



EST(19-20)H

3PH Run & Standby, Roof Or Plantroom Twinfans

Installation Manual



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.
- 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.
- 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 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 Nuair EST Twinfan Belt Drive range consists of the following unit:

- EST-X (Duct Mounted, Plantroom/Roof) in line unit.
- EST-R (Roof Mounted, end inlet) side discharge unit*.
- EST-B (Roof Mounted bottom inlet) side discharge unit*.

*Larger units have end discharge.

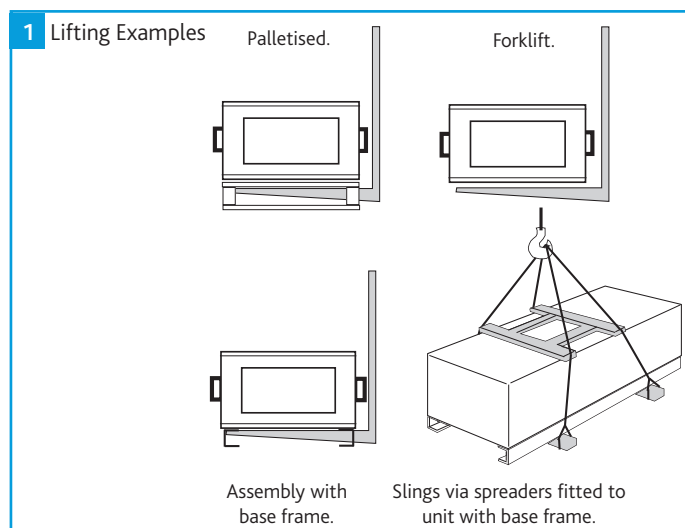
Units are rectangular in section. The casing is manufactured from heavy gauge 'Aluzinc' aluminium-zinc coated mild steel. A full size internally lined access panel is fitted to the top face and this panel is fully detachable for inspection purposes. The motor plate and frames are supported on the base by resilient mountings allowing the fan unit to be operated without the need for separate anti vibration fan case mountings. Suitable for operation in ambient temperatures up to 40°C.

2.1 Handling

The units should only be lifted by a suitably qualified and responsible person. Always handle the units carefully to avoid damage and distortion and ensure that they remain upright at all times.

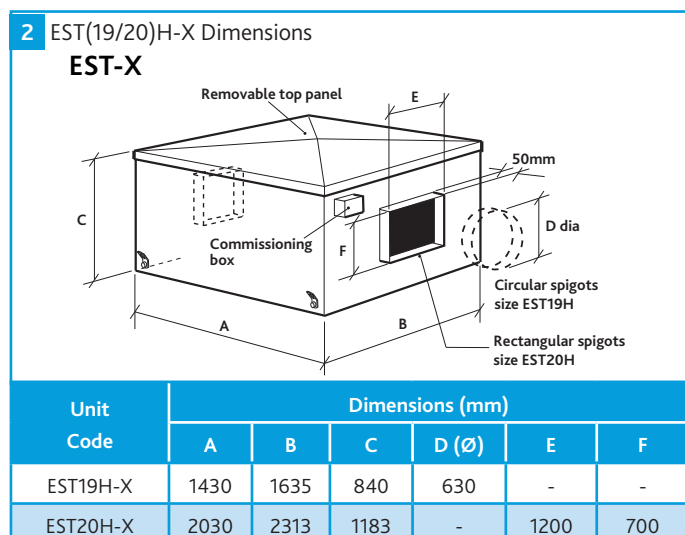
Eyebolts are provided on smaller units for lifting purposes, while larger units can be moved as per the images below.

If mechanical aids are used to lift the unit, spreaders should be employed and positioned so as to prevent the slings, webbing etc. from making contact with the casing.

