iHP User Guide

V02

mixergy®

Contents

1. An overview of your Mixergy iHP

1.1. The technology in your system and what it does

Thanks for buying a Mixergy integrated Heat Pump (iHP) cylinder.

The Mixergy iHP cylinder uses a combination of technologies to deliver the highest possible system efficiency whilst making best possible use of low cost renewable energy when it is available. These technological features can be summarised as follows:

1.1.1. High speed boost mode delivering hot water 10 times faster

To ensure maximum comfort, the iHP exploits the physics of thermal stratification to provide a rapid, high efficiency boost capability. This is illustrated by the following figure:

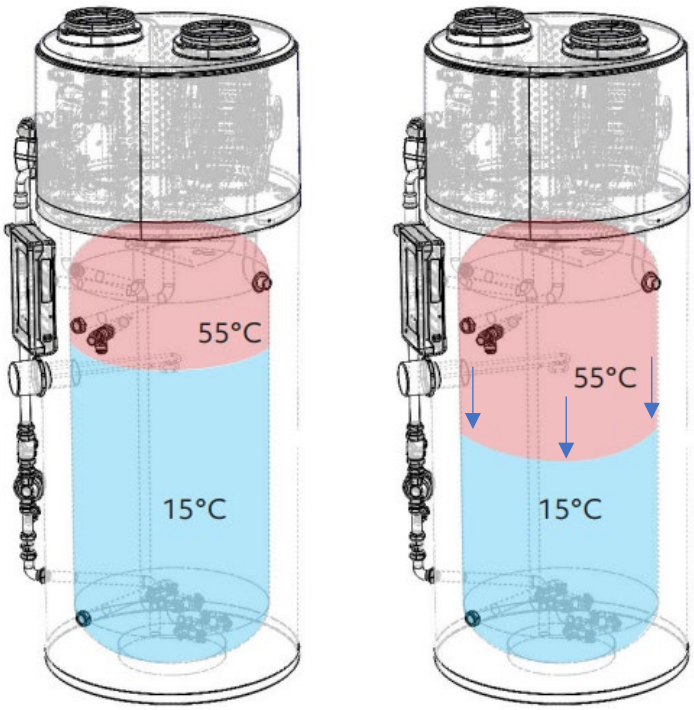


Figure 1 An illustration of the internal temperature distribution within the Mixergy iHP during boost mode

This boost capability uses the heat-pump to provide instantaneous hot water into the top of the hot water cylinder. This method demonstrates more than double the efficiency when compared to traditional immersion heaters for boost applications.

Press the Mixergy Gauge button or swipe up on the app to boost your iHP (see Sections 2.1 and 2.2).

1.1.2. High efficiency eco mode to deliver the lowest energy consumption possible

In eco-mode, the iHP delivers market leading efficiency by using Mixergy's patented heat transfer technology. In eco-mode, it is possible to get up to four units of heat for every single unit of electricity (or in other words, it is possible to obtain a 'Coefficient of Performance' of four). Mixergy's iHP achieves a market leading score on efficiency within the European Energy Labelling Scheme.

During eco-mode, the iHP heats the whole volume of hot water during a process we call 'full circulation'. The temperature of the whole cylinder gradually increases when heating in this manner. This process is illustrated by the following figure:

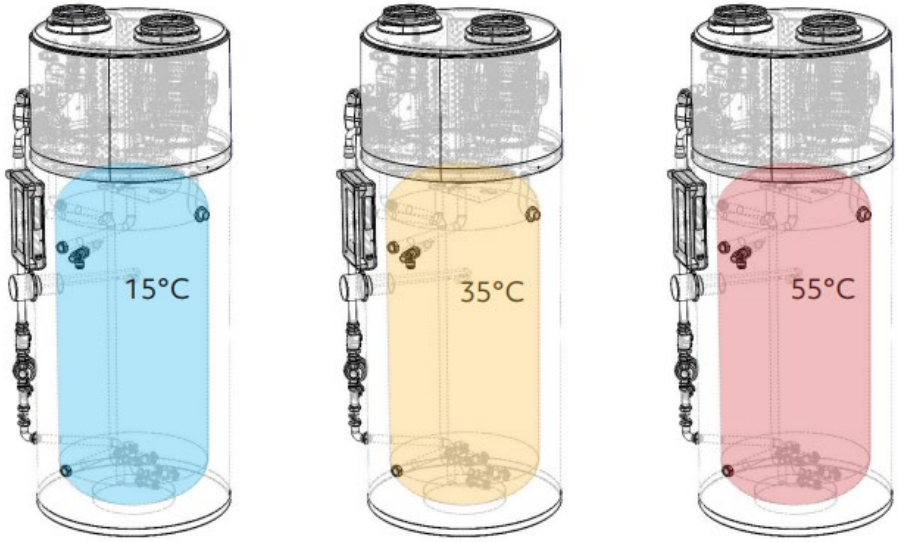


Figure 2 Mixergy's iHP heating in eco-mode

Whilst slower than heating with boost mode, eco-mode delivers more economical performance and so is the default mode when heating via the Mixergy Schedule (see Section 2.2).

