

Purewell Variheat mk2

- Floor standing condensing modular boiler
- Cast iron heat exchanger
- Open vented and sealed systems

THE ONLY
ErP
COMPLIANT
CONDENSING
CAST IRON
BOILER



5 MODELS, OUTPUTS 70 - 180KW



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Perfect for refurbishments

The Purewell Variheat boiler is our customers' favourite choice for refurbishment projects.

The highly dependable cast iron heat exchanger is proven tolerant to the conditions of existing heating circuits and backed up by Hamworthy's 10-year warranty, making it the perfect fit for replacing older atmospheric boilers.



Proven, robust and reliable

The Purewell Variheat boiler has evolved from a 50-year long history of boilers using the same cast iron heat exchanger which has been designed and built for efficiency and a long life. Tough, compact, powerful and built to last, the Purewell Variheat mk2 boiler range is available in five models from 70kW to 180kW.

Hamworthy has developed the Purewell Variheat to retain all the benefits of traditional boilers, but with vastly improved performance to meet the efficiency requirements for modern day systems. The mk2 version of the boiler has built on this heritage with further improvements to make service and maintenance easier, integrate advanced controls, and change from a hot surface ignitor to spark ignition.

Purewell Variheat mk2 boilers can be used as single boilers, or as modules in a multiple boiler installation. Each boiler is equipped with a pre-mix down firing burner, cast iron primary heat exchanger and a control panel, all enclosed in a Hamworthy branded factory fitted casing.

Up to 16 Purewell Variheat mk2 boilers can be combined, under the built-in sequencer control, for up to 2.88 MW output, with up to six boilers sharing a single flue header.

Centres are the same as the Purewell and UR predecessors, simplifying replacement. The boilers are suitable for open vented or pressurised systems and have a maximum working pressure of 6 bar.

Key benefits



Advanced sequence control for up to 16 boiler modules



Easy access for service and system cleaning



Fits through a standard doorway



6 bar maximum operating pressure



Suitable for open vented systems



Heat exchanger has large waterways

Key features:

- ⊗ Floor standing condensing modular boiler
- ⊗ 5 models: 70, 95, 110, 140 and 180kW output
- ⊗ Natural gas
- ⊗ Open vented and sealed systems
- ⊗ Up to 3:1 turndown ratio
- ⊗ Up to 95.8% Gross Seasonal Efficiency
- ⊗ Cast iron heat exchanger
- ⊗ Volt free contact as standard

Pipework kits (Page 6)

- ⊗ Reverse return pipework header kit for:
 - 2 boiler installation
 - 3 boiler installation
 - 4 boiler installation (2 x 2-boiler installation)
- ⊗ Pre-assembled pipe kits include:
 - Isolating ball valves for water flow, return and gas inlet connection on each boiler
 - Flow and return headers
 - Pre-assembled flow and return pipe sub-assemblies between boilers and headers
 - Flow line safety relief valve and ½" connection for pressure gauge
 - Return line drain valve and ½" connection for expansion vessel in line with BS6644
 - Blanking flanges for header ends
 - Support legs

Controls (Page 12)

- ⊗ Built in advanced Navistem (Siemens LMS) controls as standard
- ⊗ Boiler sequencing cascade controller
- ⊗ Room & outside temperature sensors
- ⊗ LPB bus communications
- ⊗ Zone control
- ⊗ DHW cylinder sensor kit

Flues (Page 16)

- ⊗ B23 open flue system

Service & warranty

(Page 28)

- ⊗ 10-year heat exchanger warranty
- ⊗ Range of service options
- ⊗ Commissioning

Anatomy of the Purewell Variheat mk2

- ① Gas valve
- ② Fan
- ③ Control panel
- ④ Pre-mix down-firing burner
- ⑤ Primary heat exchanger cast iron sections
- ⑥ Secondary heat exchanger



Technical data & dimensions

All Models

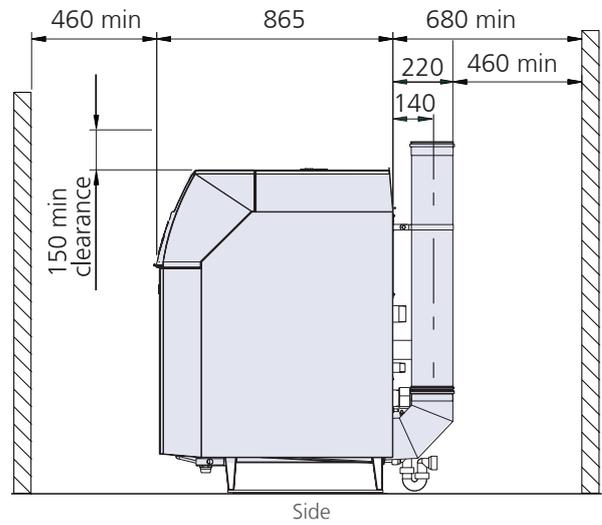
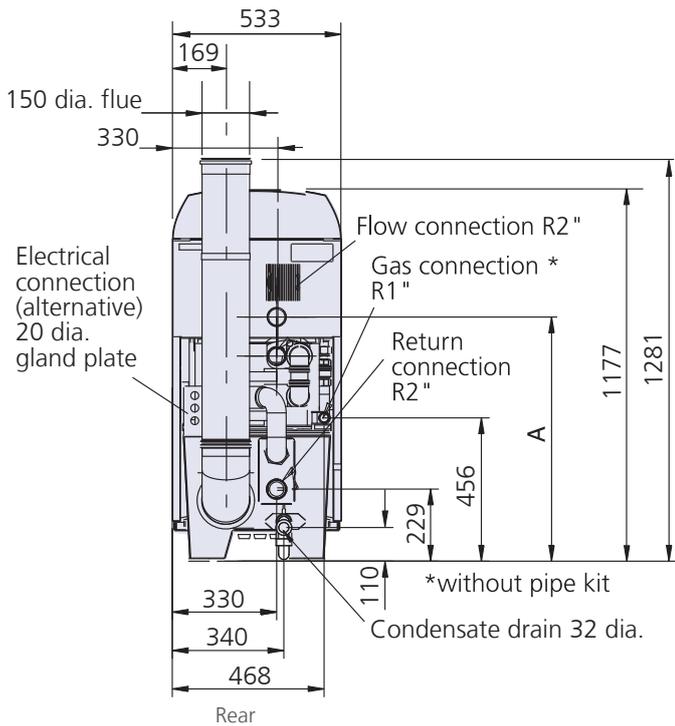
	Boiler models	Units	PV70c	PV95c	PV110c	PV140c	PV180c
Energy	Building regulations - seasonal efficiency	(%) gross	95.3	95.6	95.8	95.7	94.6
	ErP efficiency rating (modules ≤ 70kW only)		A	N/A	N/A	N/A	N/A
	Boiler output 80/60°C - max	kW	63.5	86.3	99.8	134.4	172.8
	Boiler output 80/60°C - min	kW	21.2	28.8	33.3	44.8	50.3
	Boiler output 50/30°C - max	kW	70	95	110	140	180
	Boiler output 50/30°C - min	kW	23.3	31.67	36.37	46.67	53.0
	Gross boiler input - max	kW	72.2	98.4	115	151.3	194.6
	Gross boiler input - min	kW	24.1	26.7	38.3	50.4	56.6
	Net boiler input - max	kW	65	88.6	103.5	136.3	175.2
	Net boiler input - min	kW	21.7	29.6	34.5	45.4	51.0
Water	Water content	litres	8	8	8	11	11
	System design flow rate @ 20°C ΔT rise	l/s	0.8	1.1	1.3	1.7	2.1
	Water side pressure loss @ 20°C ΔT rise	mbar	32	52	72	134	221
	System design flow rate @ 11°C ΔT rise	l/s	1.5	2.1	2.4	3	3.9
	Water side pressure loss @ 11°C ΔT rise	mbar	96	176	244	442	731
	Maximum water pressure	bar g	6	6	6	6	6
Gas	Gas flow rate natural gas (G20) - max	m³/hr	6.9	9.4	10.9	14.4	18.5
	Nominal inlet pressure natural gas (G20) - max	mbar	20	20	20	20	20
	Maximum gas inlet pressure natural gas (G20)	mbar	25	25	25	25	25
Flue	Flue Gas Flow Rate@ 15°C, 9.5% CO ₂	m³/hr	86	117	137	180	232
	Approx. flue gas temperature @ 50/30°C	°C	40	40	45	50	50
	Approx. flue gas temperature @ 80/60°C	°C	60	60	65	70	75
	Pressure at boiler flue spigot @full load	Pa	100	100	100	100	100
	Dry NOx emission*	mg/kWh	21.3	31.1	39.1	32	37.8
Connection	Water flow/return connections	inches	R2"	R2"	R2"	R2"	R2"
	Gas inlet connection pipe thread size	inches	R1"	R1"	R1"	R1"	R1"
	Nominal flue diameter (I/D)	mm	150	150	150	150	150
Electrics	Electrical supply		230 V 1Ph 50 Hz				
	Power consumption @ max	W	94	94	94	207	207
	IEC power outlet power consumption @ max	W	460	460	460	460	460
	Start current and run current	Amp	0.54	0.54	0.54	0.6	0.6
	Approx shipping weight	kg	195	195	195	250	250
Noise emission @1m and @maximum boiler modulation	Max dB (A)	53	53	53	65	65	
CO ₂ (±0.25%) - max	%	9.5	9.5	9.5	9.5	9.5	
CO ₂ (±0.25%) - min	%	9.5	9.5	9.5	8.5	8.5	

*0% excess oxygen, dry air free, European Class 6

Dimensions

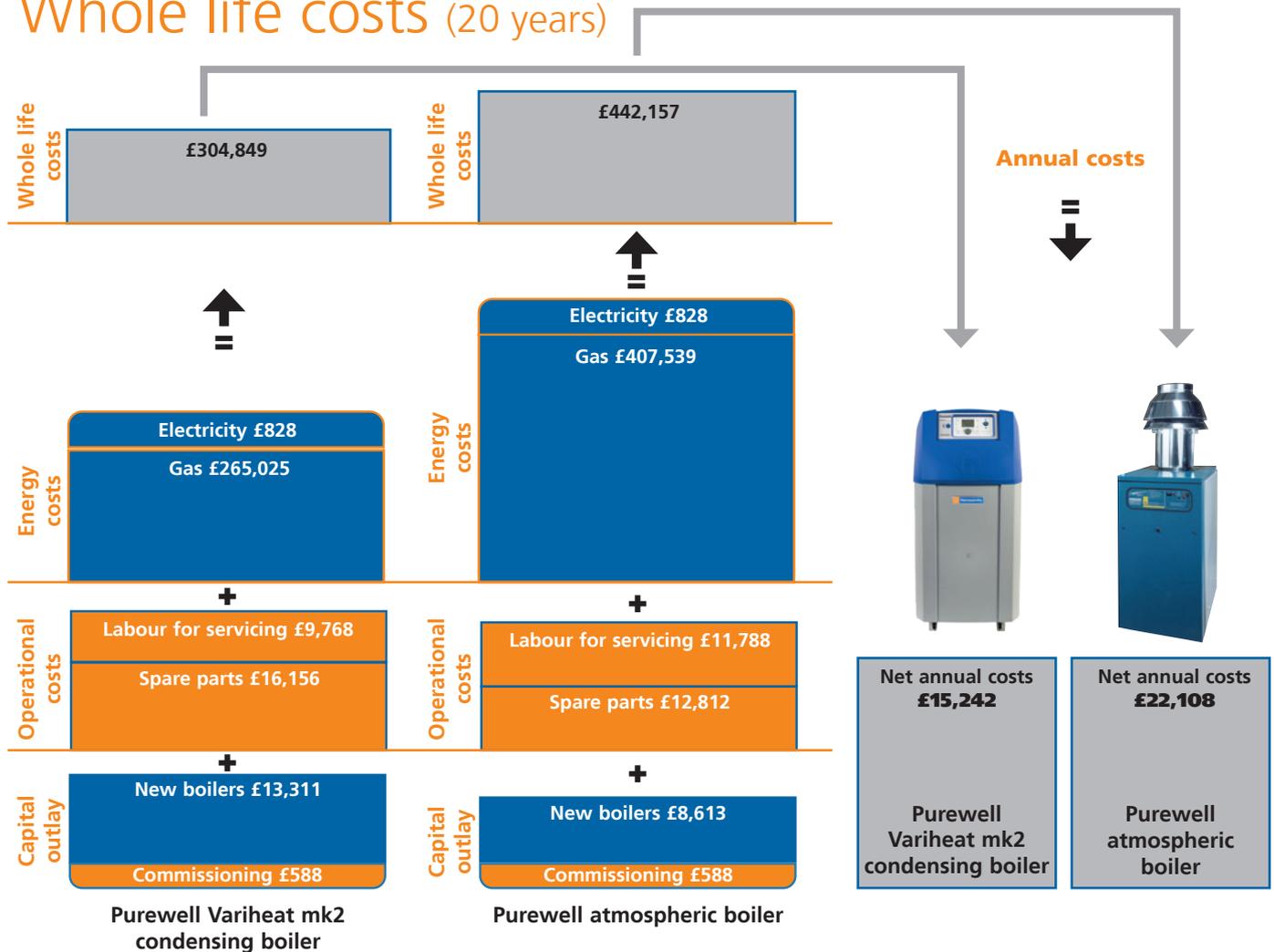
All Models

Dimensions mm	Ref.	PV70c, PV95c, PV110c	PV140c, PV180c
Flow connection	A	647	775



Note: Do not run trunking or pipework across the top of the boiler. Access is required top and front for servicing. All dimensions in mm unless otherwise stated.

