




Important  This manual must be read in full before Installation, Operation and Maintenance of the units supplied

Please ensure that this document is passed to the end user. This manual forms an integral part of the product and should be kept for the working life of the product. Additional copies of this and supporting documents are available by contacting VES or by visiting www.ves.co.uk and following the 'Download O & M's' link.

The following symbols used within this document refer to potential dangers, advice for safe operation or important points of reference

Warning  Indicates hazards associated with electric current and high voltages

Caution  Indicates hazards that require safety advice for personnel or potential unit/property damage

Important  Indicates important information

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Introduction 1 The Ecovent® **EAX** series is a range of Heat Recovery units, with duties up to 0.5 m³/s. Suitable for either plantroom, ceiling void or internal locations. As standard, each unit will have been supplied pre-wired to an isolator or fitted control panel, as specified at the time of order. The standard operating temperature of these units is -20 to +35 °C.

For further technical details regarding dimensions and weights, contact VES on **08448 15 60 60**, quoting the sales order (SO) number and the unit type as found on the unit nameplate, or alternatively visit www.ves.co.uk.



ecovent® EAX Heat Recovery Unit
 Installation, Operation and Maintenance Manual

Nomenclature Part Number Coding	2	Point Description	Point Variants	Details (as appropriate)
	1	Product	EA	Ecovent® Acoustic Heat Recovery Units
	2	Heat Recovery type	X	Crossflow plate heat exchanger
	3	Unit Size	2	Sequential see unit outline for details
	4	Fan Type	4	Backward curve centrifugal EC fan
	5	Fan Size	4	Sequential
	6	Phase	-1	230V 50Hz Single Phase
	7	Unit Configuration	/FP	Flat Plantroom
	8	Main Heating	Null	No Heating
			-E	Electric Heater Battery
			-W	LPHW Coil
	9	Infill	/EE	50mm double skinned
	10	Handing <i>(denotes position of supply airflow LIDSAF)</i>	/LT	Left/Top Access
			/RT	Right/Top Access
			/LB	Left/Bottom Access
			/RB	Right/Bottom Access
	11	Main Filter	Null	No filter
			/G4	EU4 Pleated Filter
			/F7	High efficiency pleated filter
	12	Control Panel Section	Null	No fitted controls
			/I	Pre-wired isolator
			/CPSC	Fitted control panel
			/ISC	Fitted isolator/speed controller
	13	Colour	Null	Galvanised finish
			/R7004	Powdercoated finish, RAL7004 etc...
	14	Powder Coat Type	Null	As colour
			/IT	Internal powdercoated only
			/BT	Internal/External powdercoated
	15	Special	/S	Special (non-standard) Unit

Typical Example

EAX244-1/FP-W/EE/RT/G4/CPSC/R5015/S

EA X 2 4 4 -1 /FP -W /EE RT/ G4 /CPSC /R5015 /S
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮



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Receipt of Goods & Handling

3 Immediately upon receipt of goods, check for possible damage in transit paying particular attention to fan impellers, coil connections and unit casing. Prior to installation please check to ensure alignment and smooth rotation of the impeller after transit. Also check to ensure that any ancillary items are included. These will normally be supplied fitted or, in the case of small items, taped to the unit.
In the event of any damage having occurred or if any item is found to be missing, it is essential to inform VES Andover Ltd. within **7 days** of delivery quoting sales order number and the unit type, as found on the unit nameplate. After this period, VES would be unable to accept any claim for damaged or missing goods.

Installation

4 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 manufacturer's recommendations, with due regard to the current HEALTH AND SAFETY AT WORK ACT and conforms to all relevant statutory regulations.
Where a unit is installed so that a failure of components could result in injury to personnel, precautions should be taken to prevent such an injury. If the unit is installed where there is a reasonable possibility of persons or objects coming into contact with the impeller whilst operational, a guard should be fitted or steps taken to prevent this. It is the installer's responsibility to ensure that access panels are not obstructed in any way and safe working access for maintenance must be provided in accordance with Health and Safety and Building Regulations. For confirmation of required access please see the appropriate unit outline drawing.
For optimum unit performance, careful consideration must be paid to the location of the unit in relation to the ductwork and associated items; placing the unit directly adjacent to a bend in ductwork will impede airflow and reduce performance. Consideration must also be given by the installer for adequate illumination of the unit location in order for safe maintenance. Further consideration should be given to the unit's position and secured into place as appropriate. This is especially important with external mounting as the wind and elements may effect the overall stability and safety of the unit.

