



AxTân

Fire-Rated Axial Skid Assembly Installation Manual

nuaire



1.0 SAFETY INFORMATION

- The provision of the electrical supply and the connection of the unit to the electrical supply must be carried out by a qualified electrician in accordance with latest edition of the wiring regulations.
- Isolate from power supply before removing any covers. During installation or maintenance ensure all covers are fitted before switching on the mains supply.
- All-pole disconnection from the mains as shown in the wiring diagram must be incorporated within the fixed wiring and shall have a minimum contact separation of 3mm in accordance with latest edition of the wiring regulations.
- This unit must be earthed.
- Ducting must be securely fixed with screws to the spigot to prevent access to live parts. Duct runs terminating close to the fan must be adequately protected by suitable guards.
- Precautions must be taken to avoid the back-flow of gases into the room from the open flue of gas or other fuel-burning appliances.
- This appliance should not be used by children or persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge, unless they have been given supervision or instruction concerning the safe use of the appliance by a person responsible for their safety. Children shall not play with the appliance. Cleaning and user maintenance shall not be carried out by children.
- Other relevant safety information including that related to PPE, transportation, installation, maintenance and operation can be found in the following instructions.

1.1 Hazard Symbols



GENERAL WARNING

Signifies a general warning regarding hazard specified by supplementary information.



ELECTRIC SHOCK

This unit must be completely electrically isolated before any panels are removed. Check mains supply and control connections.



ROTATING PARTS

This unit contains fast moving rotational parts which may start automatically. It is the sole responsibility of the installer to adequately guard these components.



REFER TO INSTRUCTION MANUAL

Read and understand the installation and maintenance manual before installing, operating or maintaining this product.

1.2 Important Information

This manual contains important information on the safe and appropriate assembly, transport, commissioning, operation, maintenance, disassembly and simple troubleshooting of the product.

While the product has been manufactured according to the accepted rules of current technology, there is still a danger of personal injury or damage to equipment if the following general safety instructions and the warnings contained in these instructions are not complied with.

- **Read these instructions completely and thoroughly before working with the product.**
- **Keep these instructions in a location where they are accessible to all users at all times.**
- **Always include the operating instructions when you pass the product on to third parties.**

1.3 Personal Protective Equipment

The following minimum Personal Protective Equipment (PPE) is recommended when interacting with Nuair product:

- **Protective Steel Toed Shoes** - when handling heavy objects.
- **Full Finger Gloves (Marigold PU800 or equivalent)** - when handling sheet metal components.
- **Semi Fingerless Gloves (Marigold PU3000 3DO or equivalent)** - when conducting light work on the unit requiring tactile dexterity.
- **Safety Glasses** - when conducting any cleaning/cutting operation or exchanging filters.
- **Reusable Half Mask Respirators** - when replacing filters which have been in contact with normal room or environmental air.

Nuair would always recommend a site specific risk assessment by a competent person to determine if any additional PPE is required.

2.0 INTRODUCTION

Mechanically ventilated smoke shafts are now a common solution to extract smoke from high-rise properties to protect common escape routes and maintain tenable conditions for fire-fighting access during a fire. These systems are becoming increasingly popular because they take up less space compared to natural ventilation systems. In a natural shaft, the head is terminated with an automatic opening ventilator, where mechanical smoke shafts use extract fans, which are mounted on the roof and connected to the riser with sheet metal ducting.

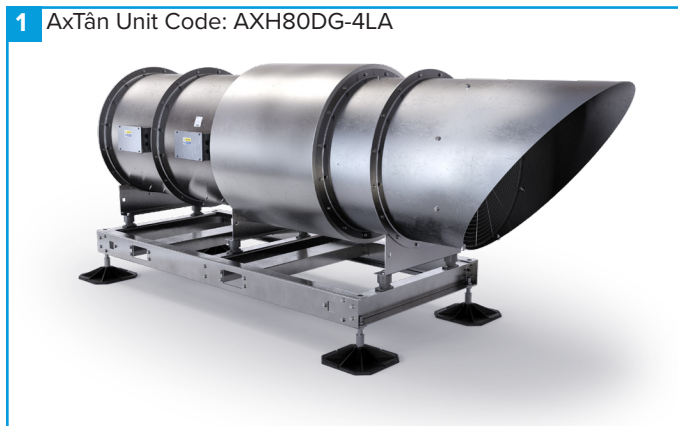
The fans are available for three phase operation only.

The units are designed for:

- **S1 DUTY** Day to day operation and in the event of fire a one off emergency use.
- **S2 DUTY** One off emergency extract only.

The range has been designed for ease of installation onto new or existing buildings and are EN12101-3 compliant, refer to EC certificate of conformity, 2797-CPR-672476.

1 AxTân Unit Code: AXH80DG-4LA



2.1 Code Description

1	2	3	4	-	5	6	7	8
AX	H	80	DG	-	4	L	A	C4

- | | |
|-----------------------------|--|
| 1. Axial Type | AX = Long case, foot mounted |
| 2. Orientation | H = Horizontal
V = Vertical |
| 3. Impeller Size (cm) | 80 |
| 4. Impeller blade reference | Contact Nuair |
| 5. Motor pole | 2, 4, 6 or 8 |
| 6. Blade angle reference | Contact Nuair |
| 7. Attenuator location | B = Both
A = Atmosphere side
R = Room Side
N - No attenuator fitted |
| 8. Environment | Blank = C3 or below
C4 = Coastal |

