CRAFTSTROM
SOLAR

USER GUIDE

THE CRAFTSTROM PLUG IN SOLAR KIT WITH POWER METER

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POWER METER

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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.

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.

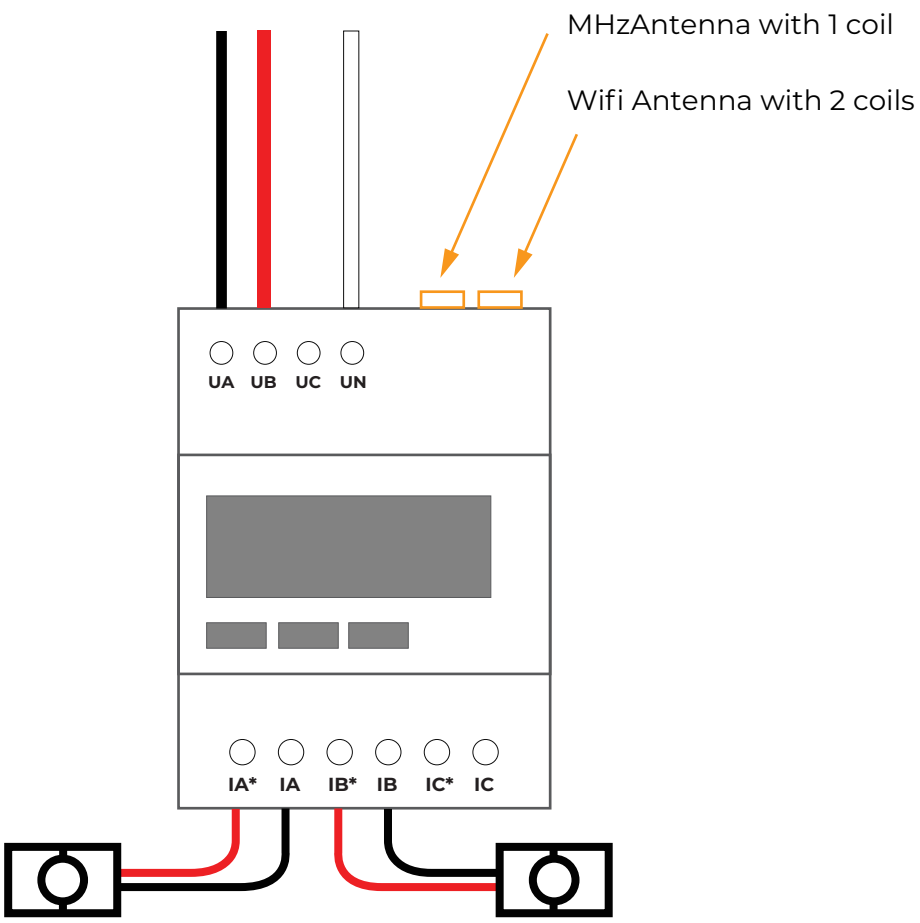
Safety regulations

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.

TECHNICAL SPECS & ASSEMBLY

Please flip open the 2 cover on the power meter to expose the screws and markings!



Add 3 wires to the Power meter

1. Black to terminal marked **UA**
2. Red to terminal marked **UB**
3. White to terminal marked **UN**

Add 2 Clamps to the Power meter

1. Red wire of 1st clamp to **IA***
2. Black wire of same clamp to **IA**
3. Red wire of 2nd clamp to **IB***
4. Black wire of 2nd clamp to **IB**

Function

Bi-directional power measurement

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
Measure ments	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 measure ment	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 octocoupler
Pulse	pulse width		80±20ms
	IPulse constant		400imp/kWh,10000imp/kW
Communi cation	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 intrusionof 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
Install the CraftStrom app.

INSTALLATION IN THE BREAKER BOX

Step 1

Mount the Power Meter inside of the breaker box and connect the3 wires as follows:

L1 (Black) to the left "Phase" of the breaker box and to the port marked UA on Power Meter.
L2 (Red) to the right "Phase" and UB on Power Meter.
N (White) to the "Neutral Bar" and UN on Power Meter.

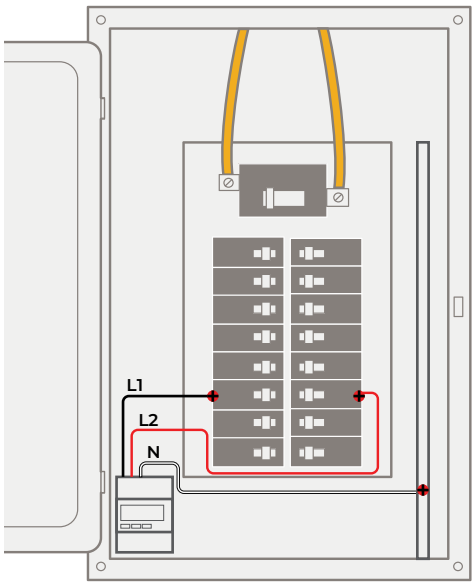
L1 & L2 can be added to existing 15A or 20A breaker.

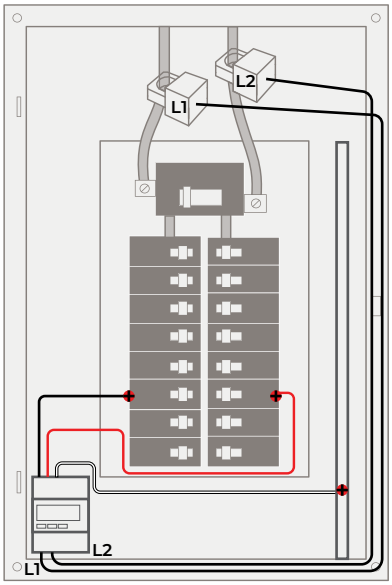
Step 2

Clamp the **Left Main line with L1 CLAMP** and hook up to **port IA* (red wire) and IA (black wire)** on Power Meter

Clamp the **Right Main line with L2 Clamp** and hook up to **port IB* (red wire) and IB (black wire)** on Power Meter
Clamps must face the same direction - to the right or to the left.

If one of the values on Power Meter is negative - then please flip the red and black wire on the power meter side.

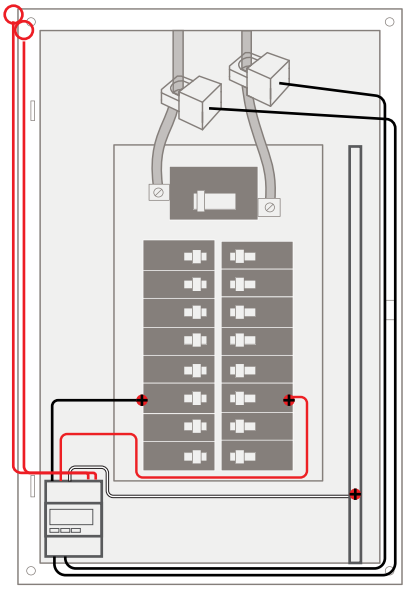


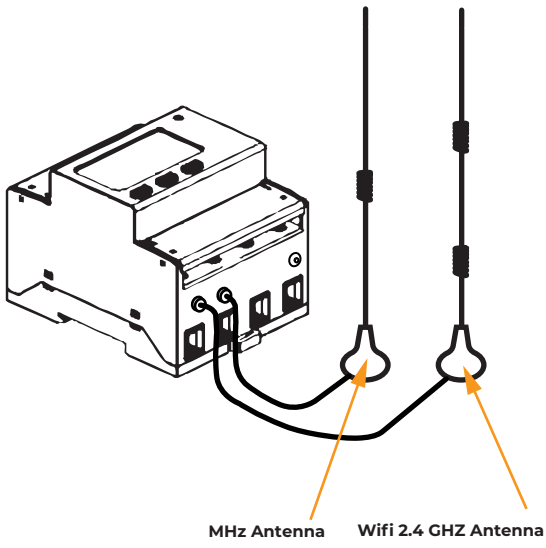


Step 3

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.

