

passiv

Passiv Smart Thermostat



Installation Guide

Safety

WARNING: The Passiv Smart Thermostat must be installed by a qualified electrician or a registered competent person, complying with local regulations. Installation by unqualified persons may result in product malfunction, electric shock or fire.

Read this guide carefully before starting the installation.

Before any intervention, make sure power is turned off.

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Compatibility - RS485 Modbus

The Passiv Smart Thermostat is compatible with a selection of RS485 Modbus enabled heat pumps. The heat pump needs the following connections and control capabilities:

- RS485 Modbus RTU (may be an extra add-on module)
- Hot water cylinder temperature sensor
- Diverter valve (hot water or heating) control
- Hot water immersion control

Ensure the heat pump has been installed in accordance with the manufacturer's instructions.

For a full list of compatible heat pumps and manufacturer specific Passiv Smart Thermostat installation guidance, please visit installer.passivuk.com

The Passiv Smart Thermostat may be installed and used without any internet connection.

Note: An ethernet connection to a broadband router should be considered during the installation to enable use of the Passiv app and unlock the best bill savings.

Compatibility - Relay

Alternatively, the Passiv Smart Thermostat can be installed with any heat pump that supports a call-for-heat signal using the Relay control method.

The Relay control method does not support the following:

- Hot water control. This must remain with the heat pump or another control solution
- Heat pump flow temperature cannot be optimised by the Passiv Smart Thermostat
- The Analysis section will not be available in the Passiv app

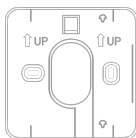
When using Passiv Smart Thermostat with Relay control, RS485 cable connections are still required between the Passiv Hub and the Passiv Programmer.

Specific instructions in this guide relating to an RS485 connection between the Passiv Hub and the heat pump can be ignored.

In the box



Passiv Hub



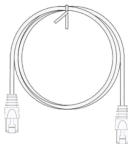
Passiv Hub wall bracket



Passiv Thermostat(s)*



Passiv Programmer



1m ethernet cable



Screws and wall-plugs

*The number and type of Thermostat will depend on the Passiv Smart Thermostat kit being installed.

Before you start

What else is needed?



To ensure noise-free communication, RS485 **twisted pair screened cable** is required to connect the Passiv Hub to the heat pump and then the Passiv Programmer.

To make reliable RS485 cable connections, ferrules or boot-laces should be fitted prior to using the push-fit connectors on the Passiv Smart Thermostat devices. The push-fit connectors support conductor core sizes between 22 AWG - 16 AWG (0.2mm^2 - 1.5mm^2).

If wired Thermostats are being installed, 2-core **SP24** (e.g. 24/0.2mm) speaker cable is recommended (minimum core area of 0.5mm^2 and resistance not exceeding 50 ohms/km).

Avoid installing 230v mains cables for the wired Thermostats, as they operate using 24v. The use of low voltage cable prevents dangerous wiring errors during and after installation. If the Passiv Smart Thermostat is replacing an existing wired thermostat and the previous thermostat's location will provide an accurate reading of the zone temperature, then existing cabling may be reused. However, please label the repurposed cable '24v' at both ends to avoid confusion after installation.

For a full list of compatible heat pumps and manufacturer specific Passiv Smart Thermostat installation guidance, please visit installer.passivuk.com.

Where should you install it?

The Passiv Hub and the Programmer do not need to be co-located. However, the following considerations should be made:

- An ethernet cable will be required between the household broadband router and the Passiv Hub in order to use the Passiv app.
- The Passiv Hub requires a 230v AC mains socket for its power supply.
- An RS485 cable will be required between the Passiv Hub, heat pump and Programmer. Starting with the Passiv Hub the devices can be connected in any order as a single cable run. See diagram 1 on the next page for one connection example.
- The Passiv Programmer's proximity to heating zone valves and circulation pump (if fitted). These peripherals need to be wired into the Programmer.
- A 3A fused spur is required to provide 230v AC to power the Programmer, valves and circulation pump (if fitted).

Note: The Programmer must be positioned in an accessible location for the householder to use comfortably.

The diagram below shows an example of the communication cabling between different parts of the Passiv Smart Thermostat.

