Solo III
USER MANUAL

Welcome to geo's energy management service. You've taken that all important first step towards complete control of your home energy use.

Your **Solo III** will help you manage and visualise your energy – helping you on the way to optimise efficiency and maximum cost savings.

In this manual you'll find everything you need to quickly and simply set up and start using your display. You'll also find out more information about how the monitor works, how it can help you and how you can identify ways to save energy (and money).

Safety information

⚠️ Do not fit rechargeable batteries

⚠️ Keep the **Solo III** away from water and other liquids. Clean only with a dry, soft cloth. If any components appear damaged or faulty, please contact your utility

⌂ For use in a dry, indoor environment only

🗑️ To protect the environment, these products and any batteries must be disposed of safely at the end of their life. Please take to a recycling centre for safe disposal

🅿️ RoHS compliant

CE CE approved

⚠️ Please only use the power supply provided

IMPORTANT SAFETY NOTICE

⚠️ *The following safety regulations must be observed at all times.*
Failure to observe precautions could result in severe injury or death.

- This equipment contains two disconnection switches for interruption of supply that do not provide supply isolation. Means of isolation from the supply must be provided as part of the building installation. Do not work on the equipment unless the supply is isolated. If isolation is made by removal of fuses or other cut-outs, the removed devices must be kept secure from replacement whilst work is performed. If isolation is provided by a switch, the switch must conform to the requirements of IEC 947-1 and IEC 947-3 or equivalent.

- Over-current protection is not provided by the equipment and must be provided as part of the building installation. For the domestic supply the maximum over-current device rating is 100A at 415V AC, conforming to the requirements of BS1361 or equivalent.

- Only suitable trained and qualified personnel shall be allowed to work on the equipment. Local safety standards shall be observed and shall take precedence over these regulations in points of conflict.

- The meters must be held securely during installation. They can cause injury if dropped.

- Meters that have fallen must not be installed. Even if no damage is apparent, meters must be returned to the manufacturer for testing. Internal damage can result in functional disorders or short-circuits.

- The meters must only be cleaned whilst disconnected and with a dry cloth without solvent and on no account be cleaned with running water or with high-pressure devices. Penetrating water can cause internal short-circuits.

- A terminal cover protects inadvertent exposure to the meter tail connections and must be fitted prior to energising the electrical supply.

CONTENTS

CONTENTS OF YOUR SOLO III

Your Solo III kit contains the following items:

Meter

- MID approved twin element meter

Hub (optional)

- Power supply

- Ethernet cable

Display

- Power supply

METER

About the meter

The twin element meter connects to both the PV system and the consumer unit to allow the Solo III system to measure generation, import, export and consumption via a low powered radio link.

Using the generation, consumption and export information, the energy**note**® platform and Solo III display can show you this detailed information in both energy and cost.

The meter measures active and reactive energy consumption in single phase two wire installations.

See the separate Solo III display Quick Reference Guide for further information.

Buttons & LEDs

The red and green LEDs on the upper section of the meter indicate that it is transmitting information to the hub

Reading the meter

You may be required to record the total generation from your Solar PV system

Locate the meter

The meter will typically be located near the main electricity meter for your home and close to where your fuses or trip switches are located.

Note down the reading

As shown in the example below, the meter will only show the total generation for your Solar PV system in kWh (kilowatt-hours)

The figure is shown with hundredths of kWh, so the reading in the example is 1,273.85 kWh.

EXP or IMP indicate if exporting or importing

HUB (OPTIONAL)

About the hub

The hub connects.the meter to the internet and allows the user to view their generation, import, export and consumption data online using their smartphone, tablet or computer.

It is important that the hub is powered on at all times to ensure that all the generation and consumption information is kept up to date.

It is also recommended that the hub is permanently connected to your broadband connection.

Buttons & LEDs

The link (⊗) and cloud (△) buttons are used during the setting up of your Solo III system.