Wifi antenna has 2 coils
MHz antenna has 1 coil
(refer to illustration what port to attach to)





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

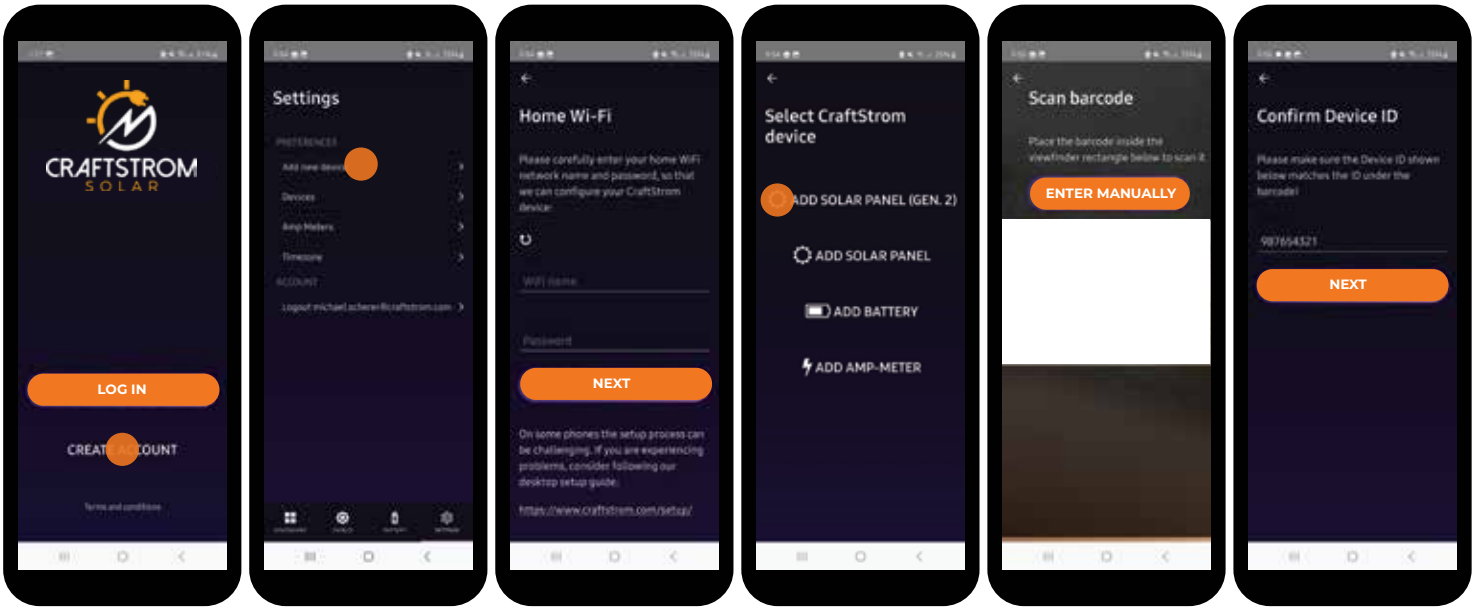
Step2
Go to add new device

Step3
Pick your home wifi and enter Password

Step4
Pick Add Amp-Meter

Step5
Scan barcode or enter ID manual-ly

Step6
Confirm ID



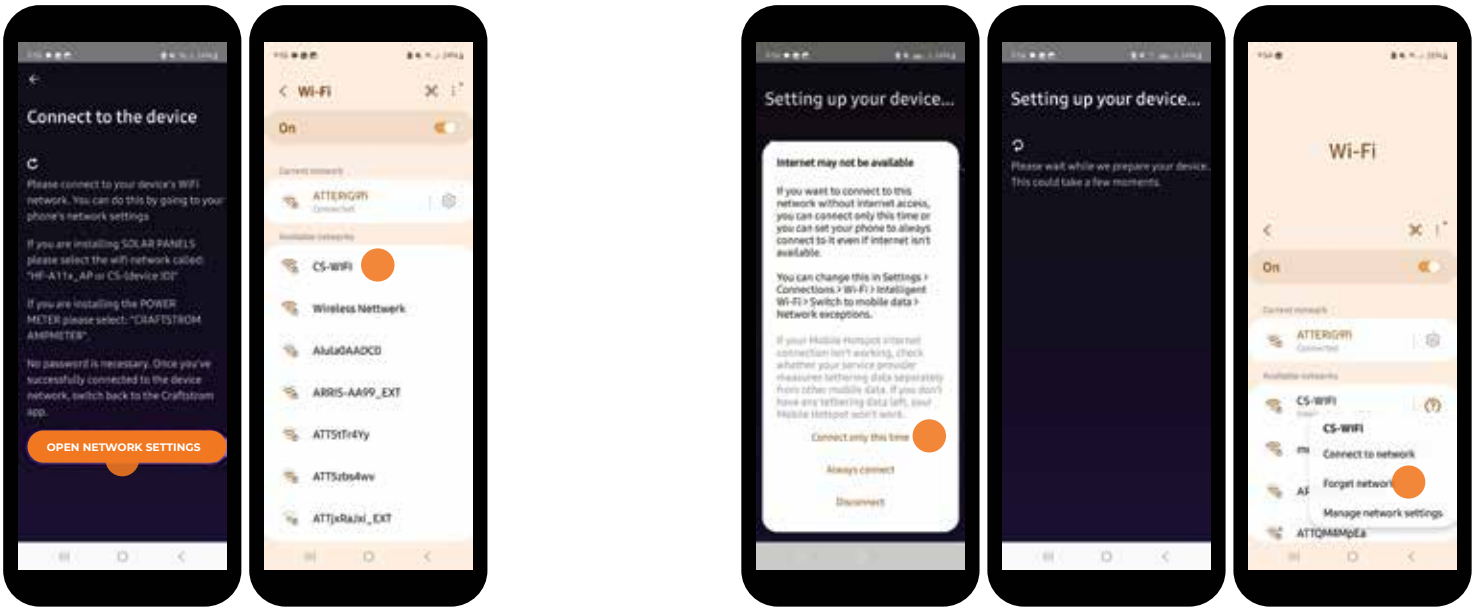
Step7
Open Network setting by press-ing button below

