

**7 Darney Road
Air Mitigation Report**

For

Se&Se Consultancy Ltd

Job No: A438
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Low
Carbon Energy
Assessor

Contents

1. INTRODUCTION.....	3
2. BACKGROUND – MITIGATION MEASURES	6
3. OVERHEATING AND SOLAR GAINS	8
4. PROPOSED MITIGATION MEASURES (MVHR DETAILS).....	9

Appendix 1 – MVHR Model and Datasheet

1. INTRODUCTION

This report is a commissioned Air Quality Mitigation Report on a scheme at 7 Darnley Road Gravesend Kent DA11 0RU.

The development (app ref: 20150923) is for the 'Change of use of the basement and ground floor from offices to a restaurant (Use Class A3) incorporating the erection of a single storey rear extension with terrace over, enlargement of the basement and conversion of the first floor and loft space into 1no. self-contained maisonette with access via 4-6 Darnley Road.'

This Report seeks to satisfy Planning Condition 6 which states:

"Prior to the commencement of the development hereby permitted a detailed scheme for air quality mitigation, shall be submitted to and approved, in writing, by the Local Planning Authority. The scheme must include a positive pressure air system, heat recovery, sealed windows on the front elevation and fresh intake air coming from a suitable clean source at the rear of the building and sited so that it would not be contaminated by odour from the extraction system for the restaurant use at the ground and basement levels of the building or any other pollution source e.g. gas flue etc.

The approved scheme shall be installed to the satisfaction of the Local Planning Authority prior to the first occupation of the maisonette hereby permitted. Thereafter, also prior to first occupation, the Local Planning Authority shall be provided with a written commissioning report from a competent ventilation engineer that the approved system has been incorporated into the maisonette and that it fulfils its purpose (i.e. that it prevents pollution from the roadside entering the maisonette) and shall

also be inspected by the Local Planning Authority to ascertain that the system in place is in suitable working order. The system shall be maintained as approved and in full working order at all times.

Reason: *In order to protect the amenity of future occupants of the maisonette at first and second floor level as the majority of the site is within a declared Air Quality Management Area (AQMA) for Nitrogen dioxide and the site itself suffers from high levels of Nitrogen dioxide from road traffic."*

This report has also been written to satisfy the Air Quality checklist associated with the development. This checklist can be seen on the following page

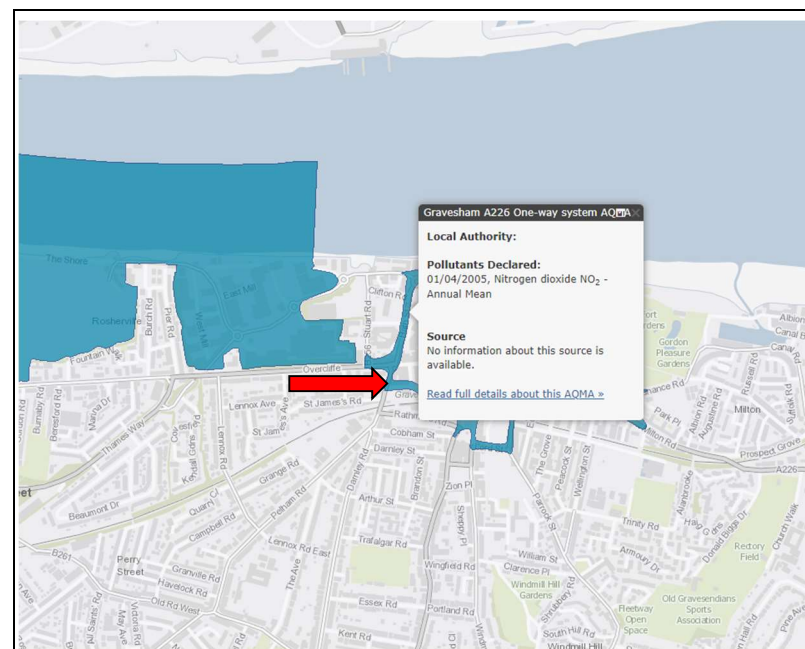


Figure 1: AQMA Local Boundary with Site Location

	Checklist	Section / Comment
1	Written confirmation that air system to be installed	Section 4 – Proposed Installer – p10
2	Confirmation that system to be installed prior to occupation	Section 4 – Proposed Installer – p10
3	Full details of supplier	Section 4 – Proposed Manufacturer – p10
4	Full details of installer	Section 4 – Proposed Installer – p10
5	Details of unit including make, model number etc. in each apartment	Section 4 – Proposed MVHR Unit and Schematic – p9
6	Confirmation that unit has a heat exchange system	Section 4 – Proposed Manufacturer – p10
7	Written details of locations of units and ductwork	Section 4 – Proposed MVHR Unit and Schematic – p9 Section 4 - Kitchen Flue and MVHR Inlet Location – p12
8	Written details of locations of inlets and outlets (must be outside of polluted area i.e. rear roof level at the furthest point away from traffic away from flues etc.)	Section 4 - Kitchen Flue and MVHR Inlet Location – p12
9	Layout and elevation plans submitted including ducting, inlets and vents etc. Plan numbers.	Section 4 - Kitchen Flue and MVHR Inlet Location – p12
10	Details of the acoustic attenuation of the air system to prevent noise breakout causing nuisance to occupiers in the apartment and neighbours.	Section 4 – Noise Attenuation – p10
11	Confirmation of the absence of trickle or other passive vents.	Section 4 – Ductwork – p10
12	Confirmation windows and balcony doors permanently sealed closed	Section 3 – p8

13	Confirmation that system will be running 24 hours and cannot be turned off	Section 4 – Control of Electricity Supply – p11
14	Details of settings for flow rate for inlet air (note this must be higher than outlet rate to create positive pressure)	Section 4 – Flow Rate (Inlet Air) – p10
15	Details of settings for flow rate for extract air	Section 4 – Flow Rate (Extract Air) & Boost Settings – p10
16	Details of boost settings for when cooking smells or steam present	Section 4 – Flow Rate (Extract Air) & Boost Settings – p10
17	Air temp setting degrees C	Section 4 – Flow Rate (Extract Air) & Boost Settings – p10
18	Control of electricity supply to unit (advised that fused spur to be in a location not easily accessible to resident but accessible by service engineer)	Section 4 – Control of Electricity Supply – p11
19	Confirmation that occupant cannot turn off system (note resident/tenant must not be able to disable the system easily)	Section 4 – Control of Electricity Supply – p11
20	Details of maintenance regime including filter cleans and servicing, who by and what periods.	Section 4 – Maintenance Regime – p11
21	System compliant with Building Regulations?	Section 4 – Proposed Manufacturer – p10
22	Has the risk of solar gain affecting internal room temperatures been addressed?	Section 3 – p8
22	Details of information to be supplied to the future occupier about the system and the reasons why it has been installed etc. i.e. copies of operating manuals and details of schedule of maintenance and who is responsible.	Section 4 – Commissioning – p11
23	Independent ventilation engineer to carry out commissioning inspection of systems to confirm that inlet and outlet settings are correct and to confirm that system fulfils its purpose i.e. to create positive pressure within residential unit to ensure no polluted air comes in from outside etc. Report to be produced and submitted to LPA.	Section 4 – Commissioning – p11
24	Visit to site by LPA to see system installed and working.	Section 4 – Commissioning – p11

2. BACKGROUND – MITIGATION MEASURES

Mechanical Ventilation with Heat Recovery

MVHR (Mechanical Ventilation with Heat Recovery) provides fresh filtered air into a building whilst retaining most of the energy that has already been used in heating the building.

Heat Recovery Ventilation is the solution to the ventilation needs of energy efficient buildings. Mechanical ventilation with heat recovery (MVHR), heat recovery ventilation (HRV) or Comfort ventilation are all names for the same thing.

A heat recovery ventilation system properly fitted into a dwelling provides a constant supply of fresh filtered air, maintaining the air quality whilst being practically imperceptible.

MVHR works quite simply by extracting the air from the polluted sources e.g. kitchen, bathroom, toilets and utility rooms and supplying air to the 'living' rooms e.g. bedrooms, living rooms, studies etc. The extracted air is taken through a central heat exchanger and the heat recovered into the supply air. This works both ways, if the air temperature inside the building is colder than the outside air temperature then the coolth is maintained in the building.

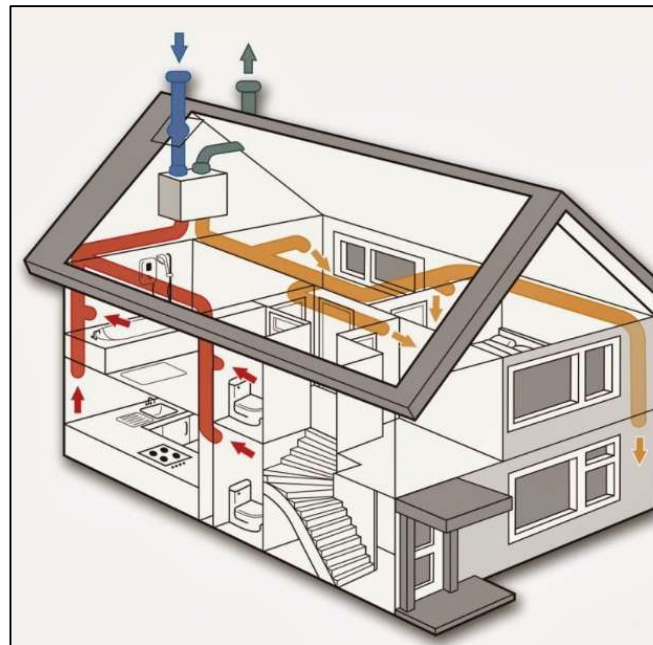


Figure 2: MVHR system illustration

Positive Pressure Air (Ventilation) System (PPAS)

Positive Pressure Ventilation Systems draw in fresh air and dry it at an ambient temperature. The air is then gently and continuously introduced into the property via a fan, whereby it can displace and dilute the stale, moist air that is present in the house.

The most common type of Positive Pressure Ventilation System consists of a loft unit fitted into the roof void, ducted via an air diffuser, and mounted above a ceiling vent in the ceiling above a stairwell. Some systems are supplied with a pre-heat facility which heats the air before it is pushed down into the property, and controls for both heating and fan speed are usually located on the wall in the landing area.



Figure 3: PPAS illustration – Source: Nuair

Positive Pressure Air System and MVHR Distinctions

A PPAS unit works much in the same way as a Mechanical Ventilation with Heat Recovery (MVHR) system. MVHR however, requires ducting which isn't always feasible to add to an existing house. PPAS does not possess the ability to recover heat from escaping high-pressure hot air that is forced out of the dwelling via the process of positive air pressure.