3.0 DELIVERY & HANDLING

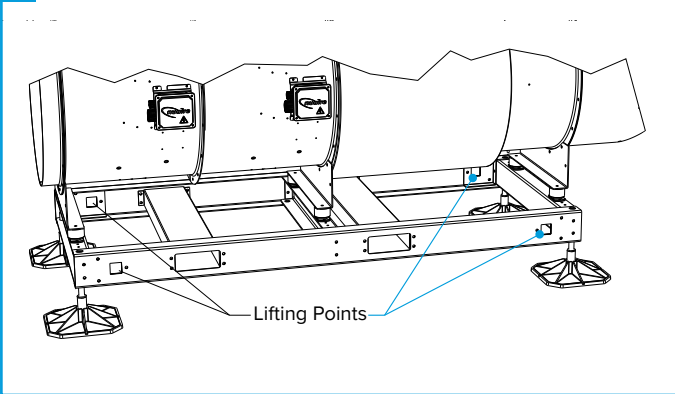
All equipment is inspected prior to despatch and leaves the factory in good condition. Upon receipt of the equipment an inspection should be conducted and any damage indicated on the delivery note.

Particulars of damage and/or incomplete delivery should be endorsed by the driver delivering the goods before offloading by the purchaser. No responsibility will be accepted for damage sustained during the offloading from the vehicle or on the site thereafter. All claims for damage and/or incomplete delivery must be reported to Nuair within two days of receipt of the equipment.

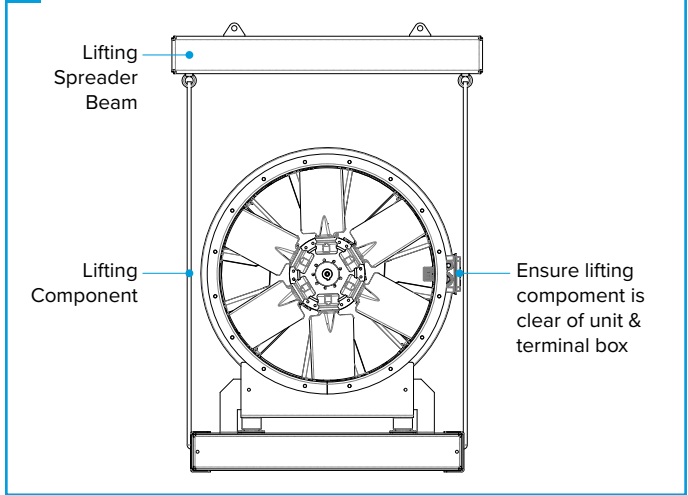
The fan impeller is carefully balanced and centralised in the fan case, it is therefore essential that great care is exercised when handling the unit. Check the weight on the rating plate details before attempting to lift.

Lifting points are shown in Figure 2 and always use a spreader when lifting as shown in Figure 3 so the lifting component is clear of the unit.

