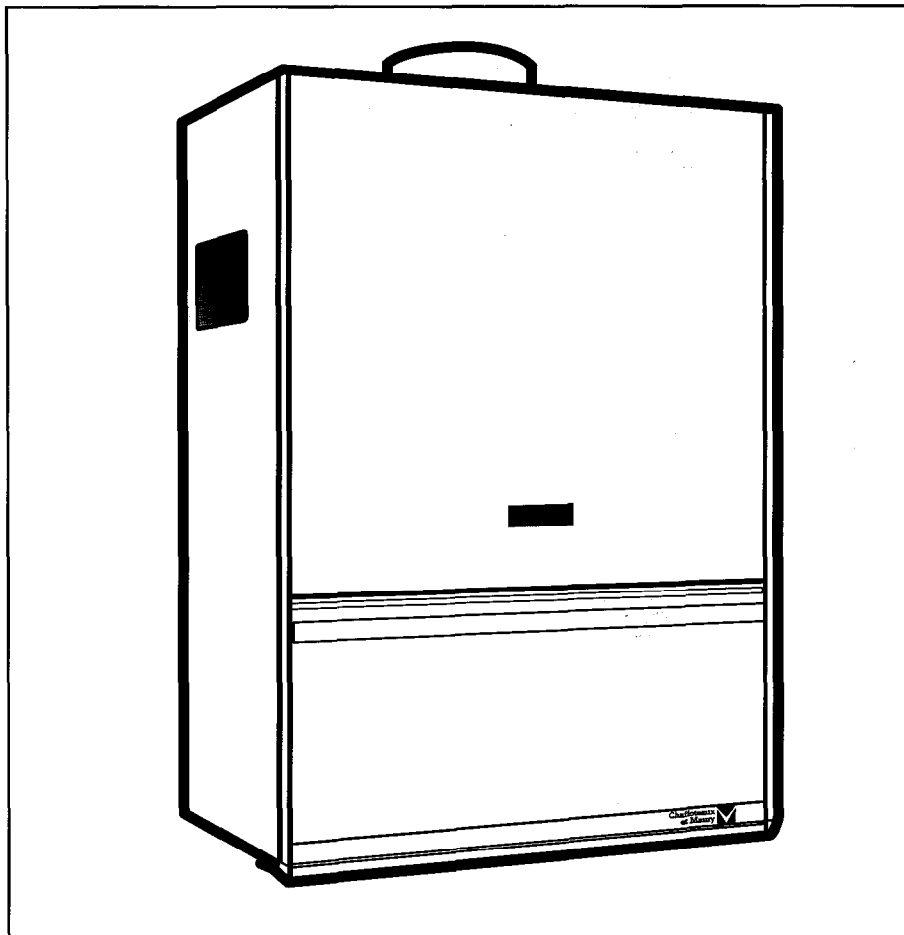


**Chaffoteaux
et Maury**



Moduloflame 140



**Wall Hung Gas Boiler Designed For
Modular Commercial Use**

INSTALLATION AND SERVICING MANUAL





CHAFFOTEAUX ET MAURY Limited.
Trench lock, Trench,
Telford, Shropshire TF1 4SZ
Telephone. : Telford (0952) 222727
Telefax. : (0952) 243493

Ref. : 92220-141 - 09/96

Moduloflame 140
cat. II 2H3P

STATUTORY REQUIREMENTS

The installation of this appliance must be carried out by a CORGI Registered person or other competent person and in accordance with the requirements of the current editions of the Gas Safety (Installation and Use) Regulations, the IEE Wiring Regulations and local Water Authority By-Laws. It should also comply with the following documents:

The Building Regulation:

- The Gas Safety (Installation and Use) Regulations
- The Public Health Act -1936
- British Gas Publications - Flues for Commercial and Industrial Gas Fired Boilers and Air Heaters (1979) IM/11

British Standards:

Codes of Practice

- BS CP 331: Part 3 - "Gas supplies to appliances"
- BS CP 341 300 - 307 Central Heating by low pressure hot water
- BS CP 342 - Centralised hot water supply:
 - Part 1- Individual dwellings
 - Part 2 - Buildings other than Individual dwellings
- BS 6759 Safety Valves
- BS 4076 Specifications for steel chimneys

-BS 6891, BS 5440 parts 1 and 2, BS 5449 part 1, BS 7593, BS 6798, BS 5546, BS 4814, BS 7074 part 1 and 2, BS 7671 and BG DM2.

To comply with the Control of Substances Harmful to Health Regulation 1988 we are required to provide information on the following substance that is contained within the appliance.

Description: Combustion Chamber Lining

Material: Alumino Silicone Fibre

Precautions: During servicing, keep the dust generation to a minimum and avoid inhaling any dust and contact with the skin and eyes. Normal handling and use will not present any discomfort, although some people with a history of skin complaints may be susceptible to irritation. When disposing of the lining, ensure that it is securely wrapped and wash hands after contact.

GUARANTEE

The manufacturer's guarantee is for 12 months from the date of purchase. The guarantee is voidable if the appliance is not installed in accordance with the recommendations made herein or in a manner not approved by the manufacturer.

CUSTOMER CARE

Chaffoteaux et Maury Ltd., as a leading manufacturer of domestic and commercial water heating appliances, is committed to providing high quality products and a high quality after sales service. If it is necessary to contact an engineer, then telephone your local Chaffoteaux Service Centre. The number can be obtained from the leaflet enclosed in the customer care pack with your boiler or by telephoning the Chaffoteaux Customer Services Department at Telford.

Advice on installation or servicing can also be obtained by contacting the Chaffoteaux Customer Services Department at Telford.

