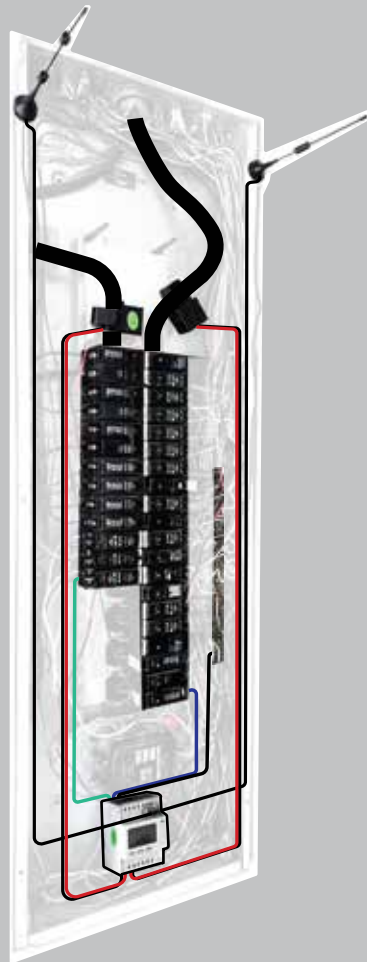




USER GUIDE

GRACE THE SMART CRAFTSTROM POWER METER



Contact us:

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www.craftstrom.com

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SAFETY INSTRUCTIONS

INSTRUCTIONS & SYMBOLS

Please hire an electrician to install the power meter in your breaker box!

The following symbols are used to alert you to the respective level of danger, i.e. H. to draw attention to the severity and likelihood of a hazard in each section of this document.



Caution

Situation/action that may result in property damage or loss of data.



Warning

Indicates a hazard that could result in death or injury.



Notice

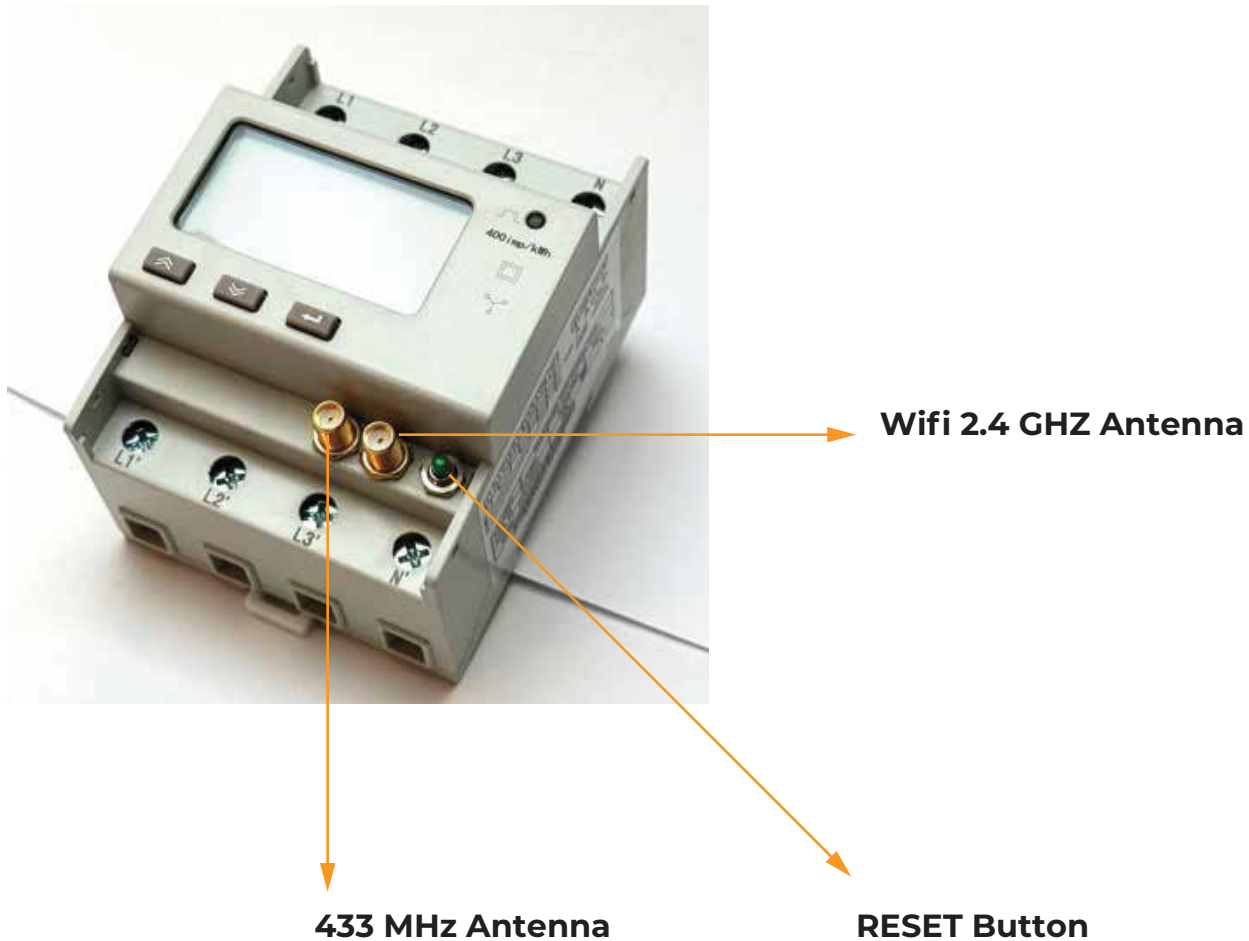
Identifies an important policy and other useful information.

