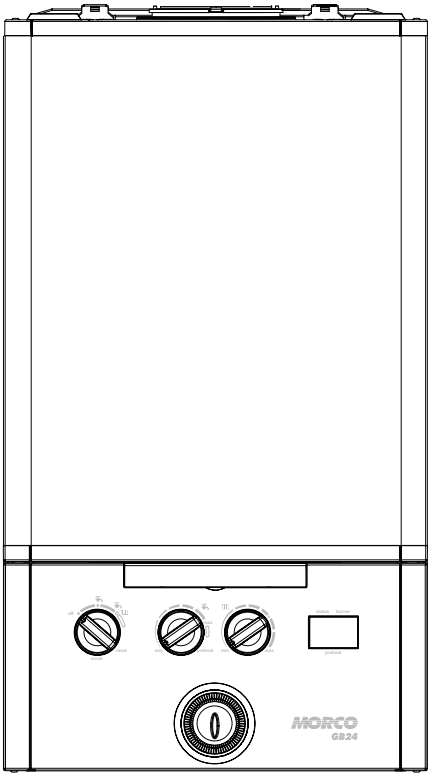
GB24 & GB30

Technical Instructions



BOILER OUTPUT

To Domestic Hot Water:

GB24/30 Minimum 8.0 kW (27,296 Btu/h)
GB24 Maximum 24.2 kW (82,570 Btu/h)
GB30 Maximum 30.3 kW (103,384 Btu/h)

To Central Heating:

GB24/30 Minimum 8.0 kW (27,296 Btu/h)
GB24/30 Maximum 24.2 kW (82,570 Btu/h)

CE

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Morco GB24 & GB30

Combination Boiler

Destination Country:

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

CONTENTS

Table 1 - General Data

Morco GB			24	30
Gas supply			I_{3p} - G31 - 37mbar	
Gas Supply Connection			15mm copper compression	
Injector Size		(mm)	3.75	3.75
Inlet Connection	Domestic Hot Water		G1/2	
Outlet Connection	Domestic Hot Water		G1/2	
Flow Connection	Central Heating		G3/4	
Return Connection	Central Heating		G3/4	
Flue Terminal Diameter		mm (in)	100 (4)	
Average Flue Temp-Mass Flow Rate		(DHW)	63°C - 11g/s	68°C - 13g/s
Maximum Working Pressure (Sealed Systems)		bar (lb/in²)	2.5 (36.3)	
Maximum Domestic Hot Water Inlet Pressure		bar (lb/in²)	10.0 (145)	
Minimum Domestic Hot Water Inlet Pressure*		bar (lb/in²)	0.8 (11.6)	1.3 (18.9)
Electrical Supply			230 V ~ 50 Hz.	
Power Consumption		W	146	152
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 (lb)	33.8 (74.4)	34.1 (75.2)
Maximum Installation Weight		kg (lb)	31 (68.3)	31.2 (68.8)
Boiler Casing Size	Height	mm (in)	700 (27.5)	
	Width	mm (in)	395 (15.5)	
	Depth	mm (in)	285 (11.2)	

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

Table 2 - Performance Data - Central Heating

Boiler Input :			Max.		Min.	
			24	30	24	30
Boiler Input 'Q'	Nett CV	kW	24.3	24.3	8.0	8.0
		Btu/h	82,912	(82,912	27,296	27,296
	Gross CV	kW	26.4	26.4	8.7	8.7
		Btu/h	90,077	90,077	29,684	29,684
Gas Consumption		m³/h	1.00	1.25	0.329	0.329
		ft³/h	35.33	44.20	11.62	11.62
		kg/h	1.83	2.26	0.58	0.58
Boiler Output :						
Non Condensing		kW	24.2	24.2	8.00	8.00
70°C Mean Water temp.		Btu/h	82,570	82,570	27,296	27,296
Condensing		kW	25.6	25.6	8.5	8.5
40°C Mean Water temp.		Btu/h	87,347	87,347	29,002	29,002
Seasonal efficiency* SEDBUK 2005					91%	91.1%
Seasonal efficiency* SEDBUK 2009					89%	89%
NOx Classification			CLASS 5			

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	m³/h	1.00	1.25
	ft³/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:

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

Key to symbols

PMS = Maximum operating pressure of water

C_{13} C_{33} = 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.

1.1 INTRODUCTION

The **Morco GB** 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 8.0 to 24.2kW (27,296 to 82,570 Btu/h)

30 8.0 to 24.2kW (27,296 to 82,570 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 and the boiler features a DHW preheat facility.

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.

OPERATION

With no demand for CH, the boiler fires only when DHW is drawn off, or periodically for a few seconds without any DHW draw-off, in order to maintain the DHW calorifier in a heated condition. This only occurs if pre-heat on.

When there is a demand for CH, the heating system is supplied at the selected temperature of between 45°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 64 °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.

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.

OPTIONAL EXTRA KITS

- **Horizontal Flue Terminal (RSF305)** - (1000mm long)
- **Horizontal Flue Terminal (RSF303)** - (600mm long)
- **Flue Extension Ducts (RSF341)** - (1000mm 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)
- **90º Elbow Kit (RSF315)**
- **Flue Vertical Connector (RSF346)**

SAFETY

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

The appliance is suitable only for installation in GB and IE 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 and installed in accordance with the current edition of I.S. 813 “Domestic Gas Installations”. The current Building Regulations and reference should be made to the current ETCI rules for electrical installation.

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 - Specification for the installation of LPG systems for habitation purposes leisure accomodation 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.

SAFE HANDLING OF SUBSTANCES

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

1.2 BOILER DIMENSIONS, SERVICES & CLEARANCES

all dimensions in mm

The boiler connections are made on the boiler bulkhead fittings.

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

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

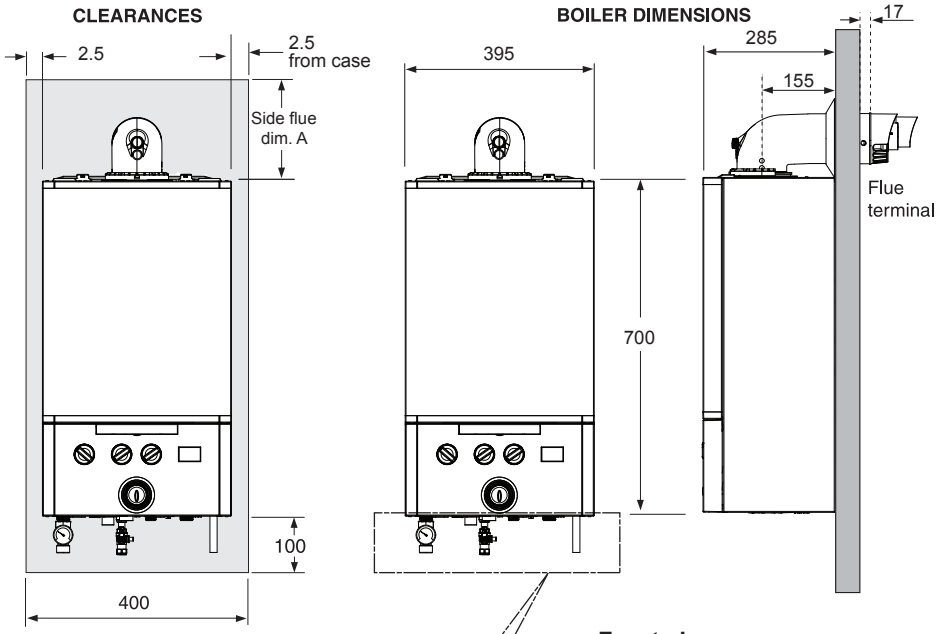
Side and Rear Flue

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 (24"). 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.

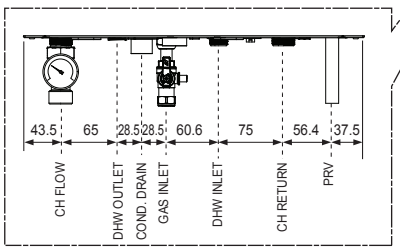
Installation from inside ONLY

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 spinning.



Inset: Water Connections and Gas Connection



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.

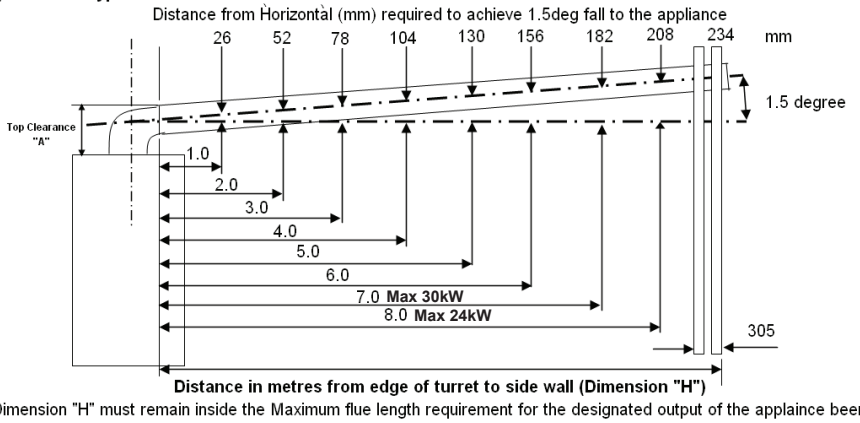
Bottom clearance

Bottom clearance after installation can be reduced to 5mm.

This must be obtained with an easily removable panel, to enable the consumer to view the system pressure gauge, and to provide the 100mm clearance required for servicing.

Min Top Clearance "A" 165mm Rear flue type

(Min Top Clearance "A") SIDE Flue type	(167)	(193)	(219	(245	(271)	(297)	(323)	(349)	(375)	(401)	mm
Distance from Horizontal (mm) required to achieve 1.5deg fall to the appliance	26	52	78	104	130	156	182	208	234		mm



1. Dimension "H" must remain inside the Maximum flue length requirement for the designated output of the applaince been installed.
2. For flue lengths requiring "D" pack extentions the flue must incline by 26mm per 1 Metre of flue length.

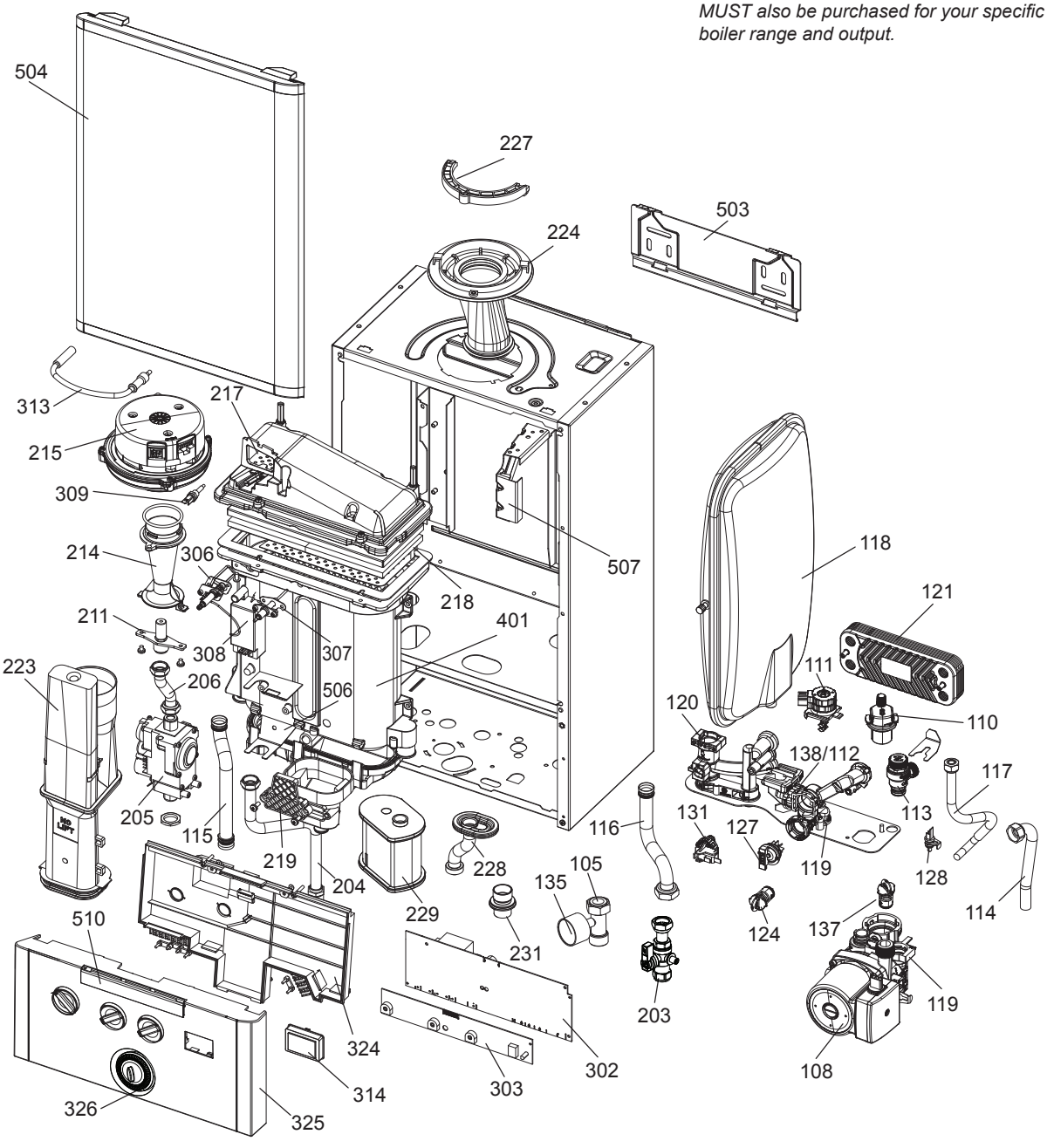
No flue length greater that the maximum flue length shown above should be exceeded.

1.3 BOILER ASSEMBLY - Exploded View

Note that item numbers are linked to the spares list

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

** Note. that production boiler PCB's are factory pre-set to operate for boiler range and output, but when ordering Primary PCB as a spare, an additional Boiler Chip Card (BCC) MUST also be purchased for your specific boiler range and output.*



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.

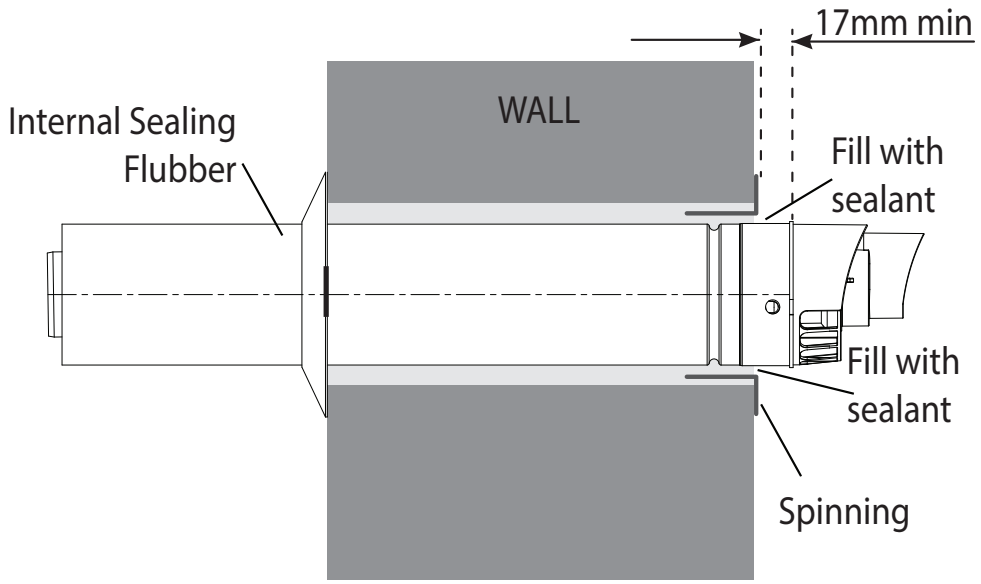
Extension Kit RSF341 - contains: 1 metre length of flue pipe (Functional length 950mm), 1 support bracket.

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 spinning by at least 17mm. The gap between the spinning 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 spinning)

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 90º bends

Minimum Horizontal Flue Lengths (Centre line of turret to outside face of the spinning)

Rear Flue - 191mm

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

2.2 DETERMINING THE FLUE LENGTH

FIGURE 1

REAR FLUE

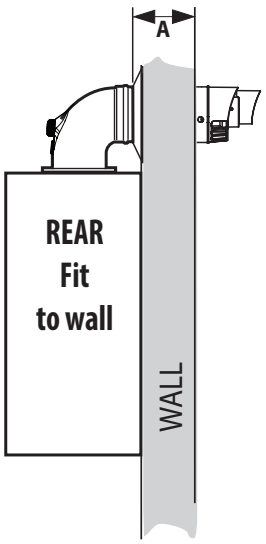
Cut flue length = distance from edge of turret to outside of wall dimension A + 47mm.

