10.2 Checking the Combustion - ‘Chimney Sweep’ Function

1. To set the boiler to operate at MAXIMUM and MINIMUM, press \( \text{MAX} \) & \( \text{MIN} \) 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 \( \text{MIN} \) until ‘00’ is displayed, indicating minimum input.

3. To exit the function press \( \text{MAX} \) & \( \text{MIN} \) 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.
10.0 Commissioning

10.2 Checking the Combustion - ‘Chimney Sweep’ Function (cont)

1. This procedure is mandatory in GB from April 2014. It is strongly recommended to perform the procedure before that date.
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.

1. Press $\text{[P]}$ & $\text{[+]}$ 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 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)

**Measure the Gas Rate**

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

- **Natural Gas**
  - 12 model: 1.27 m³/h
  - 15 model: 1.59 m³/h
  - 18 model: 1.90 m³/h
  - 24 model: 2.54 m³/h
  - 28 model: 2.96 m³/h
  - 32 model: 3.40 m³/h

- **Propane**
  - 12 model: 0.93 kg/h
  - 15 model: 1.17 kg/h
  - 18 model: 1.4 kg/h
  - 24 model: 1.86 kg/h
  - 28 model: 2.18 kg/h
  - 32 model: 2.49 kg/h

5. Press $\text{[P]}$ & $\text{[+]}$ 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.
11.0 Completion & System Draining

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 switches, 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 $i \ P \ & \ i i i$ 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. This will purge air from the system. The display will show $3 \ i 2$.

5. Once De-Aeration is complete set the external controls as required by the user.
12.1 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 BS. 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 CPA1 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
- Adjust the gas valve (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. 40) 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. 41). Remove any deposits from the sump and trap. Clean as necessary and replace the sump.
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. 43).

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. 43).

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, insulation & 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.

13. 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. 44)

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.

### 13.2 Fan (Fig. 45)

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 (32) or extension piece (12 - 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.

### 13.3 Air/Gas Venturi (Figs. 45 & 46)

1. Remove the clip securing the gas feed pipe to the venturi.
2. Undo the screws securing the collector to the cover (32) or extension piece (12 - 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.
13.0 Changing Components

13.4 Burner (Fig. 47)

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 (32) or extension piece (12 - 28). Remove this extension piece from the cover (on 12 - 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. 48)

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.
## 13.0 Changing Components

### 13.6 Flue Sensor (Fig. 49)

1. For ease of access on 12 - 28 models remove the Expansion Vessel as described in Section 13.17.

2. Ease the retaining tab on the sensor away and disconnect the electrical plug.

3. Turn the sensor 90° anticlockwise to remove - it is a bayonet connection.

4. Reassemble in reverse order.

### 13.7 Heating Flow & Return Sensors (Fig. 50)

1. There is one sensor on the flow (red wires) and one sensor on the return (blue wires). Note: For access to the return sensor on 12 - 28 models first remove the fan and air/gas collector (see 13.2).

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. 51)

1. Pull the plug 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 plug is pushed fully on.

### 13.9 Hydraulic Pressure Sensor (Fig. 52)

1. Close the flow and return isolation taps and drain the primary circuit. Remove the fan and heat exchanger flow pipe.

2. Remove the plug from the sensor and pull the retaining clip forwards. The clip is captive and does not need to be fully removed.

3. Reassemble in reverse order.
13.0 Changing Components

13.10 Pump - Head Only (Fig. 53)

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

13.11 Pump - Complete (Fig. 54)

1. Disconnect the electrical supply plug from the pump.
2. Close the flow and return isolation taps and drain the boiler primary circuit. For ease of access remove the heating pressure gauge (13.14).
3. Undo the three screws securing the body to the inlet assembly and pump flow pipe. Draw the complete pump forwards.
4. Pull off the securing clip and remove the automatic air vent. Transfer them to the new pump body.
5. Examine the ‘O’ ring seals, replacing if necessary and reassemble in reverse order.

13.12 Automatic Air Vent (Fig. 54)

1. For access on 12 - 28 models see Section 13.17 to remove the expansion vessel. Close the flow and return isolation taps and drain the primary circuit.
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.
13.13 Safety Pressure Relief Valve (Fig. 55)

1. Close the flow and return isolation taps and drain the primary circuit.

2. For access remove the screws securing the condensate trap, and pull off the pipe from the heat exchanger. Ease the trap to one side.

3. Disconnect the discharge pipe from the pressure relief valve and remove the sealing grommet.

4. Pull off the clip retaining the valve and withdraw it from the outlet assembly.

5. Fit the new valve and ‘O’ ring seal and reconnect the discharge pipe. Ensure the grommet is correctly refitted to maintain the integrity of the case seal. Refit the condensate trap.

