

ModuSat TP Twin Plate Satellite Heating Unit

Installation, Commissioning and Servicing Instructions

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1 GENERAL INFORMATION

1.1 Warnings

The ModuSat unit requires mains electrical connections and connection to the primary, low temperature hot water system and mains cold water supply to function.

A pre-installation rig is available to the installer to help position and space the pipe connections to the unit during first fix, prior to the ModuSats being delivered to site.

Installation must be carried out by a competent engineer in line with current regulations. Failure to read and follow the instructions provided within this document may cause potential injury or failure of the equipment.

Therefore it is advised that the installer reports any equipment faults or defects to an authorised Evinox representative.

Any modifications or adjustments carried out without EVINOX official authorisation will invalidate the warranty and absolves Evinox from any liability.

Evinox has the right to make any changes or modifications to the products without prior notice.

1.2 Symbols

Follows a list of symbols used in this manual:



**IMPORTANT NOTE REGARDING CORRECT
INSTALLATION**



CAUTION !

**IMPORTANT NOTE REGARDING PERSONAL SAFETY
AND CARE**



CAUTION !

DANGER OF ELECTRICAL SHOCK!

1.3 Safety Instructions

All installation and maintenance operations must be carried out by competent engineers according to current regulations

In case of water leaks:

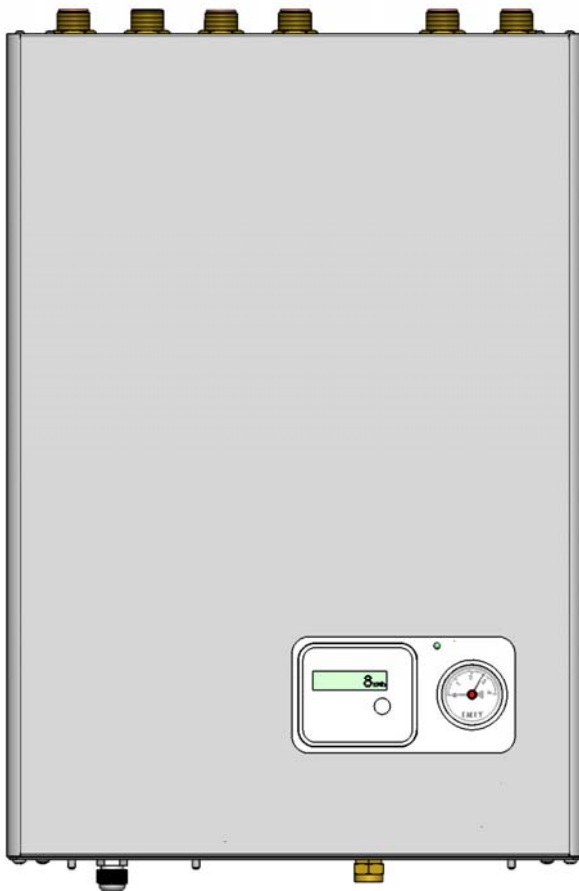
- Disconnect the electric power supply
- Slowly close the main water isolation valves to the unit
- Inform Evinox or approved Evinox engineer



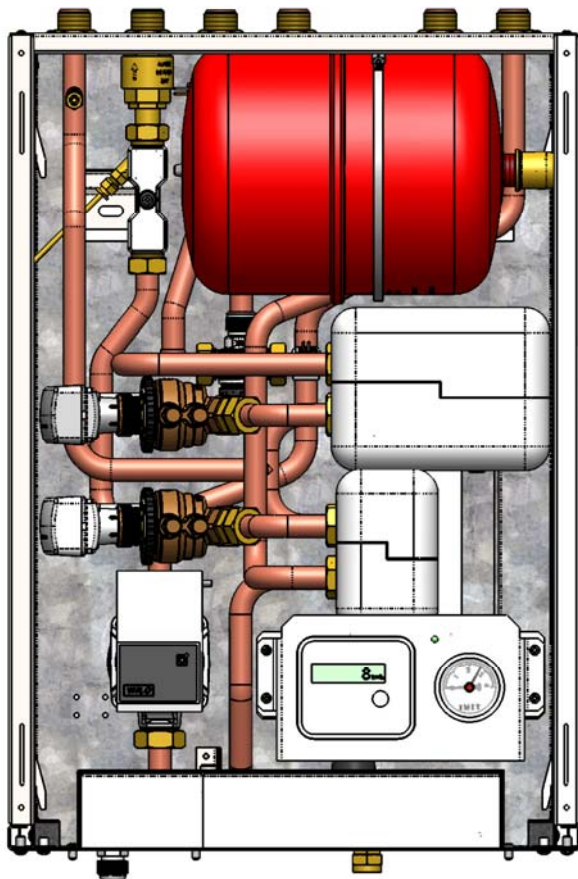
We recommend the unit is checked at least once a year by an authorised maintenance engineer. If the unit is subject to excessively heavy usage or non domestic installations (for example in a light commercial environment), we recommend having it checked more than once per year.



Disconnect the electrical supply prior to starting any work on a ModuSat TP.



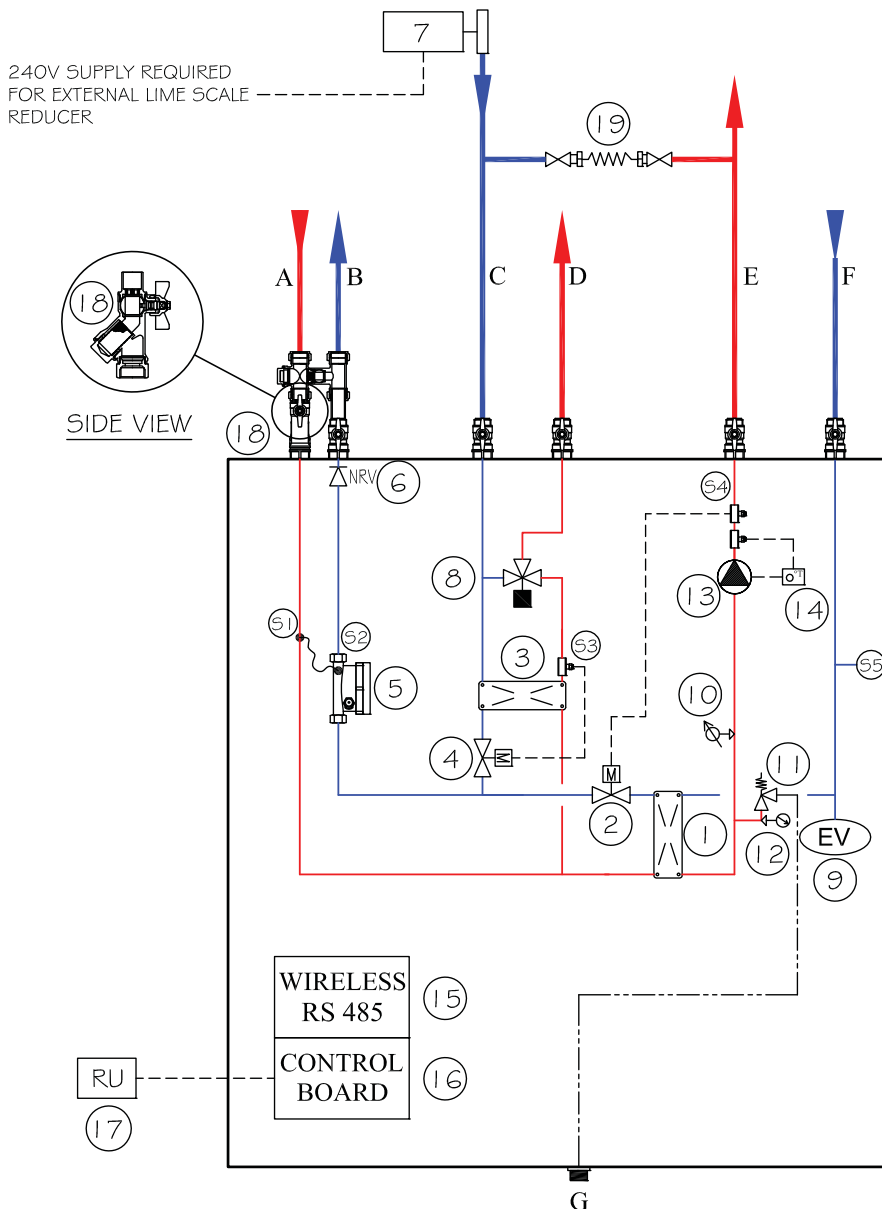
**ModuSat TP – Top
Connections**



2 TECHNICAL FEATURES

2.1 Typical Schematic Principle (All Top Connections)

ModuSat TP 40-10, 50-10, 55-10 & 60-10



Note: Other connection arrangements are available on request

Components

- A Primary / DH flow
- B Primary / DH return
- C Domestic cold water Inlet
- D 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
- 6 Non-return valve

DHW Secondary Side Circuit

- 7 Lime scale reducer (Optional)
- 8 Blending valve

Heating Secondary Side Circuit

- 9 Heating expansion vessel
- 10 Low pressure switch
- 11 Safety relief discharge
- 12 Manometer
- 13 Heating circulation pump
- 14 Safety thermostat (Optional)

Controls & Other Items

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

The cabinet is constructed from painted steel in white

2.2 Connection configurations

Various connection configurations are available; a few of them are detailed here below.
Please contact Evinox for further information.

Legend: PF primary flow, PR primary return, SF secondary flow, SR secondary return
DR drain, CW cold water, HW domestic hot water