PPAS consists of a single unit typically fitted in a loft, making it a good retrofit option. It is, however, much more accustomed to older dwellings and is not seen in many modern buildings. MVHR can also be designed to create a system and regime of positive pressure similar to that of a standalone PPAS.

If airtightness cannot be guaranteed or the duct runs cannot be designed and installed with low resistance (which can be a challenge in existing homes) then PPAS can be considered over MVHR.

A large drawback from PPAS is that it will increase heating costs if not mitigated against. The effects of PPAS adds cool air from the outside and circulates it around a dwelling. As such, heating systems have to work harder in colder months.

Based on these comparisons, if MVHR can be fitted to a dwelling, then it provides benefits that PPAS do not, and does not possess the drawbacks that PPAS exhibits.

3. OVERHEATING AND SOLAR GAINS

Criterion 3 of Part L 2013 of the Building Regulations relates to limiting the effects of heat gains in summer - this is implemented for new dwellings as set out in Appendix P of SAP 2012. All dwellings pass this Criterion.

The overheating & cooling hierarchy as seen on the right-hand side of this section, addressed the risk of solar gain affecting internal room temperatures.

The Building Regulations recognises that Criterion 3 does not cover all factors influencing overheating and that there is no guarantee that buildings will not overheat.

However, this development should have no issues with overheating due to all stages of the cooling hierarchy being followed, with the lack of communal heat distribution, provision of MVHR and windows with blinds being major factors in mitigating any potential risks.

Stage 4 of the Cooling Hierarchy will not be strictly adhered to as windows on the front elevation will be sealed. Windows on the rear elevation will be openable.

The site visit conducted on the 1st February 2022 confirmed that the windows are sealed at the front elevation.

Cooling Hierarchy	Measures Undertaken
1. Minimising internal heat generation through energy efficient design	As the dwellings will be heated by Individual Boilers, there will be no communal heat infrastructure in the building requiring mitigation.
2. Reducing the amount of heat entering the building in summer	- Carefully designed shading measures have been considered, including: i. specification of Internal Blinds ii. designing in the stack-effect
3. Use of thermal mass and high ceilings to manage the heat within the building	- Level of exposed thermal mass has been maximised where possible, but it must be noted that in high buildings the internal partitions are built to minimize its weight so increasing thermal mass of internal partitions is not feasible for this scheme - The Floor to Ceiling Height complies with statutory requirements.
4. Passive Ventilation	Openable Windows
5. Mechanical ventilation	MVHR will be installed. Mechanical Ventilation will make use of 'free cooling' (when the outside air temperature is below that in the building during summer months). This will be achieved via a by-pass mode on the heat recovery system for summer mode operation.

Table 1: Cooling Hierarchy

4. PROPOSED MITIGATION MEASURES (MVHR DETAILS)

For the scheme at Darnley Road and based on the background considerations listed in Section 2, it is therefore considered appropriate to utilise an MVHR system. The following is demonstrated in this section:

- MVHR can be fitted to the existing property;
- The MVHR intake will be positioned away from the ground floor restaurant flue, with wind direction considered;
- The windows will be sealed to provide further protection from pollutants and odours.

Existing Heating Arrangements

A site visit was conducted on the 1st of February 2022. This site visit confirmed that the existing heating is provided by a Low Temperature Hot Water system.

A low-temperature heating system is defined as one in which the hot water leaving the heat generator is always at a temperature not exceeding 45 °C or 35 °C.

Low-temperature heating possesses a different system design, mainly to ensure that the heat emitters (radiators, fan-assisted radiators or convectors, or underfloor heating pipes) can deliver the same amount of heat at the lower temperature as a traditional radiator system would have done at normal temperature (over 55 °C). The emitters in each room must be sized correctly to ensure they can achieve that. The existing property at Darnley Road has been fitted radiators to achieve this.

Proposed MVHR Unit and Schematic

The below schematic and proposals can and have demonstrated that an MVHR system with ducting will be applicable to the property at Darnley Road. This schematic has been designed with the proposed (found in Appendix 1) HRV1.25 Q Plus Range. There will be one unit to serve the individual and single dwelling.

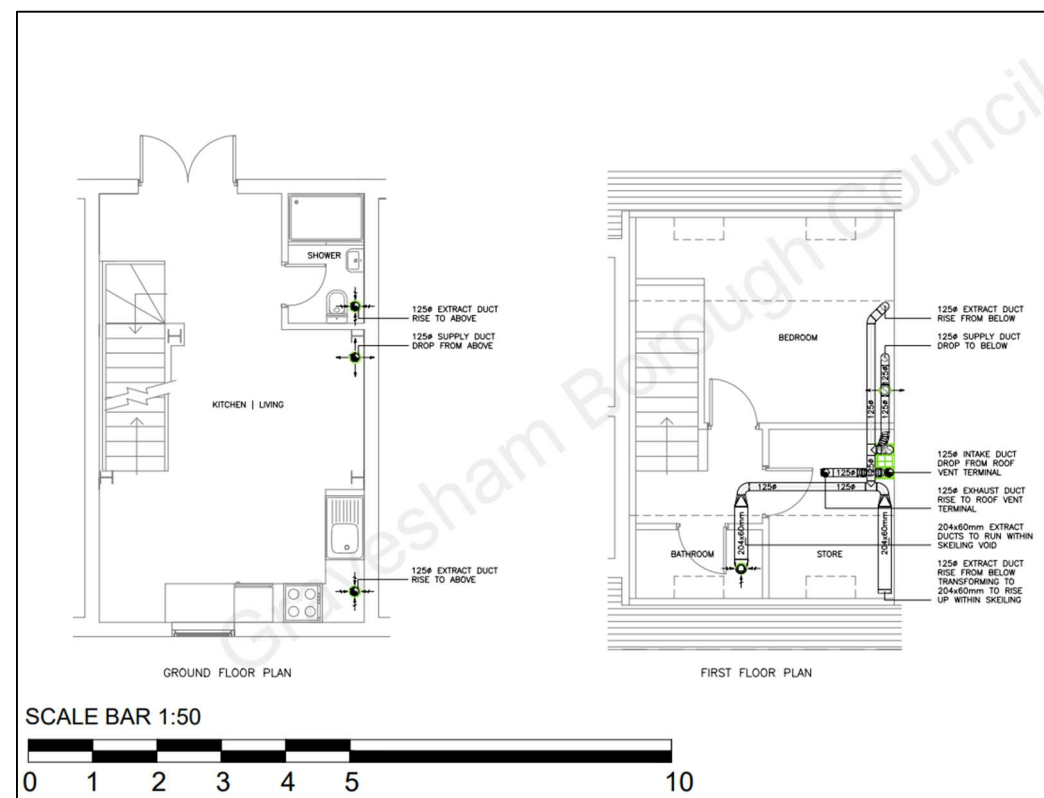


Figure 4 : Proposed MVHR System

Proposed Manufacturer

The proposed manufacturer as mentioned above will be Titon. Specifically, the Titon HRV1.25 Q *Plus* Range model will be utilised at the development.

The Titon HRV1.25 Q Plus Range model will also be installed with a heat exchange system. Additionally, the Titon HRV1.25 Q Plus Range model is compliant with building regulations.

Proposed Installer

The installation of the proposed Titon MVHR system will be done by a certified professional and/or company and will take place prior to occupancy of the new property.

Ductwork

As previously mentioned, the new property will be designed with ducting and will therefore be suitable for an MVHR system. This ducting will be rigid plastic, with dimensions of 204 x 60mm or 125mm diameter (minimum) complete with thermal ducting on the atmosphere side of the ductwork.

Further to this, the system will not possess any trickle vents or passive vents.

Noise Attenuation

To prevent noise breakout causing nuisance to occupiers in the apartment – and neighbours, attenuators will be installed to the Titon system. These

will specifically be the Titon Semi Flexible Attenuators 89720 125mm diameter X 500mm.

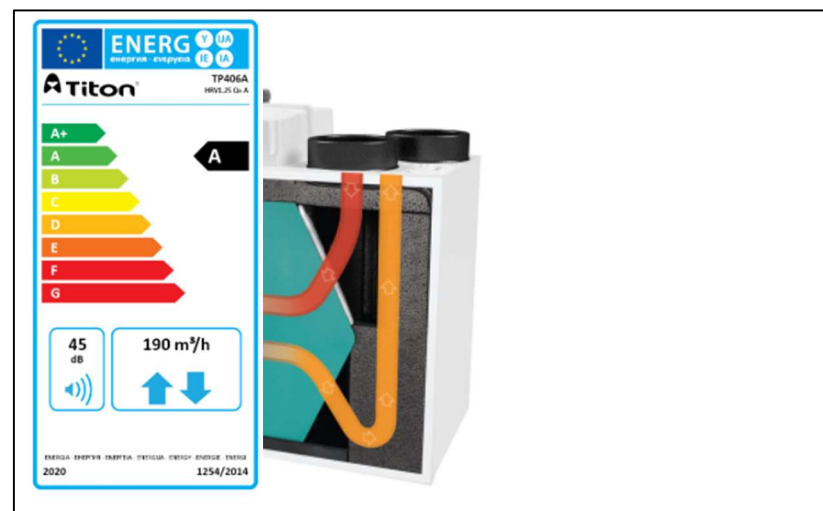


Figure 5 : Proposed MVHR Model and Rating

Flow Rate (Inlet Air)

Controlled ventilation and flow rate can be achieved with the Titon model and MVHR in general. This will be balanced, or create positive pressure, via two separate fan speed settings that can be manually or via on Aura-T controller that can programme percentage speed settings.

Flow Rate (Extract Air) & Boost Settings

Part F Buildings regulations provides minimum low and high rates for MVHR systems. A Boost switch can be fitted to each individual Kitchen and Wet Room that will switch between low continuous rate and boost high rate.

The Titon MVHR unit will also have a programmed RH (Relative Humidity) percentage rate set between 65 and 90% RH which can trigger the

ventilation setting to Boost automatically.

Control of Electricity Supply

The Titon MVHR unit will be installed with a fused spur which is a switch that's used to isolate electrical equipment from the mains supply. As such, the control of electricity supply will be available.

This fused spur will be installed at a high level next to the MVHR and as such would not be easily accessible to any new resident/occupier but would be accessible for a service engineer. Because of this, the occupant will not be able to disable the system easily.

Further to this, the system will also be running for 24 hours each day and will not turn off.

Maintenance Regime

A filter cleaning indication will be programmed for inspection via an Aura-T controller. The Aura-T is a simple touchscreen controller for programming, commissioning and occupancy control for Titon's range of Mechanical Ventilation Heat Recovery (MVHR) units. This will therefore be able to be used by the new occupier to clean their own filtration unit.

