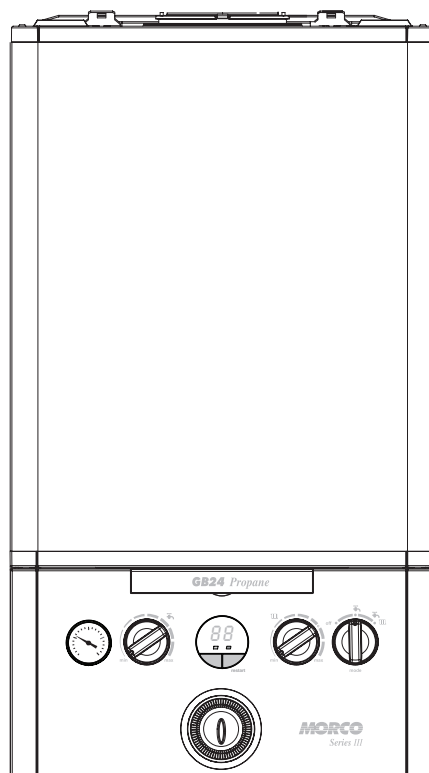


GB24 & GB30

Series III

Propane

Technical Instructions



BOILER OUTPUT

To Domestic Hot Water:

GB24-Propane Minimum 4.9 kW (16,600 Btu/h)
GB30-Propane Minimum 6.1 kW (20,700 Btu/h)
GB24-Propane Maximum 24.2 kW (82,570 Btu/h)
GB30-Propane Maximum 30.3 kW (103,384 Btu/h)

To Central Heating:

GB24-Propane Minimum 4.9kW (16,600 Btu/h)
GB30-Propane Minimum 6.1 kW (20,700 Btu/h)
GB24-Propane Maximum 17.2 kW (58,728 Btu/h)
GB30-Propane Maximum 20.4 kW (69,607 Btu/h)



MORCO

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Morco GB24 & GB30 *Series III*

Combination Boiler

Destination Country:

BE = Belgium
CH = Switzerland
CZ = Czech Republic
DE = Germany
ES = Spain
FR = France
GB = UK
GR = Greece
IE = Ireland
IT = Italy
NL = Netherlands
PL = Poland
PT = Portugal
SI = Slovenia

CONTENTS

SECTION.....	PAGE	SECTION.....	PAGE
1 GENERAL.....	5	3.24 Diverter Valve Body Assembly Replacement	29
1.1 Introduction.....	5	3.25 DHW Plate Heat Exchanger Replacement.....	30
1.2 Operation.....	5	3.26 Pump Head Replacement	30
1.3 Safe Handling.....	5	3.27 CH Water Pressure Switch Replacement	30
1.4 Optional Extra Kits.....	5	3.28 DHW Filter & DHW Flow Regulator	
1.5 Safety	6	Cleaning/Replacement	31
1.6 Safe Handling of Substances	6	3.29 Flow Thermistor Replacement	31
1.7 Boiler Dimensions, Services & Clearances	7	3.30 Return Thermistor Replacement	31
1.8 Boiler Assembly - Exploded View	8	3.31 Heat Engine Replacement	32
2 INSTALLATION.....	9	3.32 Expansion Vessel Recharging & Replacement	33
2.1 Determining the Flue Length	9	3.33 Boiler Sealing Panel Seal Replacement	33
2.2 Determining the Flue Length	10		
2.3 Cutting Horizontal Flue Terminal		4 FAULT FINDING	34
RSF303 (600MM Long)	10	4.1 Operation Modes.....	34
2.4 Installing the Flue	11	4.2 Service Mode.....	34
2.5 Flue Extensions RSF341 (Optional)	12	4.3 Fault Codes	36
2.6 Flue Deflector Kit RSF300 (Optional).....	12	4.4 Fault Finding Chart Main Menu	37
2.7 90° KIT RSF315 (Optional).....	12	4.5 'L1' - Flow Temperature Overheat Lockout.....	38
2.8 Fitting the Optional Roof Flue Kit		4.6 'L2' - Ignition Lockout.....	38
RSF345 (Optional) - Flat or Pitched-.....	13	4.7 Alternating 'L' and '5' - 5 Resets Within 15 mins.....	39
2.9 Assembling the Roof Flue Kit	13	4.8 'L6' - False Flame Lockout	39
2.10 Condensate Drain.....	14	4.9 'F1' - Low Water Pressure	39
2.11 Wiring Diagram.....	16	4.10 'F2 OR Fn OR Ln' - Flame Loss	40
		4.11 'F3' - Fan Fault	40
3 SERVICING.....	17	4.12 'F4 OR L4' - Flow Thermistor Fault.....	41
3.1 Servicing Schedule.....	17	4.13 'F5 OR L5' - Return Thermistor Fault	41
3.2 Boiler Upper & Lower Front Panel		4.14 'F6' - Outside Sensor Fault.....	42
Removal / Replacement	18	4.15 No CH Operation but HW Works OK.....	42
3.3 Fan & Venturi Assembly Removal and Cleaning.....	18	4.16 No HW but CH On.....	43
3.4 Burner Removal & Cleaning	19	4.17 No Display	43
3.5 Cleaning The Condensate Trap/Siphon	19		
3.6 Cleaning The Heat Exchanger	20		
3.7 Reassembly.....	20		
3.8 Replacement Of Components	21		
3.9 Fan Replacement	21		
3.10 Burner Injector Replacement	22		
3.11 Burner Replacement.....	22		
3.12 Ignition/Flame Electrode Replacement.....	23		
3.13 Spark Generator Replacement.....	23		
3.14 Gas Control Valve Replacement	24		
3.15 Diverter Valve Actuator Replacement	24		
3.16 Condensate Trap/Siphon Replacement	25		
3.17 Main PCB Replacement	26		
3.18 Replacing The Mechanical Timer	27		
3.19 Draining The Boiler.....	27		
3.20 DHW Flow Turbine Replacement	27		
3.21 Pressure Gauge Replacement	28		
3.22 Safety Relief Valve Renewal	28		
3.23 Pump Automatic Air Vent Replacement	29		

SECTION 1 - GENERAL

Table 1 - General Data

Morco GB Series III			24	30
Gas Supply			II _{2H3P} - G31 - 37mbar (I _{3P} - G31 - 30mbar DE)	
Gas Supply Connection			15mm copper compression	
Injector Size	mm		3.3	3.75
Inlet Connection	Domestic Hot Water		G ½	
Outlet Connection	Domestic Hot Water		G ½	
Flow Connection	Central Heating		G ¾	
Return Connection	Central Heating		G ¾	
Flue Terminal Diameter	mm		100	
Average Flue Temp-Mass Flow Rate	DHW		63°C - 11g/s	68°C - 13 g/s
Maximum Working Pressure (Sealed Systems)	bar (lb/in ²)		2.5 (36.3)	
Maximum Domestic Hot Water Inlet Pressure	bar (lb/in ²) (kPa)		10.0 (145) (1000)	
Minimum Domestic Hot Water Inlet Pressure*	bar (lb/in ²) (kPa)		0.8 (11.6) (80)	1.3 (18.9) (130)
Electrical Supply			230 V - 50 Hz.	
Power Consumption	W		79	79
Fuse Rating			External : 3A Internal : T4H HRC L250 V	
Water Content	Central Heating	litre (gal)	1.2 (0.26)	
Domestic Hot Water		litre (gal)	0.5 (0.11)	
Packaged Weight	kg		32.9	32.9
Maximum Installation Weight	kg		30	30
Boiler Casing Size	Height	mm	700	
	Width	mm	395	
	Depth	mm	285	

*Required for maximum flow rate. Boiler operates down to 2 l/min DHW delivery

Table 2 - Performance Data - Central Heating

		Max.		Min.	
		24	30	24	30
Boiler Input :					
Boiler Input 'Q'	Nett CV kW	17.3	20.4	4.9	6.1
	Btu/h	59030	69607	16720	20814
	Gross CV kW	18.8	22.2	5.3	6.6
	Btu/h	64148	75749	18084	22520
Gas Consumption	m³/h	0.71	0.82	0.20	0.25
	ft³/h	25.1	29.0	7.1	8.8
Boiler Output :					
Non Condensing	kW	17.2	20.4	4.9	6.1
70°C Mean Water temp.	Btu/h	58688	16720	16720	20814
Condensing	kW	18.2	21.6	5.15	6.45
40°C Mean Water temp.	Btu/h	62100	73702	17572	22008
Seasonal efficiency*	SEDBUK 2005	24kW = 91.0		30kW = 91.1	
Seasonal efficiency*	SEDBUK 2009	24kW = 88.9		30kW = 89.5	
NOx Classification		CLASS 6			

Table 3 - Performance Data - Domestic Hot Water

Maximum DHW Input :		24	30
Nett CV	kW	24.3	30.4
	Btu/h	82,912	103,725
Gross CV	kW	26.4	33
	Btu/h	90,077	112,596
Gas Consumption	m ³ /h	1.00	1.25
	ft ³ /h	35.33	44.20
	kg/h	1.83	2.26
Maximum	kW	24.2	30.3
DHW Output	Btu/h	82,570	103,384
DHW Flow Rate at 35°C temp. rise.	l/min	9.9	12.4
	gpm	2.2	2.8
DHW Specific Rate	l/min	11.5	14.5
	gpm	2.5	3.2

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

Note. Gas consumption is calculated using a calorific value of 95.65 MJ/m³ (2569 Btu/ft³) gross or 88 MJ/m³ (2360 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 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.

Key to symbols

- C₁₃ C₃₃** = 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_{3P}** = An appliance designed for use on 3rd Family gas, Group P only.
- II_{2H3P}** = Appliances capable of using gases of Group H and gases of Group P.

1 GENERAL

1.1 INTRODUCTION

The **Morco GB Series III** range of boilers are wall mounted, full sequence, automatic spark ignition, low water content, fanned flue, high efficiency, condensing, combination gas boilers.

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

Central heating (CH) output is fully modulating with a range of:

24 4.9 to 17.2kW (16720 to 58728 Btu/h)

30 6.1 to 20.4kW (20814 to 69607 Btu/h)

Instantaneous domestic hot water (DHW) output is also fully modulating with a maximum of :

24 24.2kW (82,570 Btu/h)

30 30.3kW (103,384 Btu/h)

The boiler is supplied fully assembled with DHW plate heat exchanger, diverter valve, circulating pump, pressure gauge, safety valve and CH expansion vessel.

Variable CH and DHW temperature controls are fitted on the user control.

The boiler includes as standard:

- Automatic bypass
- Daily pump and diverter valve exercise
- Mechanical 24hr timer

The boiler casing is of white painted mild steel.

The boiler temperature controls are visible 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.

1.2 OPERATION

With no demand for CH, the boiler fires only when DHW is drawn off.

When there is a demand for CH, the heating system is supplied at the selected temperature of between 30°C and 80°C, until DHW is drawn off. The full output from the boiler is then directed via the diverter valve to the plate heat exchanger to supply a nominal DHW draw-off of

24 9.9 l/min at 35 °C temperature rise.

30 12.4 l/min at 35 °C temperature rise

The DHW draw off rate specified above is the nominal that the boiler flow regulator will give. Due to system variations and seasonal temperature fluctuations DHW flow rates/temperature rise will vary, requiring adjustment at the draw off tap.

At low DHW draw-off rate the maximum temperature is limited to 65 °C by the modulating gas control.

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 EXTRA KITS

- **Horizontal Flue Terminal (RSF305)** - (900mm long)
- **Horizontal Flue Terminal (RSF303)** - (600mm long)
- **Flue Extension Ducts (RSF341)** - (980mm long)
24-up to 8m (minus any flue kit options)
30-up to 7m (minus any flue kit options)
- **Flue Deflector Kit (RSF300)**
- **Roof Flue Kit (RSF345)** (min. length 0.950m - max. length 7.5m)
- **90° Elbow Kit (RSF315)**
- **Flue Vertical Connector (RSF346)**

1.5 SAFETY

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

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

In GB, 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
- The appropriate Building Regulations either The Building Regulations, The Building Regulations (Scotland), Building Regulations (Northern Ireland).
- The Water Fittings Regulations or Water byelaws in Scotland.
- The Current I.E.E. Wiring Regulations.

The appliance must be installed so that the electrical power socket is not switchable.

If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid hazard.

Mains supply and system wiring must be through a common isolator.

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

In other countries the installation must be carried out by a qualified and competent Gas Installer. In the approved country the boiler is installed, this must be in accordance with their current rules in force.

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

BS. 5482: Part 1 2005 - Code of Practice for domestic butane and propane gas burning installations in permanent dwellings, residential park homes and commercial premises.

BSEN1949:2011+A1:2013 - Specification for the installation of LPG systems for habitation purposes leisure accommodation vehicles and in other road vehicles.

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. These appliances are CE certificated for safety and performance. It is, therefore, important that no external control devices, e.g. flue dampers, economisers etc., are directly connected to these appliances unless covered by these Installation and Servicing Instructions or as otherwise recommended by **Morco** in writing. If in doubt please enquire.

Any direct connection of a control device not approved by **Morco** could invalidate the certification and the normal appliance warranty. It could also infringe the Gas Safety Regulations and the above regulations.

1.6 SAFE HANDLING OF SUBSTANCES

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

SECTION 1 - GENERAL

1.7 BOILER DIMENSIONS, SERVICES & CLEARANCES

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

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

Side and Rear Flue

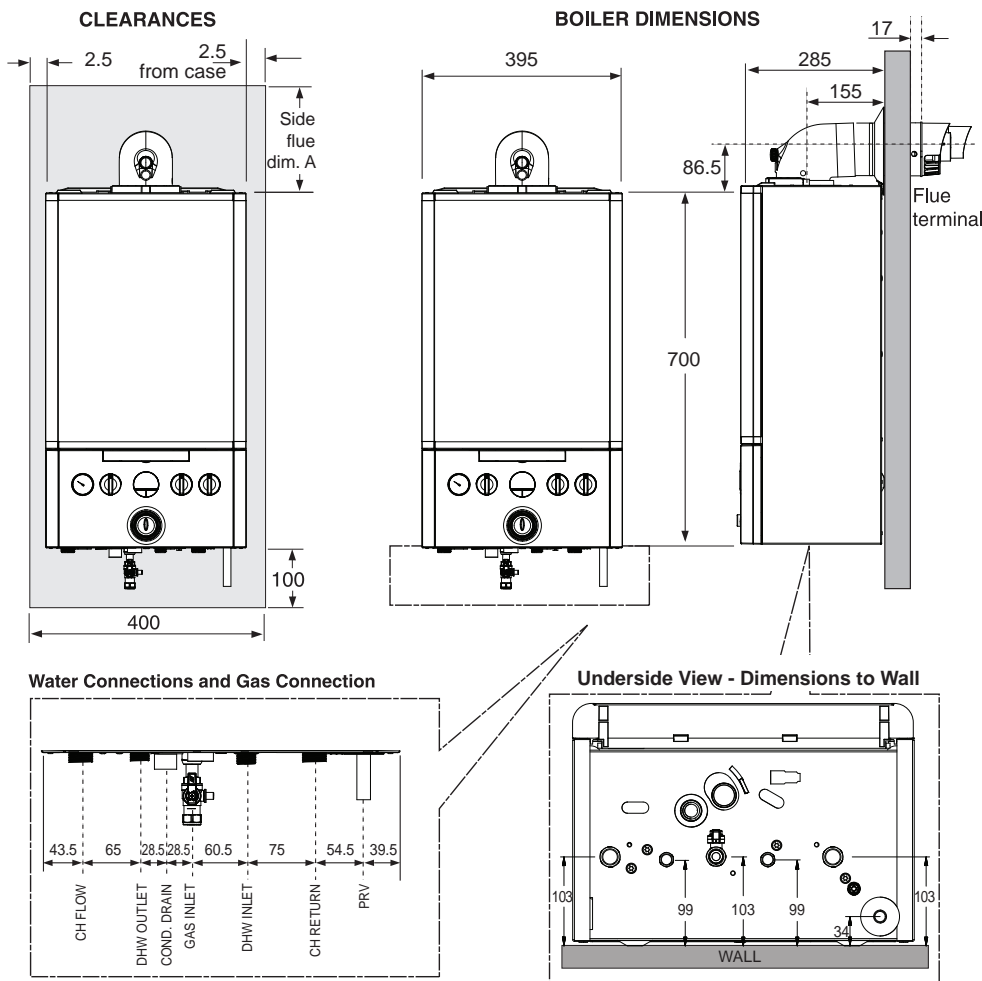
- a. Provided that the flue hole is cut accurately, e.g. with a core boring tool or hole cutter the flue can be installed from inside the dwelling where wall thicknesses do not exceed 600mm. Where the space into which the boiler is going to be installed

is less than the length of flue required the flue must be fitted from the outside.

Installation from inside ONLY

- b. If a core boring tool or hole cutter is to be used inside the dwelling the space in which the boiler is to be installed must be at least wide enough to accommodate the tool.

In either of the above cases safe external access is required to allow the addition of sealant to seal the flue to the aluminium flue collar (RSF 060).



Front clearance

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

*

Bottom clearance

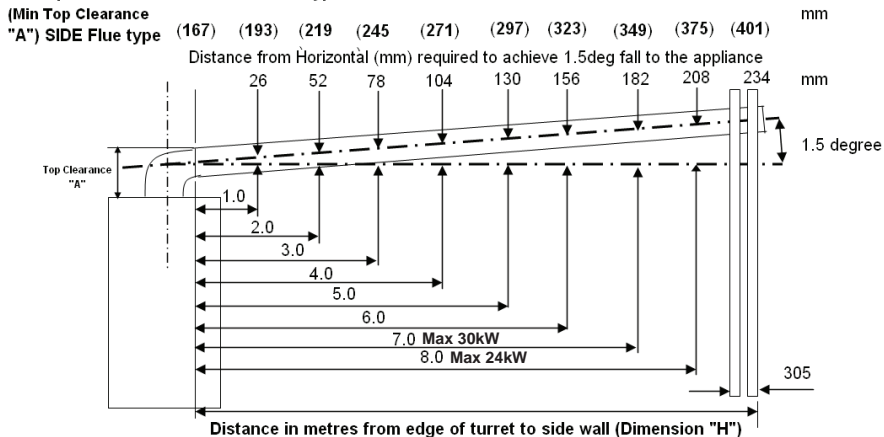
Bottom clearance after installation can be reduced to 5mm.

This must be obtained with an easily removable panel, to provide the 100mm clearance required for servicing.

