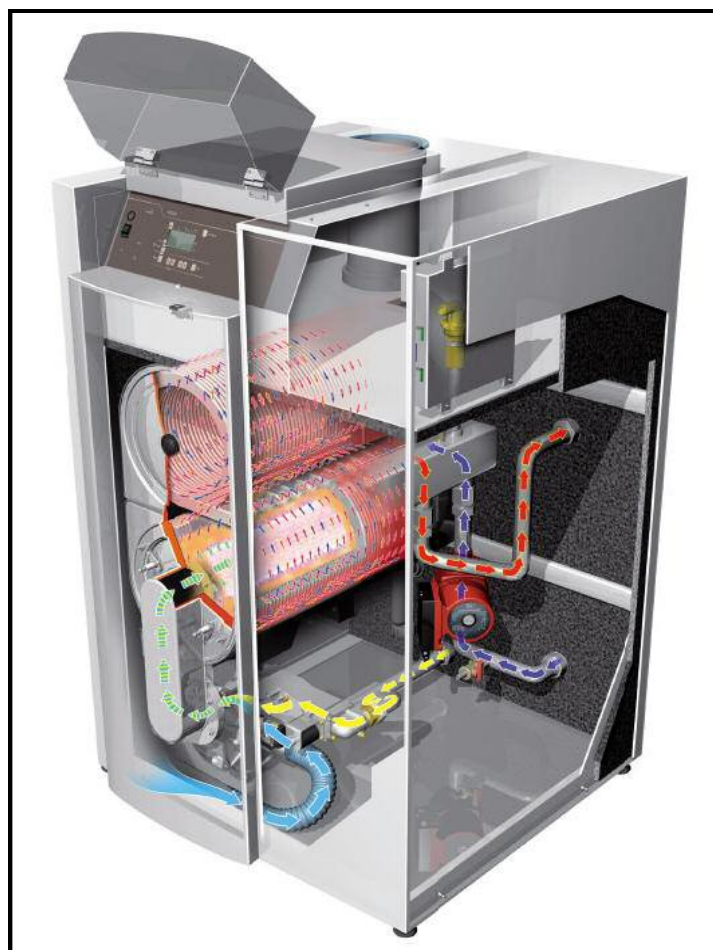


MHS

BOILERS

Ultramax PB 65 - 120 Floor Standing Condensing Boiler

Operating & Maintenance Manual



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1.0 General Notes

These instructions are intended to assist the installer; commissioning engineer, maintenance engineer and the user with the application and usage of the Ultramax PB floor standing gas fired condensing boilers.

Please read this manual carefully before commencing the installation, maintenance or commissioning of the appliance. Failure to strictly observe these instructions may invalidate the warranty or prevent the appliance from operating correctly.

The Ultramax PB must be installed and commissioned by persons deemed to be competent i.e. Registered with a recognised registration body.

All installations MUST conform to the Gas Safety (Installation and Use) Regulations and Building Regulations

If you need more information relating to this appliance or its installation please do not hesitate to contact us at MHS Boilers Ltd. 3 Juniper West, Fenton Way, Southfields Business Park Basildon. Essex. SS15 6SJ. Telephone 01268 546700 Fax 01268888270 or WWW.MHSBOILERS.COM

The data published in this manual is based on latest information (at the date of publication) and may be subject to revisions.

We reserve the right to continuous development in both design and manufacture, therefore any changes to the technology employed may not be retrospective nor may we be obliged to adjust earlier supplies accordingly.

The appliance must not be left to operate with the outer casing removed.

Instructions, data badge and warning labels on the boiler must never be removed or altered, and if damaged or missing should be replaced as soon as possible. Generally applicable safety instructions related to accident prevention must be consulted in addition to the information supplied in this manual.

This appliance must not be modified or non-manufactures spare parts fitted without written permission.

Failure to comply with the above may lead to prosecution.

This manual must be handed to the appliance user following completion of the installation.

1.1 Conformity Statement

Ultramax PB boilers are manufactured to the highest standards of quality, performance and safety, in accordance with EC standards and carry the CE mark.

1.2 Installation Requirements

The installation of Ultramax PB boilers must be in accordance with the relevant requirements of Gas Safety (Installation & Use) Regulations 1998, Health & Safety at Work Act, Building Regulations, British Standards, Institution Gas Engineers, IEE. Regulations, Construction (Design & Management) Regulations 1994, Local Authority Bye-Laws, National, Fire Regulations and Insurance Company requirements.

Flueing and Ventilation should be to the relevant Standards and Codes of practice, a guide to flueing is provided in Appendix E.

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The following Codes of Practice are also applicable: -

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 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 7593:2006 Code of Practice for treatment of water in domestic hot water central heating systems.
BS 7671:1992 Requirements for electrical installations. IEE Wiring Regulations. Seventeenth Edition
CISBE Guide reference sections B7, B11 and B13.
CP342 Part 2: 1974 Code of Practice for centralized hot water supply.
IGE/UP/1 or 1A Gas Tightness Testing & Purging of Commercial Industrial Gas Installations
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.
IG/UP/10 edition 3 Installation of gas appliances in Industrial and Commercial premises.
Part 1: Flued appliances.

1.3 Hot Water Quality

Composition and quality of the system water directly affects the performance of the entire system and the longevity of the boiler.

For the initial filling and subsequent refilling of the system, under normal circumstances, regular tap water with a pH value between 7 and 8 can be used unless the water is highly corrosive (chloride content > 150 mg/l) or very hard (<14° dH, hardness level IV). A tap water analysis can be requested from the local water utility company. If the specific system volume is greater than 20 litre/kW of heating power (for example through installation of a heating water buffer reservoir) the maximum permissible introduction of calcium via fill and replacement water must be determined according to the calculations specified in VDI Guidelines 2035. Softening of the fill water may have to be performed if necessary.

Criterion	Permissible Value	Effect upon Deviation
pH	7-8	Risk of corrosion for boiler components and heating system
Hardness	<14 dH	- increased calcium deposits - reduced longevity of boiler
Chloride content	<150 mg/l	Corrosion of alloy materials

1.4 Unknown Water Quality and Exchanger Systems

Quite frequently, water contains materials and additives, which affect function and longevity of the Heat exchanger. Therefore, either

- Prior to exchanging the equipment, heat up the old system and drain completely afterwards.

OR

- After exchanging the equipment, rinse the heating system carefully.

1.5 Existing System

For old systems, floor heating systems and problematic system water, MHS Boilers recommends the installation of a plate heat exchanger to segregate the primary and secondary systems.

1.6 Scope of Delivery

- Ultramax PB condensing boiler with switch panel, including exterior sensor with weather-regulated heating control for 1 heating circuit and hot water conditioning
- Documentation.

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2.0 PRODUCT DESCRIPTION

2.1 Technical Data

Ultramax Boiler Model		PB 65	PB 85	PB 100	PB 120
Product Identification Number		0063BQ3008			
Gas Category		112ELL3P / 112H3P			
Nominal Heat Output 80/60C	kW	8.4 - 60.0	15.6-77.8	17.6-88.2	21.9-109.8
Nominal Heat Output 40/30C	kW	9.4-65.0	17.0-85.0	19.2-96.3	24.0-120.0
Nominal Heat Input Net	kW	8.6 - 60.7	16.0 - 80.0	18.0 - 90.0	22.5 - 112.4
Gas Input Natural Gas G20	m3/h	6.28	8.28	9.32	11.65
Gas Input LPG G31	m3/h	2.42	3.2	3.6	4.6
Inlet Gas Pressure G20 Min/Max	mbar	20/25	20/25	20/25	20/25
Inlet Gas Pressure G31 Min/Max	mbar	30/50	30/50	30/50	30/50
Max Fluegas Mass G20	kg/h	111.6	147.6	165.6	208.8
Residual Flue Positive Pressure Max	Pa	230	230	230	230
Max Flow Temperature	C	85	85	85	85
Water Pressure Min/Max	bar	1.0/3.0	1.0/3.0	1.0/3.0	1.0/3.0
Residual Pump Head (Standard Blr Version)	kPa	11	11	23	15
Flow/Return Connections	BSP	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Gas Connection	BSP	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Flue Connection Concentric	mm	110/150	110/150	110/150	110/150
Flue Connection Parallel	mm	2 x 110	2 x 110	2 x 110	2 x 110
Condense Waste Connection Tail	mm	25	25	25	25
Water Content	l	6.6	8.4	10.3	12.0
Weight Dry/Wet	kg	115/121.6	120/128.4	145/155.3	150/162.0
Electrical Supply Voltage / Phases	/ Hz	220-240/1/50	220-240/1/50	220-240/1/50	220-240/1/50
Power Consumption Max (inc. internal pump)	W	240	321	363	418
Design Water Flow Rate @ 20°C	l/s	0.71	0.93	1.10	1.31
Efficiency @ Full Load Gross/Net	%	87.8/97.5	87.5/97.2	87.5/97.2	87.5/97.2
Efficiency @ 30 % of Full Load Gross/Net	%	97.3/108.0	96.9/107.6	96.9/107.6	96.9/107.6
Flue Classification		B23, C13, C33, C43, C53, C63, C83			
Optional Accessory Items					
Weight of Low Loss Header	kg	9.1	9.1	9.1	9.1
Resistance of Boiler with Inbuilt Low Loss Header	kPa	5.3	9.0	13.0	18.0
Weight of Boiler Protection Plate Heat Exchanger	kg	14.5	14.5	14.5	16.4
Resistance of Secondary Side of Plate Heat Exchanger	kPa	9.5	15.9	21.8	18.6
Maximum Pressure - Secondary Side of Plate Heat Exchanger	bar	6.0	6.0	6.0	6.0

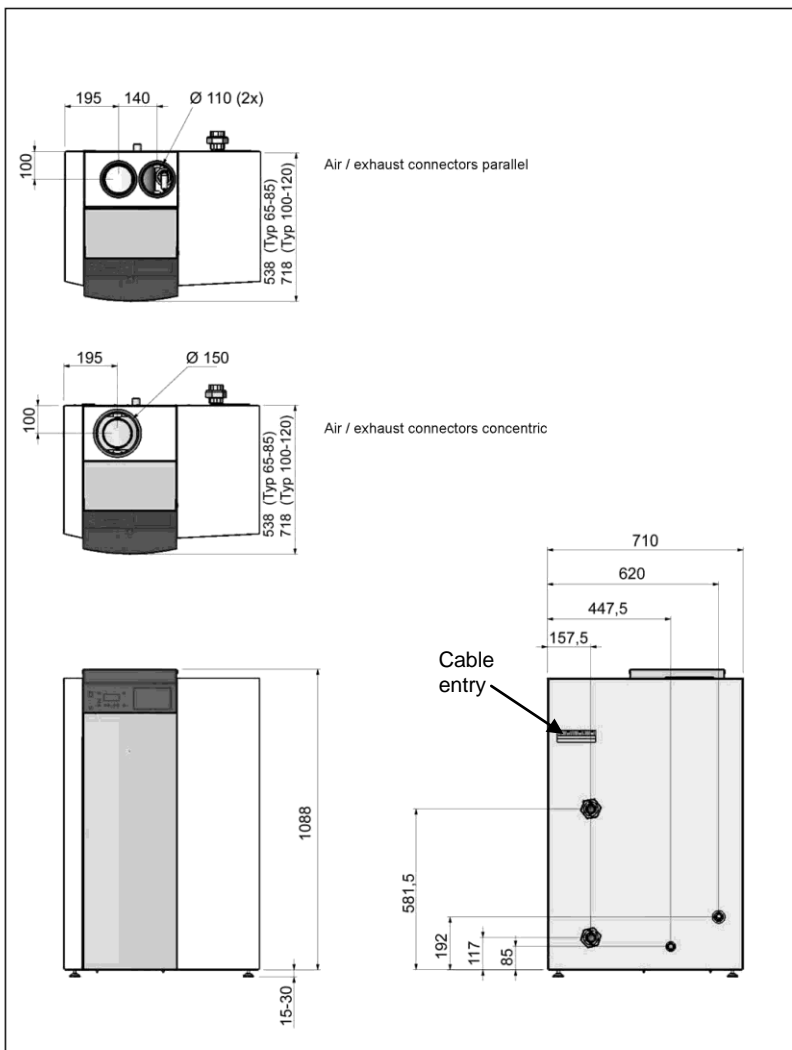
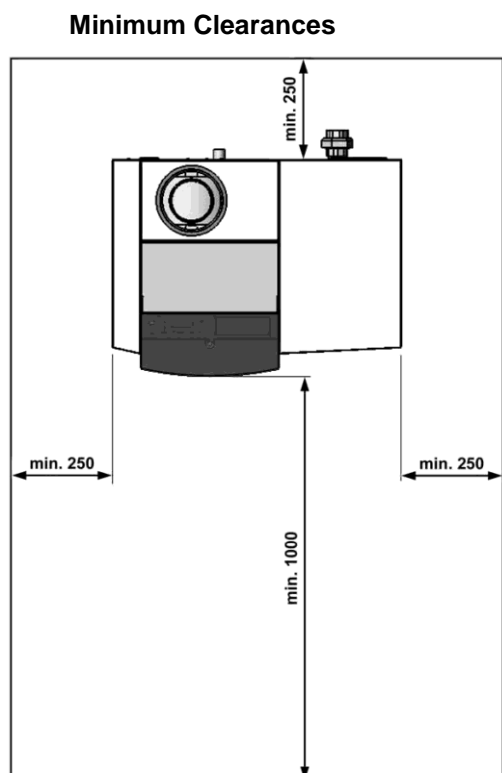
For boiler pump information please go to page 27.

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2.0 Production Description cont.

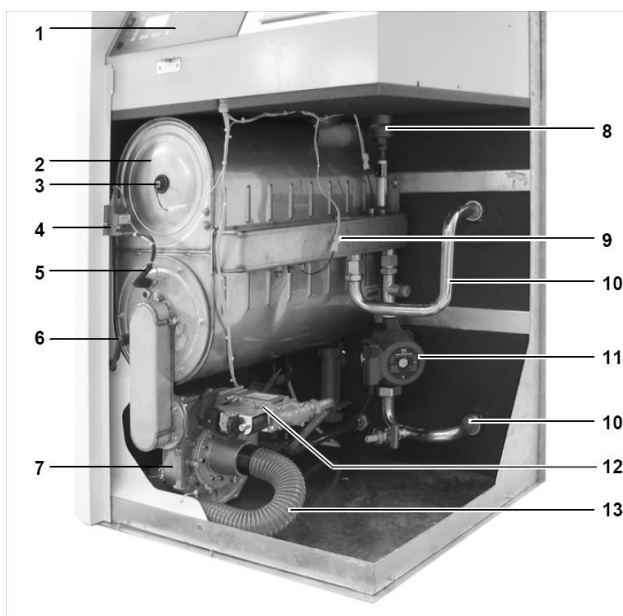
2.2 Dimension Diagram

Dimensions



2.3 Components

1	Control panel
2	Heat exchanger
3	Exhaust temperature sensor
4	Ignition transformer
5	Ignition electrode
6	Ionisation electrode
7	Fan
8	Auto Air Vent for heat exchanger
9	Flow and return sensor
10	Adaptor, standard version (to be change if plate or low loss header fitted)
11	Boiler pump
12	Gas valve
13	Air supply tube



ULTRAMAX PB 65 - 120

2.0 Production Description cont.

2.4 Compliance

The Ultramax PB condensing boiler is identified with CE-0063BQ3008 and is compliant with the following standards and guidelines.

- DN EN 677
- EN 60 335
- EN 55 014-1/2
- 90 / 396 / EWG
- 89 / 336 / EWG
- 73 / 23 / EWG
- 92 / 42 / EWG
- DIN EN 483
- DIN EN 297
- DIN EN 656
- Compliance with NOx limits required in accordance with 1 BImSchV§7 (2).

The Ultramax PB condensing boiler represents a system with a closed heat exchanger independent of room air. The air for combustion is provided through a ventilation system. The condensing boiler is used for closed hot water heating systems. Boiler performance is modulated and adjusted to the momentary demand in heat through the integrated controls.

2.5 Heat Exchanger

The 316L Stainless Steel Heat Exchanger is made of flat coils and provides for an exchange of heat from the exhaust to the boiler water. Condensation takes place at the upper part of the heat exchanger. Any condensate is discharged downward at the rear portion of the heat exchanger.

2.6 Regulations and Control Unit

The regulation and control unit assumes the function of automated firing as well as controlling the modulating operation of the boiler, including weather-regulated heating control and hot water conditioning, expandable through Clip in module to another mixed heating circuit. The display signals the operational readiness of the boiler and the automated firing controls monitor the technical safety aspects of the operation.

2.7 Accessories

2.71 QAA73 Room Unit

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



2.711 QAA70 Room Unit

The QAA70 is a Room Temperature Controller (available as an optional extra) for use with the RVA 47 Cascade Manager. For further information concerning installation and programming, please refer to the separate QAA70 Installation and Maintenance Manual.



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2.72 AGU2.500 Clip-In Module Extra Heating Zone

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).



2.73 AGU2.511 Clip-In Module BMS Interface

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 Lockout.

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

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



2.74 OCI420 Clip-In Module LPB Communication

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).



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2.75 RVA47 Cascade Controller (Grey) & Housing

The RVA47 Cascade Controller (Grey) is a comprehensive unit that can be wall or control panel mounted. The RVA47 is supplied with 2 No QAD21 System Sensors (flow & return) and a QAC32 outside air sensor. Each Ultramax PB 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.



2.76 RVA46 Zone Controller (Black)

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.



2.77 RVA63 Zone Controller (Grey) & Housing

The RVA63 Controller (Grey) is a comprehensive controller that can be wall or control panel mounted. The Ultramax PB 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.



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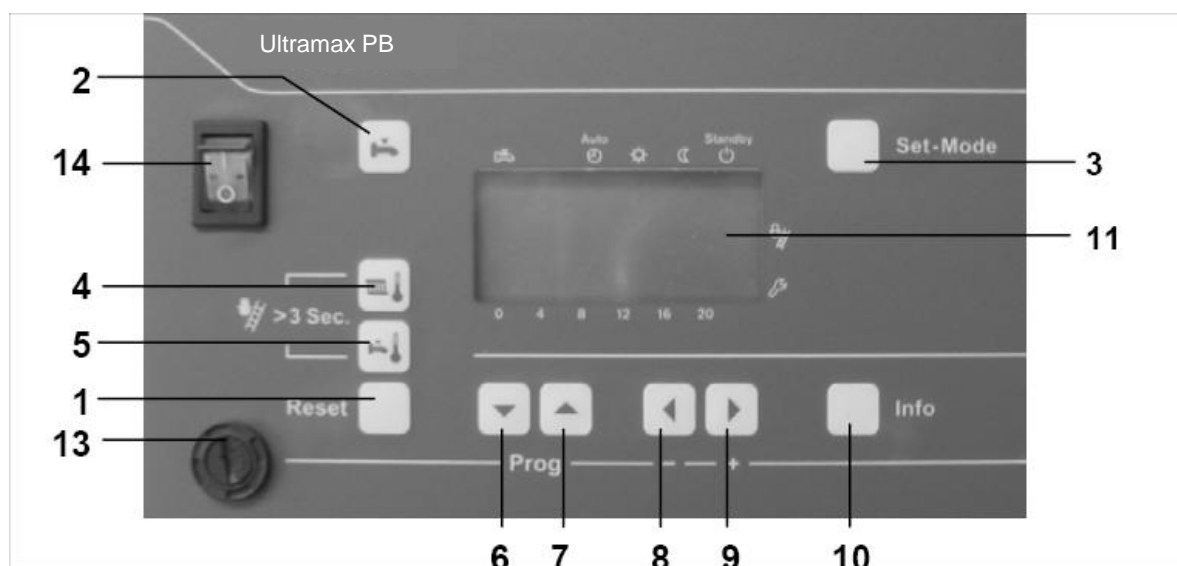
2.8 Control Panel

The switch panel and all of the above operating elements are integrated into the condensing boiler. The LMU system electronics offer:

- Management of modulating boiler control
- Weather-regulated heating control for 1 heating circuit
- Hot water generation
- Outside Air Sensor


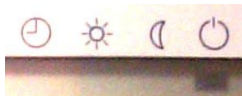








The hot water temperature is factory preset to 55°C but can be changed. The heating circuit characteristics are preset and can be adjusted according to the respective system. All adjustment parameters can be adjusted using the AGU 2.311 operating panel on the front of the boiler or the QAA73 room unit (accessory).