1.2. State of charge measurement for convenient control

State Of Charge (SOC) represents the amount of useful hot water inside your Mixergy iHP. This is represented in the app or on the gauge provided (see section 2.3.1)

1.3. How your Mixergy system works with both traditional and renewable energy sources through smart tariffs

By connecting your Mixergy system to the internet and setting up a Mixergy account through your phone, it is possible to link your Mixergy iHP to a variety of time of use (or Smart) tariffs now available on the market. Time of use and Smart tariffs offer lower cost (or even negatively priced!) electricity whenever there is surplus renewable energy. Surplus renewable energy arises when there is more generation from sources like wind and/or solar than demand from homes, commercial premises and factories. You can find out more information about tariffs available from specific suppliers on Mixergy's website through the following link:

https://www.mixergy.co.uk/solutions/smart-tariffs/

By signing up to a Smart tariff, your Mixergy cylinder is helping the grid to decarbonize by storing energy from excess wind and/or solar. Not only are you saving money, you are helping to save the planet.

1.4. How Mixergy Future Proofs Your Home

1.4.1. Working with future Smart tariffs

Installing a Mixergy iHP is a step into the future. With the high efficiency heat-pump alone, you have drastically reduced your energy consumption and resulting in lower carbon emissions. Typically, you might expect a drop from ~9gCO_2/kWh to <3gCO_2/kWh on a standard fixed energy tariff in the UK.

However, if you link your Mixergy iHP to a Smart tariff, you can go from ~3gCO_2/kWh to <2gCO_2/kWh and, as the grid decarbonizes, 0gCO_2/kWh by 2050.

1.4.2. Working with excess solar energy

If you decide to fit solar PV to your home, by operating a Mixergy iHP with a Mixergy Current Clamp connected to your incoming mains supply, your iHP will heat whenever there is enough surplus solar energy to turn on the compressor. This in effect provides free hot water whenever there is more solar power from your roof than demand from other appliances in your home. The following Figure illustrates how a Mixergy iHP future proofs you both from the perspective of a Smart tariff enabling more renewable energy and from any future solar PV you may choose to install:

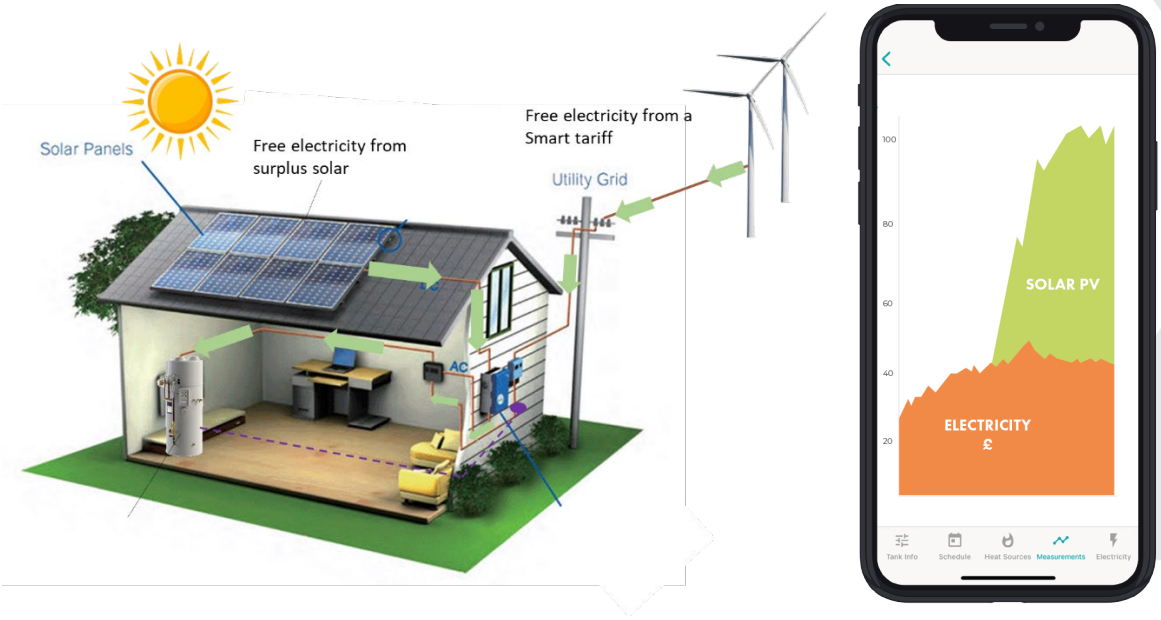


Figure 3 Future your proofing your home with the Mixergy iHP

2. How to control your Mixergy system

2.1. Local control with the Mixergy Gauge

Your Mixergy cylinder comes equipped with a simple gauge to allow for easy and fast control of your hot water:

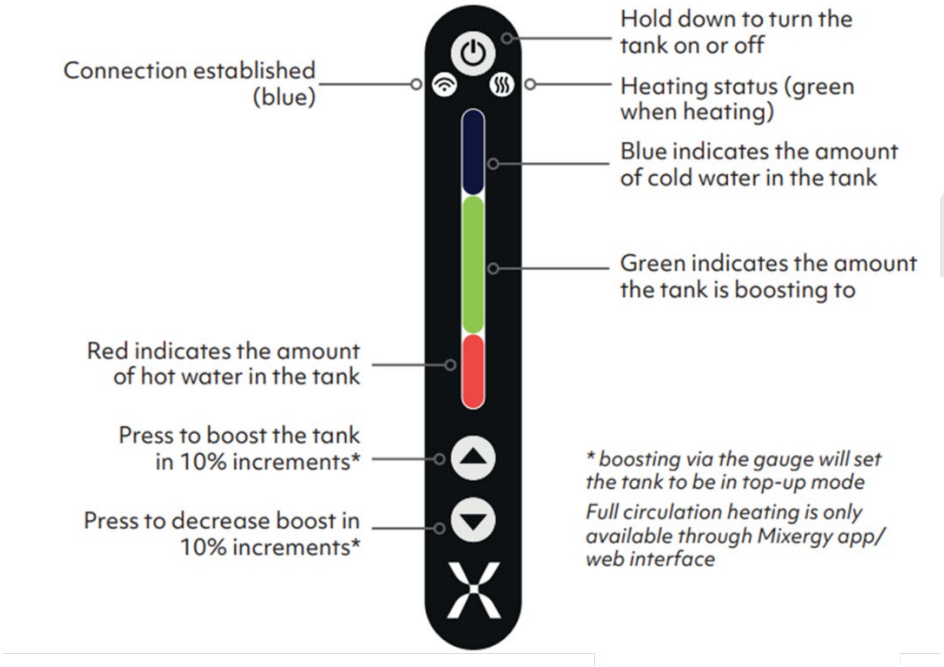


Figure 4 The Mixergy control gauge.

Pressing the up arrow allows you to incrementally boost the amount of desired energy within the iHP cylinder. You can cancel a boost by pressing the down arrow until the green bar (annotated in green in Figure 4).

2.2. Setting up a Mixergy account to control with your Mixergy App

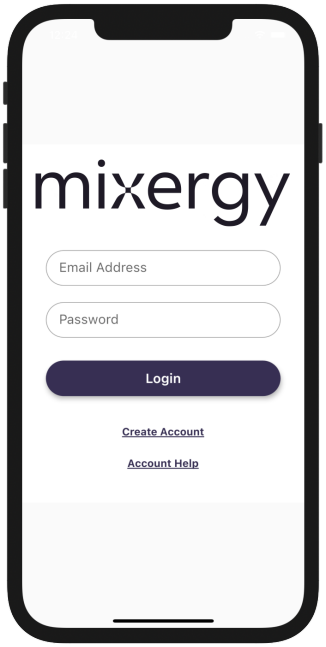
A. Download the Mixergy App by searching for Mixergy on the App Store or Google Play.

Google Play

Download on the App Store

B. Create a Mixergy account

Upon opening the App, you will be presented with a Login screen. Click **Create Account** and then set your credentials.



After entering all the required details, you will receive an email from noreply@mixergy.co.uk. Click through this link to validate your account and then go back to the Mixergy App to login with your set credentials.

Mixergy's terms and conditions are available during sign up and are also available at www.mixergy.co.uk/terms-of-use

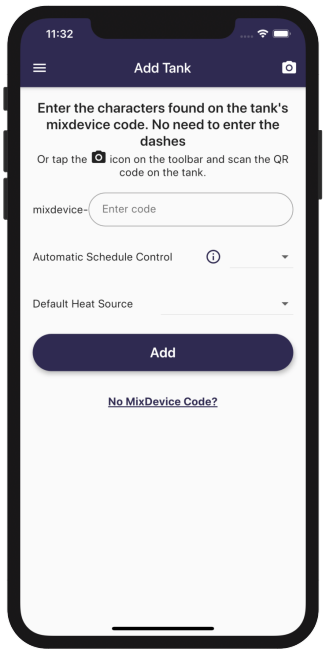
Our privacy notice is available at www.mixergy.co.uk/privacy

C. Register your Mixergy iHP to your account.

After logging in for the first time, you will be asked to register your cylinder to your account.

On your cylinder, there will be a label containing a mixdevice code which is a 25-character identifier unique to your cylinder (please note: this is not the MX number shown on the same label!).

Enter this code into the App. Alternatively, scan the QR Code (only available in iOS) on the label on your cylinder to save typing in this code.



