Hamworthy Melbury HE

High Efficiency Steel Shell
Power Flame Boilers
Gas, Oil, Biofuel or Dual Fuel Burners
Outputs 530kW to 10000kW

CE

Hamworthy

Heating *at work.*

Melbury HE

High Efficiency
Steel Shell Boilers
Gas, Oil, Biofuel or Dual Fuel

For buildings with high heating and hot water energy demands in commercial and industrial applications, the Melbury HE provides excellent performance for the reliable delivery of low temperature hot water (LTHW).

There are 19 models in the range with outputs from 530kW to 10000kW, with a choice of fully modulating or high low matched burners, delivering operating efficiencies up to 93% nett (84% gross). The high efficiency performance of the Melbury HE exceeds the minimum requirements of the Building Regulations, and provides a cost effective solution for high heating load projects.

The burner options give a choice of fuel; Natural gas or oil. Selected models are also suitable for dual fuel arrangements.

Oil burners are suitable for 28 second Kerosene and 35 second gas oil and where matched burners are available, FAME and RME blends of liquid biofuel may be specified, offering sustainable energy solutions.

The heat exchanger is a three-pass design rated to 6 bar working pressure, which incorporates an innovative feature to reduce turbulence in the combustion chamber, which in turn reduces the production of thermal nitrogen oxide (NOx).

Additionally, there is a range of low NOx matched burners to further improve the environmental credentials of the boiler.

The thermal mass within the Melbury HE boiler can accommodate fluctuating operating conditions, and with no minimum water flow requirement, eliminates the need for a shunt pump, simplifying the hydraulic system design.

Options

- **Natural gas, oil, biofuel or dual fuel burners**
- **High low or modulating burners**
- **Low NOx burners**
- **Flue gas economiser**

BENEFITS

- **Cost effective solution for high system loads**
- **Sustainable energy solutions**
- **Economical and reliable operation**
- **No minimum water flow**
- **Low standing losses**
- **Robust heat exchanger design**
- **Lower NOx emissions**

The option to use liquid biofuel allows the Melbury HE boiler to be specified where sustainable energy solutions are a requirement.

Melbury HE boilers 580kW to 3000kW

Specification

Melbury HE

The Melbury HE is a high quality steel shell boiler range, designed to deliver high outputs and high efficiency performance.

The boilers can be used individually, or in multiple boiler configurations, and are suitable for use on open vented or sealed low temperature hot water heating systems. For domestic hot water (DHW) production they can be used in conjunction with the Hamworthy Powerstock range of calorifiers.

Low NOx Performance

Melbury HE boilers are designed with a three-pass heat exchanger to maximise heat transfer and performance of the boiler.

An innovative and patented element of the design is the second-pass heat transfer tubes with swept entry, to reduce turbulence within the combustion chamber, improve the flow of hot gases into the tubes and effectively evacuate heat away from the combustion chamber, which in turn reduces the production of thermal nitrogen oxide (NOx).

Low NOx Burners

For further reduction in emissions, low NOx burners are available for natural gas. Where low NOx burners are used, the nominal boiler output is slightly reduced. *For further details please contact our technical department. Tel: 01202 662500.*

Low Flow Rate

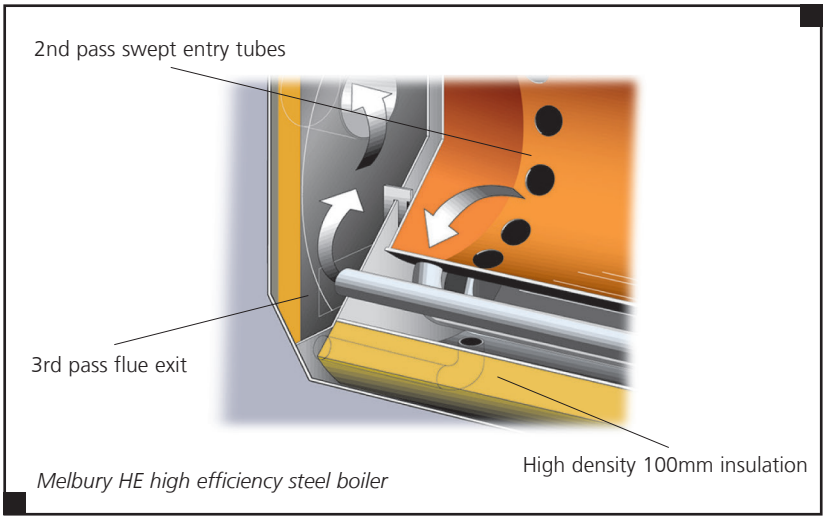
The design of the Melbury HE boiler is such that it is not necessary to maintain flow through the boiler because there is sufficient thermal mass to absorb residual combustion heat, without tripping the high limit thermostat.

This allows more flexible heating system design and eliminates the requirement for primary circuit pumps or boiler shunt pumps, so reducing energy consumption.

Minimum flow temperatures must be maintained at all times.

Back End Protection

Each boiler requires suitable back end temperature protection to ensure minimum return temperatures are maintained within the boiler, thereby preventing formation of condensate. *For further information, please refer to the schematics on page 16.*



Melbury HE high efficiency steel boiler

Construction

The boilers are manufactured from high quality steel, with the multiple second and third pass tubes arranged radially around the combustion chamber.

A large hinged door provides ease of access to the combustion chamber and flue ways for cleaning and servicing. This door can be arranged to swing open to either the left or right hand side.

The entire boiler shell is provided with a generous 100mm depth of glass fibre insulation ensuring standby losses are minimised.

Boiler Casings

Melbury models HE580 to HE3000 are finished in flat steel panels, supplied flat-packed for site assembly.

Boilers HE3800 to HE10000 have rolled steel panels which are factory fitted.

All boiler casings are finished externally using powder coating.

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All boiler casings are finished externally using powder coating.

Pressures and Temperatures

Melbury HE boilers are suitable for operation on open vented or pressurised systems. *Please refer to the technical data tables on pages 6 to 9, for details of minimum head pressure.*

The Melbury HE is a robust design and capable of operating at a maximum pressure of 6.0 bar.

Maximum flow temperature is 90°C.

Minimum flow temperatures are 60°C oil fired and 70°C gas fired.

Multiple Boiler Sequencing

Each boiler is provided with remote enable circuitry allowing the use of external boiler sequence controls with high/low and fully modulating burners.

Fully modulating burners are supplied with a temperature sensor that must be fitted in the flow pipe work immediately leaving the boiler, and wired directly to the burner. This sensor provides temperature feedback data from which the burner derives the correct load setting to maintain the temperature set-point.

Alternatively fully modulating burners can be specified with optional controls, to provide full BMS compatibility using a 0-10 volt analog signal to set the load performance of the burner within its operating band. This option must be stated at the time of ordering.

Specification

Melbury HE

Control Panel

The boiler control panel on all models is supplied in a fabricated steel housing for mounting on the boiler on site.

For Melbury models HE530 to HE895, the control panel is positioned on top of the boiler, with an optional position on the side, left or right.

On models HE1150 to HE3000 the control panel position is on the side of the boiler only, left or right.

On boiler models HE3800 to HE10000 the control panel position is also on the side of the boiler, left or right.

For further details, refer to drawings on page 10.

