

Smappee Energy

Installation manual



Table of contents

1. Safety instructions	3
2. How to install	5
3. Physical installation	6
4. Cloud connection and setup	11
5. Validation of the installation	12
6. Three-phase voltage and current mapping	13
Addendum 1 – Colour code explanation	16
Addendum 2 – Wi-Fi connection properties and firewall rules	17

1. Safety instructions

Safety warning

Carrying out electrical work in a home or workplace can be dangerous. Only certified electricians may carry out the installation, which must be in accordance with the national safety regulations.

Safety precautions

	CAUTION: Risk of electric shock.
	CAUTION: Refer to the accompanying documentation whenever you see this symbol.
	DO NOT clamp or pull out NON-INSULATED conductors carrying DANGEROUS VOLTAGE which could cause an electric shock, burns, or arc flash.

Please observe the following safety precautions to avoid potential electric shock, fire, or personal injury:

- Use this product only for its intended purpose.
- Use the product indoors only.
- Do not open the equipment or touch any of its electronic circuitry.
- Do not attempt to open, repair or service any parts. Only certified electricians can perform reparations.
- Only use specified replacement parts.
- Only use the cables and power cords delivered with the product.
- Do not use damaged current transformers, power cords or cables. Make sure the insulation isn't damaged and the metal isn't exposed. Check the connection of the power cords.
- Do not immerse the product in water or any other liquids.
- Do not expose the product to heat, flame, or extreme cold.
- Do not connect the product to voltages higher than 240 V.
- Power off the electrical installation before proceeding with the physical installation.

Product identification

- Smappee Energy: monitor-e1

Maintenance

- Clean the outside only with a dry, clean cloth.
- Do not use abrasive agents or solvents.

Responsibility

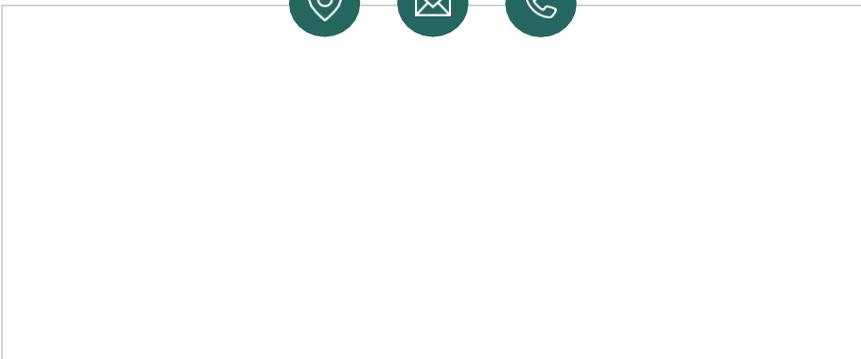
- Assembly, connection, and use must be carried out in accordance with the installation standards currently in force.
- The device must be installed in accordance with the instructions given in this manual.
- Failure to observe the instructions for installing this unit may compromise the device's intrinsic protection.
- The device must be placed in a system that complies with the applicable standards and safety regulations of the country of installation.

Explanation of the safety symbols

	Class II equipment does not require an earth connection.
---	--

Support

If you have any questions, please contact your local distributor.



2. How to install

The installation procedure consists of the following steps:

- 1 Physical installation:** The physical installation of all the Smappee Energy components.
- 2 Cloud connection and setup:** The creation of a location, its properties, and the loads to be measured.
- 3 Validation of the installation:** Checking the accuracy of live power values.

This procedure is done with the Smappee Energy Monitor mobile app.



3. Physical installation

This procedure describes the required steps for the physical installation of the Smappee Energy.



WARNING: For safety purposes, it is necessary **to power off the installation** before proceeding with the physical installation.