TL1

T1	T2	T3	T4	T5	T6	T7
PF	PR	CW	HW		SF	SR
				DR		
B1	B2	B3	B4	B5	B6	B7

TL2

T1	T2	T3	T4	T5	T6	T7
PF	PR	CW			SF	SR
			HW	DR		
B1	B2	B3	B4	B5	B6	B7

TL3

T1	T2	T3	T4	T5	T6	T7
PF	PR		HW		SF	SR
		CW		DR		
B1	B2	B3	B4	B5	B6	B7

TL4

T1	T2	T3	T4	T5	T6	T7
PF	PR				SF	SR
		CW	HW	DR		
B1	B2	B3	B4	B5	B6	B7

TL5

T1	T2	T3	T4	T5	T6	T7
PF	PR	CW	HW			
				DR	SF	SR
B1	B2	B3	B4	B5	B6	B7

TL6

T1	T2	T3	T4	T5	T6	T7
PF	PR	CW				
			HW	DR	SF	SR
B1	B2	B3	B4	B5	B6	B7

TL7

T1	T2	T3	T4	T5	T6	T7
PF	PR		HW			
		CW		DR	SF	SR
B1	B2	B3	B4	B5	B6	B7

TL8

T1	T2	T3	T4	T5	T6	T7
PF	PR					
		CW	HW	DR	SF	SR
B1	B2	B3	B4	B5	B6	B7

BL1

T1	T2	T3	T4	T5	T6	T7
		CW	HW			
PF	PR			DR	SF	SR
B1	B2	B3	B4	B5	B6	B7

BL2

T1	T2	T3	T4	T5	T6	T7
		CW				
PF	PR		HW	DR	SF	SR
B1	B2	B3	B4	B5	B6	B7

BL3

T1	T2	T3	T4	T5	T6	T7
			HW			
PF	PR	CW		DR	SF	SR
B1	B2	B3	B4	B5	B6	B7

BL4

T1	T2	T3	T4	T5	T6	T7
PF	PR	CW	HW	DR	SF	SR
B1	B2	B3	B4	B5	B6	B7

BL5

T1	T2	T3	T4	T5	T6	T7
		CW	HW		SF	SR
PF	PR			DR		
B1	B2	B3	B4	B5	B6	B7

BL6

T1	T2	T3	T4	T5	T6	T7
		CW			SF	SR
PF	PR		HW	DR		
B1	B2	B3	B4	B5	B6	B7

BL7

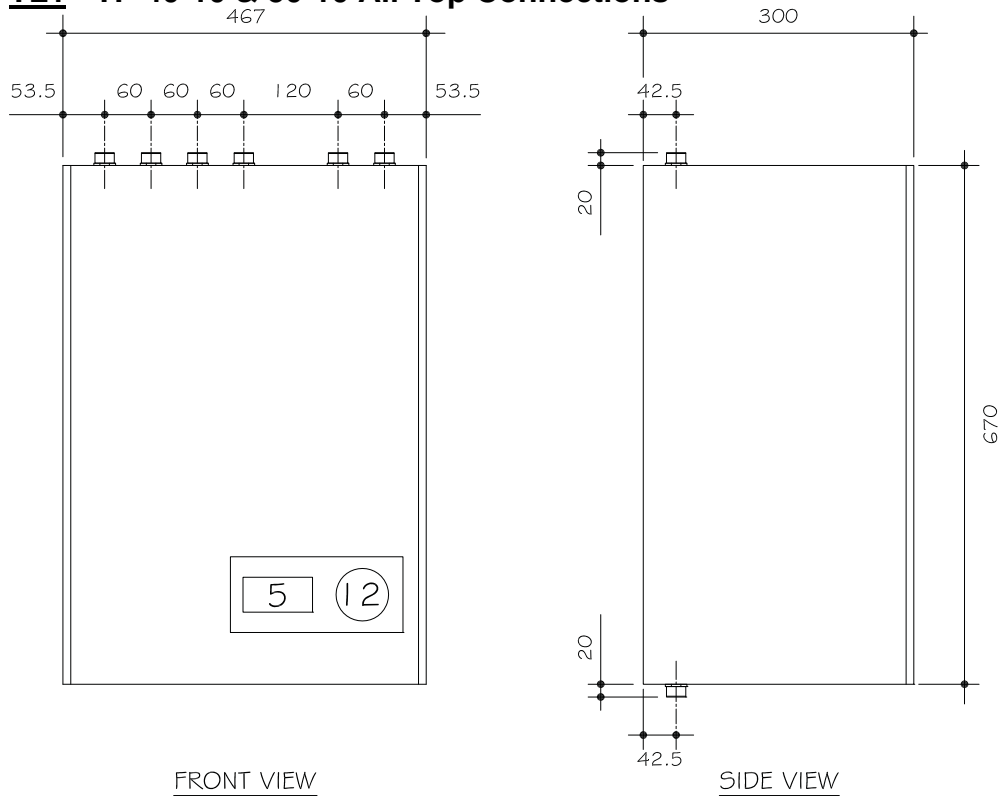
T1	T2	T3	T4	T5	T6	T7
			HW		SF	SR
PF	PR	CW		DR		
B1	B2	B3	B4	B5	B6	B7

BL8

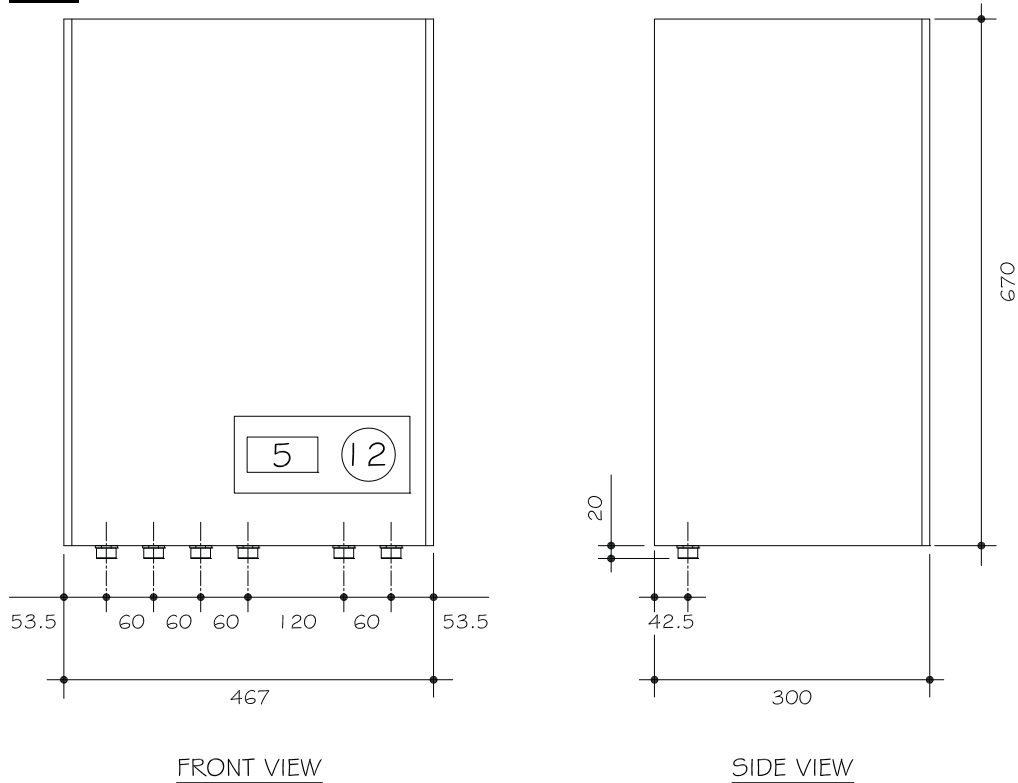
T1	T2	T3	T4	T5	T6	T7
PF	PR					
		CW	HW	DR	SF	SR
B1	B2	B3	B4	B5	B6	B7

2.3 Typical Dimensions (Typical connection configurations shown)

TL1 - TP 40-10 & 50-10 All Top Connections

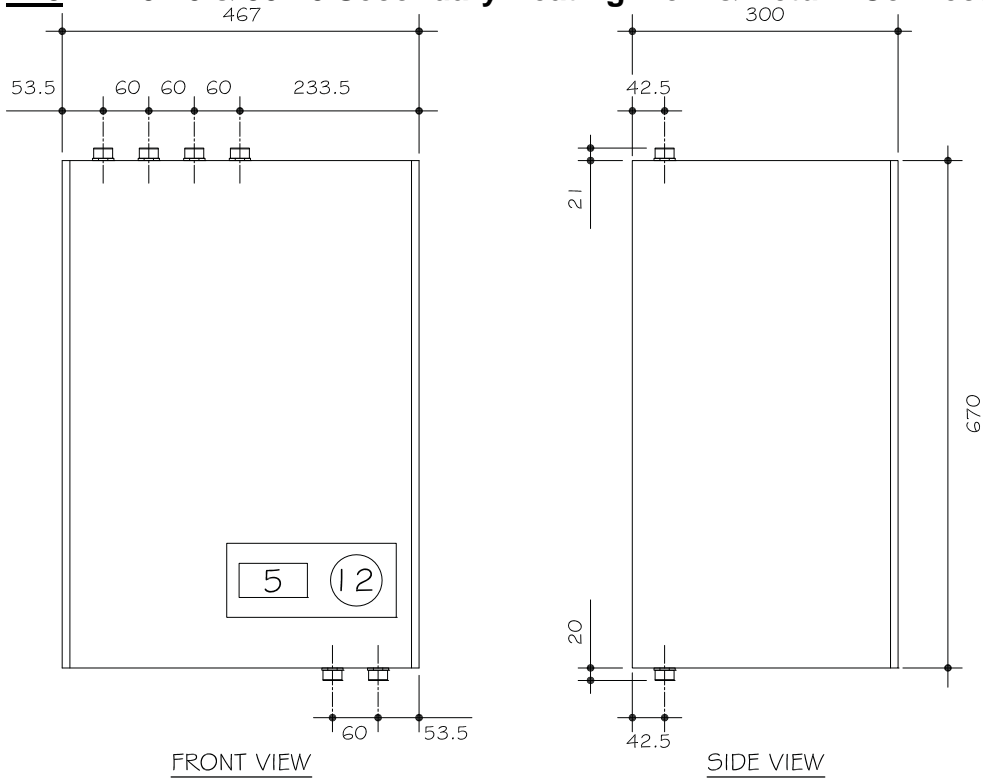


BL4 TP 40-10 & 50-10 All Bottom Connections

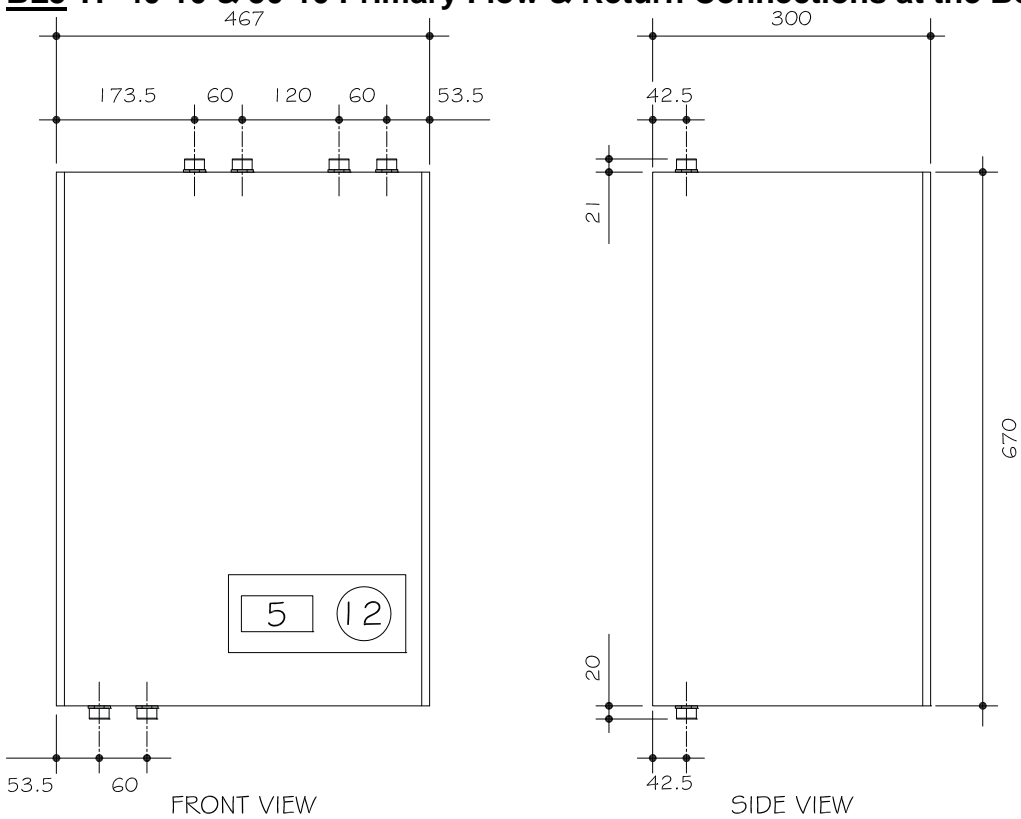


Note: For clarity, safety drain connections are not shown. Please refer to hydraulic arrangements. Additional connection configurations available as detailed on pages 7-9 of this manual. For specific hydraulic arrangements for other connection configurations please contact the Evinox Technical Department on 01372 722277.

