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ORIGINAL INSTRUCTIONS
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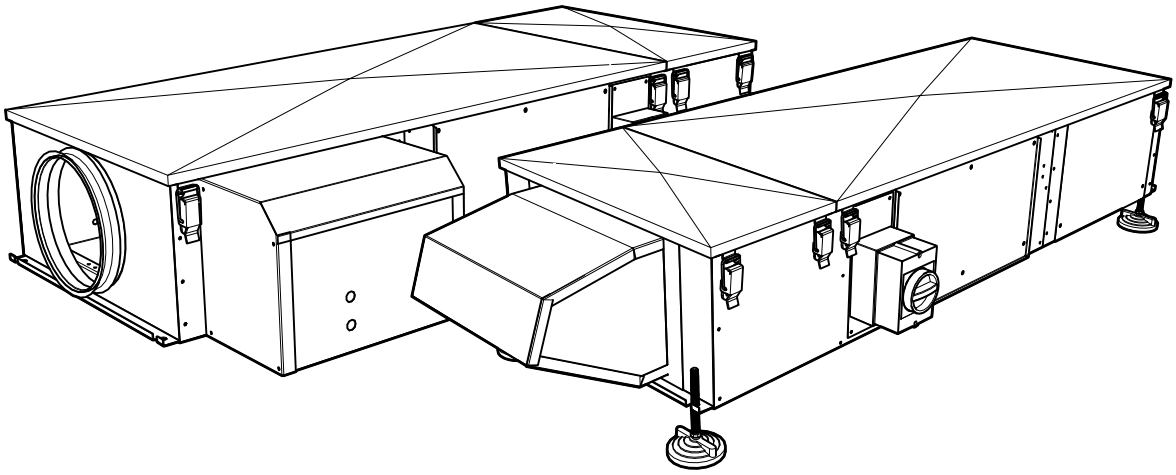
colourfan® Supply Unit

Installation, Operation and Maintenance Manual



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 'Information Centre' 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** supply series is a range of centrifugal supply units, direct driven with duties up to 2.5 m³/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 external isolator. The standard ambient operating temperature of the unit 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**.

Nomenclature 2

Part Number Coding

	Point Description	Point Variants	Details (as appropriate)
1	Product	**CLS**	colourfan supply units
2	Unit Size	**0...9**	Sequential see unit outline for details
3	Fan Type	**3**	AC 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	**Null**	No Infill
		/DS	double skinned, mineral wool infill
		/AL	optional acoustic liner
9	Handing	**/RT**	Right/Top Access
		/RB	Right/Bottom Access
		/LT	Left/Top Access
		/LB	Left/Bottom Access
10	Main Filter	**Null**	No filter
		/G4	G4 panel filter
		/F7	F7 panel filter
11	Control Panel Section	**Null**	No fitted controls
		/I	Pre-wired isolator
		/ISC	Pre-wired isolator & speed controller
		/CP	Fitted control panel
		/CPSC	Fitted control panel & speed controller
		/IF	Isolator/Fan starter
		/IFSC	Isolator/Fan starter & speed controller
12	Inlet/outlet	**/L**	weather louvre outlet
		/C	weather cowl outlet
		/SP	rectangular spigot
		/CS	circular 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

Please note: Weatherproof units are supplied in R7004 powdercoating as standard

Typical Example CLS031-1/P/AL/RT/I/CS/S

colourfan® Supply Unit

Installation, Operation and Maintenance Manual

Receipt of Goods & Handling 3

Immediately upon receipt of goods, check for possible damage in transit paying particular attention to fan impellors, coil connections 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.

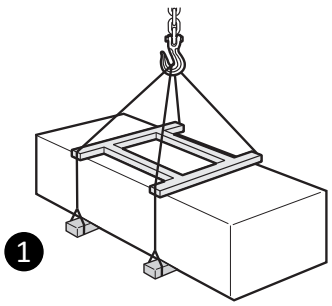
Installation 4

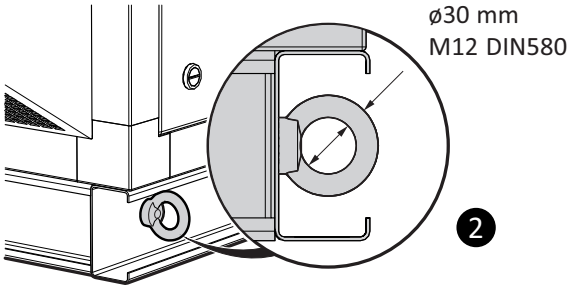
The entire system must be considered for safety purposes and it is the responsibility of the installer to ensure that all of the equipment is installed in compliance with the manufacturer's recommendations, with due regard to the current HEALTH AND SAFETY AT WORK ACT and conforms to all relevant statutory 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 appropiate 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.