13.14 Heating Pressure Gauge (Figs. 56 & 57)

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.
13.0 Changing Components

13.15 P.C.B. & R.D.S. (Removable Data Stick)  
(Fig. 58)

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.


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

13.16 Gas Valve (Fig. 59)

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

13.17 Expansion Vessel (Fig. 60)

1. Close the flow and return isolation taps and drain the primary circuit.
2. Prise off the securing clip and disconnect the braided hose from the vessel.
3. Whilst supporting the vessel undo the locknut and manoeuvre the vessel out of the boiler.
4. Reassemble in reverse order.
14.0 Combustion & Calibration

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 \( IP \) & \( III^+ \) 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’.

3. Insert the analyser probe and once stabilised note the CO₂ reading.

4. Press \( IP \) to select the Ignition Phase Speed. A value will be displayed, e.g. ‘33’. Note the CO₂ reading.

5. Press \( IP \) 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 \( IP \) & \( III^+ \) 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 \( III^- \) and \( IP \) 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 ‘304’ is displayed, 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 \( IP \) and \( III^- \) 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 \( III^- \) flashing together at regular intervals.

5. To exit the function press \( OR \), ‘ESC’ will be displayed and the calibration function completed.
Key To Wiring Colours

b - Blue  r - Red
bk - Black  g - Green
br - Brown  g/y - Green/Yellow
w - White  y - Yellow
gr - Grey
<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
<th>Manufacturers Part No.</th>
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<td>B</td>
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<td>C</td>
<td>Spark Ignition Electrode</td>
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<td>D</td>
<td>Flame Sensing Electrode</td>
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<td>F</td>
<td>Safety Thermostat</td>
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<td>Pump</td>
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<td>K</td>
<td>Hydraulic Pressure Sensor</td>
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<td>L</td>
<td>Heating Pressure Gauge</td>
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## 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.

5. 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 `-` followed by 20, 28, 40, or 160 indicates possible faulty components.

   - Followed by 55 (after replacing R.D.S.) indicates calibration required (Section 14.2).

   - 110 indicates overheat of the primary system water.

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

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

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

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

   - 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°C. In these instances poor primary circulation is indicated.

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

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### Table Of Error Codes

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<td>Gas Valve Fault</td>
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<td>Central Heating NTC Fault</td>
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<td>Pre-circulation Fault</td>
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<td>Safety Thermostat Operated</td>
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<tr>
<td>130</td>
<td>Flue NTC Operated</td>
</tr>
<tr>
<td>133</td>
<td>Interruption Of Gas Supply or Flame Failure</td>
</tr>
<tr>
<td>134</td>
<td>Elapsed Time - Gas Valve Open Without Gas</td>
</tr>
<tr>
<td>135</td>
<td>Interruption Of Gas Supply (Internal Error)</td>
</tr>
<tr>
<td>154</td>
<td>Flow/Return Sensor Temperature Test</td>
</tr>
<tr>
<td>160</td>
<td>Fan or Fan Wiring Fault</td>
</tr>
<tr>
<td>270</td>
<td>Circulation Fault (Dry Fire)</td>
</tr>
<tr>
<td>384</td>
<td>False Flame</td>
</tr>
</tbody>
</table>

---

### '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 `III` to scroll to ‘15’. Confirm with `IP` then press `OR` to return the display to normal.

#### To De-activate


9. Press `III` until ‘25’ is displayed. Confirm with `IP` then press `OR` to return the display to normal.

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Refer to “Illustrated Wiring Diagram” for position of terminals and components

Central Heating - Follow operational sequence

Turn on mains power
The display illuminates

NO → Go to section ‘A’

YELLOW, 15, 110, 125, 133, 134, 135 or 384 flashing

YES → Press the reset button for 1 to 3 seconds

If YELLOW 10 is still flashing go to section ‘H’

NO → Go to section ‘D’

NO → E 117 or 118 flashing

YES → Go to section ‘I’

NO → Set Central Heating temperature to Maximum.
Symbol flashing, pump runs

YES → Ensure all controls and programmers are calling for heat

NO → Ensure controls are set to demand and verify the contacts are closed

NO → Fan runs after up to 3 minutes

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

NO → Fan runs at correct speed

YES → 160 flashing

NO → Go to section ‘C’

YES → 160 flashing

GO to section ‘C’

NO → Spark at ignition electrodes up to 5 seconds & for 3 attempts

YES → Burner lights

NO → Go to section ‘E’

YES → Burner goes out after 5 seconds

YES → 133 flashing

NO → Go to section ‘F’. Press the reset button for 1 to 3 seconds

NO → 125 flashing after 1 min

YES → Go to section ‘G’

NO → 110 flashing

YES → Go to section ‘H’

NO → Burner modulates to maintain set temperature

NO → Check Heating flow sensor.
Go to section ‘D’

NO → E 130 flashing

YES → Go to section ‘K’

NO → Burner goes out

YES → Fan stops after 10 seconds

YES → Boiler operation correct
17.0 Fault Finding

Fault Finding Solutions Sections

A

Is there 230V at:

1. Main terminals L and N
   NO → Check electrical supply
   YES → Connection OK at X41

2. Main terminal fuse
   NO → Replace fuse

3. PCB - X10 connector Main terminals L and N
   NO → Check wiring
   YES → Display illuminated

B

230V at PCB - X13 connector (between blue & brown - see Wiring Diagram)

YES → 230V at pump
   NO → Replace pump

C

Fan connections correct at fan & PCB X11 and X23 connectors - see Wiring Diagram.

