

zappi

eco-smart EV charge point



operation & installation manual

MODELS:

ZAPPI-32A1P1T05

ZAPPI-32A1P1T08

ZAPPI-32A1P2T05

ZAPPI-32A1P2T08

myenergi.uk

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Introduction

Thank you for choosing zappi. Of course, we think you have made an excellent choice and are sure you will be very happy with the features, benefits and quality of this myenergi product.

These instructions will help you to familiarise yourself with the zappi, by reading the instructions, you will be sure to get the maximum benefit from this 'eco-smart' device.

Safety

The device has been manufactured in accordance with the state of the art and the recognised safety standards. However, incorrect operation or misuse may result in:

- Injury or death to the operator or third parties
- Damage to the device and other property of the operator
- Inefficient operation of the device

All persons involved in commissioning, maintaining and servicing the device must:

- Be suitably qualified
- Have knowledge of and experience in dealing with electrical installations
- Read and follow these operating instructions carefully
- Always disconnect the device from the supply before removing the cover

The device is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the device by a person responsible for their safety.

Disposal

In accordance with European Directive 2002/96/EC on waste electrical and electronic equipment and its implementation in national law, used electrical devices must be collected separately and recycled in an environmentally responsible manner. Ensure that you return your used device to your dealer or obtain information regarding a local, authorised collection and disposal system. Failure to comply with this EU Directive may result in a negative impact on the environment.

Copyright

Copyright of these operating instructions remains with the manufacturer. Text and images correspond to the technical level at the time of going to press. We reserve the right to make changes. The content of the operating instructions shall not give rise to any claims on the part of the purchaser. We are grateful for any suggestions for improvement and notices of errors in the operating instructions.

Overview

Microgeneration systems such as Solar PV and small wind turbines are at their most efficient when the generated energy is consumed on-site rather than exporting it to the grid. This is what we call 'self-consumption'.

zappi is a Mode 3 charging station, compatible with all electric vehicles that comply with SAE J1772, EN62196 and EN61851 plug-in electric vehicle standards.

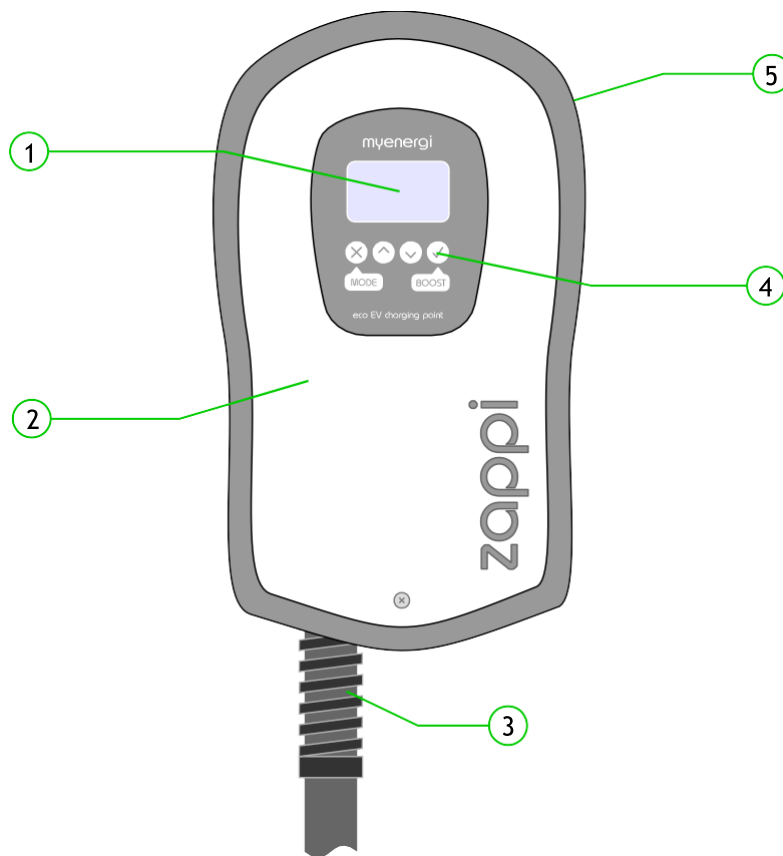
zappi works like any regular charging point but has special eco charging modes which will benefit homeowners with grid-tied microgeneration systems, like wind or solar generation. Two special ECO charging modes automatically adjust charging current in response to on-site generation and household power consumption. In FAST charge mode, zappi operates like an ordinary EV charging.





A grid current sensor (supplied) simply clips around the incoming supply cable. This sensor is used to monitor excess power and when using the special ECO charge modes, zappi automatically adjusts the charge rate in response to available surplus.

Feature Set

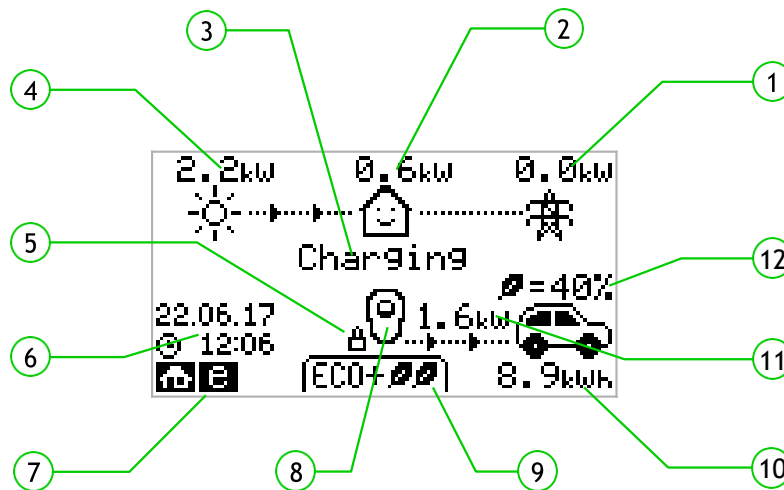
- Available with Type 1 or Type 2 connector
- 3 charging modes: ECO, ECO+ & FAST
- Optimises microgeneration self-consumption
- Works with solar PV or wind turbine systems
- Economy tariff sense input
- Programmable timer function
- Charge and event logging
- Remote control and monitoring add-on option
- Pin-code lock function
- Tap operated display backlight
- Built-in RCD protection
- Integral cable holster
- Supplied with clip-on grid current sensor

Operation Controls & Indicators






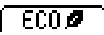

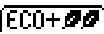














| | | |
|---|-------------------------|---|
| 1 | Display | Graphical LCD display with LED backlight <ul style="list-style-type: none"> Backlight can be activated by tapping the unit |
| 2 | Front Cover | The white front cover hides the enclosure screws |
| 3 | Tethered Charging Cable | The charging cable is 5m or 8m and is fitted with Type 1 or Type 2 plug |
| 4 | Control Buttons | Four tactile buttons used to navigate the menus and alter settings: <ul style="list-style-type: none">  Change charging Mode Exit current menu  Enter Menu Move up a menu item Increase value  Enter Menu Move down a menu item Decrease value  Boost Select item Confirm value and move to next setting |
| 5 | Integrated Cable Holder | When not in use, the charging cable should be wrapped around the unit |

Display



| | |
|-------------------------------------|--|
| <p>① Import / Export Power</p> | <p>The power being either imported or exported from or to the grid (kW). The direction of the arrows indicate if the property is currently importing power (left) or exporting power (right) The size of arrows is proportion to the level of power. When the property is neither importing or exporting power, the figure will be 0.0kW and there will no animated arrows. The property is then said to be 'in balance'</p> |
| <p>② House Load Power</p> | <p>The power that the property is currently using in kW It does not include any surplus power being sent to the heater(s)</p> |
| <p>③ Status Text</p> | <p>The current status is displayed here (see <i>Status Screens</i> page 10)</p> |
| <p>④ Generation Power</p> | <p>The power being generated at this time in kW</p> |
| <p>⑤ Lock Icon</p> | <p>Operation lock is active</p> |
| <p>⑥ Date & Time</p> | <p>The current date and time</p> |
| <p>⑦ Mode Icons</p> | <p>These icons indicate that the import limiting is active (house) or the e-Sense input is live (e)</p> |
| <p>⑧ zappi Icon</p> | <p>This zappi unit. If there are wavy lines above the icon, the unit is thermally limiting (the output power will be temporarily reduced)</p> |
| <p>⑨ Charge Mode</p> | <p>Shows the selected Charging Mode; FAST, ECO or ECO+ (see <i>Charging Modes</i> page 12)</p> |
| <p>⑩ Charge Delivered to EV</p> | <p>The accumulated charge energy that has been sent to EV in this charge session</p> |
| <p>⑪ Current Charging Power</p> | <p>When the EV is charging, arrows will show here along with the charging power in kW</p> |
| <p>⑫ Green Level of last charge</p> | <p>This is percentage of 'Green' energy for the last charge session, this is shown at the end of a charge or when the EV is unplugged</p> |