Caution



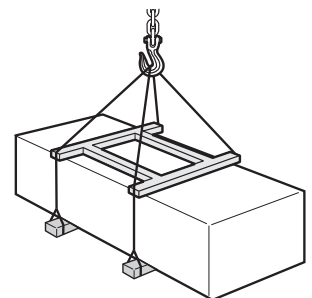
Handles, lids, housings and coil connections must NOT be used as lifting points

Lifting Detail

Fig. 1

When moving the unit, handle with care and in such a manner as to avoid damaging the external finish as this may reduce the ability to resist corrosion.

Units are to be rigged and lifted using spreaders, taking into account the weight of the unit, and lifting gear should be arranged so as not to bear on the casework see right.



Caution



Units should only be supported using the support feet as provided by VES with the unit. Contact VES before attempting to support the unit using alternative methods. Only experienced fitters should undertake this work. Take necessary safety precautions when working in elevated positions.

Important



For associated components (speed controllers, controls) please refer to the relevant accompanying O&M



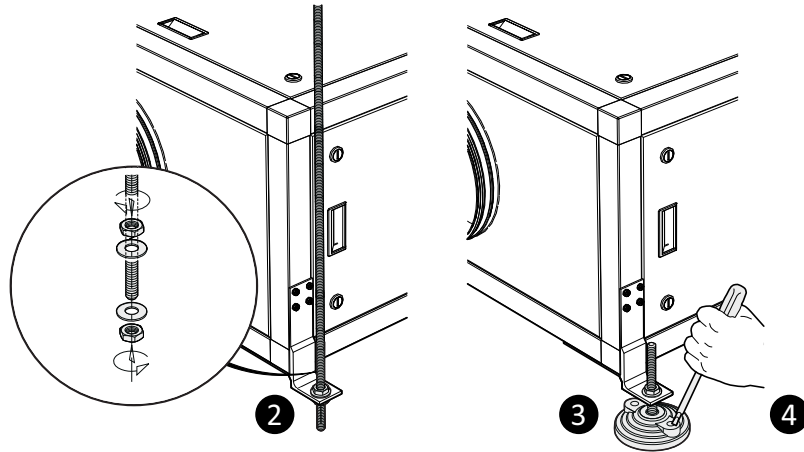
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Installation 4 Continued

Ecovent® EAX units are supplied with feet suitable for floor or ceiling-void mounting, either by use of drop-rod mounting, in either top or bottom access orientation, with airflow in the horizontal plane. For alternative mounting please consult your outline drawing as supplied with the unit, or refer to VES Customer Services for further information.

Secure drop rods/unit with the appropriate fixings as shown below 2. Self-levelling feet are available for floor mounting, with fixings as per drop rods 3. The unit can be further secured to the floor via knockout fixings holes on the feet, fixings to be supplied by others 4.



Unit mounting detail

Fig. 2 3 4

Important

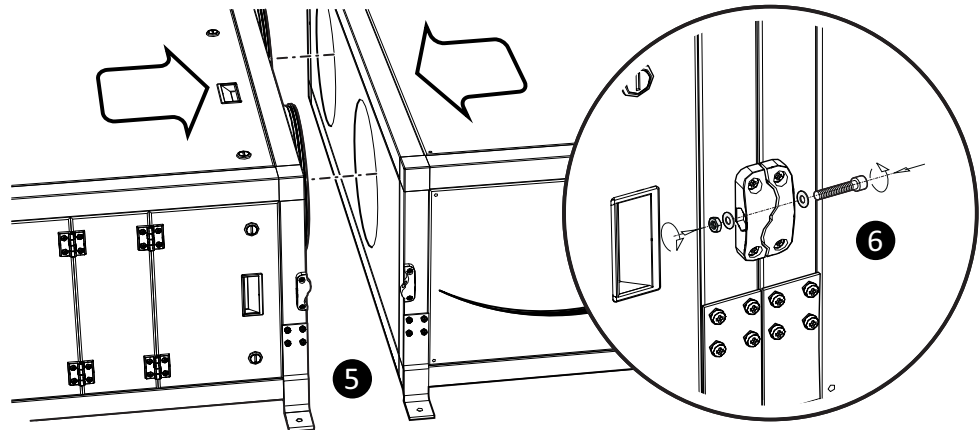


When hanging units from drop-rods, ensure that the load is evenly spread and that **ALL** feet are used within the support, including those for fitted silencers if included. Ensure that the drop rod used is selected appropriately to accommodate the load of the unit.

