



Authorised User No. 00510



Hamworthy Stratton mk2 Wall Hung

Stainless Steel Condensing Boilers
Natural Gas or LPG
Outputs 43kW to 146kW



Hamworthy

Heating *at work.*

Stratton mk2

Wall Hung, Pre-mix
Gas Fired Modular Boilers

The new Stratton mk2 wall hung condensing boiler offers exceptional system tolerance with a highly durable stainless steel heat exchanger at the heart. Suitable for use with natural gas and LPG this boiler can be specified for a multitude of commercial wall hung boiler applications.

An extensive product range of 7 models with outputs from 43kW to 146kW enables you to choose the most appropriate boiler to meet the building heat load. A superb 5:1 turndown ratio per boiler module means any changes in system load are accurately matched. This minimises boiler cycling and wastage of energy. Outstanding efficiency in excess of 108% nett keeps operating costs to a minimum, and the pre-mix burner technology gives clean operation with ErP Class 6 NOx emissions.

The boiler is protected from operating during adverse system conditions thanks to built in monitoring of low water pressure and flow rate.

The Stratton mk2 wall hung boiler can be installed with both room sealed and open flue arrangements. Pre-defined flue headers for up to 4 boilers, plus off the shelf flue solutions for single boilers help simplify installation.

Designed for sealed and pressurised systems only, the hydraulic installation can be fast tracked using factory manufactured frame and header kits that include boiler pumps for up to 4 boilers.

All Stratton mk2 boiler models are on the Government's Energy Technology List (ETL) meaning that it offers financial advantages to purchasers through the Enhanced Capital Allowances (ECA) scheme.

BENEFITS

- Durable stainless steel heat exchanger
- Accurate load matching
- Fully modulating for greater efficiency
- Quiet operation <60dB(A)
- Integral boiler sequence controller

Suited to low ceiling height plant rooms. Less than 2.2 metres to top of flue header when mounted on low height pipe kit.

Options

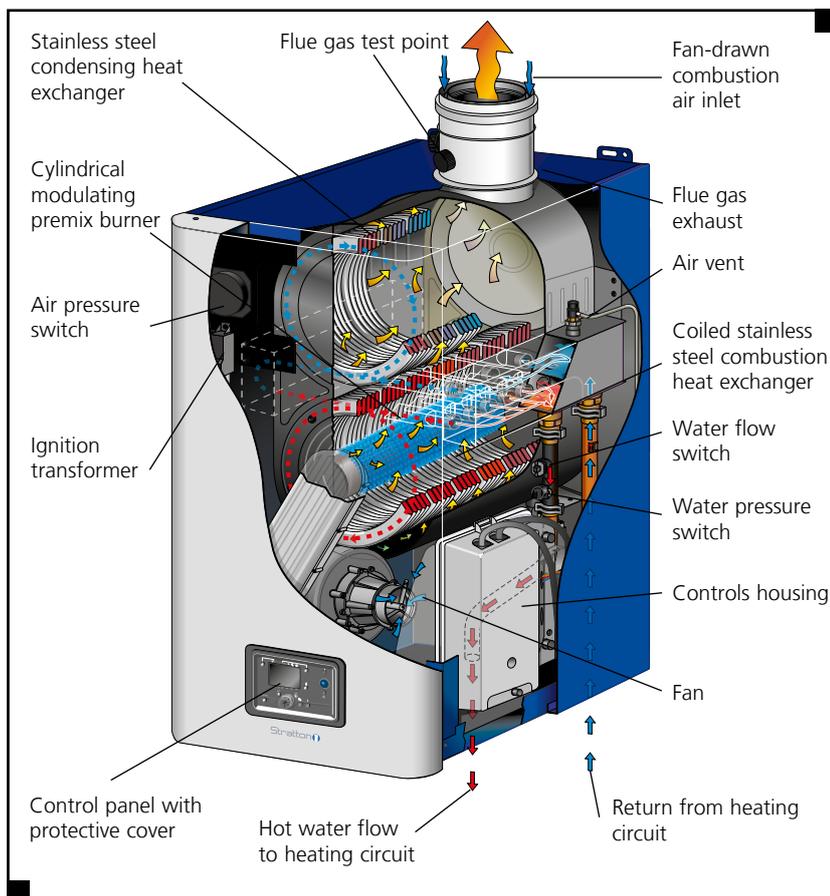
- Single and multiple boiler controls
- Boiler sequencing cascade controller
- Natural gas or propane
- Pipe kits and low loss header
- Support frame kit
- Flue header kits



Stratton mk2 boiler with pipe kit

Specification

Stratton mk2 Wall Hung Boiler Typical Layout



Pre-mix Burner

Stratton mk2 boilers feature a pre-mix burner for clean combustion with low ErP Class 6 emissions. Full modulation from 20% to 100% output is managed from the boiler control varying the fan speed and gas input to deliver correct gas air ratio across the range of modulation. With NOx emissions less than 40mg/kWh maximum BREEAM credits are available for contribution towards an 'Excellent' building accreditation.

The burner head features spark ignition with flame detection provided by flame ionisation probe.

An integrated flue gas non return valve is located between the burner and fan. This is to prevent any possibility of flue gas recirculating through non firing modules in a multiple boiler configuration making it easier to install with common flue headers whilst reducing height requirements above the boiler.

A differential air pressure switch monitors air flow through the flue passages of the boiler to ensure there is adequate air flow before the burner is permitted to light. This offers protection from operation with a blocked flue or a poorly maintained and blocked burner.

Each boiler is supplied optimised for use with natural gas, however they can be easily converted for LPG usage with a simple set up change during commissioning.

Heat Exchanger

Using stainless steel heat exchangers throughout the boiler range makes the Stratton mk2 boilers very tolerant to varying water conditions in both new and existing systems. Manufactured from 316L grade stainless steel gives a high resistance to corrosion and a long life backed by a 5 year heat exchanger warranty.

The design of flue passages and waterways within the heat exchanger matched with optimised combustion ensure highly efficient operation. Part load efficiency exceeds 108% Nett for all models when operating in suitable system conditions.

Condensate from the combustion process is safely removed from the heat exchanger via a syphon trap to outside of the boiler. This allows condensate to flow safely but prevents the escape of flue gases via the drain.

Operating Efficiency

Dependent on operating temperatures the Stratton mk2 boiler is capable of delivering high efficiency with part load efficiency in excess of 108% Nett and full load efficiency exceeding 97% Nett across the whole boiler range.

The boiler range exceeds the minimum requirements of Building Regulations Part L and European ErP legislation for both new and existing buildings.

Primary Circulation - Shunt Pump

A dedicated pump can be connected to each boiler module and controlled by the boiler controls platform for primary circulation.

Fuel Supply

Stratton mk2 boilers are certified for operating with Natural Gas and LPG. Factory set to operate with Natural Gas, boilers up to 100kW can be site adjusted for operation using LPG requiring parameter changes and gas orifice replacement as part of the commissioning process. Each boiler is supplied with the required parts to facilitate conversion to LPG firing if required.

Boiler models S2-120 and S2-150 are not suitable for operation with LPG.

Specification

Stratton mk2 Wall Hung Boilers

Wall Mounting

To aid installation each boiler is provided with a wall mounting plate to fix to the wall ahead of hanging the boiler. Once secured to the wall the boiler simply hooks onto the wall plate. Should the integrity of the wall be unsuitable there is an optional frame kit transferring boiler weight to the floor.

System Connections

All connections for flow, return and gas are located in a recess on the underside of the boiler enabling the boiler to be stood flat on the ground and reducing the potential for damage during the installation process.

Temperature Controls

Stratton mk2 boilers can operate independently using their integral temperature control. Flow temperature is monitored using an electronic flow temperature sensor with a corresponding maximum set point of 85°C. The boiler control will modulate the burner set point back as the temperature set point is approached for near continuous operation with minimum cycling.

The boiler control can also be configured to receive a 0-10 volt analog BMS signal to define either the temperature set point up to the maximum 85°C, or the burner load setting up to the maximum 100% output.

Each boiler is additionally fitted with a manual reset high limit thermostat factory set to 95°C but which can be set up to a maximum of 110°C dependent on application.

Water flow switch

Protecting the boiler from inadequate circulation, the integral water flow switch prevents the boiler from firing should the flow rate become too low.

Water pressure sensor

The boiler is protected from both high and low water pressure conditions. Water pressure within the boiler is monitored by the integral sensor and the boiler prevented from operating under the following conditions:

- High pressure. The burner is prevented from firing should internal boiler pressure reach 4 bar and released for operation once the pressure drops to 3.8 bar.
- Low pressure. The burner is reduced to 20% modulation should internal pressure drop below 1 bar, and prevented from firing should internal pressure drop below 0.8 bar. Once the internal pressure recovers to 1 bar the burner operates at 20% modulation until pressure reaches 1.2 bar when full burner modulation resumes.

Pipe Kits with Low Loss Headers

The boiler must be used with a low loss header arrangement to provide hydraulic separation from the heating circuits, thus ensuring flow conditions within secondary circuits cannot adversely effect operation of the boiler. See *Scheme 1 on page 17*.

Optional pipe kits are available for up to 4 boilers to speed up installation, leaving only the final system connections to be made on site.

Each pipe kit comprises of an individual support frame for each boiler, with the hydraulic headers set for location under the boilers once in position. Isolating valves for flow, return and gas connections, as well as the boiler pump are provided within the pipe kit.

Flue Connection

A concentric flue connection is located centrally towards the rear top of each boiler allowing compact flue arrangements above the boiler.

Flue Headers Kits for Open Flues – B23

For multiple boiler installations optional flue headers are available allowing connection of up to 4 boilers into a common open B23 type flue system. Manufactured in polypropylene the flue headers are lightweight and easy to assemble using push fit technology with integral seals at all joints.

Boiler connections enter the flue header from the side ensuring flue system condensate flows the full length of the flue headers to the syphon equipped drain point.

A flue gas non return valve within the boiler combustion circuit removes the need for an external non return valve resulting in a compact flue header arrangement above the boiler.