All of the components of your system have been connected together during installation, so you do not normally need to use the buttons.

The lights indicate the health of the system.

Overview
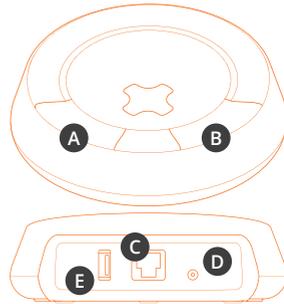
A link button (⊗) and status light

B cloud button (△) and status light

C Ethernet socket

D Power socket

E USB (not used)

SOLO III DISPLAY

About the display

Your Solo III display will help you understand just how much electricity your solar PV system is generating, how much your house is using and whether there is any electricity being exported to the grid.

Signal strength
Signal quality to the hub

Cloud
energy**note®** connected

Usage totals
Choose between GEN (generation), USE (house consumption), IMP (amount being used from the grid) and EXP (amount being exported to the grid). All values are shown in kWh.

Generation available
Green bars ▪◼▪ mean you are currently exporting. Now is the time to use cheaper energy.

Temperature
Current temperature where the display is located

Speedometer
Shows how much is being generated, consumed, exported or imported now. The digits show the value in kWh. (Only shown when in usage view.)

Cost totals
Select between SAVE (savings), COST (cost of import) and EARN (earnings from export).

Importing
Red bars ▪◼▪ mean you are currently importing. This is the most expensive electricity.

Buttons
◀ changes the total being shown, ▶ changes the time period and ◯ switches between usage and cost views.

FURTHER INFORMATION ON THE DISPLAY CAN BE FOUND ON PAGES 19-20

ABOUT THE SOLO III PV

The Solo III PV is designed for installers looking for a hassle-free installation, reliable meter accurate information and an engaging user interface for the end user.

The Solo III picks up and displays generation, import and export information helping you get the most out of your solar PV system. The system uses our geo energy**note**® online service and an in-home display.

The Solo III can be installed either as a standalone system connected directly to the twin element meter or as part of a connected system with a hub.

Features & Benefits

- Works independently of the inverter and compatible no matter what invertor you specify.

- The geo MID approved twin element meter records generation, import and export, the display then works out the usage.

- No additional sensors required, the meter talks directly to the display.

- The hub pushes all data continuously to geo's online service which allows the user live access from their smartphone, tablet or PC.

- Meter accurate information sent wirelessly to the geo hub and display.

- Compatible with 1-20kW PV arrays – single phase only.

- Display indicates when to switch on appliances based on precise export levels.

- Shows when you are importing and when you are exporting.

- Shows FIT earnings and savings by using your generated energy and deeming amounts.

- Live and historic information via smartphone, tablet and PC. Trends and analysis data download are available via the energy**note**® online service.

SETTING UP
PAIRING THE HUB TO THE TWIN ELEMENT METER

1. Once the installer has wired in your new twin element meter using the wiring diagram below, power on the hub and connect it to your internet modem using the Ethernet cable provided. (Please refer to the installer guide for more info on installing the meter.)
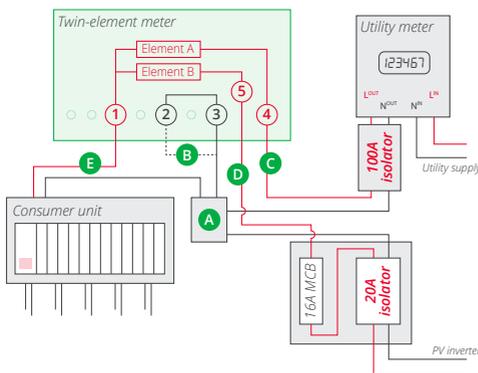
(A) All **N** wires can be connected together

(B) Connect **N** to either terminal **2** or **3**

(C) Connect **L** from utility meter to terminal **4**

(D) Connect **L** from PV MCB / isolator to terminal **5**

(E) Connect **L** from consumer unit to terminal **1**

2. Once the hub is connected to the internet it will perform an automatic software update, you will see two flashing green lights to indicate that the hub is going through an update, this can take around five minutes to complete depending on your internet speed.