Step8
Pick CS-Wifi

Step9
On Android allow to connect only this time

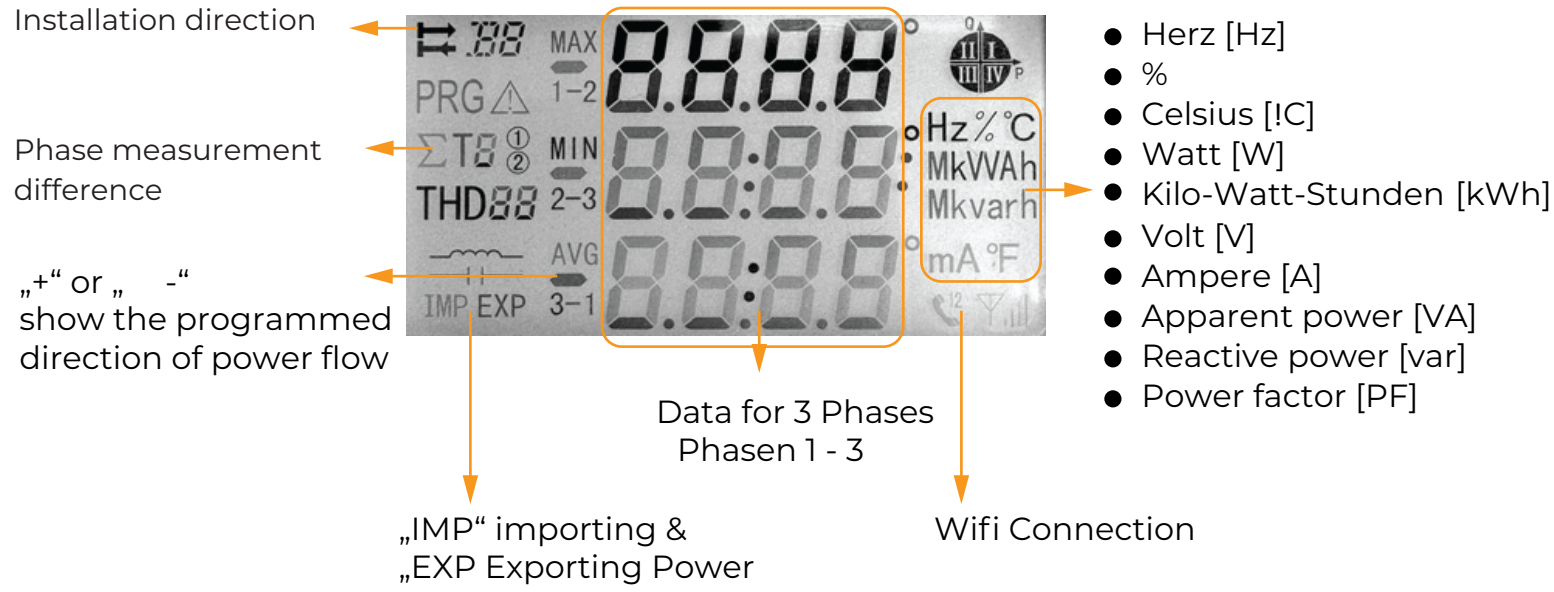
Step10
Success! Your Power Meter is setup! Now press the RESET button for 6 seconds. Give it a moment to populate...

Step11
If you are installing other Inverters go to network settings and tell it to forget network! Repeat Install with new Inverter



If the Meter does not show up on the usage page after 10 min, then go back to Settings - Devices delete the ID number. To reset Meter - press green button next to antennas for 15 sec. and start installation again

DISPLAY READINGS



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.

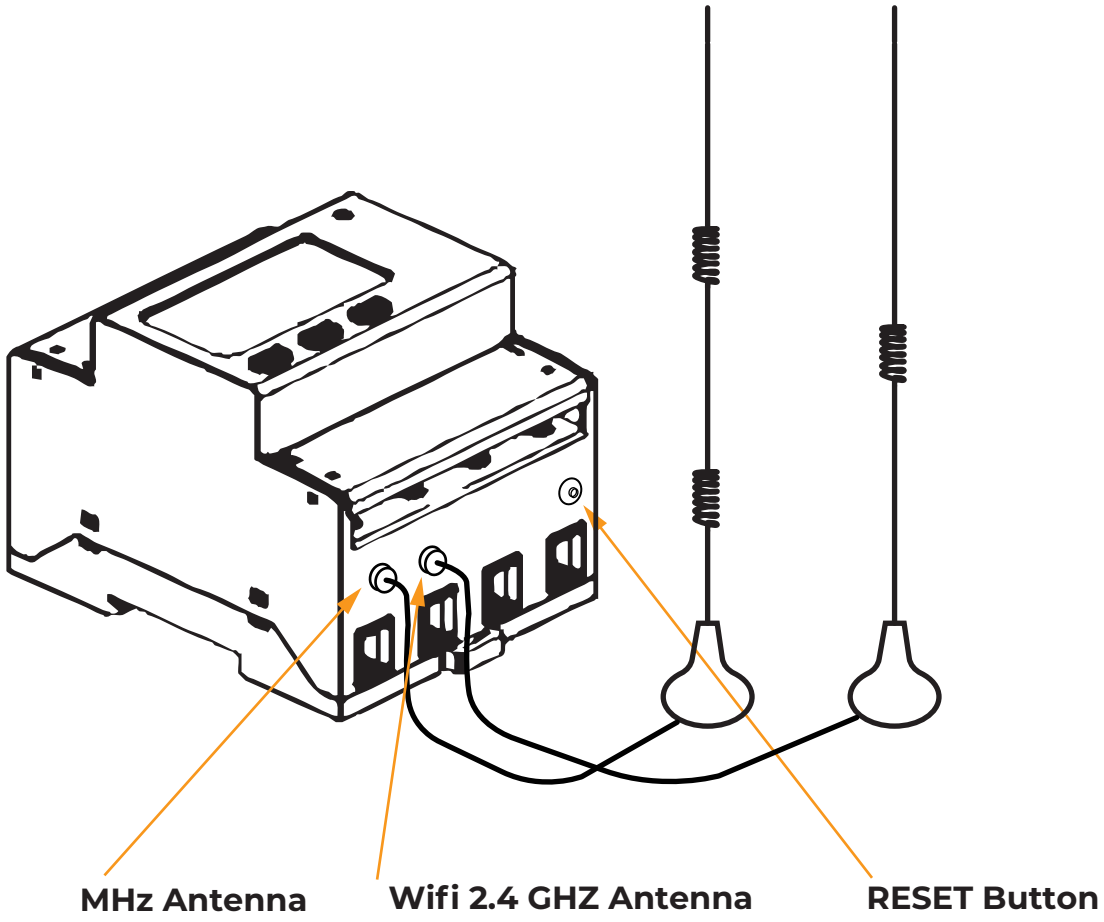
WiFi Verbindung:

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

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 15 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.

SOLAR KIT

CONGRATULATIONS!

