



Hamworthy Wessex ModuMax 200 Series

High Efficiency, Fully Modulating Boilers
Condensing & Non Condensing
Pre-mix, Modular Gas Fired
Outputs 220kW to 750kW



Heating *at work.*

Wessex ModuMax 200 Series

High Efficiency, Low Emissions
Condensing or Non Condensing
Fully Modulating Pre-mix
Modular Gas Fired Boilers

The Wessex ModuMax is a compact floor standing range of boilers which offers the choice of high efficiency condensing or non condensing models.

In the 200 Series there are three condensing models with modulating outputs from 50kW to 250kW per module, giving total outputs of 250kW for the single module, 500kW for the two-module boiler and 750kW for the three-module boiler.

For those refurbishment applications that require a high efficiency performance operating at traditional 80°C flow temperature, the Wessex ModuMax non condensing models are available in three models with total outputs of 220kW, 440kW and 660kW respectively, all utilizing fully modulating modules with outputs from 44kW to 220kW.

The Wessex ModuMax 200 Series is the boiler solution for those upper range applications requiring outputs above 400kW, to achieve the optimum number of boilers and minimise life time costs associated with service and maintenance.

For the mid-range loads, the Wessex ModuMax 100 Series provides fully modulating condensing or non condensing solutions to retain excellent turndown and back-up for system security and maximum flexibility.

All Wessex ModuMax boilers are equipped with a control system that uses proven technology from a world class leader in building control systems, and utilises an LPB bus communications system which simplifies the controls requirements, using clip-in modules, integrating the boiler and building control capabilities. The optional cascade control module is able to manage up to 9 boilers in a multiple boiler installation.

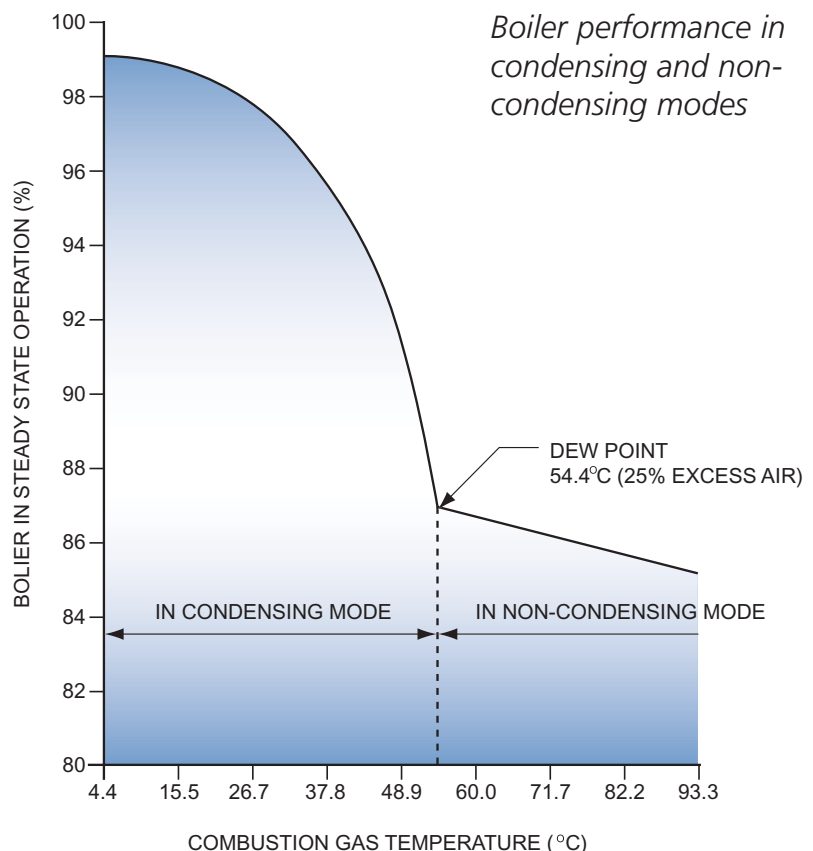
Options

- **Modulating sequence cascade controller**
- **Room sensor, with digital programmer**
- **LPB bus communications modules**
- **Pipework kits**

- **Energy saving condensing performance**
- **Very compact units, less floor space**
- **Fully assembled for fast installation**
- **Large waterways tolerant of older systems**
- **Lightweight for easier installation**
- **Comprehensive integrated control options**

BENEFITS

The Wessex ModuMax range of condensing and non condensing boilers gives system designers the choice of high efficiency solutions that all comply with the latest Building Regulations Part L.



Operating temperatures are one factor to consider in choosing between condensing and non condensing boilers.