1	Button Reset (unlock)
2	Button Operating mode domestic water use
3	Button Operating Mode heating circuit
4	Button Target temperature heating circuit.
5	Button Target temperature domestic water use
4+5	Buttons Chimney sweep (To put into commissioning mode press and hold together for at least 3 secs until 100% appears in the display.)
6	Buttons Line selector (Down)
7	Buttons Line selector (Up)
8	Buttons Setting (Back) Minus
9	Buttons Setting (Forward) Plus
10	Button Information
11	LCD Display
13	Fuse 6.2 AT
14	Switch ON – OFF



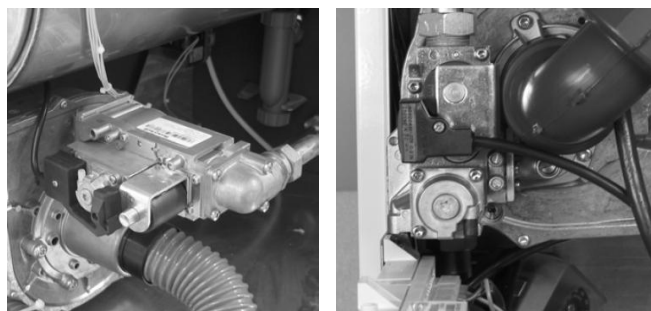
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2.0 Production Description cont.

Button	No of Presses	Description	Options / Range	Recommended Setting
	1 - 4	Mode of Operation. 'Automatic', 'Constant', 'Night Set-Back', 'OFF, frost control'. (Cursor under symbol dictates mode selected).		Automatic (Cursor under Clock Symbol).
	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.	Selection of operating line	
		Buttons for the adjustment of selected values	Re-adjustment of set-up parameters	
	1	Full System Reset following a Fault, or Customer Induced fault E153.	N/A	N/A
	1	Maximum Heating Temperature, or Assumed Room Temperature <i>{If Outside Air Sensor (QAC34) has been installed}</i>	20 - 85°C or 10 - 30°C	80°C or 20°C
	1	Stored Hot Water Target Temperature. <i>{If HWS Sensor (QAZ21) has been installed}</i>	20 - 60°C	55°C
	1	Hot Water Selection On/Off. <i>{Only available if HWS Sensor (QAZ21) connected, or Volt Free Stat is in Demand position}.</i>		On (Cursor under symbol under TAP Symbol).

2.9 Compact Gas Fitting

The compact gas fitting functions as a gas safety shutoff valve and as a control valve. The control valve operates as a pneumatic gas/air differential pressure valve. On the gas exit side, it controls the gas pressure P_0 as a function of the combustion air pressure P_L . If no air pressure is accumulated ($P_L = 0$), the gas valve remains closed. The gas/air pressure ratio and thus the gas/air volume ratio can be adjusted and therefore remain nearly constant throughout the set load range.



Safety shutoff valves 2, class B/C
 Line Voltage 239 VAC
 Current load 0,37A
 Gas pressure monitoring set to 10 mbar
 Gas fitting including gas filter

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3.0 General Requirements

3.1 Condensing Boiler

In condensing boilers, residual heat is extracted from the exhaust gases through cooling and condensation and subsequently fed back into the heating system. This ensures a high degree of efficiency and low energy consumption.

3.2 Chimney Notes

Exhaust vents must be installed in a shaft or chimney compliant with the prevailing Standards and Codes of Practice.

The low flue gas temperature and residual fan pressure prevail ant with the Ultramax PB boilers, place specific design requirements on the chimney system serving the appliance.

Examples:

The joints in flue system components must be moisture and pressure tight. The typical dynamic pressure expected within the flue system will be in the region of 200pa.

The flue component must be manufactured from a material that will not fail when subjected to the condense formed during the combustion process. This will be slightly acidic with a PH level between 5.5 and 7.0.

Flue system components must be selected, sized and designed to meet the specific requirements of the boilers and site conditions. If there is potential for the condensate formed within the flue system to be exposed to sub-zero temperatures, provision must be incorporated to ensure that freezing does not occur.

Suitable access must be made available to allow all joints within the flue components to be inspected as a part of general maintenance procedures

3.3 Prior to assembly of any condensing boiler, always check the exhaust vent system.

Dimensions shall be applicable to the use of a polypropylene (PPS) exhaust system in pursuant to the prevailing Standards and Codes of Practice. The low exhaust temperatures require commercially available exhaust vents applicable to condensing boilers.

Examples:

- Chimneys resistant to moisture
- Interior shells resistant to condensate
- Certified exhaust vents
- Diameters of connectors (sleeves) must be taken into consideration for minimum shaft diameters.

3.4 Condensate

The connection of the condensate discharge (behind boiler) must be sloped into the discharge line.

The location of condense pipework must be protected against freezing within tundishes, traps and pipework.

The condensate may be discharged into the foul water system subject to National or Local Regulations.

3.5 Exhaust venting

Conduit pipes and sections must be

- freely accessible and available for inspection from outside the shafts and must be protected from freezing.

3.6 Exhaust vents

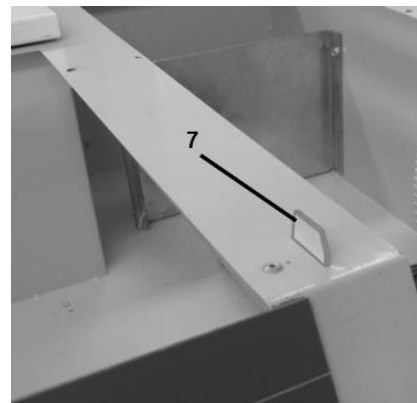
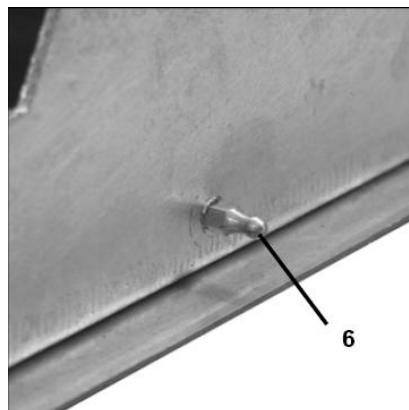
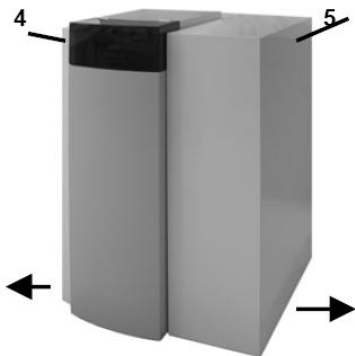
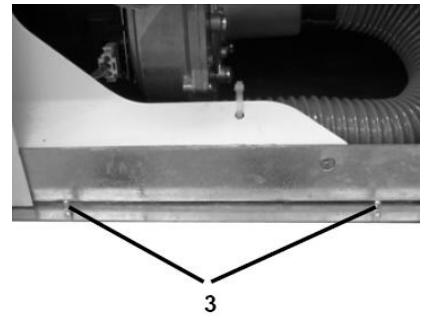
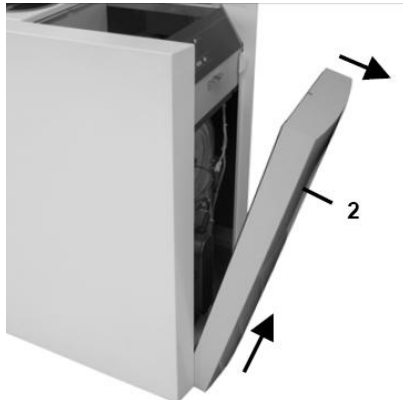
- must be resistant to moisture
- must be suitable for exhaust temperatures below 40°C
- must be suitable for positive pressure
- Suitable for temperatures up to 80°C

ULTRAMAX PB 65 - 120

4.0 Installation instructions

4.1 Disassembly of boiler panels

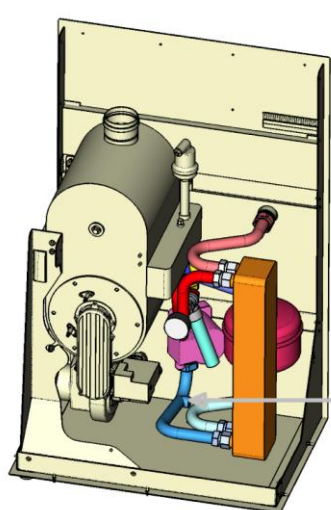
- Loosen Allen bolt (1) at front panel (2). Exert slight pressure to front panel.
- Pull the front panel forward and pull upward out of the retainer clip (3).
- Pull off top panel upwards.
- Remove side panels (4+5) to the bottom right and left from the retainer clips (6) and take off at the top via the two fastening tongues (7).



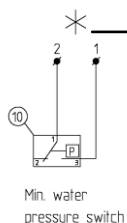
ULTRAMAX PB 65 - 120

4.2 Installation of internal hydraulic pressure switch

In order to protect the boiler / plate heat exchanger primary circuit from operating under conditions of low water pressure, a minimum water pressure switch kit has been developed and is now available as an additional optional extra item. Please ensure that this item is mounted / included whenever a boiler protection plate heat exchanger set is utilised with the Ultramax PB Boiler. As can be seen from the diagram below, the pressure switch is mounted to a tee piece, which is attached via the primary drain cock tapping.



The cables from the pressure switch to the terminal rail should be routed via the grommet circled in the image.

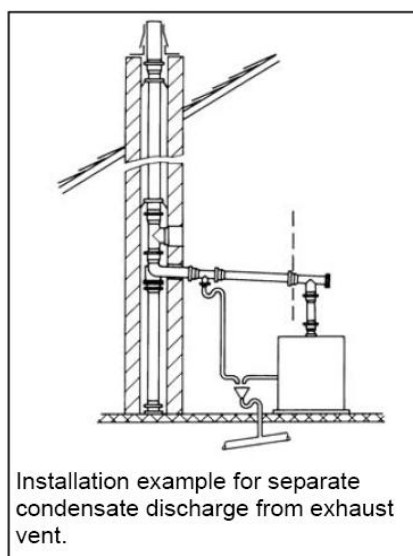
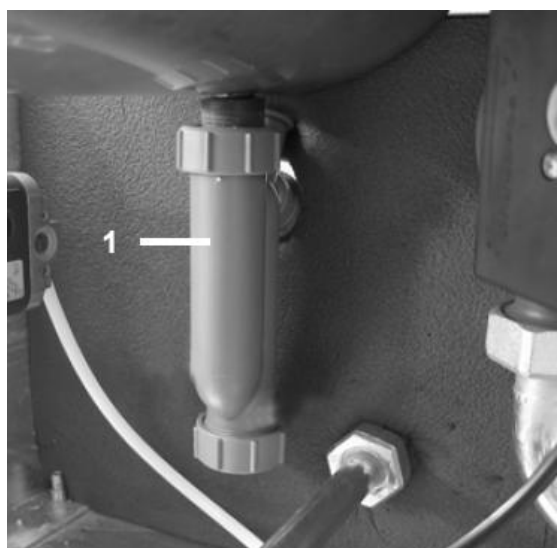


Min. water pressure switch

To electrically connect the minimum water pressure switch (10); remove and discard the link between terminals 1 & 2 on the main terminal strip within the boiler and connect the switch as shown in the adjacent diagrams

4.3 Siphon and condensate discharge

- Insert siphon (1) according to the Figure below.
- Dismount cover panelling from condensing boiler.
- Connect condensate discharge to a foul water drain or a neutralizing device (accessory) to the siphon.



Installation example for a separate condensate discharge from the exhaust vent

Note:

The condensate must be able to freely drip into a funnel. The condensate pipework must be acid resistant and connected to the foul water drain.

4.4 Flue Installation Options

For the installation of the exhaust system, please pay attention to the respective local regulations.

ULTRAMAX PB 65 - 120

4.0 Installation instructions cont.

4.5 Connection to air/exhaust system through an existing chimney.

For the concentric air/exhaust system, use original accessory parts only, including the PPS exhaust system lubricant available. Gas condensing boilers with an air/exhaust system via an existing chimney to the roof must be installed in the attic or in rooms in which the ceiling is also the roof, or where the only thing above the ceiling is the roof construction. Unless using a flexible liner to the relevant standards.

The air/exhaust system must not be routed through any other storage rooms. Unless using a flexible liner to the relevant standards.

If the ceiling requires certain fire resistance duration, all conduits for the combustion air supply and the exhaust ventilation must have a similar fire shielding of non-flammable materials between the top of the ceiling and the roof skin.

If no such fire resistance duration is required for the ceiling, all conduits for the combustion air supply and the exhaust ventilation must be routed inside a shaft of non-flammable and shape-resistant materials or inside a metal protective pipe between the top of the ceiling and the roof skin (mechanical protection). Exhaust conduits must be able to be checked for free passage. The installation must be equipped with at least one inspection opening for maintenance purposes.

Sleeve and seal shall make exhaust-side connections. All sleeves must be placed counter to the flow direction of the condensate. The air/exhaust system must have a 3° slope towards the condensing boiler.

The overall length to be calculated for the air/exhaust system shall not exceed 15m for an installation against the exterior wall or for an air/exhaust system through the roof. The calculated length of the air/exhaust system consists of the length of straight pipes plus the length of pipe bends. A 90° bend is calculated at 1 m, a 45° bend as 0.8m in length.

We recommend a minimum distance of 2.5m between the combustion air supply and exhaust routing through the roof in order to avoid effects upon each other.

4.6 Connection to moisture-resistant air/exhaust chimney, exhaust chimney, or exhaust system.

Chimneys as exhaust systems may be permitted for gas condensing boilers by the building and local authorities. Using the calculation tables pursuant to the respective exhaust values category specifies the dimensions. A maximum number of three 90° angles are permitted for the installation. For chimneys a conveyance pressure of 0 Pa is applied for calculation purposes.

4.7 Connection to moisture-resistant air/exhaust chimney C43x

The straight air/exhaust system for installation in an air/exhaust chimney must not be longer than 1.4m. A maximum number of three 90° angles are permitted for the installation.

4.8 Connection to moisture-resistant exhaust chimney or exhaust system B23 for room air independent operation

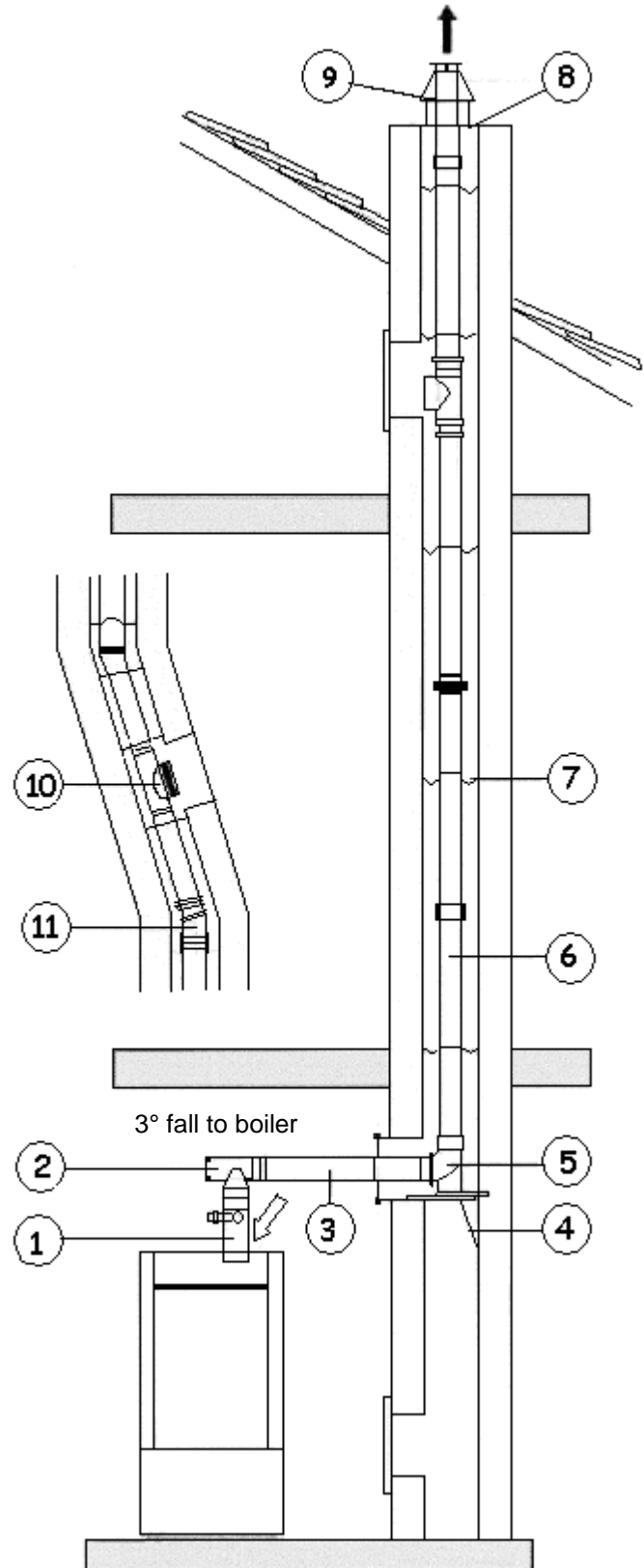
The straight air/exhaust system for installation in an exhaust chimney must not be longer than 2m. A maximum number of three 90° angles are permitted for the installation.

ULTRAMAX PB 65 - 120

4.0 Installation instructions cont.

4.9 Room Air Independent flue arrangement.

- 1 Boiler connector
- 2 T-connector with lid, 87.5°
- 3 Pipe with sleeve
- 4 Support bracket
- 5 Support round
- 6 Pipe with sleeve
- 7 Spacer
- 8 Chimney shaft cover
- 9 Roof Terminal
- 10 Access hole
- 11 Bend 30°





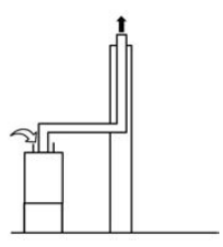




ULTRAMAX PB 65 - 120

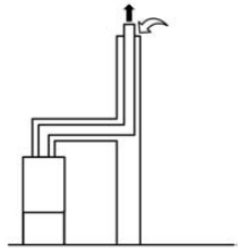
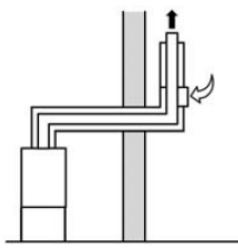
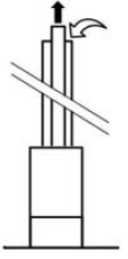
4.0 Installation instructions cont.

4.10 Flue installation options

Room air dependent

B23	<p>Exhaust connected to exhaust system Multiple assignment (vacuum, overpressure)</p> <p>Basement installation Air supply from installation room Exhaust venting via roof</p> <p>Minimum shaft diameters Shaft rear ventilation pursuant to DIN 18160 when using B23 configuration (room air dependent)</p> <table border="1" data-bbox="247 716 662 862"> <tr> <td>Exhaust pipe diameter</td><td></td><td></td></tr> <tr> <td>110 mm</td><td>> 168</td><td>188</td></tr> </table>	Exhaust pipe diameter			110 mm	> 168	188	
Exhaust pipe diameter								
110 mm	> 168	188						

Room air independent PPS/Alu white

C33x	<p>Air and exhaust venting via roof at same pressure range</p> <p>Basement installation Exhaust and ventilation system to exhaust chimney Air and exhaust venting via roof Installation in moisture-resistant exhaust chimney</p>	
	<p>Air and exhaust venting via roof at same pressure range</p> <p>Floor or roof installation Exhaust and ventilation system via pitched or flat roof</p>	
C43x	<p>Connection to AZ / LAS (2 conductor) multiple assignment</p>	<p>By customer</p>
C53x	<p>Air supply and exhaust venting to outside in different pressure ranges</p>	<p>By customer</p>
C63x	<p>Air and exhaust connection to separate tested and supplied air / exhaust pipes</p> <p>Basement / floor installation Air and exhaust venting via exterior wall Exhaust venting through heat insulated exhaust pipe or AZ-AW Exhaust line (standing air layer) at exterior wall</p>	
C83x	<p>Exhaust connection to exhaust system, multiple assignment (vacuum) Combustion air supply via separate air pipe.</p>	<p>By customer</p>

ULTRAMAX PB 65 - 120

4.0 Installation instructions cont.

4.11 Connection to a combustion air supply and exhaust system C63x not tested in conjunction with gas boiler.

The straight air/exhaust system for connection to a combustion air supply and exhaust system must not be longer than 2m. A maximum number of three 90° angles are permitted for the installation. If combustion air is supplied from the shaft, it must be kept free from any dirt.