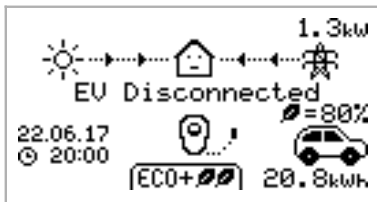
Display Icons Key

| | | | |
|---|--------------------------------------|---|--|
|  | House Consumption - Not Importing |  | Charge Mode = FAST |
|  | House Consumption - Importing |  | Charge Mode = ECO |
|  | Solar Generation Power |  | Charge Mode = ECO+ |
|  | Wind Generation Power |  | zappi Device - Normal |
|  | Grid Power - Import / Export |  | zappi Device - Too Warm (output limited) |
|  | Power Flow Direction - Small Amount |  | Import Power Limiting Active |
|  | Power Flow Direction - Medium Amount |  | Economy Tariff Electricity Available |
|  | Power Flow Direction - Large Amount |  | Current Charging Power |
|  | Waiting For Surplus Power |  | Energy sent to EV for this charging |
|  | DSR Mode Active |  | Warning - refer to text on screen |

Operation

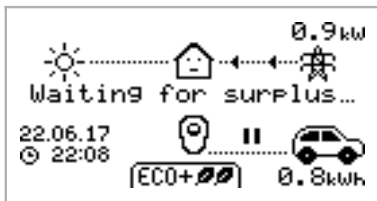
Status Screens

EV Disconnected



The EV is not connected to zappi
In this example the last charging session delivered 20.8kWh of energy to the EV and 80% of that energy came from the solar panels.

Waiting for Surplus...



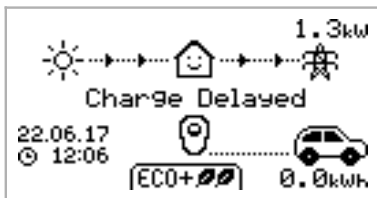
zappi is waiting for sufficient surplus power from the microgeneration system. This screen will be shown in ECO+ mode as it's only in this mode that charging will stop if there is not enough surplus power.
The house in the centre is straight-faced as grid electricity is being used by the house (0.9kW is this example).

Waiting for EV...



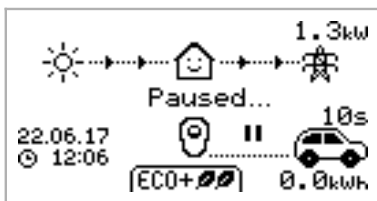
zappi is waiting for the EV to respond; the EV is not ready to accept charge.

Charge Delayed



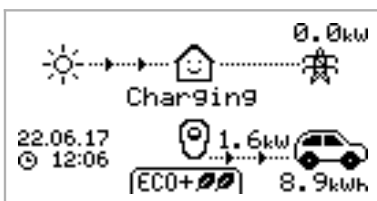
The charging session has been delayed by the EV because a schedule charge has been set in the vehicle.

Paused...



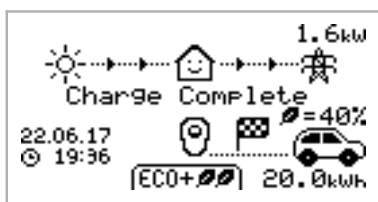
zappi is paused for a few seconds in order to limit the start/stop frequency during ECO+ mode charging.
The Start/Stop Delay can be changed in the Charge Settings/ECO+ Settings menu option.

Charging



The EV is charging.
In this example the car is charging in ECO+ mode at 1.6kW, there is no import or export from the grid (0.0kW) and the EV battery has charged by 8.9kWh since the car started.

Charge Complete



The EV is fully charged.


The charge energy used during the last charge is displayed at the bottom right (20.0kWh in this case) and the 'green contribution' is also shown (40% in this example).

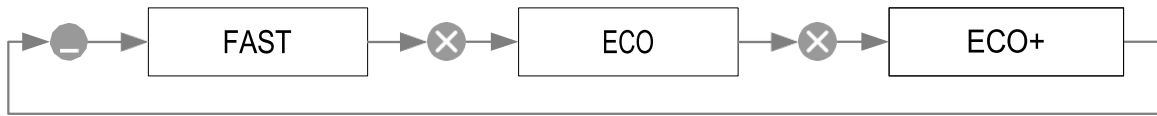
Restart...



Zappi is doing a restart sequence. This may happen with some EVs that need to be 'woken-up' to start charging after a pausing charge. Charge should start immediately afterwards, otherwise the "Charge Delayed" message will appear.

Charging Modes

zappi has three different charging modes which can be selected simply by pressing the  button when the main screen is showing. The charge mode can be changed before or during a charge.



Regardless of the charge mode used, all of the surplus electricity is used but zappi's special eco charge modes, limit the amount of grid electric used. Below is explanation of each of the three charging modes.

FAST

Charges at the fastest rate.



Fast Mode will charge the EV at the fastest rate and will import grid electricity if there is insufficient surplus generated power.

The actual charge rate is dependant on the EV's onboard charger and the grid supply voltage. Typically, vehicles have either a 3.3kW or 6.6kW charger. The actual power can be a little different if the grid supply voltage is not exactly 230V.

zappi will deliver up to 7kW provided the supply connection is suitably rated.

ECO

Adjusts the charge rate to limit the use of grid electricity.



The charge rate is continuously adjusted, in response to changes in generation or power consumption elsewhere in the home, thereby minimising the use of grid power.

Charging will continue until the vehicle is fully charged, using available surplus power.

However, if at any time, the available surplus power falls below 1.4kW, the shortfall will be drawn from the grid.

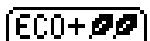
Note: The EV charging standard does not support charging below 1.4kW.

ECO+

Adjusts the charge rate to limit the use of grid electricity and will pause the charge if there is too much grid electricity being used.

The charge rate is continuously adjusted, in response to changes in generation or power consumption elsewhere in the home, thereby minimising the use of grid power.

Charging will pause if there is too much imported power, continuing only when there is enough surplus power available.



The surplus power threshold at which the charge will start or stop can be set in the ECO+ Settings option, which is found in the Charge Settings menu.

It is possible to charge the EV using only surplus renewable power, providing there is sufficient surplus power to do so. To do this, set the Min Green Level to 100%.

The Min Green Level is the minimum level for the contribution of green energy at the end of the charge. The actual green contribution for the charge, is displayed when the charge is complete or the EV is disconnected. For example: With Min Green Level set to 50%, charging will be paused if 700W of power is being imported from the grid and will resume charging when there is 700W of power being exported.


Note: The EV charging standard does not support charging below 1.4kW.

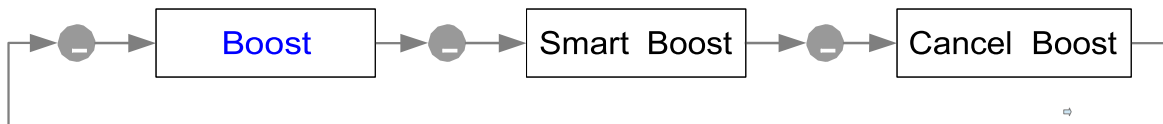
Manual Boost

The Manual Boost function can only be used when charging in ECO or ECO+ mode. When boosting, the charge rate is set to maximum (just like FAST mode), until a set amount of energy has been stored in the EV's battery. After which, zappi will revert back to ECO or ECO+ mode.


This function is useful if you arrive home with an almost flat battery and would like to charge the vehicle immediately to ensure there is enough charge for a short trip if needed.

The amount of energy (kWh s) the boost uses can be changed in the Charge Settings/Boost menu.

When in ECO or ECO+ mode, each press of the  button will cycle through the boost options as illustrated below:



Activating Boost

1. When charging in ECO or ECO+ mode, press  until BOOST is shown.
2. The boost will start after a couple of seconds and the display will show the remaining boost energy.

The boost duration can be altered (when a boost is not in progress) in the Charge Settings/Manual Boost menu option.

Cancelling Boost


The boost can be cancelled by pressing  until Cancel Boost is shown.

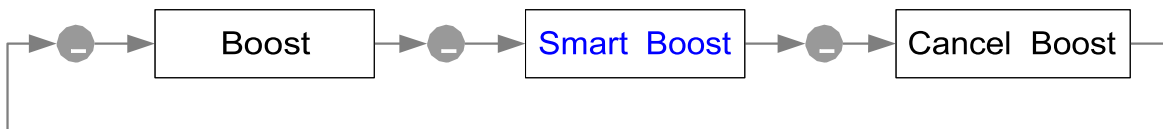
Operation

Smart Boost

The Smart Boost function will charge the EV with a minimum kWh figure by a set time. Smart Boost is available only in ECO and ECO+ modes.