Hi and Welcome to the easiest solar setup in the world. Please follow these instructions diligently to ensure proper working order and safety. The CraftStrom solar inverter is the only solar inverter that features both WiFi and sub-GHz communication. While the WiFi function allows you to communicate with the inverter and gather data in your CraftStrom App, sub-GHz communication is used by our products to create their own network, independent of your home WiFi. Should your WiFi ever fail, you can be sure that our products will keep working faithfully on their own. This, however, means you won't be able to check on your system during a WiFi outage.

SMART INVERTER - CARE AND SAFETY GUIDE

This manual mainly introduces the assembly, commissioning, maintenance and troubleshooting methods of "HEDY" the intelligent micro inverters.

CAUTION!

while it is in operation. Danger of high voltages. Beware of hot surface. The microinverter can become hot while operating. Avoid contact with metal surfaces while operating.

Do not open up or remove cover of Inverter. Send back to Craftstrom for servicing.

WARNING! DC cable from the solar panel to the inverter should not exceed 3m.

When the photovoltaic aray is exposed to light. it spplies a DC voltage to this equipment.

To be connected only to a dedicaated circuit. Maximurm branch circuit over current protection: 20A

Important Safety Instructions

HEDY Micro inverters are designed and tested according to international safety requirements.

But precautions must be taken when installing and operating this microinverter.

The installer must read and follow all instructions, precautions and warnings in this installation manual.

All operations, including transport, installation, start-up and maintenance,

must be carried out by qualified and trained personnel.

Before installation, inspect the equipment to ensure there is no shipping or

handling damage that could affect insulation integrity or safety clearances. Choose the installation location carefully and adhere to the specified cooling requirements. Unauthorized removal of necessary protective devices, improper use, and incorrect installation and operation can result in serious safety and electric shock hazards or equipment damage.

Before connecting the microinverter to the distribution grid, please contact

the local distribution grid company to obtain the appropriate approvals.

Only 2 x 200W PV modules can be connected to one input of the micro-inverter.

Do not connect batteries or other power sources.

Do not install the device in harsh environments such as flammable,

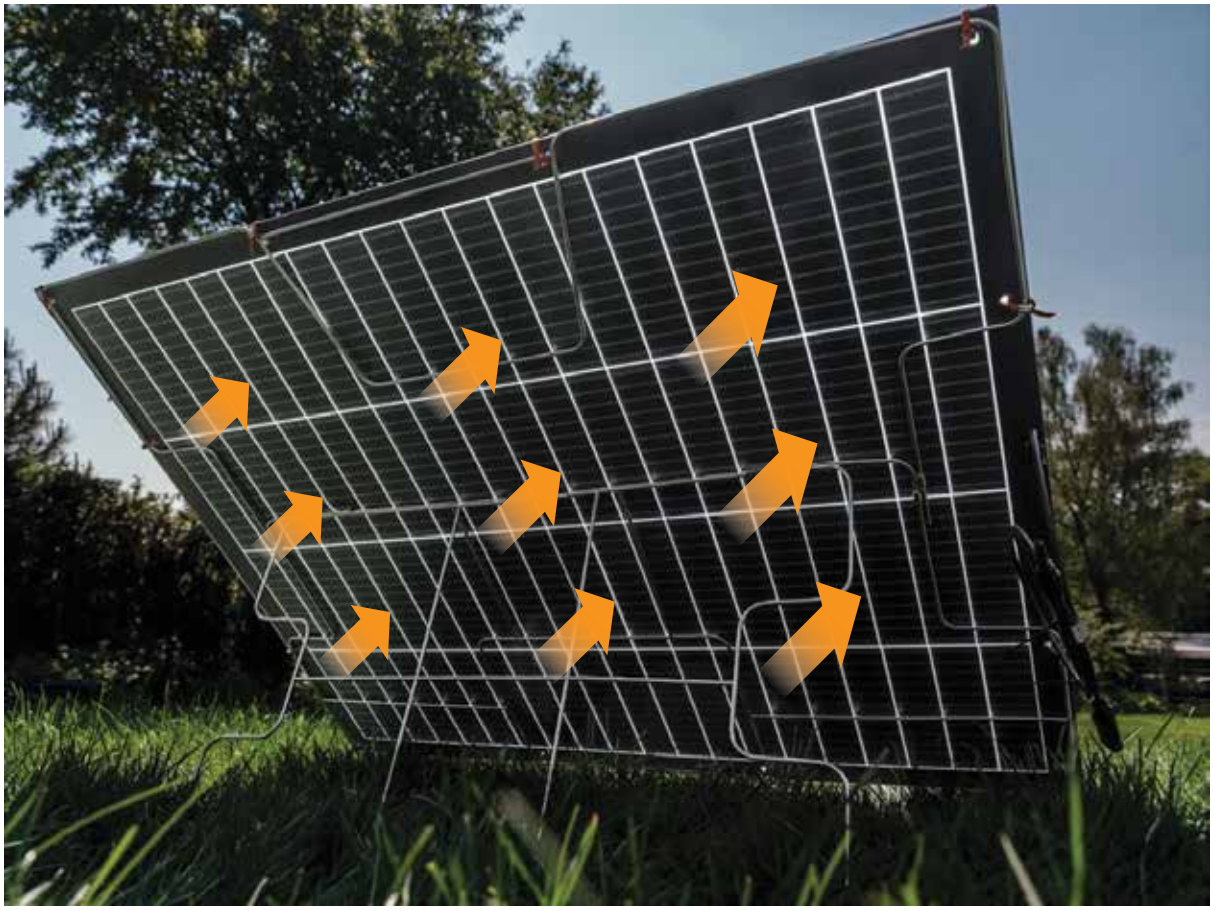
explosive, corrosive, extremely hot or cold, and humid or wet. Do not use the device when the Power Meter is not working or disabled. Always use personal protective equipment including gloves and goggles when installing. Notify the manufacturer of non-standard installation conditions.

Donot use the device if any abnormality is observed during operation.

SMART INVERTER - CARE AND SAFETY GUIDE

Any liability arising from commercial components rests with their respective manufacturers. Exercise extreme caution whenever the microinverter is disconnected from the public network, as some components may retain enough charge to create an electric shock hazard. Before touching any part of the microinverter, ensure that surfaces and equipment are at a safe touch temperature and voltage potential before proceeding. We are not responsible for damages caused by errors or improper operation. Electrical installation and maintenance should be performed by a licensed electrician and should follow local wiring regulations.

SEMI-FLEXIBLE SOLAR PANEL



Semi -Flexible & Transparent Bifacial Solar Panels (36V)

Max Power Front	200W
Max Power Back	170W
Max Power Voltage	36.48V
Open-circuit Voltage	42.88V
Max Power Current	5.49A
Cell Efficiency	23.5%
Protective Layer	ETFE
Max System Voltage	DC1000V
Dimensions	1170 x 923 x 3.8mm
Weight	4.2 KG
Working Temperature	-40°C +80°C

WARNING

This module produces electricity when exposed to light.
Follow all applicable electrical safety precautions!
-ONLY qualified personell should install or perform maintenance work on these modules.
-Be Aware of dangerous high DC voltage wne connecting modules.
-Do NOT damage or scratch the rear surface of the module.
-FOLLOW the battery manufacturers recommendations if batteries are used with modules.
Refer to instruction manual for more info.

