WALL MOUNTED, ROOM SEALED, FAN ASSISTED, GAS COMBINATION BOILER

TECHNICAL INFORMATION
INSTALLATION
and
SERVICE INSTRUCTIONS

Read these Instructions thoroughly before using the appliance

Phone numbers:

installer __________________

Service Engineer _______________

Serial No. _______________

FOR SERVICE INFORMATION
OR HELP PLEASE TELEPHONE
08707 282 885

Férroli Ltd, Lichfield Road, Branston Ind Estate,
Burton Upon Trent, Staffordshire  DE14 3HD

ALL SPECIFICATIONS SUBJECT TO CHANGE

Stockton Close, Minworth Industrial Park, Minworth, Sutton Coldfield, West Midlands B76 8DH
Sales: 021/3132030 Service: 021/3131030 Fax 021/3132319
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General Description

The Ferroli Optima 900 is a wall mounted, room sealed, fan assisted, combination boiler for Central Heating (C.H.) and domestic Hot Water (D.H.W.).

The boiler is of light weight construction and the heat exchanger provides Central Heating and Domestic Hot Water from an integrally designed unit. The boiler contains its own expansion vessel for sealed systems. The wall mounting jig contains all the isolating cocks for the water and gas supplies which can be fitted to the wall and provided with all the necessary gas and water connections prior to the boiler being attached. The flue can either be left hand, right hand or rear. There are three flue lengths available and they are 0.75 metres (for wall thickness up to 565 mm), 2 metres (for wall thickness up to 1815 mm) and 3 metres (for wall thickness up to 2815 mm). These wall thicknesses assume a rear flue outlet. For side flue outlet the effective wall thickness for each flue length is reduced by 91 mm plus the distance of the appliance from the side wall. The Central Heating and the Domestic Hot Water temperature is controlled by the Honeywell Modureg valve in conjunction with the P.C.B. There is a limit thermostat on the central heating circuit which operates at 88°C and a limit thermostat in the Domestic Hot Water circuit which operates at 70°C. There is also an overheat cut-off thermostat which will shut the boiler down completely and this thermostat operates at 100°C. The boiler is fitted with its own Central Heating pump. The pump is switched ON/OFF by the time clock and/or a 24 Volt room thermostat. The pump circuit also has a 5 minute over-run time. There is a Domestic Hot Water flow switch fitted and when there is a demand for Domestic Hot Water (flow of more than 0.5 gallon/minute, 2.5 litres/minute) the Central Heating pump is switched off making available the maximum output of the gas burner for Domestic Hot Water. On the P.C.B. the maximum output for Central Heating can be set. This does not influence the maximum output for domestic hot water.

At the factory the central heating output is pre-set to maximum. The appliance is not suitable for external installation.

Related Documents

This appliance must be installed strictly in accordance with these instructions:


The Local Building Regulations

The Building Regulations.

The Buildings Standards (Scotland - Consolidated) Regulations.

British Standards Codes of Practice:

B.S. 7593 1993 TREATMENT OF WATER IN DOMESTIC HOT WATER CENTRAL HEATING SYSTEMS
B.S. 5446 1990 INSTALLATION OF HOT WATER SUPPLIES FOR DOMESTIC PURPOSES
B.S. 5440 PART 1 FLUES
B.S. 5440 PART 2 AIR SUPPLY
B.S. 5449 1990 FORCED CIRCULATION HOT WATER SYSTEMS
B.S. 6798 1987 INSTALLATION OF GAS FIRED HOT WATER BOILERS
B.S. 6881 1989 GAS INSTALLATIONS
B.S. 7671 1992 IEE WIRING REGULATIONS

Model Water Bye Laws
### Technical data

#### NATURAL GAS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Nominal heat input (gross calorific value)</td>
<td>34.8 kW</td>
</tr>
<tr>
<td>Nominal heat output</td>
<td>27.9 kW</td>
</tr>
<tr>
<td>Minimum heat output</td>
<td>11.8 kW</td>
</tr>
<tr>
<td>Gas rate</td>
<td>3.3 m³/h</td>
</tr>
<tr>
<td>Burner setting pressure</td>
<td>14 mbar (max.)</td>
</tr>
<tr>
<td>Minimum burner pressure</td>
<td>2.5 mbar (min.)</td>
</tr>
<tr>
<td>Main injector Ø</td>
<td>1.15 mm</td>
</tr>
<tr>
<td>Pilot injector Ø</td>
<td>0.27 mm</td>
</tr>
<tr>
<td>Dimensions (overall)</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>1020 mm</td>
</tr>
<tr>
<td>Width</td>
<td>480 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>360 mm</td>
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<td>Weight (net)</td>
<td>51 kg</td>
</tr>
<tr>
<td>Weight (gross)</td>
<td>53 kg</td>
</tr>
<tr>
<td>Electricity supply</td>
<td>240V - 50 Hz</td>
</tr>
<tr>
<td>Fuse rating: Mains</td>
<td>3 Amp. (main fuse)</td>
</tr>
<tr>
<td>on P.C.B. in boiler</td>
<td>F2 Amp (Fast)</td>
</tr>
<tr>
<td>Electrical input</td>
<td>160 Watt</td>
</tr>
<tr>
<td>Domestic Hot Water flow (35°C rise)</td>
<td>11.4 l/min</td>
</tr>
<tr>
<td>Minimum Domestic Hot Water Flow</td>
<td>2.5 l/min</td>
</tr>
<tr>
<td>Maximum domestic cold water</td>
<td></td>
</tr>
<tr>
<td>Inlet pressure:</td>
<td></td>
</tr>
<tr>
<td>C.H. Safety valve pressure setting</td>
<td>3 bar</td>
</tr>
<tr>
<td>C.H. Expansion vessel capacity</td>
<td>7 litre</td>
</tr>
<tr>
<td>Min. heating circuit pressure</td>
<td>0.6 bar</td>
</tr>
<tr>
<td>Max. heating circuit pressure</td>
<td>3.0 bar</td>
</tr>
<tr>
<td>Boiler water capacity:</td>
<td></td>
</tr>
<tr>
<td>Heating</td>
<td>1.5 litre</td>
</tr>
<tr>
<td>Domestic hot water</td>
<td>0.5 litre</td>
</tr>
<tr>
<td>Pipe connections:</td>
<td></td>
</tr>
<tr>
<td>Gas</td>
<td>22 mm</td>
</tr>
<tr>
<td>Domestic cold water inlet</td>
<td>15 mm</td>
</tr>
<tr>
<td>Domestic cold water outlet</td>
<td>15 mm</td>
</tr>
<tr>
<td>Central heating flow</td>
<td>22 mm</td>
</tr>
<tr>
<td>Central heating return</td>
<td>22 mm</td>
</tr>
<tr>
<td>Pressure relief valve drain</td>
<td>15 mm</td>
</tr>
<tr>
<td>Min. installation clearances Sides:</td>
<td></td>
</tr>
<tr>
<td>Left hand</td>
<td>5 mm</td>
</tr>
<tr>
<td>Right hand</td>
<td>5 mm</td>
</tr>
<tr>
<td>Front</td>
<td>50 mm</td>
</tr>
<tr>
<td>Min. height from worktop to base</td>
<td>200 mm</td>
</tr>
</tbody>
</table>

#### PROPANE LPG

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Nominal heat input (gross calorific value)</td>
<td>34.8 kW</td>
</tr>
<tr>
<td>Nominal heat output</td>
<td>27.9 kW</td>
</tr>
<tr>
<td>Minimum heat output</td>
<td>11.8 kW</td>
</tr>
<tr>
<td>Gas rate</td>
<td></td>
</tr>
<tr>
<td>Burner setting pressure</td>
<td>36 mbar (max.)</td>
</tr>
<tr>
<td>Minimum burner pressure</td>
<td>5.0 mbar (min.)</td>
</tr>
<tr>
<td>Main injector Ø</td>
<td></td>
</tr>
<tr>
<td>Pilot injector Ø</td>
<td></td>
</tr>
<tr>
<td>Dimensions (overall)</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td></td>
</tr>
<tr>
<td>Depth</td>
<td></td>
</tr>
<tr>
<td>Weight (net)</td>
<td></td>
</tr>
<tr>
<td>Weight (gross)</td>
<td></td>
</tr>
<tr>
<td>Electricity supply</td>
<td></td>
</tr>
<tr>
<td>Fuse rating: Mains</td>
<td></td>
</tr>
<tr>
<td>on P.C.B. in boiler</td>
<td></td>
</tr>
<tr>
<td>Electrical input</td>
<td></td>
</tr>
<tr>
<td>Domestic Hot Water flow (35°C rise)</td>
<td></td>
</tr>
<tr>
<td>Minimum Domestic Hot Water Flow</td>
<td></td>
</tr>
<tr>
<td>Maximum domestic cold water</td>
<td></td>
</tr>
<tr>
<td>Inlet pressure:</td>
<td></td>
</tr>
<tr>
<td>C.H. Safety valve pressure setting</td>
<td></td>
</tr>
<tr>
<td>C.H. Expansion vessel capacity</td>
<td></td>
</tr>
<tr>
<td>Min. heating circuit pressure</td>
<td></td>
</tr>
<tr>
<td>Max. heating circuit pressure</td>
<td></td>
</tr>
<tr>
<td>Boiler water capacity:</td>
<td></td>
</tr>
<tr>
<td>Heating</td>
<td></td>
</tr>
<tr>
<td>Domestic hot water</td>
<td></td>
</tr>
<tr>
<td>Pipe connections:</td>
<td></td>
</tr>
<tr>
<td>Gas</td>
<td></td>
</tr>
<tr>
<td>Domestic cold water inlet</td>
<td></td>
</tr>
<tr>
<td>Domestic cold water outlet</td>
<td></td>
</tr>
<tr>
<td>Central heating flow</td>
<td></td>
</tr>
<tr>
<td>Central heating return</td>
<td></td>
</tr>
<tr>
<td>Pressure relief valve drain</td>
<td></td>
</tr>
<tr>
<td>Min. installation clearances Sides:</td>
<td></td>
</tr>
<tr>
<td>Left hand</td>
<td></td>
</tr>
<tr>
<td>Right hand</td>
<td></td>
</tr>
<tr>
<td>Front</td>
<td></td>
</tr>
<tr>
<td>Min. height from worktop to base</td>
<td></td>
</tr>
</tbody>
</table>
Appliance Dimensions

