

## MRXBOXAB-ECO4-SW (Standard Unit) MRXBOXAB-ECO4-OHSW (Opposite hand Unit)

Mechanical Ventilation Units with Heat Recovery and  
Heat Exchanger Bypass for Wall Mounting

# Installation and Maintenance



## 1.0 Introduction

The ECO4 wall mounted units are designed to provide mechanical supply and extract ventilation with heat recovery and an integral automatic HX bypass.

The units also incorporate an integral humidistat and frost protection (see page 7 for details).

To recover heat from the extract air the heat exchanger block is utilised. The heat exchanger can recover up to 95% of the normally wasted heat.

Figure 1. Airflow through unit (Standard unit).

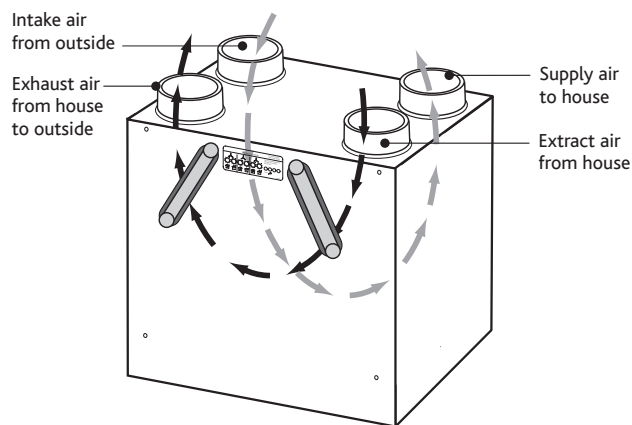


Figure 2. Airflow through OH unit (Opposite hand unit).

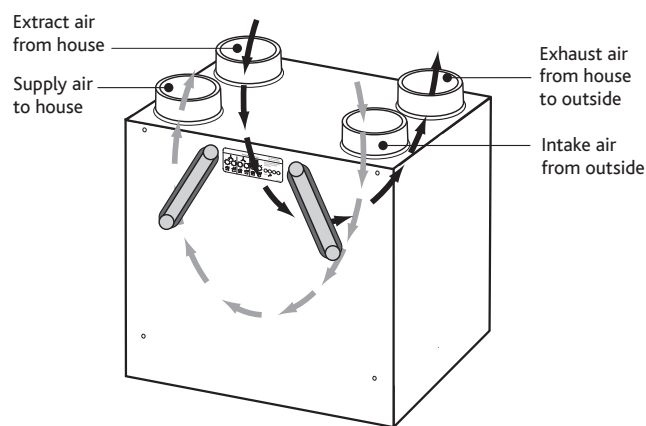
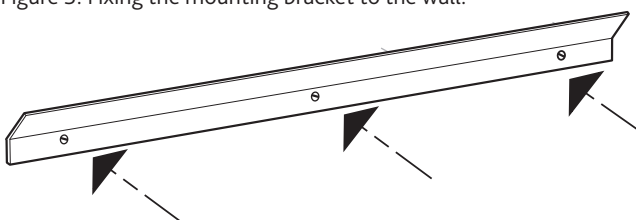


Figure 3. Fixing the mounting bracket to the wall.



### IMPORTANT

The unit must remain switched on at all times to maintain ventilation within the dwelling. Turning the unit off will cause long term damage to the unit and building fabric.

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 the use of the appliance by a person for their safety. Children should be supervised so that they do not play with the appliance.

## 2.0 Installation

Installation must be carried out by competent personnel in accordance with the appropriate authority and conforming to all statutory governing regulations. All mains wiring must be in accordance with the current I.E.E. Regulations, or the appropriate standards. Ensure that the mains supply (Voltage, Frequency and Phase) complies with the rating label.

Please note a clear working space is required around the installed unit to allow the cover to be removed and provide sufficient access for maintenance such as filter change.

Please allow a minimum of 480mm in front of the unit.

The fan must be installed indoors, on a suitable wall away from direct sources of frost, heat and water spray or moisture generation. For a vibration-free result the unit must be mounted to a solid wall.

**The unit is designed for wall mounting only on a solid wall, a gypsum block or a stud wall will not suffice. Additional measures such as extra studs or double panelling using 20mm MDF is required.**

1. One part of the mounting bracket (supplied) should be offered up to the wall, ensuring it's located horizontally. Mark the fixing points through the pre drilled holes in the bracket and install with screws (by others), whilst ensuring the interlock side is at the top (fig. 3).
2. Install the unit on the wall by ensuring the bracket on the unit interlocks over the wall mounted bracket (fig. 4). Ensure the mains power cable does not become trapped between the brackets during this process as this will prevent engagement and potentially damage the electrical insulation. The cable gland can be rotated through 90 degrees to assist this operation and subsequent cable routing.

