

 **colourfan[®]**

Acoustic Supply Units

Operation & Maintenance Manual



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Original Instructions


Conventions


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 **Colourfan acoustic** supply series is a range of centrifugal supply units, direct driven with duties up to 3m³/s. Suitable for plant-room, ceiling void and external locations. As standard, each unit will have been supplied with either pre-wired fitted controls or pre-wired to an isolator. The standard ambient operating temperature of the unit is -20 to +40°C.

For further technical details regarding dimensions and weights, contact VES on **02380 46 11 50**, quoting the sales order (SO) number and the unit type as found on the unit nameplate, or alternatively visit www.ves.co.uk.

Nomenclature	2	Point Description	Point Variants	Details (as appropriate)
Part Number Coding	1	Product	CAS	Colourfan acoustic supply units
	2	Unit Size	0...10	Sequential see unit outline for details
	3	Fan Type	4	Backward Curve centrifugal fan
			5	Backward Curve centrifugal fan
	4	Fan Size	1...10	Sequential
	5	Phase	-1	230V 50Hz Single Phase
			-3	400V 50Hz Three Phase
	6	Unit Configuration	/P	Plantroom (flat)
			/W	Weatherproof (flat)
	7	Main Heating	Null	No Heating
			-E	Electric Heater Battery
			-W	LPHW Coil
	8	Infill	/EE	50mm, Mineral wool infill
	9	Handing	/RT	Right/Top Access
			/RB	Right/Bottom Access
			/LT	Left/Top Access
			/LB	Left/Bottom Access
			/L	Left Access
			/R	Right Access
	10	Main Filter	Null	No filter
			/G4	G4 panel filter
			/F7	F7 Panel filter
	11	Control Panel Section	Null	No fitted controls
			/ISC	Pre-wired isolator & speed controller
			/CPSC	Fitted control panel & speed controller
	12	Inlet/outlet	/L	weather louvre outlet
			/C	weather cowl outlet
			/SP	rectangular spigot
	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

CAS0051-1/P/EE/LB/F7/ISC/SP/S

CAS 00 5 1 -1 /P /EE /LB /F7 /ISC SP /S
 (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15)

Receipt of Goods & Handling **3** Immediately upon receipt of goods, check for possible damage in transit paying particular attention to fan impellers and unit casing. Prior to installation please check to ensure alignment and smooth rotation of the impellor 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.

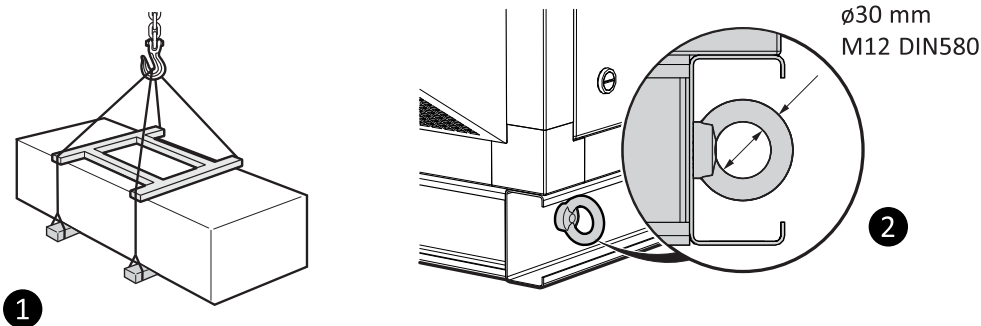
Where a unit is installed so that a failure of components could result in injury to personnel, precautions should be taken to prevent such an injury. If the unit is installed where there is a reasonable possibility of persons or objects coming into contact with the impellor whilst operational, a guard 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 should be secured into place as appropriate; this is especially important with external mounting as the wind and elements may effect the overall stability of the unit.

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

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. Lifting gear should be arranged so as not to bear on the casework **1**. Larger size units may be supplied with a channel base, in this case 30mm lifting eyes will be supplied. Use appropriate fixings, again taking all necessary precautions **2**.

Lifting Details
Fig. **1** **2**



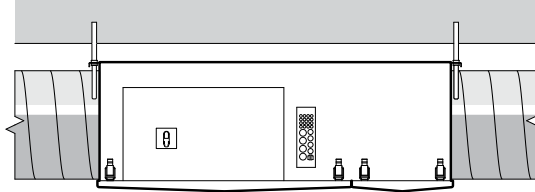
Caution  Units should only be supported using the support feet as provided by VES with the unit. Contact VES before attempting to support the unit using alternative methods. Only experienced fitters should undertake this work. Take necessary safety precautions when working in elevated positions.