   Once the hub has updated and is ready to pair with the meter, the status LEDs will show the following:

   Link LED (⊗) is RED - Cloud LED (☁) is AMBER

3. Press and hold the button on the front of the meter for five seconds then release, you should see the word "Pairing" on the LCD of the meter.


4. Press and hold the link button on the hub until the LED flashes amber.

5. The hub link LED should turn green as soon as it pairs to the twin element meter.

PAIRING
THE DISPLAY TO THE HUB

1. Power on the display using the power supply provided.

2. Once the display powers on it will show "**PAIR HUB?**"
   (If the display fails to show "Pair hub" or has been previously paired to a hub then you will need to carry out a reset, to do this refer to the troubleshooting page 27).

3. Press the left button (y) on the display for "yes".

4. Press and hold the link button on the hub until the status LED flashes amber
   (If you fail to press and hold the link button within 60 seconds of pressing "yes" on the display you will see "HUB FAIL" displayed on the screen and then return to the start)

5. Display should now read "**HUB OK**" and show live reading on the screen.

6. The figure is shown with hundredths of kWh, so the reading in the example is 1,273.85 kWh.

Pairing flow diagram
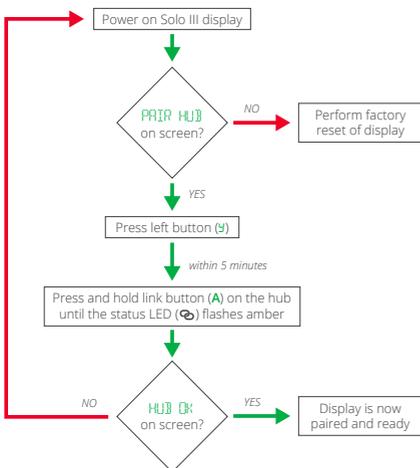
PAIRING
THE DISPLAY DIRECTLY TO THE METER WITHOUT HUB

Follow the steps below if you do not have the optional hub

1. Power on the display using the power supply provided.

2. Once the display powers on it will show "**PAIR HUB?**"
   (If the display fails to show "Pair Hub" or has been previously paired to a hub then you will need to carry out a reset, to do this refer to the troubleshooting on page 27).

3. Press the right button (n) on the display for "No".

4. Press and hold the button on the front of the meter for 5 seconds then release, you should see the word "Pairing" on the LCD of the meter.

5. Enter the pair code using the left and right buttons and press the middle button to move to the next step, the code can be found on the top of the meter **(e.g. ABC123).**

6. Once you confirm the code the display should read "**PAIRING MTR**" followed by "**METER OK**".

   If the verification fails, then the words 'METER FAIL' shall be shown for five seconds and the user is returned to the "PAIR HUB?" screen.

Pairing flow diagram
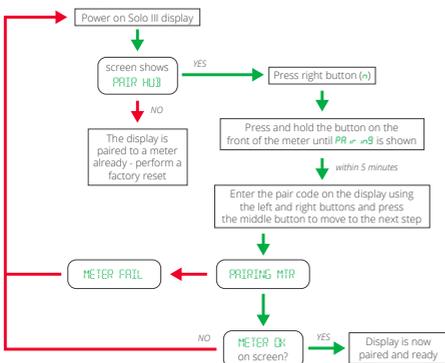
USING THE DISPLAY

The Solo III display will immediately start to show live generation and consumption readings taken directly from the twin element smart meter.

Pressing the left button will cycle through the following screens:

- **GEN TODAY**
  Total generation from the PV system for today

- **USE TODAY**
  Total usage for the whole house for today

- **IMP TODAY**
  Total amount of energy imported from the grid for today

- **EXP TODAY**
  Total amount of energy exported to the grid for today

Pressing the right button will change between **TODAY**, **Y'DAY** (yesterday), **THISWK** (this week), **LSTWK** (last week) and this and previous month (e.g. **AUG**, **JUL**).

