

10.0 Commissioning

10.2 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 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 m ³ /h
	28 model	2.96 m ³ /h
	33 model	3.49 m ³ /h
	40 model	4.23 m ³ /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.

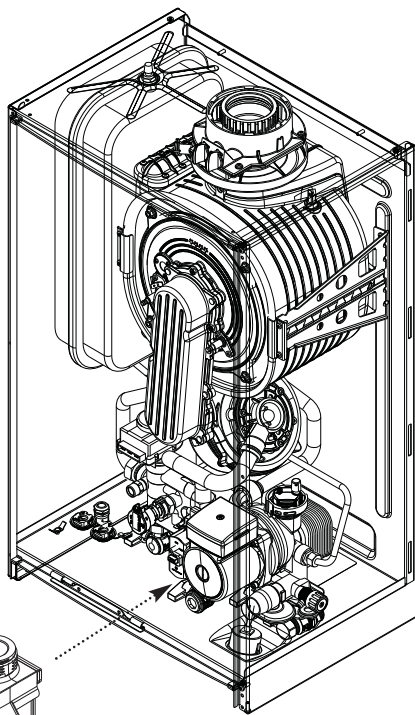
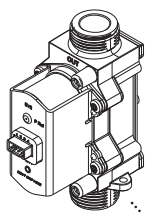
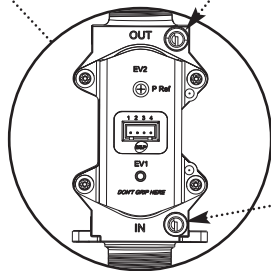


Fig. 40



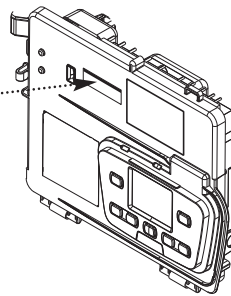
DO NOT check gas pressure here



Inlet Gas Pressure Test Point

Gas Type Label

	GAS SETTING INFORMATION	
N.G. Factory Set	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.	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.

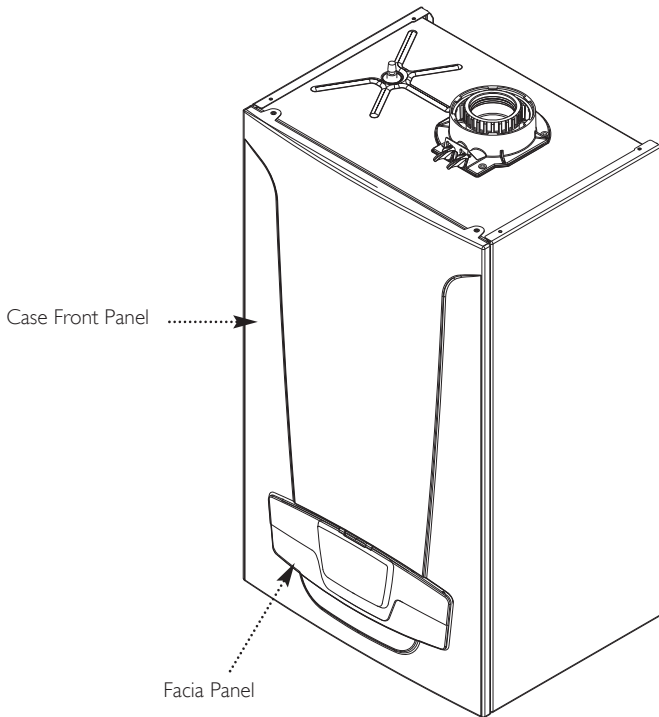


Fig. 42

To change the information displayed see the table below:-

<p>The iP button can be pressed so that the display shows the following information:-</p> <p>1 press - '00' alternates with Sub-Code (only when fault on boiler) or '000'</p> <p>2 presses - '01' alternates with CH Temperature</p> <p>3 presses - '02' alternates with Outside Temperature (where Sensor fitted)</p> <p>4 presses - '03' alternates with DHW Temperature</p> <p>5 presses - '04' alternates with DHW Temperature</p> <p>6 presses - '05' alternates with System Water Pressure</p> <p>7 presses - '06' alternates with Return Temperature</p> <p>8 presses - '04' alternates with Flue Temperature</p> <p>9 presses - '05' alternates with Heat Exchanger Temperature</p>
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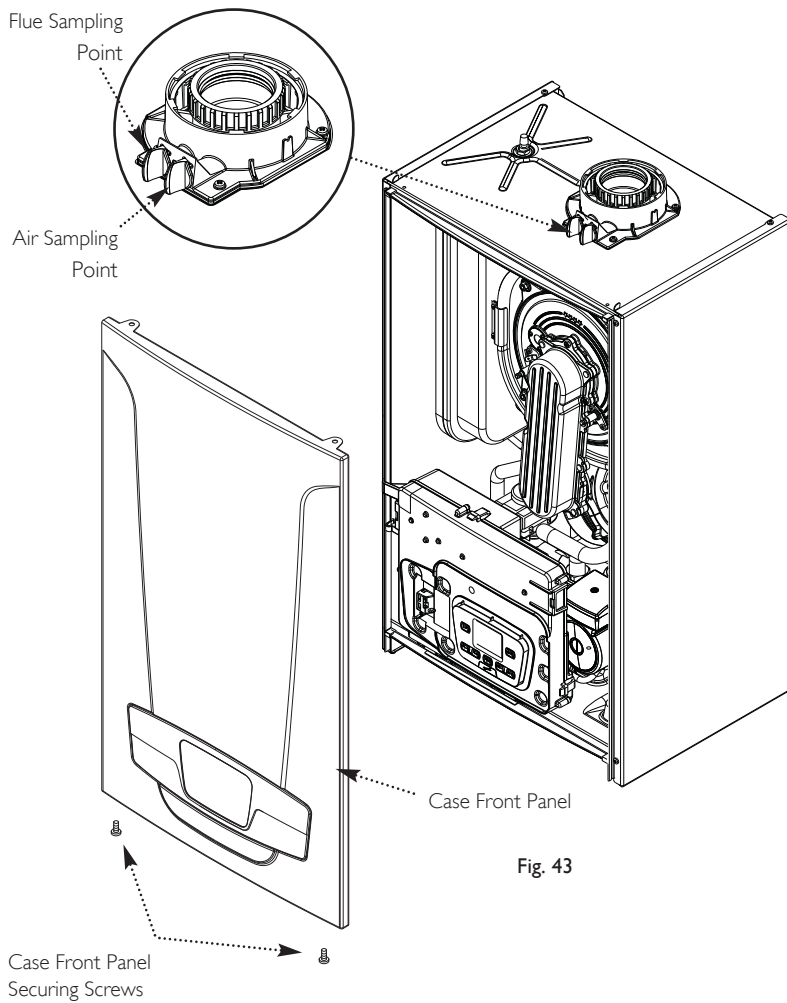


Fig. 43

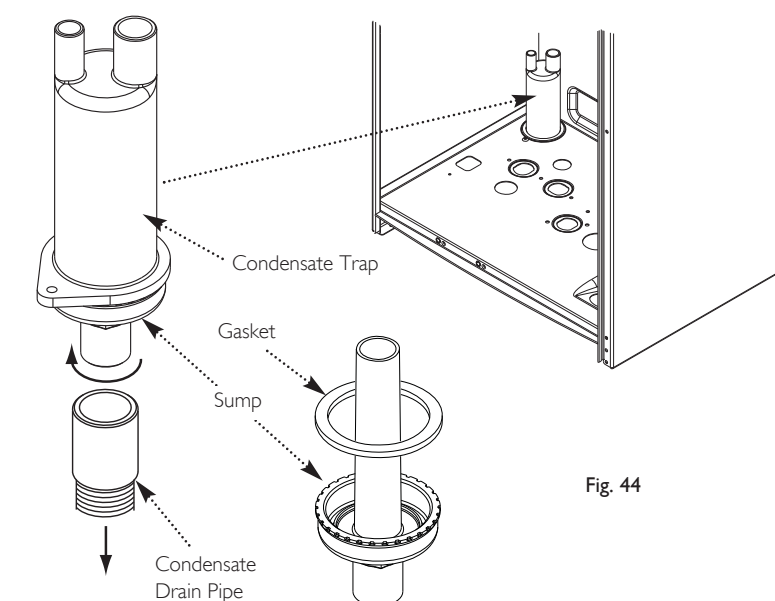


Fig. 44

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 13.2.3) & 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.

12.0 Servicing

12.2 Annual Servicing Inspection (Cont)

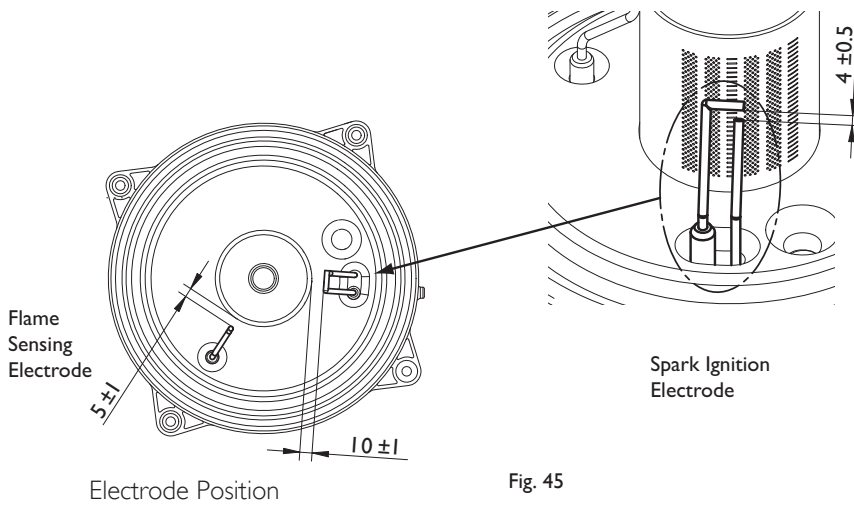


Fig. 45

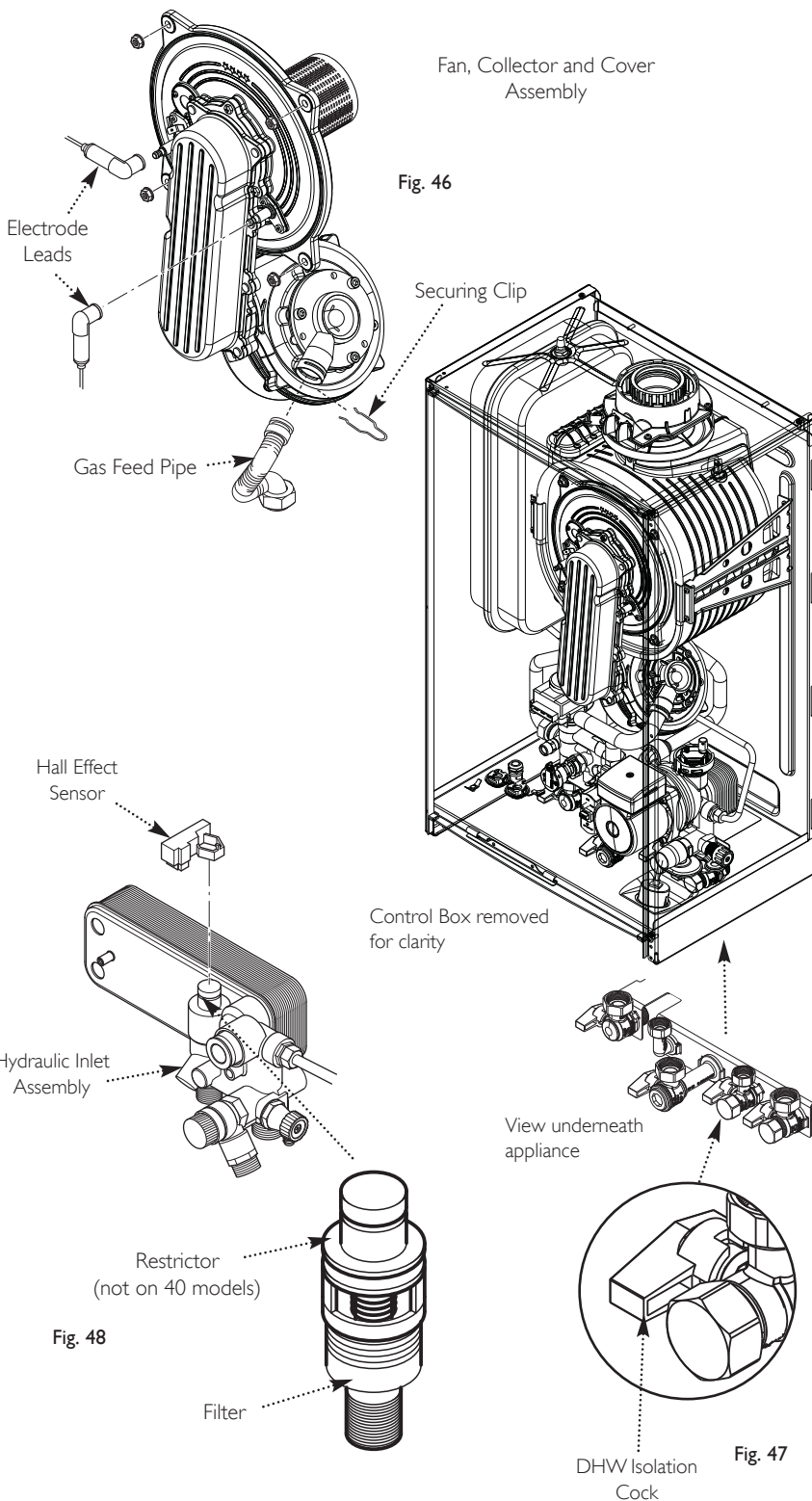


Fig. 46

5. Remove the clip securing the gas feed pipe to the air/gas venturi. Disconnect the pipe. Do not break the joint between the pipe and gas valve unless necessary.