CUSTOMER SERVICES DEPARTMENT

Tel: 01952 222288

Fax: 01952 260915

CONTENTS

Statutory requirements	2
Guarantee	2
Customer care	2
Introduction	4
Description	4
Technical data	5
Dimensions	5
Installation and Operation	6
Operation	6
Installation Requirements	6
Location	6
Flue	6
Ventilation	6
Gas supply	6
System Guidance	6
Flushing and water treatment	6
System controls	6
Pump	7
Installing the Boiler	7
Water connections	7
Gas connections	7
Electrical connections	7
Commissioning	7
Pre-commissioning	7
Filling and purging	7
Lighting the boiler	7
Setting the gas rate	8
Post commissioning	8
Handing over to user	8
Routine Servicing	8
Suggested Sequence for Servicing	8
Preliminary checks	8
Service schedule	9
Additional procedures	9
Replacing Components	9
Heat exchanger	9
Burner manifold	9
Burner	9
Ionisation and ignition electrodes	9
Gas solenoids	9
Pump	9
Fuses	9
Printed circuit board	9
Spark generator	9
Thermostat	9
Thermistor	9
Overheat thermostat	10
Spillage detector	10
Fault Finding Chart	10
Schematic Wiring Diagram	11
Short Parts List	11
Component Recognition Chart	11

Installation Instructions

INTRODUCTION

The MODULOFLAME 140 is a wall mounted, low water content open flued boiler. The boiler is rated between 13.1 kW (45,000 Btu/h) and 35 kW (120,000 Btu/h) outputs. The boiler is designed for use with Natural Gas and L.P.G. when a conversion kit is fitted.

The MODULOFLAME 140 is intended for the larger domestic installations, swimming pools, commercial and industrial applications. The boiler is suitable for open vented or sealed water systems. A pump must be installed in the water circulation system irrespective of whether the system is of the open or sealed type. The pump incorporated in the boiler is sufficient only to overcome the resistance of the boiler. It has electronic ignition and flame supervision, a fully adjustable electrical thermostat which operates the boiler pump and thermistor control for the flow temperature.

The MODULOFLAME 140 is supplied in one carton. The 54 mm monotube should be fitted to the flow and return connections to the boiler as shown in the picture below.