Safety Notices describe danger level, safety instructions also describe the type and cause of the danger, possible consequences and measures to avoid it.

BUTTONS AND CONNECTIONS

ANTENNAS

There are two connections for antennas on the PowerMeter. The left port is for the MHz antenna, while the right port, right next to the “Reset” button, is for the WiFi (2.4GHz).



RESET Button

The reset button has two functions:

1. WiFi Reset: Briefly press Reset (1 sec.). Resets the WiFi to AP (Access Point) mode, i.e. the WiFi module with the name “CS-WIFI” can be found again after approx. 1 minute. ATTENTION: This means that the PowerMeter must be registered in the app again.
2. Power Reset: Press and hold Reset for 6 seconds to completely restart the PowerMeter. If there are problems with the PowerMeter, we always recommend testing this function first. This power reset saves the need to remove the main fuses for a restart.

BUTTONS



“Up” | Shows the exact measurements

- Voltage [V]
- Current [I]
- Frequency [Hz],
- Total harmonic distortion [THD]
- A Σ sign represents the respective sum or difference of a measurement.



“Down” | Shows the exact measurements

- Power [W]
- Reactive power [var]
- Apparent power [VA]
- Power factor [PF]
- A Σ sign represents the respective sum or difference of a measurement
E.g., the power measurement across all 3 phases is summed up here, to represent consumption minus solar production.



“Back” | Shows the calculation

- Total energy consumption imported [IMP ... kWh]
- Total energy consumption exported [EXP ... kWh]
- Imported blind work [IMP ... kvarh]
- Exported blind work [EXP ...kvarh]

The “Back” button is also essential for programming the PowerMeter:



Hold for 3 seconds to enter the menu.
The display shows 0000 as the password, where the last 0 blinks.


