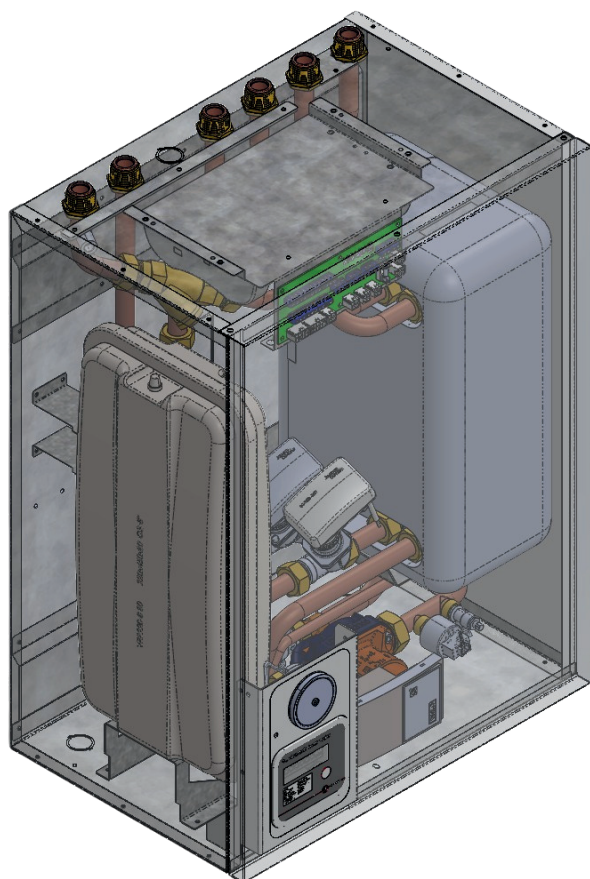## ModuSat® XR Twin Plate Heat Interface Units

Heat interface unit for indirect heating and instantaneous domestic hot water (DHW) with electronic PID control using Pressure Independent Control Valves (PICVs) with modulating actuators achieving a low primary return temperature as well as providing differential pressure control and flow rate regulation.

Application
The ModuSat® XR unit is the complete solution for instantaneous hot water and space heating production in communal and district heating systems. Designed to operate with Evinox SmartTalk® two-way communication system for remote metering and diagnostics.

The ModuSat® XR is a compact wall mounted unit that fits perfectly in an apartment utility room or kitchen cupboard.

Domestic Hot Water
Domestic hot water is heated via a separate plate heat exchanger and the temperature is regulated by the modulation of primary flow rate with the integrated PICV actuator.

Heating
The heating circuit flow temperature is controlled by the modulation of the primary flow rate with the integrated PICV actuator, whilst the integrated pump modulates the secondary flow based on the design dT ensuring low secondary and primary return temperatures.
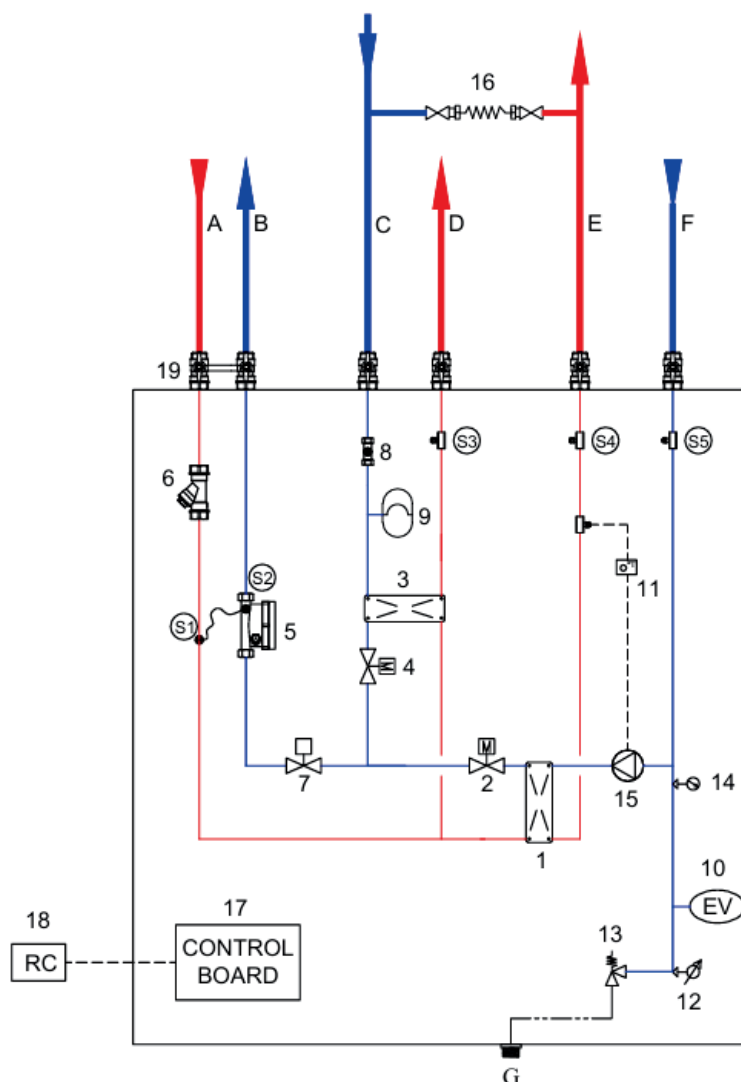
Weather compensation is applied to the set heating flow temperature using SmartTalk® 2-way communication ensuring maximum system efficiency. Suitable for radiators, underfloor heating and fan coil units.