Installation 4 Continued

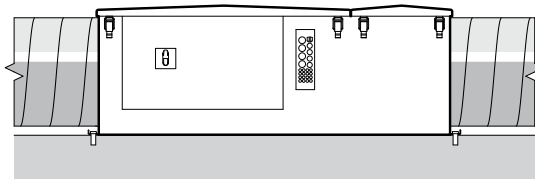
Colourfan acoustic supply units are suitable for floor or ceiling-void mounting, either by use of drop-rod mounting, in either top or bottom access orientation, or using compatible feet in top orientation, with airflow in the horizontal plane (illustrated below). For alternative mounting please consult your outline drawing as supplied with the unit, or refer to VES Customer Services for further information.

Unit Mounting Options

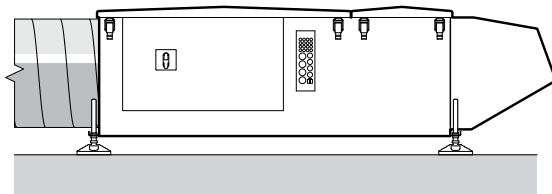
Fig. 3 4 5



3 Plantroom ceiling mounted
(fan, filter & control panel option shown)



4 Plantroom floor mounted
(fan, filter & control panel option shown)



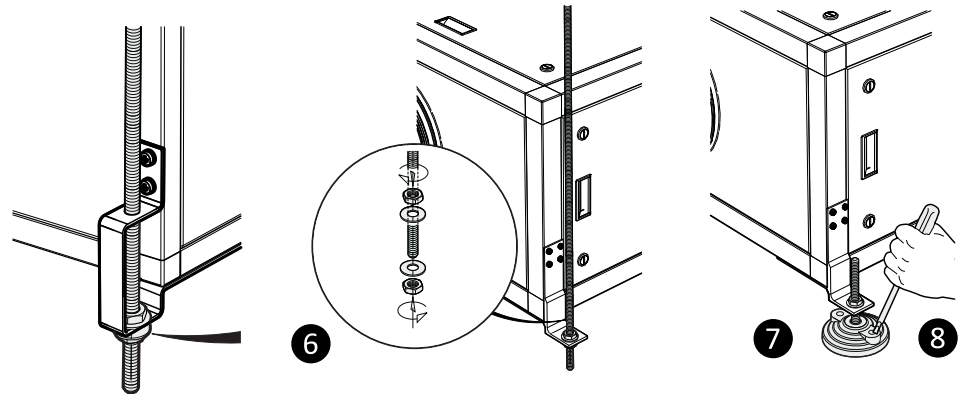
5 Weatherproof roof mounted
(fan, filter & control panel option shown)

Installation 4 Continued

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

Secure drop rods/unit with M10 fixings as shown below **6**. Self-levelling feet are available for floor mounting, with M10 fixings as per drop rods **7**. If required the unit can be further secured to the floor via knockout fixings holes on the feet, fixings to be supplied by others **8**.

Unit mounting detail
Fig. **6 7 8**



Important

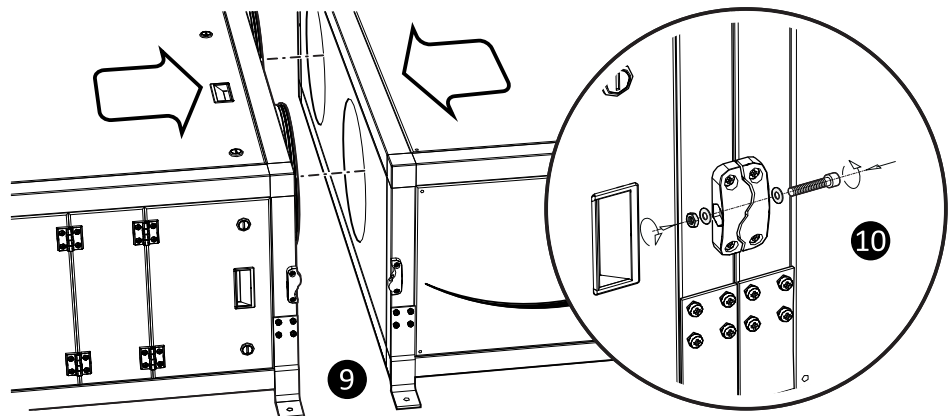


When hanging units from drop-rods, it is important that the load is evenly spread and that all feet are used within the support.

Where provided, flanges and spigots should not be used to support the ductwork connection. Further consideration should be given to the unit's position and secured into place as appropriate.

Colourfan acoustic 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 **9**. 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 8mm hex key, drawing the sections together evenly **10**.

Section joining detail
Fig. **9 10**



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.

Installation 4 Continued
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.

Caution



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**.