Now





Press so that the password is changed to 0001



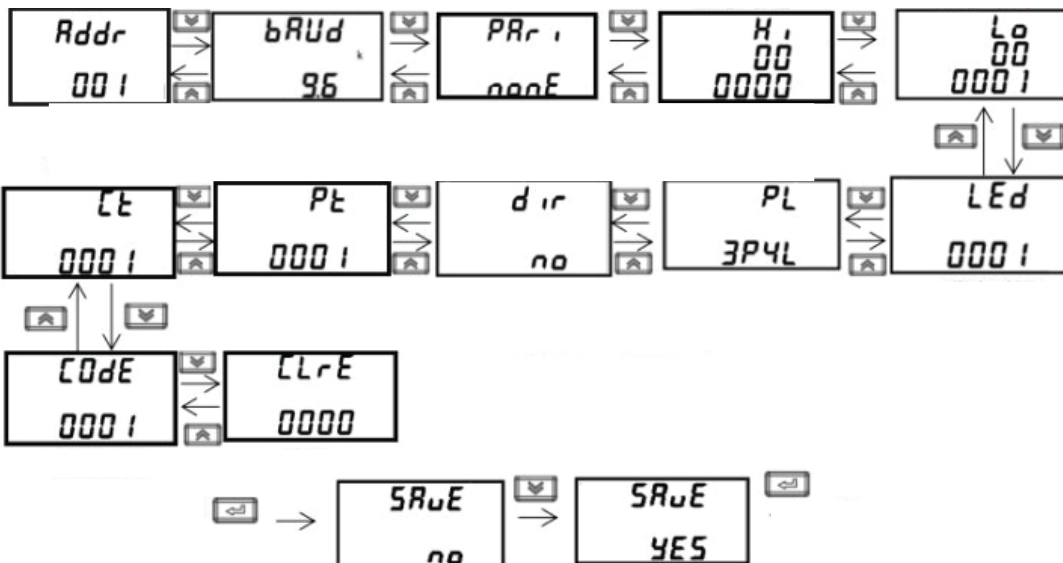
Press to confirm your entry. You are now in the main menu to be able to change certain parameters.

After changing a parameter, press and hold  again until „SAuE“ shows on the display.

underneath is „no“. Now press  to change “no” to “yes” , now press  to get back to the main menu.

SUBMENU AND SETTINGS

#	Untermenü		
	Symb ol	Meaning	Intervall
1	ADD R	Communication address	1-254
2	Baud	Baud-number	1200! 2400! 4800! 9600! 19200
3	Pari	parity selection	None! Odd! Even
4	HI	DL/T645 High	000000-999999
5	LO	DL/T645 Low	000000-999999
6	LED	LED Lighting settings	1-255 Min oder 0 immer an
7	PL	Phase selection	3P4L: – 3 Phasen 4 Leiter 3P3L: – 3 Phasen 3 Leiter
8	DIR	Current direction	No – normal, yes - rückwärts
9	S-TY	calculation of apparent power	PQS oder RMS
10	EF-E	Multi-rate function	EF – mit Zineszins E – ohne Zineszins
11	Pt	Voltage transformation ratio	1-9999
12	Ct	Current transformation ratio	1-9999
13	CoD E	Password Settings	1-9999
14	CLrE	Delete All	0-9999



SAFETY INSTRUCTIONS

Responsibilities

CraftStrom does not carry out any installations of the products on the customer side. The customer is therefore obliged to read the safety instructions in this user manual and to hire a qualified and certified person for the installation. The safety regulations must be strictly adhered to. CraftStrom assumes no responsibility for the installation of this meter.

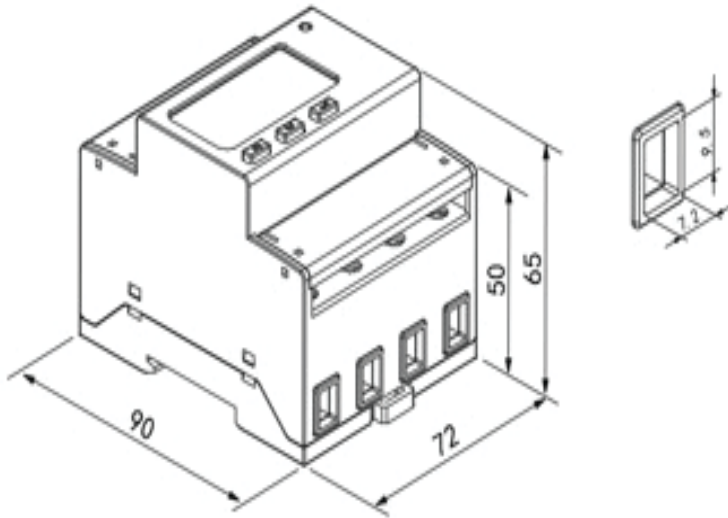
Safety regulations

Please follow these safety regulations carefully at all times during installation or removal of this Power-Meter.

