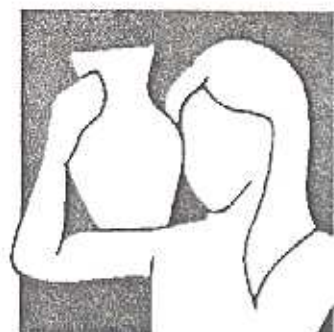
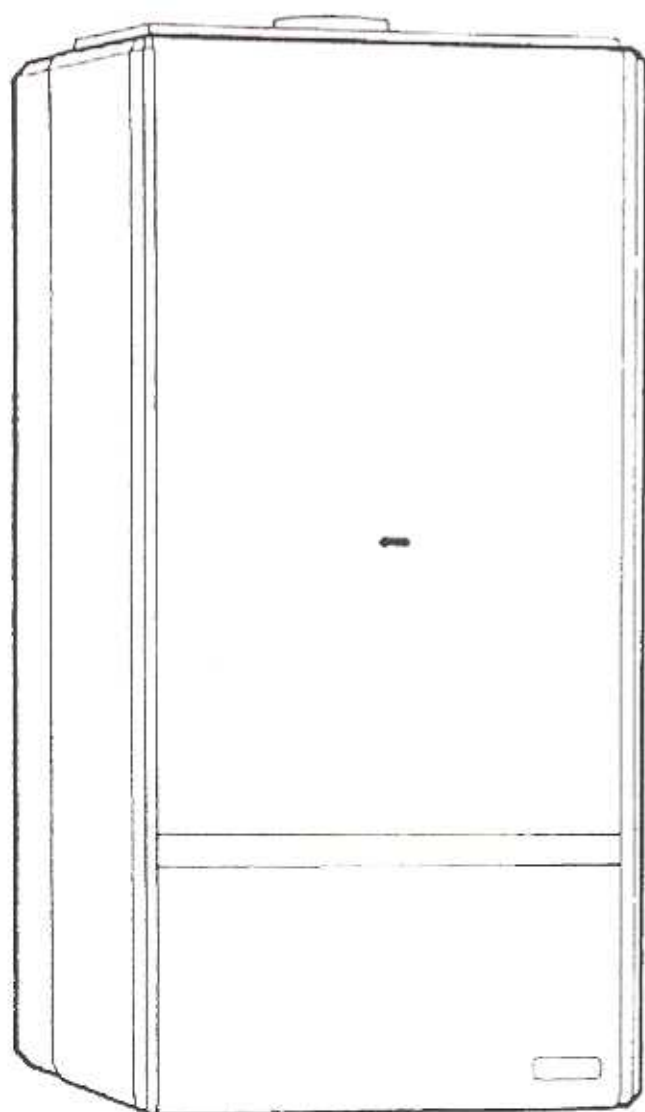




Vokèra

DOMESTIC HEATING APPLIANCES

ELIDRA 24/96 A.G.M.



Installation and Servicing Instructions

British Gas Tested and Certified
Approval No. BG/AND/94/21

HAND THESE
INSTRUCTIONS
TO THE USER

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This Appliance is for use
with Natural Gas Only

The Vokera Elidra A.G.M. is a combined central heating and domestic hot water appliance. By design it incorporates full air/gas modulation, electronic ignition, circulating pump, expansion vessel, safety valve, temperature indication, pressure indication and 3 port diverter valve.

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 degrees. A vertical flue option is available.

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

The provision of stored domestic hot water is possible by the addition of an indirect cylinder with 'Y' or 'S' plan controls.

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

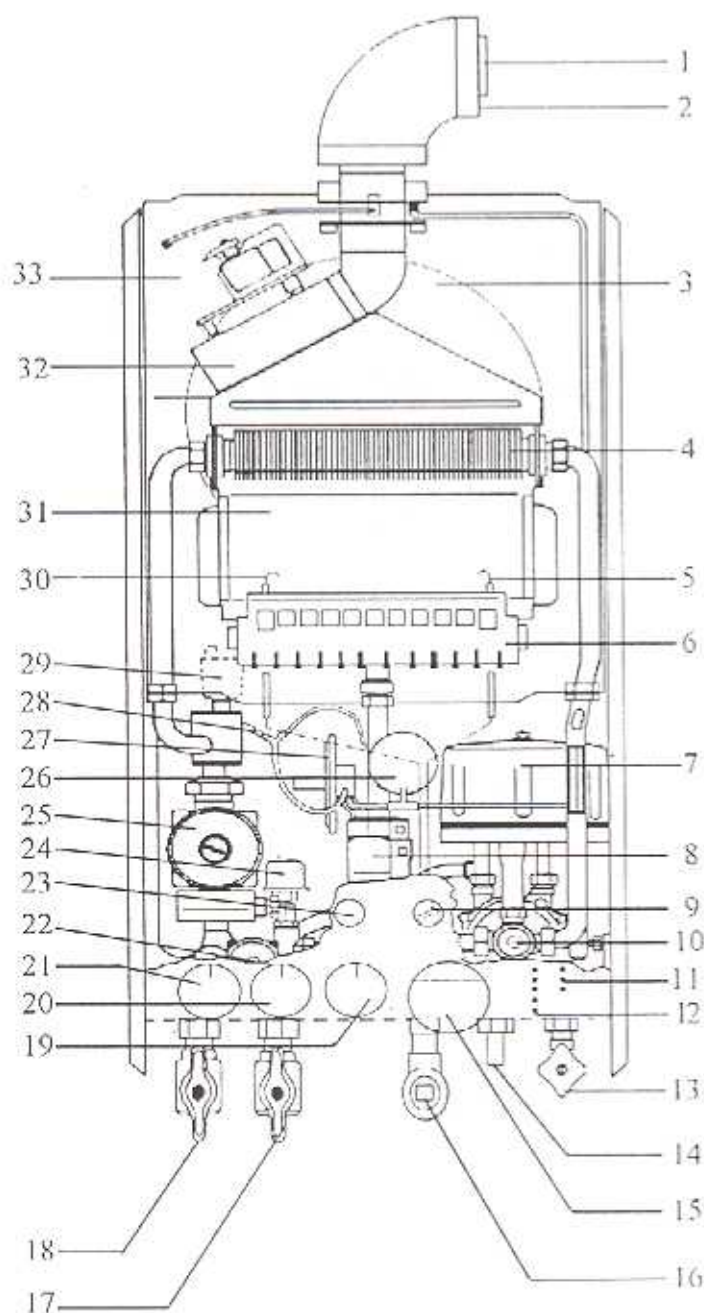
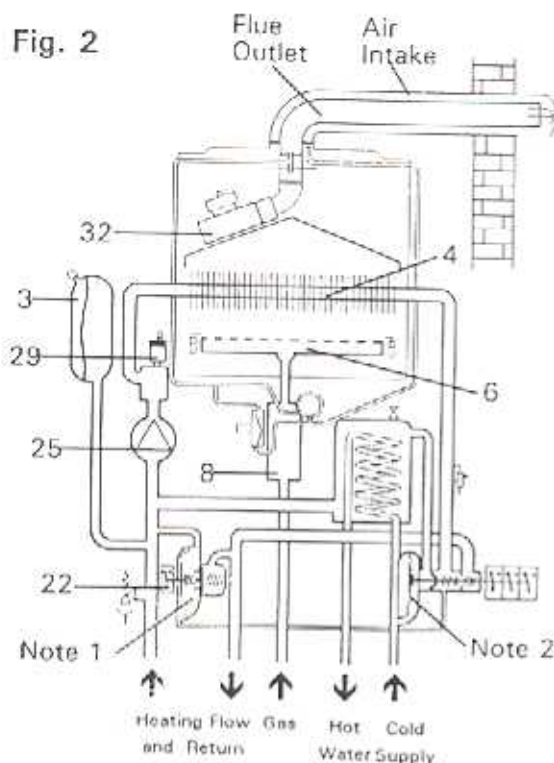


Fig.1 General Layout

- 1 Flue Outlet
- 2 Air Intake
- 3 Expansion Vessel
- 4 Main Heat Exchanger
- 5 Spark Electrode
- 6 Main Burner
- 7 Domestic Heat Exchanger
- 8 Gas Valve
- 9 High Limit Stat Reset Button
- 10 Diverter Valve
- 11 System Pressure Indicators
- 12 Temperature Indicators
- 13 Cold Water Inlet Stopcock
- 14 Hot Water Outlet
- 15 Time Clock (Optional)
- 16 Gas Service Cock
- 17 Central Heating Flow Valve
- 18 Central Heating Return Valve
- 19 DhW Temperature Control
- 20 Central Heating Temperature Control
- 21 Mode Selector Switch Control Knob
- 22 Flow Switch
- 23 Lockout Reset Button
- 24 System Pressure Sensor
- 25 Pump
- 26 Pressure Differential Switch
- 27 Compensator
- 28 Silicone Pressure Tube
- 29 Automatic Air Release Valve
- 30 Flame Sensing Electrode
- 31 Combustion Chamber
- 32 Fan
- 33 Air Chamber (With Front Removed)

Fig. 2



Notes

1. Differential pressure unit. Senses water flow rate through pump & main heat exchanger and operates flow switch.(22)
2. Differential pressure unit. Senses domestic hot water rate which operates the 3 port valve and microswitch.

SECTION 3 DESIGN PRINCIPLES AND OPERATING SEQUENCE

2.1 Fig.1 illustrates the general layout of components. Fig.2 illustrates the operating principles described below

2.2 Central Heating Mode

2.2.1 When the various switches and controls impose a demand for heat, the fan and pump are started. (The fan will rotate at a speed in relation to the temperature of the primary water, the higher the temperature the lower the fan speed. The air flow through the appliance acts on the compensator valve which in turn determines the gas pressure). The flow of primary water created by the pump operates a flow switch. This in turn energises both the gas valve and the electronic circuitry. The burner ignition is checked by the electronic circuitry, and once proven will allow gas to flow through the gas valve, at a rate proportional to the speed of the fan.

2.2.2 As water temperature increases this is sensed by a thermistor which in turn is sensed by the electronic circuitry. This lowers the speed of the fan in relation to temperature, which consequently lowers the gas input proportionally.

2.2.3 Depending on the load, either the water temperature will continue to rise to a point where it reaches maximum temperature and the main burner switches off, or temperature will fall which will increase the fan speed and therefore increase the gas input proportionally.

2.3 Domestic Hot Water Mode

2.3.1 The appliance will operate in domestic hot water mode whenever the mode selector switch is in either the  or  mode.

2.3.2 Opening a draw off tap will operate the dhw differential pressure device which in turn operates the 3-port valve (10) and the dhw flow switch.

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

2.3.3 Once the main burner has ignited and the ignition has been proven, temperature rise or fall is sensed by the thermistor which in exactly the same manner as the central heating mode, will decrease or increase the fan speed which in turn will decrease or increase the gas input proportionally to maintain an average heat input.

2.3.4 A fan overrun is incorporated in the appliance and will overrun in both dhw and c/h modes until the primary water cools to approximately 80°C (176°F).

2.4 Safety Devices

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

- 2.4.1 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 control circuit shutting off the gas valve.

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

- 2.4.2 A safety valve is provided to relieve excess pressure from the primary circuit.

SECTION 3 TECHNICAL DATA

3.1 Units

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

3.2 Dimensions and Contents

Height 1065mm (42in) overall (890 casing)
Width: 450mm (17.7in)
Depth: 360mm (14.2in)
Weight (empty 53kg (117lb)
(full 56kg (123 lb)
Water content: 3 litres (.66 gals)
for further dimensions see figs 13 -16

3.3 Connection sizes

Heating flow and return: Nut and olive for 22mm o.d.
Cold water inlet: Nut and olive for 15mm o.d.
Hot water outlet: Nut and tail for 15mm compression or capillary.
Gas Service: Rc 1/2 (1/2in BSP int)
Safety valve outlet: Rc 1/2 (1/2in BSP int)
Flue outlet: nom dia 100mm specially supplied with boiler.

3.4 Installation Requirements

3.4.1 Clearances (Horizontal or Vertical Flue)

Minimum - above casing 225mm (9in)
Minimum - below 300mm (12in) (from casing)
Minimum - In front 600mm (24in) (from casing)
Minimum - At sides 25mm (1in) (from casing)

3.4.2 Maximum heating system contents

approx. 96 litres (21 gals) Acceptance capacity of expansion vessel 10 litres (2.2 gals).

3.4.3 Air supply/Ventilation: To requirements of BS 5440 Part 2 1989

3.4.4 Means of filling sealed system: To accord with BS and/or local water authority requirements.

3.4.5 The standard flue duct assembly allows a maximum length of duct as follows: Rear flue: 693mm (wall thickness) Side flue: 890mm (to centre line of boiler).

The addition of 1 extension tube increases these dimensions to 1553mm and 1750mm respectively. The addition of two extension pipes increases these dimensions to 2303mm and 2500mm respectively.

The maximum length of horizontal flue is 2.5m.

The maximum number of bends/offsets that may be used, and the reduction in flue length for each fitting are listed below (Section 5.5.20) gives further details.

BEND	REDUCTION IN FLUE LENGTH FOR EACH BEND	MAX. BENDS
90°	750mm	1
45°	375mm	2
OFFSET	750mm	1

3.5 Electrical Details

Mains supply 240/250v ~ 50Hz Fused 3A
Power consumption: 200w.
Internal fuse rating F2A

3.6 Performance and Limitations

Max. input 30.3 kW (103,400 Btu/h)
Min. input 9.5 kW (32,450 Btu/h)
Designed water temperature rise 20°C
Max. output 27.9 kW (95,000 Btu/h)
Min. output 9.0 kW (30,700 Btu/h)
Max flow temperature 85°C

Central Heating output range

Max. 27.9 kW (95,000 Btu/h)
Min. 9.0 kW (30,700 Btu/h)
(fig.22 shows the relation between burner pressure and input/output btu's)

Nominal hot water production

11.4 litres/min. raised through 35°C
13.3 litres/min. raised through 30°C
(2.53 gal/min raised through 63°F)
(2.9 gal/min raised through 54°F)

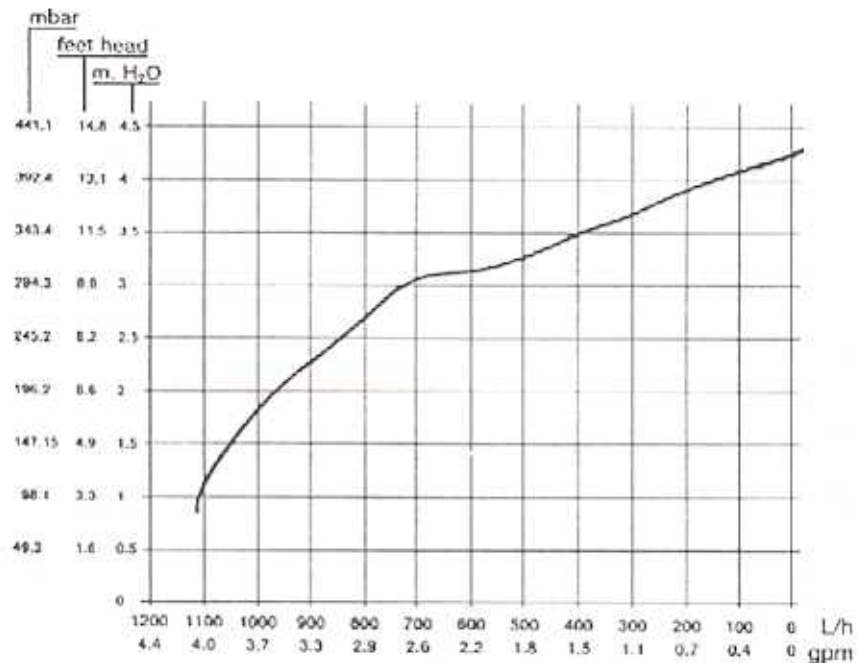
Central Heating Pump Duty

Fig.3 indicates the flow rate available plotted against system pressure drop.

N.B. When using this graph apply only the pressure drop of the system. The curve has been modified to allow for the pressure drop through the appliance.

Fig. 3 Available pump head

Fig. 3 shows the residual pump head available for the central heating system after allowing for the pressure loss through the appliance.



Working Pressures

Maximum

Minimum

Safety valve setting

Heating System

1.5bar/15m.wg/50ft wg

0.5bar/5m.wg/16ft wg

3bar/30m/102ft

Hot Water System

6.0bar/90psig

1.5bar/22psig

Flow Rates

Min. water flow (dhw) 2.8 litres/min (0.6 gal/min)

Min. central heating flow rate through appliance

350 litres/h (1.28 gal/min).

Gas Rates

Min. Gas Rate

m³/h

1.0

ft³/h

35.3

Max. Gas Rate

m³/h

3.20

ft³/h

113.0

3.7

Burner Details

Main Burner

Polidoro NP 14

Main Burner Injectors

14 x 1.35

Burner Pressure Max.

9.4 mbar

Burner Pressure Min

0.8 mbar C/H and DHW

Gas Control Valve: Honeywell VR4347A 4066 1 220/240v

4.0 General Requirements

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

4.1 Related Documents

The installation of this boiler must be in accordance with the relevant requirements of the Gas Safety (Installation & Use) Regulations 1984 the Local Building Regulations, the current I.E.E. Wiring Regulations, the by-laws of the local water undertaking, and in Scotland, in accordance with the Building Standards (Scotland) Regulation.

It should be in accordance also with any relevant requirements of the local gas region and local authority and the relevant recommendations of the following British Standard Codes of Practice:

BS 6891		1988	Low pressure installation pipes
BS 6798		1987	Boilers of rated input not exceeding 60kW.
BS 5449	Part 1	1990	Forced circulation hot water systems
BS 5546		1979	Installation of gas hot water supplies for domestic purposes (2nd family gases).
BS 5440	Part 1	1990	Flues
BS 5440	Part 2	1989	Ventilation.

4.2 Location of Appliance

The combination boiler may be installed in any room or internal space, although particular attention is drawn to the requirements of the current I.E.E. Wiring Regulations, and in Scotland, the electrical provisions of the Building Regulations applicable in Scotland, with respect to the installation of the combination boiler in a room or internal space containing a bath or shower.

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

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 6798:1987 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 6798:1987. This appliance is not suitable for external installation.

4.3 Gas Supply

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

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 BS 6891:1988.

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

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

N.B. If the gas supply for the boiler serves other appliances ensure that an adequate supply is available both to the boiler and the other appliance when they are in use at the same time.

4.4 Flue System

The terminal should be located where dispersal of combustion products is not impeded and with due regard for the damage or discolouration 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.

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.

A suitable guard is available from G.R.Claudio (Vokera) Ltd. Part No 018, G.C. No. 301 106

This guard must be fitted centrally over the terminal. Mark the positions of the fixings, drill the wall and secure using wall plugs and 3 of 1 1/2" No. 8 plated screws.

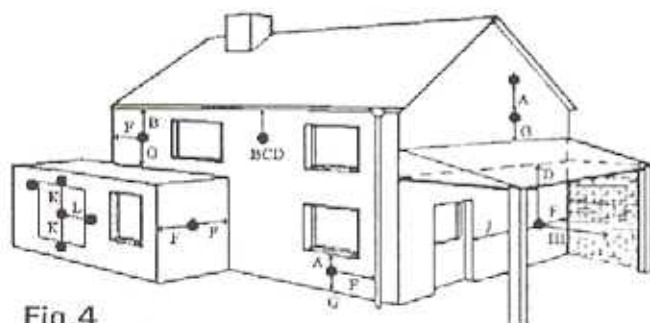


Fig.4

Terminal position for fan assisted boiler (minimum distance)

	mm
A - Directly below an open window or other opening (e.g. 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 below 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

Recommendations for air supply are detailed in BS5440:2:1976. The following notes are intended for general guidance.

The room sealed 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 following 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	273 cm ² (42.5 in ²)	137 cm ² (21.5 in ²)
LOW LEVEL	273 cm ² (42.5 in ²)	137 cm ² (21.5 in ²)

N.B. 1. Both vents must either communicate with the same room or space or be on the same outside wall.

2. 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 6798:1987 and BS 5449:1:1977 (for smallbore and microbore central heating systems).

4.6.1 The following notes are given for general guidance.

4.6.2 Pipework

Copper tubing to BS 2871:1:1971 is recommended for water pipe. Jointing should be either by 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. See cl. 6.9.4

4.6.4 System Design

Figs 5 & 6 illustrate typical heating only layouts. However the boiler is also suitable for Y & S plan systems. Section 10 gives wiring details.

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.

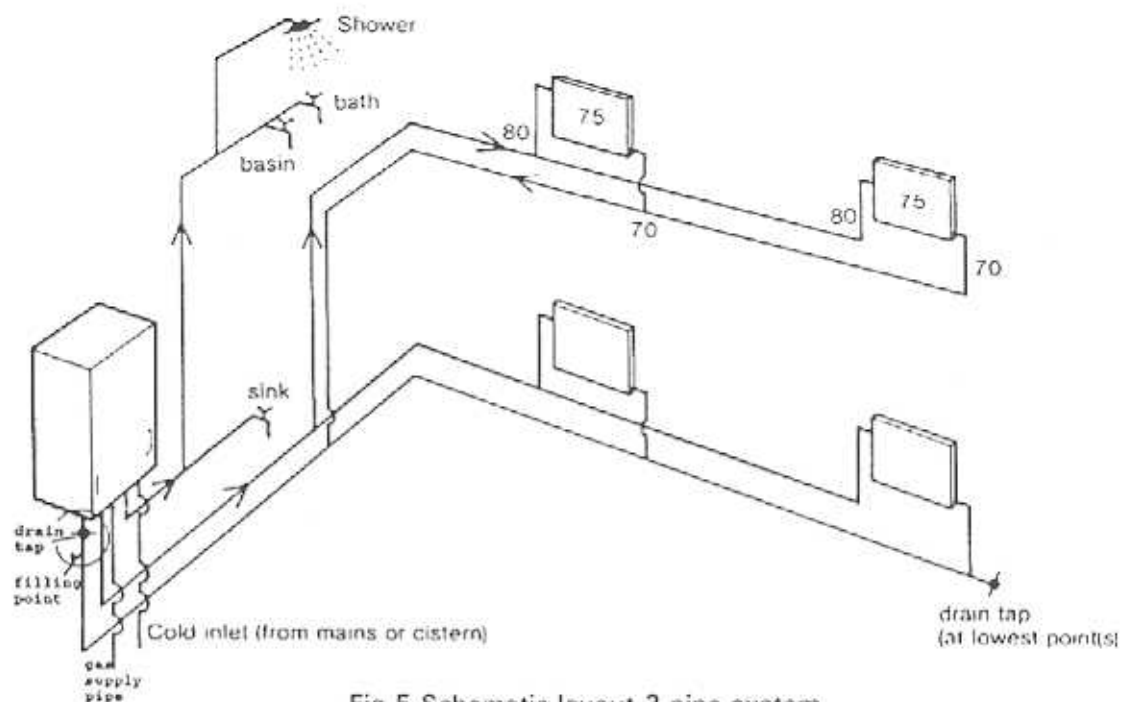


Fig.5 Schematic layout 2 pipe system

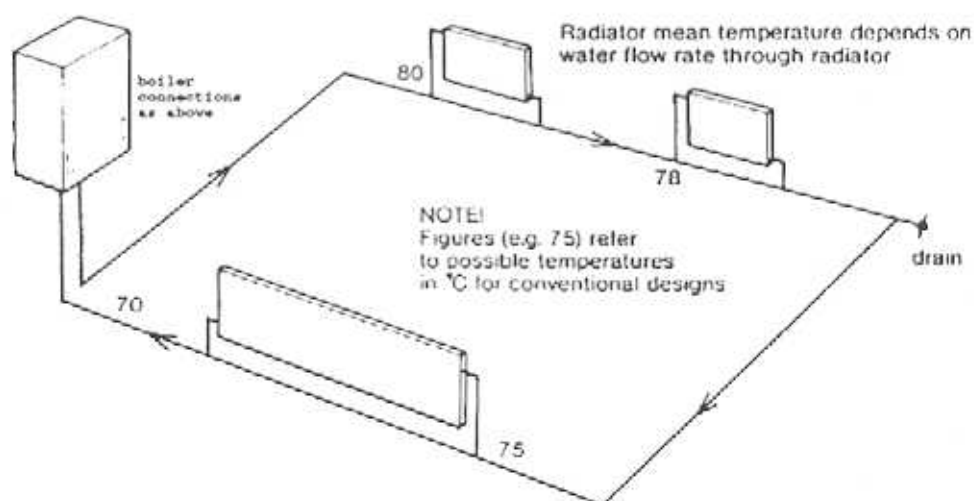


Fig.6 Schematic single pipe central heating

Salient features of each system

2 Pipe

- Radiators connected in parallel
- Water flow to each is 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 connection to main circuit.
- Shutting off individual radiators hardly affect total flow in system.
- Radiator mean temperature progressively drops around systems.
- Low flow rate seriously affects the 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 (2.2gals) 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 replacing water lost during servicing must be provided, and it must comply with local water authority regulations.

A method is shown in fig. 7 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 methods.

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 3-amp 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.

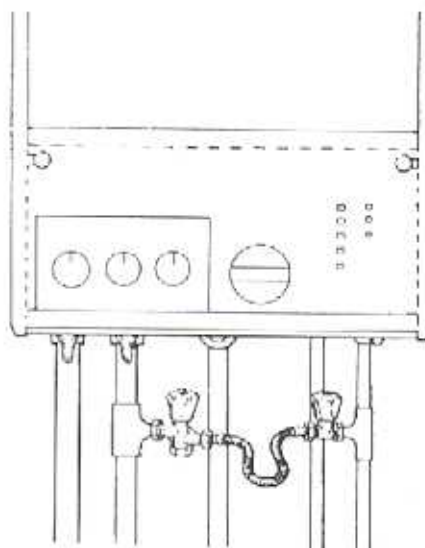


Fig. 7

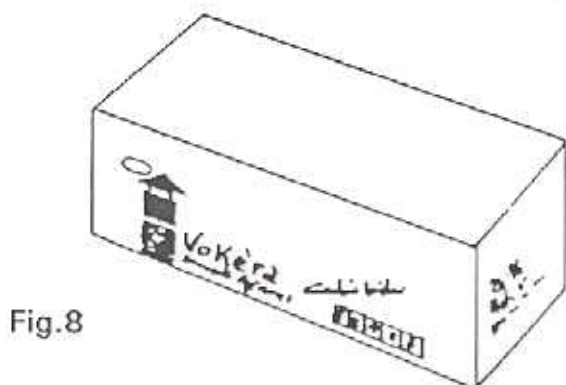


Fig. 8

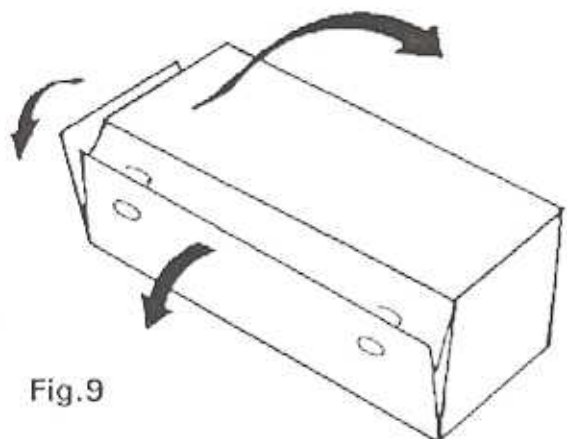


Fig. 9

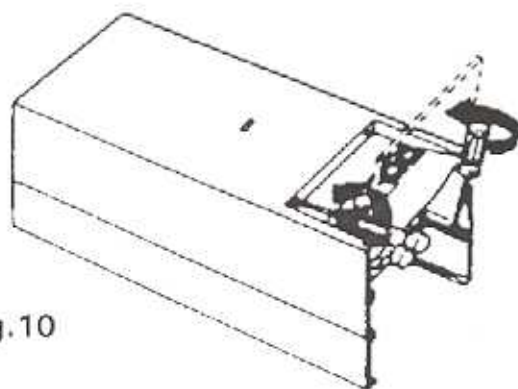


Fig. 10

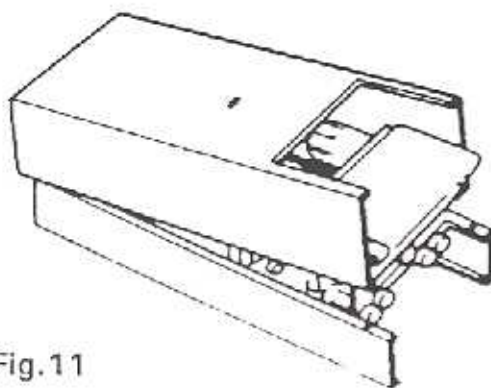


Fig. 11

5.1 Delivery (Fig. 8)

The appliance is delivered in a heavy duty cardboard carton.

Lay the carton on the floor with the writing the correct way up.

5.2 Unpacking (Fig. 9)

Pull both sides of the carton open. Do not use a knife. Unfold the rest of the carton from around the appliance.

Lay the appliance with the black frame on the floor. Remove the plastic vacuum sealed bag, remove two polystyrene blocks one at the top and the other at the base of the appliance.

Remove the hanging bracket from the top polystyrene block and the box containing the fixing kit from the lower polystyrene block.

The fixing kit contains

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

Flue kit supplied in a separate carton

5.3 Preparing for Mounting

5.3.1 Remove 4 screws securing the lower part of the casing to the case frame. (Fig. 10)

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. 11)

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. 12)

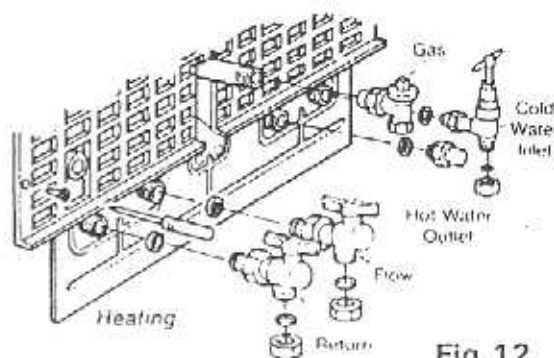


Fig. 12

Fig.13

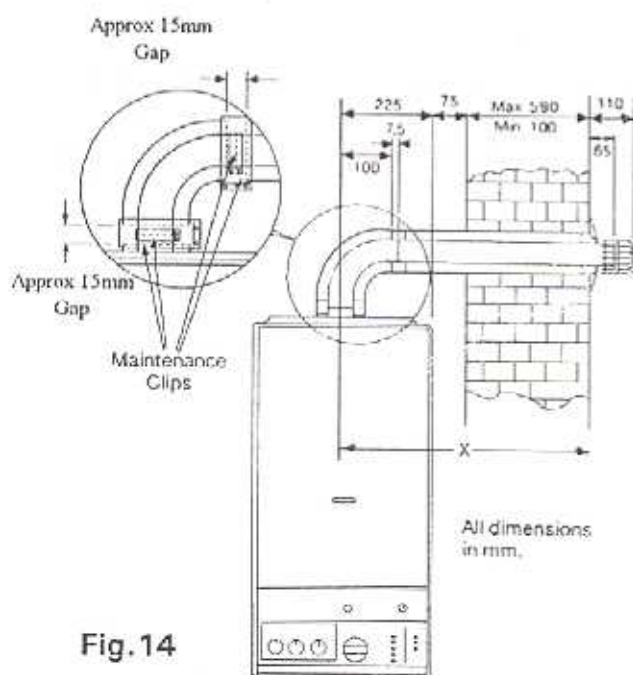
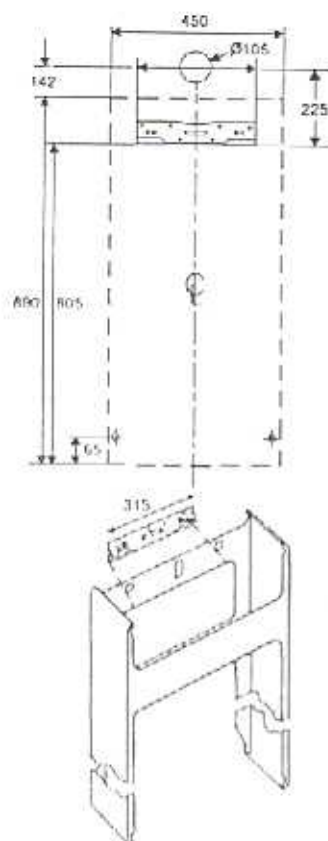


Fig.14

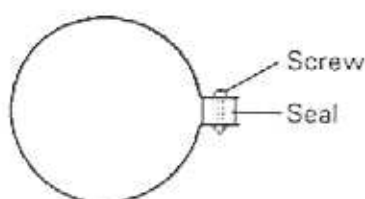


Fig.14a

5.4 Mounting the Appliance (Fig.13)

5.4.1 Place the template on a smooth, vertical incombustible surface and use it to locate the upper bracket, bottom fixing and flue pipe holes. (If the appliance is to be fitted on a wall of combustible material, the wall must be protected by a sheet of fireproof material.

