



XBOXER XBC

UNIT SIZES 10 - 65 WITH
ECOSMART CONNECT CONTROL (CO)

INSTALLATION, CONTROL DETAILS,
OPERATING AND MAINTENANCE



FOR THE COMPLETE VENTILATION SOLUTION





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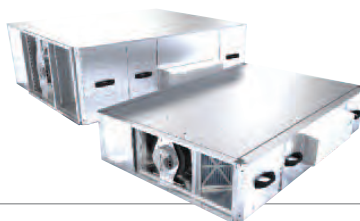
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XBOXER XBC ECOSMART (CO) MODELS

SUPPLY & EXTRACT VENTILATION UNIT WITH HEAT RECOVERY

INSTALLATION, OPERATING & MAINTENANCE INSTRUCTIONS



CE The EMC Directive
2004/108/EC
The Low Voltage
Directive 2006/95/EC

ecosmart
CONNECT

INTRODUCTION - XBOXER XBC ECOSMART (CO) MODELS

The information contained in this document provides details of installation, operation and maintenance for installers and users of the XBOXER XBC Supply and Extract Ventilation Unit with Heat Recovery.

This supply and extract air handling unit range comprises a combination of high efficiency centrifugal fans with EC motors, a counterflow design plate heat exchanger, filters, optional heaters (LPHW and Electric) and a casing with high mass acoustic treatment.

A range of matched, close coupled attenuators with a similar construction method to that of the unit is available. The attenuators can be flipped for positioning on the left or right of the fan unit (see fig 1) allowing flexibility for duct layout.

Attenuators are available in 1050, 1250 and 1600mm lengths and a matching attenuator flange is attached to the fan unit.

General information regarding performance and specifications for the equipment may be obtained from our Technical Literature, and/or project specific documentation.

Figure 1: Layout Overview of the XBC unit viewed from above and shown with matched room side and atmospheric side attenuators. Access for maintenance and inspection of the standard XBOXER XBC units is from the side of the unit.

CODE DESCRIPTION: XBOXER XBC VENTILATION UNIT

XBC 45 - H - LCO - R - BA

1 2 3 4 5 6 7

1. XBOXER XBC Range
2. Unit size 10, 15, 25, 45, 55 and 65
3. H = Horizontal Side by Side layout
4. E = Electric Heater; L = LPHW Heater, N = No Heater
5. CO = Ecosmart Connect Control
CL = Ecosmart Connect Control with Legacy Sensor Support
6. R = Opposite arrangement, (refer to page 3)
7. BA = Bottom access (filters only, refer to page 3)

CODE DESCRIPTION: MATCHED COMBINED ATTENUATOR

XBC 25 - HS - MS10

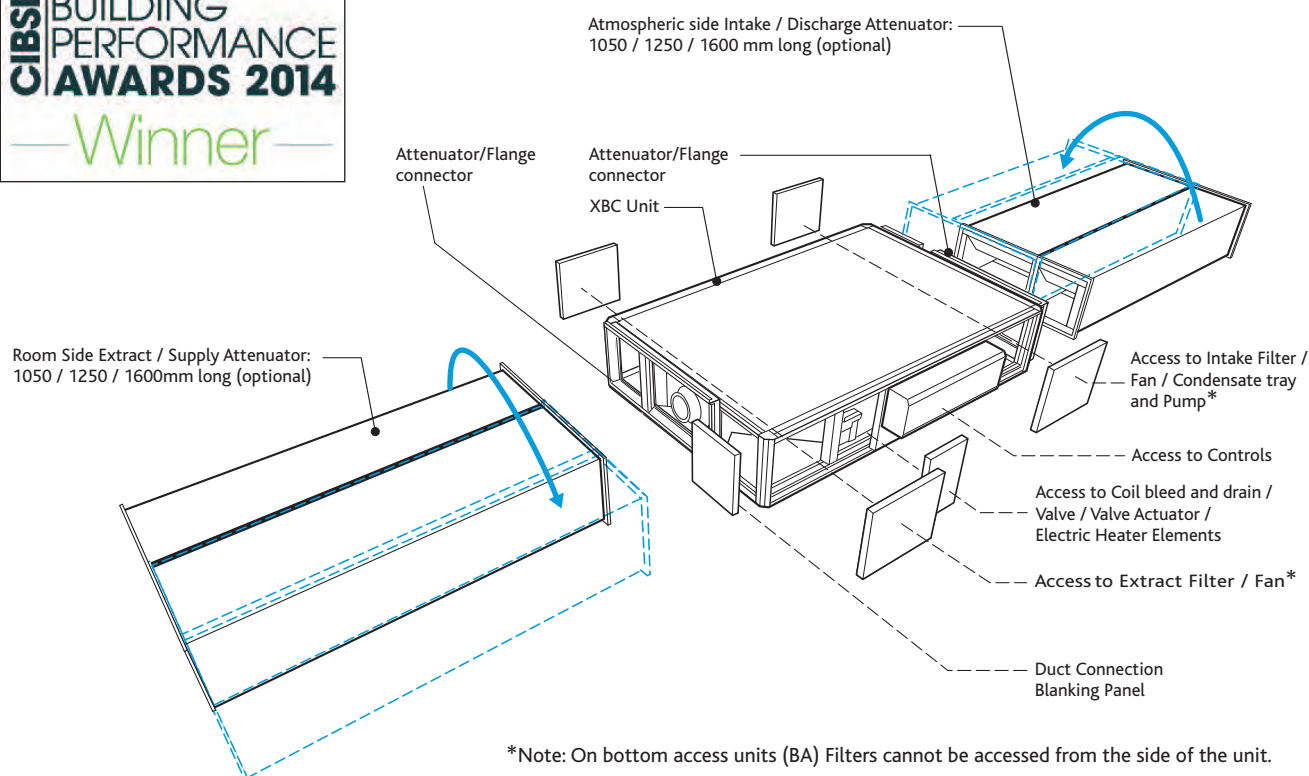
1 2 3 4

1. XBOXER XBC Range
2. Unit Size 10, 15, 25, 45, 55 and 65
3. HS = Horizontal Supply/Discharge unit
or HE = Horizontal Extract/Intake unit
4. Attenuator MS10 = 1050 mm; MS12 = 1250 mm;
MS16 = 1600 mm

CODE DESCRIPTION: XBC UNITS WITH WEATHER ROOF

XBC 15 - H - LCOWP

Unit Size 10, 15, 25, 45, 55 and 65
WP = Fan Unit supplied with Weather Roof



XBOXER XBC ECOSMART (CO) MODELS

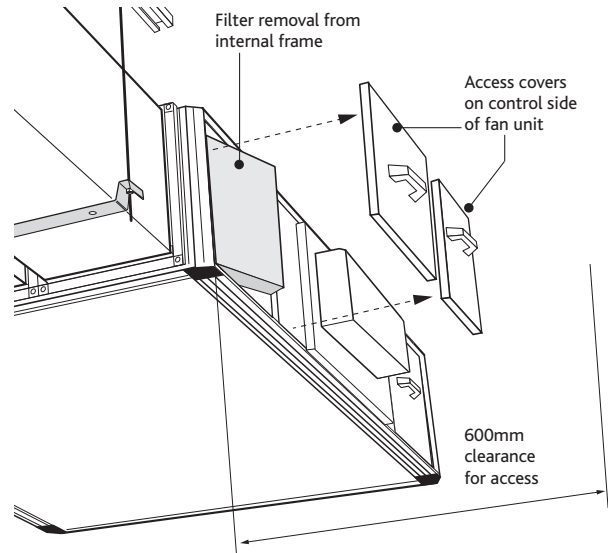
1.0 XBOXER XBC UNIT ACCESS CONCEPTS

In this product range, several unique concepts have been implemented with a view to simplifying the installation design.

1. The unit configuration is such that the supply and discharge connections are positioned on the unit centreline.
The corresponding Intake and Extract connections may be positioned on either side of the unit, allowing greater flexibility in the layout of ductwork in the space. (see Fig 2a) with the blanking panel re-positioned to suit.
2. The standard Ecosmart XBC unit configuration is shown in Fig 2b. **Unit handing information will not be requested for this range,** and units will be supplied in this format as standard.
3. The unit must be installed with at least 600mm clearance from a wall / barrier on the control side of the unit. With this absolute minimum clearance, the unit may be connected to the power supply and control connections. (Note: - cable connections must allow for the relative movement when the control is re-positioned).
4. With this clearance, unit filters may be changed, and the fans coils, heat exchanger and condensate tray may be inspected and cleaned if necessary.
5. The LPHW and Electrical heater settings, coil bleed and drain, and all other control adjustments are similarly accessible (see Fig 1).
6. Side access, where possible, is preferred in all cases in terms of safe working access to the equipment under the CDM regulations.
7. Note however, that access in the situation is difficult and additional time should be allocated. For convenience it is preferred that wherever possible, this minimum access provision is not adopted, and it is recommended that a minimum of around 600mm clearance (as stated in ADF 2010) is allowed.

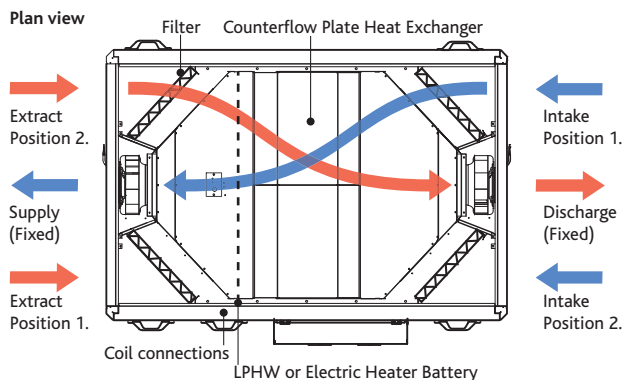
8. Where these arrangements are not suitable, the Consultant's and Contractor's project specific requirements will always be accommodated where possible.

Figure 4: The control side of the unit must be installed with at least 600mm clearance from a wall / barrier to gain access from the side.



9. Bottom access only units. (Example code: XBC15-H-LCO BA). Provides access to filters only (see fig 4). **Filter removal is not available from the sides on these units.** Bottom access units must be installed with the following minimum clearance below the units.
XBC15 = 225mm, XBC25 = 300mm XBC45 = 360mm.
Note: Bottom access is not available on XBC55 or XBC65 units.

Figure 2a: Selectable Duct Connections (Top view).



Note: The unit is shipped with four G4 filters in place, two of which are included as spares. For F7 filters contact Nuair.

Figure 2b: Standard Unit Format (Top view).

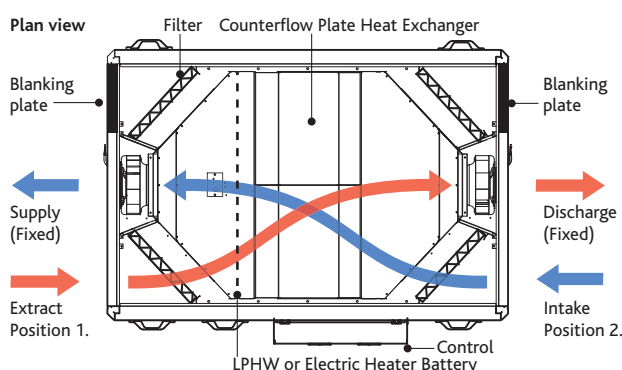


Figure 3: Opposite unit arrangement (R) side access (Top view).

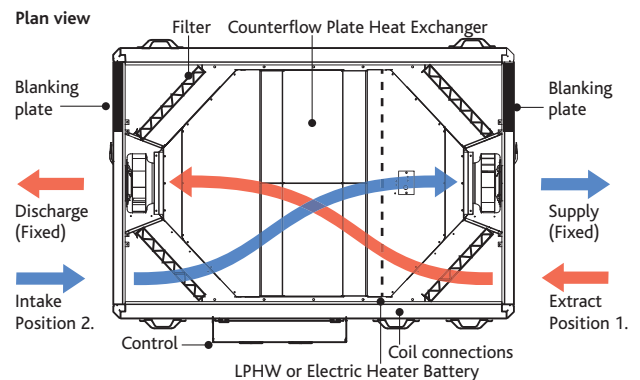
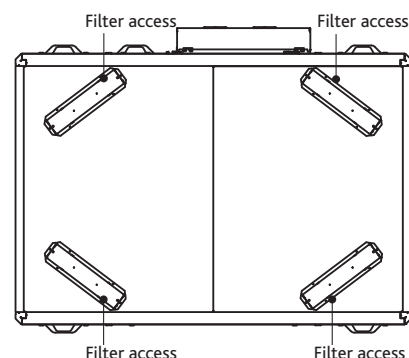


Figure 4: bottom access only unit. (Example code: XBC15-H-LCO BA).



IMPORTANT

Safety first! – before commencing any work ensure:

- That all appropriate risk assessments have been carried out, and the required safety measures have been taken
- That you understand the work required
- That you are trained and competent to carry it out

2.0 DELIVERY OF EQUIPMENT

2.1 Receipt of equipment

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

Particulars of damage and/or incomplete delivery should be endorsed by the driver delivering the goods before offloading by the purchaser.

No responsibility will be accepted for damage sustained during the offloading from the vehicle or on the site thereafter.

All claims for damage and/or incomplete delivery must be reported to Nuaire within two days of receipt of the equipment.

2.2 OFF LOADING AND HANDLING FROM THE DELIVERY VEHICLE

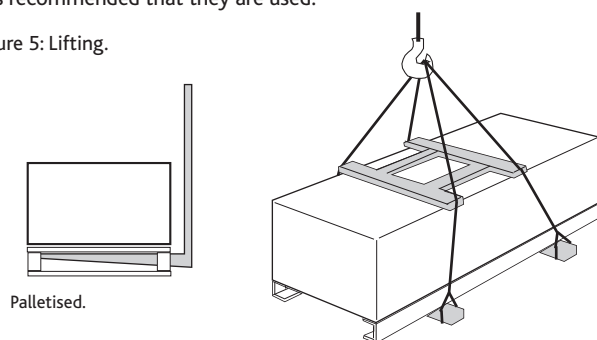
The weight of the unit modules and palletised items is displayed on the unit rating plate or on the packaging. Some of the modules have an uneven weight distribution, and this will be indicated by labelling where appropriate. Ensure that lifting and handling equipment is adequately rated.

Offloading and positioning of the equipment is the responsibility of the purchaser.

Spreaders should be used when lifting with slings to avoid damage to the casings. Care must be taken to ensure that slings are correctly positioned to avoid crushing and twisting of the unit castings.

Where channels and/or support frames are bolted to the underside of the unit casing, slings or fork-lift arms should be positioned to locate in the apertures in the channels. If Lifting Eyes have been supplied / fitted it is recommended that they are used.

Figure 5: Lifting.



XBOXER XBC unit sections will be delivered to site in the number of sections shown below.

Unit	No. of sections
XBOXER XBC Central Ventilation Unit	1

The unit will be labelled with the direction of air flow.

The direction convention must be observed during assembly.

The unit may only be operated in its intended horizontal installation plane.

The unit must be fully levelled during installation (this is essential to ensure that condensate drains correctly).

See page 7. for dimensions and weights.

2.3 STORAGE

The equipment must be stored in a dry, internal location. Ductwork connection apertures shall be sealed against the ingress of dust, water and vermin.

If the storage period is to exceed two months, contact Nuaire for guidance on the appropriate "mothballing" procedures.

Do not stack units, modules or components.

3.0 ERECTION AND ASSEMBLY

Units must be installed in accordance with good industry practice.

These units may only be mounted horizontally and must be fully levelled in the horizontal plane.

The units are heavy, and should be mounted using the fixing brackets supplied or other suitable methods of support.

The supporting structure must be assessed for structural suitability.

Heat recovery components and modules that incorporate cooling coils may produce condensation during use.

An insulated drip tray and condensate pump is provided.

The drain connection must be connected to a suitable drainage point. (See fig 13, page 13 for details).

CONDENSATE PUMP ALARM

The condensate pump incorporates an alarm function. If the water level in the condensate tray exceeds a maximum level (for example, as a result of the discharge tube becoming blocked or frozen), the alarm contact will open. This contact is internally connected to the heat exchanger bypass actuator, and the unit will automatically be placed into bypass mode, preventing further condensate production. Unit operation will otherwise be unaffected.

CONDENSATE PUMP SPECIFICATION

Maximum flow rate = 12 l/h

Maximum head = 20m Vertical, 100m Horizontal

Pipe Connection size (Low Pressure Condensate connection) XBOXER XBC = 8 mm

LPHW Coils, if fitted, are tested during manufacture to 16 Bar (using dry compressed air). Coil and valve assemblies are similarly tested to 10 Bar. Operation of standard equipment is rated at PN6, if the intended system requires higher operating pressures; please contact the Nuaire Technical department for advice.

Electrical connections to the unit shall be made in accordance with the appropriate product (see below); and installation wiring diagrams, and shall use appropriately sized and rated cables.

Only the prepared apertures in the unit casing may be used for cable entry. Do not drill or cut the unit casing for this purpose. Cable access points are provided at the ends of the control enclosure.

If the control is rotated to aid connection of cables, please ensure that sufficient flexibility is provided in the final connection run.

NB to avoid conflict with the unit access panels, it is recommended that electrical and plumbing service connections to the unit are run at 90 degrees to the main air flow axis.

Control circuit connections must be segregated (i.e. routed separately) from power connections.

The unit rating label shows the maximum electrical load of the equipment. Connections to the unit may include single phase supply connections, and a variety of control circuits.

Only the prepared apertures in the unit casing may be used for cable entry. Do not drill or cut the unit casing for this purpose.

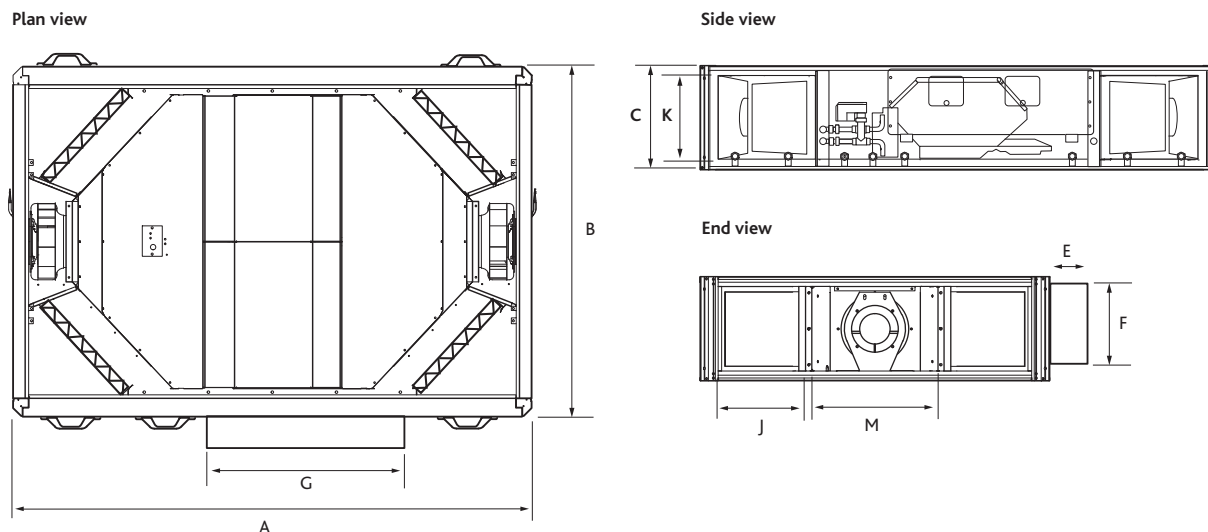
The equipment must be earthed and earth-bonded.

Means of local isolation for maintenance purposes are generally required (by others). Ensure that all mains connections are isolated.

XBOXER XBC ECOSMART (CO) MODELS

4.0 XBOXER XBC (CO) UNIT DIMENSIONS (MM) AND WEIGHTS (KG)

Figure 6: Standard unit dimensions (mm) and weights (kg).



Unit code	Dimensions (mm)						Control dimensions			Unit weights	Packed weights
	A	B	C	J	K	M	E	F	G	(kg)	(kg)
XBC10-*CO	1600	1000	260	250	225	340	120	200	670	145	195
XBC15-*CO	1600	1000	260	250	225	340	120	200	670	195	245
XBC25-*CO	1700	1150	340	265	305	455	120	200	670	242	292
XBC45-*CO	1900	1250	400	280	365	525	120	200	670	298	398
XBC55-*CO	1900	1560	470	410	435	580	120	200	670	368	418
XBC65-*CO	1900	1560	620	410	585	580	120	200	670	476	626

2 attenuator flange connectors are attached to every unit. Add 50mm to dimension 'A' to include both flanges.

*Type of heater battery.

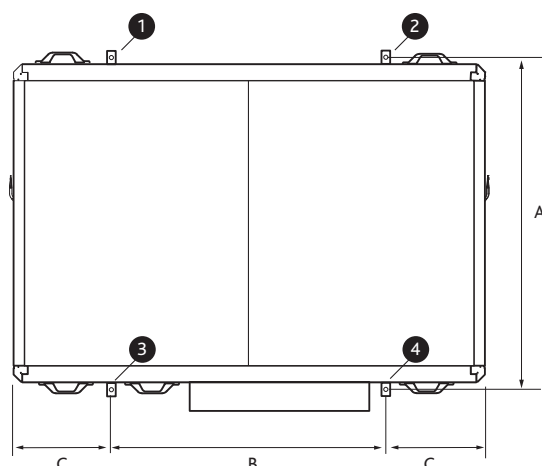
Weatherproof Dimension Changes (mm)

	A	B	C	J	K	M	E	F	G
Weatherproof	Add	Add	Add	No	No	No	Add	Equal to	Add
Unit Size Increase	470	260	100	change	change	change	130	dim C	400

Size increases are approximate and may vary depending on model.

4.1 XBOXER XBC UNIT HANGING BRACKET POSITIONS

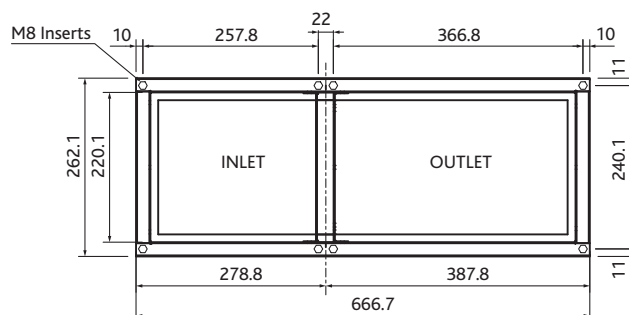
Figure 7: Plan view of unit with 4 hanging brackets attached (Two each side of the unit).



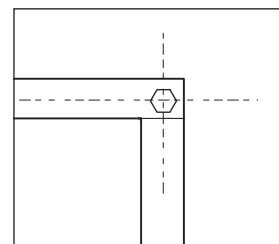
Unit code	Dimensions to hole centres (mm)		
	A	B	C
XBC10	1059	858	371
XBC15	1059	858	371
XBC25	1207	888	406
XBC45	1309	1008	446
XBC55	1619	1058	421
XBC65	1619	1058	421

4.2 XBOXER XBC ATTENUATOR FLANGE CONNECTOR DIMENSIONS (MM) Figure 8.

XBC10 & 15 FLANGE CONNECTOR

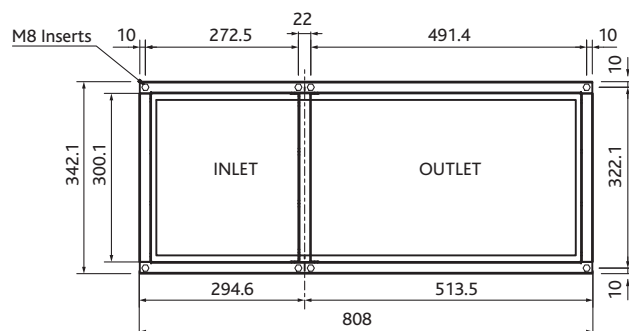


Hole centres.

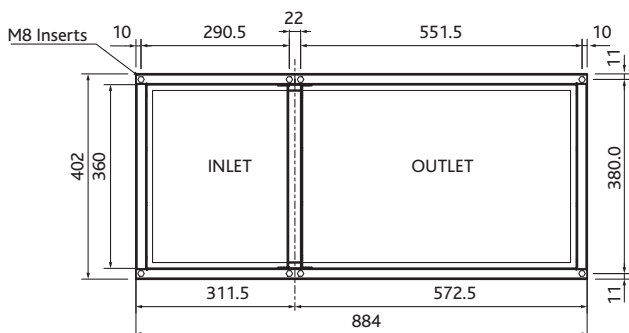


Compatible with 20mm Mez.

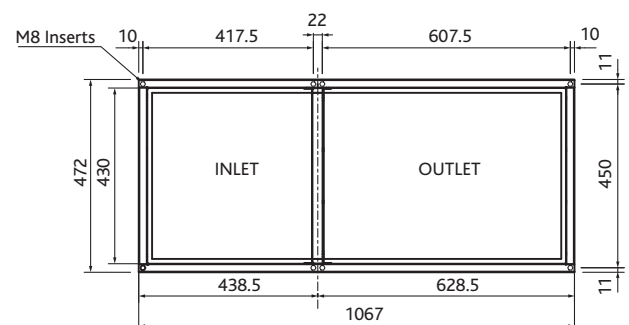
XBC25 FLANGE CONNECTOR



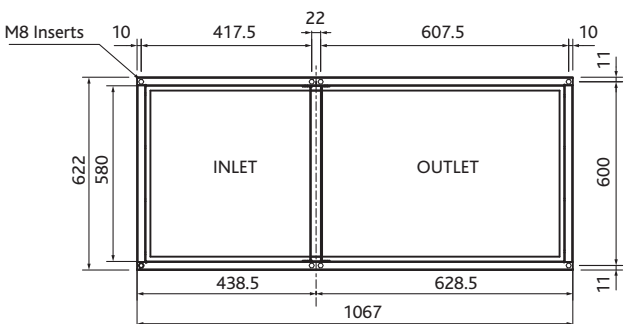
XBC45 FLANGE CONNECTOR



XBC55 FLANGE CONNECTOR



XBC65 FLANGE CONNECTOR

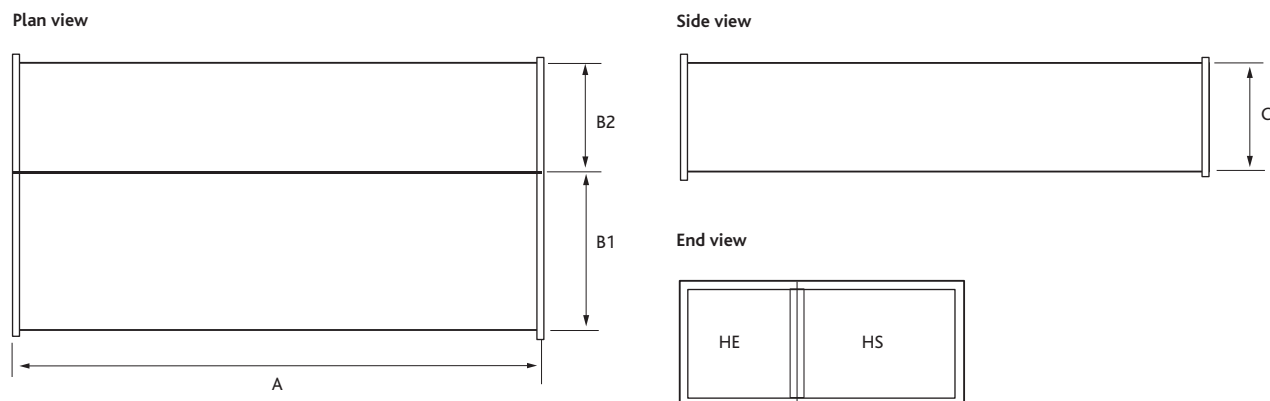


Note: The flange connector leaves factory attached to unit.

XBOXER XBC ECOSMART (CO) MODELS

4.3 XBOXER XBC ATTENUATOR DIMENSIONS (MM) AND WEIGHTS (KG)

Figure 9: Attenuator dimensions (mm).