6. Disconnect the electrode leads, noting their position, and the fan electrical plugs (Fig. 46).

7. Undo the four nuts retaining the combustion box cover to the heat exchanger.

8. Carefully draw the fan, collector and cover assembly forward (Figs. 46).

9. Clean any debris from the heat exchanger and check that the gaps between the tubes are clear.

10. Inspect the burner, electrodes position and insulation, cleaning or replacing if necessary. Clean any dirt or dust from the air box.

11. Carefully examine all seals & gaskets, replacing as necessary. Look for any evidence of leaks or corrosion, and if found determine & rectify the cause.

12. Reassemble in reverse order, ensuring the front case panel is securely fitted.

DHW Filter & Turbine Assy. (Fig. 48)

13. If the flow of domestic hot water is diminished, it may be necessary to clean the filter.

14. Turn the DHW isolation cock (Fig. 47) off and draw off from a hot tap.

15. Remove the retaining clip and extract the filter cartridge and rinse thoroughly in clean water. Reassemble and check the flow. Ensure that the turbine spins freely.

16. Recommission the boiler as described in Section 10.0.

17. Complete the relevant Service Interval Record section of the Benchmark Commissioning Checklist at the rear of this publication and then hand it back to the user.

13.0 Changing Components

IMPORTANT: When changing components ensure that both the gas and electrical supplies to the boiler are isolated before any work is started. When the component has been changed recommission the boiler as described in Section 10.0.

Always examine any seals or gaskets, replacing where necessary. The Case Front Panel **MUST** seal effectively against the air box side panels.

See Section 12.1 "Annual Servicing" for removal of case panel, door etc.

13.1 Spark Ignition and Flame Sensing Electrodes (Fig. 49)

1. Disconnect the electrode leads, noting their positions.
2. Remove the retaining screws securing each of the electrodes to the combustion box cover and remove the electrodes.
3. Check the condition of the sealing gaskets and replace if necessary. Reassemble in reverse order.
4. After changing the Flame Sensing Electrode check the combustion - see Section 14.1.
5. When satisfactory combustion readings are not obtained ensure the electrode position is correct and perform the combustion check again.

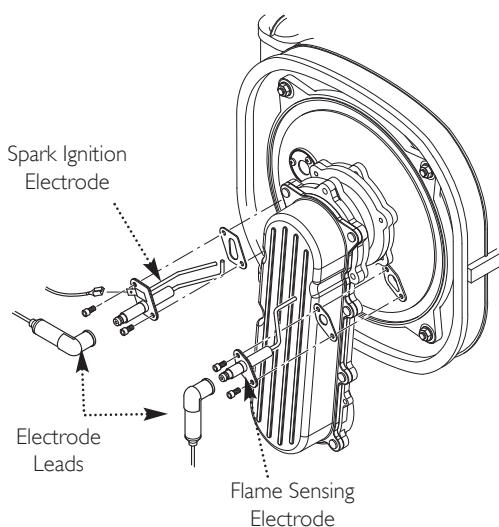
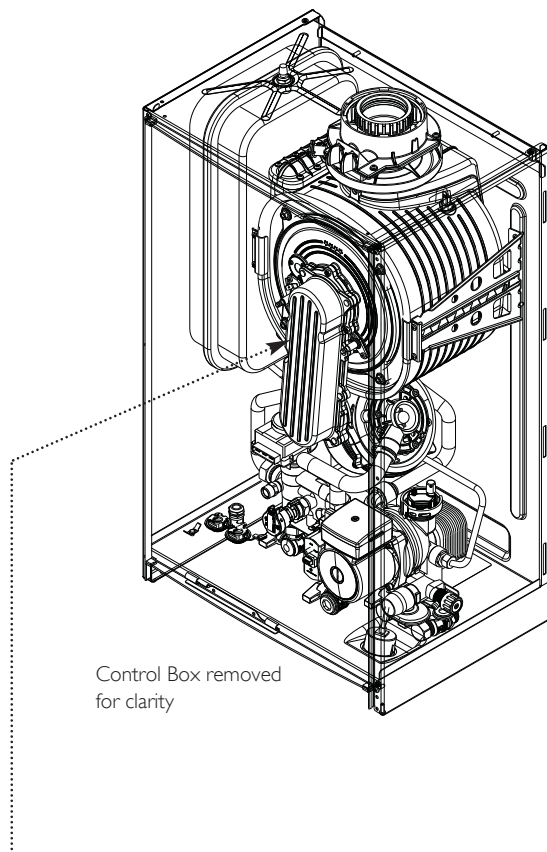
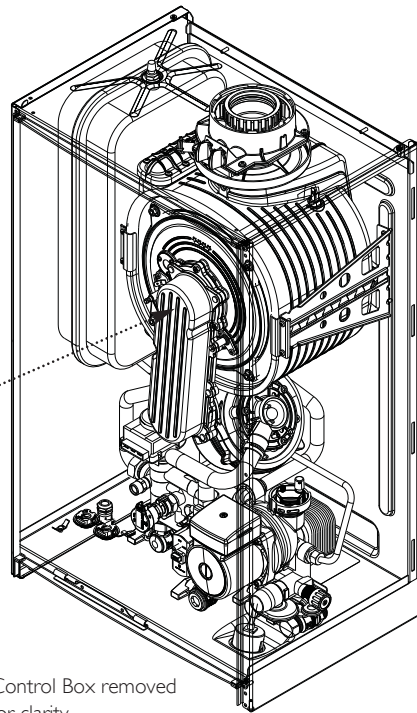


Fig. 49

13.0 Changing Components

13.2 Fan (Fig. 50)

1. Remove the clip securing the gas feed pipe to the air/gas venturi. Disconnect the pipe.
2. Undo the screws securing the air/gas collector to the cover (33/40) or extension piece (24/28) and disconnect the fan electrical plugs.
3. Remove the collector and fan assembly, being careful to retain the gasket.
4. Undo the screws securing the fan to the collector. Retain the gasket.
5. Undo the screws securing the venturi to the fan (noting its position) and transfer to the new fan, replacing the seal if necessary.
6. Examine the gasket(s) and replace if necessary.
7. Reassemble in reverse order and perform the Calibration Function - see Section 14.2.



Control Box removed for clarity

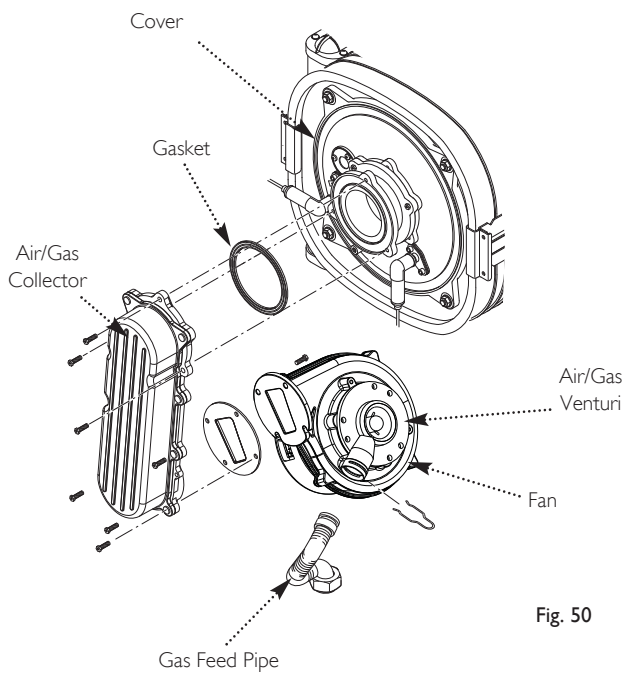


Fig. 50

13.3 Air/Gas Venturi (Figs. 50 & 51)

1. Remove the clip securing the gas feed pipe to the venturi.
2. Undo the screws securing the collector to the cover (33/40) or extension piece (24/28) and disconnect the fan electrical plugs.
3. Remove the collector and fan assembly, being careful to retain the gasket.
4. Undo the screws securing the venturi to the fan (noting its position) and fit the new venturi, replacing the seal if necessary.
5. Examine the gasket and replace if necessary.
6. After changing the venturi check the combustion - see Section 14.1.

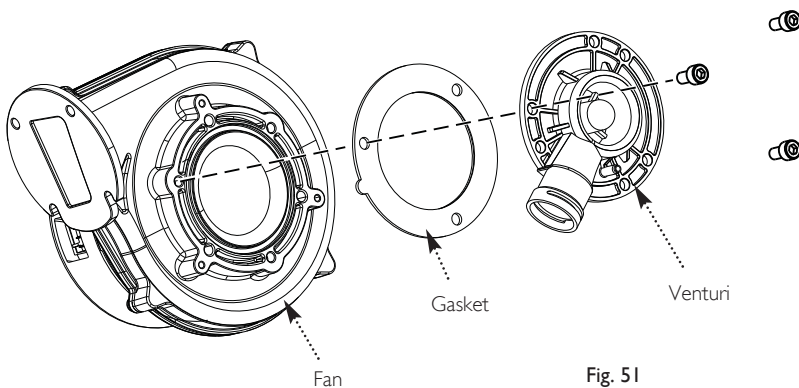


Fig. 51

13.0 Changing Components

13.4 Burner (Fig. 52)

1. Remove the clip securing the gas feed pipe to the air/gas venturi and disconnect the fan electrical plugs.
2. Undo the screws securing the air/gas collector to the cover (33/40) or extension piece (24/28). Remove this extension piece from the cover (on 24 and 28 models).
3. Withdraw the burner from the cover and replace with the new one.
4. Examine the gasket(s), replacing if necessary.
5. After changing the burner check the combustion - see Section 14.1.

13.5 Insulation (Fig. 53)

1. Remove the clip securing the gas feed pipe to the air/gas venturi and disconnect the fan electrical plugs.
2. Remove the electrodes as described in section 13.1.
3. Undo the nuts holding the cover to the heat exchanger. Draw the air/gas collector, fan and cover assembly away.
4. Remove the cover insulation piece.
5. Fit the new insulation carefully over the burner and align it with the slots for the electrodes.
6. If the rear insulation requires replacement, remove it and all debris from the heat exchanger. Also it may be necessary to separately remove the spring clip from the pin in the centre of the heat exchanger and the 'L' shaped clips embedded in the insulation.
7. Do not remove the shrink-wrapped coating from the replacement rear insulation. Keep the insulation vertical and press firmly into position.
8. Examine the cover seal and replace if necessary. Reassemble in reverse order.