If the appliance is to be fitted in a timber framed building it should be fitted in accordance with the British Gas publication 'Guide for Gas Installations in Timber Framed Housing'. Reference DM2. If in doubt advice must be sought from the local Gas Region of British Gas.

Alternatively, position bracket and holes to dimensions in fig 13.

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 1 1/2" No 10 screws.

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

Refer to fig.13 and figs 14-18 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 (Horizontal)

Vertical flue installation instructions are on page 60 appendix a.

Refer to figures 14-18

5.5.1 Assemble the large and small maintenance clips as fig.14a

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 extension up to 890mm - from outside of wall to centre of the flue elbow. Extension kits (Part No. 026, G.C. No. 370 346) are available to order for flue extensions of up to 2.5 metres total length.

5.5.3 Hang the boiler on the bracket. Adjust the boiler sideways to its correct position. Measure carefully from the actual face of the outside wall to the centre of the flue bend. (Dimension X on Figs 14 & 15).

Locate the small maintenance clip onto the flue elbow (fig.14) and assemble onto the flue outlet on the top of the boiler.

Twist the flue bend to the outlet direction required, and tighten the maintenance clip to secure the flue bend in place. Carefully level across to check that the hole through the wall is at the same level as the flue bend.

5.5.4 The flue kit supplied is suitable for an exact dimension of 890mm. 1 or 2 extension tubes will increase X to 1750mm and 2500mm respectively.

5.5.5 Where X is less than 890mm, the supplied flue must be shortened as follows:-

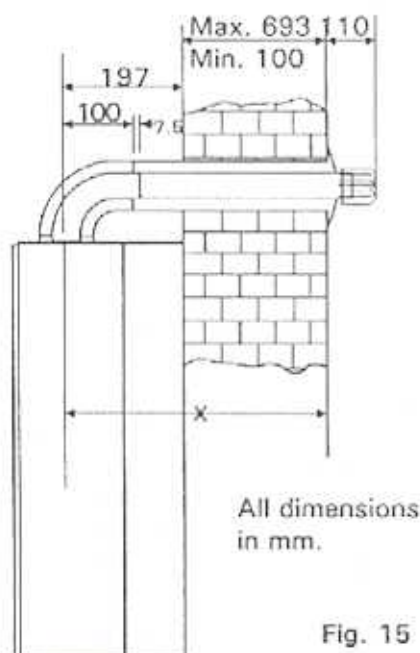


Fig. 15

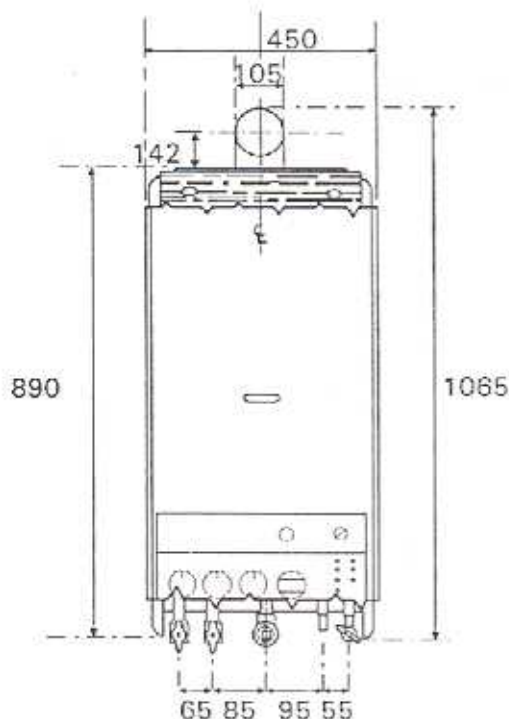


Fig. 16

Separate the two tubes by removing screw G (fig. 17). Subtract the measured length from 890mm. The difference is the precise length to be removed from both tubes ($890 - X = \text{length to be cut off from the plain ends}$).

Example

X is measured as 630mm

Amount to be cut off both tubes is $890 - 630 = 260$.

5.5.6 Where X is more than 890mm an extension kit (or kits) is needed. The standard uncut lengths with extension(s) is as follows:-

Always cut the extension tubes, not the standard tube.

1. Measure X.

2a. If using 1 extension piece, cut $(1770 - X)$ mm from the inner flue tube but $(1750 - X)$ mm from the outer air tube.

2b. If using 2 extension pieces, cut $(2600 - X)$ mm from the inner flue tube but $(2560 - X)$ mm from the outer air tube.

Shorten inner and outer tubes of last extension piece.

EXAMPLE $X = 1295$

Cut $1770 - 1295 = 465$ mm from air tube

Cut $1750 - 1295 = 445$ mm from flue tube

CUT CLEAN AND SQUARE WITH FINE TOOTH SAW AND REMOVE BURRS.

5.5.7 Loosen the small maintenance clip and lift the flue bend off the boiler flue outlet.

5.5.8 Ensure inner and outer terminal tubes are firmly fitted together with screw G (fig. 17). Push the terminal tubes through the wall until the face of the outer tube protrudes 18mm from the face of the wall (fig. 17). The terminal grill (D) will then protrude 110mm from the wall face.

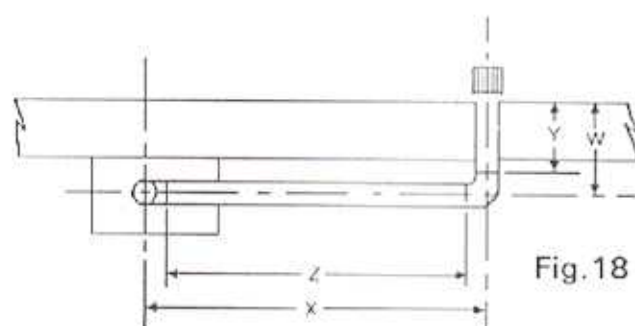
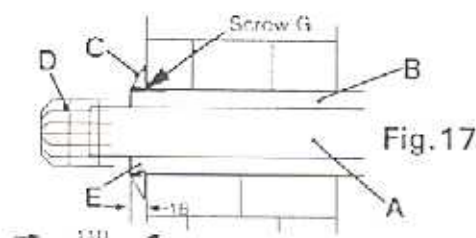
5.5.9 If extension pieces are used assemble these using the maintenance clips provided. Always fully butt the joints before securing the clips.

5.5.10 Make sure the entire length of the flue is truly horizontal and adequately supported. Use at least one bracket for each extension. (Conventional adjustable strap supports, Part No 03, G.C. No 301 105, suffice, Vokera stockist can supply if necessary)

5.5.11 Assemble the second small maintenance clip on the end of the inner flue tube.

5.5.12 Refit the flue elbow onto the boiler. Align the flue elbow with the flue pipe and tighten the maintenance clip between the flue elbow and the boiler. Ensure pipe sections butt together.

5.5.13 Draw the flue pipe towards the boiler and tighten the second clip over the joint between the inner flue pipe and the flue elbow.



5.5.14 There must now be a gap of approximately 15mm from the elbow to the end of the outer tube.

5.5.15 Check also that the outer end of the flue projects as indicated in fig. 17.

5.5.16 Referring to fig. 14 fit the large maintenance clips into position and secure the clip screws.

5.5.17 Check adjust and tighten all supports.

5.5.18 Seal the peripheral gap around the outer tube with cement or mastic and slip the cosmetic flexible plastic collar (fig. 17 item C) into groove on the pipe. This operation can only be carried out with external access. Seal the internal wall face around the air duct.

N.B. Absence of the collar will not affect operation of the appliance but the outer wall must be weather proofed around the air duct.

5.5.19 When the flue and appliance are finally positioned screw the lower frame to the wall. (fig. 13)

5.5.20 Installing optional 90 degree flue bend
Part No 02, G.C. No. 301 104

5.5.21 Assemble the large and small maintenance clips as shown in fig 14a.

5.5.22 Carry out steps 5.5.2-5.5.3

5.5.23 Ensure when siting the flue hole position that the combined distances (Y + Z on fig. 18) between the flue elbow on the boiler to the extra bend and from the face of the outside wall to the extra bend do not total more than 1.75 metres.

5.5.24 Measure carefully the distance between the centre of the flue bend on the boiler to the centre of the hole through the wall (dimension X fig. 18).

NOTE: Extension kit/s part no 026 G.C. No 370 346 will be required if the distance measured is greater than 780mm

5.5.25 Subtract 230mm from the measured dimension, separate the two tubes and cut the outer tube to this dimension.

5.5.26 Cut the inner tube 15mm longer than the outer tube.

5.5.27 Referring to fig. 14 assemble a small maintenance clip on the outlet of the boiler flue bend. Push the inner flue tube into clip and tighten clip screws.

5.5.28 Slide the outer flue tube into place leaving approx. 15mm between the bend and the flue tube.

5.5.29 Referring to fig. 14 fit the large maintenance clip into position and tighten clip screws.

5.5.30 Connect the flue tube to the extra bend using the same method ensuring that the bend outlet is in line with the hole through the wall

5.5.31 Ensure that the flue pipe runs parallel to the wall then carefully measure the distance from the outside face of the wall to the centre of the extra bend (dimension W fig. 18).

5.5.32 Subtract 97mm from the dimension and cut the outer tube to this length.

NOTE: The two tubes must be separated by removing screw G fig. 17 before cutting.

5.5.33 Ensure that any shortening of the tube is done from the plain end.

5.5.34 Reassemble the inner and outer flue tubes and refix screw G.

5.5.35 Mark the inner tube 7mm longer than the outer and cut off the inner tube at this point.

5.5.36 Remove the large maintenance clip, loosen the small clip and remove the bend.

5.5.37 Push the flue tubes through the wall, loosely refit the extra flue bend.

5.5.38 Assemble a small maintenance clip onto the inner flue tube, draw the flue tube towards the flue bend until the inner tubes butt. Tighten the screws on the small clip.

- 5.5.39 Referring to fig.14 fit the large maintenance clip into position and secure clip screws.
- 5.5.40 Check and adjust if necessary so that the outer flue tube protrudes 18mm from the outside face of the wall.
- 5.5.41 Tighten all maintenance clips, make sure that the entire flue is horizontal and adequately supported. Use at least one bracket (part no 03 G.C. No 301 105) for each extension.

5.6 Connecting the Gas and Water

- 5.6.1 Figs.12 and 16 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.

- 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**
Provide a suitable coupling and connect the hot water draw-off pipe to the 15mm o.d tail. Tighten the nut.

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**
Connect a 15mm cold water service pipe to the inlet stopcock of the appliance. Tighten the nut.
- 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 beneath 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 (possible boiling) water will not create danger or nuisance; but in an easily visible position.

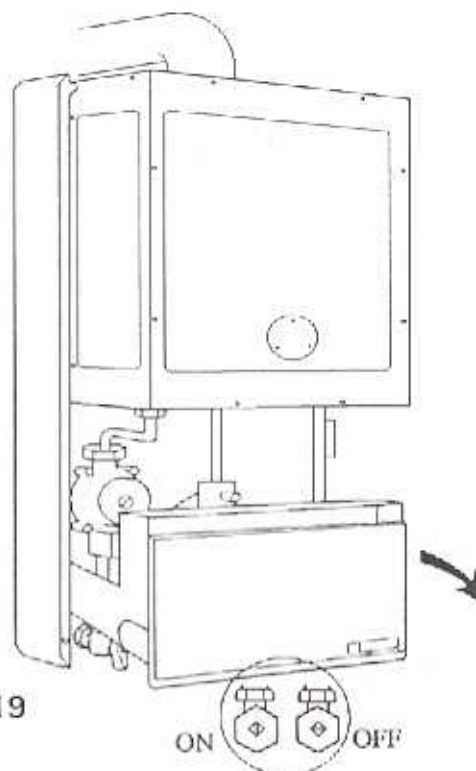


Fig.19

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 electrical terminals hinge down the spring loaded control fascia. (ref to fig.19) until it rests in an approximately horizontal position.

Press in the sides of the printed circuit board cover to release retaining clips, and lift cover off.

The terminal block is easily visible on the left of the printed circuit board.

- 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) to table 15-16, BS 6500.

Wiring to the appliance should be rated for operation in contact with surface 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.
- 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 screw until the cable is secure.
- 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 1 & 3 (after removing a factory fitted link). If a neutral is needed use the terminal mark N.
- If required pass this cable through the same cord anchorage.
- The conductors should be so connected that the conductor to terminal 1 becomes taut before those to 3 & N should the cable be strained.

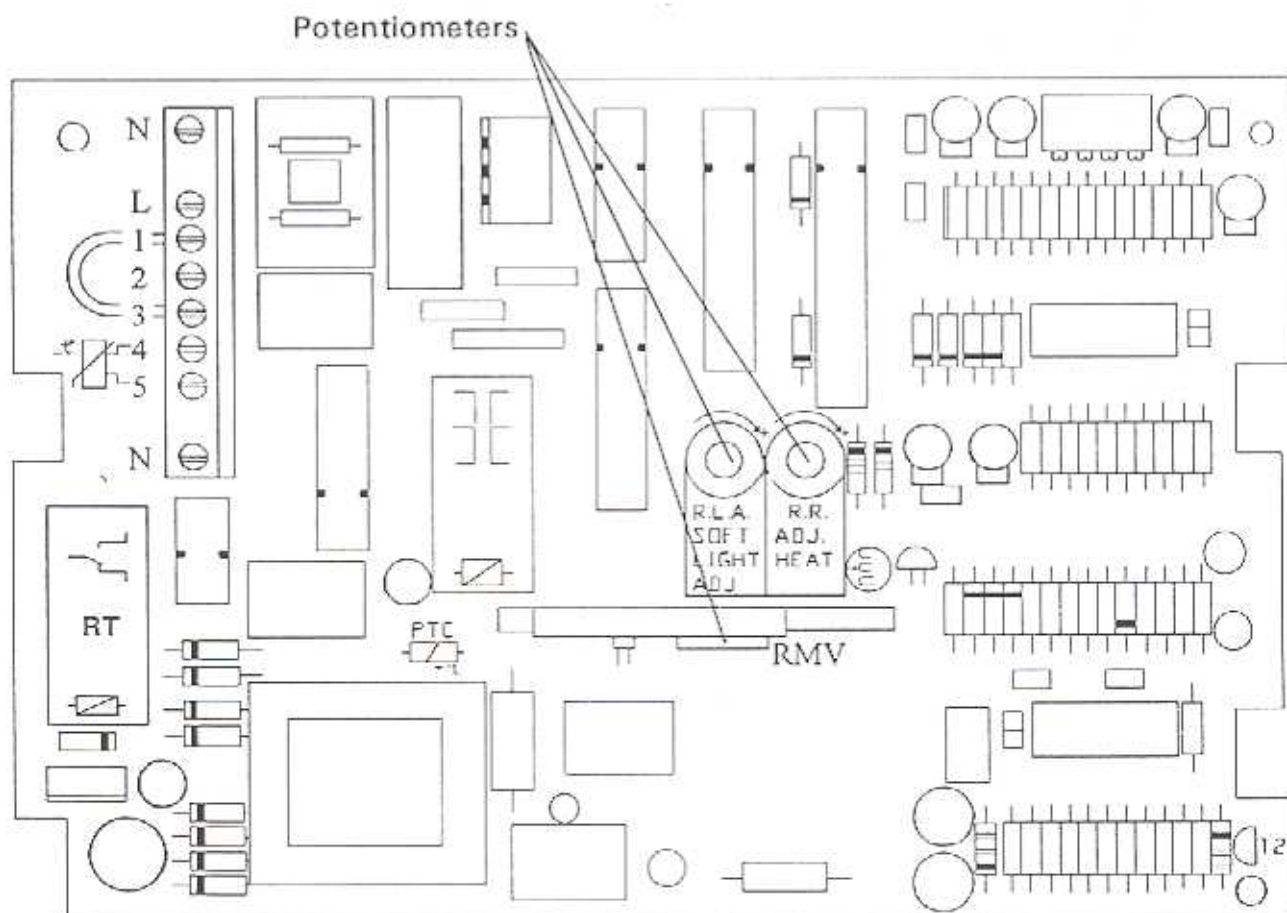


Fig.20

- 6.1** Where the text bears identifying numbers in brackets, refer to figs.1 and 2 unless otherwise instructed. Close control panel, open controls cover.
- 6.2** **Gas Supply Installation**
Inspect the entire installation including the meter, test for soundness and purge, all as described in BS6891:1988.
- 6.3** **Central Heating Systems**
- 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 (15psig)
- 6.3.2** **Initial Flushing of the Pipework**
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.
- 6.3.2.1** Close the appliance central heating valves and disconnect from the appliance (17 and 18, Fig. 1).

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 valves 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 valves (red handle vertical indicates open, horizontal indicates closed).
- 6.3.3.3** Close all air release taps on the central heating system.
- 6.3.3.4** Gradually open stopcocks 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 (7) until clear water is discharged.
- 6.3.3.7** Continue filling the system until the green L.E.D. is showing on the pressure indicator gauge (11), then turn off the filling point stopcocks.
- 6.3.3.8** Inspect the system for water soundness and remedy any leaks discovered.
- 6.3.4** **Setting the System Pressure**
- 6.3.4.1** The appliance is equipped with 3 L.E.D. pressure indicators.

Red = Pressure too high
Green = Correct pressure
Amber = Pressure too low
- 6.3.4.2** The correct pressure indication is green, should the indication be amber the system requires filling. (See section 6.3.3). Should the indication be red the system pressure requires lowering. (See section 6.3.4.3).

N.B. The safety valve is set to lift at 3bar / 30m /45psig.
- 6.3.4.3** To lower the system pressure to the required value, turn the red knob of the safety valve a quarter turn to release water until the green indicator is illuminated (11).
- 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 (13)
- 6.3.5.3** Slowly open each draw-off until clear water is discharged.
- 6.4** **Checking Electricity Supply**
- 6.4.1** Carry out preliminary checks for continuity, polarity, and resistance to earth, (see page 59 for further details) gaining access as required according to clause 5.7.2 in this manual.
- 6.4.2** Leave the appliance with the control fascia closed and with the mains electricity switched OFF
- 6.5** **Lighting the Boiler**
- 6.5.1** Ensure flow and return valves are open (CI 6.3.3.2)

If external controls are fitted (e.g. Timeclock and Room thermostat) ensure they 'call for heat'. The commissioning of the appliance may be easier if the external controls are disconnected and terminals 1 & 3 linked. (For access procedure turn off electricity and refer to clause 5.7.2 for instructions).
- 6.5.2** Switch on the mains electricity and turn the mode selector switch to  (21).
- 6.5.3** Set the central heating temperature control knob (20) at its highest setting.
- 6.5.4** After a delay period of approximately 3 minutes the boiler will go through an ignition sequence and the burner will light. (By activating the domestic hot water microswitch for 2-3 seconds this will by-pass the 3 minute delay period when heating is called for).

- 6.5.5 If during the ignition attempt period (10 secs approx.) the appliance fails to light, the ignition control circuit will go to lockout (indicated by the illumination of the red indicator light on the front control panel) (23) deenergising the gas valve, but leaving the fan and pump running.
- 6.5.6 In the event of the appliance going to lockout reset by depressing the red indicator button on the front control panel (23). The most common cause of the appliance going to lockout during commissioning is air in the gas supply. Check that the gas supply is completely purged of air and that gas is reaching the boiler then repeat from 6.5.2.

6.6 Checking Burner Pressures

- 6.6.1 The heat inputs for high and low gas rates are factory set to maximum values given in 3.6 for domestic hot water and central heating but it is necessary to check them when commissioning.
- 6.6.2 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.
- 6.6.3 Turn off the main electricity supply. Gain access to the interior as instructed in clause 5.7.2
- 6.6.4 Locate the main burner test point (Fig.21) and slacken the screw half a turn in an anticlockwise direction. Attach a suitable pressure gauge. Turn on electricity supply and turn the mode selector switch to the  position.

Fully open a domestic hot water tap to operate the appliance in hot water mode. Adjust the domestic hot water temperature control knob to the maximum setting.

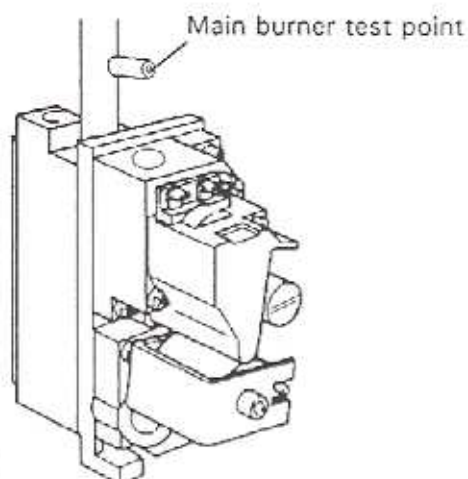


Fig.21

- 6.6.5 The pressure reading for maximum rate should be 9.4 mbar / 3.7in wg (plus or minus 0.95 mbar / 0.37in wg)
- If the pressure is wrong it should be adjusted as instructed in clause 8.24. (N.B Whenever any adjustment is made a complete adjustment of the gas pressures is necessary, as adjustment requires specialist equipment Vokera recommend that should any of the gas pressure settings be incorrect that you call a Vokera engineer for assistance).
- 6.6.6 To establish low flame turn the mode selector switch (21) to  position. Turn on any external controls e.g. roomstat, clock etc. Adjust the central heating control knob to maximum then adjust the potentiometer on the circuit board marked ADJ HEAT (Fig.20) to minimum. The pressure reading should be 0.8 mbar / 0.31in wg (plus or minus 0.08 mbar/0.03in wg). If it is different adjustment should be made in accordance with the instructions in clause 8.24. Adjust back to maximum or see section 6.6.14.
- 6.6.7 Checking Ignition Heat Input (Soft Light Ignition)
- 6.6.8 The soft light ignition pressure is factory set, but it is necessary to check it when commissioning.
- 6.6.9 Turn off the main electricity supply.
- 6.6.10 Pull off the sensing electrode lead from terminal 8 on the electronic ignition control box.
- 6.6.11 Turn on the main electricity supply turn the mode selector switch to the  position.
- Turn on a domestic hot water tap to operate the appliance in domestic hot water mode.
- 6.6.12 The appliance will now light at a reduced pressure the pressure should be 1.5mbar / 0.6in wg (plus or minus 0.15mbar / 0.06in wg). If the pressure is incorrect it should be adjusted as in clause 8.24.
- N.B. While checking the soft light pressure the burner will only light for approximately 10 seconds before going to lock-out mode. (See clause 6.5.6)
- 6.6.13 Turn off the main electricity supply and reconnect the sensing electrode to terminal 8 of the ignition control box.

6.6.14 Setting the Maximum Rate for Central Heating (Range Rating)

Locate the main burner test point (Fig.21) and connect a suitable pressure gauge. Refer to fig.22 to determine the pressure for the heating output you need. Use a screwdriver to turn the ADJ HEAT potentiometer until the required pressure is indicated on the gauge. Once this pressure has been fixed remove the pressure gauge and record the pressure indelibly on the label provided and affixed next to the data badge. This is to ensure that the burner can be reset when any service operation involves alteration of burner settings.

6.7 Checking The Flue System

6.7.1 The flue system should be visibly checked for soundness. Check all clamp fixings are secure and tight.

6.8 Checking The Heating Thermostat

6.8.1 Allow the system to warm up and manipulate the central heating temperature control knob (20) to ensure the burner increases in gas pressure as the temperature control is increased and decreases as the temperature control is decreased. (scale range covers approx. 45°C- 85°C).

6.9 Regulating the Central Heating System

6.9.1 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.

6.9.2 If the burner will not light, ensure that water is in fact circulating See cl 4.6.3.

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

6.9.4 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). This may mean the addition of a small manual by-pass being fitted to the system if a fully TRV system is used.

6.10 Final Flushing of the Heating System

6.10.1 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.

6.10.2 Inspect the system for soundness. Turn the appliance mode selector switch to 'O' (fig.1 21) and switch the mains electricity off.

Open all drain taps and quickly drain the system whilst still hot to remove offending substances. Refill as instructed in clause 6.3.3. For further details on flushing systems refer to B.S. 7593 : 1992.

6.11 Filling, Testing and Regulating the Domestic Hot Water System

6.11.1 Start with the appliance switched to having completed the procedures described in clause 6.4 to 6.9.

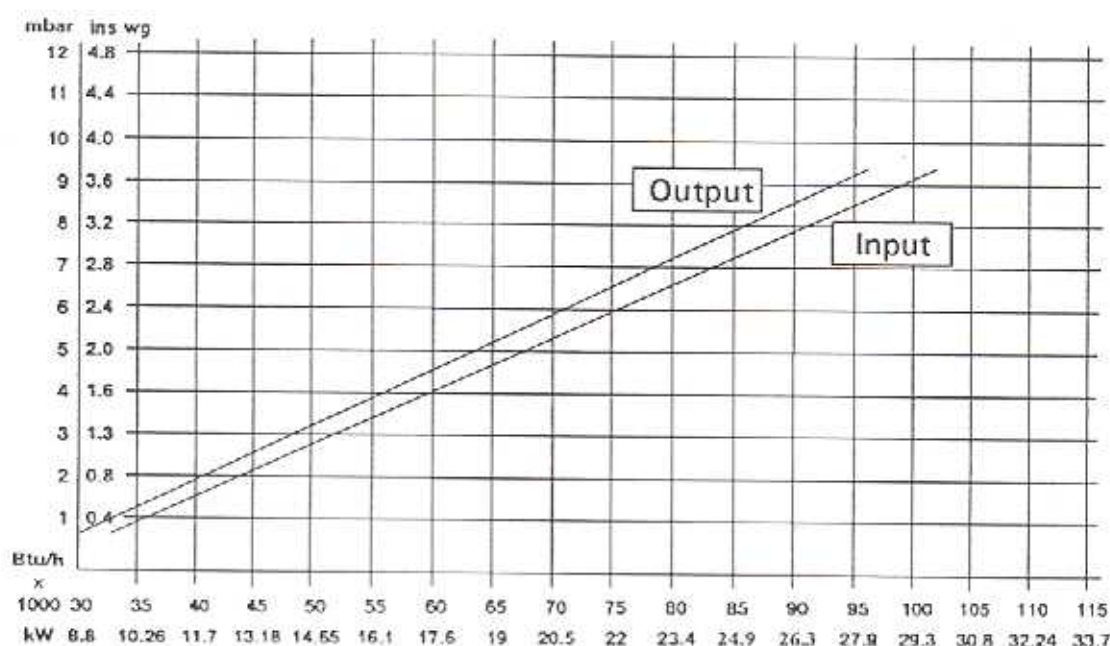


Fig.22

- 6.11.2 Open a domestic hot water tap (Preferably the bath tap). Ensure cold water inlet stopcock (13) is fully open and the dhw temperature control (19) is set at maximum.
- 6.11.3 The flow of water should activate the differential pressure device and drive the diverting valve (10) 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 activate the micro-switch and light the burner on maximum rate.
- 6.11.4 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).
- 6.11.5 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.

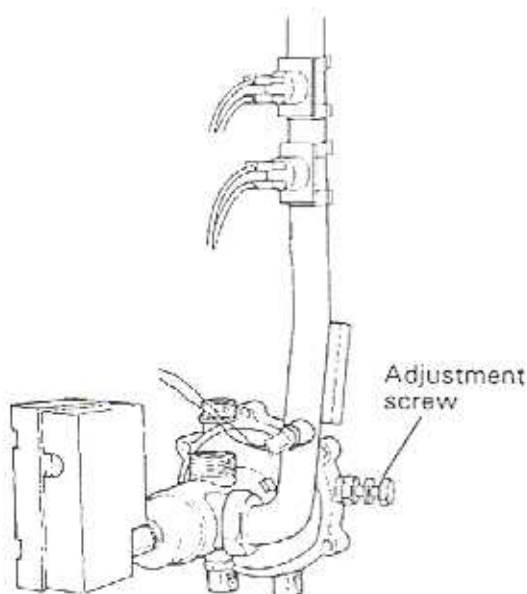


Fig.23

- 6.11.6 To adjust the flow rate ref to fig. 23 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.
- 6.11.7 Turn the appliance mode selector switch (21) to 
- Slowly close the tap to reduce the draw off rate to above the minimum approx. 2.8 litres/min (0.61 gal/min) Rotate the dhw temperature control knob (19) to ensure it operates at its various setting.
- 6.11.8 Close the draw-off tap still further. The burner should stop when the rate falls below approximately 2.8 litres/min (0.61 gal/min).
- 6.12 Final Check for Operations
- Turn mode selector switch to 'O' (21) disconnect pressure gauge, retighten screw. Relight boiler.
- 6.12.1 Re-check for gas soundness
- 6.12.2 Re examine heating and hot water systems and cold water supply for water soundness.
- 6.12.3 Check the appearance of the gas flame to assess adequacy of combustion air supply.
- 6.12.4 Re-check the flue system for soundness and adequacy of supports.
- 6.13 Concluding Operations
- 6.13.1 If external controls have been disconnected and terminals 1 & 3 temporarily linked remove the link and reconnect the external control circuit, check the operation of the external controls.
- 6.13.2 Hinge up the control fascia.
- 6.14 Refixing the Front Cover (fig. 24)
- 6.14.1 Offer up the front casing to the back frame in a near vertical attitude and locate the hooks on the casing over the hooks on the frame.
- Slide the casing downwards to fully engage the hooks and to align the bottom fixing holes. Replace the four case retaining screws. (fig.24)

6.15 Supplementary Instructions for Fitting & Removing Optional Time Clock and for Wiring to External Controls.

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

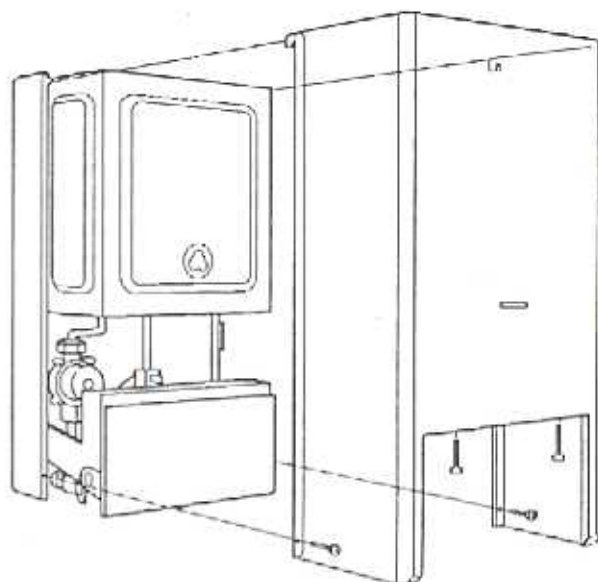


Fig.24

SECTION 7 INSTRUCTING THE USER

- 7.1 Hand over the copy of the Users Instructions supplied with the appliance, together with these Instructions, and explain how to operate the boiler correctly and explain how to use the timeclock and room thermostat if fitted.
- 7.2 Show the user how to switch off the appliance quickly and indicate the position of the electric supply isolator.
- 7.3 Explain that air supply grilles must not be blocked in any way.
- 7.4 Inform the user of the location of all drain cocks and air vents.
- 7.5 Explain how to turn the appliance off 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.

