

Keston
BY IDEAL HEATING

INSTALLATION & SERVICING

SYSTEM²
S30

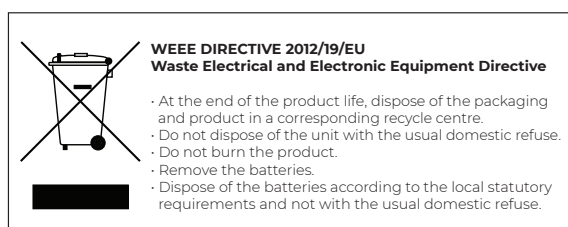
When replacing any part on this appliance, use only spare parts that you can be assured conform to the safety and performance specification that we require. Do not use reconditioned or copy parts that have not been clearly authorised by Keston.

For the very latest copy of literature for specification and maintenance practices visit our website keston.co.uk where you can download the relevant information in PDF format.



ERP DATA

	SYMBOL	UNITS	30 kW
Condensing Boiler	n/a	n/a	yes
Low Temperature Boiler	n/a	n/a	no
B1 Boiler	n/a	n/a	no
Cogeneration Space Heater	n/a	n/a	no
Equipped with a Supplementary Heater	n/a	n/a	no
Combination Heater	n/a	n/a	no
Nominal Heat Output for Space Heating			
Full Load	P4	kW	30.3
Part Load	P1	kW	9.9
Auxiliary Electricity Consumption			
Full Load	elmax	kW	0.052
Part Load	elmin	kW	0.012
Standby	PSB	kW	0.001
Seasonal Space Heating Energy Efficiency			
Full Load	η_4	%	89.6
Part Load	η_1	%	98.2
Standby Loss	Pstby	kW	0.05
Ignition	Pign	kW	0
Emissions			
	NOx (Gross)	NOx, pond Hs	mg/kWh
Annual Energy Consumption	QHE	GJ	93
Sound Power Level, Indoors	LWA	dB	50



The code of practice for the installation, commissioning & servicing of central heating systems



PRODUCT FICHE

KESTON SYSTEM² S BOILER

Keston Heating ERP DATA

	SYMBOL	UNITS	MODEL
			30 kW
Condensing boiler			Yes
Seasonal space heating efficiency class			A
Rated heat output		kW	30
Seasonal space heating energy efficiency	η_s	%	93
Annual energy consumption	QHE	GJ	93
Sound power level, indoors	LWA	dB	50

Seasonal Space Heating Energy Efficiency of the Boiler								94% ^{***}	A
Temperature control (from fiche of temperature control)								%	B
<i>Class I</i>	<i>Class II</i>	<i>Class III</i>	<i>Class IV</i>	<i>Class V</i>	<i>Class VI</i>	<i>Class VII</i>	<i>Class VIII</i>		
1%	2%	1.5%	2%	3%	4%	3.5%	5%		

Solar Contribution (from fiche of solar device)

Collector Size
(in m²)

Tank Volume
(in m³)

Collector Efficiency
(in %)

Tank rating
A* = 0.95
A = 0.91
B = 0.86
C = 0.83
D-G = 0.81

= ('III' x + 'IV' x) x 0.9 x (/ 100 x) = % **C**

Seasonal Space Heating Energy Efficiency of Package

TOTAL: A+B+C=

 %

Seasonal Space Heating Energy Efficiency Class of Package

<input style="width: 30px; height: 30px;" type="checkbox"/>	<input style="width: 30px; height: 30px;" type="checkbox"/>	<input style="width: 30px; height: 30px;" type="checkbox"/>	<input style="width: 30px; height: 30px;" type="checkbox"/>	<input style="width: 30px; height: 30px;" type="checkbox"/>	<input style="width: 30px; height: 30px;" type="checkbox"/>	<input style="width: 30px; height: 30px;" type="checkbox"/>	<input style="width: 30px; height: 30px;" type="checkbox"/>	<input style="width: 30px; height: 30px;" type="checkbox"/>	<input style="width: 30px; height: 30px;" type="checkbox"/>
G	F	E	D	C	B	A	A+	A++	A+++
< 30%	≥ 30%	≥ 34%	≥ 36%	≥ 75%	≥ 82%	≥ 90%	≥ 98%	≥ 125%	≥ 150%

The energy efficiency of the package of products provided for in this document may not correspond to its actual energy efficiency once installed in a building, as the efficiency is influenced by further factors such as heat loss in the products in relation to the building size and its characteristics

NOTES FOR THE INSTALLER

For any technical queries please ring the Keston installer helpline : 01482 443005

BOILER RESTART PROCEDURE -

Press the RESTART button. The boiler will repeat the ignition sequence if a heat demand is present.

DEFINITIONS



WARNING: Risk of injury or death



CAUTION: Risk of damage to objects



IMPORTANT: Important information

Table of Acronyms

CH - Central Heating

DHW - Domestic Hot Water

TRV - Thermostatic Radiator Valve

PRV - Pressure Relief Valve

IE - Ireland

ETCI - Electro-Technical Council of Ireland

BS - British Standard

WRAS - Water Regulations Advisory Scheme

SAP - Standard Assessment Procedure

IEE - Institution of Electrical Engineers

UKCA - UK Conformity Assessed

RHS - Right Hand Side

LHS - Left Hand Side

PCB - Printed Circuit Board

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Section 1 - General

Table 1 General Data

		30 kW
Gas Supply		2H-G20-20mbar
Gas Supply Connection		15mm copper compression
Injector Size	mm	4.65
Flow Connection	Central Heating	22mm copper compression
Return Connection	Central Heating	22mm copper compression
Flue Terminal Diameter	mm	100
Average Flue Temp-Mass Flow Rate		69°C - 13g/s
CO2 Content (± 0.7)	Max. CH	9.6%
	Min. CH	8.7%
Maximum Working Pressure (Sealed Systems)	bar (psi)	2.5(36.3)
Electrical Supply		230 V ~ 50Hz
Power Consumption	W	102
Fuse Rating		External:3A Internal :T4A HRC L250 V
Water Content	Central Heating litre (gal)	1.2(0.26)
Packaged Weight	kg	31.3
Lift Weight	kg	27.3
Boiler Casing Size	Height mm	700
	Width mm	395
	Depth mm	278

Table 2 Performance Data - Central Heating

Boiler Input:		30 kW	
		Min	Max
Net CV	kW	6.1	30.4
Gross CV	kW	6.7	33.7
Gas Consumption	m ³ /h	0.623	3.136
Boiler Output :			
Non Condensing 70°C Mean Water Temp.	kW	6.1	30.3
Condensing 40°C Mean Water Temp.	kW	6.4	31.0
Seasonal Efficiency* SEDBUK 2005		91.1%	
Seasonal Efficiency* SEDBUK 2009/2012		89.6%	
SEAI HARP*		91.1%	
NOx Classification		Class 6	

* The value is used in the UK Government's Standard Assessment Procedure (SAP) for energy rating of dwellings.

** The value is used in the Irish Government's Dwelling Energy Assessment Procedure (DEAP) for energy rating of dwellings. The test data from which it has been calculated have been certified by a notified body.

The test data from which it has been calculated, has been certified by a notified body.

Gas consumption is calculated using a calorific value of 38.7 MJ/m³ (1038 Btu/ft³) gross or 34.9 MJ/m³ (935 Btu/ft³) nett

To obtain the gas consumption at a different calorific value:

- For l/s - divide the gross heat input (kW) by the gross C.V. of the gas (MJ/m³)
- For Btu/h - multiply the gross heat input (kW) by 26.8
- For ft³/h - divide the gross heat input (Btu/h) by the gross C.V. of the gas (Btu/ft³)
- For m³/h - multiply l/s by 3.6

C13 C33 C53 = A room sealed appliance designed for connection via ducts to a horizontal or vertical terminal, which admits fresh air to the burner and discharges the products of combustion to the outside through orifices which, in this case, are concentric. The fan is up stream of the combustion chamber.

I_{2H} = An appliance designed for use on 2nd family gas, Group H only.

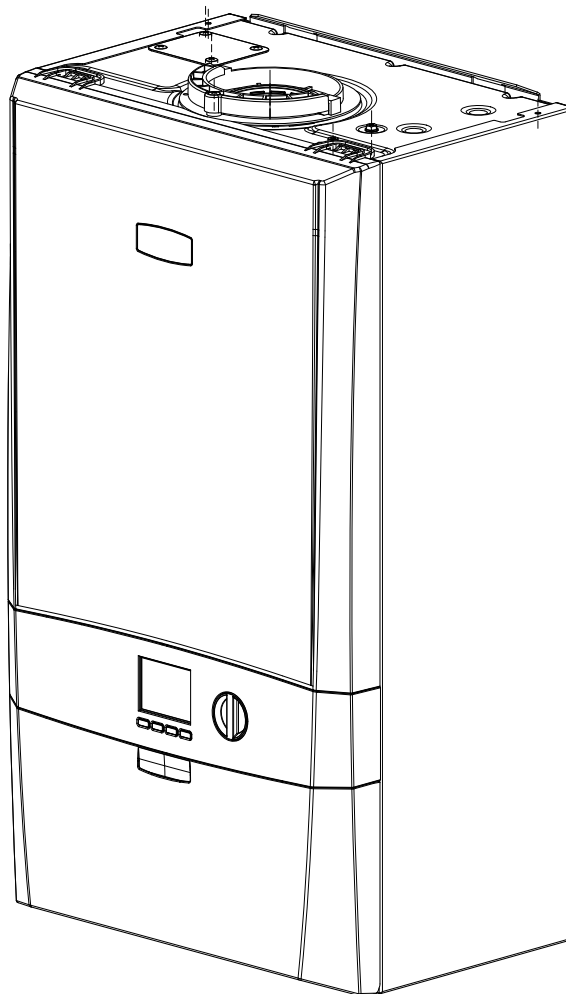
II_{2H/3P} = An appliance designed for use on 2nd or 3rd family gases, Group H or P.

KESTON SYSTEM² S

Natural Gas Only

BOILER SIZE kW	G.C. Appliance No (Benchmark No.)
30	41-930-54

Destination Country: GB, IE, RO



For UK, to comply with Building Regulations Part L1 (Part 6 in Scotland) the boiler should be fitted in accordance with the manufacturer's instructions. Self-certification that the boiler has been installed to comply with Building Regulations can be demonstrated by completing and signing the Benchmark Commissioning Checklist.

Before installing this boiler, read the Code of Practice sheet at the rear of this book.

BENCHMARK COMMISSIONING CHECKLIST DETAILS

Boiler	Page	Page
Make and model.....	7	
Appliance serial no. on data badge	Front Cover	
SEDBUK No. %.....	6	
Controls		
Time and temperature control to heating	27	
Time and temperature control to hot water	27	
Heating zone valves.....	n/a	
TRVs	10	
Auto bypass	10	
Boiler interlock.....	10	
For all boilers		
Flushing to BS.7593.....	13	
Inhibitor	13	
<i>Central heating mode</i>		
Heat input.....	to be calculated	
		Burner operating pressure n/a
		Central heating flow temp. measure and record
		Central heating return temp. measure and record
		For combination boilers only
		Scale reducer..... 13
		<i>Hot water mode</i>
		Heat input..... to be calculated
		Max. operating burner pressure n/a
		Max. operating water pressure..... measure & record
		Cold water inlet temp measure & record
		Hot water outlet temp..... measure & record
		Water flow rate at max. setting..... measure & record
		For condensing boilers only
		Condensate drain..... 23-24
		For all boilers: Complete, sign & hand over to customer

NOTE TO THE INSTALLER: COMPLETE THE BENCHMARK COMMISSIONING CHECKLIST AND LEAVE THESE INSTRUCTIONS WITH APPLIANCE



For assistance call
Technical Helpline
01482 443005

Section 1 - General

1.1 INTRODUCTION

The **Keston System² S** boilers are wall mounted, full sequence, automatic spark ignition, low water content, fanned flue, high efficiency, condensing, system gas boilers.

Due to the high efficiency of the boiler a plume of water vapour will form at the terminal during operation.

The boiler is supplied fully assembled with circulating pump, pressure gauge, PRV and CH expansion vessel.

A variable temperature control is fitted on the user control.

The boiler includes as standard:

- Boiler Automatic bypass
- Boiler frost protection
- Daily pump exercise.

The boiler casing is of white painted mild steel with a white polymer front panel.

The boiler temperature controls are visibly located in the control panel on the front of the boiler.

The heat exchanger is manufactured from cast aluminium.

The boiler is suitable for connection to fully pumped, sealed heating systems ONLY. Adequate arrangements for completely draining the system by provision of drain cocks MUST be provided in the installation pipework.

Pipework from the boiler is routed downwards.

Data Plate

The boiler model and serial number can be located on the bottom of the boiler casing, shown in Section 1.14 - Water & Gas Connection Diagram.

1.2 OPERATION

When there is a demand the system is supplied at the selected temperature of between 30°C and 80°C.

The boiler features a comprehensive diagnostic system which gives detailed information on the boiler status when operating, and performance of key components to aid commissioning and fault finding.

1.3 SAFE HANDLING

This boiler may require 2 or more operatives to move it to its installation site, remove it from its packaging base and during movement into its installation location. Manoeuvring the boiler may include the use of a sack truck and involve lifting, pushing and pulling.

Caution should be exercised during these operations.

Operatives should be knowledgeable in handling techniques when performing these tasks and the following precautions should be considered:

- Grip the boiler at the base.
- Be physically capable.
- Use personal protective equipment as appropriate, e.g. gloves, safety footwear.

During all manoeuvres and handling actions, every attempt should be made to ensure the following unless unavoidable and/or the weight is light.

- Keep back straight.
- Avoid twisting at the waist.
- Avoid upper body/top heavy bending.
- Always grip with the palm of the hand.
- Use designated hand holds.
- Keep load as close to the body as possible.
- Always use assistance if required.

1.4 OPTIONAL ACCESSORIES

Please visit Keston.com to access the optional accessories for this boiler.

1.5 SAFETY

Current Gas Safety (installation and use) regulations or rules in force:

The appliance is suitable only for installation in UK and should be installed in accordance with the rules in force.

In UK, the installation must be carried out by a Gas Safe Registered Engineer. It must be carried out in accordance with the relevant requirements of the:

- Gas Safety (Installation and Use) Regulations
- Appropriate Building Regulations, either The Building Regulations, The Building Regulations (Scotland), Building Regulations (Northern Ireland).
- Water Fittings Regulations or Water byelaws in Scotland.
- Current I.E.E. Wiring Regulations.

Where no specific instructions are given, reference should be made to the relevant British Standard Code of Practice.

In IE, the Installation must be carried out by a Registered Gas Installer (RGI) and installed in accordance with the current edition of I.S.813 "Domestic Gas Installation", the current Building Regulations and reference made to the current ETCI rules for electrical installation.

The Boiler has been tested and certified to:

BSEN 15502-1, BSEN 15502-2, BSEN 15502-2-1, BSEN 60335-1, BSEN 60335-2-102, BSEN 55014-1 and BSEN55014-2 for use with Natural Gas & Propane.

Detailed recommendations are contained in the following British Standard Codes of Practice:

BS5440:1 Flues (for gas appliances of rated input not exceeding 70 kW).

BS5440:2 Ventilation (for gas appliances of rated input not exceeding 70 kW).

Section 1 - General

- BSEN12828** Heating Systems in buildings: Design for water based heating systems.
- BSEN12831** Heating Systems in buildings: Method for calculation of the design heat load.
- BSEN14336** Heating Systems in buildings: Installation and commissioning of water based heating systems.
- BS5546** Installation of gas hot water supplies for domestic purposes (2nd Family Gases)
- BS6798** Installation of gas fired hot water boilers of rated input not exceeding 70 kW.
- BS6891** Installation and maintenance of low pressure gas installation pipework.
- BS 7593:2019** Code of practice for the preparation, commissioning and maintenance of domestic central heating and cooling water systems.

Health & Safety Document No. 635.

The Electricity at Work Regulations, 1989.

The manufacturer's notes must NOT be taken, in any way, as overriding statutory obligations.

! **IMPORTANT:** This appliance is UKCA/CE certificated for safety and performance. Do not connect external control devices directly to this appliance unless recommended in this manual or by **Ideal Heating** in writing. If in doubt, please enquire.

Unapproved control devices could invalidate the warranty of this appliance and infringe the Gas Safety Regulations.

1.6 SAFE HANDLING OF SUBSTANCES

No asbestos, mercury or CFCs are included in any part of the boiler or its manufacture.

1.7 LOCATION OF BOILER

The boiler must be installed on a flat and vertical internal wall, capable of adequately supporting the weight of the boiler and any ancillary equipment.

The boiler may be fitted on a combustible wall and insulation between the wall and the boiler is not necessary, unless required by the local authority.



WARNING: Rear access to the boiler is not permitted.



CAUTION: Do not fit the boiler outside.

Timber Framed Buildings

Boilers installed in a timber-framed building must comply with IGE/UP7 +A 2008.

High Rise Installations

Installations in England above 18 meters requires a High Rise Flue Kit. This adheres to the new building regulations. (ADB_Vol1_ Dwellings_2019_edition_inc_2020_amendments).

Installations in Scotland above 11 meters requires the High Rise Flue Kit. This adheres to the new building standards technical handbook 2020: Domestic Buildings (April 2021 Addendum).

Bathroom Installations

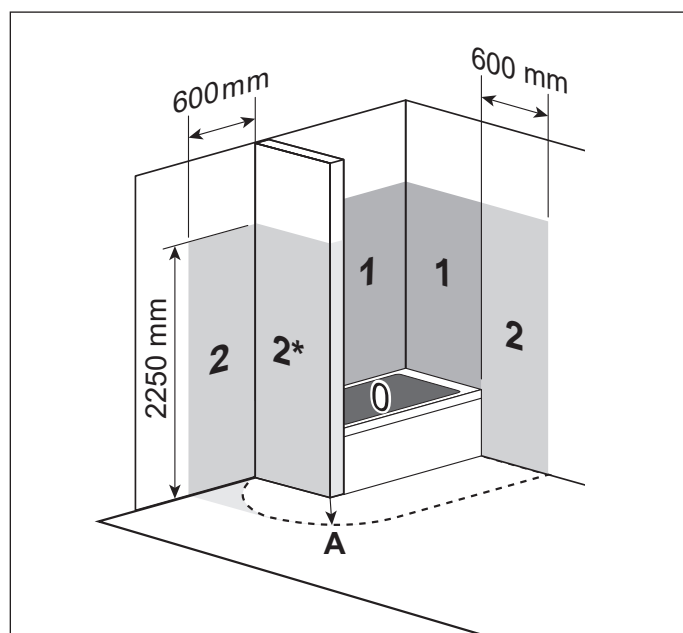


CAUTION: This appliance is IP20 rated, do not clean with jets of water.

You may install the boiler in any internal space. The installation must comply with the current IEE (BS 7671) Wiring Regulations and the electrical regulations applicable in Scotland.

For IE, reference should be made to the current ETCI rules for electrical installations and I.S.813

If the appliance is to be installed in a room containing a bath or shower then the appliance must be installed beyond Zone 2, as detailed in BS7671.



Bathroom Installations

[0] Zone 0

[1] Zone 1

[2] Zone 2

[2*] Without the end wall, zone 2 must extend 600 mm from the bath

[A] 600 mm radius from the bath or shower

Compartment Installations

A boiler installed in a compartment does not require ventilation. However, A boiler installed in a compartment must provide adequate clearances for servicing.

The compartment should also be fitted with a suitable label in accordance with current standards.

Refer to Section
1.14

Section 1 - General

1.8 AIR SUPPLY.

It is not necessary to have an air vent in the room or internal space where the boiler is installed.

1.9 GAS SUPPLY

Consult the local gas supplier to establish an adequate supply of gas. Do not use existing service pipes without consulting the local gas supplier.

The gas supply must be governed with a meter.

A gas meter can only be connected by the local gas supplier or by a Gas Safe Registered Engineer.

An existing meter should be checked, preferably by the gas supplier, to ensure that the meter is adequate to deal with the required gas supply rate.

It is the responsibility of the Gas Installer to size the gas installation pipework in accordance with BS6891.

Whilst the principle of the 1:1 gas valve ensures the Keston range is able to deliver its full output at inlet pressures as low as 14 mb, other gas appliances in the property may not be as tolerant. When operating pressures are found to be below the minimum meter outlet of 19 mb these should be checked to ensure this is adequate for correct and safe operation.

Allowing for the acceptable pressure loss of 1mb across the installation pipework, it can be assumed that a minimum permitted operating pressure of 18mb will be delivered to the inlet of the appliance.

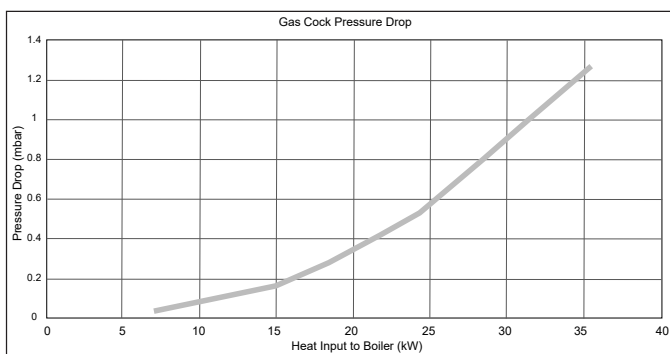
(Reference BS6400-1 Clause 6.2 Pressure Absorption).

The external gas cock could further reduce the operating pressure when measured at its test point. The pressure drop is relative to the heat input to the boiler (kW), refer to graph below.

IMPORTANT: Ensure all gas valve connections are gas tight with a gas soundness check up to the gas control valve.

Installation pipes must be fitted in accordance with BS6891.

The complete installation MUST be tested for gas tightness and purged as described, for the majority of installations the appropriate standard is IGEM/UP/1B [23], but alternatively IGEM/UP/1 [21] or IGEM/UP/1A [22], as appropriate, can be utilized.



1.10 WATER CIRCULATION SYSTEM

IMPORTANT: A minimum length of 1 metre of copper pipe MUST be fitted to both flow and return connections from the boiler before connection to any plastic piping.

The central heating system should be in accordance with BS6798 and, in addition, for smallbore and microbore systems, BS5449.

Water treatment is covered later in these instructions.

Refer to Section
1.17

1.11 BOILER CONTROLS

System controls should be installed to ensure the boiler has no demand when there is no requirement from the system, in compliance with Building Regulations.

Heating systems utilising full thermostatic radiator valve control of temperature in individual rooms should also be fitted with a room thermostat controlling the temperature in a space served by radiators not fitted with such a valve.

When thermostatic radiator valves are used, the space heating temperature control over a living / dining area or hallway having a heating requirement of at least 10% of the minimum boiler heat output should be achieved using a room thermostat, whilst other rooms are individually controlled by thermostatic radiator valves. However, if the system employs thermostatic radiator valves on all radiators, or two port valves, then a bypass circuit must be fitted with an automatic bypass valve to ensure a flow of water should all valves be in the closed position.

1.12 ELECTRICAL SUPPLY



WARNING: This appliance must be earthed

Wiring external to the appliance MUST be in accordance with the current I.E.E. (BS7671) Wiring Regulations and any local regulations which apply.

For IE, reference should be made to the current ETCI rules for electrical installations.

The mains supply to the boiler and system wiring centre shall be through one common fused double pole isolator and for new heating systems, and where practical replacement installations, the isolator shall be situated adjacent to the appliance.

1.13 CONDENSATE DRAIN

The condensate drain provided must be connected to the drainage point on site. All condensate drainage pipework and fittings must be made of plastic.

IMPORTANT: The condensate drain pipework should be installed in accordance with BS6798.

The drain outlet on the boiler is sized for standard 21.5 mm overflow pipe. It is a universal fitting to allow use of different brands of pipework.

Refer to Section
2.16

Section 1 - General

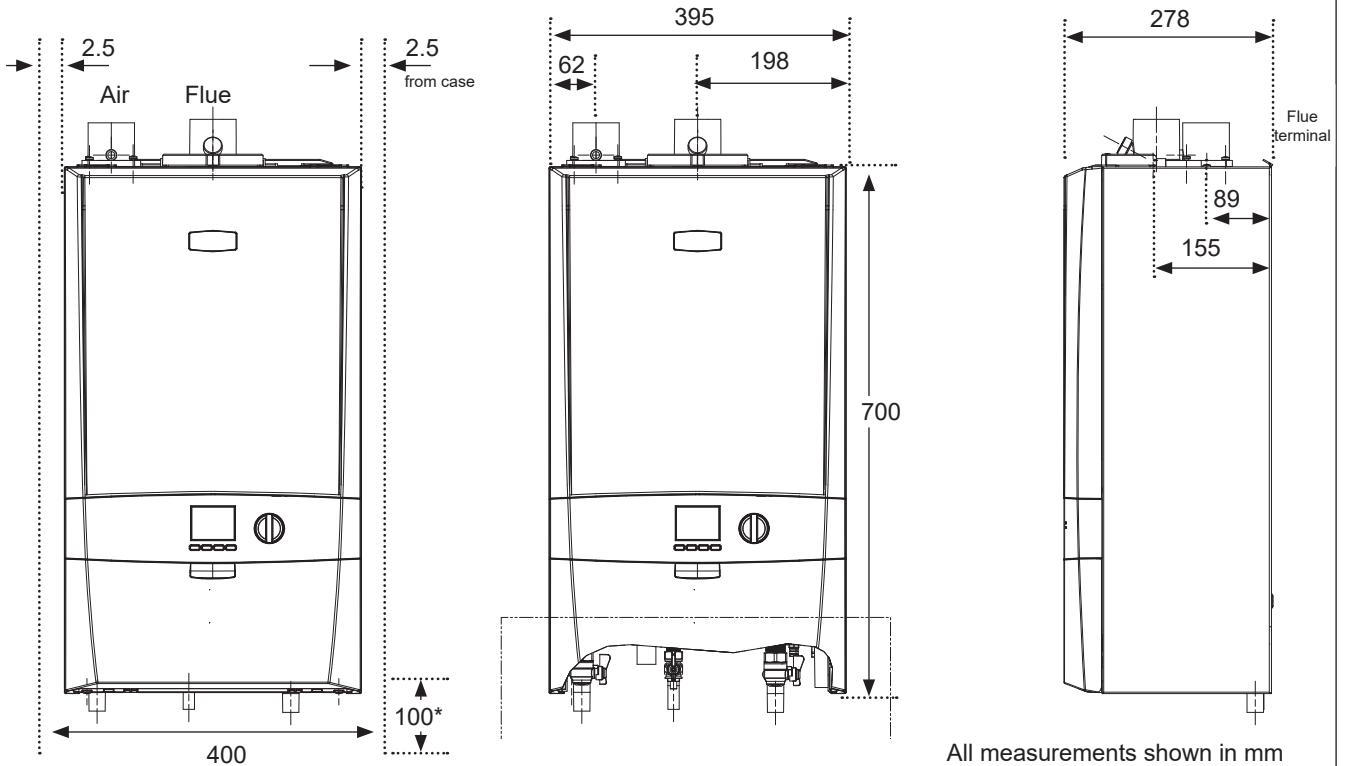
1.14 BOILER DIMENSIONS, SERVICES & CLEARANCES

Refer to Section 2.18

The boiler connections are made on the boiler connection tails.

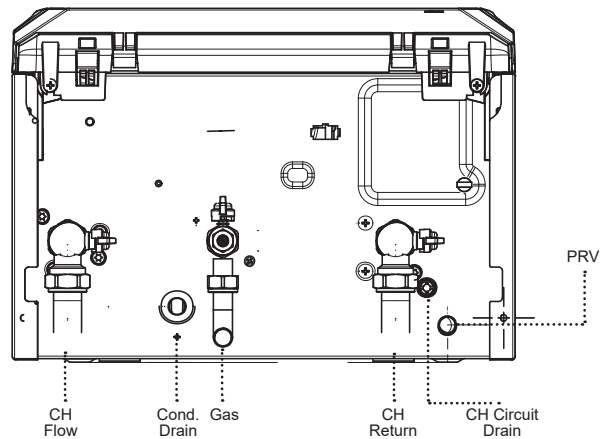
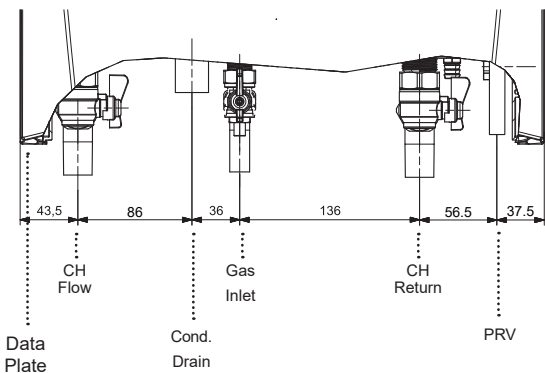
Additional space will be required for installation, depending upon site conditions.

The following minimum clearances must be maintained for operation and servicing.



Water and Gas Connections

Underside View



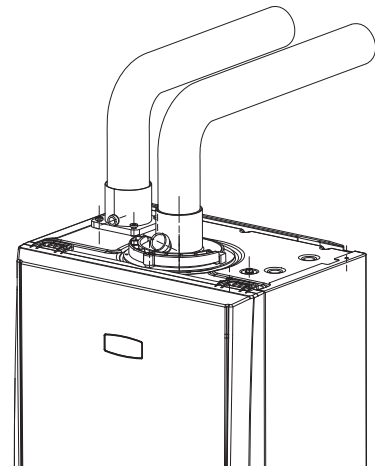
Front Clearance

The minimum front clearance when built in to a cupboard is 5 mm from the cupboard door but 450 mm overall clearance is still required, with the cupboard door open, to allow for servicing.