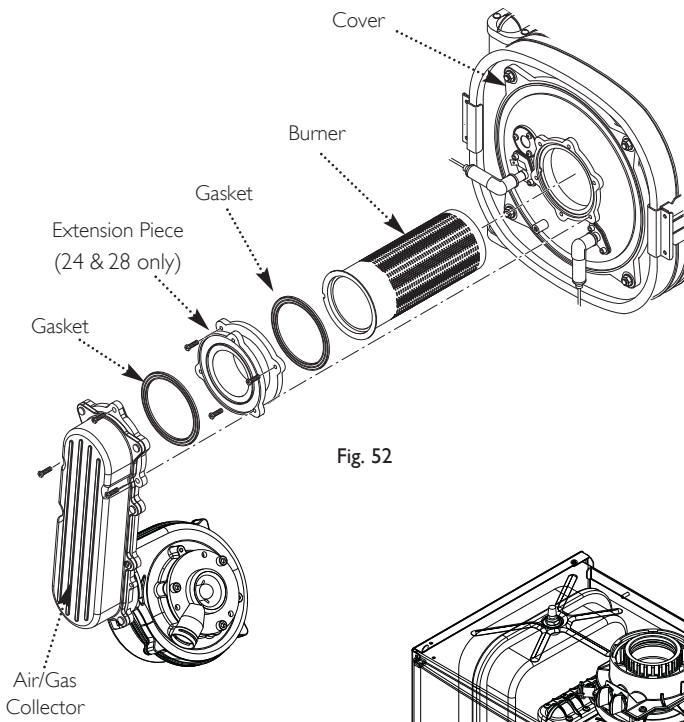


Fig. 52

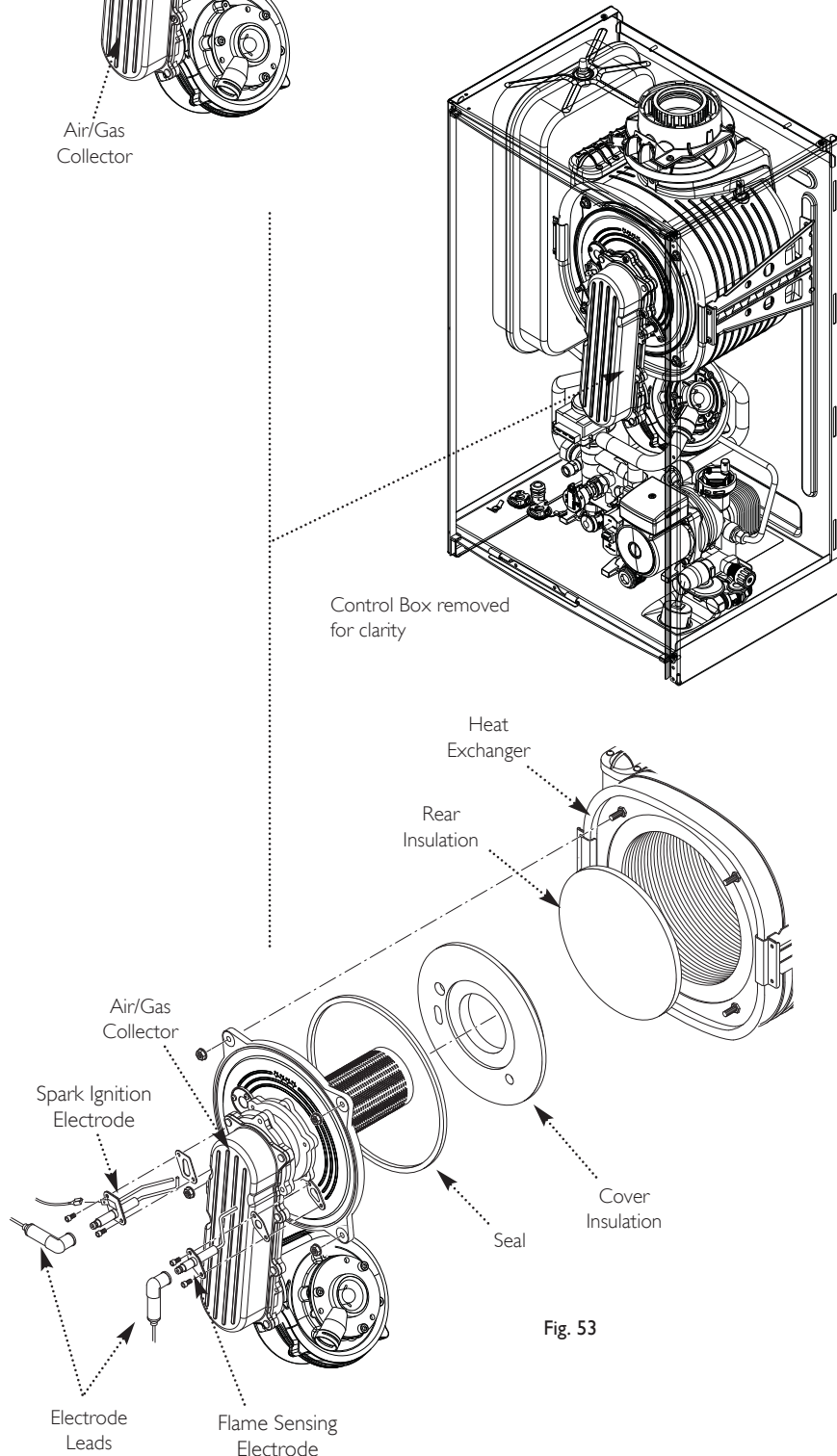


Fig. 53

13.0 Changing Components

13.6 Flue Sensor (Fig. 54)

1. Ease the retaining tab on the sensor away and disconnect the electrical plug.
2. Turn the sensor 90° anticlockwise to remove - it is a bayonet connection.
3. Reassemble in reverse order.

13.7 Heating Flow & Return Sensors (Fig. 55)

1. There is one sensor on the flow (red wires) and one sensor on the return (blue wires).
2. After noting the position prise the sensor clip off the pipe and disconnect the plug.
3. Connect the plug to the new sensor and ease the clip onto the pipe as close to the heat exchanger as possible.

13.8 Safety Thermostat (Fig. 55)

1. Pull the terminals off the safety thermostat.
2. Remove the screws securing the thermostat to the mounting plate on the flow pipe.
3. Reassemble in reverse order, ensuring that the terminals are pushed fully on.

13.9 DHW NTC Sensor (Fig. 56)

1. Turn off the mains cold water supply tap and draw off the residual domestic hot water.
2. Ease the retaining tab on the sensor away and disconnect the electrical plug.
3. Unscrew the sensor from the hydraulic outlet assembly. Examine the sealing washer, replacing if necessary.
4. Reassemble in reverse order. The plug will only fit one way.

13.10 Hydraulic Pressure Sensor (Fig. 56)

1. Close the flow and return isolation taps and drain the primary circuit.
2. Disconnect the plug from the sensor.
3. Prise off the spring clip and remove the sensor. Examine the 'O' ring, replacing if necessary.
4. Reassemble in reverse order.

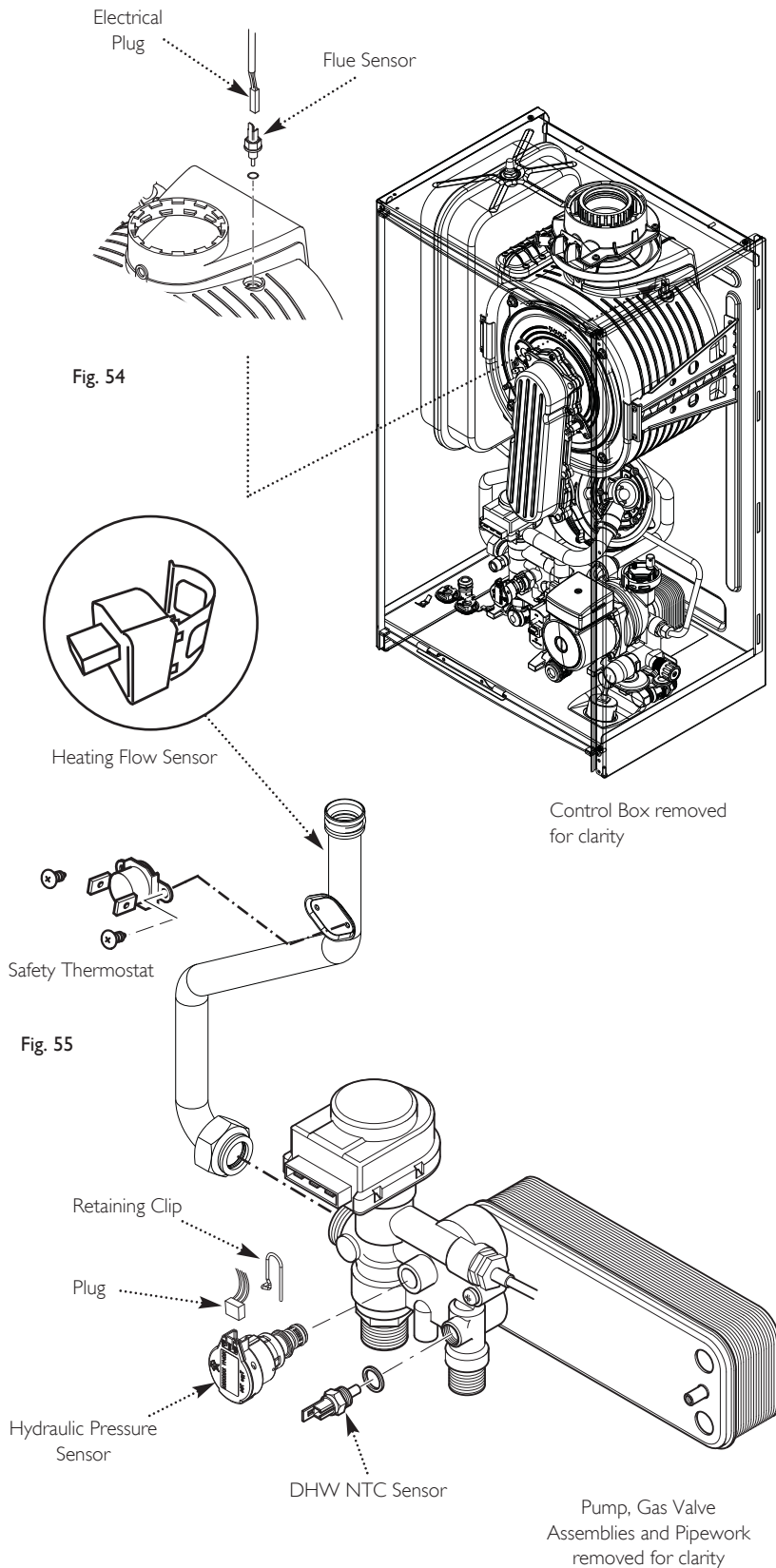


Fig. 56

13.0 Changing Components

13.11 Pump - Head Only (Fig. 57)

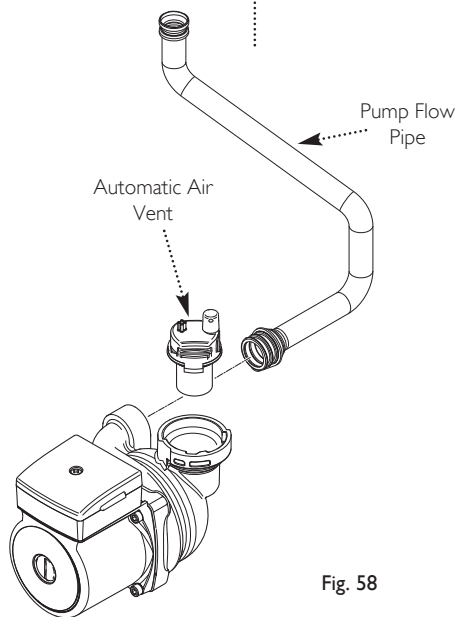
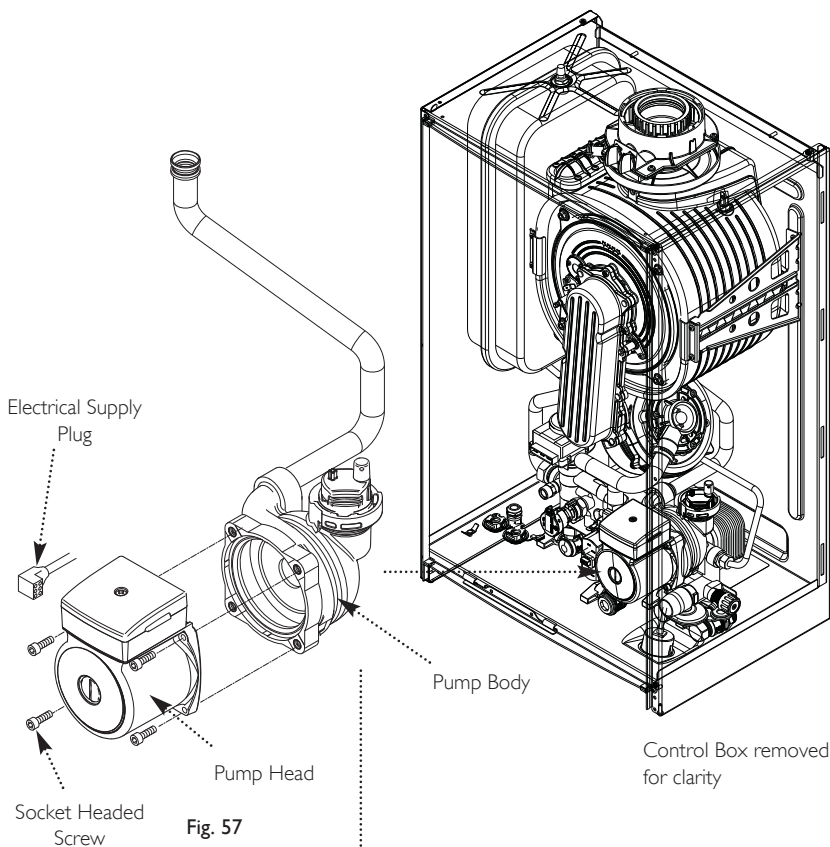
1. Disconnect the electrical supply plug from the pump.
2. Close the flow and return isolation taps and drain the primary circuit. Remove the socket head screws securing the pump head to the body and draw the head away.
3. Reassemble in reverse order.

13.12 Pump - Complete (Fig. 58)

1. Disconnect the electrical supply plug from the pump.
2. Close the flow and return isolation taps and drain the primary circuit. Undo the two screws securing the body to the inlet assembly and pump flow pipe. Draw the complete pump forwards.
3. Pull off the securing clip and remove the automatic air vent. Transfer them to the new pump body.
4. Examine the 'O' ring seals, replacing if necessary and reassemble in reverse order.

13.13 Automatic Air Vent (Fig. 58)

1. Close the flow and return isolation taps and drain the primary circuit. Disconnect the gas pipe from the venturi
2. The automatic air vent is a bayonet fitting. Remove by twisting anticlockwise.
3. Fit the new automatic air vent, ensuring the 'O' ring is fitted and the cap is open. Reassemble in reverse order.



13.0 Changing Components

13.14 Hall Effect Sensor (Fig. 59)

1. Ease the sensor upwards off the hydraulic inlet manifold assembly.
2. Disconnect the electrical plug from the sensor.
3. Connect the plug to the new sensor. Carefully fit the new sensor to the hydraulic assembly, ensuring it is fully down.

13.15 Safety Pressure Relief Valve (Fig. 60)

1. Close the flow and return isolation taps and drain the primary circuit.
2. Disconnect the discharge pipework from the valve. Remove the sealing grommet.
3. Slacken the grub screw securing the pressure relief valve and remove from the inlet assembly.
4. On reassembly ensure that the 'O' ring is in place and the sealing grommet is correctly refitted to maintain the integrity of the case seal.

13.16 Heating Pressure Gauge (Figs. 61 & 61a)

1. Close the flow and return isolation taps and drain the primary circuit.
2. Remove the gauge from the boiler lower panel.
3. Remove the clip securing the pressure gauge capillary.
4. Fit the new gauge, ensuring that the capillary is routed to prevent any sharp bends. Reassemble in reverse order and ensure the gauge is firmly in position to maintain the integrity of the case seal.