FRONT VIEW

LEFT SIDE VIEW

REAR VIEW

Key

1. Electricity cable entry
2. Gas supply
3. Domestic Hot Water outlet
4. Domestic Cold Water inlet
5. Central Heating Pressure relief valve
6. Central Heating Flow outlet
7. Central Heating Return inlet

Fig. 1
Boiler Flow Diagram
### Key

1. Fixing point  
2. Flue terminal  
3. Flue/air intake hood  
4. Sealing gasket  
5. Room sealed compartment  
6. Control panel  
7. Gas Inlet  
8. Domestic hot water outlet  
9. Cold water inlet  
10. Central heating flow outlet  
11. Central heating return inlet  
12. D.H.W. draining point  
13. Central heating safety valve  
14. Fan  
15. Combustion - heat exchanging compartment  
16. Burner assembly  
17. Main Injector  
18. Burner  
19. Thermocouple  
20. Spark electrode  
21. Pilot  
22. Combustion chamber insulation  
24. Flue collector from heat exchanger  
25. Internal flue exit  
26. Flue/surplus air collector  
27. Air pressure control damper  
28. Central heating pump  
29. C.H. waterway of the heat exchanger  
30. C.H. flow temperature sensor  
31. Air separator  
32. Automatic air vent  
33. Cold water inlet filter  
34. Cold water flow switch  
35. Cold water flow limiter  
36. D.H.W. waterway of the heat exchanger  
37. D.H.W. temperature sensor  
38. Air pressure switch  
39. Combination gas valve  
40. Knob gas valve  
41. Operator gas valve  
42. Modulating regulator (Modureg) gas valve  
43. Burner pressure test point  
44. Overheat cut-off thermostat 100°C  
45. Central heating limit thermostat 85°C  
46. Central heating frost thermostat  
47. D.H.W. limit thermostat  
48. Heat exchanger venting point  
49. Temperature sensing phial  
50. Expansion vessel  
51. Fan air outlet pressure test point  
52. Flue outlet pressure test point  
53. Extended control knob to gas valve  
54. C.H. selector switch  
55. Time clock  
56. C.H. boiler thermostat  
57. C.H. temperature/pressure gauges  
58. Master switch combination gas valve  
59. Ignition transformer  
60. Control box with P.C.B.  
61. Inner flue duct  
62. Outer air intake duct  
63. Modulating balance tube  
64. 240 V + 24 V roomstat terminal blocks  
65. Venturi test point  
66. P.C.B. (printed circuit board)  
67. Gas inlet pressure test point
Installation Details

Gas Safety (Installation & Use) Regulations: 1984

In the interest of safety, it is the law that all gas appliances are installed by a competent person in accordance with the above Regulations, Building Regulations/Building Standards Scotland, Codes of Practice, current I.E.E. Regulations and the byelaws of the Local Water Undertaking. Failure to comply with the Regulations may lead to prosecution; it is in your interest and that of safety to ensure that the law is complied with.

Important - If the boiler is to be fitted in a timber framed building it should be fitted in accordance with the British Gas publication; Guide for Gas Installation in Timber Frame Housing: Reference DM2. If in doubt advice must be sought from the Local Gas Region of British Gas Plc.

Location of Boiler

The installation of the Optima 900 must be on a suitable non-combustible load bearing wall which will provide an adequate fixing for the boiler mounting bracket assembly. The location should be in an area where the water pipes will not be subjected to frost conditions. In siting the combination boiler the following limitations must be observed:

The combination boiler may be installed in any room or internal space, although particular attention is drawn to the requirements of the current, i.e., wiring regulations and in Scotland the electrical provisions of the building regulations applicable in Scotland, with respect to the installation of the combination boiler in a room or internal space containing a bath or shower.

Where a room sealed appliance is installed in a room containing a bath or shower any electrical switch or appliance control utilising mains electricity, should be so situated that it cannot be touched by a person using the bath or shower.

Terminal Position

<table>
<thead>
<tr>
<th>POSITION</th>
<th>MINIMUM SPACING (fig. 3)</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Directly below an openable window, air vent, or any other ventilation opening</td>
<td>300</td>
</tr>
<tr>
<td>B</td>
<td>Below gutters, soil pipes or drainpipes</td>
<td>75</td>
</tr>
<tr>
<td>C</td>
<td>Below Eaves</td>
<td>100</td>
</tr>
<tr>
<td>D</td>
<td>Below a Balcony</td>
<td>100</td>
</tr>
<tr>
<td>E</td>
<td>From vertical drainpipes or soilpipes</td>
<td>75</td>
</tr>
<tr>
<td>F</td>
<td>From internal or external corners</td>
<td>100</td>
</tr>
<tr>
<td>G</td>
<td>Above adjacent ground or balcony level</td>
<td>100</td>
</tr>
<tr>
<td>H</td>
<td>From a surface facing the terminal</td>
<td>600</td>
</tr>
<tr>
<td>I</td>
<td>Facing another terminal</td>
<td>1,200</td>
</tr>
<tr>
<td>J</td>
<td>From opening (door/window) in carport into dwelling</td>
<td>1,200</td>
</tr>
<tr>
<td>K</td>
<td>Vertically from a terminal on the same wall</td>
<td>300</td>
</tr>
<tr>
<td>L</td>
<td>Horizontally from a terminal on the same wall</td>
<td>300</td>
</tr>
<tr>
<td>N</td>
<td>Below carport</td>
<td>600</td>
</tr>
</tbody>
</table>

A Quinell Bar and Quinell guard (part No. C2) should be screwed to the wall centrally over the terminal, when the distance is less than 2 m from the outside floor.

Air Supply

The room in which the boiler is installed does not require a purpose provided vent. If the boiler is installed in a cupboard or compartment, permanent air vent are required in the cupboard or compartment, one at high level one at low level, either direct to the outside air to a room. Both high and low level air vents must communicate with the same space.

Minimum effective area requirements of compartment air vents (for cooling purposes only) (fig. 4).
**Terminal Position**

<table>
<thead>
<tr>
<th>APPLIANCE LOCATION</th>
<th>APPLIANCE FLUE SYSTEM</th>
<th>ROOM-SEALED</th>
<th>AIR VENT AREAS</th>
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</thead>
<tbody>
<tr>
<td>IN ROOM</td>
<td></td>
<td>NIL</td>
<td></td>
</tr>
<tr>
<td>IN COMPARTMENT OPEN TO ROOM</td>
<td>AIR VENT</td>
<td>HIGH LEVEL: 252 cm³ (85 ft³)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AIR VENT</td>
<td>LOW LEVEL: 252 cm³ (85 ft³)</td>
<td></td>
</tr>
<tr>
<td>IN COMPARTMENT OPEN TO OUTSIDE</td>
<td>AIR VENT</td>
<td>HIGH LEVEL: 126 cm³ (4.5 ft³)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AIR VENT</td>
<td>LOW LEVEL: 126 cm³ (4.5 ft³)</td>
<td></td>
</tr>
</tbody>
</table>

**Minimum Clearance** mm

---

**NOTES**

* If a side outlet flue is to be used, a clearance of 75 mm will be needed on the flue outlet side of the boiler.

** Access to the front of the boiler must be available for maintenance (min. 600 mm).
NOTE: A bypass must be fitted as far as possible from the boiler if thermostatic radiator valves are fitted throughout.

Key
1. Filling point C.H.
2. Temporary connection
3. Cold water supply
Built-In Central Heating Water Circulating Pump

The pump head available for circulating the water is given in fig. 8.

N.B. - The pump is factory set at position 3. The pump is a Grundfos type 15-50 UPS series.

Grundfos Pump performance graph

Note - Minimum flow through boiler heat exchanger at any time should not fall below 6 litres per minute.

If required an additional expansion vessel may be fitted to the central heating return inlet.

If the total volume of water in the system exceeds 40 litres an additional expansion vessel must be fitted to the central heating return inlet.

Pump performance curve Grundfos UPS 15-50

---

SIZING OF ADDITIONAL EXPANSION VESSELS:
Deduct from the value given in the table the 7 litre vessel supplied.