Specification

Wessex ModuMax 200 Series Natural Gas

This new generation Wessex ModuMax range builds on the extraordinary pedigree of the Wessex boiler which was first launched in 1980. The Wessex ModuMax has a fully modulating pre-mix burner and can accurately match the building load requirements using the optimum number of boilers

Retaining the Wessex M Series philosophy, the modules can be assembled 1, 2 or 3 modules high, and the high efficiency performance now extends to condensing models in all sizes.

- 3 high efficiency, non condensing models with copper finned heat exchanger
- 3 condensing models with stainless steel heat exchanger
- Up to 10 bar water pressure
- Fully welded stainless steel combustion chamber
- European Class 5 NOx performance
- Flue connection with tri-lip seal
- BMS compatible
- Full modulation control with 0-10 volt analogue signal
- Optional pipework kits
- Optional sequence control system

The modulating burner operates to 20% of full output per module for very close load matching on demand.

The boiler casing is air cooled and requires no fibrous insulation material, increasing the environmentally friendly attributes of the product. Standing losses are extremely low, less than 1%, and the Wessex ModuMax range achieves the highest rating for low NOx emissions, European Class 5 performance.

The low water content enables the Wessex ModuMax range of boilers to provide rapid response to demand for heat, whilst the modulation responds to closely match the load, saving energy and reducing the number of firing operations, which saves wear and tear on the boiler.

High Efficiency (Non Condensing) Models

Wessex ModuMax high efficiency boiler, fully modulating, pre-mix, gas fired, 220kW modules, fully automatic, volt free contacts. Output @ 80/60°C.

Model	Output kW	No of Modules	Module Size (kW)
WM 220/220	220	1	220
WM 220/440	440	2	220
WM 220/660	660	3	220

High Efficiency Condensing Models

Wessex ModuMax condensing boiler, fully modulating, pre-mix, gas fired, 250kW modules, fully automatic, volt free contacts. Output @ 50/30°C.

Model	Output kW	No of Modules	Module Size (kW)
WM 250/250c	250	1	250
WM 250/500c	500	2	250
WM 250/750c	750	3	250

The Wessex ModuMax boilers feature a fully modulating pre-mix burner control system. An electronic thermostat monitors the boiler operating conditions and automatically adjusts the output to suit.

The gas/air ratio control system ensures that clean and efficient combustion is maintained throughout the maximum modulation range, down to a minimum of 20% capacity.

Ultra Compact

For the space conscious designer, large boiler outputs are easily achievable within a minimal environment. The ModuMax range packs nearly 1MW into just one square metre of floor space. This unprecedented output changes the requirements for all future plant rooms, not only by saving space but also by providing condensing performance to maximise efficiency.

Low Weight Design

The boiler's lightweight design, compared with traditional cast iron sectional boilers, offers perfect solutions for roof top installations without the need for excessive structural reinforcement.

Around one-third of the weight of conventional boilers, the Wessex ModuMax 200 Series weighs in at approximately 1kg per kW output.

The Wessex ModuMax 100 Series satisfies the mid-range loads, providing fully modulating condensing or non condensing solutions ranging from 110kW to 360kW. To satisfy the smaller outputs, Hamworthy has the Sherborne wall hung high efficiency and condensing, fully modulating pre-mix boilers (65kW and 70kW outputs), which can be open flued or fitted with a room sealed balanced flue.

For further details of Wessex ModuMax 100 Series boilers please refer to publication 500002351, and for Sherborne boilers refer to publication 500002216

Specification

Wessex ModuMax 200 Series

Construction

The Wessex ModuMax boilers have individual combustion chambers which allow any module to be fired in any sequence, to achieve even usage of the modules. Each combustion chamber is manufactured from high quality stainless steel and is fully welded to ensure watertight containment of condensate.

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

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

Each assembled boiler has a pallet design base and can be manoeuvred easily using a pallet truck, and will pass through a standard single doorway.



Easy handling through a single door

Heat Exchanger

All Wessex ModuMax boilers have a highly efficient cylindrical primary heat exchanger. The high efficiency non condensing models have a heat exchanger constructed from copper finned tubing. The tubes are expanded at each end into cast iron tube plates. These tube plates are sectioned to provide even flow through each tube in a multi pass arrangement.

The relatively large 22mm diameter tubes combined with the high water flow velocities considerably reduces the risk of blockage in comparison with alternative heat exchanger designs, which have smaller waterways.



Section of copper finned heat exchanger tube

The condensing primary heat exchanger is also a multi-pass finned tube construction using high quality stainless steel to withstand the corrosive nature of the condensate.