Test standard: IEC61215 AM1.5 25°C 1000W/m2

FC CE RoHS

Semi -Flexible & Transparent Bifacial Solar Panels (24V)

Max Power Front	200W
Max Power Back	170W
Max Power Voltage	23.2V
Open-circuit Voltage	27.5V
Max Power Current	8.63A
Cell Efficiency	23.5%
Protective Layer	ETFE
Max System Voltage	DC1000V
Dimensions	1170 x 923 x 3.8mm
Weight	4.2 KG
Working Temperature	-40°C +80°C

WARNING

This module produces electricity when exposed to light.
Follow all applicable electrical safety precautions!
-ONLY qualified personell should install or perform maintenance work on these modules.
-Be Aware of dangerous high DC voltage wne connecting modules.
-Do NOT damage or scratch the rear surface of the module.
-FOLLOW the battery manufacturers recommendations if batteries are used with modules.
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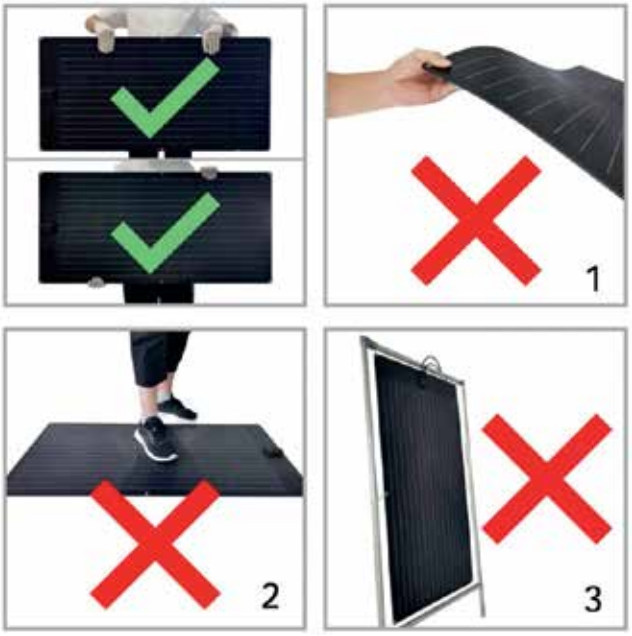
Test standard: IEC61215 AM1.5 25°C 1000W/m2

FC CE RoHS

SEMI-FLEXIBLE SOLAR PANELS



Setup

1. Plug one module into one of the two thin pairs of cables on the sides of the inverter.
   The plugs only fit together in the correct pairing. It will click when it snaps into place.
   (Some plugs/sockets of solar modules or PV extensions require a relatively large amount of force when plugged into the inverter.
   Nevertheless, make sure you have the correct connection and the click mentioned above.)

2. Connect the connection cable with the AC cable.

3. You're done by plugging the AC cable into the Outdoor outlet!

Attention: Do not use the outer socket in your outdoor outlet to power anything else!

MAINTENANCE

- When it snows, you free the modules from heavy snow loads.
- Wash the modules regularly with weak soap to remove any remaining dirt from the ETFE.
- Do not use brushes to protect the ETFE from scratches.
- Also regularly check all cable connections for cracks, animal damage, etc. to prevent short circuits.

ATTENTION

1. A small area of distortion of solar panels can easily lead to broken internal chips.

2. Avoid stepping on or hitting the panel to cause excessive pressure damage.

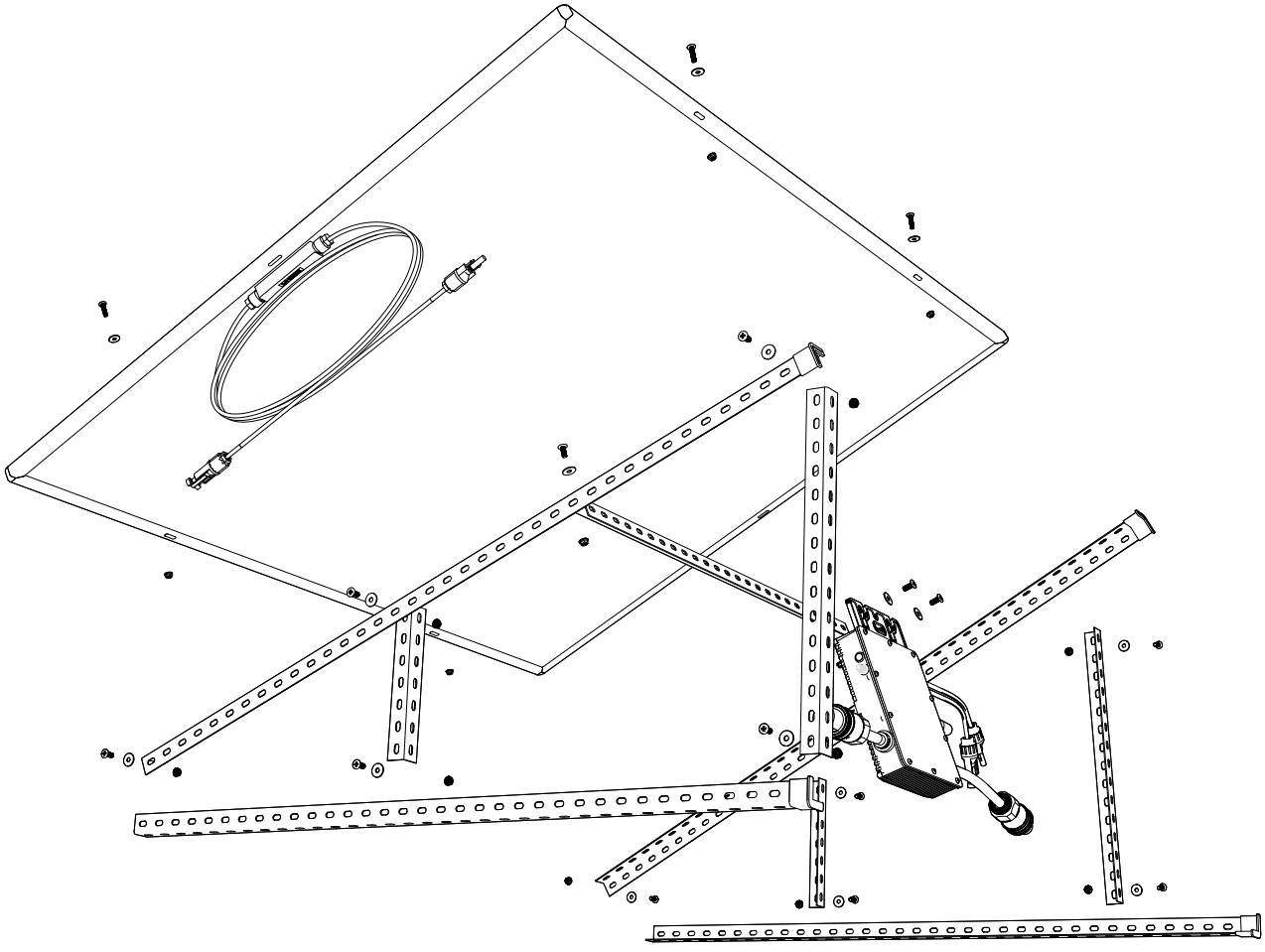
3. When installing the solar panel, you should make sure that it is not mounted freely, as in the picture.
   It needs stabilization at the back to avoid damage from excessive crosswinds.