Note
1. Fill C.H. installation to min. 1.5 bar
2. Select by preference the expansion vessel for increased system pressure of 2.0 bar
3. Expansion vessel must be fitted to Central Heating Return Inlet
4. The standard 7 litres expansion vessel is charged to 1 bar

---

<table>
<thead>
<tr>
<th>TOTAL WATER CONTENT OF SYSTEM</th>
<th>EXPANSION VESSEL VOLUME (litres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>3.5</td>
</tr>
<tr>
<td>50</td>
<td>7.0</td>
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<tr>
<td>75</td>
<td>10.5</td>
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<tr>
<td>100</td>
<td>14.0</td>
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<tr>
<td>125</td>
<td>17.5</td>
</tr>
<tr>
<td>150</td>
<td>21.0</td>
</tr>
<tr>
<td>175</td>
<td>24.5</td>
</tr>
<tr>
<td>200</td>
<td>28.0</td>
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<td>25</td>
<td>6.5</td>
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<tr>
<td>50</td>
<td>12.9</td>
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<tr>
<td>75</td>
<td>19.4</td>
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<tr>
<td>100</td>
<td>25.9</td>
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<td>125</td>
<td>32.4</td>
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<td>150</td>
<td>38.9</td>
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<tr>
<td>175</td>
<td>45.3</td>
</tr>
<tr>
<td>200</td>
<td>51.8</td>
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</tbody>
</table>

Fig. 8

---

<table>
<thead>
<tr>
<th>VELOCITY SETTING (m/s)</th>
<th>DENSITY (kg/m³)</th>
<th>VISCOSITY (cP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>1038</td>
<td>1.02</td>
</tr>
<tr>
<td>1.0</td>
<td>1038</td>
<td>1.02</td>
</tr>
<tr>
<td>1.5</td>
<td>1038</td>
<td>1.02</td>
</tr>
</tbody>
</table>

---

Fig. 9
Installation

Note - To mount the boiler on the wall, a two person lift will be needed.

1.0 UNPACKING

The appliance is delivered in 2 cartons.
1.1 The large carton contains the boiler, and the Installation/Servicing and Users Instructions.
1.2 The second carton contains the mounting jig assembly, complete with isolating valves, the assembly fixing screws and wall plugs (x4), the boiler mounting nuts and washers (x2), drilling template, flue assembly and turret

When the cartons are unpacked examine for any signs of damage in transit. All protective plastic should be left in place until installation is complete.

2.0 FIXING THE MOUNTING JIG ON THE WALL (Rear Wall Flue Applications)

2.1 Select the boiler location carefully ensure that all requirements given in previous text are satisfied. Fig. 10 will also give guidance to fixing dimensions.
2.2 Locate template on wall, mark the positions of the four jig bracket fixing holes and the flue opening.
2.3 Carefully cut the circular hole (118 mm minimum diameter) for the flue assembly.
2.4 Using a 10 mm drill, drill 70 mm deep holes to accept the wall plugs, and insert wall plugs.
2.5 Fit the mounting jig assembly using the four fixing screws provided (Ensure that all the service cocks are in the OFF position). Operate valves several times to ensure they are free.
2.6 With the exception of the connection to the pressure relief valve, make all the water and gas connections to the jig bracket valves. Fully tighten (fig. 11). Water connections can be made with compression or capillary fittings (before the gas inlet to the boiler there must be at least 100 mm of straight before any bends).

3.0 FIXING THE MOUNTING JIG ON THE WALL (Side Wall Flue Applications)

3.1 Select the boiler location carefully ensuring that all the requirements given in previous text are satisfied. Fig. 10 will also give guidance.
3.2 Locate the template on wall and mark the position of the four jig bracket fixing holes
3.3 Using a 10 mm drill, drill 70 mm deep holes to accept the wall plugs, and insert wall plugs.
3.4 Fit the mounting jig assembly using the four fixing screws provided.
3.5 Extend a horizontal line from the centre of the rear flue outlet to the side wall.
3.6 Mark the centre line (vertically) for the flue assembly hole, and mark the centre of the hole.
3.7 Carefully cut the circular hole (118 mm minimum diameter) for the flue assembly.
Important Note - Always use two spanners to prevent twisting of soft copper pipework on the boiler.

Flush out the water system

Note - The maximum inlet cold water pressure must not exceed 10 bar (145 P.S.I.) and a water governor or a pressure reducing valve will be required if the pressure is in excess of 5 bar (72 P.S.I.)

Ensure all pipework is adequately supported.

Drilling template

1 = Electrical cable entry
2 = Gas supply
3 = Domestic Hot Water outlet
4 = Domestic Cold Water Inlet
5 = Outlet Central Heating safety valve
6 = Central Heating flow outlet
7 = Central Heating return inlet

2 = 22 mm
3-4-5 = 15 mm
6-7 = 22 mm

Important Note - Always use two spanners to prevent twisting of soft copper pipework.

Note - The central heating safety valve (5) should be piped 15 mm to discharge safely outside the property.
4.0 PREPARING THE FLUE ASSEMBLY

4.1 Rear Flue Outlet (fig. 12)

Important - The aluminium flue pipe must protrude into the outside grill by 2 in (50 mm), never cut it to the same length as the plastic air pipe (aluminium flue pipe = plastic air inlet pipe + 50 mm!).

Aluminium flue pipe length = Plastic air inlet pipe length plus 50 mm (2") longer.

4.1.1 Accurately measure the Wall thickness (P1)
4.1.2 From the end opposite to the terminal, cut the plastic air duct (dimension A1) to length (P1 + 105 mm)
Note - That the terminal is not included in A1.
4.1.3 Cut the metal flue duct to length (P1 + 155 mm) (dimensions F1).
Note - The metal flue pipe must be 50 mm (2 inches) longer than the plastic air inlet pipe.
4.1.4 Drill a 3 mm hole 15 mm from the plain end of plastic air duct.
4.1.5 Place flue components to one side to be used later.
4.2 Side Flue Outlet (fig. 13).

Important - The aluminium flue pipe must protrude into the outside grill by 2 in (50 mm), never cut it to the same length as the plastic air pipe.

Aluminium flue pipe length = Plastic air inlet pipe length plus 50 mm (2") longer.

4.2.1 Accurately measure the Wall thickness (P2).
4.2.2 Accurately measure the distance from the centre of the stud fixing of the mounting jig assembly to the side wall (Q2).
4.2.3 From the end opposite to the terminal, cut the plastic air duct (dimension A2) to length (P2 + Q2 + 126 mm).
Note - That the terminal is not included in length A2.
4.2.4 Cut the metal flue duct to length (P2 + Q2 + 175 mm) (dimension F2).
Note - The metal flue pipe must be 50 mm (2 inches) longer than the plastic air inlet pipe.
4.2.5 Drill a 3 mm hole 15 mm from the plain end of plastic air duct.
4.2.6 Place flue components to one side to be used later.
5.0 CONNECTING THE BOILER

5.1 Place the boiler on its back.

5.2 Remove the boiler base plate, four screws (fig. 16). Remove the plugs fitted to the boiler water connections. Remove the bag of sealing washers from the boiler pipework. Remove the front panel by gripping on both sides and pulling away from the main boiler.

5.3 Lift boiler as shown in fig. 15 onto the top studs and fit supplied nuts and washers hand tight.

5.4 Lift at bottom to engage the water and gas connections. Tighten central heating flow and return, and the domestic hot water inlet and outlet, using appropriate sealing washers. Tighten the gas union.

5.5 Screw the pressure relief valve adaptor provided, through the jig bracket into the valve, using the remaining washer (fig. 17).

5.6 Connect the pressure relief valve discharge pipe (15 mm) to the outside of the building, where possible over a drain. The discharge must be such that it will not be hazardous to occupants or passers-by cause damage to external electric components or wiring. The pipe should be directed towards the wall.

must not discharge above an entrance or window, or any type of public access. The installer must consider that the overflow could discharge boiling water.
Fig. 15

Fixing points
Lift here

Fig. 16
Fixing screws

Fig. 17
6.0 FITTING THE FLUE ASSEMBLY
6.1 With Sufficient Clearance To Insert Assembly From Inside
6.1.1 Push the air duct seal onto the air duct at the cut end.
6.1.2 Insert the flue assembly into the wall.
6.1.3 Make good internal wall face.
6.1.4 Fully insert the flue assembly into the turret spigot. Insert the self tapping screw supplied. Fully tighten.
6.1.5 Secure the turret.
6.1.6 Slide the air duct seal over the joint.
6.1.7 Check the terminal relationship with the wall as shown in fig. 12.
6.1.8 Make good the outside wall face, re-weatherproof.
6.2 With insufficient Clearance To Insert Assembly From Inside
6.2.1 From outside, push flue duct, then the air duct through the wall.
6.2.2 Push the air duct seal over the air duct.
6.2.3 Fully insert the flue duct into the turret, then the air duct. Slide, back the seal and secure the air duct with the self tapping screw provided.
6.2.4 Slide the seal over the joint and secure the turret.
6.2.5 Continue as detailed in 6.1.8 above.

ELECTRICAL INSTALLATION

Electrical installation must be carried out by a competent electrician. The appliance is to be connected to a 240 V - 50 Hz supply (see fig. 18). The supply fuse rating is 3A. The terminals are accessible after removing the white base plate and single screw securing the terminal cover (see fig. 18).