8.1 General

To ensure the continued safe and efficient operation of the appliance, it is recommended that it is checked and serviced as necessary at regular intervals.

The frequency of servicing will depend upon the particular installation conditions and usage but, in general, once per year should be adequate.

It is the law that all servicing work is carried out by a competent person such as British Gas or other CORGI registered personnel.

The following instructions apply to the appliance 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 preliminary flame checks 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.

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 clause 8.4.).
4. Replace fuse if previously removed (8.2. above) and turn on electricity, run the appliance 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. 1 17&18) 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. 1 11) which should be indicating green 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.

8. Remove main burner. cl 8.6.3 to 8.6.6. 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).

9. Place cloth below combustion chamber to catch debris. Clean heat exchanger using suitable brushes and rods if necessary.

10. 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 8.12).

11. Replace all parts in reverse order but leave the controls fascia open and outer casing off.

12. Undertake a complete commissioning check as detailed in section 6.

13. Close up control fascia and refix front casing.

14. Clean off casing using soft cloth and dilute detergent.

8.3.2 Replacement of Parts

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 fig.25

Ensure electricity supply is isolated before carrying out any servicing.

8.4.1 To remove front casing.

Release 4 retaining screws fig.25.

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

The control panel can now be hinged down for access.

8.4.2 Remove 4 vertical screws and pull lower plastic grill downwards.

8.5 Room Sealed Chamber Front Cover (Including Viewing Window). Part No. 5904 Refer to fig.26

8.5.1 Gain general access as 8.4

8.5.2 Remove room sealed front cover plate by releasing eight screws (fig.26) and easing cover off. The screws are not captive. Inspect gasket for damage. If damaged, replace.

8.6 Main Burner and/or Spark and Sensing Electrodes Part No 5853 Refer to fig 28&29

8.6.1 Gain general access as 8.4.

8.6.2 Remove room-sealed front cover 8.5.2.

8.6.3 Remove front of combustion chamber by releasing six screws (fig.27)

8.6.4 Remove four burner retaining screws (see fig.28) ease burner forward and rest on chamber base.

8.6.5 Release electrode retaining screws Carefully remove electrodes.

8.6.6 Trace electrode leads to electronic ignition control and disconnect.

8.6.7 Remove main burner. Reassemble in reverse order ensuring correct location of electrodes. Ensure that right hand electrode is connected to Terminal 10 of the electronic ignition control box.

Note: If difficulty is found in relocating the burner securing screws, easy access can be gained by removing the two side panels (Fig.29).

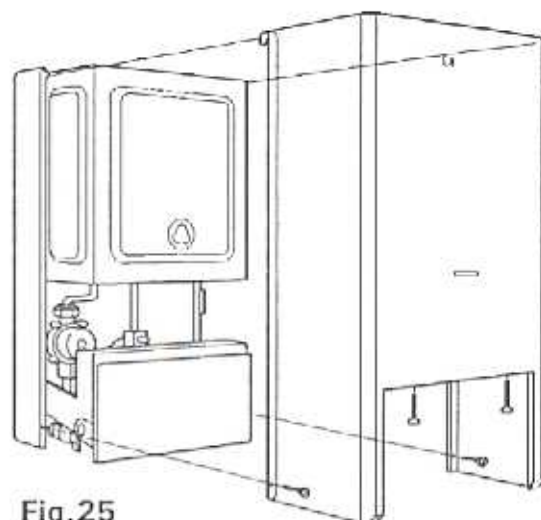


Fig.25

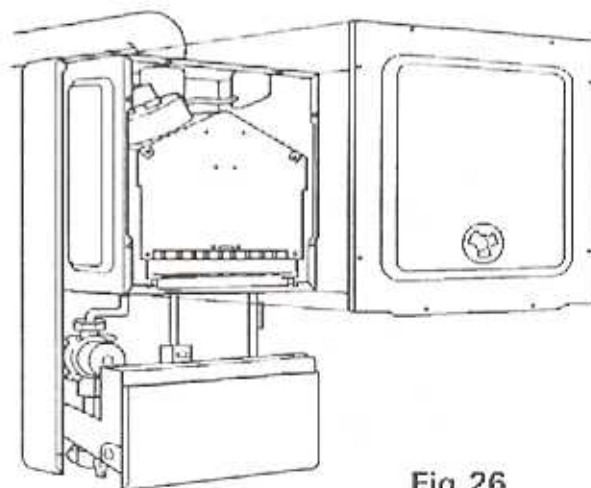


Fig.26

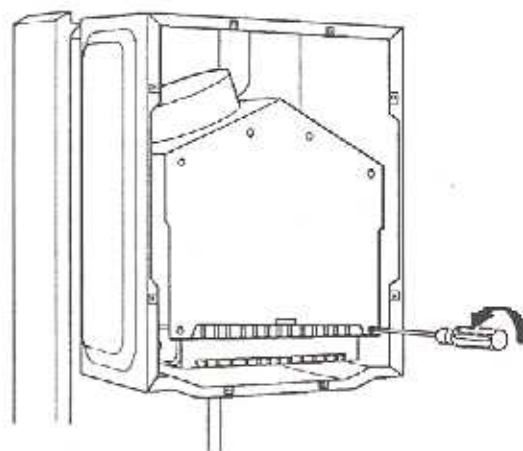


Fig.27

8.7 Main Burner Injectors

- 8.7.1 Gain general access as 8.4.
- 8.7.2 Remove room sealed front cover plate and combustion chamber front (8.5.2 & 8.6.3).
- 8.7.3 Remove main burner (8.6.4. to 8.6.5).
- 8.7.4 Unscrew injector(s).
Reassemble in reverse order.

8.8 Main Heat Exchanger

Part No 5356

Refer to Fig. 30

- 8.8.1 Gain general access as 8.4
- 8.8.2 Remove room sealed front cover plate (8.5.2).
- 8.8.3 Remove front of combustion chamber.
- 8.8.4 Remove two air baffle plates. 1 screw securing the R/H side baffle plate.
- 8.8.5 Remove both side panels, 5 screws each (Fig.29)
- 8.8.6 Close heating valves ($\frac{1}{4}$ turn until handle is horizontal). Turn safety valve $\frac{1}{4}$ turn to drain primary circuit of boiler.
- 8.8.7 Place cloth under heat exchanger to catch surplus water.
- 8.8.8 Disconnect upper flanges by removing 2 screws on each flange (Fig.28). Undo unions for the flow and return pipes below the room sealed chamber, lower the pipes and slide out main heat exchanger, taking care not to damage insulation panels. Avoid spillage of water on boiler electrics.
- 8.8.9 Reassemble in reverse order using new fibre washers on flanges.

8.9 Flue Fan

Part No 5739

- 8.9.1 Remove room sealed front cover plate (8.4 8.5.2), left hand side panel (8.8.5) and front of combustion chamber (8.6.3).
- 8.9.2 Loosen maintenance clip securing screws (see fig.30) and slide upwards to clear joint.
- 8.9.3 Remove 2 flue hood retaining screws (see fig.30)

NOTE: (i) When removing the two side screws the two air baffle plates can be removed. (ii) The centre screw is captive.

- 8.9.4 Disconnect the electrical leads and slide the flue hood forward taking care to avoid damage to the fan motor and motor cooling fan.
- 8.9.5 Unscrew 4 screws securing fan to flue hood and remove fan. Transfer aluminium manifold (two screws) to new fan.
- 8.9.6 Reassemble in reverse order, replacing centre hood screw first.

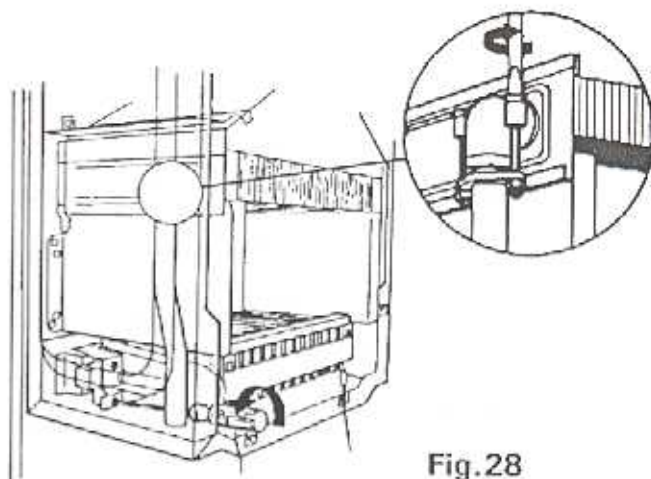


Fig.28

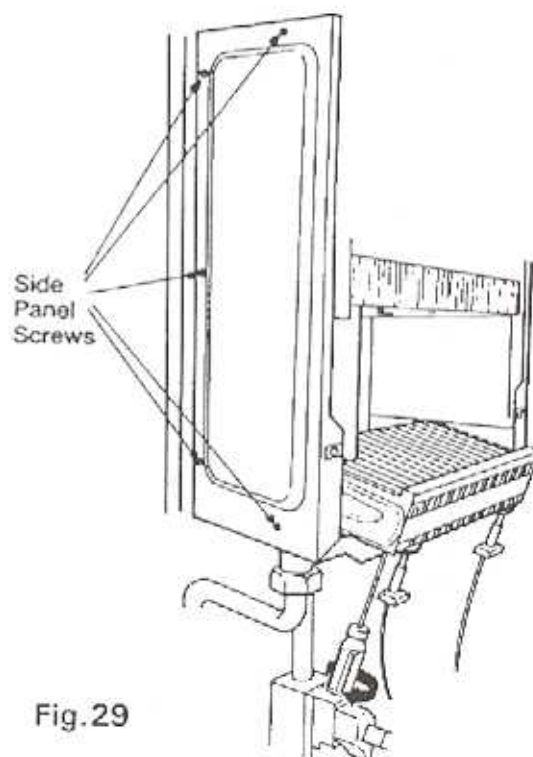


Fig.29

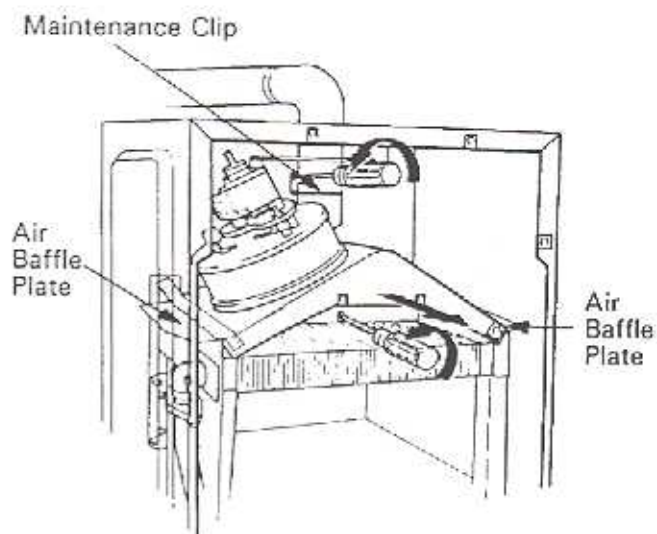


Fig.30

- 8.10 Flue Pressure Differential Switch
Part No 5733
- 8.10.1 Remove front casing (8.4.1).
- 8.10.2 Remove the 2 screws securing the pressure differential switch to the bracket.
- 8.10.3 Disconnect the pressure differential switch from the air tube connecting tee by pushing the plastic ring on the outer edge of the tee towards the tee and thus releasing the component.
- 8.10.4 Disconnect silicone air pressure pipe, pull off tab connectors and remove from appliance.
- 8.10.5 Reassemble in reverse order.
See fig. 52 for correct fitting of electrical connections.

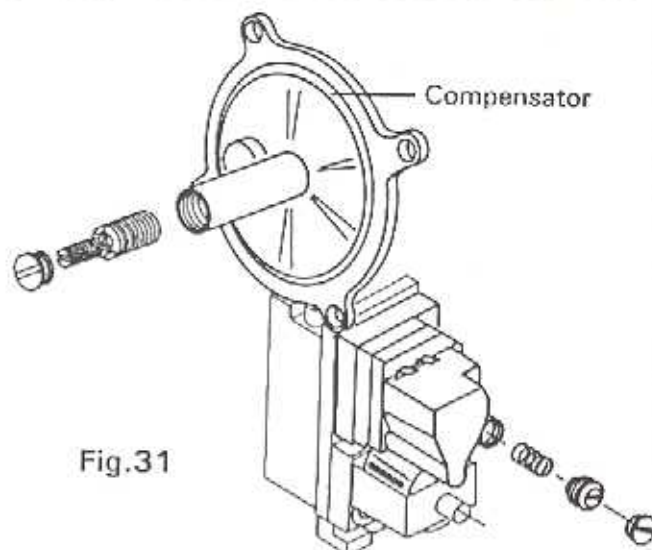


Fig.31

- 8.11 Compensator
Part No 6679
Refer to fig.31
- 8.11.1 Gain general access as 8.4
- 8.11.2 Remove pressure differential switch clauses 8.10 to 8.10.5.
- 8.11.3 Undo retaining screw on front top corner of the compensator.
- 8.11.4 Disconnect the silicone tube from the 2nd of the 4 pipes connecting to the compensator.
- 8.11.5 Identify the 1st of the 4 unions connecting to the compensator and undo.
- 8.11.6 Undo the remaining 2 pipe unions from the top of the gas valve and withdraw compensator.
- 8.11.7 Reassemble in reverse order.

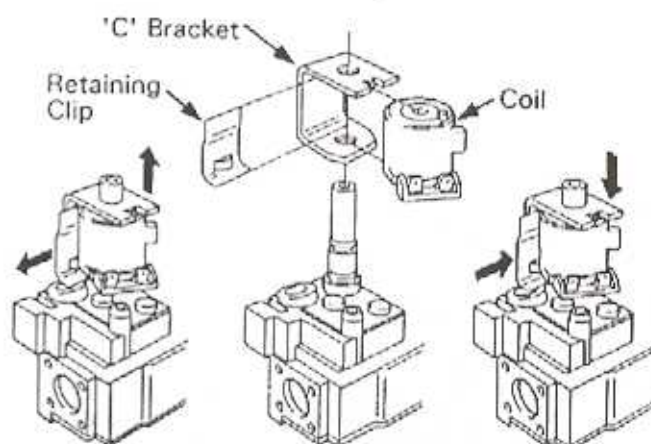


Fig.32

- 8.12 Combustion Chamber Insulation Boards
- 8.12.1 Gain general access as 8.4.
- 8.12.2 Remove room sealed front cover 8.5.2
Remove front of combustion chamber 8.6.3.
Close Heating Valves 8.8.6.
Remove Main Heat Exchanger 8.8.
- 8.12.3 To remove side combustion chamber insulation boards. Gently prise upwards and pull out.
- 8.12.4 To remove rear board. Gently prise upwards and pull out.
- 8.12.5 Fourth panel (front) is replaced complete with combustion chamber front panel.

- 8.13 Gas Control Valve and Operators.
Refer to figs. 32-34

- 8.13.1 Solenoid (Fig.32)
- 8.13.2 Pull off electrical leads from solenoid, also remove earthing tag.

- 8.13.3 Remove the spring blade retaining clip.
- 8.13.4 Pull off the 'C' bracket and coil assembly see fig.32.
- 8.13.5 Place new coil in 'C' bracket and slide the assembly back onto the solenoid post.
- 8.13.6 Push the retaining clip back into position and check that the bottom of the clip has engaged in the groove at the base of the solenoid post.
- 8.13.7 See fig. 52 for electrical connections.
- 8.13.8 Servo Pressure Regulator (Fig. 33)
- 8.13.9 Pull off all electrical leads from operator tab connectors, also remove earthing tag.
- 8.13.10 Undo union on top of the servo pressure regulator (fig.34).
- 8.13.11 Remove screw nut and washer which connects the compensator valve to the pressure differential switch bracket.
- 8.13.12 Release 2 screws securing regulator to valve body.(fig.33)
- 8.13.13 Gently lift the compensator to disengage the union from the top of the servo pressure regulator. Remove module and rubber diaphragm from valve body.

- 8.13.14 Carefully place new rubber diaphragm in position on valve body and fit replacement regulator, taking care not to displace the diaphragm.
- 8.13.15 Replace 2 screws and tighten.
- 8.13.16 Reassemble in reverse order. See fig. 52 for electrical connections.
- 8.13.17 Check burner pressures as clause 6.6

8.14 Gas Control Valve

- 8.14.1 Gain general access as 8.4
- 8.14.2 Turn off gas supply. Disconnect 2 earth leads. Pull off all electrical connections to operator and servo pressure regulator.
- 8.14.3 Remove solenoid and servo pressure regulator. Clauses 8.13.1 to 8.13.17.
- 8.14.4 The operator etc. can be transferred to any new valve to retain regulation settings.
- 8.14.5 Remove 4 flange securing screws at the base of the gas valve.
- 8.14.6 Remove 2 screws securing gas valve bracket to base frame.
- 8.14.7 Remove compensator (clause 8.11)
- 8.14.8 Undo upper gas barrel union and withdraw valve.
Transfer upper gas barrel to new valve by removing 4 flange securing screws, replacing the gasket in the process.
- 8.14.9 Replace in reverse order using new gaskets.
- 8.14.10 Test all joints for gas soundness.
- 8.14.11 Check burner pressures (cl 6.6).
If incorrect adjust as instructed in cl 8.24

8.15 Pump

Part No 6090
Refer fig.35

- 8.15.1 Gain general access as 8.4
- 8.15.2 Close heating flow and return valves (fig 1, 17&18) by turning $\frac{1}{4}$ turn until handles are horizontal.
- 8.15.3 Drain appliance via safety valve by a $\frac{1}{4}$ turn anticlockwise of safety valve knob.
Note: The head of the pump only may be exchanged by unscrewing the 4 allen screws around the pump head. Pull the head from the base of the pump. Go to section 8.15.7.
- 8.15.4 Disconnect pipe union connection at front left corner of combustion chamber.
- 8.15.5 Disconnect top union on pump and remove pipe and air separator assembly from the pump.

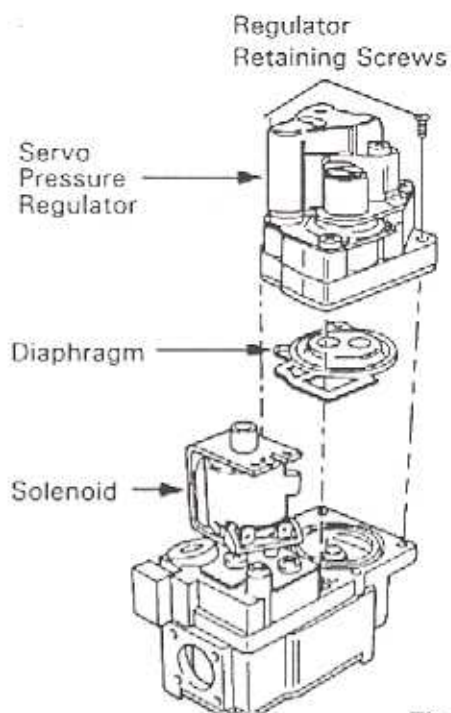


Fig.33

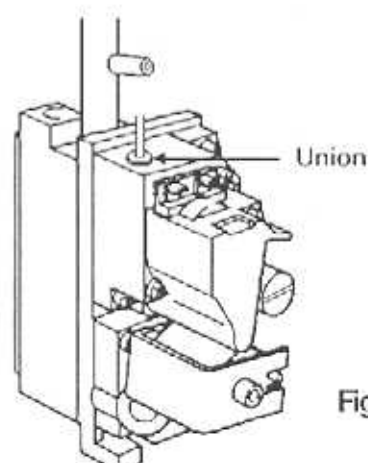


Fig.34

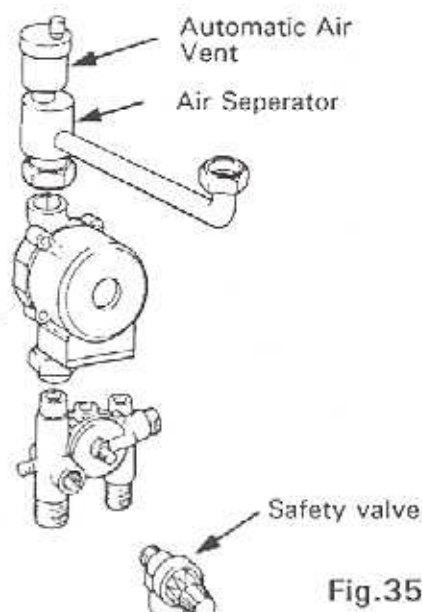


Fig.35

- 8.15.6 Grasp pump and pull upwards with slight twisting movement to release pump from manifold.
- 8.15.7 Disconnect electrical leads from pump.
- 8.15.8 Reassemble in reverse order.

Reconnect electrical leads Brown to L, Blue to N and Green to E.

8.16 Heating Manifold Part No 3208 Refer to fig. 36

- 8.16.1 Remove pump 8.15.
- 8.16.2 Disconnect safety valve discharge pipe and heating valve unions.
- 8.16.3 Remove retaining screw (securing manifold to frame).
- 8.16.4 Disconnect expansion vessel pipe union, domestic hot water heat exchanger union, heating flow union, and connecting pipe to 3 port valve union.
- 8.16.5 Unscrew and remove retaining nut and remove micro switch.
- 8.16.6 Disconnect wires from system pressure sensor (24) and remove from manifold.
- 8.16.7 Remove manifold

Manifold Assembly

Release cover retaining screws and ease off with a screwdriver.

Refer to fig.36 for location of components.

Replace in reverse order, ensuring that washers are replaced in all union connections.

8.17 Removal of Domestic Hot Water Heat Exchanger

Refer to figs 37, 38 and 39

- 8.17.1 Gain General access (8.4)
- 8.17.2 Close cold water inlet stopcock and central heating valves.
- 8.17.3 Open lowest draw-off or drain tap on hot water system.
- 8.17.4 Turn safety valve $\frac{1}{4}$ turn anticlockwise to drain primary side.
- 8.17.5 Place receptacle or an absorbent pad below appliance to catch trapped water.
- 8.17.6 Remove retaining nut (fig. 38) and remove micro switch.
- 8.17.7 Remove DHW expansion vessel (unscrew) as 8.21.
- 8.17.8 Disconnect main flow pipe unions from heat exchanger and 3-port valve and carefully move aside disconnecting the overrun thermostat, thermistor and high limit thermostat in the process. (Fig.42)
- 8.17.9 Disconnect 4 union nuts (fig.37).
- 8.17.10 Ease the unit out of the appliance.

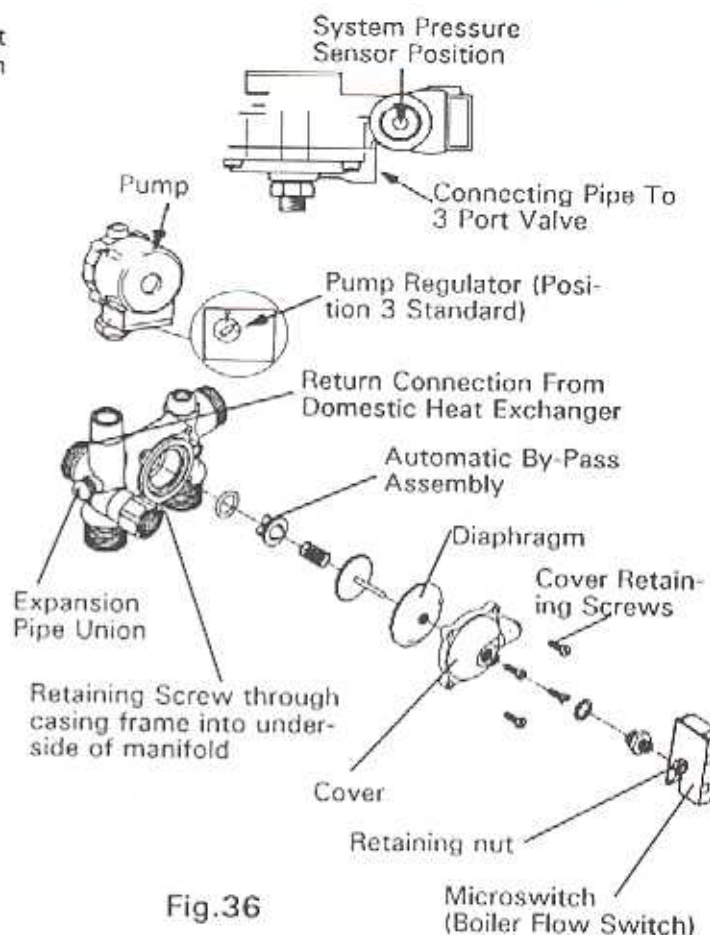


Fig.36

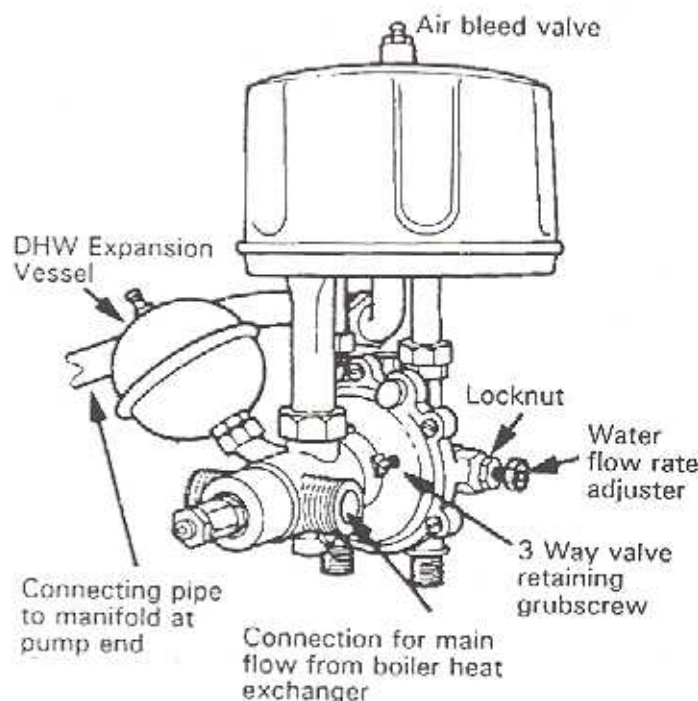


Fig.37

8.17.11 Reassemble in reverse order, using new fibre washers. NB When refitting main flow tube ensure that the sensor for the high limit thermostat is fully located in the relevant pocket.

8.18 3-Way Diverting Valve Refer to figs.38 & 39

8.18.1 Gain general access 8.4

8.18.2 Close central heating valves (valve head is horizontal when closed).

8.18.3 Drain appliance via safety valve by $\frac{1}{4}$ turn of knob.

8.18.4 Unscrew retaining nut and remove micro switch (fig 38).

8.18.5 Disconnect 3 pipe unions (prepare to catch a small quantity of water).

8.18.6 Unscrew connecting pipe to heating manifold.

8.18.7 Slacken retaining grub screws securing valve to manifold and withdraw valve. (if necessary slacken unions at opposite ends of connecting pipes to facilitate removal).

8.18.8 Reassemble in reverse order.

8.19 Removal of Domestic Hot Water Manifold Refer to fig.39

Gain general access 8.4

8.19.1 Remove 3 way diverting valve 8.18.

8.19.2 Close cold water inlet stopcock and drain secondary side by opening draw-off or drain tap.

8.19.3 Remove dhw heat exchanger 8.17.

8.19.4 Disconnect unions at cold water inlet and hot water outlet and remove manifold retaining screw (through base frame).

8.19.5 Remove manifold (fig.39) gives details of further disassembly.

8.19.6 Reassemble in reverse order.

NB Ensure the sensor for the high limit thermostat is fully located in the relevant pocket.

8.20 Checking/Replacing Main Expansion Vessel

8.20.1 The expansion vessel is factory pressurised to 1 bar (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 (i.e. car foot pump and gauge) to the nipple at the top right-hand side of the expansion vessel, and pressurise to 1 bar (14.7psi) and remove the pump.

NOTE: Access to the nipple can be improved by loosening the upper vessel retaining screw and rocking the vessel forwards.

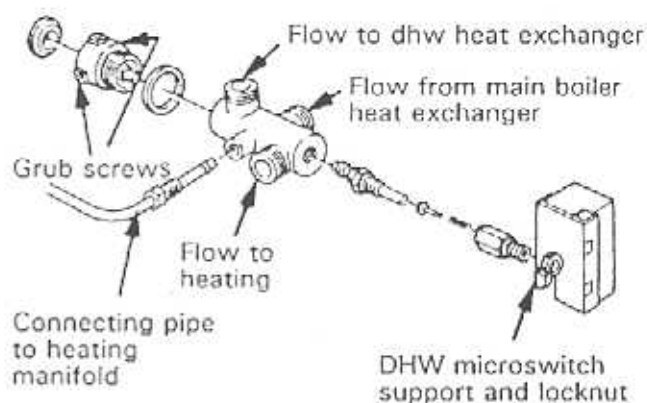


Fig.38

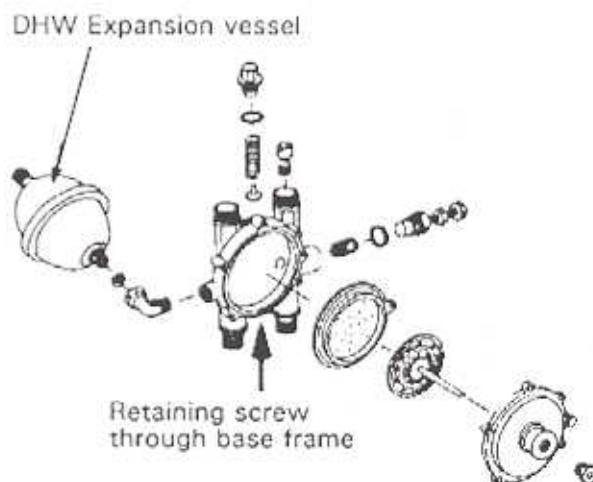


Fig.39

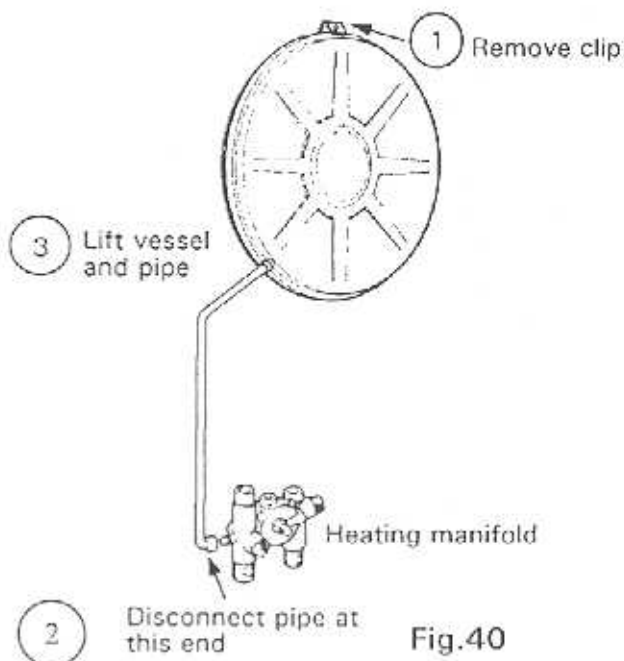


Fig.40

If the vessel cannot be repressurised or if pressure loss is very frequent the expansion vessel will require changing. Alternatively, a new vessel can be fitted in the return to the appliance, and the old vessel isolated in situ.