Further guidance will also be provided to any new resident in the form of a leaflet or provision of online guidance, to facilitate the cleaning of the MVHR filter.

The Aura-T touch screen controller also allows straightforward operation of ventilation speeds. Offering a display that is backlit, and provides enhanced functionality when connected to a 2019 HMB model. This filtration will be reviewed every 6-12 months depending on environmental

conditions, and programme timing can be altered between 0-24 months.

Commissioning

An independent ventilation engineer is to carry out the commissioning inspection of the MVHR system to be installed, and to confirm that the inlet and outlet settings are correct. The engineer will also confirm that the system fulfils its purpose of creating positive pressure with heat recovery.

This is to ensure that no polluted air from the outside comes inside the new dwelling. Once this engineer has completed his inspection, he is to carry out a report and submit it to the LPA independently. Following this, the LPA will also undertake a site visit to ensure that the system is installed and working.

Both of these commissioning arrangements are to be made by the contractor once the installation is complete.

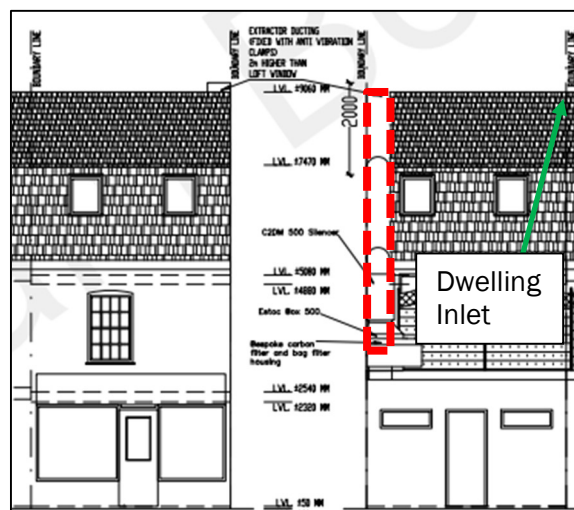
A leaflet will be provided to the future occupant by the developer, that at a minimum will include for:

- The reasoning for the installation of the MVHR
- Operating manuals
- Details of schedule of maintenance and who is responsible
- Aura-T Controller details
- Relative online details for all of the above.

Figure 6 : Kitchen Flue & Extract Rooftop Locations

Kitchen Flue and MVHR Inlet Location

The site visit conducted on the 1st February confirmed the locations of the extract ventilation system (flue) present at the roof level of the ground floor restraint. The precise location of this flue relative to the site layout can be seen across.



The positioning of the inlet for the MVHR ducting system is imperative in ensuring comfort at the dwelling above the restaurant premises.

The inlet/intake position demonstrated on Figure 4 is deemed to be in a suitable position away from the extract restaurant flue, and to the farthest distance from traffic that is possible.

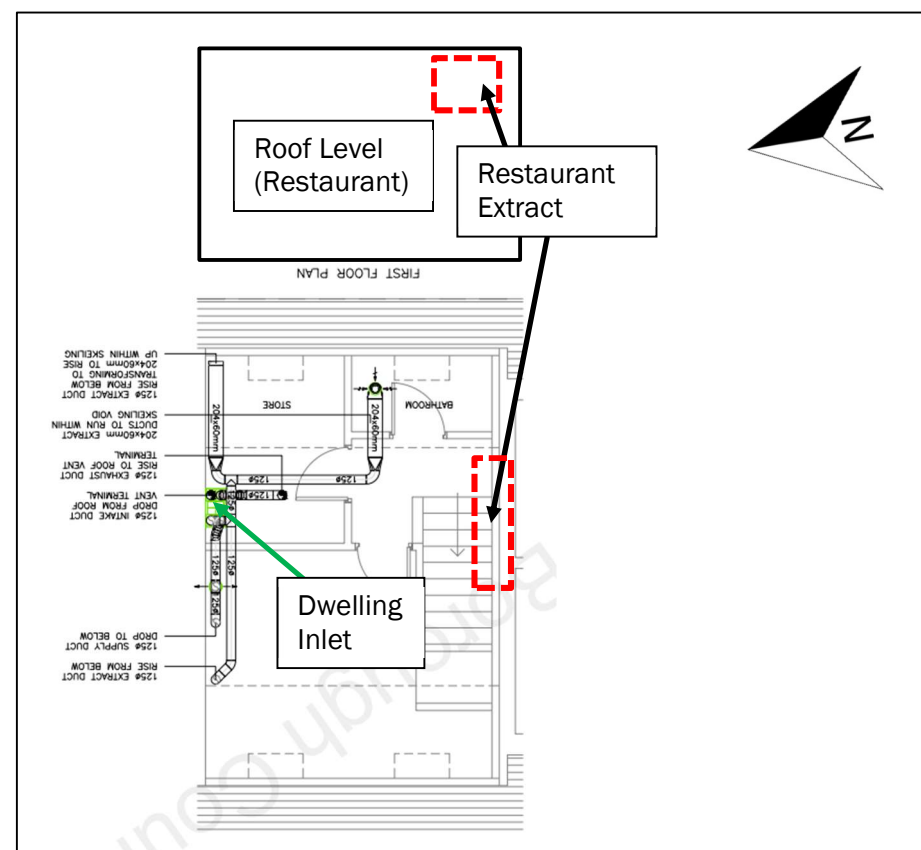
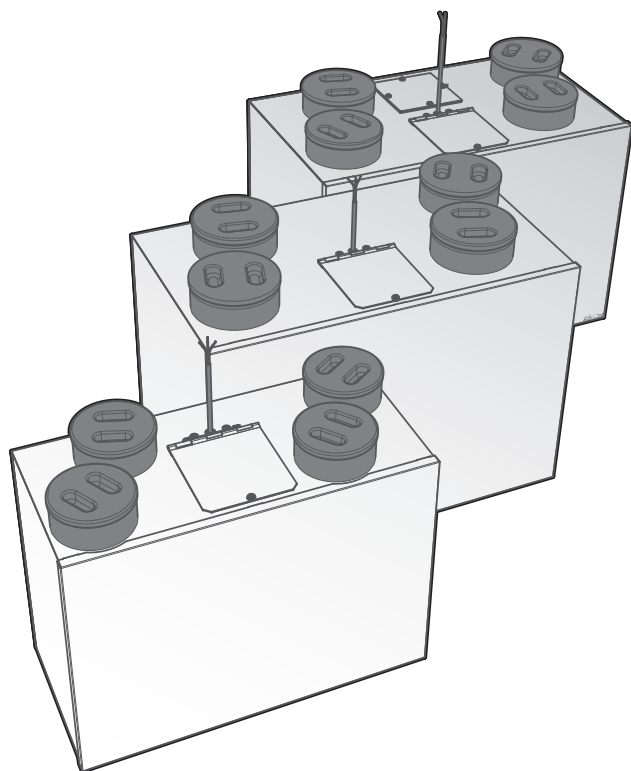


Figure 7 : Flue and Inlet Relative Location

EN



HRV1 *Q Plus*

TP400A

HRV1.25 *Q Plus*

TP406A

HRV1.5 *Q Plus*

TP403A, TP403ABD

TP403ABS

HRV1.75 *Q Plus*

TP404A, TP404ABD

TP404ABS

HRV2 *Q Plus*

TP401A, TP401ABD

TP401ABS

HRV2.75 *Q Plus*

TP405A, TP405ABD

TP405ABS

HRV3 *Q Plus*

TP402A, TP402ABD

TP402ABS

Heat Recovery Ventilation Units Product Manual



Product Overview

Safety and Guidance	3
Dimensions HRV1 & 1.25 <i>Q Plus</i>	4
Dimensions HRV1.5, 1.75, 2, 2.75 & 3 <i>Q Plus</i>	5
Product Features	6
Controls & Features	7
Setback Speed	7
Boost Speed with Overrun Timer	7
SUMMERboost®	7
Summer Bypass	8
Automatic Frost Protection	8
Duct Heater	8
Summer Mode	9
Constant Volume Fans	9
Packaging Contents	10
Notes	11

Installation

Fixing	12
Condensate Drain	15
Ducting Connections	16
Wiring & Safety	18
Wiring Connections Access	18
Wiring Diagrams	19
Wiring Diagrams	20
Wiring Diagrams	21
Wiring Diagrams	22
Duct Heater	23
Fitting	24
Connection to Mains	25
Maintenance	26
Overheating	26

Commissioning

Controls	27
Control Parameters	27
Continuous Supply & Extract Speeds:	28
Boost Supply & Extract Speeds:	28
Boost Overrun	28
Controller Reset	29
Hardware Reset	29

Maintenance

Routine Maintenance	30
Front Cover Removal	30
Cleaning Interior	31
Cleaning Exterior	31
Condensate Tray	31
Filter Replacement	32
How to Change Filters	33
Service Record	34

Safety and Guidance

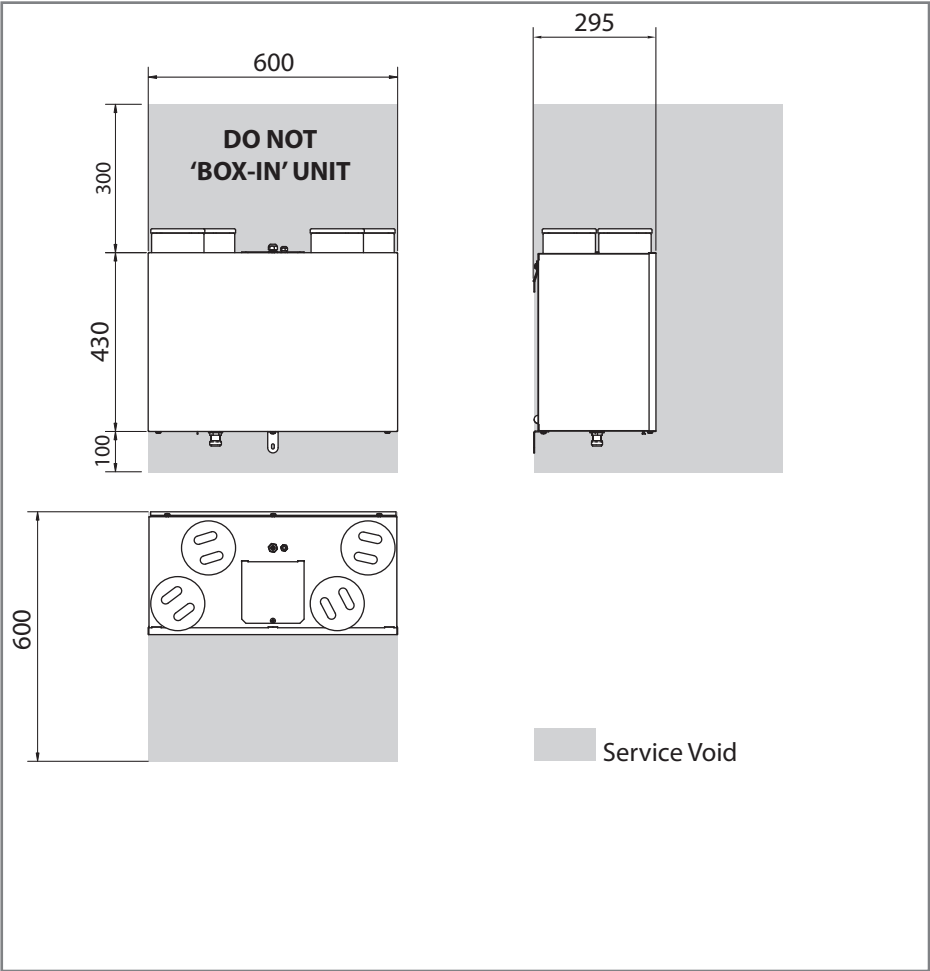
Important: read these instructions fully before the installation of this appliance