Hot Surface Ignition

Fully automatic ignition is achieved utilising a hot surface ignition system. This highly effective and reliable form of ignition requires less maintenance than conventional spark ignition and eliminates electrical interference that is sometimes associated with that type of system. Flame proving is achieved using a flame rectification probe. The Wessex ModuMax boilers are fitted with a transformer to reduce the mains voltage to 120volts for the hot surface ignition supply, providing a more reliable power system.

The Gas Train

A zero governor gas valve is used to precisely control the mixture of gas and air entering the burner as the firing rate modulates. This is achieved by measuring the pressure drop across a venturi at the fan inlet and adjusting the gas pressure accordingly.

Combustion Air Intake

Incoming combustion air is pre-heated by directing the flow through the innovative casing design, contributing to the efficiency performance. The flow of combustion air also serves to insulate the boiler casing panels and removes the need for insulation material in the casing.

Burner

A cylindrical burner is positioned centrally within 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 thus lowers NOx emissions.

Continuous seamless modulation on the Wessex ModuMax 200 Series provides outputs from 250kW to 50kW on the condensing models, and from 220kW to 44kW on the non condensing high efficiency models.

Thermostats

All Wessex ModuMax Series boilers are fitted with a manual reset limit thermostat, which has a range of 90-110°C. This will normally be factory set to 100°C.

An electronic temperature control thermostat regulates the boiler flow temperature up to a maximum of 90°C.

To accommodate multiple boiler installations the limit thermostat is adjustable up to a maximum of 110°C however 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 ModuMax boiler also incorporates a return temperature sensor which in conjunction with the flow temperature sensor governs the modulation set point of the boiler.

Water System

The Wessex is designed for a maximum working pressure of 10 bar. Each module is supplied with a connection for fitting a pressure and temperature relief valve, (not Hamworthy supply).

Where 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.

Power Supply

An independent isolator and fused electrical supply is recommended for each module, to enable each module to be shut down without losing the entire boiler output.

230 volt, 50Hz single phase.

Remote Signalling

Volt free contacts are fitted as standard to all models to indicate common fault and normal run. The contacts are BMS compatible and allow the boiler to connect to a Building Management System to monitor boiler operation and status.

Delivery

Wessex ModuMax Series boilers are supplied fully assembled from the factory. The assembled boiler can be easily manoeuvred using a pallet truck and will pass through a standard single doorway.

The 440, 500, 660, and 750 models are supplied with a separate close-coupled flue header, which has to be fitted to the boiler on site.

Commissioning

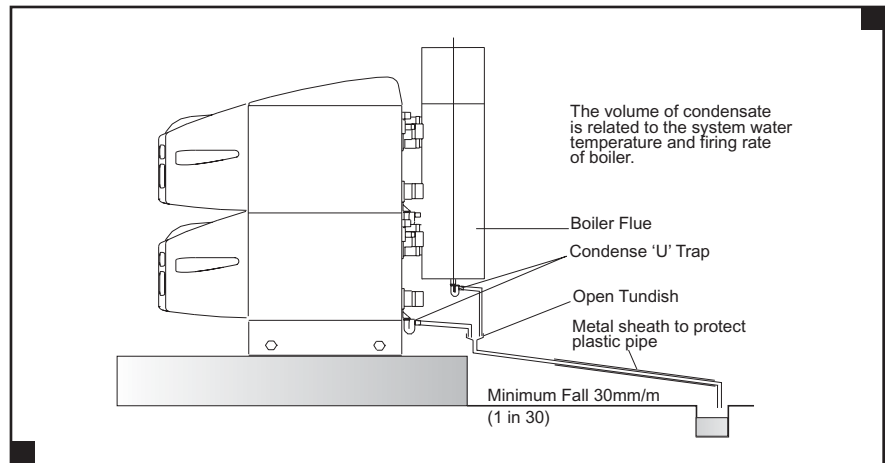
Hamworthy Heating strongly recommends that all boilers are commissioned by their service department. On completion, Hamworthy will issue a boiler log book which will provide details of the initial operating settings. The log book should be used to record any future maintenance and service work.

For more information on commissioning contact Hamworthy Heating Service Department:

Tel: 0845 450 2866

Condensate Discharge

Due to the high thermal efficiency of all boilers, condensation will occur within the boiler casing during firing from start-up, low load conditions, and on the condensing models when the return temperature falls below 55°C. A drain with an integral trap is fitted to the rear centre of each module to enable the disposal of the condensate.



The condensate drains on the boiler must be connected to a suitable drainage system, typically as shown above. The material should be a suitable PVC plastic system with glued sealed joints to prevent the escape of condensate.

