



# ModuSat® XR & XR-ECO

## Twin Plate Heat Interface Unit

### Installation, Commissioning and Servicing Instructions

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# 1. GENERAL INFORMATION

## 1.1 Application

The Evinox ModuSat® XR heat interface unit provides instantaneous domestic hot water and indirect space heating when connected to a district or communal heating system. The Evinox ModuSat® XR unit requires electrical supply to function.

## 1.2 Symbols





|   |  |
|---|--|
|  | <b>IMPORTANT NOTE REGARDING CORRECT INSTALLATION</b> |
|  | <b>WARNING REGARDING PERSONAL SAFETY</b>             |
|  | <b>WARNING OF DANGER OF ELECTRIC SHOCK</b>           |

## 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.

|   |  |
|---|--|
|  | <b>High temperatures.</b><br>Take necessary precautions when working on the unit as high operating temperatures may cause severe skin burns.   |
|  | <b>Risk of Electric shock.</b><br>Disconnect the electricity supply before starting any works on the unit.   |
|  | <b>Qualified personnel.</b><br>Electrical installation must only be carried out by technical personnel. .  |
|  | <b>In the case of water leak.</b> <ul style="list-style-type: none"><li><input type="checkbox"/> Take caution of hot water</li><li><input type="checkbox"/> Slowly close the isolation valve at the top of the unit</li><li><input type="checkbox"/> Contact Evinox Energy</li></ul> |

## 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 Unit

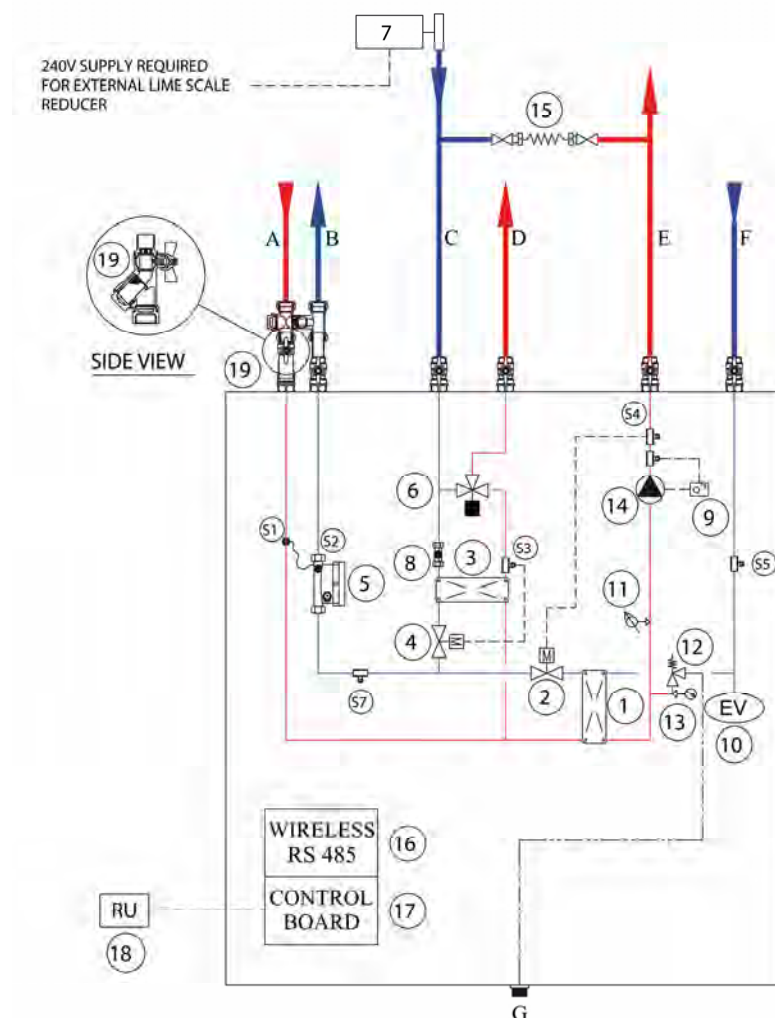


Note: The product may look different from the image shown.

### 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 2-3 minutes.

## 2.3 Typical Schematic (All Top Connections)



Note: Other connection arrangements are available see page 9 for details.

### Components

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

### Primary Circuit Side

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

### DHW Secondary Side Circuit

- 6 Blending valve (For additional DHW safety only)
- 7 External lime scale reducer (Optional)
- 8 Flow sensor

### Heating Secondary Side Circuit

- 9 Safety UFH thermostat (optional)
- 10 Heating expansion vessel
- 11 Pressure sensor
- 12 Safety relief discharge
- 13 Manometer
- 14 Heating circulation pump

### Controls & Other Items

- 15 Filling loop (External)
- 16 Wireless RS 485 (optional)
- 17 Electronic control board
- 18 ViewSmart room control unit
- 19 Strainer & IV assembly

S1, S2 – temperature sensors as a part of the heat meters

S7 – primary return (limit) temperature sensor

S3 – DHW temperature sensor

S4, S5 – heating flow and return temperature sensors

## 2.4 Technical Parameters

### Electrical

|                    | XR 55-XX, XR-ECO 55-XX & XR-ECO 70R-XX | XR 100-XX |
|--------------------|--|-----------|
| Electric supply    | 220 / 240 Volt (AC)                    |           |
| Frequency          | 50 Hz                                  |           |
| Current absorption | 0,6 Amps                               |           |

### Hydraulic connections

| Primary circuit supply   | A | ¾" F thread            | 1" Compression fitting |
|--------------------------|---|------------------------|------------------------|
| Primary circuit return   | B | ¾" F thread            | 1" Compression fitting |
| DCW inlet                | C | ¾" F thread            | 1" Compression fitting |
| DHW supply               | D | ¾" F thread            | 1" Compression fitting |
| Apartment circuit supply | E | ¾" F thread            | ¾" Compression fitting |
| Apartment circuit return | F | ¾" F thread            | ¾" Compression fitting |
| Drain                    | G | ½" Compression fitting | ½" Compression fitting |

### Hydraulic characteristics

| Pipework material  | Copper  |
|--|---|
| Plate heat exchanger material                            | Stainless steel 316L  |
| Operating medium   | Water   |
| Primary circuit max pressure                             | 10 bar (16 bar Optional)  |
| Primary minimum differential pressure                    | 50 kPa* (0.5 bar)<br>*may vary depending on the required output |
| Primary maximum differential pressure                    | 400 kPa* (4 bar)<br>*may vary depending on the required output  |
| Apartment heating circuit recommended cold fill pressure | 1.5 bar   |
| Apartment heating maximum pressure                       | 3 bar   |
| Apartment heating expansion vessel size                  | 8 L   |
| DHW max pressure   | 5 bar   |
| DCW min pressure   | 1 bar   |
| Max supply temperature (Primary)                         | 95°C  |

### Weight

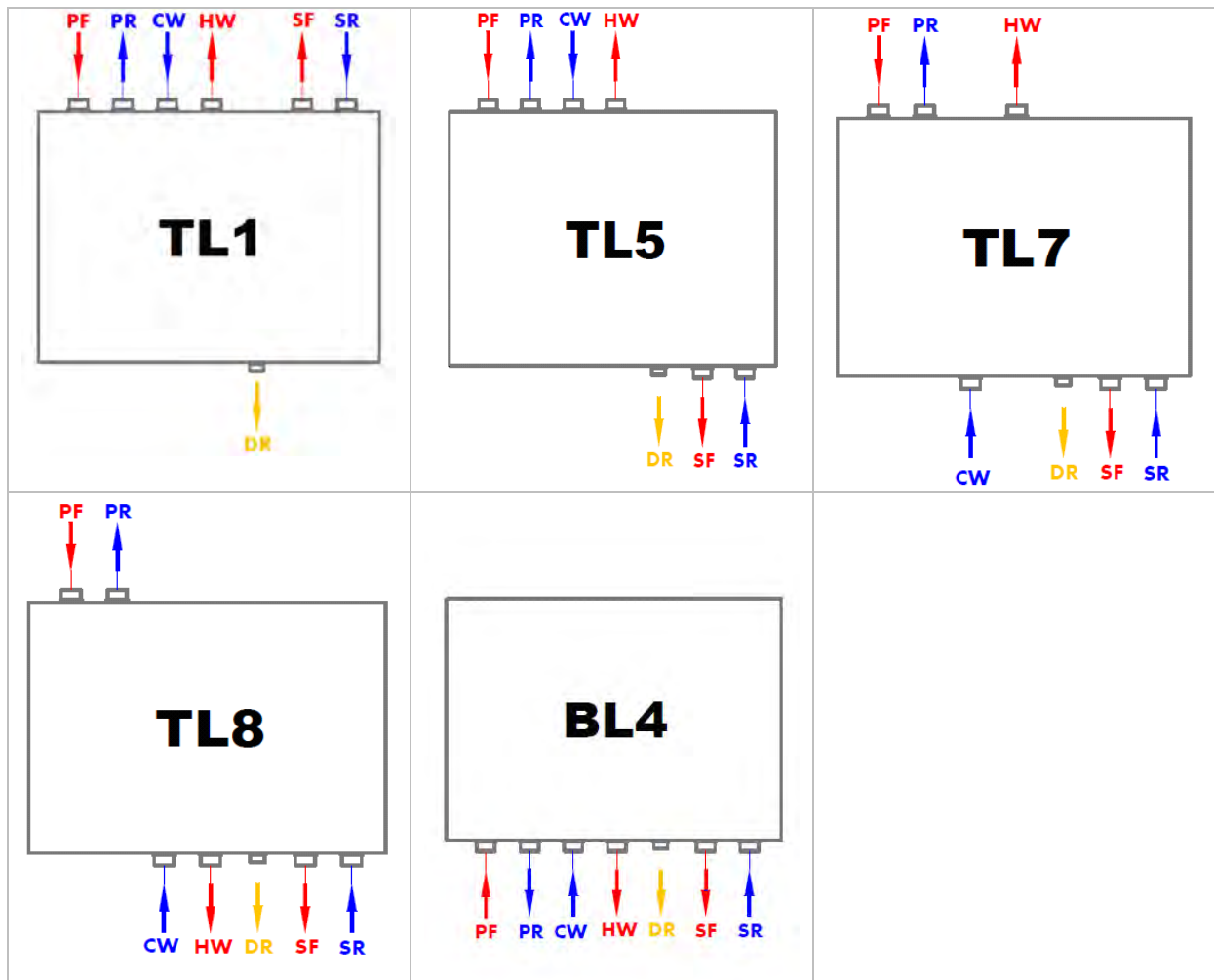
|                      | Dry     | Wet     |
|----------------------|---------|---------|
| Weight XR-ECO 55-10R | 36.9 kg | 38.4 kg |
| Weight XR 55-10      | 36.9 kg | 38.4 kg |
| Weight XR-ECO 70-10  | 37 kg   | 38.5 kg |
| Weight XR 100-10     | 43 kg   | 45 kg   |

For other models please contact Evinox.