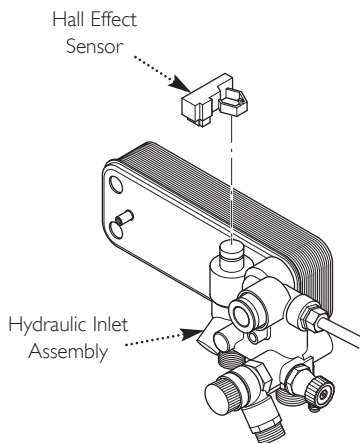
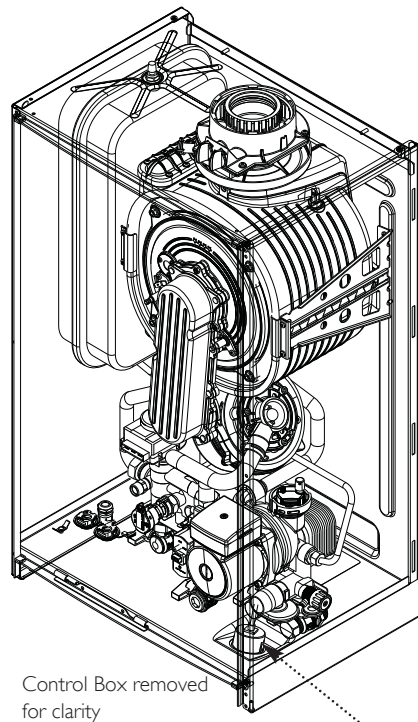


Fig. 59

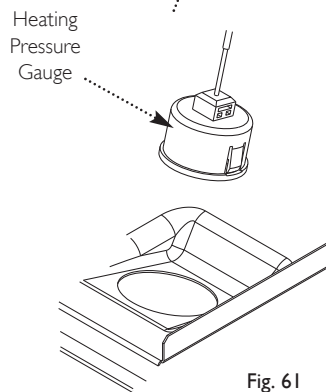


Fig. 61

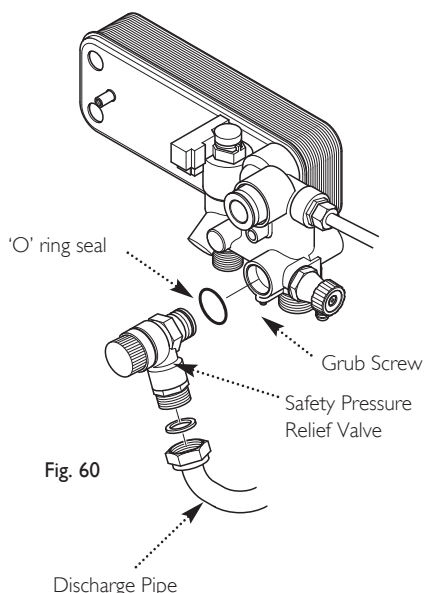


Fig. 60

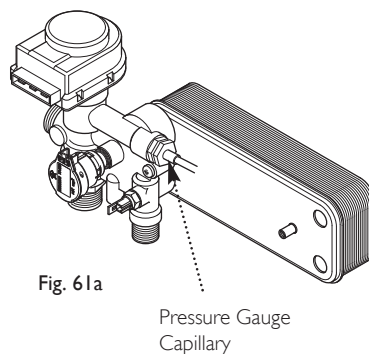


Fig. 61a

13.0 Changing Components

13.17 Plate Heat Exchanger (Fig. 62)

1. Close the flow & return isolation taps and the cold mains inlet. Drain the primary circuit and draw off any residual DHW.
2. Remove the gas valve as described in Section 13.20. and disconnect the pressure gauge capillary.
3. Undo the screws securing the plate heat exchanger to the hydraulic inlet & outlet assemblies
4. Withdraw the plate heat exchanger upwards and remove.

Seals

5. There are four rubber seals between the hydraulic assembly and heat exchanger which may need replacement.
6. Ease the seals out of the hydraulic assembly. Replace carefully, ensuring that the seal is inserted parallel and pushed fully in.
7. When fitting the new heat exchanger note that the right hand location stud is offset more towards the centre.
8. Reassemble in reverse order.

13.18 Diverter Valve - Motor & Valve Assembly (Fig. 63)

1. To replace the motor, disconnect the multi-pin plug.
2. Pull off the retaining clip and remove the motor.
3. The motor can now be replaced, or the valve assembly removed.
4. Drain the primary circuit and draw off any hot water once the isolating taps are closed. Disconnect the pressure gauge capillary and h/exchanger flow pipe.
5. Undo the nuts on the tap rail under the boiler. Remove the screws securing the valve assembly to the boiler bottom panel and plate heat exchanger.
6. Remove the valve assembly. Examine all seals and washers, replacing if necessary. Transfer the DHW NTC and hydraulic pressure sensor to the new valve and reassemble in reverse order.

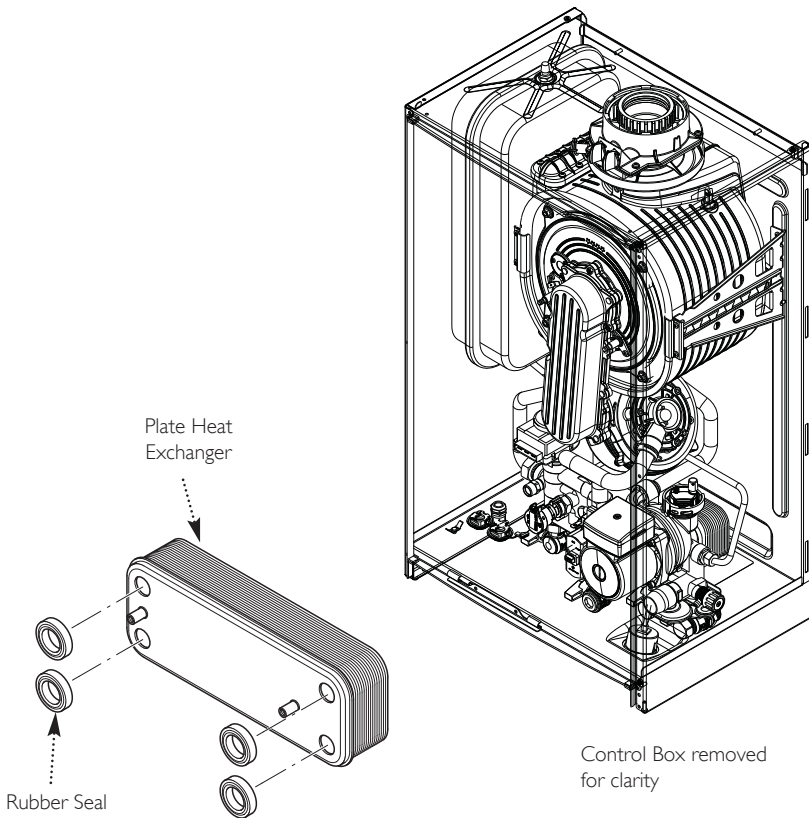


Fig. 62

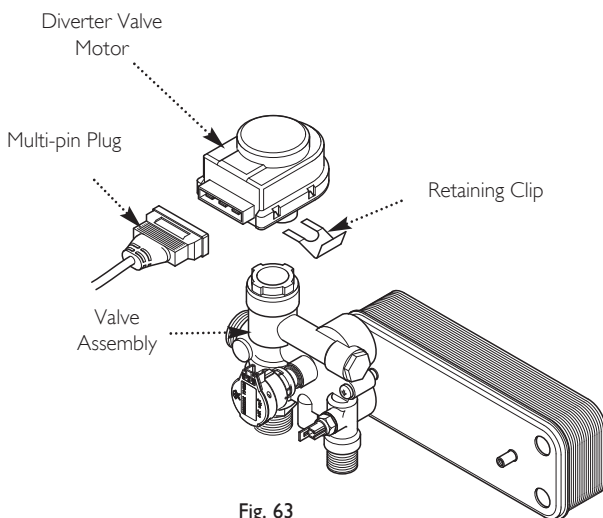


Fig. 63

13.0 Changing Components

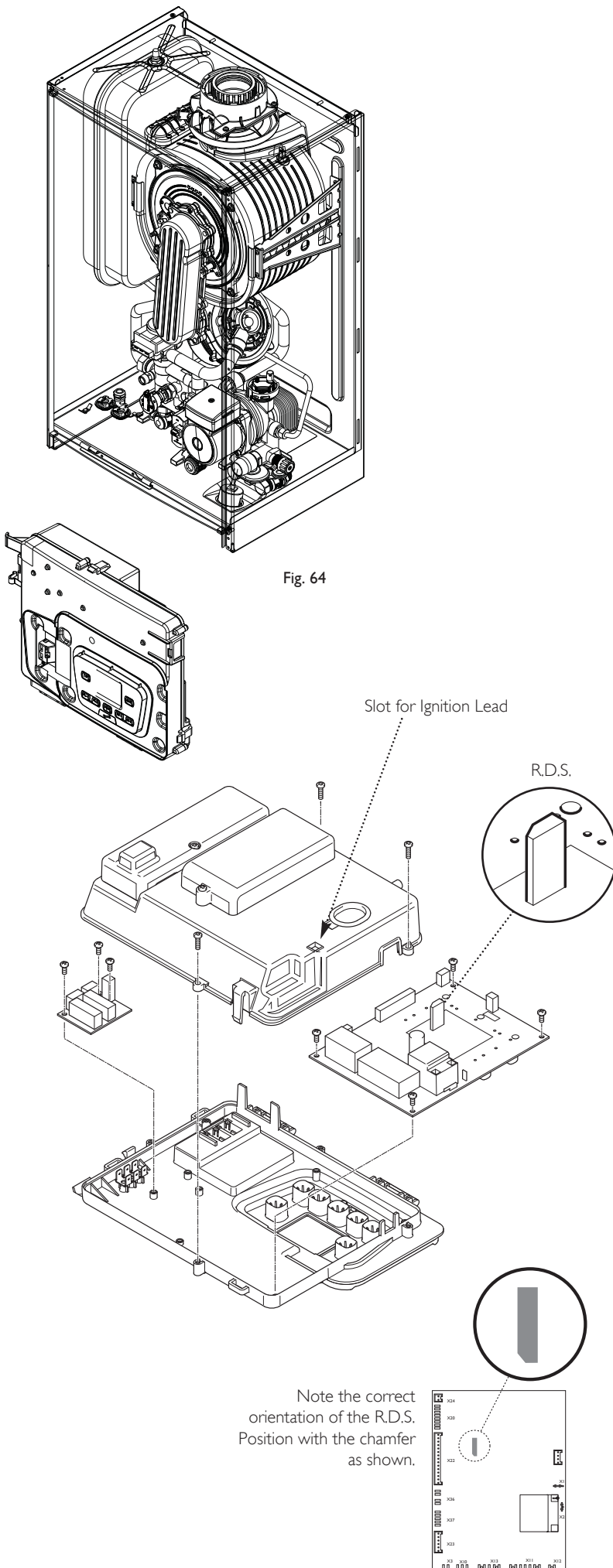
13.19 P.C.B. & R.D.S. (Removable Data Stick) (Fig. 64)

NOTE: Both P.C.B. and R.D.S. are available as spare parts. The P.C.B. is suitable for any boiler model. An R.D.S. specific to the boiler model output & gas type will be required if the R.D.S. from the original P.C.B. is not being transferred. It is recommended that P.C.B. and R.D.S. are replaced together.

1. Ensure that the power to the boiler is isolated and wait 10 seconds.
2. Remove the screws securing the control box cover and release the cover retaining barbs from their slots.
3. Note the position of all plugs and wires on the P.C.B. and disconnect them.
4. Undo the securing screws and remove the P.C.B.

IMPORTANT: If only the P.C.B. is being replaced transfer the R.D.S. from the original board to the new one. Where both P.C.B. and R.D.S. are being replaced ensure the new R.D.S. is on new the board.

5. Reassemble in reverse order. Ensure that the ignition lead is connected correctly.
6. **P.C.B. ONLY changed** - Check the Combustion - see Section 14.1.
7. **P.C.B. & R.D.S. changed** - enable the Calibration Function as described in Section 14.2, then Check the Combustion - see Section 14.1.



13.0 Changing Components

13.20 Gas Valve (Fig. 65)

IMPORTANT: After replacing the valve the CO₂ must be calibrated as detailed in Section 14.0 Combustion & Calibration. Only change the valve if a suitable calibrated combustion analyser is available, operated by a competent person - see section 12.1.