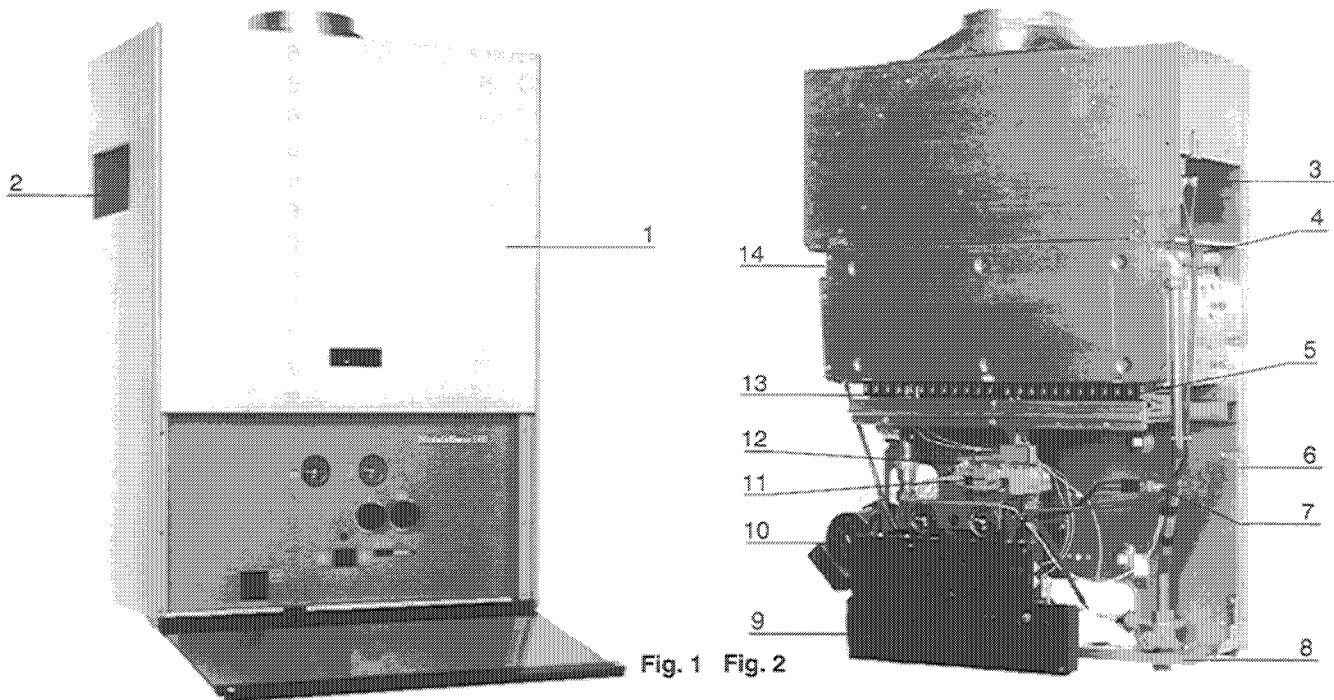


Fig. 1 Fig. 2

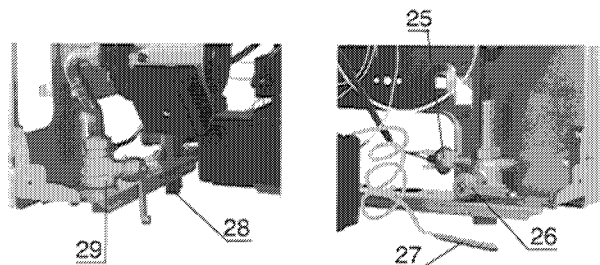


Fig. 5

Fig. 4

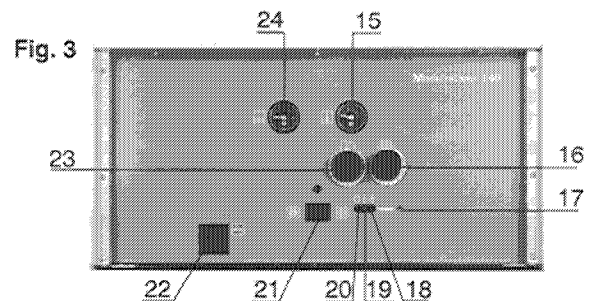


Fig. 3

DESCRIPTION

- | | | |
|---|---|--|
| 1. Outer case | 11. Gas solenoid assembly | 22. Fuses |
| 2. Built in down draught diverter | 12. Gas rate adjusting screw | 23. Two stage thermostat adjustment |
| 3. Spillage detector | 13. Ignition and ionisation electrodes | 24. Pressure gauge |
| 4. Heating body containing a copper finned heat exchanger | 14. Manually resettable overheat thermostat (not visible) | 25. Water pressure switch |
| 5. Patented twenty four blade stainless steel multigas burner | 15. Temperature gauge | 26. Flow valve to isolate heating body |
| 6. Steel chassis | 16. System temperature adjustment | 27. Monotube thermostat phial |
| 7. Thermistor | 17. Reset button | 28. Gas service tap |
| 8. Support bracket for the valves | 18. Red bulb (lock out) | 29. Return valve to isolate heating body |
| 9. Electrical box | 19. Orange bulb (burner "on") | |
| 10. Grundfos pump | 20. Green bulb (Power "on") | |
| | 21. Main switch | |

TECHNICAL DATA

Type B11BS

Suitable only for natural gas and conversion to L.P.G.

Moduloflame 140

Heat input	38.8 kW
Heat output	13.1 - 35 kW
Burner manifold injectors	24
Minimum air supply required	85 m ³ /h
Combustion products rate	32 g/l
Average flue gas temperature	120 °C
Maximum flow temperature	85°C
Minimum return temperature	50°C
Maximum system pressure	6 bar
Minimum system pressure	0.6 bar
Water capacity	2 litres
Electrical supply	230 V single phase - 50 Hz
Power consumption	90 W
Weight excluding packaging	51 kg
Weight including packaging	54 kg
Burner pressure G20 (natural gas) @ 20 mbar	8 mbar
Burner pressure G31 (propane L.P.G.) @ 37 mbar	24.8 mbar

Gas rate (15 °C -1013 mbar)

Gas type	Pressure	Net C.V.	Gas rate
G20	20 mbar	35,9 MJ/m ³	4.21 m ³ /h
G31	37 mbar	46,4 MJ/kg	3.09 kg/h

Burner injectors

Natural gas (Restrictor diameter : ø 2.8 mm & 6.0 mm) : 1.28 mm

Propane gas (Restrictor diameter : ø 1.9 mm & 4.0 mm) : 0.74 mm

DIMENSIONS

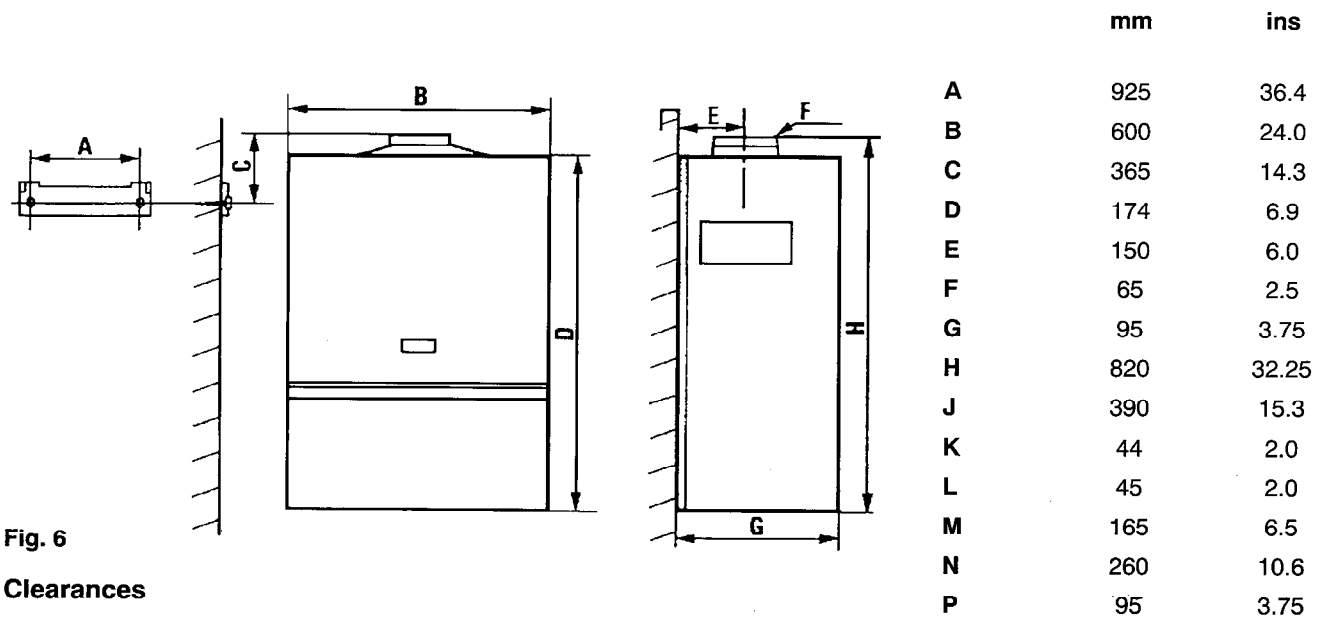


Fig. 6

Clearances

Side	150mm (6 ins)
Top	100mm (4 ins)
Bottom	150mm (6 ins)
Front	1000 mm (39 ins)

NB. When boilers are installed side by side there should be at least 300mm clearance between them.

INSTALLATION & OPERATION

OPERATION

When the external controls are calling for heat, and the temperature in the monotube is below the temperature set on the thermostat, the pump will run. Once the flow through the boiler is established and the temperature in the boiler is below the one set on the boiler thermostat, the water pressure switch will allow the grey safety solenoid and the blue first stage solenoid to open. The ignition sequence begins. A continuous, high speed stream of sparks ignites the gas. Once the ionisation circuit detects the flame the orange secondary solenoid opens to allow the full, or set, gas rate to the burner. If a flame is not detected within 8 - 10 seconds the security solenoid will close and shut off the gas. The red lockout indicator bulb will light. The temperature of the primary circuit is sensed by the thermostat in the monotube and the flow temperature of the boiler is detected by the thermistor in the flow pipe. These two thermostats interact with each other and the boiler thermostat must always be set above the monotube temperature.