4.12 Multiple assignment of exhaust systems (not part of the delivery program)

For modular flue systems, the calculation, layout and proof of functionality by the chimney manufacturer must be taken into consideration.

	Temperature (°C)	Volume flow (m³/h)	Mass flow (g/s)	Conveyance pressure (Pa)
Ultramax PB	Max./Min.	Max./Min.	Max./Min.	Max./Min.
65	70 / 55	113 / 16	31 / 4	230 / 10
85	70 / 55	149 / 30	41 / 8	230 / 15
100	70 / 55	168 / 34	46 / 9	230 / 15
120	70 / 55	209 / 42	58 / 12	230 / 15

Flue System

The Ultramax PB Boilers have been tested using 110/150 Concentric Flue and as a result of the examination, the appliances may be used with up to 15m of Concentric Flue Pipe plus 4 x 93 degree bends plus a Concentric Terminal.

If planning to install a non room sealed flue; the following data will be of assistance:

Boiler Model		PB 65	PB 85	PB 100	PB120
Max Resistance of Flue	Pa	230	230	230	230
1m Length 110mm Ø PP Flue	Pa	1.25	2.25	3.0	4.0
110mm Ø 93° PP Bend	Pa	1.25	2.25	3.0	4.0
110mm Ø 45° PP Bend	Pa	1.0	1.8	2.4	3.2
110mm Ø Open Termination with	Pa	1.25	2.25	3.0	4.0

4.13 Ventilation / exhaust system

Applicable local regulations must be complied with when installing the exhaust system. The Ultramax PB heating boiler must be operated with an approved exhaust system only. Customer supplied exhaust systems must be resistant to moisture, corrosion and condensate, and must comply with all static and operational requirements. The chimney design should be such that resistance to flow and therefore static pressure within the system is minimised. The termination should be open with a mesh only.

The connection between flue and Ultramax PB must be sloped (3%) so that the accumulating condensate may flow back from the exhaust pipe. This connection should have as few bends as possible. The exhaust vent shall have inspection openings to current Standards and Codes of Practice.

4.14 Exhaust Pipes

Horizontal pipe layout must be avoided in order to avoid any puddling of condensate. You must ensure that the various components are connected and sealed tightly. Any assembly shall use 45° bends. Vertical parts shall be fastened with straps.

4.15 Placement and Distances

Minimum distances must be maintained in order to enable free access for operation and maintenance.

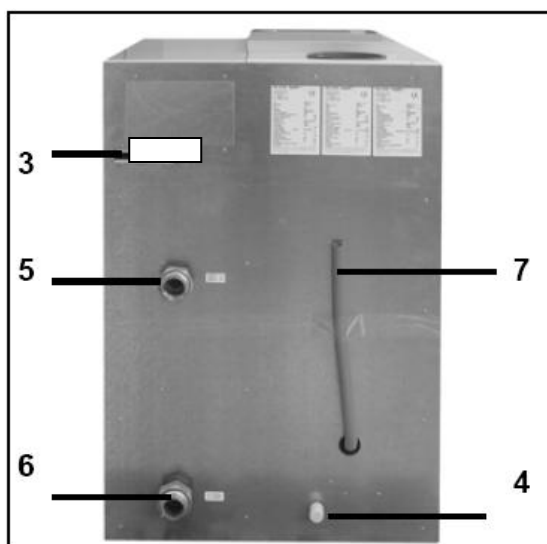
ULTRAMAX PB 65 - 120

4.0 Installation instructions cont.

4.16 Installation requirements

- The system shall not be placed inside any rooms with aggressive vapours (such as hairspray, perchloroethylene, tetrachlorobenzene) or high accumulation of dust or humidity (such as a laundry room).
- The place of installation must be protected against freezing. Any warranty shall be void for damages resulting from non-compliance with these requirements. When assembling the equipment, care must be taken to prevent any foreign particles (such as drilling dust) from entering the gas-condensing boiler.
- The plinth or floor must be sufficiently strong to support the weight of the filled boiler and be flat and level.
- The floor or plinth must be fire proofed to BS 6644 2005 and allow sufficient space for installation, commissioning, service and maintenance.

3	Cable passage for exterior cable
4	Gas connector $\frac{3}{4}$ "
5	Flow connector
6	Return connector
7	Condensate connector



ULTRAMAX PB 65 - 120

5.0 Hydraulic Schemes

Typical single
Ultramax PB
(standard version)
boiler schematic

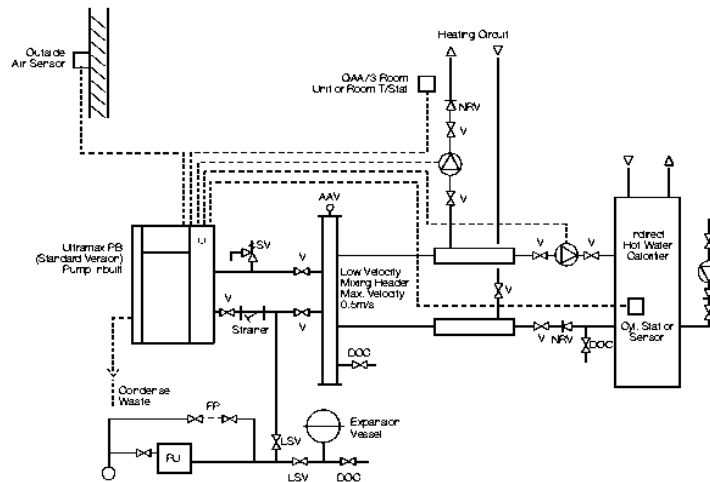


Fig.1

Typical scheme
for single
Ultramax PB
boiler with inbuilt
optional low loss
header or boiler
protection plate
heat exchanger

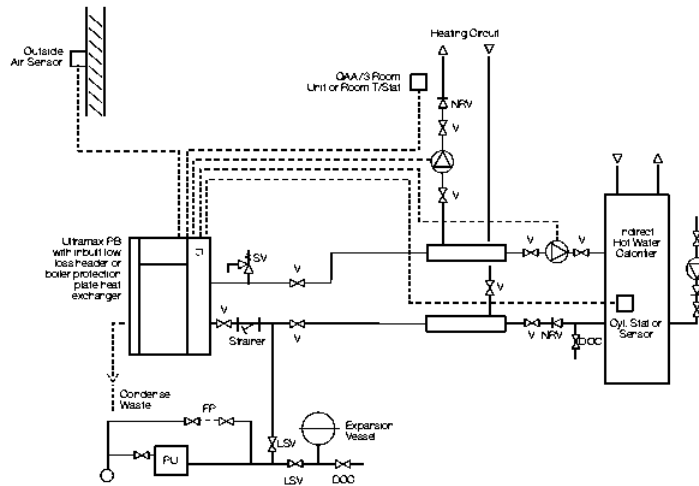
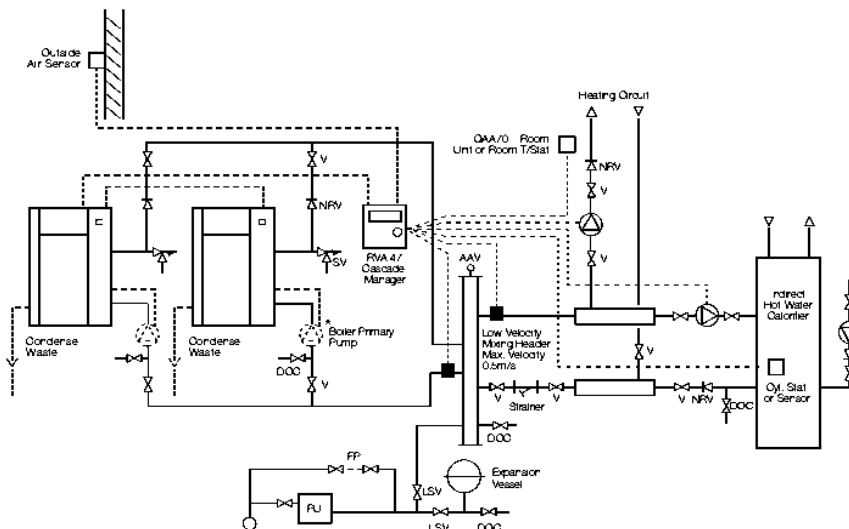


Fig.2

Note: Boilers equipped
with optional boiler
protection plate heat
exchanger must be
provided with
(temporary) provision
for filling to fill point
located within boiler
casing

Typical multiple
Ultramax PB
installation
schematic. If using
RVA47 Cascade
Manager + OCI420
Communication
Clips within boilers
from MHS - up to
12 boilers may be
controlled



Note: Boilers equipped
with optional boiler
protection plate heat
exchanger must be
provided with
(temporary) provision
for filling to fill point
located within boiler
casing

* Boiler primary pump -
only required when
boilers are equipped
with boiler protection
plate heat exchangers

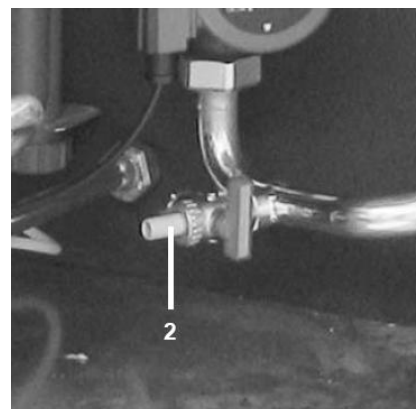
Fig.3

ULTRAMAX PB 65 - 120

6.0 Filling system

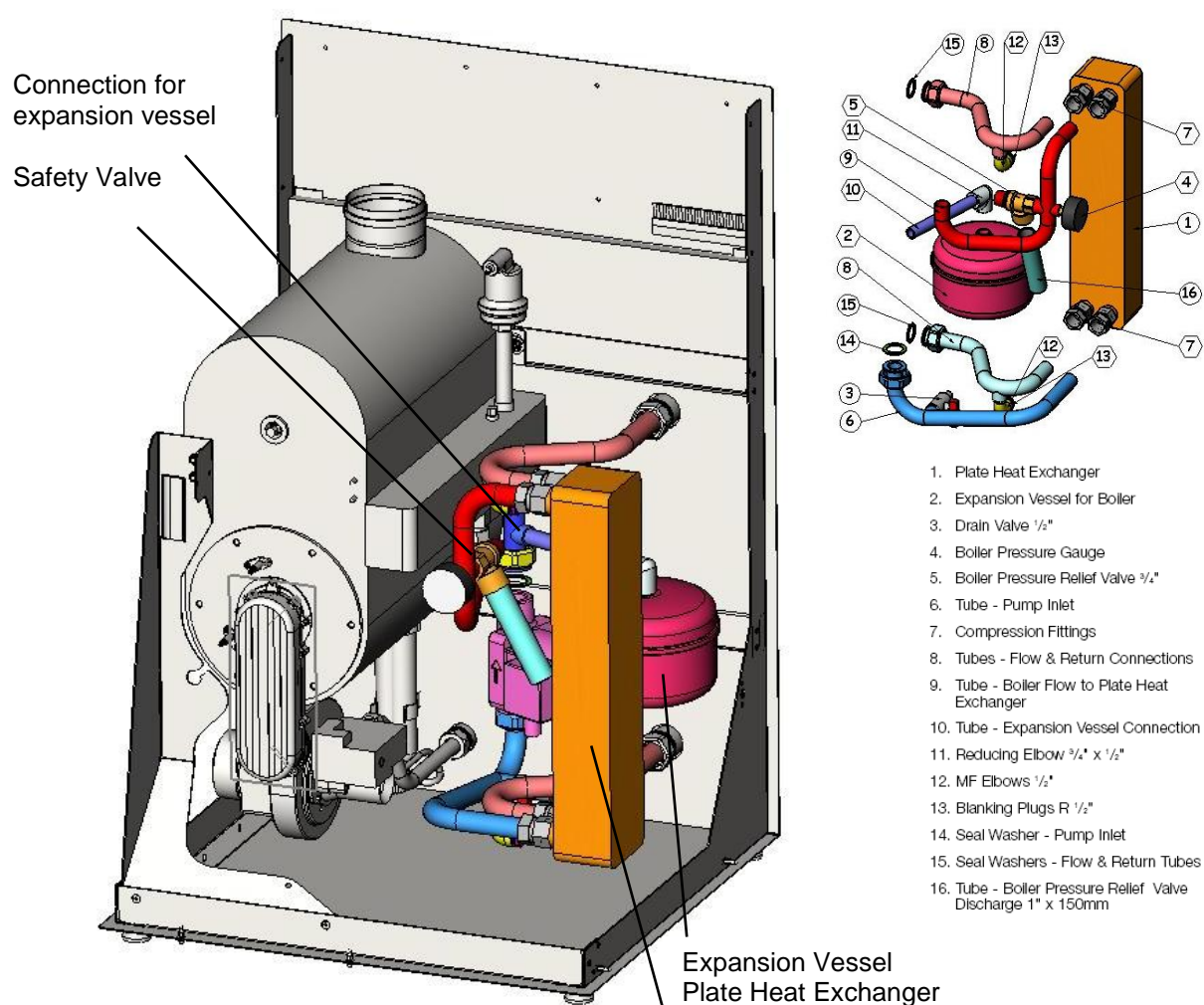
Connect water hose to KFE valve (2).

- Open all radiator valves.
- Fill cold system up to 1 bar.
- Monitor water quality.
- Ventilate pump (loosen impeller with screwdriver if necessary).
- Fill condensate siphon with water (approx. 0.5L).
- Start-up pump several times.
- Upon completion venting, fill system to final operating pressure.
- Close venting screw and remove filling hose.



6.1 Installation of internal hydraulic accessories

Plate Heat Exchanger

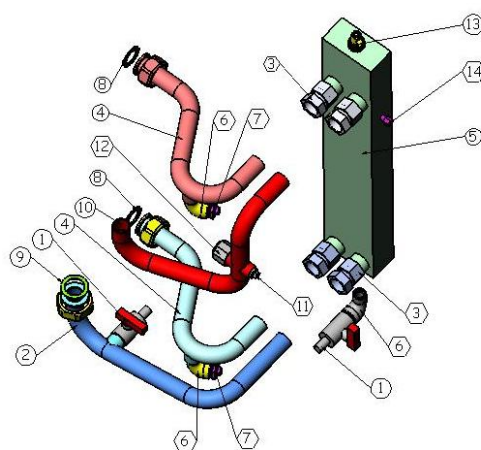
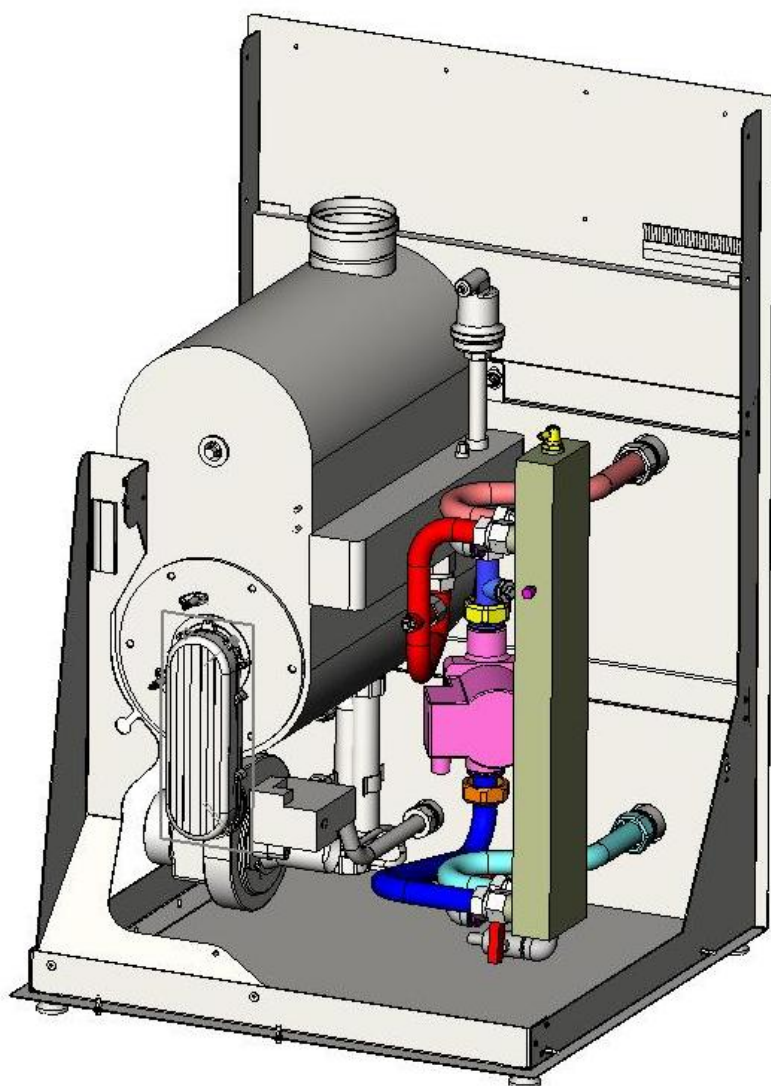


Note

When utilising a plate heat exchanger an optional primary water pressure switch is available.

ULTRAMAX PB 65 - 120

Low Loss Header



1. Drain Valve 1/2"
2. Tube - Pump Inlet
3. Compression Fittings
4. Tubes - Flow & Return Connections
5. Low Loss Header
6. MF Elbow
7. Blanking Plugs R 1/2"
8. Seal Washers - Flow & Return Tubes
9. Seal Washer - Pump Inlet
10. Tube - Boiler Flow to Low Loss Header
11. Blanking Plug R 1/4"
12. Cap 3/4"
13. Vent Valve 1/2"
14. Temperature Sensor

7.0 Gas connection

Authorised gas installers must perform the layout of gas pipes and connection to the gas line only. Heating and gas lines must be cleaned from any residue, particularly for older systems, prior to the connection of the gas condensing boiler. Care must be taken to ensure a non-stressed layout of all gas lines.

Prior to commissioning, all pipe conduits and connections must be checked for tightness and leaks. Gas fittings at the burner may be pressure checked up to 150 mbar.

ULTRAMAX PB 65 - 120

8.0 Mounting the exterior temperature sensor

This sensor is not pre-wired.