1. Installation of the appliance must be carried out by a qualified and suitable competent person and be carried out in clean, dry conditions where dust and humidity are at minimal levels.
2. The unit must be stored in a clean and dry environment.
3. Do not install the appliance in areas where the following may be present or occur:
 - Excessive oil or a grease laden atmosphere
 - Corrosive or flammable gases, liquids or vapours
 - Ambient temperatures above 40°C or below -5°C
 - Humidity levels above 90% or is a wet environment
4. The appliance is not suitable for installation to the exterior of the dwelling
5. This appliance is not intended for use 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 appliance by a person responsible for their safety
6. Children should be supervised to ensure that they do not play with the appliance
7. Ensure that external grilles are located away from any flue outlet, in accordance with relevant Building Regulations
8. The unit must not be connected to a tumble drier
9. The unit must not be connected to a cooker hood
10. Precautions must be taken to avoid the back-flow of gases into the room from an open flue appliance
11. Ensure all ducting and condensate drain and associated pipe work is free from debris and blockages before switching on the unit

IMPORTANT - Fully read this Product Manual to help ensure the ventilation system is installed, commissioned and used properly

Dimensions HRV1 & 1.25 Q Plus

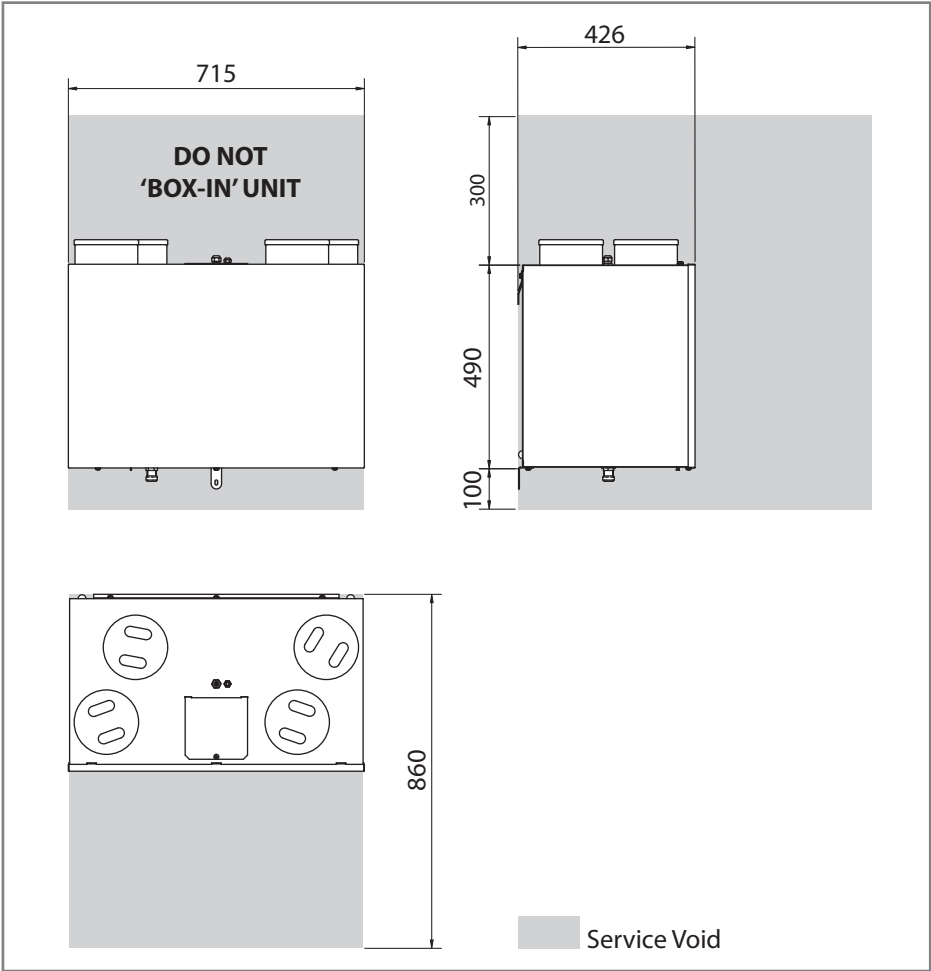
This diagram details the overall size of the unit and the additional space required around the unit to allow for commissioning and future servicing and maintenance.



All dimensions in millimetres

Dimensions HRV1.5, 1.75, 2, 2.75 & 3 Q Plus

This diagram details the overall sizes of the units and the additional space required around the units to allow for commissioning and future servicing and maintenance.



All dimensions in millimetres

Product Features

The table below lists the models covered by this Product Manual. To find out what features your Titon HRV *Q Plus* has refer to the part number. The part number can be found on the serial number label fixed to the top and front of the unit.

Model	HRV1 Q Plus			HRV1.25 Q Plus			HRV1.5 Q Plus			HRV1.75 Q Plus			HRV2 Q Plus			HRV2.75 Q Plus			HRV3 Q Plus		
Part Number	TP400A	TP406A	TP403A	TP403ABD	TP403ABS	TP404A	TP404ABD	TP404ABS	TP401A	TP401ABD	TP401ABS	TP405A	TP405ABD	TP405ABS	TP402A	TP402ABD	TP402ABS				
Filter Covers		•																			
Setback Speed	•	•	•			•			•			•			•						
Continuous Speed	•	•	•			•			•			•			•						
Boost Speed with Overrun Timer	•	•	•			•			•			•			•						
SUMMERboost®					•			•			•			•			•				
Summer Bypass				•	•		•	•		•	•		•	•		•	•				
Duct Heater Connection				•	•		•	•		•	•		•	•		•	•				
Summer Mode	•	•	•			•			•			•			•						
Constant Volume Fans									•						•						
Ø100 & 125mm Ducting	•	•																			
Ø125 & 150mm Ducting			•			•			•			•			•						
Independent adjustment of Fans	•	•	•			•			•			•			•						
Step-less fan Speed Setting	•	•	•			•			•			•			•						
Automatic Frost Protection	•	•	•			•			•			•			•						

GB Patent Nos. GB2469254, GB2470331, GB2470528, GB2470684, & GB2471406
 GB Patent Application No. GB2491516,
 EP Patent Application No. EP2242959

Controls & Features

The HRV *Q Plus* units are controllable by various volt free switches and sensors. The following describes the controls and features of the HRV *Q Plus* units and how they are controlled. Refer to the table opposite. Ensure all controls are adequately labelled, indicating their function clearly.

Setback Speed

Setback Speed is used to reduce ventilation rates. Setback Speed is automatically set at the mid point between minimum possible continuous speed and the selected continuous speed. The Setback Speed can be enabled by connection of a volt free one-way switch, or combined with the Boost Speed with the 3 position switch TP 508.

Boost Speed with Overrun Timer

Boost Speed increases the extract and supply air flow. Boost Speed is configured with Step-less independent fan controls and includes an Overrun Timer variable between 0 and 60 minutes. The Boost Speed can be triggered by any device which provides a volt free one-way switch, such as a PIR, thermostat, humidistat or a standard one-way switch.

SUMMERboost®

An optional SUMMERboost® facility is available that configures both the supply and extract fans to run at full speed whenever the Summer Bypass is activated. SUMMERboost® can be configured to trigger either manually or automatically:

- Manual - This is by means of a volt-free switch wired directly into the controller PCB
- Automatic - This is by means of a dedicated wall mounted room thermostat. In this configuration, the SUMMERboost® will only operate when the temperature within the room has exceeded the dedicated thermostat setting. Should the room temperature fall below the thermostat setting, then SUMMERboost® will not operate.

Summer Bypass

Summer Bypass is designed to operate during hot periods where fresh air can be vented straight into the property without being preheated by the extracted stale air. Summer Bypass operation is automatically controlled. The Summer Bypass mechanism diverts the stale air being extracted from the dwelling around the heat cell so that its heat energy is not transferred to the fresh air being supplied to the property.

Automatic Frost Protection

During very cold weather, Automatic Frost Protection will detect temperatures that could form ice inside the unit. It will reduce the supply ventilation rate to prevent ice build up within the heat cell. Automatic Frost Protection reduces the flow rate of cold air, thus allowing the warmer stale air to raise the temperature within the heat cell to such a level that prevents the formation of ice. As internal temperatures rise Automatic Frost Protection will increase the supply ventilation flow rate back to the commissioned settings.

Duct Heater

To maintain ventilation flow rates where prolonged periods of very low temperatures occur, the facility for the control of a Duct Heater is provided, MAX 1000W. This is achieved using an electrically powered Duct Heater placed in-line between the outside supply vent and the From Atmosphere terminal on the HRV *Q Plus*. In these applications, the heater is used to pre-warm the outside fresh air supply before it enters the HRV *Q Plus*. During Duct Heater operation fan speeds are not changed. However if the temperatures fall below a predetermined level Automatic Frost Protection will engage to protect the heat cell.

Summer Mode

In properties where it is desirable to reduce the supply of warm fresh air during hot weather, but where full Summer Bypass may be inappropriate or not available, the optional Summer Mode operation is available. Summer Mode operates by stopping the supply fan. Summer Mode can be triggered either manually or automatically:

Manual - This is by means of a volt-free switch wired directly into the controller PCB

Automatic - This is by means of a dedicated wall mounted room thermostat. In this configuration Summer Mode will only operate when the temperature within the room has exceeded the dedicated thermostat setting. When Summer Mode is selected the supply fan will remain off even if the HRV is placed into Boost.

