



# ModuSat (TP) Twin Plate Satellite Heating Unit

Installation, Commissioning and Servicing Instructions

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#### **GENERAL INFORMATION** 1

#### 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 Energy representative.

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

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

#### **Symbols** 1.2

The following is a list of symbols used in this manual:



IMPORTANT NOTE REGARDING CORRECT INSTALLATION



IMPORTANT NOTE REGARDING PERSONAL SAFETY AND CARE



DANGER OF ELECTRIC SHOCK!

#### 1.3 Safety Instructions

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

In the case of a water leak:

- Disconnect the electric power supply •
- Slowly close the main water isolation values to the unit
- Inform Evinox Energy or an Evinox Energy approved engineer



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.



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

## Typical ModuSat TP Unit





ModuSat TP – Top Connections

## **2 TECHNICAL FEATURES**

## 2.1 Typical Schematic (All Top Connections)

#### ModuSat TP



# Note: Other connection arrangements are available on request

The cabinet is constructed from painted steel in white.

#### 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
- 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 (Optional)
- **16** Electronic control board
- 17 Room control unit
- 18 Flushing Bypass with Strainer & IV
- 19 Filling loop (External)

### 2.2 Connection configurations

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

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

TL1						
<b>T1</b>	<b>T2</b>	Т3	Т4	<b>T5</b>	<b>T6</b>	<b>T7</b>
PF	PR	CW	HW		SF	SR
				DR		
<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b>B6</b>	<b>B7</b>

TL2										
<b>T1</b>	<b>T2</b>	<b>T3</b>	Т4	<b>T5</b>	Т6	<b>T7</b>				
PF	PR	CW			SF	SR				
			HW	DR						

TL3

IL5			-	-	-	-
T1	<b>T2</b>	<b>T3</b>	<b>T4</b>	<b>T5</b>	<b>T6</b>	<b>T7</b>
PF	PR		HW		SF	SR
		CW		DR		
B1	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b>B6</b>	<b>B7</b>

TL4										
<b>T1</b>	<b>T2</b>	<b>T3</b>	<b>T4</b>	<b>T5</b>	<b>T6</b>	<b>T7</b>				
PF	PR				SF	SR				
		CW	HW	DR						

TL5

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

TL6										
<b>T1</b>	<b>T2</b>	<b>T3</b>	Т4	<b>T5</b>	Т6	<b>T7</b>				
PF	PR	CW								
			НW	DR	SF	SR				
<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b>B6</b>	<b>B7</b>				

TL7	_					
T1	<b>T2</b>	<b>T3</b>	<b>T4</b>	<b>T5</b>	<b>T6</b>	<b>T7</b>
PF	PR		HW			
		CW		DR	SF	SR
<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b>B6</b>	<b>B7</b>

TL8
-----

<b>T1</b>	<b>T2</b>	<b>T3</b>	<b>T4</b>	<b>T5</b>	<b>T6</b>	<b>T7</b>
PF	PR					
		CW	нw	DR	SF	SR
<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b>B6</b>	<b>B7</b>

BL1						
T1	<b>T2</b>	<b>T3</b>	<b>T4</b>	T5	<b>T6</b>	<b>T7</b>
		CW	HW			
PF	PR			DR	SF	SR
<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b>B6</b>	<b>B7</b>

BL2						
<b>T1</b>	<b>T2</b>	<b>T3</b>	Т4	<b>T5</b>	<b>T6</b>	<b>T7</b>
		CW				
PF	PR		HW	DR	SF	SR

BL3

T1	<b>T2</b>	<b>T3</b>	Т4	<b>T5</b>	<b>T6</b>	<b>T7</b>
			HW			
PF	PR	CW		DR	SF	SR
<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b>B6</b>	<b>B7</b>

BL4

<b>T1</b>	<b>T2</b>	<b>T3</b>	Т4	<b>T5</b>	Т6	<b>T7</b>	
PF	PR	CW	HW	DR	SF	SR	
<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b>B6</b>	<b>B7</b>	