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

The pipework should be installed with at least a 3 degrees fall (approximately 50mm per metre). In addition to the boiler condensate drain, the two-module and three-module boilers have a condensate drain connection fitted to the close-coupled flue header. This is a 22mm diameter drain stub which should be connected in a similar manner via a suitable trap.

Flue System

Each of the boiler variations is designed for direct connection to a flue system. The two-module and three-module boilers are supplied with a separate close-coupled flue header, and the outlets from more than one boiler may be connected to a single chimney.

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

The flue system must be capable of handling the wet flue gases, and horizontal sections should incorporate a fall for drainage of the condensate that forms in the flue system.

The Hamworthy Masterflue MF system is designed specifically for high efficiency condensing boilers and features fully welded construction and a unique factory fitted tri-lip silicone sealing ring with every component. The Masterflue MF range of components also includes a standard range of tees and elbows at 87 and 43 degrees to facilitate easy drainage without alignment problems.

Refer to page 11 for further details on the Flue System.

Controls

Integrated Systems

The Wessex ModuMax is a range of modular boilers for use in multiple boiler installations for commercial applications. Equally, the Wessex ModuMax can be used as a single boiler installation.

The full benefits of installing high efficiency condensing boilers can only be realised if the heating system is equipped with appropriate controls, that integrate the boiler and the other system components, to create a cohesive solution.

For that reason, the Wessex ModuMax range of boilers incorporate a control system that is easy to integrate and communicates with the leading building management system protocols.

The microprocessor based boiler control system (LMU) accommodates clip-in modules providing relay contacts for remote alarm and signalling, for external control and LPB bus communications, for use with the boiler Cascade controller for multiple boiler installations.

All external connections are made direct to the LMU, simplifying the installation of the boiler.



Clip in modules on the LMU

The Wessex ModuMax boiler incorporates a number of inbuilt and optional controls features that enable the end user to achieve desired operational mode whilst maintaining the optimum efficiency of the system.

The controls are housed within a fabricated steel enclosure, and each module fascia features a visual display allowing the user to monitor the current operating status of the boiler. The panel also displays comprehensive fault code information in the unlikely event of a boiler lockout.

Volt Free Contacts

All Wessex ModuMax modules are fitted with a multi-function clip-in module to provide volt free contacts as standard.

Remote alarm signalling is provided for a general fault alarm and boiler normal run indication.

0-10 Volt DC Analog Input

The standard multi-function clip-in module also provides a 0-10 volt DC analog signal interface to control the modulation level of the burner, or to set the flow temperature set point. The 0-10 volt signal can be used for remote connection of the boilers to a Building Management System, (BMS) to enable modulating control remotely.

LPB Bus Communications Module

The optional LPB bus communication clip-in kit is used to connect the boiler LMU control unit to the optional Cascade sequence control module. Each boiler in a modular installation requires a clip-in LPB bus communications module to communicate with the Cascade controller.

Outside Temperature Sensor

Wessex ModuMax boilers can be supplied with an optional outside temperature sensor to exploit the full functionality of the boiler controls and enable direct temperature compensation on the boiler, maximising the condensing operating conditions. The outside temperature sensor is to be used in conjunction with the optional Cascade control module

When fitted with an outside temperature sensor, the boiler's own thermostat is overridden and the flow temperature is controlled as a function of external temperature conditions. The flow temperature is adjusted according to a preset heating curve built into the standard boiler controls. This slope can be adjusted to suit the needs of individual systems by for example using a steeper slope on underfloor heating systems.

Room Sensor with Digital Programmer

An optional combined room sensor and digital programmer can be connected to the boiler to provide both temperature control of ambient conditions and to programme up to three daily periods for heating or hot water.

Note: An outside sensor must be used when using the room sensor and programmer.

Separate ambient temperatures can be set for each time period with an override facility, enabling the user to switch the system either on or off at their request. The programmer will display the current system operating parameters and also indicate any boiler fault conditions that might occur.

The boiler control system features a two stage frost protection system. When the boiler is not operating, the frost protection system fires the boiler to maintain a minimum water temperature, to prevent freezing of the heating system water. Additionally, if an external temperature sensor is connected, the circulation pump will be run intermittently when the outside temperature falls below 1.5°C.

