



Long Cased Axial Fans

High Pressure Ambient & High Temperature 300°C / 400°C for 2 hours

Installation Manual



1.0 SAFETY INFORMATION

- The provision of the electrical supply and the connection of the unit to the mains must be carried out by a qualified electrician.
- Isolate from power supply before removing any covers. During installation / 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.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- 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.

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 Nuaire 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.

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

2.0 INTRODUCTION

The AXUS high pressure range of axial flow fans are designed for 'in duct' applications. Manufactured from mild steel then galvanised, making the unit suitable for indoor and outdoor applications.

These units are available for selection in 3 variants. For temperature rating please refer to the product rating label.

- Ambient (day to day use).
- F300 (day to day use, with one off emergency smoke extraction 300°C for 120min).
- F400 (day to day use, with one off emergency smoke extraction 400°C for 120min).

Case diameters of 630mm to 900mm.

Unit codes AX63 to AX90.

Impellers have been selected at blade angle settings matched to various motor speeds to perform against the design criteria laid down in Nuaire's selection catalogue / software.

Any attempt to adjust or reset impeller blade angles will invalidate warranty.

For full unit description, dimensional, weight and performance details refer to the Nuaire product catalogue. A comprehensive range of ancillaries and silencers are also listed.

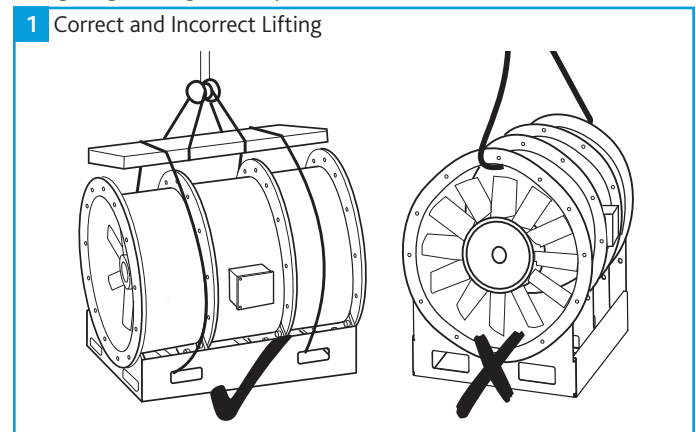
2.1 Code Description:

AX 80 LQ - 2 1 S 8 + 2R
 | | | | | | | | | |
 1 2 3 4 5 6 7 8 9 10

- | | |
|---------------------------|--|
| 1. Range: | Long Case Axial Fans |
| 2. Impeller Size (cm): | 31 to 160 |
| 3. Impeller Reference: | Contact Nuaire |
| 4. Guide Vanes: | * = Guide Vanes
- = No Guide Vanes |
| 5. Motor Poles: | 2, 4, 6 or 8 |
| 6. Blade Angle Reference: | Contact Nuaire |
| 7. Impeller Material: | A = Aluminium
S = Steel |
| 8. Motor Type: | 7 = Three Phase 300°C/2hr
8 = Three Phase 400°C/2hr |
| 9. Speed Control: | + = Must Be VSD Controlled
- = No Speed Control |
| 10. Further Options: | Contact Nuaire |

3.0 HANDLING

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 any lift. Always use a spreader as shown (Figure 1), or a suitable forklift, if forklift access points are provided within the mounting feet. Never pass lifting slings through the impeller.



4.0 MECHANICAL 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, HVCA, ATEX, BSI & EN standards etc.

Before commencing installation check that all materials, including optional ancillaries 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.

The units are designed to be supported by the mounting bracket, in a horizontal orientation. For any other mounting orientation please contact Nuaira.

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

- Is thermally uninsulated.
- May be located in smoke reservoir and non-smoke reservoir applications.
- Is dual purpose i.e. suitable for day-to-day operation and one-off emergency use.
- Suitable for mounting in horizontal, intermediate, or vertical orientation.
- Flow A, motor-impeller, and Flow B, impeller-motor operation.

The list below states the main characteristics of the AXUS axial fan range certified for operation at 400°C for 2 hours. The unit:

- Is thermally uninsulated.
- May be located in smoke reservoir and non-smoke reservoir applications.
- Is dual purpose i.e. suitable for day-to-day operation and one-off emergency use.
- Suitable for mounting in horizontal, intermediate, or vertical orientation.
- Flow A, motor-impeller, and Flow B, impeller-motor operation.