#### BL5 **T1 T2 T3 T4 T5** T6 T7 **CW HW** SF SR PR DR PF **B2 B3 B4 B5 B6 B7 B1**

## BL6

		r	r	-		-
<b>T1</b>	<b>T2</b>	<b>T3</b>	<b>T4</b>	<b>T5</b>	<b>T6</b>	<b>T7</b>
		CW			SF	SR
PF	PR		НW	DR		
<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b>B6</b>	<b>B7</b>

## BL7

T1	<b>T2</b>	<b>T3</b>	Т4	<b>T5</b>	<b>T6</b>	<b>T7</b>
			HW		SF	SR
PF	PR	CW		DR		
<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b>B6</b>	<b>B7</b>

BL8						
<b>T1</b>	<b>T2</b>	Т3	<b>T4</b>	<b>T5</b>	<b>T6</b>	<b>T7</b>
					SF	SR
PF	PR	CW	НW	DR		
B1	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b>B6</b>	<b>B7</b>



### 2.3 Typical Dimensions (Typical connection configurations shown) <u>TL1</u> - TP 40-XX, 50-XX, 55-XX & 70-XX All Top Connections



**Minimum space requirements for access and servicing:** Top: 168.5 mm (To allow for H-type flushing by pass), Front: 700 mm, Side: 50 mm, Bottom: 50 mm. **Please Note:** Flushing bypass to be installed on primary connections A & B. Please refer to page 26 for flushing bypass dimensions.

### BL4 TP 40-XX, 50-XX, 55-XX & 70-XX All Bottom Connections





**Minimum space requirements for access and servicing:** Bottom: 168.5 mm (To allow for H-type flushing by pass), Front: 700 mm, Side & Top: 50 mm.

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

TL5 TP 40-XX, 50-XX, 55-XX & 70-XX Secondary Heating Flow & Return Connections at the Bottom



<u>TL6</u> TP 40-XX, 50-XX, 55-XX & 70-XX Secondary Flow & Return and DHW Outlet Connections at the Bottom





**Minimum space requirements for access and servicing:** Top: 168.5 mm (To allow for H-type flushing by pass), Front: 700 mm, Side: 50 mm, Bottom: 70 mm (To allow for isolation valve). **Please Note:** Flushing bypass to be installed on primary connections A & B. Please refer to page 26 for flushing bypass dimensions.

BL5 TP 40-XX, 50-XX, 55-XX & 70-XX Primary Flow & Return Connections at the Bottom









**Minimum space requirements for access and servicing:** Top: 70 mm (To allow for H-type flushing by pass), Front: 700 mm, Side: 50 mm, Bottom: 168.5 mm (To allow for isolation valve). **Please Note:** Flushing bypass to be installed on primary connections A & B. Please refer to page 26 for flushing bypass dimensions.

#### TL1 - TP 100-XX All Top Connections





**Minimum space requirements for access and servicing:** Top: 168.5 mm (To allow for H-type flushing by pass), Front: 700 mm, Side: 50 mm, Bottom: 50 mm. **Please Note:** Flushing bypass to be installed on primary connections A & B. Please refer to page 26 for flushing bypass dimensions.

#### TL5 - TP 100-XX All Top Connections





Minimum space requirements for access and servicing: Bottom: 168.5 mm (To allow for H-type flushing by pass), Front: 700 mm, Side & Top: 50 mm.

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

#### 2.4 Technical features

#### Electrical

	MTP 40, 50, 55 & 70-XX	MTP 100-XX	
Electric supply	220 / 240 Volt (AC)		
Frequency	50 Hz		
Current absorption	0,6 Amps		

### Hydraulic connections

	Ref,		
	Schematic		
Primary circuit supply	A	<sup>3</sup> ⁄4" F thread	1" Compression fitting
Primary circuit return	В	¾" F thread	1" Compression fitting
DCW inlet	С	¾" F thread	1" Compression fitting
DHW supply	D	¾" F thread	1" Compression fitting
Apartment circuit	E	¾" F thread	<sup>3</sup> ⁄ <sub>4</sub> " Compression fitting
supply			
Apartment circuit	F	¾" F thread	<sup>3</sup> ⁄ <sub>4</sub> " Compression fitting
return			
Drain	G	1/2"	1/2"
		Compression fitting	Compression fitting