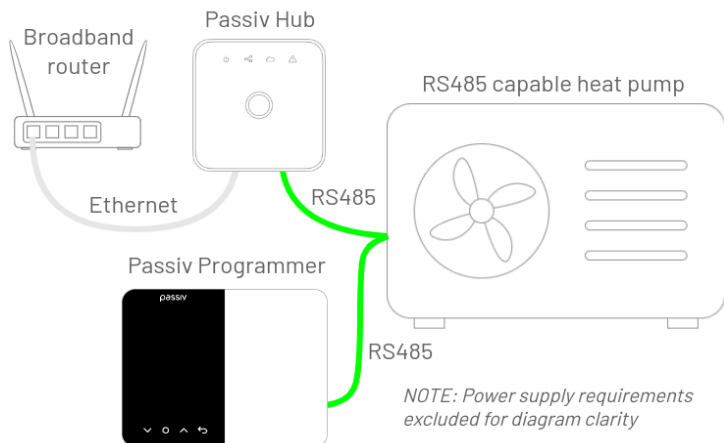


Diagram 1 – Passiv Smart Thermostat communication wiring

Specific instructions in this guide relating to an RS485 connection between the Passiv Hub and the heat pump can be ignored when installing only Relay control.

Installing the Passiv Hub

Once the Passiv Hub location has been determined, fix the wall bracket to the wall or a 1-gang pattress box, using the appropriate screws provided.

On the underside of the Passiv Hub connect the RS485 twisted pair screened cable to the A and B connectors, using ferrules on each core. Ferrules can simply be pushed into place for a reliable connection. If not using ferrules, depress the connector button fully and carefully insert the RS485 cables. Gently tug test to confirm a connection.

Keep the RS485 core colour consistent between the Hub and all RS485 device connections, e.g. White = A and Black = B.

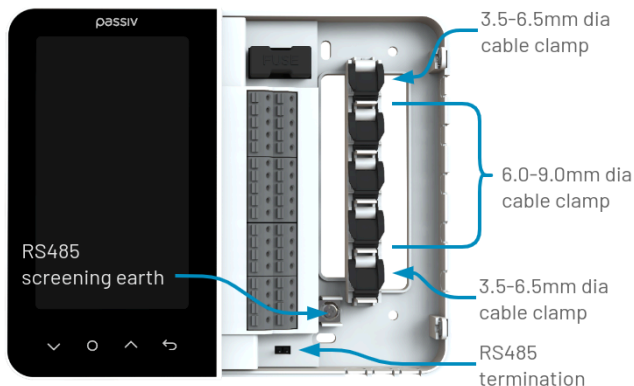


If a pattress box is not used and the RS485 cable is surface mounted, ensure the cable is secured with a cable tie (not supplied) to the underside of the Passiv Hub to prevent accidental disconnection.

Attach the Passiv Hub to the wall bracket and connect the mains socket power supply and the supplied ethernet cable into the Hub's RJ45 port. Alternatively, fit an ethernet cable to connect the household broadband router to the Hub.

Installing the Programmer

Prior to installation, open the Programmer's connection bay by loosening the two screws on the right-hand side. The screws should **not** be unscrewed completely.



The Programmer can be surface mounted to a wall using the **slotted screw holes**. Two additional fixture points are also provided to prevent accidental rotation when surface mounted.

In some installations the use of a **vertical 2-gang pattress box** allows for easier wall fixing, as the Programmer's slotted screw holes align to the pattress box fixing points. Additionally, pattress box use also permits hidden cable runs.

The connection bay lid has a connection guide detailing all connections. Key connections are covered on the next page.

Mains power supply connections

The Programmer requires a fused protected spur supplying 230v AC. An internal fuse rated at **T3.15A 250v** (20 x 5mm) prevents excessive currents from damaging any connected valves or pumps.

Note: The installer is responsible for ensuring that the total current of the connected valves and pumps does **NOT exceed 3 Amps**.

If surface cabling is installed, quick fit/release push-fit cable clamping is provided in two convenient sizes as shown in the diagram on the previous page. The smaller size is ideal for 3 core 0.75mm² mains flex cable or RS485 twisted pair cable. The larger size is intended for 5 core cables used for connecting valves.