EAX units with fitted silencers are sectional and handed. It is important that all sections are joined together securely prior to positioning and installation. Remove and retain the fixings from the joining bracket. Butt the correct silencer to the unit section ensuring the unit spigots enter the silencer section fully see fig. 5. This joint should be assembled using self-adhesive rubber tape at the joints prior to assembly so as to prevent air leakage; replace with similar if damaged. Finish the assembly by installing the joint fixings through both parts of each joining bracket and tighten using a 6mm hex key, drawing the sections together evenly see fig. 6.

Section joining detail

Fig. 5 6



Caution



Joining brackets are **NOT** structural and are included as part of the unit sealing only. When moving assembled units ensure that **ALL** sections are fully supported.



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Installation Electric Heater Batteries

4 Continued

On **EAX/ -E** units, an electric heater battery (EHB) will be installed. Supply to the heater should be 1Phase or 3Phase with separate neutrals; confirmation of this can be found on the unit nameplate. Cables should be of silicone rubber, fibreglass or of a similar high temperature insulated type and be installed to current

I.E.E. Regulations, ensuring a sufficient earth connection to the terminal provided. Care should be taken not to overstrain the terminal pillars as this may permanently damage the elements.



The heater is fitted with a manual-reset high temperature cutout with normally closed (NC) terminals and is set to break if the duct temperature rises above 130 °C. It is important that the cutout is connected to the safety circuit so the heater is isolated in the event of overheating caused by airflow failure.

The electrical supply must be isolated before attempting to reset the manual cut-out and should be given sufficient time to cool. For further information regarding electric heaters please see **VES Ref. ID431**.

If a speed controller is fitted to the system, it must not stop the fan independently of the control system, or allow airflow to fall below the stated volume on the electric heater battery. Suitable speed controllers without on/off switches are available from VES Andover.

Coils

Coils should be piped according to any relevant local codes of practice. Where threaded connections are supplied, the only approved method of jointing method is by use of Boss white and hemp. The thread fitted to the coil is to be supported at all times whilst making joints. All external piping is to be supported independently from the coil. Fluid filters are recommended.



It is important that water and steam coils are protected against damage from extreme weather conditions during the winter season. If the water is allowed to freeze in the coil system, damage may occur potentially bursting pipes and resulting in emergency problems. Fitting a frost thermostat at the unit inlet and ensuring that boilers run continuously in low ambient temperatures can help to prevent this.



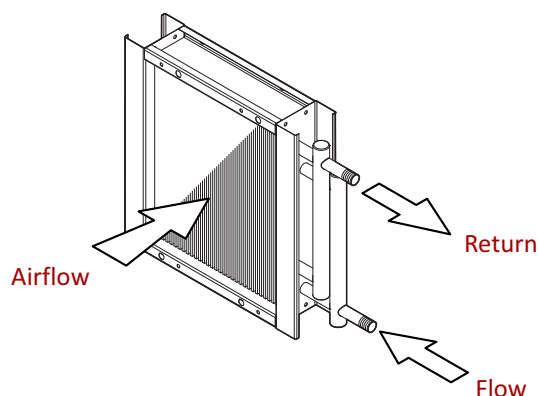
Heating coils do not cool immediately when the hot water supply is cut off. The residual heat must be dissipated to avoid damage. The continuous running of the fan after shutdown resolves this, by operation of a run-on timer. The recommended length of run-on is **2 minutes minimum**.

LPHW Coils

On Ecovent® **EAX / -W** units, a Low Pressure Hot Water (LPHW) coil will be installed. The coils are normally suitable for LPHW at 82 °C flow and 71 °C return temperature. LPHW coils are supplied as standard with an air vent and drain plug located on the pipe work immediately adjacent to the coil connections on the AHU. The air vent should be at the highest point, with the drain at the lowest. The coil should be regularly vented so as to avoid potential air locks, resulting in a fall off of duty.

Typical LPHW Coil

Fig. 7





 **ecovent® EAX Heat Recovery Unit**
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Installation
LPHW Coils

4 Continued

It is recommended that a check be made as to whether any treatment is required to the water supply for prevention of corrosion and scaling of the equipment. Information regarding the necessary action to be taken can be obtained from the relevant Local Water Supply Authority. The unit will have been supplied with connections either left or right-hand side looking in direction of airflow. Please see order acknowledgement for confirmation of this handing. Should you need to alter this please consult VES as unit adjustment may invalidate your warranty.

