

9.0 Installation

9.3 Fitting The Boiler

1. Remove the sealing caps from the boiler connections.

NOTE: A small amount of water may drain from the boiler once the caps are removed.

2. Lift the boiler as indicated by the shaded areas. The boiler should be lifted by TWO PEOPLE. Engage the mounting bracket at the top rear of the boiler on the wall plate (Fig. 21) (see **Safe Manual Handling** page 5).

3. Insert the sealing washers between the valves and pipes on the wall plate and the boiler connections. Tighten all the connections.

9.4 Fitting the Safety Pressure Relief Discharge Pipe (Fig. 22)

1. Remove the discharge pipe from the kit.
2. Determine the routing of the discharge pipe in the vicinity of the boiler. Make up as much of the pipework as is practical, including the discharge pipe supplied.

IMPORTANT: Make all soldered joints before connecting to the pressure relief valve. The relief valve is intentionally angled to the right of the boiler. DO NOT adjust the position of the valve. The discharge pipe must be installed before pressurising the system.

3. The pipework must be at least 15mm diameter and run continuously downwards to a discharge point outside the building. See section 6.7 for further details.
4. Utilising one of the sealing washers, connect the discharge pipe to the adaptor and tighten the nut hand tight, plus 1/4 turn to seal.
5. Complete the discharge pipework and route it to the outside discharge point.

9.5 Condensate Drain (see section 7.7) (Fig. 23)

1. Using the short piece of rubber hose supplied, connect the condensate drain pipework to the boiler condensate trap outlet pipe. When connecting the hose, ensure that the condensate sump is not inadvertently unscrewed,

Ensure the discharge of condensate complies with any national or local regulations in force (see British Gas "Guidance Notes for the Installation of Domestic Gas Condensing Boilers" & HHIC recommendations).

2. The hose will accept 21.5mm (3/4in) plastic overflow pipe which should generally discharge internally into the household drainage system. If this is not possible, discharge into an outside drain is acceptable.

3. The boiler condensate trap should be primed by pouring approximately 300ml of water into the flue spigot (Fig. 22a). Do not allow any water to fall into the air inlet.

