

 **colourfan<sup>®</sup>**

*Acoustic Twin Extract Units*

*Operation & Maintenance Manual*



Eagle Close, Chandlers Ford Industrial Estate, Chandlers Ford, Eastleigh, Hampshire, SO53 4NF


Tel: +44 (0) 2380 46 11 50

email: [info@ves.co.uk](mailto:info@ves.co.uk)

web: [www.ves.co.uk](http://www.ves.co.uk)


VES Ref. ID. 1085  
Issue D  
December 2022  
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](http://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** twin fan series is a range of compact twin fan extract units, utilising direct driven centrifugal fans with duties up to 3m<sup>3</sup>/s. Suitable for plant-room, ceiling void and external locations. As standard, each unit will have been supplied pre-wired to an auto-changeover panel or fitted isolator. The standard 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](http://www.ves.co.uk).

<b>Nomenclature</b>	<b>2</b>	Point Description	Point Variants	Details (as appropriate)
Part Number Coding	1	Product	<b>CAT</b>	<b>colourfan</b> twin fan units
	2	Unit Size	<b>0...10</b>	Sequential see unit outline for details
	3	Fan Type	<b>4</b> <b>5</b>	Backward curve centrifugal fan Backward curve centrifugal fan
	4	Fan Size	<b>1...10</b>	Sequential
	5	Phase	<b>-1</b> <b>-3</b>	230V 50Hz Single Phase 400V 50Hz Three Phase
	6	Unit Configuration	<b>/P</b> <b>/W</b>	Plantroom (flat) Weatherproof (flat)
	7	Main Heating	<b>Null</b>	No Heating
	8	Infill	<b>/EE</b>	50mm Construction
	9	Handing	<b>/RT</b> <b>/RB</b> <b>/LT</b> <b>/LB</b> <b>/L</b> <b>/R</b>	Right/Top Access Right/Bottom Access Left/Top Access Left/Bottom Access Left Access Right Access
	10	Main Filter	<b>Null</b>	No filter
	11	Control Panel Section	<b>Null</b> <b>/ISC</b> <b>/CPSC</b>	No fitted controls Pre-wired isolator & speed controller Fitted control panel & speed controller
	12	Inlet/outlet	<b>/L</b> <b>/C</b> <b>/SP</b>	weather louvre outlet weather cowl outlet rectangular spigot
	13	Colour	<b>Null</b> <b>/R7004</b>	Galvanised finish Powdercoated finish, RAL7004 etc...
	14	Powder Coat Type	<b>Null</b> <b>/IT</b> <b>/BT</b>	As colour Internal powdercoated only Internal/External powdercoated
	15	Special	<b>/S</b>	Special (non-standard) Unit

Typical Example CAT0051-1/P/EE/LB/CPSC/SP

CAT 00 5 1 -1 /P /EE /LB /CPSC 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.

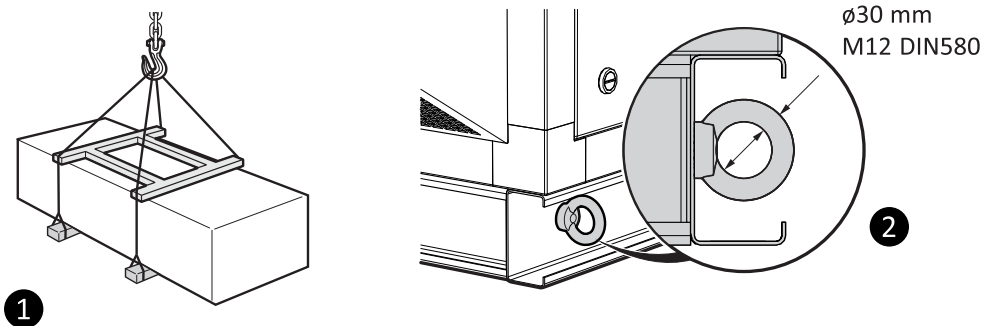
Where a unit is installed so that a failure of components could result in injury to personnel, precautions should be taken to prevent such an injury. If the unit is installed where there is a reasonable possibility of persons or objects coming into contact with the impellor whilst operational, a guard 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**



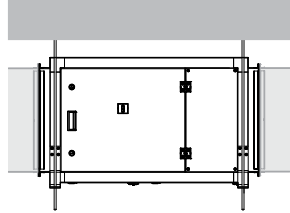
**Caution**  Units should only be supported using the support feet as provided by VES with the unit. Contact VES before attempting to support the unit using alternative methods. Only experienced fitters should undertake this work. Take necessary safety precautions when working in elevated positions.