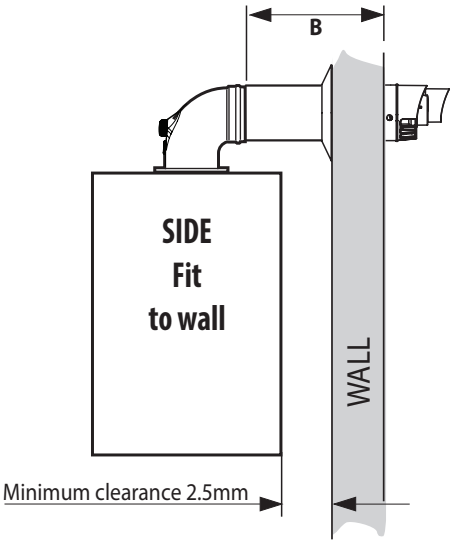
***Note**. Minimum dimension A which can be accommodated is 91mm.*

SIDE FLUE

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

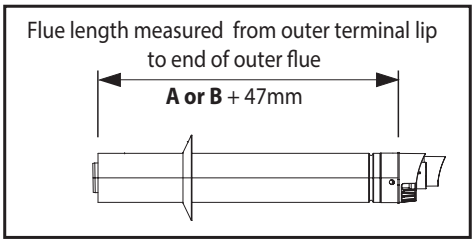
***Note**. Minimum dimension B which can be accommodated is 136mm (with minimum clearance of 2.5mm).*





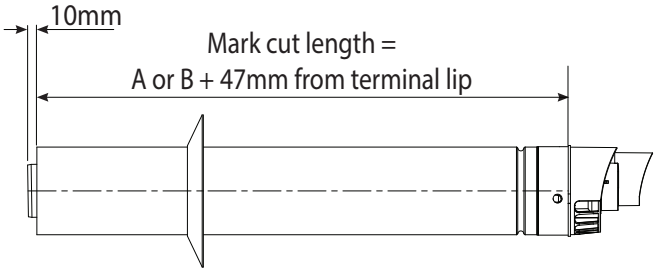
NOTES

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



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.



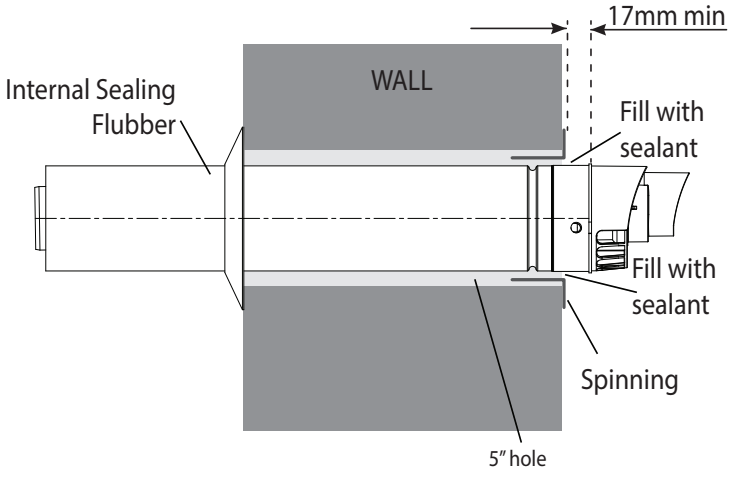
2.4 INSTALLING THE FLUE

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 spinning at least 17mm.

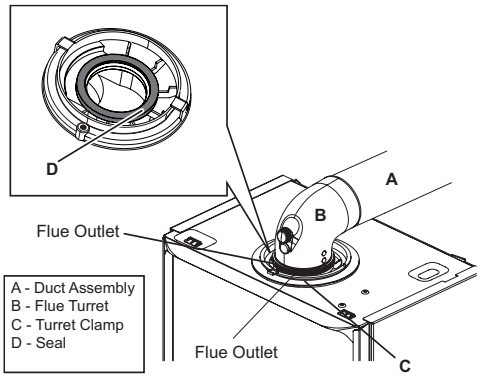
Note. If *less than 50% of the length of the flue is internal the flue should be fitted from outside.*

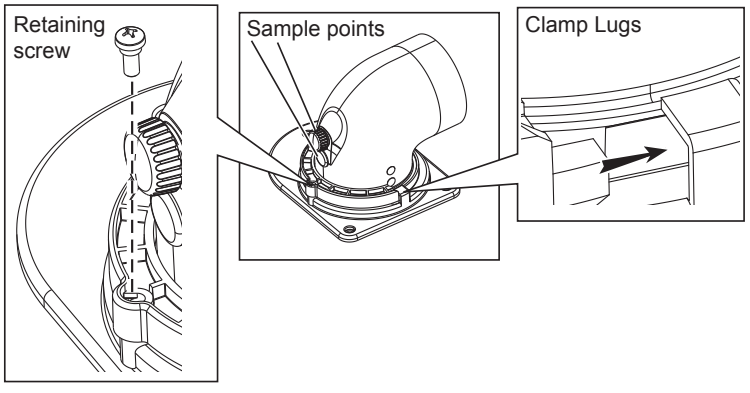
3. Fit the internal sealing flubber to the flue (leave loose) and check protrusion externally of the white air duct is 17mm.
4. Fit the turret as below



FITTING THE TURRET

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 spinning and the white air duct MUST be sealed with sealant to create a seal.



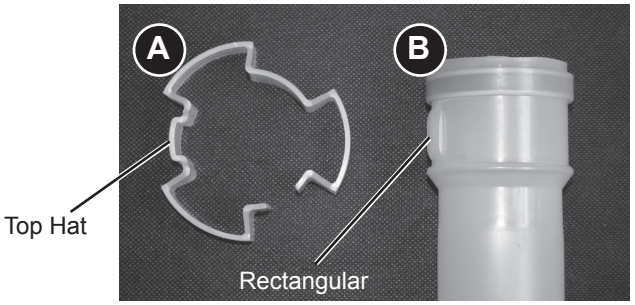


2.5 FLUE EXTENSIONS RSF341 (OPTIONAL)

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

INNER PIPE ASSEMBLY INSTRUCTIONS

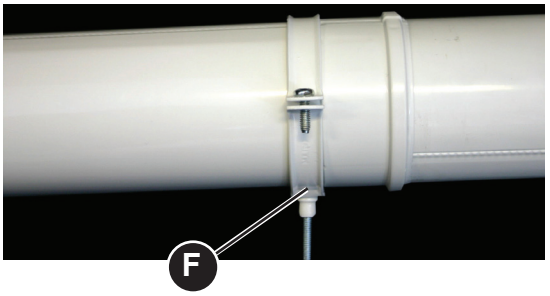
1. Make sure that 'top hat' on the collar (A) fits over the rectangular form on the inner plastic pipe (B).



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.

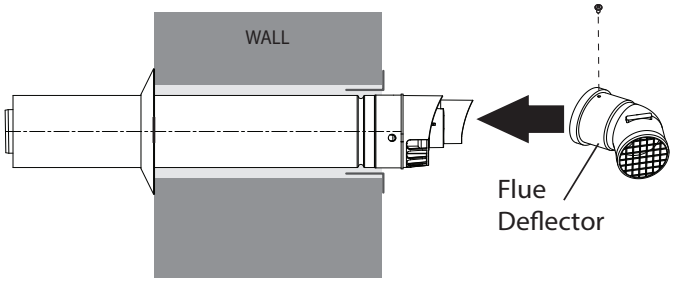
1. Refer to the boiler Installation and Servicing Instructions for fitting of the boiler and its flue system.

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 (1/8") 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 90º KIT RSF315 (OPTIONAL)

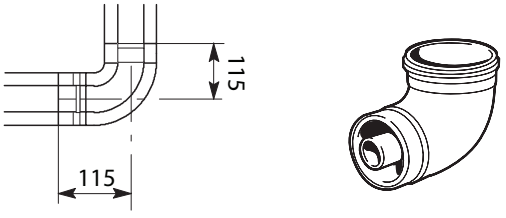
This optional kit can be used on both horizontal and vertical flue kits

1. Use dimensions below for calculating total length

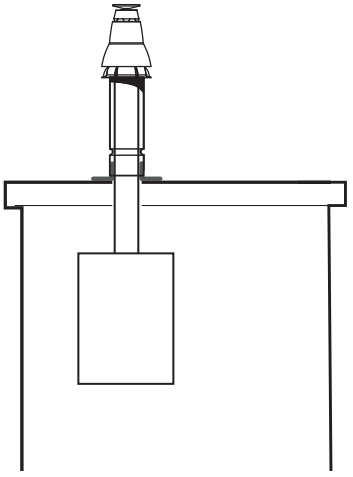
2. When cutting extensions or flue kits always allow sufficient (+ 30mm air duct + 14mm flue duct) to allow for correct engagement in the fitting

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.*



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



Note.
A flat or pitched roof flashing plate (not supplied) is required before proceeding with the installation of this kit.

This kit is suitable for both flat and 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 separately supplied vertical connector (RSF346).

WEATHER PROOFING

Where the flue passes through the roof line an adequate seal must be made. This is achieved by using either:

- Flat roof weather collar or
- Universal weather collar.

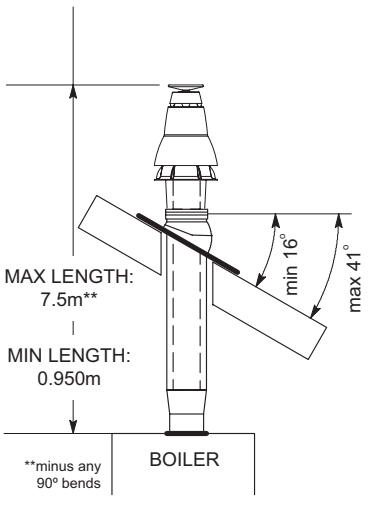
ACCESSORIES

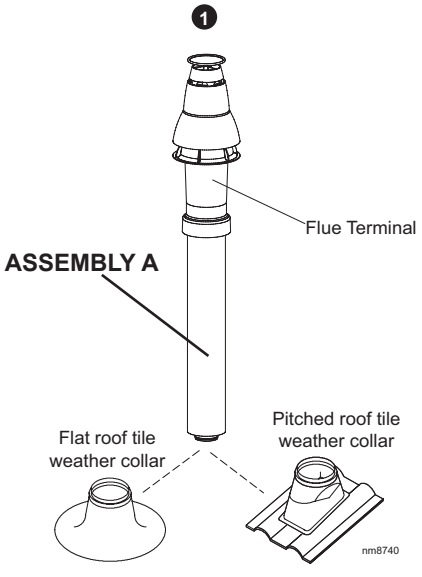
Flue Duct Extension Kits are available for flue lengths extending beyond 1m. These packs contain 1m extension ducts and may be cut to the desired length. If 90º elbows are used (RSF315) they will reduce the overall height by 1m per elbow.

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 flashing 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.

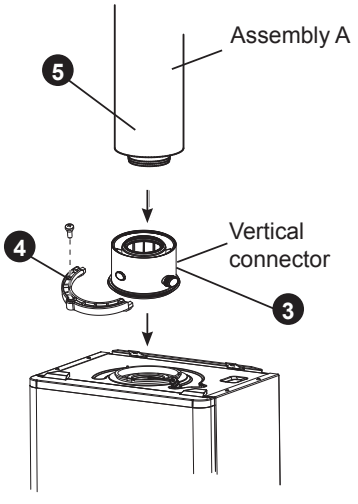
3. Fit the vertical connector (supplied separately) and secure the vertical connector by applying downward pressure on the connector.

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.

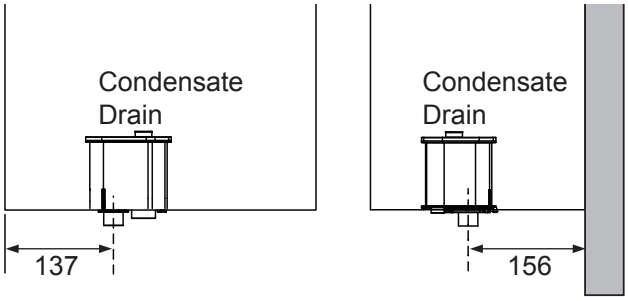
5. “Push” assembly A into vertical connector.

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

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



2.10 CONDENSATE DRAIN



This appliance is fitted with a siphonic 75mm 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:

a. 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.
b. Plastic with push fit or solvent connections.
c. Internal plastic pipe work a minimum of 19mm ID (typically 22mm OD)
d. External plastic pipe must be a minimum of 30mm ID (typically 32 OD) before it passes through the sleeved wall.
e. All horizontal pipe runs, must fall a minimum of 45mm per metre away from the Boiler.
f. External & unheated pipe work should be kept to a minimum and insulated with Class "O" waterproof pipe insulation.
g. All installations must be carried out in accordance to the relevant connection methods as shown in the "Condensate installation diagrams" & BS6798:2009
h. Pipe work must be installed so that it does not allow spillage into the dwelling in the event of a blockage (through freezing)
i. 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 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. See Fig 6.
- Where the condensate drain pipe terminates in a purpose designed soak away (see BS 6798) any above ground condensate drain pipe sections should be run and insulated as described above. See Fig 7

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

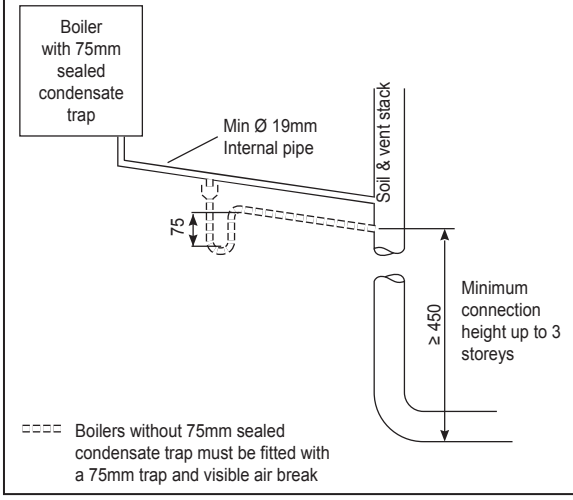
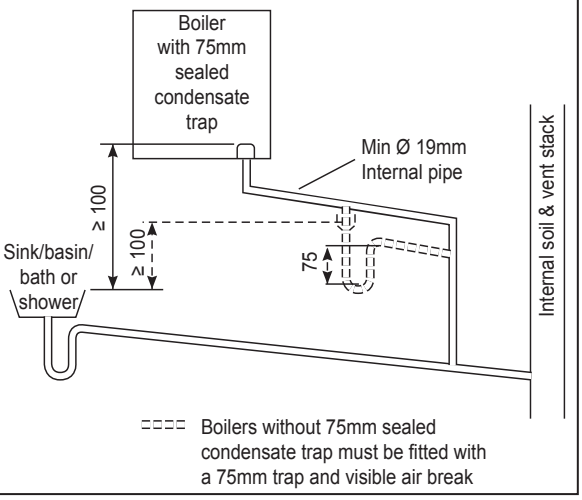


Figure 2 - Connection of a Condensate Drainage Pipe Downstream of a Sink, Basin, Bath or Shower Water Trap to Internal Soil Vent Stack



continued . . . . .

CONDENSATE DRAIN - CONT'D.....

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

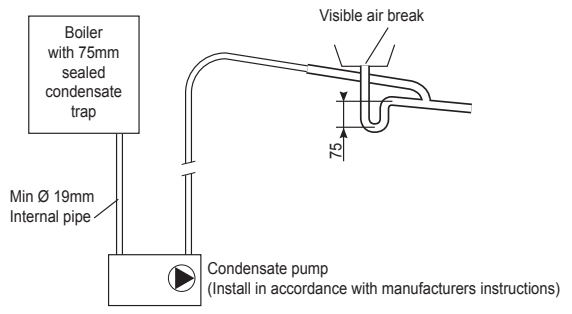


Figure 4 - Connection of Condensate Drainage Pipe to External Soil & Vent Stack

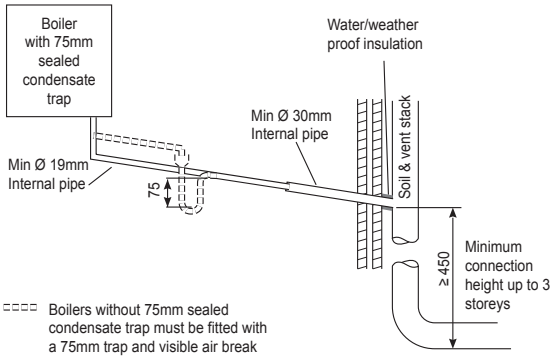


Figure 5 - Connection of a Condensate Drainage Pipe to an External Rainwater Downpipe (only combined foul/rainwater drain)

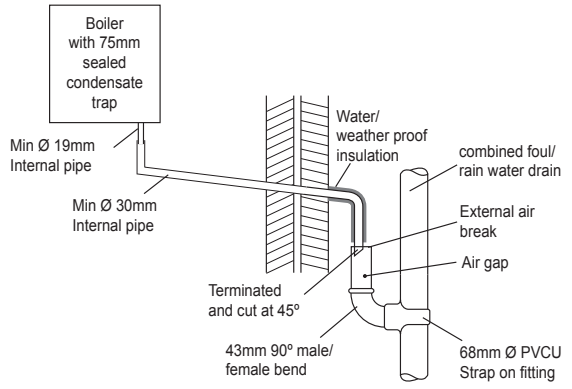


Figure 6 - Connection of Condensate Drainage Pipe Upstream of a Sink, Basin, Bath or Shower Waste Trap to External Drain, Gulley or Ranwater Hopper