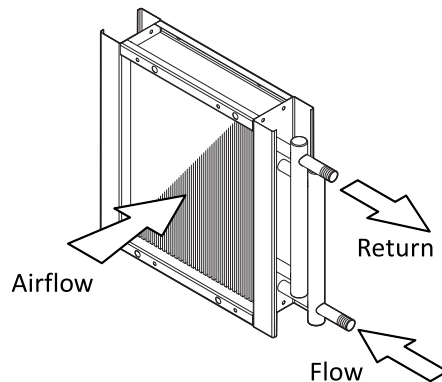
Hot Water (LPHW) Coils

On **colourfan acoustic / -W** units, a Low Pressure Hot Water (LPHW) coil will be installed **11**. 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.

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.

Typical LPHW Coil
 Fig. **11**



Electric Heater Batteries

On **colourfan acoustic /-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.T. 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.

Caution



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.

Standard Wiring 5 & Fan Installation

Warning



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.

Important



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 pages 8 and 9 for specific fan details Fig. **12** **14**.

Warning



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

For Three Phase Fans, a trial connection of the three phase supply should be made to check that the fan rotates in the correct direction as indicated on the fan. If the rotation is incorrect, interchange any two phases of the incoming supply at the isolator.
For incorrect rotation of single phase fans, check with the VES Service department for advice, on **02380 46 11 50**.

The following customer connection diagrams (*page 9,10 & 11*) are a guide to the standard fan options found on **Colourfan acoustic** 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 **02380 46 11 50**, quoting the sales order (SO) number and unit type as found on the unit name plate.



BlueSense provides practical answers to the issues you are faced with today. With controls at its heart it draws on the very best technology, products and expertise providing a range of solutions, all of which will go a long way towards helping you meet your regulatory and environmental commitments.

All products in the **colourfan acoustic** range can form part of the BlueSense energy saving commitment; supply, extract or twinfan units can be optimised with a pre-wired controls package, energy efficient speed controller and air quality sensor, all programmed to work in unison.

The CPB range is specifically designed for air handling units requiring remote or room unit control, with applications suitable for individual supply or extract systems.

The control system is offered fully integrated into the supply air handling unit pre-wired and factory commissioned. For remote unit control through a BMS system or other external source the control panel will be supplied with terminals for easy customer connections, or the control system is supplied with a versatile room unit.

