



# AXUS AX

## Circular Long Cased Axial Flow Fans Installation and Maintenance



### 1.0 Introduction

The AXUS SWIFT range of axial flow fans are designed for 'in duct' applications. Manufactured from galvanised steel, the units are suitable for indoor or outdoor installation and at any installed angle.

Available for single and three phase supplies.  
Case diameters of 350mm to 1000mm.  
Unit codes AXS350 to AXS1000.

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

**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.

### 2.0 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 to lift and always use a spreader as shown (fig. 1), never pass lifting slings through the impeller (fig. 2).

Figure 1. Correct method of lifting using a spreader.

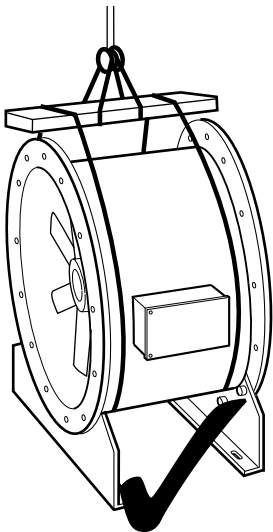
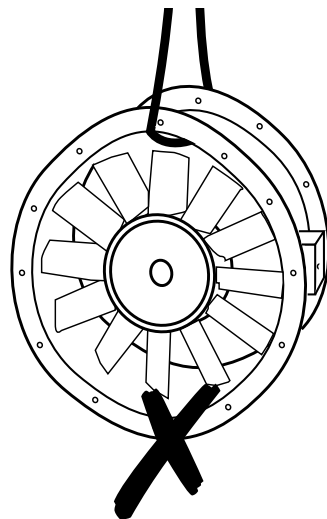


Figure 2. The wrong method of lifting with sling through impeller can cause case distortion.



### 3.0 Installation And General Advice

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.

If the fan is to be installed in a potentially explosive atmosphere it will have been designed to ATEX directive 2014/34/EU and will incorporate motors requiring compatible installation wiring direct to the motor termination box, to complete this installation also follow the guidance advice of data sheet 671216.

**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.**

#### 3.1 Mechanical Installation

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 optional support brackets are correctly fitted, at any position around the circumference, but suit the installation plane.
- 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.

#### 3.2 Horizontal on Floor or Supported from Wall etc.

Optional resilient mountings should be attached to the unit mounting brackets at this stage (fig. 3). If the unit is supported from a wall, supporting brackets should be used. 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.

Figure 3. Resilient Mounting 'Floor' fixing.

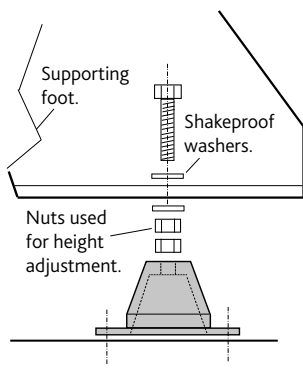
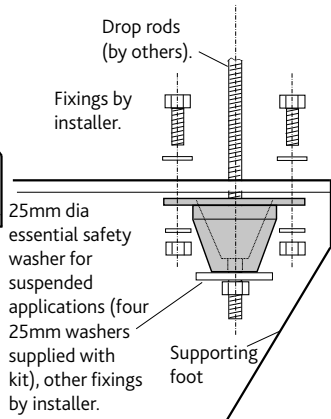


Figure 4. Resilient Mounting 'Suspended' fixing.



## IMPORTANT

**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.**

## IMPORTANT

**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.**

### 3.5 Electrical Installation

Units are not supplied with electrical isolators, their selection and provision is the responsibility of the installer.

Ensure the electrical supply is suitable for the fan and that all wiring, fuse and overload protection, etc. is appropriately sized by comparing with the rating plate.

Electrical connection is made direct to the motor termination box on all fans, if explosion proof motors are fitted they will require matched specified wiring; refer to data sheet 671216 for additional advice.

Wiring connection diagrams; where a starter, frequency inverter or Ecosmart control is used also refer to the relevant control I&M instructions. Bifurcated fans should only be speed controlled by a frequency inverter.

