WORCESTER
Bosch Group

24CDi/28CDi/35CDi II
RSF

WALL MOUNTED COMBINATION BOILER FOR CENTRAL HEATING AND MAINS FED DOMESTIC HOT WATER

INSTALLATION AND
SERVICING INSTRUCTIONS

BOILER OUTPUT
Automatic Modulating Control

<table>
<thead>
<tr>
<th></th>
<th>Domestic Hot Water</th>
<th>Central Heating</th>
</tr>
</thead>
<tbody>
<tr>
<td>24CDi</td>
<td>9 - 24kW</td>
<td>9 - 24kW</td>
</tr>
<tr>
<td>28CDi</td>
<td>9 - 28kW</td>
<td>9 - 24kW</td>
</tr>
<tr>
<td>35CDi II</td>
<td>9.5 - 35.3kW</td>
<td>10.5 - 27.5kW</td>
</tr>
</tbody>
</table>

IMPORTANT: THESE INSTRUCTIONS APPLY IN THE UK ONLY

These instructions are to be left with the user or at the gas meter.

This appliance must be installed by a competent person in accordance with the Gas Safety (Installation and Use) Regulations 1998.
1. Installation Regulations

1.1 Gas Safety (Installation & Use) Regulations 1998: It is the law that all gas appliances are installed by a competent person in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution. It is in your interest, and that of safety, to ensure compliance with the law.

1.2 The manufacturers notes must not be taken, in any way, as overriding statutory obligations.

1.3 The compliance with a British Standard or European Norm does not, of itself, confer immunity from legal obligations.

1.4 The installation of the appliance must be in accordance with the relevant requirements of the Gas Safety Regulations, current IEE Regulations, Building Regulations, Building Standards (Scotland) and local water bye-laws.

1.5 The installation should follow the recommendations of the following British Standards unless otherwise indicated:

- BS 5449 - Central heating for domestic premises.
- BS 5440 - Flues and ventilation for gas appliances of rated input not exceeding 60kW (Gross).
- BS 5444 - Flues and ventilation for gas appliances of rated input not exceeding 60kW (Gross) - Flues.
- BS 5440/1 - Flues and ventilation for gas appliances of rated input not exceeding 60kW (Gross) - Flues.
- BS 5440/2 - Flues and ventilation for gas appliances of rated input not greater than 60kW (Gross). Air supply.
- BS 5482 - Domestic butane and propane gas burning installations - permanent dwellings.
- BS 5489 - Installation of low pressure gas pipework installations up to 28mm (R1).
- BS 56700 - Domestic water supply in buildings.
- BS 57953 - Water treatment in domestic heating systems.

1.6 To ensure that the installation will perform to the highest standards, the system and components should conform to any other relevant standards.

1.7. The appliance and/or components conform, where applicable, with the Essential Requirements of the Gas Appliance Directive, the Boiler Efficiency Directive, the EMC Directive and the Low Voltage Directive.

1.8. In accordance with the requirements of COSHH the appliance does not contain any substances which are harmful to health.

1.9. Product Liability regulations indicate that, in certain circumstances, the installer can be held responsible, not only for mistakes on his part but also for damage resulting from the use of faulty materials. We advise that, to avoid any risk, only quality approved branded fittings are used.

1.10. LPG Installation. The appliance shall not be installed in a room or internal space below ground level when it is intended for use with LPG. This does not preclude the installation into rooms which are basements with respect to one side of the building but open to the ground on the opposite side.

1.11. The advice and instructions given in this document, as far as possible, the foreseeable situations which may arise. Contact Worcester Technical Department, Telephone: 08705 266241, for advice on specific installations.

2. General Information

The Benchmark initiative is the new code of practice to encourage the correct installation, commissioning and servicing of domestic central heating boilers and system equipment.

The 'checklist' is a vital document that must be completed by the installer at the time of installation. It confirms that the boiler has been installed and commissioned according to the manufacturers instructions.

Without the completion of the checklist, manufacturers may refuse to respond to a call-out from a householder, who will be advised that he or she must call back the installer, who has not fulfilled his obligations to record the information required by the initiative.

It is important that:

The services and the system are properly flushed as specified.

The user is clearly instructed on the correct operation of the appliance.

The benefits of regular servicing are explained - to maintain the efficiency and extend the life of the appliance.

2.1. General Information

2.1.1. The appliance is set to provide the maximum output for domestic hot water and a central heating load of 24kW (24/28CDi) or 27.5kW (35CDi II). The hot water flow rate is limited to a nominal 9 l/min (24CDi) or 10 l/min (28CDi) or 12 l/min (35CDi II) at a maximum temperature rise of 40°C.

2.1.2. The sanitary water section of the appliance is suitable for water mains pressures of up to 10bar.

2.1.3. Conversion kits are available to convert the appliance from Natural Gas to Propane operation and vice versa. The kits include conversion instructions.

2.2 Electrical Supply

Mains supply: 230V ~ 50 Hz. 180Watts.

Externalfuse: 3A (BS 1362), Internal fuses: T 2A (F1), and T 1.25A (F2).

2.3 Gas Supply

Check the data plate located on the inner cover of the appliance to ensure the appliance has been set up for the correct gas supply. The appliance can be set up for either of the following gases: Natural gas (G20) or Propane (G31). A conversion kit including instructions is available to change the appliance from one gas to the other.

The boilers require a gas flow in m³/h of:

- NG (G20) LPG (G31),

<table>
<thead>
<tr>
<th>Type</th>
<th>NG(20)</th>
<th>LPG(31)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24CDi</td>
<td>2.9</td>
<td>1.13</td>
</tr>
<tr>
<td>28CDi</td>
<td>3.3</td>
<td>1.3</td>
</tr>
<tr>
<td>35CDi II</td>
<td>4.16</td>
<td>1.6</td>
</tr>
</tbody>
</table>

The meter governor or regulator should deliver a dynamic pressure of 20mbar for natural gas or 37mbar for propane at the appliance, which is about 18.5mbar or 35.5 mbar at gas valve inlet pressure test point. The complete installation, including the gas meter (G20), must be tested for soundness and purged. Refer to BS 6891.

2.4 Packing

The appliance and flue components are packed in separate cartons.

2.5 Installation

The appliance is suitable for indoor installations only.

A wall-spacing frame to allow pipe runs behind the appliance is available.

An inlet water filter is fitted to the mains cold water inlet on the appliance.

The appliance is fitted with a system filling link assembly. See Page 8. The appliance is suitable for connection to a sealed or open vented primary system (35CDI II SEALED SYSTEM ONLY).
Any specified ventilation openings made into a wall or compartment door must not be obstructed. If the appliance is to be fitted into a compartment then the compartment must conform to the requirements of BS 5440:2. Notwithstanding the instructions given in BS 5440:2, this appliance may be fitted in a compartment with no vents as long as the minimum clearances stated in Section 6: Air Supply, are maintained. Do not place anything on top of the appliance. The clearances specified for servicing must be maintained. Refer to Fig. 2.

2.6 Flue
The appliance has a multi-directional horizontal fanned flue system. The standard telescopic flue assembly accommodates flue lengths from 297mm to 725mm. Extension flue lengths available are from 726mm up to 4000mm (24CDJ) or up to 3000mm (28CDI and 35CDI II). A vertical flue assembly kit is available. Optional 45° and 90° flue bends are available. A terminal guard, Type K2, GC 393 553, is available from Tower Flue Components, Vale Rise, Tonbridge, TN9 1TB. Do not allow the flue terminal fitted to the outside wall to become obstructed or damaged. A kit for the internal fixing of the flue is available separately.

2.7 Controls
The ON/OFF switch will turn the mains electricity on and off at the appliance. Note: There is still a live connection to the appliance. The electronic control system and gas valve modulate the heat input in response to the central heating and domestic hot water temperature settings.

The Central Heating Temperature control knob provides for the selection of domestic hot water only (turned fully anti-clockwise) or central heating and domestic hot water (turned clockwise).

The position of the Domestic Hot Water control knob will determine the temperature of the water delivered to the tap or shower or bath. A choice of facia mounted programmers are available as optional extras. A remote mounted programmer may be connected to the appliance. The integral facia displays indicate the status of the appliance. There is provision for the connection of a mains voltage room thermostat and/or a frost thermostat. The electronic controls prevent rapid cycling of the appliance in the central heating mode.

2.8 System Notes
IMPORTANT: Check that no dirt is left in the water pipework as this could cause damage to the appliance. Thoroughly flush the heating system and the cold water mains supply in accordance with the recommendations of BS7593: 1992. Remove all system cleanser before adding any inhibitor. The water pipe connections throughout a sealed system must be capable of sustaining a pressure of up to 3 bar. Radiator valves must conform to the requirements of BS 2767:1991. The relief valve discharge must be directed away from any electrical components or where it would cause a hazard to the user. A drain cock to BS 2879 must be fitted to the lowest point of the system. For circuit design purposes it is important that due note is taken of the information given in Table 3 relating to the available pump head.

2.9 Showers, Bidets, Taps and Mixing Valves
Hot and cold taps and mixing valves used in the system must be suitable for operating at the mains pressure. Thermostatically controlled or pressure equalising shower valves will guard against the flow of water at too high a temperature. If a pressure equalising valve is used, set the Domestic Hot Water temperature control knob to the ‘MAX’ position. Hot and cold mains fed water can be supplied direct to an over-rim flushing bidet subject to local Water Company requirements. With all mains fed systems the flow of water from the individual taps will vary with the number of outlets operated simultaneously and the cold water mains supply pressure to the property. Flow balancing using ‘Ball-o-Fix’ type valves is recommended to avoid an excessive reduction in flow to individual outlets. For further information contact Worcester Bosch Technical Helpline.

2.10 Safety Considerations
The appliance must not be operated in a waterless condition. The appliance must not be operated with the boiler inner casing cover removed. Work must not be carried out on the appliance without the gas and electricity supplies being switched off.

Checks must be made to ensure that, where applicable, the ventilation openings made into walls and partitions are of the correct size and are not obstructed. IMPORTANT: Where back-flow prevention devices, including water meters, are fitted the expansion of hot water into cold water main can be prevented. This can result in a pressure build-up that may cause damage to the boiler and household devices such as showers, washing machines etc.

In these cases we recommend that a mini-expansion vessel be fitted adjacent to the boiler in the cold water pipe.

2.11 Operation
Domestic Hot Water: With a demand for hot water the burner will light at its maximum setting and then automatically adjust its output to maintain the temperature of the delivered water. When hot water is no longer required, the burner will extinguish. The fan and pump may continue to run for a short period to dissipate the residual heat from the appliance.

Central Heating: With a demand for heating the burner will light at its minimum setting and gradually increase to give the maximum output. The output of the appliance is then automatically adjusted to maintain the temperature of the system. The output can reduce down to its minimum of setting. If the system no longer requires even the minimum output to maintain the desired room temperature the burner will extinguish. The fan and pump may continue to run to dissipate the residual heat from the appliance. The appliance will remain off for a fixed period of three minutes before re-lighting to automatically meet the system requirements.

Domestic Hot Water and Central Heating: The appliance will supply heat to the central heating system as required. A demand for domestic hot water at a tap or shower will override the central heating requirement for the period of the domestic hot water demand. When hot water is no longer required the appliance will return to the central heating state and its normal mode of operation. The fan may continue to run to dissipate the residual heat from the appliance as necessary.

Fig. 1. Appliance water flow diagram.