* Bottom Clearance

Bottom clearance after installation can be reduced to 15 mm. This must be obtained with an easily removable panel to provide the 100 mm clearance required for servicing. For easy access to the pressure gauge a bottom clearance of 15 mm is required for a partial open door.

IMPORTANT: Please ensure there is sufficient clearance either side and below the boiler, particularly from door hinges and the base of a cupboard, to allow the door to be opened to allow the pressure gauge to be checked.



1.15 SYSTEM REQUIREMENTS - CENTRAL HEATING

- a. The method of filling, refilling, topping up or flushing sealed primary hot water circuits from the mains via a temporary hose connection is only allowed if acceptable to the local water authority.
- b. Antifreeze fluid, corrosion and scale inhibitor fluids suitable for use with boilers having aluminium heat exchangers may be used in the central heating system.

General

1. The installation must comply with all relevant national and local regulations.
2. Design the system for flow temperatures up to 80°C.
3. The system components must be suitable for an operating pressure of 3 bar and a maximum temperature of 110°C.

The following components are incorporated within the appliance:

- a. Circulating pump.
- b. PRV, with a non-adjustable preset lift pressure of 3 bar.
- c. Pressure gauge, covering a range of 0 to 4 bar.
- d. An 8 litre expansion vessel, with an initial charge pressure of 0.75 bar.

4. **Makeup Water.** One of the following provisions must be made for replacing system water loss:

- a. Manually filled vessel

The vessel must:

Have a visible water level

Be mounted at least 150 mm above the system's highest point

Connect through a non-return valve to the system

Be at least 150 mm below the makeup vessel on the return side of the radiators

- b. System prepressurisation.

The efficiency of the expansion vessel will be reduced in a pressurised system; a larger vessel or smaller system volume may be necessary.

If the vessel's capacity is not sufficient, an additional vessel must be installed on the return to the boiler.

If the system is not pressurised, the cold water capacity must not exceed 143 litres.

Guidance on vessel sizing is given in table above.

Table 3 Vessel Sizing

PRV setting	bar	3.0	
Vessel charge pressure	bar	0.5 to 0.75	
System pre-charge pressure	bar	None	1.0
System volume (litres)		Expansion vessel volume (litres)	
25		1.6	1.8
50		3.1	3.7
75		4.7	5.5
100		6.3	7.4
125		7.8	9.2
150		9.4	11.0
175		10.9	12.9
190		11.9	14.0
200		12.5	14.7
250		15.6	18.4
300		18.8	22.1
For other system volumes multiply by the factor across		0.063	0.074

Model		15	18	24	30
Max CH output	kW	15	18	24.2	30.3
Water flow rate	l/min	10.7	13	17.2	21.5
	(gal/min)	(2.4)	(2.8)	(3.8)	(4.7)
Temp differential	°C	20	20	20	20
Head available for system	m.w.g.	5	4.5	3.3	1.9
	(ft.w.g.)	(16.2)	(14.7)	(10.8)	(6.2)

5. Filling

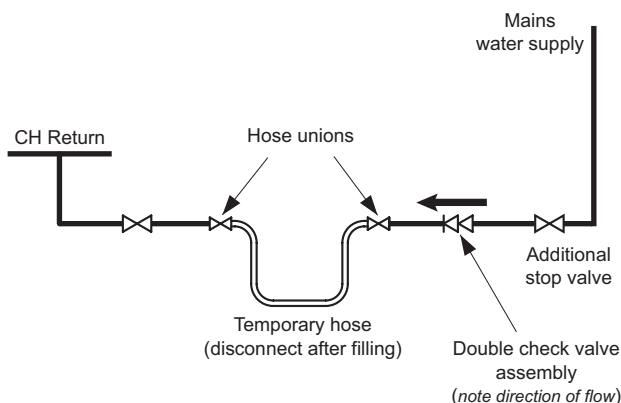
The system may be filled by the following method:

Where the mains pressure is excessive a pressure reducing valve must be used to facilitate filling.

- a. Thoroughly flush out the whole system with cold water.
- b. Fill and vent the system until the pressure gauge registers 1 bar and examine for leaks

Refer to Section 2.18

- c. Check the operation of the PRV by raising the water pressure until the valve lifts. This should occur within 0.3 bar of the preset lift pressure.
- d. Check no escape of water occurs except at the discharge point
- e. Release water from the system until the minimum system design pressure is reached; 1.0 bar if the system is to be pre-pressurised.



1.16 SYSTEM BALANCING

Note. Systems incorporating zone valves which could completely cut off the flow through the system must also include a bypass.

The boiler does not normally need a bypass but at least some radiators on the heating circuit, of load of at least 10% of the minimum boiler output, must be provided with twin lockshield valves so that this minimum heating load is always available.

Balancing

1. Set the programmer to ON.
Close the manual or thermostatic valves on all radiators, leaving the twin lockshield valves (on the radiators referred to above) in the OPEN position.
Turn up the room thermostat and adjust the lockshield valve to give an uninterrupted flow through the radiator.
These valves should now be left as set.
2. Open all manual or thermostatic radiator valves and adjust the lockshield valves on the remaining radiators, to give around 20°C temperature drop at each radiator.
3. Adjust the room thermostat and programmer to NORMAL settings.

1.17 WATER TREATMENT

Central Heating

The Keston range of boilers have an ALUMINIUM alloy heat exchanger.

 **IMPORTANT** The application of any other treatment to this product may render the guarantee of Ideal Heating invalid.

Ideal Heating recommend Water Treatment in accordance with the Benchmark Guidance Notes on Water Treatment in Central Heating Systems.

If water treatment is used **Ideal Heating** recommend only the use of SCALEMASTER SM-1 PRO, FERNOX, MBI, ADEY MC1, SENTINEL X100 or CALMAG CM100 inhibitors and associated water treatment products, which must be used in accordance with the manufacturers' instructions.

This boiler can be used with a water softener. However, the heating system should not be filled with softened water as any softening chemicals could enhance corrosion of certain materials inw the heating system, including aluminium and steel. The heating system should always be filled from the bypass on the water softener installation.

Notes

1. It is most important that the correct concentration of the water treatment products is maintained in accordance with the manufacturers' instructions.
2. If the boiler is installed in an existing system any unsuitable additives **MUST** be removed by thorough cleansing. BS7593:2019 details the steps necessary to clean a domestic heating system.
3. In hard water areas, treatment to prevent lime scale may be necessary - however the use of artificially softened water is **NOT** permitted.
4. Under no circumstances should the boiler be fired before the system has been thoroughly flushed.

For further information contact:

Fernox
www.fernox.com
Tel: +44 (0) 3301 007750

Sentinel Performance Solutions
www.sentinelprotects.com
Tel: +44 (0) 1928 704330

Scalemaster Water Treatment Products
www.scalemaster.co.uk
Tel: +44 (0) 1785 811636

Calmag Ltd.
www.calmag Ltd.com
Tel: +44 (0) 1535 210320

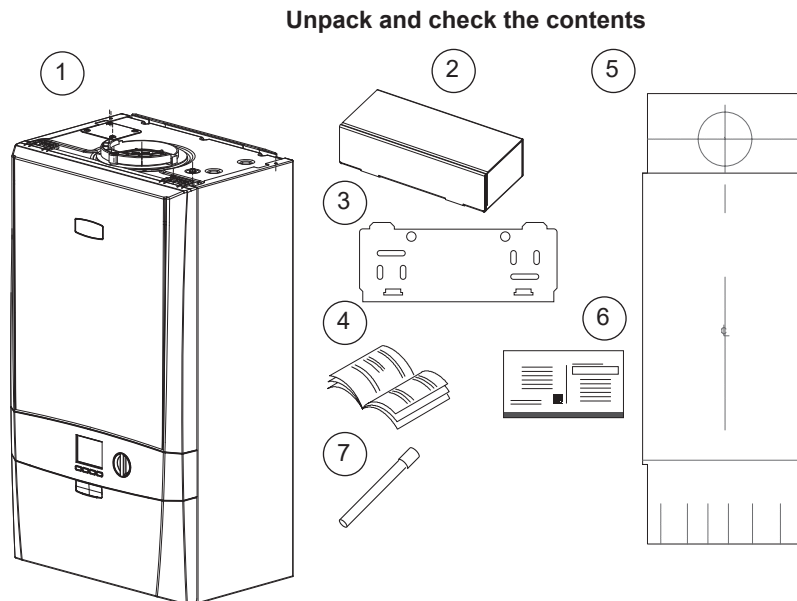
Adey
www.adey.com
Tel: +44 (0) 1242 546700

2.2 UNPACKING

The boiler is supplied fully assembled in Pack A. A telescopic or non-telescopic flue assembly for rear or side flue outlet in Pack B is supplied as a separate order.

Pack A Contents

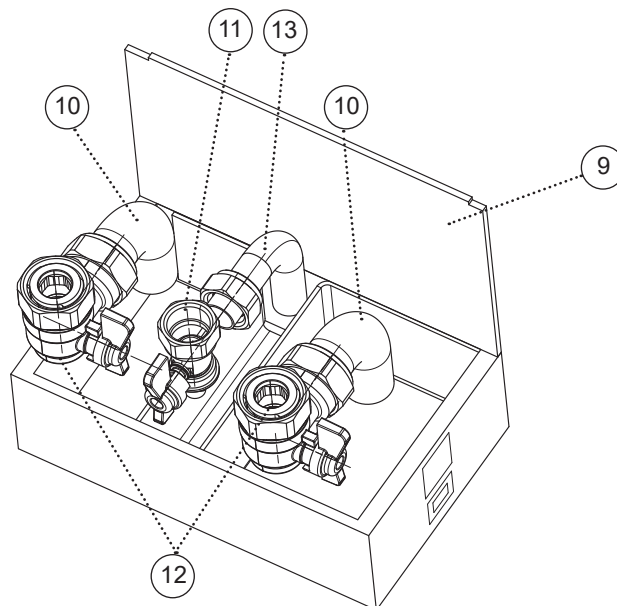
1. Boiler
2. Hardware Pack Box
3. Wall Mounting Plate
4. These Installation/Users Instructions
5. Wall Mounting Template
6. Boiler Warranty
7. PRV Drain Pipe



Hardware Pack

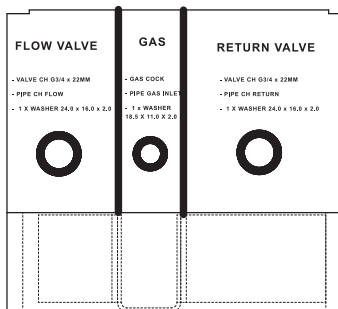
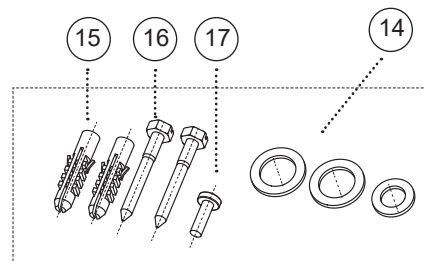
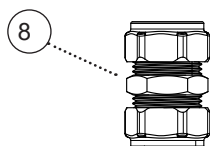
Box Contents

8. 1x Coupling
9. 1x HP Box - 180 x 111 x 57.5 mm
10. 2x Pipe CH Flow/Return
11. 1x Gas Cock
12. 2x Valve CH G³/₄ x 22 mm
13. 1x Pipe Gas Inlet



Accessory Bag Contents

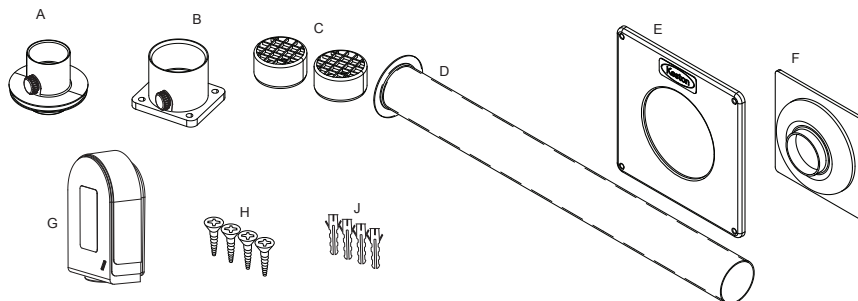
14. 3x Washers*
15. 2x Wall Plugs
16. 2x Screws
17. 1x Flue Clamp Screw



*Refer to Valve Washer Template inside box lid.

FLUE PACK CONTENTS

- A Flue Adaptor
- B Air Spigot
- C Terminals - 2 off
- D Flue Sleeve
- E Wall Plate
- F Wall Seal
- G Outside Sensor
- H Screws - 4 off
- J Wall Plugs - 4 off



2.3 WALL MOUNTING TEMPLATE

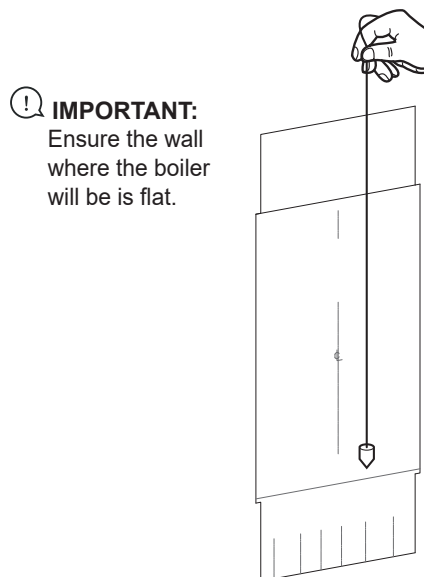
The wall mounting template is located on the internal protective packaging.

Note. The template shows the positions of the fixing holes and the position of the air and flue connections. Care **MUST** be taken to ensure the correct holes are drilled.

1. Tape template into the selected position. Ensure squareness by hanging a plumbline as shown.
2. Mark onto the wall the following:
 - a The wall mounting plate screw positions (choose one from each group).
 - b The position of the air and flue when exiting straight out of the wall where the boiler is mounted.

Note. Mark the centre of the hole as well as the circumference.

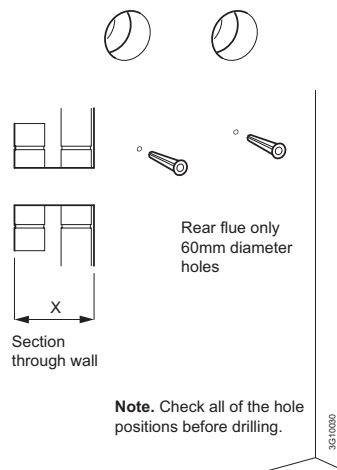
3. Remove the template from the wall.



2.4 PREPARING THE WALL

WARNING Ensure that, during the cutting operation, masonry falling outside of the building does not cause damage or personal injury.

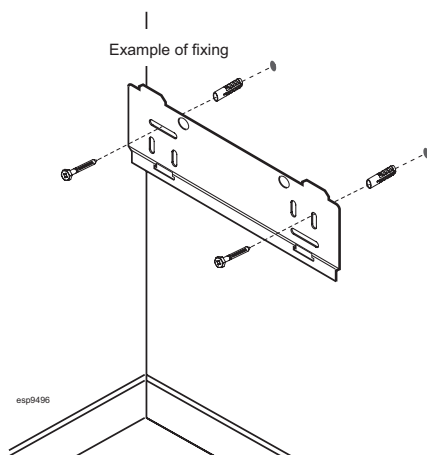
1. Cut the flue and air holes (preferably with 60 mm core bore tool) ensuring the holes are square to the wall.
2. Drill 2 holes with a 7.5 mm / 8 mm masonry drill and insert the plastic plugs, provided, for the wall mounting plate.
3. Locate 2 No.14 x 50 mm screws in the wall mounting plate (one at each side, in any of the 3 holes provided at each side) and screw home.



2.5 FITTING THE WALL MOUNTING PLATE

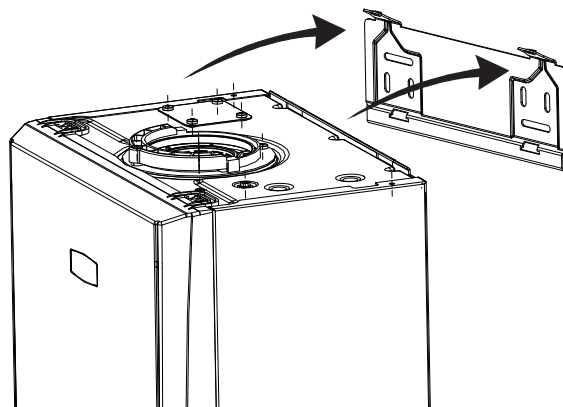
Screw the wall mounting plate to the wall using 2 wall plugs fitted previously with the 2 screws provided.

Choose one of the 2 sets of slots in left and right bank. Ensure that at least one of the screws is fitted into a top slot and the mounting bracket is level.



2.6 MOUNTING THE BOILER

1. Lift the boiler onto the wall mounting plate and locate it over the 2 tabs.



2.7 FLUE SYSTEM

! IMPORTANT

When installing a replacement boiler a new flue system is recommended. However re-using the existing boiler flue installation is acceptable if the installer checks and confirms:

- The flue pipe is the approved Marley/Polypipe/Terrain/Wavin 50mm muPVC solvent weld flue system
- The flue installation is upgraded to the most recent flue standards taking particular care to comply with flues in voids
- A risk assessment is conducted to confirm the effectiveness of the flue
- The existing flue will last the lifetime of the new appliance

The following pipe and fittings are approved.

Polypipe System 2000 muPVC Solvent Weld System (50mm)	
Polypipe Code	
MU 301	4m length muPVC wastepipe 5/225
MU 313	50mm x 45 deg muPVC obtuse bend
MU 314	50mm x 92.5 deg muPVC swept bend
MU 310	50mm muPVC straight coupling
MU 316	50mm x 92.5 deg muPVC swept tee

Marley muPVC Solvent Weld System (50mm)	
Marley Code	
KP 304	50mm x 4m double spigot pipe
KP32	50mm x 45 deg bend
KSC3	50mm straight coupling
KB3	50mm x 88.5 deg bend
KT3	50mm swept tee

DESIGN

Individual air supply and flue outlet pipes are used as standard.

The material approved for this application which **MUST** be used are:

- Marley muPVC Solvent Weld System (50 mm)
- Polypipe System 2000 muPVC solvent weld (50 mm)
- Polypipe Terrain 200 muPVC Solvent Weld System (50 mm)
- Wavin OSMA PVC-C Solvent Weld System (50 mm)

to BS5255 and/or BSEN1566-11 and BSEN1329, are the only systems approved for this application.

Polypipe Terrain Solvent Weld System (50mm)	
Polypipe Code	
200.2.40	4m length muPVC wastepipe
201.2.135	50mm x 135 deg muPVC bend
200.2.91	50mm x 91 1/4 deg muPVC swept bend
210.2	50mm muPVC straight coupling
204.2.135	50mm muPVC swept tee

Wavin OSMA PVC-C Solvent Weld System (50mm)	
Wavin Code	
2M073	3M length waste pipe 50mm
2M163	50mm x 45 deg bend
2M161	50mm x 87.5 deg bend
2M104	50mm double socket
2M190	50mm x 8.75 tee

Consideration **MUST** be given to expansion and contraction of the flue. Refer to Assembly Practice (Section 3.7) in this installation and Servicing Instructions for further guidance.

2.8 FLUE SYSTEM - CONTINUED

Termination of the flue and air

The flue and air pipes may terminate independently through any external walls within the same dwelling except on opposing walls, within the maximum lengths shown in graph below. (Alternatively a vertical flue pipe termination is acceptable.)

The air pipe must have an elbow and 150 mm length of pipe directed downwards with a termination grill fitted (unless adequately sheltered i.e. on a balcony).

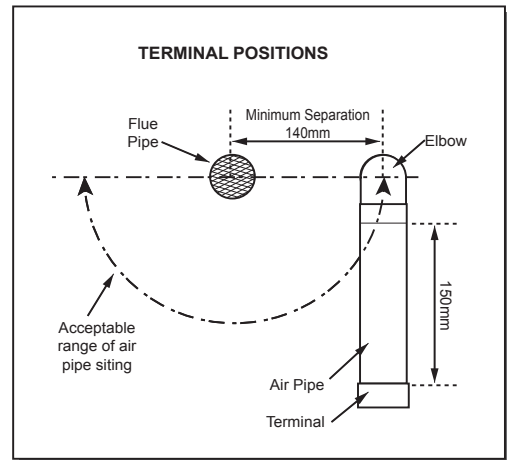
The air pipe can be situated at the side or beneath the flue pipe to a minimum dimension of 140 mm (see diagram right). It must not be sited above the flue pipe.

The flue and air pipes must extend by at least 40mm from the wall surface.

Condensing boilers emit a visible plume of water vapour from the flue terminal, this is normal. It is the responsibility of the installer to judiciously select a terminal location that does not cause a nuisance.

If either the flue or air terminal is below a height of 2 m from ground level a terminal guard must be fitted.

Notes. Installations in England above 18 meters requires a High Rise Flue Kit. This adheres to the new building regulations. (ADB_Vol1_Dwellings_2019_edition_inc_2020_amendments).



Installations in Scotland above 11 meters requires the High Rise Flue Kit. This adheres to the new building standards technical handbook 2020: Domestic Buildings (April 2021 Addendum).

Installations using the approved stainless steel 45° elbow on the air intake must achieve a minimum separation of 300 mm horizontally or below the flue pipe. Please refer to instructions provided with the kit.

Any vertical termination **MUST** have the terminals fitted and the air intake comply with the dimensions above.

Maximum lengths

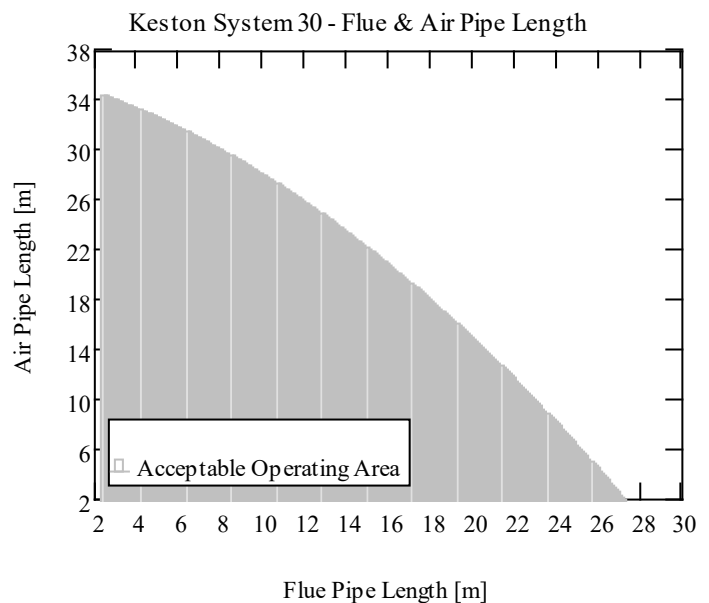
Due to the resistance presented by extended flue length a slight reduction in maximum boiler output will occur where combined flue and air lengths in excess of 18.0 m and 16.0 m (50 mm muPVC) are used. In such cases the boiler output will be reduced by 0.6% and 0.8% per additional metre.

The maximum lengths of both air inlet pipe and flue outlet pipe, when no bends are used, are as detailed in graphs below.

However, each bend used has an equivalent length that must be deducted from the maximum straight length stated in graphs below. Knuckle bends must not be fitted.

A 92.5° swept elbow is equivalent to 1.0 m straight length. A 45° bend is equivalent to 0.5 m straight length.

It is possible to have variable flue and air lengths as described within the shaded area of graphs below.

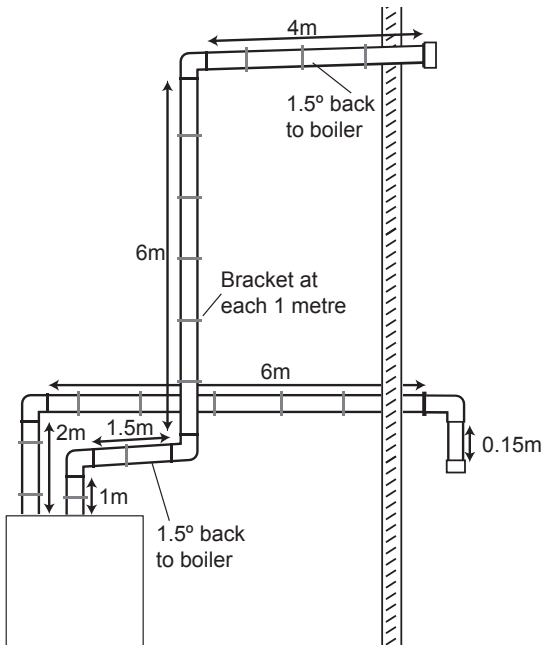


Slope

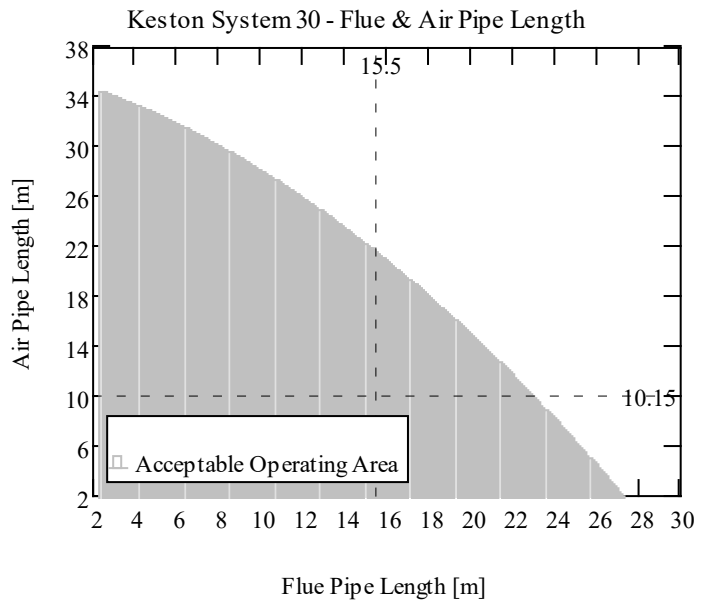
'Horizontal' flue outlet pipework **MUST** slope at least 1.5 degrees (26 mm per metre run) downwards towards the boiler. Pipework can be vertical. Only swept elbows can be used.

Air inlet pipework can be truly horizontal or vertical, or sloping in a downward direction towards the boiler but in each case rain, etc., **must** be prevented from entering the pipe. There must be no troughs in any of the pipework, whether it be air inlet or flue outlet.