The Smappee Energy can be used to measure the following loads:

- Single Phase - 1P (1 * 230 V): total consumption
- Single Phase - 1P (1 * 230 V): total consumption and production (E.g. Solar production)
- Three Phase - 3P+N (3 * 400 V) and 3P (3 * 230 V): total consumption

Steps

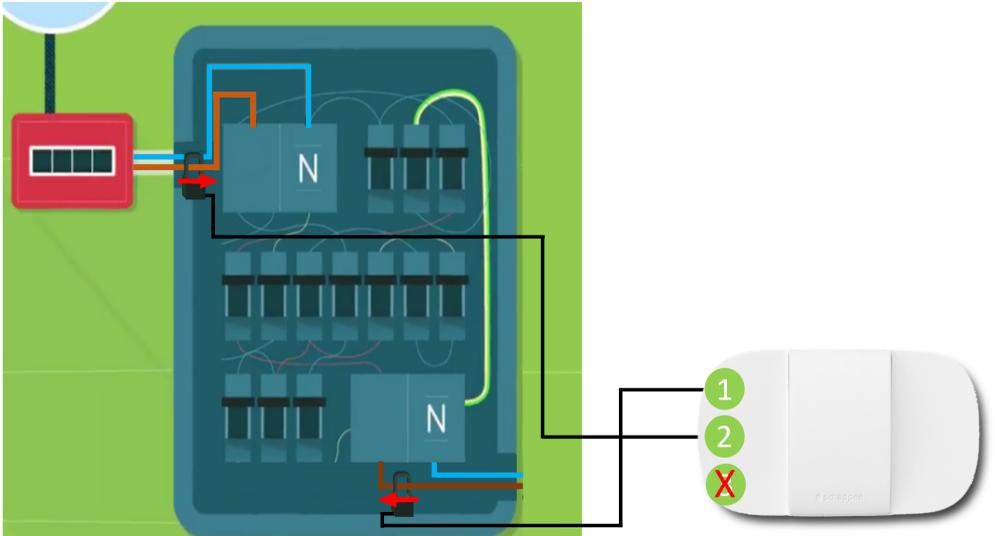
- 1 Power off the installation and open the fuse box.
- 2 Connect the current transformers (CTs) according to the connection diagram, see next pages.
- 3 Position the monitor near the fuse box and a wall socket. You can just place it or mount it on the wall using two screws.
- 4 Close the fuse box and power in the installation.
- 5 Connect the supplied power cord to the monitor and plug the power cord in the nearby wall socket to power on the Smappee monitor.
- 6 Proceed in the Smappee Energy Monitor mobile app and follow the steps as shown.

	Make sure there's a stable Wi-Fi connection at the location of installation.
	Smappee Energy is only compatible with 2.4 GHz Wi-Fi networks.
	Make sure the Wi-Fi network is online when powering on the Smappee monitor.

	The arrow indicated on the CT (K > L) must point in the direction of the current flow: <ul style="list-style-type: none">• Consumption: away from the utility meter, towards the consumers (fuses).• Solar: away from the inverter, towards the consumers.	
	Mount the CTs around the phase wires.	

Connection diagram – 1P (1 * 230 V)

	Brown – L1
	Blue – Neutral



Connect the CTs to the Smappee Energy:

- Input 1: Consumption
- Input 2: Solar
- Input 3: Do not use

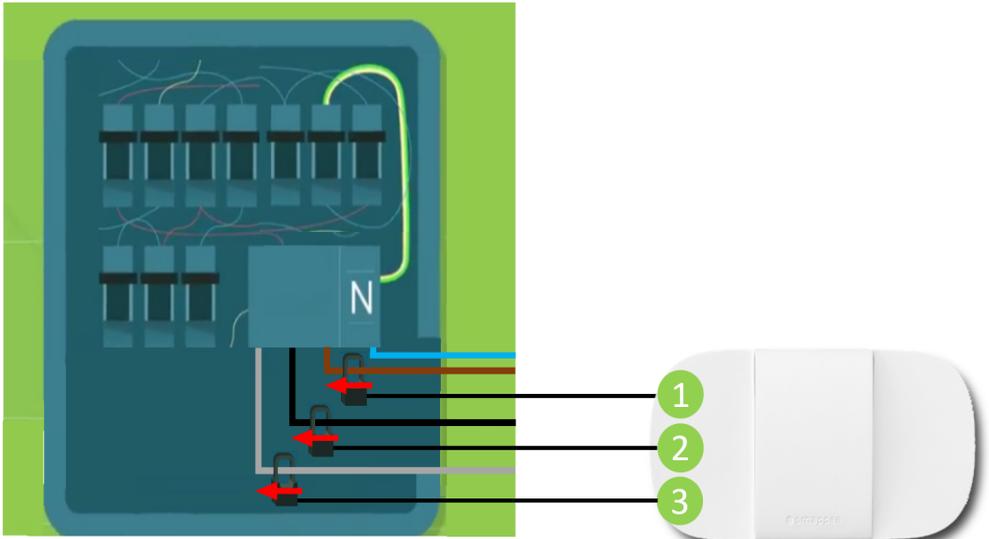
Use a digital multimeter to determine the phase wire of the solar inverter.

