STRATA

Streamline 16/31/47/75

WALL MOUNTED, GAS FIRED
ULTRA HIGH EFFICENCY CONDENSING BOILER

INSTRUCTIONS FOR INSTALLATION,
SERVICING & OPERATION OF
THE MODEL 16/31/47/75 BOILER

Software Version - 3.0

MHS BOILERS

L 267.1

Updated - 16/01/06

Index

1.0 General Notes

These instructions are intended to assist the installer, commissioning engineer, maintenance engineer and the user with the application, usage of the Strata Streamline 16, 31, 47 & 75 gas fired condensing boilers.

Please read this manual fully before commencing the installation of the appliance. The Strata Streamline 16, 31, 47 & 75 must be installed by persons deemed to be competent i.e. CORGI Registered. This manual must be handed to the appliance user following completion of the installation. The appliance must not be left to operate with the outer casing removed.

Conformity Statement

Strata Streamline 16, 31, 47 & 75 boilers are manufactured to the highest standards of quality, performance and safety, in accordance with EC standards and carry the CE mark.

Installation Requirements

The installation of Strata Streamline 16, 31, 47 & 75 boilers must be in accordance with the relevant requirements of Gas Safety (Installation & Use) Regulations 1994, Health & Safety at Work Act, Building Regulations, IEE Regulations, Construction (Design & Management) Regulations 1994, Local Authority Bye-Laws, National, Fire Regulations and Insurance Company requirements.

The following Codes of Practice are also applicable:-

- BS 5440-1: 2000 Installation of flues and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases).
  Part 1: Specification for the installation of flues.
- BS 5440-2: 2000 Installation of flues and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases).
  Part 2: Specification for installation and maintenance of ventilation for gas appliances.
- BS 5449: 1990 Specification for forced circulation hot water central heating systems for domestic premises.
- BS 6644: 2005 Specification for gas fired hot water boilers of rated inputs between 70kW (net) and 1.8MW(net) (2nd and 3rd family gases).
- BS 6798: 1987 Specification for installation of gas fired hot water boilers of rated input not exceeding 60 kW.
- BS 6880: 1988 Code of Practice for low temperature hot water heating systems of output greater than 45kW. Parts 1, 2 & 3.
- BS 6891: 1988 Specification for installation of low pressure gas pipework of up to 28mm (R1) in domestic premises (2nd family gases)
- BS 7593: 1992 Code of Practice for treatment of water in domestic hot water central heating systems.
- BS 7671: 1992 Requirements for electrical installations. IEE Wiring Regulations. Sixteenth edition.
- CISBE Guide reference sections B7, B11 and B13.
- CP342 Part 2: 1974 Code of Practice for centralized hot water supply.
- IGE/UP/2 Gas installation pipework, boosters and compressors on industrial and commercial premises.
- IGE/UP/4 Commissioning of gas fired plant on industrial and commercial premises
- IGE/UP/10 Installation of gas appliances in industrial and commercial premises.
  Part 1: Flued appliances.

2.0 Product Description

The Strata Streamline 16, 31, 47 & 75 wall mounted gas fired condensing boilers are state of the art appliances, which include a comprehensive range of features.

The appliance must only be used on a sealed and pressurized system. System design must take into account that the boiler operates on a 20ºC Δt.

Wall mounted with compact dimensions

At 750mm High, 381mm Deep, and 510mm Wide for the Strata Streamline 16, 31, & 47 boilers, and 750mm Wide for the Strata Streamline 75 boiler, these provide maximum heat output from minimum dimensions without compromising serviceability.

Fully modulating heat output

The output of the boiler is fully variable, sliding between (approx.) 24% to 100%, which automatically and instantly adjusts to match the needs of the system. The percentage of power at any given time can be dictated by either outside air temperature, flow temperature, return temperature, stored domestic hot water temperature, room temperature, or a combination of the aforementioned.

Fully condensing stainless steel heat exchanger

The Strata Streamline 16, 31, 47 & 75 boilers are designed with extended heat exchanger surface area and is fabricated from corrosion resistant long-life 316L stainless steel. The unique Spiranox heat exchanger will return operating efficiencies up to 96.4 % gross (107 % net) at 30ºC return temperature.

Extremely low harmful emissions

The Strata Streamline 16, 31, 47 & 75 boiler utilizes 100% pre-mix gas/air fed at positive pressure to the metal fibre sheathed radiant burner. The combustion system incorporates pre-mixed fuel/air control, returning ultra low emissions to satisfy the most stringent emission regulations in the world currently.

That is: < 31mg/kWh NOx (22 ppm DAF) and < 54mg/kWh CO (50 ppm DAF). The fully modulating nature of the appliance also reduces emissions by avoiding repeated start/stops and the associated increase in emissions, which occurs with burner ON/OFF cycling.

Accurate variable burner output control

The pre-mix burner fan has a direct current drive motor with pulse relay counting. This system allows precise control over fan speed / combustion air volumes. Coupled with a gas valve system set to provide proportionately measured volumes of fuel to air, this allows extremely accurate and instant variable burner output control to be achieved.

Natural Gas or LPG

Appliances can be supplied for use with Natural Gas (G20) of Liquefied Petroleum Gas (G31). Conversion Kits are available from MHS Boiler, Spares Department. 01268 597139 or 597135

2.0 Product Description (cont'd)

Comprehensive microprocessor control

The Strata Streamline 16, 31, 47 & 75 boiler control panel includes a user friendly microprocessor control centre which manages the entire function of the appliance and encompasses:-

1 Management of the essential safety functions of burner ignition and flame monitoring.
2 Water high temperature and flue gas high temperature safety cut out.
3 Modulation of the burner output in conjunction with operating temperature control.
4 Large LCD display screen with clear graphical notations which continuously display operation or fault status.
5 In built weather compensation to provide direct-on-boiler VT flow temperature (if required).
6 Remote stored hot water temperature control.
7 In built 2 stage boiler frost protection program.
8 In built pump exercise program to avoid standstill seizure.
9 Range rate adjustment which allows the power to be set to accurately match the maximum needs of the system, with the facility to set different firing rates for heating and hot water generation.
10 Facility to connect optional matched control components which allow the boiler to control;
- A hot water priority system using a 3 port valve or primary charging pump, and hot water sensor attached to a stored hot water cylinder.
- An additional heating circuit pump and 3-port VT valve (if required).
- A multi functional room temperature controller with separate heating and hot water time controls, night setback, frost protection, and remote interrogation of the boilers' set-points and function modes.

Room Sealed Option

Utilizing a concentric flue system 125/80mmØ (Air duct / Flue duct), the Strata Streamline 16, 31, 47 & 75 can be installed to take combustion air directly from outside the building. Horizontal and Vertical terminals sets are available. Inherent safety is achieved by the negative pressure within the boiler case, which in the event of incorrect sealing of the boiler case would result in safe inward air leakage only.

Alternatively the Strata Streamline 16, 31, 47 & 75 may be installed as a conventional flue, exhaust only, using an 80mmØ OD Polypropylene flue gas tube and fittings to exhaust the appliance to a suitable flue terminal location, either vertical or horizontal.

Extended flue pipe lengths

The excess pressure from the combustion system at maximum output is in the order of 400 Pa. This allows for the Strata Streamline 16, 31, 47 & 75 to be flued over considerable distances providing a great deal of flexibility in positioning the boiler.

Designed for ease of maintenance

The Strata Streamline 16, 31, 47 & 75 has been engineered for ease of maintenance, even the most major of service operations being able to be completed easily and quickly without the need for specialist tools.

Guarantee

The warranties available on the Strata Streamline 16, 31, 47 & 75 range of boilers is as follows;

Supply Only	-	**Parts Only Warranty,** against manufacturing or material defects for a period of 12 months from the date for delivery.
Supply and Commissioned (By an MHS Engineer)	-	**Parts and Labour Warranty,** against manufacturing or material defects for a period of up to 15 months from the date for delivery.

In addition to the above warranties, the Primary Heat Exchanger carriers a five year guarantee against manufacturing or material defect.

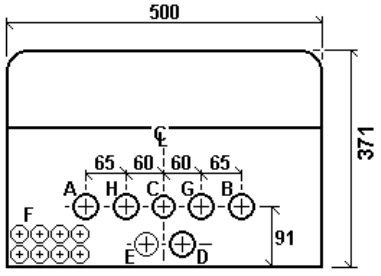
3.0 Technical Data & Dimensions

Technical Data			16H	31H	47H	75H
Nominal Heat Input Net	Min/Max	kW	4.0/15.0	6.5/29.0	12.0/45.0	16.0/70.0
Nominal Heat Input Gross	Min/Max	kW	4.4/16.6	7.2/32.2	13.3/49.9	17.7/77.7
Carbon Emissions	G20	kgC/kWhr	0.061	0.061	0.061	0.060
100% Of max Output	G31	kgC/kWhr	0.078	0.078	0.078	0.077
Carbon Emissions	G20	kgC/kWhr	0.055	0.055	0.055	0.055
30% Of max Output	G31	kgC/kWhr	0.070	0.070	0.070	0.070
SEDBUK Rating			B	B	B	B
Nominal Heat Output (50ºC/30ºC)	Min/Max	kW	4.3/15.8	7.0/30.9	12.9/47.0	17.0/74.6
Design Flow Rate (50ºC/30ºC)		Ltr/sec	0.188	0.369	0.560	0.888
Heat Exchanger Resistance (50ºC/30ºC)		m/W.C	N/A	N/A	N/A	4.7
Nominal Heat Output (80ºC/60ºC)	Min/Max	kW	3.9/14.6	6.5/27.0	11.7/43.5	15.0/67.8
Design Flow Rate (80ºC/60ºC)		Ltr/sec	0.174	0.321	0.519	0.807
Heat Exchanger Resistance (80ºC/60ºC)		m/W.C	N/A	N/A	N/A	3.9
Minimum Flow Rate		**Ltr/sec**	**0.125**	**0.246**	**0.373**	**0.592**
Residual Head from In-built Pump		m/W.C	3.7	1.3	1.0	N/A
Maximum Input Gas Rate	G20	m³/hr	1.55	2.96	4.65	6.91
	G31	m³/hr	0.57	1.08	1.72	2.60
Gas Inlet Pressure	Min/Max	Mbar	18.0/50.0	18.0/50.0	18.0/50.0	18.0/50.0
Maximum Flue Gas Volume	(Hot)	m³/hr	21.36	40.81	64.08	96.84
Available Fan Pressure		Pa	400	400	400	400
Maximum Water Pressure	(Hot)	bar	3.0	3.0	3.0	3.0
Minimum Water Pressure	(Cold)	bar	0.8	0.8	0.8	0.8
Maximum Flow Temperature		ºC	90	90	90	90
Power Supply (230 V / 50 Hz)		Amps	5	5	5	5
Max Power Consumption		Watts	122	129	145	145
Water Content		Ltrs	5.2	5.2	5.2	8.2
Lift Weight (Dry)		kg	43.0	43.0	43.0	70.0

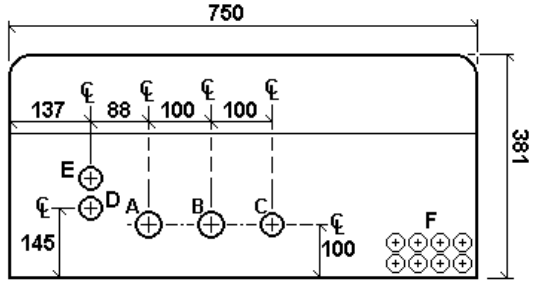
Connections

HTG Primary Flow	**(A)**		22mm	22mm	22mm	1 ¼"BSP
HTG Primary Return	**(B)**		22mm	22mm	22mm	1 ¼"BSP
Gas	**(C)**		22mm	22mm	22mm	¾"BSP
Condensate Outlet	**(D)**	Plastic	¾"BSP	¾"BSP	¾"BSP	¾"BSP
Condensate Trap Cleaning Point	**(E)**		¾"BSP	¾"BSP	¾"BSP	¾"BSP
Electrical Cable Glands	**(F)**		8 x 10mm	8 x 10mm	8 x 10mm	8 x 10mm
DHW Primary Return *(Optional Extra)*	**(G)**		22mm	22mm	22mm	N/A
DHW Primary Flow *(Optional Extra)*	**(H)**		22mm	22mm	22mm	N/A

Underside View 16, 31, & 47 Only

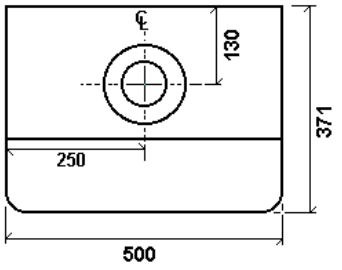


Underside View 75 Only

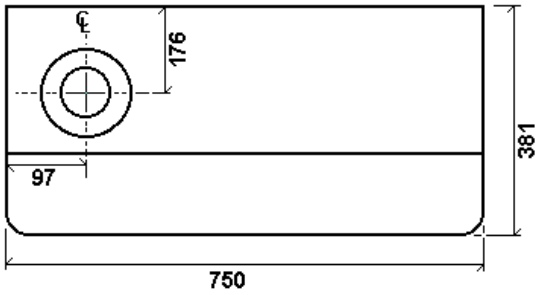


3.0 Technical Data & Dimensions (cont'd)

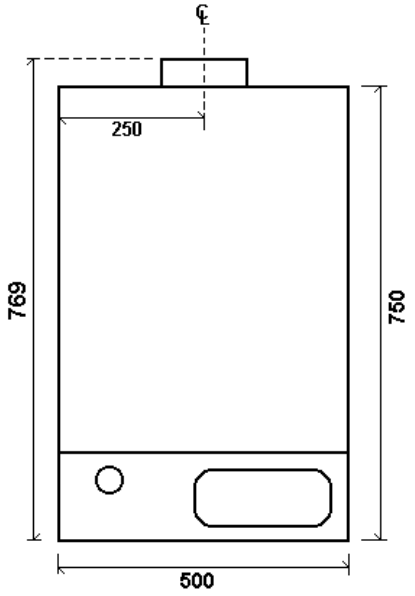
Plan View 16, 31, & 47 Only



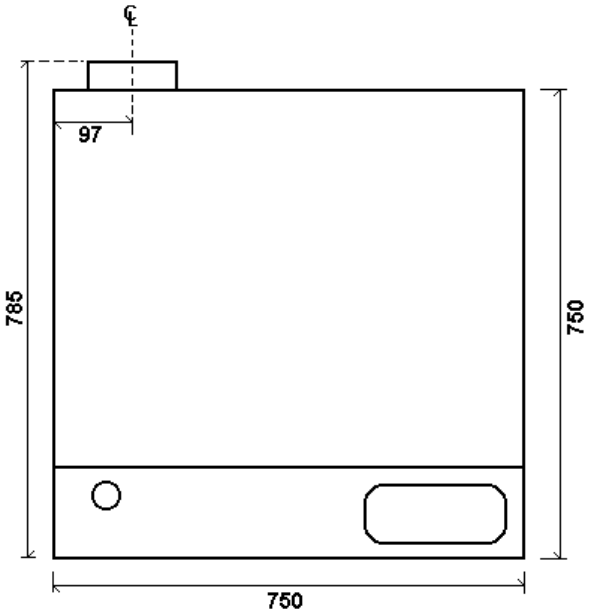
Plan View 75 Only



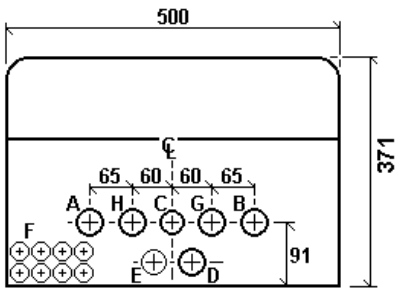
Front View 16, 31, & 47 Only



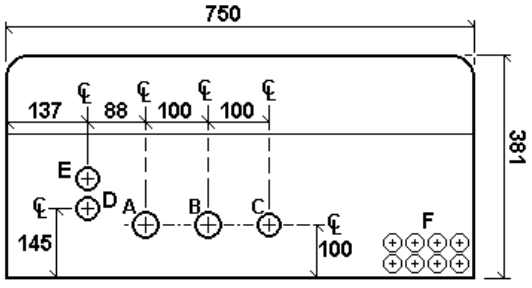
Front View 75 Only



Underside View 16, 31, & 47 Only



Underside View 75 Only



All dimensions are in Millimeters

4.0 Delivery Consignment / Unpacking The Boiler

The boiler is delivered as a consignment of a palleted carton containing the boiler and associated fittings, plus any other optional ancillary flue or control components in separate cartons.

The boiler carton contains:-

- Assembled boiler.
- Wall mounting bracket and associated fixings.
- Fittings bag including, condensate waste outlet, outside air sensor (QAC34).

To unpack the boiler, the palleted carton should be laid on the floor. Carefully cut the nylon bands and lift the fibreboard protective panel. Open the carton top and lift out wall hanging bracket and fittings bag. Remove packing material and lift away bottomless carton. With 2 people, carefully lift the boiler from palleted carton by holding the rear chassis only.

To remove the casing from the boiler, turn the two casing screws, on the blue casing strip above the control panel, through 90º. This will release the casing latches. Pull casing slightly to the front and lift upwards to disengage the casing from the top securing lip. The casing can then be removed.

5.0 Boiler Location

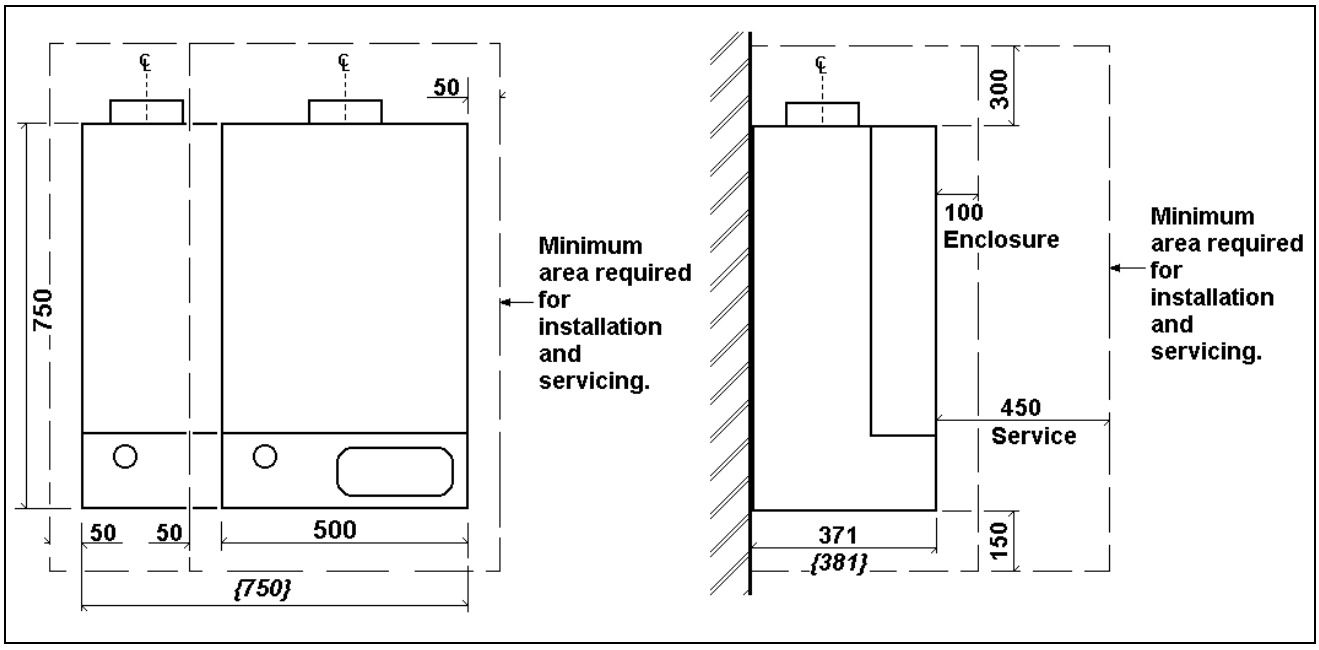
The Strata Streamline 16, 31, 47, & 75 boiler is not suitable for installation external to a building. The position chosen for the boiler must be a structurally sound wall capable of supporting the weight of the boiler and any ancillaries.

The position should allow for access to a nearby foul water drain suitable to accept condensate water, an alternative is to install a condensate sump receptacle and condense disposal pump which should remove the condense water to a remote foul water drain suitable to accept condensate water.

The position of the boiler on the wall must be truly plumb vertical to ensure correct operation of the internal gravity flow condense system. The position for the boiler must satisfy the requirements of BS 6644: 2005 or BS 6798: 1987 as appropriate.

6.0 Installation Clearances

For ease of installation, commissioning, servicing and maintenance the following clearances should be observed.



NOTE: These distances are MINIMUM and MUST NOT be reduced. Clearance Dimensions relate to ALL models. ***Dimensions in { } relate to model 75 only.***

7.0 Wall Mounting

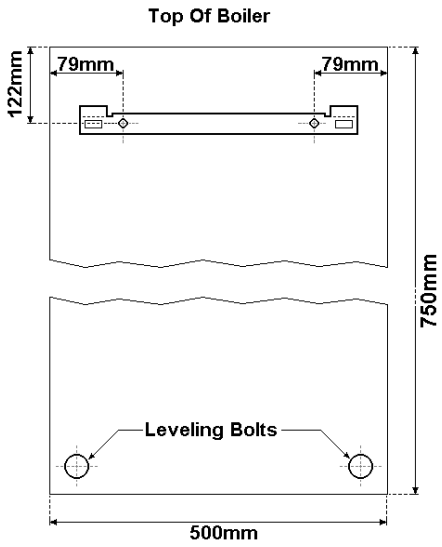
The Strata Streamline 16, 31, 47, & 75 boiler is mounted to the wall via a wall-mounting bracket, which interlocks to a rail mounted on the rear of the boiler.

The wall-mounting bracket should be securely fixed to the wall using suitable fixings for the wall construction and boiler weight. The wall-mounting bracket positioning detail is shown in fig 7.1 for Model 16, 31, & 47; and fig 7.2 for model 75 only.

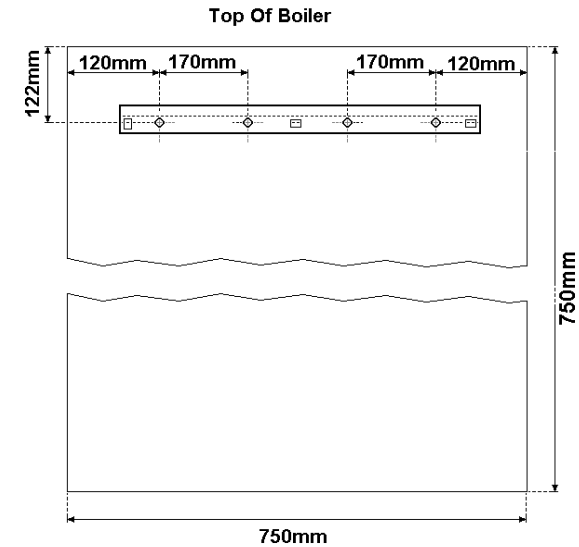
The boiler should be carefully lifted by two people and offered up to the wall so that the rail on the rear of the boiler is just above the mounting bracket, and then gently lowered the boiler to engage the bracket onto the rail. **DO NOT** lift the boiler by any of the internal parts of the boiler.

Important Notice

When viewed from the side, the North / South axis of the boiler must be vertical. The appliance must not be incline out from the top, if necessary adjust the position of the boiler at the bottom.



(Models 16, 31, & 47 Illustrated) Fig 7.1



(Model 75 Illustrated) Fig 7.2

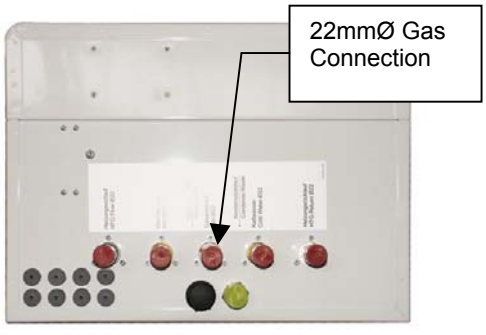
8.0 Gas Connection

The gas connection is located at the base of the appliance in the centre, see fig 8.1 for Models 16, 31 & 47; see fig 8.2 for model 75.

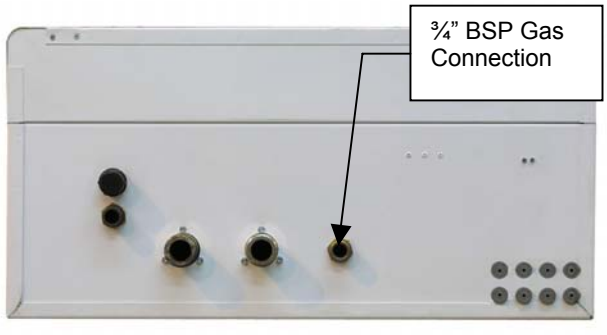
The pipe size used to supply the appliance must not be smaller than the gas connection size. The connection to the appliance MUST include an isolation valve and a suitable method of disconnection, installed between the isolation valve and the appliance.

The gas pipe used to supply the appliance must be installed in accordance with BS 7591: 1988, IGE/UP/2, and IGE/UP/10 as applicable, and MUST NOT allow a dynamic pressure drop of greater than 1mbar from the meter to the appliance with all gas appliances operational.

The nominal inlet working pressure measured at the appliance should be 20.0 mbar for Natural Gas (G20), or 37 mbar for Liquefied Petroleum Gas (G31). The installer should provide a pressure test point adjacent to the gas inlet connection between the isolation valve and the appliance.



(Model 16, 31 & 47 illustrated) Fig 8.1



(Model 75 illustrated) Fig 8.2

9.0 Water Connection

The Strata Streamline 16, 31, 47, & 75 boilers MUST only be installed on a sealed, pressurized heating system. The maximum working pressure of the boiler is 3 bar.

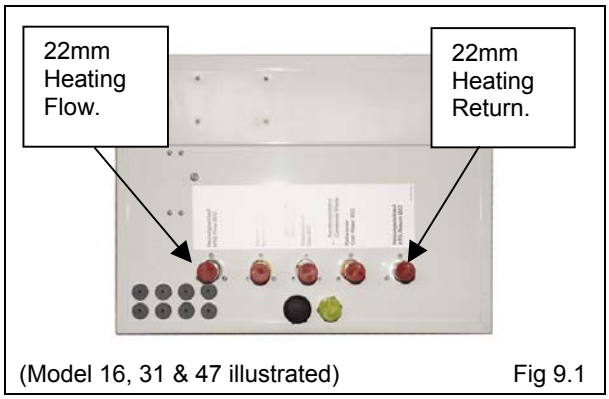
A safety valve set at 3.0 bar MUST be installed into the heating flow pipe adjacent to the appliance and before any isolation valves. It is recommended that the final working pressure (hot) of the system should not exceed 2.5 bar.

The system that the boiler is installed onto will require an expansion vessel. The Streamline 16 & 31 models include an integral 10-litre expansion vessel.

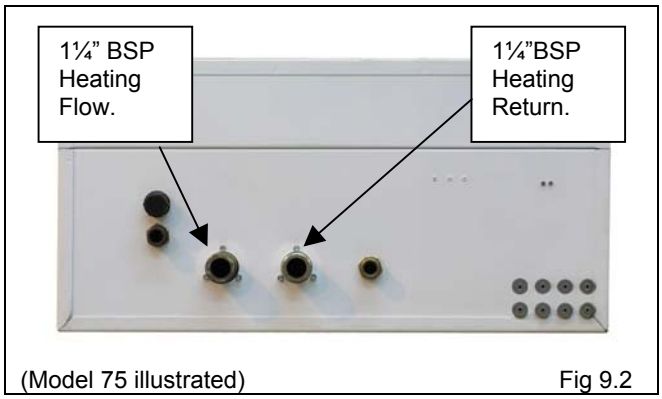
Please contact MHS Sales Department for advice on the sizing of an expansion vessel suitable for the systems requirements.

The flow and return connections should include isolation valves, a drain facility, and a suitable method of disconnection between the isolation valves and the appliance.

The flow and return connections on the 75 model are 1¼" BSP M (parallel), therefore it is recommended that a fitting with a tapered thread, such as a Tapered Union or Tapered Socket, be utilized for the connection onto the boiler.



(Model 16, 31 & 47 illustrated) Fig 9.1



(Model 75 illustrated) Fig 9.2

10.0 Condensate Waste Connection

The condensate waste connection is located at the bottom of the appliance, see figs 10.0a & 10.0b.

The condense syphon cleaning point is factory fitted with a heavy black plastic cap which MUST NOT BE REMOVED apart from during routine maintenance when the syphon is cleaned and must be in place whenever the appliance is in operation.

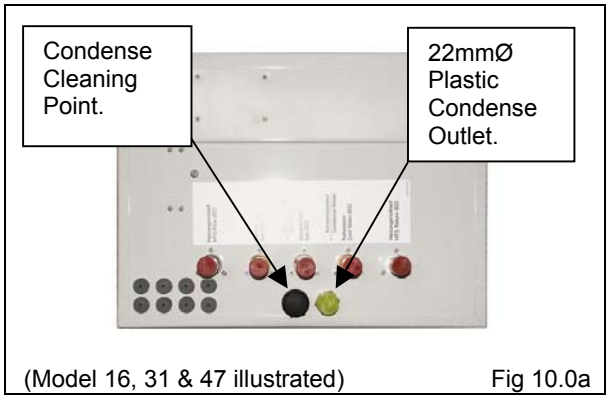
WARNING, operating the appliance with the cap removed will result in products of combustion being discharged from the cleaning point.

The condensate waste connection is a ¾"BSP Male threaded stub fabricated from plastic.
The installer must connect to the stub, a condensate waste pipe fabricated from plastic tube & fittings (¾" or 22mmØ overflow pipe is considered suitable). ***Copper Tube is not acceptable.***

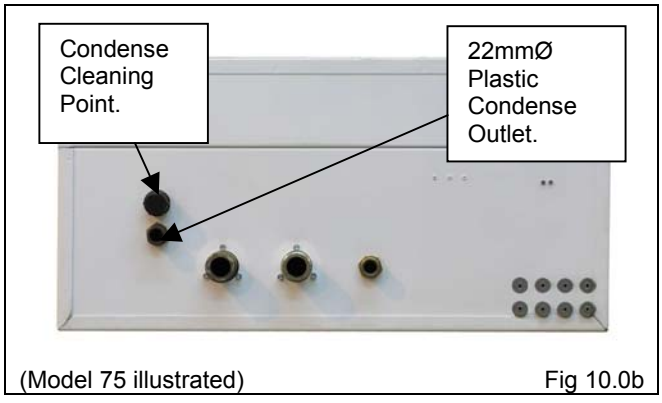
The condense waste pipe must fall continuously from the appliance to a nearby foul water drain suitable for accepting condense waste. If any part of the condensate waste pipe is to be run external to the building or is at risk of freezing, then the pipe must be suitably insulated to protect against freezing.

If a suitable drain for accepting condense waste is not available nearby and below the boiler, (e.g. boiler installed in a basement), then a suitable condense sump receptacle with a discharge pump should be installed below the boiler to remove the condense waste to a suitable remote foul water drain. Available as an optional extra, Contact MHS Sales Department for more information.

When making the connection to the condense waste pipe, do not use adhesives, it is recommended to lightly apply a suitable jointing tape (PTFE or similar) and use only light pressure to connect the fittings to the appliance to avoid damage to the condense waste outlet assembly. It is recommended that a suitable method of disconnection be fitted, and cleaning points be fitted at regular intervals.



(Model 16, 31 & 47 illustrated) Fig 10.0a



(Model 75 illustrated) Fig 10.0b

11.0 Flue

The flue outlet and combustion air inlet connections to the appliance are located on the top of the appliance; see fig. 11.1. These connections are arranged concentrically with a Female 80mmØ flue gas connection centrally within a Male 125mmØ air connection.

There are two options for flueing the Strata Streamline boiler:

1) Room Sealed, using either concentric 80/125mmØ flue components, or separate 80mmØ flue components; where the air for combustion is taken from outside of the building. When using a room sealed flue, ventilation to the boiler/s location may not be required, see section 14.0 for further guidance.

2) Conventionally, using 80mmØ flue components for the combustion gases only and air for combustion being taken from the room or compartment that the appliance is installed. The ventilation to the room or compartment that the boiler/s are installed MUST be ventilated in accordance with the requirements of BS5440 or BS6644 as appropriate, see section 14.0 for further guidance.

11.1 Conventional Flue

The Strata Streamline 16, 31, 47, & 75 boilers have an excess pressure combustion system, which coupled with very low flue gas temperatures, allows the appliance to be flued over considerable distances.

As standard the Strata Streamline 16, 31, 47, & 75 boiler is supplied with a concentric flue outlet on the top of the boiler and utilizes an 80mmØ PPS polypropylene flue gas pipe within a 125mmØ painted metal combustion air pipe, see fig 11.1.

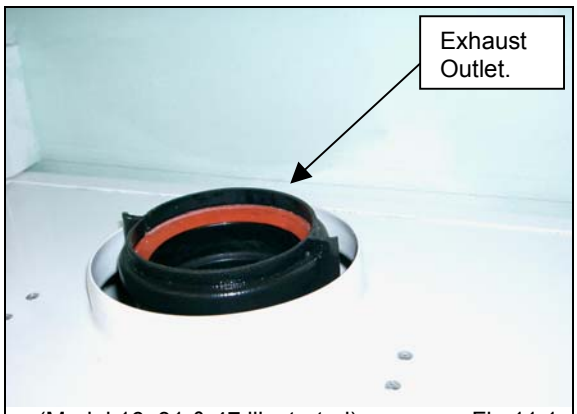
To flue the boiler Conventionally, i.e. exhaust only, only the inner 80mmØ PPS socket is used.