Important



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

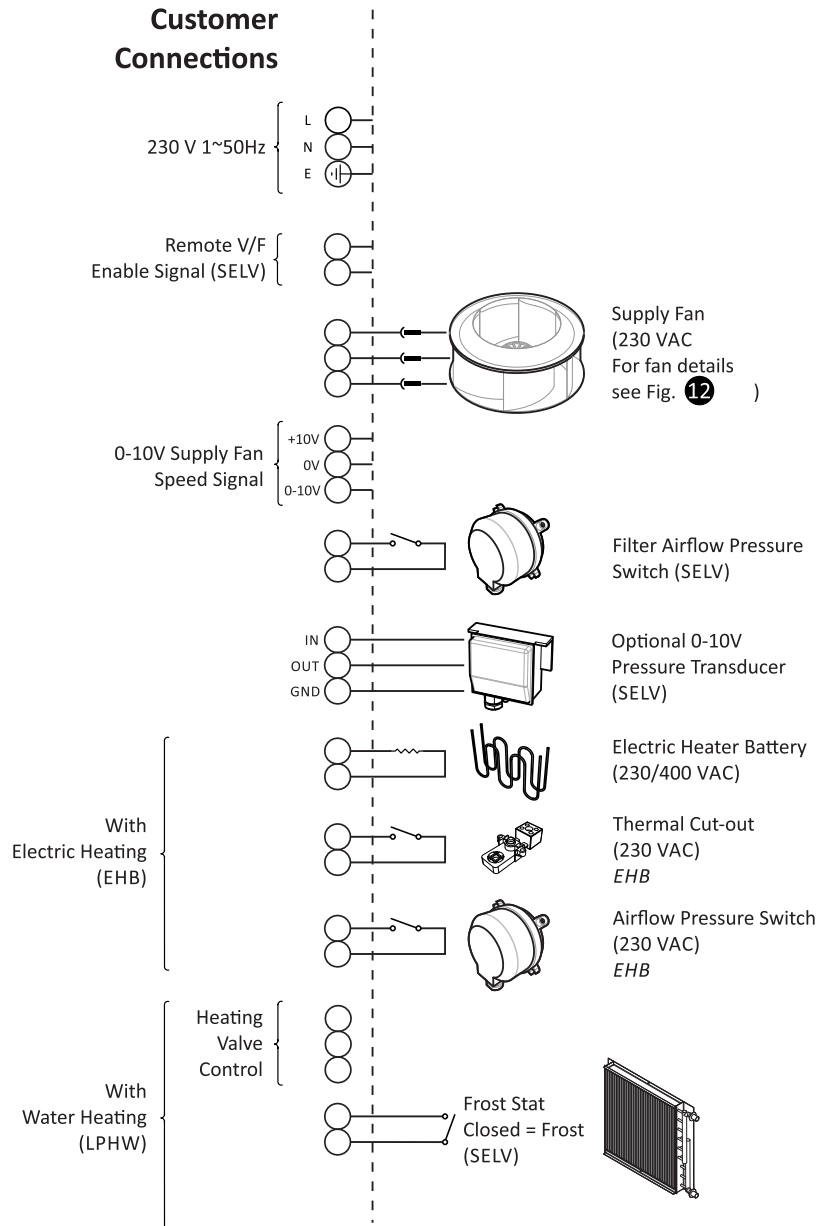
Standard Wiring & Fan Installation

5 Continued

Standard fan details
230 VAC Single Phase
Fig. 12

Model		230 V 1PH 50Hz	
Colourfan Acoustic Unit	Fan	Motor Power (KW)	F.L.C (A)
0051-1	ZE0101	0.043	0.32
0141-1	ZD0101	0.12	0.68
0242-1	ZD0201	0.14	0.78
0343-1	ZD0301	0.23	1.2
0444-1	ZD0411	0.32	1.2
0545-1	ZD0501	0.4	1.5
0646-1	ZD0601	0.35	1.3

Standard Field Connections
Isolator 230 VAC
Fig. 13

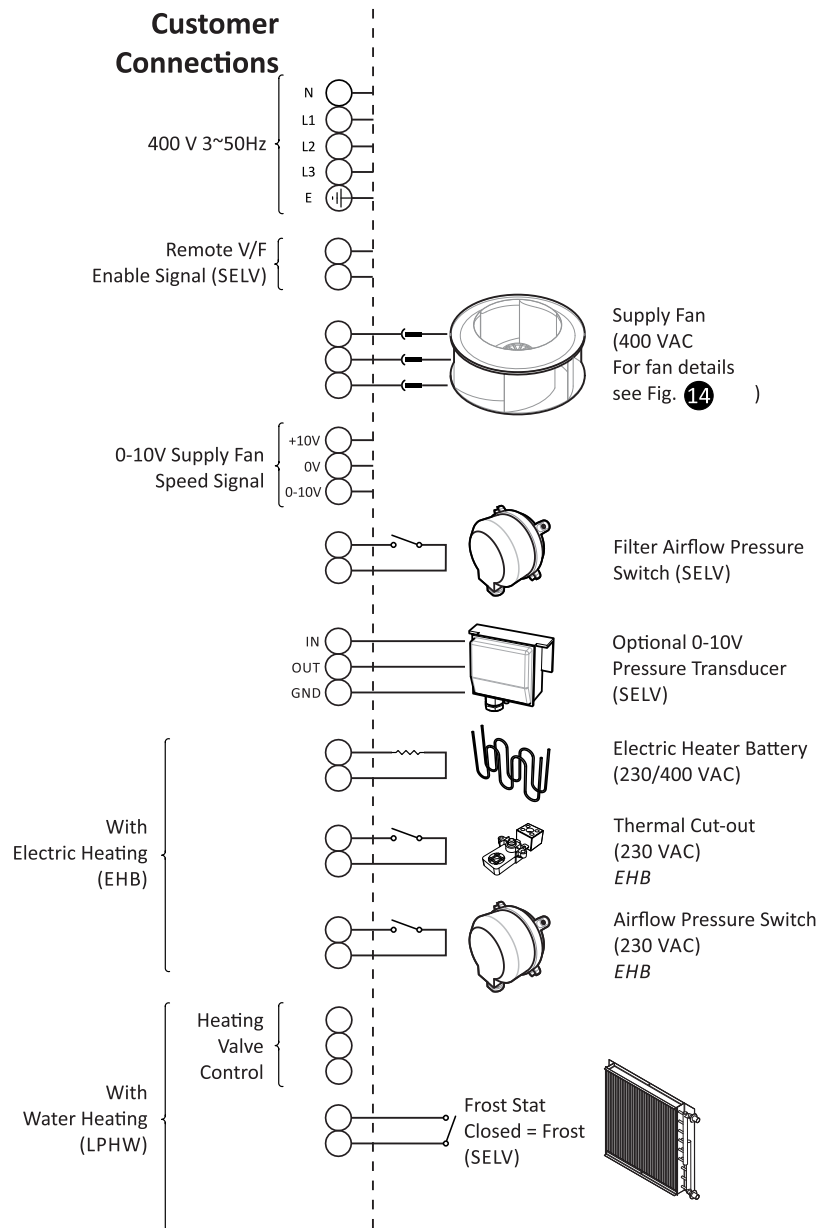


Standard Wiring & Fan Installation 5 Continued

Standard fan details
400 VAC Three Phase
Fig. 14

Model		400 V 3PH 50Hz	
Colourfan Acoustic Unit	Fan	Motor Power (KW)	F.L.C (A)
0747-3	ZD0703	1.4	1.9
0848-3	ZD0803	1.45	2
0949-3	ZD0903	1.25	1.65
10410-3	ZD1003	1.5	2.1