- The meter's connections must be disconnected from all voltage sources during installation or opening.
- Contact with live parts can be life-threatening. Therefore, remove the main fuses until the work is completed and store them in a safe place so that other people cannot replace them unnoticed.
- Local safety regulations must be adhered to. Only technically qualified and appropriately trained personnel may install the meters.
- Only suitable tools may be used for work. This means e.g. B. that the screwdriver is the correct size for the screws and that the handle of the screwdriver must be insulated.
- Meters must be held securely during installation to avoid damage.
- Dropped meters may not be installed, even if no damage is apparent, but must be returned to CraftStrom for inspection purposes. Internal damage can lead to malfunctions or short circuits.
- The meters must never be cleaned under running water or with compressed air. Water ingress can cause short circuits.

DIMENSIONS AND TECHNICAL SPECS

Appearance and installation dimensions (4P) (mm)



The CraftStrom PowerMeter is a power measuring device that is installed either on standard DIN rails in distribution boxes; or, if there is no space or no DIN rail available, there is also the option to purchase the PowerMeter with induction sensors (CT brackets).

Function

Bi-directional power measurement

Active power - reactive power - A,B,C in-phase active power

The POWER METER measures the active power in the electrical circuit. Reactive power in an electrical circuit is measured using a VAR meter. The active power always flows in one direction, i.e. from the source to the load. Reactive power flows in both directions between source and load. Through bi-directional measurement we can distinguish between electricity production and consumption.

All Measurements

Voltage [U] - Current [I] - Active power [P] - Reactive power [Q] - Apparent power [S] - Frequency [f]
Power factor/Phase Shift Distribution Factor [PF]

Communication

The PowerMeter has the CraftStrom communication module with WiFi and MHz communication for secure data transmission. **WiFi – 2,4 GHz & 433 MHz**

TECHNICAL SPECS

Specifications		1-3 phase power meter	
Measurements	Voltage	Reference voltage	3×100V, 3×380V, 3×57.7/100V, 3×220/380V
		Consumption	<10VA (Single phase)
		Impedance	>2MΩ
		Accuracy	±0.2%
	Current	Input current	3×1(6)A 3×10(80)A
		Consumption	<1VA (Single circuit rated current)
		Accuracy	±0.2%
Power		± 0.5%	
Mains frequency		45~ 65Hz, ±0.2%	
Energy measurement	Electrical energy	Active power (accuracy level 0.5S) Reactive power (accuracy level 2)	
	Time measurement	≤0.5s/T	
Digital signal	electricity pulse output	1 channel optocoupler	
Pulse	pulse width	80±20ms	
	IPulse constant	400imp/kWh,10000imp/kW	
Communication	Internal	RS485 Modbus RTU, DL/T645	
	External	2.4 GHz (WiFi), 433 MHz	
	Baudrate	1200bps~19200bps	
Environmental conditions	Operating temperature range	-25°C ~+55°C	
	Humidity	≤95%	



INSTALLATION



Do not touch any live parts

Dangers can arise from live electrical systems, to which the meters are connected. Touching live part is life-threatening. All safety instructions must therefore be strictly adhered to.

Necessary environmental conditions for installation

- The PowerMeter may only be used in a mechanical environment M1 - with insignificant Vibration and shock – installed in accordance with Directive 2014/32/EU.
- The PowerMeter is designed for installation in an electromagnetic environment “E2” in accordance with Directive 2014/32/EU.
- The PowerMeter is for indoor installation in non-condensing conditions Humidity provided.
- When using CT terminals (if the PowerMeter is not connected to a DIN rail meter box can be installed) it must be ensured that the ladders are freely accessible.

This meter is for indoor use only

In cases where outdoor installation is unavoidable, ensure that the meter is installed in a suitable housing, to maintain the operating environment according to the meter specification. Such enclosures must be securely sealed to reduce the risk of meter damage through exposure to the outdoor environment, including (but not limited to) extreme temperatures, humidity and intrusion of insects.



Who is allowed to install?

The following conditions must be met for the installation and usage of the meter:

- The work described below may only be carried out by technically qualified and qualified personnel be carried out by appropriately trained persons.
- The expert must be familiar with local safety regulations and and adhere to them.
- Strict compliance with the instructions contained in the “Safety Regulations” section, in particular the safety regulations and the instructions for safe operation.
- Before starting work, ensure that you have the necessary materials and tools available.

INSTALLATION



Dangerous voltage on conductors

The connecting wires at the installation site must not be live when installing the meter. Touching live parts is life-threatening. Remove the main fuse until the work has been completed and store it in a safe place so that other people cannot replace it unnoticed.