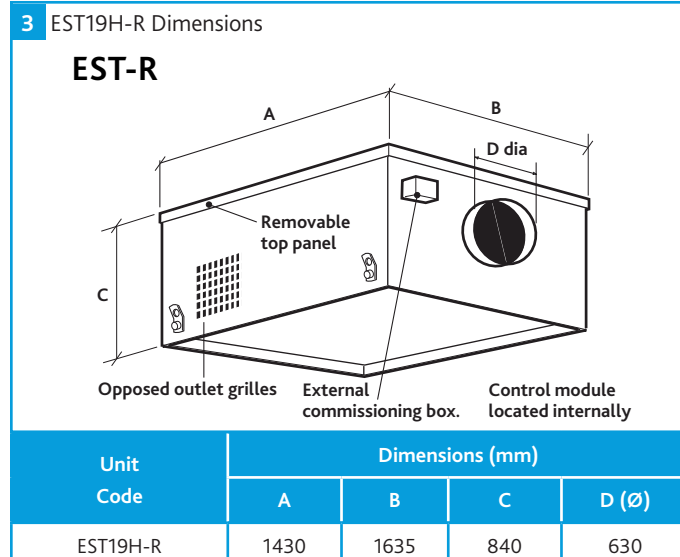


2.2 Dimensions (mm)

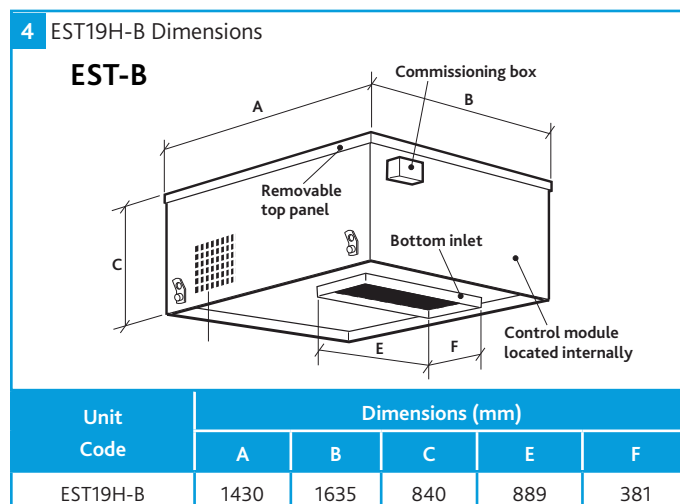
2.2.1 EST(19/20)H-X



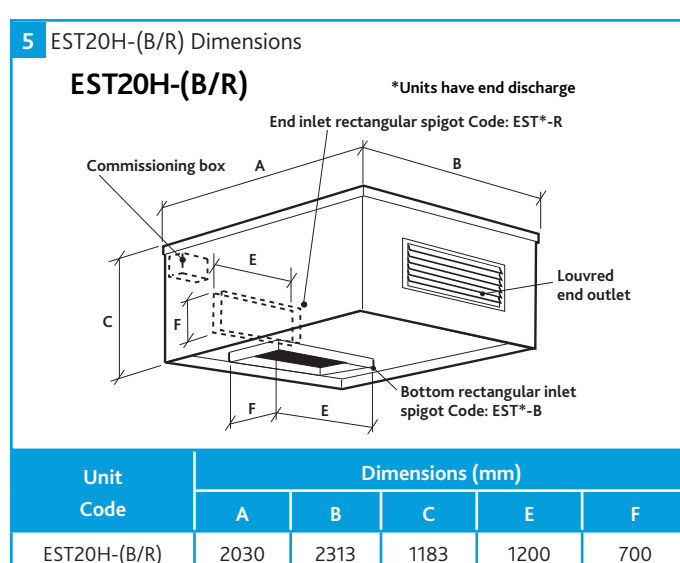
2.2.2 EST19H-R



2.2.3 EST19H-B



2.2.4 EST20H-(B/R)



3.0 MECHANICAL INSTALLATION

Installation must be completed by competent persons, in accordance with good industry practice and should conform to all governing and statutory bodies i.e. IEE, CIBSE, etc.