INSTALLATION REQUIREMENTS

Location

The Moduloflame 140 is wall mounted and the position chosen should allow adequate space for servicing and for sufficient air flow around the boiler. The location must permit the satisfactory routing and termination of the flue. The surface should be flat and non combustible and able to adequately support the weight of the boiler and ancillary controls.

For guidance, a wall area of: 900 mm (36 ins) wide and 1185 mm (47 ins) high would provide the necessary clearances for case removal and for air movement.

As it is an open flued appliance certain locations are banned, for example bedroom, bedsitting rooms, private garages or rooms containing a bath or a shower. A cupboard or compartment used to house the boiler must have been designed and constructed, or modified, specifically for the purpose. Refer to BS 6798 for further guidance.

Flue

The following notes are for general guidance only. For detailed recommendations refer to BS 5440: pt 1.

There should be at least 600 mm of vertical flue after the boiler before the use of any bends. The flue must take the most direct route practicable. The number of bends must be kept to a minimum. Long external runs and Horizontal or slightly inclining runs must be avoided.

Ventilation

The following notes are for general guidance only. For detailed recommendations refer to BS 5440: pt 2.

The boiler must have a permanent air supply. This may come from an adjacent room or internal space which must also have permanent ventilation to outside or direct from outside. If the supply is from another internal space or room, that room must have a permanent air supply at least the size as required for the boiler. If installed in a room, the boiler requires a vent with 175 cm² free air space.

Where the boiler is installed in a compartment, the air is supplied through vents at high and low level as shown in the chart below:

Note: both vents should communicate with the same room, internal space or be on the same wall to outside air.

If there is an extractor fan installed on the premises, a spillage test must be carried out with the fan operating.

Position of air vent	Air from room or internal space	Air direct from outside
High level	350 cm ²	175 cm ²
Low level	700 cm ²	350 cm ²

Gas Supply

Do not use pipe smaller than the boiler gas connection which is 3/4" BSP. The gas installation should comply with BS 6891. The meter and pipework must be of sufficient capacity to supply the boiler and other gas appliances. The completed installation must be tested for soundness in accordance with the requirements of BS 6891.

Electrical Supply

The boiler requires an earthed 230V - 50 Hz single phase supply. It must be possible to completely isolate the appliance electrically. Connection should be via a 3 amp fused double-pole isolating or a fused three pin plug and an unswitched shuttered socket outlet. Either method must be in accordance with the current I.E.E. regulations. It should be readily accessible and only supply the appliance.

SYSTEM GUIDANCE

Flushing and Water Treatment

Before connecting to the system, the pipework should be chemically cleansed to remove metal filings, solder, machining oils and other fluxes and greases which might impair the performance of the boiler and its controls. Refer to BS 7593 (1992). Consideration should also be given to the treatment of the system water and advice can be sought from the manufacturers of water treatment products such as

Betz Dearbon Ltd
Foundry Lane
Widnes
Cheshire
WA8 8UD

Tel: 0151 424 5351

Fernox Manufacturing
Britannica Works
Clavering
Essex
CB11 4QZ

Tel: 01799 550811

If the boilers are being installed on an existing system, a sump and drain should be fitted on the heating return at the lowest point. It is essential that the system is fully flushed to remove any sludge and debris before the boiler is connected.

System Controls

The Moduloflame 140 is electrically controlled and so most normal pumped primary control systems can be used. Please note that when thermostatic radiator, or zone valves are used, the controls should be so arranged as to turn off the boiler when they are satisfied. A by-pass will be necessary to maintain a minimum flow rate of 27.5 l/h (6.05 g/m) 1.65 m³/h through the monotube.

Pump

The system pump should be sized to take into consideration the load and design of the system. The integral pump will overcome the resistance of the heat exchanger and so for calculation purposes the boiler can be disregarded. The temperature difference across the monotube should not exceed 18°C.

INSTALLING THE BOILER

The boiler is delivered in one carton. Having removed the boiler do not stand it on either the draught diverter or the bottom chassis carrying the isolating valves. Using the dimensions in the diagram on page 5 mount the wall bracket and hang the boiler on it. Fit the monotube ensuring that the thermostat pocket is to the left of the boiler. Remove the thermostat phial from behind the electrical box and insert in the thermostat pocket and secure with a retaining pin.

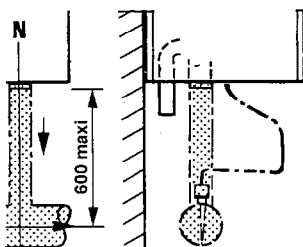
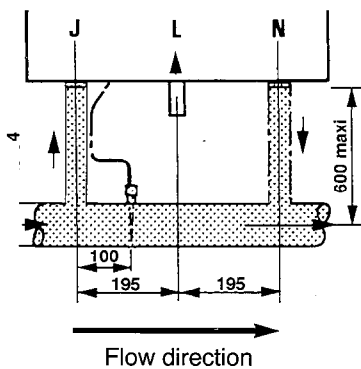


Fig. 7

WaterConnections

Flow and return connections made to the monotube are 54 mm copper. Note that the flow is from left to right when viewed from the front.

Gas Connections

The gas service tap is attached to the boiler. An inlet bend and filter-washer is provided. The gas connection is 3/4" BSP. and the supply should not be less than 22 mm and should be connected directly to the meter. If the pipe run is

likely to exceed 9 m (29.5 ft) then consult the following table for guidance.

Equivalent pipe length, including fittings, in metres.	Pipe diameter.
9 m	22 mm
12 m	28 mm
15 m	28 mm
20 m	28 mm
25 m	28 mm
30 m	28 mm
40 m	35 mm

The supply should be sufficient to provide 20 mbar (8 in wg) pressure with the boiler working.

Electrical Connections

Withdraw the fuses
Unclip the door on the front of the electrical box to gain access to the connections. Connect the live and neutral wires to the connecting block as shown in the picture below and the earth wire to the pillar. The connections must be made so that should the lead be pulled from its anchorage, the current carrying wires become taut before the earth wire.