4.1 General

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 and ensure that:

- **All optional accessories such as support brackets, attenuators, inlet cones, guards, flexible connectors etc. are assembled to the fan.**
- **The mounting brackets are fitted for horizontal application. For other orientations please contact Nuaira for advice.**
- **External termination box is accessible to the electrician.**
- **When offering the fan to the ducted system that both inlet and outlet connections are perfectly aligned.**

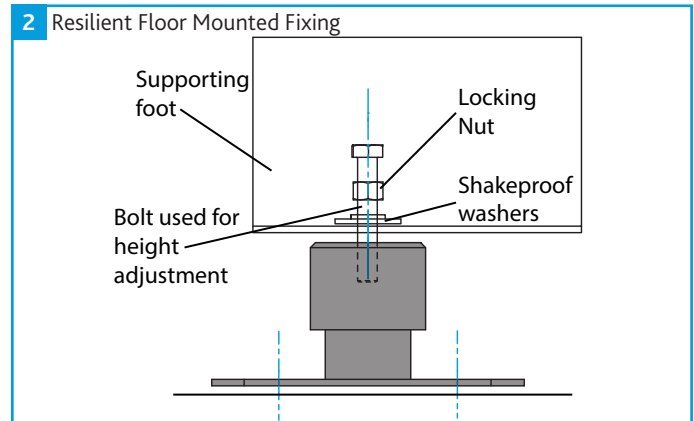
4.2 Floor Mounting

Optional resilient mountings should be attached to the unit mounting brackets at this stage (Figure 3). Position and align the unit with the ductwork in both horizontal and vertical planes and pack height under mounting feet if necessary.

Matching attenuators, if required, should be fitted to the fan with any other accessories before installation.

Matching flanges are fixed to the ductwork ends with rivets.

AV mounts isolate the fan only. Silencers / backdraught dampers and other "significant mass" accessories should form part of the fixed ductwork after the flexible connection.



4.3 Suspended Mounting (Horizontal or Vertical)

Anti-Vibration (A.V.) mounts must be arranged so that they are used in compression only.

A suspended steel under frame would be necessary to support the unit, (by others) standing on A.V. mounts.

5.0 ELECTRICAL INSTALLATION

To minimise the possibility of Electro Magnetic Interference:

- Always install screened cable between the control and the fan, maximum length 30 metres. Please consult Nuaire if a longer cable run is needed.
- This product must be earthed and always 'earth' the screened cable at both ends. Ensure that ALL earth connections are the same potential. Cable glands are provided.
- Always keep mains supply cables and motor supply cables separate and DO NOT install any data cable or low voltage cable within 50mm of other cables or on the same metal cable tray as other cables.

5.1 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. Frame sizes 160mm and above are re-greaseable type.

Enclosures are to IP55 with class F/H insulation dependant on motor temperature rating.

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

High Temperature unit motors are tested in accordance with EN12101-3.

5.2 Electrical Connections

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

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

Single speed motors 4kW and above

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

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.

5.3 Start-up procedure

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 approximately 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.

5.4 High Temperature Inverter Control

High temperature Axus fans F300 Series have been tested with frequency converters under BS EN 12101-3:2015, and may be used with suitable frequency converters under emergency fire mode conditions. To inform the selection process for the frequency

converters, reference shall be made to the table below.

Test parameters used in / derived from test series - ref C.6.2 (n)

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

5.5 Wiring

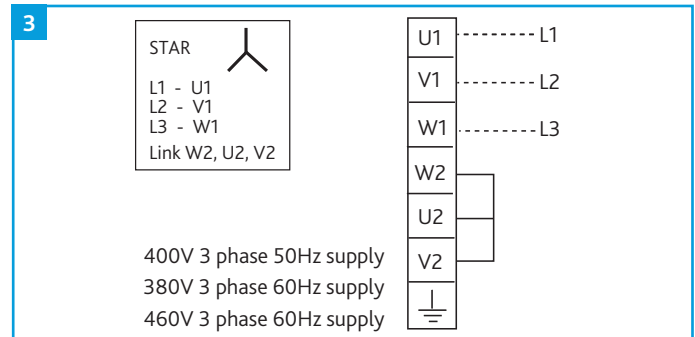
For specialist connections not shown always refer to the wiring diagram supplied with the unit. In the event of query or uncertainty contact NUAIRE directly before any connection is made.

An inverter is used to provide speed control. When the fan is isolated, allow 5 minutes for the capacitors in the inverter to discharge before commencing any work on the unit.