It is essential to note that for all three phase fans of 4kW and above the final connection must be in DELTA.

If a Star/Delta starter is to be used, connect all six motor terminals to the appropriate terminals of the starter. If the fan is to be started direct on line (DOL) to a frequency inverter or Nuair's Ecosmart speed control the motor **must be connected in Delta**.

If T1/ T2 are located in the fan terminal block, this is the motor overheat protection device which is Thermistors or Thermostat as specified.

## IMPORTANT

**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.**

### 3.3 Suspended Horizontally or Vertically

A.V. mountings must be arranged so that they are used in compression only. If Resilient Mountings NAV1 to NAV5 are specified the rubber mountings must also remain in compression. The large metal washers must be fitted under the studding nuts on each mounting (fig. 4).

**Other types of A.V. mounts - spring etc. are also designed to be used in compression only.**

A suspended steel underframe would be necessary to support the unit, (by others) standing on A.V. mountings.

### 3.4 Ecosmart Control Installation (optional)

The controller must be fitted indoors (an optional outdoor cover can be purchased) and away from water spray and heat source.

The operating range is -10°C to 35°C up to 85% relative humidity. The controller must be fitted to a vertical vibration free wall with appropriate fasteners and for ease of installation the cover should be removed and the casing separated from the base. If cooling fans are fitted they should be disconnected while installation takes place.

The cable connecting the Ecosmart control and the fan must be a screened power cable, not exceeding 30 metres.

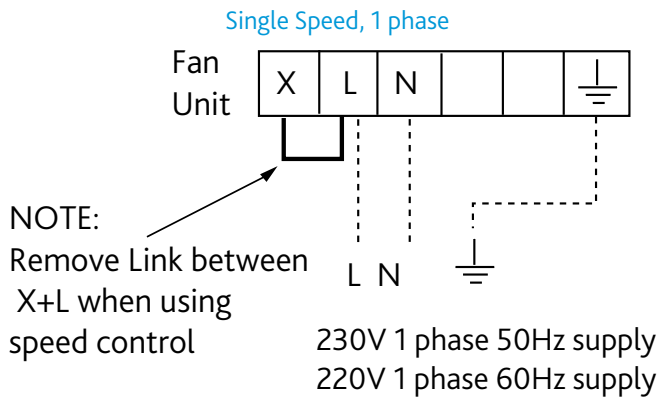
The screening must be earthed at both ends using the special cable glands supplied.

Bridge any break in the screening (e.g. at local isolators) using braided earthing strap.

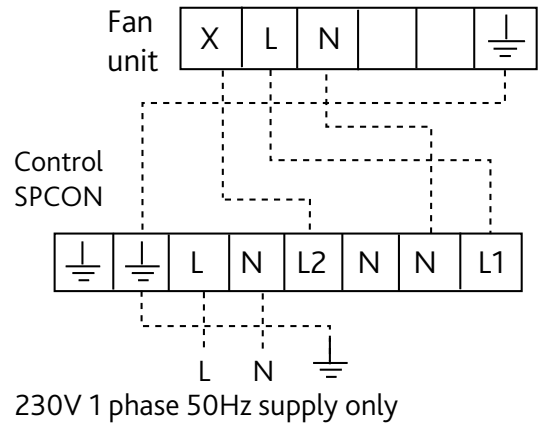
**(Details of Ecosmart controls and wiring connections can be found on pages 4, 5 and 6).**