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 8.20.10 - 8.20.11

If the clearance above is less than 343 mm (13.5in) or with a back exit it is not possible to remove the expansion vessel in situ, follow steps 8.20.2 - 8.20.11

- 8.20.2 Gain access 8.4
- 8.20.3 Close central heating valves (valve head is horizontal when closed).
- 8.20.4 Drain appliance via safety valve by $\frac{1}{4}$ turn of knob.
- 8.20.5 Remove screws on large maintenance clips (fig.41) and remove clips, loosen screws on the small clips and remove flue elbow.
- 8.20.6 Disconnect all pipe unions at the appliance
- 8.20.7 Switch OFF mains electricity and gain general access. Disconnect electricity supply at p.c.b. (read cl. 5.7)
- 8.20.8 Remove lower fixings (fig.13) and lift appliance off upper bracket.
- 8.20.9 Refer to fig.40
- 8.20.10 Remove clip securing vessel at top. Disconnect expansion pipe at heating manifold, lift vessel & pipe out of appliance.
- 8.20.11 Reassemble and remount all in reverse order.
- 8.21 DHW Expansion Vessel
Refer to fig.39
- 8.21.1 Gain access 8.4
- 8.21.2 Close cold water inlet stopcock. Open lowest draw off or drain tap on system.
- 8.21.3 Unscrew vessel from 135 degrees support elbow.
- 8.21.4 Re-assemble in reverse order.
- 8.22 Safety Valve
- 8.22.1 Gain General Access 8.4.
- 8.22.2 Drain down primary side of boiler by closing heating valves ($\frac{1}{4}$ turn until handle is horizontal). Turn safety valve $\frac{1}{4}$ turn anticlockwise to drain appliance. Remove Heating Microswitch as 8.23.2.
Unscrew safety valve discharge pipe. Unscrew complete valve from Heating Manifold. Replace in reverse order.

8.23 Removal of Electrical Components

- 8.23.1 Ensure electricity is switched off at main isolator and gain general access (8.4)
- 8.23.2 Heating Micro Switch (Flow switch)
Part No 4302
Refer to fig.36
- 8.23.3 Hold switch and unscrew retaining nut
- 8.23.4 Remove switch and remove cover
- 8.23.5 Pull off electrical tab connections.
- 8.23.6 Reassemble in reverse order.
- 8.23.7 DHW Microswitch
Part No 4563
Refer to fig.43
- 8.23.8 Hold switch and remove locking nut securing it to the 3 way valve.
- 8.23.9 Remove switch and remove cover.
- 8.23.10 Pull off electrical tab connections.
- 8.23.11 Reassemble in reverse order.
- 8.23.12 High Limit Thermostat
Part No 3409
Refer to fig.42
- 8.23.13 Pull off the two electrical connections on the back of the thermostat.
- 8.23.14 Unscrew the black cap, and remove retaining nut.
- 8.23.15 Remove capillary tube retaining clip from flow tube and withdraw sensor probe.
- 8.23.16 Reassemble in reverse order. Ensuring the sensor is fully located within the pocket.

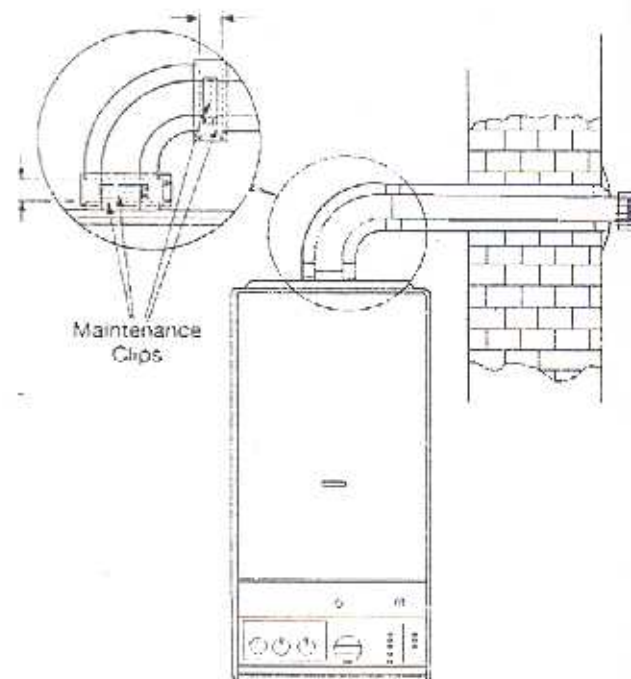


Fig.41

- 8.23.17 Fan Overrun Thermostat
Part No. 4931
Refer to fig.42
- 8.23.18 Disconnect two electrical connections on the rear of the thermostat.
- 8.23.19 Ease off thermostat retaining clip.
- 8.23.20 Reassemble in reverse order.
- 8.23.21 Safety Thermostat
Part No. 5441
Refer to Fig.42
- 8.23.22 Disconnect two electrical connections on the rear of the thermostat.
- 8.23.23 Ease off thermostat retaining clip.
- 8.23.24 Reassemble in reverse order.
- 8.23.25 Thermistor
Part No. 5753
Refer to fig.42
- 8.23.26 Drain down primary side of boiler by closing heating valves ($\frac{1}{4}$ turn until handle is horizontal). Turn safety valve $\frac{1}{4}$ turn anticlockwise to drain appliance.
- 8.23.27 Disconnect wires by removing the plug from the thermistor.
- 8.23.28 Unscrew thermistor from pocket. Reassemble in reverse order.
- 8.23.29 Thermostat Potentiometer Board
Part No 6693
Refer to fig.43
- 8.23.30 Remove both the DHW and central heating temperature control knobs from the front control panel
- 8.23.31 Remove the two screws securing the thermostat potentiometer board to the front control panel.
- 8.23.32 Disconnect the plug from the printed circuit board.
- 8.23.33 Withdraw the thermostat potentiometer board from the appliance.
Reassemble in reverse order

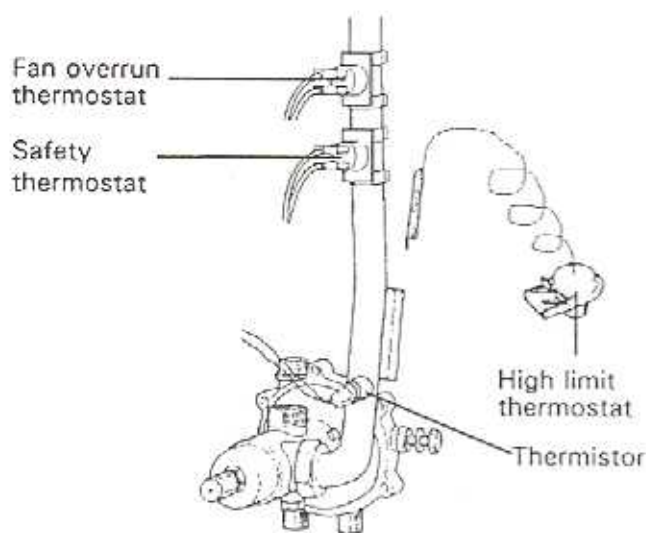


Fig.42

- 8.23.34 L.E.D. Board
Part No 6705
Refer to fig.43
- 8.23.35 Remove the two screws securing the cover to the rear of the L.E.D Board.
- 8.23.36 Disconnect the two plugs from the L.E.D Board. Withdraw L.E.D Board. Reassemble in reverse order.
- 8.23.37 Electronic Ignition Controller
Part No 5852
Refer to Fig.43
- 8.23.38 Disconnect spark electrode lead from terminal 10 and the receiving electrode from terminal 8.
- 8.23.39 Depress the clips on the sides of the electronic ignition controller and pull off the back plate complete with wires.
- 8.23.40 Remove the two screws securing the electronic ignition controller to the front control panel.
- 8.23.41 Reassemble in reverse order re-using the existing back plate.
- 8.23.42 Removal of Printed Circuit Board
Part No 6681
Refer to fig.43
- 8.23.43 Press in the sides of the printed circuit board cover (fig.43) to release retaining clips and lift cover off.
- 8.23.44 Disconnect external incoming live and neutral and any control wiring from terminal strip.
- 8.23.45 Remove 8 plugs from p.c.b.
- 8.23.46 Pull back p.c.b retaining lugs and remove p.c.b.
- 8.23.47 Replace in reverse order.
- 8.23.48 Replace electrical connections. Refer to fig. 52 to ensure correct locations.

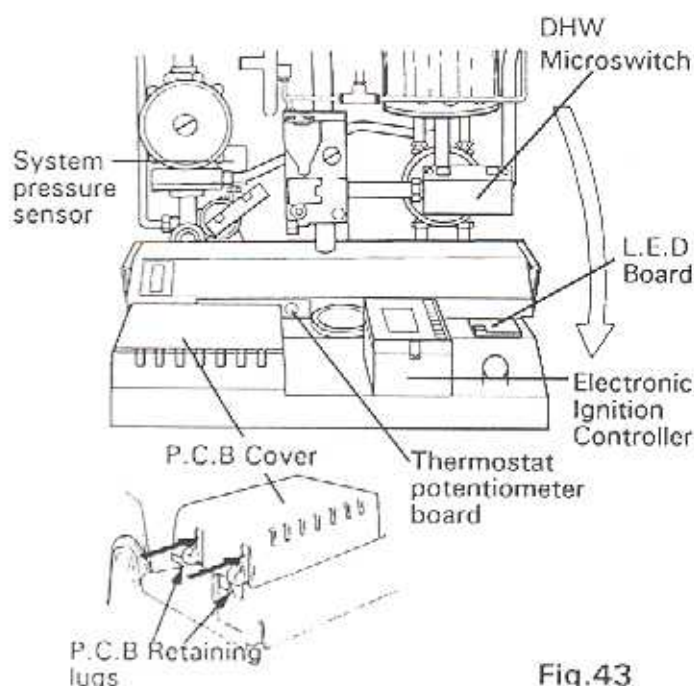


Fig.43

- 8.23.49 Mode selector switch
Part No 5591
- 8.23.50 Pull off mode selector switch control knob.
- 8.23.51 Remove two screws behind mode selector switch control knob to release mode selector switch from the front control panel.
- 8.23.52 Pull off tab connectors and withdraw from appliance.
- 8.23.53 Reassemble in reverse order.
- 8.23.54 Removal of Mechanical Instruments and Components.
- 8.23.55 System pressure sensor
Part No 6704
Refer to fig.43
- 8.23.56 Close central heating flow and return valves, by $\frac{1}{4}$ turn to horizontal position, drain appliance through the safety valve by $\frac{1}{4}$ turn anticlockwise of the knob.
- 8.23.57 Disconnect two wires connecting to system pressure sensor.
- 8.23.58 Unscrew system pressure sensor from central heating manifold and withdraw from appliance.
- 8.23.59 Reassemble in reverse order.

8.24 Setting Burner Pressures

- 8.24.1 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.
- 8.24.2 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.
- 8.24.3 Turn off the main electricity supply. Gain access to the interior as instructed in clause 5.7.2.
- 8.24.4 Locate the main burner pressure test point (Fig.44) and slacken the screw half a turn in an anticlockwise direction. Attach a suitable pressure gauge.
- 8.24.5 Connect a frequency meter to electrical connection pin no's 39&40 on the modulation printed circuit board (Fig.45).
- 8.24.6 Connect a differential pressure gauge to the appliance as shown in fig.47. Ensure the tap in the pipe is closed.
N.B. When disconnecting the pipe from the air tube connecting tee (fig.47) see fig.46 for disconnection details.

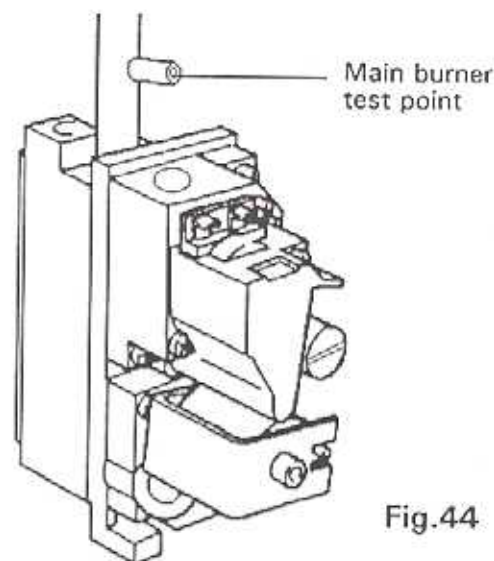


Fig.44

- 8.24.7 Turn the gas service cock to the 'off' position. Deliberately put the appliance into lockout mode by attempting to light the appliance as described in section 6.5. When lockout mode is achieved the red indicator on the front panel will be illuminated.
- 8.24.8 Turn all three potentiometers on the circuit board fully clockwise (marked RMV, SOFT LIGHT and ADJ HEAT Fig.45) and check that the pressure difference on the pressure differential gauge is reading more than 4.1 mbar. (A reading of less than 4.1 mbar suggests that there may be an installation fault within the flue system, or the primary water temperature is too high).
- 8.24.9 Turn the potentiometers marked RMV & ADJ HEAT fully anticlockwise, then adjust the SOFT LIGHT potentiometer until the reading on the differential pressure gauge reads 1.5mbar.
- 8.24.10 Turn the gas cock back to the ON position. Reset the lockout indicator button to ignite the appliance then adjust the potentiometer marked RMV until the reading on the frequency meter is $290\text{Hz} \pm 3\text{Hz}$.
- 8.24.11 Adjust the reading on the pressure differential gauge to $0.8 \text{ mbar} \pm 0.05\text{mbar}$. Increase the pressure by adjusting the ADJ HEAT potentiometer or decrease the pressure by slowly opening the tap on the silicone pipe and leave it open.
- 8.24.12 Adjust the gas pressure to $0.6 \text{ mbar} \pm 0.1 \text{ mbar}$ by turning the offset screw in the compensator using a tube spanner. (Fig.48)

- 8.24.13 Adjust the minimum gas pressure to 0.8 mbar $\pm$ 0.2 mbar by turning the centre adjusting screw in the compensator. (Fig.48)
- 8.24.14 Close the tap on the silicone tube (if already open).
- 8.24.15 Turn the ADJ HEAT potentiometer fully clockwise, adjust the main burner to 9.4 mbar using the adjuster on the gas valve regulator (Fig.48).
- 8.24.16 Turn OFF the electrical supply to the appliance and remove the gauges, ensuring that the pipes are reconnected correctly.
- 8.24.17 Turn the appliance ON and check that in both heating and hot water mode the appliance adjusts from high to low to off by turning the control knobs on the front control panel to verify this operation.
- 8.24.18 Check that with the domestic hot water control knob set at approximately mid position the hot water temperature remains constant.

- 8.24.19 Central heating Range rating) to set maximum rate in central heating mode. See clause 6.6.14 for necessary adjustments. Refer to the commissioning rate recorded by the commissioning Engineer on the appliance data badge.

8.25 End of servicing

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

Refit casing and clean up.

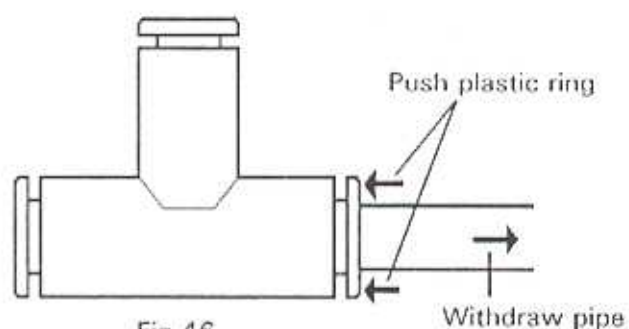


Fig.46

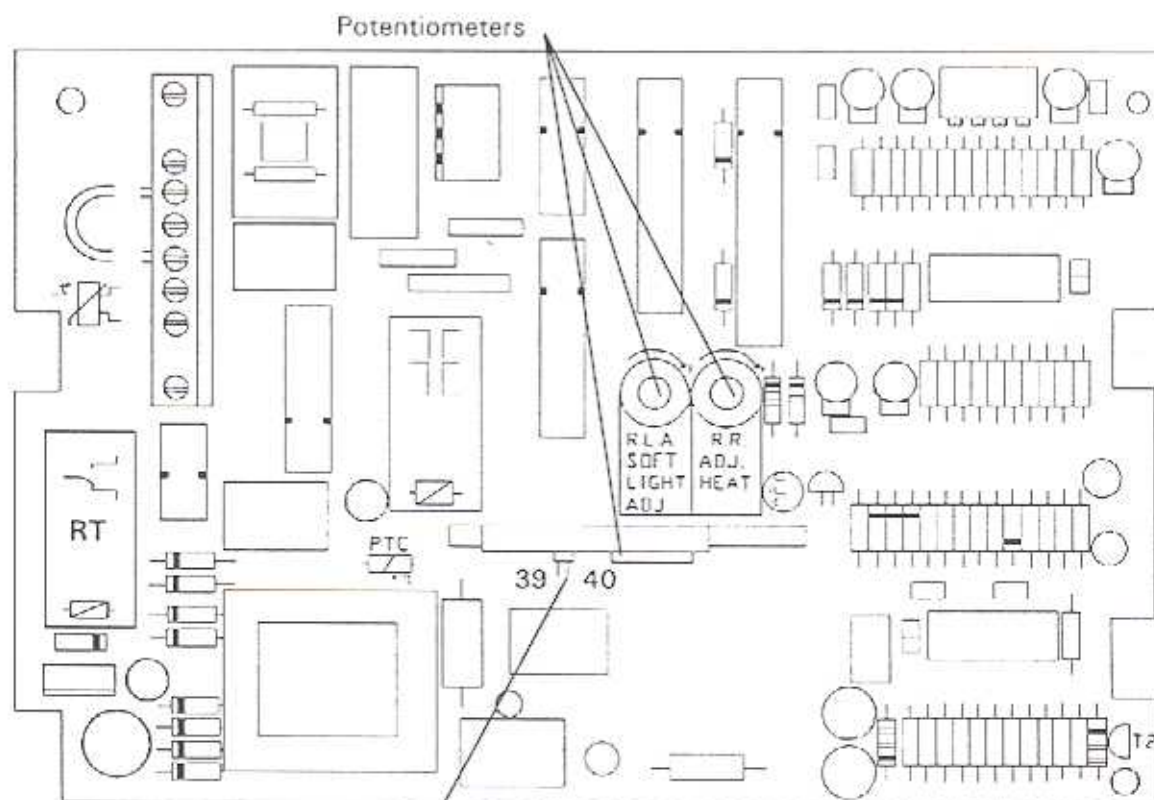


Fig.45

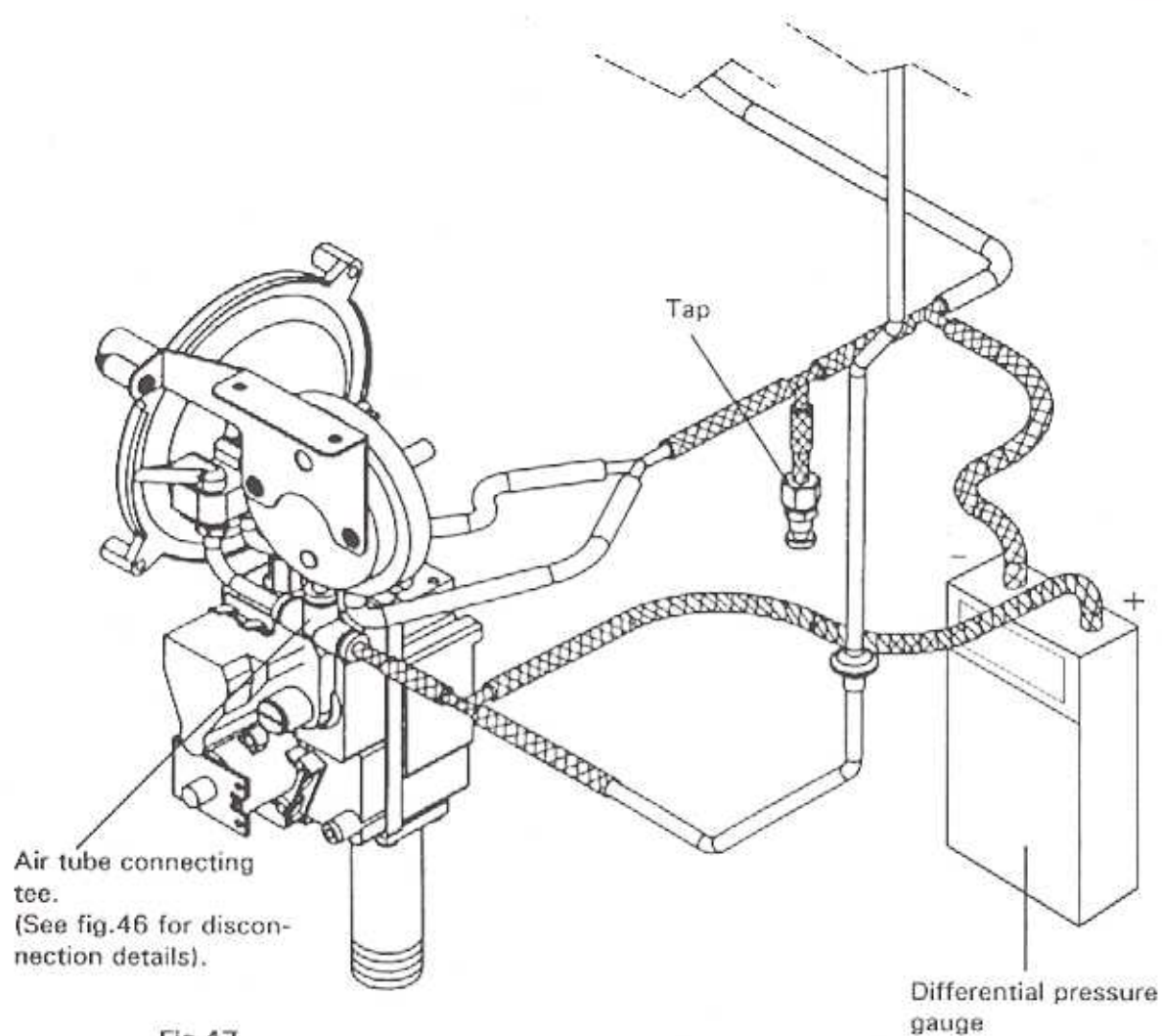


Fig.47

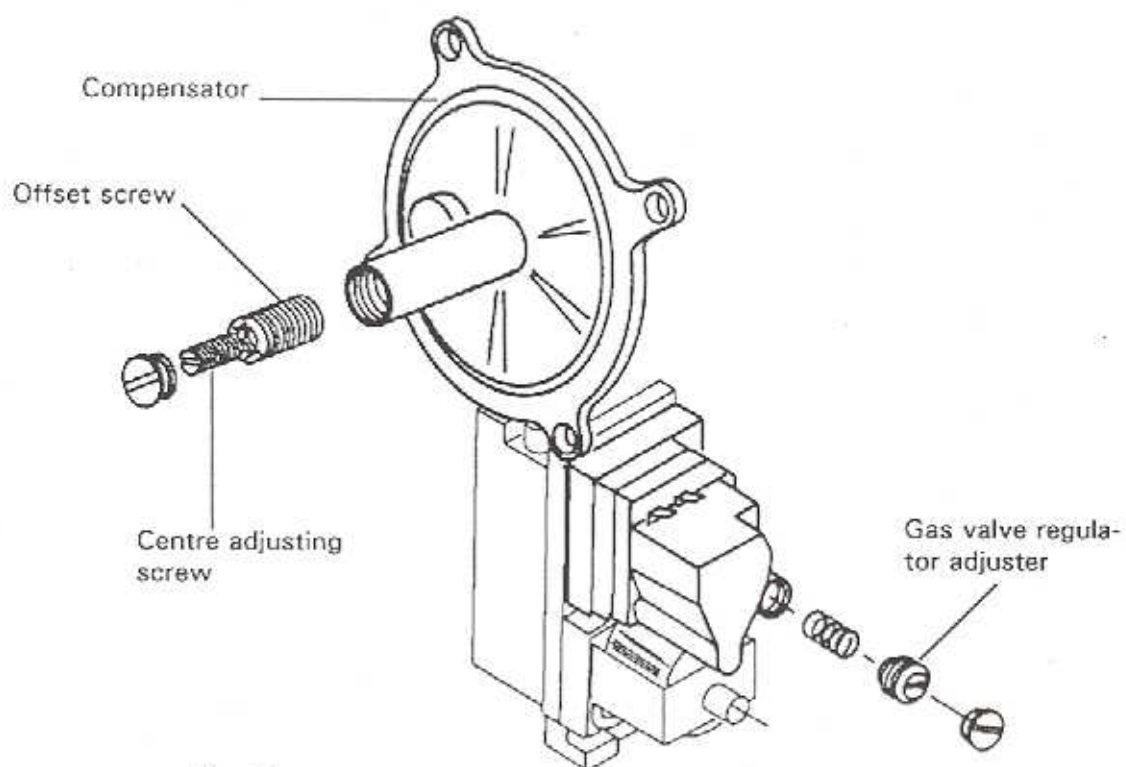


Fig.48

- 9.1 On completion of any service/fault finding task which has required the breaking and remaking of electrical connections, the checks Earth Continuity, polarity and Resistance to Earth must be repeated. (See page 53 for further details).

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 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 figs. 50 & 52. It is assumed that the mode selector switch is in either the

 or  mode.

9.2.1 Domestic Hot Water Mode

Turning on a tap will cause the domestic diaphragm to flex which in turn operates the 3-way valve and dhw microswitch (situated on the end of the 3-way valve).

The operation of the 3-way valve diverts primary water to the domestic heat exchanger. Activation of the double microswitch will start the pump and fan. With sufficient primary water circulating around the appliance the flow switch is activated, at the same time air movement through the combustion chamber activates the pressure differential switch. Once these actions have been proven the gas valve will be energised and the electrode will start to spark.

If a flame is detected during the ignition attempt time (8-12 secs) the sparking will cease, the gas valve will remain energised and the appliance will produce hot water as described below.

If a flame is not detected the appliance will go to lockout (failure to detect a flame during the ignition attempt time). This is indicated by the illumination of a red indicator light on the front control panel. At which time the gas valve will be de-energised and the sparking will stop.

To reset the appliance in the event of a lockout situation depress the illuminated red indicator light on the front control panel.

The temperature of primary water in the appliance is sensed by a thermistor on the flow pipe leaving the main heat exchanger. An increase in temperature rise will through the electronic circuitry lower the speed of the fan or conversely a decrease in temperature rise will increase the speed of the fan.

Therefore the fan will rotate at a speed in relation to the temperature of the primary water. The air flow through the appliance created by the speed of the fan acts on a compensator valve which has a direct affect on the gas valve. The higher the air flow the higher the gas input, the lower the air flow the lower the gas input.

In summary the gas input is proportional to the speed of the fan and the speed of the fan is dictated by the temperature of the primary water. Constant monitoring of the temperature of the primary water by the thermistor will regulate the speed of the fan which regulates the gas rate and in turn maintains an average heat input.

Depending on load, either the water temperature will continue to rise which will result in a gradual decrease in fan speed and a proportional decrease in gas input to a point where it reaches maximum temperature and the main burner switches off, or temperature will fall which will increase the fan speed and therefore increase the gas input proportionally.

The maximum primary water temperature is determined by adjusting the dhw temperature control knob.

As the thermistor senses the temperature of the primary water leaving the main heat exchanger, the amount of heat transferred from the primary water depends upon the temperature differential between them.

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 when the fan will overrun to remove residual heat or, if there is a heating call, to the mode described below.

9.2.2 Central Heating Mode

To obtain central heating the mode selector switch must be in the  position.

With all controls calling for heat the pump and fan will run. The pressure differential switch will be activated by the air movement created by the fan, and provided sufficient primary water is circulating the flow switch is activated.

Once these actions have been proven both the electronic ignition and the gas valve are energised. An ignition attempt is then started, if after 8-12 seconds the appliance fails to light the sparking will cease and the gas valve will be de-energised. This will result in appliance lockout and the red lockout indicator light will become illuminated on the front control panel.

To reset the appliance in the event of a lockout situation depress the illuminated red indicator light on the front control panel.

When after a successful ignition attempt the sparking will cease and the gas valve will remain energised. The temperature of primary water in the appliance is sensed by a thermistor on the flow pipe leaving the main heat exchanger.

An increase in temperature rise will through the electronic circuitry gradually lower the speed of the fan, this will in turn gradually lower the gas rate proportionally to the speed of the fan to a point where the appliance reaches the set temperature, the fan stops, the gas valve is de-energised and the burner is extinguished.

The appliance has an in built delay timer and re-ignition will not be attempted for approximately 3 minutes.

Conversely a fall in temperature of the primary water will increase the speed of the fan (in relation to temperature) which will proportionally increase the gas rate.

Constant monitoring of the temperature of the primary water by the thermistor will regulate the speed of the fan which regulates the gas rate and in turn maintains an average heat input.