Whole life costs (20 years)



5

70-180

MODELS

kW
OUTPUT

Pipe kit details & dimensions

All Models

Designed to save time and simplify installation, optional pipe kits are available for Purewell Variheat mk2 boilers. The kits enable multiple boilers to be connected in configurations of 2, 3 or 4 boilers. There are two pipe kits available:

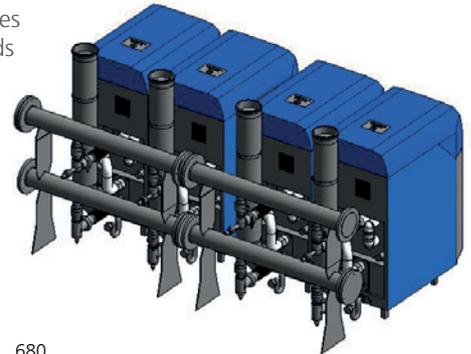
- ⊙ Two-boiler pipe kit
- ⊙ Three-boiler pipe kit

For a four-boiler arrangement, use two 2-boiler pipe kits together.

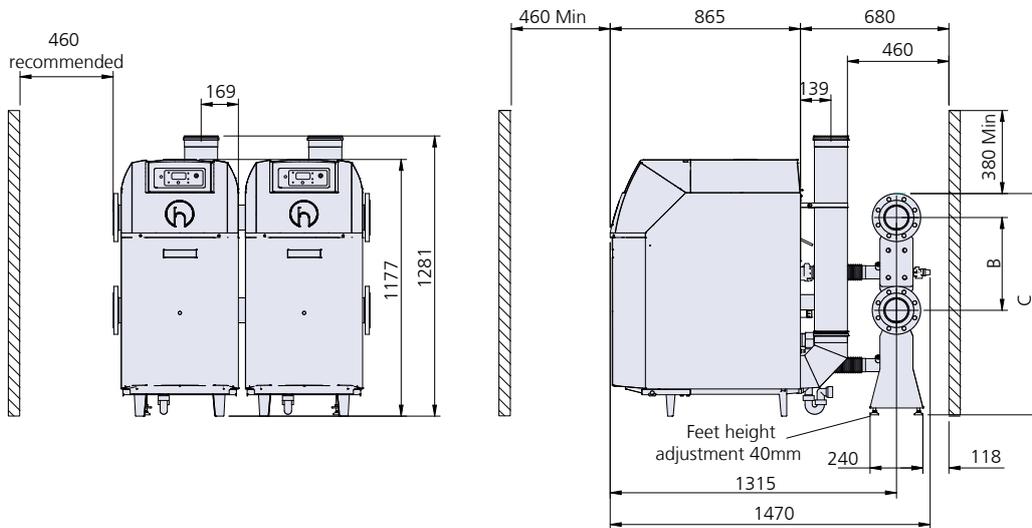
The pipe kits are factory tested and supplied part assembled for ease of installation. Each flow and return pipe is a single continuous length of pipe, with flanged connection at each end. The pipe kits are sized for the width of two boilers or three boilers accordingly.

Pre-assembled pipe kits include:

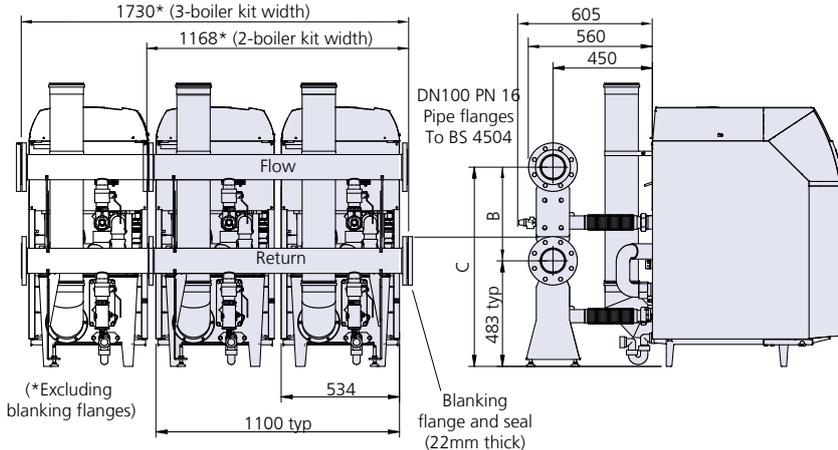
- ⊙ Isolating ball valves for water flow, return and gas inlet connection on each boiler
- ⊙ Flow and return headers
- ⊙ Pre-assembled flow and return pipe sub-assemblies between boilers and headers
- ⊙ Flow line safety relief valve and ½" connection for pressure gauge
- ⊙ Return line drain valve and ½" connection for expansion vessel in line with BS6644
- ⊙ Blanking flanges for header ends
- ⊙ Support legs



Models	Weights (kg)
2 Boiler installation	57
3 Boiler installation	95
4 Boiler installation (use 2 x 2 "Boiler installation")	133



For 4 boilers use 2 x 2-boiler pipe kit, width 2336*
1730* (3-boiler kit width)

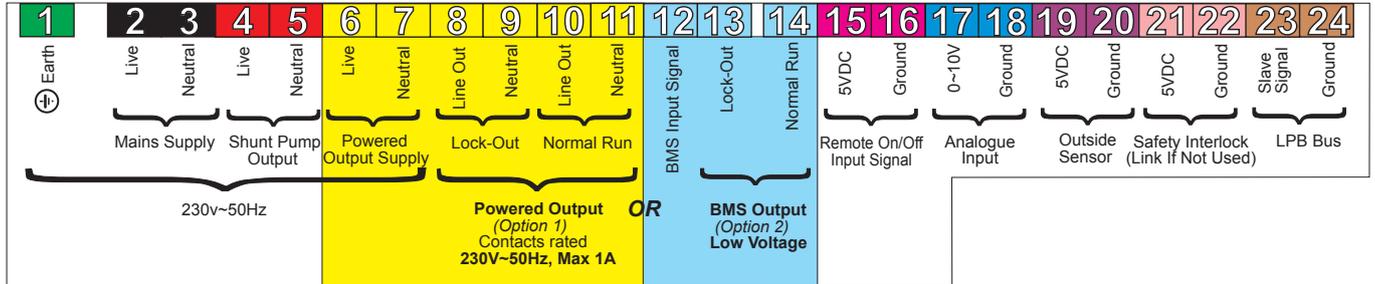


Note: All dimensions in mm unless otherwise stated.

Dimensions mm	Ref.	PV70c, PV95c, PV110c	PV140c, PV180c
Flow/return centres	B	425	550
Header Flow connection	C	908	1033
Pipe flange to BS4504		DN100 (4") NB PN16	

Electrical connections

Connections to boiler

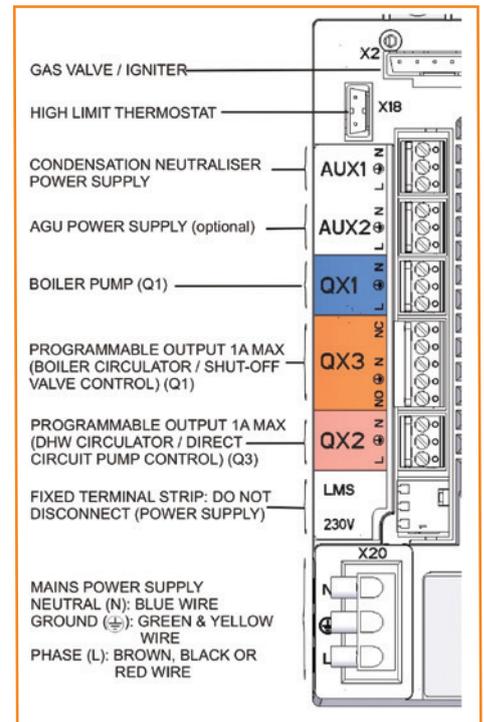


The following electrical connections are provided on each module on a rail at the base of the front of the boiler:

- ⦿ Supply: Live, neutral and earth
- ⦿ Live and neutral connections for shunt pump or primary pump
- ⦿ Boiler overheat fault alarm signal output
- ⦿ Common fault alarm signal output
- ⦿ Boiler normal run signal output
- ⦿ Remote on/off
- ⦿ 0-10v analogue control signal input
- ⦿ Outside temperature sensor
- ⦿ LPB bus connection (option)

High voltage connections

Terminal reference	Function	Electrical	Max load
AUX1	Power supply to condensate neutraliser where fitted	230v 50Hz 1Ph	1 Amp
AUX2	Power supply to optional controls kit for: 1. Optional volt free contacts (run and fault signal) 2. Optional heating circuit control kits	230v 50Hz 1Ph	
QX1	Programmable power supply for either: 1. Alarm - common fault 2. Non-Hamworthy boiler shunt pump/circulator	230v 50Hz 1Ph	1 Amp
QX3	Programmable power supply for either: 1. Boiler shut off valve 2. Non-Hamworthy boiler shunt pump/circulator 3. Direct uncompensated heating circuit pump	230v 50Hz 1Ph	
QX2	Programmable power supply for either: 1. DHW pump/circulator 2. Direct uncompensated heating circuit pump	230v 50Hz 1Ph	
LMS 230V	Not for customer use		
L N E	Main power supply	230v 50Hz 1Ph	6.3 Amp



Electrical connections

There are three dedicated electrical conduit connections at the rear left hand side of each boiler module to accept cables for power supply and controls. These conduits are routed through the casing to the control panel located at the front of the boiler. Cables carrying mains voltage (230V 50Hz 1Ph) for electrical supply and pump outputs should be routed via a separate conduit to low voltage cables serving sensors and enable circuits.

Power supply

An independent isolator and fused electrical supply is recommended for each boiler module. Supply 230 volt, 50Hz, single phase. Wiring external to the boiler must be installed in accordance with IET Regulations and any local regulations which apply. Wiring must be completed in heat resistant 3 core cable, (size 1.0 mm² c.s.a.). Fascia fuse rating is 2 amp. External fuses should be 6 amp for all single boiler sizes.

To prevent drawing excessive current (>1 amp) through the boiler control panel, it is recommended that pumps are connected via contactors.

Specification

Construction

A down-firing fully modulating gas burner is fitted on top of the primary cast iron heat exchanger and a secondary heat exchanger is positioned in the base of the boiler to maximise heat recovery from the flue gases.

The boilers are finished externally using steel side panels and stylish moulded plastic front and top covers.

Site assembly

The boilers are delivered fully assembled, but for plant rooms with difficult access, it is a simple task to separate the individual heat exchanger sections for easier handling.

Performance

Purewell Variheat mk2 condensing boilers achieve a full load efficiency up to 88.9% gross (98.7% net), whilst at part load the efficiency rises to 98.0% gross (109% net).

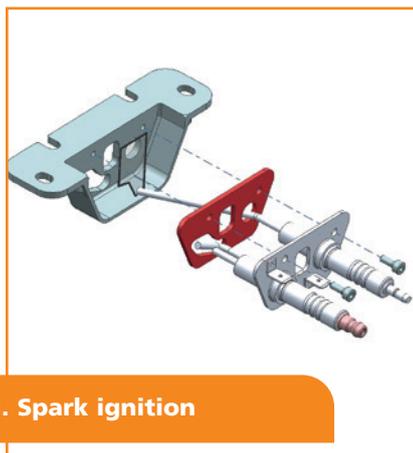
This equates to seasonal efficiencies up to 95.8% gross; easily exceeding the Building Regulations minimum seasonal efficiency requirements of 91% gross or new buildings and 82% for existing buildings.

All boilers achieve European Class 6 performance for NOx emissions.

All models comply with the efficiency requirements of the European Union's ErP Energy-Related Products directive.

Spark ignition (1)

Spark ignition is a known technology with proven reliability and consistency. The spark ignition in the Purewell Variheat mk2 has minimal components and can be removed as a single unit using an Allen key.



1. Spark ignition

Easy to service (2)

Quick-to-remove covers with hooks and dog points provide easy access to the gas valve and fan. The burner is rigidly secured with just four nuts making disassembly of the gas train and access to the burner for cleaning and servicing fast and efficient. All ignition components can be accessed easily without needing to remove the entire gas train.

Cast sections of the primary heat exchanger can be removed individually for inspection or repair. The secondary heat exchanger can be withdrawn from the front of the boiler for fast inspection without dismantling the primary heat exchanger castings.

Other useful features include entirely dry thermostat pockets for all temperature sensors removing any need for boiler draining for sensor replacement. A burner pressure test point is provided to assess burner performance and cleanliness against the original commissioned readings before burner removal.

There is a mains power outlet making it easier for service engineers in plant rooms with no power outlets.

Burner (3)

The Purewell Variheat mk2 features a fully modulating pre-mix burner control system. An electronic thermostat monitors the boiler operating conditions and automatically adjusts the output to suit these conditions.

The gas/air ratio control system ensures that clean and efficient combustion is maintained throughout the maximum modulation range, down to a minimum of 33% capacity, giving a 3:1 turndown ratio.



2. Easy to service

The plaque burner is positioned centrally above the primary heat exchanger and is constructed using a FeCrAl Aconit woven mesh. This design of burner allows for good flame stability at low turndown rates. The woven fibre construction of the burner also results in lower flame temperatures being achieved and low NOx emissions.

Boiler thermostats

Purewell Variheat mk2 boilers are fitted with a manual reset limit thermostat, which has a range of 90-110°C on all models. This is factory set to 95°C.

Electronic controls allow the flow temperature normally to be set in the range 30°C to 80°C. The electronic temperature control thermostat is pre-set to regulate the boiler flow temperature up to a maximum setting of 80°C. If higher flow temperatures are required (up to 85°C maximum), please contact Hamworthy.

To accommodate multiple boiler installations, the limit thermostat is adjustable up to a maximum of 110°C, but is factory set at 95°C. Where the boiler control thermostats are to be set higher than 83°C, adequate system pressure must be available either by gravity head or system pressurisation.

The boiler also incorporates a return temperature sensor, which, in conjunction with the flow temperature sensor, governs the modulation set point of the boiler.

