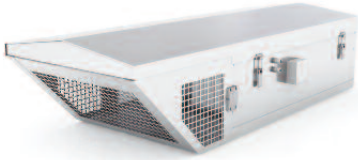


Patent applied for.

AIRE-VOLVE TWIN FANS (AVT/AVTCP) Direct Drive, Run & Standby Fans for External use Installation and Maintenance

CE The EMC Directive
2014/30/EU
The Low Voltage
Directive
2014/35/EU



1.0 Introduction

Units are rectangular in section and incorporate a full size hinged access panel fitted to the top of the unit for inspection purposes.

The models are coded as follows:

Code descriptions

AVT - CP I-X

| | |
1 2 3 4

1. Aire-Volve Twin Fan range
2. Constant Pressure option
3. Case sizes I to 9
4. Spigot configuration

AVT-X (External/Internal Duct Mounted) in line unit.

AVT-R (Roof Mounted, end inlet) side discharge unit.

AVT-X units are rectangular in section and have circular rigid spigots at each end.

AVT-R units are rectangular in section and are supplied with a circular end spigot and an individual module with two opposed side discharge grilles.

2.0 Handling

Upon receipt of the equipment an inspection should be made. Before commencement of lifting ensure that normal equipment safety checks have been carried out.

The unit/sections should be removed from the vehicle using a fork lift or crane. Always handle with care to avoid damage and distortion, and where lifting slings are employed use spreaders to ensure slings do not come into contact with the unit case, or control pack.

Correctly position slings to avoid twisting of the unit case and observe the centre of gravity before the final lift is made.

Note: the weight of the unit from the rating plate.

Dependent on model and size units may be supplied in single or multi-modular sections. Handle each section individually do not stack for lifting or storage.

3.0 Installation

Installers - please note that installation must be carried out by competent personnel in accordance with the appropriate authority and conforming to all statutory and governing regulations e.g. I.E.E., CIBSE, COHSE, HSG33.

AVT-X/R units are suitable for internal or external use. The unit can be mounted at a maximum angle of 20 degrees from horizontal with the units discharge blowing downwards away from the roof ridge. The unit cannot be vertically mounted. Units should always be positioned with sufficient space to allow the access cover to open and subsequent removal of fan and motor assemblies etc.

Whether internally or externally mounted, the method of fixing to the roof is the responsibility of the installer.

All units have a bottom skirt to allow for fixing directly onto a suitably sized curb or builders upstand. Nuaire can supply matching adjustable leg supports. Ductwork connections must be airtight to prevent any loss of performance.

3.1 Fitting the grille section, module

Fig. 1a. Remove spigot outlet by removing end panel fixings, and release from gutter section (upward motion).

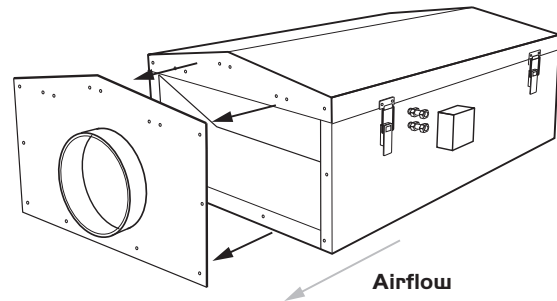


Fig. 1b. Disassembly fixing bracket(s) and fit to main unit using M6 fixing points provided & locate grille assembly onto unit. Note: grille section is to be lowered (hooked) over guttering of unit.

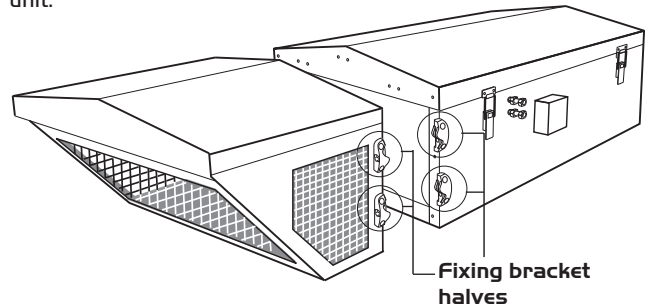
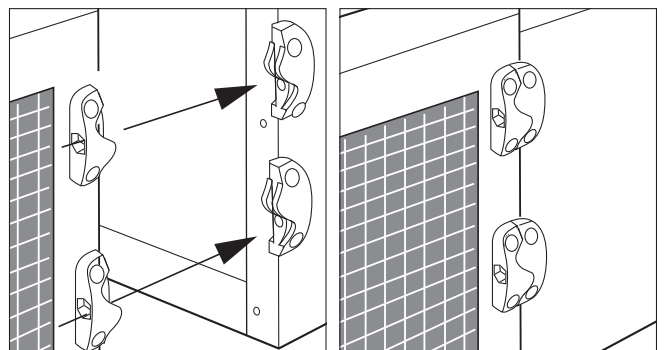


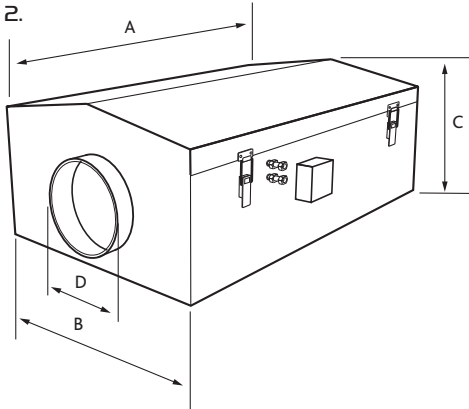
Fig. 1c. Ensure fixing brackets halves are correctly aligned and assemble using M8 Cap head bolt and nut supplied with bracket.