Condensate Trapping

A drain pan is fitted to all units. Should conditions mean that condensation is likely ensure that the unit connected to an appropriate waste system. Refer to manual **VES Ref. ID665** for further information on trapping details.

Consideration should be given to the height required for the trap to function correctly and that the unit may need additional base support in order to accommodate this correctly.

An optional peristaltic pump is available. For pump fitting and installation instructions see the documentation accompanying the pump assembly.

The drain pan is fitted with an internal spigot suitable for connection with a Ø15 mm push-fit straight connector, to be supplied by others. Terminate through the case onsite as required, ensuring that any swarf is removed. Should it be required to remove any component, ensure that it is replaced correctly.



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**Standard Wiring 5
 & Fan Installation**



The electrical supply **must be fully isolated** before attempting to affect any work on this unit. All electrical connections to any unit must be carried out in accordance with the current edition of the I.E.E Regulations, only competent Electricians should be allowed to affect any electrical work to our units.



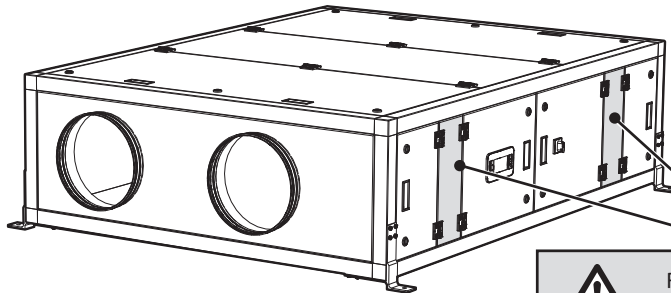
It is recommended that the cable entry point should be at the end of the control section as shown below in figure 8. These panels are removable to assist with installation. It is the responsibility of the installer to ensure that a suitable cable gland (giving adequate protection and strain relief) is fitted, and in doing so also ensure that no internal components are damaged during this installation. Make certain all swarf is removed before use.

It is the customer's responsibility to supply earth fault protection through the building installation device and a dedicated, isolated power supply with overload protection, to account for motor start up currents. See below for specific fan details Fig. 9.



Do not connect any unit to an electrical supply voltage outside of the specification.

**Recommended
 cable entry points
 Fig. 8**



Recommended cable entry points

The following wiring diagrams are a guide to installing the standard fan and actuator options found on Ecovent® EAX units. If in any doubt, for units with fitted VES controls or for special versions of the units, consult the wiring diagram in your document pack or contact VES Customer Services Department on **08448 15 60 60**, quoting the sales order (SO) number and unit type as found on the unit name plate. For incorrect fan rotation, check with the VES Service Department for advice, on **08448 15 60 60**.

**Standard Fan Details
 Fig. 9**

Model		230V 1PH 50Hz	
EAX Unit	Fan	Motor Power (kW)	F.L.C. (A)
2	ZD0411	0.32	1.70