TL5 TP 40-10 & 50-10 Secondary Heating Flow & Return Connections at the Bottom

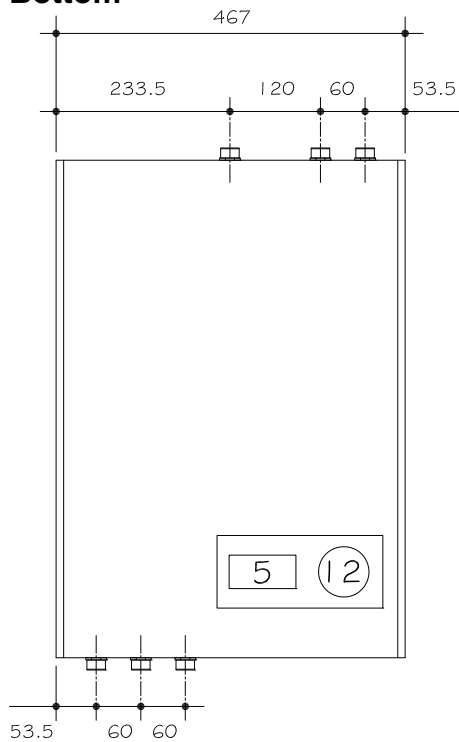


BL5 TP 40-10 & 50-10 Primary Flow & Return Connections at the Bottom

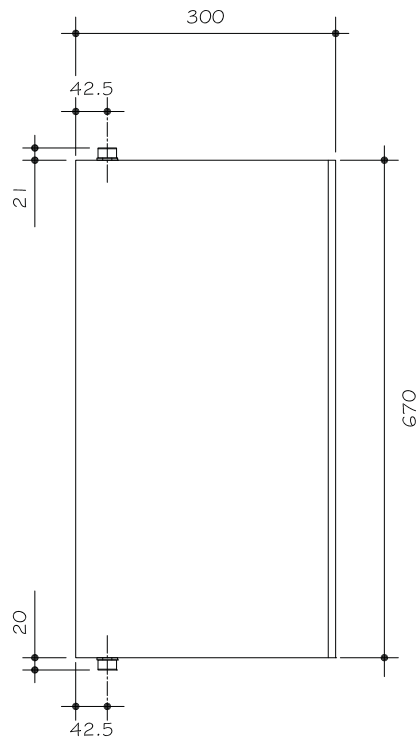


Note: For clarity, safety drain connections are not shown. Please refer to hydraulic arrangements. Additional connection configurations available as detailed on pages 7-9 of this manual. For specific hydraulic arrangements for other connection configurations please contact the Evinox Technical Department on 01372 722277.

BL7 TP 40-10 & 50-10 Primary Flow & Return and DCW Inlet Connections at the Bottom

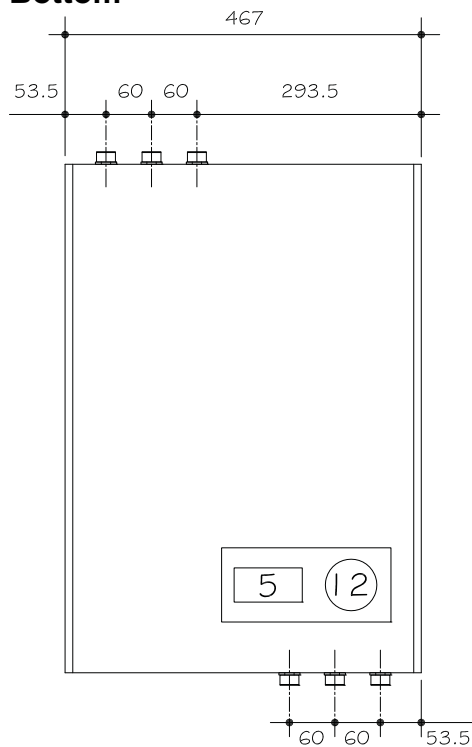


FRONT VIEW

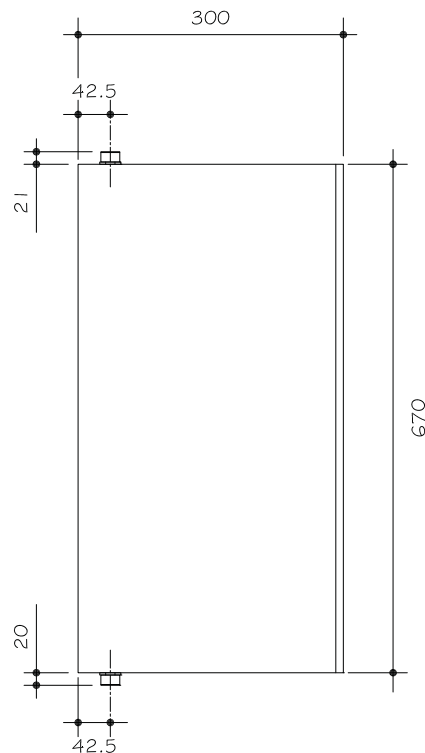


SIDE VIEW

TL6 TP 40-10 & 50-10 Secondary Flow & Return and DHW Outlet Connections at the Bottom



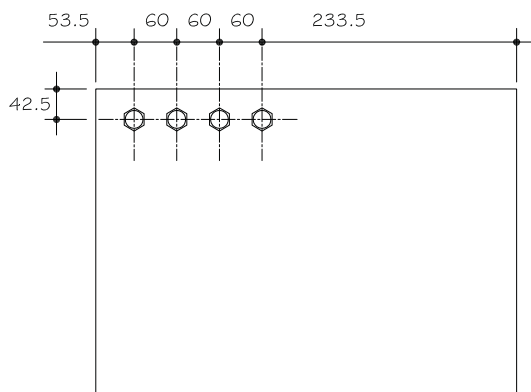
FRONT VIEW



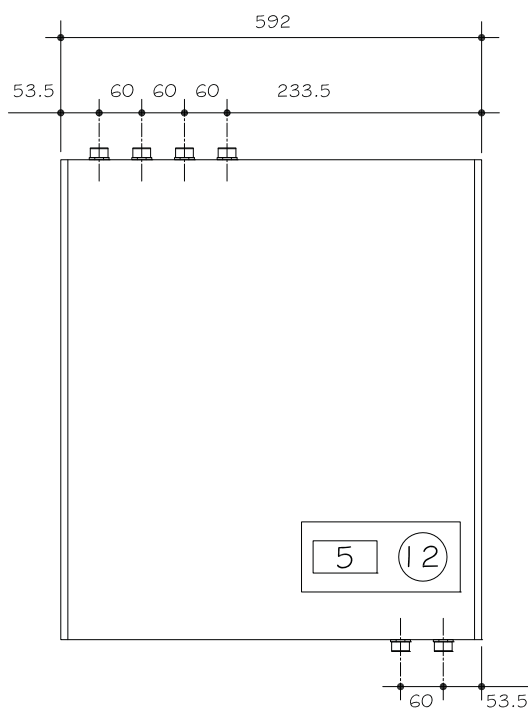
SIDE VIEW

Note: For clarity, safety drain connections are not shown. Please refer to hydraulic arrangements. Additional connection configurations available as detailed on pages 7-9 of this manual. For specific hydraulic arrangements for other connection configurations please contact the Evinox Technical Department on 01372 722277.

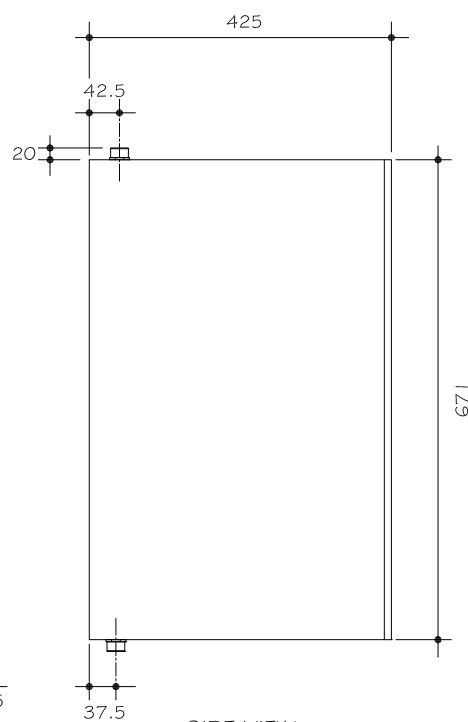
TP 55-10 & 60-10



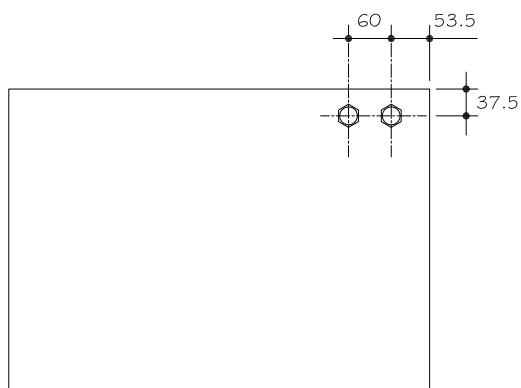
PLAN



FRONT VIEW



SIDE VIEW



VIEW FROM BOTTOM

Note: For clarity, safety drain connections are not shown. Please refer to hydraulic arrangements. Additional connection configurations available as detailed on pages 7-9 of this manual. For specific hydraulic arrangements for other connection configurations please contact the Evinox Technical Department on 01372 722277.

2.4 Technical features

Electrical

	MTP 40-10, 50-10 & 55-10	MTP 60-10
Electric supply	220 / 240 Volt (AC)	
Frequency	50 Hz	
Current absorption	0,6 Amps	

Hydraulic connections

Primary circuit supply	¾" ext. thread	1" ext. thread
Primary circuit return	¾" ext. thread	1" ext. thread
Apartment circuit supply	¾" ext. thread	¾" ext. thread
Apartment circuit return	¾" ext. thread	¾" ext. thread
DHW supply	¾" ext. thread	1" ext. thread
DCW inlet	¾" ext. thread	1" ext. thread
Drain	¾" ext. thread	¾" ext. thread

Hydraulic characteristics

Primary circuit max pressure	10 bar Standard / 16 Bar Optional
Apartment heating circuit recommended cold fill pressure	1.5 bar
DHW max static pressure	4 bar
DCW min static pressure	0,5 bar
Max supply temperature (Primary)	90 °C
Min supply temperature (Primary)	70 °C
Recommended primary flow rate	800 l/h
Secondary heating circuit expansion vessel size	8 litres

Weight

	Dry	Shipping
Weight 40-10	32 kg	33 kg
Weight 50-10	34 kg	35 kg
Weight 55-10	TBC	TBC
Weight 60-10	TBC	TBC

Part number

The part number identifies the unit model and the components fitted on board, for instance MTP40-10 means

- MTP: ModuSat Twin Plate
- 40: number of DHW plates (and also nominal capacity) of plate heat exchanger
- 10: number of Heating plates (and also nominal capacity) of plate heat exchanger

3 INSTALLATION

The installation and commissioning of the units should be carried out only by competent and qualified personnel according to the current regulations and standards.

3.1 *Recommended handling procedure*

The unit should be moved into position still within its packaging to prevent any damage whilst being positioned. Once safely in its install position, the unit should be removed from its packaging and lifted into position.

The ModuSat TP may have been transported and handled many times if you consider the on-site storage, handling and installation, therefore it is vitally important that all unions and connections are checked and tightened as required. In case of damage please contact Evinox immediately. Packaging materials must be properly disposed of in line with current environmental guidelines.



It is recommended that at least two people perform any lift. Clear the route of the carton from point of delivery to point of installation. Take care to avoid trip hazards, slippery or wet surfaces and where possible climbing steps and stairs. Always seek assistance if required. If a sack truck is used it is recommended that the carton is strapped to the truck, to prevent the unit from falling.

When unpacking the unit from the carton, it is recommended that at least two people perform any lift.

Ensure the protective cover over the ModuSat TP pipe connections are kept in place to prevent ingress of any debris.



Take care when lifting this appliance and ensure your back is kept straight at all times. Avoid twisting at the waist - reposition the feet instead.



Avoid upper body bending when holding the appliance and keep the ModuSat TP as close to the body as possible. Safety footwear and gloves are recommended. PPE should be used when lifting this appliance - to protect against any injury caused by possible sharp edges and also to ensure a good grip.

3.2 *ModuSat TP positioning*



There are no specific requirements with regards to location and venting / airflow. However, to ensure the correct operation the temperature of the location of the unit should, whilst running, not exceed 40 °C with the humidity between 15% to 85% RH.



The unit must be sheltered from the extremes of weather and temperature; it should therefore not be installed or stored outdoors. The ModuSat TP is designed to be used internally and within a well protected area.

Ensure that the environment where the ModuSat TP is to be installed complies with current regulations and guidelines.

3.3 *Checks before connecting the ModuSat TP*



Before connecting the ModuSat TP the primary and secondary system must be thoroughly flushed to remove all residues, dirt etc, that may be present and would compromise / cause damage to the appliance.

The system should also be thoroughly rinsed to ensure all cleaning products used are fully removed.



Disconnect the electrical power before any installation works.