4. Use 3M Very High Bond dual sided tape to glue down the panels as well.

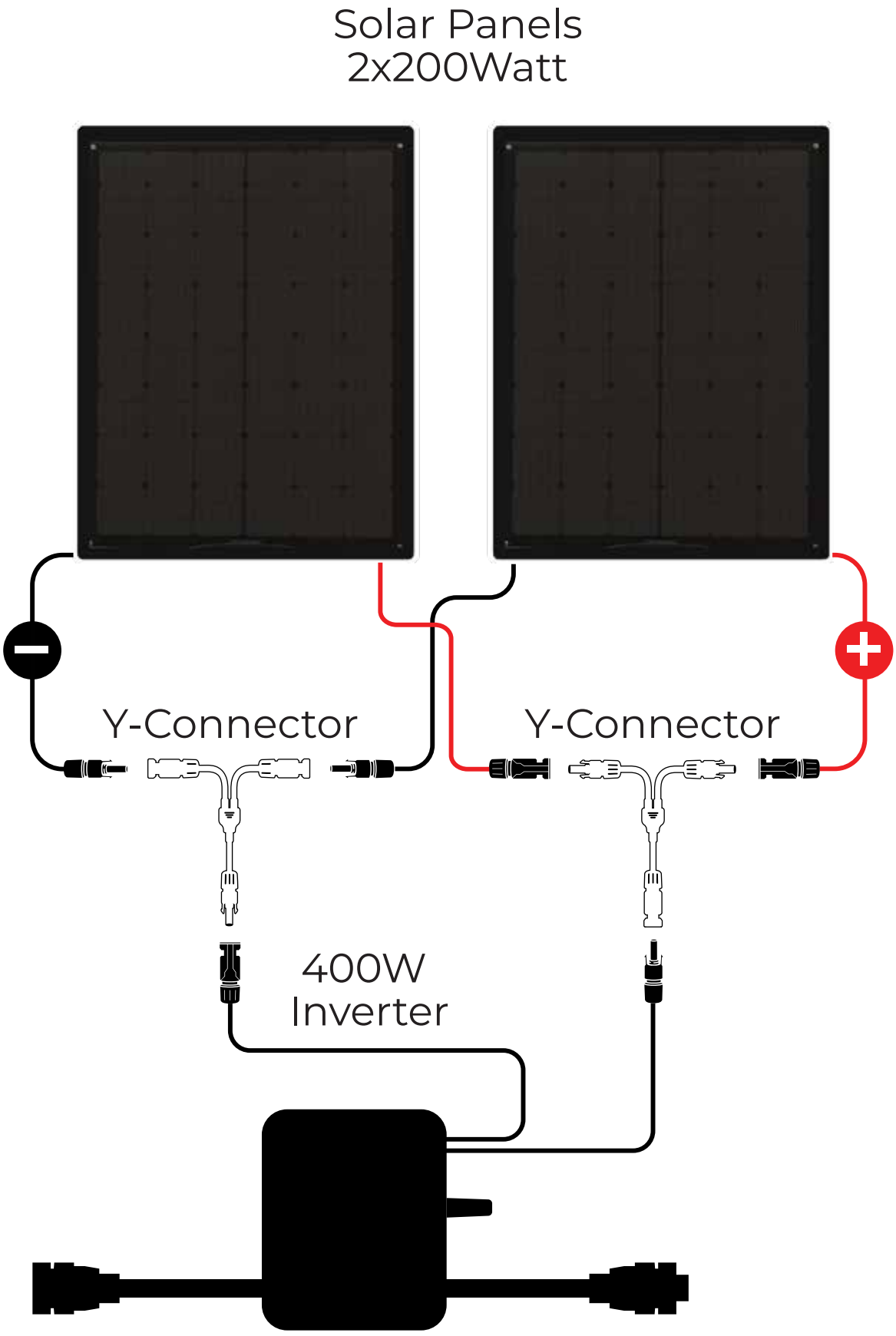
INSTALLATION

Appearance and Connectors

1. Unpack solar panels, being careful not to bend beyond 30°.
2. Unpack solar inverter and attach the antenna in the box.
3. Connect the AC cable to standard outdoor outlet and then plug it into the inverter
5. Mount the solar inverter in a shaded and & dry environment. Ensure airflow around the inverter. The housing of the inverter is the heat sink. Be careful never to touch the inverer during operation, as it can get very hot. This is normal.
6. Only plug in 1 inverter at a time, then install in App. Move on the the next inverter. This prevents the wifi signals from interfering wiht each other during installation in App.