Installation 4 Continued

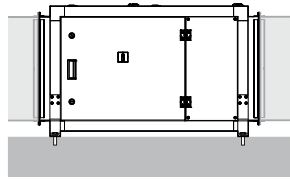
Colourfan acoustic twin fan units are supplied with feet suitable for floor or ceiling-void mounting, either by use of drop-rod mounting, in either top or bottom access orientation, with outlet airflow in the horizontal plane only. For alternative mounting please consult your outline drawing as supplied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

Unit Mounting Options

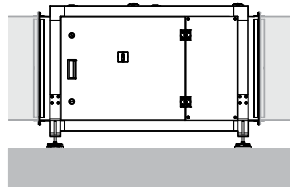
Fig. 3 4 5 6 7



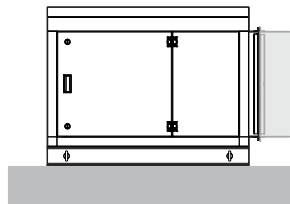
3 Plantroom ceiling mounted



4 Plantroom floor mounted



5 Plantroom floor mounted (optional adjustable foot )



6 Weatherproof roof mounted (WH)

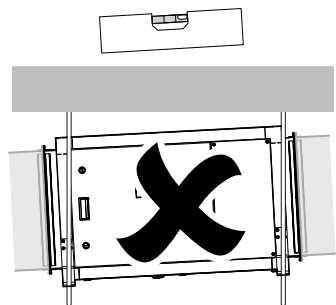
Important



It is important that the unit is level to ensure all components operate correctly.

Incorrect mounting (example)

Fig. 7



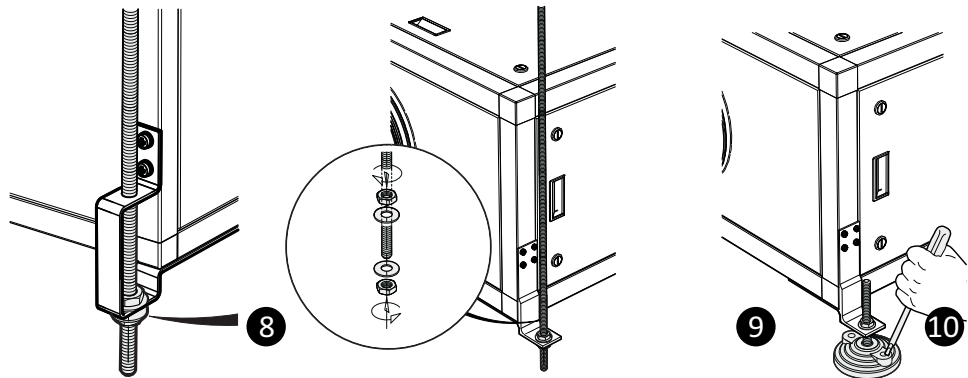
Installation 4 Continued

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 8. Self-levelling feet are available for floor mounting, with M10 fixings as per drop rods 9. If required the unit can be further secured to the floor via knockout fixings holes on the feet, fixings to be supplied by others 10.

Unit mounting detail

Fig. 8 9 10



Important



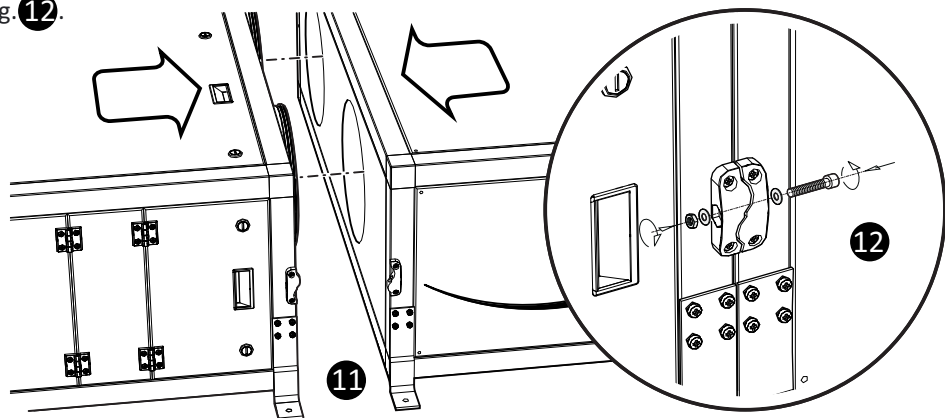
When hanging units from drop-rods, it is important that the load is evenly spread and that all feet are used within the support.