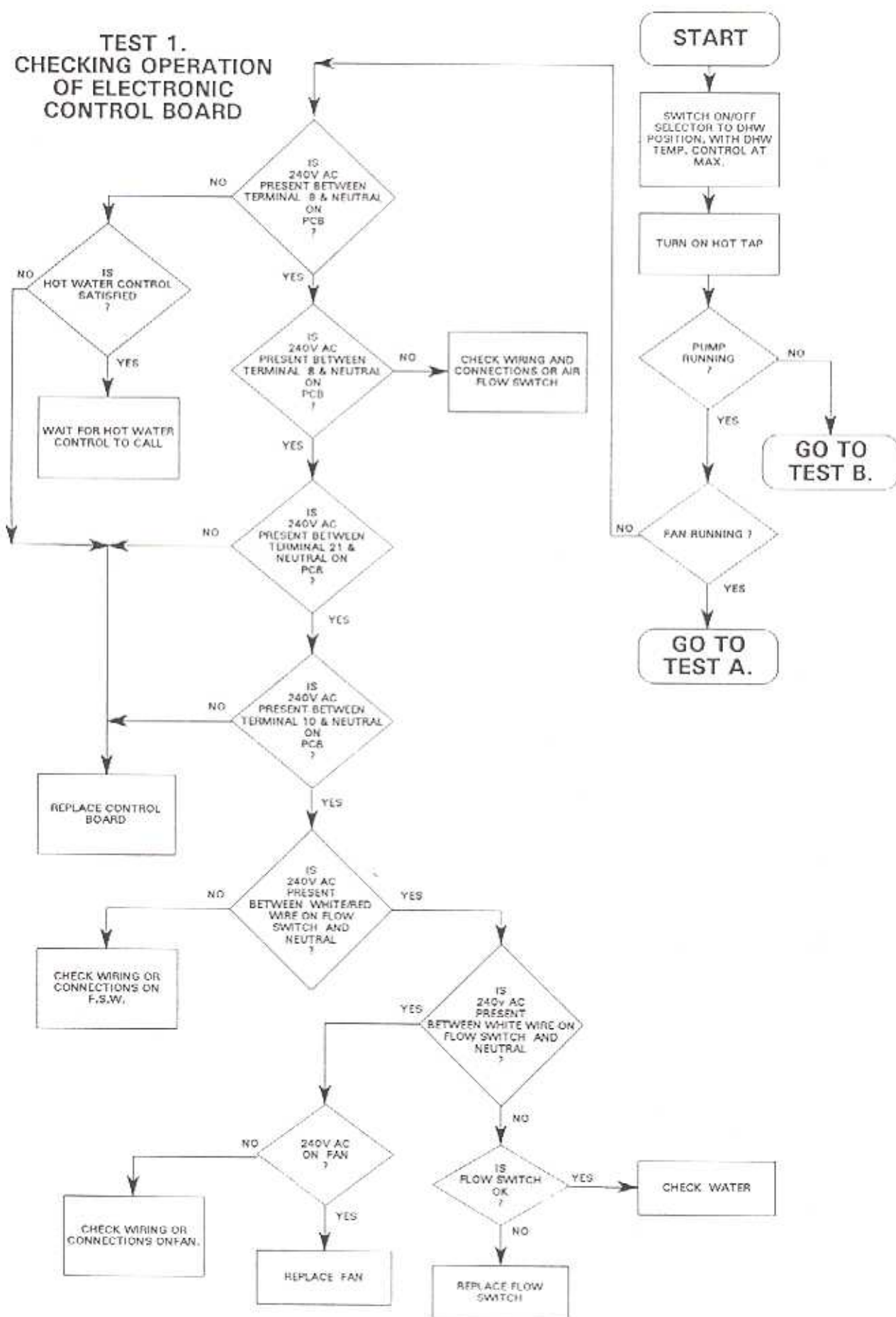
When the appliance has reached temperature and the burner is off, the pump will continue to run to circulate the primary water around the central heating system.

The maximum primary water temperature is determined by adjusting the central heating temperature control knob.

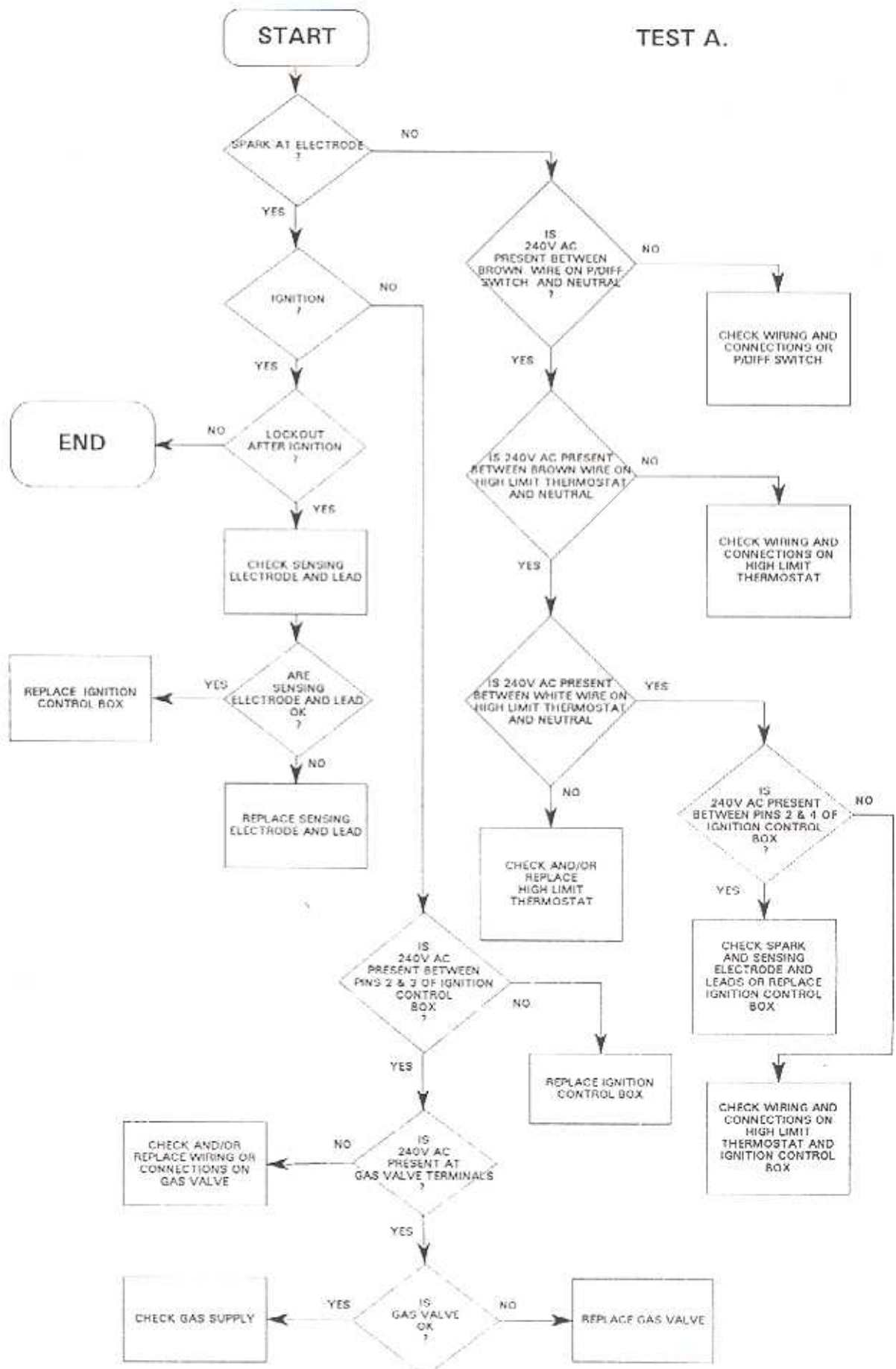
If supply to the appliance is broken e.g. by a room thermostat or time clock the burner is extinguished and the fan stops, but the pump will continue to run until the 3 minute delay period has expired, the pump will stop running and the fan will start to overrun until the primary water temperature is below 80°C.

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

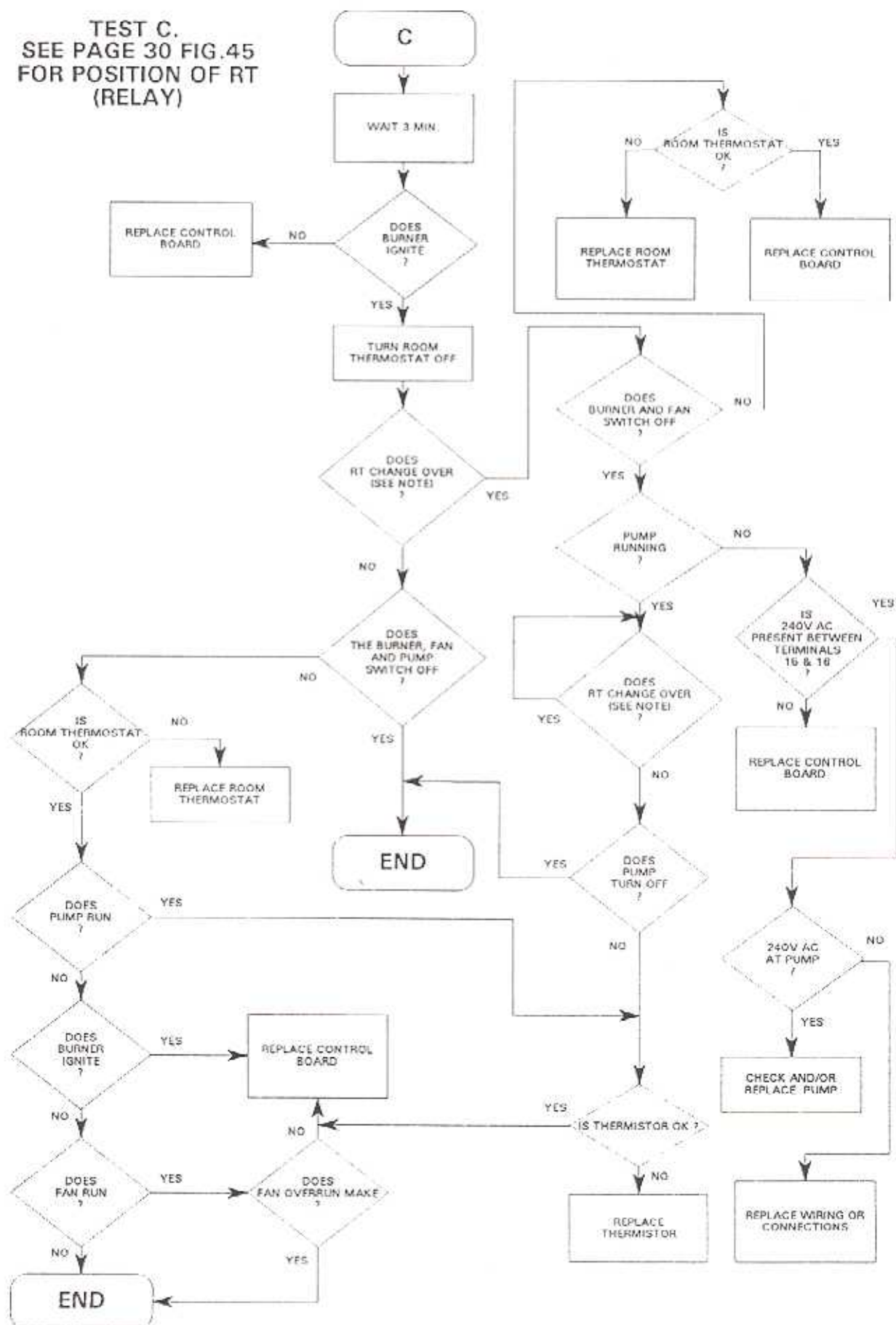
TEST 1. CHECKING OPERATION OF ELECTRONIC CONTROL BOARD



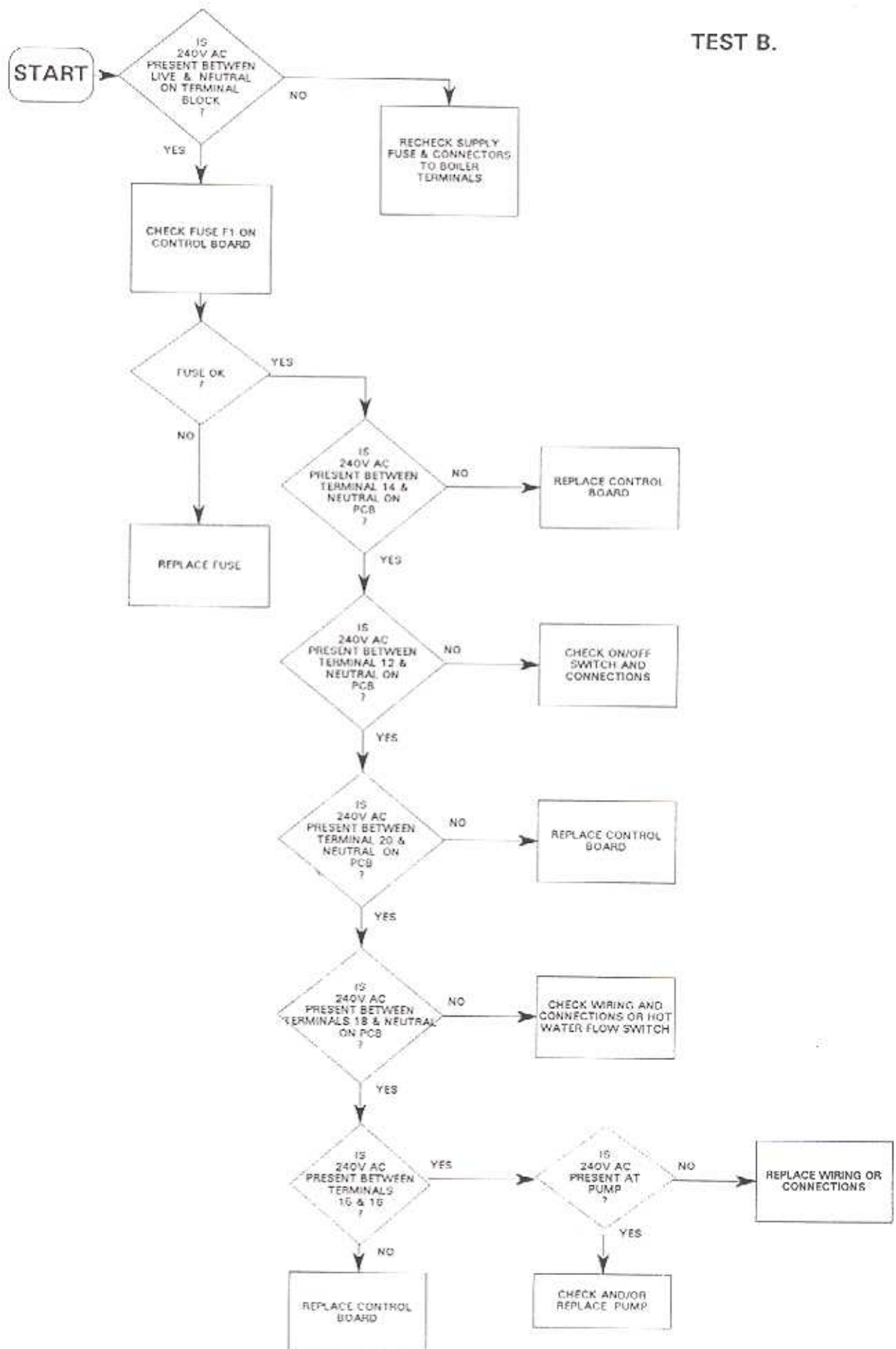
TEST A.

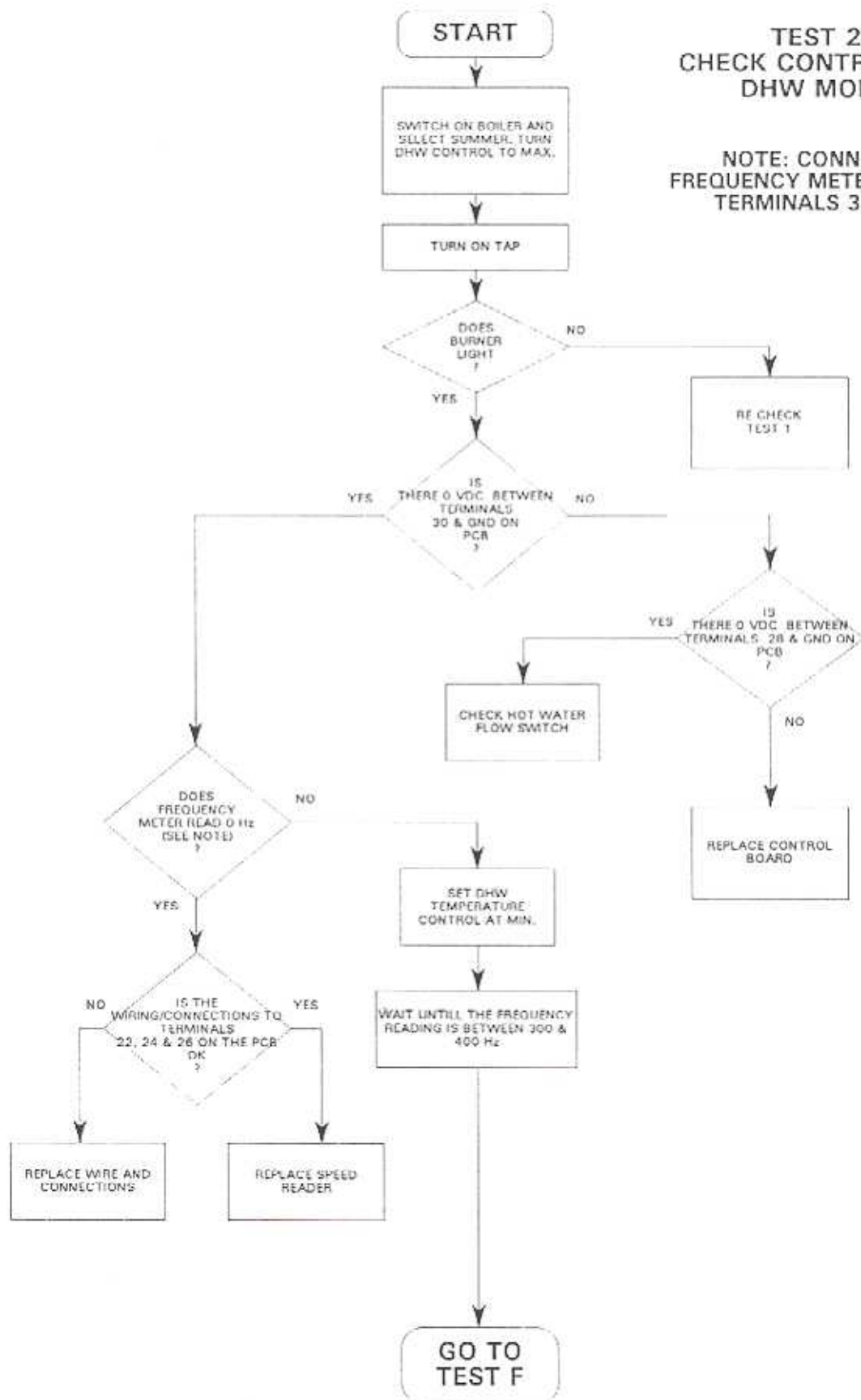


**TEST C.
SEE PAGE 30 FIG.45
FOR POSITION OF RT
(RELAY)**



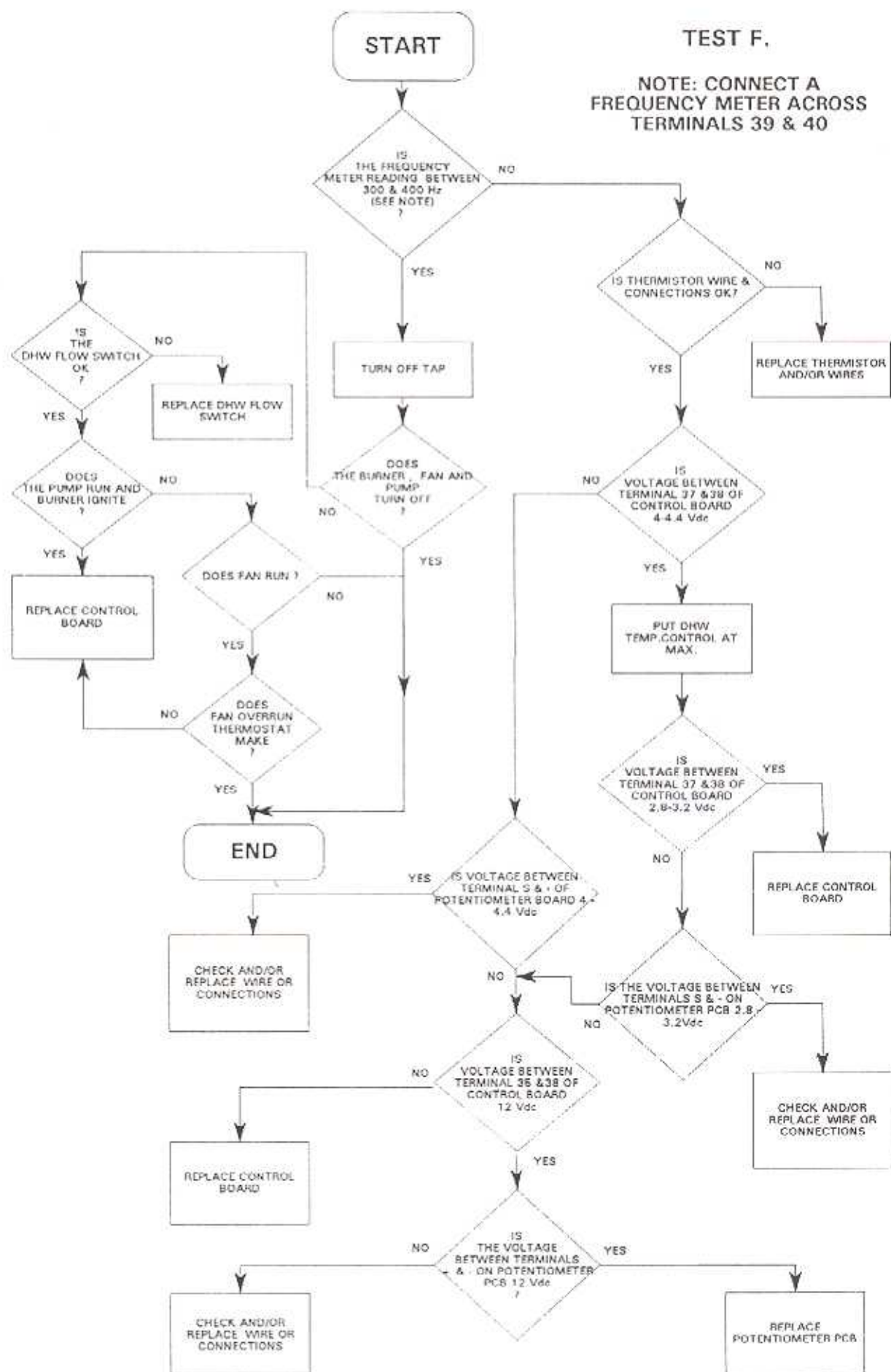
TEST B.