Units must not be installed at an angle over 5° from the horizontal (to ensure the backdraught shutters operate satisfactorily). **Units must be installed with the access panel on top, never up-side-down.**

Units should always be positioned with sufficient space to allow removal of the access covers and subsequent removal of fan and motor assemblies etc. Ductwork connections must be airtight to prevent loss of performance.

The method of mounting used is the total responsibility of the installer. The lower edge of the casing has an internal skirt allowing the unit to be located on an upstand or prefabricated curb if desired. The units must be securely screw fixed to the upstand/curb to prevent vibration and/or wind damage.

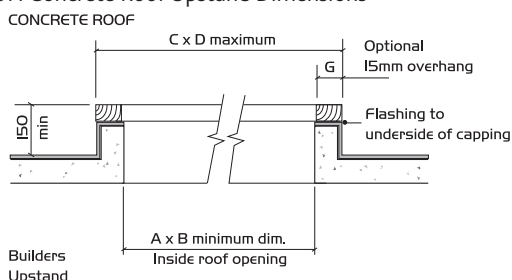
It is the installers responsibility to drill the case to provide access for the electrical cables. Care should be taken not to damage internal components and the cable entry must be properly sealed. **On bottom inlet units the electrical cabling may be routed up through the bottom inlet spigot.**

3.1 EST19H Upstand Details

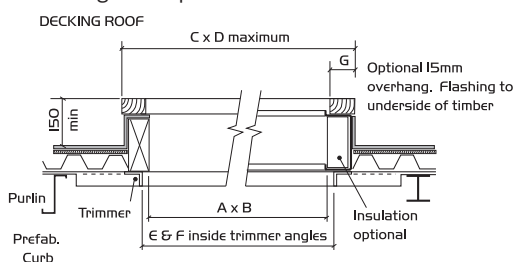
Details of roof opening dimensions etc. required and basic construction of a builders upstand etc. are shown below for typical concrete and decking roof installations.

Prefabricated curbs can be used to support internal or external units.

6 EST19H Concrete Roof Upstand Dimensions



7 EST19H Decking Roof Upstand Dimensions



Unit Code	Prefab Curb Code	Dimensions (mm)						
		A	B	C	D	E	F	G
EST19H	ESPFC6B	1169	1375	1399	1605	1268	1471	100

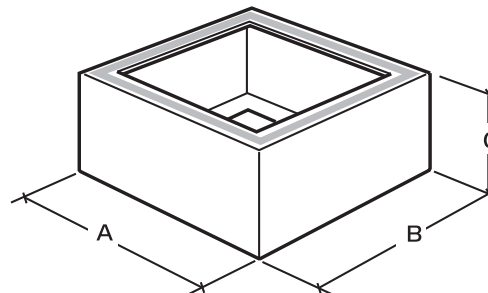
3.2 EST19H Prefabricated Curb

Prefabricated curbs can be used to support internal or external units.

Manufactured in pre galvanised steel these curbs will reduce design work and guarantee correct unit mounting when on site.

Upper faces of curb are fitted with robust sealing strip.

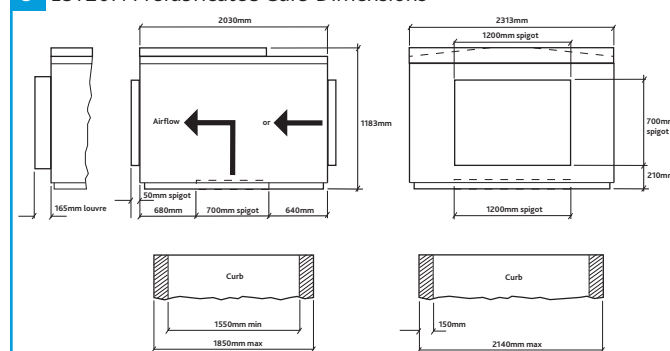
8 EST19H Prefabricated Curb Dimensions



Unit Code	Prefab Curb Code	Dimensions (mm)		
		A	B	C
EST19H	ESPFC6B	1374	1580	250

3.3 EST20H Roof Upstand Requirements

9 EST20H Prefabricated Curb Dimensions



4.0 ELECTRICAL INSTALLATION

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

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.