## 2.5 Connection Configurations

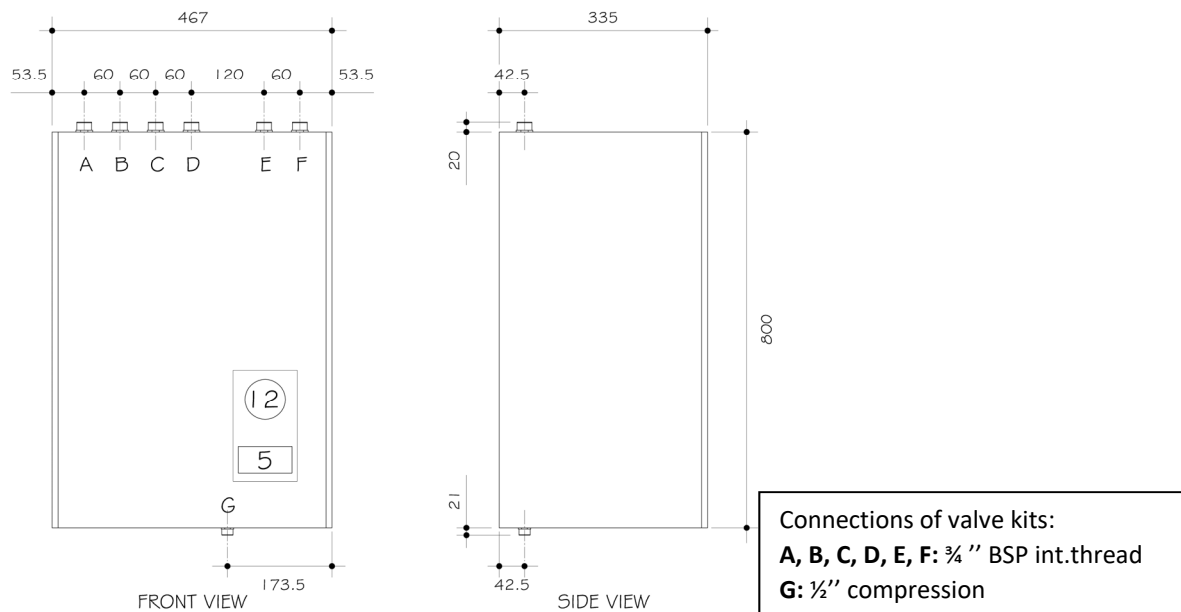
The ModuSat® XR heat interface unit comes with a variety of connection combinations to ease the installation and the esthetics of the installation. Please find the options below.



**PF** – Primary flow (in)      **CW** – Cold water (in)      **SF** – Secondary heating flow (out)  
**PR** – Primary return (out)      **HW** – Hot water (out)      **SR** – Secondary heating return (in)  
**DR** – Secondary heating drain (safety relief discharge)

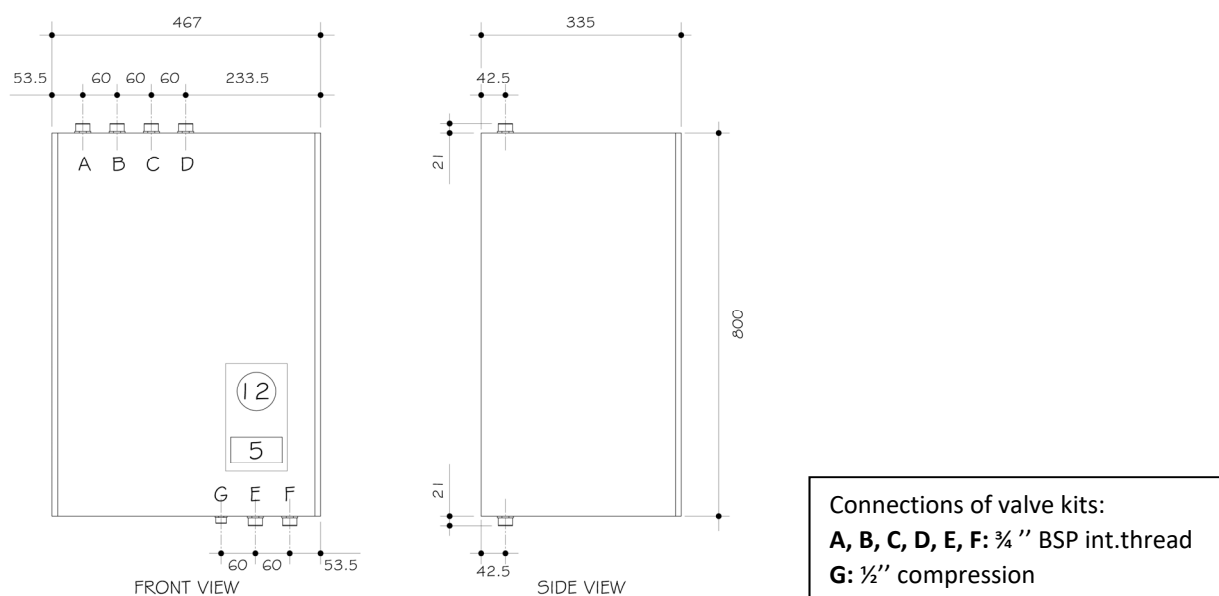
## 2.6 Typical Dimensions (connection configurations shown)

### TL1 –ModuSat® XR 55-XX & XR-ECO 55-XX & XR-ECO 70-XX All Top Connections



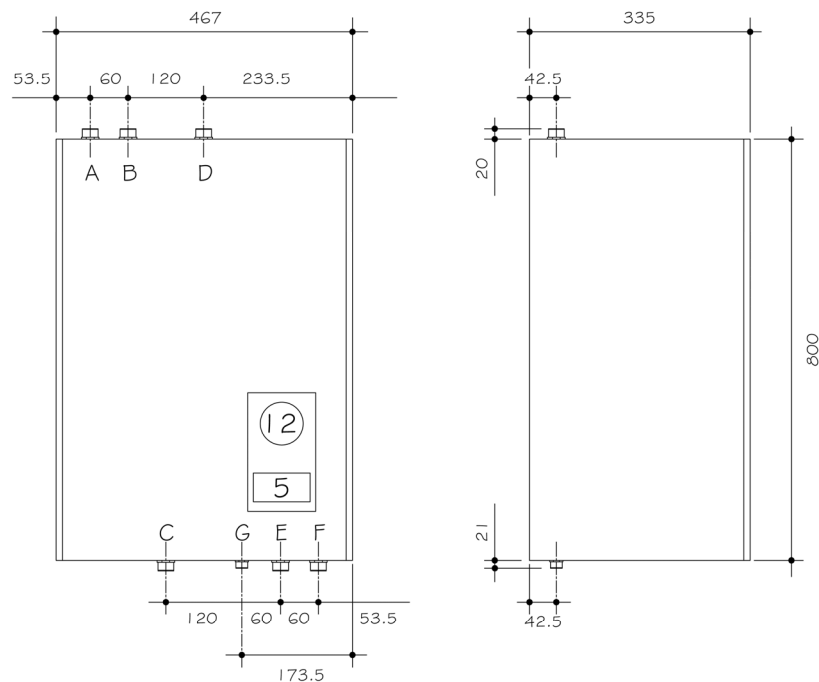
**Minimum space requirements for access and servicing:** Top: 190 mm (To allow for H-type flushing by pass), Front: 700 mm, Side: 50 mm, Bottom: Sufficient space to connect the drain.  
**Please Note:** Flushing bypass to be installed on primary connections A & B. Please refer to page 26 for flushing bypass dimensions.

### TL5 ModuSat® XR 55-XX & XR-ECO 55-XX & XR-ECO 70-XX Secondary Heating Flow & Return at the Bottom



**Minimum space requirements for access and servicing:** Top: 190 mm (To allow for H-type flushing by pass), Front: 700 mm, Side: 50 mm, Bottom: Sufficient space to connect the drain.  
**Please Note:** Flushing bypass to be installed on primary connections A & B. Please refer to page 26 for flushing bypass dimensions.

**TL7 –ModuSat® XR 55-XX & XR-ECO 55-XX & XR-ECO 70-XX** - Primary Flow & Return and DHW Connections Top. Cold Water Inlet and Secondary Heating Flow & Return Connections at the Bottom



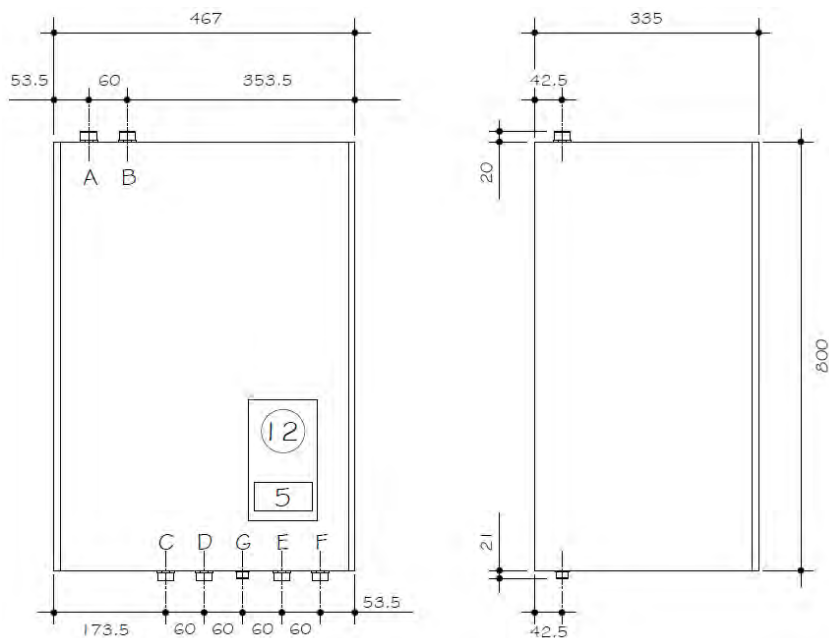
Connections of valve kits:  
**A, B, C, D, E, F:** 3/4" BSP int.thread  
**G:** 1/2" compression



**Minimum space requirements for access and servicing:** Top: 190 mm (To allow for H-type flushing by pass), Front: 700 mm, Side: 50 mm, Bottom: Sufficient space to connect the drain.

**Please Note:** Flushing bypass to be installed on primary connections A & B. Please refer to page 26 for flushing bypass dimensions.

