



trio + heating

Installation Guide

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Safety Notices



*The following safety regulations must always be observed.
Failure to take precautions could result in severe injury or death.
This product must only be installed by a competent person*

	This Trio + Heating installation guide is intended for engineer use only. Please refer to the Trio + Heating "Quick Start Guide" for end-user documentation. It is important to observe some simple safety precautions when installing and using this product. Read this important information before continuing. Safe operation of the unit is impaired if not used or installed in a manner specified by the manufacturer. • Do not cover any of the devices • Do not fit rechargeable batteries in any of the devices • Keep the devices away from water and other liquids • Clean only with a dry, soft cloth • If any components appear damaged or faulty do not use, please contact supplier
	Isolate mains supply before removing the switch cover. When connected to a live mains supply, all internal parts are at mains potential. No user serviceable parts inside.
	All devices are for use in dry, indoor environments only.
	At the end of its life please recycle at a suitable recycling facility. Do not place in general waste.

Installation Procedure

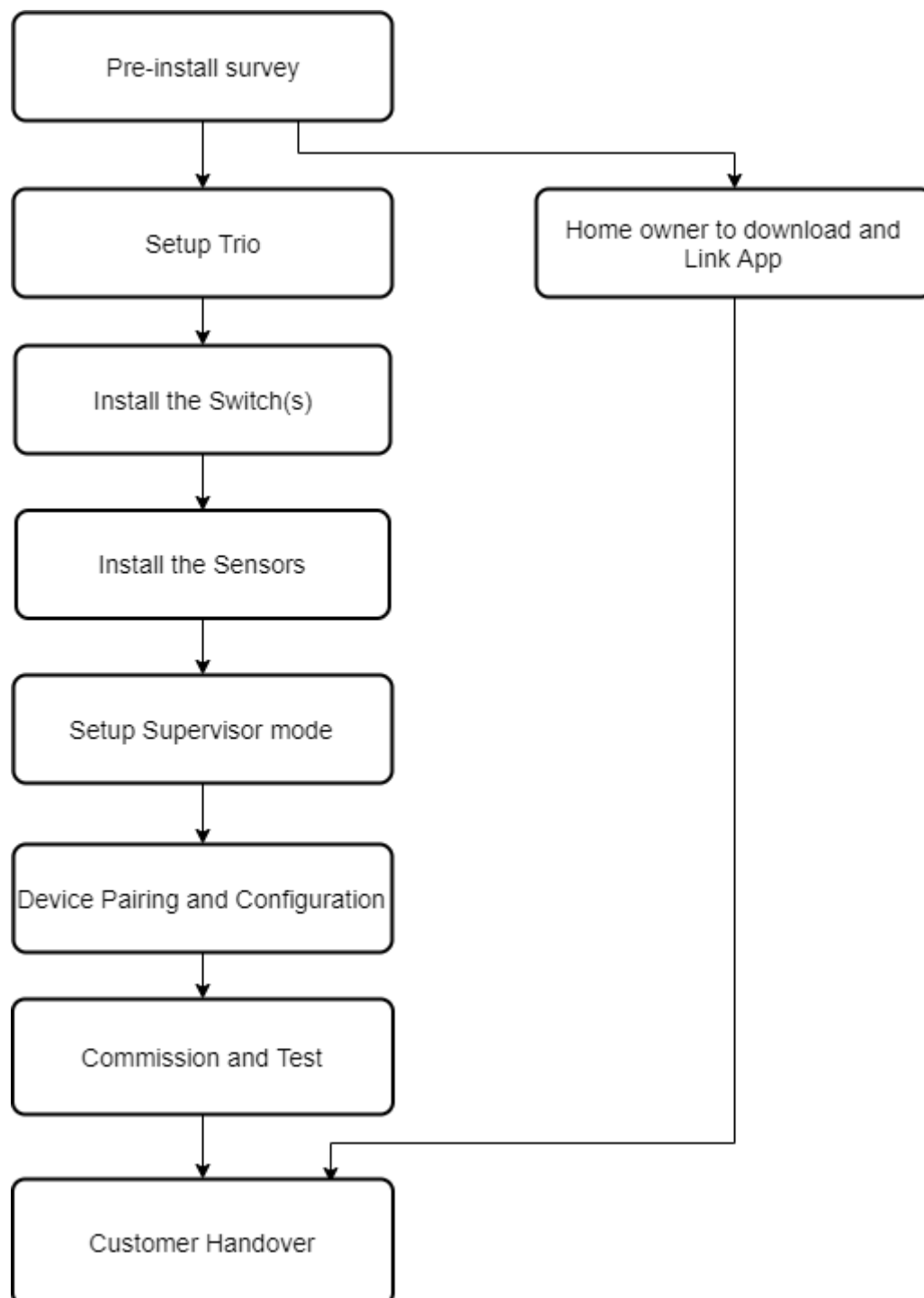


Fig 1.0 - Installation Procedure

Heating Components

The system has three main components, an In Home Display (IHD), Switches and Sensors:



The Trio is both the smart meter display and a hub for controlling the heating system.

The IHD must be on at all times to allow it to communicate with other components in the heating system.

The Trio is connected to the internet via WiFi, allowing heating to be controlled via the “geo Home” mobile app.



The Switch is a 2 channel, mains-powered wirelessly controlled switch, suitable for controlling a gas boiler

The switch controls hot water on systems with a hot water tank. (i.e. not a combi boiler) and can be used with a ‘Y plan’ hot water system which uses a three-way valve or an ‘S plan’ or ‘S Plus Plan’ system using individual valves.



The Sensor is a battery powered, wireless temperature sensor.

Step 1 - Pre-Installation Survey

Before an installation takes place a survey of the property should be undertaken to ascertain the following:

Prior to visit

- ☐ Smart meter is available if not being installed during the visit?
- ☐ Wi-Fi is available, and the customer has their password? (It is not required by installer)
 - Note : Most modern wifi routers are supported, including BT Homehub5 and later.
- ☐ Homeowner, or appropriate permissions from landlord to perform the install?
- ☐ iOS or Android Smart phone available to run the App? It should be reasonably up to date.
- ☐ Gas central heating is available (Combi, conventional or condensing boiler)?
- ☐ Is the heating controlled with one or two thermostats?
- ☐ Advise the customer that the Switch will be installed either close to the boiler, or in the airing cupboard, so space should be cleared if required.