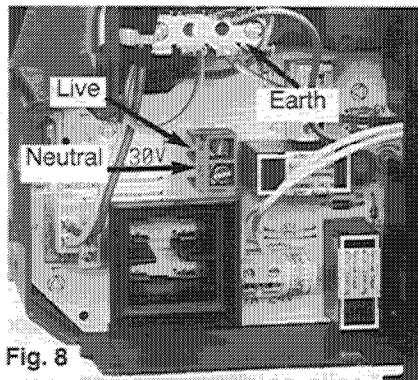


Fig. 8

COMMISSIONING AND TESTING

Pre-commissioning

Ensure that the system has been adequately flushed.
Purge gas supply and test for soundness
Carry out final electrical tests to ensure the correct polarity and earthing continuity

Filling and Purging

Open System

Ensure all valves are open
Fill the system slowly ensuring the

filling pressure remains constant.

Purge the installation of air.

It should not be necessary to vent the boiler. If it is, the drain valve may be used.

Sealed System

Ensure all valves are open

Fill the system slowly ensuring the filling pressure remains constant.

Purge the installation of air.

It should not be necessary to vent the boiler. If it is, the drain valve may be used.

To check the operation of the safety valve.

Raise the pressure in the system until the safety valve starts to discharge. This should happen at ± 0.5 bar (± 7.2 p.s.i.) of the maximum working pressure which is 3.5 bar (50.75 p.s.i.). Release water from the system until the designed system pressure is attained, taking into account the difference in height between the pressure gauge and the pressure vessel.

Lighting the Boiler

Connect gas pressure gauge to test point (Fig. 8).

Turn on the gas supply and boiler gas tap (28 page 4).

Ensure electrical supply is on.

Ensure all external controls are calling for heat.

Turn selector switch (21 page 4) to ON position . IIII

Turn the boiler thermostat to maximum.

Pressure test point

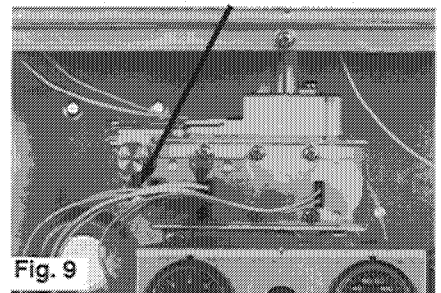


Fig. 9

The boiler will light.

Check for gas soundness.

Allow the boiler to heat system.

Check the inlet gas pressure is 20 mbar (8 in wg) with boiler operating.

Once up to temperature, re-flush the system to remove any dissolved oils and fluxes.

Recharge system pressure and introduce any water treatment as required.

Setting The Gas Rate

Run boiler for 10 mins to bring up to temperature.

Switch the boiler off at the electrical control box.

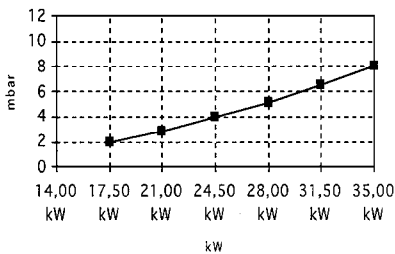
Remove the pressure test point (Fig. 9) and connect pressure gauge. Remove hexagonal cap (Fig. 10) to expose the adjuster screw.

Adjust pressure to suit output as per the graph below.

Note: The burner pressure is reduced when the screw is turned clockwise and increased when turned anti clockwise.

Turn off boiler before removing the pressure gauge.

Test pressure point for soundness.



Adjustment beneath cap

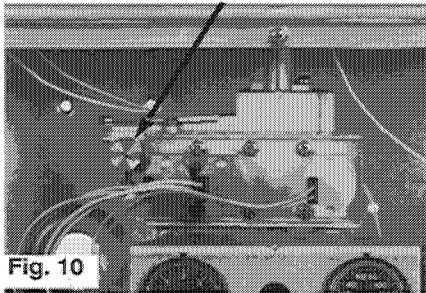


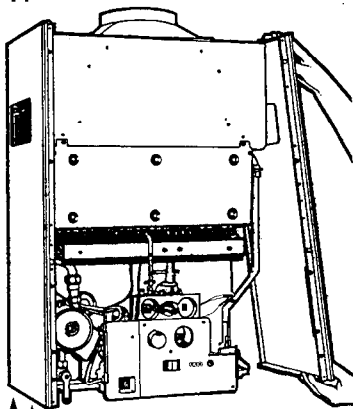
Fig. 10

Assemble the casing

Remove the two side panels, the front panel, the control panel and the glass door from the packaging.

If it is necessary, please remove the protective film on white panels.

Fig. 11



Position for case fixing screws

Assemble parts starting with the sides panels as shown in the picture below after located the grommets on their support at the top of the chassis.

Hang the side panels and position the two case fixing screws without tightening.

- Position the control panel onto the electrical box with the centre screw.
- Fix the control panel to the side panels with four screws adjusting the position before final tightening.
- Hang the front panel on the upper supports and fix it to the control panel with 3 screws.
- Fit the temperature adjustment knobs.

The glass door is fitted using the hinges A and B and the tie bar C which when unpacked is holding hinges A and B to the door.

- Remove and discard the nuts retaining the tie bar and screws. for future use.
- Offer the door locating hinge B into the aluminium profile on the right hand side panel and fix in position with the screw and tie bar as in the drawing below.

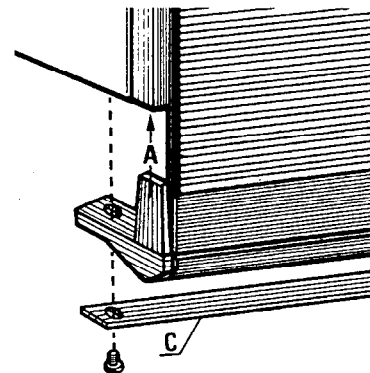
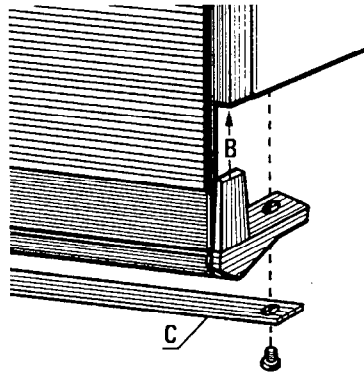


Fig. 12

- Hing door forward so that the hinge A can be offered into position and fix using screw and tie bar as in the drawing below.