Fig. 1d. Once located, tighten bolts ensuring seal between grille and seal is achieved.



4.0 Dimensions (mm) Aire-Volve external units AVT I - 9-X

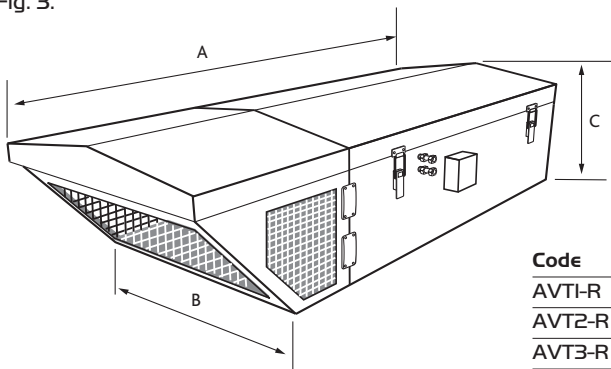
Fig. 2.



Code	Dim A. End panels (5mm)	Dim A. + spigot length (100mm)	B	Dim B + control (40mm)	C	D	Weight (Kg)
AVT1-X	1120	1220	716	756	393	250	56.0
AVT2-X	1120	1220	716	756	393	250	56.7
AVT3-X	1120	1220	716	756	393	250	57.4
AVT4-X	1466	1566	857	897	502	315	99.4
AVT4L-X	1466	1566	857	897	502	315	98.4
AVT5-X	1466	1566	857	897	502	315	103.3
AVT6-X	1831	1984	1045	1085	656	400	145.6
AVT7-X	1831	1984	1045	1085	656	400	148.6
AVT8-X	2172	2272	1278	1318	709	500	236.0
AVT9-X	2172	2272	1278	1318	709	500	203.0

4.1 Dimensions (mm) Aire-Volve external units AVT I - 9-R

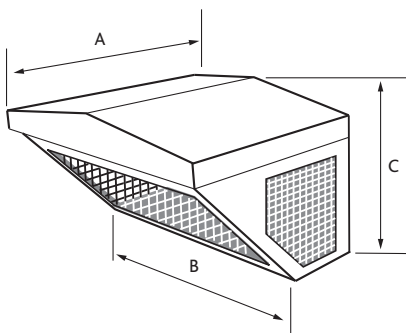
Fig. 3.



Code	Dim A. End + grille panels (5mm)	Dim A. + spigot length (50mm)	B	Dim B + control (40mm)	C	Weight (Kg)
AVT1-R	1620	1670	716	756	393	64.0
AVT2-R	1620	1670	716	756	393	64.7
AVT3-R	1620	1670	716	756	393	65.4
AVT4-R	2066	2116	857	897	502	110.4
AVT4L-R	2066	2116	857	897	502	109.4
AVT5-R	2066	2116	857	897	502	114.3
AVT6-R	2575	2625	1045	1085	656	160.9
AVT7-R	2575	2625	1045	1085	656	163.9
AVT8-R	2956	3006	1278	1318	709	262.0
AVT9-R	2956	3006	1278	1318	709	229.0

4.2 Dimensions (mm) Aire-Volve external units Grille assembly AVT I - 9-R-MOD

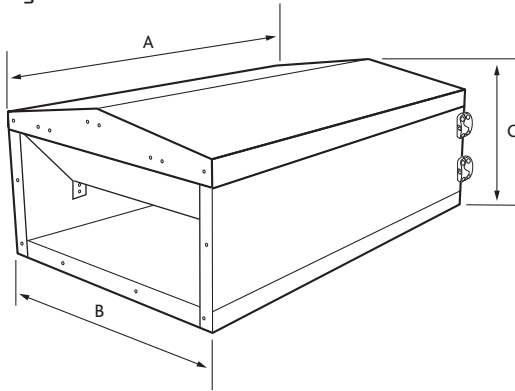
Fig. 4.



Code	Grille assembly	Length A	B	C	Weight (Kg)
AVT1-R	AVT3-R	500	716	393	8.0
AVT2-R	AVT3-R	500	716	393	8.0
AVT3-R	AVT3-R	500	716	393	8.0
AVT4-R	AVT5-R	600	857	502	11.0
AVT4L-R	AVT5-R	600	857	502	11.0
AVT5-R	AVT5-R	600	857	502	11.0
AVT6-R	AVT7-R	744	1045	656	16.0
AVT7-R	AVT7-R	744	1045	656	16.0
AVT8-R	AVT9-R	784	1278	709	19.0
AVT9-R	AVT9-R	786	1278	709	19.0

