Evinox ModuSat XR ECO CHHC

Combined Heating, Hot Water and Cooling

Contents

1. GENERAL INFORMATION

1.1 *Application*

The Evinox ModuSat® CHHC heat interface unit provides instantaneous domestic hot water, indirect space heating and cooling when connected to a district heating and cooling systems. The Evinox ModuSat® CHHC unit requires electrical supply to function.

1.2 *Symbols*

	**IMPORTANT NOTE REGARDING CORRECT INSTALLATION**
	**WARNING REGARDING PERSONAL SAFETY**
	**WARNING OF DANGER OF ELECTRIC SHOCK**

1.3 *Warning*

- ☐ **Follow the instructions.** These instructions must be read and observed carefully before installing and operating the ModuSat® heat interface unit. Failure to read and follow the instructions provided within this document may cause a safety hazard or/and failure of the equipment.
- ☐ **Qualified personnel only.** The Evinox heat interface unit must be installed, commissioned and maintained by a qualified and competent personnel in accordance with this document as well as national regulations and standards.
- ☐ **Warning of transport damage.** Always check to ensure that the ModuSat® heat interface unit has not been damaged during the transport.
- ☐ **Warranty.** Any modifications or adjustments carried out without Evinox Energy official authorisation will invalidate the warranty and absolve Evinox Energy from any liability.
- ☐ **Product modifications.** Evinox Energy reserves the right to make changes or modifications to the products without prior notice.

1.4 *Safety instructions*

The Evinox heat interface unit must be installed, commissioned and maintained by a qualified and competent personnel in accordance with this document as well as national regulations and standards.

	High temperatures. Take necessary precautions when working on the unit as high operating temperatures may cause severe skin burns.
	Risk of Electric shock. Disconnect the electricity supply before starting any works on the unit.
	Qualified personnel. Electrical installation must only be carried out by qualified personnel.
	In the case of water leak. ☐ Take caution of hot water ☐ Slowly close the isolation valve at the top of the unit ☐ Contact Evinox Energy

1.5 *Maintenance requirements*

We recommend the unit is checked at least every 24 months by an authorised maintenance engineer. If the unit is subject to excessively heavy usage or non domestic installations (for example in a light commercial environment), we recommend having it checked more than every 24 months.

2. TECHNICAL FEATURES

2.1 *Typical ModuSat® XR & XR-ECO CHHC Unit*

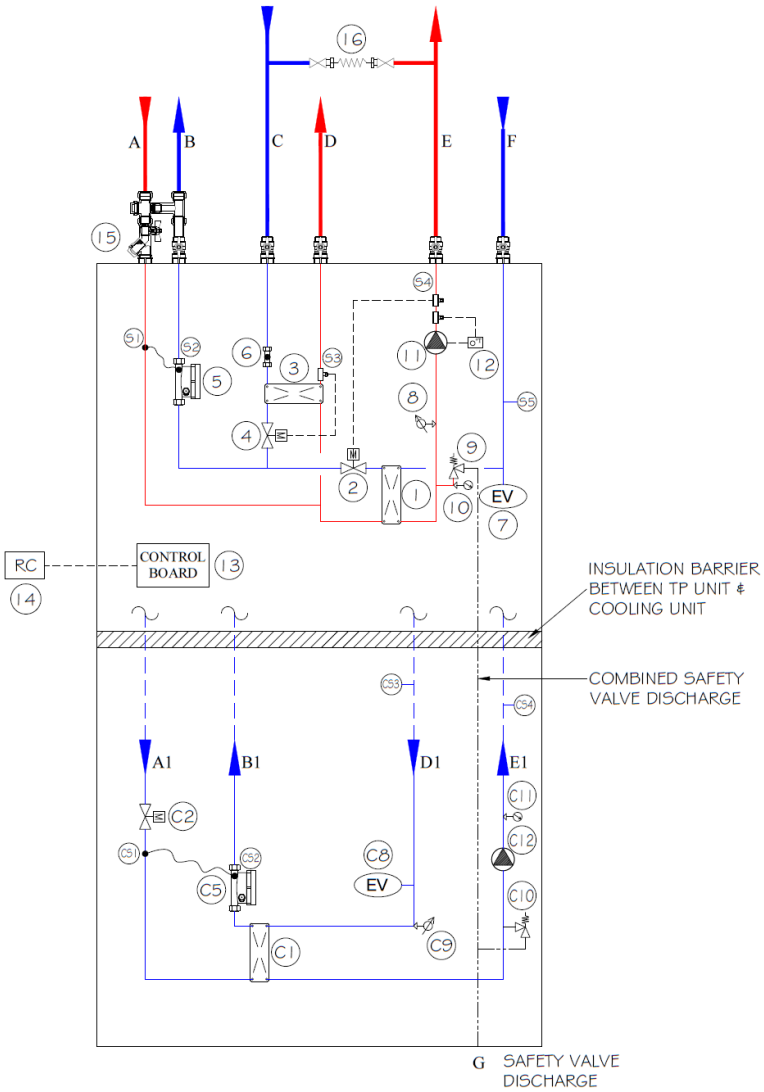
Photo

Note: The product may look different from the image shown.

2.2 *Function and operation*

- **District or communal heating system** – the primary thermal energy is used to produce domestic hot water and heating.
- **Domestic hot water (DHW) -** the DHW is prepared via a plate heat exchanger. The electronically controlled Pressure Independent Control Valve (PICV) modulates the primary flow rate to maintain the DHW temperature. This unit operates with the DHW taking priority over HTG – when the hot water is used it will temporarily cut the heating operation. Once the hot water outlets are closed the heating operation will be resumed.
- **Heating (HTG)** – when the space heating demand is requested by the end user controller, the heating operation is started. The electronically controlled PICV is used to modulate the primary flow rate to match the heating demand. The unit has an integrated heating circulation pump which is switched on when the heating is on.
- **Keep Warm Facility** – when the heat interface unit is set in the Comfort mode, the DHW plate heat exchanger is kept warm by opening the domestic hot water PICV to heat the plate up to comfort temperature. This cycle runs about 3-5 minutes.
- **District or communal cooling system** – the primary chilled water flow is used to produce cooling.
- **Apartment cooling** – when the space cooling demand is requested by the end user controller, the cooling operation is started. The electronically controlled PICV is used to modulate the primary flow rate to match the cooling demand. The unit has an integrated circulation pump which is switched on when the cooling is on.

2.3 *Typical Schematic (All Top Connections)*



Note: Other connection arrangements are available

Components

A Primary / LTHW flow
B Primary / LTHW return
C Domestic cold water Inlet
D Domestic hot water outlet
E Secondary heating flow
F Secondary heating return
G Connection for safety discharge

A1 Primary cooling flow
B1 Primary cooling return
D1 Secondary cooling return
E1 Secondary cooling flow

Primary Circuit Side

1 Insulated plate heat exchanger (Heating)
2 Heating Pressure Independent Control Valve (PICV) with actuator
3 Insulated plate heat exchanger (Domestic Hot Water)
4 DHW Pressure Independent Control Valve (PICV) with actuator
5 Heat meter

C1 Insulated plate heat exchanger (Cooling)
C2 Cooling Pressure Independent Control Valve (PICV) with actuator
C5 Cooling meter

DHW Secondary Side Circuit

6 Flow sensor

Heating Secondary Side Circuit

7 Heating expansion vessel
8 Pressure sensor
9 Pressure relief valve
10 Pressure gauge
11 Heating circulation pump
12 Safety UFH thermostat (optional)

Cooling Secondary Side Circuit

C8 Cooling expansion vessel
C9 Pressure sensor
C10 Pressure relief valve
C11 Pressure gauge
C12 Heating circulation pump

Controls & Other Items

13 Electronic control board
14 ViewSmart room controller (optional)
15 Strainer & IV assembly
16 Filling loop (External)

S1, S2 – temperature sensors as a part of the heat meter
S3 – DHW temperature sensor
S4, S5 – heating flow and return temperature sensors
CS1, CS2 – temperature sensors as a part of the cooling meter
CS4, CS3 – heating flow and return temperature sensors

2.4 *Technical Parameters*

Electrical

Electric supply	220 / 240 Volt (AC)	
Frequency	50 Hz	
Current absorption	0,6-1 Amps	

Hydraulic connections

		Type 1	Types 2 & 3	Type 4
Primary LTHW flow	A	3/4 “	3/4 “	3/4 “
Primary LTHW return	B	3/4 “	3/4 “	3/4 “
DCW inlet	C	3/4 “	3/4 “	3/4 “
DHW supply	D	3/4 “	3/4 “	3/4 “
Secondary heating flow	E	3/4 “	3/4 “	3/4 “
Secondary heating return	F	3/4 “	3/4 “	3/4 “
Drain	G	1/2 “	1/2 “	1/2 “
Primary cooling flow	A1	3/4 “	1”	1 1/4”
Primary cooling return	B1	3/4 “	1”	1 1/4”
Secondary cooling flow	C1	3/4 “	1”	1 1/4”
Secondary cooling return	D1	3/4 “	1”	1 1/4”

		Type 5	Type 6 & 7	Type 8
Primary LTHW flow	A	1”	1”	1”
Primary LTHW return	B	1”	1”	1”
DCW inlet	C	1”	1”	1”
DHW supply	D	1”	1”	1”
Secondary heating flow	E	1”	1”	1”
Secondary heating return	F	1”	1”	1”
Drain	G	1/2 “	1/2 “	1/2 “
Primary cooling flow	A1	3/4 “	1”	1 1/4”
Primary cooling return	B1	3/4 “	1”	1 1/4”
Secondary cooling flow	C1	3/4 “	1”	1 1/4”
Secondary cooling return	D1	3/4 “	1”	1 1/4”