Room Sealed Flue Kits – C13, C33, C53

Optional flue kits are available for individual boilers to enable room sealed flue connection. Using either concentric or twin pipe arrangements flues can be terminated both horizontally and vertically within permitted legislative requirements.

Manufactured in polypropylene and using push fit connections with integral seals, flue kits are quick and simple to assemble. The flues are easy to adapt or shorten on site using basic tools.

Flue terminal plumbing

Low flue gas temperature resulting from a highly efficient combustion process will on colder days result in visible plumbing from flue terminals. The location of flue terminals must be chosen carefully to prevent plumbing becoming a nuisance and ensure the effective dispersion of flue gases exiting the flue terminal whilst remaining compliant with flue regulations.

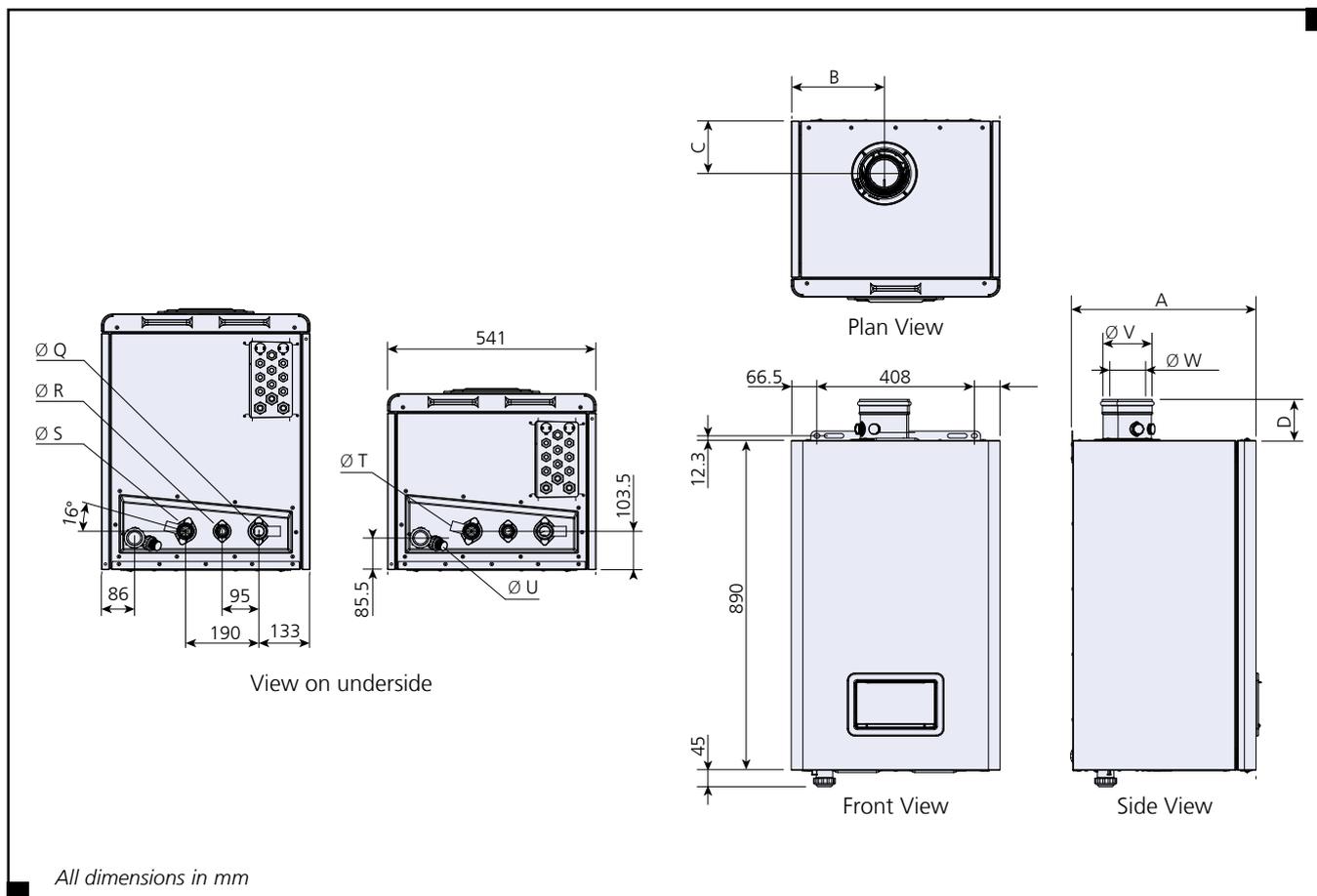
Technical Data

Stratton mk2 Boiler Performance and General Data Information

Stratton mk2 boiler Model		S2-40	S2-60	S2-70	S2-80	S2-100	S2-120	S2-150
Energy	Building regulations Part L seasonal efficiency % gross	95.75	96.13	95.50	95.50	96.02	95.95	95.75
	SAP 2009 Annual efficiency %	89.00	89.20	88.80	88.80	89.10	89.10	89.00
	ErP efficiency rating (modules ≤ 70kW only)	A	A	A	N/A	N/A	N/A	N/A
	Boiler output - maximum 80/60°C, NG & LPG. kW	40.0	56.4	69.9	79.8	95.7	119.5	134.0
	S2-120 & S2-150 models Nat Gas only. Btu/hr x 1000	136.5	192.4	238.5	272.3	326.5	407.7	457.2
	Boiler output - maximum 50/30°C, NG & LPG. kW	43.0	61.0	76.8	87.5	104.5	129.5	146.0
	S2-120 & S2-150 models Nat Gas only. Btu/hr x 1000	146.7	208.1	262.0	298.6	356.6	441.9	498.1
	Boiler output - minimum 80/60°C, Nat Gas. kW	8.3	11.5	17.1	17.1	19.0	23.9	26.8
	Btu/hr x 1000	28.3	39.2	58.3	58.3	64.8	81.5	91.4
	Boiler output - minimum 80/60°C, LPG kW	8.3	11.5	31.9	31.9	33.5	N/A	N/A
Btu/hr x 1000	28.3	39.2	108.8	108.8	114.3	N/A	N/A	
Boiler input (gross) - maximum, NG & LPG. kW	45.7	64.4	80.0	91.3	109.3	136.5	151.6	
S2-120 & S2-150 models Nat Gas only.. Btu/hr x 1000	156.0	219.6	273.0	311.7	373.0	465.8	517.2	
Boiler input (net) - maximum, NG & LPG. kW	41.2	58.0	72.1	82.3	98.5	123.0	137.9	
S2-120 & S2-150 models Nat Gas only. Btu/hr x 1000	140.6	197.9	246.0	280.8	336.1	419.7	470.5	
Standby Losses W	42	51	87	87	94	104	117	
Water	Water content litres	3.6	5.0	9.0	9.0	10.2	12.8	15.3
	System design flow rate @ 25°C ΔT rise l/s	0.4	0.5	0.7	0.8	0.9	1.1	1.3
	Water side pressure loss @ 25°C ΔT rise mbar	205	224	176	205	246	314	380
	System design flow rate @ 20°C ΔT rise l/s	0.5	0.7	0.8	0.9	1.1	1.4	1.6
	Water side pressure loss @ 20°C ΔT rise mbar	320	350	275	320	385	490	580
	System design flow rate @ 11°C ΔT rise l/s	0.9	1.2	1.5	1.7	2.1	2.6	2.9
	Water side pressure loss @ 11°C ΔT rise mbar	1058	1157	909	1058	1273	1620	1700
	Minimum water pressure barg	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Maximum water pressure barg	4	4	4	4	4	4	4
	Maximum flow temperature setting °C	85	85	85	85	85	85	85
Gas	Gas flow rate, NG (G20) - maximum m³/hr	4.4	6.1	7.6	8.7	10.4	13.0	14.6
	Maximum gas inlet pressure, Nat Gas mbar	25	25	25	25	25	25	25
	Nominal gas inlet pressure, Nat Gas mbar	20	20	20	20	20	20	20
	Minimum gas inlet pressure, Nat Gas mbar	17	17	17	17	17	17	17
	Gas flow rate, LPG (G31) - maximum m³/hr	1.7	2.4	3.0	3.4	4.0	N/A	N/A
	Nominal gas inlet pressure, LPG mbar	37.5	37.5	37.5	37.5	37.5	N/A	N/A
Flue	Approx. flue gas volume Nat Gas @ 15°C, 9.1–9.3% CO ₂ @ N.T.P m³/hr	57	79	98	112	135	168	189
	Maximum flue gas temperature @ 80/60°C Nat Gas °C	80	76	70	74	76	70	70
	Pressure at boiler flue spigot @ 80/60°C Nat Gas Pa	156	200	123	179	187	200	200
	Approx. flue gas volume LPG @ 15°C, 10.3–10.5% CO ₂ @ N.T.P m³/hr	55	77	96	109	128	N/A	N/A
	Maximum flue gas temperature @ 80/60°C LPG °C	81	78	69	73	75	N/A	N/A
	Pressure at boiler flue spigot @ 80/60°C LPG Pa	126	200	105	150	138	N/A	N/A
Electrics	Dry NOx emission (0% excess oxygen, mg/kWh dry air free); NG/LPG mg/kWh	36	35	35	35	34	36	35
	Electrical supply	230 V 1 Ph 50 Hz						
	Power consumption - maximum boiler modulation W	68	138	96	141	160	206	263
	Start current (per module) Amp	1.2	2.4	1.68	2.8	3.2	4.0	4.5
	Run current (per module) Amp	0.30	0.60	0.42	0.61	0.70	0.90	1.14
Approx shipping weight kg	50	60	90	90	95	100	125	
Noise emission @1m: @max. modulation dB (A)	57.4	59.7	57.3	57.3	58.5	61.6	59.3	
Noise emission @1m: @min. modulation dB (A)	34.3	35.8	33.5	33.5	34.3	35.4	36.8	