Unit Code	Dimensions (mm)				Unit weights (kg)
	A	B1	B2	C	
XBC15-HS-MS10*	1050	340		225	49
XBC15-HE-MS10*	1050		250	225	37
XBC15-HS-MS12*	1250	340		225	63
XBC15-HE-MS12*	1250		250	225	50
XBC15-HS-MS16*	1600	340		225	81
XBC15-HE-MS16*	1600		250	225	62
XBC25-HS-MS10	1050	455		305	59
XBC25-HE-MS10	1050		265	305	44
XBC25-HS-MS12	1250	455		305	76
XBC25-HE-MS12	1250		265	305	59
XBC25-HS-MS16	1600	455		305	99
XBC25-HE-MS16	1600		265	305	73
XBC45-HS-MS10	1050	525		365	69
XBC45-HE-MS10	1050		280	365	49
XBC45-HS-MS12	1250	525		365	88
XBC45-HE-MS12	1250		280	365	66
XBC45-HS-MS16	1600	525		365	114
XBC45-HE-MS16	1600		280	365	81
XBC55-HS-MS10	1050	580		435	79
XBC55-HE-MS10	1050		410	435	62
XBC55-HS-MS12	1250	580		435	101
XBC55-HE-MS12	1250		410	435	82
XBC55-HS-MS16	1600	580		435	131
XBC55-HE-MS16	1600		410	435	102
XBC65-HS-MS10	1050	580		585	87
XBC65-HE-MS10	1050		410	585	74
XBC65-HS-MS12	1250	580		585	112
XBC65-HE-MS12	1250		410	585	97
XBC65-HS-MS16	1600	580		585	145
XBC65-HE-MS16	1600		410	585	122

Coding: The 'HS' denotes the type of silencer required for the supply or discharge.
The 'HE' denotes the type of silencer required for the extract or fresh air intake on the unit.

*Note: XBC15 silencers are also suitable for XBC10 units.

5.0 INSTALLING THE XBC FAN UNITS AND ATTENUATORS

The ventilation unit must be installed first—with consideration made for the length of the associated attenuators.

Installation of the XBOXER XBC units, including all external services and controls should be installed in accordance with the appropriate site procedures, and MUST conform to all governing regulations e.g. CDM, CIBSE, IEE, and in strict accordance with the applicable Building Regulations.

The correct installation position for the units shall be decided with due regard to access and maintenance requirements, and the objective of minimising the system ductwork resistance.

The recommended installation method is to use standard Unistrut channel secured to the slab / steelwork above the unit.

Four suitable drop rods should be secured to the Unistrut channel and extended to be fixed to the unit's four mounting brackets, (two each side of the fan unit) or to other horizontal supports by others where wider load distribution is required.

INSTALLING THE ATTENUATORS

It is recommended that additional Unistrut channels are used to support the matched attenuators. M8 drop rods should be secured to the Unistrut channel and extended to be fixed to the four piece support brackets to be used on the underside of the attenuators. (see fig 10b).

Note – once the attenuators are supported and levelled, and immediately before securing the attenuator to the attenuator flange connector, remove the backing from the Foam Sealing Strip.

The attenuators must be secured to the unit using the screws provided.

Figure 10a: Installing the fan unit.

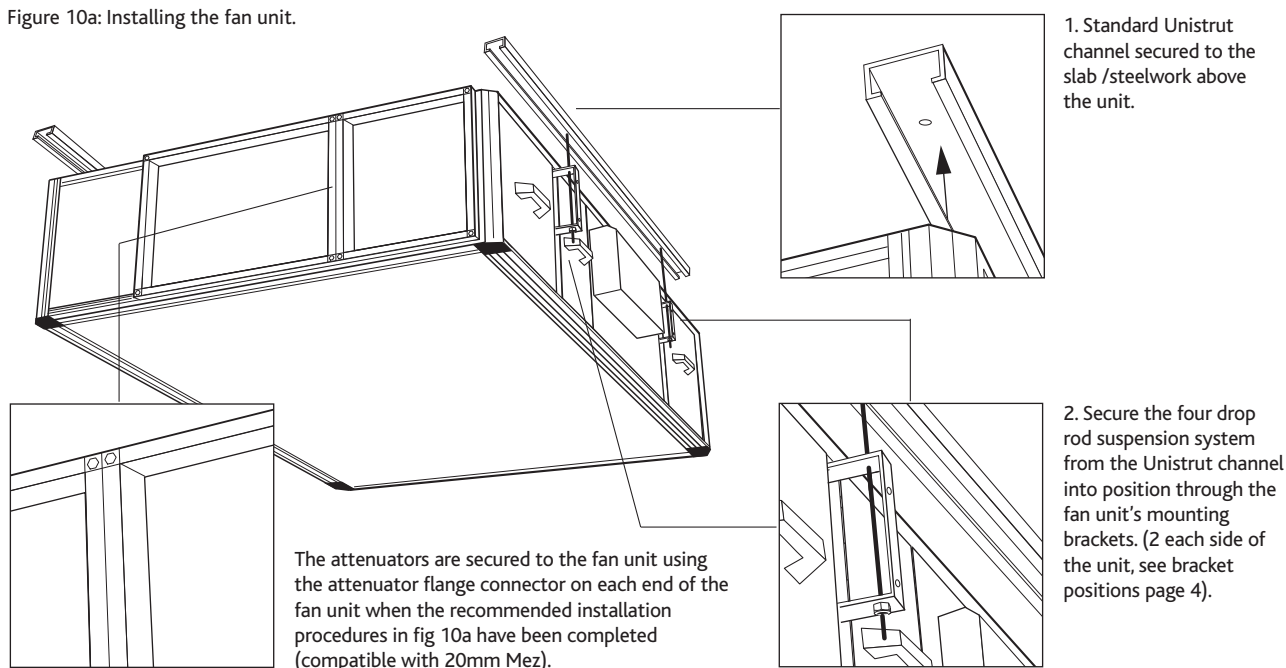
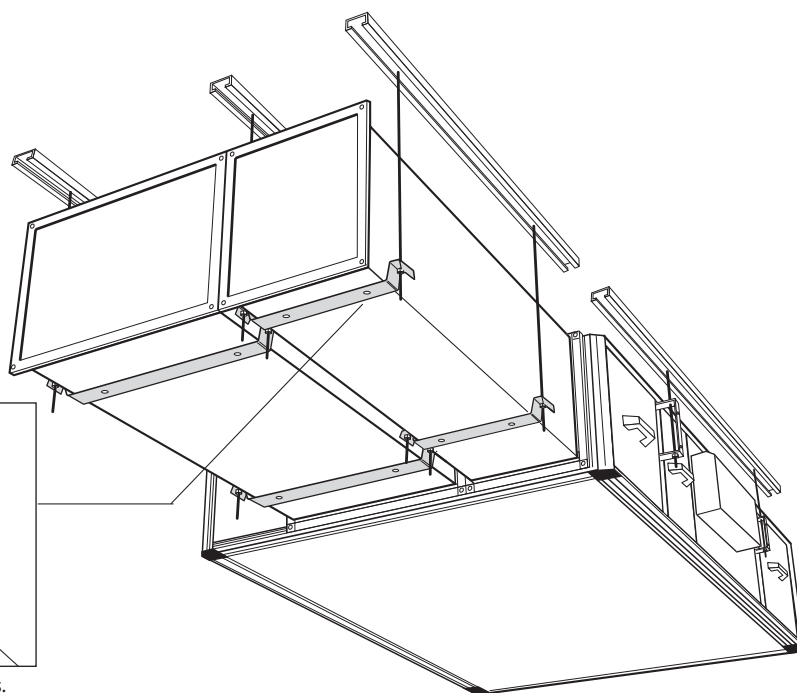
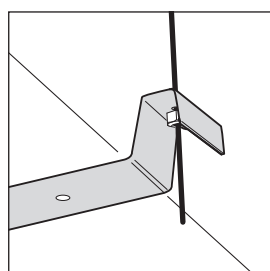


Figure 10b: Installing the fan attenuators.

1. Secure standard Unistrut channel to the slab / steelwork above the attenuators.
2. Secure M8 drop rods from the Unistrut channel into position.
3. Raise up the attenuator into position and attach the four piece support brackets onto the drop rods. (2 on each attenuator).
4. Utilising the 2 x 5.6mm dia holes in each bracket use relevant self tapping screws to fix into position on the underside of the attenuators.
5. Immediately before securing the attenuator to the connector, remove the backing from the Foam Sealing Strip.
6. Secure the attenuators to the attenuator flange connector on the end of the fan unit. (see fig 10).



XBOXER XBC ECOSMART (CO) MODELS

5.1 INSTALLING THE XBC WEATHERPROOF ROOF ON ECOSMART (CO) FAN UNITS

Having installed the ventilation unit and attenuators, the Weatherproof Roof can now be installed if required.

The Roof assembly and control cover must be secured to the unit using the fixing channel provided. In order to fit the weatherproof cover, the four existing external hanger brackets must be removed.

When the roof has been installed onto the fan unit please ensure that the edges of the roof are fully sealed where it joins the fan unit. This does not apply to the control cover as this will have to be removed if necessary.

WEATHERPROOF COMPONENTS

Item	Description	Quantity
A	Roof Assembly	1
B	Control Cover	1
C	Fixing Channel	4
D	Control Lid with Heater	1

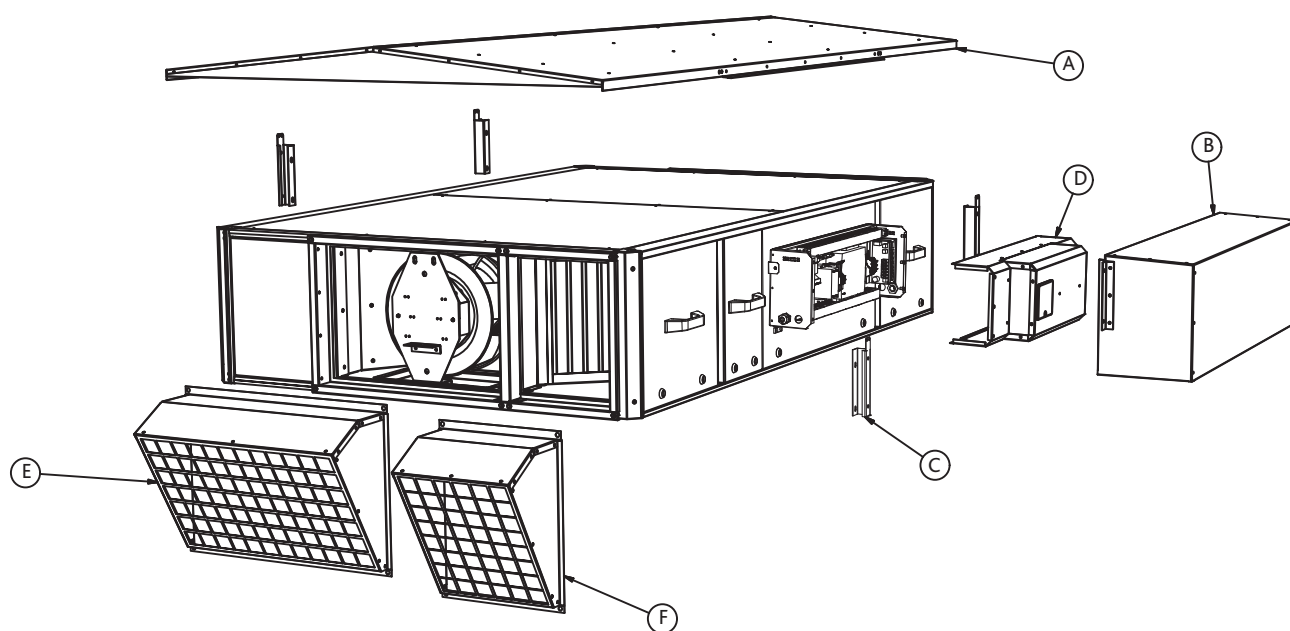
OPTIONAL EXHAUST & INTAKE TERMINALS

Item	Description	Quantity
E	Exhaust RT	1
F	Intake RT	1

UNIT CODES FOR OPTIONAL EXHAUST & INTAKE TERMINALS

XBC10-EXHAUST-RT
XBC10-INTAKE-RT
XBC15-EXHAUST-RT
XBC15-INTAKE-RT
XBC25-EXHAUST-RT
XBC25-INTAKE-RT
XBC45-EXHAUST-RT
XBC45-INTAKE-RT
XBC55-EXHAUST-RT
XBC55-INTAKE-RT
XBC65-EXHAUST-RT
XBC65-INTAKE-RT

Figure 11: Installing the Weatherproof Roof, Exhaust & Intake Terminals.



The weatherproof control lid is supplied with a built in thermostat and heater for low temperature and anti-condensation applications. The lid is equipped with a live, neutral and earth flying leads for connection into the control panel. To remove the cover, first disconnect the heater power connector behind the small access cover. The cover will then lift off as normal. The thermostat should not be set any higher than 10°C.

Caution, the heater may retain some residual heat even when disconnected.

CODE DESCRIPTION:

EXAMPLE WEATHERPROOF ANCILIARY CODE:
XBC15-H-WP-CO

5.2 XBC MOTORISED DAMPERS

Internal version (example code: XBC15-MD-CO).

External weather proof version (example code: XBC15-MD-CO-WP).

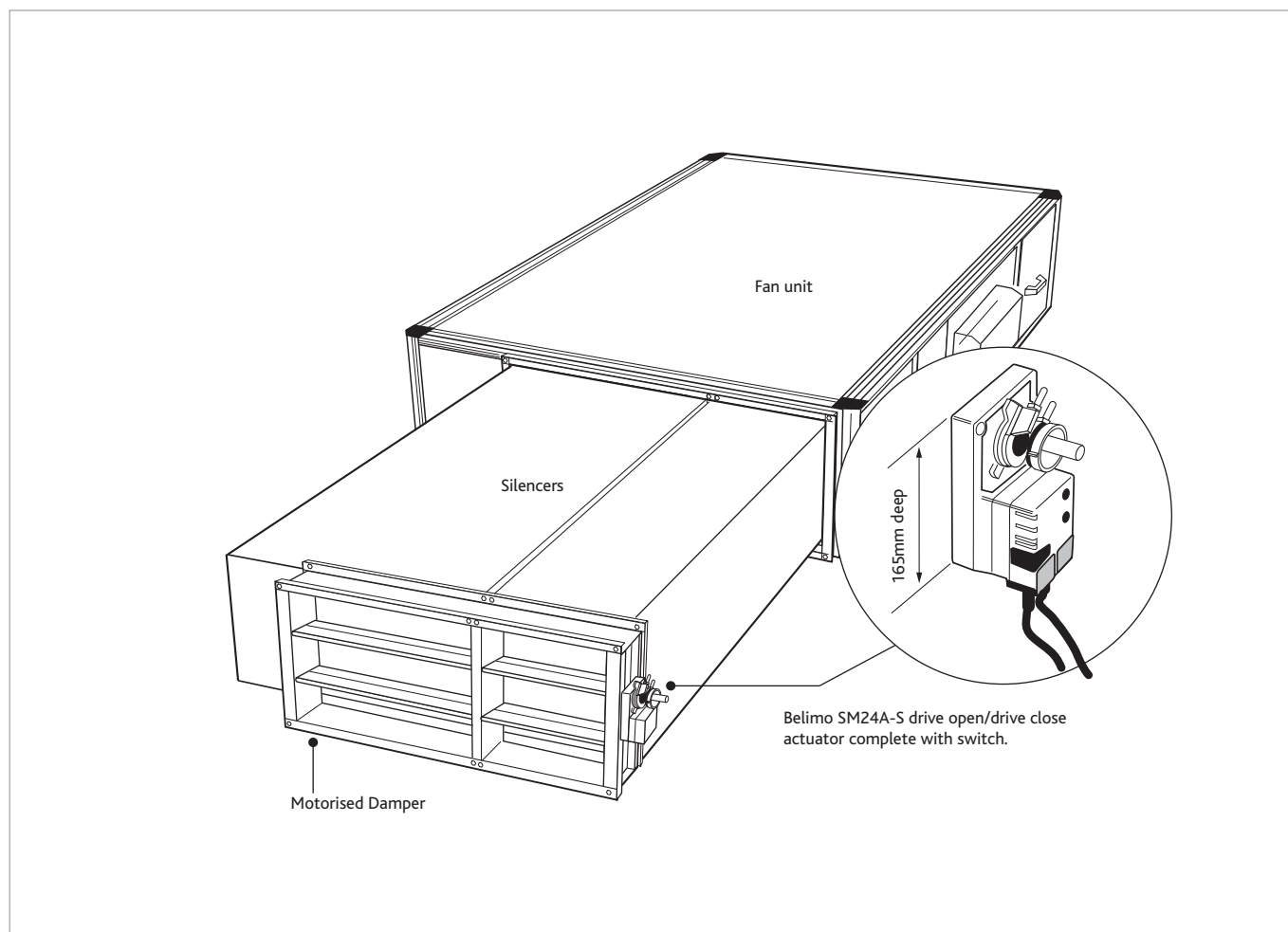
If Nuaire matched silencers (example code XBC15-H-MS16) are being fitted to the fan unit, the motorised damper (example code XBC15-MD-CO) needs to be fitted after the silencers (as figure 12). This ensures that breakout noise levels are kept to a minimum.

The motorised damper units will be supplied loose and are designed to fit directly onto the flange connector (by others).

- Fully interlocking parallel blades, half inch diameter electroplated mild steel spindle.
- Nylatron bushes and external nylon/aluminium blade inter connection linkage.
- Fitted with Belimo SM24A-S drive open/drive close actuator complete with switch.

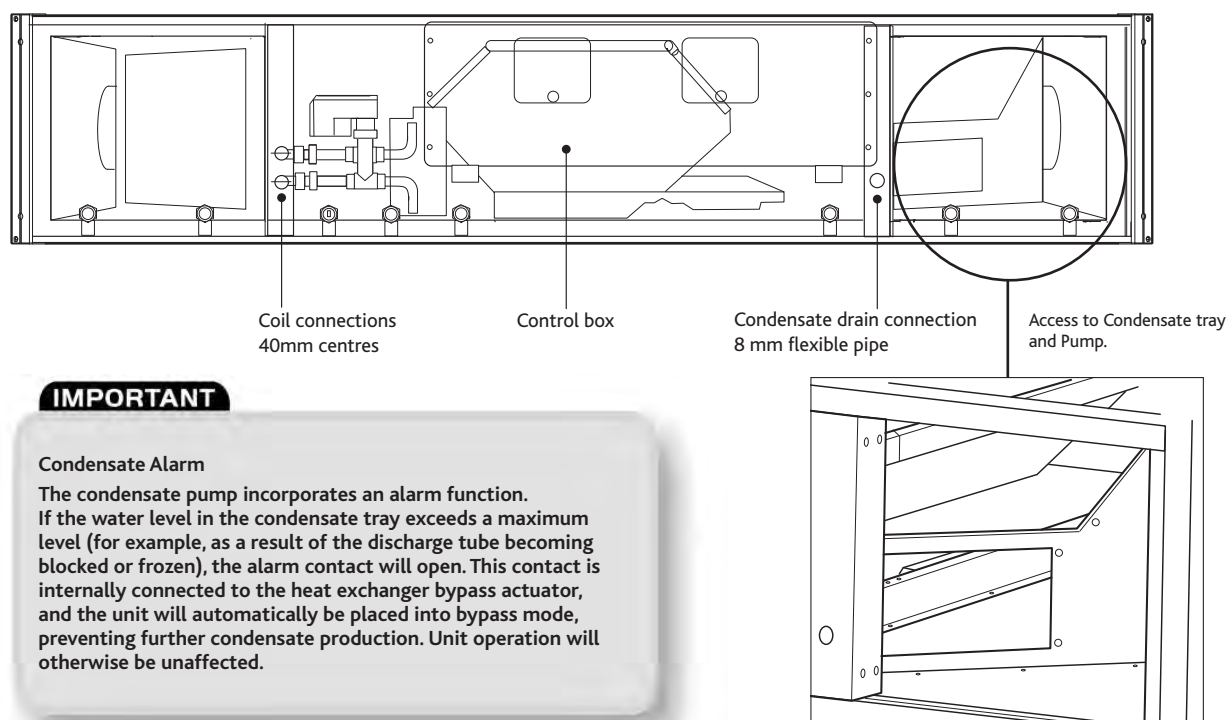
Note: See section 9 for wiring diagrams.

Figure 12: Installing the Motorised Damper.



XBOXER XBC ECOSMART (CO) MODELS

Figure 13: Control side of unit showing coil and condensate connections.



IMPORTANT

Condensate Alarm

The condensate pump incorporates an alarm function. If the water level in the condensate tray exceeds a maximum level (for example, as a result of the discharge tube becoming blocked or frozen), the alarm contact will open. This contact is internally connected to the heat exchanger bypass actuator, and the unit will automatically be placed into bypass mode, preventing further condensate production. Unit operation will otherwise be unaffected.

6.0 COMMISSIONING & SETTING TO WORK

(Note – not all of the components listed here are necessarily included with the equipment supplied).

6.1 FILTERS

Remove filter access panels (observe and note airflow direction labels), inspect filters for contamination with construction debris, replace as necessary. Replace access panels.

Filter pressure drops will depend on actual flow rate and condition. Observe and record filter pressure drops after performance commissioning.

Typically, filter “dirty” condition occurs when the initial filter “clean” readings have been increased by 125Pa.

If filter manometers, pressure switches or indicators have been fitted, they should be set or adjusted to reflect the commissioned system operation.

6.2 HEATING COILS LPHW

Observe the Flow and Return connection labels on the unit. Drain and bleed valves are located on the coil (see fig 12). Other valves may be required in the system pipe-work depending on the installation (by others).

Where the wet system is at risk of frost damage, the addition of a proprietary anti-freeze solution to the water is recommended. Note that any frost protection offered by the unit’s integral control system will not operate if the power supply to the unit is interrupted.

Piped connections should be made to the unit using appropriate techniques, and all pipework must be independently supported.

No hot work is permitted within one metre of the unit.

Ensure that installed pipework runs do not prevent or restrict access to the unit at any point.

The completed installation (including the connections within the unit, as these may be disturbed during installation) shall be pressure tested to the project engineer’s specification.

(This is a condition of the unit warranty).

6.3 FAN SECTIONS

Access to the fan section is via lift off panels. (see figs 1 & 13).

For non-Ecosmart units, wiring to the fan motor / unit terminal box should be mechanically protected and in made in accordance with the details on the motor name plate and diagram attached to the unit.

With the unit electrically isolated, rotate the fan impeller / drive manually, checking that it spins freely.

Check all fixings are secure.

Units must not be operated without all access panels in place – damage to equipment or injury to personnel may result.

Units must not be operated unless control interlocks are in place – damage to equipment may result.

Test run motor for condition and correct rotation.

Check that the correct current overloads are fitted and that the current being drawn does not exceed the motor nameplate value. Excessive current normally indicates that the ductwork system resistance is different to design.

6.4 ACCESS TO FAN UNIT

Access to the fan sections on the non control side and controls side of the unit is shown in figure 1.

Access to the Dampers and actuators is shown in figure 1.

IMPORTANT

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



INDEX - DESCRIPTION OF CONTROL

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XBOXER XBC ECOSMART (CO) MODELS

7.0 DESCRIPTION OF CONTROL SOFTWARE STRATEGY

7.1 GENERAL

The system incorporates a preconfigured BACnet MS/TP enabled controller.



7.2 THE NUAIRE UNIT CONTAINS THE FOLLOWING CONTROLLABLE ITEMS:

- Inlet Damper (if fitted).
- Exhaust Damper (if fitted).
- Heat Recovery and Bypass Damper.
- Heating Coil (if fitted).
- Cooling Coil (if fitted).
- Supply Fan Speed.
- Extract Fan Speed.

7.3 ENABLE SIGNAL

The unit can be enabled via the following methods:

- Software switch (ENABLE) via local display or network.
- Switched live (230VAC) input, PIR etc.
- Volt free input contacts.
- Night cooling / summer free-cooling strategy.
- Scheduled via weekly calendar. (Schedule are accessed and adjusted via the ESCO-LCD)
- Fan Speed Override
- Room Module PIR sensor
- Room Module 3-Fan Speed Button (While in low, med or high state)

When the enable signal is removed, the unit will run on for a time defined by the run-on setpoint.

If auto run-on is enabled, the unit will measure the each enable period and set a dynamic run-on time proportionally to this value. This time is scaled by the network input "Auto run-on Scale Factor" and limited by the input "Auto Run-on Max Time".

7.4 ROOM MODULES

Ecosmart Connect allows the connection of multiple Room Modules which are automatically detected and connect to the controller via a SA (Sensor Actuator) MS/TP bus. See Network Accessory section for more connection details.



7.4.1 ROOM MODULE PIR

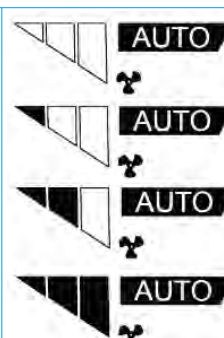




When a Room Module PIR sensor is connected via the SA bus, the control will automatically use this as an enable signal by default. There is a non-adjustable minimum run-on time of 15mins for Room Module PIRs. This is in addition to any software run-on times.

7.4.2 RM 3-SPEED FAN OVERRIDE (ESCO-TDFS ONLY)

When a RM fan speed override is available it will override fan speed functions.

This function overrides any run-on time (except for electric heater heat dissipation). While in override mode, the unit will ignore return air temperature and set the supply air to the setpoint. Multiple fan override sensors are not supported.




Whenever a fan-speed override Room Module is connected, the display will automatically show the fan speed status at all times. **Warning: If a RM Fan Speed override button is left in any position (apart from auto), the unit will stay in override mode indefinitely. This includes off mode.**

Mode	Operation	Display
"Auto"	The controller will ignore the fan speed override. Current fan speed will still be displayed.	
"Off"	The controller will override all functions and stop the fans.	
"Low"	The fans run at low speed.	
"Medium"	The fans run at medium speed.	
"High"	The fans run at high speed.	

7.0 DESCRIPTION OF CONTROL SOFTWARE STRATEGY

7.4.3 RM OCCUPANCY DISPLAY

If an RM sensor with occupancy display is connected, it will automatically display the occupancy state as follows.

State	Description	RM Display
Occupied	An enable signal is present i.e. Fans are running.	
Unoccupied	No enable & no trickle. i.e. Fans are stopped.	
Standby	No enable signal but fans are trickling	

7.5 MULTIPLE SENSORS

Where multiple sensors are connected the following options are available.

Network Input Name	Options
Temp Sensor Operation	Room module average (Default) Return Air only Room Module & Return Air Average
Setpoint Operation	Last Value Changed (Default) Software Setpoint Only (ignore room module)
Humidity Sensor Operation	Average (Default) Max Ignore
CO2 Sensor Operation	Average (Default) Max Ignore
Pressure Sensor Operation	Average (Default) Max Ignore

7.6 AUXILIARY INPUTS 4 & 5 (0-10V INPUTS)

The function of IN4 & IN5 can be set by the network inputs IN4 Function & IN5 Function. The available options are as follows.

Function	Description	Available Ranges
None	The signal is ignored	N/A
Fan Speed Control	A 0-10V input is used as a fan speed demand. 0V = Min Speed 10V = Max speed	N/A
EGG (Ecosmart Gateway Gadget)	0-10V from the EGG PCB is Control used as a fan speed demand. The optional EGG PCB can be used for backwards compatibility with some Ecosmart Classic sensors.	N/A
0-10V CO2 Sensor	0-10V is scaled as defined by the network input "CO2 0-10V Output Range"	0-2,000ppm 0-4,000ppm 0-5,000ppm 0-10,000ppm 0-20,000ppm

Function	Description	Available Ranges
0-10V Temperature Sensor	0-10V is scaled as defined by the network input "Temperature Sensor 0-10V Output Range"	0 to 50°C 0 to 40°C 0 to 100°C 0 to 80°C 0 to 90°C
0-10V Pressure Sensor	0-10V is scaled as defined by the network input "Pressure Sensor"	0-25Pa 0-50Pa 0-100Pa 0-300Pa 0-500Pa 0-1000Pa 0-1600Pa 0-2500Pa 0-3000Pa
0-10V Humidity Sensor	0-10V is scaled to 0-100% humidity	0-100% only

7.6.1 FAN SPEED CONTROL INPUT

Once assigned to either input 4 or 5, the 0-10V input is scaled to 0-100% fan speed demand.

7.6.2 ECOSMART GATEWAY GADGET (EGG)

If an EGG PCB is installed on the system this will give an enable signal and also a 0-10V fan speed demand. The EGG allows an existing NET sensor network to give a fan speed demand to a controller.