### 4.0 Electrical Wiring

#### 4.1 Single Phase Units

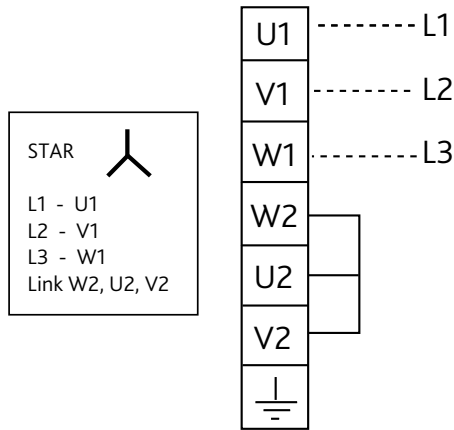


#### Speed Control - TRANSFORMER, 1 phase



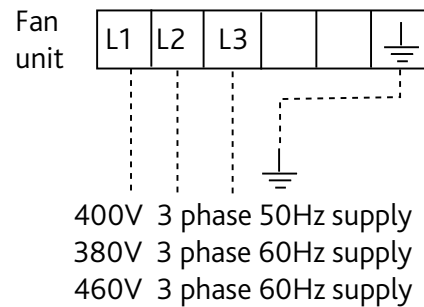
#### 4.2 Three Phase Units

##### D.O.L. Starting, 3 phase (3kW and below)



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

##### Single Speed, 3 phase

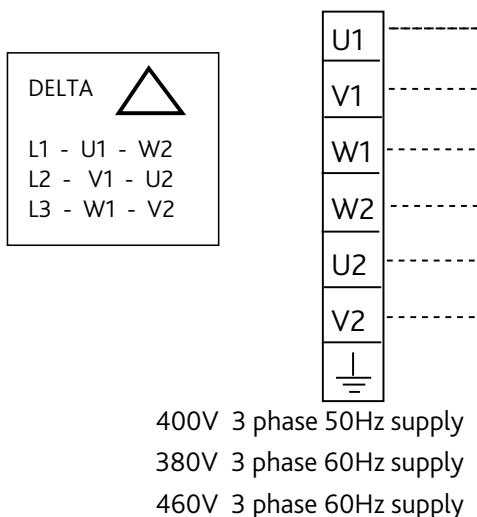


#### IMPORTANT

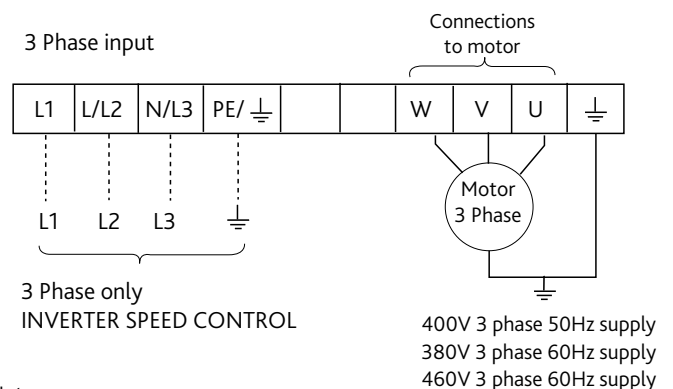
For specialist connections not shown always refer to the wiring diagram supplied with the unit. In the event of query or uncertainty contact NUAIRE directly before any connection is made.

##### Star / Delta Starter, 3 phase (4kW and above)

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



##### Speed Control - ELECTRONIC, 3 phase



#### Notes:

Total Length of motor leads should not exceed 50 metres. If a screened motor 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.

Sections 4.3, 4.4 & 5 are applicable to Ecosmart Control option only.

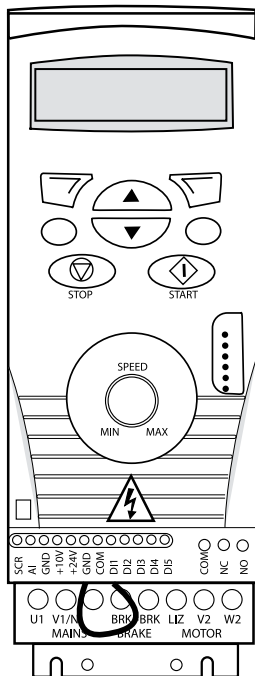
### 4.3 Electrical Wiring - Ecosmart Control

The mains power supply to the controller must be appropriately sized and installed via a local isolation switch (by others). The isolator must also accommodate the 230V switched live (if used).