2 Lifting Points

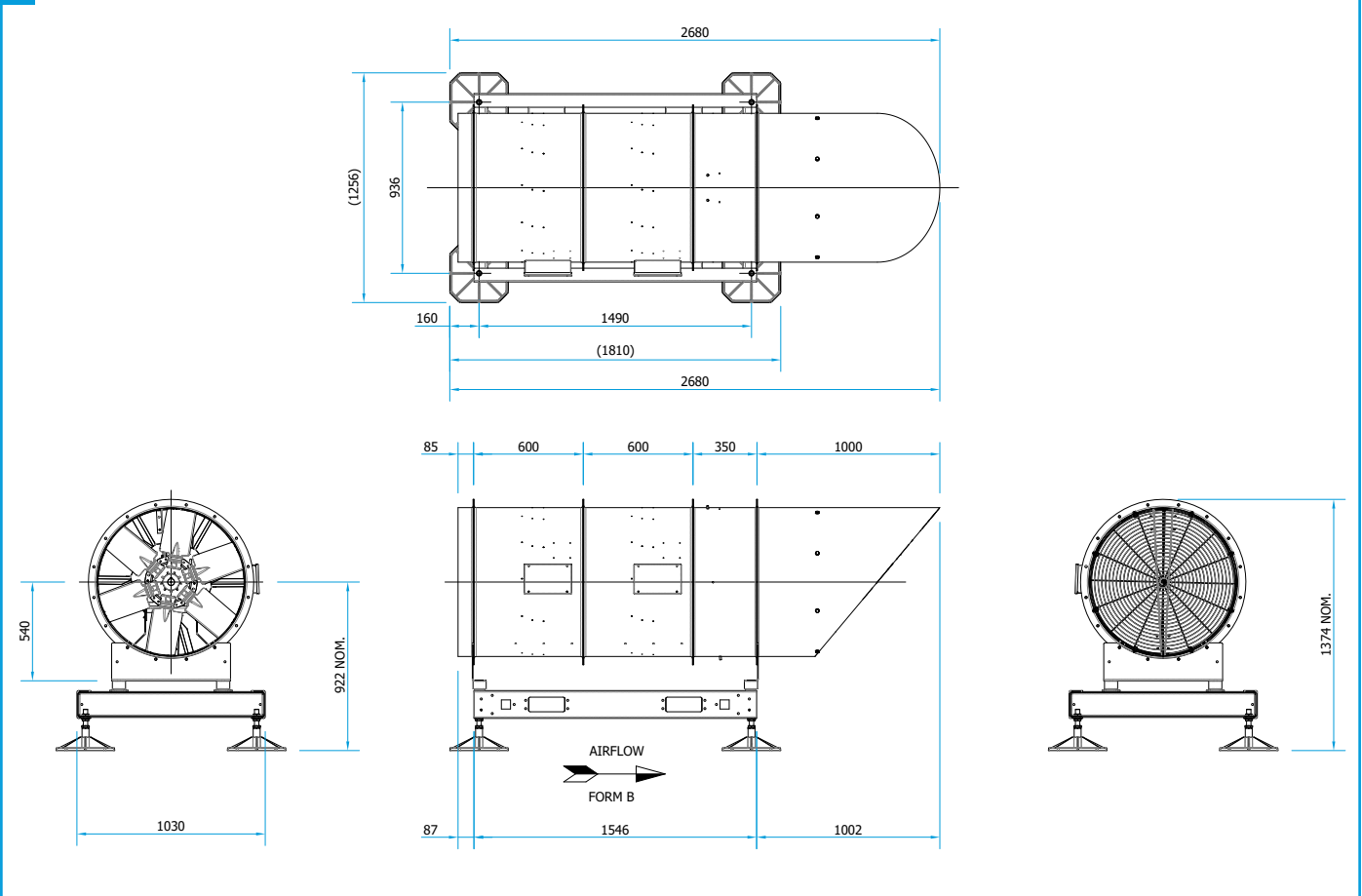


3 Lifting Unit Using a Spreader Beam

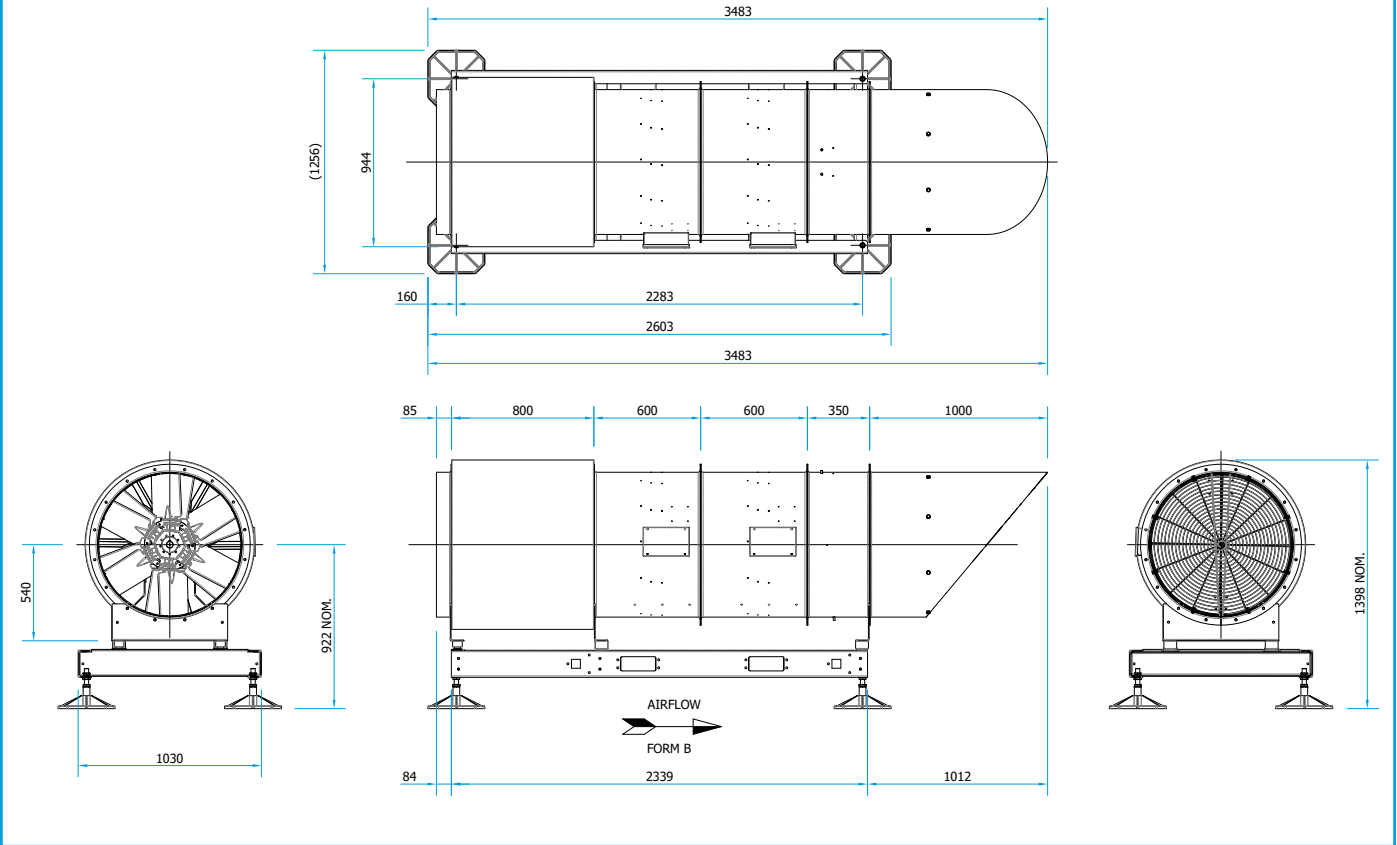


4.0 DIMENSIONS

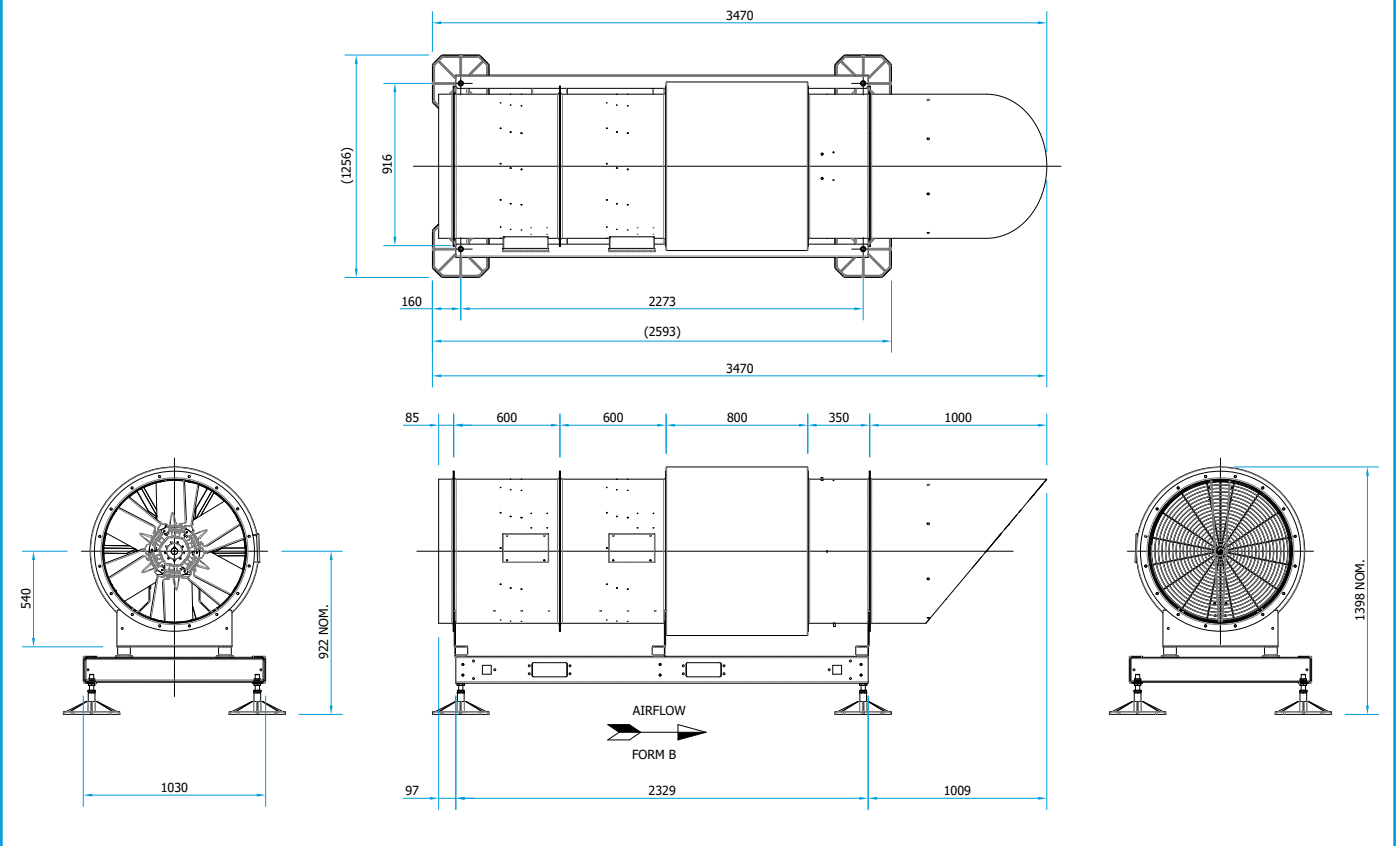
4 AXH80DG-4LN Dimensions



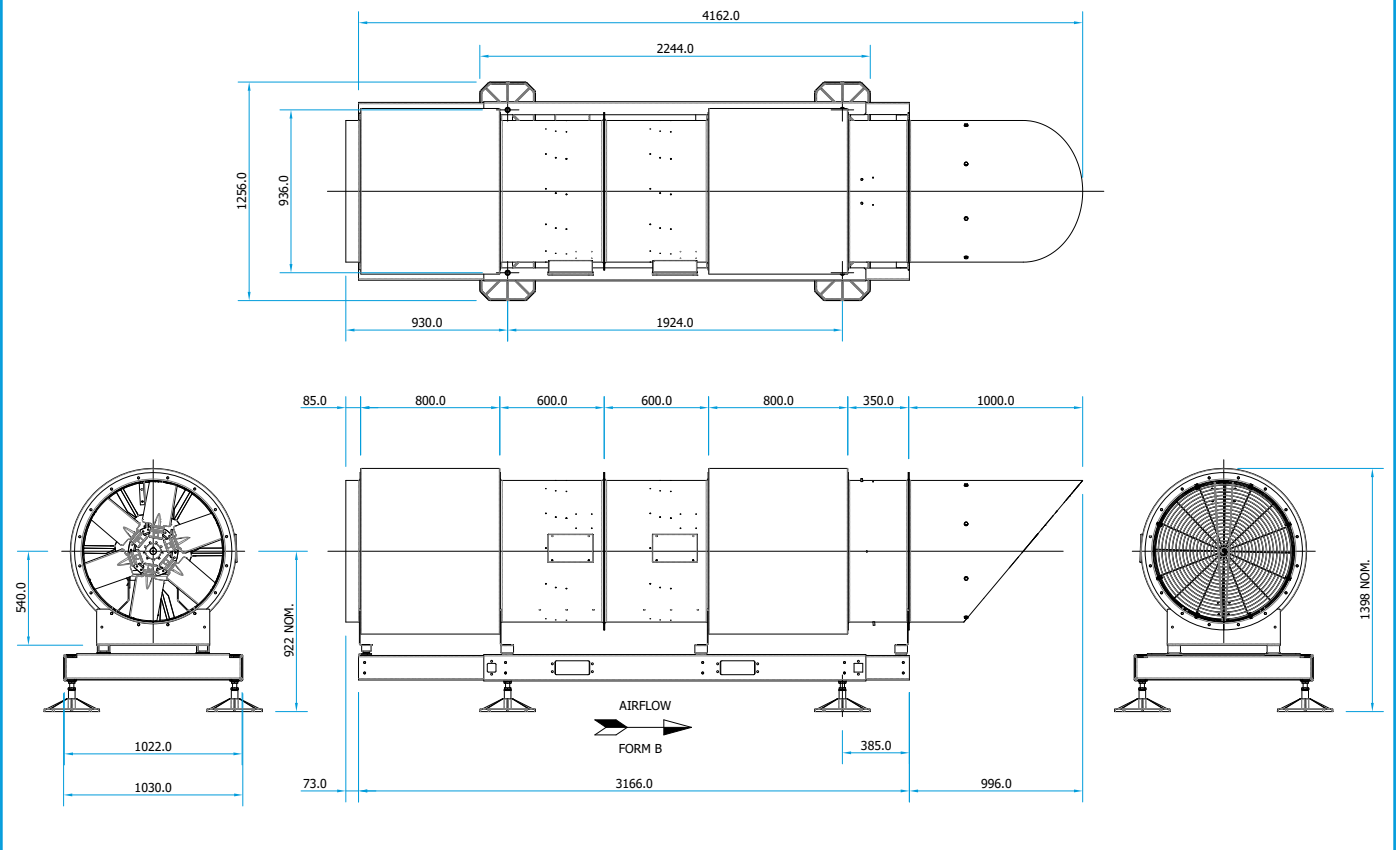
5 AXH80DG-4LR Dimensions



6 AXH80DG-4LA Dimensions



7 AXH80DG-4LB Dimensions



5.0 INSTALLATION

Installation must be carried out by competent personnel, in accordance with good industry practice, the appropriate authority and in conformance with all statutory and governing regulations e.g. IEE, CIBSE, COSHH, HVCA, ATEX, BSI & EN standards etc.

Before commencing installation check that all material, including mounting feet are available to complete the installation. Every unit is tested and serialised at works and a test certificate produced, the details recorded on the fan side rating plate should also be referred to before handling and installation.