- ✓ **Smart, Lower Cost** Communication Network Connection
- ✓ **Lower Output Models** perfectly placed for CIBSE ADE code of practice
- ✓ **New Internal Layout** configured for simple installation and maintenance
- ✓ **Supplied with SmartTalk® Pro** web interface for remote control and diagnostics
- ✓ **Compact Design**

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2551867G

Technical Information	ModuSat® XR/XR-ECO Twin Plate 30/55/70	ModuSat® XR Twin Plate 100
Primary Heating Circuit		
Maximum Flow Temperature	85°C	
Maximum Operating Pressure	Up to 16 bar Max	
Maximum Differential Pressure Rating	Up to 4 bar	
Min Differential Pressure	50kPa	
Domestic Hot Water		
Plate Heat Exchanger	High efficiency stainless steel brazed plate heat exchanger	
Differential Pressure/Flow Rate/Energy control	Pressure Independent Control Valve (PICV), electronic actuator and PID control	
Domestic Hot Water output	Dependent on model and plate selection. See performance table on page 6	
Operating Pressure	1 bar min cold water static pressure	
DHW response time	Average 8 sec to 45°C (BESA tests 5a, 5b)	
Space Heating		
Plate Heat Exchanger	High efficiency stainless steel brazed plate heat exchanger	
Differential Pressure/Flow Rate/Energy control	Pressure Independent Control Valve (PICV), electronic actuator and PID control	
Space Heating output	Dependent on model and plate selection. See performance table on page 7	
Operating Pressure	1 - 2.5 bar	
SH Flow Temperature	Dependent on model and plate selection. See performance table on page 7	
Safety Valve Rating	3 bar	
Expansion Vessel	8L	
Pump	Energy class A, Wilo PWM	
Pressure Gauge	Included	
Enclosure		
Dry Weight	34.1kg	37kg
Wet Weight	36.8kg	42kg
Pipework Insulation	Thickness: 9mm / Thermal Conductivity: 0.039 W/(M*K)	
Plate Heat Exchanger Insulation	Thickness: 29mm / Thermal Conductivity: 0.040 W/(M*K)	
Full Casing Insulation (optional)	Thickness: 5mm / Thermal Conductivity: 0.051 W/(M*K)	
Cover	White powder coated steel	
Accessories and Options		
Flushing bypass/isolation valves	¾" (Supplied separately)	1" (Supplied separately)
Strainer	Included within flushing bypass kit (primary heating flow)	
Filling loop	Supplied separately	
Pre-Installation Rig for First Fix	Available upon request (1 supplied free prior to unit supply)	
Heating Controller/Programmer	Evinox ViewSmart controller. Supplied separately	
Energy Display Device	ENE3 upgrade to ViewSmart Energy Display Device. (Optional)	
Pre-Payment Credit Display	PaySmart upgrade to ViewSmart controller. (Optional) No additional hardware required. Requires HIU's to be connected to communications network.	
Advanced Functions		
Keep Warm Facility	Time and temperature controlled	
Remote Diagnostics and Maintenance	Via SmartTalk® Pro - available separately. (Optional) Requires HIU's to be connected to communications network.	
Additional Features	Anti-jam, floor drying routine, alarm signal from leak detection system (volt free contract), and secondary delta T control.	
Metering and Billing		
Evinox Heat Meter	Ultrasonic, MID approved and class 2 accuracy (BS EN 1434). Available in two protocols: RS485 ModBus or M-Bus	
Energy Shut-Off Valve	Not required. PICV's act as shut off valve for PAYG systems	
Pre-Payment System Enabled	Integrated. Requires ViewSmart with appropriate upgrade	
Additional Meters	Up to 3 meters can be connected – CHW (ModBus), Cold Water (Pulse) and Electricity (ModBus)	
Connectivity		
Communications Connection Options	Modbus TCP/IP (meter information) open protocol RS485 - TCP/IP proprietary Evinox protocol for PAYG and Remote maintenance	
Regulations and Certification		
WRAS	WRAS Approved	
CE	CE Marked Unit	
BESA (British Engineering Services Association) UK Standard for Heat Interface Units	Results published on BESA website - www.thebesa.com/ukhiu (Model Tested: MTP4R-1R-TL1/1B)	
Electrical		
Power supply voltage	220/240V 50Hz	