On arrival, prior to installation

- ☐ Home broadband and wireless router supporting 2.4ghz g/b/n Wi-Fi.
 - Note : Most modern wifi routers are supported, including BT Homehub5 and later.
- ☐ Security details to join network must be available (for use by the homeowner only)
- ☐ Suitable location for Trio (Requires power and to be in range of home Wi-Fi network and Smart Meter home area network.)
- ☐ Smartphone with either iOS 9.0 or later or Android 'Jelly Bean' 4.1 or later available
- ☐ Inspect the customer's existing heat sources: Gas boiler, heating and hot water are tested and all working.
 - This is to protect the installer if something is found to be defective after the installation
- ☐ If not being installed as part of the visit then ensure an appropriate smart meter is available for the property and can be paired by the installer (further details are provided in the "Trio Installer Guide")
- ☐ Verify the heating system is suitable for Smart Heating installation:
 - Confirm there are one or two heating zones
 - Locate existing wall thermostats (if any)
 - Confirm S or Y plan wiring
- ☐ Confirm the number of components needed for the installation:
 - Each heating zone requires one Sensor and one channel of a Switch (each Switch has two channels)
 - Each hot water zone requires one channel of a Switch (a Sensor is not required for a hot water zone)
 - Components required are therefore:
 - 1 Heating zone requires **1x Switch, 1x Sensor**
 - 1 Heating zone + Hot water requires **1x Switch, 1x Sensor**
 - 2 Heating zones requires **1x Switch, 2x Sensors**
 - 2 Heating zones + Hot water requires **2x Switches, 2x Sensors**
- ☐ Adequate space and power available to install the Switch(s).
 - Approximate switch dimensions: (W) 95mm X (H) 85mm X (D) 37mm.

Installer Prerequisites

- ☐ geo Home App installed on a device with an internet connection
- ☐ Installer has an installer account on <https://api.geotogether.com/support>

Step 2 - Setup the Trio

1. Initial Steps with the customer

- The Welcome Card and Quick Start Guide should be provided to the customer
- The customer should download the “geo Home” App from either the App store or Google Play.
- Ask the customer to create a geo account using the App they've downloaded.

2. Install the Trio

- Fit the Trio stand and plug the device in using the supplied power supply and cable.
- The Trio will start up and immediately try to connect to a Smart Meter, the splash screen (see Fig 2.0)

3. Connect the Trio to a Smart Meter

- **IMPORTANT: The Trio should be connected to the Smart Meter before continuing the rest of the installation**
- The Trio display is designed to connect to a single Zigbee® network that provides connection to one electricity smart meter and/or one gas smart meter.
- The following is required before the Trio can be connected to a smart meter network:
 - Provision of the smart meter HAN with the Trio credentials
 - Opening of the HAN network
- Automatic HAN connection
 - In most installations the HAN should have been configured with the Trio details, the display will automatically connect to the HAN after being powered on.
 - Once the connection to HAN is established, the Home screen will be shown on the display (see Figure 2.1). It may take a few minutes for data to be shown on the screen (gas can take over 30 minutes).



Fig 2.0 - Startup screen

- Manual HAN connection
 - If the display is unable to connect automatically after three attempts, it will indicate it is unable to connect to the HAN.

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- Check the HAN is open and the Trio has been provisioned to the smart meter networks.
- For more information on connection to the HAN please refer to the **Trio Installer Guide**.
- Once connected to the HAN, you can check the status of the network on the System status screen
 - To access this screen, when on the Home screen press the Home button and then the Status icon (see Fig 2.1).
- The Trio home screen shown in Fig 2.1 will be displayed.

Overview of the Home screen

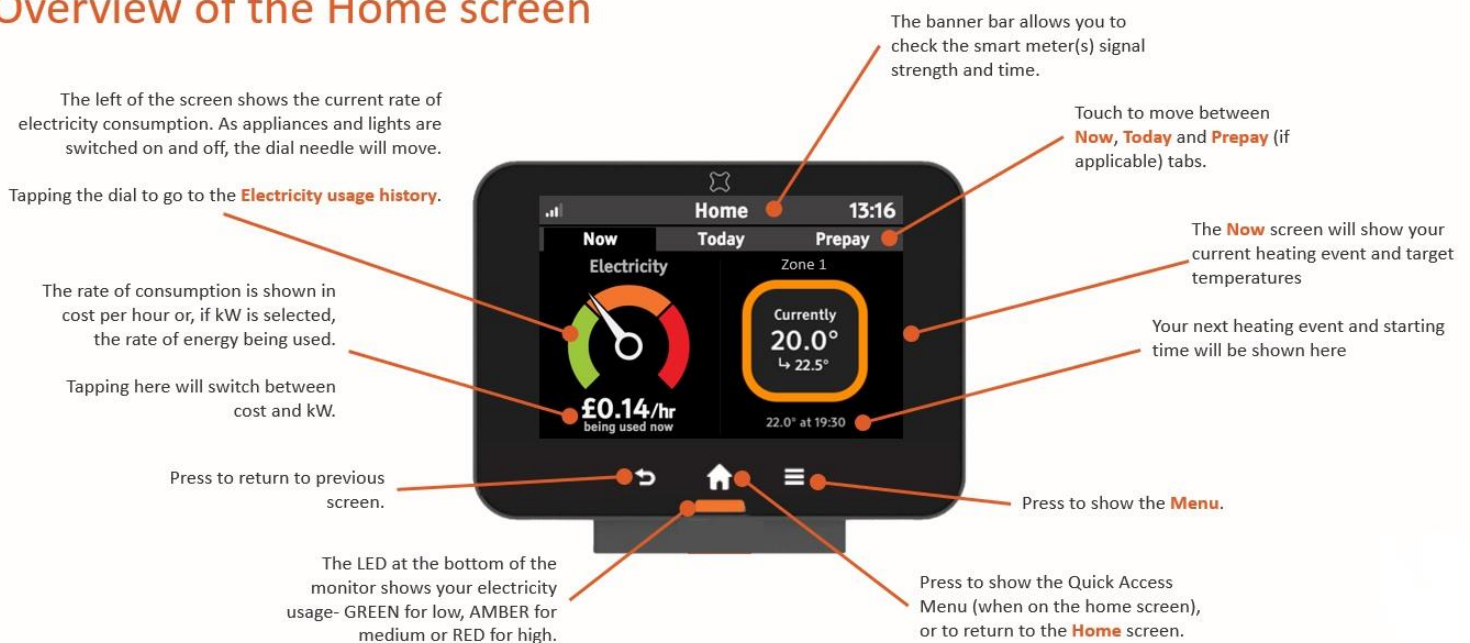


Fig 2.1 - IHD Home Screen

4. Connect the Trio to Wi-Fi

- On the Trio:
 - Press the menu button (see Fig 2.1)
 - Scroll down and select **Settings > WiFi Network**
- Select **WiFi button** to enable WiFi if required (see Fig 2.2)
- Select **Set up network > List networks** (see Fig 2.3)
 - Select required network, then ask householder to enter the password.
- Power cycle the Trio to force an immediate OTA update.
 - Once connected to WiFi the IHD may start to download a software update in the background.
 - **IMPORTANT: When an upgrade is in progress the Heating features such as Pairing and Adhocs may take longer to complete or may require multiple attempts to complete. Upgrades in progress can be seen in the Support Tool.**
 - When the download is complete a notification will be shown on screen to confirm the device is being upgraded, the device will restart automatically during the upgrade. There may be a few updates, taking approximately 20 minutes each.