7.6.3 CO2 CONTROL

When a CO2 sensor is assigned to the system and an enable signal is received, ventilation will increase fans speeds to reduce CO2 concentration. The target CO2 sensor setpoint can be changed as one of the commissioning setpoints. Room Module CO2 sensors are detected automatically. 0-10V CO2 sensors need to be assigned to input 4 or 5.

7.6.4 HUMIDITY CONTROL

When a humidity sensor is assigned to the system and an enable signal is received, ventilation will increase fans speed to reduce humidity. The target humidity setpoint can be changed as one of the commissioning setpoints. Room Module humidity sensors are detected automatically. 0-10V humidity sensors need to be assigned to input 4 or 5.

7.6.5 CONSTANT PRESSURE CONTROL

When a pressure sensor is assigned to the system and an enable signal is received, ventilation will increase fans speeds to increase pressure to the target setpoint. The target pressure setpoint can be changed as one of the commissioning setpoints. 0-10V pressure sensors need to be assigned to input 4 or 5. Room Module pressure sensors are not available.

XBOXER XBC ECOSMART (CO) MODELS

7.0 DESCRIPTION OF CONTROL SOFTWARE STRATEGY

7.7 CONFIGURABLE MODE (VIA SWITCHED LIVE 2)

The switched live 2 input is a configurable input that can be set to perform a number of functions. The function is set via the network input Configurable Mode SL2.

These functions will include the following:

- Fan Boost (Default Setting)

This enables Fan Boost mode

- Heater Boost

The heater function will be enabled. Fan speeds will be increased where necessary to keep supply temp at the heater boost setpoint. (Default 35°C).

7.7.1 FAN BOOST

When the control receives a boost signal, from either the network input "Boost" or "Configurable SL2" configured to boost the fans will run at boost speed. Once the signal is removed the fans will run on for a time defined by the boost run-on setpoint.

7.7.2 HEAT BOOST

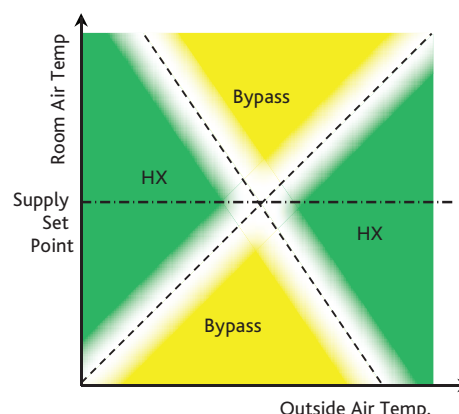
When the control receives a heat boost signal, from either the network input "Heat Boost" or "Configurable SL2" configured to "heat boost", the heater output will increase to 100%. The fan speed will be increased as required to reach the heat boost setpoint.

7.8 TEMPERATURE CONTROL

7.8.1 SUPPLY TEMPERATURE CONTROL (DEFAULT) Figure 14:

While an enable signal is present, this mode modulates heating, cooling & heat exchanger bypass dampers with the aim of the supply air reaching the temperature setpoint. Please note that heating and cooling outputs will only function if the "Heating Type" or "Cooling Type" network inputs are set to heating or cooling options.

The heat exchange bypass damper operates by calculating the supply air temperature based on the return air temperature, the outside air temperature and the heat exchanger efficiency. (Eg. A 13°C outside air temperature with a 23°C return air temperature will give a supply air temperature of 20.5°C). The control then chooses the damper position which requires the minimal heat/cool tempering in order to achieve the setpoint.



Note that the white areas indicate regions where either heat exchanging or bypassing will achieve the same supply temperature.

7.8.2 ROOM TEMPERATURE CONTROL Figure 15:

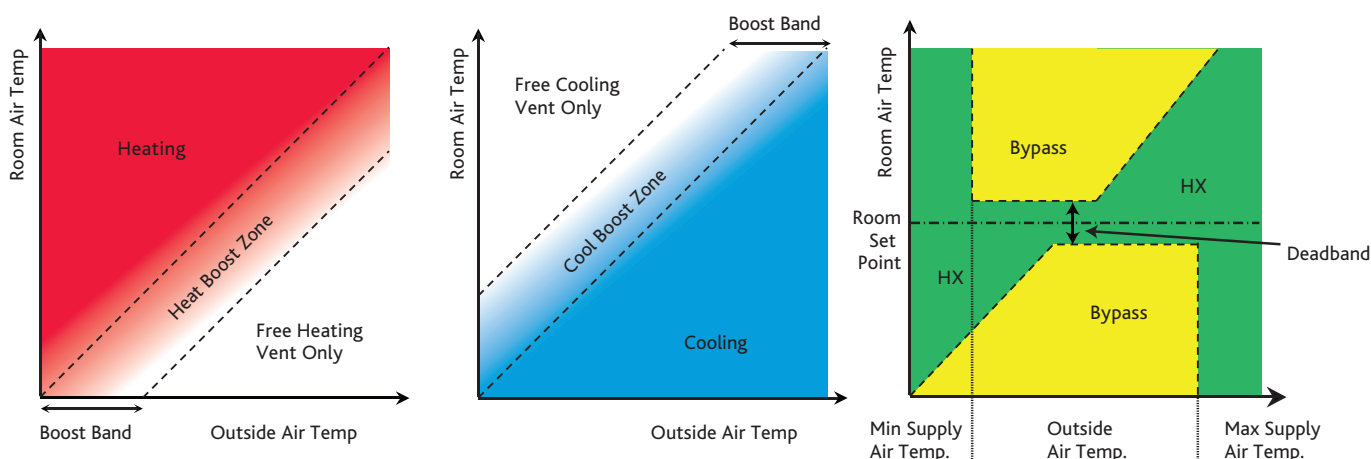
While an enable signal is present, this mode modulates heating, cooling & heat exchanger bypass dampers with the aim of the room air reaching the temperature setpoint. Please note that heating and cooling outputs will only function if the "Heating Type" or "Cooling Type" network inputs are set to heating or cooling options.

When heating or cooling is required achieve the room setpoint, the output of the heat/cool loops are split between ventilation demand or heat/cool demand according to the following graphs. The intermediate "boost" zone is the area in which a small amount of free-heat/cooling is available. In this zone, heating/cooling is used to boost the free-heating/cooling.

In room temperature control mode, the bypass damper is controlled according to the following chart. A minimum supply air temperature limit is included to stop the heat exchanger being bypassed when the air temp is uncomfortably cold, even though cooling is required. In this case the heat exchanger will temper the air for comfort. The reverse applies for the maximum supply air temperature limit.

If the supply air temperature exits the min-max supply temperature range, the unit will adjust ventilation, heating or cooling to compensate.

Note: Room temperature control will only be effective if the heater unit is sized correctly for the space. If the unit is undersized, heating from an external source may be required.



7.0 DESCRIPTION OF CONTROL SOFTWARE STRATEGY

7.8.3 OVERRIDES

When the following conditions occur, the system will temporarily exit "Room Temperature Mode" and enter "Supply Temperature Mode".

- Trickle Mode with no enable signal. (Trickle deadband applies)
- Heat Boost Active
- Fan Boost Active
- Purge Mode Active
- 3-Speed override by Room Module

7.9 TRICKLE MODE

When trickle mode is active, the fans will run at their minimum speed even when there is no enable signal. Heating and cooling will also function in this mode if available. While in trickle mode, the unit will function in "Supply Temperature Control Mode" but with a different, wider deadband, set by the network input Trickle Deadband.

7.10 FROST PROTECTION

Should the internal temperature of the unit fall below a value defined in the commissioning variables, the control will override all heating/cooling logic to open the LPHW or CW control valves, if fitted. This is to allow any protective flow through the heating/cooling coils. The supply fan will also stop and the appropriate frost protection software module will enter an alarm state. This period will last for a minimum of 5 minutes by default. The fault relay will also open. Heat and cool demand relays will operate and the software frost alarm will enter an alarm state.

Please note that frost protection will only function if the Heating Type or CoolingType setpoints are set to LPHW or CW.

7.11 NIGHT COOLING / SUMMER FREE COOLING

Once enabled in software, this routine uses an individual time schedule to cool the fabric of the building at night using only the external air. This mode only functions if the daytime temperature is above the setpoint, cooling is possible and if the cooling air is not too cold.

7.12 PURGE MODE

Once enabled in software, this routine uses an individual time schedule to provide a period of increased air change throughout a space. This mode only functions if the inlet air is above a minimum temperature of 12°C. While purge is in progress, the unit will function in "Supply Temperature Control Mode" but with a different, wider deadband, set by the network input "Trickle Deadband".

7.13 HIBERNATE

This mode is available for LPHW and CW units where the valves are required to be driven open in anticipation of a period where the unit is electrically isolated and inactive. When enabled via the network input "Hibernate Mode" this will stop the fans and open all LPHW & CW valves fully. The unit can then be powered down. This mode activation is reset upon power cycle so when restarted the unit will function as normal.

This mode is for periods when the building is left dormant and will stop the coils trapping water and causing a freeze risk. It will be the building's responsibility to provide freeze-preventative heating during this time. This can also be used for a cleaning or flushing cycle.

7.14 ALARMS

7.14.1 CRITICAL ALARM LATCHING

Once in critical alarm state the unit will drive all heating and cooling outputs to 0V. In the event of fan fail other functions continue as normal. The critical alarm is latched and required manual reset or power cycle to clear.

Causes of critical alarm:

- Fan fail via fault circuit 1
- Heater overtemp via fault circuit 1

7.14.2 MAINTENANCE ALARMS (NON-LATCHING)

Once in maintenance alarm state the only action taken is de-energising of the fault relay. Once the trigger is removed, the alarm will reset automatically.

Causes of maintenance alarm:

- Condensate pump fault (This bypasses the heater exchanger automatically)
- Sensor Failure
- Low supply temperature, default 8°C. This can be set to stop fans if required
- Frost protection routine active, default 4°C (This only runs if water valves are selected as fitted)
- Excessively high supply temperature reading (this will stop heating)
- Filter dP fault (if fitted)

All alarms have a hold off period set by the setpoint "Alarm Delay".

7.14.3 THERMAL TRIP

In case of software failure, as a final resort, the electric heater is protected by a fail-safe thermal overload switch. This switch disables the heater controller once the temperature reaches 80°C. When this occurs, the critical alarm will latch in software.

Once the unit cools, the contactor will re-engage but the heater signal will remain at 0V until the critical fault is reset in software or by power cycle.

XBOXER XBC ECOSMART (CO) MODELS

7.0 DESCRIPTION OF CONTROL SOFTWARE STRATEGY

7.15 EXPOSED BACNET OBJECT LIST (BY CATEGORY)

ENABLE

LCD Browser Page	BACnet Object	Description	Object Type	Object ID	Default Value	Units
32	Enable	Software enable switch	MSV	10218	Off	Off/On
19	SL Enable	The state of the enable input	BI	10161	N/A	Off/On
10	Run-on (Enable)	Run-on timer value	AV	10267	0	Seconds
25	Time Schedule	Local Time Schedule	SCH	10496	N/A	N/A
32	Enable via Schedule	Enabled via Schedule	MSV	10219	N/A	Off/On

TRICKLE MODE

35	Trickle Mode	Enable trickle mode	MSV 1	0250	Off	Off/On
16	Trickle Deadband	Trickle mode deadband	AV	10316	5	Degrees-Celsius

IO DAMPERS

13	IO Damper Delay	Delay between starting the fan relay and the fan output.	AV	10279	0	Seconds
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ANALOGUE INPUTS

2	IN4	The 0-10 voltage at input 4	AI	10032	N/A	Volts
29	IN4 Function	Function of the UI4 input	MSV	10209	None	None Fan Speed Control EGG 0-10V CO2 Sensor 0-10V Temperature Sensor 0-10V Humidity Sensor 0-10V Pressure Sensor
2	IN5	The 0-10 voltage at input 5	AI	10035	N/A	Volts
30	IN5 Function	Function of the UI5 input	MSV	10210	None	None Fan Speed Control EGG 0-10V CO2 Sensor 0-10V Temperature Sensor 0-10V Humidity Sensor 0-10V Pressure Sensor

CONFIGURABLE INPUTS

19	SL2 Input	The state of the configurable input (IN9)	BI	10164	N/A	Off/On
28	SL2 Mode	Set the function of switched live 2	MSV	10202	Fan Boost	None/Fan Boost/Heater Boost

FAN BOOST

32	Fan Boost	Software enabled Fan boost	MSV	10240	Off	Off/On
11	Run-on (Boost)	Boost run-on time	AV	10272	0	Seconds
11	Fan Boost Speed	Fan boost speed	AV	10273	100	Per cent

HEAT BOOST

28	Heat Boost	Software enabled Heater boost	MSV	10205	Off	Off/On
12	Heat Boost Setpoint	Setpoint Heater Boost Setpoint	AV	10276	35	Degrees-Celsius

FAN OUTPUTS

7	Supply Fan Output	The 0-10V signal to the supply fan	AO	10182	N/A	Volts
7	Extract Fan Output	The 0-10V signal to the extract fan	AO	10176	N/A	Volts
20	Fan Enabled Cmd	The state of the fan enabled relay	BO	10191	N/A	Off/On

XBOXER XBC ECOSMART (CO) MODELS

7.0 DESCRIPTION OF CONTROL SOFTWARE STRATEGY

7.15 EXPOSED BACNET OBJECT LIST (BY CATEGORY)

FAN COMMISSIONING

LCD Browser Page	BACnet Object	Description	Object Type	Object ID	Default Value	Units
10	Extract Fan Max	Individual fan maximum speed setting	AV	10268	100	Percent
11	Extract Fan Min	Individual fan minimum speed setting	AV	10270	20	Percent
16	Supply Fan Max	Individual fan maximum speed setting	AV	10312	100	Percent
16	Supply Fan Min	Individual fan minimum speed setting	AV	10314	20	Percent

TEMPERATURE CONTROL

15	Software Setpoint	Software Setpoint	AV	10309	22	Degrees-Celsius
10	Deadband	Deadband for temp control	AV	10266	3	Degrees-Celsius
31	SetPoint Op	Setpoint operation	MSV	10214	Last Value Chg	Last Value Changed /Software Only
31	T Sens. Op	Temperature sensor operation	MSV	10215	NS Average	NS Average/Return Air Only/ NS & Return Average
31	0-10V Temp Range	Temperature sensor range	MSV	10216	0 to 50°C	0 to 50°C/0 to 40°C/ 0 to 100°C/0 to 80°C/ 0 to 90°C
33	Temp Control Mode	Temperature control mode STC/RTC	MSV	10245	ReturnTempCtrl	Supply Temperature Ctrl/ Return Temperature Ctrl
15	STC H/C Pref	STC Heat/Cool Pref	AV	10310	50	No units
16	STC HX Efficiency	STC HX Efficiency	AV	10311	0.8	No units
14	RTC Boost Band	Return Temperature Control Boost Band	AV	10306	15	Degrees-Celsius
15	RTC Max Supply Temp	Max supply temp when in RTC mode	AV	10307	35	Degrees-Celsius
15	RTC Min Supply Temp	Min supply temp when in RTC mode	AV	10308	12	Degrees-Celsius

HEATING OUTPUT

29	Heating Type	Set the type of heating fitted	MSV	10206	As per build	None/LPHW/Electric
7	Heating Output	The 0-10V signal to the heating output	AO	10179	N/A	Percent
21	Heating Demand Cmd	The state of the heating demand relay	BO	10197	N/A	Off/On

COOLING OUTPUT

28	Cooling Type	Set the type of cooling fitted	MSV	10203	None	None/Cold Water/DX
7	Cooling Output	The 0-10V signal to the cooling output	AO	10173	N/A	Percent
20	Cooling Demand Cmd	The state of the cooling demand relay	BO	10194	N/A	Off/On

HX BYPASS DAMPER

20	Bypass Damper Cmd	The signal to the bypass damper (Close = Bypass)	BO	10185	N/A	Open/Close
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XBOXER XBC ECOSMART (CO) MODELS

7.0 DESCRIPTION OF CONTROL SOFTWARE STRATEGY

7.15 EXPOSED BACNET OBJECT LIST (BY CATEGORY)

FAN DEMANDS INPUTS

LCD Browser Page	BACnet Object	Description	Object Type	Object ID	Default Value	Units
10	CO2 Target	Target CO2 Value	AV	10265	650	Parts-Per-Million
27	0-10V CO2 Range	CO2 sensor output range	MSV	10200	0-2,000ppm	0-2,000ppm/0-4,000ppm/ 0-5,000ppm/0-10,000ppm/ 0-20,000ppm
27	CO2 Sensor Op	CO2 sensor operation in case of multiple sensors	MSV	10201		Average CO2/MaxCO2/ Ignore CO2
12	Humidity Target	Relative HumidityTarget	AV	10278	60	Percent-relative-Humidity
29	Humidity Sensor Op	Humidity Sensor Operation in case of multiple sensors	MSV	10207	Average RH%	Average RH%/Max RH%/Ignore RH%
14	Pressure Target	Target pressure value	AV	10303	400	Pascals
30	0-10V Press Range	Pressure sensor range	MSV	10212	0 to 1000Pa	0-25Pa/0-50Pa/0-100Pa /0-300Pa/0-500Pa/0-1000Pa /0-1600Pa/0-2500Pa/ 0-3000Pa
30	P sens. Op	Pressure sensor operation in case of multiple sensors	MSV	10213	Average Value	Average Value/ Max Value

SELECTED PROCESS VARIABLES

17	Room Air Temp	The room air temperature	AV	11296	N/A	Degrees--Celsius
17	CO2 Level	The CO2 Level	AV	13980	N/A	ppm
17	Humidity	The Humidity Level	AV	14297	N/A	% RH
17	Active Setpoint	The setpoint currently used	AV	14534	N/A	Degrees-Celsius

XBC TEMPERATURE SENSORS

1	Supply Air Temp (B)	The supply air temperature	AI	10005	N/A	Degrees-Celsius
1	Fresh Air Temp (H)	The fresh air temperature	AI	10008	N/A	Degrees-Celsius
1	Extract Air Temp (C)	The extract air temperature	AI	10011	N/A	Degrees-Celsius

ZONE SENSORS

2	RM199 Temp	The temperature at RM address 199	AI	10029	N/A	Degrees-Celsius
2	RM199 Humidity	The Humidity at RM address 199	AI	10017	N/A	Percent-Relative-Humidity
8	RM199 Setpoint	The setpoint at RM address 199	AV	10023	N/A	Degrees-Celsius
26	RM199 Fan Speed	Fan Speed Override Status of RM199	MSV	10014	N/A	Off/Auto/Low/Medium/High
35	RM199 Fan Display	Fan Speed Override Display at RM address 199	MSV	14703	N/A	No Status/Off/Low/Medium /High/Auto-Off/Auto-Low /Auto-Medium/Auto-High
3	RM200 Temp	The temperature at RM address 200	AI	10050	N/A	Degrees-Celsius
3	RM200 Humidity	The Humidity at RM address 200	AI	10053	N/A	Percent-Relative-Humidity
8	RM200 Setpoint	The set point at RM address 200	AV	10074	N/A	Degrees-Celsius
3	RM201 Temp	The temperature at RM address 201	AI	10065	N/A	Degrees-Celsius
4	RM201 Humidity	The Humidity at RM address 201	AI	10077	N/A	Percent-Relative-Humidity
8	RM201 Setpoint	The setpoint at RM address 201	AV	10083	N/A	Degrees-Celsius
3	RM202 Temp	The temperature at RM address 202	AI	10068	N/A	Degrees-Celsius
4	RM202 Humidity	The Humidity at RM address 202	AI	10092	N/A	Percent-Relative-Humidity
8	RM202 Setpoint	The setpoint at RM address 202	AV	10098	N/A	Degrees-Celsius

XBOXER XBC ECOSMART (CO) MODELS

7.0 DESCRIPTION OF CONTROL SOFTWARE STRATEGY

7.15 EXPOSED BACNET OBJECT LIST (BY CATEGORY)

ZONE SENSORS (Continued from previous page)

LCD Browser Page	BACnet Object	Description	Object Type	Object ID	Default Value	Units
4	RM203 Temp	The temperature at RM address 203	AI	10071	N/A	Degrees-Celsius
4	RM203 Humidity	The Humidity at RM address 203	AI	10107	N/A	Percent-Relative-Humidity
9	RM203 Setpoint	The setpoint at RM address 203	AV	10113	N/A	Degrees-Celsius
5	RM212 CO2	The CO2 at RM address 212	AI	10137	N/A	Parts-Per-Million
6	RM212 Temp	The temperature at RM address 212	AI	10149	N/A	Degrees-Celsius
5	RM213 CO2	The CO2 at RM address 213	AI	10140	N/A	Parts-Per-Million
6	RM213 Temp	The temperature at RM address 213	AI	10152	N/A	Degrees-Celsius
5	RM214 CO2	The CO2 at RM address 214	AI	10143	N/A	Parts-Per-Million
6	RM214 Temp	The temperature at RM address 214	AI	10155	N/A	Degrees-Celsius
5	RM215 CO2	The CO2 at RM address 215	AI	10146	N/A	Parts-Per-Million
6	RM215 Temp	The temperature at RM address 215	AI	10158	N/A	Degrees-Celsius

FROST PROTECTION

11	Frost Prot. Fan Off	Minimum time the supply fan will stop in a frost protection state	AV	10274	300	Seconds
12	Frost Prot.Temp	Supply temperature at which frost protection becomes active	AV	10275	4	Degrees-Celsius

HIBERNATE

32	Hibernate Mode	Unit is ready for hibernation. Resets on powercycle	MSV	10241	Off	Off/On
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PURGE MODE

33	Purge Active	This input will enable purge mode	MSV	10243	Off	Off/On
14	Purge Fan Speed	Purge Fan Speed	AV	10304	60	Percent
14	Purge Min Temp	The minimum temperature that will stop purge mode	AV	10305	12	Degrees-Celsius
25	Purge Time Schedule	Purge Time Schedule	SCH	10499	N/A	N/A
35	Purge via Schedule	Purge Time Schedule State	MSV	10512	N/A	Off/On

NIGHT COOL MODE

33	Night C Mode	This input will enable night cool mode	MSV	10242	Off	Off/On
13	Night C Fan Speed	The night cool fan speed	AV	10281	60	Percent
13	Night C Min Temp	The minimum temperature that will stop night cooling	AV	10302	12	Degrees-Celsius
25	Night C Schedule	Night Cooling Schedule	SCH	16014	N/A	N/A
36	Night C Schedule	Night Cool Schedule State	MSV	16014	N/A	Off/On
25	Night C Sample	Daytime schedule for winter or summer decision making	SCH	15875	N/A	N/A
36	Night C Sample	Night Cool Sampling Schedule State	MSV	16008	N/A	Off/On

AUTO RUN-ON

31	Auto Run-on	Auto run-on mode	MSV	10217	Off	Off/On
9	Auto-Run-on Max Time	Maximum Run-on Max Time	AV	10263	900	Seconds
9	Auto-Run-on Scale Factor	Scale Factor for automatic run-on time	AV	10264	2	No Units

XBOXER XBC ECOSMART (CO) MODELS

7.0 DESCRIPTION OF CONTROL SOFTWARE STRATEGY

7.15 EXPOSED BACNET OBJECT LIST (BY CATEGORY)

ALARM

LCD Browser Page	BACnet Object	Description	Object Type	Object ID	Default Value	Units
20	Fault Relay Cmd	The state of the fault relay (Fault = De-energised)	BO	10188	N/A	Alarm/Normal
9	Alarm Delay	Alarm hold off period	AV	10262	10	Seconds
22	Reset Alarms	Changing this value will reset any latched alarms	BV	10332	FALSE	True/False
19	Alarm Circuit 1	The state of Alarm Circuit 1	BI	10167	N/A	Normal/Alarm
19	Alarm Circuit 2	The state of Alarm Circuit 2	BI	10170	N/A	Normal/Alarm
12	High Temp Alarm	Supply temp which will trip the high supply alarm	AV	10277	50	Degrees-Celsius
13	Low Temp Alarm	Supply temp which will trip the low supply alarm	AV	10280	8	Degrees-Celsius
30	Low Temp Action	Action taken when the low supply alarm is engaged	MSV	10211	Alarm Only	Alarm only / Alarm and stop fans
35	Critical Alarm	Unit is latched in critical alarm	MSV	15309	N/A	Normal/Alarm
36	Maint. Alarm	Maintenance Alarm	MSV	15310	N/A	Normal/Alarm
36	XBC Sensor Alarm	XBC Sensor Out of Range	MSV	17009	N/A	Normal/Alarm
37	Low SA-T Alarm	Low Supply Air Alarm	MSV	17011	N/A	Normal/Alarm
37	High SA-T Alarm	High Supply Air Alarm	MSV	17012	N/A	Normal/Alarm
37	Frost Alarm	The unit is in frost mode	MSV	17013	N/A	Normal/Alarm

LCD EVENT SIGNAL

37	Ala(A Circ 1)	For LCD Event Signal only	MSV	17281	N/A	Normal/Alarm
38	Nor(A Circ 1)	For LCD Event Signal only	MSV	17282	N/A	Normal/Alarm
38	Ala(Low Supply Temp)	For LCD Event Signal only	MSV	17285	N/A	Normal/Alarm
38	Nor(Low Supply Temp)	For LCD Event Signal only	MSV	17286	N/A	Normal/Alarm
38	Nor(High Supply Temp)	For LCD Event Signal only	MSV	17289	N/A	Normal/Alarm
39	Ala(High Supply Temp)	For LCD Event Signal only	MSV	17290	N/A	Normal/Alarm
39	Ala(A Circ 2)	For LCD Event Signal only	MSV	17293	N/A	Normal/Alarm
39	Nor(A Circ 2)	For LCD Event Signal only	MSV	17294	N/A	Normal/Alarm
39	Ala(Frost)	For LCD Event Signal only	MSV	17316	N/A	Normal/Alarm
40	Nor(Frost)	For LCD Event Signal only	MSV	17317	N/A	Normal/Alarm
40	Ala(XBC Sensor)	For LCD Event Signal only	MSV	17320	N/A	Normal/Alarm
40	Nor(XBC Sensor)	For LCD Event Signal only	MSV	17321	N/A	Normal/Alarm

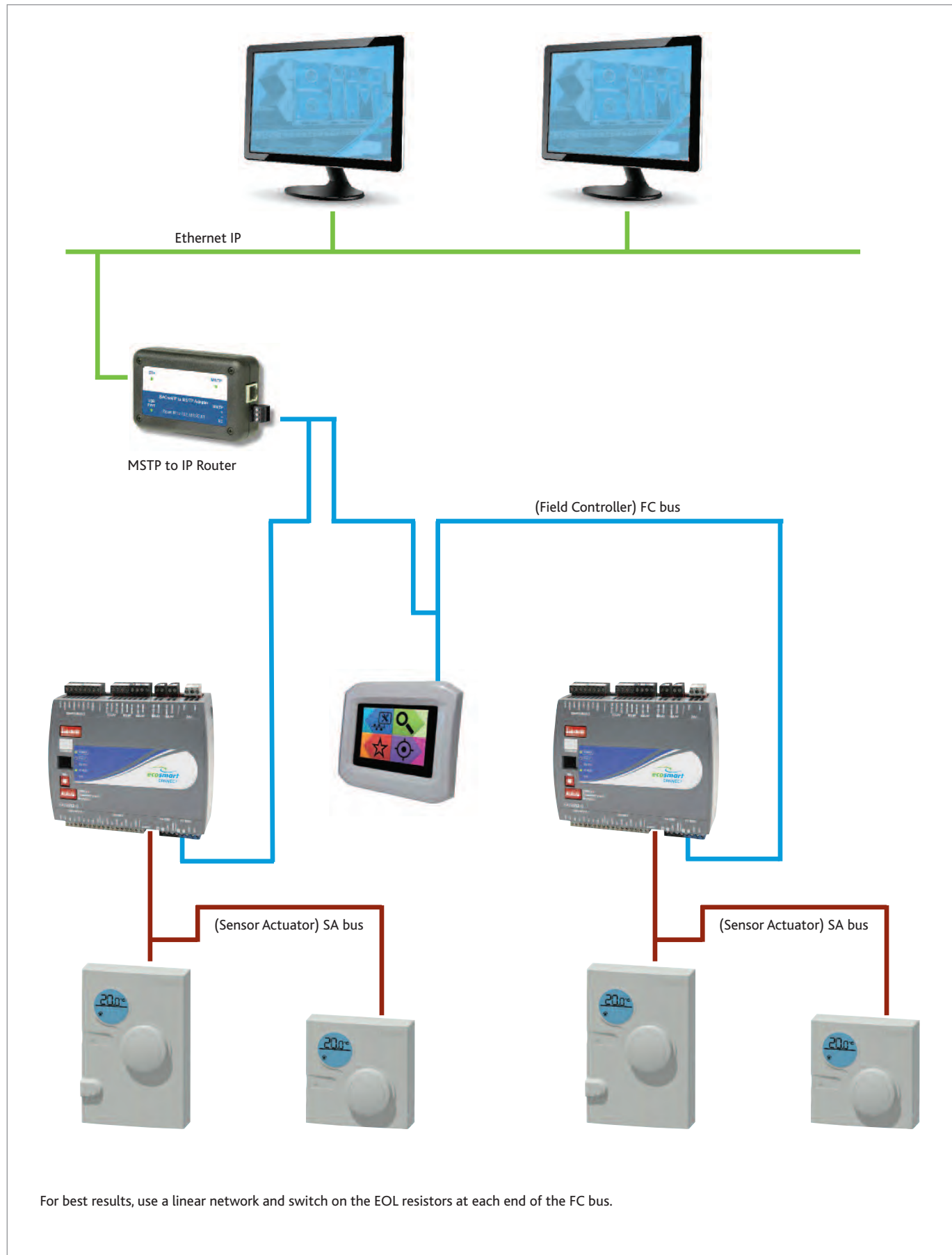
FACTORY SETTINGS

28	Damper Override	Override bypass damper position	MSV	10204	Auto	Auto/Heat Exchange/Bypass
33	Tacho PCB Fitted	Is a "Taco Bell" PCB fitted	MSV	10244	As per build	Yes/No
22	Tuning Reset	Resets the PID auto tuning loops	BV	12880	FALSE	True/False
29	Ignore PIR Sensors	Ignore all MSTP network PIR sensors	MSV	10208	No	Yes/No
18	EF Max Volt	The upper voltage for the extract fan	AV	17273	10	volts
18	EF Start Volt	The voltage required to start the extract fan	AV	17274	1	volts
18	SF Max Volt	The upper voltage for the supply fan	AV	17275	10	volts
18	SF Start Volt	The voltage required to start the extract fan	AV	17276	1	volts
40	SW-FAC2612-2-4A	Strategy Version	MSV	17340	Off	Off/On

XBOXER XBC ECOSMART (CO) MODELS

8.0 NETWORKING

NETWORK CONNECTION DIAGRAM Figure 16:



XBOXER XBC ECOSMART (CO) MODELS

9.0 FC BUS DEVICES

9.1 FAC CONTROLLER Figure 17:

A FAC controller is used to control the unit. The controller can connect to the FC bus via the 4 pin FC connection.