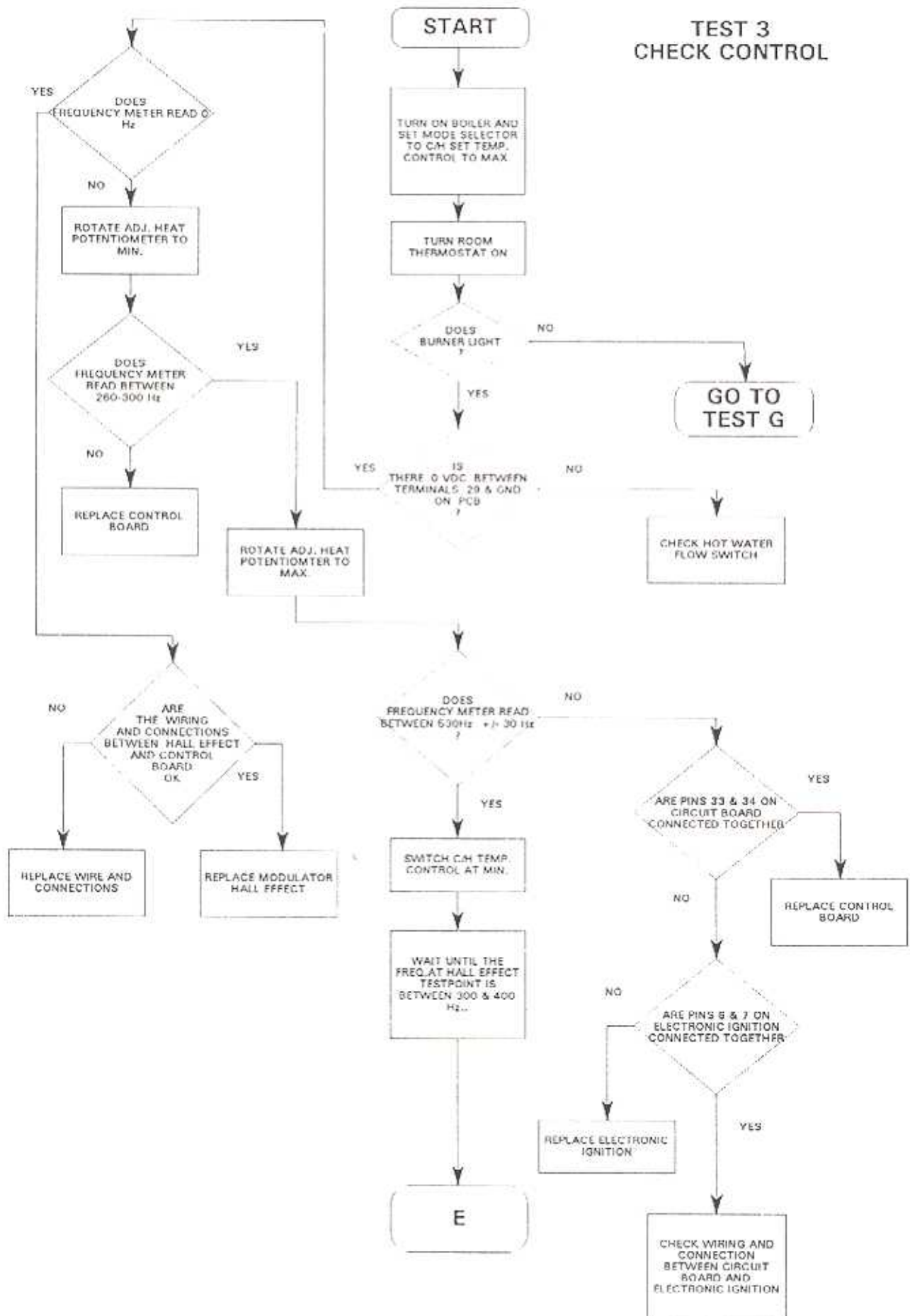


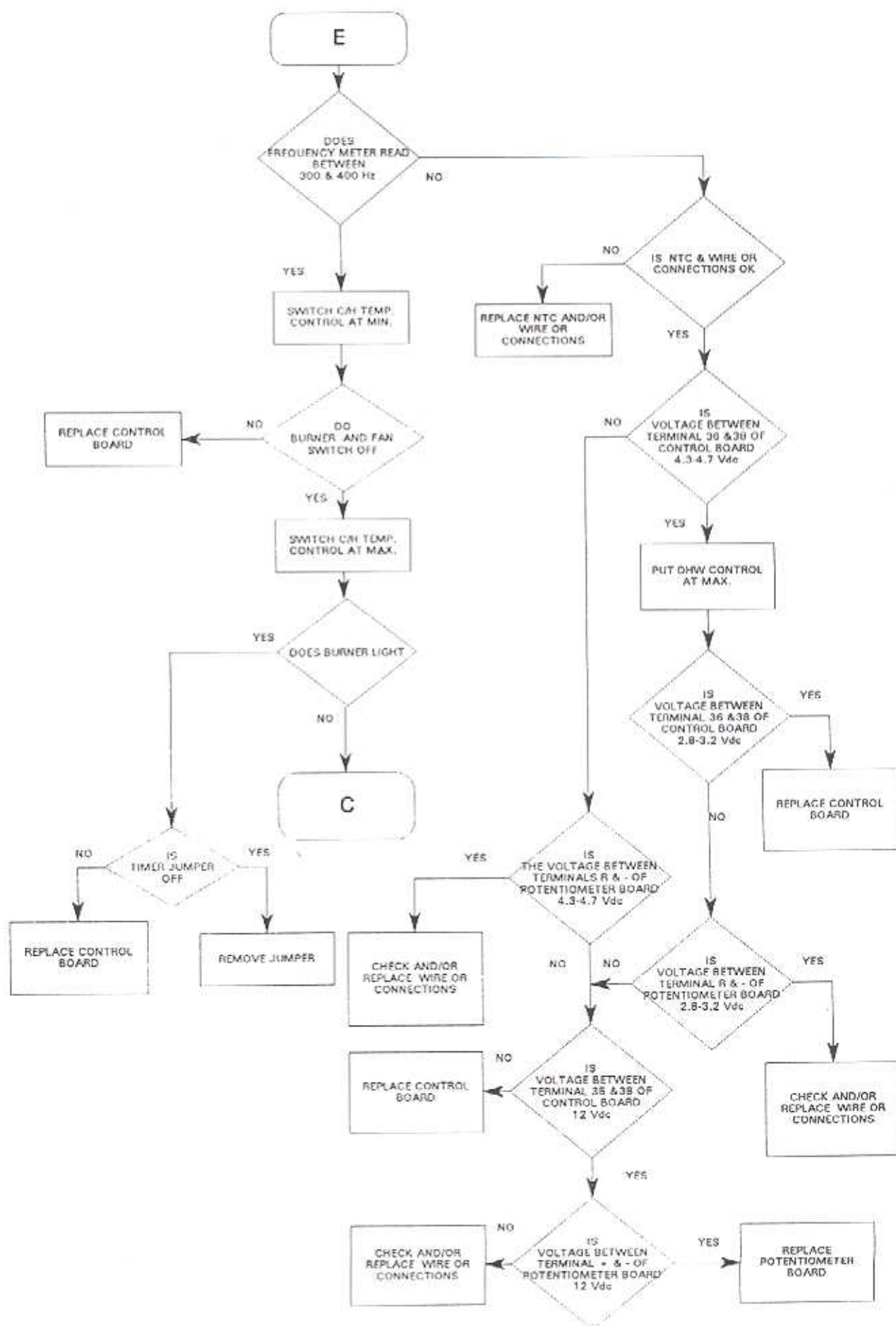
TEST 2 CHECK CONTROLS IN DHW MODE

NOTE: CONNECT A
FREQUENCY METER ACROSS
TERMINALS 39 & 40

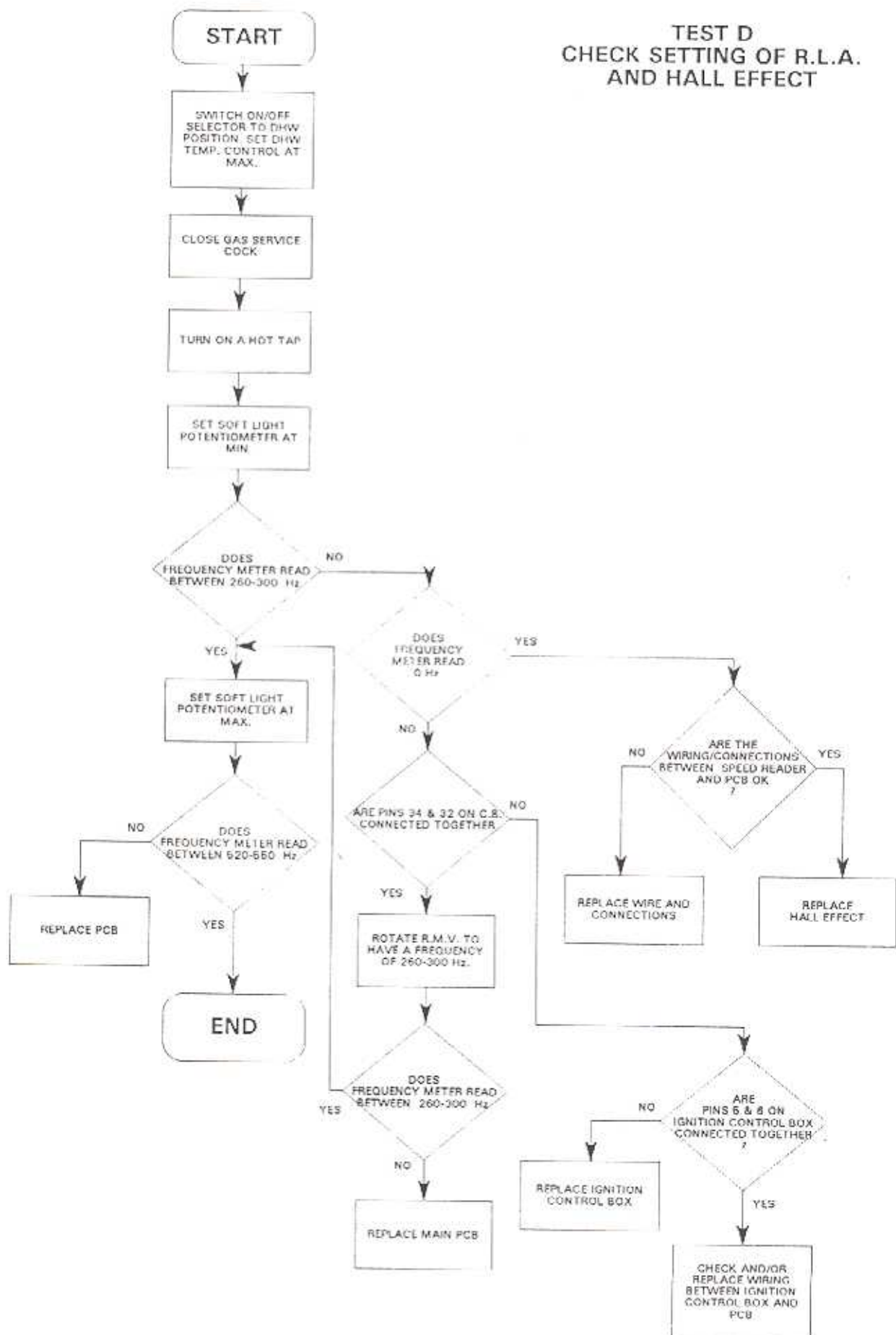


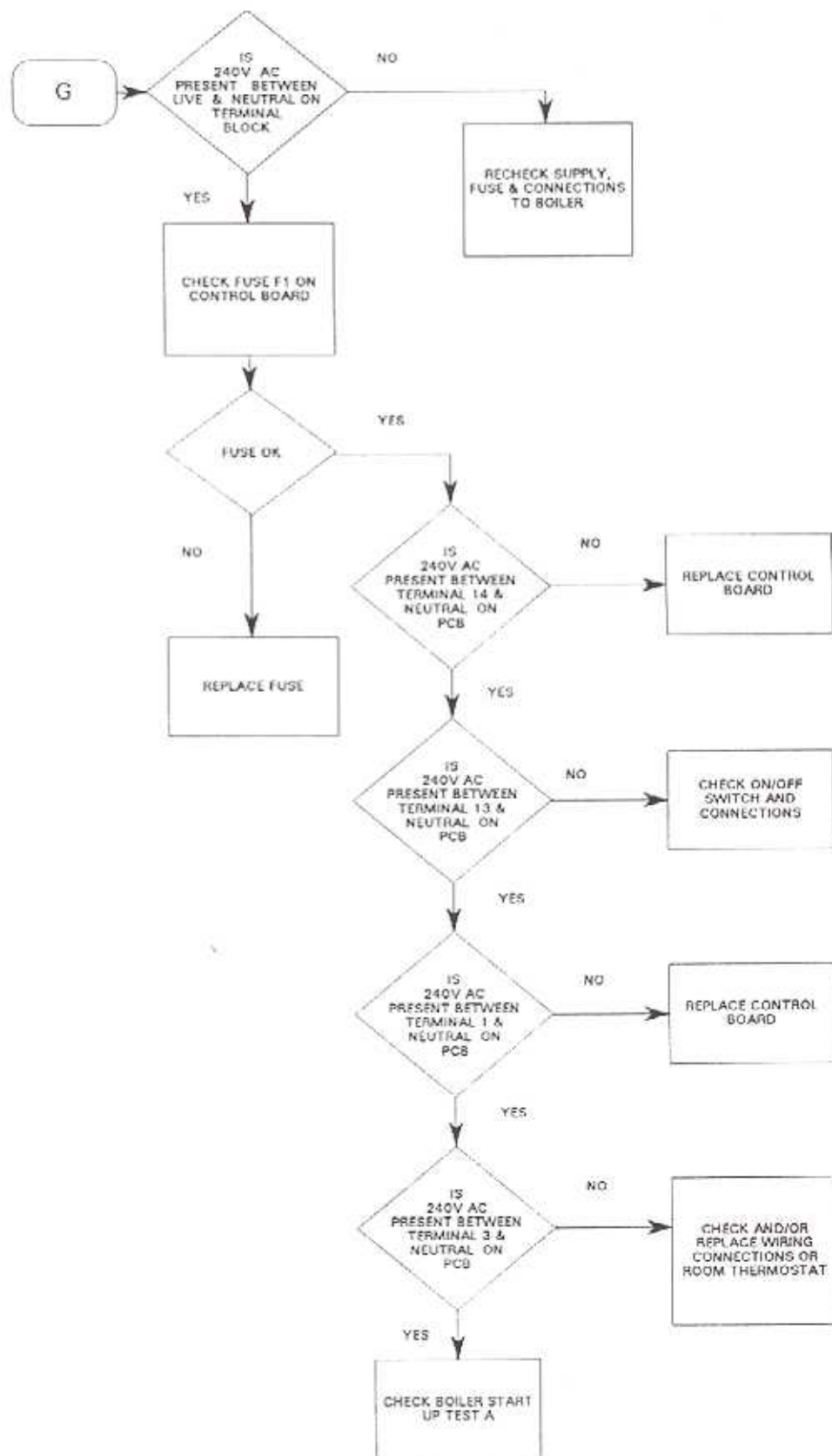
TEST 3 CHECK CONTROL



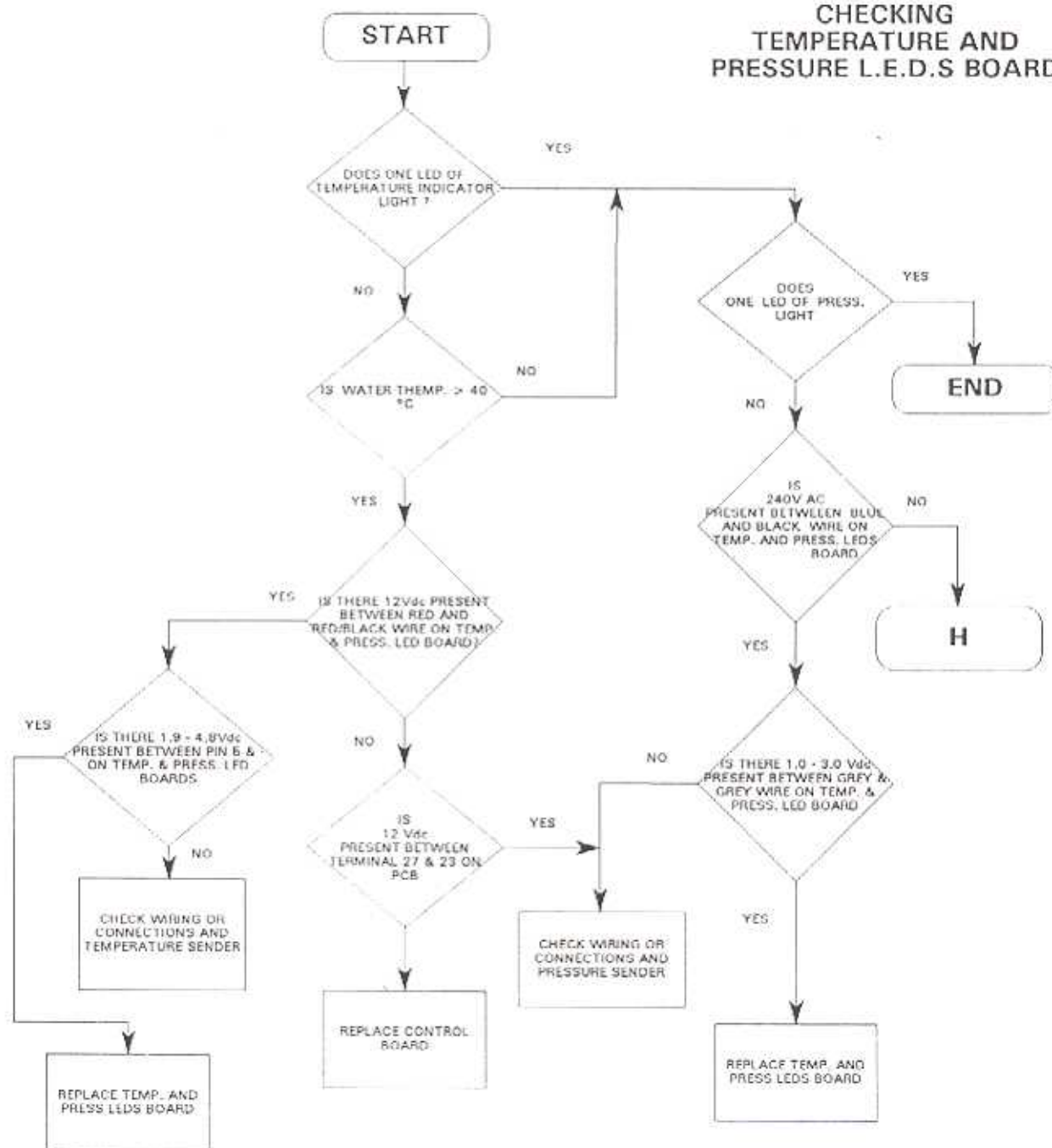


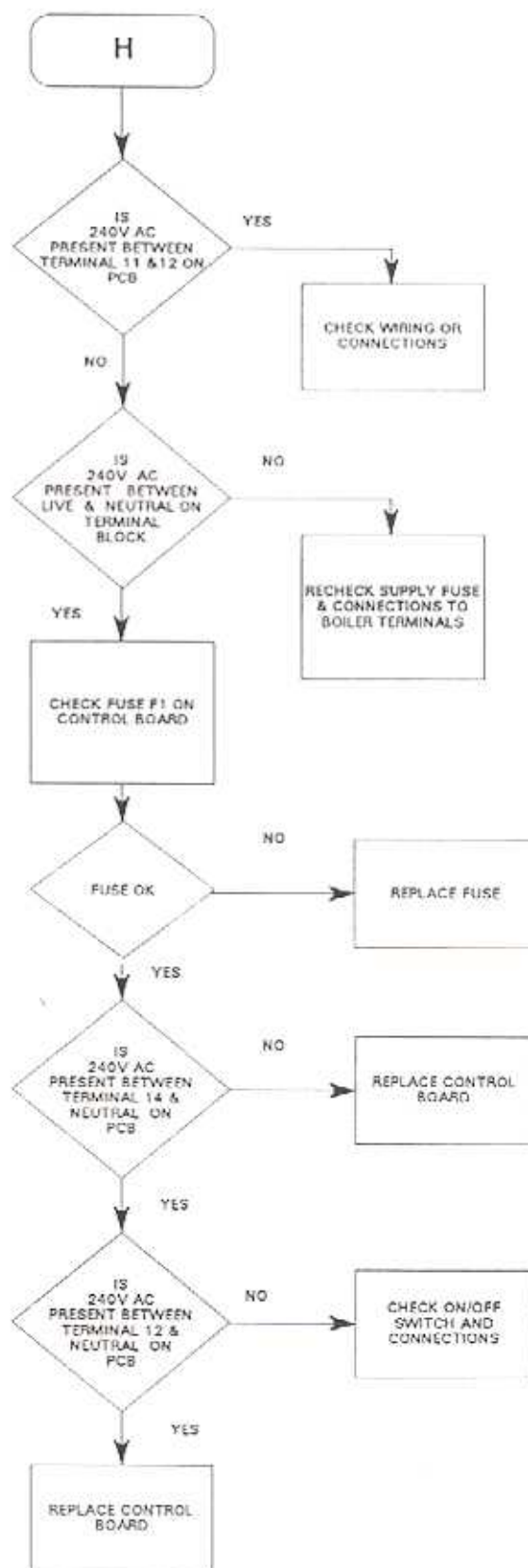
**TEST D
CHECK SETTING OF R.L.A.
AND HALL EFFECT**





TEST E CHECKING TEMPERATURE AND PRESSURE L.E.D.S BOARD





Instructions for:

- (A) Fitting Vokera 24 Hour Time Switch (Part No. 032 GC No. 301 110)
and Fitting Vokera Digital 7 Day Time Switch (Part No. 05 GC No. 301109)
- (B) Wiring to external Time Switches, Room Thermostats and Frost Thermostats
- (C) Wiring to 'Y' plan or 'S' plan installations

A. Installation of Vokera time switches (24hr and 7 day)

Remove the clock aperture blanking plate (1) fig.1 by squeezing the two lugs on the rear of the plate together and push the plate out.

Remove the clock from it's box.

Wire the clock as shown in fig. 4.

Insert the clock into the aperture from the back of the control panel. Push the mounting bezel (2) through the front panel and secure to the clock using the four screws provided. (See fig.2)

Connect the other ends of the wires as detailed below. (fig.3)

White/Red: Connects to double connector on brown wire on the rear of the mode selector switch.

Blue: connect to bottom terminal marked N on main terminal strip.

Red/Black: Cut off spade connector, strip end of wire and connect to terminal 1 on main terminal strip.

FOR INTERNAL CLOCK ONLY

White: Connect to terminal 3 on main terminal strip, (remove link wire connected between terminals 1 & 3.)

FOR INTERNAL CLOCK AND ROOM STAT

White: Connect to terminal marked 2, remove link between terminals 1 & 3 and connect the room thermostat to terminals 2 & 3.

ROOM THERMOSTAT ONLY

Remove the loop between terminals 1 & 3 and connect room thermostat as fig. 5

Note:

The loop between terminals 1 & 3 remains when no external or internal control is used.

Terminal 2 is a spare terminal used for linking external controls.

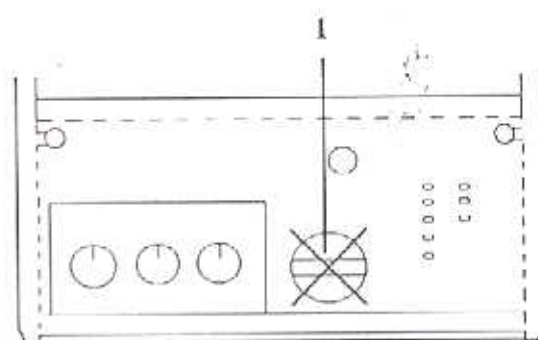


Fig. 1

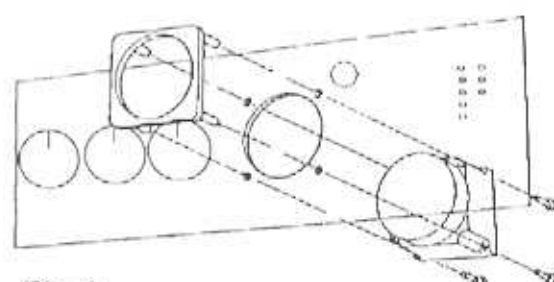


Fig. 2

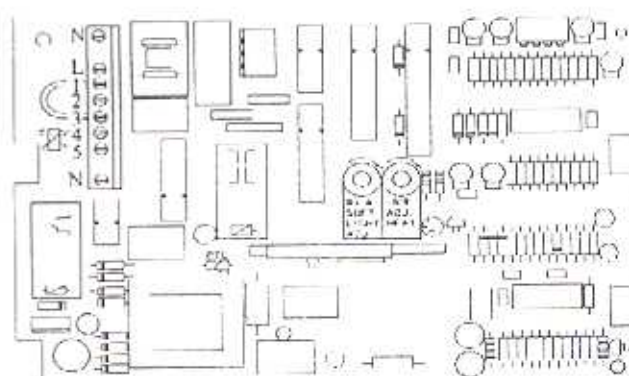


Fig. 3

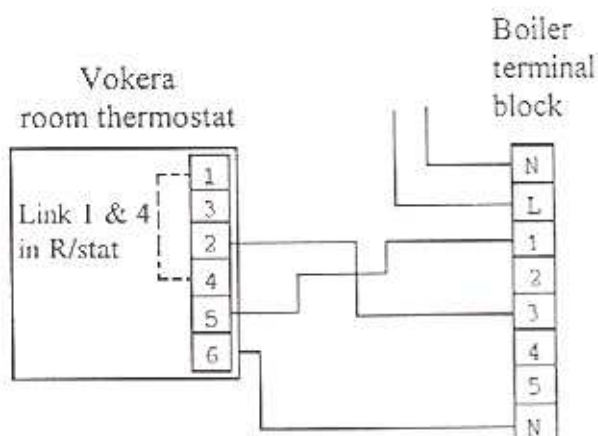


Fig. 5

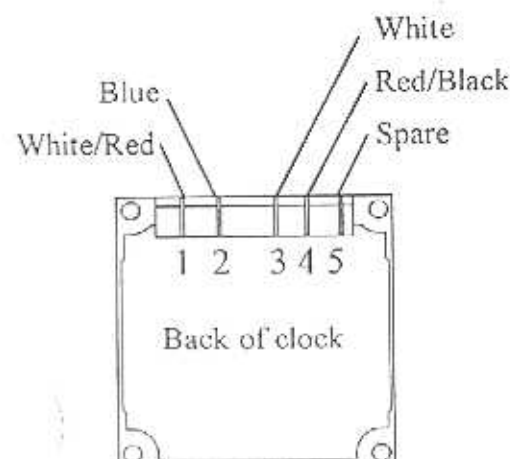
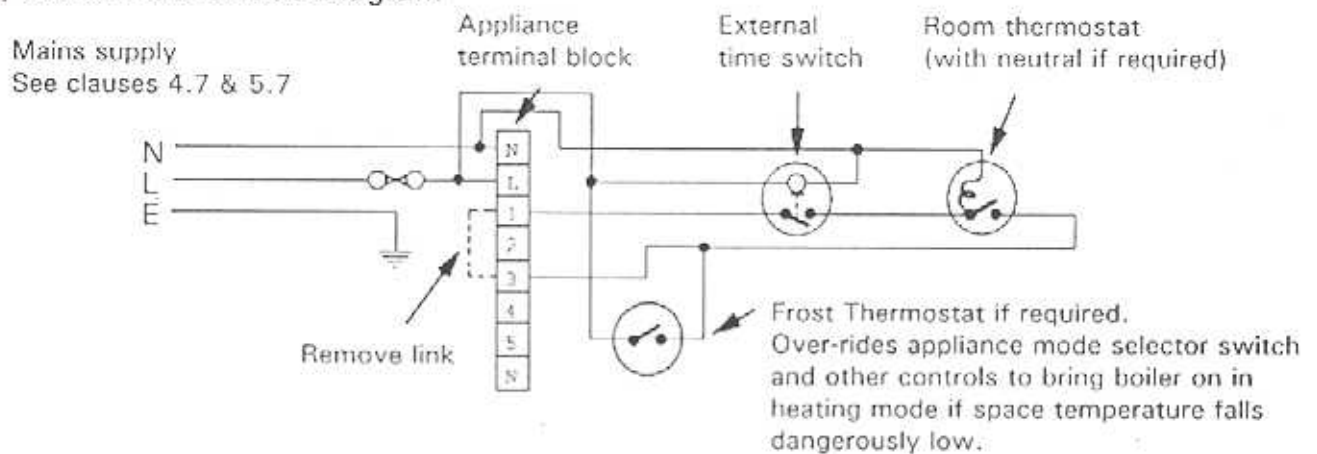


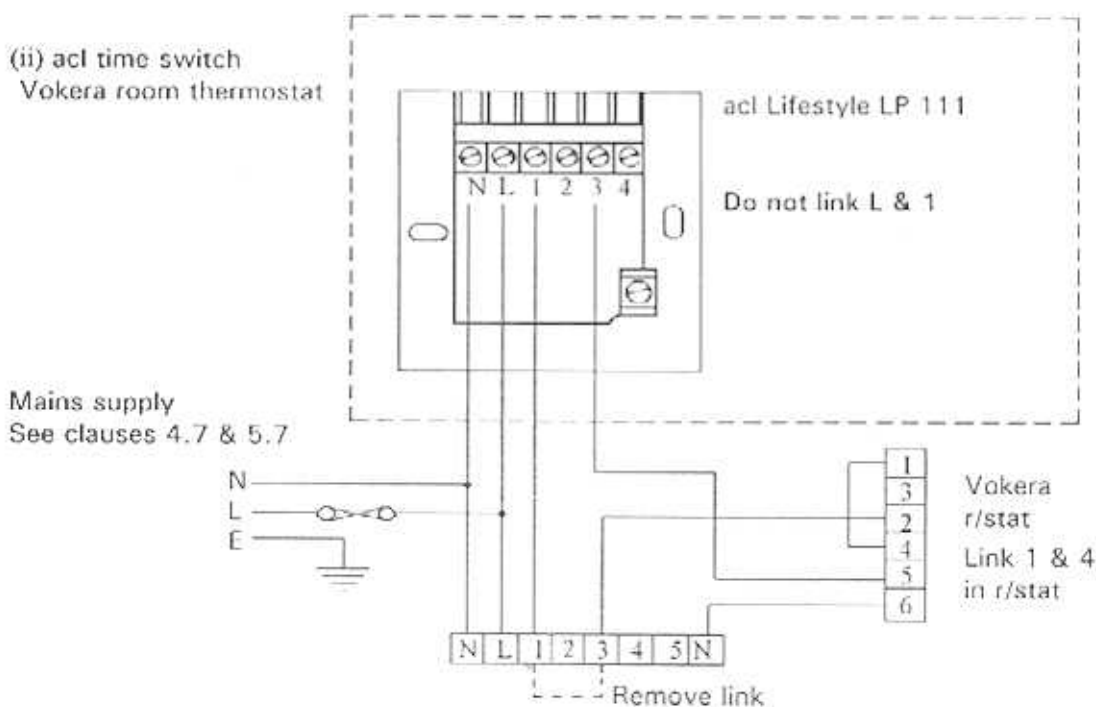
Fig. 4

B. Wiring to External Time Switches and Thermostats

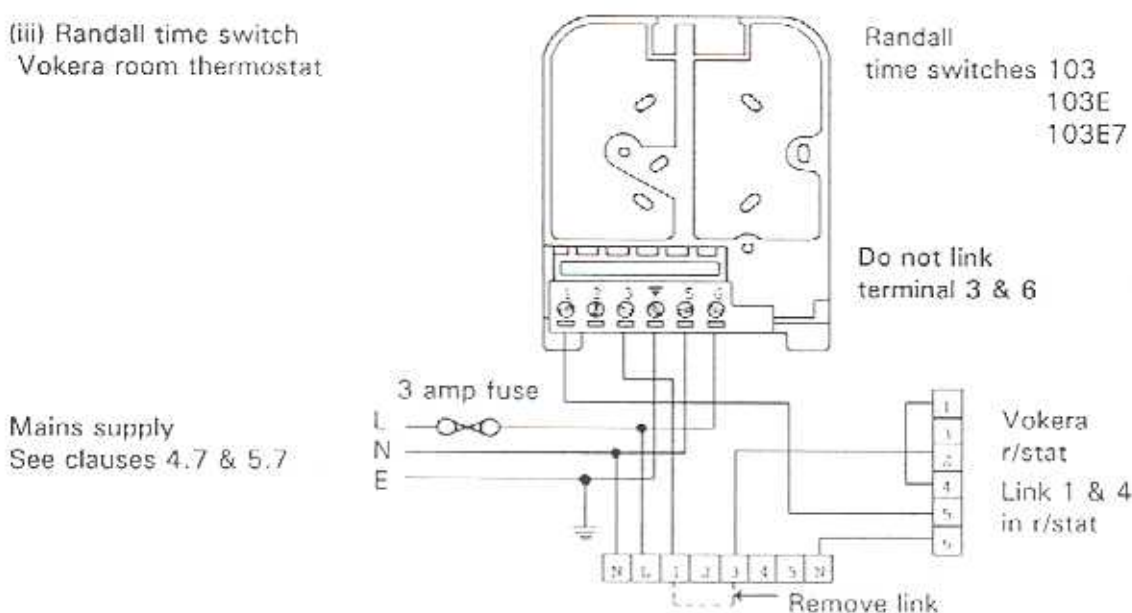
(i) General Schematic Diagram



(ii) acl time switch Vokera room thermostat

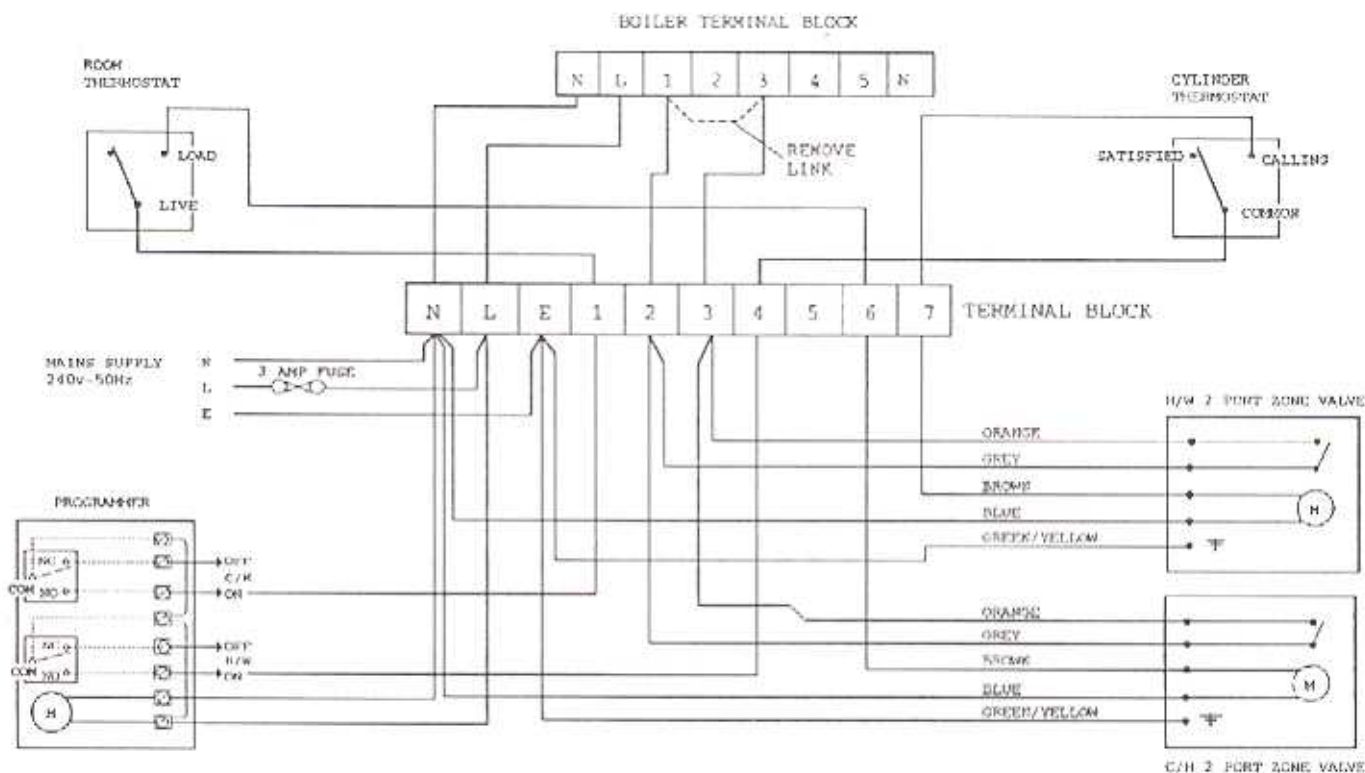


(iii) Randall time switch Vokera room thermostat

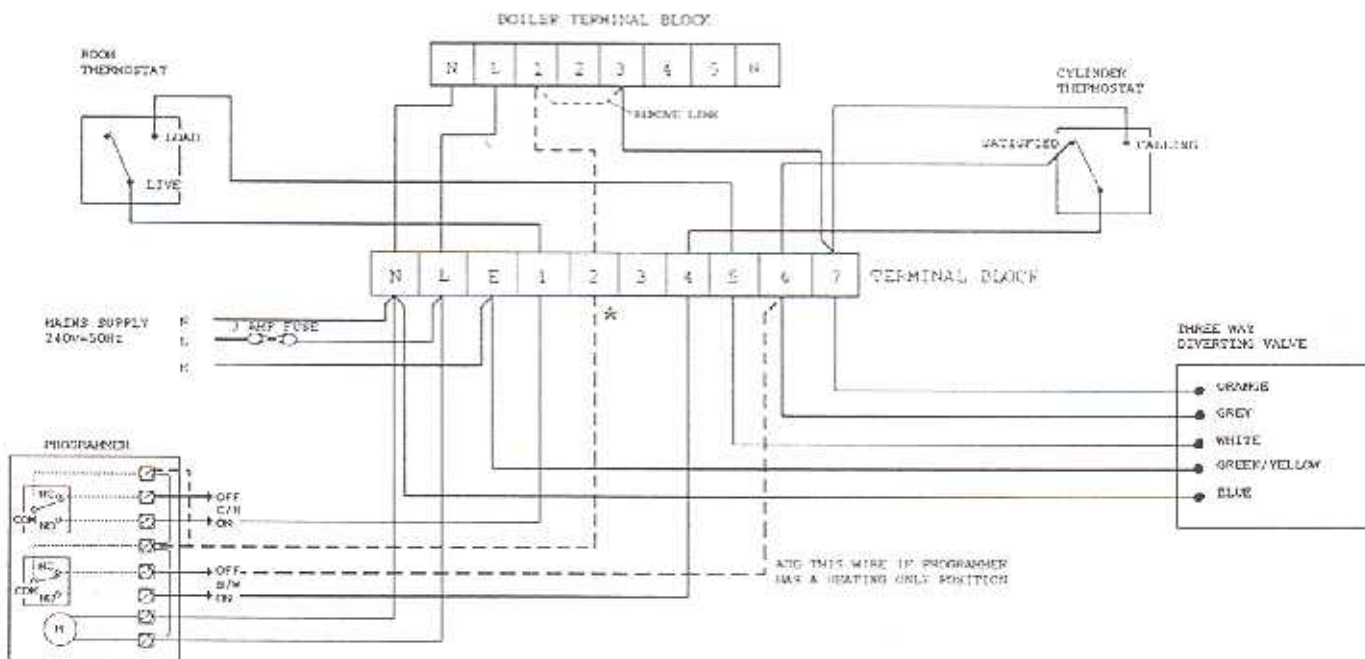


C. Wiring to 'Y' plan or 'S' plan installations

(i) 'S' plan



(ii) 'Y' plan



* If the programmer commons are internally linked do not use this dotted wire.
If the programmer requires you to link the commons it is preferable to link them using this dotted wire. By linking the programmer at the programmer terminal block will override the mode selector switch.

