



# WORKHORSE Centrifugal fans

Installation, Operation and maintenance Manual

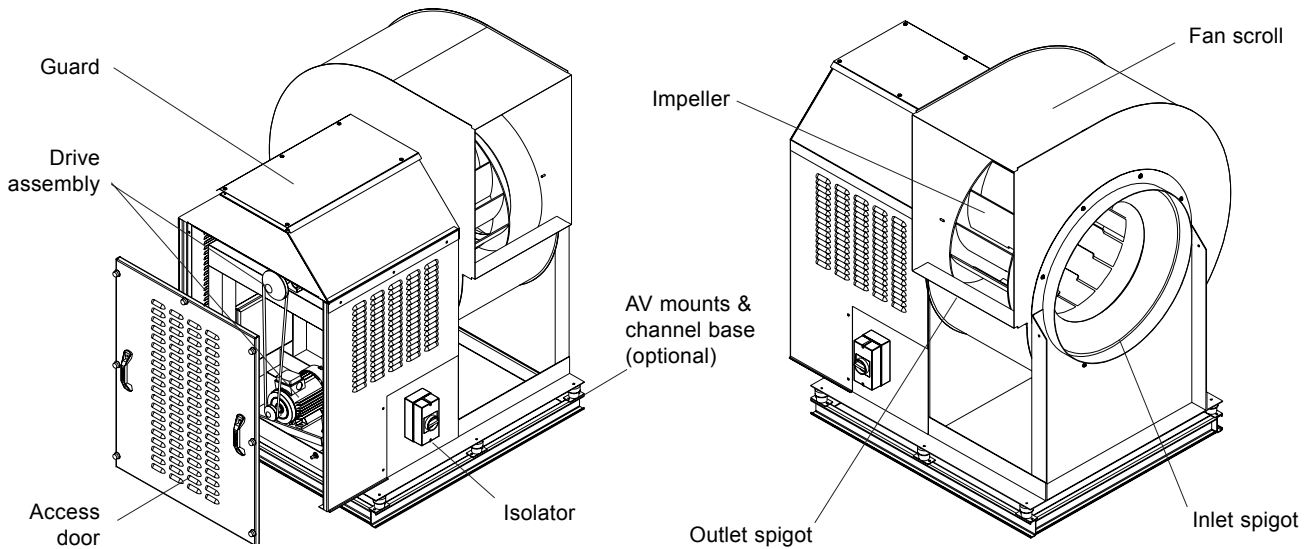



Fig. 1 Typical unit layout

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

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## 1 Introduction

The WORKHORSE is a range of utility extract fan units, with a duty range of between 0.5 and 11m<sup>3</sup>/s.


The unit offers a reliable solution to arduous environments, complete with a drive/weather guard and fitted isolator. The standard operating temperature of the unit is -20 to +35°C.

For further technical details contact VES on **08702 404340** quoting the sales order (SO) number and the unit type as found on the unit nameplate.


## 2 Receipt of Goods/Handling

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

Units are suitable for external or internal use. When moving the unit, handle with care and in such a manner as to limit 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.

**IMPORTANT**   
The unit should NOT be lifted by handles, lids, housings shaft, motor or drive

## 3 Installation

**IMPORTANT**   
Only experienced fitters should undertake this work.

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.

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.

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.

Should the system require the unit to work in free air, guards should be fitted to the exposed inlet/outlet opening.




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Consideration must also be given by the installer for adequate illumination of the unit location in order for safe maintenance.

Where provided, flanges and spigots should not be used to support the ductwork and used solely as a means of ductwork connection.

Each unit is fitted with a Ø22mm drain connection to the lowest point of the fan scroll (omitted on those units where the outlet is facing down). If this connection is redundant ensure that the drain plug is fitted.

**IMPORTANT**  Consideration should be given to the units location, this is especially important with external mounting as the wind and elements may affect the overall stability of the unit. Secure unit in place as appropriate.

## 4 Set-up

Motor and electrical details must be checked prior to connection to mains supply. All motor information can be found on the unit data sheet, supplied attached to the unit.

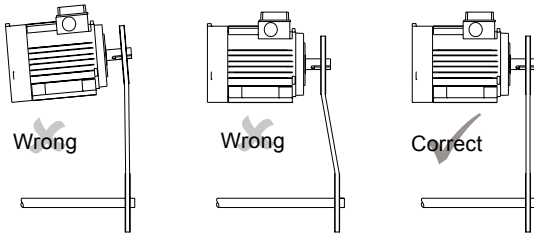


Fig.2 Pulley alignment

Ensure correct pulley alignment as indicated in *fig.2*.