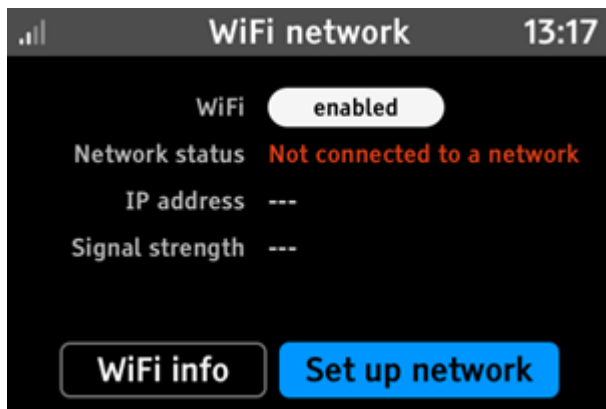


Fig 2.2 - WiFi Configuration



Fig 2.3 - WiFi Setup

5. The Trio is now installed

- Place the display somewhere that has a good Wi-Fi connection to the householder's router and their Smart Meter.

Step 3 – Heating System Preparation

Before installing the heating system the configuration and settings should be decided and documented, this provides a record of the configuration and simplifies the installation process.

- The system is organised into Zones
- There can be one or two Heating Zones, and one Hot Water Zone
- Each Switch contains two independent channels that are wired into the heating or hot water control units. The channels are shown below in Fig 3.0
- Each Heating Zone will contain one Switch channel and one Sensor
- The Hot Water zone will contain one Switch channel
- Each Switch channel, Hot water channel and zones need to be named.
- Unused channels in a Switch need to be configured as 'not in use'

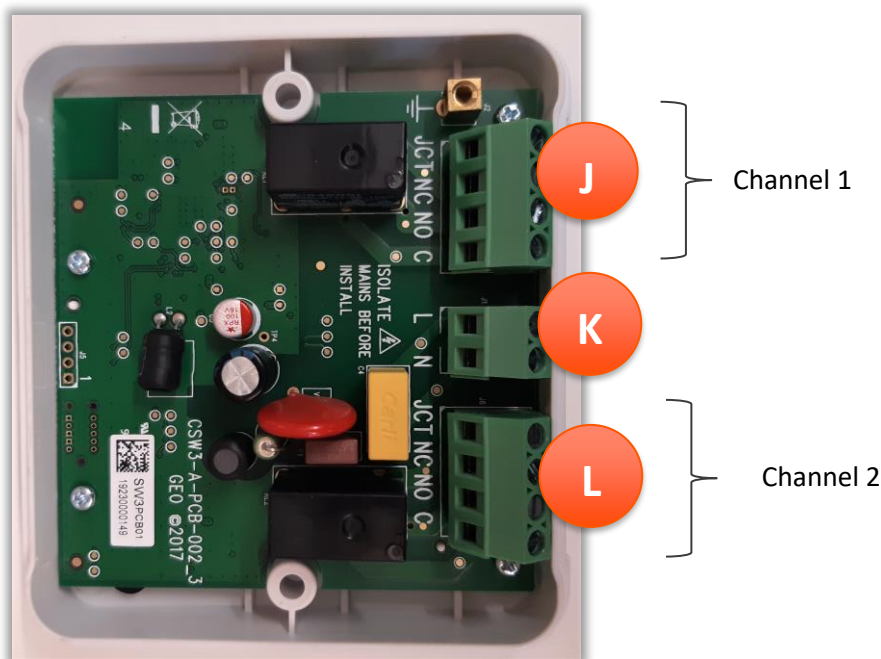


Fig 3.0 Switch Channels

Heating System Configuration

The system configuration and pairing codes should be documented during the installation to ease the installation and help later offsite support.

Note that it is easier to record the Switch pairing codes before they are installed.

Switch Pairing Codes and Configuration

Device	Pairing Code	Channel 1 Config	Channel 2 Config
Switch 1		☐ Heating - Parallel ☐ Heating - Series ☐ Hot water ☐ Not connected Name : -----	☐ Heating - Parallel ☐ Heating - Series ☐ Hot water ☐ Not connected Name : -----
Switch 2		☐ Heating - Parallel ☐ Heating - Series ☐ Hot water ☐ Not connected Name : -----	☐ Heating - Parallel ☐ Heating - Series ☐ Hot water ☐ Not connected Name : -----

Sensor Pairing Codes

Device	Pairing Code
Sensor 1	
Sensor 2	

Step 4 - Install the Switches

Important : Inspect the wiring of the existing boiler for damage or degradation. If any is present, the install must be aborted, and the end user informed

- The Switch is to be installed in compliance with local wiring regulations, including a suitable means of disconnection from the supply.
- The Switch must be installed in an easily accessible and dry indoor location which meets the requirements of IP40
- It is recommended that:
 - The Switch is installed adjacent to the heating junction box
 - The wire access hole in the pattress box is made with a suitable drill or hole cutting tool
 - Cable Ties should be used on the cable on the inside of the Switch to alleviate any tension (not supplied)

The Switch should be wired for either Y Plan or S Plan systems (see Fig 4.0). A wiring diagram for Y Plan is shown in Fig 4.1 and for S Plan is shown in Fig 4.2.

- Each channel in a Switch has an associated relay with Normally open (NO), normally closed (NC) and common (C) connections.
- Each Switch can control 2 heating zones or 1 hot water and 1 heating zone.
- The heating relay can be installed in either series or in parallel with the existing room thermostat. Note that **Parallel** wiring is referred and is usually the easier option.
- If no room thermostat is fitted, then the switch can be fitted to a suitable connection on the boiler controller.
- Each switch also requires a 230V supply, this can normally be provided from the existing boiler wiring.
- Wire in the 230V supply on connector K. (see Fig 3.0). If a permanent 230v supply is not available at the installation point then it may be possible to use the feed from the existing heating system programmer. This may require that the programmer is left in a permanently on or off state (dependent on the wiring). If this is required, the programmer should be labelled to make it clear that it should be left on/off. In Y-Plan systems the HW Off feed is preferred.
- Wire in the relays on connectors J and L noting which zone and zone type is connected to each channel. (see Fig 3.0)
- Secure the lid to the base, restore mains when ready to pair the switch to the hub.
- Repeat for the second heating zone if required.

Existing system

- The Trio + Heating system is designed to be installed alongside the existing system. This allows for easier installation and makes it possible to re-enable the existing system if required.
- The existing system should be disabled by setting the existing hot water and heating programmer to always OFF.
- The existing thermostat can stay in position, although the customer could remove it if desired.