Post Commissioning

Ensure system pressure has been set correctly.

- Set boiler thermostat and controls.
- Set external controls.

Handing Over to the User

Demonstrate the lighting and operation of the boiler.

Explain the benefits of annual maintenance by a competent person.

Explain how to register guarantee.

Leave Installation Manual, User's Instructions and all documentation with the user.

ROUTINE SERVICING

To ensure continued efficient operation of the appliance, it is recommended that it is checked and serviced as necessary at regular intervals. The frequency of servicing will depend upon the particular installation condition and usage, but in general, once a year should be adequate.

It is the law that any service work must be carried out by a competent person such as your local Chaffoteaux Service Centre, British Gas or other CORGI registered personnel in accordance with the current Gas Safety (Installation and Use) Regulations.

SUGGESTED SEQUENCE for SERVICING

Before disconnecting or removing any parts, isolate the gas and electricity supplies.

(for detail please see section on Parts Removal and Replacement)

Preliminary Checks

Lift off outer case in one piece by removing the four lower case fixing screws, the screw in the centre of the control panel and the temperature adjustment knobs

On sealed system, check the system pressure is at least 1bar cold.

Check operation of 1/3 and 2/3 solenoids.

Check that the burner is extinguished fully when both solenoids are closed.

Test ionisation functions and check that lockout occurs by turning off gas tap.

The service schedule should include the following operations:

- Check the pressure in the system.
- Check the correct operation of the appliance.
- Check the correct operation of the gas controls.
- Check the functions of the safety controls.
- Check combustion chamber insulation panels for damage.
- Clean the burner.
- Clean the heat exchanger.
- Check the burner manifold injectors.
- Clean gas and water filters.
- Clean and check operation of safety valve.

Additional Procedures that may be necessary:

- Carry out combustion test.
- Check, clean and replace components as necessary.
- Check burner pressure and gas flow rates.

REPLACING COMPONENTS

Heat exchanger

- Isolate from the system and drain the boiler
- Remove the front cover to the combustion chamber
- Release the nuts connecting the heat exchanger to the internal pipework
- Remove the four screws securing the combustion chamber to the chassis
- Remove the combustion chamber complete with the heat exchanger
- Remove two screws at the rear and two screws at the front of the heat exchanger
- Remove the heat exchanger
- Re-assemble in the reverse order

Burner manifold

- Remove the four screws securing the manifold to the burner assembly. Pull it toward you.
- Replace gasket on gas section before re-assembly.

Burner

- Remove manifold as above.
- Unscrew and remove the two screws securing the burner assembly to back plate.
- To remove ionisation and ignition electrode assemblies unscrew retaining screws and lift free.
- Re-assemble in reverse order.

Ionisation and ignition electrodes

-To remove ionisation and ignition electrodes without removing the burner assembly, remove the front combustion chamber panel.

- Unscrew retaining screws and lift free.
- Remove the fuses and screws securing the front panel of the electrical box
- Disconnect all plugs and noting the positions.
- Re-assemble in reverse order.

Gas solenoids

- Pull the colour coded wires free.
- Remove the six retaining screws.
- The solenoids can be removed complete with their base plate. Take care not to lose springs and valves.
- Replace gasket on gas section before re-assembly.

Pump

- Remove the fuses and the screws securing the door on the left side of the front panel of the electrical box
- Unplug the pump supply leads and earth connection
- Release the two union nuts on the inlet and outlet of the pump volute
- Release the pressure sensing pipe
- Remove the stainless steel retaining pin
- Remove the pump and volute complete
- Re assemble in the reverse order

Fuses

-Fuses are accessible from the front panel.

PCB

- Remove the fuses and screws securing the front panel of the electrical box
- Disconnect all plugs and noting the positions, remove any loose wiring
- Remove the retaining screw
- Release the retaining clips and remove the PCB
- Re-assemble in the reverse order
- Please note that the plugs cannot be

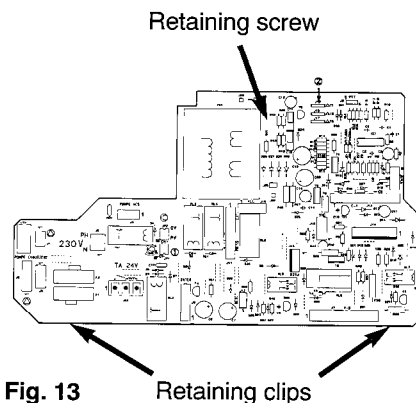


Fig. 13

placed in the wrong positions

Spark generator

The spark generator is located behind the electrical box.

- Remove the electrical box retaining screws as shown in the picture below.
- Pull the electrical box forward to gain access to the spark generator.
- Remove screw and cover to gain access to electrical connections.
- Lift the spark generator clear of locating pins.
- Re-assemble in reverse order.

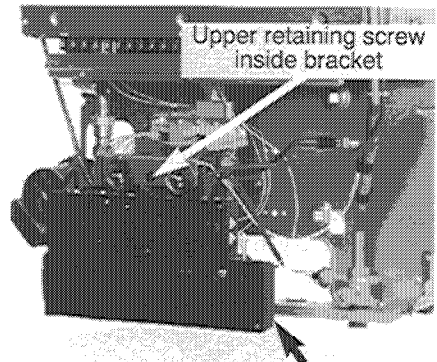


Fig. 14

Thermostat

The thermostat is located within the electrical box at the bottom right hand corner and sensing phial is located in the monotube.

- Open the electrical box.
- Remove the wires
- Remove the thermostat and capillary from the electrical box.
- Withdraw the retaining pin and pull the phial free from monotube.
- Re-assembly in reverse order.

Thermistor

The thermistor is located in a dry pocket on the flow pipe.

- Remove the wires from the thermistor.
- Unscrew the collar.
- Pull the thermistor free from the dry pocket.
- Re-assembly in reverse order.

