



Vokèra

20-80 R.S. TURBO



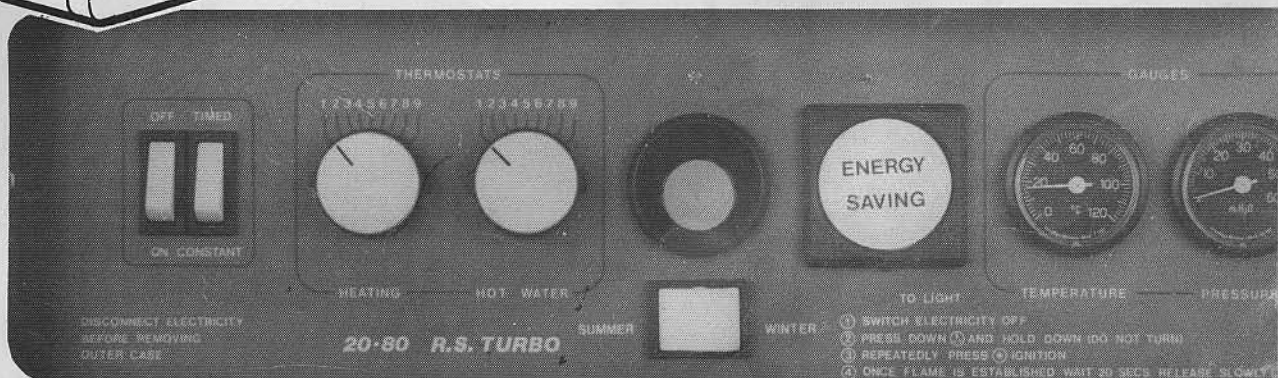
Installation and Servicing Instructions

Serial No 03002101 upwards

G C No. 4709403
British Gas Tested and Certified
NWC No. 8608012

Leave these instructions adjacent to the Gas Meter

This Appliance is for use with Natural Gas only



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SECTION 1 INTRODUCTION

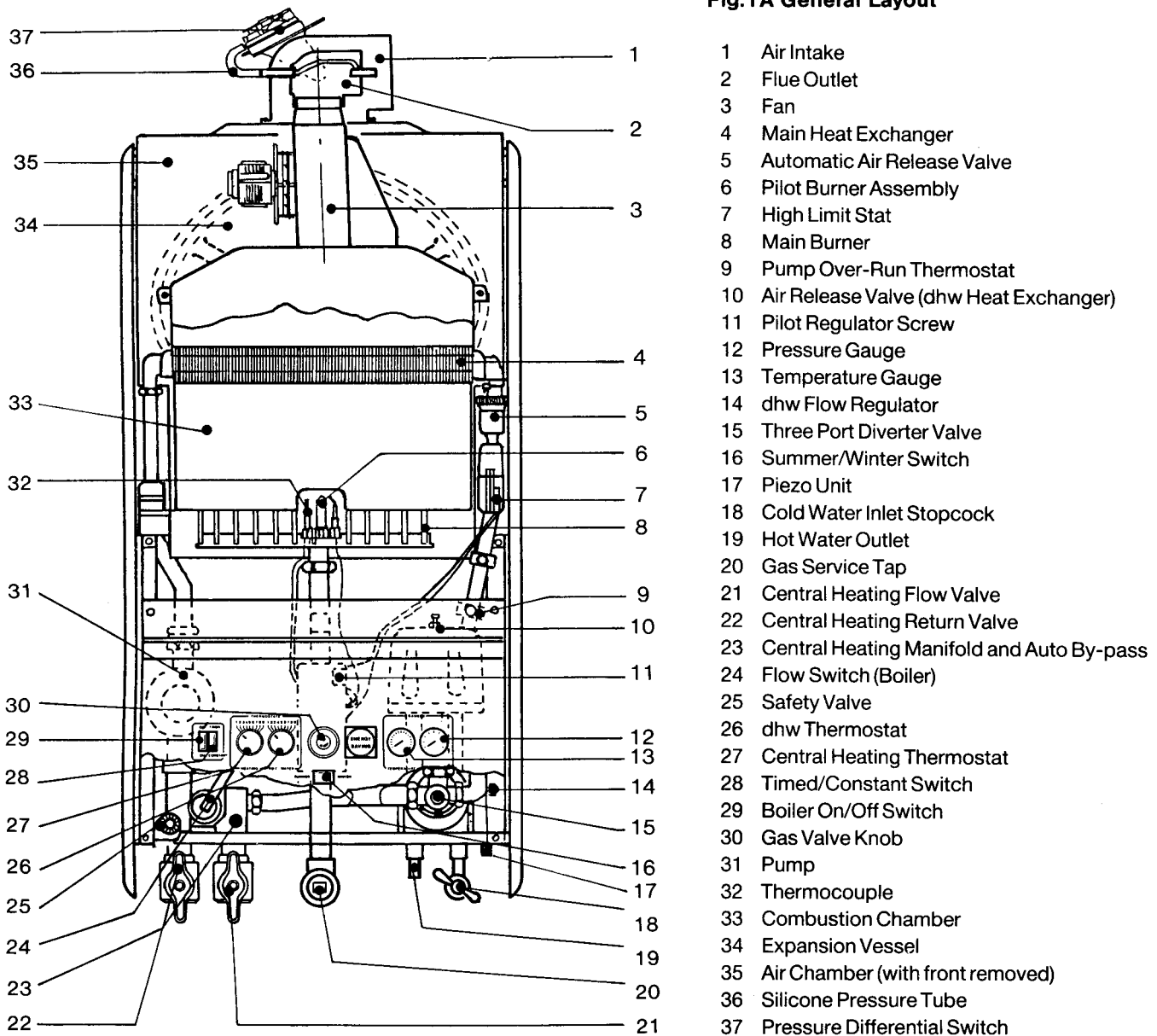
The Vokera RS20/80 is a combined central heating and domestic hot water appliance. By design, it incorporates a circulating pump, 3 port valve, expansion vessel, safety valve temperature gauge, pressure gauge and automatic by-pass.

It is produced as a room sealed category 1N appliance suitable for wall mounting applications only. It is provided with a fan powered flue outlet with an annular co-axial combustion air intake which can be rotated through 360°.

The appliance is designed for use with a sealed heating system and is not intended for use on an open vented system.

A range-rating facility is incorporated in the boiler for the central heating system in conjunction with the high/low burner control. The domestic hot water (dhw) service utilizes a differential water pressure control combined with a 3-port diverter valve to give hot water priority.

Fig.1A General Layout



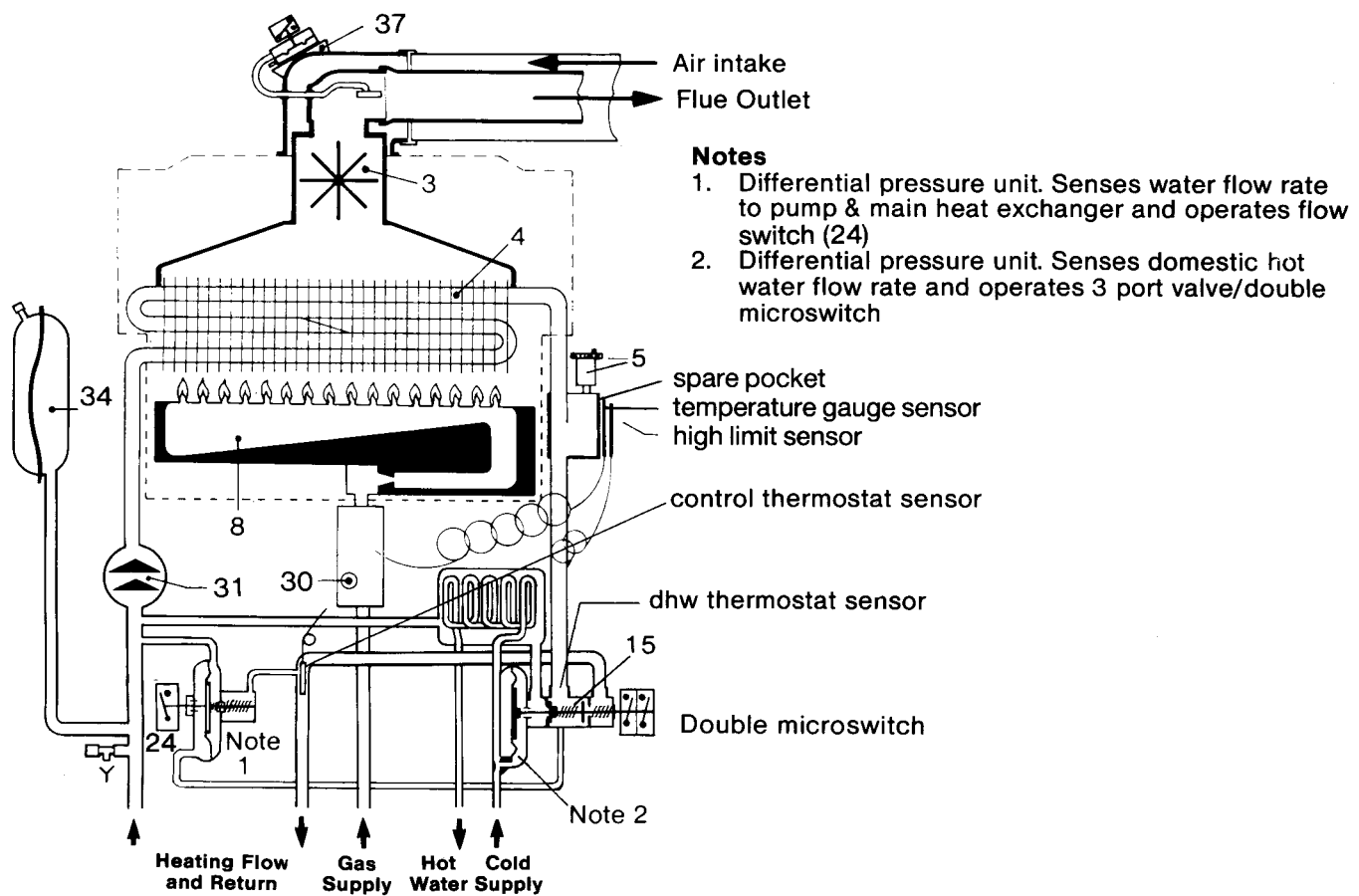


Fig. 1B

SECTION 2 DESIGN PRINCIPLES AND OPERATING SEQUENCE

- 2.1** Fig.1A illustrates the general layout of components. Fig 1B illustrates the operating principles described below.
- 2.2 Ignition & Rest Mode**
- 2.2.1** With the appliance main switch (29) in the 'off' position the pilot is ignited by depressing the gas valve knob and pressing the Piezo button.
- 2.2.2** As soon as a pilot flame is established and the gas valve knob released, the main switch (29) must be switched 'on'. This allows the flue fan to run at slow speed to scavenge the combustion chamber and provide air for the pilot burner.
- 2.2.3** In this mode the appliance remains 'ticking over' until there is a call for heat.
- 2.3 Central Heating Mode**
- 2.3.1** When the various switches and controls impose a demand for heat, the fan is switched to full speed. The pump is switched on and the flow of water operates a flow switch. This in turn energises the gas valve operator permitting gas flow through the main burner to be ignited by the permanent pilot flame.
- 2.3.2** As water temperature increases this is sensed by the thermostat which eventually operates at its first stage to switch the burner to low flame.
- 2.3.3** Depending on the load, either the water temperature will continue to rise when the second stage of the thermostat (27) will operate to switch the burner off, or the water temperature will fall and re-establish high flame.

2.4 Domestic Hot Water Mode

2.4.1 The appliance will operate in domestic hot water mode whenever the main switch is on and the pilot lit, regardless of Summer/Winter switch position and any demand for central heating.

2.4.2 Opening a draw off tap will operate the dhw differential pressure device which in turn operates the 3-port valve (15) and the dhw flow switch.

The three port valve diverts boiler water to the dhw heat exchanger.

The dhw flow switch transfers control of the burner to the dhw thermostat (26) which switches successively from high to low flame to maintain an average heat input to suit the dhw output required.

2.4.3 When the switch (16) is in the Winter position there is a pump overrun thermostat in circuit which allows the pump to continue running until the boiler water cools to approximately 60°C (140°F).

2.5 Safety Devices

2.5.1 In both central heating and hot water modes safe operating is ensured by

(A) Differential pressure units in both primary and dhw circuits which prevent burner operation if water flow rates are too low.

(B) A high limit thermostat, which interrupts the flame supervision circuit

(C) At the same time the fan will still operate.

2.5.2 A safety valve is provided to relieve excess pressure.

SECTION 3 TECHNICAL DATA

3.1 Units

Dimensions and values are given in the preferred S.I Units, with Imperial units in brackets where applicable.

3.2 Dimensions and Contents

Height: 1065mm (42ins) overall
(890 casing)

Width: 480mm (18.9ins)

Depth: 360mm (14.2ins)

Weight (empty 53kg (117lbs)
(full 56kg (124lbs)

for further dimensions see figs. 13 and 14

3.3 Connection sizes

Heating flow and return: Nut & olive for 22mm o.d.

Cold water inlet: Nut & olive for 15mm o.d.

Hot water outlet: Nut & tail for 15mm o.d.

Gas Service: Rc ½ (½in BSP int)

Safety valve outlet: Rc ½ (½in BSP int)

Flue outlet: nom. dia. 100mm specially supplied with boiler

3.4 Installation Requirements

3.4.1 Clearances

Preferred – Above 343mm (13.5in) (above flue cover)

Minimum – Above 153mm (6in) (above flue cover)

Minimum – Below 460mm (18in) (from casing)

Minimum – In front 600mm (24in) (from casing)

Minimum – At sides 75mm (3in) (from casing)

3.4.2 Maximum heating system contents approx 170 litres (38 gals)

Acceptance capacity of expansion vessel 10 litres (2.2 gals)

3.4.3 Air supply/Ventilation: To requirements of BS 5440 Part 2 1976

3.4.4 Means of filling sealed system: To accord with BS and/or Local Water Authority requirements

3.4.5 Maximum effective length of flue pipe 2.5 metres, in a straight length only.

3.5 Electrical Details

Mains supply 240/250v ~50Hz Fused 3A

Power consumption: 200w.

3.6 Performance

Central Heating

Nominal Heat Input

Max. 27.5 kW (93,500 Btu/h)

Min. 12.8 kW (43,700 Btu/h)

Nominal Heat Output

22 kW (75,000 Btu/h)

9 kW (30,700 Btu/h)

Max. Pressure 11.5 mbar (4.6 ins wg)

Min. Pressure 1.9 mbar (0.8 ins wg)

Domestic Hot Water

Nominal Heat Input

Max. 27.5 kW (93,500 Btu/h)

Min. 12.8 kW (43,700 Btu/h)

Nominal Heat Output

22 kW (75,000 Btu/h)

(e.g. 10.5 l/min raised 30°C)

min. modulation rate input

12.8 kW (43,700 Btu/h)

Fig.2 shows the residual pump head available for the central heating system after allowing for the pressure loss through the Appliance.

Fig.3 shows the actual pressure loss through the Appliance.

Fig.23 shows the relation between burner pressure and central heating output.

Fig. 2 Available pump head.

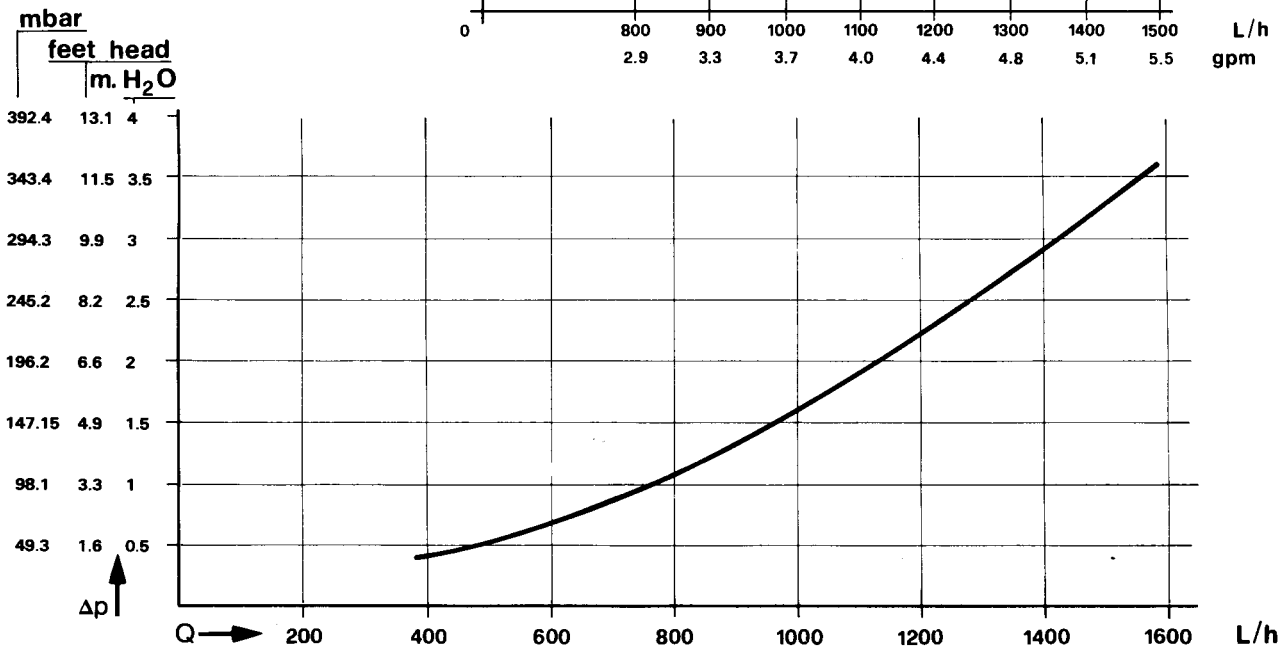
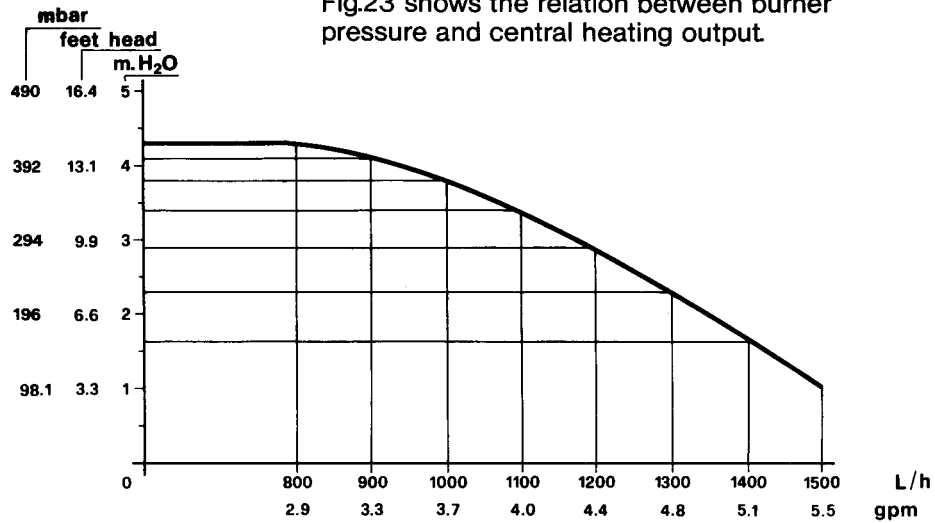


Fig. 3 Pressure drop across appliance

Working Pressures	Heating System	Hot Water System
Maximum	1.5 bar/15m.wg/50ft w.g.	6.0bar/90psig
Minimum	0.5 bar/5m.wg/16ft w.g.	0.5bar/ 7psig
Safety valve setting	3 bar/30m/102ft	-

Flow Rates

Min. Water Flow (dhw) 2.8 litres/min (0.61 gpm)
 Minimum central heating flow rate through appliance 350 litres/hour (1.28 gals/min)

Min Gas Rate	2.986 m ³ /h	Max. Gas Rate	10.85 m ³ /h
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3.7 Burner Details

Main Burner: Polydoro BWT 22 Super
 Main Burner Injectors: 13 x 1.25
 Burner Pressure: Max Rate 11.5 mbar
 Min Rate Central Heating and d.h.w. 1.9 mbar

Pilot Burner: Polydoro 3497
 Pilot Injector: .27 (marking) 2 holes

Gas Control Valve Basic: Honeywell V4600C 1128 2 220/240V This unit is modified. The modification comprises a coil carried by the main burner regulation screw. For low flame a voltage of approx 12.5v dc is applied to the coil to hold the valve spindle against the mechanical stop. For central heating max. rate the valve is restricted in its max. opening by application of a site adjustable voltage.

SECTION 4 GENERAL REQUIREMENTS

4.0 General Requirements

This appliance must be installed by a competent person in accordance with the Gas Safety (Installation & Use) Regulations 1984.

An existing meter should be checked, preferably by the gas Region to ensure that the meter is adequate to deal with the rate of gas supply required for all appliances it serves. Installation pipes should be fitted in accordance with CP 331 : 3 : 1974.

4.1 Related Documents

The installation of this boiler must be in accordance with the relevant requirements of the Gas Safety Regulations, the local building regulations, the I.E.E. Wiring Regulations, the by-laws of the local Water Undertaking, and in Scotland, in accordance with the Building Standards (Scotland) Regulation.

Pipework from the meter to the boiler must be of adequate size. Pipes of a smaller size than the boiler inlet gas connection should not be used.

The complete installation must be tested for soundness as described in the above Code.

It should be in accordance also with any relevant requirements of the local gas

N.B. If the gas supply for the boiler serves other appliances ensure that an adequate

CP 331	Part 3	1974	Low pressure installation pipes
BS 5376	Part 2	1976	Boilers of rated input not exceeding 60kW.
BS 5449	Part 1	1977	Forced circulation hot water systems.
BS 5546		1979	Installation of gas hot water supplies for domestic purposes (2nd family gases).
BS 5258	Part 1	1978	Supplement 1 Fan powered appliances.
BS 5440	Part 2	1976	Air supply

Region and local authority and the relevant recommendations of the following British Standard Codes of Practice:

supply is available both to the boiler and the other appliances when they are in use at the same time.

4.2 Location of Appliance

The location chosen for the boiler must permit the provision of a satisfactory flue and termination. The location must also permit an adequate air supply for combustion purposes and an adequate space for servicing and air circulation around the boiler.

Where the installation of the boiler will be in an unusual location special procedures may be necessary and BS 5376 : 2 : 1976 gives detailed guidance on this aspect.

A compartment used to enclose the boiler must be designed and constructed specifically for this purpose. An existing cupboard or compartment may be used provided that it is modified for this purpose.

Details of essential features of cupboard/compartment design including airing cupboard installations are given in BS 5376 : 2 : 1976.

4.3 Gas Supply

A gas meter is connected to the service pipe by the local gas Region or a local gas Region contractor.

4.4 Flue System

The specially designed flue system for this appliance can be installed from the inside of the building.

The terminal should be located where dispersal of combustion products is not impeded and with due regard for the damage or discoloration that might occur to building products in the vicinity (see fig. 4)

In cold and/or humid weather water vapour may condense on leaving the flue terminal. The effect of such 'steaming' must be considered.

The terminal must not be closer than 50mm (2in) to any combustible material. For protection of combustibles, refer to BS 5440:1 where the terminal is less than 2m (6.6ft) above a pavement or platform to which people have access (including any balcony or flat roof) the terminal must be protected by a guard of durable material.

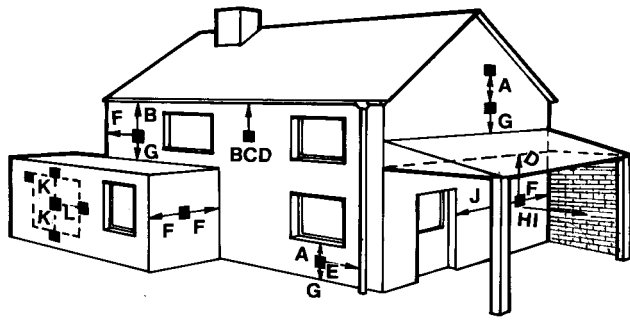


Fig. 4

Terminal position for fan-assisted boiler

(minimum distance)	mm
A — Directly below an openable window or other opening (eg air brick)	300
B — Below gutters, soil pipes or drain pipes	75
C — Below eaves	200
D — Below balconies or car port roof	200
E — From vertical drain pipes and soil pipes	75
F — From internal or external corners	300
G — Above ground or balcony level	300
H — From a surface facing a terminal	600
I — From a terminal facing a terminal	1200
J — From an opening in the car port (e.g. door window) into dwelling	1200
K — Vertically from a terminal on the same wall	1500
L — Horizontally from a terminal on the same wall	300

4.5 Air Supply

4.5.1 Recommendations for Air Supply are detailed in BS 5440:2:1976. The following notes are intended for general guidance.

4.5.2 The roomsealed fan flued boiler does not require a permanent air vent for combustion air supply.

Where installed in a **cupboard** or **compartment** ventilation is required for cooling.

The table below gives the recommended minimum effective areas of such air vents.

POSITION OF AIR VENTS	AIR VENT AREAS	
	AIR FROM ROOM OR INTERNAL SPACE	AIR DIRECT FROM OUTSIDE
high level	225cm ² (35in ²)	112cm ² (17.5in ²)
Low Level	225cm ² (35in ²)	112cm ² (17.5in ²)

- N.B.
- Both vents must either communicate with the same room or space or be on the same outside wall.
 - Where vents communicate with an adjacent internal space, it is suggested that the space is adequately ventilated.

4.6 Water Circulation (Central Heating)

Detailed recommendations are given in BS 5376:2:1976, BS 5449:1:1977 (for smallbore and microbore central heating systems).

The following notes are given for general guidance

4.6.2 Pipework

Copper tubing to BS 2871:1:1971 is recommended for water pipes. Jointing should be either with capillary soldered or with compression fittings.

Where possible, pipes should have a gradient to ensure air is carried naturally to air release points and water flows naturally to drain taps.

It should be ensured as far as possible that the appliance heat exchanger is not a natural collecting point for air.

Except where providing useful heat, pipes should be insulated to prevent heat loss and to avoid freezing. Particular attention should be paid to pipes passing through ventilated spaces in roofs and under floors.

4.6.3 By-pass

An automatic by-pass is incorporated in the boiler and systems should be designed to ensure that with only one radiator turned on a flow rate of at least 350 litres/hour (1.28 gals/min) is achieved through the boiler.

4.6.4 System Design

Figs 5 & 6 illustrate typical layouts.