- The Smart Boost function does not bring the battery to a certain state of charge. The target kWh is only the energy added during the charging session.

When in ECO or ECO+ mode, each press of the  button will cycle through the boost options as illustrated below:

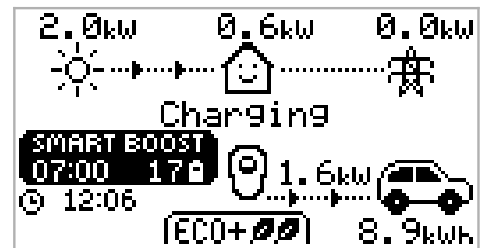


Example: It's a sunny Sunday and you wish to ensure there is enough charge in the EV to get to work in the morning (e.g. 15kWh), but in the meantime, you want to use the surplus energy from the PV system to charge the car, so you choose to use ECO+ mode. At sunset there was only 10kWh of charge accumulated. However, because you activated Smart Boost, and set the time you needed to leave for work, zappi automatically boosted the charge in the night to top up the battery to the required 15kWh by 7am.

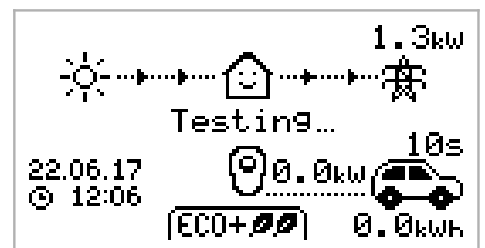
Activating Smart Boost

1. When charging in ECO or ECO+ mode, press  until SMART BOOST is shown.

2. The SMART BOOST icon will show including the set energy amount in kWhs and the target time, (17kWhs and 7am respectively, in this example screen shot).



3. zappi will then test the EV for a few seconds, to determine the maximum charger rate.



4. The boost will start at the latest possible time to achieve the set energy amount, if the current charge session has already accumulated enough energy, the boost will not be required and so will not operate.

The required energy and target time can be altered only when Smart Boost is not active. These settings are in the Charge Settings/Smart Boost menu option.

Boost Timer

When using ECO or ECO+ charge modes, zappi can be programmed to 'boost' the current charge at certain times. When boosting, the charge rate is set to maximum (just like FAST mode), regardless of the amount of available surplus power. This means that power may be drawn from the mains grid supply during boost times.

- There are four editable time slots which can be set to operate for certain days of the week.
- Setting the duration to 0h00 will make the boost inactive.

Programming Boost Times

1. From the main screen, press or to enter Main Menu
2. Select Boost Timer from within the Charge Settings menu. The BOOST TIMER screen is then shown.
3. The boost can now be edited: Use or buttons to highlight the time slot you wish to change. The screen below shows the start hour being edited:
4. Alter the start hour with the or buttons and then press to move to minutes.
5. Edit the duration in the same way and then press again to edit the days of the week you want the boost to be active for; each day of the week and by toggled on/off with or buttons, press to go to the next day. Pressing on the last day (Sunday) will confirm the boost time slot and whole line will be highlighted again.
6. Press to exit the BOOST TIMER screen.

```

      BOOST TIMER
Start Dur  Days
07:30 1h30 MTWTF--
08:00 0h15 MTWTF--
12:00 0h00 -----SS
17:00 0h00 -----SS
    
```

```

      BOOST TIMER
Start Dur  Days
07:30 1h30 MTWTF--
08:00 0h15 MTWTF--
12:00 0h00 -----SS
17:00 0h00 -----SS
    
```

Economy Tariff Boosting

Boosting only when economy rate electricity is available can be achieved in one of three ways:

1. By setting the boost timer to coincide with the economy tariff times. This option should be used only if the electricity meter is a dual-rate meter (modern meters usually are).
2. Boost only at set times AND if economy rate electric is available.
3. Automatically boost whenever the economy tariff rate electricity is available, regardless of boost times*

*Options 2 and 3 are available only when using the eSense input.

For option 1, the eSense Input in the Advanced menu should be set to Boost Timer Enable.

With the Boost Timer Enable function set, the BOOST TIMER screen will include an extra column (see screenshot). The e can be toggled on/off, if e is present, the boost will activate only when the boost times are valid and the economy rate tariff is available.

```

      BOOST TIMER
Start Dur  Days
e 07:30 1h30 MTWTF--
- 08:00 0h15 MTWTF--
- 12:00 0h00 -----SS
- 17:00 0h00 -----SS
    
```

Alternatively the eSense input can be used to active the boost whenever the economy tariff rate electricity is available, regardless of boost times (option 2). To do this, the eSense Input option in the Advanced menu should be set to Boost. When using this option, the Boost Timer is not needed.

Boost Time Conflicts

If one or more boost times conflict, the boost will follow the latest time or longest duration.

Lock Function

zappi can be locked from unauthorised operation. The Lock Function requires a pin number to be entered before the unit can be operated. The lock can be set to be active only when the EV is plugged in or only when unplugged, it can also be set to be always active.

The settings for the Lock Function can be found in the Other Settings/Lock Function menu option.

| Lock Function Setting | Description |
|-----------------------|--|
| EV plugged | The Lock Function is active when the EV is plugged in, preventing tampering with the charge session or changing any settings |
| EV unplugged | The Lock Function is active when the EV is disconnected, preventing unauthorised charging |
| Timeout | The time before the Lock Function automatically reactivates after being unlocked |
| Lock Code | This is the current lock code and is five digits from (1 to 4), it can be changed here |
| Auto Hide | If set, this will hide the main display of the zappi to keep the power readings private |

Menus

Main Menu

| Main Menu Options | | Description | |
|-------------------|----------------|------------------------|--|
| Charge Log... | Today... | Log of charge sessions | |
| | Yesterday... | | |
| | Week... | | |
| | Month... | | |
| | Year... | | |
| | Total... | | |
| Event Log... | Today... | Log of events | |
| | Yesterday... | | |
| | Week... | | |
| | Custom Date... | | |
| Readings... | READINGS 1/4 | Status: | Current status of the unit |
| | | Exporting/Importing: | Power being imported or exported, from or to the grid respectively |
| | | Charge Power: | Power level in Watts being supplied to the EV |
| | | Pilot (PWM): | Control Pilot PWM |
| | | Charge Current: | AC current supplied to the EV |
| | | Unit Temp: | Internal temperature of the zappi unit |
| | READINGS 2/4 | Voltage: | Supply voltage to the unit |
| | | Voltage Max: | Maximum supply voltage since switch-on |
| | | Voltage Min: | Minimum supply voltage since switch-on |
| | | Frequency: | Grid frequency |
| | | Exporting/Importing: | Power being imported or exported, from or to the grid respectively |
| | READINGS 3/4 | Exporting/Importing: | Power being imported or exported, from or to the grid respectively |
| | | Generation: | Power from the generator (if available) |
| | | Consumption: | Power consumed by the house (if available) |
| | | Diverting: | Total diverted power (inc. all devices) |
| | | Charge Power: | Current power being supplied to the EV |
| | | Charge Energy: | Energy supplied to EV during current charge session |
| | | Charge Time: | Duration of current charge session |
| | Information... | INFORMATION 1/2 | Status: |
| Serial No: | | | Serial number of the unit |
| Firmware: | | | Firmware version installed in the unit |
| Assembled: | | | Factory assembly date |
| Cal Date: | | | Calibration changed date |
| Power Fail: | | | Time and date of last supply failure |
| INFORMATION 2/2 | | Grid Sensor: | Grid current sensor source |
| | | Signal Quality: | RF signal reception quality |
| | | Last Fault: | Last recorded fault code |
| | | Fault Date: | Date and time of last recorded fault code |
| INFORMATION 3/3 | | Network ID: | Network information for this device when linked to other devices using RF network (EU Models only) |
| | | Device Address: | |