### Hydraulic characteristics

Primary circuit max pressure	16 Bar 5	Standard	
Apartment heating circuit	1.5 bar		
recommended cold fill pressure			
Apartment heating maximum pressure	3	bar	
DHW max pressure	5 bar		
DCW min pressure	1 bar 1.5 ba		
Max supply temperature (Primary)	90°C		
Min supply temperature (Primary)	60	)°C	
Recommended primary flow rate for	700-1000 l/h 1000-1400 l/ł		
DHW production			
Secondary heating circuit expansion	8 litres		
vessel size			

\* varies depending on the max DHW output required.

## Weight

	Dry	Wet
Weight 40-XX	35.5 kg	37.0 kg
Weight 50-XX	36.0 kg	37.5 kg
Weight 55-XX	36.85 kg	38.35 kg
Weight 70-XX		
Weight 100-XX		

#### INSTALLATION 3

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 situated, the unit should be removed from its packaging and lifted into position.

The ModuSat TP may have been transported and handled many times prior to 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 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 the 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 that 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 ventilation. 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



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 flushed 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 a 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 Energy are not liable for damage caused by incorrect electrical connections or faulty wiring.



The ModuSat should be provided with additional fused protection. This will be via a suitable rated fused spur adjacent to the HIU position. <u>We highly recommend</u> that this is an unswitched spur to ensure that the unit is not powered off by the

end user.

#### 3.4 Hydraulic connections

The ModuSat TP 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 to 13 of this manual for details).



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



#### 3.6 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 TP Pre-Installation Rig on the 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.

novement 1=15 mm

**STEP4:** To remove the pre-installation rig 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.

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



## Pre-installation Rig Typical Dimensions

## Typical Evinox Energy Valve Kit Installation



#### 3.7 Pressure Independent Control Valve (PICV) Adjustment



The ModuSat TP features two PICVs, one for DHW and one for HTG. The PICV is a combined flow regulation and DP control whilst also serving as an energy shut off valve.

PICV's are set by Evinox Energy engineers as part of the commissioning procedure.

The DHW PICV is left fully opened and the maximum flow is set in the software electronically. The HTG PICV maximum flow rate is set mechanically.

Design parameters must be confirmed prior to commissioning.

It is the contractors responsibility to ensure that the valve is within it's operating prssure drop range.

	DHW PICV valve	HTG HIGH FLOW	HTG LOW FLOW
		(STANDARD)	(OPTION)*
Maximum flow rate	1600 l/h +/- 10%	565 l/h +/- 10%	200 l/h +/- 10%
Start up ∆P	25 kPa	25 kPa	25 kPa
Max differential ∆P	400 kPa	400 kPa	400 kPa
Valve size	DN20	DN15	DN15
Thread	G1	G 3/4"	G 3/4"
Actuator Stroke	2.5 mm	2.5 mm	2.5 mm
Actuator control	0-10V	0-10V	0-10V
signal			

\*For Ultra Low flow rates, Evinox Energy technical design engineers select the low flow option for better controllability of the flow.

#### **HEATING VALVE PRESSETTING:**



MANUAL ADJUSTMENT OF THE MAXIMUM PRIMARY FLOW RATE FOR HEATING MODE



FOR THE CORRECT USE OF THIS PRODUCT, WATER MUST BE OF HIGH QUALITY AND COMPLY WITH CURRENT BSRIA & CIBSE GUIDELINES AND EVINOX ENERGY REQUIREMENTS.

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

The actuators are pre-fitted. Removal should only be carried out in the event of failure and following discussion and approval from an Evinox Energy 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 Energy engineer to ensure they are within the max / min tolerance.

