



ESBH

Ecosmart Boxer Air Handling Units 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.
- 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.
- 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 information contained in this document provides details of installation, operation and maintenance for installers and users of the ESBH Ecosmart Boxer range of air handling units.

A standard system incorporates the following, as appropriate to fan type:

- Inlet Section
- Filters
- Electric / LPHW Heater
- Chilled Water / DX Coil
- Belt or Direct Drive Section
- Ecosmart Control
- Fan Failure Circuit
- Integral Temperature Sensor

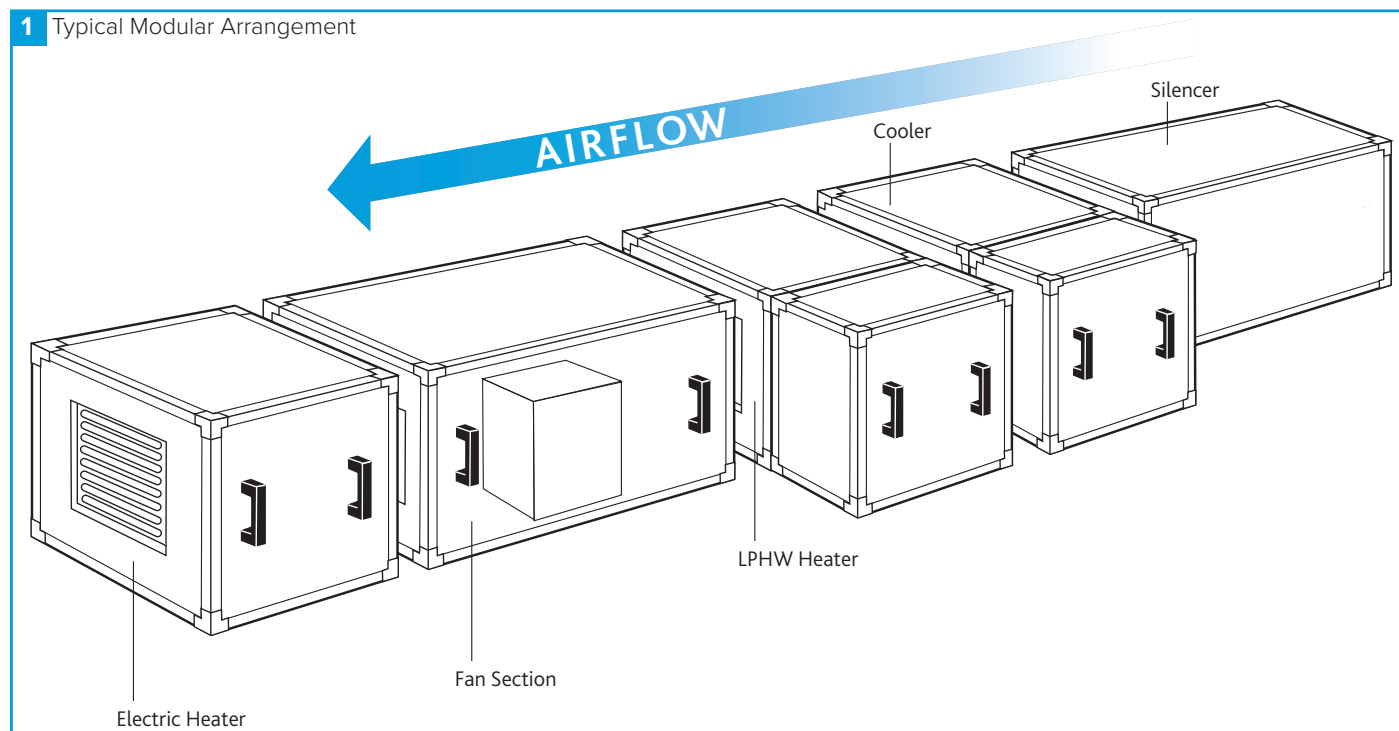
Optional extras may include:

- Silencers
- Dampers
- Heat Exchangers
- Inlet and Outlet Terminals
- Weathering Roof
- Sensors
- User controls

For systems which include supply fans with heating and/or cooling coils, other than where the BMS has control, the appropriate user control is required.

Units sizes 3 and above incorporate control boxes on external casing as shown in Figure 1 and are supplied in modular sections, their assembly and wiring between controls, sensors and actuators located in each section is the responsibility of the installer and is discussed within this document.

1 Typical Modular Arrangement



2.1 Code Description

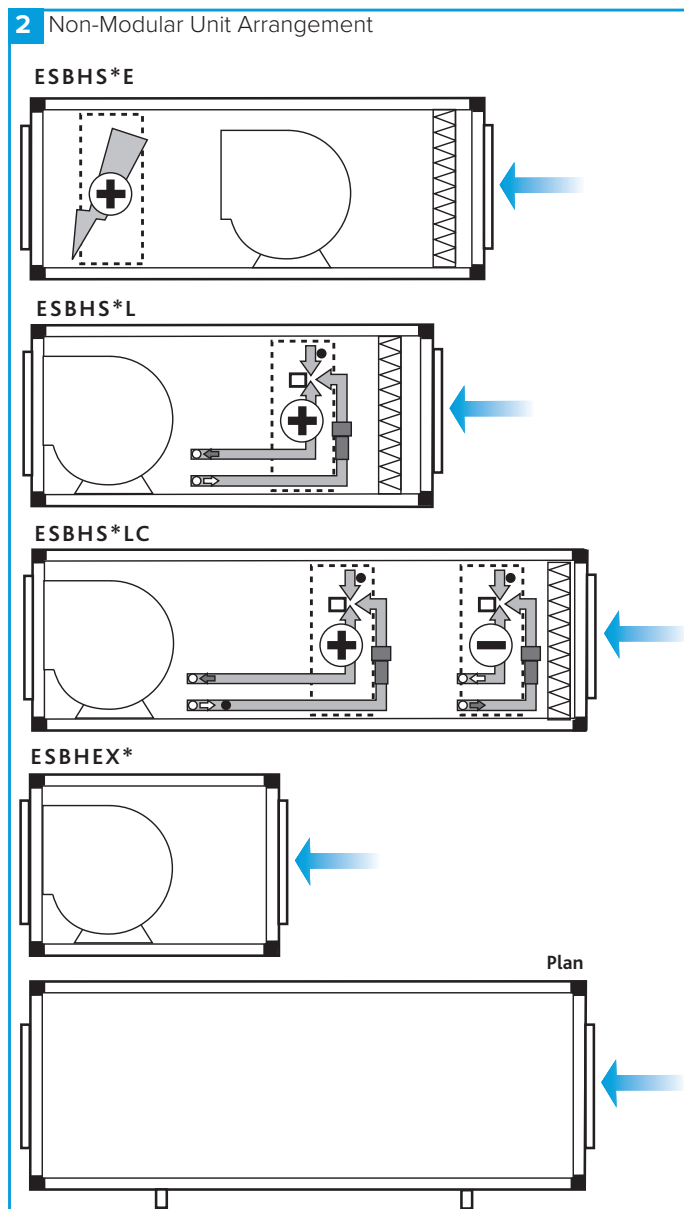
1	2	3	-	4	5
ESBH	S	1	-	L	C

1. Range: **Ecosmart Boxer AHU**
2. Airflow Type: **EX** = Extract
S = Supply
3. Unit Size: **1 - 7**
4. Heating Type: **E** = Electric
L = LPHW
5. Cooling Type: **C** = CHW
D = DX