Menus

| Main Menu Options | | Description | | |
|--------------------|--------------------|--|--|--|
| | | Master Address: | (Only shows if connected to other devices) | |
| | | Channel: | | |
| | | EUI: | | |
| Charge Settings... | ECO+ Settings... | Min Green Level: | ECO+ charge mode settings. See <i>Charging Modes</i> page 12 | |
| | | Start/Stop Delay: | | |
| | Manual Boost... | | Manual Boost settings. See <i>Manual Boost</i> page 13 | |
| | Smart Boost... | | Smart Boost settings. See <i>Smart Boost</i> page 14 | |
| Boost Timer... | | Programmable boost times. See <i>Boost Timer</i> page 15 | | |
| Other Settings... | Time & Date... | Time: | Set current time in 24 hour format | |
| | | Date: | Set date in Format (see below) | |
| | | Format: | Sets the date format | |
| | | Auto DST: | Automatic Daylight Saving Time adjustment | |
| | | DST Zone: | Set zone for Daylight Saving Time | |
| | Display & Sound... | Language... | | Set language for the main screen and menus |
| | | Icons... | Generation: | Generation icon can be sun or wind |
| | | | Monitoring: | If the is on generation on-site then generation monitoring can be switched off |
| | | Backlight... | | Set the duration the display backlight remains on after a button press |
| | | Contrast... | | Set the display contrast |
| | | Set Buzzer: | | Switches ON or OFF the buzzer for button presses and mode changes |
| | Lock Function... | EV plugged: | | Lock is active only when EV is plugged in |
| | | EV unplugged: | | Lock is active only when EV is unplugged |
| | | Timeout: | | Length of time for the lock to reactive after unlocking |
| | | Lock Code: | | The lock code can be changed here |
| | | Auto Hide: | | Hide the main screen when zappi is locked |
| | Advanced... | | Advanced menu and settings (passcode protected) | |

Advanced Menu

| Advanced Menu Options | | Description |
|-----------------------|--------------------|--|
| Supply Grid... | Phase: | Set the supply phase to use for this device – see <i>Advanced Settings</i> page 21 for more information |
| | Device Limit: | Set the maximum available supply current to be drawn by the zappi – see <i>Advanced Settings</i> page 21 for more information |
| | Export Margin: | Minimum level of export power which is maintained when zappi is diverting surplus power – see <i>Advanced Settings</i> page 21 for more information |
| | Grid Limit: | Maximum grid import power limit. When charging, the charge power is reduced to keep import below this level. This also applies when boosting – see <i>Advanced Settings</i> page 21 for more information |
| | Battery: | Sets the mode for managing power when a battery system is present in the installation. See <i>Battery Storage Systems</i> (page 32) for more information. |
| | Net Phases: | When set to ON will net the imports and exports across phases allowing surplus power from one phase to be used on a different phase. – see <i>Advanced Settings</i> (page 21) for more information. |
| CT Config... | CTINT: | Internal CT, used to configure a group limit. See <i>Load Balancing/Current Limiting</i> (page 32) for details. |
| | CT1: | Set the function of CT1 input See <i>CT Config</i> (page 22) for more details. |
| | CT2: | Set the function of CT2 input See <i>CT Config</i> (page 22) for more details. |
| eSense Input... | Disabled | eSense input is disabled |
| | Boost | If the eSense input is live, zappi will boost the charge – see <i>eSense Input</i> page 23 |
| | Boost Timer Enable | zappi will boost the charge if eSense is live AND the boost timer is set to operate at that time. see <i>eSense Input</i> page 23 |
| Compatibility... | PF Responsive: | zappi will adapt to EV's with poor power factor (e.g. Renault Zoe). |
| | Min PWM: | Control Pilot PWM minimum limit |
| | Power Factor: | When PF Responsive is ON, the measured power factor must be better than this set value to enable lower charging current set by Min PWM |
| | End Charge Delay: | Charge Complete status is delayed by this time to allow access to the vehicle without starting a new charge session |
| | Infinite PWM: | Keeps zappi ready to restart charge after charge is complete – this is needed on some EV's when the user wants to preheat the vehicle in morning |
| Menu Passcode... | | The code required to access the Advanced menu |

Menus

| Advanced Menu Options | | Description | |
|-----------------------|---------------------|--------------|---|
| System... | Restore Settings... | Erase Config | Restore the configuration to factory default |
| | | Erase Data | Clear all data from memory |
| | | Erase ALL | Restore configuration to factory default and erase all data |
| | | Confirm | Confirm restore options and re-boot device |
| | Download Firmware | | Downloads latest firmware from hub |
| | Bootloader | | Enter Bootloader mode |

Configuration Settings

All settings are described in the *Main Menu* section, however, the more commonly altered settings are described in more detail below.

Time & Date

The date and time are used for the Boost Timer and the savings calculations and therefore should be set correctly.

In the event of a power-cut, zappi will still keep track of the time and date for a few days, so when power is restored the clock will not need to be reset.

Time is always in 24-hour format but the date format can be changed.

zappi will automatically adjust the clock for Daylight Savings Time (DST) as long as Auto DST is enabled and the correct time zone is selected.

Icons

The heater icons shown on the main screen can be individually set for both heater outputs. This gives an installation specific, graphical representation which heater is active. For example; Heater 1 could be a hot water cylinder and Heater 2 could be a radiator. This function can be accessed via the Settings/Display/Icons menu.

As well as being able to customise the heater icons, it's also possible to change the generation type from solar to wind.

Advanced Settings

The Advanced Settings menu is passcode protected and only provided to installers.

Supply Grid - Device Limit

Sets the maximum current that the zappi will draw (including when boosting and FAST mode). This is useful if the supply current is limited, like a 16A rather than 32A.

Supply Grid - Grid Limit

Sets the limit that can be drawn from the grid connection (i.e. the maximum import current or the main fuse rating).

Example: A property may have a grid supply limit of only 65A, several appliances are on and the property is consuming 12kW (52A) by other appliances and the user wants to charge in FAST mode. Without the Grid Limit set, the total consumption would exceed the allowed import current. However, with a Grid Limit setting of 60A, zappi would temporarily limit the charging current to 8A (about 1.8kW) and the maximum allowed import current would not be exceeded.

Supply Grid - Battery

If the property has a static AC battery system installed, it's possible to get the zappi to work in harmony with the system, provided a CT has been installed to monitor the battery inverter.

See *Battery Storage Systems* (page 32) for more information about battery storage systems.

The table below details the different settings for working with an AC coupled battery storage system:

Configuration

| Setting | Function description |
|--------------|--|
| None | There is no battery system installed. |
| Limit to Gen | Will limit the output of the zappi (except when boosting), to prevent unwanted draining a AC coupled battery system. This setting does not require a CT to monitor the battery, but does need a CT to monitor the solar/wind generation. Note: This setting is to support legacy installations – it is preferable to install a CT to monitor the battery and use one of the settings below. |
| Avoid Drain | Stops the zappi (or other linked myenergi devices) draining the battery when using surplus power from the solar or wind generator. |
| Avoid Charge | Effectively allows the zappi (or other linked myenergi devices) to take priority over the battery when charging from solar or wind generation. |
| Avoid Both | Provides both of the above functions. |

Supply Grid - Export Margin

This sets a minimum level of export power which is maintained when zappi is charging in ECO or ECO+ modes.

Normally Export Margin would be set to 0W (zero Watts) and all of the available surplus will be used to charge the vehicle, however, it may be desired to have a minimum export level at all times.

CT Config

The CT1 and CT2 inputs are configured depending on the connected CT sensors. The internal CT which measures the output current also has some settings.

Important: There must be only one Grid CT set (per phase) for the whole installation.

| CT | Description |
|------|--|
| CTIL | This is the internal CT which measures the output (charging) current of the zappi. |
| CT1 | CT1 input. |
| CT2 | CT2 input. |

| CTType | Description |
|-----------------|--|
| None | No CT connected. |
| Grid | Grid CT monitors the import and export power of the property, this is main control CT and there must only be one Grid CT set for each phase. |
| Generation Only | Monitors Solar PV or Wind generation. |
| Storage Only | Monitors a device that can 'store' energy (e.g. a third-party energy diverter) and enables the zappi to take priority over it. The power used by the third-party device is considered as surplus power unless the device is intentionally using grid power (i.e. it is boosting). The CT should be installed on the Live supply cable feeding the diverter, with the arrow pointing away from it. |
| Gen & Battery | Monitors Solar PV or Wind generation that is combined with a DC-coupled battery. |

| | |
|------------|--|
| Monitor | Monitors any load, for example a washing machine or the lighting circuit. This setting can also be used to limit current drawn by myenergi devices on a particular circuit which includes other loads. See <i>Load Balancing / Current Limiting</i> (page 32) for more details. |
| AC Battery | Used to monitor an AC-coupled battery. With this setting it's possible to manage the distribution of surplus energy between the battery and the zappi (including myenergi devices). The Battery setting in the Supply Grid menu is used to configure how the zappi will operate alongside the battery system. See <i>Battery Storage Systems</i> (page 32) for more information. The CT should be installed on the Live supply cable of the battery inverter/charger, with the arrow pointing away from it. |

CT Groups

CTs can be put in groups so that their readings are netted. For example, you might want to monitor two solar PV systems and see the total generation on the display. Use Group in the CT Config menu to set which group the CT should be in.

Note: Different CT Types cannot be in the same group, the group names make this clear.
Only the first 4 groups can be used for current limiting, see Group Limits below.

Group Limits

Current limits can be set for certain CT Groups. When a Group Limit is set the myenergi devices in the group will limit the power they draw to keep within the set limit.

Group limits should be set only on the *master* device. See *Linking Devices* (p24) for details about *master* devices.