NO → Make connections

YES → 230V at PCB - X11 connector (between blue & brown - see Wiring Diagram)

YES → Fan jammed or faulty wiring
   NO → Replace PCB

D

Temperature sensor faulty. Check correct location and wiring.

YES → Cold resistance approximately 10kΩ @ 25°C (Flow & Return sensors)
   NO → Replace sensor
   (resistance reduces with increase in temp.)

E

Gas at burner

NO → Ensure gas is on and purged

YES → Replace gas valve

NO → Replace PCB
17.0 Fault Finding

**F**
Check and correct if necessary
1. Ignition electrode and lead
2. Electrode connection
3. Spark gap and position

YES → Check wiring - see Diagram
NO → Replace PCB

**G**
1. Check supply pressure at the gas valve:
   - **Natural Gas** - Minimum 17 mbar
   - **Propane** - Minimum 37 mbar

2. Check and correct if necessary
   1. The set of the gas valve
      (CO2 values - see instruction)
   2. Flame sensing electrode and lead connections
   3. Flame sensing electrode position

Replace flame sensing electrode or PCB

**H**
Safety thermostat operated or faulty

NO → Check for and correct any system faults

NO → Allow to cool. Continuity across thermostat terminals more than 1.5 ohm
YES → Replace safety thermostat

NO → Check Flow & Return Sensors - see section 'D'

YES → Is E110 still flashing?

YES → Replace PCB

**I**
CH system pressure less than 0.5 bar or greater than 2.7 bar

YES → Restore system pressure

NO → Check wiring and PCB - X22 connector for approx. 5V DC between green & black - see Wiring Diagram

YES → Replace hydraulic pressure sensor

NO → Replace PCB

**J**
Ensure that the boiler and system are fully vented

NO → System fault - correct

YES → Check flow temperature sensor connections and position.
   Cold resistance approximately
   10kΩ @ 25°C (CH sensors)
   (resistance reduces with increase in temp.)

YES → Go to section ‘B’

**K**
1. Temperature sensors faulty.
   Cold resistance approximately
   10kΩ @ 25°C (CH sensor)
   20kΩ @ 25°C (Flue sensor)
   (resistance reduces with increase in temp.)

   NO → Replace sensor

   YES → Go to section ‘B’

2. If pump is running the heat exchanger could be obstructed

YES → Replace heat exchanger
**Appliance Type**

<table>
<thead>
<tr>
<th></th>
<th>C_13</th>
<th>C_33</th>
<th>C_43</th>
<th>C_53</th>
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**Appliance Category**

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**Heat Input CH (Net)**

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<th>32 model</th>
<th>kW</th>
<th>Max</th>
<th>Min</th>
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<tr>
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<td></td>
<td>32</td>
<td>4.6</td>
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**Heat Output CH (Non-Condensing)**

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<th>Max</th>
<th>Min</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>32</td>
<td>4.6</td>
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</table>

**Heat Output CH (Condensing)**

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<th>32 model</th>
<th>kW</th>
<th>Max</th>
<th>Min</th>
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<tbody>
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<td>33.8</td>
<td>5</td>
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</tbody>
</table>

**Injector**

| 32 model | mm | 5.8 |

**Outercase Dimensions**

- Casing Height: 763mm
- Overall Height Inc Flue Elbow: 923mm
- Casing Width: 450mm
- Casing Depth: 355mm

**Expansion Vessel**

- For Central Heating only.
- Integral with appliance
- bar
- Min Pre-charge Pressure: 0.5
- 32 model litre
- Max Capacity of CH System: 155
- Primary Water Content of Boiler (unpressurised): 2.8

**Power Consumption**

| 32 model | W  | 132 |

**Inlet Pressure**

- (Natural Gas - G20)
- (Propane - G31)

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<thead>
<tr>
<th></th>
<th>mbar</th>
<th>150mm* Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Natural Gas - G20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Propane - G31)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mbar</td>
<td>20</td>
<td>37</td>
</tr>
</tbody>
</table>

**Max Gas Rate**

- (Natural Gas - G20)
- (Propane - G31)

<table>
<thead>
<tr>
<th>32 model</th>
<th>m³/h</th>
<th>Min</th>
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<tbody>
<tr>
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</table>

**Max Gas Rate**

- (Propane - G31)

<table>
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<tr>
<th>32 model</th>
<th>kg/h</th>
<th>Min</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.49</td>
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</tr>
</tbody>
</table>

**Weights**

- Packaged Boiler Carton: 42.5kg
- Installation Lift Weight: 37.5kg

---

Fig. 8

* This is MINIMUM recommended dimension. Greater clearance will aid installation and maintenance.