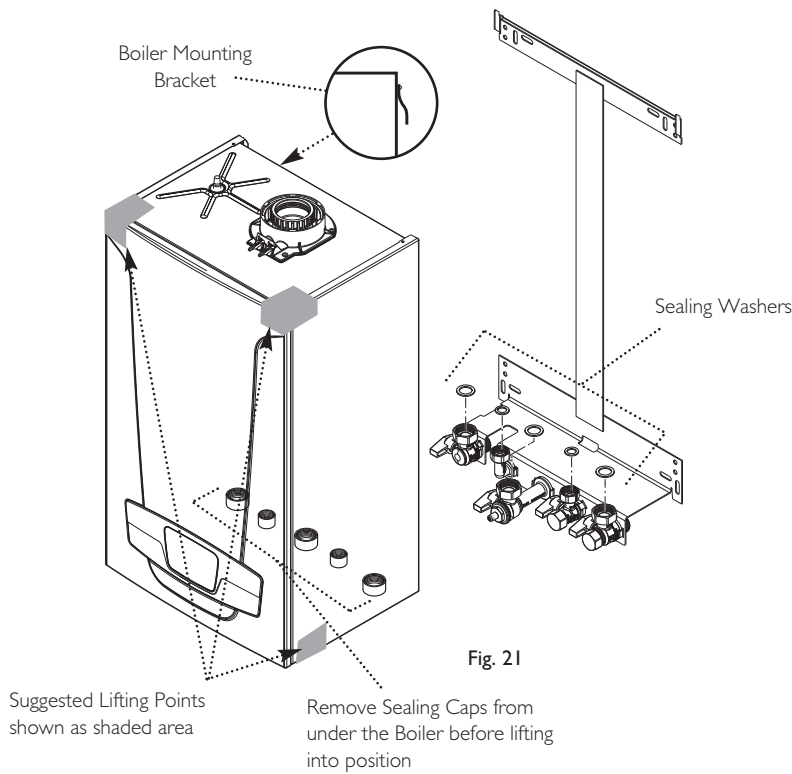


Fig. 21

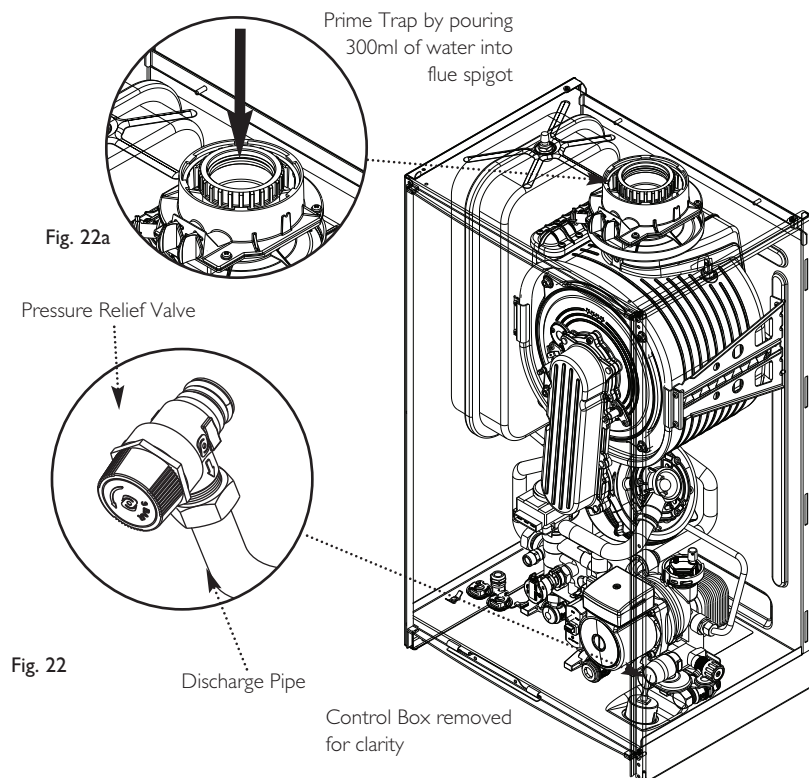


Fig. 22a

Fig. 22

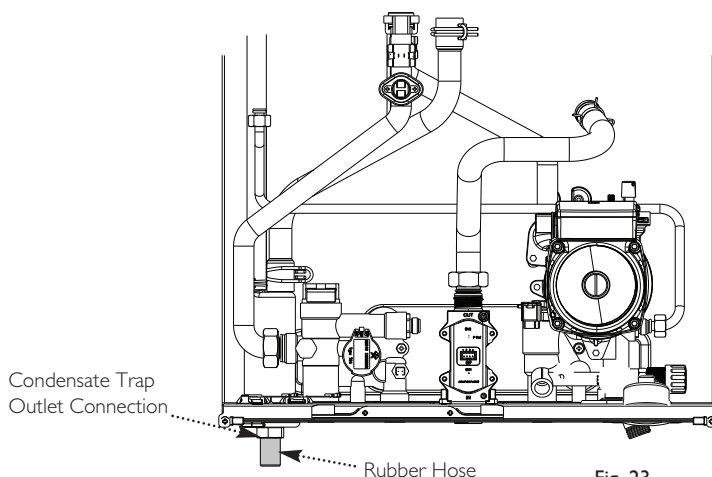


Fig. 23

9.0 Installation

9.6 Fitting The Flue

HORIZONTAL TELESCOPIC FLUE

1. There are two telescopic sections, the Terminal Assembly and the Connection Assembly, a roll of sealing tape and two self tapping screws. A 93° elbow is also supplied.

2. The two sections can be adjusted to provide a length between 315mm and 500mm (Fig. 24) when measured from the flue elbow (there is 50mm engagement into the elbow).

3. Locate the flue elbow on the adaptor at the top of the boiler. Set the elbow to the required orientation (Fig. 25).

NOTE: The flue elbow is angled at 93 degrees to ensure a fall back to the boiler.

4. Measure the distance from the outside wall face to the elbow. This dimension will be known as 'X' (Fig. 25).

5. If the distance from the flue elbow to the outside face of the wall ('X' in Fig. 25) is less than 250mm the Connection Assembly can be discarded and the Terminal Assembly fitted directly into the elbow.

6. In instances where the dimension 'X' (Fig. 25) is between 250mm and 315mm it will be necessary to shorten the Terminal Assembly by careful cutting to accommodate walls of these thicknesses.

7. To dimension 'X' add 50mm. This dimension to be known as 'Y'.

8. Adjust the two telescopic sections to dimension 'Y' and seal the joint with the tape provided (Fig. 27). Ensure that the labels marked 'TOP' on the Terminal and Connection Assemblies are uppermost.

9. Using the clearance holes in the Connection Assembly secure it to the Terminal Assembly using the screws supplied (Fig. 28).

