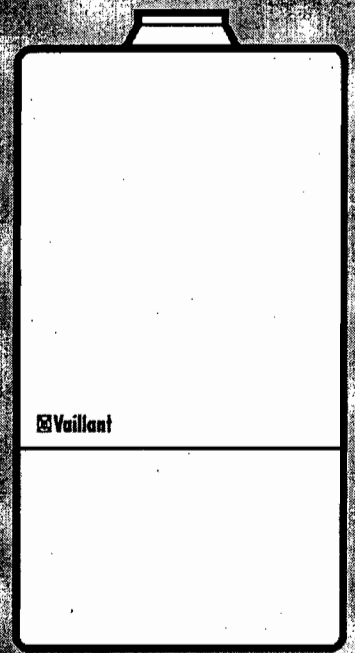
INSTRUCTIONS FOR INSTALLATION AND SERVICING

Wall mounted
COMBIcompact®
(open flued)
for central heating and instantaneous domestic hot water

This appliance shall be installed in accordance with the relevant Codes of Practice by British Gas or by an authorized installer (CORGI member)

These instructions should be left near the gas meter when the installation is completed.



VCW GB 240 XH
GC-No. 47 044 15

VCW GB 280 XH
GC-No. 47 044 16

Vaillant

HEATING, CONTROLS, HOT WATER.

Contents

CE

The COMBIcompact carries the "CE" Mark. This demonstrates that the boiler fulfils the essential requirements of the Gas Appliance Directive (Directive 90/396/EEC) and The Gas Appliances (Safety) Regulations 1992.

1 Introduction

The Vaillant gas-fired boiler is a wall-mounted open-flued appliance with built-in domestic hot water heater.

The boiler is **not** suitable for external installation.

Output ratings are shown in "Technical Data". The boiler is designed for use in a sealed system with pumped circulation.

Circulation pump, expansion vessel (for sealed system only), terminal box, control and safety devices are provided with the appliance.

The sealed system pressure relief valve is also provided.

Contact the manufacturer for information on open vented systems.

An automatic system bypass is included in the boiler.

If an inhibitor is to be used, contact an inhibitor manufacturer for their recommendations as to the best product to use.

The boiler contains a domestic hot water heat exchanger. The temperature in the heat exchanger is limited by the boiler control system and it is not normally necessary to install a scale reducer on the cold water mains inlet to the boiler. However, in exceptionally hard water areas to prevent scale formation in the property hot water system pipework a scale reducer may be fitted.

2 Technical Data

[1] For systems having a larger water capacity an additional expansion vessel can be installed easily.

[1] Higher D.H.W. flow temperatures can be obtained by adjusting the user selector (See user instruction).

We cannot accept responsibility for damage as a result of non-observance of these installation and servicing instructions.
Subject to alteration.

Type	VCW GB 240 XH	VCW GB 280 XH	Units
Nominal heating capacity	24 (81900) (86,4)	27.6 (94200) (99,4)	kW (BTU/h) (MJ/h)
Nominal heating input (based on gross C.V.)	31.2 (106400) (112.3)	35.4 (120820) (127.4)	kW (BTU/h) (MJ/h)
Main burner jet size for NG	16 x 7/150	16 x 7/150	number x mark.
Burner setting pressure Max rate Ignition rate	4.8 (1.9) 1.3 (0.5)	5.8 (2.3) 1.3 (0.5)	mbar (in W.G.)
Minimum water flow for heating system 20 °C rise	1030 (227)	1190 (262)	l/h (Imp. Gal./h)
Water capacity of appliance	4.1 (0.90)	4.1 (0.90)	l (Imp. Gal.)
Pump pressure available for central heating system	0.25 (8.4)	0.25 (8.4)	bar (feet)
Max. nominal flow temperature	90 (194)	90 (194)	°C (°F)
Max. total water capacity of heating system (cold[1]) for sealed system	90 (20)	90 (20)	l (Imp. Gal.)
Delivered gas Gross C.V. (s.t.) Gas consumption (s.t.)	G 20 37.8 (1014) 2.97 (1.75)	G 20 37.8 (1014) 3.37 (1.98)	 MJ/m³ (BTU/ft³) m³/h (c.f.m.)
Domestic hot water specification to British Standard Nominal output	24 (1365)	27.6 (1569)	kW (BTU/min)
Nominal temperature Minimum water pressure Flow rate (45 °C)	65 (149) 0.65 (9.4) 10.0 (2.2)	65 (149) 0.65 (9.4) 11.4 (2.5)	°C /°F) bar (P.S.I.) l/min. (gal/min)
D.H.W. temp rise[2] 10 l/min (2.2 gal/min) flow rate, approx. Water pressure required	35 1.6 (23.2)	40 1.6 (23.2)	(°C) bar (P.S.I.)
Min. water flow, approx. Water pressure required	3.5 (0.77) 0.3 (4.4)	3.5 (0.77) 0.3 (4.4)	l/min (Imp. G/min) bar (P.S.I.)
Max. water pressure	10 (145)	10 (145)	bar (P.S.I.)
Weight (approx.)	60 (132)	61 (135)	kg (pound)
Electric Voltage connection Input Internal Fuse / external Fuse	230–240 (~)/50 125 2 / 3	230–240(~)/50 170 2 / 3	V/Hz W Amp (slow)

3 Construction of appliance

1 Flue connection
2 Down draught diverter
3 Main heat exchanger
4 Combustion chamber
5 Main burner
6 Gas control unit with operator
9 Circulating pump
10 Hydraulically controlled diverter valve
11 Pressure gauge
12 Flow thermometer
17 Terminal box
18 Flow temperature selector
19 Fuses F 2A
20 Heat exchanger domestic hot water
23 Heating switch
24 Main switch
25 NTC sensor
26 Overheat cut-off sensor

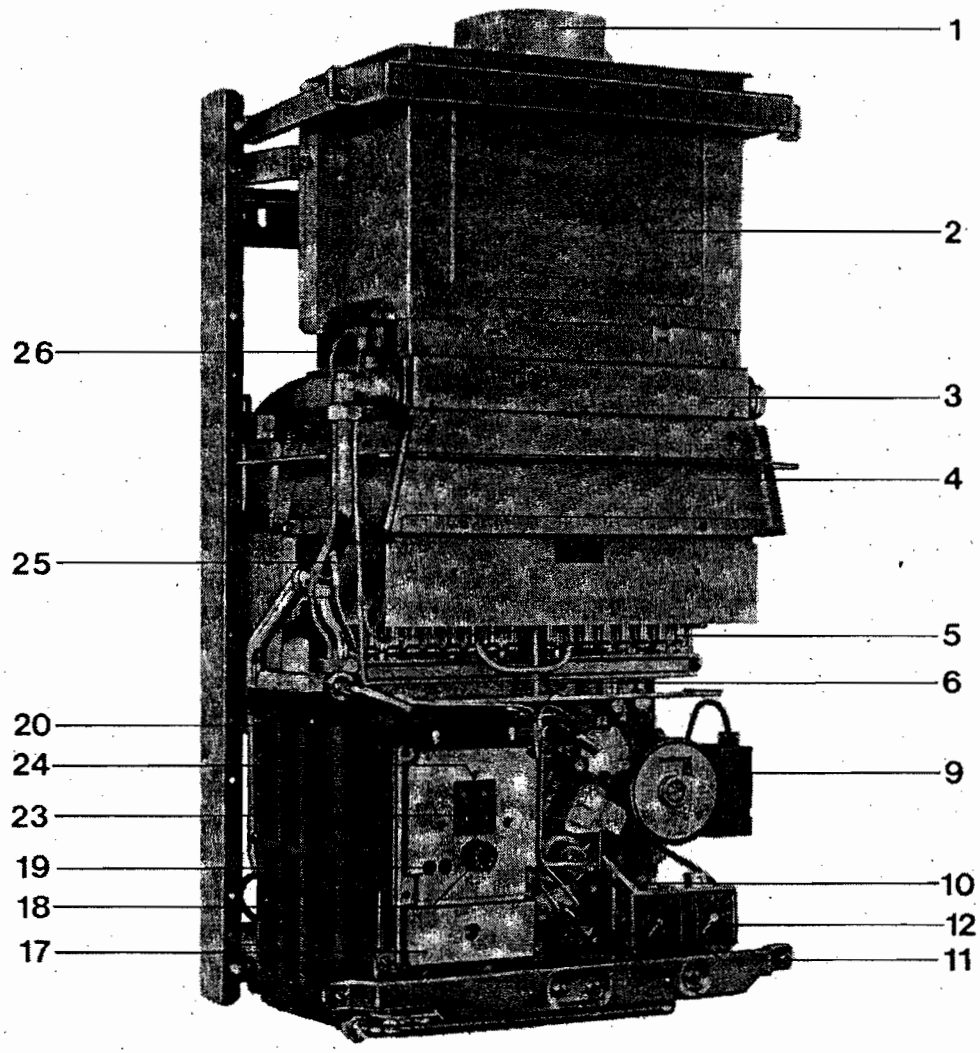


Fig. 1

The picture shows a VCW GB 240 H

4 Function

1 Flue connection
3 Main heat exchanger
4 Venting point
5 Combustion chamber
6 Automatic air vent
8 Burner
9 Gas section
10 Gas operator
11 C.H. expansion vessel pressure test point
12 C.H. expansion vessel
13 Circulating pump
14 Hydraulically operated diverter valve
15 C.H. pressure relief valve
16 Water section
17 Water section diaphragm
18 D.H.W. cold supply
19 Gas service cock
20 C.H. return service cock
21 C.H. system
22 C.H. flow service cock
23 Gas supply
24 D.H.W. outlet
25 System bypass
26 Servo control valve
27 C.H. thermostat
28 Electronic control box
29 D.H.W. exchanger
30 D.H.W. thermostat
32 N.T.C. flow sensor
33 Overheat cut off sensor
35 D.H.W. expansion vessel, if fitted
36 Thermoelectric F.F.D.
37 Flue spillage sensor

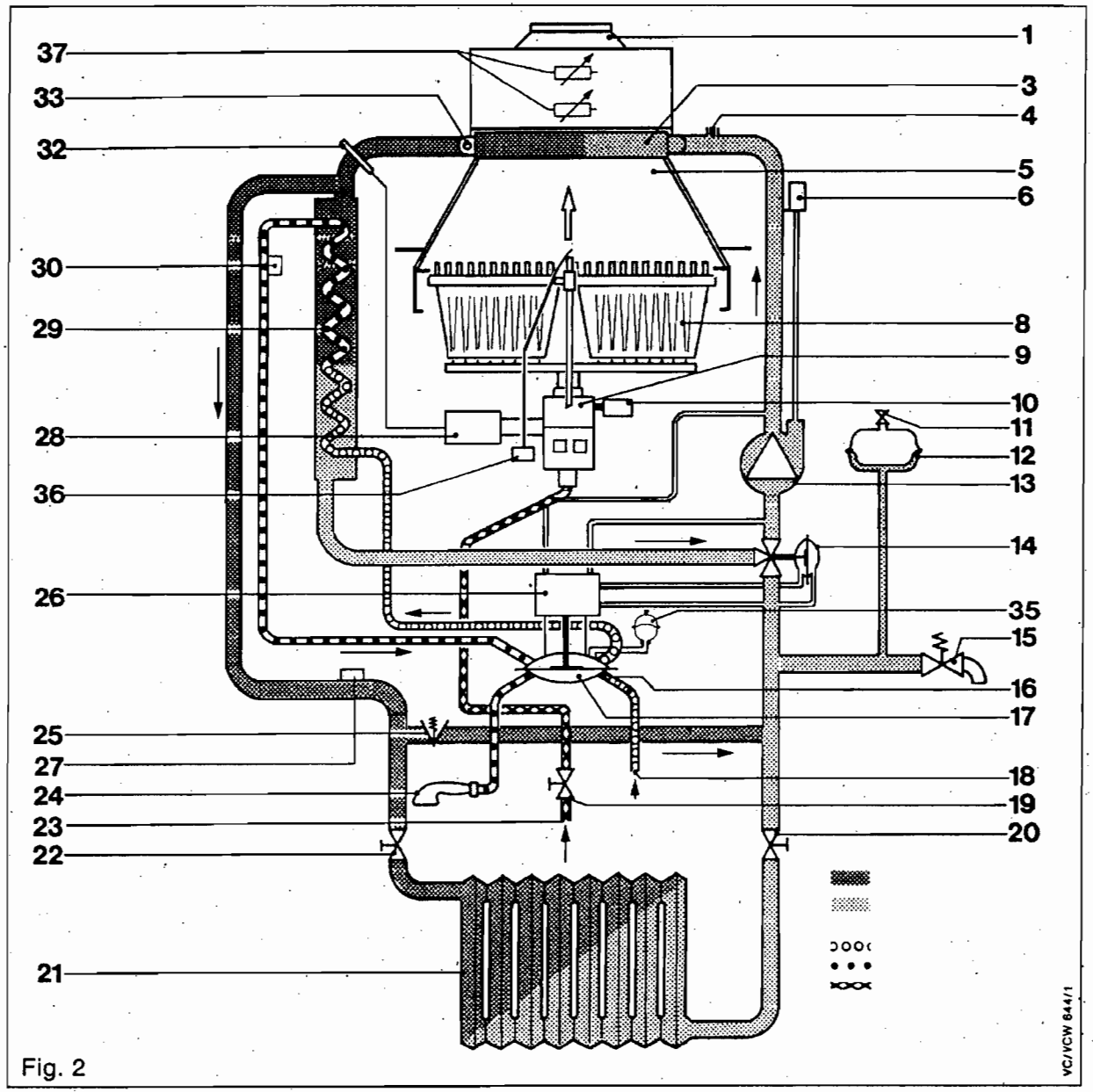


Fig. 2

5 General requirements

5.1 Related documents

The installation of the boiler must be in accordance with the relevant requirements of Gas Safety (Installations and Use) Regulation 1994*, current I.E.E. Wiring Regulations and the by-laws of the local Water-Undertaking. It should be in accordance with any relevant requirements of the Local Authority, Building Regulations, Building Standards (Scotland) Regulations and the relevant recommendations of the following British Standard Codes of Practice:

BS 6891: Installation of low pressure gas pipework of up to 28 mm (R 1) in domestic premises (2nd family).
BS 6798: Selection and installation of gas space heating (1. and 2. family gases). Boilers of rated input not exceeding 60kW.
BS 5449: Central heating for domestic premises.
Part 1: Forced circulation hot water systems.
CP 342: Centralized hot water supply.
Part 1: Individual dwellings.
Part 2: Buildings other than individual dwellings.
BS 5440: Flues and air supply for gas appliances of rated input not exceeding 60 kW (1. and 2. family gases).
Part 1: Flues
Part 2: Air supply.
BS 5546: Installation of gas hot water supplies for domestic purposes.

Unvented primary circuits may be filled or replenished by means of a temporary connection between the circuit and a supply pipe provided a "Listed" double check valve or some other no less effective backflow prevention device is permanently connected at the inlet to the circuit and the temporary connection is removed after use.

* Gas Safety (Installation and use) Regulation, 1994:

It is the law that all gas appliances are installed by competent persons, in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution. It is in your own interest, and of safety, to ensure that the law is complied with.

5.2 Location

The location chosen for the boiler must permit the provision of a satisfactory flue and adequate air supply. The location must also provide adequate space for servicing and air circulation around the appliance.

Important

This open-flued appliance must not be installed in a bathroom, bedroom or garage.

Where the installation of the boiler will be in an unusual location, special procedures may be necessary and BS 5546 and BS 6798 give 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 the purpose.

Details of essential features of cupboard/compartment design including airing cupboard installations are given in BS 6798.

5.3 Gas supply

The local gas region should be consulted at the installation planning stage in order to establish the availability of an adequate supply of gas.

An existing service pipe must not be used without prior consultation with the local gas region.

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 to ensure that it is capable of passing an additional 2.97 m^3/h (104.9 ft^3/h) before the VCW GB 240 H or 3.37 m^3/h (119 ft^3/h) before the VCW GB 280 H is installed.

Installation pipes should be fitted in accordance with BS 6891.

Pipework from the meter to the appliance must be of an adequate size. Do not use pipes of a smaller size than the appliance gas connection.

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

5.4 Electrical supply

Wiring external to the boiler must be installed in accordance with the current I.E.E. Regulations and any local regulations which apply.

The boiler is supplied for connection to a 230–240 V~, 50 Hz. Fuse rating is 3 A.

The boiler must be supplied via an unswitched socket outlet or isolator with 3 mm contact separation.

For wiring instructions see paragraph 10.

5.5 Flue system

Detail recommendations for fluing are given in BS 5440:1. The following notes are intended to give general guidance, only.

The cross sectional area of the flue fitted to the boiler must be not less than the area of the flue outlet of the appliance.

To facilitate servicing, the slip socket connector (fig. 17, pag. 21) must be fitted to ensure easy disconnection of the flue pipe.

Flue pipes and fittings should be constructed from one of the following materials:

a) Fibre Reinforced cement
b) Aluminium or stainless steel,
c) Cast-iron acid resistant vitreaous enamel lined.

If double-walled flue pipe is used it should be of a type acceptable to British Gas.

The adaptor supplied with the appliance is suitable for connection to round flue pipe complying with BS 567. If alternative flue pipe is used a suitable adaptor must be fitted.

If a chimney is used it preferably should be one that is composed of or lined with a non-porous acid-resistant material. (Chimneys lined with salt-glazed earthenware pipes are acceptable if the pipes comply with BS 65 and 540:1.) A flue pipe constructed from one of the materials in a) to c) above should form the initial connection to lined chimneys. Where a chimney is to be used which is not composed of or lined with a non-porous acid-resistant material it should be lined with a stainless steel flexible flue liner or any other liner that is of a type acceptable to British Gas. The internal diameter of the liner must not be less than shown in the technical data and should not have any joints.

If the flue liner is not to be connected directly to the boiler draught diverter a flue pipe which is constructed from one of the materials in a) to c) above should form the connection between the draught diverter and flue liner.

The flue must take the most direct route practicable and it should rise continously towards the terminal. Horizontal or very shallow runs should be avoided. A minimum of 600 mm (2 ft.) of vertical flue directly above the draught diverter should be provided wherever possible.

Before connecting the boiler to, or onserting a liner into, a flue that has been previously used, the flue must be thoroughly swept clean of any soot and loose material. If a register plate, restrictor plate, damper etc. is fitted in the flue, it must be removed before connecting the boiler to, or inserting a liner into, the flue.

The flue should terminate in accordance with the relevant recommendations given in BS 5440:1, table 4.

A terminal of a type that has been tested and found satisfactory by Brithish Gas should be fitted at the flue outlet.

The point of termination must not be within 600 mm (2 ft.) of an openable window, air vent or any other ventilation opening.

5.6 Air supply

Detailed recommendations for air supply are given in BS 5440:2. The following notes are intended to give general guidance.

5.6.1 Room or internal space air supply

The room or space in which the boiler is located must have a permanent air vent. This vent must be either direct to the outside air or to an adjacent room or internal space which must itself have a permanent air vent of at least the same size direct to the outside air. The minimum effective area of permanent air (vent(s) is specified below and is related to the maximum rated heat input of the unit.

Appliance	cm^2	$in.^2$
VCW GB 240 XH	109	17
VCW GB 280 XH	126	20

5.6.2 Cupboard or compartment air supply

Where the boiler is to be installed in a cupboard or compartment, permanent air vents are required in the cupboard or compartment at high and low level. These air vents must either be both direct to the outside air or both open to a room. Where the cupboard or compartment air vents are open to a room or internal space, this room or internal space must itself be provided with an air vent of at least the same size direct to the outside air.

5.6.3 Effect of an extract fan

If there is any type of extract fan fitted in the premises there is the possibility that if adequate air inlet area from outside is not provided spillage of the products from the flue could occur when the extract fan is in operation. Where such installations occur a spillage test as detailed in BS 5440:1 must be carried out and any necessary action taken.

		Air vent areas			
Pos. of air vents	appliance	Air from room or internal space		Air direct from outside	
		cm^2	(in^2)	cm^2	(in^2)
High level	VCW GB 240 XH	280	(43)	140	(22)
	VCW GB 280 XH	313	(48)	156	(24)
Low level	VCW GB 240 XH	561	(87)	280	(43)
	VCW GB 280 XH	625	(97)	312	(48)

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

5.7 Water circulating system

Detailed recommendations for the water circulation system are given in BS 6798, BS 5449:1 (for small bore and micro bore central heating systems) and CP 342. The following notes are of particular importance. Pipework not forming part of the useful heating surface should be insulated to help prevent heat loss and possible freezing, particularly where pipes are run through roof spaces and ventilated underfloor spaces.

Draining taps must be located in accessible positions which permit the draining of the whole system including the boiler and the hot water system. Draining taps should be at least ½ in. BSP nominal size and be in accordance with BS 2879.

The boiler is suitable for use with minibore or microbore systems.

It is recommended to use copper tubing to BS 2871:1 for water carrying pipework.

The use of horizontal pipe runs should be avoided wherever possible in order to prevent air collecting in the system. If horizontal runs are unavoidable the pipes should rise upwards towards a vent point.

For general guidance reference should be made to the British Gas publication.

— BRITISH GAS SPECIFICATIONS FOR DOMESTIC WET CENTRAL HEATING SYSTEMS — and to BS 6798 and BS 5449:1.

5.7.1 Single pipe system (Fig. 3)

The heat emitters are installed on a closed circuit. The necessary water quantity for every heat emitter (radiator) must be ensured. This can be done for instance by using suction fittings in the return connection of the radiators. The radiator sizes shall be calculated on the basis of temperature distribution around the circuit.

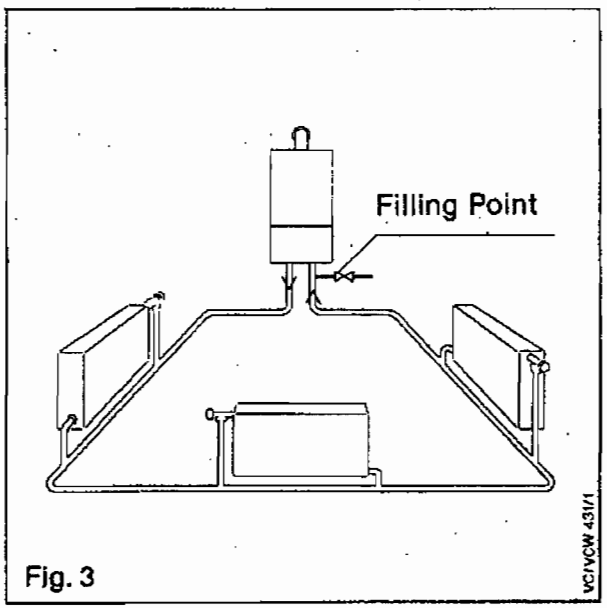


Fig. 3

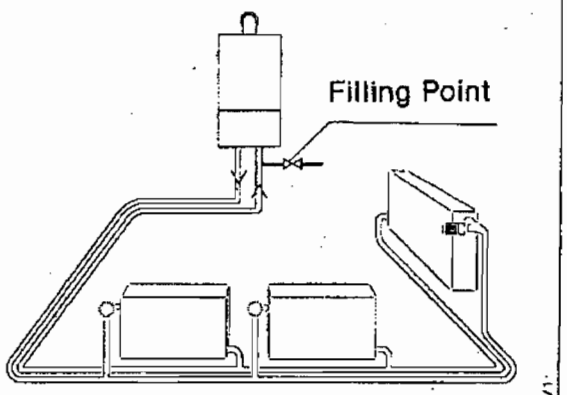


Fig. 4

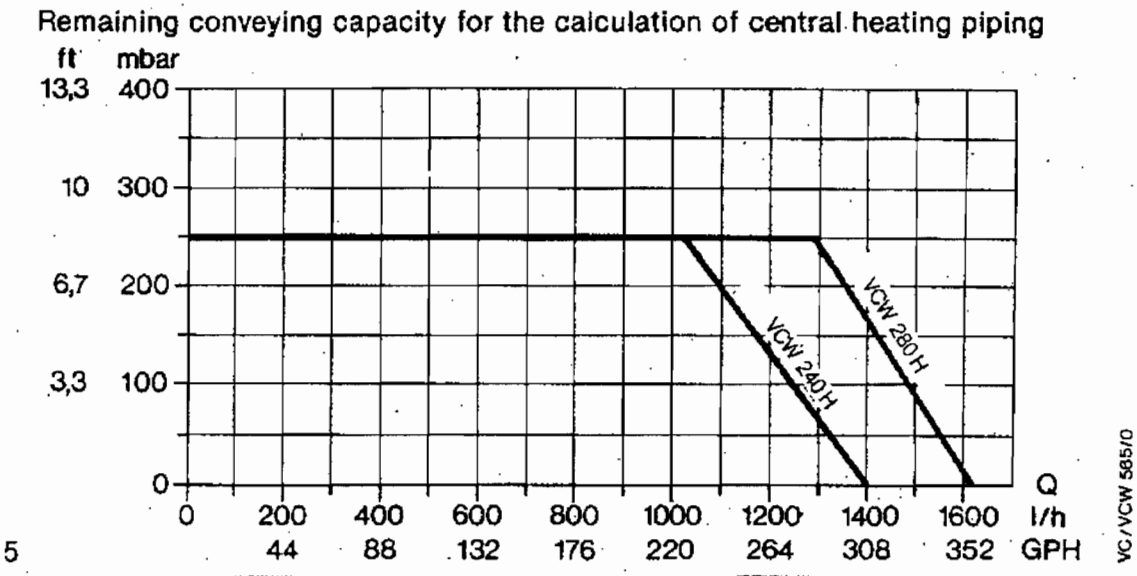


Fig. 5

N.B. The primary filling point may be placed at any convenient point on the circuit.

5.7.2 Two-pipe system (Fig. 4)

The radiators are installed parallel and the flow temperature therefore is the same for every radiator.

A typical central heating installation is shown in figure 4.

5.8 Circulating pump

The circulating pump is included into the boiler. The remaining conveying capacity can be taken from the diagram (Fig. 5).

5.9 System by-pass

An automatic system by-pass is included in the boiler. The boiler is suitable for use in systems with thermostatic radiator valves and no additional by-pass is required.

5.10 Open vented system

Refer to manufacturers for further details.

5.11 Sealed systems

Sealed systems do not require feed and expansion cisterns, open vents etc. Only good quality radiator valves and fittings should be used in order to prevent excessive detrimental topping-up.

5.11.1 Pressure relief valve

A pressure relief valve is provided ready-assembled to the return C.H. service cock (4, fig. 14). This safety device is required on all sealed C.H. systems and is pre-set at 3 bar. This is provided with a 3/4 in. BSP connection for a discharge pipe.

5.11.2 Pressure gauge

This is factory fitted to the boiler and indicates the primary circuit pressure to facilitate filling and testing.

5.11.3 Expansion vessel

An expansion vessel is incorporated into the boiler suitable for a sealed heating system with a maximum water content of 90 litres (20 Imp. galls.).