Cascade Control Module

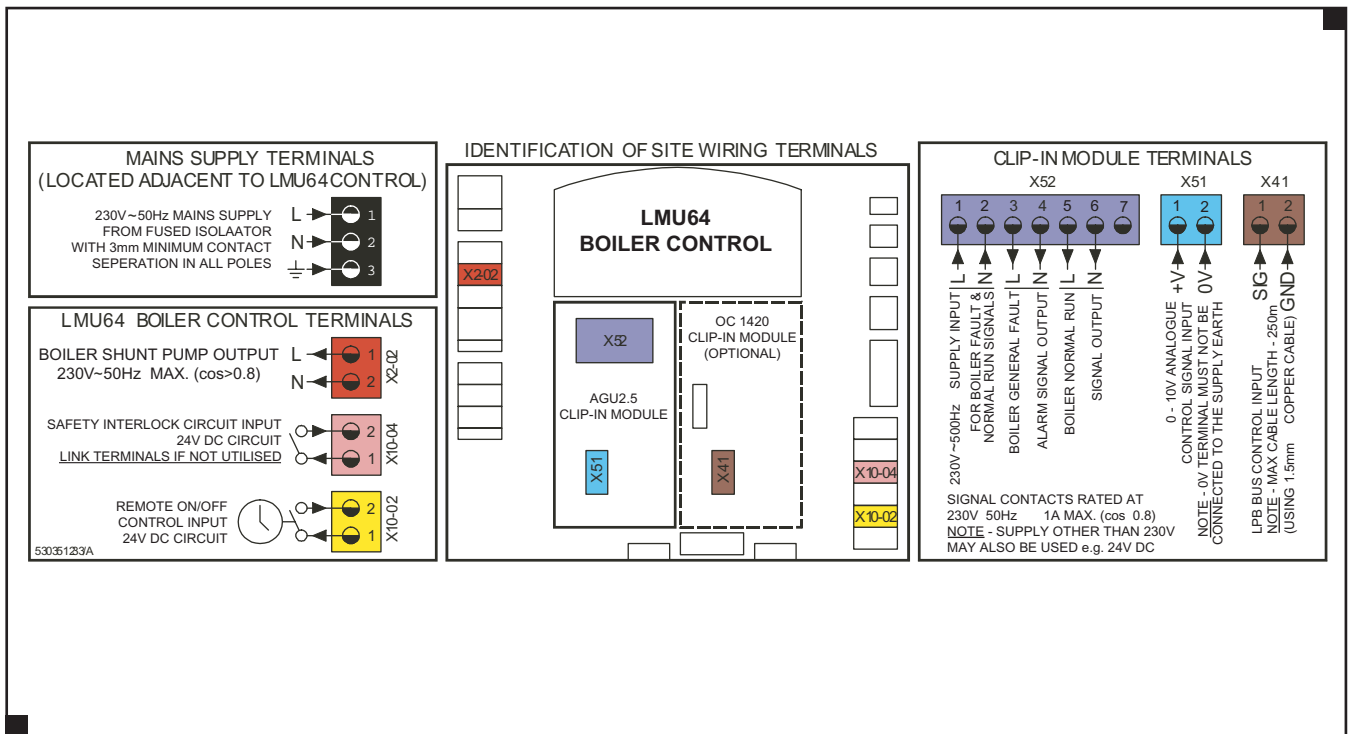
For use with multiple boilers, the optional Cascade controller can sequence up to 9 modules. The controller is supplied with two clip-in LPB bus communications modules as part of the standard Cascade kit, and for each additional boiler in the modular installation, further clip-in LPB bus communications modules must be ordered separately. (IE: A four module installation with a Cascade control kit requires two additional LPB modules).

Wiring Diagram

Wessex ModuMax 200 Series

The following electrical connections are provided on each module

- Supply Live, Neutral and earth.
- Supply input for boiler Fault and Normal Run Signs
- Boiler General Fault Alarm Signal Output
- Boiler Normal Run Signal Output
- 0-10v Analogue Control Signal Input
- Remote on/off Control Input
- Boiler Shunt Pump Output
- Safety Interlock circuit Input