No over-current protection or automatic shutdown

Since the meter does not have internal overcurrent protection or mains isolation, this must be provided by the final installation.



E VDE-AR-N 4101:2014-03

Requirements for measuring points in electrical installations in the low-voltage network.

Installation

1. Make sure that you have approx. 4 fuse locations available in the distribution box.
2. The PowerMeter should be as easy as possible to connect to the 3 phases. This means that cable routes should be as short as possible.
3. The two antenna connectors and the reset button are located on the bottom bar of the power meter. These can be covered by the cover in the distribution box. However, these are essential for operation, so the panel must be cut to approx. 30 x 10 mm.
4. Now place the PowerMeter on the DIN rail and check the cable lines for the correct lengths. Then remove the PowerMeter from the DIN rail again.

Connection

1. The power inputs and outputs (1-3) must be connected correctly. The conductor from the house connection or from the main fuse must be present at the input (top), that of the meter to the consumer at the output (bottom).
2. The neutral conductor must be screwed into connection socket 4 (both at the input and output).
3. All pressure screws for the phase connections and neutral conductors must be sufficiently tightened.
4. After connecting the 8 cables, place the PowerMeter on the DIN rail and push the DIN clamp upwards at the back to ensure a secure hold on the DIN rail.

Activation

1. Reinstall the main fuses that were removed before installation. The PowerMeter is now successfully installed and starts taking measurements.
2. Follow the installation instructions below to install the PowerMeter in the CraftStrom app.

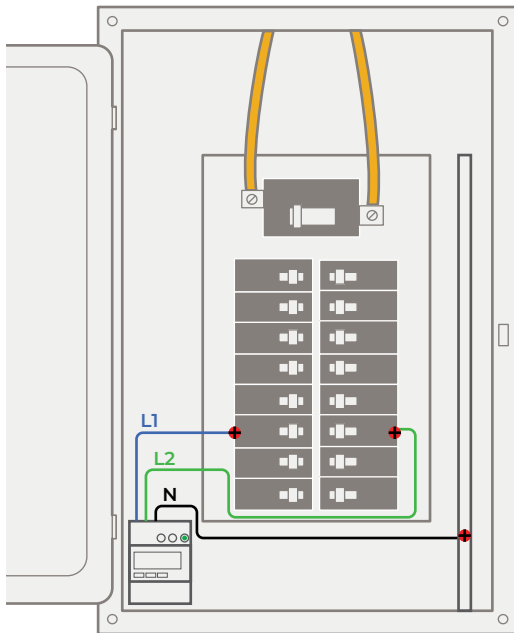
INSTALLATION IN A US - BREAKER BOX

Step 1

Mount the Power Meter inside of the breaker box and connect the 3 wires as follows:

L1 (Blue) to the left "Phase" of the breaker box
L2 (Green) to the right "Phase"
N (Black) to the "Neutral Bar"

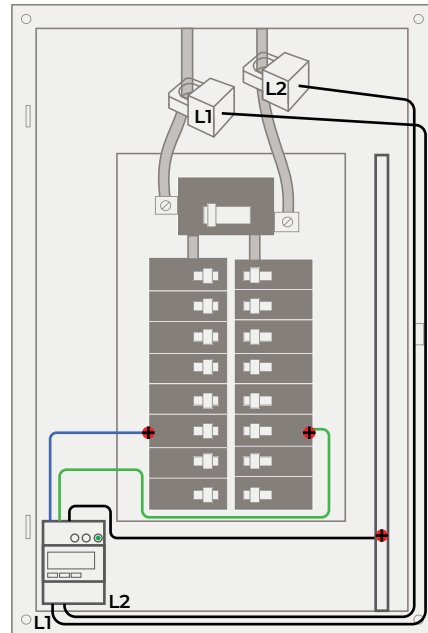
L1 & L2 can be added to existing breaker if no space available for new breaker. Do not hook up to GFCI breaker 15A or 20A is acceptable.