Dimensional Details

Stratton mk2 Boiler Dimensions and Clearances



		Stratton mk2 Models							
Ref.		S2-40	S2-60	S2-70	S2-80	S2-100	S2-120	S2-150	
A	Boiler depth	mm	477	477	574	574	574	692	800
B	Flue connection centreline	mm	241	241	242.5	242.5	242.5	242.5	242.5
C	Flue connection centreline	mm	143.5	143.5	120	120	120	120	120
D	Flue spigot height	mm	86	86	111	111	111	111	111
Ø Q	Heating return connection		G 1" 1/4						
Ø R	Gas supply		G 1"						
Ø S	Heating outlet connection		G 1" 1/4						
Ø T	Safety valve connection		G 1/2" (female)						
Ø U	Condensate drain	mm	24	24	24	24	24	24	24
Ø V	Air inlet	mm	125	125	150	150	150	150	150
Ø W	Fume duct	mm	80	80	100	100	100	100	100

Recommended Clearances to walls or opposing structures for maintenance

		S2-40	S2-60	S2-70	S2-80	S2-100	S2-120	S2-150
Front	mm	800	800	800	800	800	800	800
Sides	mm	250	250	250	250	250	250	250
Top	mm	Dependent on Flue - See pages 19 to 23						

Pipe and Header Kits

Single and Multiple Stratton mk2 Boilers

Single boiler pipe kit with low loss header

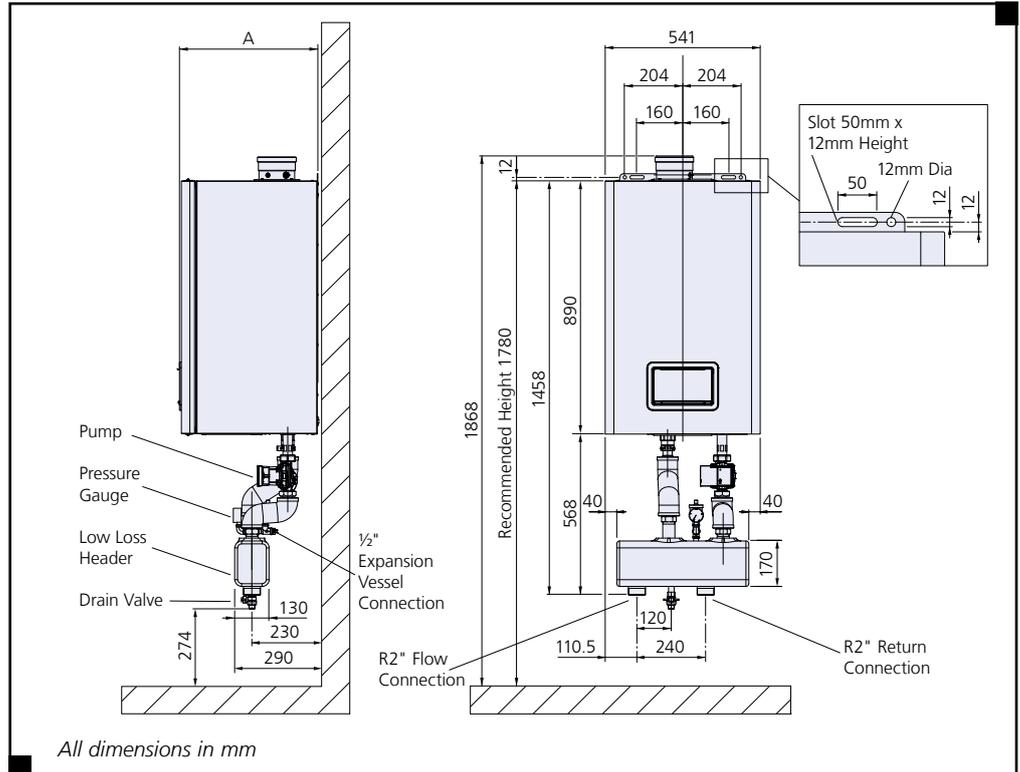
For individual boiler installations a simple pipe kit is available for location directly underneath the boiler. When using this pipe kit the boiler must be mounted to the wall directly so the combined weight of the boiler and low loss header must be accounted for.

The kit includes:

- Low loss header
- 2" Secondary heating circuit connections
- ErP compliant primary pump optimised for 20°C differential temperature
- Safety relief valve – 4 bar
- Pressure gauge
- Drain valve
- Interconnecting pipes between boiler and header
- ½" Expansion vessel connection
- Automatic air vent
- Insulation

Weight - 15kg

Note: This pipe kit is not designed to be compatible with boilers when hung on the boiler support frame.



Boiler support frame

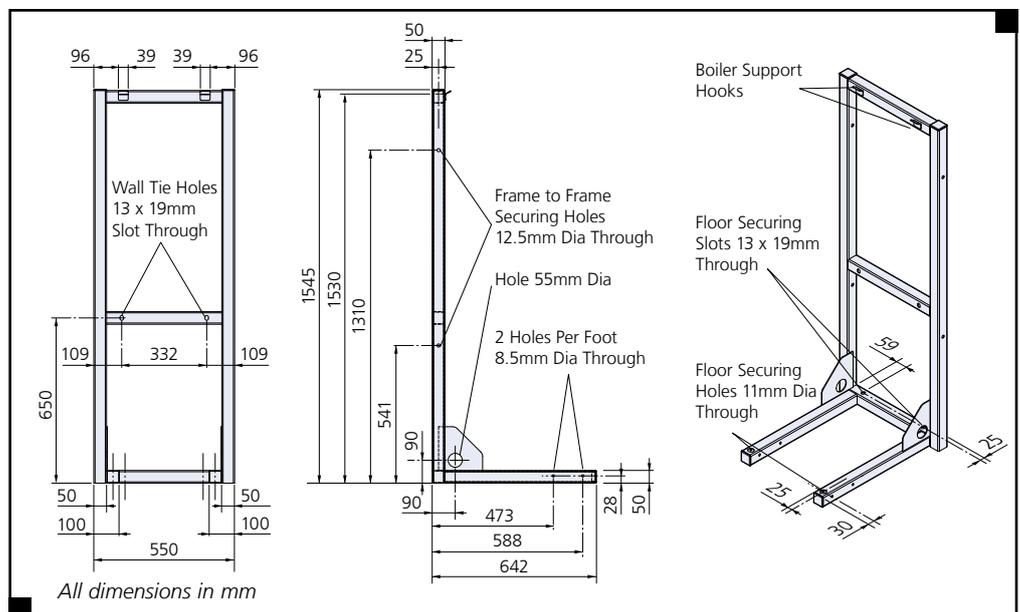
For single Stratton mk2 boilers providing support where weak walls or standalone requirement is present. Transferring the weight to the floor, multiple frames can be bolted together for modular boiler installations.

Each frame kit includes:

- Fully welded construction
- Pre drilled holes for floor and wall tie bolts
- Simple hook arrangement allowing fast mounting of boilers to frame
- Bolts for securing multiple frames together are supplied with frame
- Matt black finish

Weight - 18kg

Note: Boiler frame is not compatible with single boiler pipe kit shown above.



Pipe and Header Kits

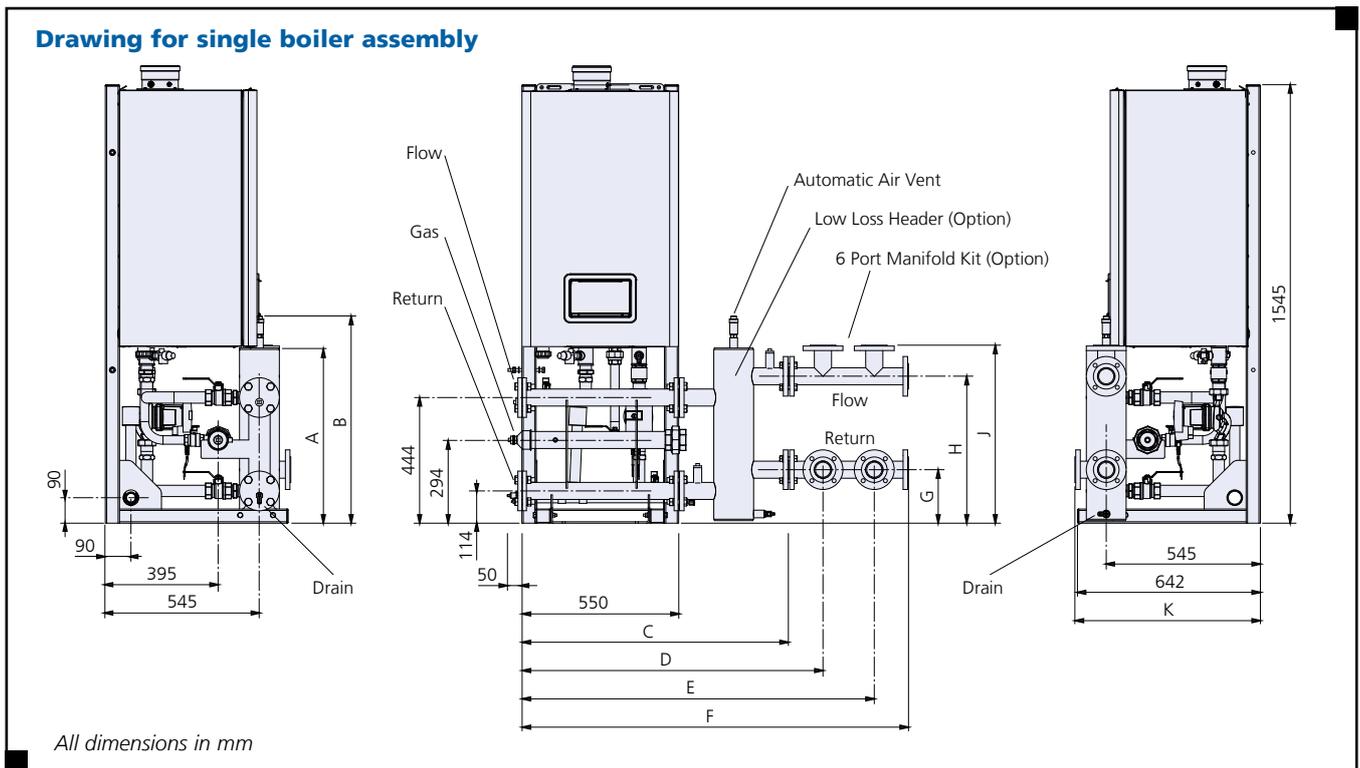
Single and Multiple Stratton mk2 Boilers

Multiple boiler pipe kits with frame and headers

For multiple boiler installations pipe frame and header sets are available for one to four boilers. Individual mounting frames are provided for each boiler, whilst header sets are available for one and two boilers allowing combinations up to four boilers to be installed by simply bolting two header sets together. Pipe kits can be located against a wall or be free standing when using suitable floor tie bolts.