This product must be earthed.

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.

4.1 RCD

If an RCD is fitted to protect the circuit, a type B RCD should be used (trip limit 300mA). Otherwise nuisance tripping will occur.

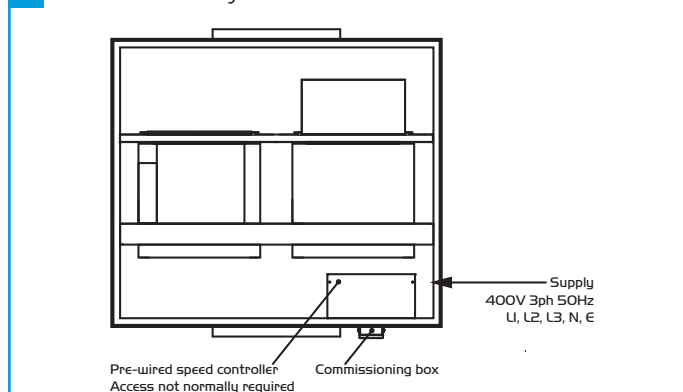
Because the run and start currents depend upon the duty and associated ductwork of an individual unit, the values quoted in table 7 are nominal.

Run currents will be exceeded if the unit is operated with its cover removed. The unit must not run for more than 2 minutes in this condition.

4.2 Unit Internal Layout

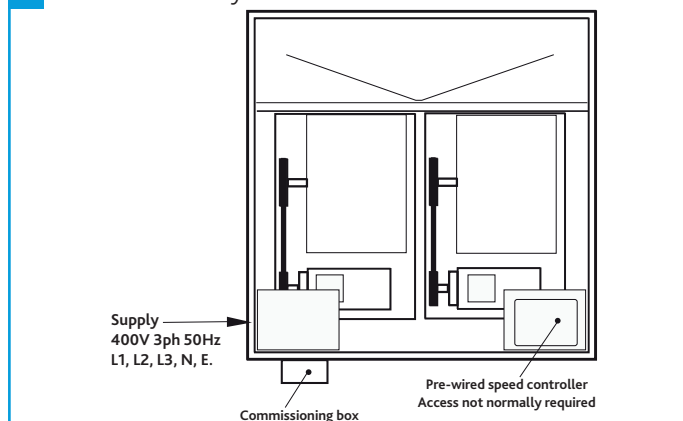
4.2.1 EST19H

10 EST19H Internal Layout



4.2.2 EST20H

11 EST20H Internal Layout



4.3 Connections

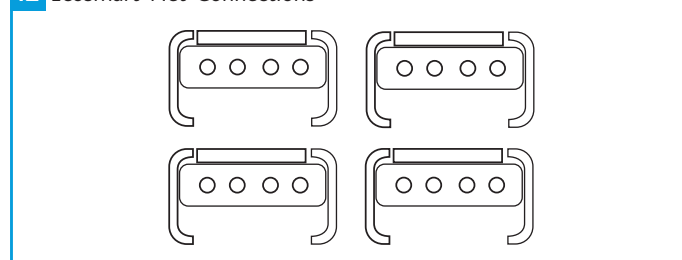
4.3.1 Mains

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

4.3.2 Control

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 (see data cable installation).

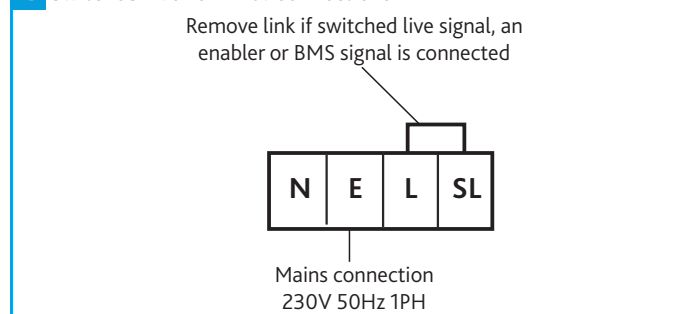
12 Ecosmart 'Net' Connections



4.3.3 Switched Live (SL)

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 (see setting to work-timer adjustment). **Do not take this signal from an isolating transformer.**