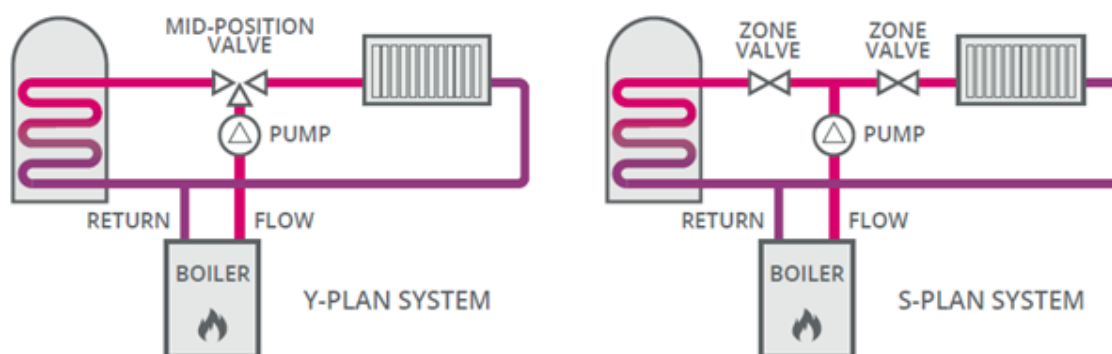
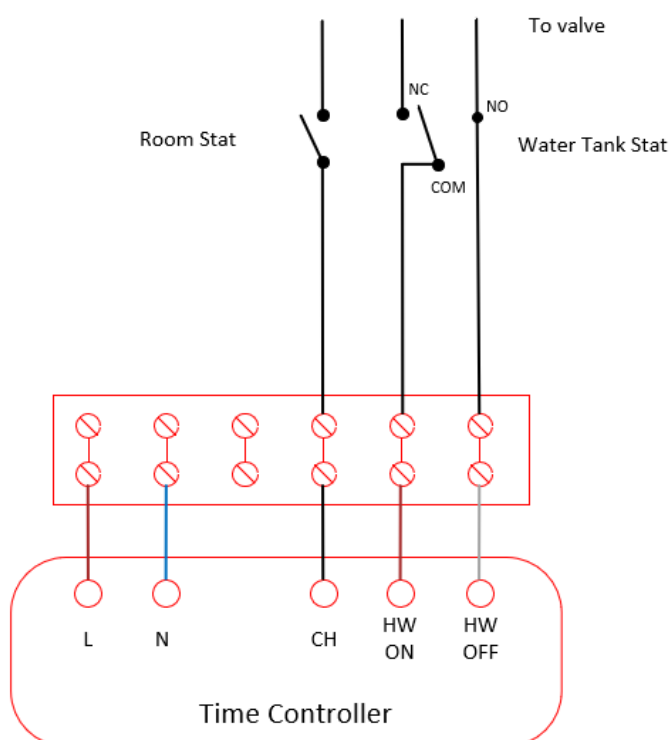


Fig 4.0 Y-Plan and S-Plan Configurations

Y Plan Wiring before and after installation

Typical Y Plan Wiring – Pre install



Typical Y Plan Wiring – Post install
(series or parallel)

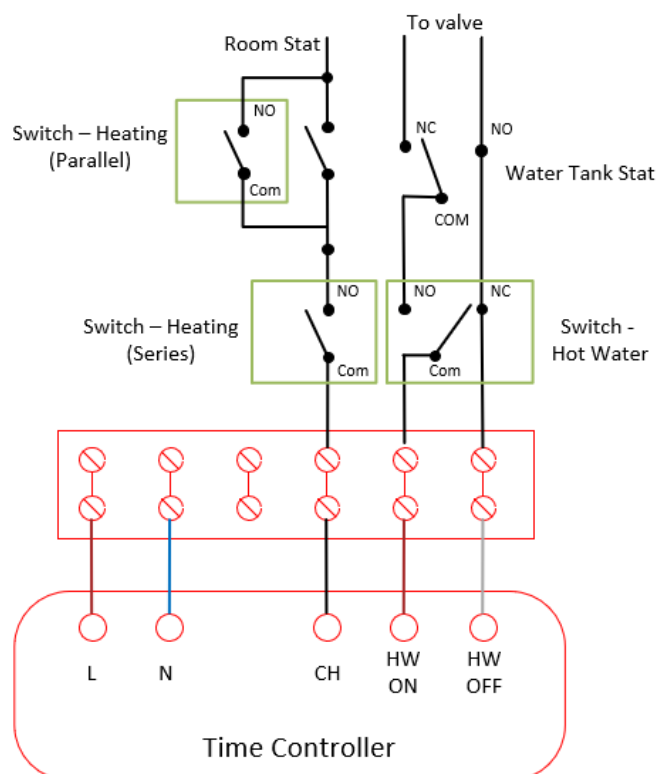


Fig 4.1 - Y Plan wiring

S Plan Wiring before and after installation

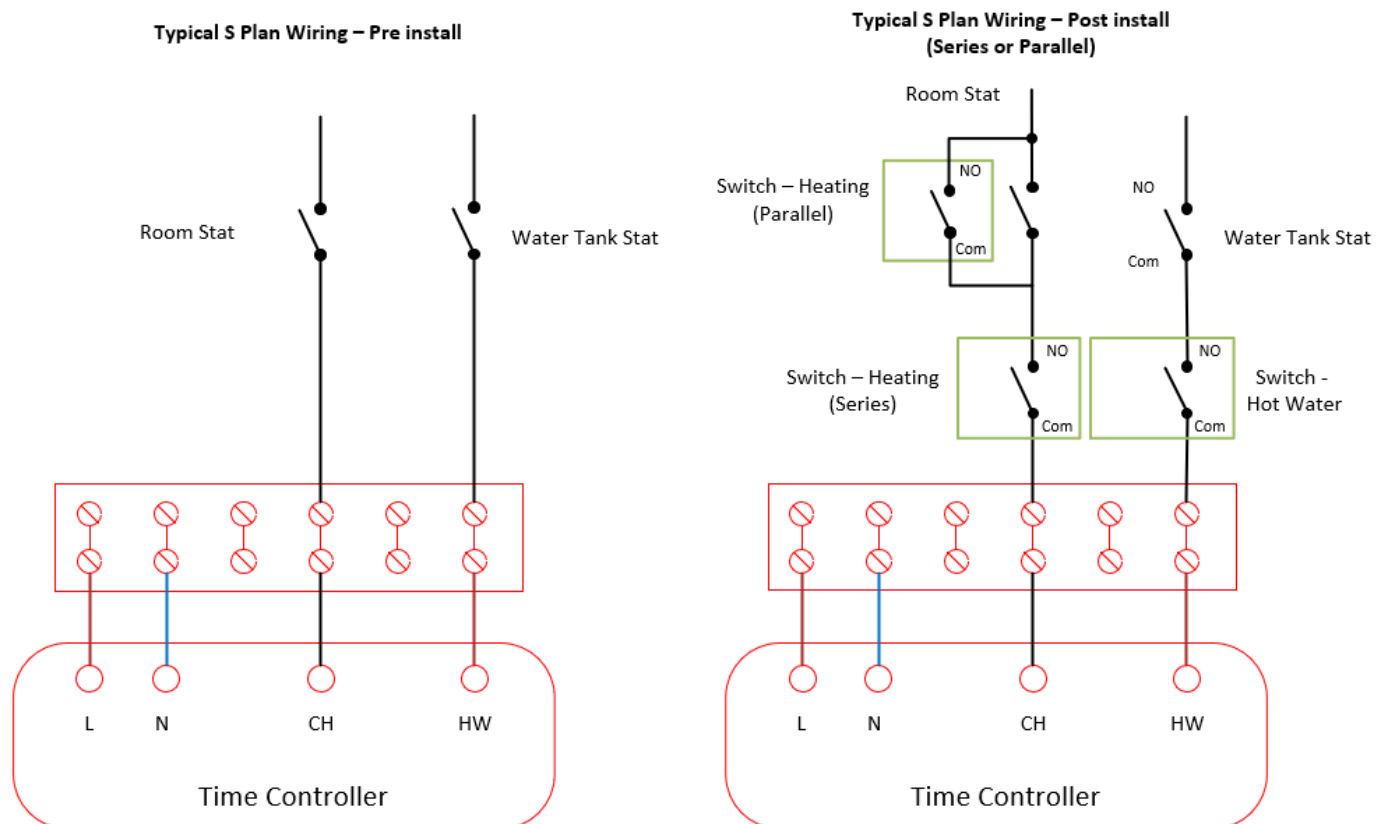


Fig 4.2 - S Plan Wiring

Step 5 - Install the Sensors

The Sensor does not require any wiring.