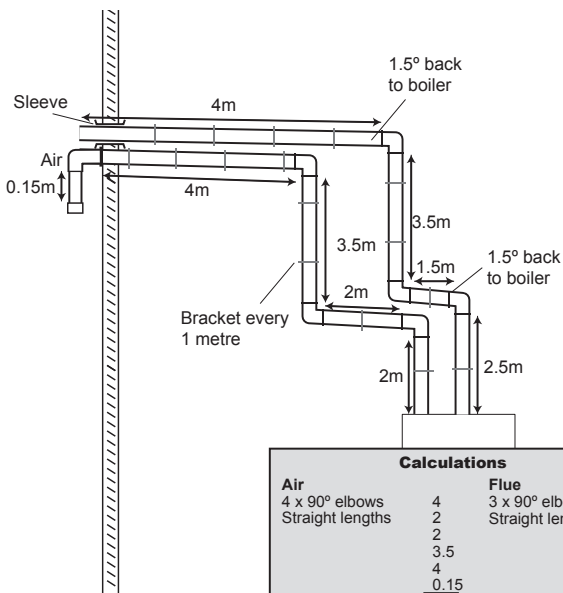
2.9 AIR AND FLUE EXAMPLE KESTON SYSTEM² S30



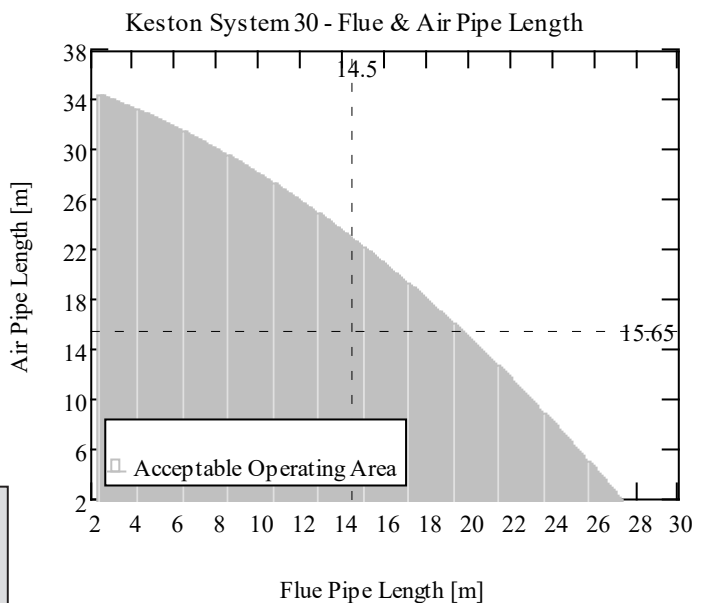
Calculations	
Air	Flue
Elbows 2 x 1m = 2m	Elbows 3 x 1m = 3m
Straights 6+2+0.15 = 8.15m	Straights 4+6+1.5+1 = 12.5m
Total = 10.15m	Total = 15.5m
Overall Flue / Air = 25.65m	



2.10 AIR AND FLUE EXAMPLE KESTON SYSTEM² S30



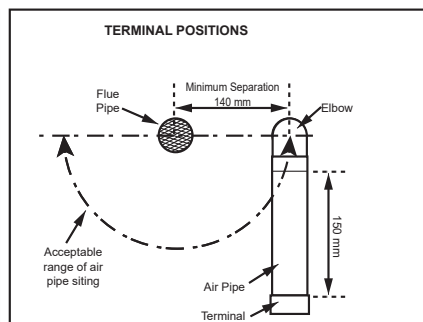
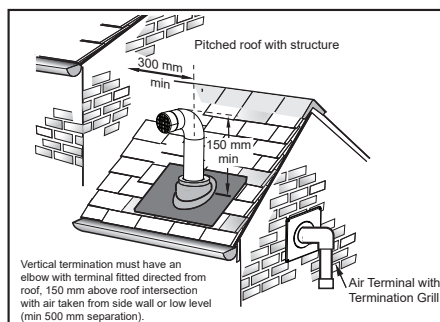
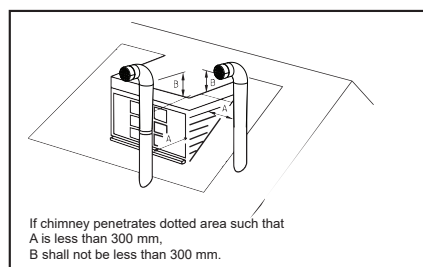
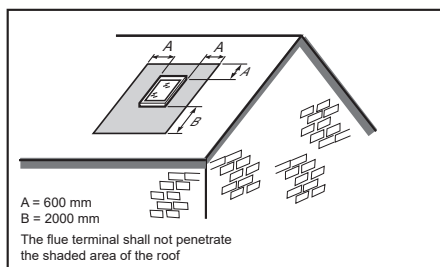
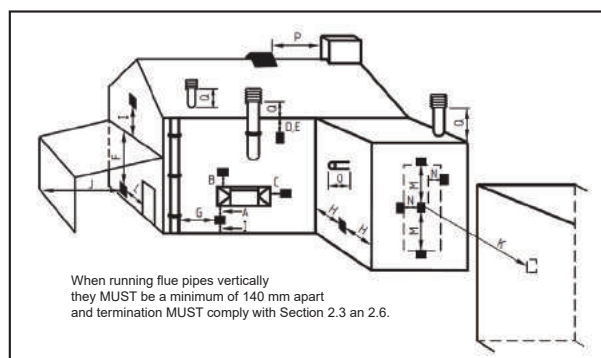
Calculations	
Air	Flue
4 x 90° elbows 4	3 x 90° elbows 3
Straight lengths 2	Straight lengths 2.5
2	1.5
3.5	3.5
4	4
0.15	14.5
15.65	
Overall Flue / Air = 30.15m	



Section 2 - Installation

2.11 FLUE TERMINATION POSITION

Twin Flue Positions		When Flue & Air Terminals are less than 500 mm apart		When Flue & Air Terminals are more than 500 mm apart	
		Flue min. spacing	Air min. spacing	Flue min. spacing	Air min. spacing
A	Below an opening (1)	300 mm	50 mm	300 mm	50 mm
B	Above an opening (1)	300 mm	50 mm	300 mm	50 mm
C	Horizontally to an opening	300 mm	50 mm	300 mm	50 mm
D	Below gutters, soil pipes or drain pipes	75 mm	75 mm	75 mm	75 mm
E	Below eaves	200 mm	50 mm	200 mm	50 mm
F	Below balcony or car port roof	200 mm	50 mm	200 mm	50 mm
G	From a vertical drain pipe or soil pipe	150 mm	50 mm	150 mm	50 mm
H	From an internal or external corner or to a boundary alongside the terminal (2)	200mm	50 mm	200 mm	50 mm
I	Above ground, roof or balcony level	300 mm	100 mm	300 mm	100 mm
J	From a surface or boundary facing the terminal	600 mm	100 mm	600 mm	100 mm
K	From a terminal facing a terminal	1200 mm	1200 mm	1200 mm	1200 mm
L	From an opening in the car port into the building	1200 mm	100 mm	1200 mm	100 mm
M	Vertically from a terminal on the same wall	1500 mm	1500 mm	1500 mm	1500 mm
N	Horizontally from a terminal on the same wall	300 mm	300 mm	300 mm	300 mm
O	From the wall on which the terminal is mounted	40 mm	40 mm	40 mm	40 mm
P	From a vertical structure on the roof	NA	NA	300 mm	NA
Q	Above intersection with roof	NA	NA	150 mm	NA
(1)	In addition, for temperature and structural reasons, the terminal should not be nearer than 150 mm (fanned draught) to an opening in the building fabric formed for the purpose of accommodating a built-in element such as a window frame				
(2)	The reference to external corners does not apply to building protrusions not exceeding 450 mm, such as disused chimneys on external walls for: fanned draught appliances				



FLUE OUTLET

2.12 FLUE TERMINATION POSITION - CONTINUED

General Installations

All parts of the system must be constructed in accordance with BS 5440 Part 1, except where specifically mentioned in these instructions.

All pipe work must be adequately supported.

All joints other than approved push-on or plastic compression connectors must be made and sealed with solvent cement suitable for muPVC pipes.

Consideration must be given to Corgi/Gas Safe bulletin TB200/TB008 regarding flues in voids.

The boiler casing must always be correctly fitted to the boiler when leaving the appliance operational.

External wall faces and any internal faces of cavity walls must be good.

Air Supply

The Keston System² is a room-sealed appliance and therefore does not require purpose provided ventilation to the boiler room for combustion air.

Compartment installation

Due to the low casing temperatures generated by the boiler, no compartment ventilation is required. However, the cupboard or compartment must not be used for storage.

Installations in England above 18 meters requires a High Rise Flue Kit. This adheres to the new building regulations. (ADB_Vol11_Dwellings_2019_edition_inc_2020_amendments).

Installations in Scotland above 11 meters requires the High Rise Flue Kit. This adheres to the new building standards technical handbook 2020: Domestic Buildings (April 2021 Addendum).

2.13 ASSEMBLY PRACTICE

Remove all plastic debris and burrs when installing air intake piping. Plastic fillings caused by cutting muPVC pipe must not be allowed to be drawn into the combustion air blower. Prevent dust entering the air intake when cutting on building sites. Blower failure which is determined to be caused by plastic filings or other debris will not be covered by guarantee.

INSTALLING FLUE AND AIR PIPES

! IMPORTANT - When installing a replacement boiler, a new flue system is recommended.

However re-using the existing boiler flue installation is acceptable if the installer adheres to Section 2.3 Flue System - Important, and also checks and confirms the following:

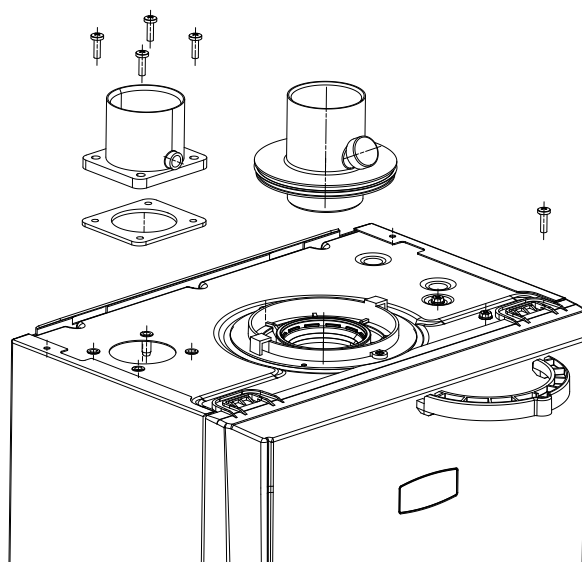
- Remove the flue adaptor and air spigot from the flue pack supplied with the boiler.
- Remove boiler front panel - Section 3.2.
- Remove air intake blanking plate by unscrewing 4 x M5 screws and put to one side, leaving sponge gasket in place.
- Fix air spigot to boiler using the 4 M5 screws, see diag. below. Ensure sponge gasket is in place and not damaged.
- Ensure the condense trap/siphon is filled with water.
- Insert the flue adaptor into the flue manifold on the top of the boiler and secure using the clamp provided in the packaging box, see diagram below.
- Measure, cut and check the air and flue pipes to pass to the exit from the wall(s) or ceiling.
- Always thoroughly deburr all pipes and most important, remove shavings from within the pipe.
- Assemble, using solvent weld cement, the pipework from the boiler connections to the exit from the first wall/ceiling, (remount the boiler if removed). When pushing pipe through walls, ensure grit and dust is not allowed to enter the pipe.

Ensure pipes are fully engaged into sockets and solvent welded with no leaks.

- Using the same methods drill any further holes (always covering existing pipework), cut and assemble the pipework.
- From outside, complete the two terminations - See Section 2.3 Flue System and make good all holes. (Wall sealing collars are available to make good hole areas on the wall face (part number C.08.0.00.07.0).

- Support any pipes whose route could be displaced either of its own accord or by accident. Any horizontal run over 1 m or vertical runs of any length must always be supported. Brackets should be placed at intervals of approximately 1 m. Brackets should be loose enough on the pipe to allow thermal expansion and contraction movement.
- Flue pipework through walls **MUST** be sleeved to allow thermal expansion and contraction movement.
- Boilers installations in England above 18 meters require a high rise flue kit which converts the flue from MUPVC to stainless steel using an adapter to conform with new building regulations. For Scotland the kit will be required for installations above 11 meters.
- Check all connections for security and re-seal any joints using solvent cement where soundness may be in doubt.

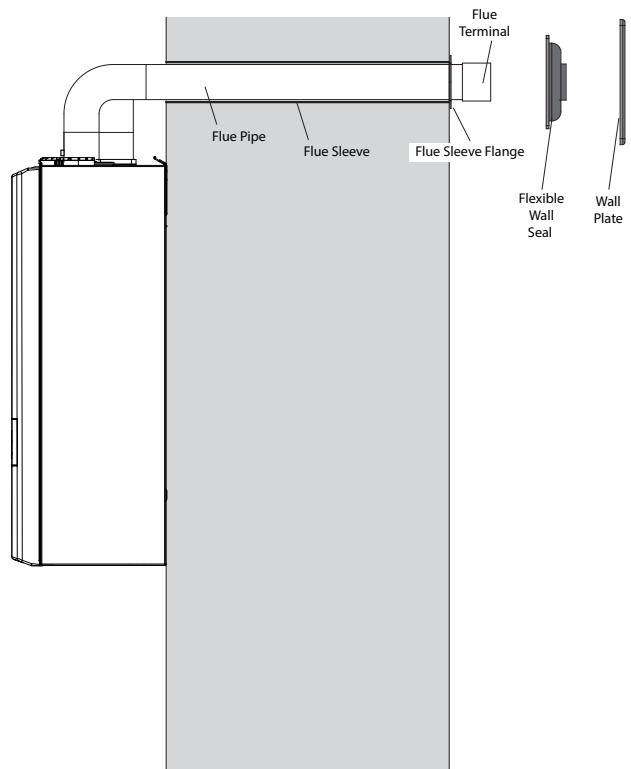
Note. It is equally important to seal the air inlet with solvent cement as the flue outlet pipe joints.



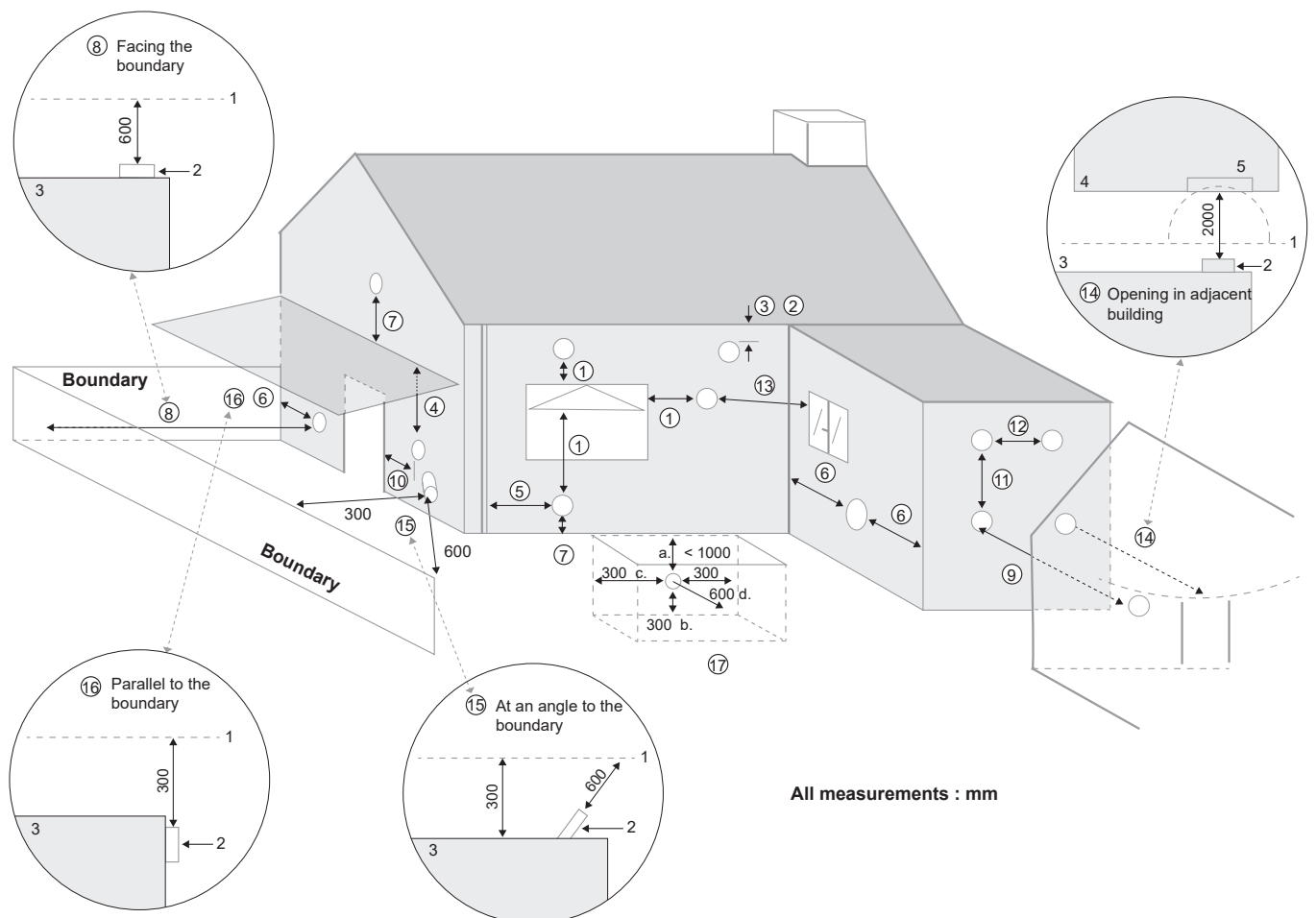
FLUE OUTLET

2.14 FITTING THE FLUE SLEEVE

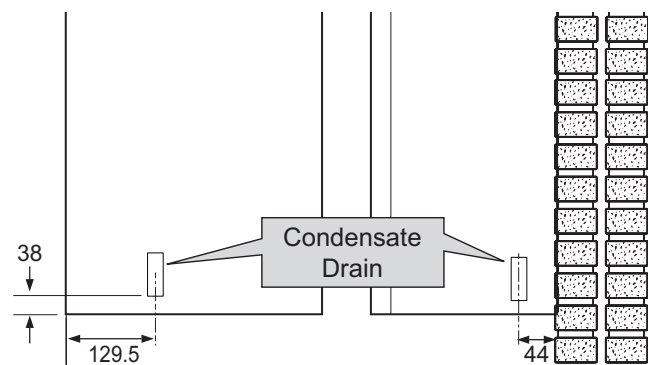
1. Cut hole in wall.
2. Measure wall thickness.
3. Cut sleeve length to match wall thickness & remove burrs.
4. Grout sleeve into wall with flange on external face.
5. Slide flue pipe into sleeve, checking it is free to slide.
6. Slide Flexible wall seal over flue pipe and push centre ring up to sleeve flange when cold.
7. Locate wall plate over flexible wall seal and clamp in place using the raw plug pack.
8. Affix flue terminal.
9. During boiler test check that the flue end is free to expand and contract with flexible wall seal.



2.15 HORIZONTAL FLUE POSITIONS



2.16 CONDENSATE DRAIN



This appliance is fitted with a siphonic 75 mm condensate trap system that requires filling before operating the appliance for the 1st time or after maintenance.

All condensate pipework should conform to the following:

- Where a new or replacement boiler is being installed, access to an internal 'gravity discharge' termination should be one of the main factors considered in determining boiler location.
- Plastic with push fit or solvent connections.
- Internal plastic pipe work a minimum of 19 mm ID (typically 22 mm OD).
- External plastic pipe must be a minimum of 30 mm ID (typically 32 mm OD) before it passes through the sleeved wall.
- All horizontal pipe runs must fall a minimum of 52 mm per metre away from the Boiler.
- External & unheated pipework should be kept to a minimum and insulated with Class "O" waterproof pipe insulation (UV Resistant).
- All installations must be carried out in accordance to the relevant connection methods as shown in the "Condensate installation diagrams" & BS6798.
- Pipework must be installed so that it does not allow spillage into the dwelling in the event of a blockage (through freezing)
- All internal burrs should be removed from the pipe work and any fittings.

In order to minimise the risk of freezing, terminate the condensate drainage pipe using one of the following methods:

Internal Drain Connections

Route the condensate pipe by gravity to an internal, foul water discharge point.

Refer to Fig.
1 & 2

Condensate Pump

When it is not practical to terminate the condensate pipe to an internal foul water discharge point using gravity, use a suitable pump recommended by the boiler or pump manufacturer.

Refer to Fig.
3

External Drain Connections

The use of an externally run condensate drainage pipe should only be considered after exhausting all internal termination options as described previously. An external system must terminate at a suitable foul water discharge point or purpose designed soakaway. If an external system is chosen then the following measures must be adopted:

The external pipe run should be kept to a minimum using the most direct and "most vertical" route possible to the discharge point, with no horizontal sections in which condensate might collect.

- For connections to an external soil/vent stack. Insulation measures as described should be used.

Refer to Fig.
4

- When a rainwater downpipe is used, an air break must be installed between the condensate drainage pipe and the downpipe to avoid reverse flow of rainwater into the boiler should the downpipe become flooded or frozen.

Refer to Fig.
5

- Where the condensate drain pipe terminates in a purpose designed soakaway (see BS 6798) any above ground condensate drain pipe sections should be run and insulated as described above.

Refer to Fig.
6

- Where the condensate drain pipe terminates over an open foul drain or gully, the pipe should terminate below the grating level, but above water level, to minimise "wind chill" at the open end. The use of a drain cover (as used to prevent blockage by leaves) may offer further prevention from wind chill.

Unheated Internal Areas

Internal condensate drain pipes run in unheated areas, e.g. lofts basements and garages, should be treated as external pipe.

Ensure the customer is aware of the effects created by a frozen condensate and is shown where this information can be found in the user manual.

Note. Please check current HHIC condensate discharge guidance available via the Gas Safe Registered Technical Bulletins List.

continued

2.17 CONDENSATE DRAIN - CONT'D

Figure 1 - Connection of Condensate Drainage Pipe to Internal Soil & Vent Stack

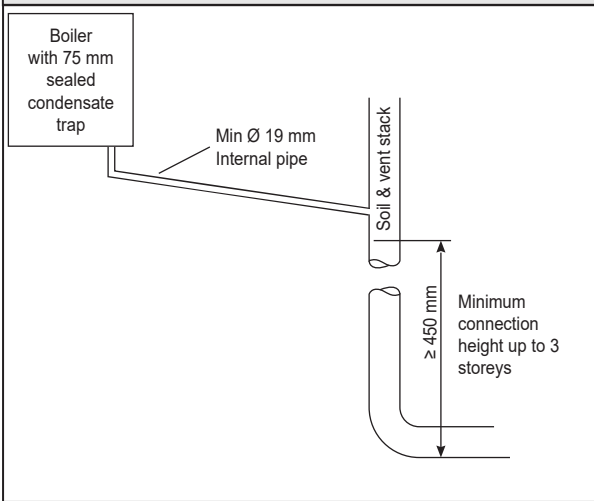


Figure 2 - Connection of a Condensate Drainage Pipe Downstream of a Sink, Basin, Bath or Shower Water Trap to Internal Soil Vent Stack

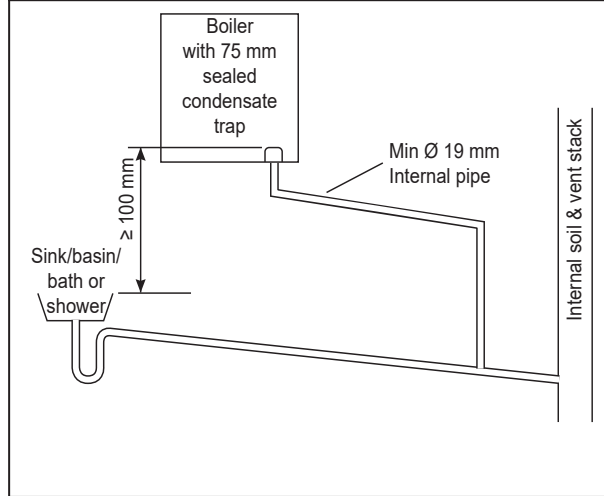


Figure 3 - Connection of a Condensate Pump Typical Method (see manufacturer's detailed instructions)

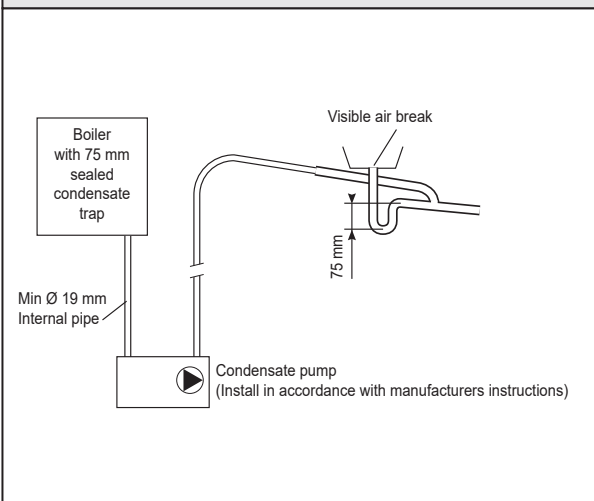


Figure 4 - Connection of Condensate Drainage Pipe to External Soil & Vent Stack

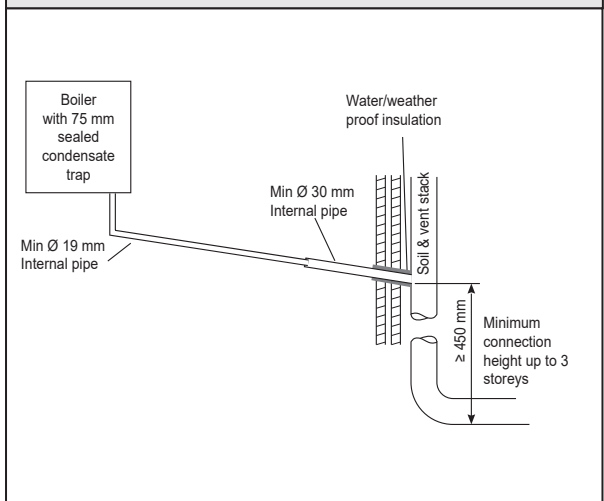


Figure 5 - Connection of a Condensate Drainage Pipe to an External Rainwater Downpipe (only combined foul/rainwater drain)

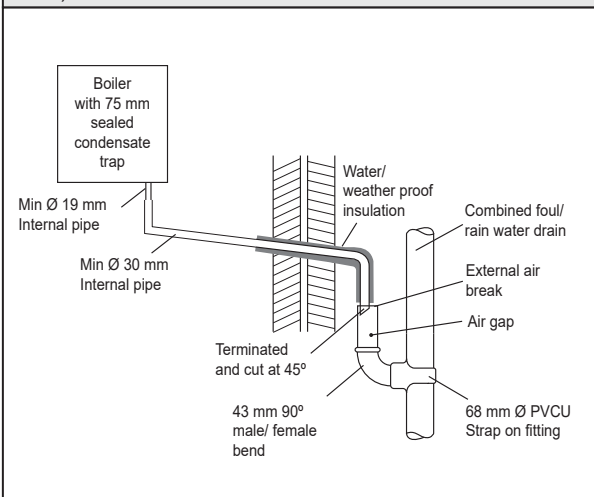
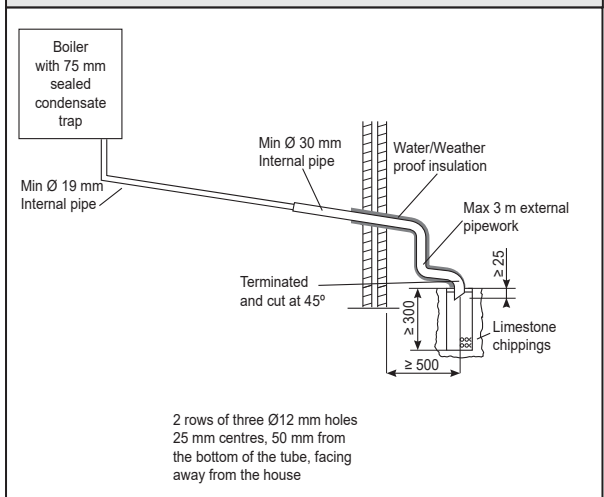


Figure 6 - Connection of a Condensate Drainage Pipe to an External Purpose Made Soakaway.



2.18 CONNECTIONS & FILLING

CAUTION: Heating the isolation valves may damage the fibre seals

Fit each union with the fibre seals provided.

WATER CONNECTIONS CH

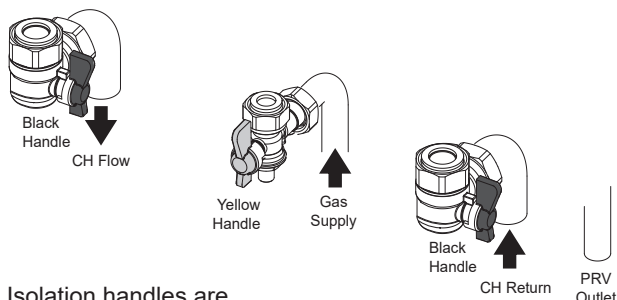
1. Connect the CH flow service valve (black handle) and copper tail provided in the hardware pack to the threaded boss connection provided at the lower rear of the boiler.
2. Connect the CH return valve (black handle) and copper tail.

GAS CONNECTION

CAUTION: The gas service cock is sealed with a non-metallic blue fibre washer, which must not be overheated when making capillary connections.

For details of the position of the gas connection:

Refer to Gas Supply
1.9



Isolation handles are shown in the open position.

FILLING

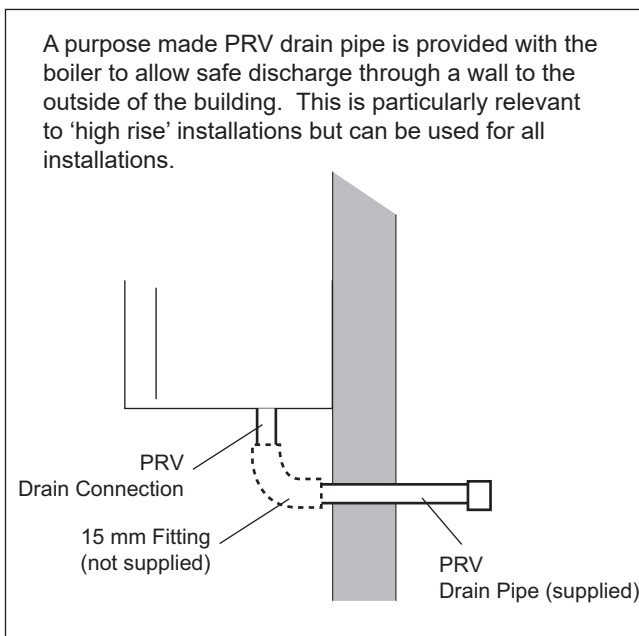
IMPORTANT - when filling:

- A. Ensure the dust cap on air vent located at the rear of the pump chamber is slightly unscrewed.
 - B. When filling, there may be a slight water leak from the air vent therefore electrical connections should be protected.
1. **Ensure that the CH isolating handles are open.**
 2. Fill and vent the system.
 3. Check for water soundness.

PRV DRAIN

The PRV connection, located at the bottom right-hand side of the boiler, comprises an open ended 15mm pipe. A 15mm compression coupling is supplied to assist in removal of pipework if required.

WARNING: Make sure that the water or steam (from the boiler) is discharged safely. Hot water or steam is dangerous and can cause serious injury, and damage to electrical systems.



A purpose made PRV drain pipe is provided with the boiler to allow safe discharge through a wall to the outside of the building. This is particularly relevant to 'high rise' installations but can be used for all installations.

2.19 ELECTRICAL CONNECTIONS

WARNING: This appliance must be earthed

A mains supply of 230 V ~ 50 Hz is required.

3 A fuse required. All external controls and wiring must be suitable for mains voltage.

Wiring external to the boiler must follow current I.E.E (BS7671) wiring regulations and local regulations.

For IE reference should be made to the current ETCI rules for electrical installations

Wiring should be 3 core PVC insulated cable, not less than 0.75 mm² (24 x 0.2 mm), and to BS 6500 Table 16.

Connection must be made in a way that allows complete isolation of the electrical supply. The means of isolation must be accessible to the user after installation.

Section 2 - Installation

2.20 INSTALLER WIRING

WARNING: Ensure the supply cord is not damaged

The boiler must be connected to a permanent live power supply.

Connecting the Switched Live to the Boiler

1. Consult the Y Plan and S Plan diagrams overleaf.
2. Isolate the mains supply to the boiler
3. Remove the front panel.

Refer to Section 3.4

4. Swing down the control box into the service position, unclip and swing back the installer wiring cover and latch into the retaining clips.

All of the connections can now be readily accessed, the plugs can be removed to aid wiring.

