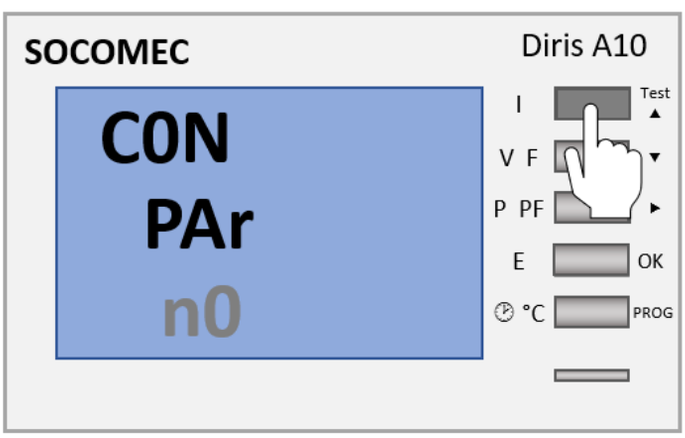


6.6. Communication parity input

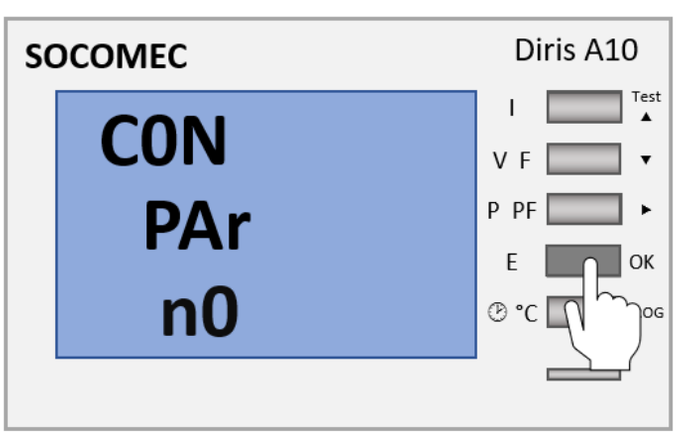
2. If the value "n0" is not selected, press the button. The selection then flashes.



3. Press the ^ button until the value "n0" is displayed



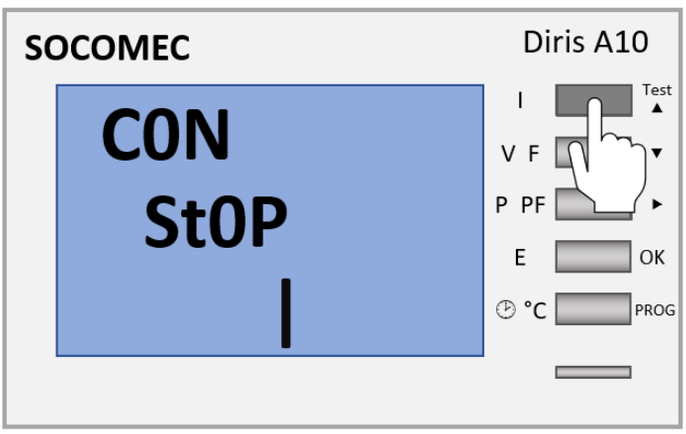
4. Press the OK button to confirm the entry.



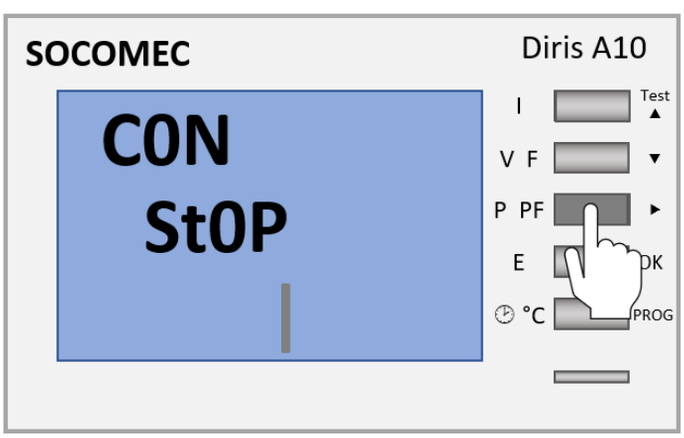
6.7. Communication stop bit input

The following steps describe the procedure for configuring the communication stop bit