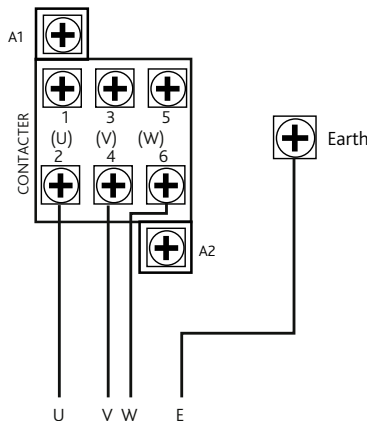
The mains supply from the Ecosmart controller to the fan must be appropriately sized, not exceeding 30 metres and must be a screened power cable, earthed at both ends. A four point gland plate is formed from the base of the control and in order to maintain EMC compliance, an EMC glanding kit is supplied.

Ecosmart controls and sensors are supplied with 10 metres of data cable plugged at both ends, if used these can now be fitted and plugged in to the low voltage sockets on the Ecosmart control board. **All other low voltage connections i.e. BMS can also be completed.**

Figure 5. Resilient Mounting 'Suspended' fixing.



Note: Internal connections between the supply terminals, output contactors the PCB and inverter are made at the factory

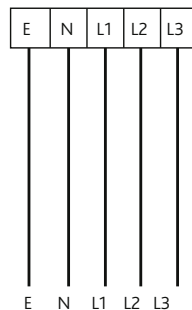
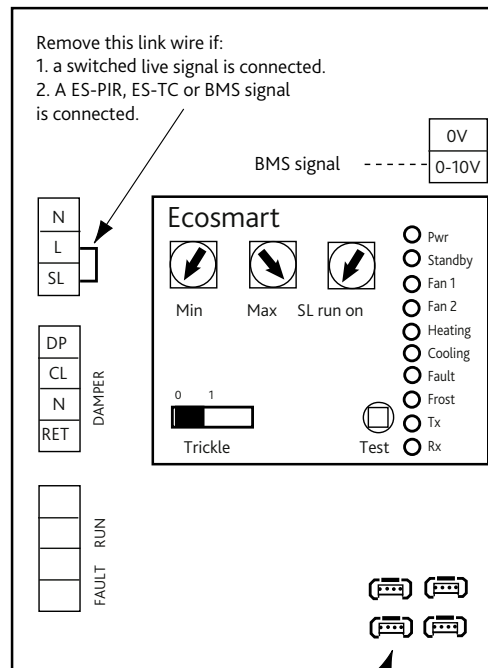


Connections to fan via screened power cable. Purpose made glands are provided to earth the screening

**IMPORTANT**

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 in the same containment as mains carrying cables.



Mains supply connections 400V 50Hz 3ph + Neutral via local isolator

**IMPORTANT**

Motors of 4kW and above must be connected to Delta

**IMPORTANT**

The screening of the power cable must be continuous. Bridge any breaks (e.g. at local isolators) using braided earthing cable. Ensure the screening is earthed at both ends.

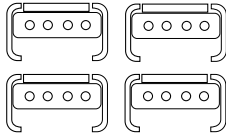
## 4.4 Control Connections

### 4.4.1 Mains Connections

Mains cables should be suitably sized and terminated at terminals shown on the appropriate diagram.

### 4.4.2 Control Connections

Figure 6. 'Net' connection for Ecosmart devices.

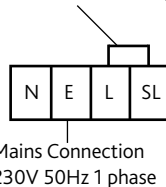


**Net** - The 4 IDC plug-in connectors are provided for the connection of compatible sensors, manual controls and for linking the fans together under a common control. If more than 4 connections are required, the junction box (product code ES-JB) should be used (data cable installation).

### 4.4.3 Switched Live (SL) terminal at the PCB

Figure 7.

Remove link if switched live signal, an enabler or BMS signal is connected.



A signal of 100-230V a.c. will activate the fan from either its off state or trickle state (see setting to work-trickle switch). When the SL is disconnected the fan will over-run for 1 – 60 minutes (see fig. 12).

Do not take this signal from an isolating transformer.