4.6.5 Draining Taps

These must be located in accessible positions to permit the draining of the whole system. The taps must be at least 15mm nominal size and manufactured in accordance with BS 2879:1980

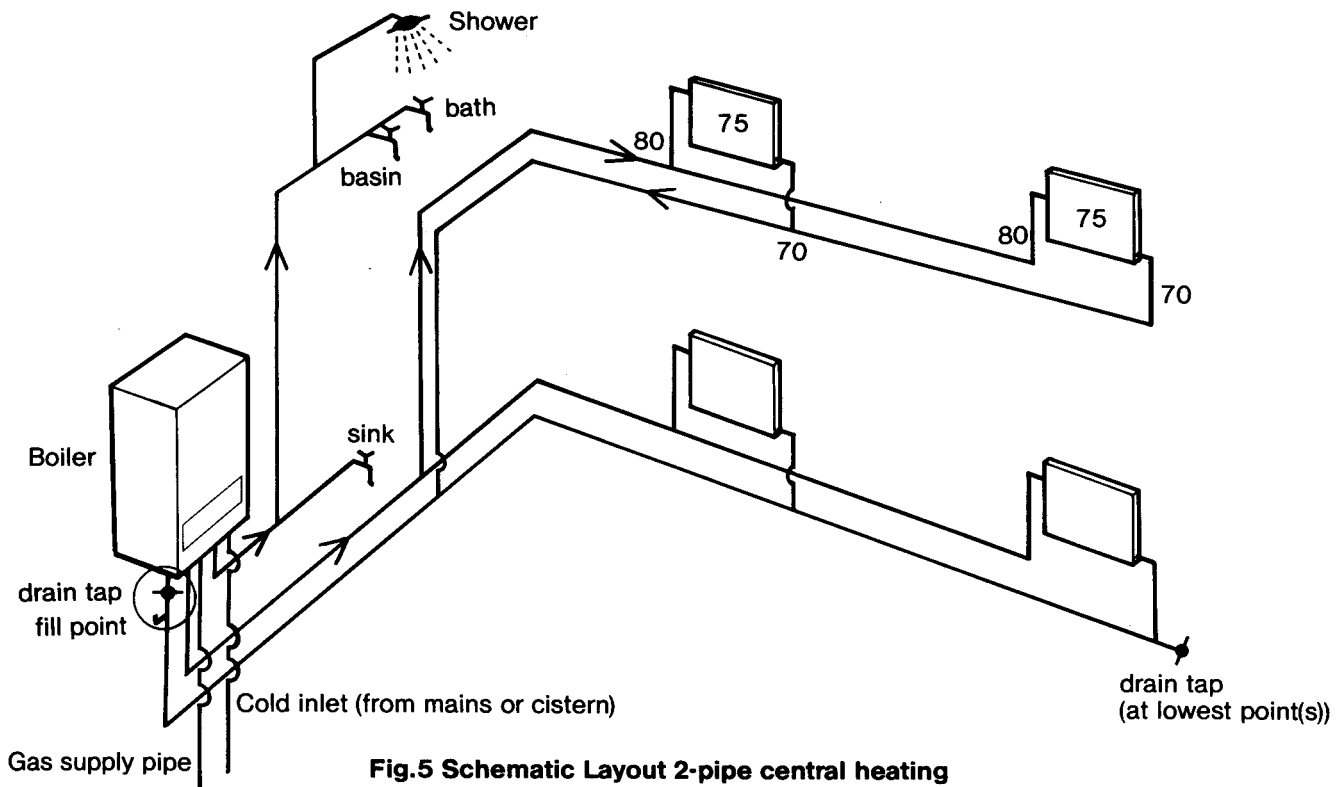


Fig.5 Schematic Layout 2-pipe central heating

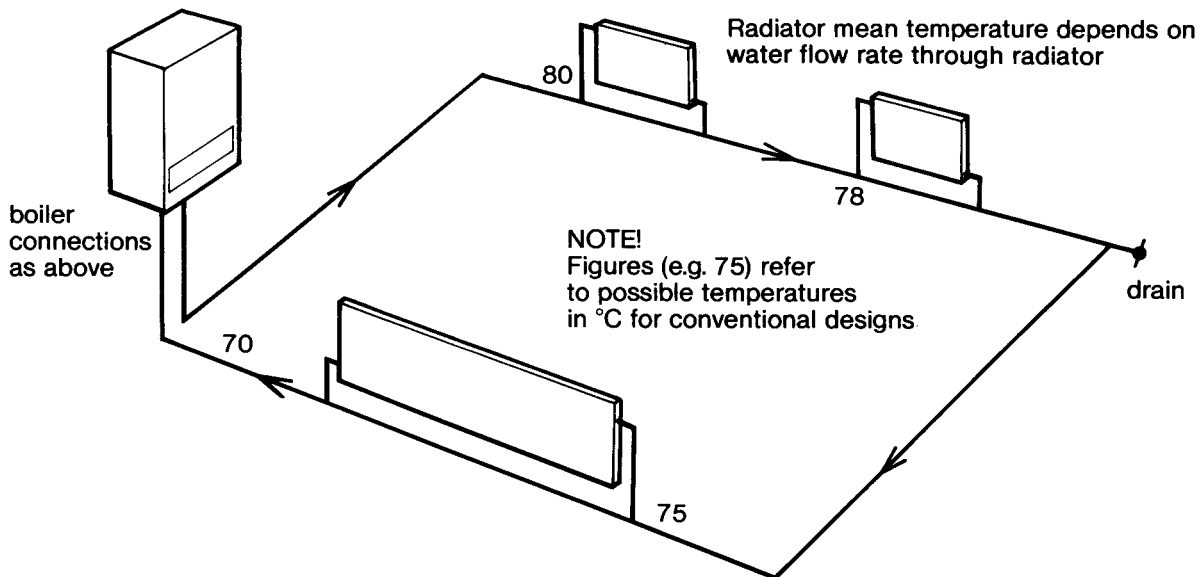


Fig.6 Schematic single pipe central heating

Salient features of each system:-

2 pipe

- Radiators connected in parallel
- Water flow to each directly affected by pump
- Shutting off radiators affects total flow in system
- Radiators have approx. same mean temperature
- Low flow rate affects all radiators equally

1 pipe

- Each radiator is on individual circuit off main pipe
- Water flow not directly affected by pump. Flow in each radiator depends on thermosyphon + pressure differential between connections to main circuit.
- Shutting off individual radiators hardly affects total flow in system
- Radiator mean temperature progressively drops around system
- Low flow rate seriously affects last radiators on circuit

N.B. Vokera Ltd recommend a 2-pipe system. Single pipe systems are more liable to be troublesome unless carefully designed and installed.

4.6.6 Air Release Points

These must be fitted at all high points where air will naturally collect, and must be sited to facilitate complete filling of the system.

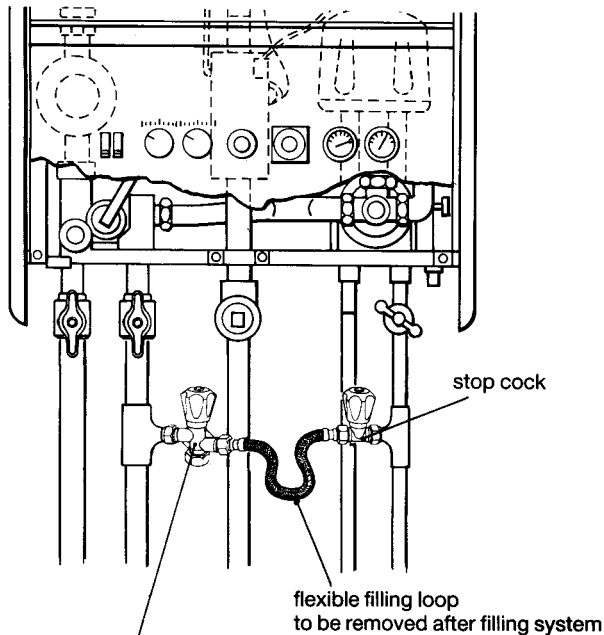
4.6.7 The appliance has an integral sealed expansion vessel to accommodate the increase of water volume when the system is heated. It can accept up to 10 litres (2.2gal) of expansion water. If the appliance is connected to a system with an unusually high water content. Calculate the total expansion and add additional sealed expansion capacity as appropriate.

In general, modern systems will present no problem.

4.6.8 Filling Point

A method for initially filling the system and for replacing water lost during servicing must be provided, and it must comply with local water authority regulations.

A method is shown below using the Vokera filling loop which is acceptable in most areas. In the event that this method is not suitable in a particular area, contact the local authority for preferred method.



Vokera double non-return valve/stop cock

N.B. The installer should ensure that no leaks exist as frequent filling of the system could cause premature scaling of the main heat exchanger.

4.7 Electrical Supply

The appliance is supplied for operation on 240/250V~ 50Hz electricity supply. It should be protected with a 3A fuse.

THIS APPLIANCE MUST BE EARTHED.

The method of connection to the mains electricity must allow complete isolation from the supply.

The preferred method is by using a fused double pole switch with a contact separation of at least 3mm.

The switch must supply ONLY the Appliance and immediate electrical control circuits (e.g. programmer/room thermostat)

Alternatively, use an unswitched shuttered socket outlet with a fused 3-pin plug both complying with BS 1363.

SECTION 5 INSTALLATION

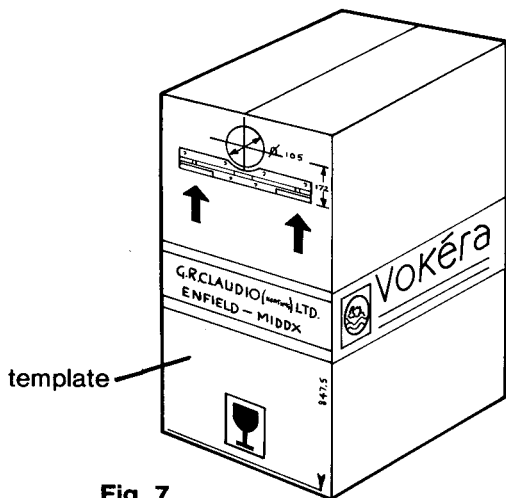


Fig. 7

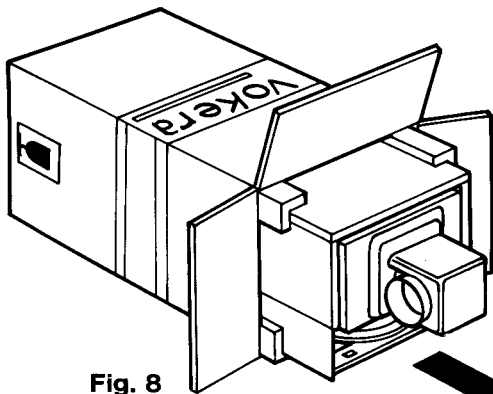


Fig. 8

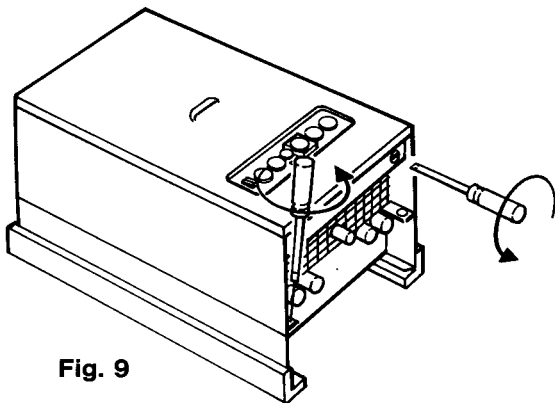


Fig. 9

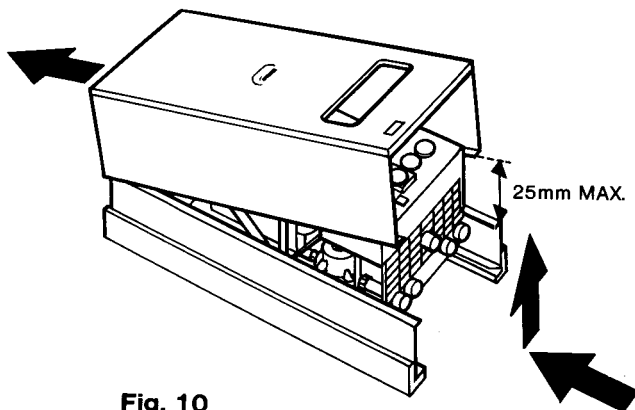


Fig. 10

5.1 Delivery (Fig.7)

The appliance is delivered in a heavy duty cardboard carton. A template is printed on the side of the carton. This should be carefully cut out and used prior to installation. To mark the locations for fixing holes for the upper bracket, the lower fixing points and the flue.

Packed with the boiler are:

- 1 - Wall bracket
- 1 - Fittings pack containing:
 - central heating valves (2)
 - gas service tap (1)
 - cold water stopcock (1)
 - hot water outlet (1 nut & tail)
 - various washers
- 1 - Installation & Service Manual

5.2 Unpacking (Fig.8)

- 5.2.1 Open the top of the carton and remove accessories and top packing.
- 5.2.2 Lay the carton, trolley side down on the floor, restrain the carton, grip the grey frame (not the flue or casing) and withdraw the appliance.

5.3 Preparing for Mounting

- 5.3.1 Remove 4 screws securing the lower part of the casing to the base frame. (fig. 9)

Note 1 The front vertical fixing screws pass through a loose plastic locating plate.
- 5.3.2 Slightly lift the casing and slide it gently towards the top of the appliance to disengage the case from the top suspension hooks. (fig. 10)

(These hooks are of spring steel and located in the frame. Undue lifting of the casing before disengagement will possibly damage them.)
- 5.3.3 Ensure the casing and screws are put to one side in a safe place.
- 5.3.4 Loosely fit (hand tight) the valves and fittings using the washers supplied. (fig. 11)

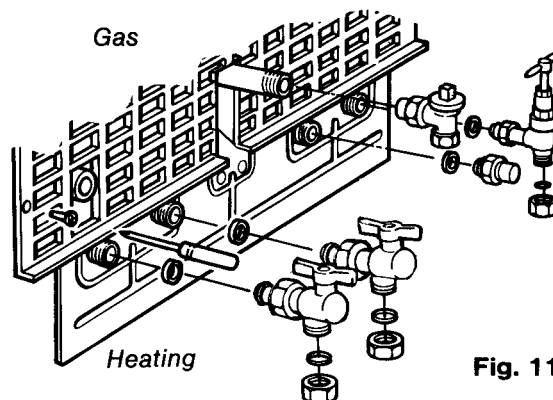


Fig. 11

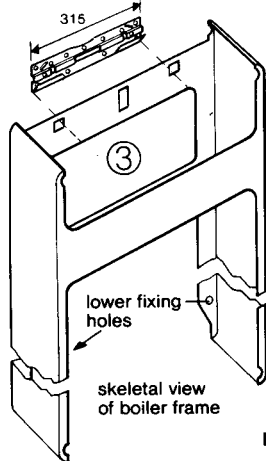
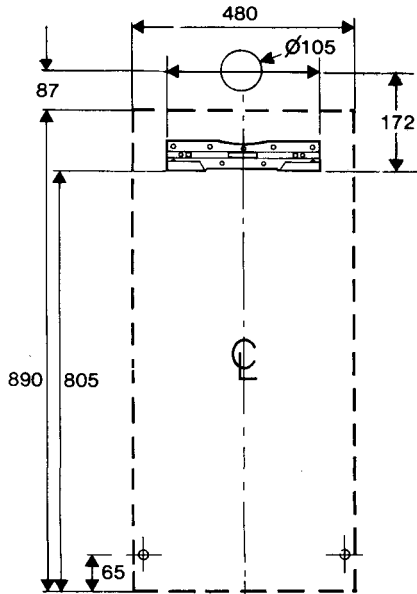


Fig. 12

5.4 Mounting the Appliance (Fig. 12)

5.4.1 Place the template on a smooth, vertical, incombustible surface and use it to locate the bracket base and the flue pipe hole.

Alternatively, position bracket and hole to dimensions in fig.12.

5.4.2 Drill and plug the wall for 2 - 2" No 10 screws for upper bracket and screw the bracket firmly into position using rust proof countersunk screws.

5.4.3 Hang the boiler on the bracket and adjust to final position. Mark the lower fixing holes.

5.4.4 Remove boiler and drill and plug wall for 1½" No 10 screws.

5.4.5 Drill a 105mm hole through the wall to allow passage of the flue pipe.

Refer to fig.12 and figs.13-17 for relevant dimensions for locating the hole. Where it is remote from the boiler take special care to ensure hole is at the correct level so that the finished flue is horizontal.

5.5 Fitting the Flue

5.5.1 Refer to figures 13-17

5.5.2 The flue outlet elbow may be rotated 360 degrees on its vertical axis. The flue may be extended from this in the horizontal plane.

The standard flue pipe supplied may be used for extensions up to 815mm - from outside of wall to centre of the flue elbow. Extension kits are available to order for flue extensions of up to 2.5 metres total length.

5.5.3 Remove the two securing screws and remove the plastic flue cover, slacken the 3 nuts and lugs securing the flue bend and hang the boiler on to the bracket. Adjust the boiler sideways to its correct position and twist the flue bend to the outlet direction required. Carefully level across to check that the hole through the wall is at the same level as the flue bend.

5.5.4 Measure carefully from the actual face of the outside wall to the centre of the flue bend. (Dimension X on Figs 13 & 14)

5.5.5 The flue kit supplied is suitable for an exact dimension of 815mm.

5.5.6 Where X is less than 815mm, the supplied flue must be shortened as follows:-

Subtract the measured length from 815mm. The difference is the precise length to be removed from the inner flue tube ($815 - X =$ length to be cut off)

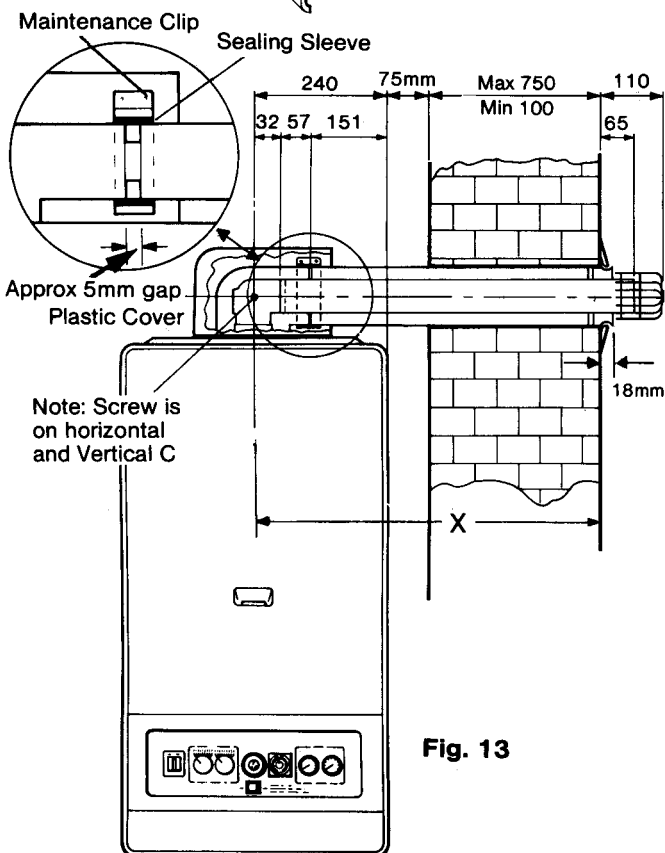


Fig. 13

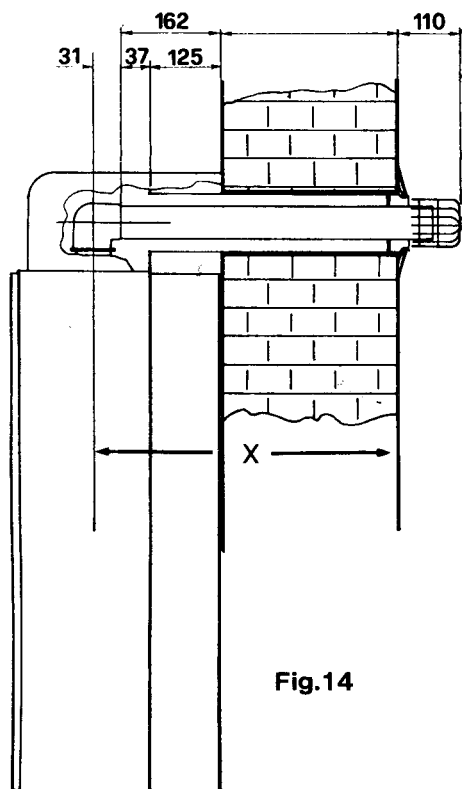


Fig.14

The outer air tube should be shortened by an extra 5mm to allow a gap for easy working (see inset on fig.13). The two tubes may be separated by removing screw G (fig.16)

Example

X is measured as 630mm.
 Amount to be cut off inner tube is $815 - 630 = 185\text{mm}$
 Amount to be cut off outer tube is $(815 - 630) + 5 = 190\text{mm}$

5.5.7 Where X is more than 815mm an extension kit (or kits) is needed. The standard uncut lengths with extension(s) is as follows:-

Supplied flue plus one extension **1605**
 Supplied flue plus two extensions **2395**

The same procedure is followed:

1. Measure X
2. Subtract X from appropriate figure and shorten the tubes accordingly.

Examples

X = 1295
 $1605 - 1295 = 310$

Shorten inner tube of last extension by 310mm
 Shorten outer tube of last extension by 315mm

X = 1920 so $2395 - 1920 = 475$
 Shorten inner tube of last extension 475mm
 Shorten outer tube of last extension 480mm

DO NOT CUT THE SWAGED SOCKETS OFF EXTENSION TUBES. ALWAYS CUT OFF AT PLAIN END. CUT CLEAN & SQUARE WITH FINE TOOTH SAW AND REMOVE BURRS.

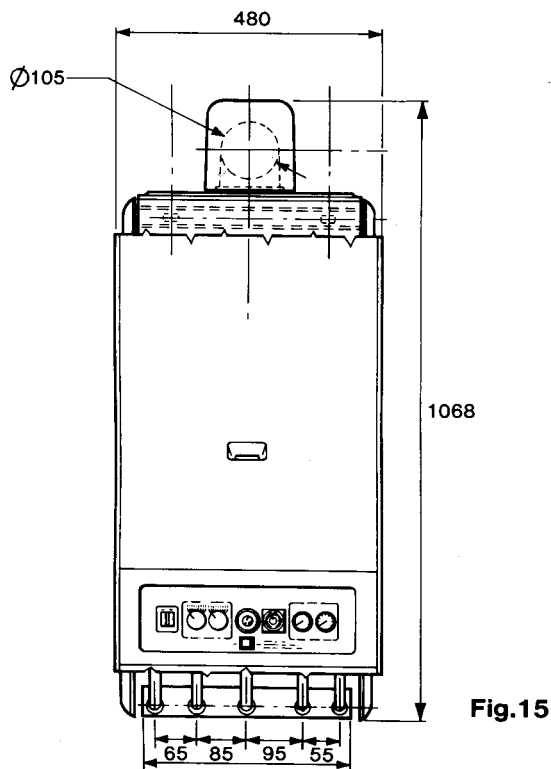


Fig.15

Standard flue length 800mm
 A must be 10mm wider than longest length used unless inserted from outside.
 B to be 750mm max. 100mm min.
 D max. 815mm for a single length of flue

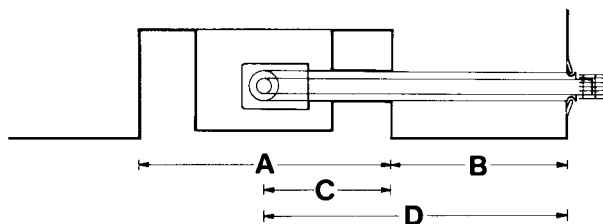


Fig.17

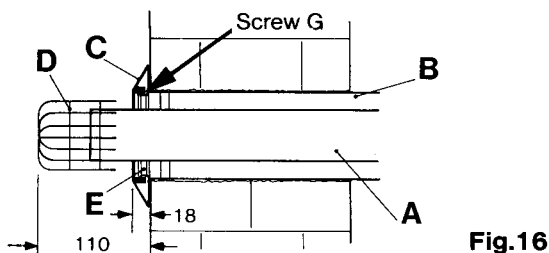


Fig.16

- 5.5.8** Remove the three securing screws and lugs and lift off the flue bend with an upward twisting motion.
- 5.5.9** Ensure inner and outer terminal tubes are firmly fitted together with the screw G (fig.16) properly secured.
- 5.5.10** Push the terminal tubes through the wall until the face of the outer tube protrudes 18mm from the face of the wall (fig.16). The terminal grill (D) will then protrude 110mm from the wall face.
- 5.5.11** If extension pieces are used fit these by pressing and twisting the socket ends over the terminal tubes making sure they are pressed fully home. Silicone grease applied to the surfaces will ease the task.
- 5.5.12** Make sure the entire length of flue is truly horizontal and adequately supported. Use at least one bracket for each extension. (Conventional adjustable strap supports suffice, Vokera stockists can supply if necessary).
- 5.5.13** Slide the maintenance clip and sealing sleeve over the flue pipe (see fig.13). Lift the inner flue and by pressing and turning slide the inner flue tube over the inner elbow. Silicone lubricant may be used.
- The flue elbow will now be directly over its correct sealing position. Press it down between the fixing screws and secure with the 3 lugs and nuts.
- 5.5.14** There must now be a gap of approximately 5mm from the elbow to the end of the outer tube.
- Check also that the outer end of the flue projects as indicated in fig.16.
- 5.5.15** Referring to fig.13 slide the sealing sleeve and maintenance clip into position and secure the clip screws.
- 5.5.16** Check adjust and tighten all supports.
- 5.5.17** Seal the peripheral gap around the outer tube with cement or mastic and slip the cosmetic flexible plastic collar (fig.16 item C) into groove on the pipe. This operation can only be carried out with external access.
- N.B. Absence of the collar **will not** affect operation of the appliance.
- 5.5.18** When the flue and appliance are finally positioned screw the lower frame to the wall (fig.12).
- 5.6 Connecting the gas and water**
- 5.6.1** Figs 11 and 15 show the locations of the fittings.
- 5.6.2** Do not over tighten nuts and use another spanner to apply counter force to avoid damaging the appliance
- 5.6.3 Gas Supply**
Connecting the gas supply
- Connect a 15mm gas pipe to the gas service tap and tighten the union nut securing the tap to the appliance.
- Do not overtighten and use another spanner as a counter force to avoid straining internal connections.
- 5.6.4 Central Heating**
Connect the central heating pipework (22mm o.d) to the respective valves, right hand = flow, left hand = return, and tighten the nuts
- 5.6.5 Hot Water**
- 5.6.5.1** Provide a suitable coupling and connect the hot water draw-off pipe to the 15mm o.d. tail. Tighten the nut
- 5.6.5.2** If the hot water system does not include a tap below the hot water outlet connection provide a suitable drain tap to permit draining of the appliance hot water side during servicing.
- 5.6.6 Cold Water**
- 5.6.6.1** Connect a 15mm cold water service pipe to the inlet stopcock of the appliance. Tighten the nut.
- 5.6.6.2** If the cold water supply is liable to large pressure fluctuations, some form of flow/pressure regulator should be fitted in the supply pipe.
- 5.6.7 Safety Valve Discharge**
The safety valve is located near the pump. It has a threaded outlet (Rc 1/2" (1/2" BSP Int)) to permit a discharge pipe to be connected.
- When connecting, ensure the discharge pipe does not restrict access to or operation of the central heating valves.
- The discharge should terminate facing downwards exterior to the building in a position where discharging (possibly boiling) water will not create danger or nuisance; but in an easily visible position.
- 5.7 Electrical Connections**
- 5.7.1** The electricity supply must be as specified in clause 4.7. If controls external to the appliance are required design of the external electrical circuits should be undertaken by a competent person.
- See Section 10 for further advice.
- N.B. It is essential that all external control circuits and wiring is wired from the same electrical isolator as serves the appliance.**
- Factory fitted internal wiring must not be disturbed when wiring external controls.

5.7.2 To gain access to the terminals release the 2 screws securing the outer control fascia. (refer to fig 18)

Note these 2 screws and associated cup washers are not captive. Ensure they are not lost.

The panel is bottom hinged. Pull it forwards and downwards until it rests in an approximately horizontal position. In the process the gas control knob should be depressed to avoid impeding movement of the fascia.