4.3 Dimensions (mm) Aire-Volve external units matched silencers

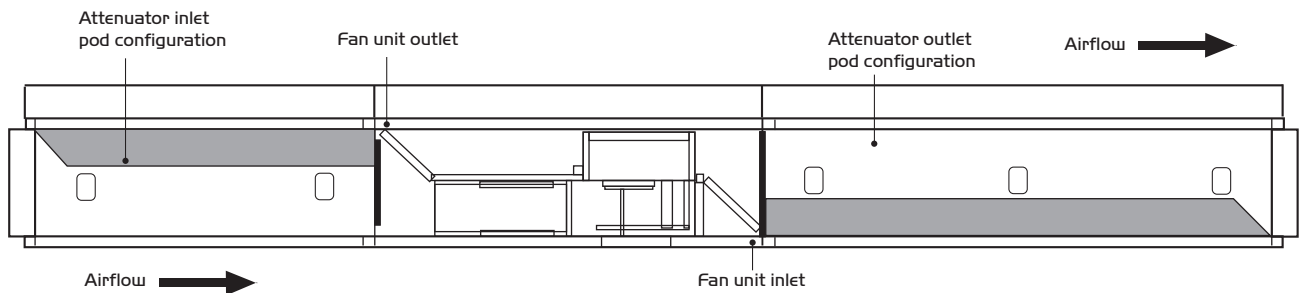
Fig. 5



Fan Code	Size	Silencer Code	A	B	C	Weight (Kg)
AVT1	Short	AVT1-MSM-X	500	716	393	27
	Standard	AVT1-MSS-X	1000	716	393	49
	Long	AVT1-MSL-X	1500	716	393	76
AVT2	Short	AVT2-MSM-X	500	716	393	27
	Standard	AVT2-MSS-X	1000	716	393	49
	Long	AVT2-MSL-X	1500	716	393	76
AVT3	Short	AVT3-MSM-X	500	716	393	27
	Standard	AVT3-MSS-X	1000	716	393	49
	Long	AVT3-MSL-X	1500	716	393	76
AVT4	Short	AVT4-MSM-X	500	857	502	34
	Standard	AVT4-MSS-X	1000	857	502	61
	Long	AVT4-MSL-X	1500	857	502	95
AVT4L	Short	AVT4L-MSM-X	500	857	502	34
	Standard	AVT4L-MSS-X	1000	857	502	61
	Long	AVT4L-MSL-X	1500	857	502	95
AVT5	Short	AVT5-MSM-X	500	857	502	34
	Standard	AVT5-MSS-X	1000	857	502	61
	Long	AVT5-MSL-X	1500	857	502	95
AVT6	Short	AVT6-MSM-X	500	1045	656	43
	Standard	AVT6-MSS-X	1000	1045	656	81
	Long	AVT6-MSL-X	1500	1045	656	124
AVT7	Short	AVT7-MSM-X	500	1045	656	43
	Standard	AVT7-MSS-X	1000	1045	656	81
	Long	AVT7-MSL-X	1500	1045	656	124
AVT8	Short	AVT8-MSM-X	500	1271	709	51
	Standard	AVT8-MSS-X	1000	1271	709	98
	Long	AVT8-MSL-X	1500	1271	709	149
AVT9	Short	AVT9MSM-X	500	1271	709	51
	Standard	AVT9-MSS-X	1000	1271	709	98
	Long	AVT9-MSL-X	1500	1271	709	149

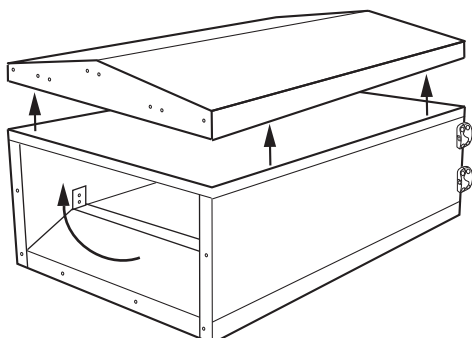
5.0 Fitting matched silencers

Fig. 6. Typical side section view of outlet silencer, roof mounted Aire-Volve unit and inlet silencer.



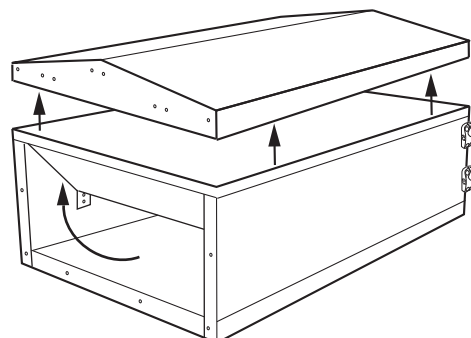
To change orientation of attenuator pod flow, follow the steps below.

Fig. 7. Rotate the silencer section in the end of the attenuator and refit lid ensure all fixings are refitted and seals are intact.



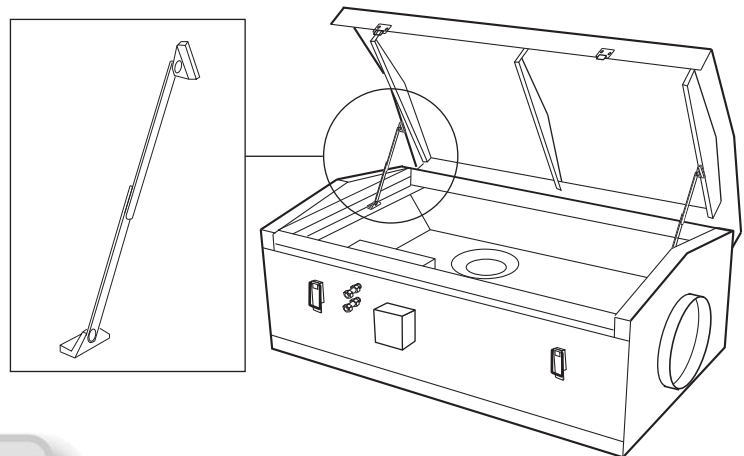
IMPORTANT

Ensure that the attenuator pods are in the correct orientation as shown in fig 6.



6.0 Access to internal components of fan unit

Fig. 8. To gain access to blowers for annual maintenance, and connections to control board, release tool operated latch and raise roof ensuring that the two stays are locked into place.