Pressing the middle button will also show **SAVE** for savings based on energy that has not been imported from the energy supplier, **COST** for total cost charges from the energy supplier and **EARN** for earning from the PV system.

After a new installation all the readings will start from zero and start to increment from the point at which the Solo III and hub are first paired.

*When associated with energy**note®**, all data will be reset.*

DISPLAY BUTTON FUNCTIONS

The three buttons have the following functions:

Left button

The left button allows the user to move through the historic totals:

Period	Screen words	Info
Today	**TODAY**	The cumulative kWh from 00:00 today to now
Yesterday	**Y'DAY**	The total kWh for yesterday from 00:00 to 23:59
This week	**THISWK**	The cumulative kWh of consumption from 00:00 on the preceding Monday
Last week	**LASTWK**	The total kWh for last week, from Monday 00:00 to Sunday 23:59
This month	**MAY** *3 letters month name*	The cumulative kWh for the current month, from 00:00 on the 1st day of the month
Last month	**APR** *3 letters month name*	The total kWh for last month, from 00:00 on 1st of the month to 23:59 on the last day of the month

Middle button

The middle button allows you to switch to the **COST** screens, showing the same period as currently selected in the NOW screen. (for example, if viewing **GEN THISWK**, pressing the middle button will show **SAVE THISWK**).

Right button

The right button allows the user to move between the four **NOW** screens, keeping the same period.

DISPLAY MODES

The display has the following modes for showing live and historic information, shown on the upper dial.

SLEEP

- This puts the LCD to sleep and uses the LED indicator on the left side of the display to show if the system is exporting or importing. green LED indicates export and red LED indicates import.

NOW

- Generation (from solar array)

- Consumption (energy being used by the home)

- Import (amount being imported from the grid / utility)

- Export (amount being exported to the grid)

COST

- Savings

- Cost of import

- Income (if generation or export rate has been set)

Import description:

- This screen shows the current difference between generation and consumption, showing if the home is consuming more than it is generating. It will only show kW and kWh and is updated as soon as the new data is received from the smart meter.

- This can be used to understand if the appliances can be switched off to protect themselves from the costs of import.

Export description:

- This screen shows the current difference between generation and consumption, showing if the home is generating more than it is consuming. It will only show kW and kWh and is updated as soon as the new data is received from the smart meter.

- This can be used to understand how much available energy there is to use to benefit from the generation and the savings.

DISPLAY MODES

The display has the following modes for showing live and historic information, shown on the upper dial.

Generation description:

- This screen shows the current output from the PV array. It will only show kW and kWh and is updated as soon as the new data is received from the meter / hub.

Consumption description:

- This screen shows the current consumption of the home. It will only show kW and kWh and is updated as soon as the new data is received from the meter / hub.

Savings description:

- This shows the savings that have been made by using self-generated electricity as opposed to off-grid electricity.

  Calculation
  This is calculated on an on-going basis as: **Savings = min (generation kWh, consumption kWh) * Tariff**

Cost description:

- This shows the cost that has been incurred using off-grid electricity.

  Calculation
  Cost is calculated on an on-going basis as: **Cost = imported kWh * Tariff**

Income / earnings:

- This shows the cumulative earnings that have been generated by the PV system. This is the summation of generation and export tariffs.

DISPLAY INFO & SETTINGS

From any of the **NOW** or **COST** screens, a long press of the middle button will allow you to enter the settings screens.

The settings are split in to two sections, **[INFO]** and **[SETTINGS]**, pressing the left or right button will cycle between the two.

After 30 seconds of no use, the display will return to the previous **NOW** or **COST** screen.

Info:

The info screens are read only and are accessed sequentially by pressing the middle button. At the end of the list, the middle button will allow you to return to the previous **NOW** or **COST** screen.