Installation site:

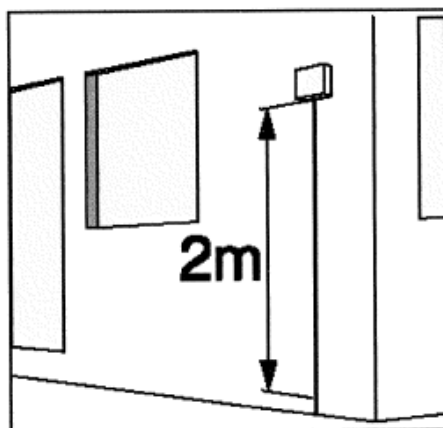
- Minimum of 2m above ground, on the north wall of the building
- Make sure that the sensor is not affected by fireplaces, windows etc

Installation type:

- Turn the sensor such that the wires exit the casing at the bottom

Conduit length:

- Maximum of 100m when using NYM 3 x 1 mm² or H05W-F3 x 1 mm²



9.0 Electrical Installation

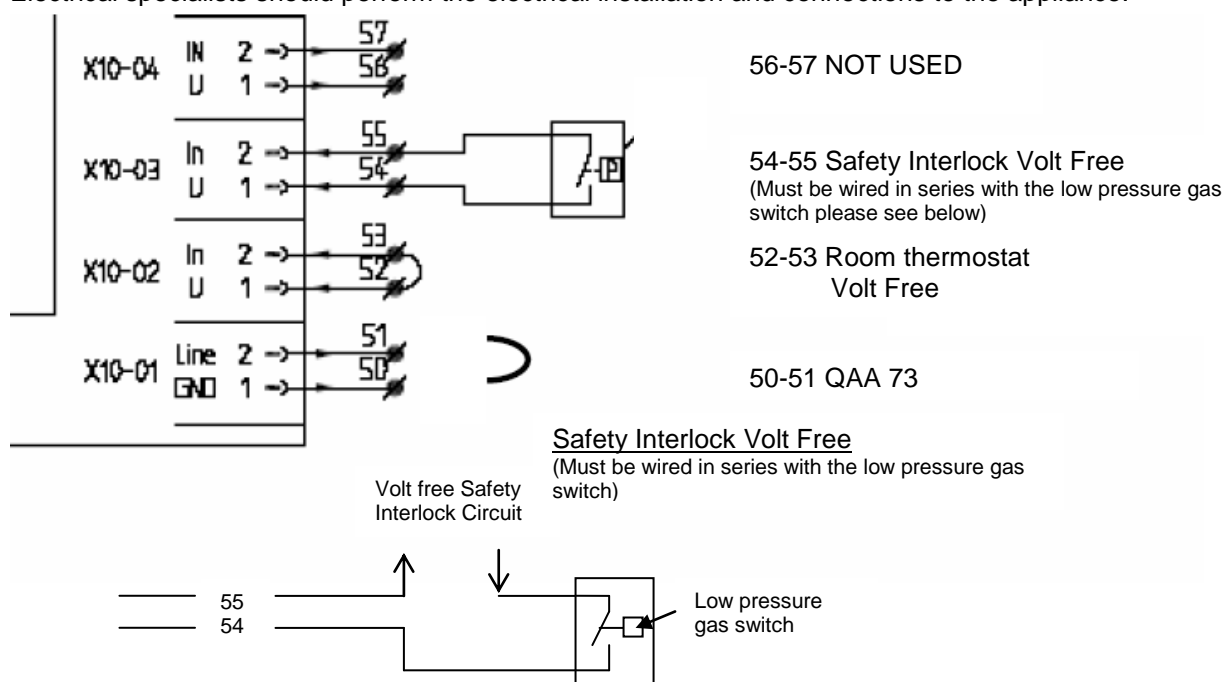
WARNING THIS APPLIANCE MUST BE EARTHED IN ACCORDANCE WITH BS 7671 and IEE REGULATIONS

9.1 General Notes

The Ultramax PB is supplied as standard with electronic operating and flame ionisation safety controls with a specially designed microprocessor at the heart of the system.

The boiler is pre-wired as shown and all connections can be made on the terminal strips (one low voltage 25 vac and one mains voltage 240 v ac).

Electrical specialists should perform the electrical installation and connections to the appliance.

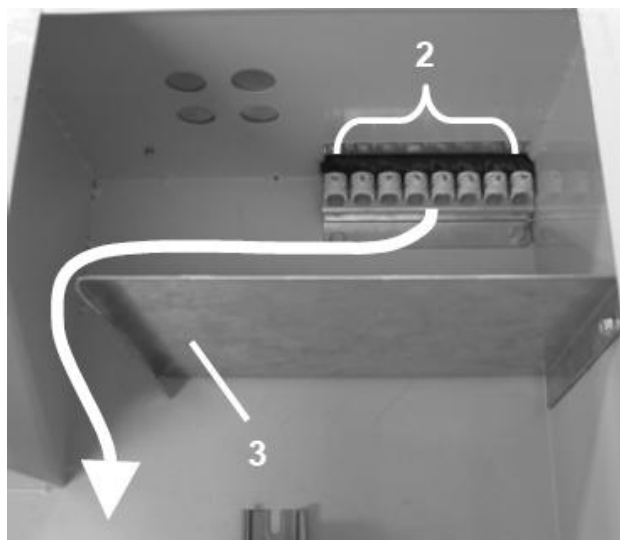


ULTRAMAX PB 65 - 120

9.0 Electrical Installation cont.

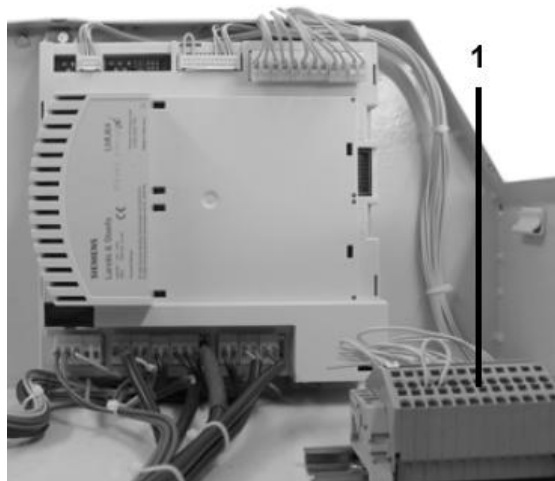
9.2 Wiring

All external connection wires must not be stripped more than 30mm. The hot lead from strain relief to cleats must tighten up before the grounded wire in case they slip out of the strain relief (2). The wire length must be dimensioned accordingly. All wires must be routed around the dividing plate.



9.3 Power connection and connection of customer-provided wiring.

The equipment is designed for a fixed connection only. The power connection is made at the terminal strip (1) of the equipment using a power circuit intended and fused for this purpose. All pole switches and contact opening of >3mm or automatic cutout switches can be used.



Line voltage	230 V, 50 Hz
Power connection fuse	10 A
Power consumption	Max. 420 W

Power consumption system pump(s) Max. switching current LMU 1A / relay Max. 5 A total.

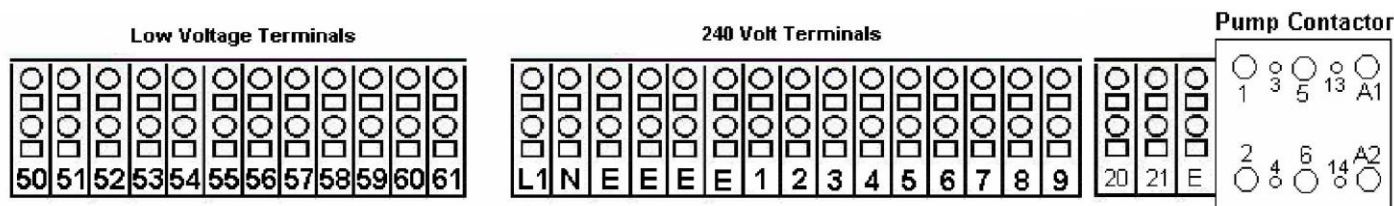
Note:

If Ultramax PB is operated with a mixer circuit connected via AGU 2.500, a jumper must be installed across terminals 50/51 (X10-01).

ULTRAMAX PB 65 - 120

9.0 Electrical Installation cont.

9.4 Boiler Wiring Terminals



Terminal Designation

Terminal #s	Voltage	Screened Cable (Earthed)	Description/Operation/Function
50 & 51 (Not Polarity Sensitive)	< 25V	Yes	QAA73 Opentherm Room Unit or Link to enable second heating zone time switch. (AGU2.500 Communication Clip required to control second heating zone)
52 & 53 (Not Polarity Sensitive)	< 25V	Yes	Heating Volt Free Enable. (Via Time Switch/Room Thermostat/BMS) (Link to be removed if QAA73 fitted)
54 & 55 (Not Polarity Sensitive)	< 25V	Yes	Safety Interlock Volt Free Enable (Must be wired in series with the low pressure gas switch) (For use with ventilation interlocks/gas pressure switch etc.)
56 & 57 (Not Polarity Sensitive)	< 25V	Yes	Do Not Use. Boiler Operation Override Volt Free Enable.
58 & 59 (Not Polarity Sensitive)	< 25V	Yes	Hot Water Sensor (QAZ36) or Volt Free Enable. (Via Time Switch/Calorifier Thermostat/BMS) (Parameter alteration required if Volt free enable used)
60 & 61 (Not Polarity Sensitive)	< 25V	Yes	Outside Air Sensor. (QAC34) (Mounted on North Facing Wall) (Parameter alteration required if outside air sensor not connected)
L1	230V	-	Permanent Live (Max 5 Amp)
N	230V	-	Permanent Neutral
E	230V	-	Permanent Earth
1 & 2	230V	-	External Temperature Limiting Device Interlock, Optional Low Primary System Pressure Switch Used in Conjunction with an Internal Plate Heat Exchanger.
3 & 4 (5)	230V	-	Hot Water Charging Pump or 3 way Valve Output. (Max 1 Amp) (Terminal 5 is a permanent Live 230V output)
6 & 7	230V	-	Internal Boiler Pump. (Max 1 Amp) (When operated without RVA47 Cascade Manager) External Heating Pump. (Max 1 Amp) (When operated with RVA47 Cascade Manager) (Parameter alteration required)
8 & 9	230V	-	External Heating Pump. (Max 1 Amp) (When operated without RVA47 Cascade Manager) Internal Boiler Pump. (Max 1 Amp) (When operated with RVA47 Cascade Manager)
20	230V	-	Optional External Boiler/Transfer Pump Live Output. To be used when an internal plate heat exchanger or low loss header option has been applied.
21	230V	-	Optional External Boiler/Transfer Pump Neutral Output. To be used when an internal plate heat exchanger or low loss header option has been applied.
E	230V	-	Optional External Boiler Pump Earth.

For cascade control via a RVA47 cascade manager each boiler must be fitted with an OCI420 Clip.

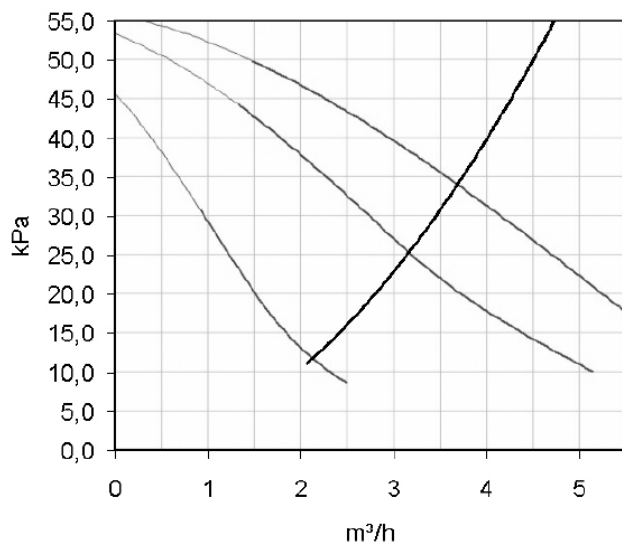
ADDITIONAL INFORMATION REGARDING ELECTRICAL SUPPLIES IS GIVEN IN BS EN60335, PART 1.

ULTRAMAX PB 65 - 120

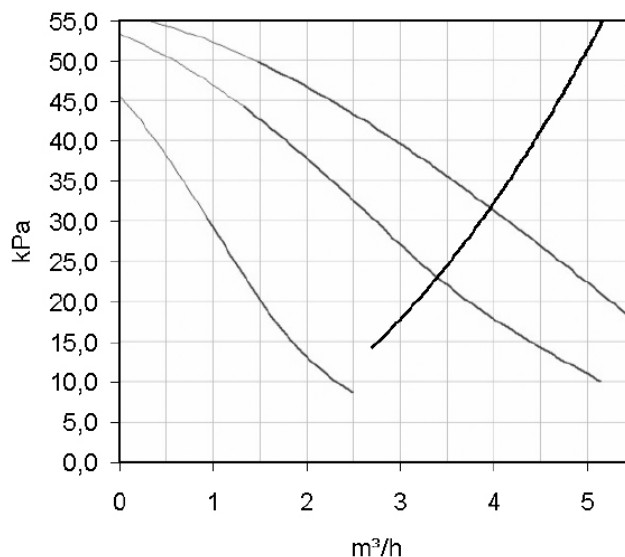
10.0 Commissioning

10.1 Re-circulation Pump

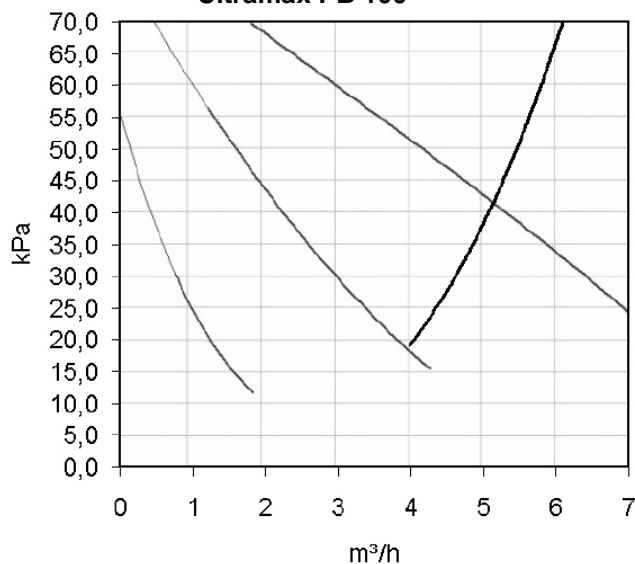
Ultramax PB 65



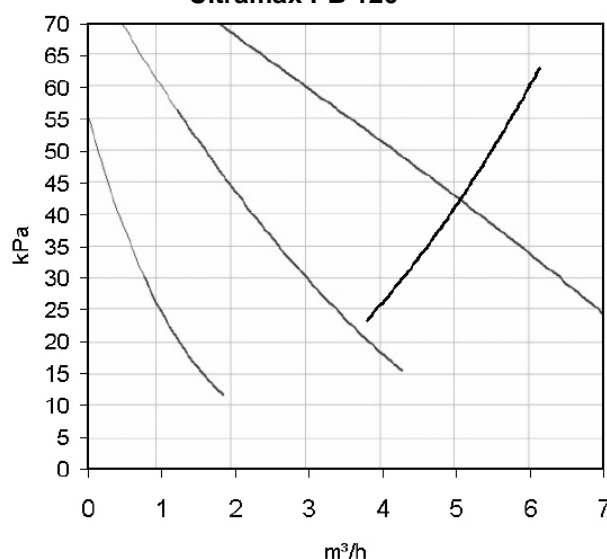
Ultramax PB 85



Ultramax PB 100



Ultramax PB 120



Pump settings when using the plate heat exchanger*	Ultramax PB	Pump	Level
	Ultramax PB 65	UPS 25-55	1
	Ultramax PB 85	UPS 25-55	2
	Ultramax PB 100	UPS 25-80	3
	Ultramax PB 120	UPS 25-80	3

*Pump setting, standard delivery, is factory set to speed 3

When using a hydraulic switch, the rpm speed of the internal pump should be specified such that a Delta T (VL/RL) = 20°C results. The boiler temperature shown on the display can determine the temperature difference. The return temperature is indicated at the expanded information level b1 (see Table on page 44)

ULTRAMAX PB 65 - 120

10.0 Commissioning cont.

10.2 Control Measures

An authorised specialist shall perform the initial commissioning only.

In general, the following control checks must be performed prior to commissioning:

- Check power supply.
- Check pressure in heating system.
- Check pressure at gas connection.
- Check gas supply for leaks.
- Check proper assembly of exhaust accessories.
- Check condensate discharge for leaks.

10.3 Minimum circulation amounts / Flow monitoring

You must ensure that the system has sufficient hydraulic flow upon heat demand. The system is equipped with a flow safety device, which monitors the through-flow. In order to maintain a minimum flow, the installation of a switch or a plate heat exchanger (both available as accessories) is recommended, or the connection of the Ultramax PB to an open manifold.

10.4 Ensure prior to commissioning

- Sufficient dimensions of the expansion container must be ascertained. Comply with notes on water quality, fill with softened water if necessary.
- Commissioning of system and venting shall take place immediately after the filling process in order to eliminate standing air pockets as a centre of corrosion.
- Commissioning at low system temperatures and maximum through-flow of the heating system avoid calcium deposits inside the boiler.
- During inspection work the complete exchange of the system water should be avoided. This can be accomplished through partial shutoffs or through re-use of retained and filtered system water.

WARNING: WHEN THE COVERS ARE REMOVED AND THE BOILER IS IN OPERATION, IT IS POSSIBLE FOR DEBRIS TO BE DRAWN INTO THE FAN INLET.

NOTE: THE BOILER IS EQUIPPED WITH AN AUTOMATIC RESTART FACILITY AND WILL ATTEMPT TO FIRE MORE THAN ONCE. IN THE EVENT THE BOILER FAILS TO IGNITE AFTER 4 UNSUCCESSFUL ATTEMPTS THE BOILER WILL GO TO LOCKOUT AND REQUIRE MANUALLY RESETTING.

ULTRAMAX PB 65 - 120

10.0 Commissioning cont

10.5 Description of Control Valve Stop Function (To place the boiler into commissioning mode)

The chimneysweeper function enables the commissioning of the boiler while in heating mode. It serves to take measurements at the boiler, with the system being set to maximum heating output until the overheat temperature thermostat is triggered. In order to enable the largest amount of heating output possible, the chimneysweeper function over rides all external control and must not be left in this position.

The control valve stop function enables a manual setting of the boiler output during the heating mode. It serves to take measurements at the boiler.

10.6 Trigger

- Activate buttons longer than 6 sec.



- The display flashes the control valve stop symbol.
- The display shows the specified relative boiler output.



10.7 Function

- Generate a forced signal to output heat.
- Deactivates the PID and 2-point controller
- Output of starting performance

10.8 Settings



- Push the set buttons to increase/decrease the output in percentage steps



- Push the line selector buttons to alternate between minimum and maximum output.

0% = minimum output (= 20% output)

100% = Maximum output

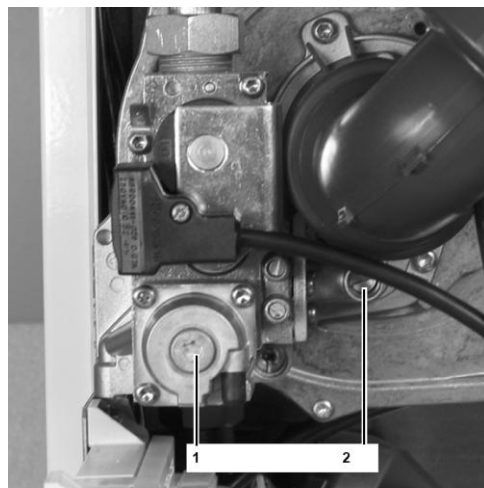
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10.9 Adjustment of combustion quality

- Connect equipment in terms of water, gas and electricity.

Due to the different ignition features of natural gas LL and natural gas E, an adjustment of the gas/air mixture is required.

- After ignition, the specified CO₂ value at full load can be adjusted by turning the adjustment screw (2).
- Adjustment of the CO₂ value at small load by turning the adjustment screw (1) at the gas fitting.



10.10 Adjustment values for Natural Gas.

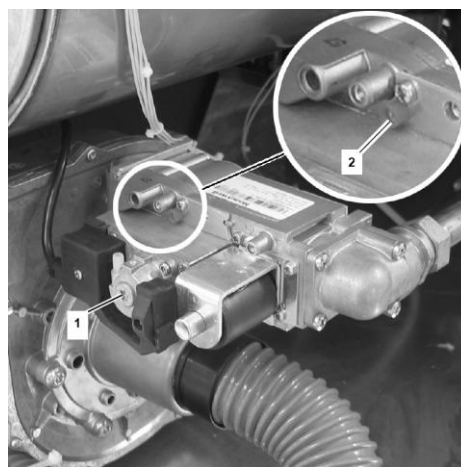
Natural Gas L / H	Ultramax PB 65-120	
Gas connection pressure	Mbar	20
CO ₂ max	%	8,8 +/- 0,2
CO ₂ min	%	8,2 +/- 0,2

Minimum and maximum CO₂ values must always have a difference of 0.3%.