Any damages or deviations should be immediately reported to the seller/supplier/agent quoting the order and product details from the product rating plate.

Do not alter the blade angle of impeller without the permission of Nuair, doing so may invalidate your warranty.

Isolation - Before commencing work, make sure that any electrical connections are isolated from the mains supply.

The list below states the main characteristics of the AXUS axial fan range certified for operation at 300°C or 2 hours.

The unit:

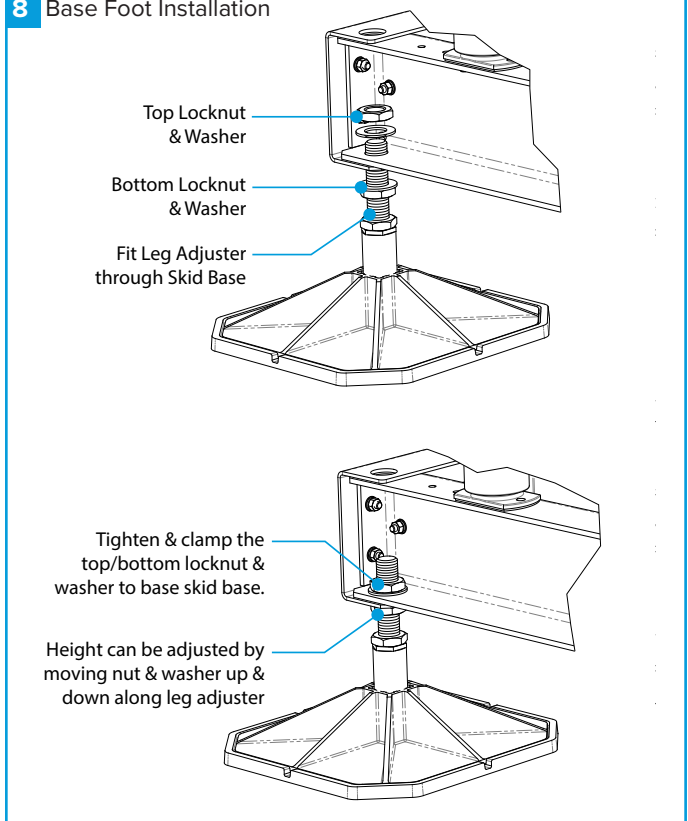
- Is thermally uninsulated.
- May be used for smoke reservoir and non-smoke reservoir applications.
- Is dual purpose i.e. suitable for day-to-day operation and one-off emergency use.