Summer Mode must not be installed in dwellings where open flue combustion appliances are used. Summer Mode must not be installed on HRV *Q Plus* ABD or HRV *Q Plus* ABS units.

Filter Covers

Some units are fitted with removable filter covers on the front panel.

Constant Volume Fans

These automatically adjust their speed depending upon the system resistance, thus ensuring that the required airflow is always maintained.

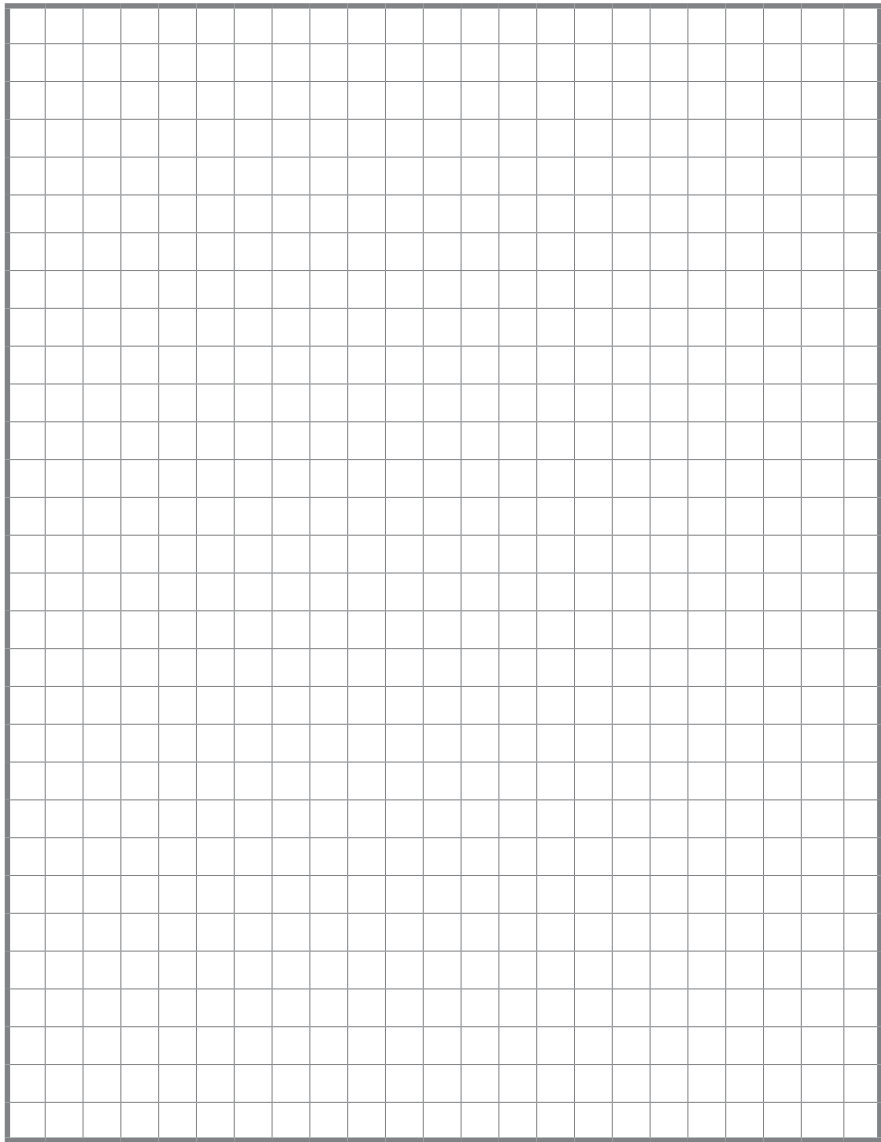
Packaging Contents

Inspect the unit when taking delivery. Check the unit for damage and that all accessories have been supplied. Each HRV *Q Plus* unit is supplied with:

- Mounting Bracket x 2
- Safety Bracket x 1
- 15mm Condensate Drain Olive & Nut x 1
- M6x10mm Pan head screws x 4
- M6 washers x 4
- Transport Bungs x 4, supplied packed in *Duct Ports*
- Product Manual x 1
- User Guide x 1

Any shortages or damage must be immediately reported to the supplier.

Notes



Installation

Fixing

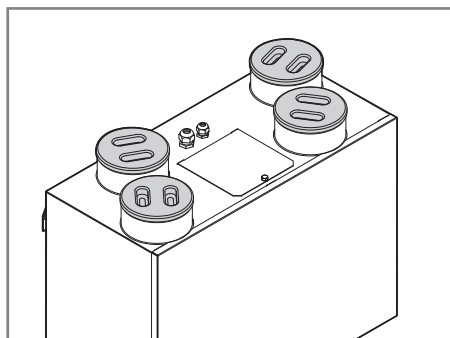
Titon recommend the use of guidance given in the Domestic Ventilation Compliance Guide 2010 Edition ISBN-978 1 85946 378 9 and Approved Document Part F 2010 ISBN-978 1 85946 370 3 for all installations in the United Kingdom.



The above documents can be downloaded free from www.planningportal.gov.uk.

Do not remove the Transport Bungs until connecting ducting. Transport Bungs are fitted to prevent debris falling into the unit and causing blockages and damage:

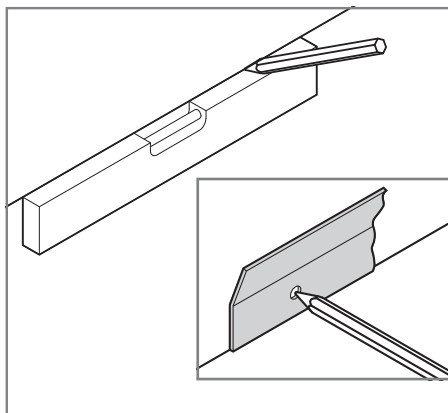
- The Titon HRV *Q Plus* is designed to be mounted on a wall or similar. The mounting surface must be sufficiently strong to support the unit
- Consider the positioning of electrical services and the Condensate Drain when siting the unit
- Ensure there is sufficient access around the HRV *Q Plus* for future maintenance
- Do not 'box-in' the unit making access to the unit difficult for maintenance and repair



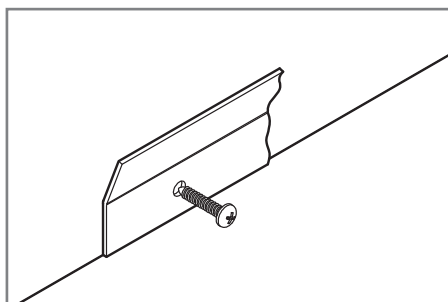
Transport Bungs highlighted

The Unit Must be mounted plumb and level front to back and side to side.

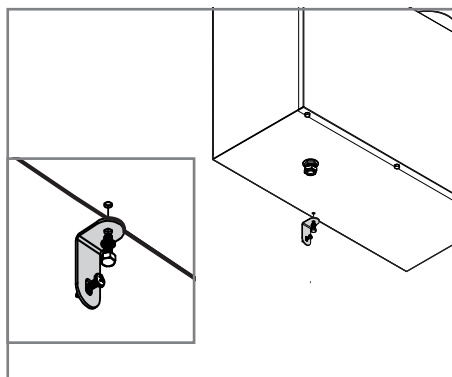
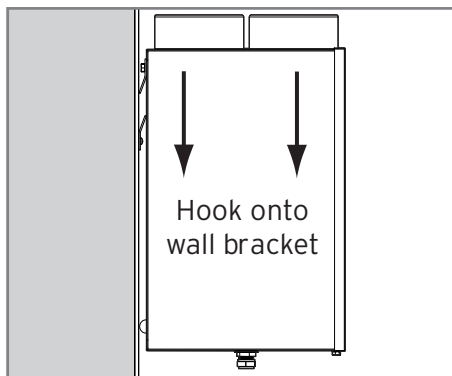
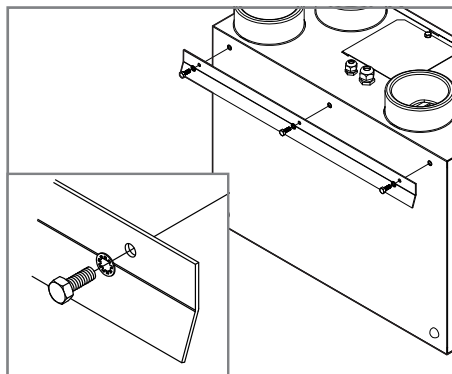
1. Mark a horizontal line on the wall using a spirit level. This line will be approximately 95mm below the location of the top face of the unit when fitted (excluding duct ports)
2. Use one of the Mounting Brackets as a template to mark the three fixing hole centres
3. Drill holes for fixings, always use a fixing suited to the wall type
4. Fix one Mounting Bracket to the wall ensuring the interlocking side is at the top, as shown



Mounting Bracket highlighted



5. Fix the remaining Mounting Bracket to the unit using the M6 screws and washers provided, ensuring the interlock side is at the bottom. Do not overtighten
6. Mount the unit by locating the two Mounting Brackets together. Ensure a positive location is made between the two Mounting Bracket
7. The Safety Bracket MUST be fitted. Fix the lower Safety Bracket as shown using the remaining M6 screw, washer and suitable wall fixing. Packing to be used as required behind the Safety Bracket to ensure unit is level



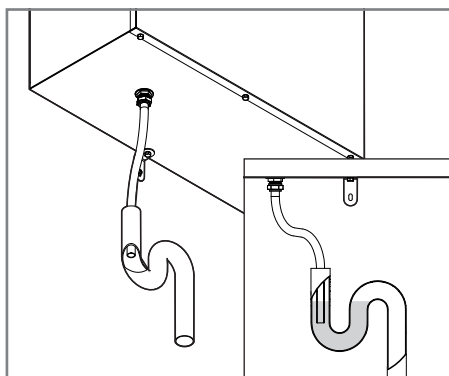
Safety Bracket highlighted

Condensate Drain

The unit's *Condensation Drain Pipe* must be fitted and connected to the dwelling's foul water drainage system in accordance with the relevant building regulations.

The *Condensation Drain Pipe*:

- Is attach via a 15mm compression fitting (drain pipe shown un-insulated for clarity), on the base of the unit
- Must incorporate a suitable trap, which must act as an air lock
- Must be adequate secured and be insulated with the equivalent of at least 25mm of insulating material with a thermal conductivity of 0.04 W/(mK) if any part of the pipe passes through an unheated void
- Should be installed to have a minimum 5° fall from the unit
- Titon recommend the use of diaphragm type waste valve in place of a conventional 'wet' trap which could dry out. Such as, BRE certificate no. 042/97 'Hepworth Hepv0 Hygienic self sealing plastic waste valve' recommended as an alternative to traditional U-Traps



Ducting Connections

Titon recommend the use of guidance given in the Domestic Ventilation Compliance Guide 2010 Edition ISBN-978 1 85946 378 9 and Approved Document Part F 2010 ISBN-978 1 85946 370 3 for all installations in the United Kingdom.