10.11 Conversion from Natural Gas to LPG.

For a refitting to an operation using liquid gas, the following faceplates must be used

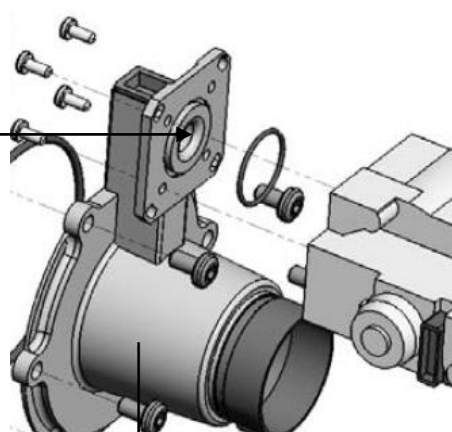
Ultramax PB 65	6,0mm
Ultramax PB 85	6,0mm
Ultramax PB 100	6,2mm
Ultramax PB 120	8,0mm



10.12 Adjustment values for liquid gas

1 LPG	Ultramax PB 65-120	
Gas connection pressure	Mbar	50
CO ₂ max	%	9,8 +/- 0,2
CO ₂ min	%	9,0 +/- 0,2

Faceplate



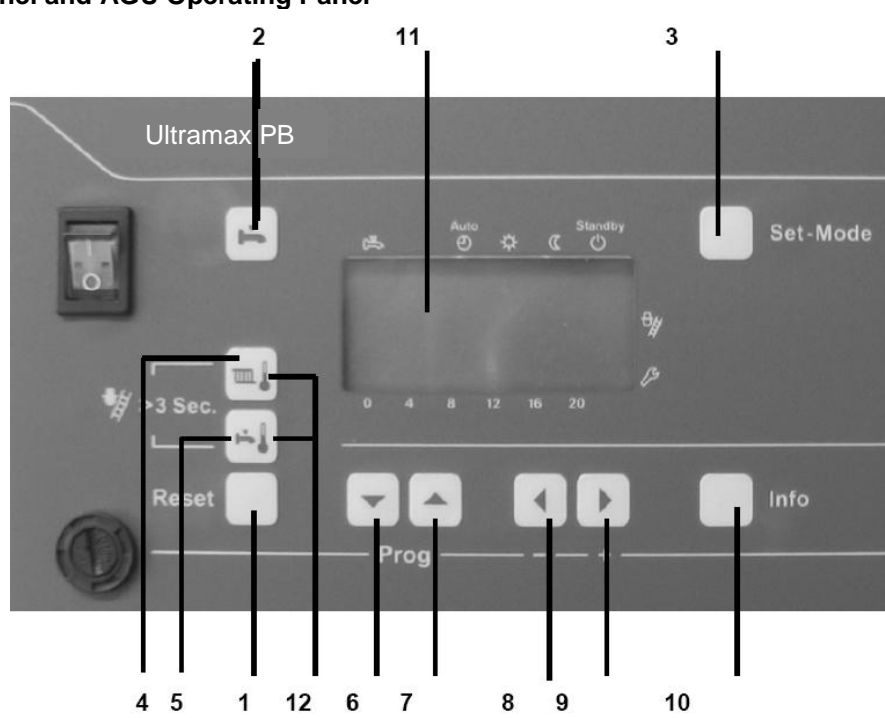
Minimum and maximum CO₂ values must always have a difference of 0.3%.

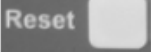
















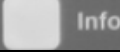

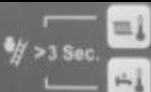


All adjustments must be made with the aid of a flue gas analyser continually sampling the appliances products of combustion in the appliances flue, concentric flue adapter or where no other option is available via the flue gas sensor tapping. (in this case the probe should be inserted 2/3s of the depth of the heat exchanger.

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10.0 Commissioning cont.

10.13 Switch Panel and AGU Operating Panel

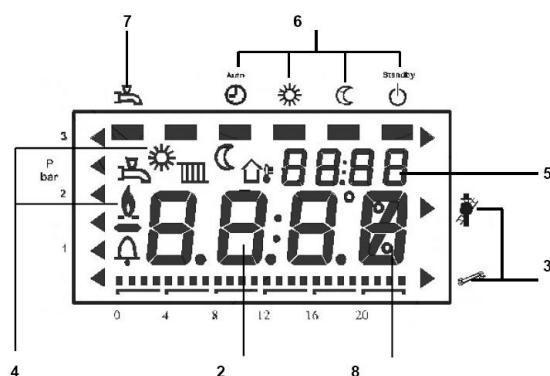


Button	Operating Element	Function
1		Button Reset (unlock) Unlocking LMU... Ignition manager
2		Button Domestic water use mode  Domestic water use ON/OFF
3		Button Set mode heating circuit  Switch operating mode to:
		 Automatic mode
		 Continuous mode at nominal level
		 Continuous mode at reduced level
		 Frost protection
4		Button Target temp. heating circuit  Adjustment for desired room temperature
5		Button Target temp. domestic water use  Adjustment for desired domestic water temperature
6 7		Buttons Line selector (down) and (up)  Selection of operating line
8 9		Buttons Adjustment of selected value  Readjustment of set-up parameters
10		Button Information  Change information display
11		LCD display Display of data and operating modes
12		Chimney sweeper  Chimney sweeper function / valve stop (push both buttons)
		

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10.0 Commissioning cont.

10.14 AGU Operating Panel



	Display	Function
2	Display	Display current value
3	Display (large)	Function Display:
		Chimney sweeper active
		Control stop active
4	Display symbols	Symbol meaning:
		Display - Domestic use water temperature - Domestic use water operation
		Display - Boiler water nominal value, - Room nominal value, - Heating operation
		Display outside temperature
		Operating at nominal value
		Operating at reduced level
		Display flame
		Display error /problem
5	Display (small)	Display of time, parameterisation or error code
6	Heating Circuit operating mode	Operating mode in or changing to
		Auto Automatic operation
		Continuous operation at nominal value
		Continuous operation at reduced value (freeze protection)
		Standby
7	Domestic use water operation	Domestic use water loading On or OFF
8	Time bar	Display of timer program for heat circuit

- LCD with backlight.
- Multi function date display for various devices, boiler, heating and hot water, as well as error codes using LCD display.
- Display with toggle switch between end user and professional user levels.
- Operating philosophy similar to room device QAA73 Remote Room Unit. Integrated clock module daytime timer program for heating circuit 1 and hot water with 3 phases / day.
- Parameter mode of LMU64 control module for Ultramax PB.

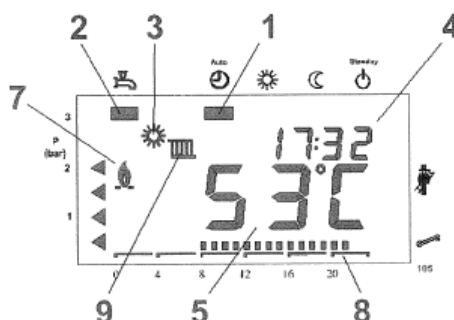
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10.0 Commissioning cont.

10.15 AGU Operating Panel

Display

1	Operating modes for heating circuit
2	Operating modes for domestic use water
3	Heating circuit operating mode (day/night)
4	Time
5	Current boiler value
7	Flame status
8	Time bar
9	Boiler operating mode



10.16 Information Button

Pushing the information button will switch you into the information level. Further activation of the information button calls up various information available at this level.

	Information Button	Description
1		Domestic water temperature
2		
3	X.	Operating phase
4		Outside temperature
5	Ex	ALBATROS – error code
6		Boiler flow temperature
7	 or 	Return to standard display

If you are at the information level, an additional information mode may be called up.

	Information Button	Description
1		Push both buttons simultaneously
2		Select display level
3		Select display value at this level
4	 or 	Return to information mode







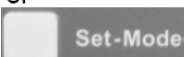
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10.0 Commissioning cont.

10.17 Adjustment of Target Temperature for Heating Circuit.








The target value for room temperature or boiler temperature is adjusted depending on the heating system!

If no buttons are pushed during an approximate 8 min time period, the system automatically reverts back to the standard display, and any changes are not saved.

	Button	Display	Description
1			Push the flow temperature button to select the target value for the heating circuits
2			Push the  button to set the desired temperature
3	 or  or 		Push either of these buttons to return to the standard setting, any changed values are being saved

10.18 Adjustment of Target Temperature for Domestic Hot Water “DHW Target”

If no buttons are pushed during an approximate 8 min time period, the system automatically reverts back to the standard display, and any changes are not saved.








	Button	Display	Description
1			Push the domestic use water target button to select the target value for domestic hot water.
2			Push the  button to set the desired target value
3	 or  or 		Push either of these buttons to return to the standard setting, the changed values are being saved

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11.0 Parameterisation for End User

11.1 Adjustment for individual End User Requirements

If no buttons are pushed during an approximate 8-minute time period, the system automatically reverts back to the standard display. No changes are saved.

	Button	Description
1		Push one of the two line selector buttons. They take you directly to the "End User" level
2		Use one of the line selector buttons to advance to the respective line. It is shown in display (1) As "Pxxx"
3		Set the desired values by using the  plus or minus button. The setting is saved as soon as you exit the programming level or switch into another line. The following parameter list displays all possible settings.
4	 or 	Push either one of these buttons to exit the "End User" programming level
5		Push the information button to exit the programming level. Any changed values are being saved.

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11.0 Parameterisation for End User

11.2 Parameterisation

Item	AGU2.311 Parameter	Factory Setting	Adjustment Range	Units	Function
Time / Date					
1	P1		0...23:59	hh:mm	Time
2	P2		1-7		Current day of the week (1=Monday)
Target Values					
4	P5	16	20-85		Room temperature – reduced – target value
Timer Program HC1 (Heating Circuit 1)					
	P10		0-9		Day of the week timer setting HC1 (0; 1-7; 1-5;6-7)
5	P11	06:00	00:00...24:00	hh:mm	Timer program HC1 Timer ON = Phase 1
6	P12	22:00	00:00...24:00	hh:mm	Timer program HC1 Timer OFF = Phase 1
7	P13	“-“	00:00...24:00	hh:mm	Timer program HC1 Timer ON = Phase 2
8	P14	“-“	00:00...24:00	hh:mm	Timer program HC1 Timer OFF = Phase 2
9	P15	“-“	00:00...24:00	hh:mm	Timer program HC1 Timer ON = Phase 3
10	P16	“-“	00:00...24:00	hh:mm	Timer program HC1 Timer OFF = Phase 3
Timer Program HC2 (Heating Circuit 2)					
11	P20		0-9		Day of the week timer setting HC2 (0; 1-7; 1-5; 6-7)
12	P21	06:00	00:00...24:00	hh:mm	Timer program HC2 Timer ON = Phase 1
13	P22	22:0	00:00...24:00	hh:mm	Timer program HC2 Timer OFF = Phase 1
14	P23	“-“	00:00...24:00	hh:mm	Timer program HC2 Timer ON = Phase 2
15	P24	“-“	00:00...24:00	hh:mm	Timer program HC2 Timer OFF = Phase 2
16	P25	“-“	00:00...24:00	hh:mm	Timer program HC2 Timer ON = Phase 3
17	P26	“-“	00:00...24:00		Timer program HC2 Timer OFF = Phase 3
Timer Program DRW as Domestic Use Loading Program for Drinking Water					
18	P30		0-9		Day of the week timer setting HC2 (0; 1-7; 1-5; 6-7)
19	P31	06:00	00:00...24:00	hh:mm	Timer program DRW Timer ON = Phase 1
20	P32	22:00	00:00...24:00	hh:mm	Timer program DRW Timer OFF = Phase 1
21	P33	“-“	00:00...24:00	hh:mm	Timer program DRW Timer ON = Phase 2
22	P34	“-“	00:00...24:00	hh:mm	Timer program DRW Timer OFF = Phase 2
23	P35	“-“	00:00...24:00	hh:mm	Timer program DRW Timer ON = Phase 3
24	P36	“-“	00:00...24:00	hh:mm	Timer program DRW Timer OFF = Phase 3
25	P45	No	No/Yes		Standard timer program for HC1, HC2 and DRW
Parameter Setting					
26	516	30	8-30	°C	Summer/Winter switch temperature
27	520	10	0-10	K	Drop amount for room target temperature with timers
28	532	15	1-40		Heating characteristic HC1
29	533	10	1-40		Heating characteristic HC2
30	534	0	-31 ⇄ +31	K	Room target value correction HC1
31	535	0	-31 ⇄ +31	K	Room target value correction HC2
32	629	0			End user may acknowledge a pending maintenance message
33	726	0			Contains a numeric maintenance code
34	727	50b			Internal diagnostics code

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12.0 Clock Function

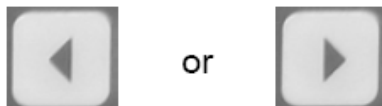
The timer must be set to the correct time in order to provide the correct heating program operation. The current time is set as described on the previous page (Parameterisation End User).

12.1 Effect

Clock is set to the current time. The correct setting is important to ensure that the heating and domestic hot water program can function properly.

Notes

Clock continues to run during the adjustment process. During the clock adjustment process, each activation of



Resets the second zero.

12.2 Description of Domestic Use Water Provision


The provision of domestic use water can be switched on or off independently from the other operating models.

12.3 Operating Mode

The domestic use water operating mode is turned ON or OFF by activating the domestic use water provision button



12.4 Effect

A bar below the domestic use water symbol indicates domestic use water provision turned ON  , Domestic hot water is provided automatically according to the internal specifications. No domestic hot water production is indicated by the removal of the bar below the domestic use water symbol.



13.0 Function upon Attached Room Device QAA73 (Accessory)

If a room device (QAA 73) is connected to the Ultramax PB, all functions supported by it are either locked out or blocked out by the AGU2.311 panel. These are, for example:

- Clock setting at AGU2.311 operating panel (display only).
- Timer programs.
- Target values.

Parameterisation via the operating panel is still possible!

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14.0 Backlight

Upon activation of any button, the backlight is activated for a period of approx. 8 minutes.

15.0 Maintenance and Service

Trained and authorised personnel only must perform maintenance and cleaning. Said personnel shall bear all responsibility for their proper implementation.

Important

Equipment must be isolated from the Electrical supply, Gas supply, flow and return supplies before commencing any maintenance or service work.

Maintenance shall be performed once a year. The cleaning of the heat exchanger can be avoided in case of minor dirt accumulation but must be performed at least every 2 years.

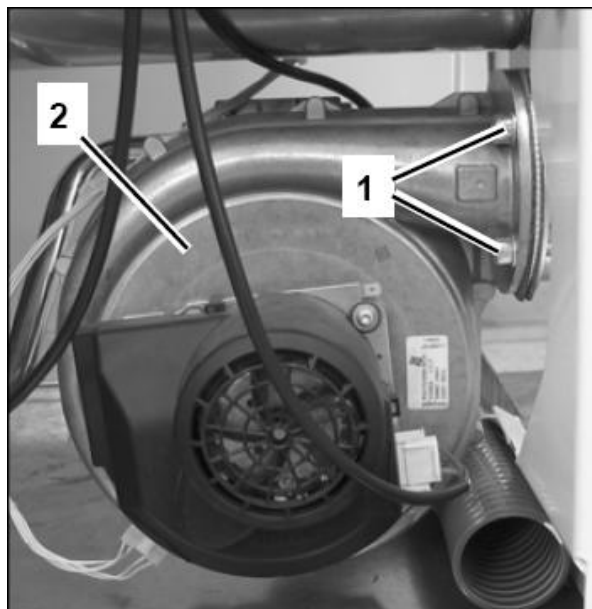
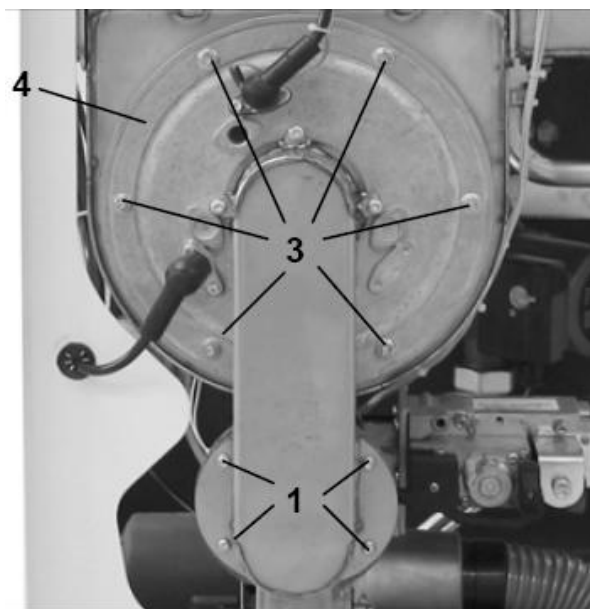
- Measurement and assessment of specified emission values.
- Turn off heating main switch and secure against accidental turning on, or separate all poles of equipment.
- Turn off gas valve.
- Dismount equipment panels.
- Disassemble blower, gas valve and burner unit.
- Remove ignition cable. Check ignition plug for cracks and moisture (moist/wet ignition plugs do cause error messages – replace ignition plug if necessary).
- Visual inspection of burner (clean with paint brush / nylon brush if necessary).
- Visual inspection of blower and Venturi tube (clean with paint brush / nylon brush if necessary)
- Remove combustion chamber insulation.
- Rinse heat exchanger with clean water (remove stubborn dirt accumulations with a thin plastic brush, then rinse).
- Clean out siphon and fill with water prior to reassembly.
- Check and correct gas pressure monitor (10 mbar), if necessary.
- Check all condensate-bearing parts for leaks. Remove any leaking condensate or other moisture.
- Check all fastener bolts, replace if necessary.
- Check system pressure, expansion container and safety valve.
- Disassembled seals for gas and water-bearing parts must be replaced with new one upon reassembly. This is especially true for O-rings at the gas valves and all burner seals.
- Reassemble equipment ready for use.
- Re-open gas line and check for leaks.
- Turn on heating main switch.
- Perform functional check, including emission measurement.
- Adjust values to factory specifications.

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16.0 Cleaning

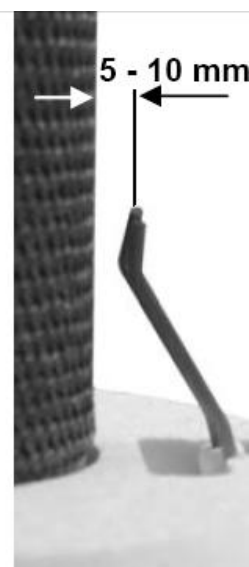
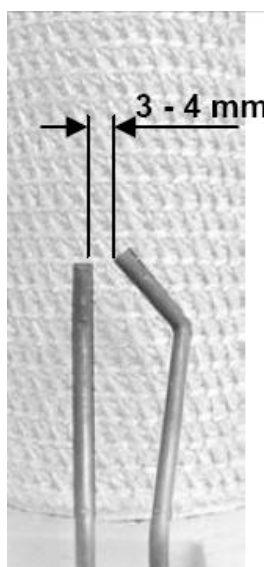
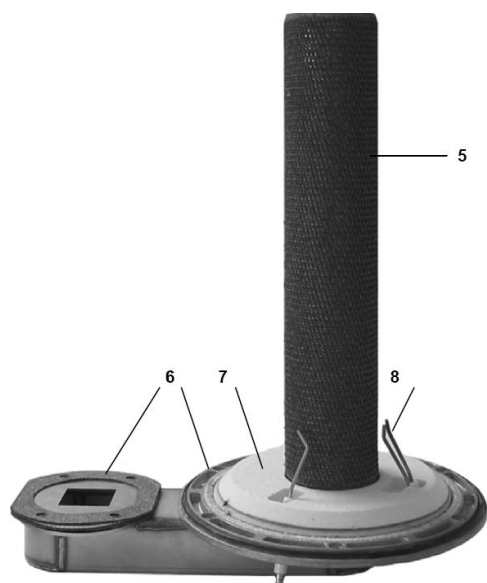
16.1 Disassembly of Burner

- Remove electrical plug-on HT and Ignition caps. Remove earth lead.
- Loosen bolts (1) at fan unit (2).
- Loosen mounting bolts (3) at burner unit (4).
- Remove burner unit completely from heat exchanger.