The gap between the 80mmØ PPS socket and the 125mmØ painted metal combustion air pipe is left open to allow the air for combustion to enter the boiler from the room in which the boiler is installed.

Any sections of the flue system that are to be installed horizontally MUST have at least a 3º fall to the boiler to allow any condense which may form in the flue system to drain back to the boiler.

The flue system must be gas and water tight, and must be adequately supported over its entire length. Supports at 1 metre intervals are essential.

Care should be taken when selecting a position with a low level discharge, or discharges' adjacent to windows, doors, etc, as the flue terminal will plume heavily and the white water vapour discharged may cause a visual nuisance.



(Model 16, 31 & 47 illustrated) Fig 11.1

The PPS flue components have push together spigot and socket joints, and have soft EPDM O-rings located in the socket components. To aid assembly and assure that the joints have been fully pushed home, the sealing EPDM O-rings and male ends of the tubes and fittings should be lightly lubricated with silicone grease.

A range of 80mmØ PPS flue components are available from MHS Boilers Ltd; and is listed on page 15.

11.2 Modular Conventional Flue

The Strata Streamline 16, 31, 47 & 75 boilers can be connected onto Common Conventional Flue, in a Modular arrangement; however, due to the excess pressure combustion system, consideration must be given to ensure that the excess pressure of a firing appliance/s is not applied to any non-firing appliance/s.

Therefore, to ensure that the excess pressures are catered for, the common flue system MUST be designed so that under partial load, the resistance of the common riser MUST always be of a lesser resistance than that of any boiler flue branch connecting to the common riser, furthermore, the use of swept or shoed tee MUST be utilized.

The flue components used shall be pressure tight, and suitable for a pressure in excess of 400 Pascal's.

They shall also be of a suitable material for use with condensing boilers, such as PPS Plastic, or 316L Stainless Steel, etc.

Typical Modular Conventional Flue Arrangement

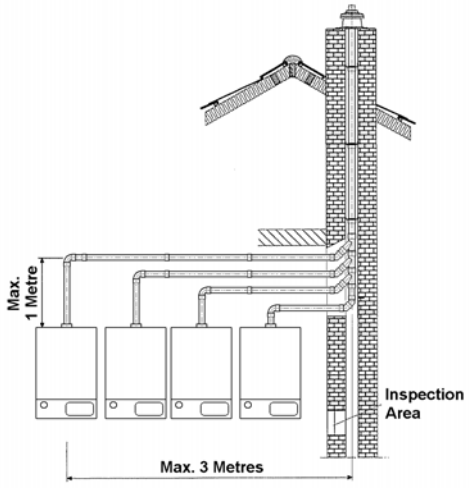


Fig 11.2

11.3 Room Sealed Flue

The Strata Streamline 16, 31, 47, & 75 boilers have an excess pressure combustion system, which coupled with very low flue gas temperatures, allows the appliance to be flued over considerable distances.

As standard the Strata Streamline 16, 31, 47, & 75 boiler is supplied with a concentric flue outlet on the top of the boiler and utilizes a Female 80mmØ PPS polypropylene flue gas pipe within a Male 125mmØ painted metal combustion air pipe, see fig 11.1. To connect to the standard concentric flue components supplied by MHS a flue adaptor is required, Part No 15492100. See fig 11.3

The flue system must be installed to have at least a 3º fall to the boiler to allow any condense which may form in the flue system to drain back to the boiler.

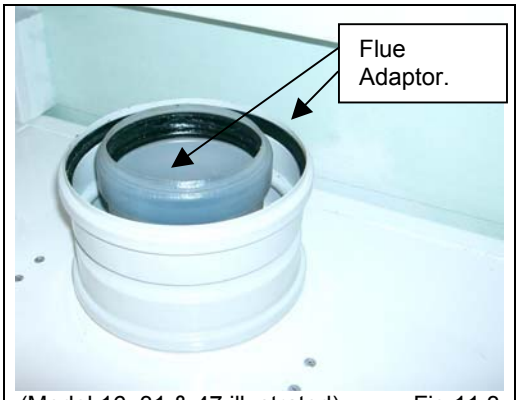
The flue system must be gas and water tight, and must be adequately supported over its entire length. Supports at 1-metre intervals are essential.

Care should be taken when selecting a position with a low level discharge, or discharges' adjacent to windows, doors, etc, as the flue terminal will plume heavily and the white water vapour discharged may cause a visual nuisance.

The concentric flue components have push together spigot and socket joints. Both the inner PPS flue gas tube, and the outer combustion air tube have soft EPDM O-rings located in the socket components.

To aid assembly and assure that the joints have been fully pushed home, the sealing EPDM O-rings and male ends of the tubes and fittings should be lightly lubricated with silicone grease.

A range of concentric flue components are available from MHS Boilers Ltd; and is listed on page 15



(Model 16, 31 & 47 illustrated) Fig 11.3

11.4 Installation of a Horizontal Wall Terminal

Rear Outlet Assembly Method

The following procedure applies to rear flue terminal position.

1) With the boiler mounted in position, see section 7.0, draw a horizontal line on the wall 210mm (16, 31 & 47 models), or 220mm (75 model) above the top of the boiler. See fig 11.4a.
2) Mark the center of the flue spigot on the wall, remove the boiler from its hanging bracket and carefully position to one side. Draw a vertical line from the center mark of the flue spigot to intersect the horizontal line. See fig 11.4a.
3) At the intersection of the horizontal and vertical lines, cut a 130mmØ hole with a core drill. See fig 11.4a.
4) Measure the wall thickness 'W' in millimeters, add 155mm (16, 31 & 47 models), or 200mm (75 Model) to achieve total length 'TL' of flue pipe required.
5) Mark the Horizontal Wall Terminal a distance of 'TL' from the outer edge of the Air Pipe. Both tubes should be cut flush and square with each other, and any burrs removed. See fig 11.4b.
6) Re-position the boiler onto the hanging bracket, as detailed in section 7.0.
7) Fit the Flue Adaptor to the top of the boiler and lubricate the two seals with silicone grease.
8) Lubricate the male ends of the concentric bend and the flue adapter with silicone grease; locate the flue adapter onto the flue outlet connection on top of the boiler, and gently push home. Locate the bend on top of the flue adapter, and gently push home.
9) Locate the wall bezel plate onto the wall terminal assembly and position the terminal through the previously prepared hole from outside the building.
10) Locate the bezel plate onto the wall terminal for the inside face of the wall. Lubricate the male ends of the concentric bend with silicone grease.
11) Locate concentric tubes into bend and gently push fully home. Ensure that the plain section of the external part of the air inlet tube is located uppermost. See fig 11.4c.
12) Fix internal and external wall bezel plates with fixings provided. See fig 11.4c.

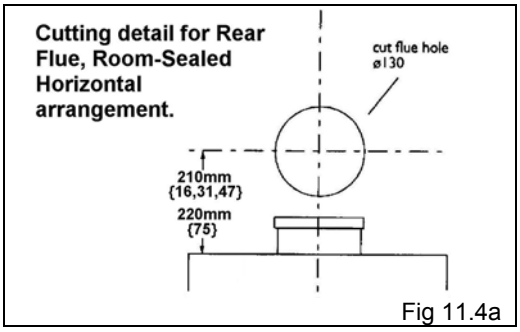


Fig 11.4a

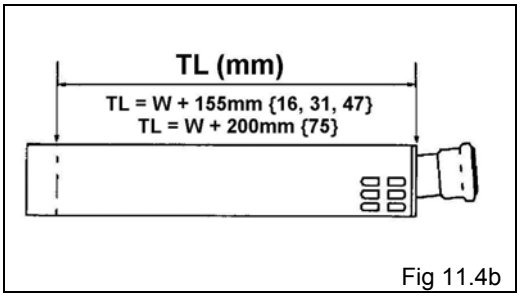


Fig 11.4b

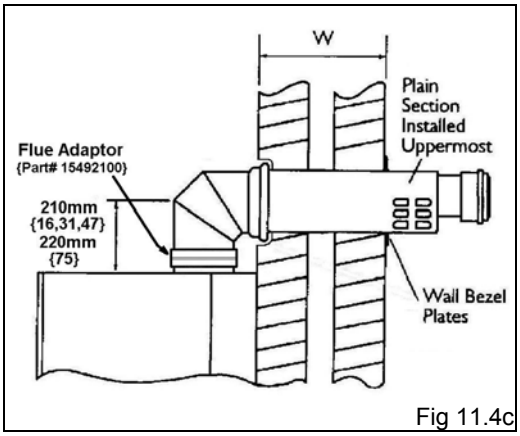


Fig 11.4c

11.4 Installation of a Horizontal Wall Terminal (cont'd)

Side Outlet Assembly Method

The following procedure applies to horizontal, side flue terminal position.

1) With the boiler mounted in position, see section 7.0, draw a horizontal line along the wall 210mm (16, 31 & 47 models), or 220mm (75 model) above the top of the boiler. This line should rise at approximately 3º from the horizontal toward the terminal position to allow any condensate to drain through the boiler. See fig 11.4d.
2) On the adjacent sidewall, draw a vertical line 130mm (16, 31 & 47 models), or 176mm (75 model) from the wall that the boiler is mounted on. Continue the horizontal line previously marked on the sidewall, See fig 11.4d
3) At the intersection of the horizontal and vertical lines, cut a 130mmØ hole with a core drill. See fig 11.4d.
4) Measure the wall thickness 'W' in millimeters and the distance between the side of the boiler and the adjacent sidewall (L1).

   For the 16, 31 & 47 models, add 275mm to the sum of Length 'L1 + W', to achieve total length 'TL' of flue pipe required.

   For the 75 model, if flueing to the LEFT, add 122mm to the sum of Length 'L1 + W', to achieve total length 'TL' of flue pipe required; If flueing to the RIGHT, add 678mm to the sum of Length 'L1 + W', to achieve total length 'TL' of flue pipe required

   If 'TL' is greater than 845mm, then additional flue extensions will be required.
5) Mark the Horizontal Wall Terminal, and flue extensions if required, a distance of 'TL' from the outer edge of the Air Pipe. Both tubes should be cut flush and square with each other, and any burrs removed. See fig 11.4e.
6) Re-position the boiler onto the hanging bracket, as detailed in section 7.0.
7) Fit the Flue Adaptor to the top of the boiler and lubricate the two seals with silicone grease.
8) Lubricate the male ends of the concentric bend and the flue adapter with silicone grease, locate the flue adapter onto the flue outlet connection on top of the boiler, and gently push home. Locate the bend on top of the flue adapter, and gently push home.
9) Locate the wall bezel plate onto the wall terminal assembly and position the terminal through the previously prepared hole from outside the building.
10) Locate the bezel plate onto the wall terminal for the inside face of the wall.
11) Lubricate the male ends of the concentric bend with silicone grease. Locate concentric tubes into bend and gently push fully home. Ensure that the plain section of the external part of the air inlet tube is located uppermost. See fig 11.4f.
12) Fix external wall bezel plate with fixings provided. See fig 11.4f.

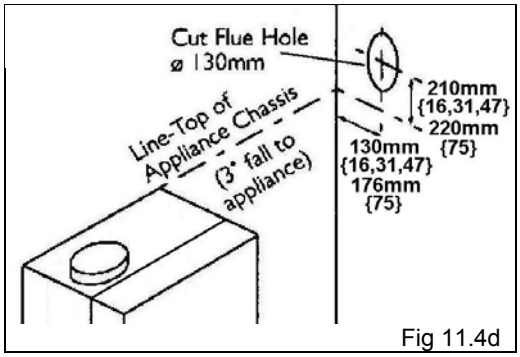


Fig 11.4d

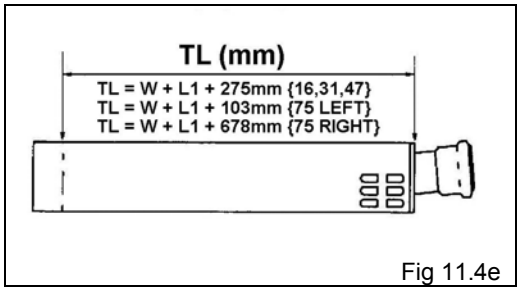


Fig 11.4e

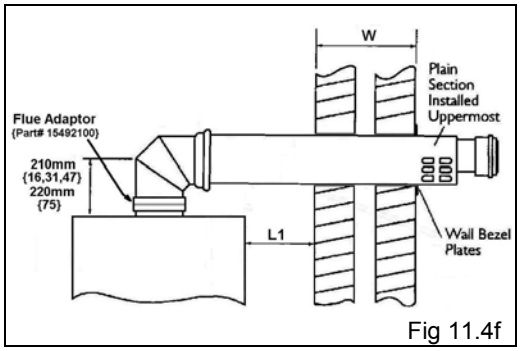


Fig 11.4f

11.5 Installation of a Vertical Discharge Wall Terminal

The Strata Streamline 16, 31, 47, & 75 boilers are a fully condensing appliance with very low flue gas temperature, consequently the flue gas discharge is commonly seen as white water vapour plume. Although this is not harmful when properly discharged into the atmosphere outside the building from a correctly operating appliance, the white water vapour plume may cause, in certain applications, a visual nuisance. It must also be considered that the flue termination may drip condense water, which may result in an ice hazard below the terminal position.

The installation of the Vertical Discharge Wall Terminal is the same as detailed in section 11.2, for the Horizontal Wall Terminal, however the cutting details for the flue pipe are different.

For a Rear Outlet the cutting Dimension 'TL' = 'w'+ 175mm (16, 31 & 47 models), see fig 11.5a.
'TL' = 'w'+ 220mm (75 models), see fig 11.5a.

For a Side Outlet the cutting Dimension 'TL' = 'L1' + 'W' + 295mm (16, 31 & 47 models, see fig 11.5b.
'TL' = 'L1' + 'W' + 142mm (75 model) RIGHT, see fig 11.5b.
'TL' = 'L1' + 'W' + 678mm (75 model) LEFT, see fig 11.5b.

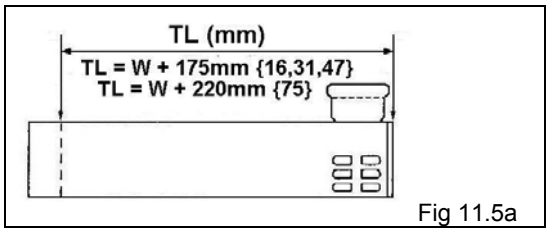


Fig 11.5a

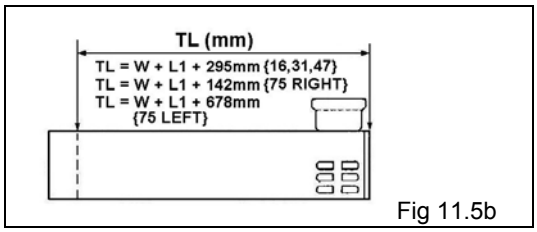


Fig 11.5b

Assembly Method

The following procedure applies for the extended vertical discharge pipe only; the assembly methods in section 11.4 should be referred to for the installation of the concentric flue between the boiler and the Wall Terminal.

1) Install the Concentric Flue and Vertical Wall Terminal for either Rear or Side Outlet, as detailed in Section 11.4 above.
2) Lubricate the male end of the 80mmØ PPS flue pipe, locate on to the Vertical Terminal outlet socket, and gently push home. Continue installing the 80mmØ PPS flue pipe to a suitable location. Please note the 80mmØ PPS flue pipes will require support clamps every 1 metre.
3) Lubricate the male end of the 80mmØ PPS flue bend; locate onto the flue pipe socket, and gently push home. Install the Bird Mesh Cowl into the socket of the flue bend. See fig 11.5c.

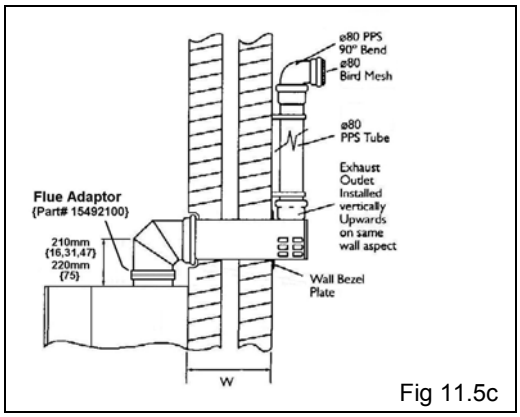


Fig 11.5c

11.6 Twin Pipe Room Sealed.

As detailed in section 11.2, the Strata Streamline 16, 31, 47, & 75 can be flued over great distances. If the distance required is outside of the limits available with the concentric flue components, the Air and Exhaust flue pipes can be converted to 2 No 80mmØ PPS pipes, one for Air for Combustion, and the second for Exhaust flue gases. A Concentric to Twin Pipe adapter is required (Part No 15492500).

The two pipes can then be routed to outside of the building either vertically or horizontally. Any horizontal sections MUST be installed with at least a 3º fall to the boiler to allow any condense which forms in the exhaust flue system to run back to the boiler. The flue system must be gas and water tight, and must be adequately supported over its entire length. Supports at 1 metre intervals are essential.

For vertical termination, the Air and Exhaust pipes can either stay separated, as fig 11.6a, or they can be converted back to concentric, to use the Standard Vertical Terminal, see fig 11.6b.

For horizontal termination the Air and Exhaust pipe can either be terminated 'Side-by-Side', with a minimum distance of 350mm between center lines, or 'One-Above-The-Other', When the Exhaust pipe terminating a minimum of 300mm above the Air pipe. See fig 11.6c.

Twin Pipe Roof Terminal Position

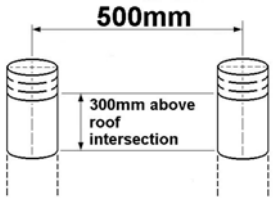


Fig 11.6a

Twin Pip Wall Terminal Positions

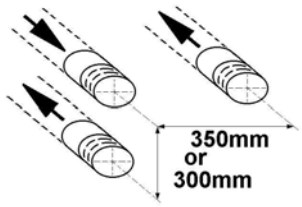


Fig 11.6c

Concentric Vertical Terminal with Twin Pipe Adapter

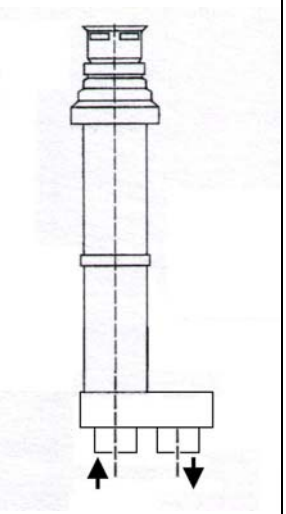
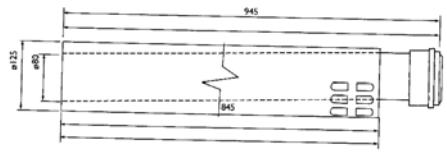


Fig 11.6b

11.7 Flue Components

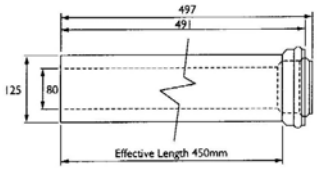
80/125mmØ Concentric Flue Components

Standard Wall Terminal



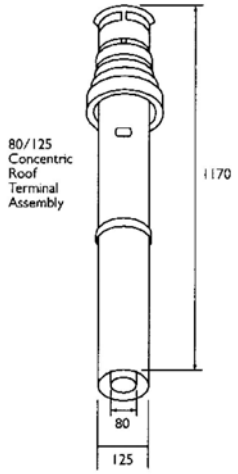
Part No. 15492010

500mm Flue Extension



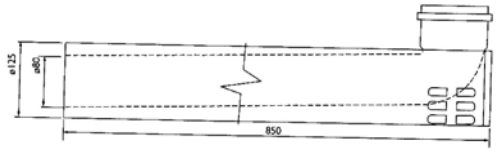
Part No. 15492210

Vertical Terminal Kit



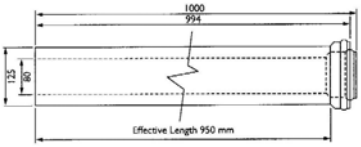
Part No. 15492201

Vertical Discharge Wall Terminal



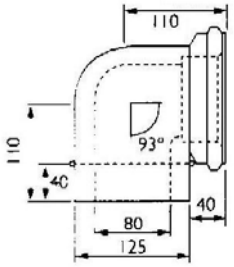
Part No. 15482012

1000mm Flue Extension



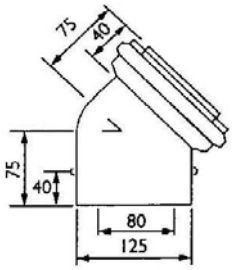
Part No. 15492220

93º Bend



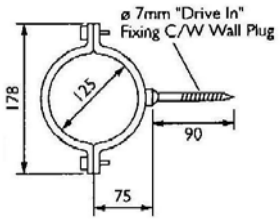
Part No. 15492203

45º Bend



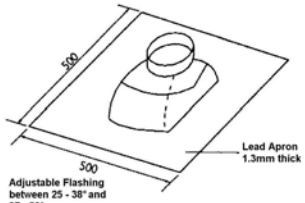
Part No. 15492204

Support Bracket



Part No.15491000

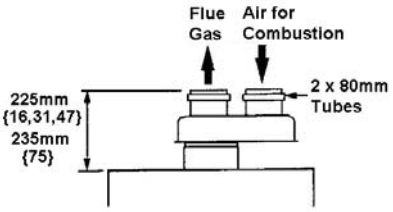
Pitched Roof Flashing



Part No. 15491300

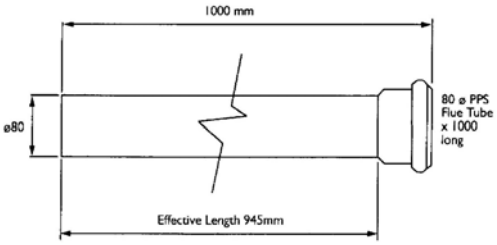
80mmØPPS Flue Components

Concentric to Twin Pipe Adapter



Part No. 15492500

1000mm Flue Extension

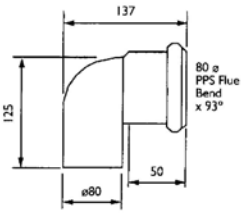


Part No. 15492320

Air Pipe Terminal

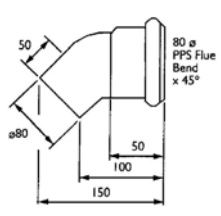
Part No. 15492402

93º Bend



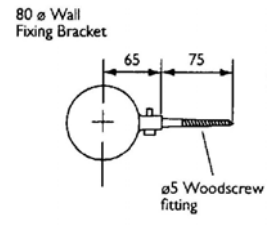
Part No. 15492303

45º Bend



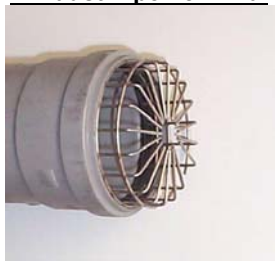
Part No. 15492304

Support Bracket



Part No. 15492305

Exhaust Pipe Terminal



Part No. 15494012

12.0 Calculating the Flue Pressure Loss

The excess pressure available from the boiler fan for overcoming the frictional resistance of the flue system is 400 Pa. The adjacent table lists the resistances of the flue components, which will assist the designer in calculating the resistance of the total flue system.

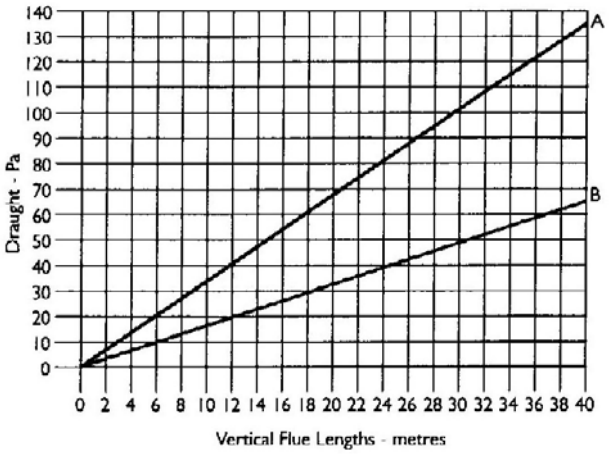
As with all vertical flue systems, thermal up-draught is generated in the vertical sections of a flue, the graph below (fig 12.1) shows the Thermal Up-draught generated, in Pa's, which can then be deducted from the total flue resistance.

If the resistance of the total flue system exceeds 400 Pa's, this will result in a reduction of the boiler output. The graph below (fig 12.2) shows the available maximum boiler output in relation to flue resistance.

	16H	31H	47H	75H
Concentric Flue Components				
Standard Wall Terminal	4.0	5.0	8.0	16.0
Vertical Discharge Wall Terminal	4.0	5.0	8.0	16.0
Vertical Terminal	4.0	5.0	8.0	16.0
1000mm Flue Extension	2.5	4.0	6.0	12.0
500mm Flue Extension	1.25	2.0	3.0	6.0
93º Bend	2.5	4.0	6.0	12.0
45º Bend	1.25	2.0	3.0	6.0
80mmØ PPS Flue Components				
Concentric to Twin Pipe Adapter	1.5	3.0	5.0	10.0
Exhaust Pipe Terminal	1.0	2.5	4.0	8.0
Air Pipe Terminal	2.0	4.0	7.0	15.0
1000mm Flue Extension	1.5	3.0	5.0	9.0
500mm Flue Extension	0.75	1.5	2.25	4.5
93º Bend	1.5	3.0	5.0	9.0
45º Bend	0.75	1.5	2.25	4.5

Thermal Up-draught Graph

Thermal Up-draught when flue gas temperature 80ºC and outside temperature - 5ºC.



A = Flue insulated or within the building.
B = Flue un-insulated and exterior to the building.

Fig 12.1

Boiler Output / Flue Resistance Graph

Effect of the flue system resistance on the boiler output.

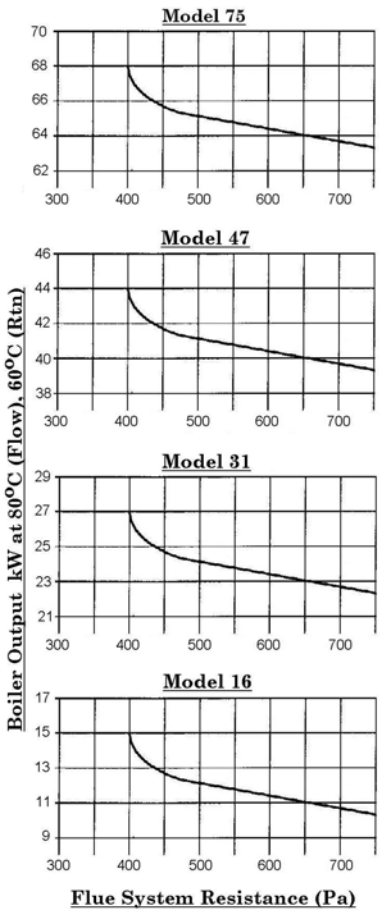


Fig 12.2

13.0 Flue Terminal Positions

The flue terminal of the Strata Streamline 16, 31, 47, & 75 boilers' will plume water vapour, heavily and care must be taken when selecting the terminal position to ensure that a "nuisance situation" is not created.

Where the flue terminal discharges within 2 metres of ground or any upper part of the building where people have general access, i.e. balcony level, etc., a terminal guard MUST be fitted to prevent the terminal from being touched.

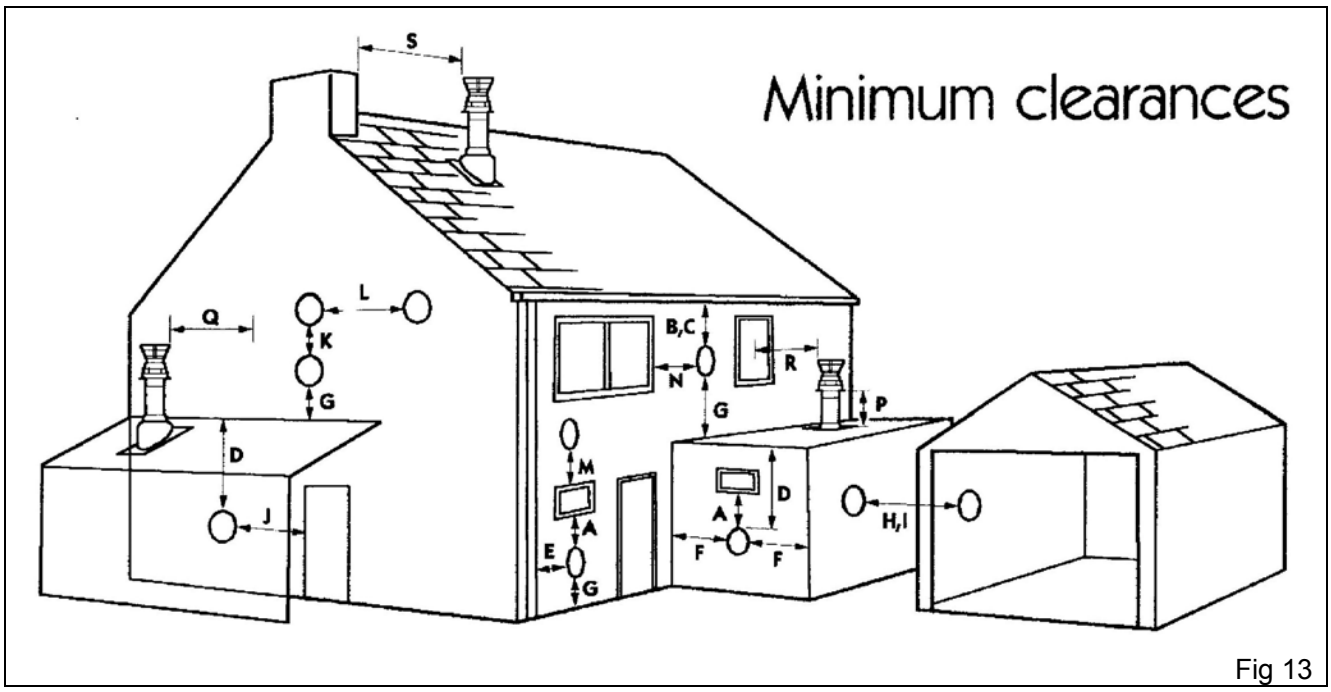


Fig 13

Minimum Distance

All Dimensions are in millimeters, See Fig 13.

Dimension	Description	Minimum Distance
A	**Directly below an opening, air brick, window, etc.**	**300**
B	Below gutters, soil pipes, drain pipes, etc.	75
C	Below eaves	200
D	**Below balconies, car port roof, etc.**	**200**
E	Vertically from soil pipes, drain pipes, etc.	150
F	From internal or external corners.	300
G	Above ground, intersecting roof, balcony level, etc.	300
H	From a surface facing the terminal.	2000
I	From a terminal facing the terminal.	2000

Dimension	Description	Minimum Distance
J	**From an opening, door, window, etc., in a car port**	**1200**
K	Vertically from a terminal on the same wall.	1500
L	Horizontally from a terminal on the same wall.	300
M	Above an opening, window, etc.	500
N	**Horizontally to an opening, window, etc.**	**300**
P	Above a level roof (base of terminal).	500
Q	From adjacent wall (edge of terminal).	500
R	From adjacent opening window.	1000
S	From any other flue terminal.	600

Dimensions highlighted in BOLD are not recommended locations.

14.0 Ventilation Requirements

The room or space in which the Strata Streamline 16, 31, 47, & 75 boiler is installed may need to be ventilated in accordance with BS 5440: Part 2:2000, or BS 6644: 2005, as appropriate.

The table below details the ventilation required for individual Strata Streamline 16, 31, 47 & 75 boiler installations ONLY.

Conventional Flue Installation	**16H**	**31H**	**47H**	**75H *(*1)***
Room Installation. Natural Ventilation direct to outside.	40cm²	110cm²	190cm²	140cm² High, 280cm² Low Level
Room Installation. Natural ventilation from adjacent room, which is directly ventilated to outside.	40cm²	110cm²	190cm²	N/A
Compartment Installation. Natural Ventilation direct to outside.	75cm² High, 150cm² Low Level	145cm² High, 290cm² Low Level	225cm² High, 450cm² Low Level	350cm² High, 700cm² Low Level
Compartment Installation. Natural ventilation from adjacent room, which is directly ventilated to outside.	150cm² High, 300cm² Low Level	290cm² High, 580cm² Low Level	450cm² High, 900cm² Low Level	N/A

Room Sealed Flue Installation	**16H**	**31H**	**47H**	**75H *(*1)***
Room Installation. *(Consideration shall be given to provide general ventilation for cooling purposes).*	NIL	NIL	NIL	140cm² High & Low Level
Compartment Installation, room sealed flue. Natural ventilation direct to outside.	75cm² High & Low Level	145cm² High & Low Level	225cm² High & Low Level	350cm² High & Low Level
Compartment Installation. Natural ventilation from adjacent room. Adjacent room similarly ventilated direct to outside	150cm² High & Low Level	290cm² High & Low Level	450cm² High & Low Level	700cm² High & Low Level

Important Notice

The Ventilation Requirements detailed above are for guidance purposes and are relevant for single appliance installations ONLY.

For further information on different ventilation options/requirements, for single or multiple boiler installations, please refer to BS 5440: Part 2:2000 and BS 6644: 2005, as appropriate.