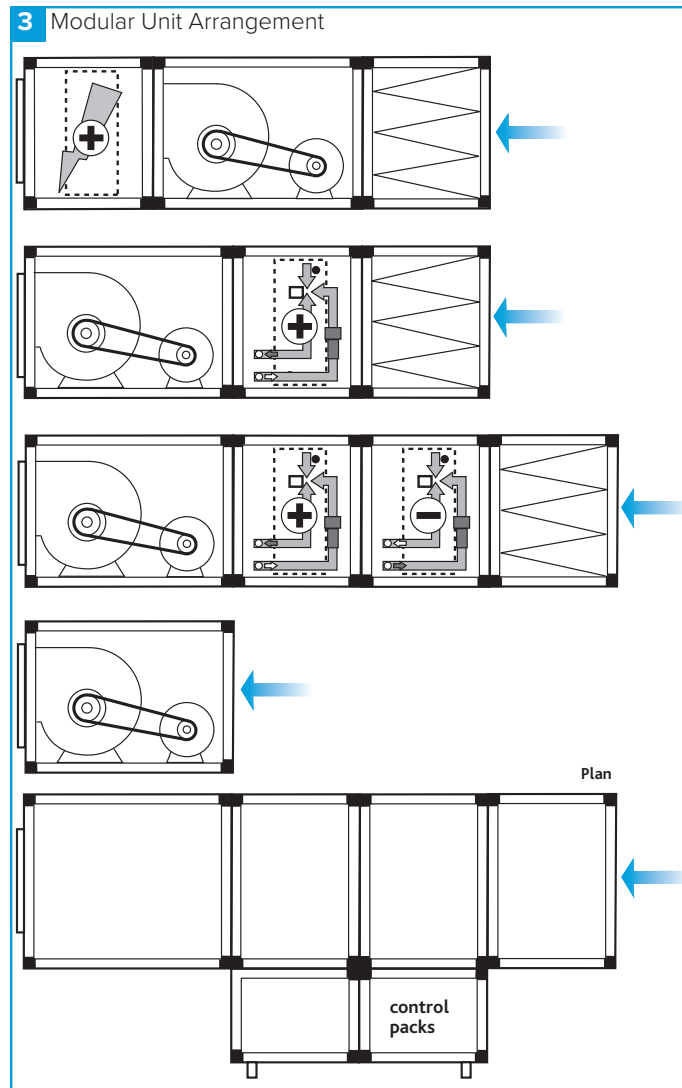
2.2 Typical Unit Arrangements

Unless otherwise stated i.e. RHT in unit code, all control packs are positioned on the left of the unit when viewed with direction of airflow. For any alternative control or pipework position, contact us on the number opposite.

2.2.1 Non-Modular Unit Arrangement (Sizes 1 and 2)



2.2.2 Modular Unit Arrangements (Sizes 3 - 7)



2.3 Dimensions & Weights

Full details, with project specific documents and drawings are available from the Nuair Technical Estimating Department.

2.4 Handling

Upon receipt of the equipment an inspection should be made, and before commencement of lifting ensure that normal equipment safety checks have been carried out.

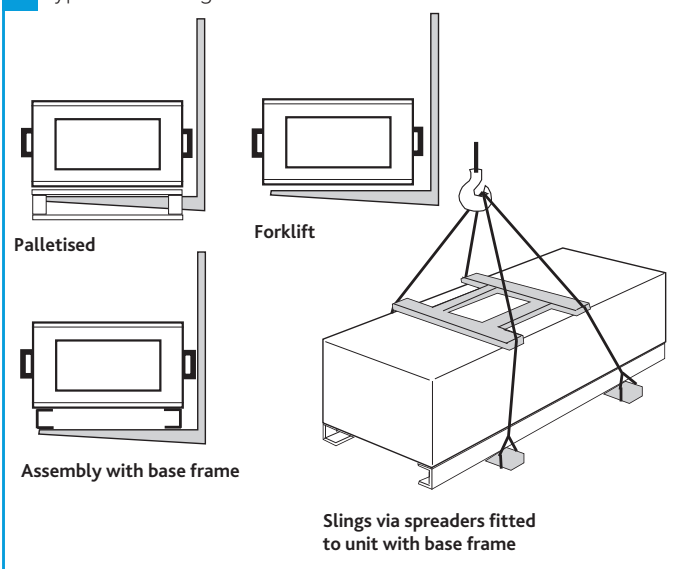
The unit/sections should be removed from the vehicle using a fork lift or crane. Always handle with care to avoid damage and distortion, and where lifting slings are employed use spreaders to ensure slings do not come into contact with the unit case, or control pack (Figure 4).

Correctly position slings to avoid twisting of the unit case and observe the centre of gravity before the final lift is made.

Note: The weight of the unit from the rating plate.

Dependent on model and size units may be supplied in single or multi-module sections. Handle each section individually **do not stack for lifting or storage.**

4 Typical Handling Methods



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.

3.1 Joining Modules

Unit sizes 1 and 2 are generally single section units and require no assembly.

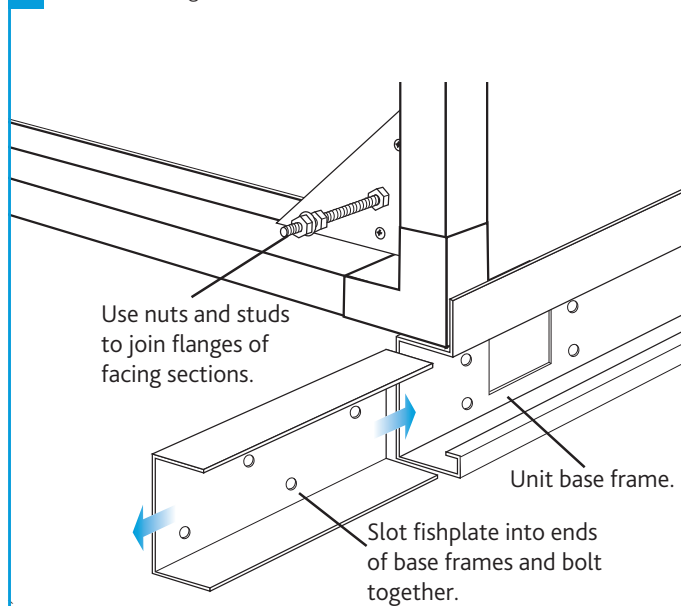
Unit sizes 3 to 7 are multi-section units supplied on a base frame. The units and base frame will require bolting together using matched drilled flanges and the nuts and bolts provided. In addition fish-plates must be used to join two base frames together (Figure 5).

The various modular sections are delivered separately for assembly on site.

Ensure that all inter-connecting wiring looms are connected between the adjoining modules - refer to the appropriate wiring diagram in section 5.

When selecting the unit position, ensure adequate access for connection of external services, commissioning, future inspection and maintenance and the removal of component parts.