MAC Address

The physical MAC address of the FAC adjustable between 4-127 and is set via the DIP switch on the front of the unit. When multiple controllers are connected on the same FC bus, each controller's MAC address must be unique.

BACnet Instance Number

The BACnet instance number of the FAC is factory-set to a random unique value from 0-4,194,304. This ensures that every controller will have a unique BACnet instance number on any possible network.

End Of Line (EOL) Resistor

When an FAC controller is used as a terminator at the end of a FC bus line, the EOL resistor dip switch can be switched on for best performance.

Fault Light Status

Blink 5Hz - Not all possible room modules are connected. This is normal.

Blink 2Hz - Startup in progress

Off Steady - No Faults

On Steady - No Software

9.2 BACNET IP TO MS/TP ROUTER (ESCO-IPN) Figure 18:

The BACnet IP to MS/TP Router exchanges information between networks and allows the controller to communicate on an IP network. One router is required for each MS/TP network.



The BACnet router has a USB 2.0, Type B receptacle which is only used to obtain power from a computer or USB adapter. A mains adapter and cable is supplied.

The router connects to the FC bus via screwed terminals.

Address Type	Default Address
IP Address	192.168.92.68
Subnet Mask	255.255.255.0 (/24)

A reset switch is available inside a small hole located on the side of the case. If you press the reset switch with a paper clip (or similar device) for at least 1 second, the switch resets to the default values of the IP address, gateway address, and netmask. After you use the reset switch, you need to reboot the router. The BACnet/IP to MS/TP Router contains a Web server. You can access the Web server from any Internet-compatible computer on the local network. To configure the router, you need a computer with an Ethernet connection, router, and standard Web browser.

9.3 INTERCONNECTION

The FC bus connects via the following MSTP cabling:

ESCO-MSTPC30M	Ecosmart Connect MSTP cable reel 30m
ESCO-MSTPC150M	Ecosmart Connect MSTP cable reel 150m

Suggested Wiring Colouring

White	+
Green	-
Black	COM
Red	Unused

Note: On the SA Bus, the + and - wire are one twisted pair, and the COM and SA PWR are the second twisted pair of wires.

These cannot be used with RJ12 connections and must be stripped and connected using screwed terminals. The shield must be earthed at the control panel end only and be made continuous along the bus length. Room Modules must not be fitted more than 150metres (cable length) from the controller.



XBOXER XBC ECOSMART (CO) MODELS

9.0 FC BUS DEVICES

9.4 TOUCH SCREEN (ESCO-LCD) FIELD ADVANCED DISPLAY (FAD)

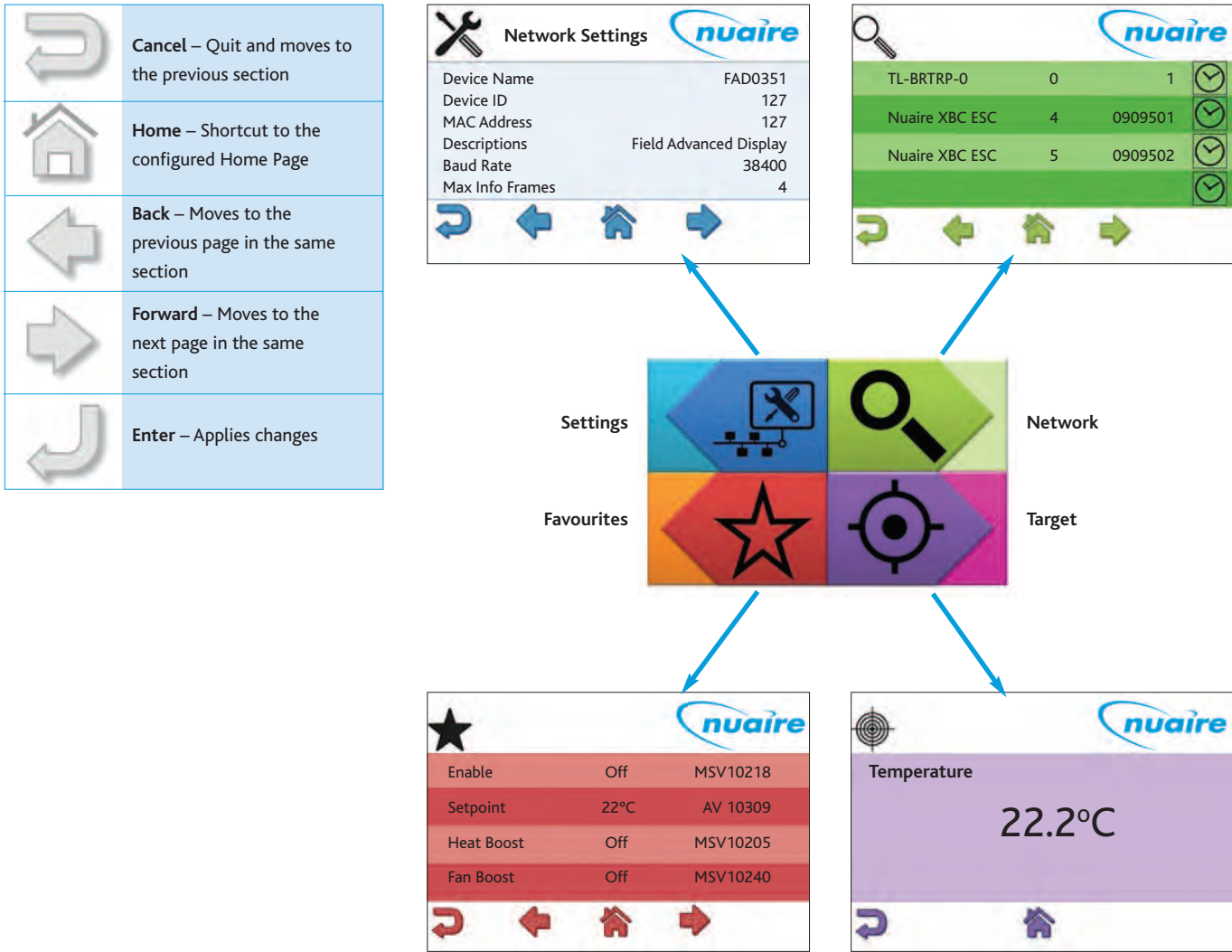
The ESCO-LCD is a user friendly operator interface featuring BACnet® communication and a colourful, graphic display with touch-screen interface. It is powered by 12-24VAC / VDC and connected via the FC bus.

Figure 19:



9.4.1 NAVIGATION

Figure 20:



XBOXER XBC ECOSMART (CO) MODELS

9.0 FC BUS DEVICES

9.5 QUICK SETUP

The following section explains how to quickly set-up the FAD with a target object and some favourites.

9.5.1 SETTING UP A TARGET OBJECT

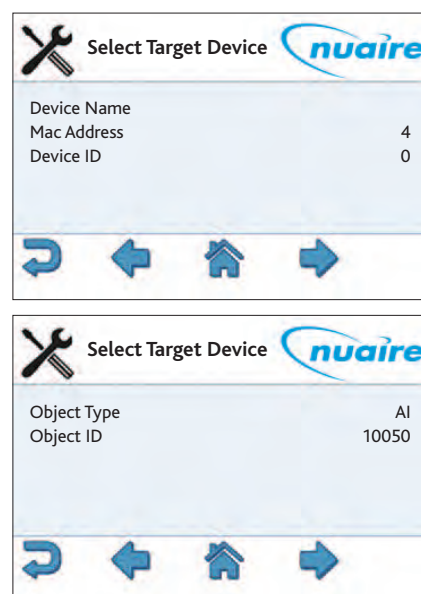
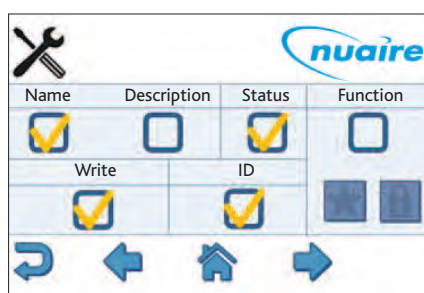
Target objects allow the user to view a "target" device and object within the entire network.

To choose a target object

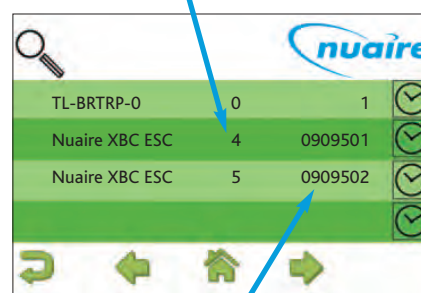
- Navigate to the settings page.
- Select the right arrow four times to reach the Select Target Device screen.
- Enter the physical MAC address* of the controller (Device names or BACnetIDs can also be used but MAC addresses are shorter)
- Select the right arrow once
- Enter the object type of the required object (Eg AI,AO,MSV)**
- Enter the BACnet ID** of the object. (0-4194304)
- Select the home icon.

* This is the setting of the DIP switch on the front of the FAC controller.
This can also be discovered by browsing to the network screen while ID is selected in the View Config settings screen.

Figure 21:

Name	Description	Status	Function
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Write	ID		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>



Name	Description	Status	Function
TL-BRTRP-0	0	1	<input checked="" type="checkbox"/>
Nuaire XBC ESC	4	0909501	<input checked="" type="checkbox"/>
Nuaire XBC ESC	5	0909502	<input checked="" type="checkbox"/>

MAC Address

BACnet Device ID

** Popular object details are listed below, or use the network browser or see "Exposed BACnet Object List" for a full list.

Network Page	Description	Object Type	Object ID
17	Room Air Temp	AV	11296
17	CO2 Level	AV	13980
17	Humidity	AV	14297
17	Active Setpoint	AV	14534
1	Fresh Air Temperature	AI	10008

9.0 FC BUS DEVICES

9.5.1 SETTING UP A TARGET OBJECT CONT.

To set the target object page as the default home page.

- Navigate to the settings page.
- Select the right arrow twice to reach the display settings screen.
- Select Home Page
- Select Target
- Select the enter icon
- Select the home icon

Note: The BACnet type & ID will be displayed on the target page if 'ID' is selected on the 'View Config' settings screen.

Note: If the target page is selected as the home page and a security password is set the home page will be locked. The only way to exit the target screen in this case is to press the Nuaire logo to the top right of the screen for 5 seconds.

9.5.2 SETTING UP FAVOURITES

The "Favourite" screen displays a list of favourite objects.

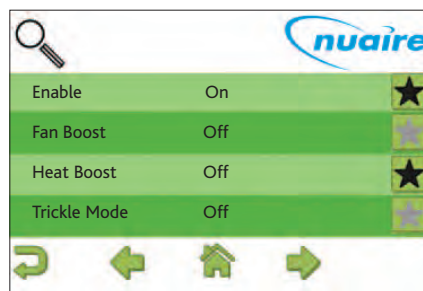
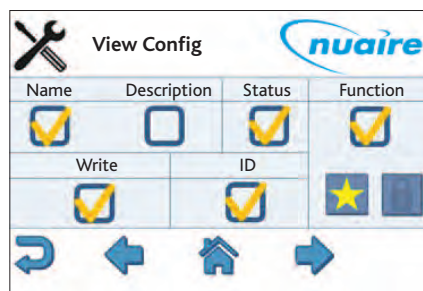
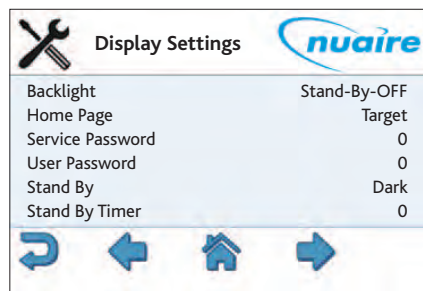
To add or remove favourites.

- Navigate to the settings page.
- Select the right arrow six times to reach the View Config screen.
- Select the function tickbox and favourite star.
- Select the home icon
- Navigate to the network page.
- Select the appropriate controller
- Navigate to the required object. See "Exposed BACnet Object List" for a full list.
(Pressing for 3 seconds on an object will display the full name.)
- Select the star to turn it black
- Navigate and select any other required favourites
- When finished, navigate back to the View Config screen in the settings section and remove the function tick

Favourites can be removed by browsing the favourites page, selecting an object and then selecting the trashcan.

Favourites can be re-ordered by uploading the favourite settings to a usb memory stick and changing the order of the items in the favourites.csv file. This file can then be downloaded back to the LCD.

Figure 22:



Network Page	Description	Object Type	Object ID
17	Room Air Temp	AV	11296
17	CO2 Level	AV	13980
17	Humidity	AV	14297
17	Active Setpoint	AV	14534
32	Enable	MSV	10218
25	Time Schedule	SCH	10496
32	Fan Boost	MSV	10240
28	Heat Boost	MSV	10205
1	Fresh Air Temperature	AI	10008
15	Software Setpoint	AV	10309

XBOXER XBC ECOSMART (CO) MODELS

9.0 FC BUS DEVICES

9.5.3 SETTING UP SECURITY

9.5.3.1 TO SET A USER PASSWORD

- Navigate to the settings page
- Select the right arrow twice to reach the display settings screen
- Change the user password a 4 digit number
- The user password will now be requested each time a locked object is written
- The user password is also needed to exit the target page. (When the home page is set to target)

9.5.3.2 TO SET A SERVICE PASSWORD

- Navigate to the settings page
- Select the right arrow twice to reach the display settings screen
- Change the service password a 4 digit number
- The service password will now be requested each time the settings page is accessed

9.5.3.3 TO DISABLE WRITING OF VALUES

- Navigate to the settings page
- Select the right arrow six times to reach the View Config screen
- De-select the write tickbox. All controller points are now read only
- A service password will need to be set to stop users re-enabling the write function

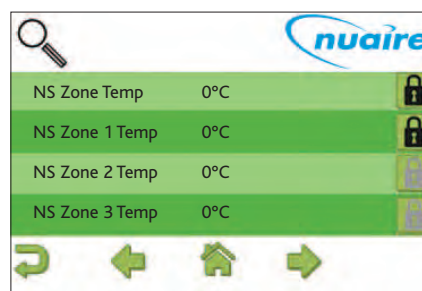
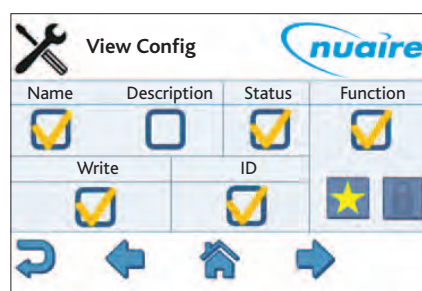
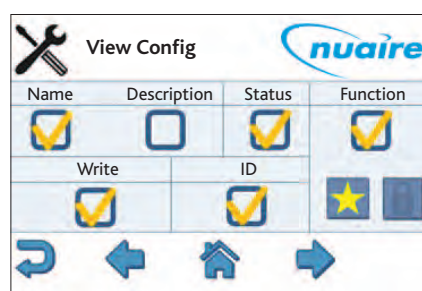
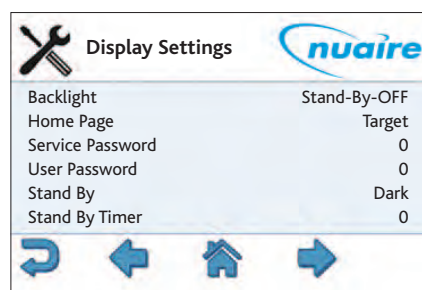
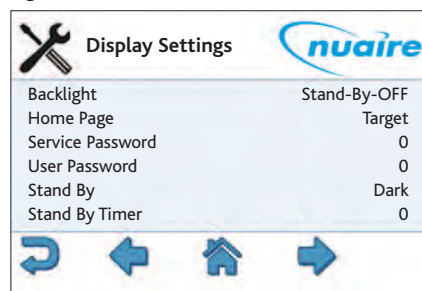
9.5.3.4 TO ALLOW BASIC VALUES TO BE WRITTEN BY THE USER

- Navigate to the settings page
- Select the right arrow six times to reach the View Config screen
- Select the function tickbox and lock
- Select the home icon
- Navigate to the network page.
- Select the appropriate controller.
- Navigate to the required object. See "Exposed BACnet Object List" for a full list.
- Select any values that need password protection. A black lock indicates a locked value
- When finished, navigate back to the View Config screen in the settings section. Remove the Function tick and enable writing of values
- A user password will need to be set to stop writing of locked values. It is recommended that all values are locked except the following;

Network Page	Description	Object Type	Object ID
32	Enable	MSV	10218
25	Time Schedule	SCH	10496
32	Fan Boost	MSV	10240
28	Heat Boost	MSV	10205
15	Software Setpoint	AV	10309

Note: If the target page or favourite page is selected as the home page and a security password is set, the home page will be locked. The only way to exit the target screen in this case is to press the Nuair logo to the top right of the screen for 5 seconds. A security password will then be requested to access the main menu. The security password timeout is the same as the standby timer and set via the display settings.

Figure 23:





XBOXER XBC ECOSMART (CO) MODELS

9.0 FC BUS DEVICES

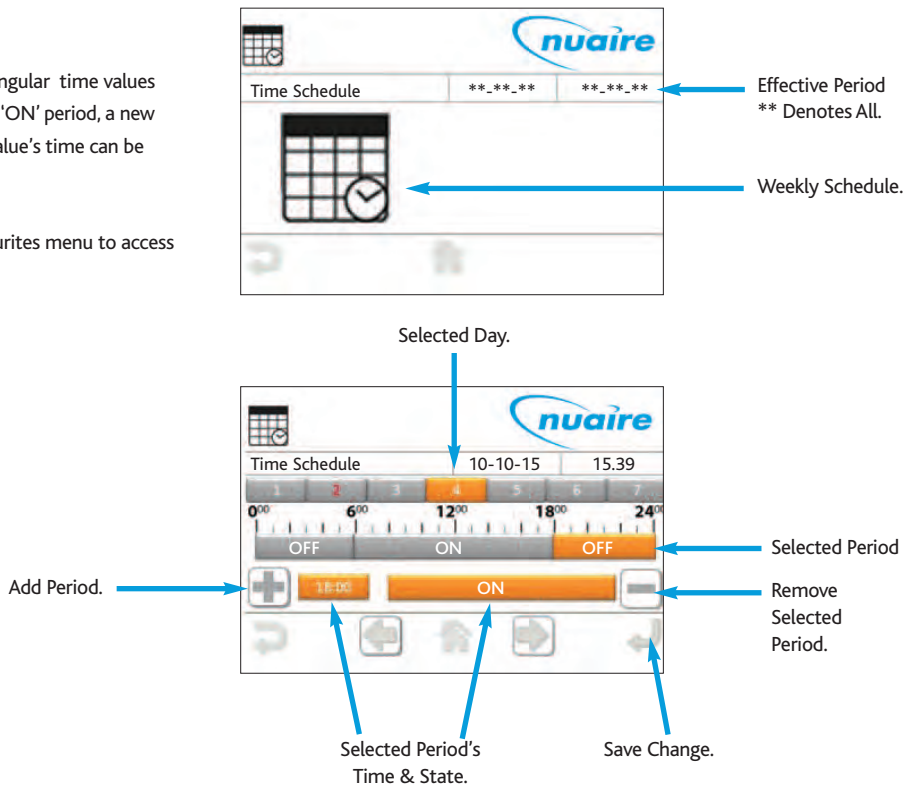
9.5.4 SCHEDULING PAGE

Standard BACnet schedule objects can be adjusted in the same way as any other BACnet object.

The BACnet schedule function consists of an array of singular time values with a corresponding ON/OFF state. In order to end an 'ON' period, a new value must be created with a value of 'OFF'. This new value's time can be adjusted to the desired end time.

Select a schedule object via object browser or the favourites menu to access the following screens.

Figure 24:



9.5.5 ALARM LOG

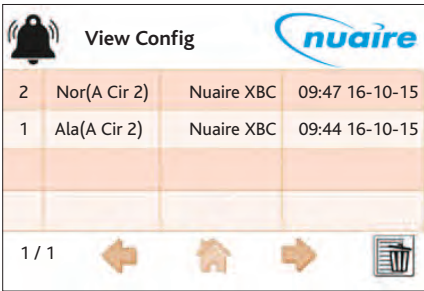
When an XBC alarm changes state, a signal is sent to the LCD display and logged on the alarm page. If there are items on the alarm page the standard top left page icons change to one of the following, depending on the current page. The alarm page can be accessed by selecting the alarm icon.

Alarm events are logged with a date and time.
'Nor' represents a change to a normal state.
'Ala' represents a change to an alarm state.

The text in parentheses denotes the alarm the event applies to. The log can hold up to 40 events.

Logged alarm events can be deleted by using the delete icon. If all events are deleted, alarm states can still be checked by navigating to the BACnet alarm objects via the network browser page. See the BACnet alarm list for alarm objects.

The LCD can be set to sound a continuous beep when a new item is added to the alarm log. This beep is silenced by any user interaction, but the alarm event is still logged. This option can be changed via the settings page.



9.5.6 BACKUP

The LCD settings, favourites and locked items can be backed up to a usb drive by plugging a usb into the rear of the LCD. The screen will automatically change to a download screen. Select the item required and choose upload. To download data to the LCD select the data type and choose download. If a user or service password is forgotten, they can be reset by re-downloading a backup file to the LCD that has no set password. It is recommended that a backup is made of a LCD with no password set.

XBOXER XBC ECOSMART (CO) MODELS

9.0 FC BUS DEVICES

9.6 SETTINGS PAGES

These set of pages allow the user to configure the technical functions of the LCD both from the BACnet and user interface perspectives.

The settings page requires a service password for access.

9.6.1 NETWORK SETTINGS PAGE

Allow the user to discover all devices connected on the MS/TP network and browse all objects exposed within these devices.

Parameter Name	Description	Default Setting
Device Name	It defines the BACnet Device Object Name	FAD0351
Device ID	It defines the BACnet Device Object Identifier	127
MAC Address	MSTP Address of FAD	127
Descriptions	BACnet Description of FAD	Field Advanced Display
Baud Rate	It defines the FAD communication speed over the BACnet local network.	38400
Max Info Frames	It defines the BACnet Device Object Max_Info_Frames	3
Adjust Priority	The Adjust priority parameter defines with which priority the display will command AV / BV / MV values.	16
Override Priority	The Override priority parameter defines with which priority the display will command AO / BO / MO values	8
Page Refresh Time	It defines the polling speed at which the FAD will refresh the values shown on the screen	30 sec
Max Master	This parameter represents the value of the Max_Master property of the node's Device object	127
APDU Time	The APDU Timeout property defines the amount of time, in seconds, the FAD waits for responses from other devices.	3

9.6.2 DISLAY SETTINGS PAGE

Parameter Name	Description	Default Setting
Backlight	It defines whether the back light remains ON or turns OFF during Standby	Stand-By ON
Homepage	It defines which page to show at power up or pressing the "Home" shortcut button	Main Menu
Service Password	Password required to enter settings page	0
User Password	Password Required to change locked values (All values are locked by default)	0
Stand By	It defines the behaviour of the display once the "Stand By Timer" has expired without interactions from the user	-
Stand By Timer	It defines the inactivity period, in minutes, required to force the display in Stand By mode and for both Service and User passwords expiration. Defining this parameter to Zero, the passwords request (if any) is prompted at any access to pages requiring them	0 min
Feedback Sound	It defines whether the device shall provide a sound feedback during user interaction	OFF
Alarm	It defines whether the device shall provide a sound feedback when receiving a new Alarm. The notification sound can be continuous (ON) or intermittent (BEEP)	OFF
Date	It adjusts settings related to the Day, Month and Year of the FAD integrated clock	
Time	It adjusts settings related to the Hour and Minute of the FAD integrated clock	
Day Of Week	It adjusts settings related to the Day of Week (1-7) of the FAD integrated clock	

XBOXER XBC ECOSMART (CO) MODELS

9.0 FC BUS DEVICES

9.6.3 SELECT TARGET DEVICE PAGE

Parameter Name	Description	Default Setting
Device Name	Name of the device where the object resides	
MAC Address	The MSTP address of the device where the object resides	
Device ID	The BACnet ID of the device where the object resides	
Object Type	The object type	
Object ID	The object BACnet ID	

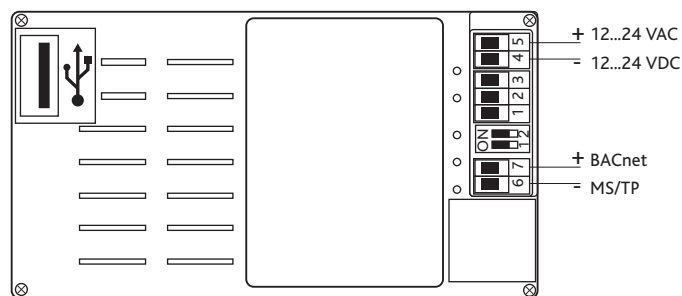
9.6.4 VIEW CONFIG

Parameter Name	Description	Default Setting
Name /Description	Chooses whether objects are described by their name or description	Name
Write	Allows editing of objects	Yes
ID	This will display the BACnet ID next to all BACnet objects on the network, favourites and target pages	Yes
Function (Favourite/Lock)	This option allows objects to be added to the favourite or locked list. Once it is selected, navigate to the network page and choose which objects are required. A user password is required to change any locked object, if set. All values are unlocked by default.	None

9.7 MULTIPLE CONTROLLERS

When accessing the Network View the FAD launches a Network Discovery function. The purpose of this function is to find other BACnet devices residing on the same MS/TP trunk. The maximum number of devices supported by the FAD discovery function is 32.