****1 – Consideration shall be given for the Summer Usage of the boiler, and the appropriate ventilation allowance applied, as detailed in BS 6644: 2005.***

15.0 Hydraulic System Design

The Strata Streamline 16, 31, 47, & 75 boiler can be operated to serve a heating load as either;

- Constant Temperature, the option of adjusting the desired set-point temperature between 20ºC and 85ºC.
- Direct-On-Boiler weather compensated flow temperature.
- Hot Water Production, on a priority basis.

The Strata Streamline 16, 31, 47, & 75 boilers are designed to operate with a 20ºC ΔT, the heating & hot water loads shall be designed around a 20ºC ΔT, operating the boiler on a reduced ΔT will result in a reduced boiler output.

Where the system index circuit/s have a greater hydraulic resistance than that of the residual head pressure available from the internal boiler pump {16, 31, 47}, or chosen boiler pump {75}, then a low loss header must be used, with the boilers pump delivering the water to the low loss header.

Where multiple boilers are to be installed, a low loss header must be used, with the boiler primary pumps delivering the water to the low loss header. Non-return valves MUST be fitted to each boiler to prevent short-circuiting. See 18.8 System Type 8.

Where the system has multiple pumped circuits that are proposed to operating at the same time, then sub headers, both flow and return, should be used with non-return valve being installed directly after each pump to prevent re-circulation. See Fig 15.0

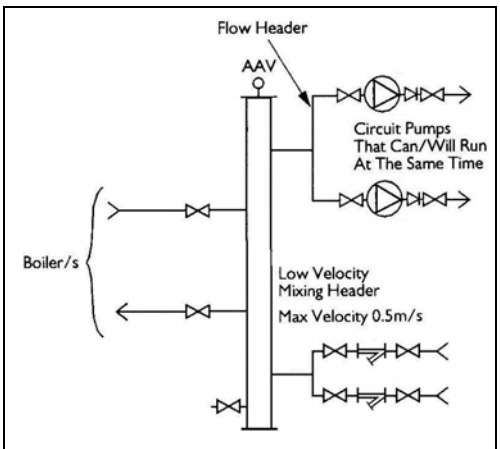


Fig 15.0

15.1 Low Water Pressure Protection.

A low water pressure switch has been incorporated into the boiler and therefore an external unit is not required. The activation setting of the switch is 0.5 bar, with a 0.3 bar differential; therefore the system pressure must be in excess of 0.8 bar for the switch to activate and allow the appliance to function.

15.2 Water Treatment, System Cleaning (BS 7592: 1992)

The entire primary system MUST be thoroughly cleaned and flushed to remove debris, flux residues, etc. before opening the boiler isolation valves & flooding the boiler. Particular care must be taken where the Strata Streamline boiler is being retro-fitted into an old/existing system, as system silt or magnetite can be very damaging to the new boiler.

Following cleaning and flushing the system MUST be dosed with a good quality water treatment to prevent corrosion and the formation of scale. FAILURE TO OBSERVE THESE REQUIREMENTS WILL RENDER THE WARRANTEE ON THE APPLIANCE VOID.

Cleaning, flushing and water treatment must be carried out in accordance with the requirements of BS 7593:1992, prior to commissioning the boiler.

Repeated draining and refilling of the system, without replenishment of water treatment, must be avoided, as this is very damaging to the boiler. The boiler must not operate without the system water being correctly and adequately treated, and maintained, with an appropriate level of corrosion inhibitor.

For specific guidance on water treatment, direct contact is advisable with:-

Betz Dearborn Limited
(Sentiel)
Foundry Lane
Widnes
Cheshire
WA8 8UD
Tel: 0151 424 5351
Fax: 0151 420 5447

Alpha-Fry Technologies
(Fernox)
Cookson Electronics
Forsyth Road
Sheerwater
Woking
Surrey
GU21 5RZ
Tel: 0208 665 6666
Fax: 0208 665 4695

15.3 Care With The Use of Solder Flux

The Strata Streamline 16, 31, 47, & 75 boiler has a heat exchanger fabricated from 316L Stainless Steel. It is most important that the compatibility of any flux is checked with the supplier before use, and that any flux manufactures recommendations are strictly followed with regards to use in conjunction with Stainless Steel.

15.4 Inclusion of Strainers

The return pipework ***MUST*** include some method of filtering or straining. The filter or strainer must be fitted with isolation valves to allow easy cleaning with the minimum amount of water loss and water replenishment.

15.5 Pressure (Safety) Relief Valve

In accordance with BS 5440: 2000 and BS 6644: 2005, as applicable, the installer shall install as suitably sized Pressure (Safety) Relief Valve.

The location of this valve is important with respect to the applied pressure of the boiler circulation pump, it is therefore recommended to locate the Pressure (Safety) Relief Valve on the flow pipe immediately adjacent to the boiler; furthermore, there must not be any means of isolation between the boiler and the Pressure (Safety) Relief Valve.

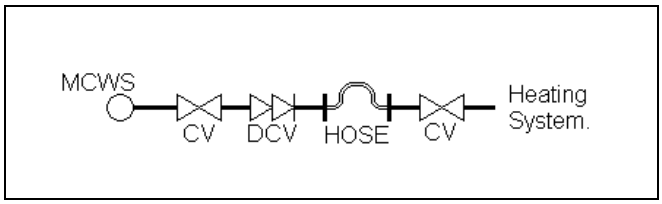
15.5 Filling the System

The Initial filling of a sealed heating system, and subsequent refilling, must be by a method that has been approved by the Water Regulation Advisory Scheme (WRAS) for that type of heating system.

i.e.	Domestic (*In-House*)	Fluid Category 3 (*C-3*)
	Non Domestic (Other than *In-House*)	Fluid Category 4 (*C-4*)

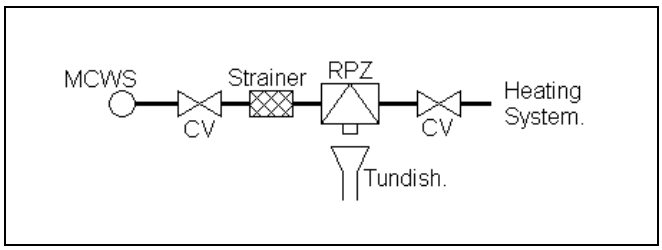
For Category 3 systems, the approved method of filling must comprise of the following components in the arrangement shown;

- Control Valve incorporating a Double Check Valve on the Mains Cold Water pipework.
- Temporary Connecting Hose, which must be disconnected after use.
- Control Valve, on the heating system.



For Category 4 systems, the approved method of filling must comprise of the following components in the arrangement shown;

- Control Valve.
- Strainer.
- Verifiable Backflow Device with Reduced Pressure Zone (RPZ Valve)
- Incorporating a 'Type BA' Air Gap.
- Tundish.
- Control Valve.



Further more, in accordance with BS 6644: 2005 system with an input greater than 70kW (nett), an automatic water replenishment unit shall be installed to automatically replenish any lost or evaporated water.

Please refer to BS 6644: 2005 for allowable water replenishment methods for use with sealed/pressurised heating systems.

For information on a comprehensive range of pressurization units that comply with current British Standards and WRAS Regulations, please contact MHS Boiler Sales.

15.6 Expansion Vessel

In accordance with BS 5440: 2000, BS 6644: 2005, WRAS Regulations, and Local Authority Water Regulations, as applicable, the installer shall install a suitably sized, and approved, Expansion Vessel to ensure that the water capacity of the system has ample expansion capacity.

The location of the expansion vessel shall only be isolatable from the system via a Lockable Type Service Valved, which shall be locked in the *OPEN* position, to prevent accidental isolation.

Furthermore, a drain facility should be provided adjacent to the expansion vessel to aide the routine maintenance, overhaul, of the vessels Air Pressure setting.

The Strata Streamline 16 & 31 boilers ONLY, are supplied with an internal 10-litre expansion vessel. This vessel is suitable for a system with a maximum capacity of 100 litres. This is based upon a Cold Fill Pressure of 1.0bar, and a Final Working Pressure (HOT) of 2.5bar.

For information on a comprehensive range of expansion vessels that comply with current British Standards and WRAS Regulations, please contact MHS Boiler Sales.

16.0 Electrical Connections.

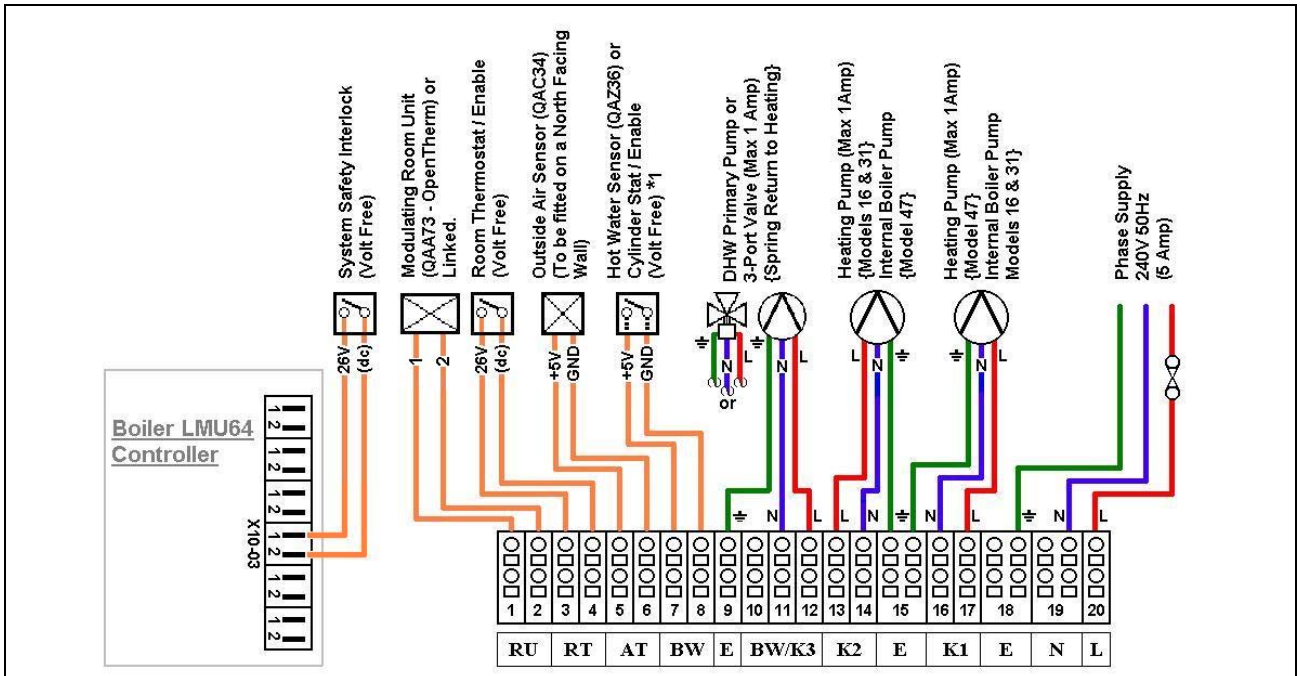
The electrical connections to the Strata Streamline boiler are made via a labeled terminal rail, which is located within the boiler case, models 16, 31 & 47, or direct to the LMU64 on the model 75.

Connections must only be made using the appropriate diameter multi-stranded flex cables and cable entry must only be via the rubber glanded cable entry points located at the bottom left hand side of the boiler. If the boiler is to be operated as Room Sealed, care must be taken to ensure that the cable entries are reasonable airtight. For electrical connection rail details, see fig 16.0a & 16.0b.

It is essential that the low voltage cables be screened to prevent stray electrical currents from higher voltage cables interfering with the low voltage control signals. The screening therefore, must be earthed.

Care MUST be taken with the low voltage connections, connecting Mains Power (240V AC) to the Low Voltage connections will irreversible damage the boilers controls, which is not covered by the 12-month warranty.

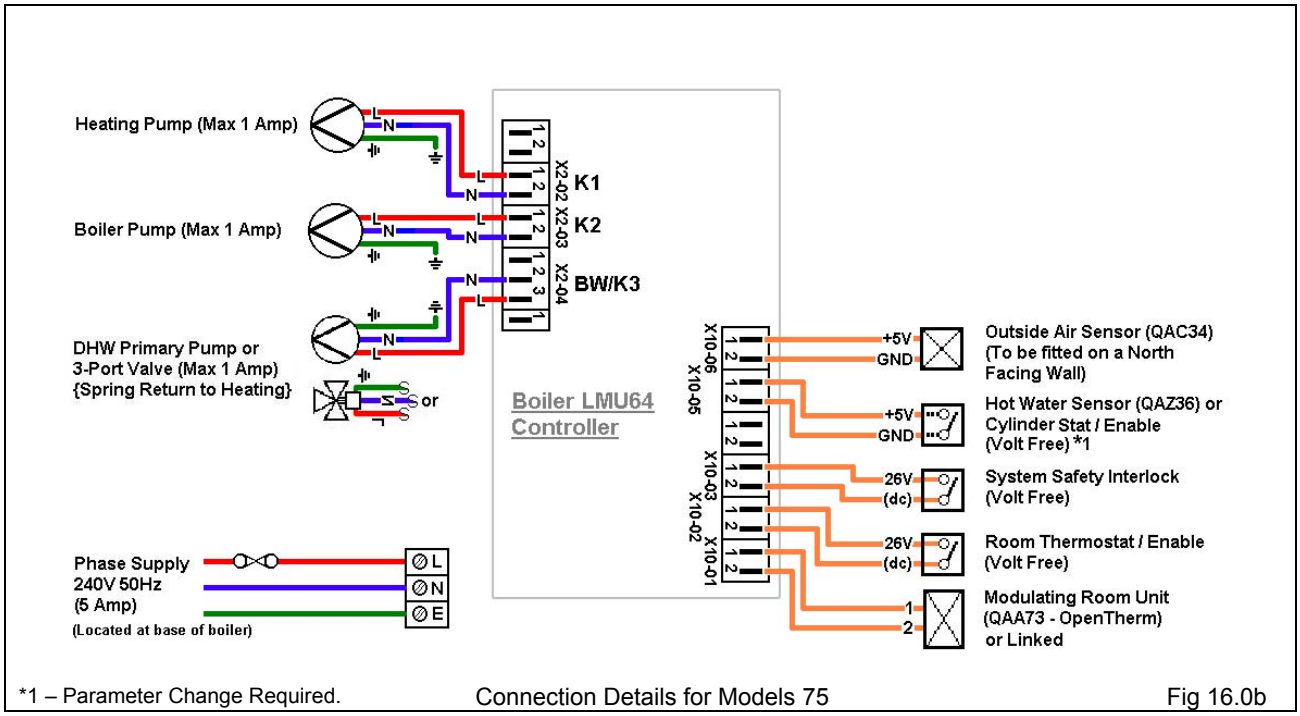
Under NO circumstances shall any connections be 'Commoned', connected together with adjacent connections either on a single appliance, or any adjacent appliance, as damage will occur to the boiler control unit/s, which will not be covered by the 12-month warranty.



*1 – Parameter Change Required.

Connection Details for Models 16, 31& 47

Fig 16.0a

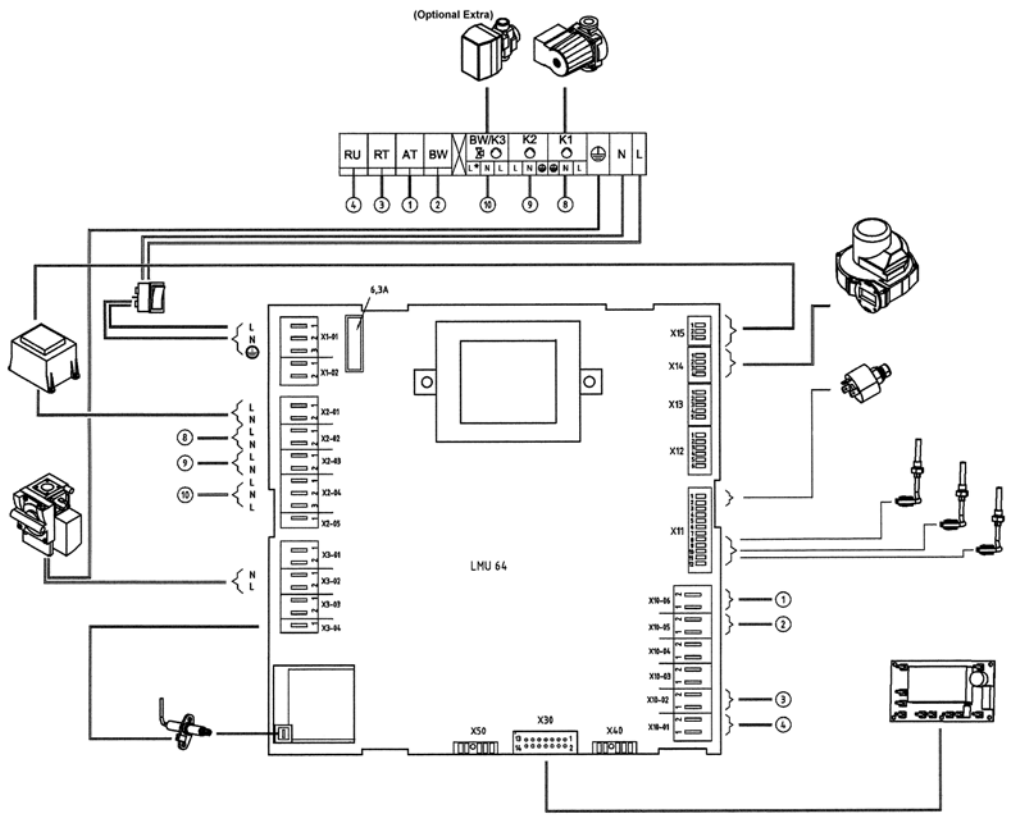


*1 – Parameter Change Required.

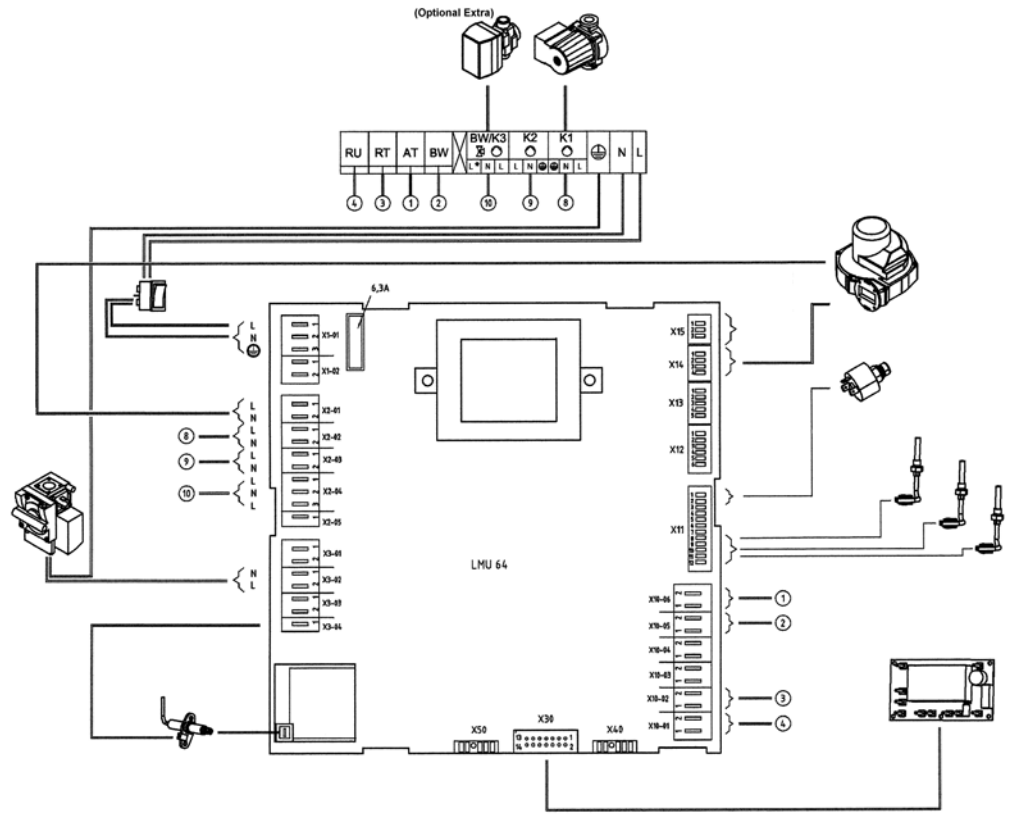
Connection Details for Models 75

Fig 16.0b

16.1 Internal Wiring Diagrams

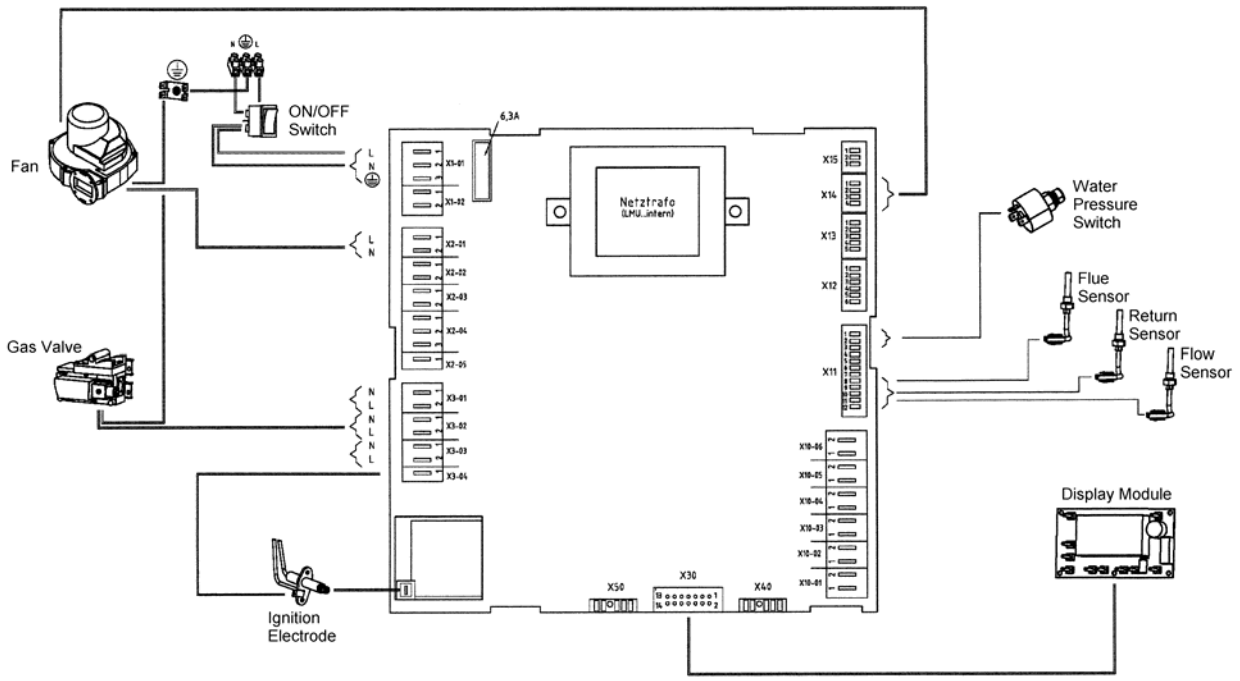


Internal Wiring Diagram for Models 16 & 31 Fig 16.1a



Internal Wiring Diagram for Models 47 Fig 16.1b

16.1 Internal Wiring Diagrams (cont'd)



Internal Wiring Diagram for Models 75 Fig 16.1c

16.2 Low Voltage Cables

All low voltage cables should be of a suitable screened type for 24-volt data transfer.

The Outside Air Sensor (QAC34), and optional QAA73 unit and Hot Water Sensor (QAZ36), all require Low Voltage Cables.

The adjacent table gives guidance on the size of cable required for the length of cable required.

All low voltage cables should be keep away from mains voltage cables as much as possible as electrical interference from Mains Voltage cables will adversely affect the operation of the boiler and its controls. The screening of the cables must be earthed.

Cable Details	
Length (mtrs)	Cable (Ømm²)
Up to 35	0.25
35 to 70	0.5
70 to 140	1.0

16.3 Outside Air Sensor QAC34

If weather compensated flow temperatures are required (recommended for best seasonal efficiency and comfort), then the Outside Air Sensor must be installed and electrically connected to the boiler.

The Outside Air Sensor MUST be installed on an exterior wall which is North facing, away from any artificial heat influences such as ventilation discharges, lights, etc, and MUST not be installed in direct sunlight.

The Outside Air Sensor complete with 5mmØ wall fixing and screw is supplied with the boiler. See Fig 16.3.

Fig 16.3

17.0 Optional Extra Control Options

17.1 QAA73 Room Unit Interface (OpenTherm)

Fig 17.1

The QAA73 Room Unit Interface (available as an optional extra) not only provides room temperature control for day set-point, night-time set-point and frost protection, but also includes individual day programming for heating and hot water control, and also displays the boiler error message, if set to the OpenTherm Plus mode.

With the use of an AGU2.500 Clip-In Module, and additional Heating Circuit can also be time controlled, see Item 17.2.

For further information concerning installation and programming, please refer to the separate QAA73 Installation and Maintenance Manual.

17.2 AGU2.500 Clip-In Module Extra Heating Zone
(Part No – 96.38000-7003)

Fig 17.2

With the use of an AGU2.500A109 Clip-In Module, a second heating zone can be activated.

When used in conjunction with a QAA73 Room Unit, this second heating zone can operate under the same temperature dictates as heating zone 1, or separately under time control only.

When a QAA73 Room Unit is NOT being used, the RU connections (X10-01) MUST be linked so the time clock for the second heating zone time clock can be accessible via the boiler fascia.

If a mixing value is required to accommodate lower operating temperatures from that of Heating Zone 1, then a QAD36 flow sensor will be required, available as an optional extra.

Please refer to instructions supplied with the Clip-In Module for programming instructions (Ref. – LAGU2).

17.3 AGU2.511 Clip-In Module BMS Interface
(Part No – 96.38000-7005)

Fig 17.3

With the use of an AGU2.511 Clip-In Module, the boiler controller can communicate with a BMS System.

This Clip-In Module has three 240V (50Hz) programmable outputs that can be configured to respond to the operational status of the boiler, for remote monitoring, such as, Healthy, Run and Lock-Out.

This Clip-In Module can also accept a 0-10V dc or 0-20mAmp input signal for Set-point Temperature, or Percentage Output control.

Please refer to instructions supplied with the Clip-In Module for programming instructions (Ref. - LAGU).

17.4 OCI420 Clip-In Module LPB Communication
(Part No – 96.38000-7004)

Fig 17.4

With the use of an OCI420 Clip-In Module, the Optional Extra Controls detailed from 17.5 onwards can also be utilized.

One Clip-In Module is required per boiler in a Multiple Boiler arrangement.

Please refer to instructions supplied with the Clip-In Module for programming instructions (Ref. - LOCI).

17.5 RVA47 Cascade Controller (Grey) & Housing


Fig 17.5

The RVA47 Cascade Controller (Grey) is a comprehensive unit that can be wall or control panel mounted, and can control up to twelve Strata Streamline 16, 31, 47, & 75 boilers. The RVA47 is supplied with 2 No QAD21 System Sensors (flow & return) and a QAC32 outside air sensor. Each Strata Streamline boiler MUST be fitted with an OCI420 Communication Clip-In Module, see item 17.4.

In addition to boiler control, the RVA47 can provide the drive signal for a heating circuit pump and can provide control for stored domestic hot water, with the RVA47 providing the drive signal for a hot water primary circuit pump.

External control input to the RVA47 can be by either, a Volt Free contact (e.g. time clock), 0-10v analogue input, a QAA70, QAA50 or QAA10 Modulating Room Unit.

Heating flow temperatures are weather compensated variable (QAC32 supplied), if constant temperature is required, a 620Ω resistor needs to be installed in place of the outside air sensor.

If more than twelve boilers need to be controlled, then additional RVA47 Cascade Controllers can be connected to the first unit in a 'Master/Slave' arrangement. Each subsequent 'Slave' RVA47 can control up to twelve boilers each.

Standard features include Pump Overrun, Boiler Load Rotation, Frost Protection, and Pump Exercise program. Please refer to instructions supplied with the RVA47 for programming instructions (Ref. - LRVA47QR/LRVA47S).

17.6 RVA46 Zone Controller (Black)


Fig 17.6

The RVA46 Zone Controller (Black) is a match controller for the RVA47 (Grey), and is located in the Left-Hand position of the RVA47 Housing

The RVA46 can provide the drive signals for the Zone Circulation pump and Mixing Valve (Supplied by Others).

If a mixing value is required to accommodate lower operating temperatures from that of the other Zones, then a QAD21 flow sensor will be required, available as an optional extra.

External control input to the RVA46 can be a QAA70, QAA50 or QAA10 Modulating Room Unit.

Please refer to instructions supplied with the RVA46 for programming instructions (Ref. - LRVA46QG/LRVA46S)..

17.7 RVA63 Zone Controller (Grey) & Housing


Fig 17.7

The RVA63 Controller (Grey) is a comprehensive controller that can be wall or control panel mounted. The Strata Streamline boiler MUST be fitted with an OCI420 Communication Clip-In Module, see item 17.4.

The RVA63 can provide the drive signals for two heating primary pumps and mixing valves (if required) and can provide control for stored domestic hot water, with the RVA63 providing the drive signal for a hot water primary circuit pump.

If a mixing value/s is required to accommodate lower operating temperatures from that of the other Zones, then a QAD21 or 26 flow sensor will be required per zone, available as an optional extra.

External control inputs to the RVA63 can be by either, Volt Free Enable contact (e.g. time clock), or QAA70, QAA50, QAA10 Modulating Room Units. An external control input is required per zone. The RVA63 can also be linked to an RVA47 for Multiple boiler installations.

Please refer to instructions supplied with the RVA46 for programming instructions (Ref. - LRVA46QG/LRVA46S)

18.0 System Configurations.

The Strata Streamline 16, 13, 47 & 75 boilers can be connected to a number of different types of heating and hot water systems. Depending upon how the boiler is to be utilized will depend upon how the boiler is wired and configured in the boilers parameters.

The following System Types show standard Hydraulic layouts, wiring diagrams, and the necessary parameter changes. If the system you have installed is not shown in one of these standard layout, we would recommend that you consult with MHS Boilers Technical Department for further advice.

If the System Type to be installed requires parameters to be changed, these will need to be undertaken during the commissioning of the boiler.

To access the 'Engineer Level', press and hold the ▲▼PROG buttons simultaneously, for approximately 3 second, until **H90** appears on the screen. Use the ▲ and ▼ PROG buttons to access the required parameter number, and use the **+** and **–** buttons to alter/adjust the required parameter value. On completion of satisfactory adjustment/s to a/any parameter, the INFO button must be pressed to store the amendments and to return to the normal operating display.

A full list of Parameter and Default Values in listed in Section 23.0

Please Note:

When changing Parameter No 552 (System Hydraulics') the pump connections K1 and K2 for the internal pump and the external Heating Circuit may vary.

On the Strata Streamline 16, 31 & 47 boilers the internal pump wiring may need to be re-located from the factory position, as detailed on the System Type Wiring Diagrams.

Streamline 16 & 31 - K1 (Terminals 16 & 17) to position K2 (Terminals 13 & 14),
Streamline 47 - K2 (Terminals 13 & 14) to position K1 (Terminals 16 & 17),

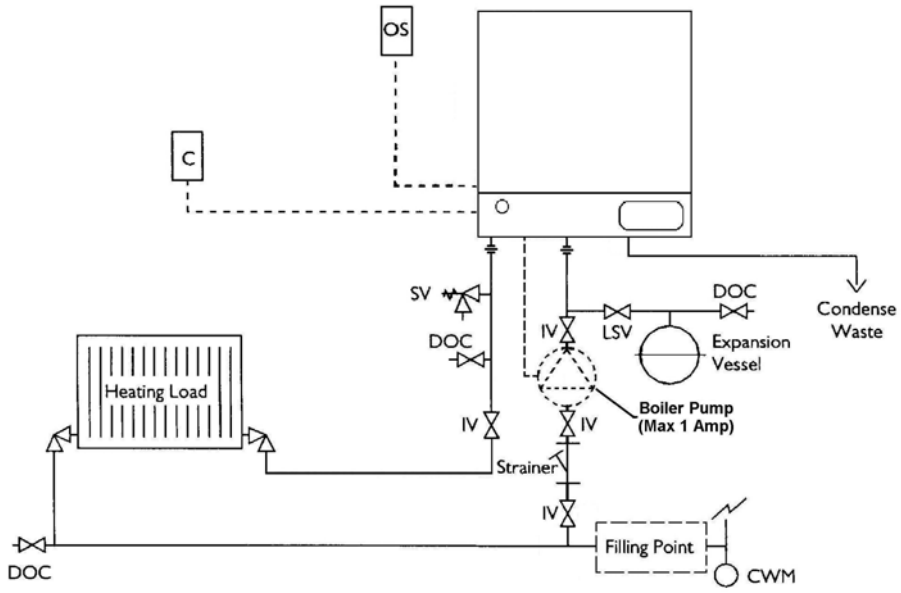
18.1 System Type 1.

Typical single Strata Streamline 16, 31, 47, & 75 boiler installation serving heating only.