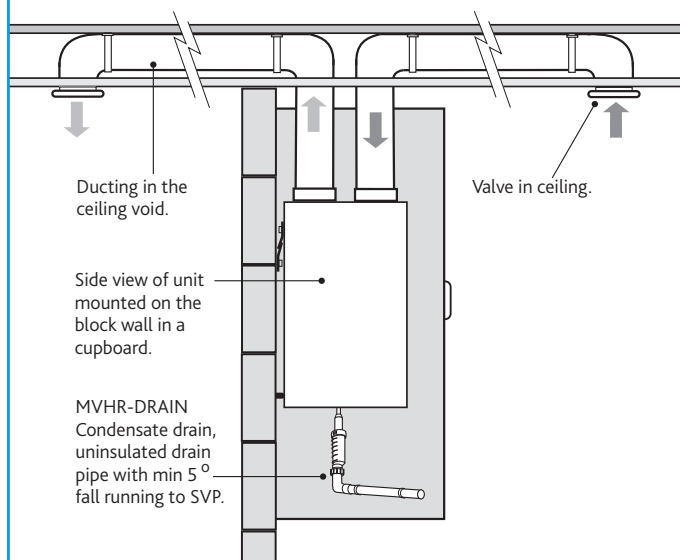
**Note: Care must be taken to ensure the unit is installed true in all 3 dimensions. Failure to do so may result in overflow from the internal condensation drip tray.**

**If fitting the MVHR in conjunction with a MRXBOX-SIL4 the unit should be mounted using alternative brackets supplied under part code MRXBOX-AV4, the standard wall brackets supplied with the MVHR are not rated for the additional load.**

## 2.1 Option 1: Wall Mounting

The MVHR unit fixed to a solid wall construction using the mounting bracket provided.

Figure 4. Typical example of a cupboard mounted unit (Standard unit) fixed to a block work wall.



## 2.2 Option 2: Wall Mounting

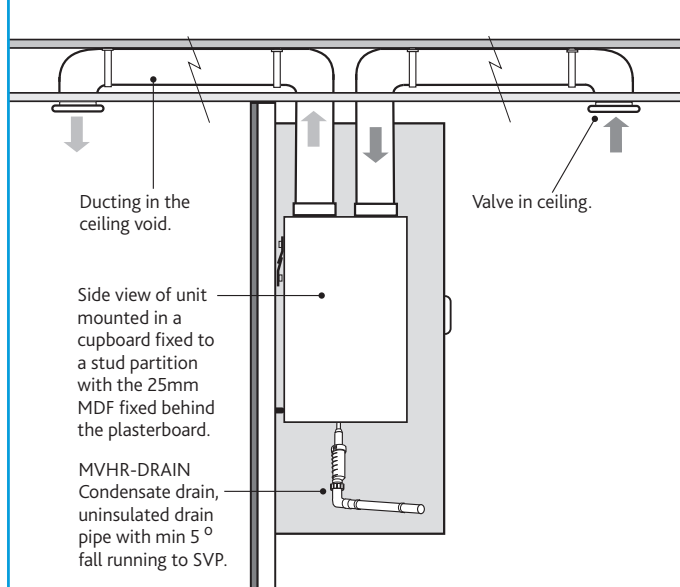
If it is not practical to use a solid wall, the MVHR unit should be fixed to a stud partition with a 25mm minimum thickness MDF panel solidly fixed behind the plasterboard.

If fixing to a stud wall the MDF panel should extend, width wise, over a minimum of 3 vertical studs with centres of no more than 400mm. Add additional vertical supports if necessary.

Height wise, ideally, the MDF panel should extend from floor to ceiling but as a minimum should be a least 2m high.

Fix the mounting bracket to the wall (as fig. 3) and use the wall mounted bracket to mount the unit on (as shown in fig. 5).

Figure 5. Typical example of a cupboard mounted unit (Standard unit) fixed to a stud partition with the MDF panel fixed behind the plaster-board.



## 2.3 Condensate Drain

1. The condensate must be discharged under a water level in a U-trap drainpipe or an alternative drain method which acts as an airlock.
2. The condensate discharge drain is a 32mm male threaded connection.
3. If using a U-trap please ensure the U-trap has been filled to a suitable level of water to avoid any air locks.
4. If the condensation pipe is fitted in an unheated space the pipe should be insulated to prevent freezing.

Nuaire recommend MVHR-DRAIN be used as the primary condensate take-off. (see figure 10 and 11).

Figure 6. Wet option: Condensate pipe connection to unit and a typical example of a "U" trap drainpipe (Standard configuration only).

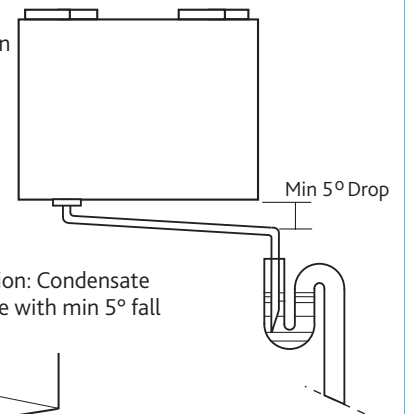
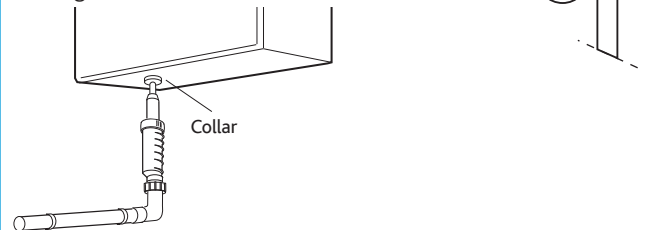
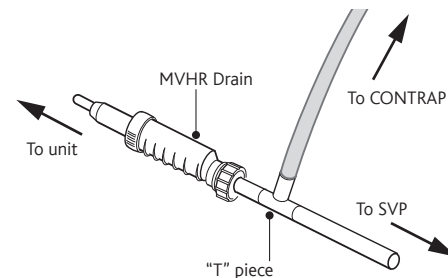


Figure 7. MVHR-DRAIN option: Condensate drain, uninsulated drain pipe with min 5° fall running to SVP.