5 Modular Fixings



3.2 General Installation

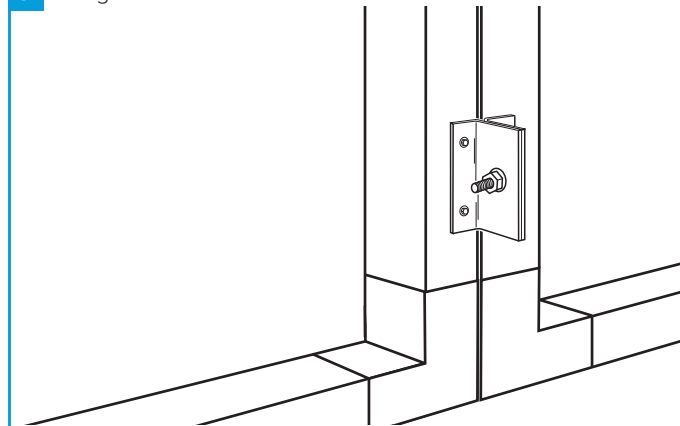
Ensure all components and sections are available to complete the work. The flanges of facing sections must be offered one to the other, and secured via the studs and nuts provided. Access to each securing point is by removal of the access doors on each section. Each joint must be appropriately sealed to ensure weathering and to prevent air leakage.

Where cooling coils and heat exchangers are in use condensate drainage points are provided. It is the installers' responsibility to ensure connection to the appropriate trap and drainage.

On sizes 1 and 2, where motorised dampers are coupled to a system, it will be necessary to remove the spigot section inlet/discharge to fix the damper into position. Where ancillaries such as silencers, bag filters, frost heaters etc. are to be fitted, each additional component is supplied with a fixing kit (Figure 6).

It is the assembler's responsibility to seal all modular facing joints.

6 Fixing Kit for Unit Sizes 1 & 2



Installation Location

3.2.1 Indoors

The standard fan is suitable for installation indoors only, away from heat sources, steam generation or water spray. Site the fan on a secure and level surface, using the base frame provided, suspend on a platform or support rails, alternatively hang using drop rods.

3.2.2 Outdoors

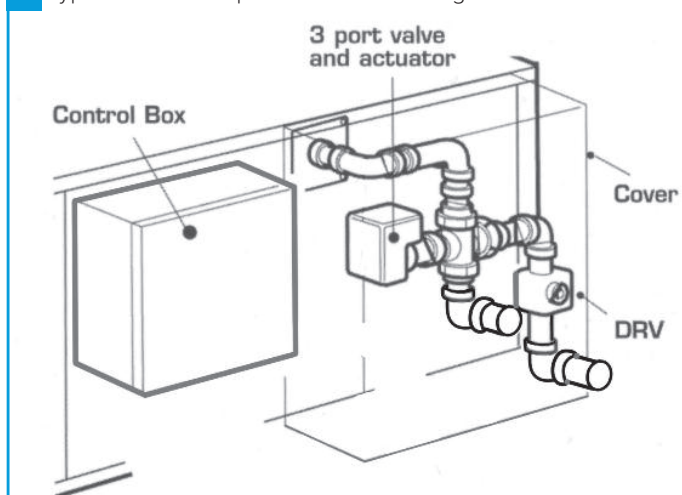
Where an external installation is required, install on a secure and level surface, use the base frame and the weather roof tailored for each system. Connect ducting, inlet or extract cowls as appropriate.

3.3 Heating & Cooling Pipe Connections

The flow valve is not factory set and should be adjusted by the commissioning engineer.

Unit Model	Frost Coils	CHW Coils	LPHW Coils
ESBHS1	0.75" BSP	1" BSP	1.25" BSP
ESBHS2	0.75" BSP	1.25" BSP	1.25" BSP
ESBHS3	1" BSP	1.25" BSP	1.25" BSP
ESBHS4	1" BSP	1.25" BSP	1.5" BSP
ESBHS5	1.25" BSP	1.5" BSP	2" BSP
ESBHS6	1.25" BSP	2" BSP	2" BSP
ESBHS7	1.5" BSP	2" BSP	2" BSP

7 Typical Wet Coil Pipe Termination Arrangement



The electrical wiring must be carried out by a competent person and the unit must be provided with means of local isolation (by others) for maintenance purposes. A suitable isolator is available from Nuaire as a separate option.

This product must be earthed.

4.1 Electrical Information

Unit Model	FLC Fan Only	Electric Heater (Max Power)	FLC Heater
ESBHEX1, ESBHS1-L	4.9 A	N/A	N/A
ESBHS1-E	4.9 A	18kW	25A
ESBHEX2, ESBHS2-L	7.3 A	N/A	N/A
ESBHS2-E	7.3 A	24kW	33A
ESBHEX3, ESBHS3-L	5.0 A	N/A	N/A
ESBHS3-E	5.0 A	27kW	38A
ESBHEX4, ESBHS4-L	7.0 A	N/A	N/A
ESBHS4-E	7.0 A	36kW	50A
ESBHEX5, ESBHS5-L	8.5 A	N/A	N/A
ESBHS5-E	8.5 A	54kW	75A
ESBHEX6, ESBHS6-L	8.5 A	N/A	N/A
ESBHS6-E	8.5 A	54kW	75A
ESBHEX7, ESBHS7-L	11.4 A	N/A	N/A
ESBHS7-E	11.4 A	54kW	75A

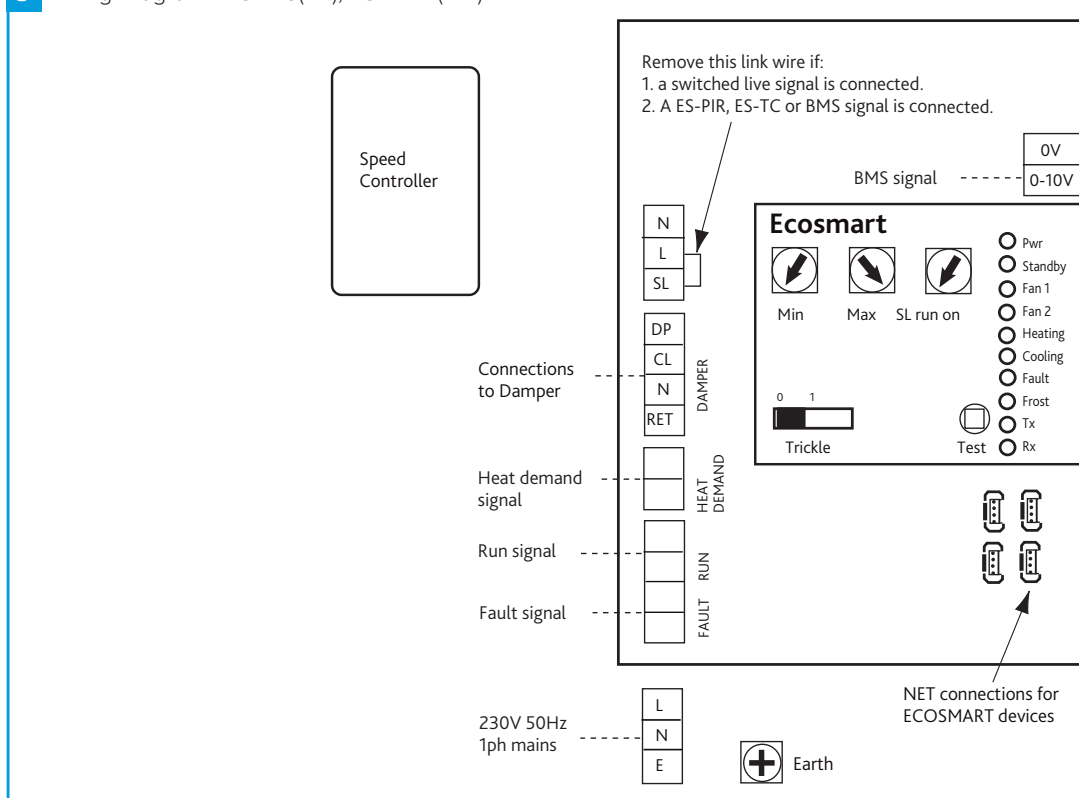
4.0 ELECTRICAL INSTALLATION

Cautionary Notes:

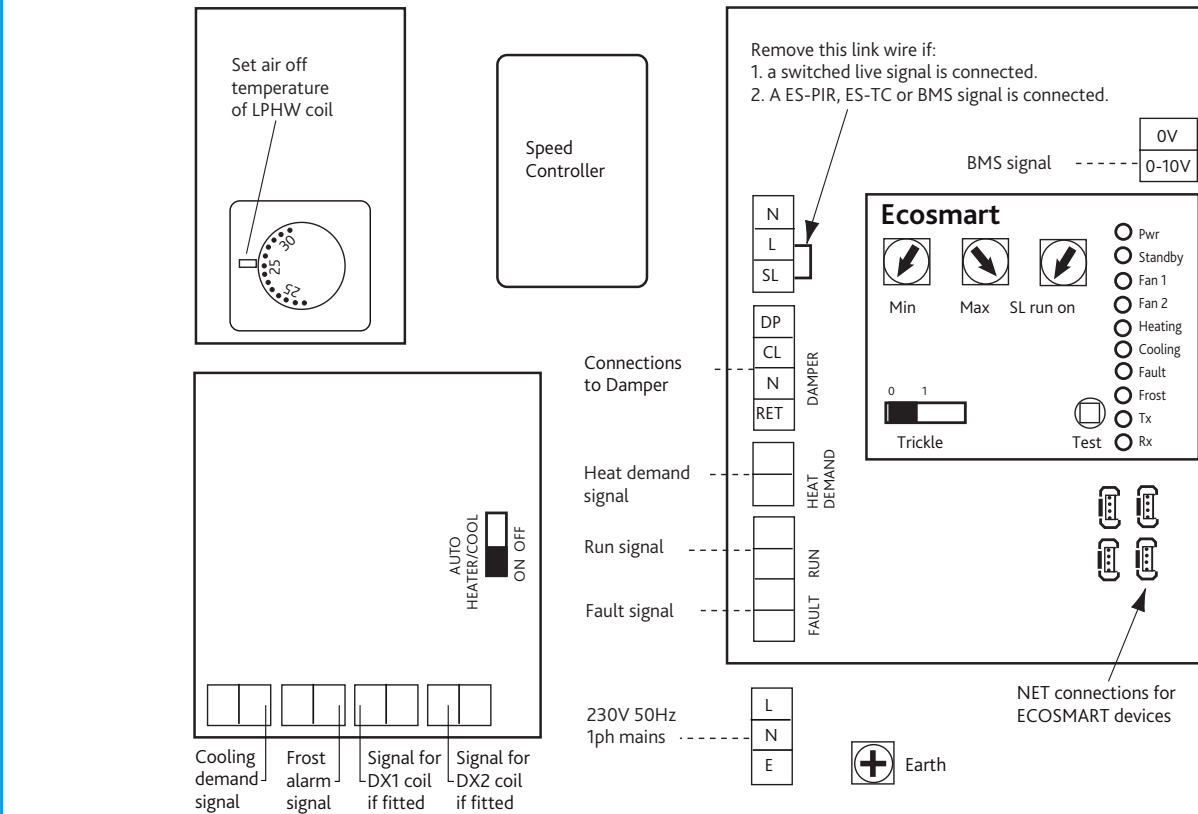
- Ecosmart controls use 'burst fire' control technology to manage the heater output. Due to the high absorbed currents on electric heaters there may be voltage drops experienced in the electrical system that may have an adverse effect on lighting etc.
- There are no inrush starting currents quoted because the Ecosmart control incorporates a soft starting speed control feature.
- The inverters are pre-set to match the fan heaters and control requirements. Under normal circumstances it should not be necessary to adjust them.
- Pay particular attention to the model type, recorded on the product rating plate and connect as follows.

4.2 Wiring Diagrams

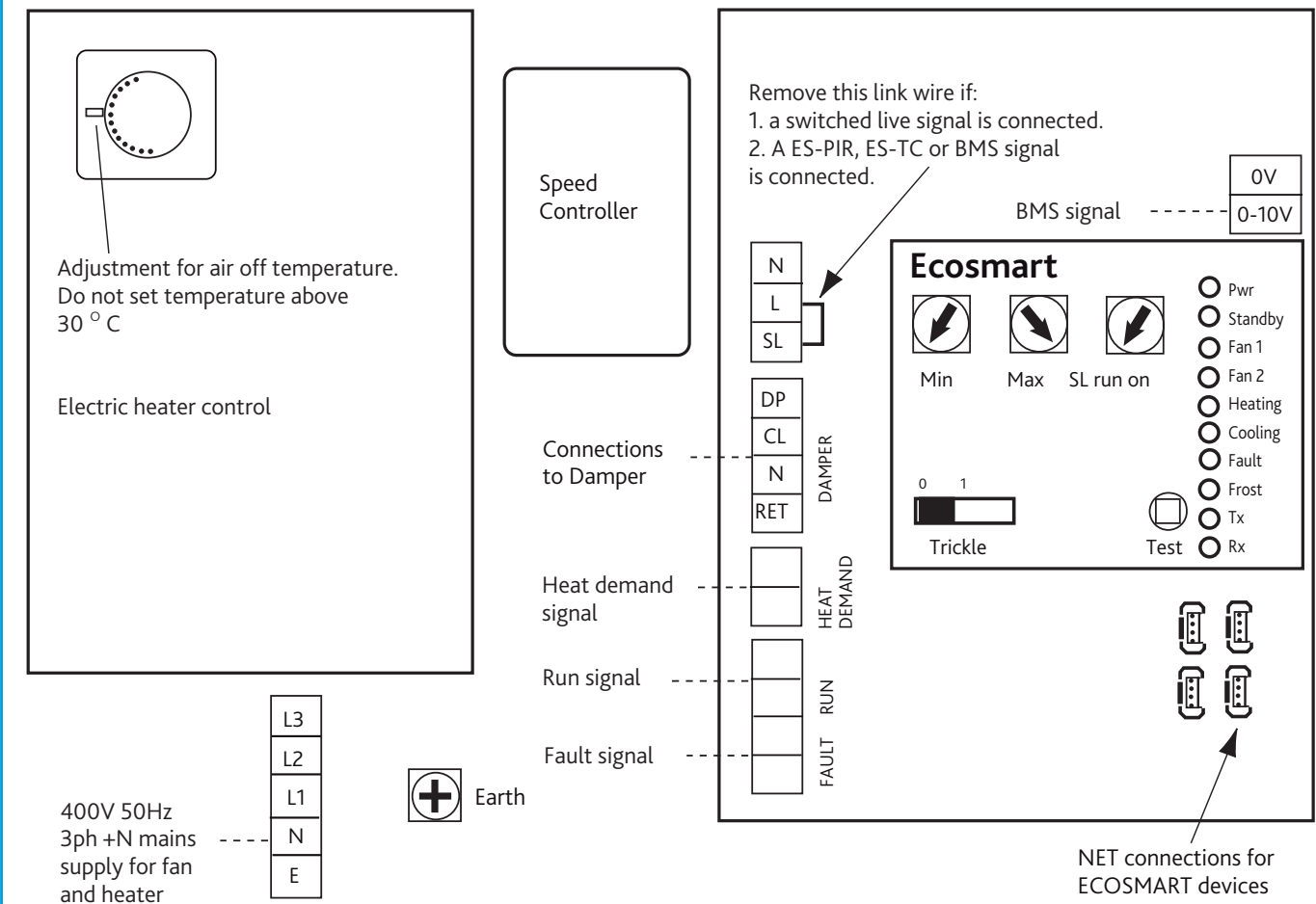
8 Wiring Diagram - ESBHS(1-2), ESBHEX(1 -2)