1. Automatic air vent.
2. Gas to water heat exchanger.
3. Circulating pump.
4. Water to water heat exchanger.
5. Water diverting valve.
6. CH flow.
7. DHW out.
8. Mains cold water in.
9. CH return.
10. Safety discharge.
11. Central heating by-pass adjustment.
12. Pressure relief valve.
13. Sealed system expansion vessel.
3. Technical Data

**Table 1**

<table>
<thead>
<tr>
<th>NOMINAL BOILER RATINGS (10 minutes after lighting)</th>
<th>BOILER ADJUSTED FOR G20 (Natural Gas)</th>
<th>BOILER ADJUSTED FOR G31 (Propane)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX. OUTPUT (DHW) kW</td>
<td>24.0  28.0  35.3</td>
<td>24.0  28.0  35.3</td>
</tr>
<tr>
<td>MAX. INPUT (net) kW</td>
<td>27.0  31.5  39.2</td>
<td>27.0  31.5  39.2</td>
</tr>
<tr>
<td>BURNER PRESSURE mbar</td>
<td>14.8  15.5  13.5</td>
<td>35.5  35.5  34.7</td>
</tr>
<tr>
<td>GAS RATE m³/h</td>
<td>2.9   3.3   4.15</td>
<td>1.13  1.3   1.6</td>
</tr>
<tr>
<td>MAX. OUTPUT (CH) kW</td>
<td>24.0  24.0  27.5</td>
<td>24.0  24.0  27.5</td>
</tr>
<tr>
<td>MAX. INPUT (net) kW</td>
<td>27.0  27.0  30.1</td>
<td>27.0  27.0  30.1</td>
</tr>
<tr>
<td>BURNER PRESSURE mbar</td>
<td>14.8  10.8  8</td>
<td>35.3  24.3  21.3</td>
</tr>
<tr>
<td>GAS RATE m³/h</td>
<td>2.9   2.9   3.19</td>
<td>1.13  1.3   1.23</td>
</tr>
<tr>
<td>MIN. OUTPUT (DHW) kW</td>
<td>9.0   9.0   9.5</td>
<td>9.0   9.0   9.5</td>
</tr>
<tr>
<td>MIN. INPUT (net) kW</td>
<td>11.4  11.4  11.9</td>
<td>11.4  11.4  11.9</td>
</tr>
<tr>
<td>BURNER PRESSURE mbar</td>
<td>1.5   1.0   0.9</td>
<td>5.4   3.8   3.1</td>
</tr>
<tr>
<td>GAS RATE m³/h</td>
<td>1.2   1.2   1.26</td>
<td>0.46  0.5   0.49</td>
</tr>
</tbody>
</table>

**Table 2**

<table>
<thead>
<tr>
<th>FLUE DETAILS</th>
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<tbody>
<tr>
<td>WALL HOLE DIAMETER</td>
</tr>
<tr>
<td>EXTERNAL FIX 110</td>
</tr>
<tr>
<td>INTERNAL FIX 150</td>
</tr>
<tr>
<td>STANDARDS (From flue outlet centre)</td>
</tr>
<tr>
<td>MIN UNCUT LENGTH 425</td>
</tr>
<tr>
<td>MAXIMUM LENGTH 725</td>
</tr>
<tr>
<td>EXTENDED FLUE</td>
</tr>
<tr>
<td>MAXIMUM LENGTH 24CDi 4000</td>
</tr>
<tr>
<td>28CDi and 35CDi II 3000</td>
</tr>
<tr>
<td>FLUE ASSEMBLY DIAMETER</td>
</tr>
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<td>100</td>
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**Table 3**

<table>
<thead>
<tr>
<th>PUMP HEAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOILER OUTPUT kW</td>
</tr>
<tr>
<td>HEATH Metres</td>
</tr>
<tr>
<td>MIN. FLOW RATE L/min.</td>
</tr>
<tr>
<td>FLOW/RETURN DIFFERENTIAL °C</td>
</tr>
<tr>
<td>9.0</td>
</tr>
<tr>
<td>24.0</td>
</tr>
<tr>
<td>27.5</td>
</tr>
</tbody>
</table>

**Table 4**

<table>
<thead>
<tr>
<th>MECHANICAL SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CENTRAL HEATING FLOW - COMPRESSION  22mm</td>
</tr>
<tr>
<td>CENTRAL HEATING RETURN - COMPRESSION  22mm</td>
</tr>
<tr>
<td>COLD WATER INLET - COMPRESSION  15mm</td>
</tr>
<tr>
<td>DOMESTIC HOT WATER FLOW - COMPRESSION  15mm</td>
</tr>
<tr>
<td>GAS INLET Rp 1/2</td>
</tr>
<tr>
<td>RELIEF VALVE DISCHARGE  15mm Copper Tube</td>
</tr>
<tr>
<td>CASING HEIGHT  24/28CDi 35CDi II</td>
</tr>
<tr>
<td>850mm 850mm</td>
</tr>
<tr>
<td>CASING WIDTH  450mm 500mm</td>
</tr>
<tr>
<td>CASING DEPTH  360mm 370mm</td>
</tr>
<tr>
<td>WEIGHT - DRY  45kg 49kg</td>
</tr>
<tr>
<td>WEIGHT - MAXIMUM INSTALLATION  42kg 46kg</td>
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<tr>
<td>WEIGHT - PACKAGED  48kg 53kg</td>
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</table>
**PERFORMANCE SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
<td>PRIMARY WATER CAPACITY</td>
<td>2.0 litres</td>
</tr>
<tr>
<td>MAXIMUM MAINS INLET PRESSURE</td>
<td>10 bar</td>
</tr>
<tr>
<td>MINIMUM MAINS INLET PRESSURE (working) for max. hot water flow</td>
<td>1.2 bar</td>
</tr>
<tr>
<td>MINIMUM MAINS INLET PRESSURE (working) to operate appliance</td>
<td>0.7 bar</td>
</tr>
<tr>
<td>MAXIMUM CENTRAL HEATING FLOW TEMPERATURE</td>
<td>82°C nom</td>
</tr>
<tr>
<td>MAXIMUM CENTRAL HEATING SYSTEM SET PRESSURE</td>
<td>1.5 bar</td>
</tr>
<tr>
<td>DOMESTIC HOT WATER TEMPERATURE RANGE</td>
<td>50 - 62°C</td>
</tr>
<tr>
<td>OUTPUT TO DOMESTIC HOT WATER GAP</td>
<td></td>
</tr>
<tr>
<td>NATURAL GAS (G20)</td>
<td>9.0 - 24 kw</td>
</tr>
<tr>
<td>LPG - PROPANE (G31)</td>
<td>9.0 - 28kw</td>
</tr>
<tr>
<td>OUTPUT TO CENTRAL HEATING GAP</td>
<td></td>
</tr>
<tr>
<td>NATURAL GAS (G20)</td>
<td>9.0 - 24kw</td>
</tr>
<tr>
<td>LPG - PROPANE (G31)</td>
<td>9.0 - 24kw</td>
</tr>
<tr>
<td>DOMESTIC HOT WATER SPECIFIC RATE AT 30° RISE</td>
<td>11.8 l/min, 13.5 l/min, 16.8 l/min</td>
</tr>
<tr>
<td>MAXIMUM DOMESTIC HOT WATER FLOW RATE FROM APPLIANCE AT 40° RISE</td>
<td>9.0 l/min, 10 l/min, 12 l/min</td>
</tr>
<tr>
<td>NOx CLASSIFICATION</td>
<td>Class 2</td>
</tr>
<tr>
<td>SEDBUK*</td>
<td>NATURAL GAS 78.1% D</td>
</tr>
<tr>
<td></td>
<td>LPG - PROPANE 81% D</td>
</tr>
<tr>
<td></td>
<td>80.7% D</td>
</tr>
<tr>
<td></td>
<td>80.8% D</td>
</tr>
</tbody>
</table>

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

**Table 5**

<table>
<thead>
<tr>
<th>DISCHARGE RATE l/min</th>
<th>TEMPERATURE RISE °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>49</td>
</tr>
<tr>
<td>8</td>
<td>42.9</td>
</tr>
<tr>
<td>9</td>
<td>38.1</td>
</tr>
<tr>
<td>10</td>
<td>34.3</td>
</tr>
</tbody>
</table>

**Table 6a (24CDi)**

<table>
<thead>
<tr>
<th>DISCHARGE RATE l/min</th>
<th>TEMPERATURE RISE °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>57.3</td>
</tr>
<tr>
<td>8</td>
<td>50.2</td>
</tr>
<tr>
<td>9</td>
<td>44.6</td>
</tr>
<tr>
<td>10</td>
<td>40.1</td>
</tr>
</tbody>
</table>

**Table 6b (28CDi)**

<table>
<thead>
<tr>
<th>DISCHARGE RATE l/min</th>
<th>TEMPERATURE RISE °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>57.3</td>
</tr>
<tr>
<td>10</td>
<td>50.2</td>
</tr>
<tr>
<td>11</td>
<td>44.6</td>
</tr>
<tr>
<td>12</td>
<td>40.1</td>
</tr>
</tbody>
</table>

**Table 6c (35CDi II)**

<table>
<thead>
<tr>
<th>DISCHARGE RATE l/min</th>
<th>TEMPERATURE RISE °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>57.3</td>
</tr>
<tr>
<td>6</td>
<td>50.2</td>
</tr>
<tr>
<td>9</td>
<td>44.6</td>
</tr>
</tbody>
</table>

**Table 7**

<table>
<thead>
<tr>
<th>TOTAL LENGTH OF GAS SUPPLY PIPE</th>
<th>3</th>
<th>6</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAS DISCHARGE RATE m3/h</td>
<td>8.7</td>
<td>5.8</td>
<td>4.6</td>
</tr>
<tr>
<td>PIPE DIAMETER mm</td>
<td>22</td>
<td>22</td>
<td>22</td>
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</tbody>
</table>

**Table 8**

<table>
<thead>
<tr>
<th>CLEARANCES (mm)</th>
<th>INSTALLATION</th>
<th>SERVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABOVE APPLIANCE FLUE ELBOW</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>IN FRONT OF APPLIANCE</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>BENEATH APPLIANCE</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>RIGHT AND LEFT HAND SIDE</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

**Table 9**

<table>
<thead>
<tr>
<th>SYSTEM CAPACITY WITH A 10 LITRE VESSEL</th>
<th>TOTAL SYSTEM VOLUME litres</th>
</tr>
</thead>
<tbody>
<tr>
<td>INITIAL PRESSURE bar</td>
<td>INITIAL CHARGE PRESSURE bar</td>
</tr>
<tr>
<td>0.5</td>
<td>1.0</td>
</tr>
<tr>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>1.5</td>
<td>72</td>
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<tr>
<td></td>
<td>92</td>
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<td>1.0</td>
<td>n/a</td>
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<td></td>
<td>64</td>
</tr>
<tr>
<td>1.5</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>53</td>
</tr>
<tr>
<td>1.5</td>
<td>64</td>
</tr>
</tbody>
</table>
4. Siting The Appliance

4.1 The appliance may be installed in any room although particular attention is drawn to the requirements of the current I.E.E. Wiring Regulations BS 7671 and, in Scotland, the electrical provisions of the Building Regulations applicable in Scotland, with respect to the installation of appliances in rooms containing baths or showers.

Where a room sealed appliance is installed in a room containing a bath or shower, any electrical switch or appliance control using mains electricity must not be able to be touched by a person using the bath or shower.

4.2 The appliance is not suitable for external installation.

4.3 The appliance does not require any special wall protection.

4.4 The wall must be capable of supporting the weight of the appliance. See Table 4.

4.5 The specified clearances must be available for installation and servicing. See Fig. 2. and Table 8.

4.6 The appliance can be installed in a cupboard used for airing clothes provided that the requirements of BS 6798 and BS 5440:2 are maintained.

Notwithstanding the instructions given in BS 5440:2, this appliance may be fitted in a compartment with no vents as long as the minimum clearances stated in Section 6: Air Supply, are maintained.

4.7 An airing space must be separated from the boiler space by a perforated non-combustible partition. Expanded metal or rigid wire mesh are acceptable provided that the major dimension is less than 13mm. See BS 6798.

4.8 The distance between the inner face of a cupboard door and the cabinet front should not be less than 75mm.

4.9 The pipe connection positions on the manifold are shown in Fig. 3 allowing the system to be pre-piped and flushed before the appliance is fitted. Always consider the possible need to disconnect the pipes from the appliance after installation.

4.10 LPG Installation: The appliance shall not be installed in a room or internal space below ground level when it is intended for use with LPG. This does not preclude the installation into rooms which are basements with respect to one side of the building but open to ground level on the opposite side.

Fig. 3. Appliance pipework connections

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH Flow</td>
<td>62.5</td>
<td>87.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DHW Out</td>
<td>127.5</td>
<td>152.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mains Cold Water In</td>
<td>192.5</td>
<td>217.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas Inlet</td>
<td>257.5</td>
<td>282.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CH Return</td>
<td>322.5</td>
<td>347.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Relief</td>
<td>382.5</td>
<td>407.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Screw driver required to operate Valves. Valves shown closed.
5. Siting The Flue Terminal

The flue system must be installed following the requirements of BS5440:1. The standard uncut flue kit length is 425 - 725mm. Extension kits for flues up to 4m (24CDi), 3m (28CDi and 35CDi II) are available. The terminal must not cause an obstruction nor the combustion products a nuisance.

A minimum of 75mm must be achieved where the terminal is near fusible or combustable materials such as a plastic drain pipe or guttering or carport roof UNLESS suitable heat shields are provided.

If the terminal is less than 2m above a surface to which people have access then a guard must be fitted. The guard must be evenly spaced about the terminal and fixed with plated screws. A guard Type K2 can be obtained from Tower Flue Components, Vale Rise, Tonbridge, TN9 1TB.

It is essential that products of combustion cannot re-enter the building. Refer to Fig 4.

6. Air Supply

6.1 The appliance does not require a separate vent for combustion air.

6.2 The appliance can be fitted in a cupboard or compartment with no vents for cooling but the minimum clearances must be increased to those given below. (Note: The clearance at the front is to removable panel, e.g. a door).

<table>
<thead>
<tr>
<th></th>
<th>ABOVE THE FLUE TURRET</th>
<th>IN FRONT</th>
<th>BELOW</th>
<th>RIGHT-HAND SIDE</th>
<th>LEFT-HAND SIDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>24CDi</td>
<td>30mm</td>
<td>250mm</td>
<td>200mm</td>
<td>75mm</td>
<td>75mm</td>
</tr>
<tr>
<td>28CDi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35CDI II</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.3 If the appliance is to be fitted in a cupboard or compartment with less clearance than those in the table above (minimum clearances are given in Section 4. Siting The Appliance) then permanent air vents for cooling are required. One at high level and one at low level, either direct to outside air or to a room. Both vents must pass to the same room or be on the same wall to the outside air.