The unit requires a 220/240Volt (AC) – 50Hz supply, check the Line and Phase polarity. Protect the cables to prevent any damage.

Make sure that there is an efficient, reliable earth connection to protect against possible electric shocks, in line with current electrical regulations.



All electrical wiring should be installed / checked by qualified personnel in line with current regulations. EVINOX are not liable for damage caused by incorrect electric connections or faulty wiring.



The ModuSat should be provided with additional fused protection. This will be via a suitable rated fused switch adjacent to the HIU position.

3.4 Hydraulic connections

The ModuSat TP is designed to be wall mounted with the typical primary circuit and domestic water hydraulic connections as shown here below. (Other configurations are available; please refer to pages 10-13).

In order to ease the installation and maintenance of the unit, it is recommended to follow the instructions about minimum spacing.



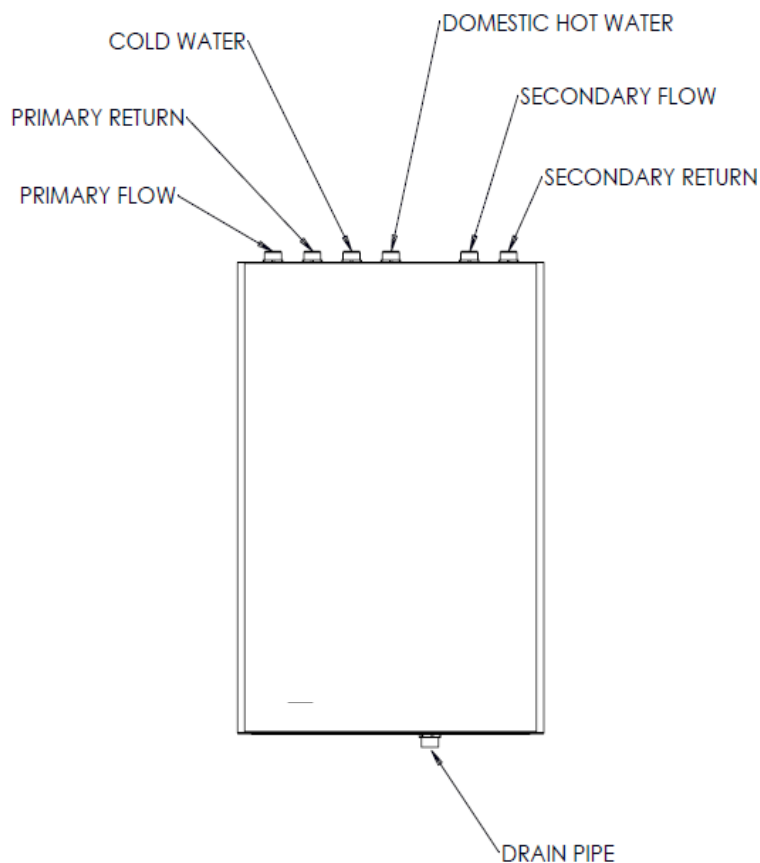
The safety valve drain must be connected to a tundish that allows a visual check, in the event of a system issue or valve discharge. This must be installed in such a way so as to prevent damage or risk of injury to occupants, children or animals. Evinox cannot be held responsible for any damage caused by incorrect installation.

- The unit must be connected to a suitable primary network that provides sufficient flow and temperature as per the system design.
- The system must be fully cleaned and treated in line with the requirements detailed in section 3 of this manual.



Minimum space requirements for access and servicing:

- Front: 700 mm
- Side: 50 mm
- Bottom: 400 mm



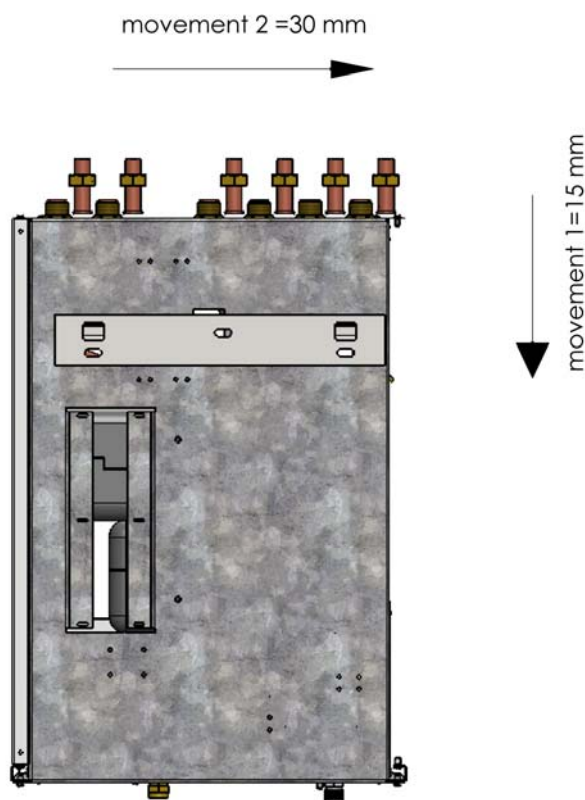
3.5 Use of Pre-installation Rig

A pre-installation rig is available upon request on a sale or return basis. 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 TP Pre-Installation Rig on the bracket. Then slide down and across to the right, as indicated in diagram.

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

STEP3: Shut off isolation valves, pressure test pipework and then disconnect the valve unions and lift away the Pre-Installation Rig leaving the valves ready for the ModuSat arrival.

STEP4: To remove the pre-installation rig undo all flat face unions and slide the rig to the left taking all connections off centre, slowly lift and remove. Take the Pre-Installation Rig to the next apartment and repeat the process.

NB: Please take care of the Pre-Installation Rig as this is typically purchased on Sale and Return basis. Damaged pre-installation rigs cannot be returned for credit.

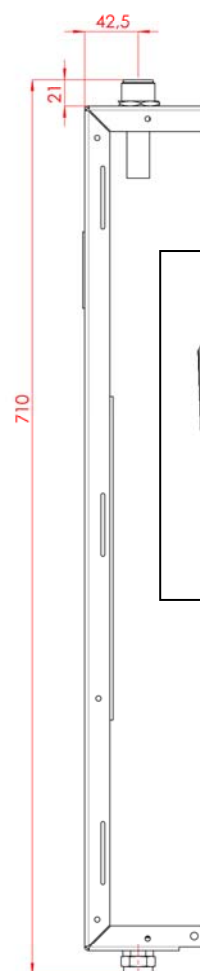
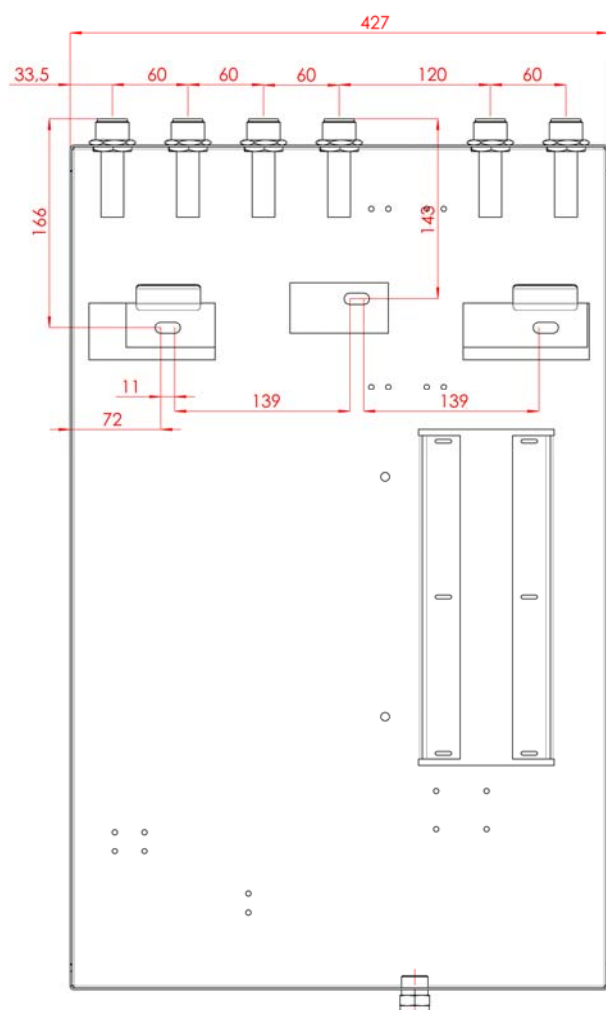
Please refer to section 2.3 for the relevant model dimensions and typical connection configuration.

Typical Evinox Valve Kit Installation

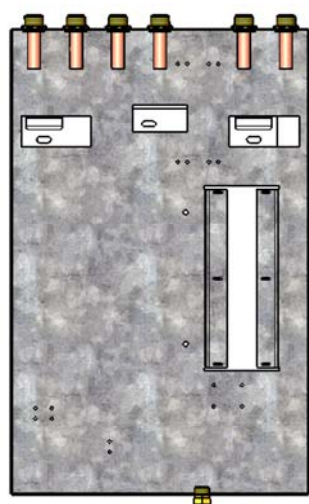


3.6 Wall fixing

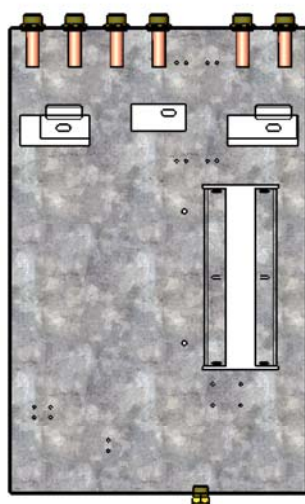
The ModuSat TP is designed for wall mounting using brackets to be screwed to the wall as shown below.



movement 2=30 mm

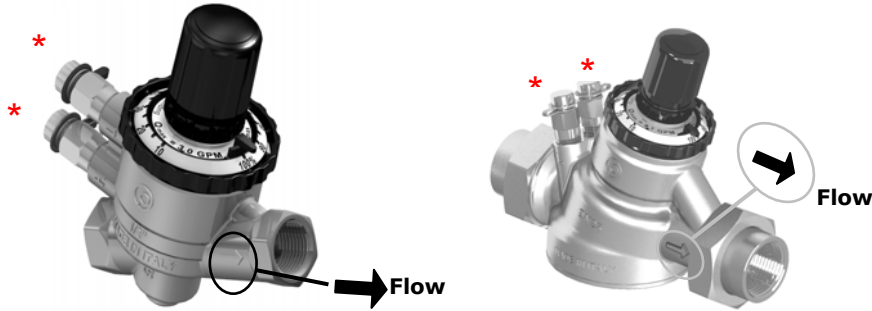


movement 1=15 mm



Please note – Weights of the units are shown in the technical table on page 14.

3.7 Pressure Independent Control Valve (PICV) Adjustment



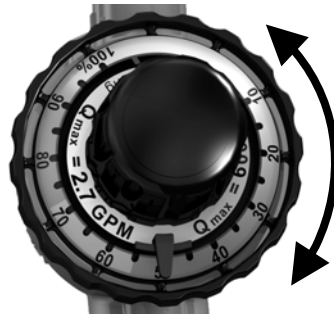
The PICV contained within the ModuSat is a combined flow regulation, DP control and energy valve. The valve will be pre-set during commissioning based on the design parameters, however adjustment can be to the Qmax (Maximum flow) if required.