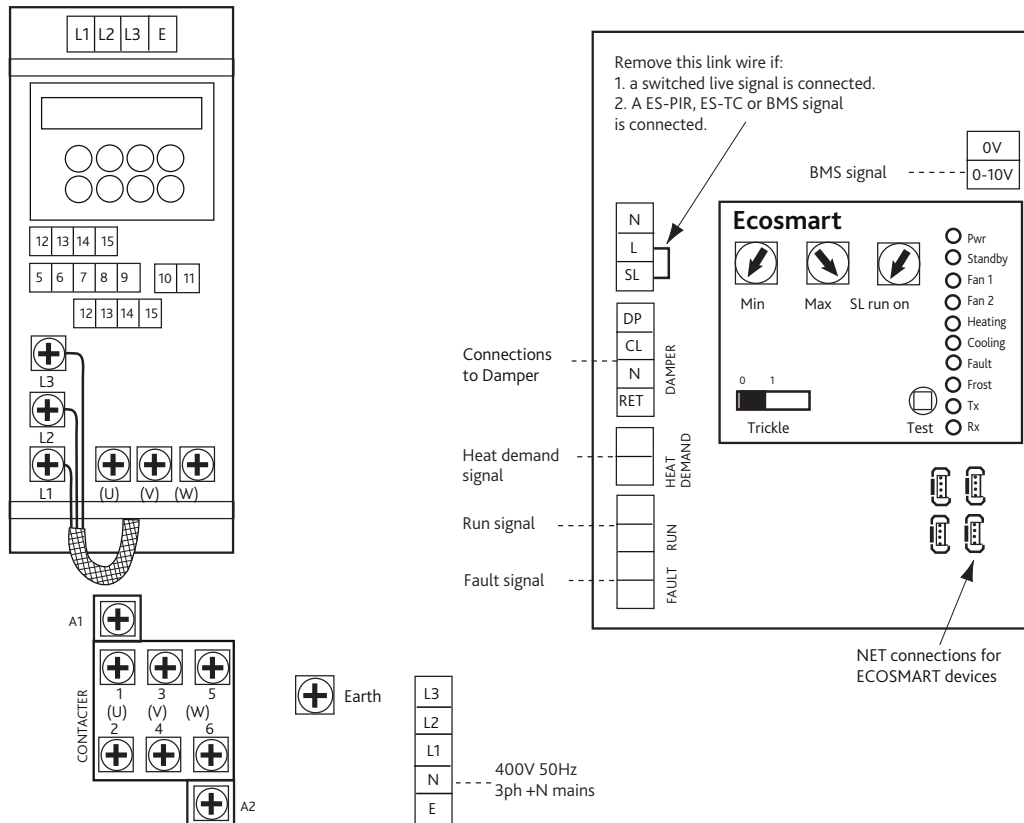
9 Wiring Diagram - ESBHS(1-2)-L, ESBHS(1-2)-LD