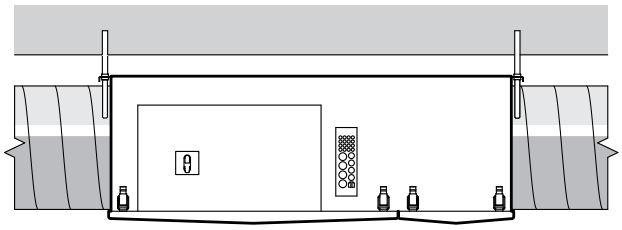
Installation 4 Continued

Colourfan supply units are suitable for floor and ceiling-void mounting, either by use of drop-rod mounting, in either top or bottom access orientation, or using compatible feet in the top orientation.

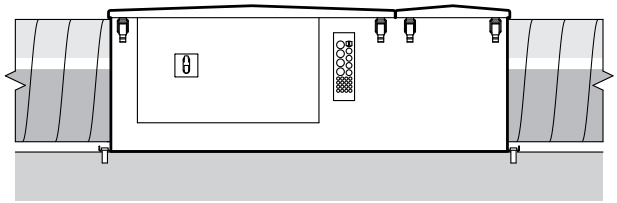
Important For alternative mounting please consult your outline drawing as supplied with the unit, or refer to VES Customer Services for further information.

Unit Mounting Options

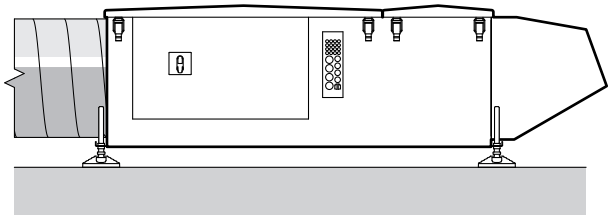
Fig. 3 4 5



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)
Note: larger units supplied on a channel base

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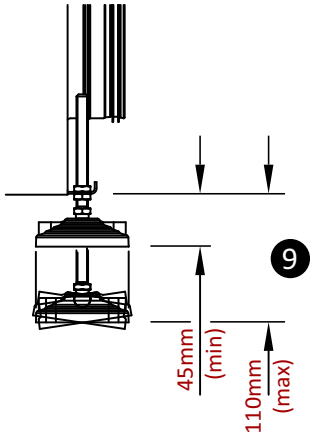
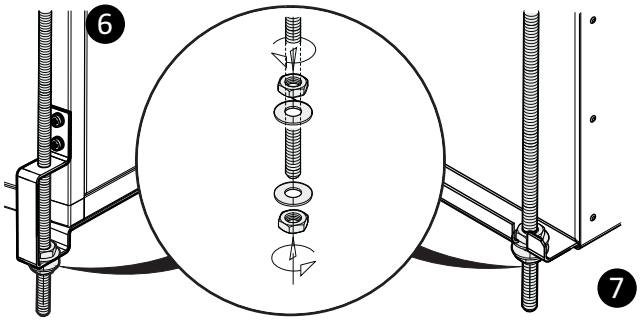
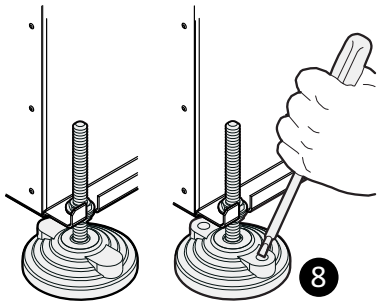
Installation 4 Continued

Secure drop rods/unit with M10 fixings as shown 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 fixing holes on the feet, fixings to be supplied by others 8.
Note: max/min dimensions for foot height 9.



Mounting Details
Fig. 6 7 8 9





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 and used solely as a means of ductwork connection. Further consideration should be given to the unit's position and secured into place as appropriate.

Important Units are supplied with customer connections as specified at time of order. Should you need to alter this please consult VES as unit adjustment may invalidate your warranty.

Electric Heater Batteries

On **colourfan / -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.

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**.

Installation Coils 4 Continued

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.

