

Installation Guide

On-site installation procedure PV monitoring with Xemex KWHIQ meter

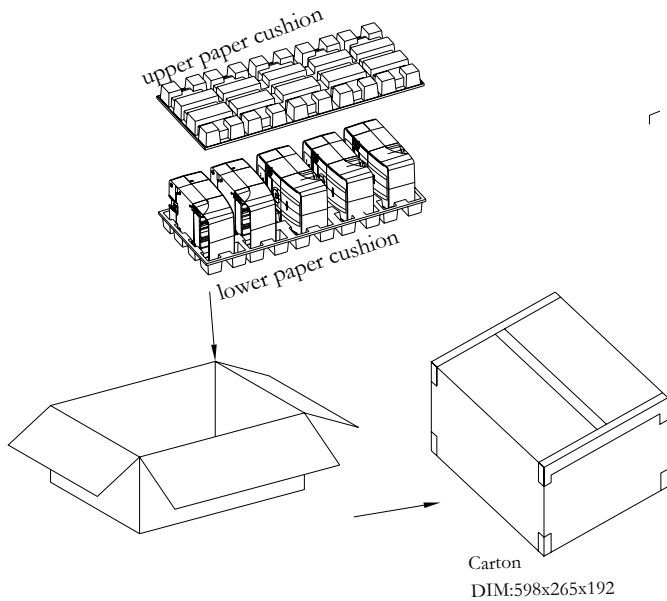


Introduction

The Kwhiq IQ0102065BNEM electricity meter is a single-phase smart meter developed for measuring and monitoring energy to enable good energy management. Many energy parameters (such as energy, voltage, power, ...) are measured, logged and made available. The meter can be read and configured via the mobile network (4G / 2G).

The most important features:

Measurement accuracy	Active power: EN 50470-3 Class B Reactive power: IEC 62053-23 Class 2 MID certified
Connection	1 phase, 2 wires, direct connection
Rated voltage Voltage range	230V +/- 20%: 184V – 276V
Rated current Current range	5A 0.25A - 65A
Starting current	20mA
Frequency	50Hz (+/- 5%)
Internal power consumption	Voltage circuit: < 2W / 10 VA per phase. Current circuit: 0.5 VA per phase
Interfaces	<ul style="list-style-type: none"> - DLMS / COSEM via CAT M / GPRS / NBIoT mobile network - Optical local interface DLMS / COSEM direct HDLC - IEC 62056-21 - P1 port (SMR v5.0.2) - LCD display with auto-scroll and push button for manual scrolling. - 2 energy pulse LEDs: active 2000 imp/kWh & reactive 2000 imp/kvarh
Real time klok	IEC 62054-21 0.5s deviation over 24h at 23°C +/- 0.15 s/°C/24h Backup by super capacitor to bridge 5 days of power failure
Mechanical	Dimensions: 210 x 131.6 x 85.5 mm Weight: 0.95 kg

Environment	IP54 -40°C - +70°C in operation, -40°C - +80°C in storage or transport Relative humidity up to 95% non-condensing
Packaging	5 meters per box with meter and box barcodes also externally on the box label 

Description

Front view

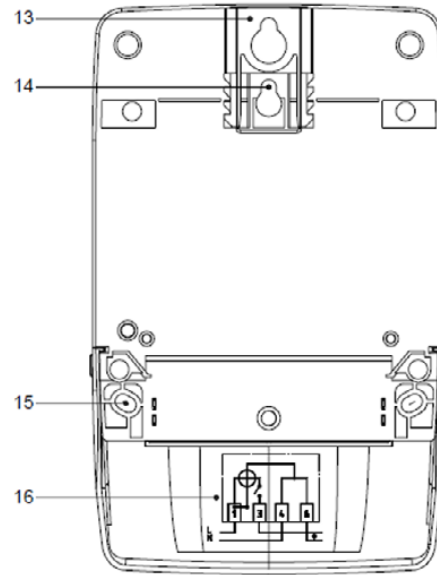
1. Optical port for local configuration and debugging applications
2. Status LEDs -> 'Power' (energised/de-energised) & 'Status': mobile communication status & 'Res': reserved for future use
3. Sealing of communication module
4. Interchangeable module for mobile communication with type designation
5. Type designation of electricity meter
6. Serial number with bar code
7. LCD Display
8. Display scroll button
9. Sealed button for manual checkout (not applicable)
10. Peripheral equipment connection (P1 port).
11. Terminals cover (can be sealed). With wiring diagram on the inside.
12. Indicator lights. The red LED flashes when energy is being consumed or fed in.
There is a LED for active energy (left) and a LED for reactive energy (right).