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 see fig. 11. 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 see fig. 12.

Section joining detail

Fig. 11 12



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.

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 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. 13 14.



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 8-10) are a guide to the standard fan options found on **Colourfan acoustic** units. For units with 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.



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

Where a factory set airflow pressure switch (APS) needs adjustment, contact VES Customer Services Department on 02380 46 11 50.

Standard fan details  
230 VAC Single Phase  
Fig. 13

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

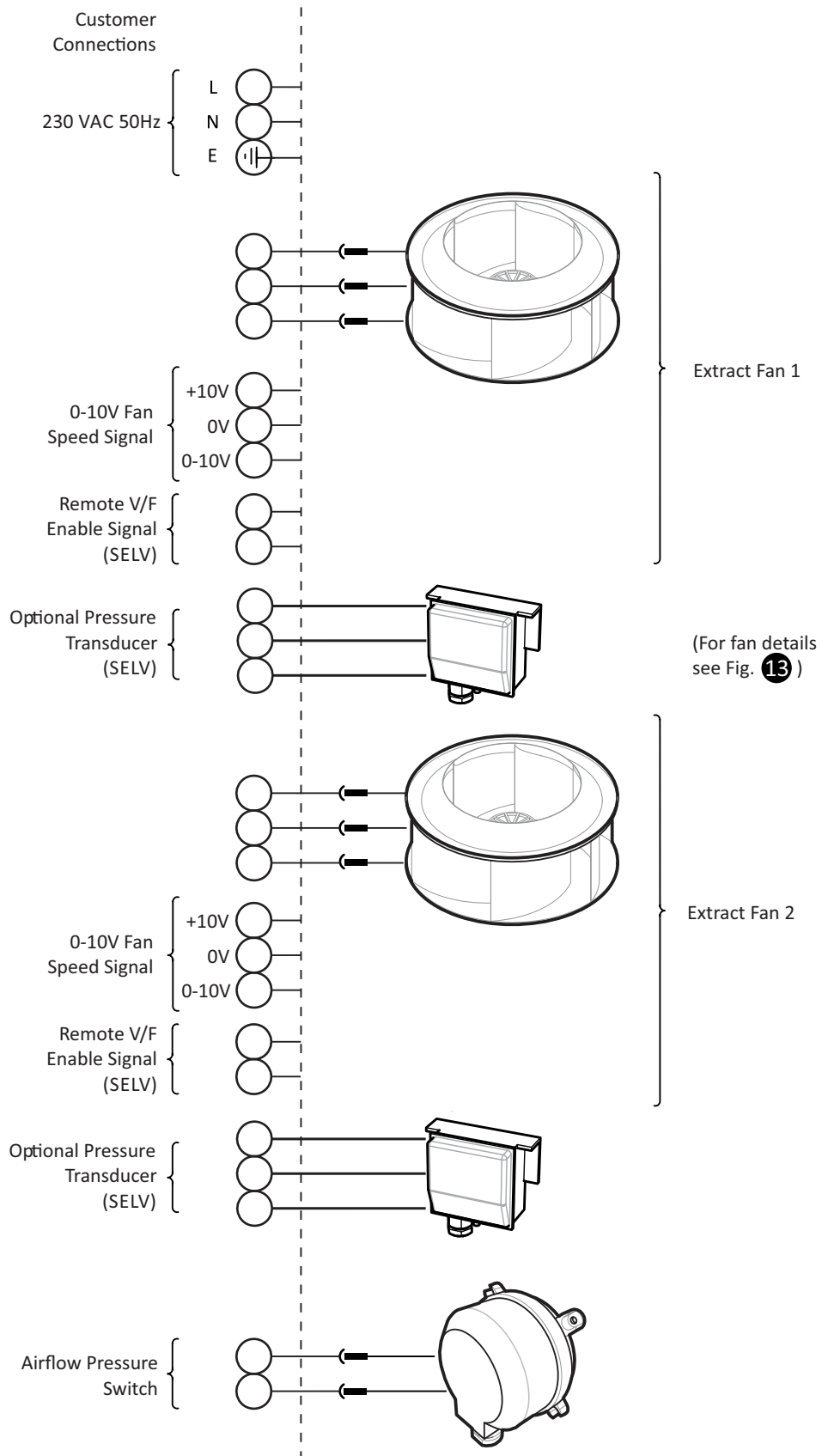
Standard fan details  
400 VAC Three Phase  
Fig. 14