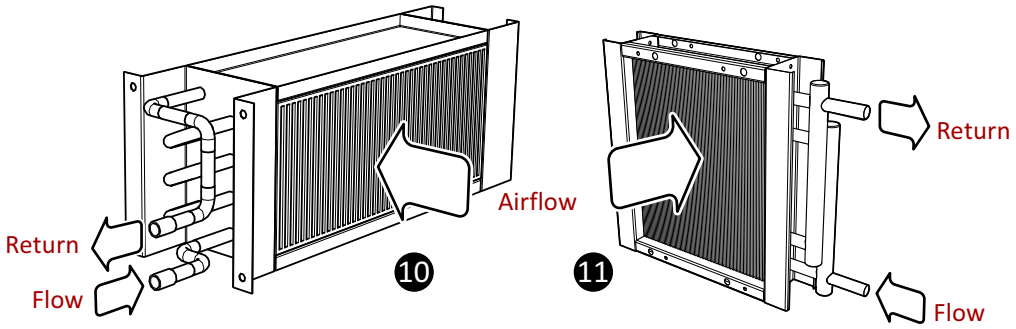
Caution ⚠ Heating coils do not cool immediately when the hot water supply is cut off. The residual heat must be dissipated to avoid damage. The continuous running of the fan after shutdown resolves this, by operation of a run-on timer. The recommended length of run-on is **2 minutes minimum**.

Hot Water (LPHW) Coils

On **colourfan / -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. 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.

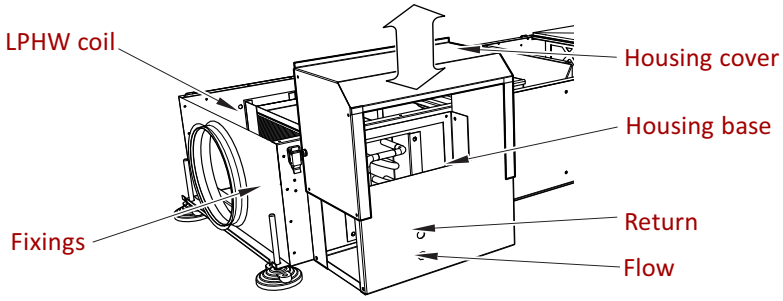
Unit Size 1-6 LPHW Coil Configuration Fig. 10

Unit Size 7-9 LPHW Coil Configuration Fig. 11



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.
Unit Sizes 1-6 will feature LPHW coil connection cover housings 12. To access during installation carefully remove the lid by unfastening the side catches around the casework. Remove the side fixings to the coil cover and slide up and off. Holes have been provided in the housing base for pipework entry. Please follow the appropriate manufacturer's instruction carefully when fitting a valve actuator. Ensure that the cover, lid and fixings are replaced upon completion.

Unit Size 1-6 LPHW Coil connection Fig. 12



Standard Wiring & Fan Installation 5

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 the fan wiring diagram for specific fan details on page 8 and 10 Fig. 13 16.

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 **08448 15 60 60**.

The following wiring diagrams (*page 8 ,9, 10,11 and 12*) are a guide to installing the standard fan options found on **colourfan** 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.

BlueSense
Intelligent Control

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 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 CPA 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 commisioned. For remote unit control through a BMS system or other external source the control panel will be supplied with teminals for easy customer connections, or the control system is supplied with a versatile, fully configurable LCD room unit with built-in temperature sensor for individual control

Important

For details regarding colourfan controls please see O&M IDRef. 941 Colourfan Controls.
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 50Hz