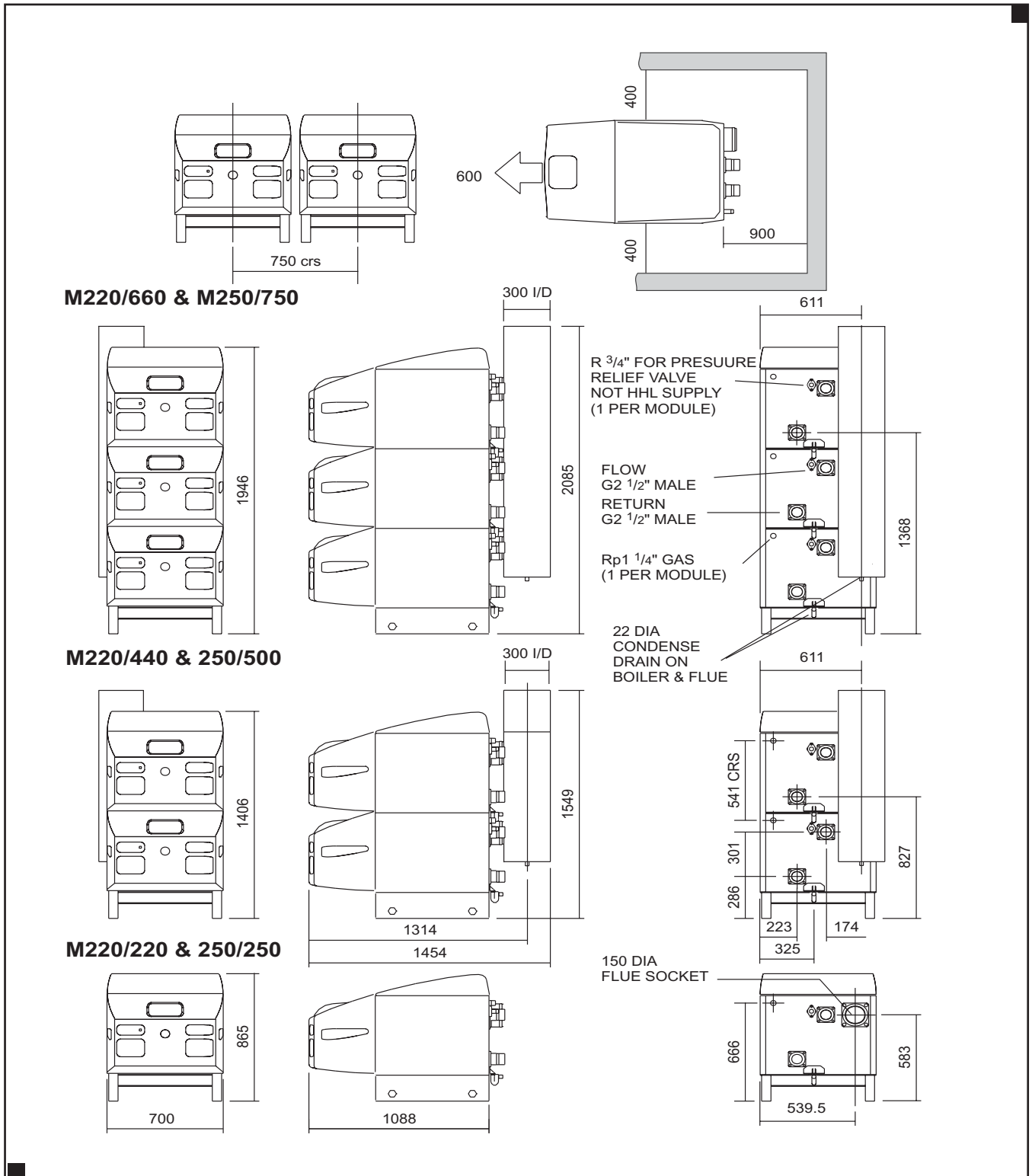
Technical Data

Wessex ModuMax 200 Series - Performance and General Data

Boiler Model Number of Modules		High Efficiency			Condensing			
		220/220 1	220/440 2	220/660 3	250/250 1	250/500 2	250/750 3	
Energy	Boiler output 80/60	kW Btu/h x 1000	220 750	440 1501	660 2252	246 839	493 1682	739 2521
	Boiler output 50/30	kW Btu/h x 1000	NA NA	NA NA	NA NA	250 853	500 1706	750 2559
	Boiler input (gross) Maximum	kW Btu/h x 1000	262 894	524 1788	787 2685	293 1000	585 1996	878 2994
	Boiler input (nett) Maximum	kW Btu/h x 1000	236 805	472 1610	708 2416	263 897	527 1798	790 2695
	Boiler output Minimum 80/60	kW Btu/h x 1000	44 150	88 300	132 450	49 167	98 336	147 504
	Boiler output Minimum 50/30	kW Btu/h x 1000	NA NA	NA NA	NA NA	49 167	98 334	147 502
Water	Water content (not including headers)	litres	17	34	51	22	44	88
	System design flow rate across boiler @ 20°C Δt rise @ 30°C	l/s	2.63	5.26	7.88	2.98	5.96	8.94
	System design flow rate @ 11°C Δt rise	l/s	4.78	9.56	14.33	5.44	10.88	16.32
	Water side pressure loss @ 20°C Δt rise	mbar	40	40	40	395	395	395
	Water side pressure loss @ 11°C Δt rise	mbar	120	120	120	1303	1303	1303
	Maximum water pressure	barg	10					
Gas	Gas flow rate natural gas (G20) - Maximum	m³/hr	24.99	49.97	74.96	27.9	55.75	83.63
	Nominal gas inlet pressure natural gas (G20)	mbar	20					
	Maximum gas inlet pressure natural gas (G20)	mbar	25					
Flue	Approx. flue gas volume @ 8.7 - 9.3% CO ₂	m³/hr	329	659	988	367	734	1101
	Approx. flue gas temperature @ 80/60	°C	135	135	135	87	87	87
	No. Emission (DAF) European Class 5	mg/kWh	37-68					
Connection	Pressure at flue outlet	Pa	15	15	15	10	10	10
	Water flow/return connections		G2 ½" m					
	Gas inlet connection pipe thread size		R1 ¼" m					
	Nominal flue diameter (I/D)	mm	150	300	300	150	300	300
	Condensing trap connections		22					
Electrics	Nominal supply voltage	V	230v					
	Power consumption - maximum	W	250	500	750	250	500	750
	Module start current	Start Amps Run Amps	1.3 0.9					
	Approx. shipping weight	kg	220	430	635	207	417	622