See section 8 for CHHC model types

Hydraulic characteristics

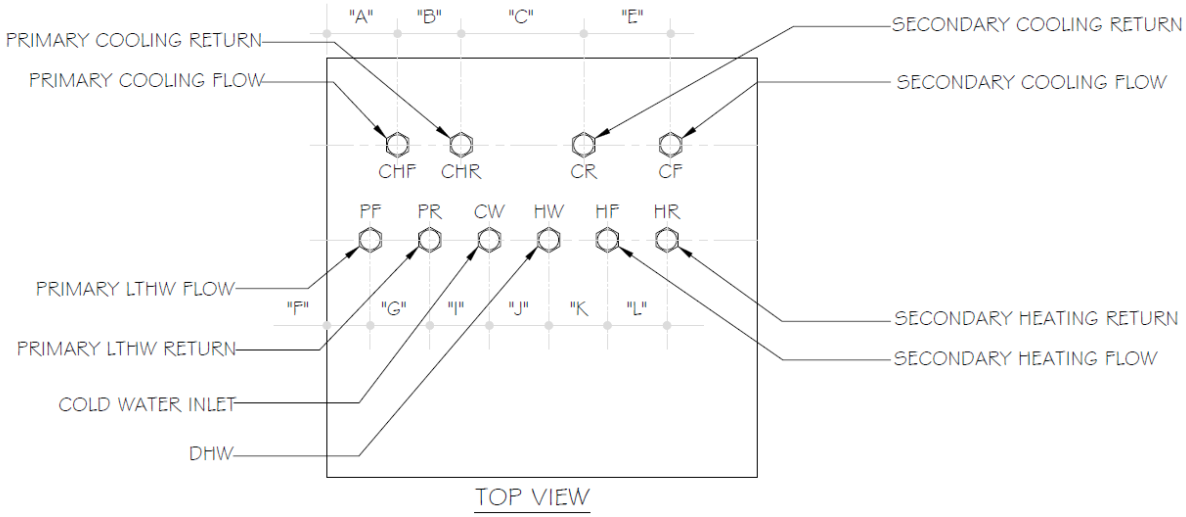
Pipework material	Copper
Plate heat exchanger material	Stainless steel 316L
Operating medium	Water
Primary circuit max pressure	16 bar
Primary minimum differential pressure	0.5 bar (May vary depending on the required output)
Primary maximum differential pressure	4 bar (May vary depending on the required output)
Apartment heating circuit recommended cold fill pressure	1 bar
Apartment heating maximum pressure	3 bar
Apartment heating expansion vessel size	8 L
Apartment cooling circuit recommended cold fill pressure	1 bar
Apartment cooling maximum pressure	3 bar
Apartment cooling expansion vessel size	8 L
DHW max pressure	10 bar
DCW min pressure	1.5 bar
Max primary supply temperature	85°C

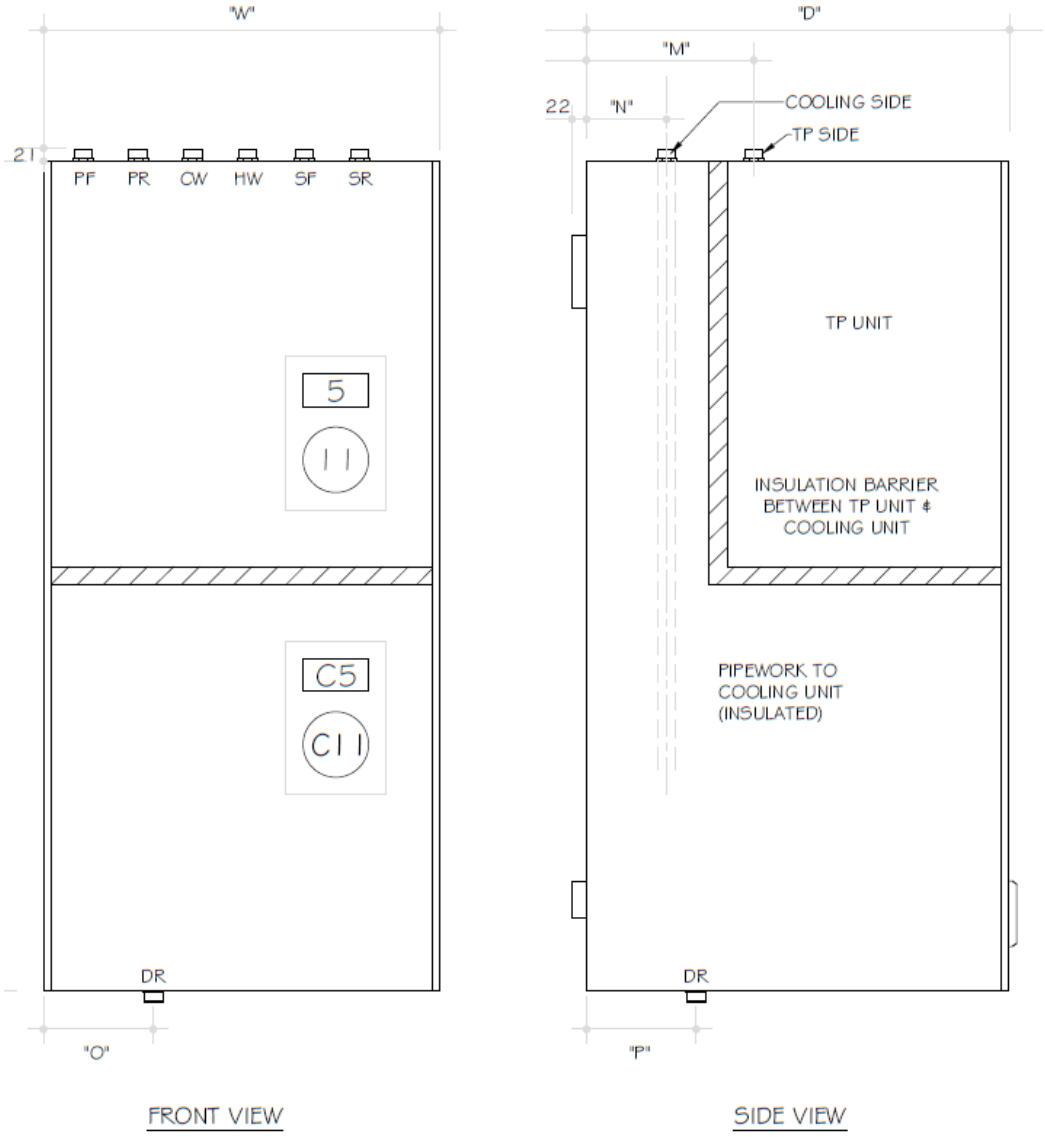
Weight

	Dry	Wet
CHHC XR ECO 55-10A-R40	74 kg	79 kg
CHHC XR ECO 70-10A-R70	86 kg	93 kg
CHHC XR ECO 100-10A-B50	104 kg	113 kg

For other models please contact Evinox.

2.5 *Typical Dimensions*





CONNECTION DETAILS (INCH)				
CHHC	PR, PR, CW, HW	HF, HR	CHF, CHR, CF, CR	DR
TYPE 1	3/4"	3/4"	3/4"	1/2"
TYPE 2	3/4"	3/4"	1"	1/2"
TYPE 3	3/4"	3/4"	1"	1/2"
TYPE 4	3/4"	3/4"	1 1/4"	1/2"
TYPE 5	1"	3/4"	3/4"	1/2"
TYPE 6	1"	3/4"	1"	1/2"
TYPE 7	1"	3/4"	1"	1/2"
TYPE 8	1"	3/4"	1 1/4"	1/2"

DIMENSION DETAILS (MM)														
CHHC	"A"	"B", "C", "E"	"F"	"G", "I", "J"	"K"	"L"	"M"	"N"	"O"	"P"	"W"	"H"	"D"
TYPE 1	154	60	121	60	120	60	152	52	136	53	550	1180	420
TYPE 2	94	90	121	60	120	60	152	52	136	53	550	1180	420
TYPE 3	69	90	121	60	120	60	152	52	111	53	550	1250	420
TYPE 4	79	120	121	60	120	60	182	67	489	53	600	1330	440
TYPE 5	154	60	82	90	60	60	152	52	136	53	550	1180	420
TYPE 6	94	90	82	90	60	60	152	52	136	53	550	1180	420
TYPE 7	69	90	82	90	60	60	152	52	111	53	550	1250	420
TYPE 8	79	120	112	90	60	60	182	67	489	53	600	1330	440

See section 8 for CHHC model type

Minimum space requirements for access and servicing: Top: 250 mm (To allow for H-type flushing by pass), Front: 700 mm, Side: 50 mm. Flushing by pass kits for 1 1/4" are not supplied by Evinox, installer must ensure that there is enough space for the 1 1/4" kit.
Please Note: Flushing bypass to be installed on primary connections A & B and A1 & B1.

3. INSTALLATION

The Evinox combined heating, hot water and cooling unit must be installed, commissioned and maintained by qualified and competent personnel in accordance with this document as well as national regulations and standards.

3.1 *Handling*

- ☐ The unit should be moved into position before lifting still within its packaging to prevent any damage whilst being positioned. Only once it is safely situated, the unit should be removed from its packaging and lifted into position.
- ☐ The ModuSat® unit may have been transported and handled many times prior to the installation, therefore it is vitally important that all unions and connections are checked and tightened as required. In case of damage please contact Evinox Energy on 01372 722277.
- ☐ Packaging materials must be disposed in accordance with the requirements of the construction site or the property.