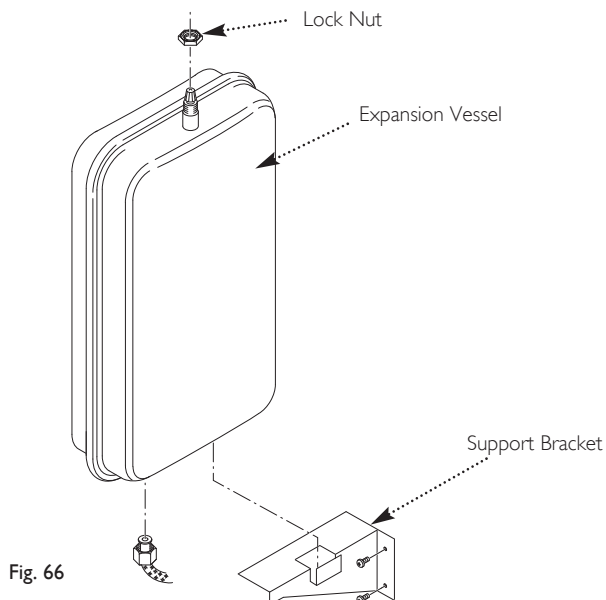
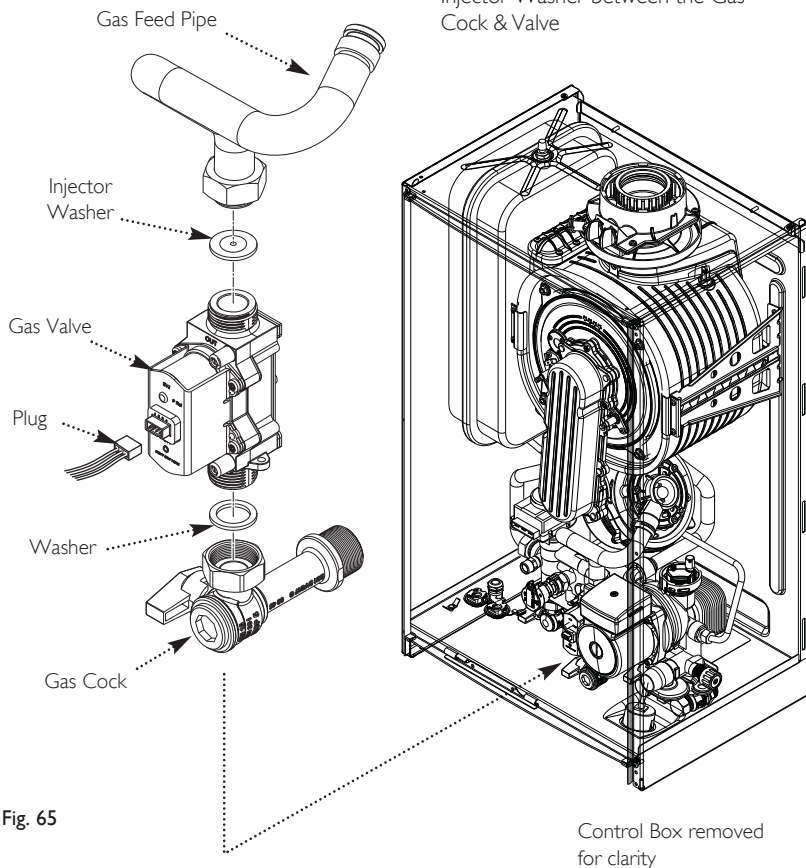
1. Turn the gas cock off and undo the nut under the boiler. Retain the washer.
2. Remove the electrical plug from the valve.
3. Undo the nut on the gas feed pipe and ease the pipe aside. It is recommended that the injector washer is changed as well.
4. Remove the screws securing the gas valve to the boiler bottom panel.
5. Reassemble in reverse order, ensuring the injector washer is in place, and perform the Calibration Function & Combustion Check - see Sections 14.1 & 14.2.

NOTE: Check for gas tightness after replacing gas valve.

13.21 Expansion Vessel (Fig. 66)

1. Close the flow and return isolation taps and drain the primary circuit.
2. Undo the nut on the pipe connection at the bottom of the vessel, and slacken the nut on the hydraulic inlet assembly.
3. Remove the screws securing the support bracket, and withdraw the bracket.
4. Whilst supporting the vessel undo and remove the locknut securing the vessel spigot to the boiler top panel.
5. Manoeuvre the vessel out of the boiler.
6. Reassemble in reverse order.

NOTE: The Injector Washer MUST be fitted as shown between the Valve & Pipe. DO NOT fit the Injector Washer between the Gas Cock & Valve



IMPORTANT: DO NOT insert the Analyser Probe into the Test Point immediately. This will prevent saturation of the analyser.

During the Calibration Function the combustion ratio may increase for a short time while the boiler performance is optimised.

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.

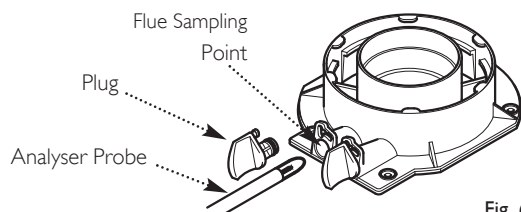


Fig. 67

14.3 Adjusting the CO²

1. Press **iP** & **||||+** together and hold for at least 6 seconds. 'On' will be displayed briefly, followed by '304' then the boiler CH output expressed as percentage i.e. '100'.
2. Press **iP** to select the adjustment function. '0' will alternate with '304'. Using the **||||-** & **||||+** buttons adjust '0' between '-3' & '3'.
3. Decreasing the value lowers the CO², and selecting a higher value will increase CO².
4. Once the correct CO² reading is achieved press **iP** to return to the fan speed selection.
5. Using **||||-** or **||||+** to select the next fan speed. '00' indicates MINIMUM speed, the other speed (Ignition Phase) will be indicated by, for example '33' (this varies depending on boiler model).
6. Repeat step 2. above to adjust the CO² at Ignition Phase and Minimum fan speeds. Press **iP** & **||||+** together and hold for at least 6 seconds to exit the function.

14.1 Checking the Combustion

1. Combustion should be:-

Natural Gas 9.0% CO² ± 0.7

Propane 10.5% CO² ± 1.0

at all 3 fan speeds:- '100' (Maximum), the Ignition Phase speed and '00' (Minimum).

2. Press **iP** & **||||+** together and hold for at least 6 seconds. 'On' will be displayed briefly, followed by '304' then the boiler CH output expressed as percentage i.e. '100'. It may be necessary to open one or more hot taps in order to maintain the boiler at full rate.
3. Insert the analyser probe and once stabilised note the CO² reading.
4. Press **||||-** to select the Ignition Phase Speed. A value will be displayed, e.g. '33'. Note the CO² reading.
5. Press **||||-** again to select the Minimum Output. '00' will be displayed. Note the CO² reading.
6. If the CO² is not within the tolerances referred to above at any of the speeds, follow the procedure in **Section 14.3 opposite** to calibrate the boiler.
7. To exit the function press **iP** & **||||+** together for 6 seconds.

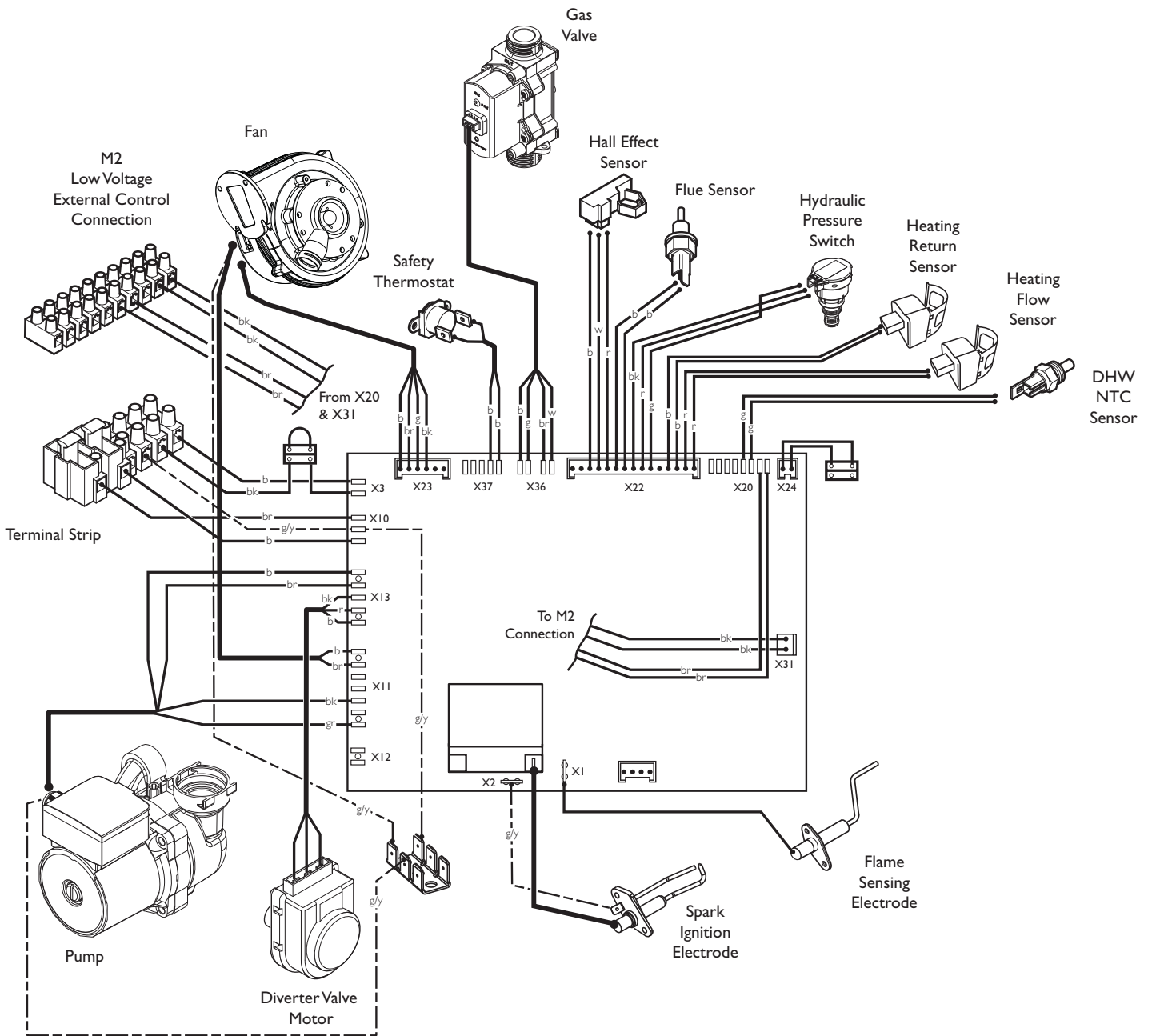
14.2 Calibration Function

IMPORTANT: Do not commence the Calibration Function whilst the burner is lit! The case front panel **MUST** be fitted.

Note: 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. The function is activated by pressing buttons **||||-** and **OR** together for 6 seconds then quickly pressing button **iP** while 'On' is displayed. The Ignition Phase fan speed code will then be displayed. Calibration will take approximately 5 minutes.
2. If '303' is displayed, then the Calibration Function has not been activated correctly. Isolate and reinstate all power sources to the boiler and repeat the above.
3. The boiler will automatically calibrate at '100', the Ignition Phase speed then '00'. These represent the percentage of MAXIMUM fan speed (i.e. '00' is MINIMUM fan speed). Once the boiler has stabilised and self-calibrated at each fan speed the **P** and **||||** symbols will be displayed before the next speed is automatically set.
4. When self-calibration is complete the boiler will run at MINIMUM fan speed ('00' displayed). The following symbols will also be displayed **||||** flashing together at regular intervals.
5. To exit the function press **OR**. 'ESC' will be displayed and the calibration function completed.

15.1 Illustrated Wiring Diagram

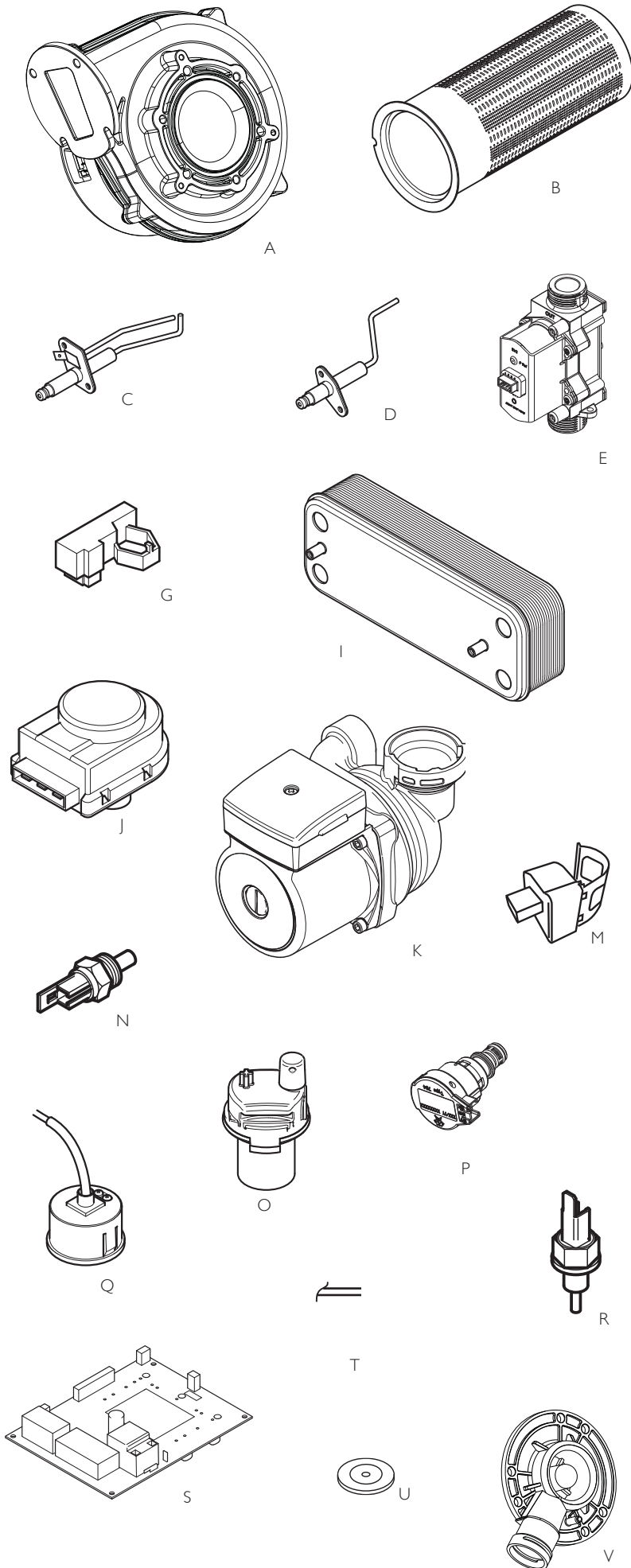


Key To Wiring Colours

- | | |
|------------|--------------------|
| b - Blue | r - Red |
| bk - Black | g - Green |
| br - Brown | g/y - Green/Yellow |
| w - White | y - Yellow |
| gr - Grey | |