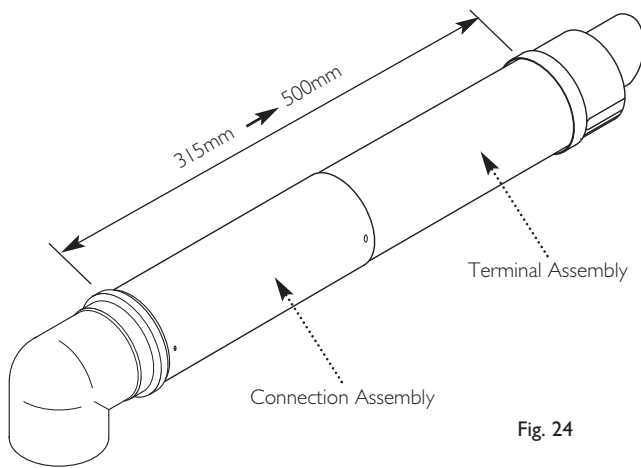


Fig. 24

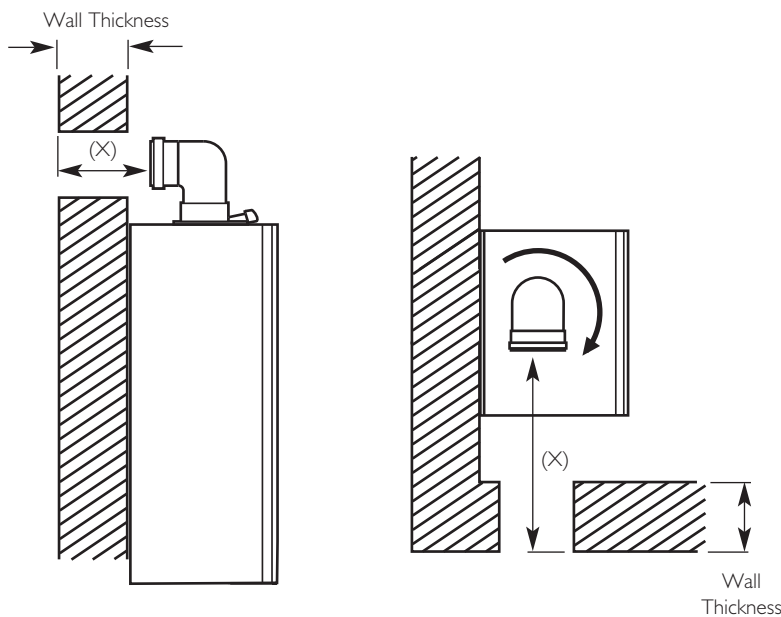


Fig. 25

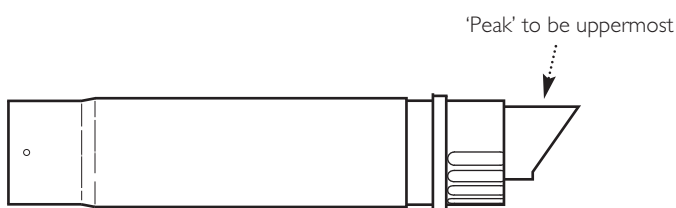


Fig. 26

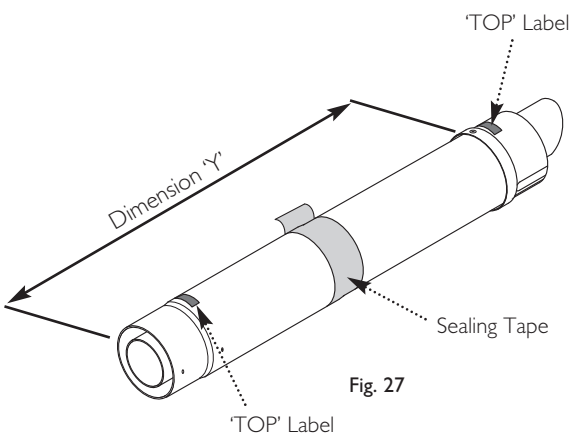


Fig. 27

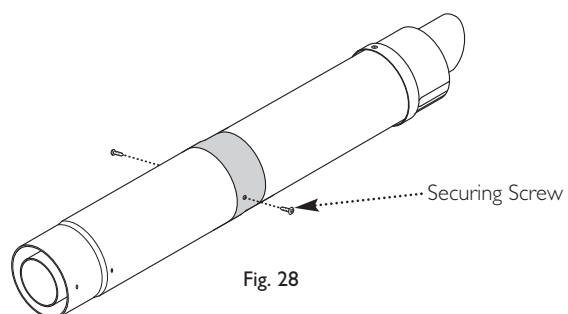


Fig. 28

9.6 Fitting the Flue (Cont)

10. Remove the flue elbow and insert the flue through the hole in the wall.

11. Refit the elbow to the boiler adaptor, ensuring that it is pushed fully in (Fig. 29).

12. Two flue trims are supplied, one for internal use, the other for outside. The internal trim is packaged and identified as such - it should not be used externally.

13. It is recommended that if the internal trim is being used it is first fitted over the elbow to allow access to the securing screws and then manoeuvred into place against the wall.

14. Draw the flue back through the wall and engage it in the elbow. It may be necessary to lubricate to ease assembly of the elbow and flue (Fig. 30).

15. Ensure that the terminal is positioned with the slots to the bottom (Fig. 31). Secure the flue to the elbow with the screws supplied (Fig. 30).

16. Secure the elbow flue to the boiler adaptor with the screws supplied in the boiler fittings pack (Fig. 30).

IMPORTANT: It is essential that the flue terminal is fitted as shown to ensure correct boiler operation and prevent water entering the flue.

17. Make good between the wall and air duct outside the building, appropriate to the wall construction and fire rating.

18. If necessary fit a terminal guard (see Section 8.4).

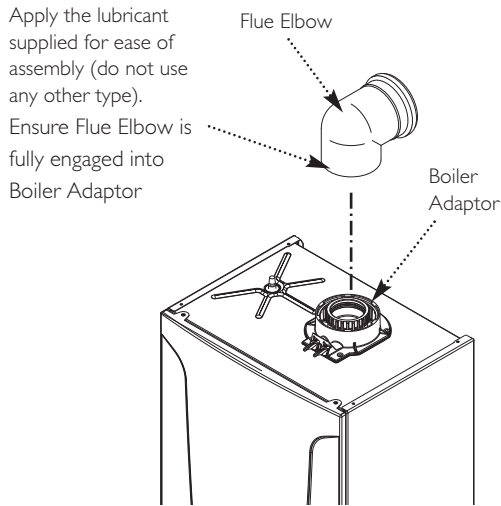


Fig. 29

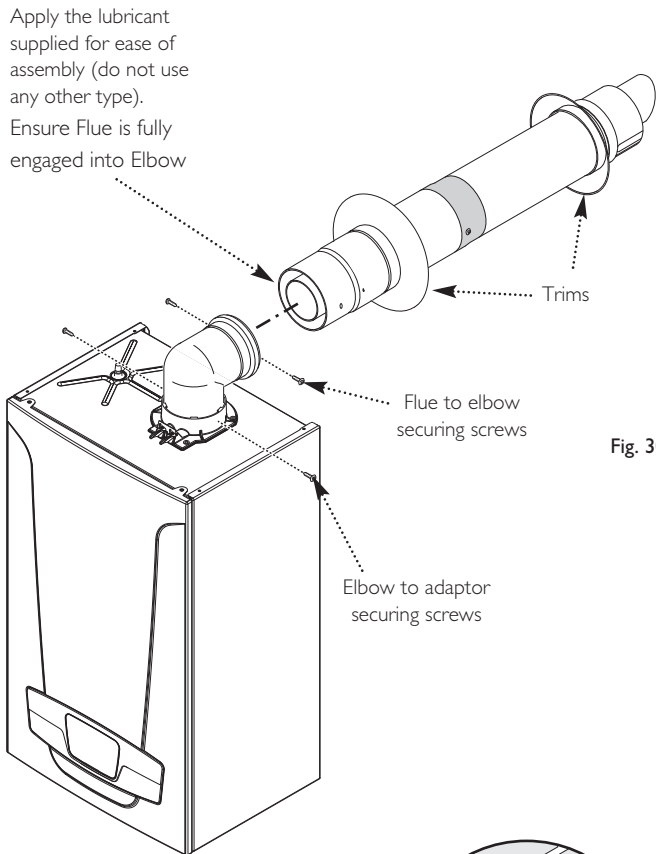


Fig. 30

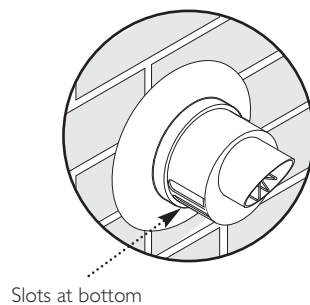


Fig. 31

9.0 Installation

9.7 Making The Electrical Connections

1. Undo the securing screws and lift the case front panel off.
2. Disengage the securing tab and hinge the control box downwards. Undo the terminal block cover securing screw and remove the cover (Fig. 34).
3. Slacken the gland nut in the left of the boiler lower panel and pass the mains cable through it. Remove the grommet adjacent to the gland nut, pierce the diaphragm and insert the cable from the external control system.
4. Leave sufficient slack in the cables to allow the Control Box to be hinged fully open. Tighten the gland nut and refit the grommet.
5. Connect the Earth, Permanent Live and Neutral wires to the terminal strip.