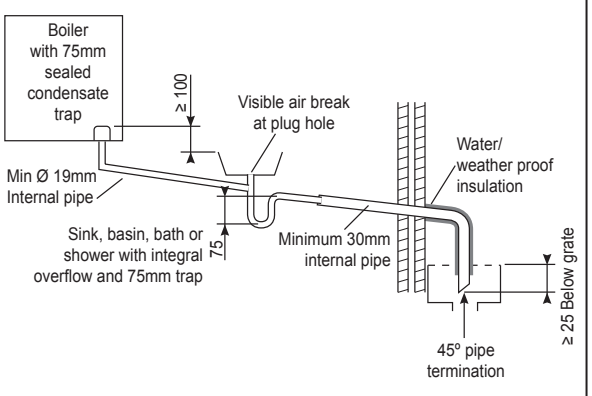
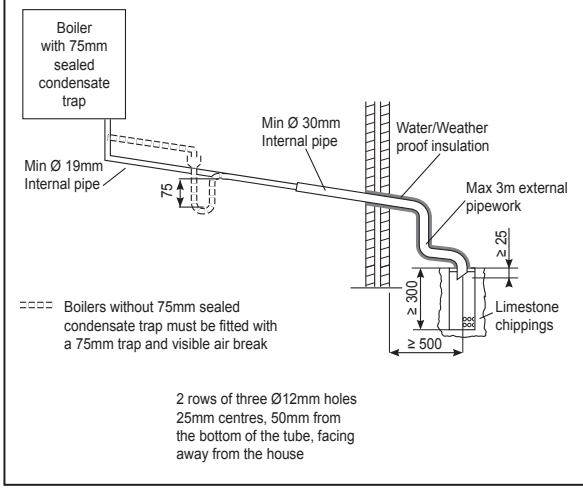
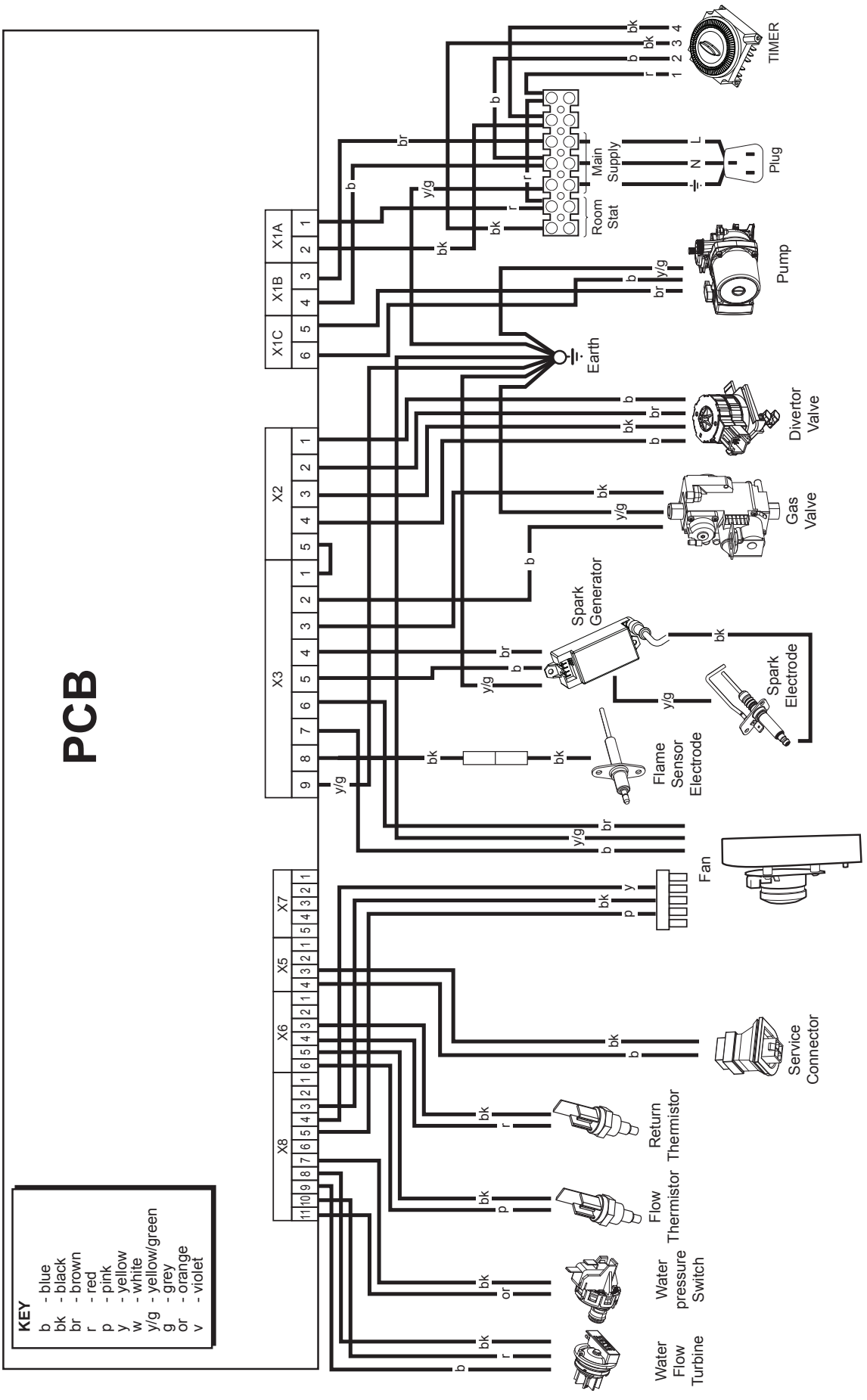


Figure 7 - Connection of a Condensate Drainage Pipe to an External Purpose Made Soak Away.



2.11 WIRING DIAGRAM



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 Frame 3.2.

1. Clean the main burner. Refer to Frame 3.4.

2. Clean the heat exchanger & condensate trap/siphon. Refer to Frames 3.5 & 3.6.

3. Check the main injector for blockage or damage. Refer to Frame 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 Frame 3.30.

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

IMPORTANT.

6. After completing the servicing or exchange of components always test for gas tightness.

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 & CO_2.

If the CO/CO_2 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.

11. Complete the service section.

GENERAL

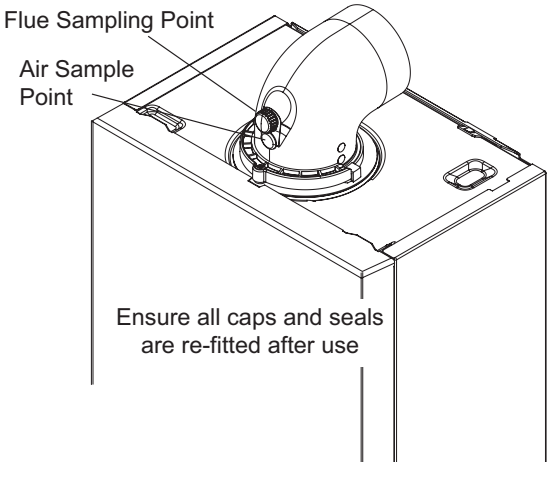
Please Note: During routine servicing, and after any maintenance or change of part of the combustion circuit, the following must be checked:

- 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, and
- Competence can be demonstrated, for example, by satisfactory completion of the CPA1 ACS assessment (UK only), which covers the use of electronic portable combustion gas analysers in accordance with BS7967, Parts 1 to 4.



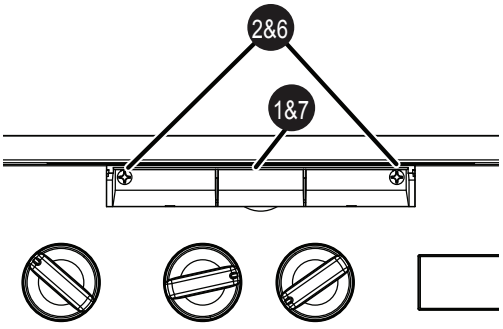
3.2 BOILER UPPER & LOWER FRONT PANEL REMOVAL / REPLACEMENT

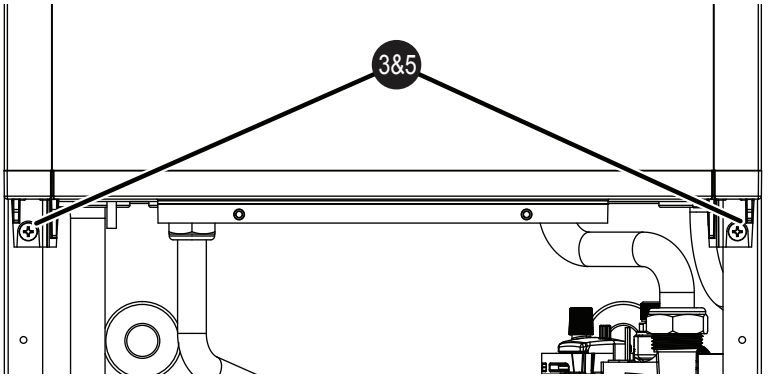
REMOVAL

1. Lift the lower front panel access panel.
2. Unscrew the two fixing screws, 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

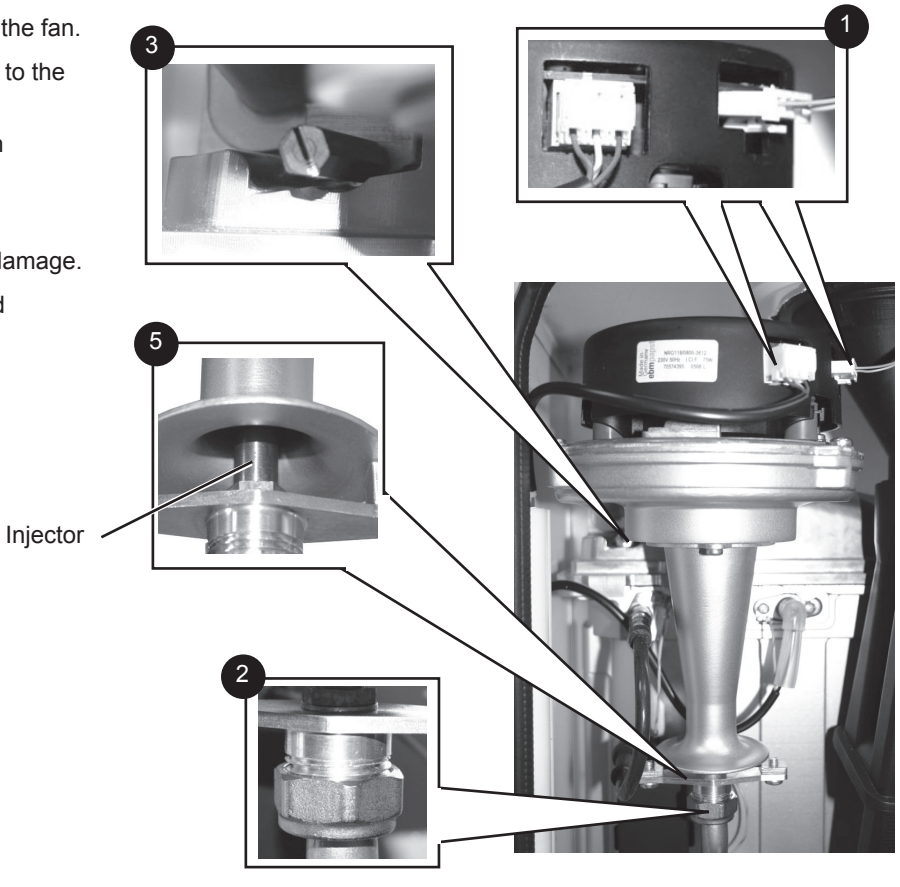
4. Hook the upper panel onto the top retaining clips.
5. Retain the upper panel with the two fixing screws previously removed ensuring a good seal is made.
6. Swing the lower front panel up and retain with the two screws.
7. Close the lower front panel access panel.



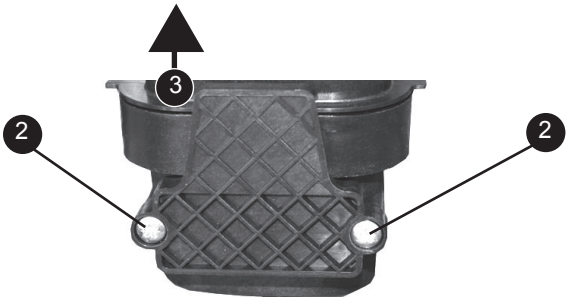


3.3 FAN AND VENTURI ASSEMBLY REMOVAL AND CLEANING

1. Disconnect the electrical leads from the fan.
2. Undo the gas pipe union connection to the injector housing.
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 AND CLEANING

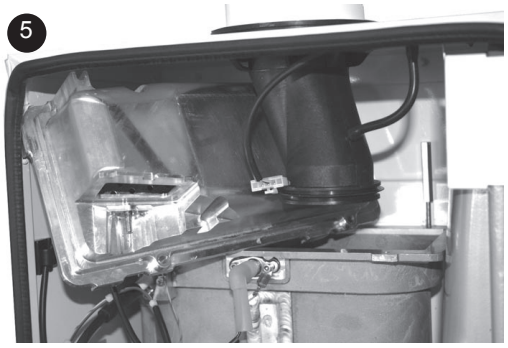


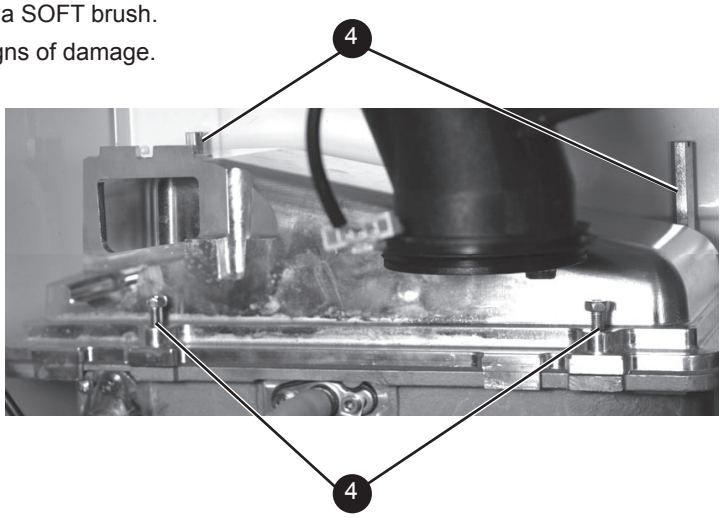
1. Ensure the sump is fully drained
2. Undo the two screws and remove the sump cover retaining the lower flue manifold.
3. Lift the manifold to clear the bottom sealing gasket and remove manifold.
4. Remove the 2 burner front fixing screws and loosen the 2 rear extended nuts by at least ten turns.
5. 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.



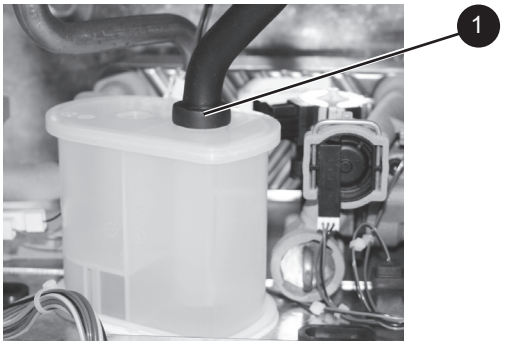


3.5 CLEANING THE CONDENSATE TRAP/SIPHON

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*

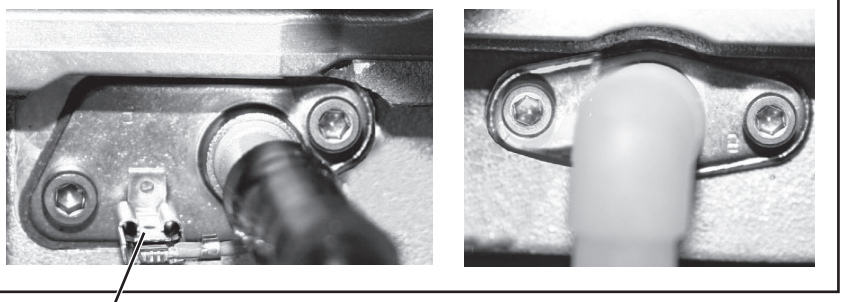


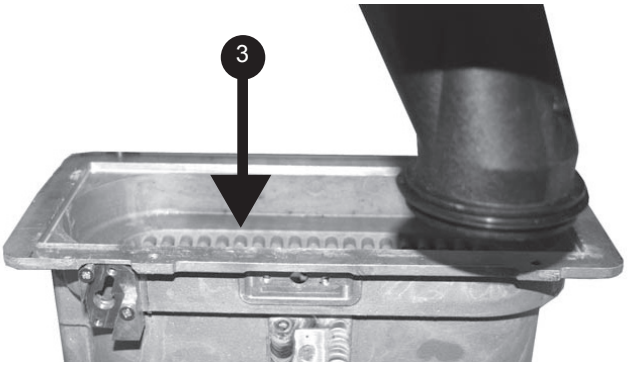
3.6 CLEANING THE HEAT EXCHANGER

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

1. Remove ignition and flame detection electrodes. Refer to Frames 3.12 & 3.13.
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 and detection electrodes. Ensure that they are clean and in good condition - replace if necessary.
6. Re-fit the ignition and flame detection electrodes. Ensure that earth wire is connected to the electrode
7. Check that the ignition and detection gaps are correct. Refer to Frames 3.12 & 3.13.

1



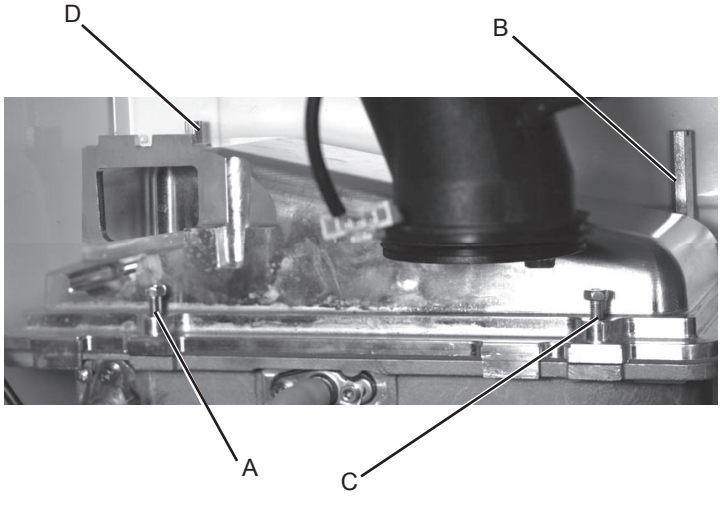


3.7 REASSEMBLY

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 Frame 3.2.