**Figure 8. IMPORTANT: When using a "T" Piece to connect the CONTRAP drainage and the MVHR drain pipework the MVHR drain must always be fitted before the "T" Piece to prevent condensate from feeding back into the MVHR system.**



## 2.4 Extract/Input Areas

The unit is designed to extract air from all wet rooms e.g. bathroom, kitchen, en-suite, utility room (with sink). WC's do not need to be ventilated if openable windows are fitted.

Supply air should be to all habitable rooms e.g. bedrooms and lounge. Extract / input grilles should be adjustable valve types (not supplied). External grilles are to have a minimum free area of 12,250 sq. mm.

## 2.5 Ducting

It is recommended that rigid ducting be used it all times. Flexible ducting has a very high resistance and it is impossible to calculate how much resistance will be on a system if used.

If used, the flexible ducting must be kept to a minimum and should always be pulled taut. A maximum of 300mm should be used on each leg.

To prevent condensation on the exterior of the outside air inlet duct and the air outlet duct from the unit, these ducts should be insulated with material having a thermal resistance of  $>0.625\text{m}^2 \text{K/w}$ .

Ducting must be installed in such a way that resistance to airflow is minimised. Bends should be kept to a minimum.

A minimum distance of 200mm between the appliance and any bends in ductwork is recommended. Ideally 200mm diameter or 204 x 60mm rectangular ducting should be used.

Ducting joints must be sealed with silicone type sealant and shall be adequately and reliably fixed to the appliance.

## 2.6 Ventilation Flow Rates

Table 1. ADF 2010 - Extract ventilation rates.

Room	Min high rate	Min low rate
Kitchen	13 l/s	Total extract rate should be at least the whole dwelling ventilation rate given in table 2.
Utility Room	8 l/s	
Bathroom	8 l/s	
Sanitary Accommodation	6 l/s	

Table 2. Whole dwelling ventilation rates.

	Number of bedrooms in dwelling				
	1	2	3	4	5
Whole dwelling ventilation rate l/s <sup>1,2</sup>	13	17	21	25	29

### Notes:

1. In addition, the minimum ventilation rate should be no less than 0.3 l/s per m<sup>2</sup> of internal floor area. (This includes all floors, e.g. for a two-story building add the ground and first floor areas).

2. This is based on two occupants in the main bedroom and a single occupant in all other bedrooms. This should be used as the default value. If a greater level of occupancy is expected add 4 l/s per occupant.

### IMPORTANT

Any air intake terminal **MUST** be installed in accordance with the appropriate regulation.

As a guide, the BS5440 series of British Standards deals with this issue and currently states that an air intake must be at a minimum distance of 300mm from a gas boiler balanced flue.

Installers are advised to be aware of the requirements of this standard when installing 'through the wall' supply air ducting.

## 2.7 ADF 2010 Ventilation Calculations Design of MVHR Systems

The MVHR system has been sized for the winter period. Additional ventilation may be required during the warmer months and it has been assumed that the provisions for purge ventilation (e.g. openable windows) could be used.

**Step 1:** For any design air permeability, determine the whole dwelling ventilation supply rate from **Table 2**.

As an alternative where the design air permeability is intended to be more than ( $>$ )  $5\text{m}^3/(\text{h.m}^2) 50 \text{ Pa}$ , allow for infiltration for all dwelling types by subtracting from the whole dwelling ventilation supply rate **from Table 2**;  $0.04 \times$  gross internal volume of the dwelling heated space ( $\text{m}^3$ ).

**Step 2:** Calculate the whole dwelling extract ventilation rate by summing the individual room rates for 'minimum high rate' **from Table 1**.

(For sanitary accommodation only, as an alternative, the purge ventilation provisions given in ADF 2010 can be used where security is not an issue. In this case 'minimum high extract rate' for the sanitary accommodation should be omitted from the step 2 calculation).

**Step 3:** The required airflow rates are as follows:

- The maximum whole dwelling extract ventilation rate (e.g. boost) should be at least the greater of step 1 and step 2. Note that the maximum individual room extract rate should be at least those given in **table 1**.
- The minimum air supply rate should be at least the whole building ventilation rate found in step 1.

For Scotland refer to **BRE Digest 398**.