NOTE: Both the Permanent Live and Neutral connections are fused.

6. Refer to the instructions supplied with the external control(s).

IMPORTANT: Any thermostat **MUST** be suitable for 230V switching.

7. Remove the link between terminals 1 & 2. The 230V supply at terminal 2 must be connected to the thermostat. The switched output from the thermostat must be connected to terminal 1. (Figs. 35 & 36). If the room thermostat being used incorporates an anticipator it **MUST** be wired as shown in Figs. 35 & 36.

NOTE: When only Low Voltage controls are being used (connected to Terminal M2) it is still necessary to remove the link wire !

8. Replace the terminal block cover.

9. See Section 18.0 for details of fitting the Optional Outdoor Sensor.

9.8 Preliminary Electrical Checks

1. Prior to commissioning the boiler preliminary electrical system checks should be carried out.
2. These should be performed using a suitable meter, and include checks for Earth Continuity, Resistance to Earth, Short Circuit and Polarity.

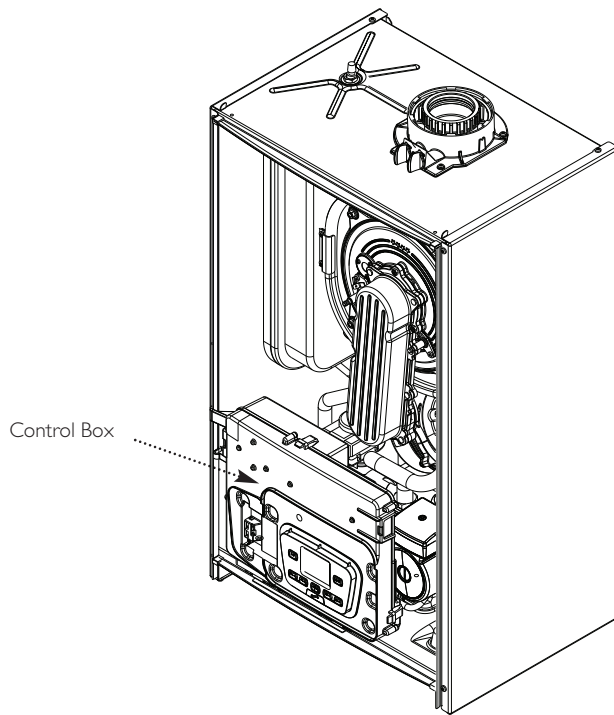


Fig. 34

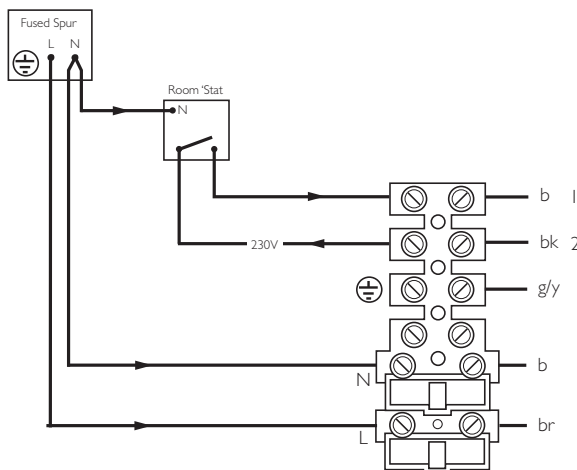


Fig. 35

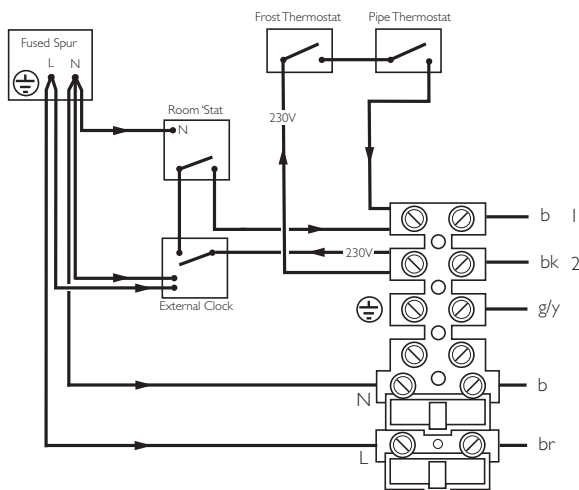


Fig. 36

NOTE: The 230V switched signal for external controls (Frost Stat - Room Stat - Timer) must always be taken from terminal 2 at the boiler. Live, Neutral and Earth to power these controls must be taken from the Fused Spur.

10.0 Commissioning

10.1 Commissioning the Boiler

1. Reference should be made to BS:EN 12828, 12831 & 14336 when commissioning the boiler. Ensure that the trap has been primed -see Section 9.5.3.
2. At the time of commissioning, complete all relevant sections of the Benchmark Checklist at the rear of this publication.
3. Open the mains water supply to the boiler and all hot water taps to purge the DHW system.
4. Ensure that the filling loop is connected and open, then open the heating flow and return valves on the boiler. Ensure that the cap on the automatic air vent on the pump body is opened (Fig. 37).
5. The system must be flushed in accordance with BS 7593 (see Section 6.2) and the flushing agent manufacturers instructions.
6. Pressurise the system to 1.5 bar (Fig. 38) then close and disconnect the filling loop.
7. Test for gas tightness, turn the gas supply on and purge according to in GB BS 6891 and in IE I.S. 813 "Domestic Gas Installations".

De-Aeration Function

8. When power is supplied to the boiler for the first time the software will be displayed, followed by **000**. However if **⏻** is shown, press **⏻R** for 2 to 4 seconds. **000** will now be displayed.
9. Press **iP** & **||||+** together and hold for at least 6 seconds. The 'De-Aeration' Function will be activated and **'On'** displayed.
10. The boiler pump will run for up to 10 minutes during which time the diverter valve will switch between heating & hot water. This will purge air from the system. The display will show **3 12**.