Kits include:

- Fully welded boiler mounting frames with holes for wall and floor ties
- Simple hook arrangement allowing fast mounting of boilers to frame
- DN50 or DN80 flow and return headers – PN06, blank flanges provided
- 2" Gas header with pressure test point and plugged purge connection
- 32mm polypropylene condensate header
- Individual boiler isolating valves for water and gas
- Non-return valve to prevent reverse circulation through non-firing boiler modules
- ErP compliant boiler shunt pumps optimised for 20°C differential temperature
- Safety relief valve – 4 bar
- Flexible interconnecting pipes between boilers and headers
- Optional low loss headers to suit DN50 or DN80 pipe kit assemblies
- Optional 6 port extension manifold kit to suit DN50 or DN80 pipe kit assemblies



Boiler models	Flow Header	Return Header	Gas Header	Condensate Header
S2-40, S2-60, S2-70, S2-80	DN50 PN06	DN50 PN06	R2"	32mm Poly
S2-100, S2-120, S2-150	DN80 PN06	DN80 PN06	R2"	32mm Poly

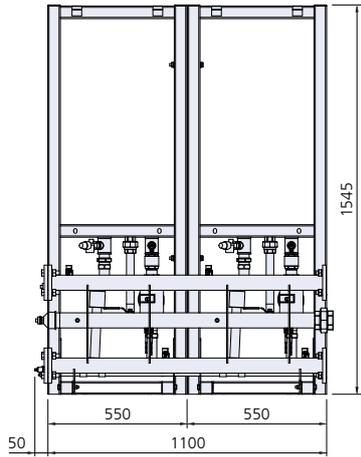
Boiler models	A	B	C	D	E	F	G	H	J	K
S2-40, S2-60, S2-70, S2-80	620	735	933	1056	1236	1356	189	519	629	651
S2-100, S2-120, S2-150	720	832	1010	1155	1385	1530	214	565	684	694

Note: Hydraulic circuits should never impede circulation through the boilers. The use of a low loss header (optional) is strongly recommended to ensure adequate boiler flow. See page 17 for hydraulic circuit design.

Pipe and Header Kits

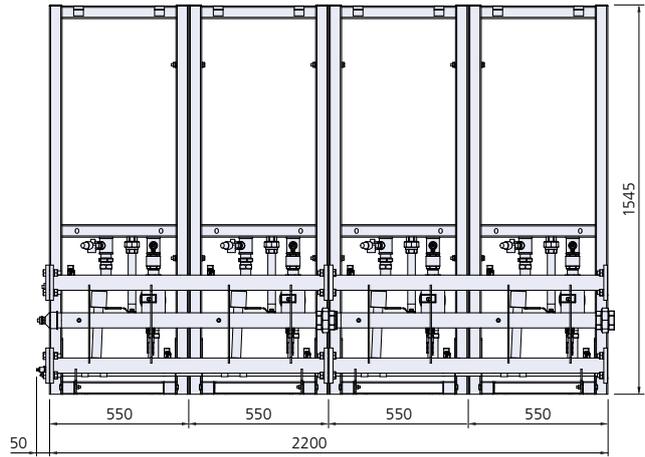
Single and Multiple Stratton mk2 Boilers

Two boiler assembly



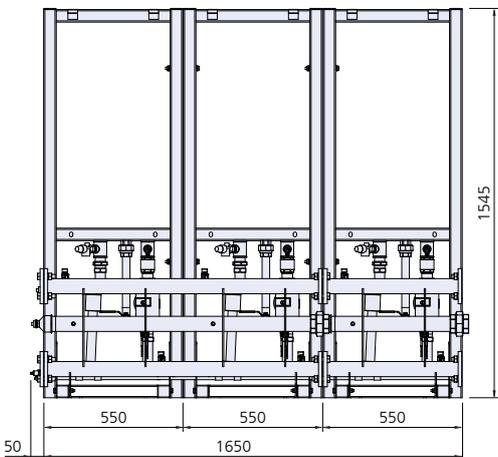
All dimensions in mm

Four boiler assembly



All dimensions in mm

Three boiler assembly



All dimensions in mm

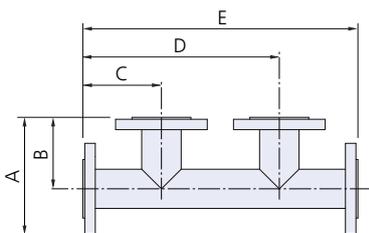
Optional low loss headers

Boiler models	A	B	C	D	E	F	G
S2-40, S2-60, S2-70, S2-80	663	785	510	180	152	420	210
S2-100, S2-120, S2-150	710	824	535	205	220	460	230

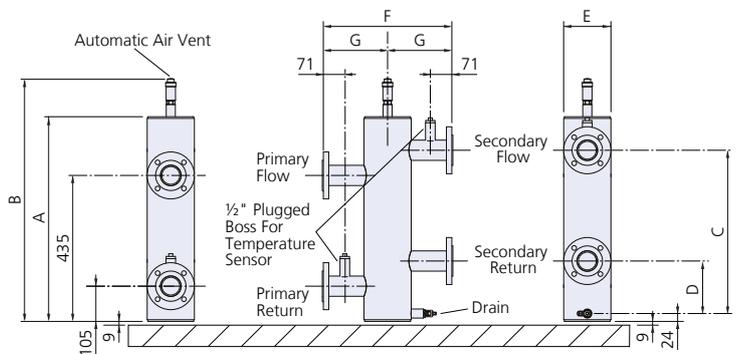
Optional manifold extension kits

Boiler models	A	B	C	D	E
S2-40, S2-60, S2-70, S2-80	180	110	120	300	420
S2-100, S2-120, S2-150	235	140	145	375	520

Optional manifold extension kits



Optional low loss headers



All dimensions in mm

Boiler models	Primary Flow Connection	Primary Return Connection	Secondary Flow Connection	Secondary Return Connection
S2-40, S2-60, S2-70, S2-80	DN50 PN06	DN50 PN06	DN50 PN06	DN50 PN06
S2-100, S2-120, S2-150	DN80 PN06	DN80 PN06	DN80 PN06	DN80 PN06

Controls For Single Boilers

Stratton mk2 Boilers

Single boilers may be used in a variety of situations, often smaller premises without sophisticated controls such as Building Management Systems. Stratton 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 functions available as standard (no optional extras):

- Time control with 3 programs per day
- 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

Optional Outside Air Temperature Sensor QAC34

Whatever the level of control required 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 pre-determined set-point
- Adaptable weather compensation - Matches boiler flow temperature to building thermal dynamics as outside air temperature fluctuates up and down.

Part number 533901457 – Model QAC34

Optional Heating Circuit Control Kit

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 which the circuit flow temperature sensor, mixing valve and pump are all wired to. Pumps must be connected via a suitably rated contactor – not HHL supply.

An optional heating circuit control kit is required for each heating circuit.

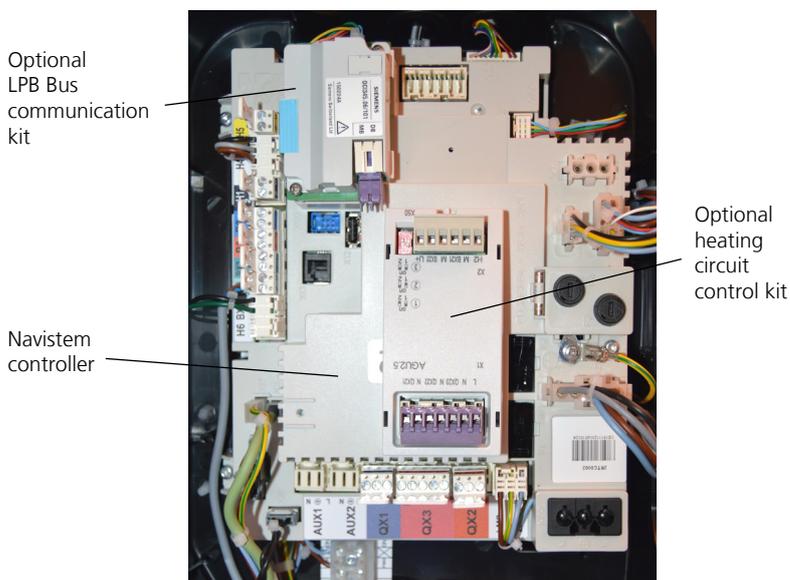
Part number 059753 – for single heating circuit.

Remote interlock

Each boiler can be interlocked to prevent operation when external controls elements are in fault, such as gas solenoid valve closure. A programmable input on terminals H5 can be commissioned to shut down the boiler if the contacts go open circuit. External switches using this circuit must be volt free.

Optional 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 QAA75, 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.



Controls For Single Boilers

Stratton mk2 Boilers

Optional Programmable Room Sensor - QAA75

The programmable room temperature sensor communicates with the boiler and allows the user full adjustment of the room temperature, time clock, holiday periods and frost protection settings. The unit also displays fault codes from the boiler plant. Alternatively, offset adjustable room sensors are also available, for installations requiring users to have less access to system settings.

- 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 533901587 – Model QAA75



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 533901589 – Model QAA55

Optional Domestic Hot Water Control

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.