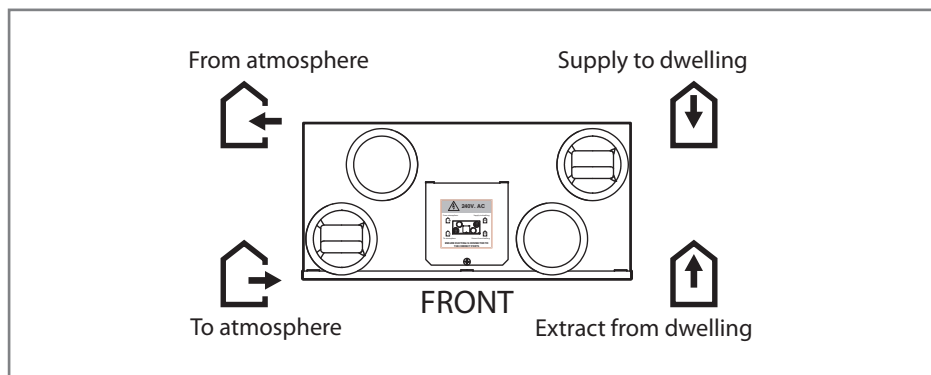


The above documents can be downloaded free from www.planningportal.gov.uk.

Once the unit has been installed and the ducting is ready to connect to the unit, remove the Transport Bungs from the Duct Ports.

Titon recommend that:

1. Ø125mm ducting is used to connect the HRV1 & 1.25 *Q Plus*.
2. Ø150mm ducting is used to connect the HRV1.5, 1.75, 2, 2.75 & 3 *Q Plus*.
3. A short piece of flexible ducting, approximately 200mm long is used to connect the unit to the ducting system.



ENSURE DUCTING IS CONNECTED TO THE CORRECT PORTS

4. Any flexible ducting used must be pulled taut.
5. A minimum distance of 200mm between the HRV *Q Plus* unit and any sharp bends in duct work.

6. Ducting should be insulated where it passes through unheated areas and voids with the equivalent of at least 25 mm of a material having a thermal conductivity of $\leq 0.04 \text{ W/(m.K)}$ to reduce the possibility of condensation forming. Where a duct extends externally above roof level the section above the roof should be insulated or a condensate trap should be fitted just below roof level.
7. Ducts within the building heated envelope between the external terminals and the unit's From Atmosphere and To Atmosphere ports should be insulated and wrapped additionally with a vapour barrier outside the insulation.
8. Where ducts pass through fire barriers, they must be appropriately fire stopped in accordance with the requirements of Part B of the Building Regulations (for England & Wales).
9. A ducting condensate drain must be fitted to vertical To Atmosphere duct work.
10. Ducting must be installed in such a way that resistance to airflow is minimised.
11. Ducting connected to the From Atmosphere & To Atmosphere ports, must be to the external air outside the building envelope.
12. All ducting joints including those to the HRV *Q Plus* unit's Duct Ports must be permanently sealed with tape and/or an appropriate non-hardening sealant and/or Jubilee clips or similar. Do not distort ducting or Duct Ports by over tightening clips.
13. A minimum distance of 2m exists between the external supply and exhaust terminals.

Wiring & Safety

WARNING: The unit **MUST** be earthed. All wiring must conform to current I.E.E. Wiring Regulations and all applicable standards and Building Regulations.

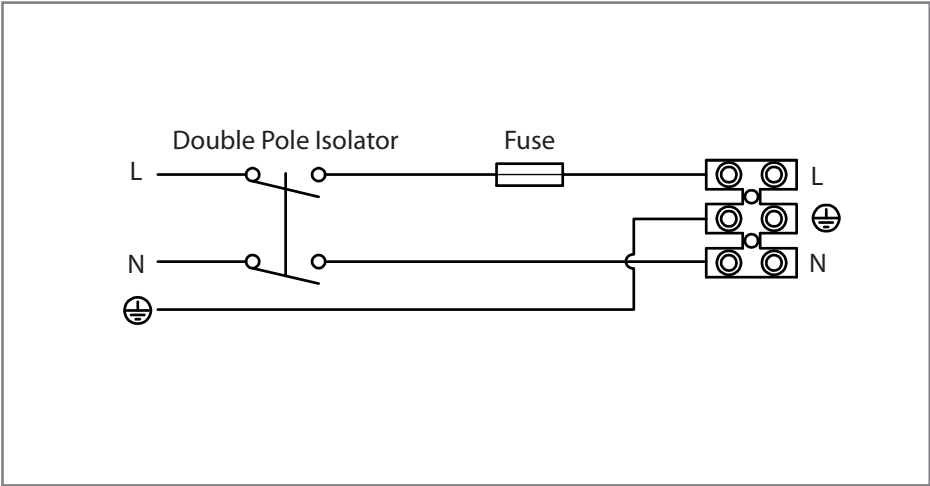
1. Electrical installation of the appliance **MUST** be carried out by a suitably qualified competent person
2. The unit is supplied with a mains rated 3 core flexible cord (PVC sheathed, brown, blue and green/yellow 0.75mm²)
3. Inspect the appliance and electrical supply cord. If the supply cord is damaged, it must be replaced by the manufacturer, their service agent or similarly qualified persons in order to avoid a hazard
4. The appliance must be connected to a local double pole isolation switch with a contact separation of at least 3mm
5. HRV1 *Q Plus*, HRV1.25 *Q Plus*, HRV1.5 *Q Plus*, HRV1.75 *Q Plus*, HRV2 *Q Plus* & HRV2.75 *Q Plus* are suitable for 230V ~ 50/60Hz single phase with a fuse rating of 3A
6. HRV3 *Q Plus* is suitable for 230V ~ 50/60Hz single phase with a fuse rating of 5A
7. Control cable access is via the fitted cable gland(s) which are suitable for Ø3- 6mm cable
8. Ensure all cable glands are fully tightened

Wiring Connections Access

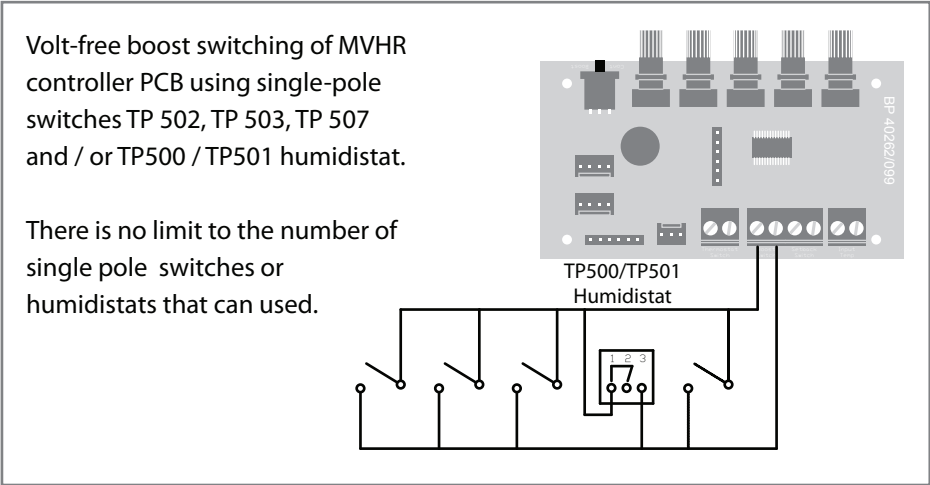
Access to the connections for Boost and other volt free control functions is via the hinged cover on the top of the unit, at the front. All units.

Access to the connections for the duct heater is via the cover fixed by four screws on top of the unit, at the rear. ABD and ABS units.

Wiring Diagrams



Supply wiring diagram 230V~50Hz ref EE 141

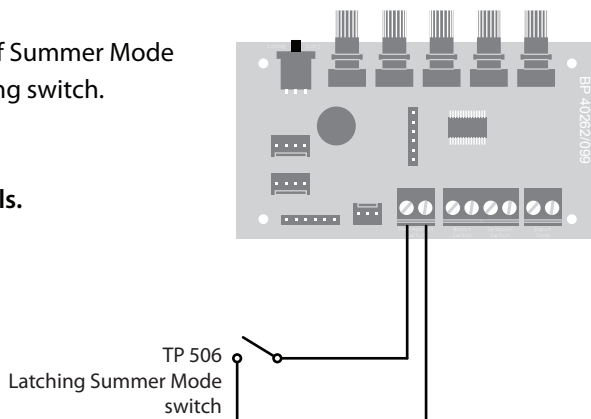


Boost switching and Humidistat connection ref EE 142

Wiring Diagrams

Volt-free activation of Summer Mode using one way latching switch.

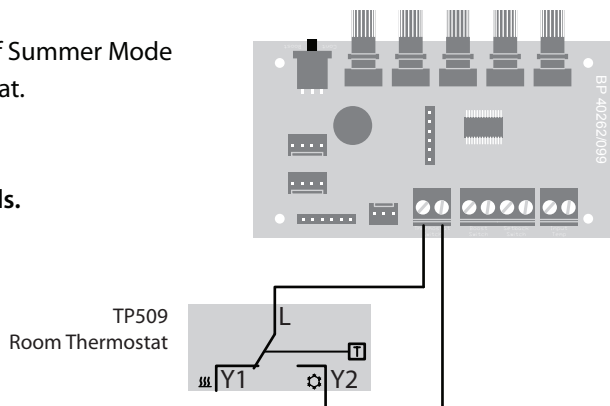
Not to be installed on ABD & ABS models.



Summer Mode switch connection ref EE 144

Volt-free activation of Summer Mode using room thermostat.

Not to be installed on ABD & ABS models.

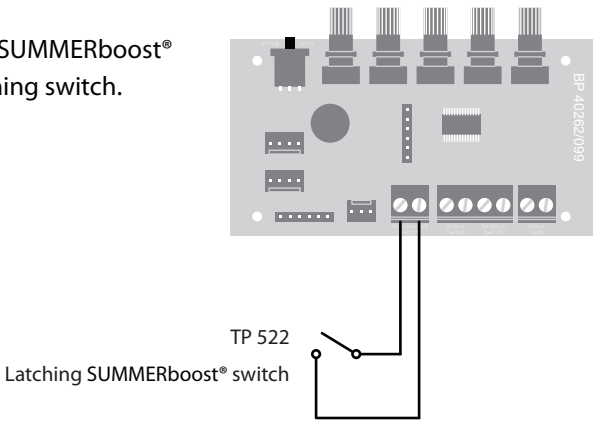


Summer Mode thermostat connection ref EE 144

Wiring Diagrams

Volt-free disable of SUMMERboost®
using one way latching switch.