Description

Rear view

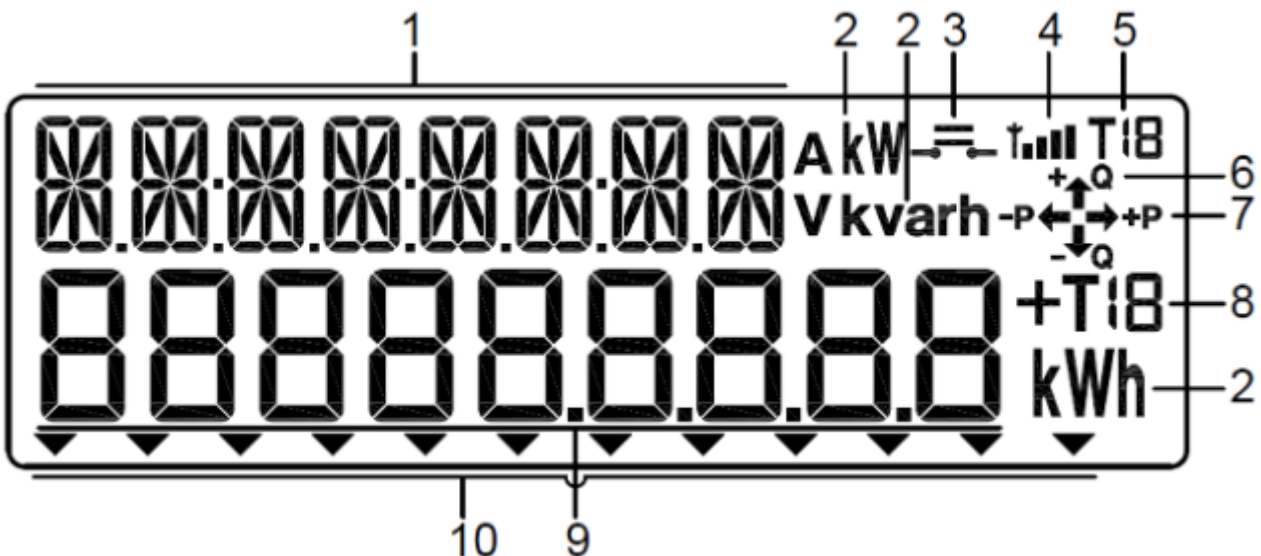
- 13. Adjustable mounting hook
- 14. Mounting hook
- 15. Fixing hole
- 16. Wiring diagram



Display

LCD display

- 1. CODE indicating which value is shown on the display
- 2. Unit of the value shown on the display
- 3. Main breaker state closed/open
- 4. Mobile network - signal strength
- 5. Tariff indication (not used)
- 6. Direction of reactive energy: consumption from the grid f (+Q) or delivery to the grid j (-Q)
- 7. Direction of active energy: consumption from the grid ^ (+P) or delivery to the grid ^ (-P)
- 8. Tariff
- 9. Value
- 10. Indicators:
 - i. L1 -> Voltages on phase 1
 - ii. F -> Meter cover opened (fraud)!
 - iii. T -> Terminals cover opened
 - iv. M -> Strong magnetic field detected (fraud)!
 - v. C -> error situation (for example: invalid internal clock)



After starting: the firmware version of the meter is first shown on the display (briefly).