9.8 WIRING



Terminal Block

Description

1-3	Unused
4	Power Supply (-) 12...24 VAC / VDC
5	Power Supply (+) 12...24 VAC / VDC
6	BACnet MS/TP Port (RT-)
7	BACnet MS/TP Port (RT+)
	Programming USB Port
DIP Switch 1	BACnet MS/TP Line Terminator (End of Network 120Ω resistor switch)
DIP Switch 2	Unused

There are two ways of connecting the LCD.

1. Connected to the FC bus using screwed terminals. A separate power supply is required.
2. If the controller is standalone, the LCD display can be connected to the RJ12 FC bus port on the front of the FAC controller.
This FC port will also power the LCD, so in this case, a separate power supply is not required.

One of the following cables is required to do this.

ESCO-LCD-3M	Ecosmart-Connect LCD RJ12 Connection Cable 3m
ESCO-LCD-5M	Ecosmart-Connect LCD RJ12 Connection Cable 5m
ESCO-LCD-10M	Ecosmart-Connect LCD RJ12 Connection Cable 10m
ESCO-LCD-20M	Ecosmart-Connect LCD RJ12 Connection Cable 20m
ESCO-LCD-30M	Ecosmart-Connect LCD RJ12 Connection Cable 30m

XBOXER XBC ECOSMART (CO) MODELS

10.0 SA BUS DEVICES

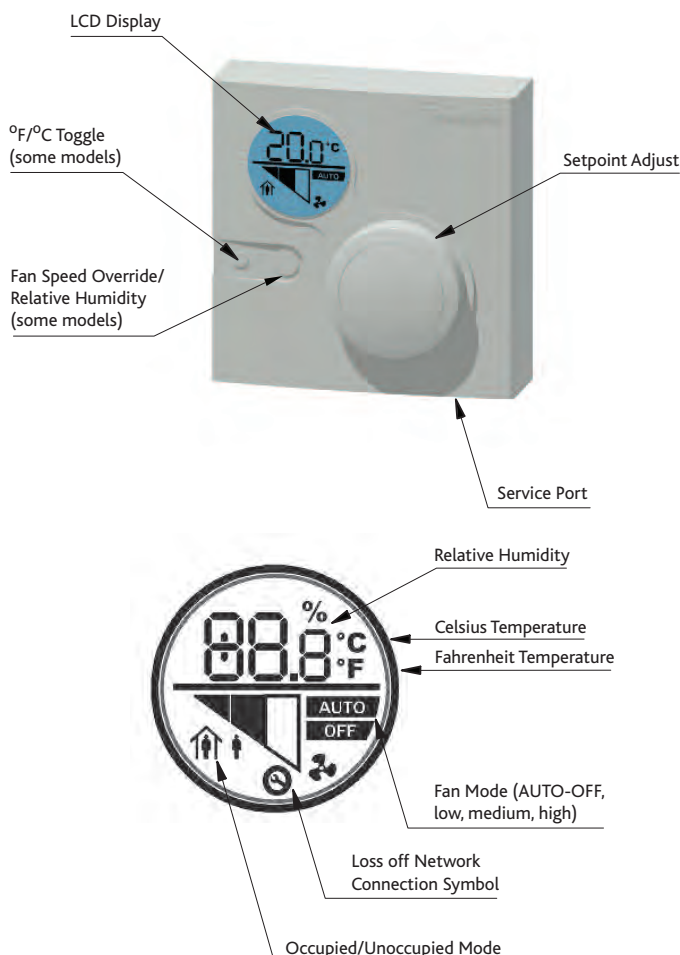
10.1 ROOM MODULES Figure 25:

Room Modules are electronic, wall-mountable sensors designed to work directly with the Nuaire control panel.



Room modules are automatically detected and require no set-up. The majority of RM modules monitor room temperature; however, options are available to also monitor zone humidity, carbon dioxide (CO₂), local temperature setpoint adjustments, PIR, and other variables. This data is transmitted to a controller on the Sensor Actuator (SA) Bus.

10.2 FEATURES Figure 26:



Backlit LCD Display - All LCD display versions of Room Modules include a dial to adjust room setpoint. While the setpoint is being adjusted the backlight will switch on and the display will update to show the setpoint. While inactive the display will revert to display the current room temperature. The occupancy status is also displayed on the LCD. On fan speed override models the fan speed and override status is also displayed. A maintenance icon will display if there is a sensor network error.

Service Port - A RJ12 service port is provided at the base of each Room Module. This allows the temporary connection of an extra module to the sensor network.

Fan Speed Override/Room Humidity- This button cycles through fan speed override settings.

Room Humidity - The ESC-RM-2-TDH-120 model includes a push button on the face of the network sensor to allow occupants to view the temperature and relative humidity of the zone. Pressing the push button toggles between temperature and RH on the LCD. The LCD defaults to temperature 5 seconds after the push button is released. Following this procedure to permanently change the default display:

1. If the display backlight is off, press and release the push button to illuminate the backlight. If the display backlight is already on, proceed to Step 2.
2. Press and hold the push button for 5 seconds to switch to the desired default display (either temperature or RH). Note: The desired default display will flash for 5 seconds. After the display stops flashing, the new default display is in effect.
3. Release the push button; the desired display is now the new default display.

The humidity setpoint cannot change via RM sensors. This must be changed through a commissioning tool.

10.3 INSTALLATION

Location Considerations

Locate the network sensor:

- on a partitioning wall, approximately 5 ft (1.5 m) above the floor in a location of average temperature
- away from direct sunlight, radiant heat, outside walls, outside doors, air discharge grills, or stairwells; and from behind doors
- away from steam or water pipes, warm air stacks, unconditioned areas (not heated or cooled), or sources of electrical interference

To remove the rear cover

1. Use a pozi screwdriver to loosen the screw on the top of the unit.
2. Insert a coin into the slot next to the security screw location, pressing the tab that keeps the unit closed. Then carefully pry the top edge of the sensor assembly away from its mounting base and remove.

Modular Jack:

For the modular jack, simply snap the wiring plug into the jack. A modular jack requires a straight-through, one-to-one connection (not a crossover). See interconnection section for details.

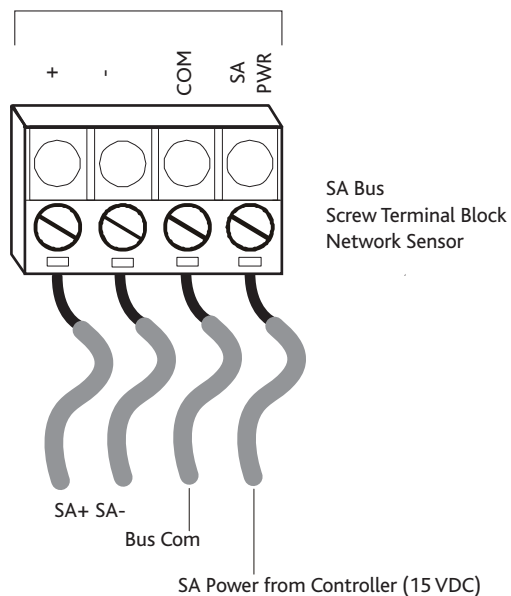
10.0 SA BUS DEVICES

10.4 ROOM MODULES WIRING Figure 27:

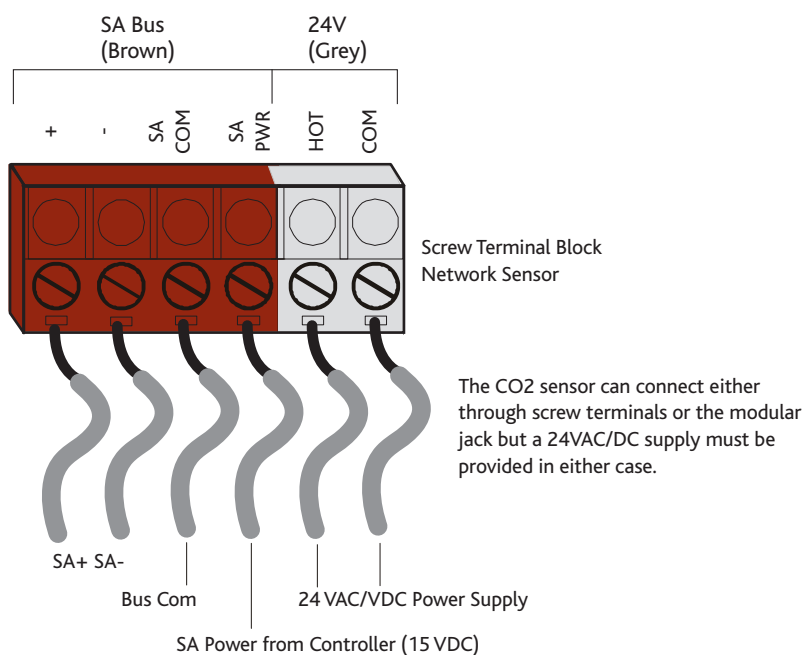
Screw terminal wiring:

If RJ12 cables are not used, the screw terminal connections on the Room Modules can be used.

Standard Sensor Wiring.



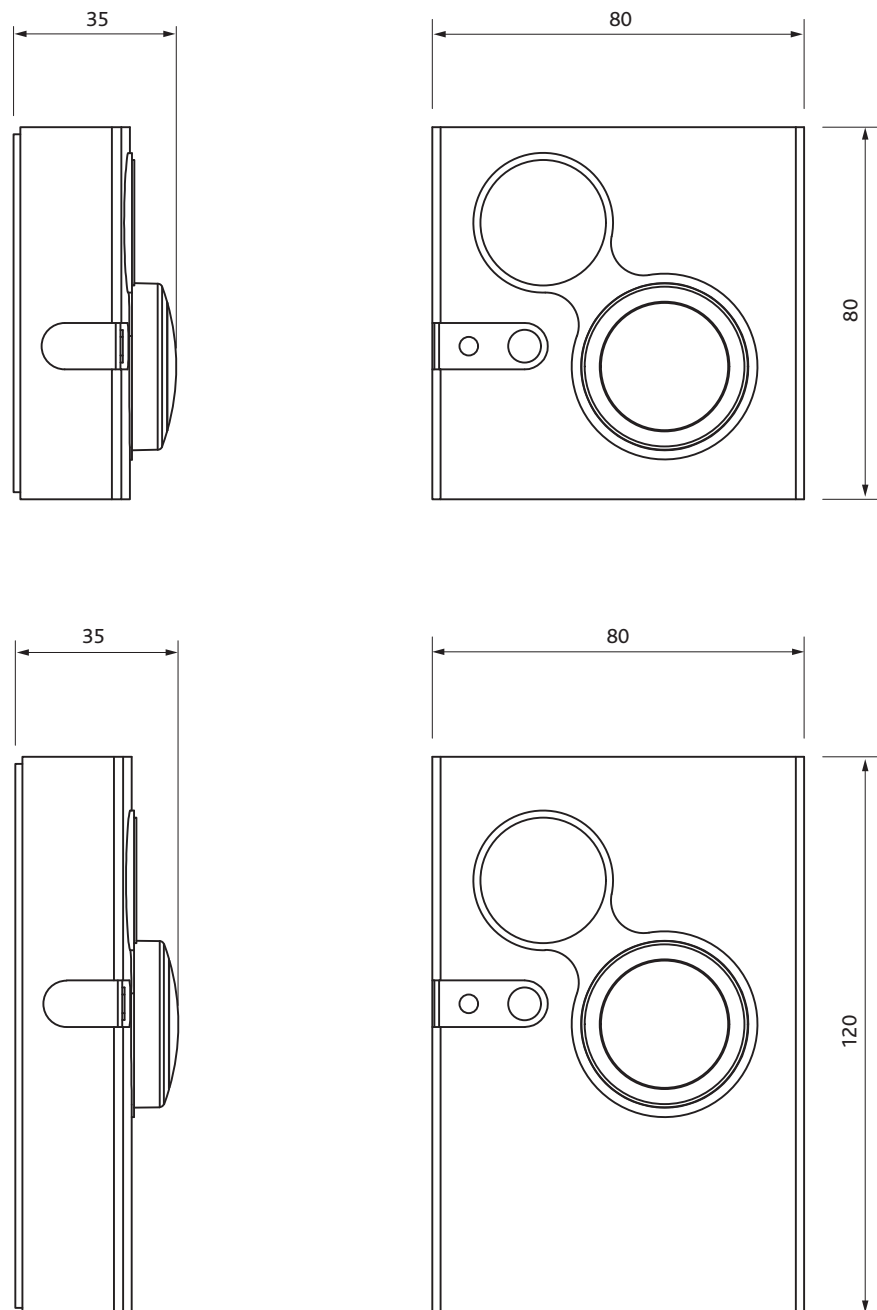
CO2 Sensor Wiring.



XBOXER XBC ECOSMART (CO) MODELS

10.0 SA BUS DEVICES

10.5 DIMENSIONS ROOM MODULES (MM) Figure 28:















XBOXER XBC ECOSMART (CO) MODELS

10.0 SA BUS DEVICES

10.6 AVAILABLE ROOM MODULES

The following room modules are available.

Group	Nuaire Part Number	Size (mm)	Temperature Sensor	Humidity Sensor	LCD, Setpoint Adjust & Occupancy Display	PIR	Fan Speed Override	Fan Status Display	CO2 Sensor	Network Address Range	Notes	
Group 1 Max of 1 Per Controller	ESCO-TDFS	80x80	YES		YES		YES	YES		199 (fixed)	Max of 1 per controller	
	ESCO-TS	80x80	YES							200-203		
Group 2 Max of 3 Per Controller	ESCO-THS	80x80	YES	YES						200-203		
	ESCO-TDS	80x80	YES		YES					200-203		
	ESCO-TDHS	80x80	YES	YES	YES					200-203	Relative Humidity is not displayed	
	ESCO-TPL	80x120	YES			YES				200-203		
	ESCO-THPL	80x120	YES	YES		YES				200-203		
	ESCO-TDPL	80x120	YES		YES	YES				200-203		
	ESCO-TDHPL	80x120	YES	YES	YES	YES				200-203	Relative Humidity is not displayed	
	ESCO-TDHL	80x120	YES	YES	YES					200-203	Relative Humidity is displayed	
	ESCO-PL	80x120				YES				200-203		
	ESCO-CL	120x80							YES	212-219	Powered via separate 24vac/ dc supply	

XBOXER XBC ECOSMART (CO) MODELS

10.0 SA BUS DEVICES

10.7 SENSOR ADDRESSING

ESCO-TDFS has a fixed device address of 199 on the SA Bus. The address can be changed on other models via DIP switches on the PCB rear.

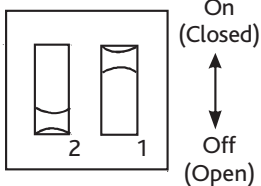
The designation of each address is shown in the following table.

Address Range	Type	Module Type
199	Fixed	Multi-function (with Fan Speed Override)
200-203	Adjustable	Multi-function
212-219	Adjustable	Room CO2 Sensor Module

Each sensor on the SA bus must have a unique address. The default controller strategy is preconfigured to automatically detect all Room Modules on the network and react accordingly.

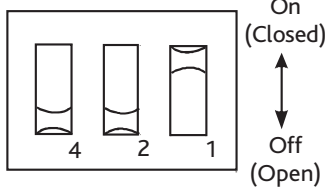
200-203 Address Switch Settings

Address	Switch Settings
	Switch 2 Switch 1
200	OFF OFF
201	OFF ON
202	ON OFF
203	ON ON



212-219 Address Switch Settings

Address	Switch Settings
	Switch 4 Switch 2 Switch 1
212	OFF OFF OFF
213	OFF OFF ON
214	OFF ON OFF
215	OFF ON ON
Not supported	ON ANY ANY



10.8 ROOM MODULES TECHNICAL SPECIFICATIONS

Supply Voltage	15VDC (Powered from SA bus)
Temperature Measurement Range	0 to 40°C
Humidity Measurement Range	0 to 100% (Full) 10 to 90% (Calibrated)
Temperature Sensor Type	Local 1k ohm Platinum Resistance Temperature Detector (RTD); Class A per IEC 60751
Humidity Sensor Type	Thin Film Capacitive Sensor
Temperature Resolution (Models with LCD)	±0.5°C
Default Temperature Setpoint Adjustment Range	10°C to 30°C
PIR Occupancy Sensor Motion Detection	Minimum 94 Angular Degrees up to a Distance of 15 ft (4.6m); Based on a clear line of sight
Ambient Operating Conditions	10°C to 30°C 10 to 90% RH (Temp Probe -10°C to 60°C)
Ambient Storage Conditions	-20 to 60°C 5 to 95% RH
CO2 Sensor Warmup time	Less than 1 Minute; less than 10 minutes for full accuracy

10.0 SA BUS DEVICES

10.9 INTERCONNECTION

The sensors or other devices on the SA bus network connect either by modular RJ12 connections or by screwed terminals using plain ended cable. All sensors are fitted with both.

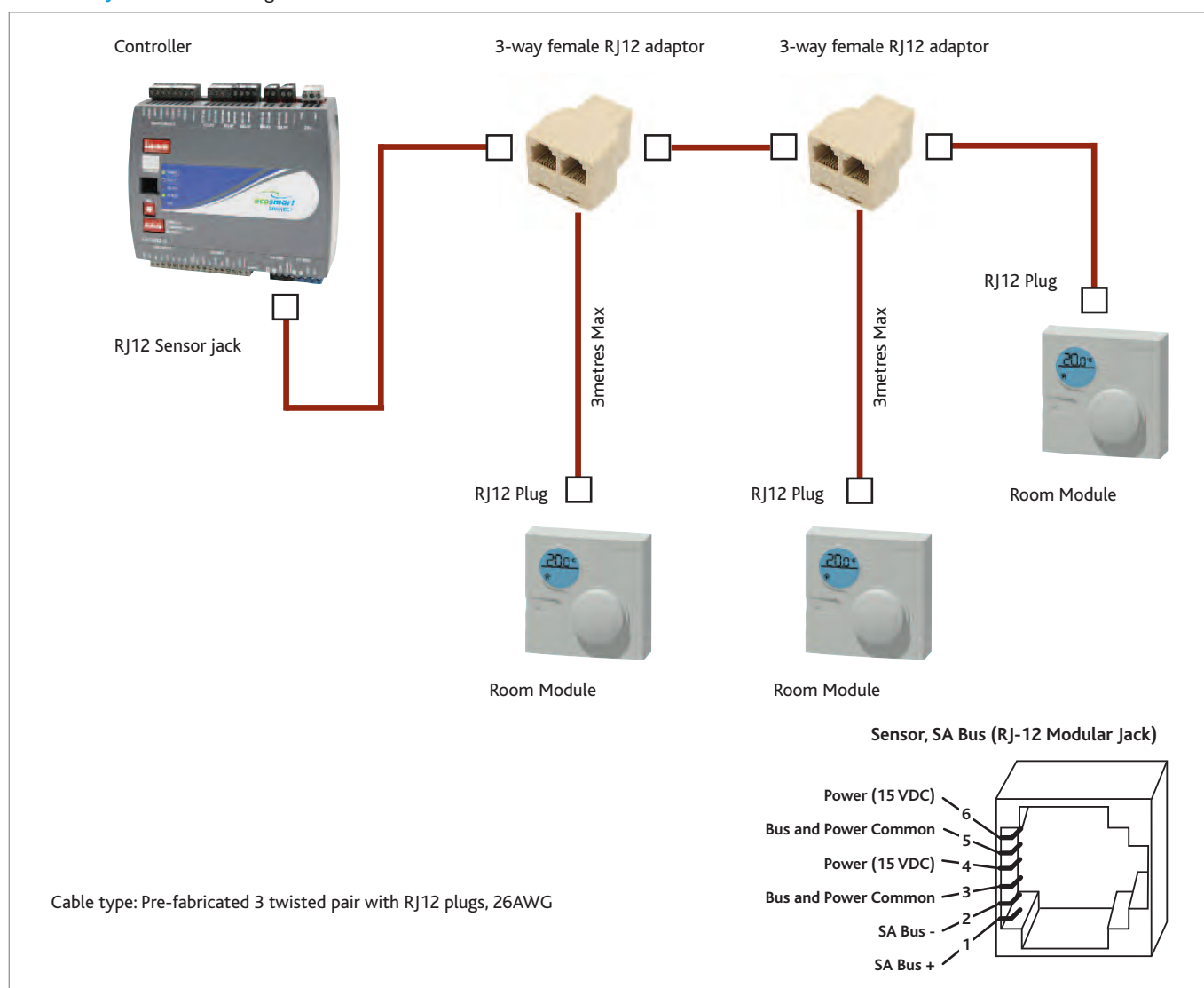
8.2.3.1 MODULAR CABLE (UP TO 30METRES)

The Room Modules can connect using a 24AWG twisted 3-pair cable with RJ12 connections over the Sensor Actuator (SA) bus. the following items are available.

ESCO-C3M	3m Prefabricated sensor cable with modular jacks
ESCO-C5M	5m Prefabricated sensor cable with modular jacks
ESCO-C10M	10m Prefabricated sensor cable with modular jacks
ESCO-C20M	20m Prefabricated sensor cable with modular jacks
ESCO-C30M	30m Prefabricated sensor cable with modular jacks
ESCO-2WA	3-port adapter
ESCO-3WA	2-port extension adapter

Room Modules must not be fitted more than 30metres (cable length) from the controller when using this connection method.

MODULAR JACK NETWORK Figure 29:



XBOXER XBC ECOSMART (CO) MODELS

10.0 SA BUS DEVICES

10.10 PLAIN CABLE (30 TO 150 METRES)

If a Room Module is to be fitted more than 30metres (cable length) from a controller, the following cable is recommended.

ESCO-MSTPC30M	Ecosmart Connect MSTP cable reel 30m
ESCO-MSTPC150M	Ecosmart Connect MSTP cable reel 150m

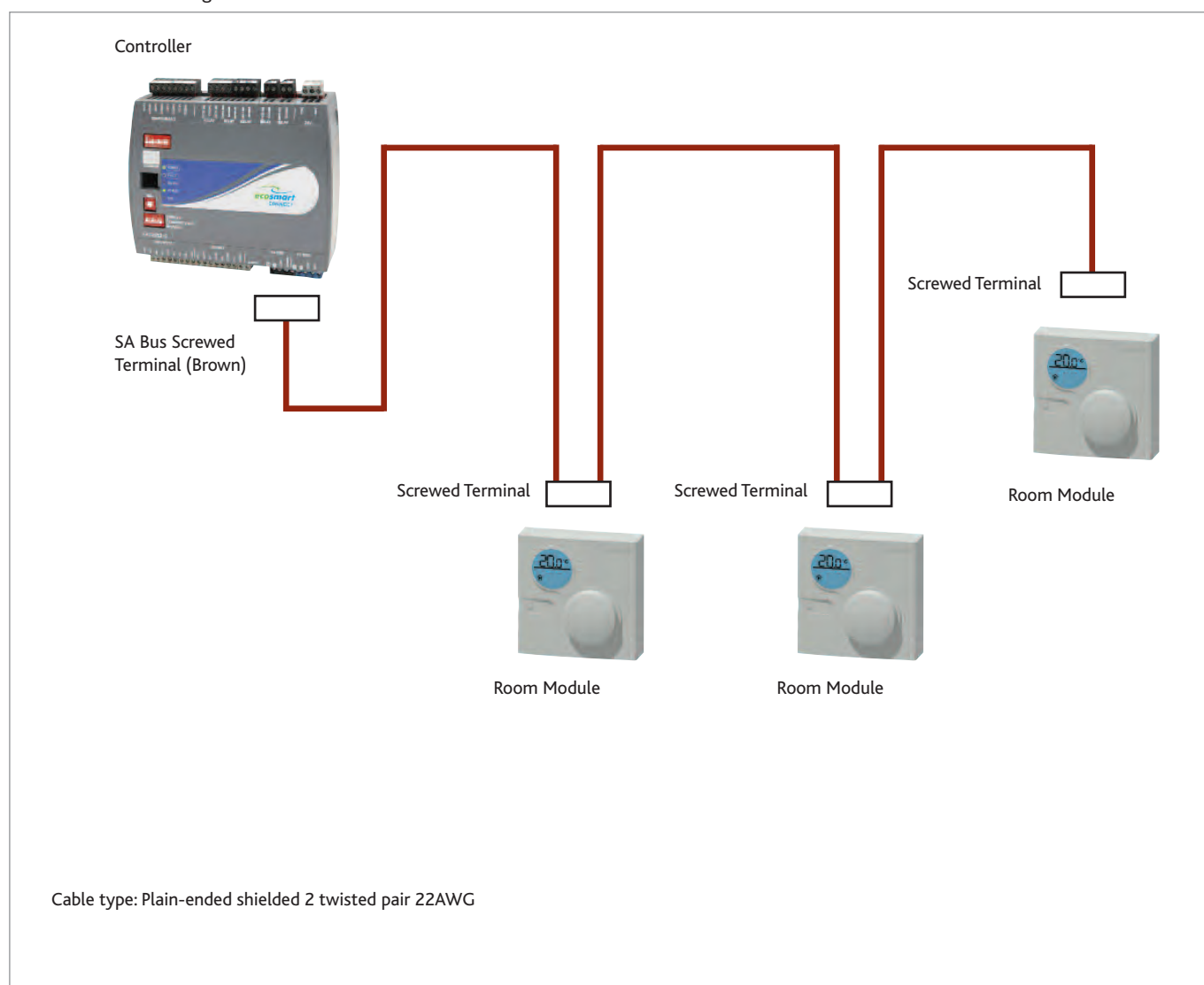
Note: On the SA Bus, the + and - wire are one twisted pair, and the COM and SA PWR are the second twisted pair of wires.

These cannot be used with RJ12 connections and must be stripped and connected using screwed terminals. The shield must be earthed at the control panel end only and be made continuous along the bus length.

Room Modules must not be fitted more than 150metres (cable length) from the controller.