### 4.4.4 Damper Connections

**OP** - 230V 50Hz 1A max supply to open the damper.

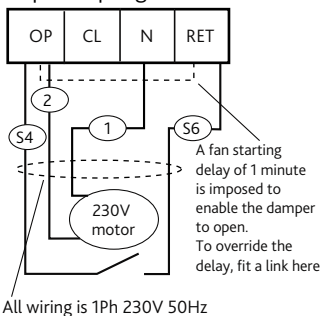
**CL** - 230V 50Hz 1A max supply to close the damper.

**N** - Neutral supply to damper.

**RET** - 230V ac return signal from the damper limit switch indicates the damper has reached its operating position. If the return signal is not present, the fan will wait for 1 minute before starting.

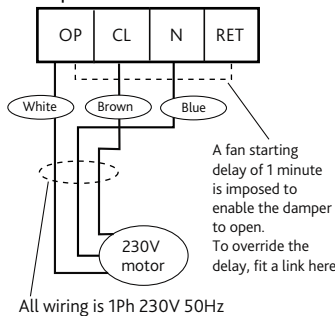
Note: If a damper is not fitted, connect a link wire from OP to RET. This will cancel the delay.

Figure 8. Drive Open / Spring close.



All wiring is 1Ph 230V 50Hz

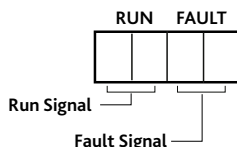
Figure 9. Drive Open / Drive Close



All wiring is 1Ph 230V 50Hz

### 4.4.5 Volt Free Relay Contacts

Figure 10.



Note that the volt free contacts are not fused. If these are used to power any external equipment, the installer must provide adequate fusing or other protections.

These contacts are rated at 5A resistive, 0.5A inductive.

**Run connections** - These contacts are closed when the fan is running.

**Fault connections** - No fault = the contacts are closed.

Fault = the contacts are opened.

### 4.4.6 Data Cable Installation

A 4-core SELV data cable is used to connect devices.

Do not run data cable in the same conduit as the mains cables and ensure there is a 50mm separation between the data cable and other cables. The maximum cable run between any two devices is 300m when it is installed in accordance with the instructions.

Please note that the total data cable length used in any system must be less than 1000m. Keep the number of cable joints to a minimum to ensure the best data transmission efficiency between devices.

### 4.4.7 Maximum Number Of Devices

The maximum number of devices (including fans) that can be connected together via the cable is 32, irrespective of their functions.

### 4.4.8 Other Low Voltage Cables e.g. BMS Signal

Follow the basic principle (as per section 4.4.6). Keep the cable run as short as possible, maximum cable length of 50m. If the cable is longer than 12m, Nuair recommend using screened cable with the screening grounded at one end only (preferably at the inverter end).

### 4.4.9 Other Low Voltage Cables e.g. BMS Signal

Follow the basic principle (as per section 4.4.6). Keep the cable run as short as possible, maximum cable length of 50m. If the cable is longer than 12m, Nuair recommend using screened cable with the screening grounded at one end only (preferably at the inverter end).

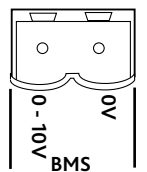
### 4.4.10 BMS Input Signals

The BMS connection is made with a plug-in connector via the socket (see fig. 11).

To ensure the connection is made only by suitably qualified and authorised personnel the plug is not supplied.

**It is available from R S Components, Part No. 403-875 or Farnell, Part No. 963-021.**

Figure 11.



## IMPORTANT

Reversal of the BMS connection will damage the control.

The system's response to a 0-10V dc BMS signal is given in the following table.

Note:

The BMS signal will override any sensors and user control connected in the system. The voltage tolerance is +/- 125mV and is measured at the fans terminal.

	Ventilation Mode
Local Control	0.00
OFF/Trickle	0.25
Speed 1	0.50
Speed 2	1.50
Speed 3	2.50
Speed 4	3.50
Speed 5	4.50
Speed 6	5.50
Speed 7	6.50
Speed 8	7.50
Speed 9	8.50
Speed 10	9.50

## 5.0 Setting To Work

Note that the volt free contacts are not fused. If these are used to power any external equipment, the installer must provide adequate fusing or other protections.