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

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

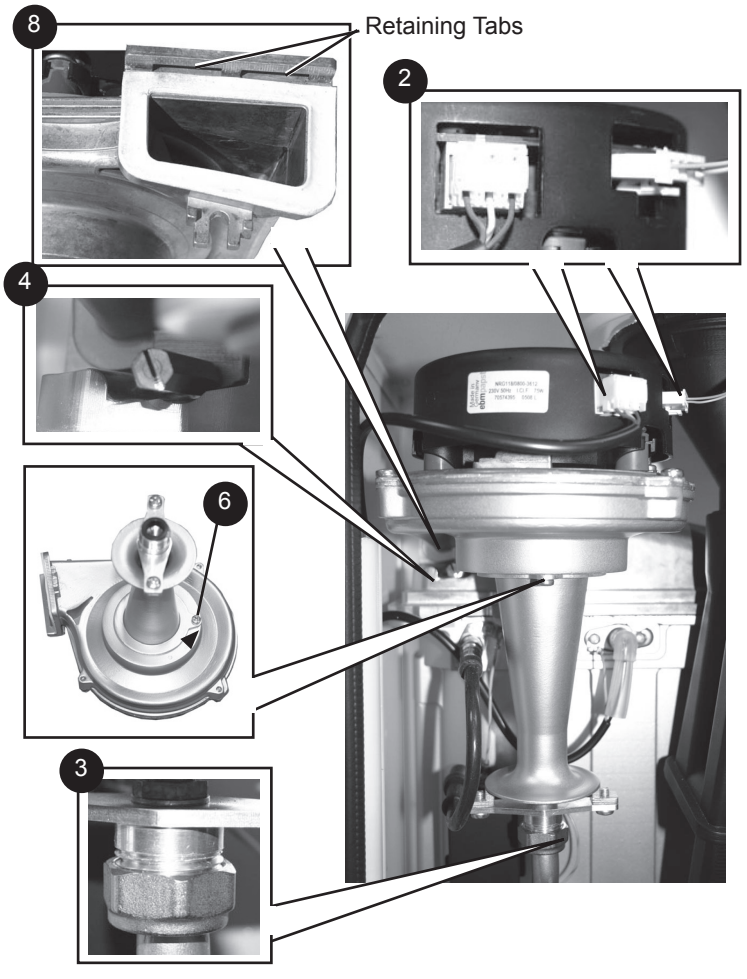
Notes.

1. *In order to assist fault finding, the control panel has an LED diagnostic display.*
2. *In order to replace components in Frames 3.22-3.35 it is necessary to drain the boiler. Refer to Frame 3.21.*

THE BOILER MUST NOT BE OPERATED WITHOUT THE FRONT PANEL FITTED

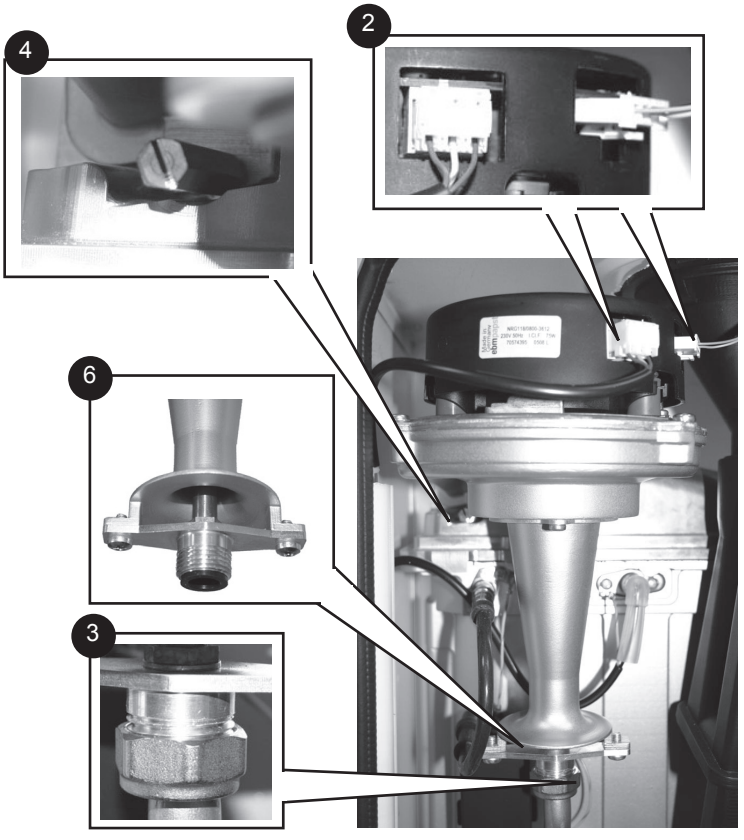
3.9 FAN REPLACEMENT

1. Refer to Frame 3.8.
2. Disconnect the electrical leads from the fan.
3. Undo the gas pipe union connection to the injector housing.
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.
10. Check the operation of the boiler.



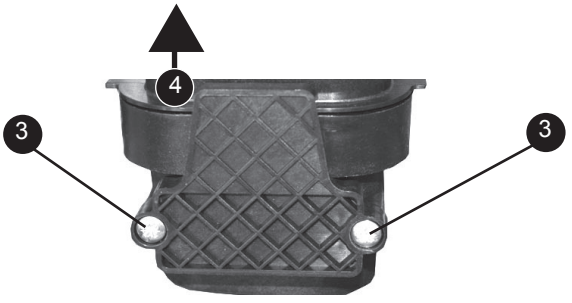
3.10 BURNER INJECTOR REPLACEMENT

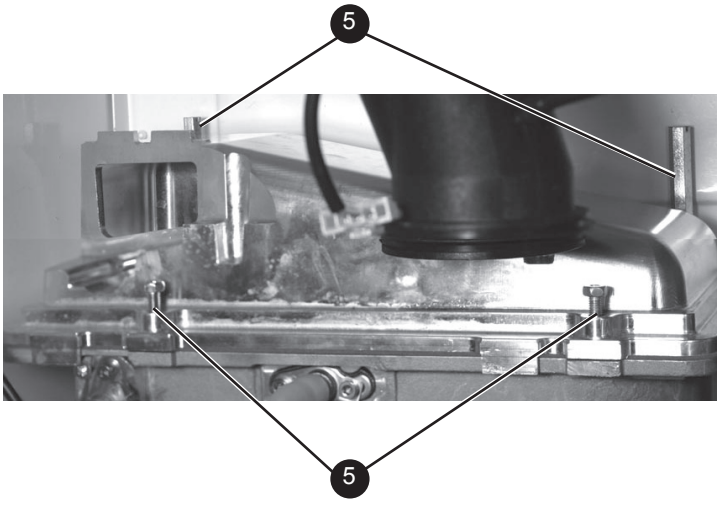
1. Refer to Frame 3.8.
2. Disconnect the electrical leads from the fan.
3. Undo the gas pipe union connection to the injector housing.
4. Loosen the screw retaining the fan mounting bracket.
5. Lift and remove the fan and venturi assembly.
6. Remove the 2 injector housing screws.
7. Withdraw the injector 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 Frame 3.8.
2. Refer to Frame 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.

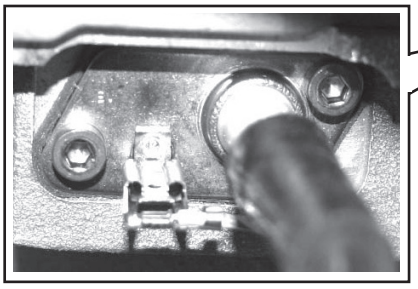


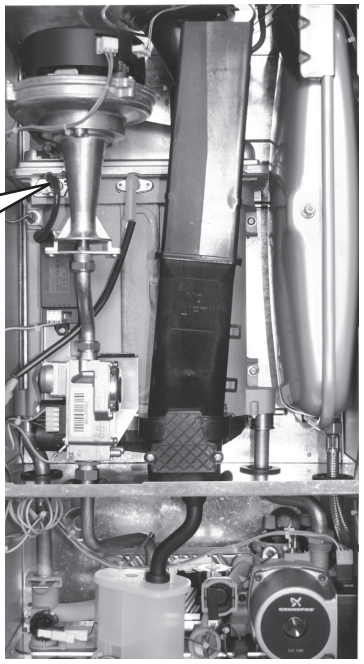


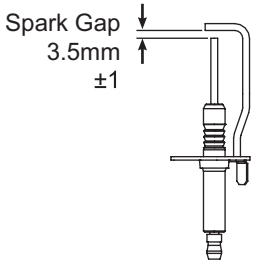
3.12 IGNITION ELECTRODE REPLACEMENT

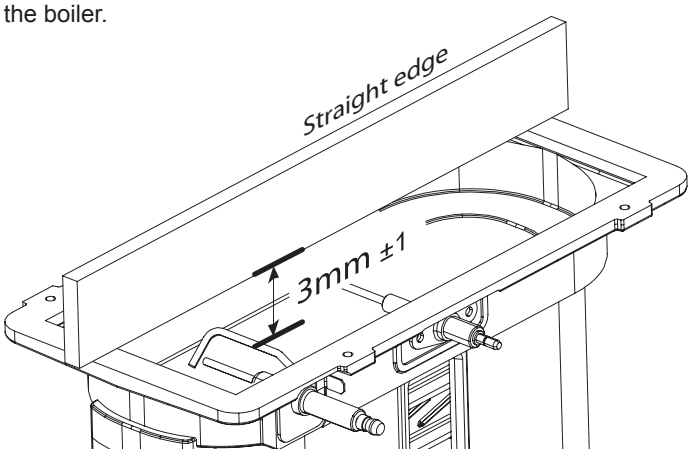
1. Refer to Frame 3.8.
2. Remove the burner. Refer to Frame 3.10.
3. Unplug the ignition lead from the electrode.
4. Remove the earth lead from the ignition electrode.
5. Remove the 2 screws holding the ignition electrode to the combustion chamber.
6. Remove the electrode.
7. Fit the new ignition electrode,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

Ignition Electrode





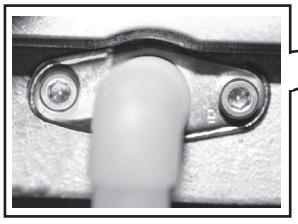


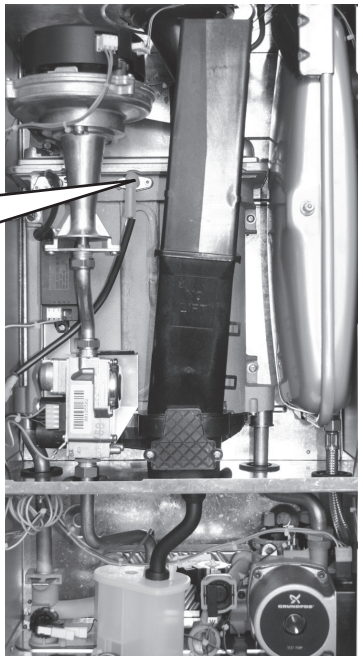


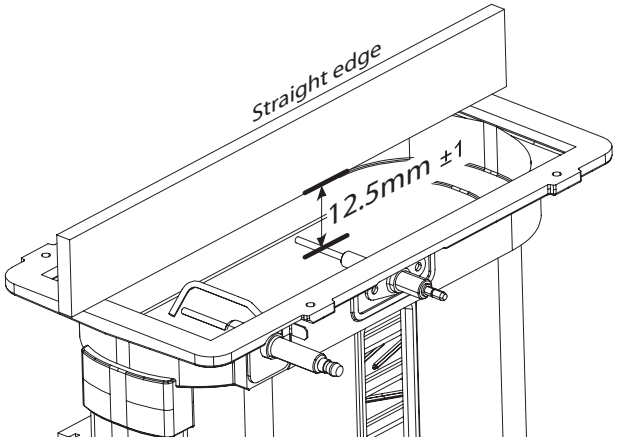
3.13 FLAME DETECTION ELECTRODE REPLACEMENT

1. Refer to Frame 3.8.
2. Remove the burner. Refer to Frame 3.10.
3. Unplug the flame detection lead from the electrode.
4. Remove the 2 screws retaining the detection electrode.
5. Remove the electrode.
6. Fit the new flame detection electrode, using the new gasket supplied.
7. Reassemble in reverse order.
8. Check the operation of the boiler.

Flame Detection Electrode



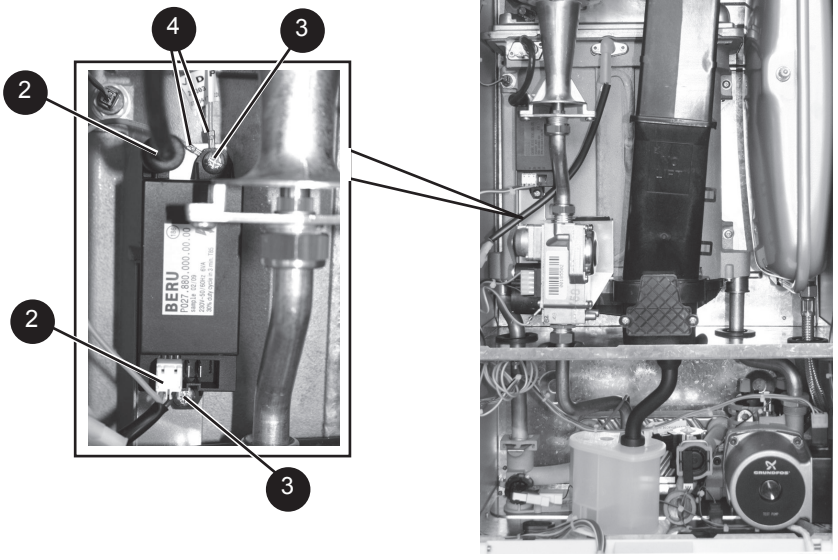




3.14 SPARK GENERATOR REPLACEMENT

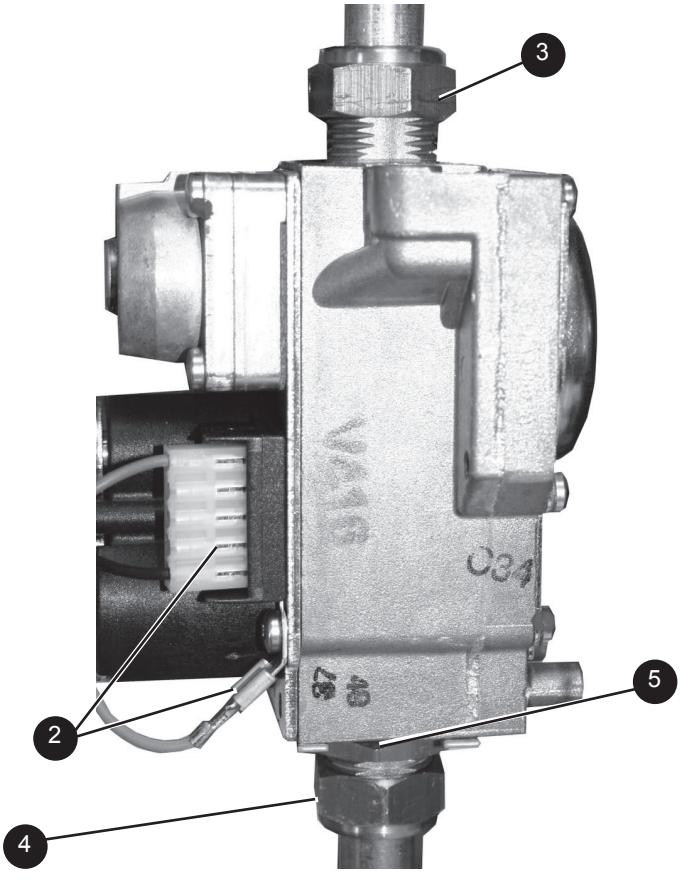
1. Refer to Frame 3.8.
2. Disconnect the leads from the spark generator.
3. Remove the M5 screws securing the spark generator to the boiler chassis.
4. Fit the new spark generator and re-assemble in reverse order ensuring the two earth leads are correctly replaced.
5. Check operation of the boiler.

Spark Generator



3.15 GAS CONTROL VALVE REPLACEMENT

1. Refer to Frame 3.8.
2. Unplug the electrical lead connection from the gas control valve and disconnect the earth wire.
3. Undo the union nut on the outlet of the gas control valve.
4. Undo the gas inlet pipe union at the inlet to the gas control valve.
5. Loosen the back nut retaining the valve to the bracket and withdraw the valve forwards.
6. Fit the new gas control valve ensuring the two sealing washers are in place and reconnect gas and electrical connections.
7. Check operation of the boiler.