For further information refer to "Domestic Ventilation Compliance Guide" [www.planningportal.gov.uk/buildingregulations/approveddocuments/part1/compliance](http://www.planningportal.gov.uk/buildingregulations/approveddocuments/part1/compliance)

## Pre Commissioning MRXBOX95 MVHR Units

MRXBOX95 units are designed to ventilate the whole dwelling and must not be used during site construction or the clean-up period. Cement and plaster dust can be abrasive and can affect fan performance and reliability. Please ensure that the filters are checked prior to commissioning to ensure there is no build-up of dust or debris.

While the property is drying out, very high moisture levels are likely to occur. Therefore it is advisable that if the installation and building works are complete the unit is left running. If the building works are not complete please close the air valves or cover up the air valves to prevent condensation forming in the ductwork and the MRXBOX95 unit due to natural migration of warm air.

### 3.0 Dimensions (mm)

Figure 9. Unit dimensions.

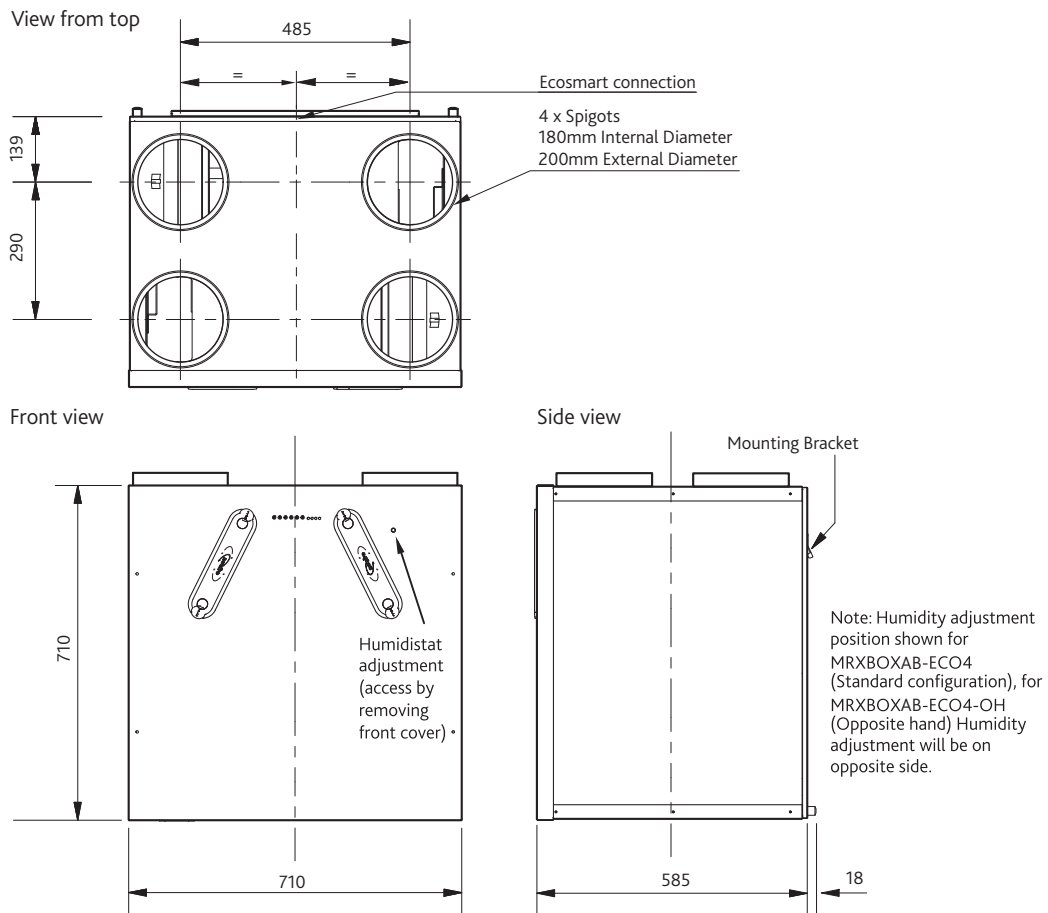


Figure 10. Dimensions: MRXBOX95-3SWITCH

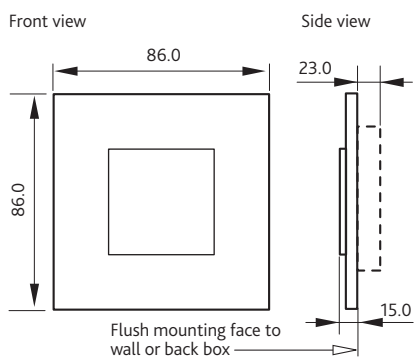
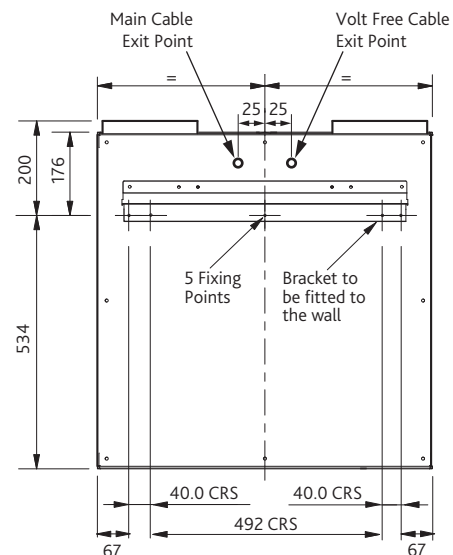


Figure 11. Dimensions: Unit wall mounting bracket position (viewed from the back).