Min Top Clearance "A" 165mm Rear flue type

(Min Top Clearance

"A") SIDE Flue type



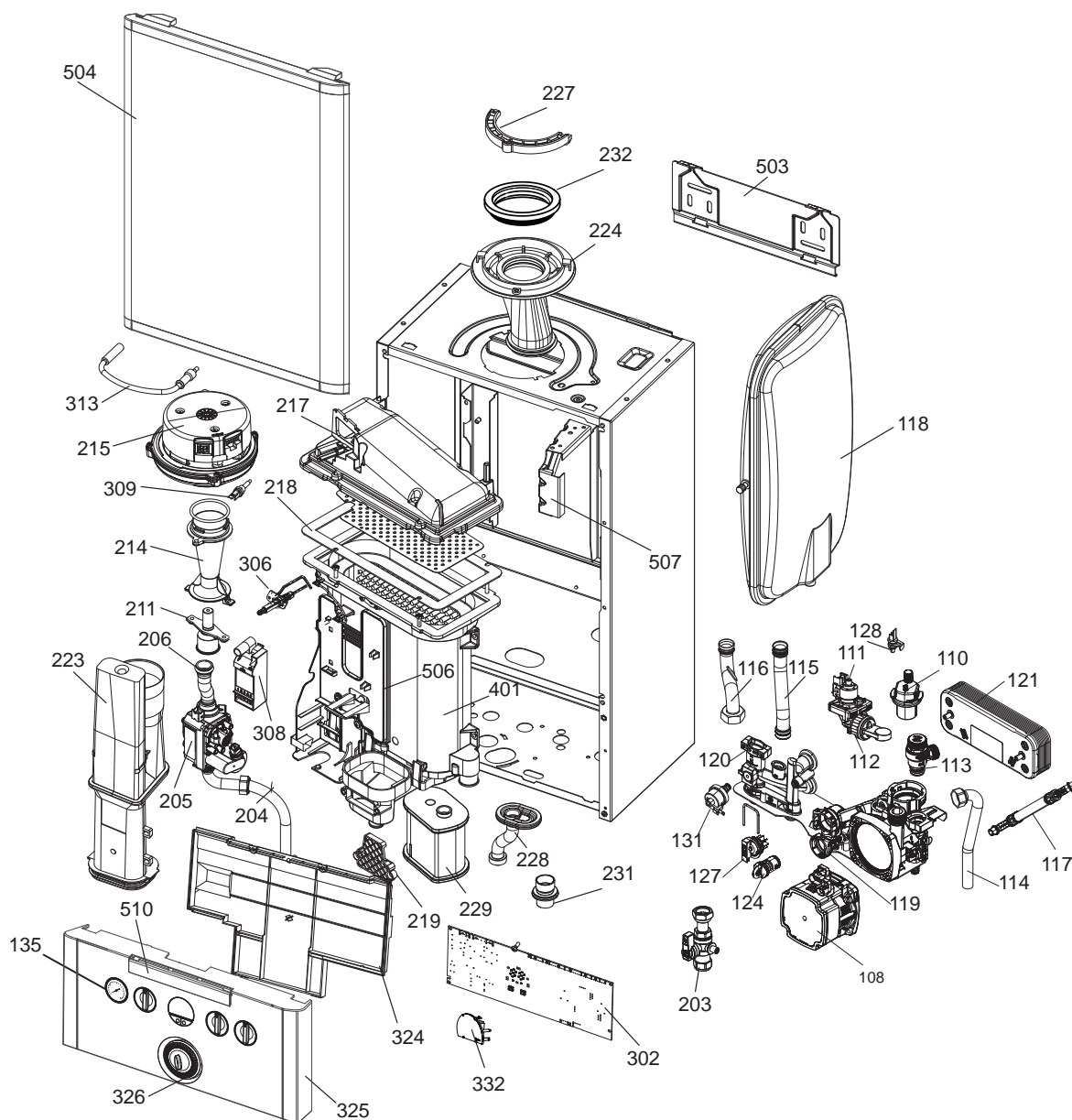
1. Dimension "H" must remain inside the Maximum flue length requirement for the designated output of the appliance been installed.
2. For flue lengths requiring "D" pack extensions (RSF 341), the flue must incline by 26mm per 1 Metre of flue length. No flue length greater that the maximum flue length shown above should be exceeded.

SECTION 1 - GENERAL

1.8 BOILER ASSEMBLY - EXPLODED VIEW

Note that item numbers are linked to the spares list

108	PUMP HEAD	135	PRESSURE GAUGE	231	CONDENSATE OUTLET CONNECTION
110	AIR VENT PUMP	203	GAS COCK	232	TOP FLUE MANIFOLD SEAL
111	DIVERTOR VALVE MOTOR	204	PIPE - GAS INLET	302	PCB
112	DIVERTOR VALVE BODY	205	GAS VALVE	306	IGNITION/FLAME IONISATION ELECTRODE
113	PRESSURE RELIEF VALVE	206	PIPE - GAS INJECTOR	308	IGNITER UNIT
114	PIPE - PRV OUTLET	211	INJECTOR ASSEMBLY	309	FLOW THERMISTOR
115	PIPE - FLOW	214	VENTURI	313	IGNITION LEAD
116	PIPE - RETURN	215	FAN	324	CONTROLS BOX LID
117	PIPE - EXPANSION VESSEL	217	BURNER	325	CONTROL BOX FRONT
118	EXPANSION VESSEL	218	GASKET - BURNER	326	MECHANICAL TIMER
119	RETURN GROUP KIT	219	SUMP CLEAN OUT COVER	332	LIGHT GUIDE
120	FLOW GROUP KIT	223	FLUE MANIFOLD	401	HEAT ENGINE
121	PLATE HEAT EXCHANGER	224	FLUE MANIFOLD TOP	503	WALL MOUNTING BRACKET
124	FLOW REGULATOR CARTRIDGE	227	CLAMP RETAINING FLUE TURRET	504	FRONT PANEL
127	FLOW SENSOR/TURBINE	228	HOSE CONDENSATE INTERNAL	506	BRACKET - GAS VALVE
128	RETURN THERMISTOR	229	SIPHON TRAP	507	BRACKET - EXPANSION VESSEL
131	WATER PRESSURE SWITCH			510	ACCESS FLAP



2 INSTALLATION

2.1 DETERMINING THE FLUE LENGTH

IMPORTANT. The boiler must be installed in a vertical position in accordance to the installation instructions.

STANDARD FLUE KITS

Horizontal Flue Terminal RSF303 (600mm long) - contains: Flue turret, non telescopic single piece flue incorporating a terminal and inner rubber wall seal.

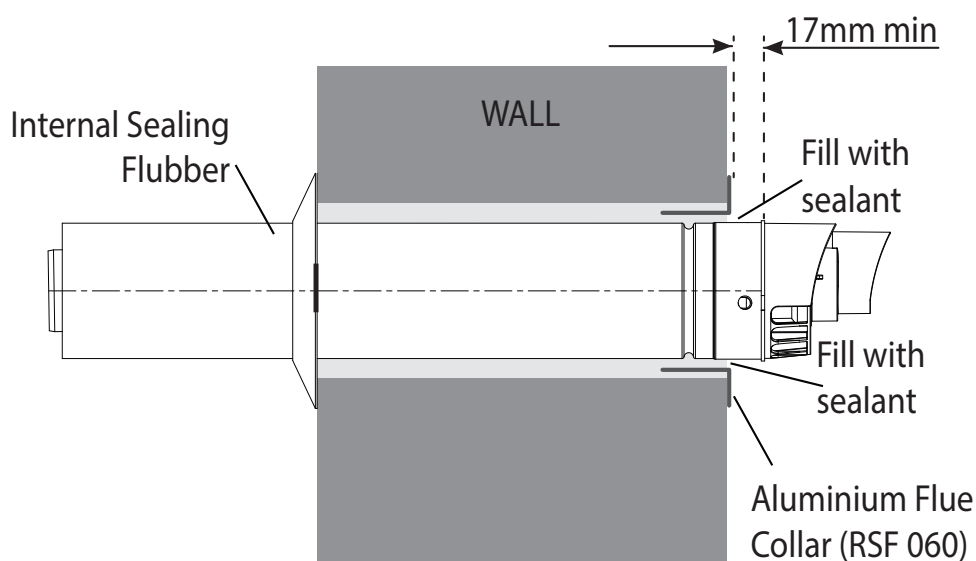
Extension Kit RSF341 - contains: 1 metre length of flue pipe (Functional length 900mm), 1 support bracket.

When extension kits are used the flue duct must incline 1.5 degrees away from the appliance, to allow the condensate to drain back to the boiler and out of the condensate drain. It is recommended that a support bracket is fitted on every 1 metre of pipe work used and the bracket is located as close to the collar as possible. The bracketing must ensure a 1.5 degree fall back to the appliance.

Only use water as a lubricant during assembly.

The horizontal flue kit terminal is classed as part of the maximum flue length.

Once the flue is installed it is IMPORTANT that the white air duct protrudes from the aluminum flue collar (RSF 060) by at least 17mm. The gap between the aluminium flue collar (RSF 060) and the white air duct MUST be sealed with sealant to create an adequate seal.



It is **IMPORTANT** that all attachments are fitted in accordance with the installation instructions provided in this manual.

The TURRET supplied in the Horizontal Flue Kits (RSF303 & RSF305) has an upper combustion sample point with a screw cap seal and a lower air sample point with an air stopper seal. Ensure all caps & seals are in place.

Additional Termination Kits available for use with these Horizontal Flue Kits (RSF303 & RSF305)

Flue Deflector Kit (RSF300)	The resistance is the equivalent of 1 metre of flue pipe and therefore must be deducted from any maximum flue length
-----------------------------	--

Total Maximum Permissible Horizontal Concentric Flue Length combining both Horizontal Flue Kits and Extension Kits (Measured from centreline of the turret to the outside face of the aluminium flue collar (RSF 060))

24 kW appliances	Total Maximum: 8 metres - minus any flue kit options
30 kW Appliances	Total Maximum: 7 metres - minus any flue kit options

Total Maximum Permissible Vertical Flue Length

24 & 30kW Appliances	Total Maximum: 7.5 Metres - minus any 90° bends
----------------------	---

Minimum Horizontal Flue Lengths (Centre line of turret to outside face of the aluminium flue collar (RSF 060))

Rear Flue - 191mm

Side Flue - 236mm (with minimum 2.5mm clearance)

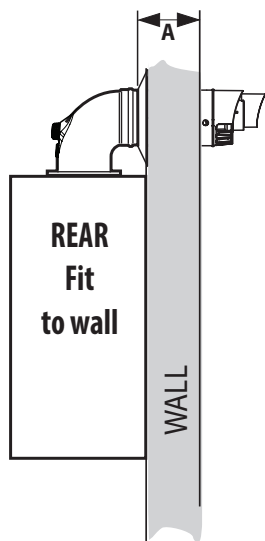
2.2 DETERMINING THE FLUE LENGTH

FIGURE 1

REAR FLUE

Cut flue length = distance from edge of turret to outside of wall dimension A + 47mm.

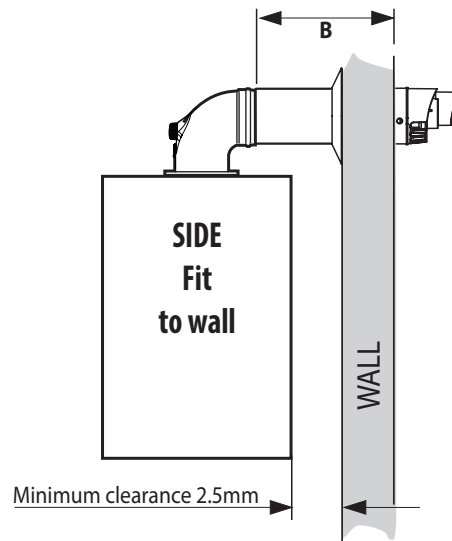
Note. Minimum dimension A which can be accommodated is 91mm.



SIDE FLUE

Cut flue length = distance from edge of turret to outside of wall dimension B + 47mm.

Note. Minimum dimension B which can be accommodated is 136mm (with minimum clearance of 2.5mm).



NOTES

Centre of turret to edge of turret = 100mm

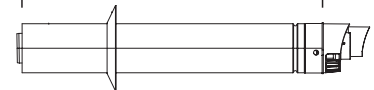
Turret has a flue insertion of 30mm

The white outer flue tube must protrude the wall by 17mm.

From centreline of turret to wall. Rear mount 155mm, side (including clearance) 200mm

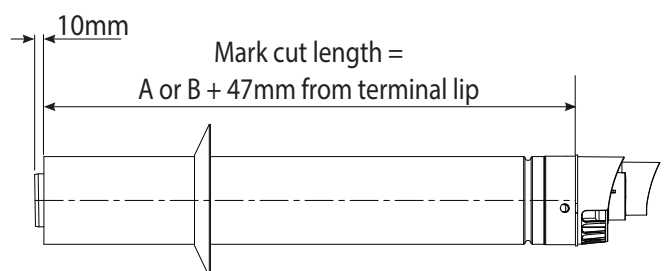
Flue length measured from outer terminal lip to end of outer flue

A or B + 47mm



2.3 CUTTING HORIZONTAL FLUE TERMINAL RSF303 (600MM LONG)

1. Measure from the outer terminal lip to end of outer flue. Mark the required cut length (A or B + 47mm) around the circumference of the outer flue and cut following the mark to ensure its cut square.
2. Dress the cut end to make sure all burr's are removed and the cut edge is in its original shape.
3. Mark the inner tube 10mm longer than the outer tube around its circumference and cut following the mark to ensure its cut square.
4. Remove all burrs and place a light chamfer on the outer edge to aid assembly.



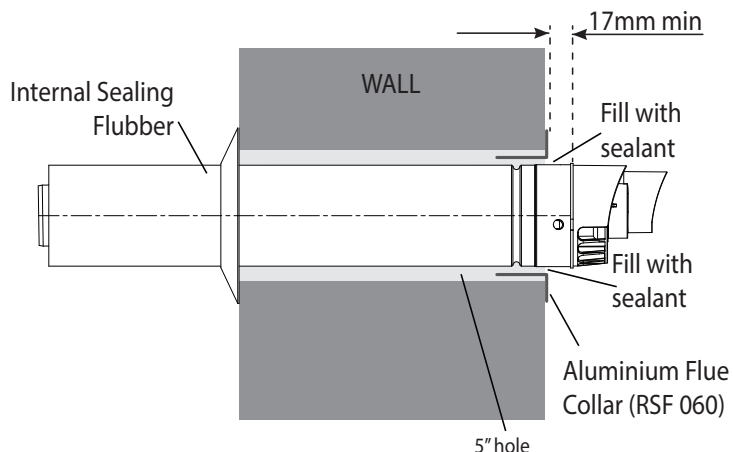
2.4 INSTALLING THE FLUE

FITTING FLUE THROUGH THE WALL

1. Ensure the seam and the outlet terminal are at the top and fitted as shown.
2. Once the flue is installed it is **IMPORTANT** that the white air duct protrudes from the aluminium flue collar (RSF 060) at least 17mm.

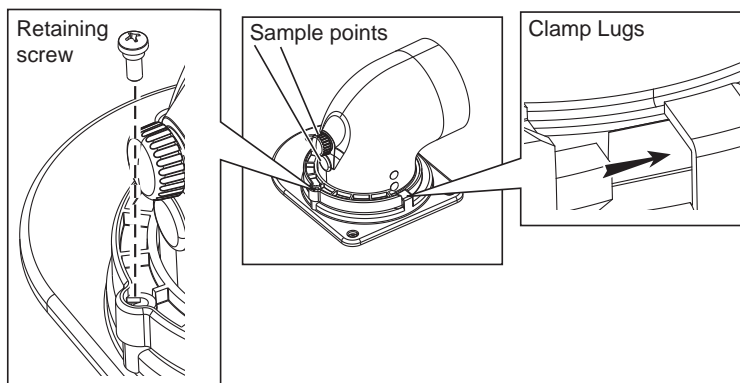
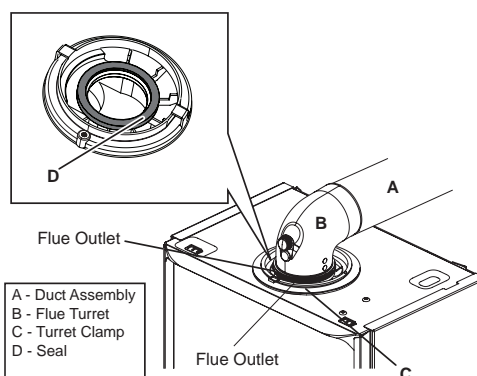
Note. If less than 50% of the length of the flue is internal the flue should be fitted from outside.

3. Fit the internal sealing flubber to the flue (leave loose) and check protrusion externally of the white air duct is 17mm.
4. Fit the turret as below



FITTING THE TURRET - Ensure the condensate trap / siphon is filled with water

1. Ensure the rubber seal is fitted correctly on the appliance manifold and that all flue seals are undamaged.
2. Hold the flue firmly and push the turret on until it has travelled 30mm on to the flue pipe and is fully engaged. Make sure the flue has not rotated or moved forward during fitting and the flue seam is upper most.
3. Push the turret into the manifold ensuring the upper plastic lip is flush with the top of the manifold.
4. Fully engage the clamp location section into the manifold location holes. Rotate down on to turret flange.
5. Secure clamp to appliance using securing screw.
6. Ensure all sample points are accessible and all sample plugs and caps are fitted.
7. Fully engage the flue into the turret and slide internal flubber to wall.
8. The gap between the aluminium flue collar (RSF 060) and the white air duct **MUST** be sealed with sealant to create a seal.



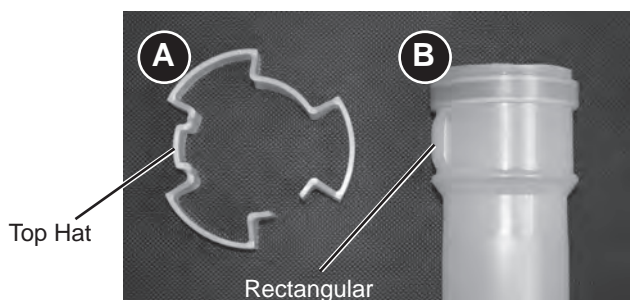
SECTION 2 - INSTALLATION

2.5 FLUE EXTENSIONS RSF341 (OPTIONAL)

For side outlet refer to section 1.2 before commencing any work.

INNER PIPE ASSEMBLY INSTRUCTIONS

1. Make sure that 'top hat' on the collar (A) fits over the rectangular form on the inner plastic pipe (B).



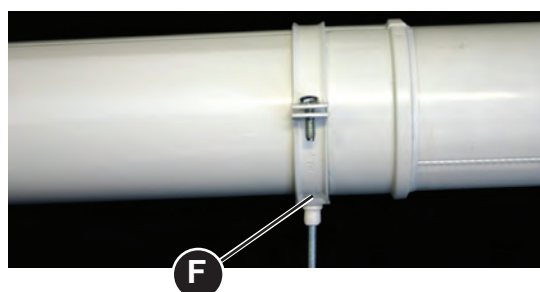
2. Ensure that the flat base of the collar (C) is positioned on the bottom lip of the pipe (D).



3. Slide the pipe and collar assembly back into the outer housing (E), note that this can only be done at the female end of the outer housing.



4. When fitting support brackets (F) make sure they are positioned on the female side of the neck as shown.



2.6 FLUE DEFLECTOR KIT RSF300 (OPTIONAL)

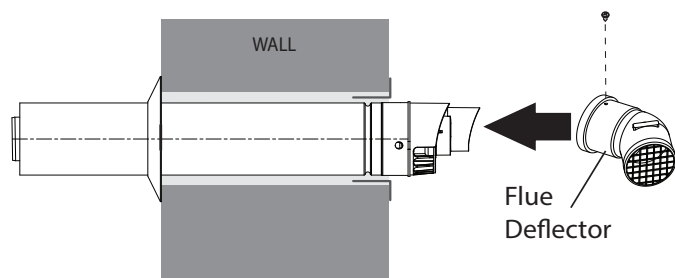
The flue deflector elbow can be fitted to the flue outlet of the standard terminal kits RSF303 or RSF305 to deflect the flue products **horizontally** to the left or the right only.

1. Refer to the boiler Installation and Servicing Instructions for fitting of the boiler and its flue system.

Note. The resistance of the deflector is equivalent to 1 metre of flue length. Ensure this is used when calculating the maximum allowable flue length.

2. Choose the direction required to deflect the flue products (**horizontally** left or right only).
3. Push the deflector elbow onto the angled flue outlet of the terminal in the desired position and ensure the deflector is pushed up to the shoulder to fully engage the rubber seal. Drill the terminal through the hole in the deflector with a 3.2mm drill and secure the deflector with the self tapping screw provided.

Note. Only use water as a lubricant during assembly. Do not use mineral based oils.

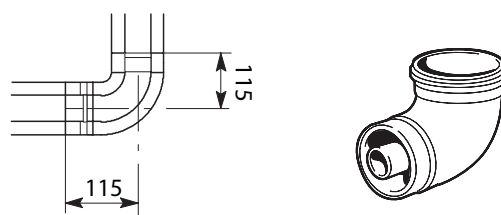


2.7 90° KIT RSF315 (OPTIONAL)

This optional kit can be used on both horizontal and vertical flue kits

1. Use dimensions below for calculating total length
2. When cutting extensions or flue kits always allow sufficient (+ 30mm air duct + 14mm flue duct) to allow for correct engagement in the fitting
3. 1 elbow reduces the maximum available length by 1m

Note. Only use water as a lubricant during assembly. Do not use mineral based oils.



SECTION 2 - INSTALLATION

2.8 FITTING THE OPTIONAL ROOF FLUE KIT RSF345 (OPTIONAL) - Flat or Pitched-

Note.

A 5° or 14° pitched roof plate (not supplied) is required before proceeding with the installation of this kit.

This kit is suitable for both 5° and 14° pitched roof terminations, using a concentric flue to run vertically from the top of the boiler and terminating above roof level.