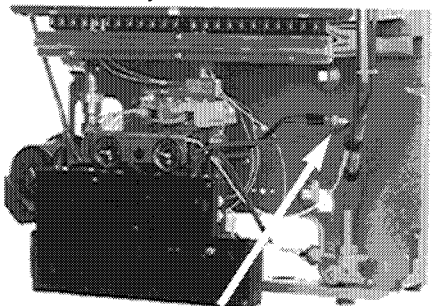


Fig. 15

Overheat thermostat

- Unplug the two connectors.
- Remove the 2 retaining screws and the overheat sensor.
- Re-assembly in reverse order.

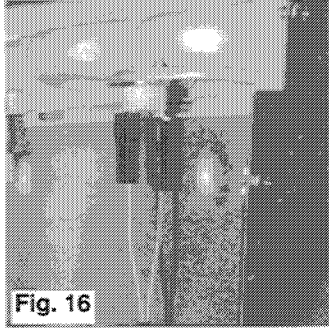


Fig. 16

Spillage detector

- Unplug the two connectors.
- Remove the 2 retaining screws and the spillage detector.
- Re-assembly in reverse order.

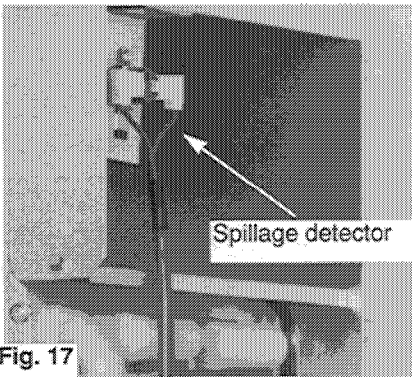
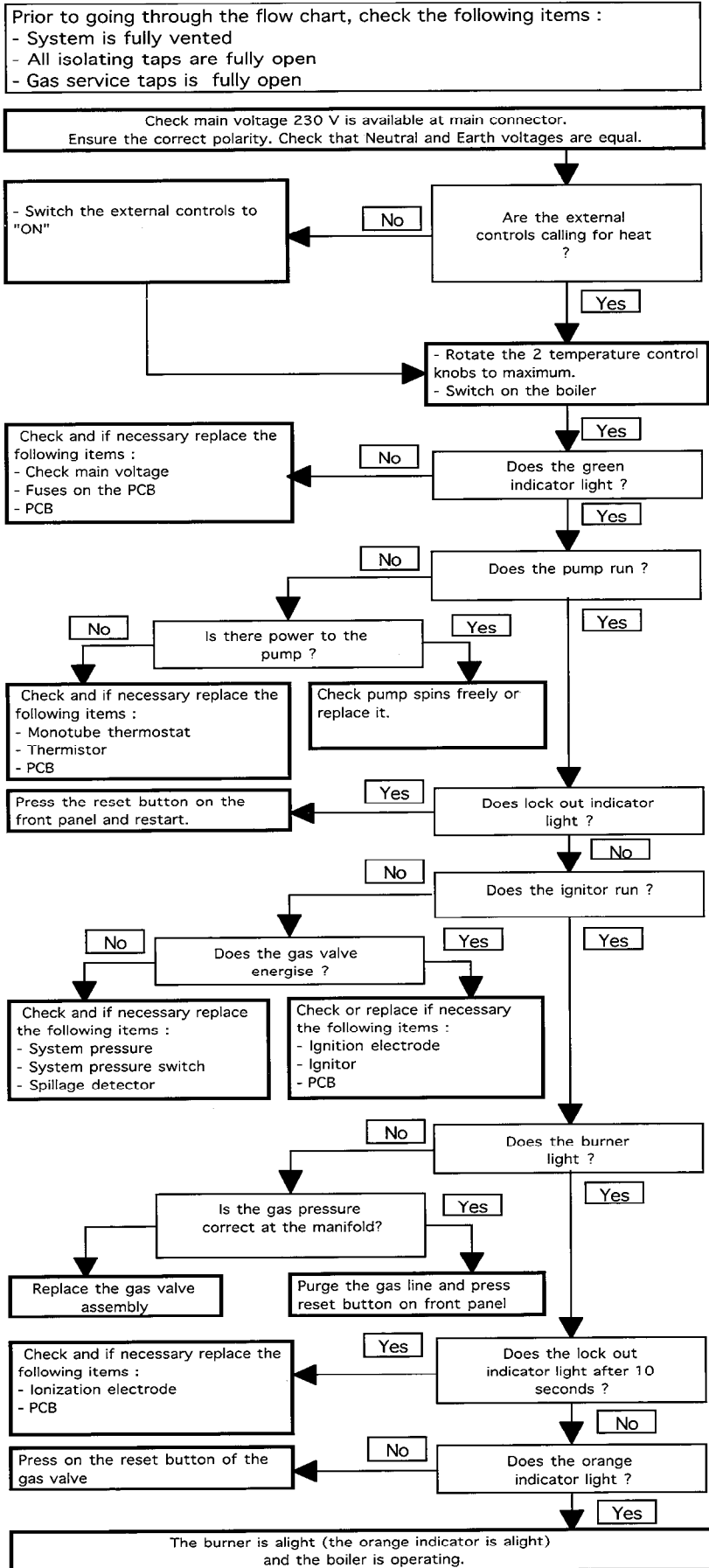