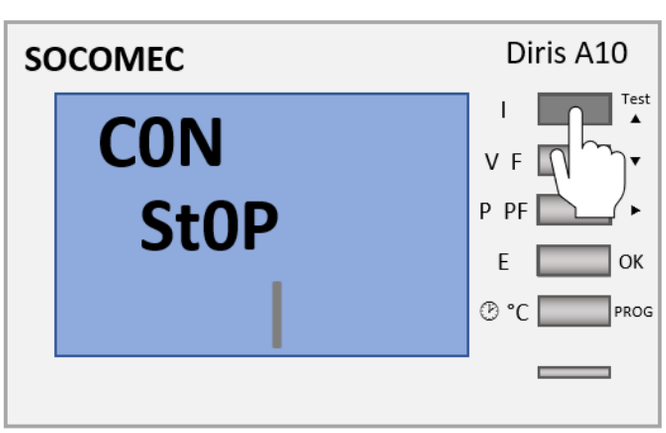
1. Press the ^ button several times until the menu item "CON St0P" appears.



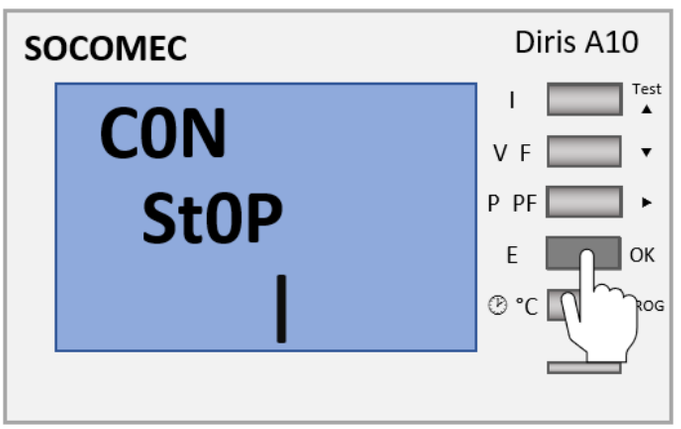
2. If the value "1" is not selected, press the button. The selection then flashes.



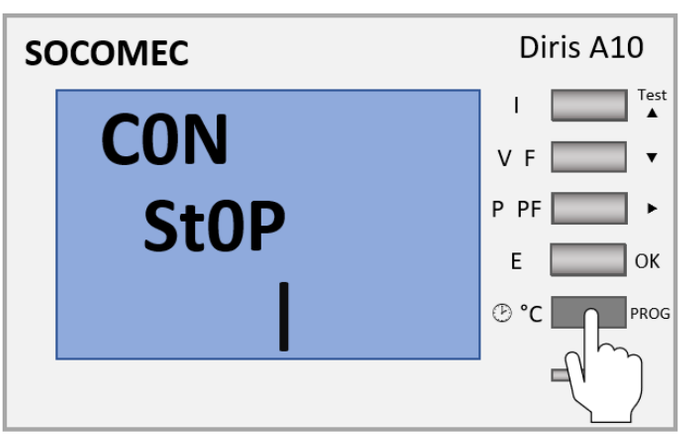
3. Press the ^ button until the value "1" is displayed



4. Press the OK button to confirm the entry.



5. Press the PROG button to save the entries. The commissioning can then be continued.



7. Connection — Function test

During the test, the meter must apply current and voltage to each of the three phases. Furthermore, this function assumes that the Power Factor of the installation is between 0.6 < PF < 1. If the Power Factor of the installation is not within this range, this function cannot be used.

With 4 BL / 3 BL / 2BL / 1 BL, only the TI connection is tested. With 4NBL and 3NBL, the entire connection is tested.

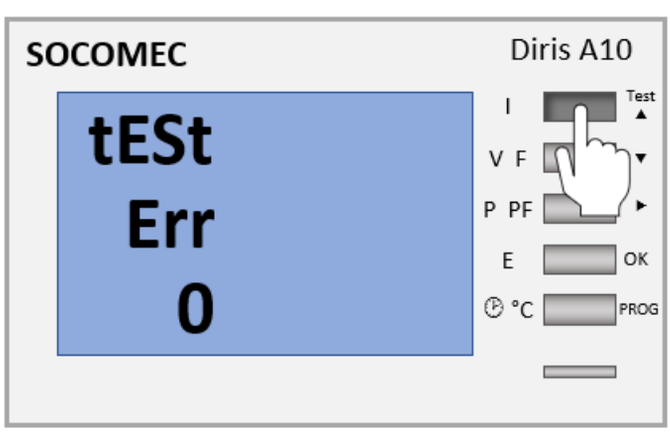
There are 7 different error codes:

1. **Err 0** = no error
2. **Err 1** = Phase 1 of the current transformer inverted
3. **Err 2** = Phase 2 of the current transformer inverted
4. **Err 3** = Phase 3 of the current transformer inverted
5. **Err 4** = Voltage between V1 and V2 inverted
6. **Err 5** = Voltage between V2 and V3 inverted
7. **Err 6** = Voltage between V3 and V1 inverted

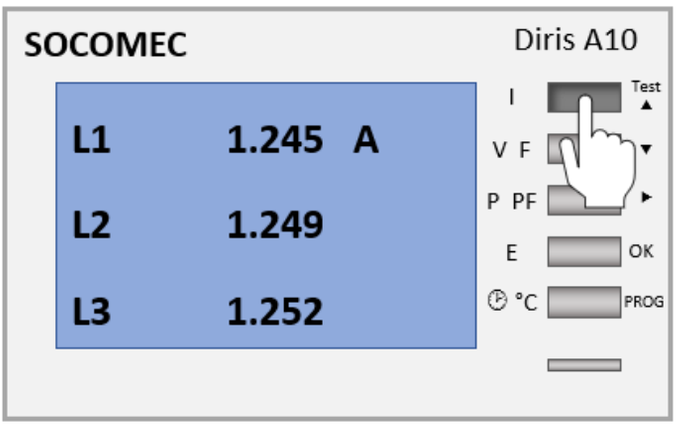
For errors **Err 1**, **Err 2** and **Err 3**, the change can be made via the meter or manually by correcting the power connections. For errors **Err 4**, **Err 5** and **Err 6**, the change must be made manually by correcting the voltage connection.