IMPORTANT

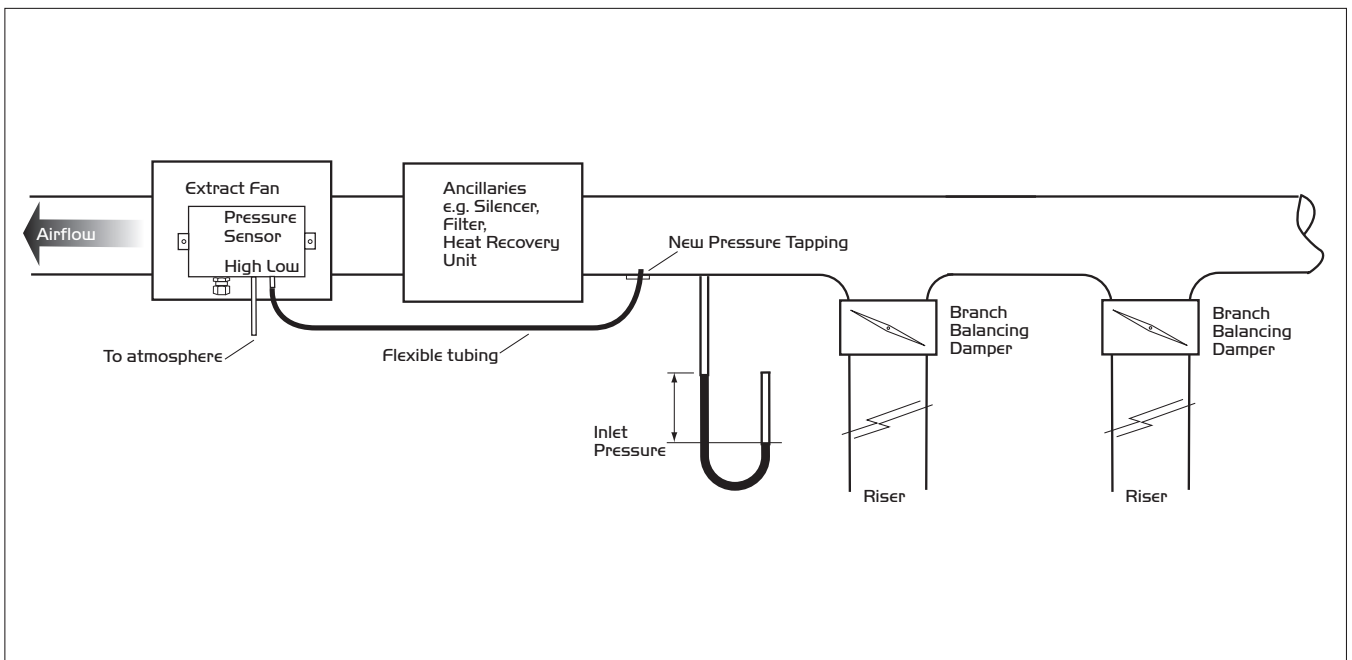
Make sure work is carried out only when weather conditions do not put the health and safety of workers and public in danger.
Reference: Health & Safety in Roof Work HSG33.

7.0 AVTCP Constant pressure range - Controlling static pressure at fan inlet

Ecosmart constant pressure extract fans are supplied to control the static pressure at the fan inlet. This set up is suitable for the majority of applications. However, when ancillaries with high pressure losses are fitted to the fan's inlet side, the low pressure tapping needs to be moved from the

fan chamber to a location upstream of the ancillaries as shown below in fig. 9. Failure to do this will result in excessive pressure being applied to the dampers at the rooms when the system is running in trickle mode.

Fig. 9.



8.0 Electrical detail

Because the run and start currents depend upon the duty and associated ductwork of an individual unit, run currents will be exceeded if the unit is operated with its cover removed. It is therefore recommended that the unit is not run for prolonged periods in this condition.

8.1 Testing after installation

Ensure that the fan unit and any specified controls are fitted securely according to the instructions.

Switch on the mains supply, push the test button to run each fan and check that they run satisfactorily.

If a switched live signal is used, activate this signal and check that the fan runs. De-activate the switched live signal and check the run-on-time; adjust if necessary.

Adjust the set point of any sensors and PIR; check that they function correctly. Adjust the maximum and minimum airflow (if required) by following the commissioning procedures.

IMPORTANT

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

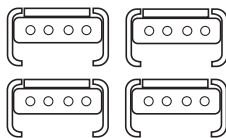
9.0 Wiring Connections

a) Mains connections

Mains cables should be suitably sized and terminated at terminals shown on the appropriate diagram.

b) Control Connections

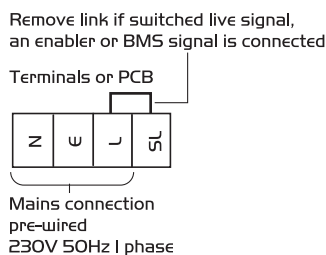
Figure 10. 'Net' connection for Ecosmart devices.



Net - the 4 IDC plug-in connectors are provided for the connection of compatible sensors, manual controls and for linking the fans together under a common control. If more than 4 connections are required, the junction box (product code ES-JB) should be used (see data cable installation).

c) Switched Live (SL) terminal

Figure 11.



A signal of 100-230V a.c. will activate the fan from either its off state or trickle state (see setting to work-trickle switch). When the SL is disconnected the fan will over-run (see setting to work-timer adjustment).

Do not take this signal from an isolating transformer.

d) Damper connections

Figure 12a. Drive open/Spring close.