TECHNICAL DATA	91L 3/4"	91H 3/4"	93L 1"
	ModuSat TP HEATING 40/50/55/60-10	ModuSat TP 40/50/55-10 DHW	ModuSat TP 60-10 DHW
Max flow rate	1000 l/h 0.278 l/s	1500 l/h 0.417 l/s	2200 l/h – 0.611 l/s
Max. Flow accuracy [Δp 0.3 ÷ 1 bar]	±10%	±10%	±10%
Start-up $\Delta p \rightarrow Q = \text{const.}$	25 kPa 0.25 bar	35 kPa 0.35 bar	25 kPa – 0.25 bar
Max Δp	400 kPa – 4 bar	400 kPa – 4 bar	400 kPa – 4 bar
Temperature	-10 ÷ 120 °C	-10 ÷ 120 °C	-10 ÷ 120 °C
Max working pressure	2500 kPa 25 bar	2500 kPa 25 bar	2500 kPa 25 bar
Connections	Rp 3/4" F EN10226-1	Rp 3/4" F EN10226-1	Rc - EN10226-1

MANUAL ADJUSTMENT OF THE QMAX (MAXIMUM PRIMARY FLOW)



Carefully Lift up locking device



Select the flow rate by rotating the pre-setting ring



Carefully Push down locking device

PRE-SETTING %	91L 3/4"		91H 3/4"		93L 1"	
	ModuSat TP HEATING 40/50/55/60-10		ModuSat TP 40/50/55-10 DHW		ModuSat TP 60-10 DHW	
	Flow l/h	Flow l/s	Flow l/h	Flow l/s	Flow l/h	Flow l/s
100%	1000	0,278	1500	0.417	2200	0.611
90%	900	0,250	1350	0,375	1980	0.550
80%	800	0,222	1200	0,333	1760	0.489
70%	700	0,194	1050	0,292	1540	0.428
60%	600	0,167	900	0,250	1320	0.367
50%	500	0,139	750	0,208	1100	0.306
40%	400	0,111	600	0,167	880	0.244
30%	300	0,083	450	0,125	660	0.183
25%	-	-	375	0,104	-	-
20%	200	0,056	-	-	440	0.122
10%	100	0,028	-	-	220	0.061



FOR THE CORRECT USE OF THIS PRODUCT, WATER QUALITY MUST BE

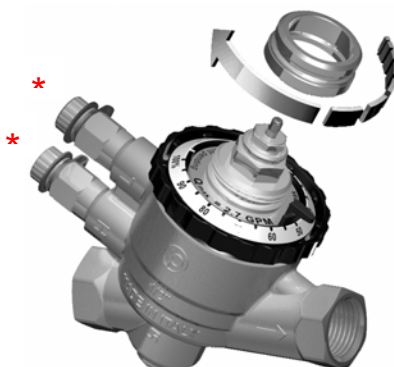
HIGH AND COMPLY WITH CURRENT BSRIA & CIBSE GUIDELINES AND EVINOX REQUIREMENTS.

Please note that the flow rates stated are subject to a + / - 10% tolerance.

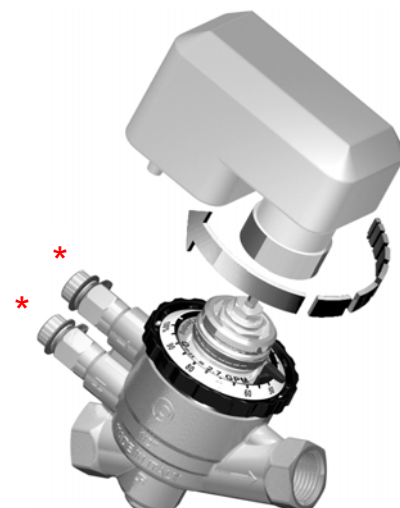
TYPICAL ACTUATOR FITTING / REMOVAL



Carefully remove the handwheel



Screw the ring adaptor by hand



Screw the nut actuator by hand

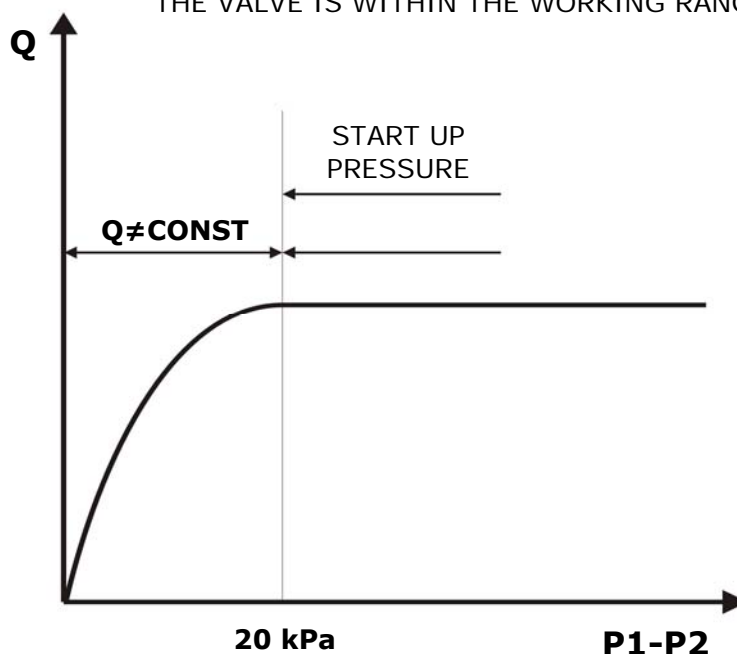
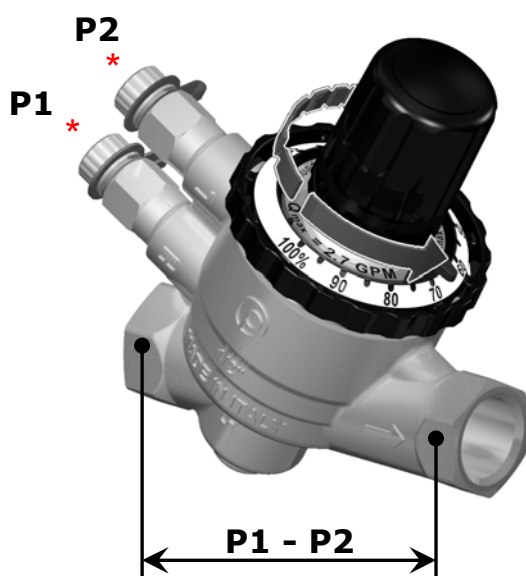
The removal is the reverse of the above as the actuators are pre-fitted. Removal should only be carried out in the event of failure and following discussion and approval from an Evinox engineer.

In the event that the pressure parameters need to be checked during operation, temporary binder points can be installed for testing purposes by an Evinox engineer to ensure they are within the max / min tolerance, the following data can be checked:-

For 91L 3/4" – ModuSat TP 40-10, 50-10, 55-10 & 60-10 HEATING &

For 91H 3/4" – ModuSat TP 40-10, 50-10 & 55-10 DHW

If $P1-P2 > 20 \text{ kPa}$ THEN
THE VALVE IS WITHIN THE WORKING RANGE

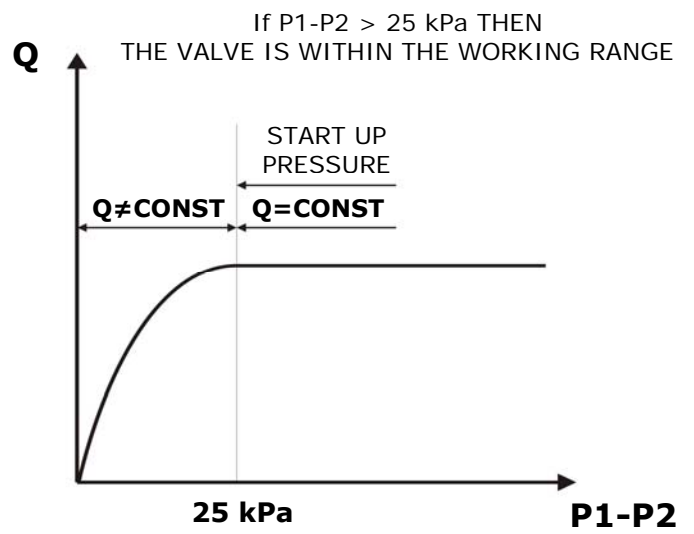
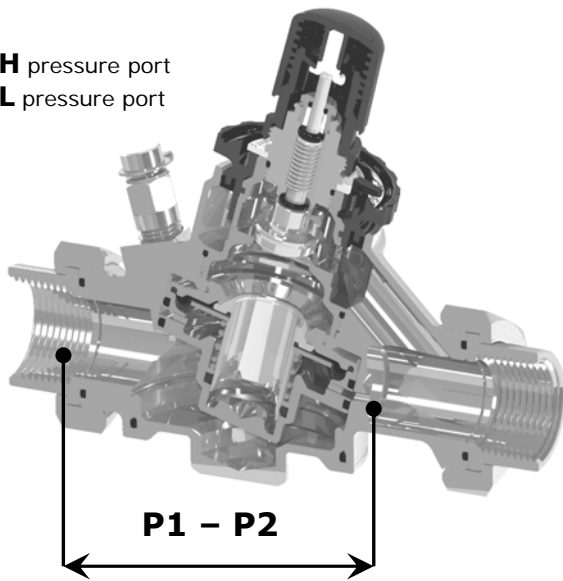


* Please note that the binder points are not supplied with the valve as standard. Temporary binder points can be installed by an Evinox engineer should any checks be required.

For 93L 1" – ModuSat TP 60-10 DHW

P1 = H pressure port

P2 = L pressure port



4 PRIMARY AND SECONDARY CIRCUIT

Prior to the circuits being filled and isolated, they must be fully pressure tested in line with the design requirements and current regulations.

4.1 Water treatment

It's important to prevent corrosion and oxidisation. Therefore, 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.

Parameter	Recommended
Hardness (TH)	About 10 °F
Chlorides	Up to 100 mg/l
PH	7 to 8,5
Resistivity	Higher than 2000 Ohm/cm
Salinity	Up to 50 mg/l
Conductivity	200 crs
TDS	0-200 ppm
Iron	Up to 1 mg/l
Copper	Up to 1 mg/l

Typical Water Quality Guidelines

Typical water quality guidelines are as follows:

pH – this measures the alkalinity of the water, neutral alkalinity is pH7. Heating systems require an alkaline pH.

TDS – this measures the dissolved solids in the system and is a measure of the cleanliness of the water. Recommended levels 0-200 ppm.

Conductivity – this is the measure of the ability of water to pass an electrical current and is affected by the presence of dissolved solids. Recommended levels 200 crs.

Free copper – this measures the level of copper in the system in mg/litre. Recommended levels are under 1 mg/l.

Total iron – this measures iron concentration in mg/litre. Recommended levels are under 1 mg/l.

4.2 Cleaning

The cleaning and treatment of the systems must be carried out strictly in accordance with BSRIA and CIBSE guidelines and the relevant British Standards. It is a requirement that the following is undertaken:

- Clean the boiler room plant.
- Cleaning of the primary circuit, with the ModuSat TP isolating valves closed and the flushing bypass fully opened.
- Cleaning of the horizontal pipework and the ModuSat TP unit.
- Cleaning of the apartment heating circuit.
- Use of a dirt separator in the boiler room and strainer on each ModuSat TP, which is supplied as part of the valve kit, to provide additional system protection.

During the final fill and treatment the systems must be fully vented to remove all air, and the system pressure adjusted to design requirements (that form part of the design criteria and specification). If the tender specification does not enforce a particular standard then Evinox requirements would be the BSRIA AG 1/2001.1 standard.

Note: Never leave the system filled with raw untreated water for any length of time.

In order to guarantee the optimal performance of the unit check that the water quality is within BSRIA and CIBSE requirements and guidelines.

SCALE BUILD UP AND CORROSION Topping up the circuit with non treated fresh water can produce:



- Dissolved oxygen – Thus leading to potential corrosion
- Carbonates: (produce scale build up): the water top ups must be reduced to the minimum.

N.B: Scale and other residues may clog the heat meters within the ModuSat units, causing errors in the energy consumption calculations.

WATER TREATMENT IS A STRICT REQUIREMENT AND MUST BE CHECKED IN THE FOLLOWING CASES:



- Circuits with large capacity that produce large amounts of dissolved oxygen.
- Frequent top ups due to leaks, repair and maintenance.
- Use of water with characteristics that are not in line with the recommendations within this manual or in line with BSRIA / Evinox requirements.

4.3 Precautions

The correct operation of the unit, as well as the entire system, depends on good water quality. Water treatment is often an afterthought and consideration is not given to the amount of damage that can result from a poor cleaning and treatment regime.