Part number 563605674 – Model QAZ36

Optional Controls Kits For Single Boilers

Controls option	Part number
Outside air temperature sensor QAC34	533901457
Domestic Hot Water sensor kit (sensor and pocket)	563605674
Mixing valve heating circuit control kit (clip in control module, temperature sensor and pocket) for 1 zone	059753
Programmable room sensor QAA75	533901587
Offset adjustable room sensor QAA55	533901589

Remote Start Stop

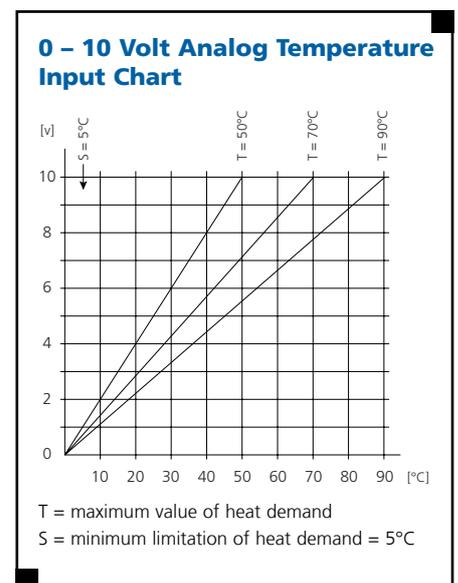
Each boiler is equipped with a remote start stop circuit. On receiving a start signal from for instance an outside time clock the boiler will operate according to its internal temperature management program. This level of control simply overrides the boilers internal time clock program. The boiler may 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 detailed above.

BMS Control

Additionally all Stratton mk2 boilers may be controlled using more sophisticated controls such as Building Management Systems using the 0-10 volt analog input which can be configured for temperature or load control. Where a Building Management System 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 O&M Navistem B3000 ref 500001310

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Controls For Multiple Boilers

Stratton mk2 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 complex 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 15 boiler modules using integral Master/Slave feature of control.
2. Sequencing of up to 16 boiler modules using the Hamworthy Merley boiler sequence controller for mounting remote to the boiler or within clients own control panel. See *Brochure 500002524*.

Key features of both methods of multiple boiler control include:

- Choice of control inputs including:
 - External enable signals
 - 0-10v analog heat demand signal
 - Built in time clock settings
- Choice of cascade or unison sequencing strategies
- Lead boiler rotation
- 7 Day integral time clock – 3 programmable periods per day
- Optimised start and stop based on outside and room air temperatures
- Holiday periods
- Frost protection
- Constant or variable flow temperature based on outside and room air temperatures
- 2 Stage frost protection based on outside and room 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
- Reduced temperature/night set back for non occupancy hours
- Pump kick for connected pumps

Using Master/Slave Boiler Sequence Controller

When using Master/Slave sequencing it is important to select which boiler module is going to be the Master. All site wiring associated with the sequence control function must be routed to this boiler and connected to the boiler controller. Programming of the sequence control will also be completed via the interface on this boiler module.

LPB Bus Communication Kit OCI345

Up to 16 boiler modules may be sequence controlled and communication between boiler modules is facilitated via an LPB bus. Each boiler module must be equipped with an optional LPB bus communications kit.

Part number 563605667 – Model OCI345

Outside Air Temperature Sensor – QAC34

Whatever the level of control required 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 to prevent boiler operation when outside temperature reaches a pre-determined set-point
- Adaptable weather compensation to match boiler flow temperature to building thermal dynamics as the outside air temperature fluctuates up and down.

Part number 533901457 – Model QAC34

Common Flow Temperature Sensor QAZ36

A flow temperature sensor must be located in the common primary flow leaving the boilers and before the low loss header. The sequence controller responds to signals from this sensor, comparing temperature set-point with actual flow temperature, then manages the number of boilers in operation and modulation rate of each boiler to achieve and maintain the desired flow temperature. A dedicated sensor kit including immersion pocket is available.

The number of boiler modules released to fire is selected according to the programmed sequence control strategy.

Part number 563605673 – Model QAZ36

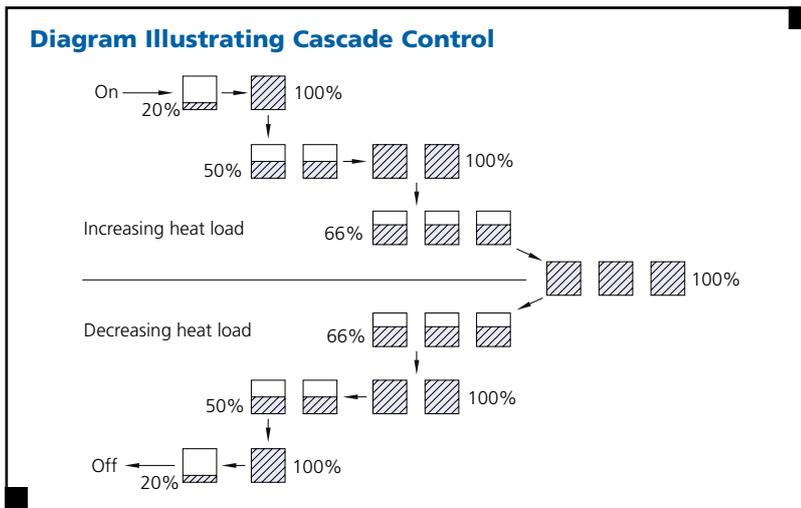
Controls For Multiple Boilers

Stratton mk2 Boilers

Boiler Sequence Control Strategies

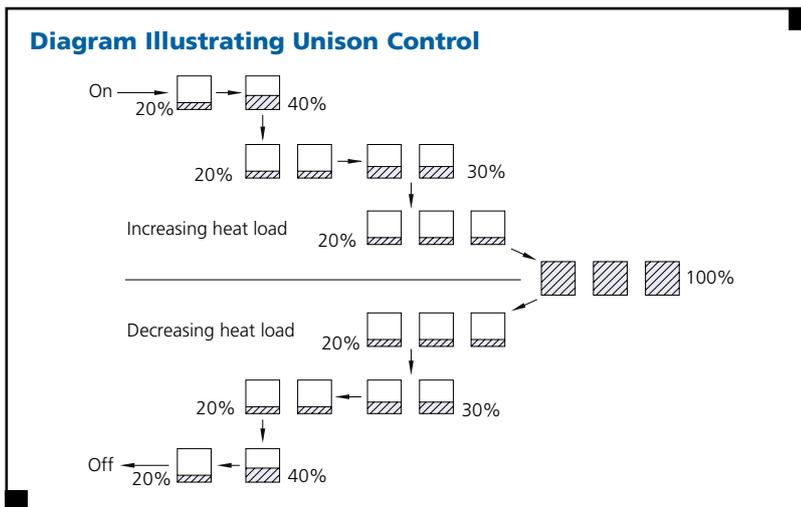
Cascade Control

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.



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

Stratton mk2 boilers can be installed using pumping solutions that best match the system design requirements. In all instances it is essential 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.

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 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.

Notes

Option 2 - individual boiler shunt pumps are provided with all optional pipe kits for Stratton mk2 boilers.

Controls For Multiple Boilers

Stratton mk2 Boilers

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 over-ridden until the over-ride function is manually de-activated. Frost protection and summer shutdown controls remain active.

Remote Enable

The Master boiler can be programmed to receive an enable signal from an outside 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 analog input to initiate heat generation.

NOTE: When using a BMS to initiate cascade control via a 0-10 volt analog 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.

Optional controls kits for multiple boilers

Controls option	Part number
Outside air temperature sensor QAC34	533901457
Volt free contact kit for remote status signalling AGU2.550A109	563605666
Heating circuit sensor kit (sensor and pocket) QAZ36	563605673
Merley boiler sequence controller, wall mounted	563605672
Merley boiler sequence controller, loose kit for panel mounting	563605671
LPB Bus communication module OCI345, one required per boiler module	563605667
Programmable room sensor QAA75	533901587

Electrical details

Stratton mk2 Boilers

Connections To Boiler

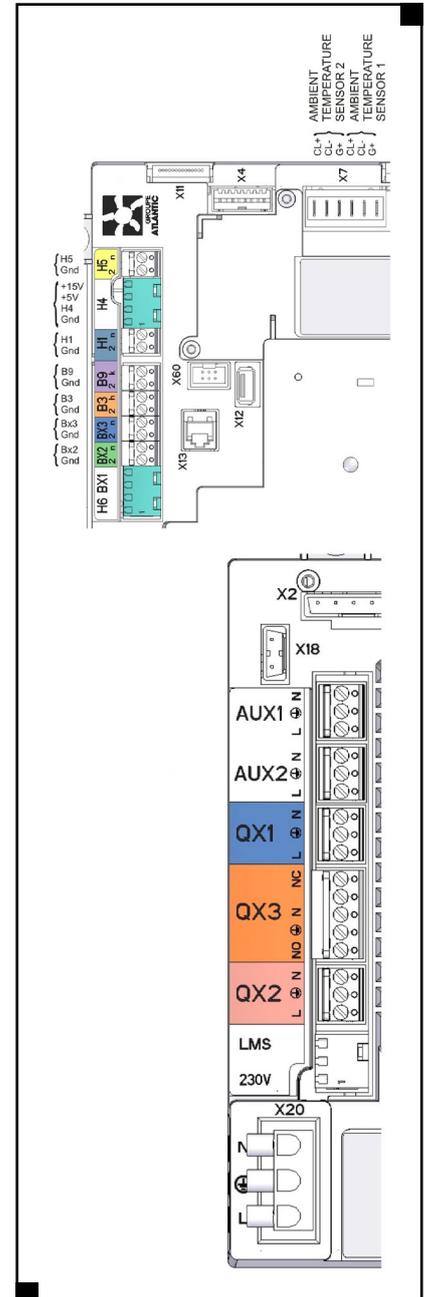
Low Voltage Connections

Terminal reference	Function	Electrical	Max load
H5	Programmable input for: 1 Remote interlock (external vfc switch)	24V DC	
H4	Not for customer use		
H1	Programmable input for: 1 0-10V analog signal 2 Remote enable switch/time clock (vfc switch)	0-10V 24V DC	
B9	Input for outside air temperature sensor	Resistance input	
B3	Programmable input for DHW temperature: 1 QAZ36 DHW sensor kit input 2 Mechanical thermostat input (vfc switch)	Resistance input 24V DC	
BX3	Programmable input - spare		
BX2	Programmable input for: 1 Common flow sensor for master/slave 2 Sequence control (Master boiler only)		
BX1	Not for customer use		
H6	Not for customer use		

High Voltage Connections

Terminal reference	Function	Electrical	Max load
AUX1	Not used		
AUX2	Not used		
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	1 Amp
QX2	Programmable power supply for either: 1 DHW pump/circulator 2 Direct uncompensated heating circuit pump	230v 50Hz 1Ph	1 Amp
LMS 230V	Not for customer use		
LNE	Main power supply	230v 50Hz 1Ph	6.3 Amp

Note: boiler shunt pumps supplied as part of Hamworthy pipe kits are connected to terminals QX3 providing mains 230V.