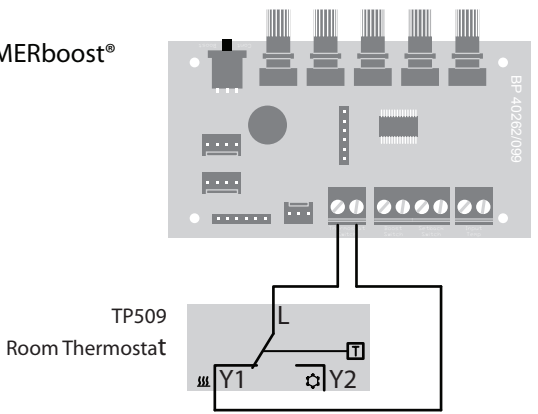
ABS models only.



SUMMERboost® switch connection ref EE 150

Volt-free disable of SUMMERboost®
using room thermostat.

ABS models only.



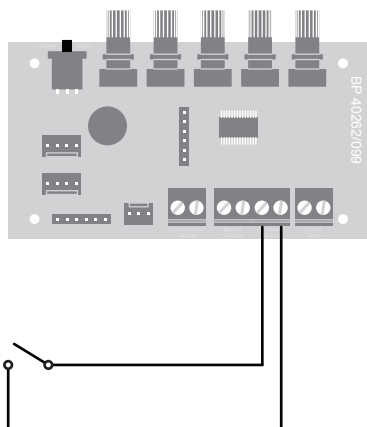
SUMMERboost® thermostat connection ref EE 150

Wiring Diagrams

Volt-free setback switching of MVHR controller PCB using single-pole latching switch and / or volt-free normally open relay contacts.

To avoid the unit being inadvertently left in Setback Mode, it is recommended that only one latching switch is fitted.

Volt-free setback switch or
normally open relay contacts

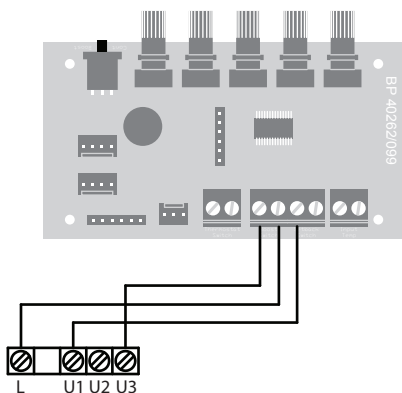


Setback Mode switching and connection ref EE 143

SWITCH POSITIONS

- 1 - Setback Speed
- 2 - Continuous Speed
- 3 - Boost Speed

TP 508
Three position rotary switch



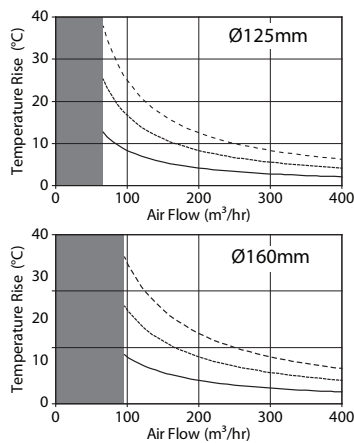
Three Position Rotary Switch TP 508 switching and connection ref EE 147

Duct Heater

Using the factory fitted PCB it is possible to control an external mains operated duct heater to pre-warm the incoming fresh air supply. During periods of cold weather, this reduces the possibility of ice build-up within the unit by raising the temperature of the incoming supply air. However there will be a significant increase in electrical energy use.



Duct Heater

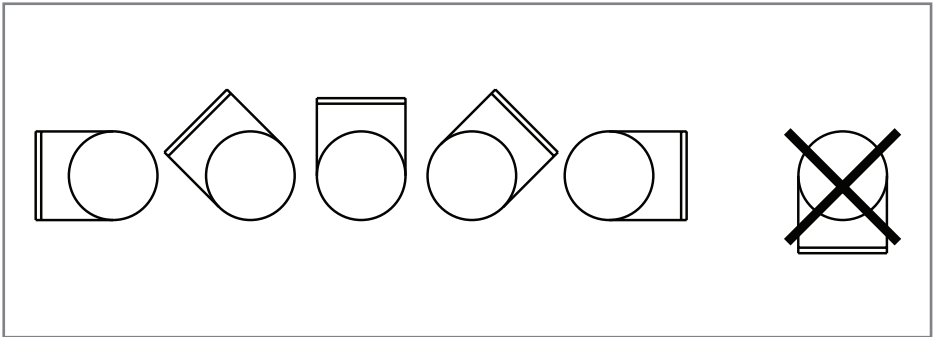


Size mm	Watts	Part No.
Ø125	300	DH 125 300
	600	DH 125 600
	900	DH 125 900
Ø160	300	DH 160 300
	600	DH 160 600
	900	DH 160 900

Duct Heater Operational Ranges

Fitting

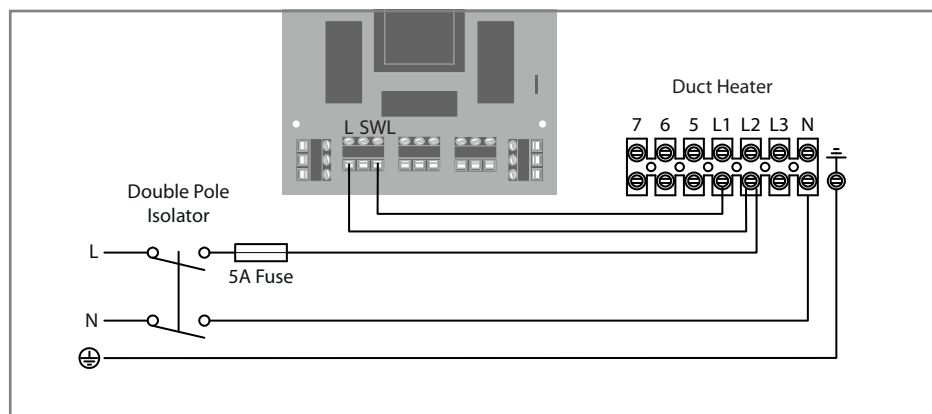
1. The heater is designed for insertion into standard spiral steel ducting and is fixed to the ducting with screws
2. The air must flow through the heater in the direction of the arrow (located on the side of the heater close to the connection box)
3. The heater can be fitted in either horizontal or vertical ducting. The electrical connection cabinet can be freely placed facing upwards or sideways to a maximum angle of 90°. Fitting with the box facing downwards is NOT allowed
4. The access opening in the heater must be equipped with a fixed mesh or an



Duct Heater fitting orientation

- intake air device which makes it impossible to touch the element inside
5. A warning sign must be attached close to the air outlet, stating that the air outlet must not be covered
6. The distance from (to) the heater to (from) a duct bend, valve, filter, etc should correspond to at least twice the duct diameter, otherwise there is a risk that the airflow through the heater is uneven which can cause activation of the overheating cut-out
7. The heaters may be insulated in accordance with valid regulations for ventilation ducting. However, the insulation material must be incombustible. The cover of the heater must be free from insulation so that the type plate is visible and the cover can be removed
8. The parts of the ventilation system where heaters are installed must be kept accessible to allow replacement and service

9. The distance from the heater's metal casing to any wood or other combustible material must NOT be less than 30 mm
10. The maximum ambient temperature allowed is 40°C
11. The air flow through the heater must have a speed of at least 1.5 m/s
12. The maximum output temperature allowed is 40°C



Duct Heater CV 12-09-1M Connection Wiring Diagram ref EE 148

Connection to Mains

1. All wiring must conform to current I.E.E. Wiring Regulations and all applicable national standards and Building Regulations
2. The installation MUST be carried out by a suitably qualified competent person.
3. The duct heaters are designed to operate on single phase alternating current. See the wiring diagram for the particular heater and the electrical data on the rating plate placed on the cover of the duct heater
4. The duct heater must be connected to the mains supply with a fixed installed round cable. The heater must be equipped with a cable grommet or cable fitting designed for the cable, which ensures that the electrical protection class of the heater is retained. The standard design is IP43
5. It must not be possible to switch on the power to the element unless the *HRV Q Plus* is operating

6. An all phase breaker or a double pole switch with a contact gap of at least 3mm must be included in the fixed installation
7. The duct heater is equipped with two overheating cut-outs (one with manual reset) designed to prevent overheating when the airflow is too low or in the event of a fault in the system
8. A drawing must be attached inside the fuse box or on the wall of the service room. The drawing shows the rating of the duct heaters and their location in the building, together with information about the measures to be taken in the event that the overheat protection cutout(s) is activated

Maintenance

No maintenance is required except a periodic functional test.

Overheating

When the overheating cut-out with manual reset has been activated, the following should be observed:

1. The heater must not be interfered with in any way, such as removal of the cover, except by an authorised electrical fitter
2. Turn off the mains power
3. Investigate carefully the reason for activation of the cut-out
4. When the fault has been eliminated, the cut-out can be reset

The heater has a built in manual reset thermal protection with the reset button placed on the lid.

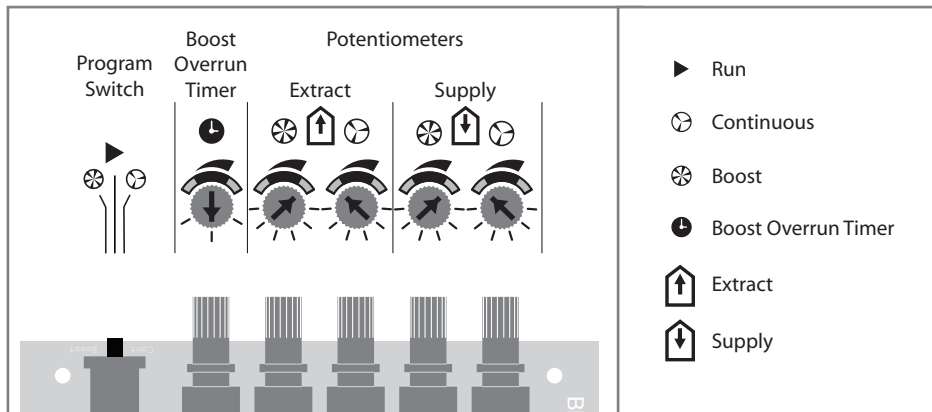
Controls

The fan speeds of the Titon HRV *Q Plus* will require adjustment to ensure the flow rates achieved provide adequate ventilation. The Titon HRV *Q Plus* has 2 standard fan speed settings Continuous Speed and Boost Speed.