The following information will be available in the **INFO** settings:

Info	Title	Description	Sample
Local time	**TIME**	Local time from the network in 24hour format	14:33
DST active	**DST**	Whether daylight saving time is active or inactive	OFF
Active import tariff	**IMPORT TRF**	Current active TOU import tariff	£0.185
Standing charge	**STAND CHG**	Current standing charge, if set	£0.20
Active export tariff	**EXPORT TRF**	Current export tariff rate	£0.15
Active generation tariff	**GEN TRF**	Current generation tariff	£0.10

DISPLAY INFO & SETTINGS

Settings:

The user can configure the following settings:
the value shall flash (0.5s on/off) and pressing the left button will decrement and the right button will increment. Pressing the middle button will confirm and change the setting.

At the last setting, the middle button will return the user to the previous **NOW** or **COST** screen.

The following settings are possible:

Info	Title	Description	Increment	Sample
DST active	DST	Set DST to be ON or OFF	-	ON
Tariff 1*	TARIFF1	Tariff 1 cost	£0.001	£0.122
Tariff 2*	TARIFF2	Tariff 2 cost	£0.001	£0.000
Tariff 2 start time*	TARIFF2 ON	Starting time for tariff 2 - only visible if tariff 2 is greater than zero	00:15	22:00
Tariff 2 end time*	TARIFF2 OFF	End time for tariff 2	00:15	6:00
Tariff 3	TARIFF3	Tariff 3 cost, only visible if tariff 2 is greater than zero	£0.001	£0.000
Tariff 3 start time*	TARIFF3 ON	Start time for tariff 3 - only visible if tariff 3 is greater than zero	00:15	00:00
Tariff 3 end time*	TARIFF3 OFF	End time for tariff 3	00:15	00:00
Standing charge	STANDING CH	Daily standing charge	£0.001-	£0.000
Currency	CURRENCY	Configuration of the currency from the available units (£, €, $, kwd, kr)	-	£
Display off	DISPLAY OFF	Time for the display to be switched off	00:15	22:00
Display on	DISPLAY ON	Time for the display to be switched on	00:15	06:00

* = Only visible if no hub present

READING YOUR DISPLAY ICONS

📶 Signal strength

The signal strength icon shows the quality of the radio connection to the optional hub or meter depending on what it is connected to.

☁ Cloud

When the cloud icon is on solid without flashing it means that the Solo III display is paired to the hub and connected to the internet.

When the cloud icon is flashing it means the Solo III display is paired to the hub but not connected to the internet. This is because the hub is not connected to the broadband router or the hub is failing to receive internet connection. If the service is down (energy**note**®/internet) for 12 hours or longer then "**CLOUD ERROR**" will appear on the screen. Pressing a button will suppress the message for a further 12 hours.

Please note: If you do not have the optional hub the cloud icon will not appear on the Solo III display.

Temperature

This represents the current temperature where the display is located.

LED indicator

The LED indicates if the home is exporting or importing, If more than 50W is being exported.

Speedometer

The import / export bars indicate if the home is exporting or importing electricity to indicate if there is excess generation that can be used in the home.

Segment index (n)	Step per segment (kW)	Segment count	Cumulative (kW)
1	0.005	1	0.005
2 to 20	0.05	19	1.0
21 to 35	0.50	15	8.5
36 to 40	2.50	5	21.0

Import / export bar
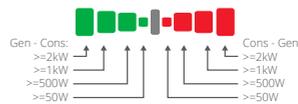
The import / export bars indicate if the home is exporting or importing electricity. If there is excess generation that can be used in the home, then it will show the green LED, if more than 50W is being imported, then this will change to the red LED.

👆 Threshold icon

This lights up when you are generating enough power to run a heavy load appliance (e.g. your tumble dryer or washing machine).

SETTING TARIFFS

Please note: you will only get the following options if your display is directly paired to the twin element meter without the hub.