### IMPORTANT

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

#### Warning - Inverter Speed Control

**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.**

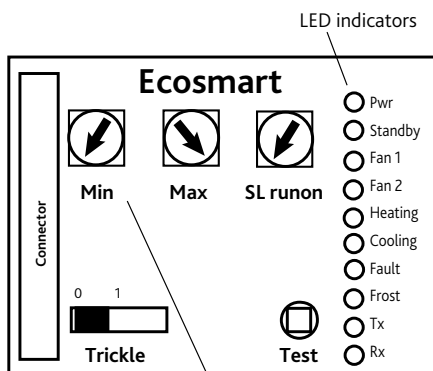
## 5.1 Electrical

### 5.1.1 Using The Test Button

The test button allows the blower within the unit to be checked for its operation. If the fan is running already, press the button once to stop the fan, press again to switch on the fan.

**Note that the fan will return to normal operation after 30 seconds.**

Figure 12.



- Min = Minimum speed adjustment
- Max = Maximum speed adjustment
- SL runon = Switched live run-on timer adjustment
- Trickle = Selects trickle running: 0 = off, 1 = selected
- Test = Test button

## 5.2 LED Indication

PWR	GREEN: Power on & OK.
Standby	LED on when fan is not running.
Fan 1	GREEN: Fan 1 is running, RED: Fan 1 faulty.
Fan 2	GREEN: Fan 2 is running, RED: Fan 2 faulty.
Heating*	Not applicable, see note.
Cooling*	Not applicable, see note.
Fault	LED on when a fault is present on unit.
Frost*	Not applicable, see note.
Tx	LED on when the controller is transmitting data.
Rx	LED on when the controller is receiving data.

**\* Note that the control panel is common to all the Ecosmart products and will have indicators for functions that are not available in this particular fan. However these indicators will not be illuminated.**

## 5.3 Settings

### 5.3.1 Setting The Maximum Airflow rate

- Ensure the power supply is switched off and that a link wire is connected from the supply L to the SL terminal. Unplug all items connected to the 'Net' connectors.

- Switch on the power supply.

- Wait for the fan to reach steady condition. Measure the airflow using standard commissioning instruments at a suitable point in the ductwork. If adjustment is required, rotate the pot marked 'MAX' to obtain the desired airflow. Remove the link wire if not required (fig. 7).

### 5.3.2 Setting The Minimum / Trickle Airflow Rate (Nomial 20%)

- Repeat the same procedure as for maximum airflow above but without the link wire between supply L and SL terminal. Ensure the trickle switch is in the 'ON' position. Adjustment must be made on the pot marked 'Min'.

- Note that the minimum setting (nominally 20%) must be below the maximum setting; otherwise minimum setting will be automatically set to be the same as the maximum.

- The minimum speed set is the trickle speed at which the fan operates.

**Note: The working speed range of the user control and sensors is between the minimum and maximum set points.**

### IMPORTANT

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

### IMPORTANT

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

## 6.0 Maintenance

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.

### 6.1 Maintenance Intervals

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.

### 6.2 Maintenance Check List ✓

- Check that bird guards/safety grilles are secure and free of obstruction.
- Inspect all bolts, fixings and electrical terminals for security.
- 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.
- Generally clean.
- Check resilient mounts and replace any that show signs of wear or deterioration.

### 6.3 Lubrication

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

### 6.4 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.

**If an ATEX compliant unit, observe the advice of the guidance notes in document 671216.**

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.

## 7.0 Replacement Of Parts

Should any component need replacing, Nuaire keep extensive stocks for quick delivery. Ensure that the unit is electrically isolated, before carrying out any work.

When ordering spare parts, please quote the serial number of the unit and the ARC number of the purchase; if possible **(This information will be available on the fan label).**

## 8.0 Warranty

Axus AX units have a 3 year warranty. Units with Ecosmart control have a 5 year warranty. The 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.

## 9.0 After Sales

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

**Telephone 02920 858 400**  
**[aftersales@nuaire.co.uk](mailto:aftersales@nuaire.co.uk)**