The Continuous Speed and Boost Speed are programmed by placing the controller into Program Mode via the Program/Run Switch and changing the position of rotary potentiometers.

When applying power for the first time, the unit can take up to four minutes to start operating

Prior to the first commission set Continuous Speed potentiometers to minimum and Boost Speed potentiometers to maximum or reset the controller.



Control Identification

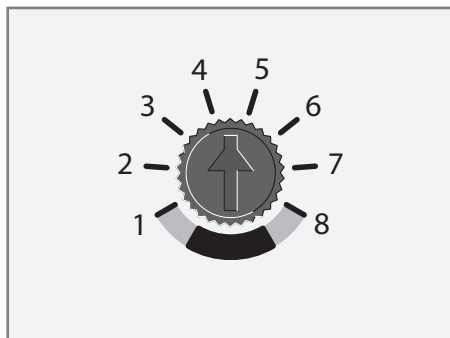
Control Parameters

- The Boost Speed cannot be set lower than the Continuous Speed
- The Continuous Speed cannot be set higher than the Boost Speed
- All switching inputs are disabled when the Program/Run Switch is in Continuous or Boost positions
- Speed control potentiometers are disabled when the Program/Run switch is in centre Run position

For the commissioning settings to be stored the unit needs to be powered up.

Continuous Supply & Extract Speeds:

1. Move Program/Run Switch to Continuous position
2. Rotate supply fan Continuous Speed adjustment potentiometer to achieve required supply continuous air flow
3. Rotate extract fan Continuous Speed adjustment potentiometer to achieve required extract continuous air flow
4. Return Program/Run Switch to centre position to exit commissioning



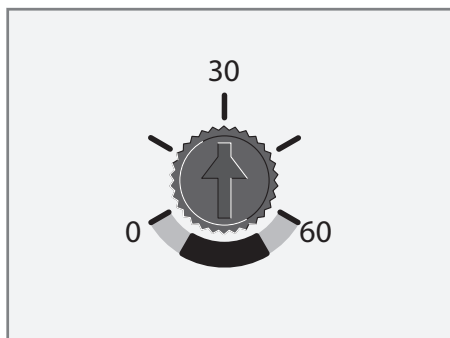
Commissioning Pot positions

Boost Supply & Extract Speeds:

1. Move Program/ Run Switch to Boost position
2. Rotate supply fan Boost Speed adjustment potentiometer to achieve require supply boost air flow
3. Rotate extract fan Boost Speed adjustment potentiometer to achieve required extract boost air flow
4. Return Program/Run Switch to centre position to exit commissioning

Boost Overrun

Boost Overrun Timer is variable between 0 and 60 minutes. Rotate potentiometer to change overrun time. This can be done at any time.



Controller Reset

Following a controller reset the ventilation system will need to be fully commissioned.

The procedure to reset the Titon HRV *Q Plus* controller is a simple three step operation. The unit will need to be powered up during the reset procedure.

1. Rotate the Supply and Extract Continuous Speed potentiometers fully anti-clockwise
2. Rotate Supply and Extract Boost Speed potentiometers fully clockwise move the Run/Program Switch from the Run position to the Continuous position, from the Continuous position to the Boost position and back to the Run position. To ensure that the reset switch movements are registered by the controller wait two seconds between each switch movement. Controller reset is now complete.

Hardware Reset

Certain conditions (repeated supply interruptions etc.) can activate the automatic motor protection mode. Where by the fan motors are prevented from operating. This requires a hardware reset to return the unit to normal operating mode, to achieve this power to the unit should be switched off for 5 minutes, restoring the power after this time will reset the hardware of both the motor and PCB. Commissioning settings are not affected during a hardware reset.

Maintenance

Routine Maintenance

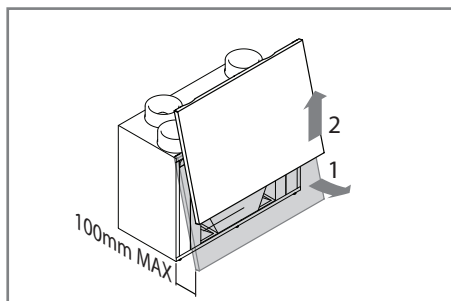
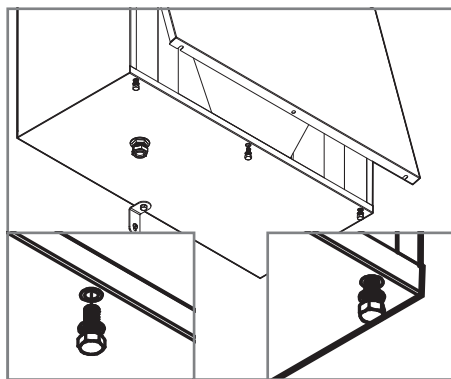
All ventilation units require periodic maintenance. Routine maintenance, apart from filter changes, must only be carried out by a suitably qualified and competent person. The air filters should be checked regularly, the frequency of replacement will vary depending on the environmental conditions.

WARNING: The unit uses a 230V ~ supply and contains rotating mechanical parts. ISOLATE the unit from mains power supply and allow sufficient time for all moving parts to stop before undergoing any Servicing or Maintenance. The unit may be supplied with multiple live supply if a Duct Heater is fitted.

Front Cover Removal

1. ISOLATE the unit from mains power supply and allow sufficient time for all moving parts to stop
2. Loosen the two corner screws located on the bottom front of the unit
3. Completely remove the centre screw
4. Completely remove the Front Cover by pulling it away from the unit at the bottom and lifting

Cover replacement is the reverse of the above steps. Ensure it is securely located at the top before tightening screws.



Cleaning Interior

For best results:

1. Slide out Filter Frames fitted either side of heat exchanger
2. Carefully remove any dust from face of heat exchanger, interior of the unit and the Bypass(if fitted) using a vacuum cleaner
3. Do not use water or any other fluids

Cleaning Exterior

For best results use a clean cloth and warm water with a mild detergent solution.

Do not use solvents or abrasive cleaners.

Condensate Tray

If the Condensate Tray is split a replacement must be ordered and fitted.

HRV1 & 1.25 *Q Plus*

Part No. XP40042/012

HRV1.5, 1.75, 2, 2.75 & 3 *Q Plus*

Part

No. XP40142/012



Condensate Tray

Filter Replacement

Filters should be replaced at least annually, or more regularly dependent on environmental conditions. Replacement Filters are available from Titon. Titon HRV *Q Plus* Filters are available in two grades G3 and G4. Filter media should be replaced like for like. Filter may be supplied with either metal or plastic frames both are fully compatible with the units.

Filter Part numbers in table below. The Unit part number can be found on the serial number label fixed to the top and front of the unit.

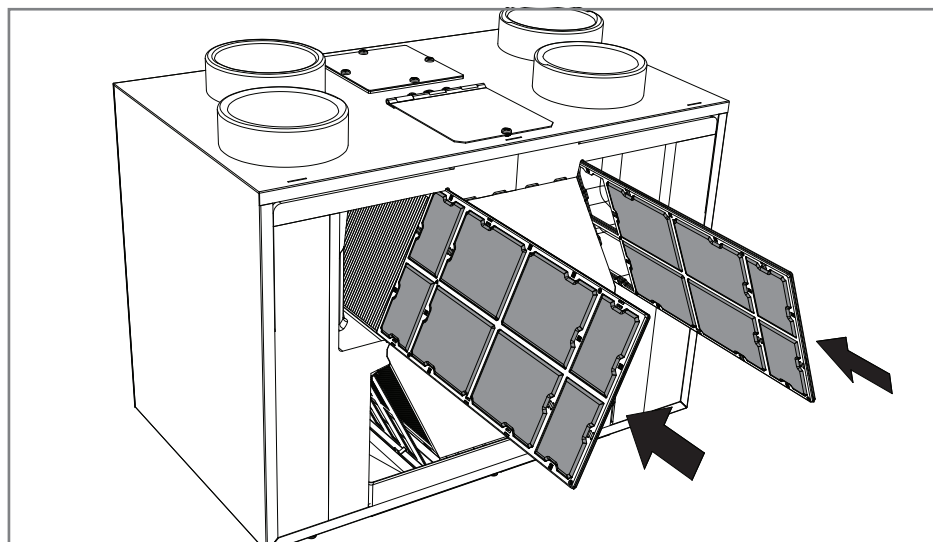
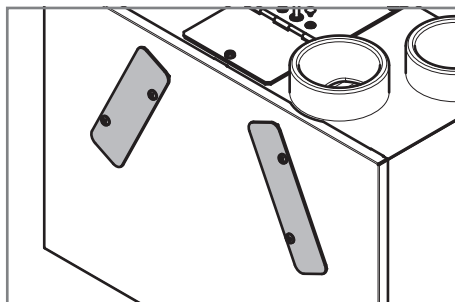
G3 Filters - Both faces white.

G4 Filters - One face white, one face blue.

Model	Part Number	G3 Filter Set 2 framed filters	G4 Filters Set 2 framed filters
HRV1 <i>Q Plus</i>	TP400A	XP40032/099	XP46022/099
HRV1.25 <i>Q Plus</i>	TP406A		
HRV1.5 <i>Q Plus</i>	TP403A	XP40132/099	XP46122/099
HRV1.75 <i>Q Plus</i>	TP404A		
HRV2 <i>Q Plus</i>	TP401A		
HRV2.75 <i>Q Plus</i>	TP405A		
HRV3 <i>Q Plus</i>	TP402A		
HRV1.5 <i>Q Plus</i>	TP403ABD, TP403ABS	XP40133/099	XP46123/099
HRV1.75 <i>Q Plus</i>	TP404ABD, TP404ABS		
HRV2 <i>Q Plus</i>	TP401ABD, TP401ABS		
HRV2.75 <i>Q Plus</i>	TP405ABD, TP405ABS		
HRV3 <i>Q Plus</i>	TP402ABD, TP402ABS		

How to Change Filters

1. Remove Front Cover or Filter Covers.
2. Slide out Filters.
3. Filters can be cleaned by carefully using a vacuum cleaner, Filters should be replaced at least annually
4. Replace Filters by carefully sliding the replacement/cleaned filters.
5. ABD and ABS models use unequal Filters. When replacing Filters ensure the filter with the open section is fitted to the right hand side of the heat exchanger with the open section to the back of the unit, see illustration
6. Replace the Front Cover or Filter Covers.



Service Record

Serviced By	Company	Date	Notes

Serviced By	Company	Date	Notes

Installed by



In the event of any queries please contact the system installer. Ensure this booklet is passed to the householder once installation and commissioning of the ventilation system is complete. This Product Manual must be kept in the Home Information Pack and used as a service record.



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