Please note;

- ***The Strata Streamline16, 31 & 47 models include an internal pump and therefore an external boiler pump may not be required. The hydraulic resistance of the Index Circuit MUST NOT exceed the amount of the Residual Head pressure available, please refer to the Technical Data detailed in Section 3.0***
- ***The boiler pump on the Strata Streamline 75 must be wired to K2 (Terminals X02-03)***

Hydraulic Layout



Legend

C	External Controller, either QAA73 Room Unit, or Volt Free Enable
OS	Outside Air Sensor (QAC34)
SV	Safety Valve.
IV	Isolation Valve
LSV	Lockable Service Valve.
CWM	Cold Water Main
DOC	Drain Off Cock

Fig 18.1a

18.1 System Type 1 (cont'd)

Wiring Diagram for Models 16, 31 & 47

Notes

*1 Only fit one type of Room Temperature Control.

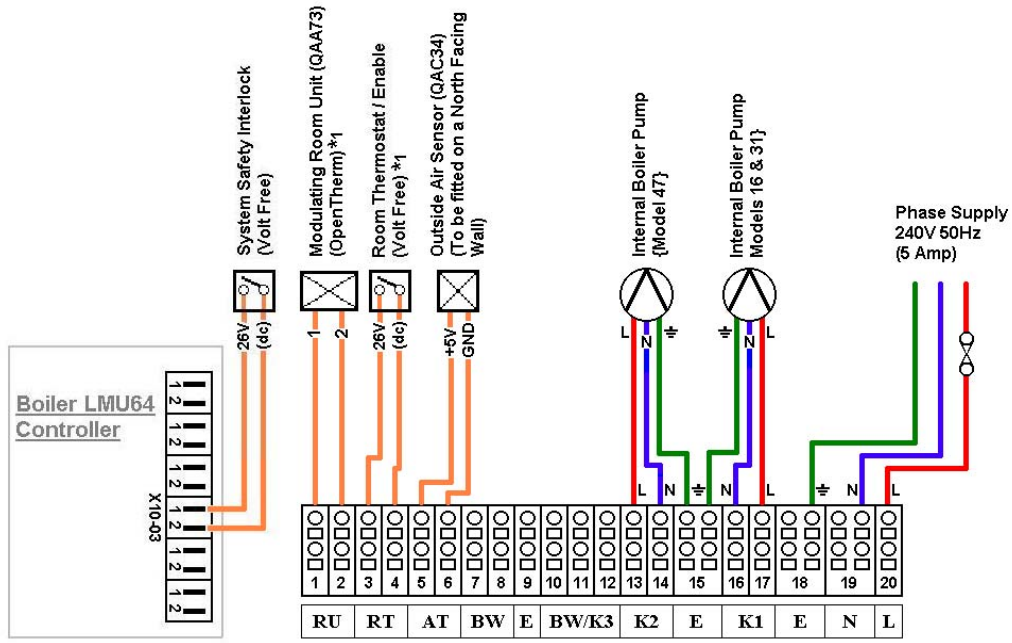


Fig 18.1b

Wiring Diagram for Model 75

Notes

*1 Only fit one type of Room Temperature Control.

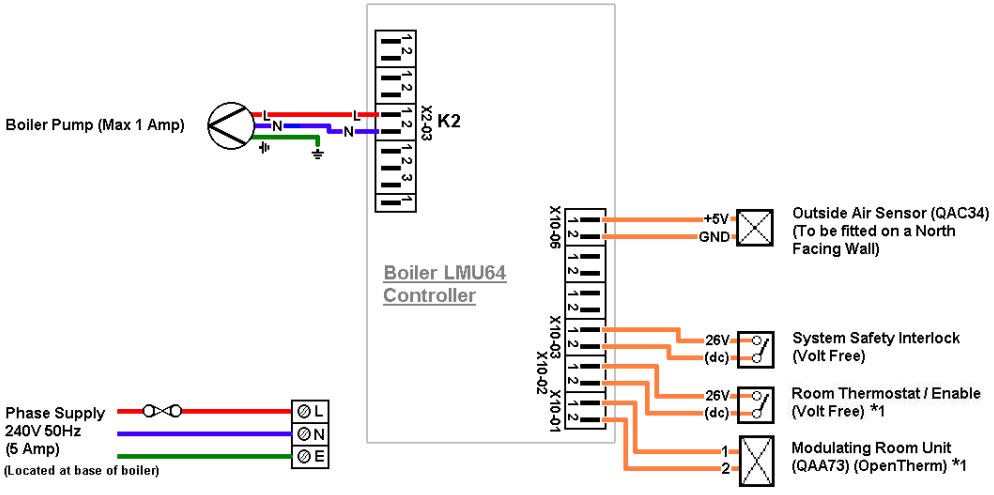


Fig 18.1c

Potential Parameter Changes Applicable to System Type 1.

Line ID	Description	Default Setting	New Setting for This System
H554 -b3	Weather Compensation / Constant Temperature *{0 = Constant Temp, 1 = Variable Temp}*	1	As Required

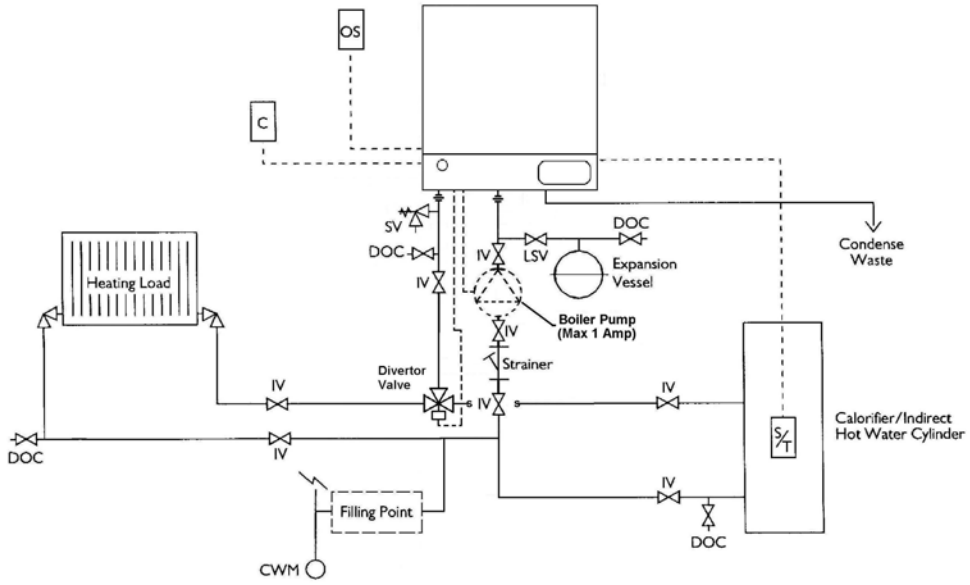
18.2 System Type 2.

Typical single Strata Streamline 16, 31, 47 boiler installation serving heating and domestic hot water (priority) via a 3 Port Valve.

Please note;

- ***The Strata Streamline16, 31 & 47 models include an internal pump and therefore an external system pump may not be required. The hydraulic resistance of the Index Circuit MUST NOT exceed the amount of the Residual Head pressure available, please refer to the Technical Data detailed in Section 3.0***
- ***This configuration is not recommended for the Strata Streamline 75, please consider System Type 3.***

Hydraulic Layout



Legend

C	External Controller, either QAA73 Room Unit, or Volt Free Enable
OS	Outside Air Sensor (QAC34)
SV	Safety Valve.
IV	Isolation Valve
LSV	Lockable Service Valve.
S/T	Hot Water Sensor (QAZ36), or Volt Free Enable.
CWM	Cold Water Main
DOC	Drain Off Cock

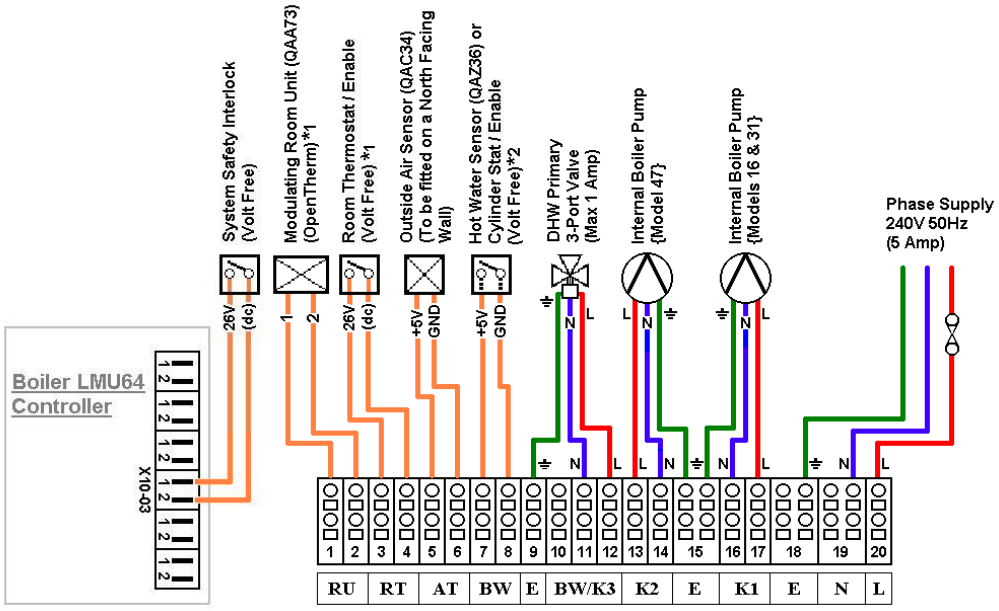
NOTE

Diverter Valve MUST be installed to spring return to Heating, NOT Hot Water.

Fig 18.2a

#

Wiring Diagram for Models 16, 31 & 47



Notes

*1 Only fit one type of Room Temperature Control.

*2 Parameter Change may be required.

Fig 18.2b

18.2 System Type 2 (cont'd)

Wiring Diagram for Model 75
(Not Recommended, please consider System Type 3)

Notes

***1** Only fit one type of Room Temperature Control.

***2** Parameter Change may be required.

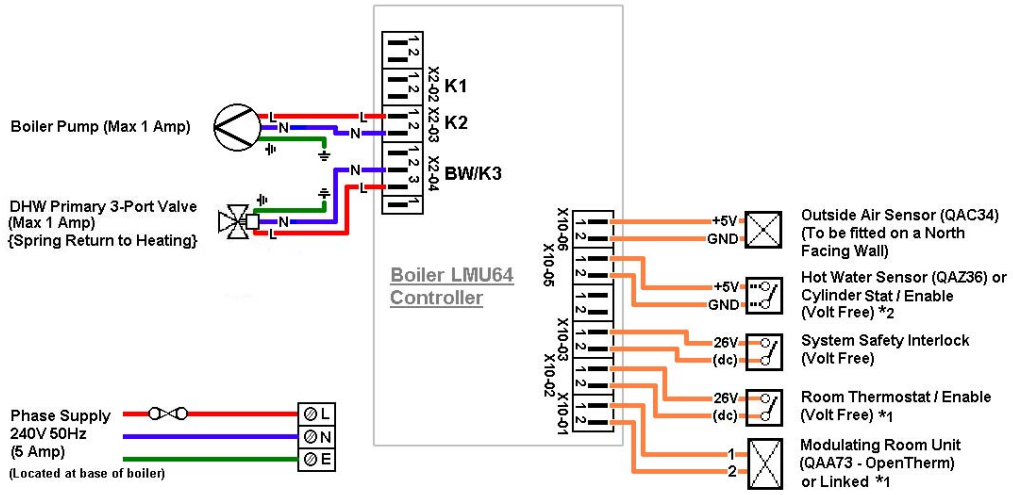


Fig 18.1c

Potential Parameter Changes Applicable to System Type 2.

Line ID	Description	Default Setting	New Setting for This System
H554 - b3	Weather Compensation / Constant Temperature. *{0 = Constant Temp, 1 = Variable Temp}*	1	As Required
H558 – b2	HWS Production Control. *{0 = Sensor (QAZ36), 1 = Volt Free Enable}*	0	As Required

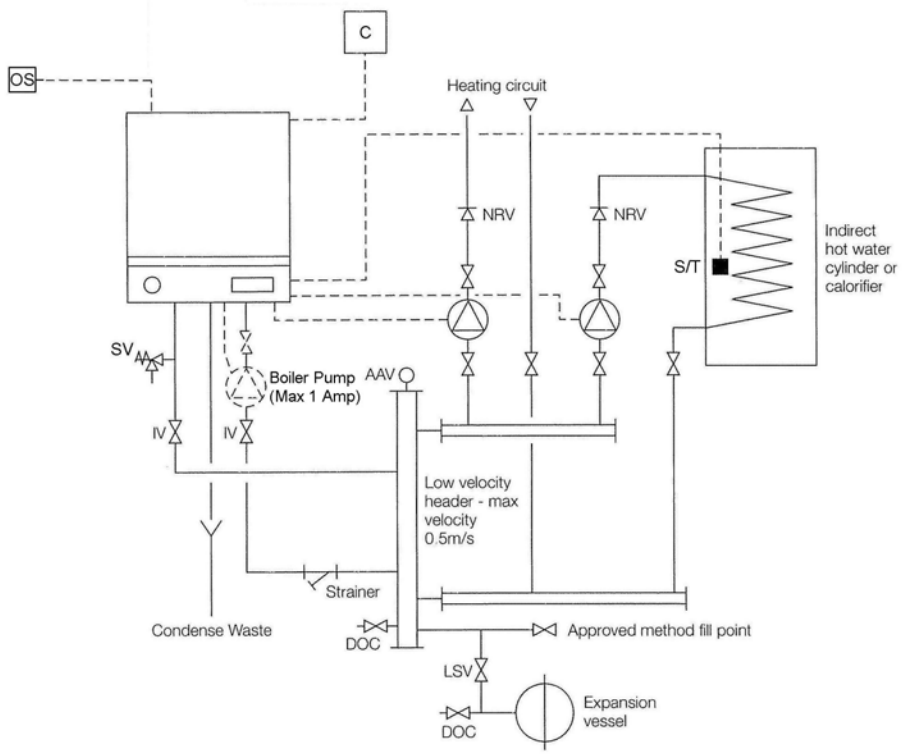
18.3 System Type 3

Typical single Strata Streamline 16, 31, 47, & 75 boiler installation serving a heating and domestic hot water (priority) with individual charging pumps, using a low velocity mixing header.

Please note;

- ***The Strata Streamline16, 31 & 47 models include an internal pump and therefore an external boiler pump is not required.***
- ***The boiler pump on the Strata Streamline 75 must be wired to K2 (Terminals X02-03)***

Hydraulic Layout

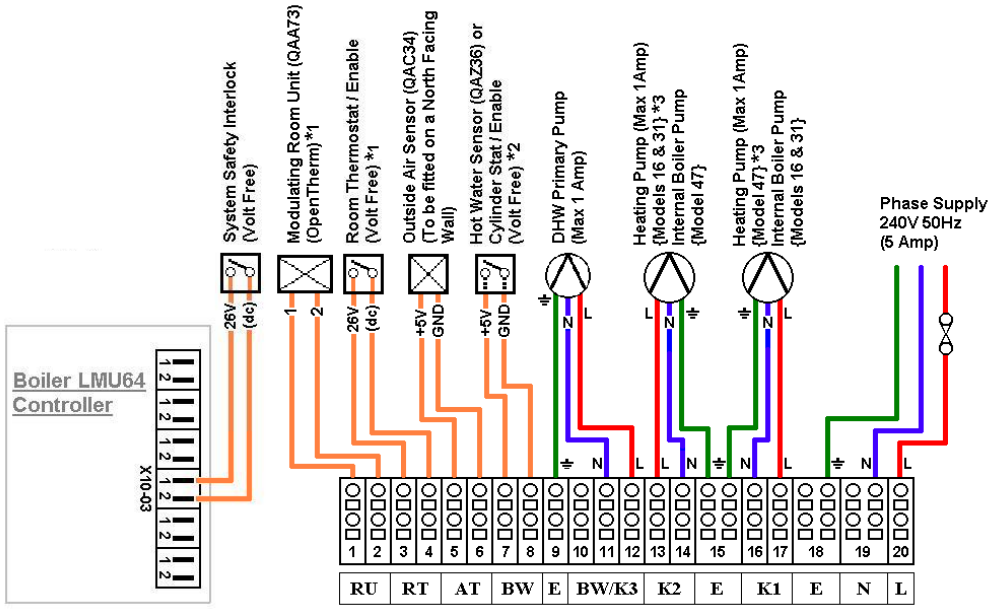


Legend

C	External Controller, either QAA73 Room Unit, or Volt Free Enable
OS	Outside Air Sensor (QAC34)
SV	Safety Valve.
IV	Isolation Valve
LSV	Lockable Service Valve.
S/T	Hot Water Sensor (QAZ36), or Volt Free Enable
CWM	Cold Water Main
DOC	Drain Off Cock

Fig 18.3a

Wiring Diagram for Models 16, 31 & 47



Notes

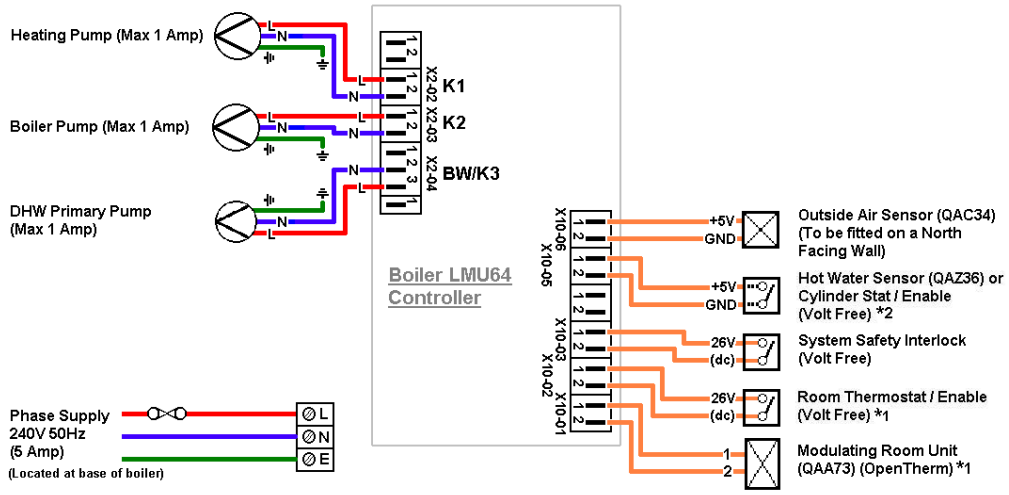
*1 Only fit one type of Room Temperature Control.

*2 Parameter Change may be required.

Fig 18.3b

18.3 System Type 3 (cont'd)

Wiring Diagram for Model 75



Notes

*1 Only fit one type of Room Temperature Control.

*2 Parameter Change may be required.

Fig 18.1c

Essential Parameter Changes Applicable to System Type 4.

Line ID	Description		Default Setting	New Setting for This System
H587 – b6	HWS Charging Pump (Standing Operation) {16, 31}	*{0 = OFF, 1 = ON}*	0	1

Potential Parameter Changes Applicable to System Type 3.

Line ID	Description		Default Setting	New Setting for This System
H554 - b3	Weather Compensation / Constant Temperature. *{0 = Constant Temp, 1 = Variable Temp}*		1	As Required
H558 – b2	HWS Production Control.	*{0 = Sensor (QAZ36), 1 = Volt Free Enable}*	0	As Required

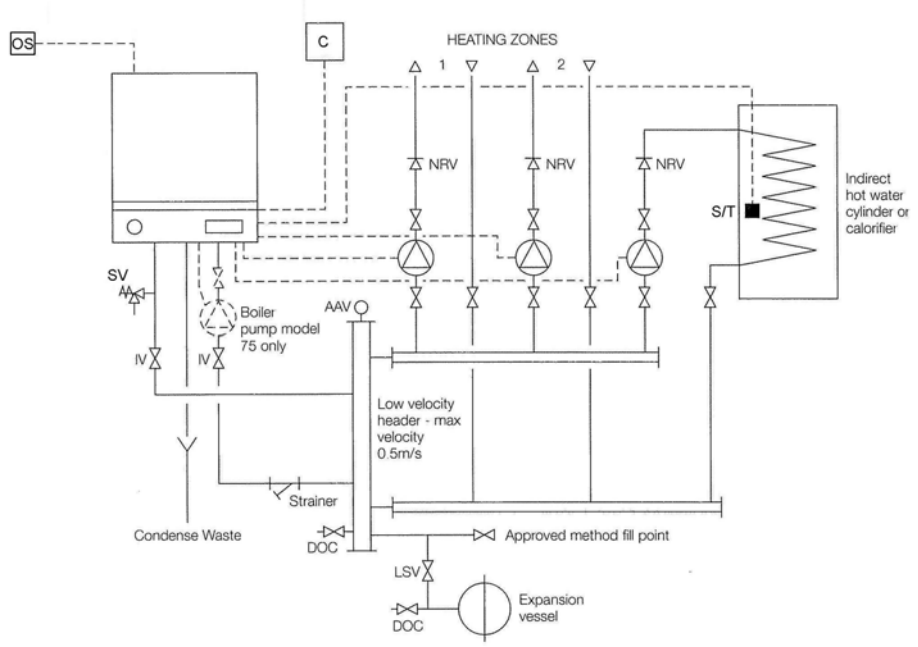
18.4 System Type 4.

Typical single Strata Streamline 16, 31, 47, & 75 boiler installation serving two heating zones and domestic hot water (priority) with individual charging pumps, using a low velocity mixing header. AGU2.500 Clip-In Module required.

Please note;

- ***The Strata Streamline16, 31 & 47 models include an internal pump and therefore an external boiler pump is not required.***
- ***The boiler pump on the Strata Streamline 75 must be wired to K2 (Terminals X02-03)***

Hydraulic Layout

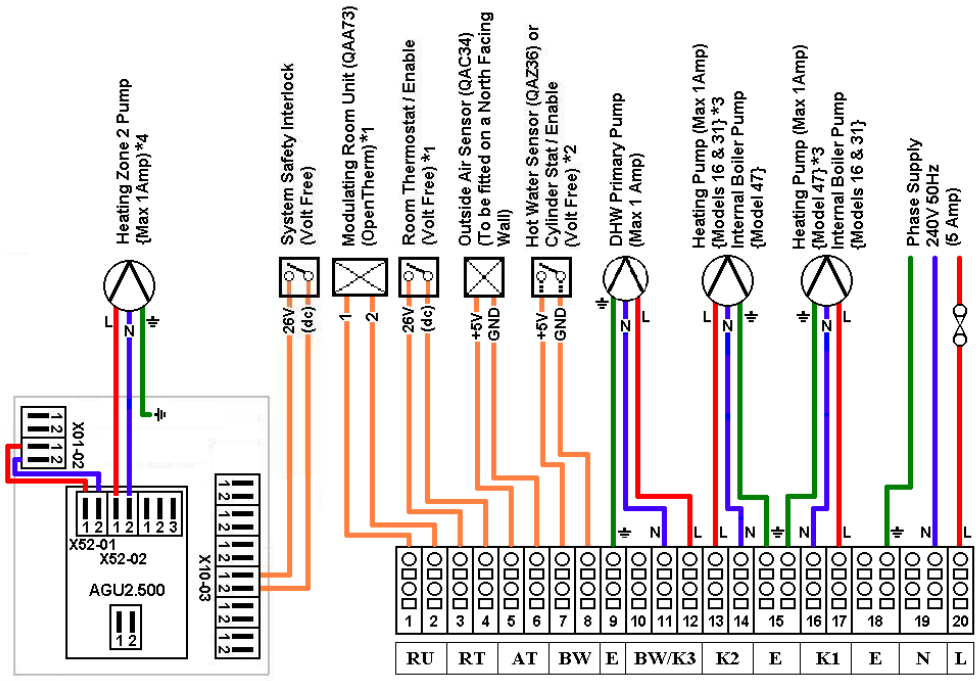


Legend

C	External Controller, either QAA73 Room Unit, or Volt Free Enable
OS	Outside Air Sensor (QAC34)
SV	Safety Valve.
IV	Isolation Valve
LSV	Lockable Service Valve.
S/T	Hot Water Sensor (QAZ36), or Volt Free Enable
CWM	Cold Water Main
DOC	Drain Off Cock

Fig 18.4a

Wiring Diagram for Models 16, 31 & 47



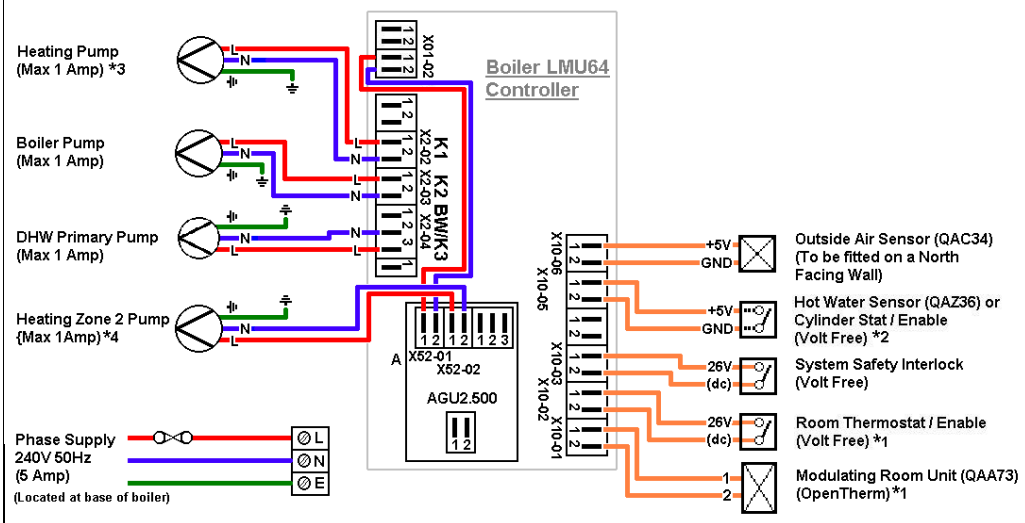
Notes

*1	Only fit one type of Room Temperature Control.
*2	Parameter Change may be required.
*3	Heating Zone 1
*4	Heating Zone 2, via AGU2.500 Clip-In Module.

Fig 18.4b

18.4 System Type 4 (cont'd)

Wiring Diagram for Model 75



Notes

- ***1** Only fit one type of Room Temperature Control.
- ***2** Parameter Change may be required.
- ***3** Heating Zone 1
- ***4** Heating Zone 2, via AGU2.500 Clip-In Module.

Fig 18.4c

Essential Parameter Changes Applicable to System Type 4.

Line ID	Description		Default Setting	New Setting for This System
H516	Summer/Winter Changer Over		18	30
H554 – b5	Heating Zone 2 Flow Sensor Present	*{0 = NO, 1 = YES}*	1	0
H587 – b6	HWS Charging Pump (Standing Operation) {16, 31}	*{0 = OFF, 1 = ON}*	0	1

Potential Parameter Changes Applicable to System Type 4.

Line ID	Description		Default Setting	New Setting for This System
H554 - b3	Weather Compensation / Constant Temperature.	*{0 = Constant Temp, 1 = Variable Temp}*	1	As Required
H558 – b2	HWS Production Control.	*{0 = Sensor (QAZ36), 1 = Volt Free Enable}*	0	As Required

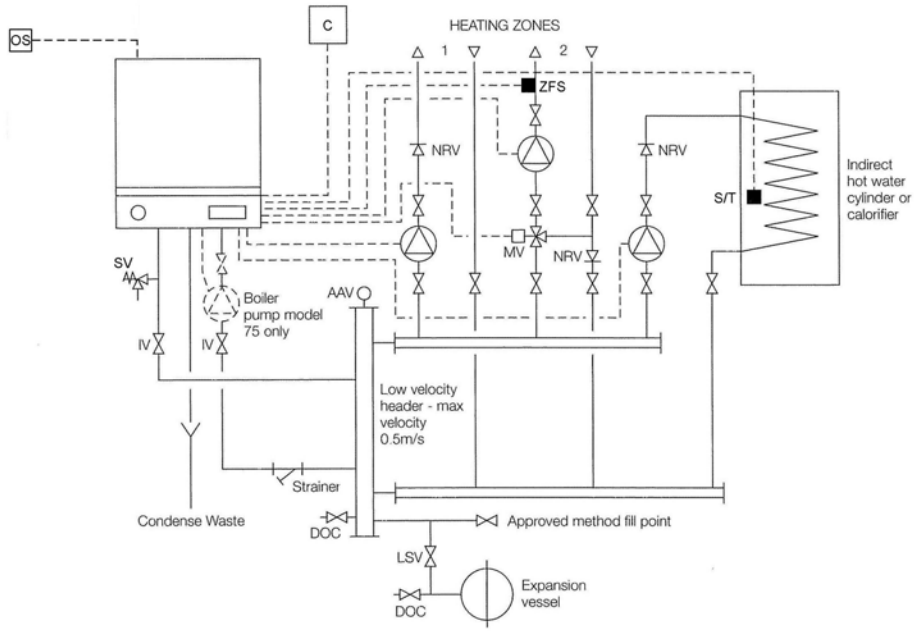
18.5 System Type 5

Typical single Strata Streamline 16, 31, 47, & 75 boiler installation utilizing an AGU2.500 Clip-In Module serving two heating zones, one with a mixing valve, and domestic hot water (priority) with individual charging pumps, using a low velocity mixing header. AGU2.500 Clip-In Module and QAD36 flow sensor required.

Please note;

- ***The Strata Streamline16, 31 & 47 models include an internal pump and therefore an external boiler pump is not required.***
- ***The boiler pump on the Strata Streamline 75 must be wired to K2 (Terminals X02-03)***

Hydraulic Layout

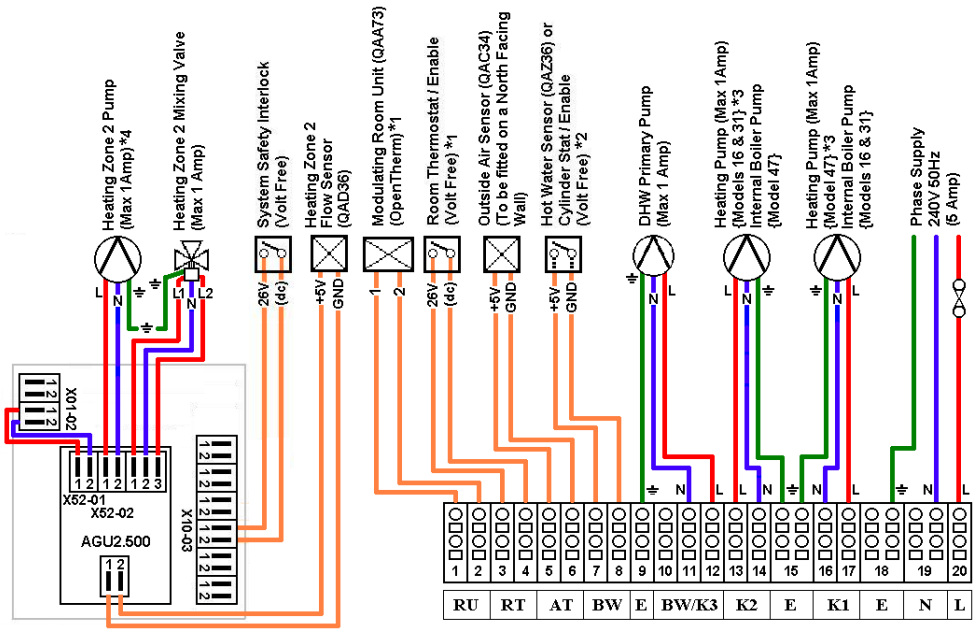


Legend

C	External Controller, either QAA73 Room Unit, or Volt Free Enable.
OS	Outside Air Sensor (QAC34)
SV	Safety Valve.
IV	Isolation Valve
LSV	Lockable Service Valve.
S/T	Hot Water Sensor (QAZ36), or Volt Free Enable.
CWM	Cold Water Main
DOC	Drain Off Cock
ZFS	Zone Flow Sensor (QAD36)

Fig 18.5a

Wiring Diagram for Models 16, 31 & 47



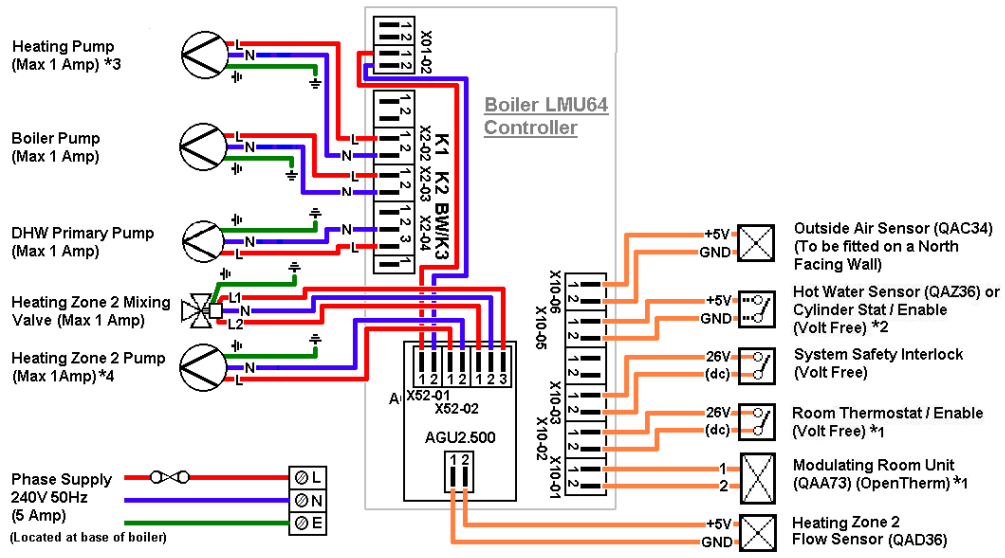
Notes

*1	Only fit one type of Room Temperature Control.
*2	Parameter Change may be required.
*3	Heating Zone 1
*4	Heating Zone 2, via AGU2.500 Clip-In Module.