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 Wiring & Fan Installation

5 Continued

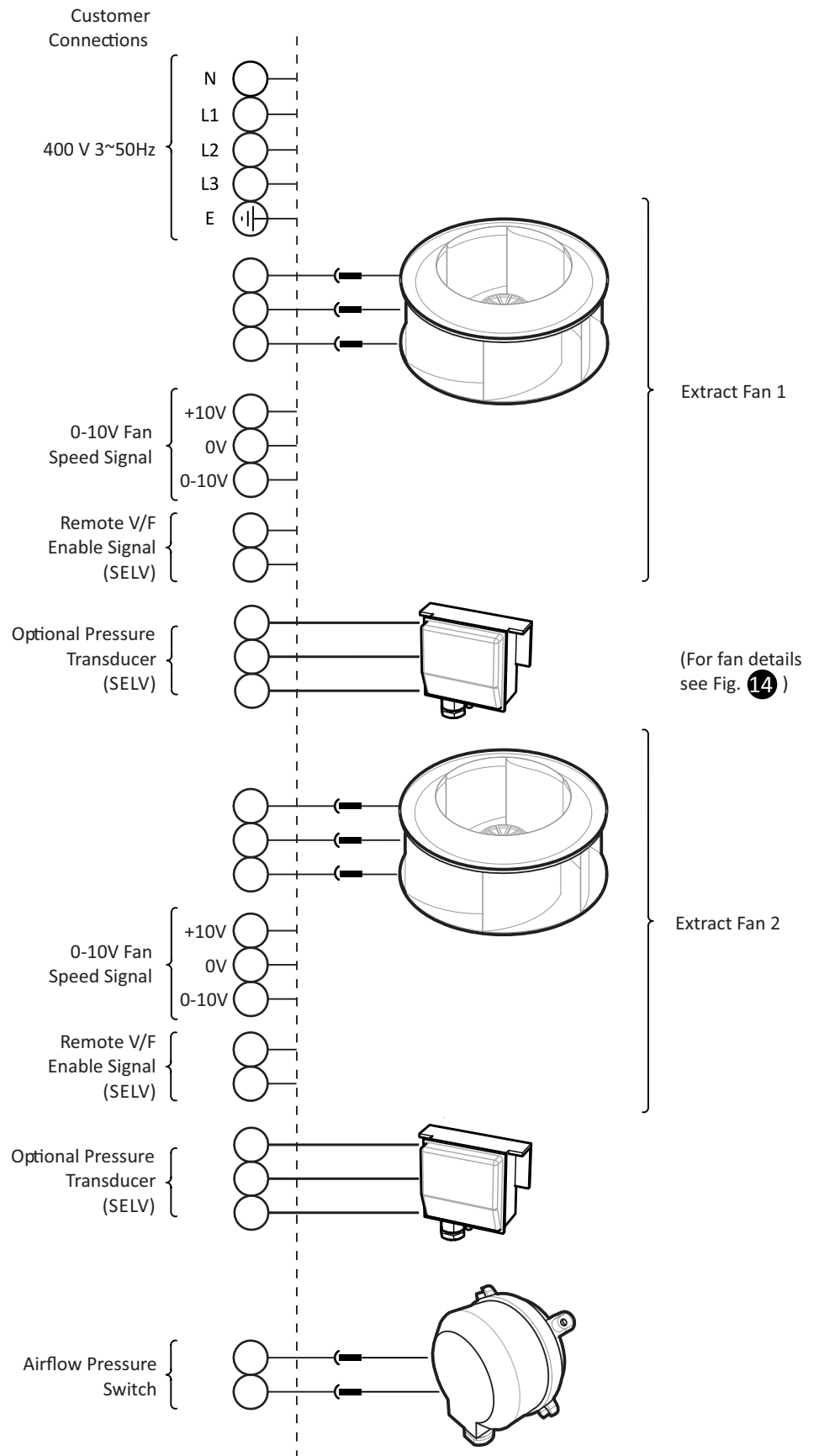
Standard Field Connections  
Isolator 230 VAC  
Fig. 15