Gas Type Check

11. Once de-aeration is complete the boiler will go automatically to first fire-up and run at the Ignition Phase fan speed for 3 or 4 minutes to check the gas type (N.G. or Propane L.P.G.). The boiler software checks the combustion value against the set value. **000** will be displayed, alternating with a figure representing the Ignition Phase speed, e.g. **'33'** or **'43'** (Note: Each boiler model will display a different figure).
12. The boiler is factory set for Natural Gas. On a Natural Gas Supply **n G** will be displayed and the boiler is ready for the Inlet Pressure & Gas Rate to be checked (Section 10.2).

13. **IMPORTANT** - In cases where the supplied gas is Propane gas **LPG** will be displayed. Press **iP** for at least 6 seconds to confirm that this is the intended gas type for the installation.

14. IF THE BOILER IS TO BE OPERATED ON PROPANE A SUITABLE PERMANENT MARKER PEN MUST BE USED TO ALTER THE 'GAS SETTING INFORMATION' LABEL ADJACENT TO THE DATA LABEL!

15. Having checked:

- That the boiler has been installed in accordance with these instructions.
 - The integrity of the flue system and the flue seals.
 - The integrity of the boiler combustion circuit and the relevant seals.
- Perform the combustion check.

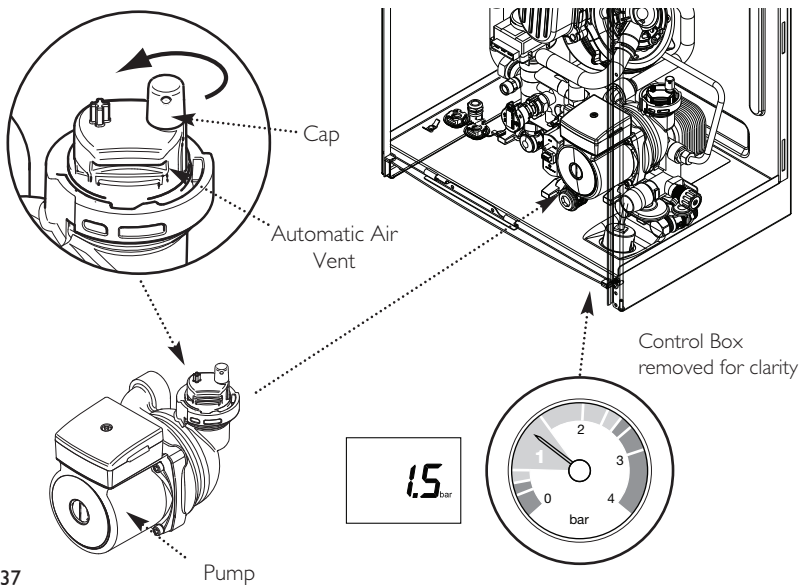


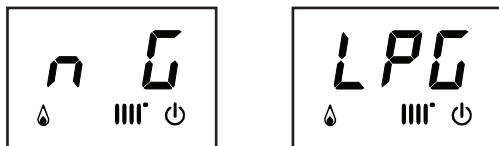
Fig. 37

Fig. 38



Fig. 39

Display showing Gas Type Recognition



IMPORTANT: The combustion for this appliance has been checked, adjusted and preset at the factory for operation on the gas type specified on the appliance data plate. No measurement of the combustion is necessary.

Do not adjust the air/gas ratio valve.

During the Gas Type Check Function the combustion ratio will increase for a short time while the gas type is established.

FUNCTION INTERRUPTION

If either De-aeration or Gas Check is interrupted by a fault e.g. low water pressure (E118) or air in the gas supply (E128 or E133) the fault must be rectified and the function reactivated. During De-aeration, if water pressure is lost, repressurising to 1.0 bar will allow the function to continue. Whilst the Gas Type Check is being performed if water pressure is lost the function can be reactivated by repressurising then pressing **iP** & **||||+** together and holding for at least 6 seconds. If a gas supply fault occurs **⏻R** must be pressed before **iP** & **||||+**.