Auto scroll mode (4 screens)

This is followed by the active energy consumed so far in 0.001 kWh (code 1.8.0)



After 5 seconds, this is automatically followed by the active energy delivered so far in 0.001 kWh (code 2.8.0)



After 5 seconds, the current power consumption in 0.001 kW (code 1.7.0) is automatically displayed



After 5 seconds, the current power consumption in 0.001 kW (code 1.7.0) is automatically displayed



Then, after 5 seconds, it starts again at the beginning of the display cycle (back at code 1.8.0)

Manual scroll mode (21 values)

Scroll through the list of values by briefly (> 0.2s & < 2s) pressing the upper blue button. After 60 seconds without pressing this button, the display will return to auto scroll mode.



CODE	VALUE
no code	Clock (UTC): top row the time/ bottom row the date/ “ “ if unknown
97.98.0	Alarm Register (0 = no alarm, 1 = clock (still) not synchronised).
1.8.0	Total active energy consumed from the grid (+A)
2.8.0	Total active energy delivered to the grid (- A)
1.8.1	Active energy consumed from the grid (+A)-during low tariff (tariff T = 1)
1.8.2	Active energy consumed from the grid (+A)-during high tariff (tariff T = 2)
2.8.1	Active energy delivered to the grid (- A)-during low tariff (tariff T = 1)
2.8.2	Active energy delivered to the grid (- A)-during high tariff (tariff T = 2)
14.7.0	Frequency of the grid
16.7.0	Active power - net value: (I+PI-I-PI)
32.7.0	Voltage
31.7.0	Current
25.6.0	GSM operator (name of 'mobile country code' + 'mobile network code') + status network registration: 0 = not registered 1 = registered on own network 2 = not registered and looking for a (new) network operator 3 = registration denied 4 = unknown 5 = registered as roaming (= normal value) + access technology 0 = not active 1 = GPRS 2 = EDGE 7 = LTE CAT M1 (= normal value) 8 = LTE CAT NB1 9 = LTE CAT NB2
94.31.6	Mobile network signal strength indicator
94.31.7	Mobile network signal strength RSRP
94.31.8	Mobile network signal strength RSRQ
94.31.9	Mobile network signal strength RSSI
25.4.0	Mobile network - APN
94.31.4	SIM kaart ICCID
25.1.0	IP_address
0.2.0	Active firmware version (FW version measurement part + FW version application)

Installation

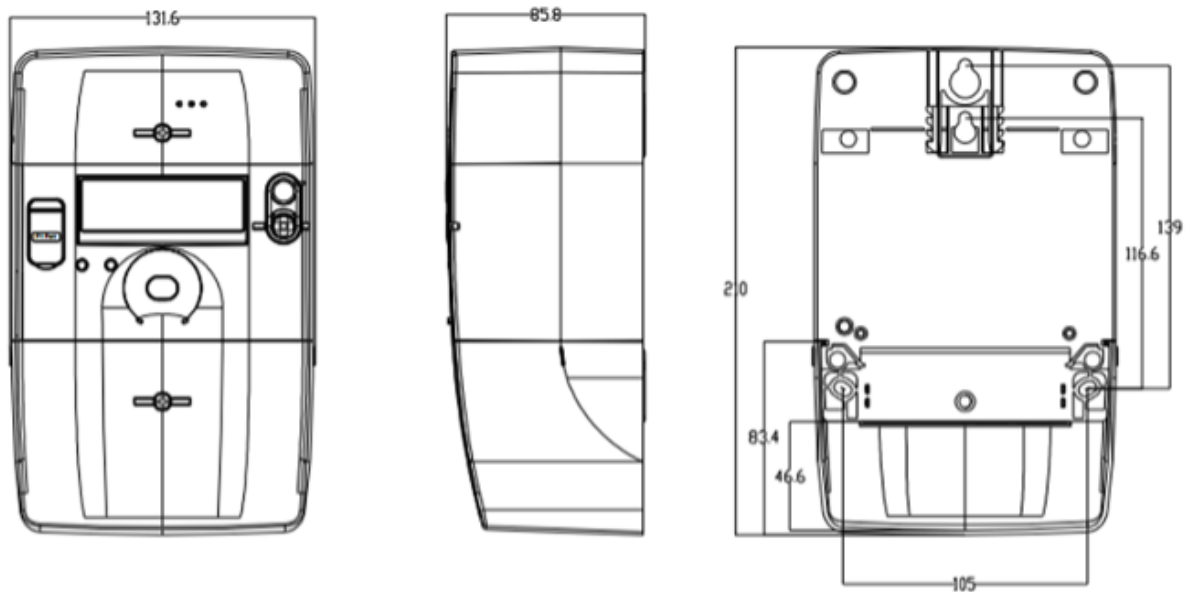
Choose a suitable location with sufficient signal strength