16.0 Short Parts List

Short Parts List



Key No.	Description	Manufacturers Part No.
A	Fan	720768101
B	Burner (24/28/33) Burner (40)	720767901 720785201
C	Spark Ignition Electrode	720767301
D	Flame Sensing Electrode	720767101
E	Gas Valve	720752301
G	Hall Effect Sensor	720788001
I	Plate Heat Exchanger (24 & 28) Plate Heat Exchanger (33 & 40)	720852401 720852601
J	Diverter Valve Motor	720788601
K	Pump	720787401
M	Heating Flow/Return Sensor)	720747101
N	DHW NTC Sensor	720789201
O	Pump Automatic Air Vent	720787601
P	Hydraulic Pressure Sensor	720789001
Q	Heating Pressure Gauge	720787201
R	Flue Sensor	720851401
S	PCB only	720878201
T	R.D.S. - 24 R.D.S. - 28 R.D.S. - 33 R.D.S. - 40 R.D.S. - 24 LPG R.D.S. - 28 LPG R.D.S. - 33 LPG R.D.S. - 40 LPG	720843201 720843501 720843801 720844101 720844401 720844701 720845001 720845301
U	Injector Washer - 24 (Ø 4.4) Injector Washer - 28 (Ø 4.6) Injector Washer - 33 (Ø 4.9) Injector Washer - 40 (Ø 5.8)	720751701 720775801 720776001 720786601
V	Air/Gas Venturi (24 & 28) Air/Gas Venturi 33 Air/Gas Venturi 40	720768301 720785401 720785601

Table Of Error Codes

E 09	Gas Valve Connection Cable
E 15	Gas Valve Fault
E 20	Central Heating NTC Fault
E 28	Flue NTC Fault
E 40	Central Heating Return NTC Fault
E 55	Calibration Required
E 109	Pre-circulation Fault
E 110	Safety Thermostat Operated
E 117	Primary System Water Pressure Too High
E 118	Primary System Water Pressure Too Low
E 125	Circulation Fault (Primary)
E 128	Flame Failure
E 130	Flue NTC Operated
E 133	Interruption Of Gas Supply or Flame Failure
E 134	Elapsed Time - Gas Valve Open Without Gas
E 135	Interruption Of Gas Supply (Internal Error)
E 154	Flow/Return Sensor Temperature Test
E 160	Fan or Fan Wiring Fault
E 270	Circulation Fault (Dry Fire)
E 321	Hot Water NTC Fault
E 384	False Flame

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

'Service Due' Message

1. After 11 months operation the 'Service Due' message will be shown on the boiler display. (If the installation has been subject to prolonged electrical isolation or power cuts this period may be longer than 11 months)

2. Once the service has been completed satisfactorily the 'Service Due' message can be reset or de-activated.

To Reset

4. Press **||||-** & **||||+** for 6 seconds. Using **||||+** scroll through until '22' is displayed. Press **iP**.

5. Press **||||+** to scroll to '15'. Confirm with **iP** then press **OR** to return the display to normal.

To De-activate

6. Press **||||-** & **||||+** for 6 seconds. Using **||||+** scroll through until '22' is displayed. Press **iP**.

7. Press **||||+** until '22' is displayed again. Press **iP**. Using **||||+** scroll through to '50'. Press **iP**.

8. Press **||||+** until '25' is displayed. Confirm with **iP** then press **OR** to return the display to normal.

17.0 Fault Finding

17.1 Initial Fault Finding Checks

1. Check that gas, water and electrical supplies are available at the boiler.
2. Electrical supply = 230V ~ 50 Hz.
3. The preferred minimum gas pressure is 20mb (NG) 37mb (LPG).
4. Carry out electrical system checks, i.e. Earth Continuity, Resistance to Earth, Short Circuit and Polarity with a suitable meter.

NOTE: These checks must be repeated after any servicing or fault finding.

7. Ensure all external controls are calling for heat and check all external and internal fuses. Before any servicing or replacement of parts, ensure the gas and electrical supplies are isolated.

17.2 Error Codes

1. If a fault occurs on the boiler an error code may be shown by the facia display.

2. The codes are a flashing number, either two or three digit, preceded by the symbol **E**:-

E followed by 20, 28, 40, 160 or 321 indicates possible faulty components.

E followed by 55 (after replacing R.D.S.) indicates calibration required (Section 14.2).

E 110 indicates overheat of the primary system water.

E 117 is displayed when the primary water pressure is greater than 2.7 bar.

E 118 is displayed when the primary water pressure is less than 0.5 bar.

E 133, 134 and 135 indicate that the gas supply has been interrupted, ignition has failed or the flame has not been detected.

E 128 is displayed if there has been a flame failure during normal operation.

E 125 is displayed in either of two situations:-

i) If between 15 and 30 seconds of the burner lighting the boiler temperature has not changed by 1°C.

ii) If within 10 minutes of the burner lighting the boiler actual temperature twice exceeds the selected temperature by 30°.

In these instances poor primary circulation is indicated.

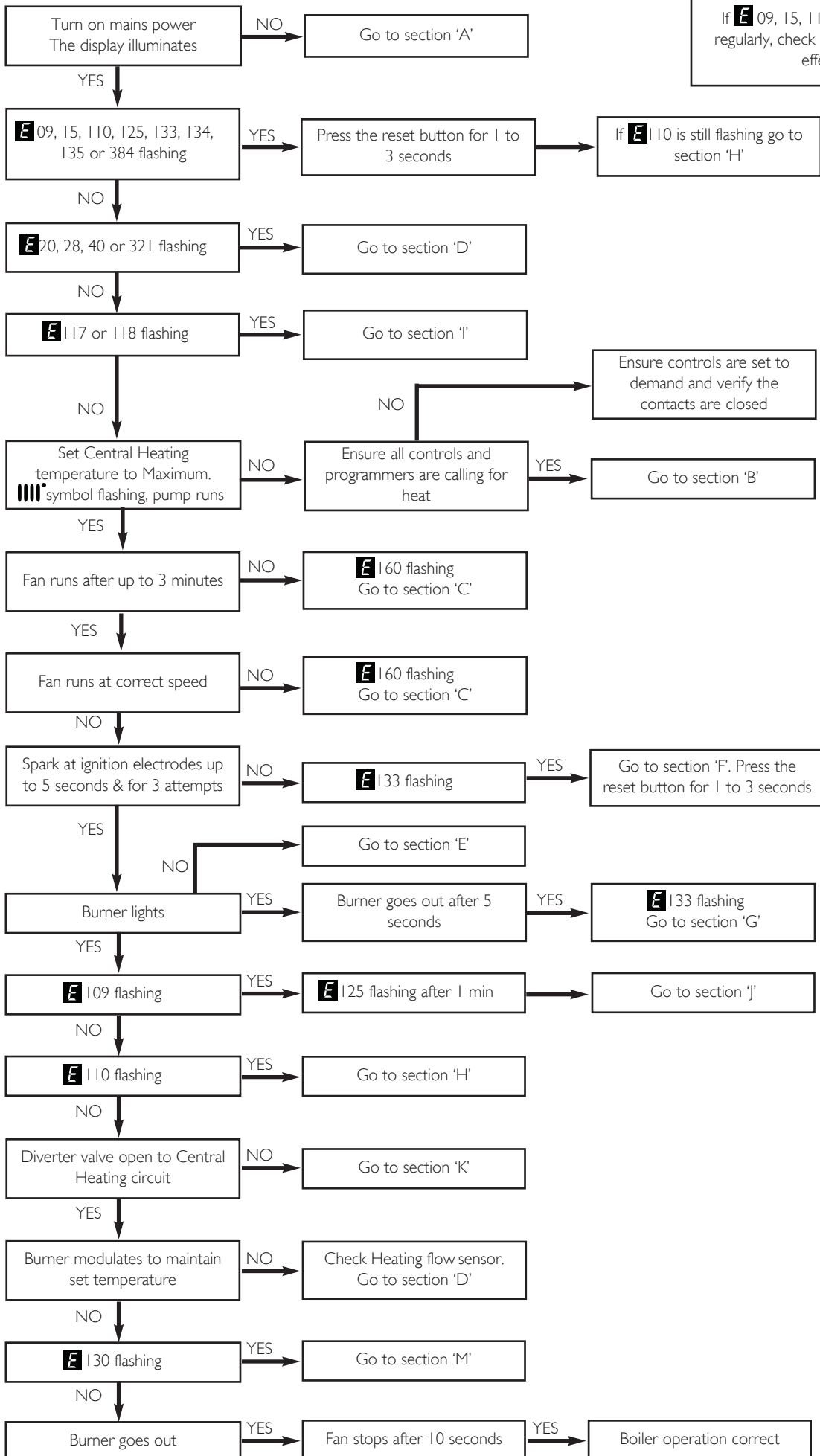
3. By pressing the 'Reset' button for 1 to 3 seconds when

E 110, 125, 133, 134, 135, 09, 15, 128 & 384 are displayed it is possible to relight the boiler.

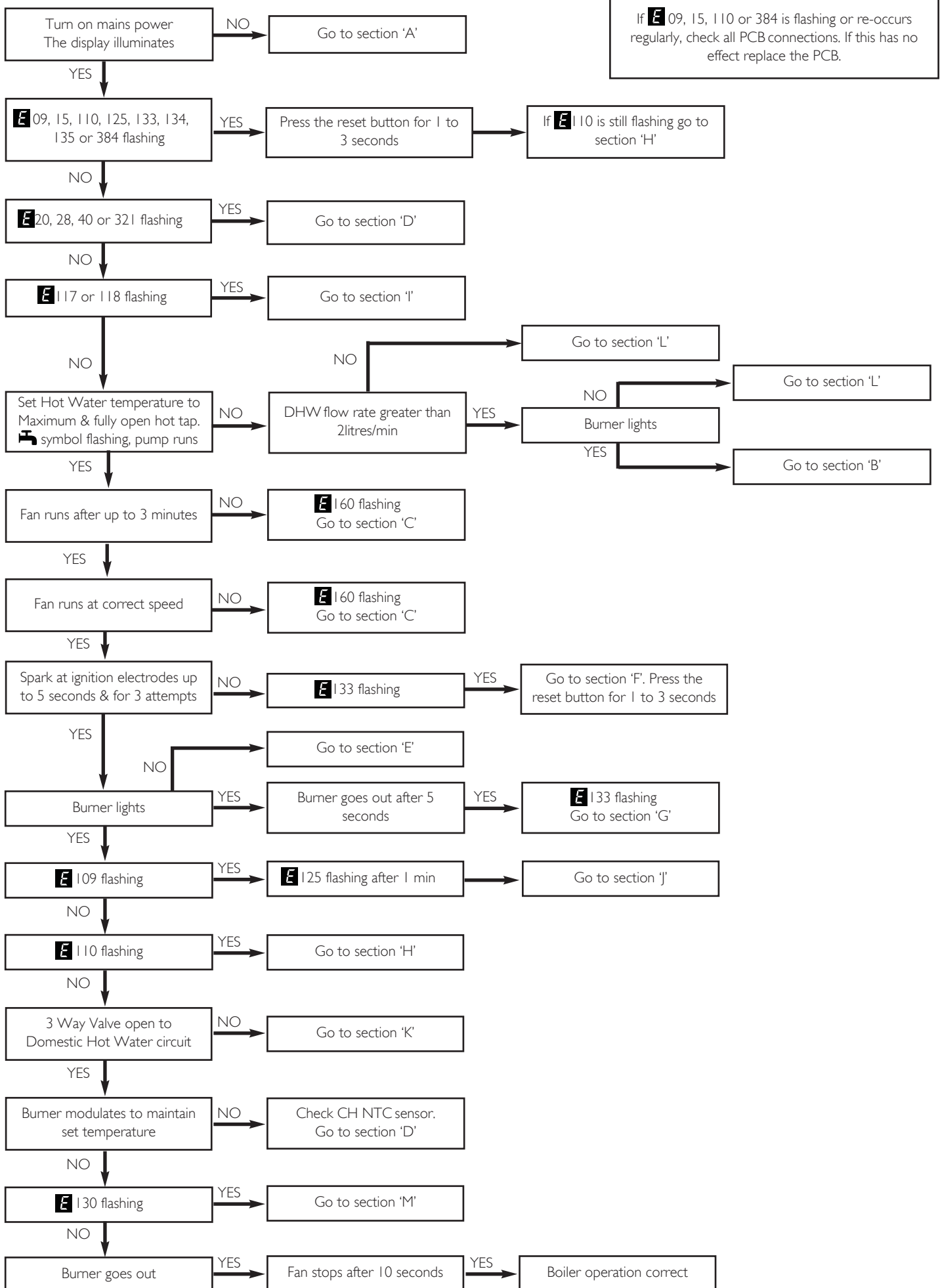
4. If this does not have any effect, or the codes are displayed regularly further investigation is required.