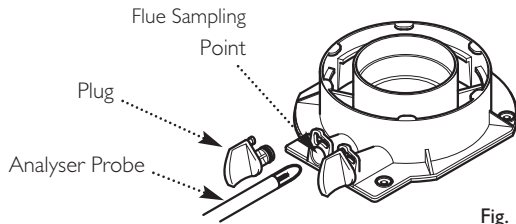


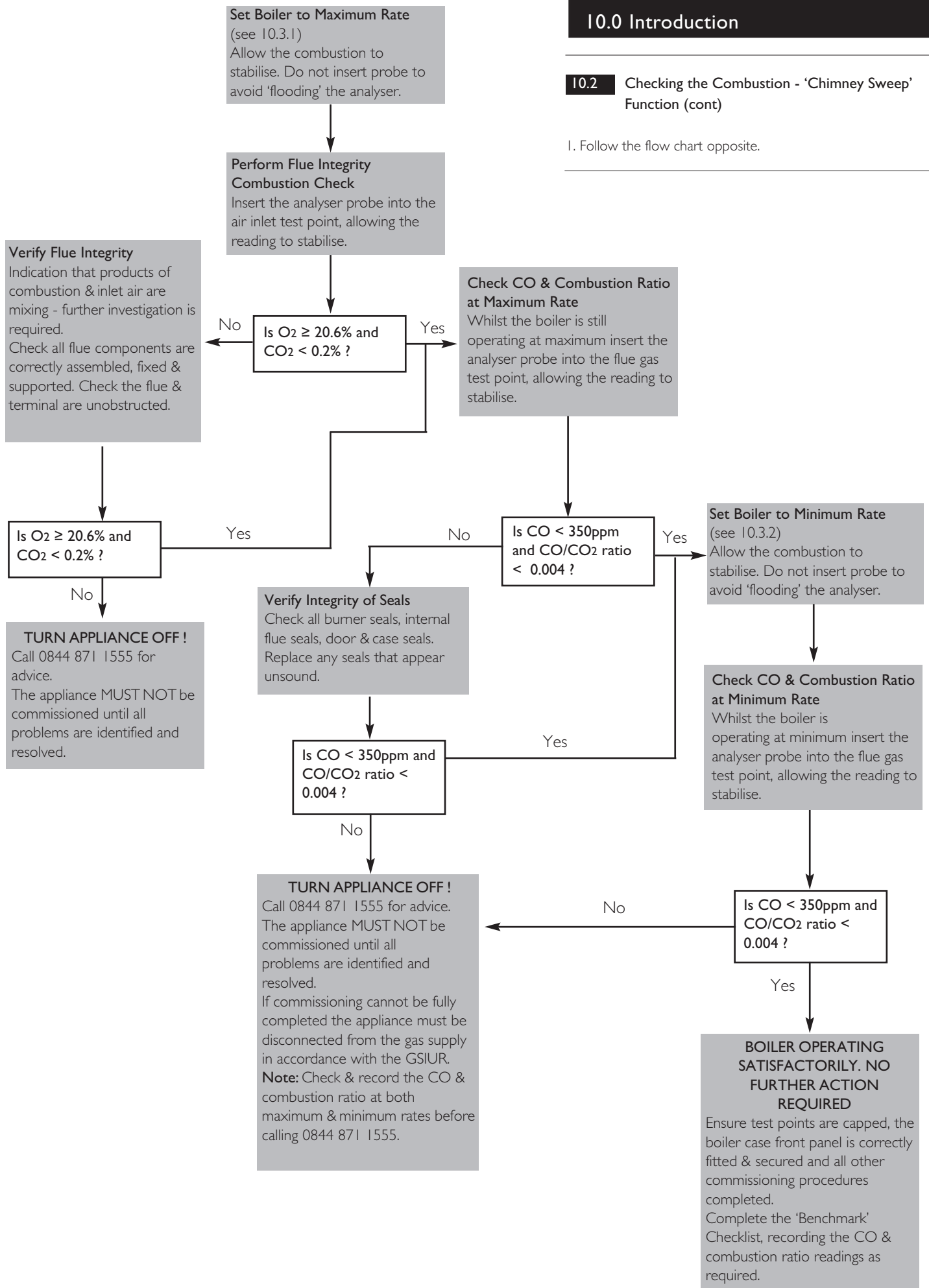
Fig. 36a

10.2 Checking the Combustion - 'Chimney Sweep' Function

1. To set the boiler to operate at MAXIMUM and MINIMUM, press **iP** & **||||+** together and hold for at least 6 seconds. 'On' will be displayed briefly, followed by '304' then the boiler output expressed as percentage i.e. '100'.
2. Press **||||-** until '00' is displayed, indicating minimum input.
3. To exit the function press **iP** & **||||+** together for 6 seconds.
4. The combustion (CO level and CO/CO₂ ration) must be measured and recorded at MAXIMUM DHW input and MINIMUM input.
5. Follow the flow chart on the next page to comply with the requirement to check combustion on commissioning.
6. The system MUST be cold to ensure the boiler is operating under full demand

10.2 Checking the Combustion - 'Chimney Sweep' Function (cont)

1. Follow the flow chart opposite.



10.0 Commissioning

10.3 Check the Operational (Working) Gas Inlet Pressure & Gas Rate

Note: The system MUST be cold to ensure the boiler is operating under full demand. To obtain an accurate measurement on smaller capacity systems it may be necessary to open one or more hot taps in order to maintain the boiler at full rate.

1. Press **iP** & **||||+** together and hold for at least 6 seconds. 'On' will be displayed briefly, followed by '304' then '100' when the boiler is lit, indicating the CH output is at MAXIMUM ('Chimney Sweep Function').

2. With the boiler operating in the maximum rate condition check that the operational (working) gas pressure at the inlet gas pressure test point on the gas cock or valve is in accordance with B.S. 6798 & B.S. 6891. This must be AT LEAST 17mb ! (LPG - 37mb)

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

Measure the Gas Rate

4. With any other appliances & pilot lights turned OFF the gas rate can be measured. It should be:-

Natural Gas	24 model	2.54 m³/h
	28 model	2.96 m³/h
	33 model	3.49 m³/h
	40 model	4.23 m³/h

Propane	24 model	1.92 kg/h
	28 model	2.25 kg/h
	33 model	2.64 kg/h
	40 model	3.2 kg/h

5. Press **iP** & **||||+** together and hold for at least 6 seconds to exit the function.

6. Carefully read and complete all sections of the Benchmark Commissioning Checklist at the rear of this publication that are relevant to the boiler and installation. These details will be required in the event of any warranty work. The publication must be handed to the user for safe keeping and each subsequent regular service visit recorded.

7. For IE, it is necessary to complete a "Declaration of Conformity" to indicate compliance with I.S. 813. An example of this is given in I.S. 813 "Domestic Gas Installations". This is in addition to the Benchmark Commissioning Checklist.

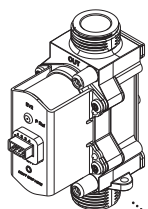
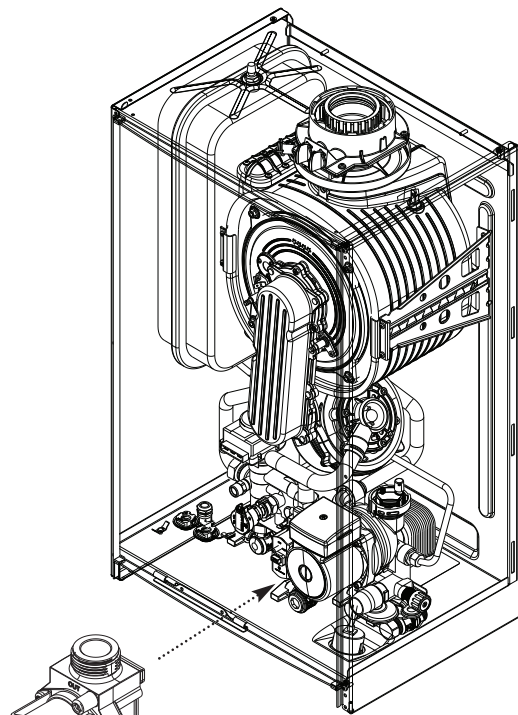