On this screen, you may choose whether you'd like to manually schedule your cylinder (you choose when it heats, and how much), or you can select the option for **Automatic Schedule Control** (our machine learning algorithm will optimise your schedule to save on energy and money).

- If set to Off, your schedule will not be adjusted (i.e. you must manually schedule your cylinder).
- If set to Standard, your cylinder will be conservative in its scheduling, aiming to save some money whilst minimising the chance that you'll run out of hot water.
- If set to Economy, your cylinder will optimise its schedule to maximise savings. This comes with an increased risk that you may run out of hot water if your household uses more than estimated.

2.3. Remote monitoring and control through the Mixergy app

The Mixergy App allows you to view your hot water level, quickly boost your cylinder, set a schedule, or simply delegate all control to our Automatic Schedule Control setting. Automatic Schedule Control uses machine learning to determine how much to heat and when against your particular hot water consumption habits and energy tariff. The Mixergy App can be downloaded from the Apple App Store, or Google Play Store, for more details around how to download and use the App, please visit the following link:

https://support.mixergy.co.uk/how-do-i-access-and-use-the-mixergy-app

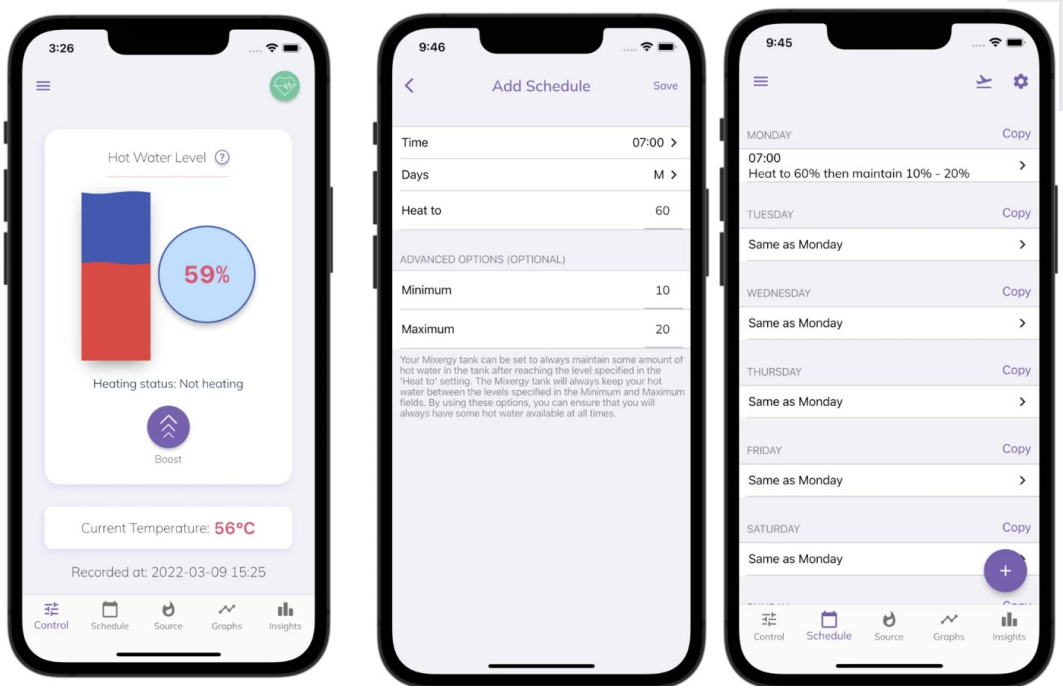


Figure 5 Using the Mixergy app to see how much hot water you have, set a schedule or simply let Automatic Schedule Control take care of things whilst saving energy

2.3.1. View your hot water level

The home screen shows the current heating status of your cylinder, and how much water is available.

The Hot Water Level is the percentage of the water in the cylinder that is usable hot water.

In this example, 59% of the water in the cylinder is usable hot water (the red portion of the graph) and the remaining 41% is considered cold (the blue portion of the graph).

The Heating Status tells you if the cylinder is currently heating or not. If it is heating, it will state where the instruction has come from. For example, whether it is in response to a boost (from the internet or gauge), or due to a user defined heating schedule, demand side response, or a water sterilisation cycle.

Underneath the Heating Status it will say what time the water measurements were last received by Mixergy servers. This information can be useful when diagnosing internet connection issues in the home.

2.3.2. Boosting your cylinder

To boost your cylinder, drag the slider on the right up with your finger to the desired level and let go. The green portion of the graph represents the level your cylinder is heating to, and the heating status below will change. As the cylinder heats up, the red portion will climb until the target hot water level is reached.