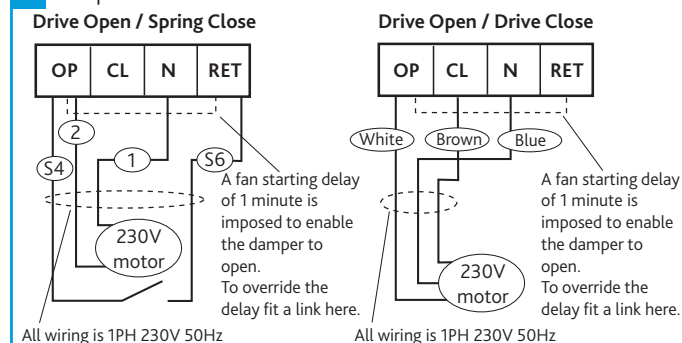
13 Switched Live Terminal Connections



4.3.4 Damper

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

14 Damper Connections

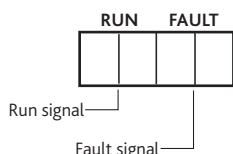


4.3.5 Volt Free Contacts

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: Contacts are closed when the fan is running.
- Fault connections: **No Fault** = Contacts are closed.
Fault = Contacts are opened.

15 Volt Free Connections



4.3.6 Data Cable

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.

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.

4.3.7 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

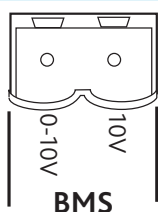
4.3.8 Other Low Voltage Cables (e.g. BMS Signal)

Follow the basic principle (as Data Cable). Keep the cable run as short as possible, less than 50 metres.

4.3.9 BMS Input Signals

The BMS connection is made with a plug-in connector via the socket (Figure 9). 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.**

16 BMS Connections



Reversal of the BMS connection will damage the control.

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

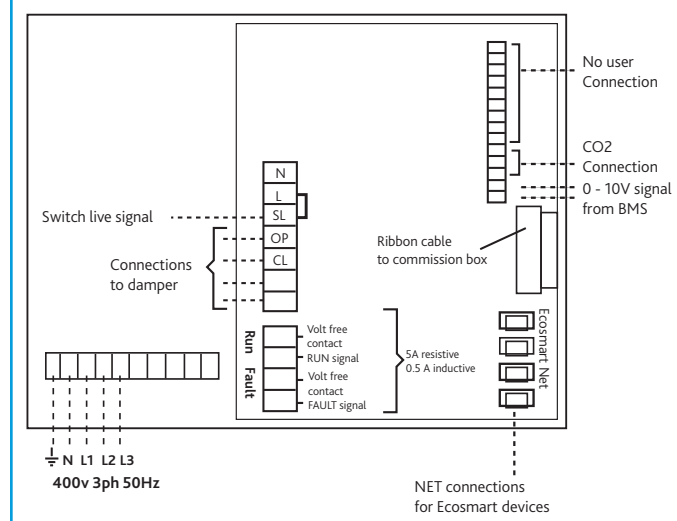
The BMS signal will override any sensors and user control connected in the system. The voltage tolerance is +/- 125mV and is measured at the fans terminal.

	Ventilation Mode	Cooling Mode*	Heating Mode*
Local Control	0.00	-	-
OFF/ Trickle	0.25	-	-
Speed 1	0.50	0.75	1.00
Speed 2	1.50	1.75	2.00
Speed 3	2.50	2.75	3.00
Speed 4	3.50	3.75	4.00
Speed 5	4.50	4.75	5.00
Speed 6	5.50	5.75	6.00
Speed 7	6.50	6.75	7.00
Speed 8	7.50	7.75	8.00
Speed 9	8.50	8.75	9.00
Speed 10	9.50	9.75	10.00

*Only available on relevant units.