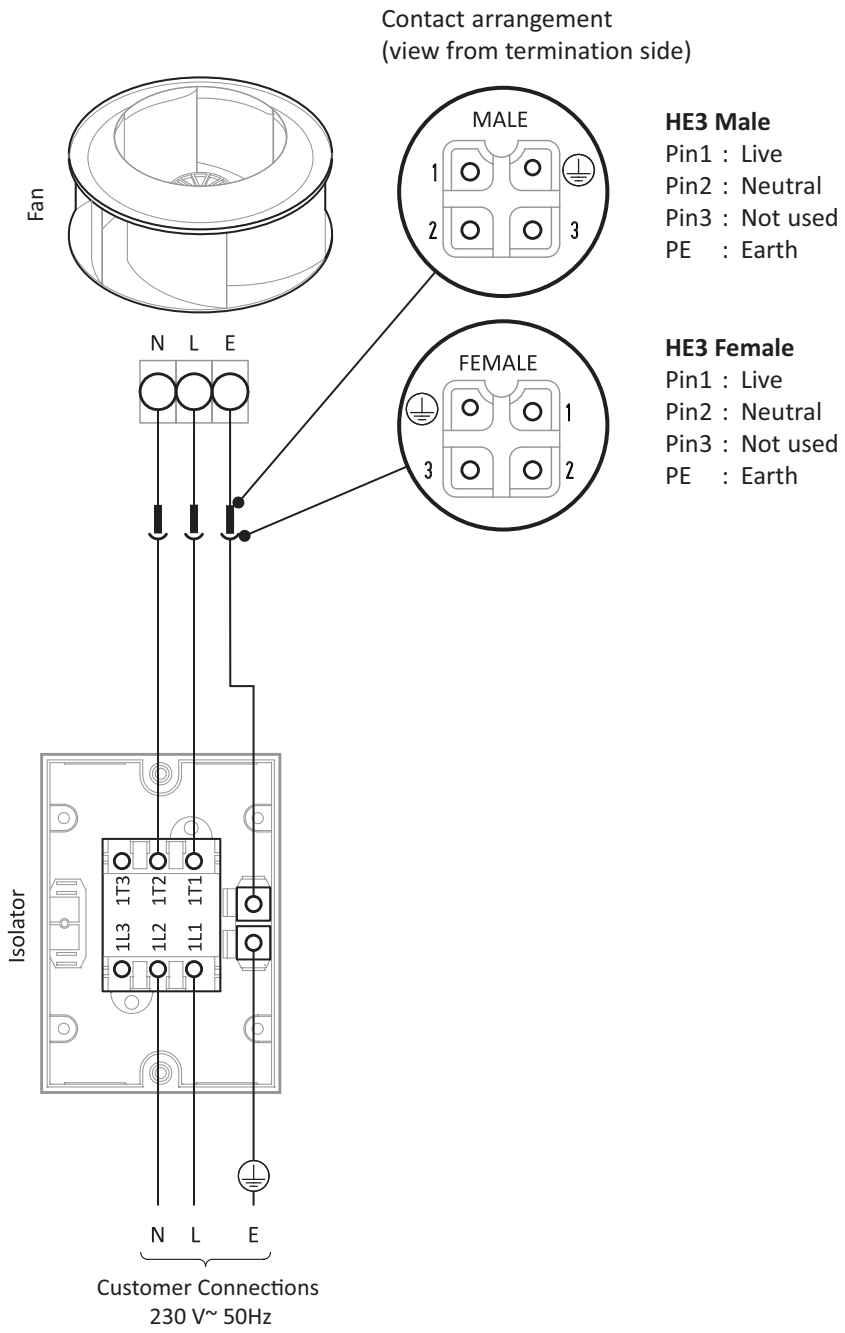
Fig. 13

Model		230 V 1PH 50Hz			
colourfan Unit	Fan	Motor power (KW)	FLC (A)	S (A)	C400V µF
031-1	ZC0101	0.06	0.26	0.48	2
132-1	ZC0201	0.10	0.45	0.82	2.5
233-1	ZC0301	0.20	0.86	1.70	6
334-1	ZC0401	0.11	0.53	1.20	4
435-1	ZC0501	0.14	0.62	0.90	4
536-1	ZC0601	0.27	1.30	3.90	6
637-1	ZC0701	0.43	1.90	5.00	10