Each Purewell Variheat mk2 module is supplied with volt free contact outputs for Normal Run, Boiler lock-out from a General Fault, 0-10v analogue control input. Also provided are connections for BMS, Shunt Pump & Remote On/Off control as well as connections to a boiler lock circuit (causing the boiler to go to standby).



3. Burner

Primary heat exchanger

Cast to last

Each boiler has a cast iron primary heat exchanger. Cast iron has long been the choice of material for the manufacture of boilers, dating back to the late 19th century where the first coal fired cast iron boilers were produced.

Hamworthy is one of the few manufacturers who continue to use this material. The design used in the Purewell Variheat mk2 boiler has stood the test of time, demonstrating its reliability over decades. Originally used in our UR boilers in the 1970s, the cast iron heat exchangers have been continuously improved and refined, pushing the boundaries of the casting process whilst still benefiting from the properties of a robust, rugged metal that does not readily corrode.

Sectional design

The heat exchanger is arranged with horizontal sections, connected at one end only to allow expansion and contraction. System return water enters the bottom section and flows towards the front where it rises into the section above and flow towards the back, again rising into the next section above. Using this series flow arrangement results in a naturally balanced flow path throughout the boiler.

The primary heat exchanger is fitted on top of the base assembly and encloses the secondary heat exchanger.

Large waterways

With waterways typically larger than lightweight wall-mounted boilers, Purewell Variheat mk2 heat exchangers offer greater resilience to problems associated with older heating circuits. This makes the Purewell Variheat mk2 boiler the perfect choice when replacing old atmospheric boilers.



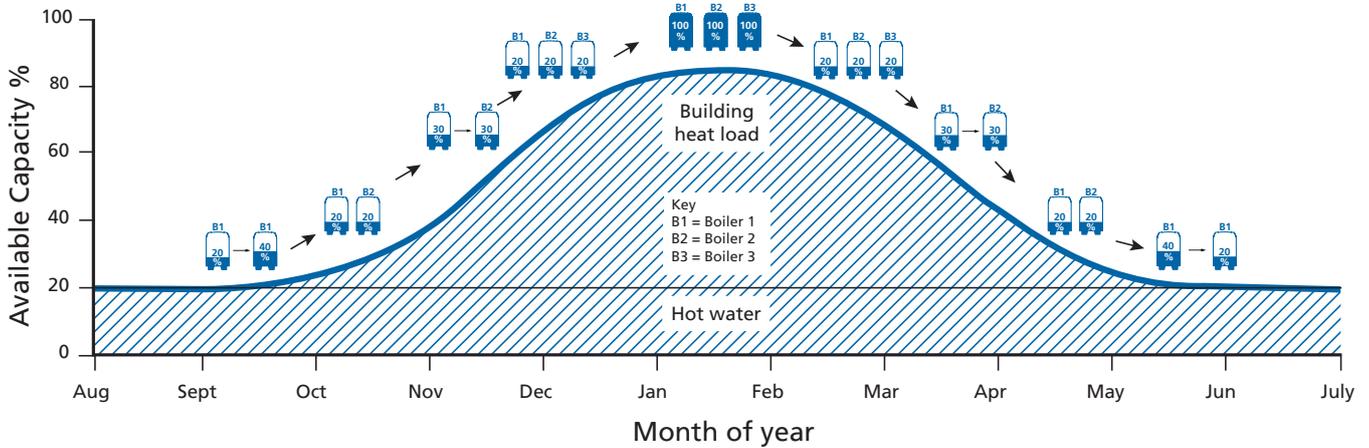
Secondary heat exchanger

Condensing performance is achieved by returning the system water through a secondary heat exchanger which allows for the flue gases to condense on the fins of the exchanger tubes. This enables the flue gases to give up their latent heat into the returning water.

The condensing heat exchanger is designed for 20°C ΔT temperature rise, with no minimum flow temperature, maximising the opportunity for condensing performance.



Energy and load matching



The overall efficiency of a multiple boiler plant depends on how close its total output can be controlled to match the load profile of the building. Therefore, it is a really important aspect of product selection.

Why match plant output to load?

Matching the building's heat load enables you to deliver the right amount of heat at the right time with little or no wastage. A commercial heating system is designed to match the peak load to heat a building up to full temperature within a short period of time. This requires a large load from the heat source; the boilers. However most of the time the boilers will be working at much lower loads. The trick is to match both, peak loads and low loads without oversizing the boiler and wasting energy. And to do this you need a system with a large turndown ratio.

Turning it down

Let's look at turndown ratios. Turndown ratio refers to the width of the operational range of the boiler, and is defined as the ratio of the maximum capacity to minimum capacity.

In a typical modular boiler system each module could have a turndown ratio of 3 to 1. So a cascade of 3 modules will have 9 to 1 turndown. This gives you a substantial range of outputs.

Purewell Variheat mk2 boiler - turndown

- ⊗ A Purewell Variheat mk2 PV180c module has a 3:1 turndown – can deliver energy from 60kW to 180kW.
- ⊗ A cascade of 8 x Purewell Variheat mk2 PV180c has a 24:1 turndown - can deliver energy from 60kW to 1,440kW.



It's about how you drive it

Just like your car, a boiler needs to be driven correctly to achieve high operating efficiencies and close load matching. A good boiler sequence controller will help control the boilers in the most efficient way. The Purewell Variheat mk2 boiler has one built in, but for larger sites the Merley sequence controller can be used (see pages 12-15 for control options).



Saving fuel, money and the environment

Accurate load matching ensures you only use the fuel you need. This saves you money and reduces carbon emissions. And depending on the size of the project, these savings can be quite considerable.

Large vs small

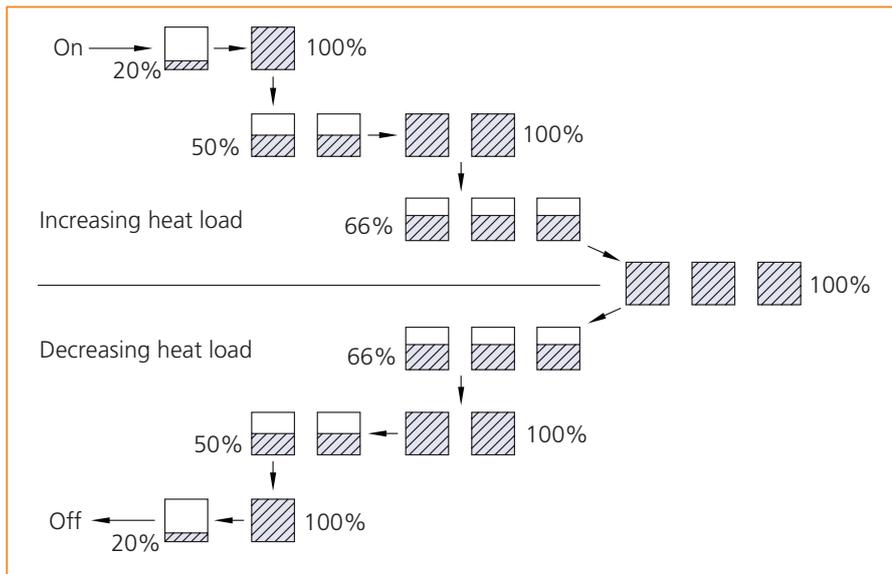
But have you also considered the impact of replacing one large output single boiler with multiple smaller output modular boilers? The differences in gas use for the right application can be huge.

A large boiler will have to fully heat up regardless of how much heat is actually needed by the system. Whereas smaller modules can be setup to come on at low modulation, or only one module out of the system may need to fire up to meet the demand. Plus, smaller modules will get to temperature quicker than a large boiler due to a lower water content.

Boiler sequence control strategies

Cascade control

Steps a boiler module on at its lowest rate and then modulates it to its maximum rate before switching on the next boiler module. Maintains the lowest number of boiler modules in operation for a given heat load.



Option 1 is to install a dedicated primary circuit pump (not HHL supply) serving the flow requirements of all boilers with flow being present through both firing and non-firing boiler modules. Controlled from the Master boiler via a suitable contactor (not HHL supply) the primary circuit pump should be set for constant flow ensuring correct flow for each module. The primary pump will operate for the full duration of heat demand across all boilers and is provided with a 5 minute overrun period. Reverse return flow and return pipework is required with this arrangement.

This arrangement is beneficial when there is insufficient space to install dedicated boiler module shunt pumps and where an existing pump might be suitable for re-use.

Option 2 is to install dedicated boiler shunt pumps (not HHL supply, unless using Hamworthy pipework kits) in the return connection to each boiler module to isolate flow when the boiler module is not firing. Individual boiler pumps are wired to and controlled from their respective boiler module and provided with a 5 minute overrun period. A suitable pump contactor (not HHL supply) should be fitted between the individual boiler module and its pump. Reverse return flow and return pipework is not necessary with this arrangement.

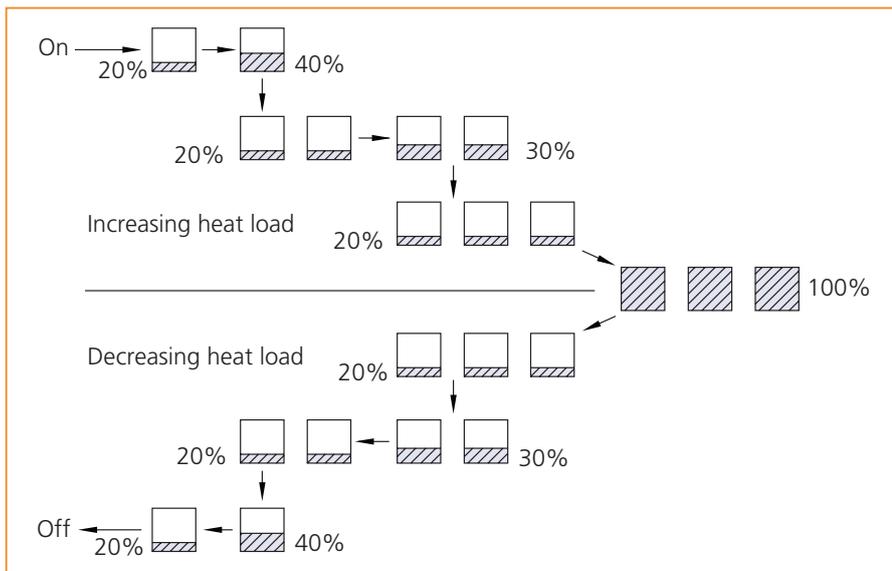
This arrangement offers the benefit of reduced energy consumption for pumping as well as increased standby capacity should one pump fail. There will be increased requirements for electrical supplies and controls wiring with this arrangement.

Option 3 is to install a motorised isolation valve in the return connection to each boiler module to isolate flow when the boiler module is not firing. Individual motorised valves are wired to and controlled from their respective boiler module and provided with a 5 minute overrun period. Motorised valves can be motor open, motor close, or motor open, spring return.

This arrangement requires reverse return flow and return pipework and a dedicated primary circuit pump set for constant pressure allowing the pump to modulate according to the number of boiler modules on line at any time contributing to energy savings. There will be increased requirements for electrical supplies and controls wiring with this arrangement.

Unison control

Steps each boiler module on at its lowest rate until all boiler modules are firing and then modulates all boilers modules simultaneously to higher rates to match the system load. This method of sequencing can offer higher operating efficiencies, taking advantage of the higher part load efficiency of the boiler at lower firing rates.



Pump and motorised isolating valve control

Purewell Variheat mk2 boilers can be installed using pumping solutions that best match the system design requirements. It is recommended to install the boilers within a dedicated primary circuit having a low loss header to ensure adequate boiler flow regardless of flow conditions within the secondary circuits.

Controls

Each Purewell Variheat mk2 boiler is controlled by a Navistem boiler controller (Siemens LMS platform).

The controller functions, settings and configurations are accessed via the rotary dial on the individual fascia panels.

Comprehensive details and instructions on setting and using the boiler controller can be found in the separate Navistem instruction manual, which is supplied with each boiler.

A concise user instructions guide is also supplied with each boiler. This guide gives instructions on initial set up as well as a list of possible error codes.

The Navistem controller is located on the main control panel assembly which can be accessed after removal of the boiler front cover.

Controls for single boilers

Single boilers may be used in a variety of situations, often smaller premises without sophisticated controls such as Building Management Systems. Purewell Variheat mk2 is perfectly suited to such installations having a control system that's expandable from very basic integral time clock control with fixed temperature operation all the way up to controlling multiple zone systems with full inside/outside temperature compensation and optimised time programming.

Control features

- ⊕ BMS compatible, load or temperature
- ⊕ Time control with 3 programs per day
- ⊕ Remote start stop mode
- ⊕ Holiday mode
- ⊕ Fixed flow temperature control
- ⊕ Boiler shunt pump control (pump contactor required to suit electrical load of pump – not HHL supply)
- ⊕ 5 minute over run for shunt pump
- ⊕ Pump kick for shunt pump to help prevent seizure
- ⊕ Frost protection based on water temperature, 5°C fixed set point
- ⊕ Volt Free Contact alarm
- ⊕ Backlit display
- ⊕ Graphics and Text user interface
- ⊕ Simple rotary adjustment knob
- ⊕ Red LED fault indication
- ⊕ Green LED Flame detection
- ⊕ Hot water and heating mode buttons
- ⊕ Chimney Sweep Function

Volt Free Contacts (VFC)

Volt free contacts allow for remote fault and run signalling, **these are supplied as standard with this boiler.**

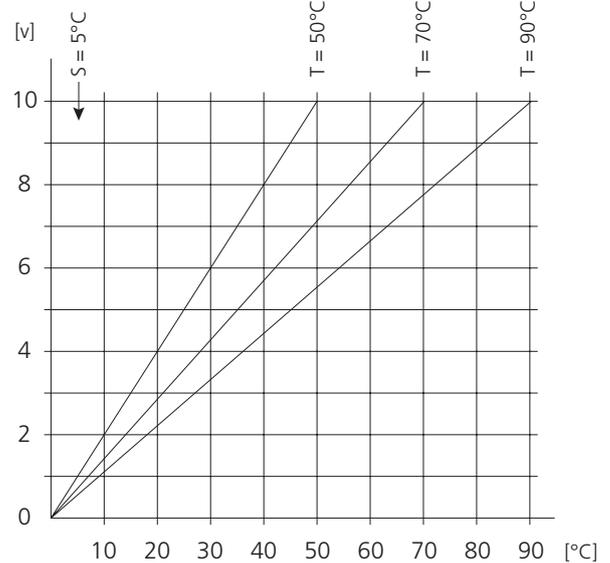
Each Purewell Variheat mk2 boiler has the capacity for three optional clip in control kits. The VFC take up one of these optional clip in kit locations, so only two optional heating circuit control kits can be fitted.