Fig 18.5b

18.5 System Type 5 (cont'd)

Wiring Diagram for Model 75



Notes

*1 Only fit one type of Room Temperature Control.
*2 Parameter Change may be required.
*3 Heating Zone 1
*4 Heating Zone 2, via AGU2.500 Clip-In Module.

Fig 18.5c

Essential Parameter Changes Applicable to System Type 5.

Line ID	Description		Default Setting	New Setting for This System
H516	Summer/Winter Changer Over		18	30
H554 – b5	Heating Zone 2 Flow Sensor Present	*{0 = NO, 1 = YES}*	1	0
H587 – b6	HWS Charging Pump (Standing Operation) {16, 31}	*{0 = OFF, 1 = ON}*	0	1

Potential Parameter Changes Applicable to System Type 5.

Line ID	Description		Default Setting	New Setting for This System
H506	Minimum flow setpoint temperature Heating Zone 2 (20 °C<=TvSmin<=TvSmax)		25	As Required
H507	Maximum flow setpoint temperature Heating Zone 2 (TvSmin<=TvSmax<=90 °C)		90	As Required
H554 - b3	Weather Compensation / Constant Temperature.	*{0 = Constant Temp, 1 = Variable Temp}*	1	As Required
H558 – b2	HWS Production Control.	*{0 = Sensor (QAZ36), 1 = Volt Free Enable}*	0	As Required

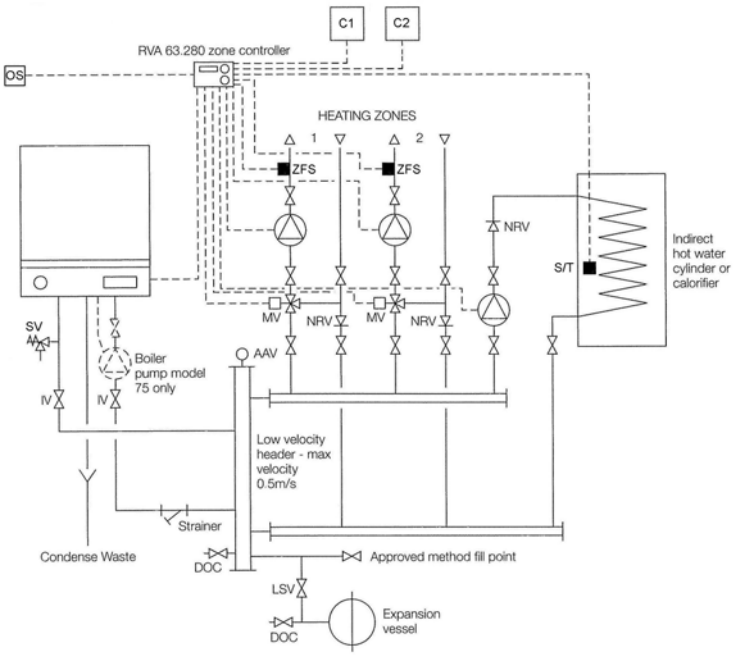
18.6 System Type 6.

Typical single Strata Streamline 16, 31, 47, & 75 boiler installation utilizing an RVA63 Controller serving two heating zones each with a mixing valve, and domestic hot water (priority) with individual charging pumps, using a low velocity mixing header. RVA63 Controller & Housing, 2 No QAD21/26 flow sensors, and an OCI420 Communication Clip-In Module required.

Please note;

- ***The Strata Streamline16, 31 & 47 models include an internal pump and therefore an external boiler pump is not required.***
- ***The boiler pump on the Strata Streamline 75 must be wired to K2 (Terminals X02-03)***

Hydraulic Layout



Legend

C1	Heating Zone 1 Temp Controller (either QAA73, QAA50 or QAA10) or Volt Free Enable
C2	Heating Zone 2 Temp Controller (either QAA73, QAA50 or QAA10) or Volt Free Enable
OS	Outside Air Sensor (QAC32) or 620Ω Resistor {Fitted to RVA63}
SV	Safety Valve.
IV	Isolation Valve
LSV	Lockable Service Valve.
S/T	Hot Water Sensor (QAZ21), or Volt Free Enable
CWM	Cold Water Main
DOC	Drain Off Cock
ZFS	Zone Flow Sensor (QAD21/26)

Fig 18.6a

Wiring Diagram for Models 16, 31 & 47

Notes

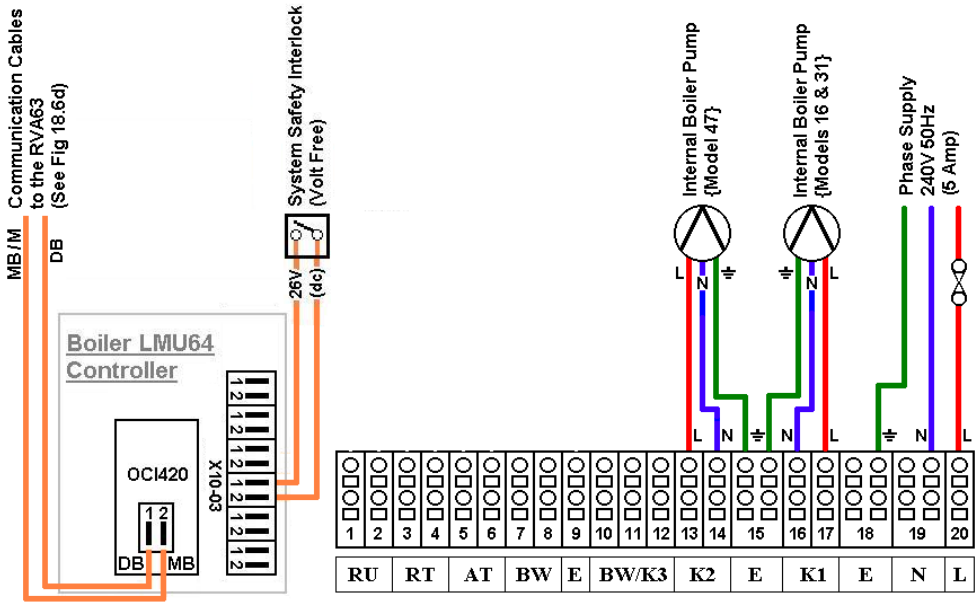


Fig 18.6b

18.6 System Type 6 (cont'd)

Wiring Diagram for Model 75

Notes

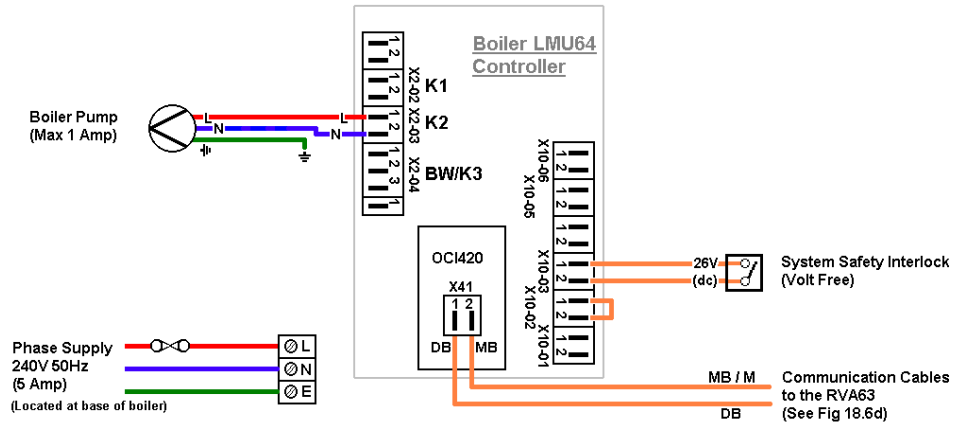
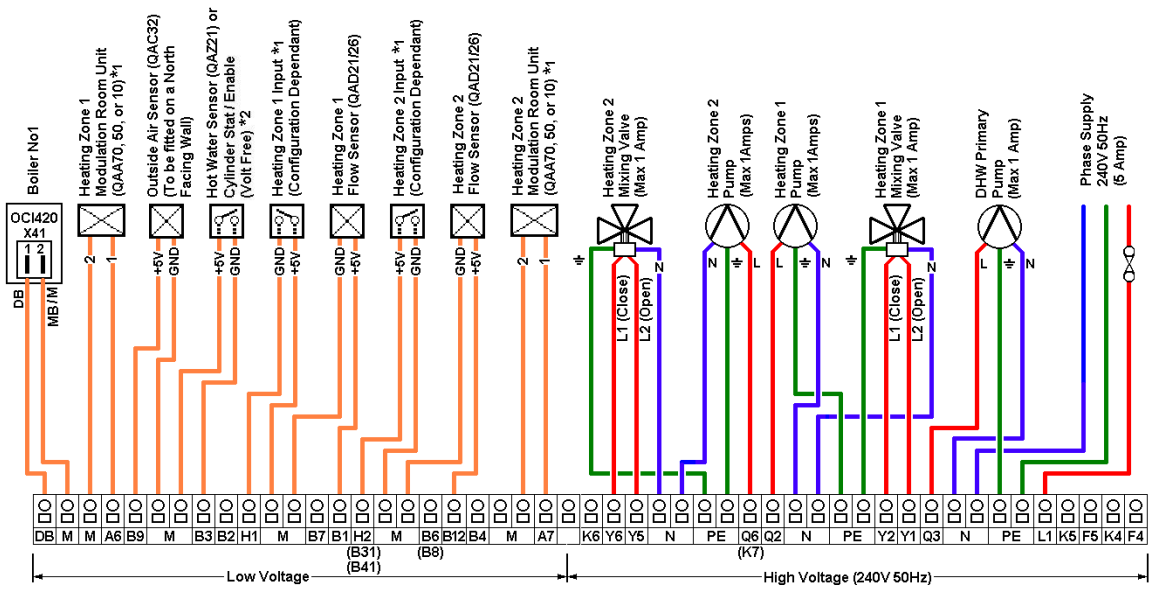


Fig 18.6c

Essential Boiler Parameter Changes Applicable to System Type 6.

Line ID	Description	Default Setting	New Setting for This System
H516	Summer/Winter Changer Over	18	30

Wiring Diagram for RVA63



Notes

*1 Only fit one type of Room Temperature Control. *2 Parameter Change may be required.

Fig 18.6d

Essential RVA63 Parameter Changes Applicable to System Type 6.

Line ID	Description	Default Setting	New Setting for This System
P29	Summer / Winter Cut-Off	18	30
P80	Type of Heat Source	2	0
P140	Control Device Address.	0	1
P141	Control Device Segment.	0	1
P148	Clock Aultomity	3	2

Potential RVA63 Parameter Changes Applicable to System Type 6.

Line ID	Description		Default Setting	New Setting for This System
P125	HWS Production Control.	*{0 = Sensor (QAZ36), 1 = Volt Free Stat}*	0	1

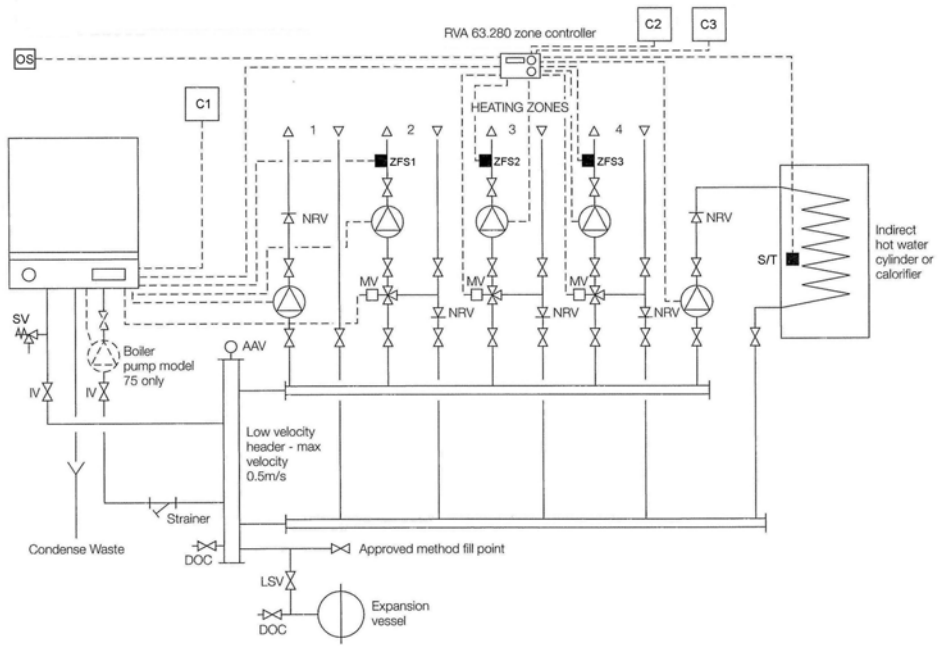
18.7 System Type 7.

Typical single Strata Streamline 16, 31, 47, & 75 boiler installation utilizing an AGU2.500 Clip-In Module and an RVA63 Controller serving four heating zones, three of which having mixing valves, and domestic hot water (priority) with individual charging pumps, using a low velocity mixing header. RVA63 Controller & Housing, 2 No QAD21/26 flow sensors, an AGU2.500 Clip-In Module, a QAD36 flow sensor, and an OCI420 Communication Clip-In Module required.

Please note;

- ***The Strata Streamline16, 31 & 47 models include an internal pump and therefore an external boiler pump is not required.***
- ***The boiler pump on the Strata Streamline 75 must be wired to K2 (Terminals X02-03)***

Hydraulic Layout

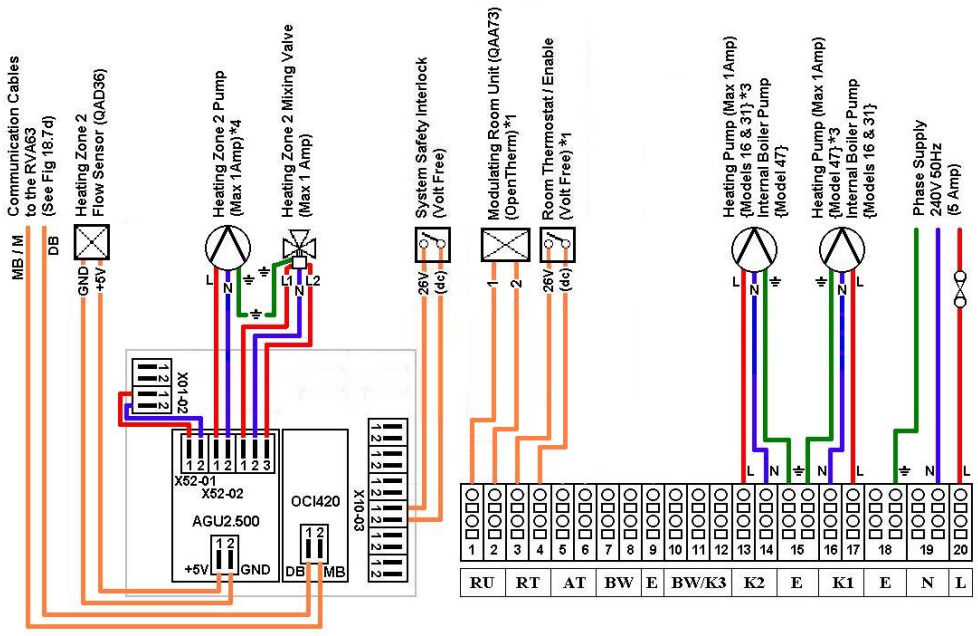


Legend

C1	Heating Zone 1 & 2 Temp Controller (QAA73) or Volt Free Enable
C2 & 3	Heating Zone 3 & 4 Temp Controllers (1 Per Zone required either QAA73, QAA50 or QAA10) or Volt free Enable
OS	Outside Air Sensor (QAC32) or 620Ω Resistor {Fitted to RVA63}
SV	Safety Valve.
IV	Isolation Valve
LSV	Lockable Service Valve.
S/T	Hot Water Sensor (QAZ21), or Volt Free Enable
CWM	Cold Water Main
DOC	Drain Off Cock
ZFS1	Zone 1 Flow Sensor (QAD36)
ZFS2	Zone 2 & 3 Flow Sensor
ZFS3	(QAD21/26)

Fig 18.7a

Wiring Diagram for Models 16, 31 & 47



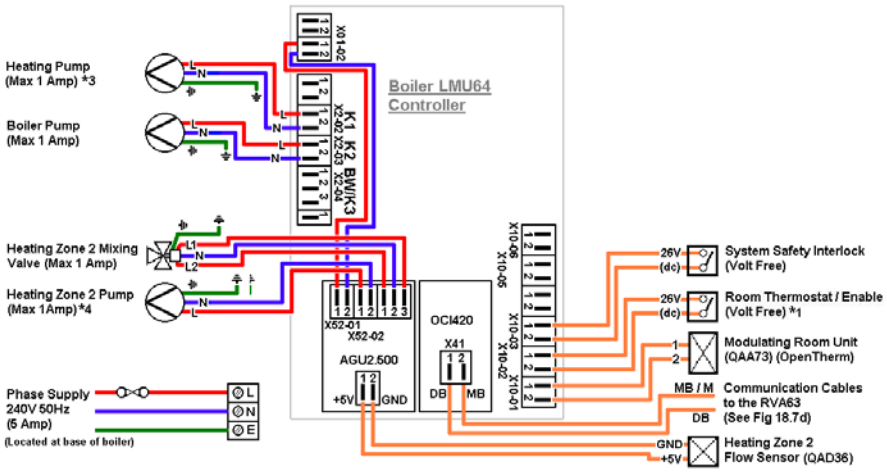
Notes

***1**	Only fit one type of Room Temperature Control.
***2**	Parameter Change may be required.
***3**	Heating Zone 1
***4**	Heating Zone 2, via AGU2.500 Clip-In Module.

Fig 18.7b

18.7 System Type 7 (cont'd)

Wiring Diagram for Model 75



Notes

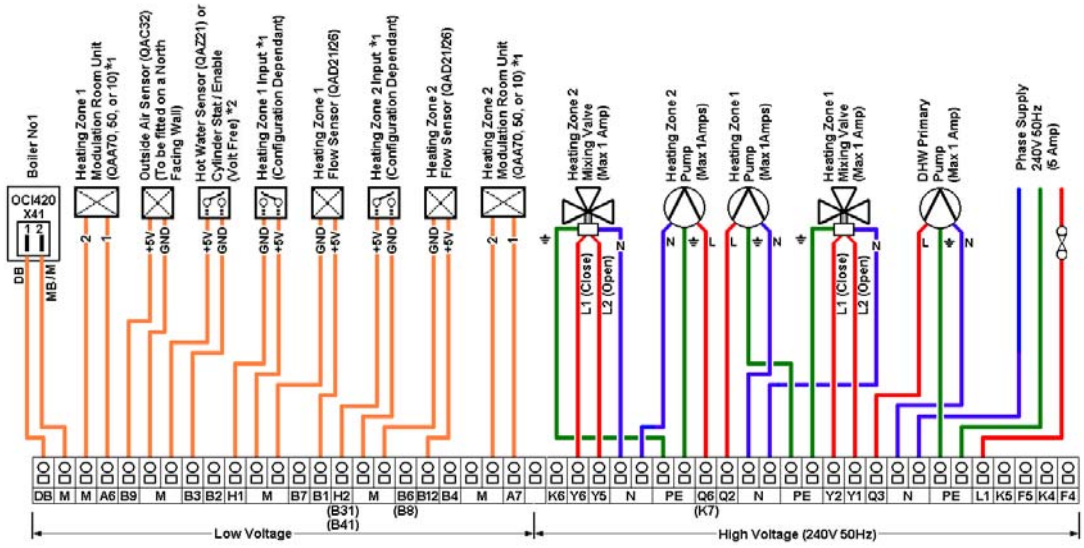
*1 Only fit one type of Room Temperature Control.
*2 Parameter Change may be required.
*3 Heating Zone 1
*4 Heating Zone 2, via AGU2.500 Clip-In Module.

Fig 18.7c

Essential Boiler Parameter Changes Applicable to System Type 8.

Line ID	Description	Default Setting	New Setting for This System
H516	Summer/Winter Changer Over	18	30

Wiring Diagram for RVA63



Notes

*1 Only fit one type of Room Temperature Control. *2 Parameter Change may be required.

Fig 18.7d

Essential RVA63 Parameter Changes Applicable to System Type 6.

Line ID	Description		Default Setting	New Setting for This System
P29	Summer / Winter Cut-Off		18	30
P80	Type of Heat Source		2	0
P125	HWS Production Control.	*{0 = Sensor (QAZ36), 1 = Volt Free Enable}*	0	1
P140	Control Device Address.		0	1
P141	Control Device Segment.		0	1
P148	Clock Aultomity		3	2

Potential RVA63 Parameter Changes Applicable to System Type 6.

Line ID	Description		Default Setting	New Setting for This System
P125	HWS Production Control.	*{0 = Sensor (QAZ36), 1 = Volt Free Stat}*	0	1

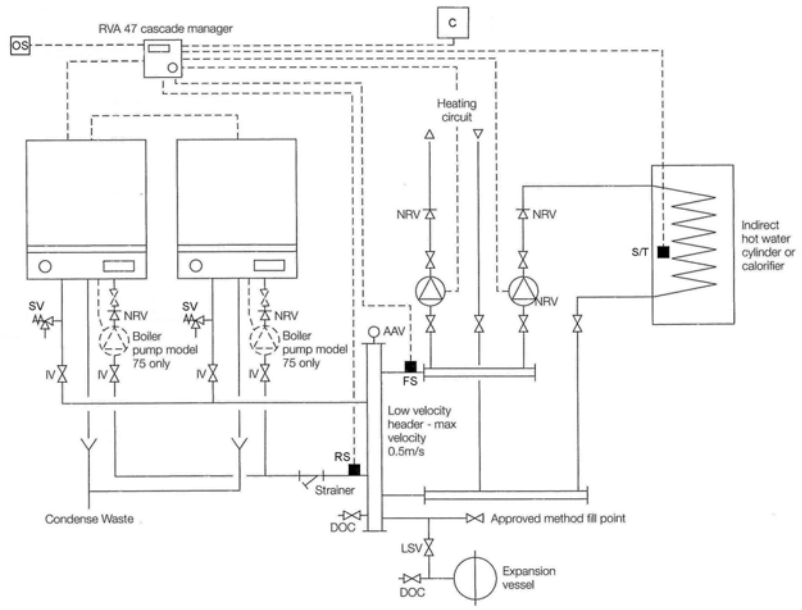
18.8 System Type 8

Typical multiple Strata Streamline 16, 31, 47, & 75 boiler installation utilizing an RVA47 Cascade Manager serving a heating and domestic hot water with individual charging pumps, using a low velocity mixing header. RVA47 Controller & Housing (complete with 2 No QAD21/26 sensors), and OCI420 Communication Clip-In Modules (1 per boiler) required.

Please note;

- ***The Strata Streamline16, 31 & 47 models include an internal pump and therefore an external boiler pump is not required.***
- ***The wiring of the internal pump on the Strata Streamline 47 MUST be relocated from K2 (Terminals 13 & 14) to K1 (Terminals 16 & 17)***
- ***The boiler pump on the Strata Streamline 75 must be wired to K1 (Terminals X02-02)***

Hydraulic Layout



Legend

C	External Controller, (either QAA70, QAA50, QAA10) Room Unit, or Volt Free Enable.
OS	Outside Air Sensor (QAC32) or 620Ω Resistor {Fitted to RVA47}
SV	Safety Valve.
IV	Isolation Valve
LSV	Lockable Service Valve.
S/T	Hot Water Sensor (QAZ21), or Volt Free Enable
CWM	Cold Water Main
DOC	Drain Off Cock
NRV	Non-Return Valve
RVA47	Cascade Manager
FS	Flow Sensor (QAD21/26)
RS	Return Sensor (QAD21/26)

Fig 18.8a

Wiring Diagram for Models 16, 31 & 47

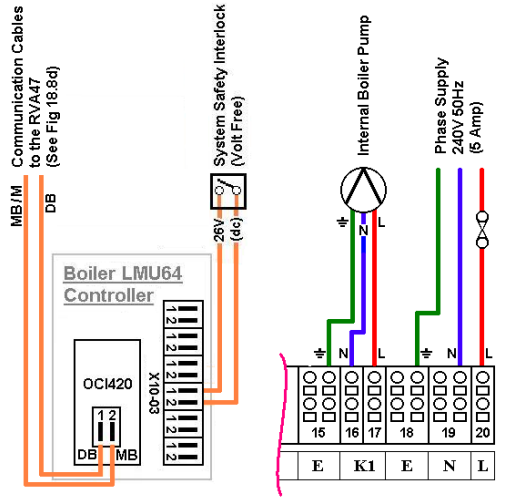


Fig 18.8b

Wiring Diagram for Model 75

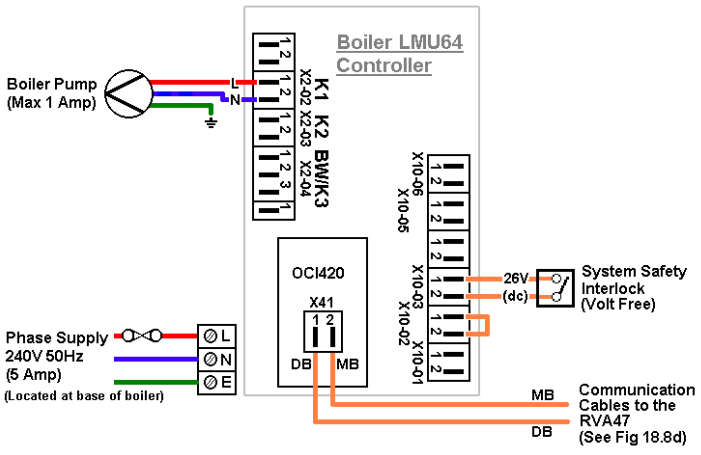


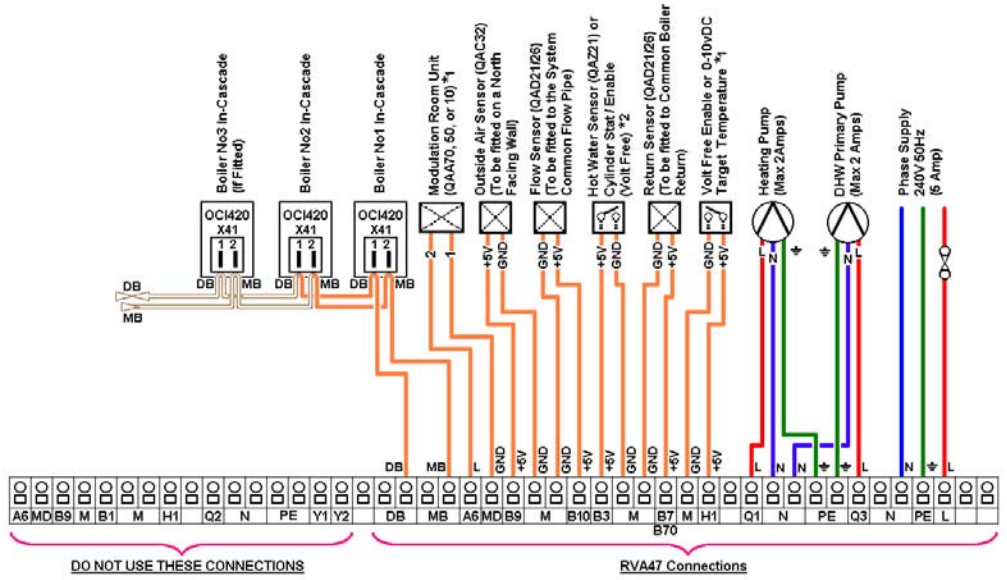
Fig 18.8c

Essential Boiler Parameter Changes Applicable to System Type 8.

Line ID	Description	Default Setting	New Setting for This System
H516	Summer/Winter Changer Over	18	30
H552	Hydraulic System Configuration	66 {47 & 75} 67 {16 & 31}	80
H605	Boiler Numbering In Cascade *{2 = Boiler No1, 3 = Boiler No2, 4 = Boiler No3, ……13 = Boiler No12}*	1	2 - 13

18.8 System Type 8 (cont'd)

Wiring Diagram for RVA47



Notes

*1 Only fit one type of Room Temperature Control.

*2 Parameter Change may be required.

Fig 18.8d

Essential RVA47 Parameter Changes Applicable to System Type 8.

Line ID	Description	Default Setting	New Setting for This System
P16	Summer / Winter Cut-Off	18	20

Potential RVA47 Parameter Changes Applicable to System Type 8.

Line ID	Description	Default Setting	New Setting for This System
P125	HWS Production Control. *{0 = Sensor (QAZ21), 1 = Volt Free Enable}*	0	1

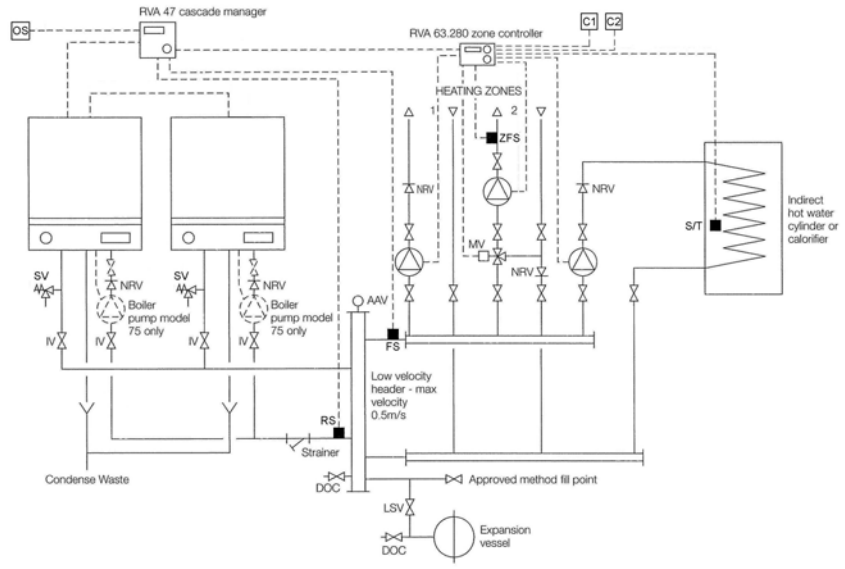
18.9 System Type 9

Typical multiple Strata Streamline 16, 31, 47, & 75 boiler installation utilizing an RVA47 Cascade Manager and a RVA63 Controller, two heating zones, one of which having mixing valves, and domestic hot water with individual charging pumps, using a low velocity mixing header. RVA63 Controller & Housing, an RVA47 Controller & Housing, 3 No QAD21/26 flow sensors, and OCI420 Communication Clip-In Modules (1 per boiler) required.

Please note;

- ***The Strata Streamline16, 31 & 47 models include an internal pump and therefore an external boiler pump is not required.***
- ***The wiring of the internal pump on the Strata Streamline 47 MUST be relocated from K2 (Terminals 13 & 14) to K1 (Terminals 16 & 17)***
- ***The boiler pump on the Strata Streamline 75 must be wired to K1 (Terminals X02-02)***

Hydraulic Layout



Legend

C1 & 2	Heating Zone 1 & 2 Temp Controllers (1 Per Zone required either QAA70, QAA50 or QAA10) or Volt Free Enable.
OS	Outside Air Sensor (QAC32) or 620Ω Resistor {Fitted to RVA47}
SV	Safety Valve.
IV	Isolation Valve
LSV	Lockable Service Valve.
S/T	Hot Water Sensor (QAZ21), or Volt Free Enable
CWM	Cold Water Main
DOC	Drain Off Cock
NRV	Non-Return Valve
RVA47	Kascade Manager
FS	Flow Sensor (QAD21/26)
RS	Return Sensor (QAD21/26)
ZFS	Zone Flow Sensor (QAD21)

Fig 18.9a

Wiring Diagram for Models 16, 31 & 47

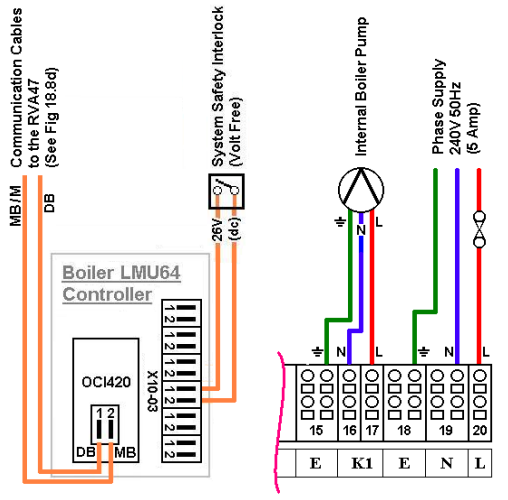


Fig 18.9b

Wiring Diagram for Model 75

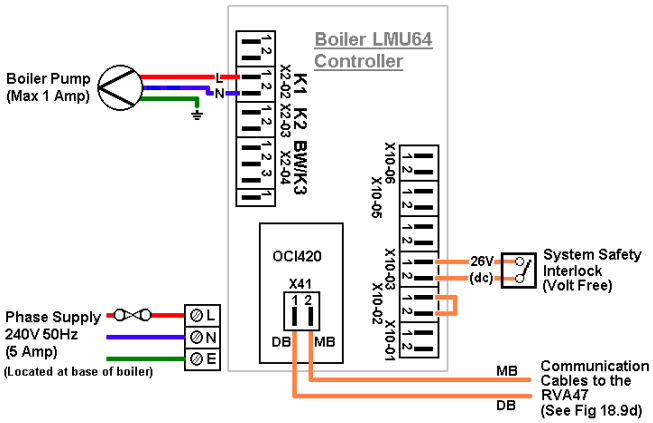


Fig 18.9c

Essential Boiler Parameter Changes Applicable to System Type 9.