Step 2

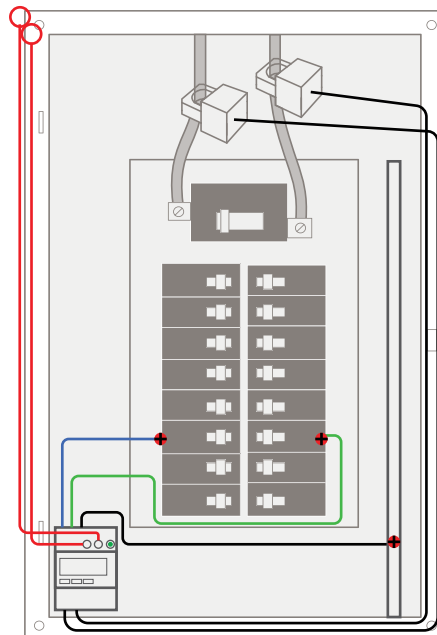
Clamp the Left Main line with L1 CLAMP
Clamp the right Main line with L2 Clamp
Clamps must face the same direction - to the right or to the left.

If Power Meter displays a negative value - then please flip the clamp in its axis but still facing the same direction



Step 3

Attach the Antennas to the Power Meter and place them up high on the frame of the Breaker Box. They are magnetic and will stay in place.



THE CRAFTSTROM-APP

INTRODUCTION

The CraftStrom PowerMeter works in conjunction with the CraftStrom solar inverters and batteries to regulate the flow of information between the CraftStrom products, but also to the app. To do this, it must be registered in the CraftStrom app. As soon as the registration of all devices in the app is complete, they set up an independent communication network (433MHz). Important data for monitoring and control is also sent to the server via WiFi (2.4GHz).



When registering, it is therefore very important that only the 2.4GHz network of the Internet router is used.

The CraftStrom app is free and allows you to monitor your devices & Management of solar production vs. consumption and storage in the smart battery. But the app can do much more...

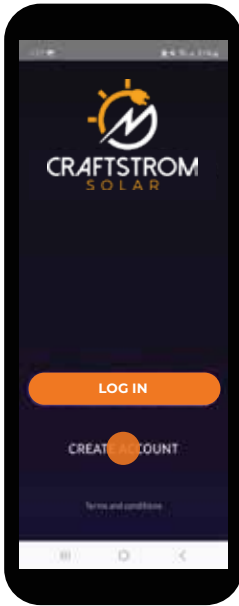
Monitor devices and your success. Check your monthly electricity Invoice – simply compare the readings of our electricity meters in “kWh”. “kWh” is stated on the electricity bill.