Electrical Connections

There are a number of cable entry glands located on the underside of the boiler to the right-hand side beneath the controls centre. 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

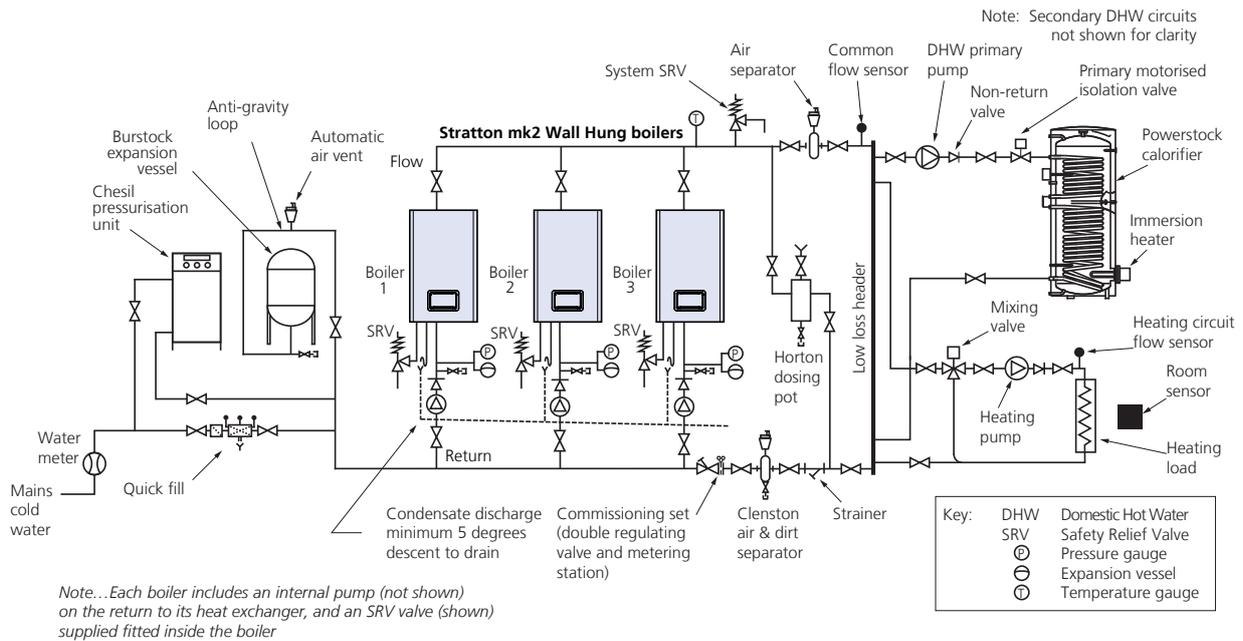
An independent isolator and fused electrical supply is recommended for each boiler module. Supply 230 volt, 50Hz, single phase. Wiring external to the boiler must be installed in accordance with IET Regulations and any local regulations which apply. Wiring must be completed in heat resistant 3 core cable, (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.

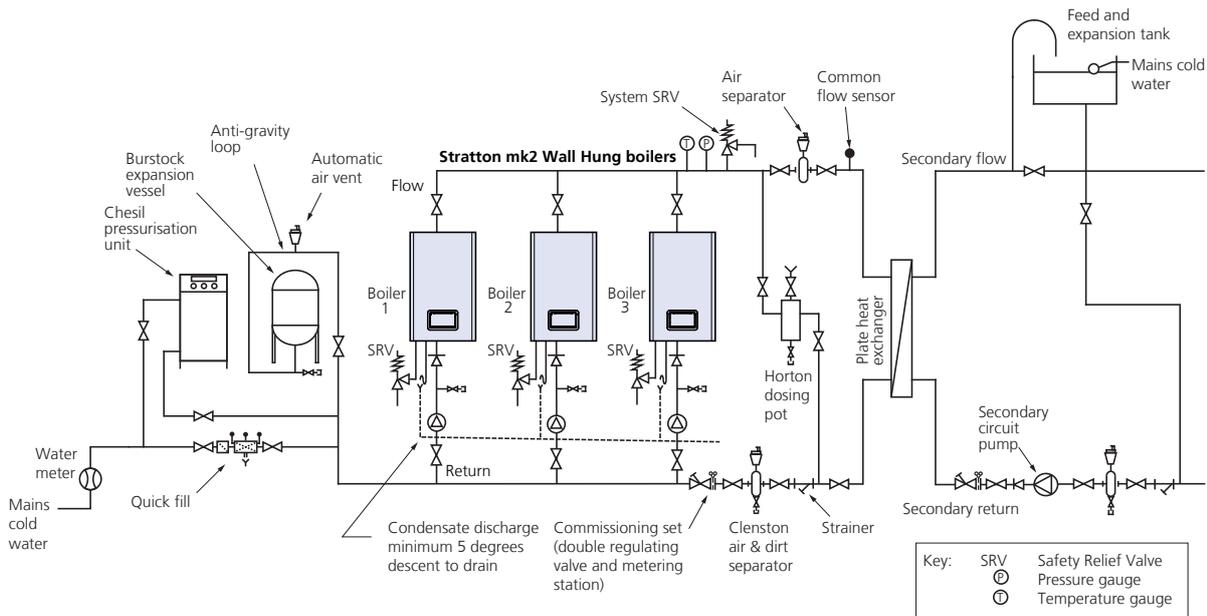
Hydraulic Schemes 1 & 2

Stratton mk2 Boilers

Scheme 1: Sealed System with Low Loss Header



Scheme 2: Sealed Primary and Open-Vented Secondary System with Plate Heat Exchanger Separation and without a Low Loss Header



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

Note: Hydraulic circuits should never impede circulation through the boilers. The use of a low loss header is strongly recommended, or use of a plate heat exchanger for hydraulic separation to ensure adequate boiler flow.

Application & System Data

Stratton mk2 Boilers

Gas Supply Pipes

Supply pipes must be fitted in accordance with BS6891 or IGE/UP/2 as appropriate. Pipework must be of adequate diameter for the length of run, and must not be of a smaller diameter than the boiler's gas connections. For gas pipe sizing calculations refer to Chartered Institute of Building Services Engineers (CIBSE) Guide C.

The complete installations must be purged and tested for soundness as described in BS6891 or IGE/UP/1 and IGE/UP/1A as appropriate.

Water Flow Requirements

The Stratton mk2 boiler is designed as a rapid response, low water content unit, to run continuously with maximum reliability. Care should be taken in the initial design and layout to ensure adequate water flow through the boiler(s) having due regard for the influence of the control system.

The primary circuit design should be such that secondary circuit conditions cannot have an influence over reliable operation of the boilers.

System Feed Water Quality

Modern heating systems often contain a diverse mix of metals which, when combined with supply water of varying chemical composition, can lead to corrosion. It is therefore important to treat water to ensure the long term satisfactory operation of the boilers and heating system.

Hamworthy recommend a water treatment specialist is appointed to undertake analysis of the water and to recommend suitable cleaning and dosing regimes, to ensure the quality of the system and make-up water remains within the following tolerances throughout the life of the installation:

Water Properties	Permitted Levels
Acidity level	8.2<pH<9.5
Concentration of dissolved oxygen	<0.1 mg/l
Chlorides (Cl)	<50 mg/l
Calcium Carbonate (CaCO ₃)	<100mg/l (initial fill) <50mg/l (top up)

System Water Meter

Adding a large amount of untreated water always contributes a significant amount of scaling. To monitor this and to detect problems, a system water meter must be installed.

Water Filter

A coarse filter and dirt separator must be fitted in the return pipework to remove suspended particles, and suitable air separation must be provided at high points in the circuit.

Condensate Discharge

Natural gas boilers typically produce condensate at a rate of 13 litres per hour per 100kW input energy when operating in condensing mode. Although the condensate produced is mildly acidic (typical pH~3.5), normally it can be disposed

of through the drainage system. If in any doubt about local regulations, check with the local water authority.

The Stratton mk2 boilers are equipped with a polypropylene syphon drain connection to which plastic polypropylene piping, with glued sealed joints should be connected, to dispose of the condensate. The condense discharge pipe should have a minimum fall of 3° to drain, and should discharge via tundish arrangement. To prevent any risk of freezing in winter, the condense pipe should be insulated and/or routed internal to the building where possible.

General Ventilation Requirements

An adequate supply of fresh air for combustion and ventilation must be provided in accordance with BS 5440 for boiler installations less than 70kW net rated input (Stratton mk2 models S2-40 and S2-60), and in accordance with BS 6644 for boiler installations greater than 70kW net rated input (Stratton mk2 models S2-70, S2-80, S2-100 and S2-120 or multiple Stratton mk2 boiler combinations). When Stratton mk2 boilers are installed as room sealed units the air supply is for ventilation only.

Boiler House Temperatures

Additional requirement of BS 6644 for multiple boiler installations requires that the air supplied for boiler house ventilation shall be such that the maximum temperatures within the boiler house do not exceed:

At floor level, 25°C (or 100mm above floor level)

At mid-level, 32°C (1.5m above floor level)

At ceiling height, 40°C (or 100mm below ceiling height)

Ventilation Grille Openings

High and low level ventilation grilles shall be positioned as high and as low as practicably possible. Low level grills will be located within 1metre of floor level for Natural Gas. High level grilles are recommended to be positioned within 15% of the boiler room height from the ceiling. High and low ventilation grilles shall communicate with the same room or internal space where compartment ventilation is used. Where ventilation grilles communicate directly with outside air they shall be positioned on the same wall.

Air Supply

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 boiler modules, the boilers should not be fired whilst building work is being undertaken.

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 information.