Standard wiring arrangement Isolator Termination

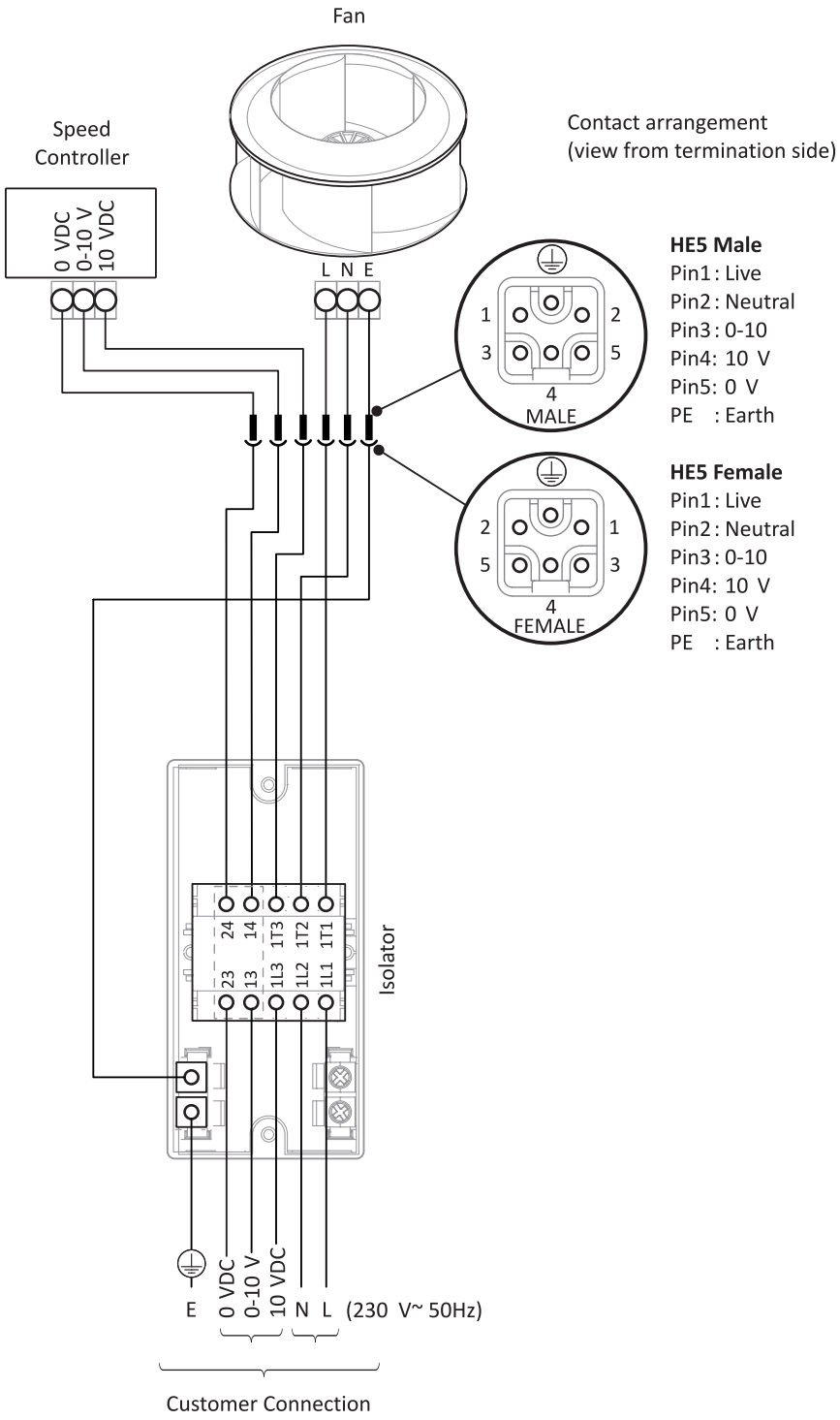
230 VAC 50Hz

Fig. 14



Standard Wiring & Fan Installation 5 Continued

Standard wiring arrangement
Isolator Termination
230 VAC 50Hz
c/w speed controller
Fig. 15