If the nominal capacity of the built-in expansion vessel is not sufficient for the heating system (for instance in case of modernization of old open systems) an additional expansion vessel can be installed external to the appliance in the return pipe as close as possible to the boiler in accordance with BS 5449: Part. 1.

Guidance on the sizing of additional expansion vessel sizing is given in Table A (p. 13).

5.12 Filling and make up (Fig. 6)

The system should be filled with water via a separate filling point fitted at a convenient point on the heating circuit. Where local Water Authority Regulation allows, a temporary connection to the mains may be used. The connection must be removed when filling is completed. Where local Water Authority Regulation does not allow temporary connection, a sealed system filler pump with break tank must be used. **The heating system will not be filled automatically from the domestic side.**

In principle, sealed systems do not require water make-up facilities, but experience has shown that some make-up may be necessary.

Methods of filling sealed systems are given in appendix A of BS 6798 and BS 5449: Part.1.

5.13 Parallel installation

If two appliances are installed in parallel for one heating system, it is essential to install one nonreturn valve each in the heating system flow pipe of the appliances.

Refer to manufacturers for further details.

5.14 Gas and water connection

A general view of pipework for gas and water connection is given in Fig. 7.

The wall distance (to the finished wall) of pipework for gas and heating system is 50 mm and 35 mm for domestic water pipework.

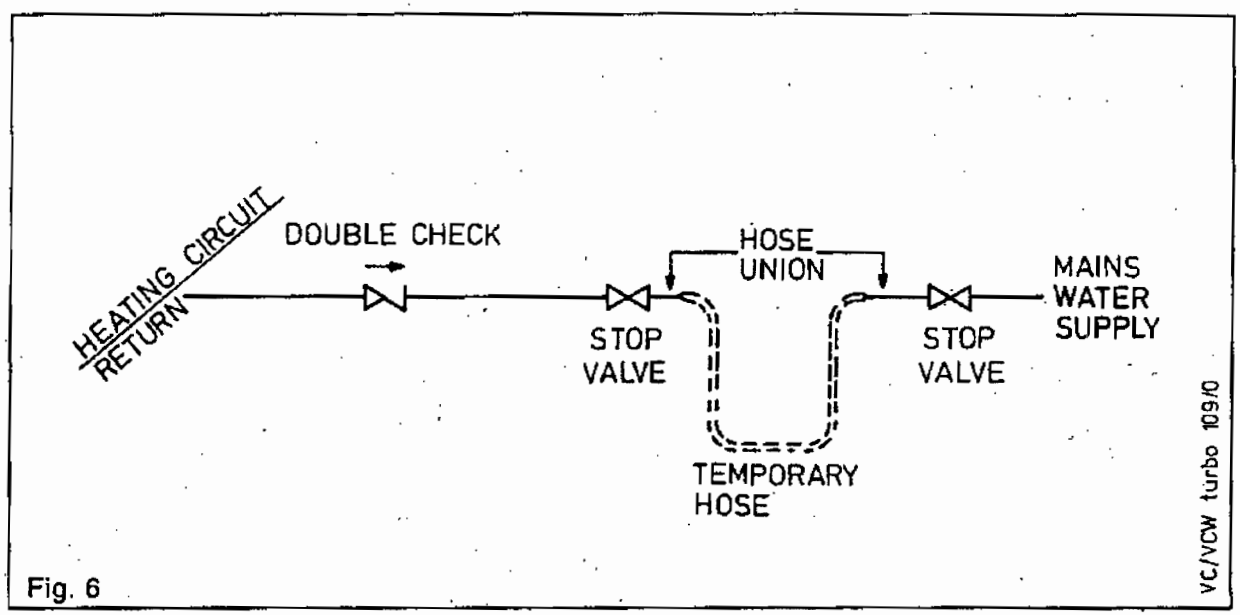


Fig. 6

5.15 Venting

The appliance is fitted with an automatic air vent. Additional provision should be made to enable the heating system to be vented during filling and commissioning either by automatic air vents or manually. Hydroscopic types of automatic air vents should not be used on a sealed system as these allow evaporation of small quantities of water.

5.16 DHW expansion vessel accessory

A DHW expansion vessel kit is available as an optional extra from Vaillant Ltd. This expansion vessel kit should be fitted to the boiler whenever either a stop valve of the loose jumper type or a non return valve are present in the cold water mains supply to the boiler (fig. 6.1).

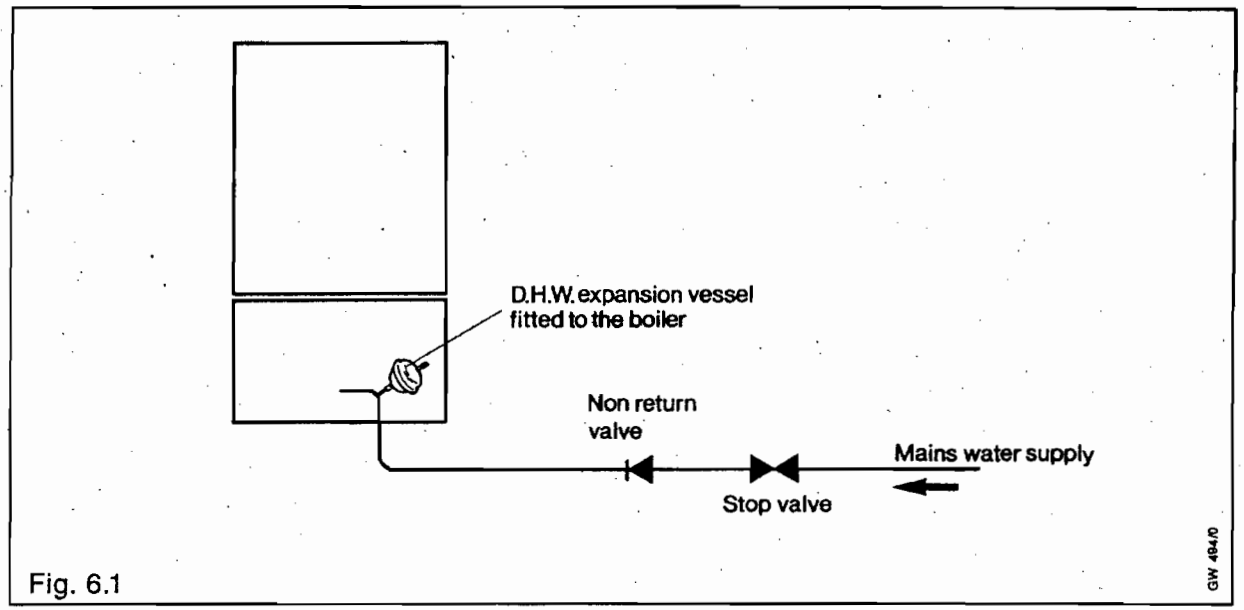


Fig. 6.1

1 Connection support bracket
2 Service cock (flow of heating system)
3 Domestic hot water connection
4 Compression union (gas)
5 Gas service cock (supplied with the boiler)
6 Cold water connection with shut-off valve
7 Service cock (return of heating system)
8 Discharge pipe
9 Pressure relief valve
10 Compression union (return of heating system)
11 Compression union (flow of heating system)
23 Frame of appliance (lower connection)

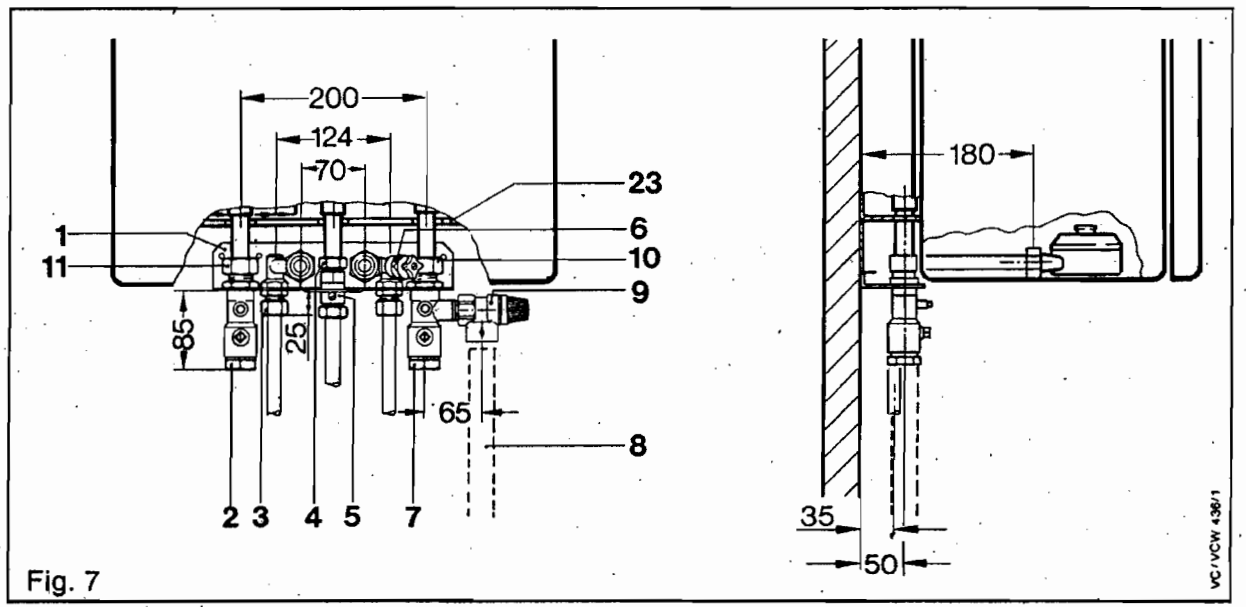


Fig. 7

Table A **Sizing of additional expansion vessels:**

Safety valve setting (bar)	3,0								
Vessel charge pressure (bar)	0,5				1,0			1,5	
Initial system pressure (bar)	0,5	1,0	1,5	2,0	1,0	1,5	2,0	1,5	2,0
Total water content of system	Expansion vessel volume (litres)								
litres									
25	2,1	3,5	6,5	13,7	2,7	4,7	10,3	3,9	8,3
50	4,2	7,0	12,9	27,5	5,4	9,5	20,6	7,8	16,5
75	6,3	10,5	19,4	41,3	8,2	14,2	30,9	11,7	24,8
100	8,3	14,0	25,9	55,1	10,9	19,0	41,2	15,6	33,1
125	10,4	17,5	32,4	68,9	13,6	23,7	51,5	19,5	41,3
150	12,5	21,0	38,3	82,6	16,3	28,5	61,8	23,4	49,6
175	14,6	24,5	45,3	96,4	19,1	33,2	72,1	27,3	57,9
200	16,7	28,0	51,8	110,2	21,8	38,0	82,4	31,2	66,2
225	18,7	31,5	58,2	124,0	24,5	42,7	92,7	35,1	74,5
250	20,8	35,0	64,7	137,7	27,2	47,5	103,0	39,0	82,7
275	22,9	38,5	71,2	151,5	30,0	52,2	113,3	42,9	91,0
300	25,0	42,0	77,7	165,3	32,7	57,0	123,6	46,8	99,3
325	27,0	45,5	84,1	179,1	35,7	61,7	133,9	50,7	107,6
350	29,1	49,0	90,6	192,8	38,1	66,5	144,2	54,6	115,8
375	31,2	52,5	97,1	206,6	40,9	71,2	154,5	58,5	124,1
400	33,3	56,0	103,6	220,4	43,6	76,0	164,8	62,4	132,4
425	35,4	59,5	110,1	239,2	46,3	80,7	175,1	66,3	140,7
450	37,5	63,0	116,5	247,9	49,0	85,5	185,4	70,2	148,9
475	39,6	66,5	123,0	261,7	51,8	90,2	195,7	74,1	157,2
500	41,6	70,0	125,9	275,5	54,5	95,0	206,0	78,0	165,5
For system volumes other than those given above, multiply the system volume by the factor across	0.0833	0.140	0.259	0.551	0.109	0.190	0.412	0.156	0.331

The volume of the expansion vessel found from the above table, should be multiplied by 0,9 to take into account the flow temperature.

6 Dimensions

appliance	B	B 1	C
VCW GB 240 XH	136	125	Ø 15
VCW GB 280 XH	136	125	Ø 25

(all dimensions in mm)

1 Flue connection
2 Appliance bracket
3 Heating system return ¾" Rp (¾" B.S.P.)
4 Cold water connection (15 mm)
5 Gas connection
6 Hot water connection (15 mm)
7 Heating system flow ¾" Rp (¾" B.S.P.)
8 Inlet bushings in the terminal box for external connections
9 Compartment with terminal block
10 Wall outlet of electrical connections
12 Pre-assembled connection set with service cocks (flow and return) pressure relief valve, cold and hot water connection
13 Pressure relief valve ¾" Rp (¾" B.S.P.)

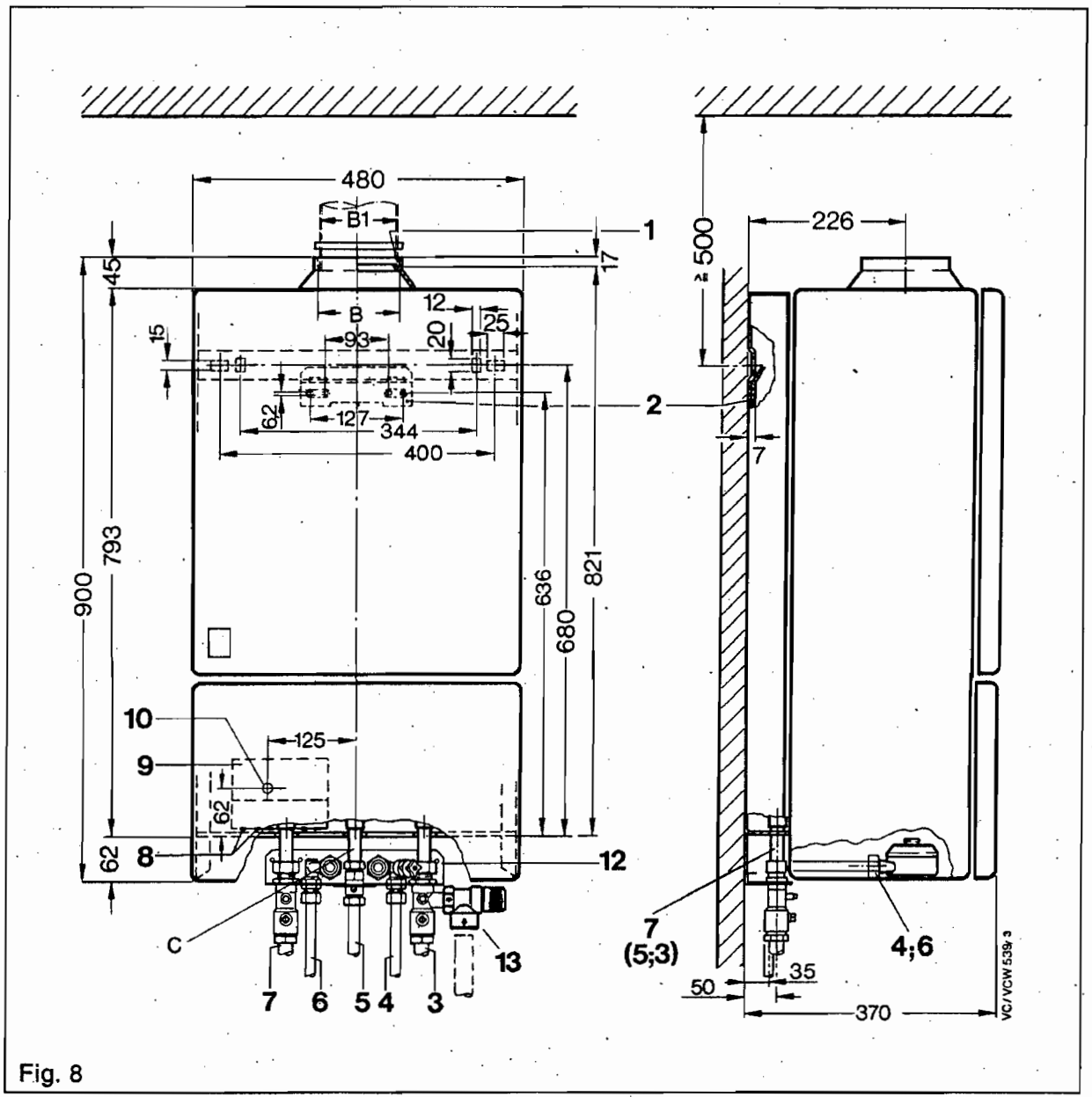


Fig. 8

7 Installation of the boiler

7.1 General

The boiler is to be wall-mounted and a vertical flat area of wall is required in a position which permits the provision of a suitable flue system as described in 5.5.

The wall must be of sufficient area for the boiler together with clearances for installation and servicing. The template provided includes these clearances which are:

* 80 mm (3.2 in.) either side of the boiler
* 150 mm (6 in.) below the boiler

Note:
A clearance of 25 mm either side of the boiler will allow the safe and correct functioning of the appliance and also allow all servicing and repair operations except for the replacement of the main heat exchanger. The replacement of this component will require a side clearance of 80 mm either side of the boiler which may be catered for by allowing removal of kitchen units etc.

Sufficient clearance above the boiler flue connection must be provided to permit the installation of the slip socket flue pipe connector (see 5.5). This flue connector is essential in order to permit disconnection of the flue from the boiler to carry out servicing operations on the boiler. Additional clearances than these given above may be necessary for installation. As this varies from site to site, it is left to the discretion of the installer.

If the appliance is to be fitted on a wall of combustible material, the wall must be protected by a sheet of fire proof material.

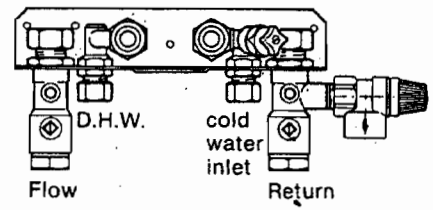
Accessories	Order no.	
1) Pre-assembled connection group set incl. isolating valves (flow and return), pressure relief valve, cold and hot water connections (supplied with the boiler)	9313	

Fig. 9

In addition, a minimum clearance of 500 mm (20 in.) must be available at the front of the appliance to enable the combi boiler to be serviced.

IMPORTANT NOTICE

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

7.2 Installation accessories

The connection accessories for the connection of the boiler are listed in the fig. 9.

8 Delivery

The Vaillant boiler is delivered in two packages:

the cased boiler (item 1, fig 10).
pre-assembled installation set (order-no.: 9313)

The foam packing shells (2) contain the following:

a) Upper front panel (3)
b) Door panel (4) and screen plate (4a)
c) Installation instructions and user instructions (5)
d) Gas service cock
e) Wall bracket with fixing screws, wall plugs and 2 x 22 mm nuts and olives
f) The appliance (8)
g) template
h) flue adaptor

Note: Lift boiler by the appliance frame

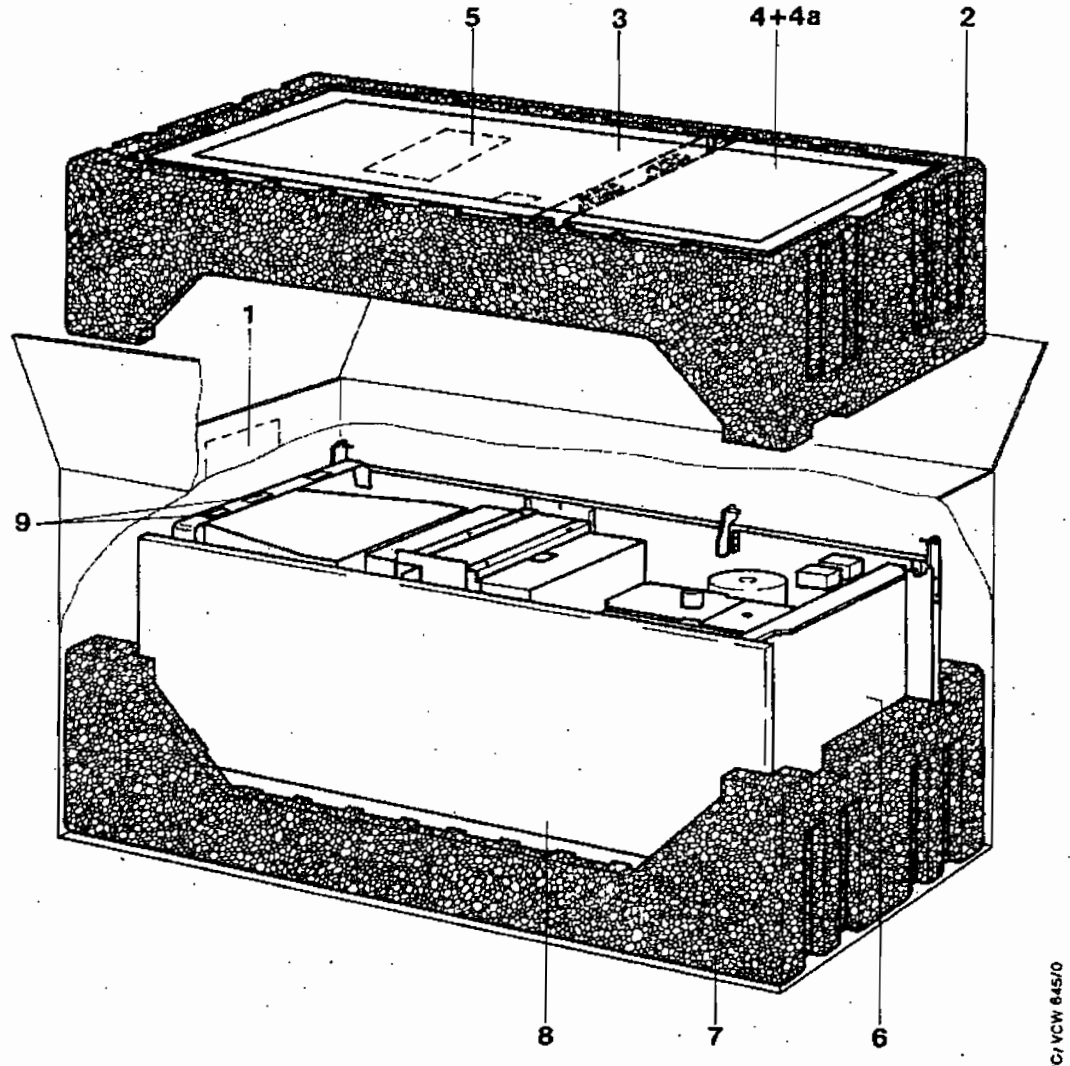


Fig. 10

Check on the data plate (9) the appliance is the correct model for the gas supply.

9 Installation sequence

Using the template (Fig. 11)

— Fix the template onto the selected position.

  Check with a plumb line that the centre-line (℄) of the template used is vertical. The template shows the appliance with necessary clearance around for servicing and air circulation.

  Before proceeding check the following:

— that a suitable flue system can be provided in accordance with section 5.5.

  Install a suitable permanent air supply to the appliance in accordance with section 5.6

— Drill two holes (2) out of four fixing the appliance bracket as marked on the template with 8 mm (5/16 in.) diameter.

— Drill three holes with 8 mm (5/16 in.) diameter (3) out of seven to fit the connecting group. Use the alternative fixing holes where necessary.

— Remove the template from the wall and fit the mounting bracket in position (2) and the connecting group in position (3) using the wall plugs and screws provided ensuring both brackets are level.

If the condition of the wall is poor, additional or alternate screw fixings will be required to ensure adequate support.

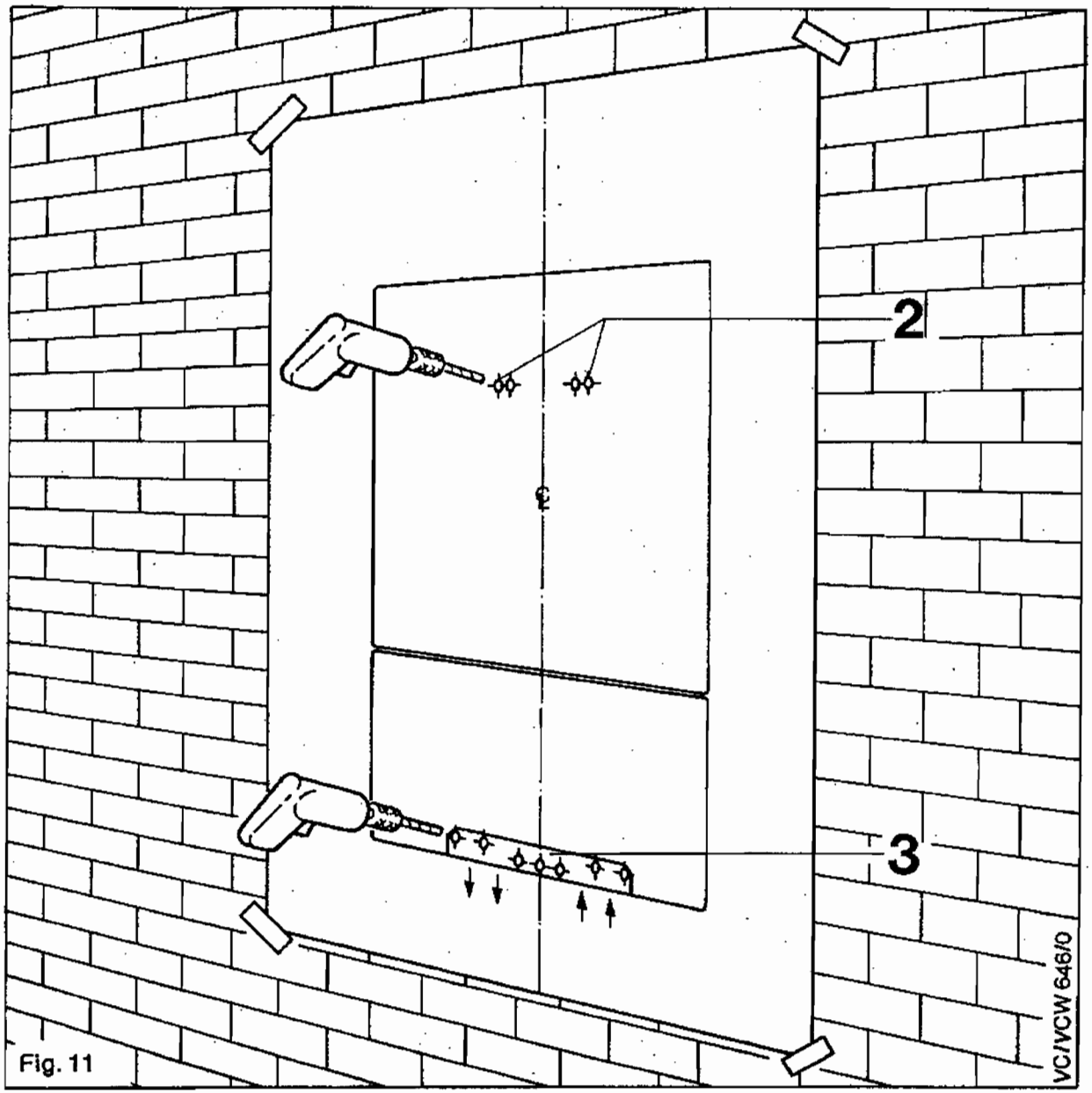


Fig. 11

9.1 Domestic cold and hot water connection

Note:

When the appliance is fitted, some adjustment of the position of the domestic hot and cold water connection fittings on the connection set may be necessary in the horizontal plane (e.g. movement up to 3 mm (0.12 in.) out from the wall). If the intended pipework cannot accommodate this movement, do not make the final domestic hot and cold water pipe connections to the connection set until after the appliance has been fitted.