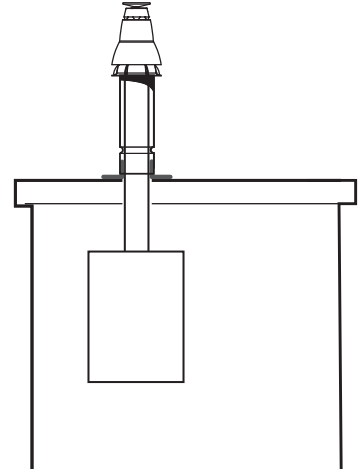
Connection to the top of the boiler is made using a vertical connector (supplied in the kit - RSF346).

WEATHER PROOFING

Where the flue passes through the roof line an adequate seal must be made. This is achieved by using a suitable sealant.

ACCESSORIES

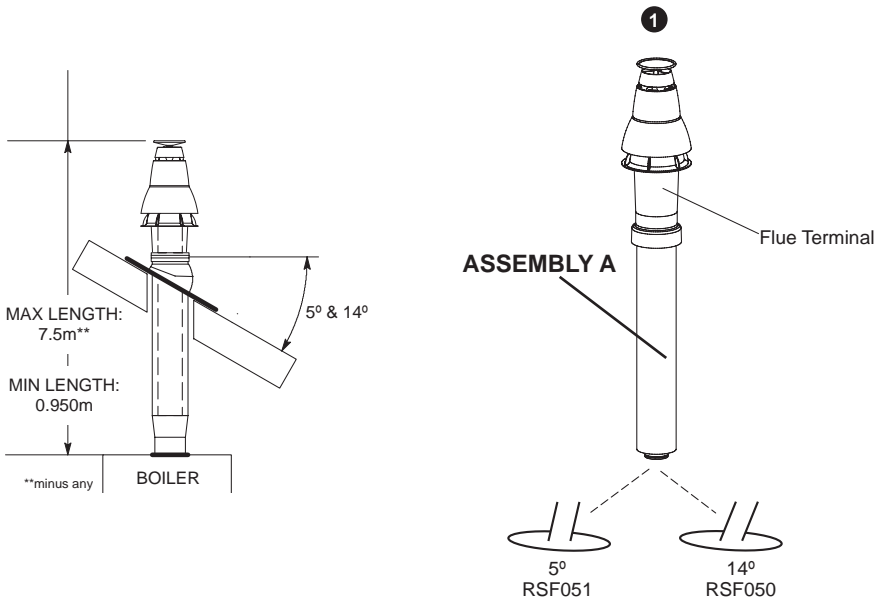
Flue Duct Extension Kits are available for flue lengths extending beyond 1m. These packs contain 1m extension ducts and may be cut to the desired length. If 90° elbows are used (RSF315) they will reduce the overall height by 1m per elbow.



Terminal Position	Minimum Dimension
Directly below an opening, air brick, windows, etc.	300 mm
Below plastic / painted gutters	300 mm
Painted surface	300 mm
Below eaves or balcony	500 mm
Below velux windows	2000mm
Above or side of velux windows	600mm

2.9 ASSEMBLING THE ROOF FLUE KIT

1. Position the roof plate (supplied separately) over the hole cut in the roof and insert flue terminal from the roof end.



2. Ensure that if the length needs to be adjusted to allow an additional 30mm added to the outer air tube length and 14mm added to the inner flue length. This allows correct engagement into the vertical connector.

Note. Ensure a square cut. remove all burrs and sharp edges.

3. Fit the vertical connector (supplied in the kit) and secure the vertical connector by applying downward pressure on the connector.

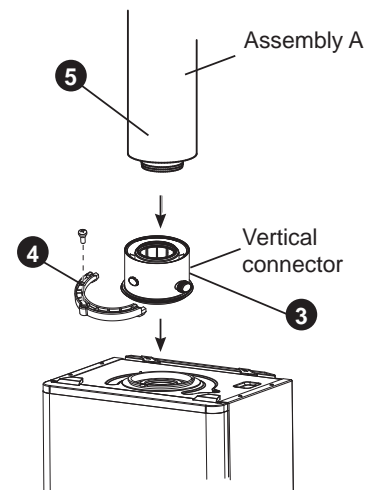
4. Position the clamp on the top face of the flue manifold and push it horizontally backwards. Locate both clamp lugs into the flue manifold and secure to the flue manifold clamp with the M5 retaining screw.

5. "Push" assembly A into vertical connector.

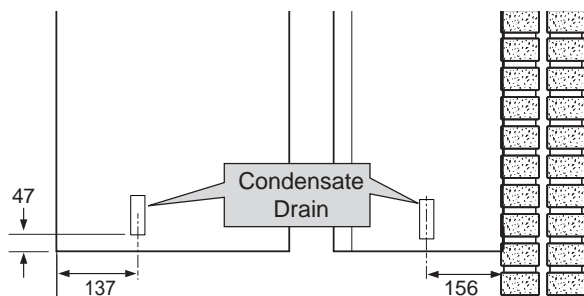
Notes. Ensure turret sample points are servicable and all caps and plugs are fitted.

Ensure condensate siphon/trap is filled with water.

6. Finally ensure the roof plate is correctly sealed to the roof.



2.10 CONDENSATE DRAIN



This appliance is fitted with a siphonic 75mm sealed 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 19mm ID (typically 22mm OD)
- External plastic pipe must be a minimum of 30mm ID (typically 32 OD) before it passes through the sleeved wall.
- All horizontal pipe runs, must fall a minimum of 45mm per metre away from the Boiler.
- External & unheated pipe work should be kept to a minimum and insulated with Class "O" waterproof pipe insulation.
- All installations must be carried out in accordance to the relevant connection methods as shown in the "Condensate installation diagrams" & BS6798:2009
- Pipe work 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.

NB. Clip runs to prevent pipework disconnecting due to vibration etc.

In order to minimise the risk of freezing during prolonged very cold spells, one of the following methods of terminating condensate drainage pipe should be adopted.

Internal Drain Connections

Wherever possible, the condensate drainage pipe should be routed to drain by gravity to a suitable internal foul water discharge point such as an internal soil and vent stack or kitchen or bathroom waste pipe etc. See Figs 1 and 2.

Condensate Pump

Where gravity discharge to an internal termination is not physically possible or where very long internal pipe runs would be required to reach a suitable discharge point, a condensate pump of a specification recommended by the boiler or pump manufacturer should be used terminating into a suitable internal foul water discharge point such as an internal soil and vent stack or internal kitchen or bathroom waste pipe etc. (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 soak away. 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 see Fig 4. Insulation measures as described should be used.
- 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, see 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. See 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 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.

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

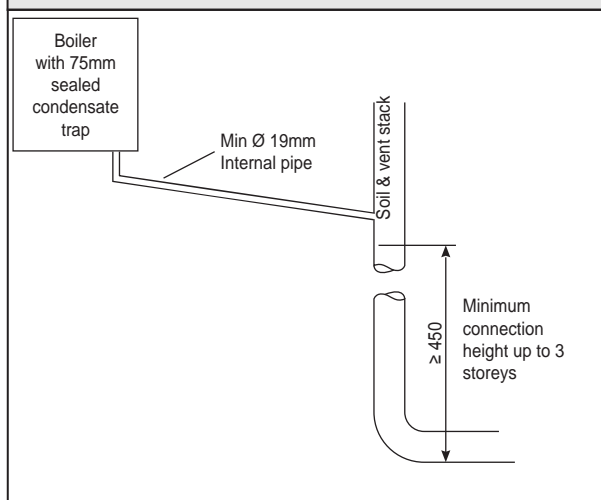
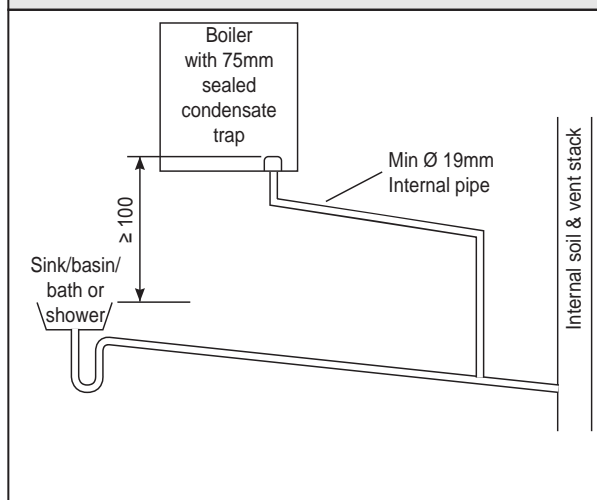


Figure 2 - Connection of a Condensate Drainage Pipe Downstream of a Sink, Basin, Bath or Shower Water Trap to Internal Soil Vent Stack



continued

SECTION 2 - INSTALLATION

CONDENSATE DRAIN - CONT'D.....

Figure 3 - Connection of a Condensate Pump Typical Method (see manufacturers detailed instructions)

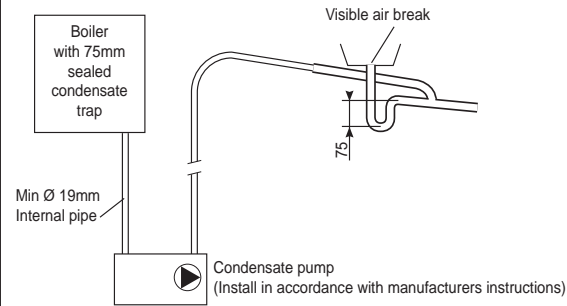


Figure 4 - Connection of Condensate Drainage Pipe to External Soil & Vent Stack

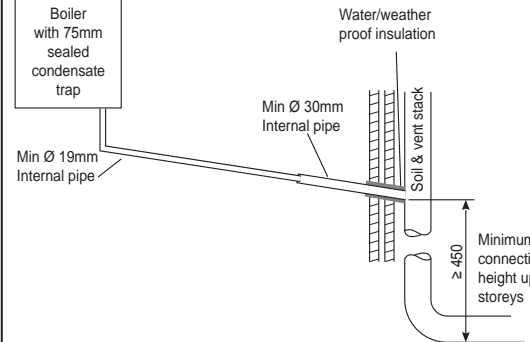


Figure 5 - Connection of a Condensate Drainage Pipe to an External Rainwater Downpipe (only combined foul/rainwater drain)

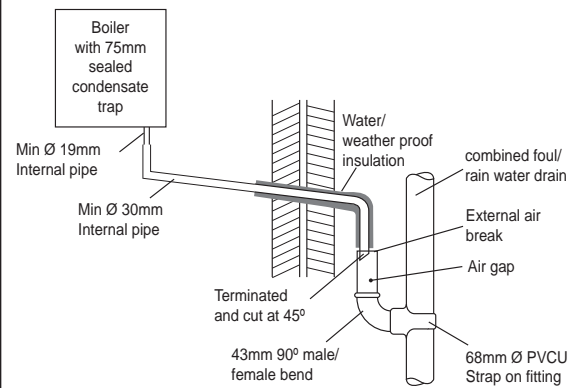
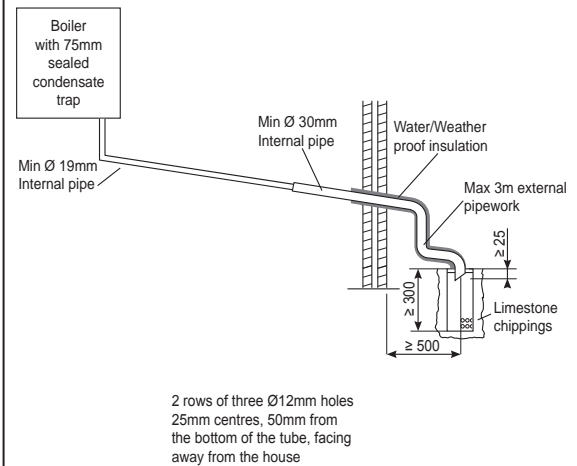
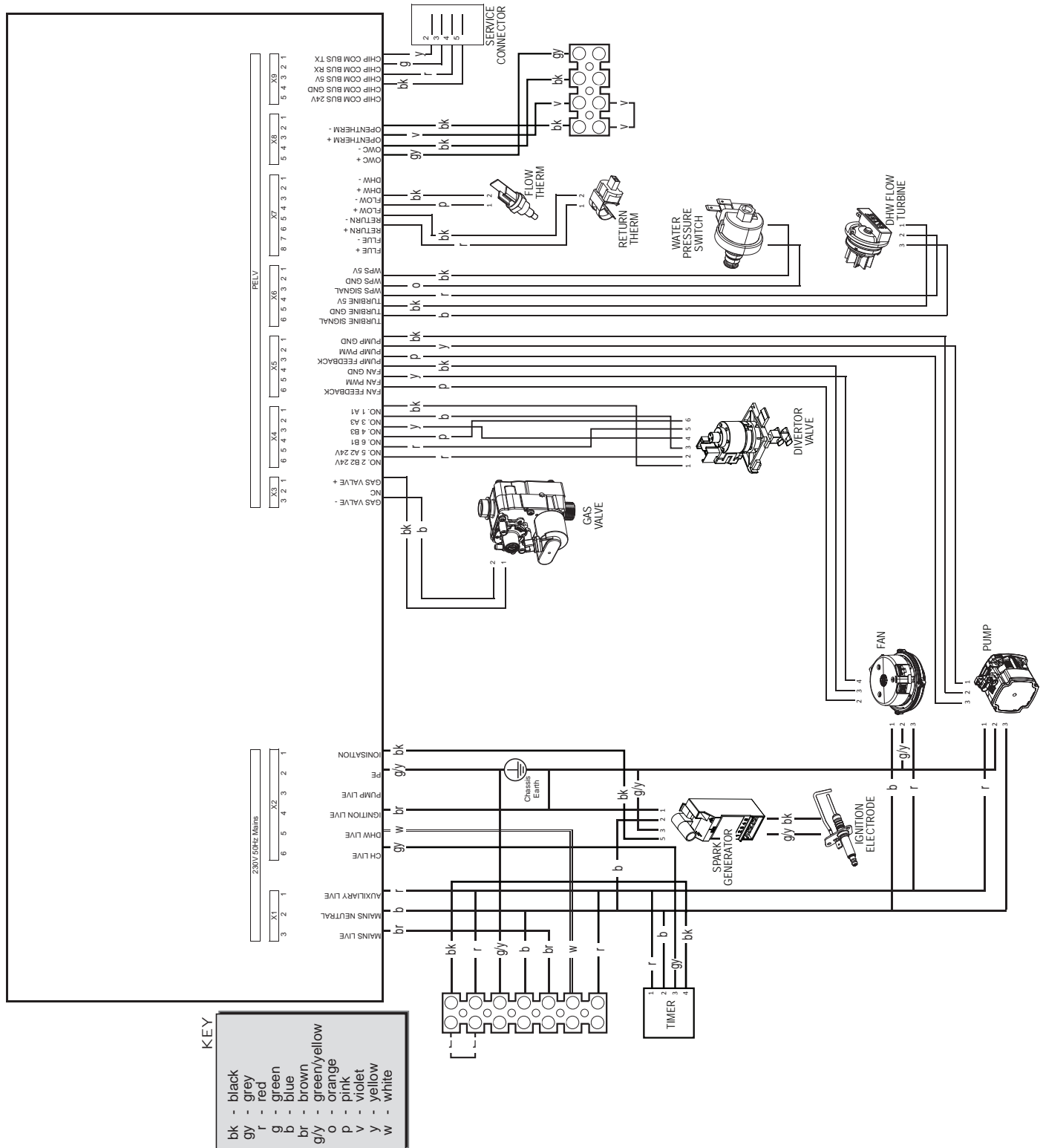


Figure 6 - Connection of a Condensate Drainage Pipe to an External Purpose Made Soak Away.



2.11 WIRING DIAGRAM



3 SERVICING

3.1 SERVICING SCHEDULE

For the very latest copy of literature for specification, maintenance practices and parts replacement, visit our website www.morcoproducts.co.uk where you will be able to download the relevant information.

WARNING. 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 BS7927.

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.

It is the law that any service work must be carried out by a Gas Safe Registered Engineer, or in other countries a qualified and competent Gas Installer.

INSPECTION

1. Light the boiler and carry out a pre-service check, noting any operational faults.
2. Check the flue terminal (and terminal guard if fitted) is undamaged and clear of any obstruction.
3. 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.

CLEANING PROCEDURE

Note. In order to carry out either servicing or replacement of components the boiler upper and lower front panels must be removed. Refer to Section 3.2.

1. Clean the main burner. Refer to Section 3.4.
2. Clean the heat exchanger & condensate trap/siphon. Refer to Sections 3.5 & 3.6.
3. Check the main injector for blockage or damage. Refer to Section 3.10.
4. Check that the flue terminal is unobstructed and that the flue system is sealed correctly.

ALSO IF THE DHW FLOW RATE IS IN QUESTION :-

5. Check the DHW filter for blockage. Refer to Section 3.28.

The cleaning procedures are covered more fully in Sections 3.3-3.7 and MUST be carried out in sequence.

IMPORTANT.

6. 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.
7. When work is complete the front panels MUST be correctly refitted, ensuring that a good seal is made.

Do NOT OPERATE the boiler if the upper front panel is not fitted.

8. If, for any reason, the condensate trap/siphon has been removed ensure the trap is refilled with water before reassembling.
9. Check the gas consumption if on metered installations.
10. Check combustion by connecting the flue gas analyser to the flue gas sampling point as shown in the diagram and measure CO & CO₂.

If the CO/CO₂ ratio is greater than 0.004 AND the integrity of the complete flue system and combustion circuit seals have been verified and the inlet gas pressure have been verified, then contact Morco.

GENERAL

Please Note: During routine 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. Turn on one or more DHW taps
- The combustion performance.

COMPETENCE TO CARRY OUT THE CHECK OF COMBUSTION PERFORMANCE

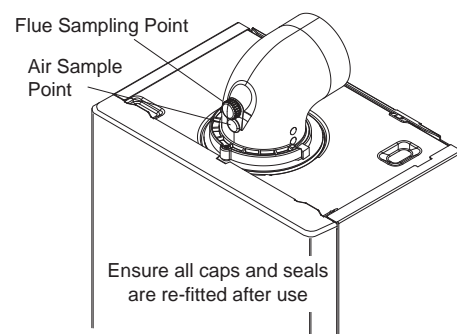
Please Note: BS 6798:2009 Specification for installation and maintenance of gas-fired boilers of rated input not exceeding 70kW net advises that:

- The person carrying out a combustion measurement should have been assessed as competent in the use of a flue gas analyser and the interpretation of the results.
- The flue gas analyser used should be one meeting the requirements of BS7927 or BS-EN50379-3 and be calibrated in accordance with the analyser manufacturers requirements.

SERVICE MODE

To access the service mode:

Press and hold the restart and function button for 5 seconds. The display will show the last 3 faults followed by "S H".



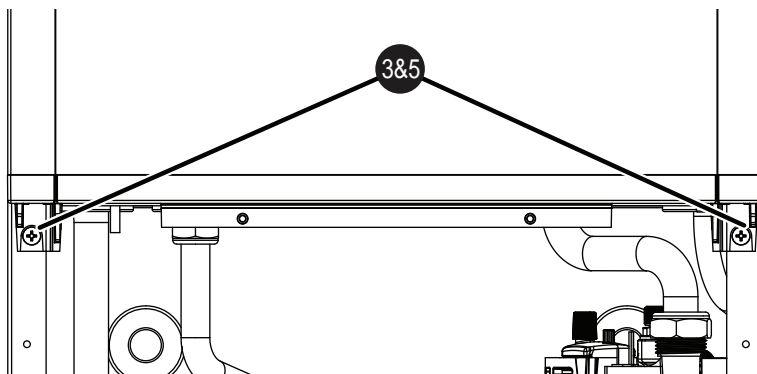
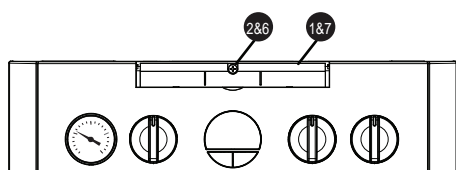
3.2 BOILER UPPER & LOWER FRONT PANEL REMOVAL / REPLACEMENT

REMOVAL

1. Lift the lower front panel access panel.
2. Unscrew the fixing screw, close the access panel to retain the two screws and hinge the lower front panel down into the service position.
3. Remove the two upper front panel fixing screws, lift the panel and remove.