⚠	**Lifting.** Take care when lifting this appliance. It is recommended that at least two people perform the lifting.
⚠	**Leave caps over the connections.** Ensure that the protective cover (caps) over the ModuSat® pipe connections are kept in place to prevent ingress of any debris.

3.2 *Positioning*

The heat interface unit should be installed in a sheltered environment and is not suitable for outdoor installation. It is recommended that the surrounding environment conditions do not exceed 40 °C with the relative humidity from 15% to 85%.

Note: As the unit contains water, to operate, it is recommended not to place electrical devices, such as control boards and other devices, underneath the unit in the case of a water leak. The manufacturer cannot accept any responsibility for goods damaged in such a way.

☞	**Maintenance space.** It should be ensured that a sufficient space around the unit is provided to allow the future maintenance and servicing of the unit. The removal of the front panel should <u>not</u> be restricted. See section 2.5 for the minimum space requirements

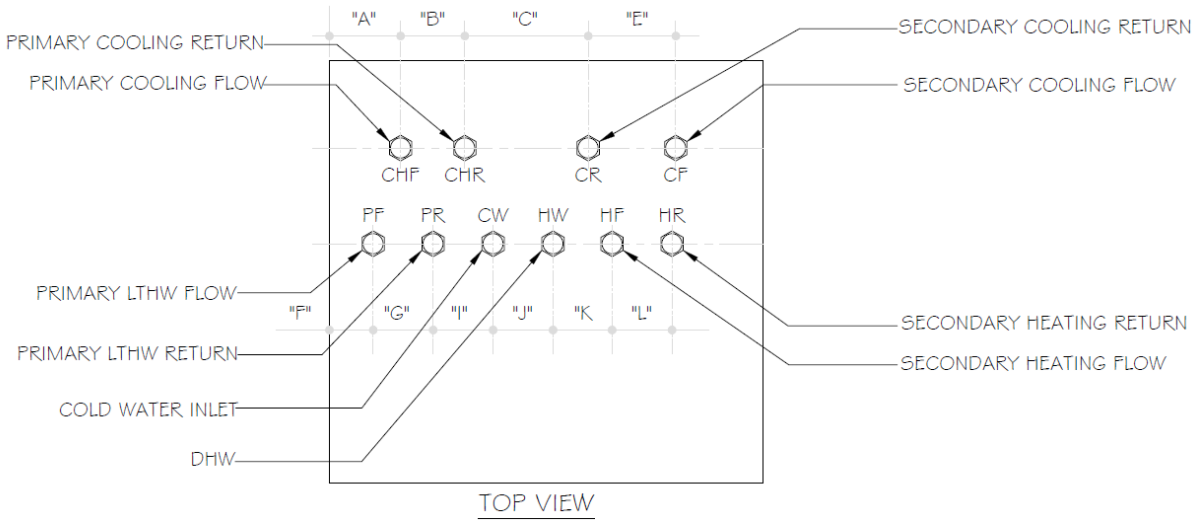
3.3 *Hydraulic connections*

	Connection arrangement. Ensure that the hydraulic connections of the pipework piped up to the unit are correct and follows the hydraulic schematic. The manufacturer cannot accept any responsibility for any damage caused to the unit due to crossed connections. **Any Evinox engineer callout/visit due to this issue will be chargeable.**

The ModuSat® heat interface unit is designed to be wall mounted or floor standing with the typical primary connections and domestic water hydraulic connections as shown below.

The Evinox Energy flushing by-pass valve kit should be installed before connecting the unit to the network. **Isolation valves should not be opened until system is flushed.**

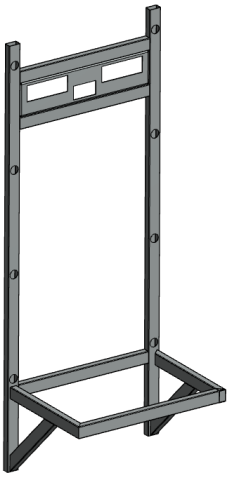
The whole primary system should be cleaned and flushed in accordance to BG29/2012 before installing the heat interface unit to ensure the ModuSat® unit is not damaged.



3.1 *Wall fixing*

There are two ModuSat® CHHC unit configurations: floor standing or wall mounted. Wall mounted HIU can be installed on the wall bracket or wall frame, both provided by Evinox.

Wall bracket



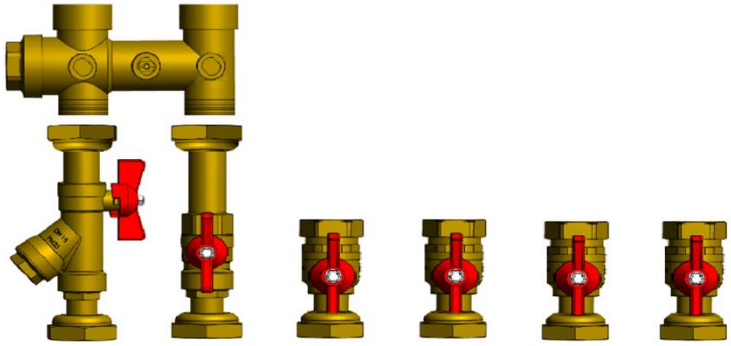
Wall frame

	Wall fixing Installer must ensure that appropriate fixings are used.

3.2 *Evinox Flushing By-pass Kit*

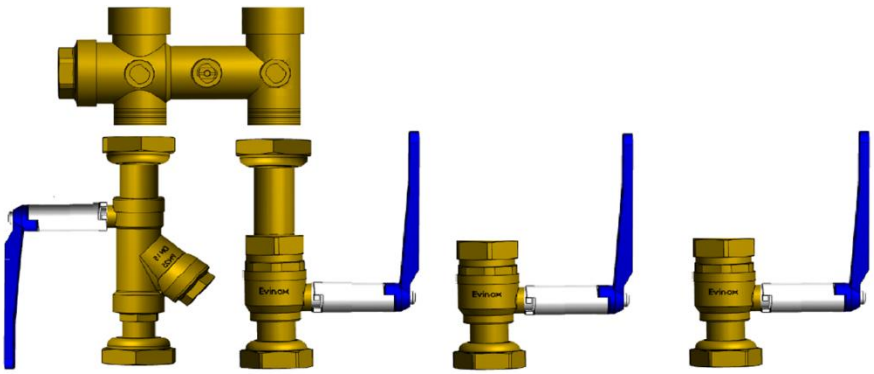
Evinox flushing by-pass kit allows to isolate HIU from the network during cleaning and flushing the system. The kit includes an H shape by-pass with an inbuilt extended isolation valve, 1 strainer and 5 isolation valves.

Evinox ModuSat® flushing kit for heating circuit



⚠	**Close valves** Before connecting flushing by-pass kit to the HIU ensure all isolation valves are closed. Valves can be opened after LTHW system has been flushed.

Evinox ModuSat® flushing kit for cooling circuit



⚠	**Close valves** Before connecting flushing by-pass kit to the HIU ensure all isolation valves are closed. Valves can be opened after the system has been flushed.
☞	**1 1/4" valve kit** Evinox only supply 3/4" and 1” valve kits. 1 1/4" kits need to be purchased elsewhere.

3.3 *Flushing Primary Circuit*

Before filling ModuSat® heat interface unit. The primary system should be cleaned and flushed in accordance to BG29/2012

To open the by-pass:

- ☐ Ensure both isolation valves are closed as shown in the picture.
- ☐ Use a suitable screwdriver or other tool to twist the screw on the H-shape by-pass valve into the open position.
- ☐ Close the bypass after flushing is complete.

	Provide isolation valves and a strainer. If Evinox valve kit is not used, it must be ensured that other isolation valves provided. Strainer on the primary inlet protects internal components from debris and sediments.
	Tighten the connections. When connecting the ModuSat® heat interface unit, ensure that all the connections are tightened to avoid any leaks.

3.4 *First fill of the HIU*

	Clean and flush the system before connecting the unit. Filling the system should be performed only after the system has been fully flushed and cleaned. Poor water quality may cause failure of the operation of the unit.
	Water quality. It is recommended that the flushing and cleaning of the primary circuits, domestic water circuit, secondary cooling and heating circuits is performed by a qualified person in accordance with current standards, regulations and BSRIA guidelines.
	In the case of a water leak. ☐ Take caution of hot water ☐ Slowly close the isolation valves at the top or bottom of the unit ☐ Contact Evinox Energy
	The ModuSat® pump should not be used for flushing. The pump is integral to the unit and should not be used for flushing and cleaning the system. Failure to meet this requirement will invalidate the warranty.

Filling the primary circuit

Please take care when filling the ModuSat® unit.

- ☐ Make sure that the by-pass valve is in closed position
- ☐ Slowly open the isolation valves on the primary circuit.
- ☐ Visually check that there are no leaks. Tighten the connections of the valve kit if necessary.
- ☐ If there is a leak internal to the unit, ensure the isolation valves are left in a closed position.

3.5 *HIU Flushing*

⚠	**Clean and flush LTHW system before flushing through the HIU** Filling the system should be performed only after the system has been fully flushed and clean. Poor water quality may cause failure of the operation of the unit.

3.6 *First fill of apartment heating and cooling systems*

The ModuSat® CHHC unit is fitted with 2 pressure gauges that are mounted on the front panel. Gauge reading should be used when filling the secondary circuits. An external filling loop should be used for filling the secondary circuits with the mains cold water.

- ☐ Open the isolation valves on the filling loop.
- ☐ Cold fill should be done to about 1 bar
- ☐ Once the required pressure is reached, close the filling loop ball valve, vent the system and repeat it again.
- ☐ Disconnect filling loop.