BMS control

All Purewell Variheat mk2 boilers can be controlled with more sophisticated controls such as Building Management Systems (BMS) using the 0-10 volt analogue input which can be configured for temperature or load control. Where a BMS exists, it is recommended that heating circuit and domestic hot water control is managed by this system.

For full details concerning control set up refer to Manual Navistem B3000 ref 500001310.

0-10 volt analogue temperature input chart



T = maximum value of heat demand
S = minimum limitation of heat demand = 5°C

Remote start stop

Each boiler is equipped with a remote start stop circuit. On receiving a start signal from, for instance, an outside time clock the boiler will operate according to its internal temperature management program. This level of control simply overrides the boiler's internal time clock program. The boiler may still be equipped with optional controls, including an outside air temperature sensor, room temperature sensors and individual heating zone controls whilst controlling also domestic hot water cylinder using the control options.

Optional controls

Optional domestic hot water control QAZ 36

A single domestic hot water cylinder (calorifier) may be controlled from the boiler. Energy loading of the cylinder is achieved by starting and stopping the pump to the cylinder coil. Internal temperature sensing for the stored domestic hot water is achieved by either fitting the cylinder with an optional domestic hot water kit (temperature sensor QAZ36 and pocket) or the boiler can be configured to receive a Normally Open/Normally Closed signal from a standard cylinder thermostat. The high limit thermostat for the cylinder must also be wired to ensure the boiler energy supply is isolated from the cylinder in the event of the high limit thermostat setting being reached.

- ⊕ Immersion Sensor complete with sensor pocket
- ⊕ DHW cylinder control connected directly to the boiler
- ⊕ Frost protection based on storage water temperature
- ⊕ Can be set to reduce water store temp when outside of occupancy hours
- ⊕ Anti legionella function

Part number 563605674

Optional outside air temperature sensor QAC 34

It is always recommended to fit an outside air temperature sensor allowing enhanced frost protection for protection of both the building infrastructure and the boiler plant. The sensor should be located on a north facing wall. Control functions available with outside air temperature sensor fitted:

- ⊕ **2 Stage frost protection** – based on water temperature and outside air temperature.
- ⊕ **Stage 1** – Air temperature: starts circulation pumps to move heat around the circuit from within the building protecting the plantroom.
- ⊕ **Stage 2** – Water temperature: starts the boiler to prevent water within the system freezing.
- ⊕ **Summer shutdown** – Stops boiler operation when outside temperature reaches a predetermined set-point.
- ⊕ **Adaptable weather compensation** – Matches boiler flow temperature to building thermal dynamics as outside air temperature fluctuates up and down.

Part number 533901457

- 1 Navistem control panel
- 2 Volt free contact kit (fitted as standard)
- 3 Location for optional OCI 345 LPB bus interface unit

Optional heating circuit sensor kit QAZ 36

Heating circuit controlled directly from the boiler but programmed with the QAA 74 programmable room sensor.

- ⊕ Immersion sensor complete with sensor pocket
- ⊕ For directly compensated heating circuits not utilising a 3 port mixing valve

Part number 563605673

Optional heating circuit strap on sensor kit QAD 36

A surface mounted pipe temperature sensor for use where an insertion sensor is not suitable. One sensor required for the primary circuit and one for the heating circuit. Not for use with hot water cylinders.

Part number 533901594

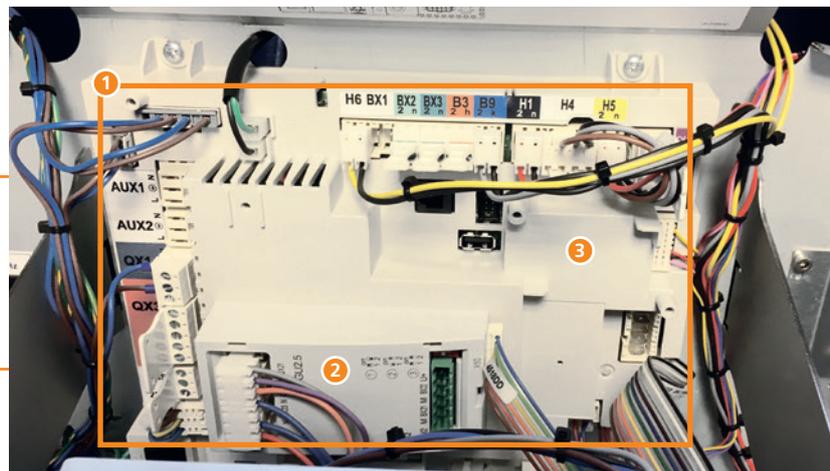
Optional heating circuit control kit AGU2.550

Up to 2 independent heating circuits incorporating mixing valves is possible with each circuit operating with a different flow and room temperature requirement to the other circuits. The boiler generates flow water to the highest zone temperature requirement whilst the other zones use mixing valve control to reduce flow temperature into their respective circuits. This allows heating to be maintained throughout any demand and domestic hot water requirement.

An optional heating circuit kit must be fitted to the boiler comprising a clip in controls module AGU2.550A109. To which the circuit flow temperature sensor, mixing valve and pumps need to be wired to. The individual circuit pumps must be connected via a suitably rated contactor to prevent overcurrent situations affecting the control PCB (not HHL supply).

Optional heating circuit control kits available:

- ⊕ Single heating circuit - Part number 219357
- ⊕ Two heating circuits - Part number 219358



Optional controls

Optional heating room temperature sensors

Each heating circuit can be equipped with an independent room temperature sensor. There are two types of room sensor, a fully **programmable room sensor QAA74**, and an **offset adjustable room sensor QAA55**. When a room temperature sensor is fitted enhanced control of the heating circuits can be achieved based on both internal and outside air temperatures. This could for instance compensate for an unexpected higher internal air temperature allowing the heating system to start later and at a lower flow temperature saving energy.

Optional offset adjustable room sensor QAA55

For installations where limited control is required by the building occupants, the offset adjustable room sensor may be used. This permits adjustment +/- 3°C from the programmed room temperature set point and communicates room temperature to the boiler.

- ⊕ Setting the operating mode between automatic operation, continuous operation comfort or night setback temperature, off with frost protection active
- ⊕ Setting a temporary off condition during an un-programmed non-occupancy period that will reset automatically according to following program settings
- ⊕ Programmable lock to prevent tampering.

Part Number 563605696



Optional programmable room sensor

This communicates with the boiler and allows full adjustment of the room temperature, time clock, holiday periods and frost protection settings. The unit also displays fault codes from the boiler plant.

- ⊕ 3 programmable periods per day
- ⊕ Reduced temperature/night set back for non occupancy hours
- ⊕ Holiday period (frost protection remains active)
- ⊕ Programme lock to prevent tampering
- ⊕ Indication of operating parameters and boiler fault condition
- ⊕ 7 day time clock with automatic summer/winter clock adjustment

Part number 563605695

Controls options	Part number
Outside air temperature sensor - QAC34	533901457
Domestic hot water sensor kit (sensor and pocket) - QAZ36	563605674
Heating circuit sensor kit - QAZ36	563605673
Mixing valve heating circuit control kit (clip in module, temperature sensor and pocket) for 1 zone	219357
Mixing valve heating circuit control kit (clip in module, temperature sensor and pocket) for 2 zones	219358
Programmable room sensor - QAA74	563605695
Offset adjustable room sensor - QAA55	563605696
Heating circuit strap on water temperature sensor - QAD36	533901594
Wireless programmable room sensor - QAA78	533901588
Wireless outside air temperature sensor - AVS13	533901592
Radio module (required for all wireless sensors) - AVS71	533901590
Merley sequence controller loose kit	563605671
Merley sequence controller fully assembled	563605672

Controls for multiple boilers

Multiple boilers are likely to be installed within larger buildings where the controls requirements can be expected to be more complex. Often larger buildings are equipped with Building Management Systems and where this is the case it is recommended to take advantage of the powerful control capability of these systems to not only manage the various heating circuits within the building but also to control the operation of the boilers.

Where Building Management Systems are not present, or independent control of the boilers is required there are two alternative options available from Hamworthy:

1. Sequencing of up to 16 boiler modules using integral Master/Slave feature of control (1 master, 15 slaves).
2. Sequencing of up to 15 boiler modules using the Hamworthy Merley boiler sequence controller for mounting remote to the boiler or within clients own control panel.

Control features

- ④ Choice of control inputs including:
 - External enable signals
 - 0-10V analogue heat demand signal
 - Built-in time clock settings
- ④ Choice of cascade or unison sequencing strategies (see page 11)
- ④ Lead boiler rotation
- ④ 7 Day integral time clock – 3 programmable periods per day
- ④ Optimised start and stop based on outside and room air temperatures
- ④ Holiday periods
- ④ Frost protection
- ④ Constant or variable flow temperature based on outside and room air temperatures
- ④ 2 stage frost protection based on outside and room air temperature
- ④ Stage 1 – Air temperature: starts circulation pumps to move heat around the circuit from within the building protecting the plantroom
- ④ Stage 2 – Water temperature: starts the boiler to prevent water within the system freezing
- ④ Summer shutdown
- ④ Reduced temperature/night set back for non-occupancy hours
- ④ Pump kick for connected pumps

Note Each boiler module requires a LPB Bus OCI 345 for the master slave functionality.

Note The Merley sequencer is supplied with two OCI 345 clip ins. If you are controlling more than two boilers, you will need an additional clip in OCI 345 for each boiler module.

Merley sequence control

A common controls platform, external to the boiler, that can be used with the Wessex ModuMax mk3, Upton, Stratton mk2, Varmax and Purewell Variheat mk2 boilers. For more information refer to the Merley brochure 500002524.

Master slave function

Programmed directly from the integrated Navistem controller and modules communicate via the LPB bus module clip in (OCI 345). Part number 563605667

Time control

A 7 day time clock with 3 adjustable time periods per day is a standard feature of the sequence controller.

Optimised start and stop

The optimiser uses a combination of the actual room temperature and outside air temperature to calculate the exact time at which the heating will be started or stopped to ensure comfort levels at the correct occupancy times. A self-learning function monitors discrepancies in room temperatures at the pre-defined times allowing the optimiser to fine tune to the building thermal performance.

Manual over-ride

Continuous on or off operation can be set during which the time program is overridden until the over-ride function is manually de-activated. Frost protection and summer shutdown controls remain active.

Remote enable

Can be programmed to receive an enable signal from an external control system. Whilst the in-built time clock and optimiser are over-ridden, frost protection and summer shutdown remain active.

Summer shutdown

Whenever the outside air temperature exceeds the adjustable programmed setting, the heating is turned off.

Using BMS 0-10 volt signals

The sequence controller can be configured to accept a BMS analogue input to initiate heat generation. When using a BMS to initiate cascade control via a 0-10 volt analogue signal, the internal time clock and remote enable circuit functions are disabled.

Input signals to the sequence controller must be temperature configured. The input signal is translated to a temperature set point for the flow temperature, and translation is according to a linear graph from 5°C to an upper limit set during commissioning. 10 Volts corresponds with the upper limit with a maximum 85°C setting.

Wireless control

Wireless control options are available. Talk to us to find out more.

Flue guide

Purewell Variheat mk2 boilers have a pressurised flue outlet, enabling a flue installation to be designed using smaller diameter components.

The following points should be noted:

- ⊗ A suction condition within the flue is not required, so it may be possible to achieve a lower chimney terminal height, however, all installations must still comply with the requirements of the Clean Air Act 1993 Chimney Memorandum, BS 6644, BS 5440 and IGE/UP/10.
- ⊗ Draught conditions: the flue must be designed to limit the maximum suction at the flue connection to the boiler to be no greater than 0.3mbar negative (boilers cold), and with all boilers firing no greater than 1.0mbar negative.
- ⊗ Where draught conditions at the boiler flue outlet are likely to become negative, it is recommended that a draught stabiliser is fitted.
- ⊗ All models have a fan assisted burner to overcome boiler resistance. The flue must be designed taking into account that there may be a positive pressure generated by the boiler combustion fan. The maximum permitted positive pressures (flue resistance) at the flue connection to the boiler are given in the tables to the right.
- ⊗ The flue system must be capable of handling saturated flue gases in a positive pressure system.
- ⊗ The boilers may be flued individually. Details of flue sizes and length of flue runs are shown on pages 16-18.
- ⊗ Multiple boilers may be installed using a common flue header. The maximum number of boilers firing into a common chimney is 8. Please consult with our flue technical team for further advice.
- ⊗ The flue components should be fully welded and CE marked for positive pressure application.
- ⊗ The flue system must be self supporting and facilitate access for cleaning and maintenance near the boiler connection.
- ⊗ When designing the flue system, care must be taken to ensure that any condensate that may form within the system can be drained safely to a suitable waste point, and that the flue and drain materials are resistant to the corrosive effect of condensate.
- ⊗ Purewell Variheat mk2 boilers are suitable for installation in a balanced compartment in accordance with the requirements of BS6644.
- ⊗ Due to low flue gas temperatures (50°C to 70°C in condensing models), condensation will occur in the flue, therefore flue materials must be non-corrosive and use fully sealing joints.
- ⊗ Twin-walled flue construction is recommended, with adequate facilities provided for draining the flue condensate.