The meter should be installed in a dry and well-ventilated location. The meter or the installation board should be placed against a robust, fire-resistant solid wall. In case of any doubt (e.g. in basements), use a **telephone and reference meter** to check the signal strength of the mobile network in advance.

Fix the meter

Respect the safety regulations and act in accordance with the user manual of the meter.

Dimensions: 210mm x 131,6mm x 85.8mm



Materials:

- Pozidriv screwdriver PZ no.2 for the screws on the terminal block.
- 3 Self-tapping M5 screws with countersunk head for fixing to the wall or panel.
- Drill with M5 stone drill bit and 3 plastic plugs for installation against a concrete wall.

Check the meter before connecting it. Only connect the meter if there is no visible or audible damage or defect (loose parts). Meters that have been dropped may not be installed, even if no damage is visible. They must be returned to the manufacturer for inspection. Internal damage may cause short circuits or malfunction.

The meter is fixed at 3 points: 1 hook at the top and 2 screw holes.

The hook can be adjusted to 3 positions. First hang the meter on the hook at the top and then attach the 2 screws.



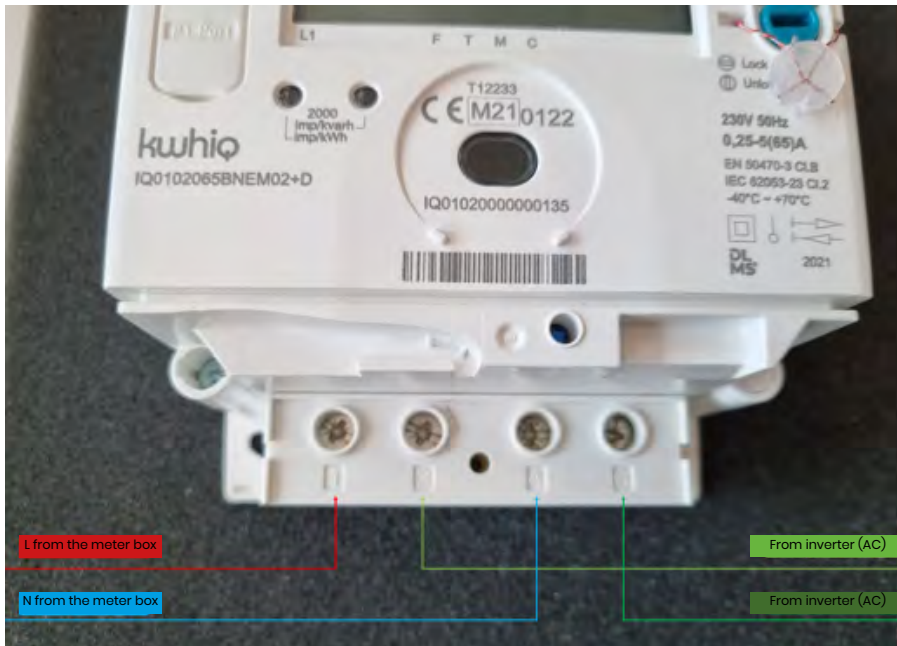
Connect the meter

First de-energise the side of the circuit to which the meter is to be connected. Make sure that the circuit cannot be re-energised by accident.