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Circuit Diagram

Typical ModuSat® XR 30/55/70 Twin Plate
supplied with a removable 3/4" HTP flush bypass kit

HYDRAULIC DIAGRAM

Primary Circuit

1 Plate Heat Exchanger (Heating)
2 Pressure Independent Control Valve (PICV) with actuator (Heating)
3 Plate Heat Exchanger (DHW)
4 Pressure Independent Control Valve (PICV) with actuator (DHW)
5 Heat Meter
6 Strainer
7 Shut-off Valve (Optional)

DHW Circuit

8 Flow Sensor
9 Shock Arrestor (Optional)

Heating Circuit

10 Heating Expansion Vessel
11 Safety Thermostat (Optional)
12 Pressure Sensor
13 Safety Pressure Relief Valve
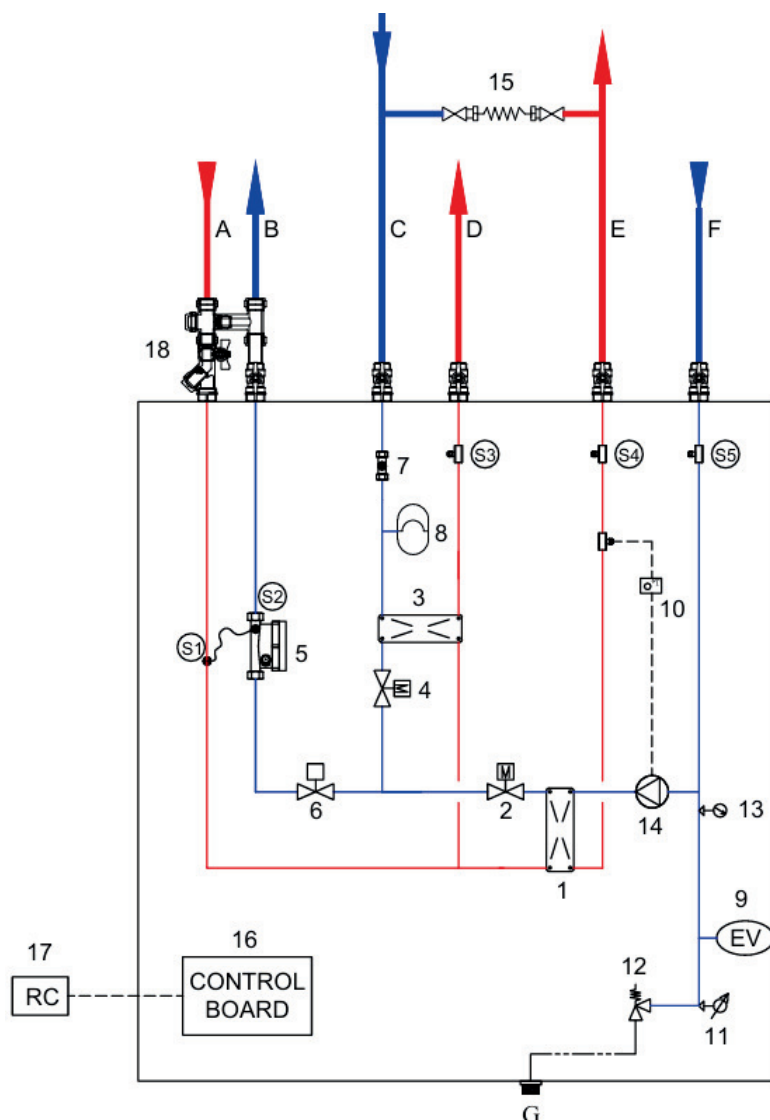**14** Pressure Gauge
15 Heating Circulation Pump