Purewell Variheat mk2 condensing boilers			
Model	Units	Max. positive flue back pressure at boiler spigot	Max. negative flue pressure (suction) at boiler spigot
All models	mbar	+1.0	-0.3 (cold), -1.0 (hot)



**Need help with your flue design?
Talk to Jeremias, our flue partner.**

The Jeremias Group is one of the leading manufacturers of flue systems and chimney systems in domestic and industrial applications worldwide.

Their history dates back to the early 70's with the discovery of a niche sector in relining chimney systems due to the use of new technologies in the heating sector.

The UK division was created in 2010 with a focus on providing the most reliable turn key service in the UK, combining the complete Know-How of the Jeremias group.

Jeremias UK can offer special component design, manufacture, install, technical support, commissioning, or supply only.

For any enquiries, technical support or project requirements please talk to Jeremias UK:
www.jeremias.uk 01623 889219 info@jeremias.uk

Flue system

Flue system

The Purewell Variheat mk2 is a high efficiency boiler, and like all other high efficiency appliances, requires a water tight flue system that will retain condensate whilst working under positive pressure.

The boiler is fitted with a primary flue connection directly into the base assembly. The connector is fitted as standard with a tri-lip full ring silicone seal which is impervious to water and vapour, ensuring a water tight flue joint. It is suitable for stainless steel flue components in single or twin wall formats.

A fixed draught diverter is not required in the flue system, however, a draught stabiliser is recommended for some installations.

Flue terminal location

Purewell Variheat mk2 condensing boilers will produce condensate due to their high thermal efficiency. The effect of this condensate production is to produce pluming from the flue terminal, and careful consideration must be given to the location of the flue terminal. Should pluming be a concern, then the flue system should be designed to discharge at high level, so as not to cause a visual intrusion to the building occupants.

Flue system for individually flued single boilers only

The table below provides a guide to the maximum flue length allowed for each boiler using 150 mm diameter components on condensing boilers.

Purewell Variheat mk2 condensing boilers				
Boiler model	Flue diameter (mm)	Maximum flue length (m)	Equivalent length (m)	
			90° elbow	45° elbow
PV70c	150	131	2.1	1.6
PV95c	150	114	2.2	1.7
PV110c	150	114	2.2	1.7
PV140c	150	79	2.3	1.8
PV180c	150	57	2.3	1.8

Open flue

Purewell Variheat mk2 boilers are designed for type B23 open flue systems.

Type B: An appliance intended to be connected to a flue that evacuates the products of combustion to the outside of the room containing the appliance. The combustion air is drawn directly from the room.

Type B2: A type B appliance without a draught diverter.

Type B23: A type B2 appliance incorporating a fan upstream of the combustion chamber/heat exchanger.

For details of the full range of classifications refer to BSI publication PD CEN/TR 1749:2005.

Equivalent length components

The maximum flue length is the sum of all the vertical and horizontal sections plus the equivalent lengths of all the 90 degree and 45 degree elbows.

The tables opposite provide details of the flue system maximum lengths, and the equivalent lengths for the elbows.

Flue system for multiple boilers

Multiple boilers may be installed using a common flue header. For more information see page 18.

Notes

1. As the flue coupled to these boilers will be pressurised and the flue gases wet, leading to running condensation within the flue, it is important that the flue components used are fully sealed and resistant to the aggression of condensate.

2. 45° and 90° bends are based on slow radius components. Alternative bends and components will have differing performance characteristics leading to a final performance that does not match the details in the charts.

3. If the flue system intended is not covered by the details in the charts then contact Hamworthy Heating for advice. Using different sizes and diameters will effect the equivalent length of flue that may be used.

Flue system

Multiple boilers - same appliance type

Up to 6 Purewell Variheat mk2 boilers may be installed using a common flue header, with a maximum of 8 boilers connecting to the same riser or chimney via two or more flue headers. The use of swept connections from appliances into a common flue is recommended to assist the flow of gases into the common flue in the intended direction of flow. The combustion circuit within Purewell Variheat mk2 boilers is equipped with a back flow prevention device to prevent flue gases spilling through non-firing appliances.

Flue liners

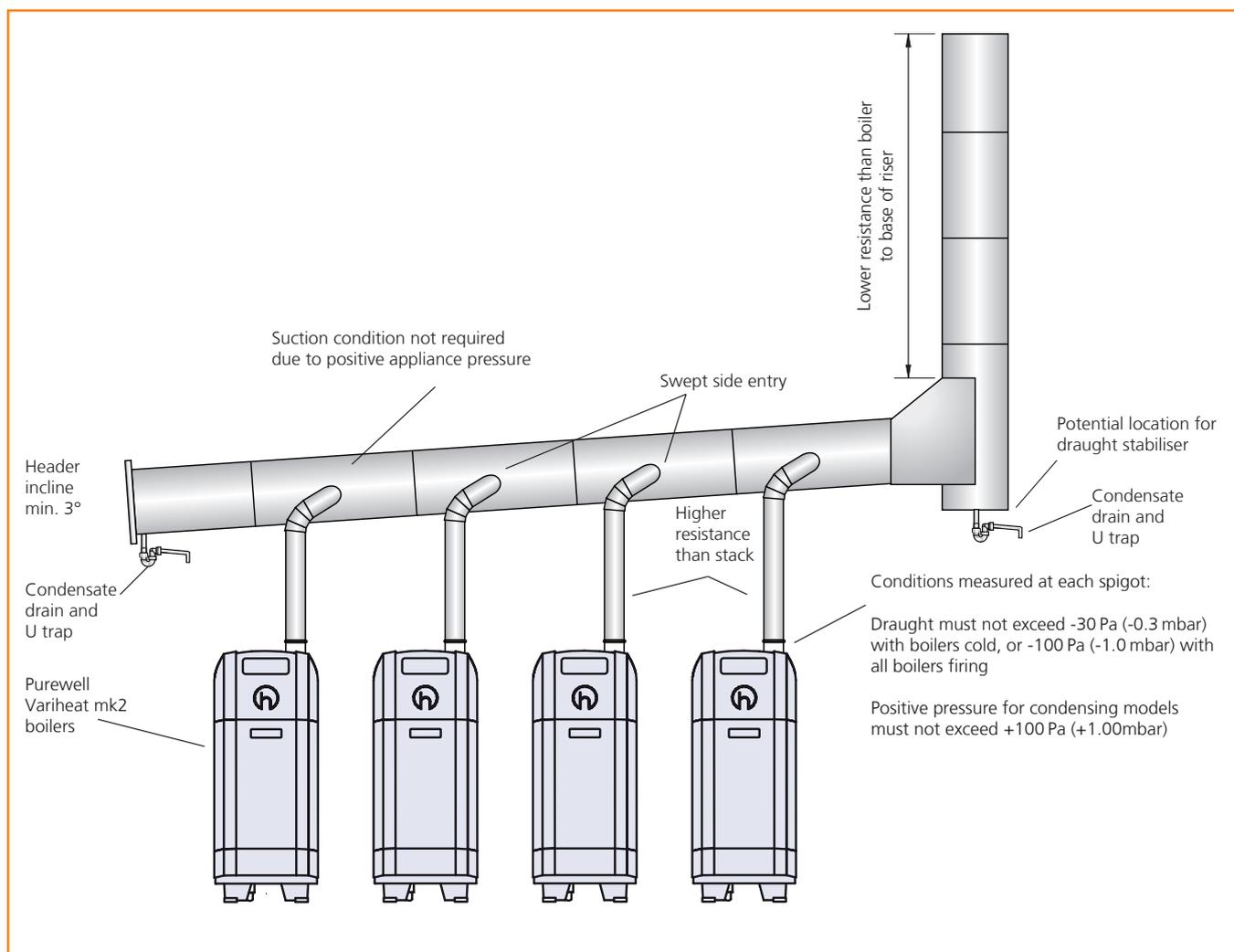
When replacing atmospheric boilers and appliances, it may be possible to install a continuous stainless steel flue liner within the existing flue riser as atmospheric appliances typically have larger diameter flue systems than modern fan-assisted pre-mix appliances. At the base of any such flue riser, the flue header is likely to require replacement using fully sealed and pressure tight components that have been sized for the installed appliances.

Flue system condensate discharge

In addition to the boiler condensate discharge, it is important that the flue header and riser, used with multiple appliance systems, is drained independently to avoid flue condensate draining back through the boiler or other appliance.

Draught generated by flue risers

- ⊗ 4 Pa (0.04 mbar) per metre height @140°C
- ⊗ 2 Pa (0.02 mbar) per metre height @80°C
- ⊗ 0 Pa (0.00 mbar) per metre height @40°C



Multiple Purewell Variheat mk2 boilers sharing a common flue header and B23 type flue

Case study

Hallmark Hotel, Carlton,
Bournemouth



Purewell Variheat c upgrade at the
Hallmark Carlton Hotel, Bournemouth.

Products

- ⊗ Purewell Variheat boilers
- ⊗ Merley sequence controller

Building

- ⊗ Hotel
- ⊗ Refurbishment

Application

- ⊗ Space heating 1260 kW
- ⊗ Modular boilers
- ⊗ Domestic hot water

Hamworthy Heating's Purewell Variheat boilers were the natural choice to enable a seamless heating upgrade at the Hallmark Bournemouth Carlton Hotel, a four star hotel on the east cliff of Bournemouth.

Cedar Green projects installed seven Purewell Variheat 180 kW condensing boilers in place of the existing sixteen Purewell Classic 70 kW atmospheric boilers. The new boilers plus five remaining calorifiers provide the space heating and hot water for the entire seventy six bedroom hotel and adjoining timeshare apartments, including a leisure club with indoor pool and spa and outdoor swimming pool.

Danny Bulch, Director at Cedar Green commented, "We pride ourselves on giving customers continuity of their heating and hot water systems throughout refurbishment projects. It is vital for commercial premises such as hotels and hospitals to have no system downtime due to the services being critical to their business. With the number of boilers reducing from two rows to just one, we could keep a row of old boilers running whilst we installed the new equipment alongside."

Midtherm, Hamworthy's flue partner, installed the new flue and lined the existing chimney to enable it to cope with a system that produces condensate.

The old system: 16 x Purewell classic boilers (~80% efficient)



With older plant rooms access can inevitably be one of the main issues. The stairs to the Carlton Hotel's basement plant room are fairly steep and required the use of a crane to lift out the old boilers and install the new ones. Disassembled when access is problematic.

Danny went on to say, "It's always a pleasure to work with Hamworthy and their staff through the entire process from sales and technical assistance to despatch and commissioning. I only ever install Hamworthy boilers; they are easy to fit and reliable. The Carlton Hotel has seen their system upgraded from the early Hamworthy UR boilers through to the Purewell Variheat boilers of today. The upgrades have been straight forward due to the ease of replacement between old atmospheric and newer condensing models in Hamworthy's range. The newer models also provide benefits to the hotel of better efficiencies and lower service and maintenance costs, since the number of boilers have more than halved."

The new system: 8 x Purewell VariHeat boilers (~96% efficient)



Application and water system

The installation of the boiler MUST be in accordance with the relevant requirements of the Gas Safety Regulations, Building Regulations, IET Regulations and the bylaws of the local water undertaking. It should also be in accordance with any relevant requirements of the local gas region and local authority.

Location

The location chosen for the boiler must permit the provision of a satisfactory flue system and an adequate air supply. The location must also provide adequate space for servicing and air circulation around each unit. This includes any electrical trunking laid along the floor and to the appliance.

Any combustible material adjacent to the boiler and the flue system must be so placed or shielded to ensure that its temperature does not exceed 65°C. Further details regarding boiler location are given in BS 6644 & BS 5440 part 2.

Purewell Variheat mk2 boilers should be positioned on a level non-combustible surface that is capable of supporting the boiler weight when filled with water, plus any ancillary equipment.

Adequate water flow

The Purewell Variheat mk2 boiler is designed as a quick response, low water content unit to run continuously with minimal operating problems. Care should be taken in the initial design and layout, having due regard for adequate water flow through the boilers, and the influence of the control system.

The control system and valves, where fitted, should be regulated to avoid lower flows occurring. Designed to operate with systems operating at 20°C differential temperatures and with no minimum design return temperature, although the return temperature will be limited by frost protection settings. Increased flow rates may be used for lower temperature differentials with due regard for the increased pressure loss through the boiler.

Water systems

Purewell Variheat mk2 boilers are suitable for both open vented or sealed pressurised systems. For safe operation (formerly a requirement of the Health and Safety Document PM5; now withdrawn) Hamworthy recommends sealed systems to have a fuel supply cut off in the event of low and high pressure conditions. Hamworthy also recommend for sealed systems to use a Chesil pressurisation unit with correctly sized Burstock expansion vessels.

In multiple boiler installations, the flow and return headers should be connected in a "reverse return" arrangement, i.e. the water flow in each header follows the same direction, thus providing equal flow through each boiler. This also ensures that the pressure loss across any number of boilers will never be greater than the head loss across one boiler plus local pipework losses.

Open vent pipe size and cold feed

Boiler	Open vent size	Cold feed size
<60kW	25 mm (1 in)	19 mm (3/4 in)
60kW - 150kW	32 mm (1 1/4 in)	25 mm (1 in)
150kW - 300kW	38 mm (1 1/2 in)	32 mm (1 1/4 in)
300kW - 600kW	50 mm (2 in)	38 mm (1 1/2 in)
601kW - 800kW	65 mm (2 1/2 in)	50 mm (2 in)
801kW - 1200kW	80 mm (3 in)	50 mm (2 in)

System feed water quality

If the boiler feed water has a high degree of hardness, it is recommended that the water be treated to prevent precipitation of scale or sludge in the boiler water passageways. Details of additives can be obtained from any reliable manufacturer of water treatment products or the local water authority.

Pressure relief valve

Each boiler, or in the case of a modular installation, each bank of boilers, must be fitted with a pressure relief valve to BS EN ISO 4126-1, and sized and located as detailed in BS 6644.