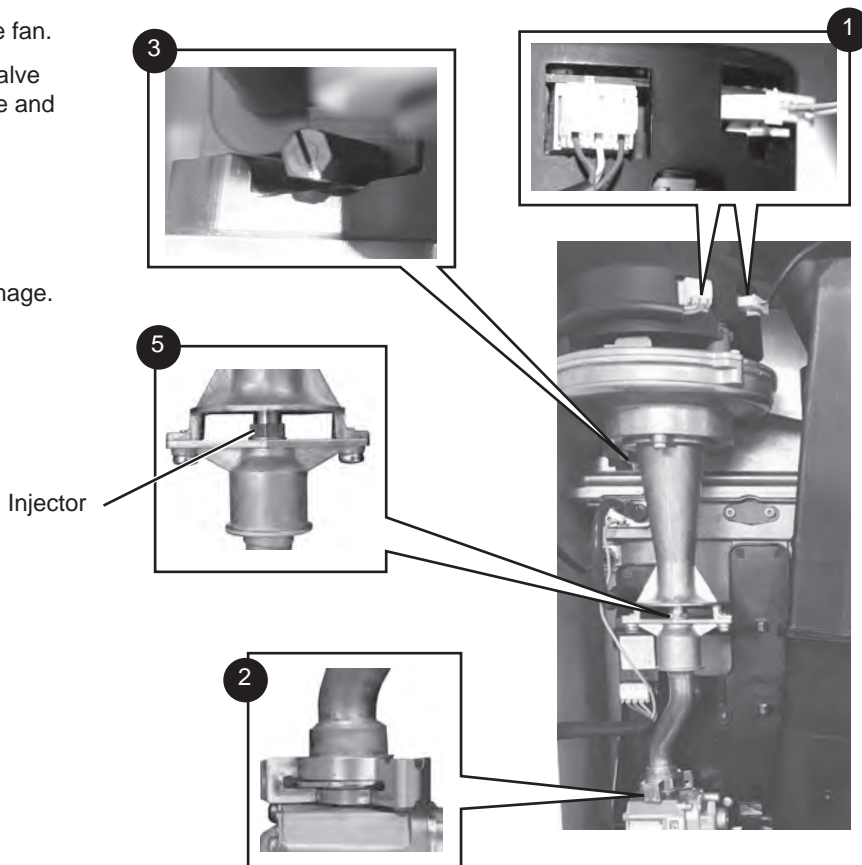
REPLACEMENT

4. Hook the upper panel onto the top retaining clips.
5. Retain the upper panel with the two fixing screws previously removed ensuring a good seal is made.
6. Swing the lower front panel up and retain with the two screws.
7. Close the lower front panel access panel.



3.3 FAN & 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. Inspect the injector for blockage or damage.
6. Inspect fan outlet sealing gasket and replace if necessary.



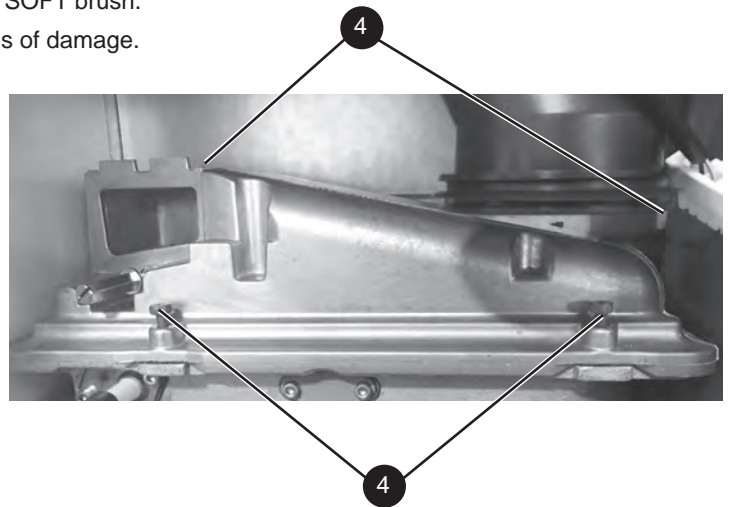
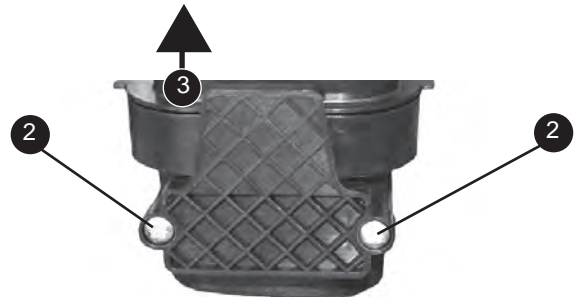
3.4 BURNER REMOVAL & CLEANING

1. Ensure the sump is fully drained
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 2 burner front fixing screws and loosen the 2 rear extended nuts by at least ten turns.
5. Lift off the burner from the combustion chamber. To facilitate the removal angle the burner as shown.

IMPORTANT

The burner head is a ceramic plaque construction. Care must be taken to ensure that **the burner is not placed down upon its face** as this may cause damage to the ceramic.

6. Brush off any deposits that may be on the ceramic with a SOFT brush.
7. Inspect the sealing gasket around the burner for any signs of damage. Replace as necessary.



3.5 CLEANING THE CONDENSATE TRAP/SIPHON

Note: Ensure condensate trap is fully drained before removal.

1. Pull off the rubber pipe at the siphon.
2. Turn the siphon clockwise to disengage and lift to remove.
3. Flush out all deposits with clean water.
4. Reassemble in reverse order

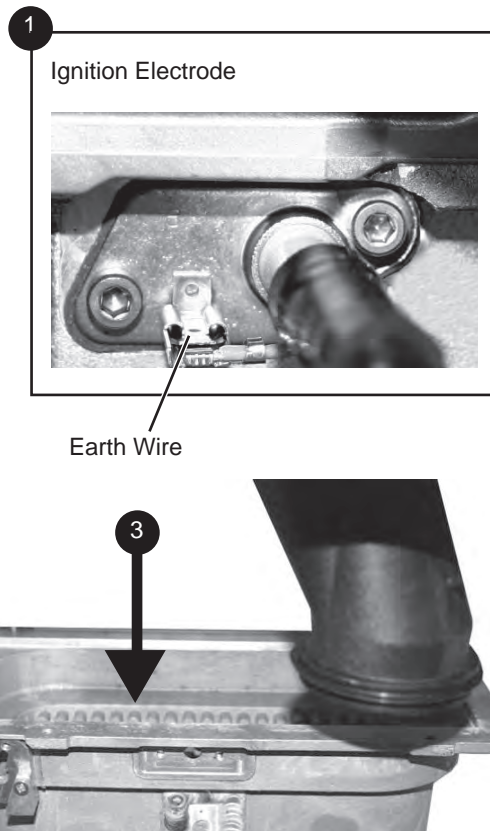
Note: When reassembling ensure the trap is full of water



3.6 CLEANING THE HEAT EXCHANGER

Note: Ensure the condensate trap/siphon is fully drained before cleaning. Refer to Section 3.17.

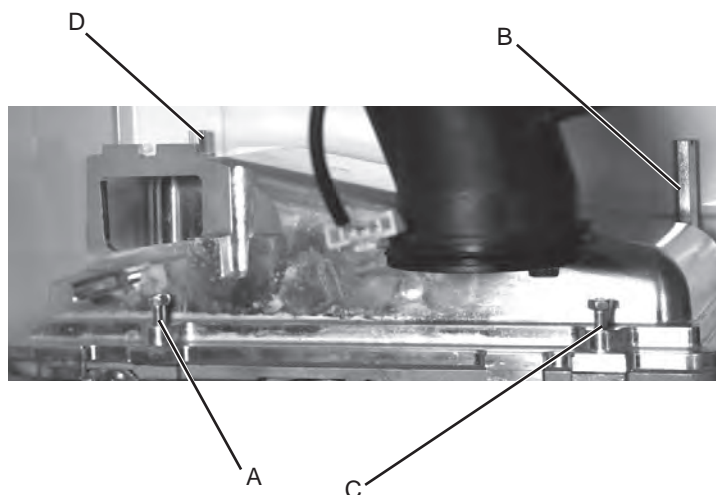
1. Remove ignition electrode. Refer to Section 3.12.
2. It is advisable to replace the sump cover prior to the water flush process.
3. Thoroughly flush the heat exchanger by pouring water into the top of the combustion chamber ensuring the full top area is covered.
4. Remove the sump cover and clean loose deposits from the sump.
5. Inspect the ignition electrode. Ensure that it is clean and in good condition - replace if necessary.
6. Re-fit the ignition electrode. Ensure that earth wire is connected to the electrode.
7. Check that the ignition gap is correct. Refer to Sections 3.12 & 3.13.



3.7 REASSEMBLY

Reassemble the boiler in the following order:

1. Ensure that the condensate trap/siphon is full of water.
 2. Refit the burner ensuring the sealing gasket is correctly positioned and free from damage (tighten the 4 fixing screws in the sequence A,B,C,D, shown below).
 3. Refit the fan / venturi assembly ensuring the retaining tabs are correctly positioned and the sealing gasket is correctly positioned and free from damage.
 4. Reconnect the fan electrical leads.
 5. Remove the sump cover and refit the lower flue manifold as shown.
 6. Refit the sump cover.
 7. Refit the boiler upper and lower front panels.
- IMPORTANT.** Ensure that the boiler upper front panel is correctly fitted and that a good seal is made.
8. Turn on the gas supply at the gas service cock.
 9. Reconnect the electrical supply.



3.8 REPLACEMENT OF COMPONENTS

GENERAL

When replacing ANY component

1. Isolate the electricity supply.
2. Turn off the gas supply.
3. Remove the lower front panel fixing screws, swing the panel into the servicing position and remove the upper front panel. Refer to Section 3.2.

After replacing ANY component check operation of the boiler, including gas soundness, gas rate and combustion test.

IMPORTANT.

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

When work is complete, the front panels must be correctly refitted - ensuring that a good seal is made.

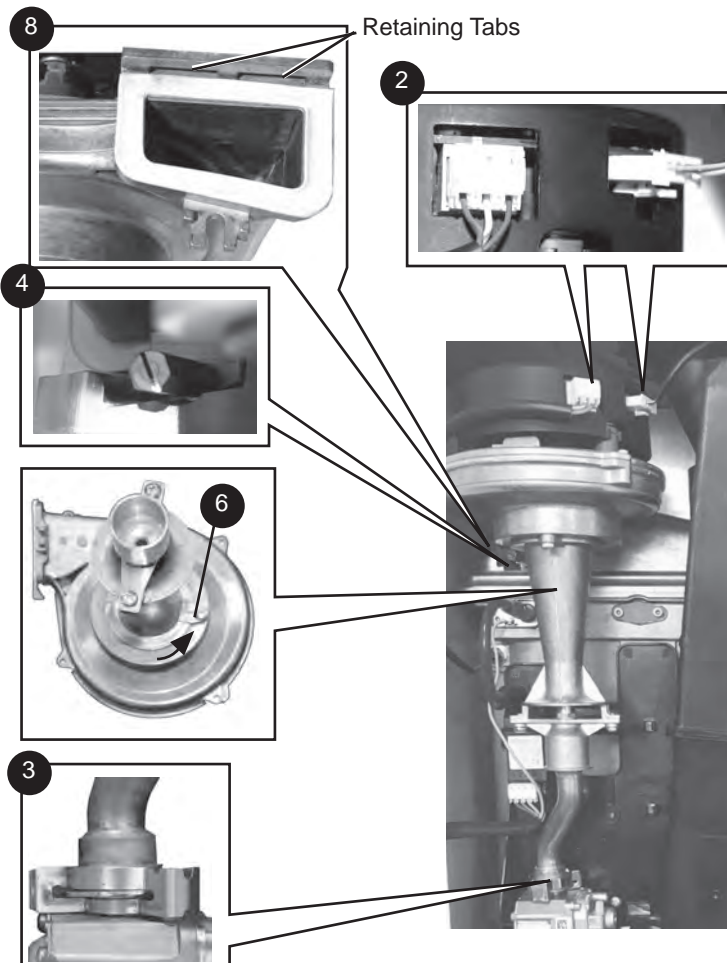
Notes.

1. In order to assist fault finding, the control panel has an LED diagnostic display.
2. In order to replace components in Sections 3.20-3.32 it is necessary to drain the boiler. Refer to Section 3.19.

THE BOILER MUST NOT BE OPERATED WITHOUT THE FRONT PANEL FITTED

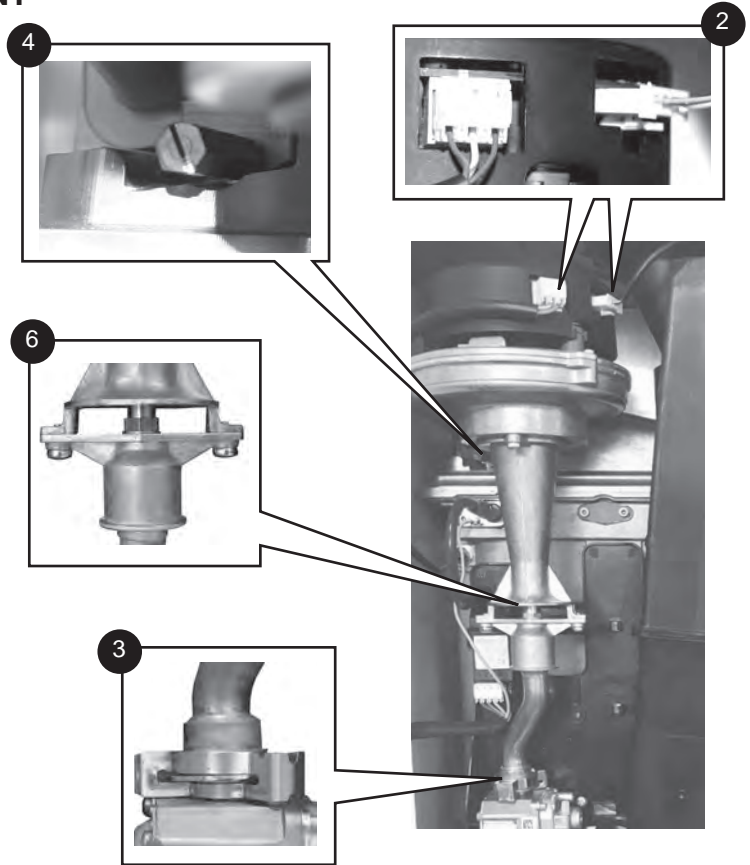
3.9 FAN REPLACEMENT

1. Refer to Section 3.8.
2. Disconnect the electrical leads from the fan.
3. Remove the clip from the gas control valve and the gas pipe.
4. Remove the extended nut retaining the fan mounting bracket.
5. Lift and remove the fan and venturi assembly.
6. Remove the screw and twist venturi anti-clockwise to remove venturi assembly, *noting the orientation of the venturi in relation to the fan body*.
7. Transfer the venturi assembly to the new fan, replacing the 'o' ring if evidence of damage or deterioration is visible.
8. Fit the new fan / venturi assembly ensuring the retaining tabs are correctly positioned and the fan outlet sealing gasket is correctly positioned and free from damage. Refit the extended nut.
9. Reassemble the boiler in reverse order, taking care not to overtighten the screw on the fan mounting bracket and ensure all gas 'o' rings are in place.
10. Check the operation of the boiler.



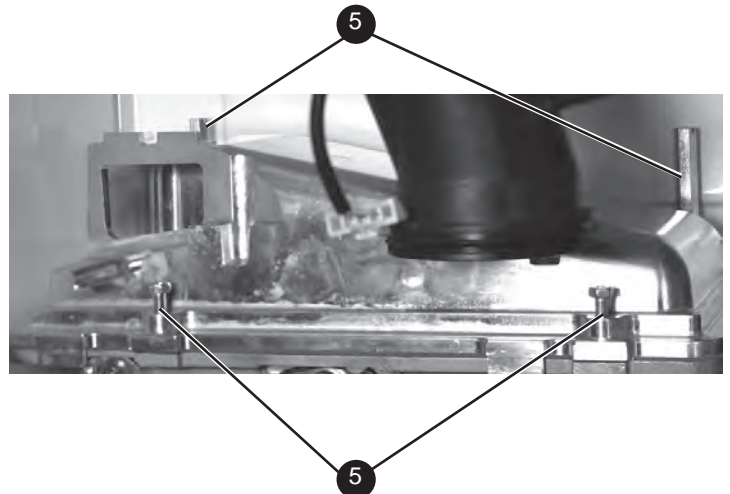
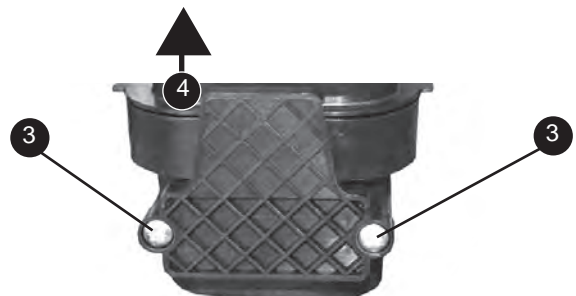
3.10 BURNER INJECTOR REPLACEMENT

1. Refer to Section 3.8.
2. Disconnect the electrical leads from the fan.
3. Remove the clip from the gas valve and ease the pipe upwards, rotate and ease down to remove.
4. Loosen the screw retaining the fan mounting bracket.
5. Lift and remove the fan and venturi assembly.
6. Remove the 2 injector housing screws.
7. Withdraw the injector housing.
8. Fit the new injector housing complete with injector.
9. Reassemble in reverse order, ensuring that the new gas seal supplied is located correctly in the injector housing.
10. Check operation of the boiler.



3.11 BURNER REPLACEMENT

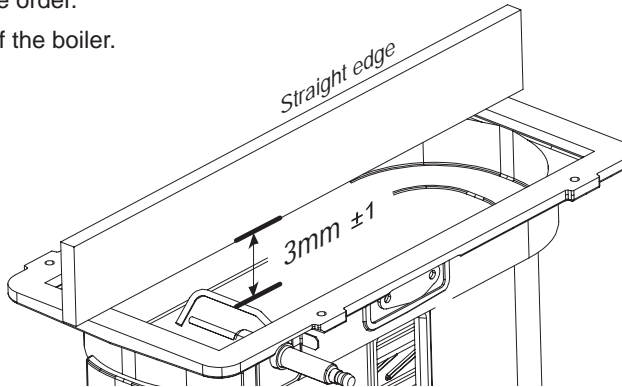
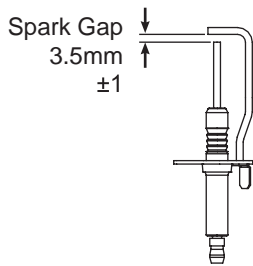
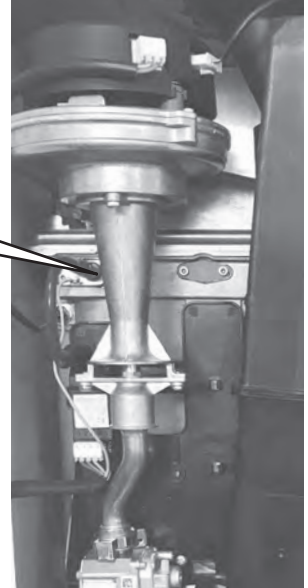
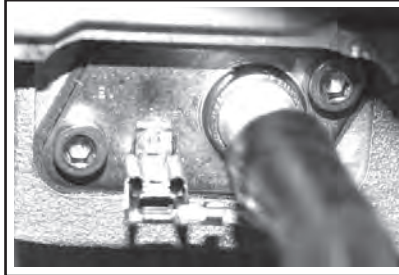
1. See Section 3.8.
2. Refer to Section 3.9.
3. Undo the two screws and remove the sump cover.
4. Lift the manifold to clear the bottom sealing gasket and remove manifold.
5. Remove the 2 front fixing screws and loosen the 2 rear extended nuts.
6. Lift off the burner from the combustion chamber. To facilitate the removal angle the burner as shown.
7. Fit the new burner, replacing any damaged or deteriorating sealing gasket.
8. Reassemble in reverse order.
9. Check the operation of the boiler.



3.12 IGNITION/FLAME ELECTRODE REPLACEMENT

1. Refer to Section 3.8.
2. Remove the burner. Refer to Section 3.10.
3. Unplug the ignition lead from the electrode.
4. Remove the earth lead from the ignition electrode.
5. Remove the 2 screws holding the ignition electrode to the combustion chamber.
6. Remove the electrode.
7. Fit the new ignition electrode, using the new gasket supplied. Check dimensions as shown.
8. Reassemble in reverse order.
9. Check the operation of the boiler.