Safety Relief Valve

Safety relief valves are only provided as part of optional pipe kits. Where a Hamworthy pipe kit is not used an appropriately sized safety relief valve must be fitted on the flow outlet before any isolation valve.

Flue Design

Stratton mk2 Boilers
Single boilers
B23p Open Flue Systems

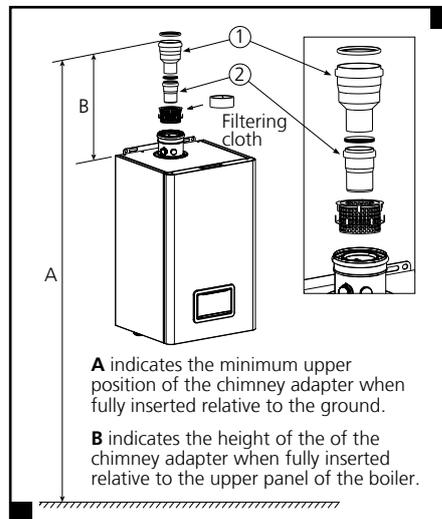
B23p pressurised open flues for single boilers include a dedicated flue pipe for removing the flue gases to outside. Combustion air is drawn into the boiler directly through the outer annulus of the concentric flue connection on top of the boiler which is supplied with an air filter.

Boilers must be equipped with the appropriate one piece or two piece chimney adaptor and air filter kit dependent on the final diameter of flue system being used.

Flue components are constructed in polypropylene with EPDM seals for removing flue gases from the boiler. Flue terminal kits are manufactured from stainless steel.

Flue components are CE certified EN14471 T120 H1. Flue pressure H1 up to 5000 Pa, and flue temperature T120 up to 120°C.

Flue components other than terminals are only suitable for installation inside the building.



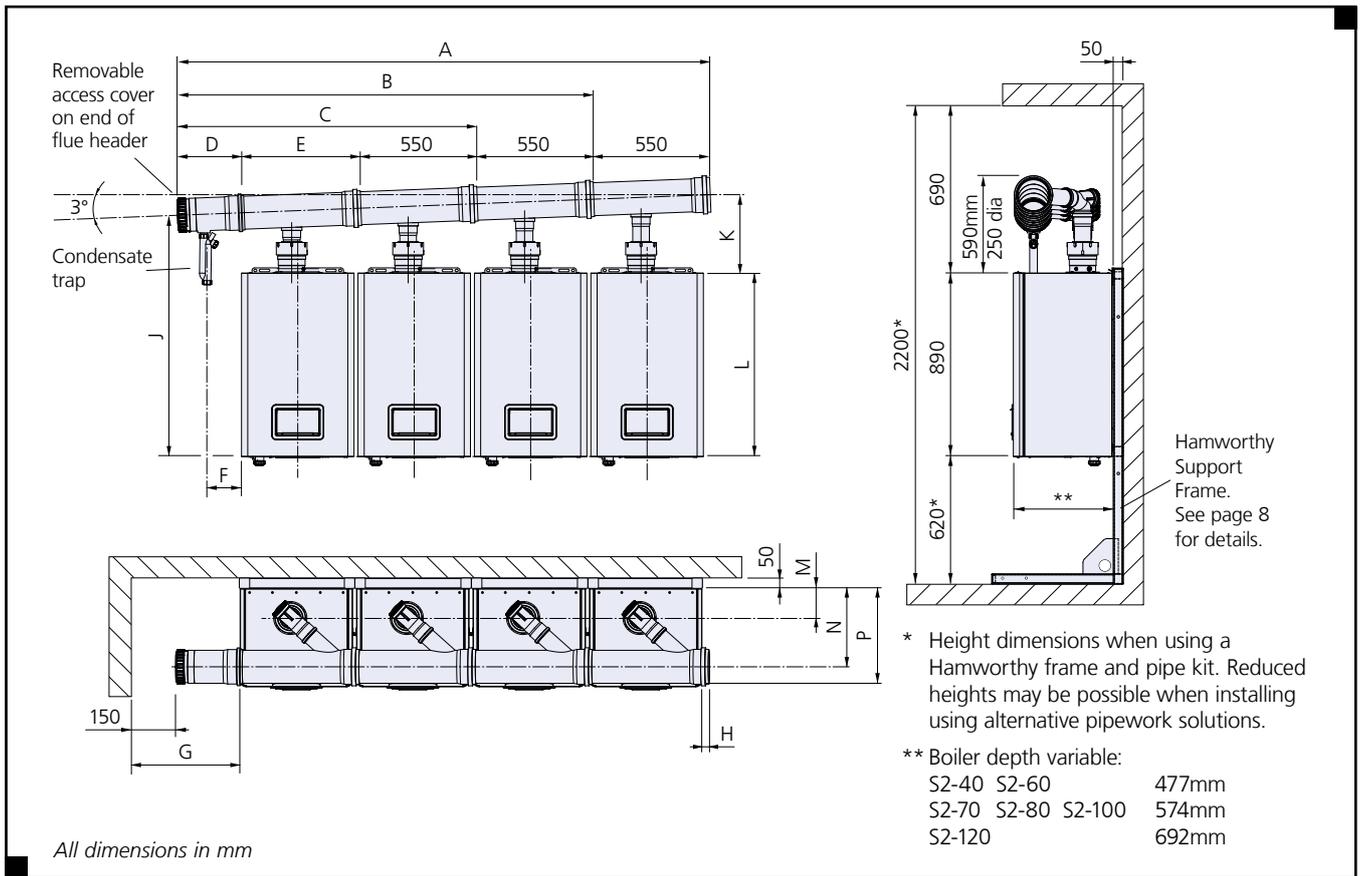
B23p Flue connection kits including air inlet filter					
Item	Boiler models S2-40 and S2-60		Boiler models S2-70, S2-80, S2-100, S2-120, S2-150		
	Final flue diameter		Final flue diameter		
	80mm Item 2 only	125mm Item 1 & 2	110mm Item 2 only.	125mm Item 1 & 2	160mm Item 1 & 2
Flue connection kit including air inlet filter part number	040945	040940	041052	040940	041050
Minimum height A (mm)	2000	2140	2090	2155	2170
Minimum height B (mm)	220	260	310	375	390

B23p Open flue components				
Item	Dia. 80mm	Dia. 110mm	Dia. 125mm	Dia. 160mm
	Part number	Part number	Part number	Part number
Flue connection kit including air inlet filter	040945	041052	040940	041050
Flue pipe 1000mm length	573407321	532511255	573407338	573407314
Flue pipe 500mm length	573407288	532511256	573407337	573407313
Flue elbow 90 degrees	573407289	532511257	573407341	573407316
Flue elbow 45 degrees	573407320	532511258	573407340	573407317
Pitched roof terminal kit including flashing	573407386	562511115	573407388	573407390
Flat roof terminal kit including flashing	573407387	562511116	573407389	573407391
Wall bracket	532511270	532511259	532511016	573407328

B23p Pressurised open flue performance data for Stratton mk2 boilers							
Model	S2-40	S2-60	S2-70	S2-80	S2-100	S2-120	S2-150
Flue diameter (mm)	80	80	110	110	110	110	110
Maximum flue length (m)	43	20	72	83	50	24	40
Equivalent length 90° Elbow (m)	3	3	3	3	3	3	3
Equivalent length 45° Elbow (m)	2	2	2	2	2	2	2
Flue diameter (mm)	125	125	125	125	125	125	125
Maximum flue length (m)	100	100	100	100	100	62	80
Equivalent length 90° Elbow (m)	2	3	3	4	4	4	3
Equivalent length 45° Elbow (m)	1	2	2	2	2	2	2
Flue diameter (mm)	N/A	N/A	160	160	160	160	160
Maximum flue length (m)	N/A	N/A	100	100	100	100	300
Equivalent length 90° Elbow (m)	N/A	N/A	2	3	5	5	5
Equivalent length 45° Elbow (m)	N/A	N/A	1	2	3	3	3

Flue Design

Stratton Boilers
Multiple Boilers
B23p Open Flue Header Systems



Flue headers are provided for 2, 3 or 4 boiler installations and sized according to the maximum output capacity of the combined installed boilers. The flue header can be installed to run to the left or the right and must run continuously downhill in the direction of the condensate removal fitting at the end of the header at a minimum 3 degrees.

B23p Open flue header kits including air inlet filter						
	Boiler models S2-40 & S2-60		Boiler models S2-70, S2-80 & S2-100		Boiler models S2-120, S2-150	
No. of boilers	Flue header kit diameter (mm)	Flue header kit part number	Flue header kit diameter (mm)	Flue header kit part number	Flue header kit diameter (mm)	Flue header kit part number
2 Boiler header	160	082287	160	082290	200	082296
3 Boiler header	160	082288	200	082291	200	082297
4 Boiler header	160	082289	200	082292	250	082298

Flue headers are constructed in polypropylene with EPDM seals for removing flue gases from the boiler. Flue components are CE certified EN14471 T120 H1. Flue pressure H1 up to 5000 Pa, and flue temperature T120 up to 120°C.

Header diameter (mm)	Number of boilers and models			Dimension (mm)													
	2	3	4	A	B	C	D	E	F	G	H	J	K	L	M	N	P
160	S2-40, S2-60, S2-70, S2-80, S2-100	S2-40, S2-60	S2-40, S2-60	2532	1982	1432	311	571	170	461	30	1170	382	1272	144	384	476
200	S2-120, S2-150	S2-70, S2-80, S2-100, S2-120, S2-150	S2-70, S2-80, S2-100	2557	2007	1457	311	596	155	461	55	1255	462	1352	120	358	472
250			S2-120, S2-150	2696	2146	1596	450	596	292	600	55	1241	458	1348	120	385	522

Flue Design

Stratton mk2 Boilers

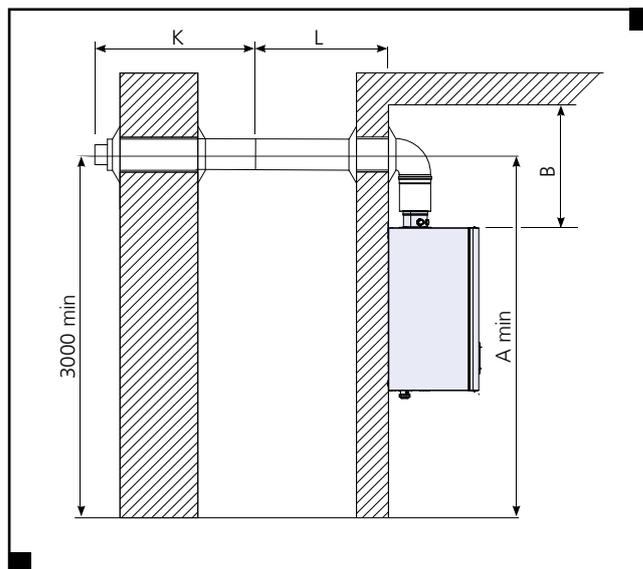
C13 Room Sealed Flue Systems

C13 room sealed flues include a concentric flue system designed for termination horizontally through an external wall carrying combustion air and flue gases safely to and from outside.