— **Flush out all foreign matter from the supply pipe before connecting to the connection set.**

— Fit the 15 mm domestic mains water inlet pipe to the right hand compression union (2) and the 15 mm hot water outlet pipe to the left hand compression union (3).

In hard water area the cold water mains supply should be via a scale reducer.

— Check domestic water system for soundness.

N.B.
The boiler has a maximum domestic water working pressure of 10 bar. A pressure relief valve is fitted to the D.H.W. system which is set at 10 bar. If water pressure exceeds this value a pressure reducing valve will have to be fitted to the cold water inlet.

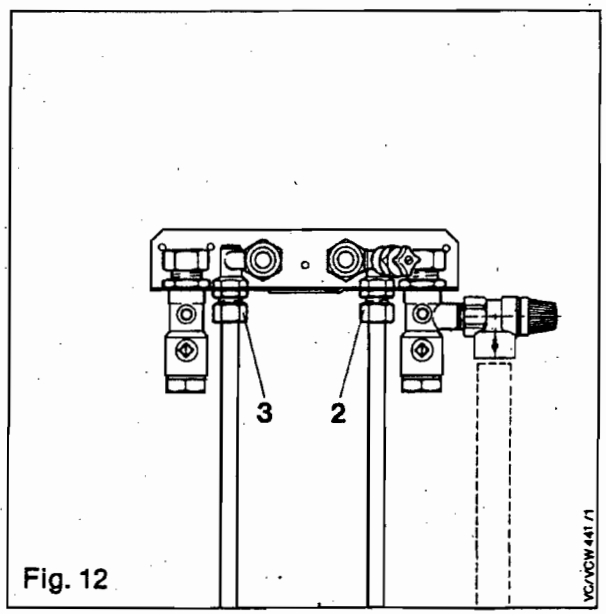


Fig. 12

9.2 Connection of heating system

Flush out all foreign matter from the flow and return pipe before connecting to the connection set.

Heating system flow and return should be connected to the connection set as shown in Fig. 13 via ¾" B.S.P. adaptors.

Fill the heating system and test for soundness.

9.3 Pressure relief valve and overflow

The pressure relief valve (4), required for a sealed system, is included in the connection set 9313.

15 or 22 mm pipe should be connected to the pressure relief valve via a ¾" B.S.P. adaptor and the pipe must be routed to a position outside the building such that any discharge of water or steam from the valve cannot create a hazard to occupants or damage to any external electrical components or wiring. The discharge pipe must have a slight continuous fall towards the outside of the building.

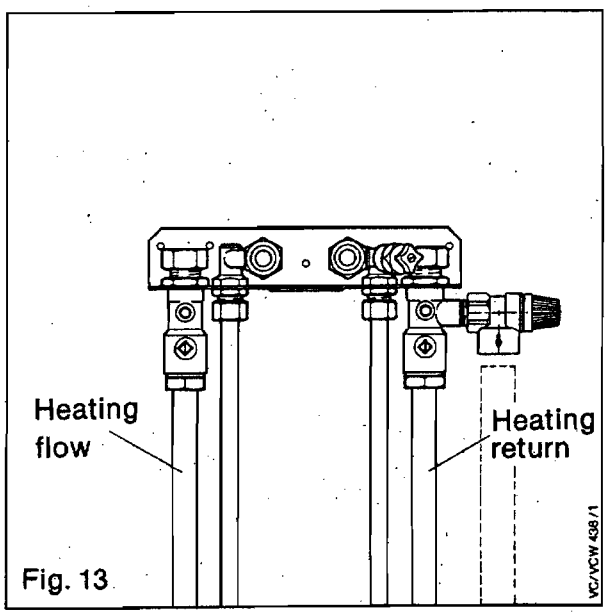


Fig. 13

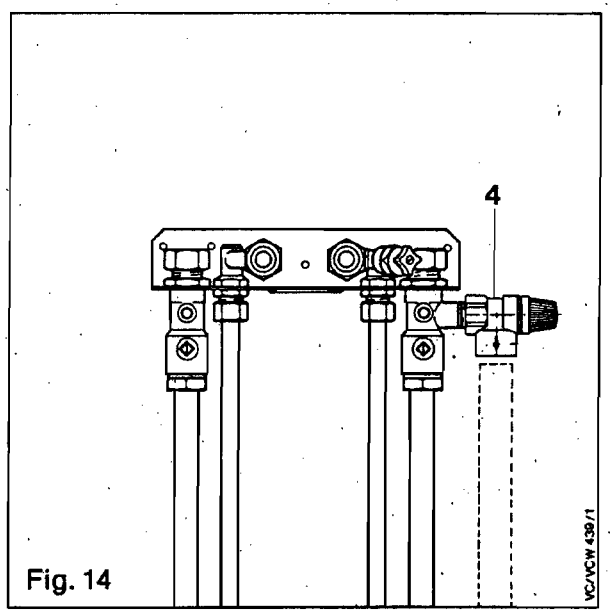


Fig. 14

9.4 Fitting the appliance

Close service cocks (5), unscrew union nuts (6) and take off the olive-shaped plastic plugs.

Close mains water service cock (8) and unscrew the union nuts (9), discard plastic plug.

Take care not to lose sealing washers.

Unpack boiler from carton and remove side panels (as in fig. 33) and packing aids as well as plastic caps from the connections.

Push union nuts (6) and compression rings (7) onto the C.H. flow and return pipes of the appliance. Temporarily secure nuts and rings well clear of the ends of the pipes with tape. Mount the appliance by inserting the connection tubes into the C.H. service cocks on the connection group and hang the appliance with the crossbar (2) onto the appliance fixing bracket (3).

Loosen the back nuts securing the domestic hot and cold water connection fittings on the connection group bracket to permit movement.

Align domestic hot and cold water connections to the appliance, fit sealing washers and tighten union nuts (9). Retighten back nuts. Complete the final 15 mm pipe connections to the connection group if not already carried out in section 9.1.

Remove tape and tighten union nuts (6).

9.5 Gas connection

Fit the gas service cock (5) to the appliance.

Ensure the gas service cock is fully located on the appliance and the ON/OFF control is accessible.

Clean out all foreign matter from the gas supply pipe before connecting to the service cock!

Connect the gas supply pipe to the service cock and tighten.

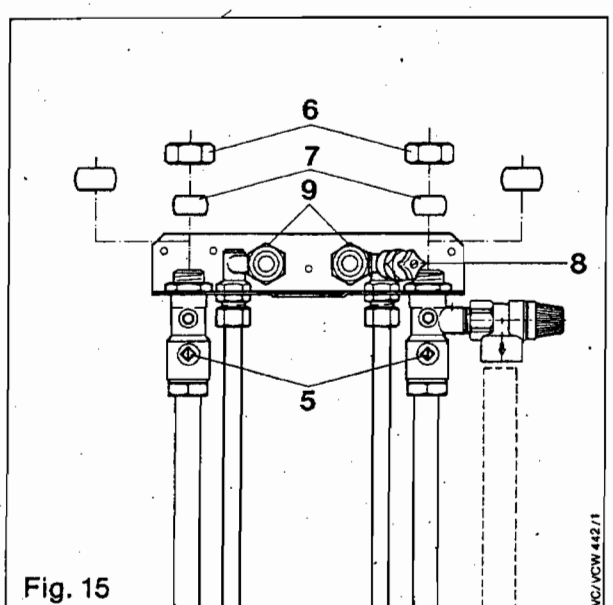


Fig. 15

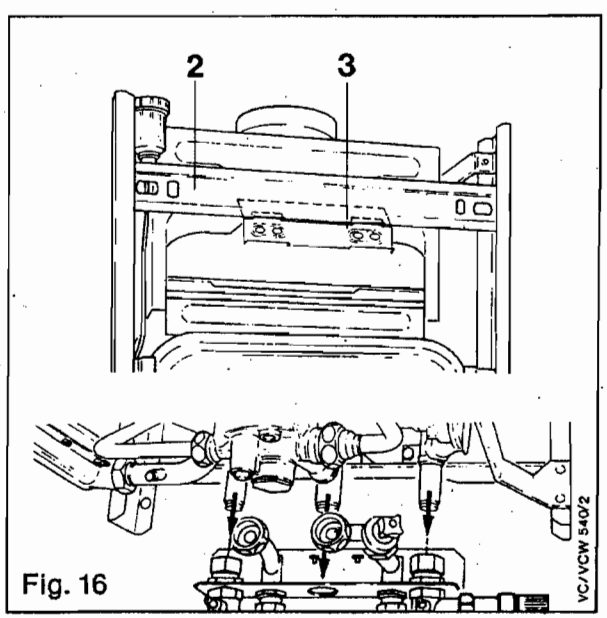


Fig. 16

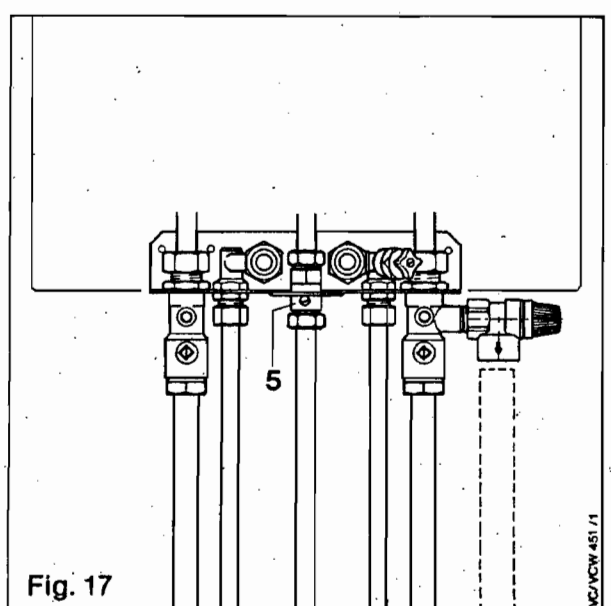


Fig. 17

9.6 Flue connection (open flued)

Fit the flue connector provided into the draught diverter. Insert the flue into the top of the connector.

To facilitate servicing the flue connector must be fitted to ensure easy disconnection of the flue (see 5.5)

9.7 Flue spillage sensor

These Vaillant open flued central heating boilers are fitted with a flue spillage sensor. In the event that flue gases are not properly drawn into the flue system the flue spillage sensor will automatically shut down the appliance.

If the boiler shuts down for any reason, operation will be prevented for between 15 and 20 minutes. After 20 minutes it will be possible to use the appliance in accordance with the instructions for use.

IMPORTANT

If the appliance repeatedly shuts down **do not** use it and consult your qualified installer or service engineer.

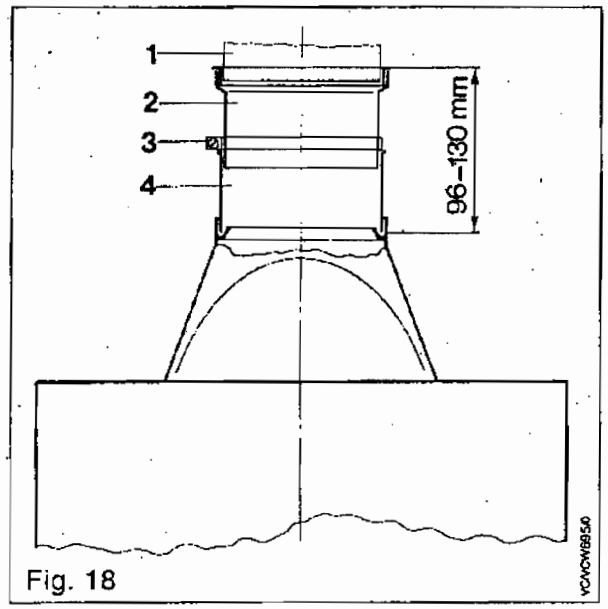


Fig. 18

The figure shows the VCW GB 240 H

1 Flue pipe
2 Flue connector
3 Clamp ring
4 Flue connector

10 Electrical installation

Vaillant boilers are completely wired. It is only necessary to connect to the electrical mains and the room thermostat. Connect to a 230–240 V(~), 50 Hz electrical supply fused 3 A.

Warning! This appliance must be earthed.

The method of connection to the electricity supply must facilitate complete isolation and should preferably be via a fused, threepin plug and unswitched, shuttered socket, both complying with the requirements of BS 1363. Alternatively, connection may be made via a fused, double-pole isolator having a contact separation of at least 3 mm in all poles and supplying the boiler and system controls only.

When connecting the power-supply cord, ensure that the length of the wires is such that the current-carrying conductors become taut before the earthing conductor should the cord slip from the cable clamp.

After removing the terminal box cover (1) connect the mains with the wire coloured blue to the terminal 1 (N) and the wire coloured brown to the terminal 2 (L) and the earth-wire coloured green and yellow to the terminal marked ⏚.

A 3 core flexible cord according BS 6500 tables 6, 8 or 16 (3 x 0,75 to 3 x 1,5 mm²) should be used. A cardboard label showing the correct mains connection to the terminals is in the terminal box.

Do not connect the electrical main supply to the terminals 7, 8, 9!

Use the first left-hand cable clamp for the power supply cord.

Full wiring diagrams for various control schemes are shown in fig. 20–25. Take care that the cords to the terminal box can not touch the hot water pipework, otherwise cords having a minimum appropriate T-rating of 90 shall be used. In the event of an electrical fault after installation, preliminary system checks i.e. earth continuity, polarity, resistance to earth shall be carried out as detailed in the B.G. Multimeter Instruction book.

List of terminals

Terminals	Connection
1, 2	Mains
3, 4	Room thermostat (230–240 V~)
5	Neutral for ext. controls (230–240 V~)
7, 8, 9 (20 V only)	N/A MUST NOT BE USED
10, 11, 12	

1 Terminal box cover
2 Screw
3 Terminal strip
4 Earth connection
5 Cable grip
6 Cable grommet
7 Switch box
8 Screws
9 Screws
12 Fuses F 2 A
13 Pilot lamp "Operatur on"
14 Pilot lamp "Diaphragm pump on"
15 Fuse (160 mA)

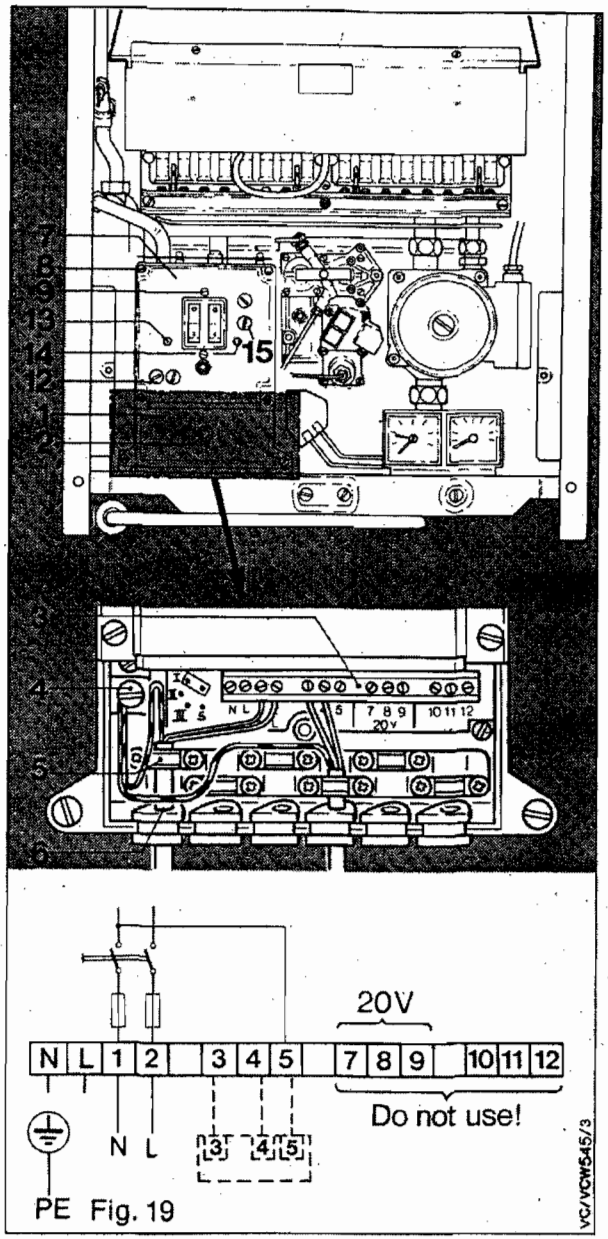


Fig. 19

10.1 Connection of Vaillant room thermostat (VRT 378)

Connection of room thermostat is made to the terminals 3 and 4. It is recommended to install a Vaillant room thermostat (VRT) with accelerating resistance (terminal 5). The room thermostat must be installed on an inner wall which is influenced neither by current of air nor by sun, in the living room. During the installation of the room thermostat the manufacturer's instructions must be followed. For the sake of economy and comfort the Vaillant boiler should be regulated by a room thermostat with accelerating resistance. If the room thermostat is not connected, to operate the heating system for testing purposes after the installation, the unit can be operated by provisional application of a bridge between the terminals 3 and 4. When the room thermostat is wired in this bridge must be removed.

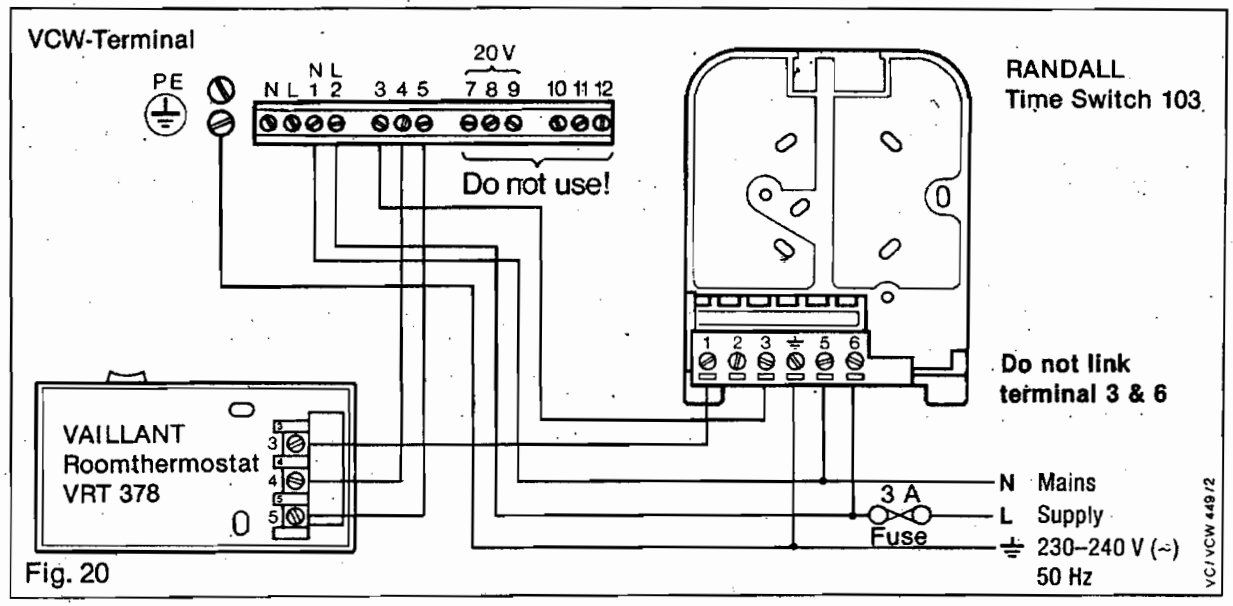


Fig. 20

10.2 Thermostatic radiator valves

Where TRV's and a clock are used the switching side of the clock is connected between terminals 3 and 4.

Where no clock is used a wire bridge must be inserted between terminals 3 and 4.

Set pump control to position II.

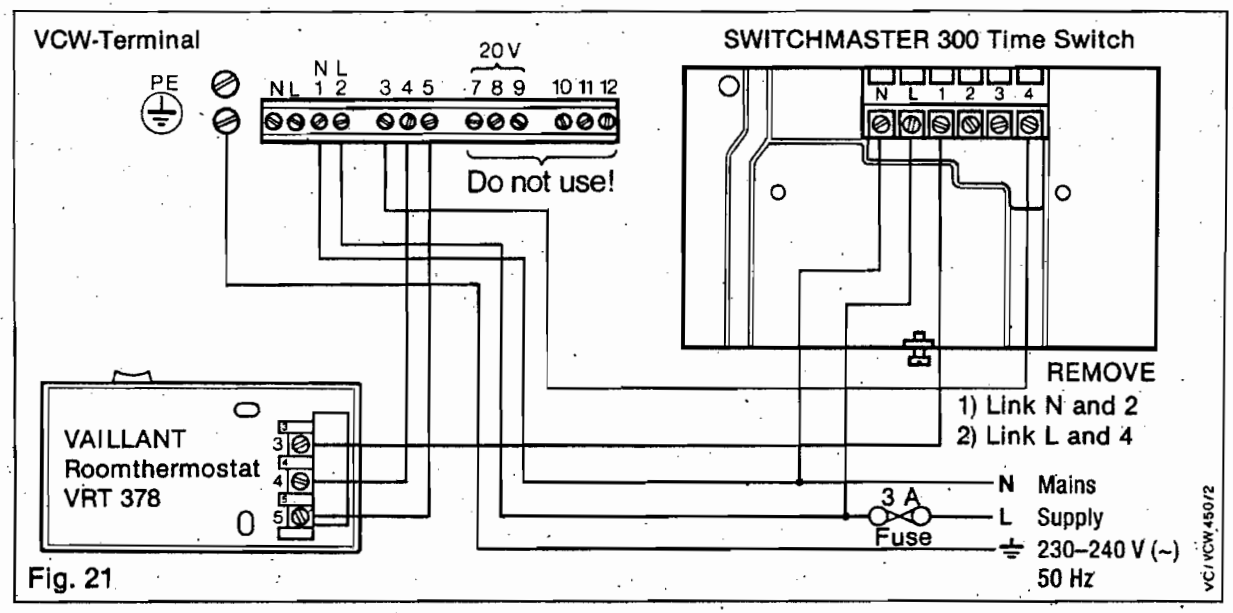


Fig. 21

Frost Protection

If a frost thermostat is fitted then it should be connected in parallel across terminals 3 & 4 on the boiler.

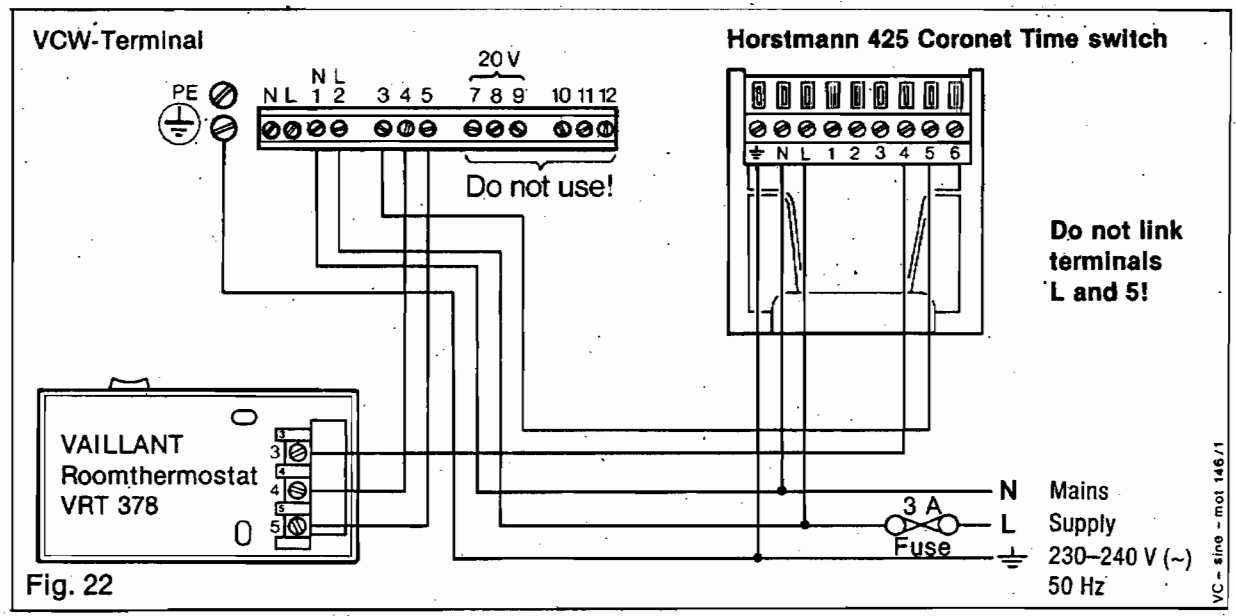


Fig. 22

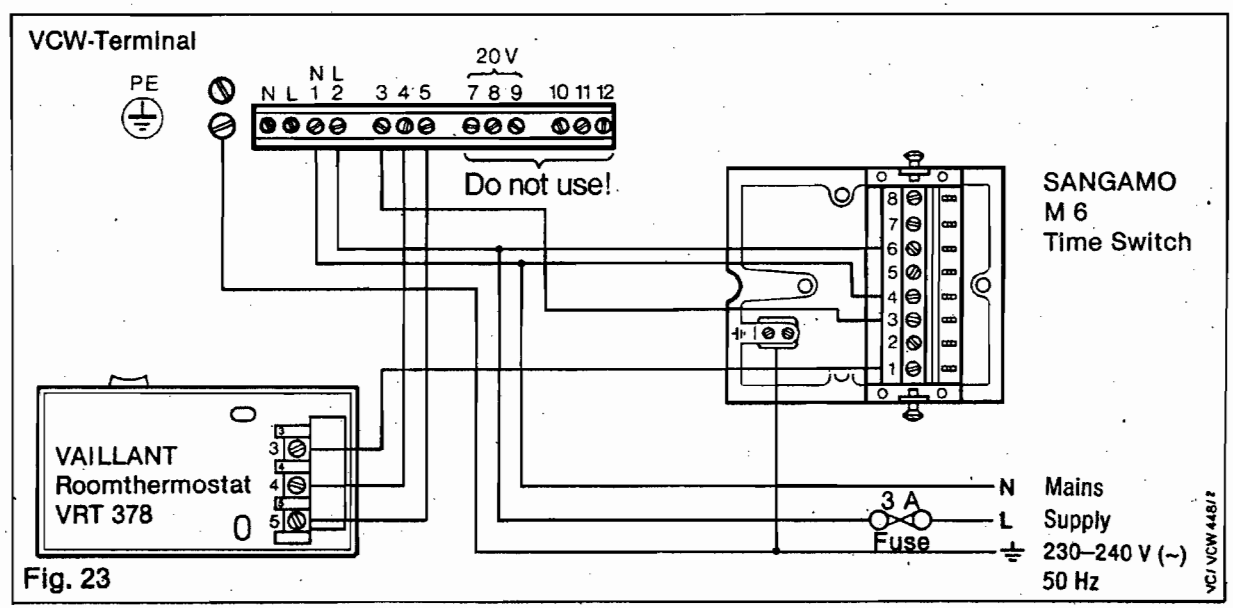


Fig. 23

CALOTROL - VRT 394

The Vaillant Room thermostat CALOTROL - VRT 394 includes a timer. The CALOTROL can operate in one of two modes.