7.1 Procedure
7.1.1 The supply cable must be no less than 0.75 mm (24x0.2 mm) to BS6500 table 16.
7.1.2 The earth conductor must be cut longer than the live and neutral (fig. 19).
Connect the Supply Cable to the terminal block marked 240 V - 50 Hz, L, N; the supply cable is to be connected as follows:
(i) The brown wire to the L (live) terminal.
(ii) The blue wire to the N (neutral) terminal.
(iii) The green/yellow wire to the (earth) terminal.
7.1.3 Secure the cable with the cable clamp. The supply cable can be connected to the mains supply by the use of an unswitched shuttered socket-outlet in conjunction with the 3A fused 3 pin plug both in accordance with BS 1363. This provides complete isolation. Alternatively, a fused double pole switch having a contact separation of at least 3 mm. In all poles and provided just for the boiler and its external controls can be used. A wiring diagram is provided on the appliance, attached to the rear of the front panel. In addition, there is one in this manual (fig. 25). Attention is drawn to the requirements of the current I.E.E. Regulation and in Scotland, the electrical provisions of the Building regulations.

7.2 Room Thermostat (fig. 18) (or remote time clock connection)
7.2.1 Please note that the room thermostat, clock switch connection is 24 V. To connect mains voltage to these terminals will seriously damage the printed circuit board. The room thermostat and clock switch connector block is situated within the connector box. Twin core cable should be used for this connection (terminals 4 and 5).

If using a remote 240 Volt time clock ensure that the motor and switch connections are totally separate in the clock and that the switch connections are independent for the 24 Volt terminals (4 and 5) on the boiler.

External controls: room stat or remote time clock in the place of loop terminals 4 and 5. Please note 24 V only, use only voltage free contacts.

IMPORTANT
If 240 V is connected to terminals 4 or 5, damage will be caused to the P.C.B.

IF IN DOUBT PHONE 021 313 1030

Fig. 18

Fig. 19
8.0 COMMISSIONING AND TESTING

8.1 Filling the Central Heating System

Remove the top front panel by gripping both sides and pulling forward away from main boiler assembly.
Loosen the cap of the automatic air vent (fig. 20) and leave it loose.
Open the central heating flow and return cocks (fig. 11).
Gradually fill the system as detailed in Make up Water.
While filling, vent the heat exchanger at venting point by loosening cap (fig. 20) and vent each radiator.
Tighten cap on heat exchanger air vent.
Ensure the working pressure, when filled, is between 1 to 1.5 bar on the pressure gauge (see technical data).
Check the system for leaks.
Flush system in accordance with B.S. 7563.

8.2 Filling the Domestic Hot Water System
Close all hot water draw off points. Open main cold water stop cock and ensure the cold water inlet cock is open at the boiler fig bracket (fig. 11). Slowly open each hot tap in turn until clean water, free from air pockets, is seen.
Check system for leaks.

8.3 Electricity Supply
Carry out preliminary checks (i.e. earth continuity, polarity short circuit and resistance to earth using a suitable multimeter).

8.4 The Gas Installation
The whole of the gas installation including the meter, should be inspected and tested for soundness, and purged in accordance with the recommendations of BS6891-1986.
8.5 To Light the Boiler (fig. 21)

a. Open controls panel door.
b. Switch on electricity supply.
c. Adjust room thermostat and all external controls to «ON». Check operation of pump.
d. Turn the boiler thermostat to maximum. Fan will run (a waiting time of max 3 minutes before fan will run is possible). Wait 20 seconds after fan starts to run at full speed.
e. Depress the gas control knob fully (this should operate the electronic ignitor). When the pilot flame is seen to light through the pilot viewing window, keep the control knob fully depressed for a further 15 seconds, then release.

Should the pilot fail to remain alight (or goes out on any other occasion i.e. if electricity supply as been turned off) wait 3 minutes and repeat. Should the pilot still fail to remain alight, refer to the fault finding section.
f. With the pilot burner established, observe that the main burners cross-light smoothly.
g. Temporarily turn off by switching off electricity supply.

Important Note: If the burner stops for C.H. only after a waiting time of 3 minutes will the boiler light again!
Burner Pressure C.H. and D.H.W.

8.6 To Range Rate the Boiler C.H. (not required for standard installations)
The boiler can be range rated for an output from 11.8 kW (40,000 Btu/h) up to 27.9 kW (95,000 Btu/h). When the boiler is supplied it is factory set at the maximum output 27.9 kW (95,000 Btu/h).

Procedure
a. Release the control panel fixing screws (fig. 30) and lower panel.
b. Loosen the screw in the burner pressure test point (fig. 22) and attach a gauge.
c. Switch on the electricity supply to relight the main burner.

Note 1 - Modulation is available on central heating, so the procedure must be carried out while the system is relatively cold. Recheck boiler thermostat is set to maximum.

d. Adjust the potentiometer P1 on the PCB (fig. 23) in the control panel until the required burner pressure is obtained (Anticlockwise to reduce the pressure).

Note 2 - Short circuit 04-05 only on connector X3 on the P.C.B.
- Boiler starts for C.H.
- Waiting time is excluded
- Max burner pressure C H can be checked/set with potentiometer P1

Note 3 - The range of inputs with corresponding burner pressure is given on the Data badge which is situated behind the top front panel. Further information is on fig. 24a - 24b.

e. With the pressure set, turn off the electrical supply and mark the set input on the Data badge (with sticker supplied)

Burner Pressure C.H. and D.H.W.
P1 = C.H. range rating to be set on site (if required)
P2 = Max output D.H.W. (factory set, not to be adjusted)
P3 = D.H.W. temperature (factory set, not to be adjusted)
P1 Adjust with screwdriver!
Burner Pressure C.H.
- Natural gas
- L.P.G. (Propane)

Fig. 24a - Burner pressure VS C.H. Load with L.P.G. (G31) (Propane)

Fig. 24b - Burner pressure VS C.H. load with natural gas (G20)
8.7 D.H.W. Burner Pressure
The domestic hot water burner pressure is not range rateable and not adjustable but the maximum and minimum burner pressure should be checked as follows:

a. Check electricity supply is still off.
b. Open a D.H.W. tap at high flow until the water runs cool and leave running.
c. Switch on the electricity supply.
d. The pressure should be 14 mbar +/- 0.5 mbar.
e. Disconnect one of the wires from the «Modureg» (fig 22), this will reduce the burner to minimum which should read 2.5 mbar +/- 0.5 mbar. If the burner pressure is not as stated check the inlet working pressure (fig 22) which should be minimum 20 mbar. If that is correct, consult Ferroli. No attempt should be made to alter D.H.W. burner pressure.
f. Switch off electrical supply and close hot tap.
g. Reconnect the wire to the «Modureg». Remove pressure gauge, tighten the test screws.
h. Replace control panel (2 screws).
i. Turn on electricity supply, open a hot tap to full flow and when the burner lights, test for gas soundness with a leak detection fluid around the gas valve and connections including the pressure test point screws.

Note - The cutting of the electricity supply may result in the pilot being extinguished - re-light if need be, after waiting three minutes at least.

9.0 SYSTEM OPERATION
Let the boiler operate normally on central heating for about 30 minutes.

I) Vent radiators.
II) Vent heat exchanger.
III) Examine all pipework for leakage.
IV) Turn on a D.H.W. tap and check that the C.H. pump stops running.
V) As the D.H.W. temperature reaches 60°C check the burner for modulation.

Turn the gas valve «off», (twist left hand white button 1/12th turn clockwise and release), and isolate electricity supply.

Drain down the central heating system fully, when hot.
Refill the system as previously instructed. Repeat the venting,
Examine the system's water pressure and top up as necessary.
Replace the casing front panel and close the control panel cover.

10.0 HANDING OVER TO THE USER
After completion of installation and commissioning of the system:

a. Hand over the User's Instructions to the Householder and explain His/Her responsibilities under the Gas safety (Installation and Use) Regulations 1984.
b. Explain and demonstrate the lighting and shutting down procedure.
c. Explain the operation of the boiler including the use and adjustment of ALL system controls.
Advise the User of the precautions necessary to prevent damage to the system and to the building, in the event of the system remaining inoperative during frost conditions.
d. Stress the importance of regular servicing by a qualified Heating Engineer and that a comprehensive service should be carried out at LEAST ONCE A YEAR.
Electrical Functional Flow Wiring Diagram

Note:
All contacts shown in following condition:
* No electrical mains
* No domestic hot water flow
* Temperature too low
  (all mechanical thermostats closed)

Notes:
1. C.H. pump will be switched on if temperature
   of 50°C (Heat exchanger limit thermostat) is too
   high.
2. C.H. pump will be switched on for 1 sec. after
   D.H.W. tap has been closed.