4. Water treatment

The quality and cleanliness of the water within both the primary and secondary circuits is vitally important to prevent damage to the ModuSat® components, and to ensure that the efficiency and service life of the unit is maintained.

It is therefore necessary to fully flush and treat both primary and secondary circuits using suitable water treatment chemicals.

	Water treatment in accordance to these instructions. Please confirm with the water treatment consultants that the chemicals used and cleaning method statement complies with the requirements set out in this section.
	Water quality may damage the unit. Poor water quality may damage the components used in the unit and invalidate the warranty. The manufacturer cannot take responsibility for any damage of the unit caused by poor water quality.
	Chemical cleaning and dosing. Chemical cleaning and dosing of the system should be in line with the current regulations, standards and guidelines. Which are, but are not limited to: ☐ BSRIA Application Guide BG29/2012 ☐ BS7593:2006 ☐ Requirements of your local water authority ☐ The Water Industry Act 1991, Section 119 ☐ HSE The Control of Legionella 1991 ☐ HSC Approved Code of Practice and Guidance HSG274, Part 2

	Recommended
Hardness (TH)	Up to 150 mg/l (as $CaCO_3$)
Chlorides (Cl^-)	Up to 150 mg/l
PH	7.5 – 9.0
Resistivity	> 2000 Ohm/cm
Sulphate (SO_4^{2-})	Up to 70 mg/l
Conductivity	200 crs
TDS	0-200 ppm
Free carbon dioxide (CO_2)	Up to 5 mg/l
Manganese (Mn)	Up to 0.1 mg/l
Iron (Fe)	Up to 0.2 mg/l (or 5ppm)
Copper	Up to 1 mg/l

Typical Water Quality Guidelines

4.1 *Water Quality Guidelines*

- ☐ TH - Total hardness is caused by calcium and magnesium.
- ☐ pH – this measures the alkalinity of the water, neutral alkalinity is pH7. Heating systems require an alkaline pH. Lower pH will increase the corrosion risk.
- ☐ TDS – dissolved solids in the system and is a measure of the cleanliness of the water (satisfactory level should be within TDS of 10% of the mains water) .
- ☐ Conductivity – this is the measure of the ability of water to pass an electrical current.
- ☐ Free copper – the level of copper in the system.
- ☐ Total Iron and Manganese – this measures iron concentration in mg/litre. These are strong oxidants and may increase the risk for corrosion.

Visual inspection should be carried out ensuring that the water is clear, bright and free from particulate matter. The system must be fully vented, pressurised and dosed with anti-corrosion and anti-bacterial growth inhibitor.

	High DHW temperature may cause scaling. High operating temperatures on the domestic hot water circuit may lead to scaled DHW plate heat exchanger. It is recommended to set the DHW temperature to maximum of 55°C especially in hard water areas.

4.2 *Dosing Secondary System*

Once the system is cleaned and flushed the inhibitors should be added to the secondary side to prevent the corrosion or bacteria growth.

A suitable long term corrosion inhibitor and inhibitor for preventing the bacteria should be introduced in a proportion of the system volume.

	Excessive filling of the secondary circuit with untreated water may lead to scale build up and corrosion. This may damage the ModuSat® unit or reduce the performance.
	Please confirm with the water treatment consultants that the chemicals used and cleaning method statement complies with the requirements set out in this section.
	Evinox Energy do not take responsibility for approving inhibitors used for dosing the system.

4.3 *Warranty due to Water Quality*

The warranty of the ModuSat® unit is strictly related to the instructions and procedures indicated in this manual and the warranty does not cover any damage caused by scale and/or corrosion resulting from poor water quality.

The components and materials used in the system assembly should also be checked to ensure they do not contribute to dissolved oxygen that can cause corrosion.

Also:-

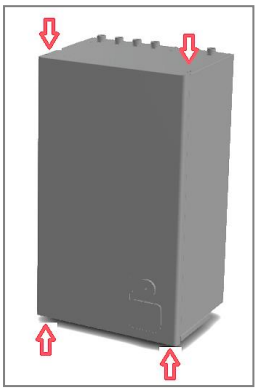
- ☐ Ensure there are no air pockets in the system
- ☐ Remove gas permeable parts and materials
- ☐ Ensure the expansion vessels are properly sized and the pre-charge pressure valve to guarantee positive pressure, with respect to the ambient pressure, throughout the circuits.

5. Electrical Connections

	Risk of Electric shock. Disconnect the electric supply before starting any works on the unit.
	Qualified personnel. Electrical installation must only be carried out by qualified personnel.
	Overvoltage or lightning. The ModuSat® unit has no protection against lightning or other overvoltage shocks.
	Power supply via un-switched double pole fused connection. The ModuSat® requires a 220/240V (AC) 50Hz mains supply connection through an un-switched fused connection fitted with a 3 Amp fuse (to BS1632). Extension cords, multiple plugs, and other adapters must not be used. The device must be earthed.
	Follow the instructions Any damage caused by an incorrect connection will invalidate the warranty. Evinox Energy cannot accept any responsibility for incorrect wiring.

The ModuSat® wiring boards are located within the ModuSat® itself under a removable metal cover. To access the connection board, the full front case cover should be removed. To take off the cover the retaining screw should be removed and the cover lifted off.

5.1 *Removing the Front panel*



To access the wiring board, the front panel must be removed.

- ☐ On a wall-hung units the front panel is fixed with four screws – two at the top of the unit and two at the bottom as shown opposite.
- ☐ Untighten the screws and remove the panel pushing it upwards first and then remove it towards yourself.
- ☐ The panel is powder coated stainless steel. Take care when removing and placing the front panel to ensure the surface is not damaged.
- ☐ After the works are finished, place the panel on the unit and tighten the screws.

5.2 *ModuSat® Wiring Connections*

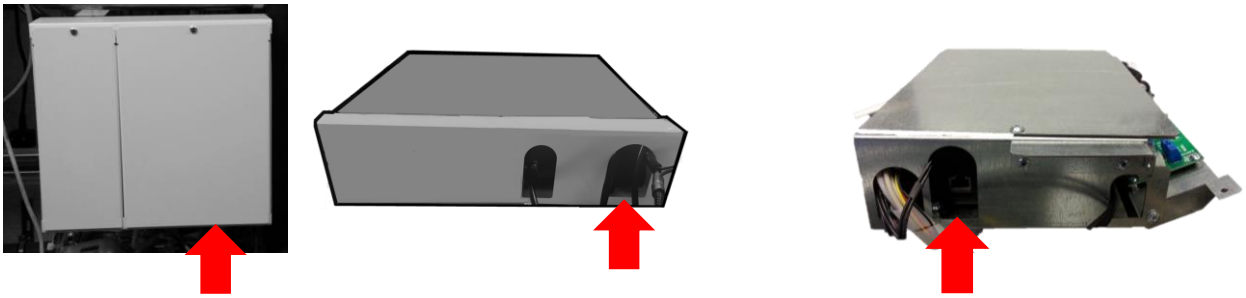
The ModuSat® wiring boards is located within the ModuSat® itself under a removable metal cover. CHHC has two wiring boards, one for the heating and one for the cooling. Depending on the model, the boards can be found in either metal boxes shown below.

To access the connection board, take off the cover. The retaining screw should be removed and the cover lifted off. The connection board will then be accessible and all required connections can be made simply using the clearly labelled screw down terminal connections. Guides for the various connection applications and requirements are detailed in the wiring principle drawings shown on pages 21-23.

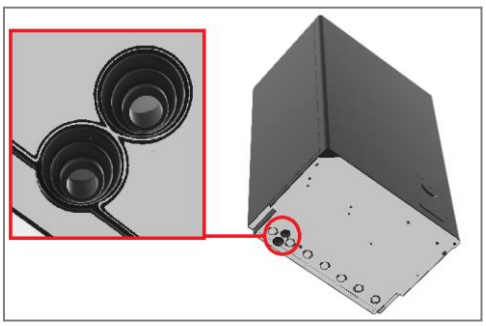
	The Control Board The control board is located next to the connection board. <u>The control board cover must not be removed.</u> Doing so may invalidate the warranty.
	Connection Terminations Evinox Energy strongly recommend in accordance with best practice that all wiring connections to the board, especially the BUS and room controller are terminated using 'bootlace ferrule' connectors. These connectors ensure a good connection and that the whole cross sectional area of the wiring is intact.