Controls

The pre-wired control panel includes the following features:

- Control fuse 6.3 AT
- Limit thermostat 110°C manual reset
- Control thermostat 35°C to 90°C
- High fire control thermostat 35°C to 90°C
- Burner on/off switch
- Limit thermostat test button
- Overheat indicator lamp
- Safety interlock indicator lamp
- Burner lock out lamp
- Water temperature thermometer
- High and low fire hours run meters
- 5 Volt free contacts for remote signalling

External Controls Interface

Each boiler control panel is supplied with controls interfaces that can be connected to external controls solutions for:

- Emergency on off circuit
- Safety interlock circuit
- Remote on off circuit (remote enable)

Emergency on off circuit immediately cuts the electrical supply to the boiler control panel stopping burner operation and heat generation.

Remote Signalling

Remote signalling is achieved via a set of volt free contacts which indicate the following:

- Burner low fire operation
- Burner high fire operation
- Overheat lockout
- Burner lockout
- External interlock fault

Burner Connection

Each control panel is supplied with a set of cables for making electrical connections to the burner. Final connection between control panel and burner is made using polarised plugs and sockets.

Burners

The Melbury HE range of boilers is available with a choice of high/low or fully modulating matched Riello burners. Burners from other manufactures may be available on request.

There is a choice of fuel; natural gas or oil. Selected models are also suitable for dual fuel arrangements. Oil burners are suitable for 28 second Kerosene and 35 second gas oil and where matched burners are available, FAME and RME blends of liquid biofuel may be specified.

Most gas burners used with Melbury HE boilers will require gas supply pressures in excess of those guaranteed from the national grid, therefore a gas booster may be needed for normal operation.
For gas pressure requirements with matched gas burners see technical data tables on pages 6 to 9.

A drilled mounting plate is supplied to suit the specified burner. Burners are supplied with a flying lead and plug for connection to the boiler control panel. For new buildings with a total heat load greater than 500kW, it is a requirement of Building Regulations Part L: 2006 that each boiler will be fitted with a fully modulating gas burner, or a multi stage burner for oil fired installations.

Liquid Biofuel

Liquid biofuel must conform with the requirements of EN 14213. Suitable classifications of liquid biofuel for use with Riello burners are FAME (Fatty Acid Methyl Ester) and RME (Rape Methyl Ester) blends up to B50. Higher concentrations of liquid biofuel up to B100 can be accommodated, however, burners must be matched specifically to the fuel specification.

All liquid biofuel specifications must be referred to our technical department. Tel: 01202 662500.

Where external storage is used for liquid biofuel, it is recommended that Kerosene (Class C2) blend is used. Kerosene blends have better cold filter plugging points (CFPP) than gas oil (Class D) blends, providing improved reliability during cold weather. Other blends may cause problems with gelling and blockages in the fuel system when ambient temperatures are very low.

Blended liquid biofuel must be sourced from a reputable supplier, capable of demonstrating compliance with a certified quality assurance system such as ISO 9000, and able to provide the correct specification of fuel.

Liquid biofuel burners are supplied with specific flexible oil feed hoses. It is important to stipulate the use of liquid biofuel at the time of ordering.

For further advise on liquid biofuel, please contact our technical department. Tel: 01202 662500.

Liquid Biofuel Storage and Handling

Oil storage tank manufacturers' must verify that their tank construction and ancillary equipment is suitable for use with liquid biofuel.

Any suitable existing oil storage tank must be thoroughly cleaned prior to use.

Liquid biofuels are hydroscopic and any traces of water absorbed into the oil could result in blocked filters, oil pumps or nozzles.

Liquid biofuels can be susceptible to bacteria growth so it is advisable to implement management best practice for storage of the fuel. Prudent precautions such as using additives and limiting the storage volume (not oversizing) may help limit bacterial growth.

Electrical Details

The boiler control panel requires a 230 volt, 50 Hz, single phase supply.

The burner requires an additional three phase electrical supply directly to the burner, wired in accordance with the manufacturer's instructions.

An isolator correctly fused at 5 amps should be sited close to each boiler for the control panel.

Burner Matchings

The following table illustrates the availability of Riello matched burners with Melbury HE boiler models.

Fuel	Natural Gas			Oil or Liquid Biofuel		Dual Fuel		
Type	High/Low	Modulating		High/Low	Modulating	Mod (gas) High/Low (oil)		
Boiler / Burner	Standard	Standard	Low NOx	Standard	Standard	Standard	Standard	Nat Gas Low NOx
MHE 530	✓	✓	✓	✓	✓	✓	n/a	✓
MHE 580	✓	✓	✓	✓	✓	✓	n/a	✓
MHE 630	✓	✓	✓	✓	✓	✓	n/a	✓
MHE 700	✓	✓	✓	✓	✓	✓	n/a	✓
MHE 800	✓	✓	✓	✓	✓	✓	n/a	✓
MHE 895	✓	✓	✓	✓	✓	✓	n/a	✓
MHE 1150	✓	✓	✓	✓	✓	✓	n/a	✓
MHE 1300	✓	✓	✓	✓	✓	n/a	✓	✓
MHE 1650	✓	✓	✓	✓	✓	n/a	✓	✓
MHE 1900	n/a	✓	✓	✓	✓	n/a	✓	✓
MHE 2500	n/a	✓	✓	✓	✓	n/a	✓	✓
MHE 3000	n/a	✓	✓	✓	✓	n/a	✓	✓
MHE 3800	n/a	✓	✓	n/a	✓	n/a	o/a	o/a
MHE 4500	n/a	o/a	o/a	n/a	✓	n/a	o/a	o/a
MHE 5400	n/a	o/a	o/a	n/a	✓	n/a	o/a	o/a
MHE 6300	n/a	o/a	o/a	n/a	✓	n/a	o/a	o/a
MHE 7400	n/a	o/a	o/a	n/a	✓	n/a	o/a	o/a
MHE 8600	n/a	o/a	o/a	n/a	✓	n/a	o/a	o/a
MHE 10000	n/a	o/a	o/a	n/a	✓	n/a	o/a	o/a

All burners require a 3 phase power supply. n/a = not available o/a = on application
Note: Low NOx burner not available for oil

Technical Data

Melbury HE Boilers - 530kW to 895kW
Performance and General Data

	Boiler Model		MHE530	MHE580	MHE630	MHE700	MHE800	MHE895
Energy	Building Regulations seasonal efficiency	(%) gross	84.99	85.34	85.16	85.63	85.33	85.82
	Boiler output at 80/60°C	kW Btu/h x 1000	530 1808	580 1979	630 2150	700 2388	800 2730	895 3054
	Boiler input (gross) - Maximum	kW Btu/h x 1000	645 2201	697 2379	762 2599	838 2859	966 3296	1068 3644
	Boiler input (nett) - Maximum	kW Btu/h x 1000	581 1983	628 2144	686 2341	755 2576	870 2970	962 3283
	Boiler output at 80/60°C for natural gas - Minimum	kW Btu/h x 1000	95 324	121 413	121 413	175 597	175 597	269 918
	Boiler output at 80/60°C for oil - Minimum	kW Btu/h x 1000	211 720	272 928	272 928	355 1211	355 1211	494 1685
Water	Water content	litres	530	650	650	790	790	960
	System design flow rate at 20°C ΔT rise	l/s	6.34	6.94	7.54	8.37	9.57	10.71
	Waterside pressure loss at 20°C ΔT rise	mbar	11	13	15	18	24	30
	System design flow rate at 10°C ΔT rise	l/s	12.68	13.88	15.07	16.74	19.14	21.41
	Waterside pressure loss at 10°C ΔT rise	mbar	42	50	59	73	96	120
	Water flow rate - Minimum	l/s	No minimum flow rate					
	Water pressure - Maximum	barg	6					
	Water pressure - Minimum	barg	0.55	0.55	0.65	0.50	0.70	0.75
	Water flow temperature - Maximum	°C	90					
	Water flow temperature - Minimum	°C	70°C Nat Gas / 60°C Oil					
	Water return temperature - Minimum	°C	60°C Nat Gas / 50°C Oil					
Fuel	Flow rate for natural gas - Maximum	m^3/h	61.5	66.5	72.6	79.9	92.1	101.8
	Inlet pressure for natural gas - Nominal*	mbar	20					
	Inlet pressure for natural gas - Maximum	mbar	50					
	Input rate for oil (35 Sec)	l/h	61.0	66.0	72.0	79.3	91.4	101.0
Flue	Flue gas volume at 15°C, 9%CO_2, N.T.P - Approx	m^3/h	737.9	799.3	891.6	983.8	1137.5	1229.8
	Flue gas temperature at 80/60°C	°C	209	187	197	179	196	172
	Combustion chamber resistance	mbar	5.97	4.22	5.06	5.03	6.74	5.33
Connections	Water flow connection	PN6	DN100					
	Water return connection	PN6	DN100					
	Gas inlet connection		Rc2"					
	Drain connection		R1¼"					
	Flue diameter (O/D) - Nominal	mm	200	250				300
	Flue hood drain connection		R¾"					
	Electrical supply for boiler		230V 1Ph 50Hz					
	Electrical supply for burner		400V 3Ph 50Hz					
	Shipping weight (excluding burner) - Approx	kg	1130	1490	1490	1810	1810	2000