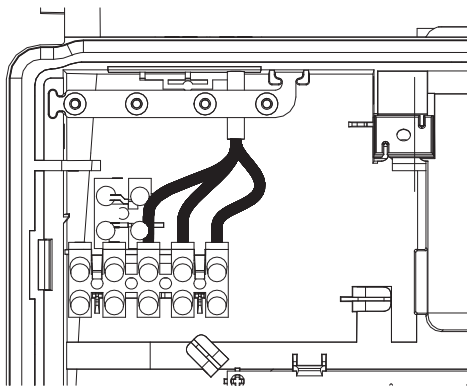
5. Connect the switched live to the terminal block as shown.

Note. The cable strain relief system and grommets. Once any wiring is completed, to secure the boiler, reverse the order above.

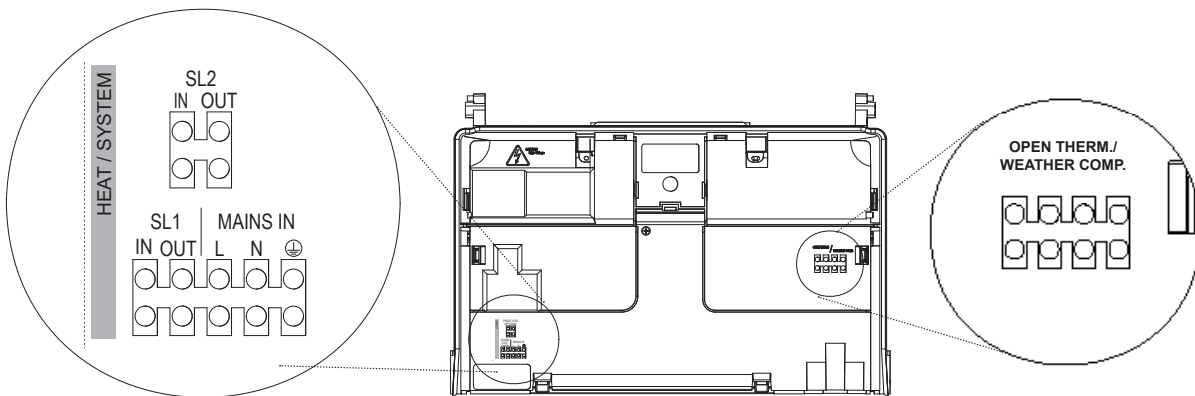
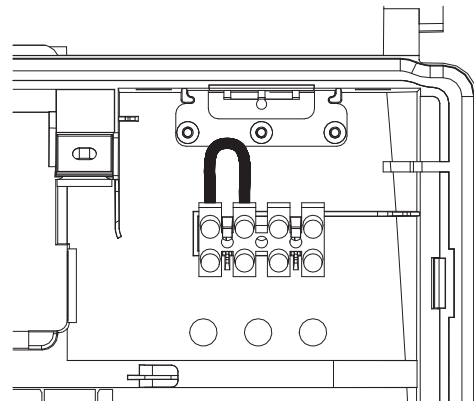
FROST THERMOSTAT – WIRING

If parts of the system are vulnerable to freezing or the programmer is likely to be left off during cold weather, a frost stat should be fitted in conjunction with a pipe thermostat..

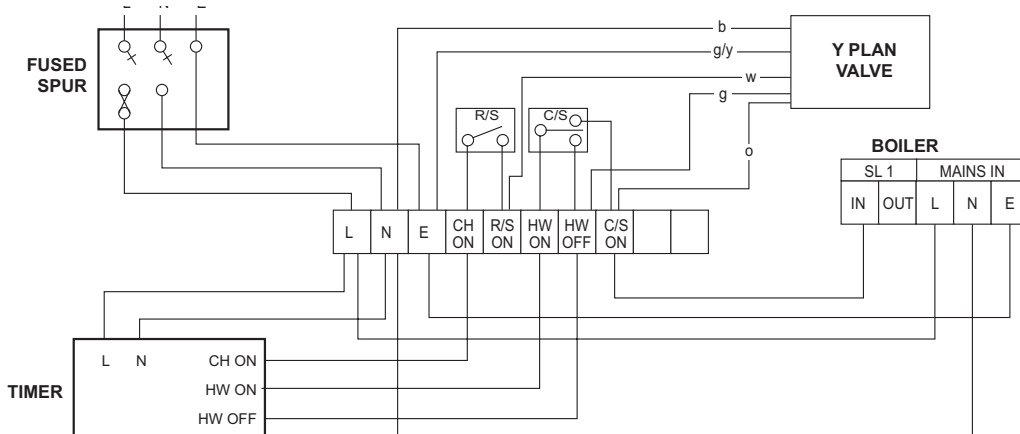
Installer Connections (LHS)



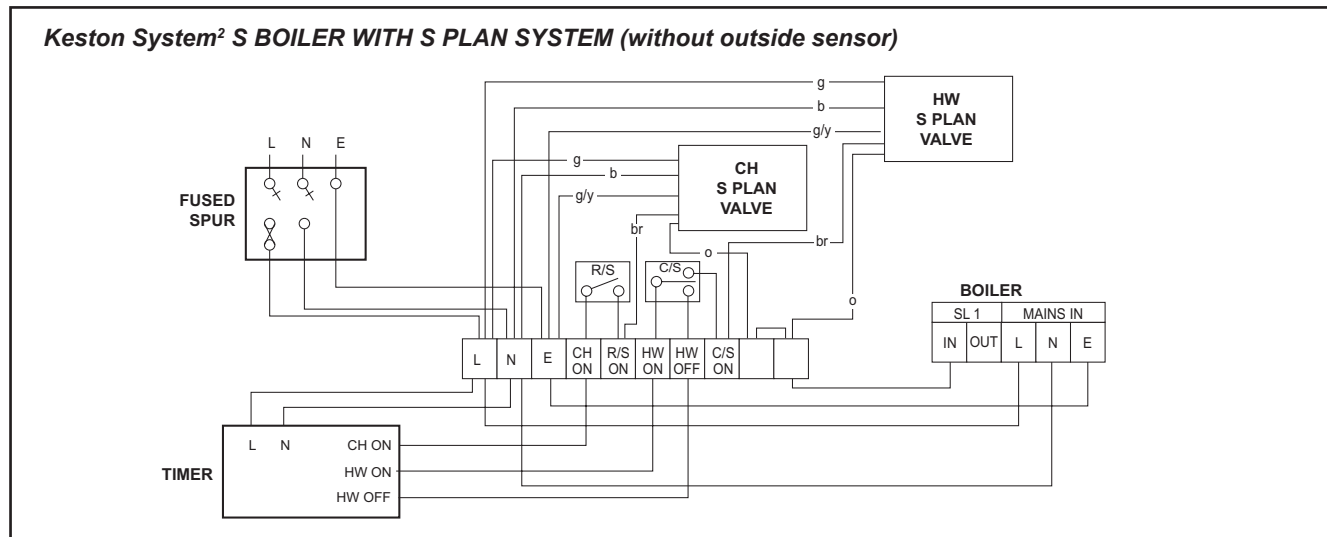
Installer Connections (RHS)



Keston System² S BOILER WITH Y PLAN SYSTEM (without outside sensor)



2.21 INSTALLER WIRING CONT.



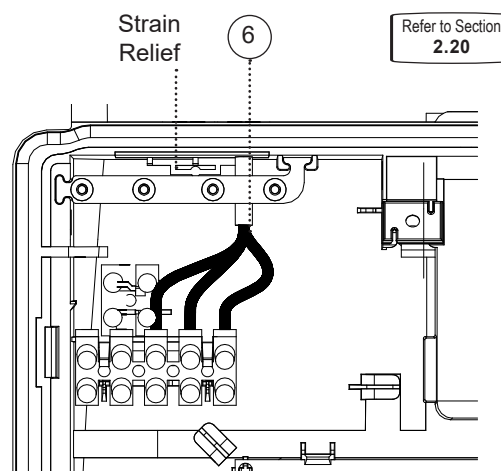
2.22 REPLACING PRE-FITTED MAINS CABLE

If it is necessary to use an alternative mains cable to the one pre-fitted then use the following guide.

Replacement wiring should comply with notes and be carried out by a qualified person.

1. Isolate the mains supply to the boiler.
2. Remove the front panel.
3. Swing the control box down into the service position, unclip and swing back the installer wiring cover to latch into the retaining clips.
4. Unscrew the L N & ⊕ connections & remove wires from connector.
5. Remove the mains cable by pulling back through the grommet .
6. Route the replacement through the grommet and re-fit.
7. Close the installer wiring cover ensuring that it is located correctly and that the cable is retained into the strain relief.
8. Swing the control box back up into the operating position and re-fit the front panel ensuring a good seal is made.

The earth connection should be longer than the current carrying connections. If the cord anchorage slips, the current carrying wires become taut before the earth.



2.23 ELECTRICAL CONTROLS

Wiring External to the Boiler

The fuse rating should be 3A.

Wiring external to the boiler MUST be in accordance with the current I.E.E. (BS.7671) Wiring Regulations and any local regulations.

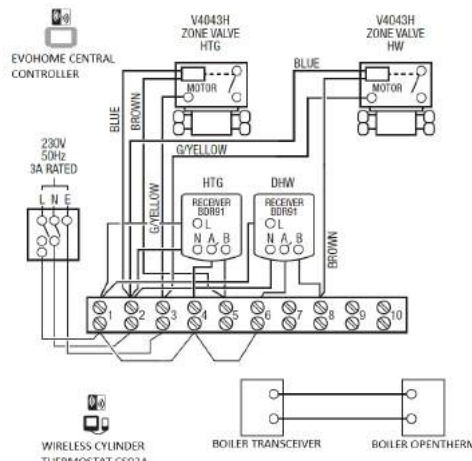
Frost Protection

If parts of the pipework run outside the house or if the boiler will be left off for more than a day or so then a frost thermostat should be wired into the system.

The frost thermostat should be sited in a cold place but where it can sense heat from the system.

If the boiler is installed in a garage it may be necessary to fit a pipe thermostat, preferably on the return pipework.

EXAMPLE - Connection to Honeywell Evohome



(for additional information visit www.honeywelluk.com)

Section 2 - Installation

2.24 CH OPERATION

The ON and OFF time control of central heating should be controlled by a separate timer.

During programmed ON times the Central Heating Radiator Flow Temperature is controlled by the boiler relative to the Outside Temperature as shown in the diagram.

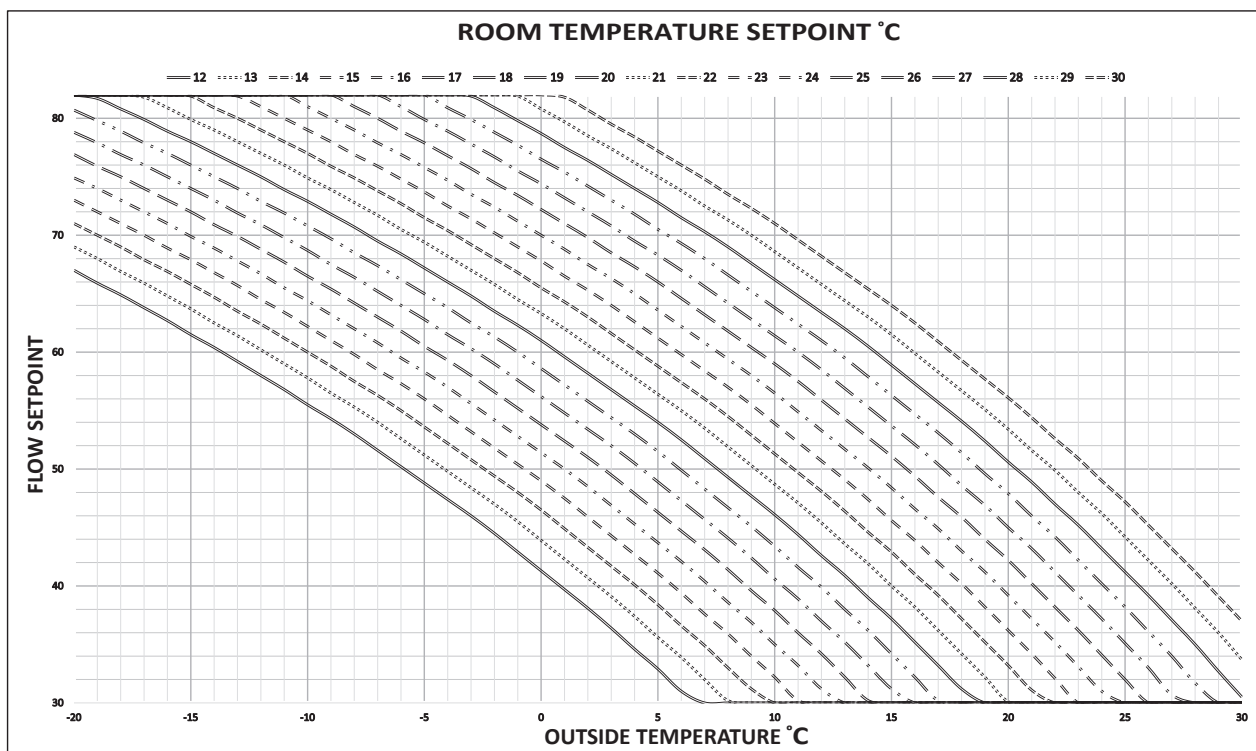
The Room temperature can be adjusted using the Central Heating Temperature Control Knob on the boiler as follows. Essentially rotating the knob clockwise increases the room temperature and rotating the knob anti-clockwise decreases the room temperature.

The Room Temperature Setpoint in the associated graph is not directly related to the Actual Room Temperature but is the Desirable Room Temperature during a programmed CH period.

This can be adjusted between 5 and 30 degrees by the CH Potentiometer Knob on the Boiler when the Outside Temperature Sensor is connected. The graph only shows temperatures between 12 and 30 degrees for clarity.

Examples:

1. If the CH Potentiometer Knob is set to display 22°C on the Boiler Display the Room Temperature Setpoint will be 22°C and the curve 22 will be followed, indicated by 11th curve in from the left hand side. So as the outside temperature varies, the Flow Setpoint to the CH circuit will increase and decrease proportionally.
2. If the CH Potentiometer Knob is rotated fully clockwise, the Boiler Display will read 30°C and the Room Temperature Setpoint will be 30°C hence the curve 30 will be followed.
3. If the CH Potentiometer Knob is rotated fully anticlockwise, the Boiler Display will read 10°C and the Room Temperature Setpoint will be 10°C. This is an unrealistic Room Temperature Setpoint for a CH period during an ON time, but it is calculated internally for managing Frost Protection for the system based upon Outside Temperature.



2.25 THE WEATHER COMPENSATION KIT - SUPPLIED AS STANDARD

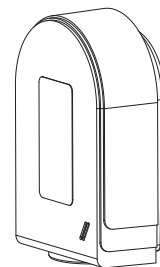
This kit provides the facility to apply outside air temperature control to the boiler water flow temperature which provides energy savings. The outside sensor provided measures outside air temperature and sends a signal to the boiler, which adjusts the maximum boiler flow temperature in response. If outside air temperature is greater than the system design temperature, the boiler flow temperature is reduced providing running cost savings. The boiler will operate in the condensing mode more frequently increasing savings.

Once the sensor is fitted it is automatically detected.

The sensor operation may be configured by adjustment of the boiler operating parameters, if necessary.

Kit Contents

A. Outside Air Sensor



Fitting the Kit

Note. A timer should be fitted to the system so that CH will be switched off when appropriate.

Fitting the sensor:

The air sensor should be located on an external wall of the building to be heated. Fix the sensor to a north/north-east facing wall to avoid direct radiation from the sun. The air sensor should be located to avoid any heating effect from the boiler flue.

To fix the air sensor to the wall, unscrew the sensor box plastic cover and screw/plug the sensor body to the wall.

Wire a twin core 0.5 mm² cable from the sensor to the boiler through an RH grommet located on the underside of the boiler. Cable length between sensor and boiler should be no greater than 20 m. Note that this connection is safety extra low voltage. It is not necessary for the person carrying out the wiring to be approved to Part P of the Building Regulations.

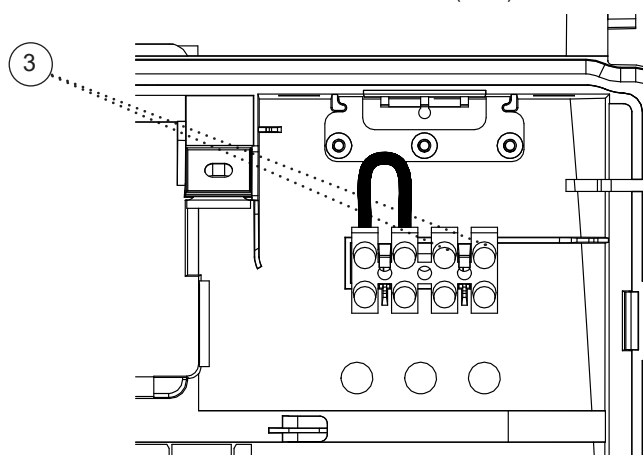
Avoid running this cable alongside mains voltage cables.

Wiring the Weather Compensation Kit to the Keston System².

1. Isolate the electricity supply to the boiler.
2. Remove the boiler front panel (Refer to boiler installation instructions).
3. Swing the control box down into the service position, unclip and swing back the installer wiring cover to latch into the retaining clips. Refer to Section 3.8.
4. Connect the sensor wiring into the RHS of the 4 way terminal block and secure with the strain relief .
5. Re-assemble in reverse order.

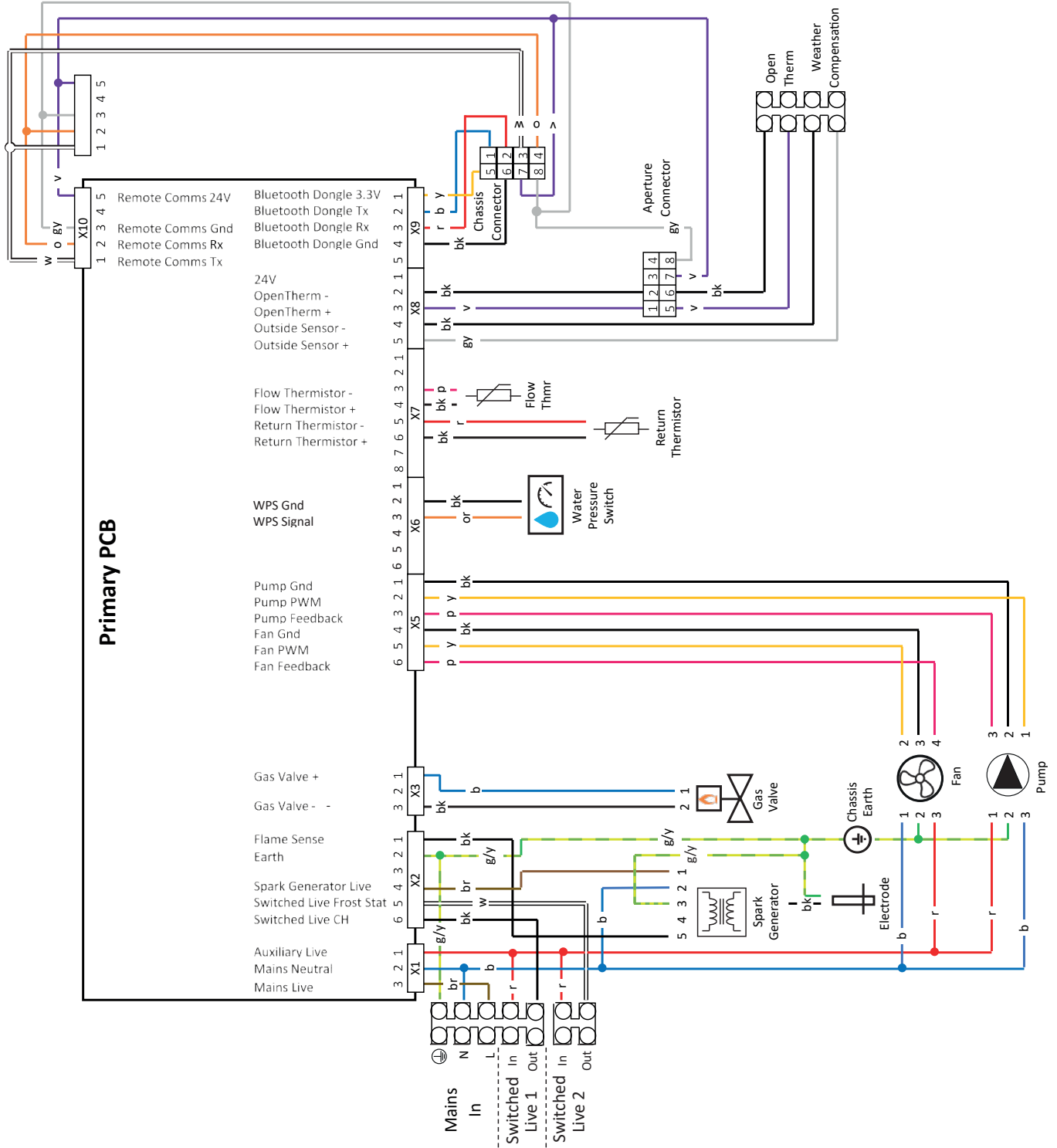
Note. If fitting this with the boiler, then please complete product Fiche system label, adding % efficiency. This is a Class II Control (2%).

Installer Connections (RHS)



Section 2 - Installation

2.26 WIRING DIAGRAM



- Key**
- bk: Black
 - gy: Grey
 - r: Red
 - g: green
 - b: blue
 - br: brown
 - g/y: green/yellow
 - o: orange
 - p: pink
 - v: violet
 - y: yellow
 - w: white

2.27 COMMISSIONING AND TESTING

A. Electrical Installation

WARNING: Electrical safety checks should be carried out by a qualified person.

Complete preliminary electrical system checks.

B. Gas Installation

WARNING: Open windows, doors and extinguish flames before starting the next steps. Do not smoke.

1. The whole of the gas installation, including the meter, should be inspected and tested for tightness and purged in accordance with the recommendations of BS.6891.
2. Purge air from the gas installation by the approved methods only.

General

The combustion for this appliance has been checked, adjusted and preset at the factory for operation on the gas type defined on the appliance data plate.

DO NOT adjust the air/gas ratio valve.

Having checked:

- That the boiler has been installed in accordance with these instructions.
- The integrity of the flue system and the flue seals, as described in the Flue Installation section.

Proceed to put the boiler into operation as follows:

Check the operational (working) gas inlet pressure.

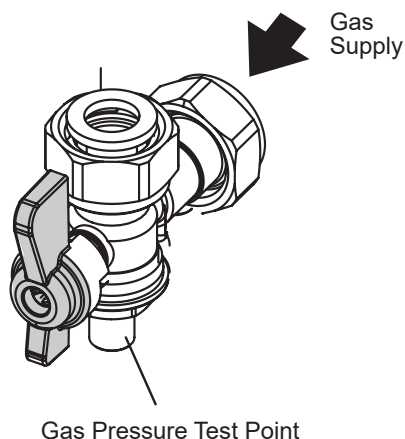
Set up the boiler to operate at maximum rate.

Refer to Section
2.32

With the boiler operating in the maximum rate condition check that the operational (working) gas pressure at the inlet gas pressure test point complies with the requirements.

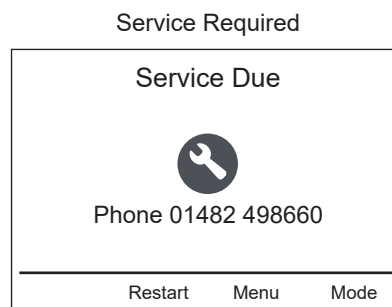
Refer to Section
1.9

Ensure that this inlet pressure can be obtained with all other gas appliances in the property working.



“SERVICE REQUIRED” function

When the boiler has run for more than 1 year the following screen will appear:-



To cancel this message press “RESTART”.

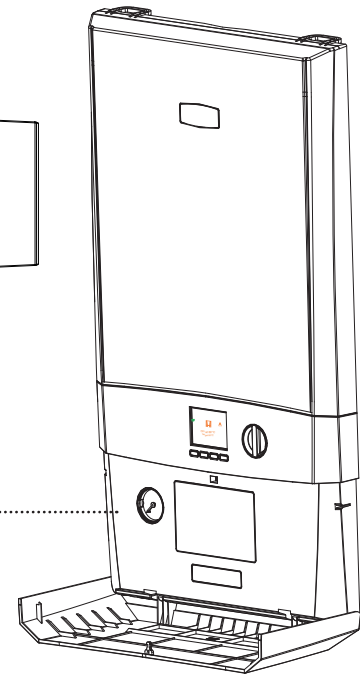
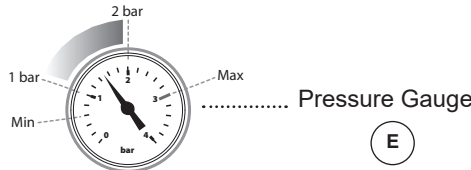
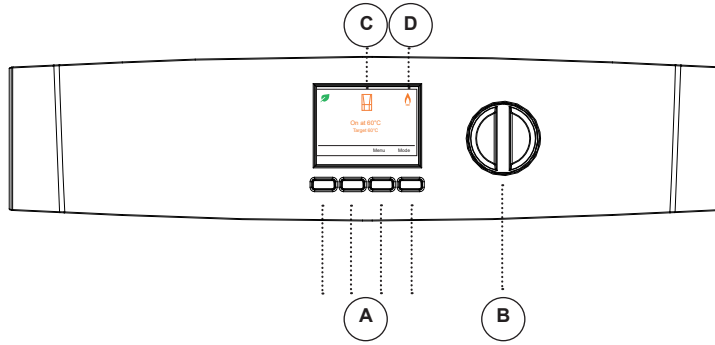
IMPORTANT: A condition of the manufacturer’s warranty is that Benchmark commissioning process is completed. The flow chart is provided on page 61.

Section 2 - Installation

2.28 INITIAL LIGHTING

Legend

- A. Hot Keys
- B. Central Heating Temperature Knob
- C. Boiler Status Display
- D. Burner On indicator
- E. Pressure Gauge
- F. CH Flow Isolating Valve
- G. Gas Cock
- H. Gas Inlet Pressure Test point
- I. Boiler Drain Valve
- J. CH Return isolating valve



CAUTION: Do not operate the appliance before it has been fully vented of air. If it is necessary to operate the pump, do so with the gas service cock turned off.

The boiler incorporates a fan overrun cycle which must not be interrupted by isolation of electricity supply.

1. Check that the system has been filled and that the boiler is not airlocked. Ensure the automatic air vent cap is open.
2. Refit the boiler front panel.

Refer to Section 3.4
3. Check that the drain valve (I) is closed and that the CH isolating valves (F & J) are OPEN.
4. Press the Mode button until OFF is shown underneath the boiler symbol on the boiler display.
5. Switch the electrical supply OFF
6. Check that the gas service cock (G) is OPEN.
7. Slacken the screw in the inlet pressure test point (H) and connect a gas pressure gauge via a flexible tube.
8. Switch the electricity supply ON and check all external controls are calling for heat.
9. Press the Mode Button (A) until OFF is not shown underneath the boiler symbol on the boiler display. Turn the Boiler Temperature Knob clockwise until a target of 80°C is shown. The boiler control will now go through its ignition sequence until the burner is established.

10. If the boiler does not light then after 5 attempts the boiler will lock out and display "Ignition Lockout". Press the Restart Button. The boiler will repeat its ignition sequence. If Restart occurs 5 times within 15 minutes then "Too Many Restarts" will be shown.

When the burner is established the flame symbol (D) will be shown on the display and the current flow temperature will be shown in the large digits underneath the radiator symbol.

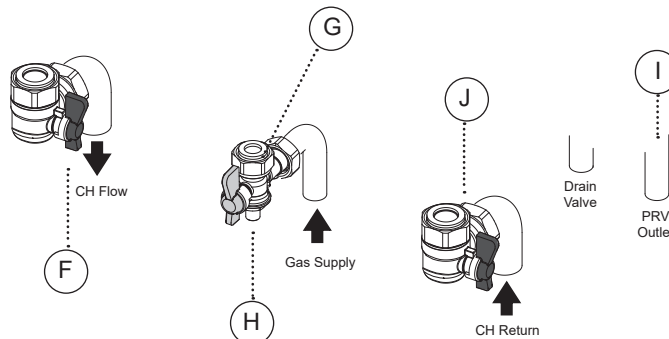
11. Ensure that with the boiler operating, the dynamic gas pressure is able to obtain maximum output.

Refer to Table 1

IMPORTANT The gas input to the burner is regulated by the gas valve according to the air flow produced by the fan. It is NOT user-adjustable. Any interference to sealed settings on the gas valve will adversely affect operation and render our warranty void.

Refer to Gas Supply page 10

12. Remove gas pressure gauge, tighten inlet pressure test point and check for gas tightness.



Valves shown are in the open position.

2.29 USER INTERFACE COMMISSIONING

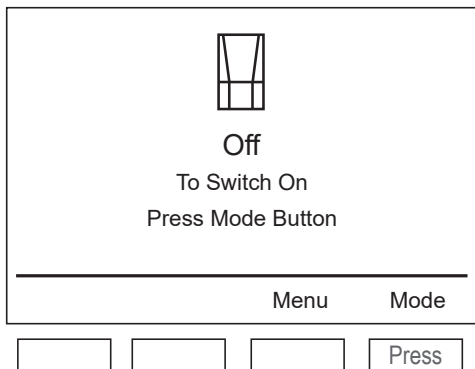
When the boiler is powered up for the first time, you will have the options to set the contact details for boiler servicing.