Fig. 41

DO NOT check gas pressure here

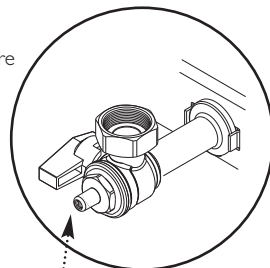
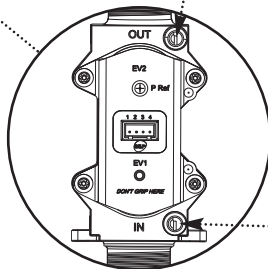


Fig. 40

Inlet Gas Pressure Test Point

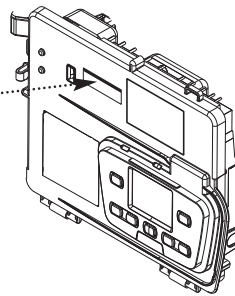
Gas Type Label

N.G. Factory Set

GAS SETTING INFORMATION	
Set for use with NG (2H - G20 - 20mbar)	<input checked="" type="checkbox"/>
Set for use with LPG (3P - G31 - 37mbar)	<input type="checkbox"/>

When reset for L.P.G.

GAS SETTING INFORMATION	
Set for use with NG (2H - G20 - 20mbar)	<input type="checkbox"/>
Set for use with LPG (3P - G31 - 37mbar)	<input checked="" type="checkbox"/>



Changing the Gas Type

1. It may be necessary to adjust the boiler gas type if the supply is changed, for example when Natural Gas is provided to a rural area previously reliant on Propane. In these instances a replacement Gas Type Label may be required, which is available on request as a spare part.

2. Press **||||-** & **||||+** and hold for at least 6 seconds. **P 01** will be displayed, alternating with **00**.

3. Press **||||+** to select the next parameter **P 02**. Press **iP**.

4. Press **||||-** or **||||+** to select the value that corresponds with the required gas type. For Natural Gas:- **00**
For Propane:- **01**

5. Press **iP** to save the change, then **OR** to return to the normal display.

11.1 Completion

1. Replace the case front panel, and secure with the screws previously removed.
2. This publication must be handed to the user for safe keeping and each subsequent regular service visit recorded.
3. Set the central heating and hot water temperatures to the requirements of the user. Instruct the user in the operation of the boiler and system.
4. Instruct the user in the operation of the boiler controls. Hand over the User's Operating, Installation and Servicing Instructions, giving advice on the necessity of regular servicing.
5. Demonstrate to the user the action required if a gas leak occurs or is suspected. Show them how to turn off the gas supply at the meter control, and advise them not to operate electric light or power switched, and to ventilate the property.
6. Show the user the location of the system control isolation switch, and demonstrate its operation.
7. Advise the user that they may observe a plume of vapour from the flue terminal, and that it is part of the normal operation of the boiler.

11.2 System Draining

1. If at any time after installation it is necessary to drain the central heating system (e.g. after replacing a radiator) the De-Aeration Function should be activated.
2. On refilling the system ensure that there is no heating or hot water demand, but that there is power to the boiler.
3. Press **iP** & **||||** together and hold for at least 6 seconds. The 'De-Aeration' Function will be activated.
4. The boiler pump will run for up to 10 minutes during which time the diverter valve will switch between heating & hot water. This will purge air from the system. The display will show **3 12**.
5. Once De-Aeration is complete set the external controls as required by the user.

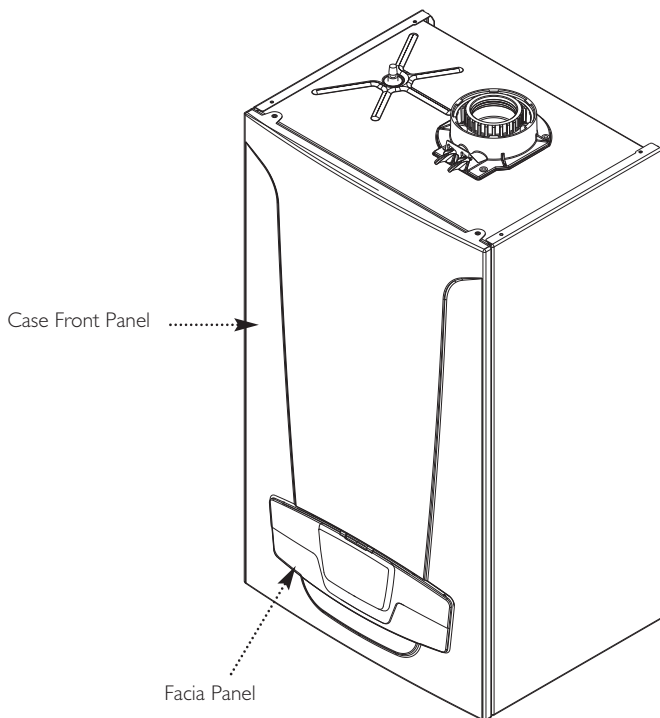


Fig. 42

To change the information displayed see the table below:-

The **iP** button can be pressed so that the display shows the following information:-

1 press - '00'	alternates with Sub-Code (only when fault on boiler) or '000'
2 presses - '01'	alternates with CH Temperature
3 presses - '02'	alternates with Outside Temperature (where Sensor fitted)
4 presses - '03'	alternates with DHW Temperature
5 presses - '04'	alternates with DHW Temperature
6 presses - '05'	alternates with System Water Pressure
7 presses - '06'	alternates with Return Temperature
8 presses - '04'	alternates with Flue Temperature
9 presses - '05'	alternates with Heat Exchanger Temperature