A) Automatic temperature setback (Fig. 24) or
B) ON/OFF operation (Fig. 25)
with room temperature control.

CALOTROL - VRT 394 Timed Automatic set-back operation

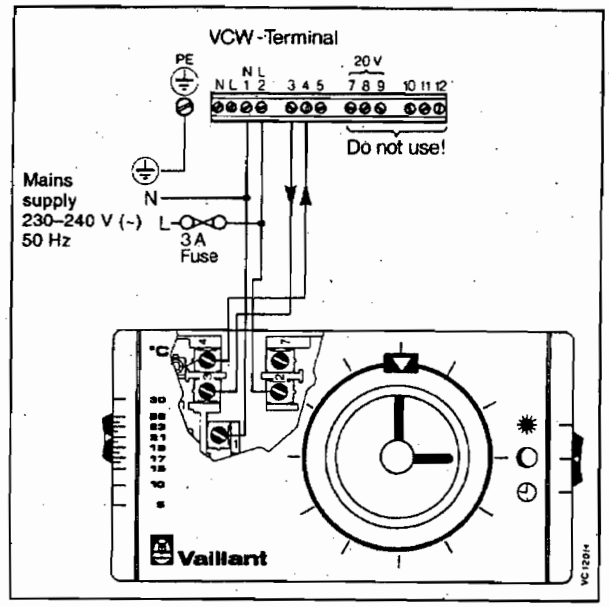


Fig. 24

CALOTROL - VRT 394 ON/OFF operation and room temperature control

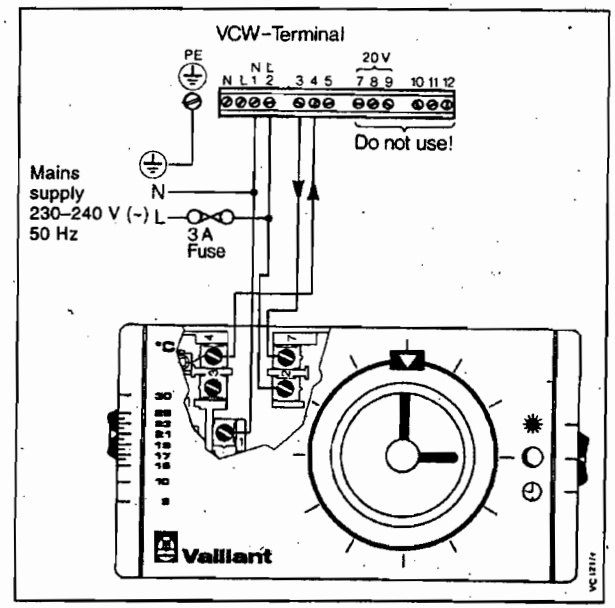


Fig. 25

10.3 Operating modes of the system water circulating pump

In the factory, the heating system pump is set to operating mode (I) (electrical connection to contact I — see fig. 26).

By resetting the plug (1) to contacts I, II, III or S the following operating modes of the circulating pump become possible.

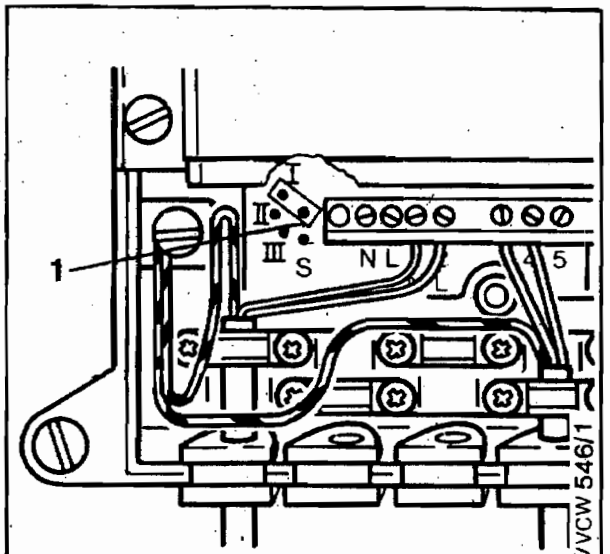


Fig. 26

Connection to:

Contact I: (as supplied)	The pump is controlled by the room thermostat (only when connection is made across terminals 3 and 4).
Contact II:	The pump is controlled by the flow thermostat (electronic) only. After switching off the burner by the control, a pump over-run device will leave the pump running for about 20 seconds.
Contact III:	The pump runs continously as long as the heating switch is on.
Contact S: (if fitted. This control is identified by the marking HY on the control box front cover)	The same as contact II but, after switching off the burner by the control, a pump over-run device will leave the pump running for about 5min (factory setting).

10.3.1 Reignition delay for the heating system

The appliance control incorporates a reignition delay to prevent rapid on-off cycling of the burner in the C.H. mode. This delay is factory set to 5 minutes.

On appliances which use a control box marked HY on the front cover, it is possible to change the re-ignition delay if necessary.

Remove the screw (2) to adjust the potentiometer, which is behind the screw.

Adjustment range: about 1-12 minutes.

If the time has been changed the over-run of the pump (connection S) will be also changed accordingly.

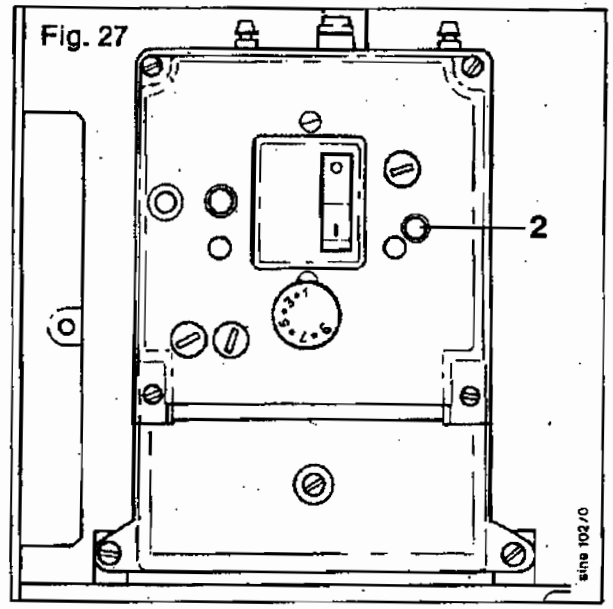
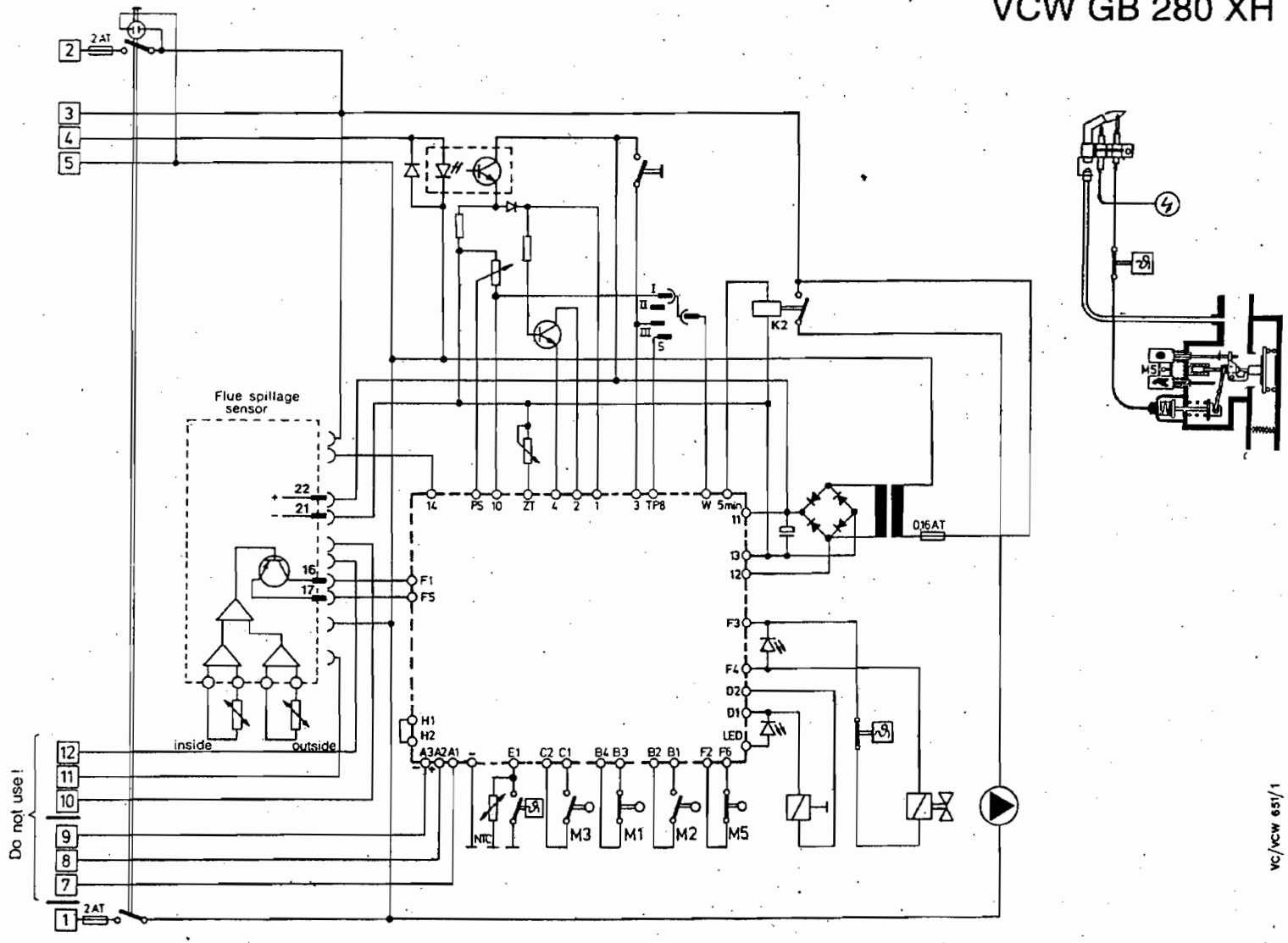


Fig. 27

Schematic appliance circuit diagram

(This version is for appliances with HY marked on front cover of control box)

VCW GB 240 XH
VCW GB 280 XH



11 Commissioning and testing

11.1 Electrical installation

Preliminary electrical system checks to ensure electrical safety shall be carried out by a competent person. Those checks are outlined in the INSTRUCTIONS FOR BRITISH GAS MULTIMETER. i.e. earth continuity, polarity, resistance to earth.

11.2 Gas installation

The whole of the gas installation, including the meter, should be inspected and tested for soundness and purged in accordance with the recommendations of BS 6891.

11.3 Central heating system

The whole of the system must be flushed out with both cold and hot water. Ensure all valves at the system and the appliance service cocks are open.
Open the stop cock gradually at the filling point connection to the central heating system until water is heard to flow. Do not open fully.

The system should be filled and air locks cleared. Starting with the lowest radiator open each air release valve closing it only, when clear water, free of bubbles, flows out. In the same way release air from any high points in the pipework.

For venting the boiler, back off the screw on the heat exchanger (1, Fig. 29) (see 13.3 to gain access) and the circulating pump (2) by about 1–2 turns.

Fill the sealed system until the pressure gauge registers 1.5 bar (21.5 PSI).

After initial operation, once again drain the complete installation through the lowest point of the system to remove residues from the pipework.

In continuous operation, the appliance is vented automatically through the automatic air vent (3). It is for this reason **essential** that the cap (4) present on the top of the automatic air vent is **unscrewed** by about 1–2 turns and that it **remains** like that.

Check operation of pressure relief valve by lifting the lever or rotating the knob anticlockwise, where applicable. Release water from the system until the initial system pressure of 1.2 bar is attained.

11.4 Filling the domestic hot water circuit

Fill the domestic hot water circuit of the appliance.

a) Open the cold water stop valve (2) on the appliance.

b) Open the connected hot water tap (1) and draw water.

Fig. 29

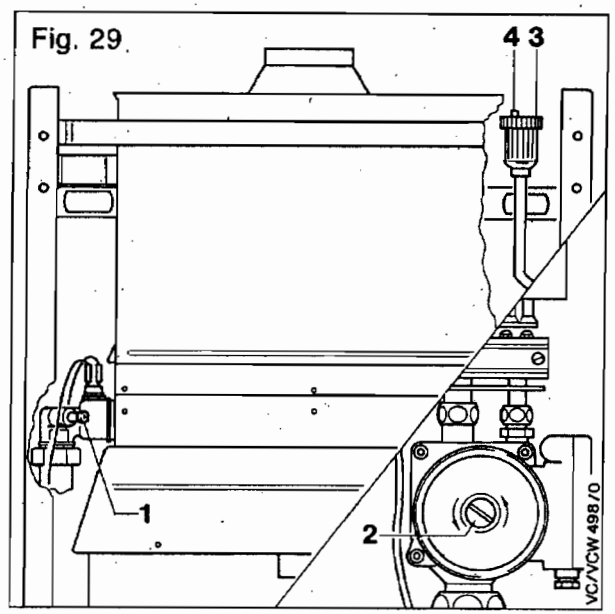
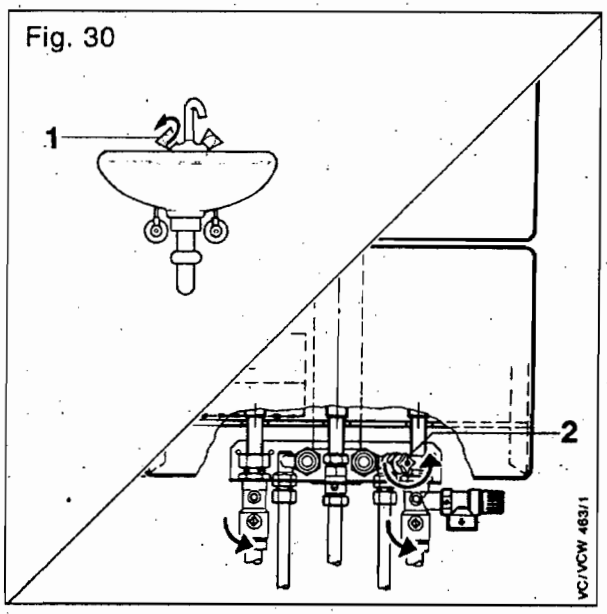


Fig. 30



11.5 Lighting the boiler

The first lighting of the appliance shall be done by a qualified fitter only. He shall also give clear verbal instructions to the user on how to operate the boiler, controls and systems generally as described separately in the "Instructions for use".

Turn on gas service cock. Ensure electrical supply is OFF.

Ensure external controls are calling for heat.

Light the pilot by pressing in the lower button on the gas section (with flame symbol) and operating the knob on the piezo ignition.

Continue pressing the button for 10 seconds after the pilot has been established. If difficulty is experienced in lighting the pilot, check that the gas supply has been purged.

If the pilot goes out after lighting, wait 3 minutes before attempting to relight. Check the shape at the pilot flame with fig. 31. The pilot is not adjustable. If the pilot flame size appears incorrect, check that the gas supply is purged and that 20 mbar gas pressure is available at the appliance inlet.

11.6 Gas soundness

Test for gas soundness around the boiler gas components using leak detection fluid. In order to test the gas soundness of the burner gas connections, turn on the electrical supply to ignite the main burner. Test for gas soundness around the connections on the main burner, pilot burner and burner test point. Shut down the appliance.

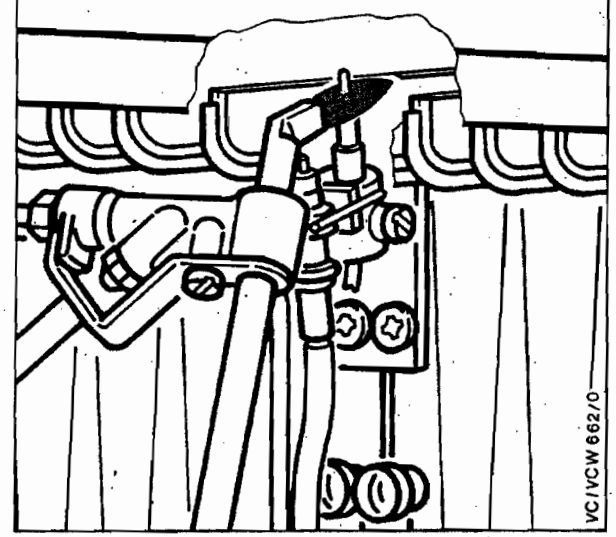
11.7 Test of flame supervision device (FSD)

With the pilot alight, disconnect the thermocouple connection to the gas section by unscrewing the retaining nut (TC, Fig. 32). The pilot flame should extinguish immediately.

Reconnect the thermocouple connection to the gas section.

Do not overtighten the retaining nut (TC, Fig. 32).

Fig. 31



11.8 Flue

Check that there is no spillage of products of combustion from the down draught diverter by carrying out a spillage test as detailed in BS 5440:1.

Check appearance of flames in order to establish that there is adequate air for combustion, check also as outlined under 5.6.3 if there is any type of extract fan fitted.

Check that all necessary air vents have been installed as specified in 5.6.

11.9 Gas pressure

11.9.1 Main burner pressure

The main burner gas pressure is factory set and sealed.

Therefore, it is not necessary to alter the setting during commissioning.

The main burner pressure can be checked by connecting a pressure gauge to the main burner test point (Fig. 32).

Operate the appliance by drawing D.H.W. at a high rate. This will generate the maximum burner pressure on the modulating burner which is:
VCW GB 240 H 4.8 ± 0.5 bar
VCW GB 280 H 5.8 ± 0.5 bar
(Note: The burner pressure will automatically modulate down when the D.H.W. operating temperature is reached).

If the burner pressure is incorrect, initially, check that a 20 mbar gas inlet pressure is available at the inlet to the appliance with the appliance operating. If the inlet pressure is less than 20 mbar, remedy external fault or contact Local Gas Region. If the inlet pressure is correct at 20 mbar, contact Vaillant Ltd.

Note: The main burner pressure immediately after ignition (ignition rate) will be only 1.3 ± 0.5 mbar. After a few seconds of appliance operation, the main burner pressure will automatically increase to the maximum rate.

11.10 Flow thermostat

Allow the C.H. System to warm up and adjust the position of the flow thermostat to check that the burner modulates down from high to low and low to off and vice versa (scale range covers about 35 to 90 °C).

Note: The appliance control incorporates a re-ignition delay to prevent rapid on-off cycling of the burner in the C.H. mode. This delay can be bypassed by briefly switching the main switch off and on again. This allows the boiler to fire immediately if it is calling for heat.

11.11 Water soundness and final system flush

Allow the water system to reach maximum working temperature and examine for water soundness. The boiler should then be turned off and the C.H. system rapidly drained while still hot. The C.H. system should again be filled and cleared of air locks (see 11.3) Sealed systems should be adjusted to the initial system design pressure of 1.2 bar. The actual reading of the pressure gauge should ideally be 0.5 bar plus an additional pressure corresponding to the head of the highest point of the system above the base of the appliance, (10 m head equals an additional 1 bar reading on the pressure gauge), in any circumstances the minimum gauge reading should not be less than 1.0 bar. Finally set the red hand of the pressure gauge to 0.8 bar. Examine for water soundness.

Note: At this stage inhibitors may be added to the system if required (the boiler itself does not require inhibitors). If an inhibitor is to be used, contact an inhibitor manufacturer for their recommendations as to the best product to use.

11.12 Flue

Check the installation and function of the flue.

11.13 Assemble appliance case

(see chapter 12)

11.14 User's instructions

Hand the instructions for use to the user for retention and instruct in the safe operation of the appliance. Advise the user of the precautions necessary to prevent damage to the system and to the building if the system does not remain operative during frost conditions.

Finally, advise the user that for continued efficient and safe operation, this Vaillant appliance should be serviced at least once a year by a qualified servicing company. It is important and strongly recommended that arrangements are made for a MAINTENANCE AGREEMENT with a qualified servicing company to ensure regular servicing.

Please contact
your Servicing Company,
your local Gas Region, or
your nearest Vaillant Office
for further details.

Note: Leave installation and servicing instructions at the meter.

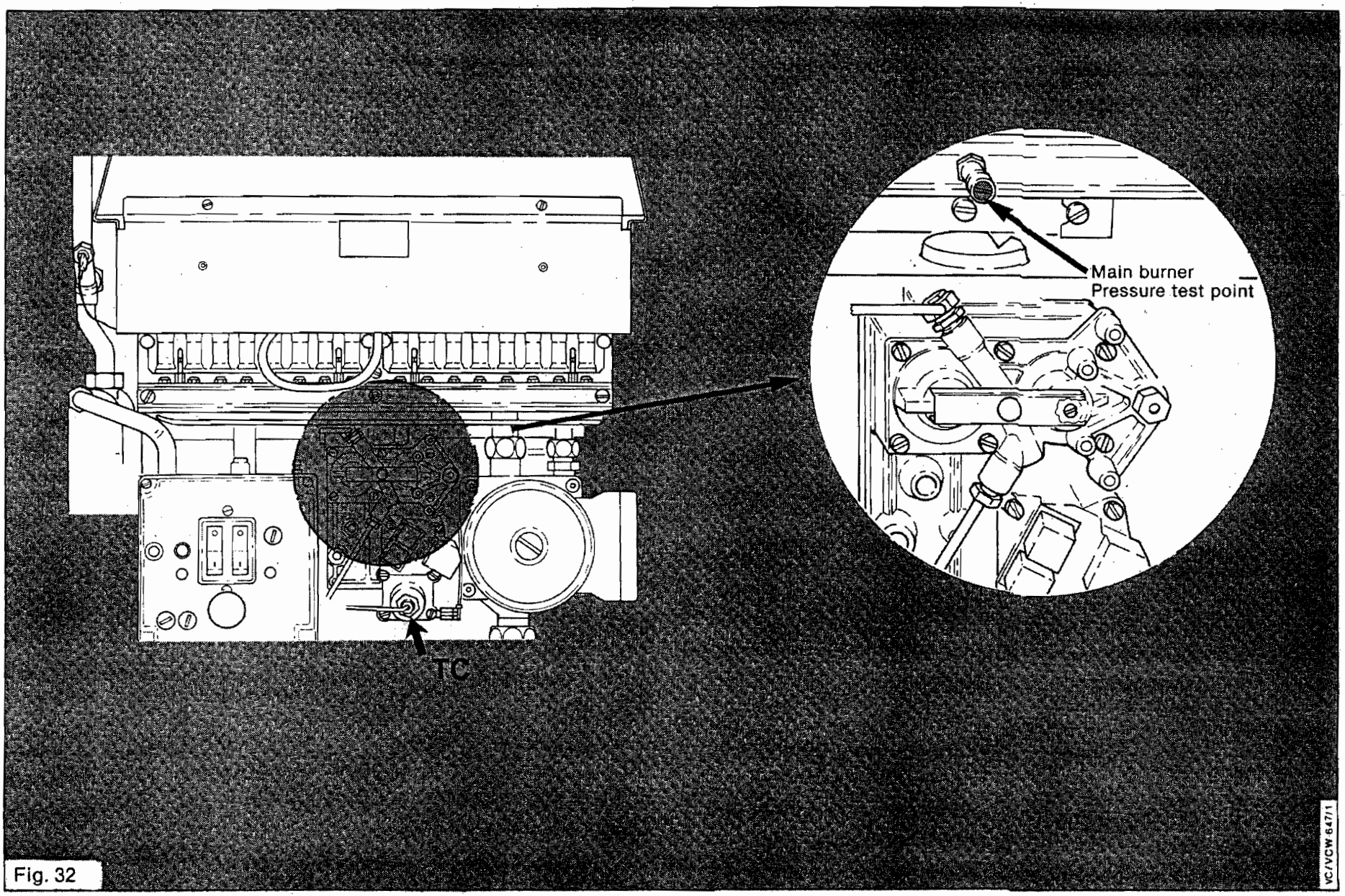


Fig. 32

12 Assembling

12.1 Door hinges

The Vaillant boiler is pre-assembled in the factory for "doors hinged at the right" (see Fig. 34).

If the doors are required to be "hinged at the left", make the following changes (see Fig. 34).

a) Unscrew door hinges top (1 a), centre (1 b) and bottom (1 c) from the right-hand side panel (2) and screw them the other way round to the left-hand side panel (3).

b) Unscrew magnets (4) of the upper appliance door (5) and screw to the opposite magnet holders (13).

c) For the installation of the appliance doors see next page. (12.5, Fig. 34).

12.2 Side panels (Fig. 33)

Place the two side panels (2, 3) from the front into the upper and the lower pin (6) of the appliance frame and screw tight with the screws (7) at the upper (8a) and the lower support strip (8b).

12.3 Screen plate

Screw on the screen plate (9) with the screws (10). Do not overtighten.

2 Side panel (right-hand)
3 Side panel (left-hand)
6 Pin
7 Screw
8a Support strip (top)
8b Support strip (bottom)
9 Screen plate
10 Screw
11 Temperature selector

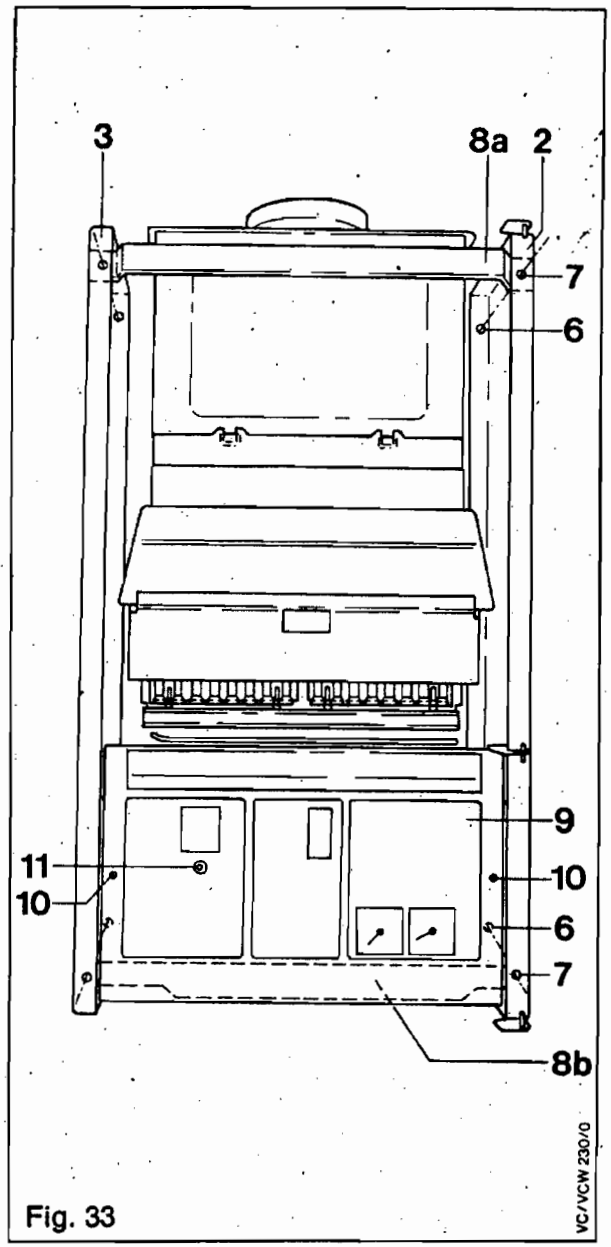


Fig. 33

12.4 Upper appliance door

a) Engage upper appliance door (5) in the door hinge (1 b).

b) Screw the hinge bolt of the upper door hinge (1 a) into the appliance door guide.