## 4.0 Ducting Arrangements - Standard Configuration

Figure 12. Typical ducted arrangement for a wall mounted unit using circular ducting.

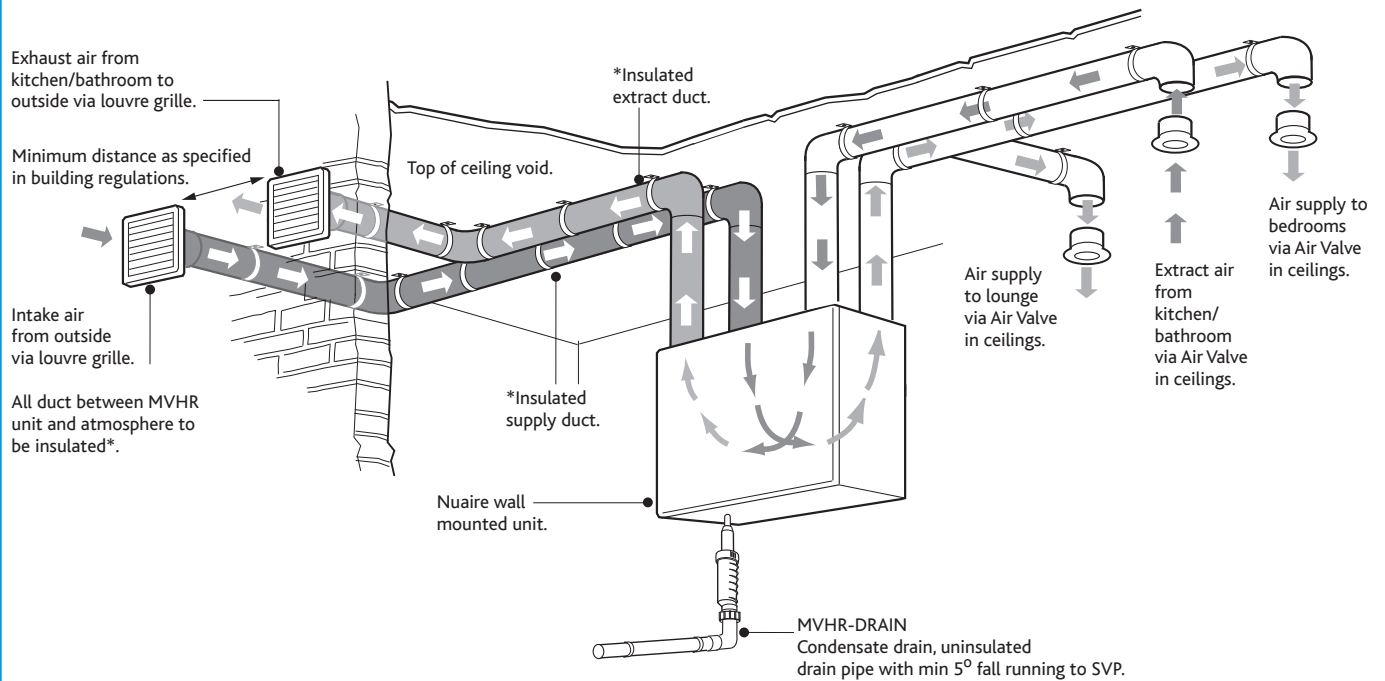
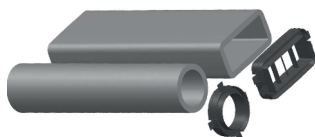
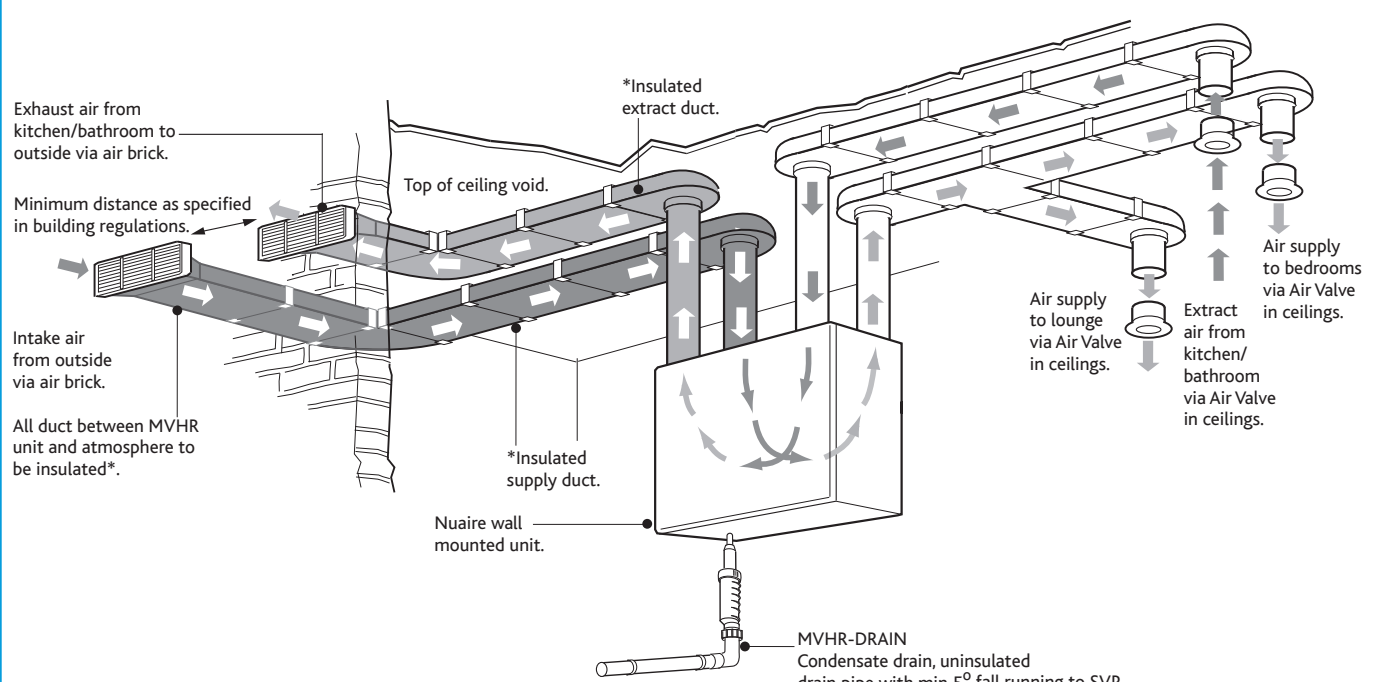