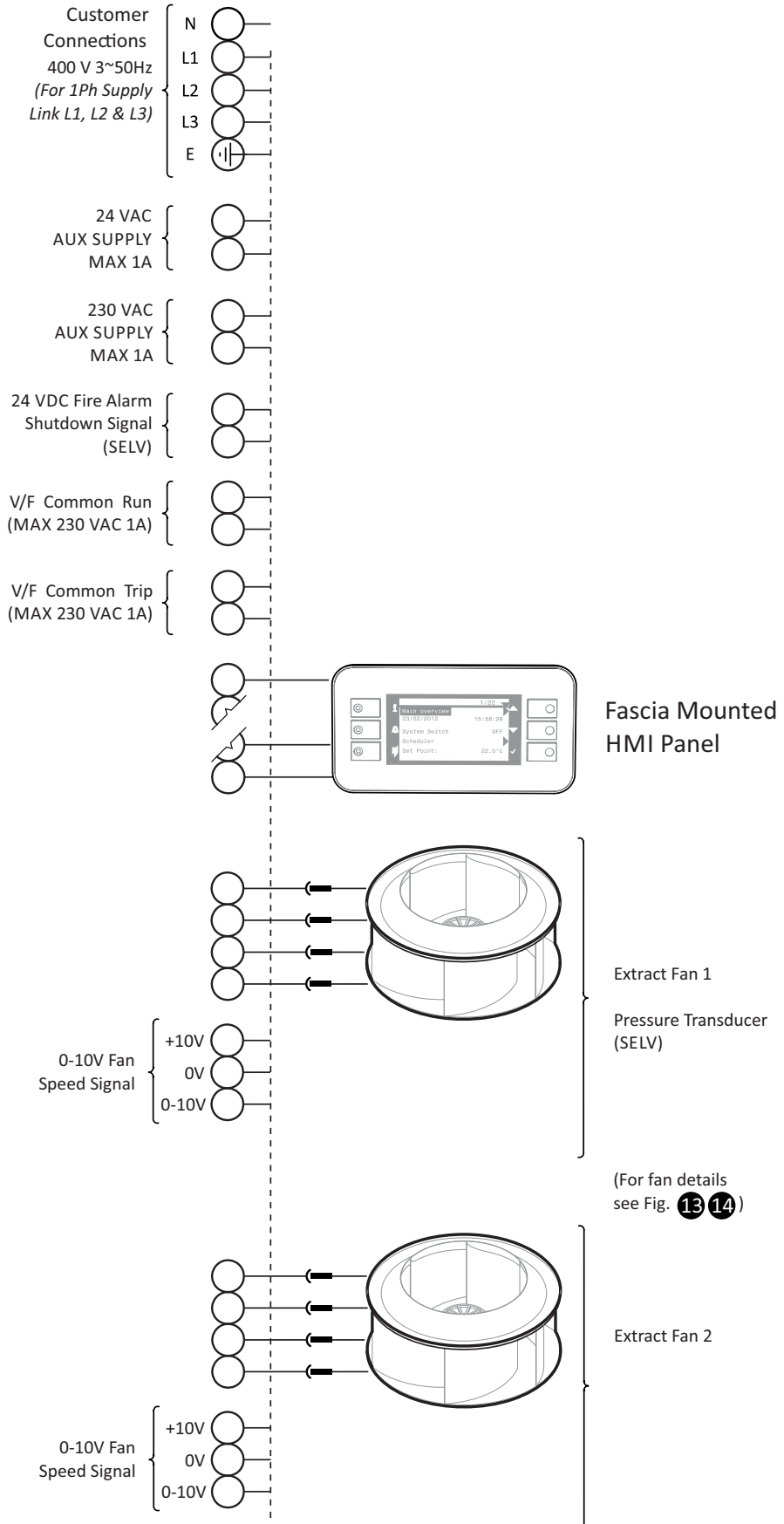
Standard Wiring & Fan Installation 5 Continued

Standard Field Connections  
Isolator 400 VAC  
Fig. 16



Standard Wiring & Fan Installation 5 Continued

Standard Field Connections Control Panel 230/400 VAC Fig. 17



**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 **18** or by using the differential pressure curve on page 12 Fig. **20**. 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

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<sup>3</sup>/s

$k$  is the fan nozzle coefficient (Fig. **19**)