16.2 Cleaning of Burner and Fan

- Perform visual inspection of burner (4) and fan (2). Any dirt intrusion from the air supply are typically blown and burnt through the burner under normal equipment use. In case of more severe dirt accumulations, such as construction dust, a careful cleaning of the metal screen (5) must be performed using a vacuum cleaner or blown out using a compressed air.
- The surrounding seals (6) of the burner plate and the ceramic fibre seal (7) must be checked for damages and must be replaced if necessary.
- Check adjustment of electrodes (8).

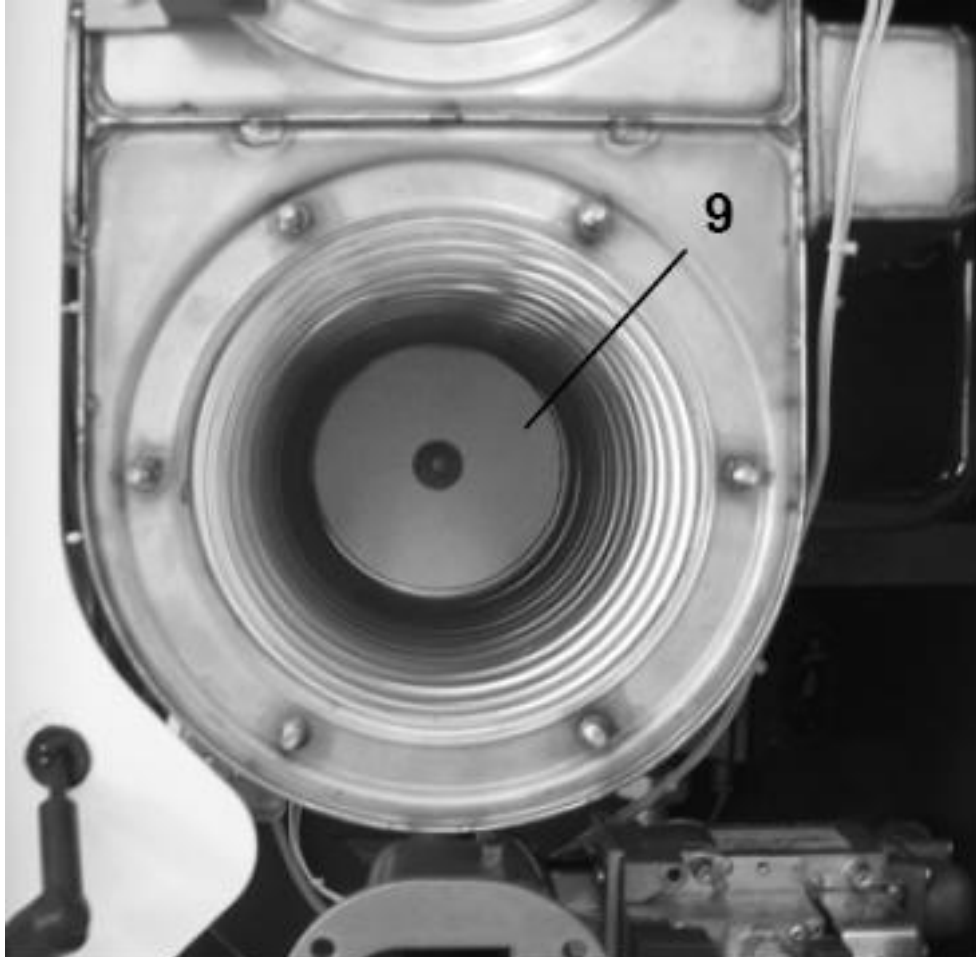


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16.0 Cleaning cont.

16.3 Cleaning of Heat Exchanger

With the Burner removed, visually check the interior of the heat exchanger. Any deposits on the surface of the stainless steel coils must be gently removed with a natural bristle brush. For stubborn deposits, cleaning granules are available from MHS Boilers Spares department.



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17.0 Error Message List

17.1 Error Messages Displayed via AGU Operating Panel

Display flashes Code No.	Error Description	Explanation of possible error causes, suggested corrections.
10	Exterior temp. sensor – fault or not detected	Check AT sensor, emergency operation
20	VL boiler sensor – fault or not detected	Check connections, exchange
28	Exhaust sensor – fault or not detected	Check connections, exchange
40	RL boiler sensor – fault or not detected	Check connections, exchange
50	HWS Sensor – fault or not detected	Check connections, exchange
61	Fault room device QAA 73	Check QAA 73 room device and bus line
62	Wrong room device fitted QAA 73	Connect proper QAA 73 room device
81	Short at LPB bus or no supply to bus	Communication error, LPB bus feed not activated
82	LPB bus address error	Check addressing of connected RVA controller or OCI460 clip in module.
91	Data loss at LMU ignition manager	Internal LMU error, check process sensor, replace LMU.
92	Hardware error in electronics	Internal LMU error, check process sensor, replace LMU, notify service
95	Invalid time	Correct time
100	Conflict between time/day masters	System error, check clock master of RVA controller or QQA73
110	STB open, excessive temperature	No dissipation of heat, cool off device and perform reset. Check hydraulics, connections or exchange sensor. Check terminals 1 & 2 for open circuit
113	Flue gas temperature too high	Check connections, exchange
130	Flue gas limit temperature exceeded	Check connections, exchange
132	External safety interlock activated	Monitoring of external processes in open circuit
133	LMU automated ignition locked (no recognition of flame after safety period)	Perform reset, if error occurs repeatedly, check gas pressure, check polarity of power lines, ignition system and ionisation monitoring
134	Flame failure during operation	Perform reset
135	Air supply error	Rpm threshold of fan exceeded or short of standard, check parameters and for defective fan.
140	Non-permitted LPB segment number or device number	Configuration error, check setting of RVA controller OCI460 clip in module.
148	Incompatible LPB interface / basic device	Configuration error, check setting of RVA controllers
151	Internal error in LMU	Check LMU parameters, unlock LMU, replace LMU.
152	Error in LMU parameterisation	Check LMU parameters, perform new LMU parameterisation
153	Ultramax PB is locked	Reset button pressed when boiler is not in fault condition.
154	Operating error detected	Check LMU parameters
160	Fan Rpm threshold not achieved	Blower defective or rpm threshold improperly set.
161	Fan maximum rpm exceeded	Max. fan rpm exceeded, check parameters
180	Chimney sweep function	Display only, no turn-off
181	Control valve stop function active	Display only, no turn-off
183	Ultramax PB is in programming mode	Display only, no turn-off

LED error display is permanently on if LMU error message cannot be changed.

In addition, the display of the diagnostics code flashes.

Pushing the reset button for more than 2 seconds voids the error message.

- 1) Turn off and lock – unlock via restart only.
- 2) Turn off, prevent restart – restart after error correction only.

Should a fault code appear which cannot be reset, or a fault code repeatedly occurs, contact MHS Boilers for assistance. Do not continue to operate or use the boiler as this may cause damage to the controls







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18.0 Information Display

18.1 Via AGU 2.311 Operating Panel

Parameters of Groups b, c and d are provided upon request only.		
Display Level	LMU Functional ID	Description
Temperatures (specialist level)		
b 0	Diagnose Code	LMU internal SW diagnostics code
b 1	TkRuec	Boiler return temperature
b 2	Tbwist2	Reservoir temperature at sensor 2 (non existent)
b 3	Tabgas	Exhaust temperature
b 4	TiAussen	Exterior temperature
b 5	TaGem	Mixed exterior temperature
b 6	TaGed	Dampened exterior temperature
b 7	Tvist	Flow temperature AGU 2.500
b 8	Not assigned	
b 9	Not assigned	
Process values (specialist level)		
c 0	Not assigned	
c 1	IonStrom	Ionisation flow
c 2	Gebi_Drehz	Blower rpb
c 3	Gebi_PWM_AusAkt	Current blower control (PWM)
c 4	RelModLevel	Relative output
c 5	Pump_PWM	Pump target value (PWM)
c 6	Ek0	Control difference
c 7	Not assigned	
c 8	Not assigned	
c 9	Not assigned	
Target values (specialist level)		
d 0	Not assigned	
d 1	Tsoll	Target value for 2-point and modulating control valve (PID)
d 2	TkSoll	Current boiler target value
d 3	RsRaum	Room temperature target value
d 4	TbwSoll	Reservoir target value
d 5	PhezMax	Maximum degree of modulation during heating mode
d 6	NhzMax	Maximum rpm at maximum output during heating mode.
d 7	Not assigned	
d 8	Not assigned	
d 9	Not assigned	

Note: By either pushing the “mode” button or waiting for 8 minutes, the display automatically reverts back to the standard display.

1. Push information button. 2. Push buttons  for at least 3 seconds until b0 appears in the display.
3. Push button  then alter b0 to c0 4. Push buttons  to select the respective parameter.
1. Push information button. 2. Push buttons  for at least 3 seconds until b0 appears in the display.
3. Push 2 x button  then alter b0 to d0 4. Push buttons  to select the respective parameter.

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19.0 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.....35°C 20 - 85°C	20°C 16°C
▲	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.....30°C	20
▲	P 727	Detailed Diagnostic Code	-	As Displayed

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20.0 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.
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.
H705	2nd Historical Fault – Operating Error Code	Actual Operating Code.
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.
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.
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.
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.
H728	1st Historical Fault – ALBATROS Error Code	The LMU64 display Error Code, relevant to Parameter H702
H729	2nd Historical Fault – ALBATROS Error Code	The LMU64 display Error Code, relevant to Parameter H705
H730	3rd Historical Fault – ALBATROS Error Code	The LMU64 display Error Code, relevant to Parameter H708
H731	4th Historical Fault – ALBATROS Error Code	The LMU64 display Error Code, relevant to Parameter H711
H732	5th Historical Fault – ALBATROS Error Code	The LMU64 display Error Code, relevant to Parameter H714
H732	Current Historical Fault – ALBATROS Error Code	The LMU64 display Error Code, relevant to Parameter H717

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Fault Code	Description	Fault Code	Description	Fault Code	Description
83	Combustion Fan Not Reaching Ignition Speed	170	RESET Button is Being Continually Depressed	406	Boiler Flow Temperature Rising to Above Maximum Limit Temperature When Burner is ON.
87	Combustion Fan Operating Beneath Minimum Setting	259	RESET Button Has Been Pressed When NO Error Has Been Displayed	422	Boiler Flow Temperature Rising to Above Maximum Limit Temperature When Burner is OFF.
90	Combustion Fan Not Reaching Pre-Purge Speed.	282	Combustion Fan Not Reaching Correct Speed	433	System Hydraulic Error, ΔT Between Flow & Return Too High
96	Flame Rectification Signal Detected When Burner OFF	400	System Hydraulic Error. Return Temperature > Flow Temperature	434	System Hydraulic Error, ΔT Between Flow & Return Too High
97	Flame Rectification Signal Detection When Burner OFF	401	System Hydraulic Error. Return Temperature > Flow Temperature	435	System Hydraulic Error, ΔT Between Flow & Return Too High
98	Flame Signal Lost During Operation	402	System Hydraulic Error. Return Temperature > Flow Temperature		
99	Flame Signal Lost During Operation	403	System Hydraulic Error. Return Temperature > Flow Temperature		
100	Flame Signal Lost During Operation	404	System Hydraulic Error. Return Temperature > Flow Temperature		
101	Flame Signal Not Detected Following Last Ignition Attempt				
102	Flame Signal Not Detected Following Last Ignition Attempt				

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

21.0 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.

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}

Note: Certain parameter lines show Bit numbers. Example: H554 b0.0 this on the display can look like H554 60.0. These Bit numbers are depicted in the following as a string of 0 and 1. The first number would be Bit 0.0, so H554 would be 00000101, therefore equal the following:
H554

Bit 0 (b0) 0	Bit 1 (b1) 0	Bit 2 (b2) 0	Bit 3 (b3) 0	Bit 4 (b4) 0	Bit 5 (b5) 1
Bit 6 (b6) 0	Bit 7 (b7) 1				

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<u>Display or QAA73 #</u>	<u>Function / Description</u>	<u>Range</u>	<u>Default Values</u>			
			65	85	100	120
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 set point (10 °C≤TrSmin≤TrSmax)	10 ... 30 °C	10	10	10	10
H502	Maximum room set point (TrSmin≤TrSmax≤30 °C)	10 ... 30 °C	25	25	25	25
H503	Minimum boiler set point temperature (20 °C≤TkSmin≤TkSmax)	20 ... 90 °C	20	20	20	20
H504	Maximum boiler set point temperature (TkSmin≤TkSmax≤90 °C)	20 ... 90 °C	85	85	85	85
H505	Boiler set point at design outside temperature	20 ... 90 °C	80	80	80	80
H506	Minimum flow set point temperature (20 °C≤TvSmin≤TvSmax)	20 ... 90 °C	20	20	20	20
H507	Maximum flow set point temperature (TvSmin≤TvSmax≤90 °C)	20 ... 90 °C	80	80	80	80
H508	Minimum DHW set point temperature (10 °C≤TbwSmin≤TbwSmax)	10 ... 80 °C	10	10	10	10
H509	Maximum DHW set point temperature (TbwSmin≤TbwSmax≤80 °C)	10 ... 80 °C	65	65	65	65
H510	Flow temperature set point boost with DHW heating	0 ... 30 °C	15	15	15	15
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	25	25	25	25
H513	Switch-off temperature for pump overrun (after DHW heating)	20 ... 90 °C	70	70	70	70
H514	Boiler temperature set point boost with mixing circuit	0 ... 30 °C	5	5	5	5
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	20	20	20	20
H517	Maximum control differential; when exceeded, minimum pause time will be aborted	0 ... 90 K	20	20	20	20
H518	Maximum temperature gradient of boiler set point ramp in heating mode (0: no set point 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 set point 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

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<u>Display or QAA73 #</u>	<u>Function / Description</u>	<u>Range</u>	<u>Default Values</u>			
			65	85	100	120
H522	Maximum dT of boiler flow and return for dT supervision	2.5 ... 35 K	25	25	25	25
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	8	8	8	8
H526	Switch-on differential of burner in DHW heating mode (sensor 1)	0.5 ... 32 K	5	5	5	5
H527	Minimum switch-off differential of burner in DHW heating mode (sensor 1)	-32 ... 32 K	1	1	1	1
H528	Maximum switch-off differential of burner in DHW heating mode (sensor 1)	-32 ... 32 K	1	1	1	1
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
H531	Maximum switch-off differential of burner in DHW heating mode (sensor 2)	-32 ... 32 K	6	6	6	6
H532	Heating curve slope heating circuit 1	1 ... 40	15	15	15	15
H533	Heating curve slope heating circuit 2	1 ... 40	8	8	8	8
H534	Room set point readjustment heating circuit 1	-31 ... 31 K	0	0	0	0
H535	Room set point readjustment heating circuit 2	-31 ... 31 K	0	0	0	0
H536	Maximum speed at maximum output in heating mode (<i>maximum speed limitation</i>)	0 ... 9950 rpm	7650	7300	7200	6600
H537	Pump speed at heating plant's design point	1 ... 50	30	30	30	30
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 (<i>supplier specification</i>)	2 ... 50	30	30	30	30
H541	Maximum degree of modulation in heating mode ($L_{modTL} \leq PhzMax \leq L_{modVL}$)	0 ... 100 %	100	100	100	100
H542	Minimum boiler output in kW (<i>lower calorific value</i>)	0 ... 9999 kW	9	16	18	22
H543	Maximum boiler output in kW (<i>lower calorific value</i>)	0 ... 9999 kW	61	80	90	122
H544	Overrun time of pumps, max. 210 min (<i>setting 255: continuous operation of Q1</i>)	0 ... 255 min	5	5	5	5
H545	Minimum burner pause time (<i>heat demand-dependent switching hysteresis</i>)	0 ... 3600 s	180	180	180	180
H546	Minimum burner running time (<i>heat demand-dependent switching hysteresis</i>)	0 ... 255 s	0	0	0	0
H547	Controller delay after burner is started up	0 ... 255 s	0	0	0	0

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<u>Display or QAA73 #</u>	<u>Function / Description</u>	<u>Range</u>	<u>Default Values</u>			
			65	85	100	120
H548	Minimum degree of modulation of modulating pump (supplier specification)	0 ... 70 %	2	2	2	2
H549	Maximum degree of modulation of modulating pump (supplier specification)	10 ... 100 %	84	84	84	84
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 (If using RVA 47 set to 80)	0 ... 255	66	66	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	00000101	00000101	00000101	00000101
H555	Setting flags (If using RVA 47 Bit 1 = 0)	0 ... 255	00010010	00010010	00010010	00010010
H556	Instantaneous DHW heater setting flags	0 ... 255	00000000	00000000	00000000	00000000
H557	AD converter configuration and heat demand	0 ... 255	00000001	00000001	00000001	00000001
H558	Setting flags	0 ... 255	00000000	00000000	00000000	00000000
H559	Setting flags	0 ... 255	01000111	01000111	01000111	01000111
H560	Setting flags	0 ... 255	01100000	01100000	01100000	01100000
H561	Setting flags	0 ... 255	00001000	00001000	00001000	00001000
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	0.25	0.25	0.25
H567	Derivative action time of DHW controller	0 ... 9.9375 s	0	0	0	0
H568	Integral action time of DHW controller	0 ... 4000 s	75	75	75	75
H569	Proportional coefficient of heating circuit controller	0 ... 9.9375	0.125	0.125	0.125	0.125
H570	Derivative action time of heating circuit controller	0 ... 9.9375 s	0	0	0	0
H571	Integral action time of heating circuit 1 controller	0 ... 4000 s	75	75	75	75
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	0.125	0.125	0.125	0.125
H576	Derivative action time of dT control	0 ... 9.9375 s	0			

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<u>Display or QAA73 #</u>	<u>Function / Description</u>	<u>Range</u>	<u>Default Values</u>			
			65	85	100	120
H577	Integral action time of dT control	0 ... 4000 s	75	75	75	75
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	Set point readjustment in Comfort mode and set point of 40 °C	-20 ... 20 K	0	0	0	0
H581	Set point readjustment in Comfort mode and set point of 60 °C	-20 ... 20 K	0	0	0	0
H582	Set point readjustment with outlet temperature control and set point of 40 °C	-20 ... 20 K	0	0	0	0
H583	Set point readjustment with outlet temperature control and set point 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 %	99	99	99	99
H587	Setting flags for instantaneous DHW heater	0 ... 255	00000000	00000000	00000000	00000000
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	10	10	10	10
H590	Locking time of dynamic switch-off differential after a change of heating<->DHW	0 ... 51 s	10	10	10	10
H592	Triggering threshold for boiler shutdown at high flue gas temperatures	0 ... 125 °C	90	90	90	90
H593	Triggering threshold for output reduction at high flue gas temperatures (limitation)	0 ... 125 °C	85	85	85	85
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 (<i>TimeOpening / Time Closing</i>)	30 ... 873 s	135	135	135	135
H597	P-band of heating circuit 2 controller	1 ... 100 K	24	24	24	24
H598	Output during controller delay time (<i>LmodTL <= LmodRgVerz <= LmodVL</i>)	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
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

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<u>Display or QAA73 #</u>	<u>Function / Description</u>	<u>Range</u>	<u>Default Values</u>			
			65	85	100	120
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 no 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	00010000	00010000	00010000	00010000
H605	LPB segment number of LMU	0...16	1	1	1	1
H606	LPB segment number of LMU	0 ... 14	0	0	0	0
H607	Set point for readiness temperature	10 ... 60 °C	40	40	40	40
H608	Setting value QAA73: modulation air at ignition load	0 ... 100 %	26.5	26.5	26.5	26.5
H609	Setting value QAA73: modulation air at low-fire; lower limit modulating range	0 ... 100 %	14	15.5	15.5	9.5
H610	Setting value QAA73: modulation air at high-fire; upper limit modulation range	0 ... 100 %	100	100	100	100
H611	Setting value QAA73: speed required at ignition load	0 ... 9950 rpm	3250	3100	2950	2950
H612	Setting value QAA73: speed required at low-fire	0 ... 9950 rpm	900	1000	1050	900
H613	Setting value QAA73: speed required at high-fire	0 ... 9950 rpm	7650	7300	7200	6600
H614	Program 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	Program input on clip-in function module	0 ... 255	0	0	0	0
H619	Function output1 clip-in function module	0 ... 255	10	10	10	10
H620	Function output2 clip-in function module	0 ... 255	1	1	1	1
H621	Function output3 clip-in function module	0 ... 255	2	2	2	2
H622	Maximum value of heat demand with external predefined temperature set point (5 °C ≤ T _{AnfoExtMax} ≤ 130 °C)	5 ... 130 °C	80	80	80	80
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 start-ups (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	0	0	0	0