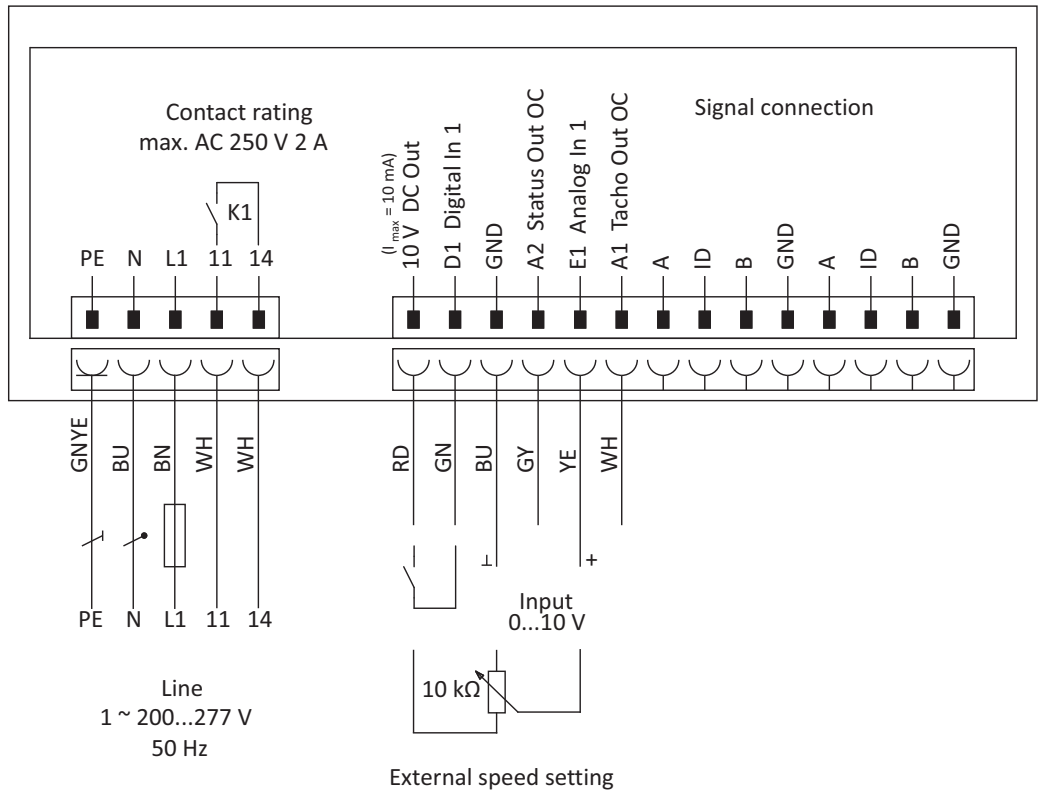


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**Standard Wiring
 & Fan Installation**

5 Continued

**Standard wiring
 arrangement
 Fan Terminals for Ecovent®
 EAX244
 Fig. 10**



**Standard wiring
 arrangement
 Damper Motor Terminals
 Fig. 11**

AC 24 V 50Hz / DC 24 V



Warning **CM24-SR Damper Actuator**
 To isolate from the main power supply, the system must incorporate a device which disconnects all the phase conductors



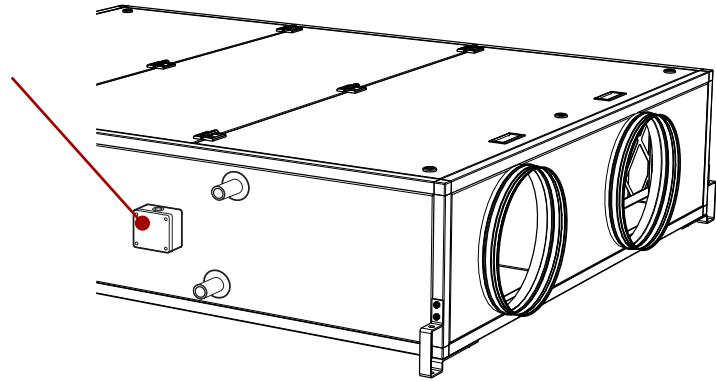
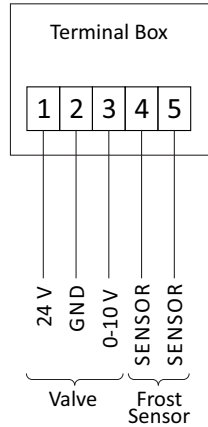
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**Standard Wiring
 & Fan Installation**

5 Continued

Standard wiring arrangement
 Valve Actuator Terminals

Fig. 12



Warning

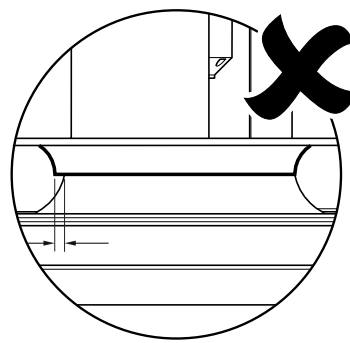
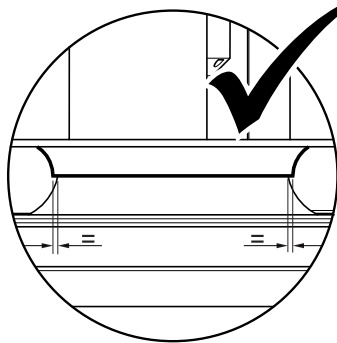


SGS65... Valve Actuator

To isolate from the main power supply, the system must incorporate a device which disconnects all the phase conductors

Fan alignment details

Fig. 13



Important



Prior to starting the unit it is important to ensure that the fans are free running, and should any components have moved during transit take care to ensure they are realigned to allow correct operation/rotation. A trial spin by hand should indicate if the fan is rubbing. To align, loosen either the fan plate fixings or the inlet ring, adjust and retighten, see figure 13 above. The same should be applied to any wiring looms which may have become unfastened; ensure that loose wiring is securely stowed away from any moving components.