$\Delta p_w$  is the measured differential pressure in Pa

Measured differential pressure: 350 Pa

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

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

$$q_v = 1796 / 3600$$

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

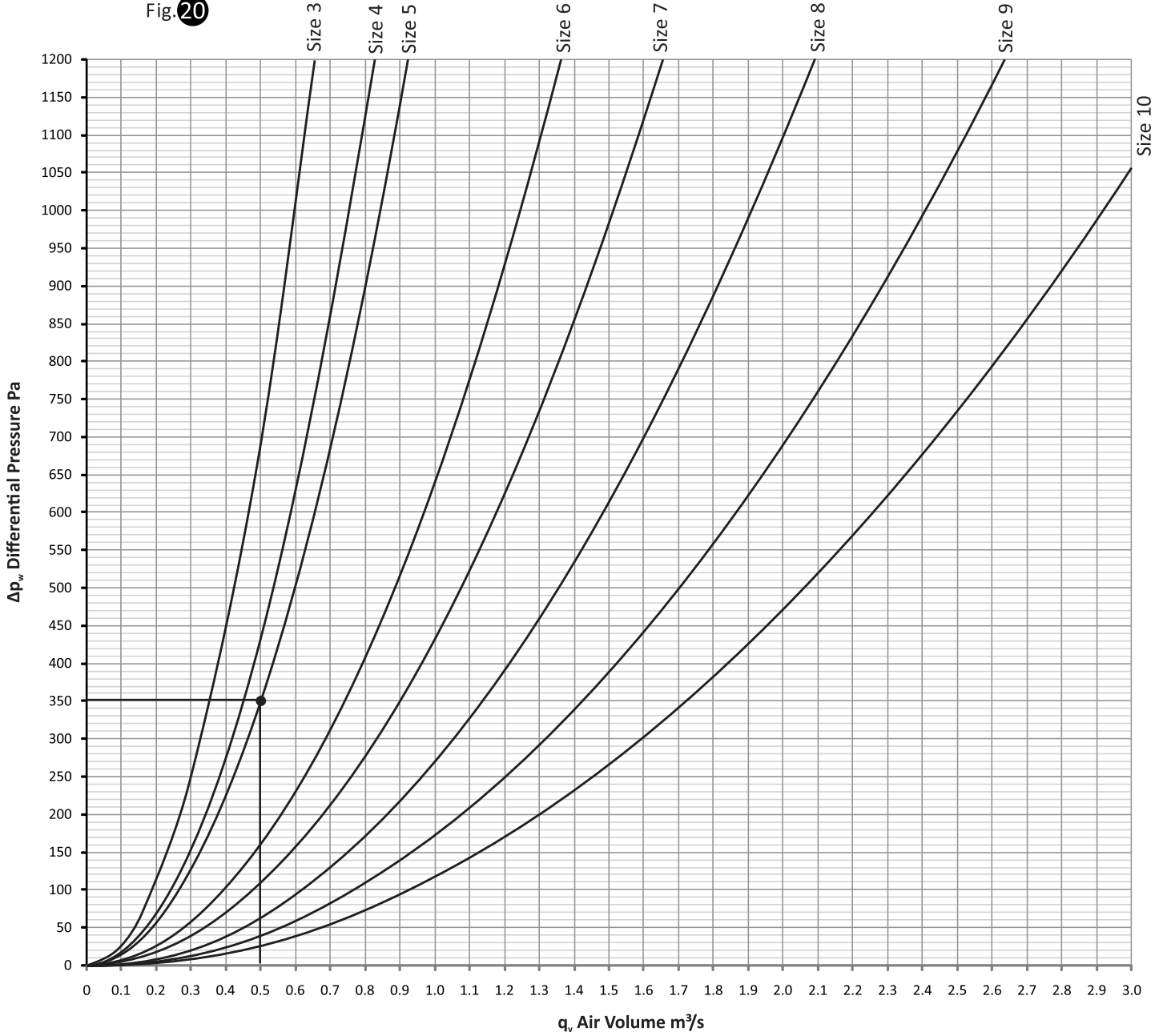
**Differential pressure calculation**  
Fig. **18**

**K Chart**  
**Fan nozzle coefficient**  
Fig. **19**

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 5 Continued  
& Fan Installation

Differential pressure curve  
Fig. 20



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 5 Continued  
 & Fan Installation