4.4 Wiring Diagram

17 PCB Wiring



4.5 BMS, Switched Live or Enabling NET Device Link

If a switched live signal, BMS System or enabling NET device is connected to SL terminal, remove the switched live signal link wire.

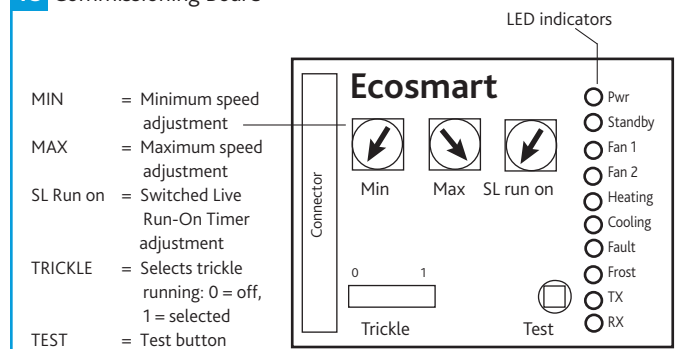
5.0 CONTROLS

5.1 Unit Testing

5.1.1 Test Button

The test button allows the individual blowers 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 standby fan, press again to stop and so on. **The fan will return to normal operation after 30 seconds.**

18 Commissioning Board



5.1.2 Testing After Installation

Ensure that the Fan unit and any specified controls are fitted securely according to the instructions. Switch on the mains supply. Push the test button to run each fan and check that they run satisfactorily. If a switched live signal is used, activate this signal and check that the fan runs. De-activate the switched live signal and check the run-on-time; adjust if necessary.

Adjust the maximum and minimum airflow (if required) by following the commissioning procedures.

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*	GREEN: Heating selected RED: Heating faulty.
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.

* 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.

6.0 COMMISSIONING

The Ecosmart twinfan is designed for maximum control flexibility. Apart from the power supply, an enabling signal is always required to set the fan running. This enabling signal can be a switched live signal (connected to the SL terminal of each fan) or an enabling device plugged in the NET connection. If an enabling signal is not available, connect a link wire from 'L' to 'SL'.

Additional sensor and manual controls may be added. For example, to run the fan with a temperature sensor, connect a link across L to SL (enabling signal) and connect a temperature sensor in one of the sockets labelled 'NET'. The fan will now adjust its speed according to temperature.

To obtain manual control, connect a link across L to SL (enabling signal) and connect a user control in one of the sockets labelled 'NET'.

6.1 Settings

6.1.1 Maximum Airflow

- 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. **Ensure unit top cover is securely attached.**
- Wait for the fan to complete its self-test operation.
- Remove the cover of the units external commissioning box. 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.

6.1.2 Minimum Trickle Airflow (nominal 20%)

- Repeat the same procedure as for maximum airflow above but without the link wire between supply L1 and SL terminal. Ensure the trickle switch is in the 'ON' position. The adjustment must be made on the pot marked 'Min'.
For unit size EST20H, ensure the pressure across the fan is greater than 50 Pa at minimum speed. If the pressure is below 50Pa, this may result in a false failure signal. Adjust the minimum speed so that this does not occur.
- 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.

7.0 MAINTENANCE

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.

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

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.

7.1 Maintenance Intervals

The first maintenance should be carried out three months after commissioning and thereafter at twelve monthly intervals. These intervals may need to be shortened if the unit is operating in adverse environmental conditions, or in heavily polluted air. Access to the unit internals is gained by removing the top cover(s).

7.2 Motors

Brush away any dust or dirt from the motor housings and ensure that the motor vents are unblocked.

Lubrication is unnecessary as the motors are fitted with sealed for life bearings.