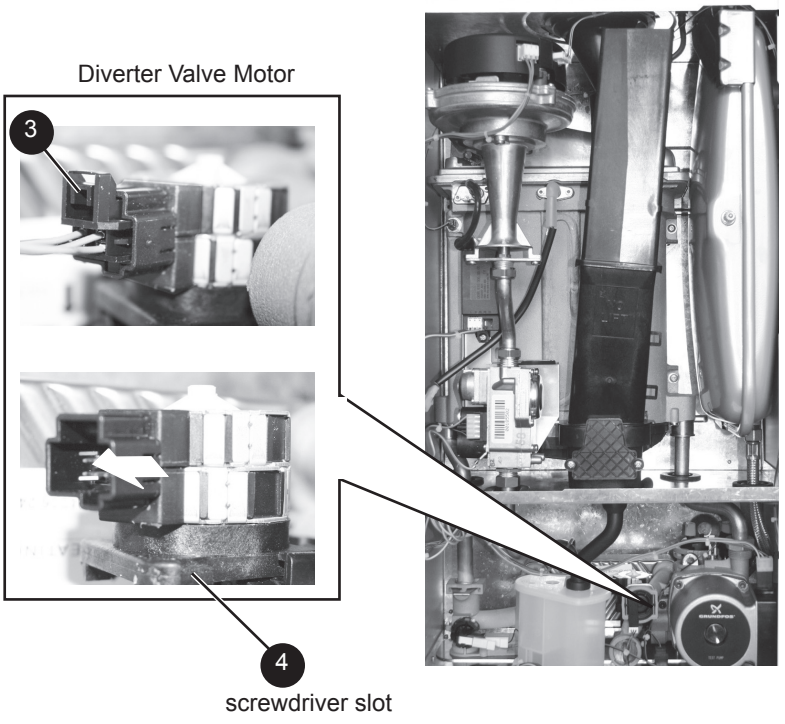


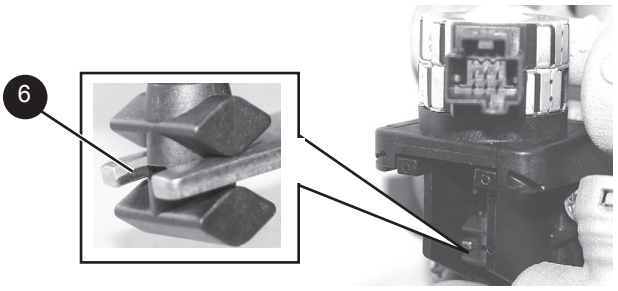
3.16 DIVERTER VALVE ACTUATOR REPLACEMENT

To remove the motor:

1. Refer to Frame 3.8.
2. Remove the condensate trap/siphon. Refer to Frame 3.17.
3. Remove the wiring connector by inserting a terminal screwdriver to release the latch, then withdraw the connector.
4. Place a flat bladed screwdriver in the actuator slot provided and ease out the actuator.
5. 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. Hold the mode knob in the reset position for more than 10 secs.
   c. The display will alternate between “d” and “U” and the actuator will move into the mid-position.
   d. The divertor valve will initially drive all the way out, this may cause the spindle to become detached from the body. If this occurs simply screw back into the body so the cycle can continue driving fully in before going to mid-position.
   e. Replace the actuator into the boiler.
6. 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.
7. Check the operation of the boiler.

Note. *All spares will be delivered in mid-position therefore ignore point 5 and proceed to point 6.*





3.17 CONDENSATE TRAP/SIPHON REPLACEMENT

1. Refer to Frame 3.8.

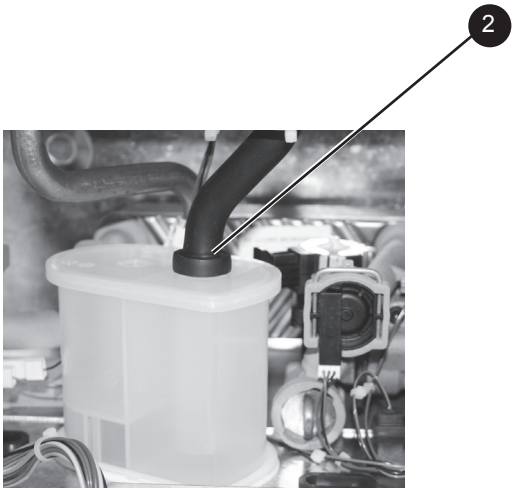
2. Pull off the rubber pipe at the SIPHON.

3. Turn the siphon clockwise to disengage and lift to remove.

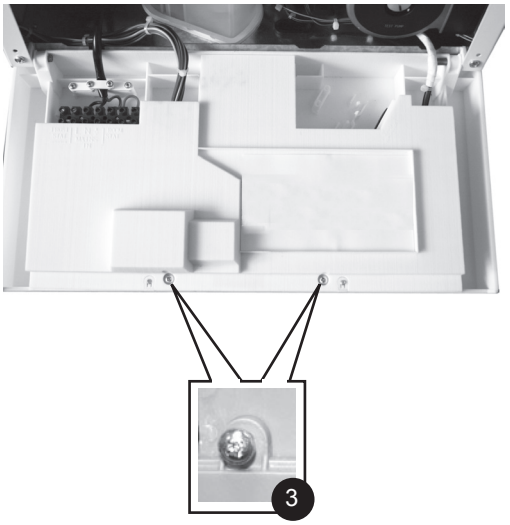
4. Reassemble in reverse order.

5. When reassembling ensure the trap is full of water.

6. Check operation of the boiler.



3.18 MAIN PCB REPLACEMENT

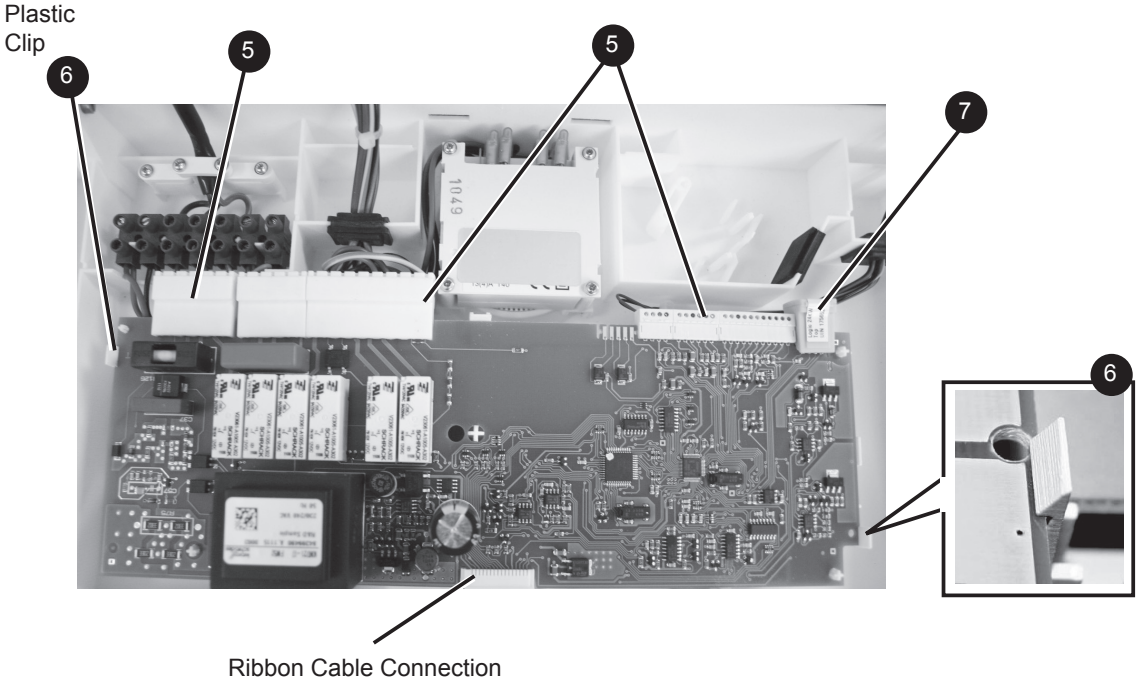


** Note. that production boiler PCB's are factory pre-set to operate for boiler range and output, but when ordering Primary PCB as a spare, an additional Boiler Chip Card (BCC) MUST also be purchased for your specific boiler range and output.*

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 Frame 3.8.
2. Note the control knob positions.
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 lead connections to the PCB including the ribbon cable.
6. Spring out the two side retaining clips and pull the PCB upwards to clear the retaining posts.
7. Take the new Primary PCB and attach the appropriate Boiler Chip Card (BCC) to it (this should correspond to the output of the boiler: 24kW or 30kW). **Note.** *Ensure the correct orientation of BCC by placing "TOP" side up as shown.*
8. Re-connect all plug connections.
9. Reassemble in reverse order.
10. **a.** Turn power on
    b. Displays "8" blue light on/off, "first digit input", "second digit input", "1st letter appliance type", i.e. "2", "4", "c"
    c. Move knob to required setting (standby, summer, winter)

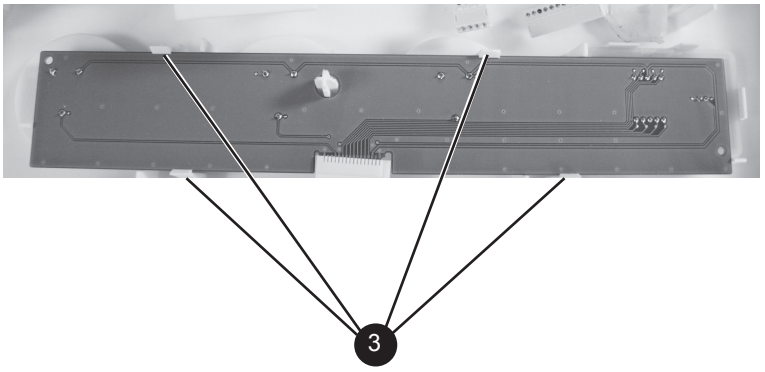
    Note. *If no BCC fitted on non programmed board items **a** & **b** will be displayed then "Boiler Type Card Fault - Contact Installer" The correct BCC for this appliance will need to be fitted.*
11. Check operation of the boiler.



3.19 USER CONTROL PCB REPLACEMENT

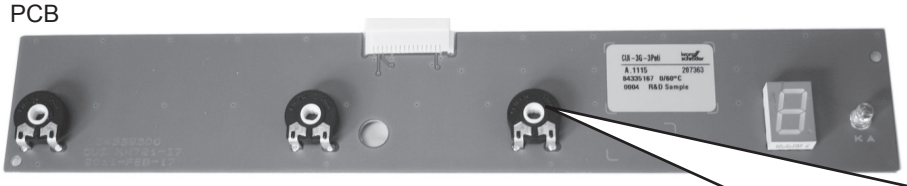
Note. *Fit the earth strap provided with the PCB to your wrist and a suitable earth on the boiler chassis.*

1. Refer to Frame 3.8.
2. Remove the main PCB, refer to Frame 3.18.
3. Unclip the PCB and lift to clear the mounting posts.
4. Fit the new PCB ensuring the 3 potentiometer spindles line up with the control knobs which must be in a vertical position.
5. Reassemble in reverse order.
6. Check operation of the boiler.

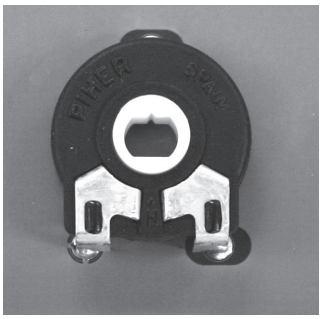


4

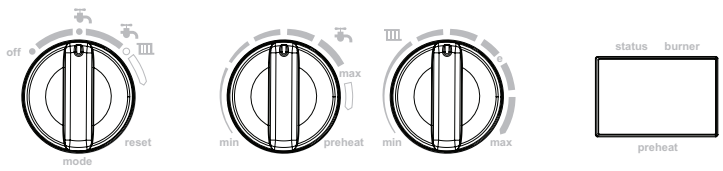
PCB



Potentiometer spindle

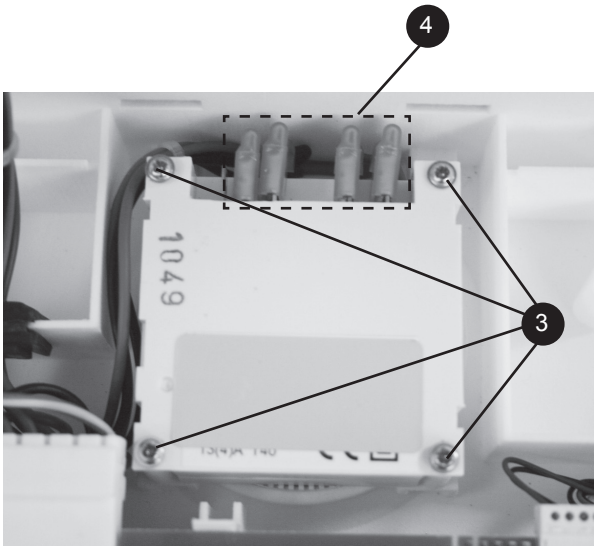


Control Knobs (to be in vertical position)

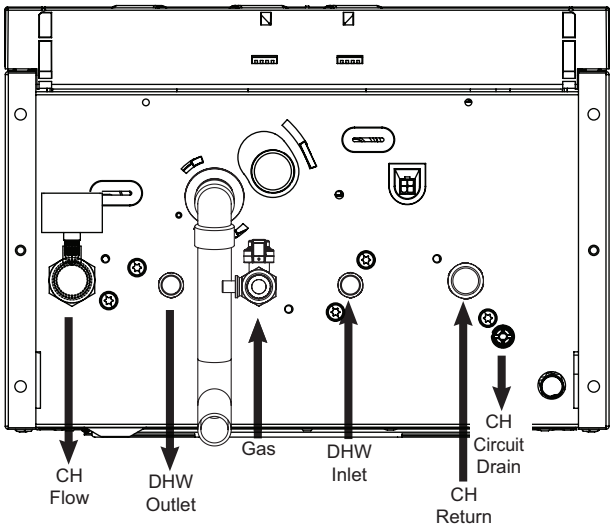


3.20 REPLACING THE MECHANICAL TIMER

1. Refer to Frame 3.8.
2. Swing the boiler lower front panel into the service position. Refer to Frame 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.



3.21 DRAINING THE BOILER



CENTRAL HEATING CIRCUIT

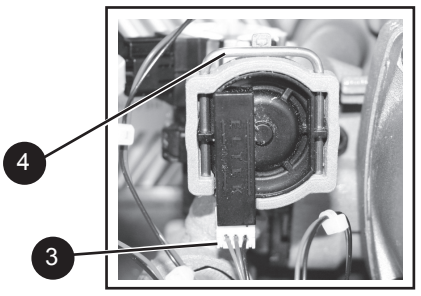
1. Refer to Frame 3.8.
2. Close all the CH water isolating valves on the boiler inlet.
3. To drain the primary heat exchanger circuit: Open the drain valve and attach a length of hose to the CH drain point.
4. After replacing any component on the boiler, remove the hose, close the drain valve and open all system isolating valves (re-pressurise as appropriate).
5. Refill with specified antifreeze.
6. Check operation of the boiler.

DOMESTIC HOT WATER CIRCUIT

1. Refer to Frame 3.8.
2. Close the DHW water isolating valve on the boiler inlet.
3. 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.
4. After replacing any component on the boiler, close tap, close the drain valve and open all system isolating valves (re-pressurise as appropriate)
5. Check operation of the boiler.

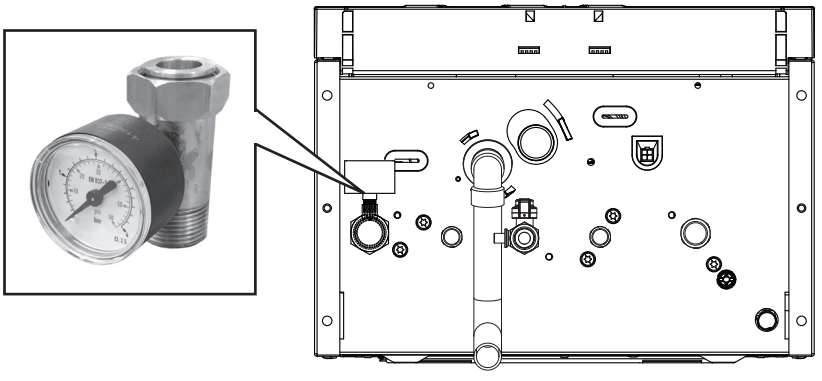
3.22 DHW FLOW TURBINE SENSOR REPLACEMENT

1. Refer to Frame 3.8.
2. Drain the DHW system. Refer to Frame 3.21.
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.



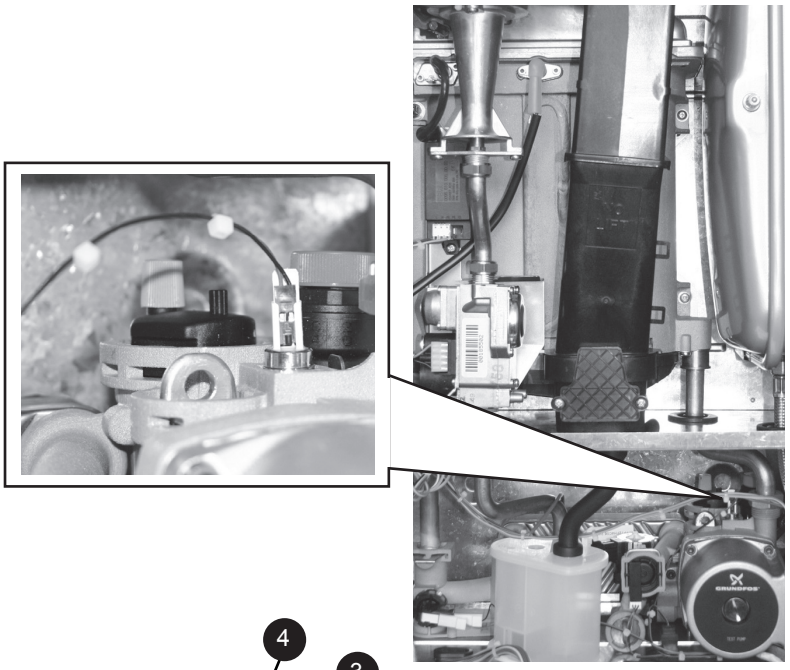
3.23 PRESSURE GAUGE RENEWAL

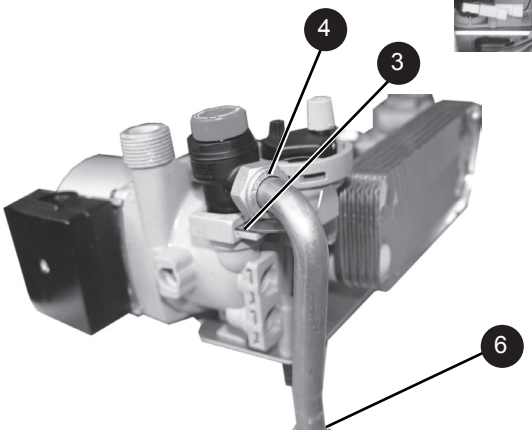
1. Refer to Frame 3.8.
2. Drain the heating system. Refer to Frame 3.21.
3. Unscrew the pressure gauge and discard.
4. Fit new pressure gauge using a suitable jointing compound.
5. Refill the boiler with specified anti-freeze.
6. Check operation of the boiler.