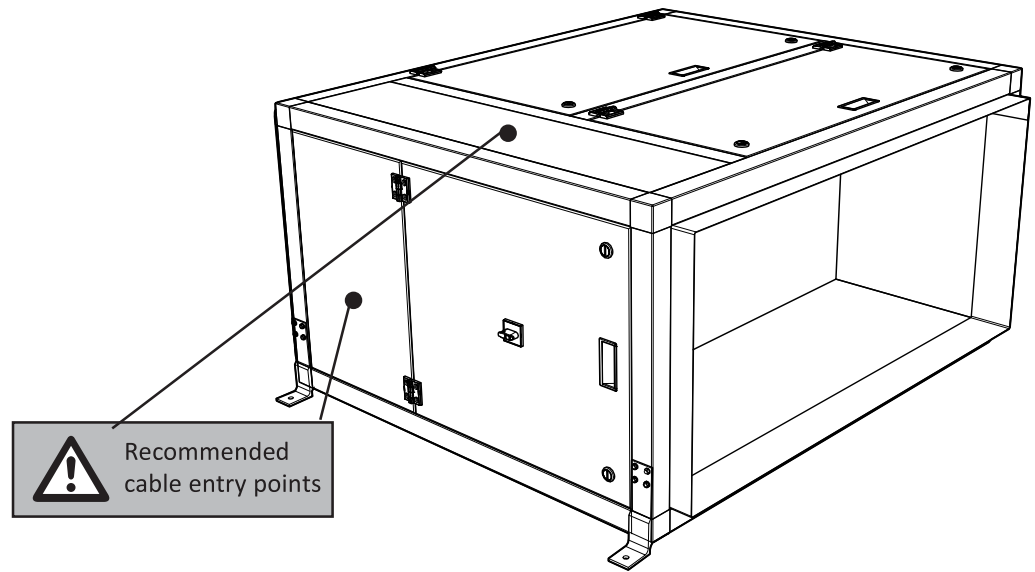
Caution



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. Care should be taken with larger unit lid removal as this may need to be undertaken by more than one person.

For cable entry proceed as follows **21**. 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 plate detail  
 Fig. **21**



Maintainance 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. When used in conjunction with an Inverter for speed control, a minimum of **Five minutes** should be given to allow for the capacitors to discharge before starting work. Care should also be taken when accessing external units as the wind and elements may cause moving parts to 'windmill'.

Caution

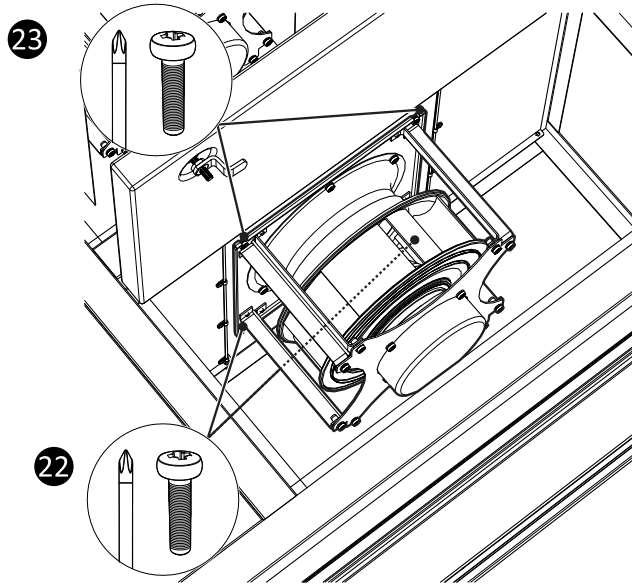


**lifting Hazard:** Due the size and weight of larger fans take extra care during removal/installation. Multiple persons are advised for this operation to avoid injury.

Maintenance 6 Continued

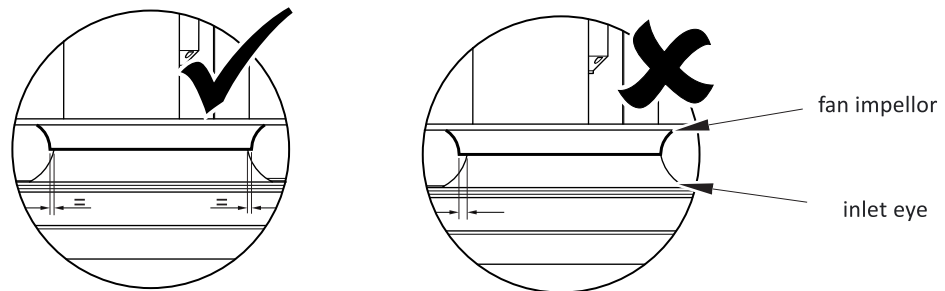
To remove the fan assembly, ensure the unit is fully isolated. Separate the supply plugs to the fan as shown in Fig. 25. Back-out the bottom screws but do not remove 22. 3 Remove the top fixings completely and retain 23. Carefully lift the fan assembly over the retained fixings and remove the fan assembly from the unit.