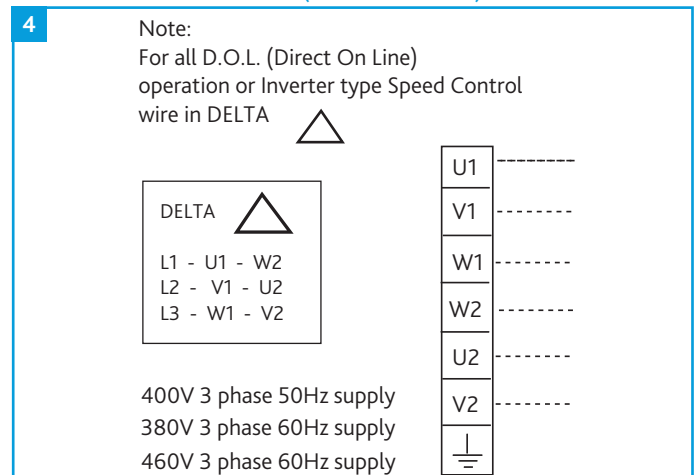
Total length of motor leads should not exceed 50 metres. If a screened cable is used, maximum length should be 25 metres. Consult our Technical Department if you wish to use longer leads.

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

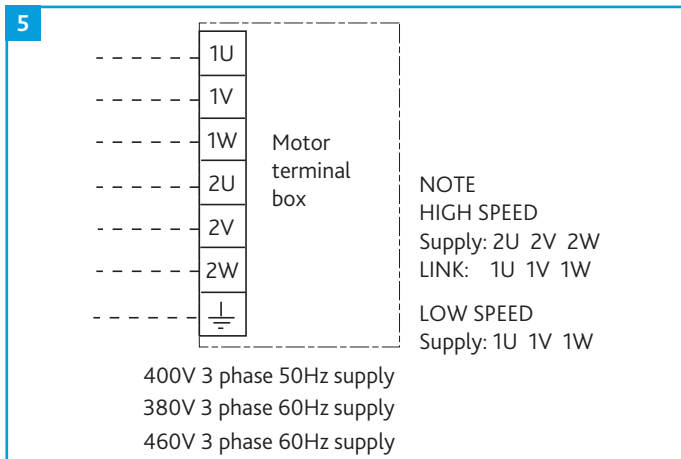
5.5.1 D.O.L. Starting - 3 Phase (3kW and below)



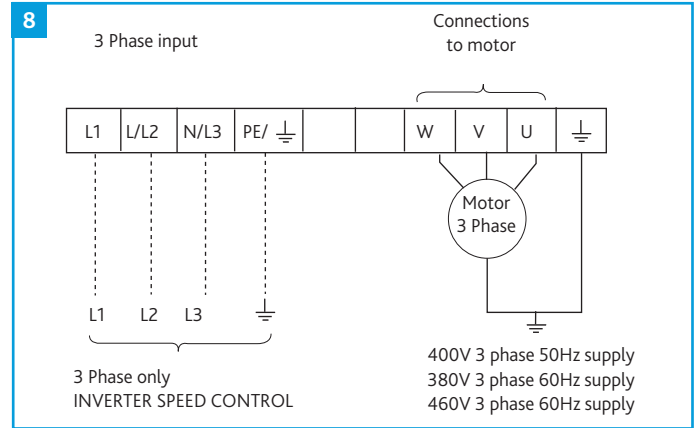
5.5.2 Star / Delta - 3 Phase (4kW and above)



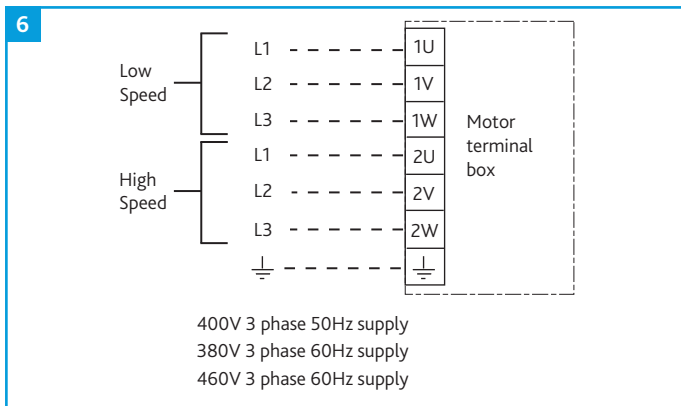
5.5.3 Two Speed - TAP/PAM WOUND MOTOR D.O.L. Starting (Both Speeds) - 3 phase