- The Sensor is designed to be either wall mounted or it can be placed on a level surface.
- It should always be positioned out of the Sun and away from draughts and heat sources.
- The pairing code for any Sensors used should be noted, to be used later during the installation and for remote support.



Fig 5.0 Temperature Sensor, with battery tab in place.

- To power up the device, simply remove the battery isolation tab on the rear of the device, shown in Fig 5.0.

Step 6 – Setup Supervisor mode for the system

The GEO online Support Tool can be used so that the installer has temporary access to the customers system so that it can be configured and commissioned.

1. On the Trio find the MAC address of the device

- Navigate to : **Menu > Settings > Wi-Fi network > WiFi info** (see Fig 6.0)



Fig 6.0 - Mac address in WiFi Info screen

2. Locate the system being installed in the Support Tool

- In a web browser navigate to <https://api.geotogether.com/support>
- Log in with your support tool credentials
- Search for the system using this MAC address in the support tool (see Fig 6.1)
- Select the system MAC address from the list provided
- **Tip:** you can search using just a few digits of the MAC addresses

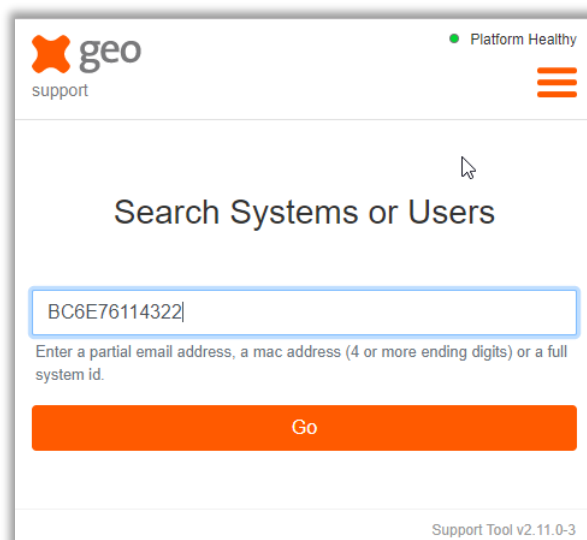


Fig 6.1 - Support Tool - search using mac address

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3. Enable Supervisor Mode for the selected device

- Select the 'Supervisor Mode' button
- Enter your password to enable supervisor mode (you may need to scroll down)

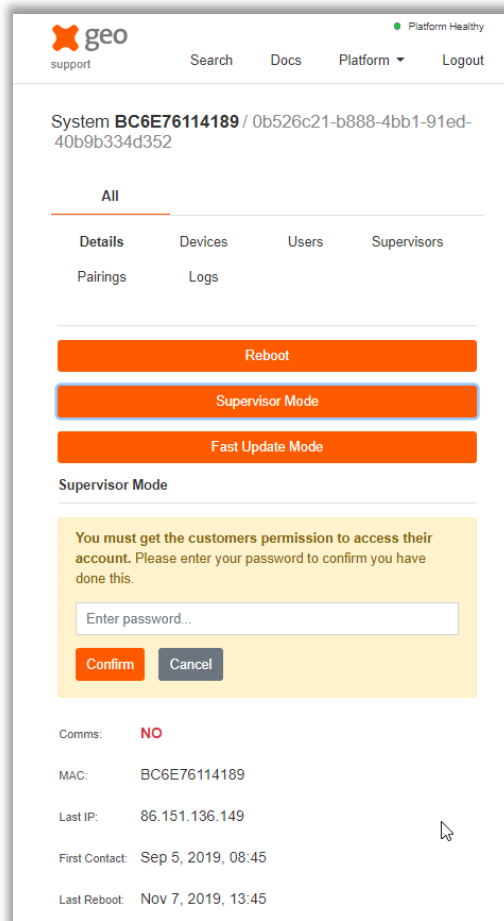
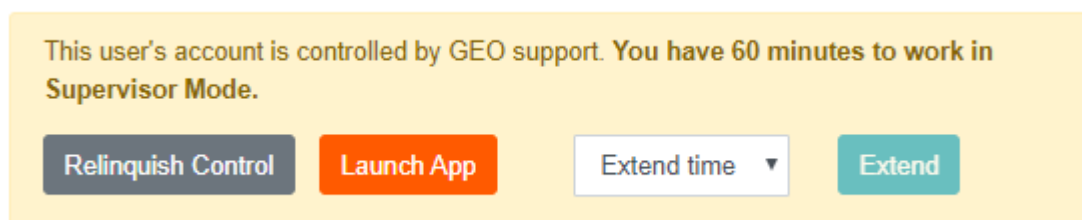


Fig 5.2 - Support Tool - select Supervisor Mode

- Extend time to 60 minutes and press "Extend"



- You now access to the customer's system via the geo home app for 1 hour.
- You can end the session early by logging out, or extend by activating 'Supervisor mode' again.

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Step 7 - Pairing Devices and Configuration using the app

Once all Sensors and Switches in the system have been installed they can be powered up and paired to the Trio using the geo Home app.

The Switches and Sensors should now be powered up if they are not already.

1. Log into the geo Home app

- Use the same installer credentials used to log into the support tool, you will be presented to a default Home screen shown in Fig 7.0
- If you're already logged in, then the app will have automatically changed to the account selected in the support tool.
- You can verify this by checking that the Electricity usage matches between the Trio display and the App.
- If the app doesn't change to the selected account, then log out and in again or close and restart the app.

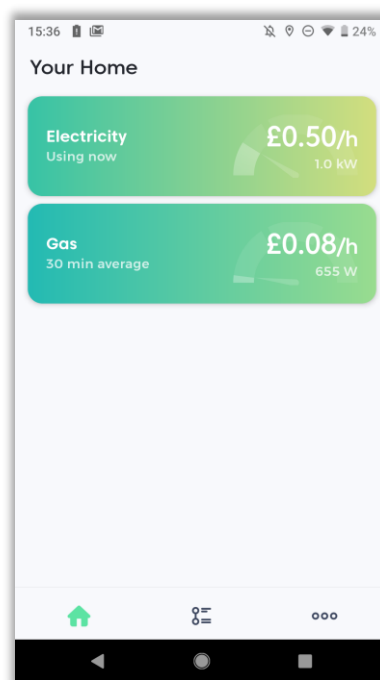


Fig 7.0 geo Home App - Home screen before heating configuration

2. Add each Sensor and Switch in the system using the pairing code

- Navigate to the **More (...)** > **System settings** > **My devices** (see Fig 7.1)