The warranty of the ModuSat storage 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 value in order to guarantee positive pressure, with respect to the ambient pressure, throughout the circuits.
- Use suitable chemicals (such as BIONIBAL available from Evinox), which are suitable for the materials and equipment used and that **PREVENT/INHIBIT CORROSION**.



Please note: If the completed installation includes boiler plant supplied by Evinox, then only BIONIBAL, which is approved by Evinox, should be used in the primary and secondary circuits.



Our technical personnel, who will visit the project during the course of the installation and at its completion to arrange for its final commissioning and calibration, do so to assist the contractor and install team. This is 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. The systems compliance with the consultant's requirements and current standards and legislation remains the exclusive responsibility of the installer / M&E contractor and comments provided by Evinox are for guidance & advice only.

4.4 Bionibal

BIONIBAL corrosion inhibitor is approved by Evinox and is a requirement in installations that incorporate our boiler plant. Thorough research shows that Bionibal protects your installation in 4 key ways:

- **FIRST LEVEL** - corrosion inhibition and prevention of rust build up.
- **SECOND LEVEL** - acidic component that stops bacteria and algae growth, particularly useful in under floor heating working at low temperatures.
- **THIRD LEVEL** - prevents the adherence of suspended particles such as tartar, keeping the surfaces clean (pumps, valves, heat meters, etc.).
- **FOURTH LEVEL** - provides traceability to enable the dosage to be fully monitored and guarantee the best protection level. It also provides a trace element to enable any leaks to be quickly identified.



Electrolytic corrosion prevention, in a circuit employing different metals.

IT IS ADVISABLE to **ADD** a suitable approved corrosion inhibitor before the system is put in operation.

Bionibal dosage and use (If used & when required if Evinox boiler plant is installed)

NEW INSTALLATIONS:



Fill the circuit with water and check for leaks. Empty the circuit in order to discard any installation residuals (if necessary clean it with an appropriate product and make sure that the circuit is well rinsed).

Once the circuit is well cleaned, fill it with water again and add **BIONIBAL** according to the dosage indicated.

EXISTING INSTALLATIONS:



Because **BIONIBAL** doesn't dissolve existing limes and other residuals accumulated over the years, proceed with emptying the circuit and perform a thorough cleaning process of it. Use accredited companies for this work.

Once the circuit is well cleaned, fill it with water again and add **BIONIBAL** according to the dosage indicated below:

IMPORTANT WARNING

Bionibal must only be put in a thoroughly clean installation that has been fully checked. It is therefore imperative to fill the entire system one or more times with clean water and flush / drain as required. In some cases, the system may need washing by a suitable product:

SUGGESTED DOSE

- 2 litres for every 100 litres of primary network
- 1 litre for every 100 litres of the radiator circuit capacity
- 2 litres for every 100 litres of the under floor heating circuit capacity with oxygen blocking barrier pipes

The system cannot be overdosed with Bionibal and will not cause system damage.



Restore the correct concentration every time the circuit is emptied / topped up with raw untreated water.

4.5 Flushing Bypass

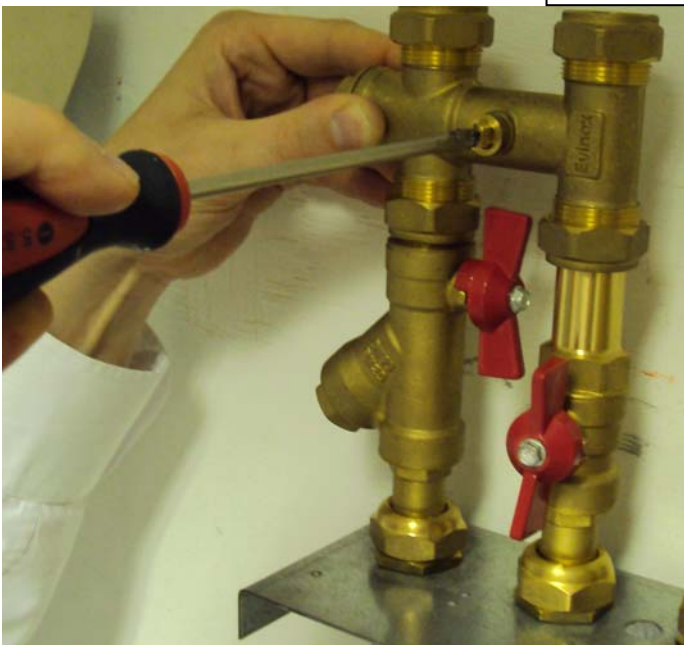


Flushing bypass



Unit bypassed

Isolation valves are closed (Handles in horizontal position) and bypass is open. Turn screw in horizontal position for flushing of primary system.



Unit in normal operation (Open to primary system)

Isolation valves are opened (Handles in vertical position) and bypass valve is closed with screw in vertical position. HIU is open to primary system for normal operation.

5 ELECTRIC CONNECTIONS

The MODUSAT requires a 220/240V (AC) 50Hz mains supply connection.



Before attempting the installation, repair or any maintenance fully disconnect the electrical supply.

Follow the instructions below to connect the electric power supply to the unit: cover pipes and cables in order not to cause any damage.

- Use cables of a suitable size for the installation.
- Ask a qualified technician to check the electric wiring because Evinox is not responsible for possible damage caused due to missing earth connection or any incorrect wiring.
- Check also that the cable size and installation is adequate for the maximum electric power needed and as indicated in this manual and the ModuSat data label.

It is vital that the unit has a good reliable earth connection in line with current regulations and to ensure protection against possible electric shocks.

Clearly identify the earth wire and connect it to the relevant earth connection.

Important! The connection to the electric power supply must be via a switched double pole fused connection fitted with a 3 Amp fuse (to BS1632).

Extension cords, multiple plugs, and other adapters must not be used.



To enable the supply to be isolated, the pipes within the modusat or connected to it should not under any circumstances be used for electric earth connections. The ModuSat storage unit has no protection against lightning or other overvoltage shocks. The unit is not protected from lightning.

Auxiliary connections



Don't connect the Evinox room controller unit to a mains supply as this will cause permanent damage.

- Use the relevant terminal connections and a suitable 4 wire shielded cable (4 x 0.35mm²) for this connection and follow the procedure on the following page before the procedure for connections is followed.
- Disconnect the electric supply to the unit using the external switch
- 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).

5.1 *Modusat Wiring Connections*

The modusat wiring board is located within the modusat itself under a removable metal cover. To access the wiring board the full front case cover should be removed. The connections board will be to your left as shown, to take off the cover the retaining screw should be removed and the cover lifted off.

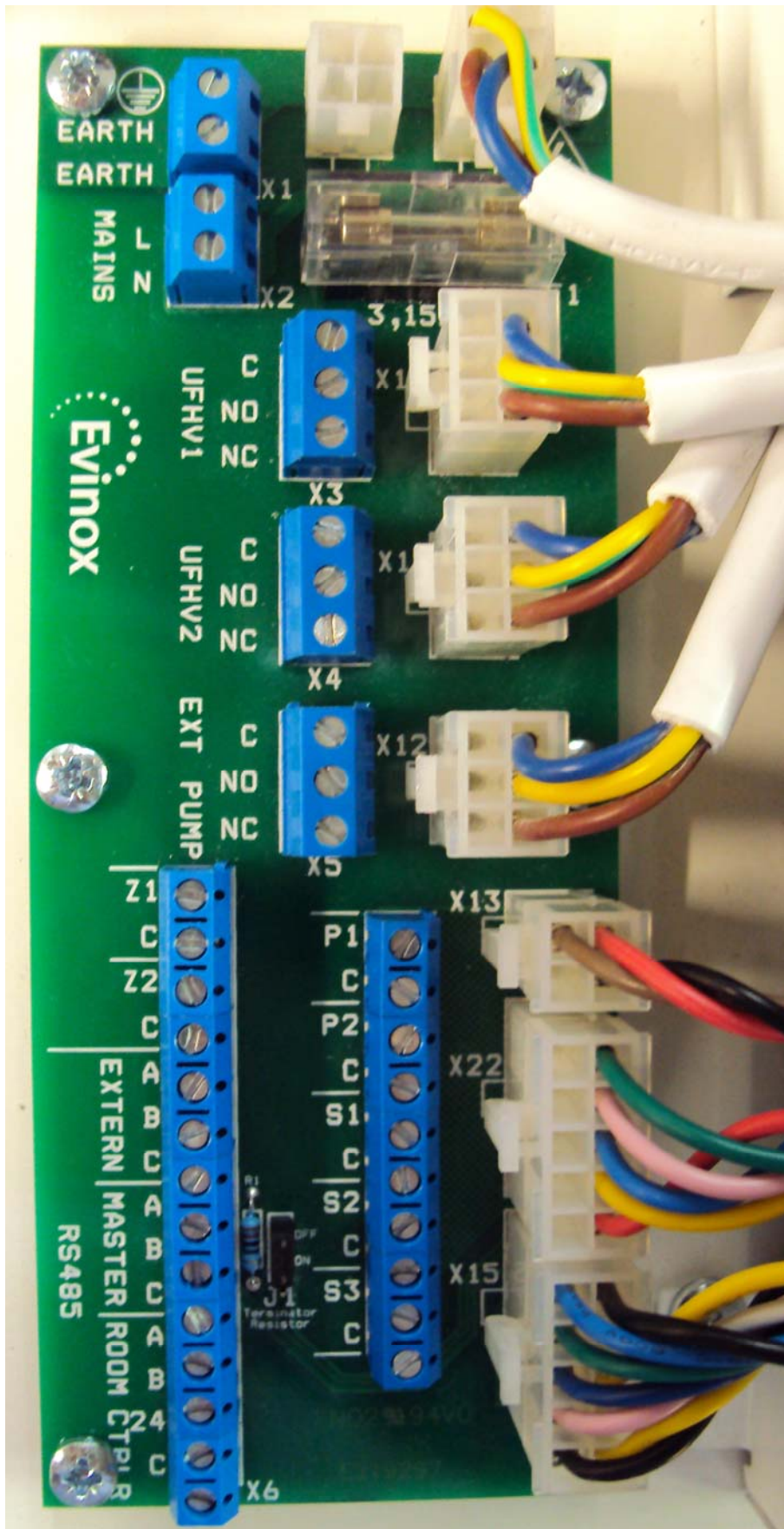




The connections board will then be accessible (as shown on the following page) and all required connections can be made simply using the clearly labelled screw down terminal connections. Guides for the various connection applications and requirements are detailed in the wiring principle drawings shown on pages 34-36.

Evinox 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 the whole cross sectional area of the wiring is intact.

5.2 ModuSat Connection Board (Visible once the cover is removed)



Please Note: 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).

5.3 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 control wiring board within the ModuSat (please refer to the electrical diagram) using a 4x0.35 mm² screened cable. The cable must not be installed adjacent to other 220/240 Volt (AC) lines. The ModuSat room controller's power is supplied by the ModuSat board and does not require batteries or additional power cabling.