12.5 Lower appliance door

a) Engage lower appliance door (12) in the door hinge (1 b).

b) Screw the hinge bolt of the lower door hinge (1 c) into the appliance door guide.

12.6 User operating instructions label

IMPORTANT

Position and fix self adhesive
— user instructions
— wiring diagram
to the inner side of the door as shown on Fig. 34.

Ensure all surfaces are cleaned before affixing labels.

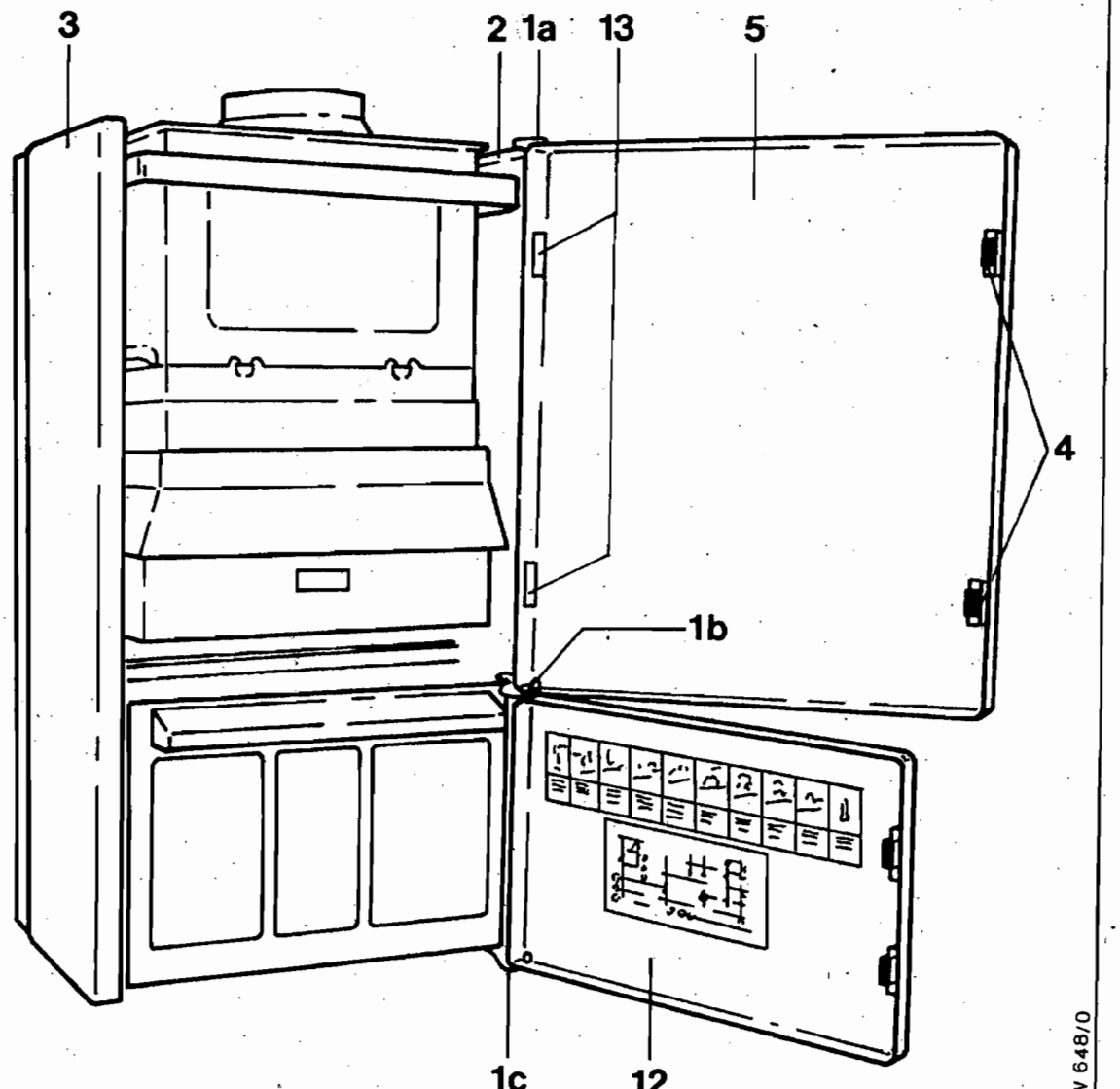


Fig. 34

1 a,b,c Door hinges
2 Side panel (right-hand)
3 Side panel (left-hand)
4 Magnet
5 Appliance door (top)
12 Appliance door (bottom)
13 Magnet holder

13 Servicing of boiler

The boiler should be serviced at least once a year (see chapter 11). The data plate is located on the appliance frame (9, Fig. 10).

IMPORTANT

Warning:
Before starting any maintenance 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 cock fitted to the appliance. Always test for gas soundness after any service work and after exchanging any gas carrying component and always carry out functional checks.

Always after any service work and after exchanging any electrical component.

Check — earth continuity
— polarity
— resistance to earth
according to INSTRUCTIONS FOR BRITISH GAS MULTIMETER.

To service the boiler follow the sequence 13.1 to 13.7

13.1 Inspection

13.1.1 Inspect exterior of the boiler, in particular the pipework, electrical connections and flue assembly for indications of damage or deterioration.

13.1.2 Inspect the air supply and ventilation arrangements of the installation ensuring that the requirements of 5.6 are met. Inspect the flue system and terminal ensuring that the requirements of 5.5 are met.

13.1.3 Operate the appliance by drawing off DHW at a high rate and inspect the burner operation through the viewing window. Check that the flames are of light blue colour and over all burner ports. Inspect for signs of yellowing, excessive lifting or sooting.

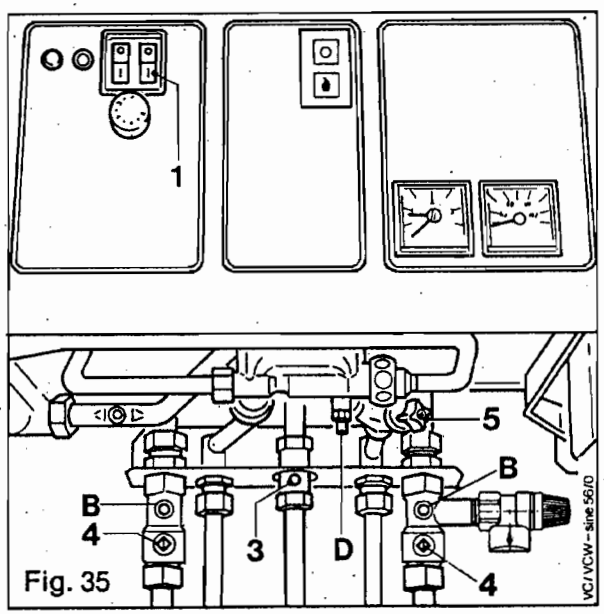


Fig. 35

13.2 Turning off the boiler

— Isolate the electrical supply to the boiler
— Turn off gas service cock (3, Fig. 35)
— Turn off boiler C.H. service cocks (4, Fig. 35)
— Turn off DHW cold water service cock (5, Fig. 35)

13.3 Removing outer case (Fig. 33, 34)

Remove upper door by unscrewing hinge pin (1a) and pulling door out and up. Remove lower door by unscrewing hinge pin (1c) and pulling door out and down.

Remove screen plate by unscrewing the two fixing screws (10, Fig. 33).

Remove side panels by unscrewing top and buttom screws (7, Fig. 33) to clear internal clips and then pulling panels outwards and off.

13.4 Cleaning of burner (Fig. 36, 37, 38)

Remove the two fixing screws (1) and pull the cover sheet (2) forward (Fig. 36).
Remove the thermocouple from the pilot assembly by removing the screw and bracket (RN, Fig. 37) and pulling thermocouple downwards.
Remove the electrode from the pilot assembly by lifting carefully spring bar (SB) in order to slacken the spark electrode (SE).
Disconnect the pilot gas supply pipe from the pilot assembly (UN, Fig. 38).
Remove the pilot assembly by unscrewing the two screws (SS, Fig. 38).
Remove the four screws (S).
Lift the RH burner vertically upwards a few millimeters to disengage from the burner bar. Remove burner downwards and out taking care to avoid distorting the pilot gas supply pipe.
Lift up LH burner and slide across to the RHS and remove downwards and out taking care to avoid distorting the pilot gas supply pipe.
Remove burner bar fixing screws (BS).
Take off burner bar (BB) by pulling firmly forward.
Clean burner and injector nozzles with a light brush or a vacuum cleaner.
Reassemble in reverse order.

Fig. 36

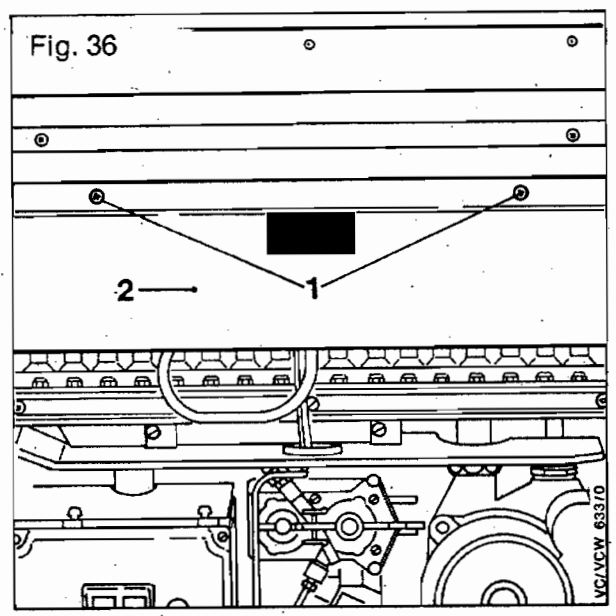


Fig. 37

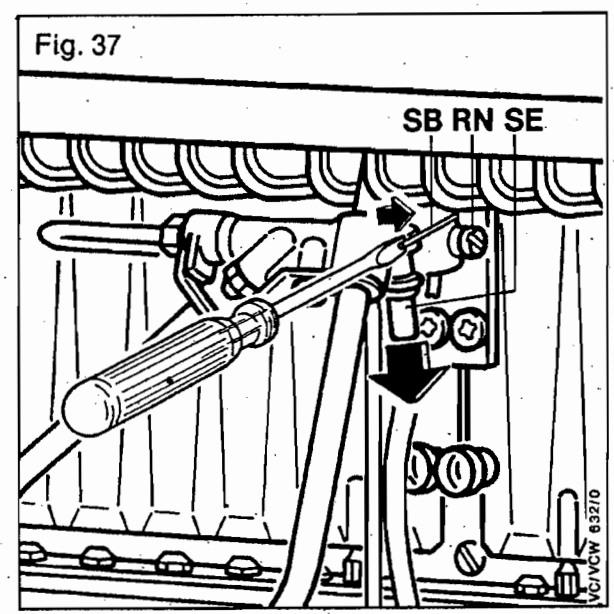
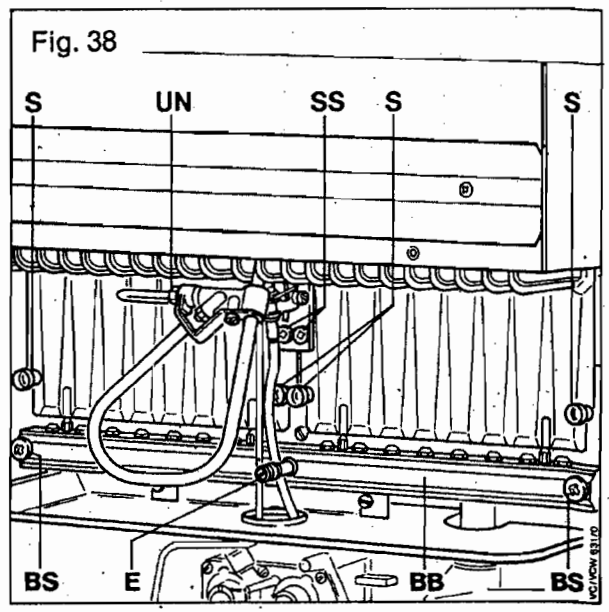


Fig. 38



13.5 Cleaning of main heat exchanger (Fig. 39)

Remove fixing screws (2) and take off cover sheet (3). Place cloth below combustion chamber.

Remove slip socket connector and disconnect flue. Remove two nuts (S, Fig. 72) and remove bracket.

Remove fixing screws (FS, Fig. 72) and lift off draught divertor.

Remove burners and pilot as under 13.4.

Inspect top and bottom of heat exchanger using a torch and clean if necessary using a long stiff bristle brush.

Reassemble in reverse order.

13.6 Check of C.H. expansion vessel

Close C.H. service cocks (4, Fig. 35)

Release pressure from the appliance as described in 14.24.

Remove protective cap.

Check internal pressure of expansion vessel which should be 0.7 to 0.9 bar. (Fig. 40), access from underneath the appliance. Repressurise the expansion vessel as necessary using an air pump.

Open C.H. Service cocks and repressurise C.H. System if necessary.

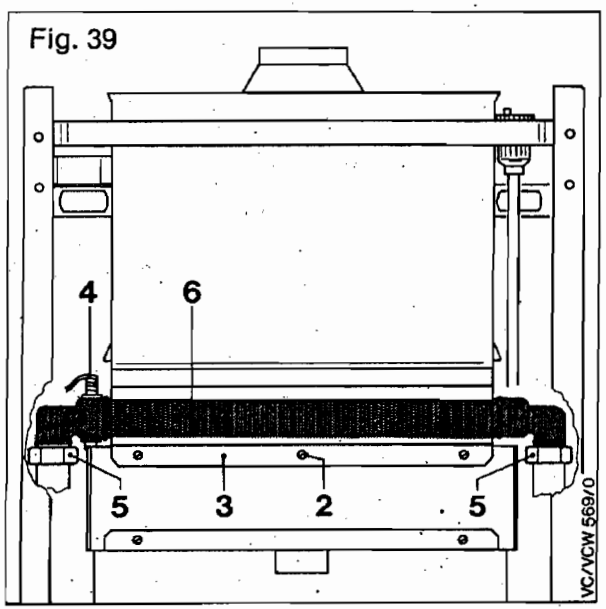
(See appropriate paragraphs of 11.11).

13.7 Recommissioning the appliance

Turn on gas service cock

a) Reconnect electrical supply
b) Check gas soundness (11.6)
c) Light the pilot (11.5)
d) Operate burner to check gas soundness of remaining gas connections
e) Check gas pressure (11.9)
f) Test flame supervision device (11.7)
g) Test C.H. flow thermostat (11.10)
h) Check water soundness (11.11)
i) Check flue (11.8)
j) Carry out electrical test (11.1)
k) Refit outer case (12)

Fig. 39



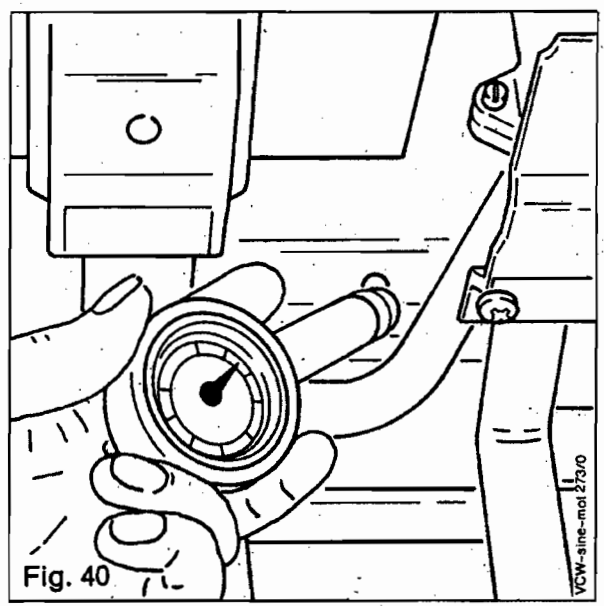


Fig. 40

14 Replacement of parts

General

Before starting any replacement of parts, switch OFF the main 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 cock.
Always test for gas soundness after any service work and after exchanging any gas carrying component.
Always carry out functional checks.
After breaking any internal electrical circuit check — earth continuity
— polarity
— resistance to earth
according to INSTRUCTIONS FOR BRITISH GAS MULTIMETER.

14.1 Change of electrode (Fig. 41)

For general access, remove outer case as under 13.3.

Remove the two fixing screws (1, Fig. 36) and pull the cover sheet (2, Fig. 36) forward.

Remove screw and bracket (RN, Fig. 37).

Remove the electrode from the pilot assembly by lifting carefully spring bar (SB, Fig. 41) in order to slacken the spark electrode (SE, Fig. 41).

Disconnect the high tension lead at the cable joint between the electrode and the piezo igniter (snap connector) and remove electrode.

Reassemble in reverse order.

14.2 Change of thermocouple (Fig. 42)

For general access remove outer case as under 13.3. Remove the two fixing screws (1, Fig. 36) and pull the cover sheet (2, Fig. 36) forward. Remove screw and bracket (TS) and pull the thermocouple downwards from its location in the pilot assembly.
Disconnect the other end of the thermocouple cable from the C.H. overheat thermostat (push on connector).
Reassemble in reverse order.

14.3 Change of pilot injector (Fig. 42)

For general access remove outer case as under 13.3. Remove the two fixing screws (1, Fig. 36) and pull the cover sheet (2, Fig. 36) forward. Remove screw (S) and take off pilot mixing tube. Unscrew pilot injector (PI). Reassemble in reverse order.

Fig. 41

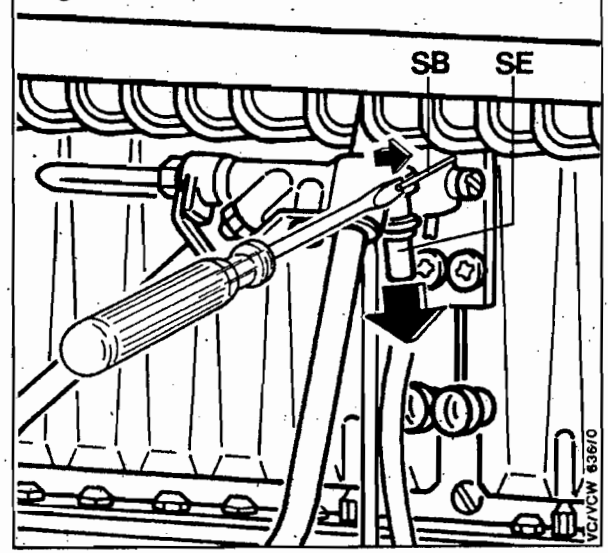
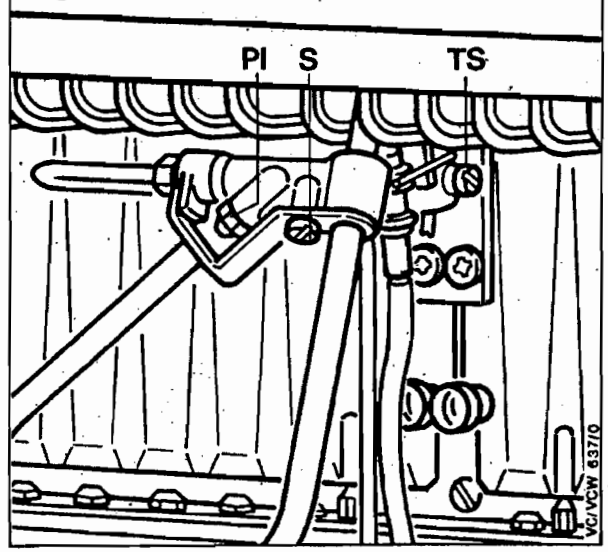


Fig. 42



14.4 Change of NTC resistor (Fig. 43)

Remove outer case as under 13.3.

Disconnect the push on connector and unscrew the NTC probe.

Reassemble in reverse order.

14.5 Change of automatic air vent (Fig. 44)

Remove outer case as under 13.3

Release system pressure as under 14.24.

Unscrew the automatic air vent by hand. Reassemble in reverse order, screwing in the automatic air vent by hand only.

Open the locking cap (LC) of the automatic air vent by 1—2 turns.

Reassemble casing in reverse order and repressurise system.

14.6 Change of diverter valve or parts

14.6.1 Electrical isolation (Fig. 45)

Remove outer case as under 13.3

Ensure the appliance is isolated from the electrical mains. Pull off the plug (S1) by shifting the retaining tongues' (S2) top and bottom to the side.

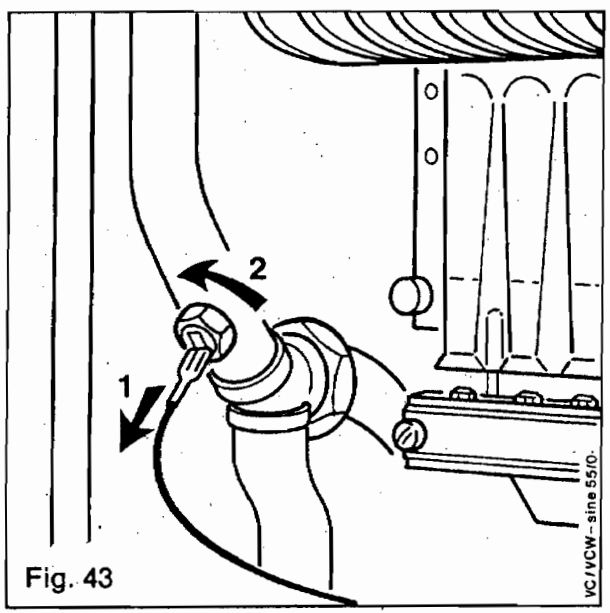


Fig. 43

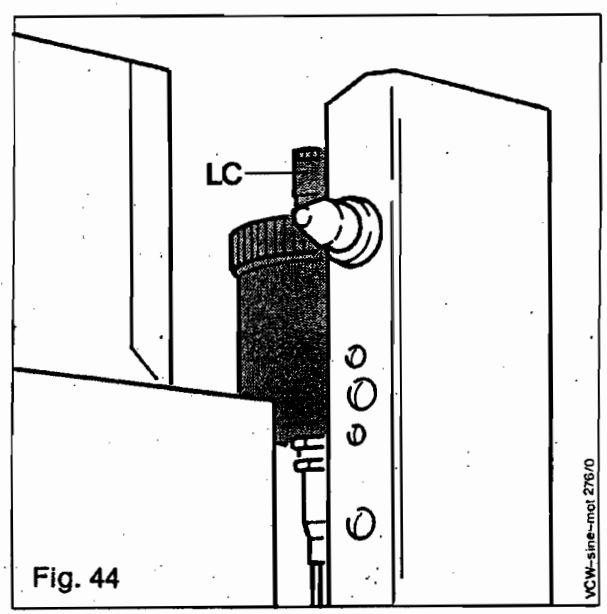


Fig. 44

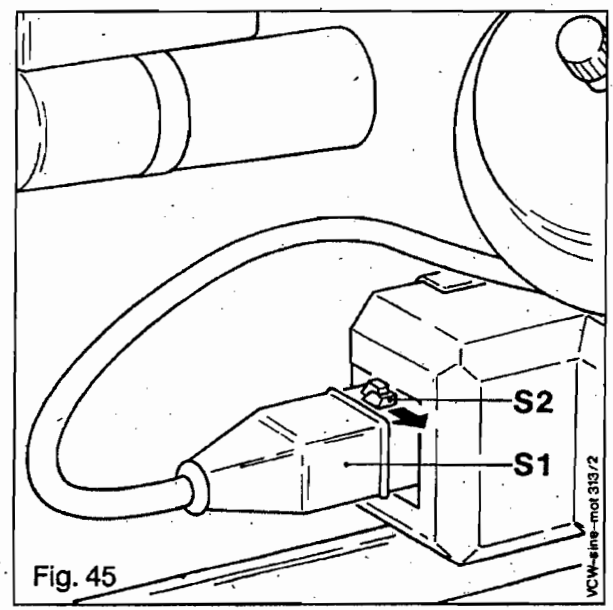


Fig. 45

14.6.2 Change of diverter valve microswitches (Fig. 46)

Spring off the protective cover (S6).

Unscrew two retaining screws (RS, Fig. 48) securing complete microswitch assembly. Remove complete assembly.

Remove screws (S7) or (S8) as appropriate, take off microswitch and remove the two push on connectors.

Reassemble in reverse order, adjust the actuating lever as under 14.6.3.1.

Note:
The black cables are connected to microswitch S7. The brown and blue cables are connected to microswitch S8.

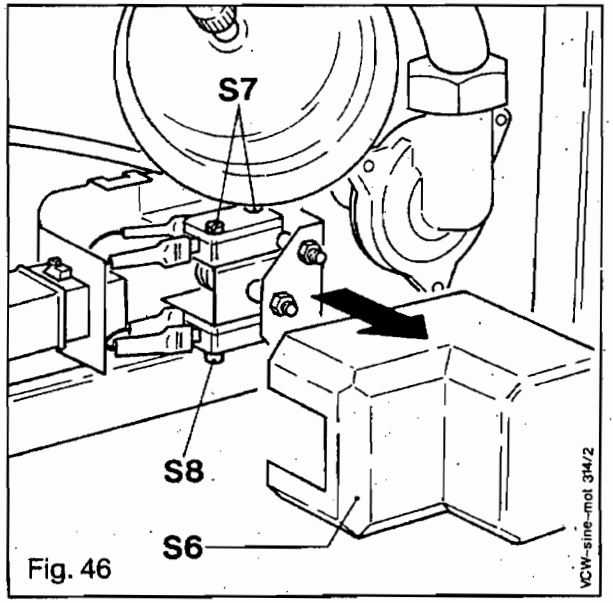


Fig. 46

14.6.3 Removal of complete diverter valve (Fig. 47)

Carry out operation 14.6.1.
Drain the C.H. side of the appliance (14.25).
Remove D.H.W. expansion vessel (14.12.1).
Mark and disconnect the control lines (CL).