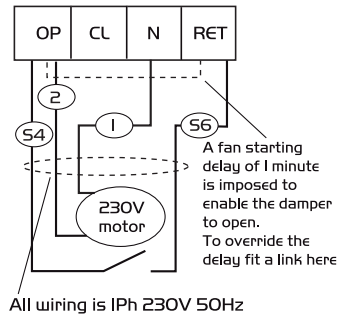
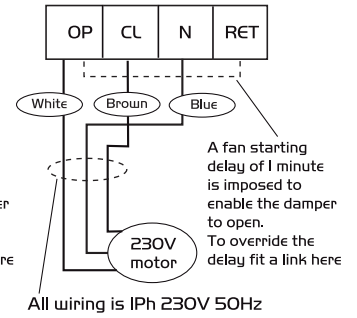


Figure 12b. Drive open/ Drive close.



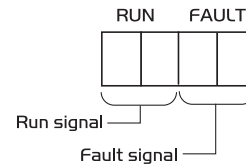
- OP** - 230V 50Hz IA max supply to open the damper
- CL** - 230V 50Hz IA max supply to close the damper
- N** - Neutral supply to damper

RET - 230V ac return signal from the damper limit switch indicates the damper has reached its operating position. If the return signal is not present, the fan will wait for 1 minute before starting.

Note: If a damper is not fitted, connect a link wire from OP to RET. This will cancel the delay.

e) Volt Free Relay Contacts

Figure 13.



f) Data cable installation

A 4-core SELV data cable is used to connect devices such as sensors to the fan and for interconnecting multiple fan units.

Do not run data cable in the same conduit as the mains cables and ensure there is a 50mm separation between the data cable and other cables.

The maximum cable run between any two devices is 300m when it is installed in accordance with the instructions.

Please note that the total data cable length used in any system must be less than 1000m. Keep the number of cable joints to a minimum to ensure the best data transmission efficiency between devices + 50m or less for ES-LCD.

g) Maximum number of devices

The maximum number of devices (including fans) that can be connected together via the data cable is 32, irrespective of their functions.

9.0 Wiring Connections cont.

Fig. I4a Wiring for single phase units AVT 1 to 8.