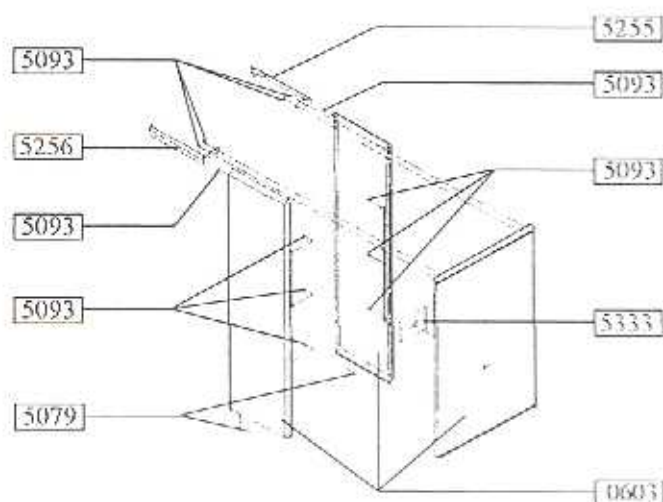
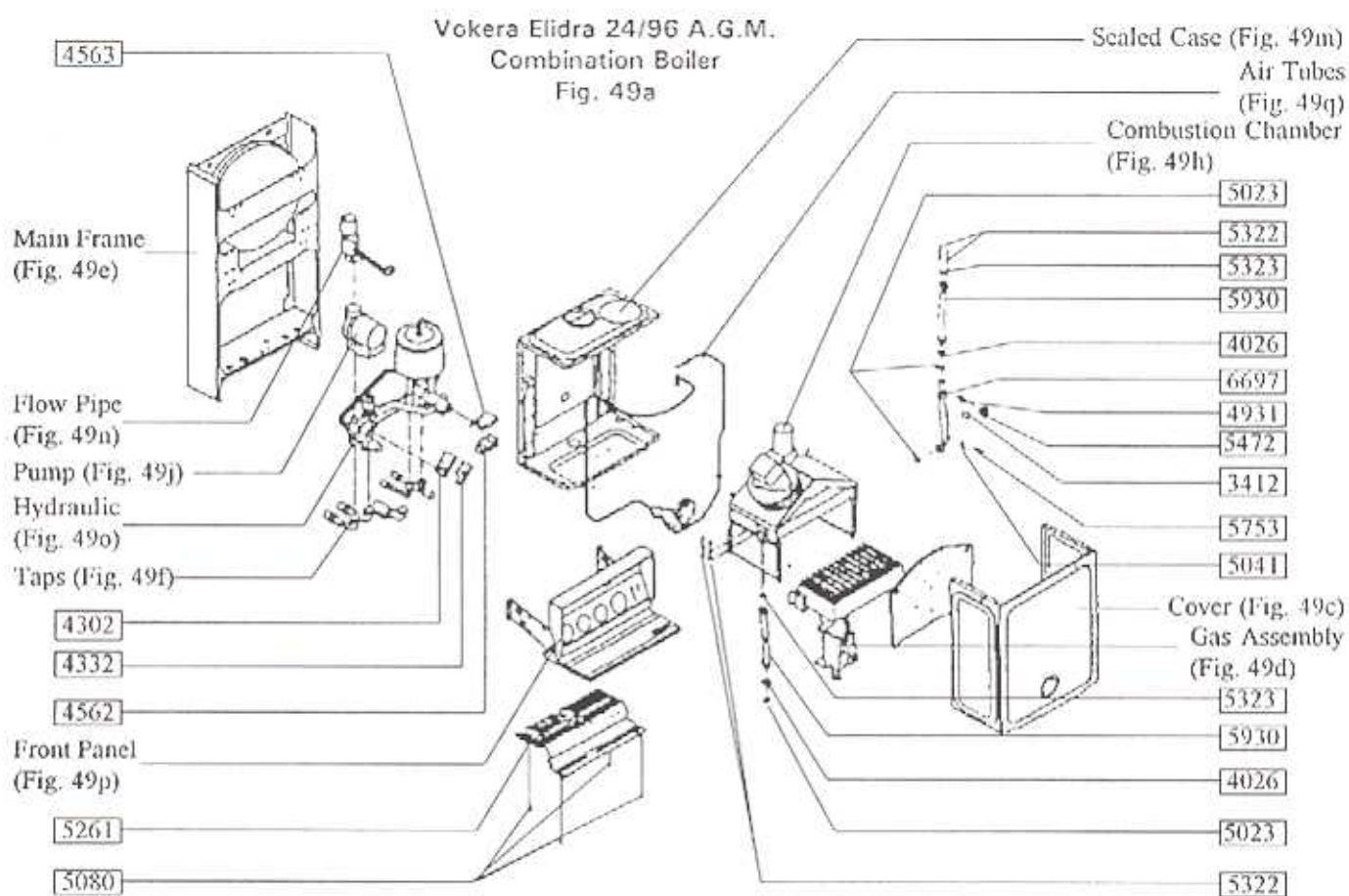


Fig. 49b Outer Casing

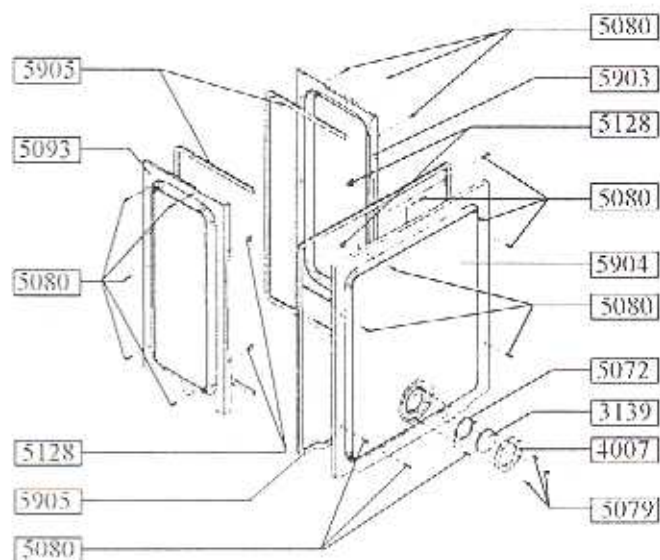


Fig. 49c Cover and Left-Right Sides

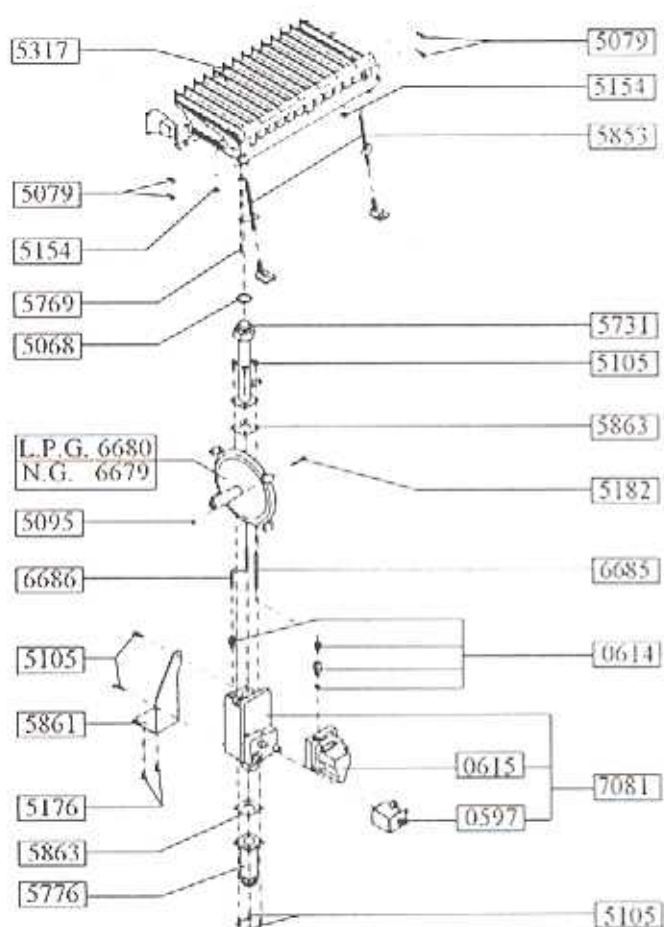


Fig. 49d Gas Assembly

Fig. 49e
Expansion Vessel 10
lt

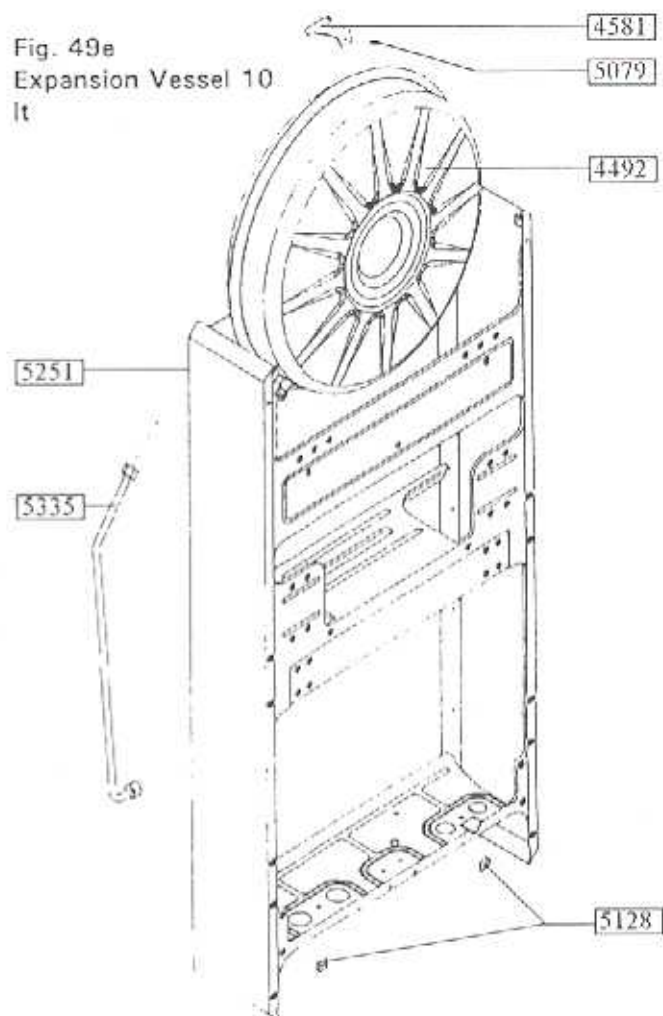


Fig. 49f Taps and Connection Pipes

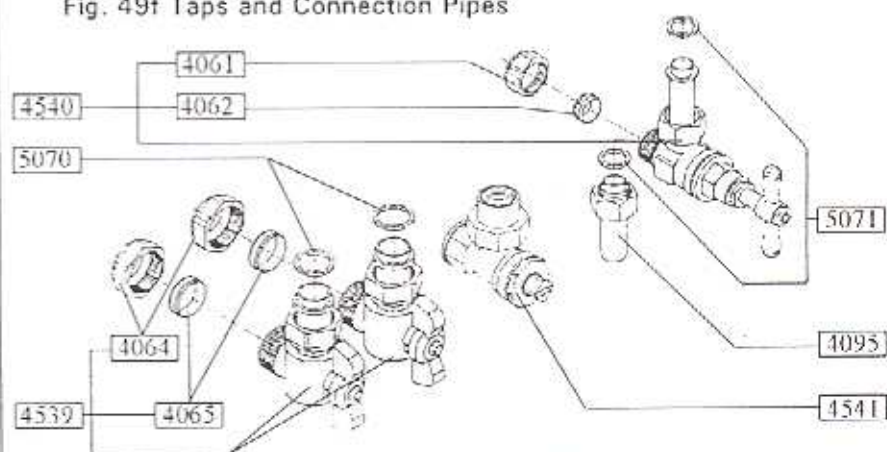


Fig. 49g Three Port Valve

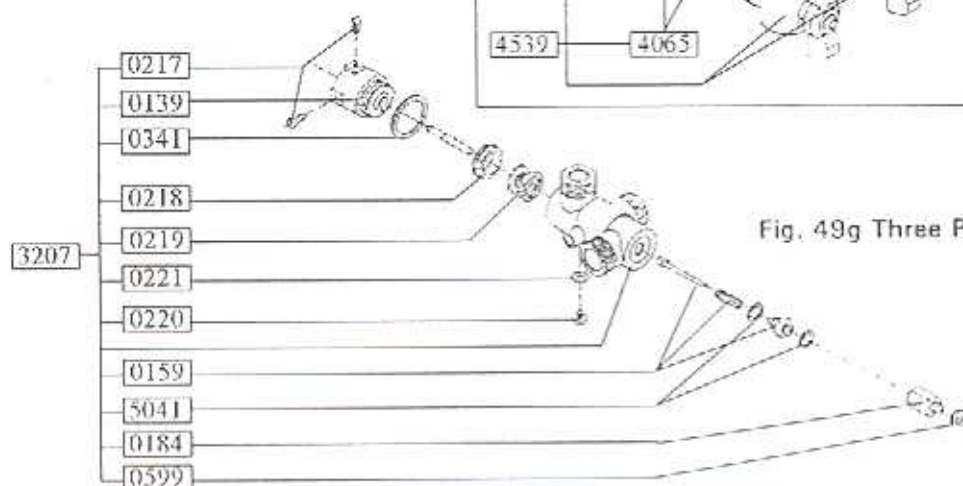


Fig. 49h Combustion Chamber

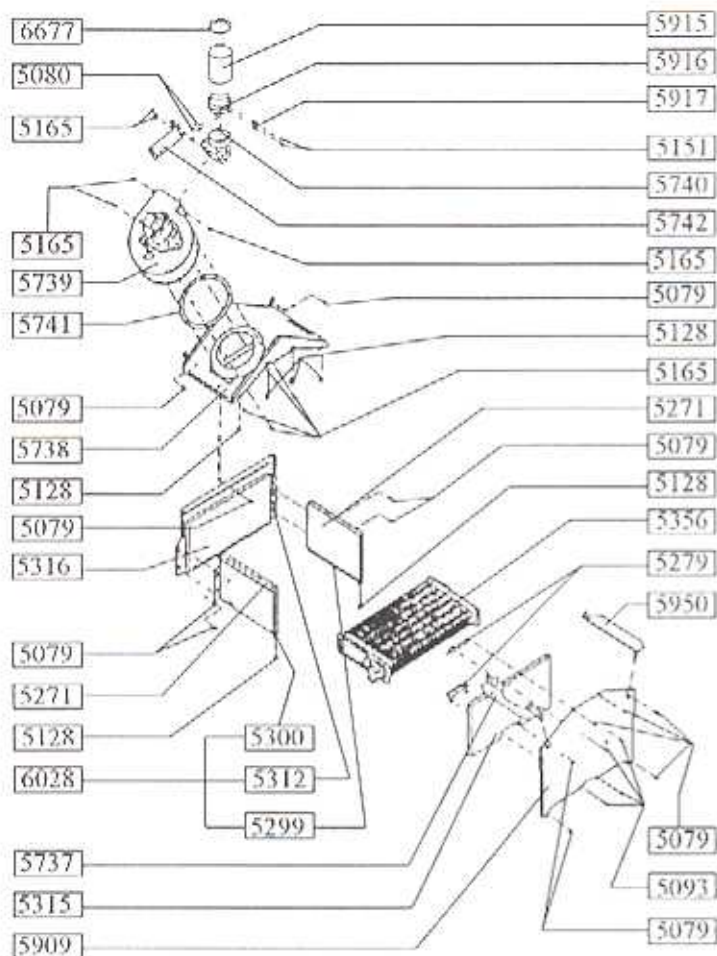


Fig.49 90° Bend

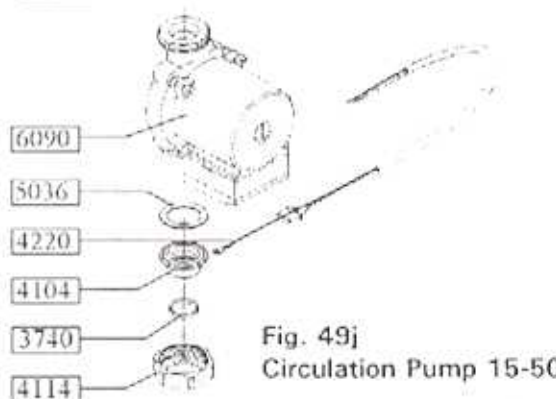
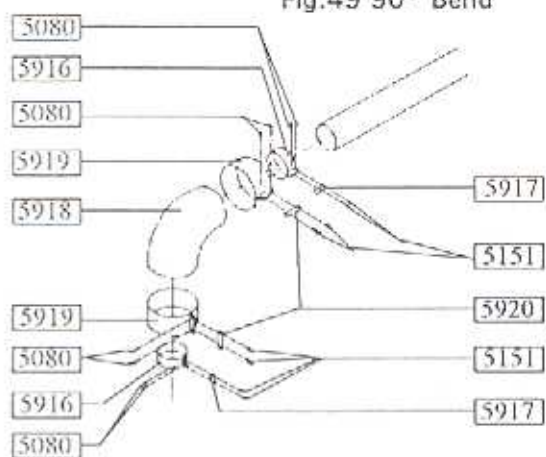


Fig. 49j
Circulation Pump 15-50

Fig. 49k
Central Heating Manifold
With Automatic By-Pass

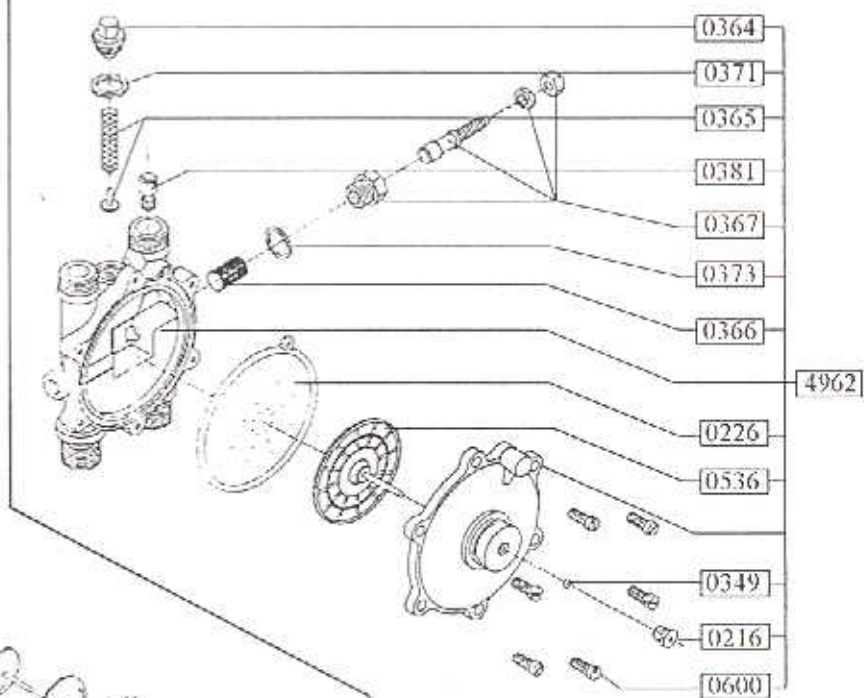
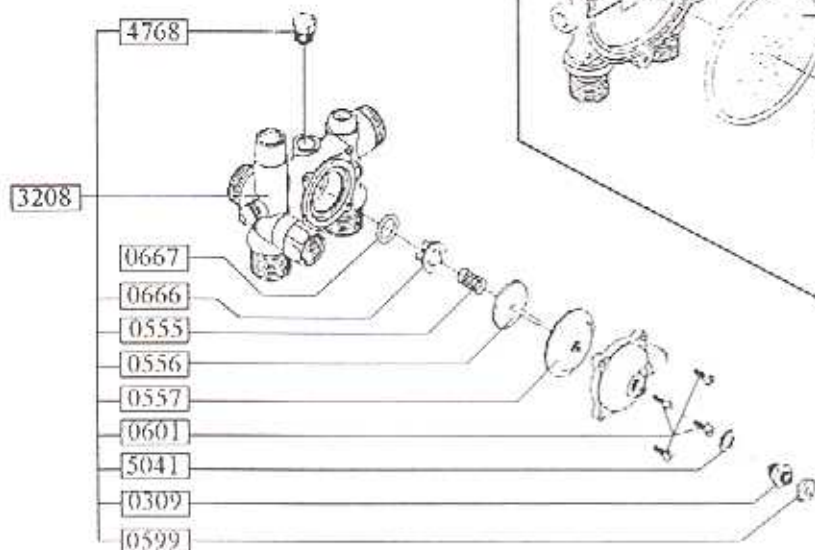


Fig. 49l
Domestic Hot Water Manifold

Fig. 49m Sealed Case

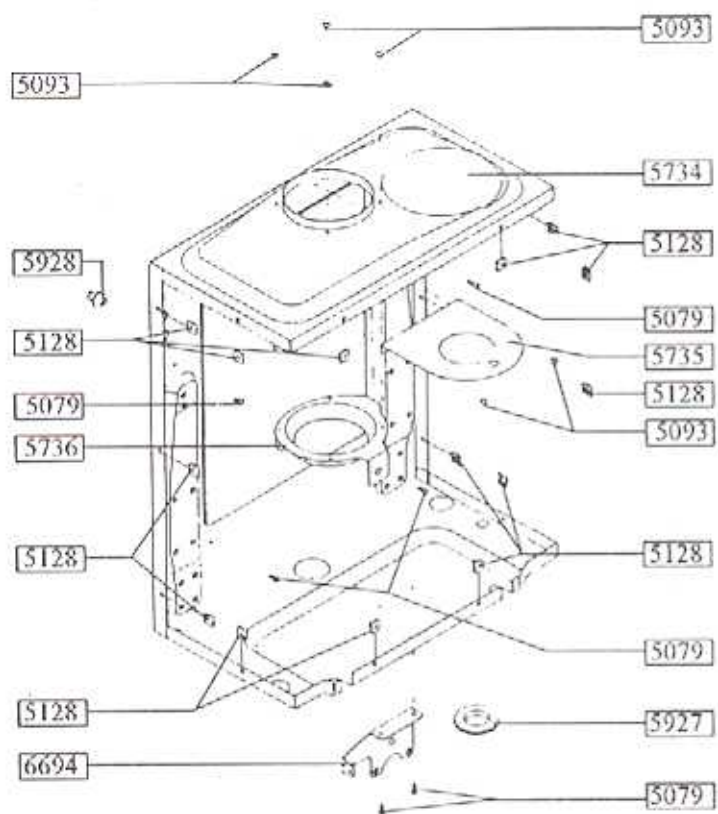


Fig. 49n Flow Pipe and Air Separator

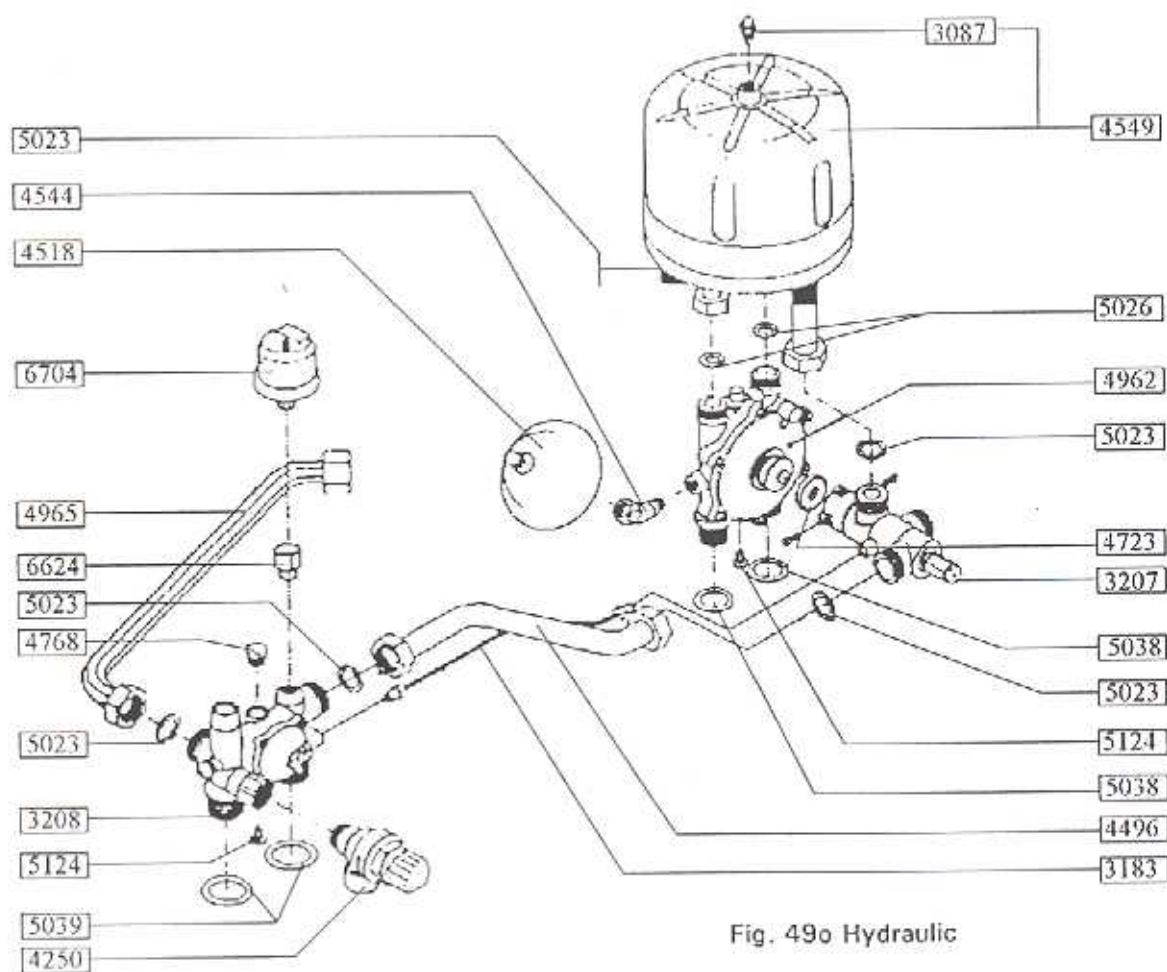
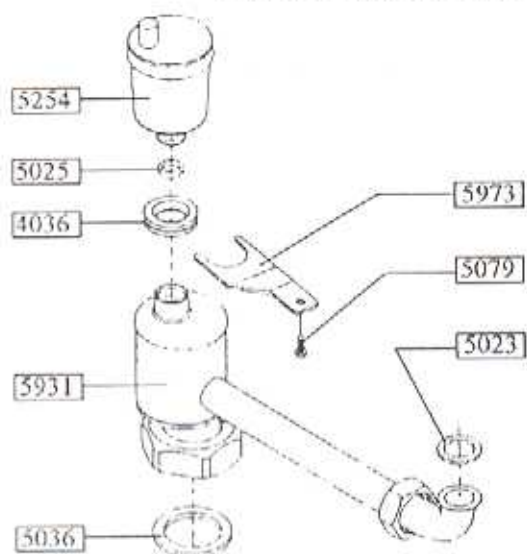


Fig. 49o Hydraulic

Fig. 49p Front Panel

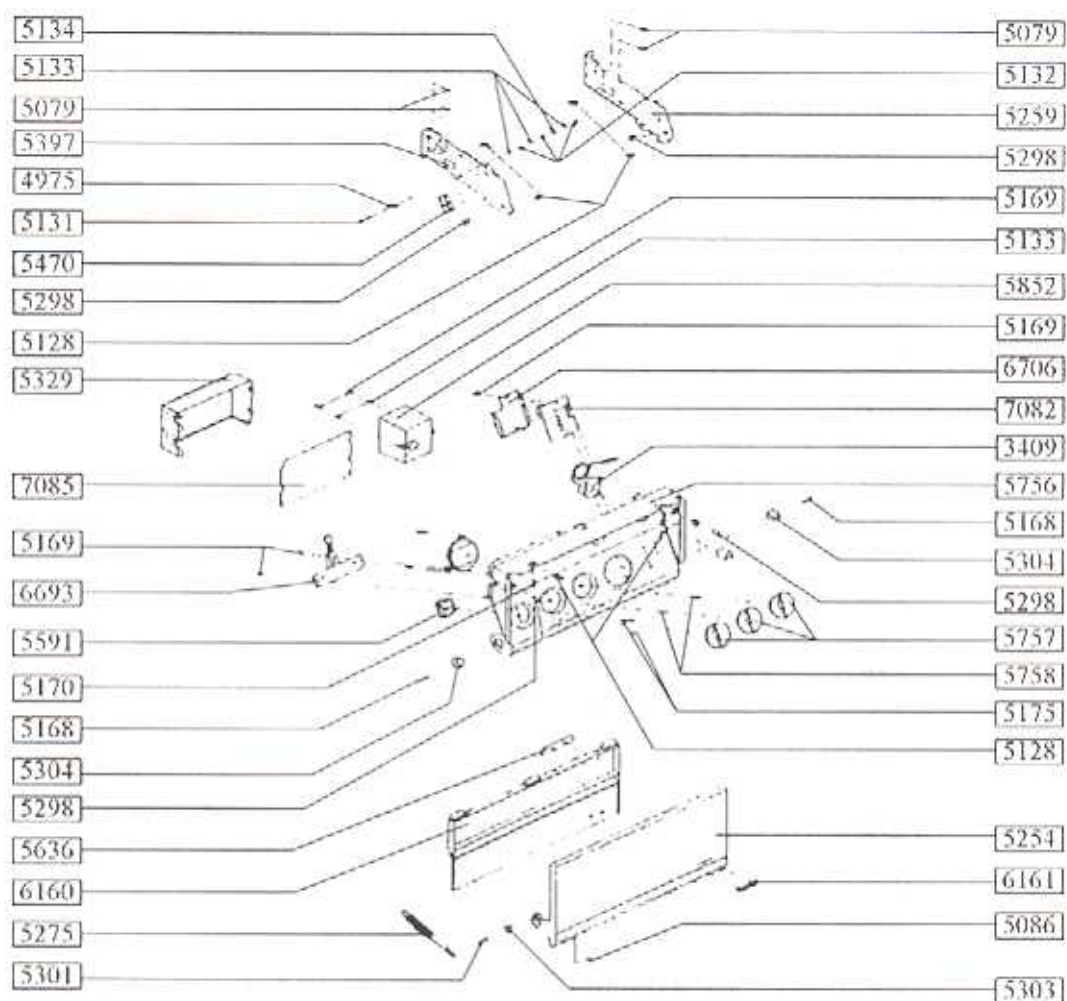
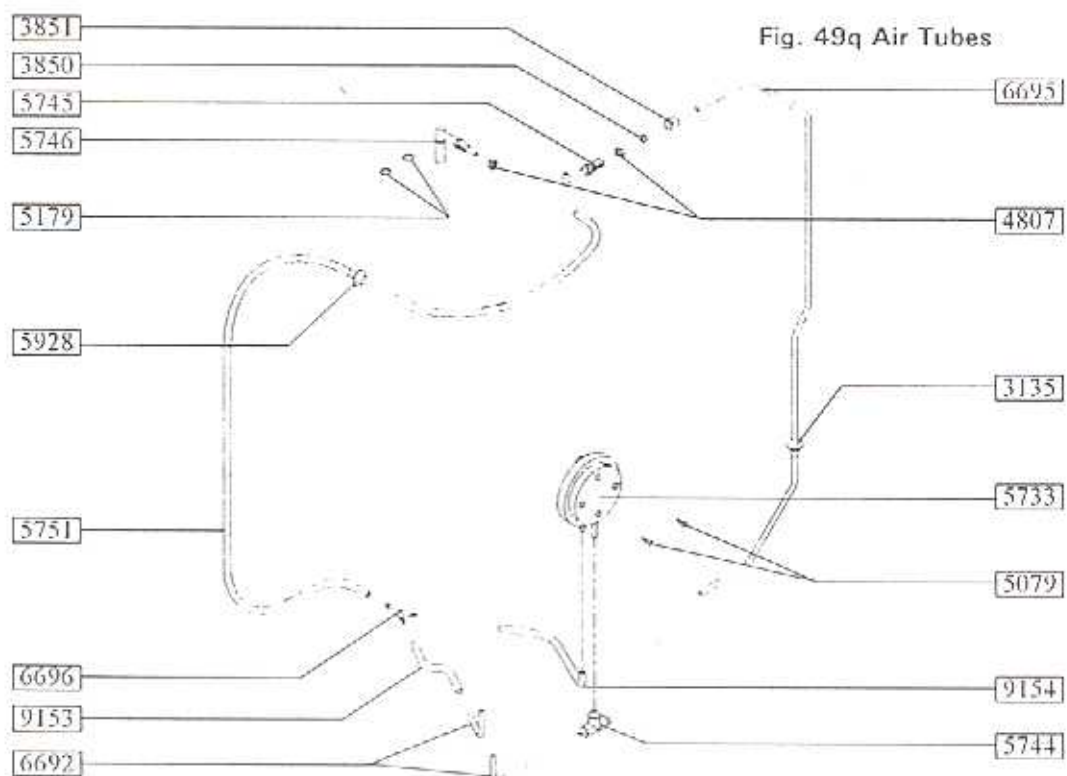