Controls

16 External filling loop (Internal option available)
17 Electronic control board
18 Room Controller (Optional)
19 Removable flushing by-pass valve set
S1, S2 Heat Meter Temperature Sensors
S3 DHW Temperature Sensor
S4 Secondary / Apartment Heating Flow
S5 Secondary / Apartment Heating Return

Connections Key

A Primary Flow
B Primary Return
C BCW Inlet
D DHW Outlet
E Secondary / Apartment Heating Flow
F Secondary / Apartment Heating Return
G Connection for Safety Discharge

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Typical ModuSat® XR 100 Twin Plate
Supplied with 1 flushing bypass kit

HYDRAULIC DIAGRAM

Primary Circuit

1 Plate Heat Exchanger (Heating)
2 Pressure Independent Control Valve (PICV) with actuator (Heating)
3 Plate Heat Exchanger (DHW)
4 PICV with modulating actuator (DHW)
5 Heat Meter
6 Shut-off Valve (Optional)

DHW Circuit

7 Flow Sensor
8 Shock Arrestor (Optional)

Heating Circuit

9 Heating Expansion Vessel
10 Safety Thermostat (Optional)
11 Pressure Sensor
12 Pressure Relief Valve
**13** Pressure Gauge
14 Pump

Controls

15 External filling loop (Internal option available)
16 Electronic control board
17 ViewSmart Room Controller (Optional)
18 Flushing by-pass valve set
S1, S2 Heat Meter Temperature Sensors
S3 DHW Temperature Sensor
S4 Secondary Heating Flow Temperature Sensor
S5 Secondary Heating Return Temperature Sensor

Connections Key

A Primary Flow
B Primary Return
C BCW Inlet
D DHW Outlet
E Secondary Heating Flow
F Secondary Heating Return
G Connection for Safety Discharge