It is possible to use more than one group limit type (e.g. IL1 with MN1, so that there are two conditions for limiting).

| Group Limit example | Additional CT installed | CT config (all devices) |
|---|--|--|
| Limit current drawn by two zappi devices that are on the same 32A supply. | None; only the internal CTs are used. | CTIL Type: Internal Group: IL1 Group Limit: 32A |
| Limit current drawn by an zappi device that is fed from a 32A supply which is also feeding another appliance (e.g. a tumble dryer). | One CT is clipped around Live of the 40A supply and wired to CT2 of the zappi. | CT2 Type: Monitor Group: MN1 Group Limit: 32A |
| Limit current drawn by two zappi devices that are in a garage which is fed from a 40A supply. A washing machine and dryer are also in the garage. | One CT is clipped around Live of the 40A supply to the garage and wired to CT2 of one of the zappi units. Note: The other zappi does not need to have a CT connected, but it will still need to have a CT input configured to be in the same Monitor group. | CT2 Type: Monitor Group: MN1 Group Limit: 40A |

eSense Input

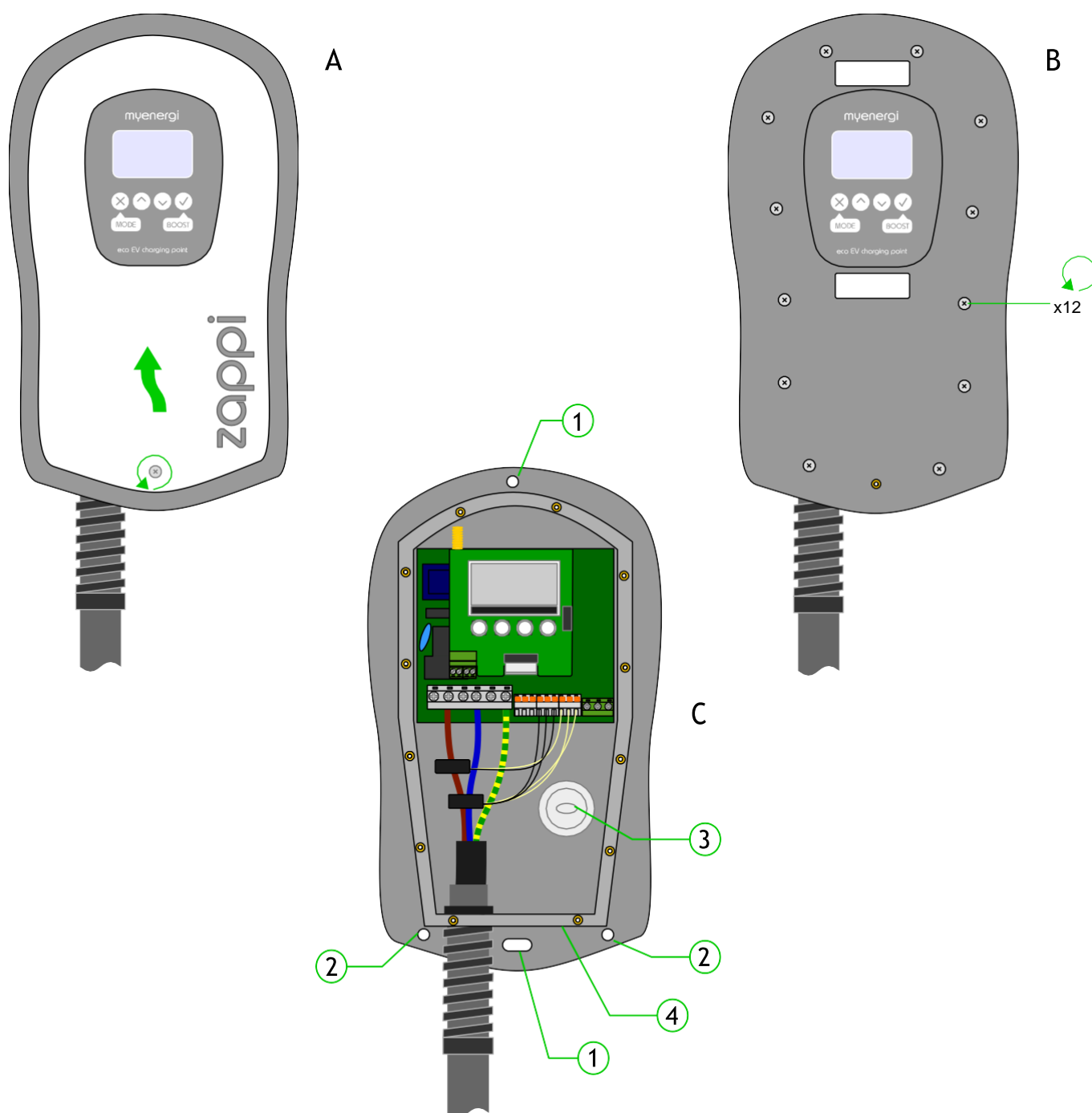
The eSense input can be configured to automatically activate a Boost during ECO or ECO+ charging, whenever economy tariff electricity is available. The eSense input must be wired to a circuit which is live during the economy tariff times for this to function. See *eSense Input (economy tariff)* page 34 for wiring details.

| eSense Setting | Description |
|--------------------|---|
| Disabled | eSense input is ignored |
| Boost | If the eSense input is live, zappi will boost the charge |
| Boost Timer Enable | zappi will boost the charge if eSense is live AND the boost timer is set to operate at that time. see <i>Economy Tariff Boosting</i> page 15 |

Installation Mounting

1. Remove the white front plate by unscrewing the M3 screw at the bottom and sliding it upwards before lifting it away.
2. Unscrew the 12 M4 screws now exposed and lift off the enclosure cover.
3. Offer the unit up to the wall and mark the holes for drilling. If fixing to a timber stud wall, you can use the two central vertically aligned fixing points (1) to screw the enclosure directly into the timber. The two additional mounting points (2) can be also be used if desired.

The supply cable entry can be via the rear grommet (3) or by drilling the enclosure at the bottom right (4) and using a suitable cable gland.

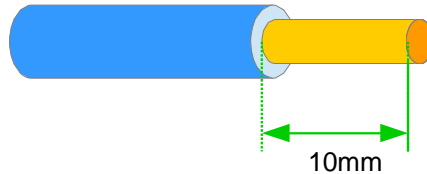


Wiring

Warnings

- WARNING! An electric shock can be fatal; electrical connection work may only be carried out by a competent person
- The earth conductor must be correctly installed and reliably connected
- This device must be equipped with an over-current protection device of maximum 40 Amps (B40)

Strip Length



Overview Diagram

The diagram on the following page gives an overview of the basic wiring with respect to the grid supply and the microgeneration system.

Supply

The zappi device should be connected to a single-phase 230V or 240V nominal AC supply. The supply should be from a dedicated 32A or 40A circuit breaker.