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Standard Wiring & Fan Installation

5 Continued

As all units in the Ecovent® EAX range feature tapped inlet rings it is possible to establish the volume flow rate by measuring the static pressure rise into the fan.
 The centrifugal fans have infinite speed adjustment, the benefits of real energy savings are apparent when the fan speed is reduced; this is best demonstrated when used in conjunction with additional sensors such as air quality or occupancy.

Using a micro manometer and adjusting the fan speed it is possible to commission each fan to the required air volume. Each fan section has a differential pressure tapping connection point; by connecting your micro manometer to the appropriate pitot a differential pressure reading can be taken. This measurement can then be applied to the calculation as below or by using the differential pressure curve on page 10. Simply read across from the pressure measurement to the fan curve and down to calculate the resultant air volume.. If the unit features a fitted control panel this action can be undertaken within the programming available; see the accompanying controls documentation for further operational details.

Example: Measured differential pressure: 280 Pa

This measurement can then be expressed in the following calculation:

$$q_v = (k \sqrt{\Delta p_w}) / 3600$$

where

q_v is the air volume in m^3/s

k is the fan nozzle coefficient (EAX244 = 86)

Δp_w is the measured differential pressure in Pa

Measured differential pressure: 280 Pa

$$q_v = (86 \sqrt{280}) / 3600$$

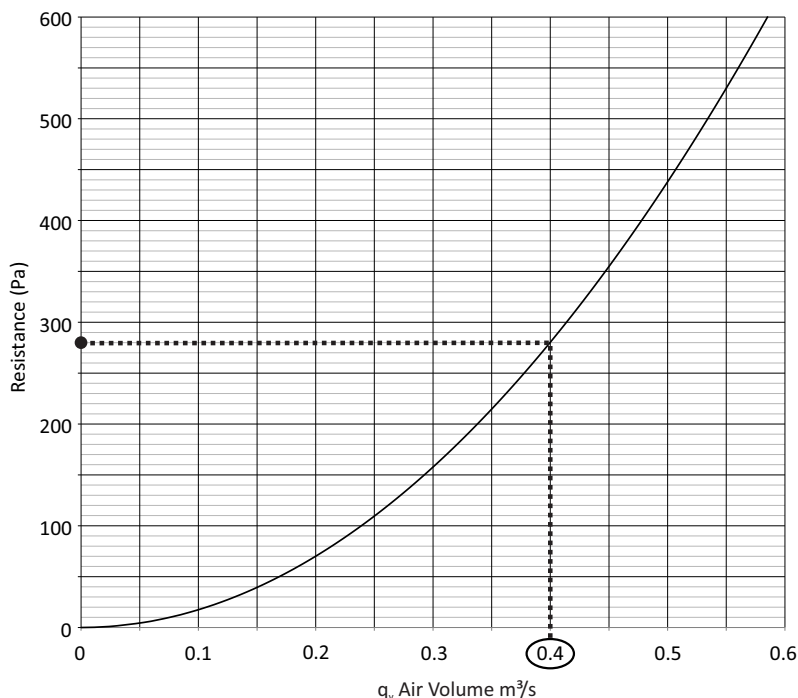
$$q_v = (86 \times 16.733) / 3600$$

$$q_v = 1439 / 3600$$

$$q_v = \text{air volume} = 0.4 \text{ m}^3/\text{s}$$

Differential pressure calculation Fig. 14

Differential pressure curve Fig. 15



Example: Measured differential pressure: 280 Pa
 Reading from graph: 0.4
 Air Volume: 0.4 m^3/s



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Maintenance 6

Important



Before attempting to carry out any work on our units, all accompanying documentation including warning labels on the unit must be referenced. Should it be necessary to remove any component ensure that these are secured into position once reinstalled. It is critical that after any maintenance work has been conducted that all components removed/replaced be refitted correctly by a competent engineer.

Warning



Before attempting to carry out any maintenance work, investigative or repair work on our units, the unit **MUST BE COMPLETELY ISOLATED** from its electrical supply. Ensure a minimum of two minutes after electrical disconnection before removing access panels. This will allow any moving parts to come to a rest. Care should also be taken when accessing external units as the wind and elements may cause moving parts to 'windmill'.

In general, this series of units require little maintenance. In the unlikely event of component failure, spares are available from stock at VES Andover Ltd.