Hamworthy can supply Purewell Variheat mk2 pipe kits which have isolation valves for each boiler, to enable individual boilers to be shut down from the system. The pipe kit includes a two port valve for each flow and return connection between the boilers and header. Also, each boiler is provided with its own dedicated safety relief valve when using our pipe kit rated 6bar at 3/4" size. The safety valve is a high lift design suitable for sealed systems.

Where these pipe kits are not used, each boiler must be fitted with a safety valve in the flow pipework, positioned before any other valve in the system. BS 6644 provides comprehensive information for the selection and location of safety valves and attention is drawn to the higher capacity requirements of safety valves for pressurised hot water systems.

Boiler and system pumps

Purewell Variheat mk2 boilers should be installed within a primary circuit having a dedicated primary pump and low loss header to ensure adequate boiler flow regardless of flow conditions within the secondary circuits.

With modern, high efficiency, low water content boilers such as the Purewell Variheat mk2, the hydraulic resistance is likely to be higher than traditional atmospheric boilers that might be being replaced and so increasing the pumping effort required.

To assist with reducing energy costs associated with running the boiler circulating pumps, it is possible to configure a dedicated pump to each boiler module in a multiple boiler arrangement, and to control each pump directly by its associated boiler's controller. Then the electrical energy required for the pumps to circulate water through the boilers will be a function of the number of pumps that are switched on, which in turn is determined by the number of boilers the system controller signals to run at any given time.

Due to seasonal variations in load, it is unlikely that all boilers will be required to fire together except in exceptionally cold winters, and so such a pump scheme will result in lower pumping requirements and associated energy costs for the majority of the season.

Pump energy usage is a factor to consider when deciding on unison or cascade boiler control when using the Merley sequence controller. See pages 12-15 for control options.

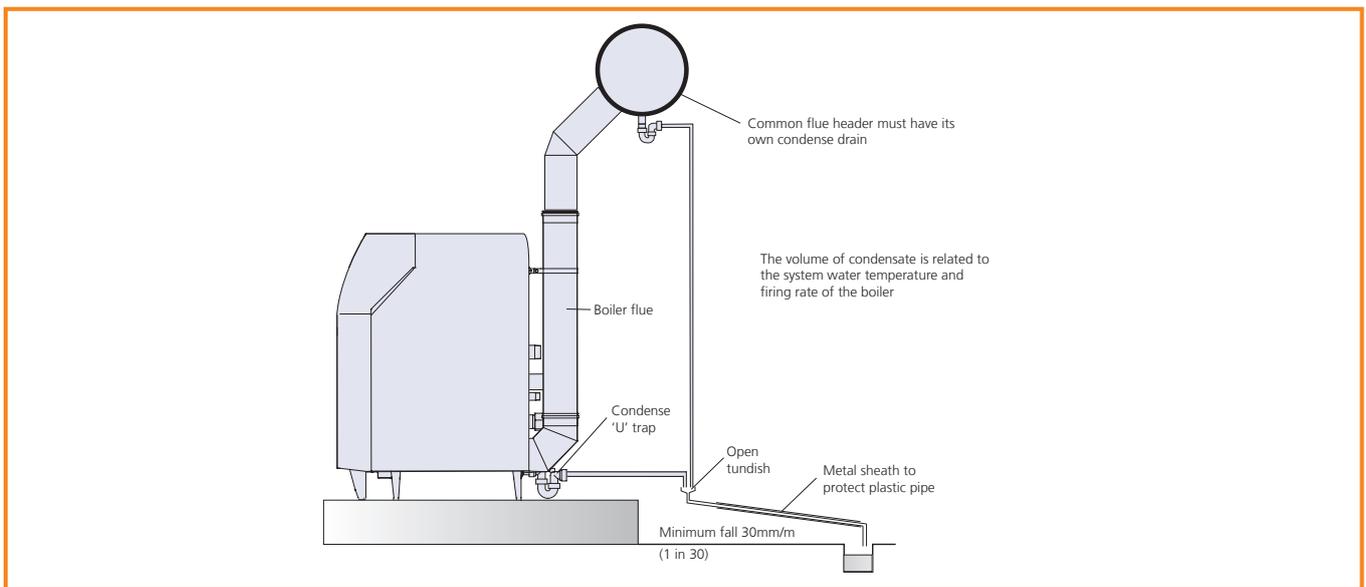
Condensate discharge and ventilation

Condensate discharge

The condensate drains safely into the base assembly and a 32 mm diameter drain connection is provided, to run in standard plastic waste piping. This condensate drain must be connected to a suitable drainage system, typically as shown below. The material should be a suitable PVC plastic system with sealed joints to prevent the escape of condensate.

Drain traps and an open tundish should be incorporated into the design, and the pipework given appropriate protection from physical damage.

The pipework should be installed with at least a 3 degrees fall (approximately 52 mm per metre).



Air supply and ventilation

An adequate supply of fresh air for combustion and ventilation must be provided in accordance with BS 6644.

The air supply should be achieved using:

- ⊗ Natural ventilation supplying air with a low level opening and discharge through a smaller sized high level opening.
- ⊗ A fan to supply air to low level with natural discharge through a high level opening.

A fan to supply air to low level and discharged by means of a fan at a high level.

Note: Fans must be selected such that a negative pressure is not created in the boiler house relative to outside air pressure.

The air supplied for boiler house ventilation should be such that the maximum temperatures within the boiler house are as follows:

- ⊗ At floor level: 25°C (or 100 mm above the floor level)
- ⊗ At mid level: 32°C (1.5 m above floor level)
- ⊗ At ceiling level: 40°C (or 100 mm below ceiling level)

The air supply should be free from contamination such as building dust. To avoid unnecessary cleaning and servicing, we recommend that the boilers are not fired whilst building work is being undertaken.

Where natural ventilation is used suitable permanent openings at low level and high level connected directly to the outside air should be provided. These openings must be fitted with grilles that cannot be blocked or flooded.

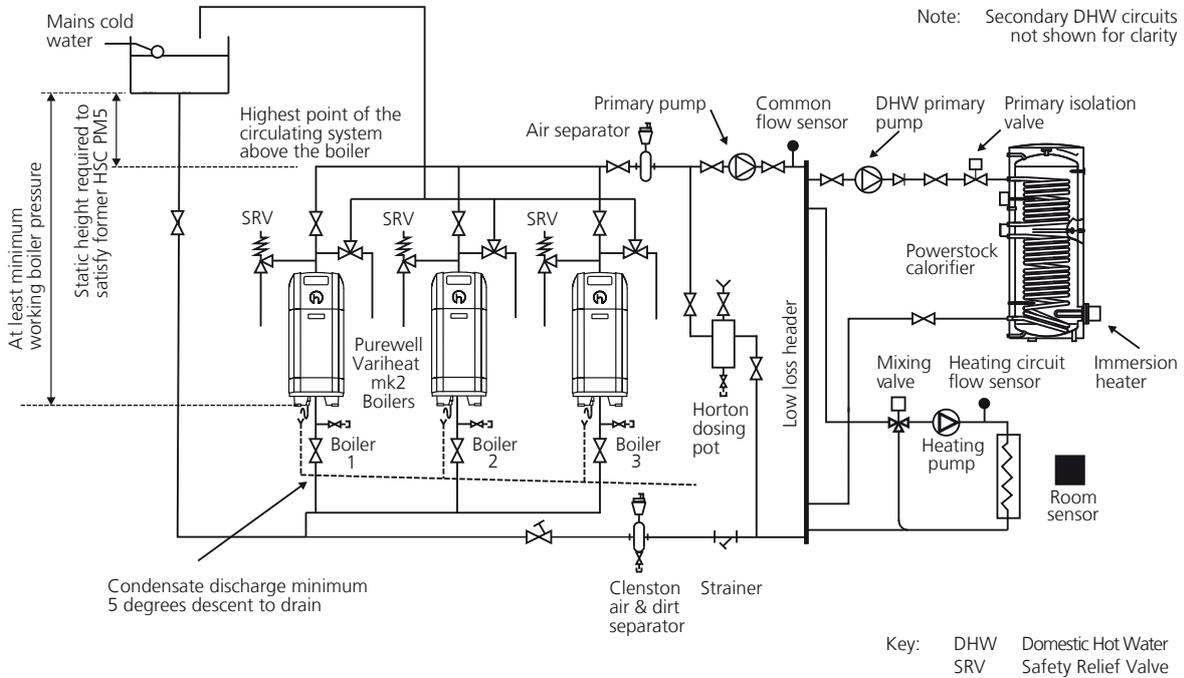
The free area of the grilles should be as follows:

- ⊗ At low level (Inlet)
4cm² per kW of net heat input.
- ⊗ At high level (Outlet)
2cm² per kW of net heat input.

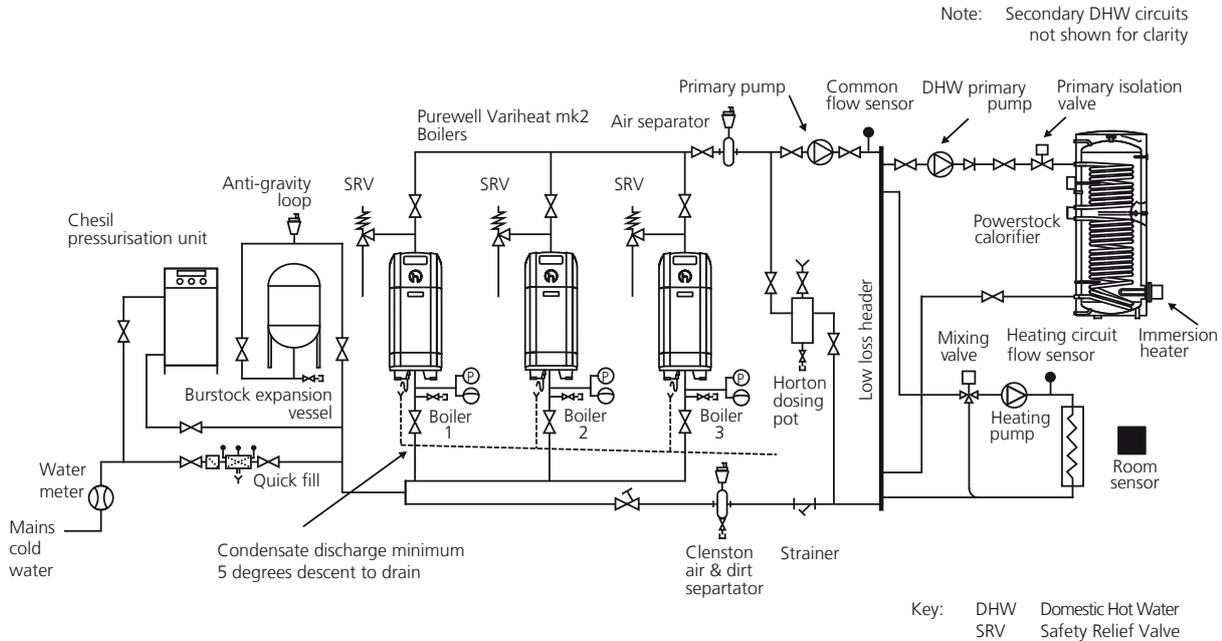
Where a boiler installation is to operate throughout the summer months, then additional ventilation allowances are required. Refer to BS6644 for more detailed information.