Standard Field connections
Isolator 400 VAC
Fig. 15

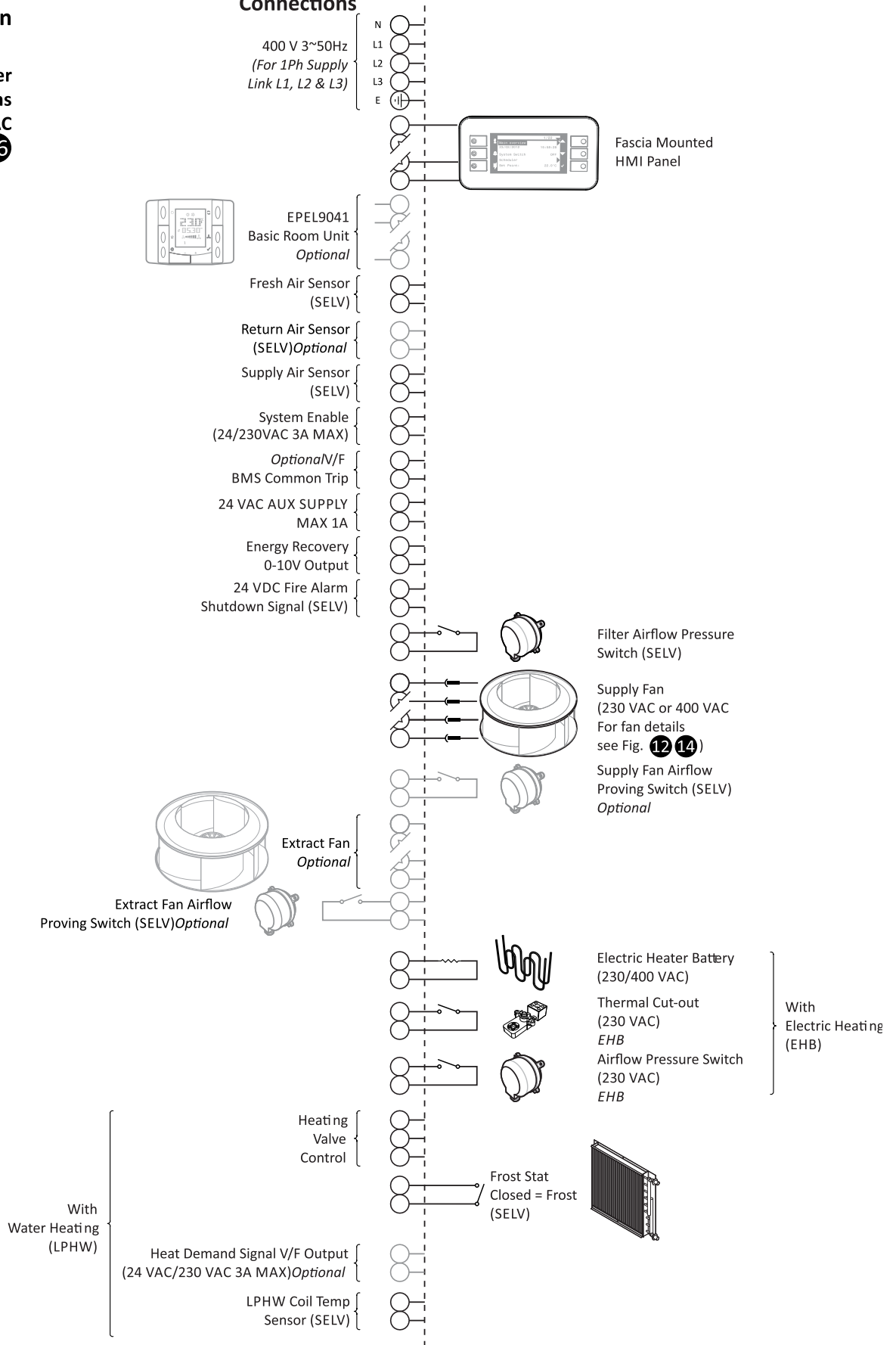


Standard Wiring & Fan Installation

5 Continued

Standard Customer Connections
Control Panel 230/400 VAC
Fig. 16

Customer Connections



Standard Wiring & Fan Installation

5 Continued

As all units in the **Colourfan acoustic** 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 13 Fig. 19. 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: 350 Pa

Differential pressure calculation

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 m³/s

k is the fan nozzle coefficient (Fig. 18)