Caution



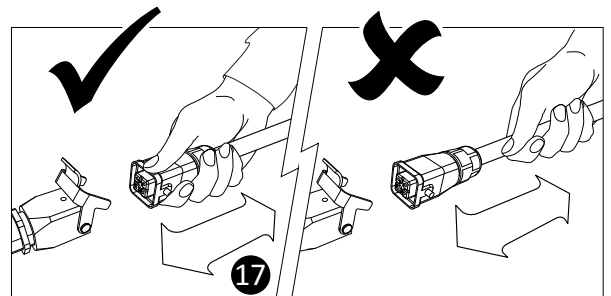
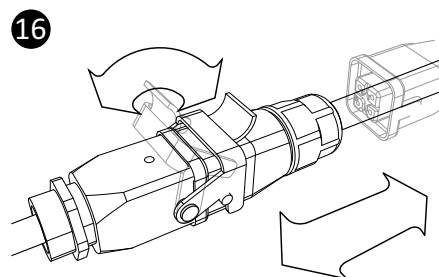
When accessing the unit ensure the access panels are handled/opened in a controlled manner so as to avoid damage to the unit or injury to personnel. This is particularly important with bottom access units. Ensure the AHU has been allowed to completely cool before attempting any work to the unit

For bottom access units, should it be necessary to remove the heat exchanger from the unit casework take care to ensure that all components are correctly supported during their removal. Remove the lids and central mullion from the unit, exposing the bypass damper. As an additional safety measure some components are held into place using PK screws. Remove the required components with care and ensure all components are replaced correctly.

Ecovent® EAX units feature plug & socket connections to allow easy removal/replacement of key components. Separate the plug connection by hand (tools not required) by lifting the locking lever **16** and pulling the plug/socket apart **17**. **DO NOT** pull the cable to separate the assembly.

Plug & socket operation

Fig. **16** **17**



Upon reconnection, the assembly features a locating lug to ensure correct orientation. Once rejoined, lock the connection together again using the locking lever as shown.



ecovent® EAX Heat Recovery Unit

Installation, Operation and Maintenance Manual

Maintenance 6 Continued

Important



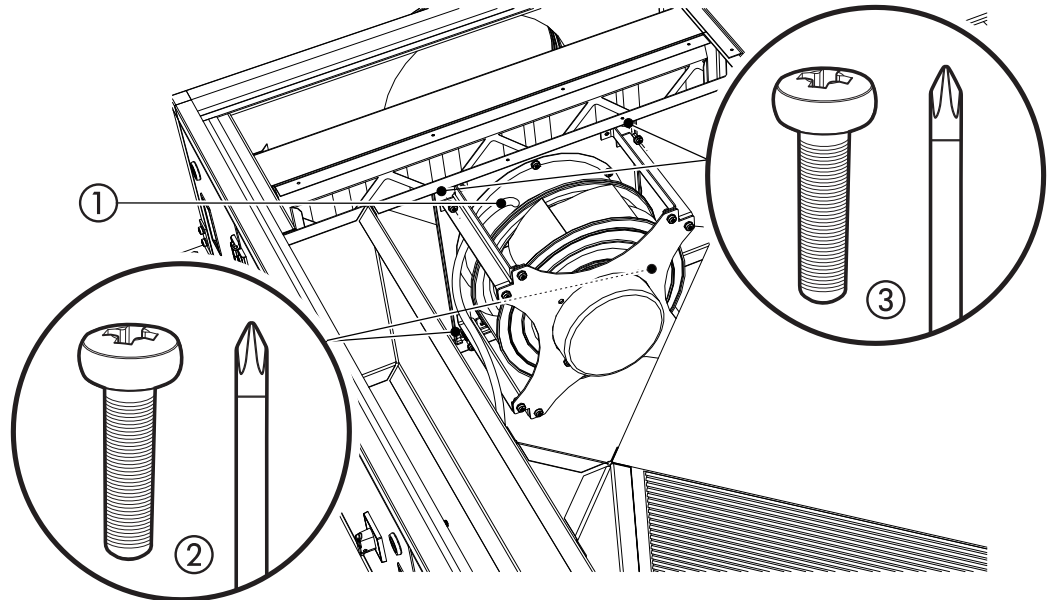
Ecovent® EAX units feature a bulkhead-mounted fan plate assembly.

Ensure that special care is taken when removing/replacing components/assemblies from bottom-access units. For larger components this may require the use of two or more persons. The mounting plate is slotted to aid plate alignment. It is important to keep the fan assembly supported at all times; the fan assembly should not be considered supported until all fixings are securely tightened.