Typical ModuSat® XR 30/55/70/100 Twin Plate - Top Connections
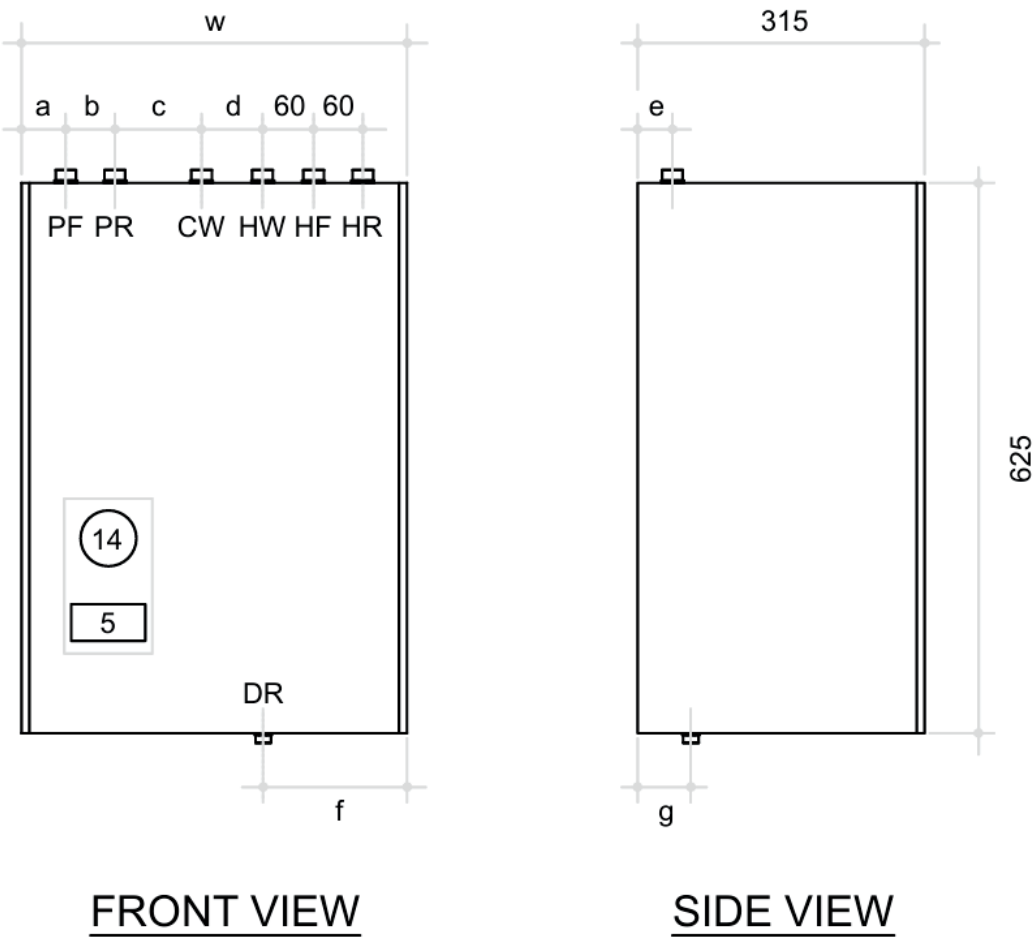
FRONT VIEW SIDE VIEW

Connections Key

A Primary Flow
B Primary Return
C BCW Inlet
D DHW Outlet
E Secondary / Apartment Heating Flow
F Secondary / Apartment Heating Return
G Connection for Safety Discharge

ModuSat® XR & XR-ECO	Connections			Dimensions						
	PF, PR, CW, HW	HF, HR	DR	W	a	b, d	c	e	f	g
30 – XX / 55 – XX / 70 – XX	3/4"	3/4"	1/2"	467	53.5	60	120	42.5	203.5	90
100 – XX	1"	3/4"	1/2"	540	82	90	90	50	229	50

Other connection options are available. See Page 6 for further details.

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ModuSat® XR Twin Plate units are supplied with five different pipework connection options as standard.

Using an HIU with pipework connections suited to project installation requirements can save an average of £50 per HIU on plumbing materials and labour costs, and also reduces the time required for installation.