SCREWED TERMINAL NETWORK 150M MAX

NETWORK LENGTH Figure 30:



11.0 APPENDIX TO SOFTWARE STRATEGY

11.1 BACNET OBJECT LIST (BY INSTANCE NUMBER)

LCD Browser Page	Name	Description	Type	BACnet Object Instance Number	Units	Default Value
1	Supply Air Temp (B)	The supply air temperature	AI	10005	Degrees-Celsius	N/A
1	Fresh Air Temp (H)	The fresh air temperature	AI	10008	Degrees-Celsius	N/A
1	Extract Air Temp (C)	The extract air temperature	AI	10011	Degrees-Celsius	N/A
2	RM199 Humidity	The Humidity at RM address 199	AI	10017	Percent-Relative-Humidity	N/A
2	RM199 Temp	The temperature at RM address 199	AI	10029	Degrees-Celsius	N/A
2	IN4	The 0-10 voltage at input 4	AI	10032	volts	N/A
2	IN5	The 0-10 voltage at input 5	AI	10035	volts	N/A
3	RM200 Temp	The temperature at RM address 200	AI	10050	Degrees-Celsius	N/A
3	RM200 Humidity	The Humidity at RM address 200	AI	10053	Percent-Relative-Humidity	N/A
3	RM201 Temp	The temperature at RM address 201	AI	10065	Degrees-Celsius	N/A
3	RM202 Temp	The temperature at RM address 202	AI	10068	Degrees-Celsius	N/A
4	RM203 Temp	The temperature at RM address 203	AI	10071	Degrees-Celsius	N/A
4	RM201 Humidity	The Humidity at RM address 201	AI	10077	Percent-Relative-Humidity	N/A
4	RM202 Humidity	The Humidity at RM address 202	AI	10092	Percent-Relative-Humidity	N/A
4	RM203 Humidity	The Humidity at RM address 203	AI	10107	Percent-Relative-Humidity	N/A
5	RM212 CO2	The CO2 at RM address 212	AI	10137	Parts-Per-Million	N/A
5	RM213 CO2	The CO2 at RM address 213	AI	10140	Parts-Per-Million	N/A
5	RM214 CO2	The CO2 at RM address 214	AI	10143	Parts-Per-Million	N/A
5	RM215 CO2	The CO2 at RM address 215	AI	10146	Parts-Per-Million	N/A
6	RM212 Temp	The temperature at RM address 212	AI	10149	Degrees-Celsius	N/A
6	RM213 Temp	The temperature at RM address 213	AI	10152	Degrees-Celsius	N/A
6	RM214 Temp	The temperature at RM address 214	AI	10155	Degrees-Celsius	N/A
6	RM215 Temp	The temperature at RM address 215	AI	10158	Degrees-Celsius	N/A
7	Cooling Output	The 0-10V signal to the cooling output	AO	10173	Percent	N/A
7	Extract Fan Output	The 0-10V signal to the extract fan	AO	10176	volts	N/A
7	Heating Output	The 0-10V signal to the heating output	AO	10179	Percent	N/A
7	Supply Fan Output	The 0-10V signal to the supply fan	AO	10182	volts	N/A
8	RM199 Setpoint	The setpoint at RM address 199	AV	10023	Degrees-Celsius	N/A
8	RM200 Setpoint	The setpoint at RM address 200	AV	10074	Degrees-Celsius	N/A
8	RM201 Setpoint	The setpoint at RM address 201	AV	10083	Degrees-Celsius	N/A
8	RM202 Setpoint	The setpoint at RM address 202	AV	10098	Degrees-Celsius	N/A
9	RM203 Setpoint	The setpoint at RM address 203	AV	10113	Degrees-Celsius	N/A
9	Alarm Delay	Alarm hold off period	AV	10262	Seconds	10
9	Max Auto-Run on Max-Time	Maximum Run-on Max Time	AV	10263	Seconds	900
9	Auto-run-on Scale Factor	Scale Factor for automatic run-on time	AV	10264	No units	2
10	CO2 Target	Target CO2 Value	AV	10265	Parts-per-million	650
10	Deadband	Dead band for temp control	AV	10266	Degrees-Celsius	3
10	Run-on (Enable)	Run-on timer value	AV	10267	Seconds	0
10	Extract Fan Max	Individual fan maximum speed setting	AV	10268	Percent	100
11	Extract Fan Min	Individual fan minimum speed setting	AV	10270	Percent	20
11	Run-on (Boost)	Boost run-on time	AV	10272	Seconds	0
11	Fan Boost Speed	Fan boost speed	AV	10273	Percent	100
11	Frost Prot. Fan Off	Minimum time the supply fan will stop in a frost protection state	AV	10274	Seconds	300

XBOXER XBC ECOSMART (CO) MODELS

11.0 APPENDIX TO SOFTWARE STRATEGY

11.2 BACNET OBJECT LIST (BY INSTANCE NUMBER)

LCD Browser Page	Name	Description	Type	BACnet Object Instance Number	Units	Default Value
12	Frost Prot. Temp	Supply temperature at which frost protection becomes active	AV	10275	Degrees-Celsius	4
12	Heat Boost Setpoint	Heater Boost Setpoint	AV	10276	Degrees-Celsius	35
12	High Temp Alarm	Supply temp which will trip the high supply alarm	AV	10277	Degrees-Celsius	50
12	Humidity Target	Relative Humidity Target	AV	10278	Percent-relative-Humidity	50
13	IO Damper Delay	Delay between starting the fan relay and the fan output	AV	10279	Seconds	0
13	Low Temp Alarm	Supply temp which will trip the low supply alarm	AV	10280	Degrees-Celsius	8
13	Night C Fan Speed	The night cool fan speed	AV	10281	Percent	60
13	Night C Min Temp	The minimum temperature that will stop night cooling	AV	10302	Degrees-Celsius	12
14	Pressure Target	Target pressure value	AV	10303	Pascals	400
14	Purge Fan Speed	Purge Fan Speed	AV	10304	Percent	60
14	Purge Min Temp	The minimum temperature that will stop night cooling	AV	10305	Degrees-Celsius	12
14	RTC Boost Band	The Return Temperature Control Boost Band	AV	10306	Degrees-Celsius	15
15	RTC Max Supply Temp	Maximum supply temp when in RTC mode	AV	10307	Degrees-Celsius	35
15	RTC Min Supply Temp	Minimum supply temp when in RTC mode	AV	10308	Degrees-Celsius	12
15	Software Setpoint	Software Setpoint	AV	10309	Degrees-Celsius	22
15	STC H/C Pref	STC Heat/Cool Pref	AV	10310	No units	50
16	STC HX Efficiency	STC HX Efficiency	AV	10311	No units	0.8
16	Supply Fan Max	Individual fan maximum speed setting	AV	10312	Percent	100
16	Supply Fan Min	Individual fan minimum speed setting	AV	10314	Percent	20
16	Trickle Deadband	Setpoint deadband used when trickling with no enable signal.	AV	10316	Degrees-Celsius	5
17	Room Air Temp	The room air temperature	AV	11296	Degrees-Celsius	N/A
17	CO2 Level	The CO2 Level	AV	13980	ppm	N/A
17	Humidity	The Humidity Level	AV	14297	% RH	N/A
17	Active Setpoint	The setpoint currently used	AV	14534	Degrees-Celsius	N/A
18	EF Max Volt	The upper voltage for the extract fan	AV	17273	Volts	10
18	EF Start Volt	The voltage required to start the extract fan	AV	17274	Volts	1
18	SF Max Volt	The upper voltage for the supply fan	AV	17275	Volts	10
18	SF Start Volt	The voltage required to start the extract fan	AV	17276	Volts	1
19	SL Enable	The state of the enable input (IN8)	BI	10161	Off/On	N/A
19	SL2 Input	The state of the configurable input (IN9)	BI	10164	Off/On	N/A
19	Alarm Circuit 1	The state of Alarm Circuit 1	BI	10167	Normal/Alarm	N/A
19	Alarm Circuit 2	The state of Alarm Circuit 2	BI	10170	Normal/Alarm	N/A
20	Bypass Damper Cmd	The controller's signal to the bypass damper. (Close=Bypass)	BO	10185	Open/Close (Open = HX, Close = Bypass)	N/A
20	Fault Relay Cmd	The state of the fault relay. (Fault = De-energised)	BO	10188	Alarm/Normal	N/A
20	Fan Enabled Cmd	The state of the fan enabled relay	BO	10191	Off/On	N/A
20	Cooling Demand Cmd	The state of the cooling demand relay	BO	10194	Off/On	N/A

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11.0 APPENDIX TO SOFTWARE STRATEGY

11.3 BACNET OBJECT LIST (BY INSTANCE NUMBER)

LCD Browser Page	Name	Description	Type	BACnet Object Instance Number	Units	Default Value
21	Heating Demand Cmd	The state of the heating demand relay	BO	10197	Off/On	N/A
21	RM199 Occupancy Status	The occupancy status at RM address 199	BV	10020	Unoccupied/Occupied	N/A
21	RM200 Occupancy Status	The occupancy status at RM address 200	BV	10056	Unoccupied/Occupied	N/A
21	RM201 Occupancy	The occupancy status at RM address 201	BV	10080	Unoccupied/Occupied	N/A
22	RM202 Occupancy Status	The occupancy status at RM address 202	BV	10095	Unoccupied/Occupied	N/A
22	RM203 Occupanc Status	The occupancy status at RM address 203	BV	10110	Unoccupied/Occupied	N/A
22	Reset Alarms	Changing this value will reset any latched alarms	BV	10332	True/False	FALSE
22	Tuning Reset	Resets the PID auto tuning loops	BV	12880	True/False	FALSE
23	Local Calendar		CAL	10496		N/A
23	8-1/Boot	8-1/Boot	-			N/A
23	8-1/Main	8-1/Main	-			N/A
23	8-1/Archive	8-1/Archive	-			N/A
24	8-1/Static	8-1/Static	-			N/A
24	8-1/Dynamic	8-1/Dynamic	-			N/A
24	8-1/Flash_Memory	8-1/Flash_Memory	-			N/A
24	Notification	Notification	-			N/A
25	Time Schedule	Local Time Schedule	SCH	10496		N/A
25	Purge Time Schedule	Purge Time Schedule	SCH	10499		N/A
25	Night C Sample	Daytime schedule for winter or summer decision making	SCH	15875		N/A
25	Night C Schedule	Night Cooling Schedule	SCH	16014		N/A
26	RM199 Fan Speed	Fan Speed Override Status of RM199	MSV	10014	Off/Auto/Low/Medium/High	N/A
26	RM199 Occ Display	Occupancy Display at RM address 199	MSV	10044	Occupied / Unoccupied	N/A
26	RM200 Occ Display	Occupancy Display at RM address 200	MSV	10062	Occupied / Unoccupied	N/A
26	RM201 Occ Display	Occupancy Display at RM address 201	MSV	10089	Occupied / Unoccupied	N/A
27	RM202 Occ Display	Occupancy Display at RM address 202	MSV	10104	Occupied / Unoccupied	N/A
27	RM203 Occ Display	Occupancy Display at RM address 203	MSV	10119	Occupied / Unoccupied	N/A
27	0-10V CO2 Range	CO2 sensor output range	MSV	10200	0-2,000ppm/0-4,000ppm /0-5,000ppm/0-10,000ppm /0-20,000ppm	N/A
27	CO2 Sensor Op	CO2 sensor operation	MSV	10201	Average CO2/Max CO2 /Ignore CO2	N/A
28	SL2 Mode	Set the function of switched live 2	MSV	10202	None/Fan Boost Fan /Heater Boost	Boost
28	Cooling Type	Set the type of cooling fitted	MSV	10203	None/Cold Water/DX	None
28	Damper Override	Override bypass damper position	MSV	10204	Auto/Heat Exchange/Bypass	Auto
28	Heat Boost	Software enabled Heater boost	MSV	10205	Off/On	Off

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11.0 APPENDIX TO SOFTWARE STRATEGY

11.4 BACNET OBJECT LIST (BY INSTANCE NUMBER)

LCD Browser Page	Name	Description	Type	BACnet Object Instance Number	Units	Default Value
29	Heating Type	Set the type of heating fitted	MSV	10206	None/LPHW/Electric	As per Build
29	H Sensor Op	Humidity Sensor Operation	MSV	10207	Average CO2/Max CO2 /Ignore Humidity	Average RH%
29	Ignore PIR	Sensors Ignore all MSTP network PIR sensors	MSV	10208	Yes/No	No
29	IN4 Function	Function of the UI4 input	MSV	10209	None/Fan Speed Control EGG 0-10V CO2 Sensor 0-10V Temperature Sensor 0-10V Humidity Sensor 0-10V Pressure Sensor	None
30	IN5 Function	Function of the UI5 input	MSV	10210	None/Fan Speed Control EGG 0-10V CO2 Sensor 0-10V Temperature Sensor 0-10V Humidity Sensor 0-10V Pressure Sensor	None
30	Low Temp Action	Action taken when the low supply alarm is engaged	MSV	10211	Alarm only/Alarm and stop fans Alarm Only	Alarm Only
30	0-10V Press. Range	Pressure sensor range	MSV	10212	0-25Pa/0-50Pa /0-100Pa /0-300Pa /0-500Pa /0-1000Pa /0-1600Pa /0-2500Pa /0-3000Pa 0 to 1000Pa	
30	P sens. Op	Pressure sensor operation	MSV	10213	Average Value /Max Value	Average Value
31	SetPoint Op	Setpoint operation	MSV	10214	Last Value Changed /Software Only	Last Value Changed
31	T Sens. Op	Temperature sensor operation	MSV	10215	NS Average/Return Air Only /NS & Return Average	NS Average
31	0-10V Temp Range	Temperature sensor range	MSV	10216	0 to 50°C /0 to 40°C /0 to 100°C /0 to 80°C /0 to 90°C	0 to 50°C
31	Auto Run-on	Auto-run on mode	MSV	10217	Off/On	Off
32	Enable	Software enable switch	MSV	10218	Off/On	Off
32	Enable via Schedule	Enabled via Schedule	MSV	10219	Off/On	N/A
32	Fan Boost	Software enabled Fan boost	MSV	10240	Off/On	Off
32	Hibernate Mode	Unit is ready for hibernation	MSV	10241	Off/On	Off
33	Night C Mode	This input will enable night cool mode	MSV	10242	Off/On	Off
33	Purge Active	This input will enable purge mode	MSV	10243	Off/On	Off
33	Tacho PCB Fitted	Is a "Taco Bell" PCB fitted	MSV	10244	Yes/No	As per Build
33	Temp Control Mode	Temperature control mode	MSV	10245	Supply Temperature Ctrl /Return Temperature Ctrl	Supply Temp. Control
34	Test (Fan)	Fan Test (Factory Use Only)	MSV	10246	Off/On	N/A
34	Test (Heater)	Heater Test (Factory Use Only)	MSV	10247	Off/On	N/A
34	Test (Override Fan)	Overtemp Test (Factory Use Only)	MSV	10248	Off/On	N/A
34	Test (Wiring)	Wiring Test (Factory Use Only)	MSV	10249	Off/On	N/A

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11.0 APPENDIX TO SOFTWARE STRATEGY

11.5 BACNET OBJECT LIST (BY INSTANCE NUMBER)

LCD Browser Page	Name	Description	Type	BACnet Object Instance Number	Units	Default Value
35	Trickle Mode	Enable trickle mode	MSV	10250	Off/On	Off
35	Purge Time Schedule	Purge Time Schedule	MSV	10512	Off/On	N/A
35	RM199 Fan Display	Fan Speed Override Display at RM address 199	MSV	14703	No Status/Off/Low/Medium/High/Auto-Off/Auto-Low/Auto-Medium/Auto-High	N/A
35	Critical Alarm	Unit is latched in critical alarm	MSV	15309	Normal/Alarm	N/A
36	Maint. Alarm	Maintenance Alarm	MSV	15310	Normal/Alarm	N/A
36	Night C Sample	Night Cooling Sample Schedule	MSV	16008	Off/On	N/A
36	Night C Schedule	Night Cooling Running Schedule	MSV	16014	Off/On	N/A
36	XBC Sensor Alarm	XBC Sensor Out of Range	MSV	17009	Normal/Alarm	N/A
37	Low SA-T Alarm	Low Supply Air Alarm	MSV	17011	Normal/Alarm	N/A
37	High SA-T Alarm	High Supply Air Alarm	MSV	17012	Normal/Alarm	N/A
37	Frost Alarm	Frost Alarm	MSV	17013	Normal/Alarm	N/A
37	Ala (Acir 1)	For LCD Event Signal Only	MSV	17281	Normal/Alarm	N/A
38	Norm (A Cir 1)	For LCD Event Signal Only	MSV	17282	Normal/Alarm	N/A
38	Ala (Low Supply Temp)	For LCD Event Signal Only	MSV	17285	Normal/Alarm	N/A
38	Norm (Low Supply Temp)	For LCD Event Signal Only	MSV	17286	Normal/Alarm	N/A
38	Norm (High Supply Temp)	For LCD Event Signal Only	MSV	17289	Normal/Alarm	N/A
39	Ala (High Supply Temp)	For LCD Event Signal Only	MSV	17290	Normal/Alarm	N/A
39	Ala (A Cir 2)	For LCD Event Signal Only	MSV	17293	Normal/Alarm	N/A
39	Norm (A Cir 2)	For LCD Event Signal Only	MSV	17294	Normal/Alarm	N/A
39	Ala (Frost)	For LCD Event Signal Only	MSV	17316	Normal/Alarm	N/A
40	Norm (Frost)	For LCD Event Signal Only	MSV	17317	Normal/Alarm	N/A
40	Ala (XBC Sensor Fault)	For LCD Event Signal Only	MSV	17320	Normal/Alarm	N/A
40	Norm (XBC Sensor Fault)	For LCD Event Signal Only	MSV	17321	Normal/Alarm	N/A
40	SW-FAC2612-2-4A	Strategy Version	MSV	17340	On/Off	Off
41	Event Log	N/A				

XBOXER XBC ECOSMART (CO) MODELS

12.0 ELECTRICAL DETAILS

The electrical wiring must be carried out by competent persons, in accordance with good industry practice and should conform to all governing and statutory bodies i.e. IEE, CIBSE, COHSE etc.

12.1 SUPPLY

The control is powered by a 240VAC supply. This must be isolated local to the unit and fitted with appropriate overcurrent and fault protection.

ELECTRIC HEATER SUPPLY

For models with electric heating, the heating circuit is powered by a separate, higher current, 240VAC supply. This must be isolated local to the unit and fitted with appropriate overcurrent protection. The main supply is still required.

ELECTRICAL SUPPLY DETAILS

Unit Code	Main Circuit (FLC)	Electric Heater Circuit (FLC) (Electric Models Only*)
XBC10-H-*CO	3.2 A	13 A
XBC15-H-*CO	4.5 A	13 A
XBC25-H-*CO	8 A	19 A
XBC45-H-*CO	8 A	19 A
XBC55-H-*CO	8 A	38 A
XBC65-H-*CO	8 A	38 A

*Electric Heater models require two separate supplies, each with an appropriate overcurrent current protection device.

12.2 VOLT FREE CONTACTS

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 3A resistive, 0.5A inductive.

Run connections - The relay is powered when the fan is running. (These contacts are used when an I/O damper is installed. See damper section 5.2 for details)

Fault connections - No fault = the relay is powered.

Fault = the relay is unpowered.

Heat demand - the relay is powered when heating is selected.

Cool demand - the relay is powered when cooling is selected.

12.3 SWITCHED LIVE

Switch Live (SL) terminal - A signal of 100-230V a.c. will activate the switched live signal.

Switch Live 2 (SL2) terminal - A signal of 100-230V a.c. will activate the switched live 2 (Fan Boost) signal.

Note that a signal from an isolating transformer will produce an unpredictable result and is not recommended.

Volt free versions of the switched live signals are also available at terminals T33-T34 & T35-T36. Link two contacts to activate the signal.

12.4 DAMPER CONNECTIONS

A fan start delay can be imposed to allow the damper time to open. This is adjustable via display screens or commissioning tools.

If an I/O damper is fitted, it must be wired to the fan run relay, and the relay supplied with the relevant supply voltage.

See I/O Damper connection diagram for details.

12.5 NETWORK SETTINGS

Default MS/TP Address: 4

BACnet Instance Number: Randomised &

Unique for each controller (0 to 4,194,304)

XBOXER XBC ECOSMART (CO) MODELS

12.0 ELECTRICAL DETAILS

12.6 CONNECTION CHART

Description	Controller Terminal No	Din Rail Terminal No	DI	AI	Relay Output	AO
Fresh Air Sensor	IN 1			1		
Supply Air Sensor	IN2			1		
Return/Room Air Sensor	IN3	25-26		1		
Input 4	IN4			1		
Input 5	IN5	31-32		1		
Alarm Circuit 1 (Fan, Heater)	IN6	27-28 (Some Models)	1			
Alarm Circuit 2 (Pump, Filter)	IN7	29-30	1			
Volt-Free Enable Input Signal	IN8	33-34	1			
Volt-Free Boost Input Signal	IN9	35-36	1			
Extract Fan 0-10V	OUT1					1
Supply Fan 0-10V	OUT2					1
Heat Demand 0-10V	OUT3					1
Cool Demand 0-10V	OUT4					1
Bypass Damper Relay	OUT5				1	
Volt-Free Healthy Relay	OUT6				1	
Volt-Free Fan Run Relay	OUT7				1	
Volt-Free Cool Demand Relay	OUT8				1	
Volt-Free Heat Demand Relay	OUT9				1	
230V Enable Input		10	1			
230V Fan Boost Input		11	1			

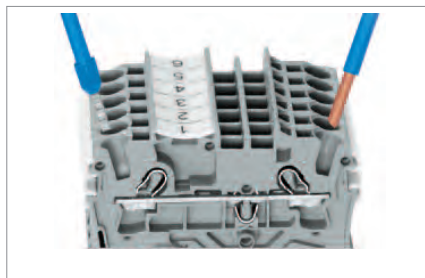
XBOXER XBC ECOSMART (CO) MODELS

12.0 ELECTRICAL DETAILS

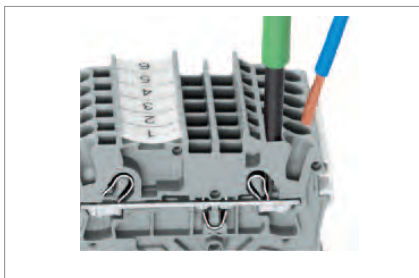
12.7 TERMINALS - WIRE CONNECTIONS

Figure 31: This control unit utilises WAGO's CAGE CLAMP®S terminal blocks, allowing for quick and easy connection.

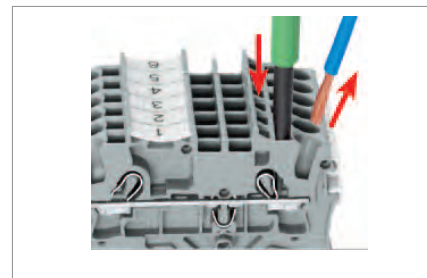
PUSH IN TERMINATION - Stripped solid conductors, fine-stranded conductors with ferrules, or ultrasonically "bonded" conductors are simply pushed in until they hit the backstop. No tool required.



TERMINATION OF FINE-STRANDED CONDUCTORS - Open the clamp by inserting an operating tool (as shown below) until it clicks into position. Then insert the conductor and remove the operating tool to complete the connection.



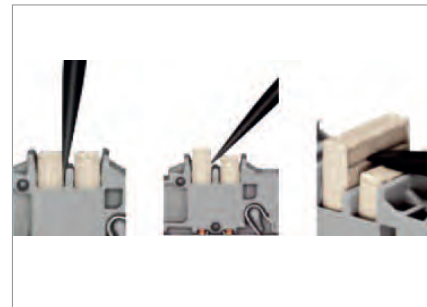
CONDUCTOR REMOVAL - Insert an operating tool in to the operating slot to remove the conductor, just like the original CAGE CLAMP® terminal blocks.



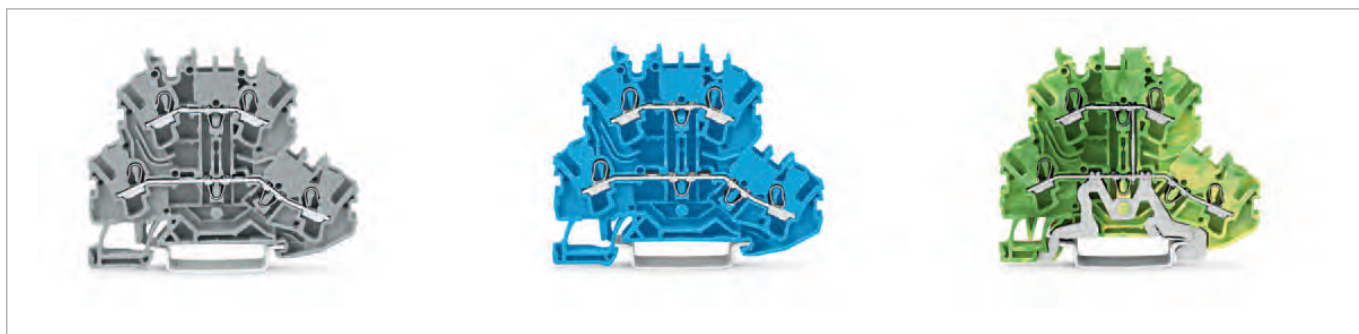
JUMPERS - Terminal blocks can be commoned together to increase the number of terminals at the same potential using push-in jumpers. In these cases the terminals are treated as one conductor.



JUMPER REMOVED - Insert the operating tool blade between the jumper and the partition wall of the dual jumper slots, then lift up the jumper.



DOUBLE DECK TERMINAL BLOCK - Each deck has a different potential (2-conductor), which creates a space saving on the rail. Decks can be commoned to adjacent terminal blocks and/or the top to the bottom deck.



EARTH TERMINAL BLOCKS - The earth terminal block (green/yellow) has a direct electrical connection to the DIN rail, with the earthing foot (earth connection only).



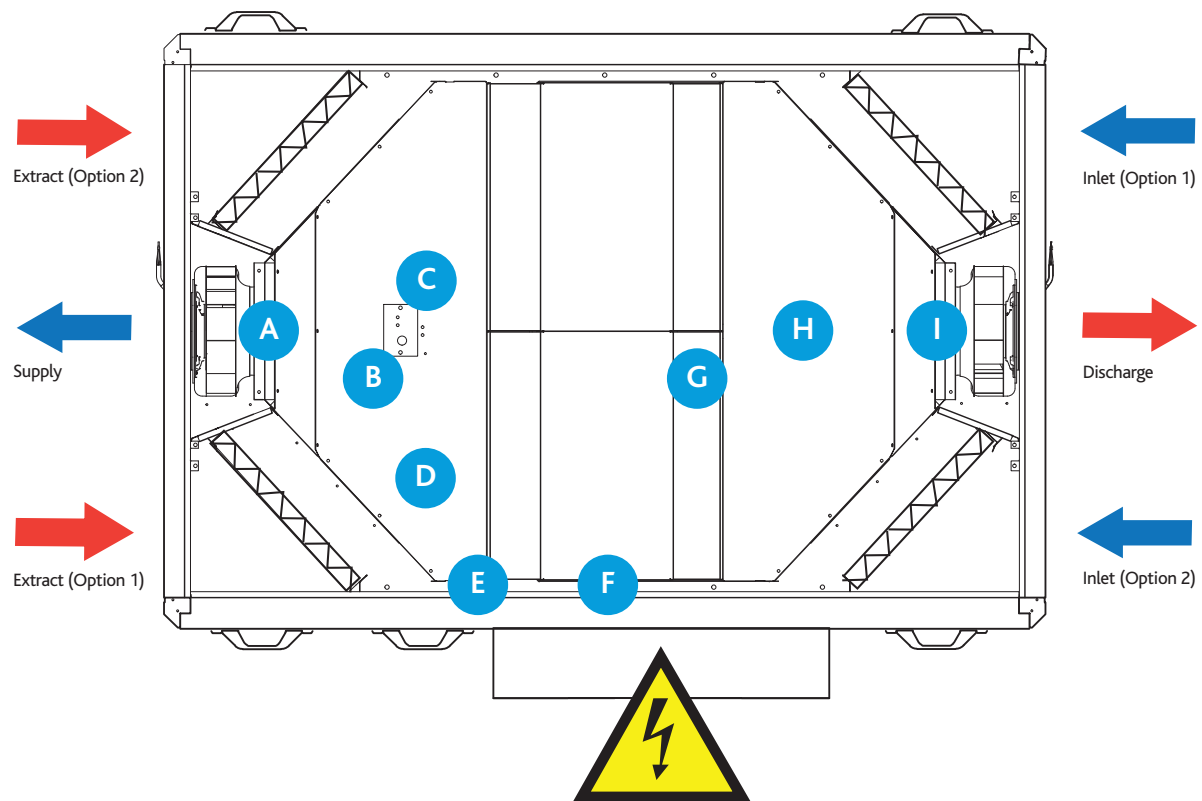
FUSE TERMINALS - Replaceable cartridge fuses are housed in quick release fuse terminals.

XBOXER XBC ECOSMART (CO) MODELS

13.0 DIAGRAMS

13.1 HARDWARE POSITIONS ON THE UNIT

Figure 32: XBC unit plan view.