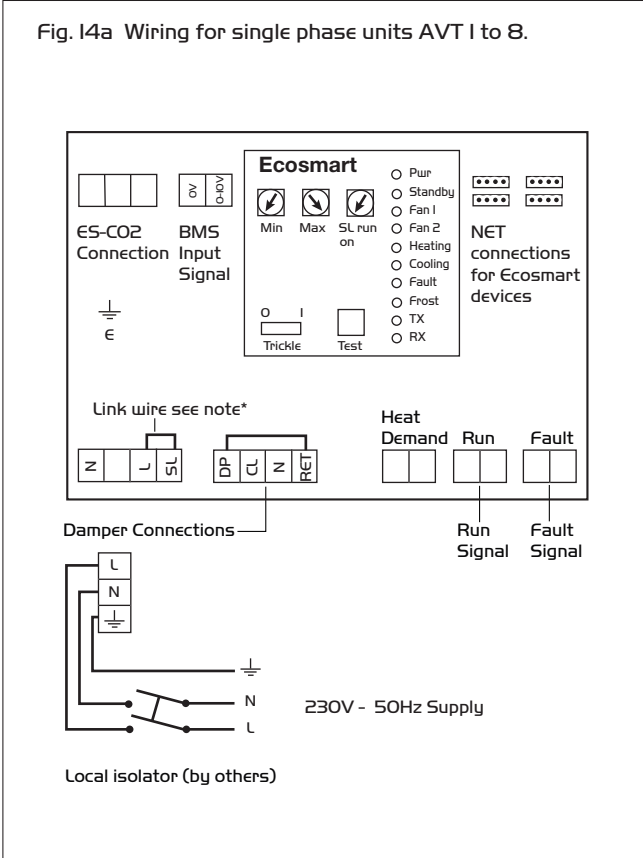
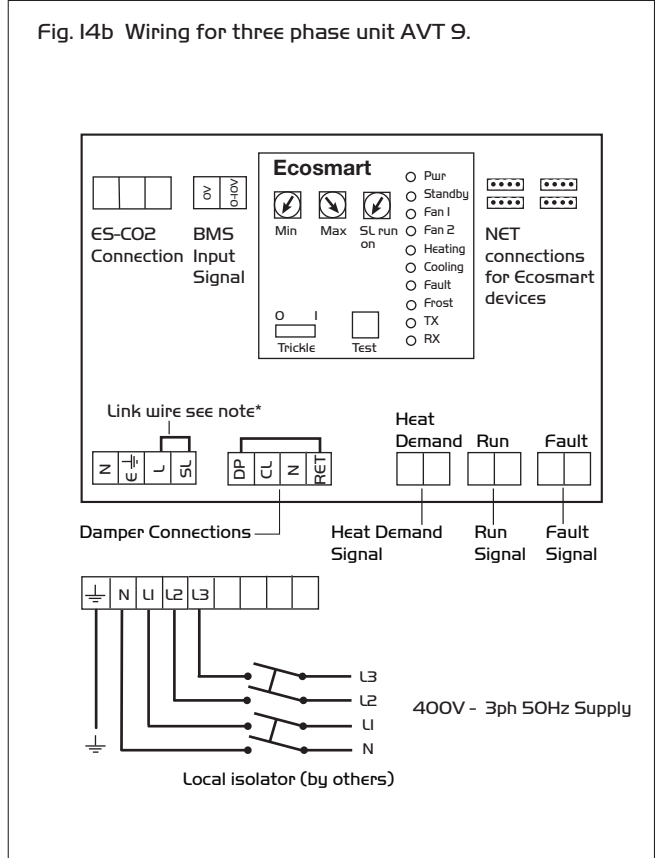
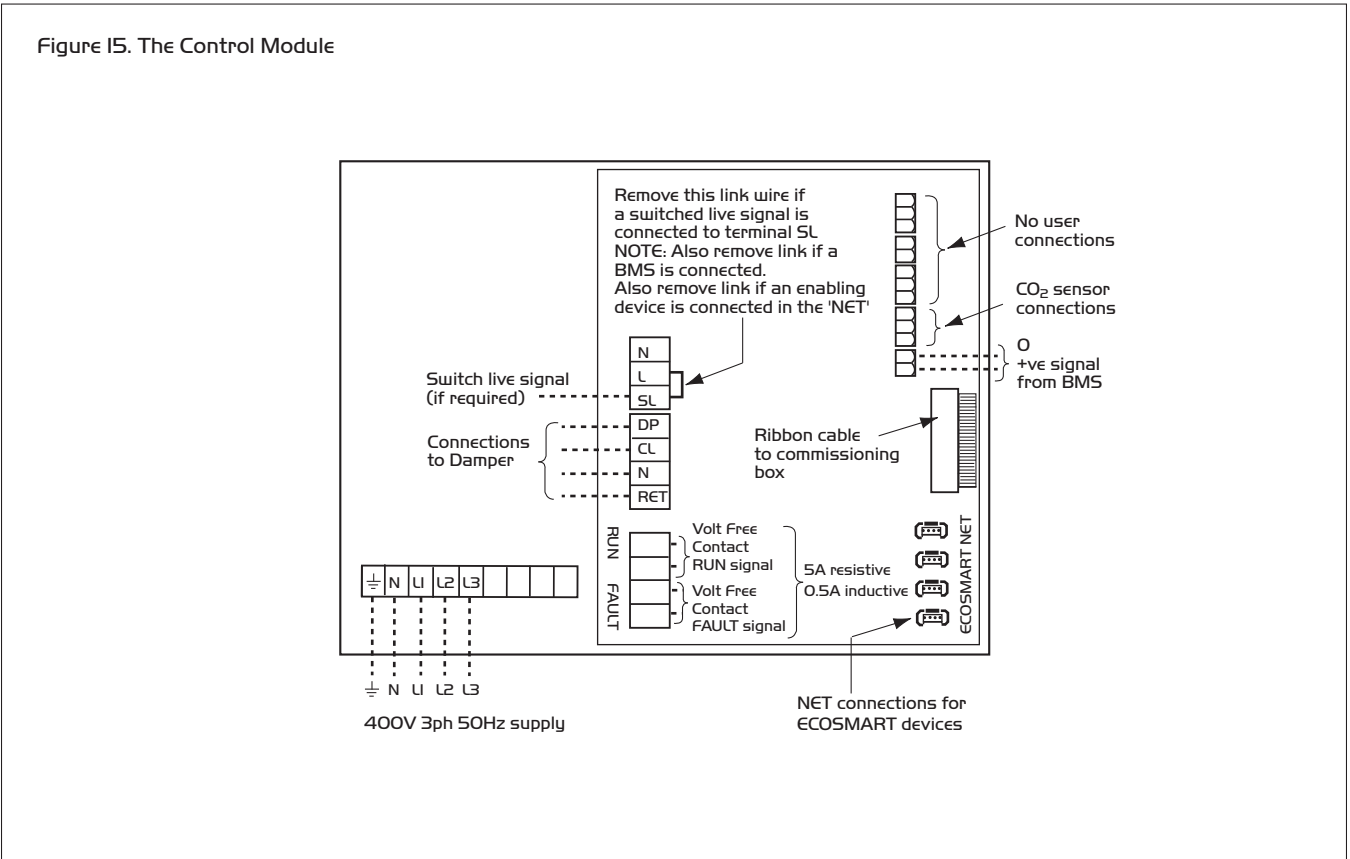


Fig. I4b Wiring for three phase unit AVT 9.



Note: All inter-connections between circuit boards, blowers and sensors are made at the factory. These diagrams only show the essential field wiring points for clarity.
 *Remove link wire if switched live signal, an enabler or BMS signal is connected.

Figure I5. The Control Module



10.0 Using the test button (see fig. 20).

The test button allows the individual blowers within the unit to be checked for its operation. If the fan is running already, press the button once to stop the fan, press again to switch on the standby fan, press again to stop and so on.

Note that the fan will return to normal operation after 30 seconds.

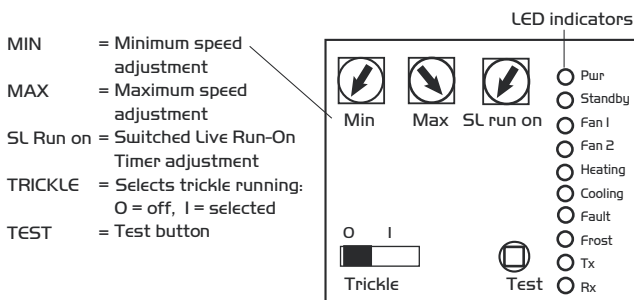
11.0 LED indication (see fig. 16).

PWR	GREEN: Power on & OK. RED: To much power is taken by peripherals or there is a short circuit in the net cable. Check the cable and use a junction box (ES-JB) to connect some of the peripherals.
Standby	LED on when fan is not running.
Fan 1	GREEN: Fan 1 is running, RED: Fan 1 faulty.
Fan 2	GREEN: Fan 2 is running, RED: Fan 2 faulty.
Heating*	Not applicable. See note.
Cooling*	Not applicable. See note.
Fault	LED on when a fault is present on unit.
Frost*	Not applicable. See note.
Tx	LED on when the controller is transmitting data.
Rx	LED on when the controller is receiving data.