	Noise emission @ 1m	Max dB (A) Min dB (A)	65 47					

Dimensional Details

Wessex ModuMax 200 Series - Boiler Dimensions and Clearances



Modulating Boilers

Optimising Life Time Performance

Accurate load matching is one of the key advantages of using multiple boilers. When first introduced, modular boilers operated in a basic mode, where modules were switched on or off to meet the system demand for heat. The requirement for turndown was met by increasing or decreasing the number of modules (boilers) in an installation.

As boiler designs advanced, so two stage modular boilers became more popular, and high/low firing boilers changed the parameters for turndown. Today, most high efficiency boilers have fully modulating capability and this once again changes the methodology for achieving close control in a multiple boiler installation.

When selecting modulating high efficiency boilers, consideration should be given to the life time costs associated service and maintenance of the boilers. Opt for too many small output (kW) boilers and the servicing costs will be higher, whereas too few large output (kW) boilers will result in less back up and system security. It is important therefore to select the optimum size boiler output and number of modules to achieve a balanced life time cost and ensure system security.

The Hamworthy range of Wessex ModuMax boilers has been designed to satisfy the majority of commercial system loads, using module sizes in the 100 Series or 200 Series which modulate to 20% of full load, to enable accurate load matching using the optimum number of boilers.

For mid-range commercial loads, the Wessex ModuMax 100 Series features 110kW modules in the high efficiency non condensing range or 120kW modules in the condensing range, each module offering a 5:1 turndown. For the higher output commercial loads, the Wessex ModuMax features 220kW modules in the high efficiency non condensing range, or 250kW modules in the condensing range.

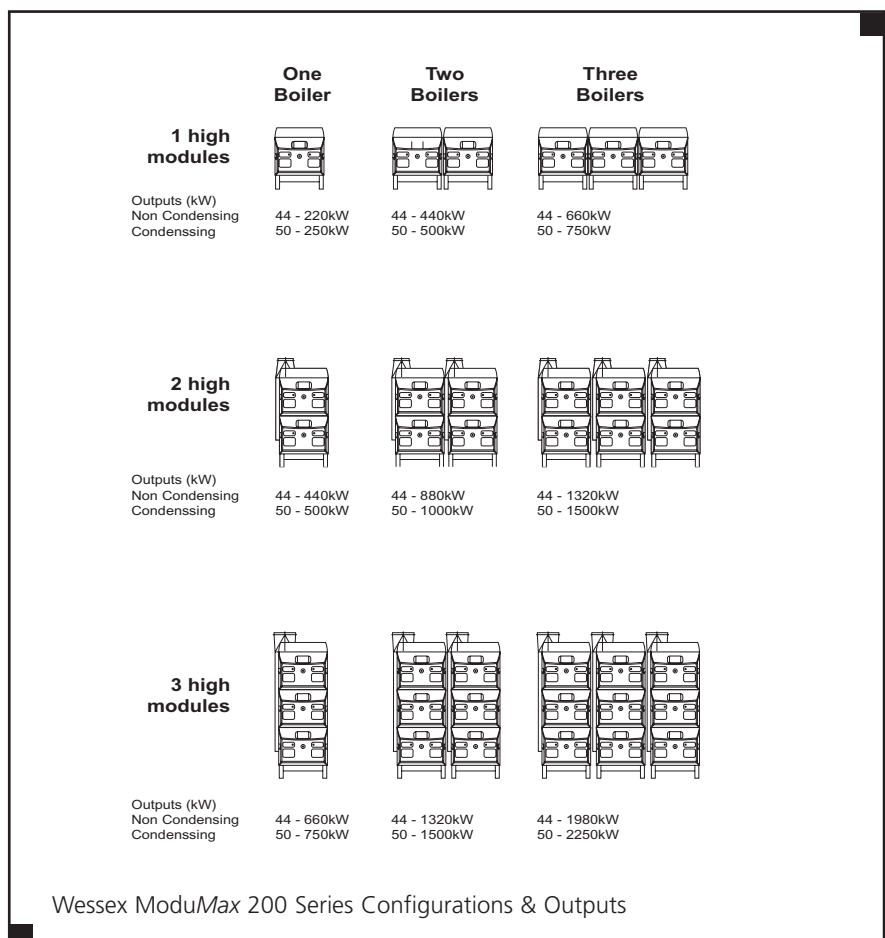
For further details of the Wessex ModuMax 100 Series, refer to publication 500002351