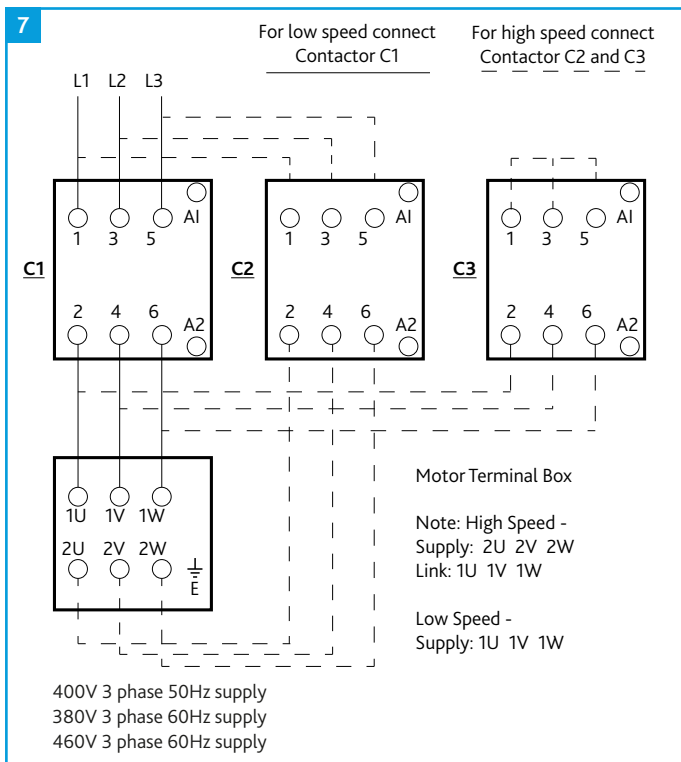
5.5.6 Speed Control - ELECTRONIC, 3 phase



5.5.4 Two Speed - DUAL WOUND MOTOR D.O.L. Starting (Both Speeds) - 3 phase



5.5.5 Example Contactor control - Two Speed Motors - 3 phase



6.0 SPECIFIC COMMISSIONING AND SERVICING REQUIREMENTS

300°C for 2 hours / 400°C for 2 hours Motors for Smoke Extract Fans

Motors for Smoke Extract Fans

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.

Operating Constraints

- i. Check on the nameplate that the selected motor corresponds to the maximum exposure temperature and duration.
- ii. Non ventilated motors MUST be placed in the airflow from the driven fan. Ventilated motors can be placed outside the flow.
- iii. AFTER THE MOTOR HAS BEEN SUBJECTED TO ONE EMERGENCY DUTY OPERATION, IT MUST BE REPLACED.
- iv. 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.

Maintenance Constraints

Regular service visits must be performed on the installation AT LEAST EVERY 6 MONTHS, incorporating the following checks:

i. 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.

ii. 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.

iii. 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:

a) 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.

b) Re-greaseable 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.

7.0 MAINTENANCE

Isolation - Before commencing work, make sure that the unit, switched live and Nuaire controls are electrically isolated from the mains supply.

Only appropriately qualified personnel, familiar not only with the electrical aspect of the work but with the plant, area or application served by the unit, should carry out routine and preventative maintenance on this product.

Ensure all mechanical and electrical connections and fixings are secure and that inlet and outlet duct work is free of any obstruction or debris. Briefly switch the fan on/off to ascertain correct direction of rotation, compare the rotational label applied to the fan case and correct if necessary.

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.

Maintenance should be carried out on a regular basis, Nuaire recommend three months from commissioning and at least annually thereafter as determined by the operating conditions and levels of airborne contamination to which the unit is exposed.

7.1 Routine Maintenance

- Clean all areas of unit and treat any areas of corrosion.
- Check that bird guards/safety grilles are secure and free of obstruction.
- Check motor for undue wear, signs of overheating and apply winding insulation and continuity tests.
- Remove all dust and dirt from impellers, be especially careful not to disturb balance weights.
- Check resilient mounts and replace any that show signs of wear or deterioration.

7.2 Annually

- Thoroughly inspect the unit and its components for corrosion, acting immediately to treat/restore any damaged areas.
- All electrical terminals within the unit should be tightened.
- Check all earth connections.

7.3 Bearing Lubrication

Motors are fitted with sealed for life bearings and do not require any lubrication.

7.4 Impellers

Impellers are dynamically balanced during manufacture, no special treatment is required during maintenance, other to clean and remove all dust and dirt residue taking care not to disturb the balance weights. Remove stubborn dirt with warm soapy water – do not use caustic fluids.

The maintenance programme must conform to 'good custom and practice' and to the published recommendations of associations such as the HVCA, CIBSE etc. The HVCA's publication 'Standard Maintenance Specification for Mechanical Services in Buildings' Vol 2 Ventilating and Air Conditioning is a recommended reference.

7.5 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.

8.0 WARRANTY

The 5 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 Nuaire International Sales office for further details.

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

9.0 END-OF-LIFE AND RECYCLING

Where possible Nuaire 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, aluminium extrusion, heating/cooling coils and other metallic items can be segregated and fully recycled.
- EPP, plastic ducting, nylon corner pieces, plastic heat exchangers, packaging material and other plastic components can be segregated into mixed plastic and widely 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 Nuaire 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.

10.0 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.

Telephone 02920 858 400
aftersales@nuaire.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.