RS485 connections

Ensure the RS485 core colour connecting A and B is consistent with the Passiv Hub RS485 connections (see page 7). Ferrules are recommended to allow quick and simple push-fit connection.

If not using ferrules, depress the connector button fully and carefully insert the RS485 cable core. Gently tug test to confirm connection.

To prevent electrical noise, the RS485 twisted pair screening drain wire (the bare core) must be connected to the RS485

earthing screw in the Programmer or an earth push-fit connection. RS485 cable screening must only be **earthed at just one end of the cable**, which avoids earthing loops.

If the Programmer is the last device in the RS485 cable run then the RS485 termination jumper should be connected, mounting the jumper on **both** pins.

Additional connections

The Programmer has been designed to support a range of heat pump deployments.

The simplest wireless Thermostat heat pump deployment with a single heating zone may require no further connections.

A heat pump deployment with two heating zones will typically have a valve or a pump for each zone. Ensure each valve or pump is wired to the correct heating zone. The Thermostat's heating zone number is set when commissioning the Programmer.

The Programmer offers five valve and switch connections to handle optional switching of a shared circulation pump.

The optional shared *Circulation pump SL* connection becomes live if **any** Zone 1, Zone 2 or Actuator 3 switch is activated. GY1, GY2, GY3 are connected to mains live and OR1, OR2 and OR3 are **all** connected to *Circulation pump SL*.

Relay control connections

The Programmer includes a “Volfree 1” set of connections, which may be connected to a heat pump that supports third-party control via a call-for-heat signal.

Extra care must be applied by the installer if the call-for-heat voltage is 230v. The use of ferrules is recommended to avoid any stray connections to neighbouring contacts within the Programmer.

Ensure the heat pump manufacturer’s instructions are followed correctly for third-party control. The Passiv Smart Thermostat will switch the relay ON when calling for heat.

Installing the Thermostats

The Passiv Smart Thermostat can be installed with wired or wireless Thermostats. The wired Thermostats are powered by the Passiv Programmer and the wireless Thermostats have a built-in rechargeable battery. The wireless Thermostats can be charged using a standard USB-C cable (not supplied).

The Passiv Smart Thermostat can be installed with one or two Thermostats but they must be both wired or both wireless Thermostats, and each must control a distinct heating zone.

The Thermostat mounting location should be:

- Approximately 1.2-1.5m above the floor
- Positioned away from radiators, draughts or direct sunlight
- Fixed to the wall and not covered by anything such as curtains to allow free air flow
- Accurately representing the heating zone temperature. For example, avoid a ground floor hallway which may be subject to frequent cold draughts from a front door.

Thermostatic Radiator Valves (TRVs) must **not** be present in the room where the Passiv Thermostat is being positioned.

The Passiv Smart Thermostat is a learning thermostat and needs to be located in areas where the customer wants the greatest level of control over their comfort, such as the living room or the master bedroom in a two-zone property.

Wireless Thermostats

Wireless Thermostats will be in a deep-sleep to preserve battery life until the reset button on the back of the Thermostat is pressed. The Thermostat will then be responsive to button presses for one hour or until paired with the Programmer.

The wireless Thermostats use 868MHz communication, and can typically cope with up to three internal walls between the Thermostat and Programmer. The maximum open space range is approximately 100m.

Wireless Thermostats **must** have their wall bracket fitted to the wall according to the mounting criteria above. They can be surface fitted or use a flush 1-gang pattress box instead.

The Thermostat's **wall bracket must be fitted** during installation. Wireless Thermostats must **not** be used as a portable device. Incorrect use will compromise heating performance.

To recharge the Thermostat, hold the bottom edge of the device, and lift it gently away from the wall.

To fit the wireless Thermostat, hook on at the top edge of the wall bracket and then press the bottom edge of the Thermostat towards the wall, until the Thermostat clips into place.

Wired Thermostats

Up to two wired Thermostats can be connected directly to the Programmer.

Alternatively, two Thermostats can be connected as a single cable run from the Programmer and then to each Thermostat in turn. The maximum cable length is 100m.

The Programmer provides a 24v power supply to the wired Thermostats. The Thermostat's connection can be wired either way around.



Wired Thermostats require a 1-gang pattress box or a small recess to accommodate the wall bracket profile.