6.4 The minimum free areas required are given below.

6.5 Refer to BS 6798 and BS 5440:2 for additional information.

### POSITION OF AIR VENTS

<table>
<thead>
<tr>
<th></th>
<th>AIR FROM THE ROOM</th>
<th>AIR DIRECT FROM OUTSIDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>24CDi</td>
<td>270 cm²</td>
<td>270 cm²</td>
</tr>
<tr>
<td>28CDi</td>
<td>315 cm²</td>
<td>315 cm²</td>
</tr>
<tr>
<td>35CDI II</td>
<td>393 cm²</td>
<td>393 cm²</td>
</tr>
<tr>
<td>HIGH LEVEL</td>
<td>24CDi</td>
<td>135 cm²</td>
</tr>
<tr>
<td></td>
<td>28CDi</td>
<td>158 cm²</td>
</tr>
<tr>
<td></td>
<td>35CDI II</td>
<td>197 cm²</td>
</tr>
<tr>
<td>LOW LEVEL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Fig. 4. Siting of the flue terminal.

<table>
<thead>
<tr>
<th>TERMINAL POSITION</th>
<th>MIN. DISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A– Directly below an openable window or other opening e.g. air brick.</td>
<td>300 mm</td>
</tr>
<tr>
<td>B– Below gutters, soil pipes or drain pipes.</td>
<td>75 mm</td>
</tr>
<tr>
<td>C– Below eaves.</td>
<td>25 mm</td>
</tr>
<tr>
<td>D– Below balconies or car port roof.</td>
<td>25 mm</td>
</tr>
<tr>
<td>E– From vertical drain pipes and soil pipes.</td>
<td>25 mm</td>
</tr>
<tr>
<td>F– From internal or external corners.</td>
<td>25 mm</td>
</tr>
<tr>
<td>G– Above ground, roof or balcony level.</td>
<td>300 mm</td>
</tr>
<tr>
<td>H– From a surface facing a terminal.</td>
<td>600 mm</td>
</tr>
<tr>
<td>I– From a terminal facing a terminal</td>
<td>1200 mm</td>
</tr>
<tr>
<td>J– From an opening in a car port (e.g. door window) into dwelling.</td>
<td>1200 mm</td>
</tr>
<tr>
<td>K– Vertically from a terminal on the same wall.</td>
<td>1500 mm</td>
</tr>
<tr>
<td>L– Horizontally from a terminal on the same wall.</td>
<td>300 mm</td>
</tr>
<tr>
<td>M– From door, window or air vent.</td>
<td>300 mm</td>
</tr>
</tbody>
</table>

Advice should be taken if the terminal is in close proximity to surfaces which may be of plastic materials i.e. car-ports, gutters etc.
7. Sealed Primary Systems

See Figs. 5, 6 and 6a
7.1 The system must comply with the requirements of BS 6798 and BS 5449.
7.2 The appliance must not be operated without the system being full of water, properly vented and pressurised.
7.3 The pressure relief valve operates at 3 bar (45lb/in²). The discharge must be directed away from electrical components or where it might be a hazard to the user.
7.4 The pressure gauge indicates the system pressure which must be maintained.
7.5 The 10 litre expansion vessel is charged to 0.5 bar and is suitable for a static head of 5 metres (17.5ft). The pressure can be increased if the static head is greater than 5 metres (17.5ft).
7.6 With an initial system pressure of 0.5 bar, a system capacity of about 72 litres can be accommodated. Refer to BS 7074 for more information. The charge pressure can be increased but with a decrease in system volume.
7.7 The appliance includes a system filling link.
7.8 Water loss must be replaced.
7.9 Repeated venting loses water from the system. It is essential that this water is replaced and the system pressure maintained. Refer to Section 13 Commissioning.
7.10 Connections to the mains water supply must not be made without the authority of the local Water Company.

8. Gas Supply

8.1 The boilers require a gas flow in m³/h of:

<table>
<thead>
<tr>
<th>Model</th>
<th>NG (G20)</th>
<th>LPG (G31)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24CDi</td>
<td>2.9</td>
<td>1.13</td>
</tr>
<tr>
<td>28CDi</td>
<td>3.3</td>
<td>1.3</td>
</tr>
<tr>
<td>35CDi II</td>
<td>4.16</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Check that the supply system can accommodate this together with any other appliances connected to it. Refer to Table 7.
8.2 A natural gas appliance must be connected to a governed meter.
8.3 There must be a pressure of 20mbar (G20) or 37mbar (G31) at the inlet to the appliance. This is equivalent to a pressure of 18.5 - 19.0mbar (G20) or 35 - 35.5mbar (G31) at the inlet pressure tapping on the gas valve.
9. Open Vent Primary Systems

9.1 The size of the flow and return pipework is given in Section 3 – Table 4. The components required to connect the appliance to an open vent system are available as an optional extra kit.

9.2 The feed and expansion cistern should be arranged so that there is a minimum static head of 0.3 metres (12 inches) above the top of the appliance or above the highest point in the heating circuit, whichever is the higher. See Fig. 7

9.3 The feed and vent pipe should be 22mm diameter and rise continuously from the appliance to the feed and expansion cistern.

9.4 A pressure relief valve is not required on an open vented system.

9.5 Air within the appliance will be expelled via the feed and vent connection or dissipated into the rest of the system which must be fitted with manual air vents at any high point.

9.6 The pump is set to maximum and must not be reset.

9.7 If it is required to use the appliance for domestic hot water before the central heating circuit is connected, a 22mm copper by-pass must be connected between the central heating flow and return. Refer to Section 12 and Fig. 7.

N.B: 35CDI II is NOT SUITABLE FOR OPEN VENT SYSTEMS.

10. Domestic Hot Water

10.1 The following are general requirements and, if necessary, reference should be made to the local Water Company before fitting the appliance.

10.2 MAINS COLD WATER INLET. Devices capable of preventing the flow of expansion water must not be fitted unless separate arrangements have been made. An expansion vessel connection point is provided within the appliance. An Rc1/8” connection is provided. A mini expansion vessel kit is available as a spare part. A thread sealant compatible with potable water must be used. Refer to Section 2.9.

10.3 The final 600mm of the mains cold water connection to the appliance should be made in copper tube only.

10.4 The appliance is suitable for a mains pressure of up to 10 bar.

10.5 The appliance is fitted with a mains supply isolating valve.

10.6 The maximum domestic hot water flow rate is 9.0 litres/min (±15%) 24CDI or 10.0 litres/min (±15%) 28CDI or 12.0 litres/min (±10%) 35CDI II.

10.7 In winter (when the mains inlet water temperature is lower) a reduced flow rate at the taps may be required to achieve the hot water delivery temperature available in warmer weather.

10.8 It is suggested that long pipe runs to the taps or shower should be insulated to prevent the rapid cooling of domestic hot water after a tap or shower has been turned off.

10.9 Hot and cold taps and mixing valves used with this appliance must be suitable for operating at mains pressure and temperatures of 65°C.

10.10 No anti-syphonage arrangements are necessary except for some loose head showers. See Clause 12.

10.11 Thermostatically controlled or pressure equalising shower valves will guard against the flow of water at too high a temperature.

10.12 The head of a loose head shower must not fall closer than 25mm (1in) above the top edge of the bath to prevent its immersion in bath water. Alternatively the shower must be fitted with an anti-syphonage device at the point of the flexible hose connections.

10.13 The supply of hot and cold mains water direct to a bidet is permitted, subject to local Water Company requirements, provided that the bidet is of the over-rim flushing type. The outlet(s) should be shrouded and unable to have any temporary hand held spray attached. No anti-syphonage arrangements are necessary.

10.14 As the maximum temperature of the Water to Water heat exchanger is limited by the control circuit, there is normally no need for water treatment to prevent scale accumulation. In exceptional circumstances a device to prevent scale formation can be fitted.

Installation of a scale inhibitor assembly should be in accordance with the requirements of the local Water Company. An isolating valve should be fitted to allow servicing. The water hardness can be determined using a standard test paper or by reference to the local Water Company.
11. Electrical

11.1. Mains supply: 230V ~ 50Hz, 180watts. External fuse 3A, Internal fuses F1 - 2A, F2 - 1.25A (20mm). Spare internal fuses are supplied with the appliance. Refer to Fig 14.

11.2. The appliance must be earthed. It must be possible to completely isolate the appliance.

11.3. The mains cable must be 0.75mm² (24x0.20 mm) to BS6500-Table 15 or 16.

11.4. The mains cable must be connected to the terminal ST12 marked L (red or brown lead), N (black or blue lead) and the Earth stud (green or green/yellow lead) and secured with the cable clamp. Check that sufficient loose lead has been left to allow access to the control box. The Earth lead must be still be slack when the other leads are taut. Refer to Fig 8.

11.5. The connection to the mains must be either: A 3A fused three-pin plug and unswitched socket outlet, both complying with BS1363 or a double pole isolator with a contact separation of 3mm in all poles and supplying the appliance and controls only.

11.6. Access to the mains connection on the driver board is gained by removing the bottom cover from the facia. Refer to Fig 12.

11.7. A room thermostat or an externally mounted programmer must be suitable for mains voltage operation and the leads securely fixed in the clamps provided. The controls must be earthed at the connection on the control board. Refer to Fig 11 and 13.

11.8. A choice of programmers, to fit into the facia, are available to control the CH. Full instructions are sent with the programmer. Refer to Fig 15.

11.9. On very rare occasions an external frost thermostat might be considered where parts of the system are remote from the appliance. Refer to The Worcester Technical Department for more information - Tel: 08705 266241.

11.10. A radio frequency room thermostat is available for use with the appliance.

11.11. Safety Check: If there is an electrical fault after installation check for fuse failure, short circuits, incorrect polarity of connections, earth continuity or resistance to earth.

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Fig. 8. Mains electricity connections.

Fig. 9. Wiring diagram.
Fig. 10. Functional flow diagram.
**Fig 11 - Electrical Connections**

1. ST12-Mains
2. Fuse-F1
3. Earth Screw
4. ST8 Room Thermostat and External Control - Mains Voltage
5. Cable Entry Screw Clamp
6. Earth Tag
7. ST15-Pump
8. ST1-Fan
9. Fuse-F2
10. Cable Entry Clamp
11. ST13-24volt Controls
12. Main Harness and Clamp
13. Control Panel Pivot Point

**Fig 12 - Facia Connections Cover**

1. Control Panel Fixing Screws
2. Facia
3. Control Panel Pivot Point
4. Connection Cover
5. Connection Cover Fixing Screws
6. Control Panel Pivot
7. Fuses-F1,F2
8. Pressure Gauge
9. Facia Panel
10. Control Board Assembly

**Fig 13 - Mains Voltage External Controls Connections**

- 230 V Room Thermostat Connections
- 230 V Programmer Connections

**Fig 14 - Replacement Fuses**

1. Control Panel Pivot Point
2. Fuses-F1,F2
3. Pressure Gauge
4. Facia Panel
5. Control Board Assembly
6. Programmer Connector
7. Facia
8. Control Board
12. Installation

Read this section fully before starting the Installation.

12.1 General.
The appliance is supplied suitable for fitting to a sealed system. If it is to be fitted to an open vent system refer to Section 9.
The flue must be installed in accordance with BS5440:1.
An optional wall spacing frame is available to allow pipework to be run behind the boiler.

12.2 Unpacking and Appliance Preparation.
Remove all the packaging from the appliance.
Using the two M4 thread-forming screws supplied in the hardware pack assemble the wall-plate cross members to the pre-plumbed manifold. Refer to Fig 16.

12.3 Site Preparation
Check that the wall is sound, flat and will support the weight of the appliance. Refer to Table 4.
Check that the position chosen for the appliance is in accordance with the instructions given in Section 4 and 5.
Ensure that the plastic cover over the valves and ‘O’ rings is left in place. The cover will protect the valves and ‘O’ rings against the ingress of dirt and dust.

12.4 Fixing Holes and Flue Opening
Hold the wall-plate to the wall. Check that the plumbing manifold is level.
Mark the position of the fixing holes. Two at the top and two on the plumbing manifold.
Mark the position of the appliance centre-line from the ‘V’ formed by the wall-plate cross-member. Refer to Fig 16.
Mark a horizontal line across the top of the plumbing manifold. Refer to Fig 16.

Rear Flue:
Draw a vertical line through the centre point marked on the wall. Measure 820mm upwards from the horizontal line marked on the wall along the vertical line and mark the point. This is the rear flue hole centre point position. Refer to Fig 16.

Side Flue:
Extend a line horizontally from the rear flue hole centre point along the appropriate wall.
Measure 197 mm from the junction of the walls and mark a vertical line. Extend horizontally the side flue line to intersect the vertical line to give the position of the side flue hole.

NOTE: If the optional wall spacing frame is used then the 197mm dimension should be increased by 35mm (see instructions supplied with frame).
Check the position and alignment of the holes before drilling the fixing holes (60mm deep for N’12 plugs) and the flue holes Ø110 for external fitting and Ø150 for internal fitting). Ensure that the flue hole is horizontal through the wall. Refer to Fig 16.