Note:
The bolt which secures the control line banjo connection contains a restrictor orifice. Check this orifice is clear.

Remove the three unions (U).
(If access to the L.H. union is restricted, leave this union undisturbed and disconnect pipe from D.H.W. heat exchanger. Withdraw diverter valve together with pipe carefully. Take care when reassembling not to overtighten the union connection to the D.H.W. heat exchanger. Ensure threads are correctly engaged.)

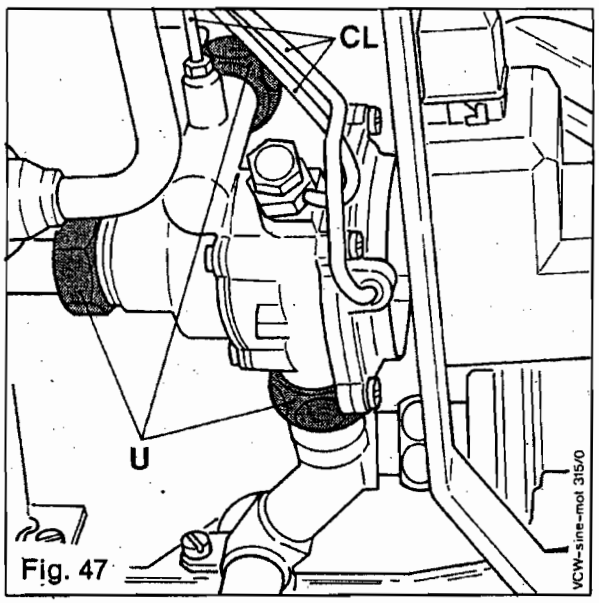


Fig. 47

14.6.3.1 Change of diverter valve stuffing box (Fig. 48)

Carry out operation (14.6.1)
Carry out operation (14.6.3) to remove the complete diverter valve.
Spring off protective cover (C).
Unscrew two retaining screws (RS) and remove complete microswitch assembly.
Unscrew stuffing box and replace using a new washer. Reassemble in reverse order and adjust actuating lever as follows:
Turn down spindle (1) slowly until microswitch closes the blue to brown circuit and make ⅔ more turn down. Press the lever assembly down to the rest and turn down spindle (2) slowly until microswitch closes the black to black circuit and make 1½ more turns down.

Lock spindles with locking nuts (3).

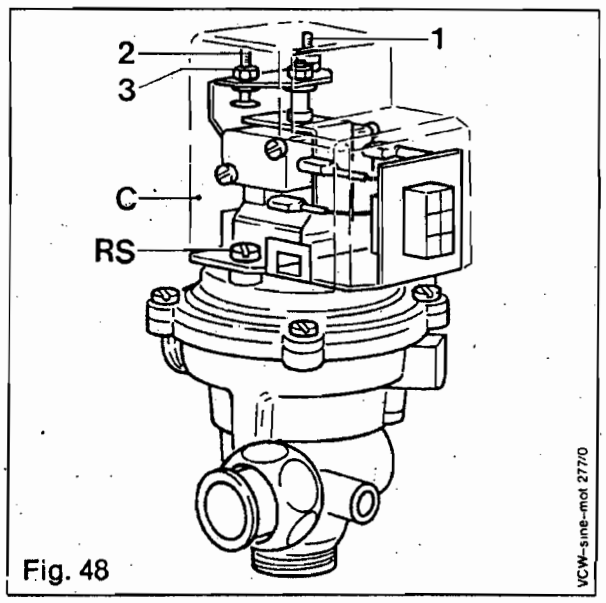


Fig. 48

14.6.3.2 Change of diaphragm (Fig. 49)

Carry out operation 14.6.1.

Carry out operation 14.6.2 and 14.6.3 to remove complete diverter valve and microswitch assembly.

Note position of the housing (H) and the diaphragm (D).

Remove the retaining screws (RS).

Check diaphragm disk (DD) for free movement. Reassemble in reverse order.

14.6.3.3 Change of internal parts (Fig. 50)

Carry out operation 14.6.1.

Carry out operation 14.6.3 to remove complete diverter valve.

Unscrew carefully the three retaining screws (RS), remove housing and change if necessary O-ring seal. Do not use any jointing compound or grease.

Check valve (V) and replace if necessary. Reassemble in reverse order.

14.6.4 Reassembling

Reassemble in reverse order, using new washers.

Check — earth continuity
— polarity
— resistance to earth
according to INSTRUCTIONS FOR BRITISH GAS MULTIMETER.

Note: position of notches on plug as shown. (Fig. 51)

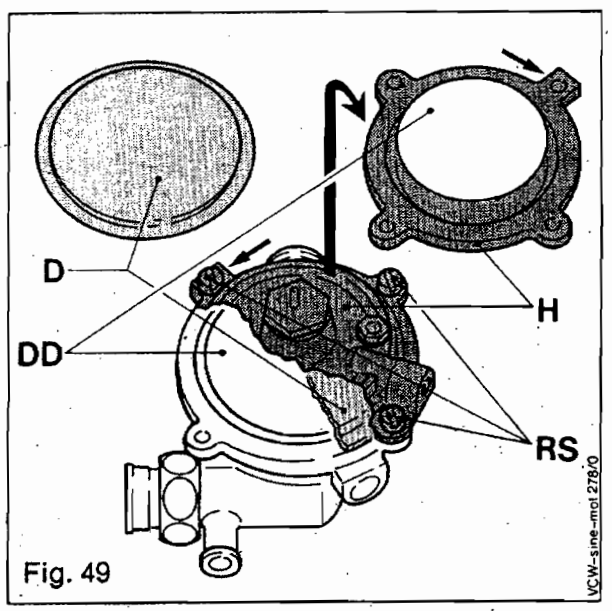


Fig. 49

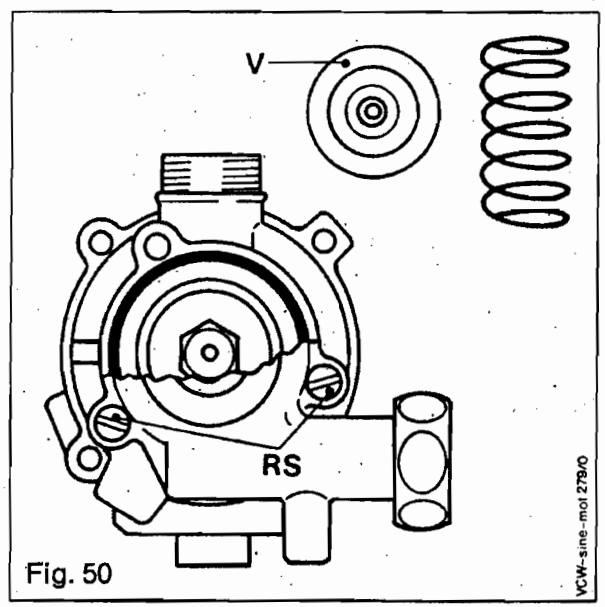


Fig. 50

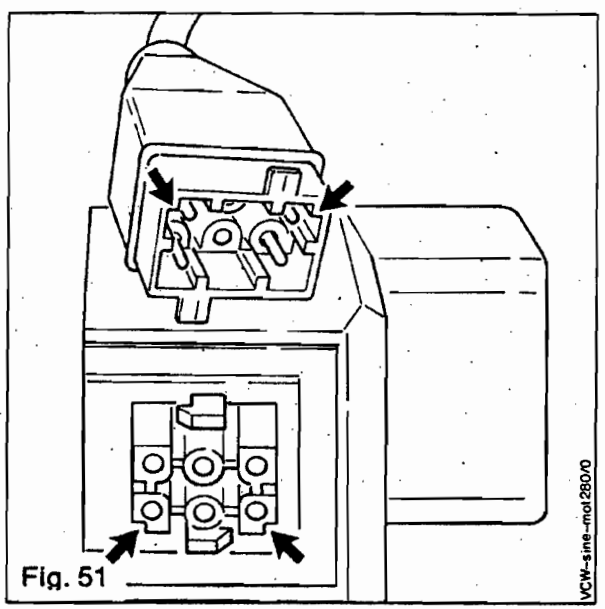


Fig. 51

14.7 Gas section

Access to the gas section can be improved by removing the retaining screws (RS, Fig. 55) and pulling the control box forward. Take care to ensure that the 2 plastic pipes on the back of the control box are not pulled off.

14.7.1 Change of operator (Fig. 52)

Turn off boiler as under 13.2
Remove outer case as under 13.3.
Isolate the appliance from the electrical mains and pull off the cable connectors from the operator (O). Disconnect the control lines (CL) by unscrewing retaining bolt (RB) and union nut (UN). Unscrew the four retaining screws (RS). Reassemble in reverse order using new gasket (G). Check for gas soundness. Carry out electrical checks (11.1). Check burner pressure (11.9).

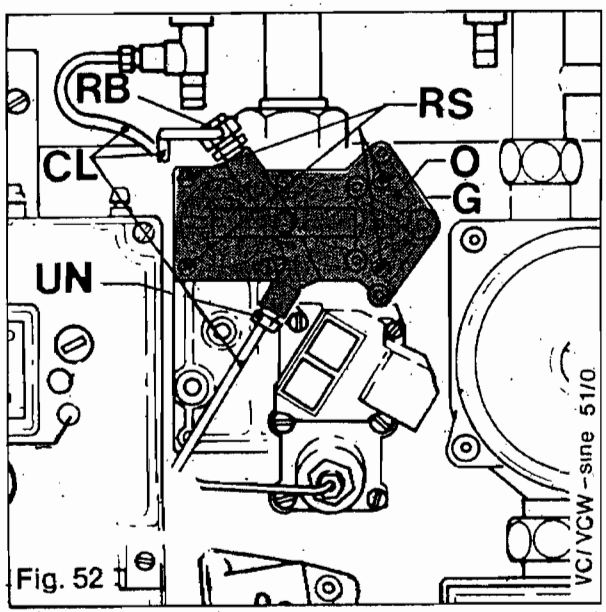


Fig. 52

14.7.2 Change of gas section (Fig. 53)

Turn off boiler as under 13.2.

Remove outer case as under 13.3.

Isolate the appliance from the electrical mains and pull off the connectors (P) from the operator (O). Disconnect the two inline cable connectors in the black leads to the gas section. Disconnect the two control lines (CL) by unscrewing the retaining bolt (RB) and the union nut (UN).
(Slacken two screws and remove burner tray to gain access).

Disconnect the pilot gas supply pipe from the gas section (PC).

Disconnect the thermocouple cable from the gas section (TC).

Remove the two retaining screws (RS) and loosen the sleeve nut (SN).

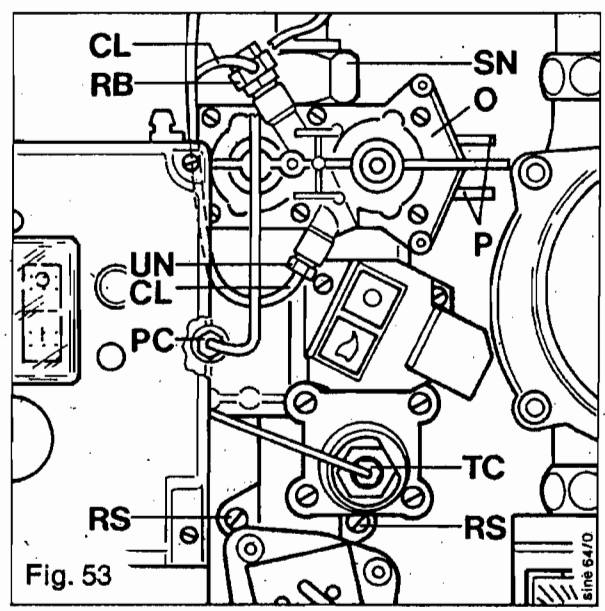


Fig. 53

Reassemble in reverse order using new washers.

Check connections for gas soundness.

Carry out electrical checks (11.1).

Check function of flame supervision device (11.7).

Check burner pressure (11.9).

14.8 Change of pump (Fig. 54)

Turn off the appliance 13.2.

Remove outer case as under 13.3.

Drain C.H. side of appliance (14.24) and 14.25).

Open terminal box of the pump.

Note the colour code of wiring and disconnect cable.

Unscrew the sleeve nut (SN) of the air vent pipe.

Unscrew the two unions (U) of the pump.

Reassemble in reverse order using new washers and repressurise system.

Carry out electrical checks (11.1).

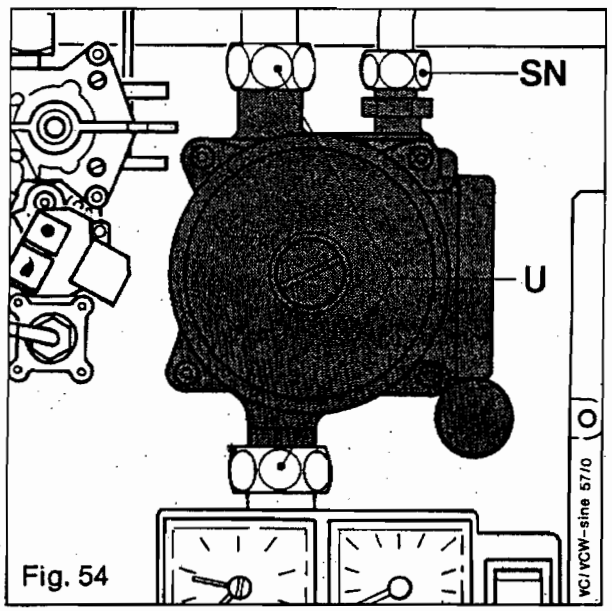


Fig. 54

14.9 Control box

14.9.1 Opening control box (Fig. 55)

Remove outer case as under 13.3.

Isolate the appliance from the electrical mains. Open the terminal box by removing the retaining screw (TS). Mark the wiring and remove it from the terminal block. Remove the four retaining screws (BS). Pull out slowly the control box cover complete with the switch board and printed circuit boards.

Pull off the multiple plugs from the PC boards. Reassemble the control box in reverse order.

When replacing the screws, position the star washer under the left lower screw.

14.9.2 Change of electronic thermostat circuit board (T.C.B.) (Fig. 56)

Take off control box cover as under 14.9.1. Pull off temperature selector knob.

Unscrew the two retaining screws (RS) or push out the plastic retaining clips (where fitted) and remove T.C.B. from main switch circuit board by lifting up.

Reassemble in reverse order.

Carry out electrical checks (11.1).

Check operation of C.H. flow thermostat (11.10).

14.9.3 Change of main switch circuit board (M.S.C.B.) (Fig. 57)

Carry out operations 14.9.1, 14.9.2.

Unscrew the two retaining screws (RS).

Unscrew the two retaining screws securing the switches.

Reassemble in reverse order.

Carry out electrical checks (11.1).

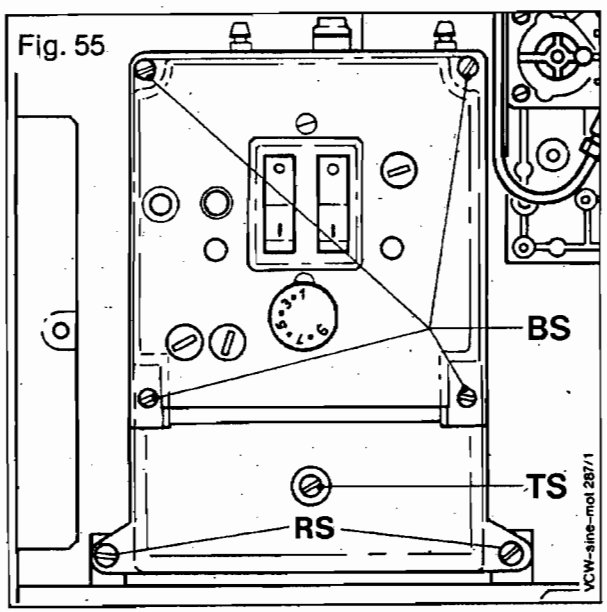


Fig. 55

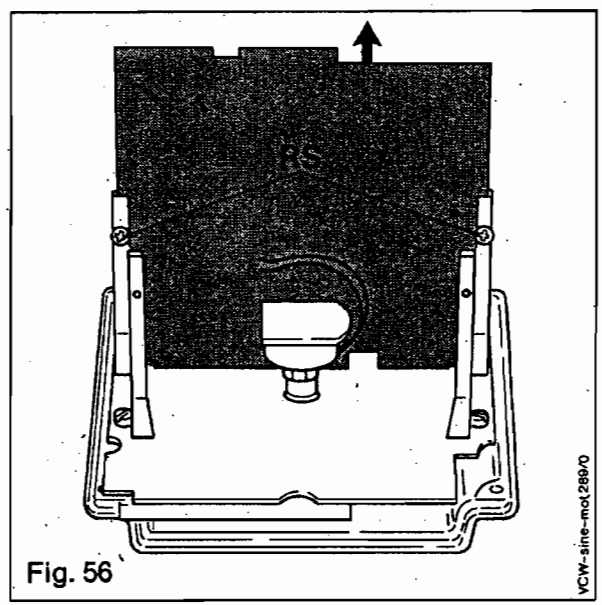


Fig. 56

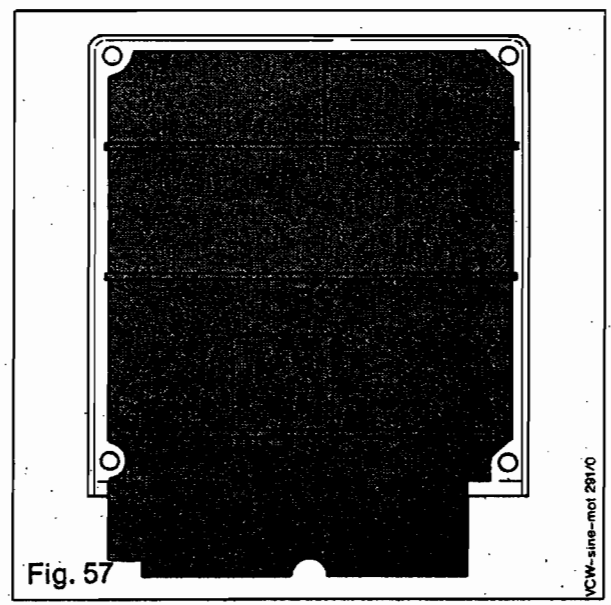


Fig. 57

14.9.4 Change of diaphragm pump (Fig. 58)

Remove outer case as under 13.3.

Isolate the appliance from the electrical mains. Open the main terminal box (screw TS, Fig. 59).

Unscrew the retaining screws (BS, Fig. 59) and (RS, Fig. 59).

Unscrew the two retaining screws (FS, Fig. 59a) and remove diaphragm pump cover.

Pull out complete control box to the front.

Mark and disconnect plastic hoses (PH) and push on connectors (AP).

Pull out diaphragm pump with rubber legs (RL) from control box bottom.

If necessary, access to the rubber legs inside the control box can be achieved by sliding out the control box cover completely with printed circuit boards (14.9.1).

Reassemble in reverse order.

Carry out electrical checks (11.1).

Fig. 58

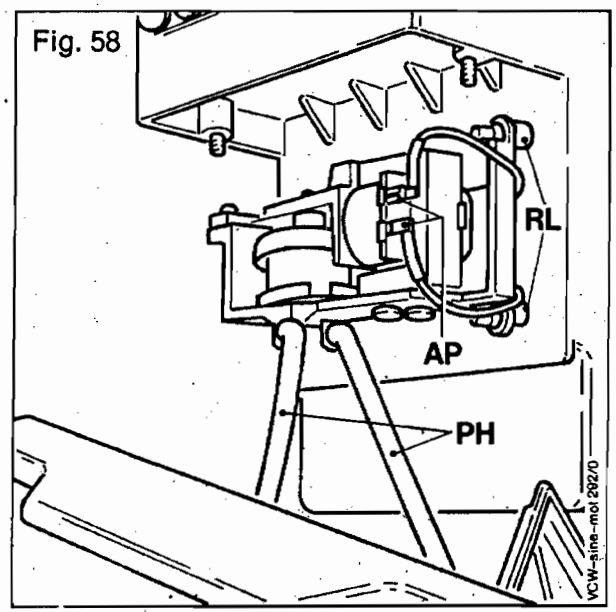


Fig. 59

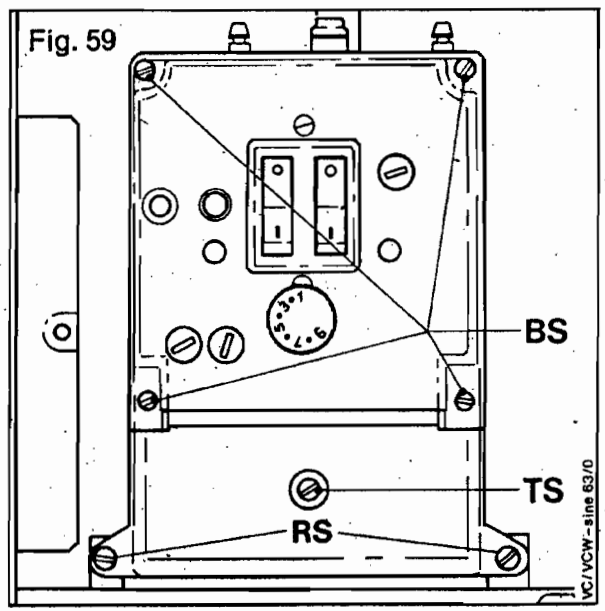
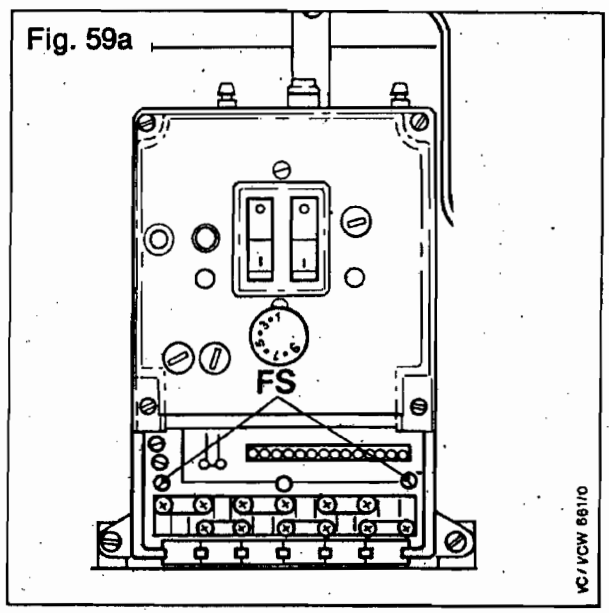


Fig. 59a



14.10 Change of main heat exchanger overheat thermostat (Fig. 60)

Turn off the boiler as under 13.2

Remove outer case as under 13.3.

The thermostat is situated on the top LHS of the main heat exchanger.

Disconnect the two push-on cable connectors from the thermostat (TS).

Unscrew the thermostat.

Reassemble in reverse order.

Do not overtighten the thermostat.

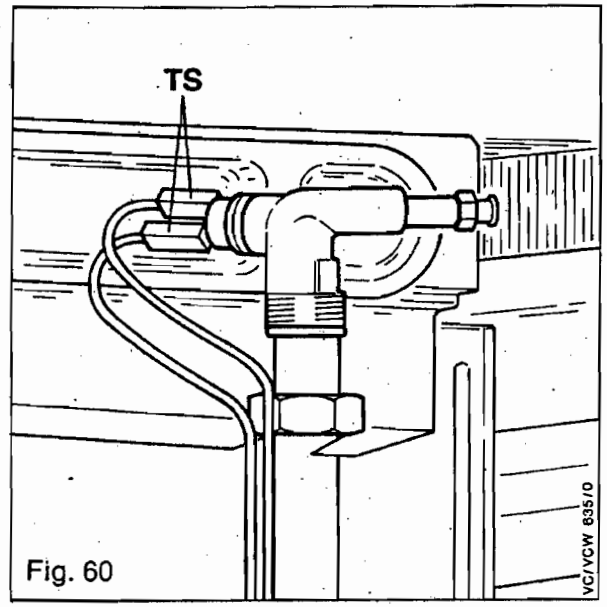


Fig. 60

14.11 Removal of servo control valve assembly (Fig. 61)

Turn off the boiler (13.2).

Remove outer case as under 13.3.

Drain the boiler as under 14.24 and 14.25
Slacken union nuts (M, Fig. 62) and collect water in suitable container.

Note the connections of the four control lines (CL1 and CL2) to the servo control valve. Note the connections of the other ends of these control lines. Remove clamp (C1) by sliding upwards. Remove clamp (C2) by sliding outwards. The control lines are a push fit into the servo control valve. Disconnect the control line (CL1) from the servo control valve by gently pulling outwards. Remove control lines (CL2) from servo control valve. (Disconnect connections at other ends of control lines to gain movement as necessary. Ensure all connections are noted to assist reassembly).
Unscrew the four union-nuts on the water section (M and N, Fig. 62).
Remove the two retaining screws (RS, Fig. 61) securing the mounting bracket to the front of the appliance.
Remove the other two screws securing the bracket from underneath the appliance.
Remove the complete assembly downwards.
Note position of cable connectors on the DHW micro switch and disconnect.
Reassemble in reverse order using new sealing washers.
Check — earth continuity
— polarity
— resistance to earth
according to INSTRUCTIONS FOR BRITISH GAS MULTIMETER.

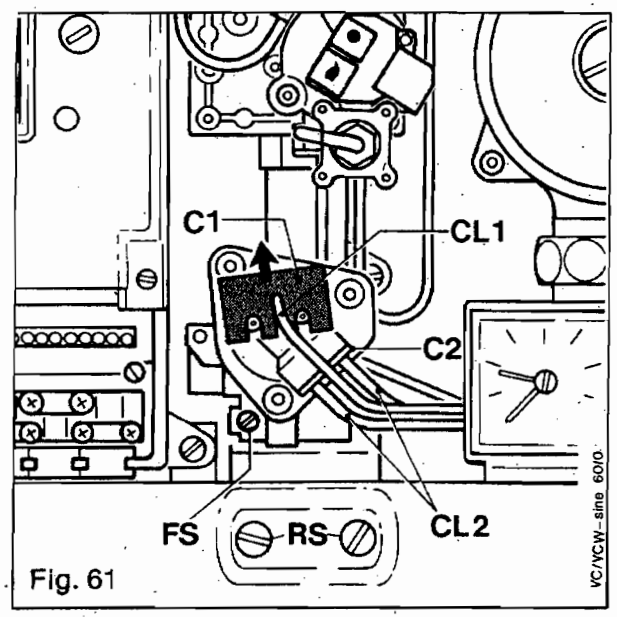


Fig. 61

14.11.1 Change of servo control valve assembly (Fig. 61)

Remove complete assembly as under 14.11.

Separate the servo control valve assembly from the water section by removing fixing screw (FS, Fig. 61) and sliding bracket sideways. Replace servo control valve assembly and replace fixing screw (FS, Fig. 61). Check adjustment of servo control valve (14.11.4).

Reassemble in reverse order.