Fig. 49q Air Tubes



Code	G.C. No.	Description
0226	333 929	Domestic Diaphragm
0557	333 832	Flow Switch Diaphragm
0597	xxx xxx	Solenoid
0615	xxx xxx	Servo Pressure Regulator
3207	333 943	3 Way Diverting Valve
3208	333 944	Heating Manifold
3409	333 978	High Limit Thermostat
4095	333 720	Hot Water Outlet
4250	333 772	Safety Valve
4254	333 722	Automatic air vent
4302	333 773	Single micro switch (Flow Switch)
4492	333 733	Expansion Vessel
4518	333 885	Domestic Expansion Vessel
4540	333 779	Mains Stop Cock
4541	333 780	Gas Service Tap
4549	333 955	Domestic Heat Exchanger
4631	333 899	Over-run Thermostat
4962	333 903	Domestic Distribution Manifold
5317	301 017	Main Burner
5356	301 023	Main Heat Exchanger
5441	301 027	Safety Thermostat
5591	xxx xxx	Mode Selector Switch
5733	xxx xxx	Pressure Differential Switch
5739	xxx xxx	Fan
5852	xxx xxx	Electronic Ignition Control Box
5757	xxx xxx	Control Knob
6090	384 288	Grundfos Circulating Pump 15-50
6679	xxx xxx	Compensator N.G.
6681	xxx xxx	Printed Circuit Board
6693	xxx xxx	Thermostat Potentiometer Board
6704	xxx xxx	Pressure Sensor
6705	xxx xxx	L.E.D. Printed Circuit Board
7085	xxx xxx	Printed Circuit Board

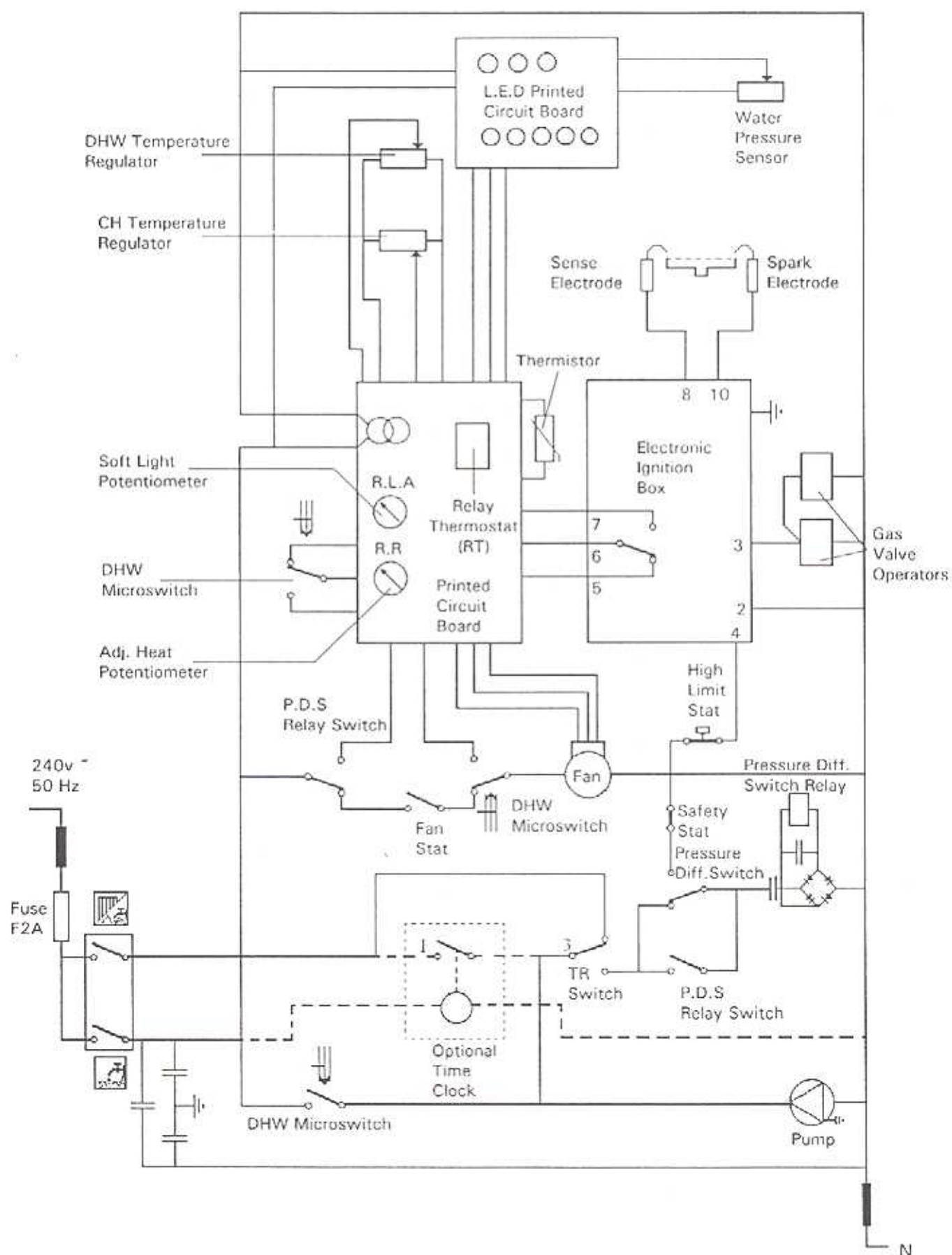


Fig. 50

GENERAL LAYOUT OF WIRING FROM PRINTED CIRCUIT BOARD

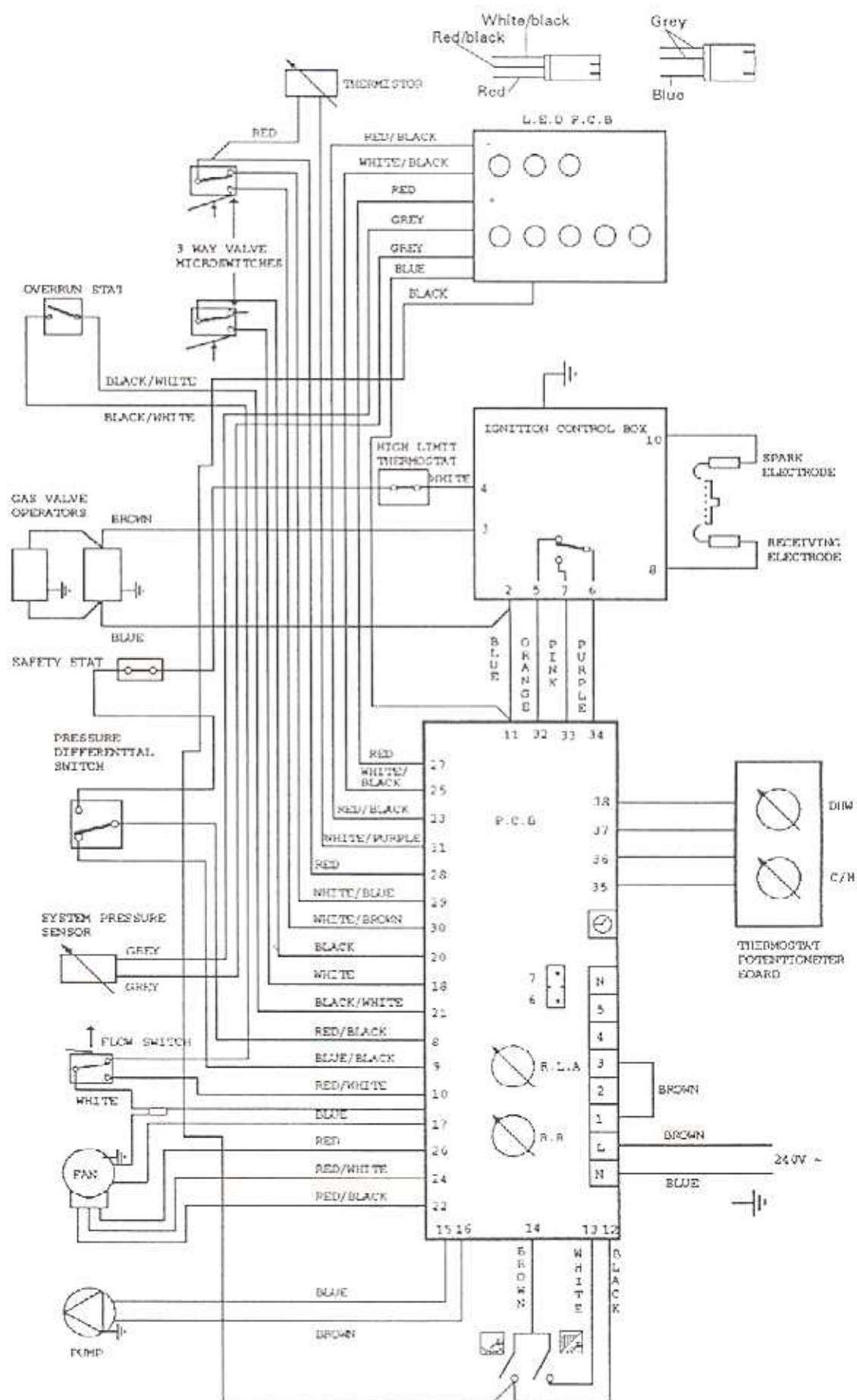


Fig. 51

ILLUSTRATED WIRING DIAGRAM

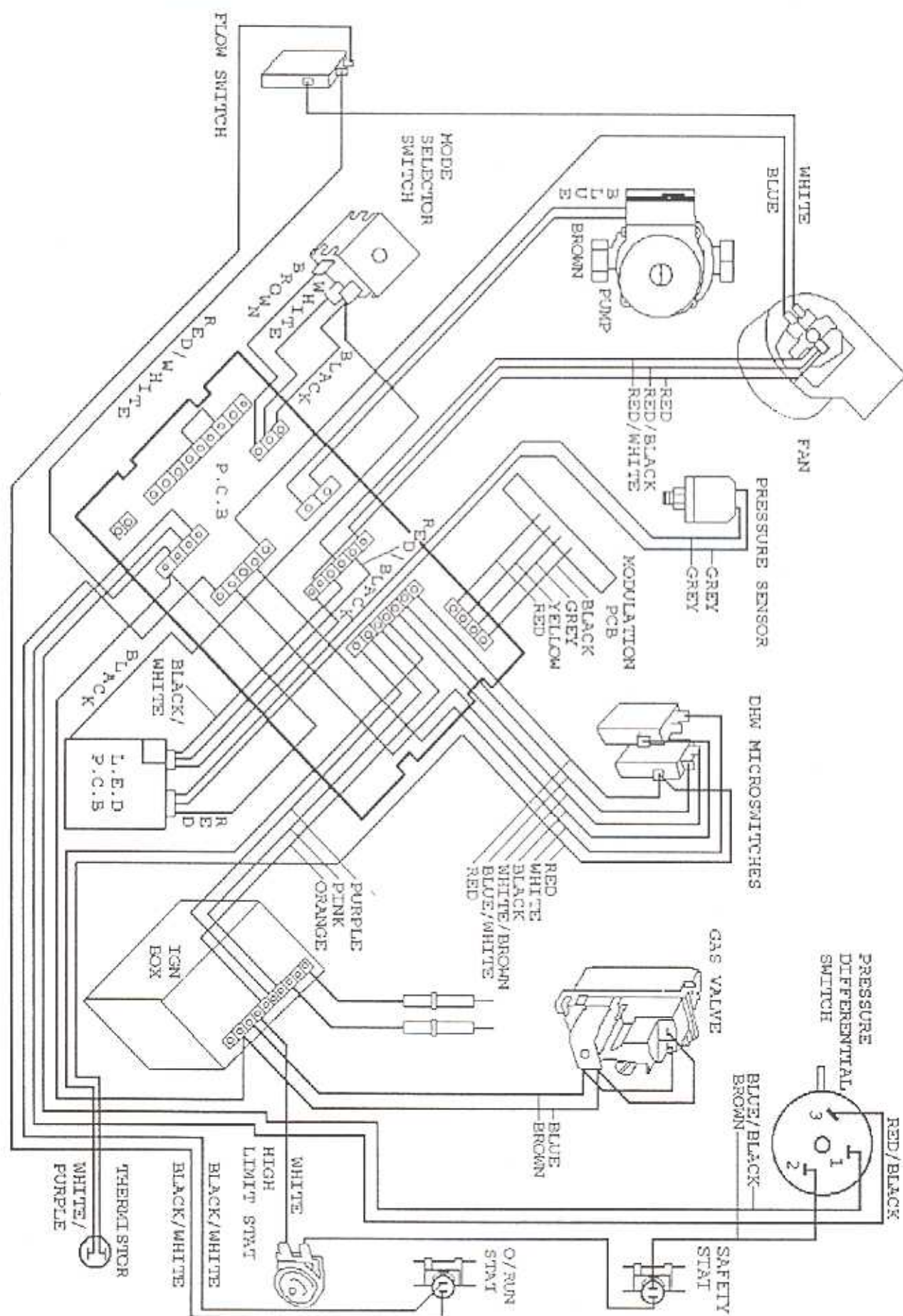


Fig. 52

A. EARTH CONTINUITY CHECK - appliance must be electrically disconnected - meter set on Ω (ohms) x 1 scale and adjust zero if necessary.

a) Test leads from any appliance earth point to earth pin on plug - resistance should be less than 0.1 Ω (ohm).

If the resistance is greater than 0.1 Ω (ohm) check all earth wires for continuity and all contacts clean and tight.

If resistance of earth is still greater than 0.1 Ω (ohm) then this should be reported to your supervisor.

B. SHORT CIRCUIT CHECK - appliance electrically disconnected, all switches ON (including stats) -

a) meter set on Ω (ohms) x 1 scale.

Test leads from L to N in appliance terminal strip/block - if meter reads 0 then there is a short circuit.

b) meter set on Ω (ohms) x 100 scale

Repeat test with leads from L to E. If meter reads less than ∞ (infinity) there is a fault.

NOTE - Should it be found that the fuse has failed but no fault is indicated - a detailed continuity check (i.e. by disconnecting and checking each component) is required to trace the faulty component. It is possible that a fault could occur as a result of local burning/arcing but no fault could be found under test. However, a detailed visual inspection should reveal evidence of burning around the fault.

C. POLARITY CHECK

Appliance connected to mains supply and meter set on 300 Vac scale. Test at appliance terminal strip:-

a) Test leads from L to N - meter reads approx 240 Vac

b) Test leads from L to E (+) - meter reads approx 240 Vac

c) Test leads from N to E (+) - meter reads from 0-15 Vac*

Thus the terminal marked L is the live terminal. If the low* Vac reading is given on terminals other than N to E (+) there is an electrical fault.

Repeat the test at the appliance plug/inlet spur to check the wiring system up to the appliance and rectify any fault. If necessary repeat the test at the supply system socket/spur - if the fault also occurs at this stage then there is a house system fault which requires attention by the ELECTRICITY AUTHORITY. The customer should be warned not to use the appliance until this examination has been carried out.

D. RESISTANCE TO EARTH CHECK

Appliance must be disconnected from mains supply and meter set on Ω (ohms) x 100 scale. All switches, including stats, ON - Test leads from L to E - if meter reads other than infinity (∞) there is a fault which should be isolated. A detailed continuity check is required to trace the faulty component.

IMPORTANT - This series of checks are the first electrical checks to be carried out during a fault finding procedure. On completion of the service/fault finding task which has required the breaking and remaking of electrical connections then the checks - A. Earth Continuity, C. Polarity and D. Resistance to Earth - must be repeated.

APPENDIX a. VERTICAL FLUE INSTRUCTIONS

The Vokera Room sealed vertical flue terminal assembly is intended for use where a horizontal flue outlet is not possible or desired. It can be used with either a flat or pitched roof (max pitch 60 Degrees see figs 1,2, & 3). The vertical flue assembly consists of an annular co-axial combustion air intake, with a specially designed terminal fitted to the top. As supplied the flue assembly is 1050mm long overall and **must not** be cut to shorter dimensions, but may be extended using 850mm long extension tubes Part No. 026 (G.C. No 370 346) or 1700mm long extension tubes Part No. 016 to a maximum overall dimension of **3.6metres**. Where a straight flue run is impossible due to an obstruction the flue may be offset using either a maximum of two fixed offsets (100mm) Part No. 060 (G.C. No 301 108) or four 45 Degree bends Part No 059 (G.C. No 301 107). If either a fixed offset or a pair of 45 Degree bends are used the maximum permissible flue height is reduced by 750mm. (See 3.4.5)

This assembly must be installed in accordance with BS 5440 part 1.

NOTE:
90° DEGREE FLUE BENDS MUST NOT BE USED ON THE VERTICAL FLUE.

NOTE
The 45° bends have one long and one short limb so may be assembled back to back in three different ways to give offsets of 130mm, 192mm or 254mm (fig. 4). Offsets of greater distance may be made by using a straight length between the bends. (fig. 2)

VOKERA FLASHING PLATES

Flat - Part No. 061

Angled - Part No. 017 (adjustable 20° - 40°)

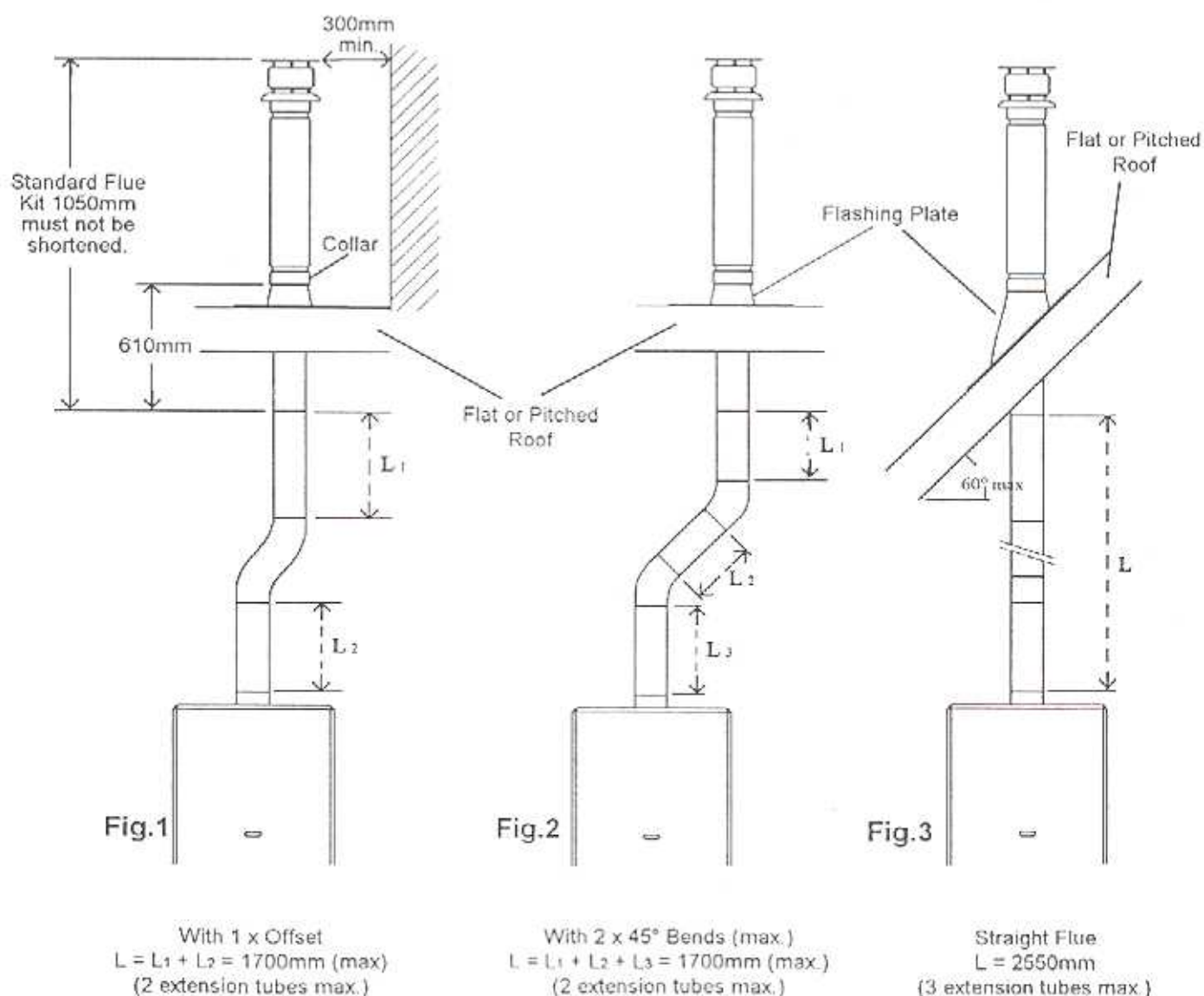
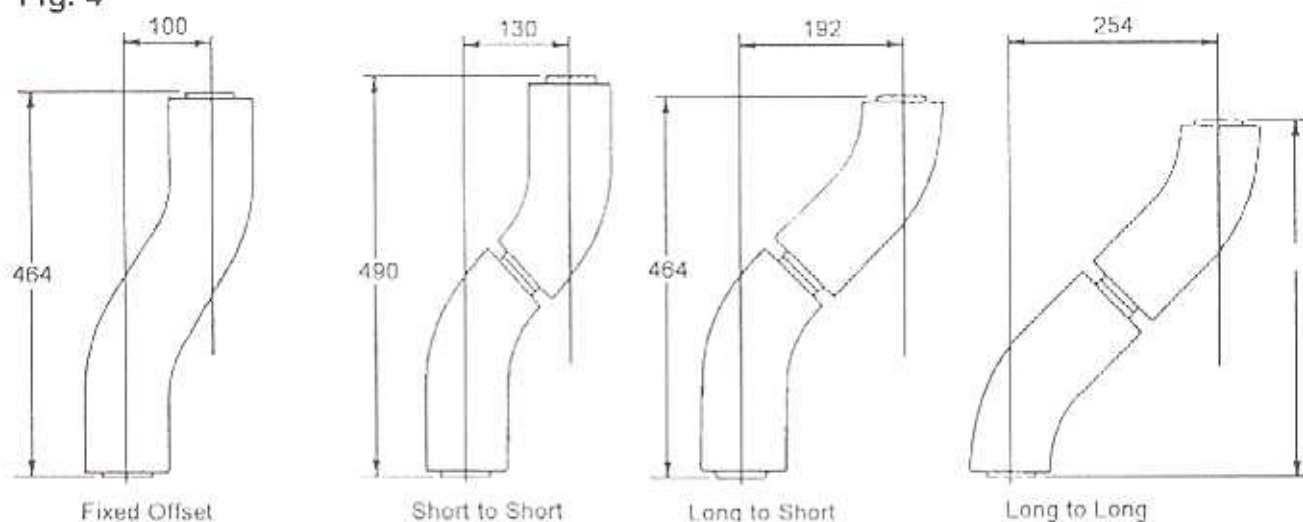


Fig. 4



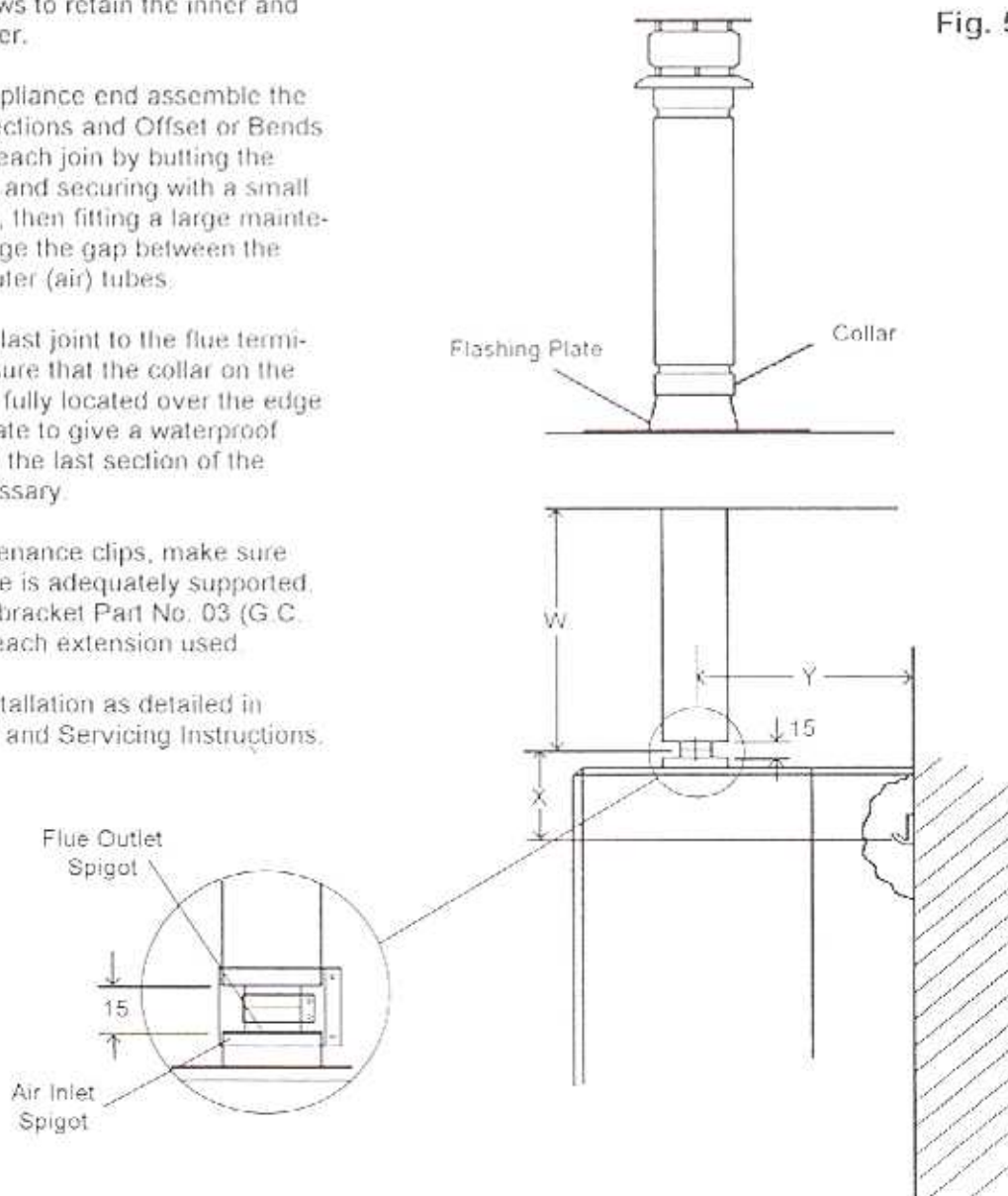
- Proceed with installation as detailed in section 5 of the main installation and servicing Instructions, ignoring all references to the flue installations. It is advisable not to proceed beyond hanging the appliance on the bracket until the flue system is installed.
- NOTE** Where the vertical flue terminal assembly is used without extension, then the dimension W (fig 5) is dictated by the particular flashing plate used and is not variable. In this case calculate dimensions W before fixing the appliance mounting bracket. (See steps 5-10).
1. Mark the position of the flue hole in the ceiling and/or roof using the dimension Y in fig 5.
 2. Ensure that the maximum permissible flue length is not exceeded and that allowance has been made for any bends or offset used. (figs 1,2 & 3)
 3. Cut a 105mm diameter hole through the ceiling and/or roof.
 4. Fit 100mm(4in) diameter flashing plate to the roof.
- TO CONNECT THE FLUE DIRECTLY TO THE APPLIANCE PROCEED BELOW. (PRIOR TO FIXING APPLIANCE BRACKET) IF USING EXTENSION TUBES/OFFSET/BENDS START AT NUMBER 11.**
5. Insert the vertical flue terminal assembly through the flashing plate from the outside.
 6. Measure W. Then $W + X\text{mm}$ (see table) = distance from ceiling for appliance hanging bracket.
 7. Fix the appliance hanging bracket and hang the appliance in accordance with section 5 of the main Installation and Servicing Instructions.
 8. Locate the small maintenance clip onto the appliance flue outlet spigot, (see insert fig.5) draw the flue assembly down towards the appliance until it locates fully into the clip. Tighten clip retaining screws.
 9. There should now be a gap approximately 15mm between the outer sleeve of the air duct and the air duct spigot, (see insert fig.5). Finally fit the large maintenance clip to seal this gap, ensure the screws are fully tightened.
 10. Ensure that the collar on the flue assembly is located over the edge of the flashing plate. (fig.5)
- FLUE CONNECTION USING EXTENSIONS/OFFSETS/BENDS**
- NOTE:** The Offset or 45° Bends must not be cut.
11. Insert the vertical flue terminal through the flashing from the outside.
 12. Measure the distance L between the inner flue tubes, or offset/bends (figs 1,2&3). Using the list below determine how many extension tubes are required.
- 1 extension - 850mm
2 extensions - 1700mm
3 extensions - 2550mm(straight flue only)

13. Any shortening of extension tubes must be carried out on the end which does not have the screw retaining the inner and outer tubes together.
14. Remove the screw retaining the inner and outer tubes together.
15. Measure the distance between the inner tubes and cut the inner tube to this length. Using the piece cut off the inner tube mark the same length to be cut from the outer tube, which will leave the inner tube approximately 15mm longer than the outer tube.
16. Replace the screws to retain the inner and outer tube together.
17. Starting at the appliance end assemble the extension duct sections and Offset or Bends (if used) making each join by butting the inner (flue) tubes and securing with a small maintenance clip, then fitting a large maintenance clip to bridge the gap between the sections of the outer (air) tubes.
18. After making the last joint to the flue terminal assembly ensure that the collar on the outlet tube is still fully located over the edge of the flashing plate to give a waterproof seal. (fig.1) Trim the last section of the extension if necessary.
19. Tighten all maintenance clips, make sure that the entire flue is adequately supported. Use at least one bracket Part No. 03 (G.C. No 301 105) for each extension used.
20. Continue with installation as detailed in these Installation and Servicing Instructions.

Dimensions in mm

Boiler	X	Y
Elidra	118	197

Fig. 5





G.R. Claudio (Vokèra) Ltd

Head Office and Accounts: Clarisham House, Morson Road, Enfield, Middlesex. EN3 4NQ Tel. 081 804 7202 Fax. 081 804 8163

Northern Region: Bowling Back Lane, Bradford, West Yorkshire BD4 8TS Tel. 0274 660314 Fax. 0274-660446

Scottish Region: Shuna Street, Maryhill, Glasgow G20 9NW Tel. 041-945 4944 Fax. 041-945-5136