Flue components are CE certified EN14471 T120 H1. Flue pressure H1 up to 5000 Pa, and flue temperature T120 up to 120°C.

Flue components other than terminals are only suitable for installation inside the building.

Note: Horizontal flue terminals must be a minimum of 3 metres above external ground level. IGEMI/UP/10.



Flue component materials of construction			
Flue diameter - mm	Inner pipe	Outer pipe	External finish
80/125	Polypropylene	Polypropylene	White
100/150	Polypropylene	Powder coated metal	White

C13 Room sealed flue performance data for Stratton mk2 boilers							
Model	S2-40	S2-60	S2-70	S2-80	S2-100	S2-120	S2-150
Flue diameter (mm)	80/125		100/150				
Minimum height A (mm)	1948		1995				
Minimum ceiling clearance B (mm)	290		350				
Maximum flue length L Nat Gas (m)	15	10	10	10	10	8	6
Maximum flue length L LPG (m)	15	8	10	10	10	N/A	N/A
Flue terminal length K (mm)	900	900	950	950	950	950	950
Equivalent length 90° Elbow (m)	1	1	1	1	1	1	1
Equivalent length 45° Elbow (m)	0.5	0.5	0.5	0.5	0.5	0.5	0.5

C13 Concentric flue components	Boiler models S2-40 to S2-60		Boiler models S2-70 to S2-150	
	Dia. 80/125 mm		Dia. 100/150 mm	
	Part number		Part number	
C13 Flue terminal kit including 90° elbow and wall plates.(black)	040946		040987	
Flue pipe 1000mm long	532511243		532511251	
Flue pipe 500mm long	532511244		532511252	
Flue pipe telescopic 300mm to 500mm	532511248			
Flue elbow 90°	532511246		532511249	
Flue elbow 45°	532511247		532511250	
Wall bracket	532511016		532511033	

Note: The Risk Assessment procedure detailed in IGEMI/UP/10 Appendix 9 should be followed to determine suitability of the desired location and position of any horizontal flue termination.

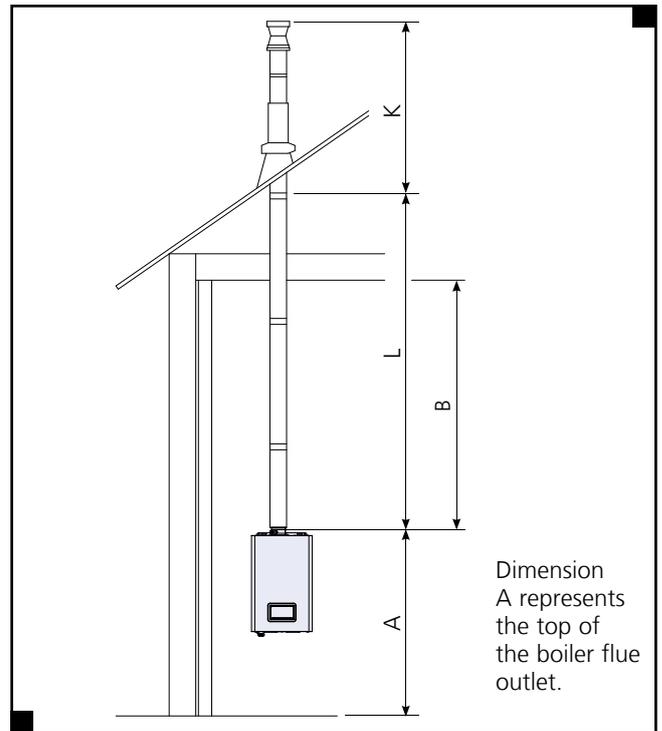
Flue Design

Stratton mk2 Boilers C33 Room Sealed Flue Systems

C33 room sealed flues include a concentric flue system designed for termination horizontally through an external wall carrying combustion air and flue gases safely to and from outside.

Flue components are CE certified EN14471 T120 H1. Flue pressure H1 up to 5000 Pa, and flue temperature T120 up to 120°C.

Flue components other than terminals are only suitable for installation inside the building.



Flue component materials of construction			
Flue diameter - mm	Inner pipe	Outer pipe	External finish
80/125	Polypropylene	Polypropylene	White
100/150	Polypropylene	Powder coated metal	White

C33 Room sealed flue performance data for Stratton mk2 boilers							
Model	S2-40	S2-60	S2-70	S2-80	S2-100	S2-120	S2-150
Flue diameter (mm)	80/125		100/150				
Minimum height A (mm)	1865		1890				
Minimum ceiling clearance B (mm)	140		170				
Maximum flue length L Nat Gas (m)	15	10	10	10	10	8	6
Maximum flue length L LPG (m)	15	8	10	10	10	N/A	N/A
Flue terminal length K (mm)	1100	1100	1150	1150	1150	1150	1150
Equivalent length 90° Elbow (m)	1	1	1	1	1	1	1
Equivalent length 45° Elbow (m)	0.5	0.5	0.5	0.5	0.5	0.5	0.5

C33 Concentric flue components	Boiler models S2-40 to S2-60		Boiler models S2-70 to S2-150	
	Dia. 80/125 mm		Dia. 100/150 mm	
	Part number		Part number	
C33 Flue terminal kit including 90° elbow and wall plates.(black finish)	040947		040988	
Flue pipe 1000mm long	532511243		532511251	
Flue pipe 500mm long	532511244		532511252	
Flue pipe telescopic 300mm to 500mm	532511248		N/A	
Flue elbow 90°	532511246		532511249	
Flue elbow 45°	532511247		532511250	
Wall bracket	532511016		532511033	
Pitched roof flashing	532511173		532511174	
Flat roof flashing	532511177		532511178	

Flue Design

Stratton mk2 Boilers

C53 Room Sealed Flue Systems

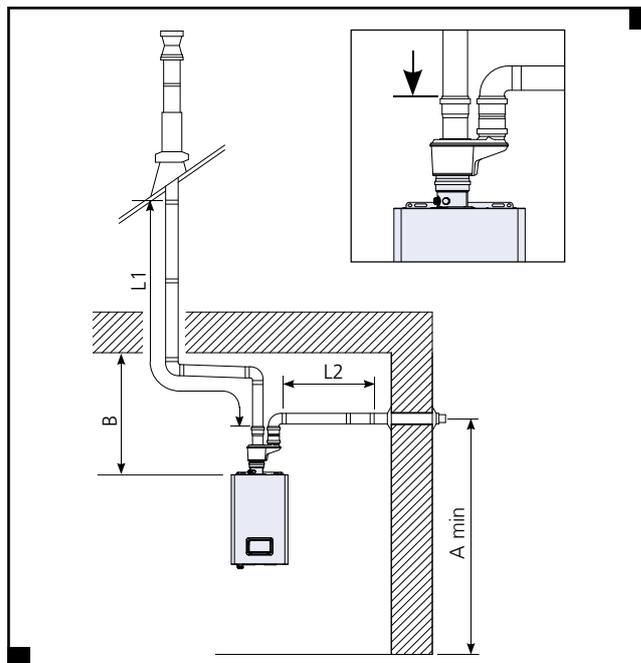
C53 room sealed flues consist of a twin pipe system with separate pipes carrying independently the combustion air and flue gases to and from outside.

Flue components are constructed from polypropylene with EPDM seals for carrying flue gases and combustion air from the boiler to outside.

Flue components are CE certified EN14471 T120 H1. Flue pressure H1 up to 5000 Pa, and flue temperature T120 up to 120°C.

Flue components other than terminals are only suitable for installation inside the building.

The appropriate adaptor kit for converting the concentric outlet of the boiler into a twin pipe system must be specified in addition to flue components and terminal.



C53 Room sealed flue performance data for Stratton mk2 boilers

Model	S2-40	S2-60	S2-70	S2-80	S2-100	S2-120	S2-150
Flue and Air diameter (mm)	80		100				
Minimum height A (mm)	2194		2240				
Minimum ceiling clearance B (mm)	510		570				
Maximum flue length L1 Nat Gas (m)	17	15	15	15	15	14	6
Maximum air length L2 Nat Gas (m)	20	15	20	20	20	10	6
Maximum flue length L1 LPG (m)	17	15	15	15	15	N/A	N/A
Maximum air length L2 LPG (m)	20	15	20	20	20	N/A	N/A
Equivalent length 90° Elbow (m)	1	1	1	1	1	1	1
Equivalent length 45° Elbow (m)	0.5	0.5	0.5	0.5	0.5	0.5	0.5

C53 Concentric flue components	Boiler models S2-40 to S2-60		Boiler models S2-70 to S2-150	
	Dia. 80 mm		Dia. 100 mm	
	Part number		Part number	
Flue terminal kit including air inlet and flue terminals, and concentric to twin pipe boiler connection kit.	040950		040999	
Flue pipe 1000mm long	573407321		532511130	
Flue pipe 500mm long	573407288		N/A	
Flue elbow 90°	573407289		532511115	
Flue elbow 45°	573407320		532511114	
Pitched roof flashing	532511269		532511178	
Flat roof flashing	532511263		532511262	
Wall bracket	532511270		532511017	



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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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Hamworthy Heating Accreditations

ISO 9001 Quality Management System

ISO 14001 Environmental Management System

OHSAS 18001 Health & Safety Management System

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