To cancel a boost made from the App, click **Cancel Boost.**

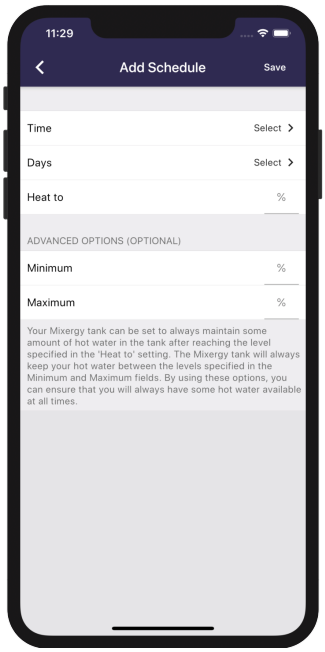
2.3.3. Setting a manual schedule

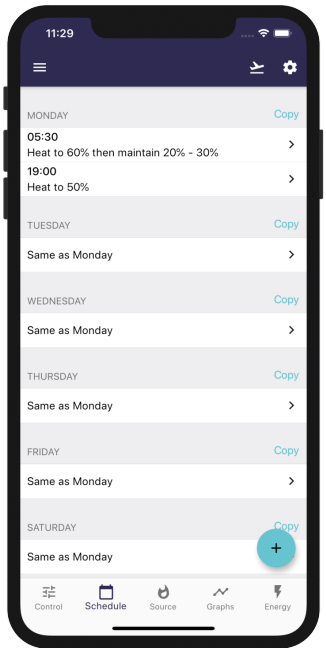
Click on the **Schedule** tab at the bottom of the page and press the + button to set when and how much you want your cylinder to heat. Click **Save** to view your new schedule.

You can set a different schedule for each day or copy the same schedule over to several days. You can also set the cylinder to re-heat back to 100% when it falls below a certain level. This means that if the hot water level falls below the minimum hot water level, the cylinder will automatically turn back again until the maximum level is reached. If no maintain parameter is set, the usable hot water will naturally cool off, unless it is first used by a draw event.

For example, a schedule can be set every weekday to heat in the morning at 06:00 up to 100%, and then again at 18:00 back to 100%.

On the weekends, it could be that everyone is expected to be in the house all day and likely to be using hot water at various times. For example, a schedule can be set to heat at 08:00 to 100%, and then a maintain parameter to re-heat back to 100% it falls below 50%.



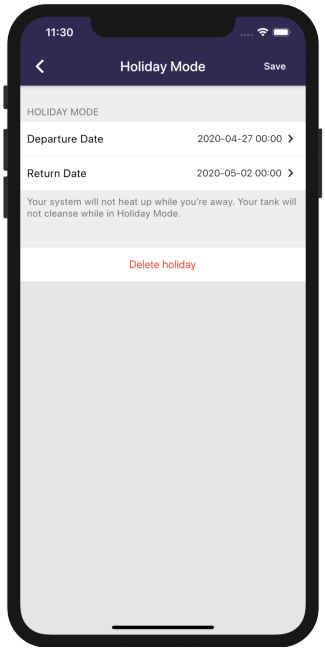


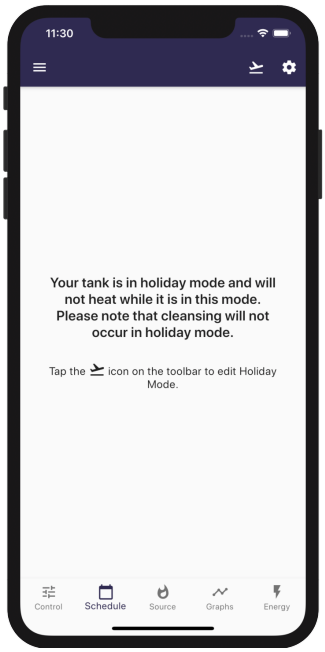
If you do not set a schedule yourself, your cylinder will automatically run on a ‘default schedule’ until you do. This setting will heat your cylinder to 100% every day at 3am. This may be useful to begin with if you are unsure of how much hot water your household requires, but please note that this may not be the most efficient setting to optimise energy/cost.

2.3.4. Holiday mode

Holiday mode will stop your cylinder heating when you are away, and any schedule currently set will be ignored until your return day.

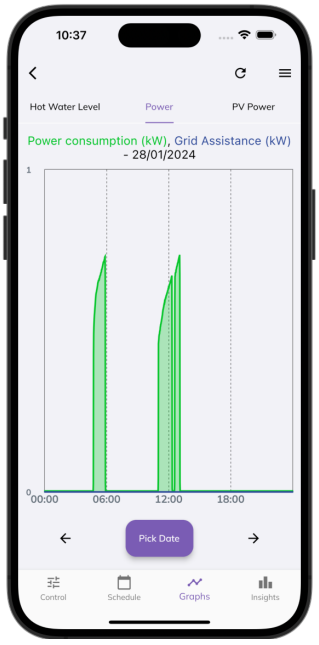
To enter vacation dates, click the **aeroplane icon** on the tool bar.