The terminal block is easily visible on the left of the printed circuit board. (fig 19)

5.7.3 The electricity supply cable from the isolator and the Appliance terminal block must be 3 core flexible sized 0.75mm² (24 x 0.2mm)

Wiring to the Appliance should be rated for operation in contact with surfaces up to 90°C

5.7.4 Pass the cable through the cord anchorage and connect it so that should the cable slip the anchorage the current carrying conductors become taut before the earthing conductor. (fig 20)

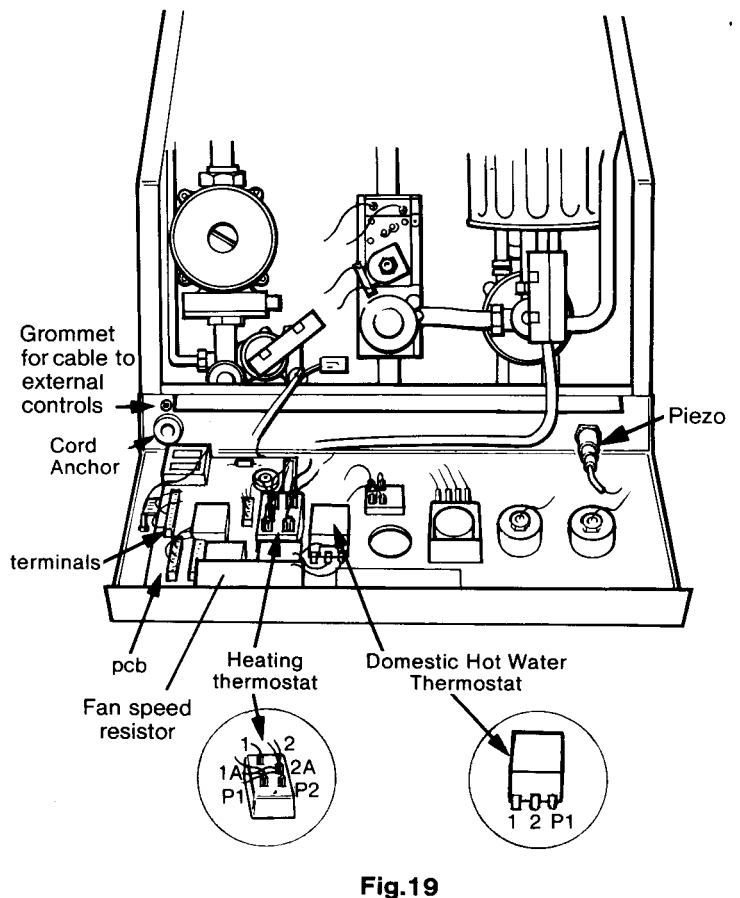
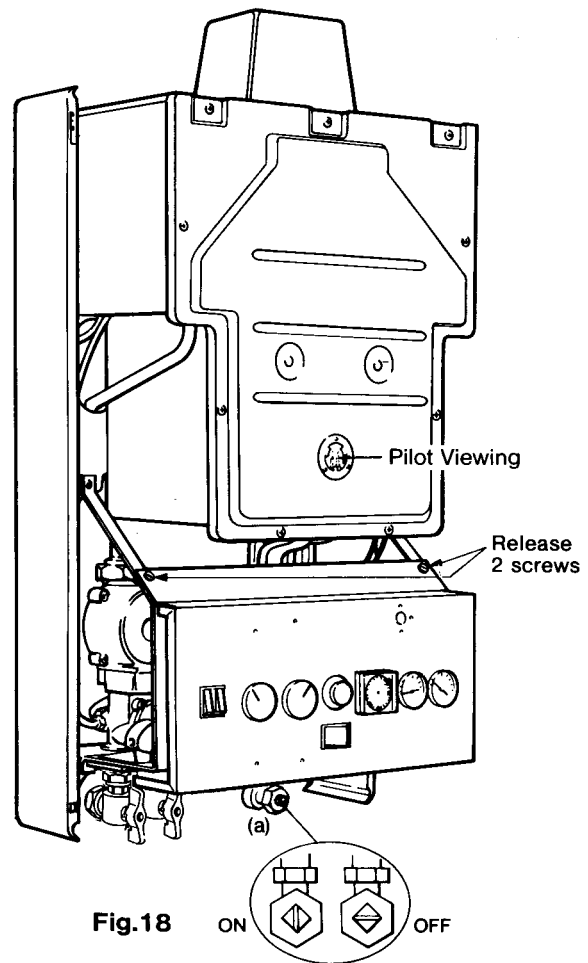
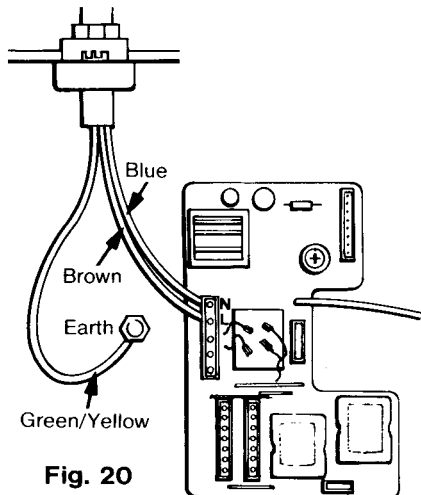
5.7.5 Securely tighten all terminal screws and arrange the cable with slack between the anchor and the terminal block. Tighten the cord anchorage.

5.7.6 Neatly arrange the external cable in such a way that unrestricted opening of the controls fascia is possible without strain on the cable.

5.7.7 External controls may be wired from terminals 3&4 (after removing a factory fitted link). If a neutral is needed use terminal 5.

A separate cable entry is provided for use if required.

The conductors should be so connected that the conductor to terminal 3 becomes taut before those to 4 or 5 should the cable be strained.



SECTION 6 COMMISSIONING

- 6.1** Where the text bears identifying numbers in brackets, refer to *figs. 1A and 1B* unless otherwise instructed.
- 6.2 Gas Supply Installation**
Inspect the entire installation including the meter, test for soundness and purge, all as described in CP 331.3
- 6.3 Central Heating System**
- 6.3.1 IMPORTANT**
Do not release air from the red sealed expansion tank. It is charged with air at the factory to 1 bar (15psi g)
- 6.3.2 Initial Flushing of the Pipework**
- 6.3.2.1** The appliance contains components likely to be damaged or blocked by grease and dirt from the system. It is recommended therefore that the appliance be disconnected from the system for the initial flush.
- 6.3.2.2** Close the appliance central heating valves and disconnect from the appliance.
Connect a temporary water supply to the return and a drain pipe to the flow and flush the entire system until the drain discharges clean water (for at least five minutes).
Drain the system by opening the drain taps at all low points. Close the drain taps and reconnect the flow and return pipes to the appliance.
- 6.3.3 Initial Filling of the System**
- 6.3.3.1** See Clause 3.4.4. and 4.6.8.
- 6.3.3.2** Open central heating flow and return (red handle vertical indicates open, horizontal indicates closed). Unscrew black cap on automatic air release valve (5) one full turn (leave open permanently).
- 6.3.3.3** Close all air release taps on the central heating system.
- 6.3.3.4** Gradually open stopcock at the filling point connection to the central heating system until water is heard to flow. Do not open fully.
- 6.3.3.5** Starting with the lowest radiator open each air release tap in turn closing it only when clear water, free of bubbles, flows out. In the same way release air from any high points in the pipework.
- 6.3.3.6** Open the primary vent screw on the top of the dhw heat exchanger (10) until clear water is discharged.
- 6.3.3.7** Continue filling the system until at least 15m registers on the gauge (12) then turn off the filling point stopcock.
- 6.3.3.8** Inspect the system for water soundness and remedy any leaks discovered.
- 6.3.4 Setting the System design pressure**
- 6.3.4.1** The design pressure must be a minimum 10m and a maximum of 15m. These figures are read off the pressure gauge and equal 1 bar and 1.5 bar respectively.
- 6.3.4.2** The actual reading should ideally be 10m *plus* the height in metres to the highest point of the system above the base of the appliance (up to the maximum of 15m total). N.B. The safety valve is set to lift at 3 bars (30m/45psig).
- 6.3.4.3** To lower the system pressure to the required value turn the red knob of the safety valve (25) a quarter turn to release water until the required figure registers on the gauge (12).
- 6.3.5 Filling the hot Water System**
- 6.3.5.1** Close all hot water draw-off taps.
- 6.3.5.2** Open cold water inlet stopcock (18)
- 6.3.5.3** Slowly open each draw-off tap until clear water is discharged.
- 6.4 Checking Electricity Supply**
- 6.4.1** Carry out preliminary checks for earth continuity, polarity, and resistance to earth as described in the British Gas Multimeter Instruction Book, gaining access as required according to clauses 5.7.2 in this manual.
- 6.4.2** Leave the appliance with the control fascia closed and secured and with the mains electricity switched OFF
- 6.5 Establishing the Pilot flame**
- 6.5.1** The main electricity supply is switched OFF (6.4.2).
- 6.5.2** Ensure main gas supply is ON.
- 6.5.3** Turn on the appliance gas service tap (20)
- 6.5.4** With the Appliance switched off press the gas control valve knob (30) and hold it in. At the same time, repeatedly press the Piezo button (17) to light the pilot burner. Once a flame is viewed through the port (see fig 18) stop pressing the Piezo but hold in the gas knob for a further 15 secs then release the knob slowly.
- 6.5.5** The pilot flame should remain alight and envelope the thermocouple. (see fig 21) If it goes out, wait 3 minutes and repeat from 6.5.4.

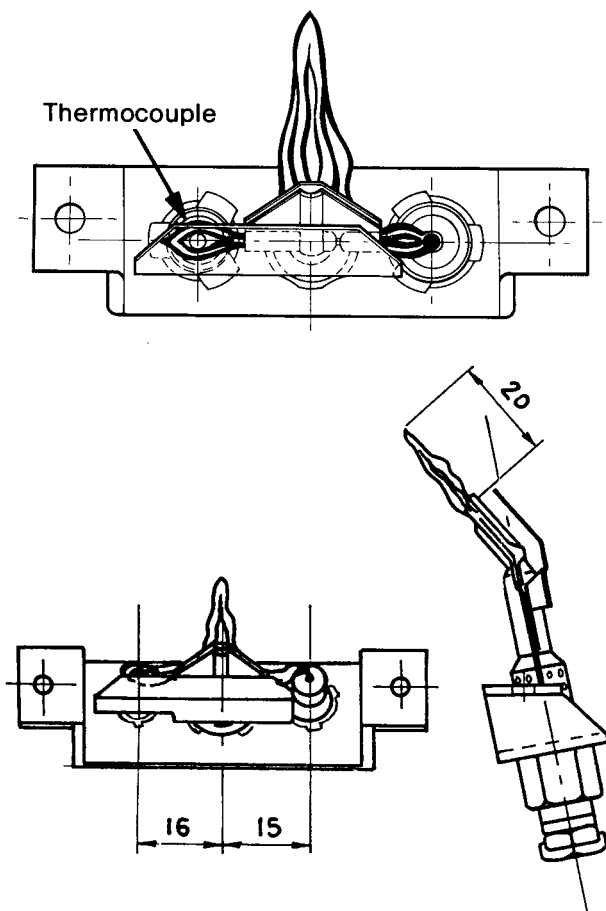


Fig 21 Pilot Flame Configuration

- 6.5.6** When the pilot flame is established switch on the mains electricity and switch on the appliance switch (29). This permits slow speed operation of the flue fan to maintain the pilot.
- 6.5.7** Refer to fig 21 and check that the pilot flame is correct. If it is necessary to adjust the flame, first switch off electricity and refer to 5.7.2 for access instructions. Fig 22 shows the location of the adjustment screw. Turning clockwise decreases the flame and vice versa.
- 6.5.8** Before completion of this section check the output of the thermocouple start at 6.5.1. but first remove the thermocouple leads from their connections at the side & rear of the gas valve and attach the BGC multimeter to the leads. Proceed through to 6.5.4 when the pilot is lit, hold the gas valve in to permit a reading of the meter. An output in the range of 7-10mV is satisfactory. Reconnect leads to gas valve

6.6 Lighting the boiler

- 6.6.1** Before lighting open flow and return valves (cl. 6.3.3.2)
If external controls are fitted (e.g. timeclock and thermostat) ensure they 'call for heat'. The commissioning of the appliance may be easier if the external controls are temporarily disconnected and terminals 3 & 4 linked. (For access procedure turn off electricity and refer to clauses 5.7.2 for instructions)
- 6.6.2** Put the Summer/Winter switch (16) in the winter position.
- 6.6.3** Set the control thermostat at its highest setting.
- 6.6.4** Set the timed/constant switch to constant.
- 6.6.5** The main burner should now light.
- 6.6.6** N.B. The most common cause of failure to light is insufficient water flow see cl. 4.6.3 & 6.11.2

6.7 Check Burner pressures

- 6.7.1** The heat inputs for high and low gas rates are factory set to the maximum values given in section 3.6 for domestic hot water and central heating but it is necessary to check them when commissioning.
- 6.7.2** The maximum heat input for the central heating mode may be reduced by a simple adjustment to suit the system load. This in no way affects the appliance maximum which is always obtained in the domestic hot water mode.
- 6.7.3** Turn off the main electricity supply. Gain access to the interior as instructed in clause 5.7.2.
- 6.7.4** Locate the main burner pressure test point (fig 22) and slacken the screw half a turn in an anti clockwise direction. Attach a suitable pressure gauge. Turn on the main electricity supply, turn on a domestic hot water tap to operate boiler in dhw mode.
- 6.7.5** The pressure reading for maximum rate should be 11.5 mbar/4.6in wg (plus or minus 1.1 mbar/0.46in wg). If the pressure is wrong it should be adjusted as instructed in clause 8.23. (N.B. Whenever the maximum rate is adjusted check and adjust the minimum rate too).
- 6.7.6** If the boiler temperature is above 60°C turn the dhw thermostat down until the low flame is established. If low fire cannot be established in this way, turn off the mains and transfer the cable on terminal 2 of the dhw thermostat to terminal 1 (Fig 19 shows location). Switch on electricity.

6.7.7 When low flame is established, the pressure gauge should read 1.9 mbar (0.8in wg) plus or minus 0.2mbar/0.08in wg. If it is different, adjustment should be made in accordance with the instructions in clause 8.23.

6.7.8 If the thermostat connection has been transposed to obtain low flame (cl 6.7.6) turn off the mains electricity and replace the cable on terminal 2.

6.7.9 Setting the maximum rate for central heating (Range Rating)

Refer to fig 23 to determine pressure for the heating output you need (e.g. for 17.6kW a pressure of 8.4mbar is needed). Use a screwdriver to adjust the potentiometer (fig 24) until the required pressure is indicated on the gauge. Once this pressure has been fixed it should be indelibly recorded on the data badge. This is to ensure that the burner can be reset when any service operation involves alteration of burner settings.

6.8 Checking the flue system

6.8.1 The flue system should be visually checked for soundness. Check all clamps and fixings are secure and tight.

6.9 Checking the Heating Thermostat

6.9.1 Allow the system to warm up and manipulate the c/h thermostat to ensure the burner switches from 'high' to 'low' and 'low' to 'off' and vice versa (Scale range covers approx. 45°C - 85°C)

6.10 Checking the operation of the flame failure Device

6.10.1 With the burner on high flame turn the gas knob in a ↻ clockwise direction and confirm that a definite 'click' is heard. Relight pilot (6.5.4).

6.11 Regulating the central heating system

6.11.1 Fully open all radiator and circuit valves and run the appliance in the central heating mode until heated water is circulating. If conditions are warm, remove any thermostatic valve heads.

6.11.2 If the burner will not light, ensure that water is in fact circulating.

6.11.3 Adjust radiator return valves and any branch circuit return valves until the individual return temperatures are correct and are approximately equal.

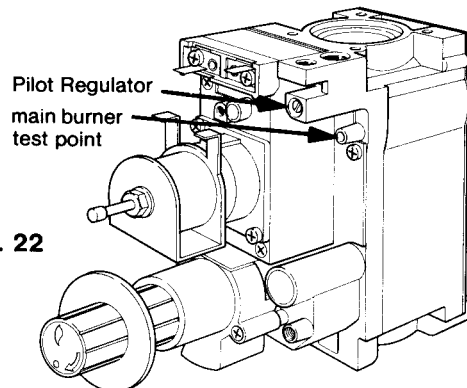


Fig. 22

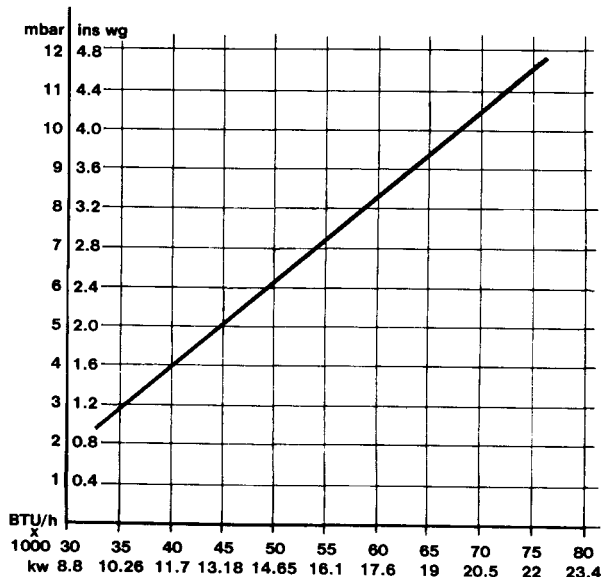


Fig. 23

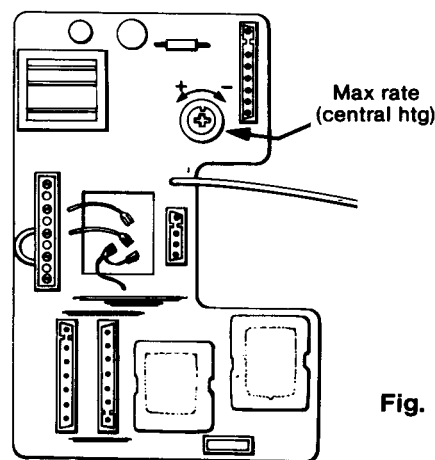


Fig. 24

6.11.4 When all is adjusted, progressively close all radiator valves to ensure that the appliance still operates when flow through the system is limited.

If the burner cuts out prematurely due to lack of water flow through the appliance, the system should be regulated to ensure a flow rate of at least 350 litres/hour (1.28 gals/min).

6.12 Final Flushing of the Heating System

6.12.1 After the system has been thoroughly heated to about 60°C (140°F) or above, and hot water has circulated to all parts any residual grease, flux and other foreign material will have been dislodged.

6.12.2 Inspect the system for soundness. Turn the appliance off and turn off the main switch (29).

Open all drain taps and quickly drain the system of water whilst still hot to remove offending substances. Refill as instructed in clause 6.3.3. 1-8

6.13 Filling, testing and regulating the Domestic Hot Water System

6.13.1 Start with the appliance switched on having completed the procedures described in clauses 6.4 to 6.10.

6.13.2 Open a domestic hot water tap (preferably the bath tap).

Ensure cold water inlet stopcock is open and the dhw thermostat (26) is set at maximum.

6.13.3 The flow of water should activate the differential pressure device and drive the diverting valve (15) to its other position thus heating the domestic water flowing through the coil of the dhw heat exchanger.

The operation of the 3-port valve will close the burner control micro-switch (24) and light the burner on maximum rate.

6.13.4 If the burner does not light, check that the water flow rate is above the minimum required to operate the differential pressure device (2.8 litres/min/0.61 gals/min).

6.13.5 The temperature of the water will depend on the rate at which it flows.

If, due to high water pressure the flow rate is unacceptably high (and thus the temperature too low for practical use) the flow rate should be adjusted.

6.13.6 To adjust the flow rate refer to fig 25 and locate the adjustment screw.

Slacken the locknut and turn the screw clockwise until the required temperature is reached. Tighten locknut. It is best to set for the lowest acceptable temperature since the user can gain higher temperatures by restricting flow at the tap. N.B. If the cold supply is subject to large fluctuations or is above the permitted maximum a suitable pressure/flow regulator should be fitted in the cold water supply to the appliance.

6.13.7 Turn the appliance mode selector switch (16) to the summer position.

Slowly close the tap to reduce the draw off rate to above the minimum (approx. 2.8 litres/min/0.61 gals/min). Rotate the dhw control thermostat to ensure it operates at its various settings.

6.13.8 Close the draw-off tap still further. The burner should stop when the rate falls below about 2.8 litres/min/0.61 gals/min.

6.14 Final check of Operations

6.14.1 Re-check for gas soundness

6.14.2 Re examine heating and hot water systems and cold water supply for water soundness.

6.14.3 Check the appearance of the pilot and gas flame to assess adequacy of combustion air supply.

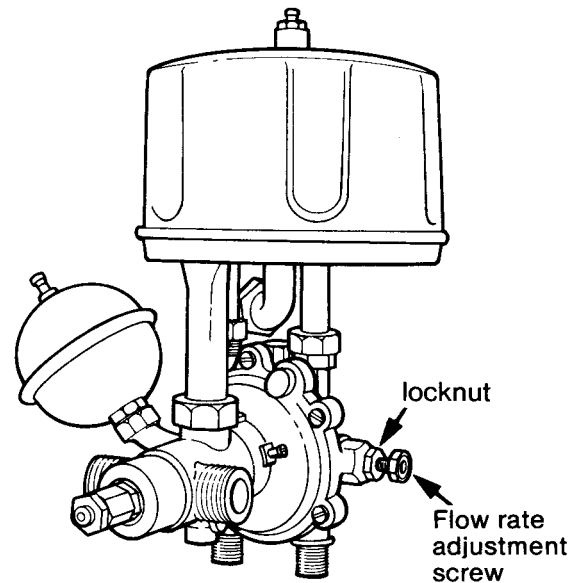


Fig. 25

6.14.4 Re-check the flue system for soundness and adequacy of supports.

6.15 Checking operation of High Limit Thermostat.

6.15.1 IMPORTANT, the boiler must constantly be attended during the test. To do this, switch off electricity and remove the red lead from terminal 2 of the dhw thermostat (see fig 19). This prevents switching to low fire. Turn on electricity supply. Operate on the dhw mode with a low draw off rate, until boiler temperature rises to about 95°C when the high limit thermostat should operate and shut down the appliance. (This will extinguish the pilot flame also). Turn off electricity and replace red wire on terminal 2 on dhw thermostat.

6.16 Concluding Operations

6.16.1 If external controls have been disconnected and terminals 3 & 4 temporarily linked, remove the link and reconnect the external control circuit, check the operation of the external controls.

6.16.2 Close up the control fascia in reverse order to the opening instructions (clause 6.7.2)

6.17 Refixing the front cover (fig 26)

6.17.1 Ensure the plastic fixing plate is located and offer up the front casing to the back frame in a near vertical attitude and hook the holes in the casing over the spring steel hooks on the frame.

Slide the casing downwards to fully engage the hooks and to align the bottom fixing holes.

6.18 Supplementary Instruction for fitting & removing optional time clock and for wiring to external controls.

Section 10 Appendices A & B at the rear of this manual provides full instructions for fitting and wiring the optional built-in time switch and for wiring to external controls.

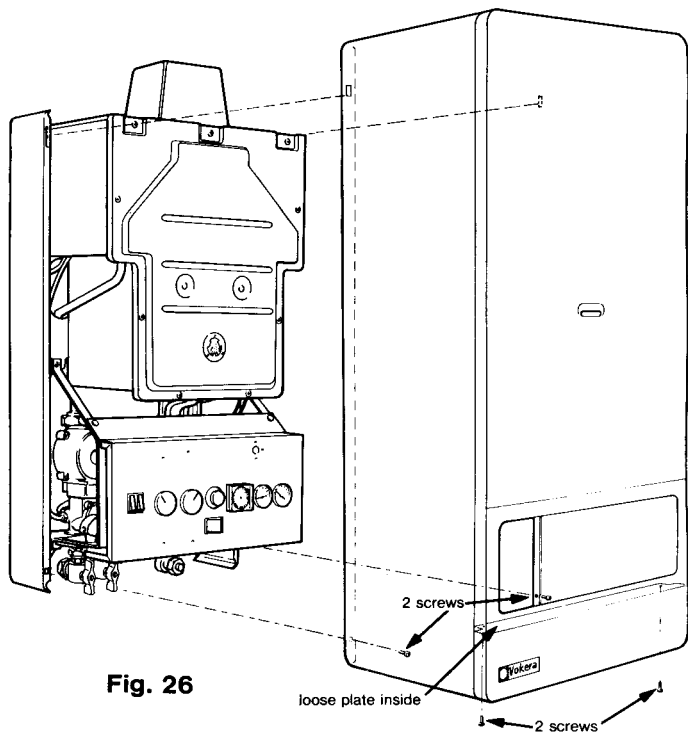


Fig. 26

SECTION 7 INSTRUCTING THE USER

7.1 Hand over the copy of the Users Instructions supplied with the appliance and explain how to use the unit in both heating and hot water modes.

7.2 Take the User step by step through the lighting instructions.

7.3 Show the user how to switch off the appliance quickly and indicate the position of the electric supply isolator.

7.4 Explain that air supply grilles must not be blocked in any way.

7.5 Inform the user of the location of all drain cocks and air vents.

Explain how to turn off the appliance for both short and long periods and advise on the precautions necessary to prevent damage should the appliance be inoperative when freezing conditions may occur.

7.6 Finally, advise the User that, for continued safe and efficient operation, the appliance must be serviced by a competent person at least once a year.

SECTION 8 SERVICING INSTRUCTIONS

8.1 General

To ensure efficient safe operation of the appliance it is necessary to carry out routine servicing at regular intervals.

The frequency of servicing will depend upon the particular installation conditions and the use to which the boiler is put; but in general, once per year should be adequate.

The following instructions apply to the boiler and its controls, but it should be remembered that the central heating and domestic hot water systems will also require attention from time to time.

8.2 Important Notes

WARNING: Having carried out a preliminary flame check and before starting any servicing work, switch OFF the mains electricity supply and disconnect the plug at the main isolating switch and socket. (If a switch is used, remove the fuse).

Turn off gas supply at the gas service tap fitted to the appliance.

Always test for gas soundness after any service work and after exchanging any gas carrying component.

Always after any service work and after exchanging any electrical component follow the instructions in the British Gas Multi Meter Book for preliminary electrical system checks, particularly the checks.

A Earth continuity
C Polarity, and
D Resistance to earth

8.3 Recommended Routine Servicing

8.3.1 Annual Servicing

The following procedures should be carried out at least once per year

1. Inspect exterior for signs of damage and deterioration particularly of flue pipework and electrical connections.
2. Inspect air supply and ventilation arrangements comparing them with the requirements laid down in clauses 4.5.1 & 2 to ensure no alterations have been made since installation.
3. Turn off mains electricity and remove front casing (see clauses 8.4.1 - 8.4.2)
4. Replace fuse if previously removed (8.2 above) and turn on electricity, run the boiler for a few minutes in the domestic hot water mode to permit inspection of its operation. This is accomplished by opening a domestic hot water draw off tap and inspect burner for yellowing of flame tip, flame lift off or sooting.

5. Ensure central heating valves (fig 1A) are open. Note these are ¼ turn valves which are open when handle is vertical, closed when handle is horizontal.

Observe pressure gauge reading (fig 1A) which should be approximately 10m.w.g. when the system is cold (see clause 6.3.4)

6. Turn off mains electricity and turn off gas service tap on the appliance.
7. Gain general access as described below in clause 8.4 and 8.5
8. Remove pilot burner assembly and brush clean. Inspect pilot injector and blow clean (see clause 8.5)
9. Remove main burner. Lightly clean with a soft brush and inspect for damage. If, during initial inspection, any combustion irregularity was suspected, remove injectors and clean or replace (see clauses 8.6 and 8.7)
10. Place cloth below combustion chamber to catch debris.

Remove the front cover of flue hood to gain access to the main heat exchanger and lightly clean with stiff long bristle brush.
11. Inspect combustion chamber lining. The insulating material is easily damaged. Do not scrape, but clean off lightly.

If any panels are damaged these should be replaced (see Clause 8.10)
12. Replace all parts but leave the controls fascia open and outer casing off.
13. Undertake a complete commissioning check as detailed in section 6.
14. Close up control fascia and refix front casing.
15. Clean off casing using soft cloth and dilute detergent.

8.3.2 Occasional Servicing

1. The life of individual components varies and they will need servicing as and when faults develop. The fault finding sequence charts in section 9 will serve to locate which component is the cause of any malfunction, and instructions for removal, inspection and replacement of the individual parts are given in the following pages.

2. The domestic hot water heat exchanger may in certain conditions become partially blocked by scale deposits. Evidence of this will be deterioration in performance.

This condition could well be treated using proprietary descalants following makers instructions without dismantling the appliance by circulating a fluid through the dhw coil. To do this, disconnection from hot and cold services is necessary. Reconnect only after thorough flushing with clean water.

8.4 To Gain general Access

To remove components access to the interior is essential. Refer to figs 27-29

8.4.1 To remove front casing

Release 4 screws at the base. 2 vertical towards front and 2 horizontal towards rear.

Pull bottom of case slightly forward and push case upwards to disengage from top support hooks.

Slightly spring sides of case outwards and withdraw from the appliance.

8.4.2 To open controls fascia (fig 28 & 29)

Release 2 screws at the top of the fascia.

Swing fascia forwards and down depressing the gas control knob which otherwise would impede free movement.

8.4.3 Servicing may be easier if lower plastic grille is removed.

Release 2 vertical screws and pull grille downwards.