SET UP THE CRAFTSTROM APP AND DEVICES

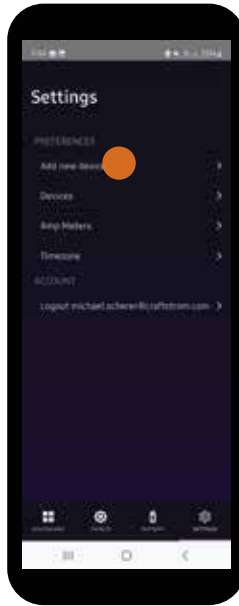
Step1

Create username and Password



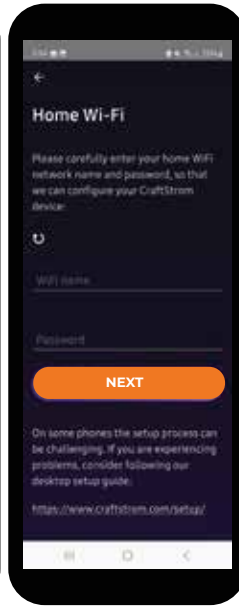
Step2

Go to add new device



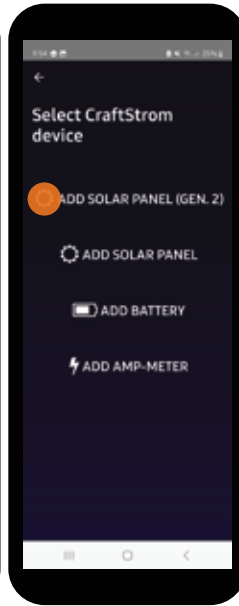
Step3

Pick your home wifi and enter Password



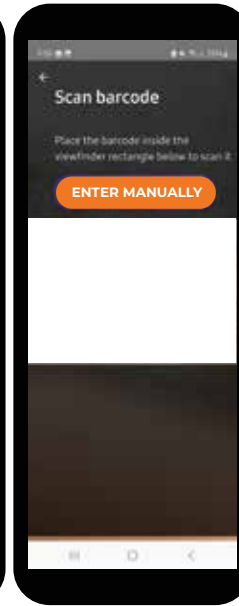
Step4

Pick Add Amp-Meter



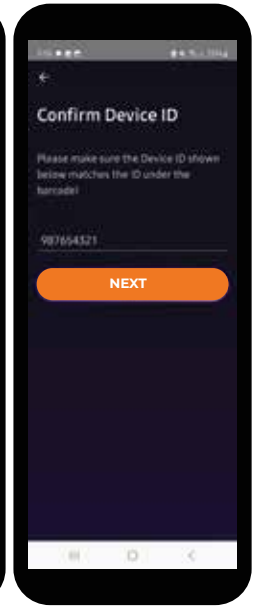
Step5

Scan barcode or enter ID manually



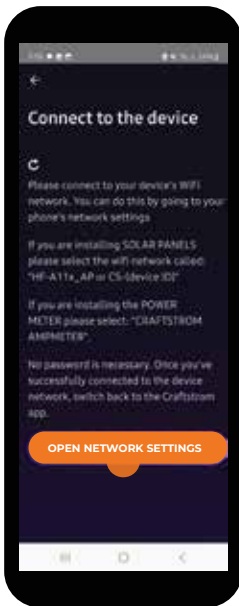
Step6

Confirm ID



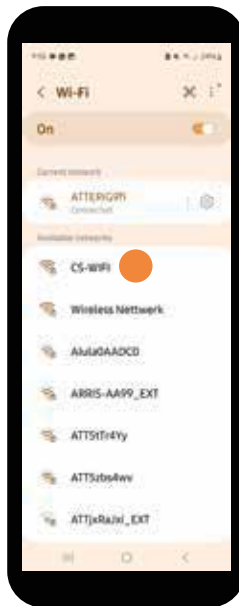
Step7

Open Network setting by pressing button below



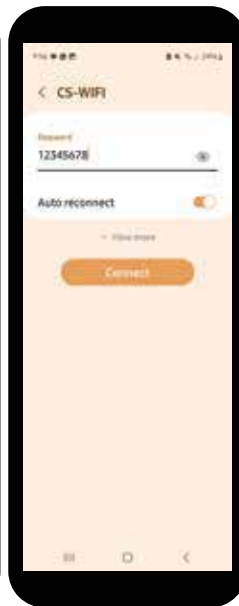
Step8

Pick CS-Wifi



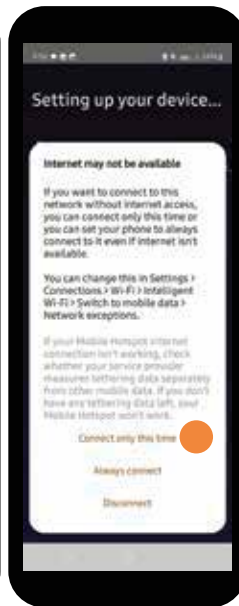
Step9

Enter Password: 12345678



Step10

On Android allow to connect only this time



Step11

Success! Your Power Meter is setup! Now press the RESET button for 6 seconds. Give it a moment to populate...



Step12

If you are installing other Inverters go to network settings and tell it to forget network! Repeat install with new Inverter



After the installation process was successful please push the rest button for 1 second. the Data should now display on dashboard!

DISPLAY READINGS

Installation direction

Phase measurement difference

„+“ or „-“ show the programmed direction of power flow



Data for 3 Phases
Phasen 1 - 3

„IMP“ importing &
„EXP“ Exporting Power

Wifi Connection

Units displayed

- Herz [Hz]
- %
- Celsius [!C]
- Watt [W]
- Kilo-Watt-Stunden [kWh]
- Volt [V]
- Ampere [A]
- Apparent power [VA]
- Reactive power [var]
- Power factor [PF]

STANDARD Display



Kilo-Watt-Hours

shows accumulative usage
of all 3 Phases.

WiFi Verbindung:

- No Phone icon– keine WiFi Verbindung vorhanden
- Blinking – WiFi is initiating
- Solid– WiFi connection is stable