7.1. Example 1: Error "Err 0"

1. Press the TEST button for 3 seconds.
2. Error "Err 0" appears.

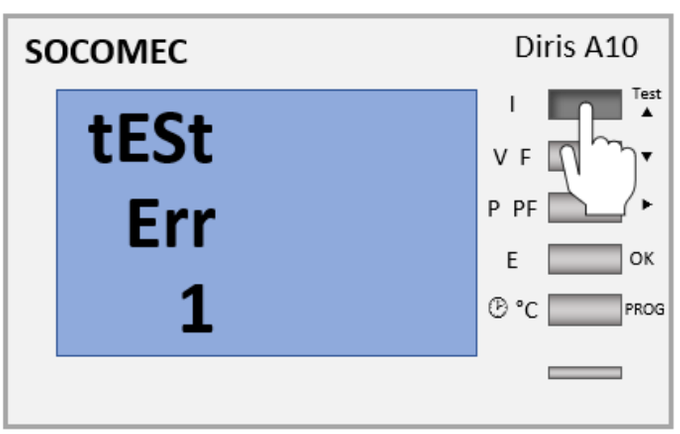


3. Press the TEST button for 3 seconds to exit test mode.

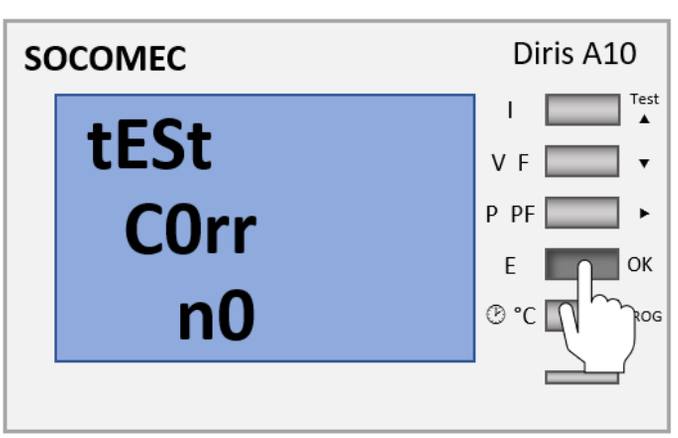


7.2. Example 2: Error "Err 1"

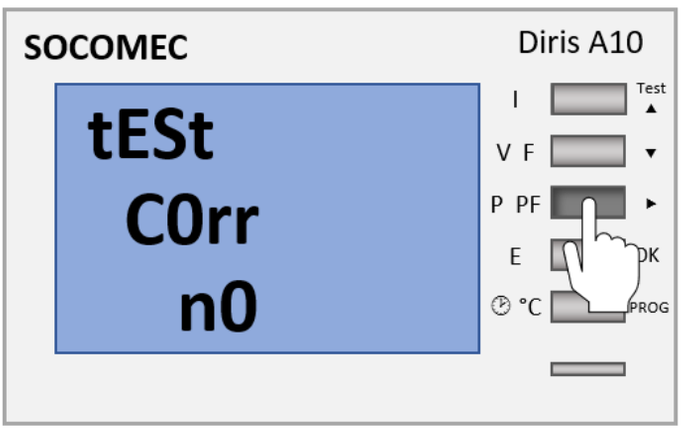
1. Press the TEST button for 3 seconds.
2. Error "Err 1" appears.



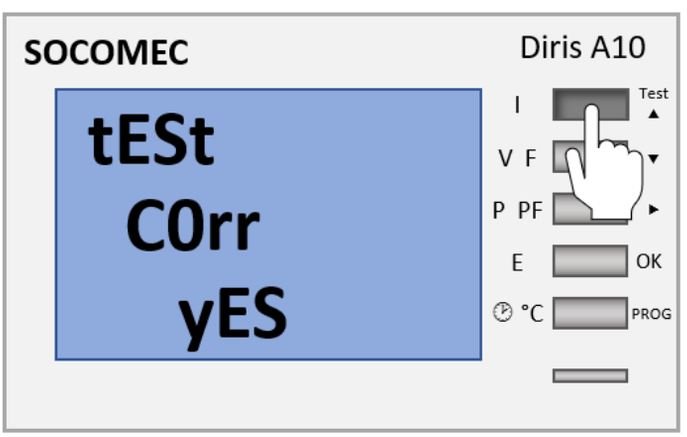
3. Press the OK button. The troubleshooting screen then appears.



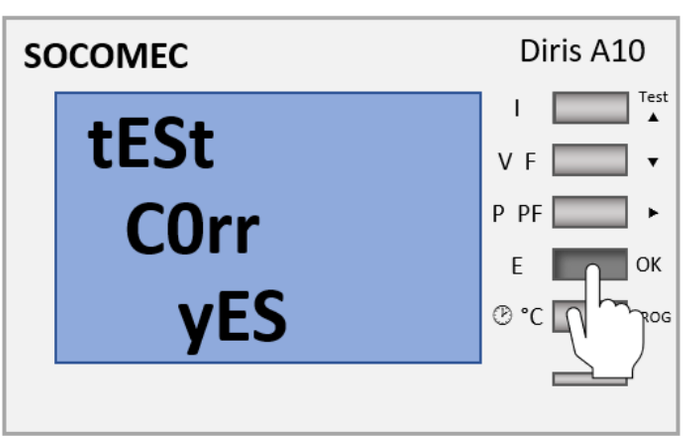
4. Press the button.



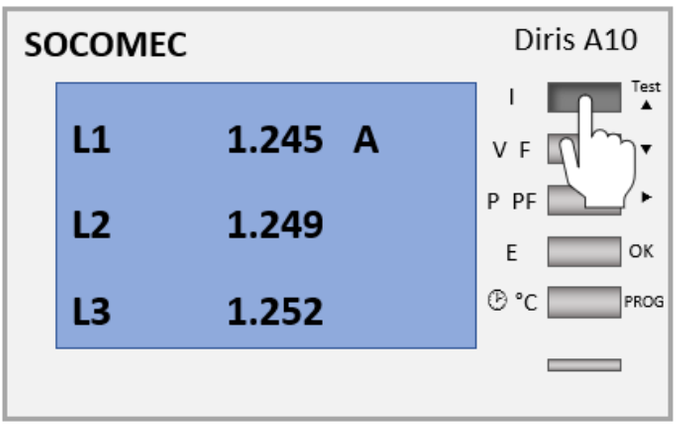
5. Press the TEST button. The error correction is set to "YES".