TL1 - All Top Connections
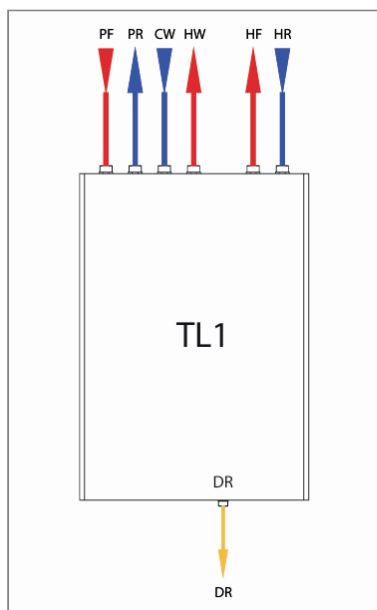
TL5 - Secondary Heating Flow & Return Connections at the Bottom
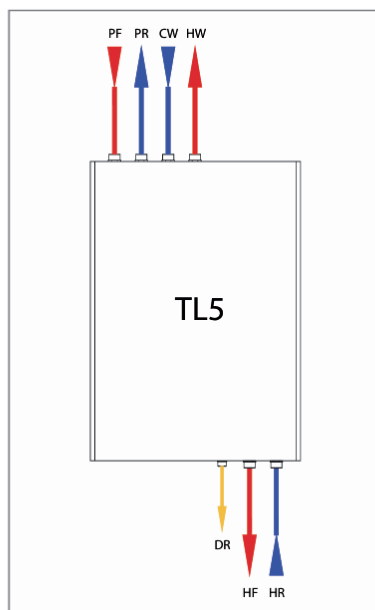
TL7 - Primary Flow & Return and DHW Connections Top. Cold Water Inlet and Secondary Heating Flow & Return Connections at the Bottom
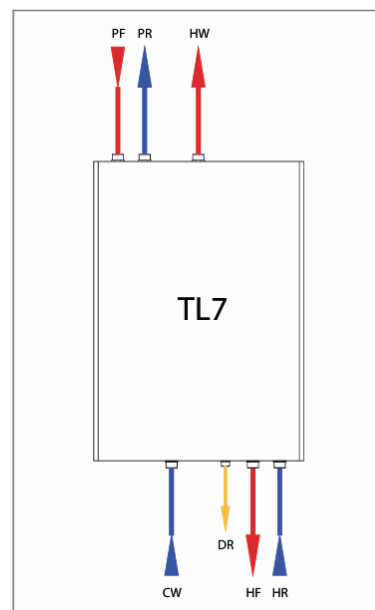
TL8 - Primary Top, Other Connections at Bottom
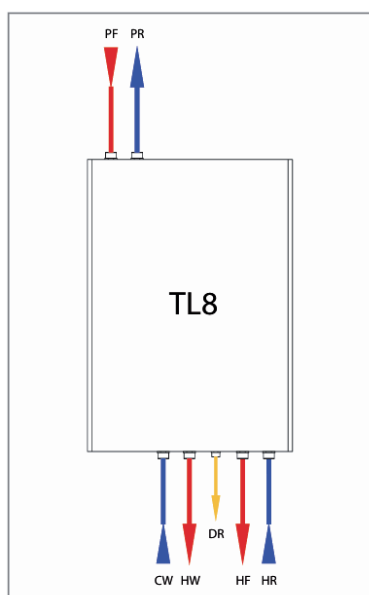
BL4 - All Connections at the Bottom
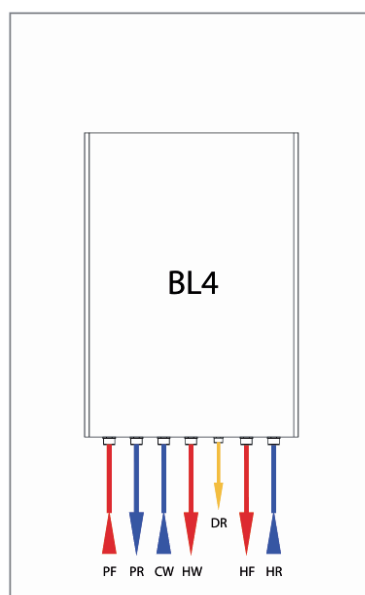
Connections Key	
PF	Primary Flow
PR	Primary Return
CW	Cold Water in
HW	Domestic Hot Water
HF	Heating Flow
HR	Heating Return
DR	Drain

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Technical Details

Understanding the ModuSat® Model Code
ModuSat® XR-ECO XX - XX
DHW Plate Heat Exchanger Model
HTG Plate Heat Exchanger Model

ModuSat® XR-ECO models are designed to provide excellent heating and hot water performance at heat network primary flow temperatures as low as 60ºC or even 55ºC.

Performances at 10/50°C

ModuSat® XR-ECO Twin Plate 30-XX

Primary flow (°C)	80	70	65	60	55
Primary Return* (°C)	17.8	18.8	19.8	21.5	24.2
Power (kW)	55	45	40	35	27
DHW flow (l/min)	19.7	16.1	14.3	12.5	9.7
Primary pressure drop** (kPa)	50	50	51	52	50

ModuSat® XR-ECO Twin Plate 55-XX

Primary flow (°C)	80	70	65	60	55
Primary Return* (°C)	17.1	17.9	18.8	20.4	23.2
Power (kW)	65	52	46	40	32
DHW flow (l/min)	23.3	18.7	16.5	14.3	11.5
Primary pressure drop** (kPa)	51	50	50	50	50

ModuSat® XR-ECO Twin Plate 70-XX

Primary flow (°C)	80	70	65	60	55
Primary Return* (°C)	15.6	16.4	17.1	18.5	20.8
Power (kW)	75	64	57	50	40
DHW flow (l/min)	26.9	23.0	20.5	17.9	14.3
Primary pressure drop** (kPa)			50		