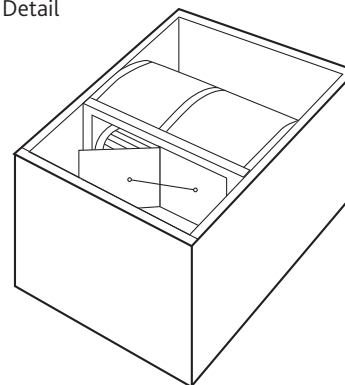
7.3 Impellers

Remove any dust and check that the impellers are securely fixed to the motor shafts. Take care not to disturb any balance weights fitted. Check sealed for life bearings for excessive wear.

7.4 Shutter Assembly

Remove any dust and check that the shutters operate freely and that they seal the appropriate fan outlet effectively.

19 EST Shutter Detail



7.5 Anti Vibration Motor Plate Mountings

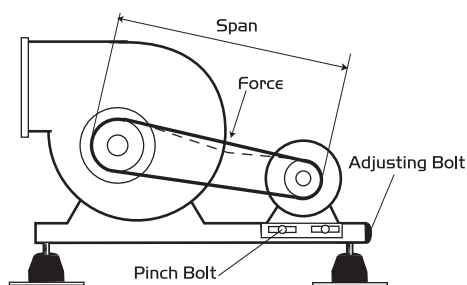
Each motor plate is supported on individual resilient mountings. Check that all the mountings are secure and in good condition.

7.6 Drive belts

7.6.1 Checking Drive Belt Tension

- Measure the span length.
- At the centre of the span, apply a force at right angles to the belt sufficient to deflect one belt 16mm for every metre of span length. The force required to deflect the 'V' belt should be from 0.5kg to 0.8kg.
- Tighten the pinch bolts.

20 Adjusting Drive Belts (EST20H)



7.6.2 Adjusting Drive Belt Tension

All belt drive units incorporate belt tensioning devices. To adjust the belt tension, slacken the pinch bolt on the sides of the motor plate. Turn the adjusting bolt clockwise to tighten the belt and counter clockwise to loosen it.

The drive should be tensioned until a slight bow appears in the slack side of the 'V' belt when running under load.

7.6.3 Changing Drive Belt

To replace a belt, remove the two bolts from the motor mounting furthest from the fan and slacken the remaining two bolts. Lift the motor plate and remove the belt. Replacing the belt is the reverse of this procedure.

7.7 General Cleaning and Inspection

Clean and inspect the exterior of the fan unit and associated controls etc. Remove the access panel from the fan unit. Inspect and, if necessary, clean the fan and motor assemblies and the interior of the case. If the unit is heavily soiled it may be more convenient to remove the fan/motor assemblies. If Nuaire controls and or remote indicators are fitted, remove the covers and carefully clean out the interiors as necessary. Check for damage. Check security of components. Refit the access covers.

- Check that all fixings are tight.
- Check sealing strips around the fan outlets are tight up against the bulkhead.
- Check that duct connections are not leaking.

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 and processed in accordance with the zero waste hierarchy. 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.


DECLARATION OF INCORPORATION AND INFORMATION FOR SAFE INSTALLATION, OPERATION AND MAINTENANCE

We declare that the machinery named below is intended to be assembled with other components to constitute a system of machinery. All parts except for moving parts requiring the correct installation of safety guards comply with the essential requirements of the Machinery Directive. The machinery shall not be put into service until the system has been declared to be in conformity with the provisions of the EC Machinery Directive.

Designation of machinery: Ecosmart Belt Drive Twinfan
 Machinery Types: EST
 Relevant EC Council Directives: 2006/42/EC (Machinery Directive)
 Applied Harmonised Standards: BS EN ISO 12100-1, BS EN ISO 12100-2, EN60204-1, BS EN ISO 9001, BS EN ISO 13857
 Applied National Standards: BS848 Parts 1, 2.2 and 5

Note: All standards used were current and valid at the date of signature.