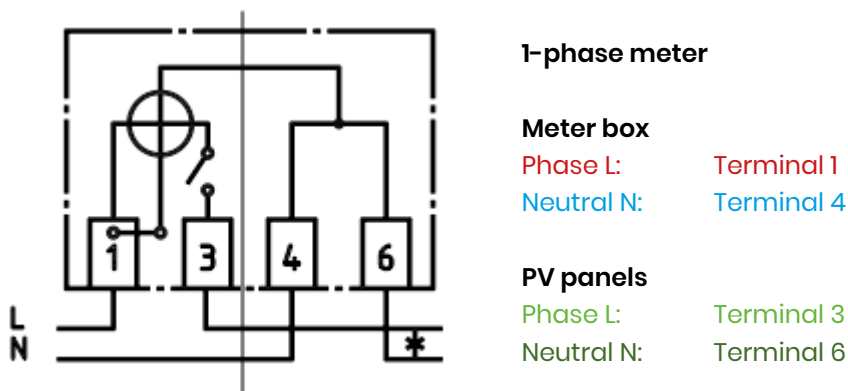
Connect the meter as indicated below.

The kWhiq meter is equipped with terminal connectors that allow the use of wires with a section of 2.5 to 25 mm². If a solid cable is not used, the correct cable ferrules must be fitted. The terminal connectors are fitted with M7 x 13 cross-head and slotted-head screws that must be tightened with a Posidriv PZ No. 2 screwdriver to a torque of at least 3.5Nm.

The 1-phase meter is connected with side of mains or meter box to L (terminal 1) and N (terminal 4).

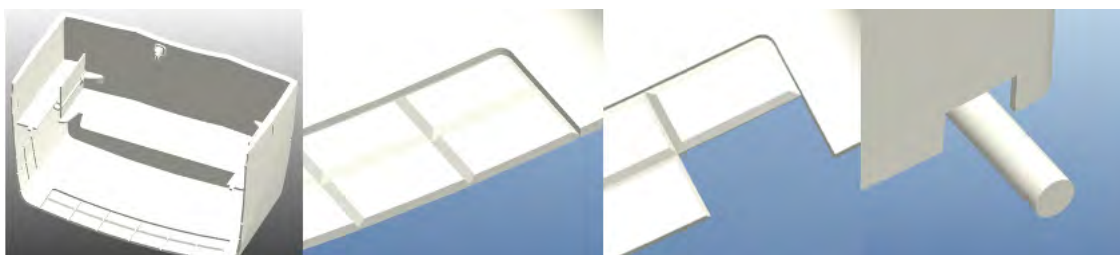


See also the diagram on the inside of the terminal cover.



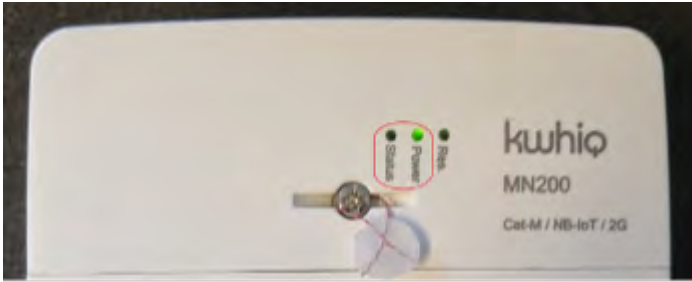
Important: if the connection of the meter box and solar panels is reversed, the solar panels will work but the monitoring will not! You can check whether the meter is correctly connected by looking at the display. This must be done with a working installation: there must be PV production. The display shows an arrow on the right with -P as caption. It must point to the LEFT.

Fit the terminal cover. On the underside, the correct routing can be cut out for the cable.