Temperature sensors
25°C = 1000 Ohm
60°C = 1300 Ohm
80°C = 1490 Ohm

Key
16. Fan
24. Spark electrode
32. Central heating pump
34. C.H. flow temperature sensor
38. Cold water flow switch
42. D.H.W. temperature sensor
43. Air pressure switch
46. Operator gas valve
47. Modulating regulator (Modureg) gas valve
50. Heat exchanger limit thermostat
51. Heat exchanger frost thermostat
52. D.H.W. limit thermostat
61. C.H. selector switch
62. Time clock
63. C.H. boiler thermostat
66. Microswitch combination gas valve
67. Ignition transformer
72. Room thermostat/remote time clock (not fitted)

<table>
<thead>
<tr>
<th>LED n°</th>
<th>colour</th>
<th>significance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>green</td>
<td>Mains on / low voltage on</td>
</tr>
<tr>
<td>2</td>
<td>yellow</td>
<td>Domestic hot water flow switch (38) on</td>
</tr>
<tr>
<td>3</td>
<td>yellow</td>
<td>Central heating room thermostat (72) /</td>
</tr>
<tr>
<td></td>
<td></td>
<td>clock (62) calling for heat</td>
</tr>
<tr>
<td>4</td>
<td>green</td>
<td>Sensor (34) or (42) calling for heat</td>
</tr>
<tr>
<td>5</td>
<td>red</td>
<td>Central Heating waiting time, max. 3 minutes delay following</td>
</tr>
<tr>
<td></td>
<td></td>
<td>shut off Boilerstat (53), Clock (62), Roomstat (72) or use of Hot Water</td>
</tr>
<tr>
<td>6</td>
<td>yellow</td>
<td>Demand for heat - fan relay (RL2) will be energised</td>
</tr>
<tr>
<td>7</td>
<td>green</td>
<td>Air pressure switch (43) on, air flow checked</td>
</tr>
<tr>
<td>8</td>
<td>yellow</td>
<td>Gas valve (46) energised</td>
</tr>
</tbody>
</table>
Short explanation on electrical functional drawing VMFS.1
240 V AC - 24 V AC - 24 V DC

1.0 All contacts shown in following condition.
   No electrical mains voltage - Temperature too low (all mechanical thermostats closed).
1.1 The electrical systems can be divided on 4 main areas.
1.2 240 V AC With fan, C.H. pump, spark igniter and fuses.
1.3 24 V AC With 4 relays, on/off operator of combination gas valve, 24 V AC is available from a 240V/24V transformer.
1.4 24 V DC For power supply to the modulating coil (Modureg) of combination gas valve.
1.5 Low V DC For electronic control system.

2.0 240 V AC Fuses F 2 Amp. (Fast)
2.1 RL2 contact of relay 2 controls directly the fan speed between low speed (low voltage from transformer) and full speed if coil of relay 2 is energised.
2.2 Pump controled by Relay 1.
   Spark igniter generates high voltage as soon as contact RL3 of relay 3 is energised by the microswitch on the combination gas valve (microswitch will close with control knob of combination gas control fully depressed).

Attention - Relay 3 has a 20 sec. electronic delay! (pre-purge time).

3.0 24 V AC
3.1 Electronic Relay E3 on P.C.B. will be switched «on» as soon as there is any heat demand for heat from central heating.
3.2 In stand-by situation the air pressure switch should be in shown position (68-67 closed) and the fan should be at low speed.
3.3 If 68-67 is not closed, relays (RLX) and (RL2) cannot be activated. This is a safety check on the correct function of the air pressure switch (no air pressure with fan at low speed).
3.4 With 24 V AC between 68 and 60 and air pressure switch in the shown position, relay RLX will be activated.
3.5 The Relay RLX links the N.C. position of the air pressure switch, Relay RL2 will switch the fan to full speed.
3.6 The switch in the air pressure switch will change position if air flow is high enough for safe combustion and LED7 will be energised.
3.7 The on/off operator in the gas valve will be activated if the high limit thermostat (heat exchanger) demand heat.
3.8 If during a period of at least 20 seconds after starting the fan at full speed, the air pressure switch was switched in the safe position (67-66 closed) relay RL3 can be energised (20 sec. time delay relay RL3).
3.10 Depressing fully the knob of the combination gas valve, the microswitch will close and a spark will be generated (for ignition of the pilot).

4.0 24 V DC
4.1 24 V DC is necessary for the power supply amplifier 9, which drives the modulating coil (Modureg) on the combination gas control. Operating voltage on the coil is between 4 Volt and 25 Volt DC.
4.2 Attention - Never link the modulating coil with a wire or amper tester. Part of the P.C.B. will be destroyed. Testing can only be done with a voltage tester!

Short explanation on electrical functional drawing Low V DC

5.0 Low V DC Electronic Control System
5.1 On the Low V DC output is a Green LED (Light Emitting Diode - Mini Lamp.) to indicate if Low V DC is available, if not replace fuse.
5.2 Domestic water flow switch; contact closed if water is running (minimum 2.5 l/min)
5.3 Electronic relay E1 (if activated by the water flow switch) switches the control system from the central heating to domestic hot water and gives priority to Domestic Hot Water (time delay of 2 seconds).

5.4 Central Heating Flow temperature sensor and Domestic Hot Water temperature sensor are electrical resistors with a positive temperature coefficient (P.T.C.).
- 1000 Ohm at 25 deg. C.
- 1300 Ohm at 60 deg. C.
- 1490 Ohm at 80 deg. C.
(These must not be looped for testing purposes at that will indicate «no heat required»)

5.5 Function of Low V DC circuit

5.5.1 Domestic Hot Water Taps Closed: Contacts of electronic relay E1 as shown. Central heating continuous (selector switch turned to the right, Time Clock contact will be linked).

5.5.1.1 Electronic relay E2 is activated and will switch off the Relay RL1. The pump will be switched on! After switching off E2 Relay RL1 will remain deenergised for 6 minutes.

5.5.1.2 Attention - The C.H. pump will be switched off immediately if Relay 2 is activated (for example on activation of relay E1 through the water flow switch).

5.5.1.3 Amplifier 1 compares the Set Point of the central heating boiler thermostat (potentiometer on front panel) with the actual temperature of the C.H. sensor. If set point is higher than actual value, amplifier 2 and 3 will be activated and if relay E3 is switched on, the fan starts at full speed through relay RL2.

5.5.1.4 Amplifier 2 is a differential on/off amplifier on the P.C.B. This amplifier controls electronically the on/off differential of low flow temperature C.H.

5.5.1.5 Amplifiers 5 and 6 are security amplifiers which check if there is not abnormal situation on the temperature sensors. For example with an abnormal low electrical resistance (sensor linked) the amplifier 5 will switch off amplifiers 6,3 and 4. So the fan will be switched to low speed and the burner will be closed down.

5.5.1.6 Amplifier 7 is the real modulating amplifier (PID) which controls the power amplifier 9 and so the voltage on the Modureg modulating coil of the combination gas valve. Amplifier 7 compares continuously the set value of the potentiometer 63 with the actual value of the sensor and will control the voltage on the Modureg coil to keep the flow temperature at the set value. If flow temperature is too high (min output burner higher then C.H. absorption) the burner will be on/off controlled by amplifier 1 (see 5.5.1.3). The Modureg can only control the gas flow to the burner within the preset minimum and maximum settings for safe ignition reasons. Min and max. pressure of Modureg is mechanically set.

5.5.1.7 With potentiometer P1 on the P.C.B. the max. output of the power amplifier 9 can be limited, through amplifier 8.

5.5.2 Domestic Hot Water tap open
Water flow minimum 0.5 Gallon/min. (2.5 L/min.). The contact in the water flow switch closes and relay E1 will be activated. Several contacts of E1 are switched over:

5.5.2.1 A contact breaks and the central heating pump will be switched off immediately.

5.5.2.2 A contact bypasses central heating (the contact of Relay E2 is bridged).

5.5.2.3 A contact switches from the central heating boiler thermostat 63 to the Hot Water temperature set point potentiometer P3 on the P.C.B.

5.5.2.4 A contact switches from the central heating temperature sensor to the domestic hot water temperature sensor.

5.5.2.5 A contact switches from max. output C.H. potentiometer P1 to max. output D.H.W. P2.

5.6 Function of selector switch Central Heating:
5.6.1 Heating continuous and Hot Water see 5.5.1 and 5.5.2.
5.6.2 Hot water only.

5.6.2.1 Fan and burner will start on "call for heat" from (domestic) water flow switch.

5.6.2.2 Fan and burner and C.H. pump will start on call for heat from frost thermostat. C.H. pump will stop 6 min. after frost thermostat contact breaks

5.6.3 Heating timed and Hot Water (position as shown in the electrical functional drawing).

5.6.3.1 See 5.6.2.1

5.6.3.2 See 5.6.2.2

5.6.3.3 Fan and burner and C.H. pump will start on call for heat from Time Clock and Room thermostat (if fitted) C.H. pump will stop 6 min. after Time Clock or Room thermostat (if fitted) contacts break.
General fault finding

Engineer Please Check

1. Gas available (check kitchen and gas cock)
2. Electrical mains is on
3. Water pressure Central Heating System (min. 1.0 barg on pressure gauge)
4. Water flow domestic hot water (min. 0.5 GPM - 2.5 L/min) (fills a 1 pint milk bottle max 15 seconds).
5. Is central heating pump running
6. Air inlet/flare outlet free from obstacles.
7. Are all service cocks open?
8. Is at least one radiator valve or bypass in Central Heating system open?

Always follow the complete General test Procedure to make sure that no fault remains unnoticed.

Never disconnect any wire without previous testing. It is possible that a fault disappears after disconnecting and rewiring the electrical connections, thus fault will come back later.

Never pull on the wires in the terminals.
To disconnect the terminal pull on the insulation cover, keeping the terminal pushed back.

The relays on the P.C.B. can be checked. The relays have transparent covers and the position of the contacts can be verified (to see if a relay is energised or not see fig. 28)

![Relay diagram](image)

Top view relay

Fig. 28
**General Test + Fault Finding - Chart 1**

Check carefully before starting fault finding
- Gas
- Electric mains
- Central heating pressure min. 1 bar.
- Central heating pump spins free
- Heat exchanger air vented
- Green LED 1 on P.C.B. alight, if not check fuse F 2 Amp. on P.C.B. and external fuses
- Waterflow D.H.W. min. 0.5 Gallon/min. (2.5 Litres/min.)