- Flow A, motor-impeller, and Flow B, impeller-motor operation.

5.1 Mechanical Installation

5.1.1 Base Feet

Initial installation requires the base mounting feet be fitted. The base feet are supplied separately and should be fitted to the assembly skid prior to final positioning. See Figure 8 for foot installation.

8 Base Foot Installation



5.1.2 General Notes

Rotate the fan impeller by hand to ensure free and smooth rotation and that no transit or handling damage has occurred, observe the direction of flow/direction of rotation arrow.

Ensure the external termination box is accessible to the electrician.

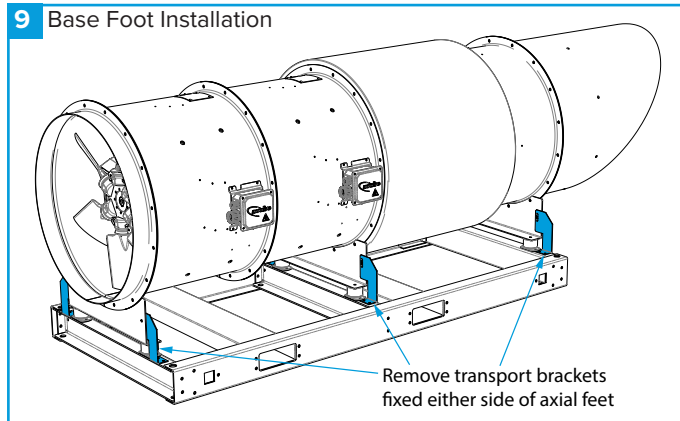
In order to ensure performance is as stated, a minimum distance of twice the fan diameter is required between the appliance and any bends in the ductwork.