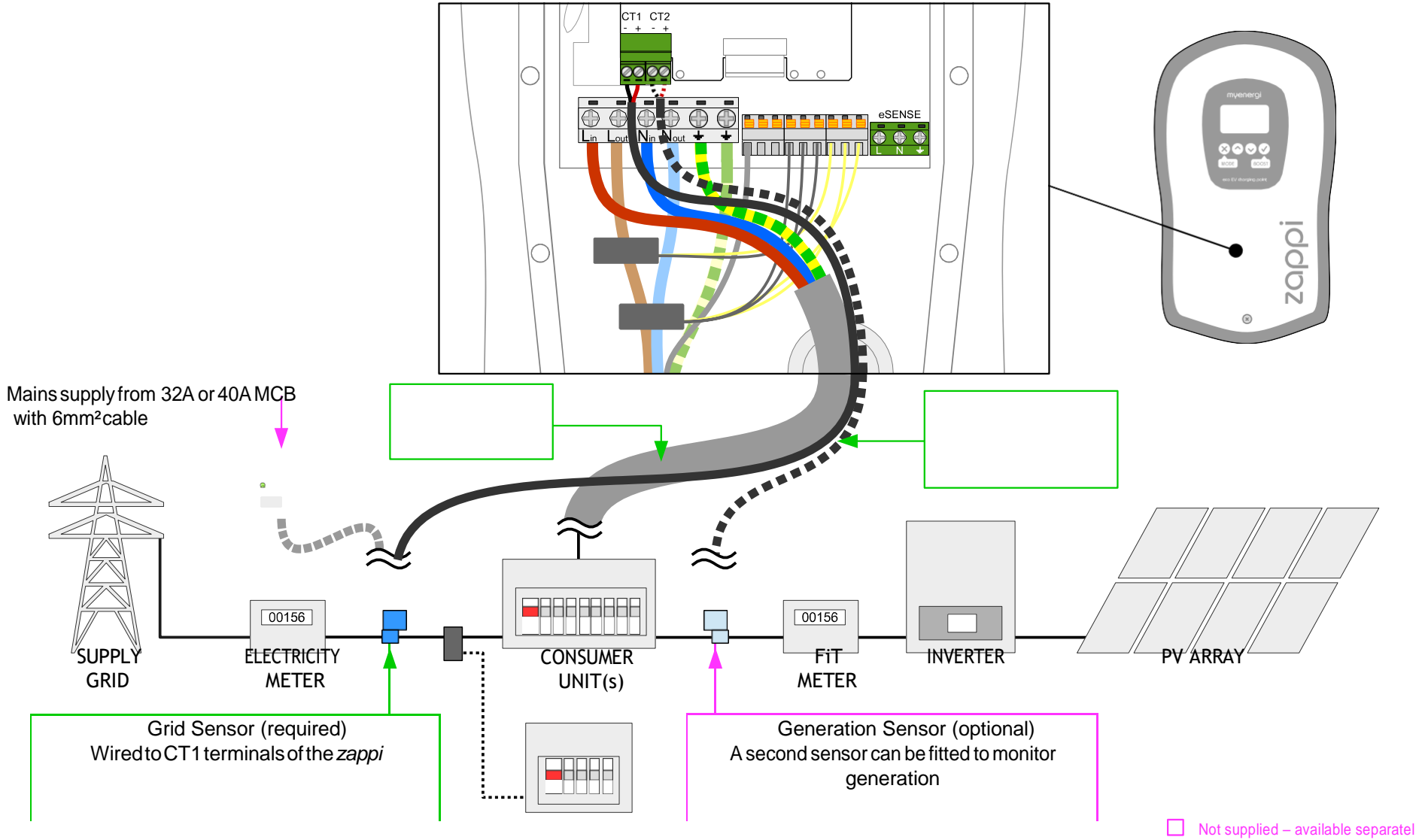
Earthing

The unit must be earthed in accordance with local regulations, e.g. It may be a requirement to install an Earthing rod if the supply is PME.

Cable Entry

There is a grommet in the rear of the unit for through-wall cable installation. If however, the supply and/or sensors cables are surfaced mounted, there is space at the bottom right-side of the enclosure to drill holes for the cables. It is essential that correctly sized cable glands with a minimum IP65 rating are used.

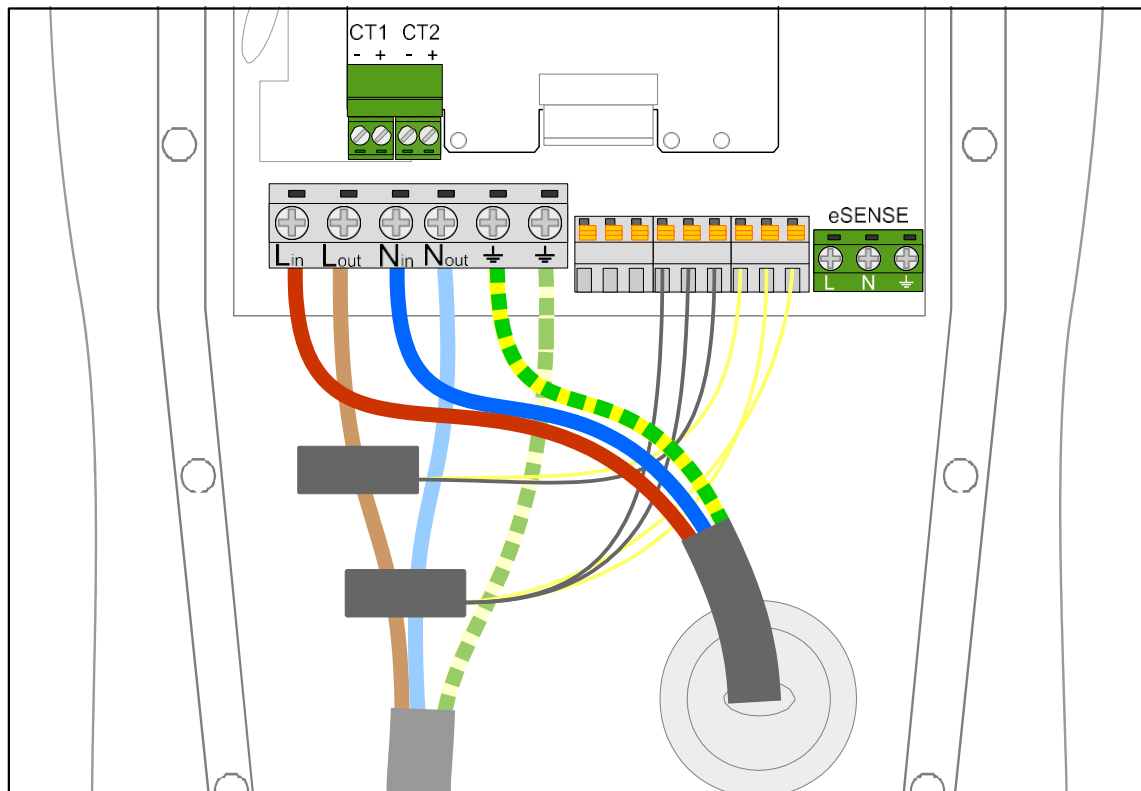
Wiring Overview Diagram



Supply Connection

The zappi device should be connected to a single-phase 230V or 240V nominal AC supply. The supply should be from a dedicated 32A or 40A circuit breaker.

zappi features an integral 30mA Type-A RCD, therefore an RCD protected supply is not required unless local regulations state otherwise.



Installation

CT Sensor Installation

Current Transformers (CTs) are used to measure current at various places of the installation. For example, the Grid connection point, the solar/wind inverter or a static battery system.

Installation of a CT to monitor the Grid connection point is required. Other CTs are optional and can be purchased separately. The number and location of CTs used within an installation will vary according to devices installed and the user requirements.

CTs can be wired to any myenergi device with CT inputs. This enables very flexible installation as the CT can be wired to the nearest device.

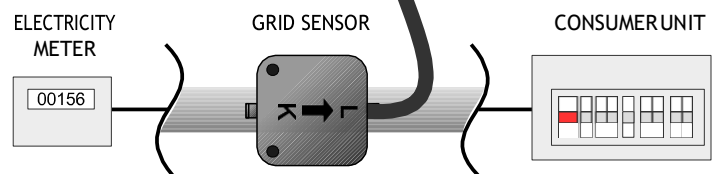
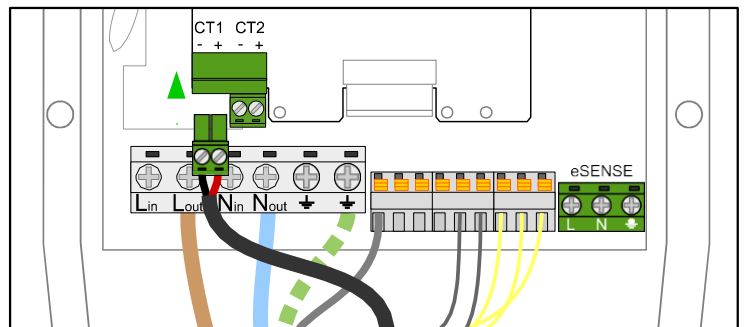
Once installed the CTs need to be configured, see *CT Config* (p22) for details of how to configure the CTs.

Grid CT

The Grid CT sensor (supplied) needs to be clipped around either the Live or Neutral meter tail of the electricity supply meter. If using the Neutral conductor, reverse the direction of the sensor (so the arrow is reversed).

The positioning of the Grid CT sensor is crucial, take note of the following when deciding where best to install the sensor:

- ✓ Can be connected to any myenergi device with a CT input
- ✓ ALL of the import and exported power must be 'seen' by the sensor – be sure to install it upstream of ANY junction box or 'Henley Block' (the CT can be fitted inside the consumer unit).
- ✓ There must be only one Grid CT per-phase for the whole installation. (There can be other CTs but only one at the grid connection point, also note CTs for third-party devices do not matter).
- ✓ The CT should be on the Live or Neutral cable.
- ✓ The arrow on the bottom of the CT sensor must be pointing towards the consumer unit (in the direction of grid import) if on the Live cable, or reversed if on the Neutral cable.
- ✓ Ensure the CT is fully closed and clicks shut.
- ✓ Be sure to wire the CT the correct way round; black [-], red [+] otherwise import and export readings will be swapped.



Reverse if on Neutral cable

Additional CTs

There is an option to add other CT sensors (available separately) for monitoring the generation or other appliances such as battery systems or general loads. Installing a CT for the generator (PV system) will allow the main screen to show the generated power and the total power consumption of all the other appliances in the property.