Carry out electrical checks (11.1).

14.11.2 Change of D.H.W. microswitch (Fig. 64)

Remove complete assembly as under 14.11.

Remove the two retaining screws (5), taking care not to loose the nuts.

Replace D.H.W. microswitch and check adjustment (14.11.4).

Reassemble in reverse order.

Carry out electrical checks (11.1).

14.11.3 Cleaning of water section (Fig. 62)

Turn off boiler as under 13.2.
Remove outer case as under 13.3.
Slacken union nuts (M, Fig. 62) and collect water in suitable container.
Remove water section by unscrewing water conections (M and N, Fig. 62) and loosening screw L.
Remove five screws securing the two halves of the water section, note position of components and separate.
Check diaphragm (P, Fig. 63) and replace if necessary. Clean water filter (Q, Fig. 63).
Check stuffing box and replace if necessary.
Reassemble in reverse order using new washers.

Note: If the complete water section is replaced it is necessary to check the adjustment of the servo control valve as under 14.11.4.

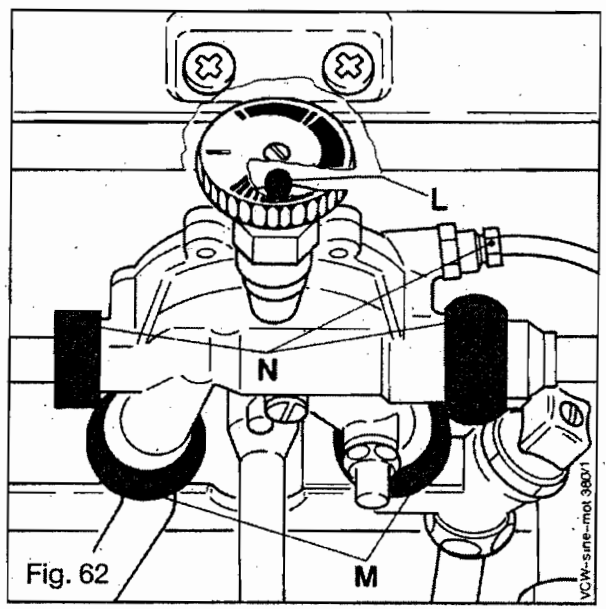


Fig. 62

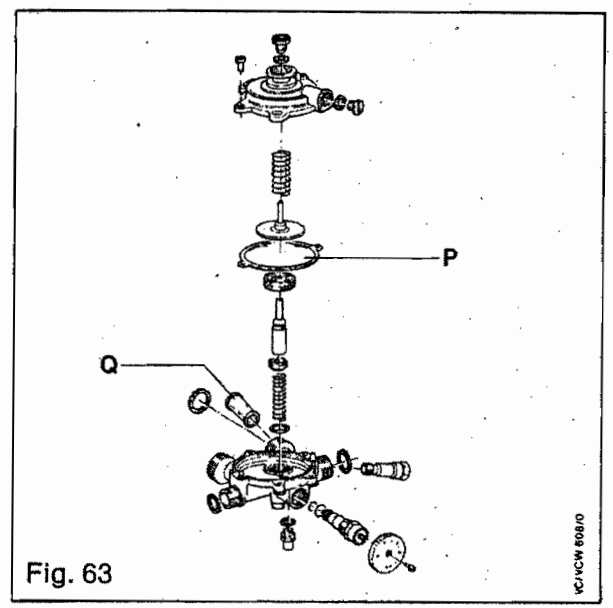


Fig. 63

14.11.4 Adjustment of servo control valve (Fig. 64)

Remove servo control valve assembly (14.11).

Adjust the distance between push rod (1) and cam (2) to 0.2 mm by slackening nut (3), turning push rod (1) and refastening nut (3). Rotate cam (2) to provide a 5-7 mm gap between the push rod (1) and cam (2).

Adjust the distance between micro-switch housing and spring plate (4) to 0.3 to 0.5 mm, using screws (5).

Reassemble in reverse order.

14.12 Change of expansion vessel

14.12.1 DHW expansion vessel (Fig. 65)

Remove outer case as under 13.3.
Turn off D.H.W. service cock.
Drain D.H.W.
Disconnect tubing nut (TN), unscrew bracket securing screw (SS) and remove expansion vessel.
Reassemble in reverse order.

14.12.2 CH expansion vessel

In the unlikely event of a failure of the CH expansion vessel either the following procedure or procedure 14.12.2.1 can be followed as appropriate. Turn off the boiler (13.2).
Remove outer case as under 13.3
Release CH system pressure as under 14.24.
Isolate the appliance from the electrical mains. Disconnect external wiring.
Isolate and disconnect the gas supply from the appliance.
Remove appliance from the wall as follows:
Disconnect flue at slip socket.
Disconnect union nuts (6, 9, Fig. 15).
Lift appliance upwards and off wall.
Remove 4 fixing clamps (FC, Fig. 66). Lift up and take out expansion vessel to the rear.
Reassemble in reverse order.
Replace appliance as under 9.4 using new washers and gaskets.

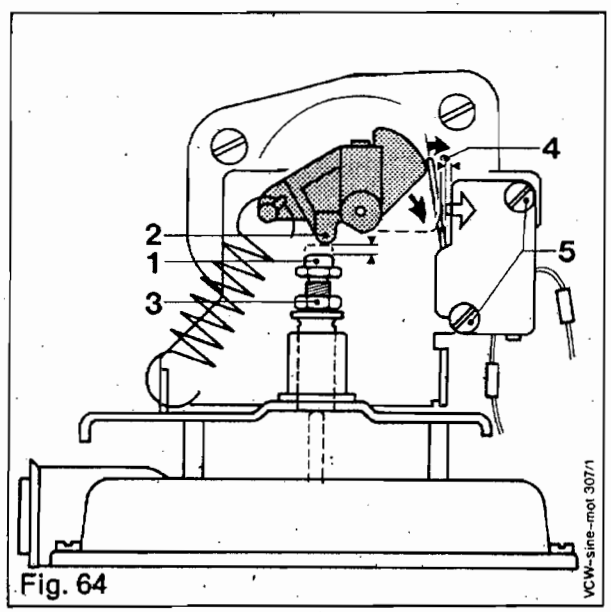


Fig. 64

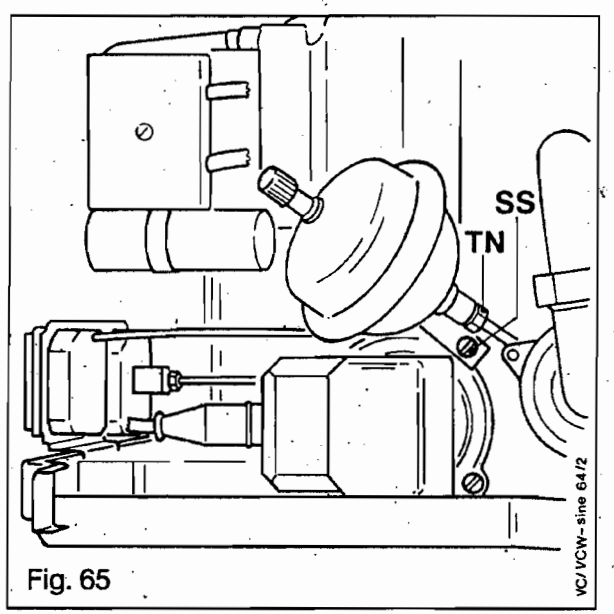


Fig. 65

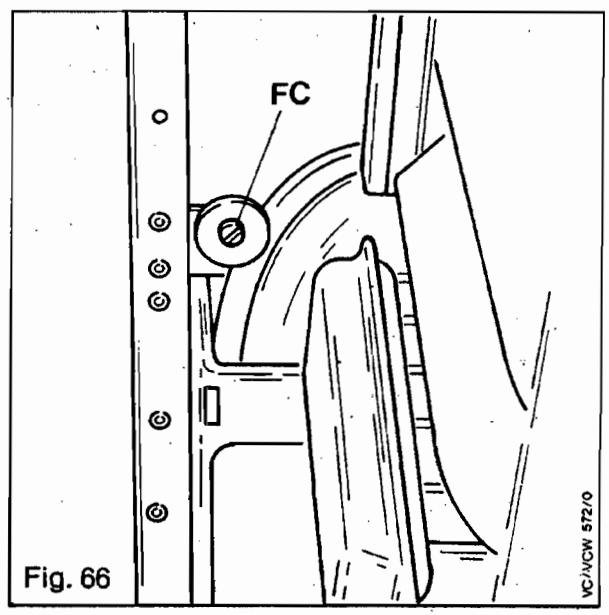


Fig. 66

14.12.2.1 External replacement vessel

Alternatively, a suitable replacement expansion vessel can be fitted external to the boiler as described in 5.11.3.

In these cirumstances, the replacement expansion vessel must be correctly sized, ignoring the original expansion vessel which can be left in position on the boiler.

14.13 Change of thermometer (Fig. 67)

Remove outer case as under 13.3.

Pull the temperature sensor (TS) out of the sensor tube. Press the two tongues into the thermometer and pull it out to the front.

Reassemble in reverse order.

14.14 Change of pressure gauge (Fig. 68)

Turn off boiler (13.2).

Remove outer case as under 13.3.

Release CH system pressure as under 14.24

Disconnect the tubing nut (TN) of the control line and press the two tongues on the pressure gauge and pull it out to the front.

Reassemble in reverse order.

14.15 Change of system bypass (Fig. 69)

Turn off boiler as under 13.2.

Remove outer case as under 13.3.
Release CH system pressure and drain boiler as under 14.24 and 14.25

Disconnect the two union nuts (V) and remove bypass valve. Access to the union nuts can be gained by removing the D.H.W. expan sion vessel as under 14.12.1 and the diverter valve as under 14.6.3 if necessary.

Reassemble in reverse order using new washers.

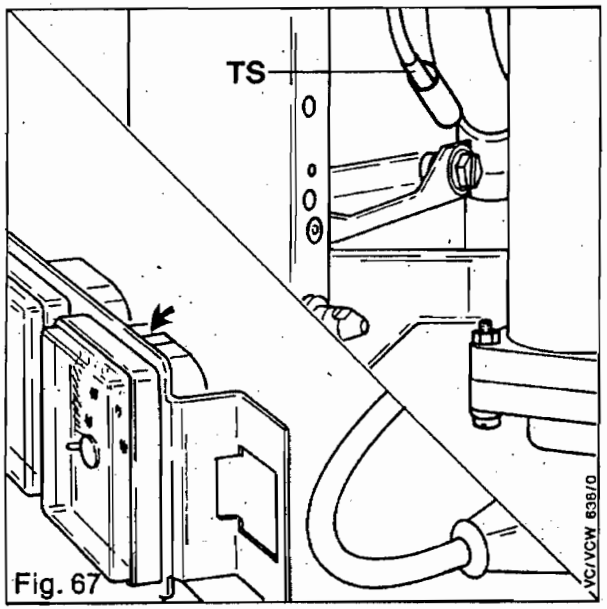


Fig. 67

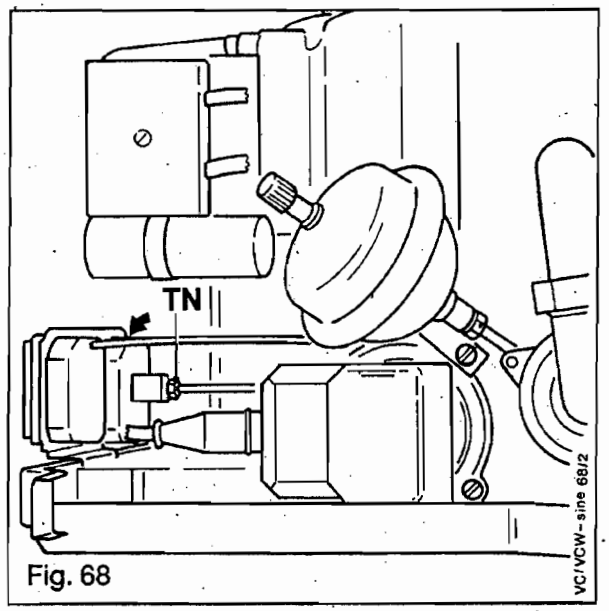


Fig. 68

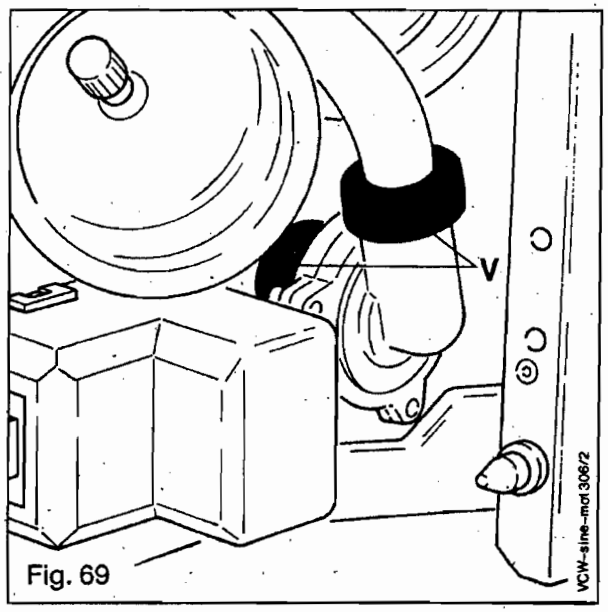


Fig. 69

14.16 Change of domestic hot water overheat thermostat

Remove the outer case as under 13.3.

The DHW overheat thermostat is located on the DHW outlet pipe from the DHW heat exchanger on the front, LHS of the boiler to the left of the control box.

Note position of the cable connectors.

Remove the cable connectors (PL, Fig. 70).

Remove the two screws securing the thermostat to the pipe.

Reassemble in reverse order.

14.17 Change of central heating overheat thermostat

The thermostat is located on the CH flow pipe at the bottom LHS of the boiler, to the rear of the DHW heat exchanger.

Remove the cable connectors.

Unscrew the thermostat from the flow pipe.

Reassemble in reverse order.

Do not overtighten the thermostat.

14.18 Change of domestic hot water pressure relief valve

Turn off the boiler as under 13.2.

Unscrew the pressure relief valve (D, Fig. 35) and collect water in a suitable container.

Reassemble in reverse order, using new washers.

14.19 Change of central heating pressure relief valve

Turn off the boiler as under 13.2.

Remove the outer case as under 13.3.

Release CH system pressure as under 14.24

Remove the discharge pipe connection.

Unscrew the pressure relief valve from the return central heating service cock.

Reassemble in reverse order.

14.20 Change of D.H.W. heat exchanger (Fig. 70)

Turn off boiler as under 13.2.

Remove outer case as under 13.3.

Drain the C.H. side off the boiler as under 14.24 and 14.25.

Slacken both sleeve nuts on the lower front side of the D.H.W. heat exchanger and collect water in a suitable container.

Unscrew the four sleeve nuts (SN) and remove the D.H.W. heat exchanger.

Reassemble in reverse order using new washers.

14.21 Change of main heat exchanger and down draught diverter (Fig. 71, 72)

Turn off the boiler as under 13.2.
Remove outer case as under 13.3.

Remove the three fixing screws (2, Fig. 39) and take off cover sheet (3, Fig. 39).

Release CH pressure as under 14.24.

Drain boiler as under 14.24 and 14.25.

Disconnect the two push-on cable connectors from the main heat exchanger overheat thermostat.

Disconnect the union nuts situated on each side of the main heat exchanger (5, Fig. 39) and slide the main heat exchanger forward and out.

If removal of the down draught diverter is necessary, remove slip socket connector and disconnect flue.

Remove the two fixing screws (S, Fig. 72) and the two screws of the brackets at each side (TS, Fig. 72). Take the brackets away and lift the down draught diverter vertically up and out.

Reassemble in reverse order.

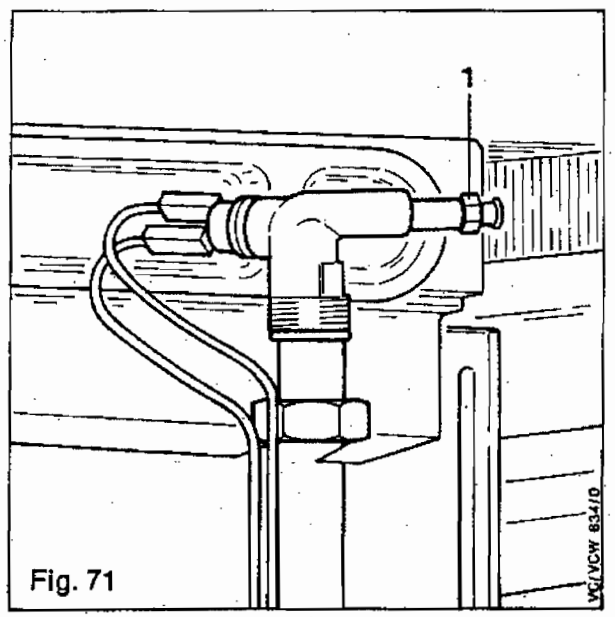


Fig. 71

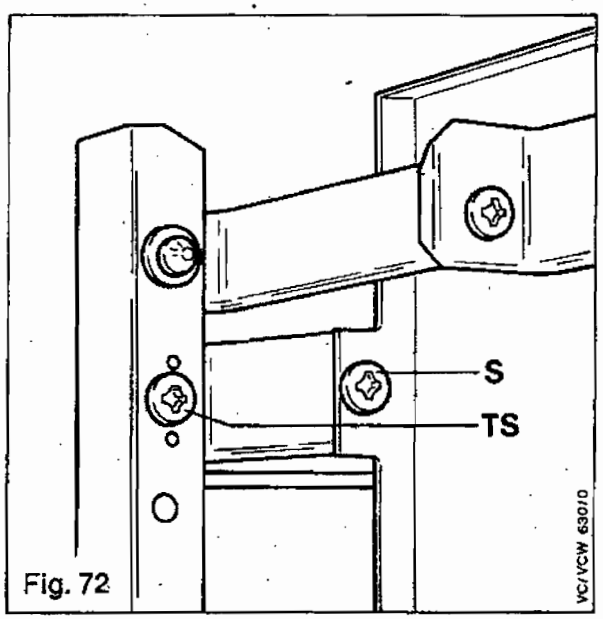


Fig. 72

14.21.1 Change of combustion chamber duct and insulation

Turn off boiler as under 13.2
Remove pilot, main burners and burner bar as described in 13.4.

Slacken screws (3, Fig. 36) and remove tray below burner. Remove the 3 fixing screws (2, Fig. 39) and take off cover sheet (3, Fig. 39).

Remove burner support bracket (2 screws into back panel of appliance).

Remove 3 screws each side securing the guide plates to the combustion chamber duct.

Remove 2 screws securing combustion chamber duct and lower away from the main heat exchanger.

Replace duct complete with insulation.
Reassemble in reverse order.

14.22 Change of thermomagnet unit (Fig. 73)

Turn off the appliance as under 13.2.
Disconnect the thermocouple cable from the gas section (PI, Fig. 73).

Straighten the tab washer (TW) and remove the retaining nut (RN).

Remove the four screws securing the thermomagnet housing (S)

Withdraw the thermomagnet housing.

Note: Take care not to loose the two star washers which are fitted between the thermomagnet housing and the body of the gas section.

Unhook the thermomagnet unit from the pivot pin inside the gas section by a downwards movement.

Reassemble in reverse order using a new gasket and sealing washers. It is essential that the two star washers are inserted between the body of the gas section and the thermomagnet housing (top two screws only) in order to complete the thermocouple electrical circuit.

Check for gas soundness (11.6)

Check function of flame supervision device (11.7).

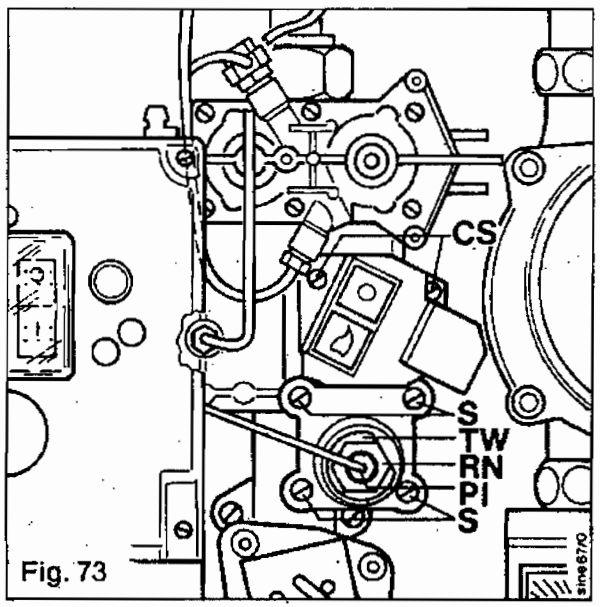


Fig. 73

14.23 Change of flame supervision device microswitch

Isolate appliance from the electrical mains.

Remove outer case (13.3).

Remove cover surrounding the push buttons on the gas section (2 screws, CS, Fig. 73).

Disconnect the two inline cable connectors in the black leads from the microswitch.

Remove the retaining screw securing the microswitch bracket to the gas section and remove the microswitch complete with the mounting bracket.

Screwdriver access is available from beneath the pump.
Replace microswitch assembly and check operation of microswitch. The electrical contacts must open when the lower button (with flame symbol) is pushed in.
When the button is released the contacts must close.

Ressemble in reverse order.

Check function of the flame supervision device (11.7).

14.24 Releasing C.H. system pressure

Check C.H. service cocks are closed (4, Fig. 35).

Release pressure from the appliance by fitting a tube to a drain nipple (B, Fig. 35) and unscrewing one turn.

Drain water into a suitable container.

14.25 Draining boiler C.H. circuit

Release C.H. system pressure (14.24).

Drain the boiler by opening air vent (1, Fig. 71) and draining C.H. side of appliance through both drain nipples (B, Fig. 35).

Drain water into suitable container.

15 Fault Finding

Before proceeding, check the following:

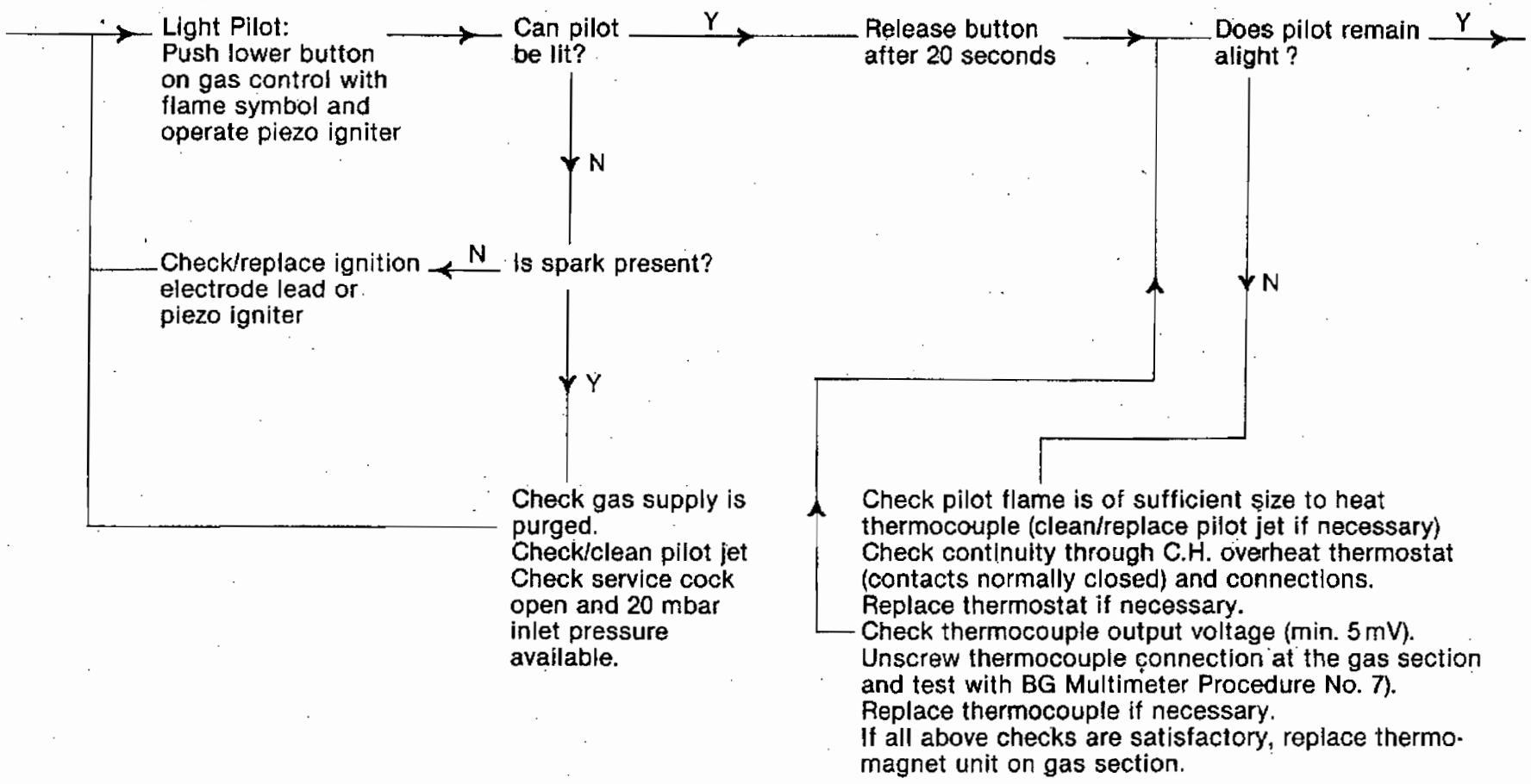
1) Carry out preliminary electrical safety checks (see 11.1).
2) Turn ON external electrical supply and check external controls are calling for heat.
3) Turn ON gas supply and appliance gas service cock.
4) Check gas supply pressure at appliance.
5) Set boiler main switch to position 1 (ON).
6) Set heating switch to position 1 (ON).
7) Do not draw D.H.W.

Always start fault finding procedure with sheet A and follow complete sequence through to sheet H.