**TL8 –ModuSat® XR 55-XX & XR-ECO 55-XX & XR-ECO 70-XX** Primary Top, Other Connections at Bottom



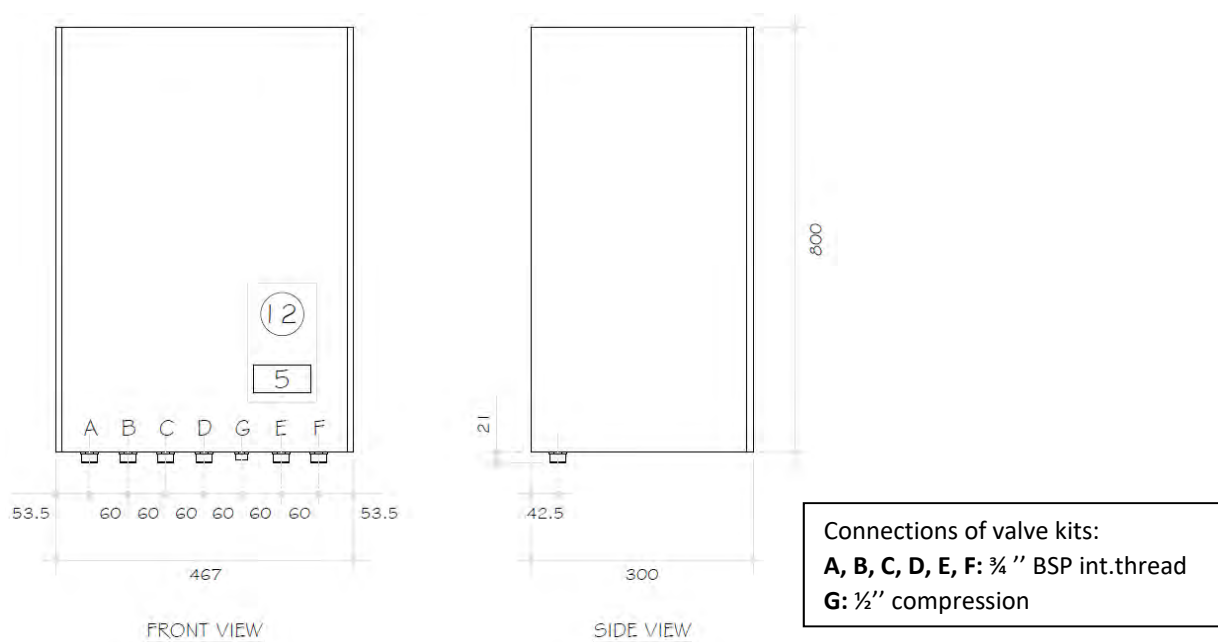
Connections of valve kits:  
**A, B, C, D, E, F:** 3/4" BSP int.thread  
**G:** 1/2" compression



**Minimum space requirements for access and servicing:** Top: 190 mm (To allow for H-type flushing by pass), Front: 700 mm, Side: 50 mm, Bottom: Sufficient space to connect the drain.

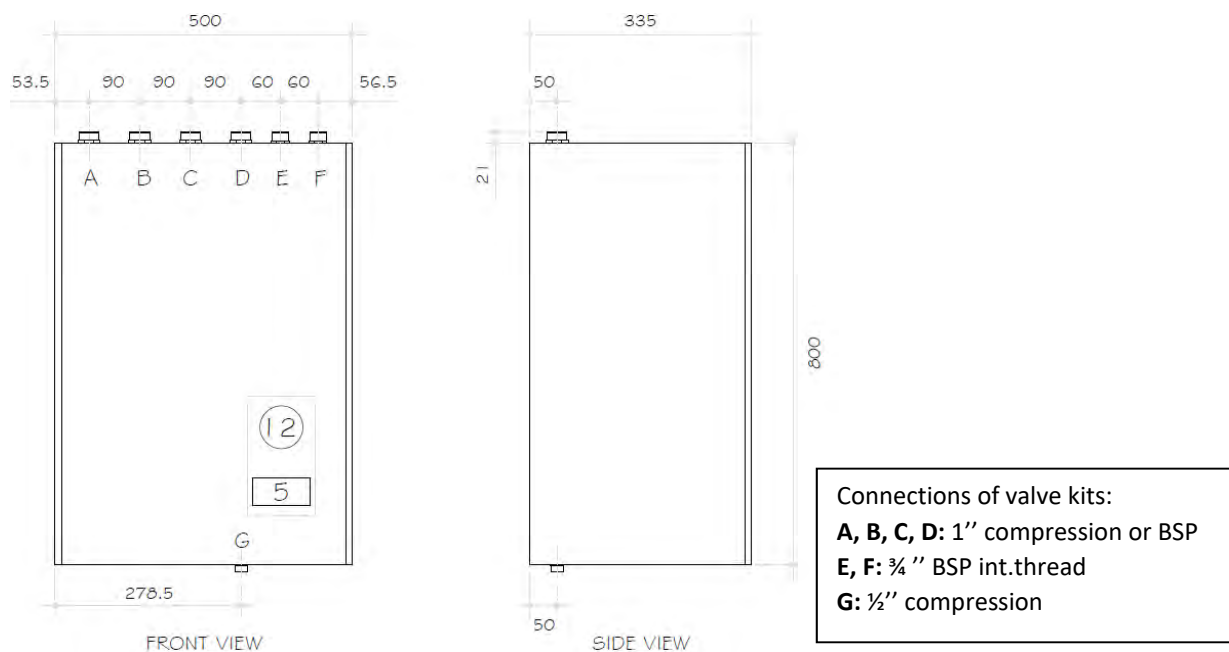
**Please Note:** Flushing bypass to be installed on primary connections A & B. Please refer to page 26 for flushing bypass dimensions.

## BL4 XR/XR-ECO 55R-XX, XR 55-XX & 70-XX All Connections at the Bottom



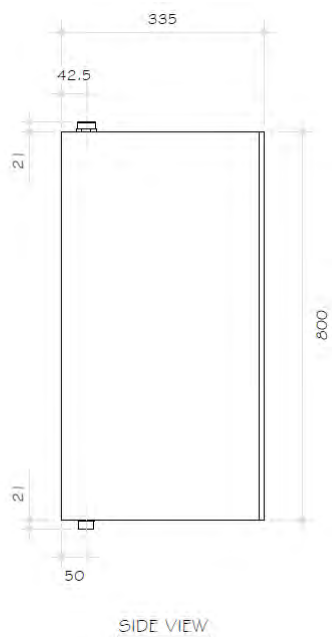
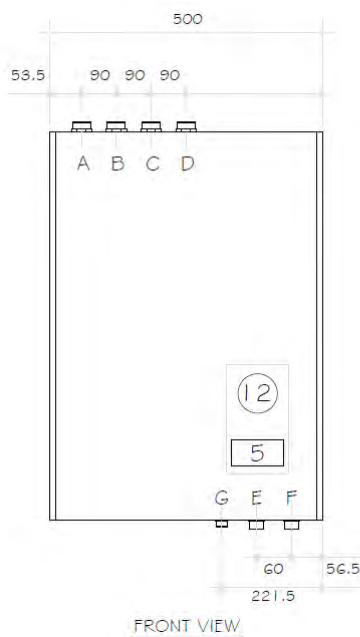
**Minimum space requirements for access and servicing:** Bottom: 190 mm (To allow for H-type flushing by pass) or more if required for connecting the drain, Front: 700 mm, Side: 50 mm  
**Please Note:** Flushing bypass to be installed on primary connections A & B. Please refer to page 26 for flushing bypass dimensions.

## TL1 - XR 100-XX All Top Connections



**Minimum space requirements for access and servicing:** Top: 250 mm (To allow for H-type flushing by pass), Front: 700 mm, Side: 50 mm, Bottom: Sufficient space to connect the drain.  
**Please Note:** Flushing bypass to be installed on primary connections A & B. Please refer to page 26 for flushing bypass dimensions.

**TL5 - XR 100-XX All Top Connections But Heating Flow & Return Bottom**



Connections of valve kits:  
**A, B, C, D:** 1" compression or BSP  
**E, F:** 3/4" BSP int.thread  
**G:** 1/2" compression



**Minimum space requirements for access and servicing:** Top: 250 mm (To allow for H-type flushing by pass), Front: 700 mm, Side: 50 mm, Bottom: Sufficient space to connect the drain.  
**Please Note:** Flushing bypass to be installed on primary connections A & B. Please refer to page 26 for flushing bypass dimensions.

### 3. INSTALLATION

The Evinox heat interface 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 immediately.
- ☐ 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 not be restricted.

### 3.3 Hydraulic connections



#### Connection arrangement.

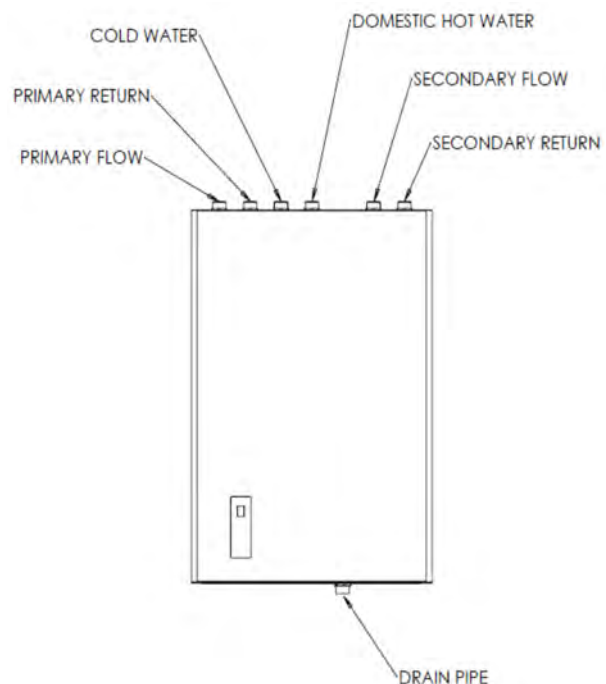
Ensure that the hydraulic connections of the pipework piped up to the unit are correct and follows the hydraulic schematic. The manufacturer cannot accept any responsibility for any damage caused to the unit due to crossed connections.

**Any Evinox engineer callout/visit due to this issue will be chargeable.**

The ModuSat® heat interface unit is designed to be wall mounted with the typical primary connections and domestic water hydraulic connections as shown below. (Other configurations are available; please refer to pages 10 - 13 of this manual for details).

The Evinox Energy flushing by-pass valve kit should be installed prior to connecting the unit and the valves left in an isolated position.

The whole system should be cleaned and flushed before installing the heat interface unit to ensure the ModuSat® unit is not damaged.