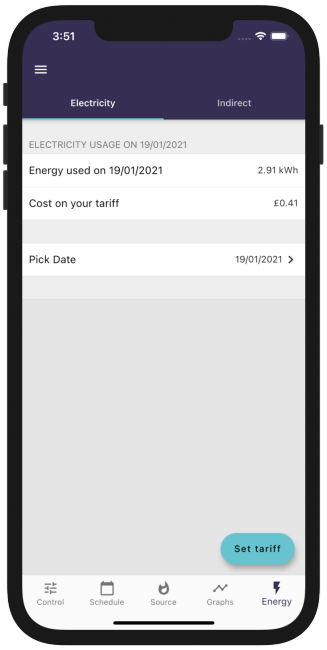
2.3.5. Viewing your hot water and energy consumption data

Click the Measurements tab to view graphs visualising your hot water usage and electricity consumption. You can see graphs of previous days by clicking Pick Date underneath the graph.



You can see how these graphs are consistent with the set heating schedule and reflect water usage and natural cooling of the water throughout the day.

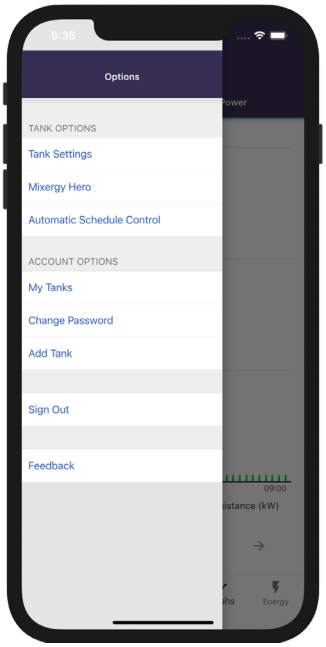
The Mixergy App can calculate how much energy you've used to heat your water, and provide an estimate of how much this has cost. Click the **Insights** tab, then click **Set Tariff**. Enter your peak/off-peak electricity prices for an estimation.

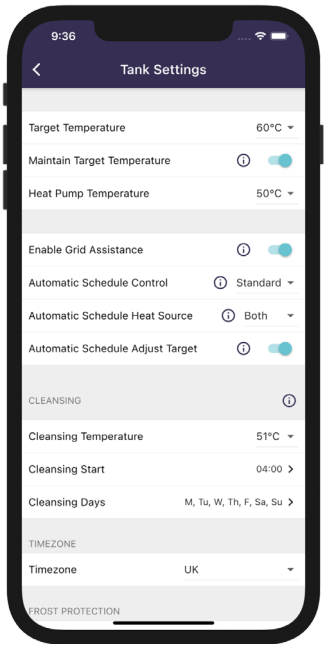


2.3.6. Admin options

To log out, change your password, or add a new cylinder to your account, return to the homepage **Cylinder Info** and click **More**.

Click **System Settings** to change the target temperature of your hot water, change your automatic schedule control setting.





2.4. Controlling Mixergy through 3rd party controls in the home

Your Mixergy system can work from third party control devices however, we recommend you use the app and gauge to optimise the maximum efficiency available to you to reduce your energy costs. If you wish to use a third-party control such as Hive please contact your original installer for further information.

2.5. Voice control through smart speakers

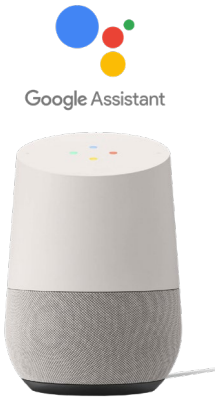
Your Mixergy cylinder can be controlled with voice control via Google Assistant or Amazon Alexa.

You can use commands to set your hot water temperature, check how much hot water you currently have or give the cylinder a boost.

A full list of commands are shown below, and we are working to add more commands to this list.

Google assistant commands

Your request	Google's response	Notes
OK Google, turn on <device name> heating	Sure, turning on heating on <device name>	Heats cylinder to 20% above current charge
K Google, turn off heating in <device name>	Alright, turning off heating on <device name>	Turns off the immersion (if it's on)
OK Google, fill <device name> <amount>	OK, filling to <amount>	
OK Google, fill <device name> to X%	Got it, filling to X%	
OK Google, how full is <device name>?	<device name> is filled to X%	
OK Google, is <device name> <heating> on	<device name> heating is on/off	
OK Google, what is the temperature in <device name>	<device name> is set to X degrees	X is the target temperature, not the actual water temperature
OK Google, set <device name> to X degrees	Sure, setting <device name> to X degrees	Sets the target water temperature



Amazon alexa commands

Your request	Alexa's response
Alexa, boost Mixergy tank charge to XX% (e.g. 50%)	OK
Alexa, increase Mixergy tank charge by XX% (e.g. 20%)	OK
Alexa, what is the hot water level in the Mixergy tank?	You have XX%
Alexa, what is the hot water level in my <device name>	You have XX%
Alexa, what is the amount of hot water in my <device name>	You have XX%
Alexa, what is the charge in Mixergy tank?	Mixergy tank charge is XX%
Alexa, what is the charge in my <device name>	<device name> charge is XX%
Alexa, what is the state of charge in my <device name>	<device name> charge is XX%
Alexa, is Mixergy tank boost on?	Mixergy tank boost is ON/OFF
Alexa, turn off Mixergy boost	OK
Alexa, set Mixergy tank temperature to XX°C (e.g. 52°C)	OK
Alexa, what is the temperature in Mixergy tank?	Mixergy tank temperature is XX°C

3. How to achieve the most from your Mixergy system

3.1. How to get the best from a solar PV array connected to your Mixergy system

The Mixergy iHP can be connected to solar PV arrays using the Mixergy EMC and current clamp. With auto-schedule enabled, your Mixergy iHP will utilise the solar array whilst ensuring you make the most of your free energy during the day.