12.5 Wall-mounting Plate and Manifold
Fit the plugs and fix the plate/manifold assembly to the wall.
Check that the assembly is properly aligned before tightening the screws.

12.6 Gas and Water Pipes
Remove and discard the plastic cover protecting the valves and ‘O’ rings. Check that the ‘O’ rings are fitted and that they are clean and lubricated.
Remove the gas cock, fix the appropriate fitting to connect to the inlet pipe and replace.
Connect the water connections to the manifold. Refer to Fig 3.
Pre-plumbing is not advised if no movement in the pipework is possible.
Pipework can only run horizontally outside the limits of the casing. It is important that the pipes are not fixed near the appliance using clips that put a strain on the connections.
Before the appliance is fitted to the wall the primary system and the mains supply must be thoroughly flushed and treated in accordance with the recommendations of BS7593:1992.

12.7 Install the Boiler
Slide the appliance onto the pre-plumbing manifold ensuring that the three pegs are located correctly.
Secure with two M6 nuts and washers at the top and screw the appliance to the manifold at the bottom using the three retaining caps and M6 bolts. Refer to Fig 17.
Unscrew and discard the automatic air vent cap. Refer to Fig.18.
Lower the facia. Refer to Fig 12.
Fit a discharge pipe to the relief valve leading it away from any electrics or where it may be a hazard. The pipe must not be less than 15mm in diameter and must run continuously downwards outside the appliance.
12.8 Air and Flue Duct Preparation.

The method of installation of the flue system may be varied to suit the actual site conditions. The instructions for connecting and fixing the ducts must, however, be strictly followed.

Unpack the flue spigot, restrictor ring and clamping rings from the Flue Spigot Kit in the boiler Installation Pack. Fit the spigot to the boiler top panel with the four screws provided in the Flue Spigot Kit.

**IMPORTANT** Check the maximum flue length and if it is less than 1m total overall length then fit the restrictor ring as shown in Fig. 18.

<table>
<thead>
<tr>
<th>Flue Type</th>
<th>Dia. (mm)</th>
<th>Flue Type</th>
<th>Dia. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24CDi</td>
<td>75</td>
<td>28CDi</td>
<td>77</td>
</tr>
<tr>
<td>35CDi II</td>
<td>85</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If the air/flue duct assembly is to be fitted from inside the building then the ducts must be cut to length, assembled and inserted through the wall now before fitting the flue elbow to the appliance. Refer to Section 12.10 following after the assembly of the flue ducts.

Remove the inner casing cover. Refer to Section 15.3.(b).

The standard uncut telescopic flue assembly is suitable for flues from 425mm up to 725mm measured from the centre-line of the boiler flue outlet to the outer face of the wall. Refer to Fig 19 & 20.

If \( L > 725 \text{mm} \) then extension duct kit/s will be required - each kit
extends the flue by 750mm up to a maximum of 4m. See table below.

<table>
<thead>
<tr>
<th>EXTENSION</th>
<th>MAXIMUM FLUE LENGTH mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>24CDi</td>
<td>1475 1475 1475</td>
</tr>
<tr>
<td>28CDi</td>
<td>2225 2225 2225</td>
</tr>
<tr>
<td>35CDi II</td>
<td>2975 2975 2975</td>
</tr>
<tr>
<td></td>
<td>3725 3000 3000</td>
</tr>
<tr>
<td></td>
<td>4000</td>
</tr>
</tbody>
</table>

12.9 Measure and Cut the Ducts.

General: Cut the ducts as necessary, ensuring that the ducts are square and free from burrs. Always check the dimensions before cutting. Measure the distance L. Refer to Fig.19 and 20.

The standard flue can be telescopically adjusted to any length between 425mm and 725mm.

Fix the flue assembly together using the self-tapping screws provided. Refer to Fig.21.

It will only be necessary to cut the standard assembly if L<425mm.
Cut the flue turret assembly and the terminal assembly by the same amount i.e L = 350 - remove 75mm from each assembly.

Minimum side flue length = 335mm (accommodating a 10mm Service clearance and a 100mm wall)
Minimum rear flue length = 297mm (accommodating a 100mm wall)

<table>
<thead>
<tr>
<th>24CDi</th>
<th>28CDi/35CDi II</th>
</tr>
</thead>
<tbody>
<tr>
<td>If L is between 1175 - 1475mm</td>
<td>1175 - 1475mm (1 extension)</td>
</tr>
<tr>
<td>1925 - 2225mm</td>
<td>1925 - 2225mm (2 extension)</td>
</tr>
<tr>
<td>2675 - 2975mm</td>
<td>2675 - 2975mm (3 extension)</td>
</tr>
<tr>
<td>3425 - 3725mm</td>
<td>N/A (4 extension)</td>
</tr>
</tbody>
</table>

It is not necessary to cut the ducts.

<table>
<thead>
<tr>
<th>24CDi</th>
<th>28CDi/35CDi II</th>
</tr>
</thead>
<tbody>
<tr>
<td>If L is between 725 - 1175mm</td>
<td>725 - 1175mm (1 extension)</td>
</tr>
<tr>
<td>1475 - 1925mm</td>
<td>1475 - 1925mm (2 extension)</td>
</tr>
<tr>
<td>2225 - 2675mm</td>
<td>2225 - 2675mm (3 extension)</td>
</tr>
<tr>
<td>2975 - 3425mm</td>
<td>2975 - 3000mm (4 extension)</td>
</tr>
<tr>
<td>3725 - 4000mm</td>
<td>N/A (5 extension)</td>
</tr>
</tbody>
</table>

It is necessary to shorten the assembly by cutting the first extension duct assembly i.e. L = 1000mm - remove 175mm from the air and flue ducts.

NOTE: Extension duct measurements do not include the socketed end. Unless specifically instructed the socketed end must not be removed.

Fix the flue ducts together before fixing the surrounding air duct, the cut ducts fit into the flue assembly.

12.10. Fitting the Flue Assembly with Access to the Terminal.

Prepare the flue duct assembly as described in Section 12.9.

Apply the plastic tape to the air duct in contact with the external brickwork.

From inside push the assembly through the wall. Align the flue turret and push fully onto the spigot on the appliance. Tighten the clamping ring and fix using the screw provided. Refer to Fig.24.

Make good the internal wall face and the external brickwork or rendering.

Replace the inner casing.

12.11 Fitting of the Flue Assembly without access to the Terminal.

NOTE: A larger diameter opening in the wall is required. Refer to Table 2.

Prepare the flue assembly as described in Section 12.9.

Fit the rubber sealing gasket centrally onto the terminal assembly and tighten the clamp. Refer to Fig. 23.

Apply the plastic tape to the air duct in contact with the external brickwork.

From inside push the assembly through the wall so that the gasket flange is against the outer face. Refer to Fig. 23.

It may be necessary to adjust the legs of the flue centring ring. Align the flue turret and push fully onto the socket on the appliance. Tighten the clamping ring and fix using the screw provided. Refer to Fig 24.

Seal the gap around the duct at the inner wall face and make good. Replace the inner casing.
90° and 45° bends are available. A maximum of two bends may be used in addition to the first bend on the flue turret.
A 90° bend is equivalent to 750mm of straight duct.
A 45° bend is equivalent to 375mm of straight duct.
A maximum flue assembly of 3m is possible with 1 X 90° bend and 2m with 2 X 90° bends.
Measure the lengths X, Y and Z. Refer to Fig. 25.
The maximum value of X using the turret assembly only is 506mm.
Reduce the ducts to the appropriate length i.e. X = 406mm, cut 100mm from the air duct and 120mm (to cover the entry into the 45° or 90° elbow) from the flue duct.
NOTE: The flue system ducts between the elbows, dimension Y, requires the socketed ends (of the first extension if two or more are used) to be removed and the air and flue tubes to be cut to the same length.
Cut the ducts to a length Y - 162mm. Refer to Fig. 25.
The final section, dimension Z, of the flue system must include a section of plain duct assembly i.e. an extension assembly with the sockets removed. Reduce the final section, including the terminal assembly, by the appropriate amount i.e. Air duct Z - 81mm and the flue duct Z - 51mm. Refer to Fig. 25.

If Z<425mm it will be necessary to cut the air and flue ducts of the extension to a plain length of 100mm and reduce the length of the terminal assembly i.e. Z = 350mm - remove 75mm from the terminal assembly.
If Z in 425 - 725mm it is not necessary to cut the terminal assembly or use a second extension duct as the length can be set telescopically.
If Z>725mm then two extension duct assemblies will be required, the first assembly being cut to length as plain tubes.

If more than two extension ducts are needed in any section to achieve the required length then the final section of the assembly must not be less than 325mm without cutting the terminal assembly.
NOTE: The flue duct of the final extension must be 30mm longer than the air duct.

Each section must be connected to the previous section of the flue bend by fixing the flue ducts together and then similarly fixing the air ducts which engage the elbows.

Fit the assembly as described in Section 12.10, 12.11. as appropriate.
Make good the internal and external brickwork or rendering.

An adapter is available for an initial short section of vertical flue.
Measure and cut the flue as described in Section 12.12.
The first, vertical, section (equivalent to dimension X) is measured from the top of the boiler casing. Cut the vertical section of the extension duct to 167mm less than the measured distance. Do not remove the socketed ends.

The minimum measured distance is 167mm.

Seal the air duct to the turret using silicone sealant.

12.14 Completion of the Installation

Check that the gas and water connections have been tightened. Refer to Fig.3.

Fit the, optional, facia mounted clock or programmer. Refer to the instructions sent with the control. Refer to Fig. 15.

Remove the facia bottom panel. Refer to Fig.12.

Connect the mains electricity supply to the appliance at terminal ST12. Refer to Fig.8. The mains cable must be clamped.

Connect any room and/or frost thermostats, the electrical leads must pass through the appropriate space in the control panel and be fixed with the cable clamps provided. Refer to Fig.11.

Refit the facia bottom panel.

Test the gas supply pipework to the appliance for soundness as indicated in BS6891.

If the appliance is not to be commissioned immediately, replace the cabinet front panel. Check that the gas supply, the electrical supply and the water connections are turned off.

If the appliance is to be filled and pressurised refer to Section 13, Commissioning for a full description.

If the premises are to be left unoccupied during freezing conditions then drain, or do not fill, the appliance and the system. For short periods commission the appliance, Refer to Section 13, and leave the appliance under the control of the built-in frost thermostat or remote frost thermostat (if fitted) or leave operating continuously with the room thermostat set at 6°C.

13. Commissioning

Benchmark Water Treatment: For optimum performance after installation, this boiler and its associated central heating system should be flushed in accordance with the guidelines given in BS7593:1992 - Treatment of water in domestic hot water systems. Full instructions are supplied with proprietary cleansers sold for this purpose. If an inhibitor is to be used after flushing, it should be used in accordance with the inhibitor manufacturers instructions.

Suitable flushing agents and inhibitors are available from Betz Dearborn Tel: 0151 4209563 and Fernox Tel: 01799 550811. Instructions for use are supplied with these products.

IMPORTANT: Any system cleaner must be flushed from the system before an inhibitor is added.

13.1 SUMMARY

The appliance is dispatched with the controls set to provide a maximum output for domestic hot water and central heating load of 24 kW (24/28cdi) or 27.5kW (35cdi II).

The appliance automatically modulates to satisfy lower heat loads.

Domestic Hot Water Circuit

Confirm that the mains water supply has been flushed out at installation. If not it will be necessary to disconnect the cold water inlet pipe from the appliance and thoroughly flush.

Central Heating System

Confirm that the system has been fully flushed out at installation using a flushing agent. Flush the system before starting to commission the appliance and, at the end of the commissioning procedure, add a suitable flushing agent and drain whilst hot. Immediately refill and re-pressurise.

Gas Service. The complete system, including the meter, must be inspected and tested for soundness and purged as indicated in BS6891. In the event of a leak, or suspected leak, at the ‘O’ ring joint on the main appliance manifold, connect a manometer to the test point on the inlet of the multifunctional gas valve. A soundness test carried out after turning off the appliance gas cock will test the section between the gas cock and the gas valve, thus enabling the leak to be traced to either a visible joint or to the ‘O’ ring.

13.2 APPLIANCE AND CENTRAL HEATING SYSTEM PREPARATION

Remove the cabinet front panel.

Check that the electrical supply and the gas service to the appliance are off. Check that all the water connections throughout the system are tight.

Open the system valves at the appliance. Open all the radiator valves, fill the system and vent each radiator in turn.

Remove the bottom panel to gain access to the filling loop assembly. Refer to Section 15.3d The grey knob for the filling loop is packed in the hardware pack and
should be fitted as shown in Fig. 6, 6a. Insert the bayonet end of the filling key into the corresponding cutouts in the filling loop housing and twist to lock the key in place. Turn the grey knob anti-clockwise to allow water ingress and fill until the pressure gauge reads 2.5 bar. Turn the grey knob clockwise to stop filling and remove the filling key by lining up the bayonet end of the key with the cutouts in the filling loop housing and withdrawing the key.