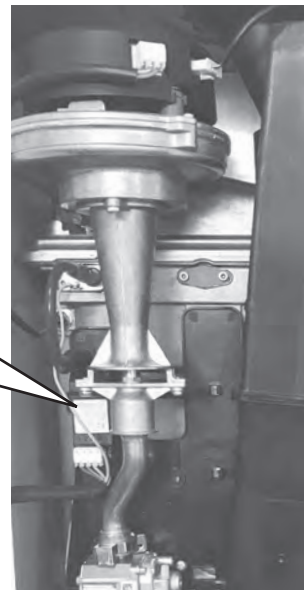
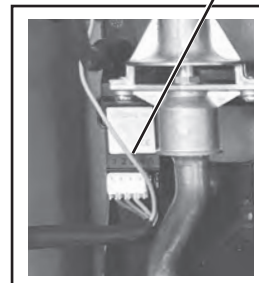
Ignition Electrode



3.13 SPARK GENERATOR REPLACEMENT

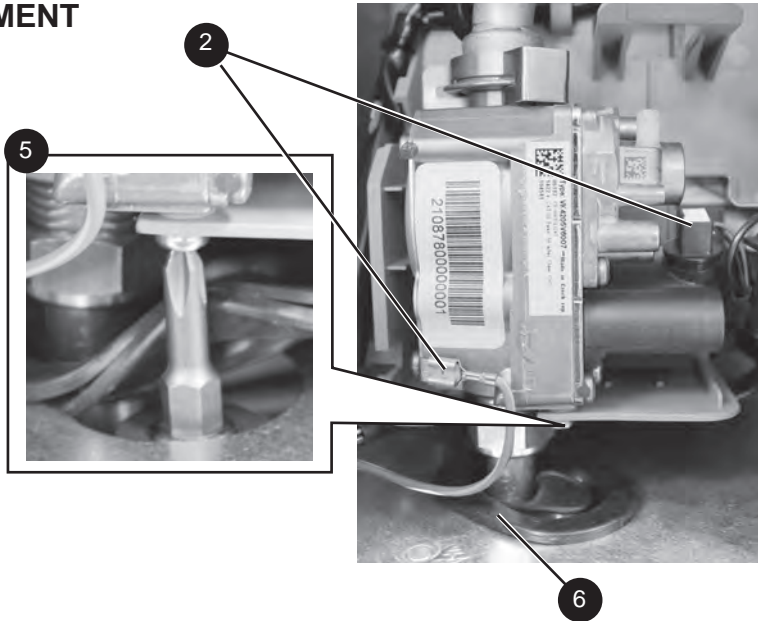
1. Refer to Section 3.8.
2. Disconnect the leads from the spark generator.
3. Pull the spark generator to unclip from the mounting bracket.
4. Fit the new spark generator and reassemble in reverse order ensuring that the the earth lead is replaced.
5. Check operation of the boiler.

Spark Generator



3.14 GAS CONTROL VALVE REPLACEMENT

1. Refer to Section 3.8.
2. Unplug the electrical lead connection from the gas control valve and disconnect the earth wire.
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 control valve.
5. Undo the single screw fixing the gas valve to the mounting bracket and withdraw the valve forwards. To gain access, temporarily move the seal.
6. Fit the new gas control valve, ensuring that the 'o' ring and sealing washer are in place. Replace screw and re-connect gas and electrical connections. **Ensure sealing washer is fully located.**
7. Ensure all gas valve connections are gas tight with a gas soundness check up to the gas control valve.
8. Check operation of the boiler.

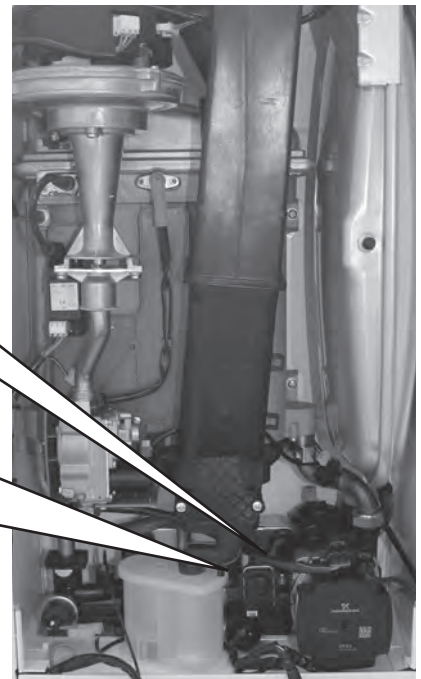
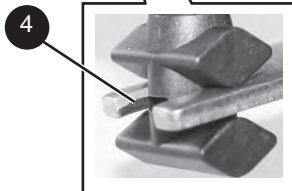
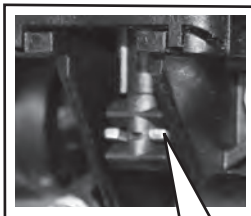


3.15 DIVERTER VALVE ACTUATOR REPLACEMENT

Refer to Section 3.8.

To remove the motor:

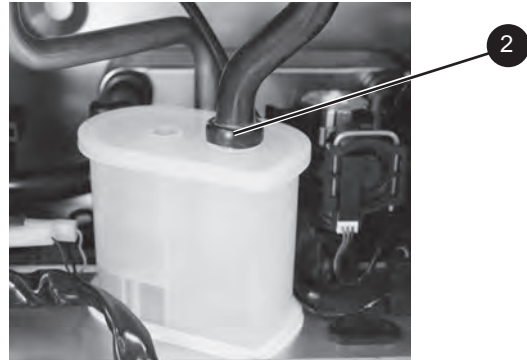
1. Remove the condensate trap/siphon. Refer to Section 3.16.
2. Place a flat bladed screwdriver in the actuator slot provided and ease out the actuator.
3. Before replacing the diverter valve actuator proceed as follows:
 - a. Ensure that the switched live to the boiler is off and that all DHW taps are shut and that pre-heat is switched off.
 - b. Press and hold the "PREHEAT" and "RESTART" buttons together for more than 5s, the last 3 faults will then be shown in sequence before "SL" is shown
 - c. Press "PREHEAT", "SH" will be shown
 - d. Press "PREHEAT", "UF" will be shown
 - e. Press "PREHEAT", "DU" will be shown
 - f. Press "RESTART" and the diverter valve will move to the mid-position
4. Fit the new motor ensuring the arm is correctly engaged in the metal fork and re-assemble in reverse order ensuring the condensate trap/siphon is refilled with water.
5. Check the operation of the boiler.



Note. All spares will be delivered in mid-position therefore ignore point 3 and proceed to point 4.

3.16 CONDENSATE TRAP/SIPHON REPLACEMENT

1. Refer to Section 3.8.
2. Pull off the rubber pipe at the siphon.
3. Turn the siphon clockwise to disengage and lift to remove.
4. Reassemble in reverse order.
5. When reassembling ensure the trap is full of water.
6. Check operation of the boiler.



3.17 MAIN PCB REPLACEMENT

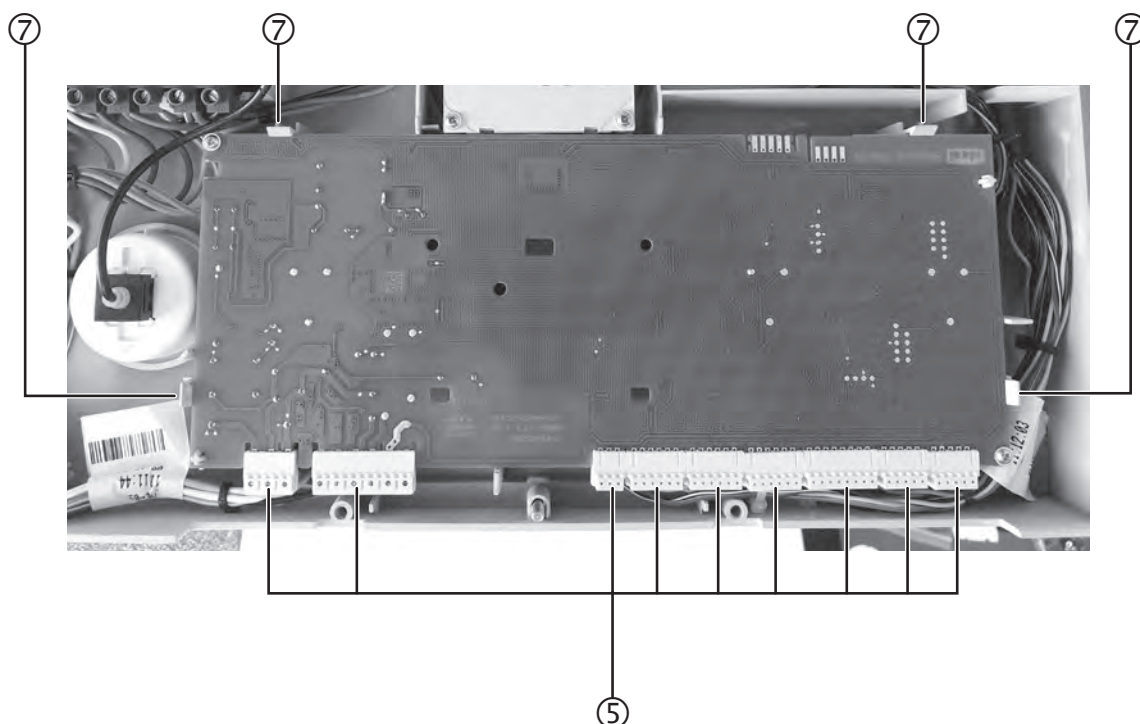
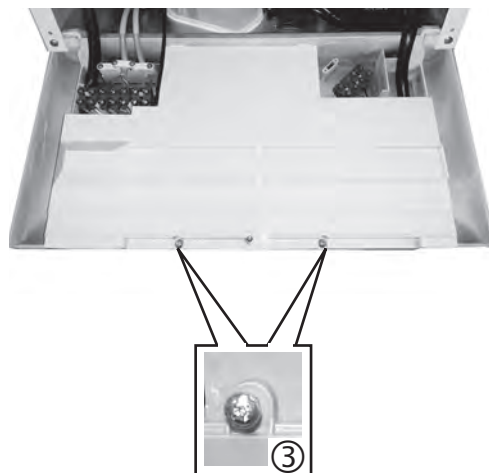
**Note that production boiler PCBs are factory pre-set to operate for boiler range and output, but when ordering spare PCBs programming may be required.*

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

1. Refer to Section 3.8.
2. Rotate all control knobs into the upright position.
3. Remove the 2 screws retaining the control box cover.
4. Carefully lift the cover at the front & pull forward to remove.
5. Unplug all connections to the PCB.
6. Remove the two screws that secure the PCB.
7. Spring out the four side retaining clips and pull the PCB upwards to clear the retaining posts.
8. Unclip the light guide and secure this to the new PCB.
9. Insert the new PCB and secure all electrical connections. Ensure control knobs are correctly aligned with PCB.
10. Reassemble in reverse order.

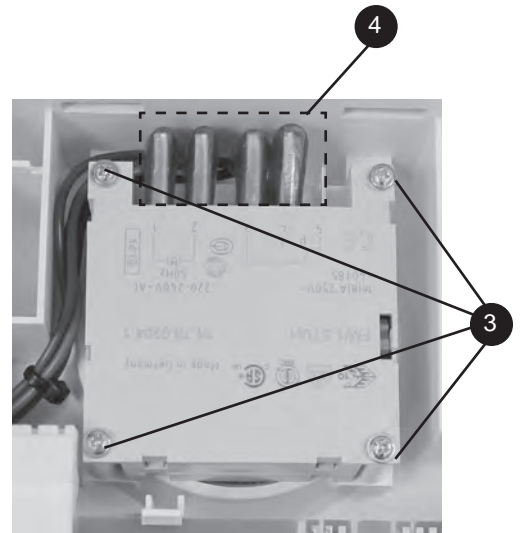
* If programming of the spare PCB is required, then proceed as follows:

11. a. Turn power on, display shows uP.
Rotate all three dials fully anti-clockwise.
- b. Press RESTART, display shows oF.
- c. Turn power off.
- d. Turn power on, display shows F9.
- e. Using central heating knob, rotate clockwise or anticlockwise to show "ES" (for combi without preheat), then press restart button.
- f. Using central heating knob, rotate clockwise or anticlockwise to show "p" for propane, then press restart button.
- g. Using central heating knob rotate clockwise or anticlockwise to show boiler size, select correct 24, or 30 then press restart button.
- h. Display shows "C", "p", Boiler size, internal number.
- j. Press restart. New PCB is now programmed.
12. Check operation of the boiler.



3.18 REPLACING THE MECHANICAL TIMER

1. Refer to Section 3.8.
2. Swing the boiler lower front panel into the service position. Refer to Section 3.2.
3. Remove the 4 fixing screws.
4. Disconnect the 4 push on connectors.
5. Remove programmer.
6. Re-fit 4 push on connectors to new programmer.
7. Fit programmer and retain with 4 screws previously removed.
8. Replace the lower front panel.
9. Check operation of the boiler.



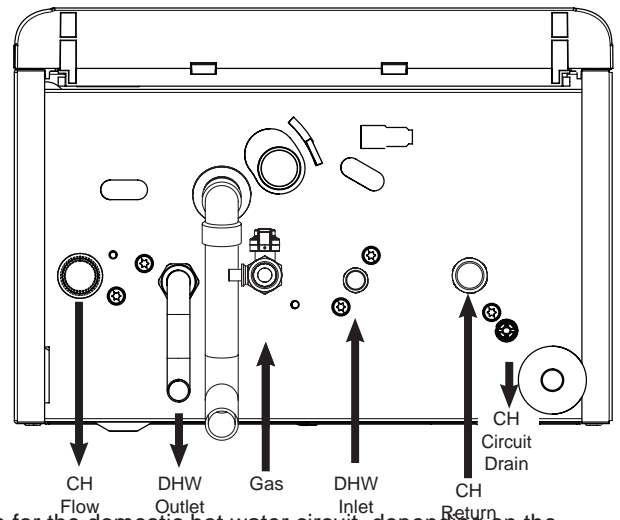
3.19 DRAINING THE BOILER

CENTRAL HEATING CIRCUIT

1. Refer to Section 3.8.
2. To drain the primary heat exchanger circuit: Open the drain valve and attach a length of hose to the CH drain point, or use filling loop re-fill point on the return pipe.
3. After replacing any component on the boiler, remove the hose and close the drain valve.
4. Refill with specified anti-freeze and re-pressurise as appropriate.
5. Check operation of the boiler.

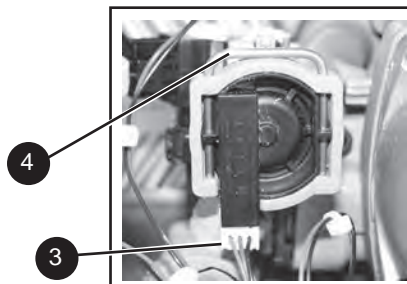
DOMESTIC HOT WATER CIRCUIT

1. Refer to Section 3.8.
2. To drain the domestic hot water circuit: As there is no direct drain for the domestic hot water circuit, depending on the location of the boiler, opening the lowest hot water tap may drain this circuit. However it must be noted that some residual water will be experienced during replacement of components.
3. After replacing any component on the boiler DHW circuit, re-fill as appropriate.
4. Check operation of the boiler.



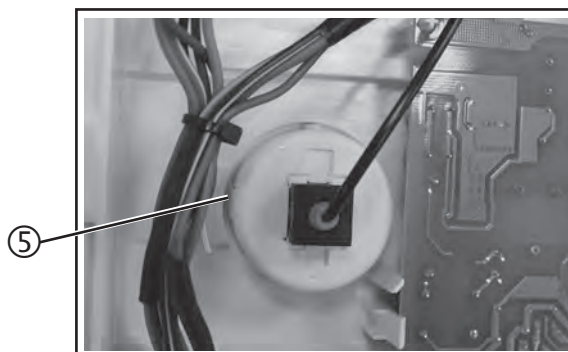
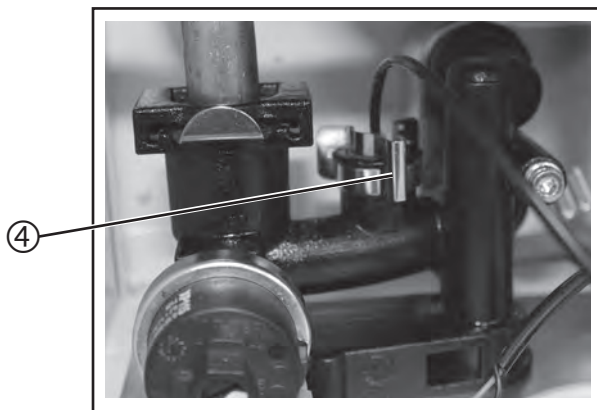
3.20 DHW FLOW TURBINE REPLACEMENT

1. Refer to Section 3.8.
2. Drain the DHW system. Refer to Section 3.19.
3. Pull off the electrical connection.
4. Using a suitable tool, lift and remove the retaining clip.
5. Use the clip to ease the turbine sensor from its housing.
6. Re-assemble in reverse order.
7. Check operation of the boiler.



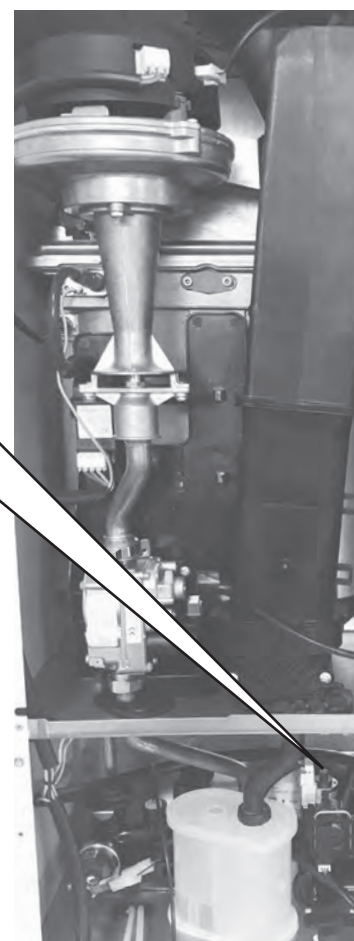
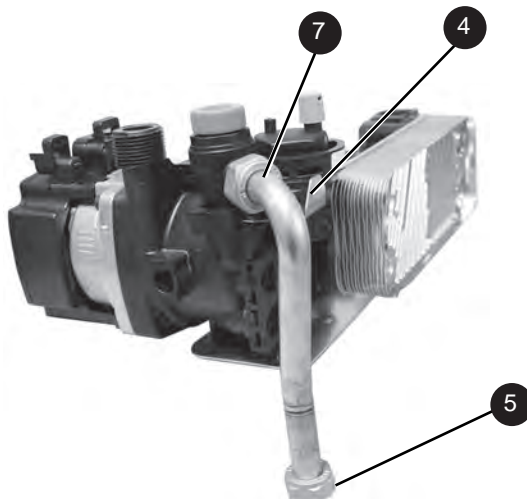
3.21 PRESSURE GAUGE REPLACEMENT

1. Refer to Section 3.8.
2. Drain the heating system. Refer to Section 3.19.
3. Remove the boiler front (See Section 3.8), lower the control panel and remove the control box cover.
4. Ensuring there is no pressure in the system unclip the C clip from the flow manifold port and remove the capillary connection together with 'o' ring.
5. Releasing the two retaining clips on the pressure gauge ease the pressure gauge through the front of the control panel.
6. Fit the new pressure gauge from the front of the control panel ensuring correct orientation. Locate push fit connection into port ensuring 'o' ring in place and secure with the C clip.
7. Refill the boiler.
8. Check that the boiler operates in both DHW & CH modes.