CTs can also be used to limit the power drawn from the supply. See *Load Balancing / Current Limiting* p32.

- ✓ Additional CTs Can be connected to any myenergi device with a CT input that is linked to the network (see *Linking Devices* p24).
- ✓ The arrow on the bottom of the sensor must be pointing in the direction of normal power flow (e.g. away from the PV inverter) if on the Live cable or reversed if on the Neutral cable.
- ✓ Ensure the sensor is fully closed and clicks shut.
- ✓ Be sure to wire the CT the correct way round; black [-], red [+].

CT Golden Rules

Grid CT

- Only ONE Grid CT per phase (check for only one ~ symbol in Linked Devices Info).
- Located to 'see' ALL import and ALL export current (i.e. always upstream of any junction box).
- Arrow pointing in direction of import (e.g. towards consumer unit if on Live cable).
- Must be on the same phase as the Master myenergi device.

All other CTs

- Arrow should point towards the consumer unit.

CT can dos

- ✓ Can be wired to ANY myenergi device in the network.
- ✓ Cable can be extended up to 100m (must use twisted-pair cable e.g. one pair of CAT5).
- ✓ Cable can be shortened.
- ✓ Can be clipped around two or more conductors feeding appliances of the same type (e.g. two Live cables from two inverters that are on the same phase).
- ✓ Can be in close proximity to other CTs.
- ✓ Wires can be swapped around in device to reverse the direction of the readings (e.g. change import to export).
- ✓ Can be grouped with other CTs of the same type so that the power reading is summed (e.g. east and west solar Generation).
- ✓ Can be used on the Neutral conductor (direction of arrow or wires must be reversed).
- ✓ Can be set to None if you want to exclude the reading.

Advanced Installation Options

Load Balancing / Current Limiting

CTs can be also used to the limit current drawn by myenergi devices to avoid overloading circuits. this is sometimes referred to as load balancing. There are four different ways to limit current and they can be used alone or combined for more complex situations. See the table below:

| Function | Operation | Example |
|--------------------------------|---|---|
| Device Limit | Sets a maximum current that can be drawn by the device (e.g. zappi). The current will not be exceeded even during Boost or Fast charge. | A zappi is wired to a 20A supply (rather than a 32A). The maximum current drawn will not exceed the set limit (e.g. 20A). |
| Grid Limit | Sets the limit that can be drawn from the grid connection (i.e. the maximum import current). The zappi and any other linked myenergi device, will limit the current they draw if there is a danger of exceeding the set Grid Limit. | A property may have a grid supply limit of only 65A, several appliances are on and the property is consuming 12kW (52A) by other appliances and the user wants to charge in FAST mode. With a Grid Limit setting of 60A, zappi would temporarily limit the charging current to 8A (about 1.8kW) and the maximum allowed import current would not be exceeded. |
| Group Limit (internal CT) | Sets the combined current limit for several myenergi devices. | A property has a large PV array and a swimming pool, three eddi units are installed to heat the pool with surplus solar power using 3kW heaters. The supply for the eddi units is only 40A, to be safe a Group Limit of 35A is set. |
| Group Limit (with external CT) | Sets the combined current limit for several myenergi devices that are sharing a supply with another large appliance. | An eddi is installed to heat the hot water cylinder in a garage which also has a washer and a dryer (2.5kW each), the garage has a supply of only 32A coming from the main consumer unit in the house. If all appliances were on and there was no limiting set, the total current would exceed the maximum supply current. |

Battery Storage Systems

AC coupled

Where there is an AC coupled battery storage system, there can be a conflict as both the storage system and the zappi are effectively competing to consume the surplus energy. Whilst this is not necessarily an issue, the results can be somewhat unpredictable.

There is the option to add an additional CT sensor to monitor the battery storage; this will give control as to which device has priority. This additional CT sensor should be wired to one of the CT terminals of the zappi This CT should be clipped around the live or neutral cable of battery inverter.

During the setup process it will be necessary to change the setting for the appropriate CT to AC Battery; refer to *CT Config* (page 22) . Also refer to *Supply Grid– Battery* (page 21) . for information on setting 'priority' of battery systems.

DC coupled

Battery systems that charge directly from the solar array and cannot change from AC are usually referred to as being DC coupled. This type of battery system uses the solar PV inverter to provide power from the batteries, thus it is not possible to differentiate between solar and battery power when using a CT to measure the AC current from the inverter.

Because of this limitation, there are less options for managing the surplus power with this type of battery system. However it is usually possible to effectively give priority to battery by setting an Export Margin in the zappi. A setting of 50W or 100W is recommend. The Export Margin setting is found in the Advanced Settings/Supply Grid menu.

Third-Party Diverters

Some properties may have a third-party energy diverter installed and you may want the zappi to take priority (when consuming surplus power) over the diverter. This is possible by installing an extra CT to monitor the diverter.

The CT should be clipped around the Live cable of the supply feeding the diverter. The arrow on the CT should be pointing away from the diverter. Wire the CT to the nearest myenergi device


Configure the CT Type as Storage Only. See *CT Config* (page 22) for details of how to configure CTs.

Voltage Optimisers

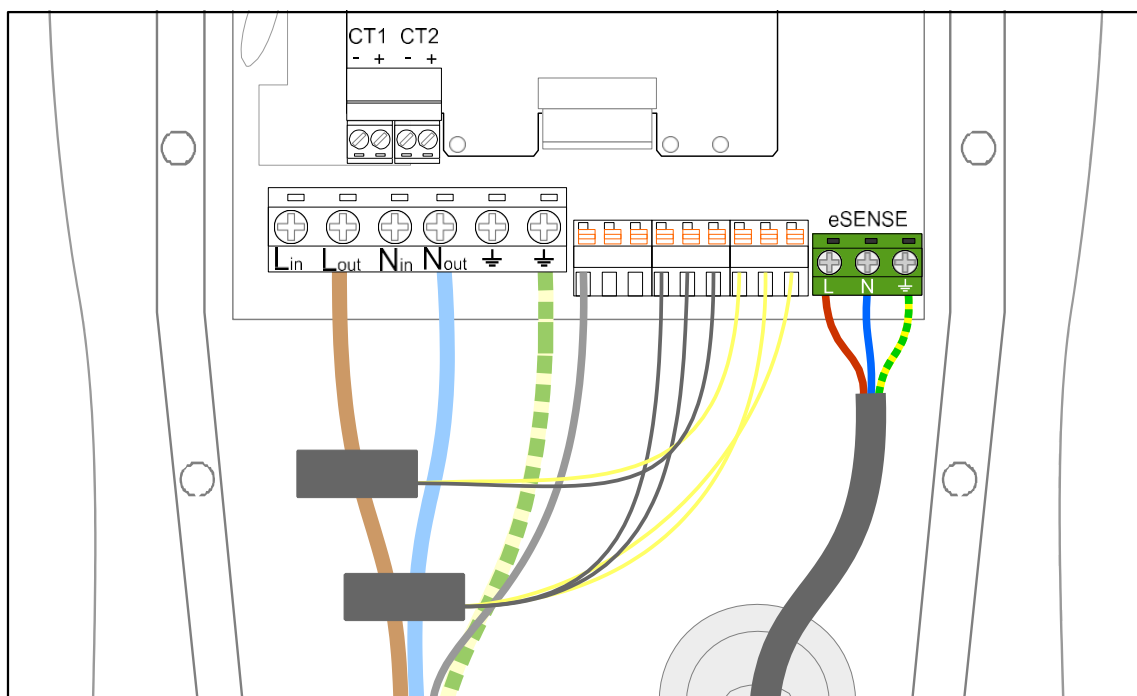
If there is a voltage optimiser (VO) installed in the property, the CT sensor and the zappi must both be on the same side of the VO; either the incoming grid supply or the optimised supply.

eSense Input (economy tariff)

zappi has an input which can be used to sense the availability of economy tariff electricity, this can be used to automatically boost the charge when in ECO or ECO+ charging modes.