2.30 CHANGING BOILER OPERATING MODE

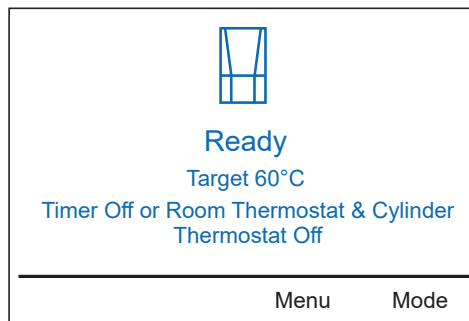
The boiler mode is displayed by default, to change the mode, simply press mode and select the desired mode.

How to change operating mode from Boiler Off to Boiler On

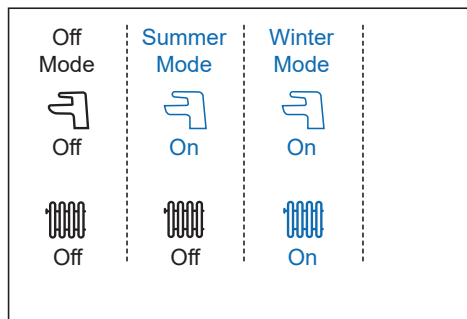
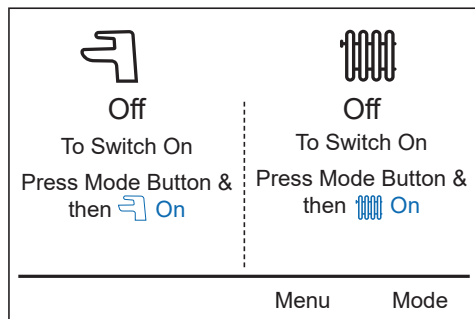


WITHOUT OUTSIDE SENSOR CONNECTED

On Mode, No Heat Demand

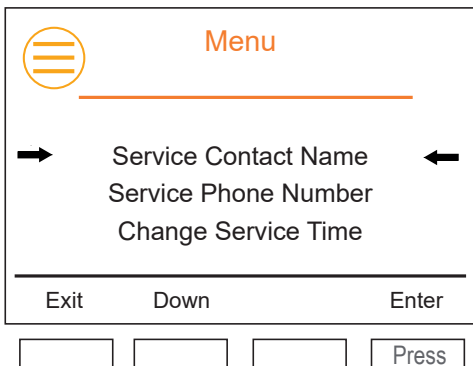


WITH OUTSIDE SENSOR CONNECTED



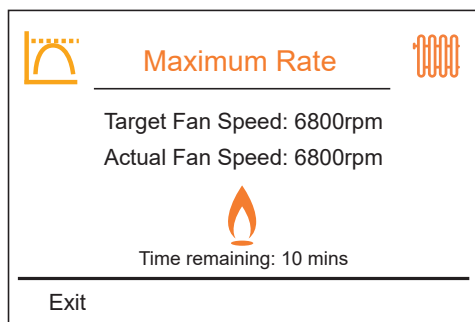
2.31 MENU OPERATION

The menu option contains a list of attributes that informs the user about the operating state of the boiler. The user should scroll down the menu and press enter to select the desired option.

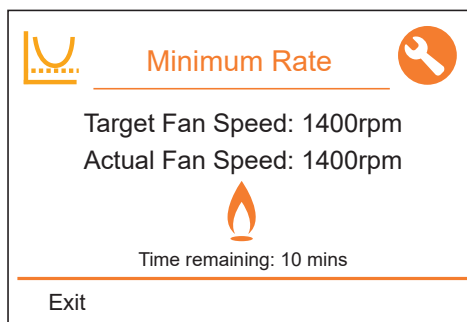


2.32 MAXIMUM AND MINIMUM RATES

Maximum and Minimum Rate can be accessed through the menu option.



The boiler will run at Maximum Rate for 10mins as long as there is sufficient cooling load



The boiler will run at Minimum Rate for 10mins

If the return temperature is under 40°C then the fan will run for 30s at maximum rate before ramping down over 60s to minimum rate.

If the return temperature is above 40°C then the fan will ramp down over 60s to minimum rate.

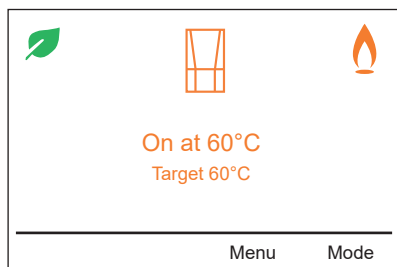
(With Outside Sensor)

2.33 GENERAL CHECKS

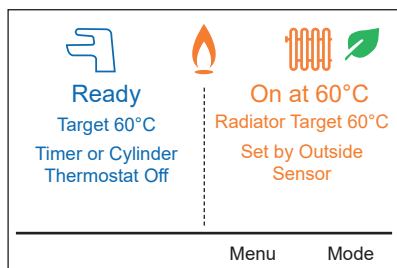
Make the following checks for correct operation in:

CENTRAL HEATING (CH) MODE

1. Ensure that the CH external controls are calling for heat and the DHW external controls are not. The display should show:-



(No Outside Sensor)



(With Outside Sensor)

2. Gas Rate

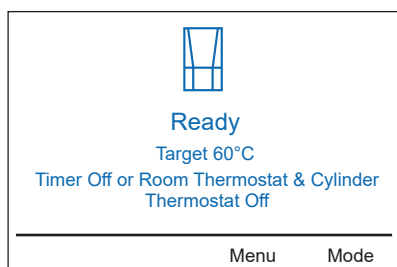
Check the boiler gas rate when the boiler is at maximum output.

Check at the gas meter, with no other appliance in use. Refer to Table 2.

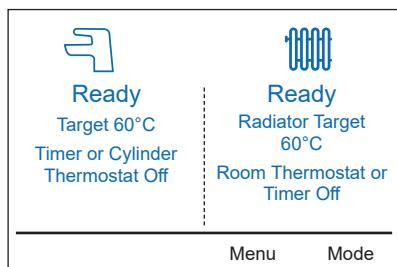
3. Set the central heating external controls to OFF.

The burner should go off.

The display should show:-



(No Outside Sensor)



(With Outside Sensor)

4. Check the correct operation of the timer (if fitted) and all other system controls. Operate each control separately and check that the main burner responds.

TEMPERATURE SETTING

(No Outside Sensor)

Temperature can be selected using the temperature knob (B).

Knob Setting	Flow Temp (°C)
Max	80
Min	30

TEMPERATURE SETTING

(With Outside Sensor)

DHW Cylinder Flow Temperature is factory set to 80°C.

Nominal room temperature can be selected using the temperature knob (B).

CH Flow Temperature is automatically adjusted to give the desired nominal room temperature.

Knob Setting	Flow Temp (°C)
Max	30
Min	10

WATER CIRCULATION SYSTEM

1. With the system cold, check that the initial pressure is correct to the system design requirements.

For pre-pressurised systems, this should be 1.0 bar.

2. With the system hot, examine all water connections for soundness. The system pressure will increase with temperature rise but should not exceed 2.5 bar.

3. With the system still hot, turn off the gas, water and electricity supplies to the boiler and drain down to complete the flushing process.

Note. A flushing solution should be used during the flushing procedure. Flushing solutions: Fernox Superfloc, Sentinel X300 (new systems) or X400 (existing systems).

Refer to Section 1.17

4. Refill and vent the system, add inhibitor, clear all air locks and again check for water soundness.

Refer to Section 1.17

5. Reset the system initial pressure to the design requirement.

6. Balance the system.

Refer to Section 1.16

7. Check the condensate drain for leaks and check that it is discharging correctly.

8. Finally, set the controls to the User's requirements.

The pump will operate briefly as a self-check once every 24 hours in the absence of any system demand.

2.34 RESTART PROCEDURE

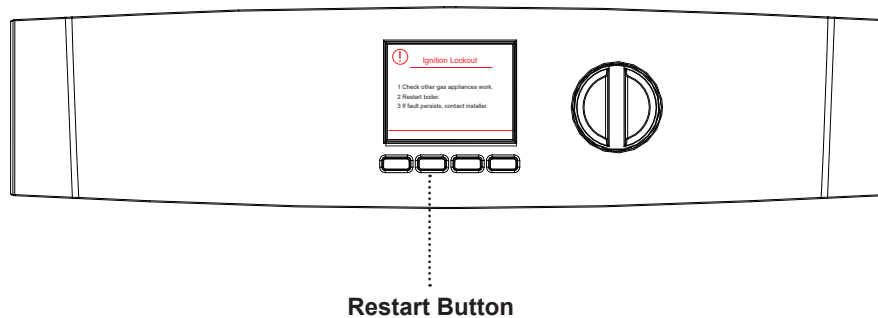
! Ignition Lockout

- 1 Check other gas appliances work.
- 2 Restart boiler.
- 3 If fault persists, contact installer.

Restart Menu

Press

To restart the boiler, press the Restart button (A).



2.35 HANDING OVER

After commissioning the system, hand it over to the householder by the following actions:

1. Hand the Instructions to the householder and explain their responsibilities under the relevant national regulations.
2. Explain and demonstrate the lighting and shutting down procedures.
3. Explain how to operated the boiler and system controls.
4. Ensure the greatest possible fuel economy consistent with the household requirements of both heating and hot water consumption.
5. Explain the precautions necessary to prevent damage to the system and to the building, in the event of the system remaining inoperative during frosty conditions. .
6. Explain the function and the use of the boiler heating and domestic hot water controls.
7. Explain the function of the boiler fault mode.
8. Explain and demonstrate the function of timers and temperature controls, radiator valves etc., for the economic use of the system.
9. If a timer is fitted draw attention to the timer Users Instructions and hand them to the householder.
10. Explain that the dial behind the drop down door, indicates the central heating system pressure and that if the normal COLD pressure of the system is seen to decrease over a period of time then a water leak is indicated. Explain the re-pressurising procedure and if unable to re-pressurise or if the pressure continues to drop a registered local heating installer should be consulted.

Refer to Section
2.18

11. Explain boiler restart procedure.

Refer to Section
2.33

12. After installation and commissioning please complete the Commissioning Checklist before handover to the customer.

For IE, it is necessary to complete a "Declaration of Conformity" to indicate compliance to I.S.813:2002



Refer to
Page 58

! **IMPORTANT**

13. A comprehensive service should be carried out annually.

Stress the importance of regular servicing by a Gas Safe Registered Engineer.

In IE servicing work must be carried out by a Registered Gas Installer(RGII).
14. Inform the householder of the boiler warranty and the requirement to register it to receive the full benefit.

3.1 SERVICING SCHEDULE



WARNING: Servicing can only be carried out by Gas Safe Registered Engineers. In IE servicing work must be carried out by a Registered Gas Installer (RGI)

Always turn OFF the gas supply at the gas service cock, and switch OFF and disconnect the electricity supply to the appliance before servicing

Combustion testing must be carried out by a competent person using a combustion analyser conforming to BS EN 50379-3:2012.

To ensure the continued safe and efficient operation of the appliance it is recommended that it is checked at regular intervals and serviced as necessary. The frequency of servicing will depend upon the installation condition and usage but should be carried out at least annually.

For the latest copy of literature, visit our website idealheating.com.

PRELIMINARY INSPECTION

1. Light the boiler and carry out a pre-service check, refer to the fault finding chart.
2. Check the flue terminal (and terminal guard if fitted) for damage and obstruction.
3. Check combustion by connecting the flue gas analyser to the flue gas sampling point as shown in the diagram and measure CO and CO₂ at maximum rate. Set the boiler to Maximum and Minimum heat inputs.

Refer to Section
3.12

If the CO / CO₂ ratio is greater than 0.004 please proceed to "Cleaning Procedure".

If the CO / CO₂ ratio is less than 0.004 please proceed to "Check Procedure".

CHECK PROCEDURE

1. Check all water and gas joints for signs of leakage. Remake any suspect joints ensuring a gas tightness check is carried out if applicable and the water system is correctly refilled, vented and re-pressurised.
2. Proceed to "IMPORTANT".

IMPORTANT

1. If, for any reason, the condensate trap has been removed, ensure the trap is refilled with water before re-assembling.
2. After completing the servicing or exchange of components always ensure all gas valve connections are gas tight with a gas soundness check up to the gas control valve.
3. When work is complete the front panel MUST be correctly refitted, ensuring that a good seal is made.
4. Complete the service section in the Benchmark Commissioning Checklist.

GENERAL

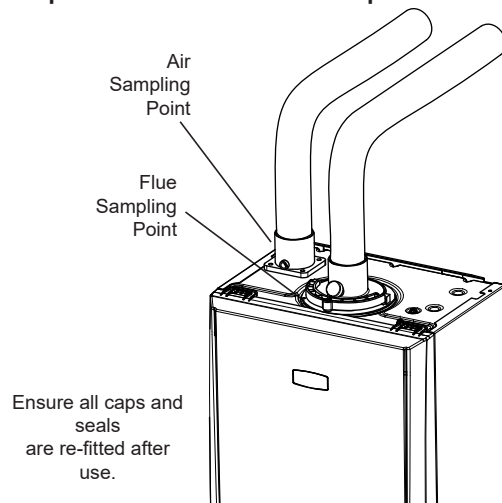
During Servicing, and after any maintenance or change of part of the combustion circuit, the following must be checked:

- The integrity of the flue system and the flue seals.
- The integrity of the boiler combustion circuit and the relevant seals.
- The operational (working) gas inlet pressure at maximum rate.
- The gas rate.
- The combustion performance.

CLEANING PROCEDURE

1. Remove the casing.
2. Visually check the appliance for signs of leakage.
3. Remove the flue manifold.
4. Remove the fan.
5. Remove the burner.
6. Refit the sump outlet cover.
7. Clean the heat exchanger by pouring warm water across the whole heat engine to flush deposits taking care to avoid pouring water over the electrode.
8. Check the electrode for damage and clean using an abrasive cloth. Check and adjust the spark gap. Replace the electrode if damaged.
9. Clean out the sump outlet to ensure any debris is removed.
10. Remove and clean the condensate trap and re- prime the trap before re-installing.
11. Re-assemble the components in reverse order.
12. Carry out post service checks on the combustion circuit. See General below.
13. Check the system water quality in accordance with BS7593:2019.
14. Complete the service record in the Benchmark section.

Do not operate the boiler if the front panel is not fitted.



3.2 REMOVAL / REPLACEMENT OF COMPONENTS

⚠ WARNING: Do not operate the boiler without a front panel fitted

When replacing any component.

1. Isolate the electricity supply.
2. Turn off the gas supply.
3. Remove the boiler front panel.

Refer to Section
2.32

4. Swing the control box down into its servicing position.

After removing / replacing any component.

5. Ensure all gas valve connections are gas tight with a gas soundness check up to the gas control valve.
6. Ensure all water connections are tight.
7. Test the appliance for correct and safe operation.

Refer to Section
3.1 (General)

Notes.

1. In order to assist fault finding, the control panel has an LCD diagnostic display. The key to boiler fault conditions is shown in Section 4.
2. In order to replace components in Sections 3.13, 3.17-3.18 and 3.20-3.25, it is necessary to drain the boiler.

Refer to Section
3.3

3.3 DRAINING THE BOILER

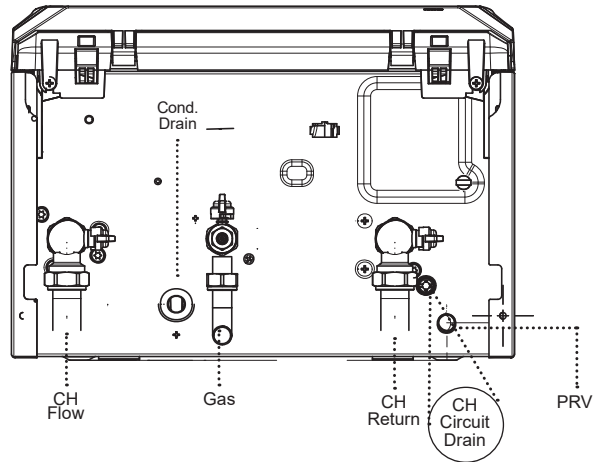
Refer to Section
3.2

CENTRAL HEATING CIRCUIT

1. Close all the CH water isolating valves on both the flow and return.
2. To drain the primary heat exchanger circuit: Open the drain valve and attach a length of hose to the CH drain point.
3. After replacing any component on the boiler, remove the hose, close the drain valve and open all system isolating valves.
4. Repressurise before proceeding to check operation of the boiler.
5. Disconnect filling loop.

Refer to Section
2.18

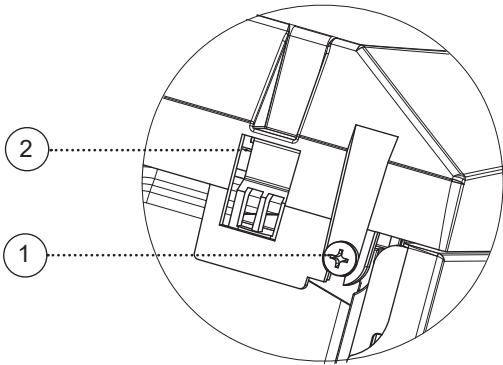
6. Check that the boiler operates.



3.4 BOILER FRONT PANEL REMOVAL / REPLACEMENT

REMOVAL

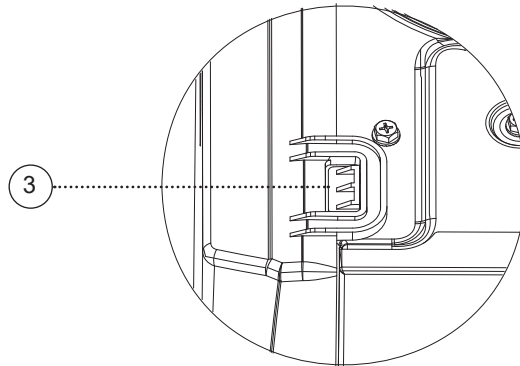
1. Loosen the two screws retaining the front panel.
2. Pull the two clips down to disengage and pull panel forward and upward and remove.



View from bottom of boiler

REPLACEMENT

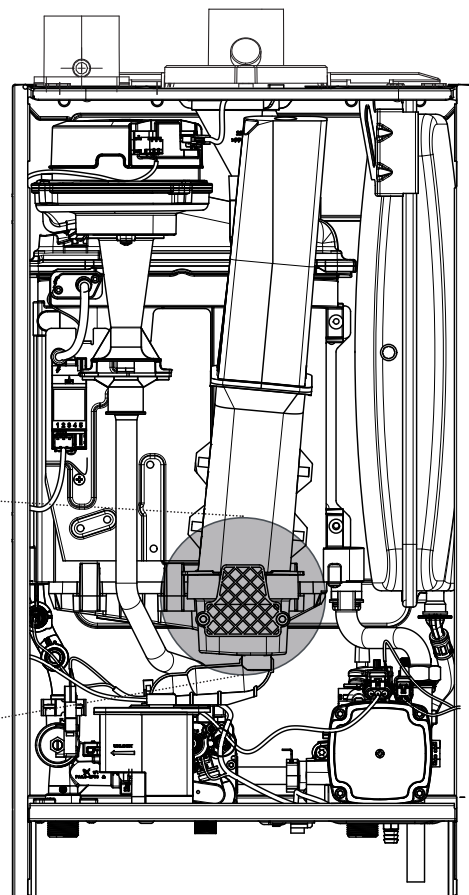
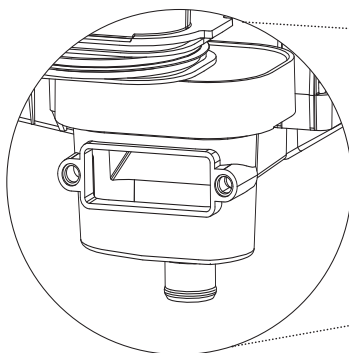
3. Hook the panel onto the top retaining clips.
4. Push the panel until the 2 bottom spring clips engage ensuring the 1 knob and 4 buttons line up with the holes in the front panel.
5. Re-tighten the two retaining screws.



View from top of boiler

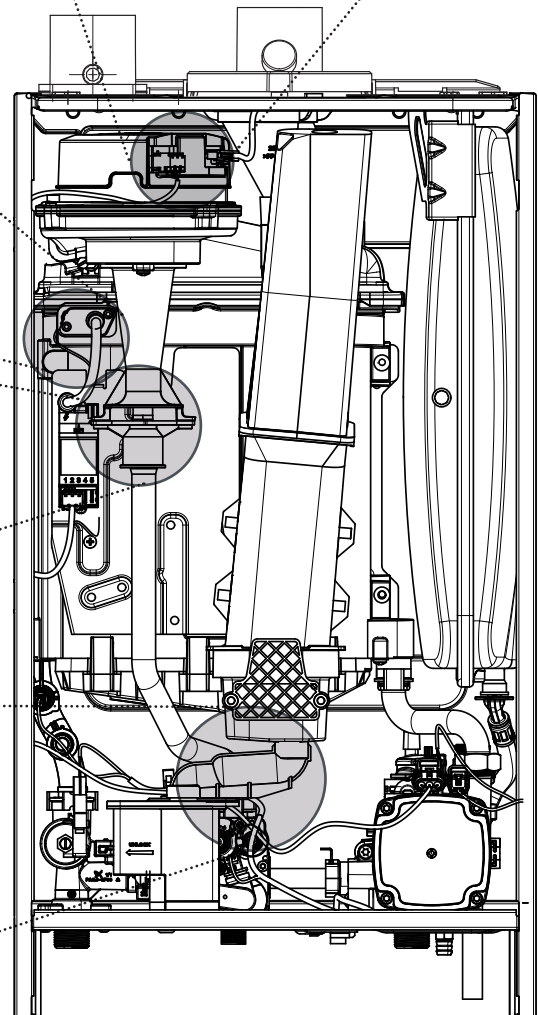
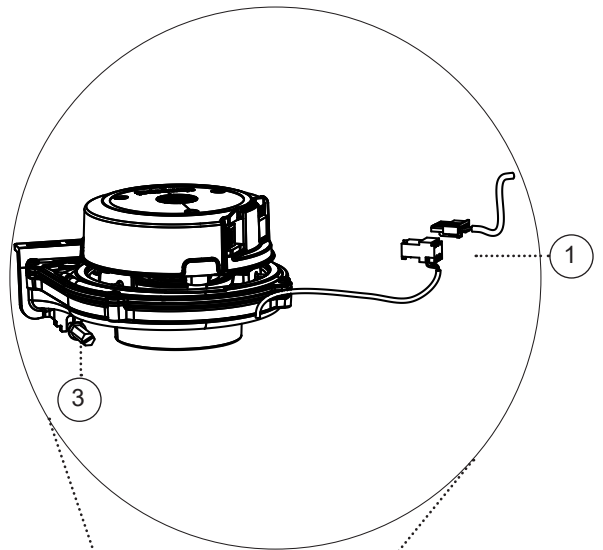
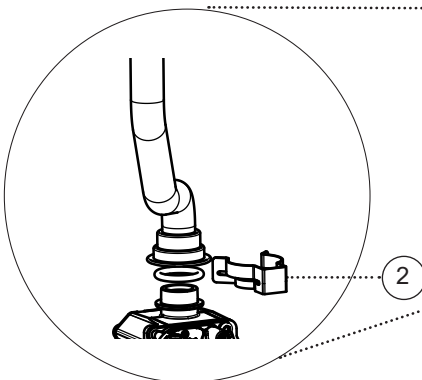
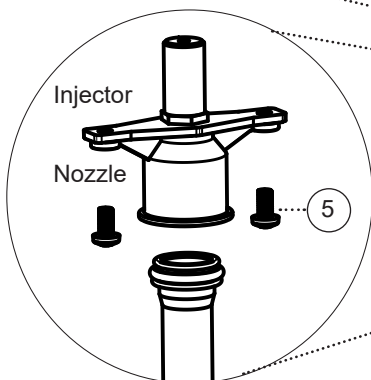
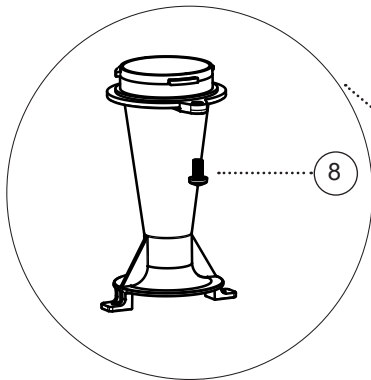
3.5 FLUE MANIFOLD REMOVAL/REPLACEMENT

1. Remove the two sump cover retaining screws
2. Remove the sump cover
3. Lift the manifold upwards to clear the sump
4. Move the manifold to the left and pull down to remove



3.6 FAN AND VENTURI ASSEMBLY REMOVAL AND CLEANING

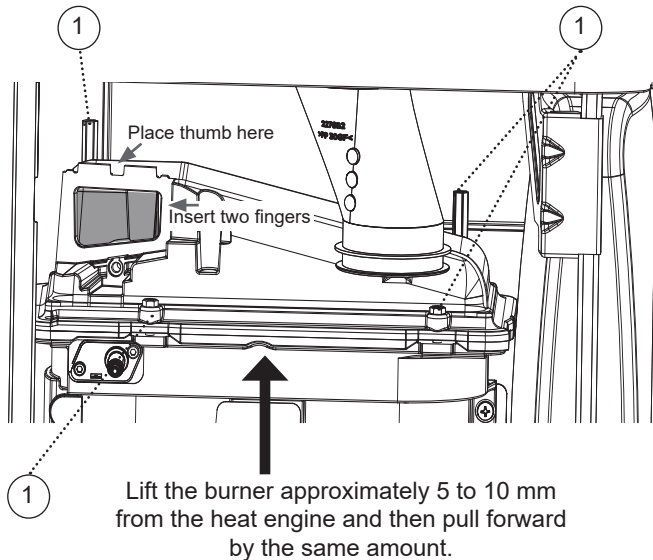
1. Disconnect the electrical leads from the fan.
2. Remove the clip from the gas control valve outlet and ease the pipe upwards. Rotate and then ease down to remove.
3. Remove the extended nut on the fan mounting bracket.
4. Lift off fan and venturi assembly.
5. Undo the two M4 screws and release the nozzle assembly.
6. Inspect the injector for blockage or damage.
7. Clean the outside of the injector and use a small flue brush to clean the injector hole. Do not use anything abrasive such as a file.
8. Remove the screw and twist venturi anti-clockwise to remove venturi assembly, noting the orientation of the venturi in relation to the fan body.
9. Inspect fan outlet sealing gasket and replace if necessary.
10. Ensure the venturi is free from dust/debris.
11. Check the 'O'-rings are fitted correctly to the gas outlet pipe replacing if any damage is witnessed.



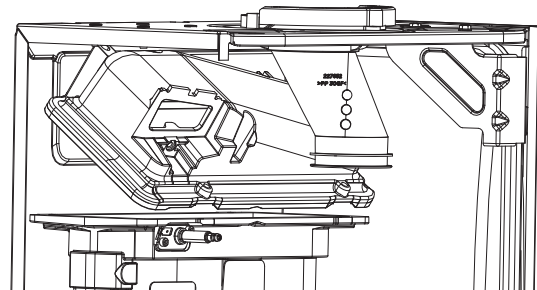
3.7 BURNER REMOVAL AND CLEANING

Refer to Section
3.6

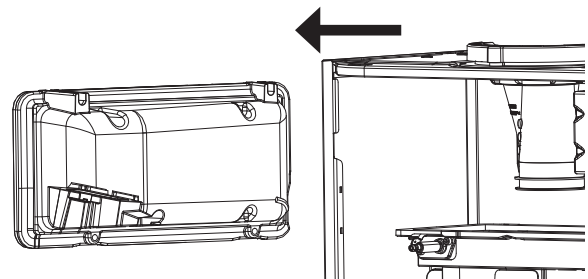
1. Remove the 2 burner front fixing screws and the 2 rear extended nuts.
2. Lift and pull forward the burner from the combustion chamber by holding the burner with two finger in the air inlet duct and your thumb on the top of the burner.
3. Tilt the burner towards yourself so that it raises to the vertical position.



4. Pull the burner out from the left hand side of the boiler once it is in the vertical position.

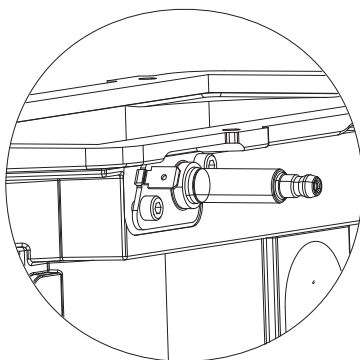


5. Carefully brush the ceramic burner with a soft non metallic bristle brush.



3.8 CLEANING THE HEAT EXCHANGER

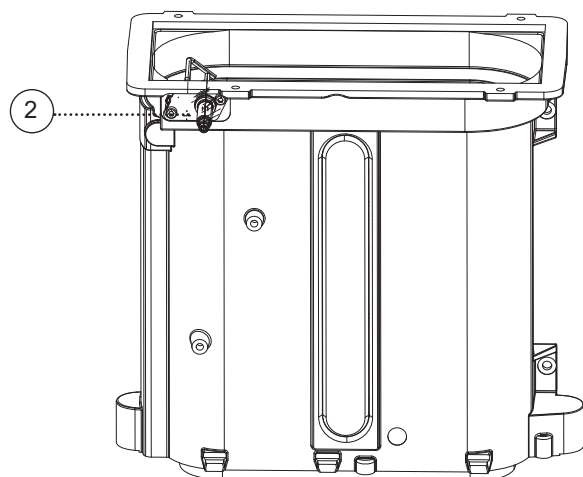
1. Replace the sump cover prior to the water flush process.
2. Thoroughly flush the heat exchanger by pouring water into the top of the combustion chamber ensuring the full surface of the heat exchanger is cleaned. Avoid pouring water over the electrode.
3. Remove the sump cover and clean loose deposits from the sump.