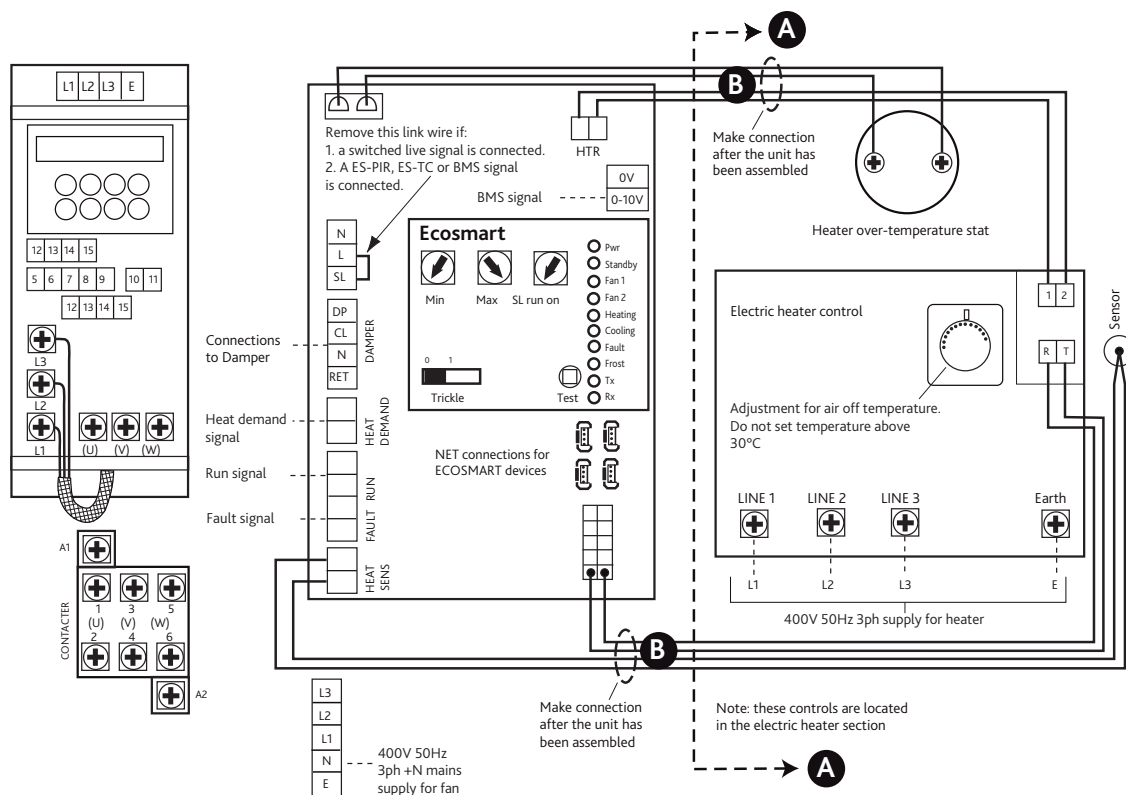
10 Wiring Diagram - ESBHS(1-2)-E



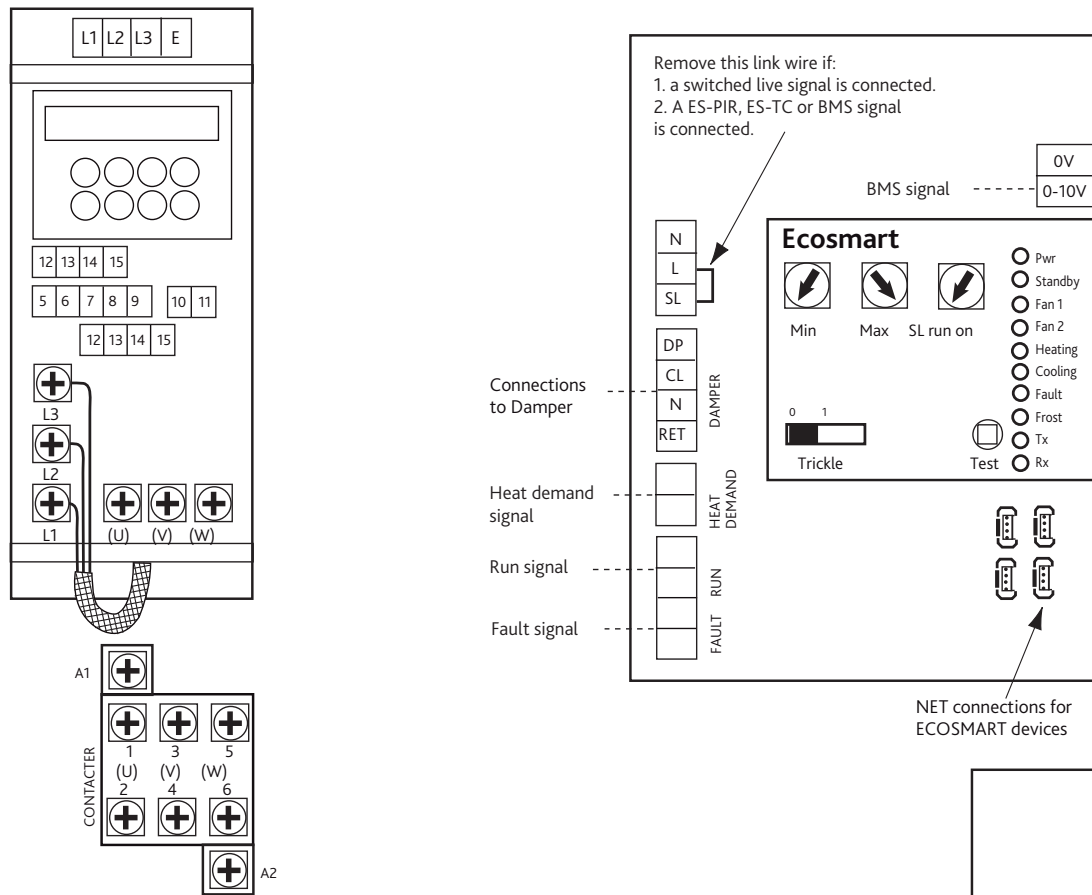
11 Wiring Diagram - ESBHEX(3-7)



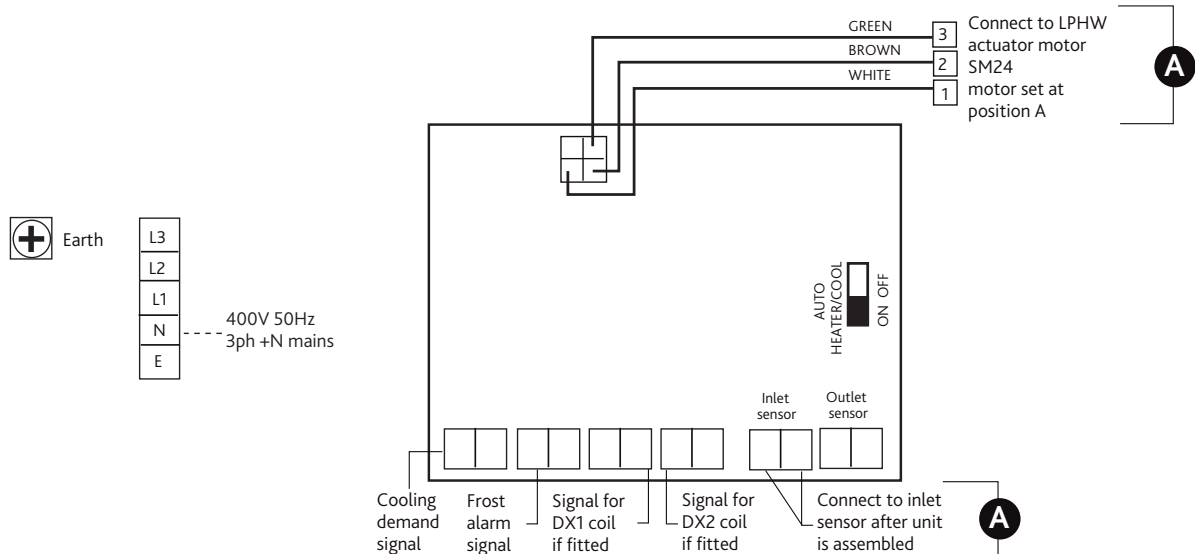
12 Wiring Diagram - ESBHS(3-7)-E



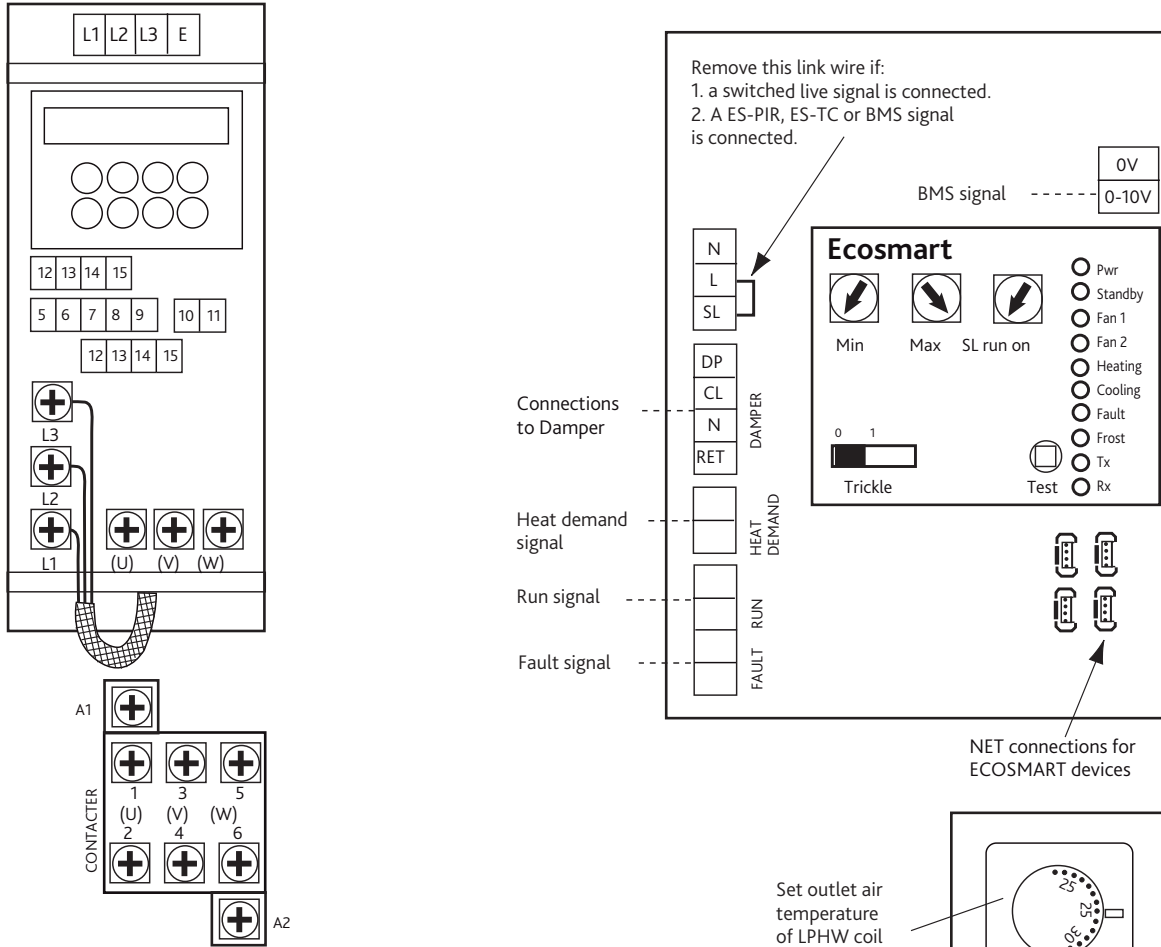
13 Wiring Diagram - ESBHS(3-7)-L, ESBHS(3-7)-LD