Your cylinder may not charge up fully overnight, as the Mixergy Controller will be leaving capacity for your solar array to fill when it gets sunny. However, the auto-schedule will prioritise your hot water usage to help make sure you don't run out of hot water

3.2. How to get the best from your Mixergy system if it is iHP only

To increase the efficiency from your Mixergy iHP, it is recommended to use as low a set point temperature as possible. The minimum temperature the iHP can be set to is 45°C. This is hot enough for most showers and baths and will help the iHP achieve high efficiency.

If you prefer manual control of your hot water cylinder, you can program your own heating schedules via the Mixergy App. When developing a schedule to enhance the performance of the Mixergy iHP, several key factors should be taken into account:

- Heating when the air temperature outside is hotter and higher humidity (During the day vs. at night) – Typically best for users with fixed rate tariffs
- Heating during off-peak hours to save money on bills – For users with smart tariffs
- Lower hot water target temperature
- Manually boosting at the gauge or via the app for non-recuring hot water demand. Boosting the cylinder in this way will 'top-up' the hot water at the top of the iHP cylinder rather than heating the entire iHP to a set temperature

If you would rather not be involved in the scheduling of your Mixergy iHP cylinder, you can also enable auto-schedule to do the hard work for you. This will take into account the points above and create a schedule according to your usage across two weeks.

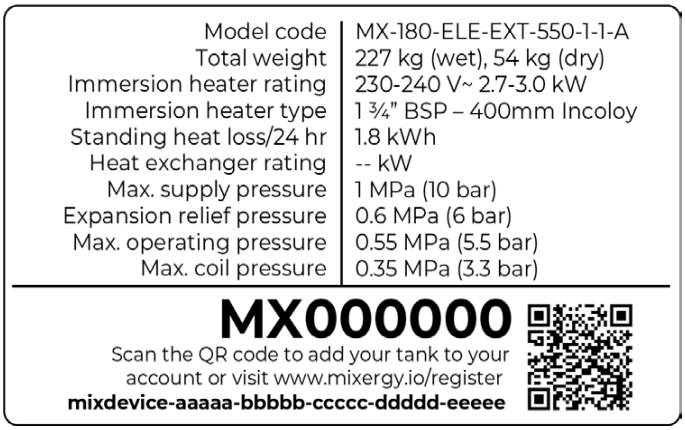
The Mixergy controller will fully heat the cylinder to 55°C every two weeks to ensure the cylinder is sterilised regularly.

4. FAQs and troubleshooting

1. The Mixergy App won't let me register my cylinder, what should I do?

a. Before you will be able to register your cylinder with your Mixergy account, the cylinder must first be installed and connected to the internet. If you are unable to establish internet connection, please see the answers to question 2 below.

b. Ensure you are entering the 25-character mixdevice number, and not the MX number. This is printed on a white sticker on the side of your cylinder.



2. What should I do if my cylinder is not connecting to the internet?

A powerline adapter (included with your cylinder) should be plugged into a mains socket and connected to your internet router via the included ethernet cable. Check this set-up has been correctly followed by your installer. If you still do not have internet connection, check each of the following steps:

i. If you already have a homeplug AV network installed in your home, it is recommended that you pair the cylinder with an existing homeplug adaptor to avoid interference

ii. Ensure that the adapter is not plugged into an extension lead.

iii. If the bottom ethernet LED on the adapter [4] is not lit, the ethernet cable may have come loose and will need to be plugged in again (you should hear it click into place).

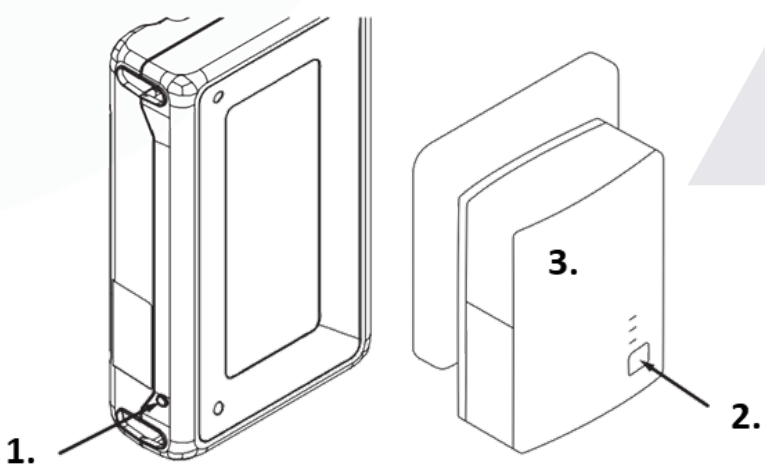
iv. If the middle powerline LED on the adapter [4] is not lit, then your cylinder may have become unpaired from the powerline adapter connected to your router.