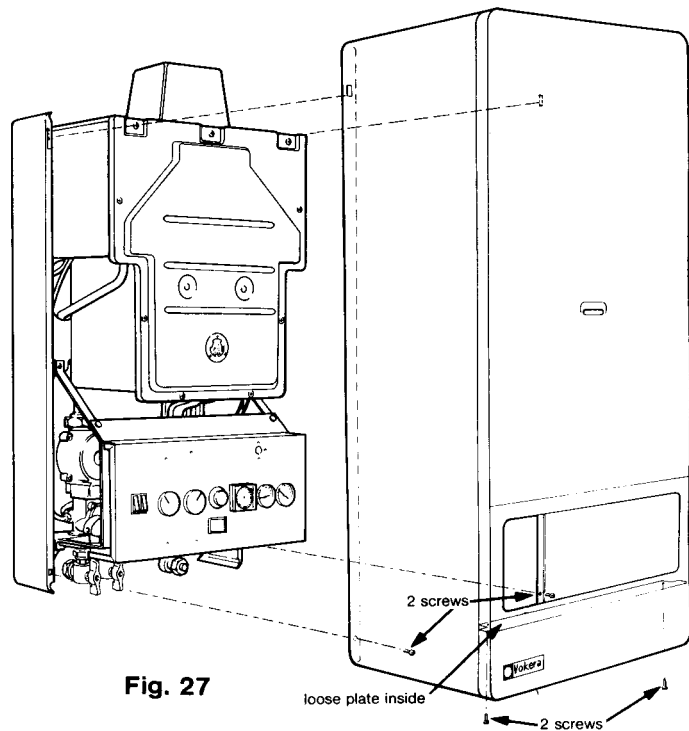


Fig. 27

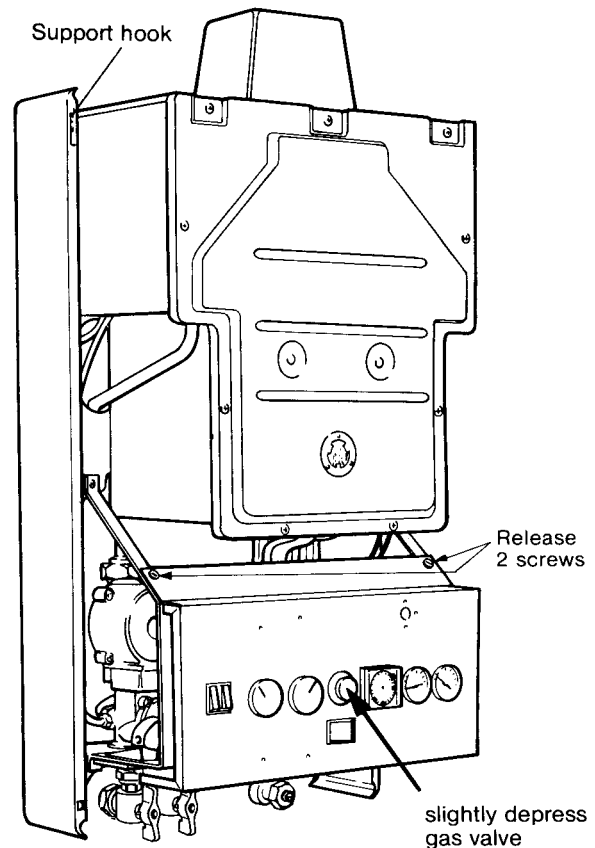


Fig. 28

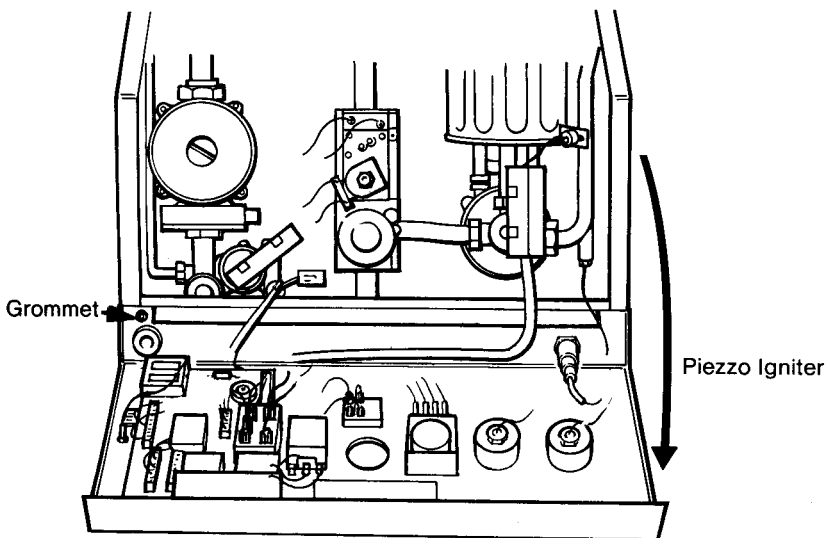


Fig. 29

8.5 To remove/replace electrode, thermocouple and pilot burner

Refer to fig no. 30 & 31

For part no reference see fig 60

8.5.1 Gain general access as (8.4)

8.5.2 Remove room sealed chamber front cover plate by releasing nine screws and easing cover off. The screws are not captive (Fig. 30).

Inspect gasket for damage. If damaged, replace, secure with Bostik adhesive.

8.5.3 To remove pilot burner assembly (Fig.31)

8.5.3.1 Pull off electrode lead.

8.5.3.2 Disconnect pilot pipe and thermocouple at gas valve end.

8.5.3.3 Release 2 screws securing pilot burner assembly.

Ease pilot burner assembly and pipe forward, sliding rubber gasket from frame.

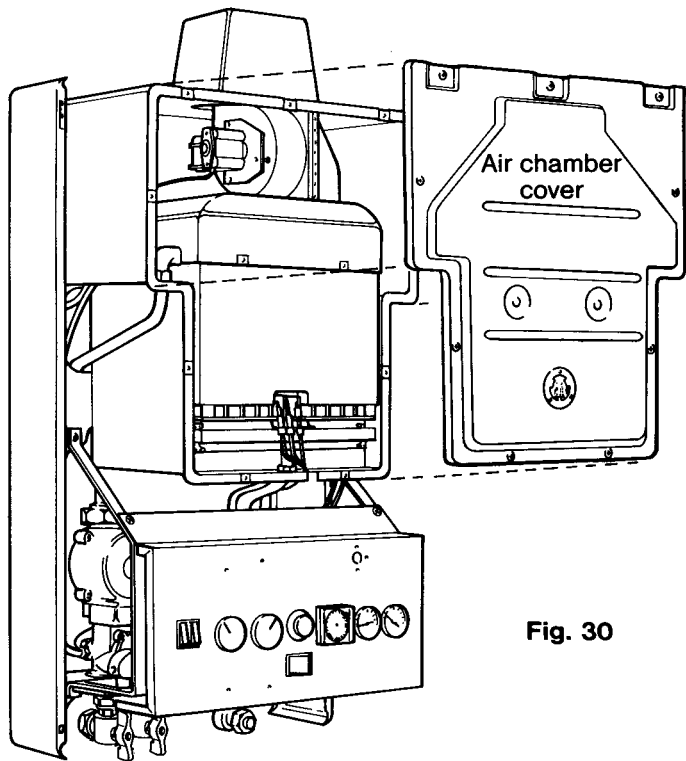


Fig. 30

8.5.4 Remove Electrode

Pull off electrode lead.

Unscrew electrode retaining nut.

Remove electrode.

Replace in reverse order.

8.5.5 To remove/replace thermocouple

8.5.5.1 Remove burner assembly (8.5.3). Unscrew retaining nut at burner end and pull out probe. Ease it through the rubber gasket. (N.B. Retaining nut is compression fit and slides off the probe in an upward direction).

8.5.5.2 If a new thermocouple is to be fitted, bend it to approximate shape of old one and replace in reverse order.

N.B. Make sure rubber gasket is intact and properly fitted to boiler case so as to be air tight

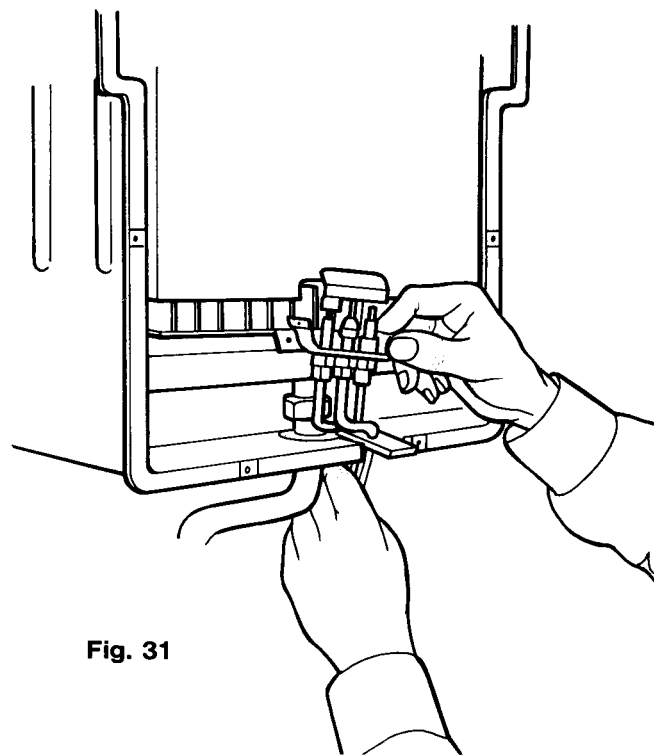


Fig. 31

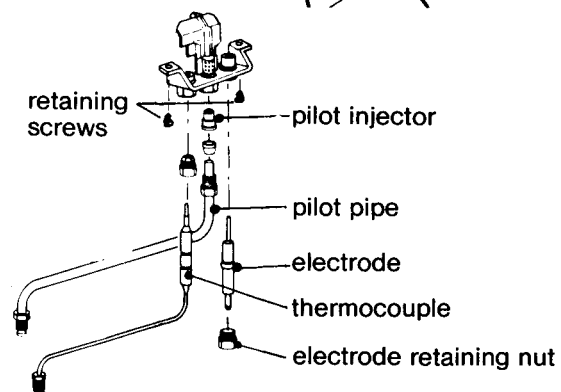
8.5.6 To remove/replace pilot burner and/or injector

8.5.6.1 Remove pilot assembly (8.5.3).

8.5.6.2 Remove electrode and thermocouple.

8.5.6.3 Unscrew pilot supply pipe union, and withdraw pipe
N.B. Pilot injector is held captive by bush on the end of the connecting pipe. It will drop out as pipe is removed.

Reassemble in reverse order.



8.6 To remove burner bar & main injectors (figs 32 & 33)

8.6.1 Gain general access (8.4)

8.6.2 Remove cover plate (8.5.2)

8.6.3 Remove pilot burner (8.5.3)

8.6.4 Unscrew gas supply union and pull pipe downwards to break joint. Ensure rubber seal is intact. If seal is damaged replace during re-assembly.

8.6.5 Release 4 securing screws and pull bar forward and out.

8.6.6 If necessary, unscrew 13 injectors.

8.6.7 Reassemble in reverse order.

8.7 To remove main burner (figs 32 - 35)

8.7.1 Carry out operations 8.6.1 - 8.6.5

8.7.2 Release two screws and remove baffle plate. (fig. 34)

8.7.3 Release two vertical screws securing front of burner.

Ease burner downwards and forwards. It will disengage from rear support pegs.

8.7.4 Reassemble in reverse order.

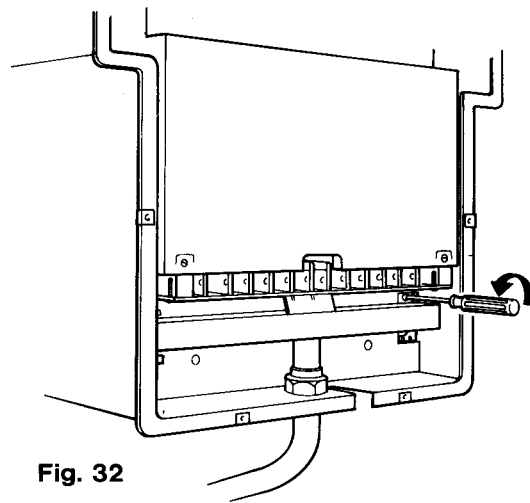


Fig. 32

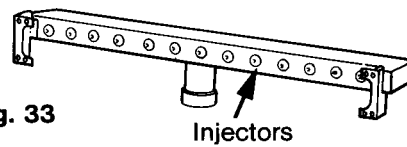


Fig. 33

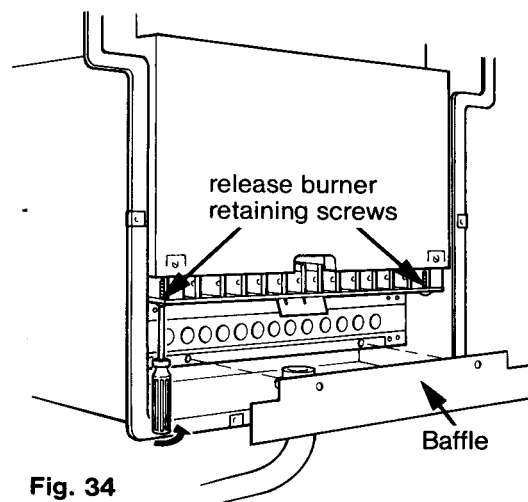


Fig. 34

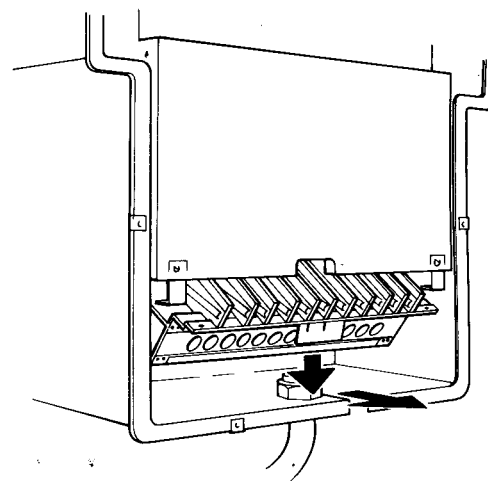


Fig. 35

8.8 (a) To Inspect Heat Exchanger

(b) To remove flue hood

See figs 36 - 38 & fig 30

8.8.1 Gain general access (8.4)

8.8.2 Remove room sealed chamber cover (clause 8.5.2 & fig 30)

8.8.3 Remove screws and remove heat exchanger inspection cover (fig 37(a))

N.B. This operation is for inspection and cleaning of heat exchanger. For flue hood removal continue with 8.8.4

8.8.4 Remove decorative plastic cover (fig 36) by removing 2 screws in top recess, and lift off.

Slacken and remove 2 screws on flue maintenance clip and slide clip to one side. The sealing sleeve below the clip should also be moved along the pipe, exposing the joint.

8.8.5 Pull off tab connectors to flue pressure differential switch.

8.8.6 Remove 3 nuts and tabs securing flue elbow to top of air chamber and slightly lift elbow to clear studs figs 37(b) & (c)

Grip elbow and pull sideways, twisting and pulling to disengage it from the pipe.

8.8.7 Release and remove 4 screws and lift off top panel of the air chamber. (fig 38)

8.8.8 Pull tab connectors off flue fan.

8.8.9 Remove 2 screws at rear of flue hood. Ease hood upwards to disengage from heat exchanger and pull forwards.

8.8.10 Reassemble in reverse order. Refer to pictorial wiring diagram (fig 65) to ensure correct positioning of electrical connections.

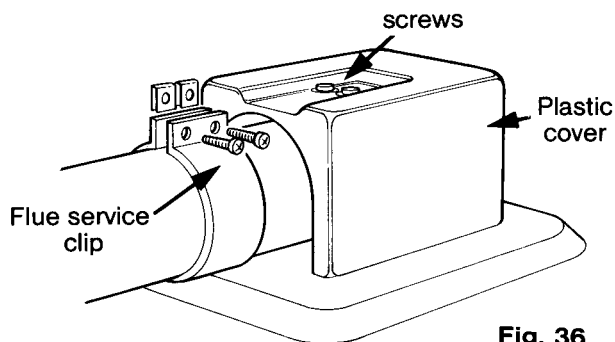


Fig. 36

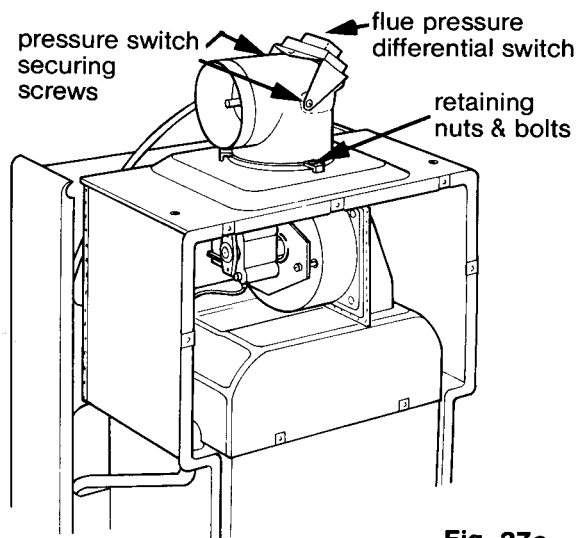


Fig. 37a

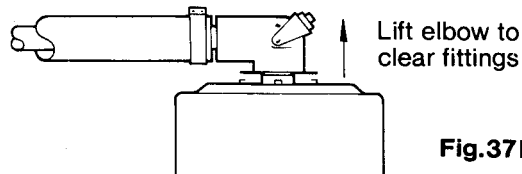


Fig. 37b

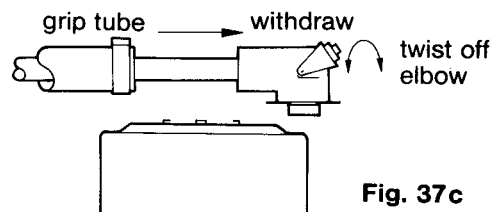


Fig. 37c

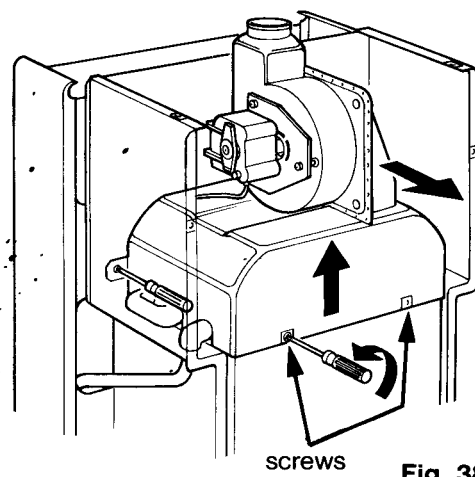


Fig. 38

- 8.9 To remove heat exchanger (fig 39)**
- 8.9.1** Carry out operations 8.8.1 - 8.8.4
- 8.9.2** Close heating valves (¼ turn until handle is horizontal). Turn safety valve ¼ turn to drain appliance.
- 8.9.3** Place cloth under heat exchanger to catch surplus water. Unscrew unions, remove locknuts, lift heat exchanger to clear casing and pull forward. Avoid spillage of water on boiler electrics.
- 8.9.4** Reassemble in reverse order.

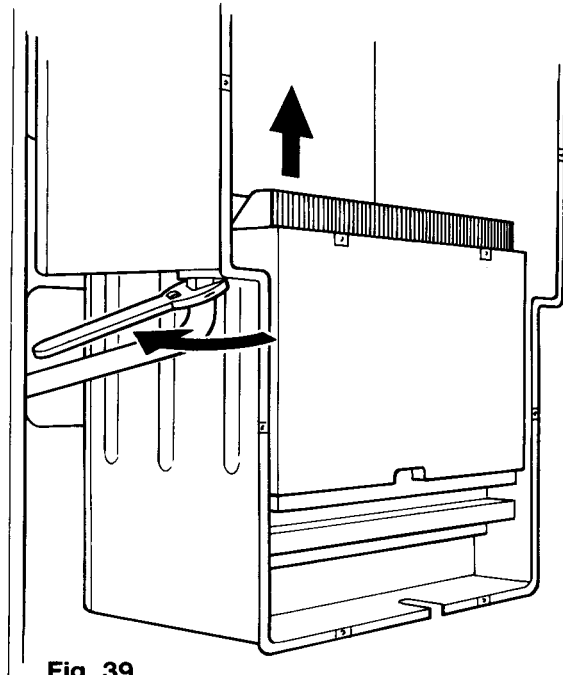
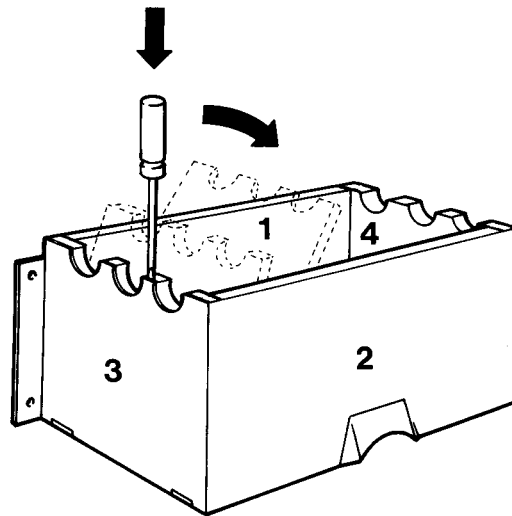


Fig. 39

- 8.10 To remove combustion chamber & insulation panels**
- 8.10.1** Carry out operations 8.8.1 to 8.8.9 and 8.9.2
- 8.10.2** Remove main burner (8.7)
- 8.10.3** Pull combustion chamber forwards.
- 8.10.4 To remove Combustion Chamber Insulation Panels (fig 40)**
Remove main heat exchanger (8.9)
Gently prise panels inwards in order shown and lift out
- 8.10.5** Reassemble in reverse order.
(N.B. Panels are brittle)



- 8.11 To remove flue fan (fig 41)**
- 8.11.1** Carry out the operations 8.8.1 to 8.8.9
- 8.11.2** Release 4 screws securing fan to flue hood and remove fan.
- 8.11.3** Reassemble in reverse order.

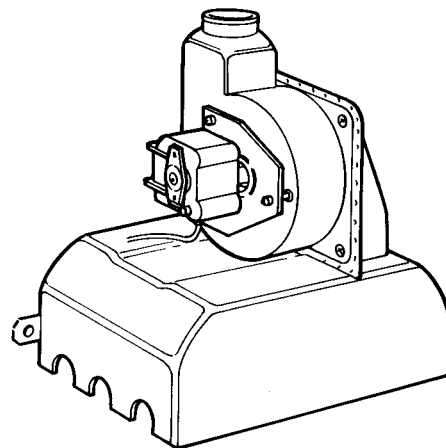


Fig. 41

- 8.12 To remove flue pressure switch**
- 8.12.1** Gain general access (8.4)
- 8.12.2** Remove plastic flue cover (8.8.3)
- 8.12.3** Pull off tab connectors.
- 8.12.4** Release 2 securing screws (fig 37a) and remove switch pulling off air tube in the process.
- 8.12.5** Reassemble in reverse order.
See fig 65 for correct fitting of electrical connections. The air tube must be reconnected to the upper nozzle on the pressure switch.

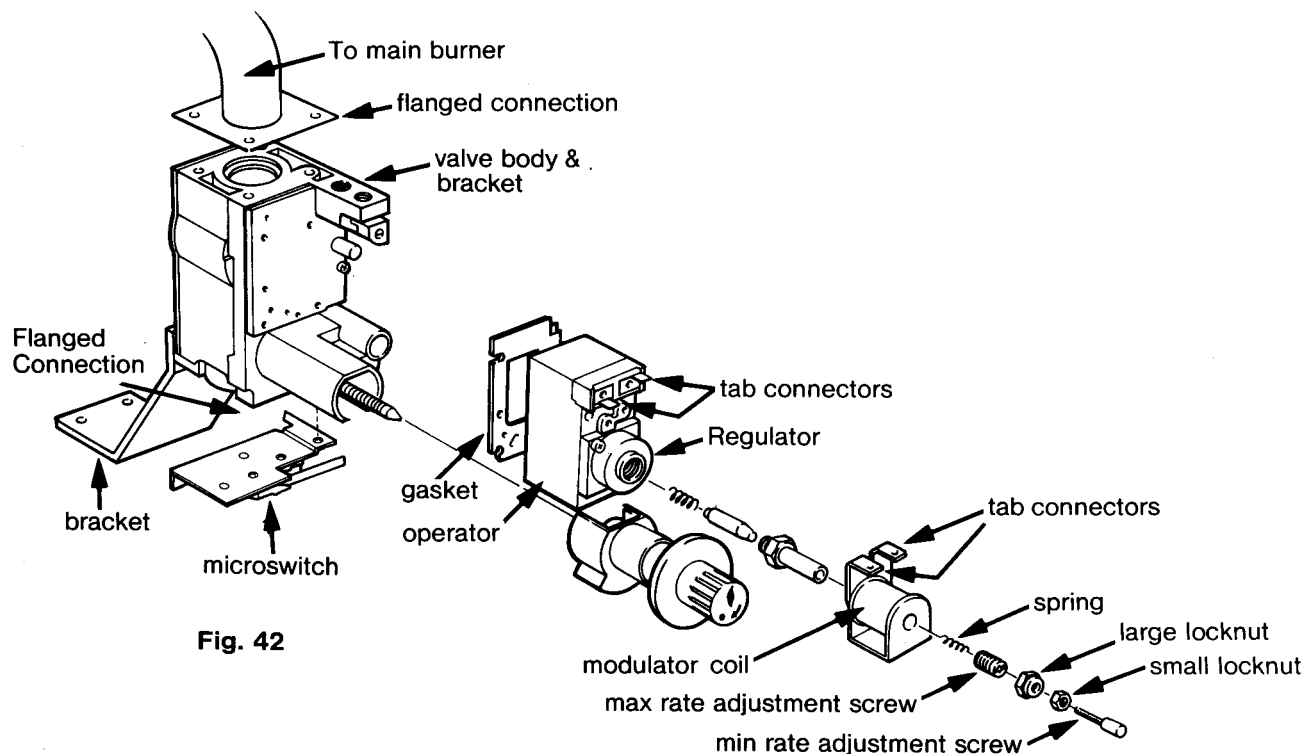


Fig. 42

8.13 To remove/replace gas control valve modulator and operator (Refer to fig 42)
For part nos see fig 60

8.13.1 Gain general access (8.4)

8.13.2 Modulator Coil (fig 42)

8.13.2.1 Pull off electrical leads from tab connectors.

8.13.2.2 Slacken large locknut, unscrew max. rate adjustment screw and remove (N.B. take care of spring)

8.13.2.3 Remove modulator coil.

8.13.2.4 Replace in reverse order (see fig 65 for electrical connections)

8.13.2.5 Check burner pressures (cl. 6.7)

8.13.3 Operator (fig 42)

8.13.3.1 Pull off all electrical leads from modulator and operator tab connectors.

8.13.3.2 Remove modulator coil (8.13.2).

8.13.3.3 Release 4 screws securing operator to gas valve body (2 at top below tab connectors 2 at bottom extreme corners).

8.13.3.4 Remove operator, exposing gasket.

8.13.3.5 Replace in reverse order using new gasket (see fig 65 for electrical connections)

8.13.3.6 Check burner pressures (cl. 6.7)

8.13.4 Gas Control Valve (fig 42)

8.13.4.1 Remove modulator coil and operator as detailed above. The operator etc. can be transferred to any new valve to retain regulation settings.

8.13.4.2 Disconnect leads from high limit thermostat, and disconnect thermocouple and pilot supply pipe connections.

8.13.4.3 Remove screws securing bracket to base frame

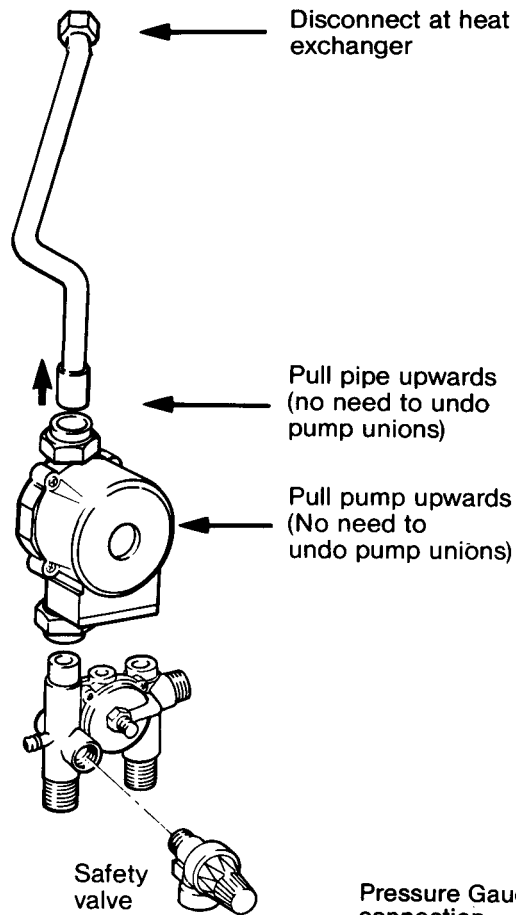
8.13.4.4 Remove 4 flange securing screws at each end, and withdraw valve (This may be easier with gas pipe disconnected from main burner)

8.13.4.5 Replace in reverse order using new gaskets

8.13.4.6 Test all disturbed joints for gas soundness. Check burner pressures (cl. 6.7). If incorrect, adjust as instructed in cl. 8.23.