Fan assembly removal/ installation Fig. 22 23

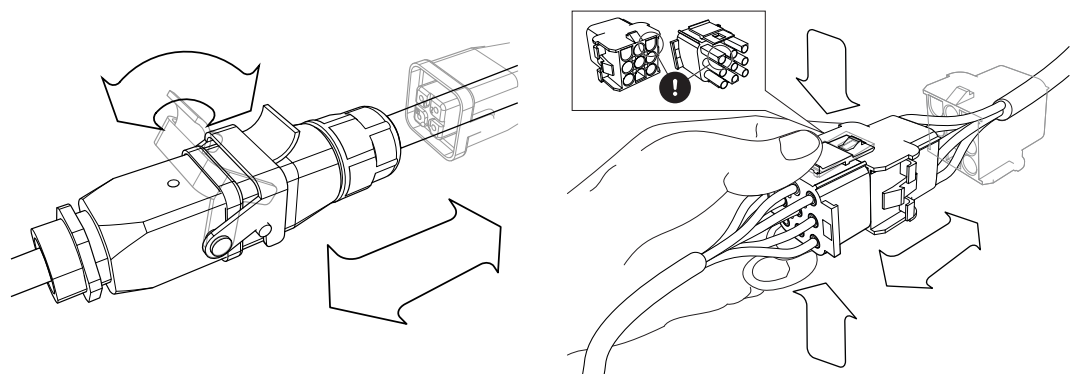


To replace the fan assembly, locate the mounting plate over the fixings retained in the unit bulkhead. Secure the loose fixings through the mounting plate and tighten all the mounting fixings. Reconnect the supply plugs as in Fig. 25 ; if more than one plug is used, ensure the correct plugs are reconnected as marked. Ensure that the fans are free running by following the fan alignment instructions in Fig. 24 on page 13, adjust as required.

Fan alignment Fig. 24

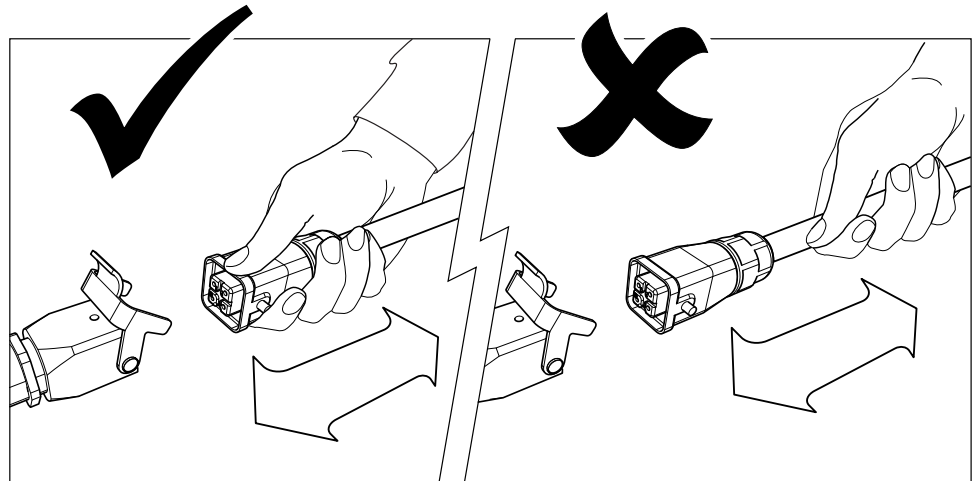



Plug Connector locking/Unlocking Fig. 25



Maintenance 6 Continued

Plug Connector  
Fig. 26



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

**Three Monthly Checks**

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

Check inside the unit for accumulation of dust, grease etc. If the fan impellor is heavily soiled, clean out carefully (ensure the unit is properly isolated). Failure to do this periodically could lead to a loss of performance or the fan to become out of balance, leading ultimately to bearing failure. If the fans are stationary for long periods in a humid atmosphere, the unit should be switched ON for minimum of two hours every month to remove any moisture that may have condensed within the motor.

Check the backdraught flaps are free moving and undamaged.

**Six 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.

**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: 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<sup>®</sup>**  
*Acoustic Twin Extract Units*  
*Operation & Maintenance Manual*

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Registered Office as above.



Eagle Close, Chandlers Ford Industrial Estate, Chandlers Ford, Eastleigh, Hampshire, SO53 4NF  
Tel: +44 (0) 2380 46 11 50      email: [info@ves.co.uk](mailto:info@ves.co.uk)      web: [www.ves.co.uk](http://www.ves.co.uk)