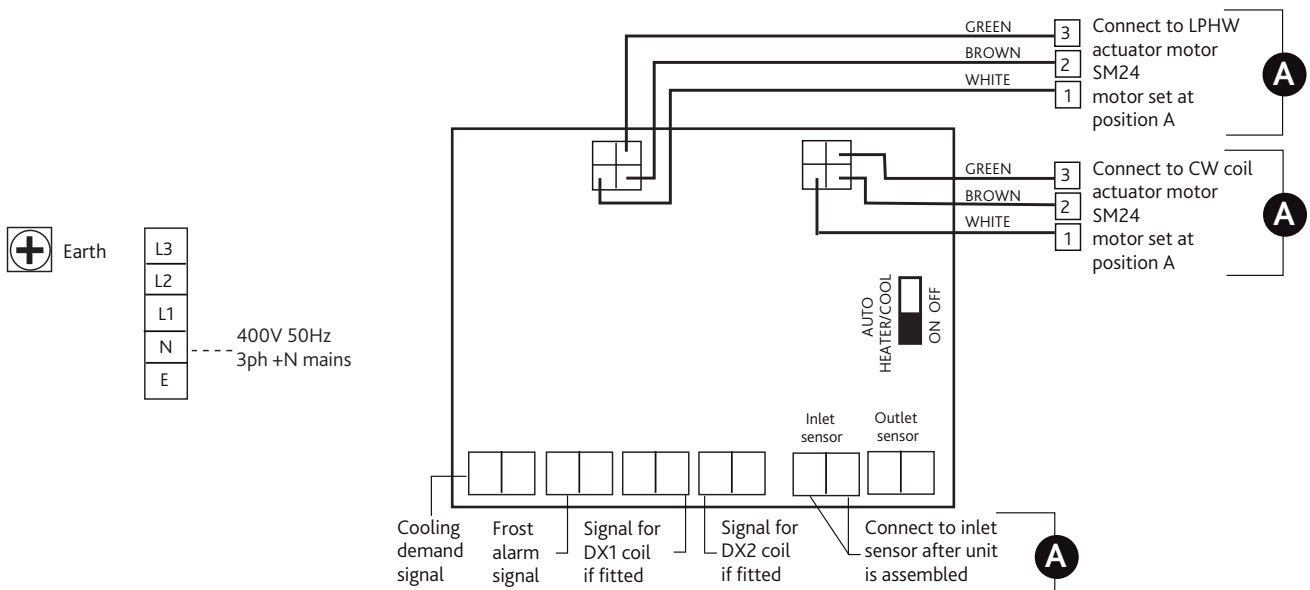
Actuator and sensors (A) are positioned in adjacent modular sections and will require wiring and connection to the Ecosmart control.



14 Wiring Diagram - ESBHS(3-7)-LC



Actuator and sensors (A) are positioned in adjacent modular sections and will require wiring and connection to the Ecosmart control.



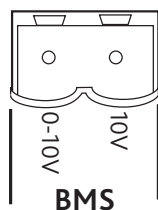
4.3.9 BMS Input Signals

The BMS connection is made with a plug-in connector via the socket (Figure 19). 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. 176-7772.

Reversal of the BMS connection will damage the control.

19 BMS Connections



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

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	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

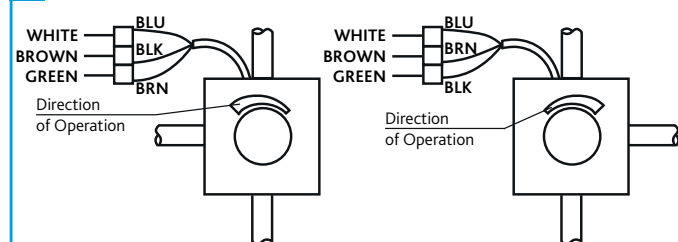
*Only available on relevant unit.

4.3.10 LPHW Actuator Connections

LPHW actuator connection (unit sizes 3-7) must be made between the control and LPHW modules, using link wire provided.

Actuator wiring can change dependent on direction of operation (Figure 20).

20 LPHW Actuator Connections



5.0 FROST COIL (OPTIONAL ANCILLARY)

5.1 Electric Frost Coil

Electric frost coil modules are powered by a 400Vac 50Hz 3 phase supply. This must be isolated local to the module and fitted with appropriate over-current and fault protection.

Using the SELV data cable supplied with the frost coil module, plug the ES-VF 'Net' connection in the frost coil module into 1 of the 4 Ecosmart 'Net' connections in the fan unit control.

Ensure only DIP switches 2 & 3 are set to ON (Fan Running & Heating Mode respectively).

Set the frost protection thermostat to the required temperature, Nuaire recommend 4°C minimum.

5.2 LPHW Frost Coil

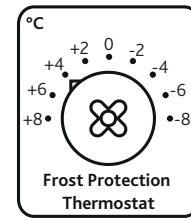
LPHW frost coil modules are powered by a 230Vac 50Hz single phase supply. This must be isolated local to the module and fitted with appropriate over-current and fault protection.

Set the frost protection thermostat to the required temperature, Nuaire recommend 4°C minimum.