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Dimensions

A  763mm
B  355*mm
*This can be reduced to 345mm by removing the boiler control access flap
C  450mm
D  116mm Ø Min.
E  160mm
(207mm for 80/125mm flue systems)
F  150mm
G  106mm
H  170mm
J  280mm

For Side Flue Exit
NOTE: The main difference between Megaflo 32 kW and other models in the range is the position of the expansion vessel. The method of changing this component is described below.

13.2.1 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.
This Commissioning Checklist is to be completed in full by the competent person who commissioned the boiler as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

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

Customer name: 
Address: 
Boiler make and model: 
Boiler serial number: 
Commissioned by (PRINT NAME): 
Company name: 
Company address: 
Gas Safe register number: 
Commissioning date: 

To be completed by the customer on receipt of a Building Regulations Compliance Certificate*

Building Regulations Notification Number (if applicable):

<table>
<thead>
<tr>
<th>CONTROLS (tick the appropriate boxes)</th>
<th>Room thermostat and programmer/timer</th>
<th>Programmable room thermostat</th>
<th>Load/weather compensation</th>
<th>Optimum start control</th>
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<tbody>
<tr>
<td>Time and temperature control to heating</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Time and temperature control to hot water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating zone valves</td>
<td>Fitted</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hot water zone valves</td>
<td>Fitted</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermostatic radiator valves</td>
<td>Fitted</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic bypass to system</td>
<td>Fitted</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boiler interlock</td>
<td>Fitted</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| ALL SYSTEMS |  |
| The system has been flushed and cleaned in accordance with BS7593 and boiler manufacturer’s instructions | Yes |
| What system cleaner was used? |  |
| What inhibitor was used? | Quantity litres |
| Has a primary water system filter been installed? | Yes No |

| CENTRAL HEATING MODE | Centred and record: |  |
| Gas rate | m³/hr |  |
| Burner operating pressure (if applicable) | mbar | OR Gas inlet pressure | mbar |
| Central heating flow temperature | °C |  |
| Central heating return temperature | °C |  |

| COMBINATION BOILERS ONLY | Is the installation in a hard water area (above 200ppm)? | Yes No |
| If yes, and if required by the manufacturer, has a water scale reducer been fitted? | Yes No |
| What type of scale reducer has been fitted? |  |

| DOMESTIC HOT WATER MODE | Measure and Record: |  |
| Gas rate | m³/hr |  |
| Burner operating pressure (at maximum rate) | mbar | OR Gas inlet pressure at maximum rate | mbar |
| Cold water inlet temperature | °C |  |
| Hot water has been checked at all outlets | Yes | Temperature °C |
| Water flow rate | l/min |  |

| CONDENSING BOILERS ONLY | The condensate drain has been installed in accordance with the manufacturer’s instructions and/or BS5546/BS6798 | Yes |

| ALL INSTALLATIONS |  |
| Record the following: |  |
| At max. rate: | CO ppm AND CO/CO₂ Ratio |  |
| At min. rate: (where possible) | CO ppm AND CO/CO₂ Ratio |  |
| The heating and hot water system complies with the appropriate Building Regulations | Yes |
| The boiler and associated products have been installed and commissioned in accordance with the manufacturer’s instructions | Yes |
| The operation of the boiler and system controls have been demonstrated to and understood by the customer | Yes |
| The manufacturer’s literature, including Benchmark Checklist and Service Record, has been explained and left with the customer | Yes |

Commissioning Engineer’s Signature
Customer’s Signature

(To confirm satisfactory demonstration and receipt of manufacturer’s literature)

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

<table>
<thead>
<tr>
<th>SERVICE 01</th>
<th>Date:</th>
<th>SERVICE 02</th>
<th>Date:</th>
</tr>
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<tbody>
<tr>
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</tr>
<tr>
<td>Telephone No:</td>
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<tr>
<td>Gas safe register No:</td>
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<td>Gas safe register No:</td>
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</tr>
<tr>
<td>Record:</td>
<td>At max. rate:</td>
<td>CO ppm AND CO₂ %</td>
<td></td>
</tr>
<tr>
<td></td>
<td>At min. rate: (Where Possible)</td>
<td>CO ppm AND CO₂ %</td>
<td></td>
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<tr>
<td>Comments:</td>
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<td>Comments:</td>
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