Advantages

- **Closely matched module size reduces number of modules required.**
- **Fewer modules, lower servicing costs**
- **3 modules per boiler reduces installation time and costs**
- **Integrated sequence control simplifies operation**
- **Easier load sharing to reduce wear and tear**

The flexibility of the Wessex ModuMax range means there is a configuration to meet the constraints of most plant rooms, and in most cases can reduce the size of plant room required.

Boilers can be arranged horizontally or vertically, up to three modules high to give outstanding space utilisation. Two and three high modular boilers are supplied complete with a close coupled flue header to simplify installation.



Flue System

Wessex ModuMax Boilers

Hamworthy Wessex boilers are designed to be used with natural draught flue systems, which should be designed in accordance with current regulations.

The following points should be noted:

- The boiler is designed for connection to a single flue system, or a common flue header, where part of a multiple boiler installation.
- The Wessex ModuMax has a low draught requirement and is therefore able to operate with a low chimney, improving the aesthetic appearance of the building exterior.
- The flue system should be designed to maintain atmospheric pressure or a slight suction at the boiler flue connection at all times.
If at any time the suction is likely to exceed 0.1 mbar (0.04 in wg), it is recommended that a draught stabiliser be fitted to the flue system.
- High efficiency and condensing boilers have low exhaust gas temperatures, therefore it is important to retain temperature within the flue using a twin wall flue system. For longer flue runs, single wall flue may be combined to reduce flue costs.
- 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.
- The Wessex ModuMax boilers are suitable for installation in a balanced compartment in accordance with the requirements of BS 6644.

Flues from Hamworthy

The Masterflue MF system from Hamworthy is a modular, twin wall, insulated, fully welded flue solution, optimised for high efficiency and condensing boiler applications.

Leak-Free

- Unique factory fitted tri-lip silicone gasket as standard - leak proof, high temperature seal, impervious to water and vapour.
- All components fully welded and pressure tight, including traditionally troublesome elbows.

Corrosion-Free

- Premium grade stainless steel construction for inner and outer walls.
- 87 degree elbows and tees to ensure condensate drains effectively.

Worry-Free

- Fast, push-fit assembly with no need for additional sealants.
- Precision finished, reliable components for high quality installation.
- Range of 'Tru-Align' adjustable wall brackets for simplifying alignment, achieving a faster installation and neater finish.
- Continuous insulation from base to stub.
- Fire resistant - 4 hour fire rated.
- Stress-free thermal expansion.
- CE mark accredited to meet 2005 legislation.

The Masterflue range from Hamworthy also comprises 3 further specialist flue lines:

Masterflue ME - single wall, fully welded flue system.

Masterflue AG - gas vent system for atmospheric appliances.

Masterflue BF - balanced flue system.

Design & Install, or Supply Only

Hamworthy's extensive knowledge of combustion systems, and the flue requirements for each boiler, makes a boiler and flue package the perfect solution for every project.

Offering a comprehensive range of flue and chimney equipment for natural draught, fan assisted and fan dilution applications, Hamworthy will provide a full design and installation service incorporating sizing, site survey and drawings for approval (where necessary) prior to installation. All this with the added benefit of a single commissioning visit for boiler and flue system together.

Alternatively, Hamworthy can provide components on a supply only basis for the contractor to install.

Speak with Hamworthy about your flue requirements and get peace of mind on your next project - guaranteed.

Phone 0845 450 2865

Email flues@hamworthy-heating.com



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

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