Figure 13. Typical ducted arrangement for a wall mounted unit using circular ducting.



ALSO FROM NUAIRE -

New **ductmaster** range of thermal ducting, an all-in-one insulated ducting system (see installation document 671780)

# Installation and Maintenance MRXBOXAB-ECO4-SW Mechanical Ventilation Unit with Heat Recovery

## 5.0 Electrical Connection

Figure 14. PCB Details

### IMPORTANT

For good EMC engineering practice, any sensor cables or switched live cables should not be placed within 50mm of other cables or on the same metal cable tray as other cables.

Please note: the electrical connection of the unit must be carried out by a qualified electrician.

The unit is supplied with a flexible cord for connection to the mains supply.

#### Electrical details:-

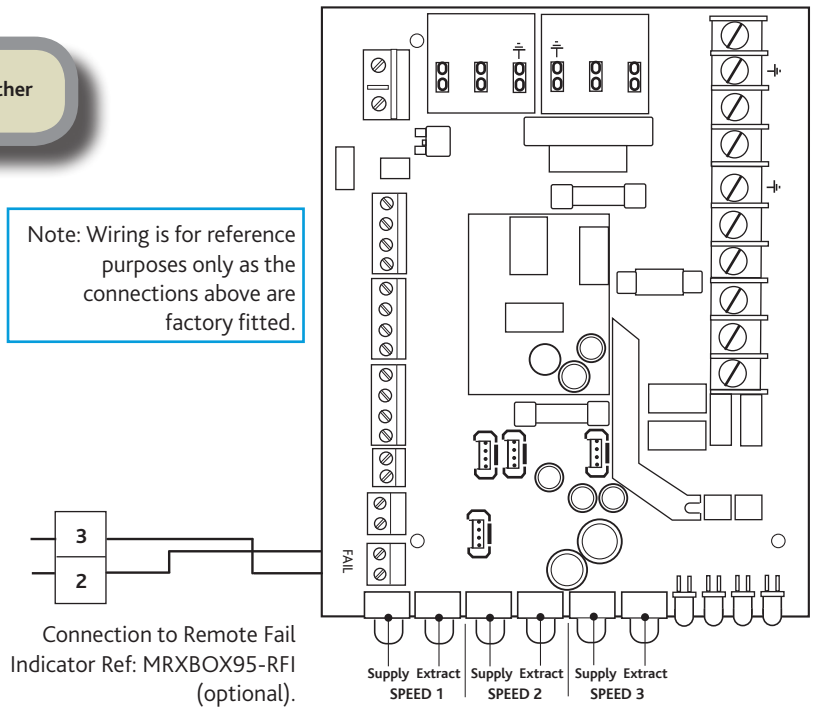
Voltage: 240V 1ph 50Hz

Consumption: 2.5 Amp

Fuse rating: 5 Amp

**NOTE This unit must be earthed.**

The cable from the mains power supply should be connected to a fixed wiring installation, via a fused isolator, in accordance with current IEE wiring regulations.