To check the tension of the drive belt apply a force perpendicular to the centre of the belt span sufficient to deflect the belt 16mm for every metre of span length as indicated in *fig.3*.

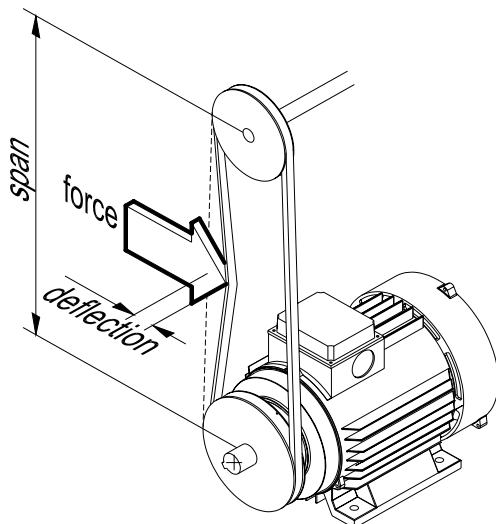


Fig.3 Belt tensioning

The force required to deflect the belt should be from 0.5 to 0.8 kg. After the unit has been positioned, re-check that the impeller is smooth running as this may have moved during transit.

For internal / plant room applications, where extra ventilation may be required, remove the weather lid as per *fig.4*. This will assist in the thermal stability of the motor.

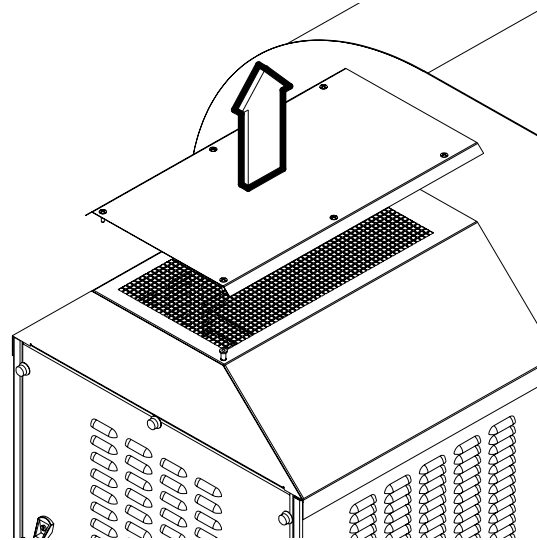




Fig.4 Weather lid detail

## 5 Wiring


**IMPORTANT**  Electrical Supply must be fully isolated before attempting to affect any work on this unit

WORKHORSE units comprise a single inlet backward curve fan powered by a belt-driven drive assembly, terminated to a local isolator.

All electrical connections to any unit must be carried out in accordance with the current edition of the I.E.E REGULATIONS and only competent Electricians should be allowed to affect any electrical work to our units.

**IMPORTANT**  Do not connect any unit to an electrical supply voltage outside of that indicated on the motor nameplate

Mains cables should be suitably sized as per details found on the unit nameplate, see *fig.5 & 6* for guidance and terminated as shown on the appropriate wiring diagram see *fig.7*. Note: 2 speed motors are dual wound

**WARNING**  When used in conjunction with an Inverter for speed control a minimum of 5 minutes should be given to allow the capacitors to discharge before commencing any work