The Heating PICV has a manual setting as well as an electronic setting to limit the maximum flow allowed through the unit when in heating mode. Please see the setting below:

	High Flow (standard)	Low Flow
Pre-set	Flow I/h	Flow I/h
0.5		
0.6	100	30
0.8	128	40
1.0	156	50
1.2	184	60
1.4	212	70
1.6	240	80
1.8	268	90
2.0	296	100
2.2	324	110
2.4	351	120
2.6	379	130
2.8	407	140
3.0	445	150
3.2	463	160
3.4	491	170
3.6	519	180
3.8	547	190
4.0	575	200

# **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 is 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.

	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	Higher than 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	Up to 5 mg/l
(CO <sub>2</sub> )	
Manganese (Mn)	Up to 0.1 mg/l
Iron (Fe)	Up to 0.2 mg/l
Copper	Up to 1 mg/l

### Typical water quality guidelines are as follows:

<u>TH</u> - Total hardness is caused by calcium and magnesium. It is expressed as ppm or mg/l of calcium carbonate CaCO<sub>3</sub>.

 $\underline{pH}$  – this measures the alkalinity of the water, neutral alkalinity is pH7. Heating systems require an alkaline pH. Lower pH will increase the corrosion risk.

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

<u>Conductivity</u> – 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.

<u>Free copper</u> – this measures the level of copper in the system in mg/litre.

<u>Total Iron and Manganese</u> – this measures iron concentration in mg/litre. These are strong oxidants and may increase the risk for corrosion.

### 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:

- Cleaning of the boiler plant room.
- 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 Energy requirements would be BG 29/2012 and BG 50/2013 or a document that supersedes it.

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: (producing scale build up): the water top ups must be reduced to the minimum.

N.B: Scale and other residues may clog the heat meter within the ModuSat unit, causing errors in the energy consumption calculations. Scale increases as the temperature increases, therefore Evinox Energy recommends the DHW temperature is below 55°C.

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



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 auestions 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 Energy are for guidance & advice only.

### 4.4 Bionibal

BIONIBAL corrosion inhibitor is approved by Evinox Energy. 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 into operation.

Bionibal dosage and use (If used & when required if Evinox Energy 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 empting 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 to be cleaned using 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 an excessive dosage 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 ELECTRICAL 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 to prevent any damage.

- Use cables of a suitable size for the installation.
- Ask a qualified technician to check the electric wiring because Evinox Energy is not responsible for possible damage caused due to missing earth connection or any incorrect wiring.

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 an un-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 unit has no protection against lightning or other overvoltage shocks.

#### Auxiliary connections



Do not connect the Evinox Energy ViewSmart room controller unit to a mains supply as this will cause permanent damage.

- Use the relevant terminal connections and a suitable 4 core shielded cable (4 x 0.33mm<sup>2</sup>) for this connection and follow the procedure on the following page before the procedure for connections is followed.
- Disconnect the electrical supply to the unit using the external fused spur.
- 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 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.



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 32-34.

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.



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



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

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).

#### 5.3 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) using a 4x0.33 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





4 x 0.33 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.



**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 Energy 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 List**

1	Plant room installation is complete and operational	
2	The system is installed to manufacturer's instructions and complies with current regulations	
3	Electrical supply is permanent not temporary	
4	Mains voltage has correct polarity and each spur has a 3 Amp fuse fitted	
5	System has been cleaned in accordance with BS 7593 or other industry accepted standard or	
	guidelines and certificated	
6	All strainers have been flushed through	
7	All bypasses on the system are closed after cleaning	
8	Primary and secondary systems are filled, balanced and fully vented	
9	Approved chemicals have been added to both primary and secondary systems	
10	Primary system has been tested	
11	All controls are operational	
12	ModuSat Master panel installation is complete	
13	Broadband is installed, live and line details have been provided	
14	Bus map showing cable route and repeater unit locations returned with this document	
15	Bus cable is installed as per Evinox Services requirements to Modusat units and tested	
16	Supply modules installed as per location on Bus map	
17	All apartments to be clearly numbered with build or postal numbers to enable the	
-1/	addressing of the ModuSats with the correct ID	
18	The site is safe and complies with all current health and safety legislation	

Please refer to the Pre-Commissioning Checklist document 2551428, which must be completed and returned to Evinox Services prior to commissioning.



If there is a problem with any of the checks listed above, contact Evinox Energy 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 electrical power to the ModuSat using the external fused switch.
- Check that the ViewSmart Room Control Unit display powers on (where applicable).
- Check indicator LEDs on PICV actuators, these will blink red for approximately 10 seconds 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.
- When the unit is switched over to heating mode please note that the pump will run for 2 minutes 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 hot water blending valve will be set during Evinox commissioning.