Δp_w is the measured differential pressure in Pa

Measured differential pressure: 350 Pa

$$q_v = (96 \sqrt{350}) / 3600$$

$$q_v = (86 \times 18.708) / 3600$$

$$q_v = 1796 / 3600$$

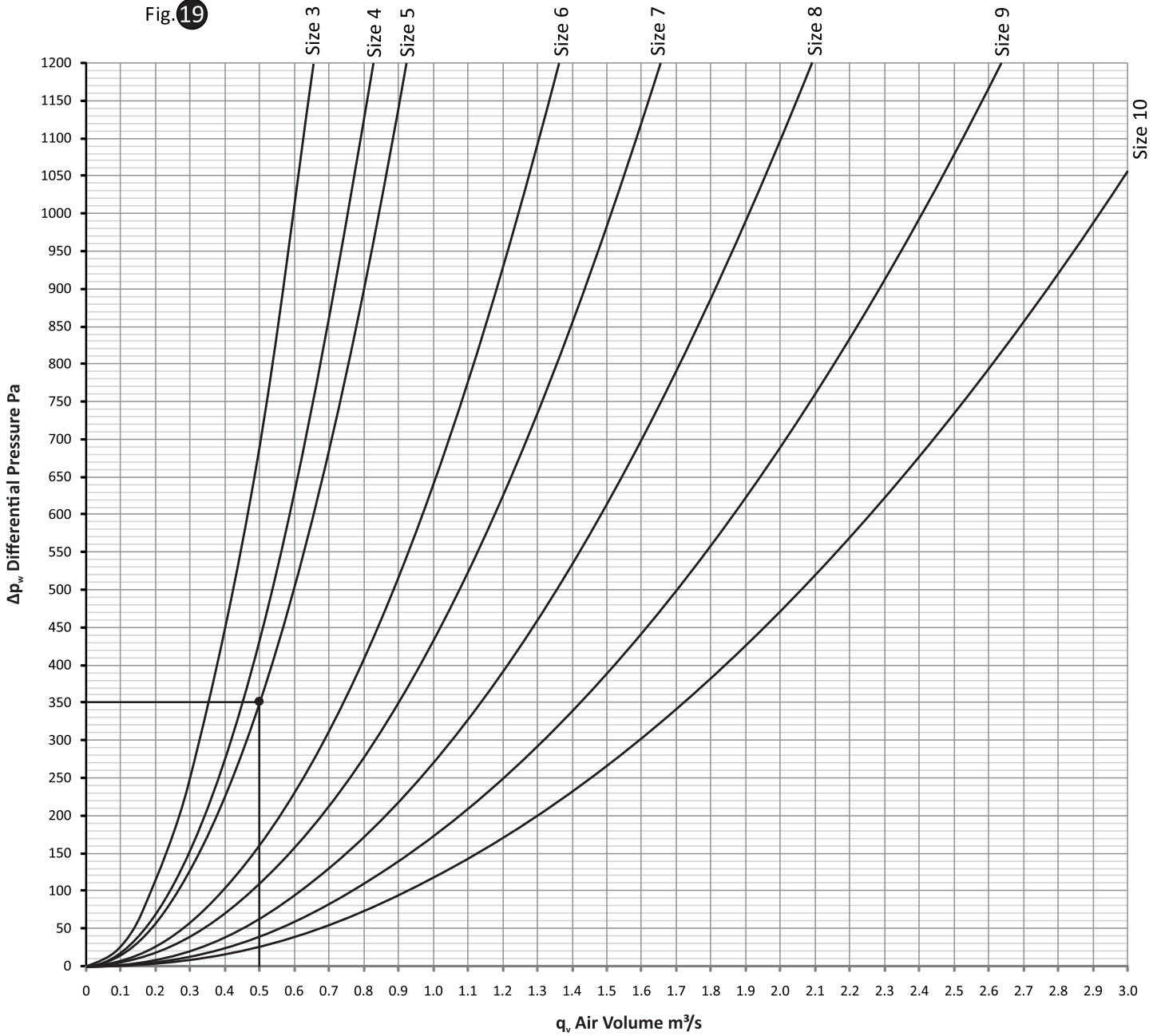
$$q_v = \text{air volume} = 0.5 \text{ m}^3/\text{s}$$

K Chart
Fan nozzle coefficient
 Fig. 18

Colourfan Acoustic Unit Size	K (Fan nozzle coefficient)
3	68
4	86
5	96
6	142
7	172
8	217
9	274
10	332

Standard Wiring & Fan Installation 5 Continued

Differential pressure curve
Fig. 19



Example: Unit Size: 5
 Measured differential pressure: 350Pa
 Reading from graph: 0.5
 Air Volume: 0.5 m³/s