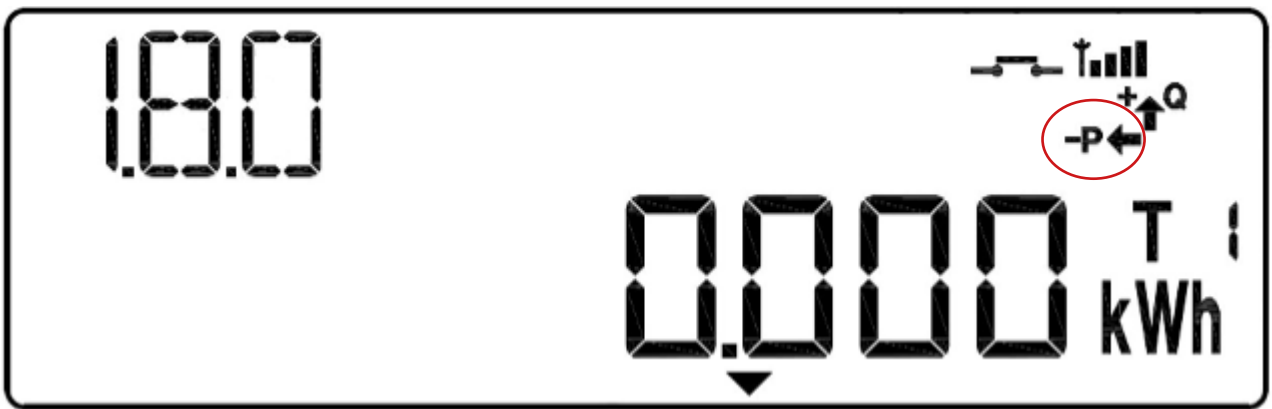
Power up the installation

The display becomes active and the 'Power' led lights up continuously. The 'Status' led lights up continuously (looking for a network) or flashes slowly (0.8 sec. on and 0.8 sec. off: registered on the network but cannot receive a data connection yet).



Check the connection

Check that the arrow on the right of the display points to LEFT.



Immediately after switching on the voltage, the arrow may point to the right (+P). This is because the inverter needs time to start up. During this start-up period, the inverter consumes electricity from the grid so that the arrow points to the right. You must wait until the inverter actually delivers solar power.

→ **If the arrow continues to point to the right (+P)**, electricity is flowing, but in the wrong direction. The meter might be connected incorrectly. Another possibility is that there is not enough sunlight to feed into the grid and the inverter is using enough power to be visible on the meter. If there is no sunlight (or if the PV plant is not working for another reason), it is also possible that there is **no arrow on the display at all**. In these cases, please check whether the meter is connected properly.






Registration on the GSM network

- Maximum 5 minutes after start-up, the 'Status' LED will start flashing faster (0.2 sec. on and 0.2 sec. off).
- In the meantime, the network symbol has also appeared in the display.
- The meter is now registered on the GSM network and able to receive a data connection.
- Usually the meter will not need 5 minutes but will be ready after +/- 25 seconds.

If the 'Status' LED does not flash quickly 5 minutes after start-up, there is probably no mobile network coverage at that location and the meter should be moved to a location where there is.

Check the signal strength

The network symbol at the top right of the display indicates the signal strength of the GSM network at that location:

	Excellent	(rsrp \geq -80 dBm)
	Good	(rsrp \geq -90 dBm & rsrp $<$ -80 dBm)
	Sufficient	(rsrp \geq -100 dBm & rsrp $<$ -90 dBm)
	Insufficient	(rsrp \geq -120 dBm & rsrp $<$ -100 dBm)
	No signal	(rsrp $<$ -120 dBm)

If there is no signal, or if the signal is insufficient or poor (less than 2 bars at the network symbol) the meter should be moved to a place where the signal strength is sufficient. An external antenna can be used (optional item). In this case, the meter can remain at the location without network coverage because an antenna is installed at the location with sufficient signal. The external antenna is connected to the meter with a cable. The connection point (MCX connector) is located under the communication module cover. This section is sealed. The seal must therefore first be broken and a new seal must be placed after the antenna cable has been connected.