Line ID	Description	Default Setting	New Setting for This System
H516	Summer/Winter Changer Over	18	30
H552	Hydraulic System Configuration	66 {47 & 75} 67 {16 & 31}	80
H605	Boiler Numbering In Cascade *{2 = Boiler No1, 3 = Boiler No2, 4 = Boiler No3, ……13 = Boiler No12}*	1	2 - 13

18.9 System Type 9 (cont'd)

Wiring Diagram for RVA47

Notes

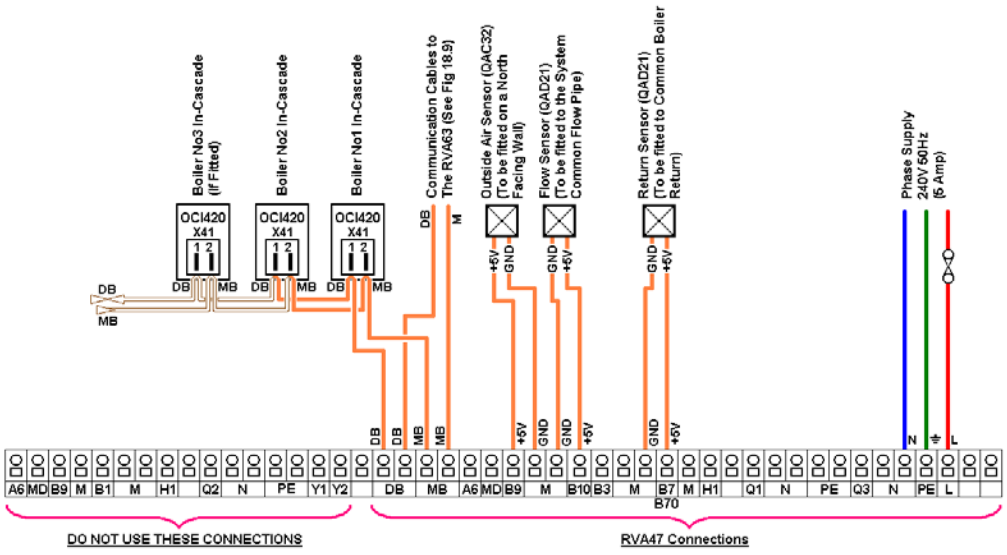
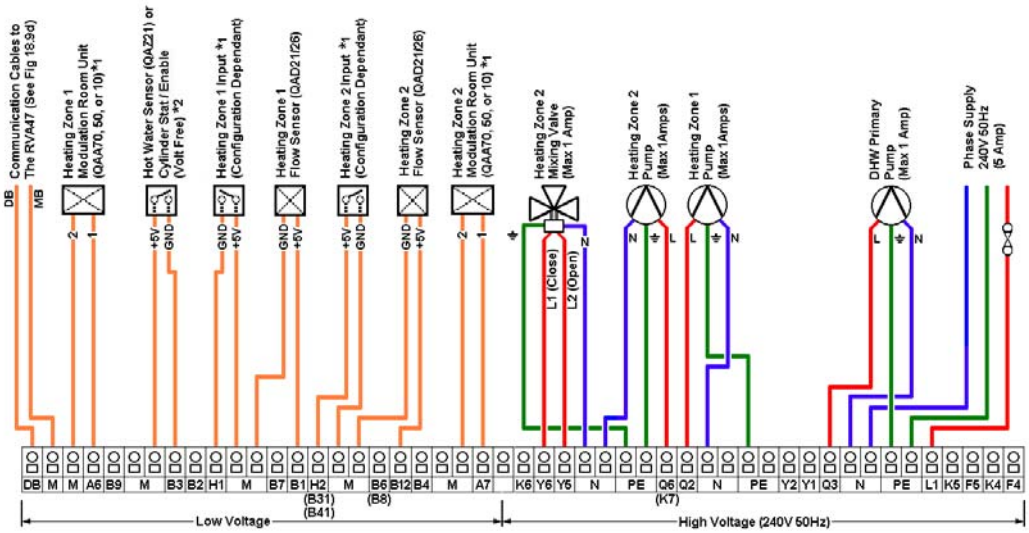


Fig 18.9d

Essential RVA47 Parameter Changes Applicable to System Type 9.

Line ID	Description	Default Setting	New Setting for This System
P16	Summer / Winter Cut-Off	18	30

Wiring Diagram for RVA63



Notes

***1** Only fit one type of Room Temperature Control. ***2** Parameter Change may be required.

Fig 18.9e

Essential RVA63 Parameter Changes Applicable to System Type 6.

Line ID	Description	Default Setting	New Setting for This System
P29	Summer / Winter Cut-Off	18	30
P80	Type of Heat Source	2	0
P140	Control Device Address.	0	1
P141	Control Device Segment.	0	1
P148	Clock Aultomity	3	2

Potential RVA63 Parameter Changes Applicable to System Type 6.

Line ID	Description		Default Setting	New Setting for This System
P125	HWS Production Control.	*{0 = Sensor (QAZ36), 1 = Volt Free Stat}*	0	1

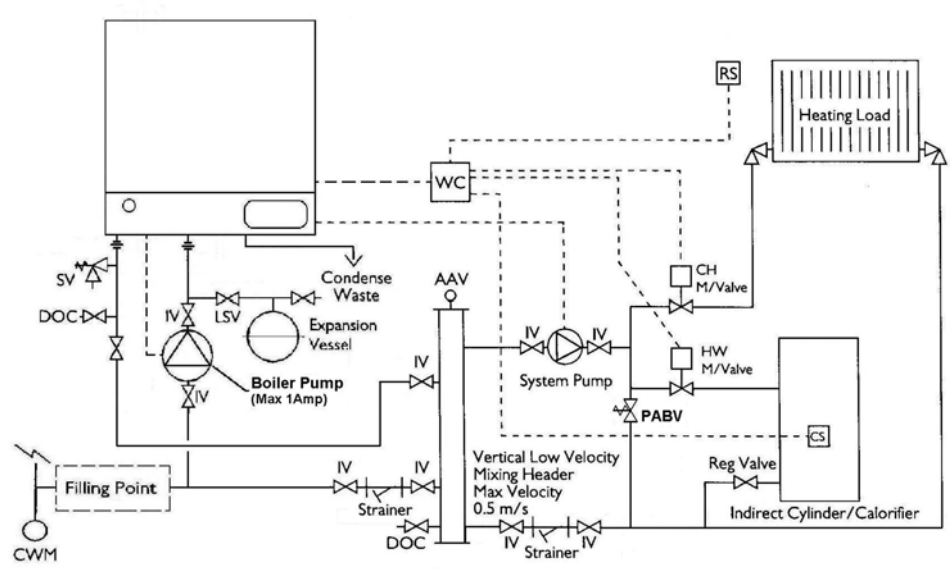
18.10 System Type 10

Typical single Strata Streamline 16, 31, 47, & 75 boiler installation serving domestic hot water and heating systems using a low velocity mixing header, single primary pump and two number 2 Port Valves with conventional controllers. Typical 'S' Plan system.

Please note;

- ***The Strata Streamline16, 31 & 47 models include an internal pump and therefore an external boiler pump is not required.***
- ***The boiler pump on the Strata Streamline 75 must be wired to K2 (Terminals X02-03)***

Hydraulic Layout



Legend

CS	Cylinder Thermostat
CWM	Cold Water Main
DOC	Drain Off Cock
IV	Isolation Valve
LSV	Lockable Service Valve.
PABV	Pressure Activated By-Pass Valve
RS	Room Thermostat
SV	Safety Valve.
WC	Wiring Centre

NOTE

This system can only be operated at Constant HIGH temperature.

Fig 18.10a

Wiring Diagram for Models 16, 31 & 47

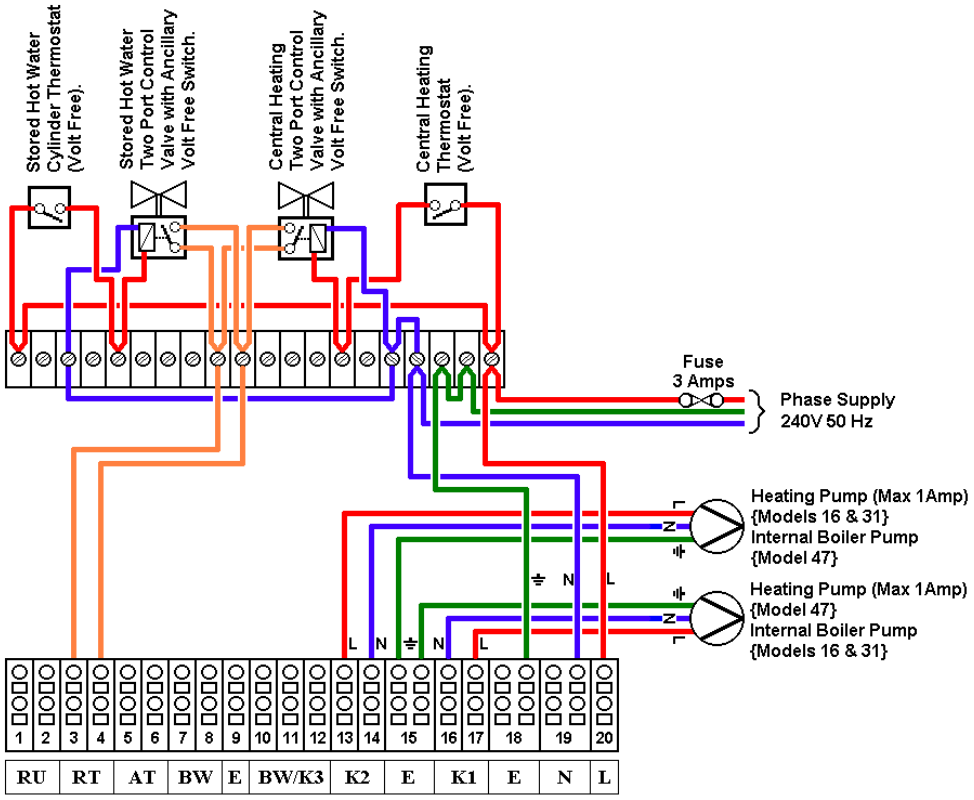


Fig 18.10b

18.10 System Type 10 (cont'd)

Wiring Diagram for Model 75

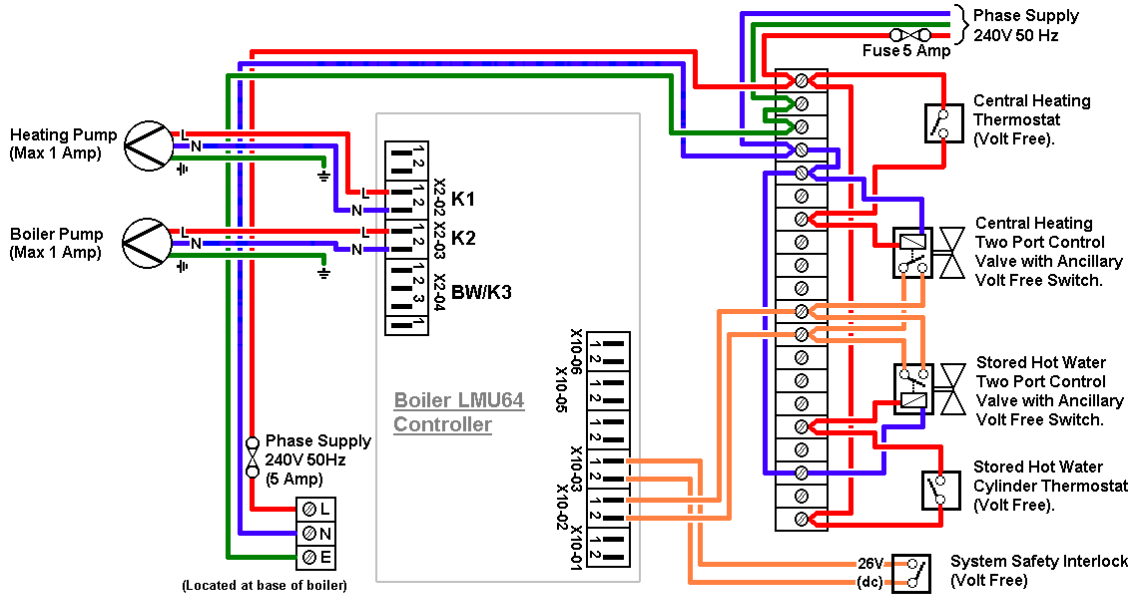


Fig 18.10c

Essential Parameter Changes Applicable to System Type 10.

Line ID	Description	Default Setting	New Setting for This System
H 554 - b3	Weather Compensation / Constant Temperature. *{0 = Constant Temp, 1 = Variable Temp}*	1	0

19.0 Commissioning

The Strata Streamline MUST be commissioned by a competent engineer who will need, in addition to standard hand tools, a U-Tube or Digital manometer and a combustion analyser.

Before attempting to set the Strata Streamline to work, the following check list must be worked through. See Section 19.1

19.1 Pre-commissioning Checks

- Ensure the entire system has been thoroughly cleansed and flushed, any strainers have been cleaned and that the appropriate water treatment has been added to the system to prevent corrosion, scale formation, etc.
  Failure to comply with this will render all appliance warrantee's VOID!
- Ensure the entire system and boiler has been properly flooded and vented of air, and the cold fill pressure at the boiler is at minimum 1.0 bar. Manual air vents are provided on the top of the primary heat exchanger to ensure that the heat exchanger is fully flooded.
- Check that the boiler pump is free to rotate by removing the vent screw in the end of the pump motor and check that the impeller shaft rotates freely when turned with an appropriate sized screwdriver. Replace vent screw. ***Please note***, it is advisable to place a rag/cloth directly below the pump, as a small amount of water will be released from the pump when the vent cap is removed, this is normal.
- Ensure the appliance installed is the correct configuration for the type of gas fuel available on the site. As standard the boilers are supplied suitable for Natural Gas. If the boiler is required to operate on LPG gas fuel see section 19.2.
- Ensure the entire gas supply pipework has been purged, and there is the availability of a working inlet pressure of nominal 20 mbar (Natural Gas), of 37 mbar (LPG).
- Check that the flue installation has been properly connected and tested.
- Check that the condense waste pipework *(Plastic or Stainless Steel – Copper tube is not acceptable)* has been connected to the boiler and that the syphon cleaning point cap is in place.
- Where the appliance is taking air for combustion from the room/enclosure in which it is installed, ensure that an adequate provision of ventilation has been provided.
- Ensure that there is an adequate heat load available.
- Ensure that all electrical connections have been made correctly, tested, and that the polarity is correct.

19.2 LPG Conversion Procedure

The Strata Streamline boilers is supplied as standard suitable for Natural Gas (G20) fuel, the boiler can be converted to operate on Liquefied Petroleum Gas (G31 – Propane).

A conversion kit is available from MHS Boilers, Part Number as listed below, and only the parts supplied in this conversion kits are to be used.

The following procedure details the works required to convert a Strata Streamline boiler to LPG fuel gas.

The LPG injector must be installed into the outlet of the gas valve in place of the existing Natural Gas injector.

Utilizing a flue gas analyser the gas valve must be adjusted to give the following emissions.

High Fire 10.5% CO_2.
Low Fire 11.0% CO_2.

See Section 21.0, for instructions on how to adjust the gas valve..

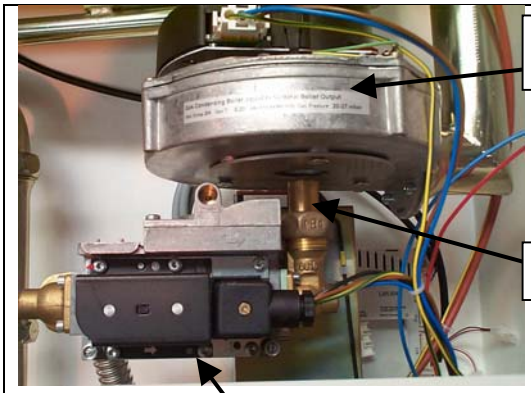


Fig 17.2
Streamline 75 Illustrated Only

	16H	31H	47H	75H
LPG Injector Size (mm)	3.5mmØ	6mmØ	7mmØ	10mmØ
Part Number	Z852003108	Z852003109	Z852003110	Z852003107
Natural Gas Injector Size (mm)	4mmØ	10mmØ	12mmØ	15mmØ
Part Number	Z852003114	Z852003115	Z852003116	Z852003112

20.0 Control Panel

The control panel for the Strata Streamline boilers includes a double pole ON/OFF switch and comprehensive information display screen and adjustment buttons.

On the Left Hand side of the boiler front is a system water pressure gauge,

The Boilers' LMU64 controller has various levels of control options and adjustments are made via the units display screen.

Fig 20.0

Standard Features Include.

- General Operation Information.
- Boiler Status - Flow temperature, etc.
- Operating Mode - Standby, Auto, HWS only, etc.
- Commissioning Mode - Low fire, High fire.
- Boiler Lockout Reset.
- Operating Parameter Review - Comfort levels.
- Operating Parameter Adjustment - Comfort levels.
- Operating Parameter Review - Combustion, Modulation, Pumping, etc.
- Engineers' Level (via password) - Operating Parameter adjustment.

20.1 Boiler LMU64 Controller

The Strata Streamline 16, 31, 47, & 75 boiler utilizes the Siemen's LMU64 boiler controller; this controller has undergone a number of software updates.

To ensure you are using the correct reference document, the software number must be retrieved from the controller. The software numbers are indicated on the display of the controller for 3 second immediately after the power has been turned ON.

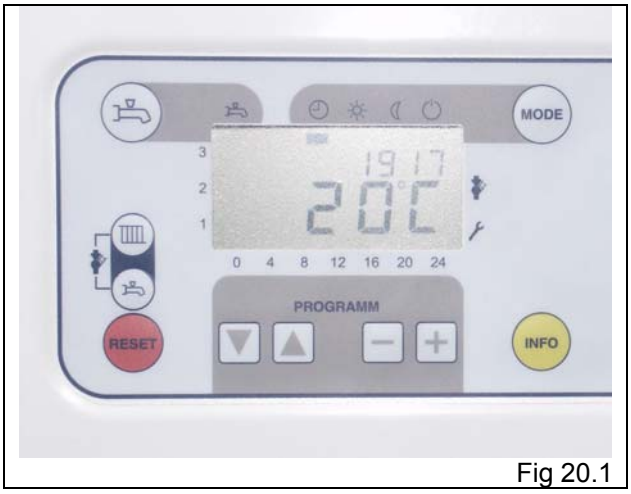


Fig 20.1

The large figures indicate the LMU64 Controller version (i.e. 3.00), where as the smaller figure indicate the AGU Display Panel version (i,e, 2.01)

This manual refers to the Version 3.00 ONLY. Instructions for the version 2.07 and 2.08 are available from MHS Boilers Literature Department.

The controller display is multifunctional, and controls both the safety functions of the boiler, as well as the daily operating functions, such as Heating and Hot Water time control.

The controller can also be connected to a matched room temperature controller, the QAA73, which offers more control functions. Please refer to instructions supplied with the QAA73 for programming instructions.

20.2 Controller Display

The Boiler controller has various levels of access, this section relates to understanding the controller fascia, display symbols and buttons.

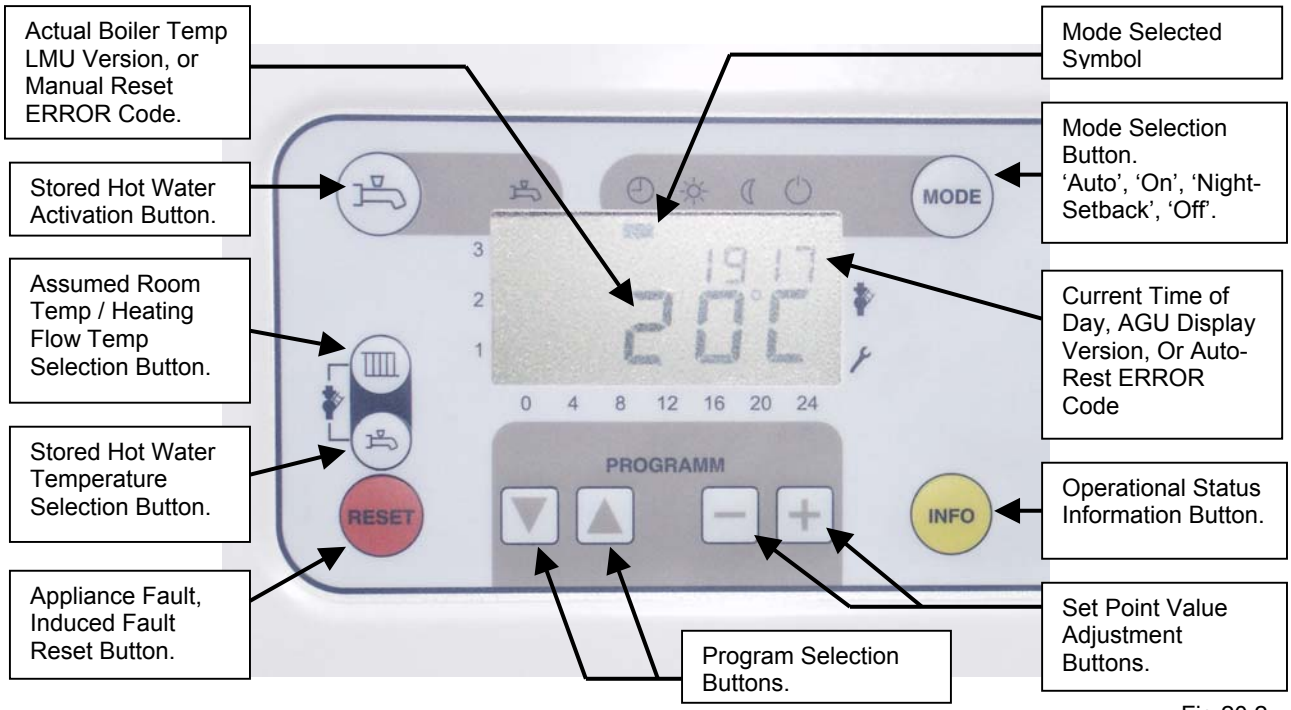


Fig 20.2

The following table lists the controller buttons with a description of the buttons use.

Button	No of Presses	Description	Options / Range	Recommended Setting
MODE	1 - 4	Mode of Operation. 'Automatic', 'Constant', 'Night Set-Back', 'OFF, frost control'. (Cursor under symbol dictates mode selected).		Automatic (Cursor under Clock Symbol).
INFO	1	Actual Boiler Flow temperature.	Review Only	Review Only
	2	Actual Stored Hot Water.	Review Only	Review Only
	3	Not Used	Not Used	Not Used
	4	Boiler Operation Function Number.	Review Only	Review Only
	5	Actual Outside Air Temperature	Review Only	Review Only
	6	Fault Code Indication.	E-00…..E-999	Review Only
		For access of the control programs, Day, Time, etc.	Various, See Program Listings, on next page.	
RESET	1	Full System Reset following a Fault, or Customer Induced fault E153.	N/A	N/A
	1	Maximum Heating Temperature, or Assumed Room Temperature *{If Outside Air Sensor (QAC34) has been installed}*	20 - 85ºC or 10 - 30ºC	80ºC or 20ºC
	1	Stored Hot Water Target Temperature. *{If HWS Sensor (QAZ21) has been installed}*	20 - 60ºC	55ºC
	1	Hot Water Selection On/Off. *{Only available if HWS Sensor (QAZ21) connected, or Volt Free Stat is in Demand position}*.		On (Cursor under symbol under TAP Symbol).

20.3 Level One Parameters Review and Alternation

A limited number of (Customer) parameter levels are available via the control panel, these parameters are as listed in table below, and can be accessed by using the ▲ & ▼ Program Buttons.

Button	Line ID Number	Description	Options / Range	Recommended Default
▲	P 1	Current Time of Day.	00:00 – 24:00	Actual Time.
▲	P 2	Day Number Selection *{1 = Mon, 2 = Tues, 3 = Wed, … …7 = Sun*	1 - 7	Actual Day
▲	P 5	Night Set-Back Temperature *{with QAC34 fitted}* , or Boiler Minimum Temperature. *{Outside Air Sensor (QAC34) Dependant}*	4…..35ºC 20 - 85ºC	20ºC 16ºC
▲	P 10	Time Switch Day Selection – Heating Zone 1 *{1 = Mon, 2 = Tues, 3 = Wed, … …7 = Sun}*	1 - 7	-
▲	P 11	Time Switch Heating Zone 1 First ON	00:00 – 24:00	06:00
▲	P 12	Time Switch Heating Zone 1 First OFF	00:00 – 24:00	22:00
▲	P 13	Time Switch Heating Zone 1 Second ON	00:00 – 24:00	--:--
▲	P 14	Time Switch Heating Zone 1 Second OFF	00:00 – 24:00	--:--
▲	P 15	Time Switch Heating Zone 1 Third ON	00:00 – 24:00	--:--
▲	P 16	Time Switch Heating Zone 1 Third OFF	00:00 – 24:00	--:--
▲	P 20	Time Switch Day Selection – Heating Zone 2 *{1 = Mon, 2 = Tues, 3 = Wed, … …7 = Sun}*	1 - 7	-
▲	P 21	Time Switch Heating Zone 2 First ON	00:00 – 24:00	06:00
▲	P 22	Time Switch Heating Zone 2 First OFF	00:00 – 24:00	22:00
▲	P 23	Time Switch Heating Zone 2 Second ON	00:00 – 24:00	--:--
▲	P 24	Time Switch Heating Zone 2 Second OFF	00:00 – 24:00	--:--
▲	P 25	Time Switch Heating Zone 2 Third ON	00:00 – 24:00	--:--
▲	P 26	Time Switch Heating Zone 2 Third OFF	00:00 – 24:00	--:--
▲	P 30	Time Switch Day Selection – Hot Water *{1 = Mon, 2 = Tues, 3 = Wed, … …7 = Sun}*	1 - 7	-
▲	P 31	Time Switch Hot Water First ON	00:00 – 24:00	06:00
▲	P 32	Time Switch Hot Water First OFF	00:00 – 24:00	22:00
▲	P 33	Time Switch Hot Water Second ON	00:00 – 24:00	--:--
▲	P 34	Time Switch Hot Water Second OFF	00:00 – 24:00	--:--
▲	P 35	Time Switch Hot Water Zone 1 Third ON	00:00 – 24:00	--:--
▲	P 36	Time Switch Hot Water Zone 1 Third OFF	00:00 – 24:00	--:--
▲	P 45	Time Switch - Reset to Default *{1 = Press +&- buttons for 3 Seconds}*	0 - 1	0
▲	P 516	Summer / Winter Change Over Temperature	8…..30ºC	20
▲	P 727	Detailed Diagnostic Code	-	As Displayed

20.4 LMU64 Controller, Fault Indication

If the boiler fails to operate correctly the unit will 'Lockout' and require manual intervention to reset the controller. On the LCD display will appear in the bottom 'Left-Hand' corner, and a LARGE ERROR code will be displayed.

If more than one error has occurred, these can be displayed by pressing the 'INFO' button. These error messages can be referenced against the table below. To reset the boiler, simply press the 'RESET' button.

Please Note;

- ***Prior to pressing the RESET Button, please make a note of this number as it will assist a member of the Technical Services Department within the MHS Group to diagnose the fault, and if required, advise on a remedial action required.***
- ***Pressing the RESET Button when a LARGE ERROR code IS NOT displayed will induce an E153 fault.***

Fault Code	See Notes	Description
E-0		No Error Detected.
E-10	*1	Outside Air Sensor Fault / Not Detected.
E-20	*1	Flow Water Sensor Fault / Not Detected.
E-28	*1	Flue Gas Sensor Fault /Not Detected.
E-40	*1	Return Water Sensor Fault / Not Detected.
E-46	*1	System Return Water Sensor Fault / Not Detected.
E-50	*1 *3	HWS Sensor Short Circuit 1 *{Check parameter if Volt Free Enable is being used}*
E-52	*1	HWS Sensor Short Circuit 2 (Not Used)
E-58	*1	HWS Volt Free Enable Fault Not Detected.
E-60	*1	Faulty Room Sensor (QAA73).
E-61	*1	Incorrect Room Unit Fitted.
E-62	*1	Incorrect Room Unit Fitted.
E-77		Water Pressure Sensor Not Detected. (Not Used)
E-78		Water Pressure Sensor Defective. (Not Used)
E-81	*1	LPB Short Circuit *{When Using OCI420 Clip & an RVA Controller}*
E-82	*1	LPB Address Conflict *{When Using OCI420 Clip & an RVA Controller}*
E-86	*1	Short Circuit in PPS Connection. *{When Using OCI420 Clip & an RVA Controller}*
E-91		EEPROM Error. Internal LUM Fault
E-92		Hardware Malfunction. (Potential PCB Overload)
E-100	*1 *3	Conflict between Time/Day Master Controller (Boiler/QAA73/RVA47…etc..).
E-105		Annual Service / Inspection Overdue *{Unit has operated for more than 12 months}*
E-110		Boiler Water Temperature Overheat / Internal Fuse Blown, X03-03 Wiring Error
E-111	*1	Boiler Temperature Currently Too High
E 113	*1	Flue Gas Temperature Currently Too High
E 117		High System Water Pressure Sensor. (Not Used)
E-118		Low System Water Pressure Sensor. (Not Used)
E 119	*1	System Water Pressure Switch Activated. (Low System Pressure)

Fault Code	See Notes	Description
E-124	*1	Boiler Temperature Currently Too High
E-130	*1	Flue Gas Temperature Currently Too High
E-131		Fault with Burner
E-132	*1	External Safety Interlock Activated (X10-03 is currently Open Circuit).
E-133	*1 *2	No Flame Detected After Last Ignition Attempt.
E-134	*1 *2	Flame Extinguished During Operation
E 135		Air Supply Error. (Not Used)
E-140	*1	LPB Address Not Recognized *{When Using OCI420 Clip & an RVA Controller}*
E-142	*1	LPB Missing Partner *{When Using OCI420 Clip & an RVA Controller}*
E-145	*1	Wrong Device Connected to PPS *{When Using OCI420 Clip & an RVA Controller}*
E-146	*1	Unrecognized Plant Configuration *{When Using OCI420 Clip & an RVA Controller}*
E-147	*1	Burner Modules Not Connected *{When Using OCI420 Clip & an RVA Controller}*
E-148	*1	LPB Interface Not Configured *{When Using OCI420 Clip & an RVA Controller}*
E-150		Non-Specific Boiler Fault
E-151		LMU64 Malfunction, Excessive Power Loading via Pump Connections.
E-152		LMU64 Parameter Programming Error
E-153		RESET Button Pressed When Boiler IS NOT in a fault condition.
E-154	*1 *2	LMU64 Operating Error Detected Refer to Section 20.5
E-160	*2	Fan Not Reaching Set Point.
E-161		Combustion Fan Speed Too High.
E 162		Air Pressure Switch Fault. (Not Used)
E164		Flow Switch / Pressure Switch Open. (not Used)
E 166		Air Pressure switch Fault. (Not Used)
E-180		Boiler Operating in Chimney Mode (100% Output).
E-181		Boiler Operating in Commissioning Mode. (0 – 100%)
E-183		Boiler Controller / QAA73 Room Unit in Parameter Setting Mode.
bu		Communication Error between LMU64 & Display Module. Check ribbon cable.

NOTES:
- *1 SMALL Error Codes will automatically reset when the fault has been corrected.
- *2 If a fault re-occurs repeatedly, then the Error Code will convert to a LARGE Error Code requiring a Manual Reset.
- *3 Refer to Parameter Changes, as detailed in Section 18, System Configurations.

20.4 LMU64 Controller, Fault Indication (cont'd)

If the optional QAA73 Room Unit, RVA47 Cascade Controller, or RVA63 Zone Controller has been connected to the boiler, and a fault occurs, the or **ER** will appear on the display of the respective Unit as well as the boiler.

The Error message can be reviewed at the QAA73 Room Unit, RVA47 Cascade Controller, or RVA63 Zone Controller, by opening the hinged flap and pressing the 'DOWN' Program button twice. ID Line 50 will be displayed on the 'Left-Hand' side, with the error message on the 'Right-Hand' side of the display.

To clear the error message the 'RESET' button on the boiler must be pressed, the error message CAN NOT be cleared at the Room Unit, or RVA controller.

20.5 Reviewing LMU64 Operating Information

To aid the End User and/or the Installation/Commissioning Engineer, the operating information of the boilers' LMU64 controller can be access and reviewed as follows;

Press the INFO button, then Press & Hold the ▲ & ▼ buttons until **b0** appears (approximately 3 seconds).
Use the **+** & **-** buttons to review the b references, use the ▲ or ▼ buttons to change from b, to c & d references.
Press the MODE button at any time to return to the normal display.