5.1.3 Transport Brackets

Care must be taken when installing assembled axial units and with attenuators fitted. These units are fitted with transport brackets for extra stability when in transport and handling.

Once the unit has been finally positioned these brackets shown (Figure 9) need to be removed prior to unit connection.

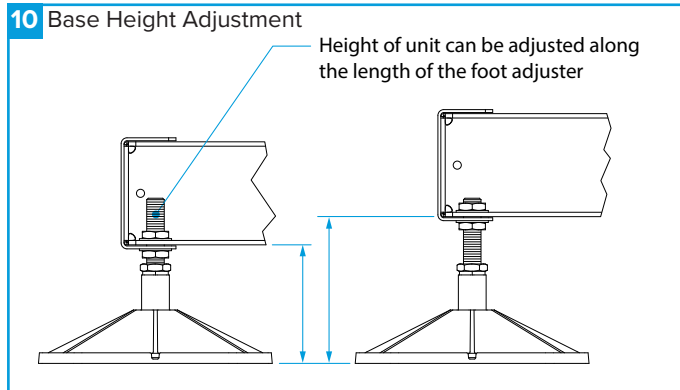
9 Base Foot Installation



5.1.4 Height Adjustment

When the fan is offered up to the ducted system, check the unit is aligned correctly. If any adjustment is required, this can be done with the base feet as shown (Figure 10).

10 Base Height Adjustment



5.2 Electrical Installation

5.2.1 Motors

Motors are totally enclosed and protected to IP55 (Dust and low pressure water jets). Motors comply with BS5000, EN600034 and IEC34-1.

The motors have sealed-for-life ball bearings in units up to 132mm frame size. For frame sizes of 160mm and above motors are of the regreaseable type. Enclosures are to IP55 with class H insulation. Motors are tested in accordance with EN12101-3.

Please note the requirements for maintenance of the motor. Failure to comply with the recommendations will invalidate any warranty claim.

5.2.2 Wiring

Electrical supply wiring connection is to an externally mounted terminal box on the case exterior. The box is pre-wired to the motor with heat-resisting cable.

5.2.3 Connection Details

Check that the voltage full load and starting current on the fan rating label is suitable for your supply. Units for external use require weatherproof conduit and glands.

Single speed motors below 4kW are suitable for Direct On Line starting only.

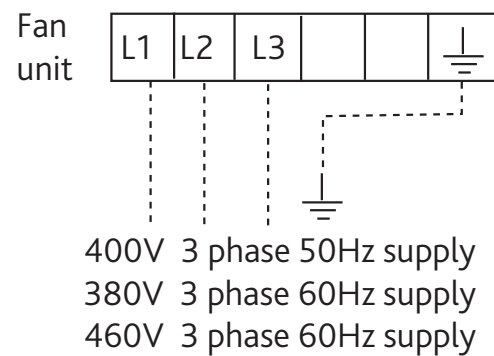
Single speed motors 4kW and above are supplied with Star / Delta capability but Direct On Line starting is recommended as the simplest means for emergency equipment operation.

Two speed motors are supplied TAP or PAM single winding or Dual Wound. All two speed types are designed for Direct On Line starting on both speeds only unless otherwise specified.

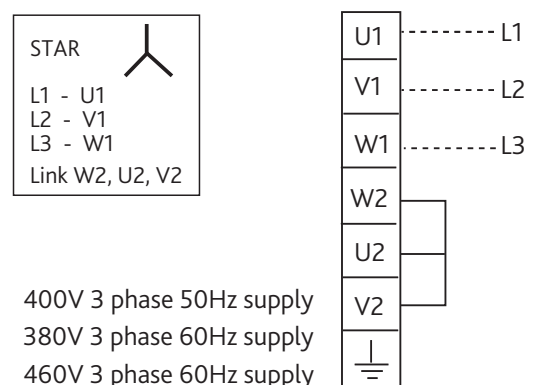
Earthing of the axial motor is done via the axial case, where the case is earthed to the main axial skid. It is essential that the main axial skid is earthed prior to connecting the supply.

5.3 Wiring Diagrams

11 Wiring - Single Speed (3kW and below) - Three Phase

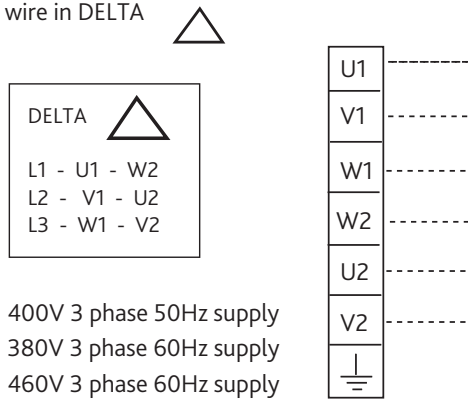


12 Wiring - Star D.O.L Starting (3kW) and below) - Three Phase



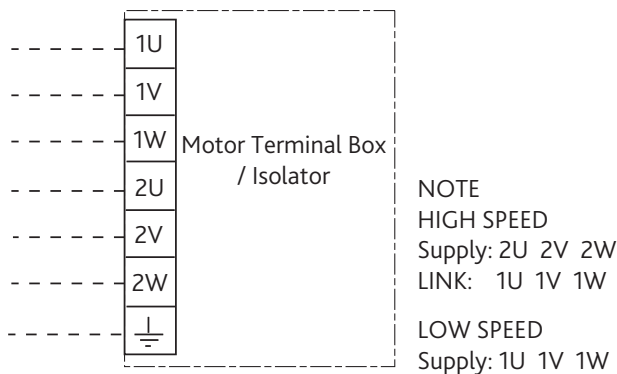
13 Wiring - Star/Delta Starter (4kW and above) - Three Phase