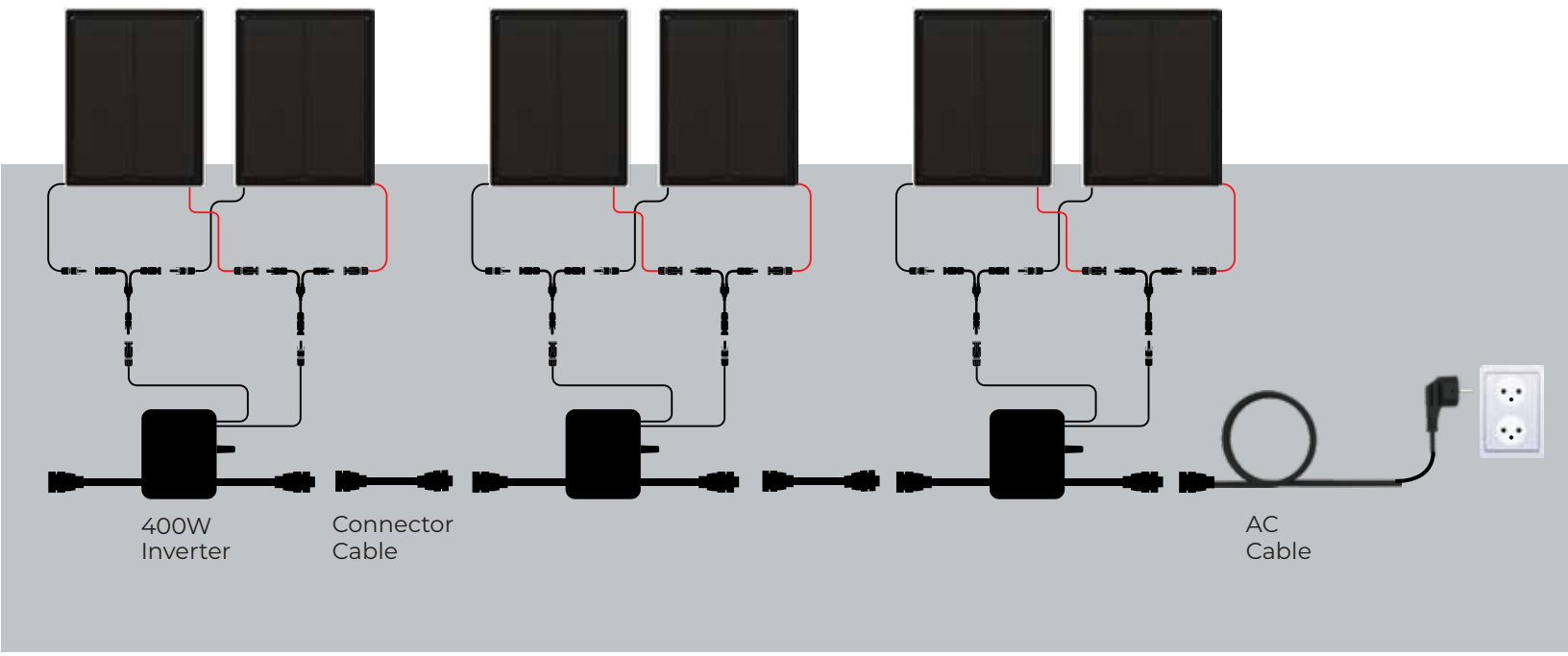


INSTALLATION



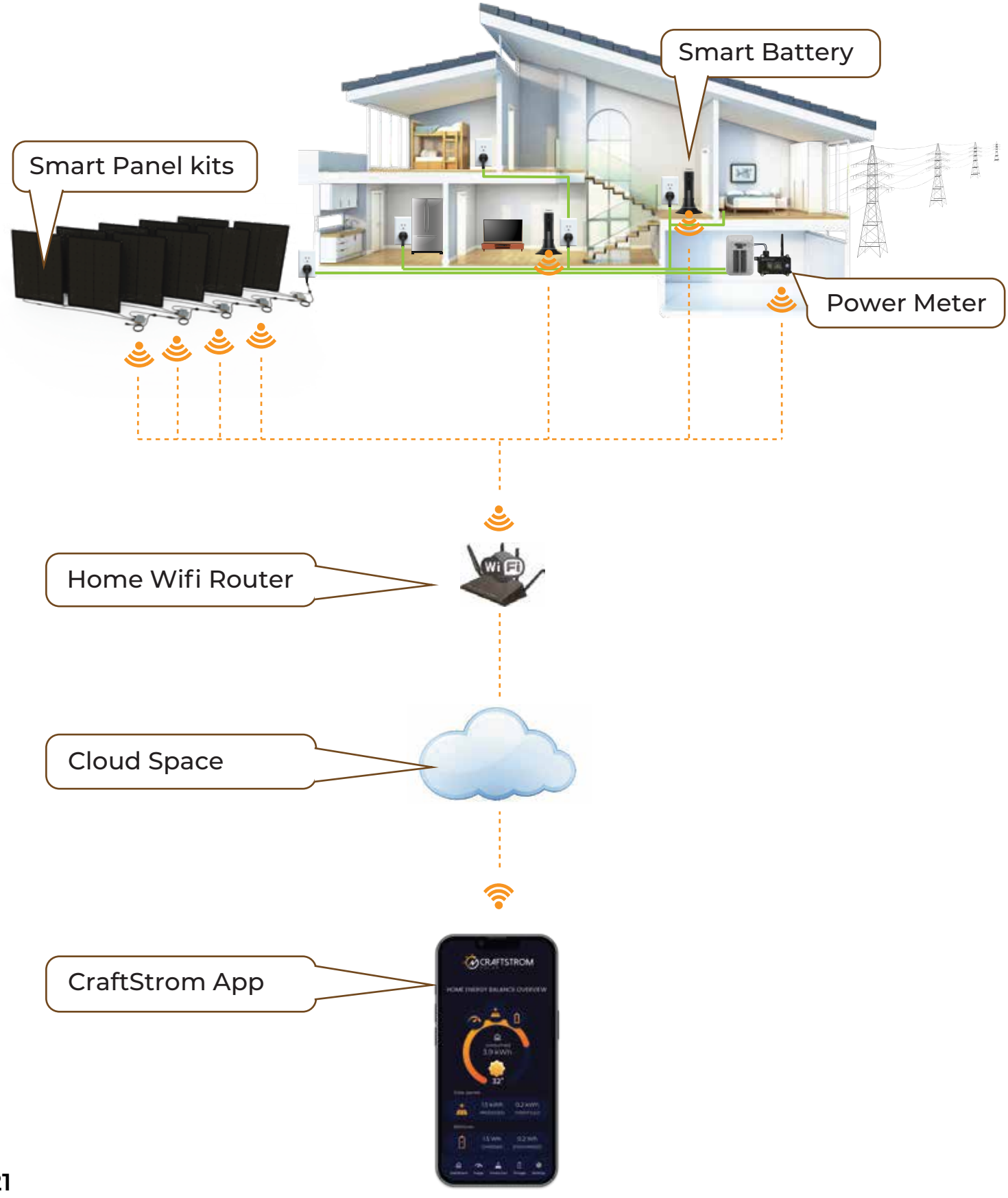
INSTALLATION

5.1 Direct Access (rated max. Current < 100A)



1. Connect the 2 panels to each other using the panels MC4 Connectors
2. Mount the solar panels using all eyelets. Improper installation will void the guarantee.
3. Only connect the panels MC4 connectors to the inverters as you are installing them in the App. Powering all of them up at the same time will jam the Inverter wifi connection.
4. If you have more than one inverter mounted, use the Connector cables (pic) to connect all inverters (max 5) in parallel.
5. If your outdoor outlet is not on a designated circuit please connect the AC end cable to our NEC Smart Breaker and plug it into the power outlet first.
6. Congratulations, you're done installing the hardware.

POWER FLOW & COMMUNICATION



MAIN TECHNICAL DATA

Model	Hedy		
Maximum input power	400 Watt		
Output voltage mode	120/230V auto switch		
PV open circuit voltage	60 - 100 VOC		
Operating voltage range	55 - 100 V		
MPPT range DC	65 - 100 V		
short circuit current	7A		
maximum working current	6.3A		
Output parameters	**@120V**	**@230V**	**@240V**
Output peak power	400 Watt	300Watt	350watt
Rated output power	400 Watt	300Watt	350watt
Output current	2.91 A	1.14A	1.52A
AC voltage range	80-160VAC	180-280VAC	180-280VAC
AC frequency range	48-51 Hz/58-61 Hz	48-51 Hz/58-61 Hz	48-51 Hz/58-61 Hz
Power factor	>95%	>95%	>95%
Number of branch connections	30 pcs (single)	30 pcs (single)	30 pcs (single)
Output efficiency	**@120V**	**@230V**	**@240V**
Static MPPT efficiency	99.5%	99.5%	99.5%
Max output efficiency	99%	99%	99%
Loss of power at night	<0.5W	<0.5W	<0.5W
Total current harmonics	5%	5%	5%
Appearance and technical features			
Temperature range	- 20°C to + 50°C		
Dimensions(LxWxH)	165mm x 176mm x 38mm		
Net weight	0.82kg		
Enclosure rating	NEMA3R		
Heat dissipation mode	Self-cooling		
Communication mode	Wifi		
Powertransmission mode	Reverse transmission, Load priority		
Monitoring system	Mobile phone App, Browser		
Electromagnetic compatibility	EN 5008.1 Part1 EN 5008.2 Part1 CSAS TD.C22.2.No.107.1		
Power grid	EN 61000-3-2 EN 62109 UL STD 1741		
Power grid detection	DIN VDE 4105, IEEE STD 1547 1547.1 and 1547.A		
Certification	FCC, CE, ETL		
Packing Weight			
Specifications	Each (Packaging)	Box(15Pcs)	
Weight	1.28kg	19.2kg	
Size	245 x 202 x 60 mm	450 x 395 x 345 mm	