### 3.1 Wall fixing

The ModuSat® unit is designed to be wall mounted. There are drillings on the back plate of the unit that ensure mounting with the wall fixing bracket.

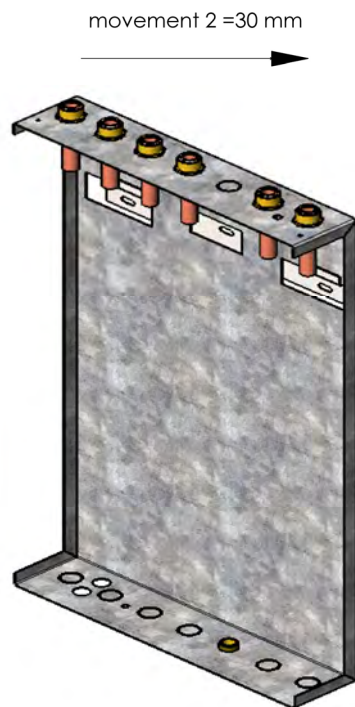


### 3.2 Use of Pre-installation Rig

A pre-installation rig is available upon request. It consists of a back panel constructed of steel. This will enable the installer to arrange the piping entering and leaving the unit during first fix prior to the unit being delivered / installed. The configuration of the pre-installation rig will be as per the unit being supplied and the project requirements.

## HOW TO INSTALL PRE-INSTALLATION RIG

FIRST STEP  
SETTLEMENT  
BETWEEN PIPES



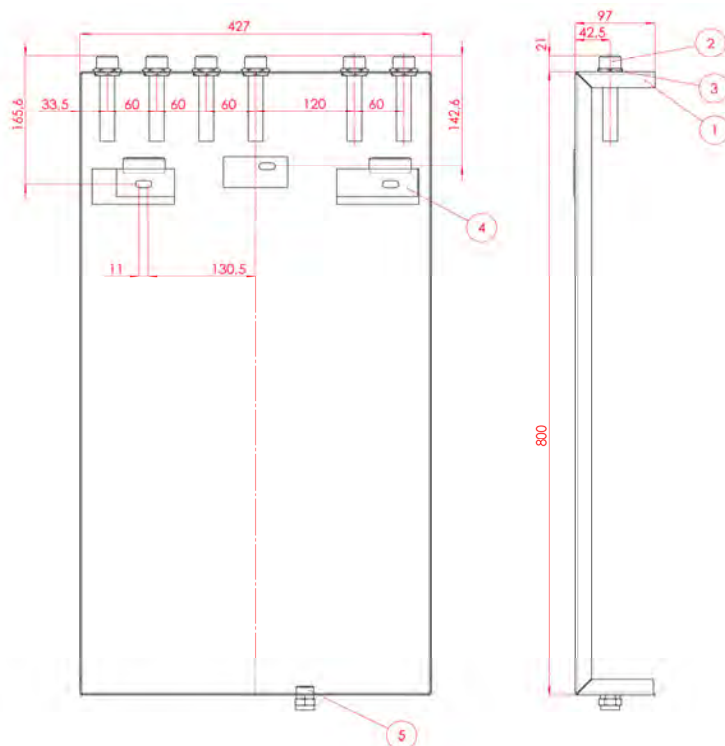
**STEP1:** Securely fix the mounting bracket to the wall in the required position. Hang the ModuSat® XR Pre-Installation Rig on the wall fixing bracket. Then slide down and across to the right, as indicated in diagram.

**STEP2:** Fit the Evinox Energy Flushing Bypass & Valve Kit to the rig and then make final connections to the pipework running to the ModuSat®.

**STEP3:** Shut off isolation valves, pressure test pipework and then disconnect the valve unions.

**STEP4:** To remove the pre-installation rig slide the rig to the left taking all connections off centre, slowly lift and remove.

## Pre-installation Rig Typical Dimensions








### 3.3 Evinox Flushing By-pass Kit

Evinox flushing by-pass kit ensures that the ModuSat® unit can be isolated from the systems circuits. It includes a H – shape by-pass valve for cleaning and flushing the system, there is a strainer on the primary circuit inlet and binder points for differential pressure measurement.

Depending on the valve kit ordered the types of valves may differ. A typical valve kit is shown below.

**Evinox FLUSH-KITC1 for ModuSat® XR 55R-XX, XR 55-XX and XR 70R-XX shown below.**



|   |  |
|---|--|
|    | <b>Close isolation valves.</b><br>Leave the isolation valves in the closed position after installing the valve kit and prior to connecting the unit as shown in the image above.   |
|  | <b>Provide isolation valves and a strainer.</b><br>If Evinox valve kit is not used, it must be ensured that there are isolation valves provided. The strainer on the primary inlet is required to ensure the components in the unit are protected from debris and sediments. |
|  | <b>Tighten the connections.</b><br>When connecting the ModuSat® heat interface unit, ensure that all the connections are tightened to avoid any leaks.   |

### 3.4 Setting Primary in a Flushing Position







When the unit is installed and the primary network is cleaned or flushed, the valve kit should be used to ensure the unit is bypassed while cleaning or flushing the system.

To open the by-pass:

- ☐ Ensure both isolation valves are in the closed position as shown in the picture. Ensure that the isolation valves are closed slowly.
- ☐ Use a suitable screwdriver or other tool to twist the screw on the H-shape by-pass valve into the open position.
- ☐ Ensure that the primary system is clean before opening the valves.

### 3.1 First fill of the system

|   |   |
|---|---|
|  | <p><b>Clean and flush the system before connecting the unit.</b></p> <p>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.</p>   |
|  | <p><b>Water quality.</b></p> <p>It is recommended that the flushing and cleaning of the primary circuit, domestic water circuit and secondary heating circuit is performed by a qualified person in accordance with current standards, regulations and BSRIA guidelines.</p>                  |
|  | <p><b>In the case of a water leak.</b></p> <ul style="list-style-type: none"><li><input type="checkbox"/> Take caution of hot water</li><li><input type="checkbox"/> Slowly close the isolation valve at the top of the unit</li><li><input type="checkbox"/> Contact Evinox Energy</li></ul> |
|  | <p><b>The ModuSat® pump should not be used for flushing.</b></p> <p>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.</p>  |

#### Filling the primary circuit



Please take care when filling the ModuSat® unit.

- ☐ Slowly close the by-pass while the isolation valves are in the closed position
- ☐ Slowly open the isolation valves on the primary circuit to the design pressure.
- ☐ 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.

### 3.2 First fill of apartment heating system

The ModuSat® unit is fitted with a manometer gauge that is mounted in the front panel. This gauge reading should be used when filling the secondary circuit.






- ☐ An external filling loop should be used for filling the secondary circuit with the mains water.
- ☐ Open the isolation valves slowly when filling the system.
- ☐ Cold fill should be done to about 1.5 bar in a single-story dwelling. The pressure required will depend on the head of the system (difference between the lowest and highest point).
- ☐ Once the required pressure is reached, close the filling loop ball valve, vent the system and repeat it again.

## 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.

|   |   |
|---|---|
|  | <b>Water treatment in accordance to these instructions.</b><br>Please confirm with the water treatment consultants that the chemicals used and cleaning method statement complies with the requirements set out in this section.  |
|  | <b>Water quality may damage the unit.</b><br>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.  |
|  | <b>Chemical cleaning and dosing.</b><br>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: <ul style="list-style-type: none"> <li><input type="checkbox"/> BSRIA Application Guide BG29/2012</li> <li><input type="checkbox"/> BS7593:2006</li> <li><input type="checkbox"/> Requirements of Thames Water Utilities</li> <li><input type="checkbox"/> The Water Industry Act 1991, Section 119</li> <li><input type="checkbox"/> HSE The Control of Legionella 1991</li> <li><input type="checkbox"/> HSC Approved Code of Practice and Guidance HSG274, Part 2</li> </ul> |


### 4.1 Water Quality Guidelines

|   | Recommended                            |
|---|--|
| Hardness (TH)                             | Up to 150 mg/l (as CaCO <sub>3</sub> ) |
| Chlorides (Cl <sup>-</sup> )              | Up to 150 mg/l                         |
| PH  | 7.5 – 9.0                              |
| Resistivity                               | > 2000 Ohm/cm                          |
| Sulphate (SO <sub>4</sub> <sup>2-</sup> ) | Up to 70 mg/l                          |
| Conductivity                              | 200 crs                                |
| TDS                                       | 0-200 ppm                              |
| Free carbon dioxide (CO <sub>2</sub> )    | 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

- ☐ 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.

|   |  |
|---|--|
|  | <p><b>High DHW temperature may cause scaling.</b><br/>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.</p> |
|---|--|

## 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.

|   |   |
|---|---|
|    | <p>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.</p> |
|   | <p>Please confirm with the water treatment consultants that the chemicals used and cleaning method statement complies with the requirements set out in this section.</p>      |
|  | <p>Evinox Energy do not take responsibility for approving inhibitors used for dosing the system.</p>  |

## 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 depression 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

|   |   |
|---|---|
|  | <b>Risk of Electric shock.</b><br>Disconnect the electric supply before starting any works on the unit.   |
|  | <b>Qualified personnel.</b><br>Electrical installation must only be carried out by technical personnel.   |
|  | <b>Overvoltage or lightning.</b><br>The ModuSat® unit has no protection against lightning or other overvoltage shocks.  |
|  | <b>Power supply via un-switched double pole fused connection.</b><br>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. |
|  | <b>Follow the instructions</b><br>Any damage caused by an incorrect connection will invalidate the warranty. Evinox Energy cannot accept any responsibility for incorrect wiring.   |

The ModuSat® wiring board is located within the ModuSat® itself under a removable metal cover. To access the connection board, the full front case cover should be removed. The connection board is found in the centre of the unit to your left. 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.

- ☐ 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 board is located within the ModuSat® itself under a removable metal cover



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 24-26.



### The Control Board

The control board is located next to the connection board on your right-hand side. The control board cover must not be removed. Doing so may invalidate the warranty.