If you have the optional hub you will need to enter the tariff settings on energynote®, via the System Settings menu. Refer to page 24 for further information.

The Solo III display can work with single energy tariff (same charge throughout the day) and also dual rate tariff (where the charges vary between day time and night time),

If the energy supplier does not provide this information on the bill, then the tariff(s) and standing charge (if charged by the supplier) can be worked out by the following simple equations:

Tariff = (charge for period in £ / energy used during period in kWh)

Daily standing charge = (charges for period in £ / number of days in the period)

Entering the tariff

To enter the tariff information on the display, do the following:

- Press and hold the middle button on the display.

- Press the right button until **SETTINGS** is shown and then press the middle button.

- Repeatedly press the middle button until **TARIFF1** is shown.

- Use the left and right buttons to decrease and increase the tariff and then press the middle button to store the value. If using more than one tariff, enter the night–time rate first.

- If there is more than one tariff, enter the second tariff in **TARIFF2** settings menu. If there is no second tariff leave it as **£0.000**. Enter the start time and end time for the tariff.

- Finally, enter any daily standing charge.

- Press the middle button to complete setting the tariff.

ENERGYNOTE®

Register and create your account now
solo3.energynote.eu/

What is energy**note®**?

energy**note®** is a cloud based platform that enables you to view in-depth information on the generation, consumption and other earning related information and can be accessed from a desktop, laptop, tablet computer or via a smart-phone.

Is this important?

Yes. The most efficient use of electricity generated by solar PV is to use it within the home, as this maximises the savings that can be made.

While it is also important to earn from exporting unused electricity to the grid, it is also cheaper to use your own electricity as opposed to paying for electricity from your utility.

Your installer will probably have helped you register as your system was professionally installed, but if not please visit the web address below to create an account.

Account creation:

Visit **solo3.energynote.eu/** and follow the instruction to create an account

- Click **Sign up**

- Enter the end user's name and valid email and password and read and agree to the terms and privacy policy

- Click **Sign up** to create the account

Account verification

Within five minutes the user will receive an email with an activation link and instructions on how to complete their account creation.

Please note: it is strongly advised to complete the account and activation during the system installation otherwise all data accumulated in the intervening time between installation and association may be lost.

ASSOCIATING
SOLO III SYSTEM WITH ENERGYNOTE®

Once the user has created and verified their online energynote® account follow the steps below.

1. Press and hold the cloud button *(☁)* on the hub for five seconds.

2. A code will appear on the display and this will need to be entered on energy**note**® to complete the association process.
   (The display must be paired to the hub and connected to the internet in order for the code to appear.)

ENERGYNOTE®
EXPLAINED

Once you log in to energy**note**® and complete the initial system setup screen, you will be greeted with the following home page:
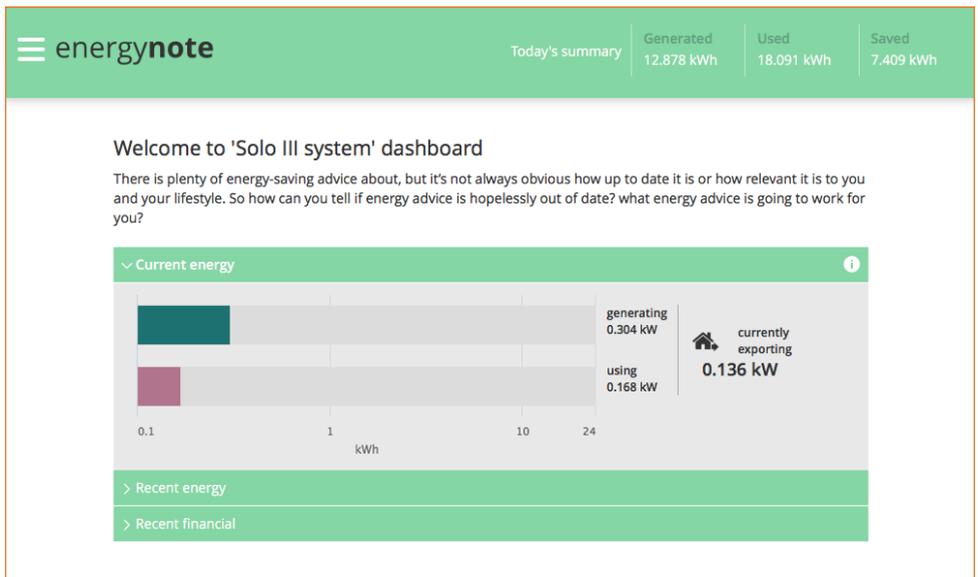
The home page allows the user to see live generation, usage, grid import, solar use, income and spend / total income in £.