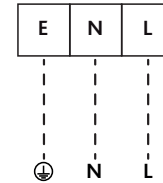
5.3 Frost Coil Wiring

22 Wiring - LPHW Frost Coil

LPHW Frost Coil Module



Recommended Frost Temperature Setting 4°C

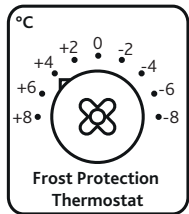


230V 50Hz 1ph
mains supply
for LPHW frost coil

21 Wiring - Electric Frost Coil

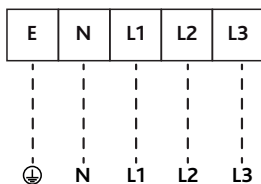
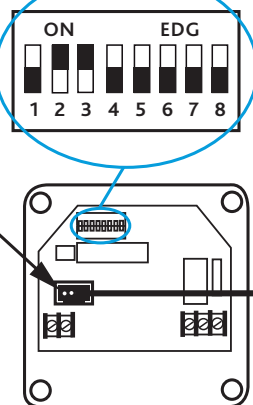
Electric Frost Coil Module

Only DIP switches
2 & 3 should be ON



Recommended Frost Temperature Setting 4°C

ES-VF 'NET'
connection

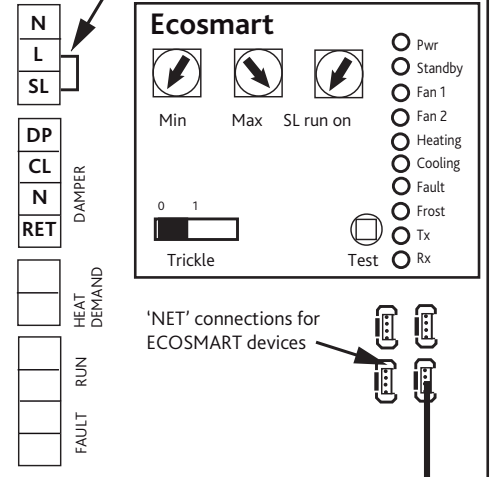


400V 50Hz 3ph + N
mains supply
for electric frost coil

Fan Unit Control

Remove this link wire if
switched live, enabler
or BMS is connected.

BMS signal ----- 0V
0-10V



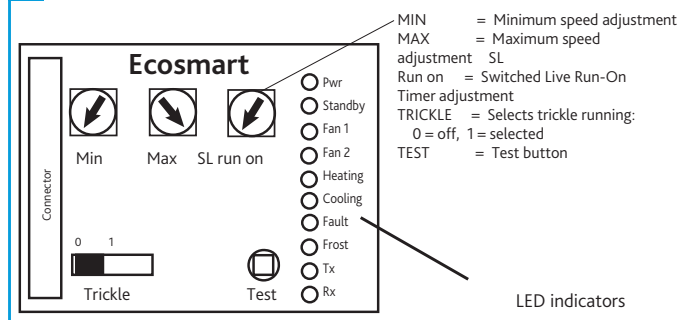
'NET' connections for
ECOSMART devices

Plug SELV data cable supplied with
frost coil module into 1 of the 4 'Net'
connections in the fan unit control

6.0 COMMISSIONING

6.1 Electrical

23 Commissioning PCB



6.1.1 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.

The fan will return to normal operation after 30 seconds.

6.1.2 LED Indication (Figure 23)

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
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.

6.1.3 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 complete its self-test operation. 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 (Figure 18).

6.1.4 Maximum/Trickle Airflow Rate (Nominal: 40% Sizes 1 & 2; 20% Sizes 3 to 7)

- 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 40%) must be below the maximum setting, or the 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.

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

6.2 Mechanical

- Wet systems require the setting of the flow valve. Set as general commissioning procedures - refer to the specified design flow duties and the documentation attached to each valve.

• Frost protection must be incorporated on shut down and fresh air conditions to avoid the coil and associated pipework freezing. Ideally, where the system is at risk of frost damage, the addition of a proprietary antifreeze solution to the water is recommended.

- DX coils have two separate cooling stages with independent condenser units, the coils are supplied with ends sealed. Connection, commissioning and setting to work is the responsibility of the condensing unit installer

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.

Isolate from power supply before removing any covers. During installation / maintenance ensure all covers are fitted before switching on 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.

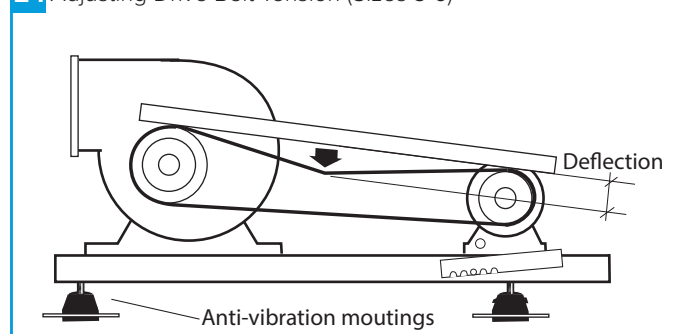
7.1 Checking Belt Tension (3 Months After Commissioning)

- Measure the span length (Figure 24).
- 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 (Figure 24). The force required to deflect the 'V' belt should be from 0.5kg to 0.8kg.
- Tighten the pinch bolts.

7.2 Adjusting Drive Belt Tension (Sizes 3-6)

To check the correct tension of a drive belt, apply a force at right angles to the centre of the belt span sufficient to deflect the belt 16mm for every metre of span length (Figure 24). The force required to deflect the 'V' belt should be from 0.5kg to 0.8kg.

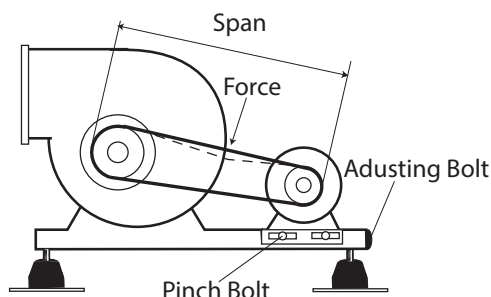
24 Adjusting Drive Belt Tension (Sizes 3-6)



7.3 Adjusting Drive Belt Tension (Size 7)

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.

25 Adjusting Drive Belt Tension (Size 7)



7.4 Routine Maintenance

- Clean all areas of unit and treat any areas of corrosion.
- Check all access doors for leakage and if necessary locks should be adjusted and any replacement gasket materials should be replaced as required.
- Any drain trays should be cleaned and repaired if necessary.

7.5 Every 3 Months

- Check filters and change/clean if required, failure to do so may impair the performance and energy efficiency of this unit.
- Ensure condensate drains are cleaned clear and that water can flow freely from unit.
- Check fin coil banks and heat exchangers. If necessary clean with a soft brush or vacuum. Check for signs of contamination.

7.6 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.
- Check control dampers blades.
- Check operation of damper actuators and linkages and adjust as necessary.
- Coil faces should be inspected and any dust removed.

7.7 Changing a 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.

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

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 BOXER FANS
Machinery Types: ESBS, ESBEX
Relevant EC Council Directives: 2006/42/EC (Machinery Directive)
Applied Harmonised Standards: BS EN ISO 12100-1, BS EN ISO 12100-2, EN294, EN60204-1, BS EN ISO 9001
Applied National Standards: BS848 Parts One, Two and Five

Signature of manufacture representatives:

Name:		Position:	Date:
1)C. Biggs		Technical Director	20. 07. 07
2)A. Jones		Manufacturing Director	20. 07. 07

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

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

To comply with EC Council Directives 2006/42/EC Machinery Directive and 2014/30/EU (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 Nuairé 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. 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 Nuairé.
- 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.
- 4.4 **Local Environment - Humidity.** Ambient humidity (the humidity at the unit's installed location) shall be within the range: 10 to 95% (for controls, non-condensing).
Air humidity (the humidity of the air passing through the unit) shall be within the range: 10 to 95% (for controls, non-condensing).

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 (e.g. 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.
- 8.5 **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.**
Care should be taken when removing and storing access panels in windy conditions.

[illegible]