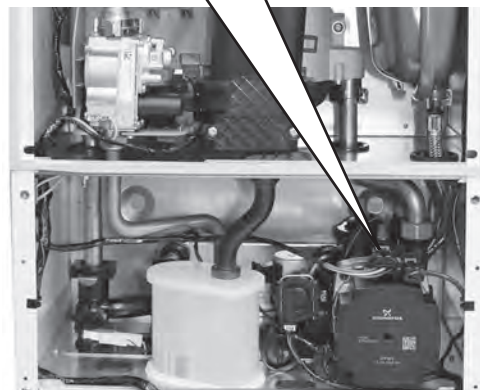
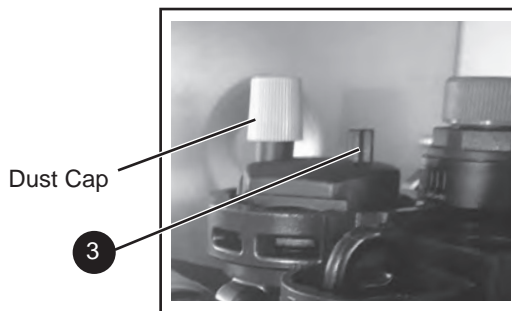
3.22 SAFETY RELIEF VALVE RENEWAL

1. Refer to Section 3.8.
2. Drain the boiler. Refer to Section 3.19.
3. Pull out and remove the clip (positioned behind the safety valve) retaining the safety valve.
4. Undo the safety valve pipe compression fitting positioned outside the boiler casing.
5. Lift out the safety valve/pipe assembly.
6. Remove the safety valve pipe and transfer to the new safety valve.
7. Reassemble in reverse order ensuring the retaining clip is correctly fitted and the pipe compression fitting retightened.
8. Refill the boiler with specified anti-freeze. Check operation of the boiler.



3.23 PUMP AUTOMATIC AIR VENT REPLACEMENT

1. Refer to Section 3.8.
2. Drain the boiler. Refer to Section 3.19.
3. Using a suitable screwdriver positioned between the air vent dust cap and the plastic protrusion, turn the air vent carefully anti clockwise to disengage and lift to remove.
4. Fit the new air vent and ensure dust cap is open
5. Re-assemble in reverse order.
6. Refill the boiler and check operation.

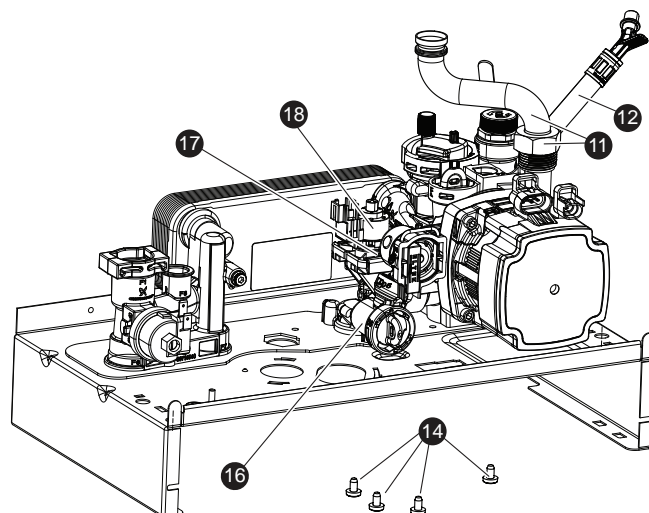


3.24 DIVERTER VALVE BODY ASSEMBLY REPLACEMENT

To remove the valve body assembly:

1. Refer to Section 3.8.
2. Drain the boiler. Refer to Section 3.19.
3. Remove the condensate trap/siphon. Refer to Section 3.16.
4. Remove the electrical plug. Refer to Section 3.15.
5. Place a flat bladed screwdriver in the diverter valve motor body slot provided and ease out the motor Refer to Section 3.15.
6. Remove the return thermistor electrical connection. Refer to Section 3.30.
7. Remove the pump electrical connection. Refer to Section 3.26 no. 3.
8. Remove DHW Turbine electrical connection. Refer to Section 3.20 no. 3.
9. Remove the DHW plate heat exchanger (note orientation). Refer to Section 3.25.
10. Undo the safety valve pipe compression fitting. See No.5 Section 3.22.
11. Remove the compression fitting above the pump and rotate the pipe.
12. If required remove expansion vessel connection hose. Refer to Section 3.32, no. 8.
13. Remove all DHW and CH connections situated beneath the boiler.
14. Remove the three torx head screws fixing the return manifold to the boiler sheet steel base.
15. Lift the manifold assembly and remove from boiler.

16. Twist and remove the DHW manifold.
17. Remove the two diverter valve body fixing screws and withdraw the diverter valve body assembly.
18. Fit the new diverter valve body assemble and replace the two fixing screws.
19. Refit the DHW manifold, fit the assembly back to the boiler and reassemble in reverse order.
20. Refill the boiler and add the correct volume of anti-freeze. Check operation of the boiler.

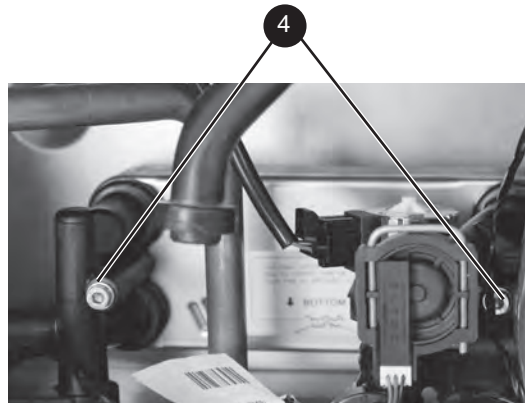


3.25 DHW PLATE HEAT EXCHANGER REPLACEMENT

1. Refer to Section 3.8.
2. Drain the boiler. Refer to Section 3.19.
3. Remove the condensate siphon. Refer to Section 3.16.
4. Remove the two plate heat exchanger fixing screws.
5. Slide the plate heat exchanger to the left and push the plate back to disengage.
6. Remove the plate heat exchanger.
7. Fit the new plate heat exchanger using the new 'O' rings provided and re-assemble in reverse order.

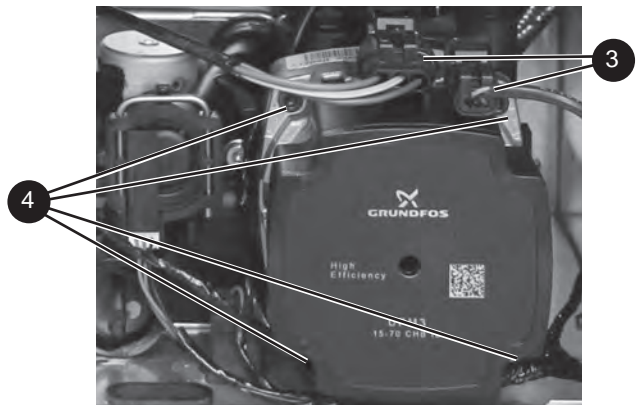
Note. Ensure dimples and "bottom" are lower most.

8. Refill the boiler and add the correct volume of anti-freeze.
9. Check operation of the boiler.



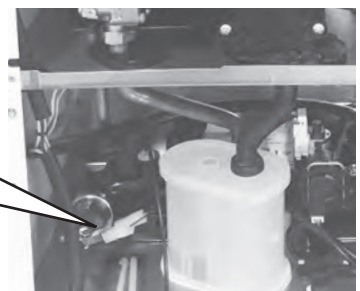
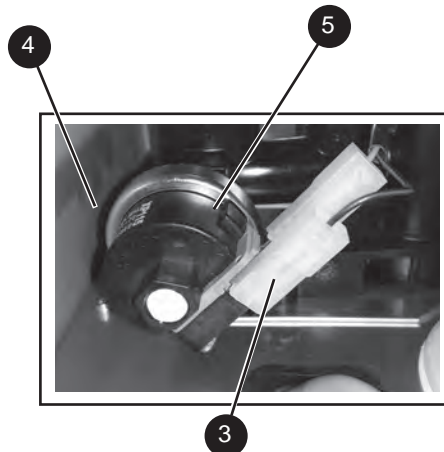
3.26 PUMP HEAD REPLACEMENT

1. Refer to Section 3.8.
2. Drain the boiler. Refer to Section 3.19.
3. Disconnect the two electrical leads from the pump.
4. Remove the 4 Allen screws retaining the pump head.
5. Remove the pump head.
6. Fit the new pump head.
7. Reassemble in reverse order.
8. Refill the boiler and add the correct volume of anti-freeze.
9. Check operation of the boiler.



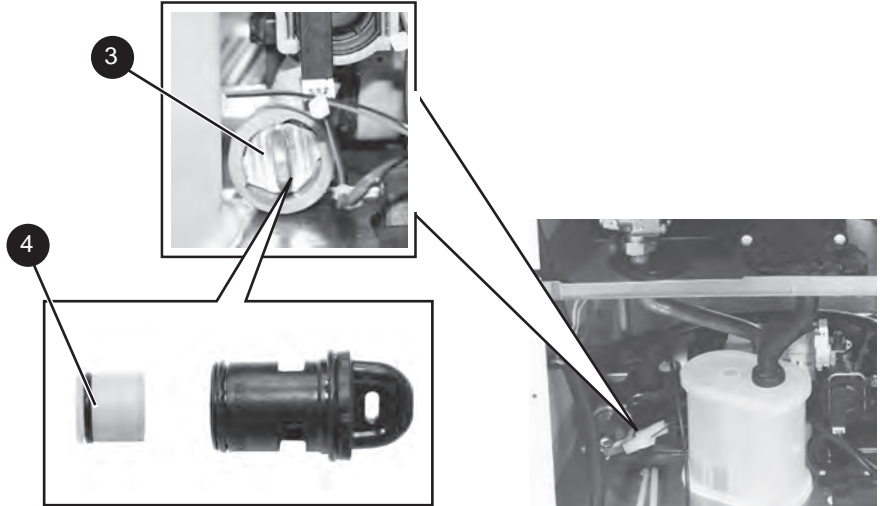
3.27 CH WATER PRESSURE SWITCH REPLACEMENT

1. Refer to Section 3.8.
2. Drain the boiler. Refer to Section 3.19.
3. Pull off the two electrical connections.
4. Using a suitable tool, pull out the metal retaining clip.
5. Carefully withdraw the pressure switch.
6. Fit the new pressure switch and re-assemble in reverse order.
7. Refill the boiler and add the correct volume of anti-freeze.
8. Check operation of the boiler.



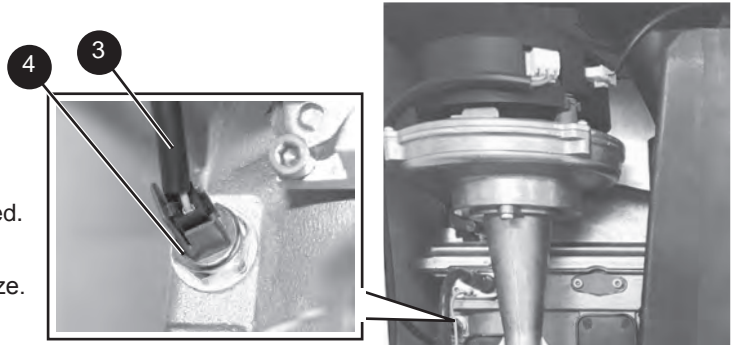
3.28 DHW FILTER & DHW FLOW REGULATOR CLEANING/REPLACEMENT

1. Refer to Section 3.8.
2. Drain the boiler. Refer to Section 3.19.
3. Turn the housing anti clockwise and pull forward to remove the cartridge.
4. Using a pair of pliers, pull out the plastic filter/flow regulator.
5. Clean or replace filter as necessary.
6. Reassemble in reverse order.
7. Refill the boiler.
8. Check operation of the boiler.



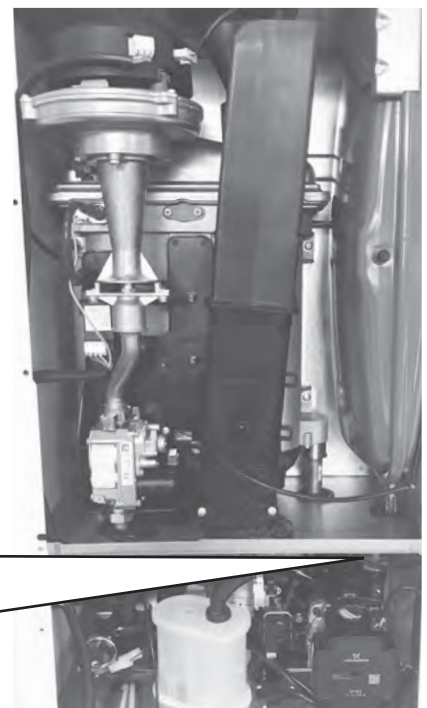
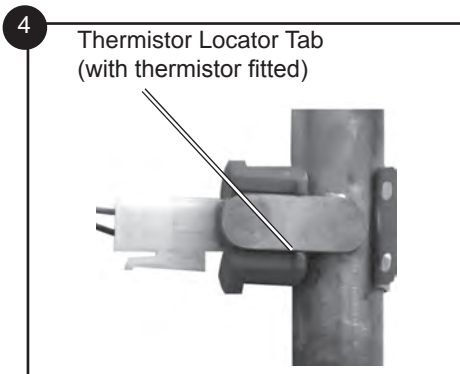
3.29 FLOW THERMISTOR REPLACEMENT

1. Refer to Section 3.8.
2. Drain down the boiler. Refer to Section 3.19.
3. Unplug the electrical lead.
4. Unscrew the thermistor (to facilitate removal a 13mm deep socket spanner should be used).
5. Fit the new thermistor using the sealing washer provided.
6. Reassemble in the reverse order.
7. Refill the boiler and add the correct volume of anti-freeze.
8. Check the operation of the boiler.



3.30 RETURN THERMISTOR REPLACEMENT

1. Refer to Section 3.8.
2. Unclip the return thermistor from the return pipe and withdraw it from the boiler.
3. Disconnect the electrical lead from the thermistor.
4. Reconnect the electrical lead to the new thermistor and reassemble in reverse order, ensuring that the thermistor is securely fitted to the pipe on the thermistor locator tab as shown.
5. Check that the boiler operates in both DHW & CH Mode.

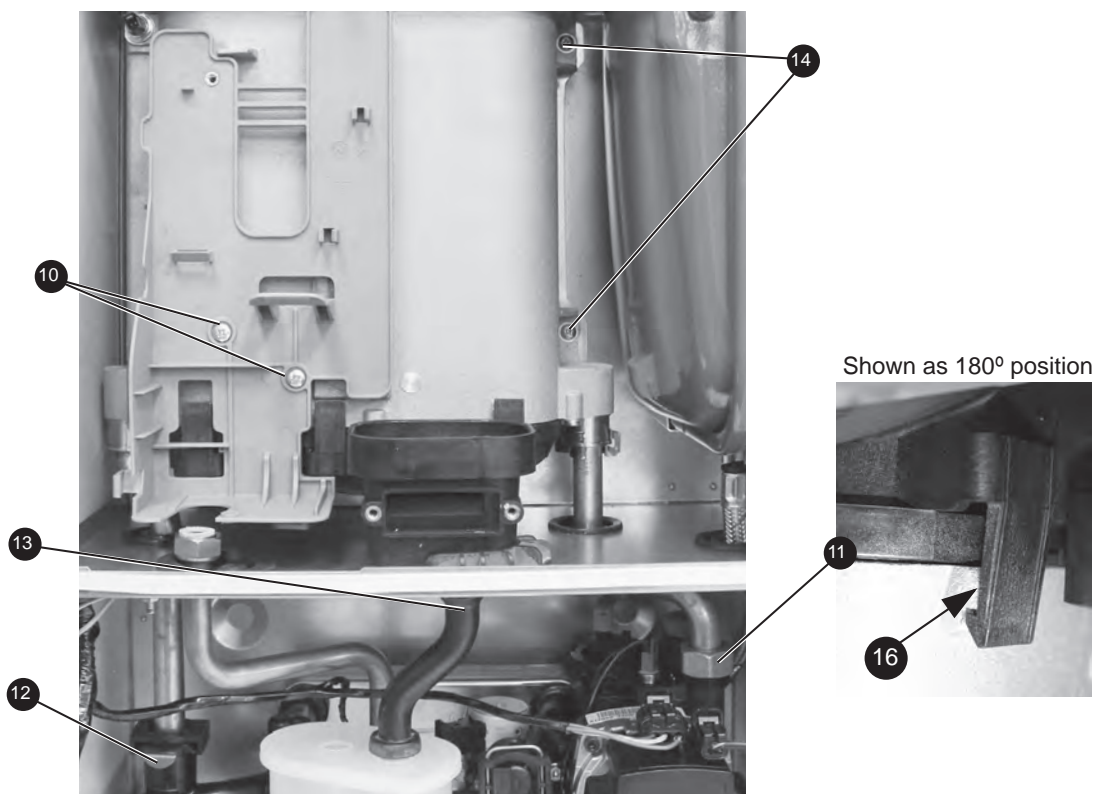


3.31 HEAT ENGINE REPLACEMENT

Refer also to Section 1.3 - 'Boiler Exploded View'

IMPORTANT - Before starting the removal procedure, protect the gas and electrical controls with a waterproof sheet or plastic bag.

1. Refer to Section 3.8.
2. Drain the boiler. Refer to Section 3.19.
3. Remove the fan / venturi assembly and place on one side. Refer to Section 3.9.
4. Remove burner and place on one side. Refer to Section 3.10.
5. Remove the ignition/detection electrode. Refer to Section 3.12.
6. Remove the spark generator. Refer to Section 3.13.
7. Remove the gas valve. Refer to Section 3.14.
8. Remove the expansion vessel. Refer to Section 3.32.
9. Remove the flow thermistor. Refer to Section 3.29.
10. Remove the 2 M5 screws retaining the gas valve mounting bracket and transfer bracket to the new heat exchanger.
11. Undo the return pipe union nut, swing the pipe and pull down to remove from heat exchanger.
12. Pull out the flow pipe spring clip, pull the pipe down and twist towards you (allows clearance of the pipe from heat exchanger plugs). Lift pipe and remove.
13. Remove the two heat exchanger fixing screws.
14. To remove the Heat exchanger slide out of location bracket.
15. Remove the condensate rubber pipe from the sump.
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 in reverse order, ensuring the heat exchanger LH retaining bracket is correctly positioned. Replace any new 'o' rings supplied with new heat exchanger and replacing 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 diameters.
18. Ensure the trap/siphon is filled with water. Refer to Section 3.16.
19. Refill the boiler and add the correct volume of anti-freeze.
20. Ensure all gas valve connections are gas tight with a gas soundness check up to the gas control valve.
21. Check operation of the boiler.



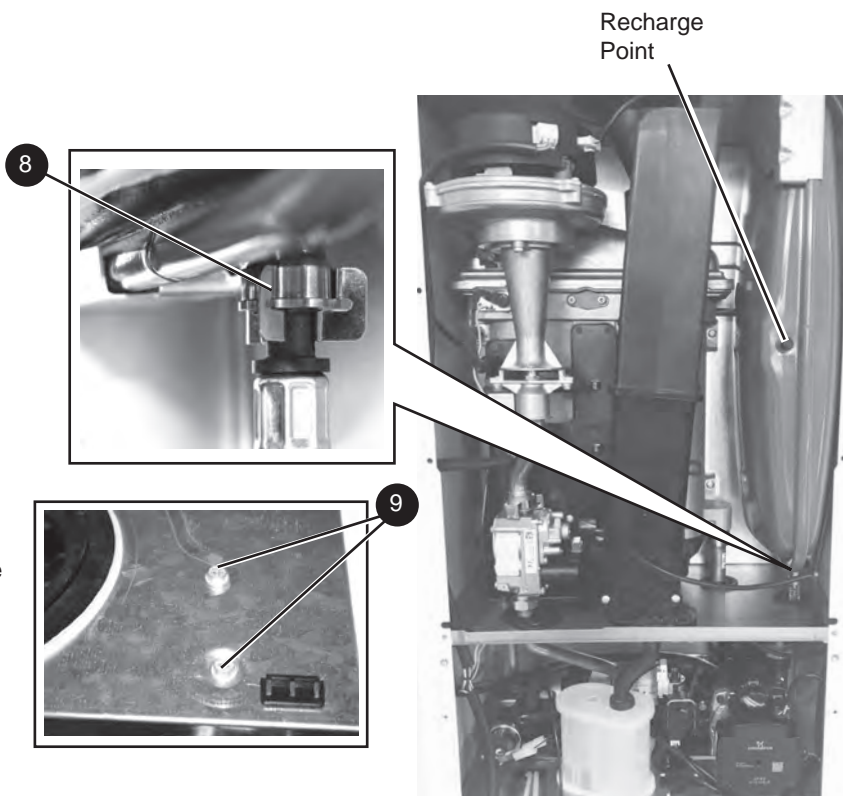
3.32 EXPANSION VESSEL RECHARGING & REPLACEMENT

RECHARGING

1. Refer to Section 3.8.
2. Drain the boiler CH circuit. Refer to Section 3.19.
3. Remove the charge point cover.
4. Recharge the tank pressure to 0.75 bar.
5. Re-assemble in reverse order, re-fill the boiler and add the correct volume of anti-freeze.
6. Check operation of the boiler.