0 volt is measured when both loads are on the same phase.



Connection diagram – 3P+N (3 * 400 V)

	Brown – L1
	Black – L2
	Grey – L3
	Blue – Neutral

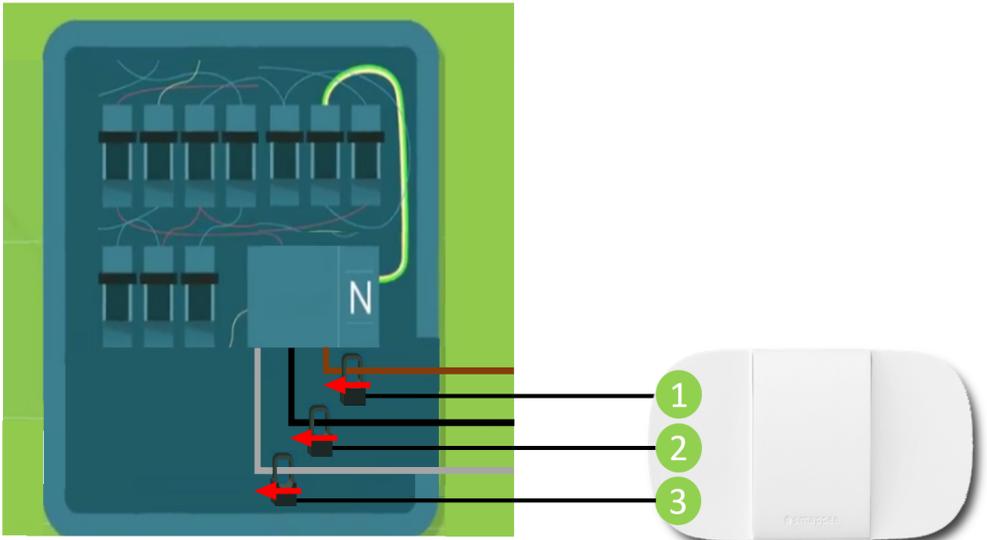


WARNING: For a three-phase installation it is mandatory to setup the voltage and current mapping in the Expert Portal (see next pages).

Incorrect line voltage and current mapping may result in incorrect reporting of the power values and monitored data.

Connection diagram – 3P (3 * 230 V)

	Brown – L1
	Black – L2
	Grey – L3



WARNING: For a three-phase installation it is mandatory to setup the voltage and current mapping in the Expert Portal (see next pages).

Incorrect line voltage and current mapping may result in incorrect reporting of the power values and monitored data.

4. Cloud connection and setup

This procedure is done with the Smappee Energy Monitor mobile app. The first step is creating a location and defining the measured loads and their properties.

- Log in to the Smappee App with the corresponding Smappee username or create a new account.
- Create a new location.
- Follow the steps shown in the mobile app.