Notes:

1. Data applies to gas and oil fired boilers, unless otherwise stated.
2. *The nominal gas inlet pressure shown is for Riello burners. Alternative burners and dual fuel burner requirements may change. Nominal gas inlet pressure must be maintained under full gas flow operating conditions.
3. The performance specification for boilers with low NOx burners may be reduced.

For further details please contact our technical department. Tel: 01202 662500.

Technical Data

Melbury HE Boilers - 1150kW to 3000kW
Performance and General Data

	Boiler Model		MHE1150	MHE1300	MHE1650	MHE1900	MHE2500	MHE3000
Energy	Building Regulations seasonal efficiency	(%) gross	85.53	85.42	85.26	85.49	85.76	85.33
	Boiler output at 80/60°C	kW Btu/h x 1000	1150 3924	1300 4436	1650 5630	1900 6483	2500 8530	3000 102360
	Boiler input (gross) - Maximum	kW Btu/h x 1000	1377 4697	1570 5357	2004 6836	2294 7829	3009 10267	3643 12429
	Boiler input (nett) - Maximum	kW Btu/h x 1000	1240 4232	1414 4826	1805 6159	2067 7054	2711 9251	3282 11199
	Boiler output at 80/60°C for natural gas - Minimum	kW Btu/h x 1000	311 1061	314 1071	367 1252	459 1566	713 2433	714 2436
	Boiler output at 80/60°C for oil - Minimum	kW Btu/h x 1000	582 1986	582 1986	680 2320	847 2890	1217 4152	1272 4340
Water	Water content	litres	1360	1360	1760	2060	2610	3070
	System design flow rate at 20°C ΔT rise	l/s	13.76	15.55	19.74	22.73	29.90	35.89
	Waterside pressure loss at 20°C ΔT rise	mbar	20	26	42	27	46	21
	System design flow rate at 10°C ΔT rise	l/s	27.51	31.10	39.47	45.45	59.81	71.77
	Waterside pressure loss at 10°C ΔT rise	mbar	81	103	167	106	184	84
	Water flow rate - Minimum	l/s	No minimum flow rate					
	Water pressure - Maximum	barg	6					
	Water pressure - Minimum	barg	0.85	1.10	1.25	1.30	1.60	1.70
	Water flow temperature - Maximum	°C	90					
	Water flow temperature - Minimum	°C	70°C Nat Gas / 60°C Oil					
	Water return temperature - Minimum	°C	60°C Nat Gas / 50°C Oil					
Fuel	Flow rate for natural gas - Maximum	m^3/h	131.3	149.7	191.0	218.8	286.9	347.3
	Inlet pressure for natural gas - Nominal*	mbar	20	30	40	45	60	
	Inlet pressure for natural gas - Maximum	mbar	50				75	
	Input rate for oil (35 Sec)	l/h	130.2	148.5	189.5	217.0	284.6	344.6
Flue	Flue gas volume at 15°C, 9%CO_2, N.T.P - Approx	m^3/h	1598.7	1813.9	2336.5	2674.7	3504.8	4242.7
	Flue gas temperature at 80/60°C	°C	179	194	205	195	188	205
	Combustion chamber resistance	mbar	6.41	8.39	9.67	9.43	10.35	9.50
Connections	Water flow connection	PN6	DN125			DN150		DN200
	Water return connection	PN6	DN125			DN150		DN200
	Gas inlet connection		Rc3"	Rc2"		Rc2½"		Rc3"
	Drain connection		R1¼"					
	Flue diameter (O/D) - Nominal	mm	350			400	450	500
	Flue hood drain connection		R1¼"					
	Electrical supply for boiler		230V 1Ph 50Hz					
	Electrical supply for burner		400V 3Ph 50Hz					
	Shipping weight (excluding burner) - Approx	kg	2460	2460	2948	3393	4248	4822

Notes:

1. Data applies to gas and oil fired boilers, unless otherwise stated.
2. *The nominal gas inlet pressure shown is for Riello burners. Alternative burners and dual fuel burner requirements may change. Nominal gas inlet pressure must be maintained under full gas flow operating conditions.
3. The performance specification for boilers with low NOx burners may be reduced.
   For further details please contact our technical department. Tel: 01202 662500.

Technical Data

Melbury HE Boilers - 3800kW to 6300kW
Performance and General Data

	Boiler Model		MHE3800	MHE4500	MHE5400	MHE6300
Energy	Building Regulations seasonal efficiency	(%) gross	85.42	85.55	85.67	85.63
	Boiler output at 80/60°C	kW Btu/h x 1000	3800 12966	4500 15354	5400 18425	6300 21496
	Boiler input (gross) - Maximum	kW Btu/h x 1000	4594 15675	5440 18562	6507 22202	7575 25846
	Boiler input (nett) - Maximum	kW Btu/h x 1000	4139 14123	4902 16724	5863 20004	6825 23287
	Boiler output at 80/60°C for natural gas - Minimum	kW Btu/h x 1000	880 3003	1160 3958	1473 5026	1582 5398
	Boiler output at 80/60°C for oil - Minimum	kW Btu/h x 1000	2012 6865	2518 8591	2930 9997	3442 11744
Water	Water content	litres	3805	5385	6060	9300
	System design flow rate at 20°C ΔT rise	l/s	45.45	53.83	64.59	75.36
	Waterside pressure loss at 20°C ΔT rise	mbar	44	62	89	47
	System design flow rate at 10°C ΔT rise	l/s	90.91	107.66	129.19	150.72
	Waterside pressure loss at 10°C ΔT rise	mbar	176	248	356	188
	Water flow rate - Minimum	l/s	No minimum flow rate			
	Water pressure - Maximum	barg	6			
	Water pressure - Minimum	barg	1.8			2.2
	Water flow temperature - Maximum	°C	90			
	Water flow temperature - Minimum	°C	70°C Nat Gas / 60°C Oil			
	Water return temperature - Minimum	°C	60°C Nat Gas / 50°C Oil			
Fuel	Flow rate for natural gas - Maximum	m^3/h	438.0	518.7	620.4	722.2
	Inlet pressure for natural gas - Nominal*	mbar	60	Data on application		
	Inlet pressure for natural gas - Maximum	mbar	75	100		Data on application
	Input rate for oil (35 Sec)	l/h	434.6	514.6	615.5	716.5
Flue	Flue gas volume at 15°C, 9%CO_2, N.T.P - Approx	m^3/h	5503.2	6517.7	7809.0	9069.5
	Flue gas temperature at 80/60°C	°C	198	196	190	185
	Combustion chamber resistance	mbar	11.01	10.18	10.91	12.46
Connections	Water flow connection	PN6	DN200			DN250
	Water return connection	PN6	DN200			DN250
	Gas inlet connection		Rc3"	Rc4"		Data on application
	Safety valve connection	PN16	DN80		DN100	
	Drain connection	PN6	R2"			DN65
	Flue diameter (O/D) - Nominal	mm	550	600	650	700
	Flue hood drain connection		R1¼"			R2"
	Electrical supply for boiler		230V 1Ph 50Hz			
	Electrical supply for burner		400V 3Ph 50Hz			
	Shipping weight (excluding burner) - Approx	kg	7025	8425	10075	13545