In case that the cylinder does not automatically pair to the powerline adapter or connection to an existing homeplug AV network is desired, please follow the steps below to pair the cylinder to the network.

i. Use a thin tool to depress and hold the pair button for 1 - 2 seconds.

ii. Depress the pair button on the powerline adapter for 1-2 seconds within 2 minutes of step

iii. Observe all 3 LEDs as solid green on the powerline adapter



3. What will happen to my heating schedule if the cylinder loses internet connection?

a. Your cylinder will continue to heat according to the last schedule set when there was an internet connection.

However, if you power the cylinder off at the mains it will need to re-connect to the internet to begin running the schedule again with the correct time. If no internet connection is available, the cylinder will enter an ‘offline’ mode where it will constantly maintain between 40-50% charge using your primary heat source.

b. You can continue to boost your cylinder via the gauge without an internet connection.

4. Why is my cylinder heating when the schedule is not set to heat?

a. The cylinder may have manually boosted from the gauge or the App.

b. If you have set ‘maintain levels’ within the App, then your cylinder will automatically begin to heat when the water level drops below the minimum parameter.

c. If you have a solar PV system, your cylinder will automatically heat when surplus energy becomes available.

d. A sterilisation cycle occurs every two weeks. This will heat the cylinder entirely to 100% in order to prevent legionella growth.

e. If you have opted for automatic heating control, your heating schedule will be automatically optimised and may be altered to assist with balancing of the National Grid.

5. Why is my cylinder not following the schedule?

a. If you have a third-party control connected, your cylinder will ignore its schedule and will heat up when the control requests heat and will stop heating when the cylinder is satisfied. To disable the third-party control in the app, click on the Schedule tab, click on the cog icon on the top tool bar, click “Ignore automatic off-peak sense and follow schedule”.

b. If you do not have third-party control connected, it is still worth checking the above step, as it could be that the system has wrongly identified a controller might be present.

c. If the cylinder has lost internet connection and been powered off and on, it will have entered offline mode and will maintain between 40-50%.

d. If the cylinder is in vacation mode, the cylinder will not follow its schedule until the return date set on in the App.

e. If the power button on the gauge has been pressed and held, the cylinder will enter a standby mode and will not heat. Press and hold the button again to continue heating according to the set schedule.

5. Mixergy warranty statement

Please Note: To validate your warranty you must first register your cylinder. You can do this using the Mixergy App or visiting www.mixergy.io

Once registered and connected online, the Mixergy iHP comes with a **25 year warranty** on the cylinder and a **5 year warranty** on the heat pump head unit, against faulty materials or manufacture subject to the following terms:

1. Correct installation in accordance with the manufacturer's instructions and all of the relevant standards, regulations and codes of practice in force at the time plus completion of the commissioning Benchmark and checklist within the manufacturer's instructions.
2. The appliance is connected to the Mixergy online platform (via App) – this facilitates remote condition monitoring. Failure to connect the cylinder to the App will limit warranty period to 2 years.
3. Labour costs to cover any software or hardware faults is included within the scope of this warranty whereby an approved Mixergy Expert Installer has been used. This period last for 12 months, before labour costs become chargeable. A list of current approved installers can be found on our website.
4. It has not been modified in any way.
5. It has not been misused, tampered with or subjected to neglect.
6. It has only been used for the storage of potable water.
7. It has not been subjected to frost damage.
8. The unit has been serviced annually.
9. The Benchmark service record has been completed in after each annual service by the installer or the unit has been connected to the online platform through the app.
10. The warranty period starts from the date of installation
11. The extended warranty is not transferable, and rests with the original householder.
12. A public mains water supply must be used, no borehole or other water supply should be used.
13. Domestic hot water temperatures within the appliance do not exceed 55°C.
14. Installations are made only in the UK & Republic of Ireland.
15. The water supply does not have a Chloride content greater than 300ppm.

16. For commercial / heavy duty installations where constant usage / reheat is required Titanium immersion heaters must be fitted in order to comply with the warranty.

17. All peripheral components (for instance heating elements, T&P valve, expansion vessel and electronic parts) are subject to a 3-year guarantee.

Exclusions:

The effects of scale build-up, any labour charges associated with replacement of the unit or parts, or consequential losses associated with the failure of the unit.

For more information on our energy saving product range visit us at https://support.mixergy.co.uk/

mixergy

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