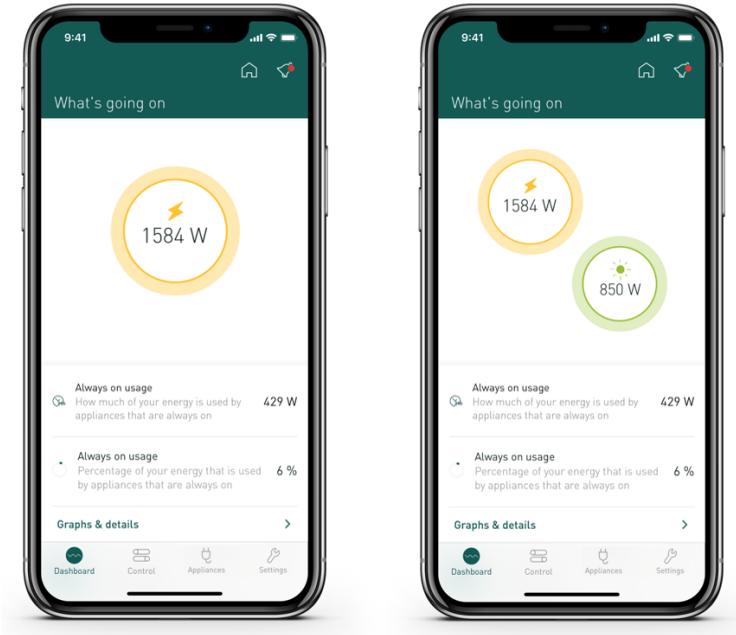


To add a new location under the same user account in the mobile app, go to Settings > Your Locations > Add a new location.

5. Validation of the installation

Once the installation is complete, it is good practice to validate the correct operation of the monitoring solution.

You should check that all CTs are operational and measuring the correct power values. To check the correct operation of the Smappee Energy, Smappee provides real-time values of the measured loads. You can access these real-time values with the mobile app.



The Smappee App reports real-time active power values. Consumption is displayed in the yellow bubble. Production is displayed in the green bubble. If no production is measured, the green bubble is not displayed.



WARNING: For a three-phase installation it is mandatory to setup the voltage and current mapping in the Expert Portal (see next pages).
Incorrect line voltage and current mapping may result in incorrect reporting of the power values and monitored data.

6. Three-phase voltage and current mapping

This procedure describes how to validate and adjust phase mapping for three-phase installations. This procedure is mandatory for three-phase installations.

- 1 Open the Smappee App, go to Settings > Your Smappee Monitors > Expert Portal and type the website link (<http://<IP-address>/Smappee.html>) in your internet browser on your laptop or pc. Log in with the default password: admin.



You need to be on the same Wi-Fi network as the Smappee Energy to connect to the Expert Portal.

- 2 Go to Configuration > Phase to input mapping
 - Power on multiple appliances (resistive loads) until you reach a power consumption greater than 200 W on each of the phases. E.g turn on the lights, an electric heater, an electric oven, a coffee machine, a hair dryer.
 - Uncheck the 'Auto Detection' checkbox.
 - Select each of the 6 options in the Phase to input mapping and click on Test setting to temporarily activate the selected option.
 - Choose the phase mapping which is the best possibility: verify whether the active power values are correct, the power values are positive and the high Cos Fi values are high enough (> 80 %).

Possibility					Feedback
<ul style="list-style-type: none"> • Two or three active power values are lower than the real power consumption. • Or two or three active power values are negative. • One or more Cos Fi value is lower than 80%. 					This phase mapping seems to be incorrect. Continue to find the correct configuration.
E.g.					
Phase	Input	Active power	Cos fi	Phase reverser	<input type="button" value="test"/>
load1	1	176.733 W	26 %	<input type="checkbox"/>	
load2	2	-2050.761 W	99 %	<input type="checkbox"/>	
load3	3	190.572 W	79 %	<input type="checkbox"/>	

Phase	Input	Active power	Cos fi	Phase reverser	test
load1	2	-940.76 W	46 %	<input type="checkbox"/>	
load2	3	20.214 W	5 %	<input type="checkbox"/>	
load3	1	641.758 W	96 %	<input type="checkbox"/>	

- Absolute power values are correct.
- Three active power values are negative.
- All Cos Fi are higher than 80 %.

This phase mapping seems to be correct but you need to reverse the voltages (see next step).

- Three active power values are lower than the real power consumption.
- Three active power values are positive.
- All Cos Fi are higher than 80 %.

E.g.