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3 Phase Motor details				
Model Ref.	Fan Speed (rpm)	Motor Size (kW)	FLC* (A)	SC** (A)
WH212	1500	0.25	0.70	2.24
WH212	1750	0.37	1.18	3.89
WH212	2000	0.55	1.60	5.76
WH212	2250	0.75	2.20	9.68
WH212	2500	1.10	2.80	12.32
WH212	2750	1.50	3.60	20.52
WH212	3000	2.20	5.30	25.44
WH212	3247	2.20	5.30	25.44
WH215	1200	0.37	1.18	3.89
WH215	1400	0.75	2.20	9.68
WH215	1600	1.10	2.80	12.32
WH215	1800	1.50	3.60	20.52
WH215	2000	2.20	5.30	25.44
WH215	2200	2.20	5.30	25.44
WH215	2400	3.00	6.80	31.28
WH215	2600	4.00	9.20	55.20
WH218	1100	0.75	2.20	9.68
WH218	1250	1.10	2.80	12.32
WH218	1400	1.50	3.60	20.52
WH218	1550	2.20	5.30	25.44
WH218	1700	3.00	6.80	31.28
WH218	1850	4.00	9.20	55.20
WH218	2000	5.50	11.40	74.10
WH218	2147	5.50	11.40	74.10
WH222	750	0.75	2.20	9.68
WH222	900	1.10	2.80	12.32
WH222	1050	1.50	3.60	20.52
WH222	1200	2.20	5.30	25.44
WH222	1350	4.00	9.20	55.20
WH222	1500	4.00	9.20	55.20
WH222	1650	5.50	11.40	74.10
WH222	1795	7.50	14.80	96.20
WH224	850	1.50	3.60	20.52
WH224	950	2.20	5.30	25.44
WH224	1050	3.00	6.80	31.28
WH224	1150	4.00	9.20	55.20
WH224	1250	5.50	11.40	74.10
WH224	150	5.50	11.40	74.10
WH224	1450	7.50	14.80	96.20
WH224	1588	9.20	18.50	118.40
WH227	700	1.50	3.60	20.52
WH227	800	2.20	5.30	25.44
WH227	900	3.00	6.80	31.28
WH227	1000	4.00	9.20	55.20
WH227	1100	5.50	11.40	74.10
WH227	1200	7.50	14.80	96.20
WH227	1300	7.50	14.80	96.20
WH227	1440	11.00	22.00	147.40
WH233	550	2.20	5.30	25.44
WH233	650	3.00	6.80	31.28
WH233	750	5.50	11.40	74.10
WH233	850	7.50	14.80	96.20
WH233	950	9.20	18.50	118.40
WH233	1050	11.00	22.00	147.40
WH233	1150	15.00	29.00	208.80

Fig.5 Standard Electrical Details 400V 3Ph 50Hz

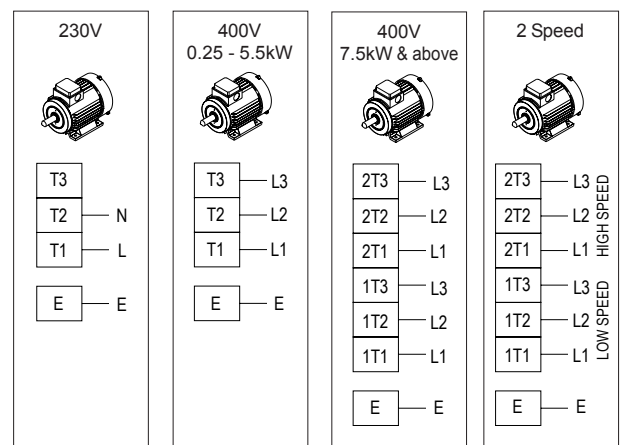
A preliminary test connection of three phase fans may be necessary to check for correct fan rotation direction, as indicated on the fan. If the rotation is incorrect, interchange any two incoming phases at the terminal block.

FLC\* Full Load Current  
SC\*\* Nominal Starting Current

1 Phase Motor details				
Model Ref.	Fan Speed (rpm)	Motor Size (kW)	FLC* (A)	SC** (A)
WH212	1500	0.25	2.30	5.06
WH212	1750	0.37	3.00	8.10
WH212	2000	0.55	4.00	12.80
WH212	2250	0.75	4.90	26.46
WH212	2500	1.10	7.40	26.64
WH212	2750	1.50	9.00	38.70
WH212	3000	2.20	12.50	57.50
WH212	3247	2.20	12.50	57.50
WH215	1200	0.37	3.00	8.10
WH215	1400	0.75	4.90	26.46
WH215	1600	1.10	7.40	26.64
WH215	1800	1.50	9.00	38.70
WH215	2000	2.20	12.50	57.50
WH215	2200	2.20	12.50	57.50
WH218	1100	0.75	4.90	26.46
WH218	1250	1.10	7.40	26.64
WH218	1400	1.50	9.00	38.70
WH218	1550	2.20	12.50	57.50
WH222	750	0.75	4.90	26.46
WH222	900	1.10	7.40	26.64
WH222	1050	1.50	9.00	38.70
WH222	1200	2.20	12.50	57.50
WH224	850	1.50	9.00	38.70
WH224	950	2.20	12.50	57.50
WH227	700	1.50	9.00	38.70
WH227	800	2.20	12.50	57.50
WH233	550	2.20	12.50	57.50

FLC\* Full Load Current  
SC\*\* Nominal Starting Current

Fig.6 Standard Electrical Details 230V 1Ph 50Hz



Note:  
2 speed  
motors are  
dual wound

Fig.7 Customer connections to pre-wired isolators



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## 6 Maintenance

### IMPORTANT !

Before attempting to carry out any 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.