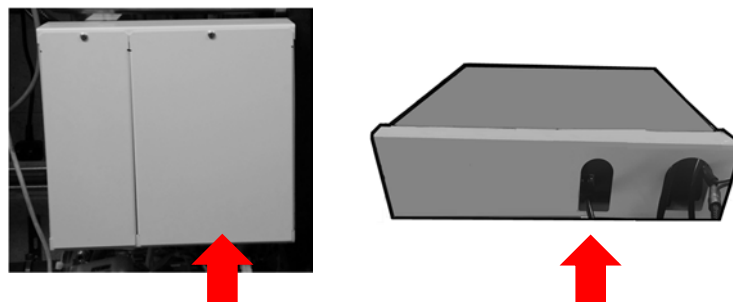


### Connection Terminations

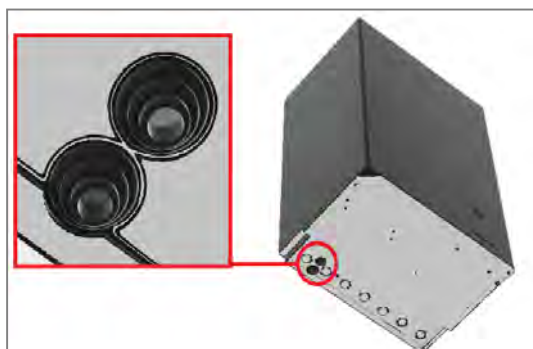
Evinox Energy strongly recommend in accordance with best practice that all wiring connections to the board, especially the BUS and room controller are terminated using 'bootlace ferrule' connectors. These connectors ensure a good connection and that the whole cross sectional area of the wiring is intact.

### 5.2.1 RJ45 Connections

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

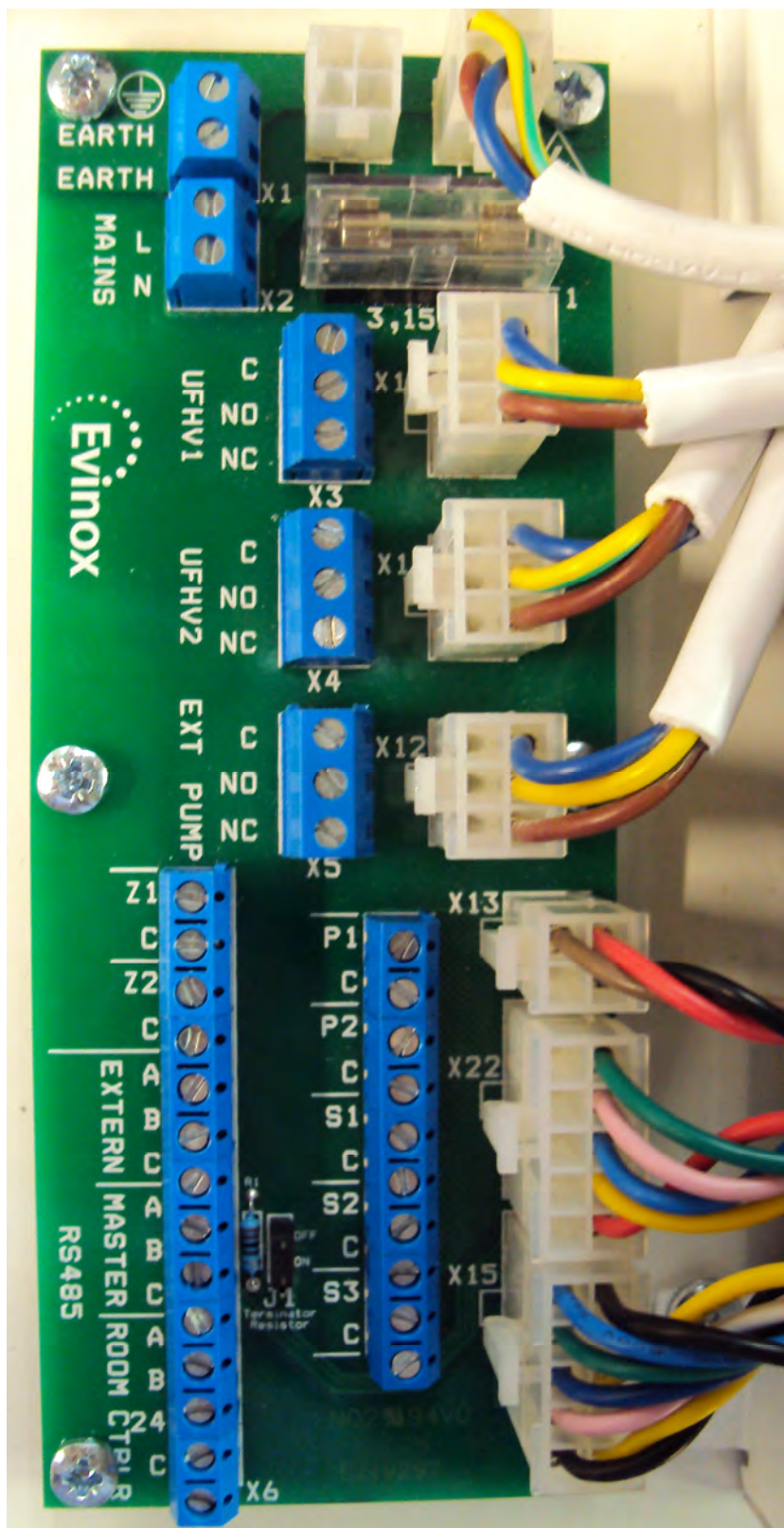


Cable glands are fitted at the bottom of the ModuSat® case as shown in below:





### 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 (Single Evinox ViewSmart Room Controller)**

*See drawing – STD-MOD-2015-1EVI*

#### **5.5 Typical ModuSat® Electric Wiring Diagram with 2 Zone Control (2 Evinox ViewSmart Room Controllers)**

*See drawing – STD-MOD-2015-2EVI*




#### **5.6 Typical Wiring Diagram with 3<sup>rd</sup> Party Room Stat**

*See drawing – STD-MOD-2015-BMSV*



## 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. 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.

|   |  |
|---|--|
|  | <b>Power Supply for ViewSmart</b><br>The ModuSat® room controller's power is supplied by the ModuSat® board and does not require batteries or additional power cabling.                                    |
|  | <b>External Valve and Pump Requirements</b><br>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). |
|  | <b>Cable Requirement</b><br>ViewSmart should be connected to ModuSat® connection board with 4 core x 0.33 mm <sup>2</sup> 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**




### **Typical Modbus system architecture**

*See drawing - STD-MOD-2013-BUS 1 - D*

### **Typical TCP/IP system architecture**

*See drawing - STD-MOD-2015-TCP-IP-2*

## 6. SETTING INTO OPERATION / COMMISSIONING

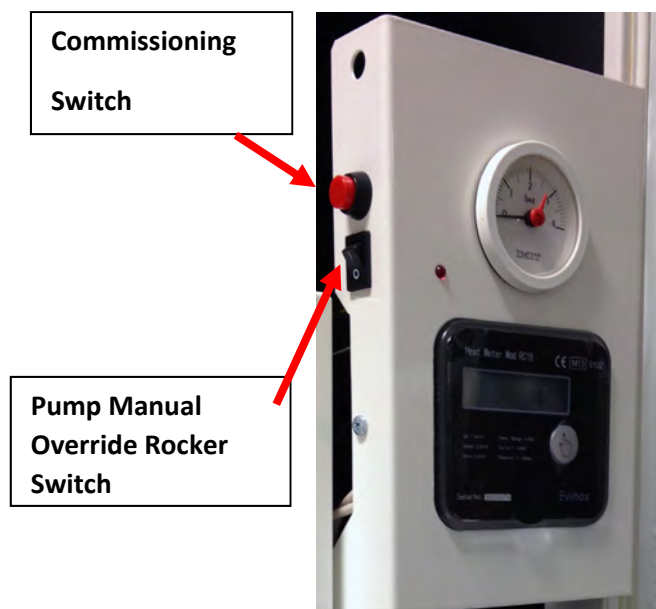
|   |   |
|---|---|
|  | <b>Evinox Commissioning Engineers</b><br>The unit should be commissioned by Evinox Energy commissioning engineers to validate the warranty unless otherwise specified by Evinox Energy. |
|  | <b>System Checklist Prior Commissioning</b><br>It is important that the system is fully ready for the works to be carried out.  |
|  | <b>Report to Evinox</b><br>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  |   |
|---|---|---|
| 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 Running the Pump for Secondary System Commissioning

The commissioning switch is located inside the ModuSat® case next to the manometer and heat meter display.



- ☐ This switch enables the unit to be put into a manual heating 'on' mode prior to full unit commissioning to enable the testing of the secondary / apartment heating circuit.
- ☐ Please note that this function should not be used until the secondary installation is complete i.e. flushed, treated and refilled to the correct pressures.
- ☐ To enable the heating run mode setting the button should be depressed and held in for approximately 30 seconds. The heating PICV will open. The unit will then run at a pre-set ouXRut temperature of 45°C thus providing a safe temperature for UFH circuits and also a gentle warm up of radiator circuits. This function will run for a pre-set period of approximately 45minutes.



### Rocket-Switch

Please note: The rocker switch below the commissioning push button is the Pump Manual Override. This should NOT be operated or used by persons other than Evinox Energy engineers as it is for fault diagnostic use only.

## 6.3 Setting unit into operation

### 6.3.1 Pressure independent control valve

|                             | DHW PICV         | HTG PICV        |
|-----------------------------|------------------|-----------------|
| Maximum flow rate           | 1450 l/h +/- 10% | 500 l/h +/- 10% |
| Start up $\Delta P$         | 25 kPa           | 25 kPa          |
| Max differential $\Delta P$ | 400 kPa          | 400 kPa         |
| Valve size                  | DN20             | DN15            |
| Thread                      | G1               | G 3/4"          |
| Actuator Stroke             | 2.5 mm           | 2.5 mm          |
| Actuator control signal     | 0-10V            | 0-10V           |
| Mechanical pre-setting      | Not 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.



### 6.3.2 Thermostatic Blending Valve

The ModuSat® unit is fitted with an internal thermostatic mixing valve on the DHW outlet from the plate heat exchanger to ensure that the DHW to outlets does not exceed the safe temperatures as an additional fail safe protection.

The blending valve is set by an Evinox Energy engineer at the commissioning. It should be noted that as both pressure and flow rates influence the mixed water temperature it is most important that these are checked and verified during installation / initial checks.

#### Technical Characteristics

Working Range: **30 - 65°C**

Max working temperature: **90°C**

Temperature Stability: **+ / - 4°C**

Max static pressure: **10 bar**

Max working pressure: **5 bar**

| Min |      |
|-----|------|
| 1   | 36°C |
| 2   | 42°C |
| 3   | 48°C |
| 4   | 51°C |
| 5   | 57°C |
| Max |      |

### 6.3.3 Pump



Evinox ModuSat® unit has an integral Wilo Pulse-width modulation (PWM) circulation pump.

**Please note:** When the unit is switched over to heating mode the pump will run for 2 mins prior to the heating PICV opening, this is not a fault in the unit but a normal control function as the HIU assesses the current heating circuit flow temperature.