Combined Ignition Detection Electrode

4. Inspect the ignition/detection electrode. Ensure that it is clean and in good condition - replace if necessary.
5. Check that the ignition gap is correct.

Refer to Section
3.9



3.9 IGNITION / DETECTION ELECTRODE REPLACEMENT / INSPECTION

Refer to Section 3.2

1. Remove the fan.

Refer to Section 3.6

2. Remove the flue manifold.

3. Remove the burner.

Refer to Section 3.14

4. When servicing the boiler inspect the condition of the electrode and check the dimensions shown. If there is damage to the electrode continue to follow steps below for replacement.

5. Unplug the ignition lead from the electrode.

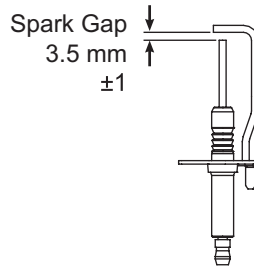
6. Remove the earth lead from the electrode.

7. Remove the 2 screws holding the electrode to the combustion chamber.

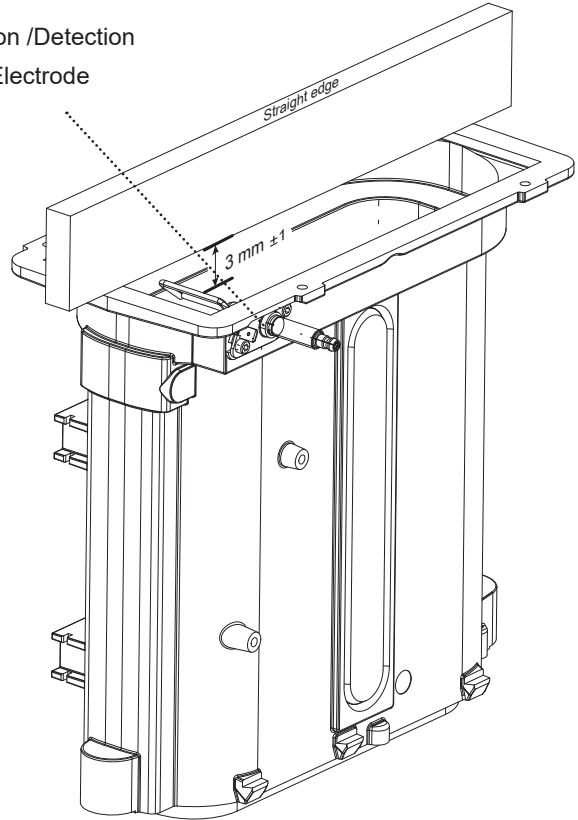
8. Remove the electrode.

9. Fit the new electrode, using the new gasket supplied. Check dimensions as shown.

Refer to Section 2.33 & 2.34



Ignition /Detection Electrode

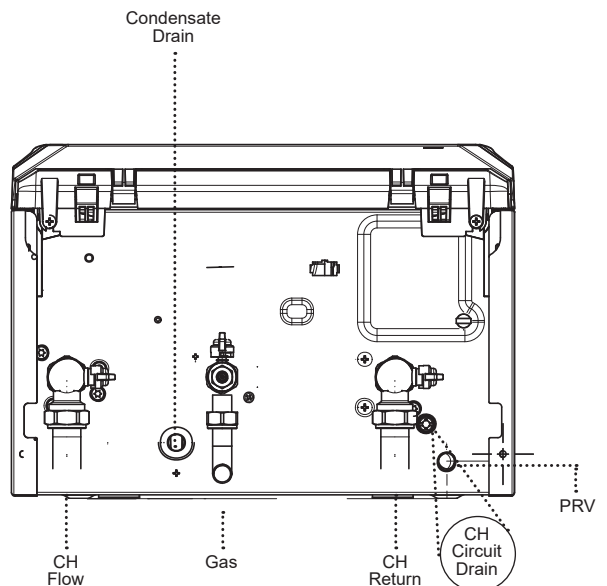
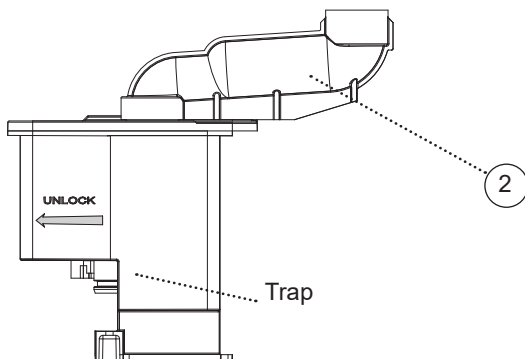


3.10 CLEANING THE CONDENSATE TRAP

CAUTION: Keep trap upright when removing

1. Pull off the rubber pipe at the sump drain.
2. Turn the trap clockwise to disengage and lift to remove.
3. Clean and fill trap with water.

SCAN for video



3.11 BURNER INJECTOR REPLACEMENT

Refer to Section
3.7

3.12 BURNER REPLACEMENT

Refer to Section
3.2 & 3.7

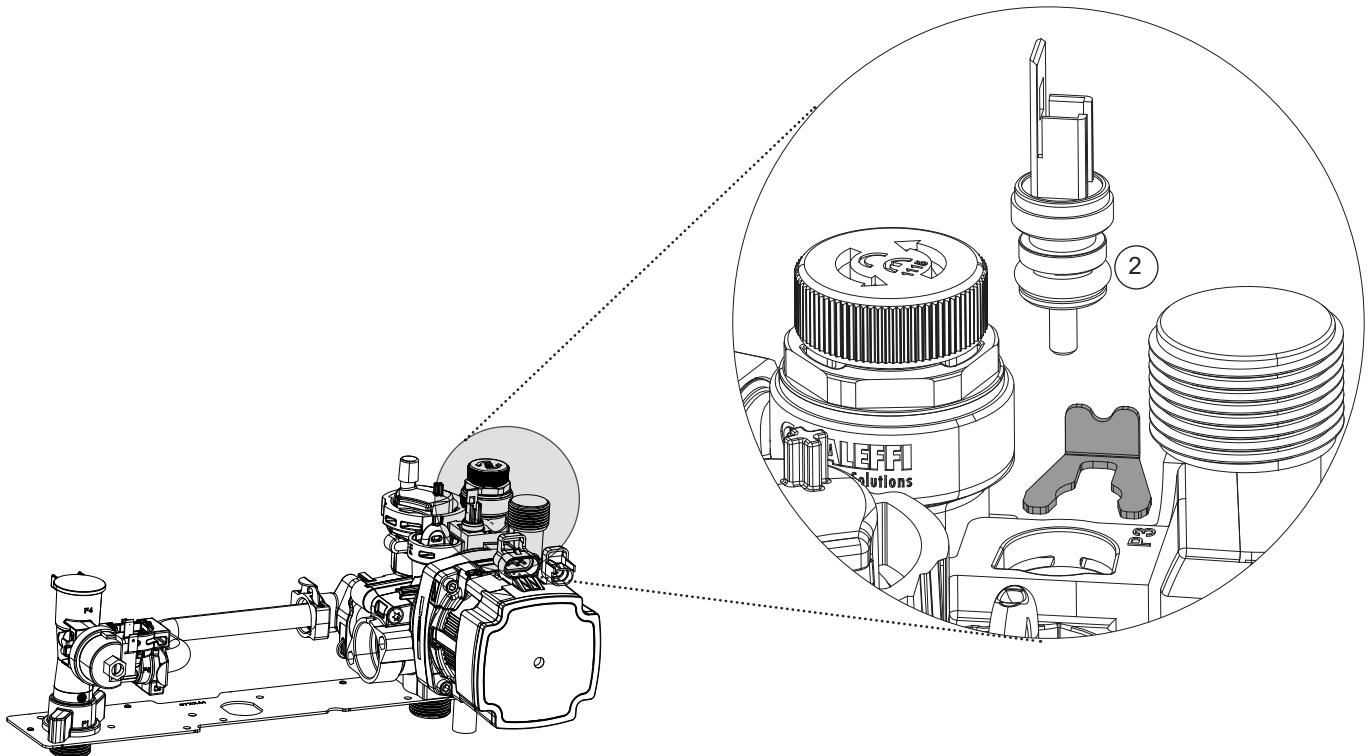
SCAN
for video



3.13 RETURN THERMISTOR REPLACEMENT

Refer to Section
3.2

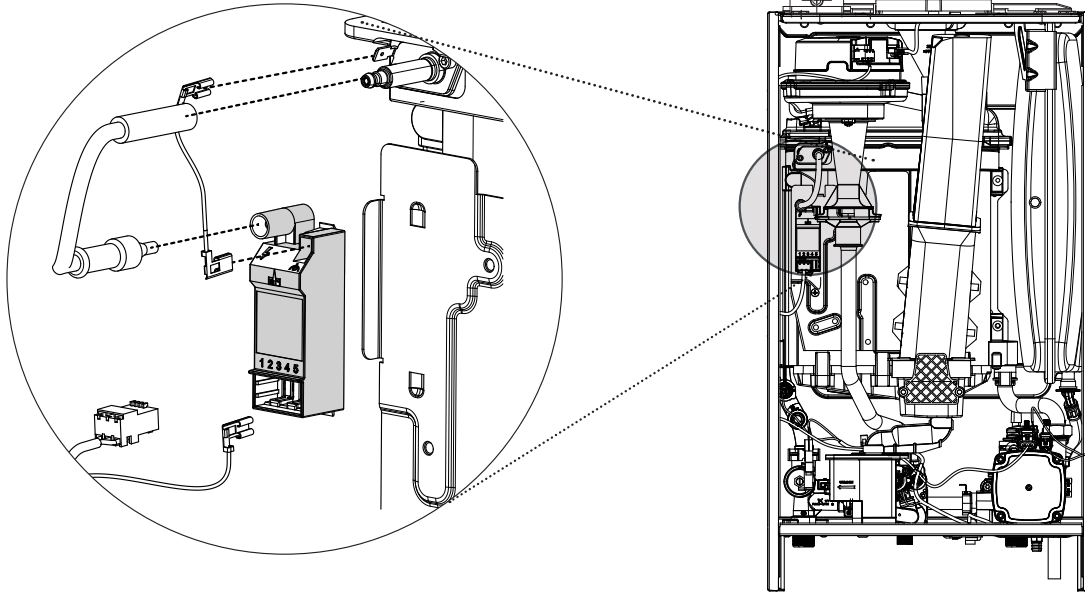
1. Isolate and drain down the boiler.
2. Remove the clip from the pump housing and remove the thermistor.
3. Disconnect the electrical lead from the thermistor.
4. Reconnect the electrical lead to the new thermistor and reassemble, ensuring that the thermistor is fully engaged and the clip is correctly located.



3.14 SPARK GENERATOR REPLACEMENT

Refer to Section 3.2

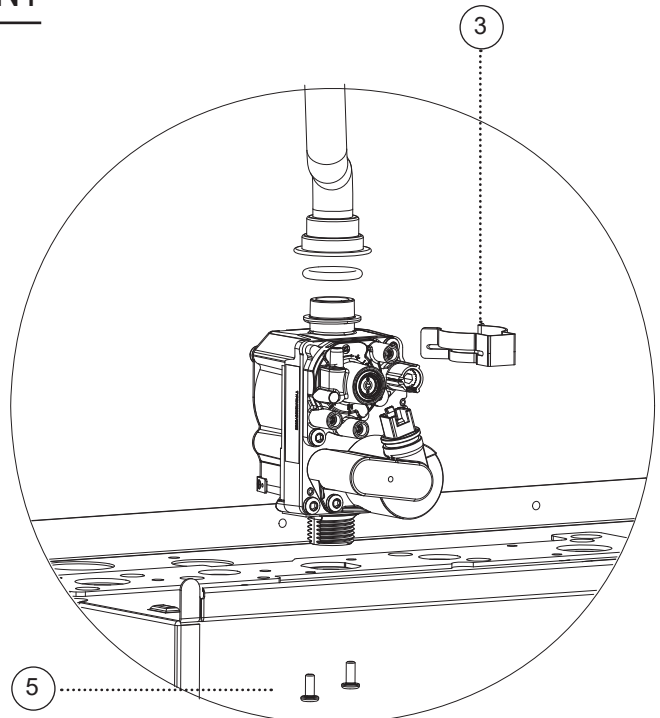
1. Disconnect the leads from the spark generator.
2. Gently push up the generator to release the bottom clip from the gas valve mounting bracket.
3. Lift the spark generator up and out of the bottom retaining location point.
4. Fit the new spark generator and reassemble, ensuring that the the earth lead is replaced.



3.15 GAS CONTROL VALVE REPLACEMENT

Refer to Section 3.2

1. Disconnect and remove the trap and rubber connector.
- Refer to Section 3.16
2. Unplug the electrical lead connection from the gas control valve.
 3. Remove the outlet gas valve clip and slide the pipe upwards.
 4. Undo the gas inlet pipe union at the inlet to the gas valve.
 5. Undo the two screw fixing the gas valve to the chassis base and lift the gas valve upwards.
 6. Fit the new gas control valve ensuring that the 'O' ring and sealing washer are in place and reconnect gas and electrical connections.
 7. Refit the trap.
 8. Ensure all gas valve connections are gas tight with a gas soundness check up to the gas control valve.



3.16 CONDENSATE TRAP REPLACEMENT / CLEANING

Refer to Section 3.10

3.17 PRESSURE GAUGE REPLACEMENT

Refer to Section
3.2

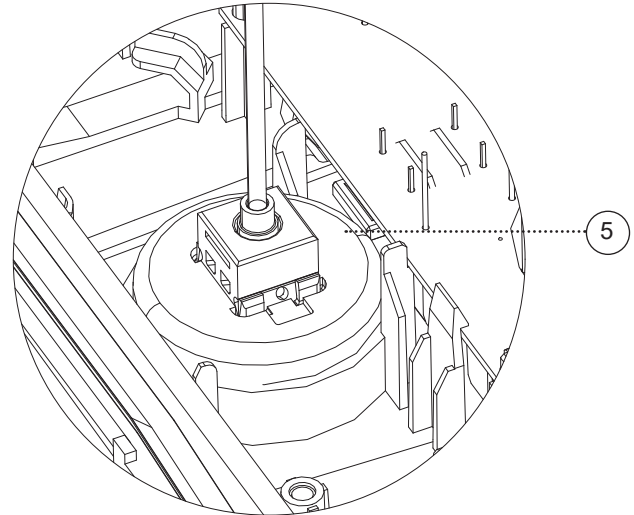
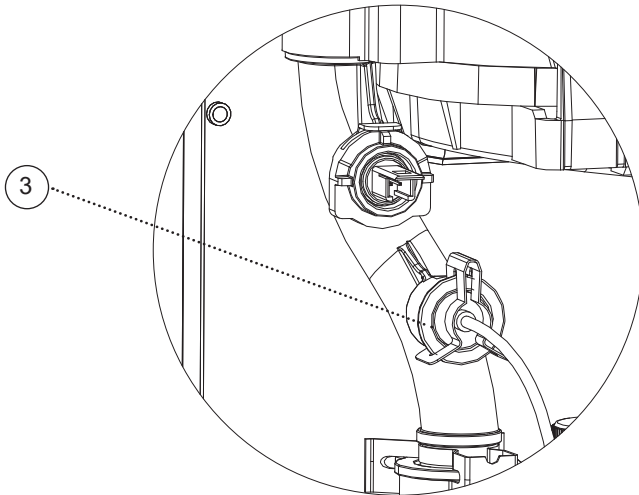
1. Drain the boiler.

Refer to Section
3.3

2. Remove the boiler front (see section 3.2), lower the control panel and remove the control box cover.
3. Ensuring there is no pressure in the system unclip the C clip from the flow pipe port and remove the capillary connection together with 'O' ring.

4. Releasing the two retaining clips on the pressure gauge ease the pressure gauge through the front of the control panel.
5. Fit the new pressure gauge from the front of the lower control panel ensuring correct orientation. Locate push fit connection into flow pipe ensuring 'O' ring in place and secure with the C clip.
6. Refill the boiler.

Refer to Section
2.18



3.18 PRV REPLACEMENT

Refer to Section
3.2

1. Drain the boiler.

Refer to Section
3.3

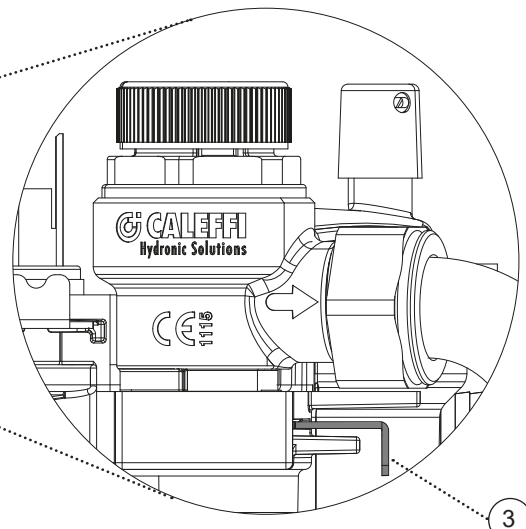
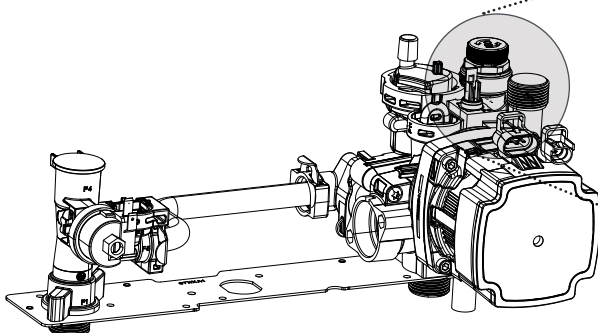
2. Remove the trap and rubber pipe.
3. Pull out and remove the clip retaining the PRV.
4. Remove compression coupling on discharge pipework.
5. Lift out the PRV/pipe assembly.
6. Remove the pipe and transfer to the new PRV.
7. Reassemble ensuring the retaining clip is correctly fitted.

8. Check the operation of the PRV by raising the water pressure until the valve lifts. This should occur within 0.3 bar of the preset lift pressure.
9. Check no escape of water occurs except at the discharge point
10. Release water from the system until the minimum system design pressure is reached; 1.0 bar if the system is to be pre-pressurised.

SCAN
for video



Refer to Section
2.18



3.19 PRIMARY PCB REPLACEMENT

WARNING: It is critical that the correct boiler size and fuel type is entered in to the boiler.

CAUTION: Fit the earth strap provided with the PCB to your wrist and secure to a suitable earth on the boiler chassis.

Refer to Section 3.2

1. Remove and keep the screw.
2. Carefully release the four retaining clips and remove control box cover.
3. Unplug all lead connections to the PCB.
4. Spring out the four side retaining clips and pull the PCB upwards to clear the corner retaining posts.
5. Fit the new PCB.
6. Re-connect all plug connections.
7. Reassemble.
8. Turn power on, display shows:

Installer	
Initialise spare PCB?	
Yes	

Press Yes and the following screen is shown:

Select Boiler Brand	
Option 1 of 4	
Max	
Back	Next Select

Press Next until 'Max' is shown, then press Select

Select Boiler Name	
Option 1 of 4	
System ² UK	

Press Next until 'System' UK is shown, then press Select

Select Boiler Model	
Option 1 of 6	
System UK	
30 kW	
Natural Gas	
Back	Next Select

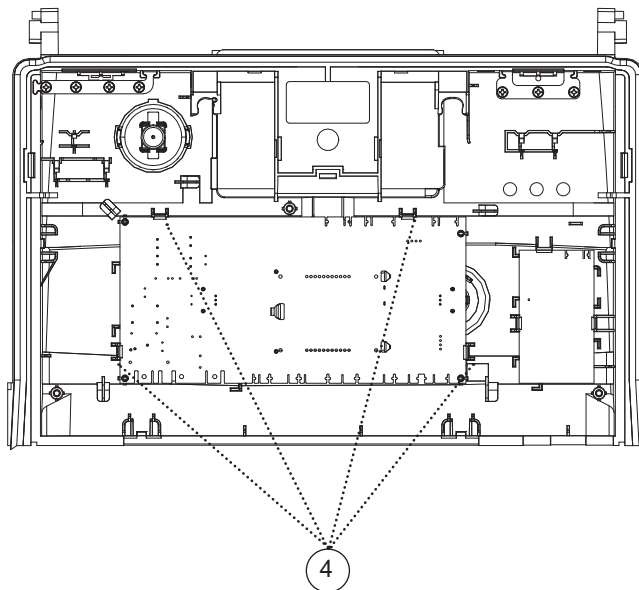
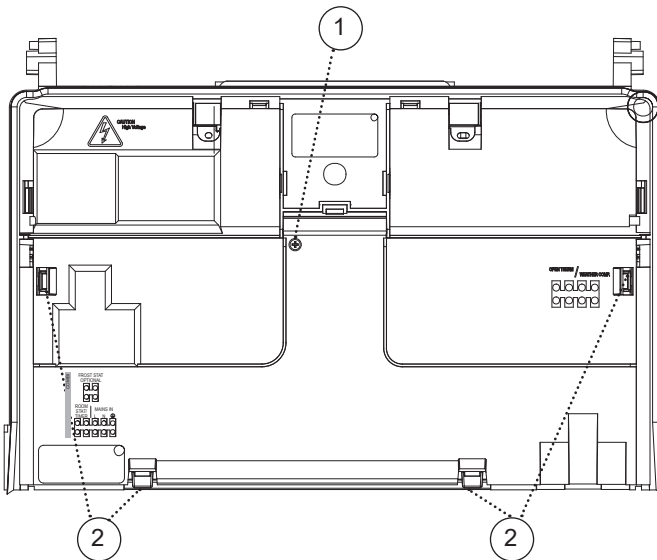
Press Next until correct Boiler model shown

- 1/2 System 30 NG
- 2/2 System 30 Propane

Press Select to confirm & the following screen is shown:

Program this model?	
System UK	
30 kW	
Natural Gas	
Back	Yes

Press Yes to finish.



3.20 PUMP AUTOMATIC AIR VENT REPLACEMENT

Refer to Section
3.2

1. Drain the boiler.

Refer to Section
3.3

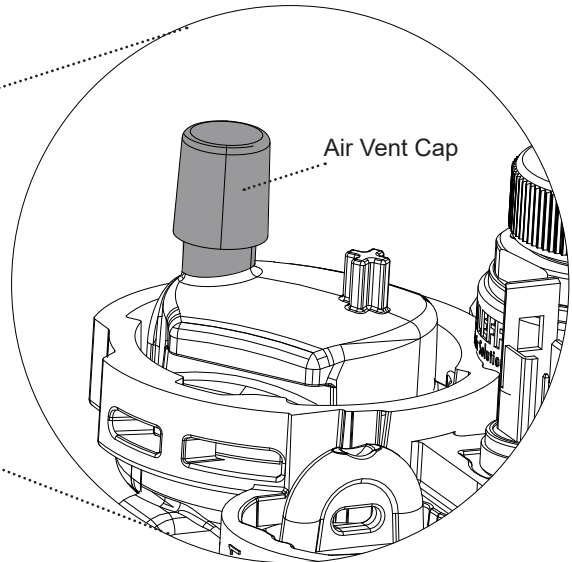
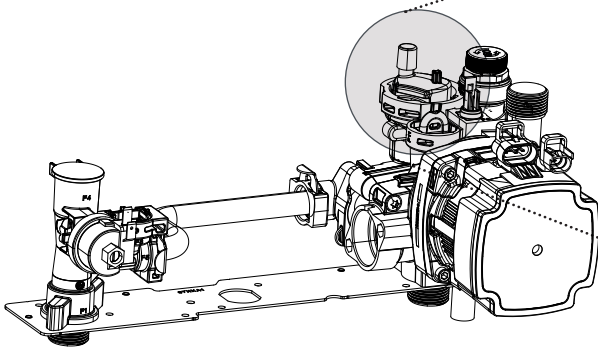
2. Remove the expansion vessel.

Refer to Section
3.24

3. Firstly, increase access area by disconnecting the 22 mm pipe connection at top of pump manifold and bottom of heat exchanger and remove pipe.
4. The automatic air vent head is retained in the pump body with a bayonet connection. The air vent head and float assembly is removed by turning the head anti-clockwise (viewed from above) and pulling upwards.

5. Reassemble. Ensure the air vent head 'o' ring seal is fitted.
6. Ensure the air vent cap is loose.
7. Refill the boiler. Check for leaks around the new air vent joint.

Refer to Section
2.18



3.21 PUMP HEAD REPLACEMENT

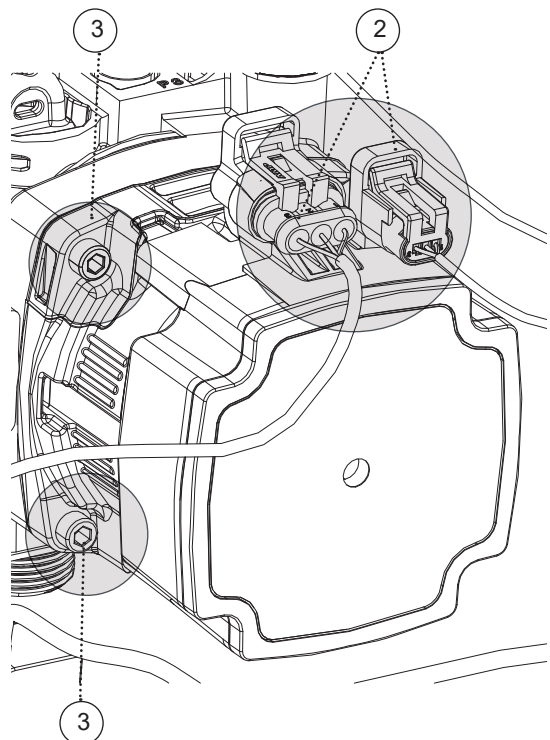
Refer to Section
3.2

1. Drain the boiler.

Refer to Section
3.3

2. Disconnect the two electrical leads from the pump.
3. Remove the 4 allen screws retaining the pump head.
4. Remove the pump head.
Be aware of water spillage.
5. Fit the new pump head.
6. Reassemble in reverse order.
7. Refill the boiler.

Refer to Section
2.18



3.22 CH WATER PRESSURE SWITCH REPLACEMENT

Refer to Section 3.2

1. Drain the boiler.

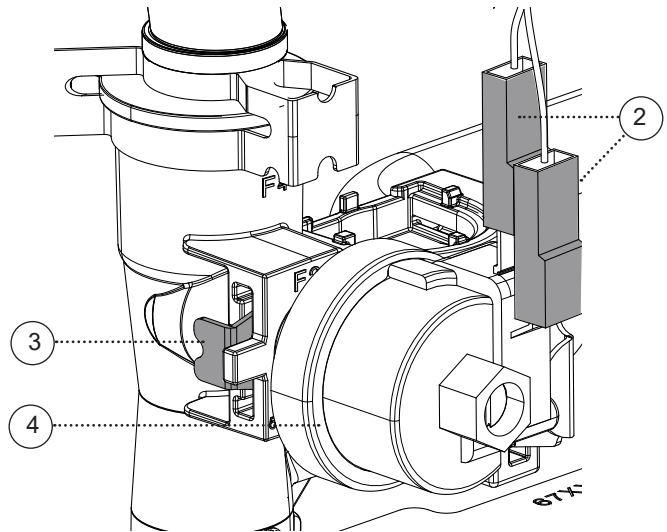
Refer to Section 3.3

2. Pull off the two electrical connections.
3. Using a suitable tool, pull out the metal retaining clip.
4. Carefully withdraw the pressure switch.
5. Fit the new pressure switch and re-assemble in reverse order. Ensure the 'O' ring is fitted and replace clip.
6. Refill the boiler.

Refer to Section 2.18

7. Check that the boiler operates..

Refer to Section 2.33 & 2.35



3.23 FLOW THERMISTOR REPLACEMENT

Refer to Section 3.2

1. Drain down the boiler.

Refer to Section 3.3

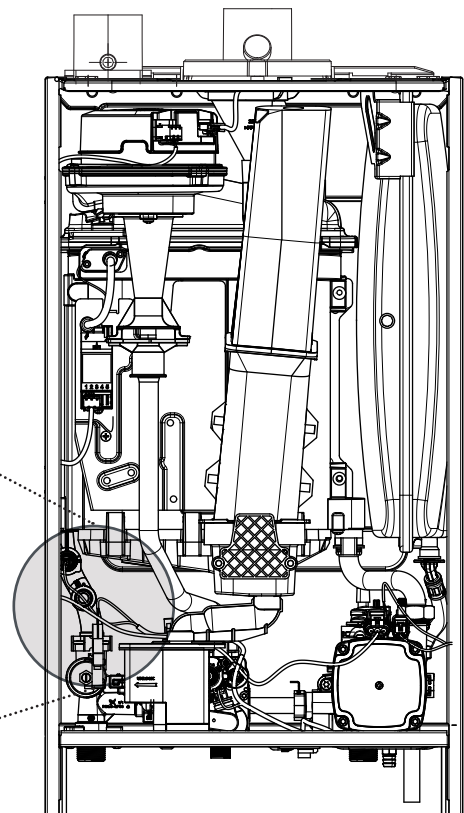
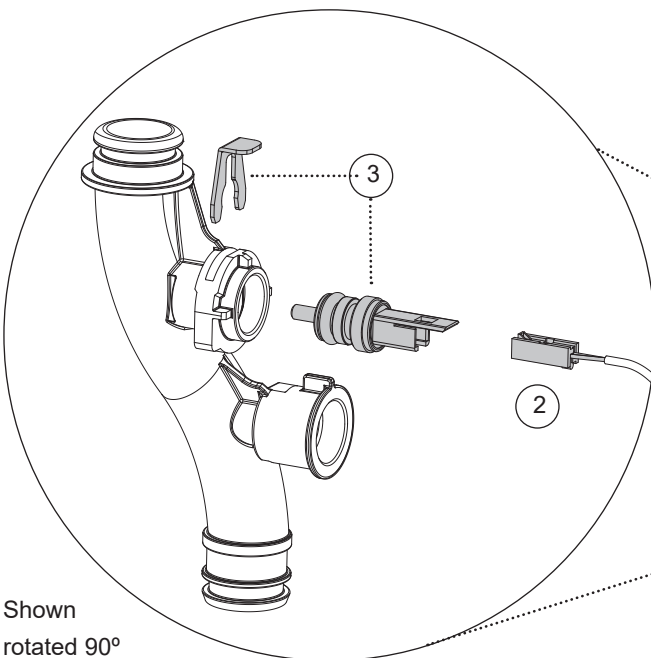
2. Unplug the electrical lead.
3. Remove the clip from the flow pipe and remove the thermistor.
4. Fit the new thermistor, ensure 'O' ring is fitted and replace clip.