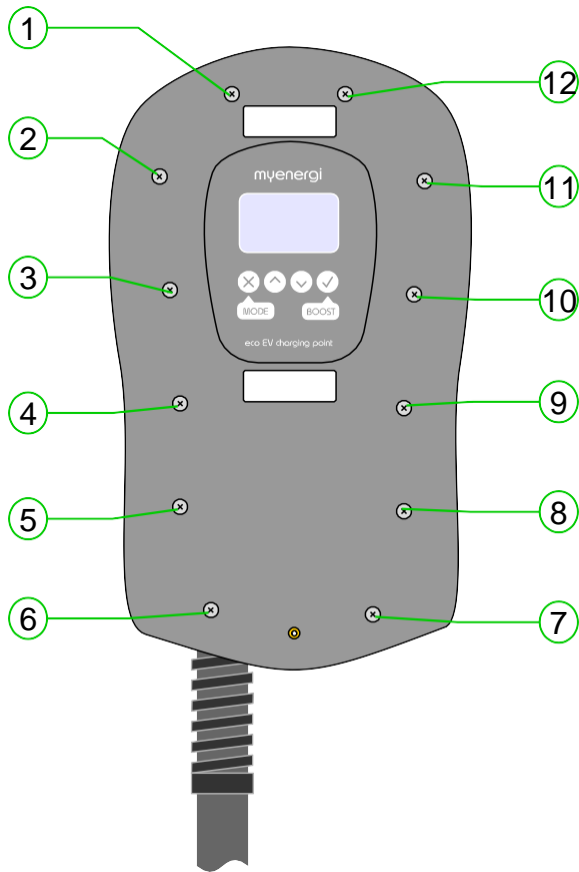
The eSENSE input is electrically isolated and effectively draws no current so the cable size is not important. An AC voltage between 100V and 260V across the L and N terminals of the eSENSE input cause the economy tariff symbol  to be shown on the main screen. The eSENSE Earth terminal is not required to be connected.

See *eSense Input* on page 23 for details of how to configure the eSENSE input.



Fitting the Cover

1. Refit the cover and secure with ALL twelve of the M4 screws. It is best to screw these by going around in sequence shown without skipping any holes.
2. Slot the white cover down onto the unit and secure with the M3 screw at bottom.



Setup

Switching On

After completing and checking the wiring of the supply, the sensor(s), switch on the zappi via the circuit breaker. zappi will start-up and the main screen will be presented after a few seconds.

Testing

Before leaving site, it is wise to perform a few checks to ensure that the sensors have been correctly installed and are functional.




1. Check that the time and date are correct and displayed at the bottom left of the main screen. If they are not present or are incorrect, set the correct time and date in the Other Settings/Time & Date menu option.
2. Check that the EV will charge in FAST mode.
3. Check the Grid Power reading at the top right of the main screen is showing sensible readings and the direction of power flow is as expected.
4. With the EV plugged in, switch to ECO mode charging and check that the charge power is at minimum (about 1.4kW) OR that it is 'tracking' the surplus power (i.e. the Grid Power reading is 0.0kW)
5. If a Generation Sensor has been installed, check that the generated power is shown at the top left of the main screen. If the generation reading is missing, the most likely cause is the CT2 input is not enabled – see *CT Config* on page 22.

Troubleshooting

| Symptom | Cause | Solution |
|---|---|--|
| Display is blank | - There is no power to the unit | - Check for correct supply voltage at the supply screw terminals (220 - 260V AC) |
| In ECO+ mode, the charge does not start, the display is always showing Waiting for Surplus and the export power is 0W | - Grid Sensor incorrectly installed - Faulty Grid Sensor | - Check the grid sensor is connected to CT1 terminals of the zappi - Check the Grid CT sensor is installed on the correct cable (see <i>Grid CT</i> page 30) - Check resistance of the sensor - it should be around 200 Ω when not connected (remove the sensor from the cable before testing resistance) - (under Devices in the zappi menu) |
| In ECO+ mode, the charge does not start, the display is always showing Waiting for Surplus, yet the export power is showing correctly | - Export Margin set too high | - Check Export Margin setting (default is 0W) |
| Generation power is always 0.0kW | - Generation sensor not installed | - Install generation sensor and connect to CT2 input - Alternatively, the Generation and House consumption figures can be hidden on the main screen by setting CT2 Input in the Advanced Settings menu to OFF |

Faults

If any of the following fault messages are displayed, follow the action described. However, if the problem persists, stop using zappi and call your installer or your local technical support.

| Displayed Message | Description | Action |
|-------------------|---|---|
| Ground Fault! | The internal Earth leakage protection has tripped | Unplug from the EV and press and hold the  button to reset the unit |
| Over Current! | The EV is drawing too much current – the output is switched off | Unplug from the EV and press and hold the  button to reset the unit |
| Overheating! | The zappi unit is too hot – the output is switched off | Unplug from the EV and press and hold the  button to reset the unit Allow the unit to cool down before attempting to charge again |

Warranty

Subject to the provisions described below, this product is protected for three (3) years from the date of purchase against defects in material and workmanship.

Prior to returning any defective product to myenergi, the end customer must report the faulty product to myenergi by either emailing myenergi at support@myenergi.uk or calling myenergi on +44 (0)333 300 1303. If myenergi agrees that the product should be returned, it will issue a Return Merchandise Authorisation (RMA) number, the RMA must be clearly marked on the packaging of the product to be returned. myenergi may arrange collection at its discretion, otherwise the customer should return the product at their own cost.

Should the product fail to perform as described within the relevant warranted period as set out above, it will be repaired or replaced with the same or functionally equivalent product by myenergi, at its discretion, free of charge provided the end customer: (1) returns the failed product to myenergi with shipping charge prepaid, and (2) provides myenergi with proof of the original date of purchase. Returned or replacement products will be returned to the end customer with shipping charges prepaid.

Replacement products may be refurbished or contain refurbished materials. If myenergi, by its sole determination, is unable to repair or replace the defective product, it will refund the depreciated purchase price of the product.

The warranty does not apply if, in the judgement of myenergi, the product fails due to damage from shipment, handling, storage, incorrect installation, accident, inappropriate use or cleaning of the product, relocation of the product after its first installation, abuse, misuse, or if it has been used or maintained in a manner not conforming to product manual instructions, has been modified in any way, or has had any serial number or other identification markings removed or defaced.

Repair by anyone other than myenergi or an approved agent will void this warranty.

All defective products should be returned to myenergi with shipping charges prepaid, unless myenergi have arranged collection at its own cost.

Nothing in this agreement will affect the end customer's statutory rights or limit or exclude myenergi's liability for (1) death or personal injury caused by its negligence, or the negligence of its employees, agents or subcontractors (as applicable), (2) fraud or fraudulent misrepresentation; (3) defective products under the Consumer Protection Act 1987; or (4) any matter in respect of which it would be unlawful for myenergi to exclude or restrict liability.

The maximum liability of myenergi under this warranty is limited to the purchase price of the product covered by the warranty.

myenergi only supply products for resale for domestic and private use. myenergi accept no liability for any commercial, business or re-sale purpose by the end customer, and myenergi accept no liability to the end customer for any loss of profit, loss of business, business interruption, or loss of business opportunity.

Technical Specifications

Performance

| | |
|----------------------------|---|
| Mounting Location | Indoor or Outdoor (permanent mounting) |
| Charging Mode | Mode 3 (IEC 61851-1 compliant communication protocol) |
| Display | Graphical backlit LCD |
| Charging Current | 6A to 32A (variable) |
| Grid Import Power Limiting | Adjustable up to 100A (optional setting to limit power drawn from the grid) |
| Charging Profile | 3 charging modes: ECO, ECO+ and FAST |
| Connector Type | Type 1 or Type 2 tethered cable, 5m or 8m |
| Compliance | LVD 2014/35/EU, EMC 2014/30/EU, EN 61851-1 & 22, EN 62196, CE Certified |

Electrical Specifications

| | |
|----------------------------|--|
| Rated Power | 7kW |
| Rated Supply Voltage | 230V AC Single Phase (+/- 10%) |
| Supply Frequency | 50Hz |
| Rated Current | 32A max |
| Standby Power Consumption | 1W |
| Earth Leakage Protection | Integral 30mA RCD (Type A) |
| Thermal Protection | Output current thermally limited if unit temperature is > 85°C |
| Over-current Protection | >35A for 1 second |
| Economy Tariff Sense Input | 230V AC sensing (2.5kV isolated) |
| Grid Current Sensor | 100A max. primary current, 16mm max. cable diameter |
| Supply Cable Entry | Rear or bottom option |

Mechanical Specifications

| | |
|-----------------------|--|
| Enclosure Dimensions | 362 x 220 x 78mm |
| Cord Length | 5m or 8m |
| Protection Degree | IP65 (weatherproof) |
| Enclosure Material | ABS 6&3mm (UL94 flame retardant) colours: white RAL9016 and grey RAL9006 |
| Operating Temperature | -30°C to +50°C |
| Fixing Points | In-line vertical mounting holes |

Model Variants

| MODEL | Connector Type | Cable Length |
|-----------------|------------------|--------------|
| ZAPPI-32A1P1T05 | Type 1 (J1772) | 5m |
| ZAPPI-32A1P1T08 | Type 1 (J1772) | 8m |
| ZAPPI-32A1P2T05 | Type 2 (EN62196) | 5m |
| ZAPPI-32A1P2T08 | Type 2 (EN62196) | 8m |

Designed to permit installations compliant with IET Wiring Regulations BS7671:2008+A3 2015 and the Electricity Safety, Quality, and Continuity Regulations 2002 and BS8300:2009+A1:2010.

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