Phase	Input	Active power	Cos fi	Phase reverser	test
load1	1	50.035 W	18 %	<input type="checkbox"/>	
load2	3	486.583 W	71 %	<input type="checkbox"/>	
load3	2	153.441 W	52 %	<input type="checkbox"/>	

- Absolute power value is correct.
- Three active power values are negative.
- All Cos Fi are higher than 80 %.

This phase mapping seems to be incorrect. Continue to find the correct configuration.

- Three active power values are positive
- Two Cos Fi are higher than 80 %.
- One Cos Fi is lower than 80 %.

E.g.

Phase	Input	Active power	Cos fi	Phase reverser	test
load1	1	51.148 W	18 %	<input type="checkbox"/>	
load2	2	135.123 W	46 %	<input type="checkbox"/>	
load3	3	-648.667 W	95 %	<input type="checkbox"/>	

- Three active power values are positive.
- All three Cos Fi are higher than 80 %

E.g.

Phase	Input	Active power	Cos fi	Phase reverser	test
load1	3	289.254 W	82 %	<input type="checkbox"/>	
load2	2	2036.696 W	99 %	<input type="checkbox"/>	
load3	1	644.691 W	96 %	<input type="checkbox"/>	

This phase mapping seems to be correct. This is the best possible configuration.

3 Voltage reversing (optional)

- If all 3 input voltages remain negative after the phase mapping changes, reverse them by clicking 'run voltage reverser'.
- If due to circumstances, one or more CTs could not be installed in the correct direction, please reverse the input using the Phase reverser checkbox.

Press 'test' to update the change(s) temporarily.

Phase	Input	Active power	Cos fi	Phase reverser	test
load1	3	289.254 W	82 %	<input type="checkbox"/>	
load2	2	2036.696 W	99 %	<input type="checkbox"/>	
load3	1	644.691 W	96 %	<input type="checkbox"/>	

4 Click 'save changes and restart metering engine'. Otherwise, the changes to the configuration will not be saved.

5 Validate the configuration. Refresh (press F5) the webpage and log in again to the Expert Portal to see if all changes are saved and the configuration is correct.

6 Final check:

- Activate a high consuming appliance of which you know the power consumption. E.g. vacuum cleaner or coffee machine.
- Verify the power increase in the yellow bubble in the Smappee App. If this is not correct, the phase mapping is incorrect.
- If you are not able to get the correct configuration, please contact your local distributor.



Inform your local distributor if you have doubts about your phase mapping.

Addendum 1 – Colour code explanation

 Green breathing	All good. The monitor is working correctly.
 Blue Steady	The monitor is starting up. This may take up to 5 minutes. The light may briefly go off during that time.
 Green Steady	Connected to the Wi-Fi and the local network (i.e. the Wi-Fi password is correct)
 Blue Flashing	The monitor is ready to be connected to the local Wi-Fi network.
 Red Steady	The monitor has no connection to the internet during startup. Connection issue.
 Red Flashing	The monitor had a working internet connection but has lost its connection to the Smappee cloud.
 Yellow Steady	The Wi-Fi hotspot access point has been activated to allow the Monitor to reconfigure the Wi-Fi settings.
 Yellow Flashing	The monitor is trying to open a Wi-Fi hotspot access point. Please wait a few seconds. The light will turn to a steady yellow in a few moments.

Addendum 2 – Wi-Fi connection properties and firewall rules

Wi-Fi Connection properties

- 2.4 GHz Wi-Fi required, preferably with automatic channel selection
- Networks without DHCP server are not supported
- WPA or WPA2 encryption mandatory
- Networks without security are not supported (!)
- SSID must be visible and should not be hidden during installation. SSID must NOT contain the following characters: é,ç,è,ä,/, \, ", à î ô ï
- Allowed special characters for the Wi-Fi password: # \$ % @ ? / \
- MAC filtering must not be active on the router
- Your firewall should allow Smappee to create outbound secure HTTP connections
- The maximum number of characters for the WPA2/PSK is 20.



The DHCP of your router assigns the IP address of your Smappee.

Firewall rules

If you use a firewall, you should apply the following firewall rules to allow traffic from and to the Smappee:

- **Inbound rules:** any IP - disabled, any port – disabled
- **Outbound rules:** any IP - allowed, any port - allowed