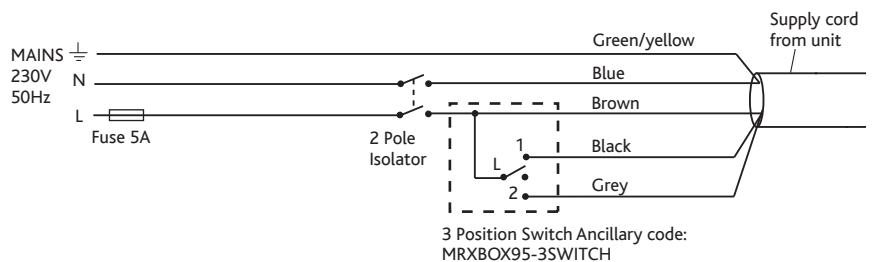


## 5.1 Examples of typical wiring layouts

### MRXBOXAB-ECO4

Figure 15. Unit only.

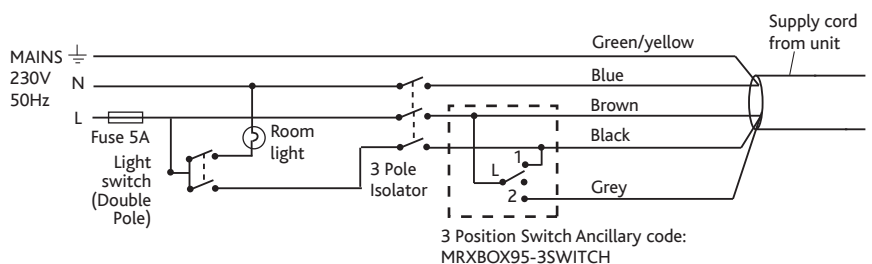
Disconnection from the supply mains must be incorporated within the fixed wiring in accordance with the wiring regulations and shall have a minimum contact separation of 3mm.



### MRXBOXAB-ECO4

Figure 16. Unit serving one bathroom.

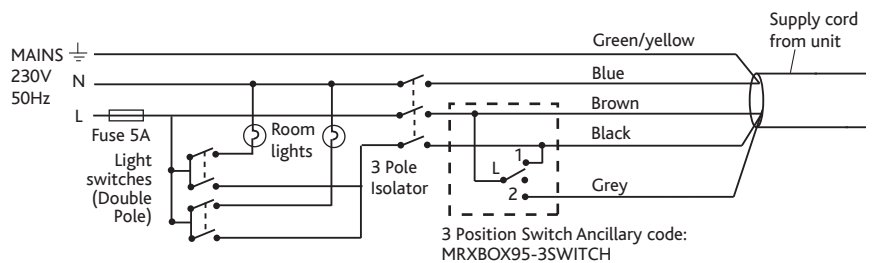
Disconnection from the supply mains must be incorporated within the fixed wiring in accordance with the wiring regulations and shall have a minimum contact separation of 3mm.



### MRXBOXAB-ECO4

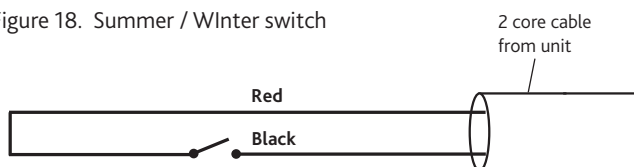
Figure 17. Unit serving two bathrooms.

Disconnection from the supply mains must be incorporated within the fixed wiring in accordance with the wiring regulations and shall have a minimum contact separation of 3mm.



## Connection of summer/winter switch

Figure 18. Summer / Winter switch



Volt free Summer / Winter Switch (supplied with unit)  
Polarity is inconsequential  
Warning! - Do not connect to mains!



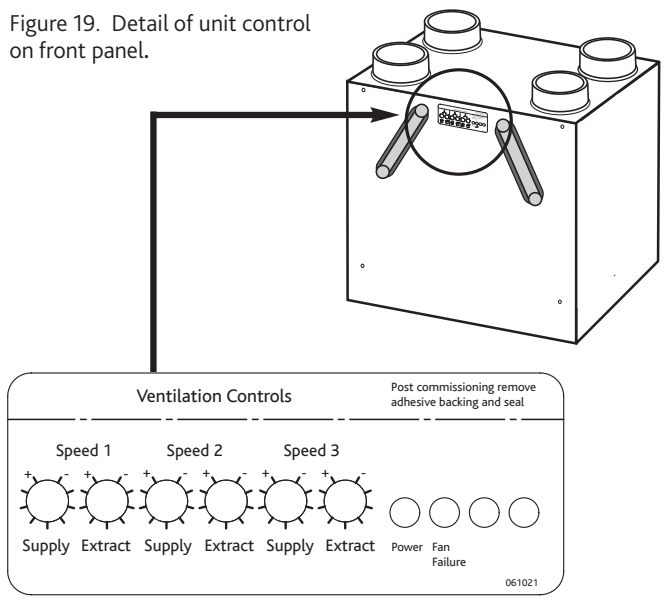
## 6.0 Commissioning

### IMPORTANT

The filters fitted inside the unit are protected with a plastic film. Prior to commissioning remove the covers (figs. 15 & 16), take off the film and replace.

1. For required air flow rates please refer to the design specification for the property, follow 2.4 or refer to building regulations ADF 2010.
2. The unit should be run for a minimum of 10 minutes to reach steady state before commencing commissioning.
3. The humidity sensor is initially set to its least sensitive position, this should be adjusted during commissioning. Depending on storage and site conditions the unit may boost due to high relative humidity levels, this will continue until the level drops below the specified set point.
4. The unit is supplied with independent control for the various speed airflows. (see fig. 19).