17.0 Fault Finding

Refer to "Illustrated Wiring Diagram" for position of terminals and components
Central Heating - Follow operational sequence

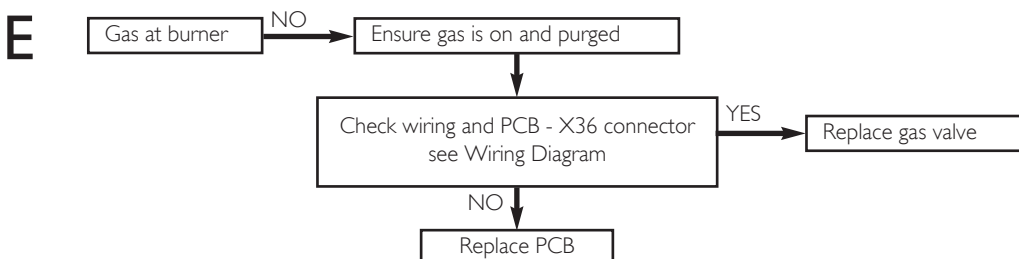
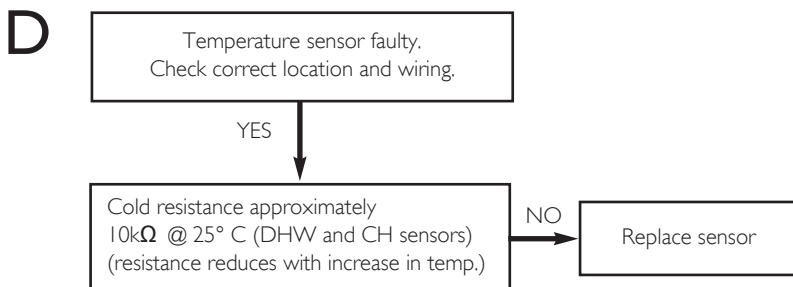
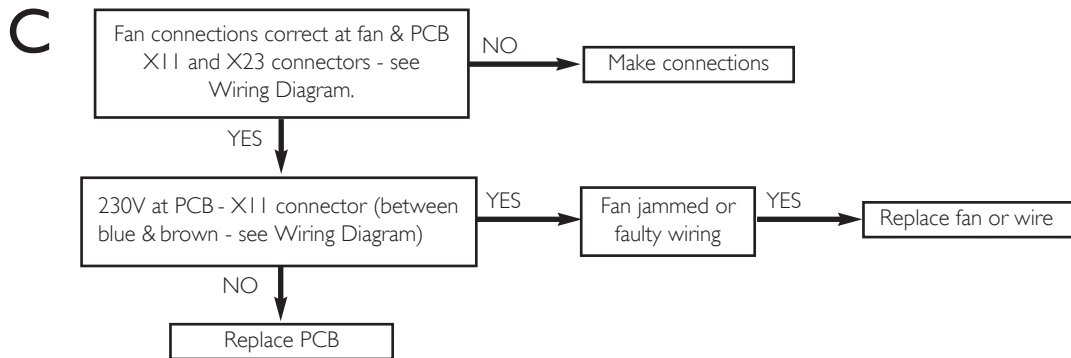
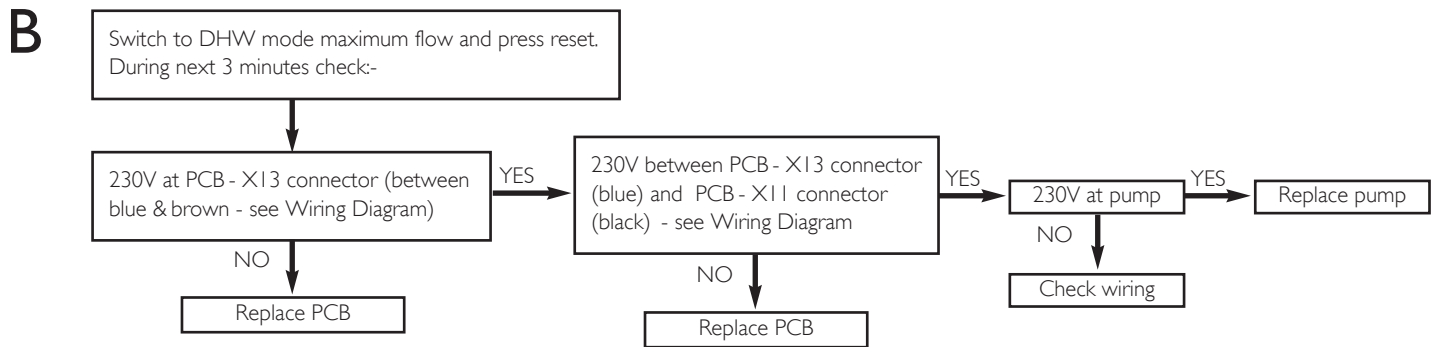
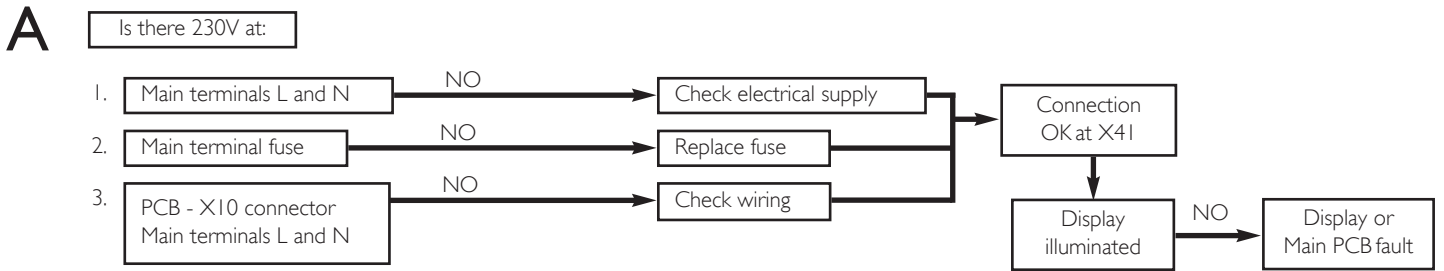


If E 09, 15, 110 or 384 is flashing or re-occurs regularly, check all PCB connections. If this has no effect replace the PCB.

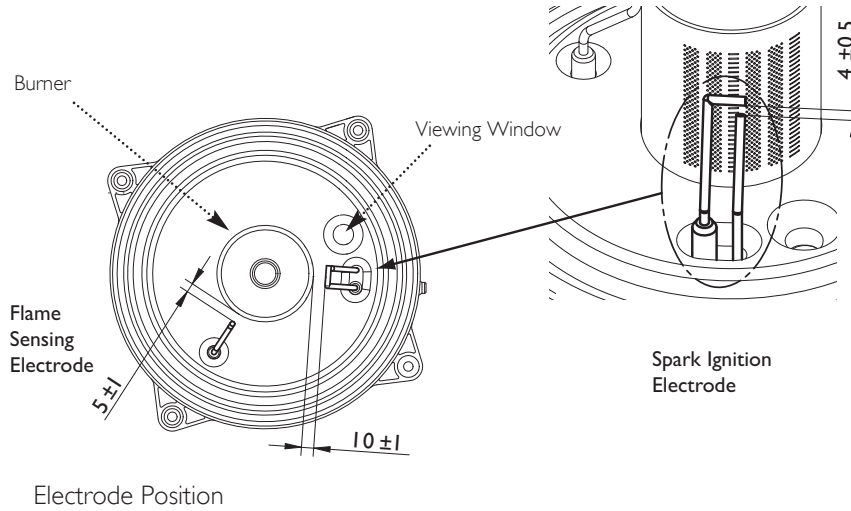


If E 09, 15, 110 or 384 is flashing or re-occurs regularly, check all PCB connections. If this has no effect replace the PCB.

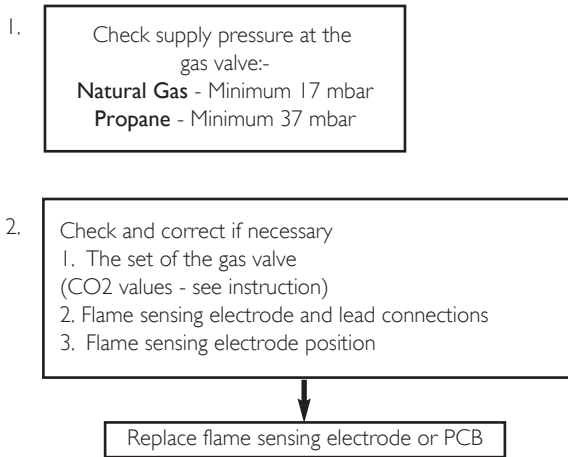
Fault Finding Solutions Sections



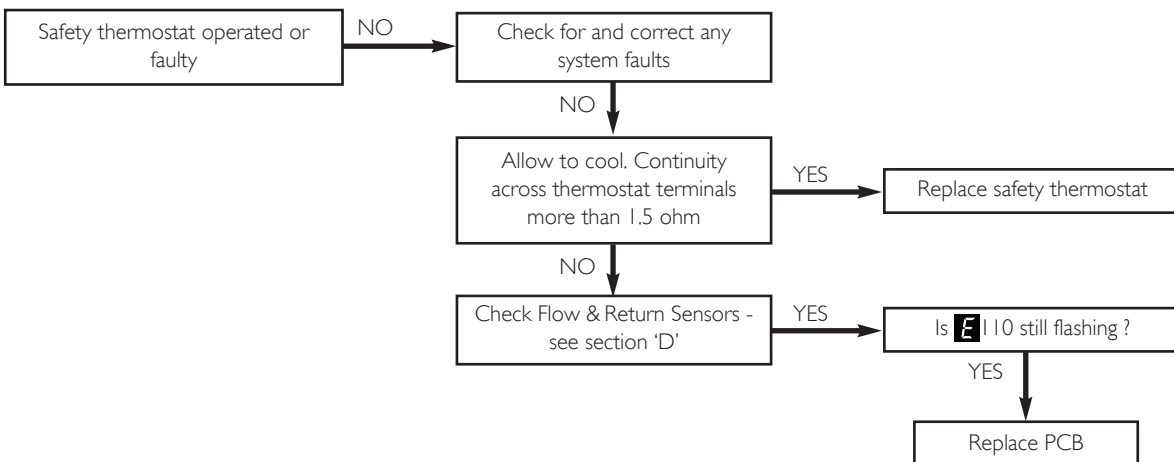
F

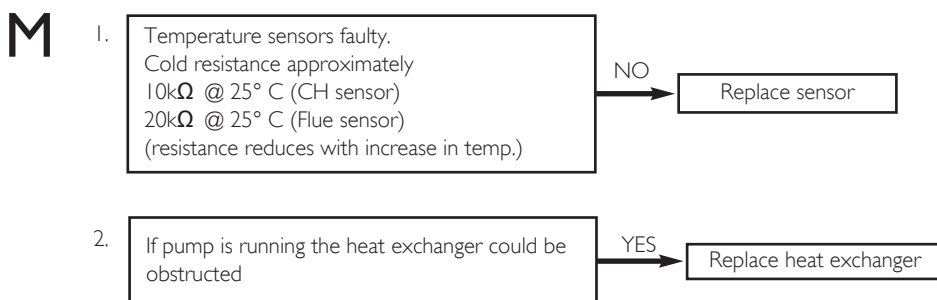
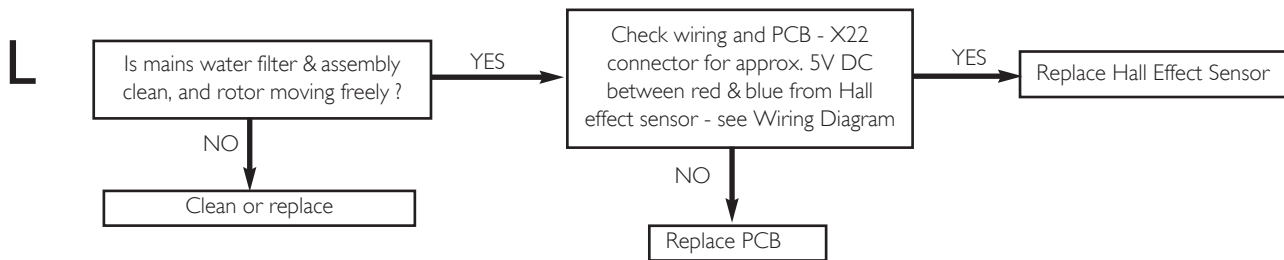
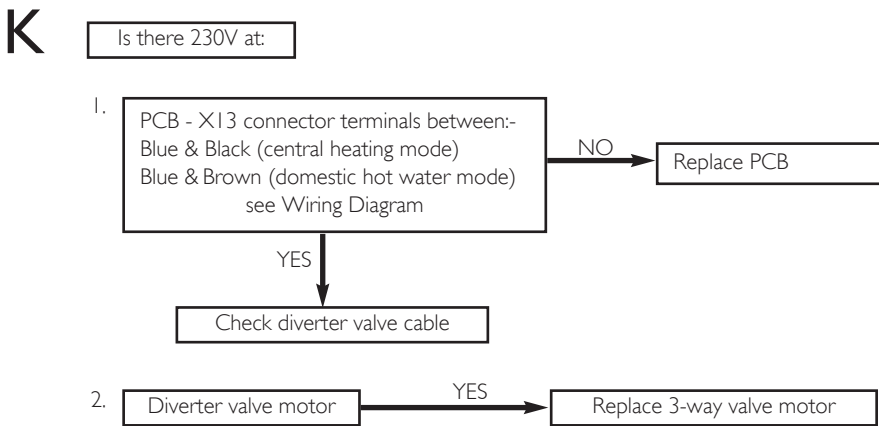
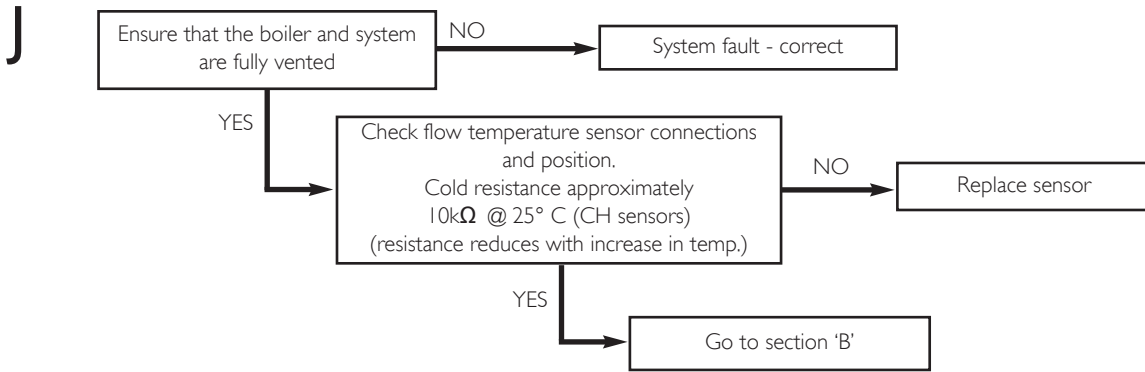
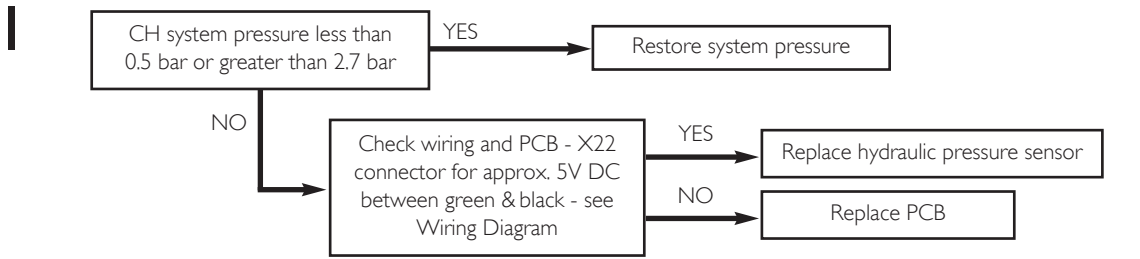