#### 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 $U < 160\text{ V}$ or<br>High voltage $> 253\text{ V}$ | 1. Check voltage supply<br>$195\text{ V} < U < 253\text{ V}$ |
|                    |                              |  | 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  |

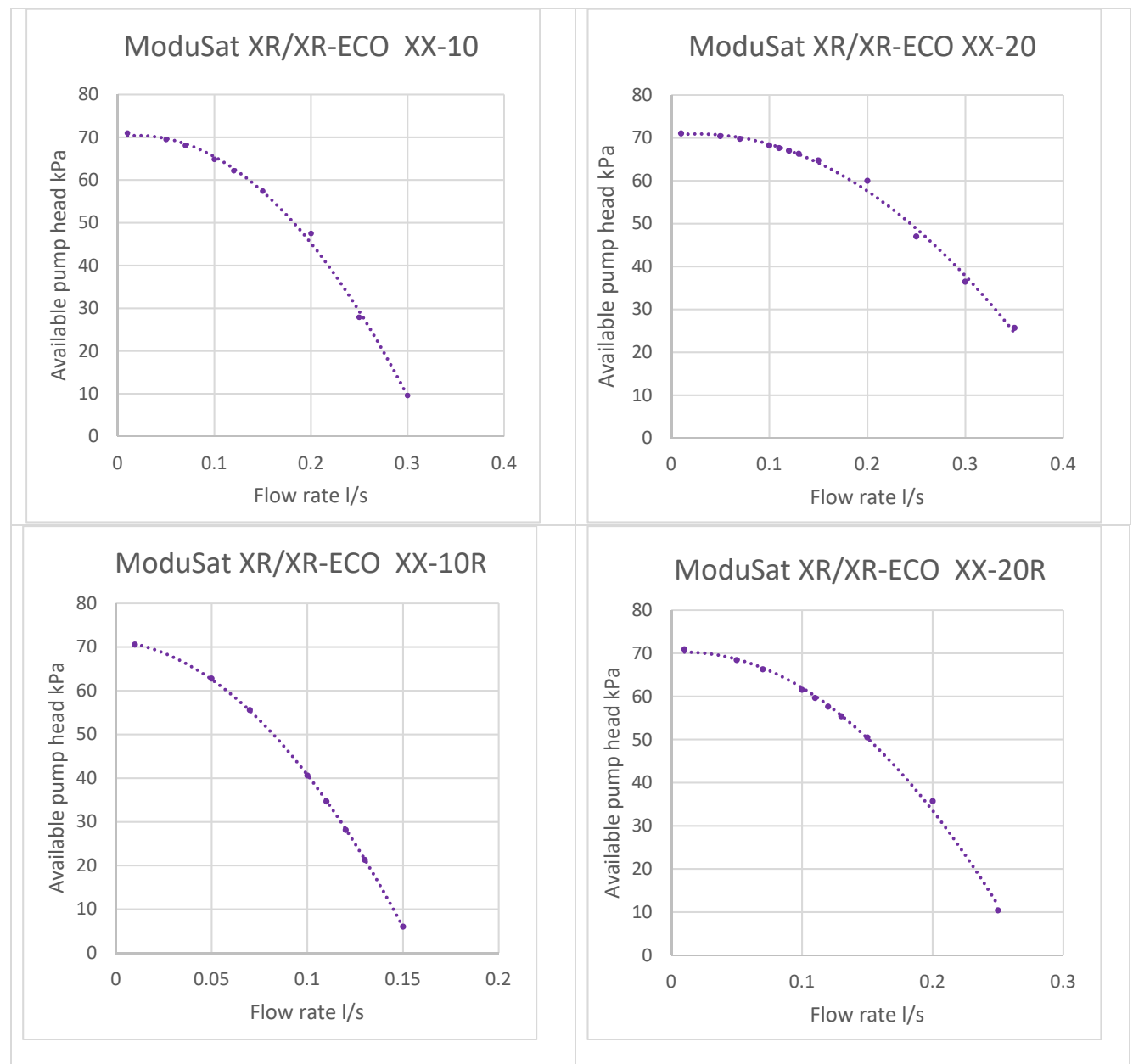
## 6.4 Available Pump Head



### Available Pump Head

Ensure that the available pump head meets the requirements of the secondary system.




The below graphs show the available pump head for different ModuSat® models depending on the secondary flow rate. The secondary apartment pressure drop (excluding the unit) should not exceed the value shown.



## 6.5 Initial Commissioning Procedure

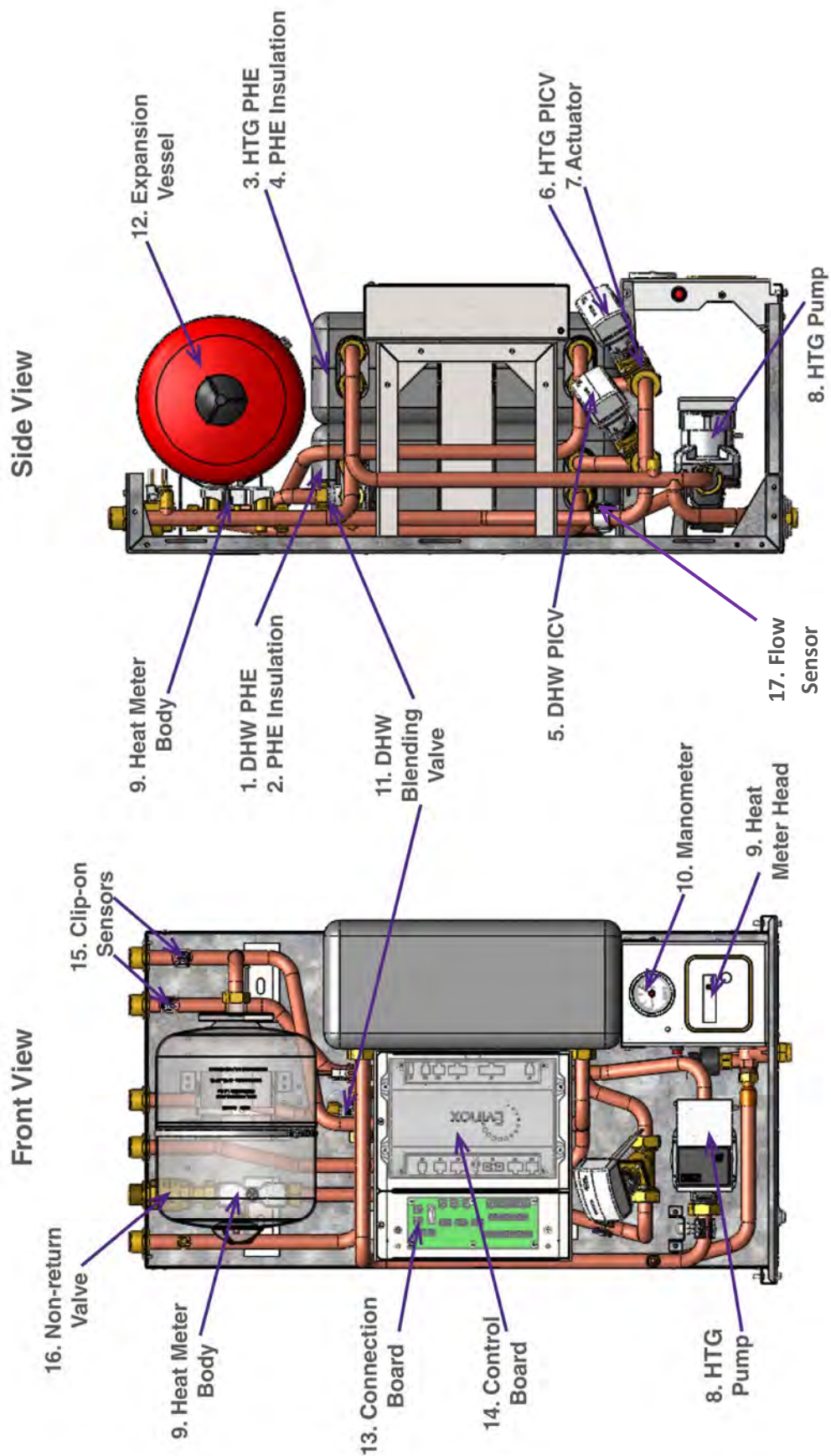
The following will be checked when commissioning the unit. The method may vary depending on the project.

| Evinox Energy Commissioning Check-List |  |   |
|--|--|---|
| 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.   | ✓ |

|   |   |
|---|---|
|    | <b>Evinox Technical Personnel</b><br>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. <b>They do not perform the role of quality control or inspector of the installation or provide approval for the works carried out.</b> |
|  | <b>Booking Commissioning</b><br>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.  |
|  | <b>Warranty</b><br>Evinox Energy Commissioning is required for warranty validation.   |



## 7. SPARE PARTS



Part Number

|         | Model number                                 | TP 40-XX   | TP 55R-XX | TP 55-XX  | TP 70-XX | TP 100-XX |
|---------|--|--|-----------|-----------|----------|-----------|
|         | Part Description                             |  |           |           |          |           |
| 1       | DHW Plate Heat Exchanger                     | EVI_00237  | EVI_00250 | EVI_00240 | *        | *         |
| 2       | DHW Plate Heat Exchanger Insulation          | EVI_00238  | EVI_00233 | EVI_00233 | *        | *         |
| 3       | HTG Plate Heat Exchanger                     | If <b>XX-10</b> EVI_00235/ <b>XX-20</b> EVI_00234/ <b>XX-10R</b> EVI_00251 |           |           |          |           |
| 4       | HTG Plate Heat Exchnager Insulation          | If <b>XX-10, XX-20 or XX-20R</b> EVI_00238                                 |           |           |          |           |
| 5       | DHW PICV                                     | EVI_00232  |           |           |          |           |
| 6       | HTG PICV (STANDARD)                          | EVI_00246  |           |           |          |           |
|         | HTG PICV (LOW FLOW)                          | EVI_00241  |           |           |          |           |
| 7       | PICV Actuator                                | EVI_00264  |           |           |          |           |
| 8       | Heating circulation pump                     | EVI_00152  |           |           |          |           |
| 9       | Heat Meter                                   | EVI_00063  |           |           |          |           |
| 10      | Manometer                                    | EVI_00058  |           |           |          |           |
| 11      | Thermostatic blending valve                  | EVI_00052  |           |           |          |           |
| 12      | Expansion vessel                             | EVI_00042  |           |           |          |           |
| 13      | Connection board                             | EVI_00074  |           |           |          |           |
| 14      | Control Board                                | EVI_00073  |           |           |          |           |
| 15      | Temperature sensors (clip on s3, s4, s5, s6) | EVI_00029  |           |           |          |           |
| 16      | Non Return Valve                             | EVI_00025  |           |           |          |           |
| 17      | FLOW Sensor                                  | 200.908101G  |           |           |          |           |
| Options |  |  |           |           |          |           |
|         | UFH Safety Stat                              | EVI_00115  |           |           |          |           |