Notes:

1. Data applies to gas and oil fired boilers, unless otherwise stated.
2. *The nominal gas inlet pressure shown is for Riello burners. Alternative burners and dual fuel burner requirements may change. Nominal gas inlet pressure must be maintained under full gas flow operating conditions.
3. The performance specification for boilers with low NOx burners may be reduced.
   For further details please contact our technical department. Tel: 01202 662500.

Technical Data

Melbury HE Boilers - 7400kW to 10000kW
Performance and General Data

	Boiler Model		MHE7400	MHE8600	MHE10000
Energy	Building Regulations seasonal efficiency (%) gross		85.65	85.77	85.99
	Boiler output at 80/60°C	kW Btu/h x 1000	7400 25249	8600 29343	10000 34120
	Boiler input (gross) - Maximum	kW Btu/h x 1000	8888 30325	10296 35128	11920 40671
	Boiler input (nett) - Maximum	kW Btu/h x 1000	8008 27323	9276 31651	10740 36644
	Boiler output at 80/60°C for natural gas - Minimum	kW Btu/h x 1000	1935 6602	2332 7957	2907 9919
	Boiler output at 80/60°C for oil - Minimum	kW Btu/h x 1000	3442 11744	4163 14204	5127 17493
Water	Water content	litres	11400	13300	15120
	System design flow rate at 20°C ΔT rise	l/s	88.52	102.87	119.62
	Waterside pressure loss at 20°C ΔT rise	mbar	65	45	61
	System design flow rate at 10°C ΔT rise	l/s	177.03	205.74	239.23
	Waterside pressure loss at 10°C ΔT rise	mbar	260	180	244
	Water flow rate - Minimum	l/s	No minimum flow rate		
	Water pressure - Maximum	barg	6		
	Water pressure - Minimum	barg	2.2		
	Water flow temperature - Maximum	°C	90		
	Water flow temperature - Minimum	°C	70°C Nat Gas / 60°C Oil		
	Water return temperature - Minimum	°C	60°C Nat Gas / 50°C Oil		
Fuel	Flow rate for natural gas - Maximum	m^3/h	847.4	981.6	1136.5
	Inlet pressure for natural gas - Nominal*	mbar			
	Inlet pressure for natural gas - Maximum	mbar	Data on application		
	Input rate for oil (35 Sec)	l/h	840.7	973.9	1127.5
Flue	Flue gas volume at 15°C, 9%CO_2, N.T.P - Approx	m^3/h	10668.2	12328.2	14265.2
	Flue gas temperature at 80/60°C	°C	185	178	169
	Combustion chamber resistance	mbar	14.40	16.03	17.48
Connections	Water flow connection	PN6	DN250	DN300	
	Water return connection	PN6	DN250	DN300	
	Gas inlet connection		Data on application		
	Safety valve connection	PN16	DN100	DN125	
	Drain connection	PN6	DN65		DN80
	Flue diameter (O/D) - Nominal	mm	750	850	900
	Flue hood drain connection		R2"		
	Electrical supply for boiler		230V 1Ph 50Hz		
	Electrical supply for burner		400V 3Ph 50Hz		
	Shipping weight (excluding burner) - Approx	kg	16040	18620	21900

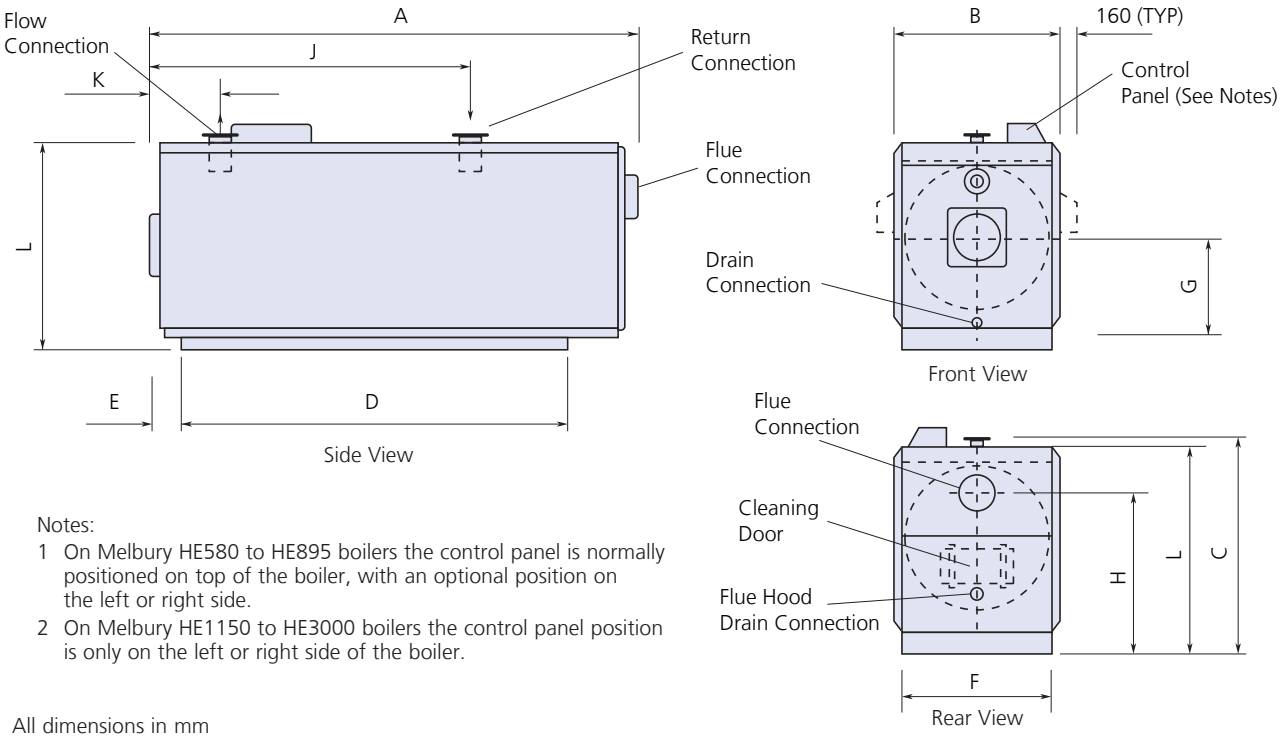
Notes:

1. Data applies to gas and oil fired boilers, unless otherwise stated.
2. *The nominal gas inlet pressure shown is for Riello burners. Alternative burners and dual fuel burner requirements may change. Nominal gas inlet pressure must be maintained under full gas flow operating conditions.
3. The performance specification for boilers with low NOx burners may be reduced.
   For further details please contact our technical department. Tel: 01202 662500.