3.24 SAFETY RELIEF VALVE RENEWAL

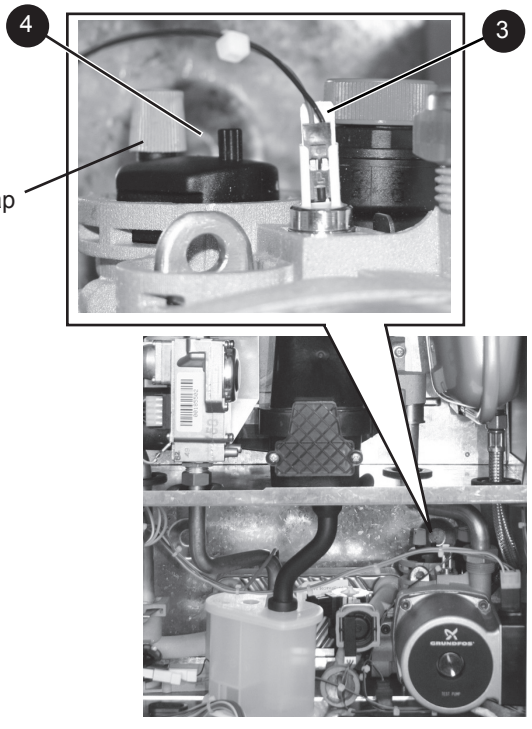
1. Refer to Frame 3.8.
2. Drain the boiler. Refer to Frame 3.21.
3. Remove the return thermistor. Refer to Frame 3.32.
4. Remove the compression nut.
5. Pull out and remove the clip (positioned behind the safety valve) retaining the safety valve.
6. Remove the quik fit coupling by pressing down the top collar and casing downwards.
7. Lift out the safety valve/pipe assembly.
8. Remove the safety valve pipe and transfer to the new safety valve.
9. Reassemble in reverse order ensuring the retaining clip is correctly fitted and the pipe quick fit coupling is re-fitted.
10. Refill the boiler with specified anti-freeze. Check operation of the boiler.





3.25 PUMP AUTOMATIC AIR VENT REPLACEMENT

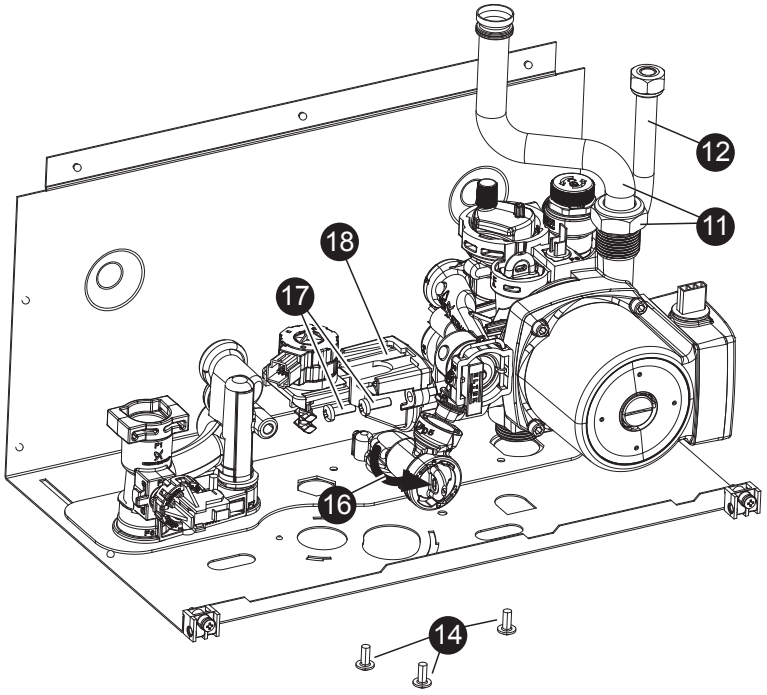
1. Refer to Frame 3.8.
2. Drain the boiler. Refer to Frame 3.21.
3. Remove the return thermistor. Refer to Frame 3.32.
4. Using a suitable screwdriver positioned between the air vent dust cap and the plastic protrusion, turn the air vent carefully anti clockwise to disengage and lift to remove.
5. Fit the new air vent and ensure dust cap is open.
6. Re-assemble in reverse order ensuring the return thermistor is replaced.
7. Refill the boiler with specified anti-freeze. Check operation of the boiler.



3.26 DIVERTER VALVE BODY ASSEMBLY REPLACEMENT

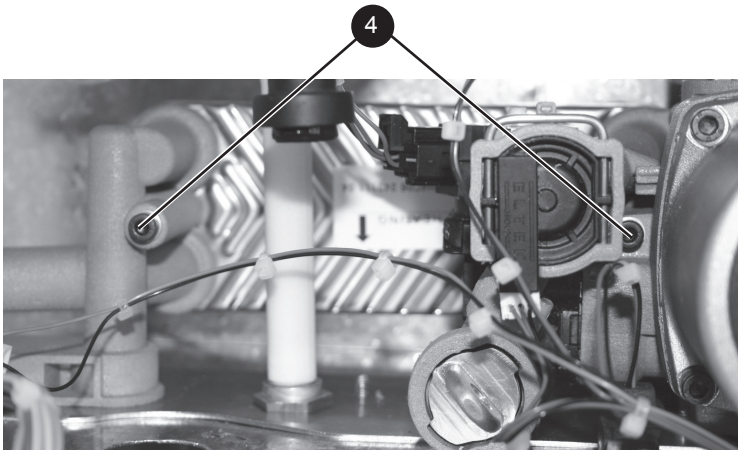
To remove the valve body assembly:

1. Refer to Frame 3.8.
2. Drain the boiler. Refer to Frame 3.21.
3. Remove the condensate trap/siphon. Refer to Frame 3.17.
4. Remove the electrical plug. Refer to Frame 3.16.
5. Place a flat bladed screwdriver in the diverter valve motor body slot provided and ease out the motor Refer to Frame 3.16.
6. Remove the return thermistor electrical connection. Refer to Frame 3.32.
7. Remove the pump electrical connection. Refer to Frame 3.25 no. 3.
8. Remove DHW Turbine electrical connection. Refer to Frame 3.22 no. 3.
9. Remove the DHW plate heat exchanger (note orientation). Refer to Frame 3.27.
10. Undo the safety valve pipe compression fitting. See No.5 Frame 3.24.
11. Remove the compression fitting above the pump and rotate the pipe.
12. If required remove expansion vessel connection hose. Refer to Frame 3.34, 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.
19. Refill the boiler and add the correct volume of anti-freeze. Check operation of the boiler.



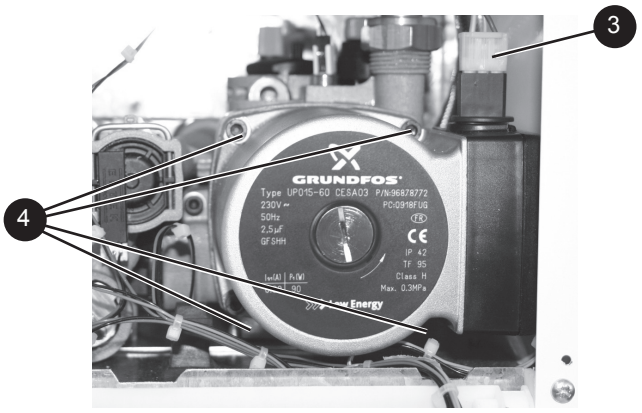
3.27 DHW PLATE HEAT EXCHANGER REPLACEMENT

1. Refer to Frame 3.8.
2. Drain the boiler. Refer to Frame 3.21.
3. Remove the condensate siphon. Refer to Frame 3.17.
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.
8. Refill the boiler and add the correct volume of anti-freeze.
9. Check operation of the boiler.



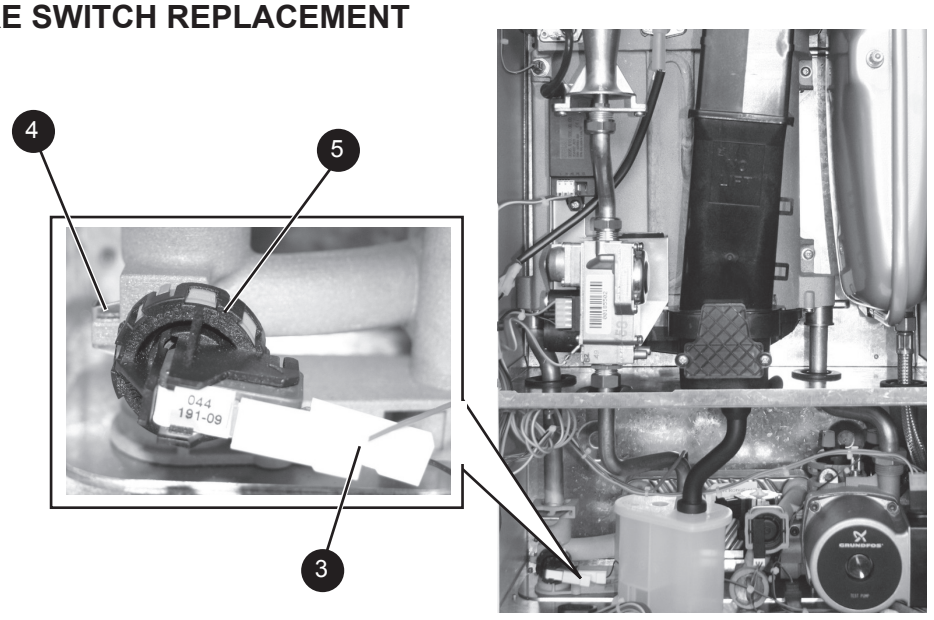
3.28 PUMP HEAD REPLACEMENT

1. Refer to Frame 3.8.
2. Drain the boiler. Refer to Frame 3.21.
3. Disconnect the electrical lead 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.



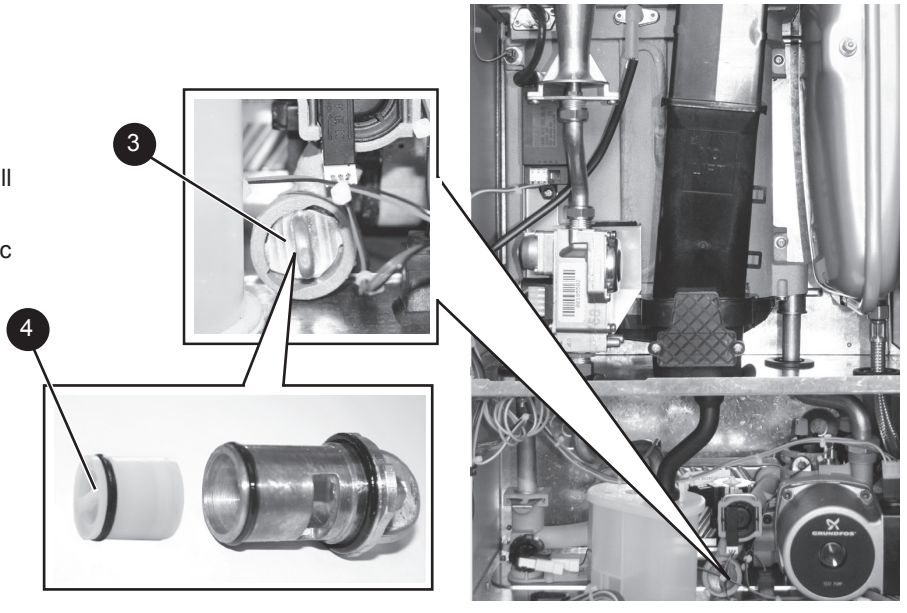
3.29 CH WATER PRESSURE SWITCH REPLACEMENT

1. Refer to Frame 3.8.
2. Drain the boiler. Refer to Frame 3.21.
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.



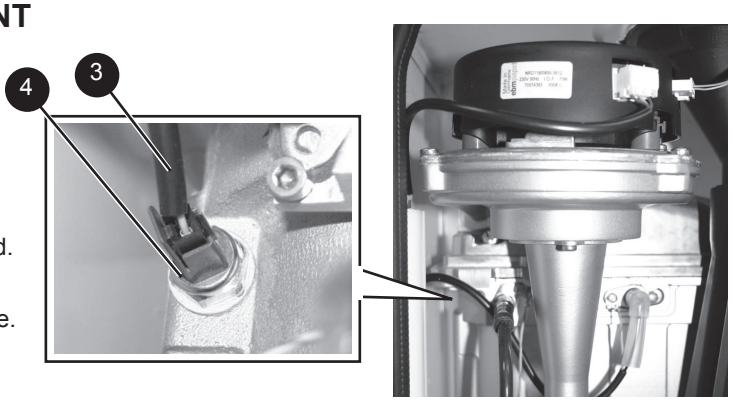
3.30 DHW FILTER & DHW FLOW REGULATOR CLEANING/REPLACEMENT

1. Refer to Frame 3.8.
2. Drain the boiler. Refer to Frame 3.21.
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 and add the correct volume of anti-freeze.
8. Check operation of the boiler.



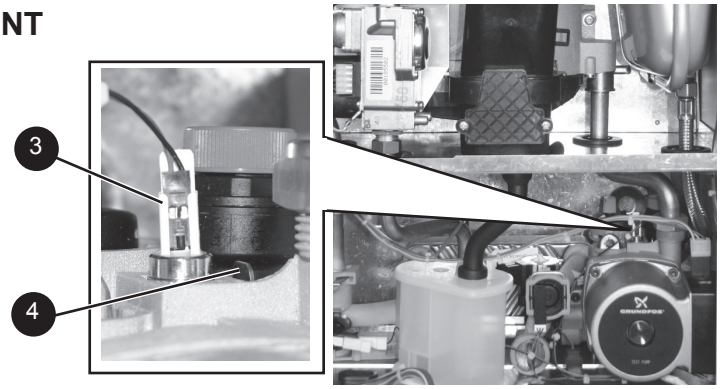
3.31 FLOW THERMISTOR REPLACEMENT

1. Refer to Frame 3.8.
2. Drain down the boiler. Refer to Frame 3.21.
3. Unplug the electrical lead.
4. Unscrew the thermistor (to facilitate removal a 13mm 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.



3.32 RETURN THERMISTOR REPLACEMENT

1. Refer to Frame 3.8.
2. Drain the boiler. Refer to Frame 3.21.
3. Unplug the electrical connection.
4. Using a suitable tool, pull out the retaining clip.
5. Carefully pull the thermistor upwards to remove.
6. Fit the new thermistor and re-assemble in reverse order.
7. Refill the boiler and add the correct volume of anti-freeze.
8. Check the operation of the boiler.

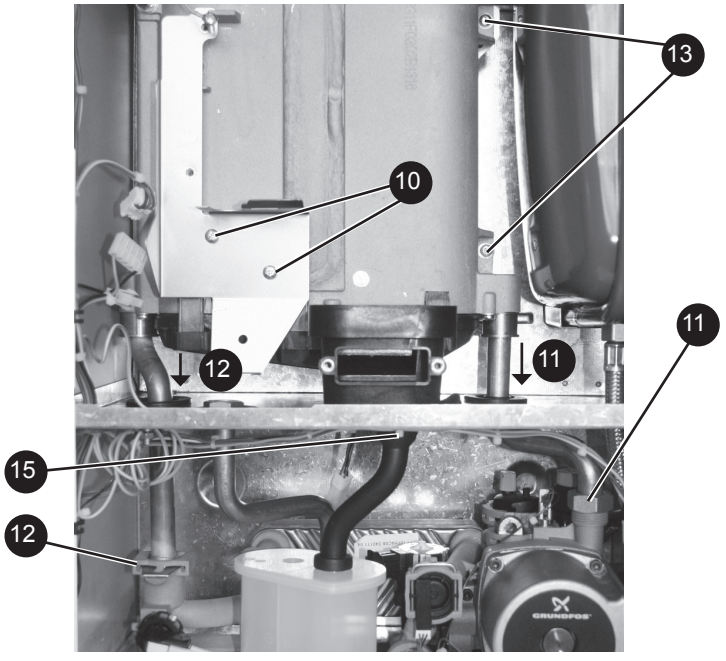


3.33 HEAT ENGINE RENEWAL

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 Frame 3.8.
2. Drain the boiler. Refer to Frame 3.21.
3. Remove the fan / venturi assembly and place on one side. Refer to Frame 3.9.
4. Remove burner and place on one side. Refer to Frame 3.10.
5. Remove the ignition and detection electrodes. Refer to Frames 3.12 & 3.13.
6. Remove the spark generator. Refer to Frame 3.14.
7. Remove the gas valve. Refer to Frame 3.15.
8. Remove the expansion vessel. Refer to Frame 3.34.
9. Remove the flow thermistor. Refer to Frame 3.31.
10. Remove the 2 M5 screws retaining the gas valve mounting bracket and transfer bracket to the new heat exchanger.
11. Undo the inlet 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 to remove from heat exchanger.
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. 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.
17. Ensure the trap/siphon is filled with water. Refer to Frame 3.17.
18. Refill the boiler and add the correct volume of anti-freeze.
19. Check operation of the boiler.