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<u>Display or QAA73 #</u>	<u>Function / Description</u>	<u>Range</u>	<u>Default Values</u>			
			65	85	100	120
H628	Set limit of fan speed for service visit	0 ... 9950 1/min	0	0	0	0
H629	End user can acknowledge a pending maintenance alarm via this parameter	0 ... 1	0	0	0	0
H630	Setting flags of maintenance alarms	0 ... 255	00000000	00000000	00000000	00000000
H631	Time for pump overrun in instantaneous DHW heater Comfort function with burner off (<i>0 = pump off with burner off; 255 = pump always on</i>)	0 ... 255 min	0	0	0	0
H632	Q8 support		00001111	00001111	00001111	00001111
H633	Selected period of time for repetition of maintenance alarm after acknowledgement	0 ... 255 days	0	0	0	0
H634	Operating hours (interval) since last service visit	0 ... 10000 hrs	0	0	0	0
H635	Start-ups (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 %	40	40	40	40
H640	Setting value QAA73: prepurge time	0 ... 51 s	10	10	10	10
H641	Setting value QAA73: postpurge time	0 ... 51 s	3	3	3	3
H642	Modulation air during full charging of stratification storage tank (<i>charging control</i>)	0 ... 100 %	100	100	100	100
H643	Set speed during full charging of stratification storage tank (<i>charging control</i>)	0 ... 9950 rpm	6750	6750	6750	6750
H644	Charging temperature set point 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	100	100	100	100
H646	Modulation air when burner control is not operating	0 ... 100 %	0	0	0	0
H647	Ionisation current maintenance alarm (<i>0 = did not occur, 1 = did occur</i>)	0 ... 255	0	0	0	0
H648	Duration of «Controller delay» after start-up when cycling in instantaneous DHW outlet operation: output delivered now is that prior to shutdown	0 ... 50 s	0	0	0	0

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<u>Display or QAA73 #</u>	<u>Function / Description</u>	<u>Range</u>	<u>Default Values</u>			
			65	85	100	120
H700	1st Historical Fault – Number of Occurrences.					
H701	1st Historical Fault – Operating Phase.					
H702	1st Historical Fault – Operating Error Code					
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.					
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	1	1	1	1
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
H727	Diagnostic Code					
H728	1st Historical Fault – ALBATROS Error Code					

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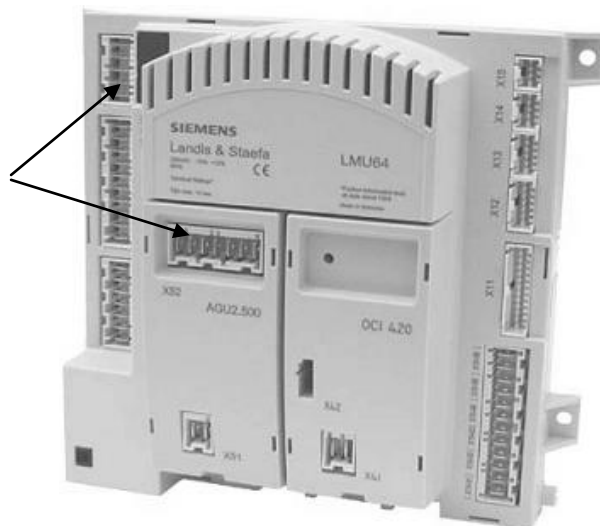
<u>Display or QAA73 #</u>	<u>Function / Description</u>	<u>Range</u>	<u>Default Values</u>			
			65	85	100	120
H729	2nd Historical Fault – ALBATROS Error Code					
H730	3rd Historical Fault – ALBATROS Error Code					
H731	4th Historical Fault – ALBATROS Error Code					
H732	5th Historical Fault – ALBATROS Error Code					
H732	Current Historical Fault – ALBATROS Error Code					
H755	Measured value of ionisation current	-				

Supplementary Information For AGU2.511 Communication Clip Installation Including LMU64 Controller reprogramming.

(Part Code. 96.38000-7005)

Following the installation of the AGU2.5 communication clip (complete with base mounted wiring connection) onto the front of the LMU64 controller a number of operational parameters within the unit must be altered to ensure the clips operates as required.

X52 must be connected to X1:02 utilising the supplied lead. (Discard the existing blue plug.)



LMU64 Pictured above with AGU2.511 and OCI420 communication clips.

A number of parameters will require altering within the LMU64 controller from their standard default setting to allow the AGU2.511 communication clip to operate correctly.

Access is gained to the H parameters by pressing the PROG ▲ ▼ buttons simultaneously for 3 seconds unit H 90 appears on the screen. The required H parameters can then be reached by using the PROG ▲. Or PROG ▼ buttons. Once at the required H parameter the required setting is achieved by using the + - buttons. To save the alteration in the controller the INFO button must be pressed.

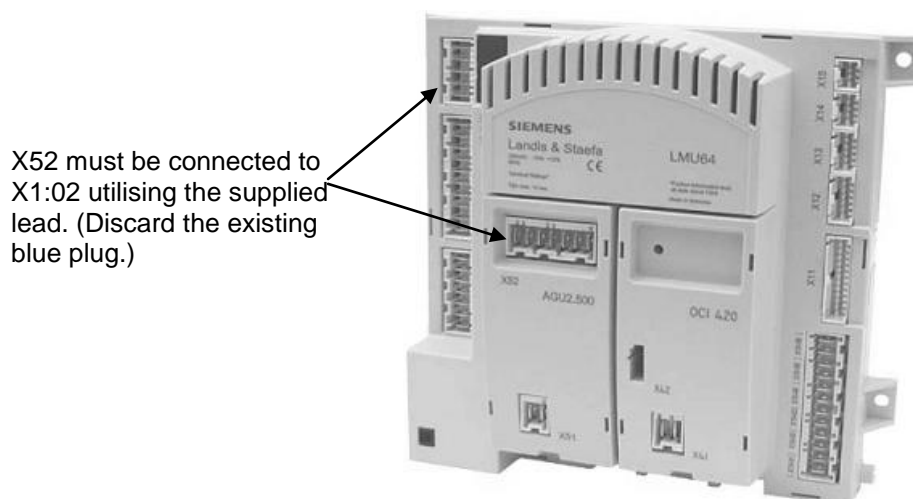
Parameter #	Description	Default	New Setting
H618	Input control configuration Input value interpretation affected by H622 or H623 Dependant upon control requirement. (4 is recommended.)	0	4. Predefined Temperature set point 5. Predefined Boiler Output 6. Low Loss Header Sensor
H622	Maximum Temperature Via X51 input 0-10 Volt	85	85
H623	Maximum Temperature Via X51 input 0-20mA	5	85
H619	Relay designation for Output from Orange Plug Left Terminal Live. Right Terminal Neutral. Output rated at 240 Volts 0.5 Amp	0	0. Hydraulic Diagram Derived. 1. LPG SSOV Output. 2. Boiler Fault Output. 3. Boiler Operating Output. 4 -12 Non supported Output.
H620	Relay designation for Output from Clear Plug Left Terminal Live. Middle Terminal Neutral. Output rated at 240 Volts 0.5 Amp	0	0. Hydraulic Diagram Derived. 1. LPG SSOV Output. 2. Boiler Fault Output. 3. Boiler Operating Output. 4 -12 Non supported Output.
H621	Relay designation for Output from Clear Plug Right Terminal Live. Output rated at 240 Volts 0.5 Amp	0	0. Hydraulic Diagram Derived. 1. LPG SSOV Output. 2. Boiler Fault Output. 3. Boiler Operating Output. 4 -12 Non supported Output.

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Ultramax PB Supplementary Information For AGU2.500 Additional Heating Zone Clip Installation Including LMU64 Controller reprogramming. (Part Code. 96.38000-7003)

Following the installation of the AGU2.500 Additional Heating Zone (Mixing Zone) clip (complete with base mounted wiring connection) onto the front of the LMU64 controller a number of operational parameters within the unit must be altered to ensure the clips operates as required.



LMU64 Pictured above with AGU2.500 and OCI420 communication clips.

A number of parameters will require altering within the LMU64 controller from their standard default setting to allow the AGU2.500 communication clip to operate correctly.

Access is gained to the H parameters by pressing the PROG ▲▼ buttons simultaneously for 3 seconds unit H 90 appears on the screen. The required H parameters can then be reached by using the PROG ▲. Or PROG ▼ buttons. Once at the required H parameter the required setting is achieved by using the + - buttons. To save the alteration in the controller the INFO button must be pressed.

Parameter #	Description	Default	New Setting
	Heating Zone Without Mixing Valve and Flow Sensor (QAD36)		
H554. bit 5	Activation of fault indication of flow sensor not installed	1	0 = Fault code indication suppressed
	Heating Zone With Mixing Valve and Flow Sensor (QAD36)		
	No Alterations Required.		

L AGU2.500

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Ultramax PB Supplementary Information For OCI420 LPB Communication Installation Including LMU64 and RVA47 Controller reprogramming. (Part Code. 96.38000-7004)

Following the installation of the OCI420 LPB communication clip (complete with base mounted wiring connection) onto the front of the LMU64 controller a number of operational parameters within the unit must be altered to ensure the clips operates as required.



Cascade wiring connection point X41. Polarity must be observed.

LMU64 Pictured above with AGU2.511 and OCI420 communication clips.

A number of parameters will require altering within the LMU64 controller from their standard default setting to allow the OCI420 communication clip to operate correctly.

Access is gained to the H parameters by pressing the PROG ▲ ▼ buttons simultaneously for 3 seconds unit H 90 appears on the screen. The required H parameters can then be reached by using the PROG ▲. Or PROG ▼ buttons. Once at the required H parameter the required setting is achieved by using the + - buttons. To save the alteration in the controller the INFO button must be pressed.

LMU Parameter #	Description	Default	New Setting
H516	External temperature at which the boiler ceases to operate in heating mode. Summer / Winter changeover temperature.	18	30
H552	System hydraulic configuration.	66	80
H605	Boiler positioning in cascade	1	Boiler # 1 = 2 Boiler # 2 = 3 etc up to boiler #12 = 13

A number of parameters will require altering within the RVA47 cascade controller from their standard default setting to allow the RVA47 to operate correctly.

Access is gained to the operational parameters of the RVA47 cascade controller by pressing the PROG ▲ ▼ buttons simultaneously for 3 seconds unit 51 appears on the screen. The required parameters can then be reached by using the PROG ▲. Or PROG ▼ buttons. Once at the required parameter the required setting is achieved by using the + - buttons. To save the alteration in the controller the AUTO button must be pressed.

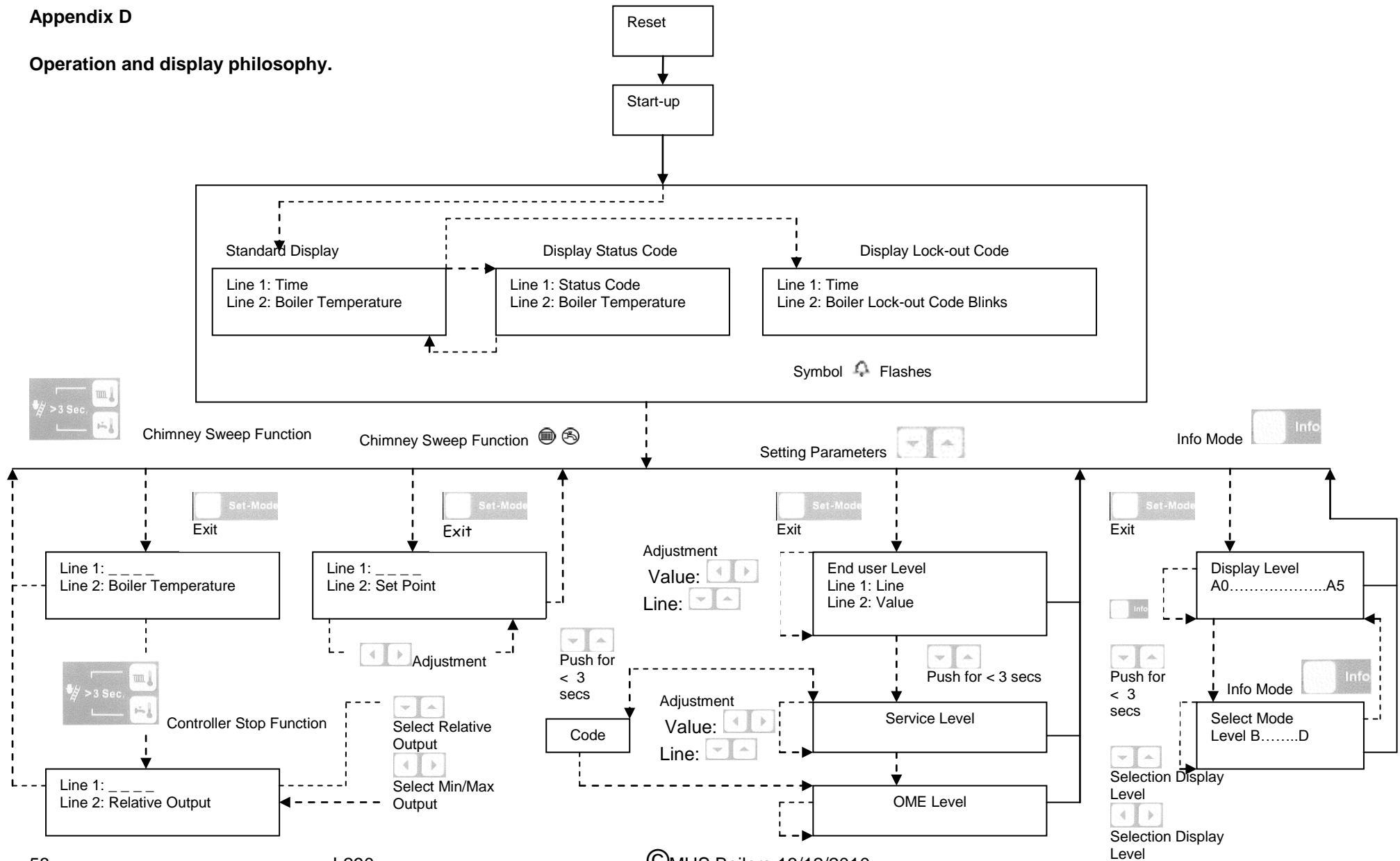
RVA47 Parameter #	Description	Default	New Setting
16	External temperature at which the boilers cease to operate in heating mode. Summer / Winter changeover temperature.	17	30
140	Cascade Communication Master Configuration	1	1
141	Cascade communication Master Configuration	0	0
148	Cascade communication Clock Configuration	3	3

Please note that the QAC32 outside air sensor must be connected to the RVA47 cascade controller.
L OCI.

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Appendix D

Operation and display philosophy.



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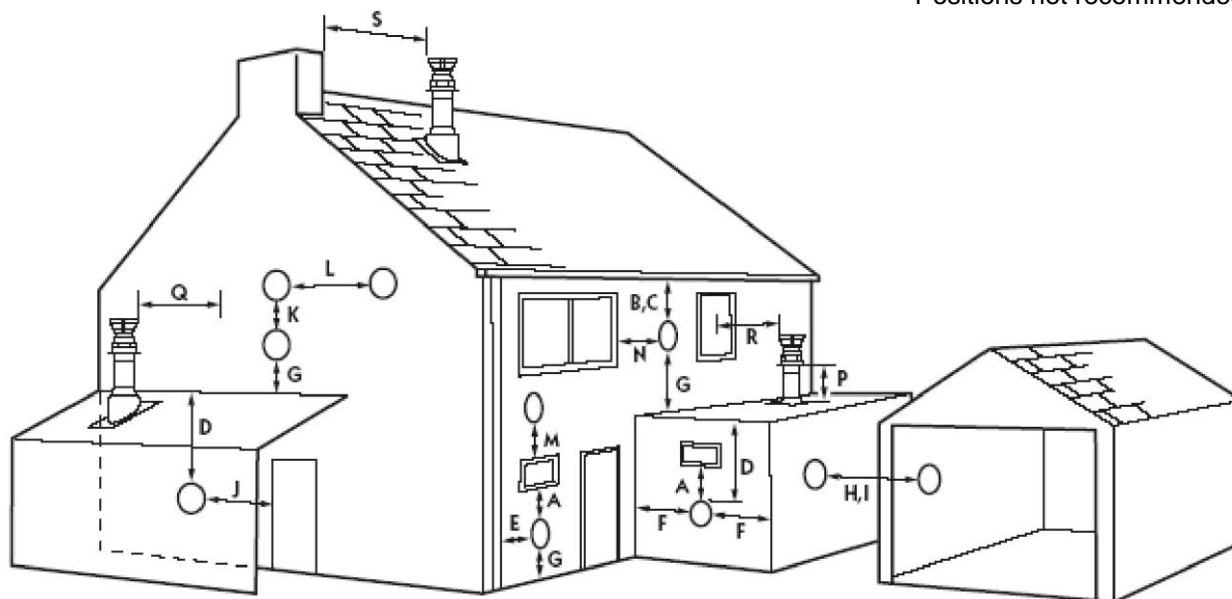
Appendix E

Balanced Flue Terminal Positions For Boilers Below and above 70kW Net Input

All measurements are in mm and are minimum clearances.

Terminal Location		Boilers with a rated Input < 70kW Net	Boilers with a rated Input > 70kW Net
A	*Below and opening window etc.	300	600
B	Below gutter soil pipes etc.	75	700
C	Below Eaves.	200	200
D	*Below balconies or carport	200	N/A
E	From vertical drain or soil pipe	150	150
F	From internal or external	300	300
G	Above ground or balcony level.	300	300 (2000 where people have general access)
H	From a surface facing the	2000	2000
I	From a terminal facing the terminal.	2000	2000
J	*From opening in a carport into a dwelling.	1200	N/A
K	Vertically from a terminal on the same wall.	1500	1500
L	Horizontally from a terminal on the same wall.	300	600
M	Above an opening, window etc.	500	600
N	*Horizontally to an opening, window etc.	300	600
P	Above a level roof (base of terminal.)	500	500
Q	From an adjacent wall (edge of terminal.)	500	500
R	From adjacent opening, window	1000	1000
S	From any other flue terminal.	600	600

* Positions not recommended.