* Note that the control panel is common to all the Ecosmart products and will have indicators for functions that are not available in this particular fan. However these indicators will not be illuminated.

Fig. 16. Commissioning panel details.

Note: A Commissioning Procedure document (leaflet No. 671153) is available on request from the Nuair Technical Library Tel: 02920 885911.



IMPORTANT

For good EMC engineering practice, any sensor or low voltage data cables should not be placed within 50mm of mains cables or placed on the same cable tray or conduit as mains cables.

12.0 BMS input signals

Other low voltage cables e.g. BMS signal

Follow the basic principle (as f, page 5). Keep the cable run as short as possible, less than 50 metres.

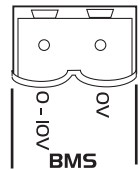
BMS input signals

The BMS connection is made with a plug-in connector via the socket (See figure 17).

To ensure the connection is made only by suitably qualified and authorised personnel the plug is not supplied.

It is available from R S Components, Part No. 403-875 or Farnell, Part No. 963-021.

Figure 17.



IMPORTANT

Reversal of the BMS connection will damage the control.

The system's response to a 0-10V dc BMS signal is given in the table below.

Note the BMS signal will override any sensors and user control connected in the system. The voltage tolerance is +/- 125mV and is measured at the fans terminal.

	Ventilation mode	Cooling mode*	Heating mode*
Local control	0.00	-	-
OFF / trickle	0.25	-	-
Speed 1	0.50	0.75	1.00
Speed 2	1.50	1.75	2.00
Speed 3	2.50	2.75	3.00
Speed 4	3.50	3.75	4.00
Speed 5	4.50	4.75	5.00
Speed 6	5.50	5.75	6.00
Speed 7	6.50	6.75	7.00
Speed 8	7.50	7.75	8.00
Speed 9	8.50	8.75	9.00
Speed 10	9.50	9.75	10.00

* Only available on relevant unit.

13.0 Setting the airflow

Setting the maximum air flow

i) Ensure the power supply is switched off and that a link wire is connected from the supply L to the SL terminal. Unplug all items connected to the 'Net' connectors.

ii) Switch on the power supply.

Note: Ensure unit cover is securely attached.

iii) Wait for the fan to complete its self-test operation.

iv) Remove the cover of the units external commissioning box. Measure the airflow using standard commissioning instruments at a suitable point in the ductwork. If adjustment is required, rotate the pot marked 'MAX' to obtain the desired airflow.

Setting the minimum trickle airflow (nominally 40%)

i) Repeat the same procedure as for maximum airflow above but without the link wire between supply L and SL terminal. Ensure the trickle switch is in the 'ON' position.

The adjustment must be made on the pot marked 'Min'.

ii) Note that the minimum setting (nominally 40%) must be below the maximum setting, otherwise minimum setting will be automatically set to be the same as the maximum.

After setting the airflows, re-connect all the items disconnected previously. Ensure that the cover over the mains terminals is replaced and that the cover of the controls enclosure is securely fastened.

14.0 Maintenance

IMPORTANT

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

The first maintenance should be carried out three months after commissioning and thereafter at twelve monthly intervals. These intervals may need to be shortened if the unit is operating in adverse environmental conditions, or in heavily polluted air.

Note: failure to maintain the unit as recommended will invalidate the warranty.

Lubrication

Motors are fitted with sealed for life bearings and do not require any lubrication.

General cleaning and inspection

Clean and inspect the exterior of the fan unit and associated controls etc. Remove the access panel from the fan unit. Inspect and, if necessary, clean the fan and motor assemblies and the interior of the case. If the unit is heavily soiled it may be more convenient to remove the fan/motor assemblies.

Check that the shutters are free to move smoothly and that they seal the appropriate fan outlet effectively.

Clean and inspect each fan and motor assembly as follows; taking care not to damage, distort or disturb the balance of the impeller.

- a) Lightly brush away dirt and dust, paying particular attention to any build up at the motor ventilating slots. If necessary, carefully remove with a blade or scraper.
- b) Stubborn dirt at the impeller may be carefully removed with a stiff nylon brush.
- c) Check all parts for security and general condition. Check that the impeller rotates freely.

Refit the assemblies to the unit (see Replacement of Parts) then replace the access covers.

If Nuair controls and or remote indicators are fitted, remove the covers and carefully clean out the interiors as necessary. Check for damage.

Check security of components.

Refit the access covers.

15.0 Replacement of parts

The only items of the fan units unit likely to require replacement are the fan/motor assemblies due to a failed motor or damaged impeller or damper actuator.

Remove the access cover. Disconnect the incoming wiring from the connection box (located on the fan scroll) on the particular fan/motor assembly to be removed.

Remove the fan/motor fixings completely, other than the two slotted hole fixings. Support the fan/motor assembly and loosen the slotted hole fixings. The fan/motor assembly can now be turned and withdrawn from the unit.

After replacing the faulty item, refit the fan motor/assembly using the slotted hole fixings to assist in supporting the assembly. Re-connect the wiring. Replace the access cover.

16.0 Spare parts

When ordering spares please quote the serial number of the unit together with the part number. If the part number is not known please give a full description of the part required.

The serial number will be found on the identification plate attached to the unit casing.

17.0 Warranty

The 5 year warranty starts from the day of delivery and includes parts and labour for the first year. The remaining period covers replacement parts only.