\* - please contact Evinox for the part number

## 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® XR 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® XR 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® XR 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. KIWA CERTIFICATE

|  |  |  |   |
|--|--|--|---|
|    |   | <b>UK APPROVAL</b><br>Certificate Number: 1506718  | <br>Partner for progress |
|  |  | Date Issued: 26 <sup>th</sup> June 2015<br>Date Expired: 26 <sup>th</sup> June 2020  |   |
|  |  | <b>Description:</b> Range of indirect heat interface units providing heating and instantaneous hot water. The hot water is generated via a plate heat exchanger and incorporates a pressure temperature control valve and a thermostatic blending valve. The heating is provided via a plate heat exchanger and the circuit incorporates an expansion vessel and expansion relief valve (3.0 bar). Maximum working pressure space heating 2.5 bar. Maximum working pressure secondary hot water 5.0 bar. Maximum operating temperature 90°C.   |   |
|  |  | <b>Product Designation:</b> ModuSat SP, TP, CHHC   |   |
|  |  | This is to certify that the above range of products manufactured / supplied by<br><b>Evinox Energy Ltd</b><br>has been tested and found to comply with the requirements of the Water Supply (Water Fittings) Regulations 1999 for England and Wales, the Water Byelaws 2000, Scotland and the Water Regulations Northern Ireland.<br>This certificate must be read in conjunction with the acceptance letter for this product.<br>This approval is intended for compliance with the above Regulations and must not be considered equivalent to the product certification provided by Kiwa N.V.<br>To comply with the Regulations and Byelaws all products require the correct installation. Details of the installation requirements (IRN's) can be obtained from the acceptance letter supplied with this certificate.<br>Applicable IRN's for this certificate - R001<br><br>Authorised Signature |   |
| <b>Kiwa Watertec</b><br>(A Trading Division of<br>Kiwa Ltd)<br>Unit 26A<br>Rassau Industrial Estate<br>Ebbw Vale, Gwent, NP23 8XA<br>UNITED KINGDOM<br>Tel: 0044 (0) 1495 308185<br>Fax: 0044 (0) 1495 304496<br>Web: www.kiwa.co.uk | <b>Certificate Issued to -</b><br>Evinox Energy Ltd<br>Unit B Blenheim House<br>1 Blenheim Road<br>Epsom, Surrey<br>KT19 8LE | <br>UK WATER SUPPLY<br>REGULATIONS  |   |



Evinox reserves the right to make changes and improvements which may necessitate alteration to the specification without prior notice.

**Evinox Energy Ltd** T. +44 (0)1372 722277 E. [info@evinoxenergy.co.uk](mailto:info@evinoxenergy.co.uk) W. [www.evinoxenergy.co.uk](http://www.evinoxenergy.co.uk)

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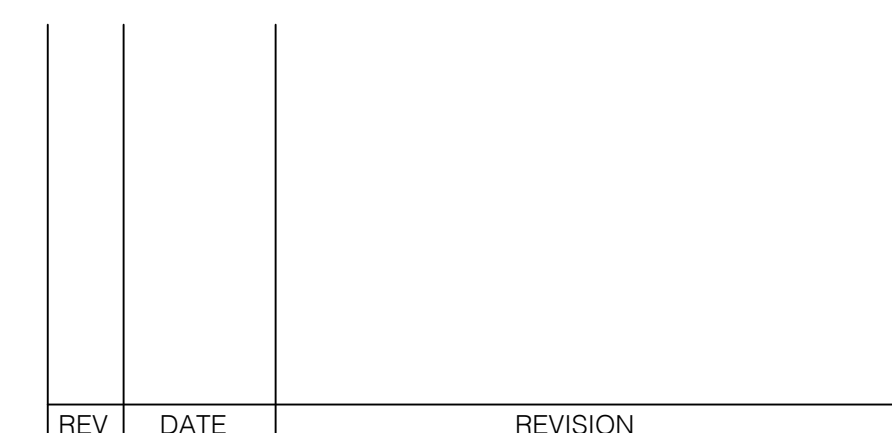


- ## Shield Termination

- ### External Pumps & Valves

- ### Termination

- 4, Bootlace ferrules to be used for connections to the connection board and room controller.



 EVINOX

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[www.evinox.co.uk](http://www.evinox.co.uk)

CLIENT \_\_\_\_\_

|         |  |
|---------|--|
| PROJECT |  |
|---------|--|

|  |
|--|
| TITLE<br>TYPICAL WIRING<br>CONNECTION ARRANGEMENT<br>WITH SINGLE ROOM CONTROLLER |
|--|

|             |               |                   |                 |
|-------------|---------------|-------------------|-----------------|
| DRAWN<br>SS | CHECKED<br>CW | DATE<br>JULY 2015 | SCALE<br>N.T.S. |
|-------------|---------------|-------------------|-----------------|

DRAWING No **STD/MOD/2015/1EVITCPIP**



NOTES

Electric wiring of MODUSAT and ROOM MODULES

1, The MODUSAT wiring board is inside the unit and shall be connected to the Room Module by means of a 4x0.35 sq mm + shield cable having a max. length of 25m the drawing shows the wiring for Modusat standard and optional connection (model dependant).

Shield Termination

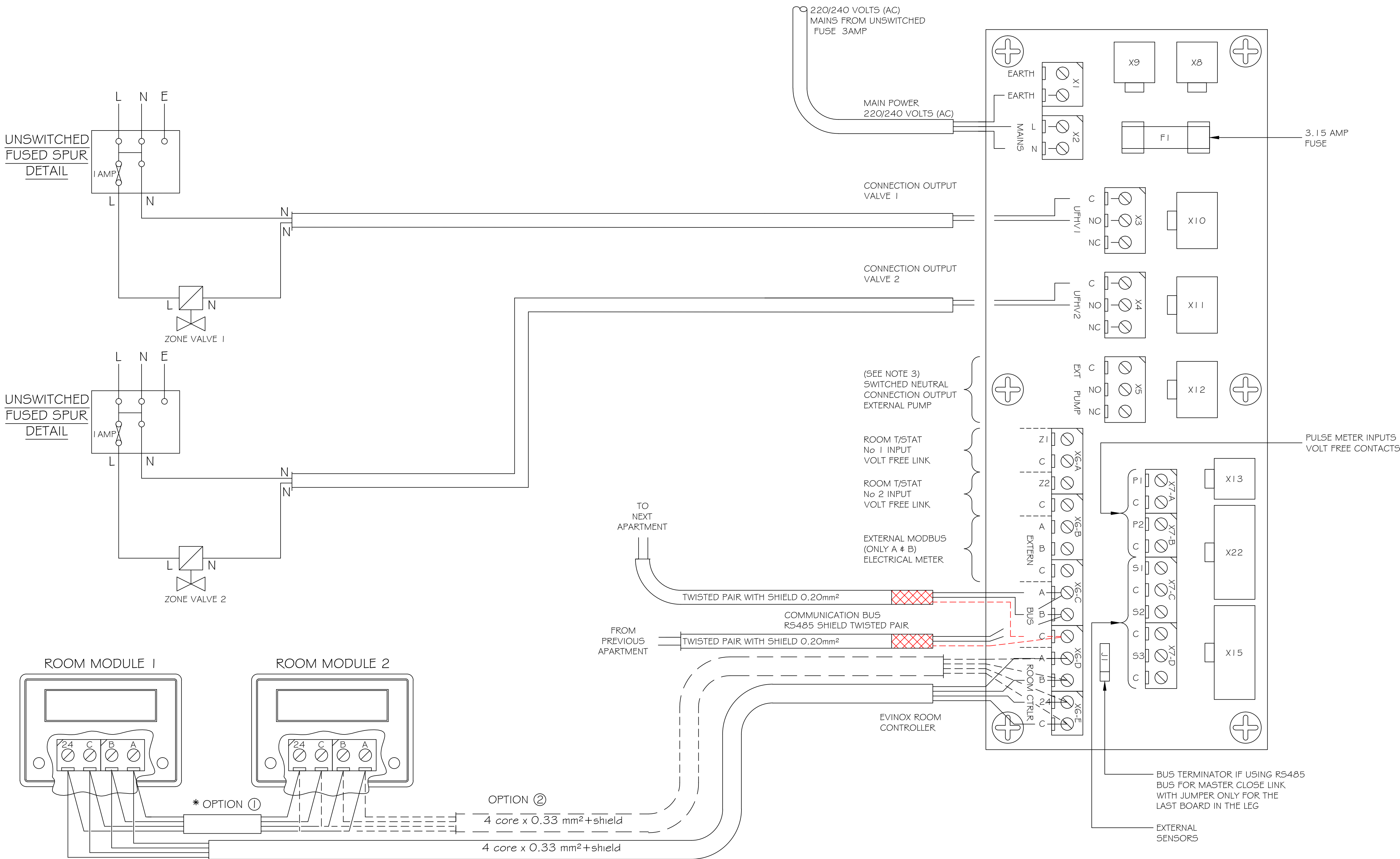
2, The Screening on the bus communication cable (RS Part no 528-210G). Connect together and put in terminal 'C'. This screening must be connected to earth at the Supply Module at the start of the run. The screening must not be connected to anything at the end of the run. This will enable any electrical disturbance to travel one direction down the screening to earth.