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



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

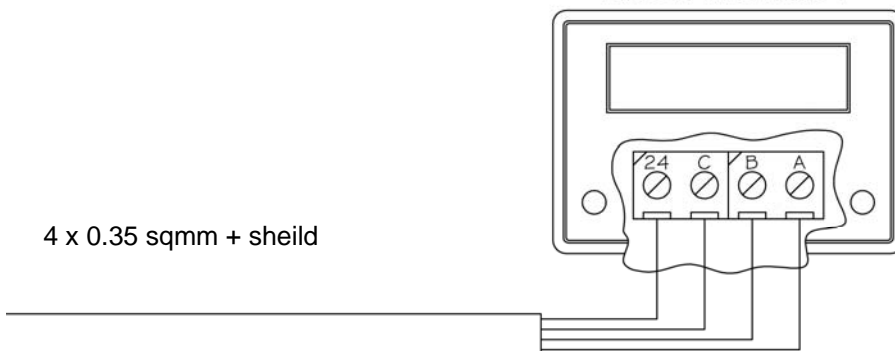


Connection terminal with room controller

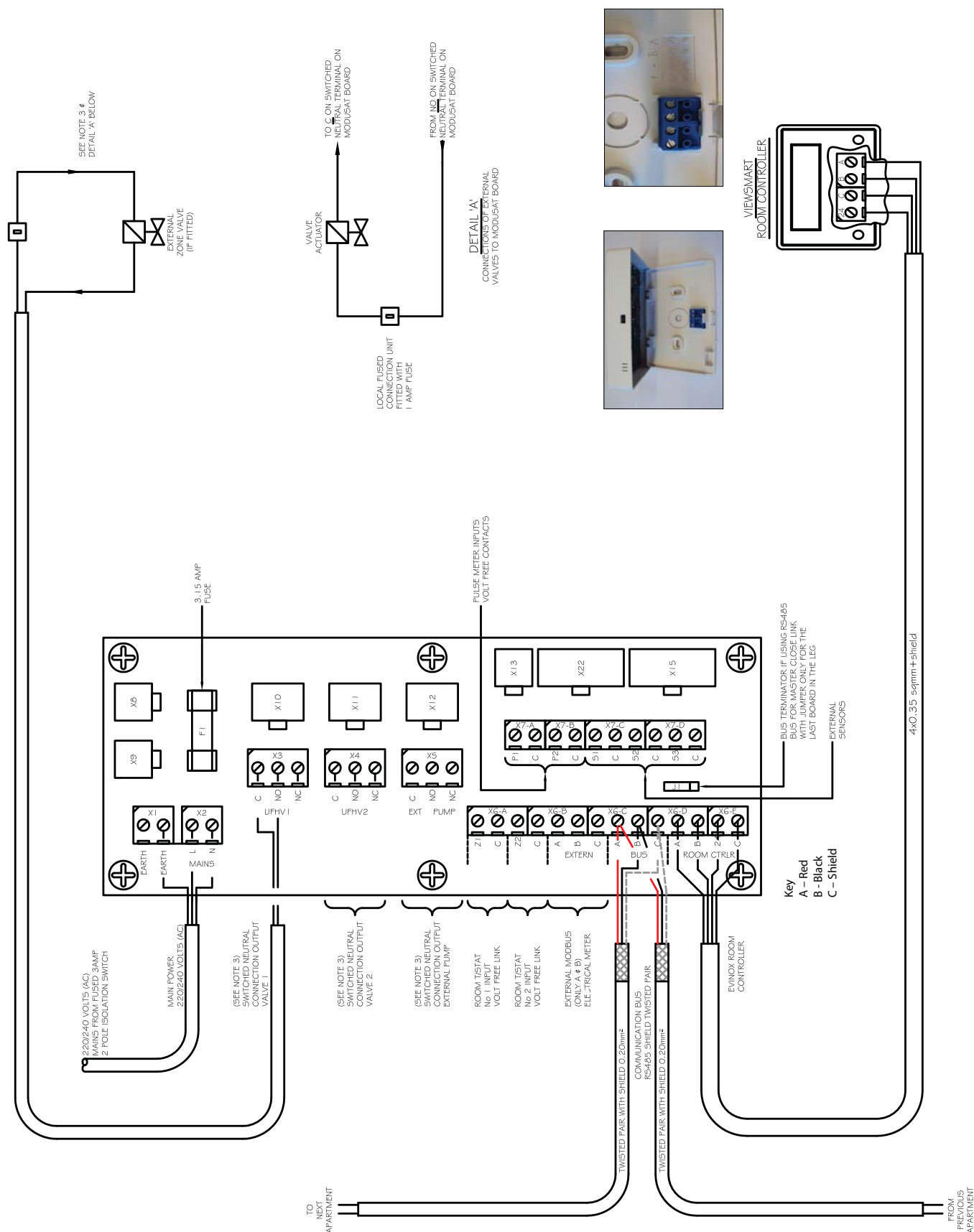


ROOM MODULE I

4 x 0.35 sqmm + sheild

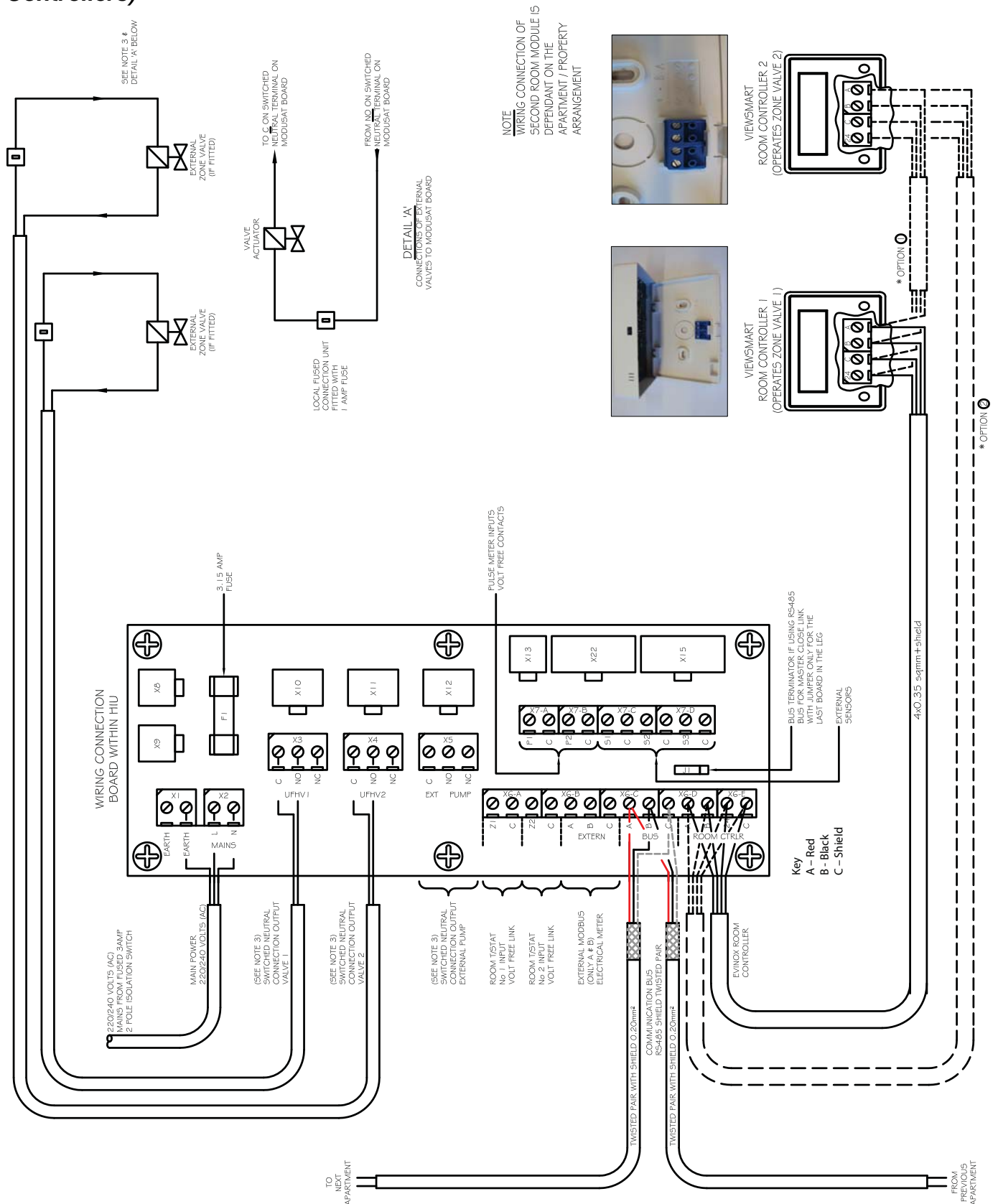


5.4 Typical ModuSat Electric Wiring Diagram (Single Room Controller)



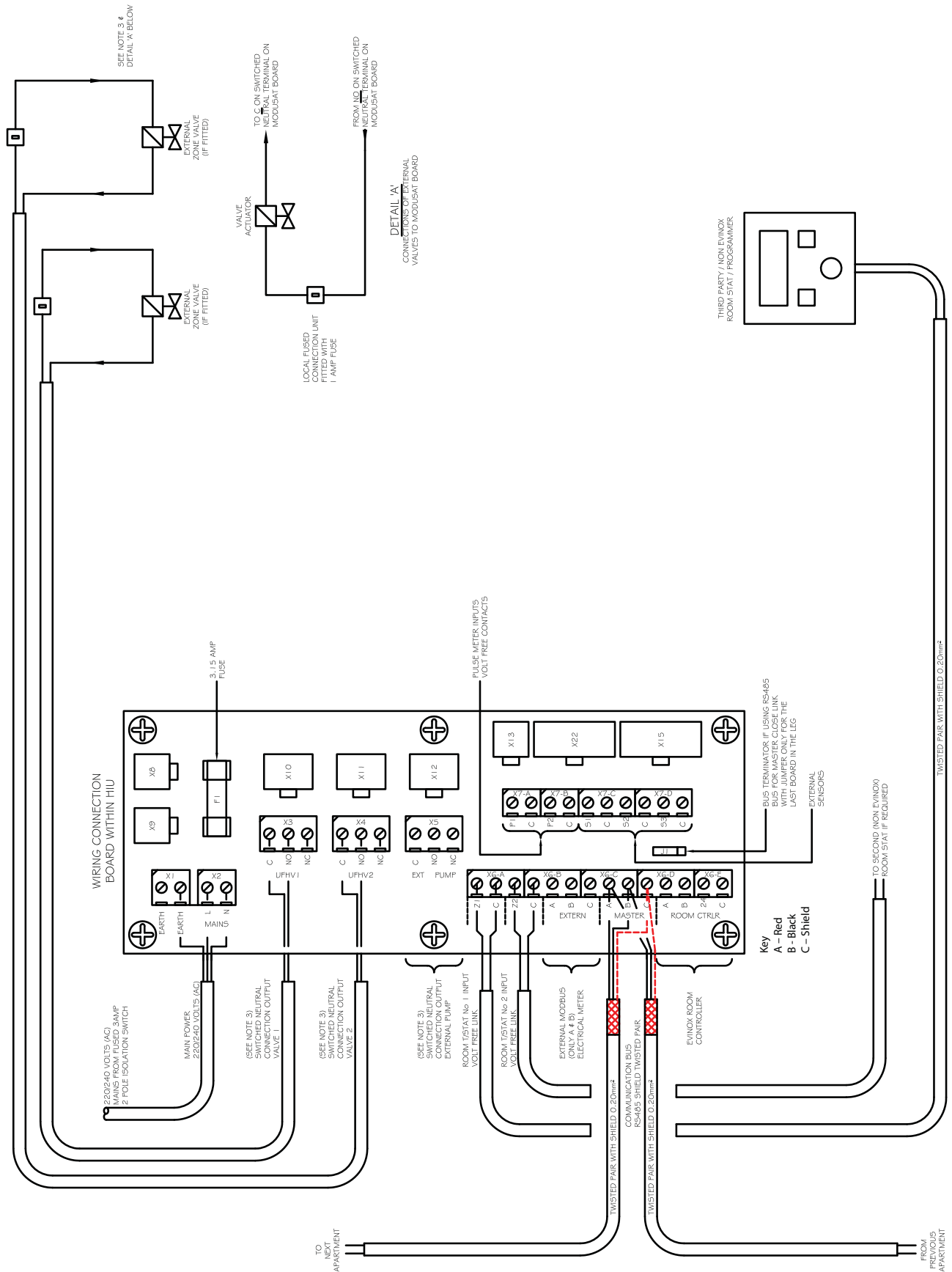
Note 3: Pumps & valves must have localized power supply. Switched neutral connection to be fitted with 1 amp in-line fuse on neutral cable.

5.5 Typical ModuSat Electric Wiring Diagram with 2 Zone Control (2 Room Controllers)



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

5.6 Typical Wiring Diagram with 3rd Party Room Stat



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

6 COMMISSIONING

Full unit commissioning will be carried out by Evinox engineers, however initial checks prior to this can be carried out.