The top right of the screen shows a summary of the amount of electricity generated, amount used within the home and the total saved.

The menu icon is used to select from the available screens.

ENERGYNOTE®
SYSTEM SETTINGS

In the settings page you will have the option to input the following:

- System settings - name your PV system and set the geographical location.

- Budget and tariff settings – this calculates the cost and compares it to a budget and calculates the electricity cost.

- Microgen settings – this allows you to enter the size of your solar array.

- Download your data – allows you to download data straight to your computer in CSV format which can then be viewed offline.

ENERGYNOTE®
ANALYSIS

The analysis page allows you to view the live and historical data information.

From the drop down option you can select the following to view in more detail:

- How much energy did I use?

- Was I over or under budget?

- How much does my PV array generate?

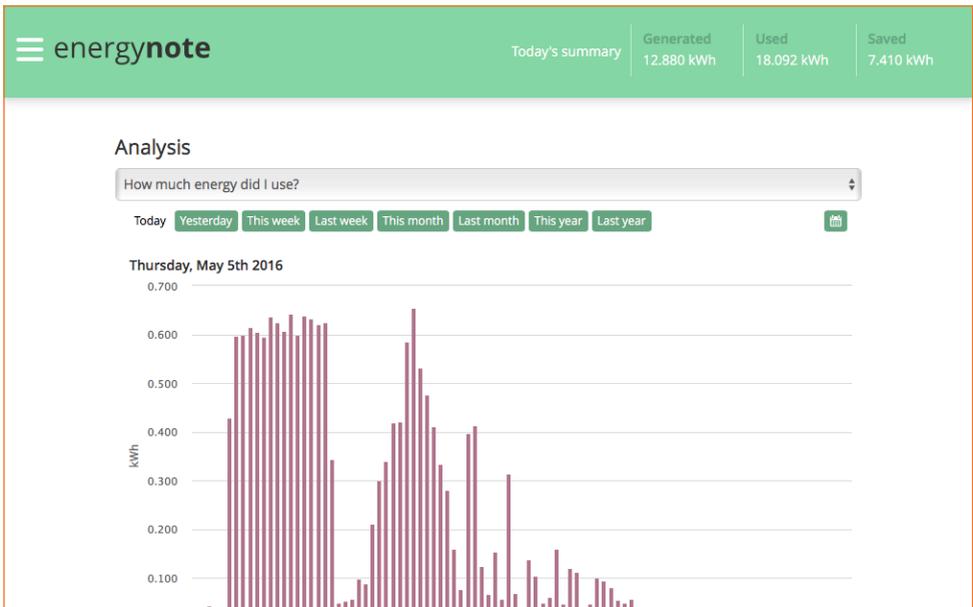- How much has my PV earned me?

- What is my import/export balance?

- How much does PV save off my bill?

You have the option to also select the following:

Today, yesterday, this week, last week, this month, last month, this year and last year's data.

You also have the option to select any date from the 📅 icon to analyse further.

FAQS

The Solo III display is blank
Check that the power supply is connected to the display. Also try and press any button, as it could be that the display has switched off the back light and is in power saving mode.

The dial is not being shown
If the current usage view is zero then the dial will not be shown.