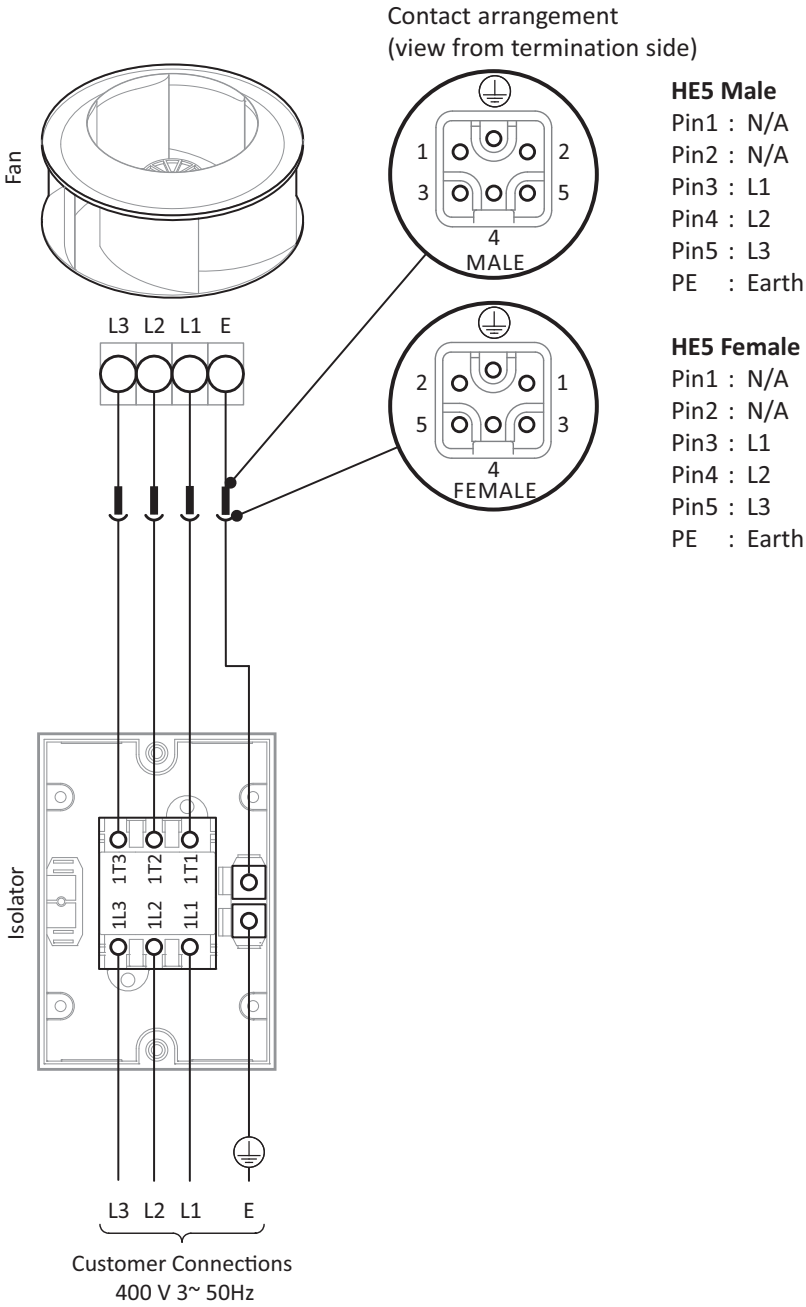


Standard Wiring & Fan Installation 5 Continued

Standard fan details
400 V Three Phase
Fig. 16

Model		400 V 3PH 50Hz		
colourfan Unit	Fan	Motor power (KW)	FLC (A)	S (A)
637-3	ZC0703	0.44	0.78	2.70
738-3	ZC0803	0.64	1.30	4.30
839-3	ZC0903	1.20	2.10	8.60
9310-3	ZC1003	1.70	3.30	12.60

Standard wiring arrangement Isolator Termination
400 V Three Phase
Fig. 17



HE5 Male
Pin1 : N/A
Pin2 : N/A
Pin3 : L1
Pin4 : L2
Pin5 : L3
PE : Earth

HE5 Female
Pin1 : N/A
Pin2 : N/A
Pin3 : L1
Pin4 : L2
Pin5 : L3
PE : Earth

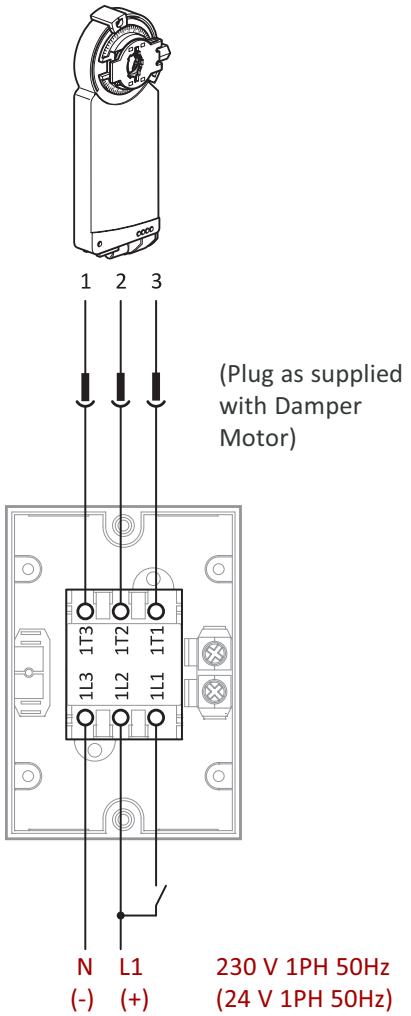
Standard Wiring & Fan Installation — 5 Continued

Standard wiring arrangement

Isolator Termination

Damper Motor

Fig. 18



Warning

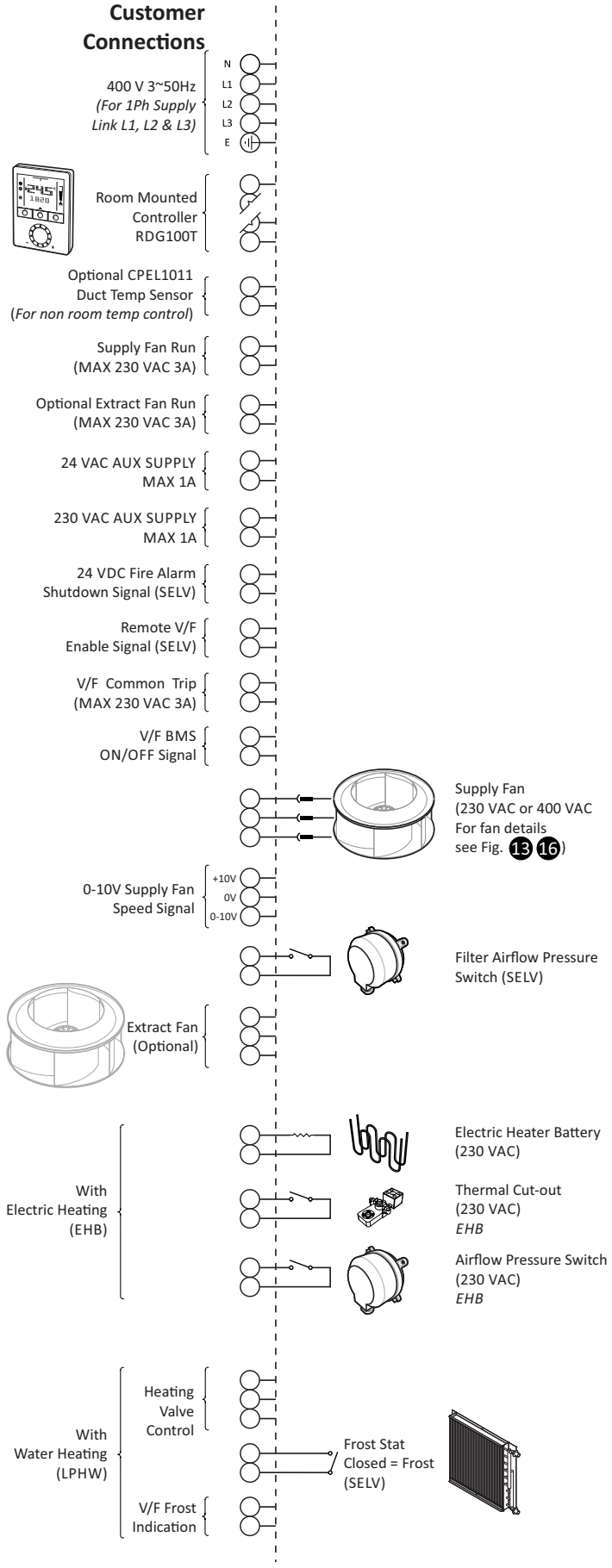
CM230/CM24 Damper Actuator
To isolate from the main power supply, the system must incorporate a device which disconnects all the phase conductors