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.

### IMPORTANT !

Before attempting to carry out any maintenance work or repair work on our units, all accompanying documentation including warning labels on the unit must be referenced.

### Recommended checks

To keep the unit in good running order, the following maintenance routine is recommended.

#### Three Monthly Check

•The belt drive should be thoroughly checked. Belts are subject to fatigue and will stretch over a period of time. Within normal operating conditions, belts tend to stretch in the first few days of running which should be taken into consideration when commissioning the unit. Inspection of belts at this early stage is advised. After this initial period, regular 3 monthly checks should be made. If belts are found to be loose or worn retighten by slackening bolts and slide the motor plate down, retighten the bolts. Refer to *fig. 3* for the recommended tension. Replace the belts if necessary.

Do not mix belts. If two or more belts are used make sure that all are replaced at the same time. Excess wear on the side of belts indicates misalignment of the pulleys and should be rectified at once see *fig. 2*.

•A check for excessive noise or vibration should be carried out. This will help to identify fan and motor defects at an early stage. The cause of excessive noise and vibration could be due to: loose connections, mis-aligned fan belts, unbalanced fans or worn bearings.

### IMPORTANT !

Lubricate the bearings via the grease nipple, with grease suitable for high temperature applications.

#### Six Monthly Check

Check for grease build-up in the system, especially around the impeller. Remove the grease residue if necessary. Failure to do this periodically could lead to a loss of performance or cause the fan to become out of balance, ultimately leading to bearing failure. If the drain connection is used ensure that this is also free of any contaminants.

#### Annual Check

It is recommended that for external units, particularly where adverse environmental conditions prevail, all painted surfaces be checked for signs of deterioration. Repaint as necessary; paint can be supplied upon request.

Check for missing fixings which can go missing during maintenance. Missing fixings should be replaced to maintain the integrity of the unit.

### 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.

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

**Telephone 08702 40 43 40**  
**Fax 08702 40 45 50**



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

We reserve the right to alter the specification without notice

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## 7 Warranty

### Extended Warranties

All VES Andover Products come with a one year guarantee from date of dispatch, which covers parts and labour. You can now extend this with the following options:

#### Option 1. **FREE extended Warranty**

We can offer you a maintenance agreement that keeps this equipment in tip-top condition. If you take out this agreement, we will extend the warranty **free of charge for up to 5 years**, providing the regular maintenance agreement remains in place.

#### Option 2. **12-24 Month Extended Warranty**

12-24 months from the date of dispatch. This can be covered at a cost of just 3% of order value. (minimum charge £50.00).

#### Option 3. **12-36 Month Extended Warranty**

12-36 months from date of dispatch. For this cover, the charge is 6% of order value (Minimum charge £80)

Please State which option you require when you place your order. A transferable certificate will then be issued to you. *Please note, this offer excludes condensing units. We would be happy to quote you for these separately.*

### **Register for separate spares reminders and get a 10% discount**

Register for this free service and we will automatically send you a regular reminder detailing the consumable spares for this unit, together with their current list prices.

**You will then be entitled to a 10% discount off any spares.**

To arrange any of these options.

or      **Phone: 023 8046 1150**  
**Email: spares@ves.co.uk**

Stating the sales order and reference number from the unit.



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## Declaration of Conformity

Date: 26th June 2006  
Product: WORKHORSE Centrifugal Fan Units  
Type: WH  
Manufacturer: VES Andover Limited

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

98/37/EC (Machinery Directive)  
89/336/EEC and amendment 92/31/EEC (Electromagnetic Compatibility Directive)  
73/223/EEC and amendment 93/68/EEC (Low Voltage Directive)

The European Harmonised Standards applied are:

BS EN ISO 12100, EN 294, EN61000, EN 60204-1

The National Standards applied in particular are :

BS 848 Part 1

Basis of Self attestation:

Quality Assurance to ISO 9001-2000, BSI Reg. Firm Cert. No. Q5375

Signature of Manufacturer:



Position of Signatory:

Technical Director