- Check the correct operation of the safety limit thermostat (where installed).
- Give the unit unique ID number (where applicable).
- Check that the zone valves are operating (where applicable).
- Check that the unit is sending heating to the heating circuit.

#### 6.2 Apartment Circuit Balancing

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

We would like to re-iterate that our technical personnel, who will visit the project during the course of the installation and at completion to arrange for final commissioning and calibration, do so to assist the contractor and install team to deal with any questions and queries. They do not perform the role of quality control or inspector of the installation or provide approval for the works carried out. 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 Energy are for guidance / advice only.

Once the initial commissioning checks have been carried out and the operation of the heating and hot water has been checked. The unit will require full commissioning by an Evinox Energy engineer. During the commissioning procedure the unit will be fully set up to the system design parameters. 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.

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 Energy's requirements.
- The unit is operating within its design parameters.

### 6.3 Use of the commissioning switch

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 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 approximately 45minutes.



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

#### 6.4 Adjustment of TMV

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.

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** Temperature Stability: **+** / **- 4°C** Max static pressure: **10 bar** Max working pressure: **5 bar** 

Mi	n
1	36°C
2	42°C
3	48°C
4	51°C
5	57°C
Ma	iX



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.

**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.

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

### Pump LED – Description of Status



			Part Numb	er er		156
	Model number	TP 40-XX	<b>TP 50-XX</b>	TP 55-XX	<b>TP 70-XX</b>	TP 100-XX
	Part Description					
1	1 DHW Plate Heat Exchanger	EVI_00237	EVI_00231	EVI_00240	*	*
C.	2 DHW Plate Heat Exchanger Insulation	EVI_00238	EVI_00239	EVI_00233	*	*
	3 HTG Plate Heat Exchnager	If XX-10 EVI_(	00235/ XX-20 EVI_0	0234/ XX-20R EVI_	00244	
7	4 HTG Plate Heat Exchnager Insulation	If X	(X-10, XX-20 or XX-2	20R EVI_00238		
- 1	5 DHW PICV		EVI_0023	2		
	E HTG PICV (STANDARD)		EVI_0024	9		
	HTG PICV (LOW FLOW)		EVI_0024	1		
5	7 PICV Actuator		EVI_0026	4		
3	8 Heating circulation pump		EVI_0015	2		
5	9 Heat Meter		EVI_00063			EV1_0064
10	0 Manometer		EVI_0005	8		
11	1 Thermostatic blending valve		EVI_00052			*
12	2 Expansion vessel		EVI_0004	2		
13	3 Connection board		EVI_0007	4		
14	4 Control Board		EVI_0007	3		
15	5 Temperature sensors (clip on s3, s4, s5, s6)		EVI_00029			*
16	6 Non Return Valve		EVI_00025			*
		Options				
	UFH Safety Stat		EVI_0011	5		

\* - please contact Evinox for the part number

## **Spare Parts Part Numbers**

### 6.7 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 TP 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 <u>do not</u> 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 TP 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 TP 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 TP 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 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 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.



Kiwa Watertec (A Trading Division of Kiwa Ltd) Unit 26A Rassau Industrial Estate Ebbw Vale, Gwent, NP23 8XA UNITED KINGDOM Tel: 0044 (0) 1495 308185 Fax: 0044 (0) 1495 304496 Web: www.kiwa.co.uk

#### UK APPROVAL Certificate Number: 1506718

Date Issued: 26th June 2015 Date Expired: 26th June 2020

**Description:** 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.

Partner for progress

Product Designation: ModuSat SP, TP, CHHC

This is to certify that the above range of products manufactured / supplied by

#### Evinox Energy Ltd

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.

This certificate must be read in conjunction with the acceptance letter for this product.

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.

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.

Applicable IRN's for this certificate - R001

Authorised Signature

Certificate Issued to – Evinox Energy Ltd Unit B Blenheim House 1 Blenheim Road Epsom, Surrey KT19 8LE





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

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