Standard Wiring & Fan Installation

5 Continued

Standard panel wiring arrangement

Fig. 19



Standard Wiring & Fan Installation 5 Continued

Control panel connection

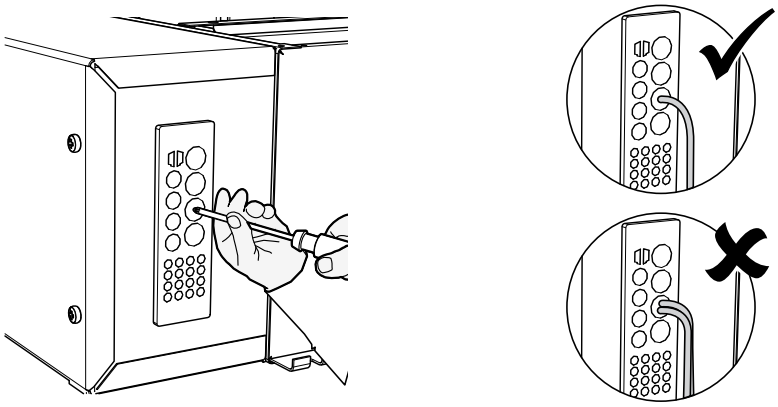
Where a **colourfan** unit has been supplied with fitted controls, a cable gland or entry plate is provided for ease of installation.

Gland plate cable entry

Where a membrane gland plate has been supplied, carefully pierce the desired entry point in the plate with a small screw driver or similar Fig 20. Note: when piercing the gland plate take care not to damage the contents of the control panel. Feed the cable through the gland plate, connect and provide appropriate cable restraint (wiring diagrams *page 8 - 12*).
A new entry point should be used for each additional cable entry.

Important This membrane gland plate is not suitable for use with traditional cable/armoured cable glands. Should the installation require the use of such glands please make alternative provisions for the cable entry to suit.

Control panel gland plate detail Fig. 20

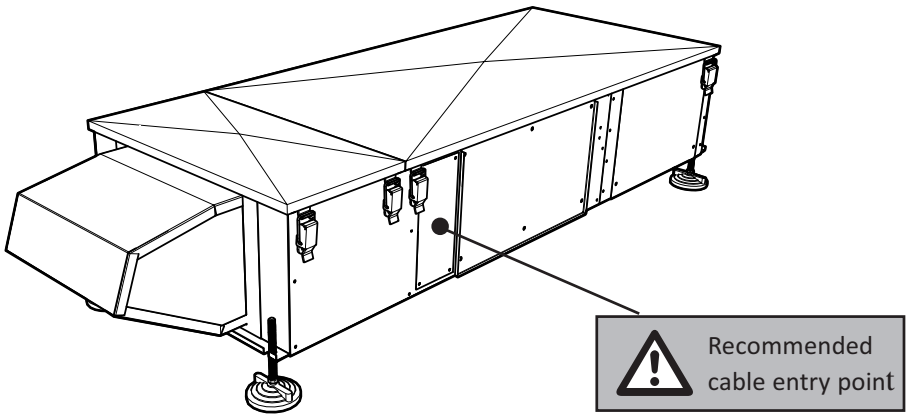


Cable entry plate

Where a cable entry plate has been supplied, carefully drill into the plate using an appropiatly sized holesaw. Suitable cable glands should always be installed. Feed the cable through the cable glands, connect and provide appropiate cable restraint (wiring diagrams *page 8 - 12*). A new entry point should be used for each cable entry.