N.B. The key must always be removed from the filling loop housing after the system has been filled to prevent accidental filling and to comply with Byelaw 14 of the Water Byelaws Scheme. Store the key in a safe place for future use and refit the bottom panel. The automatic air vent will vent the appliance. Check that the air vent cap has been loosened. See Fig. 18. Check that the pressure relief valve operates by turning the knob anti-clockwise until it releases. Water should be expelled from the discharge pipe. See Fig. 27.

N.B. The key must always be removed from the filling loop housing after the system has been filled to prevent accidental filling and to comply with Byelaw 14 of the Water Byelaws Scheme.

Lower the facia panel to gain access. Refer to Section 15.3, c.

Set the Expansion Vessel Pressure

The charge pressure of the expansion vessel as dispatched is 0.5 bar, which is equivalent to a static head of 5 metres (17 ft). The charge pressure must not be less than the static head at the point of connection. A Schraeder type tyre valve is fitted to the expansion vessel to allow the charge pressure to be increased if necessary.

Set the system pressure

Release water from the system using the relief valve test knob (see Fig. 27), until the system design pressure is obtained, up to a maximum of 1.5 bar. Initial system design pressure (bar) = Expansion vessel charge pressure + 0.3 bar.

NOTE: 1 bar is equivalent to 10.2 metres (33.5 ft) of water. Set the movable pointer on the pressure gauge to coincide with the indicating pointer giving a permanent record of the set system pressure.

If the pressure indicated on the pressure gauge is greater than 2.6 bar when operating at the maximum central heating temperature, an extra expansion vessel must be fitted to the system as close as possible to the appliance central heating return connection. The appliance (as dispatched) can accommodate a system volume of about 83 litres. Refer to BS 7074 Part 1. If the system volume is in excess of that accommodated by the expansion vessel fitted to the appliance then an extra vessel must be fitted as close as possible to the central heating return connection of the appliance.

Any extra vessel fitted must be pressurised to the same figure as the integral vessel. If the expansion vessel fails then the specified replacement must be fitted.

13.3 PROGRAMMER

Any programmer fitted on the appliance should be set up at this stage following the instructions sent with the programmer. The programmer will retain the settings for up to three weeks following an interruption in the electricity supply.

13.4 APPLIANCE OPERATION

Turn off the gas and electricity supplies to the appliance. Loosen the burner pressure test point screw on the gas valve and connect a pressure gauge. See Fig. 28.

Undo the two screws and hinge down the facia to gain access to the mode switch. Refer to Fig. 12.

Domestic Hot Water.

Set the gas valve mode switch, at the rear of the facia, to the maximum position. Refer to Fig. 26.

Turn on the gas and electricity supplies. Set the CH temperature control knob fully anti-clockwise to and the DHW temperature to MAX. Open a hot water tap. A continuous ignition spark will occur until the burner is alight and
sensed by the control circuit. The burner pressure should be 14.8mbar (24CDi) or 15.5mbar (28CDi) or 13.5mbar (35CDi II) for natural gas and 35.5mbar (24/28CDi) or 34.7mbar (35CDi II) for propane. If the burner pressure cannot be achieved then check that the inlet pressure at the appliance is 20mbar for natural gas and 37mbar for propane. This is equivalent to a 18.5-19.0 mbar (G20) or 36 mbar (G31) at the gas valve.

Set the gas valve mode switch to the minimum position.

The burner pressure will drop to the minimum setting which should be 1.5mbar (24CDi) or 1.0mbar (28CDi) or 0.9mbar (35CDi II) for natural gas or 5.4mbar (24CDi) or 3.8mbar (28CDi) or 3.1mbar (35CDi II) for propane.

Test for gas soundness at the joint between the burner and the gas valve with leak detection fluid.

NOTE: The burner pressure is factory set and if (after checking that the supply pressure is sufficient) the correct pressure is not obtained then Worcester Bosch Service Department should be contacted.

If the appliance does not light, check that it is not in the ‘lockout’ state by pressing the lockout reset button. See Fig. 30.

Set the gas valve mode switch back to the normal position and refit the facade.

Turn off the electricity supply, and then back on again to reset the controls.

Gradually close the hot tap and check that the burner pressure drops. Fully open the tap and check that the burner pressure rises. Fully close the tap and check that the burner goes off. The fan may continue running until the appliance has cooled to a preset temperature.

Set the Operating Switch to OFF.

Central Heating

Check that all the radiator valves are open. Set the room thermostat and the Central Heating Temperature Control to maximum. Set the DHW temperature control to MIN.

On sealed systems check that the system is pressurised and set to the required pressure as indicated on the gauge.

Set the Programmer, if fitted, to HEATING & WATER.

Set the operating switch to ON.

The burner will light.

The appliance will modulate its output from 9.0 to 24.0 kW (24/28CDi) or 10.5 to 27.5 kW (35CDi II) over a period of about two minutes.

Check the system to ensure that all the radiators are heating up evenly. If not then bleed each radiator through its vent screw.

Shut down all but one of the radiators and observe the burner fall pressure. Open all of the radiator valves and check that the burner pressure rises.

Balance the system so that the required temperature difference across the central heating flow and return pipes is obtained. See Table 3.

Adjust the central heating by-pass valve until the same temperature difference is obtained. See Fig. 29. This should be carried out with only a single radiator operating. If the thermostatic radiator valves are fitted then one radiator should be left uncontrolled. The bypass valve should never be fully closed.

Set the room thermostat to minimum and check that the burner goes out.

Reset the room thermostat to maximum and the burner will re-light and follow the normal operating procedure.

Check for proper ignition of the burner after a break in the gas supply. Turn off the gas service cock and wait for 60 seconds. The burner will go out but sparking from the electrode will continue for 10 seconds when the appliance will enter a ‘lockout’ state. Carefully open the gas service cock, press the lockout reset button and observe the burner re-light and follow the normal sequence of operation. Refer to Fig. 30.

Set the Operating Switch to OFF.

Turn off the gas service cock and the electrical supply to the appliance.

Drain the system while the appliance is still hot.

Refit the cabinet front panel.

If the appliance is being passed over to the user immediately, refer to Section 14 - Instructions to the User.

If the appliance is to be left inoperative, check that the Operating Switch is set to OFF. Turn off the gas service cock.

For short inoperative periods, leave the appliance under the control of the built in frost thermostat or the remote frost thermostat (if fitted) or leave operating continuously with the room thermostat set at 6°C.

Do not switch off the electricity supply.

If there is any possibility of the appliance and the system being left totally unused in freezing conditions then switch off the gas and electricity and drain the appliance and the system.

Refit the cabinet front panel.

If the appliance is being passed over to the user immediately, refer to Section 14 - Instructions to the User.

If the appliance is to be left inoperative, check that the Operating Switch is set to OFF. Turn off the gas service cock.

For short inoperative periods, leave the appliance under the control of the built in frost thermostat or the remote frost thermostat (if fitted) or leave operating continuously with the room thermostat set at 6°C.

Do not switch off the electricity supply.

If there is any possibility of the appliance and the system being left totally unused in freezing conditions then switch off the gas and electricity and drain the appliance and the system.
15. Inspection And Servicing

15.1 SERVICING
To ensure continued efficient operation of the appliance it must be checked and serviced as necessary at regular intervals. The frequency of servicing will depend upon the particular installation conditions and usage, but once per year should generally be adequate. The extent of the service required by the appliance is determined by the operating condition of the appliance when tested by fully qualified engineers.

Any service work must be carried out by competent engineers such as British Gas or Corgi registered personnel.

15.2 PRE-SERVICE INSPECTION
Check that the flue terminal and the terminal guard, (if fitted), are clear. If the appliance is in a compartment, check that any ventilation openings in the compartment door or walls are clear. See Section 6 - Air Supply.

Check the system and remake any joints or fittings, if necessary, which show signs of leakage. Refill, vent and re-pressurise as described in Section 13.2.

Operate the appliance and the system taking note of any faults.

Measurement of the Flue Gases
For consistency of results of the flue gas measurements it is necessary to have a constant output and stationary equilibrium.

- Switch on the appliance.
- Switch to DHW and CH mode.
- Hinge down the facia.
- Turn the Mode Switch to the “Max.” position.
- Wait until the appliance reaches stationary equilibrium (approx. 10 minutes).
- Remove the cap from the sensing point. See Fig. 18.
- Insert the probe into the measurement gap up to a depth of 50mm.
- Seal any gaps.

Expected measurements should be between:

- CO: 0.001 and 0.003 %.
- CO₂: 6.7 and 7.0 %.

After taking the measurement:
- Replace the sealing cap.
- Turn the Mode Switch back to the “normal” position.
- Put the facia back in to its normal position.

SAFETY
Disconnect the electrical supply at the mains and turn off the gas supply at the gas service cock on the appliance before servicing.

After completing the service always test for gas soundness as indicated in BS 6891.

15.3 COMPONENT ACCESS
To carry out a full and comprehensive service of the appliance remove the following parts to gain access to the components which need to be checked or serviced.

(a) Cabinet Front Panel. Remove by lifting off the supports.

(b) Inner Casing Cover. Check that the electricity supply to the appliance is turned off. Remove the cabinet front panel. Unscrew the four screws securing the cover to the casing and lift off. See Fig. 26.

(c) Facia Panel. Check that the electricity supply to the appliance is turned off. Remove the cabinet front panel. Unscrew the two upper screws as shown in Fig.12 and hinge down the facia taking care not to distort the pressure gauge capillary tube or electrical connections.

(d) Bottom panel. Hinge down the facia panel. Disengage the front edge of the bottom panel from the two clips and remove the bottom panel from the appliance.

(e) Fan. Remove the inner casing cover. Carefully unplug the electrical connections and pull off the sensing tubes. Unscrew the three fixing screws and remove the fan assembly. See Fig. 31.

(f) Flue Hood Assembly. Remove the fan assembly. Undo the two screws securing the flue hood. Lift and slide the flue hood assembly from the appliance. See Fig. 31. When refitting the hood ensure that the rear return edge passes under the lip at the rear of the combustion chamber.

(g) Combustion Chamber Front and Sides. Remove the inner casing cover. Slacken off to the end of the thread but do not remove the two wing nuts securing the combustion chamber. Unhook the securing rods out of the locating holes in the combustion chamber sides. Ease the combustion chamber front and side assembly clear of the appliance. Refer to Fig. 31.

(h) Burner Assembly. Remove the combustion chamber front and sides. Pull off the two spark electrode leads and disconnect the flame sense lead at the plastic connector under the inner casing. NOTE: The flame sensing lead is attached to the burner. When the burner is removed ensure this lead is fed through the inner casing. Remove the grommet seal to allow the plastic connection to pass through the inner casing. Unscrew the G 3/4” union nut on top of the gas valve and retain the sealing washer. Unscrew the front burner fixing screw. Lift the burner and ease the union nut through the inner casing sealing grommet.

Remove the burner assembly clear of the inner casing.

Ensure the flame sensing lead passes through the base of the inner casing. See Fig. 31 and 32.

15.4 SERVICE OF COMPONENTS

Clean the Fan. Any dust or fluff should be removed with a soft brush or by blowing. Take care not to distort the pressure sensing device.

Clean the Main Burner. Brush the blade tops and mixing tube with a soft brush and check that all the flame ports are clear. Remove any blockages with a non-metallic brush. Inspect the injector and clean with a soft brush. Replace the injector if it appears damaged. Do not use a wire brush or anything likely to cause damage. Replace the spark and sense electrodes if they appear damaged.
Clean the Gas to Water Heat Exchanger. Cover the burner manifold hole in the combustion chamber bottom panel with a cloth. Clean the heat exchanger using a soft brush. Remove the deposits from the bottom of the combustion chamber. Do not distort any of the blades.

Combustion Chamber Insulation. Examine and replace any pads that are damaged. Remove any dust or deposits using a soft brush after first dampening the pads.

Reassemble the appliance in the reverse order.

Check that all components are in place and correctly fixed. Leave the cabinet front panel to be fitted after checking the operation of the appliance.

15. 5 TEST THE APPLIANCE

On completion of the service and reassembly of the appliance, check for gas soundness and the correct operation of the appliance as described in Section 13 - Commissioning.

Refit the cabinet front panel and reset the controls to the users requirements.

16. Replacement Of Parts

16.1 SAFETY

Switch off the electricity and gas supplies before replacing any components. After the replacement of any components, check for gas soundness where relevant and carry out functional checks as described in Section 13 - Commissioning

16.2 COMPONENT ACCESS

To replace components it is necessary to remove one or more sections of the cabinet and cover plates within the appliance as described in Section 15.3. Any ‘O’ ring or gasket that appears damaged must be replaced. Complete gasket and ‘O’ ring packs are available for the gas and water connections on the appliance. The facia panel may also need to be hinged down as described in Section 15.3, c.

16.3 DRAINING THE APPLIANCE

Check that the electricity supply to the appliance is turned off. Before removing any component holding water it is important that as much water as possible is removed from the appliance.