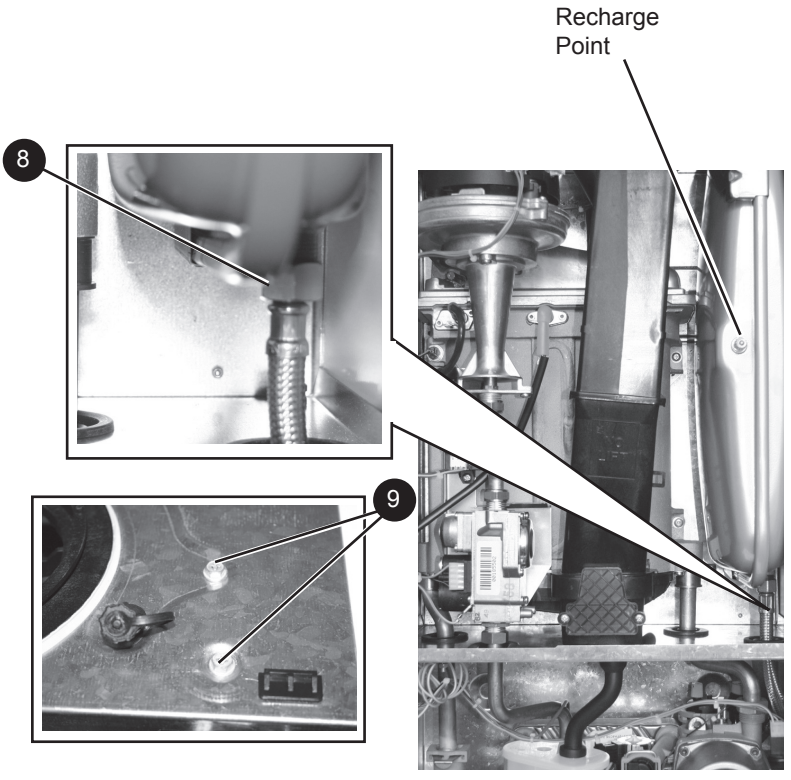
3.34 EXPANSION VESSEL RECHARGING & REPLACEMENT

RECHARGING

1. Refer to Frame 3.8.
2. Remove the charge point cover.
3. Recharge the tank pressure to 0.75 bar.
4. Re-assemble in reverse order
5. Check operation of the boiler.

REPLACEMENT

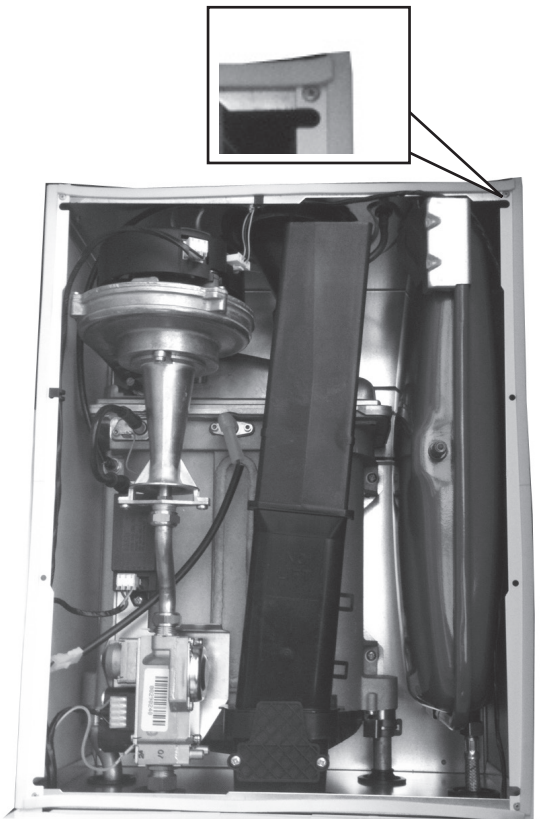
6. Refer to Frame 3.8.
7. Drain the boiler CH circuit. Refer to Frame 3.21.
8. Unscrew the union nut on the vessel water connection pipe.
9. Support the expansion vessel and unscrew the 2 screws from the securing clamp, located on the top of the boiler, and remove. (Note the position of the bracket on the vessel)
10. Remove the expansion vessel taking care not to damage the adjacent wiring harness.
11. Fit the new expansion vessel.
12. Reassemble in reverse order.
13. Refill the boiler and add the correct volume of anti-freeze.
14. Check operation of the boiler.



3.35 BOILER SEALING PANEL SEAL REPLACEMENT

1. Refer to Frame 3.8.
2. Remove the old seal from the casing and thoroughly clean the casing surfaces.
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.*



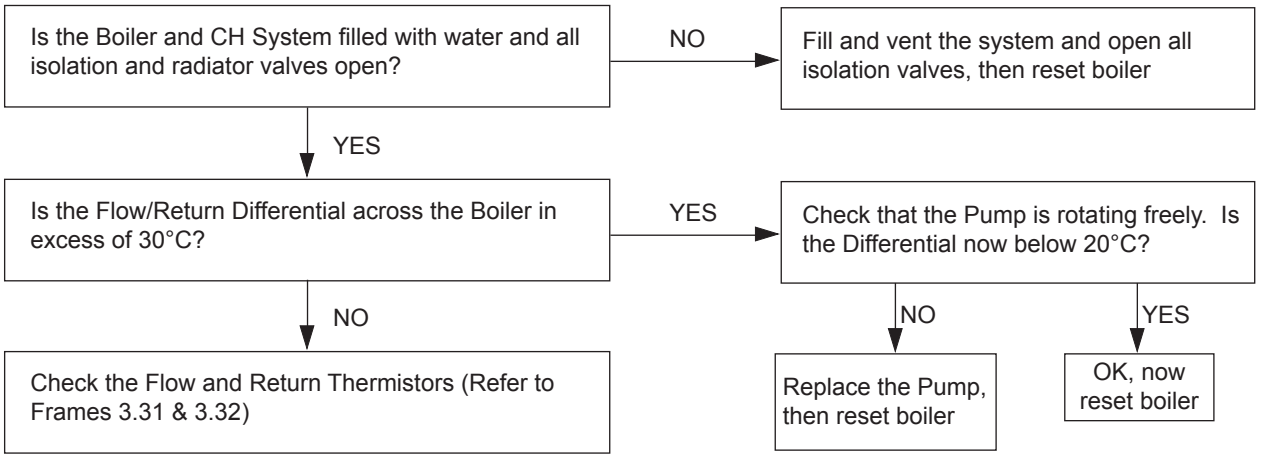
4.1 OPERATION MODES

DISPLAY CODE ON BOILER	DESCRIPTION
	The boiler is in standby mode 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 hot water mode.
	The boiler is operating in pre heat mode.

4.2 FAULT CODES

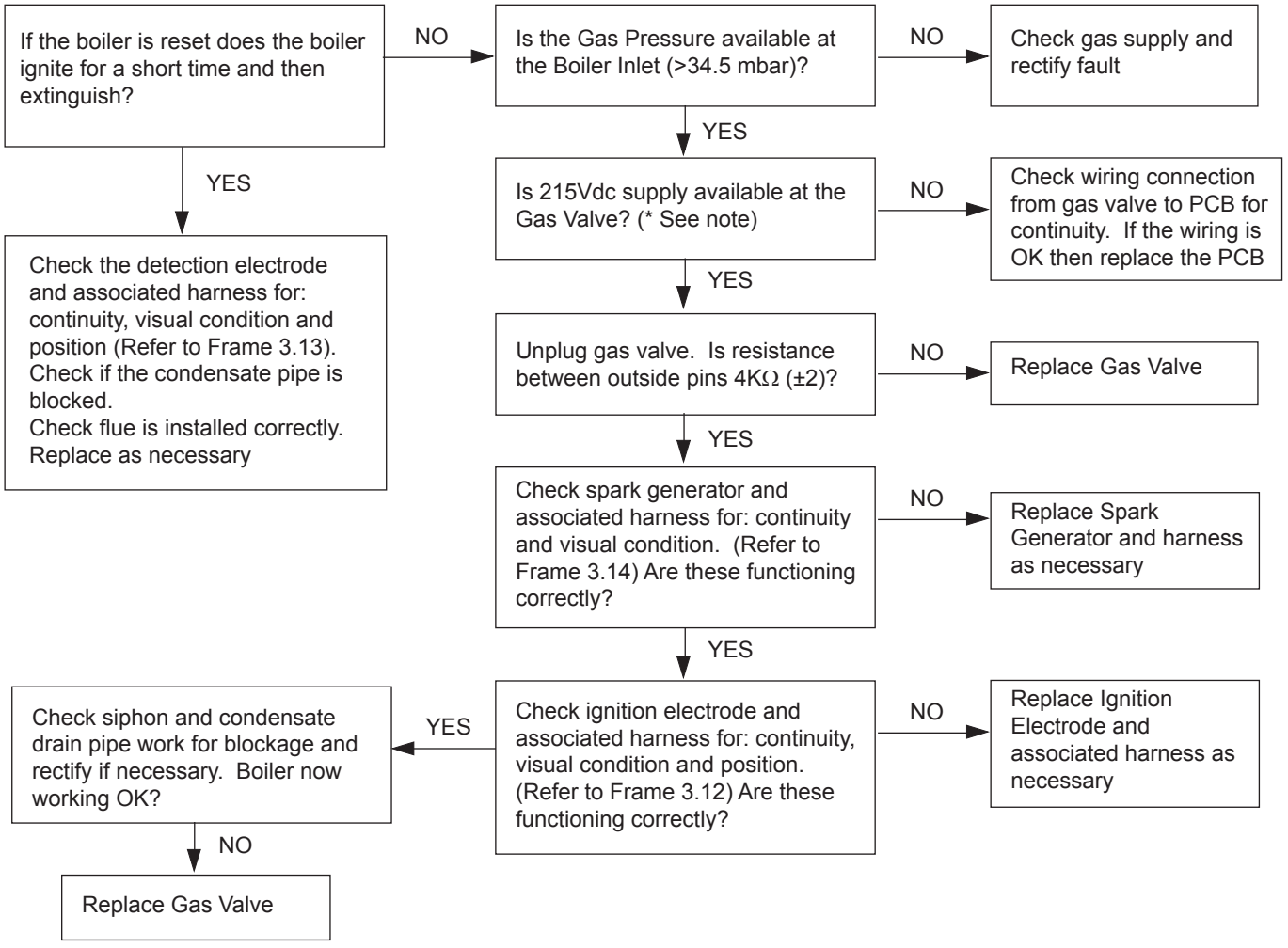
DISPLAY CODE ON BOILER	DESCRIPTION	ACTION
	Outside Sensor Failure	Reset the appliance - if the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer, or in other countries a qualified and competent Gas Installer if outside of the warranty period.
	Low Mains Voltage	Contact a qualified electrician or your electricity provider.
	Unconfigured PCB	Unconfigured PCB. Please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer, or in other countries a qualified and competent Gas Installer if outside of the warranty period.
	5 Boiler Resets in 15 minutes	1. Turn power off and on at the fused spur. 2. If the boiler fails to operate please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer, or in other countries a qualified and competent Gas Installer if outside of the warranty period.
	False Flame Lockout	Reset the appliance - if the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer, or in other countries a qualified and competent Gas Installer if outside of the warranty period.
	BCC Activation Fault	Reset the appliance - if the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer, or in other countries a qualified and competent Gas Installer if outside of the warranty period.
	BCC Fault	
	Low Water Pressure	Check system pressure is between 1 & 1.5bar on the pressure gauge. If the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer, or in other countries a qualified and competent Gas Installer if outside of the warranty period.
	Flow Temperature Overheat	
	Flame Loss	1. Check other gas appliances in the dwelling 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. If the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer, or in other countries a qualified and competent Gas Installer if outside of the warranty period.
	Ignition Lockout	
	Fan Fault	Reset the appliance - if the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer, or in other countries a qualified and competent Gas Installer if outside of the warranty period.
	Flow Thermistor	Reset the appliance - if the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer, or in other countries a qualified and competent Gas Installer if outside of the warranty period.
	Return Thermistor	Reset the appliance - if the boiler fails to operate then please contact Morco (if under warranty) or alternatively a Gas Safe Registered Engineer, or in other countries a qualified and competent Gas Installer if outside of the warranty period.

4.3 ALTERNATING 'L' AND '1' - FLOW TEMPERATURE OVERHEAT LOCKOUT



RESET PROCEDURE - To reset boiler, turn mode knob to reset position and immediately turn knob back to required setting.

4.4 ALTERNATING 'L' AND '2' - IGNITION LOCKOUT



**** Note:** due to the wave form of the rectified voltage, the reading will vary depending on the type of meter used to measure the value. In general terms a reading greater than 150V indicates that the correct voltage is supplied to the gas valve.*

RESET PROCEDURE - To reset boiler, turn mode knob to reset position and immediately turn knob back to required setting.

4.5 ALTERNATING ‘L’ AND ‘5’ - 5 RESETS WITHIN 15 MINS

Turn power off and on

4.6 ALTERNATING ‘L’ AND ‘6’ - FALSE FLAME LOCKOUT

Reset the boiler, does Boiler Work OK?

YES → Check routing and integrity of internal boiler wiring is OK. Check condition of Flame Sense Electrode and replace if deteriorated.

NO

Separate the flame detection electrode in-line connector. Is there continuity between the terminals pins connected to the electrode?

YES → Replace Flame Detection Electrode

NO

Check routing and integrity of internal boiler wiring.

RESET PROCEDURE - To reset boiler, turn mode knob to reset position and immediately turn knob back to required setting.

4.7 ALTERNATING ‘F’ AND ‘1’ - LOW WATER PRESSURE

Are the Boiler and CH System filled with water and all isolation and radiator valves open (check pressure gauge is between 1 to 1.5 bar)?

NO → Fill and vent the system and open all isolation valves

YES

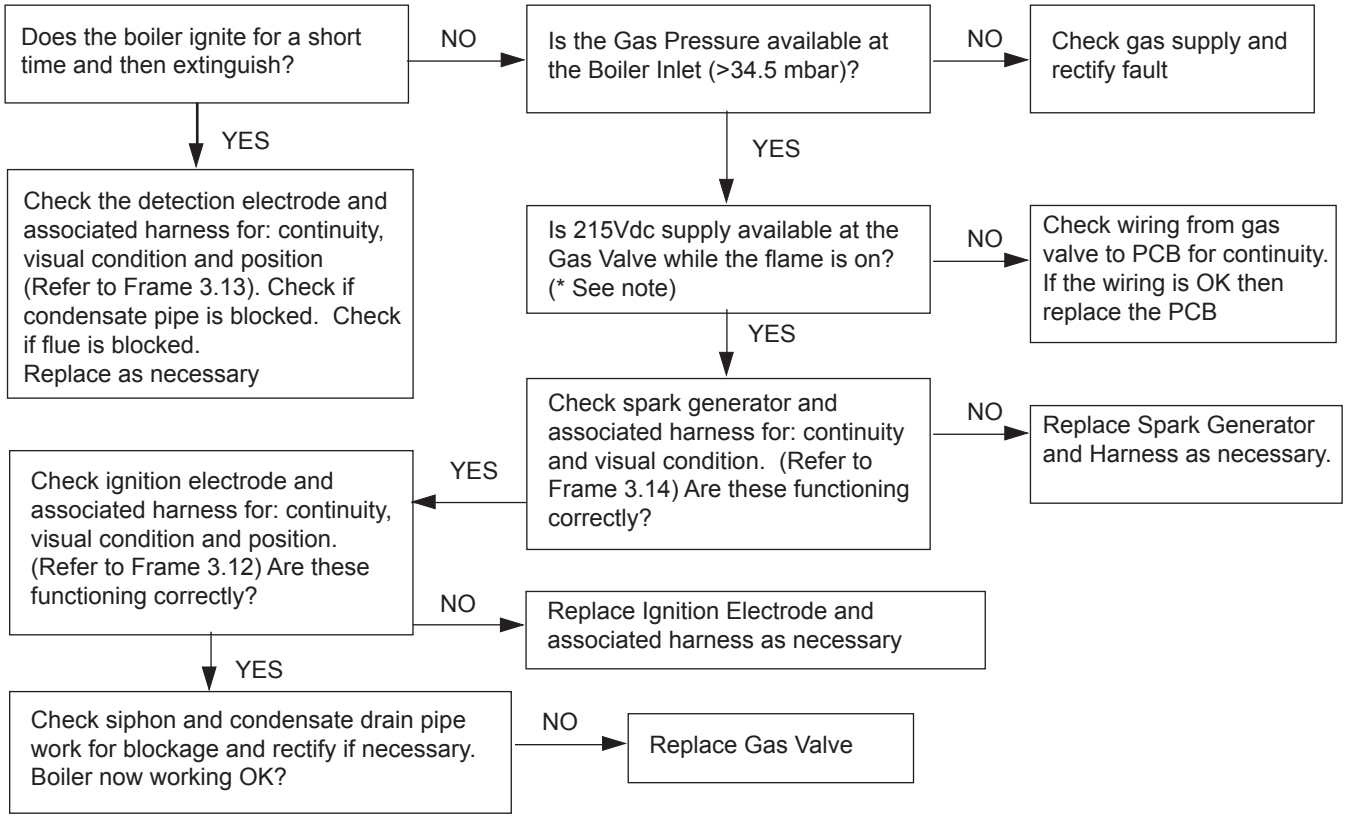
Are connections on water pressure switch secure?