5.2.1 RJ45 Connections

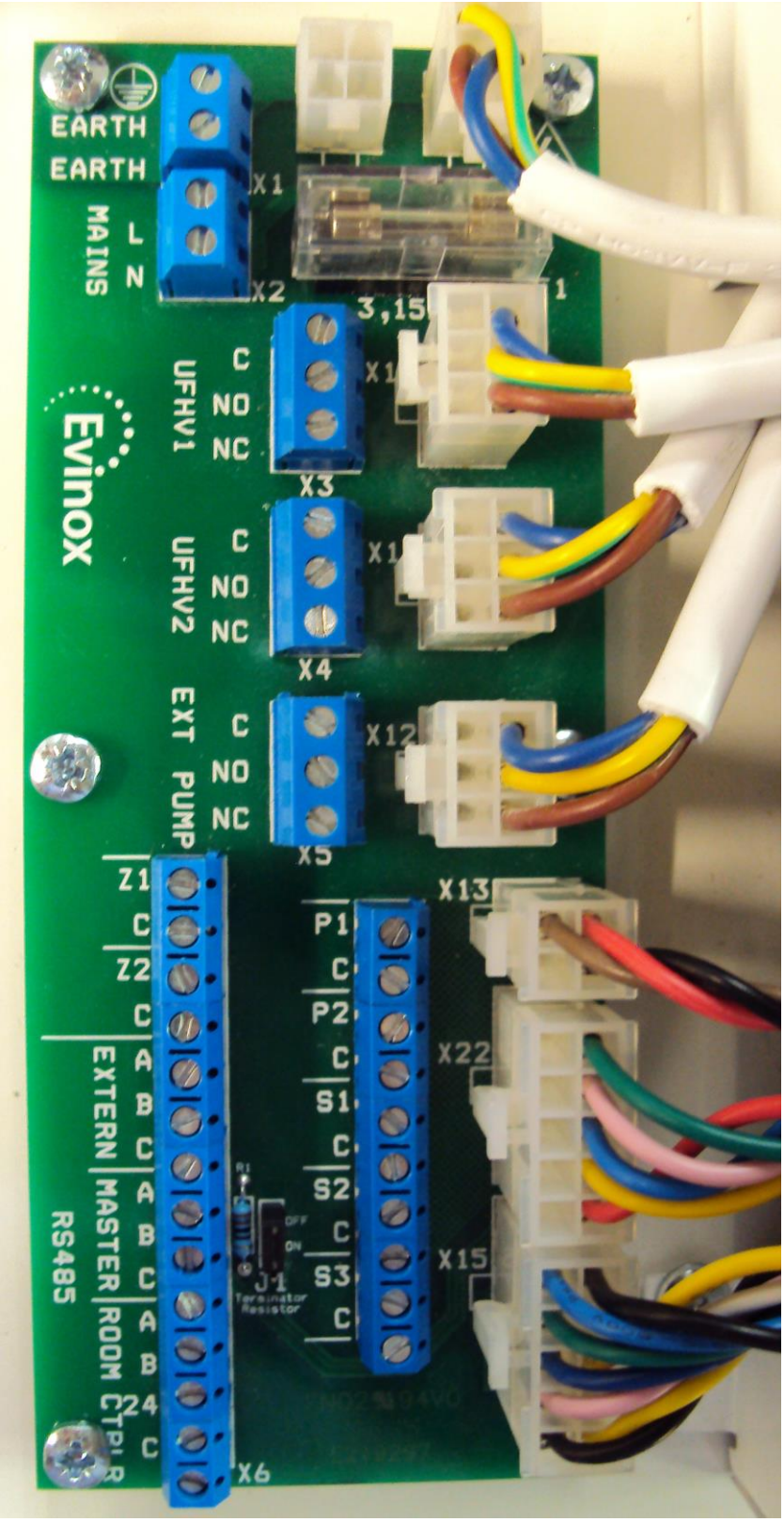
If the TCP/IP network is used (instead of the BUS) the RJ45 must be connected to the control board. The RJ45 connection can be found at the bottom of the control board as shown below.



Cable glands are fitted at the bottom of the ModuSat® case as shown in below:



5.3 *ModuSat® Connection Board*



Please Note: When connecting external valves or pumps to the ModuSat control board, it must be ensured that each connection does not exceed 1amp @ 220/240V (AC).

5.4 Typical ModuSat® Electric Wiring Diagram (Two Evinox ViewSmart Room Controllers)

See drawing – STD-MOD-BMS-CHHC_A

5.4 *ViewSmart Room controller connections*

The Room controller is a white ABS box with a graphic display. It should be installed in the main living area of the dwelling (if ViewSmart is not used as a thermostat it can be factory fitted on the front case of the CHHC) It must be connected to the connection board within the ModuSat® (please refer to the electrical diagram). The cable must not be installed adjacent to other 220/240 Volt (AC) lines.

	Power Supply for ViewSmart The ModuSat® room controller's power is supplied by the ModuSat® board and does not require batteries or additional power cabling.
	External Valve and Pump Requirements When connecting external valves or pumps to the control board of the ModuSat® it must be ensured that each connection does not exceed 1amp @ 220/240V (AC).
	Cable Requirement ViewSmart should be connected to ModuSat® connection board with 4 core x 0.33 mm^2 screened cable

Dimensions:

H= 80 mm
L= 130 mm
D= 22 mm

To open the cover to access connections, use a screwdriver in the tab at the bottom as shown below.

Step 1
To open the cover to access connections, use a screwdriver in the tab at the bottom as shown below.

Step 2
Once the tab has been released the cover can be hinged up to access connection

Step 3
Connection terminal with room controller

5.5 *SmartTalk® system wiring*

ModuSat® CHHC can be used in two network topologies: RS485 (Bus) and TCP/IP.

Typical Modbus system architecture

See drawing - STD-MOD-2013-BUS 1 - E

Typical TCP/IP system architecture

See drawing - STD-MOD-2015-TCP-IP-3

6. SETTING INTO OPERATION / COMMISSIONING

	Evinox Commissioning Engineers The unit should be commissioned by Evinox Energy commissioning engineers to validate the warranty unless otherwise specified by Evinox Energy.
	System Checklist Prior Commissioning It is important that the system is fully ready for the works to be carried out.
	Report to Evinox If there is a problem with the unit, isolate it from the hydraulic connections and the power (if necessary) and report to Evinox Energy.

6.1 *Pre-commissioning checklist*

	Pre-requisite of Commissioning	Check
1	Primary network and plant room fully operational and complete (including water treatment) in line with these instructions	☐
2	Secondary system fully operational including water treatment in line with these instructions	☐
3	The ModuSat® unit is installed as per the hydraulic connections in line with these instructions	☐
4	Electric connections and supply is complete and all controls functional in line with these instructions	☐
5	Evinox SmartTalk system installed, tested and operational (including the broadband connection	☐
6	Apartment reference and postal address schedule issued to Evinox	☐

6.2 *Setting unit into operation*

6.2.1 Pressure independent control valve (PICV)

	DHW PICV (Types 1-4)	DHW PICV (Types 5-8)	Heating PICV (Types 1-8)
Maximum flow rate	1600 l/h	3609 l/h	575 l/h
Start up ΔP	25 kPa	25 kPa	25 kPa
Max ΔP	400 kPa	400 kPa	400 kPa
Valve size	DN20	DN25	DN15
Thread	G 1”	G 1 1/4”	G 3/4’’
Actuator Stroke	2.5 mm	5.5 mm	2.5 mm
Actuator control signal	0-10V	0-10V	0-10V
Mechanical pre-setting	Not available	Available	Available

Parameter	Cooling PICV (Types 1, 5)	Cooling PICV (Types 2, 3, 6, 7)	Cooling PICV (Types 4, 8)
Maximum flow rate	1330 l/h	3609 l/h	4001 l/h
Start up ΔP	25 kPa	25 kPa	25 kPa
Max ΔP	400 kPa	400 kPa	400 kPa
Valve size	DN15	DN25	DN32
Thread	G 3/4”	G 1 1/4”	G 1 1/2”
Actuator Stroke	5 mm	5.5 mm	5.5 mm
Actuator control signal	0-10V	0-10V	0-10V
Mechanical pre-setting	Available	Available	Available

Heating PICV set points (if required)

Pre-set	Flow (l/h)	Pre-set	Flow (l/h)
0.5		2.2	324
0.6	100	2.4	351
0.8	128	2.6	379
1.0	156	2.8	407
1.2	184	3.0	445
1.4	212	3.2	463
1.6	240	3.4	491
1.8	268	3.6	519
2.0	296	3.8	547
2.2	324	4.0	575

Valve Tolerances
The maximum flow rate will vary depending on the varying differential pressure across the units and the resulting flow rate may differ from the value shown above. The valve should be set to 125% above the design flow rate. The project specific set-point (if required) can be confirmed by Evinox Energy.

Tighten Actuator Connections
Ensure that the actuators are tightened to ensure the operation of the unit.

6.2.2 Heating Pump

Evinox ModuSat® unit has two integrated pumps: cooling and heating.

Heating circulation pump is Wilo Yonos Para with Pulse-width modulation (PWM) feature.

Wilo Yonos Para Pump LED – Description of Status

LED	Indicators	Diagnosis	Status	Remedy
Solid green	Pump in operation	Pump runs according to its setting	Normal operation	
Blinks quick green	PWM model:	Pump in standby	Normal operation	
Blinks red/ green	Pump in function but stopped	Pump restarts by itself after the fault is disappeared	1. Low voltage U<160 V or High voltage >253 V	1. Check voltage supply 195 V < U < 253 V
			2. Module overheating: Temperature inside motor too high	2. Check water and ambient temperature
Blinks red	Pump out of function	Pump stopped (blocked)	Pump does not restart by itself due to a permanent failure	Change pump
LED off	No power	No power to pump	1. Pump is not connected to power supply	1. Check cable connection
			2. LED is damaged	2. Check if pump is running
			3. Electronics are damaged	Change pump

6.3 *Initial Commissioning Procedure*

The following will be checked when commissioning the unit. The method may vary depending on the project.

	Evinox Energy Commissioning Check-List	Check
1	Check if the unit is connected correctly to the hydraulic circuits. Confirm that the unit is correctly connected to the electrical supply.	☐
2	Set the unit into operation by installing firmware, checking if all the components are functional.	☐
3	Confirm the unit performs hot water and heating function. If Evinox ViewSmart Room Controller is used this will include ViewSmart functionality check.	☐
4	Ensure the unit has an ID number, record serial numbers of the control board and the heat meter.	☐

	Evinox Technical Personnel Evinox Technical Personnel who will visit the project during the course of the installation and at completion to arrange for final commissioning and calibration, do so to assist the contractor and install team to deal with any questions and queries. **They do not perform the role of quality control or inspector of the installation or provide approval for the works carried out.**
	Booking Commissioning All commissioning must be booked 6 weeks in advance and will be carried out to a pre-agreed programme that will be confirmed with the client prior to commissioning.
	Warranty Evinox Energy Commissioning is required for warranty validation.