5. Reassemble.

6. Refill the boiler.

Refer to Section 2.18

7. Check that the boiler operates.



3.24 EXPANSION VESSEL RECHARGING & REPLACEMENT

Refer to Section
3.2

RECHARGING

1. Remove the charge point cover.
2. Recharge the tank pressure to 0.75 bar.
3. Reassemble.
4. Check that the boiler operates.

REPLACEMENT

5. Drain the boiler CH circuit.

Refer to Section
3.3

6. Remove the retaining clip on the vessel water connection pipe and remove the pipe.
7. Support the expansion vessel and unscrew the 2 screws from the securing bracket, located on the top of the boiler, and remove.

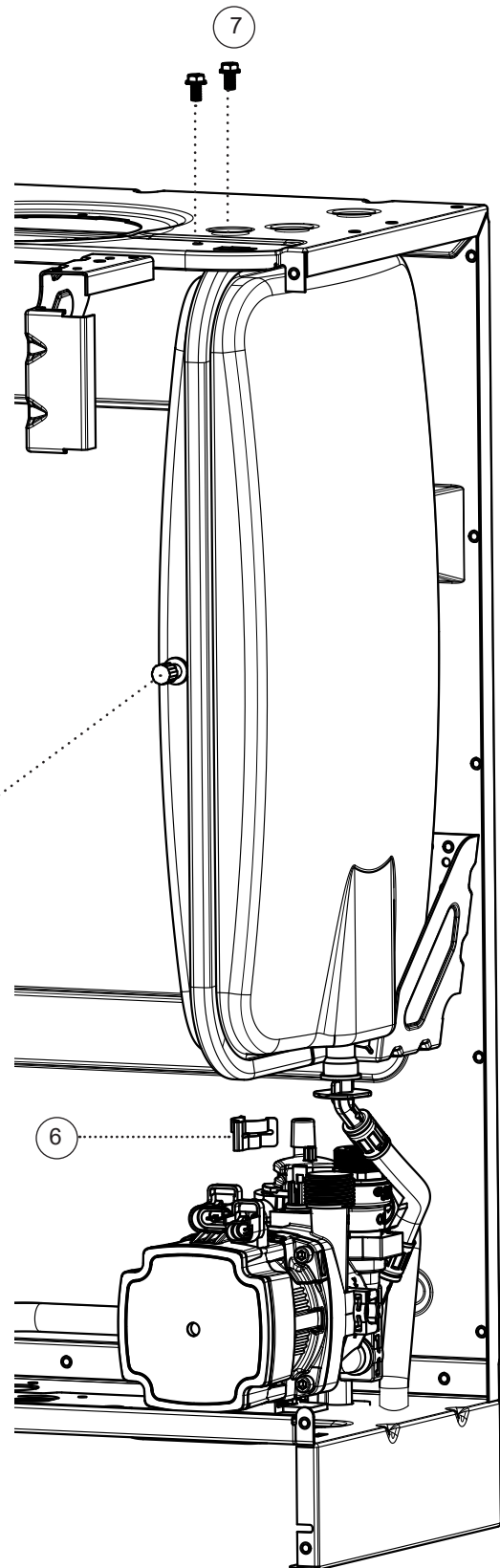
Note the position of the bracket on the vessel

8. Remove the expansion vessel.
9. Fit the new expansion vessel.
10. Reassemble ensuring the 'O' ring seal is in place and refit the retaining clip.
11. Refill the boiler and check for leaks.

Refer to Section
2.16

Recharge
Point

1



3.25 HEAT ENGINE REPLACEMENT

Refer to Section
2.1

CAUTION: Protect the gas and electrical controls with a waterproof sheet.

Refer to Section
3.2

1. Drain the boiler.

Refer to Section
3.3

2. Undo the two screws and remove the sump cover retaining the lower flue manifold.
3. Lift the manifold to clear the bottom sealing gasket and remove manifold.
4. Remove the fan / venturi assembly and place on one side.

Refer to Section
3.6

5. Remove the burner and place on one side.

Refer to Section
3.7

6. Remove the ignition/detection electrode.

Refer to Section
3.9

7. Remove the spark generator.

Refer to Section
3.15

8. Remove the gas valve.

Refer to Section
3.15

9. Remove the expansion vessel.

Refer to Section
3.24

10. Remove the 2 M5 screws retaining the spark generator, mounting bracket and transfer bracket to the new heat exchanger.

11. Undo the pump union nut and remove pipe.

12. Remove the two retaining pipe clips and remove pipes.

13. Remove the condensate rubber pipe.

Refer to Section
3.19 No.2

14. Remove the two heat exchanger fixing screws.

15. Remove the Heat exchanger, slide out of location bracket.

16. If replacement sump required: Rotate heat exchanger assembly 180°. Place new sump onto heat exchanger, ensuring correct orientation and seal is in place. Then gently apply pressure to the base of the sump at each tab fixing point and engage tabs onto the heat exchanger.

17. Reassemble, ensuring the heat exchanger is located correctly in the LHS retaining bracket. Replace any new 'O' rings supplied with new heat exchanger and replace gaskets or seals if any sign of damage is evident. When replacing the spring clips located on the return pipe connection, ensure clip is oriented to correctly match connecting pipe diametres.

18. Ensure the trap is filled with water.

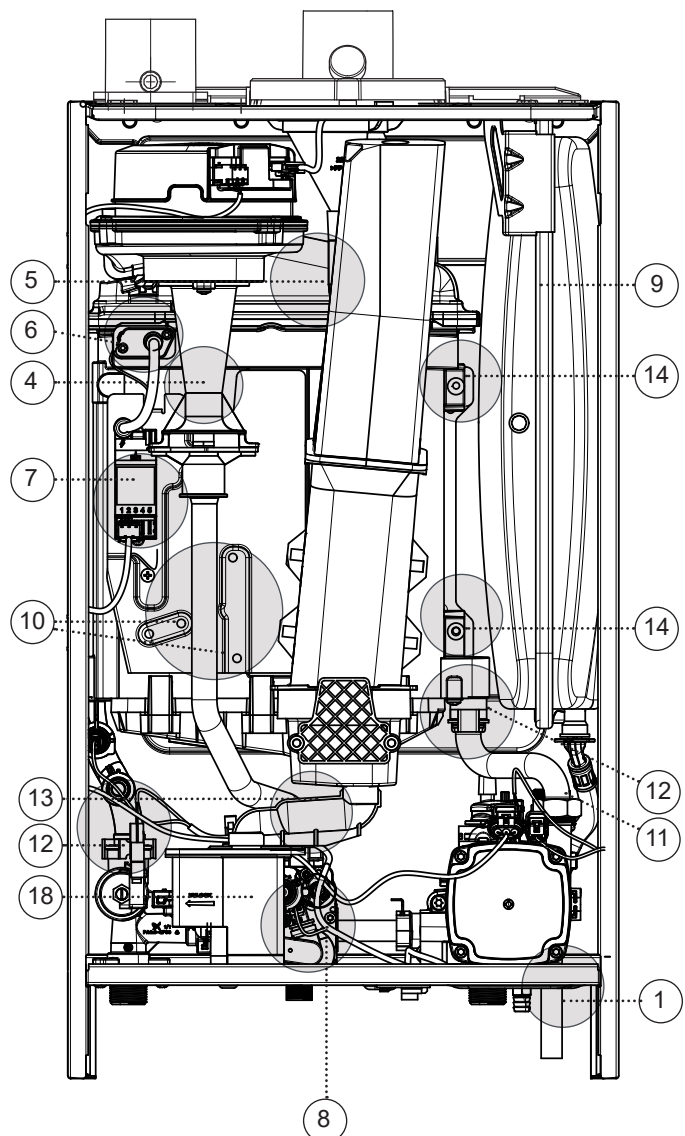
Refer to Section
3.16

19. Refill the boiler and check for leaks.

Refer to Section
2.16

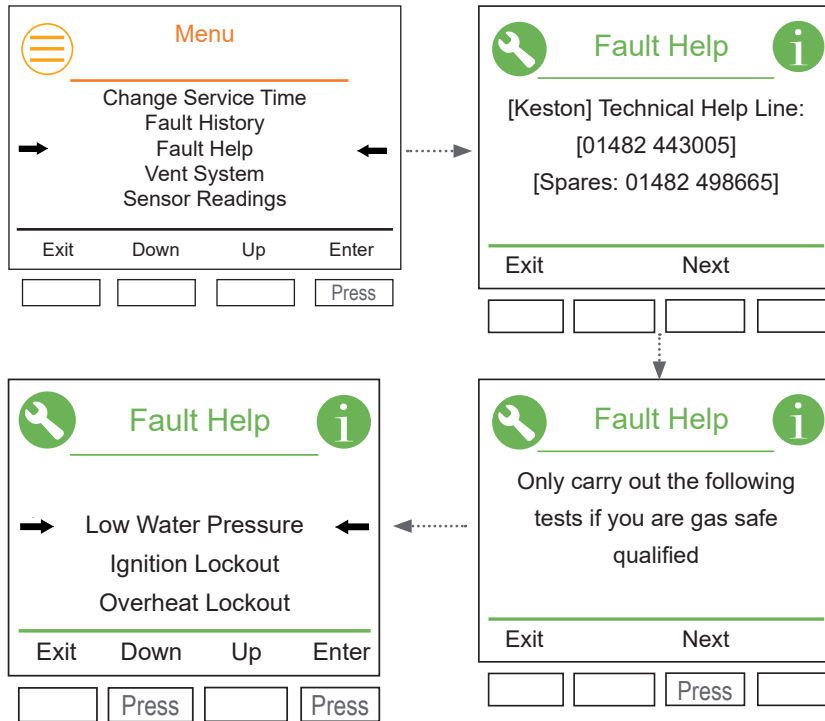
20. Ensure all gas valve connections are gas tight with a gas soundness check up to the gas control valve.

21. Check that the boiler operates.

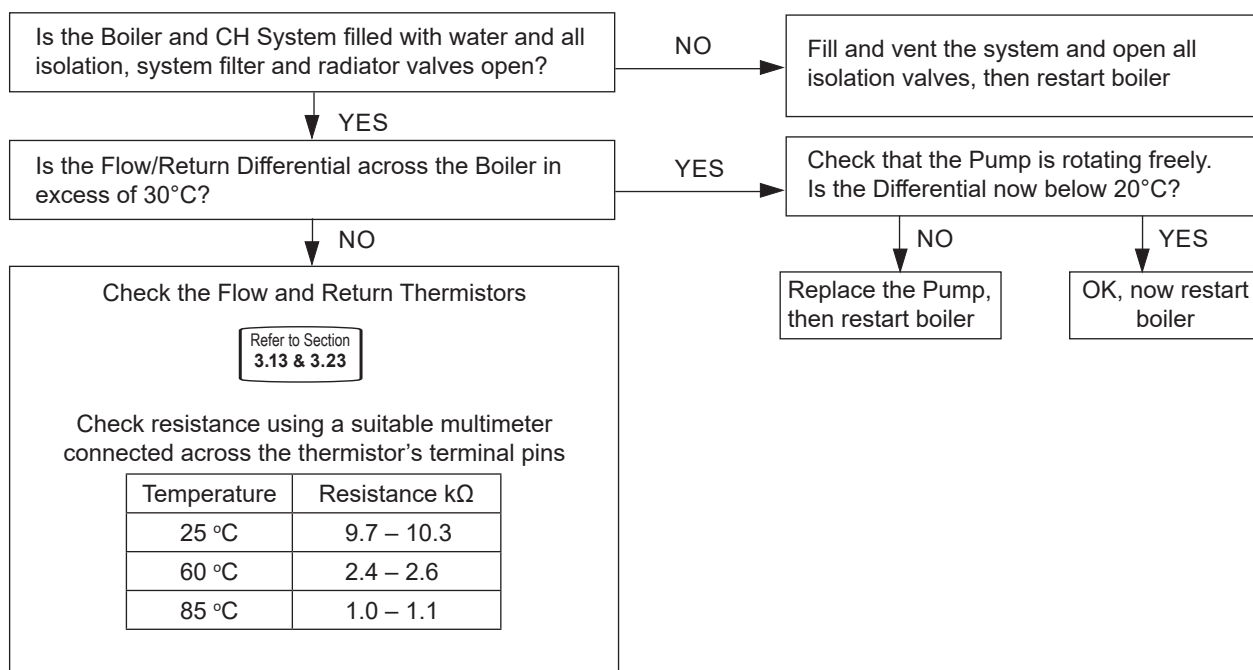


4.1 MAIN MENU, FAULT HELP

Fault finding help can be accessed through the menu. Fault finding help lists all the common faults with the necessary checks. More detailed fault checks and actions are described in the following pages.

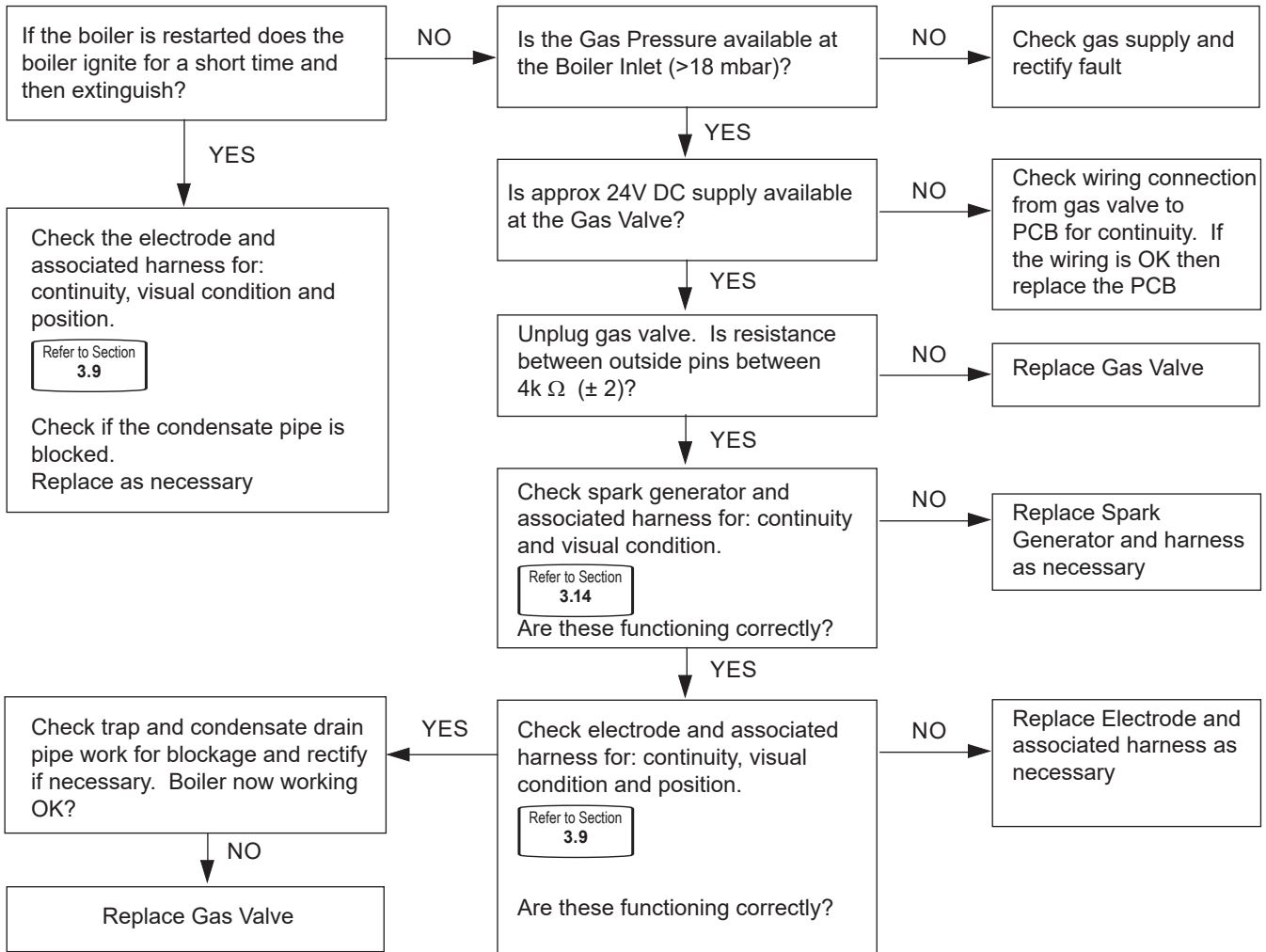


4.2 OVERHEAT LOCKOUT

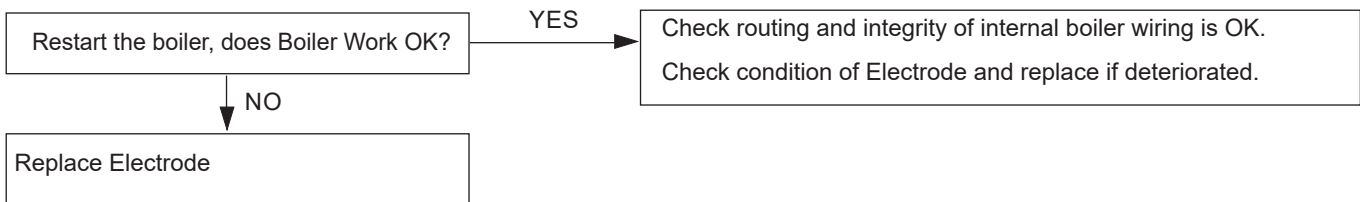


continued.....

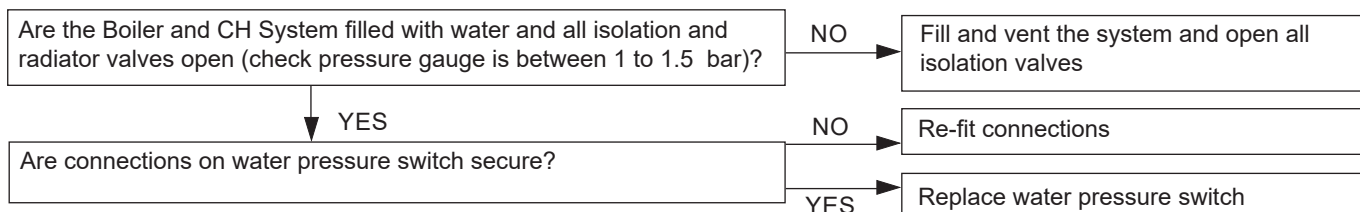
4.3 IGNITION LOCKOUT



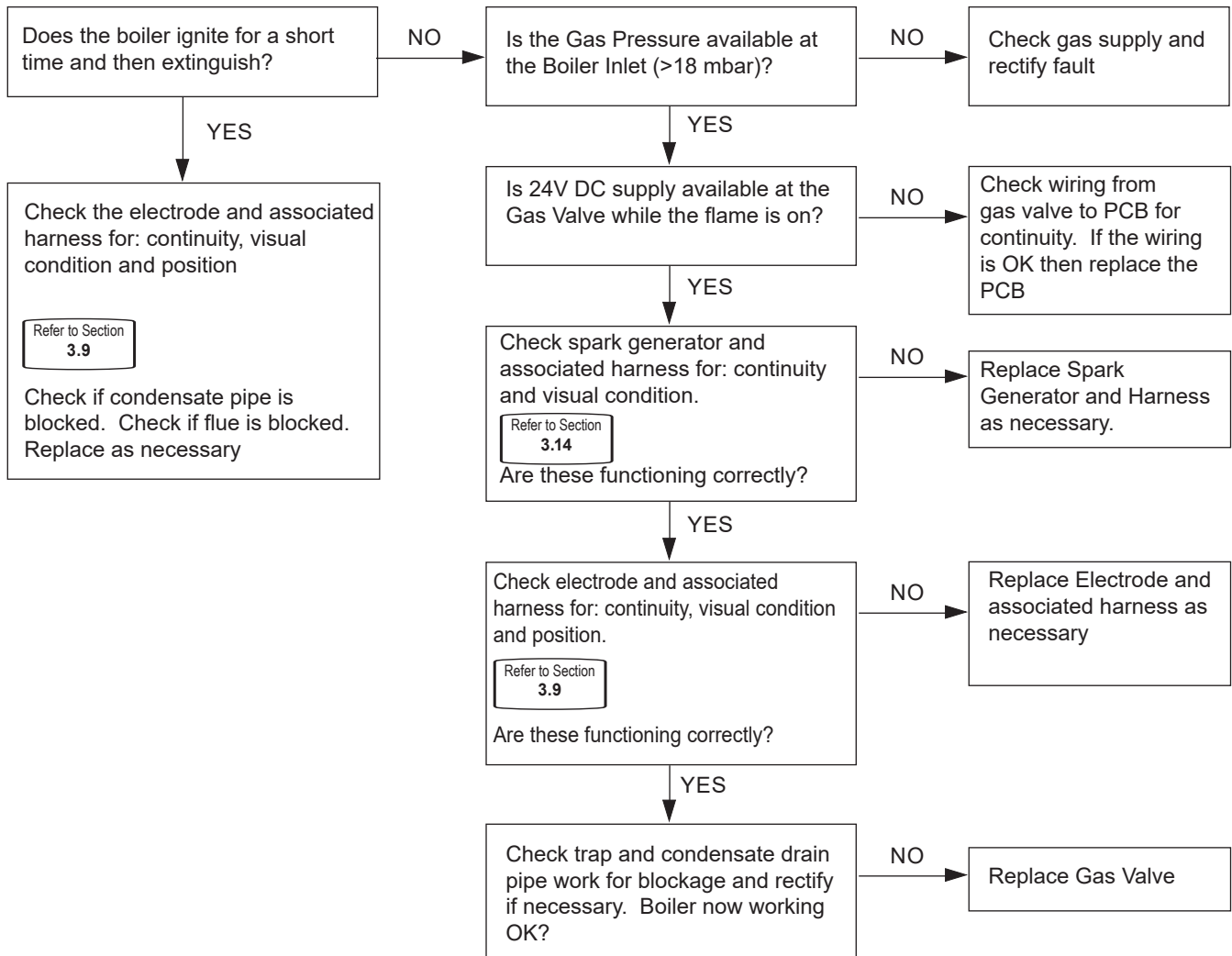
4.4 FLAME ON BEFORE GAS VALVE ON



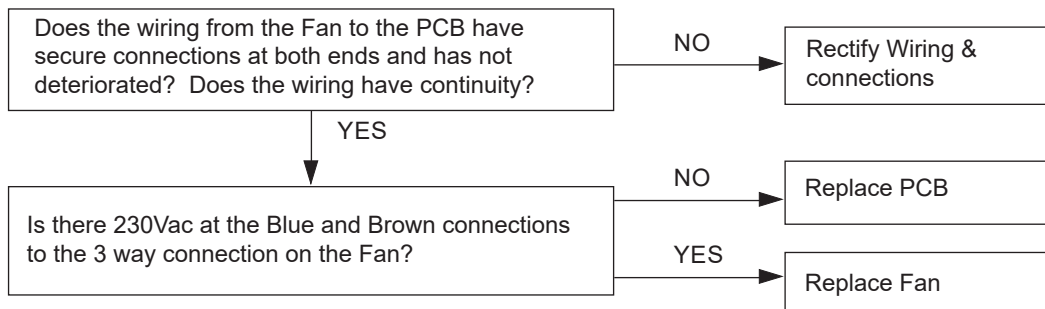
4.5 LOW WATER PRESSURE



4.6 FLAME LOSS

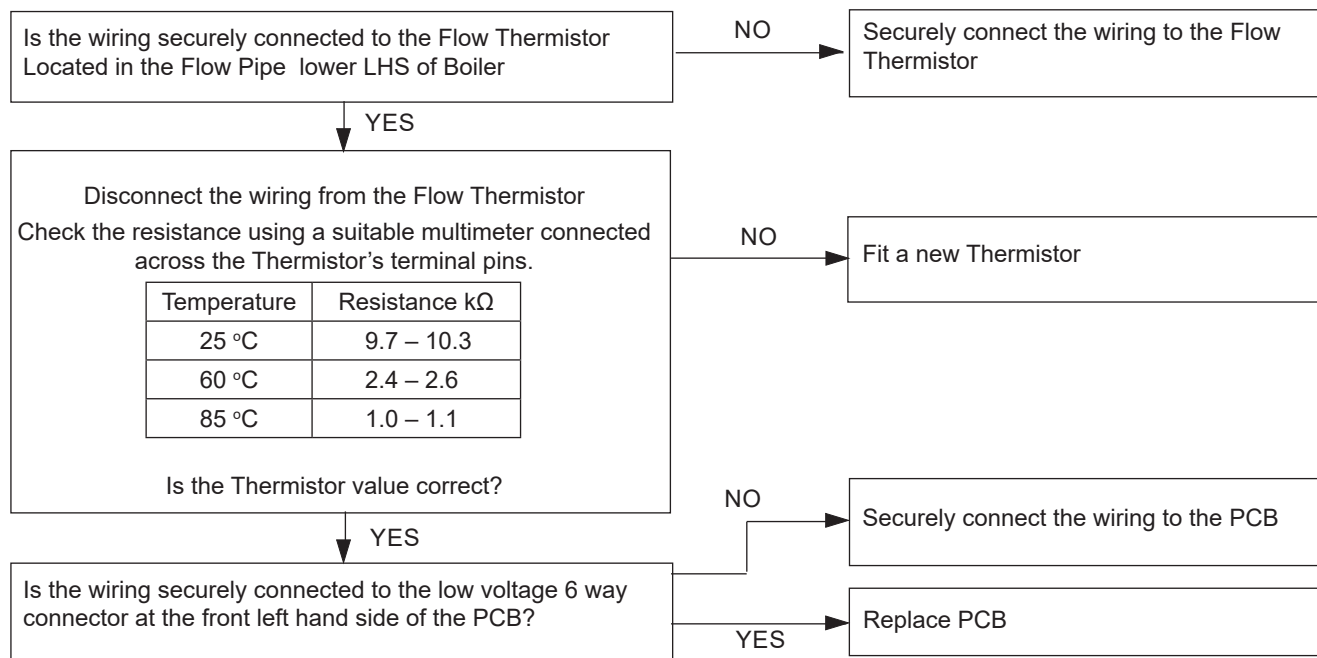


4.7 FAN FAULT

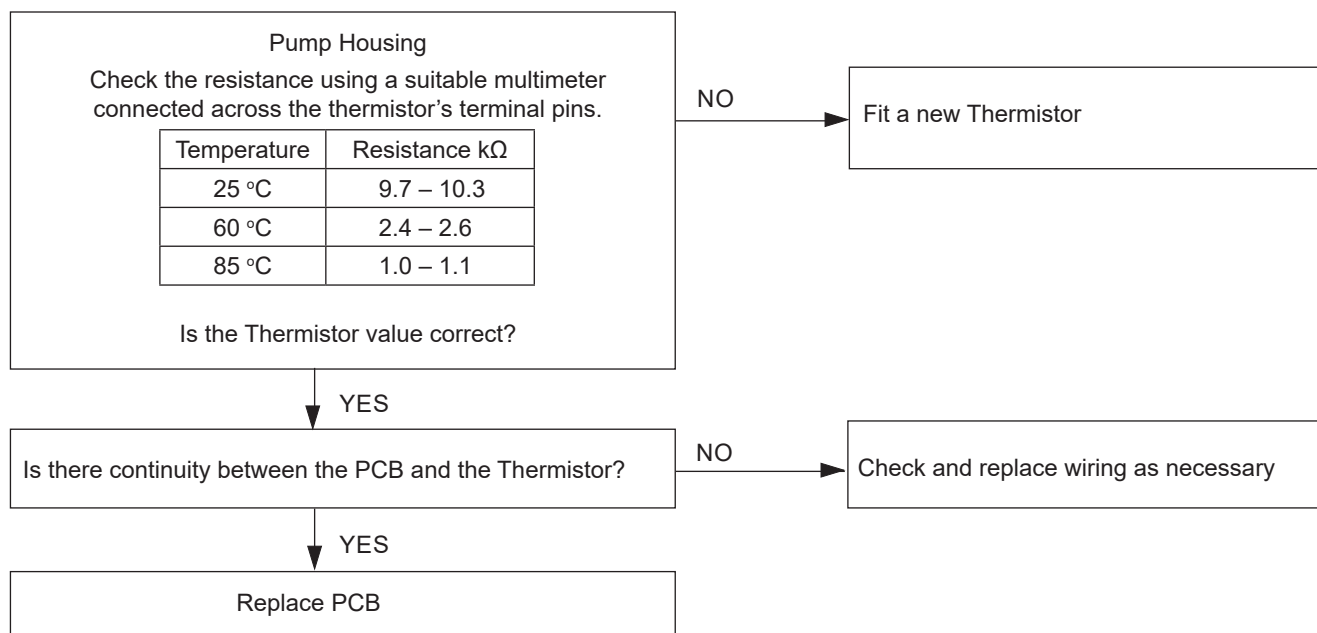


continued.....