REPLACEMENT

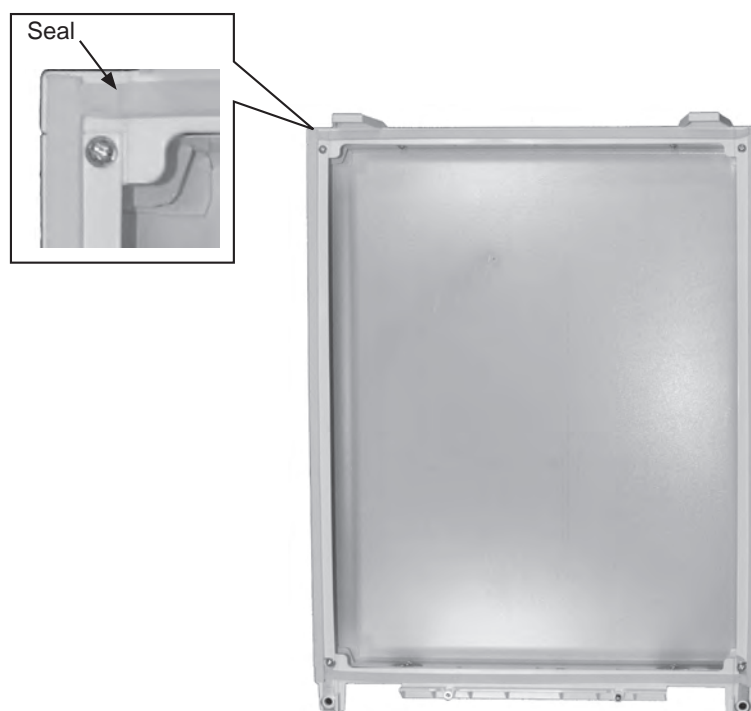
7. Refer to Section 3.8.
8. Drain the boiler CH circuit. Refer to Section 3.19.
9. Remove the retaining clip on the vessel connection pipe.
10. Support the expansion vessel and unscrew the 2 screws from the securing clamp, located on the top of the boiler, and remove. (Note the position of the bracket on the vessel)
11. Remove the expansion vessel taking care not to damage the adjacent wiring harness.
12. Fit the new expansion vessel.
13. Drain the boiler CH circuit. Refer to Section 3.19.
14. Reassemble in reverse order ensuring the 'o' ring seal is in place.
15. Refill the boiler and add the correct volume of anti-freeze.
16. Check operation of the boiler.



3.33 BOILER SEALING PANEL SEAL REPLACEMENT


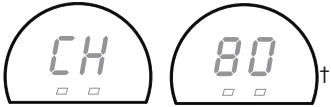
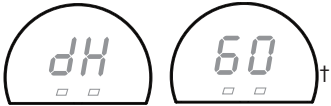
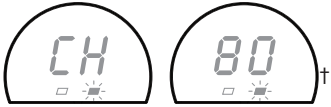
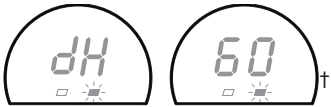


1. Refer to Section 3.8.
2. Remove the old seal from the reverse side of boiler door and thoroughly clean the casing.
3. Fit the new self adhesive seal ensuring all joints provide an air tight seal.
5. Reassemble in reverse order.
6. Check operation of the boiler.

Note. Ensure that the boiler front panel is correctly sealed, compressing the seal to make an airtight joint.



4 FAULT FINDING

4.1 OPERATION MODES

DISPLAY CODE ON BOILER	DESCRIPTION
	The boiler is in standby operation awaiting either a central heating call or hot water demand.
	The boiler has a call for central heating but the appliance has reached the desired temperature set on the boiler.
	The boiler has a call for hot water but the appliance has reached the desired temperature set on the boiler.
	The boiler is operating in central heating mode.
	The boiler is operating in domestic hot water mode.
	The boiler is operating in frost protection. Note that after the boiler has reached temperature it will show "dH" for 60s whilst it also protects the DHW circuit.
	The boiler mode knob (C) is in the off position, rotate fully clockwise for hot water and central heating operation.

† = temperature shown for example purposes only.

4.2 SERVICE MODE

THE DISPLAY

The user control has two LEDs and two 7 segment displays to inform the user about the status. The display will show the status of the boiler. The LED will show the status of the flame. If no flame is detected the LED is off. When the flame is detected the LED will be lit permanently.

Below is a list with display function in normal operation.

- 00* Standby, no demand for heat present.
- CH* Boiler is active for central heating.
- dH* Boiler is active for domestic hot water.
- F* CH circuit water less than 5°C.

Below is a list with display in fault condition. If the display is showing "L" or "F" with a number / letter refer to page 34.

- L* Boiler is in lockout for a specific error. Display will show "L" with a number or letter to show which error is detected.
- F* Boiler has a fault for a specific error. Display will show "F" with a number or letter to show which error is detected.

Service Modes

- SH* Service High
- SL* Service Low

Setting to Maximum Rate (DHW max. gas rate, operating in CH mode):

1. Hold "restart" & "function" buttons together for more than 5s
2. Last 3 faults will be shown
3. SH shown, press "restart"
4. Burner will run for 10 minutes at maximum rate.
5. Press "restart" to exit Maximum Rate mode.

***Setting to Minimum Rate:**

1. Hold "restart" & "function" buttons together for more than 5s
2. Last 3 faults will be shown
3. SH shown, press "function" button.
4. SL shown, press "restart"
5. Burner will run for 10 minutes at minimum rate.
6. Press "restart" to exit Minimum Rate mode.

SECTION 4 - FAULT FINDING

4.3 FAULT CODES

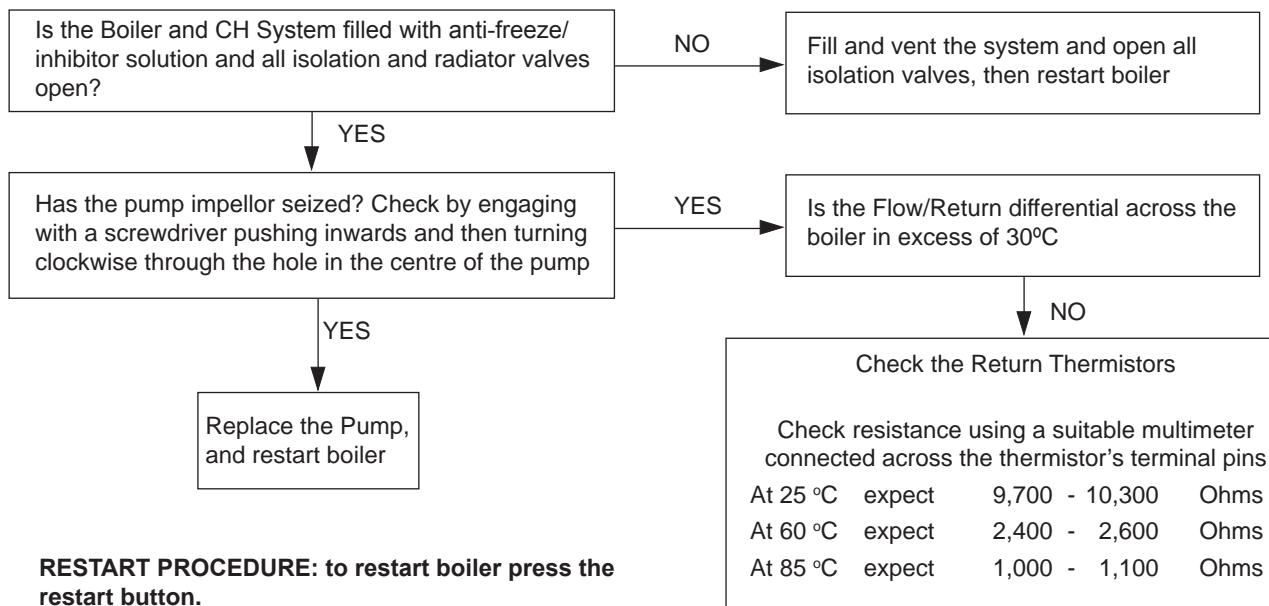
DISPLAY CODE ON BOILER	DESCRIPTION	ACTION
F1	Low Water Pressure	Check system water pressure is between 1 & 1.5bar on the system pressure gauge. To re-pressurise the system see Section 3. If the boiler still fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
F2	Flame Loss	1. Check other gas appliances in the house are working to confirm a supply is present in the property. 2. If other appliances do not work or there are no other appliances, check the gas supply is on at the meter and/or pre payment meter has credit. If the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
F3	Fan Fault	Restart the appliance - if the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
F4 L4	Flow Thermistor	Restart the appliance - if the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
F5 L5	Return Thermistor	Restart the appliance - if the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
F6	Outside Sensor Failure	Restart the appliance - if the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
F7	Low Mains Voltage	Contact a qualified electrician or your electricity provider.
F9 L9	Unconfigured PCB	Unconfigured/faulty PCB or gas valve short circuit. Please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
L1	Flow Temperature Overheat or No Water Flow	Check system water pressure is between 1 & 1.5bar on the system pressure gauge. To re-pressurise the system see Section 3. If the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
L2	Ignition Lockout	1. Check condensate Pipe for blockages (refer to Section 4) 2. Check other gas appliances in the house are working to confirm a supply is present in the property. 3. If other appliances do not work or there are no other appliances, check the gas supply is on at the meter and/or pre payment meter has credit. If the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
L6	False Flame Lockout	Restart the appliance - if the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
LC	5 Boiler Resets in 15 minutes	1. Turn electrical supply to boiler off and on. 2. If the boiler fails to operate please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
FA	Negative Differential Flow/Return Thermistor	If the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
FU	Flow/Return Differential > 50°C	If the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
dU	Diverter Valve in mid-position for service	Rotate all knobs fully clockwise, turn boiler power off and on then press restart.
FH	No primary water flow	Check system water pressure is between 1 & 1.5bar on the system pressure gauge. To re-pressurise the system see Section 3. If the boiler still fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
FL	Pump dry run	Check system water pressure is between 1 & 1.5bar on the system pressure gauge. To re-pressurise the system see Section 3. If the boiler still fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
FP	Pump rotor blocked	If the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).

4.4 FAULT FINDING CHART MAIN MENU

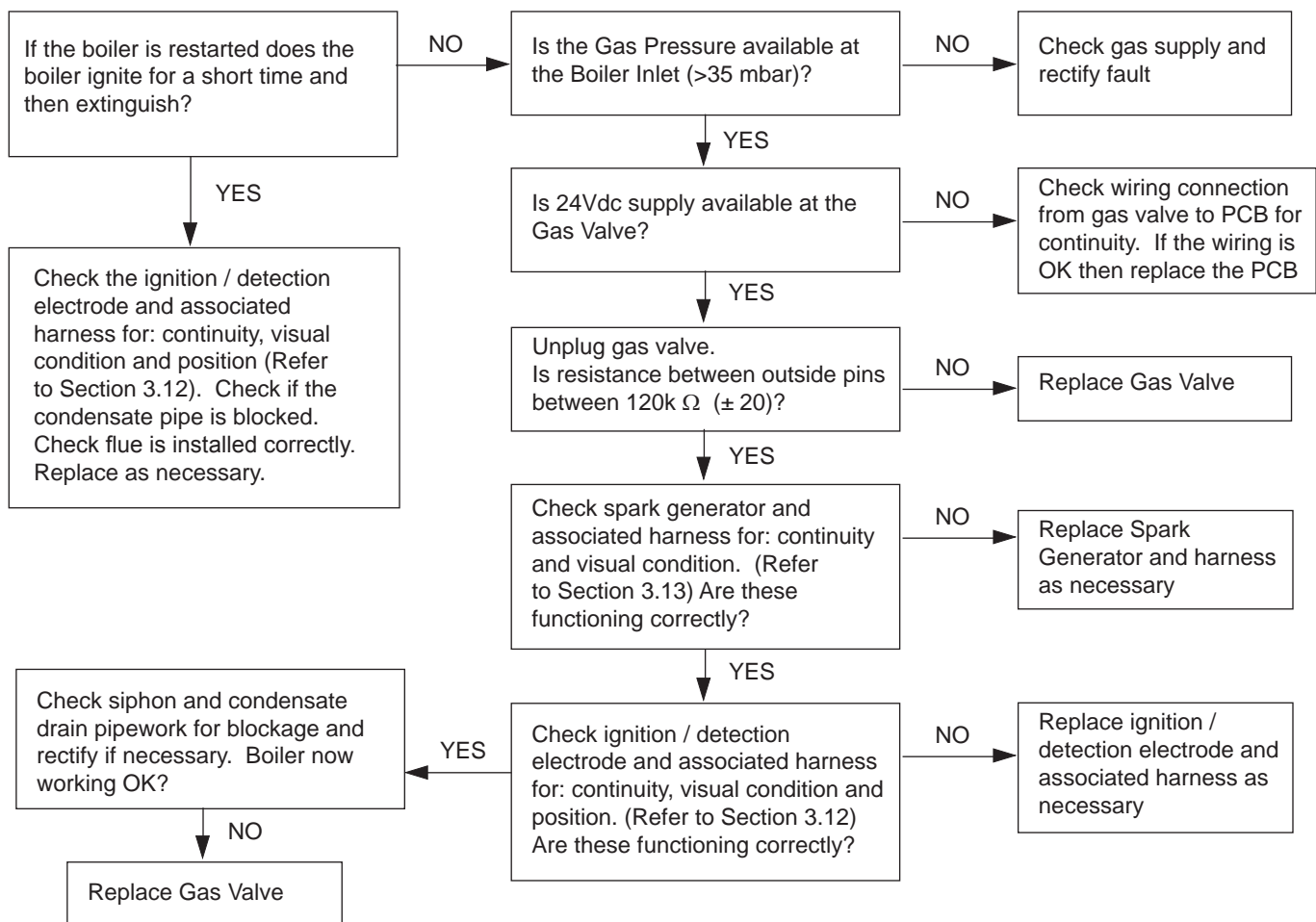
'L1'	GO TO SECTION 4.5 - FLOW TEMPERATURE OVERHEAT LOCKOUT
'L2'	GO TO SECTION 4.6 - IGNITION LOCKOUT
'LC'	5 RESETS WITHIN 15 MINS - TURN POWER OFF AND ON
'L6'	GO TO SECTION 4.8 - FALSE FLAME LOCKOUT
'F1'	GO TO SECTION 4.9 - LOW WATER PRESSURE
'F2 or Fn or Ln'	GO TO SECTION 4.10 - FLAME LOSS
'F3'	GO TO SECTION 4.11 - FAN FAULT
'L4 or F4'	GO TO SECTION 4.12 - FLOW THERMISTOR FAULT
'L5 or F5'	GO TO SECTION 4.13 RETURN THERMISTOR FAULT
'F6'	GO TO SECTION 4.14 OUTSIDE SENSOR FAULT
'F7'	LOW MAINS VOLTAGE - CONTACT ELECTRICITY PROVIDER
'F9 or L9 or F8 or L8'	PCB UNCONFIGURED/FAULTY OR GAS VALVE SHORT CIRCUIT. IF FAULT PERSISTS REPLACE PCB
'FA'	NEGATIVE DIFFERENTIAL FLOW OR RETURN THERMISTOR FAULT
'FU'	DIFF GREATER THAN 50°C CHECK ISOLATION VALVES ARE OPEN CHECK PUMP CHECK RAD VALVES OPEN CHECK SYSTEM BLOCKAGES
NO CH BUT HW OK	GO TO SECTION 4.15
NO HW BUT CH OK	GO TO SECTION 4.16
NO DISPLAY	GO TO SECTION 4.17

RESTART PROCEDURE: to restart boiler press the restart button.

4.5 'L1' - FLOW TEMPERATURE OVERHEAT LOCKOUT



4.6 'L2' - IGNITION LOCKOUT

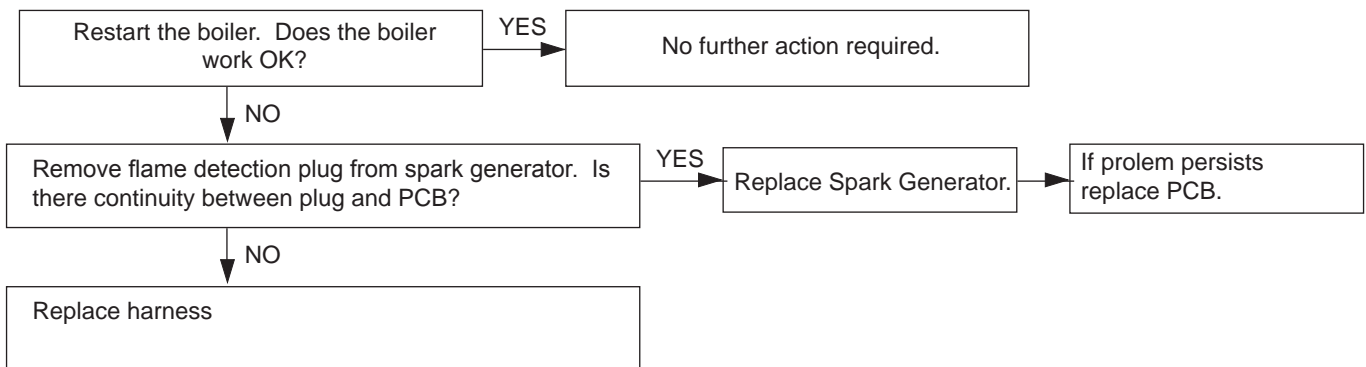


RESTART PROCEDURE: to restart boiler press the restart button.

4.7 ALTERNATING 'L' AND '5' - 5 RESETS WITHIN 15 MINS

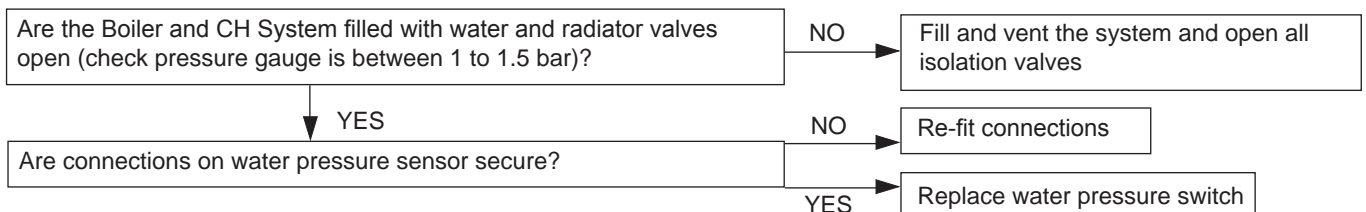
Turn power off and on

4.8 'L6' - FALSE FLAME LOCKOUT

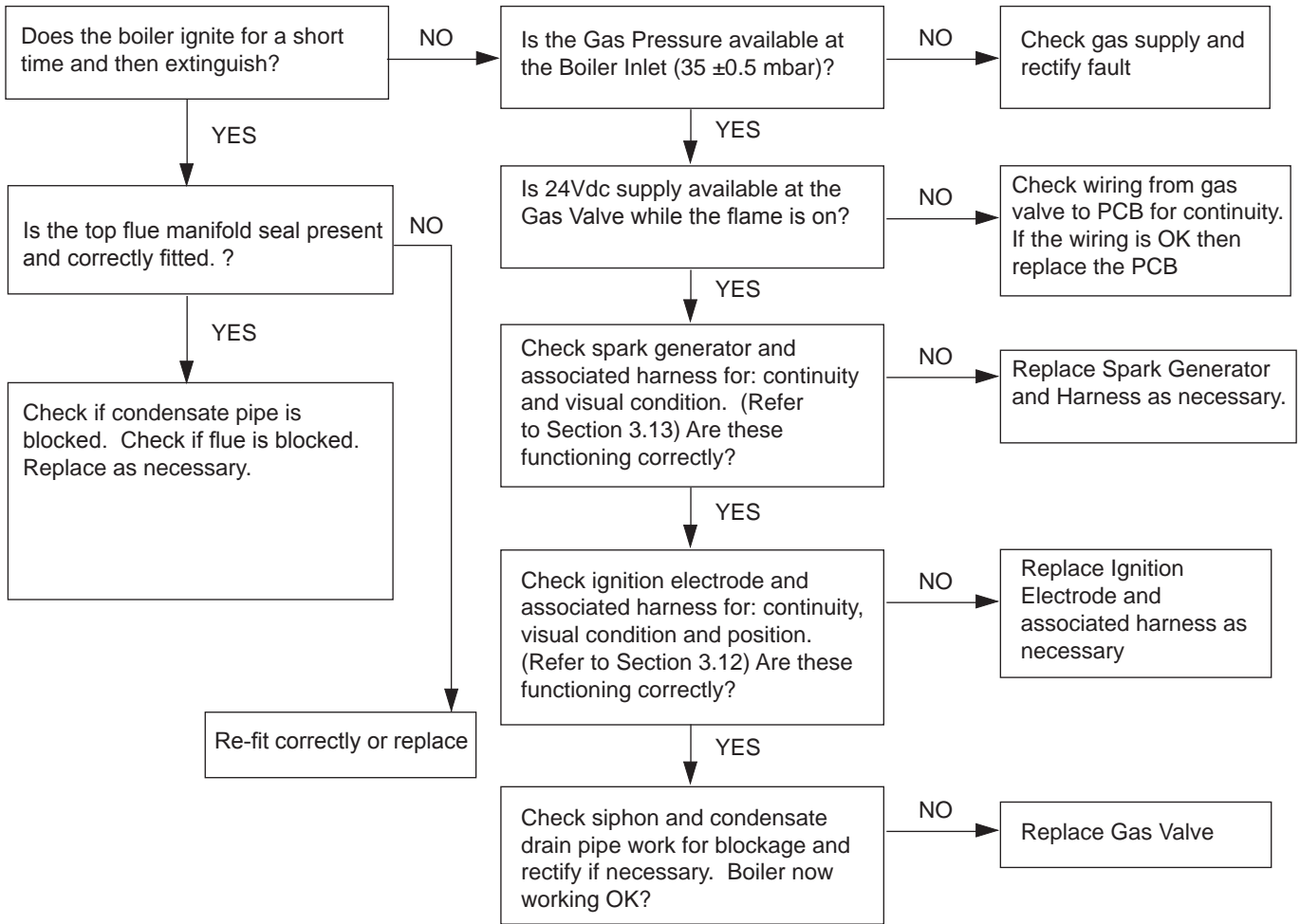


RESTART PROCEDURE - To restart boiler, press and release the restart button.