To remove the wired Thermostat from the wall bracket, use a flat headed screwdriver, insert and twist at each of the two tags on the bottom edge. Gently prise the Thermostat off the wall bracket and the connection pins.

To fit the wired Thermostat, hook on at the top edge of the wall bracket and then press the bottom edge of the Thermostat towards the wall, until the Thermostat clips into place.

Commissioning Process

Before commissioning, perform the following checks:

- All elements of the Passiv Smart Thermostat are correctly connected (see page 6)
- Heat pump manufacturer-specific system settings have been applied correctly
- The Passiv Hub*, Passiv Programmer and the heat pump are powered on

*First power up of the Passiv Hub may take up to 4 minutes before it is ready for system commissioning.

Follow the instructions on the Passiv Programmer. Initially set the date and time for accurate scheduling of heating and hot water. Pair the Thermostat(s) and identify the correct control method and heat pump. Finally, test device connections, confirming successful heat pump communication.

Once commissioned, the Installer Menu is presented providing access to:

- System Summary: Review the installed system
- Mean water temperature*: Limits the water temperature when underfloor heating is present
- Immersion test*: The immersion may be used for the hot water anti-legionella cycle
- Rerun commissioning: If a different heat pump is installed or a second heating area is added.

*These options will not be visible if the Relay control method is selected during commissioning.

To access the Installer Menu again, **press the up and down buttons at the same time**. Press the back button to exit.

Post installation checklist

Before leaving the site, complete this checklist to ensure that the heat pump and the Passiv Smart Thermostat has been installed correctly.

Heat pump checks		
RS485	Relay	
☐	n/a	Have the installed heat pump settings been applied as detailed in installer.passivuk.com ?
☐	n/a	Has the hot water cylinder probe been fully inserted into the middle cylinder pocket and is bunged/secured in place to prevent accidental extraction?
☐	☐	Have the hot water immersion connections been completed as per installed heat pump guidance? This is essential for anti-legionella protection.
☐	☐	Has the immersion element high-temperature thermostat been set to the maximum setting?
☐	n/a	Has the heat pump control panel been PIN locked (or similar) to prevent accidental adjustments?

RS485 communication checks		
☐	☐	Has a screened twisted pair RS485 cable been used between the Passiv Hub, Programmer?
☐	n/a	Has a screened twisted pair RS485 cable been used to the RS485 heat pump?
☐	☐	Have ferrules been used on RS485 connections?
☐	☐	If the Passiv Programmer is the last device in the RS485 connections, has the RS485 jumper been connected on both pins within the Programmer?
☐	☐	Has the RS485 screening drain wire been connected to earth in the Passiv Programmer?
☐	☐	Have all RS485 screening drain wires been inter-connected to ensure screening protection on all RS485 cable runs?
Ethernet		
☐	☐	Have adequate provisions been made for a wired ethernet connection to the Passiv Hub?
☐	☐	Has an ethernet cable been plugged into the Passiv Hub, ready for internet connectivity?

Commissioning and customer handover		
☐	☐	Has the Passiv Programmer date and time been set accurately?
☐	☐	Has hot water and space heating correct operation been confirmed (correct 3-way valve orientation and wiring)?
☐	☐	Has the heating distribution system been checked for successful heat delivery? For example, no TRVs are present in the Thermostat's vicinity and the heating system is balanced with good flow.
☐	☐	If there is more than one heating zone, does the correct zone respond to the correct Thermostat?
☐	☐	Has the Passiv Thermostats been correctly placed and fitted to the wall?
☐	☐	Has the Passiv Smart Thermostat User Guide been handed to the customer (or left in a safe place)?
☐	☐	Has the customer been shown the Thermostat(s) and Programmer menu? For example, how to set an Away period?
☐	☐	Has a "Do not switch off" label been applied on the Passiv Hub socket?

☐	n/a	Has a "Do not switch off" label been applied to the immersion element isolation switch?
☐	☐	Has the customer been shown the Passiv Hub and the immersion isolation switch, explaining their importance for system operation and anti-legionella safety? Note: The immersion is only used once a week to perform the anti-legionella cycle.

Installer's signature:

Date:

Please visit installer.passivuk.com for:

- Extra help and troubleshooting
- Product datasheets
- CE/UKCA Declarations of Conformity

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