No generation or consumption is being shown
Check the signal strength icon and try and move the display close to the meter.

Link light (⚭) is off
Check that the hub is properly connected to the power supply and that is it switched on

Link light (⚭) is red or amber
This means your hub is not connected to the meter. Refer to the supplied installer guide or contact your system installer.

Cloud light (◯) is off
Check the Ethernet cable is connected between the hub and broadband router and check the router is powered on.

Does my hub need to be connected to my home broadband for energy**note® to work?**
The quick answer is yes. Your hub continuously sends data to the energy**note**® cloud service and uses your broadband connection to do this.

Your hub must be connected at least once every two weeks to upload the data, but it is best to leave it connected permanently.

I have forgotten my energy**note® password**
Go to solo3.energynote.eu/ and click the **forgotten your password**? link on the login page.

How do I change my ener**gynote® password?**
You can change your password by clicking the **Forgotten your password** link and clicking the **Get new password** button.

How do I reset my display?
Remove power to the display and then press and hold the three buttons while powering the display back on. Press the right (n) for **DATA RESET** and then left button (y) to confirm **FULL RESET**

More Solo III troubleshooting can be found in the link below:
www.geotogether.com/support/solo-support/solo-iii/

TECHNICAL REFERENCE

Hub specification

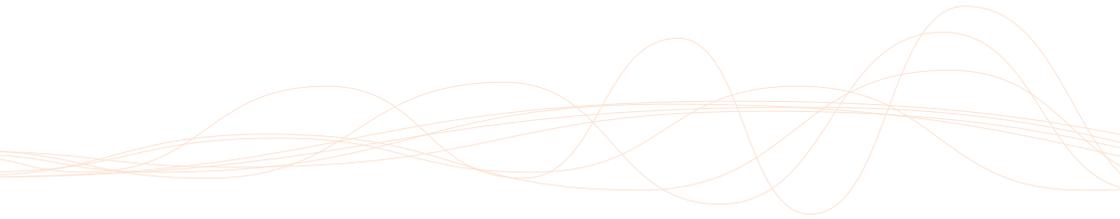|	
Supply voltage	5Vdc
Supply power	250mA, 1.25W
Operating temperature	+5 to +45ºC
Operating humidity	0 to 85% RH non-condensing
Storage temperature	0 to +55ºC
Storage humidity	0 to 85% RH non-condensing

This product is double insulated.

At the end of its life please recycle at a suitable recycling facility.

For use in dry, indoor environments only.

These units have been tested and conform to all relevant European safety and regulatory standards where applicable.

Solo III display specification

Supply voltage	5Vdc
Supply power	100mA, 0.5W
Operating temperature	+5 to +40ºC
Operating humidity	0 to 85% RH non-condensing
Storage temperature	0 to +55ºC
Storage humidity	0 to 85% RH non-condensing

Meter specification

Supply voltage	220 - 240Vac 276Vac maximum
Supply frequency	47 - 53Hz
Maximum current	100A
Operating temperature	-20 to +55ºC non-condensing
Ingress protection	IP52, according to BS EN 60529

Manufacturer

Green Energy Options Ltd.

3 St. Mary's Court, Hardwick, Cambridge, CB23 7QS, UK

Hub status LEDs

The following table shows what the different coloured LEDs mean

LED	Colour	Meaning
🔗	OFF	Check the power supply to the hub
	RED	The hub is not paired to the meter and / or Solo III display
	AMBER (flashing)	The hub is in pairing mode and waiting to pair with the meter or Solo III display
	AMBER	Devices paired, but signal lost (see FAQs)
	GREEN	The hub is paired to the meter
☁	OFF	Check the Ethernet cable - the hub is unable to obtain a network IP address
	AMBER (flashing)	Requesting association with online service
	AMBER	The hub is connected to the broadband and ready to associate with the user's account
	GREEN	The hub is connected to the broadband and associated with the user's account