Before initial start up of the unit please ensure that the following are carried out:

- Check that the primary and secondary circuits are clean, treated and filled.
- Check that the air has been removed from the circuits and that the relief valve is properly closed.
- Check that all pipework to the HIU is connected properly.
- Check all pipe connections and joints are tight.
- Check pressure(s) in expansion vessel and recharge if necessary.
- Test delivery of water from HIU by opening and running all taps, both hot and cold water and any other outlets i.e. showers etc.
- Check operation of expansion relief valve by turning the manual release and discharging water.
- Make sure that the electric wiring connections are as per the instructions and wiring.
- Check that there is no leakage from internal connections.
- Check that the voltage and fuse rating of the electrical supply is correct (Please refer to the wiring diagrams in this manual), and that the earth connection is correct and in-line with current regulations.
- Check the connection of any other components i.e. thermostats, probe etc.
- If the pressure is below 1 bar, top up the circuit to a cold fill pressure of 1.5 bar as low pressure will stop the pump from running due to the inbuilt safety parameters.
- Ensure all valves are opened slowly and the procedure of keeping the bypass valve fully open, then opening the primary flow and return valves, followed by the closing of the bypass is adhered to as previously described. This prevents the components being exposed to excessive hydraulic shock.



If there is a problem with any of the above listed checks, contact Evinox immediately and **DO NOT OPERATE THE UNIT** until rectified.

6.1 Initial Commissioning Procedure

Only after having checked the above and all is acceptable, can the unit be powered up and initial checks carried out. According to the installation type, identify the operations to use to start the unit, then:

- Switch on electric power to the ModuSat using the external fused switch.
- Check that the Room Unit display powers on
- Check indicator LEDs on valve actuators, these will blink red for approx 1 min on initial start-up, following this they will go solid green. The LED's will flash green when the actuator is either being opened or closed.
- Check that the pump starts and runs automatic venting procedure. Check status of pump LED (See page 41) (When the unit is switched over to heating mode please note that 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).
- Open hot water outlets and check that actuators on DHW PICV open and hot water flows through the taps. The unit leaves the factory pre-set at 55°C, actual temperatures will be set during Evinox commissioning procedure.
- Push commissioning switch as detailed on page 39, and ensure that the pump runs self venting procedure and heating PICV actuator operates.

- check the correct operation of the safety limit thermostat (when installed)

6.2 Apartment Circuit Balancing

It is vital that both the DHW circuits and heating circuits are fully balanced as per the specification and design parameters. This should be carried out and completed prior to commissioning work has been carried out.



We would again highlight that our technical personnel, who will visit the project during the course of the installation and at its completion to arrange for its 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. The systems compliance with the consultant's requirements and current standards and legislation remains the exclusive responsibility of the installer / M&E contractor and comments provided by Evinox are for guidance / advice only.

Once the initial commissioning checks have satisfactorily been carried out and checking the operation of both the heating and hot water functions. The unit will then require full commissioning by an Evinox engineer. During the commissioning procedure the unit will be fully set up to the system design parameters. All commissioning must be booked well in advance and will be carried out to a pre-agreed programme.

The items checked during commissioning, whilst not exhaustive, will include the following:

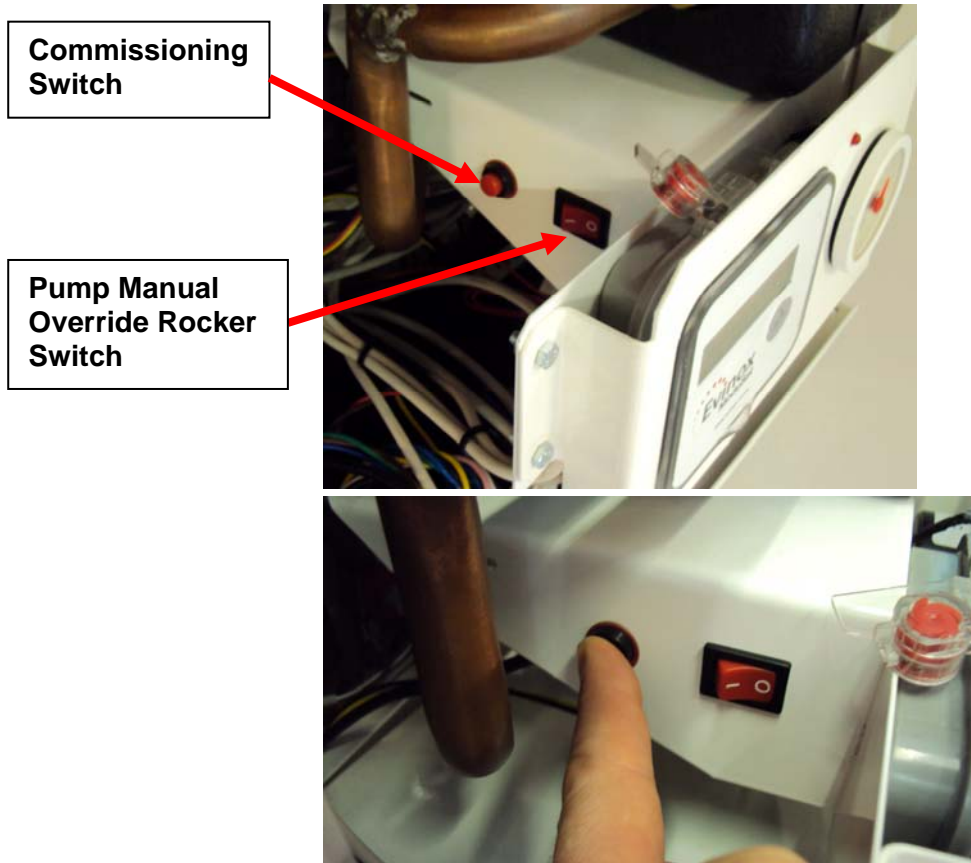
- Hydraulic connections
- Electrical connections
- Primary flow rate and temperature
- Secondary flow rate and temperature
- Pump PWM settings
- DHW draw-off rate and outlet temperature
- Setting of unit parameters and unit functions
- Meter reading
- Check of domestic hot water blending valve operation
- Check operation of all safety devices

Once all of the following has been carried out a certificate will be issued:

- All commissioning has been carried out satisfactorily.
- The unit is installed to Evinox's requirements.
- The unit is operating within design parameters.

6.3 Use of the commissioning switch

The commissioning switch is located inside the case of the ModuSat 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 opens and the pump starts its self venting procedure (As described in section 6.5). The unit will then run at a pre-set output 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 approx. 45minutes.

If the heating needs to be run again, the process is repeated and then the cycle will start and run for a further 45 mins.



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

6.4 Adjustment of TMV

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

The nominal parameters for the valve are as follows:

Cold supply water temperature	15°C +/- 2°C
Hot supply water temperature	75°C +/- 2°C
Nominal cold water pressure	3 Bar +/- 0.2 Bar
Nominal hot water pressure	3 Bar +/- 0.2 Bar
Blended flow rate	18 +/- 4

The water outlet set temperature is achieved within 15 seconds and the mixed water temp is approximately **55°C +/-2°C**.

The default valve setting is **55°C** if this needs adjustment this can be done by loosening the top screw and turning the dial to the required setting. 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.

Please also note that there are tolerances within the temperature and flow settings as detailed within the tables above.



Technical Characteristics

Working Range: **30÷65 °C**

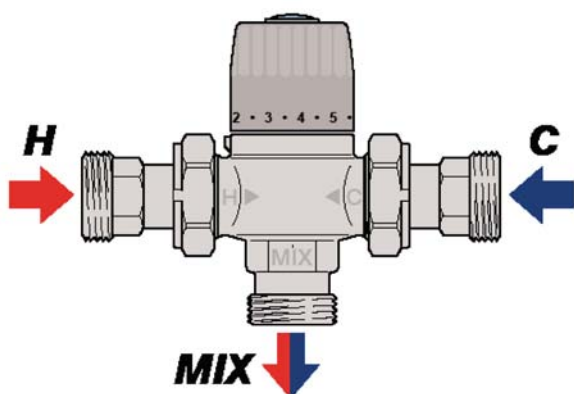
Max working temperature: **90 °C**

Accuracy: **±2 °C**

Max static pressure(structural pressure): **10 bar**

Max working pressure: **5 bar**

Min	
1	36°C
2	40°C
3	44°C
4	50°C
5	55°C
Max	



Please refer to the hydraulic layouts on pages 5-7 with details of the blending valve orientation.

6.5 Pump Start-up - Wilo PWM Pump

The Wilo Pulse-width modulation (PWM) pump features dry running protection to eliminate burn out and provides compliance with the 2015 pump efficiency regulations.



Description of the pump

The pump consists of a hydraulic system, a glandless pump motor with a permanent magnet rotor, and an electronic control module with an integrated frequency converter. The control module provides speed control by a PWM signal from the ModuSat control board and indicator LED to display the pump operating status

During automatic venting function, after the initial first start-up of the unit, the Pump runs alternately with high and low speeds to help remove any air from the pump. The pump should be left to carry out this process and once complete the pump will

switch automatically to a pre-set speed.

Filling and venting

The venting function lasts 10 minutes and is indicated with quick green LED blinking. Noises may be heard while the venting function is running. After 10 minutes, the pump stops and goes automatically in to the pre-set function.

Please note: When the unit is switched over to heating mode please note that 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 asses the current heating circuit flow temperature.

Pump LED – Description of Status

LED	Indicators	Diagnosis	Status	Remedy
Lights green	Pump in operation	Pump runs according its setting	Normal operation	
Blinks quick green	PWM model:	Pump in standby / Venting procedure	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 High voltage $U > 253 \text{ V}$	1. Check voltage supply $195 \text{ V} < U < 253 \text{ V}$
			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

6.6 Warranty

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

- Transportation
- Installation in which the Standards in force and good practice were not complied with
- Improper use of the device, abnormal use conditions, tampering by unauthorised personnel or inadequate maintenance; therefore by: Corrosion and/or sludge accumulation; lack of electrical energy; absence of suitable drainage; exceeding operating pressures; electrical and water system faults
- Freezing or fortuitous causes
- Wear due to normal use
- Malfunctioning of control and safety parts
- Corrosion due to oxygenation or roaming currents

From commissioning, ModuSat TP appliances are guaranteed against all manufacturing faults and material defects for a period of:

- 5 years for the stainless steel heat exchangers
- 2 years for parts and labour * (Where Evinox do not carry out the commissioning or have a developer agreement in place the two year warranty will cover parts with no labour cover)

However, the ModuSat TP warranty will always start from the date of the serial number and will be extended by a maximum of 6 months to allow for project completion. If the ModuSat TP is commissioned before the 6 month extensions the warranty will start from the commissioning date.

This guarantee is strictly limited to the supply, free of charge, of parts acknowledged as being defective after inspection by our technical departments, with the exclusion of labour and transport costs arising from this. These parts once again become the property of Evinox and must be returned to them without delay.

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 TP must be fitted with our isolation valve kit for servicing and 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 register the warranty when we commission the boiler and ModuSat TP 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, 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 unit should only be carried out by suitably qualified personnel and have relevant approval for associated plumbing and electrical works.

If failure occurs due to poor or faulty installation work carried out by non qualified personnel, this will invalidate the warranty.

Your Evinox appliance is one of the most reliable and technically advanced products available. However, it is imperative that it is installed correctly, commissioned and serviced in accordance with Evinox installation and servicing manuals to ensure long life, reliability and fuel savings.

Exclusion of the Guarantee

The following are not covered by the guarantee:

a) Electric indicators

- 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 coming from external elements with apparatus (effect of storm, moisture, freezing, etc)
- Seals
- Automatic air vents
- All consecutive incidents resulting from a lack 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

b) Postage costs of the parts, labour and displacement

Note: in a constant preoccupation with an improvement of our materials, any modification considered to be useful by our engineering departments and commercial can intervene without notice.

* See full terms and conditions of warranty



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

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