Hydraulic schemes

Scheme 1: Open vented system with low loss header



Scheme 2: Sealed system with system pump and low loss header

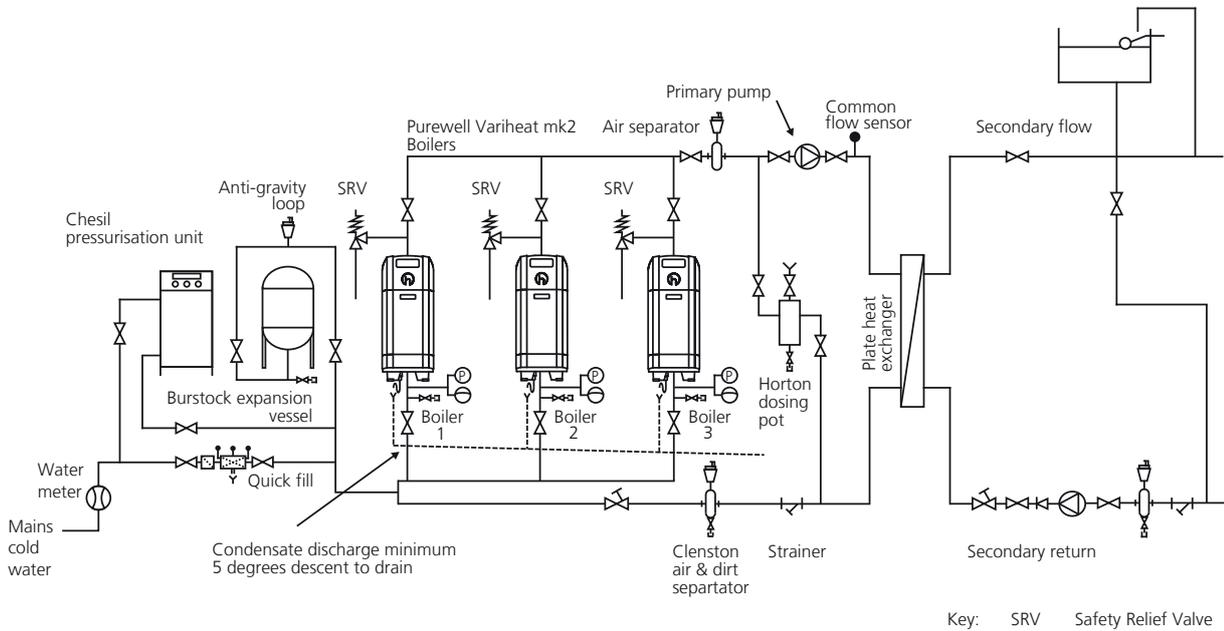


These schematics are available to download at www.hamworthy-heating.com

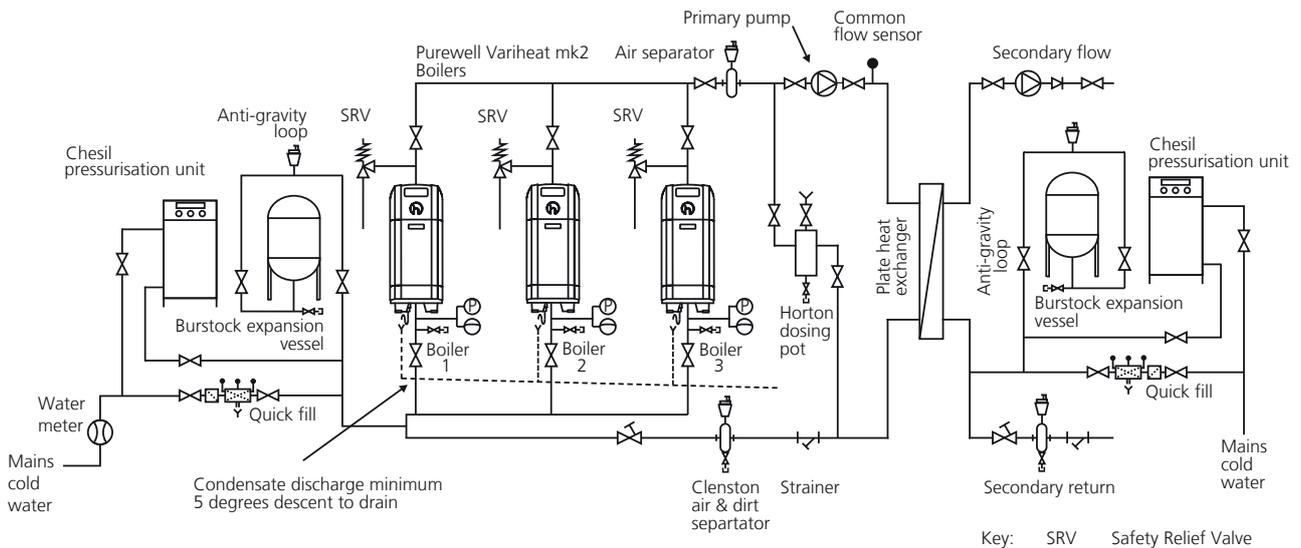
Note: These schematics have been provided for reference only.

Hydraulic schemes

Scheme 3: Sealed primary and open vented secondary system with plate heat exchanger separation



Scheme 4: Sealed system with plate heat exchanger separation

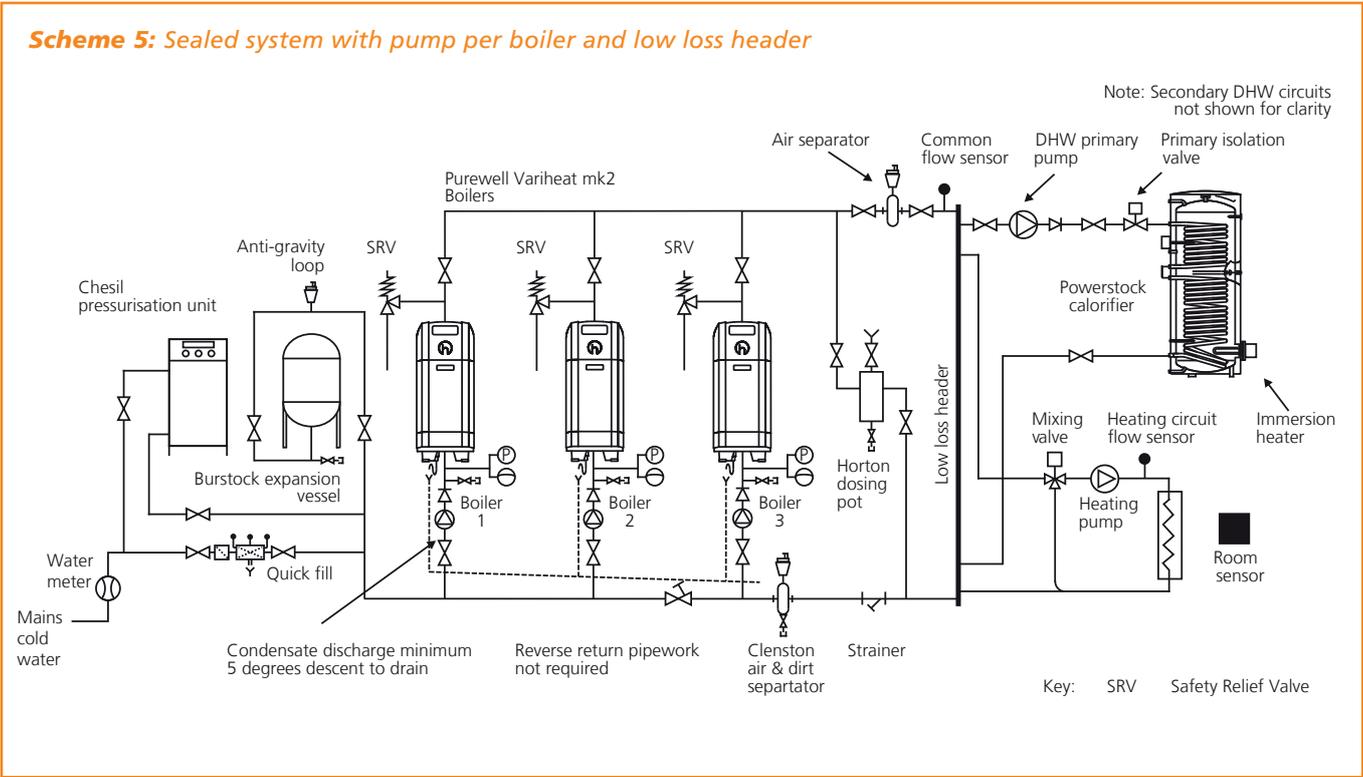


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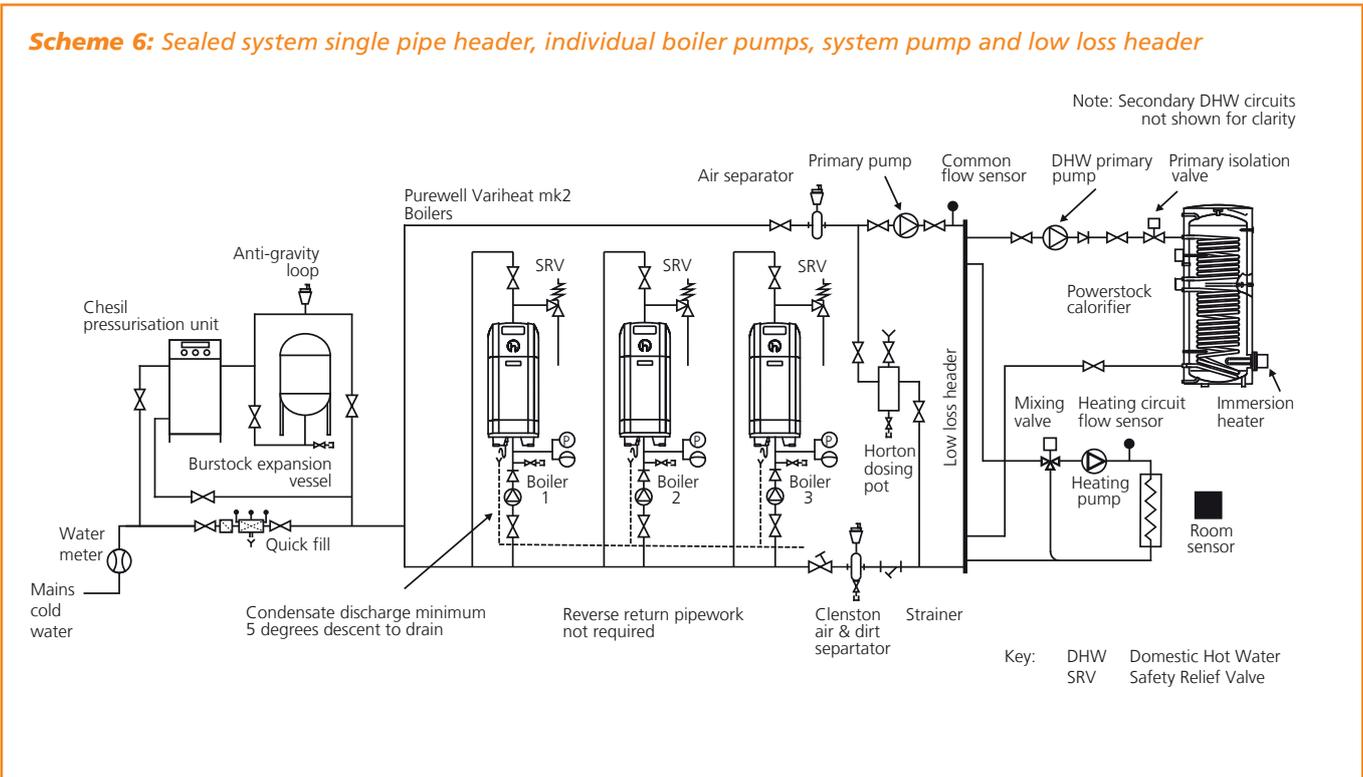
Note: These schematics have been provided for reference only.

Hydraulic schemes

Scheme 5: Sealed system with pump per boiler and low loss header



Scheme 6: Sealed system single pipe header, individual boiler pumps, system pump and low loss header

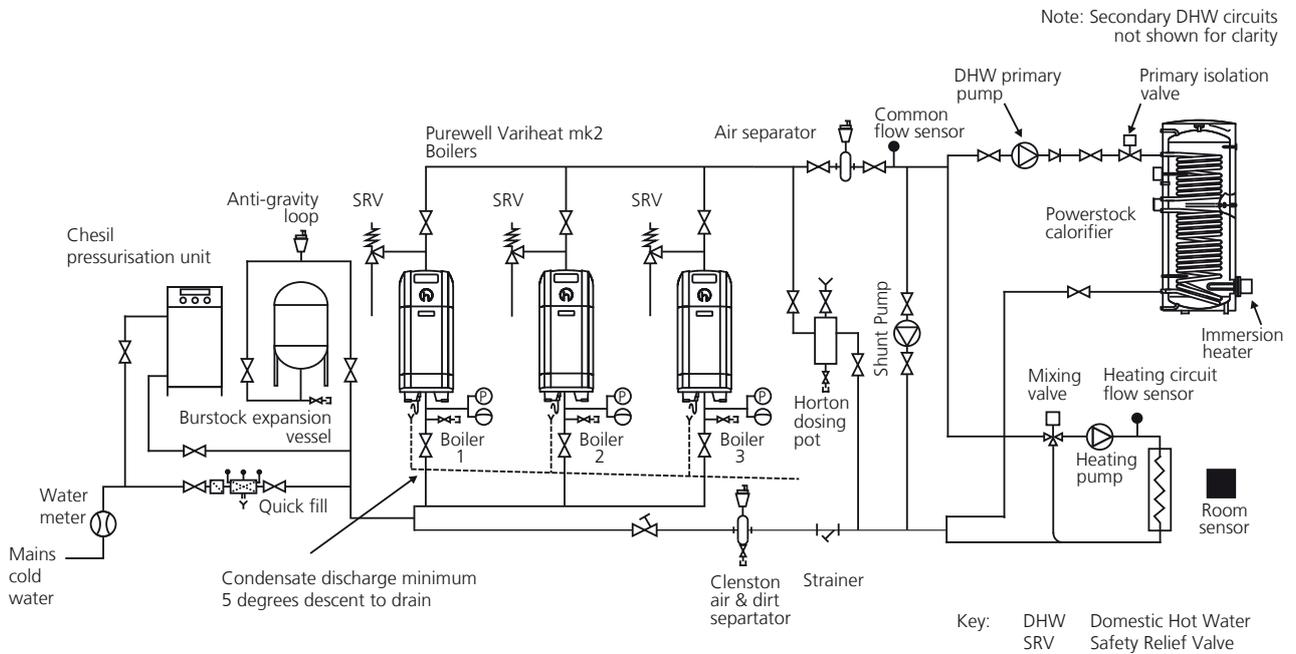


These schematics are available to download at www.hamworthy-heating.com

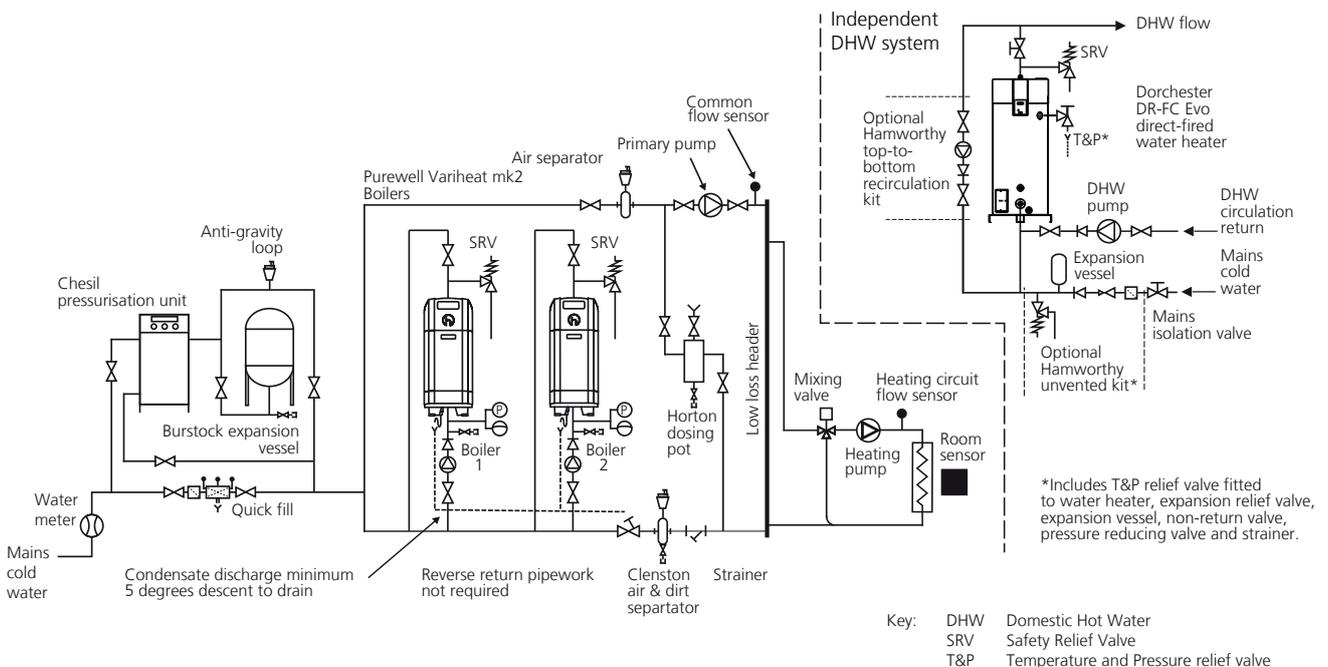
Note: These schematics have been provided for reference only.