KEY TO HARDWARE POSITIONS

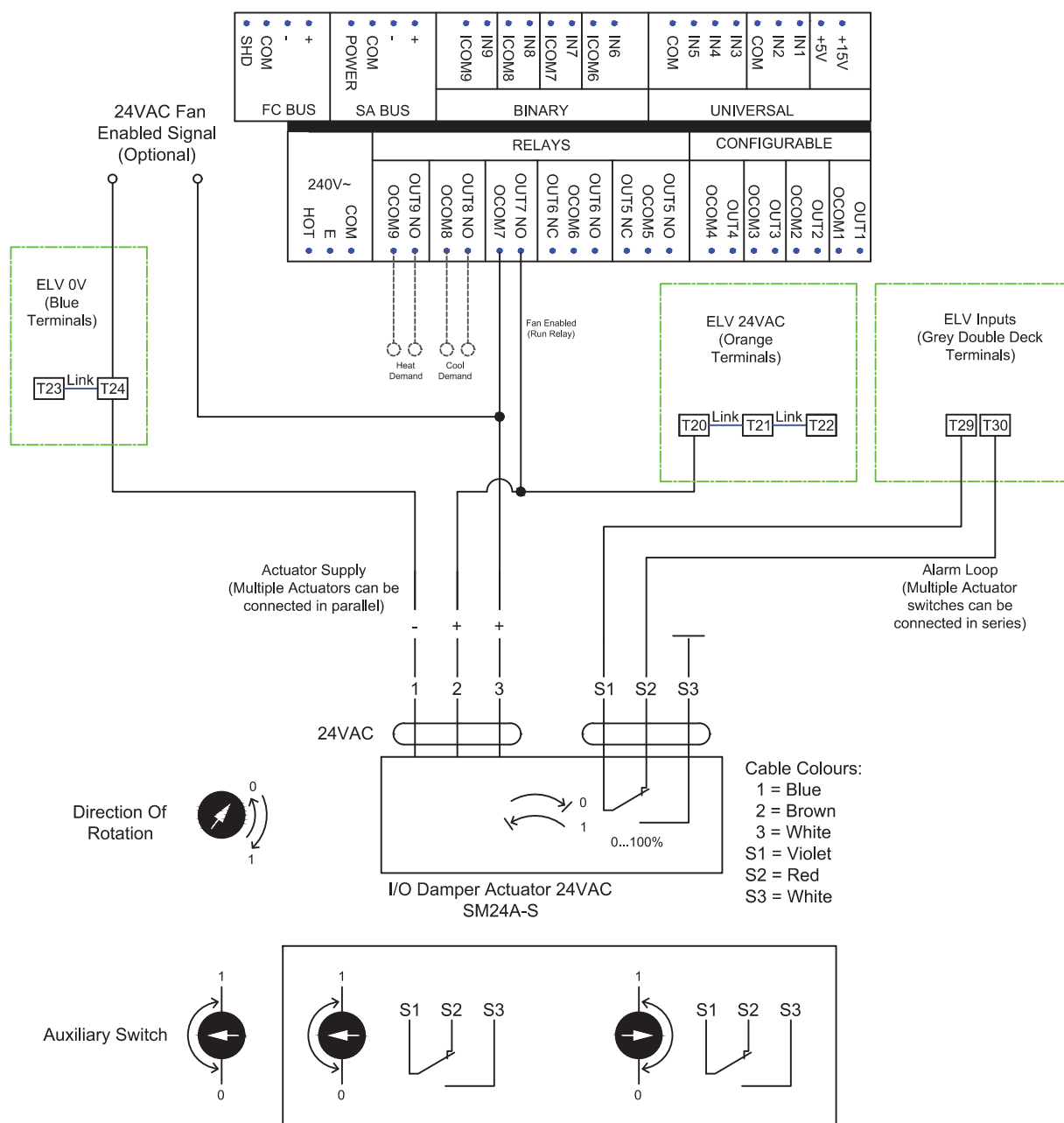
- A) Supply fan (drive & health)
- B) Delivery air temperature sensor
- C) Extract air temperature sensor
- D) Re-heater trip (electric heater models only)
- E) LPHW re-heat drive (LPHW models only)
- F) Bypass damper drive
- G) Condensate pump alarm
- H) Fresh air temperature
- I) Extract fan (drive & health)

XBOXER XBC ECOSMART (CO) MODELS

13.0 DIAGRAMS

13.2 I/O DAMPER CONNECTION 24V ACTUATOR VERSION (XBC15-MD-CO)

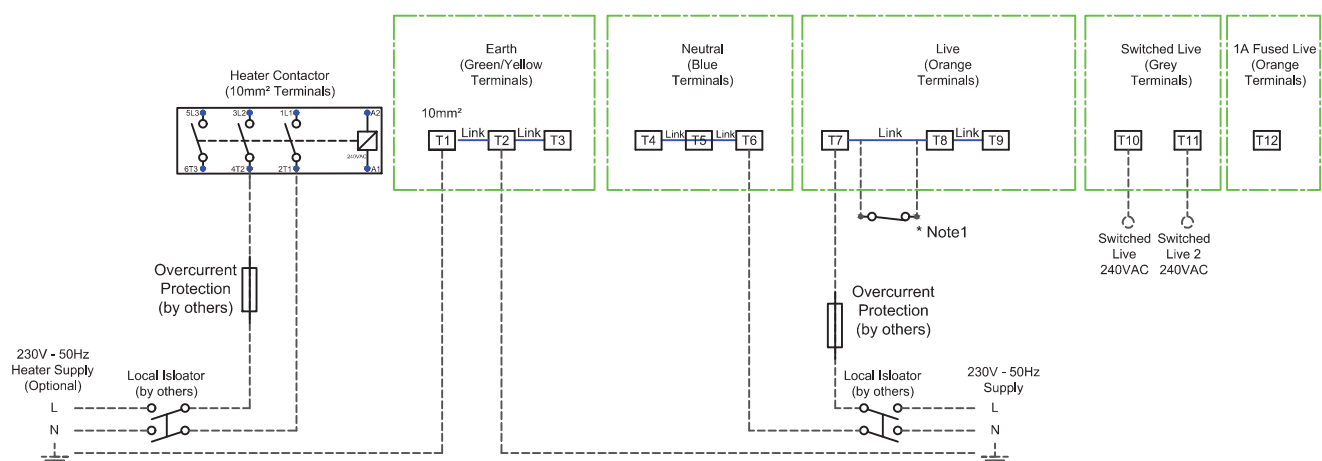
Figure 33:



13.0 DIAGRAMS

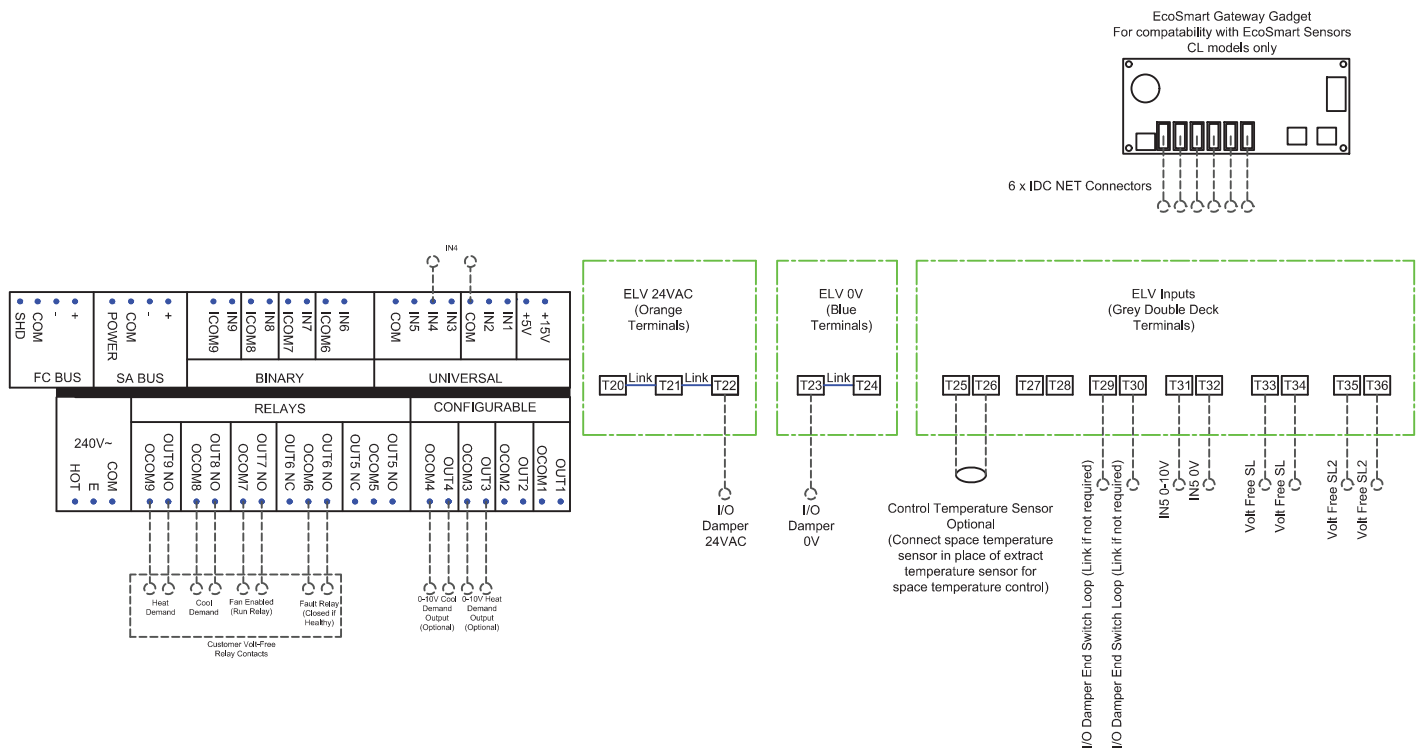
13.3 BASIC CONNECTION DIAGRAM

Figure 34:



* Note 1
Emergency Shutdown (Fire Alarm) Circuit. Break To Remove Power.
Remove Link T7-T8 To Enable.

XBOXER XBC ECOSMART (CO) MODELS



All inter-connections between circuit boards are made at the factory. This diagram only shows the essential field wiring points for clarity.

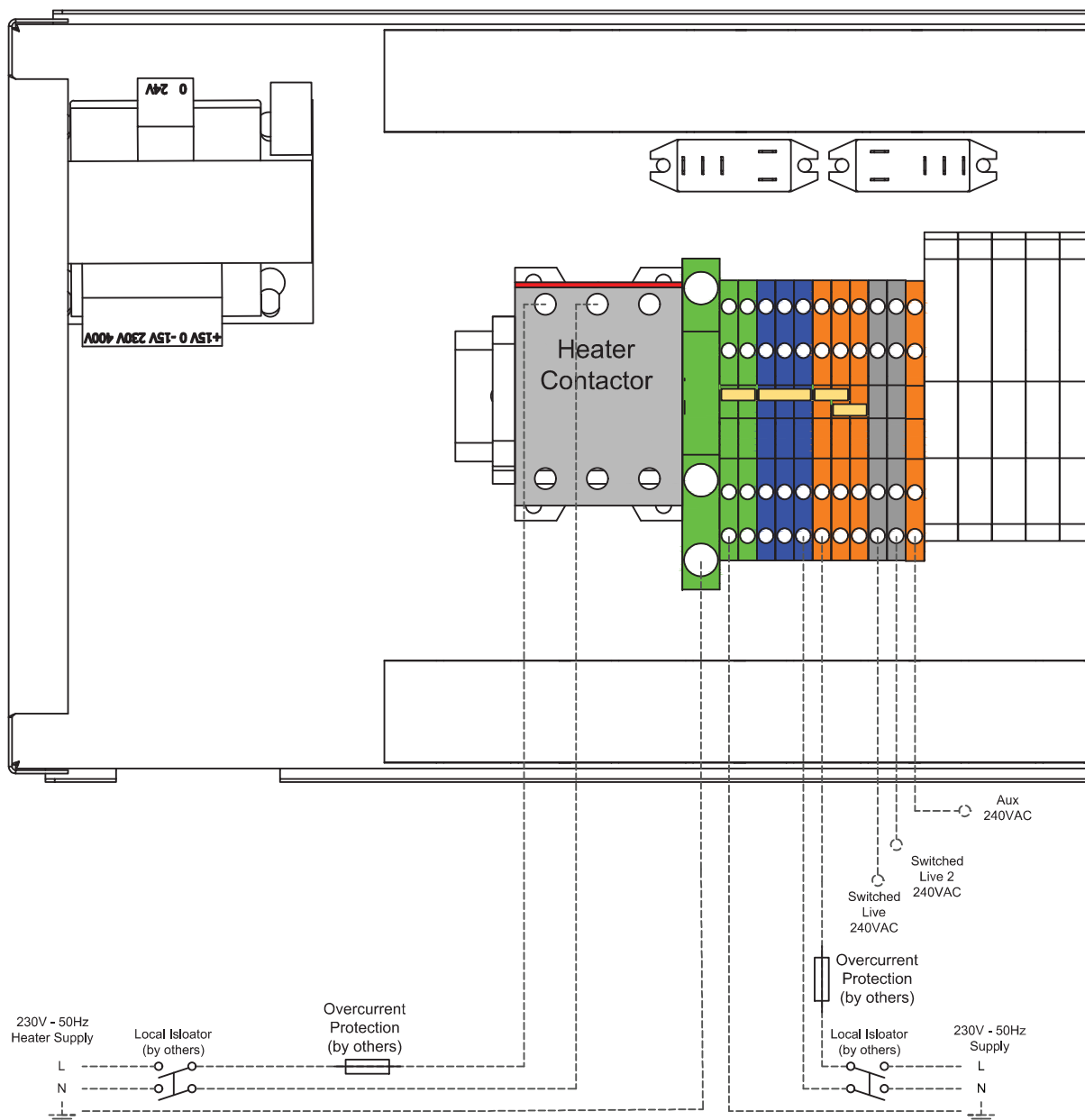


XBOXER XBC ECOSMART (CO) MODELS

13.0 DIAGRAMS

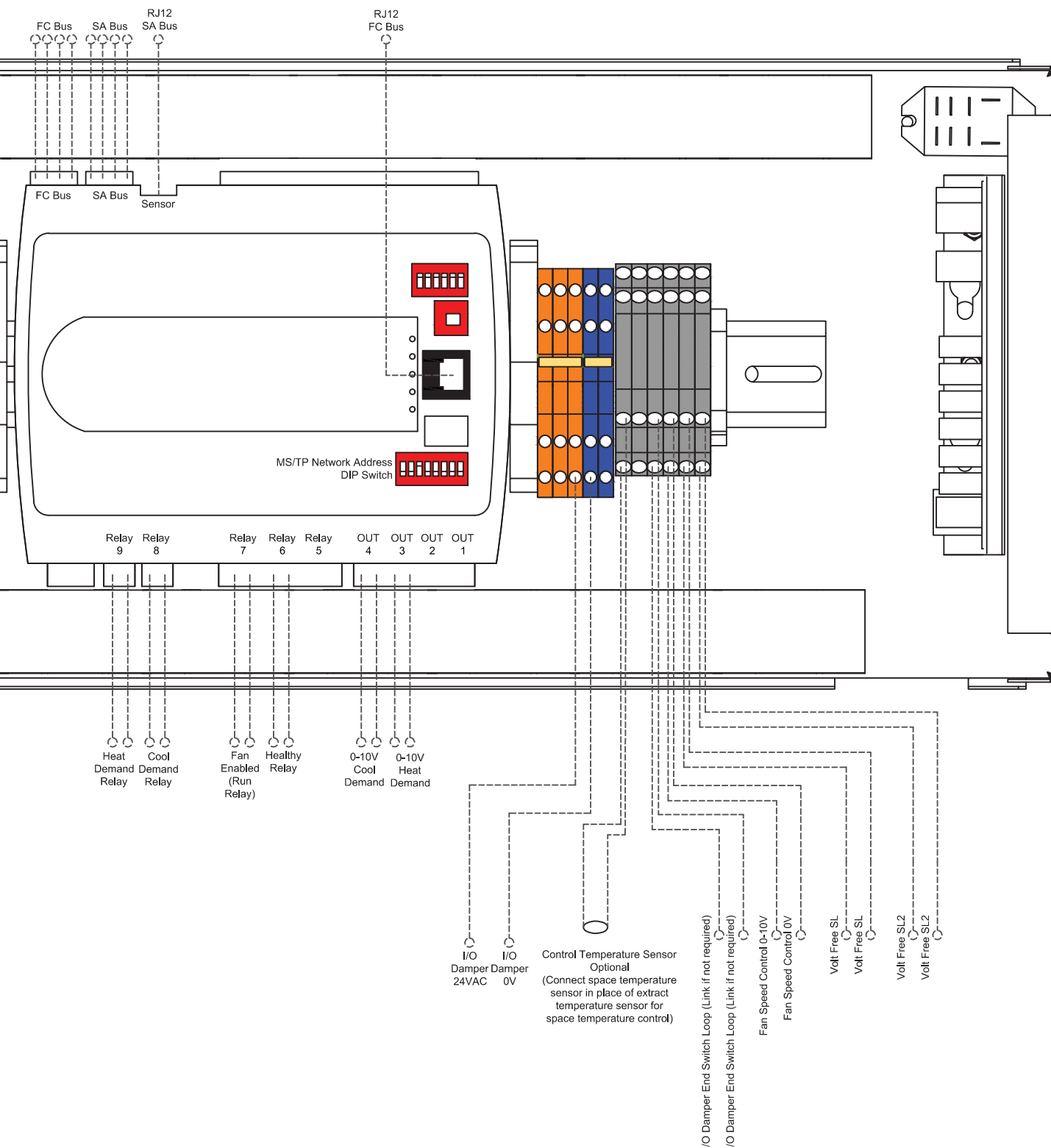
13.4 PHYSICAL LAYOUT

Figure 35:



XBOXER XBC ECOSMART (CO) MODELS

SA Bus = Sensor Actuator Bus
FC Bus = Field Controller Bus



13.0 DIAGRAMS

13.5 XBC10-15 (NO HEATER / LPHW)

Figure 36:

Key:

Internal Factory Connection ————
Optional External Connection - - - - -

A1 : 24VAC Bypass Damper Actuator
A3 : Electric Heater Controller
A5 : EGG (Ecosmart Gateway Gadget) CL only
A6 : Tacho Alarm Converter
A7 : Inlet/Outlet Dampers (Optional)

F1 : Auxiliary Fuse 1A 5x20mm
F2 : Supply Fan Fuse 8A 5x20mm
F3 : Extract Fan Fuse 8A 5x20mm
F4 : Condensate Pump Fuse 1A 5x20mm
F5 : Controller Fuse 5A 5x20mm
F6 : ELV Fuse 1.6A 5x20mm

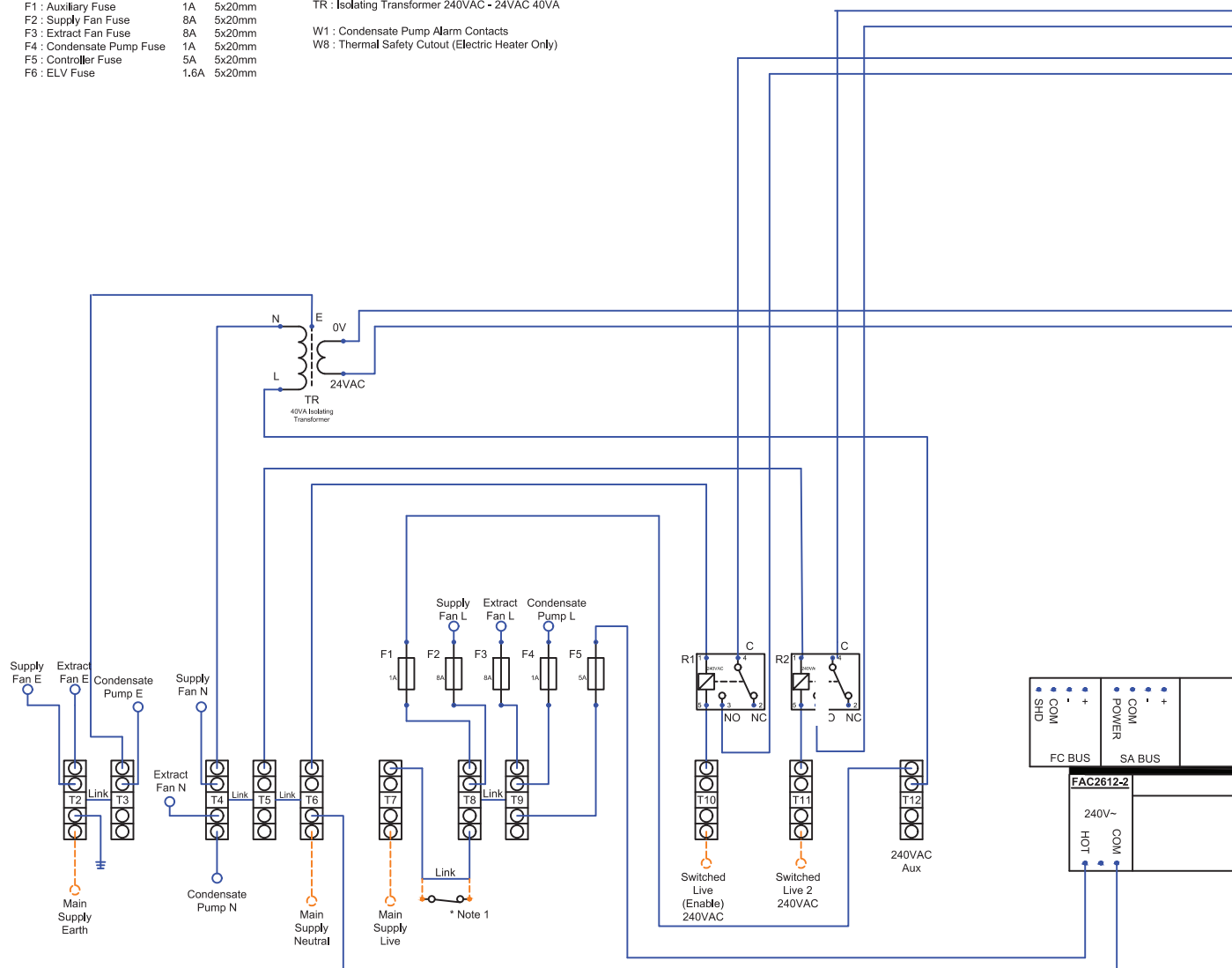
R1 : 240VAC Switched Live Input SPDT
R2 : 240VAC Switched Live 2 (Boost) Input SPDT
R3 : 24VAC Condensate Pump Alarm DPDT

S1 : Fresh Air Temp. NTC 10K
S2 : Supply Air Temp. NTC 10K
S3 : Extract Air Temp. NTC 10K
S4 : Space Air Temp. NTC 10K

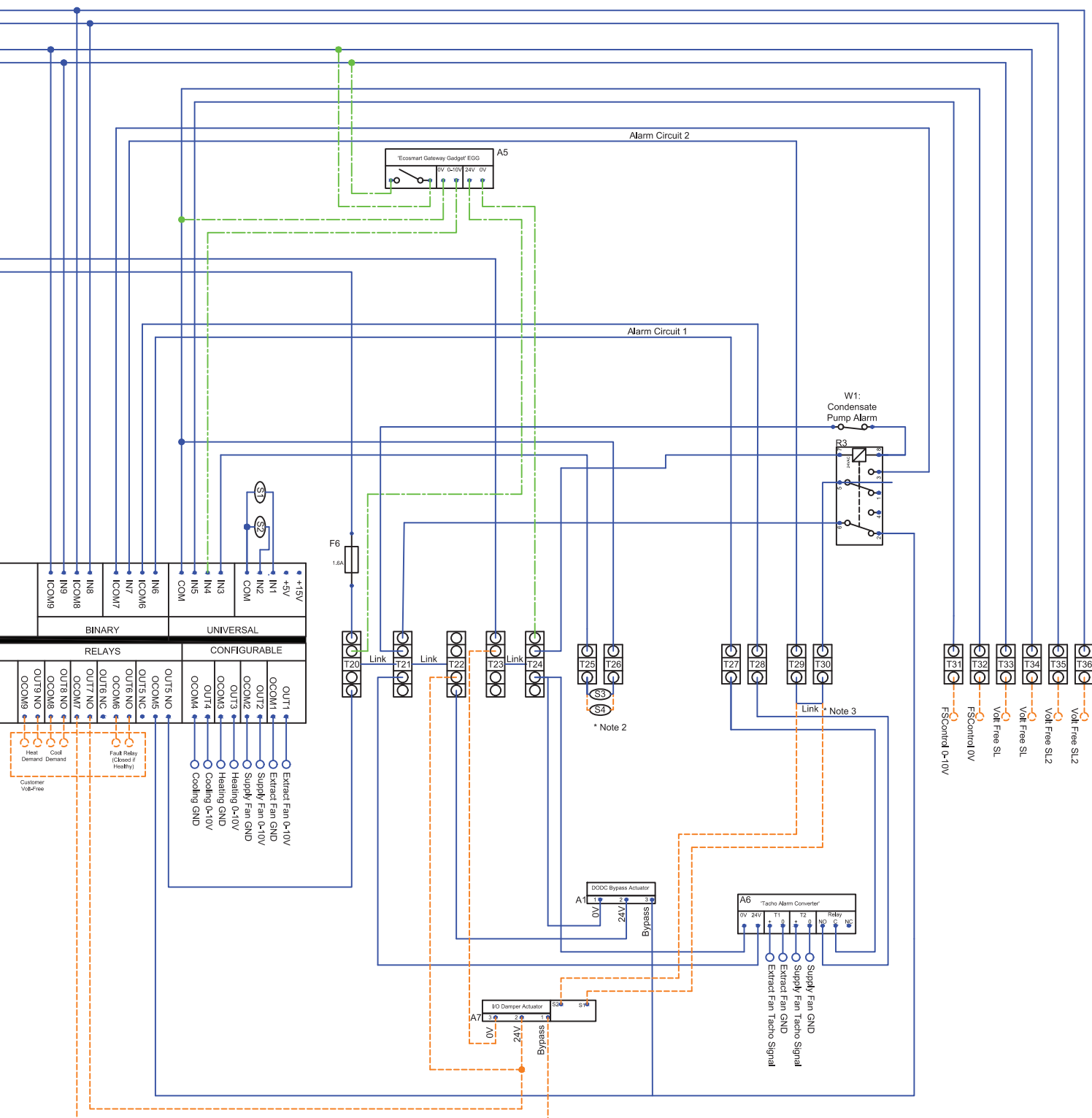
TR : Isolating Transformer 240VAC - 24VAC 40VA

W1 : Condensate Pump Alarm Contacts

W8 : Thermal Safety Cutout (Electric Heater Only)



- * Note1 Emergency shutdown circuit. Break to remove power. Remove link T7-T8 to use.
- * Note2 Connect external S4 sensor in place of S3 sensor for space temperature control.
- * Note3 Shutoff damper end-switch loop. Remove link T29-T30 to include within alarm circuit 2



13.0 DIAGRAMS

13.6 XBC25-65 (NO HEATER / LPHW)

Figure 37:

Key:

Internal Factory Connection ————
Optional External Connection - - - - -

A1 : 24VAC Bypass Damper Actuator
A3 : Electric Heater Controller
A5 : EGG (Ecosmart Gateway Gadget) CL only
A6 : Tacho Alarm Converter
A7 : Inlet/Outlet Dampers (Optional)

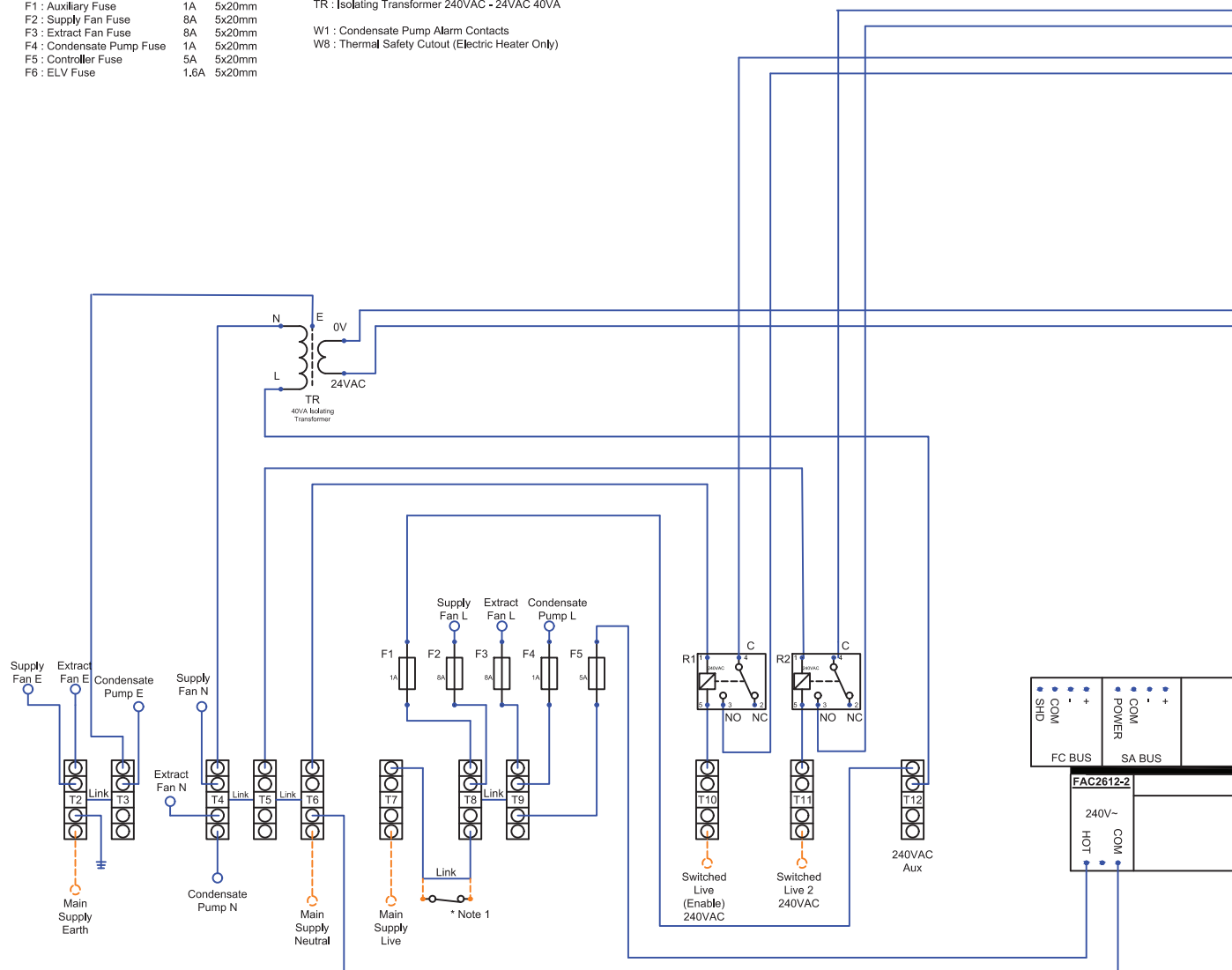
F1 : Auxiliary Fuse 1A 5x20mm
F2 : Supply Fan Fuse 8A 5x20mm
F3 : Extract Fan Fuse 8A 5x20mm
F4 : Condensate Pump Fuse 1A 5x20mm
F5 : Controller Fuse 5A 5x20mm
F6 : ELV Fuse 1.6A 5x20mm