8.14 To remove pump (figs 43 & 44)

- 8.14.1 Gain general access (8.4)
- 8.14.2 Close heating flow and return valves (fig 1a (21 & 22) by turning ¼ turn until handle is horizontal.
- 8.14.3 Drain appliance via safety valve by ¼ turn of safety valve knob
- 8.14.4 Disconnect pipe union connection at heat exchanger and pull pipe upwards with a slight twisting movement to remove from pump union.
- 8.14.5 Grasp pump and pull upwards with a slight twisting movement to disconnect at inlet.
- 8.14.6 Disconnect electrical leads from pump.
- 8.14.7 Reassemble in reverse order. Reconnect electrical leads. Brown to L, Blue to N, Yellow/Green to E.



8.15 To remove heating manifold

Part No. 4493 fig 60
Refer to fig 44

- 8.15.1 Remove pump (8.14)
- 8.15.2 Disconnect safety valve discharge, and heating valve unions.
- 8.15.3 Remove retaining screw (securing manifold to frame)
- 8.15.4 Disconnect unions including expansion pipe union and connecting pipe from 3 port valve.
- 8.15.5 Unscrew pressure gauge connection.
- 8.15.6 Unscrew central heating thermostat retaining nut and withdraw sensor.
- 8.15.7 Unscrew and remove retaining nut and remove micro switch.

Remove manifold

Manifold Assembly

Release cover retaining screws and ease off with a screwdriver.

Refer to figs 44 and 60 for location of components.

Fig. 43

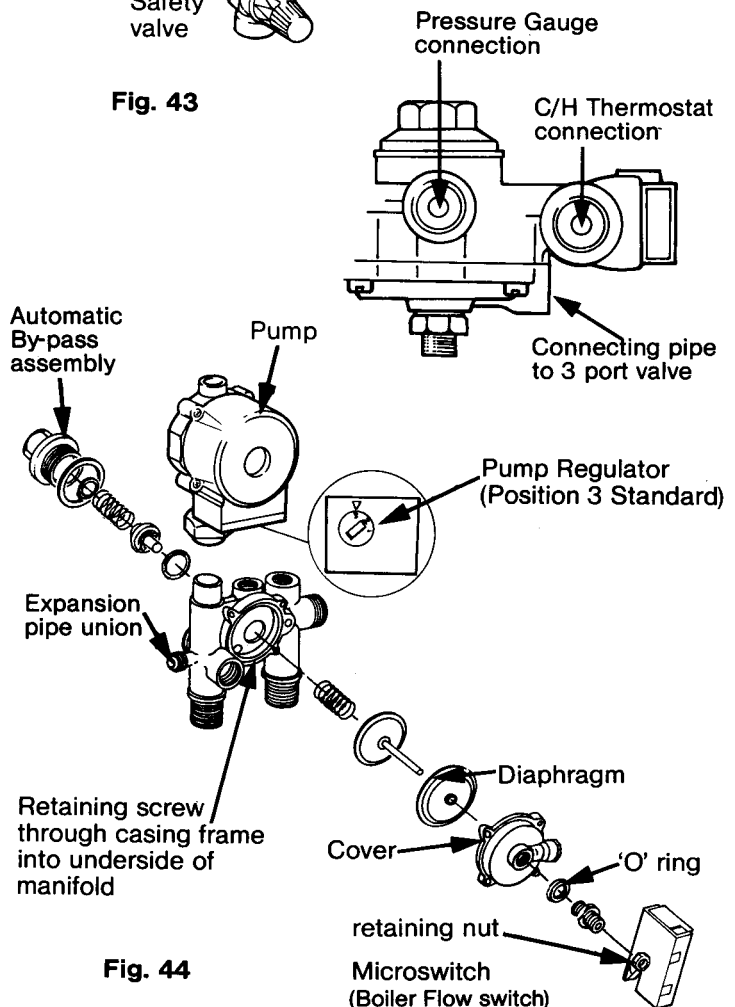


Fig. 44

- 8.16.6 Remove retaining nut and remove micro switch pulling tabs off pump overrun thermostat
- 8.16.7 Disconnect 3 union nuts leaving nut A and disconnect the union on the heating manifold at the opposite end of the pipe secured by nut A.
- 8.16.8 Disconnect main flow pipe unions from heat exchanger and 3-port valve and carefully move aside.
- 8.16.9 Ease the unit and pipe out of the appliance. Disconnect nut A.
- 8.16.10 Reassemble by connecting pipe with nut A hand tight and ease into appliance connecting pipe at manifold and tighten all nuts.
- 8.16.11 Re-assemble in reverse order.

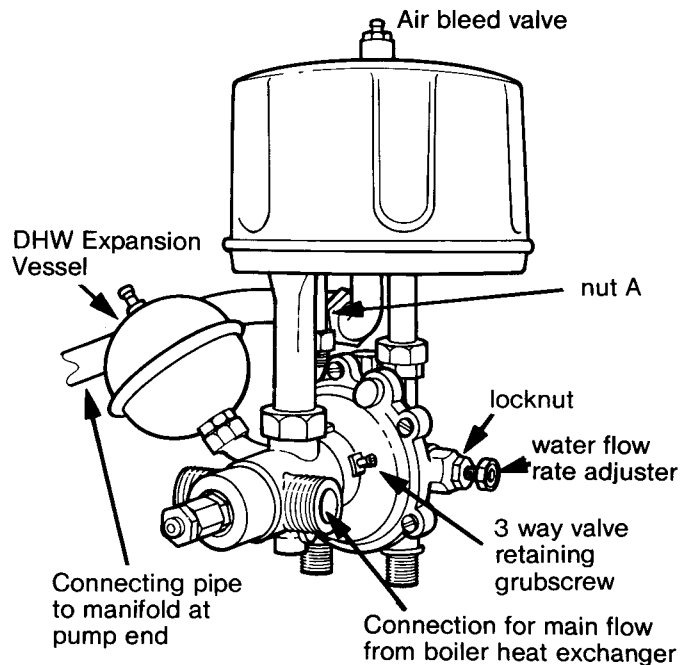


Fig. 45

8.17 Removal of 3-way diverting valve

Refer to figs 45 & 46

- 8.17.1 Gain general access (8.4)
- 8.17.2 Close central heating valves (valve head is horizontal when closed)
- 8.17.3 Drain appliance via safety valve by ¼ turn of knob.
- 8.17.4 Unscrew retaining nut and remove micro switch
- 8.17.5 Disconnect 3 pipe unions. (Prepare to catch a small quantity of water.)
- 8.17.6 Unscrew connecting pipe to heating manifold.
- 8.17.7 Slacken retaining grub screws securing valve to manifold and withdraw valve. (if necessary slacken unions at opposite ends of connecting pipes to facilitate removal).
- 8.17.8 Reassemble in reverse order.

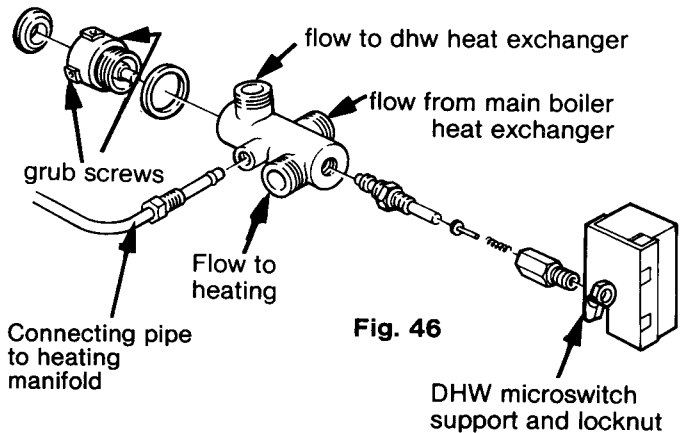


Fig. 46

8.18 Removal of Domestic Hot Water Manifold see fig 47

- 8.18.1 Remove 3 way diverting valve (8.17)
- 8.18.2 Close cold water inlet stopcock and drain secondary side by opening draw-off or drain tap.
- 8.18.3 Remove dhw heat exchanger (8.16)
- 8.18.4 Disconnect unions at cold water inlet and hot water outlet and remove manifold retaining screw (through base frame).
Remove manifold (fig 47 & 66) gives details of further disassembly.
- 8.18.5 Reassemble in reverse order.

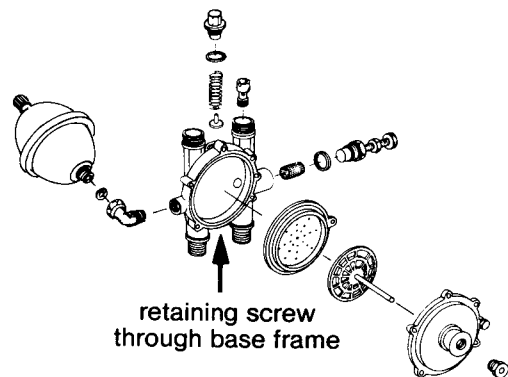


Fig. 47

- 8.19 The expansion vessel is factory pressurised to 1bar (14.7psi) and should be checked during servicing. Should it have lost pressure it can be repressurised in situ. Drain the boiler. Fit a suitable pump and gauge (ie. car foot pump and gauge) to the nipple at the top righthand side of the expansion vessel, and pressurised to 1bar (14.7psi) and remove the pump.

If it is not possible to repressurise the expansion vessel or if pressure loss is very frequent the expansion vessel will require changing.

N.B. If the boiler is installed with a clearance above of 343mm (13.5in) or more and with a side exit flue it is possible to remove the expansion vessel in situ. Follow steps 8.19.8-18.19.9

If the clearance above is less than 343mm (13.5in) or with a back exit flue it is not possible to remove the expansion vessel in situ, follow steps 8.19.1-8.19.9.

- 8.19.1 Gain access (8.4)
- 8.19.2 Close central heating valves (valve head is horizontal when closed)
- 8.19.3 Drain appliance via safety valve by ¼ turn of knob.
- 8.19.4 Follow instructions 8.8.1-8.8.6
- 8.19.5 Disconnect all pipe unions at the appliance base.
- 8.19.6 Switch OFF mains electricity and gain general access. Disconnect electricity supply at p.c.b. (Read cl. 5.7)
- 8.19.7 Remove lower fixings (fig 12) and lift appliance off upper bracket.
- 8.19.8 Refer to fig 48.

Remove clip securing vessel at top. Disconnect expansion pipe at heating manifold, lift vessel & pipe out of appliance.

- 8.19.9 Reassemble & remount all in reverse order.

8.20 Removal of DHW Expansion Vessel (fig 45)

- 8.20.1 Gain access and drain off water (8.16.1-3)
- 8.20.2 Unscrew vessel from 135° support elbow.
- 8.20.3 Re-assemble in reverse order.

8.21 Removal of Electrical Components

- 8.21.1 Ensure electricity is switched off at main isolator and gain general access (8.4)

8.21.2 Heating micro switch

Part no 4302 fig 60

Refer to fig 44

Hold switch and unscrew retaining nut

Remove switch and remove cover

Pull off electrical tab connections

Reassemble in reverse order, reconnecting electrical tab connectors following figure 65

8.21.3 DHW Microswitch

Part no 4563 fig 60

Refer to fig no 46

Hold switch and remove locking nut securing it to the 3 way valve

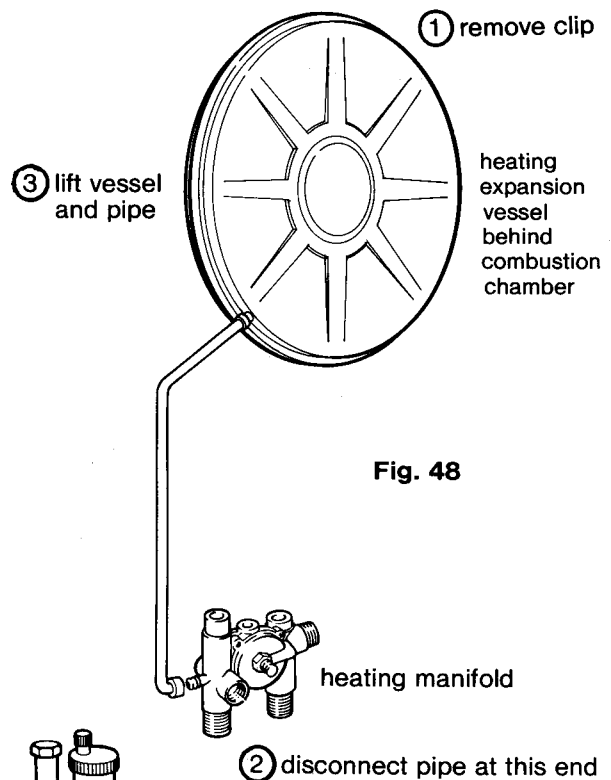


Fig. 48

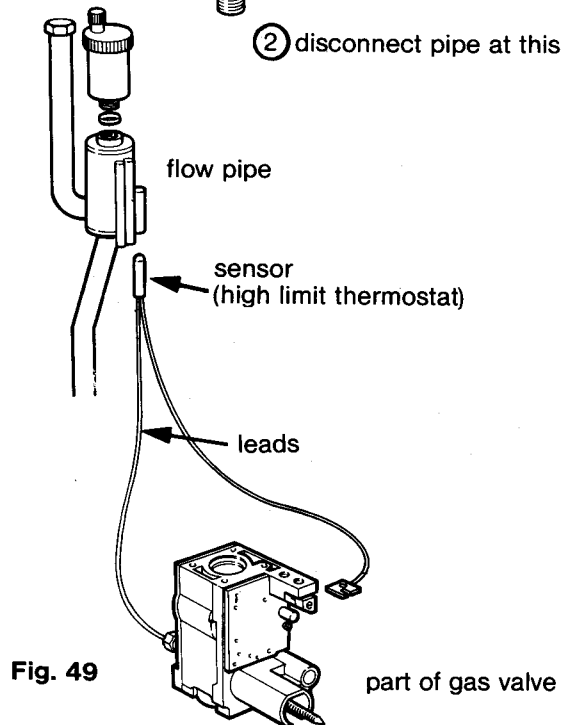


Fig. 49

Remove switch and remove cover.

Pull off electrical tab connections.

Reassemble in reverse order reconnecting electrical tab connectors following figure 65.

8.21.4 High Limit Thermostat (Thermocouple Interruptor)

Part no. 4888 fig 60

Refer to fig 49

Disconnect 2 electrical connections at Gas Control Valve. Remove split pin from carrier tube and withdraw sensor probe. Reassemble in reverse order.

8.21.5 Boiler Thermostat

Part No. 3212 fig 60

Refer to fig 50 & 51

Drain down boiler

Trace capillary tube to heating manifold
unscrew sensing probe retaining nut and
withdraw probe

Pull electrical tabs off back of thermostat

Pull knob off front revealing 2 retaining
screws

Remove screws to release thermostat and
remove.

Reassemble in reverse order using a new
fibre washer.

Refer to figs 50 & 51 to ensure correction
location of thermostat and push-on wiring
tabs

Refer to electrical drawing figs 51 & 65.

N.B. When changing this thermostat it may
be necessary to repressurise the system
(section 6.3.3 gives details).

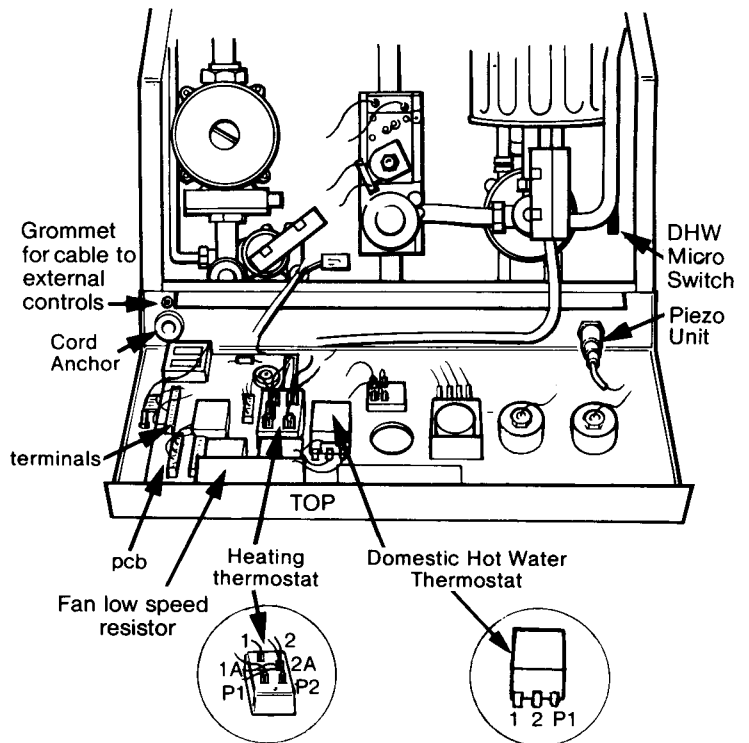


Fig. 50

8.21.6 Hot water Thermostat

Part No. 4885 fig 60

Refer to figs 58, 52 & 57

Drain down boiler

Unscrew sensing probe from bottom of main
flow tube. (fig 57)

Pull electrical tabs off back of thermostat

Pull knob off front revealing 2 retaining
screws

Remove screws to release thermostat and
remove

Reassemble in reverse order.

Refer to fig 50 to ensure correct location of
thermostat and push on wiring tabs
Refer to electrical drawing figs 52 & 65

N.B. When changing this thermostat it may
be necessary to repressurise the system
(section 6.3.3 gives details).

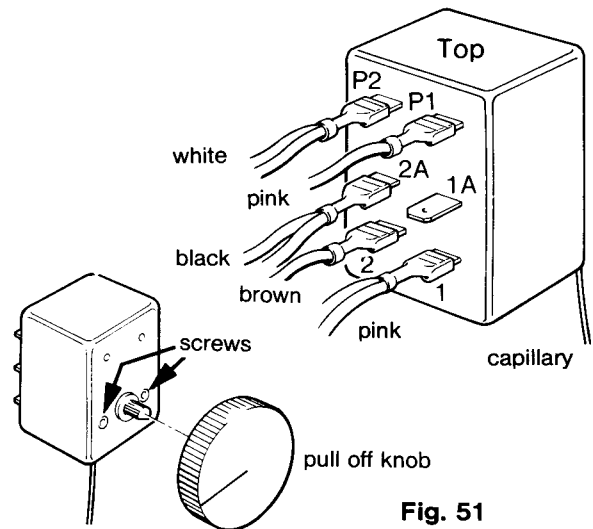


Fig. 51

8.21.7 Removal of Summer/Winter switch

Part no. 4045 fig 60

Refer to figs 58 & 53

Pull off tab connectors

Squeeze latching tabs at back of panel
and push switch out.

Reassemble in reverse order.

8.21.8 Removal of Fan Speed Resistor

Part No. 4028 fig 60

refer to fig 58 & 54

Release two screws on outer flange of
control fascia and remove plug on p.c.b.

Reassemble in reverse order.

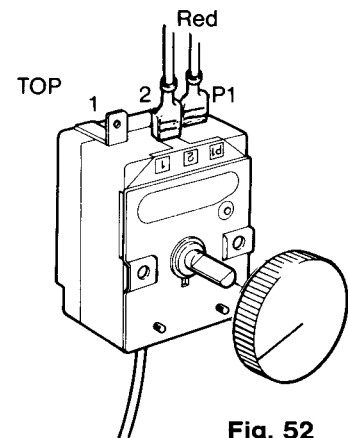


Fig. 52

8.21.9 Removal of Printed Circuit Board

Part No. 3387 fig 60

Refer to figs 19,20 & 55

Disconnect external wiring from terminal strip.

Remove 5 plugs from p.c.b.

Pull tab connectors off both rocker switches

Where the nylon support posts protrude through the front of the control fascia squeeze the spring tabs with pliers and push the posts inward to free the p.c.b.

Refix by pressing the support posts into the holes in the fascia.

Replace electric connections. Refer to fig 65 to ensure correct locations.

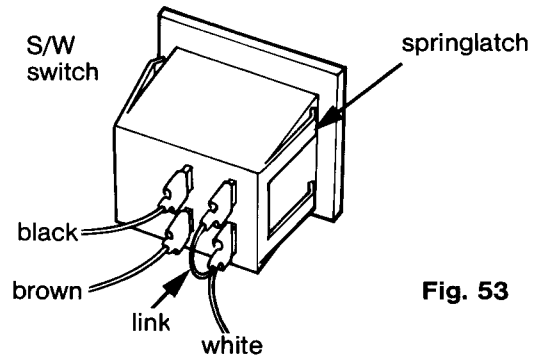


Fig. 53

8.21.10 Removal of Switches (On/Off and Timed/Constant)

Part no. 4980 & 4983 fig 60

Refer to figs 58 & 56

(Removal of the "on/off" and "timed/constant" switches may best be accomplished by first removing the p.c.b.)

Pull off tab connectors squeeze spring latching tabs at the back of the panel and push switch outwards.

To replace refer to fig 56 to ensure switch is in correct attitude and press into hole from the front until spring tabs latch. Refer to fig 65 for correct wiring details.

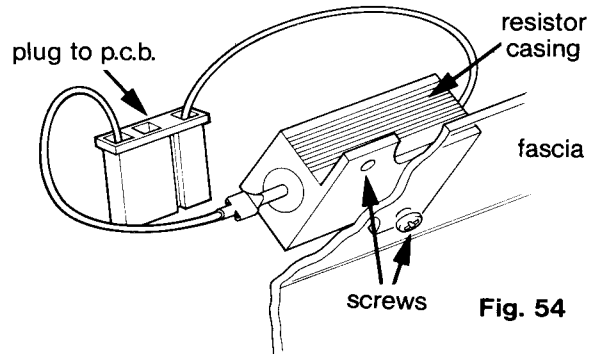


Fig. 54

8.21.11 Pump Over-run thermostat

Refer to fig 57

Pull off tab connectors and remove 2 screws.

Reassemble in reverse order. It is desirable to use heat conducting paste.

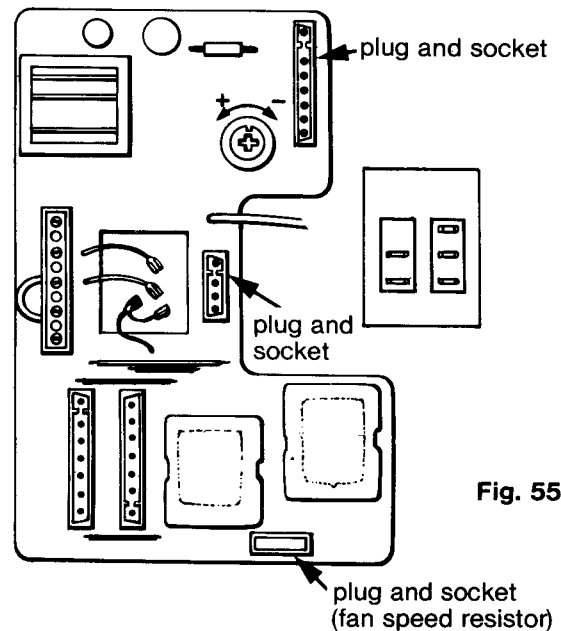


Fig. 55

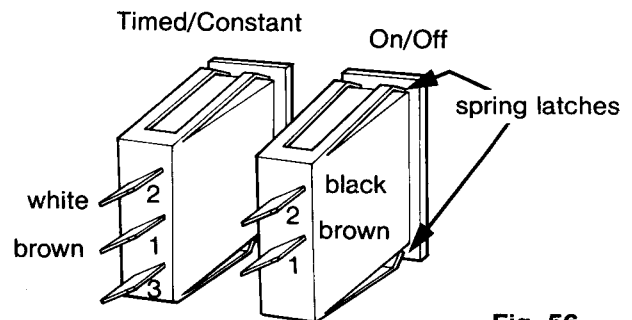


Fig. 56

8.22 Removal of Mechanical Instruments and Components

8.22.1 Pressure gauge

Part No. 4472 Fig 60
Refer to figs 44 & 58

Close central heating flow and return valves, by ¼ turn to horizontal position, drain appliance through the safety valve by ¼ turn of the knob.

Trace capillary from back of gauge to connecting point on heating manifold.

Unscrew union on manifold.

Remove and clean off washer remnants.

Squeeze plastic locking lugs behind fascia and press gauge from aperture.

Refix in reverse order following original route for capillary.

8.22.2 Temperature gauge

Part no. 4441 fig 60
refer to fig 58

Trace capillary to sensor. Remove split pin from carrier tube and withdraw sensor. Remove clip from capillary tube.

Squeeze plastic locking lugs behind fascia and press gauge from aperture.

Re-assemble in reverse order ensuring locking lugs are located in the grooves, split pin is secure and capillary clip is refixed.

8.23 Setting Gas Pressures

ALL SETTINGS DONE WITH 'U' GAUGE FITTED TO BURNER TEST NIPPLE AS INSTRUCTED IN CLAUSE 6.7.4

8.23.1 Setting Maximum Rate

Turn off electrical supply to boiler and follow instructions in section 8.4 to gain access.

Refer to Figs 42 & 59

Loosen fine locknut (7BA). Unscrew completely the fine adjusting screw.

If not already on, turn on H/Water tap and electrical supply

Adjust main gas pressure by loosening 10m/m nut and turning slotted screw clockwise to increase pressure. Anti-clockwise to decrease (set pressure to 11.5mbar/4.6ins wg)

Carefully tighten lock nut without altering setting

Turn off tap and electrical supply.

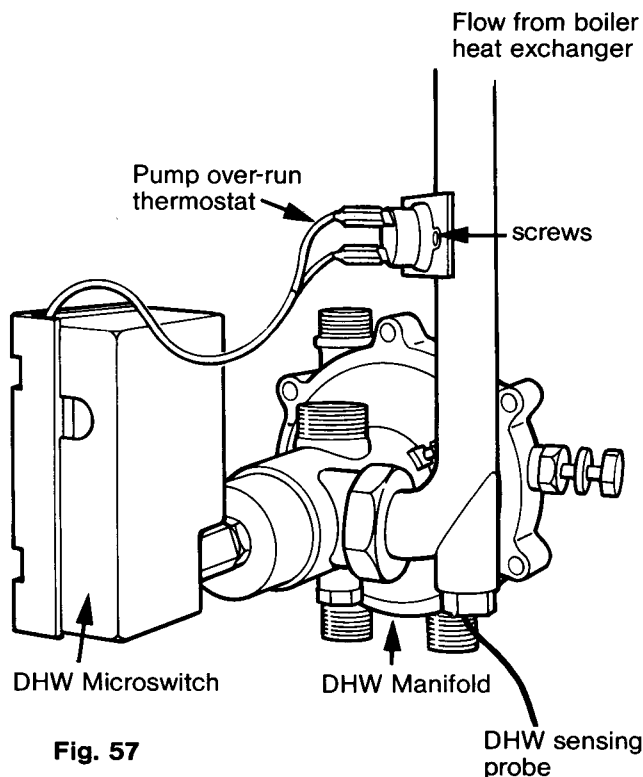


Fig. 57

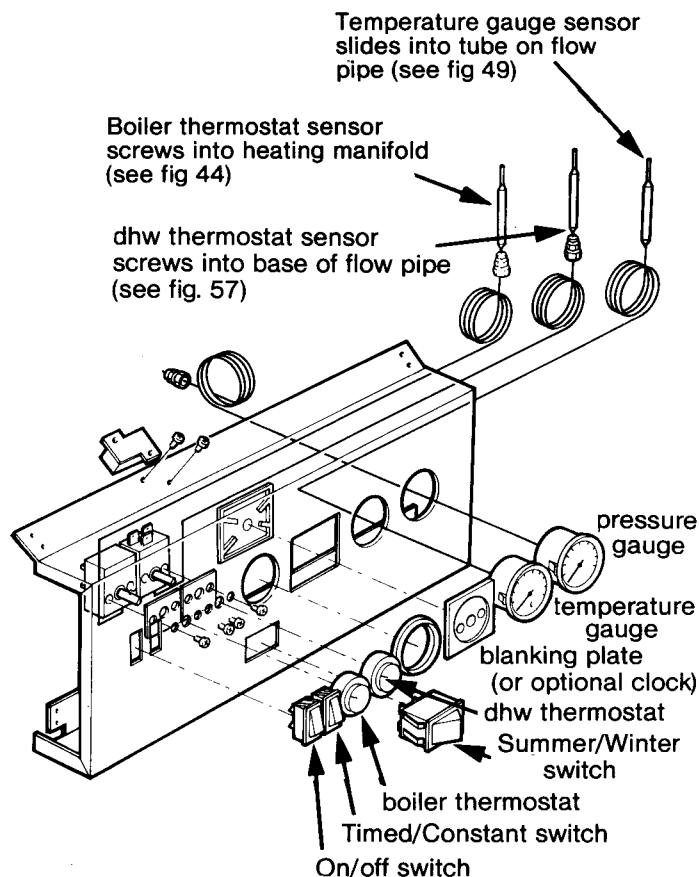


Fig. 58

8.23.2 Setting Minimum Rate

Replace fine adjusting screw.