Fig. 17

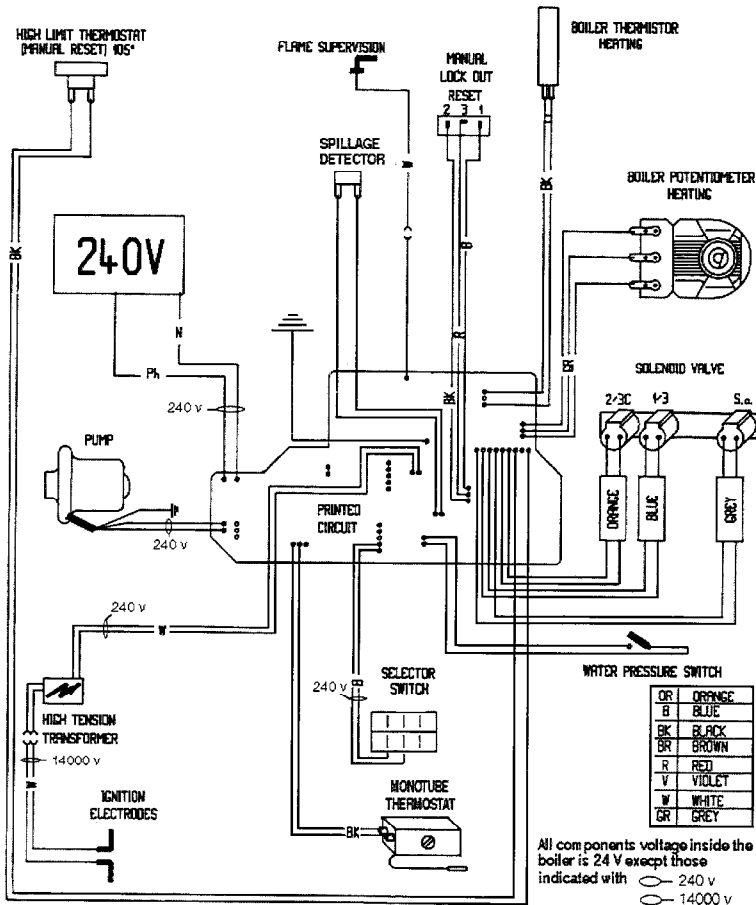
FAULT FINDING CHART



Notes :

Blank area for notes.

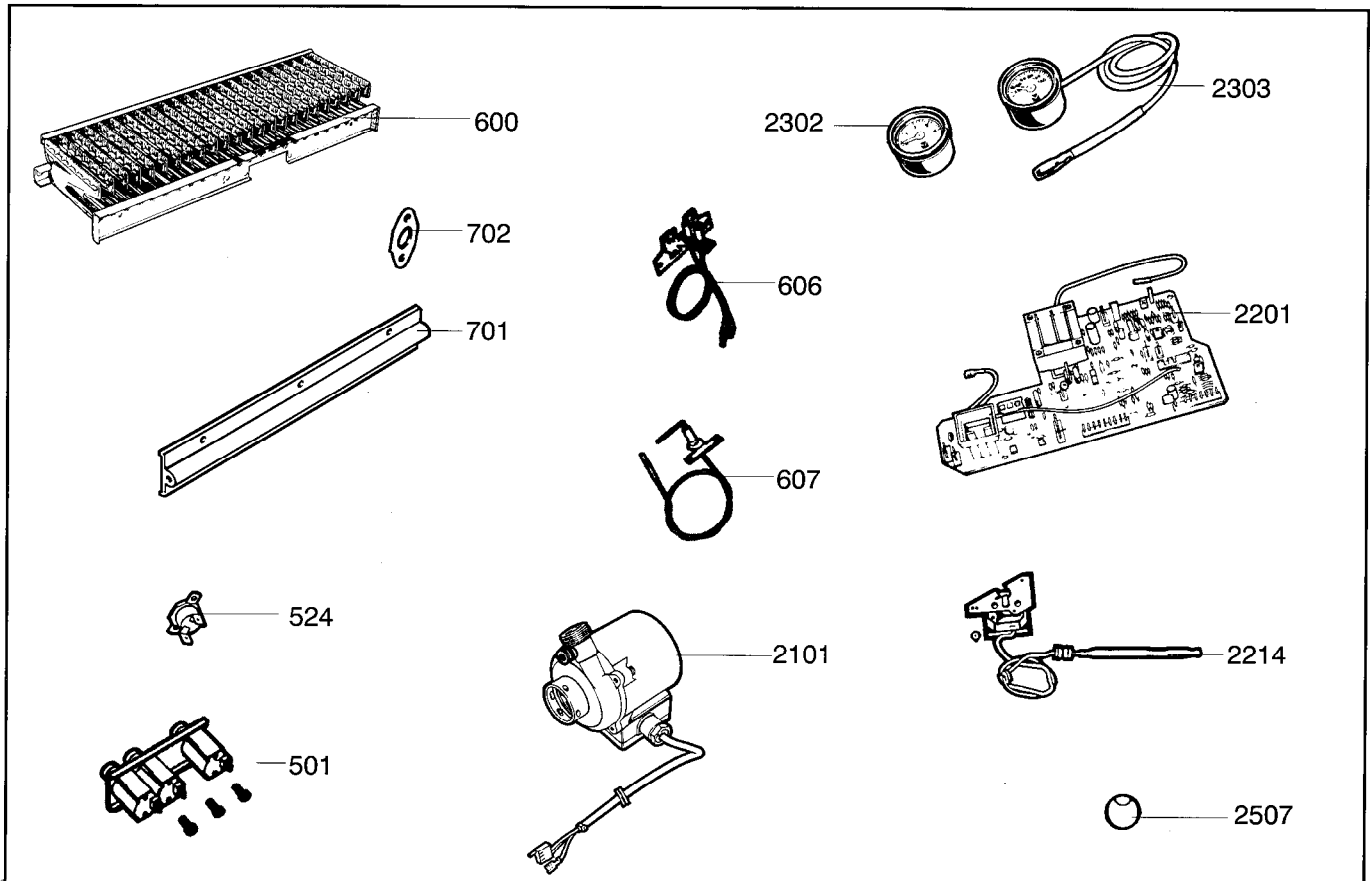
SCHEMATIC WIRING DIAGRAM



SHORT PARTS LIST

Key No.	Description :	Part number :

COMPONENT RECOGNITION CHART



Chaffoteaux et Maury are continuously improving their products and therefore reserves the right to change specifications without prior notice and accepts no liability for any errors or omission in the information contained in this document.

© Chaffoteaux et Maury 1996

Chaffoteaux et Maury Ltd
Trench Lock
Trench
Telford
Shropshire
TF1 4SZ

Tel: 01952 222727
Fax: 01952 243493

**Chaffoteaux
et Maury** 

Looking Good.Heating Better

Imp. SH - Réf. 92220-141 - 09/96