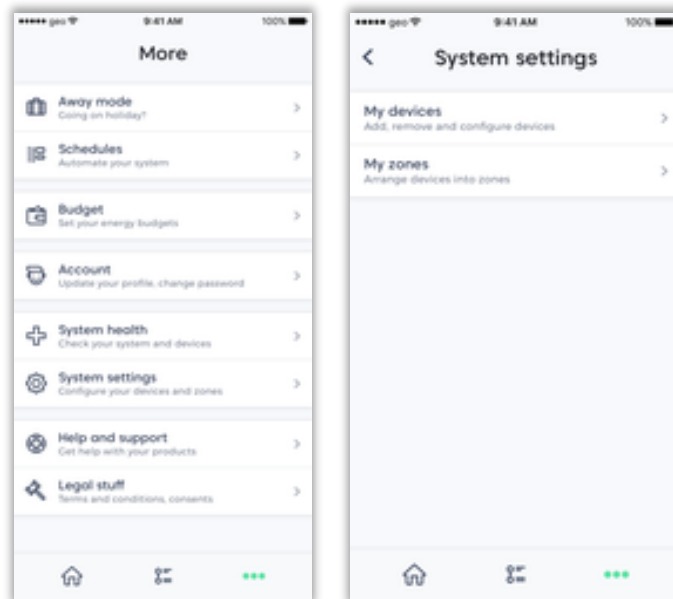


Fig 7.1 geo Home App - Navigate to 'My devices' screen

- Enter all pairing codes for each device in the system (see Fig 7.2), as documented in earlier steps.
- The pairing code is printed on the back of each device.

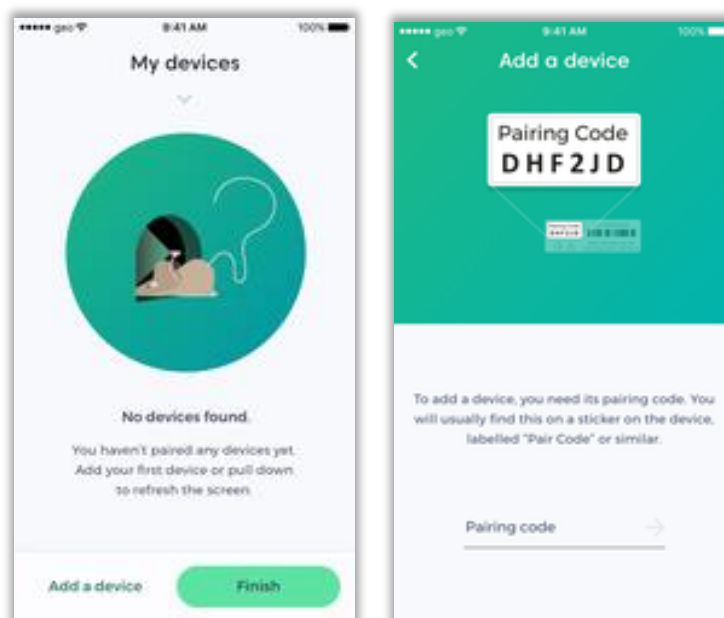


Fig 7.2 geo Home App - Pairing devices

- You should now see all devices, that are not yet configured (see Fig 7.3)
- If devices are powered on they may show as already paired.

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- Paired devices are shown as an icon (see Fig 7.3)
- Switches will show two channels per device

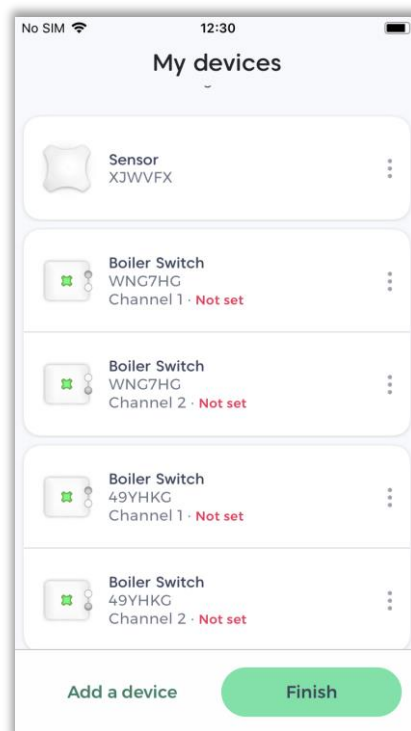


Fig 7.3 Device list before configuration

3. Confirm all devices in the system are paired and communicating with the Trio

- Ensure that all Switches are powered and remove battery tabs from the Sensor devices.

On the Sensor devices:

- Sensors will attempt to pair for 5 mins after they are powered up, after which manual pairing will be required.
- The led will flash amber until it is paired (see Fig 7.4)
- When the pairing is complete the led will change to green for a short time, then extinguish.
- For manual pairing, press and hold the button on the back of the Sensor until the led flashes again. This will start manual pairing for another 5 minutes.



Fig 7.4 - Sensor pairing status led

On the Switch devices

- Switches will attempt to pair for 30 mins when they are powered up, after which manual pairing will be required.
- The led will flash amber and green until the pairing is complete, when the pairing is complete the led will change to green (see Fig 5.8)
- For manual pairing, press and hold the centre button on the Switch for 3-6 seconds to re-start the pairing for another 30 minutes.



Fig 7.5 - Switch pairing status led

4. Rename each device to simplify configuration

- Navigate to **My devices > Rename channel/device** (see Fig 7.6)
 - Switch has channel
 - Sensor had device
- Change to a suitable name for each channel, e.g. “Hot Water Switch”
- There may be some unused channels, renaming them is optional.

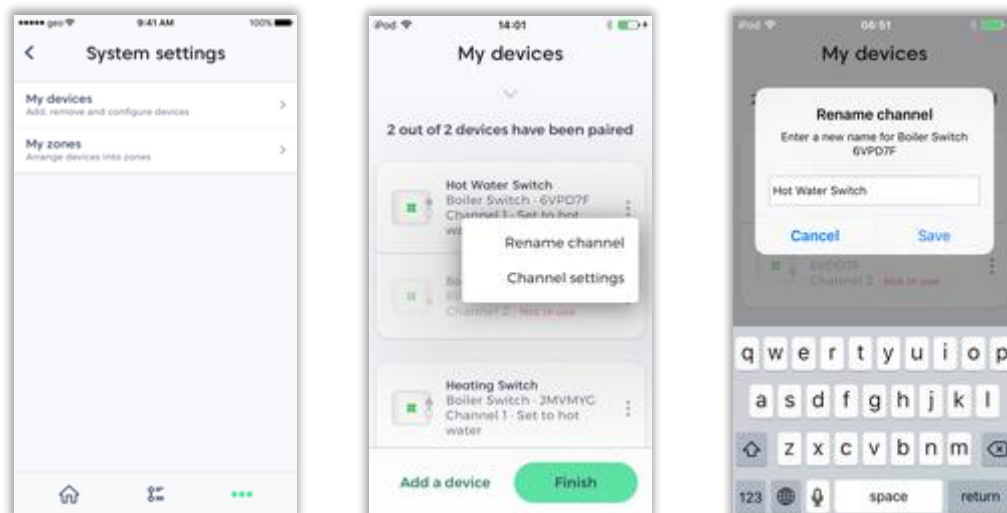


Fig 7.6 - geo Home App - Renaming channels

5. Configure the Switches in the system

- **ALL** Switch channels need to be set to either **Heating**, **Hot Water**, or **Not in Use** as appropriate.
- Navigate to **System settings > My devices** (of not there already).
- For each channel of each switch:
 - Select '...' -> '**Channel settings**'
 - Select appropriate configuration (see Fig 7.8)
 - **Heating (Series) / Heating (Parallel) / Hot water / Not in use**
 - Save to finish
- Once all channels have a configuration setting select 'Finish'.
- There should not be any channels with 'Not set' (see 'not set' example in Fig 7.8).