Remove wire on No.2 terminal of Hot water stat replace on no.1 terminal (see fig.52)

Turn on electrical supply. Turn on tap.

Boiler will light up in Hot Water mode at low fire. Adjust pressure using fine adjusting screw turn clockwise to increase anti-clockwise to decrease (set pressure at 1.9Mbar/0.8ins wg) plus or minus 0.2mbar/0.08in wg

Tighten locknut

Turn off tap. Turn off electrical supply.

Remove wire on No.1 terminal on Hot water stat and replace on No.2.

8.23.3 Central Heating (Range Rating)

To set maximum rate in central heating mode

See clauses 6.7.9 for necessary adjustments. Refer to the commissioning rate recorded by the commissioning engineer on the boiler badge.

8.24 End of Servicing

Run through the general commissioning as described in Section 6 as far as they apply.

Refit casings and clean up.

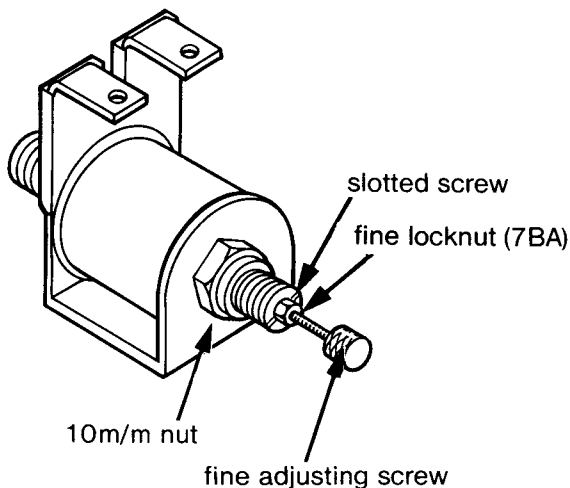


Fig. 59

SECTION 9 OPERATIONAL CHECKS, WIRING DIAGRAMS & FAULT FINDING

9.1 Preliminary electrical system checks as contained in the B.G.C. Multimeter Instruction Book are the first electrical checks to be carried out during a fault finding procedure. On completion of any service/fault finding task which has required the breaking and remaking of electrical connections the checks A, Earth Continuity, C, Polarity and D, Resistance to Earth must be repeated.

The following flow diagrams suggest the logical sequence of steps for fault finding.

They are not exhaustive but cover all that can reasonably be carried out on site by the installer.

Acquaintance with the functional sequence will prove helpful for some, and this is included for reference. As a further help, the role of each part is briefly described.

Also included in this section are wiring diagrams and schematics to assist in fault location and servicing as described in the text.

9.2 Sequence of functions

When following this sequence, refer to Fig.1B & Figs. 60-65. It is assumed that the on/off switch is ON and the pilot flame is alight.

9.2.1 At rest (Fig 62)

No call for either Heating or Domestic Hot Water. Current flows via the normally closed contact of R1, through the 560 Ω resistor and the flue fan runs at low speed to scavenge the combustion chamber and provide air for the pilot flame.

N.B. IF ELECTRICITY SUPPLY IS SWITCHED OFF OR FAILS the fan will cease to operate and there may be insufficient air to maintain the pilot. A relighting of the pilot would be necessary.

9.2.2 Domestic Hot Water Mode Fig. 63

When a hot water draw-off tap is turned on the differential pressure unit exerts thrust to change over the 3 way valve and operate the DHW flow switch.

- (a) The coil of R2 is energised via the normally closed contact of fan pressure switch
- (i) The relay is immediately 'latched' by a supply via R2/2
- (ii) A supply via R2/1 runs the fan at normal speed and the fan pressure switch operates
- (iii) R2/3 provides a supply to the Boiler Circuit flow switch

- (b) The coil of R1 is also energised to supply the pump
- (i) The Boiler circuit flow switch is closed providing a supply from R2/3 to the Gas Valve operator
- (c) The operation of the DHW Flow Switch also completes the low voltage control circuit for the modulating coil on the Gas Valve.

- (i) The normally open (make on rise) DHW Thermostat remains open circuit when calling for heat. Zero voltage on the coil permits maximum gas rate.

Closure of the thermostat provides full voltage at the coil which closes the operator to give the set minimum gas rate.

- (d) Successive operations of the thermostat alternates the boiler between high and low fire to regulate the average heat input.
- (e) Note that the sensor of the DHW thermostat senses the temperature of primary water leaving the main heat exchanger. The amount of heat transferred from the primary water to the dhw tap water depends on the temperature difference between them. Therefore as the dhw temperature rises the primary water temperature will tend to rise also. The dhw thermostat senses this and controls the gas rate accordingly.
- (f) When the domestic water draw off rate drops below the permitted minimum (2.8 l/min) the DHW flow switch reverses and the boiler reverts either to the 'rest' mode or, if there is a heating call, to the mode described below.

9.2.3 Central Heating Mode Fig. 64

In this mode the Summer/Winter switch must be closed i.e. in the Winter position, fig 1A.

With all controls calling for heat there is a supply through the boiler 2nd stage thermostat to give the following operations:

- (a)(i) The coil of R2 is energised via the Fan Pressure switch and immediately latched by R2/2
- (ii) There is then a supply to the Flue Fan which runs at normal speed and operates the Fan Pressure Switch.
- (b)(i) The coil of R1 is energised to supply the pump

-
- (ii) The Boiler Circuit flow switch closes, permitting a supply to the Gas Valve Operator via R2/3

R2/3 also provides a supply to the Transformer energising the control circuit.

- (iii) The control circuit is via the 1st stage of the Boiler Thermostat when the thermostat calls for heat it is open circuit (i.e. make on rise).

Control current to the Gas Valve modulating coil is subject to the resistance of the potentiometer. The resulting low voltage to the coil positions the Gas Valve for the Maximum Central Heating Rate.

On reaching the set temperature the thermostat closes, by-passing the potentiometer and imposing maximum voltage on the modulating coil. The boiler then operates at the set minimum rate.

Successive operations of the thermostat regulates the average heat input to that required.

- (iv) If, on low fire, the boiler temperature continues to rise the 2nd stage thermostat breaks P2-2A putting the burner circuitry back into the 'rest' mode.

P2-2 is made and so keeps the pump running to circulate to the radiators.

- (v) If the supply to P2 of the thermostat is broken (e.g. by a room thermostat both the burner and pump are switched 'off).

However, the pump over-run thermostat provides an alternative supply to the pump, keeping it running until the boiler temperature drops to about 60°C.

- (vi) Should there be a restriction in the heating circuit reducing the flow rate through the boiler to below 350 litres/hour (1.28 gals/min) the boiler circuit flow switch will open and close the gas valve.

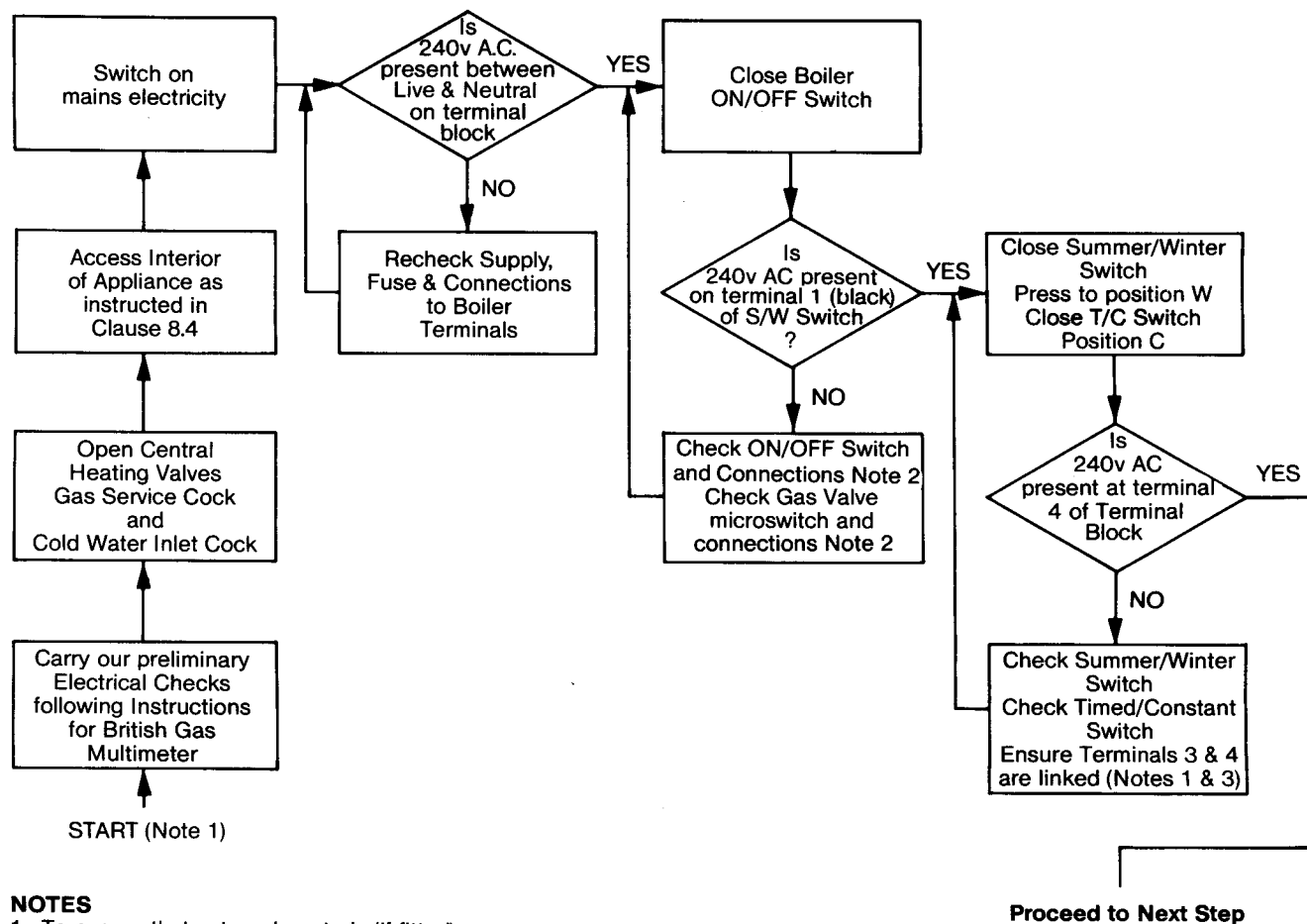
9.2.4 Note on Gas Valve Switch

The lighting procedure described in cl. 6.6 involves depressing the Gas Valve Knob, which breaks the Gas Valve Switch.

If there is a central heating call in force when the lighting procedure is in progress there can be no release of gas to the main burner until the Gas Valve Knob is released.

FAULT FINDING STEP 1

CHECK ELECTRICAL SUPPLIES, SWITCHES & CONNECTIONS

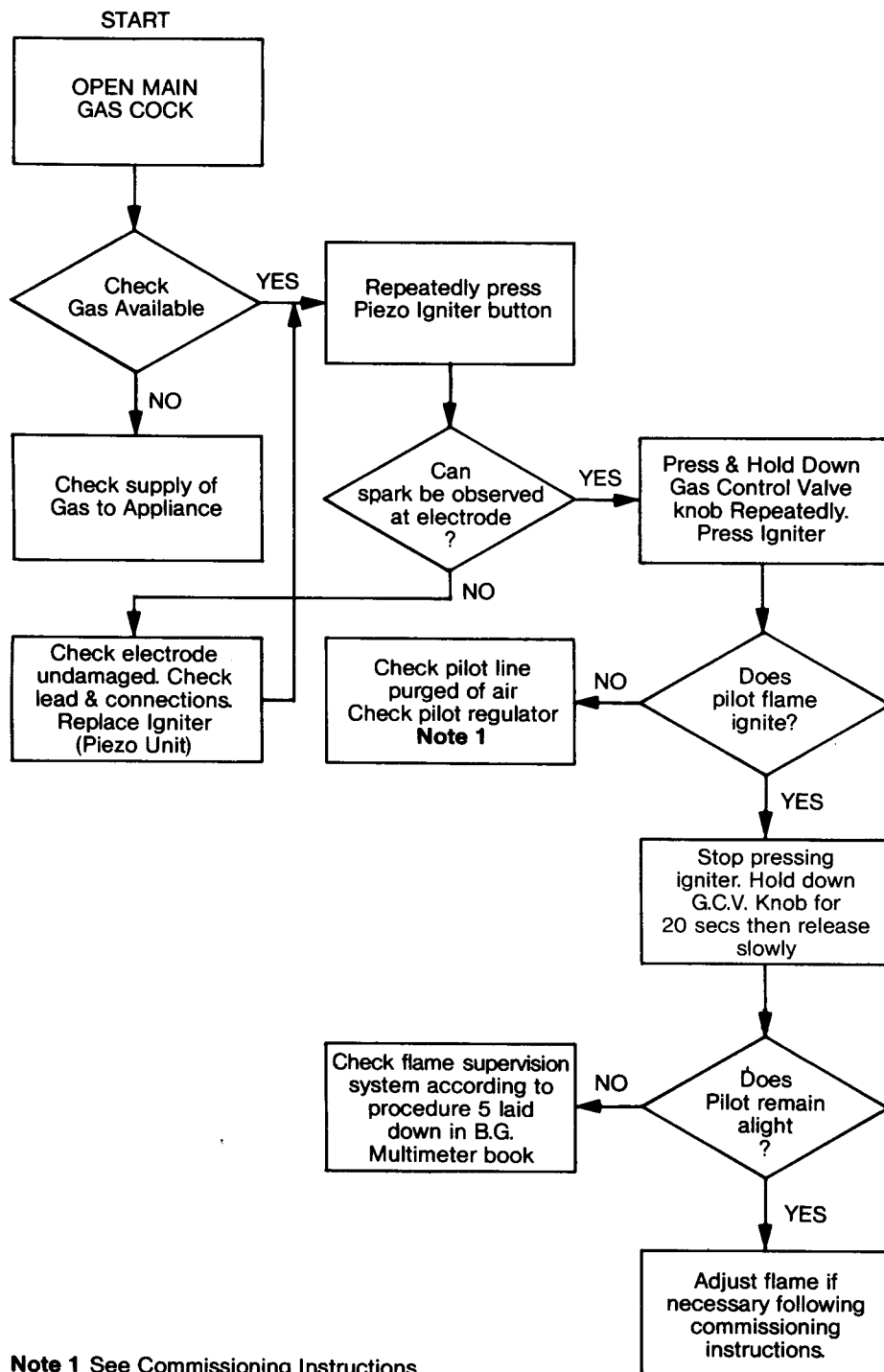


NOTES

- 1 To ensure that external controls (if fitted) do not interfere disconnect from terminals 3 & 4 (labelling to ensure correct reconnection) & provide a solid link from 3 to 4
- 2 The order should be
 - (a) Check supply available at terminal 2 (black) of ON/OFF Switch
 - (b) Check supply at common of gas valve switch. If not check wire & p.c.b.
 - (c) Check supply on normally closed terminal of gas valve switch. If not, test switch & replace if necessary
- 3 The order should be
 - Check terminal 4 (brown) of S/W switch, if no supply present, change switch
 - Check terminal 2 (Brown) of Timed/Constant switch. If no supply, change switch

FAULT FINDING STEP 2

CHECK GAS CONTROL PILOT BURNER FLAME SUPERVISING SYSTEM



Note 1 See Commissioning Instructions

FAULT FINDING STEP 3

CHECK OPERATION IN CENTRAL HEATING MODE

START

Check system is filled with water and properly commissioned.
Conclude steps 1 & 2. Start with cold system and do not draw off hot water during this check.

Open heating valves switch boiler on select winter mode

Does Main Burner light ?

NO

YES

Proceed to Step 3A (check control circuit and functions)

Does R2* operate when ON/OFF switch flicked ?

NO

YES

Check flue pressure differential switch Note 3

Does R1 operate when on/off switch is flicked ?

NO

YES

Check main boiler thermostat Note 4

Does R2* operate when on/off switch is flicked ?

NO

YES

Check pump See Note 1 & return to START

Does R1 operate when on/off switch is flicked ?

NO

YES

Change printed circuit board Return to Start

Check operation of boiler flow switch Note 5

Is 240v AC present at brown terminal of operator ?

NO

YES

Replace Gas valve operator

Does Pump Start ?

NO

YES

Check Pump Note 1

Is 240v AC at Live (brown terminal) of pump ?

NO

YES

Is 240v AC present at P2 of main stat (white)?

NO

YES

Check plug & socket connections at terminals 28 & 29 Note 2

Does R1 operate when on/off switch is flicked ?

NO

YES

Check main boiler thermostat Note 4

Does R2* operate when on/off switch is flicked ?

NO

YES

Check flue pressure differential switch Note 3

Does R1 operate when on/off switch is flicked ?

NO

YES

Check pump See Note 1 & return to START

Does R1 operate when on/off switch is flicked ?

NO

YES

Change printed circuit board Return to Start

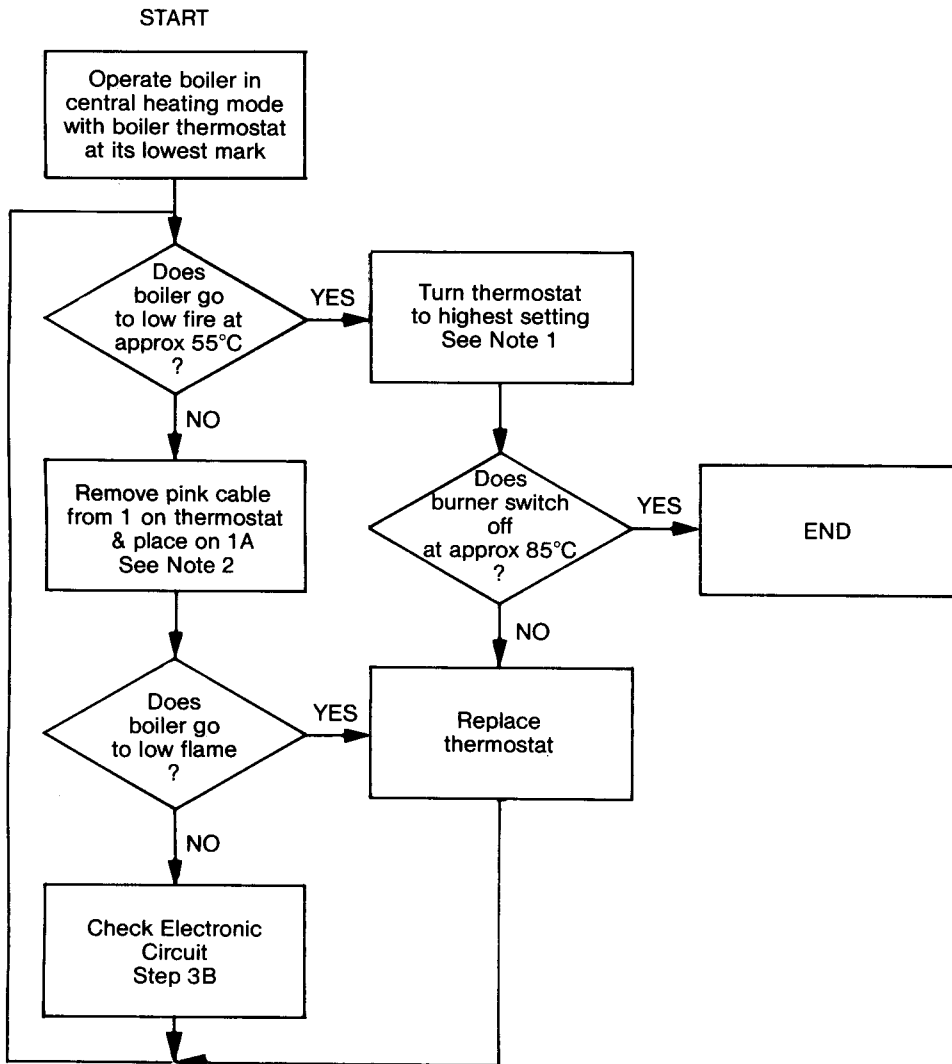
Check operation of boiler flow switch Note 5

NOTES

1. If necessary wire pump to independent electricity supply. Check capacitor. Check rotor is free. Replace pump or pump head Set new pump regulator to position 3.
2. If no signal at 28 connection from 4 via p.c.b. is faulty. Check also white lead.
3. Check if 240 v AC on N/O terminal. Check air tube correctly fitted. (Top nozzle on switch)
4. If 240V not present on terminal 2A (black lead) and boiler temperature not above thermostat setting then thermostat is faulty.
5. Turn boiler OFF then ON & observe spindle of pressure differential unit. It should move inward to release switch lever when pump starts. If spindle does not move see Section 6. clause 11 & 8.15. If switch operates check switch with meter. Replace if faulty.

* Relay operation can be checked visually through transparent cover on p.c.b.

FAULT FINDING STEP 3A
CHECKING C/H THERMOSTAT CIRCUITS

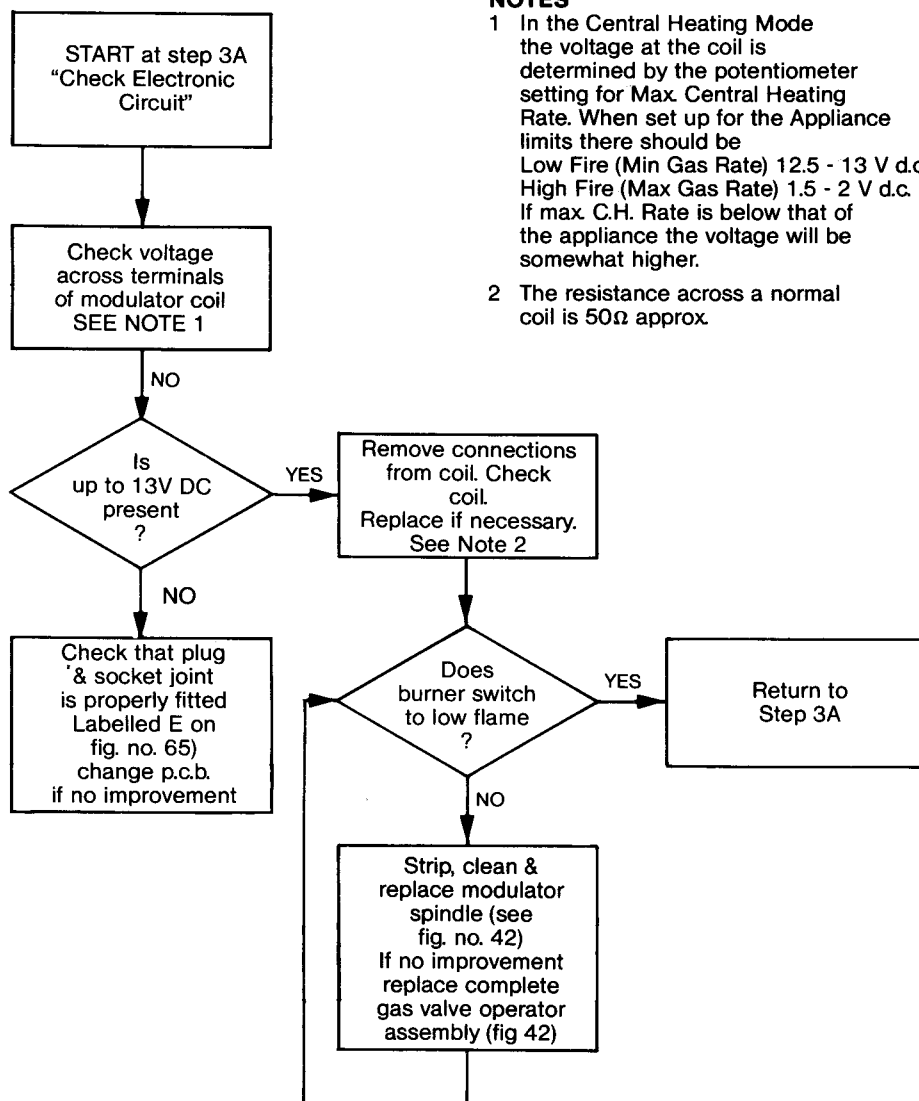


NOTES

- 1 Reduce number of radiators on to give quick response. Observe controls switch 1st to LOW and then OFF
- 2 IMPORTANT. Turn off electricity to make change. N.B. The white/black/brown leads are 240V AC. The pink leads are 12.5V DC. Do not confuse.

FAULT FINDING STEP 3B

CHECK ELECTRONIC CIRCUIT IN C/H MODE

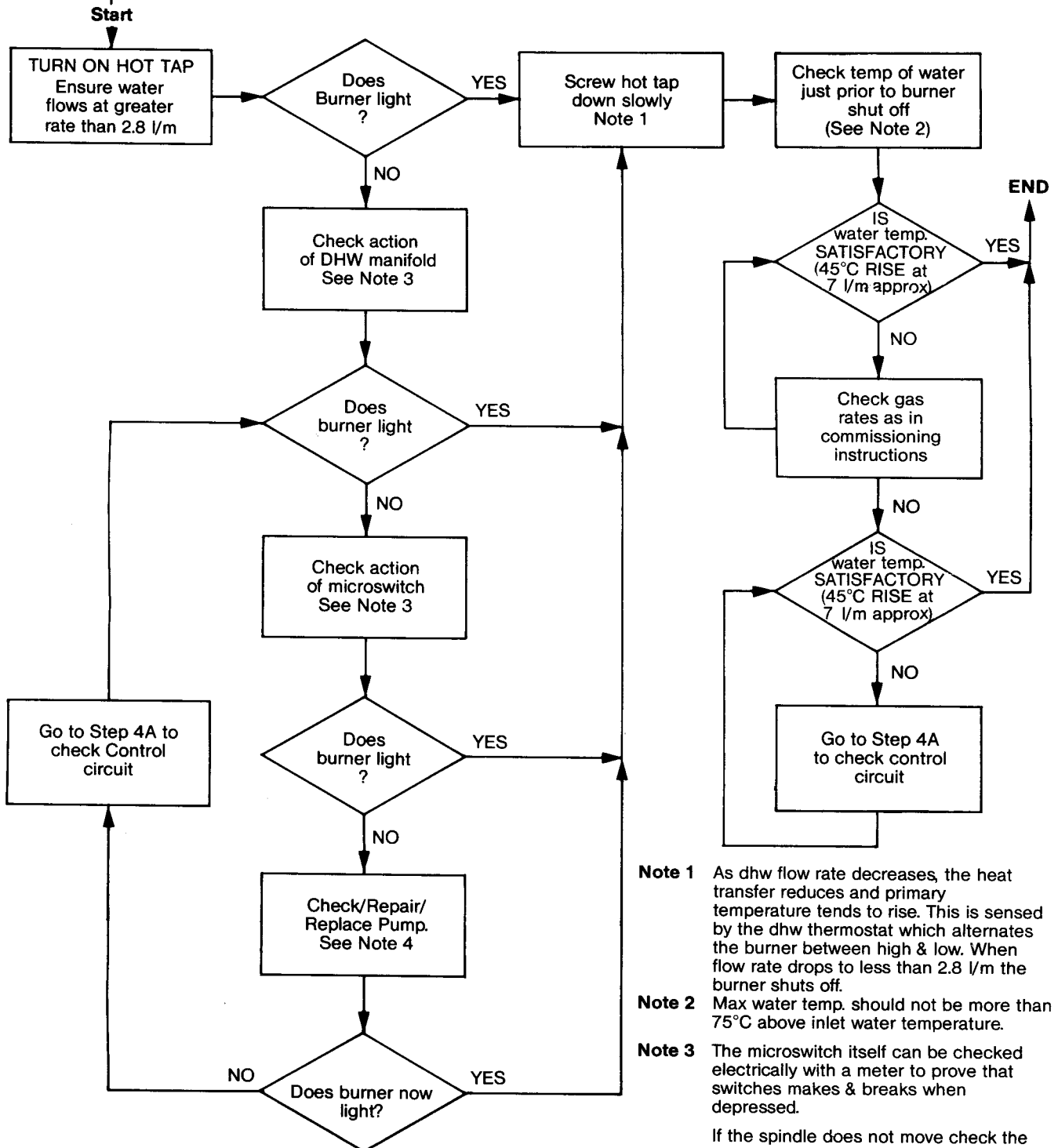


NOTES

- 1 In the Central Heating Mode the voltage at the coil is determined by the potentiometer setting for Max. Central Heating Rate. When set up for the Appliance limits there should be
Low Fire (Min Gas Rate) 12.5 - 13 V d.c.
High Fire (Max Gas Rate) 1.5 - 2 V d.c.
If max. C.H. Rate is below that of the appliance the voltage will be somewhat higher.
- 2 The resistance across a normal coil is 50 Ω approx.