7. CHHC SERVICING AND INSPECTION

HIU inspection should be carried out every 2 years in line with the current regulations, standards and guidelines. Which is, but not limited to *BSRIA Heat Interface Unit Guide BG62/2015*

	Evinox Energy CHHC Servicing and Inspection Checklist	Check
1	No leaks associated with CHHC	☐
2	Visual inspection of primary isolation valves	☐
3	Strainer valves clean where accessible	☐
4	Primary differential pressure above required minimum	☐
5	Thermal insulation intact	☐
6	Secondary heating/cooling system pressure within nominal range	☐
7	Control valves respond to demand for heating, cooling and hot water	☐
8	Heating/cooling pump is functional	☐
9	Primary supply temperature as commissioned	☐
10	Heat meter registers demand	☐
11	Appliance can be read remotely (where applicable)	☐
12	Consumer satisfied with heating, cooling and hot water performance	☐
13	Take primary water sample	☐

8. WARRANTY

The warranty has value if good practice has been strictly observed during installation and in use. Evinox Energy is not liable for equipment breakdown and damage to persons and objects caused by:

- Transportation damage
- Installation in which the instructions and good practice were not complied with
- Improper use of the device, abnormal use conditions, tampering by unauthorised personnel or inadequate maintenance; corrosion and/or sludge accumulation; lack of electrical energy; absence of suitable drainage; exceeding operating limits, electrical and water system faults
- Frost damage
- Wear due to normal use
- Malfunctioning of system controls and or safety systems
- Corrosion due to oxygenation poor water quality or roaming currents
- The pump being run against a closed system.

From commissioning, ModuSat® XR appliances have a warranty against all manufacturing faults and material defects for a period of:

- 5 years for the stainless-steel plate heat exchangers
- 2 years for parts and labour Note: -Where Evinox Energy do not carry out the commissioning or have no "developer agreement" in place the two-year warranty will cover parts only with no labour cover)

The ModuSat® warranty will always start from the commissioning date providing this date is within six months of the date of invoice to allow for project completion. If the ModuSat® XR is commissioned outside the 6-month extension date, the warranty will reduce accordingly.

This warranty is strictly limited to the supply, free of charge, of parts acknowledged as being defective after inspection by our technical department. Any costs arising from this inspection will be charged if the part is deemed not to be defective. The defective parts must be returned otherwise the replacement part will be charged for.

Failure to comply with the relevant installation requirements of the Building Regulations, Local Water Byelaws and Building Standards will invalidate any warranty claim.

The ModuSat® must be fitted with the ModuSat® Flushing by-pass isolation valve kit for ease of servicing and undertaking warranty work. Warranty calls that include draining the system will be chargeable if isolation valves have not been fitted.

It is imperative that the level of corrosion protector within the system is kept within industry guidelines at all times. Special attention should be given to ensure that, after any decoration or building works where radiators might be removed, the system is replenished with chemicals. Non-use of inhibitor will invalidate the warranty.

We will record details of the unit and commence the warranty when we commission the ModuSat® units.

Any warranty claims that are a result of user error, poor installation or lack of servicing will be chargeable. Please note that all replacement parts provided under warranty are subject to factory inspection to determine cause of failure. Replacement parts are chargeable until passed as faulty by Evinox Energy, when a credit will be provided. Any parts that have failed as a result of poor servicing or misuse will not be covered by our warranty.

Any modifications to the appliance will invalidate the warranty.

Installation of the Evinox Energy unit should only be carried out by suitably skilled and qualified personnel. If failure occurs due to poor or faulty installation work, this will invalidate the warranty.

Your Evinox Energy appliance is one of the most reliable and technically advanced products available on the market, however, it is imperative that it is installed, commissioned and serviced in accordance with Evinox Energy installation and servicing manuals to ensure long life, reliability and efficiency.

Exclusions to the Warranty

The following are not covered by the warranty:

- Electric degradation of parts resulting from connection and installation on electricity supply whose voltage measured at the entry of the apparatus would be lower by 15 % or higher of 10 % than the nominal voltage of 230 volts
- Degradation of parts arising from external elements affecting the ModuSat® Unit i.e. (effect of storm, moisture, freezing, etc.)
- All consecutive incidents resulting from a failure to check the safety components (unvented kit etc.)
- Scaling, nor its consequences
- Corrosions due to chloride concentrations in domestic hot water higher than 60 mg/l
- The wear of the safety relief valve
- Cost of postage for returned parts.

9. LIST OF CHHC MODELS

CHHC xx-xxx-xxx

DHW PHE Heating PHE Cooling PHE

TYPE 1 (3/4" - 3/4" – 3/4")		
30-10A-R20	55-20A-R30	70-30A-R40
30-10A-R30	55-20A-R40	70-30A-R50
30-10A-R40	55-20A-R50	70-30A-R60
30-10A-R50	55-20A-R60	70-40A-R20
30-10A-R60	55-30A-R20	70-40A-R30
30-20A-R20	55-30A-R30	70-40A-R40
30-20A-R30	55-30A-R40	70-40A-R50
30-20A-R40	55-30A-R50	70-40A-R60
30-20A-R50	55-30A-R60	70-10R-R20
30-20A-R60	55-40A-R20	70-10R-R30
30-30A-R20	55-40A-R30	70-10R-R40
30-30A-R30	55-40A-R40	70-10R-R50
30-30A-R40	55-40A-R50	70-10R-R60
30-30A-R50	55-40A-R60	70-20R-R20
30-30A-R60	55-10R-R20	70-20R-R30
30-40A-R20	55-10R-R30	70-20R-R40
30-40A-R30	55-10R-R40	70-20R-R50
30-40A-R40	55-10R-R50	70-20R-R60
30-40A-R50	55-10R-R60	70-30R-R20
30-40A-R60	55-20R-R20	70-30R-R30
30-10R-R20	55-20R-R30	70-30R-R40
30-10R-R30	55-20R-R40	70-30R-R50
30-10R-R40	55-20R-R50	70-30R-R60
30-10R-R50	55-20R-R60	70-40R-R20
30-10R-R60	55-30R-R20	70-40R-R30
30-20R-R20	55-30R-R30	70-40R-R40
30-20R-R30	55-30R-R40	70-40R-R50
30-20R-R40	55-30R-R50	70-40R-R60
30-20R-R50	55-30R-R60	
30-20R-R60	55-40R-R20	
30-30R-R20	55-40R-R30	
30-30R-R30	55-40R-R40	
30-30R-R40	55-40R-R50	
30-30R-R50	55-40R-R60	
30-30R-R60	70-10A-R20	
30-40R-R20	70-10A-R30	
30-40R-R30	70-10A-R40	
30-40R-R40	70-10A-R50	
30-40R-R50	70-10A-R60	
30-40R-R60	70-20A-R20	
55-10A-R20	70-20A-R30	
55-10A-R30	70-20A-R40	
55-10A-R40	70-20A-R50	
55-10A-R50	70-20A-R60	
55-10A-R60	70-30A-R20	
55-20A-R20	70-30A-R30	

TYPE 2 (3/4" - 3/4" – 1")
30-10A-R70
30-20A-R70
30-30A-R70
30-40A-R70
30-10R-R70
30-20R-R70
30-30R-R70
30-40R-R70
55-10A-R70
55-20A-R70
55-30A-R70
55-40A-R70
55-10R-R70
55-20R-R70
55-30R-R70
55-40R-R70
70-10A-R70
70-20A-R70
70-30A-R70
70-40A-R70
70-10R-R70
70-20R-R70
70-30R-R70
70-40R-R70

TYPE 3 (3/4" - 3/4" – 1")	
30-10A-B30	70-30R-B40
30-20A-B30	70-40R-B40
30-30A-B30	
30-40A-B30	
30-10R-B30	
30-20R-B30	
30-30R-B30	
30-40R-B30	
55-10A-B30	
55-20A-B30	
55-30A-B30	
55-40A-B30	
55-10R-B30	
55-20R-B30	
55-30R-B30	
55-40R-B30	
70-10A-B30	
70-20A-B30	
70-30A-B30	
70-40A-B30	
70-10R-B30	
70-20R-B30	
70-30R-B30	
70-40R-B30	
30-10A-B40	
30-20A-B40	
30-30A-B40	
30-40A-B40	
30-10R-B40	
30-20R-B40	
30-30R-B40	
30-40R-B40	
55-10A-B40	
55-20A-B40	
55-30A-B40	
55-40A-B40	
55-10R-B40	
55-20R-B40	
55-30R-B40	
55-40R-B40	
70-10A-B40	
70-20A-B40	
70-30A-B40	
70-40A-B40	
70-10R-B40	
70-20R-B40	

TYPE 4 (3/4” - 3/4” – 1 1/4")	
30-10A-B50	30-20R-B70
30-20A-B50	30-30R-B70
30-30A-B50	30-40R-B70
30-40A-B50	55-10A-B70
30-10R-B50	55-20A-B70
30-20R-B50	55-30A-B70
30-30R-B50	55-40A-B70
30-40R-B50	55-10R-B70
55-10A-B50	55-20R-B70
55-20A-B50	55-30R-B70
55-30A-B50	55-40R-B70
55-40A-B50	70-10A-B70
55-10R-B50	70-20A-B70
55-20R-B50	70-30A-B70
55-30R-B50	70-40A-B70
55-40R-B50	70-10R-B70
70-10A-B50	70-20R-B70
70-20A-B50	70-30R-B70
70-30A-B50	70-40R-B70
70-40A-B50	
70-10R-B50	
70-20R-B50	
70-30R-B50	
70-40R-B50	
30-10A-B60	
30-20A-B60	
30-30A-B60	
30-40A-B60	
30-10R-B60	
30-20R-B60	
30-30R-B60	
30-40R-B60	
55-10A-B60	
55-20A-B60	
55-30A-B60	
55-40A-B60	
55-10R-B60	
55-20R-B60	
55-30R-B60	
55-40R-B60	
70-10A-B60	
70-20A-B60	
70-30A-B60	
70-40A-B60	
70-10R-B60	
70-20R-B60	
70-30R-B60	
70-40R-B60	
30-10A-B70	
30-20A-B70	
30-30A-B70	
30-40A-B70	
30-10R-B70	