Put selector switch on hot water only

Close Domestic Hot Water taps

Fan runs at full speed

**YES**

**NO**

C.H. pump runs

**YES**

**NO**

Temperature of heat exchanger very low
Frost protection thermostat closed

If temp high check wiring or replace frost thermostat

If temp very low

Disconnect Frost Thermostat 51
Fan speed?

Fan keeps running at full speed

Relay 2 energised
Replace P.C.B.

Fan runs at low speed. See fault finding chart 2
General Test + Fault Finding - Chart 2

Fan runs at low speed

Pilot flame can be ignited with hot water tap open

- YES
  - Main burner ignites
    - YES
      - Gasflame modulates if quantity of domestic hot water flow is changed to a lower D.H.W. flow rate
        - YES
          - If only problem on C.H. check:
            - Wiring C.H. temperature sensor (34).
            - The electrical resistance of the C.H. sensor should be:
              - 1000 Ohm - 25°C
              - 1300 Ohm - 60°C
              - 1490 Ohm - 80°C
            - Time clock
            - Room thermostat
            - Boiler thermostat (potentiometer on front panel)
            - Setting C.H. max. output on P.C.B. (P1)
          - NO
            - Replace Gas Valve
    - NO
      - Replace Operator Gas Valve
      - Check:
        - Wiring to on/off operator gas valve
        - 24 VAC at terminals operator gas valve
      - Replace P.C.B.

- NO
  - See Fault Finding - Chart 3
  - 24 VAC between 61 and 80 of P.C.B.
    - YES
      - Fault very, very Rare
    - NO
      - Recheck please
General Test + Fault Finding - Chart 3

Fan runs at low speed

Pilot flame can be ignited with hot water tap open

YES

See Fault Finding - Chart 2

NO

Fan runs at full speed

YES

Spark available after 20 sec waiting time according lighting instructions

YES

NO

Pilot ignites but does not hold

Relay 3 on P.C.B. energised (see fig. 28)

YES

Check:
- Thermocouple wiring thermocouple output voltage should be between 4 - 18 mV if not replace
- Gas supply
- Thermocouple
- Overheat cut-off thermostat

NO

Replace gas valve

Check wiring and function
- Microswitch on gas valve
- Spark igniter in control box

YES

NO

With fan at full speed N/C contact of air pressure switch should be closed between 67-66 of P.C.B (LED7 on)

24 V AC between 66 and 60 of P.C.B?

YES

Check wiring
- air pressure switch

NO

Check differential air pressures according fault finding air flow (chart 5)

24 V AC between 62 and 60 on P.C.B.

YES

RL 3 not energised (see fig. 28)

Replace P.C.B.

NO

Recheck carefully

Air pressure correct?

YES

Replace air pressure switch
General Test + Fault Finding - Chart 4

Pilot flame can not be ignited according instructions

Fan runs at full speed

YES

NO

See Fault Finding - Chart 3

24 V AC between 68 and 60 of P.C.B

YES

NO

Check water flow switch D.H.W.

Relay 2 energised

(see fig. 28)

YES

NO

Check wiring air pressure switch attention:
• With fan on low speed N/C contact in air pressure switch has to be closed between 69-67 on P.C.B

Check pressures according fault finding air flow see fault finding Chart 5

Replace P.C.B.

If wiring and electrical resistance of sensor are correct

Replace P.C.B.

Replace P.C.B.

24 V AC between 67 and 60 of P.C.B.

YES

NO

Check contacts relay 2

Fan runs at Full speed

YES

NO

See Fault Finding Chart 3

Check wiring FAN

If wiring is correct

Replace FAN

Check wiring
• D.H.W. temperature sensor 42
• C.H. temperature sensor 34
• Electrical resistance sensor C.H. and D.H.W.
1000 Ohm 25°C
1300 Ohm 60°C
1460 Ohm 80°C

If wiring and electrical resistance of sensor are correct

Replace P.C.B.
General Test + Fault Finding - Chart 5

On the boiler are 2 air pressure test points
see technical information page check of air flow through boiler - Chart 6

Start boiler and check differential pressure 58 and 59: see Chart 6

<table>
<thead>
<tr>
<th>Fan low speed</th>
<th>Fan full speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 0,3 mbar</td>
<td>Less than 0,55 mbar</td>
</tr>
<tr>
<td>3 mm WG</td>
<td>5,50 mm WG</td>
</tr>
<tr>
<td>30 Pa</td>
<td>55 Pa</td>
</tr>
<tr>
<td>= correct</td>
<td>= correct</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 0,3 mbar</td>
<td>More than 0,55 mbar</td>
</tr>
<tr>
<td>3 mm WG</td>
<td>5,50 mm WG</td>
</tr>
<tr>
<td>30 Pa</td>
<td>55 Pa</td>
</tr>
<tr>
<td>Fan too fast</td>
<td>Fan too slow</td>
</tr>
</tbody>
</table>

N/C contact of air pressure switch should close between 68 - 67 on P.C.B.
If not replace air pressure switch

Check voltage on fan should be lower than 100 Volt AC

Check if damper (31) is fully closed

Check FAN

Check air/ flue system

N/O contact of air pressure switch should close between 67 - 66 on P.C.B.
If not replace air pressure switch
General Test + Check of Air Flow through boiler - Chart 6

Pressure Test Points
58 - Fan air outlet pressure test point
59 - Flue outlet pressure test point

On the boiler are two pressure test points with which the correct pressure and air flow of the air can be checked.

Attention - It is always necessary to measure **differential** pressure because the boiler is a room sealed appliance.

58 - 59 Differential pressure on air pressure switch 43.

**Checks:**
1. On low speed the **differential pressure** between points 58 and 59 should be no more than 0.3 mbar - 3 mm WG - 30 Pa.
2. On full speed **differential pressure** between 58 and 59 should be no less than 0.55 mbar - 5.5 mm WG - 55 Pa.
3. If differential pressure 58 and 59 less than 0.55 mbar check air pressure damper 31 and fan 16.
Replacement of Parts

1.0 INITIAL PROCEDURE

Before work commences ensure that:

a) The boiler is cold, electricity supply is isolated, and the gas supply is turned off at the inlet of the boiler (fig. 1).

b) For replacement of parts where water connections are broken, it will be necessary to isolate and drain either or both the central heating or domestic hot water circuits of the boiler only. The cold water mains inlet is isolated at the inlet cock (fig. 1). The D H W is drained via drain cap (fig. 37). The C H flow and return cocks are turned off at the isolation cocks (fig. 1). The C H is drained via the pressure relief valve (twist about 1/2 of a turn).

Important

- Upon completion of the work following (details of which are included in the commissioning section):
  Should be checked:
  I) Gas soundness of all joints
  II) Water soundness of all joints
  III) The electricity supply
  IV) The pressure of the sealed system and top up where necessary.

- Replace all components in reverse order, observing any special notes given.

e) Removal of Outer Casing

Note - It may not be necessary to remove all the outer casing. Refer to individual sections for the extent to which the outer case needs to be removed.

f) Front Panel
   Grip on both sides and lift away from the main boiler assembly.

g) Base Plate
   Remove the four fixing screws (fig. 16).

Side Panels
   For each panel, remove two fixing screws at base of appliance and single fixing screw at top of appliance (fig. 30).
   Also remove hinged control panel cover.

Note - The panels are located in keyhole slots, push panels upwards and pull away.

i) Removal of Combustion Chamber Outer Cover
   Remove the five combustion chamber outer cover fixing screws and undo four buckle clips (fig. 30) to remove cover.

j) To Remove Control Panel
   Hinge control panel cover downwards.
   The two control panel securing screws can now be removed (fig. 30), hinge control panel forwards and disengage from bottom lugs the control panel can now be removed.

k) To lower control box frame
   Remove screw securing gas control valve to frame.
   Remove the base plate (g) above.
   Remove the two screws securing the frame to the back panel.
2.0 PILOT BURNER, INJECTOR, SPARK ELECTRODE AND THERMOCOUPLE

a) Refer to Section 1, items a, c, d, f and i.

b) Disconnect the thermocouple from the Honeywell valve (use a 10 mm spanner) (fig. 31).

Note - The thermocouple interrupter is located in a slot below and must be in the correct position when re-connecting the thermocouple.

c) Unscrew the pilot supply pipe compression nut from the Honeywell valve (fig. 31).
d) Remove the pilot inspection cover 2 screws (fig. 32).
e) Remove the pilot retaining plate, 1 screw (fig. 32).
f) Pull pilot assembly downwards (fig. 34).
g) Unscrew the electrode with cable.
h) Unscrew the thermocouple from the pilot assembly (fig. 34).
i) Re-assemble in reverse order and ensure ignition is satisfactory.
j) Check the operation of the flame failure device. The boiler should operate satisfactorily with a thermocouple output of between 4 and 18 millivolts.
3.0 COLD WATER FLOW SWITCH (Domestic Hot Water) AND FILTER

a) Refer to section 1, items a, b, c, d, f and g (drain D.H.W only fig. 37).

b) Undo the flow switch unions and carefully lower the flow switch taking care not to lose either the (three) sealing washers, filter or flow restrictor.

c) Disconnect the electrical connections to the flow switch.

d) Re-assemble in reverse order, ensuring that the filter, flow restrictor and sealing washers are in the correct position (fig. 38). The polarity for the electrical wiring is immaterial.
4.0 HONEYWELL GAS VALVE (fig. 31)

a) Refer to Section 1, Items a, c, d, f, g, h (left hand side panel) and j.
b) Remove thermocouple and pilot gas supply from valve.
(Pull out thermocouple interrupter wire from below thermocouple).
c) Disconnect the four electrical connections from the top of the valve.
d) Disconnect modulating balance tube by removing the fixing screw, and gently pull off from the front of the valve.
e) Disconnect the gas supply to the gas valve at the inlet union.
f) Remove the screw securing the base of the gas valve to the control box frame of the appliance.
(Take care not to lose the sealing washer).
g) Remove the four Allen screw which secure the inlet supply pipe to the gas valve.
h) Undo the union which is on the burner supply pipe and withdraw gas valve towards front.