FAULT FINDING STEP 4 CHECKING DOMESTIC HOT WATER FUNCTION

Basic wiring & functions have been checked by procedures in step 3.
Open air release tap (to ensure DHW heat exchanger is fully cleared of air). Light pilot, switch boiler on select Summer position. DHW thermostat at 9



Note 1 As dhw flow rate decreases, the heat transfer reduces and primary temperature tends to rise. This is sensed by the dhw thermostat which alternates the burner between high & low. When flow rate drops to less than 2.8 l/m the burner shuts off.

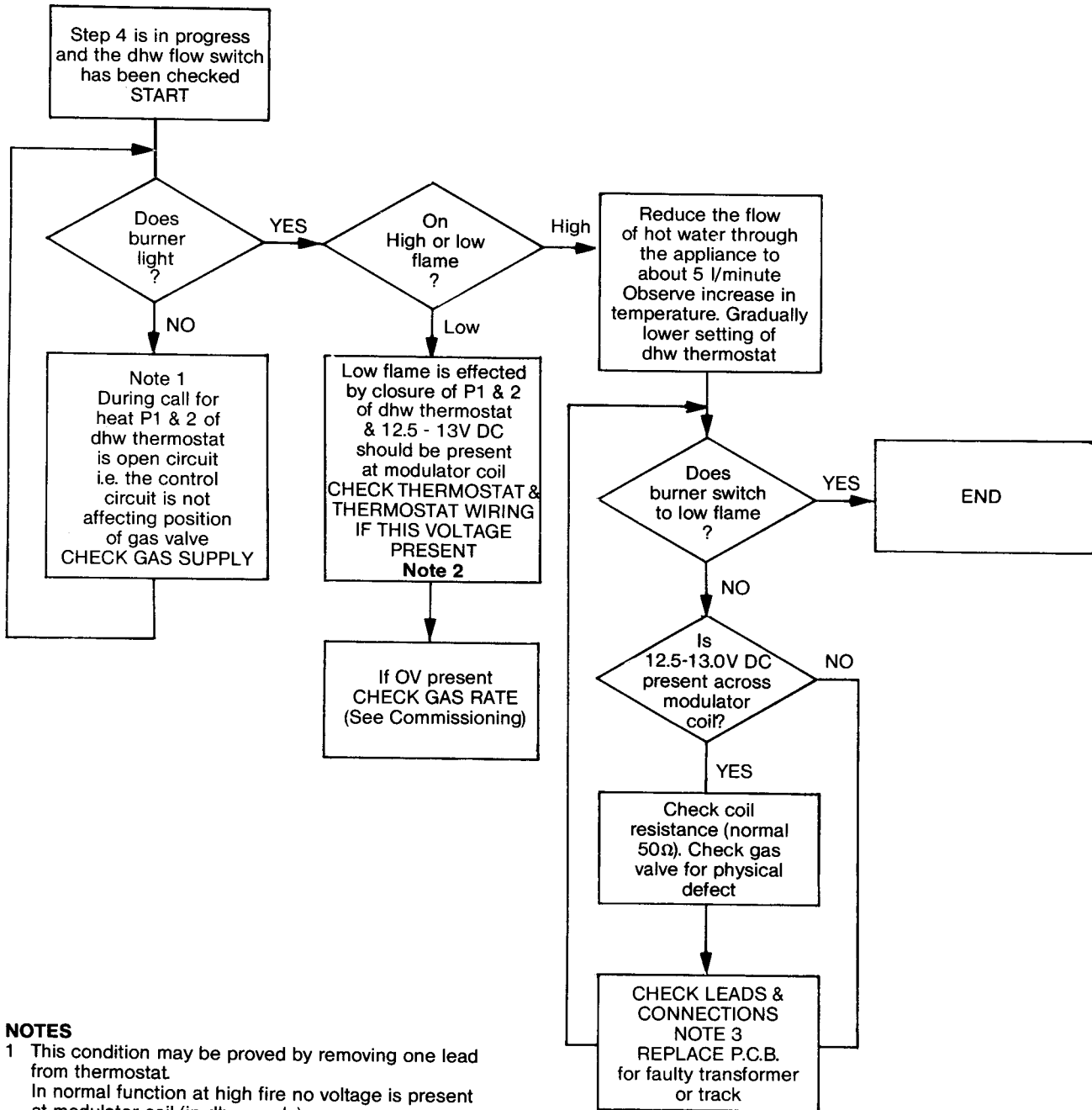
Note 2 Max water temp. should not be more than 75°C above inlet water temperature.

Note 3 The microswitch itself can be checked electrically with a meter to prove that switches makes & breaks when depressed.

If the spindle does not move check the operation of the dhw differential unit in the manifold for a faulty diaphragm or jammed spindle.

Note 4 The sequence has assumed that Step 3 has been concluded (see box top left). If the pump is not faulty double check Step 3. Look additionally for a blockage in pump or pipework.

FAULT FINDING STEP 4A
CHECK CONTROLS IN DHW MODE



NOTES

- 1 This condition may be proved by removing one lead from thermostat.
In normal function at high fire no voltage is present at modulator coil (in dhw mode).
- 2 If tab connector is on terminal 1 instead of 2 fault will occur.
- 3 To establish low flame 12.5 to 13.0 V d.c. must be present across the modulator coil. Absence due either to transformer or faulty circuit.

CHECK FOR CORRECT WIRING & CONTINUITY.

GREY lead from coil to T.7 on pcb
 PURPLE lead from 8 to common of flow switch
 RED from Normally Open of flow switch to 2 on dhw stat
 RED from P1 on stat to 9 on pcb

**Instructions for (A) Fitting Vokera Time Switch to Appliance
(B) Wiring to external Time Switches, Room Thermostats and Frost Thermostats**

A. Fitting Vokera Time Switch

- 10.1 Switch OFF electricity supply to the appliance.
- 10.2 Gain access following instructions in Clauses 8.4.1 & 8.4.2
- 10.3 Remove blank panel marked ENERGY SAVING from the control panel by releasing 2 nuts at the back.
- 10.4 Remove clock from box. Twist clear plastic front cover clockwise and lift off exposing screw on corner.
- 10.5 Remove screw. Grip the backplate firmly by the corners nearest the terminal block and pull off the back plate (fig 1).
- 10.6 Detach the grey plastic fixing strap from the clock by pulling the side lugs clear of the serrated surface of the clock and sliding the strap clear.
- 10.7 Push the clock through the aperture in the panel and slide the fixing strap over the body pushing it home against the rear of the panel to hold the clock firm. Figs 3 & 4.
- 10.8 Using the wiring loom provided with the clock, wire as follows. (Fig. 4)
- 10.9 Wire the back plate and press it on to the rear of the clock. Tighten fixing screw.
- 10.10 Close up boiler. Refit plastic clockface cover.

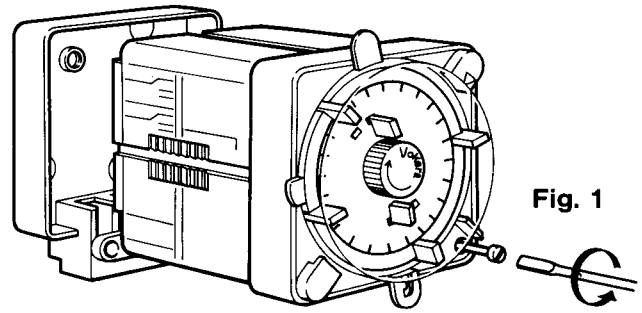


Fig. 1

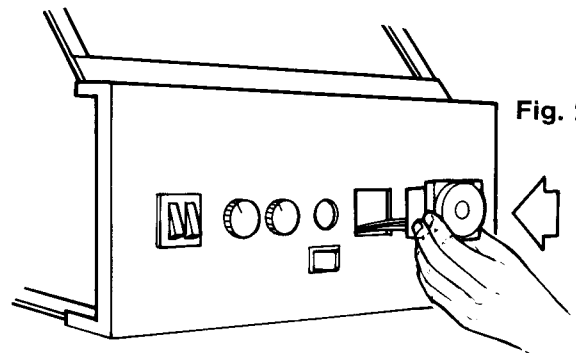


Fig. 2

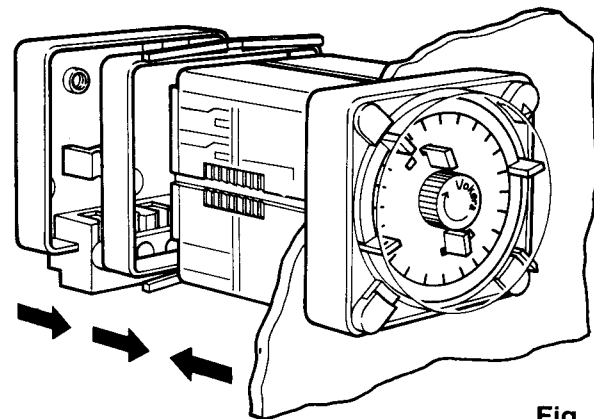


Fig. 3

Black wire: Remove existing black wire on boiler ON/OFF switch fit double connector on to terminal and refit existing wire.

Brown wire: Connects to double connector already fitted to brown wire on TIMED/CONSTANT switch (not spare terminal)

White wire: Connects to terminal 3 on main terminal strip

Blue wire: Connects to terminal 5 on main terminal strip

Remove the loop between terminals 3 & 4 on the boiler terminal strip if a room stat is also fitted

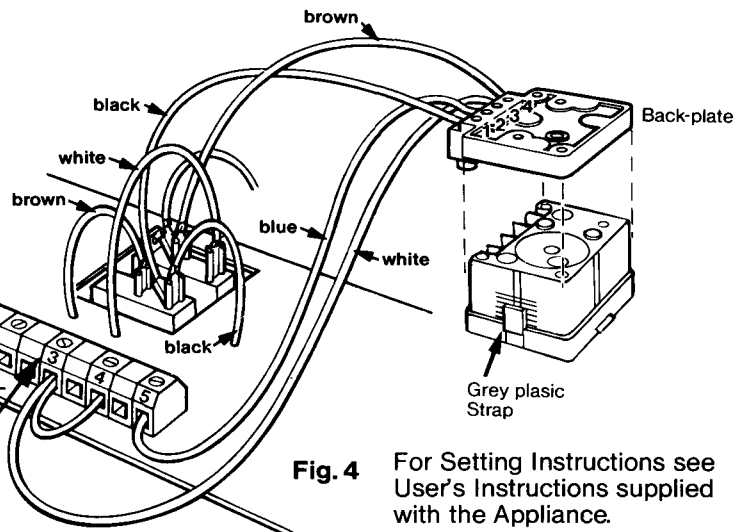
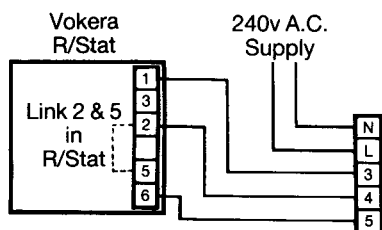
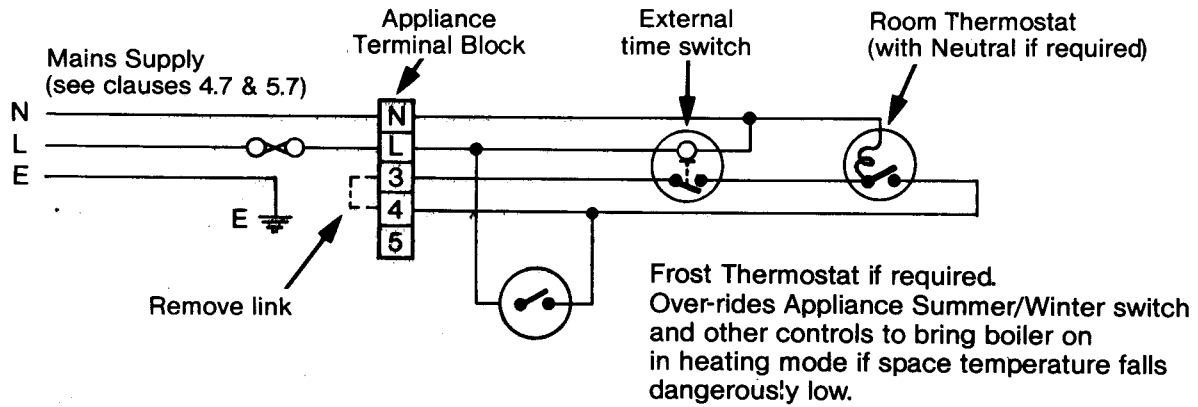


Fig. 4 For Setting Instructions see User's Instructions supplied with the Appliance.

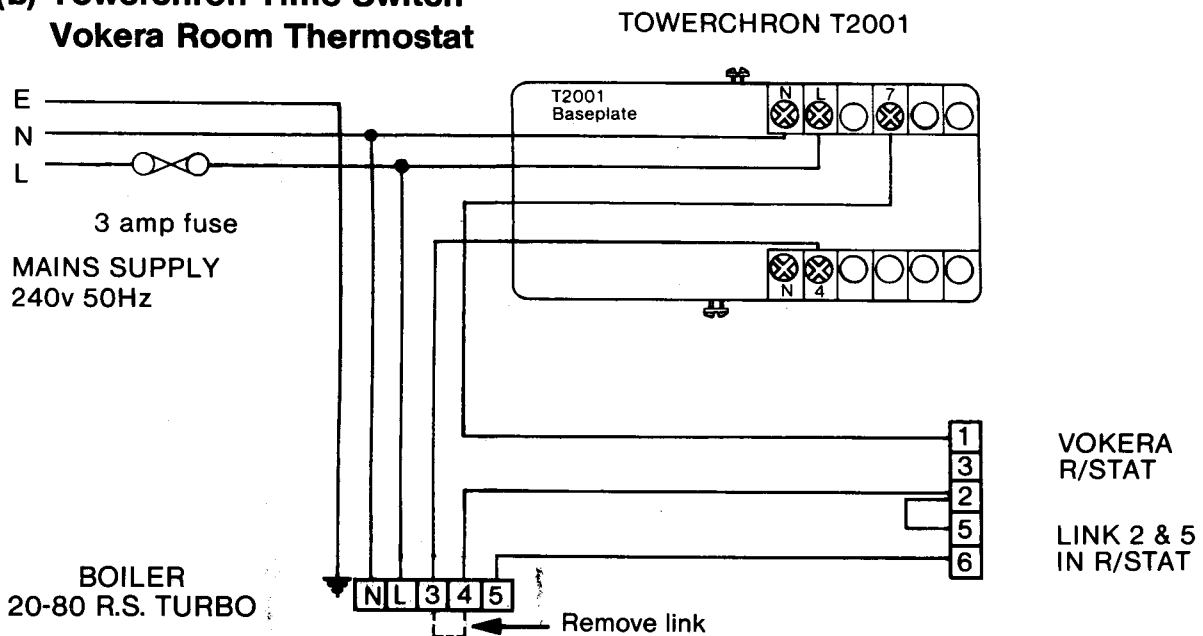


B. Wiring to External Time Switches and Thermostats.

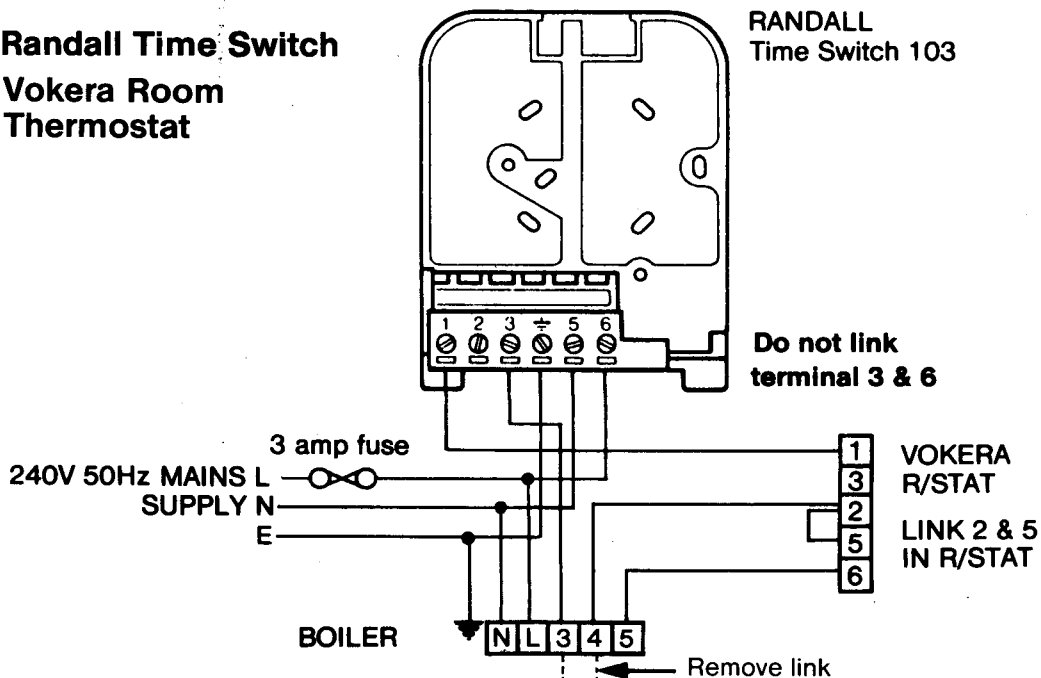
(a) General Schematic Diagram.



(b) Towerchron Time Switch Vokera Room Thermostat



(c) Randall Time Switch Vokera Room Thermostat



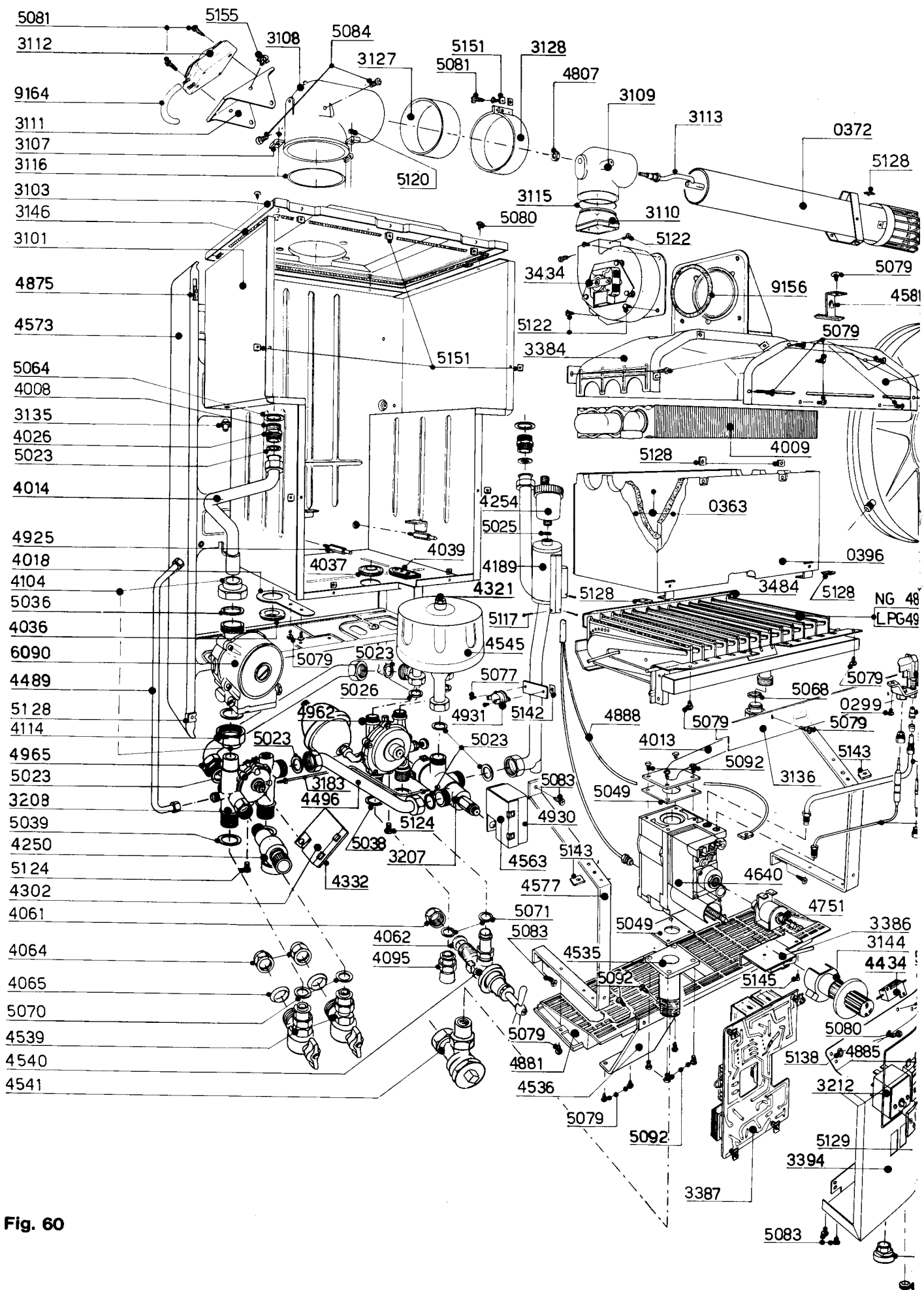
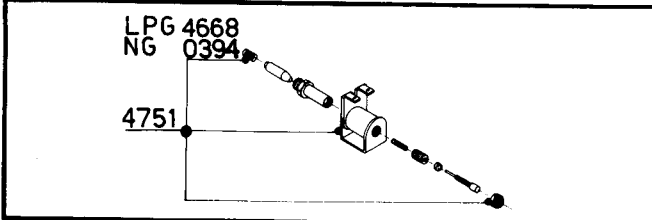
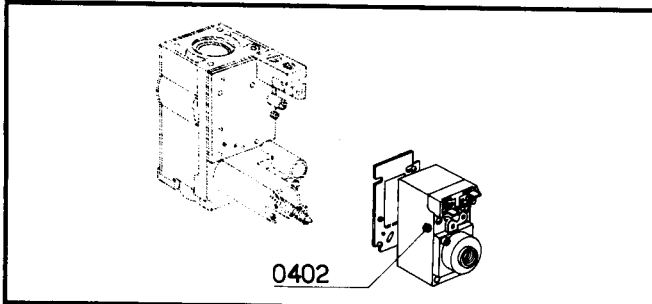
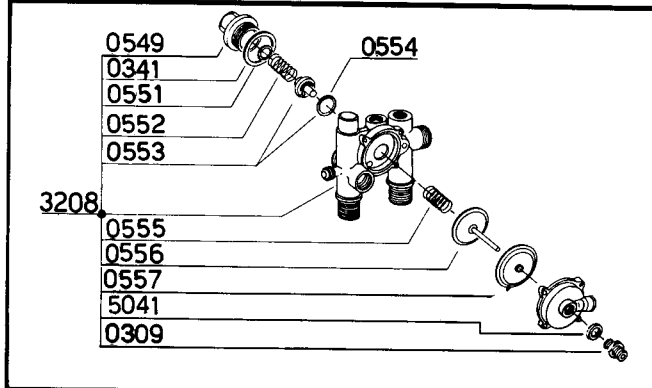
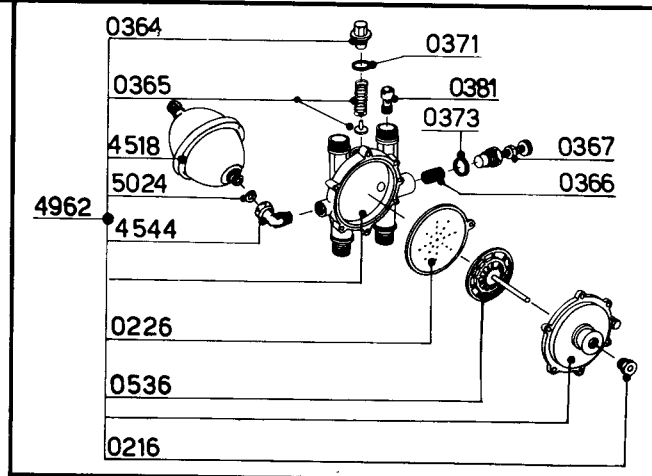
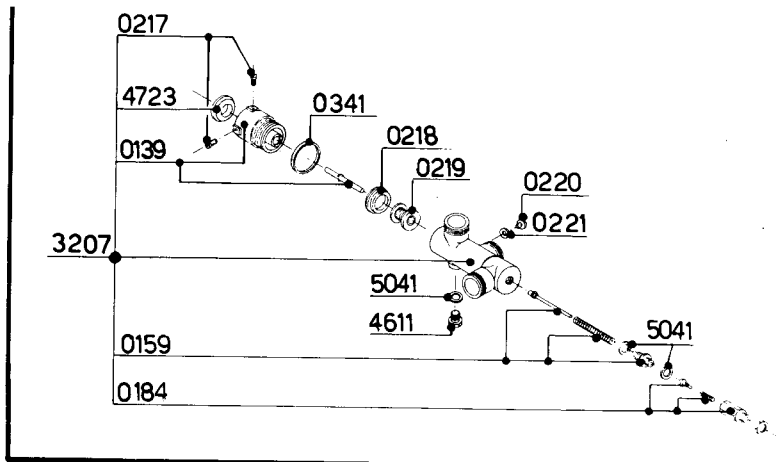
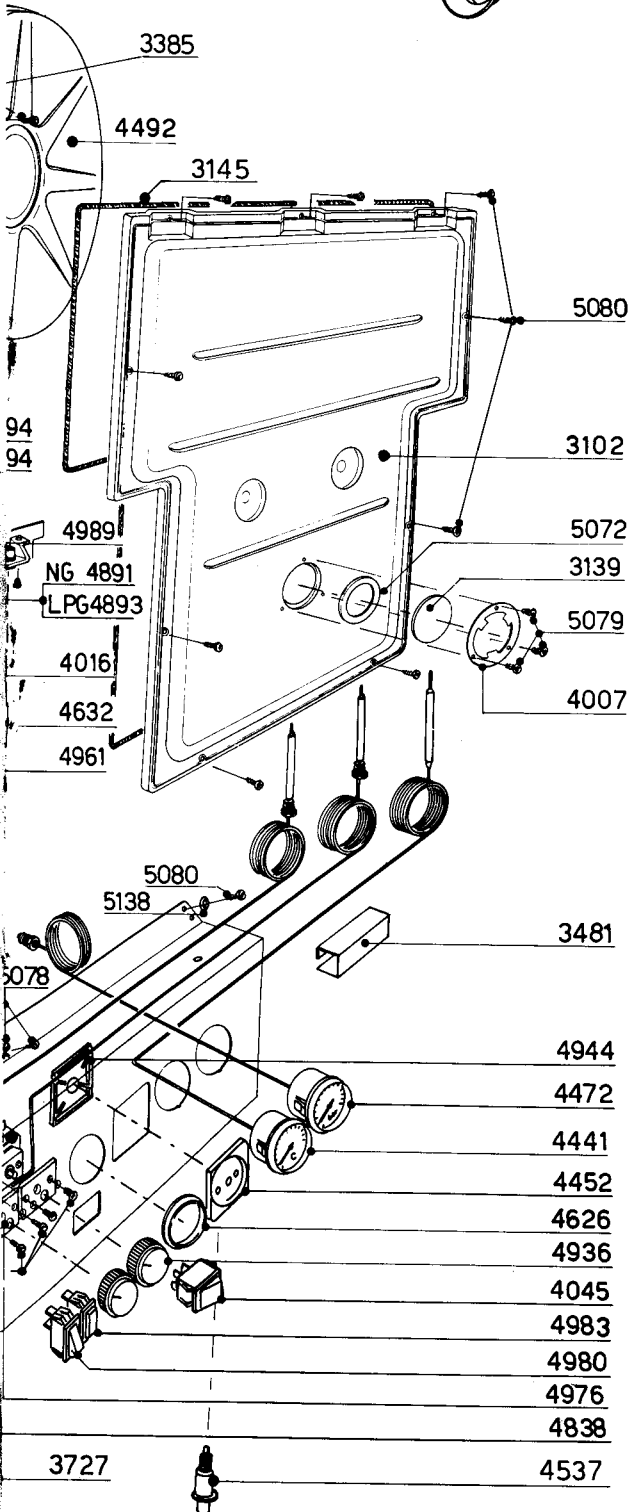
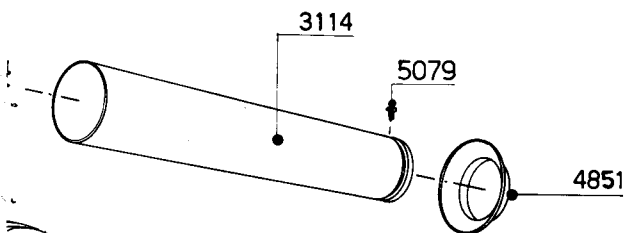