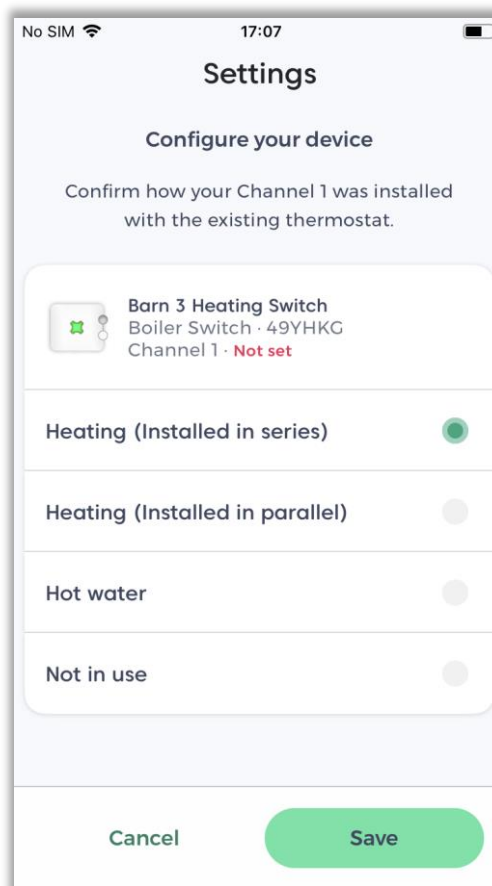
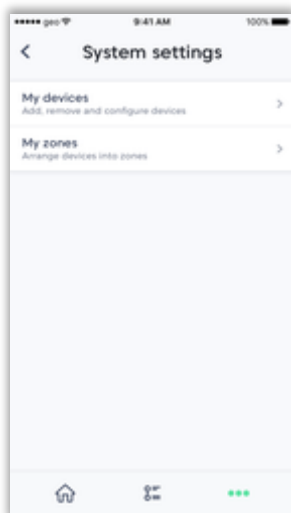


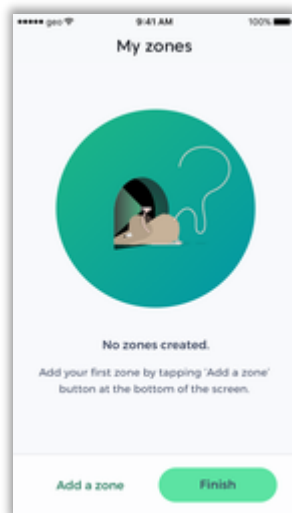
Fig 7.8 Switch configuration

6. Create Zones for heating and hot water, and assign devices to them

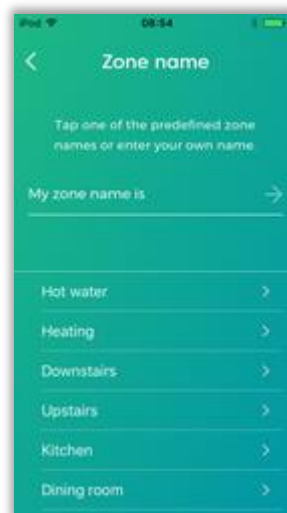
- Note that this stage is easiest if you have already decided/documented your zone names and know which channels are in which zones.
- Select **My Zones > Add a zone** (see Fig 7.9).
 - If there are no zones set up already you will be taken straight to the 'Zone name' screen.
- Enter a new zone name, or select an existing name from the list
- For Heating zones
 - Add a switch channel and a sensor to the zone. They can both be selected at the same time.
 - Press Save
 - Repeat for each heating zone.
- For Hot water
 - Add a switch channel to the new zone
 - Press Save
- Press "Finish" when all zones are configured.



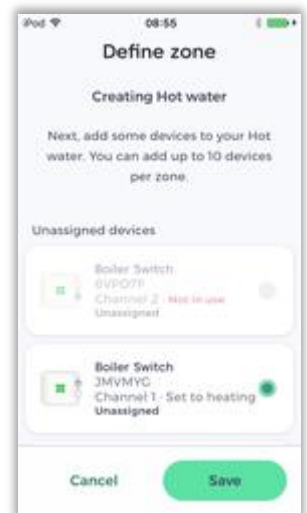
Select 'My Zones'



Select 'Add a zone'



Enter zone name, or select an existing name



Select tab for any devices to add them to the zone

Fig 7.9 - geo Home App - Creating Zones

7. Check the configuration is complete

The system should now be set up, the home screen should show the electricity, gas, hot water and heating zones where available, see Fig 7.10. If zones are not shown, review any error messages and repeat steps above.



Fig 7.10 Home screen for a configured system

Step 8 – Commission and Test

Confirm the system is operating correctly with the following steps. Check each box to show it has been carried out successfully.

1. Confirm the Meter is connected

- ☐ The Trio home screen should show values for Electricity (as appropriate)
- ☐ The App home screen should show values for Electricity and Gas (as appropriate)

2. Set Up Central Heating

- ☐ Confirm the central Green led on the Switch is lit (this means that it is being controlled by the Trio)
- ☐ Set the existing heating controls to ALWAYS ON
- ☐ Set the existing central heating thermostat to MAX (if in series), or MIN if in (parallel) for each heating zone.
- ☐ Confirm the current temperature for each zone is displayed on the App home screen

3. Testing Central heating, using a Boost heating event

- ☐ Set the target temperature to 30° using the App - check that boiler fires
- ☐ Set the target temperature lower than the current temperature - check the boiler is off
- ☐ Set the target temperature on the app to the customers preferred setting
- ☐ Repeat for each heating channel

4. Test Heating Switch override function

- ☐ Press centre button on each Switch once to enter override mode. The centre led should be OFF.
- ☐ Set the existing heating controls to ALWAYS ON
- ☐ Set the existing central heating thermostat to MIN
- ☐ Turn existing central heating thermostat up until boiler fires
- ☐ Reset the existing central heating thermostat to MAX (if in series), or MIN if in (parallel) for each heating zone.
- ☐ Press centre button on each Switch once to exit override mode. The centre led should be GREEN.

5. Test Hot Water

- ☐ Ensure boiler is set to off:
 - If heating is on, lower the target temperatures until boiler turns off.
 - If the hot water schedule has hot water set to on, change the schedule so that it is off.
- ☐ Use the App to enable the hot water.
- ☐ Ensure boiler fires and the hot water valve opens.
- ☐ Turn off the hot water using the App and ensure boiler turns off and valve closes.
- ☐ Create a schedule for the Hot Water using the App.