Signature of manufacture representatives:

Name:	Position:	Date:
1) C. Biggs 	Technical Director	5. 12. 12
2) A. Jones 	Manufacturing Director	5. 12. 12

INFORMATION FOR SAFE INSTALLATION, OPERATION AND MAINTENANCE OF NUAIRE VENTILATION EQUIPMENT

To comply with EC Council Directives 2006 / 42 /EC Machinery Directive and 20 14/ 30 /E U (EMC).
 To be read in conjunction with the relevant Product Documentation (see 2.1)

1.0 GENERAL

1.1 The equipment referred to in this Declaration of Incorporation is supplied by Nuaire to be assembled into a ventilation system which may or may not include additional components.
 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 manufacturers recommendations and with due regard to current legislation and codes of practice.

2.0 INFORMATION SUPPLIED WITH THE EQUIPMENT

2.1 Each item of equipment is supplied with a set of documentation which provides the information required for the safe installation and maintenance of the equipment. This may be in the form of a Data sheet and/or Installation and Maintenance instruction.

2.2 Each unit has a rating plate attached to its outer casing. The rating plate provides essential data relating to the equipment such as serial number, unit code and electrical data. Any further data that may be required will be found in the documentation. If any item is unclear or more information is required, contact Nuaire.

2.3 Where warning labels or notices are attached to the unit the instructions given must be adhered to.

3.0 TRANSPORTATION, HANDLING AND STORAGE

3.1 Care must be taken at all times to prevent damage to the equipment. Note that shock to the unit may result in the balance of the impeller being affected.

3.2 When handling the equipment, care should be taken with corners and edges and that the weight distribution within the unit is considered. Lifting gear such as slings or ropes must be arranged so as not to bear on the casing.

3.3 Equipment stored on site prior to installation should be protected from the weather and steps taken to prevent ingress of contaminants.

4.0 OPERATIONAL LIMITS

4.1 It is important that the specified operational limits for the equipment are adhered to e.g. operational air temperature, air borne contaminants and unit orientation.

4.2 Where installation accessories are supplied with the specified equipment eg. wall mounting brackets. They are to be used to support the equipment only. Other system components must have separate provision for support.

4.3 Flanges and connection spigots are provided for the purpose of joining to duct work systems. They must not be used to support the ductwork.

5.0 INSTALLATION REQUIREMENTS

In addition to the particular requirements given for the individual product, the following general requirements should be noted.

5.1 Where access to any part of equipment which moves, or can become electrically live are not prevented by the equipment panels or by fixed installation detail (eg ducting), then guarding to the appropriate standard must be fitted.

5.2 The electrical installation of the equipment must comply with the requirements of the relevant local electrical safety regulations.

5.3 For EMC all control and sensor cables should not be placed within 50mm or on the same metal cable tray as 230V switched live, lighting or power cables and any cables not intended for use with this product.

6.0 COMMISSIONING REQUIREMENTS

6.1 General pre-commissioning checks relevant to safe operation consist of the following:
 Ensure that no foreign bodies are present within the fan or casing.
 Check electrical safety. e.g. Insulation and earthing.
 Check guarding of system.
 Check operation of Isolators/Controls.
 Check fastenings for security.

6.2 Other commissioning requirements are given in the relevant product documentation.

7.0 OPERATIONAL REQUIREMENTS

7.1 Equipment access panels must be in place at all times during operation of the unit, and must be secured with the original fastenings.

7.2 If failure of the equipment occurs or is suspected then it should be taken out of service until a competent person can effect repair or examination. (Note that certain ranges of equipment are designed to detect and compensate for fan failure).

8.0 MAINTENANCE REQUIREMENTS

8.1 Specific maintenance requirements are given in the relevant product documentation.

8.2 It is important that the correct tools are used for the various tasks required.

8.3 If the access panels are to be removed for any reason the electrical supply to the unit must be isolated.

8.4 A minimum period of two minutes should be allowed after electrical disconnection before access panels are removed. This will allow the impeller to come to rest. NB: Care should still be taken however since airflow generated at some other point in the system can cause the impeller to "windmill" even when power is not present.

8.5 Care should be taken when removing and storing access panels in windy conditions.