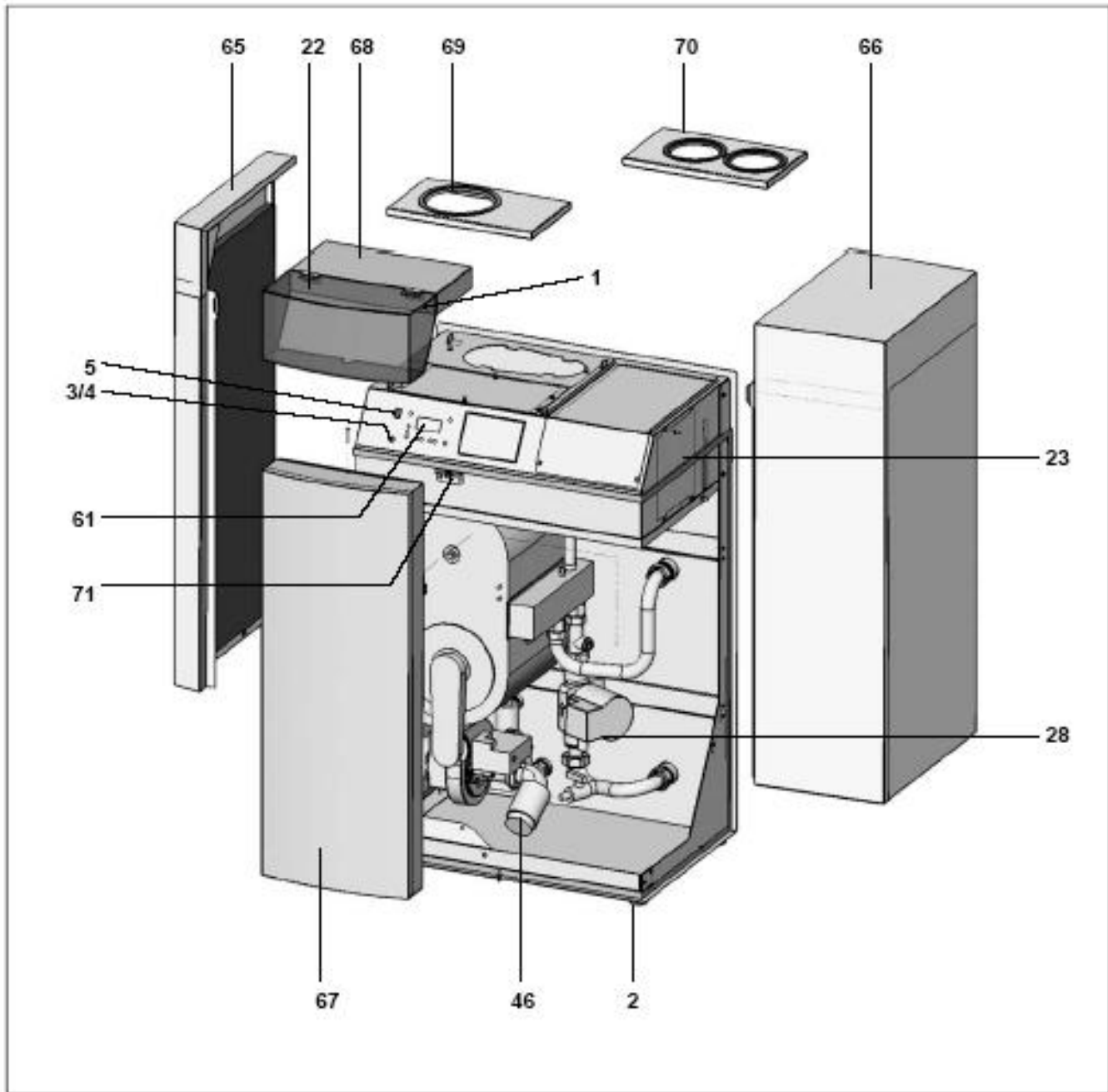
Groups of appliances of 150kW gross input (136kW net input) and above must comply with the Clean Air Act with respect to the chimney discharge height. The terminal/s shall be guarded if it is less than 2000mm above the ground or in any position where it may cause injury to persons resulting from touching a hot surface.

Absolute guidance must be sought from the respective regulation.

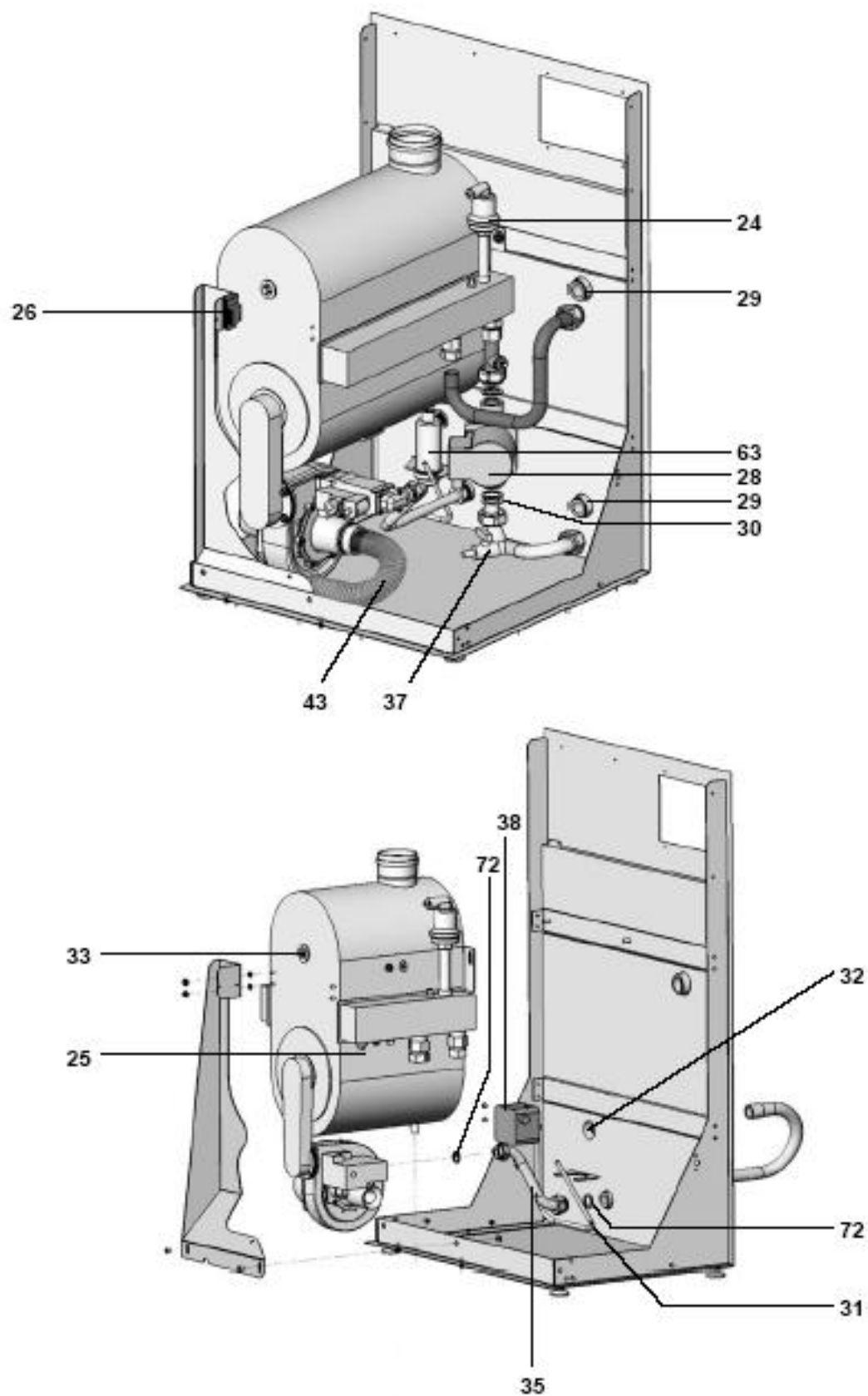
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Appendix F

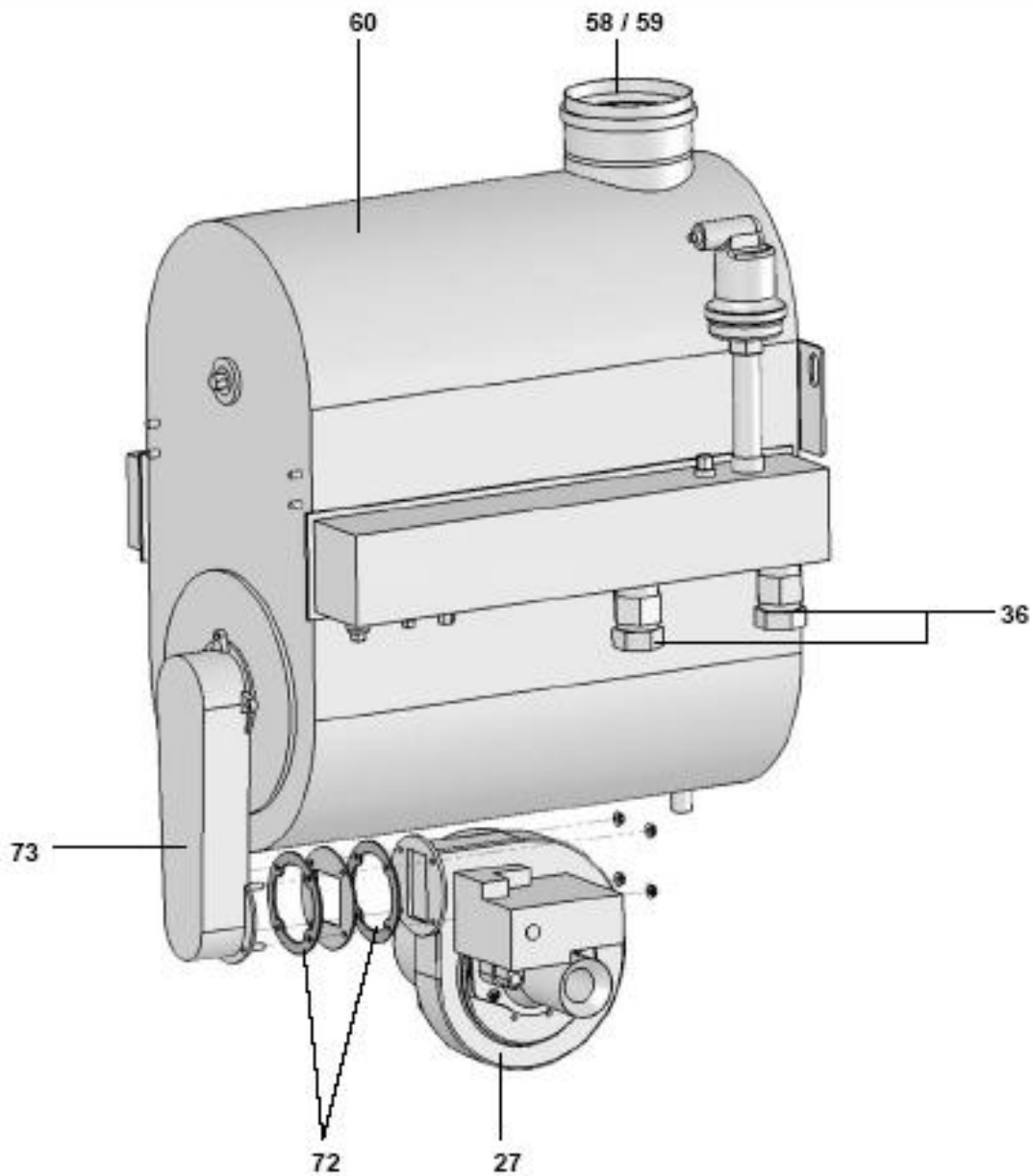
Ultramax PB Exploded Parts Diagrams



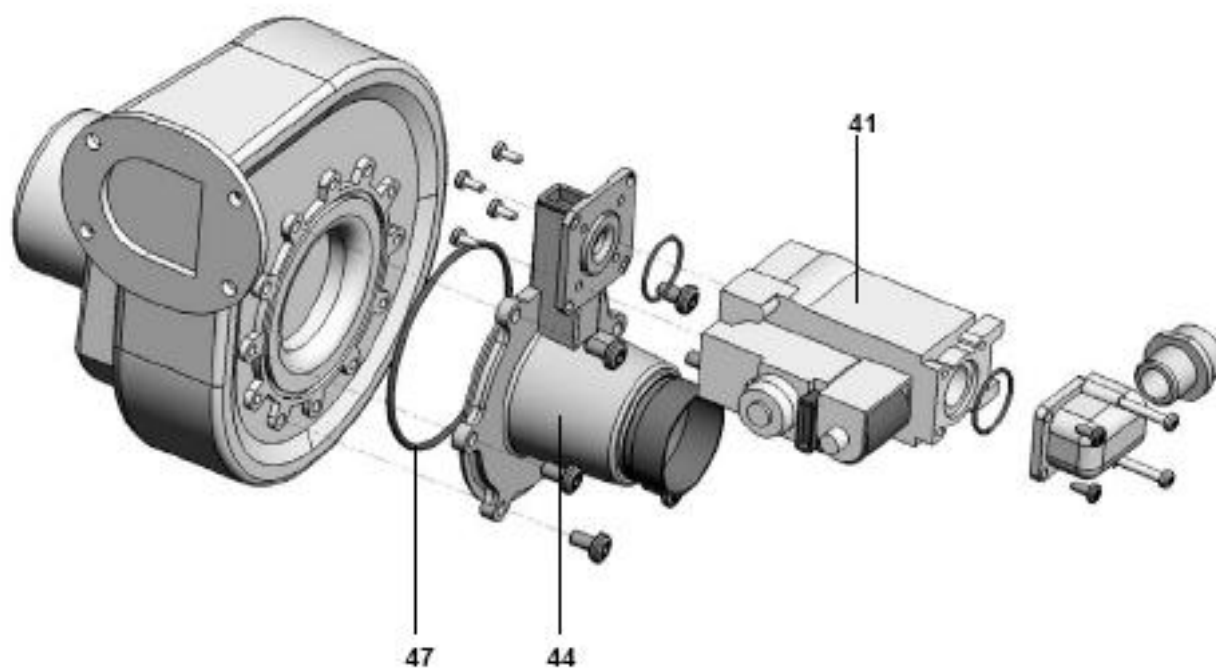
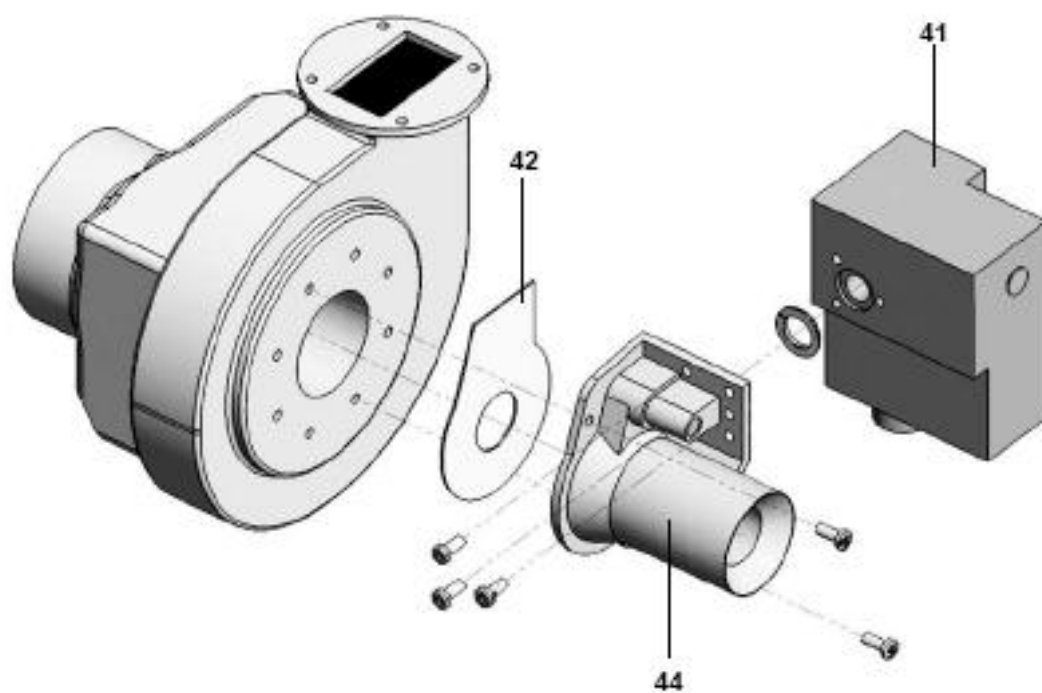
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ULTRAMAX PB 65 - 120



ULTRAMAX PB 65 - 120



ULTRAMAX PB 65 - 120

Ultramax PB Parts List

Item	Description	Article No.			
		Ultramax PB 65	Ultramax PB 85	Ultramax PB 100	Ultramax PB 120
1	Bolt M5 special for plastic cover	12052785			
2	Base bolt M8x40Z / Polyamide	4148751573			
3	Safety bracket with counter nut	12027540			
4	Fine fuse T6.3 A - H 250V	3333550051			
5	Switch ON / OFF	4758694673			
-	Cable tie for ribbon cable	12056514			
-	RAST 5 Screw-on plug 3-pin 361103K98	12027562			
-	RAST 5 Screw-on plug 2-pin green	12013636			
-	RAST 5 Screw-on plug 2-pin 361102K04	12027573			
-	RAST 5 Screw-on plug 2-pin to AGU2.500	12019312			
-	RAST 5 Screw-on plug 2-pin grey	12013603			
-	RAST 5 Screw-on plug 3-pin to LMU	12019334			
-	RAST 5 Screw-on plug 2-pin purple	12013614			
-	RAST 5 Screw-on plug 2-pin 361102K16	12027595			
-	RAST 5 Screw-on plug 2-pin 361102K03	12027606			
-	RAST 5 Screw-on plug 2-pin to QAA73	12020456			
-	RAST 5 Screw-on plug 2-pin 361102K13	12027628			
-	RAST 5 Screw-on plug 2-pin 361102K46	12027639			
-	RAST 5 Screw-on plug 2-pin 361102K09	12027650			
-	RAST 5 Screw-on plug 2-pin 361102K15	12027661			
-	RAST 5 Screw-on plug 2-pin 361102K35	12027672			
22	Cover for switch panel, complete	12056525			
23	Controller LMU64.55C167	12056536	12056547	12056558	12056569
-	Bushing for sensor cable	12035295			
24	Ventilation (spiral top)	17013674			
25	Temperature sensor Flow/Return/Exhaust	12027529			
26	Ignition transformer BW12026-05	12035053			
27	Fan	12027914			12056668
28	Circulation pump UPS 25-55 with seals Circulation pump UPS 25-80 with seals	12056580		12015737	
29	Seal Flow / Return	12038584			
30	Seal 44 x 32 x 2	12013460			
31	Teflon hose D8/6	12016177			
32	Bushing for condensate discharge	12027727			
33	Sleeve for exhaust sensor	12056591			
35	Hose nipple R1/8Z-D8 angled 90°	12016826			
36	Clamping ring connection D28 - 1Z	12056602			
37	Fill and drainage spigot DN15-R1/2Z MS	4478246091			
38	Pressure monitor DG 50B-3	1768693749			

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Item	Description	Article No.			
		Ultramax PB 65	Ultramax PB 85	Ultramax PB 100	Ultramax PB 120
-	Connecting cable Controller / Operating Panel	12056613			
41	Gas valve VK4115 V1204 Gas valve VK4615VB1006B	12027551			12056888
42	Seal	12036120			
43	Fan muffler		12056624		
44	Venturi nozzle, complete with seal and bolts	12056646	12056635		12056657
46	Fan muffler	12027441	12056624		
47	O-ring D 110.72 x 3.53 to Venturi nozzle / Blower				12059759
-	Ionisation electrode	12056679			
-	Ignition electrode	12056690			
73	Burner KPL.	12056734	12056745	12056756	12056767
-	Insulation furnace door	12056778			
-	Seal set furnace door	12056789			
-	Insulation transverse baffle heat exchanger interior	12049562			
58	Seal exhaust connection WT D80	12059770			
59	Seal exhaust accumulator D100		12056800		
60	Heat exchanger	12056811	12056822	12056833	12056844
61	Operating panel AGU 2.311	12056855			
-	Ignition cable	12056866			
63	Odour lock / Siphon complete	12056877			
65	Side panel left	12056899		12056910	
66	Side panel right	12056921		12056932	
67	Front panel, complete	12056943			
68	Cover	12056954		12056965	
69	Exhaust connecting plate, concentric	12056976			
70	Exhaust connecting plate, parallel	12056987			
71	Locking bolt and nut	12056998			
72	Seal set gas supply	12057009			12057020
-	Wire harness I switch panel 230V	12057031			
-	Wire harness II boiler 230V	12057042			12060353
-	Wire harness III low voltage	12057053			
-	Ignition cable plug	17006579			
With installed plate heat exchanger					
-	Safety valve 3/4Z 3 bar	17006205			
-	Expansion reservoir 3 litre	12056701			
-	Heat exchanger	12056712			12056723
-	Pressure gauge	17007624			

ULTRAMAX PB 65 - 120

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