Dimensional Details

Melbury HE Boilers

Models HE530 to HE3000



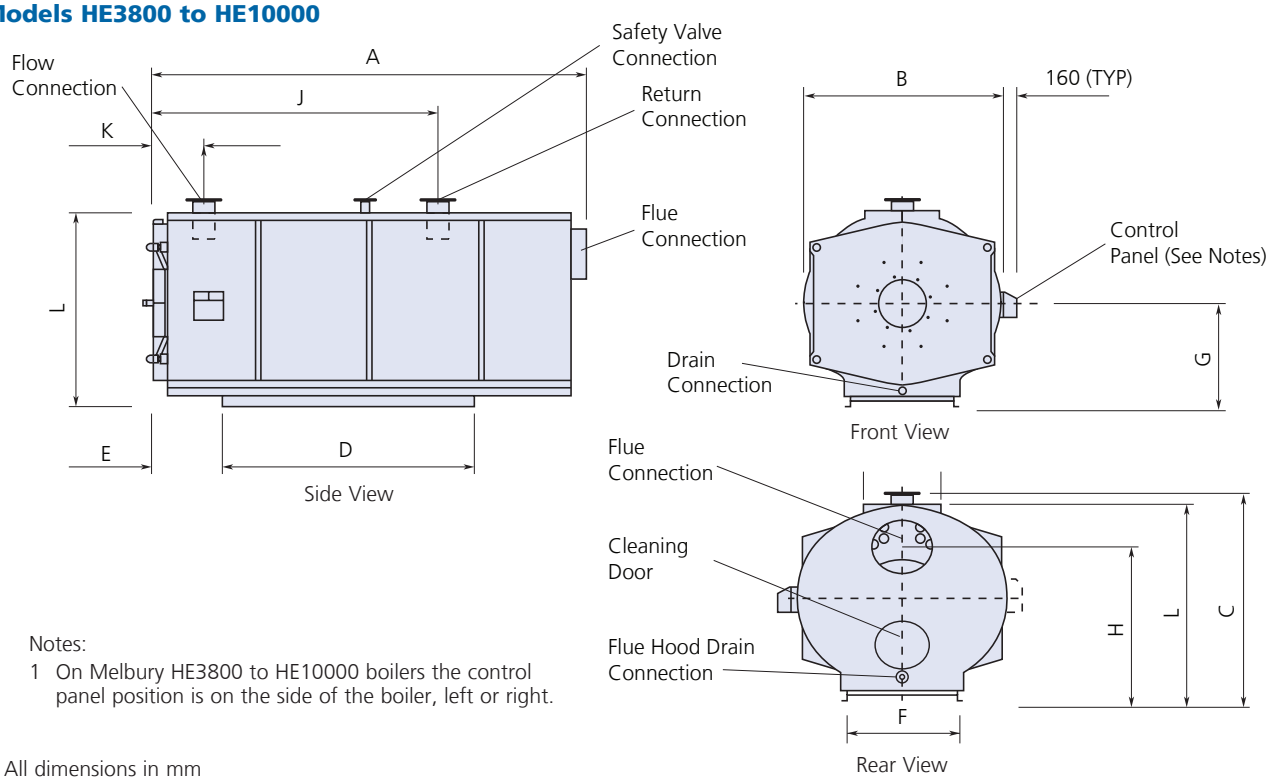
Notes:

1 On Melbury HE580 to HE895 boilers the control panel is normally positioned on top of the boiler, with an optional position on the left or right side.

2 On Melbury HE1150 to HE3000 boilers the control panel position is only on the left or right side of the boiler.

All dimensions in mm

Models HE3800 to HE10000



Notes:

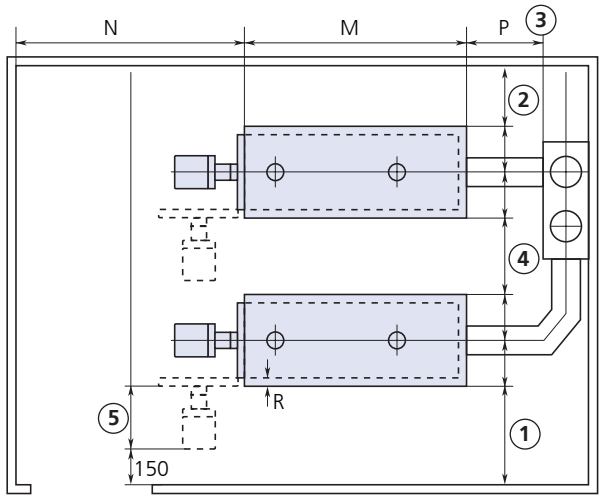
1 On Melbury HE3800 to HE10000 boilers the control panel position is on the side of the boiler, left or right.

All dimensions in mm

Dimensional Details

Melbury HE Boilers

Model	Dimensions															
	Overall Length	Casing Width	Overall Height	Frame Length	Frame Position	Frame Width	Burner Centreline	Flue Height	Return Connection	Flow Connection	Casing Height	Boiler Shell Length	Front Clearance	Rear Clearance	Side Clearance	Door Offset
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
MHE 530	2125	1120	1370	1580	145	1000	640	950	1100	150	1290	1880	1600	1000	600	5
MHE 580	2240	1180	1450	1695	145	1060	690	1000	1100	150	1370	1995	1700	1000	600	0
MHE 630	2240	1180	1450	1695	145	1060	690	1000	1100	150	1370	1995	1700	1000	600	0
MHE 700	2460	1250	1535	1880	145	1130	740	1055	1350	200	1455	2215	1900	1000	600	5
MHE 800	2460	1250	1535	1880	145	1130	740	1055	1350	200	1455	2215	1900	1000	600	5
MHE 895	2565	1330	1625	1975	145	1210	790	1115	1350	200	1545	2320	2000	1000	600	0
MHE 1150	2939	1420	1730	2314	145	1300	840	1200	1731	238	1650	2714	2300	1000	600	0
MHE 1300	2939	1420	1730	2314	145	1300	840	1200	1731	238	1650	2714	2300	1000	600	0
MHE 1650	3354	1495	1805	2674	200	1375	875	1275	2001	274	1725	3074	2700	1000	600	30
MHE 1900	3564	1565	1870	2854	200	1445	905	1315	2136	292	1790	3284	2800	1150	1000	30
MHE 2500	3846	1690	1990	3096	200	1570	965	1410	2318	318	1910	3566	3100	1150	1000	30
MHE 3000	4131	1765	2080	3356	200	1645	1015	1470	2512	344	2000	3851	3000	1150	1000	30
MHE 3800	4670	1970	2235	2700	770	1150	1110	1660	2920	390	2105	4350	3800	1150	1000	15
MHE 4500	4910	2170	2450	2850	810	1290	1225	1850	3087	410	2320	4590	4000	1150	1000	15
MHE 5400	5310	2280	2565	3200	820	1350	1285	1940	3370	450	2435	4990	4400	1150	1000	15
MHE 6300	5771	2560	2870	4110	212	1520	1450	2120	3655	495	2740	5409	4800	1150	1000	42
MHE 7400	6221	2710	3025	4510	212	1610	1530	2280	3970	540	2895	5859	5200	1150	1000	42
MHE 8600	6763	2810	3135	4912	212	1670	1590	2390	4330	590	3005	6401	5700	1150	1000	42
MHE 10000	7364	2900	3230	5412	212	1730	1640	2460	4765	645	3100	7002	6200	1150	1000	42



All dimensions in mm

Clearances for Access & Maintenance

Notes:

(1) The boiler door including burner should be able to swing open through 90° providing access to the burner head and combustion chamber for cleaning and maintenance

(2) Minimum space between boiler and wall is 200mm, however access to control panel will be required, if handed as shown. Burner clearance will be required if door handing is opposite to that shown.