R1 : 240VAC Switched Live Input SPDT
R2 : 240VAC Switched Live 2 (Boost) Input SPDT
R3 : 24VAC Condensate Pump Alarm DPDT

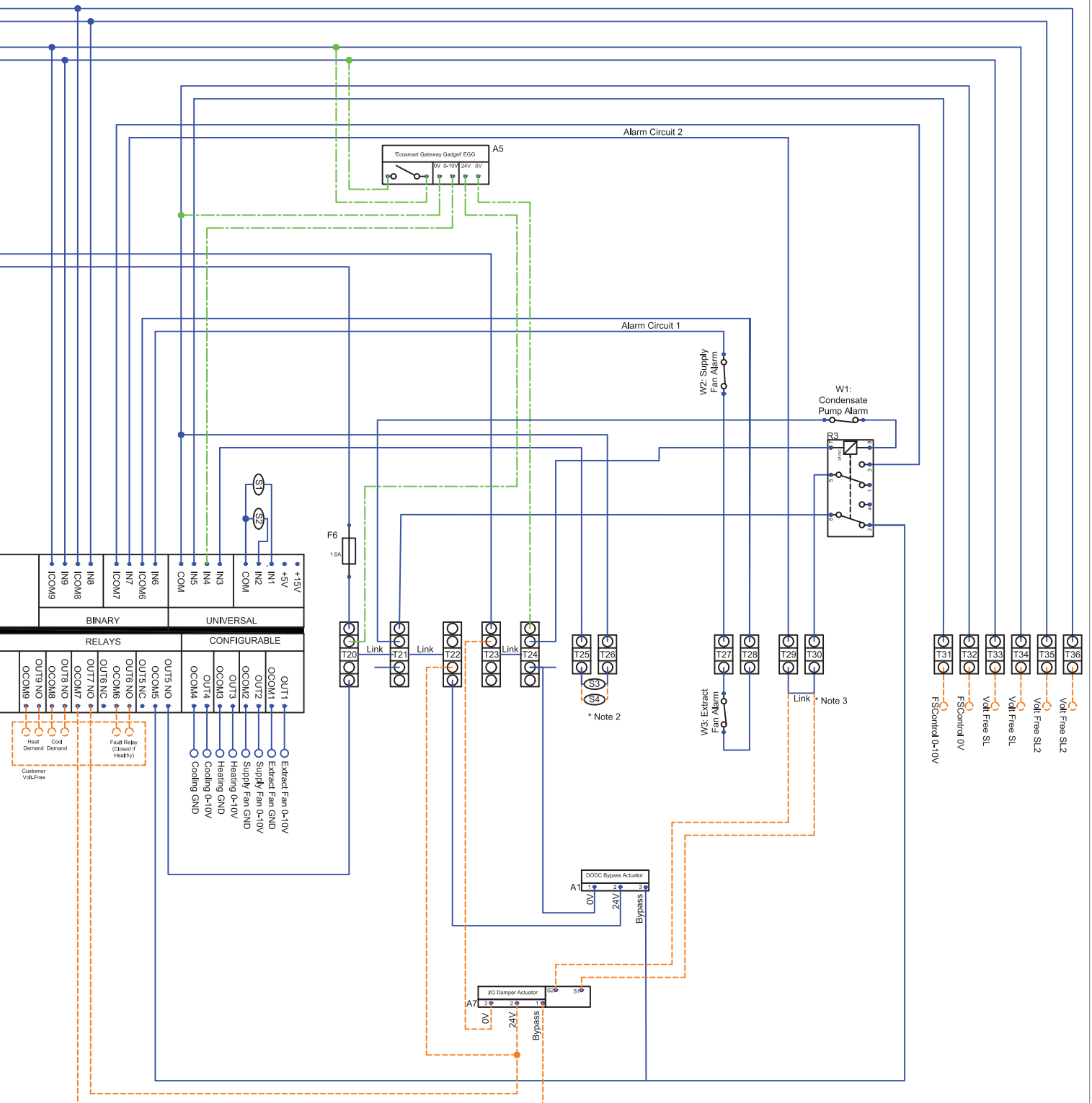
S1 : Fresh Air Temp. NTC 10K
S2 : Supply Air Temp. NTC 10K
S3 : Extract Air Temp NTC 10K
S4 : Space Air Temp NTC 10K

TR : Isolating Transformer 240VAC - 24VAC 40VA

W1 : Condensate Pump Alarm Contacts
W8 : Thermal Safety Cutout (Electric Heater Only)



* Note1 Emergency shutdown circuit. Break to remove power. Remove link T7-T8 to use.
* Note2 Connect external S4 sensor in place of S3 sensor for space temperature control.
* Note3 Shutoff damper end-switch loop. Remove link T29-T30 to include within alarm circuit 2



13.0 DIAGRAMS

13.7 XBC10-15 (ELECTRIC HEATER VERSION)

Figure 39:

Key:

Internal Factory Connection ————
Optional External Connection - - - - -

A1 : 24VAC Bypass Damper Actuator
A3 : Electric Heater Controller
A5 : EGG (Ecosmart Gateway Gadget) CL only
A6 : Tacho Alarm Converter
A7 : Inlet/Outlet Dampers (Optional)

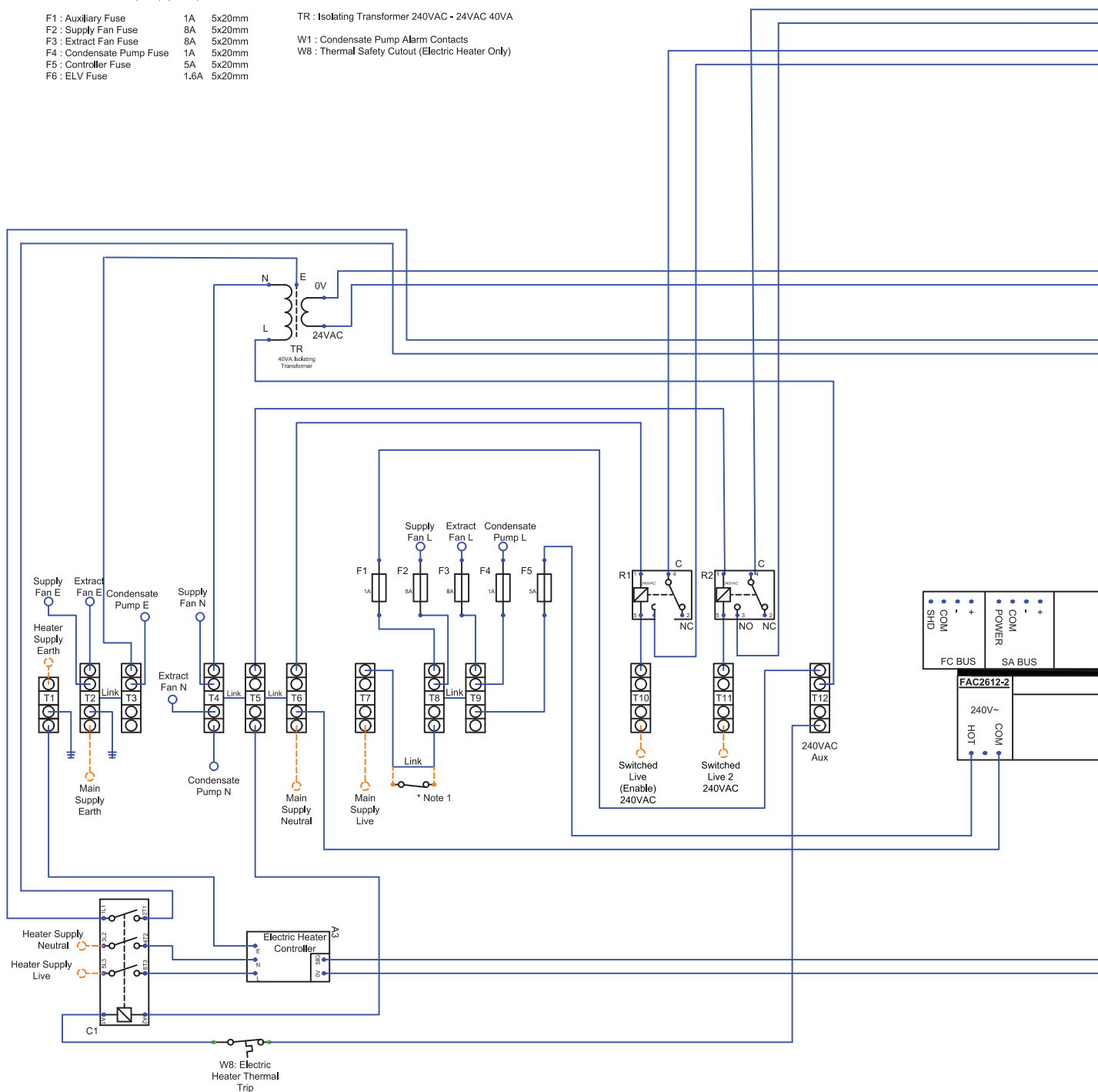
F1 : Auxiliary Fuse 1A 5x20mm
F2 : Supply Fan Fuse 8A 5x20mm
F3 : Extract Fan Fuse 8A 5x20mm
F4 : Condensate Pump Fuse 1A 5x20mm
F5 : Controller Fuse 5A 5x20mm
F6 : ELV Fuse 1.6A 5x20mm

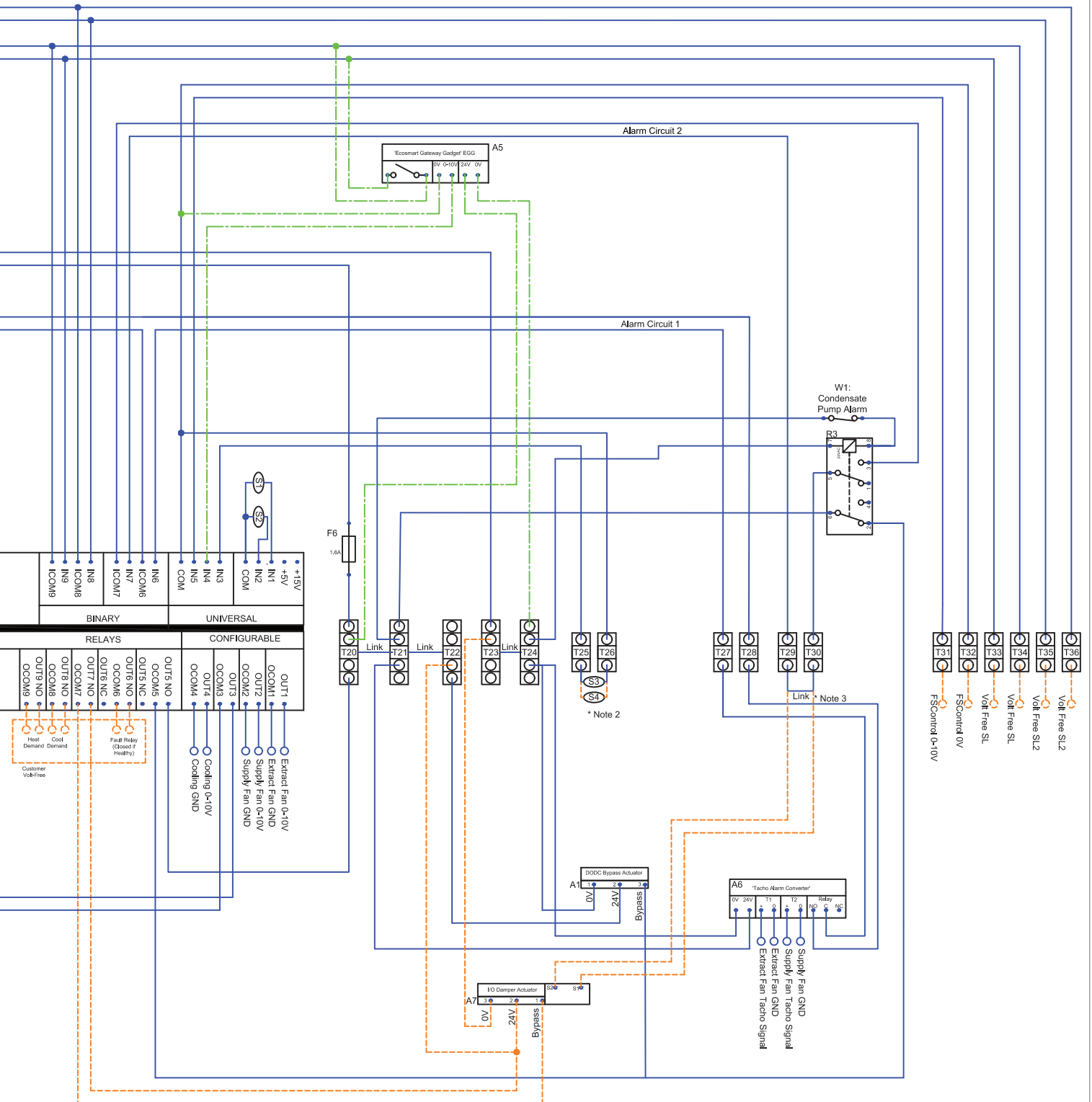
R1 : 240VAC Switched Live Input SPDT
R2 : 240VAC Switched Live 2 (Boost) Input SPDT
R3 : 24VAC Condensate Pump Alarm DPDT

S1 : Fresh Air Temp. NTC 10K
S2 : Supply Air Temp. NTC 10K
S3 : Extract Air Temp. NTC 10K
S4 : Space Air Temp NTC 10K

TR : Isolating Transformer 240VAC - 24VAC 40VA

W1 : Condensate Pump Alarm Contacts
W8 : Thermal Safety Cutout (Electric Heater Only)

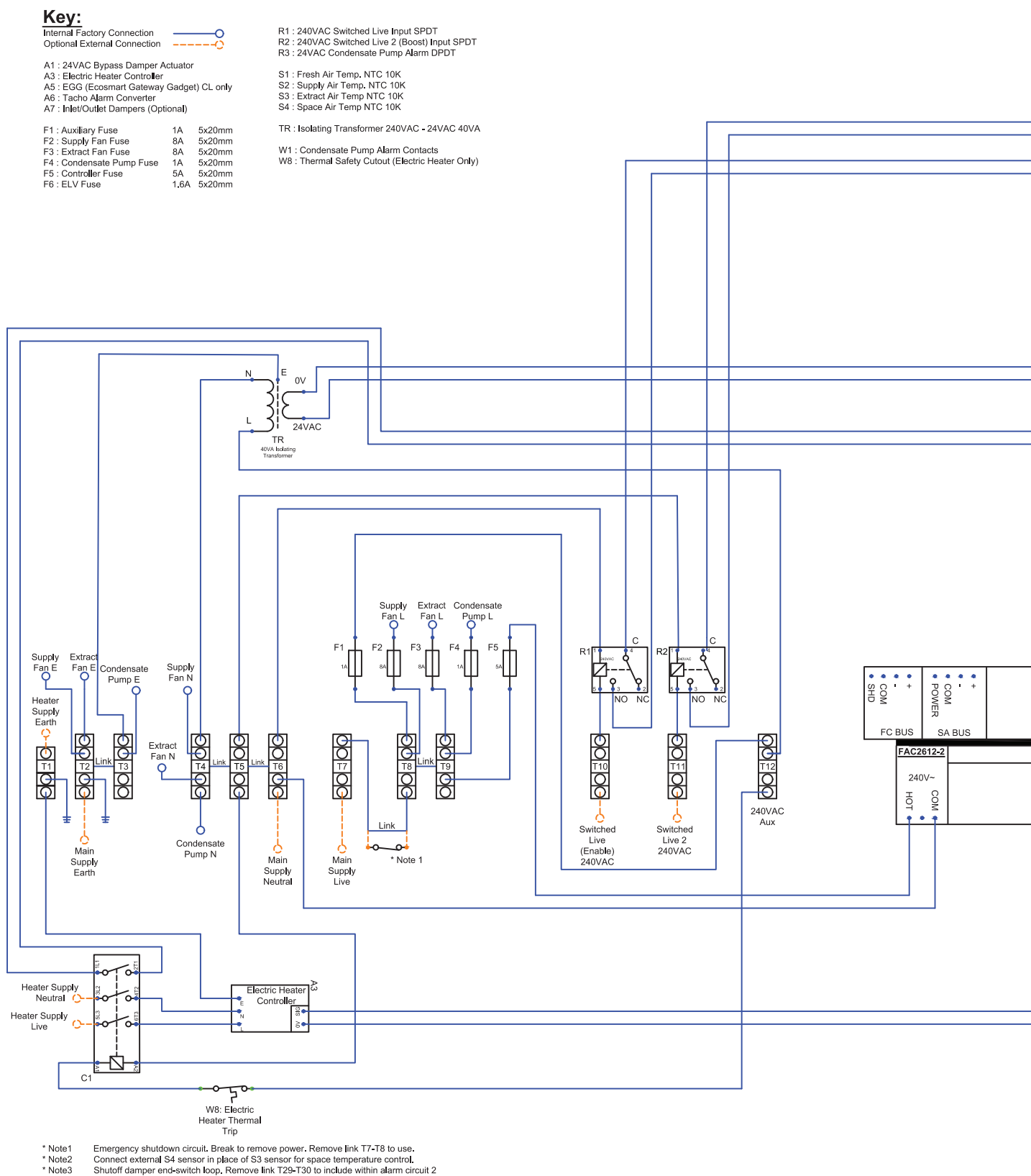


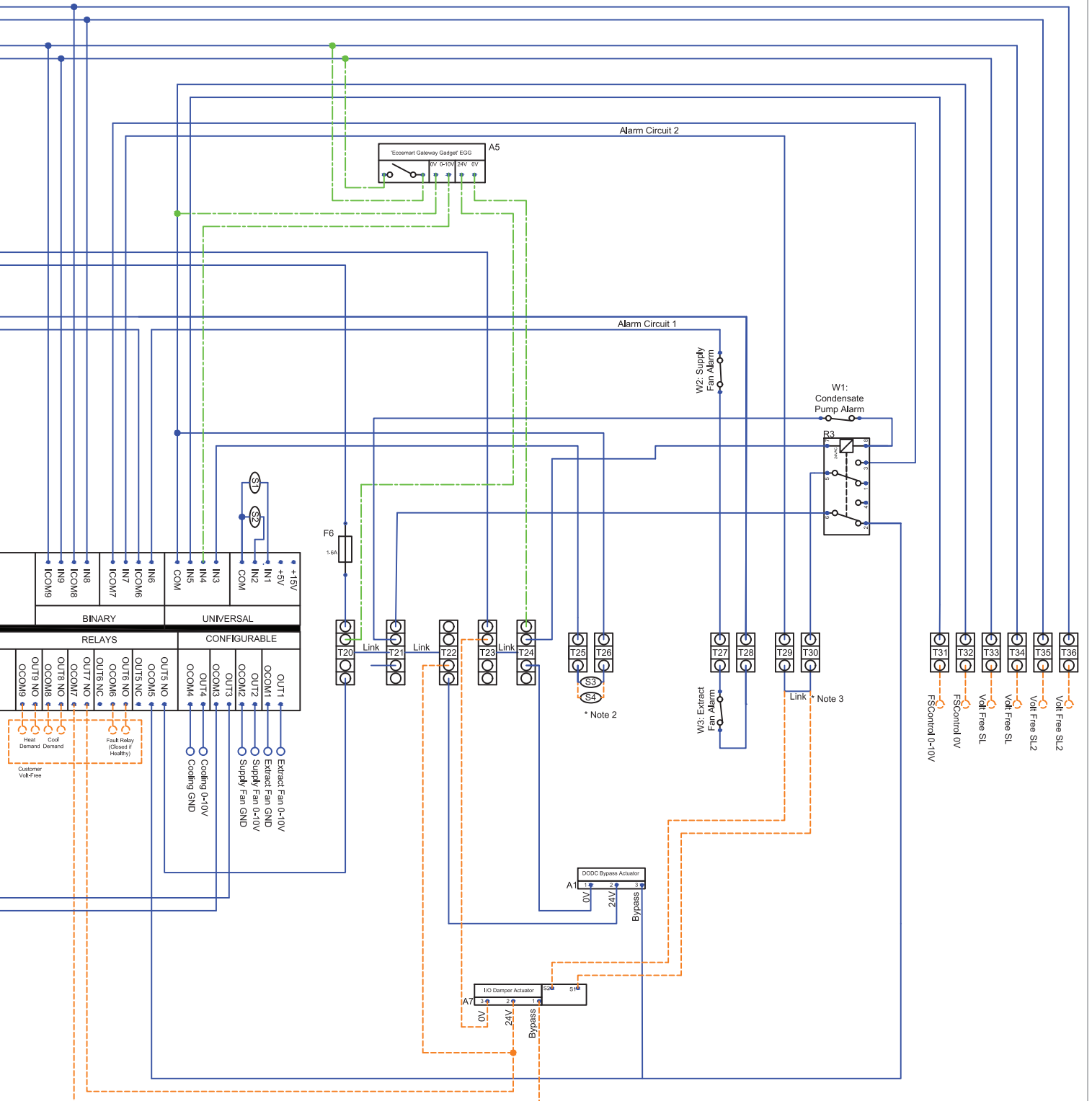


13.0 DIAGRAMS

13.8 XBC25-65 (ELECTRIC HEATER VERSION)

Figure 40:





XBOXER XBC ECOSMART (CO) MODELS

14.0 MAINTENANCE

It is recommended that PPE is always used during the maintenance of Air Handling Equipment – gloves, eye shields and respiratory mask.

IMPORTANT

Isolation - Before commencing work make sure that the unit and Nuaire control are electrically isolated from the mains supply.

In some Ecosmart units and in some third party controls, variable speed drives (inverters) are used to provide fan speed control. After the fan is isolated, allow at least 5 minutes for the capacitors in the inverter to discharge before commencing any work on the unit.

14.1 DAMPERS

At regular intervals check that the blades move freely.

14.2 FILTERS (4 X G4 FITTED AS STANDARD)

Disposable filters should be changed when an appropriate pressure drop is achieved.

14.3 HEATING COILS

Coils should have their finned surface examined for accumulation of dirt, lint and biological contaminants or similar.

If necessary, wash down affected areas with a mild detergent solution and a soft brush. Care should be taken not to damage the finned surface, and any cleaning fluids should be rinsed away with water.

A compressed air line may be used to blow out any solids between fins. Do not probe the coil fin block with metal objects as damage may cause leaks. Drain lines should be checked to ensure that they are unobstructed and free draining.

Drain pans should be flushed out periodically to remove contamination.

Note: The unit application may require particular attention to this item – Check with Building Management personnel for details.

14.4 COUNTERFLOW PLATE HEAT EXCHANGER

The heat exchanger block is normally protected from dust and contamination by upstream pre-filters. It is possible to clean the unit with compressed air in the case of dust deposits or by spraying with a mild detergent solution for grease deposits. Solvents, strong alkaline, acidic or any products that may be aggressive to aluminium should not be used. Do not use cleaning water over 50 deg C.

Drain lines should be checked to ensure that they are unobstructed and free draining. Traps should be checked that they are fully primed and functioning. Drain pans should be flushed out periodically to remove contamination, and chemical treatments may be used to provide protection between service visits.

Note: The unit application may require particular attention to this item – Check with Building Management personnel for details.

14.5 FANS AND MOTORS

Fan bearings should be manually checked at regular intervals for condition. Standard fan bearings are supplied as 'sealed for life' and have an anticipated life of 40,000 hours.

Motors have an enclosed bearing housing and are pre-greased for life. **Check all fixings are secure.**

14.6 GENERAL

Inspect all internal and external surfaces to check for corrosion or peeling of painted surfaces.

Thoroughly clean affected areas with a wire brush, apply a coat of zinc rich primer or similar, and re-touch with suitable finishing paint. Ensure tightness of all nuts, bolts, and fixings.

Check all components for general condition.

15.0 SERVICE SCHEDULE

Typical–will depend on site conditions.

	6 MONTHS	12 MONTHS
G4 FILTERS	✓ or	✓
F7 FILTERS	✓	
DAMPERS		✓
DAMPER ACTUATORS		✓
VENT WATER COILS		✓
COIL FINNED SURFACES		✓
CHECK DRAIN LINES + DRIP TRAY	✓	✓
CLEAN DRAIN PANS	Building Schedule ?	✓
NUTS, BOLTS, FIXINGS SECURE		✓
FAN BEARINGS	✓	
ELECTRIC HEATERS		✓
ELECTRICAL WIRING		✓
FAN IMPELLER	✓	
GENERAL		✓

16.0 WARRANTY

5 year warranty on ECOSMART (CO) models for peace of mind.

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 or not installed commissioned and maintained in accordance with the details contained in this manual and general good practice.

If control software is modified or removed

Nuaire will accept warranty on the hardware (unit) provided the replacement does not control the unit beyond its specified limits (refer to Nuaire testing standards and Application Guidance Notes document NA-QS-W029-3 which can be found on our website www.nuaire.co.uk)

17.0 SPARES

Spare parts and replacement components, and general advice are available from the Nuaire Ltd Service department.

TELEPHONE 029 2085 8400
FAX 029 2085 8444

XBOXER XBC ECOSMART (CO) MODELS

18.0 CERTIFICATION

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: XBOXER XBC Ecosmart Connect models (CO)

Machinery Types: Supply & Extract fans with Heat Recovery

Relevant EC Council Directives: 2006/42/EC (Machinery Directive)

Applied Harmonised Standards: BS EN ISO 12100, BS EN ISO 13857
EN60204-1, BS EN ISO 9001

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	02. 11. 15
2) A. Jones	Manufacturing Director	02. 11. 15

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

To comply with EC Council Directives 2006/42/EC' Machinery Directive and 2004/108/EC (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.
- 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 (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.

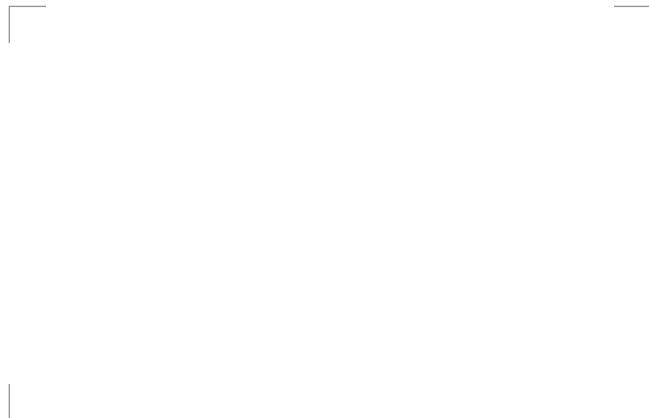
7.0 OPERATIONAL REQUIREMENTS

- 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.

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.



FOR MORE INFORMATION

www.nuaire.co.uk

COMMERCIAL

www.nuaire.co.uk/commercial

AIR HANDLING UNITS

www.nuaire.co.uk/boxerahu



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www.nuaire.co.uk

As part of our policy of continuous product development Nuaire reserves the right to alter specifications without prior notice.
Telephone calls may be recorded for quality and training purposes.