To remove the fan assembly Fig. 18, ensure the unit is fully isolated. Separate the supply plugs to the fan as shown above 16. ① Detach the measuring tube from the inlet ring and stow the tube clear. ② Back-out the bottom screws but do not remove. ③ Remove the top fixings completely and retain. Carefully lift the fan assembly over the retained fixings and remove the fan assembly from the unit.

Fan assembly removal/ installation

Fig. 18



To replace the fan assembly, ensuring the pitot tapping on the fan inlet ring is accessible, locate the mounting plate over the fixings retained in the unit bulkhead. ② ③ Secure the loose fixings through the mounting plate and tighten all the mounting fixings. ① Attach the measuring tube to the pitot tapping on the inlet ring ensuring that it is clear of all moving parts. Reconnect the supply plugs as in Fig. 16; if more than one plug is used, ensure the correct plugs are reconnected as marked.

Ensure that the fans are free running by following the fan alignment instructions on page 11, adjust as required.



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Installation, Operation and Maintenance Manual

Maintenance 6 Continued

Recommended Checks In order to keep the unit in good order the following maintenance routine is recommended:

Three Monthly Checks Filters should be inspected every three months. If they are found to be heavily soiled or damaged in any way they should be replaced. Spare filters can be ordered from VES Spares Department.

Six Monthly Checks The fan impeller should be cleaned every 6 months. Failure to clean the fan on a regular basis could result in loss of fan performance, or cause it to fall out of balance. If a fan is stationary for long periods in a humid atmosphere, it should be switched ON for minimum of two hours every month to remove any moisture that may have condensed within the motor.
The fan motors are maintenance free due to the use of ball bearings with 'life-long lubrication'. At the end of the grease life it will be necessary to change the bearings or change the fan unit. The life expectancy of bearings for standard usage is approximately 30 - 40000 hours.
Failure to keep dampers clean could result in the damper becoming inoperative. Clean damper blades and frames and lubricate with PTFE aerosol or equivalent.
The heat exchanger matrix should be inspected for debris, dust or dirt build up. If found contaminated, foreign matter should be removed accordingly; superficial dust or debris can be removed from the surface of the heat exchange by gently brushing. Loosened debris can then be vacuumed from the surface of the matrix or flushed through with warm water. Stubborn deposits can be removed by using a low pressure washer with an approved detergent solution. The solution temperature should not exceed 50 °C. When using any pressure device care must be taken not to damage the heat exchanger matrix.

Caution  Under NO circumstances should the heat exchanger be steam cleaned.

Ensure the drain pan and the drain connection is free from debris ensuring any condensate produced can freely drain away. Should a full service be required it may be necessary to disassemble the unit casework to gain access to some components.

Twelve Monthly Checks Ecovent® EAX units are supplied with unpainted galvanised steel cases as standard but have an option for powder coat paint finish. Check all painted items to ensure that they have not deteriorated, particularly where adverse environmental conditions prevail. Re-paint as necessary. Matching paint can be supplied upon request.

Spares & Repairs When enquiring after or ordering spares contact VES Spares Department, quoting the sales order (SO) number and unit type as found on the unit nameplate.

Tel: 08448 15 60 60 • Fax: 02380 26 12 04

WEEE Directive



At the end of their useful life the packaging and product should be disposed of via a suitable recycling centre. Do not dispose of with normal household waste. Do not burn.



Q 05375



PLEASE ENSURE THAT THIS DOCUMENT IS PASSED ON TO THE END USER

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CE Declaration of Conformity

Date: 20th. May 2015
Product: Ecovent EAX Heat Recovery Unit
Type: EAX
Manufacturer: VES Andover Limited

The product above is produced in accordance with EC Council Directives:

2004/108/EC (Electromagnetic Compatibility Directive)

2006/42/EC (Machinery Directive)


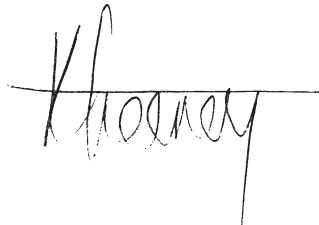
The European Harmonised Standards applied are:

BS EN ISO 12100:2010, BS EN ISO 13857:2008, EN61000, EN 60204-1, BS EN 60950-1:2006

Basis of Self attestation:

Quality Assurance to ISO 9001-2008, BSI Reg. Firm Cert. No. Q05375

Signature of Manufacturer:

Name:	Signature	Position of Signatory:
R. Peters		Deputy Managing Director
K. Feeney		Engineering Associate Director