(a) Central Heating Circuit. Turn off the central heating flow and return valves at the appliance. Fit tubes to the drain taps on the flow and return manifolds and open the drain taps about one turn, make sure that the dust cap on the auto air vent is loosened. See Fig. 18. Close the drain taps when the flow has stopped. Be careful not to overtighten the drain taps. Some water will remain in the expansion vessel, pump, diverter valve, water to water and Gas to Water heat exchangers and extra care must be taken when removing these components.

(b) Domestic Hot Water Circuit. Turn off the mains cold supply valve at the appliance and open the lowest hot water tap. A quantity of water will remain in the Water to Water heat exchanger and the diverter valve and extra care must be taken when removing these components.

Replace any components removed from the appliance in the reverse order using new gaskets/’O’ rings/sealant where necessary. Always check that any electrical connections are correctly made and that all screws are tight.

16.4 COMPONENT REPLACEMENT

1. Automatic Air Vent. See Fig. 34

Remove the inner casing cover as described in Section 15.3, b. Drain the central heating circuit as described in Section 16.3, a. Remove the circlip and lift the assembly from the appliance. Unscrew air vent from the pipe. Fit the replacement assembly, making sure the ‘O’ ring is in good condition. Replace if necessary. Ensure that the circlip is correctly fitted and the dust cap is loosened. Open the valves and fill and re-pressurise the system as described in Section 13.2.

2. Air Flow Pressure Switch. See Fig. 33.

Check that the electricity supply to the appliance is turned off. Remove the cabinet front panel as described in Section 15.3, a. Carefully pull off the sensing tubes and the electrical connections from the switch. Unscrew the two screws underneath the gas valve and remove the switch and bracket from the appliance. Fit the replacement switch in the reverse order ensuring that the electrical connections have been made to the correct terminals on the switch. Check that the sensing tubes are fitted correctly.

3. Fan. See Fig. 31.

Check that the electricity supply to the appliance is turned off. Remove the fan assembly as described in Section 15.3, e. Fit the replacement fan in the reverse order.
4. Overheat Thermostat. See Fig. 34.
Check that the electricity supply to the appliance is turned off.
Remove the inner casing cover as described in Section 15.3, b.
Carefully pull off the two wires from the thermostat head.
Undo the two M3 screws and remove from the appliance.
Fit the replacement thermostat in the reverse order ensuring that some heat sink compound is between the thermostat and the plate.

5. Gas to Water Heat Exchanger. See Fig. 34.
Check that the electricity supply to the appliance is turned off.
Drain the central heating circuit as described in Section 16.3, a.
Remove the inner casing cover, fan, flue hood assembly, burner, and Gas to Water heat exchanger as described in Sections 15.3, b, e, and f, and 16.4, 5. Remove the fibre insulation pads from the combustion chamber side, rear, and front sections. To avoid the risk of fine particles damage the pads before removal.
Fit the replacement pads in the reverse order taking care not to damage them.
Open the valves and fill and re-pressurise the system as described in Section 13.2.

6. Combustion Chamber Insulation. Refer to Fig. 35.
Check that the electricity supply to the appliance is turned off.
Drain the central heating circuit as described in Section 16.3, a.
Remove the inner casing cover, fan, flue hood assembly, burner, and Gas to Water heat exchanger as described in Sections 15.3, b, e and f, and 16.4, 5. Remove the fibre insulation pads from the combustion chamber side, rear, and front sections. To avoid the risk of fine particles damage the pads before removal.
Fit the replacement pads in the reverse order taking care not to damage them.
Open the valves and fill and re-pressurise the system as described in Section 13.2.

7. Burner. See Fig. 32.
Check that the electricity and gas supplies to the appliance are turned off.
Remove the burner assembly as described in Section 15.3, h.
Fit the replacement burner in the reverse order taking care not to damage the electrode leads.

8. Burner Injector. See Fig. 32.
Remove the burner as described in Section 15.3, h.
Unscrew the brass injector from the burner.
Fit the replacement injector in the reverse order.

9. Spark Electrode Assembly. See Fig. 32.
Remove the combustion chamber front and sides as described in 15.3, g.
Carefully pull off the two electrode leads,
Undo the M4 extended nut and remove the spark electrode assembly from the burner.
Fit the replacement electrode in the reverse order, checking that the spark gap is 3 to 4mm.
10. Flame Sensor. Refer to Fig. 32. Remove the burner as described in Sections 15.3, h and 16.4.7. Undo the M3 screw and remove the sense electrode from the burner. Fit the replacement electrode in the reverse order, checking that the sense gap is 5 to 6mm.

11. Gas Valve. Refer to Fig. 28. Check that the electricity and gas supplies to the appliance are turned off. Hinge down the facia panel into the servicing position as described in Section 15.3, c. Remove the air pressure switch bracket as described in Section 16.4.2. Undo the two G1/4 inch nuts on the gas valve and the two M4 screws on the gas valve bracket and withdraw the valve. Whilst supporting the valve carefully pull off the three electrical solenoid plug connections. Fit the replacement gas valve in the reverse order ensuring the sealing washers are correctly fitted.

To set the burner pressure. Refer to Fig. 28. The minimum and maximum burner pressure must be set after a new gas valve has been fitted. Follow the procedure described in Section 13.4 - Appliance Operation. The minimum burner pressure must be set first since maximum is adjusted simultaneously.

Start the appliance in the domestic hot water mode as described in Section 13.4 - Appliance Operation.

Turn the gas mode switch on the rear of the facia to minimum. Refer to Fig. 26. Adjust the minimum pressure screw on the gas valve to give a burner pressure of 1.5mbar (24CDi) or 1.0mbar (28CDi) or 3.1 mbar (35CDi II) for natural gas or 5.4mbar (24CDi) or 3.8mbar (28CDi) or 3.1mbar (35CDi II) for propane. Turn the gas mode switch on the rear of the facia to maximum. Adjust the maximum pressure screw on the gas valve to give a burner pressure of 14.8mbar (24CDi) or 15.5mbar (28CDi) or 13.5mbar (35CDi II) for natural gas or 35.5mbar (24CDi) or 35.5mbar (28CDi) or 34.7mbar (35CDi II) for propane. Turn the gas mode switch on the rear of the facia to normal. After completing the adjustments, check the minimum and maximum pressures and adjust as necessary.

28CDi/35CDi II ONLY: Ensure the appliance lights in the central heating mode. Turn the CH pressure adjuster on the rear of the control board (Fig. 26) fully clockwise, wait until the pressure stops increasing and then slowly turn it anti-clockwise until the burner pressure is 10.8mbar natural gas or 24.3mbar propane for 28CDi or 8mbar natural gas or 21.3mbar propane for 35CDi II. After completing the adjustments, check the minimum and maximum pressures and adjust as necessary. It should not be necessary to alter the central heating potentiometer setting when the gas valve only is replaced and the minimum and maximum pressures are set.

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**Fig. 36. Appliance Components (lower assembly)**

- Expansion vessel
- Air pressure switch
- Gas valve
- Water to water heat exchanger
- Pressure relief valve
- Drain tap (C.H. Return)
- Pressure Gauge
- Domestic hot water sensor (not shown) located behind water to water heat exchanger
- Flow pipe from pump and union connection
- Drain tap C.H. flow
- Filling loop
- Plastic water cover
- Water diverting valve and micro switch assembly
- Facia and controls shown in the service position
**12. Central Heating Sensor.** Refer to Fig. 34.
Remove the inner casing cover as described in Section 15.3, b.
Check that the electricity supply to the appliance is turned off.
Carefully pull off the two leads from the sensor.
Pull off the sensor and spring retaining clip from the pipe.
Fit the replacement sensor in reverse order with a layer of heat sink compound between the faces. Refit the leads.

**13. Domestic Hot Water Sensor.** Refer to Fig. 39.
Check that the electricity supply to the appliance is turned off.
Hinge the facia panel into the servicing position as described in Section 15.3, c.
Carefully pull off the two leads from the sensor.
Undo and remove the screw, pull off the sensor and spring retaining clip from the pipe.
Fit the replacement sensor in reverse order ensuring a layer of heat sink compound is between the faces. Refit the leads.

**14. Circulating Pump.** Refer to Fig. 37.
Check that the electricity supply to the appliance is turned off.
Drain the central heating circuit as described in Section 16.3, a.
Hinge the facia panel into the servicing position as described in Section 15.3, c.
Undo the two union nuts and the pipe to the expansion vessel, remove the pump from the pipe-work. Support the pump and remove the electrical cover.
Disconnect the electrical wires taking note of their positions.
Fit the replacement pump in the reverse order using new sealing washers.
Alternatively replace the pump head only by removing the four Allen screws on the pump, remove the head and support whilst removing the electrical connections. Refit the new head.
Open the valves and fill and re-pressurise the system as described in Section 13.2.

**NOTE:** The direction of flow should be downwards. The speed should always be set to maximum.

**15. Pressure Relief Valve.** Refer to Fig. 36.
Drain the central heating circuit as described in Section 16.3, a.
Hinge down the facia panel as described in Section 15.3, c.
Remove the bottom panel as described in Section 15.3, d.
Pull out the retaining clip and remove the pressure gauge connection. Undo the discharge pipe connection and remove the valve taking care not to distort the pipework.
Fit the replacement valve in reverse order. Reconnect the discharge pipe.
Open the valves and fill and re-pressurise the system as described in Section 13.2.

**16. Expansion Vessel.** Refer to Fig. 38.
Drain the central heating circuit as described in Section 16.3, a.
Hinge the facia panel into the servicing position as described in Section 15.3, c.
Remove the air pressure switch, gas to water heat exchanger, water to water heat exchanger and pump as described in 16.4, 2, 5, 14 and 20 and remove the vessel.
Fit the replacement vessel in the reverse order.
Open the valves and fill and re-pressurise the system as described in Section 13.2

**17. Water Diverting Valve Micro Switch Assembly.**
Refer to Fig. 39.
Check that the electricity supply to the appliance is turned off.
Hinge down the facia panel as described in Section 15.3, c.
Remove the bottom panel as described in Section 15.3, d.
Using a pair of fine nosed pliers, pull the circlip off and remove the micro switch assembly from the valve. Remove the black cover and carefully pull off the connections from the terminals on the micro switches.
Withdraw the switch assembly from the appliance.
Fit the replacement micro switch assembly in the reverse order.
18. Water Diverting Valve. See Fig. 36, 40.
Check that the electricity supply to the appliance is turned off.
Drain the central heating and domestic hot water circuits as described in Sections 16.3, a and b.
Hinge down the facia panel into the Servicing Position as described in Section 15.3, c.
Remove the bottom panel, filling loop, water to water heat exchanger and micro switch assembly as described in Section 15.3, d, and Sections 16.4.17, 20 and 22.
Pull off the large wire clip locating the water diverting valve to the central heating plastic flow manifold on the left hand side of the appliance.
Remove the wire clip securing the copper by-pass pipe to the flow manifold.
Retain the wire clips.
Carefully ease the by-pass pipe out of the manifold and allow the pipe to swing forwards to clear the manifold connection.
Remove the screw securing the bracket, located at the right hand end of the water diverting valve, to the appliance casing.
Remove the four screws located at the left hand side securing plastic manifold to the appliance.
Remove the water diverting valve and plastic manifold assembly clear of the appliance.
Ease the water diverting valve out of the plastic manifold.
Remove the securing bracket from the valve and the water filter from the valve cold water inlet.
Retain the plastic manifold, fixing screws, support bracket and water filter.
Discard the water diverting valve.
Reassemble the original support bracket, water filter and new ‘O’ ring seals to the replacement valve.
Lubricate the ‘O’ ring seal and push the plastic flow manifold onto the valve.
Reassemble the water diverting valve and plastic manifold assembly to the appliance in the reverse order.
Ensure all ‘O’ ring seals and fibre washers are renewed and replaced correctly and the ‘O’ rings are lubricated.
Reassemble the appliance in the reverse order.
Open the valves and fill and re-pressurise the system as described in Section 13.2.

19. Inlet Water Filter. See Fig. 40.
Check that the electric supply to the appliance is turned off.
Drain the central heating and domestic circuits as described in Sections 16.3, a and b.
Hinge down the facia panel into the servicing position as described in Section 15.3, c.
Follow the procedures as described in Section 16.4.18 and remove the water divering valve from the appliance.
Remove the water filter from the cold water inlet.
Discard or clean the filter.
Fit the replacement filter (push fit) in the reverse order.
Reassemble the appliance in the reverse order.
Open the valves and fill and re-pressurise the system as described in Section 13.2.

20. Water to Water Heat Exchanger. Refer to Fig. 40.
Check that the electricity supply to the appliance is turned off.
Drain the central heating and domestic hot water circuits as described in Sections 16.3, a and b.
Hinge down the facia panel into the servicing position as described in Section 15.3, c.
Remove the bottom panel as described in Section 15.3, d.
Remove the filling loop as described in Section 16.4.22. Undo the diverter valve connection. Remove the bolt and circlip and pull the heat exchanger forward and away from the appliance.
Fit the replacement heat exchanger in the reverse order.
Open the valves and fill and re-pressurise the system as described in Section 13.2.