TYPE 5 (1” - 3/4” – 3/4")
100-10A-R20
100-10A-R30
100-10A-R40
100-10A-R50
100-10A-R60
100-20A-R20
100-20A-R30
100-20A-R40
100-20A-R50
100-20A-R60
100-30A-R20
100-30A-R30
100-30A-R40
100-30A-R50
100-30A-R60
100-40A-R20
100-40A-R30
100-40A-R40
100-40A-R50
100-40A-R60
100-10R-R20
100-10R-R30
100-10R-R40
100-10R-R50
100-10R-R60
100-20R-R20
100-20R-R30
100-20R-R40
100-20R-R50
100-20R-R60
100-30R-R20
100-30R-R30
100-30R-R40
100-30R-R50
100-30R-R60
100-40R-R20
100-40R-R30
100-40R-R40
100-40R-R50
100-40R-R60

TYPE 6 (1” - 3/4” – 1")
100-10A-R70
100-20A-R70
100-30A-R70
100-40A-R70
100-10R-R70
100-20R-R70
100-30R-R70
100-40R-R70

TYPE 7 (1” - 3/4” – 1")
100-10A-B30
100-20A-B30
100-30A-B30
100-40A-B30
100-10R-B30
100-20R-B30
100-30R-B30
100-40R-B30
100-10A-B40
100-20A-B40
100-30A-B40
100-40A-B40
100-10R-B40
100-20R-B40
100-30R-B40
100-40R-B40

TYPE 8 (1” - 3/4” – 1 1/4")
100-10A-B50
100-20A-B50
100-30A-B50
100-40A-B50
100-10R-B50
100-20R-B50
100-30R-B50
100-40R-B50
100-10A-B60
100-20A-B60
100-30A-B60
100-40A-B60
100-10R-B60
100-20R-B60
100-30R-B60
100-40R-B60
100-10A-B70
100-20A-B70
100-30A-B70
100-40A-B70
100-10R-B70
100-20R-B70
100-30R-B70
100-40R-B70

10. WRAS CERTIFICATE

WRAS
APPROVED PRODUCT

This certifies that

EVINOX ENERGY LTD

has had the undermentioned product(s) examined, tested and certified as being of an appropriate quality and standard as required in the Water Supply (Water Fittings) Regulations and Scottish Water Byelaws, subject to scheme requirements being met when installed.

Model Numbers

MODUSAT SPDHW XR-ECO, MODUSAT TP XR-ECO & MODUSAT CHHC XR-ECO RANGE OF MODULAR COMBINED HEATING INTERRFACE UNITS

The certificate by itself is not evidence of a valid WRAS Approval. Confirmation of the current status of an approval must be obtained from the WRAS Approvals Directory (www.wras.co.uk/directory)

The product so mentioned will be valid until the end of:

July 2025

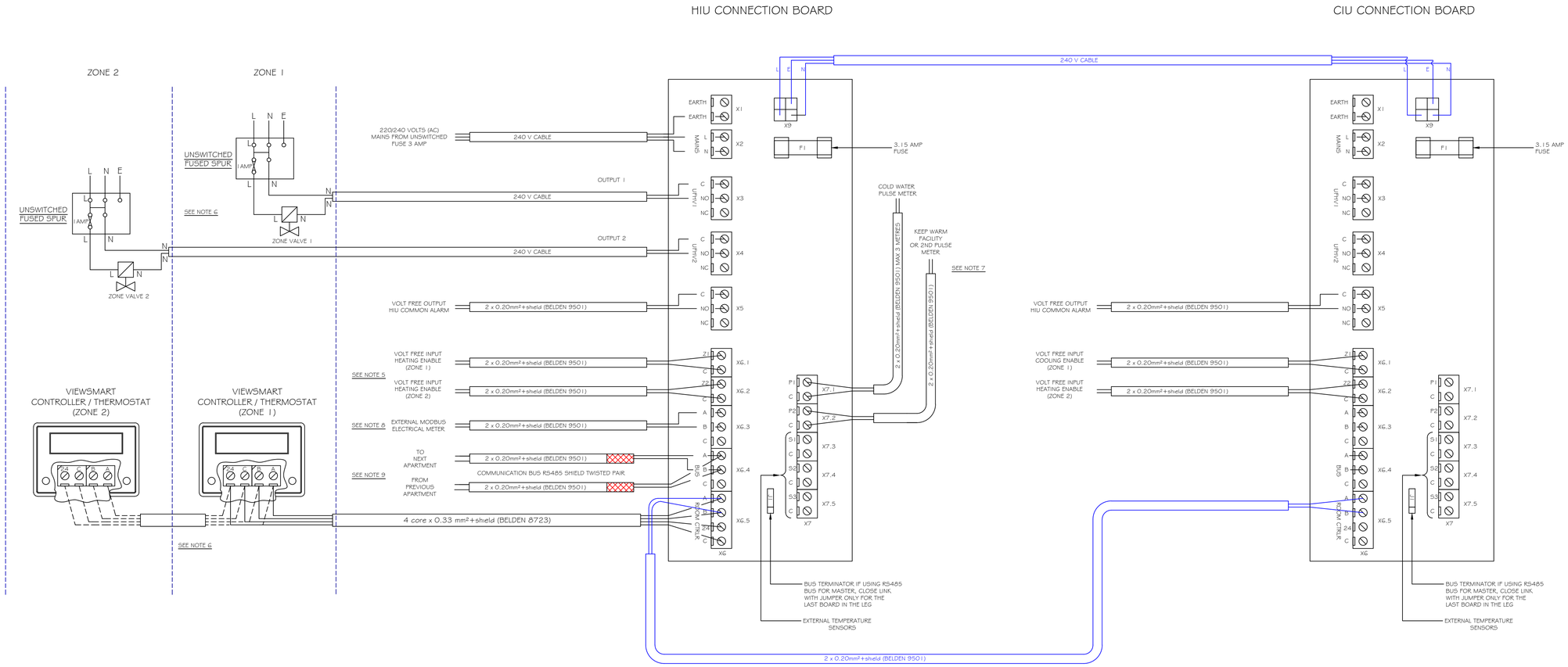
Certificate No.

2007348

Ian Hughes,
WRAS Approvals Manager

FACTORY PRE-WIRED

TO BE WIRED BY CONTRACTOR



NOTES

1. Electric wiring of MODUSAT and VIEWSMART

The MODUSAT connection board is inside the unit shall be connected to the ViewSmart by means of a 4x0.33 sq mm + shield cable (BELDEN 8723) having a max. length of 25m.

2. Shield Termination

The Screening on the bus communication cable (RS Part no 528-2106). Connect together and put in terminal 'C'
This screening must be connected to earth at the amplifier at the start of the run. The screening must not be connected to anything at the end of the run. This will enable any electrical disturbance to travel one direction down the screening to earth.

3. External Pumps & Valves

Pumps & valves must have a localised power supply. Switched neutral connection to be fitted with 1amp in-line fuse on live cable.

4. Termination

Bootlace ferrules to be used for connections to the connection board and ViewSmart.

5. Heating

When Evinox ViewSmart is used, Z1-C and Z2-C connections not needed. Z1-C and Z2-C only to be used for 3rd party controller to enable heating. Other configurations are available.

6. Zone valves and second ViewSmart controller

Zone valves and a second ViewSmart controller are only needed when two zone are used. Current Part L1A Building Regulations stipulate that all new heating systems in dwellings that are not open plan and with area greater than 150 m² must include at least two heating zones, each controlled by a thermostat and zone valve.

7. Keep Warm Facility and DHW cylinder schedules

When Evinox ViewSmart is used, P2-C connection is not needed for KWF control. P2-C only to be used for 3rd party controller to enable Keep Warm Facility or DHW cylinder schedules. P2-C can also be used for 2nd pulse meter.

8. Electricity Meter

Electricity consumption displayed on the ViewSmart. Extra credits towards BREEAM.

9. RS-485 or TCP/IP Communication

Depending on the project specification RS-485 or TCP/IP communication protocol can be used.