External Pumps & Valves

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

Termination

4, Bootlace ferrules to be used for connections on the connection board or room controller.



| REV | DATE | REVISION |
|-----|------|----------|
|     |      |          |

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www.evinox.co.uk

|  |               |                   |                 |
|--|---------------|-------------------|-----------------|
| CLIENT   |               |                   |                 |
| PROJECT  |               |                   |                 |
| TITLE<br>TYPICAL WIRING<br>CONNECTION ARRANGEMENT<br>WITH SINGLE ROOM CONTROLLER |               |                   |                 |
| DRAWN<br>SS  | CHECKED<br>CW | DATE<br>JULY 2015 | SCALE<br>N.T.S. |
| DRAWING No. STD/MOD/2015/1EVI  |               |                   |                 |

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Shield Termination

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External Pumps & Valves

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Cable Specification

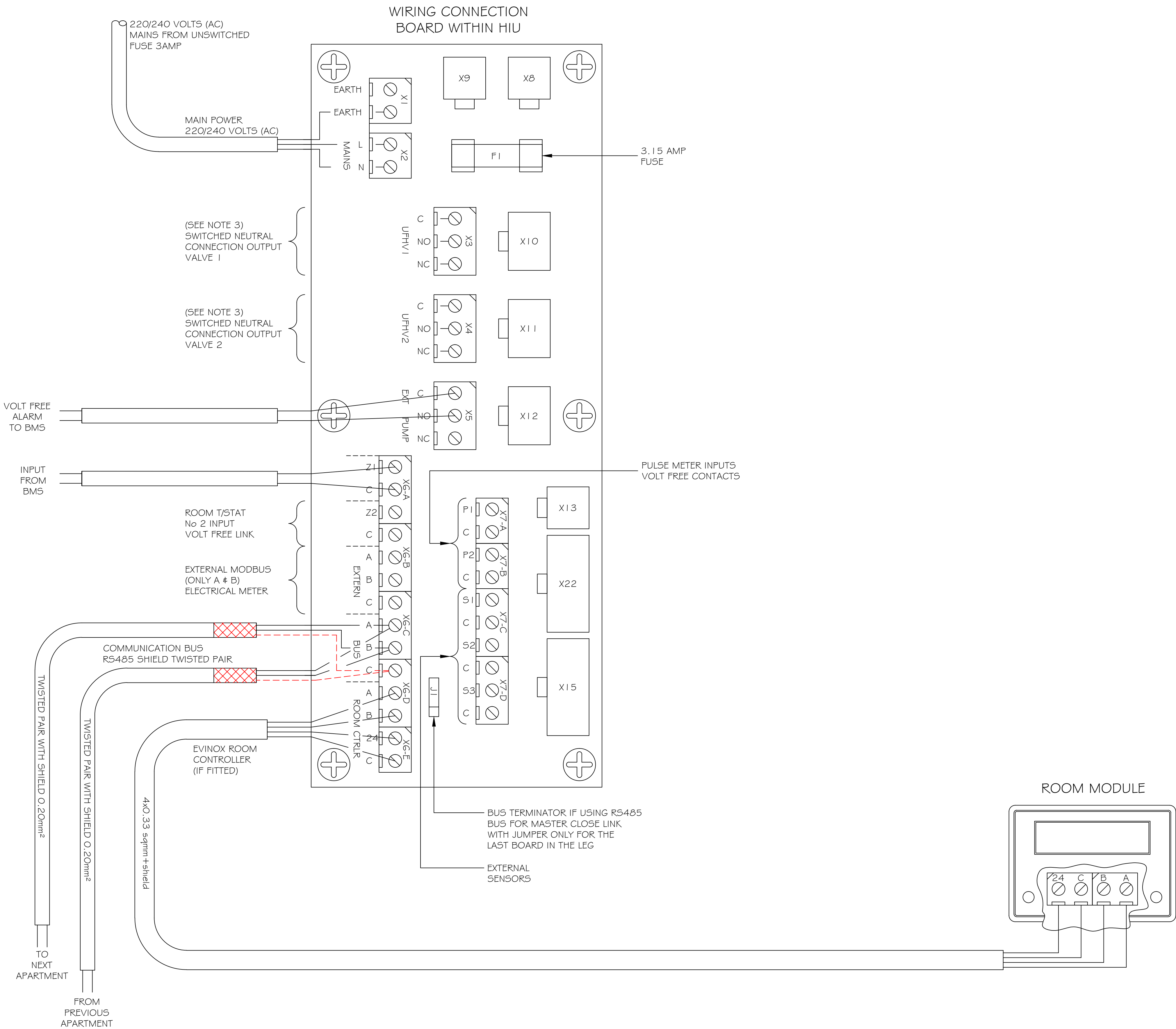
4, Modbus communication network 1 pair (RS ref overall screen multipair 528-210G)

Connection between modusat & viewsmart room controller 2 pair (RS ref overall screen multipair 528-1901)

Connection between modusat & 3 parties room controller 1 pair (RS ref overall screen multipair 528-210G)

Terminations

Terminations should be done with bootlace ferrules



| REV | DATE | REVISION |
|-----|------|----------|
|-----|------|----------|

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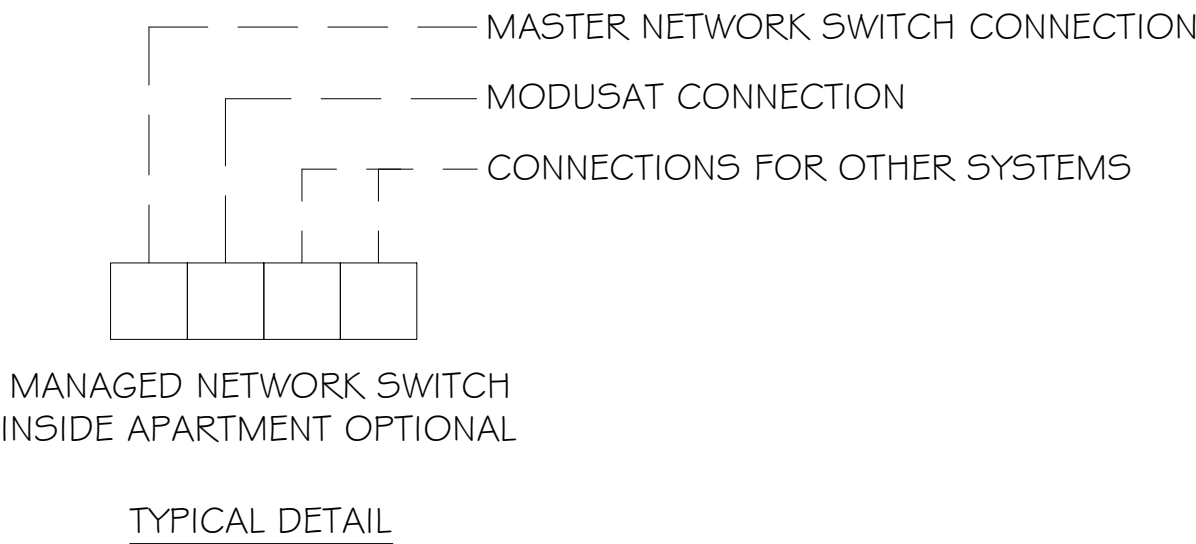
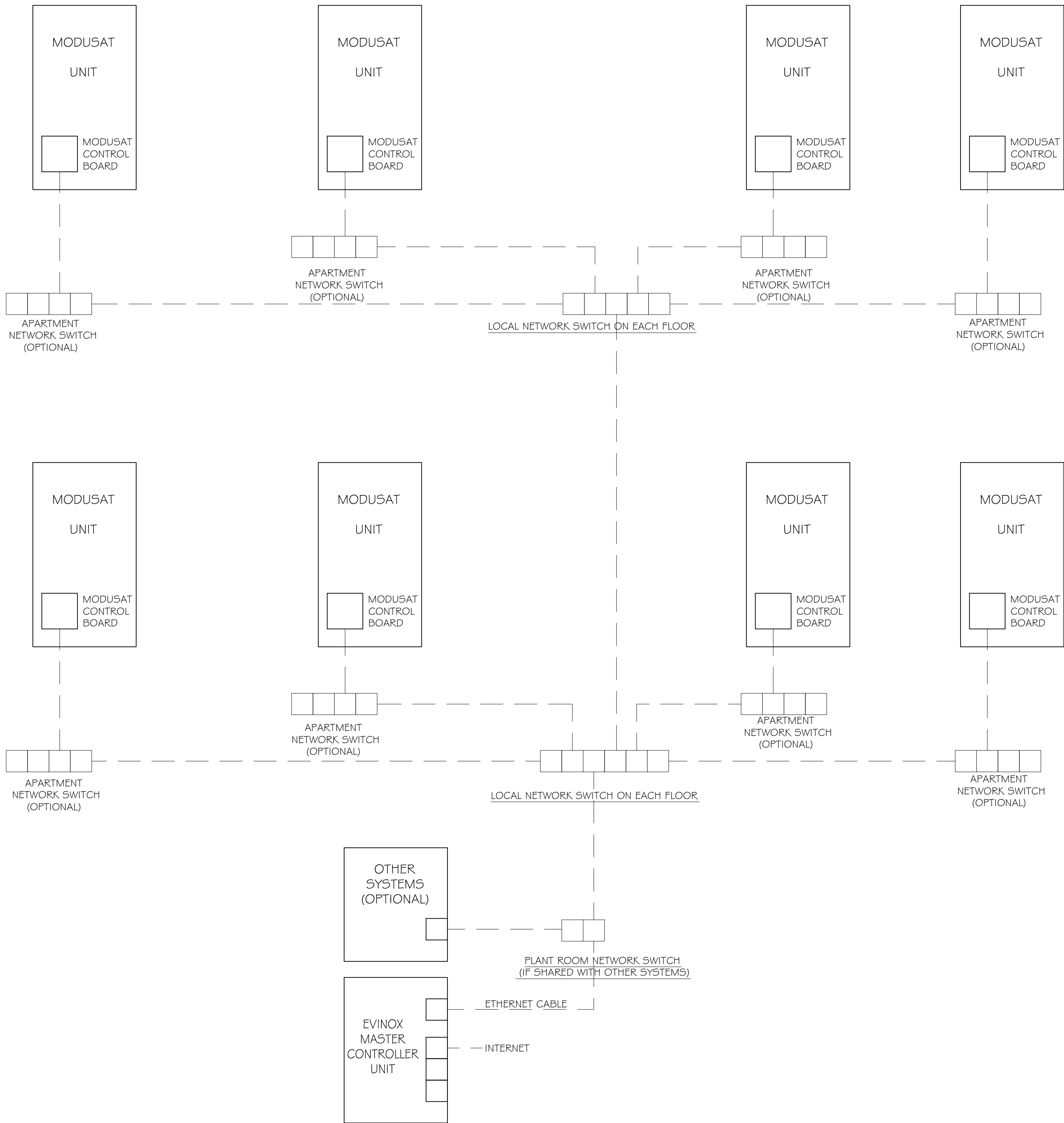
CLIENT


PROJECT

TITLE  
TYPICAL WIRING CONNECTION  
ARRANGEMENT WITH BMS INPUT  
AND EVINOX VIEWSMART

| DRAWN | CHECKED | DATE      | SCALE  |
|-------|---------|-----------|--------|
| MW    |         | MAR. 2015 | N.T.S. |

DRAWING No  
STD/MOD/2015/BMSV





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|   |                 |
|---|-----------------|
| CLIENT  |                 |
| PROJECT   |                 |
| TITLE<br>TYPICAL TCP / IP NETWORK<br>FOR MODUSAT SYSTEM |                 |
| DRAWN<br>BJW  | CHECKED<br>SS   |
| DATE<br>JAN. 2015                                       | SCALE<br>N.T.S. |
| DRAWING No. STDMOD-2015-TCP/IP-2                        |                 |