Note - Ignition wires and thermocouple interrupter wire is still attached.

i) Remove single screw securing the ignition switch to be bottom of the valve.
j) From the rear of the valve remove the thermocouple interrupter connection (10 mm spanner).
k) Remove valve, pull off gas control knob extension.
l) Re-assemble in reverse order. Re-connect electrical connection in accordance with the wiring diagram (fig. 25).
m) Fully test the operation of the new gas valve and reset burner pressures as prescribed (see commissioning).

5.0 P.C.B.

a) Refer to section 1, Items a, c, d, f and j.
b) Unscrew two fixing screws on the P.C.B. top cover plate, lift and disconnect all connectors from P.C.B. (fig. 39).
c) Unscrew upper fixing screws from P.C.B.
d) Gently pull P.C.B. off mounting studs and remove.
e) Re-assemble in reverse order (Refer to wiring diagram fig. 25).
f) Range rate the boiler C.H. and check the operation of the controls (See commissioning).

---

[Diagram showing components such as Cover plate fixing screws, P.C.B. connectors, P.C.B. upper fixing screws, C.H. selector switch, Time clock, etc.]
6.0 CENTRAL HEATING LIMIT THERMOSTAT, OR FROST THERMOSTAT, OR OVERHEAT CUT OFF THERMOSTAT OR D.H.W. LIMIT THERMOSTAT
a) Refer to Section 1, items a, d, f and i.
b) Refer to fig. 2 to identify the location of respective thermostat.
c) Remove two spring clips (with a pair of pliers).
d) Disconnect electrical connections to the thermostat.
e) Re-assemble in reverse order (Polarity immaterial). Heat sink compound must be used.

7.0 D.H.W. TEMPERATURE SENSOR OR CENTRAL HEATING TEMPERATURE SENSOR
a) Refer to section 1, items a, b, c, d, f, g, h (left hand side panel) and k.
b) Identify the sensor from fig. 2.
c) Disconnect the electrical connections to the sensor.
d) Unscrew the temperature sensor.
e) Re-assemble in reverse order (Polarity immaterial).

8.0 PRESSURE RELIEF VALVE
a) Refer to section 1, items a, b, (central heating) c, d, and g.
Note - If this valve is not working correctly then the water can only be drained from the appliance by, removing the pressure relief valve.
b) Release the outlet union to the valve and undo the valve union connection, taking care not to lose the sealing washers.
c) Remove the pressure relief valve outlet fitting.
d) Re-assemble in reverse order, and check the operation of new valve.

9.0 PUMP
a) Refer to section 1, items a, b (central heating), c, d, f, g, h (right hand side panel), j and k.
b) Loosen the two pump union connections.
c) Remove electrical cover on pump, one screw (fig. 40). (Rotate pump to remove cover).
d) Disconnect the live, neutral and earth connection.
e) Release the cable retaining gland and pull the cable clear.
f) Disconnect the two pump union connections. Remove pump (Retain washers if not re-newing).
g) Re-assemble in reverse order (fig. 40).

Note - Ensure the arrow indicating the direction of flow, on the pump housing is pointing upwards, and the speed setting is at 3.
10.0 AUTOMATIC AIR VENT

a) Refer to Section 1, items a, b (central heating), c, d, f, g, h, (right hand side panel) and k.
b) Loosen the pump union connections and swivel the pump to the right.
c) Unscrew the automatic air vent (fig. 2, item 36).
d) Re-assemble in reverse order ensuring the «O» ring is fitted (fig. 41) and that the venting cap is loose.
   Replace pump ensuring that the arrow indicating flow points upwards.
11.0 PRESSURE/TEMPERATURE GAUGE
a) Refer to Section 1, items a, b, (central heating), c, d, f, g and j
b) Remove the shim then the temperature sensing plial from its pocket (fig. 37).
c) Unscrew the pressure sensor from its housing (fig. 37) (Access from below).
d) Unscrew the knurled nut from the rear of the gauge, and remove the gauge forwards.

12.0 REMOVAL OF C.H. SELECTOR SWITCH
a) Refer to section 1, items a, c, d, f and j
b) Disconnect the electrical connections to the selector switch (fig. 42)
c) Pull off selector switch knob.
d) Unscrew the two fixing screws exposed when the knob is removed.
e) Re-assemble in reverse order (refer to fig. 42 for wiring). Check the operation of the new switch.
13.0 REMOVAL OF THE CLOCK

a) Refer to section 1, items a, c, d, f and j
b) Disconnect the electrical connections to the time clock.
c) Remove the time clock from the control panel (fig. 43)
d) Re-assemble in reverse order (refer to fig. 43 for replacement of the time clock)
14.0 REMOVAL OF BOILER THERMOSTAT

a) Refer to Section 1, items a, c, d, f, and j.
b) Remove P.C.B. top cover plate by unscrewing the two fixing screws and pulling away (fig. 39).
c) Disconnect the connector from the P.C.B. (terminals 87 - 88 - 89).
d) Pull off the thermostat knob and lever up the two securing tags revealed.
e) Re-assemble in reverse order, ensure the wires are pointing downwards. (Refer to fig. 25 for wiring)

15.0 REMOVAL OF IGNITION GENERATOR

a) Refer to Section 1, items a, c, d, f and j.
b) Disconnect electrical connection to the ignition generator.
c) Release the two ignition generator fixing screws, situated at the base. (Refer to fig. 44 for wiring)
d) Re-assemble in reverse order (Refer to fig. 44 for wiring). Check the ignition of the pilot.

---

Fig. 44
16. AIR PRESSURE SWITCH
   a) Refer to Section 1, items a, c, d, and f.
   b) Identify the air pressure switch from fig. 2.
   c) Remove the two screws securing the air collection plate (fig. 45), and withdraw the plate complete with the air pressure switch.
   d) Disconnect electrical leads to air pressure switch.
   e) Remove pressure sensing tubes.
   f) Remove the pressure switch, 2 screws.
   g) Re-assemble in reverse order (refer to fig. 46 for wiring).
17.0 REMOVAL AND RE-PRESSURISING OF C.H. EXPANSION VESSEL

Note: If there is less than 500 mm clearance above the boiler or if the boiler has a rear flue outlet then removal of the expansion vessel can only be achieved by first removing the boiler from the wall.

Note: For rear exit flues it is not recommended that the flue and air duct be removed from the wall. Either remove the boiler leaving the ducts in place or insert an equivalent vessel in the central heating return to the boiler.

a) Removal of expansion vessel.

i) Refer to section 1, items a, b and c (Drain C.H. side of boiler).

ii) Remove the two screws from the expansion vessel securing plate, (fig. 47) which can be found at the top back of the boiler.

iii) Undo the compression fitting on the top of the expansion vessel (fig. 47).

iv) Remove the expansion vessel.

v) Re-assemble in reverse order.

b) Re-pressuring of expansion vessel. (Charge pressure 0.8 - 1.0 bar)

i) Close the C.H. flow and return cocks on boiler and drain the boiler (fig. 20).

ii) The schrader valve is positioned on the top right hand side of the expansion vessel, behind the inlet connection.

iii) Re-open C.H. flow and return cocks and re-charge the system to between 1 & 1.5 bar and vent the boiler and radiators.

Fig. 47
Exploded view sealed chamber of the boiler

Key
45 Room sealed compartment
46 Adhesive packing
48 Hinge
49 Collar flue exit
50 Pressure test point
51 Nut air pressure switch test point
52 Air pressure test point
53 Flue pressure test point
58 Air pressure switch
59 Seal for curve turret
60 Red silicone tube
61 White silicone tube

62 Closing panel for room sealed compartment
63 Looking glass
64 Plate for glass
66 Plate
67 Seal
70 Flue gas outlet bend
71 Output smoke curve
72 Tube flue outlet
73 Tube air intake
74 Terminal tube protection
Exploded view gas line, combustion chamber and draft diverter

Key
75 Complete combustion chamber
76 Combustion chamber insulation back panel
77 Combustion chamber insulation side panel
78 Flue collector
79 Outlet flue deflector
81 Fan
82 Flue collector outlet from fan
83 Outlet flue junction collar
85 Venturi test point
87 Panel isolation
88 Combustion chamber panel
89 Glass window
90 Lighting grill
94 Burner box
95 Burner Venturi
96 Main Injector
97 Pilot injector
98 Ignition cable
104 Pressure test point
105 Gas valve
106 Modulating balance tube
108 Inlet tube gas valve
111 Spark electrode
112 Pilot
113 Thermocouple
114 Pilot gas supply pipe
Exploed view heat exchanger + C.H. and D.H.W. parts

Fig. 50

Key
130 Copper heat exchanger for C.H. + D.H.W.
131 Central heating frost thermostat
132 Central heating limit thermostat
133 Overheat cut-off thermostat
140 Automatic air vent
141 Safety valve
143 Central heating pump
147 D.H.W limit thermostat
148 Flue deflector
149 Temperature sensor
151 Cold water inlet filter
152 Cold water flow limiter
154 Cold water flow switch
## Spare Parts List