(3) Clearance required for access to the rear cleaning door.

(4) A minimum distance of 200mm must be maintained between boiler casings, depending on chosen position for the control panel. If the door handing is as shown, then it should be noted that burner lengths vary by model, and this distance may need increasing.

(5) Burner lengths vary by model.

Please contact our technical department for further assistance. Tel: 01202 662500.

Application & System Data

Melbury HE Boilers

The installation of the boiler MUST be in accordance with the relevant requirements of the Gas Safety Regulations, Building Regulations, IEE Regulations and the Water Supply (Water Fittings) Regulations. It should also be in accordance with any relevant requirements of the local gas region and local authority and the relevant recommendations of the following documents:

These British Standard Codes of Practice and additional publications have relevant recommendations regarding the installation of Melbury HE boilers.

British Standards

BS 5410 Code of practice for oil firing. Part 2: Installations of 45kW and above output capacity for space heating, hot water and steam supply services.

BS 6798 Boilers of rated input not exceeding 60kW.

BS 6644 Installation of Gas Fired Hot Water Boilers, 70kW to 1.8MW (nett input).

BS 6700 Design, installation, testing and maintenance of services supplying water for domestic use.

BS 6891 Installation of low pressure gas pipe work of up to 35mm (R1¼") in domestic premises.

BS 6880 Part 1, 2 & 3 Code of practice for low temperature hot water heating systems of output greater than 45kW.

BS 7074 Application, selection and installation of expansion vessels and ancillary equipment for sealed water systems. Part 2 Code of practice for low and medium temperature hot water systems.

BS 7671 Requirements for electrical installations. IEE Wiring Regulations. Seventeenth edition.

BS EN 806-2 Specification for installations inside buildings conveying water for human consumption. Design.

BS EN 12828 Heating systems in buildings, Design for water-based heating systems.

BS 855 Specification for welded steel boilers for central heating and domestic hot water supply, rated output 44kW to 3MW.

I. Gas E. Publications

IGE/UP/1 Soundness testing and purging of industrial and commercial gas installations.

IGE/UP/1A Soundness testing and direct purging of small low pressure industrial and commercial natural gas installations.

IGE/UP/2 Gas installation pipe work, boosters and compressors in industrial and commercial premises.

IGE/UP/10 Installation of gas appliances in industrial and commercial premises, Part 1 flued appliances.

Health and Safety Executive

Guidance note PM5 - Automatically controlled steam and hot water boilers.

CIBSE Publications

CIBSE Guide B Heating, ventilating, air conditioning and refrigeration.

CIBSE Guide H Building Control Systems

CIBSE Guide Energy Efficiency in Buildings

CIBSE Commissioning Code B: 2002

Dept Environment, Scottish Development Dept & Welsh Office

Third edition of the 1956 Clean Air Act Memorandum

Communities & Local Government, England & Wales

The Building Regulations 2000: Conservation of Fuel and Power.
Part L 2A, new buildings other than dwellings
Part L 2B, existing buildings other than dwellings

Location

Melbury HE boilers must be installed on a non combustible flat and level surface capable of supporting the weight of the boiler when filled with water, plus any ancillary equipment. It is recommended that a plinth at least 50mm high is used for the boiler.

Adequate space should be allowed around the boiler for installation and servicing. *Refer to page 11 for further details.*

Water Systems

Melbury HE boilers are suitable for operation on open vented or pressurised systems. Please refer to the technical tables on pages 6 to 9 for details of minimum water pressure. Sealed systems must comply with Health and Safety Document PM5 requirements for fuel supply cut off in the event of low and high pressure conditions. To ensure compliance, consider using a proprietary pressurisation unit with correctly sized expansion vessels.

For details of Hamworthy Chesil pressurisation units, refer to publication 500002486.

Safety Valves

Each boiler must be provided with a suitably sized and rated safety valve located in the boiler flow between the boiler flow connection and any isolating valve. The safety valve will ideally be located as close to the boiler as possible.

Melbury models HE3800 to HE10000 have a safety valve connection directly onto the boiler.

Safety valves should be sized in accordance with the requirements of BS 6644, and with the requirements of BS 855 for installations up to 3MW.

Adequate Water Flow

Melbury HE boilers do not have minimum flow rate requirements, however, care must be taken to ensure system hydraulics are designed to maintain the minimum required flow temperature of 70°C when gas firing and 60°C when oil firing, irrespective of the system return temperature. *Typical hydraulic schematics are shown on page 16.*

System Feed Water Quality

If the boiler feed water has a high degree of hardness, >100mg $CaCo^3$/litre, it is recommended that the water be treated to prevent the precipitation of scale and sludge in the boiler waterways. Details of additives can be obtained from any reliable manufacturer of water treatment products or the local water authority.

It should be noted however, that even if the boiler water is of average hardness, not requiring treatment, subsequent draining of the system for repair or constant make-up water due to an undetected leak will cause additional deposits and gradual build up of scale. It is essential therefore, that leaks are attended to promptly and draining is kept to absolute minimum.

It is recommended that the system be flushed out at least twice before any water treatment is added.

Air and Dirt Removal

To provide effective degassing of circulating system water and for sludge removal, an air and dirt separator equipped with a fast action flushing valve must be installed in the return pipe work to the boiler.

Additionally for the removal of larger particulate matter from circulating system water, a coarse strainer must be fitted in the return pipe work to the boiler, upstream of the air and dirt separator.

Oil Supply Storage

The oil supply and storage system should be designed and installed in accordance with BS 5410 Part 1 or 2, as appropriate.

Liquid Biofuel Storage and Handling

Oil storage tank manufacturers' must verify that their tank construction and ancillary equipment is suitable for use with liquid biofuel.

Any suitable existing oil storage tank must be thoroughly cleaned prior to use.

Liquid biofuels are hydroscopic and any traces of water absorbed into the oil could result in blocked filters, oil pumps or nozzles.

Liquid biofuels can be susceptible to bacteria growth so it is advisable to implement management best practice for storage of the fuel. Prudent precautions such as using additives and limiting the storage volume (not oversizing) may help limit bacterial growth.

Gas Supply

Some of the larger burners may require a boosted gas supply. Hamworthy offer optional gas boosters as part of the burner boiler package.

On some models, as an alternative to using gas boosters, a larger gas train may be available. *Consult with our technical sales team for further advice.*

The Gas Safety (Installation and Use) Regulations require that only competent persons (Gas Safe Certified engineers), should install gas appliances.

Delivery & Handling

Boilers are delivered to site on a flatbed lorry for offloading using a crane or other suitable lifting apparatus. Each boiler is fitted with lifting eyes.

For Melbury models HE580 to HE3000 the boiler casings are finished in flat steel panels, supplied flat-packed for site assembly.

Models HE3800 to HE10000 the casings are rolled steel panels which are factory fitted.

On all models the control panel is supplied loose for fitting on site.