Note:
For all D.O.L. (Direct On Line) operation or Inverter type Speed Control wire in DELTA



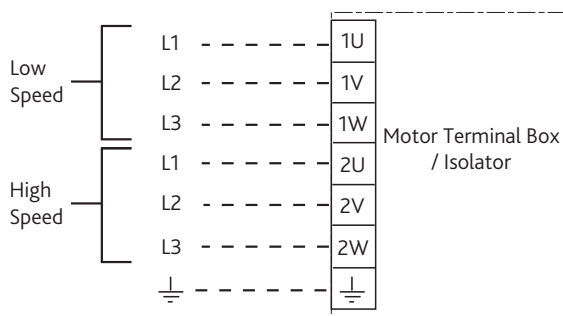
400V 3 phase 50Hz supply
380V 3 phase 60Hz supply
460V 3 phase 60Hz supply

14 Wiring - Two Speed - TAP/PAM Wound Motor - D.O.L Starting (Both speeds) - Three Phase



400V 3 phase 50Hz supply
380V 3 phase 60Hz supply
460V 3 phase 60Hz supply

15 Wiring - Two Speed - Dual Wound Motor D.O.L Starting (Both Speeds) - Three Phase



400V 3 phase 50Hz supply
380V 3 phase 60Hz supply
460V 3 phase 60Hz supply

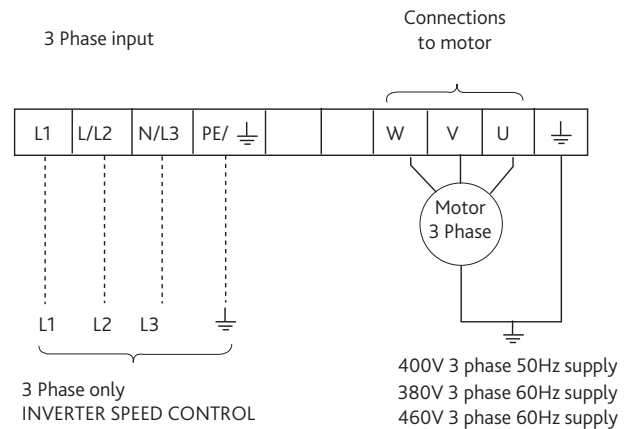
6.0 Controls

6.1 Electronic Speed Control - Three Phase

Screened cable must be used, maximum length should be 30 meters. Consult our Technical Department if you wish to use longer leads.

Inverters are configured to suit fans and control applications as described on the Customer Order, free of charge.

16 Wiring - Electronic Speed Control - Three Phase



6.2 Impeller Rotation

Ensure that the impeller rotation follows the label arrow indicator on the casing. Should the direction be incorrect on three phase units, reverse any two of the supply leads. Care should be taken to set correct rotation as incorrect rotation may result in damage to the motor. Equipment should be run for approx. 30 minutes to ensure correct operation. If any fault occurs, the equipment should be switched off. Do not re-start until the fault has been rectified.

For good EMC engineering practice, any sensor cables or switched live cables should not be placed within 50mm of other cables or on the same metal cable tray as other cables.

For specialist connections not shown always refer to the wiring diagram supplied with the unit. In the event of query or uncertainty contact Nuaire directly before any connection is made.

6.3 Optional Inverter Control for F300/2 Axis Range

High temperature Axis fans F300 Series have been tested with frequency converters to BS EN 12101-3:2015, and may be used with suitable frequency converters under emergency fire mode conditions providing they are operated at full speed, selected to meet the parameters described in the table below and the fire mode on the inverter is engaged.

Test Parameter	Result
Inverter Type	PWM
Filters Fitted	NO
Switching Frequency	4 kHz
Ramp Up Time	30 Seconds
Maximum Peak Voltage (Vmax)	156
Maximum Peak to Peak Voltage (Vp)	436
Maximum Voltage Rise du/dt = 0.8Vp/dt (V/nS)	1.659

7.0 COMMISSIONING

Axial fan 300°C for 2 hours - Motors for Smoke Extract Fans

Exposure temperature/time: 300°C for 2 hours

These motors are used to provide a safety function for people in the event of fire in public premises or in the home. They are therefore subject to strict constraints concerning their operating and maintenance.

7.1 Operating Constraints

1. Check on the nameplate that the selected motor corresponds to the maximum exposure temperature and duration.
2. **After the unit has been subjected to one emergency duty operation it must be replaced.**
3. With variable speed control. Ensure that the maximum speed never exceeds the speed of the motor supplied by the mains and that the delivered power corresponds to the previous definitions. The motor should be equipped with PTC thermistors connected to the protection system during S1 duty and switched off during S2 duty (operation during an emergency).

These qualifications ensure the qualification of the driven fan by the manufacturer.

8.0 MAINTENANCE

8.1 Maintenance Constraints

Regular service visits must be performed on the installation **at least every 6 months**, incorporating the following checks:

1. Checking the insulation resistance ($R > 100$ MOhms, 500V DC)
 - If the drain holes are blocked, open them to eliminate any accumulated condensation.
 - If $R < 100$ MOhms, dry the stator in an oven and check the insulation resistance. If the fault persists, replace the stator.
 - The stator must be replaced 5 years after installation or after 20,000 hours of operation.
2. Cooling check
 - Ensure there is no dust or grease in the entire ventilation circuit (housing fins, motor cover/fan if fitted driven fan).
 - Ensure the motor runs normally when switched on for a few minutes.
3. Bearing check (C3 or C4 play)
 - Run the motor during each maintenance visit. When the motor is cold, a high level of noise is caused by the texture of the grease. This does not indicate a bearing fault.