Installing an external antenna

1. Remove the seal from the communication module.



2. Remove the cover from the communication module.



3. Install the antenna cable. Connect the MCX connector and tuck the cable into the groove provided.



4. Break out the piece of plastic to allow the cable to come out of the cover.

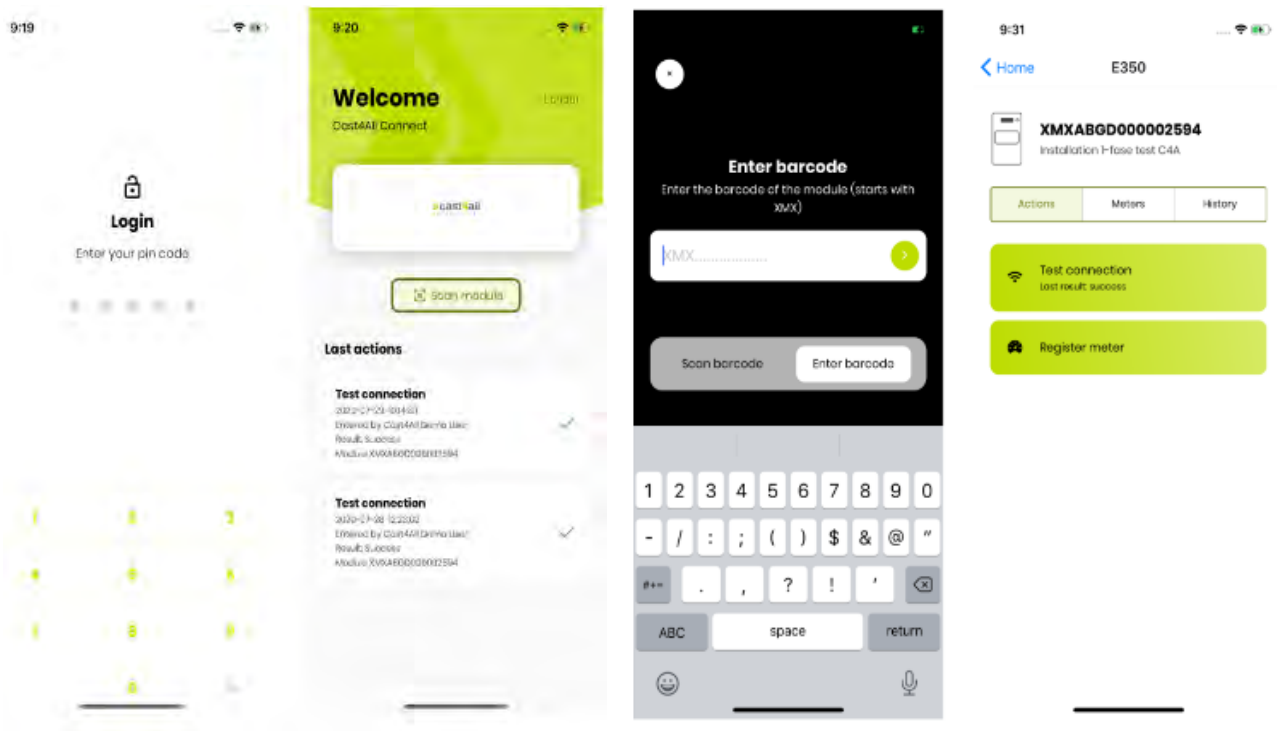


5. Replace the cover on the communication module and reseal the bolt with a (proprietary) seal.



6. Install the antenna in a location with sufficient network coverage.

Check the installation by using the Cast4All Connect app, which can be downloaded from Apple's App Store and Android's Google Play Store.



Installation unsuccessful

When nothing appears on the meter's display and the 'power' LED does not light up.

Check whether the meter has voltage at the terminal block by means of a voltage tester or voltmeter. If there is 230V between terminals 1 and 4 but nothing appears on the display, the meter may be defective. Replace the meter and start an RMA procedure for the defective meter.

If it is not possible to achieve successful confirmation in the Cast4All Connect app. And/or if the signal strength of the meter remains insufficient.

Check the signal strength of the mobile network by using a reference meter. Only if the reference meter shows a good signal strength (the value on the screen is updated every 30 seconds) in exactly the same place will the meter need to be replaced. In this case, write down or film all the data from the display. To do this, press the upper blue button and scroll through all the codes of the display cycle.

All values must be noted in the RMA document.