NO → Re-fit connections

YES

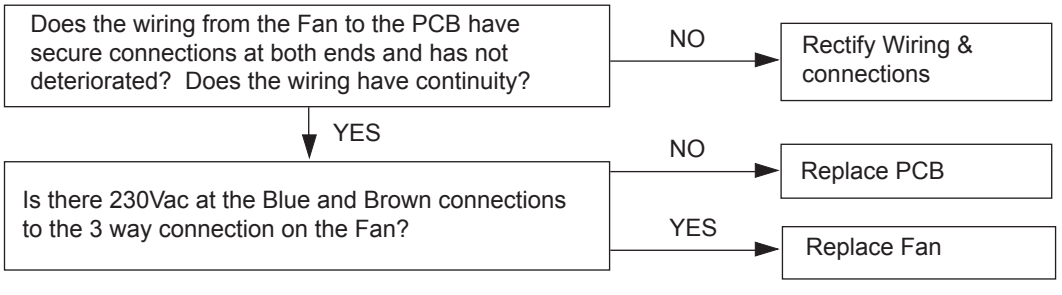
Replace water pressure switch

4.8 ALTERNATING 'F' AND '2' - FLAME LOSS

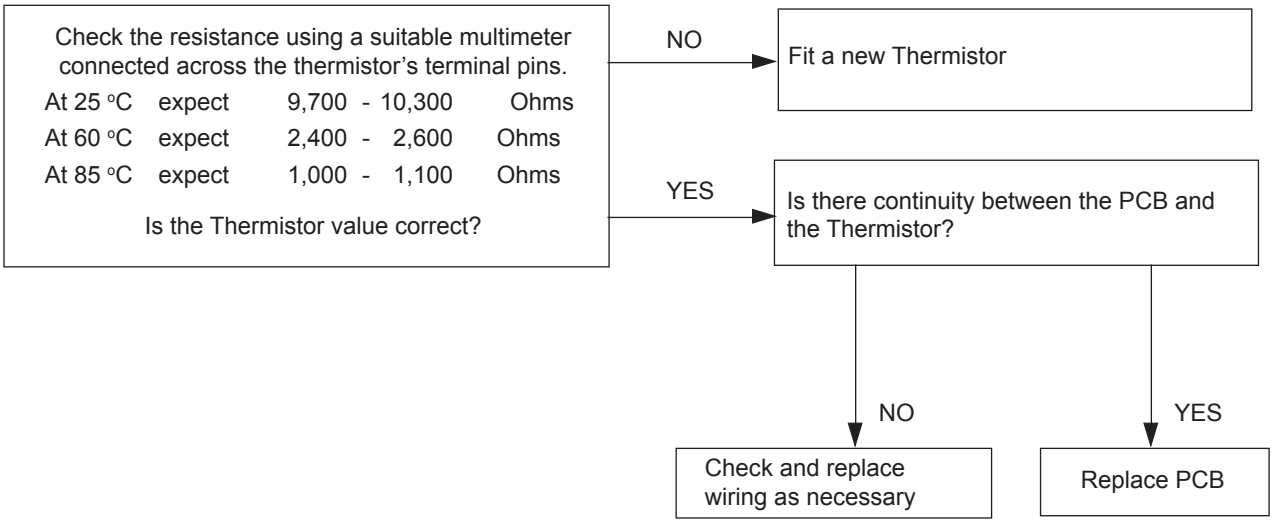


**** Note:** due to the wave form of the rectified voltage, the reading will vary depending on the type of meter used to measure the value. In general terms a reading greater than 150V indicates that the correct voltage is supplied to the gas valve.*

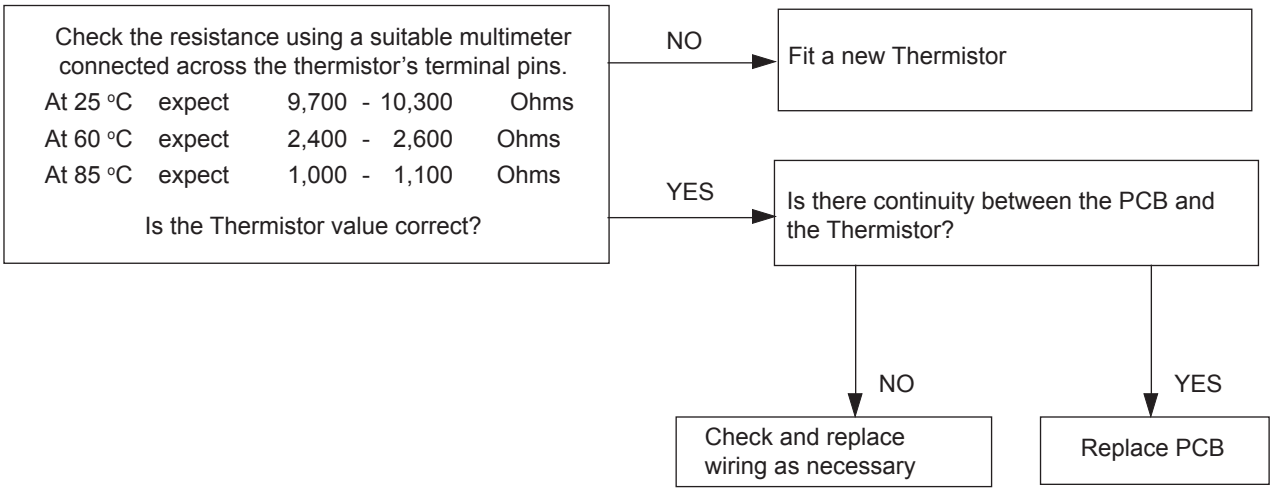
4.9 ALTERNATING 'F' AND '3' - FAN FAULT



4.10 ALTERNATING ‘F’ AND ‘4’ - FLOW THERMISTOR FAULT



4.11 ALTERNATING ‘F’ AND ‘5’ - RETURN THERMISTOR FAULT



4.12 ALTERNATING ‘F’ AND ‘7’ - LOW MAINS VOLTAGE

Contact electricity provider

4.13 ALTERNATING ‘F’ AND ‘9’ - PCB FAULT

Replace PCB -

Ensure that the BCC (boiler chip card - small plastic part) is fitted to the PCB otherwise replace PCB.

4.14 ALTERNATING ‘C’ AND ‘0’ - BCC ACTIVATION FAULT

Reset the boiler

RESET PROCEDURE - To reset boiler, turn mode knob to reset position and immediately turn knob back to required setting.

4.15 ALTERNATING ‘c’ AND ‘2’ - BCC FAULT (BOILER CHIP CARD)

Is the correct BCC for the boiler securely inserted into the slot at the front left of the PCB?
(identified by the label on the BCC)

NO → Securely insert the correct BCC for the boiler into the PCB and after switching power on and ‘c0’ being shown, reset boiler.

Note. Ensure the correct orientation of BCC by placing “TOP” side up.

YES ↓

Replace the BCC with a new BCC (that is correct for the boiler). After switching power on and ‘c0’ being shown, press reset. Is ‘c2’ still shown?

YES → Replace PCB

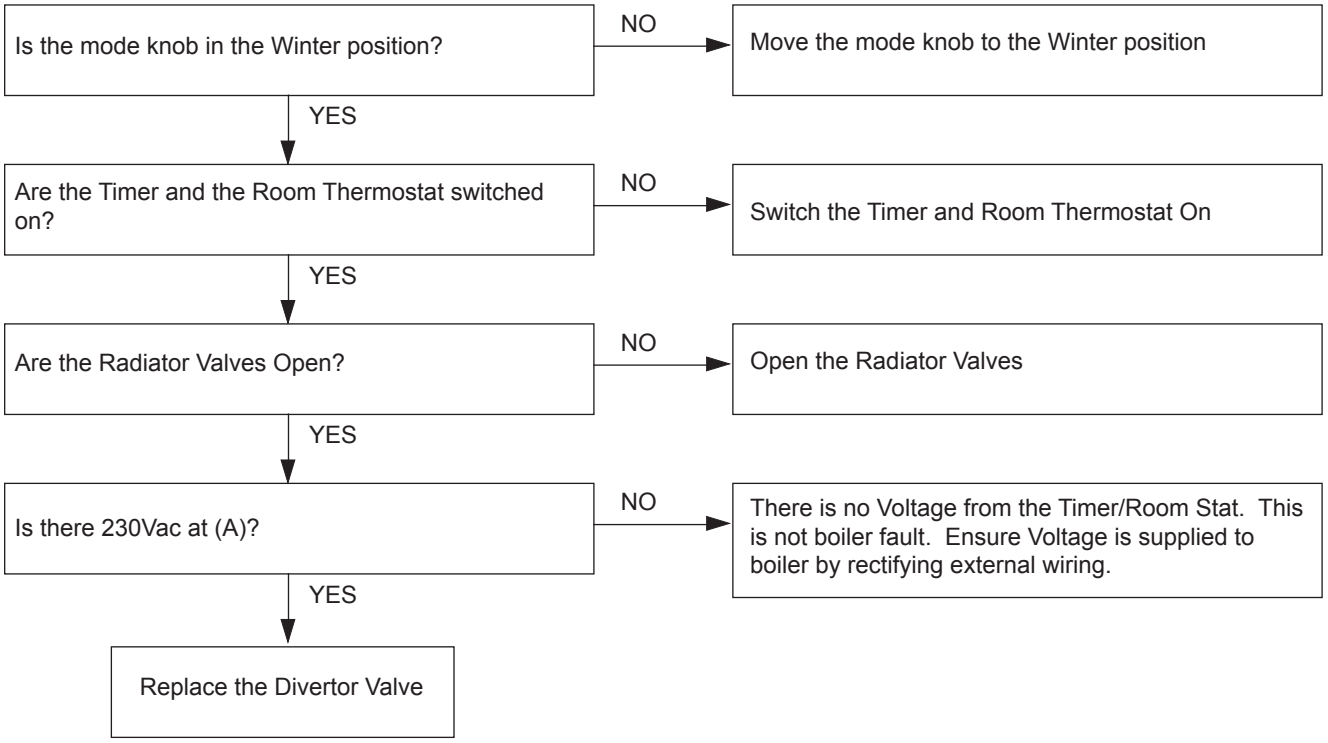
RESET PROCEDURE - To reset boiler, turn mode knob to reset position and immediately turn knob back to required setting.

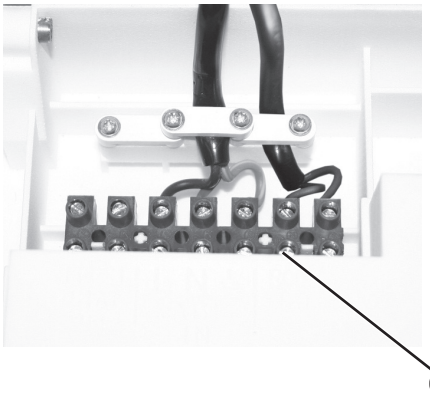
4.16 ALTERNATING ‘F’ AND ‘7’ - LOW MAINS VOLTAGE

Reset Boiler

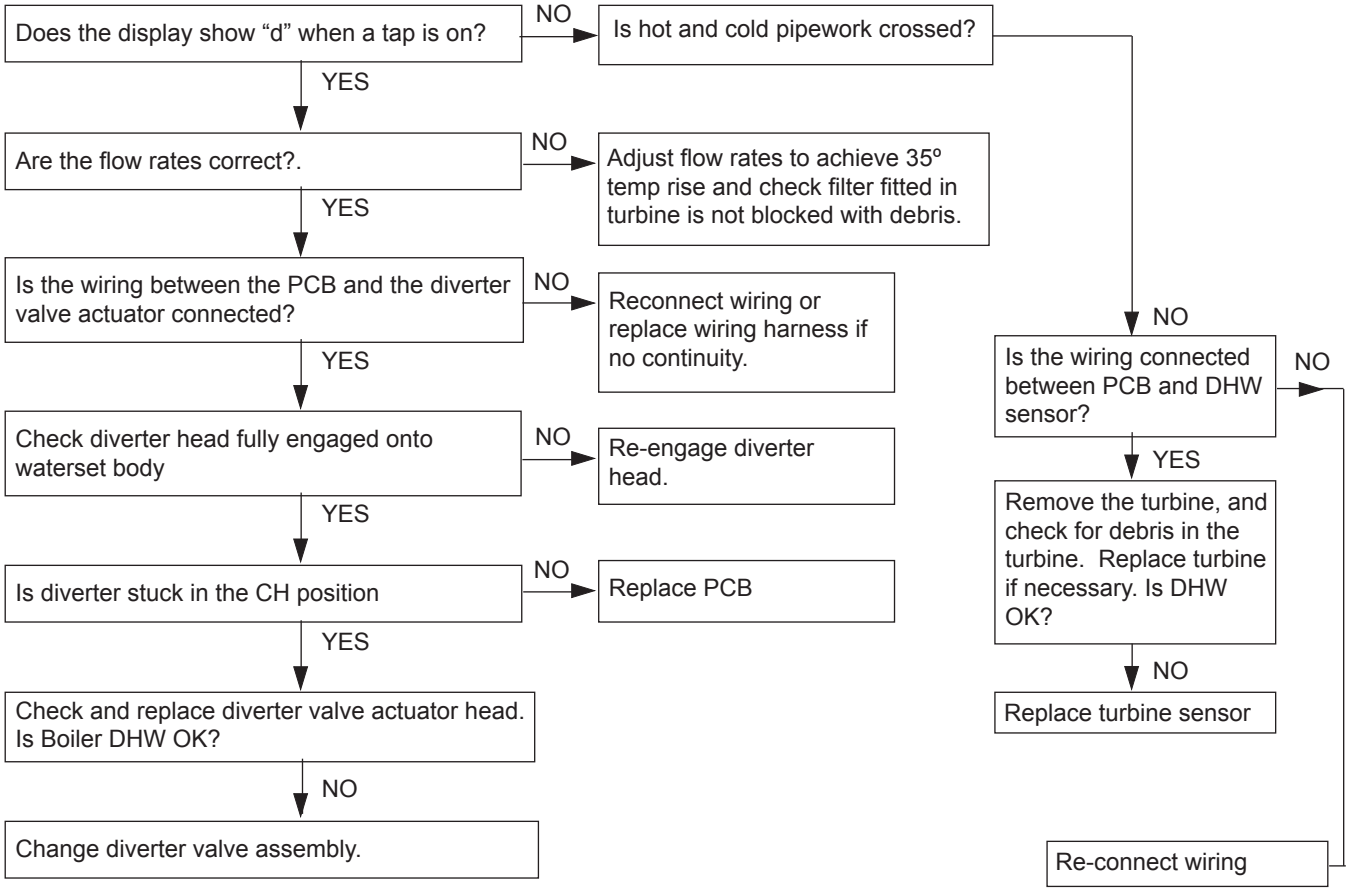
RESET PROCEDURE - To reset boiler, turn mode knob to reset position and immediately turn knob back to required setting.

4.17 NO CH OPERATION BUT HW WORKS OK

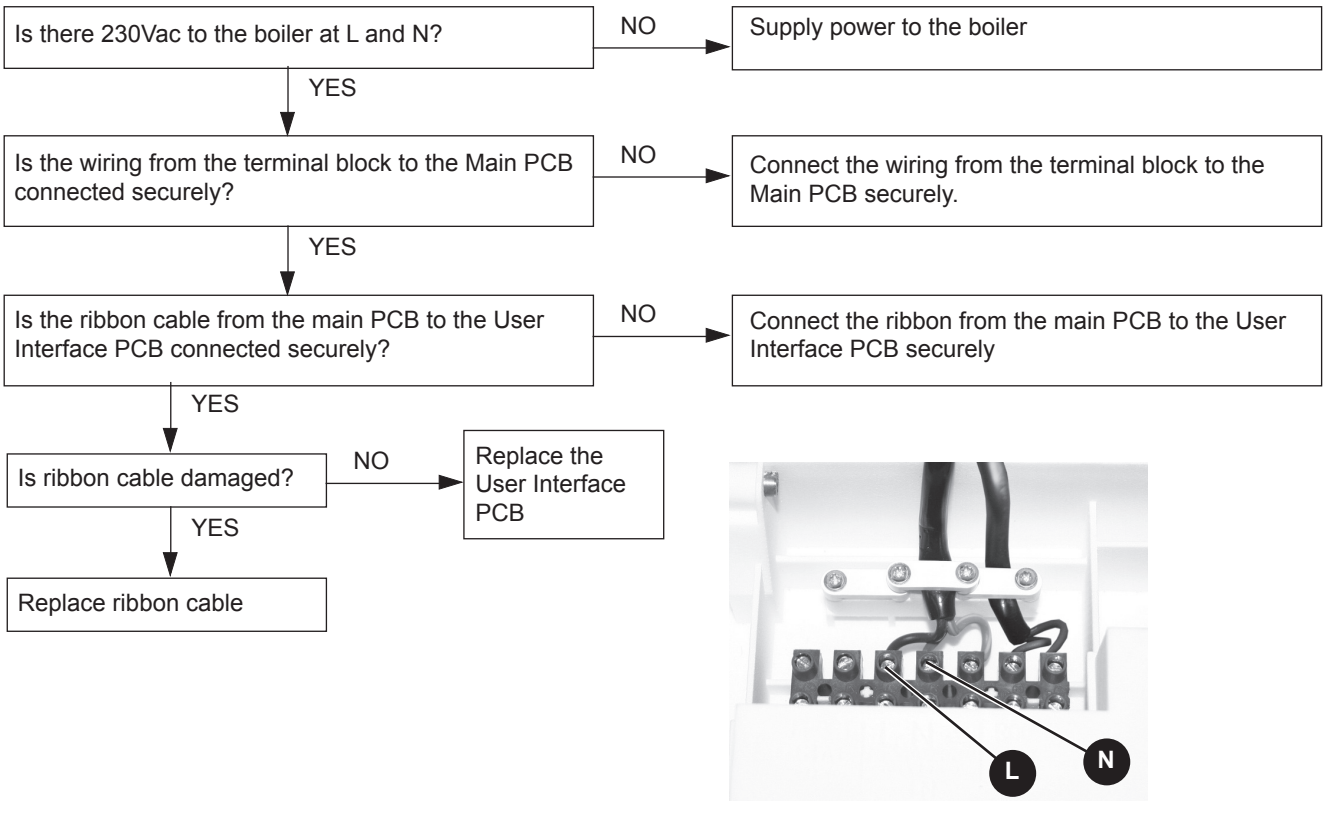




4.18 NO HW BUT CH ON



4.19 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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