<table>
<thead>
<tr>
<th>Item No.</th>
<th>G.C. Part No.</th>
<th>Makers Part No.</th>
<th>No. Off</th>
<th>DESCRIPTION</th>
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<tbody>
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<td>14</td>
<td>366818</td>
<td>900120</td>
<td>1</td>
<td>C.H safety valve</td>
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<tr>
<td>16</td>
<td></td>
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<td>Fan</td>
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<td>21</td>
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<td>Main Injector (Natural Gas)</td>
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<td>Main Injector (L.P.G.)</td>
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<td>Thermocouple</td>
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<td>Spark electrode</td>
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<td>Pilot</td>
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<td>366826</td>
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<td>Automatic air vent</td>
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<td>39</td>
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<td>Cold water flow switch (paddle type)</td>
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<td>C.H selector switch</td>
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<td>Time clock</td>
</tr>
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<td>372224</td>
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<td>C.H. temperature-pressure gauge</td>
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<td>Pilot injector (L.P.G.)</td>
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<td>820260</td>
<td>1</td>
<td>Special two pipe flue/air adapter</td>
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</table>
Domestic Hot Water Performance

Fig. 1 - D.H.W. Pressure Drop VS. flow
A = Standard with cold water Flow Restricter
B = Cold Water Flow Restricter Removed

Fig. 2 - D.H.W. temperature VS. flow
A = Cold Water 15°C
B = Cold Water 5°C

Modulating regulator (Modureg) of gas valve
1. Cap (with tube 71)
2. Shaft
3. Adjustment screw for max pressure setting
4. Adjustment screw for min pressure setting
5. 6,3 mm AMP terminals
6. "O" ring
7. Modulating balance tube

If necessary replace complete MODUREG

<table>
<thead>
<tr>
<th>Pressure settings</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mbar</td>
<td>Inch WG</td>
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<tr>
<td>Natural Gas</td>
<td>2.5</td>
<td>1.0</td>
</tr>
<tr>
<td>L.P.G.</td>
<td>5.0</td>
<td>2.0</td>
</tr>
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</table>
**Optima 900**

**Key**
- 16 Fan
- 23 Thermocouple
- 24 Spark electrode
- 31 Air pressure control damper
- 32 Central heating pump
- 34 Central heating flow temperature sensor
- 38 Cold water flow switch
- 42 DHW temperature switch
- 43 Air pressure switch
- 45 Operator gas valve
- 47 Modulating regulator (Modureg) gas valve
- 49 Overheat cut-off thermostat
- 50 Heat exchanger limit thermostat
- 51 Heat exchanger frost thermostat
- 60 DHW limit thermostat
- 60 Extended control knob gas valve
- 61 C.H selector switch
- 62 Time clock
- 63 C.H boiler thermostat
- 64 C.H temperature pressure gauges
- 65 Microwave combination gas valve
- 67 Ignition transformer
- 69 Control box with P.C.B.
- 72 Room thermostat (not fitted)
- 80 240V + 24V roomstat terminal blocks
- 101 P.C.B.

**P1 = C.H. max output (to be set on site) (if required)**
**P2 = D.H.W. max output (factory set)**
**P3 = D.H.W. temperature (factory set)**

**61. C.H. selector switch**
- Heating timed and hot water
- Hot water only
- Heating continuous and hot water

**Note:**
The transformer on the P.C.B. has a built-in overheat protection. If this is open, all LED's will be off but the C.H. pump (32) will run switch off the boiler for at least 20 minutes.

**Connector X2**
01-03 = 24V-2VA

---

**Table**

<table>
<thead>
<tr>
<th>X4</th>
<th>X3</th>
<th>c</th>
<th>d</th>
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<tr>
<td></td>
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<td>SHORT CIRCUIT 04-05 AND SHORT CIRCUIT 06-07:</td>
<td>SHORT CIRCUIT 04-05 ONLY:</td>
</tr>
<tr>
<td>a</td>
<td></td>
<td>- Boiler will start for C.H.</td>
<td>- Boiler starts for C.H.</td>
</tr>
<tr>
<td></td>
<td>04</td>
<td>- Waiting time is excluded</td>
<td>- Waiting time is excluded</td>
</tr>
<tr>
<td></td>
<td>05</td>
<td>- P1 and P2 out of operation</td>
<td>- Max burner pressure C.H. can</td>
</tr>
<tr>
<td></td>
<td>06</td>
<td>- Check/set mechanical</td>
<td>be checked/set with P1</td>
</tr>
<tr>
<td></td>
<td>07</td>
<td>MAX VOLUME</td>
<td>MAXIMUM ON MODUREG (47)</td>
</tr>
</tbody>
</table>
General Notes - For use on the Optima 900 fitted with VM6.1 Printed Circuit Board
*The pilot light can only be ignited after the fan (16) has run for at least 20 seconds on full speed.
*The central heating pump (32) will run to disperse heat if the temperature at the heat exchanger limit thermostat (50) is too high.
*The frost thermostat (51) will switch on the boiler for central heating if the temperature is too low.

<table>
<thead>
<tr>
<th>LED n°</th>
<th>Colour</th>
<th>Signification</th>
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<tbody>
<tr>
<td>1</td>
<td>green</td>
<td>Mains on/off voltage on</td>
</tr>
<tr>
<td>2</td>
<td>yellow</td>
<td>Domestic hot water flow switch (38) on</td>
</tr>
<tr>
<td>3</td>
<td>yellow</td>
<td>Central heating room thermostat (72) / clock (62) calling for heat</td>
</tr>
<tr>
<td>4</td>
<td>green</td>
<td>Sensor (34) or (42) calling for heat</td>
</tr>
<tr>
<td>5</td>
<td>red</td>
<td>Central Heating waiting time, a max. 3 minutes delay following shut off Boilerstat (63), Clock (62), Roomstat (72) or use of Hot Water</td>
</tr>
<tr>
<td>6</td>
<td>yellow</td>
<td>Demand for heat - fan relay (RL2) will energised</td>
</tr>
<tr>
<td>7</td>
<td>green</td>
<td>Air pressure switch (43) on, air flow checked</td>
</tr>
<tr>
<td>8</td>
<td>yellow</td>
<td>Gas valve (46) energised</td>
</tr>
</tbody>
</table>

### Jumpers J1 - J2

<table>
<thead>
<tr>
<th>Fitted</th>
<th>Not Fitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>J1</td>
<td>Prepurge time before ignition = 0 second</td>
</tr>
<tr>
<td>J2</td>
<td>Fan control High &amp; Low speed</td>
</tr>
</tbody>
</table>

### Resistance of Central Heating or Hot Water sensors (34) + (42)

- 10 °C 990 ohm
- 25 °C 1000 ohm
- 60 °C 1300 ohm
- 80 °C 1490 ohm

### RELAYS

- RL1 central heating pump
- RL2 fan
- RL3 ignition

### RL energised

#### CHECK OPERATION USING LED'S AS A FAULT FINDING GUIDE
First check section A, then B, then C, then D. 0 = LED off 1 = LED on x = LED either on/off is not important

#### A - Domestic Hot Water tap open

<table>
<thead>
<tr>
<th>LED</th>
<th>OK</th>
<th>FAULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Possible Cause of Fault:
- No mains electricity switches off, fuse blown.
- D.H.W. flow switch (38) not operating.
- Not required for D.H.W.
- D.H.W. sensor (42) not connected or D.H.W. temperature too high
- Waiting time after replacing P.C.B.
- Short circuit on D.H.W. sensor (42) or resistance lower than 500 Ohm

#### B - Central Heating on

<table>
<thead>
<tr>
<th>LED</th>
<th>OK</th>
<th>FAULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Possible Cause of Fault:
- No mains electricity switches off, fuse blown.
- Hot water tap open - D.H.W. flow switch (38) contact closed
- Roomstat (72) or clock (62) not calling for heat
- Boiler temperature too high
- Boiler thermostat (63) below CHI temperature
- Waiting time after replacing (max. 3 minutes)
- C.H. sensor (34) short circuit or resistance lower than 500 ohm

### C - General Test for D.H.W. and Central Heating (First check A and B above)

<table>
<thead>
<tr>
<th>LED/REL.</th>
<th>OK</th>
<th>FAULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>RL2/Rlx</td>
<td>energised</td>
<td>not energised</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Possible Cause of Fault:
- Air pressure switch (43) not in NC position or miswired, check wiring.
- Fan (16) turns too fast at low speed.
- Fan (16) running at full speed or
- Air flow too low, check e.g. air intake/air outlet or
- Air pressure control damper (31) not fully closed with front cover off
- Air pressure switch (43) faulty
- CHI limit thermostat (50) open circuit (pump will run)
- D.H.W. limit thermostat (92) open circuit

### D - Ignition of Pilot

1. Fan (16) should run at full speed for at least 20 seconds
2. Check J1, J2 and J3 above
3. Push ignition button (60) fully in
4. Microswitch (68) will close
5. Relay RL3 will energise
6. Ignition transformer (67) will energise
7. Check spark and position of spark electrode (24)
Special Installation Possibilities: Two-pipe air intake/flue outlet

Special Air Intake/Flue Outlet

The standard Flue/air intake hood on top of the boiler can be replaced by a special two pipe flue adaptor.

For details see separate instructions;
«Optional flue systems»