Figure 19. Detail of unit control on front panel.



5. Correct commissioning is essential to ensure the ventilation air flow rates are met. It also ensures the unit is not over ventilating and causing excessive power consumption.
6. Commissioning should be carried out in accordance with building regulations document "Domestic ventilation compliance guide". [www.planningportal.gov.uk/building-regulations/approved-documents/partf/associated](http://www.planningportal.gov.uk/building-regulations/approved-documents/partf/associated)  
A calibrated moving vane anemometer and hood will be required to carry out commissioning.
7. Adjustment valves should be locked in place to prevent further adjustment.
8. Once commissioned the home owner / tenant should be informed that the unit should not be adjusted as it will have a detrimental effect on the indoor air quality and could result in condensation and mould growth. The clear panel covering the control has an adhesive panel which should be exposed and sealed post commissioning to prevent tampering.

### 6.1 Humidity adjustment.

This product contains an internal humidity sensor fitted into the air-flow extracting from the wet rooms. When the unit senses that the humidity exceeds the set point the unit will boost to that set by the commissioned boost speed. The set point can be found on the front of the unit (see fig. 9) and is at its least sensitive when turned fully clockwise. Note that the sensor is measuring humidity from all the wet rooms at the same time and should not be relied on to solely boost the unit.

Additional switch should be used local to the wet rooms (see wiring diagrams).

### 7.0 Status Indication

The status of the unit is indicated by a series of LED's on the front cover. The variants are listed below.

Speed 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Speed 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Speed 3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Supply Fan Fault	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Extract Fan Fault	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frost Protection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Filter Change	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
HX Bypass (AB units only)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

**Note:** The display on the unit control panel will not indicate when a higher speed setting has been triggered by an external source, such as an ES-PIR2 etc.

### 7.1 Integral automatic HX bypass

Intake and extract temperatures are monitored at the point the airflows enter the unit, if the range falls within the set parameters the bypass damper is opened automatically to target an indoor comfort temperature all year round.

### 7.2 Summer / Winter Switch

When the switch position is set to Summer, the integral automatic summer bypass is fully operational. In the alternative Winter position, the HX bypass is disabled to ensure the unit is constantly in heat recovery mode.

### 7.3 Frost Protection

In the event of the intake air temperature at the unit dropping below the predetermined set point (-5° C as standard) the supply fan will reduce to minimum speed, once the temperature rises above the set point the fan will return to its commissioned speed.

Please note this mode will only activate after ten days of continuous run time. If commissioning of the unit is outside of this timeframe please notify the after sales department prior to site visit.

## 8.0 Maintenance

### IMPORTANT

**Isolation - Before commencing work make sure that the unit, switched live and control are electrically isolated from the mains supply and switched live supply.**

Nuaire recommend that filters are inspected every 6 months and replaced every 12 months. A flashing LED (section 7.0) will indicate that a filter change is required. This indication repeats every 12 months and will turn off automatically after 5 Days.

Remove the filter covers on the front panel of the unit by gripping the two circular tabs either end of the filter covers and pulling away from the unit. The filter can now be extracted by pulling the removal loop on the front edge of the filter. Once the filters have been inspected return or replace them as necessary.

Inspect the heat exchanger every 5 years. Generally check for damage and security of components. Refit cover.

## 11.0 After Sales

For technical assistance or further product information, including spare parts and replacement components, please contact the After Sales Department.

**Telephone 02920 858 400**  
**aftersales@nuaire.co.uk**

Figure 20. Removing the two filter covers on the front panel of the unit.

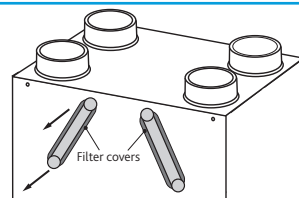
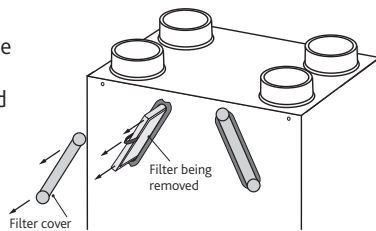


Figure 21. The filters can be removed by pulling on the black tab on the visible end of the filters.



## 9.0 Replacement of Parts

Should any component need replacing, Nuaire keep extensive stocks for quick delivery. Ensure that the unit is electrically isolated, before carrying out any work.

Note: The supply cable must be replaced by an electrically competent person.

When ordering spare parts, please quote the serial number of the unit and the ARC number of the purchase, if possible. (This information will be available on the fan label).

## 10.0 Warranty

The 5 year warranty starts from the day of delivery and includes parts and labour for the first year and parts only for the remaining 4 years.

This warranty is void if the equipment is modified without authorisation, is incorrectly applied, misused, disassembled, or not installed, commissioned and maintained in accordance with the details contained in this manual and general good practice.

The product warranty applies to the UK mainland and in accordance with Clause 14 of our Conditions of Sale. Customers purchasing from outside of the UK should contact Nuaire International Sales office for further details.