Important



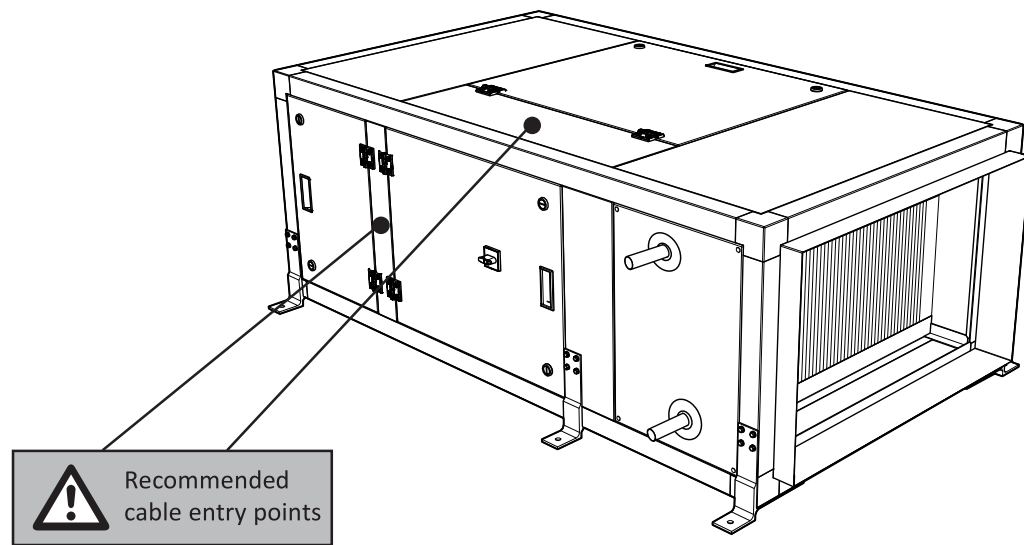
Differential Pressure readings are only available for unit sizes 3-10.

**Standard Wiring
& Fan Installation**
Cable entry Points

5 Continued

For cable entry proceed as follows **20**. Carefully drill into the unit using an appropriately sized tool. Suitable cable glands should always be installed. Feed the cable through the cable glands, connect and provide appropriate cable restraint. A new entry point should be used for each cable entry.

Control panel
Entry point detail
Fig. **20**



Important



When drilling take extra care to not damage any control panel components. Always use a drillstop and remove any swarf afterwards.

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 resecured 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'.

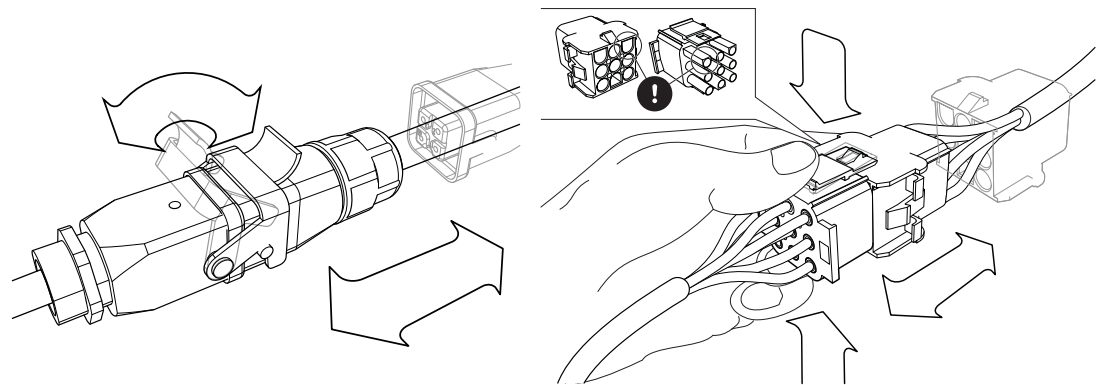
Caution



When accessing the unit ensure the access panels/lids 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. Care should be taken with larger unit lid removal as this may need to be undertaken by more than one person.

All **Colourfan acoustic** units feature plug & socket connections to allow easy removal/replacement of key components. Depending on the plug type, separate the plug connection by either lifting the locking lever 24 or by pressing the top/bottom clasp mechanism to open 25.

Plug Connector locking/Unlocking Fig. 22



On reconnection, the assembly features a locating lug to ensure correct orientation. Once rejoined, lock the connection together again using the corresponding system as shown. Note the plugs are handed and forcing an incorrect connection may result in damage to the plug.

Caution



Gently pull apart holding the plugs to separate, **DO NOT** pull the cable to separate the assembly.