ModuSat® XR-ECO Twin Plate 100-XX

Primary flow (°C)	80	70	65	60	55
Primary Return* (°C)	17.0	18.0	18.7	20.3	23.1
Power (kW)	120	100	85	75	60
DHW flow (l/min)	43.1	35.9	30.5	26.9	21.5
Primary pressure drop** (kPa)	50	51	50	50	50

Performances at 10/55°C

ModuSat® XR-ECO Twin Plate 30-XX

Primary flow (°C)	80	70	65	60	55
Primary Return* (°C)	19.5	21.2	23.0	25.1	
Power (kW)	55	43	37	25	
DHW flow (l/min)	17.5	13.7	11.8	8.0	
Primary pressure drop** (kPa)	52		50		

ModuSat® XR-ECO Twin Plate 55-XX

Primary flow (°C)	80	70	65	60	55
Primary Return* (°C)	18.4	20.1	21.8	24.9	
Power (kW)	62	50	43	34	
DHW flow (l/min)	19.8	16.0	13.7	10.9	
Primary pressure drop** (kPa)			50		

ModuSat® XR-ECO Twin Plate 70-XX

Primary flow (°C)	80	70	65	60	55
Primary Return* (°C)	16.7	18.3	19.8	22.7	
Power (kW)	75	62	55	45	
DHW flow (l/min)	23.9	19.8	17.5	14.3	
Primary pressure drop** (kPa)	50		51		

ModuSat® XR-ECO Twin Plate 100-XX

Primary flow (°C)	80	70	65	60	55
Primary Return* (°C)	18.3	20.2	21.8	24.9	
Power (kW)	115	95	80	65	
DHW flow (l/min)	36.7	30.3	25.5	20.7	
Primary pressure drop** (kPa)			50		

*Industry best practice guides, such as the London Heat Network Manual and CIBSE/ADE Heat Networks Code of Practice (CP1) recommend a primary return temperature of less than 25°C from domestic hot water production at design load.

ModuSat XR/XR-ECO units deliver return temperatures significantly below this across a wide range of primary system operating conditions, from as low as 55°C (Please refer to figures listed for "Primary return °C" in all tables above).

**Pressure drop produced by all internal components of the ModuSat; including heat meter and PICV.

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Technical Details

Understanding the ModuSat® Model Code
ModuSat® XR-ECO XX - XX
DHW Plate Heat Exchanger Model
HTG Plate Heat Exchanger Model

ModuSat® XR ECO - Typical Domestic Hot Water Performances

Underflow Heating Systems (ModuSat® XR or XR-ECO)

	ModuSat® XR/XR-ECO XX-10A					ModuSat® XR/XR-ECO XX-20A				
Primary flow (°C)	80	70	65	60	55	80	70	65	60	55
Primary Return (°C)	38.1	38.3	38.4	38.6	39.0	37.5	37.3	37.3	37.6	38.2
Power (kW)	8	8	7	6	5	12	11	10	10	10
Heating (°C)	45 / 35	45 / 35	45 / 35	45 / 35	45 / 35	45 / 35	45 / 35	45 / 35	45 / 35	45 / 35
Heating flow (l/s)	0.19	0.19	0.17	0.14	0.12	0.24	0.26	0.24	0.24	0.24
Residual pump head (kPa)	43.8	43.8	48.8	53.2	57.0	43.9	38.7	43.9	43.9	43.9

Radiator Systems

	ModuSat® XR/XR-ECO XX-10R			ModuSat® XR/XR-ECO XX-20R		
Primary flow (°C)	80	70	65	80	70	65
Primary Return (°C)	43.0	43.8	44.6	42.6	43.2	44.3
Power (kW)	7	5	3	14	11	8
Heating (°C)	60 / 40	60 / 40	60 / 40	60 / 40	60 / 40	60 / 40
Heating flow (l/s)	0.084	0.060	0.036	0.17	0.13	0.10
Residual pump head (kPa)	44.1	54.5	61.4	40.5	49.9	57.2

Typical performance figures for the heating and hot water are shown above. Other selections are available to suit project requirements. Modusat XR typical performances comply with best practice recommendations from the CIBSE/ADE CP1 and BSRIA Guide BG62/2015.

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