The table below details the references and their meanings;

Ref	Description	Ref	Description	Ref	Description
b0	Current Fault Code	**c0**	No Function	**d0**	No Function
b1	Actual Return Temp (ºC)	**c1**	Actual Rectification Current (µAmps)	**d1**	Theoretical Value for Flow Temp. (ºC)
b2	Actual HWS Temp (ºC)	**c2**	Actual Fan Speed *{XX x 100 = Actual Revs/Min}*	**d2**	Actual Target Value for Flow Temp. (ºC)
b3	Actual Flue Gas Temp (ºC)	**c3**	Actual PWM Drive Signal to Fan (%)	**d3**	Room Temp Target Value. (ºC)
b4	Actual Outside Air Temp (ºC)	**c4**	Actual Boiler Output % Relative to Maximum rate	**d4**	HWS Temp Target Value. (ºC)
b5	Averaged Outside Air Temp (ºC)	**c5**	Actual PWM Output to Modulation Boiler Pump (Not Used)	**d5**	Maximum Modulation Depth of Boiler (%)
b6	Attenuated Outside Air Temp (ºC)	**c6**	No Function	**d6**	Maximum Fan Speed / Power Output of Boiler
b7	Actual Flow Temp of Mixed Circuit, when AGU2.5 Clip Used. (ºC)	**c7**	No Function	**d7**	No Function
b8	No Function	**c8**	No Function	**d8**	No Function
b9	No Function	**c9**	No Function	**d9**	No Function

20.6 Reviewing LMU64 Operating Error Codes

As an extension of the Standard ERROR Codes, the LMU64 also records Operating ERROR Codes, which can be accessed by at Service / Commissioning Engineer.

To access the Operating ERROR Codes, 'Press & Hold' the ▲ & ▼ Buttons, for approximately 3 seconds. H 90 will appear, then use the ▲ or ▼ Buttons to reference the Parameter Line ID Number detailed below.

Line ID Number	Description	Comments
H700	1st Historical Fault – Number of Occurrences.	The number of times that this Operating Error Code as shown in Parameter H702 has occurred
H701	1st Historical Fault – Operating Phase.	The position during the operating sequence that the Operation Error occurred.
H702	1st Historical Fault – Operating Error Code	Actual Operating Code. Refer to Section 20.6.
H703	2nd Historical Fault – Number of Occurrences.	The number of times that this Operating Error Code as shown in Parameter H705 has occurred
H704	2nd Historical Fault – Operating Phase.	The position during the operating sequence that the Operation Error occurred.

20.6 Reviewing LMU64 Operating Error Codes (cont'd)

Line ID Number	Description	Comments
H705	2nd Historical Fault – Operating Error Code	Actual Operating Code. Refer to Section 20.6.
H706	3rd Historical Fault – Number of Occurrences.	The number of times that this Operating Error Code as shown in Parameter H708 has occurred
H707	3rd Historical Fault – Operating Phase.	The position during the operating sequence that the Operation Error occurred.
H708	3rd Historical Fault – Operating Error Code	Actual Operating Code. Refer to Section 20.6.
H709	4th Historical Fault – Number of Occurrences.	The number of times that this Operating Error Code as shown in Parameter H711 has occurred
H710	4th Historical Fault – Operating Phase.	The position during the operating sequence that the Operation Error occurred.
H711	4th Historical Fault – Operating Error Code	Actual Operating Code. Refer to Section 20.6.
H712	5th Historical Fault – Number of Occurrences.	The number of times that this Operating Error Code as shown in Parameter H714 has occurred
H713	5th Historical Fault – Operating Phase.	The position during the operating sequence that the Operation Error occurred.
H714	5th Historical Fault – Operating Error Code	Actual Operating Code. Refer to Section 20.6.
H715	Current Historical Fault – Number of Occurrences.	The number of times that this Operating Error Code as shown in Parameter H717 has occurred
H716	Current Historical Fault – Operating Phase.	The position during the operating sequence that the Operation Error occurred.
H717	Current Historical Fault – Operating Error Code	Actual Operating Code. Refer to Section 20.6.
H728	1st Historical Fault – ALBATROS Error Code	The LMU64 display Error Code, relevant to Parameter H702, See Page 50 for list of Fault Indications
H729	2nd Historical Fault – ALBATROS Error Code	The LMU64 display Error Code, relevant to Parameter H705, See Page 50 for list of Fault Indications
H730	3rd Historical Fault – ALBATROS Error Code	The LMU64 display Error Code, relevant to Parameter H708, See Page 50 for list of Fault Indications
H731	4th Historical Fault – ALBATROS Error Code	The LMU64 display Error Code, relevant to Parameter H711, See Page 50 for list of Fault Indications
H732	5th Historical Fault – ALBATROS Error Code	The LMU64 display Error Code, relevant to Parameter H714, See Page 50 for list of Fault Indications
H732	Current Historical Fault – ALBATROS Error Code	The LMU64 display Error Code, relevant to Parameter H717, See Page 50 for list of Fault Indications

20.7 LMU64 Operating Error Codes

Fault Code	Description
83	Combustion Fan Not Reaching Ignition Speed
87	Combustion Fan Operating Beneath Minimum Setting
90	Combustion Fan Not Reaching Pre-Purge Speed.
96	Flame Rectification Signal Detected When Burner OFF
97	Flame Rectification Signal Detection When Burner OFF
98	Flame Signal Lost During Operation
99	Flame Signal Lost During Operation
100	Flame Signal Lost During Operation
101	Flame Signal Not Detected Following Last Ignition Attempt
102	Flame Signal Not Detected Following Last Ignition Attempt

Fault Code	Description
170	RESET Button is Being Continually Depressed
259	RESET Button Has Been Pressed When NO Error Has Been Displayed
282	Combustion Fan Not Reaching Correct Speed
400	System Hydraulic Error. Return Temperature > Flow Temperature
401	System Hydraulic Error. Return Temperature > Flow Temperature
402	System Hydraulic Error. Return Temperature > Flow Temperature
403	System Hydraulic Error. Return Temperature > Flow Temperature
404	System Hydraulic Error. Return Temperature > Flow Temperature

Fault Code	Description
406	Boiler Flow Temperature Rising to Above Maximum Limit Temperature When Burner is ON.
422	Boiler Flow Temperature Rising to Above Maximum Limit Temperature When Burner is OFF.
433	System Hydraulic Error, ΔT Between Flow & Return Too High
434	System Hydraulic Error, ΔT Between Flow & Return Too High
435	System Hydraulic Error, ΔT Between Flow & Return Too High

Please consult with MHS Technical Department for assistance if fault code displayed is not listed above.

20.8 Boiler Operating Sequence Numeric Indication

By pressing the 'INFO' button three times, the Boiler Operating Sequence can be witnessed, indicated by Large numeric notation on the display.

Having reviewed the Operating Sequence, press the 'MODE' button once to return to the standard screen.

The controller will also automatically return to the standard screen after approximately 10 seconds.

The adjacent table details the numeric notation of the ignition sequence.

Sequence Number	Description
3	Fan operating at pre-purge rate.
4	Ignition spark generation.
5	Gas valve activation.
6	Flame stabilization and rectification.
10	Burner released to modulate.

21.0 First Firing / Burner Commissioning

The following procedure MUST be followed to ensure that damage does not occur to the boiler on the initial firing.

a) Ensure that the gas supply has been purged, and if so turn the gas isolation valve to the OPEN position.

b) Ensure that the electrical supply has been tested, and if so, turn ON.

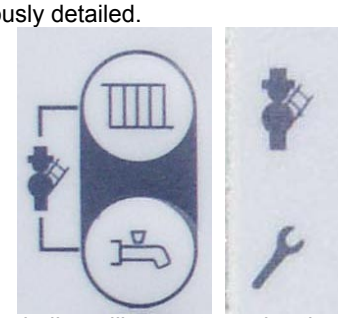
c) Check that all pumps, both internal boiler pump and external pumps, are correctly bleed of air, and that their impellors are free to turn.

d) Switch the boiler ON/OFF switch to the ON position. The boiler controller will then run though the preliminary safety checks. Check and record the LMU and Display software versions, as previously detailed.

e) Once the safety checks have been proven, the controller will then return to the STANDBY setting. Set the controller to the COMMISSIONING HIGH mode, by pressing the 'RADIATOR' and 'TAP' buttons together for a minimum of ten seconds.

Arrows will appear next to the 'SPANNER' and 'ENGINEER' symbols on the 'Right-Hand' side of the LCD display.

If an arrow appears next to the 'ENGINNER' symbol ONLY, then the boiler will be at 100% output Only. Repress the 'RADIATOR' and 'TAP' buttons, holding for a longer period of time until the arrows appear next to the 'SPANNER' and 'ENGINNER' symbols.



f) With the arrows adjacent to the 'SPANNER' and 'ENGINEER' symbols, the boiler will operate under the dictates of the '**+**' and '**-**' buttons, and the ▲ and ▼ buttons. The Output of the boiler will be displayed on the LCD display as a percentage of the modulation output. (i.e. 100% = Max Burner Output, 0% = Min Burner Output.

g) The burner will now operate at the indicated output on the LCD display, until the boiler temperature reaches 90ºC, at which point the burner will turn off. To monitor the boiler flow temperature during the burner commissioning, press the 'INFO' button once. Press the 'MODE' button once, to return to the Commissioning Output screen. Pressing the 'MODE' button once, to exit from the Commissioning mode.

h) Due to the Design of the Gas Valve, the HIGH FIRE setting should be made first, as this will have a marked effect on the LOW FIRE setting. A 2.5mm Allen key will be required to undertake the necessary adjustments.

i) Remove the Flue Gas Sampling Test Point Cap and insert a flue gas analyzer into the Test Point. The stop on the analyzer probe should be set to a depth of 20-25mm. See fig 21.0a.

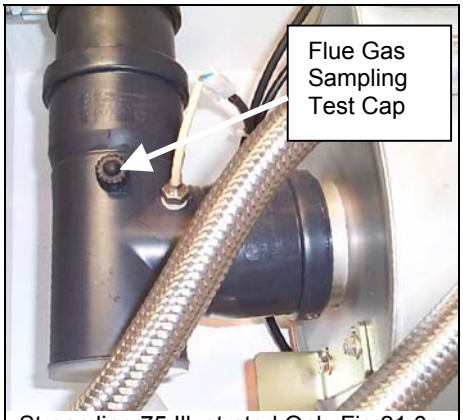
j) If the burner is not already at 100% Output, use the '**+**' or ▲ buttons to increase the burner output to 100%, take a sample and note the CO_2 level.

k) Using the '**-**' or ▼ buttons to decrease the burner output to 0%, take a sample and note the CO_2 level.

l) Check the CO_2 levels recorded against those listed in the adjacent table. If the CO_2 levels are not as listed, adjustments to the gas valve 'High Fire' and/or 'Low Fire' will be required. See fig 21.0b for adjustment locations.

m) To adjust the HIGH FIRE setting, use the '**+**' or ▲ buttons to set the controller to 100% burner output. After the burner has stabilized, adjustments can be made to 'High Fire' adjuster on the gas valve (clockwise to decrease, anti-clockwise to increase the CO_2). After each adjustment, let the burner stabilize for a minute, then check the levels again. See Fig 21.0b. Continue until the CO_2 levels are as listed in the adjacent table.

Flue Gas CO_2% Settings		
Gas Type	**Nat Gas (G20)**	**LPG (G31)**
Max Output	8.5	10.5
Min Output	9	11.0



Streamline 75 Illustrated Only Fig 21.0a

21.0 First Firing / Burner Commissioning (Cont'd)

n) To adjust the LOW FIRE rate, use the '**-**' or ▼ buttons to set the controller to 0% burner output. After the burner has stabilized, adjustments can be made to 'Low Fire' adjuster on the gas valve (clockwise to increase, anti-clockwise to decrease the CO_2). After each adjustment, let the burner stabilize for a minute, then check levels again. See Fig 21.0b. Continue until the CO_2 levels are as listed in the table above.

o) **ALWAYS re-check both HIGH and LOW fire settings after any adjustments. Adjustment to the HIGH fire setting may affect the LOW fire setting, and visa-versa.**

p) When the HIGH and LOW fire CO_2 levels are as listed in the table above, remove the flue gas analyzer and replace the Flue Sample Test Point Cap.

q) Upon completion of the burner commissioning and combustion adjustments, the integrity of the flue system must be checked (if balanced flue). Operate the boilers in Commissioning Mode, HIGH FIRE, as previously detailed.

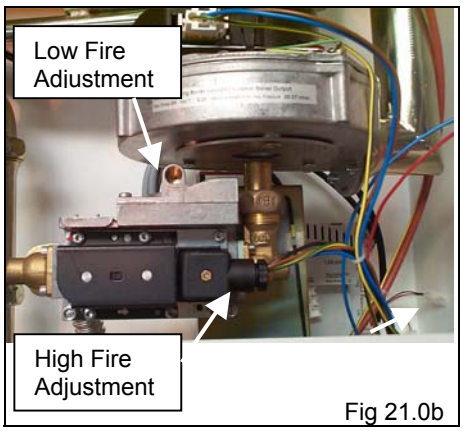


Fig 21.0b

Fit the outer casing of the appliance whilst it is operating at HIGH FIRE, and monitor the operation. If the flame extinguishes within 5 minutes of operation at HIGH FIRE, and the boiler tries to re-ignite, then the flue system must be checked for leakage / re-circulation of combustion products from the inner 80mmØ Exhaust Pipe to the outer 125mmØ Air Pipe.

Important Notice.

On completion of the above procedure it is imperative that the Flue Gas Test Point Cap is re-fitted, and that the controller is not left in the COMMISSIONING Mode. Press the MODE button to ensure that the appliance IS NOT left in the Commissioning Mode.

21.1 Setting the Boiler to Work

On completion of the commissioning detailed in sections 19.0 through to 21.0 inclusive, the boiler controller must be returned to either the 'STAND-BY' or 'AUTOMATIC' mode.

THE CONTROLLER MUST NOT BE LEFT IN THE COMMISSIONING SETTING.

Fit the boiler case ensuring that the case properly engages onto the rear chassis, and that any cables have not been trapped between the case and the chassis. Secure the casing with the two ¼ turn latches.

WARNING

THIS APPLIANCE MUST NOT BE LEFT TO OPERATE WITH THE OUTER CASING REMOVED.

22.0 Servicing

As with all Gas Appliances, we would highly recommended that a competent heating engineer services the Strata Streamline 16, 31, 47, & 75 boilers, at least every 12 months. This is assuming a normal daily usage of 8 – 10 hours.

If however the boiler is to be operated 24 hours a day, 7 days, we would recommend services every 6 months

The Strata Streamline 16, 31, 47 & 75 boilers will display an E105 SMALL Error Code when 12 months has lapsed, indicating that the appliance requires a Routine Service Inspection. This code will also be displayed on the QAA73 and remote RVA controllers, if fitted.

If the Installer/Commissioning Engineer is unable to undertake the Routine Service Inspection, as detailed Section 22.1, please contact MHS Technical Service Department, who will be able to arrange the Routine Service Inspection to be undertaken.

22.1 Routine Service Inspection

Before commencing any service/maintenance work, the following tasks must be undertaken.

a) Ask the end user about any problems with the operation of the boiler unit and note their comments.
b) Check the water pressure of the installation.
c) Remove the boiler casing and visually inspect all pipe and water joints for signs of leakage.
d) Inspect the top of the casing and the top of the heat exchanger for signs of water ingress from the outer 125mmØ Air Pipe.
e) Run the unit in Commissioning Mode HIGH FIRE; with the use of a flue gas analyzer record the CO_2 level. See section 21.0.
f) Run the unit in Commissioning Mode LOW FIRE; with the use of a flue gas analyzer record the CO_2 level. See section 21.0.
g) Listen to the sound of the combustion fan.
h) Utilizing the instructions in Section 20.5, review the LMU Operating Error Codes, and note the recorded codes onto the Service Report.
i) Undertake a System Water Analysis to check the concentration level of the Water Treatment, and note the level onto the Service Report.
j) Check the flue route including the terminal position for conformity with prevailing regulations, and trim back any foliage that may be around the terminal.
k) Check the plant room/compartment ventilation system for conformity with prevailing.
l) Check the Pressure (Safety) Relief Valve size, rating and orientation, for conformity with prevailing regulations.

The results of the Inspections undertaken above must be acted upon, and all discrepancies should be recorded on the Service Report and brought to the Client / End User's attention.

Undertake any maintenance, and if necessary any preventative maintenance, that's required.

22.2 Routine Cleaning & Maintenance

As part of the Routine Service Inspection, certain areas of the boiler need to the checked and cleaned as necessary.

a) Turn the boiler OFF at the ON/OFF switch and electrically isolate the boiler by removing the plug or fuse from the boiler supply.
b) Turn off the gas at the boiler Isolation tap, fitted by the installer, adjacent to the appliance.
c) Remove all Electrical connections from the Fan Assemble, One cable on the Streamline 16, 31 & 47 models, two cables on the Streamline 75 model.
d) Disconnect the Earth Lead, HT Cap and Lead from the Ignition Electrode.
e) ***Streamline 75 ONLY***, Undo the long Hexagon Bar at the top of the Heat Exchanger and gently rotate the heat exchanger forward, pivots to the left, See Fig 22.2a.
f) Disassemble the burner by removing the six M6 nuts around the burner door, using a 10mm Spanner. Pull the burner forward and remove from the heat exchanger. Gently put to one side.
g) Once access has been gained to the combustion chamber and front section of the heat exchanger, visually inspect the heat exchanger coils, See Fig 22.2b.

   It is usually only necessary to clean the front section of the heat exchanger. If server deposits are found, the rear section of the heat exchanger should also be checked and cleaned, which will necessitate the removal of the heat exchanger from the boiler.

   If any coils appear to be significantly dis-coloured, then a blockage of either scale, magnetite, or general system debris has occurred which will have allowed excessive overheating to have occurred within the coil.

   If dis-colouration has occurred, then specialist de-scaling of the heat exchanger will be required, however, stress cracking may have occurred, and the heat exchanger may become porous following the de-scale works.

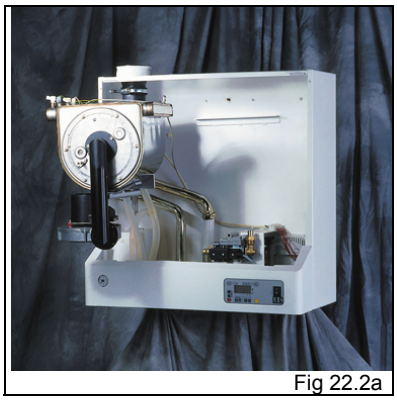


Fig 22.2a

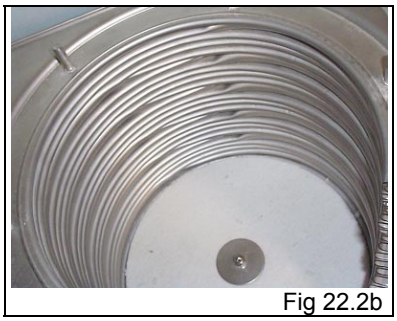


Fig 22.2b

h) If the heat exchanger has not suffered from dis-colouration, as 'Item g' above, then a Standard Service can be undertaken. Using a natural bristled brush ONLY, remove the worst of the mineral/debris buildup.

   With the use of the dissolved *Strata Combustion Chamber Cleaning Granules*, spray the solution onto the heat exchanger surface and leave for approximately 5 minutes. This will help to remove any stubborn mineral deposits. Finally brush the heat exchanger whilst rinsing thoroughly with copious amounts of fresh water. *Strata Combustion Chamber Cleaning Granules* are available from MHS Boilers Spares department. **A STEEL OR PVC BRUSH MUST NOT BE USED TO CLEAN THE HEAT EXCHANGER.**

22.2 Routine Cleaning & Maintenance (Cont'd)

i) Following the cleaning of the Heat Exchanger, the condensate syphon must be flushed to ensure that all mineral deposits/debris that has been washed from the heat exchanger surface is correctly removed. Open the syphon cleaning point cap at the base of the boiler, with a suitable receptacle directly below to collect the syphon contents. Safely dispose of the contents of the syphon. Replace the receptacle below the cleaning point and poor 2 litres of clean tap water into the heat exchanger, which will drain through the cleaning point. Refit the cleaning point cap and poor half a litre of clean tap water into the heat exchanger to ensure the syphon is re-flooded. Check the cleaning point cap for leaks.

j) Visually check the burner surface for signs of damage and debris build-up. Remove any debris buildup with compressed air. If excessive debris build up is identified, the burn lance should be removed and the inner metal surface should be washed and cleaned. **A BRUSH, OF ANY KIND, MUST NOT BE USED TO CLEAN THE BURNER SURFACE.** If damage has occurred to the burner surface, the burner MUST be replaced.

k) Check the combustion fan blades for debris build-up. Remove any debris with a soft bristle brush or preferably compressed air. **DO NOT TOUCH, OR SPIN, THE FAN BLADES WITH YOUR FINGERS AS THIS COULD AFFECT THE BALANCING OF THE FAN BLADES.**

l) Re-fit the Burner, in the reverse order of dismantling, Item F above, ensure that all electrical connections are correctly and securely connected.

m) Inspect all water joints. Any joints found to be leaking MUST be replaced. It is also advisable when replacing water joints to also change any adjacent joints at the same time.

n) Inspect all gas joints with a suitable leak detection method. Any joints found to be leaking MUST be replaced. It is also advisable when replacing gas joints to also change any adjacent joints at the same time.

o) With the use of a suitable Flue Gas Analyser, check and adjust the combustion settings, as detailed in Section 21.0, First Firing / Burner Commissioning

p) Inspect the general condition of the flue system, including the termination, repair as necessary or advise on any remedial action as required.

q) Following the satisfactory completion of the above service procedure, the internal Routine Service Control needs to be reset. Gain Access to the Second Level Parameters, as detailed in Section 23.0, and selection Parameter Line H630 – Bit 6. using the + button, adjust the value from 0 to 1 and press the INFO button to reset the Service Interval counter.

After undertaking any service work always re-check the operation of the boiler, see section 17.0 Commissioning, for further advice.

23.0 Full Parameters List

The following Pages detail the parameters of the boiler and the Standard Factory settings, please note, the installer/commissioning engineer may have changed some of these settings to suit the system installed, please refer to System Configurations, Section 17.

There are two levels of access available, as follows. If you cannot access a particular parameter line, please consult with MHS Boilers Technical Department for further assistance.

Level ONE (Customer) - Use the ▲ & ▼ Program Buttons to access the desired parameter line.

Level TWO (Installer) - Press & Hold the ▲ & ▼ Program Buttons until H90 appears (Approx 3 seconds). Use the ▲ & ▼ Program Buttons to access the desired parameter line.

{If - - - - - appears, Press the MODE button to exit this level and return to the standard operating display}

Display or QAA73 #	Function / Description	Range	Default Values			
			16	31	47	75
H90	Reduced Temperature for DHW	8….60	10	10	10	10
H91	DHW Production Control *(0=Time control 1=Constant)*	0…1	0	0	0	0
H93	DHW Production Control 0=Non Eco 1=Eco	0…1	0	0	0	0
H94	DHW Secondary Pump Control *(0= As H91. 1= As HWS Time Switch) (K2, X2:03, H615:6)*	0…1	0	0	0	0
H501	Minimum room setpoint *(10 °C<=TrSmin<=TrSmax)*	10 ... 30 °C	10	10	10	10
H502	Maximum room setpoint *(TrSmin<=TrSmax<=30 °C)*	10 ... 30 °C	30	30	30	30

23.0 Full Parameters List (Cont'd)

Display or QAA73 #	Function / Description	Range	Default Values			
			16	31	47	75
H503	Minimum boiler setpoint temperature *(20 °C<=TkSmin<=TkSmax)*	20 ... 90 °C	20	20	20	20
H504	Maximum boiler setpoint temperature *(TkSmin<=TkSmax<=90 °C)*	20 ... 90 °C	90	90	90	90
H505	Boiler setpoint at design outside temperature	20 ... 90 °C	85	85	85	85
H506	Minimum flow setpoint temperature *(20 °C<=TvSmin<=TvSmax)*	20 ... 90 °C	25	25	25	25
H507	Maximum flow setpoint temperature *(TvSmin<=TvSmax<=90 °C)*	20 ... 90 °C	90	90	90	90
H508	Minimum DHW setpoint temperature *(10 °C<=TbwSmin<=TbwSmax)*	10 ... 80 °C	10	10	10	10
H509	Maximum DHW setpoint temperature *(TbwSmin<=TbwSmax<=80 °C)*	10 ... 80 °C	60	60	60	60
H510	Flow temperature setpoint boost with DHW heating	0 ... 30 °C	16	16	16	16
H511	Boiler frost protection switch-on temperature (5 °C<=TkSfrostEin<TkSfrostAus)	5 ... 50 °C	5	5	5	5
H512	Boiler frost protection switch-off temperature *(TkSfrostEin<TkSfrostAus<=50 °C)*	5 ... 50 °C	20	20	20	20
H513	Switch-off temperature for pump overrun *(after DHW heating)*	20 ... 90 °C	80	80	80	80
H514	Boiler temperature setpoint boost with mixing circuit	0 ... 30 °C	1	1	1	1
H515	Maximum limitation of boiler temperature *(TL function 1)*	0 ... 100 °C	95	95	95	95
H516	Summer / winter changeover temperature *(30 °C: S / W changeover deactivated)*	8 ... 30 °C	18	18	18	18
H517	Maximum control differential; when exceeded, minimum pause time will be aborted	0 ... 90 K	30	30	30	30
H518	Maximum temperature gradient of boiler setpoint ramp in heating mode *(0: no setpoint ramp)*	0 ... 255 K/min	0	0	0	0
H519	Design outside temperature *(for sizing the heating plant)*	-50 ... 20 °C	-1	-1	-1	-1
H520	Reduction of room setpoint when using time switch *(dTrAbsenk=0: acting on heat demand)*	0 ... 10 K	10	10	10	10
H521	Delta flow / return temperature at TiAussenNorm, 2. 5 <=...<= dTkTrMax	2.5 ... 20 K	20	20	20	20
H522	Maximum dT of boiler flow and return for dT supervision	2.5 ... 35 K	30	30	30	30
H523	Switch-on differential of burner in heating mode	0.5 ... 32 K	3	3	3	3
H524	Minimum switch-off differential of burner in heating mode	0.5 ... 32 K	3	3	3	3
H525	Maximum switch-off differential of burner in heating mode	0.5 ... 32 K	10	10	10	10
H526	Switch-on differential of burner in DHW heating mode (sensor 1)	0.5 ... 32 K	5	3	3	5
H527	Minimum switch-off differential of burner in DHW heating mode (sensor 1)	-32 ... 32 K	0	0	0	0
H528	Maximum switch-off differential of burner in DHW heating mode (sensor 1)	-32 ... 32 K	0	0	0	0
H529	Switch-on differential of burner in DHW heating mode (sensor 2)	0.5 ... 32 K	3	3	3	3
H528	Maximum switch-off differential of burner in DHW heating mode (sensor 1)	-32 ... 32 K	0	10	10	0
H529	Switch-on differential of burner in DHW heating mode (sensor 2)	0.5 ... 32 K	3	3	3	3
H530	Minimum switch-off differential of burner in DHW heating mode (sensor 2)	-32 ... 32 K	0	0	0	0

23.0 Full Parameters List (Cont'd)

Display or QAA73 #	Function / Description	Range	Default Values			
			16	31	47	75
H531	Maximum switch-off differential of burner in DHW heating mode (sensor 2)	-32 ... 32 K	3	3	3	3
H532	Heating curve slope heating circuit 1	1 ... 40	32	32	32	32
H533	Heating curve slope heating circuit 2	1 ... 40	32	32	32	32
H534	Room setpoint readjustment heating circuit 1	-31 ... 31 K	0	0	0	0
H535	Room setpoint readjustment heating circuit 2	-31 ... 31 K	0	0	0	0
H536	Maximum speed at maximum output in heating mode *(maximum speed limitation)*	0 ... 9950 rpm	5000	5000	7000	7000
H537	Pump speed at heating plant's design point	1 ... 50	24	24	24	24
H538	Minimum pump speed permitted for the heating plant	10 ... 100 %	40	40	40	40
H539	Minimum pump speed for full charging of stratification storage tank	10 ... 100 %	40	40	40	40
H540	Number of speeds of modulating pump *(supplier specification)*	2 ... 50	24	24	24	24
H541	Maximum degree of modulation in heating mode *(LmodTL <= PhzMax <= LmodVL)*	0 ... 100 %	65	65	100	100
H542	Minimum boiler output in kW *(lower calorific value)*	0 ... 9999 kW	6	6	12	12
H543	Maximum boiler output in kW *(lower calorific value)*	0 ... 9999 kW	25	25	75	75
H544	Overrun time of pumps, max. 210 min *(setting 255: continuous operation of Q1)*	0 ... 255 min	10	10	10	10
H545	Minimum burner pause time *(heat demand-dependent switching hysteresis)*	0 ... 3600 s	300	300	300	300
H546	Minimum burner running time *(heat demand-dependent switching hysteresis)*	0 ... 255 s	0	0	0	0
H547	Controller delay after burner is started up	0 ... 255 s	0	0	0	0
H548	Minimum degree of modulation of modulating pump (supplier specification)	0 ... 70 %	5	5	5	5
H549	Maximum degree of modulation of modulating pump *(supplier specification)*	10 ... 100 %	90	90	90	90
H550	Sampling factor of dT control *(as a factor for TabtastK)*	0 ... 50	10	10	10	10
H551	Constant for quick setback without room influence	0 ... 20	2	2	2	2
H552	Hydraulic system adjustment	0 ... 255	67	67	66	66
H553	Configuration of heating circuits	0 ... 255	21	21	21	21
H554	Setting flags: status code open-circuit sensor for ANx channel suppressed / not suppressed	0 ... 255	b0=1 b1=0 b2=1 b3=1 b4=0 b5=1 b6=0 b7=0	b0=1 b1=0 b2=1 b3=1 b4=0 b5=1 b6=0 b7=0	b0=1 b1=0 b2=1 b3=1 b4=0 b5=1 b6=0 b7=0	b0=1 b1=0 b2=1 b3=1 b4=0 b5=1 b6=0 b7=0
H555	Setting flags	0 ... 255	b0=0 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0

23.0 Full Parameters List (Cont'd)

Display or QAA73 #	Function / Description	Range	Default Values			
			16	31	47	75
H556	Instantaneous DHW heater setting flags	0 ... 255	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=1 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=1 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=1 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=1 b7=0
H557	AD converter configuration and heat demand	0 ... 255	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0
H558	Setting flags	0 ... 255	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=1 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=1 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=1 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=1 b7=0
H559	Setting flags	0 ... 255	b0=1 b1=1 b2=1 b3=0 b4=0 b5=1 b6=0 b7=0	b0=1 b1=1 b2=1 b3=0 b4=0 b5=1 b6=0 b7=0	b0=1 b1=1 b2=1 b3=0 b4=0 b5=1 b6=0 b7=0	b0=1 b1=1 b2=1 b3=0 b4=0 b5=1 b6=0 b7=0
H560	Setting flags	0 ... 255	b0=0 b1=0 b2=0 b3=0 b4=0 b5=1 b6=1 b7=0	b0=0 b1=0 b2=0 b3=0 b4=0 b5=1 b6=1 b7=0	b0=0 b1=0 b2=0 b3=0 b4=0 b5=1 b6=1 b7=0	b0=0 b1=0 b2=0 b3=0 b4=0 b5=1 b6=1 b7=0
H561	Setting flags	0 ... 255	b0=0 b1=0 b2=0 b3=1 b4=0 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=1 b4=0 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=1 b4=0 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=1 b4=0 b5=0 b6=0 b7=0
H562	Minimum boiler water pressure	0 ... 25.5 bar	0.5	0.5	0.5	0.5
H563	Maximum boiler water pressure	0 ... 25.5 bar	3	3	3	3
H564	Max head of modulating pump *(supplier specification)*	0.5 ... 25.5 m	5.9	5.9	5.9	5.9
H565	Min head of modulating pump *(supplier specification)*	0 ... 25.5 m	0.6	0.6	0.6	0.6
H566	Proportional coefficient of DHW controller	0 ... 9.9375	0.25	1	1	0.25
H567	Derivative action time of DHW controller	0 ... 9.9375 s	2	0.25	0.25	2
H568	Integral action time of DHW controller	0 ... 4000 s	100	14	14	100
H569	Proportional coefficient of heating circuit controller	0 ... 9.9375	0.5	0.5	0.5	0.5
H570	Derivative action time of heating circuit controller	0 ... 9.9375 s	1	1	1	1