21. Domestic Hot Water Flow Regulator. Refer to Fig. 40.
Remove the water to water heat exchanger assembly as described in Section 16.4.20.
The plastic flow regulator is located within the brass housing on the heat exchanger.
Regulator size:

<table>
<thead>
<tr>
<th>Model</th>
<th>Flow Rate</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>24CDi</td>
<td>9 l/min</td>
<td>white</td>
</tr>
<tr>
<td>28CDi</td>
<td>10 l/min</td>
<td>blue</td>
</tr>
<tr>
<td>35CDi</td>
<td>12 l/min</td>
<td>red</td>
</tr>
</tbody>
</table>

Fit the replacement flow regulator and reassemble in the reverse order ensuring the fibre washers and ‘O’ rings are in place.

Fig. 40 Filling Loop, Water to Water Heat Exchanger and Domestic Hot Water Flow Regulator
22. **Filling Loop.** Refer to Fig. 40.
Check that the electricity supply to the appliance is turned off.
Drain the central heating circuit as described in Section 16.3, a.
Hinge down the facia panel into the servicing position as described in Section 15.3, c.
Remove the screw securing the filling loop to the underside of the water diverting valve.
Remove the clip retaining the filling loop to the plastic flow manifold.
Remove the wire clip joining the two sections of the filling loop and slide the air gap section in the direction of the arrow.
Remove from the appliance.
Fit the replacement assembly in the reverse order not forgetting the ‘O’ring between the flow manifold and filling loop joint.

23. **Control Board.** See Fig. 41.
Check that the electricity supply to the appliance is turned off.
Remove the three screws fixing the facia bottom panel to the facia.
Remove the facia bottom panel. Retain the panel and screws.
Carefully pull off all the connectors. Disconnect the mains supply lead at terminal ST 12 and the earth connection at the back.
Pull off the three plastic control knobs. Take care not to damage the knobs when pulling off.
Retain the knobs.
Hinge down the facia panel into the servicing position as described in Section 15.3, c.
Remove the plastic water cover.
Remove the four corner screws on the back of the facia and separate the metal back panel from the plastic facia.
Ease off the two spark electrode lead connections.
Release the plastic catch at each of the four mounting posts pulling the control board forwards approximately 3mm to prevent the plastic catch from returning.
Pull the board off the remainder of the mounting posts until it is free.
Unplug the transformer from rear of the board. Discard the control board retain the transformer.
Plug in the replacement transformer to the control board. The transformer will fit in one direction only.

24. **Transformer.** See Fig. 41.
Check that the electricity supply to the appliance is turned off.
Remove the control board as described in Section 16.4.23.
Unplug the transformer from rear of the board. Discard the transformer retain the control board.
Plug in the replacement transformer to the control board. The transformer will fit in one direction only.

25. **Pressure Gauge.** Refer to Figs. 40 and 41.
Check that the electricity supply to the appliance is turned off.
Drain the central heating circuit as described in Section 16.3, a.
Hinge down the facia panel into the servicing position as described in Section 15.3, c.
Remove circlip and pull out the capillary sensing bulb in the return manifold.
Prise back the retaining clips securing the gauge to the facia panel and remove.
Fit the replacement gauge in the reverse order ensuring the “O” ring is in place.
Open the valves and fill and re-pressurise the system as described in Section 13.2

---

Connectors are not interchangeable and will only fit the terminals from which they were removed.
Reassemble the facia panel and facia bottom panel in the reverse order. When replacing the control knobs ensure the knob with the shortest shaft is fitted to the left hand control position.

**28CDi/35CDi II ONLY:** Re-check the max. CH setting pressure and adjust as described in Section 16.4.11 (to set the burner pressure).

---

Fig. 41. Rear of Facia in Servicing Position, Control Board and Transformer.
## 17. Short Parts List

### Accessories

<table>
<thead>
<tr>
<th>Part</th>
<th>WHS Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal Telescopic Flue Kit</td>
<td>7 716 191 068</td>
</tr>
<tr>
<td>Flue Duct Extension Kit</td>
<td>7 716 191 006</td>
</tr>
<tr>
<td>Vertical Balanced Flue Kit &amp; Terminal</td>
<td>7 716 191 079</td>
</tr>
<tr>
<td>Vertical Flue Adaptor</td>
<td>7 716 191 016</td>
</tr>
<tr>
<td>Digital Single Channel Programmer</td>
<td>7 716 192 003</td>
</tr>
<tr>
<td>Mechanical Single Channel Programmer</td>
<td>7 716 192 002</td>
</tr>
<tr>
<td>Digistat CD (Radio Controlled Room Thermostat)</td>
<td>7 716 192 006</td>
</tr>
<tr>
<td>Wall Spacing Frame 24/28CDi</td>
<td>7 716 192 111</td>
</tr>
<tr>
<td>Wall Spacing Frame 35CDi II</td>
<td>7 716 192 278</td>
</tr>
<tr>
<td>90° Flue Elbow (Ose)</td>
<td>7 716 191 013</td>
</tr>
<tr>
<td>45° Flue Elbow (Pack of Two)</td>
<td>7 716 191 014</td>
</tr>
<tr>
<td>Mini Expansion Vessel</td>
<td>7 716 192 105</td>
</tr>
<tr>
<td>Internal Flue Fixing Kit</td>
<td>7 716 191 018</td>
</tr>
<tr>
<td>Pre-System Filling Kit</td>
<td>7 716 192 102</td>
</tr>
</tbody>
</table>
18. Operational Flow Diagrams

**Central Heating Function**

- **Main Switch On**
- **Green Light On**
- Room thermostat and/or mains programmer (or link) On
- AND
- Electronic facia programmer (if fitted) On
- AND
- ST13 link in
- AND
- CH control knob On

- **Central Heating Demand**

- **Two minute minimum burner**
  - (30 seconds - 35CDi II) pressure then ramp up pressure over next one minute

- **Modulate gas to maintain flow temperature set by control knob**

- **Demand End**
  - Pump continue four minutes. Fan continue fifteen seconds

- **Three minute wait**

- **Gas valve Off. (CH light still on. Pump still On)**

- **Over temperature shut-off if flow temperature 5°C above set value**

**Domestic Hot Water Function**

- **Main Switch On**
- **Green Light On**

- **Flow switch On (Tap open)**

- **Domestic Hot Water Demand** (Priority over CH demand)
  - HW light On. Pump On. Fan ON High speed - 28CDi. Fan ON High for 2 sec then Low speed - 35CDi II. Ignition Sequence. Burner on

- **Four second ramp to max. gas pressure. Fan speed changes at mid pressure 35CDi II.**

- **Modulate gas to maintain delivered water temperature at value set by control knob**

- **Demand End**
  - Fan continue fifteen seconds

- **Ten second wait**

- **Gas valve Off. (HW light still on. Pump still On)**

- **Over temperature shut-down if water temperature 8°C above set value**

- **Possible overrun condition within next four minutes (See next section)**

- **Burner shut-down if primary temperature 94°C (until 84°C)**
Within four minutes of last hot water demand AND primary temperature above 80°C

If heat demand has occurred in last 30 minutes

Run pump until primary drops to 80°C

If heat demand has NOT occurred in last 30 minutes

Run fan until primary drops to 80°C

If primary temperature still increases above 90°C

Run pump for two seconds (Pulse pump for 2 seconds every 10 seconds 35CDI II)

OVERRUN FUNCTION

No demand and primary temperature below 8°C

Wait in normal off state for 30 minutes

Run pump for four minutes

Monitor central heating sensor

Return to normal off state

Commence normal central heating mode until temperature reaches 30°C

AUTOFROSTAT FUNCTION
19. Fault Finding

Note: This fault-finding information is for guidance only. Worcester, Bosch Group cannot be held responsible for costs incurred by persons not deemed to be competent.

The electronic control system for this boiler incorporates four lights on the facia. These are used to show normal operating status. But as a secondary function, by flashing, they can also be used to help provide fault diagnostics. Therefore, with individual or groups of lights being permanently off, on or flashing, every normal fault can be identified.

To use the fault finding system, select a box below which represents the light situation during your fault. Then refer to the appropriate following section. This fault-finding system assumes that the appliance has been operating correctly until the time of failure.

PRELIMINARY CHECKS
Preliminary electrical system checks are the first electrical checks to be carried out during a fault-finding procedure. On completion of the Service/Fault-Finding task which has required the breaking and remaking of electrical connections, check (a) EARTH CONTINUITY, (b) SHORT CIRCUIT CHECK, (c) POLARITY and (d) RESISTANCE TO EARTH.

LIGHT SITUATION DURING FAULT

| FAIL POINT A | No lights at all |
| FAIL POINT B | No green light (Red lights function) No red lights (Green light functions) |
| FAIL POINT C | No red light (other lights function in other modes) |
| FAIL POINT D | Light on constant (CH knob in OFF position) |
| FAIL POINT E | 2 lights flashing slowly |
| FAIL POINT F | Flashing slow |
| FAIL POINT G | Flashing fast |
| FAIL POINT H | Flashing fast |
| FAIL POINT I | Flashing fast |
| FAIL POINT J | Flashing fast |
| FAIL POINT K | Other faults not covered by above |

Note:
Slow flash is once per second, fast flash is five times per second.
Slow flash can only be cleared by using the facia reset button (press for at least one second).
Fast flash is cleared by removing fault and/or main switch off/on.
Is the facia on/off switch turned on? (Clockwise)

Yes → Is there a 230V AC live supply across Terminal ST12 pins L and N

No → Check electrical supply to boiler

Yes → Has fuse F1 blown?

No → Replace control board (Section 16.4.23)

Yes → Replace fuse and investigate cause. Suggestions: Cable damage, connections to (or faults within) pump, fan, external 230V controls, transformer or board.

FAIL POINT A

Has fuse F2 blown?

No → Replace control board from facia (See Section 16.4.23) and separate transformer from board. Measure resistance across the two pairs of adjacent pins on the transformer. Is any pair above 100 ohms?

No → Replace control board (Section 16.4.23).

Yes → Replace transformer.

FAIL POINT B

Green diode is damaged. Replace control board. (Section 16.4.23)

FAIL POINT C
**FAIL POINT D**

With CH control knob fully clockwise, does the boiler ignite and appear to run normally in central heating mode?

- **Yes**
  - Red diode is damaged. Replace control board. (Section 16.4.23)
  - Is there a link at terminal ST13 pins 1 and 2?
    - **Yes**
      - Is there an electronic programmer at position ST5 at right-hand end of board?
        - **Yes**
          - Replace control board. (Section 16.4.23).
        - **No**
          - Insert (or tighten) a link
    - **No**
      - Replace control board. (Section 16.4.23).

- **No**
  - There is no heat demand. Check room thermostat or mains programmer (or link).
  - With CH control knob fully clockwise, does the boiler ignite and appear to run normally in central heating mode?
  - Is there 230V AC across terminal ST8 pins LR and N?
    - **Yes**
      - Correctly set or replace electronic programmer.
    - **No**
      - Remove programmer connector from board edge. Does CH lamp now light?
        - **Yes**
          - Replace control board. (Section 16.4.23).
        - **No**
          - Remove multiway connector from board position ST16. With tap still open is there continuity across contacts 19 and 20 (2 pink wires)?
            - **Yes**
              - Repair or replace wiring/harness
            - **No**
              - Remove the black cover from the microswitch assembly. With tap still open is there continuity between the two connected terminals (C and NO)?
                - **Yes**
                  - Repair or replace wiring/harness
                - **No**
                  - Visually observe if the plunger on the diverter valve assembly is pushing the microswitch button. (Note: May be helpful if tap is repeatedly turned on and off). If plunger moves replace microswitch (Section 16.4.17). If plunger does not move replace water diverting valve. (Section 16.4.18).

**FAIL POINT E**

With a hot water tap fully open, does the boiler ignite and appear to run normally in hot water mode?

- **Yes**
  - Red diode is damaged. Replace control board. (Section 16.4.23)
  - Remove multiway connector from board position ST16. With tap still open is there continuity across contacts 19 and 20 (2 pink wires)?
    - **Yes**
      - Replace the black cover from the microswitch assembly. With tap still open is there continuity between the two connected terminals (C and NO)?
        - **Yes**
          - Repair or replace wiring/harness
        - **No**
          - Visually observe if the plunger on the diverter valve assembly is pushing the microswitch button. (Note: May be helpful if tap is repeatedly turned on and off). If plunger moves replace microswitch (Section 16.4.17). If plunger does not move replace water diverting valve. (Section 16.4.18).
  - Remove the black cover from the microswitch assembly. With tap still open is there continuity between the two connected terminals (C and NO)?
    - **Yes**
      - Repair or replace wiring/harness
    - **No**
      - Visually observe if the plunger on the diverter valve assembly is pushing the microswitch button. (Note: May be helpful if tap is repeatedly turned on and off). If plunger moves replace microswitch (Section 16.4.17). If plunger does not move replace water diverting valve. (Section 16.4.18).
**FAIL POINT F**

Is the boiler in a very cold environment (less than 5°C)?
- **Yes**: Boiler is running in "Autofrost stat" mode. See Section 18.
- **No**: Drop down the facia. Is the gas valve mode switch in the normal position?
  - **Yes**: Replace control board. (Section 16.4.23). Note: A wet board could cause this fault.
  - **No**: Turn to normal position.