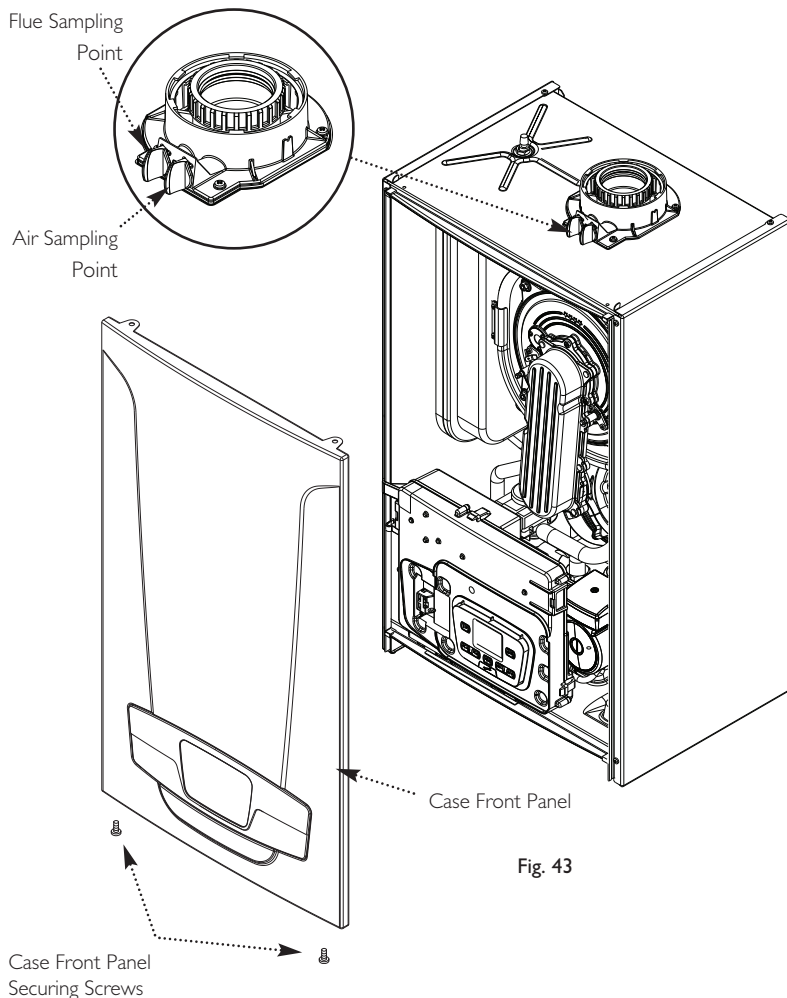


Fig. 43

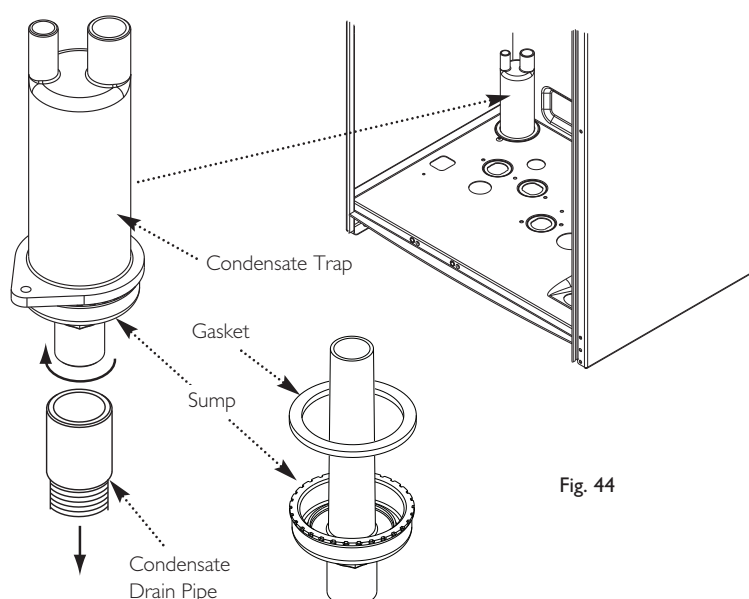


Fig. 44

12.0 Servicing

12.1 Performance Safety Check & Annual Servicing

1. For reasons of safety and economy, it is recommended that the boiler is serviced annually. Servicing must be performed by a competent person in accordance with B.S. 7967-4.

2. After servicing, complete the relevant Service Interval Record section of the Benchmark Commissioning Checklist at the rear of this publication.

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

- The integrity of the complete flue system and the flue seals (check air inlet sample).
- The integrity of the boiler combustion circuit and relevant seals as described in Section 12.2.
- The operational gas inlet pressure as described in Section 10.2.1 to 10.2.7 and the gas rate as described in 10.2.8.
- The combustion performance as described in 'Check the Combustion Performance' (12.1.4 to 12.1.6 below).

3. Competence to carry out Checking Combustion Performance

B.S. 6798 'Specification for Installation & Maintenance of Gas Fired Boilers not exceeding 70kW' 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.
- Competence can be demonstrated by satisfactory completion of the CPAI ACS assessment, which covers the use of electronic portable combustion gas analysers in accordance with BS 7967, Parts 1 to 4.

Check the Combustion Performance (CO/CO₂ ratio)

4. Set the boiler to operate at maximum rate as described in Section 14.1.1 to 14.1.6.

5. Remove the plug from the flue sampling point, insert the analyser probe and obtain the CO/CO₂ ratio. **This must be less than 0.004.**

6. If the combustion reading (CO/CO₂ ratio) is greater than this, and the integrity of the complete flue system and combustion circuit seals has been verified, and the inlet gas pressure and gas rate are satisfactory either:

- Perform the 'Annual Servicing - Inspection' (Section 12.2) & re-check.
- Perform the Combustion & Calibration functions (Section 14.0) & re-check.
- Replace the gas valve (Section 13.23) & re-check.

12.2 Annual Servicing - Inspection

1. Ensure that the boiler is cool.

2. **Ensure that both the gas and electrical supplies to the boiler are isolated.**

3. Remove the screws securing the case front panel. Lift the panel slightly to disengage it from the studs on top of the case (Fig. 43) and hinge down the Control Box.

4. Disconnect the condensate drain pipe and unscrew the sump from the bottom of the condensate trap assembly (Fig. 44). Remove any deposits from the sump and trap. Clean as necessary and replace the sump.