Fig. 60

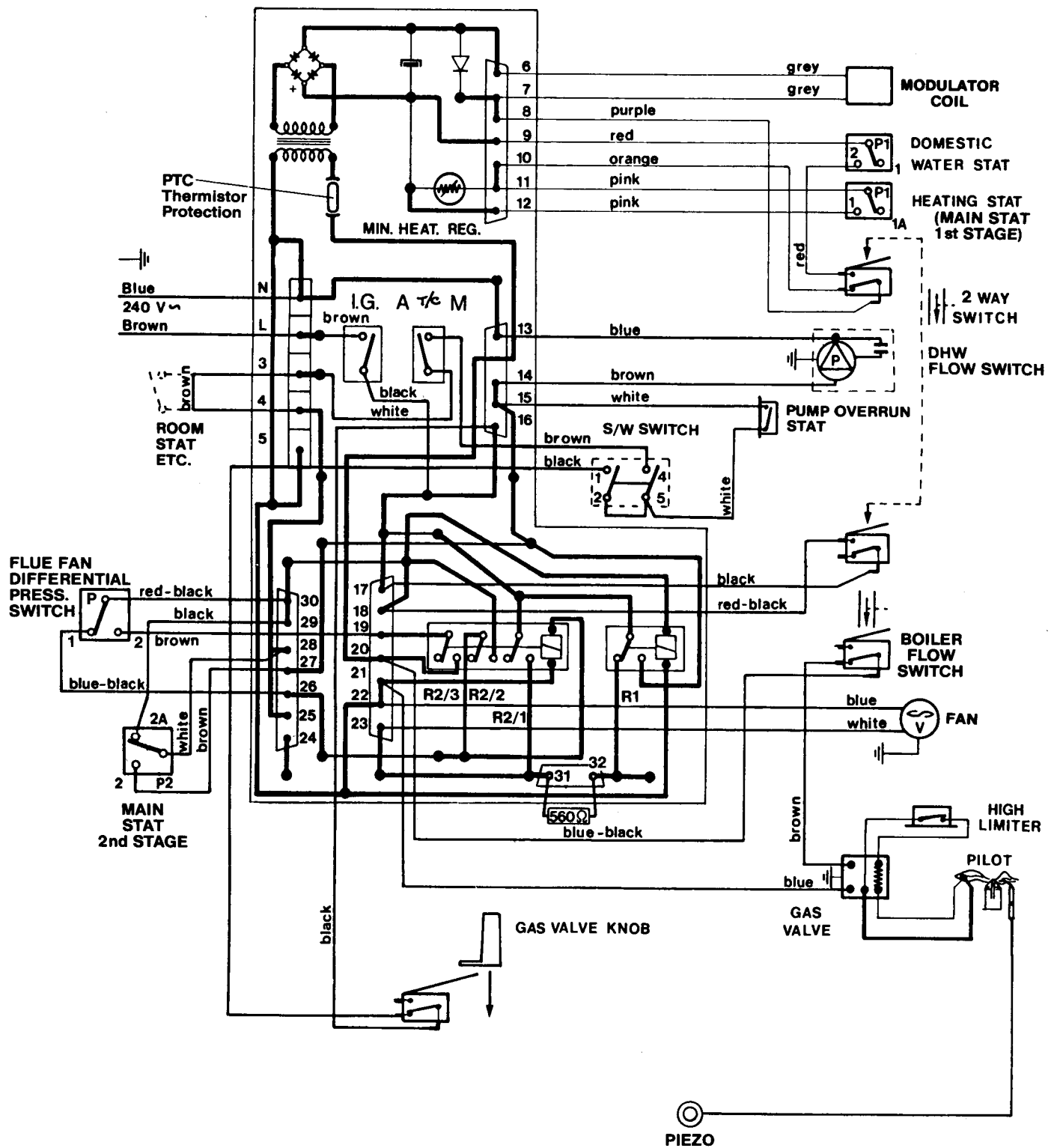


Vokera 20-80 R.S. Turbo

SHORT SPARE PARTS LIST

VOKERA 20-80 R.S.

Code	G.C. No.	Description	Code	G.C. No.	Description
0226	333 929	Domestic Diaphragm	4489	333 731	Expansion Pipe
0357	333 928	Gas Jet 1.25 Natural Gas	4492	333 733	Expansion Vessel
0363	333 828	Heat exchanger Insulation panel (complete set)	4496	333 737	Flow pipe with union
0365	333 830	Automatic By-pass Spring and Plunger	4518	333 885	Domestic Expansion Vessel
0367	333 832	Domestic water flow regulating screw	4535	333 740	Gas Connecting Barrel
0402	333 837	240v Coil Operator for Gas Valve	4536	333 741	Gas Valve mounting bracket
0557	333 941	Flow switch rubber diaphragm	4537	333 777	Piezo unit
3112	333 847	Pressure Differential Switch	4539	333 778	Heating Flow & Return valves
3144	333 857	Gas Valve Control Knob	4540	333 779	Mains stop cock
3207	333 943	3-way diverting valve	4541	333 780	Gas Service tap
3208	333 944	Heating Manifold	4545	333 887	Domestic Heat Exchanger
3212	333 945	Boiler Thermostat	4563	333 783	Double Micro Switch (DHW Micro Switch)
3384	333 860	Draft Diverter	4626	333 755	Mounting ring
3385	333 861	Draft Diverter Front Cover	4632	333 786	Electrode
3387	333 863	Printed Circuit Board	4640	333 888	Gas Control Valve (with 0402)
3434	333 864	Fan	4751	333 890	Electric Magnetic Modulator Coil
3727	333 867	Rubber Grommet	4838	333 763	Electric Wire Locking Sleeve
4009	333 870	Main Heat Exchanger	4885	333 893	Domestic Thermostat
4013	333 871	Gas Valve to Burner Connecting pipe	4888	333 894	High Limit Thermostat
4016	333 873	Pilot Pipe	4891	333 789	Pilot Injector
4045	333 880	Summer/Winter Switch	4894	333 896	Main Burner
4095	333 720	Hot Water Outlet	4931	333 899	Pump Over-run Thermostat
4104	333 721	Push fit pump union	4936	333 900	Thermostat Knob
4189	333 883	Flow Pipe with Air Separator	4961	333 902	Thermocouple
4250	333 772	Safety valve	4962	333 903	Domestic Hot Water Manifold
4254	333 722	Automatic Air Venting Bottle (3/8)	4965	333 904	Return Pipe with Union
4302	333 773	Single micro switch (Heating micro switch)	4980	333 906	On/Off Switch
4441	333 774	Temperature gauge	4983	333 907	Timed/Constant Switch
4472	333 776	Pressure gauge	4989	333 908	Pilot Burner
			5049	333 798	Gas Valve Inlet/Outlet Gasket
			6090	389 374	Circulating Pump Grundfos



GENERAL LAYOUT OF WIRING FROM PRINTED CIRCUIT BOARD

FUNCTIONAL FLOW DIAGRAM General Layout

- Notes 1. If external controls are fitted, link 3-4 removed
2. Boiler 1st and 2nd Stage thermostats in common housing.

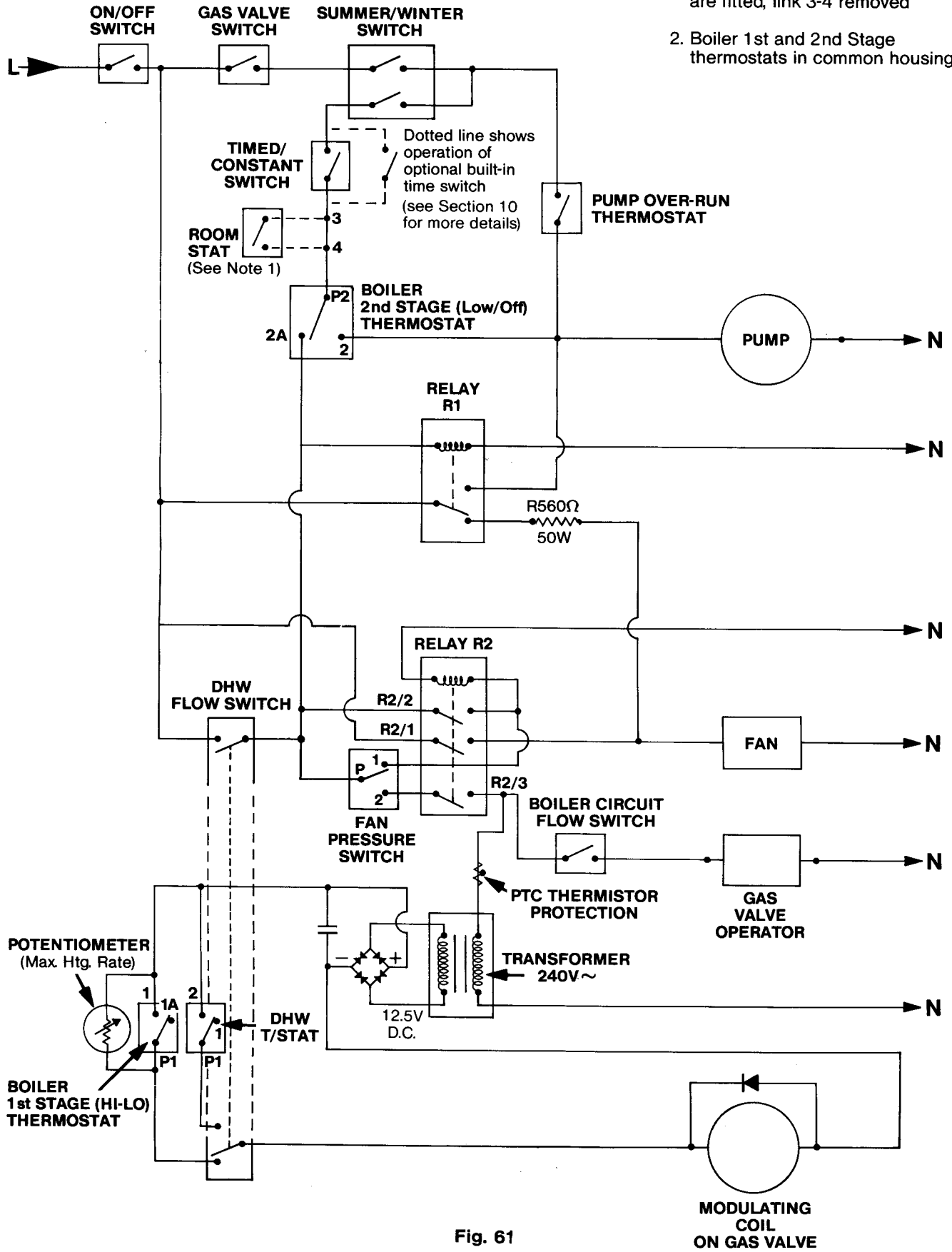


Fig. 61

FUNCTIONAL FLOW DIAGRAM At Rest. Fan on low speed

Notes 1. If external controls are fitted, link 3-4 removed

2. Boiler 1st and 2nd Stage thermostats in common housing.

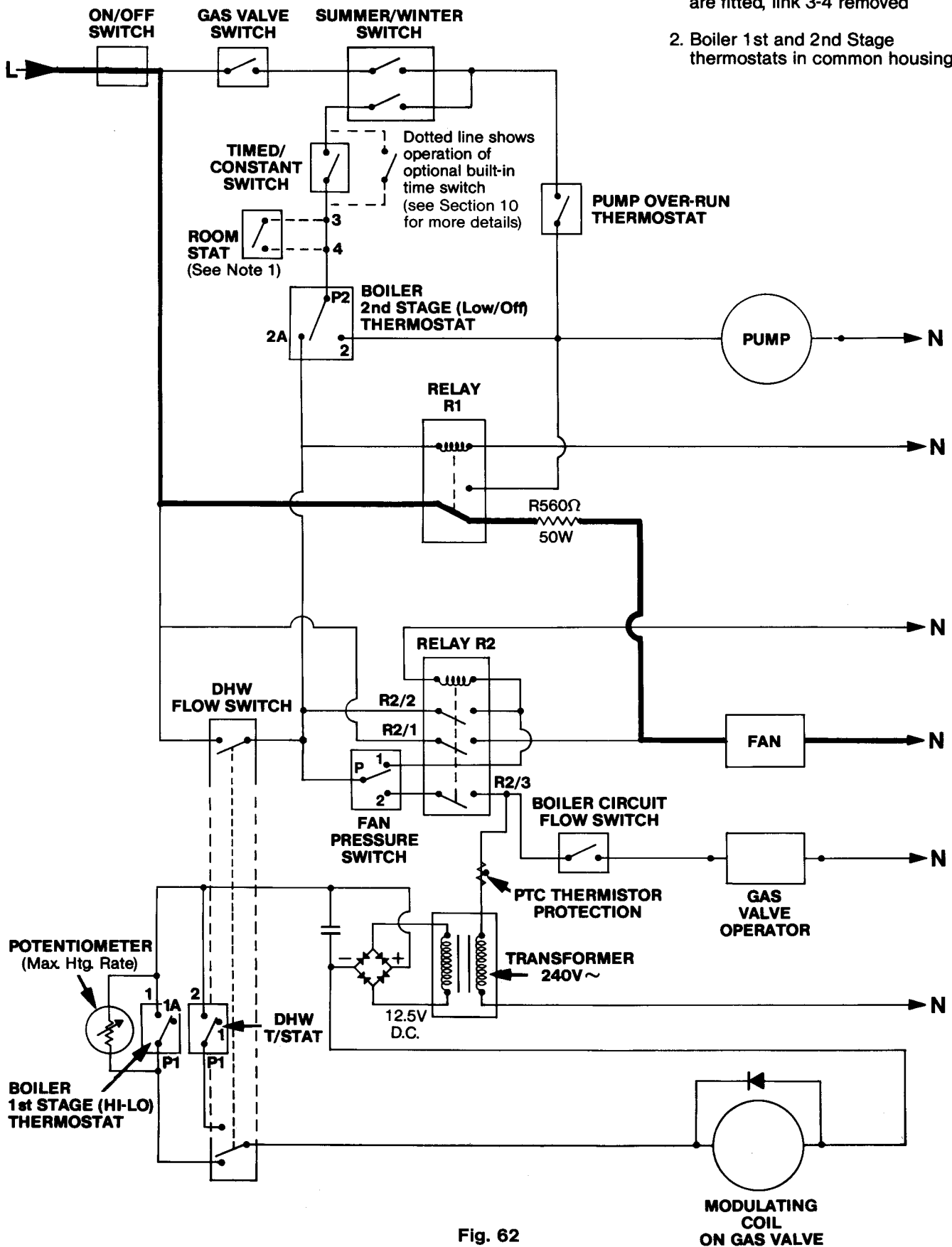


Fig. 62

FUNCTIONAL FLOW DIAGRAM In d.h.w mode

- Notes 1. If external controls are fitted, link 3-4 removed
 2. Boiler 1st and 2nd Stage thermostats in common housing.

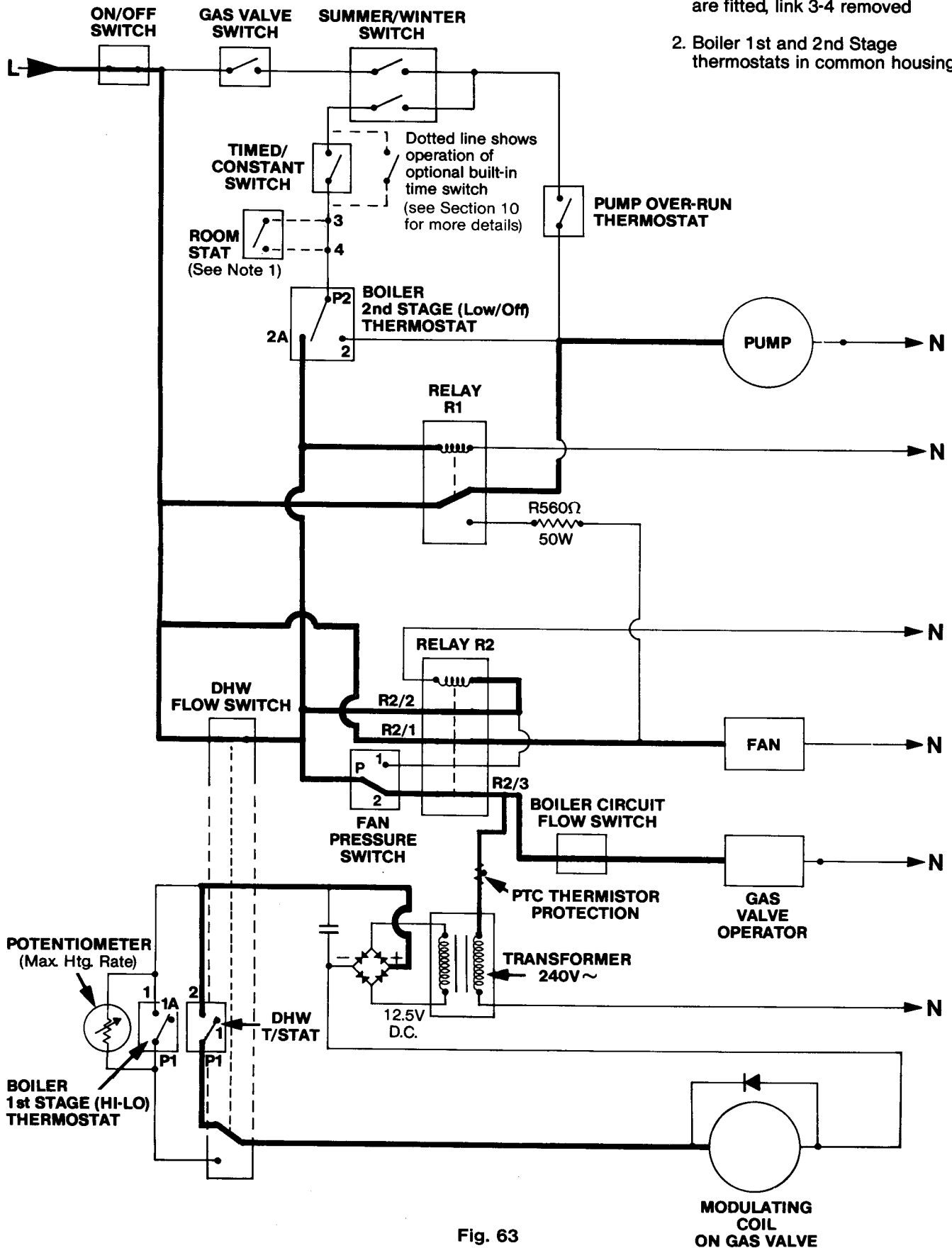


Fig. 63

FUNCTIONAL FLOW DIAGRAM In central heating mode

- Notes 1. If external controls are fitted, link 3-4 removed
 2. Boiler 1st and 2nd Stage thermostats in common housing.

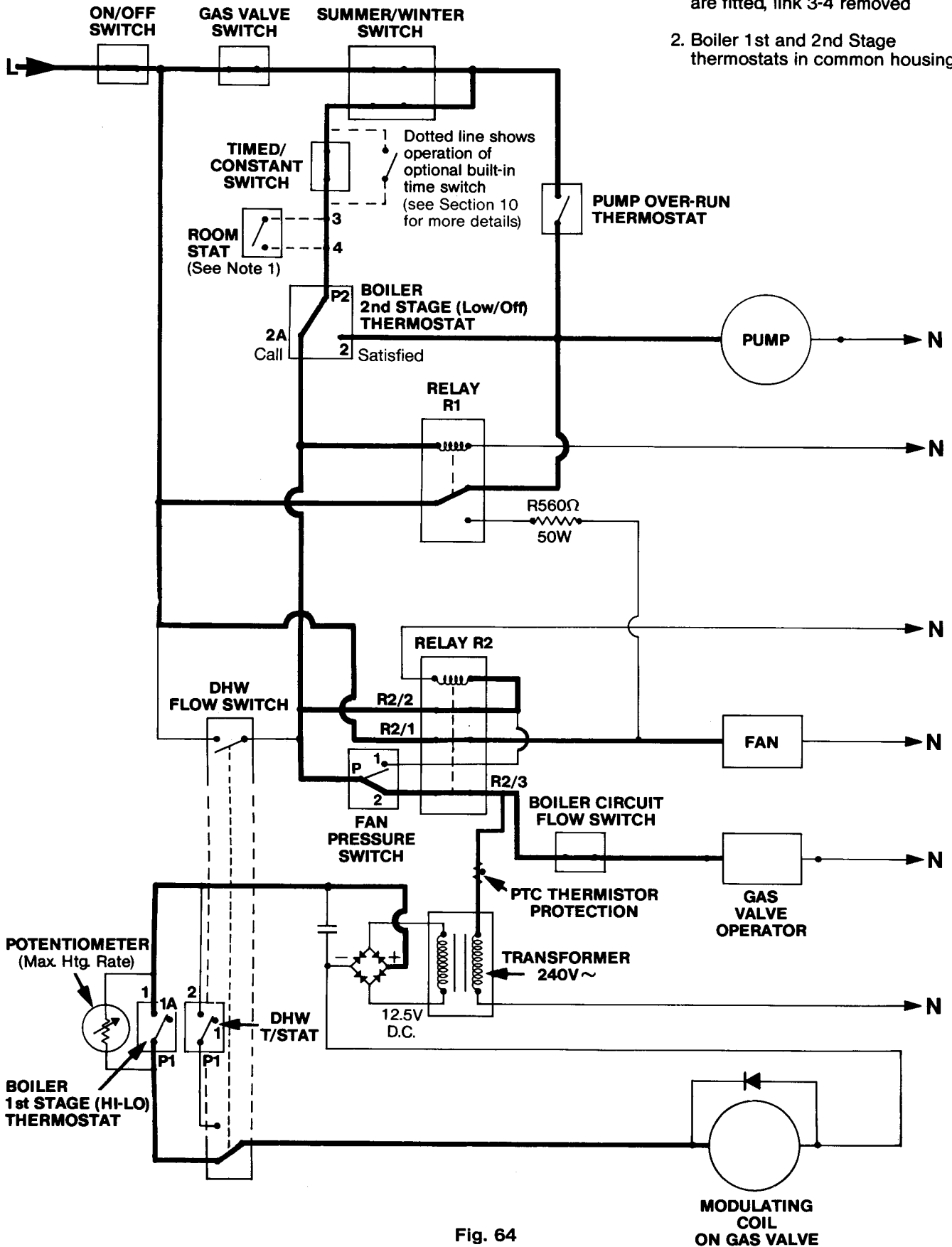
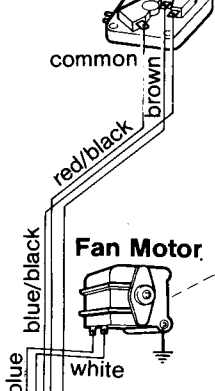


Fig. 64

Flue Fan Differential Pressure Switch



KEY TO WIRING ON PCB

- 13** 13 Blue to pump
- 14** 14 Brown to pump
- D 15** 15 White to pump o/run stat
- 16** 16 Black to Gas Valve Micro Switch

- 6** 6 Grey to Modulator coil
- 7** 7 Grey to Modulator coil
- E 8** 8 Purple to com. of DHW flow switch
- 9** 9 Red to P1(com) of DHW T/stat
- 10** 10 Orange to N/C of DHW flow switch
- 11** 11 Pink to P1(com) of Boiler T/stat
- 12** 12 Pink to 1 (N/O) of Boiler T/stat

- N** Blue for Mains Neutral
- L** Brown for Mains Live
- A 3** White to Timed/Constant Switch (via P)
- 4** Brown link (removed if terminals used for external controls)
- 5**

- 30** 30 Red/Black to common of flue fan pressure differential switch
- B 29** 29 Black to 2A (N/C) of Main Thermostat
- 28** 28 White to P2 (Com) of Main Thermostat
- 27** 27 Brown to 2 (N/O) of Main Thermostat
- 26** 26 Blue/Black to N/C of Flue fan differential switch

- 17** 17 Black to Com of DHW flow switch
- 18** 18 Red/Black to N/O of DHW flow switch
- 19** 19 Brown to N/O of Flue fan differential pressure switch

- C 20** 20 Blue/Black to Com of Boiler flow switch
- 21** 21 Blue to Gas valve operator
- 22** 22 Blue to Flue fan motor
- 23** 23 White to Flue fan motor

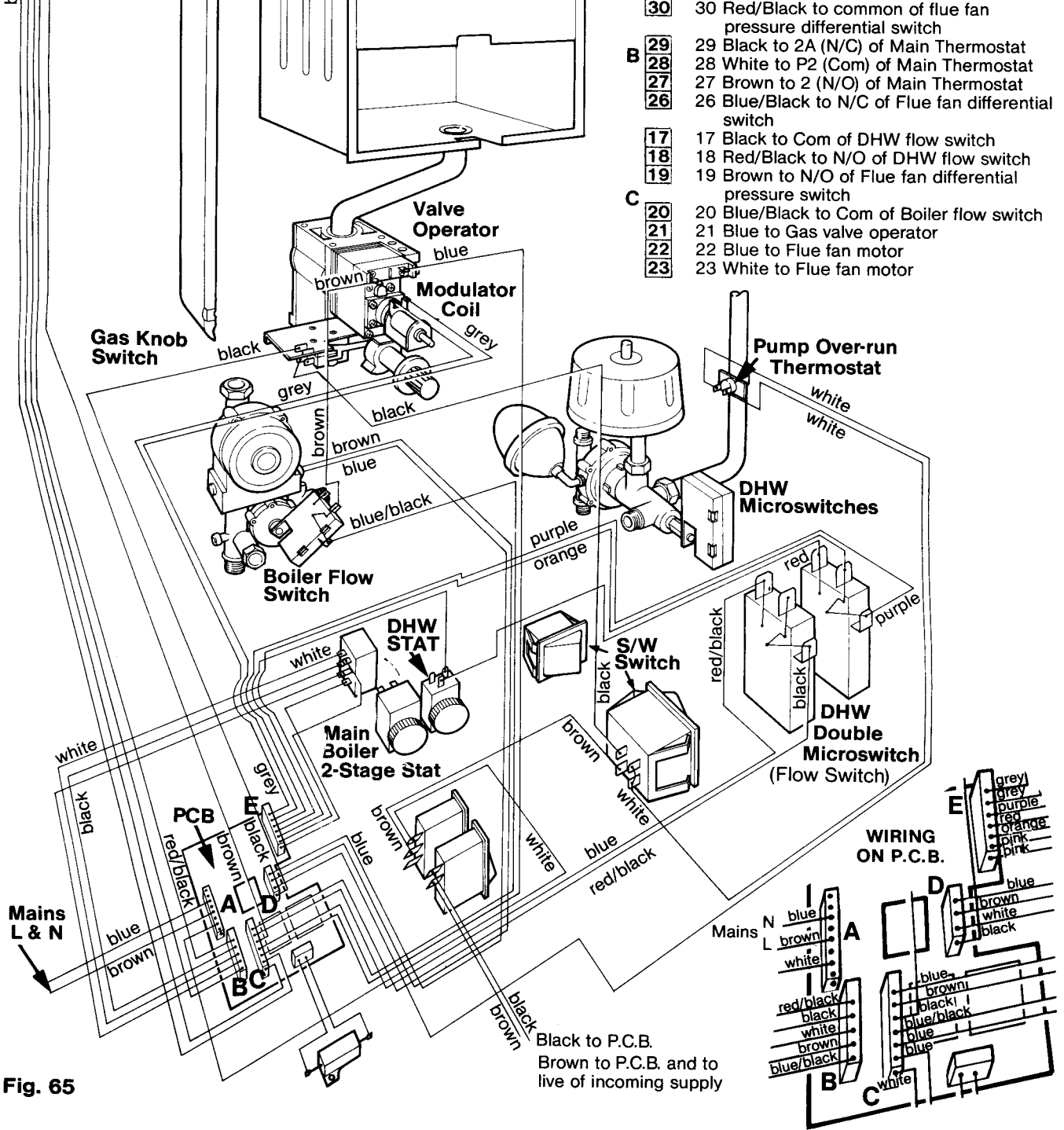


Fig. 65

Black to P.C.B.
Brown to P.C.B. and to live of incoming supply



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