**FAIL POINT G** "Primary Overheat"

Is the boiler fully water pressurised and is all air vented?
- **No**: Rectify fault.
- **Yes**: Reset the controls and restart the boiler. Does the pump run?
  - **No**: Repair or replace pump. (Section 16.4.14).
  - **Yes**: Remove inner casing cover and inspect the primary sensor (left of heat exchanger). Is it correctly fixed to pipe?
    - **No**: Re-fix sensor to pipe.
    - **Yes**: Does the burner switch off when the primary temperature reaches 94°C?
      - **No**: Replace CH sensor (Section 16.4.12)
      - **Yes**: Remove the multiway connector from board position ST16. Is there a short circuit across contacts 5 & 6?
        - **No**: Replace overheat thermostat or check wiring to it.
        - **Yes**: Fault caused by control board or primary heat exchanger.
Is the gas supply connected and at the correct inlet and outlet pressures?

No → Rectify gas supply problem.

Yes → Remove front panel. Reset and restart the boiler. Can a flame be seen through the spy glass?

No → Remove inner cover. Reset and restart the boiler. Does a spark occur across the electrodes?

No → Are the electrodes and gap and connections in good order?

No → Repair or replace spark electrode (Section 16.4.9) or HT leads.

Yes → Replace control board (Section 16.4.23).

Yes → Turn off boiler. Remove both brown connectors from gas valve. (First remove pressure switch bracket). Is there continuity from brown and violet wires to multiway connector?

Yes → Replace gas valve. (Section 16.4.11).

No → Repair or replace flame sensor (Section 16.4.10) or wiring.

Yes → Replace multiway connector from board position ST16. Is there continuity from contact 11 (white wire) to flame sensor?

Yes → Replace control board (Section 16.4.23). If problem not solved replace gas valve. (Section 15.4.11)

No → Repair or replace harness.

Yes → Replace control board (Section 16.4.23).

Note: It is not possible to reliably check the cross-light performance of the burner. In the unlikely event of such a fault, investigate flue problems or replace burner or injector. (Section 16.4.7/8).
Is the multiway connector at board position ST16 pushed fully home on to the board?

Yes

Remove multiway connector from board position ST16. Test resistance across contacts 17 and 18 (yellow wires). Is it between 1 kohm and 30 kohm?

No

Is there continuity from contacts 17 and 18 to DHW sensor?

No

Repair or replace harness.

Yes

Check or replace DHW sensor. (Section 16.4.13).

Test resistance across contacts 12 and 13 (red wires). Is it between 1 kohm and 30 kohm?

No

Is there continuity from contacts 12 and 13 to CH sensor?

No

Repair or replace harness.

Yes

Check or replace CH sensor. (Section 16.4.12).

Test resistance across contacts 7 and 8 (brown wires) and 9 and 10 (violet wires). Are both readings below 100 ohms?

No

Remove both brown connectors from gas valve. (First remove pressure switch bracket). Is there continuity from brown and violet wires to the multiway connector?

No

Replace gas valve. (Section 16.4.11).

Yes

Replace control board. (Section 16.4.23).

Yes

Push fully home.
Does this fault occur in only one of the operating modes? CH or DHW

Yes

Remove fan connector from board position ST1 and restart boiler in the fault mode. After 5 seconds is there mains 230V from the left (R) track at ST1 and right (L) track if DHW mode? Centre (L) track if CH mode?

No

Replace control board (Section 16.4.23).

Replace air pressure switch (Section 16.4.2).

Note: In the unlikely event of this not solving the problem inspect the pressure pick-up (Venturi) in the fan.

Yes

Air pressure switch is shorting. Replace switch (Section 16.4.2).

Repair or replace fan (Section 16.4.3) or cable.

No

28CDi and 35CDi II

24CDi, 28CDi and 35CDi II

Does the fan run before the fault occurs?

No

Turn off boiler. Is there continuity across the C and NO terminals of the air pressure switch (where green wires are fitted)?

Yes

Remove the fan connector from board position ST1 and restart the boiler in DHW mode. Is there mains 230V across the centre (L) and left (N) tracks at ST1? Note: Take care not to short L to N.

No

Replace control board (Section 16.4.23).

Replace tubes if condensation has occurred. Also replace pressure switch and check condition of Venturi in the fan.

28CDi and 35CDi II

Yes

Repair or replace fan (Section 16.4.3) or cable.

Pressure switch has not closed. Are the silicon tubes in good condition and free of condensation.

Yes

Inspect the flue. Is it free of any restrictions?

No

Rectify flue problem.

Yes

Replace air pressure switch (Section 16.4.2). Note: In the unlikely event of this not solving the problem inspect the pressure pick-up (Venturi) in the fan.

28CDi and 35CDi II

Yes

Remove multiway connector from board position ST16. Is there continuity of the green wires?

No

Repair wires or replace harness.

Yes

Replace control board (Section 16.4.23).

No

Does the burner ignite (burner light on) before fault occurs?

28CDi and 35CDi II

Yes

Remove electrical connectors from pressure switch and restart boiler. Is there continuity between C and NO terminal (where green wires were fitted) when the fan runs?

No

Pressure switch has opened during operation. Check flue for blockage. Also investigate sense tubes and pressure switch.

24CDi, 28CDi and 35CDi II

Yes

Remove multiway connector from board position ST16. Is there continuity of the green wires?

No

Replace control board (Section 16.4.23).
Light indication during fault not covered by above details.

Control board is likely to be wet or damaged or malfunctioning. Check for wet board or connections. Dry and re-use or replace control board. (Section 16.4.13).

Hot water temperature always too hot during a demand (not regulating).

Hot water sensor could be off or poorly fixed to pipe. Repair or replace sensor. (Section 16.4.14).

Water temperature very low/low gas pressure (with all knobs set to maximum)?

Is the gas set to correct pressure?

Yes

No

Set pressure.

Remove multiway connector from board position ST16. Is the resistance across contacts 1 and 2 (blue wires) below 60 ohms.

Yes

No

Replace control board. (Section 16.4.23).

Replace wires or replace harness.

Remove blue (top) connector from gas valve. Is there continuity along blue wires to multiway connector?

Yes

Replace gas valve. (Section 16.4.11).

No

Yes
20. Conversion Instructions

ONLY COMPONENTS SUPPLIED BY WORCESTER SHOULD BE USED.

ONLY COMPETENT PERSONNEL SHOULD ATTEMPT THE CONVERSION.

CONVERSION FROM NATURAL GAS TO LPG SHOULD NOT BE CARRIED OUT ON APPLIANCES INSTALLED IN A ROOM OR INTERNAL SPACE BELOW GROUND LEVEL

Conversion Kit LPG to NG 7 716 192 307
Conversion Kit NG to LPG 7 716 192 308

1. Ensure the gas service cock is turned OFF and the electrical supply is ISOLATED.

2. Refer to the Servicing Instructions to remove the cabinet front panel and inner casing.

3. Follow the dismantling instructions to remove the burner. Refer to Section: Inspection and Servicing.

4. Remove the injector and replace with the relevant injector from the kit. Refer to Section: Inspection and Servicing.

5. Remove the nut, end cap and bracket at the opposite end of the burner. If the conversion is LPG to NG it is necessary to remove the gauze. If the conversion is NG to LPG it is necessary to fit the gauze supplied in the kit.

6. Refit the end cap ensuring that the support bracket is in the correct orientation.

7. Remove the gas valve and replace with the gas valve supplied in the kit. Refer to Section: Replacement of Parts.

8. Re-assemble the burner and inner casing.

9. Turn on the gas and electricity supplies and follow the commissioning procedure to confirm gas soundness and correct boiler operation.

10. Check and adjust the setting pressures to the values in the table below and adjust if necessary. Refer also to the Installation and Service Instructions Section: Replacement of Parts “To Set the Burner Pressure”.

11. Refit the plastic sealing cap to the gas valve modulating valve adjuster and seal with a dab of paint or similar.

12. Turn off the boiler and when cool peel off the arrow from the data plate on the combustion chamber front panel and re-stick against the gas type for which the boiler has been converted and adjusted.

13. Replace the boiler front panel.

The conversion is now complete.

<table>
<thead>
<tr>
<th>NOMINAL BOILER RATINGS (10 minutes after lighting)</th>
<th>BOILER ADJUSTED FOR G20 (Natural Gas)</th>
<th>BOILER ADJUSTED FOR G31 (Propane)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24CDi</td>
<td>28CDi</td>
</tr>
<tr>
<td>MAX. INPUT DHW kW</td>
<td>27.0</td>
<td>31.5</td>
</tr>
<tr>
<td>BURNER PRESSURE mbar</td>
<td>14.8</td>
<td>15.5</td>
</tr>
<tr>
<td>MAX. INPUT CH kW</td>
<td>27.0</td>
<td>27.0</td>
</tr>
<tr>
<td>BURNER PRESSURE mbar</td>
<td>14.8</td>
<td>10.8</td>
</tr>
<tr>
<td>MIN. INPUT DHW kW</td>
<td>11.4</td>
<td>11.4</td>
</tr>
<tr>
<td>BURNER PRESSURE mbar</td>
<td>1.5</td>
<td>1.0</td>
</tr>
</tbody>
</table>
GAS BOILER COMMISSIONING CHECKLIST

BOILER SERIAL No. ________________________  NOTIFICATION No. ________________________

CONTROLS To comply with the Building Regulations, each section must have a tick in one or other of the boxes

TIME & TEMPERATURE CONTROL TO HEATING  ROOM T/STAT & PROGRAMMER/TIMER  PROGRAMMABLE ROOMSTAT

TIME & TEMPERATURE CONTROL TO HOT WATER  CYLINDER T/STAT & PROGRAMMER/TIMER  COMBI BOILER

HEATING ZONE VALVES  FITTED  NOT REQUIRED

HOT WATER ZONE VALVES  FITTED  NOT REQUIRED

THERMOSTATIC RADIATOR VALVES  FITTED

AUTOMATIC BYPASS TO SYSTEM  FITTED  NOT REQUIRED

FOR ALL BOILERS CONFIRM THE FOLLOWING

THE SYSTEM HAS BEEN FLUSHED IN ACCORDANCE WITH THE BOILER MANUFACTURER’S INSTRUCTIONS?        

THE SYSTEM CLEANER USED

THE INHIBITOR USED

FOR THE CENTRAL HEATING MODE, MEASURE & RECORD

GAS RATE  m³/hr  ft³/hr

BURNER OPERATING PRESSURE (IF APPLICABLE)  N/A  mbar

CENTRAL HEATING FLOW TEMPERATURE

CENTRAL HEATING RETURN TEMPERATURE °C

FOR COMBINATION BOILERS ONLY

HAS A WATER SCALE REDUCER BEEN FITTED? YES ☐ NO ☐

WHAT TYPE OF SCALE REDUCER HAS BEEN FITTED?

FOR THE DOMESTIC HOT WATER MODE, MEASURE & RECORD

GAS RATE  m³/hr  ft³/hr

MAXIMUM BURNER OPERATING PRESSURE (IF APPLICABLE)  N/A  mbar

COLD WATER INLET TEMPERATURE

HOT WATER OUTLET TEMPERATURE

WATER FLOW RATE lts/min

FOR CONDENSING BOILERS ONLY CONFIRM THE FOLLOWING

THE CONDENSATE DRAIN HAS BEEN INSTALLED IN ACCORDANCE WITH

THE MANUFACTURER’S INSTRUCTIONS? YES ☐

FOR ALL INSTALLATIONS CONFIRM THE FOLLOWING

THE HEATING AND HOT WATER SYSTEM COMPLIES WITH CURRENT BUILDING REGULATIONS

THE APPLIANCE AND ASSOCIATED EQUIPMENT HAS BEEN INSTALLED AND COMMISSIONED IN ACCORDANCE WITH THE MANUFACTURER’S INSTRUCTIONS

IF REQUIRED BY THE MANUFACTURER, HAVE YOU RECORDED A CO/CO₂ RATIO READING? N/A ☐ YES ☐ CO/CO₂ RATIO

THE OPERATION OF THE APPLIANCE AND SYSTEM CONTROLS HAVE BEEN DEMONSTRATED TO THE CUSTOMER

THE MANUFACTURER’S LITERATURE HAS BEEN LEFT WITH THE CUSTOMER

COMMISSIONING ENG’S NAME  PRINT ________________________  CORGI ID No. ________________________

SIGN ________________________  DATE ________________________
It is recommended that your heating system is serviced regularly and that you complete the appropriate Service Interval Record Below.

**Service Provider.** Before completing the appropriate Service Interval Record below, please ensure you have carried out the service as described in the boiler manufacturer’s instructions. Always use the manufacturer’s specified spare part when replacing all controls.

<table>
<thead>
<tr>
<th>SERVICE 1</th>
<th>DATE</th>
<th>ENGINEER NAME</th>
<th>COMPANY NAME</th>
<th>TEL No.</th>
<th>CORGI ID CARD SERIAL No.</th>
<th>COMMENTS</th>
<th>SIGNATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SERVICE 2</td>
<td>DATE</td>
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