Step 9 - Customer Handover

Confirm the customer is able to do the following using their App:

- ☐ Has successfully created their geo Home app account
- ☐ Has followed the in-app instructions to link their account to the Trio
- ☐ Can see the Electricity and Gas consumption on the Trio **and** in the App
- ☐ Can see the current and target temperatures for each zone on the Trio **and** in the App
- ☐ Can change the target temperature for each zone
- ☐ Can change the schedule for a zone
- ☐ Can put the system in away mode
- ☐ Can put the system in Override mode
- ☐ A budget has been set:
 - The UK average for 1-2 bedroom house/flat is £33 per month for electricity, and £34 for gas.
 - For a daily budget this is approximately:
 - £1.10 for electricity
 - £1.13 for gas
 - For a weekly budget this is approximately:
 - £7.70 for electricity
 - £7.91 for gas
 - If the house is bigger, you will need to increase your budget.

Important points to inform the customer:

- ☐ **Further information on using the Trio + Heating product can be found:**
 - In the Support section of the App
 - under '...' -> 'Help and Support' -> 'Heating Control' -> 'Trio + Heating'
 - In the Support section of the GEO website, this includes a quick start guide and a useful introduction video.
 - <http://www.geotogether.com/support/trio-heating>
- ☐ **The Trio is now the controller for the heating, it should therefore be left on at all times.**
 - If the Trio is off, the heating will go into failsafe mode, which means the heating will turn on for 10 minutes every hour.
- ☐ **If WiFi is not available the Trio will continue to control the heating according to its current schedule.**
 - However, the App cannot be used to change any heating settings or see the latest heating information.
- ☐ **The customer should set a Budget using the Trio or the App**
 - This will allow more information to be displayed on the App (such as historical information).
- ☐ **Pre-heating feature**
 - When setting your schedule and temperature, please note that the schedules you set are the times when you want the heating to be at that desired temperature.
 - Depending on the current temperature in your heating zone, the system could start heating the zone early to meet your time schedule.

Troubleshooting / FAQs

Does the Heating controller work with an existing wireless thermostat?

- Yes. In these cases the Switch has to be wired in series with the existing thermostat receiver which is normally located in the boiler or boiler controller. If the wireless thermostat receiver uses a proprietary data connection, **do not install** the Heating Switch and contact installer support.

The Trio, Switch and Sensor appear to be functioning, but the boiler is not firing?

- The house could be above the current desired temperature - check the setting within the geo Home app and try and select a mode with a higher set point (e.g. 30°C)
- Check that the existing boiler controls have been set to ALWAYS ON and that the existing thermostat (where fitted) has been set to MAX (if in series), or MIN if in (parallel)
- Check the configuration settings for the switch, in particular that it's set to Heating (not hot water) and that Series or Parallel is correctly selected (it's possible the system is configured to have an open call to heat, which is non-standard in the UK)

The user has forgotten their password

- Advise the user to use the geo Home app reset their password

The heating is not working, can I override the controller to make it work how it used to?

- Yes, you can always go back to using your original heating thermostat and controller by putting the Switch in Override mode. Simply press the central button on the Switch and the central led light will turn off, this will override the Switch allowing the hot water or heating to be controlled by the original controller.
- The Switch has a single button which is used for several purposes.
 - A single tap will place the Switch into override mode. In override mode the relay state can't be changed by the user through the app or by the hub. It can only be affected by pressing the button
 - When in override mode and the button is tapped a single time the Switch will be taken out of override mode.
 - When held down for 3-6 seconds the Switch will attempt to re-pair with the hub.
- NOTE: Override mode is defined as a mode which places control of the heating back to the users original system as follows:
 - If the channel is a hot water channel, the relay will close so that hot water is on and controlled by the existing hot water thermostat
 - If the channel is a heating channel and is installed in series the relay will close and the heating will be controlled by the users existing heating thermostat
 - If the channel is a heating channel and is installed in parallel the relay will open and the heating will be controlled by the users existing heating thermostat

Can the Trio be run on batteries?

- The Trio can be temporarily powered using 3 x AAA alkaline batteries, battery power is a backup and should not be used long term. **Rechargeable batteries should NOT be used.**

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- The supplied power supply cable is not suitable for use with any other USB device (it is only a power cable and not a USB data cable).

Switch Specification

Model	Switch
Input and switching Capacity	0.1 A 100- 230 V ~ 50Hz
Switching capacity	3A per channel
Power Consumption (device only)	1W (typ)
Ingress protection rating	IP40
Operating temperature range	0°C to +35°C
Operating humidity range	5% - 90% (non-condensing)

Switch Description

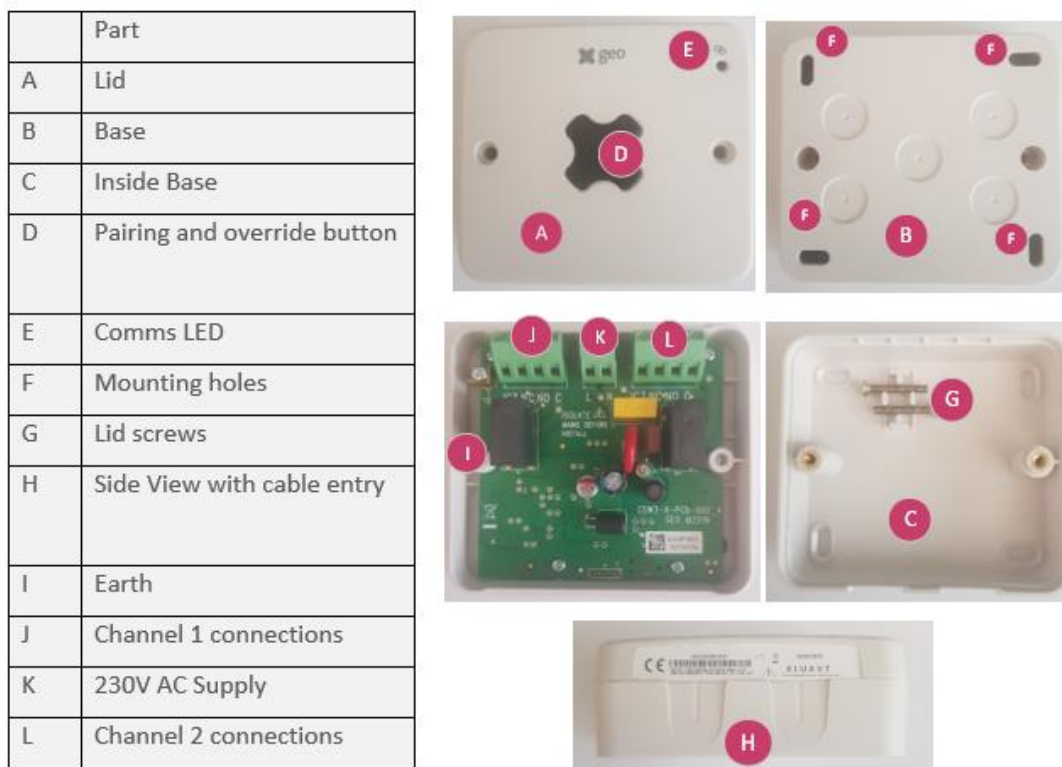


Fig 8.2 - Switch Description

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Technical Support

For help and support please visit:

<https://support.geotogether.com/en/support/home>

For technical queries relating to the installation, please reference your support agreement.

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