Commissioning

Hamworthy Heating strongly recommend that all boilers are commissioned by their service department or by an approved burner specialist. *For more information on commissioning contact Hamworthy Heating Service Department. Tel: 0845 450 2866.*

Warranty

Products from Hamworthy Heating carry a standard two-year warranty on parts, which is extended to include labour when the product is commissioned by Hamworthy service engineers. Hamworthy can tailor packages to suit individual customer requirements, many of which include extended warranty benefits. *For more information on commissioning and other after-sales services, please contact Hamworthy Heating Service Department. Tel: 0845 450 2866.*

System Head

Guidance Note PM5 Health and Safety Executive

This note states that "hot water boilers should have an automatic control apparatus to cut off fuel to the burners of gas fired plant when the water at or near the boiler flow outlet rises to a pre-determined temperature. This should provide a margin of at least 17°C below the temperature of saturated steam corresponding to the pressure at the highest point of the circulation system above the boiler." To comply with this recommendation, the minimum system pressure is dependant on system design flow temperatures and in the case of modular installations, the temperature rise across each module. In all cases the system pressure shall not be lower than the boiler minimum operating pressure detailed in the technical data table. *See pages 6 to 9.*

Single Installations

The minimum pressure must be equal to the gauge pressure equivalent to the saturated steam temperature obtained by adding 17°C to the required boiler flow temperature. The highest point of the circulation system above the boiler should never be less than 5.1m (17ft).

Required flow temperature	90°C
Safety margin	17°C
Equivalent saturated steam temperature	107°C

From steam tables corresponding gauge pressure 0.3 bar – 3.0m head of water.

Minimum boiler operating pressure takes priority if greater than calculated gauge pressure.

See technical data tables on pages 6 to 9.

Modular Installations

The minimum pressure should be equal to the gauge pressure equivalent to the saturated steam temperature. This is obtained by adding 17°C to the sum of the required mixed flow temperature plus the temperature rise across the modules.

System Δt	11°C	20°C
Required mixed flow Temperature	82°C	80°C
Temperature rise across modules at minimum flow rate	11°C	20°C
Safety margin	17°C	17°C
Equivalent saturated steam temperature	110°C	117°C

From steam tables corresponding gauge pressure at 11°CΔt 0.43 bar, 4.4 m

From steam tables corresponding gauge pressure at 20°CΔt 0.80 bar, 8.2 m

Minimum boiler operating pressure takes priority if greater than calculated gauge pressure.

See technical data tables on pages 6 to 9.

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 free from contamination such as building dust and insulation fibres from lagging. To avoid unnecessary cleaning and servicing of the burner, we recommend that the boilers are not fired whilst building work is being undertaken.

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

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:

Low Level (Inlet)
4cm^2 per kW of net heat input.

High Level (Outlet)
2cm^2 per kW of net heat input.

Ventilation

Where a boiler installation is to operate throughout the summer months, e.g. for domestic hot water production for more than 50% of the time, then additional ventilation allowances are required. Refer to BS6644 for more detailed information.

The Building Regulations 2000

Conservation of fuel and power 2006 edition

Approved Document AD L2A New Buildings, other than dwellings
Approved Document AD L2B Existing Buildings, other than dwellings

These new regulations came into force 6 April 2006. Compliance with the latest regulations now requires a whole building approach to reduction in carbon emissions. The 2006 edition requires the use of heat generating plant as detailed in the supporting 2nd tier guide - Non Domestic Heating, Cooling and Ventilation Compliance Guide.

Seasonal Efficiency

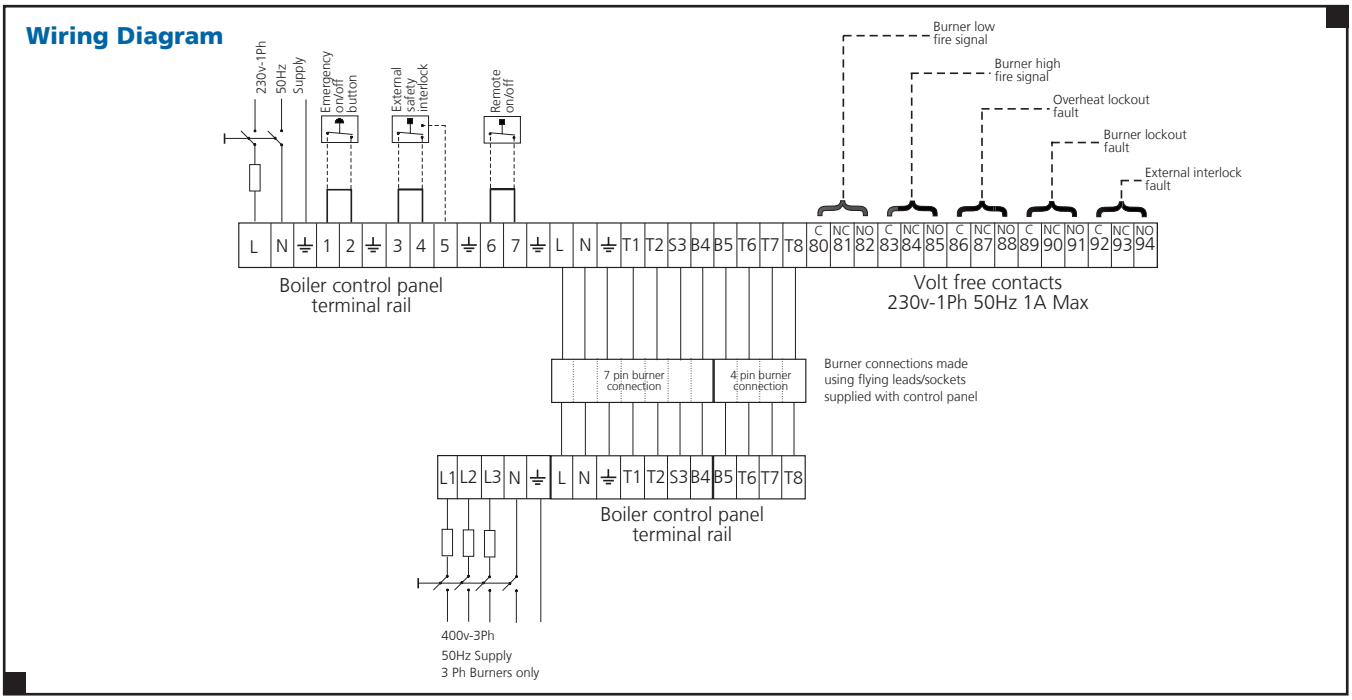
The efficiency data used for evaluating commercial boilers is known as the heat generator seasonal efficiency and this guide states that for new buildings and existing buildings, the minimum heat generating system seasonal efficiency is 84% gross for natural gas.

The heat generator seasonal efficiency for Melbury HE boilers exceed the minimum requirement.
Individual boiler figures can be found in the technical data tables on pages 6 to 9.

Electrical Wiring & Controls

Melbury HE Boilers

Wiring Diagram



Electrical Supply

The boiler control panel requires a 230 volts, 50 Hz, single phase electrical supply, via a fused isolator close to the boiler.

The burner requires an additional 400 volts, 50 Hz, three phase electrical supply directly to the burner, wired in accordance with the manufacturer's instructions, and via a fused isolator close to the burner.

External Controls Interface – terminals 1 to 7

Each boiler control panel is supplied with controls interfaces that can be connected to external controls solutions for:

- Emergency on/off circuit
- Safety interlock circuit
- Remote on/off circuit (remote enable)

Emergency on off circuit immediately cuts the electrical supply to the boiler control panel stopping burner operation and heat generation.

Where external controls are used, the hard wired links must be removed. All external wiring carries 230 volts and requires volt free external switches. External switches are not provided with the boiler.

Burner Wiring

Connections between the boiler control panel and the burner are made using flying leads with plugs and sockets supplied with the boiler and burner.

High Low burners use both the 7 pin and 4 pin burner connections.

Fully Modulating burners only use the 7 pin burner connection.