S2 duty only:

The bearings must be replaced by an identical type every 5 years. Ensure the motor runs normally when switched on for a few minutes.

S1 duty and Emergency in S2 duty:

1. Permanently greased bearings.

300°C / 400°C range; replace on 2 pole motors after 10,000 hours of operation and on motors with 4 poles or more after 20,000 hours.

2. Regreaseable bearings`

The information on the motor nameplates must be strictly respected (grease quantity, grease quality and re-greasing frequency). The bearings must be replaced after 20,000 hours of operation.

8.2 The Run/Standby Axial fan assembly

If the axial unit is disassembled at any time it is critical that it is reassembled in the correct orientation. Ensure the first stage fan is positioned in front of the second stage in relation to direction of airflow. Ensure each fan is rotating in the correct direction of rotation as per unit label.

8.3 Back draught Damper

The back draught damper is a gravity operated damper to prevent back draughts to the smoke shaft. These are manufactured in heavy gauge galvanised steel and are fitted with a pair of bolted flanges. If disassembled it is important to reassemble with the doors opening in the direction of airflow.

8.4 Flexible High Temperature Connectors

Circular without flanges, flexible duct material is flame-proof resistant to heat up to 130°C, chemicals, ozone, oil and grease. The material is airtight, waterproof and tested to BS476 Part 7.

Secure to flange and ductwork with the clamping bands provided, ensure that duct misalignment is not corrected by the flexible connector and that it is neither too tight nor too slack. Either condition can contribute to noise and impair fan performance.

8.5 Maintenance Schedule

It is important that maintenance checks are recorded and that the schedule is always adhered to. In all cases, the previous report should be referred to. When maintaining a high temperature fan, particular attention should be given to the Smoke Control Association & Fan Manufacturers' Association guide to smoke extract fan maintenance available at smokecontrol.org.uk.

8.5.1 Routine Maintenance

- Clean all areas of unit of dust or fibres and treat any areas of corrosion, including lifting lugs / eye bolts.
- Check all areas and ensure no damage is present on units i.e. impeller cracked, fan cowl bent, foot cracked etc.
- Check all access doors and bolted flange connections for leakage and if necessary bolts should be adjusted and any replacement gasket materials should be replaced as required.
- Check insulation resistance is adequate, it is imperative this is checked after any prolonged shut down period.
- Check all fasteners and tighten if necessary.
- Ensure no excessive vibration.

As unserviced shaft seals and bearings can create a point of failure due to lack of use, it is imperative that fans are "run tested" regularly as part of the overall smoke control system tests, ideally on a weekly basis during normal operation. A record should be kept of each test, along with the date and time that it was conducted. The record should be signed by a competent operative.

8.5.2 Every 3 Months

Check sealing of motor and gland plate is in good condition.

8.5.3 Annually

- Thoroughly inspect the unit and its components for corrosion, acting immediately to treat/restore any damaged areas.
- Check all cables are in good condition and all electrical terminals within the unit are tight.
- Check all earth connections.
- Check all cables are in good condition.
- Check bearing condition and if necessary re-grease bearings for 160 motor frames and larger.

8.6 Motor Repair

Due to unit certification EN12101-3 and in compliance with the construction products directive, the motor must be returned to the motor manufacturer for replacement.

9.0 WARRANTY

The 3 year warranty starts from the day of delivery and includes parts and labour for the first year. The remaining period covers replacement parts only.

This warranty is void if the equipment is modified without authorisation, is incorrectly applied, misused, disassembled, or not installed, commissioned and maintained in accordance with the details contained in this manual and general good practice.

The product warranty applies to the UK mainland and in accordance with Clause 14 of our Conditions of Sale. Customers purchasing from outside of the UK should contact Nuair International Sales office for further details.

Failure to maintain the unit as recommended will invalidate the warranty.

10.0 END-OF-LIFE AND RECYCLING

Ensure that Nuair product is made safe from any electrical / water / refrigerant supplies before dismantling commences. This work should only be undertaken by a qualified person in accordance with local authority regulations and guidelines, taking into account all site based risks.

Where possible Nuair use components which can be largely recycled when the product reaches its end-of-life:

- Fans, motors, controls, actuators, cabling and other electrical components can be segregated into WEEE recycling streams.
- Sheet metal parts and other metallic items can be segregated and fully recycled.
- Cardboard packaging, wood, used filters and other paper components can be largely recycled or fully processed in energy from waste centres.
- Remaining items can be further segregated for energy from waste centres or, as a last resort, sent to landfill. Please call After Sales Support for further information on items not listed above. Ensure that Nuair product is made safe from any electrical supplies before dismantling commences. This work should only be undertaken by a qualified person in accordance with local authority regulations and guidelines, taking into account all site based risks.

11.0 AFTER SALES AND REPLACEMENT PARTS

For technical assistance or further product information, including spare parts and replacement components, please contact the After Sales Department.

If ordering spares please quote the serial number of the unit together with the part number, if the part number is not known please give a full description of the part required. The serial number will be found on the identification plate attached to the unit casing.

Repair and replacement of the defined critical components shall only be carried out by a Nuair authorized representative. These fans are certified by a notified body, the substitution of a critical component with an alternative version of this component, must be approved by the notified body.

Telephone 02920 858 400
aftersales@nuair.co.uk

Technical or commercial considerations may, from time to time, make it necessary to alter the design, performance and dimensions of equipment and the right is reserved to make such changes without prior notice.