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

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

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.

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.

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

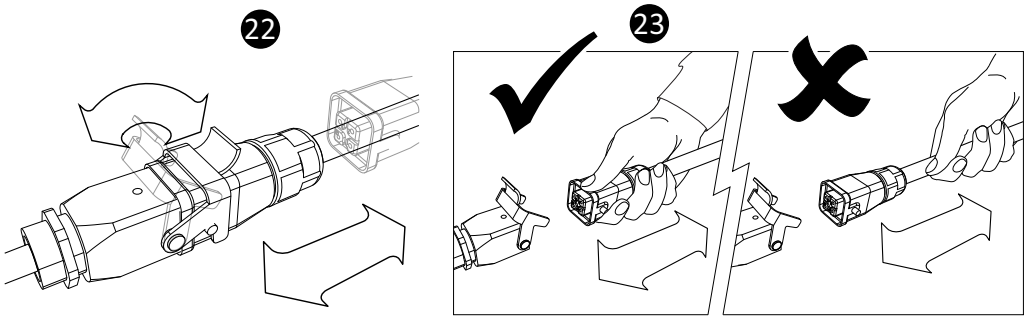
Fan assembly removal

Ensure the unit is fully isolated from the electrical supply. Carefully remove the lid by unfastening the side catches around the casework. Separate the plug connection by hand (tools not required) by lifting the locking lever and pulling the plug/socket apart 22. **DO NOT** pull the cable to separate the assembly 23. Remove and retain the four fan plate fixings 24. Carefully lift out the fan assembly; removal of the fan plate cover is not normally required.

Fan assembly installation

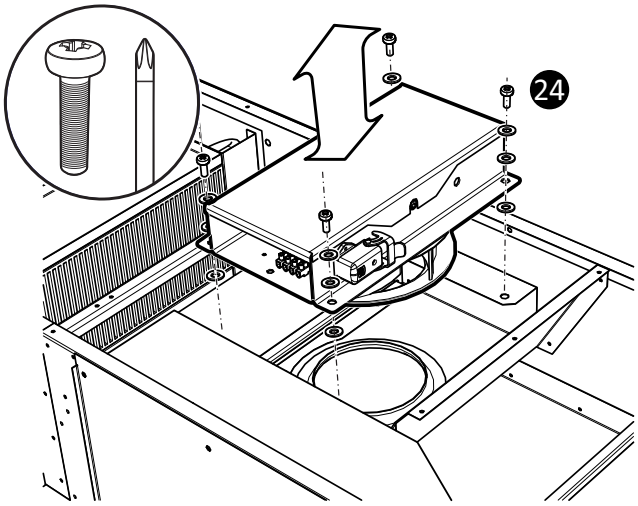
Replace the fan assembly onto the fan bulkhead; a small stud has been included to assist with correct location. When returning the fan assembly to the case take care not to drop the fan impellor on the inlet eye as incorrect alignment may damage the impellor. Secure the fan plate with the appropriate fixings, ensuring correct fan aligment with the inlet eye, adjusting as necessary 25. A trial spin by hand should indicate if the fan is rubbing. To align, losen the fan plate fixings, adjust and retighten. It is important that the loom is secured away from the fan impellor (coil excess cable and zip tie loom to fan plate as appropriate), allow enough slack for loom connection/removal to fan socket. On reconnection, the plug assembly features a locating lug to ensure correct orientation. Once rejoined, lock the connection together again using the locking lever as shown 22 . Carefully replace the lid and ensure all fixings are safely refastened.

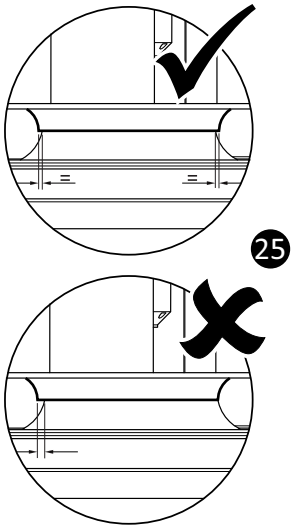
Plug connector locking/Unlocking
Fig. 22 23



Maintainance 6 Continued

Fan assembly removal/installation Fig. 24 25





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: 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: Colourfan Air Handling Unit

Type: CLS

Manufacturer: VES Andover Limited

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

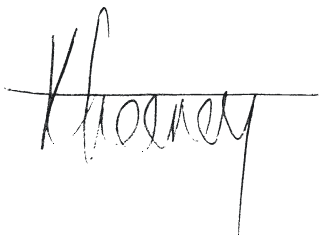
2004/108/EC (Electromagnetic Compatibility Directive)

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