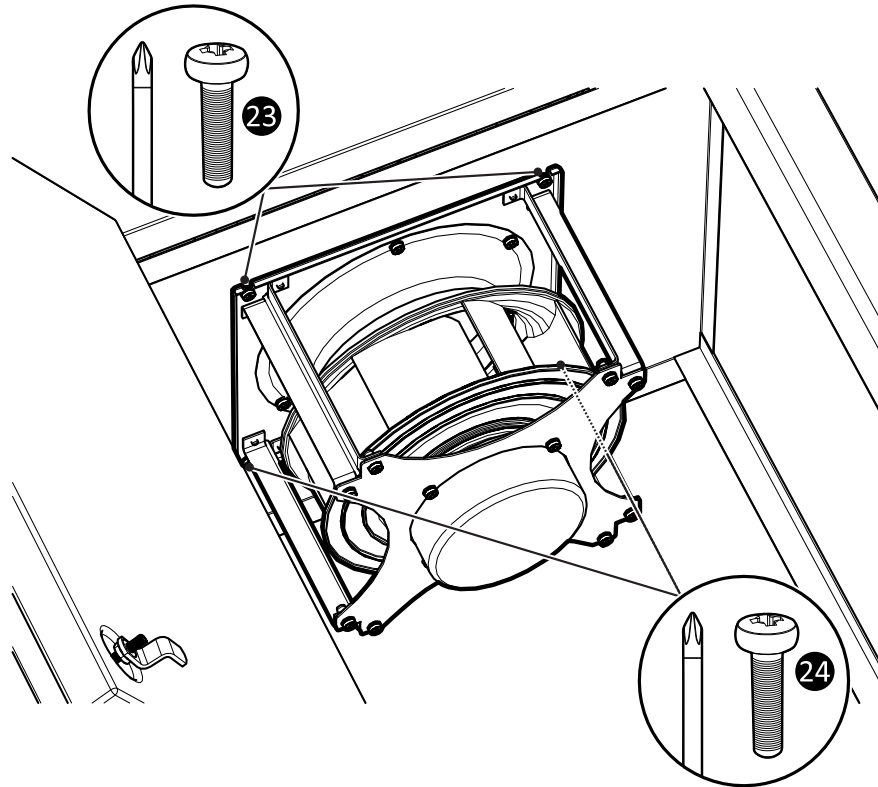
Maintenance 6 Continued

Fan assembly removal

Colourfan acoustic units feature plug & socket connections to allow easy fan assembly removal should it be required. Follow the instruction below.

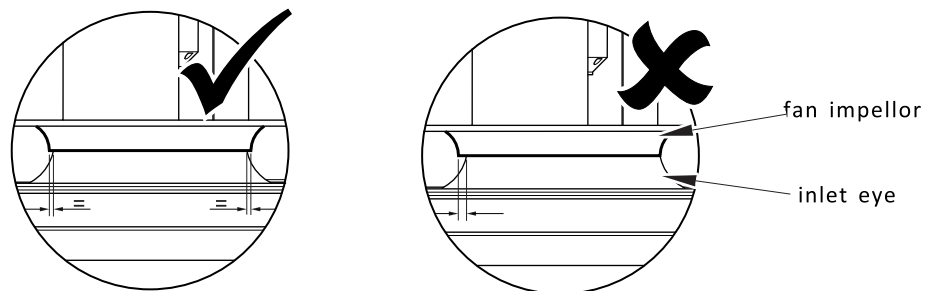
To remove the fan assembly, ensure the unit is fully isolated. Separate the supply plugs to the fan as shown in Fig. 21. Back-out the bottom screws but do not remove 24. Remove the top fixings completely and retain 23. Carefully lift the fan assembly over the retained fixings and remove the fan assembly from the unit.

Fan assembly removal/ installation Fig. 23 24



To replace the fan assembly, locate the mounting plate over the fixings retained in the unit bulkhead. Secure the loose fixings through the mounting plate and tighten all the mounting fixings. Reconnect the supply plugs as in Fig. 21; 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 in Fig. 25, adjust as required.

Fan alignment Fig. 25



Maintainance 6 Continued

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

Three Monthly Checks

Check inside the unit for accumulation of dust, grease etc. If the unit is heavily soiled, clean out carefully (ensure the unit is properly isolated). Filters should be inspected every three months. If they are found to be dirty or damaged in any way they should be replaced. Spare filters can be ordered from VES Spares Department.

Six Monthly Checks

The fan impellor 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. If included, clean damper blades and frames and lubricate with PTFE aerosol or equivalent. Failure to keep dampers clean could result in the damper becoming inoperative.

Twelve Monthly Checks

The security of fastenings and the integrity of components should be checked regularly as part of the routine maintenance operation. **colourfan** units are supplied with both unpainted galvanised sheet steel cases and 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.

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.

Spares & Repairs

Tel: 02380 46 11 50

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.

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



colourfan[®]
Acoustic Supply Units

Operation & Maintenance Manual

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VES is a trading name of VES Andover Ltd.
Registered in England No. 02303719.
Registered Office as above.



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