Hydraulic schemes

Scheme 7: Sealed system without a low loss header



Scheme 8: Sealed single pipe system with independent direct-fired Dorchester DHW system



These schematics are available to download at www.hamworthy-heating.com

Note: These schematics have been provided for reference only.

Case study

Marlowe Theatre, Canterbury



Marlow Theatre, Canterbury.

Project

- ⊙ Theatre Redevelopment

Products

- ⊙ Purewell Variheat condensing boilers
- ⊙ Powerstock calorifier

Application

- ⊙ Space heating 660kW
- ⊙ Domestic hot water

The challenge:

The old Marlowe Theatre was created out of a former cinema and had a capacity of 1,000 seats. The building was redeveloped and now comprises a 1,200 seat auditorium, plus a smaller second auditoria, offices, bar and restaurant, amenities and service areas.

The old theatre was fitted with six Hamworthy UR atmospheric boilers from the 1980s that were no longer operating efficiently. As part of the theatre rebuild the heating needed to be reviewed.

Philip Kiss, Building Services Engineer at Canterbury City Council is tasked with reducing energy use across council run buildings in Canterbury and sees heating as a key part of this. He comments, "I take a considered view at each site to review what option would be best suited. I may look at renewable energy products but I do believe we need to reduce the demand before changing the method of delivery. This is why we have installed high efficiency condensing boilers from Hamworthy Heating across many of our sites, including the Marlowe Theatre."

The solution:

The old boilers were replaced with six Hamworthy Purewell Variheat 110kW cast iron, condensing modular boilers installed by Canterbury based contractor Halsion Limited. These boilers provide the heating for the 1,200 seat theatre via heating coils and air handling units in the auditorium. They are also the indirect heat source for a calorifier to supply the domestic hot water for the building's showers and taps.

The council has a Building Management System that controls the whole building. Philip monitors the gas consumption of the building and it now uses much less gas despite being a bigger theatre, and this is thanks to the efficiencies of the condensing boilers from Hamworthy Heating as well as improved building fabric.

Customer feedback:

Philip comments, "Prior to the rebuild in 2009, two of the boilers were changed to newer boilers and this helped to improve the efficiency of the system in the interim. **Compared to 2005, the gas usage per square metre of floor space has fallen from 212 to 80kWh per m² - that's a 62% saving.**"

"Despite a 36% increase in effective area to be heated by the boilers, the annual meter reading has almost halved falling from circa 760MW to 400MW over the 10-year period. This is saving the council money on fuel bills and is also better for the environment as there is a corresponding reduction in carbon emissions."

Philip concluded, "I have used Hamworthy Heating products for a long time now. They are well manufactured robust products that come with excellent back up and support from their staff. I will continue to advocate the use of condensing boilers as the savings I have seen from the Marlowe Theatre speak for themselves."



The Purewell Variheat condensing boilers have reduced **gas consumption by nearly 50%**. They provide the heating for the busy theatre as well as being the indirect primary heat source for the hot water via a Powerstock calorifier.

Want to improve your industry knowledge?

We're accredited with CIBSE to deliver approved Continuing Professional Development (CPD) courses.

It's our opportunity to share our knowledge with you. More than 3,000 people have attended our CPD seminars and 95% rated them as good or excellent.

Hamworthy CPD seminars are free to attend and our flexible approach means that we are able to tailor our training to suit your business. Lots of our customers choose to run these online at lunchtime or at their own premises so that there is minimal disruption to the working day.

“Very good session with lots of very detailed and relevant information. Would highly recommend!”



Book a free CIBSE-accredited CPD seminar for you and your colleagues today:
hamworthy-heating.com/cpd

CPD courses available:

- **New Boilers on Old Heating Systems: Hydraulic Design - A Story of Separation**
- **Best Practice Heating & Hot Water Plant Refurbishment**
- **Energy Saving in Commercial Heating and Hot Water - Could you save a £million?**
- **Best Practice in Domestic Hot Water (DHW) - 3 modules**



Product Training

Get hands-on training with Hamworthy's commercial boilers.

We can provide training onsite, online, or you can attend a course at one of our training centres. Delivered by Groupe Atlantic engineers with years of product knowledge and industry experience. By attending our training you'll be more confident in running our equipment.

The course will guide you through the servicing and fault finding of Hamworthy products to ensure they are operating at their maximum efficiencies.

Hamworthy's training centres are conveniently located across the UK.

Each training centre has live firing boilers as well as a display of boilers, water heaters and additional system equipment.

See the latest training dates and book your place online:
hamworthy-heating.com/training

Training courses available:

- **Purewell Variheat mk2 boiler**
- **Stratton mk2 wall hung boiler**
- **Wessex ModuMax mk3 boiler**
- **Upton boiler**



Services and warranty



Commissioning

We strongly recommend that all boilers are commissioned by our service department, and some specifications state that it must be carried out by the manufacturer. As well as ensuring your product is set up correctly for maximum efficiencies, you will receive extra benefits on warranty (see below). On completion, you will get a report with details of the initial operating settings.

Service

The Purewell Variheat mk2 boiler has been designed with ease of service in mind - all major serviceable parts are located on the top of the boiler. There is a mains power outlet making it easier for service engineers in plant rooms with no power outlets. The front cover is fitted on hooks and screws have been changed to dog points making it easily removable for access to all the components for maintenance and servicing.

The split mains and low voltage wiring harness helps to reduce the quantity of fault codes.

To maintain your boilers, we have a range of servicing options that can be tailored to your requirements. For more information on commissioning and service, please contact Hamworthy Heating service department.



Warranty

Hamworthy's confidence in the integrity and durability of the heat exchangers is such that both the primary cast iron heat exchangers and the secondary condensing heat exchangers carry our full 10-year warranty. All other parts carry Hamworthy's standard two years' warranty (except for consumables in line with our Terms and Conditions). Where the product is commissioned by Hamworthy service engineers within 6 months of delivery date, then the two-year warranty covers parts and labour from date of commissioning. We offer tailored packages to suit individual customer requirements, many of which include extended warranty benefits. Full details of warranty terms and conditions are available on request.



Spares

Essential to any maintenance and service regime is the availability of quality spare parts.

By coming to us, the Original Equipment Manufacturer (OEM), you can be assured of genuine spare parts and may also benefit from technological improvements. We have a long-term commitment to spare parts for our products.

Delivery

Each boiler is despatched fully assembled and factory tested with the casing and control panel fitted. Purewell Variheat mk2 boilers are delivered to site secured to a pallet to ensure safe manoeuvrability. The primary flue pipe is supplied separately for fitting on site. Standard delivery for all Hamworthy products is free of charge.

Deliveries are closely co-ordinated with the customer, to suit the site construction programme. Products are delivered to ground level and it is the responsibility of the customer to arrange movement of products from there to the required location on site.

To enquire about special delivery services including FORS and time critical deliveries (additional charges apply), please contact our customer services team.

Service

Tel: **01202 662555**

Email: **service@hamworthy-heating.com**

Spares

Tel: **01202 662525** Fax: **01202 662551**

Email: **spares@hamworthy-heating.com**

Complete your system

As well as energy efficient commercial boilers, we supply direct and indirect fired water heaters plus equipment to enhance the efficiency and longevity of your heating system.

From dosing pots and air & dirt separators for system cleanliness to pressurisation units and expansions vessels for sealed systems, Hamworthy can offer the support equipment needed for your system installation.



Burstock expansion vessel



Chesil pressurisation unit

System equipment

Chesil pressurisation unit

Wall hung and floor standing pressurisation units for sealed systems. Available in 5 models with single and twin pump options.

Burstock expansion vessel

Floor standing expansions vessels for use with sealed heating and hot water systems. Available in 10 models from 25 to 1000 litres.

Clenston air and dirt separator

For the removal of dissolved gas and air particles from heating systems. Available in 7 models to suit pipe sizes from DN50 to DN200.

Horton dosing pots

Chemical dosing pots for introducing chemicals into a sealed heating system. Available in 4 models from 3.5 to 15 litres capacity.

Hot water

Powerstock calorifiers and storage tanks

Glass lined calorifier for indirect domestic hot water production with single and twin coil options. Available in 7 models with continuous outputs from 569 to 1,858 litres per hour.

Glass lined storage tanks for domestic hot water available in 4 models with storage capacities of 300 to 990 litres.

Halstock calorifier

Stainless steel calorifiers for domestic hot water production with a single coil and vented and unvented options. Available in 5 models with continuous outputs from 344 to 1,055 litres per hour.

Dorchester direct fired water heaters

5 ranges of condensing and non-condensing direct fired water heaters with glass lined and stainless steel options to choose from. Available in over 22 models with continuous outputs from 228 to 2,400 litres per hour.

Trigon solar thermal system

A complete solar hot water system including solar collectors, transfer stations, and controller.



About Hamworthy



Hamworthy Heating is a leading British commercial boiler manufacturer. Our energy efficient heating, hot water and renewable solutions are used in buildings across the UK.

The Hamworthy difference

British engineering excellence

Here in the UK, we design, test, manufacture and source market-leading products. We know our products inside out, back to front and from start to finish. You can trust that we know what we're talking about.

Lifetime support

From design and specification, through to commissioning, training and maintenance, as well as commitment to spares availability. We provide long term support for businesses with their commercial heating and hot water needs.

People first

It's not just our products that set us apart, it's our people. Truly excellent customer service, great technical knowledge and being easy to deal with.

That's the Hamworthy difference.



Everyone's got history, we've got heritage

Our roots date back to 1914 when two brothers in Poole set up Hamworthy Engineering. Decades of experience go in to every nut, screw and bolt. Every phone call, text and email. Since 2008, we've been part of Groupe Atlantic, a company with a similar ethos to us. Groupe Atlantic was founded in 1968 by two engineers and is now one of the market leaders in the European heating and hot water industry. We're now part of their growing UK, ROI and North America Divisions.



Our associations

We are an active member of trade associations and professional bodies supporting the industries we work in.

Our accreditations

International Organisation for Standardisation (ISO) is the world's largest developer of voluntary International Standards. We are proud to have been awarded the following ISO accreditations:

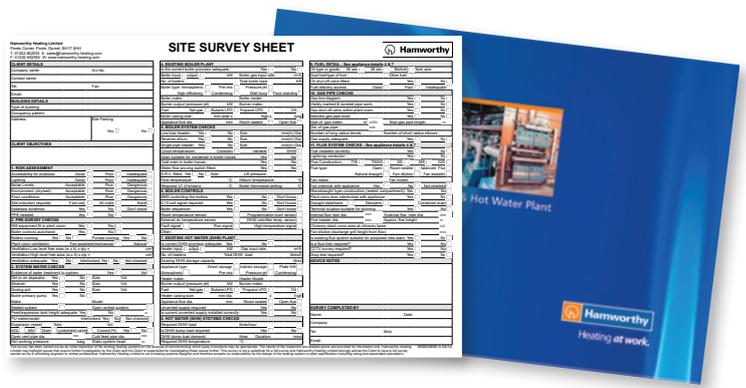
- ISO 9001 Quality Management System
- ISO 14001 Environmental Management System
- ISO 45001 Health and Safety Management System

When you deal with Hamworthy, have confidence that we're working within a defined set of standards that are internationally recognised.



Book a free site survey

hamworthy-heating.com/site-survey

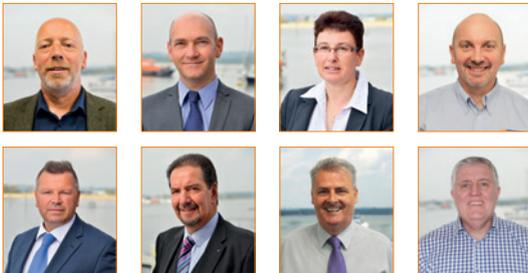


View our full CPD and product training offer

hamworthy-heating.com/cpd
hamworthy-heating.com/training

Download product literature and drawings

hamworthy-heating.com/technical-library



Find out who your local contact is

hamworthy-heating.com/find-your-local-sales-manager

Get information for discontinued products

hamworthy-heating.com/discontinued-products



Contact our in-house technical support team on

01202 662505

Your local contact is:

Placeholder for local contact information, indicated by four corner brackets.

**British engineering excellence from Hamworthy Heating;
the commercial heating and hot water specialists.**



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**SUPPORT BRITISH
MANUFACTURING**

Hamworthy Heating Accreditations

ISO 9001 Quality Management System
ISO 14001 Environmental Management System
ISO 45001 Health & Safety Management System



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Every effort has been taken to ensure the details in this guide are accurate. Hamworthy Heating does not, however, guarantee the accuracy or completeness of any information nor does it accept liability for any errors or omissions in the information.

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