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 Nuair International Sales office for further details.

18.0 After Sales

For technical assistance or further product information, please contact the After Sales Department.



Telephone 02920 858 400

DECLARATION OF INCORPORATION AND INFORMATION FOR SAFE INSTALLATION, OPERATION AND MAINTENANCE

We declare that the machinery named below is intended to be assembled with other components to constitute a system of machinery. All parts except for moving parts requiring the correct installation of safety guards comply with the essential requirements of the Machinery Directive. The machinery shall not be put into service until the system has been declared to be in conformity with the provisions of the EC Machinery Directive.

Designation of machinery: AIRE-VOLVE (AVT/AVTCP)
Machinery Types: Direct Drive External Twin Fans
Relevant EC Council Directives: 2006/42/EC (Machinery Directive)
Applied Harmonised Standards: BS EN ISO 12100-1, BS EN ISO 12100-2, EN60204-1, BS EN ISO 9001, BS EN ISO 13857
Applied National Standards: BS848 Parts 1, 2.2 and 5
 Note: All standards used were current and valid at the date of signature.

Signature of manufacture representatives:

Name:	Position:	Date:
1) C. Biggs 	Technical Director	25. 06. 12
2) A. Jones 	Manufacturing Director	25. 06. 12

INFORMATION FOR SAFE INSTALLATION, OPERATION AND MAINTENANCE OF NUAIRE VENTILATION EQUIPMENT

To comply with EC Council Directives 2006/42/EC Machinery Directive and 2014/30/EU (EMC).

To be read in conjunction with the relevant Product Documentation (See 2.1)

1.0 GENERAL

1.1 The equipment referred to in this Declaration of Incorporation is supplied by Nuairé to be assembled into a ventilation system which may or may not include additional components.
 The entire system must be considered for safety purposes and it is the responsibility of the installer to ensure that all of the equipment is installed in compliance with the manufacturers recommendations and with due regard to current legislation and codes of practice.

2.0 INFORMATION SUPPLIED WITH THE EQUIPMENT

2.1 Each item of equipment is supplied with a set of documentation which provides the information required for the safe installation and maintenance of the equipment. This may be in the form of a Data sheet and/or Installation and Maintenance instruction.
 2.2 Each unit has a rating plate attached to its outer casing. The rating plate provides essential data relating to the equipment such as serial number, unit code and electrical data. Any further data that may be required will be found in the documentation. If any item is unclear or more information is required, contact Nuairé.
 2.3 Where warning labels or notices are attached to the unit the instructions given must be adhered to.

3.0 TRANSPORTATION, HANDLING AND STORAGE

3.1 Care must be taken at all times to prevent damage to the equipment. Note that shock to the unit may result in the balance of the impeller being affected.
 3.2 When handling the equipment, care should be taken with corners and edges and that the weight distribution within the unit is considered. Lifting gear such as slings or ropes must be arranged so as not to bear on the casing.
 3.3 Equipment stored on site prior to installation should be protected from the weather and steps taken to prevent ingress of contaminants.

4.0 OPERATIONAL LIMITS

4.1 It is important that the specified operational limits for the equipment are adhered to e.g. operational air temperature, air borne contaminants and unit orientation.
 4.2 Where installation accessories are supplied with the specified equipment eg. wall mounting brackets. They are to be used to support the equipment only. Other system components must have separate provision for support.
 4.3 Flanges and connection spigots are provided for the purpose of joining to duct work systems. They must not be used to support the ductwork.

5.0 INSTALLATION REQUIREMENTS

In addition to the particular requirements given for the individual product, the following general requirements should be noted.

5.1 Where access to any part of equipment which moves, or can become electrically live are not prevented by the equipment panels or by fixed installation detail (eg ducting), then guarding to the appropriate standard must be fitted.
 5.2 The electrical installation of the equipment must comply with the requirements of the relevant local electrical safety regulations.
 5.3 For EMC all control and sensor cables should not be placed within 50mm or on the same metal cable tray as 230V switched live, lighting or power cables and any cables not intended for use with this product.

6.0 COMMISSIONING REQUIREMENTS

6.1 General pre-commissioning checks relevant to safe operation consist of the following:
 Ensure that no foreign bodies are present within the fan or casing.
 Check electrical safety. e.g. Insulation and earthing.
 Check guarding of system.
 Check operation of Isolators/Controls.
 Check fastenings for security.
 6.2 Other commissioning requirements are given in the relevant product documentation.

7.0 OPERATIONAL REQUIREMENTS

7.1 Equipment access panels must be in place at all times during operation of the unit, and must be secured with the original fastenings.
 7.2 If failure of the equipment occurs or is suspected then it should be taken out of service until a competent person can effect repair or examination. (Note that certain ranges of equipment are designed to detect and compensate for fan failure).

8.0 MAINTENANCE REQUIREMENTS

8.1 Specific maintenance requirements are given in the relevant product documentation.
 8.2 It is important that the correct tools are used for the various tasks required.
 8.3 If the access panels are to be removed for any reason the electrical supply to the unit must be isolated.
 8.4 A minimum period of two minutes should be allowed after electrical disconnection before access panels are removed. This will allow the impeller to come to rest.
NB: Care should still be taken however since airflow generated at some other point in the system can cause the impeller to "windmill" even when power is not present.
 8.5 Care should be taken when removing and storing access panels in windy conditions.

Technical or commercial considerations may, from time to time, make it necessary to alter the design, performance and dimensions of equipment and the right is reserved to make such changes without prior notice.