6. Press the OK button to confirm the entry.



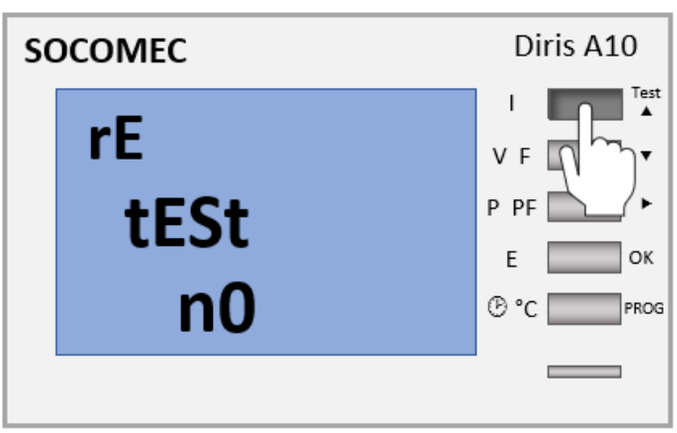
7. Press the TEST button for 3 seconds to exit test mode.



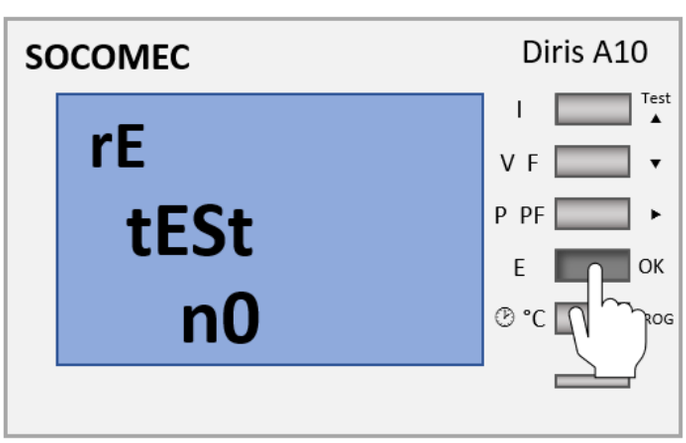
7.3. Second test run

In this operation, the changes from the first test are not taken into account.

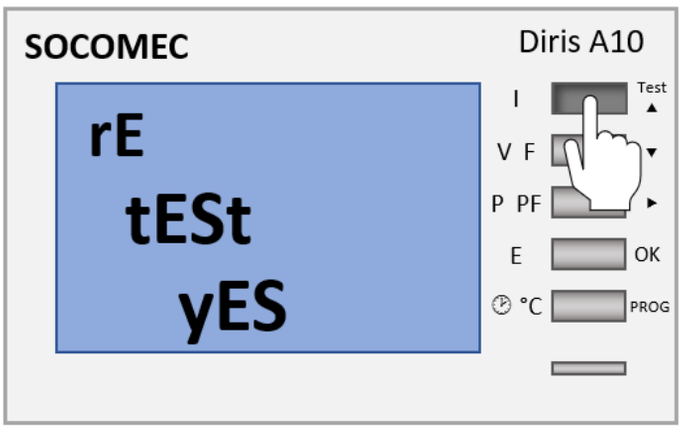
1. Press and hold the TEST button for 3 seconds.



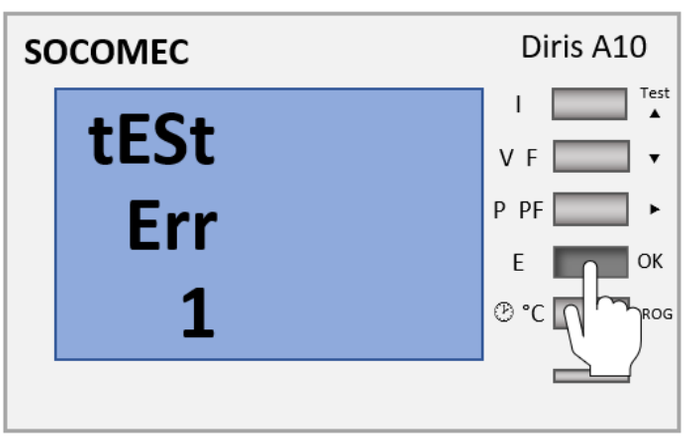
2. Press the OK button.



3. Press the TEST button. "YES" is displayed.



4. Press the OK button. As the changes from the first test are not taken into account, an error may be displayed again.



The configuration is now complete.

8. Contact us

For support, please contact:

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Gewerbepark 6
94547 Iggensbach

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

9. Directories

9.1. List of illustrations

Image 1. Voltage tap and auxiliary supply voltage
Image 2. Connection of the generator current transformer
Image 3. Connection between current transformer, meter, and metering point operator
Image 4. Connection between current transformer and consumer load
Image 5. RS-485 connection
Image 6. Looping through RS-485 of several meters
Image 7. Control elements