REV	DATE	REVISION

Evinox Energy Ltd.
Barwell Business Park
Leatherhead Road
Chessington
London KT9 2NY
Tel: 44 (0) 1372 722 277
Fax: 44 (0) 1372 744 477
www.evinox.co.uk

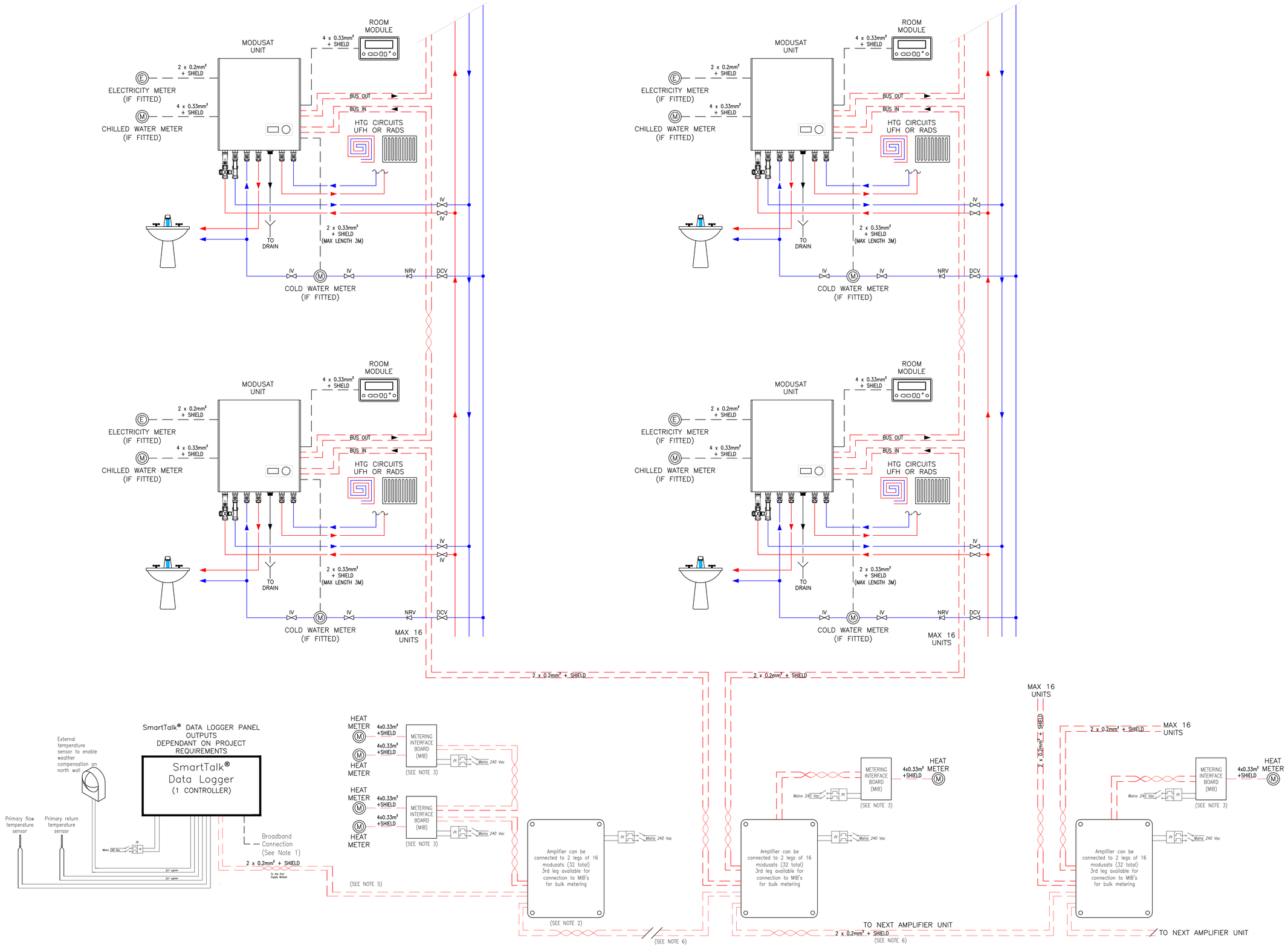
CLIENT

PROJECT

TITLE
TYPICAL WIRING
CONNECTION ARRANGEMENT
WITH TWO ROOM CONTROLLERS

DRAWN	CHECKED	DATE	SCALE
AK	PL	OCT 2019	N.T.S.

DRAWING No STD/MOD/BMS/CHHC A



NOTES

1. STATIC IP ADDRESS (MINIMUM 1GB DATA PER MONTH).
2. AMPLIFIER FOR PLANT ROOM BULK METERING AS REQUIRED.
3. EACH MIB IS ABLE TO CONNECT TO TWO HEAT METERS. MAX HEAT METER CABLE LENGTH 10M
4. MAXIMUM CABLE LENGTH FROM AMPLIFIER TO THE LAST MODUSAT HIU 500M
5. MAXIMUM CABLE LENGTH FROM MASTER CONTROLLER TO THE FIRST AMPLIFIER 100M
6. MAXIMUM CABLE LENGTH BETWEEN AMPLIFIERS 500M

REV	DATE	REVISION
E	10/09/19	AMENDED HIU PIPEWORK CONFIGURATION
D	25/5/16	MASTER -> SmartTalk® DATA LOGGER
C	14/12/15	MIB'S & HEAT METERS INDICATED ADDITIONAL NOTES ADDED
B	5/5/15	METERS, CABLE SPECIFICATIONS ADDED
A	18/6/13	ADDITIONAL TEMPERATURE SENSOR ADDED

EVINOX ENERGY
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CLIENT

PROJECT

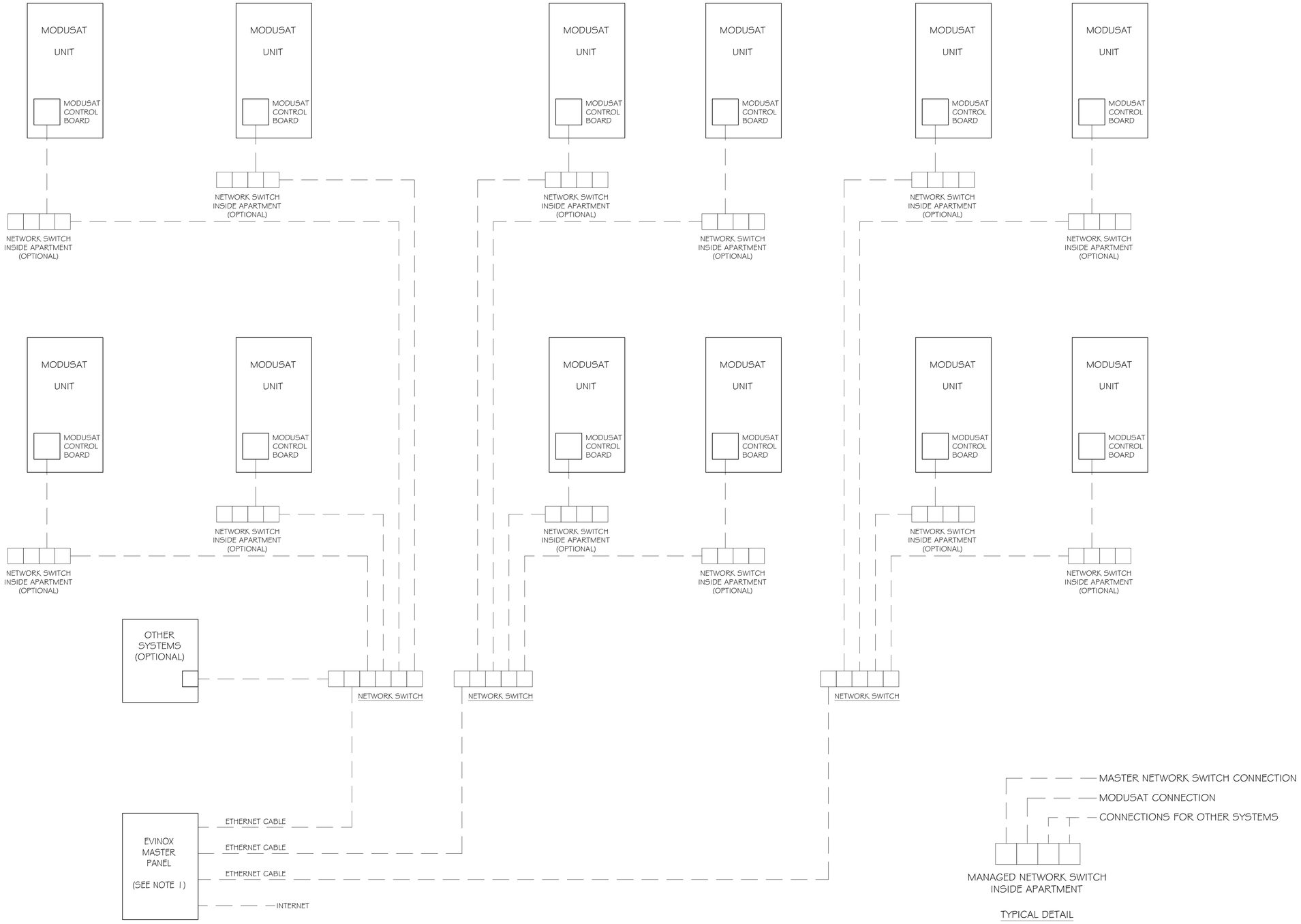
TITLE
MODUSAT SmartTalk DATA LOGGER AND SUPPLY UNIT BUS PRINCIPLE SYSTEM ARCHITECTURE

DRAWN	CHECKED	DATE	SCALE
BJW	JAL	AUGUST 2016	N.T.S

DRAWING No STD/MOD/2013/BUS 1 E

NOTES

1. PLEASE REFER TO DRAWING No STD-MOD-2015-TCP/IP-MC FOR MASTER PANEL DETAILS.



TYPICAL DETAIL

REV	DATE	REVISION

EVINOX ENERGY

Evinox Ltd.
Unit B. Blenheim House
1 Blenheim Road
Epsom
Surrey KT19 9AP
Tel: 44 (0) 1372 722 277
Fax: 44 (0) 1372 744 477
www.evinox.co.uk

CLIENT

PROJECT

TITLE
TYPICAL TCP / IP NETWORK FOR MODUSAT SYSTEM

DRAWN	CHECKED	DATE	SCALE
BJW	SS	JAN. 2015	N.T.S.

DRAWING No
STD-MOD-2015-TCP/IP-3