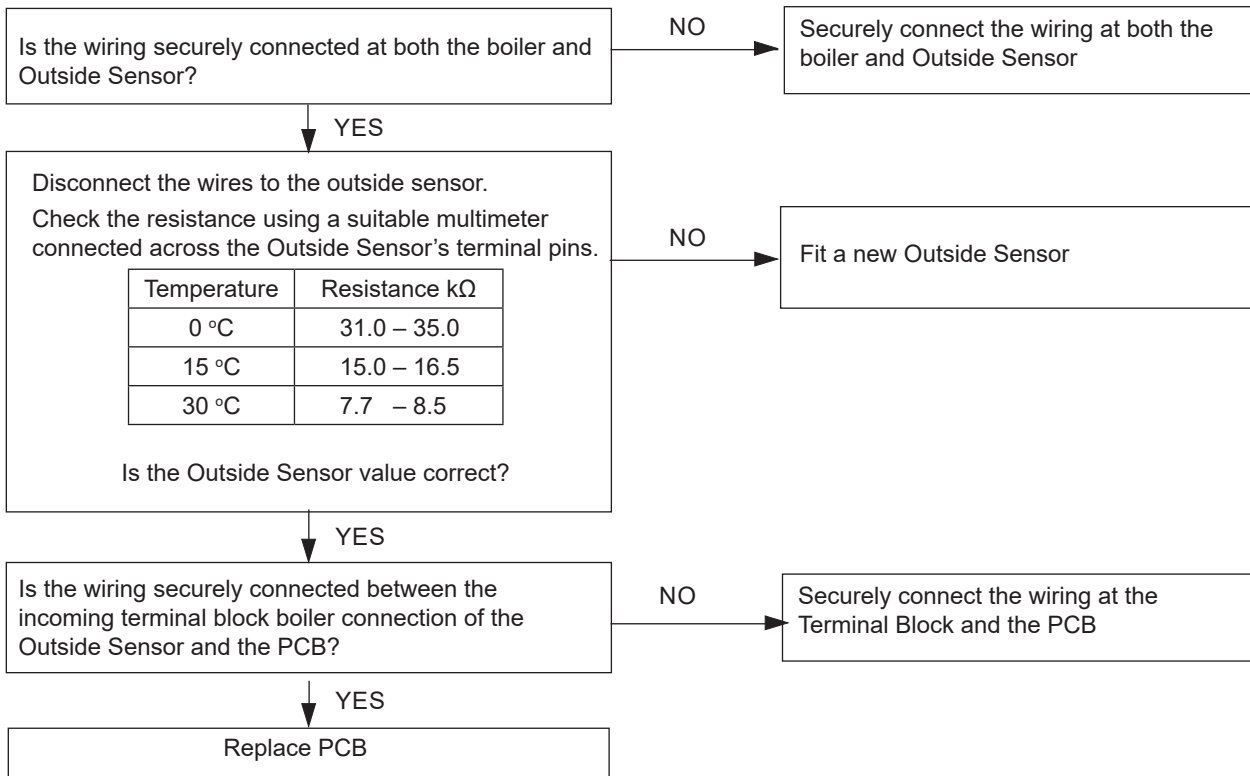
4.8 FLOW THERMISTOR FAULT



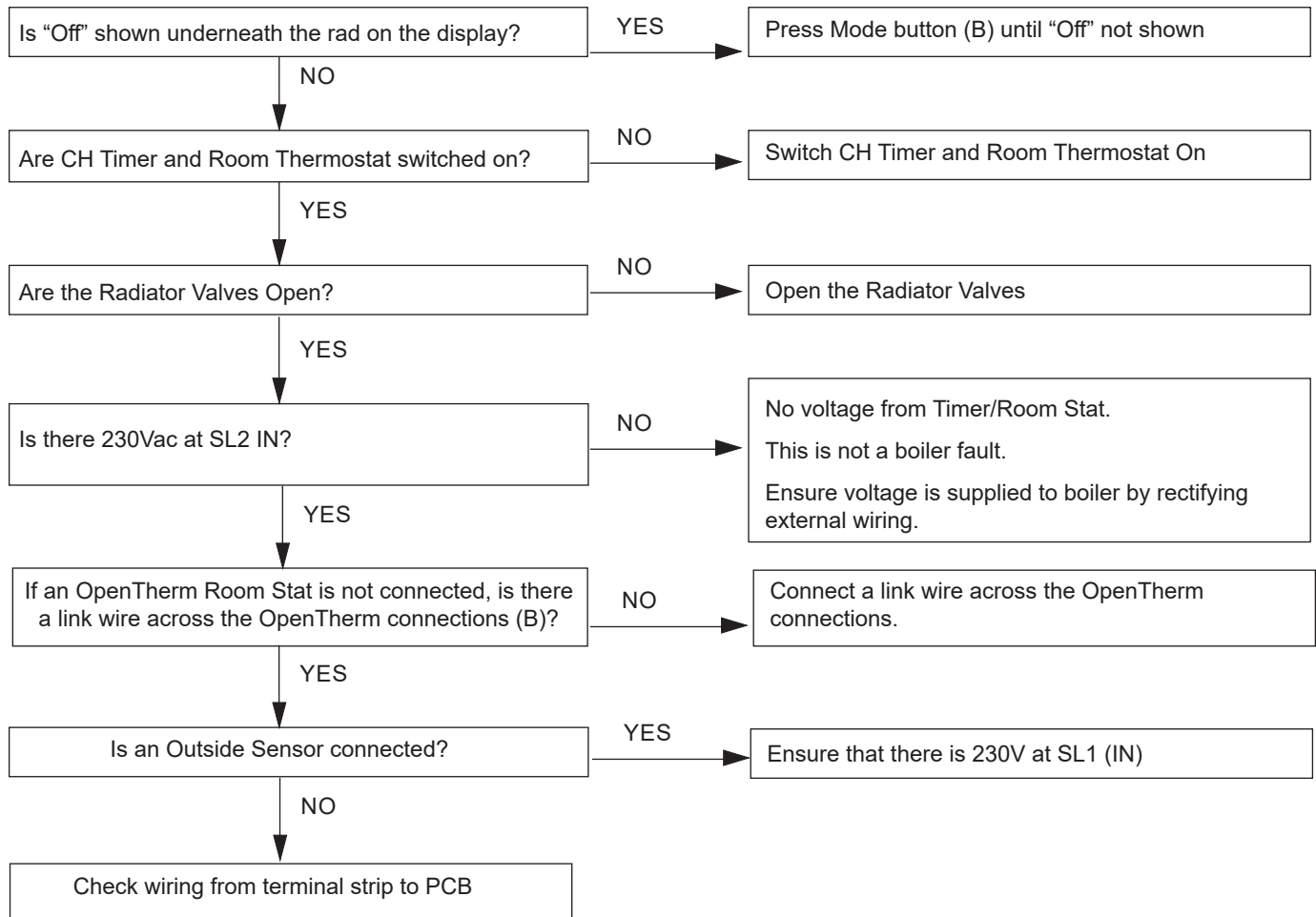
4.9 RETURN THERMISTOR FAULT



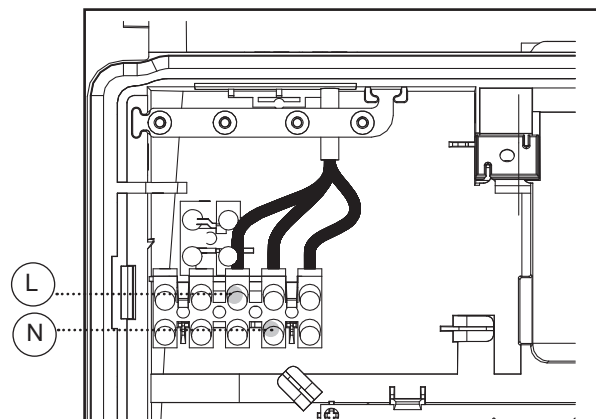
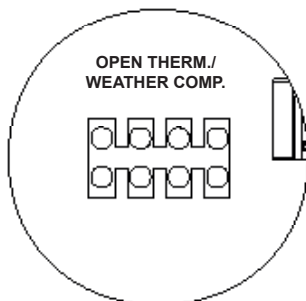
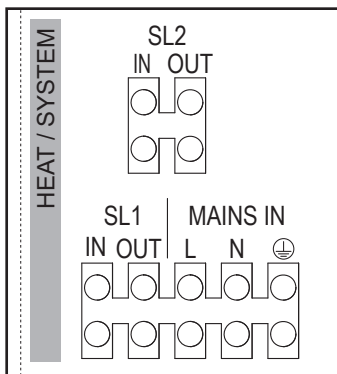
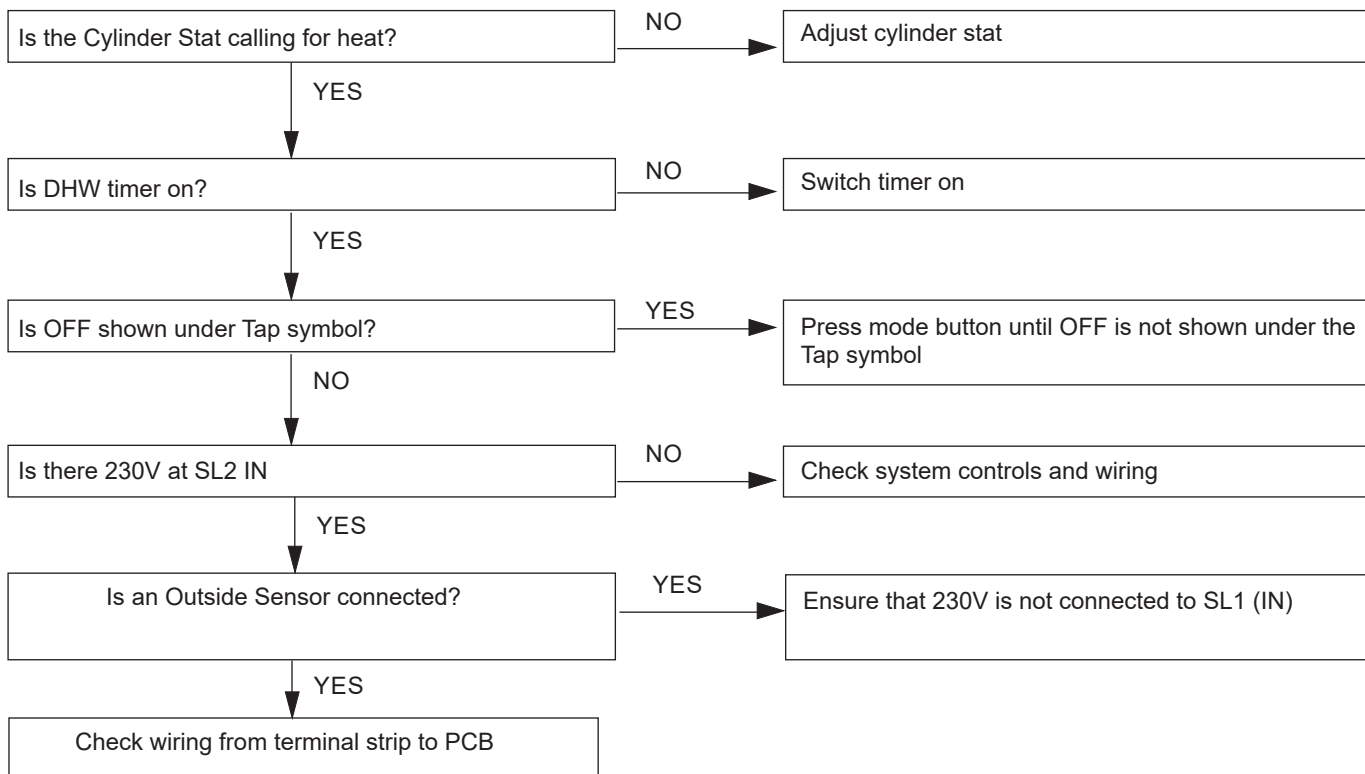
4.10 OUTSIDE SENSOR FAULT



4.11 NO CH OPERATION

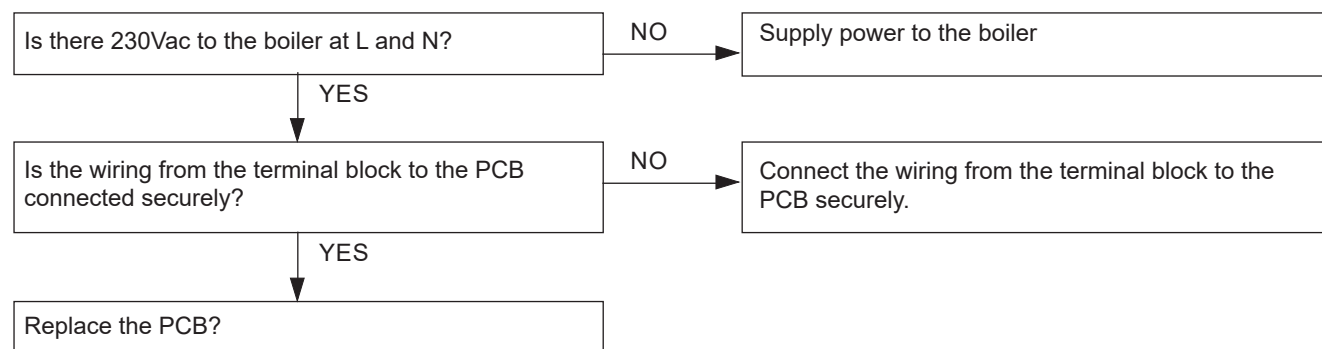


4.12 NO DHW OPERATION



FAULT FINDING

4.13 NO DISPLAY



Section 5 - Spare Parts

When replacing any part on this appliance use only spare parts that you can be assured conform to the safety and performance specification that we require. DO NOT use reconditioned or copy parts that have not been clearly authorised by Keston.

Failure to do so could affect safety or performance of this appliance.

Comprehensive spares parts information and details of approved Keston Parts Distributors are available on **idealparts.com**



Our Parts team are also available to help with your Keston Spare Parts enquiries on 01482 498665.

When calling, and to ensure we can provide you with the most accurate parts information, please ensure you have the following to hand;

- Boiler Model
- Appliance GC Number
- Boiler Serial Number

Code Of Practice

For the installation, commissioning and servicing of domestic heating and hot water products

Benchmark places responsibilities on both manufacturers and installers.* The purpose is to ensure that customers** are provided with the correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by competent persons and that it meets the requirements of the appropriate Building Regulations. Installers are required to carry out work in accordance with the following:

Standards of Work

- Be competent and qualified to undertake the work required.
- Install, commission, service and use products in accordance with the manufacturer's instructions provided.
- Ensure that where there is responsibility for design work, the installation is correctly sized and fit for purpose.
- Meet the requirements of the appropriate Building Regulations. Where this involves notifiable work be a member of a Competent Persons Scheme or confirm that the customer has notified Local Authority Building Control (LABC), prior to work commencing.
- Complete all relevant sections of the Benchmark Checklist/Service Record when carrying out commissioning or servicing of a product or system.
- Ensure that the product or system is left in a safe condition and, whenever possible, in good working order.
- Highlight to the customer any remedial or improvement work identified during the course of commissioning or servicing work.
- Refer to the manufacturer's helpline where assistance is needed.
- Report product faults and concerns to the manufacturer in a timely manner.

Customer Service

- Show the customer any identity card that is relevant to the work being carried out prior to commencement or on request.
- Give a full and clear explanation/demonstration of the product or system and its operation to the customer.
- Hand over the manufacturer's instructions, including the Benchmark Checklist, to the customer on completion of an installation.
- Obtain the customer's signature, on the Benchmark Checklist, to confirm satisfactory demonstration and receipt of manufacturer's instructions.
- Advise the customer that regular product servicing is needed, in line with manufacturers' recommendations, to ensure that safety and efficiency is maintained.
- Respond promptly to calls from a customer following completion of work, providing advice and assistance by phone and, if necessary, visiting the customer.
- Rectify any installation problems at no cost to the customer during the installer's guarantee period.



*The use of the word "installer" is not limited to installation itself and covers those carrying out installation, commissioning and/or servicing of heating and hot water products, or the use of supporting products (such as water treatment or test equipment).

**Customer includes householders, landlords and tenants.

Benchmark Commissioning & Warranty Validation Service Record

It is a requirement that the boiler is installed and commissioned to the manufacturers' instructions and the data fields on the commissioning checklist completed in full.

To instigate the boiler warranty the boiler needs to be registered with the manufacturer within one month of the installation. The warranty rests with the end-user (consumer), and they should be made aware it is ultimately their responsibility to register with the manufacturer, within the allotted time period.

It is essential that the boiler is serviced in line with the manufacturers' recommendations, at least annually. This must be carried out by a competent Gas Safe registered engineer. The service details should be recorded on the Benchmark Service and Interim Boiler Work Record and left with the householder. Failure to comply with the manufacturers' servicing instructions and requirements will invalidate the warranty.



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This Commissioning Checklist is to be completed in full by the competent person who commissioned the boiler as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission according to the manufacturers' instructions and complete this Benchmark Commissioning Checklist will invalidate the warranty. This does not affect the customer's statutory rights.

* All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

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Section 6 - Benchmark to Commissioning

GAS BOILER SYSTEM COMMISSIONING CHECKLIST & WARRANTY VALIDATION RECORD

Address:													
Boiler make and model:													
Boiler serial number:													
Commissioned by (PRINT NAME):						Gas Safe registration number:							
Company name:						Telephone number:							
Company email:						Company address:							
										Commissioning date:			
Heating and hot water system complies with the appropriate Building Regulations?											Yes		
Optional: Building Regulations Notification Number (if applicable):													
Time, temperature control and boiler interlock provided for central heating and hot water											Yes		
Boiler Plus requirements (tick the appropriate box(s))													
Boiler Plus option chosen for combination boiler in ENGLAND						Weather compensation		Smart thermostat with automisation and optimisation					
						Load compensation		Flue Gas Heat Recovery					
Time and temperature control to hot water			Cylinder thermostat and programmer/timer				Combination boiler						
Zone valves			pre-existing		Fitted		Not required						
Thermostatic radiator valves			pre-existing		Fitted		Not required						
Automatic bypass to system			pre-existing		Fitted		Not required						
Underfloor heating			pre-existing		Fitted		Not required						
Water quality													
The system has been flushed, cleaned and a suitable inhibitor applied upon final fill, in accordance with BS7593 and boiler manufacturers' instructions											Yes		
What system cleaner was used?						Brand:			Product:				
What inhibitor was used?						Brand:			Product:				
Primary water system filter			pre-existing		Fitted		Not required						
CENTRAL HEATING MODE measure and record (as appropriate)													
Gas rate (for combination boilers complete DHW mode gas rate)						m ³ /hr		or		ft ³ /hr			
Central heating output left at factory settings?						Yes				No			
If no, what is the maximum central heating output selected?												kW	
Dynamic gas inlet pressure												mbar	
Central heating flow temperature												°C	
Central heating return temperature												°C	
System correctly balanced/rebalanced?						Yes							
COMBINATION BOILERS ONLY													
Is the installation in a hard water area (above 200ppm)?						Yes				No			
Water scale reducer/softener			pre-existing		Fitted		Not required						
What type of scale reducer/softener has been fitted?						Brand:			Product:				
Water meter fitted?						Yes				No			
If yes- DHW expansion vessel			pre-existing		Fitted		Not required						
Pressure reducing valve			pre-existing		Fitted		Not required						
DOMESTIC HOT WATER MODE Measure and record													
Gas rate						m ³ /hr		or		ft ³ /hr			
Dynamic gas inlet pressure at maximum rate												mbar	
Cold water inlet temperature												°C	
Hot water has been checked at all outlets						Yes		Temperature		°C			
CONDENSATE DISPOSAL													
The condensate drain has been installed in accordance with the manufacturers' instructions and/or BS5546/BS6798											Yes		
Point of termination						Internal				External (only where internal termination impractical)			
Method of disposal						Gravity				Pumped			
ALL INSTALLATIONS													
Record the following		At max rate:		CO ppm		CO ₂ %		CO/CO ₂		Ratio			
		At min rate (where possible)		CO ppm		CO ₂ %		CO/CO ₂		Ratio			
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?											Yes		
The operation of the boiler and system controls have been demonstrated to and understood by the customer											Yes		
The manufacturers' literature, including Benchmark Checklist and Service Record, has been explained and left with the customer											Yes		
Commissioning Engineer's signature													
Customer's signature (To confirm satisfactory demonstration and receipt of manufacturers' literature)													

* All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

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Section 6 - Benchmark to Commissioning

SERVICE & INTERIM BOILER WORK RECORD

It is recommended that your boiler and heating system are regularly serviced and maintained, in line with manufacturers' instructions, and that the appropriate service / interim work record is completed.

Service provider

When completing a service record (as below), please ensure you have carried out the service as described in the manufacturers' instructions. Always use the manufacturers' specified spare parts.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>					Date:	
Engineer name:		Company name:				
Telephone N°:		Gas Safe registration N°:				
Max rate	CO	ppm	CO ₂	%	CO/CO ₂	
Min rate	CO	ppm	CO ₂	%	CO/CO ₂	
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?*					yes	
Gas rate:	m ³ /h	OR	ft ³ /h			
Were parts fitted? <small>delete as appropriate</small>		Yes	No			
Parts fitted:						
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes	n/a
Comments:						
Signature:						

*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>					Date:	
Engineer name:		Company name:				
Telephone N°:		Gas Safe registration N°:				
Max rate	CO	ppm	CO ₂	%	CO/CO ₂	
Min rate	CO	ppm	CO ₂	%	CO/CO ₂	
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?*					yes	
Gas rate:	m ³ /h	OR	ft ³ /h			
Were parts fitted? <small>delete as appropriate</small>		Yes	No			
Parts fitted:						
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes	n/a
Comments:						
Signature:						

*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>					Date:	
Engineer name:		Company name:				
Telephone N°:		Gas Safe registration N°:				
Max rate	CO	ppm	CO ₂	%	CO/CO ₂	
Min rate	CO	ppm	CO ₂	%	CO/CO ₂	
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?*					yes	
Gas rate:	m ³ /h	OR	ft ³ /h			
Were parts fitted? <small>delete as appropriate</small>		Yes	No			
Parts fitted:						
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes	n/a
Comments:						
Signature:						

*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>					Date:	
Engineer name:		Company name:				
Telephone N°:		Gas Safe registration N°:				
Max rate	CO	ppm	CO ₂	%	CO/CO ₂	
Min rate	CO	ppm	CO ₂	%	CO/CO ₂	
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?*					yes	
Gas rate:	m ³ /h	OR	ft ³ /h			
Were parts fitted? <small>delete as appropriate</small>		Yes	No			
Parts fitted:						
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes	n/a
Comments:						
Signature:						

*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>					Date:	
Engineer name:		Company name:				
Telephone N°:		Gas Safe registration N°:				
Max rate	CO	ppm	CO ₂	%	CO/CO ₂	
Min rate	CO	ppm	CO ₂	%	CO/CO ₂	
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?*					yes	
Gas rate:	m ³ /h	OR	ft ³ /h			
Were parts fitted? <small>delete as appropriate</small>		Yes	No			
Parts fitted:						
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes	n/a
Comments:						
Signature:						

*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>					Date:	
Engineer name:		Company name:				
Telephone N°:		Gas Safe registration N°:				
Max rate	CO	ppm	CO ₂	%	CO/CO ₂	
Min rate	CO	ppm	CO ₂	%	CO/CO ₂	
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?*					yes	
Gas rate:	m ³ /h	OR	ft ³ /h			
Were parts fitted? <small>delete as appropriate</small>		Yes	No			
Parts fitted:						
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes	n/a
Comments:						
Signature:						

*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

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Section 6 - Benchmark to Commissioning

FLOWCHART FOR CO LEVEL AND COMBUSTION RATIO CHECK ON COMMISSIONING A CONDENSING BOILER

Important Preliminary Information on Checks

The air gas ratio valve is factory-set and must not be adjusted DURING COMMISSIONING.

If the boiler requires conversion to operate with a different gas family (e.g. conversion from natural gas to LPG) separate guidance is provided with the conversion kit supplied and this must be followed.

PRIOR TO CO LEVEL AND COMBUSTION RATIO CHECK

The installation instructions must have been followed, gas type verified and gas supply pressure / gas rate checked as required prior to commissioning.

As part of the installation process, ESPECIALLY WHERE A FLUE HAS BEEN FITTED BY PERSONS OTHER THAN THE BOILER INSTALLER, visually check the integrity of the whole flue system to confirm that all components are correctly assembled, fixed and supported. Check that maximum flue lengths have not been exceeded and all guidance has been followed (e.g. Gas Safe Register Technical Bulletin (TB) 008 where chimney/flues are in voids).

The ECGA should be of the correct type, as specified by BS EN 50379-3:2012.

Prior to its use, the ECGA should have been maintained and calibrated as specified by the manufacturer. The installer must have the relevant competence for use of the analyser.

Check and zero the analyser IN FRESH AIR in accordance with the analyser manufacturer's instructions.

KEY:

CO = carbon monoxide

CO₂ = carbon dioxide

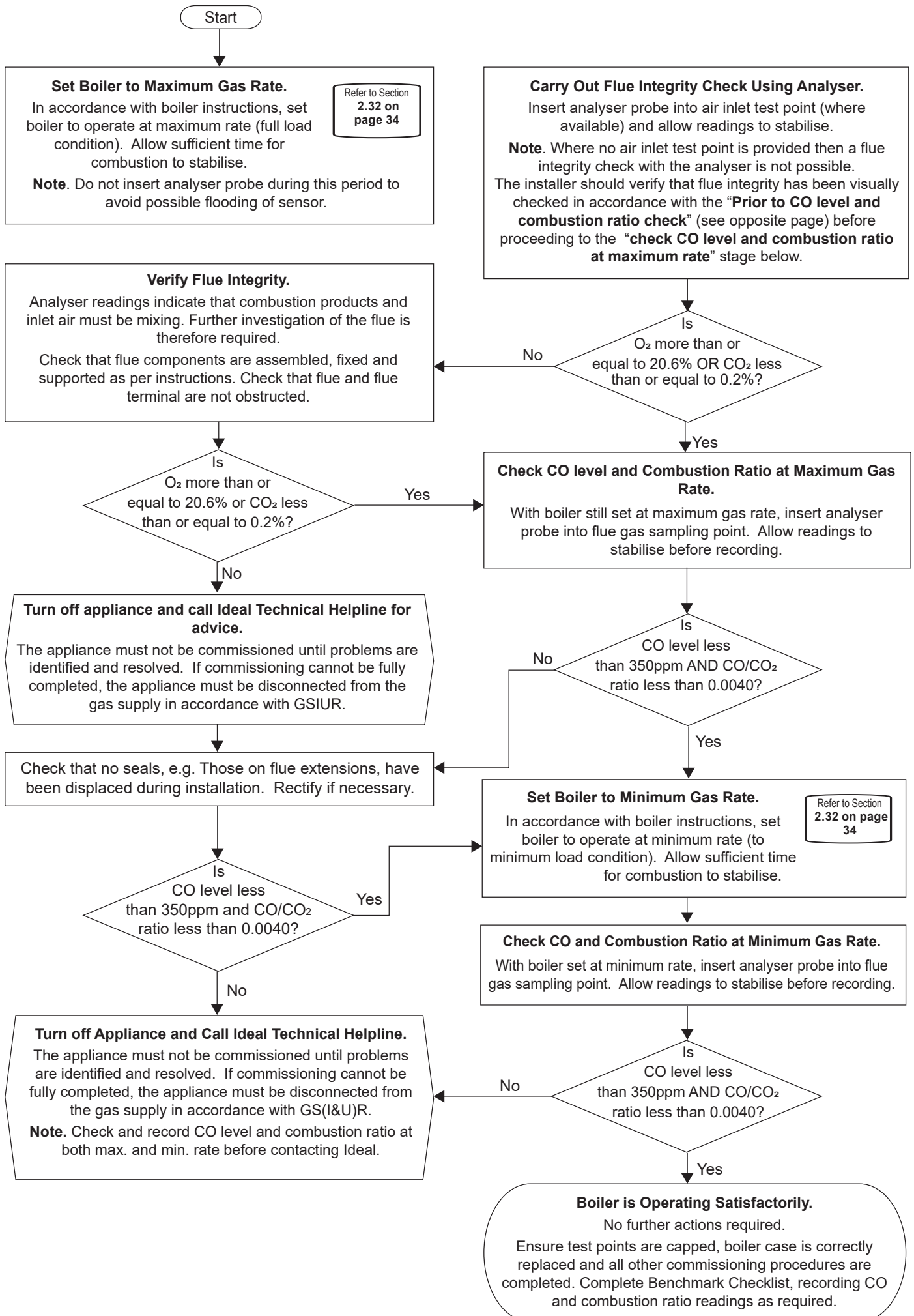
O₂ = oxygen

Combustion Ratio = The CO reading measured in ppm divided by the CO₂ reading first converted to ppm

ppm = parts per million

GS(I&U)R = Gas Safety (Installation and Use) Regulations

Section 6 - Benchmark to Commissioning



Notes

Notes



At Keston we take our environmental impact seriously, therefore when installing any Keston by Ideal Heating product please make sure to dispose of any previous appliance in an environmentally conscious manner. Households can contact their local authority to find out how. See <https://www.gov.uk/managing-your-waste-an-overview> for guidance on how to efficiently recycle your business waste.

Technical Training

Our Expert Academy offer a range of training options designed and delivered by our experts in heating. For details please visit: expert-academy.co.uk

Ideal Boilers Ltd., pursues a policy of continuing improvement in the design and performance of its products. The right is therefore reserved to vary specification without notice.

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