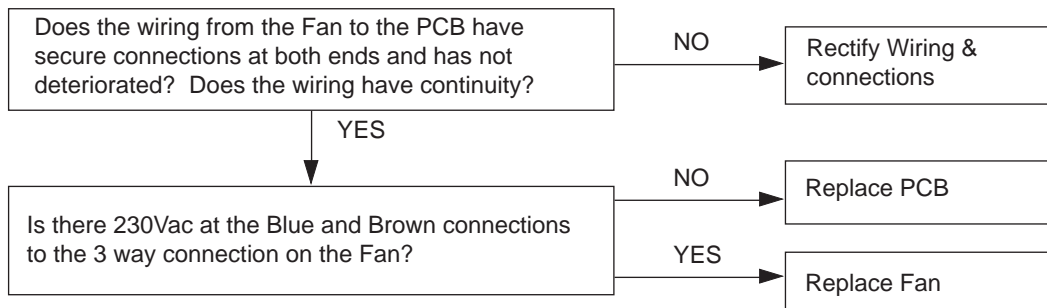
4.9 'F1' - LOW WATER PRESSURE



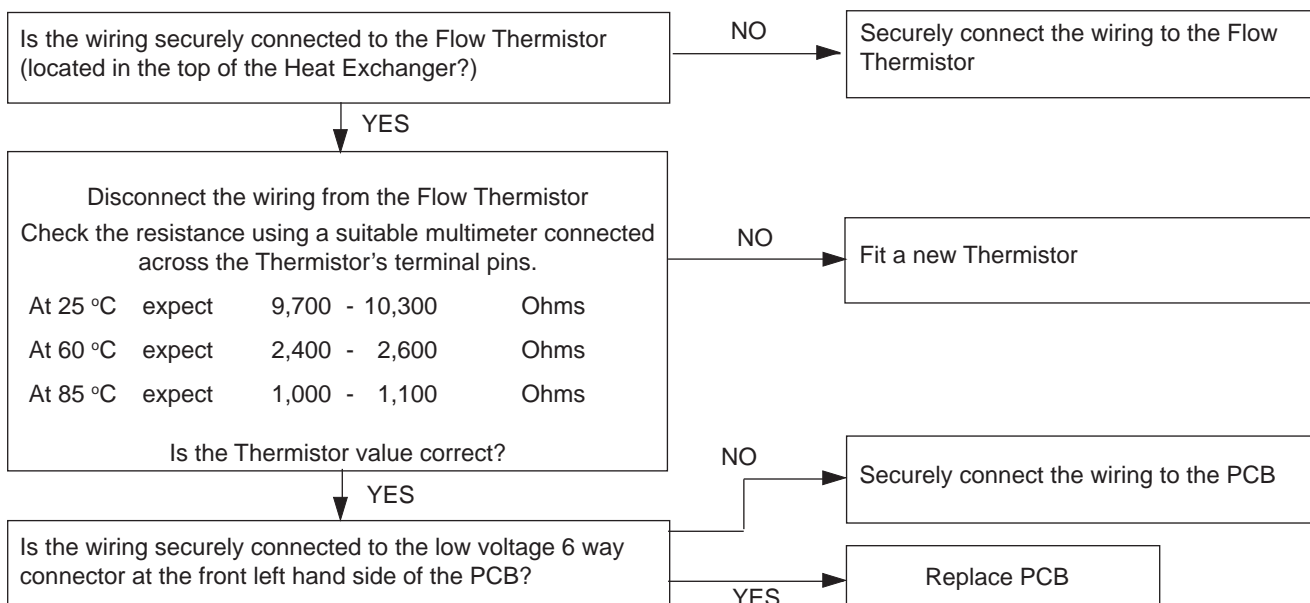
4.10 'F2 OR FN OR LN' - FLAME LOSS



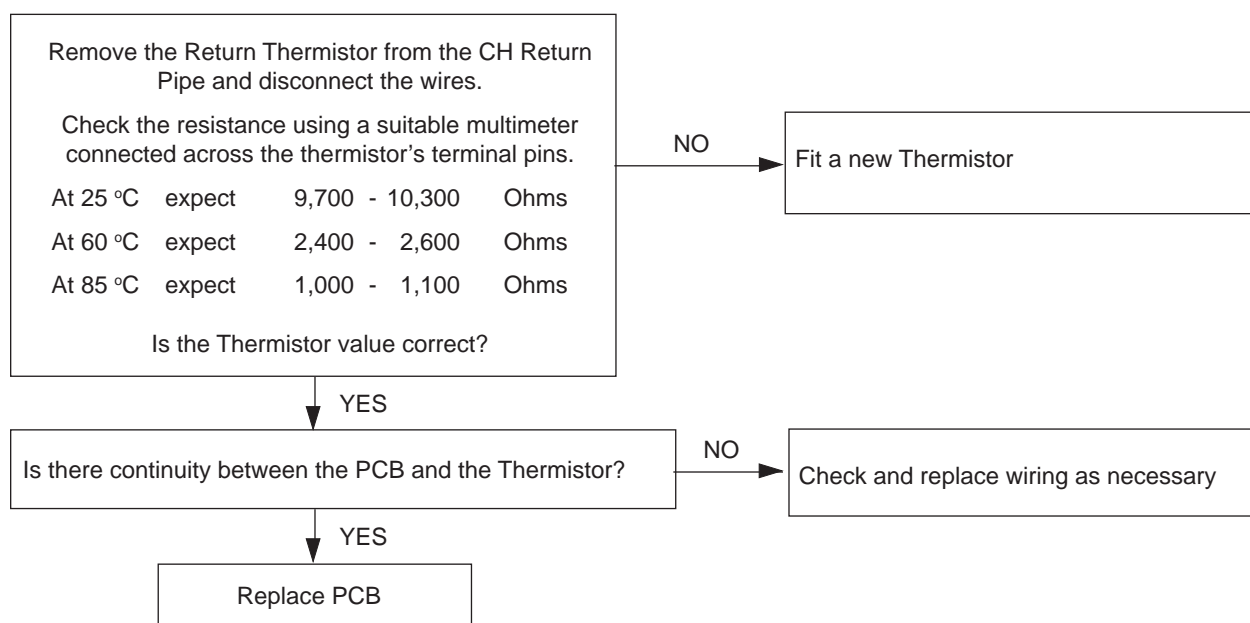
4.11 'F3' - FAN FAULT



4.12 'F4 OR L4' - FLOW THERMISTOR FAULT

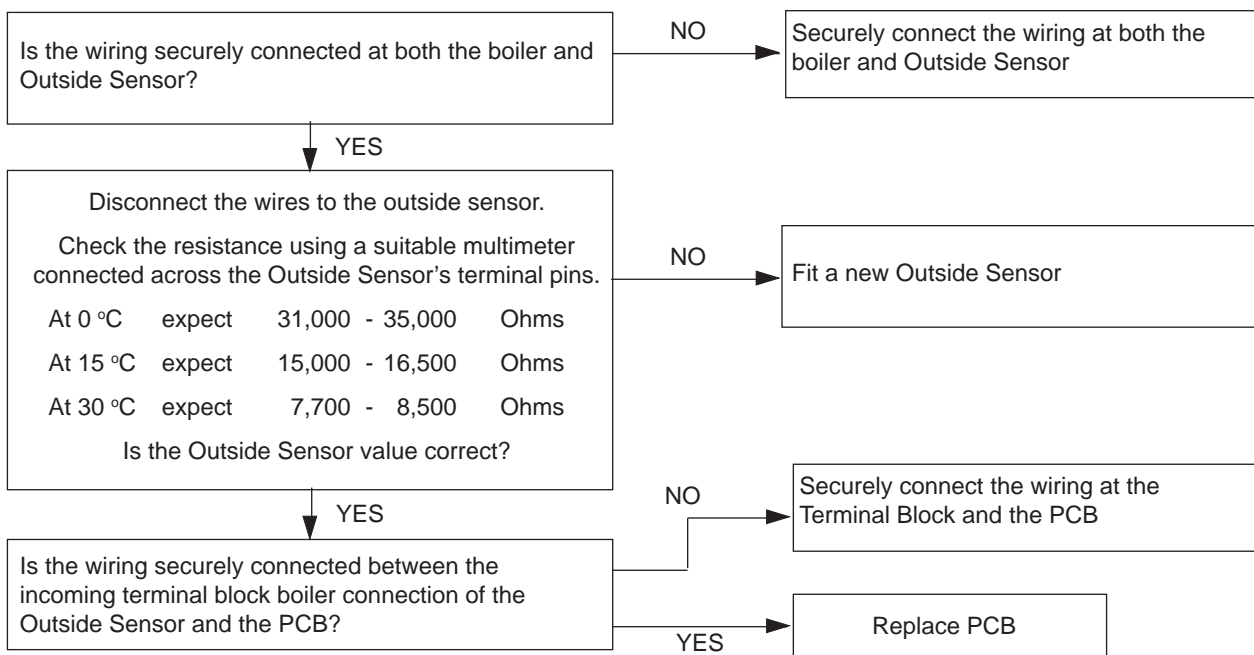


4.13 'F5 OR L5' - RETURN THERMISTOR FAULT

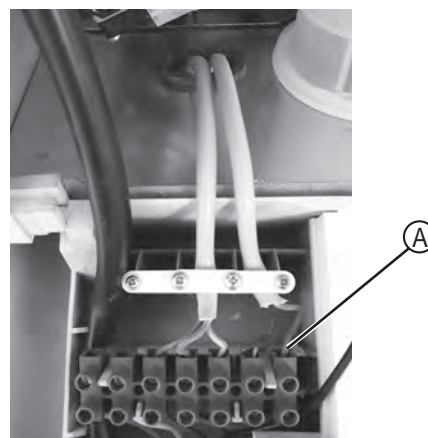
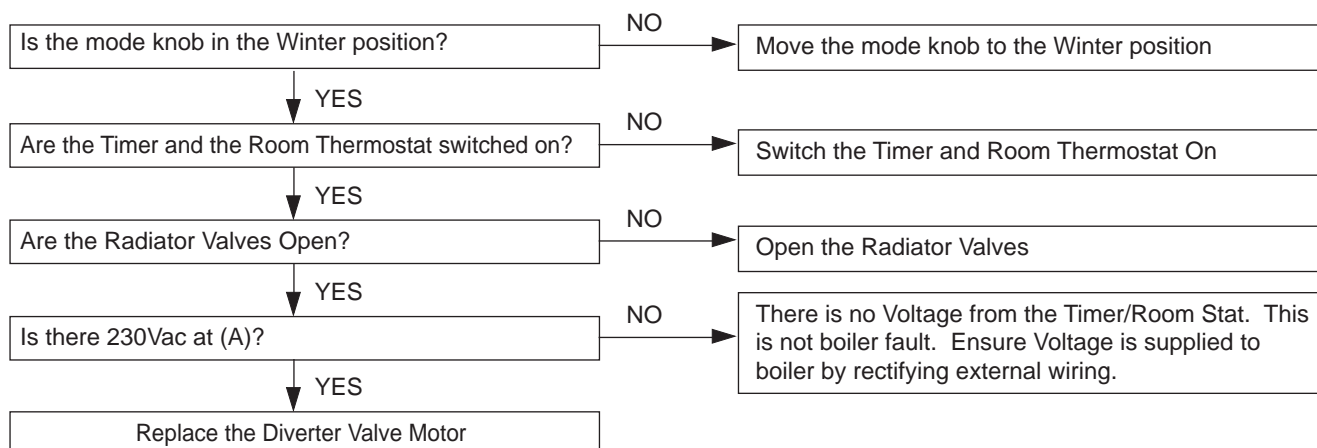


4.14 'F6' - OUTSIDE SENSOR FAULT

IMPORTANT: If no outside sensor is fitted & F6 fault is shown, replace PCB.

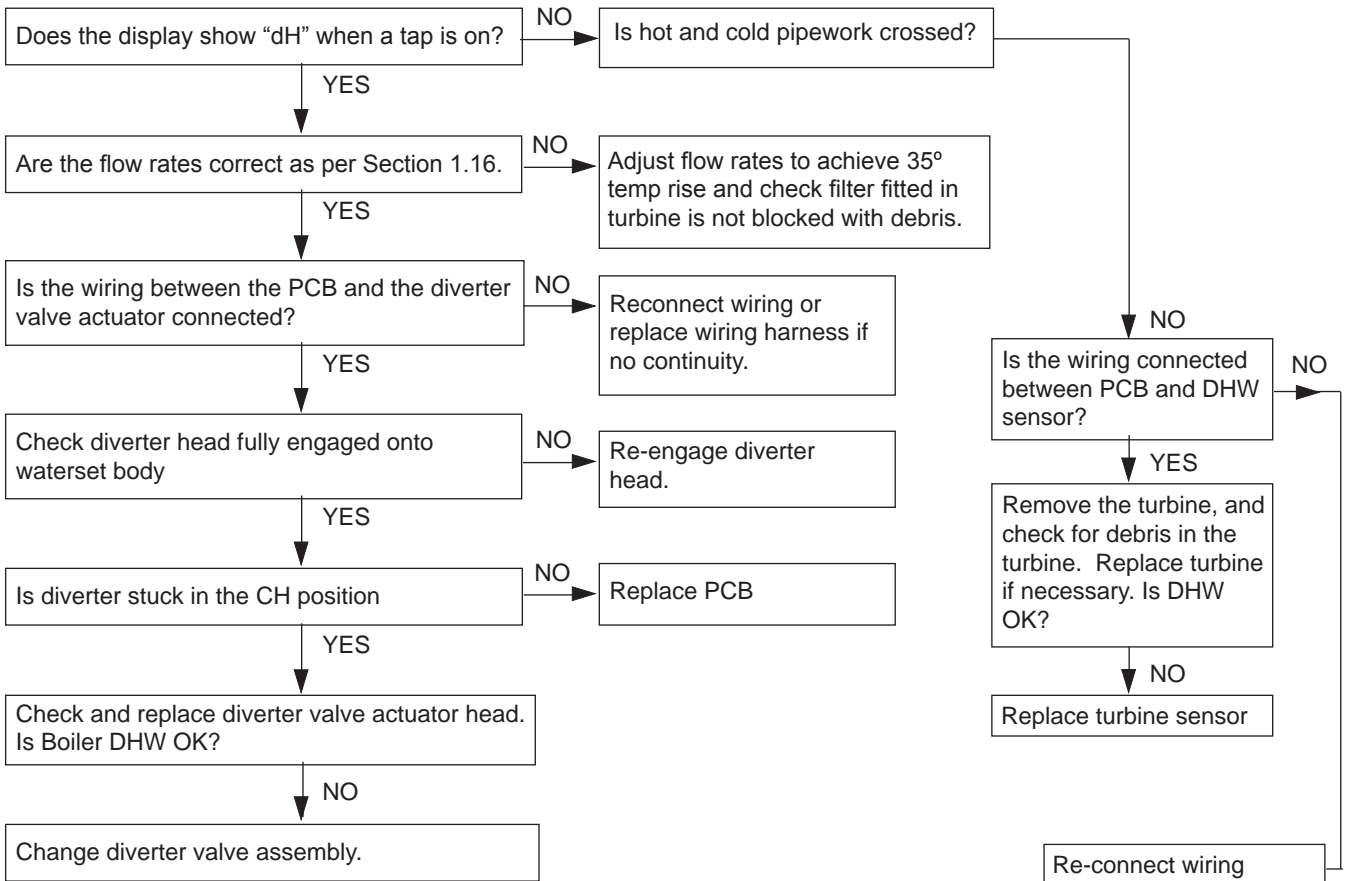


4.15 NO CH OPERATION BUT HW WORKS OK

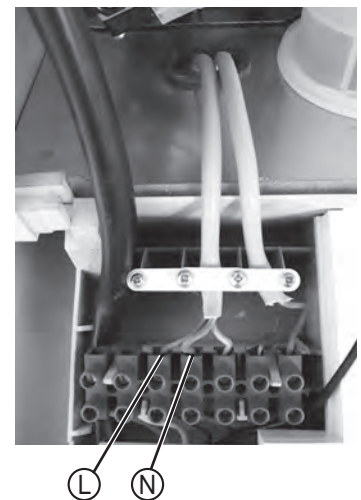
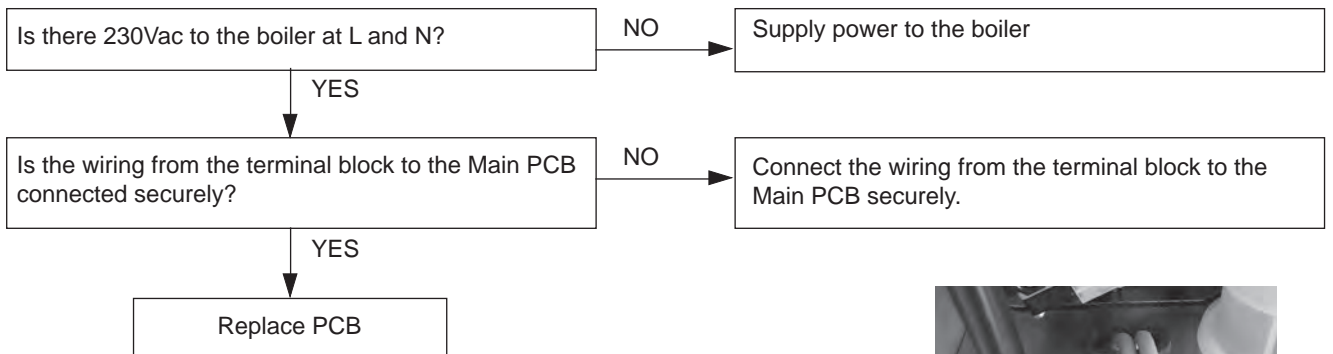


SECTION 4 - FAULT FINDING

4.16 NO HW BUT CH ON



4.17 NO DISPLAY



For more detailed servicing information, workshop manuals, technical advice, spare parts, product training, please phone us on 01482 325456 or contact us at the address below:

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