0-10 volt control of fully modulating burners requires additional wiring dependent on burner selection.

For further details please contact our technical department. Tel: 01202 662500.

Remote Signalling

Remote signalling is achieved via a set of volt free contacts which indicate the following:

- Burner low fire operation
- Burner high fire operation
- Overheat lockout
- Burner lockout
- External interlock fault

Volt Free Contacts – terminals 80 to 94

External wiring for volt free contacts is typically connected to the common and normally open contacts. Alternatively wiring may be connected to the common and normally closed contacts.

For the external interlock fault volt free contact to operate, an external interlockfault condition power supply is required to terminal 5, 230 volts.

External Wiring

Wiring external to the boiler must be installed in accordance with I.E.E regulations. Wiring to the boiler control panel must be completed in heat resistant 3 core cable, (size 1.0mm^2 c.s.a.).
An isolator correctly fused at 5 amps should be sited close to each boiler for the control panel.

System Design

Melbury HE Boilers

Scheme 1

Typical boiler installation with a full capacity single heating circuit having variable temperature control using a mixing valve.

The purpose of this circuit is to provide heat to a variable temperature heating circuit allowing for low circulation temperatures within the heating circuit, whilst providing adequate back-end temperature protection to the boilers.

Scheme 2

Typical boiler installation with multiple heating circuits having a mix of constant flow and variable flow with constant and variable temperature.

The purpose of this circuit is to provide heat to a mix of variable temperature and constant temperature heating circuits with differing flow and temperature requirements, whilst providing adequate back-end temperature protection to the boilers.

Due to the thermal mass of the boiler, the flow rate returning from the heating circuits can be low.

Back-end Protection

For back-end boiler protection, a 3 port mixing valve system is recommended to blend the return water until the main system return water temperature is above dew point.

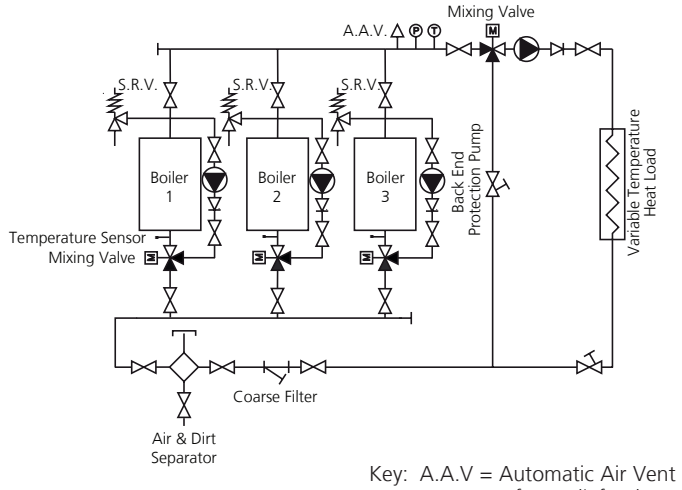
Control of the mixing valve and pump is not included with the boiler controls and must be provided by others.

Mixing valve control should be facilitated via a temperature sensor installed in the return pipe between the boiler and the mixing valve, to measure return water temperature entering the boiler. Minimum return water temperatures are 60°C for gas and 50°C for oil.

Dry Cycling

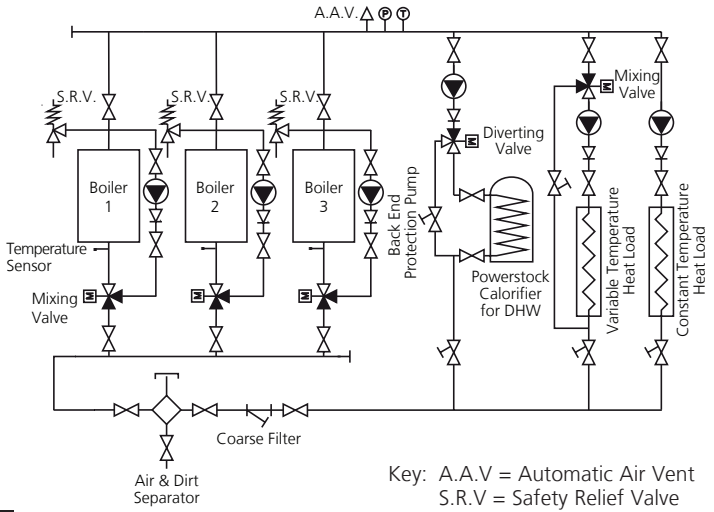
To reduce dry cycling, the back-end protection mixing valve should be controlled additionally to prevent flow through the boilers when they are not firing. The valve control should be coordinated with the boiler enable signal, to switch to the pump bypass position during idle periods, preventing flow through the boiler.

Scheme 1
Variable Temperature Heating Circuit



Key: A.A.V = Automatic Air Vent
S.R.V = Safety Relief Valve

Scheme 2
Constant and Variable Temperature Heating Circuits with Domestic Hot Water



Key: A.A.V = Automatic Air Vent
S.R.V = Safety Relief Valve

Satisfying the heat load through a reduced number of boilers allows the burner to fire for longer periods, and reduces the number of burner starts.

With high water content boilers, energy will be saved by reducing the number of heat up cycles, and systems will be more responsive.

The motorised valve must be interlocked with the boiler enabling circuit, to ensure the valve is opened whenever a boiler is fired.

Flue System & Flue Gas Economiser

Melbury HE Boilers

Flue System

Hamworthy Melbury HE 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.
- Under part load conditions, flue gases leaving the boiler will be at lower temperatures, circa 95°C for gas fired and 120°C for oil fired.
- The flue system should be designed to maintain atmospheric pressure at the boiler flue connection at all times. If at any time a suction condition is likely to arise, then it is recommended that a draught stabiliser be fitted to the flue system.
- 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 effects of the condensate.
- All flue component joints should be fully sealed to prevent leakage of condensate.
- The flue system should be constructed from materials resistant to the corrosive effects of condensate.
- Melbury HE boilers are suitable for installation in a balanced compartment in accordance with the requirements of BS 6644.

Flue Gas Economiser

Flue gas economisers are designed for use with boilers, to extract energy that otherwise would be expelled through the flue system. Hamworthy offer the Arne range of flue gas economisers and the free-standing design allows use in new or existing boiler installations, and with virtually any type of non-condensing boiler.

Fitted to the flue system, heat is transferred to the heating system return water, further increasing the energy efficiency performance. Dependent on application and return water temperature, it is possible to achieve operating efficiency performance gains up to 18%.

Hamworthy Arne flue gas economiser.

Range	Application	No. of Models	Boiler Outputs
Arne Eco	Individual boilers	12	95kW to 6470kW
Arne Eco Turbo	Multiple boilers	4	400kW to 1430kW

There are two ranges of Hamworthy Arne flue gas economiser, each having several models to suit different applications and power requirements.

Flue gases enter the economiser at the top and exit from the bottom ensuring condensate flows to the bottom of the sump for draining.

Waterways within the Arne flue gas economisers are constructed from grade 316L stainless steel smooth tubes, combining low resistance to the passage of flue gases with tolerance to the acidic nature of flue gas condensate.

Heat is recovered from the flue gases by two processes.

Firstly, sensible heat is extracted by significantly reducing the flue gas temperature from typically 190°C for Melbury HE boilers, or higher from other steel boilers, circa 220°C.

Secondly, latent heat is extracted by condensation of the water vapour present in the combustion gases, when the return water temperature is below 55°C.

For further details of Hamworthy Arne flue gas economisers, refer to publication 500002501.

Your local contact is:

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

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