DOWNLOAD THE CRAFTSTROM APP

Download Craftstrom App and Set Up Devices

The CraftStrom app is free and allows you to monitor your devices

& management of production vs. storage. But the app can do so much more...

Monitor devices and your success. Check your monthly electricity

bill – simply compare the readings of our electricity meters in “kWh”.

“kWh” stated on the electricity bill. Share your success with yours

Friends on Social Media See how your efforts are helping the environment.

CRAFTSTROM APP AND SET UP DEVICES

Step1
Create username and Password

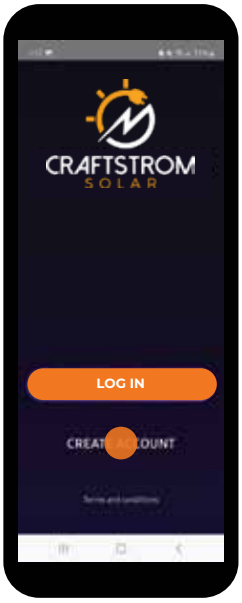
Step2
Go to add new device

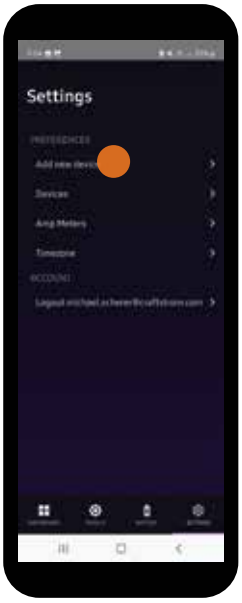
Step3
Pick your home wifi and enter Password

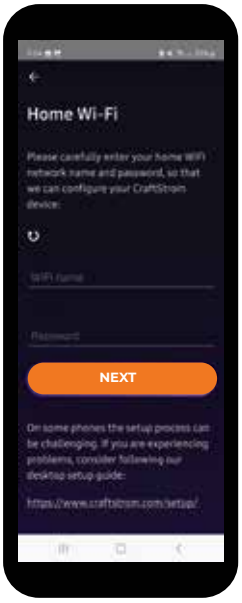
Step4
Pick Add Solar Panel (Gen 2 if you purchased in 2023)

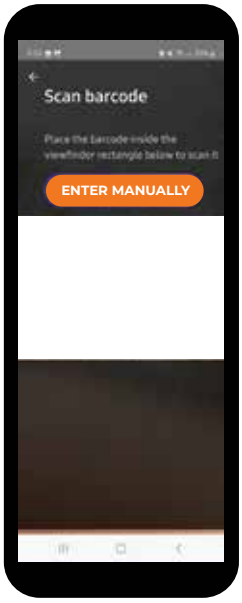
Step5
Scan barcode or enter ID manual-ly

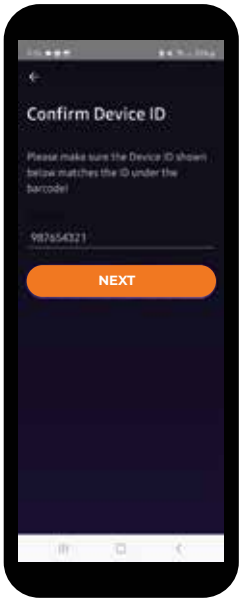
Step6
Confirm ID











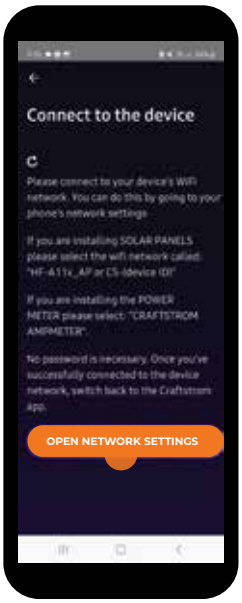
Step7
Open Network setting by press-ing button below

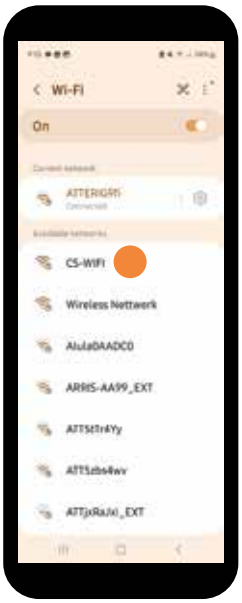
Step8
Pick CS-Wifi

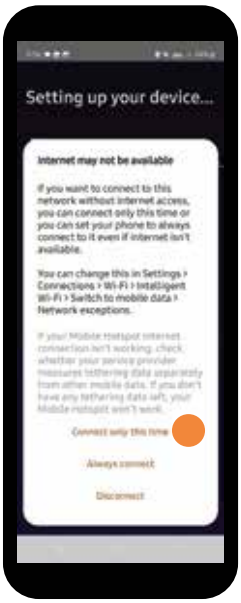
Step9
On Android allow to connect only this time

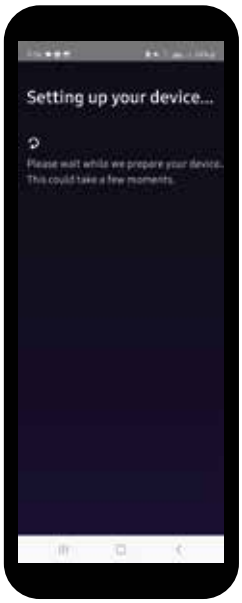
Step10
Success! Your Inverter is being setup! Give it a moment to populate

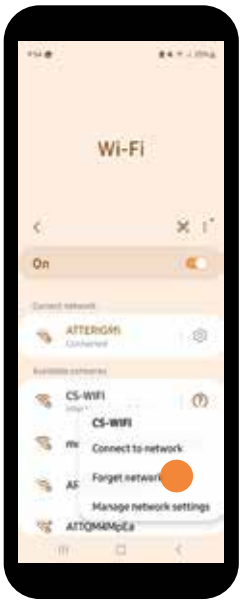
Step11
If you are installing other Inverters go to network settings and tell it to forget network! Repeat Install with new Inverter











If the Inverter does not show up on the panles page, then go back to Settings - Devices delete the ID number and repeat the installation. To reset wifi module on Inverter - press silver button next to antennas for 15 second...