23.0 Full Parameters List (Cont'd)

Display or QAA73 #	Function / Description	Range	Default Values			
			16	31	47	75
H571	Integral action time of heating circuit 1 controller	0 ... 4000 s	100	100	100	100
H574	Integral action time of heating circuit 2 controller	10 ... 873 s	90	90	90	90
H575	Proportional coefficient of dT control	0 ... 9.9375	0.5	0.5	0.5	0.5
H576	Derivative action time of dT control	0 ... 9.9375 s	0	0	0	0
H577	Integral action time of dT control	0 ... 4000 s	50	50	50	50
H578	Sampling time of temperature control loop in heating mode and with storage tank charging	1 ... 4 s	1	1	1	1
H579	Sampling time of temperature control loop with instantaneous DHW heater	1 ... 4 s	1	1	1	1
H580	Setpoint readjustment in Comfort mode and setpoint of 40 °C	-20 ... 20 K	0	0	0	0
H581	Setpoint readjustment in Comfort mode and setpoint of 60 °C	-20 ... 20 K	0	0	0	0
H582	Setpoint readjustment with outlet temperature control and setpoint of 40 °C	-20 ... 20 K	0	0	0	0
H583	Setpoint readjustment with outlet temperature control and setpoint of 60 °C	-20 ... 20 K	0	0	0	0
H584	Time for kick function of pump / diverting valve outputs	0 ... 51 s	5	5	5	5
H585	Maximum overrun time when TL / LT cuts out	0 ... 10 min	5	5	5	5
H586	Filter time constant of actual values of flow / return temperature of dT control	0 ... 100 %	94	94	94	94
H587	Setting flags for instantaneous DHW heater	0 ... 255	b0=0 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0
H588	Period of time until switch-off differential is reduced to SdHzAusMin	0 ... 210 min	10	10	10	10
H589	Period of time until switch-off differential is reduced to SdBwAusMin	0 ... 210 min	3	3	3	3
H590	Locking time of dynamic switch-off differential after a change of heating<->DHW	0 ... 51 s	0	0	0	0
H592	Triggering threshold for boiler shutdown at high flue gas temperatures	0 ... 125 °C	110	110	110	110
H593	Triggering threshold for output reduction at high flue gas temperatures (limitation)	0 ... 125 °C	110	110	110	110
H594	Water pressure above which boiler and pump will be shut down	0 ... 25.5 bar	0.5	0.5	0.5	0.5
H595	Switching differential of water pressure	0 ... 25.5 bar	0.3	0.3	0.3	0.3
H596	Running time of actuator in heating circuit 2 *(TimeOpening / TimeClosing)*	30 ... 873 s	150	150	150	150
H597	P-band of heating circuit 2 controller	1 ... 100 K	24	24	24	24
H598	Output during controller delay time *(LmodTL <= LmodRgVerz <= LmodVL)*	0 ... 100 %	19	19	19	19
H599	Response threshold for detection of end of DHW consumption with instantaneous DHW heater	-2 ... 1,984375 K/s	0.2	0.2	0.2	0.2
H600	Response threshold for detection of DHW consumption with instantaneous DHW heater in Comfort mode	-2 ... 1,984375 K/s	-0.2	-0.2	-0.2	-0.2

23.0 Full Parameters List (Cont'd)

Display or QAA73 #	Function / Description	Range	Default Values			
			16	31	47	75
H601	Response threshold for detection of DHW consumption with instantaneous DHW heater in heating mode	-2 ... 1,984375 K/s	-0.3	-0.3	-0.3	-0.3
H602	Time for instantaneous DHW heater Comfort function after consumption (when there is no demand for heat) (0 = deactivated; 1440 = continuously)	0 ... 1440 min	0	0	0	0
H603	Time for instantaneous DHW heater Comfort function after consumption *(when there is demand for heat) (0 = deactivated; 30 = 30 min)*	0 ... 30 min	0	0	0	0
H604	Setting flags for time synchronization and power supply on LPB	0 ... 255	b0=1 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0	b0=1 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0	b0=1 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0	b0=1 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0
H605	LPB device number of LMU	0 ... 16	1	1	1	1
H606	LPB segment number of LMU	0 ... 14	0	0	0	0
H607	Setpoint for readiness temperature	10 ... 60 °C	40	40	40	40
H608	Setting value QAA73: modulation air at ignition load	0 ... 100 %	25	25	25	25
H609	Setting value QAA73: modulation air at low-fire; lower limit modulating range	0 ... 100 %	14	14	14	14
H610	Setting value QAA73: modulation air at high-fire; upper limit modulation range	0 ... 100 %	65	65	100	100
H611	Setting value QAA73: speed required at ignition load	0 ... 9950 rpm	2600	2600	2600	2600
H612	Setting value QAA73: speed required at low-fire	0 ... 9950 rpm	1500	1500	1200	1200
H613	Setting value QAA73: speed required at high-fire	0 ... 9950 rpm	5500	5500	7000	7000
H614	Progr input LMU basis	0 ... 255	3	3	3	3
H615	Function programmable output K2 LMU	0 ... 255	0	0	0	0
H616	Minimum pressure differential to be reached after pump was switched on	0 ... 5 bar	0	0	0	0
H617	Maximum pressure differential that can occur when pump is switched on	0 ... 5 bar	5	5	5	5
H618	Progr input on clip-in function module	0 ... 255	0	0	0	0
H619	Function output1 clip-in function module	0 ... 255	0	0	0	0
H620	Function output2 clip-in function module	0 ... 255	0	0	0	0
H621	Function output3 clip-in function module	0 ... 255	0	0	0	0
H622	Maximum value of heat demand with external predefined temperature setpoint *(5 °C< = TAnfoExtMax< = 130 °C)*	5 ... 130 °C	85	85	85	85
H623	Threshold of analog signal from which the external demand for output will be accepted *(percentage of maximum value of analog signal)*	5 ... 95 %	5	5	5	5
H624	Output-related start on controller release in instantaneous DHW heating mode *(LmodTL <= LmodRgStartDLH <= LmodVL)*	0 ... 100 %	20	20	20	20

23.0 Full Parameters List (Cont'd)

Display or QAA73 #	Function / Description	Range	Default Values			
			16	31	47	75
H625	Set limit for the number of operating hours (interval) since last service visit	0 ... 9998 hrs	0	0	0	0
H626	Set limit for the number of startups (interval) since last service visit	0 ... 9995	0	0	0	0
H627	Set limit for the number of months (interval) since last service visit	0 ... 255 months	12	12	12	12
H628	Set limit of fan speed for service visit	0 ... 9950 1/min	0	0	0	0
H629	Enduser can acknowledge a pending maintenance alarm via this parameter	0 ... 1	0	0	0	0
H630	Setting flags of maintenance alarms	0 ... 255	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0
H631	Time for pump overrun in instantaneous DHW heater Comfort function with burner off *(0 = pump off with burner off; 255 = pump always on)*	0 ... 255 min	255	255	255	255
H633	Selected period of time for repetition of maintenance alarm after acknowledgement	0 ... 255 days	30	30	30	30
H634	Operating hours (interval) since last service visit	0 ... 10000 hrs	0	0	0	0
H635	Startups (interval) since last service visit	0 ... 10000	0	0	0	0
H636	Months (interval) since last service visit	0 ... 255 months	0	0	0	0
H637	Duration of pump shutdown when diverting valve changes from space heating to DHW heating	0 ... 10 s	0	0	0	0
H638	Delay of pump shutdown when diverting valve changes from space heating to DHW heating	0 ... 10 s	0	0	0	0
H639	Limitation of temperature boost by dT control	0 ... 100 %	100	100	100	100
H640	Setting value QAA73: prepurge time	0 ... 51 s	2	2	2	2
H641	Setting value QAA73: postpurge time	0 ... 51 s	20	20	20	20
H642	Modulation air during full charging of stratification storage tank *(charging control)*	0 ... 100 %	65	65	100	100
H643	Set speed during full charging of stratification storage tank *(charging control)*	0 ... 9950 rpm	5500	5500	7000	7000
H644	Charging temperature setpoint boost for recharging the stratification storage tank when controlling to charging temperature	0 ... 30 °C	0	0	0	0
H645	Maximum fan speed on standstill	0 ... 12750 rpm	200	200	200	200
H646	Modulation air when burner control is not operating	0 ... 100 %	0	0	0	0
H647	Ionization current maintenance alarm *(0 = did not occur, 1 = did occur)*	0 ... 255	0	0	0	0
H648	Duration of «Controller delay» after startup when cycling in instantaneous DHW outlet operation: output delivered now is that prior to shutdown	0 ... 50 s	0	0	0	0
H700	1st Historical Fault – Number of Occurrences.					
H701	1st Historical Fault – Operating Phase.					
H702	1st Historical Fault – Operating Error Code					

23.0 Full Parameters List (Cont'd)

Display or QAA73 #	Function / Description	Range	Default Values			
			16	31	47	75
H703	2nd Historical Fault – Number of Occurrences.					
H704	2nd Historical Fault – Operating Phase.					
H705	2nd Historical Fault – Operating Error Code					
H706	3rd Historical Fault – Number of Occurrences.					
H707	3rd Historical Fault – Operating Phase.					
H708	3rd Historical Fault – Operating Error Code					
H709	4th Historical Fault – Number of Occurrences.					
H710	4th Historical Fault – Operating Phase.					
H711	4th Historical Fault – Operating Error Code					
H712	5th Historical Fault – Number of Occurrences.					
H713	5th Historical Fault – Operating Phase.					
H714	5th Historical Fault – Operating Error Code					
H715	Current Historical Fault – Number of Occurrences					
H716	Current Historical Fault – Operating Phase.					
H717	Current Historical Fault – Operating Error Code					
H718	Hours run burner	0 ... 131070 hrs	0	0	0	0
H719	Hours run heating mode	0 ... 131070 hrs	0	0	0	0
H720	Hours run DHW heating	0 ... 131070 hrs	0	0	0	0
H721	Hours run zone	0 ... 131070 hrs	0	0	0	0
H722	Start counter	0 ... 327675	0	0	0	0
H723	Mean boiler output	-				
H724	Selection of summer / winter operating modes	0 ... 255	b0=1 b1=1 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0
H725	SW version of LMU for presentation on the OT parameter setting level	-				
H726	Maintenance code contains enumeration value of maintenance alarm *(precise cause)*	0 ... 255	0	0	0	0
H728	1st Historical Fault – ALBATROS Error Code					
H729	2nd Historical Fault – ALBATROS Error Code					
H730	3rd Historical Fault – ALBATROS Error Code					
H731	4th Historical Fault – ALBATROS Error Code					

23.0 Full Parameters List (Cont'd)

Display or QAA73 #	Function / Description	Range	Default Values			
			16	31	47	75
H732	5th Historical Fault – ALBATROS Error Code					
H732	Current Historical Fault – ALBATROS Error Code					
H755	Measured value of ionization current	-				

24.0 Exploded Views & Short Parts List

The following diagrams show the internal components for the Strata Streamline 16, 31, 47, & 75 Boilers, with a short parts list of the internal components.

Before ordering any replacement parts, we would recommend that you consult with MHS Boilers Spares Department to confirm that the parts numbers listed are still current.

24.1 Streamline 16, 31, & 47

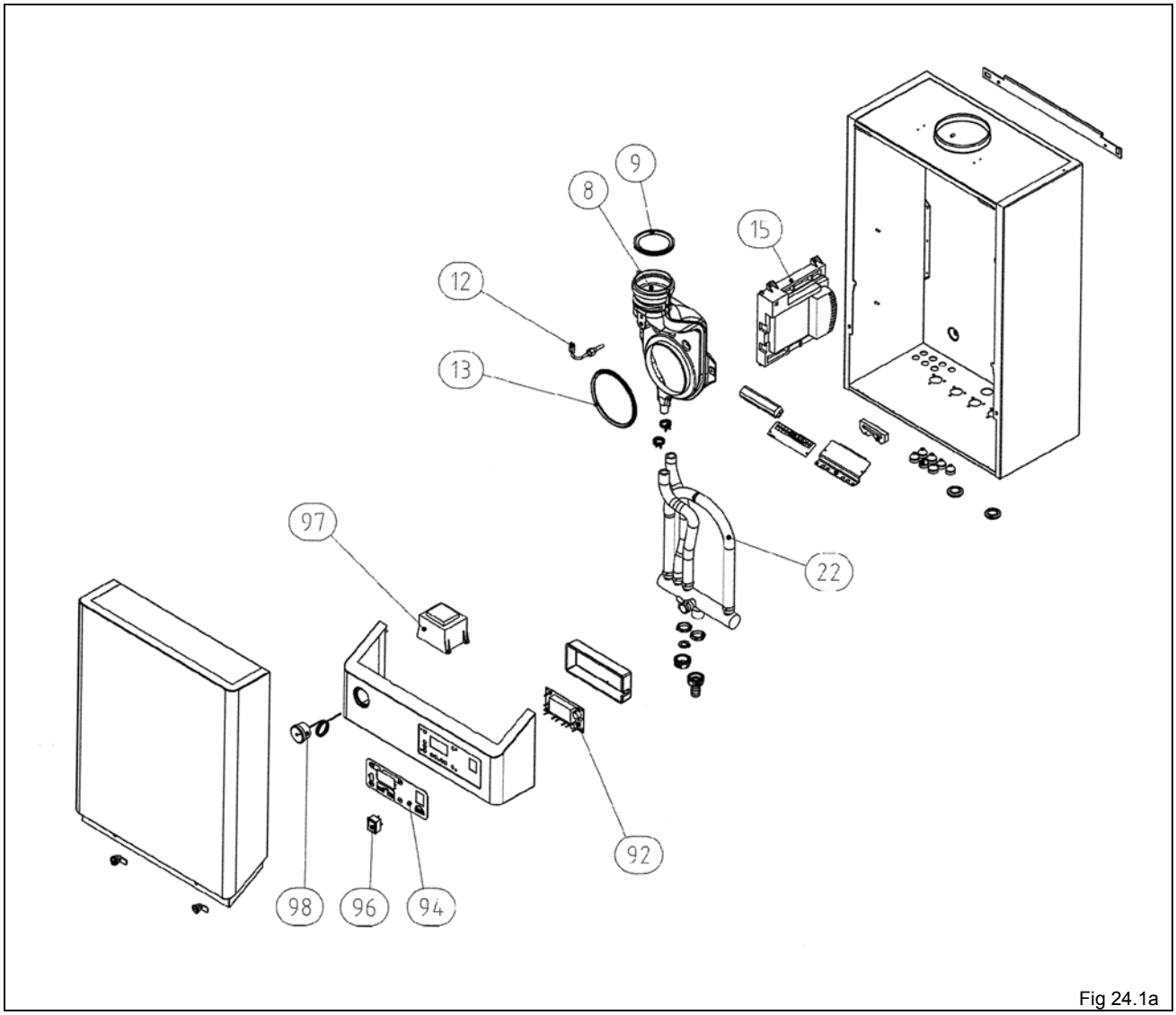


Fig 24.1a

Item No.	Description	Part Number
8	Flue Collector	852065896
9	80mm Flue Seal	846013828
12	Flue Gas Sensor	852012423
13	Heat Exchanger Flue Seal	852013836
15	LMU64 Controller {16}	852008317
	LMU64 Controller {31}	
	LMU64 Controller {47}	852008315

Item No.	Description	Part Number
22	Condensate Syphon	852018628
92	Display Module	852008915
96	ON/OFF Switch	852011721
97	Transformer	852045970
98	Pressure Gauge	852011118

24.1 Streamline 16, 31, & 47 (cont'd)

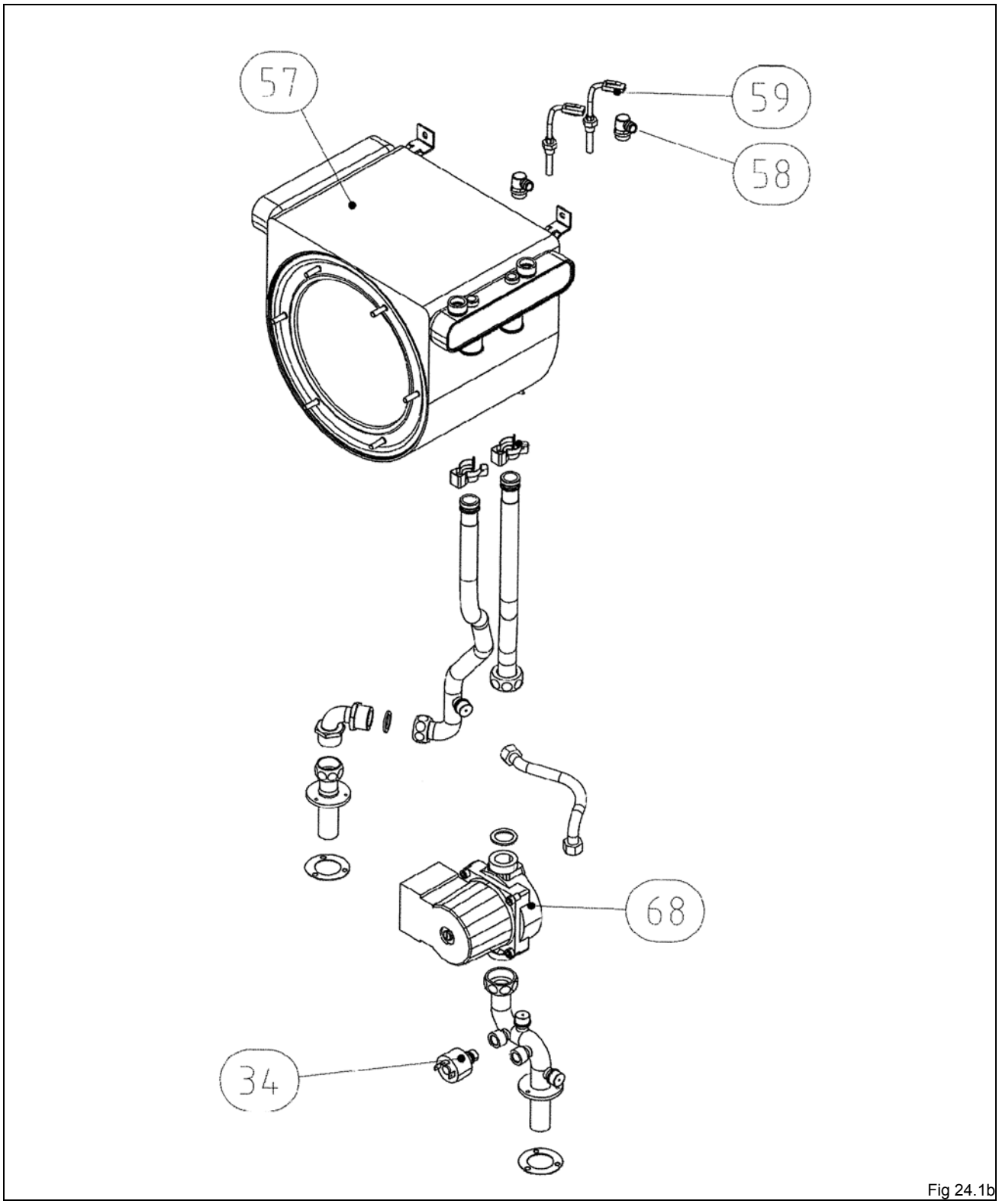


Fig 24.1b

Item No.	Description	Part Number
34	Water Pressure Switch	852011723
57	Heat Exchanger {16}	852000004
	Heat Exchanger {31}	
	Heat Exchanger {47}	852000001
58	Air Bleed Valve	846020381

Item No.	Description	Part Number
59	Flow/Return Sensor	852012423
68	Pump {16}	852005660
	Pump {31}	
	Pump {47}	852005661

24.1 Streamline 16, 31, & 47 (cont'd)

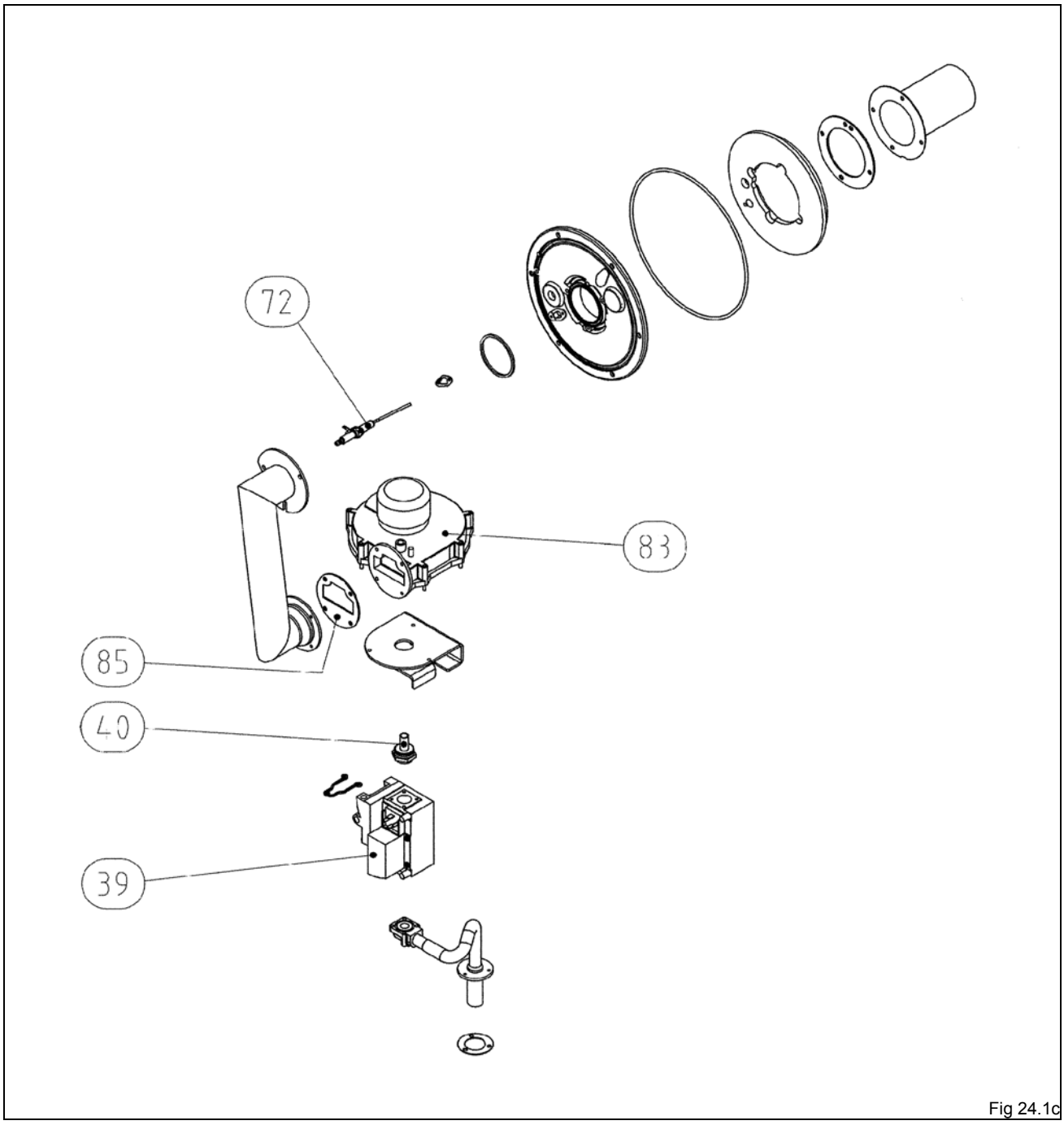


Fig 24.1c

Item No.	Description		Part Number
39	Gas Valve		852004959
40	Gas Injector {16}	(Nat Gas)	852003114
	Gas Injector {31}	(Nat Gas)	
	Gas Injector {47}	(Nat Gas)	852003116
72	Ignition Electrode		852001303

Item No.	Description	Part Number
83	Fan {16}	852004358
	Fan {31}	
	Fan {47}	852004360
85	Fan Outlet Gasket	852013829

24.2 Streamline 75

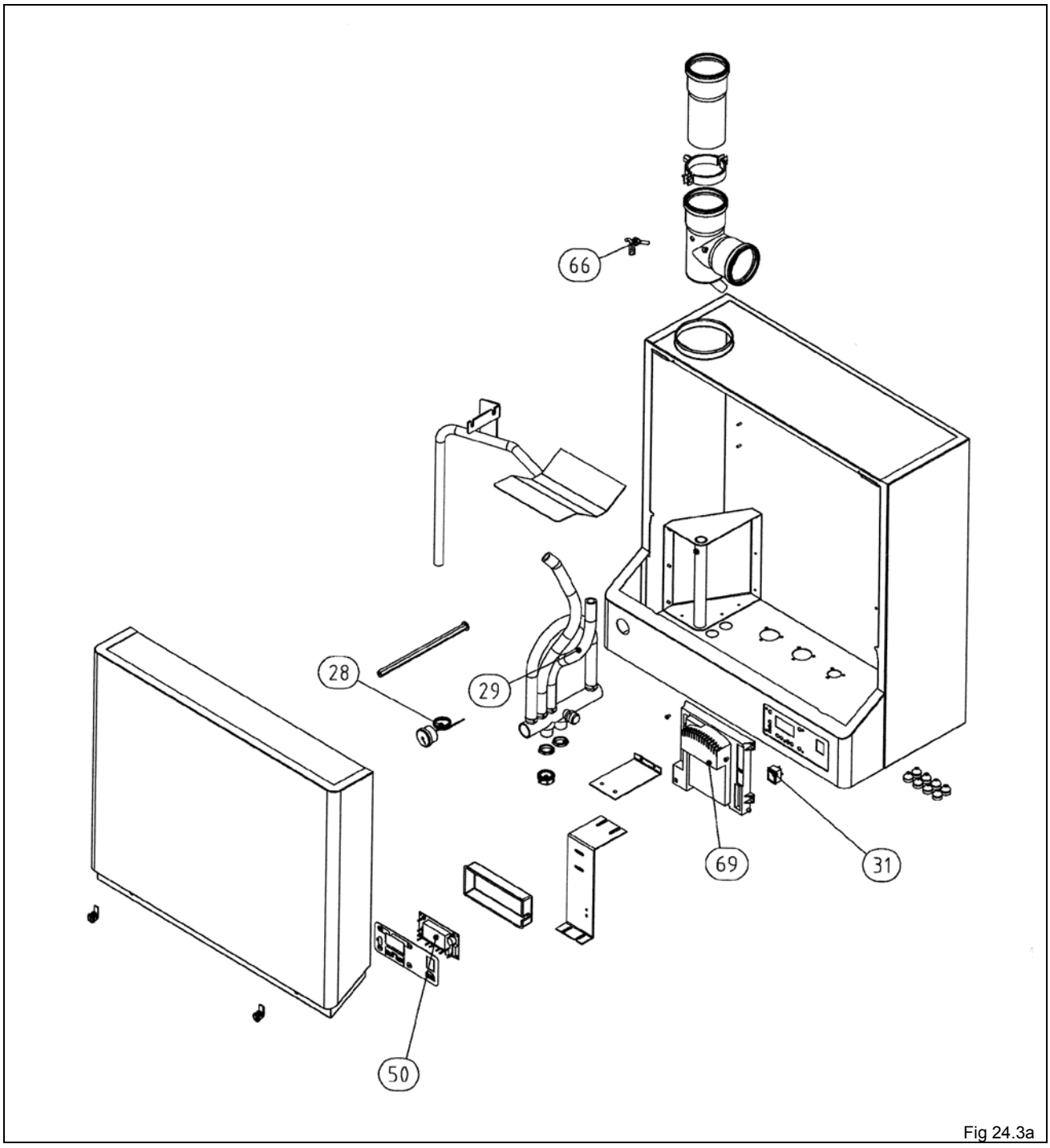
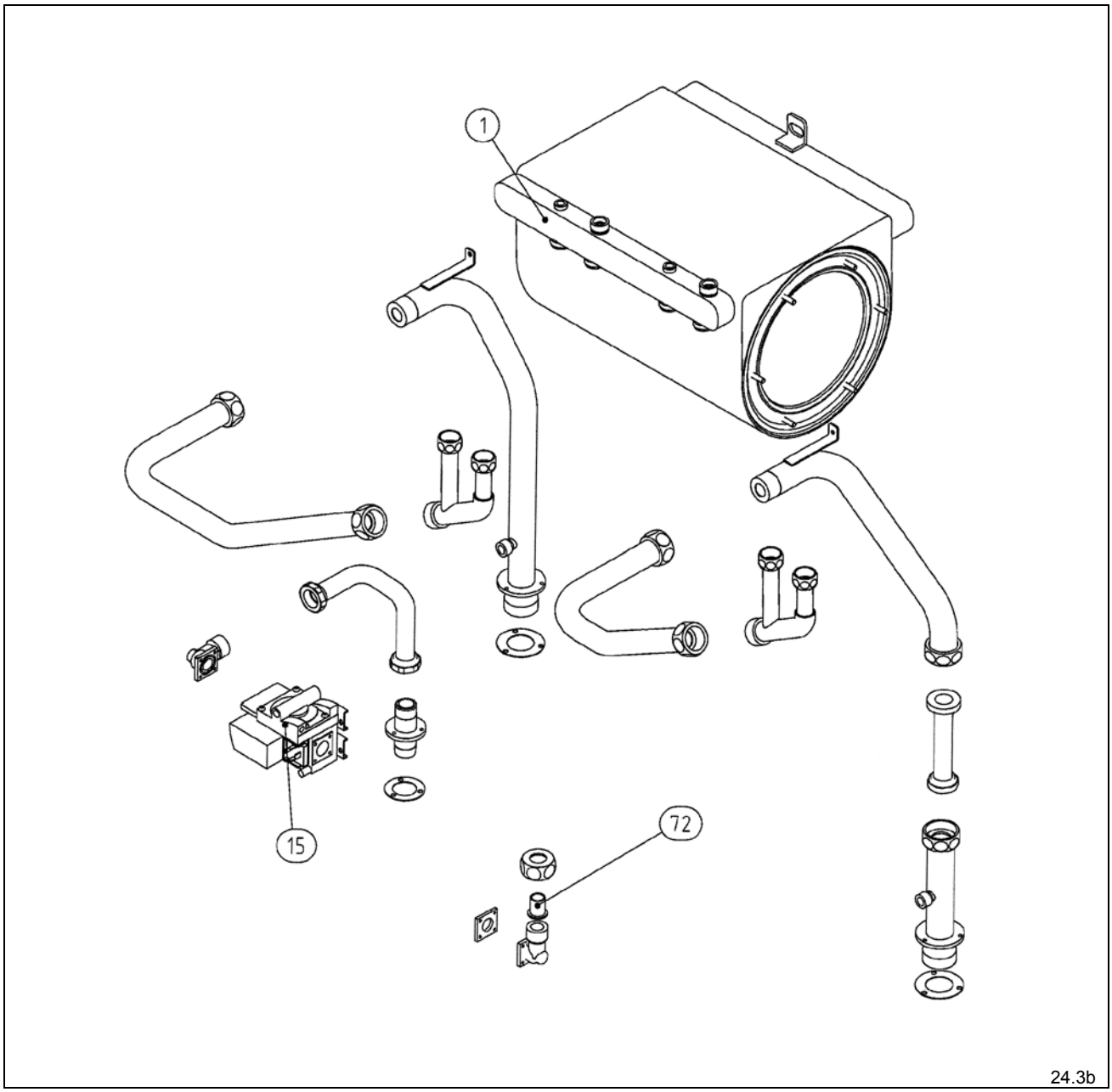


Fig 24.3a

Item No.	Description	Part Number
28	Pressure Gauge	852011118
29	Condensate Syphon	852018628
31	ON/OFF Switch	852011721

Item No.	Description	Part Number
50	Display Module	852008915
66	Flue Gas Sensor	852012423
69	LMU64 Controller	852008315

24.2 Streamline 75 (cont'd)



Item No.	Description	Part Number
1	Heat Exchanger	852000003
15	Gas Valve	852004959

Item No.	Description		Part Number
72	Gas Injector	(Nat Gas)	852003112

24.2 Streamline 75 (cont'd)

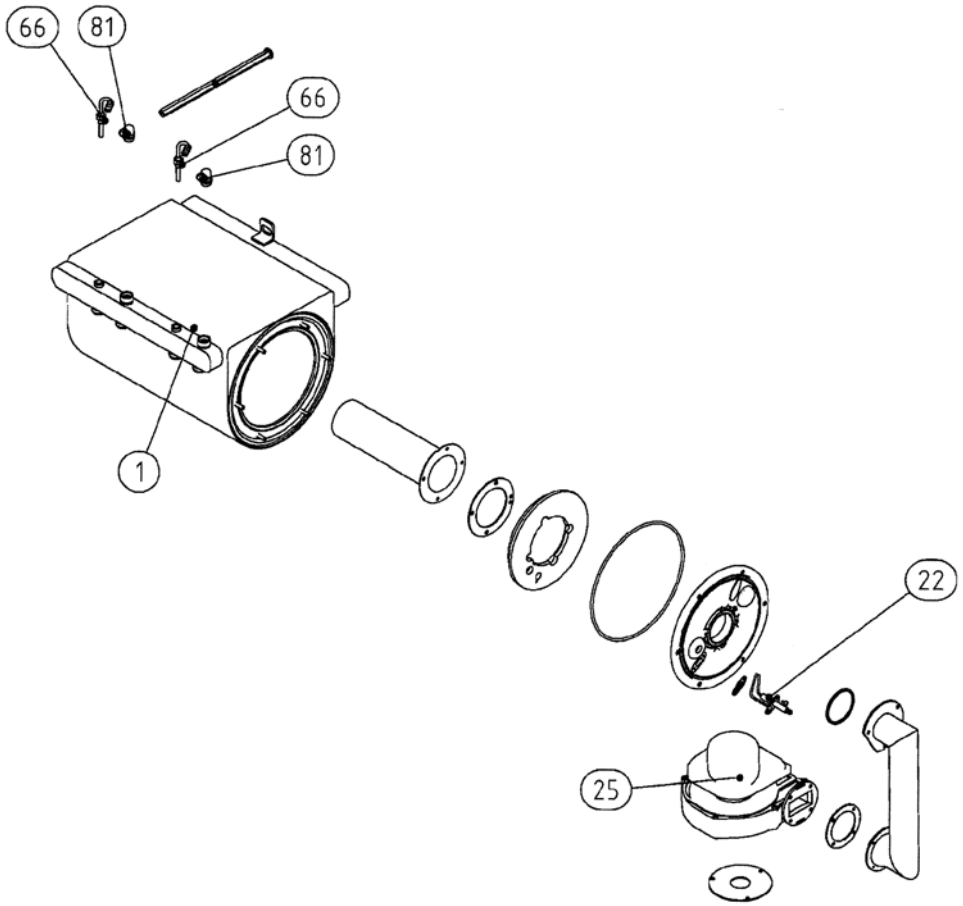


Fig 24.3c

Item No.	Description	Part Number
1	Heat Exchanger	852000003
22	Ignition Electrode	852001303
25	Fan	852004359

Item No.	Description	Part Number
66	Flow / Return Sensor	852012423
81	Air Bleed Valve	846020381

MHS BOILERS

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