G



H





18.0 External Low Voltage Controls

Optional Outdoor Sensor

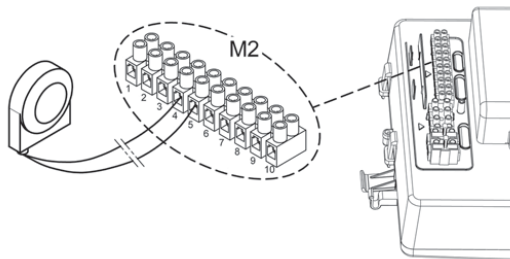
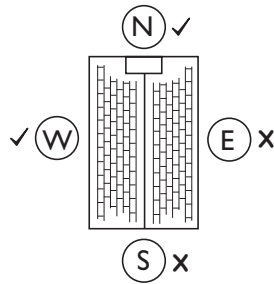
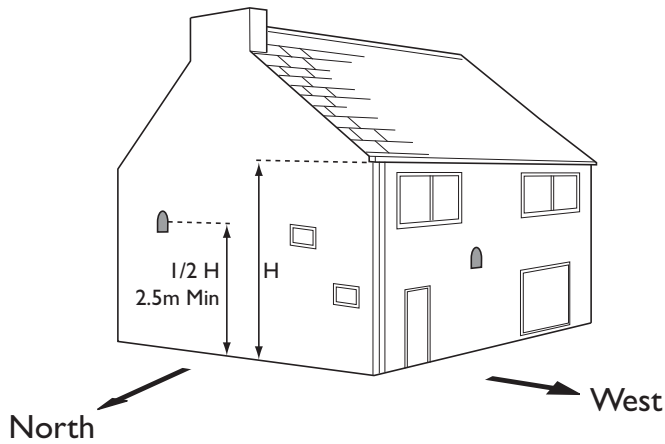
18.1 Positioning the Optional Outdoor Sensor

1. The Sensor must be fixed to an external wall surface of the property it is serving. The wall must face a north or west.

NOTE: DO NOT position it on a south facing wall in direct sunlight!

2. The Sensor should be approximately half the height of the living space of the property, and a minimum of 2.5m above ground level.

3. It must be positioned away from any sources of heat or cooling (e.g. flue terminal) to ensure accurate operation. Siting the Sensor above doors and windows, adjacent to vents and close to eaves should be avoided.



18.2 Connecting the Optional Outdoor Sensor

1. Ensure the electrical supply to the boiler is isolated. 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.



3. Remove one of the grommets, pierce the diaphragm and insert the wires from the Outdoor Sensor.

4. Leave sufficient slack in the wires to allow the Control Box to be hinged fully open. Refit the grommet.

5. Connect the wires from the Outdoor Sensor to positions 4 & 5 on M2 as shown. Refit the cover.

18.3 Setting the Sensor Curve

1. Ensure that there is power to the boiler.

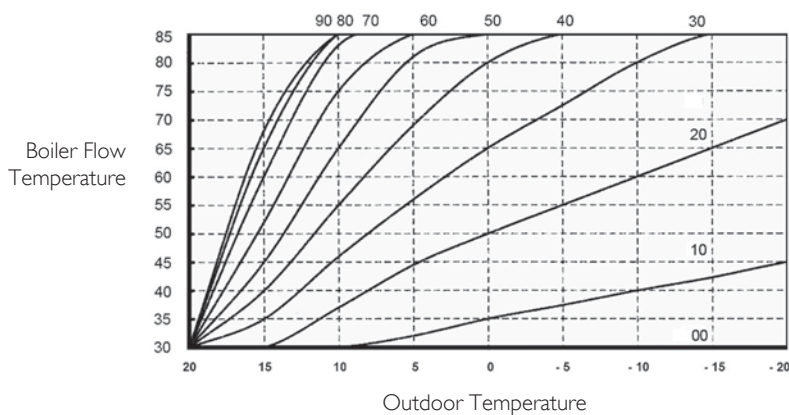
2. The Central Heating temperature buttons  - &  + are used to select the desired curve as shown on the graph.

3. Normally the display will show the current temperature of the water in the boiler (e.g. 41°C). As the buttons are pressed the curve identification code that will be shown, from '00' to '90'.

For example, if Curve '40' is selected, at an outside temperature of 5°C the boiler flow temperature will be just below 70°C. In the event of the outside temperature falling to 0°C, the boiler flow will increase to 80°C.

3. Continue with the installation and commissioning of the boiler as described in the Installation & Servicing Instructions.

4. Explain to the user how to select a different temperature curve.

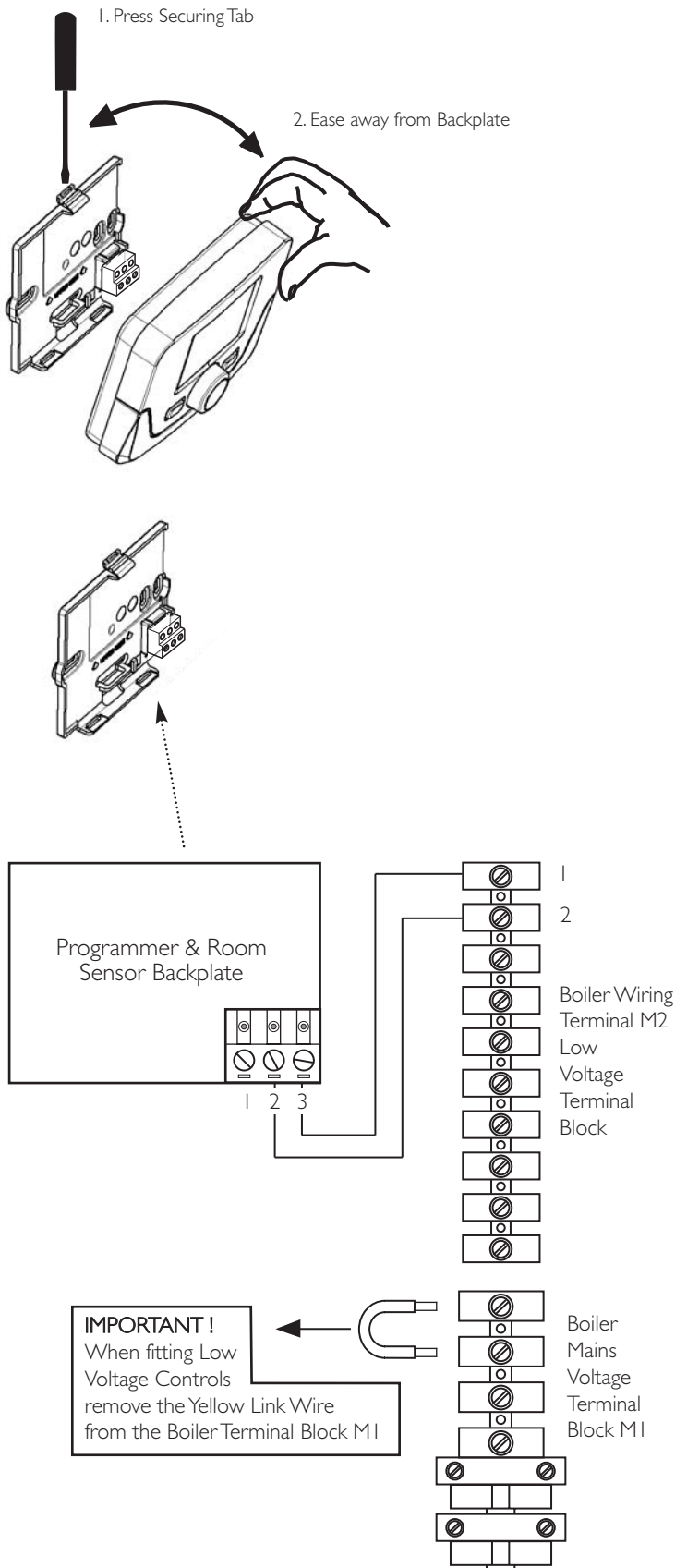


Optional 7 Day Wired Sensor

18.4 Connecting the Optional 7 Day Wired Sensor

NOTE: The yellow link wire between terminals 1 & 2 on terminal block M1 **MUST** be removed when fitting the 7 Day Wired Sensor.

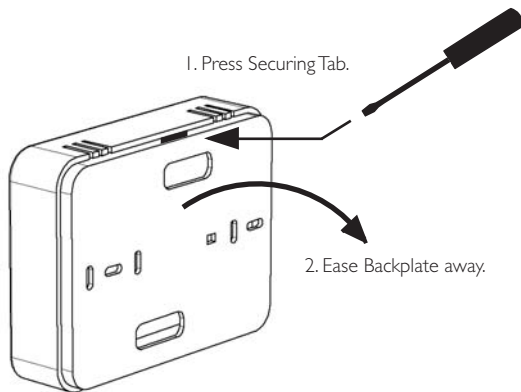
1. Ensure that the power to the boiler is isolated.
2. Remove the backplate from the unit by pressing down on the rear tab and easing apart.
3. Locate the sensor and use wiring as described in the literature supplied with it.
4. Pass the wiring through the slots in the backplate and connect as shown opposite to 2 & 3 on the sensor backplate and 1 & 2 of boiler terminal M2.
5. Complete fitting as described in the sensor literature, turn the power back on and set the controls to the requirements of the user.



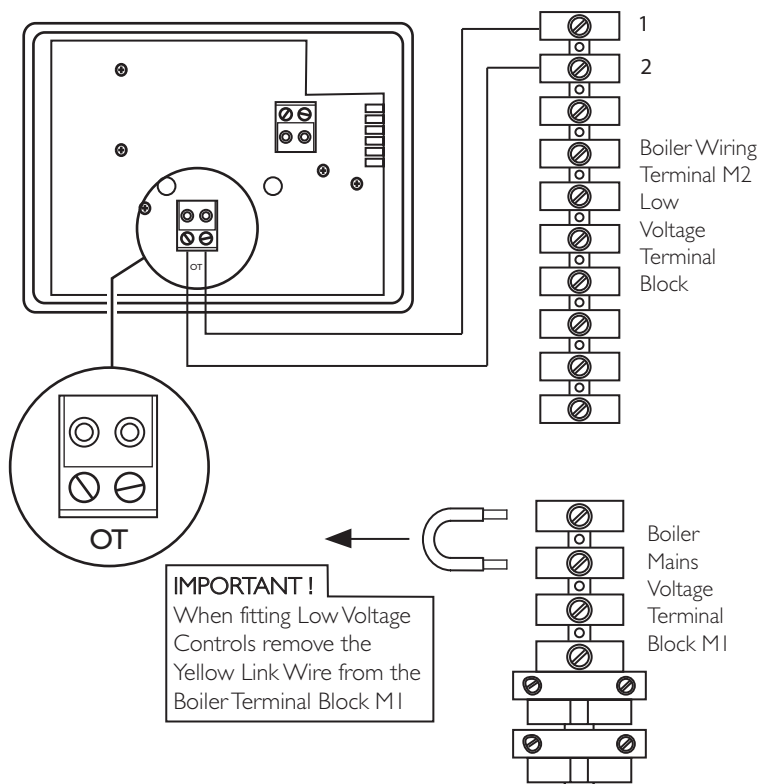
Optional 7 Day Wireless Sensor & 24hr Wireless Sensor

18.5 Connecting the Optional 7 Day Wireless Sensor & 24hr Wireless Sensor (kit includes a Sensor & Receiver - the Receiver is wired into the boiler).

NOTE: The yellow link wire between terminals 1 & 2 on terminal block M1 **MUST** be removed when fitting the 7 Day Wireless Sensor & 24hr Wireless Sensor.



1. Ensure that the power to the boiler is isolated.
2. Remove the backplate from the receiver unit by pressing down on the rear tab and easing apart.
3. Locate the receiver and use wiring as described in the literature supplied with it.
4. Pass the wiring through the slots in the backplate and connect as shown opposite to the OT connection on the receiver backplate and 1 & 2 of boiler terminal M2.
5. Complete fitting as described in the sensor/receiver literature, turn the power back on and set the controls to the requirements of the user.



Service Record

It is recommended that your heating system is serviced regularly and that the appropriate Service Interval Record is completed.

Service Provider

Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

Always use the manufacturer's specified spare part when replacing controls.

Service 1 Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Service 2 Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Service 3 Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Service 4 Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Service 5 Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Service 6 Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Operative ID No. _____

Comments: _____

Signature: _____

Service 7 Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Service 8 Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Service 9 Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Service 10 Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

All descriptions and illustrations provided in this leaflet have been carefully prepared but we reserve the right to make changes and improvements in our products which may affect the accuracy of the information contained in this leaflet. All goods are sold subject to our standard Conditions of Sale which are available on request.

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e&oe

PART OF BDR THERMEA