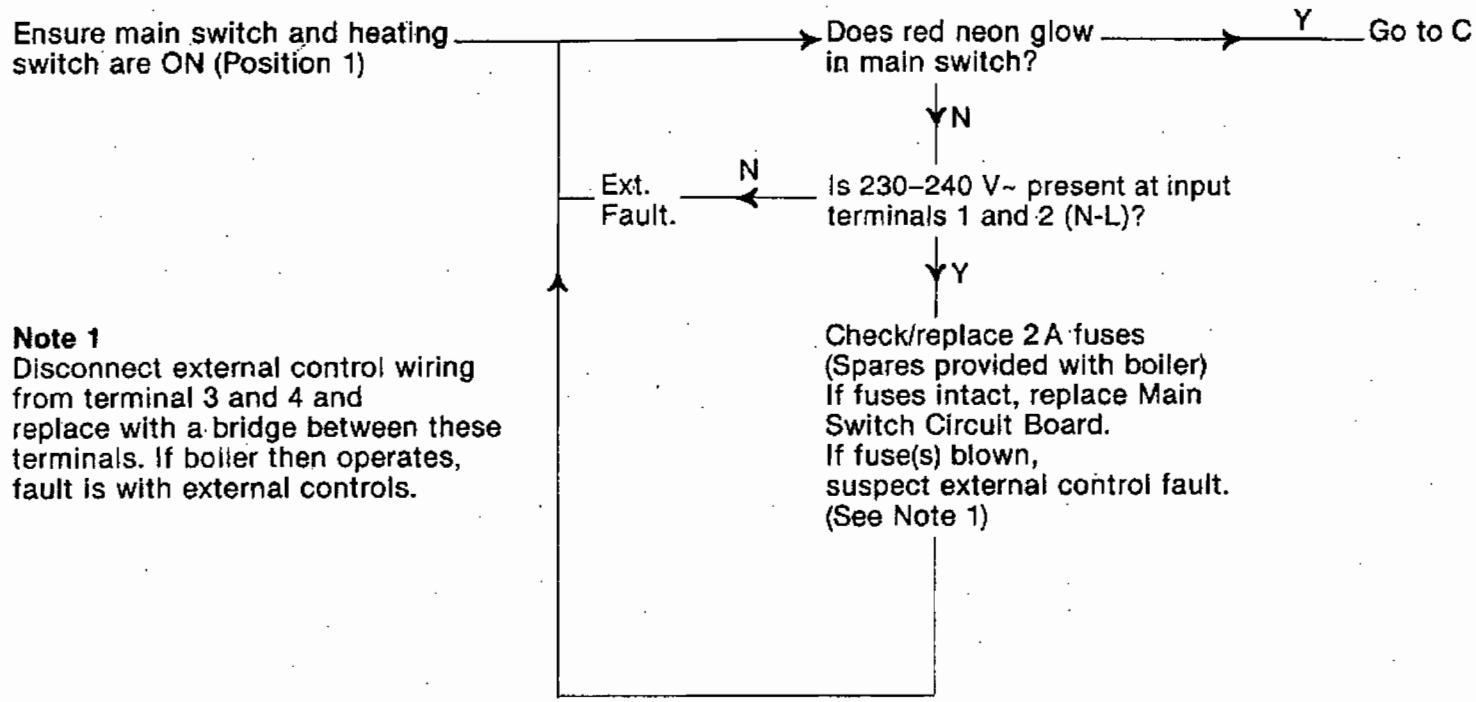
Finally complete with electrical safety checks (see 11.1.).

Sheet A

START

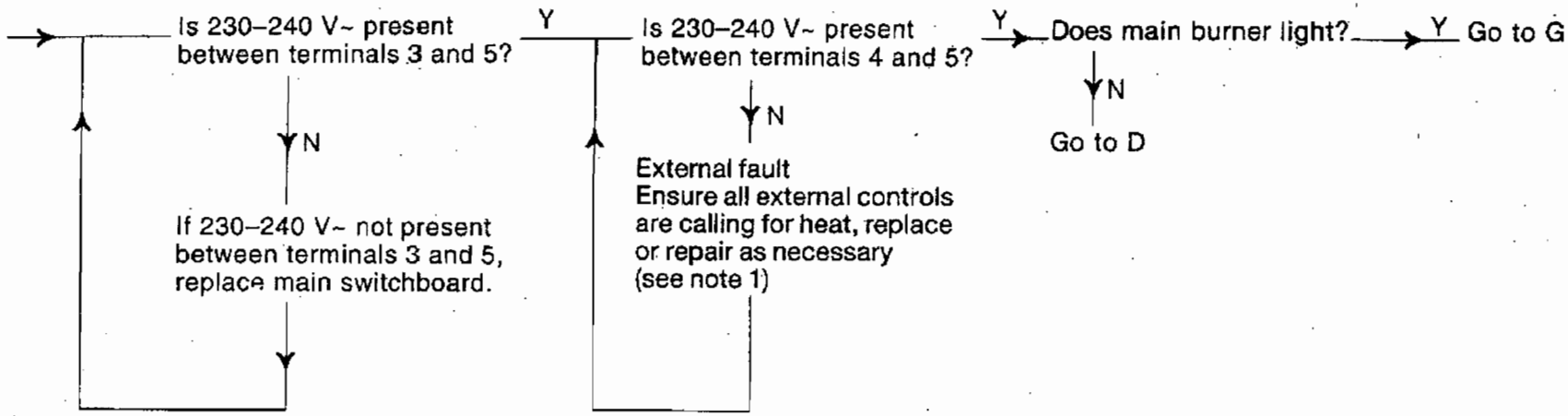


Sheet B Check electrical supply

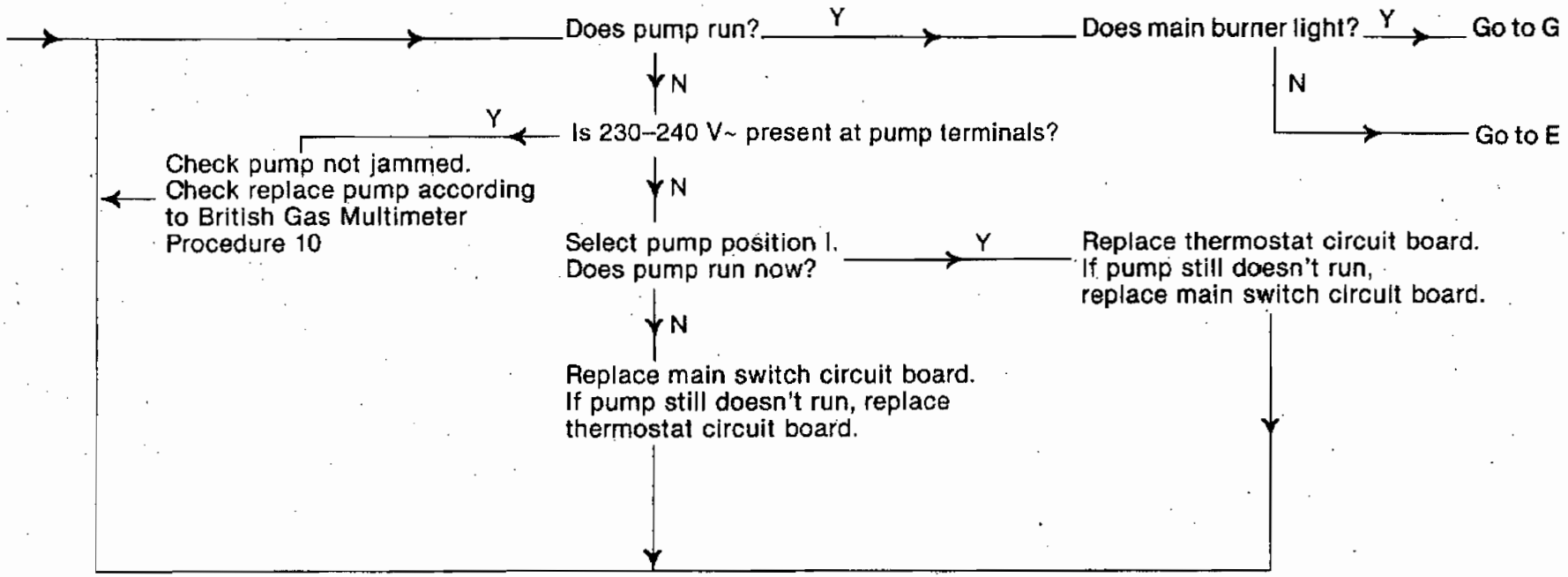


Note 1
Disconnect external control wiring from terminal 3 and 4 and replace with a bridge between these terminals. If boiler then operates, fault is with external controls.

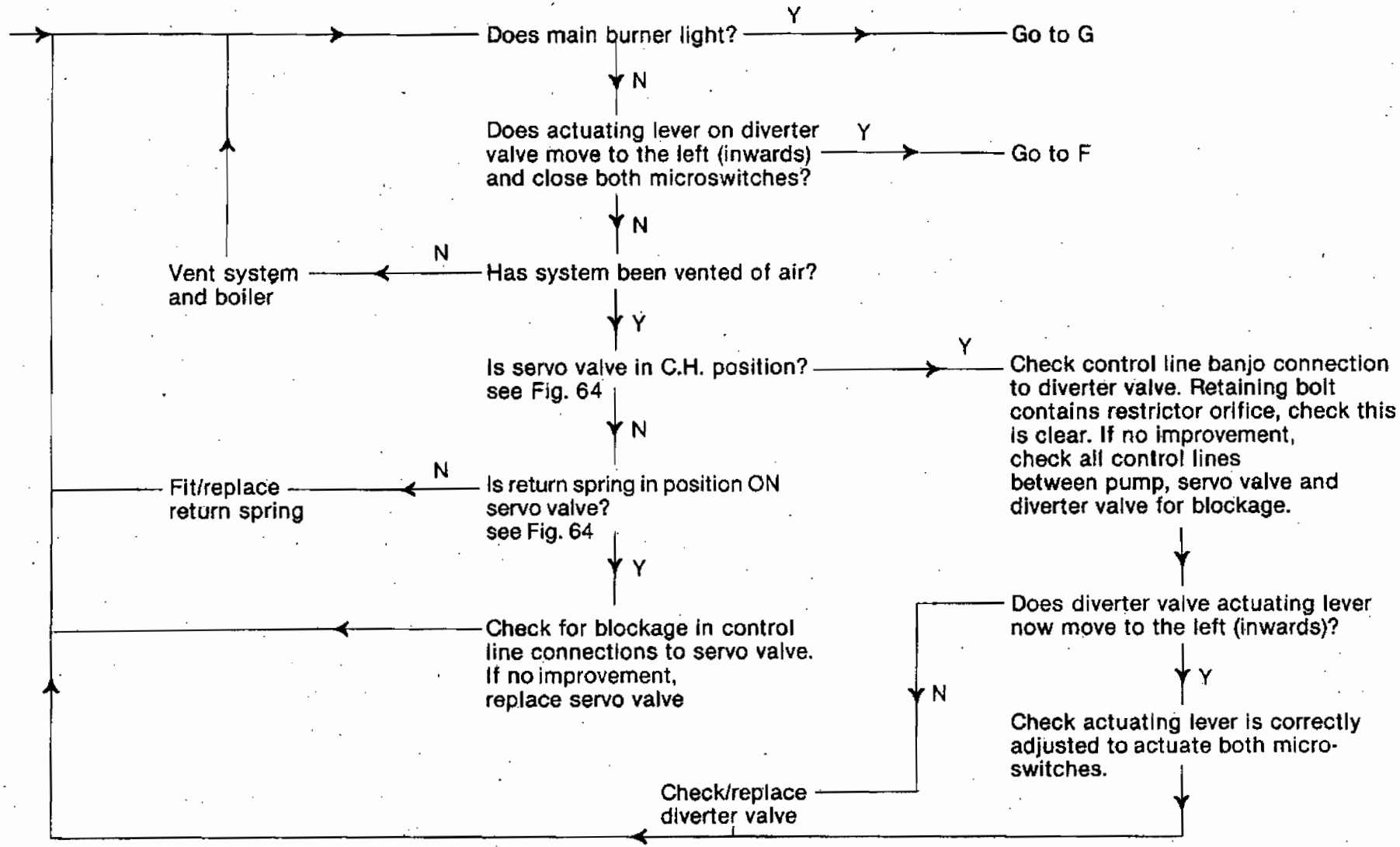
Sheet C Check main switch



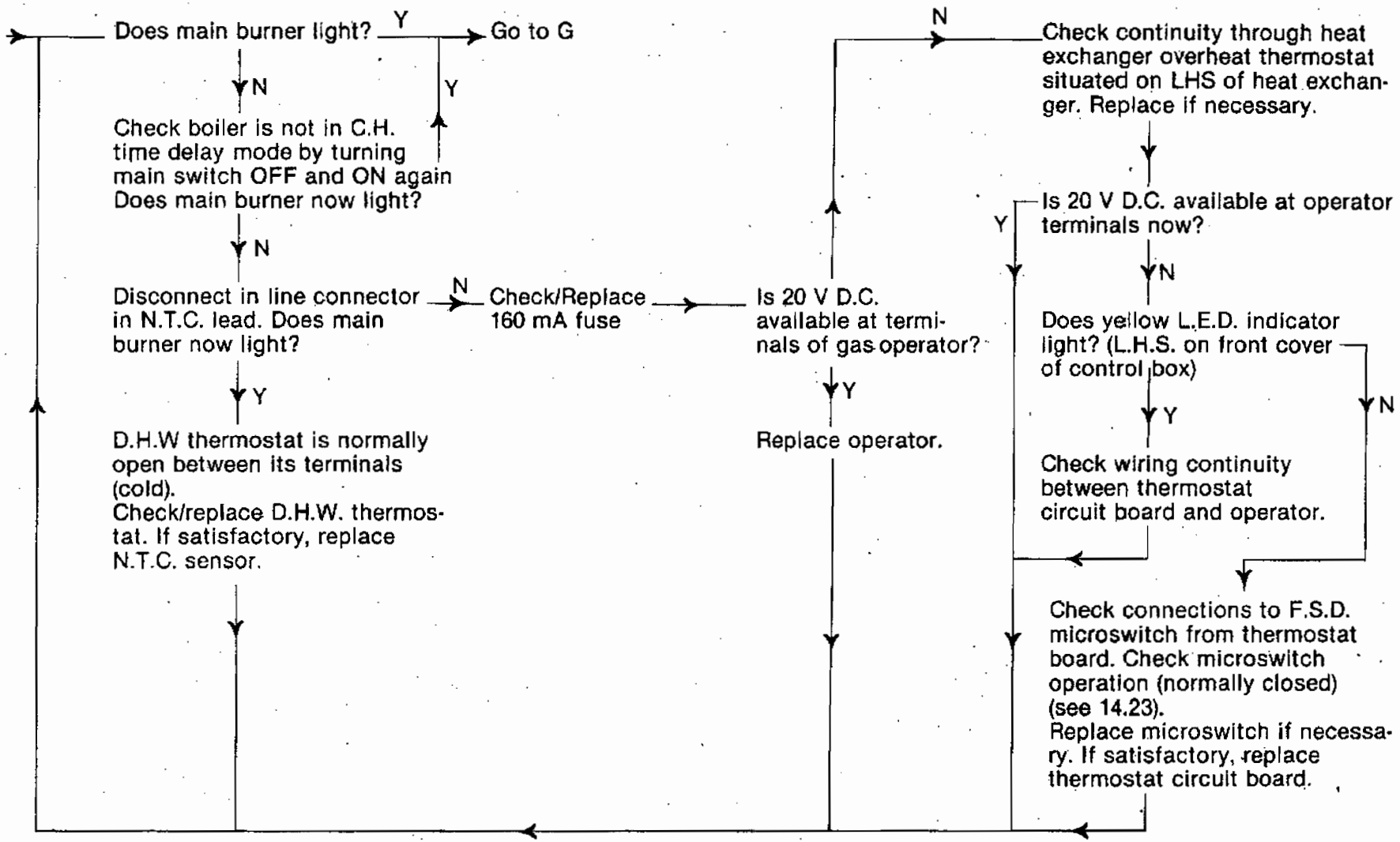
Sheet D Check operation of pump



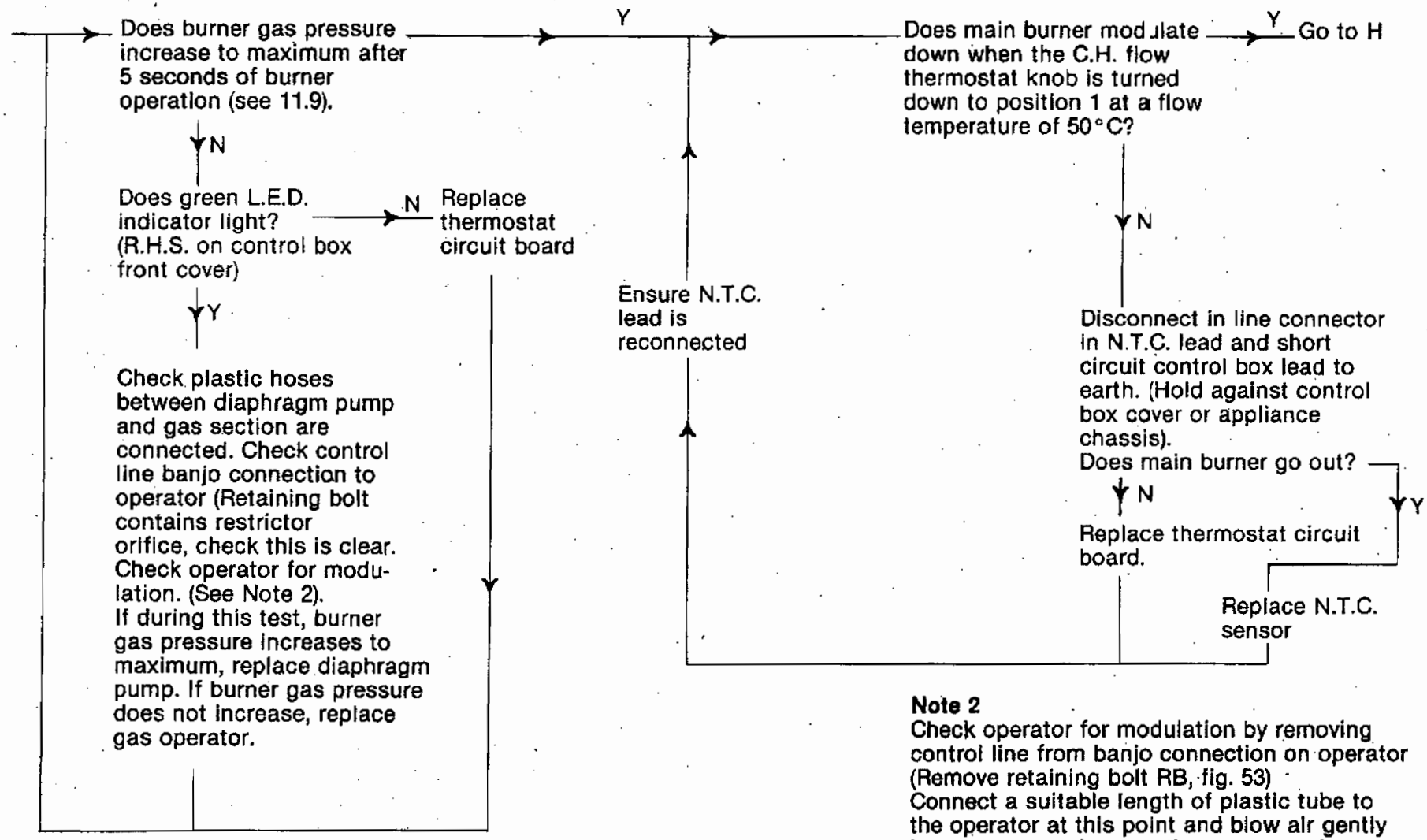
Sheet E Check operation of diverter valve



Sheet F Check gas section

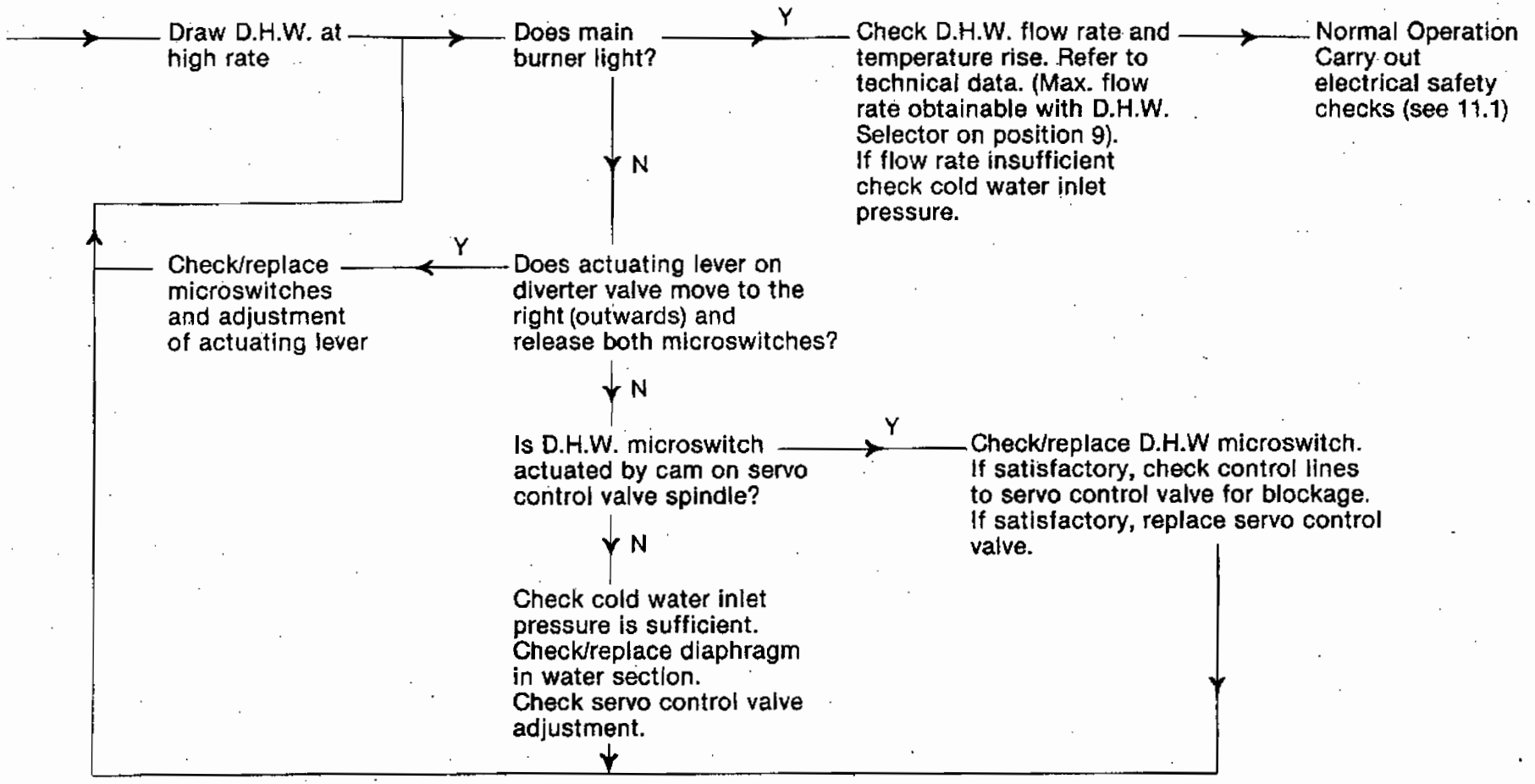


Sheet G Check burner modulation



Note 2
Check operator for modulation by removing control line from banjo connection on operator (Remove retaining bolt RB, fig. 53)
Connect a suitable length of plastic tube to the operator at this point and blow air gently into operator using mouth pressure only.

Sheet H Check D.H.W. operation



16 Electrical Diagrams

16.1 Functional Flow Diagram

Note: This diagram applies to boilers with "HY" marked on electronic control box front cover.

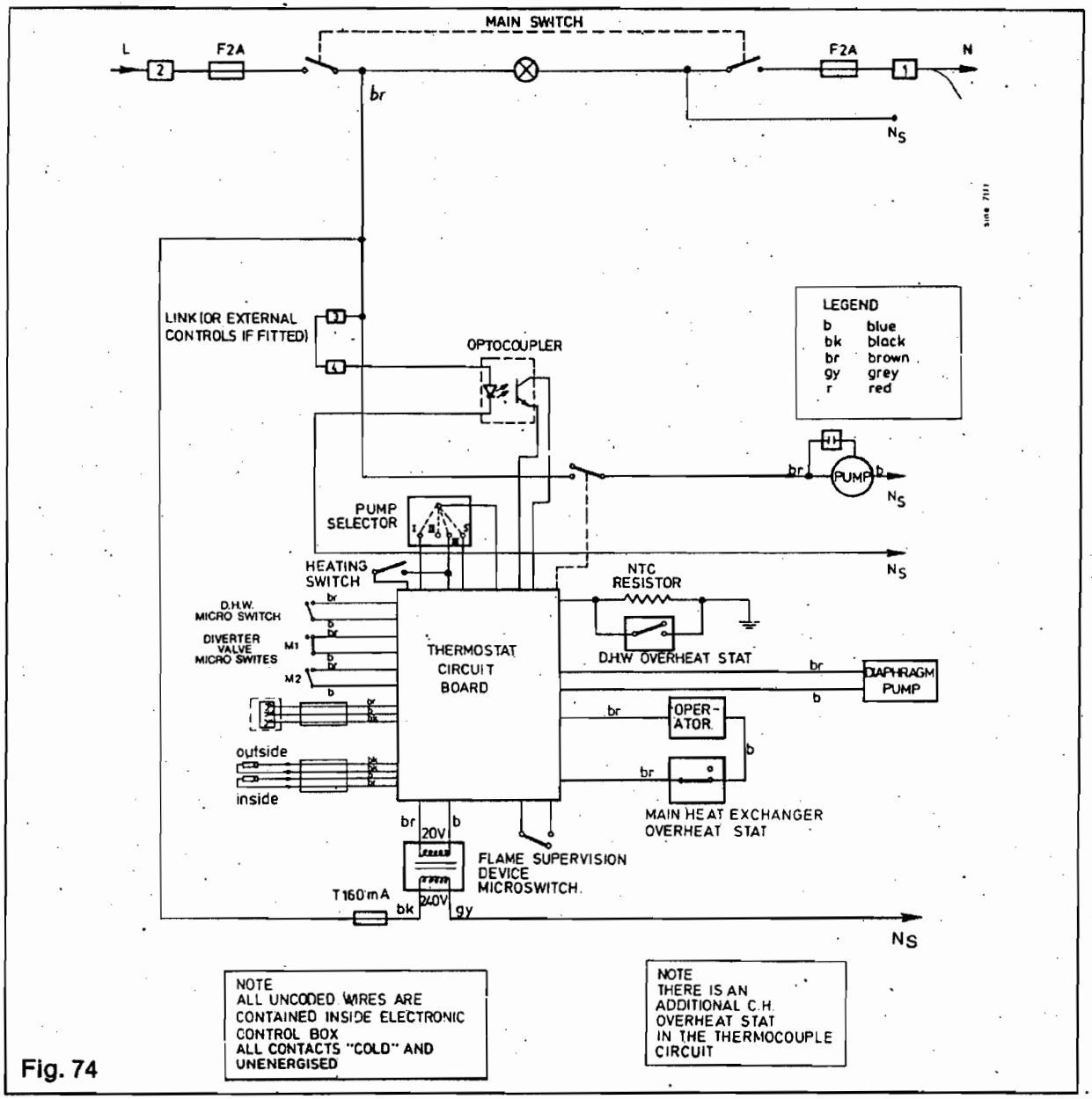


Fig. 74

16.2 Wiring Diagram

Wiring diagram for VCW GB 240 XH
VCW GB 280 XH

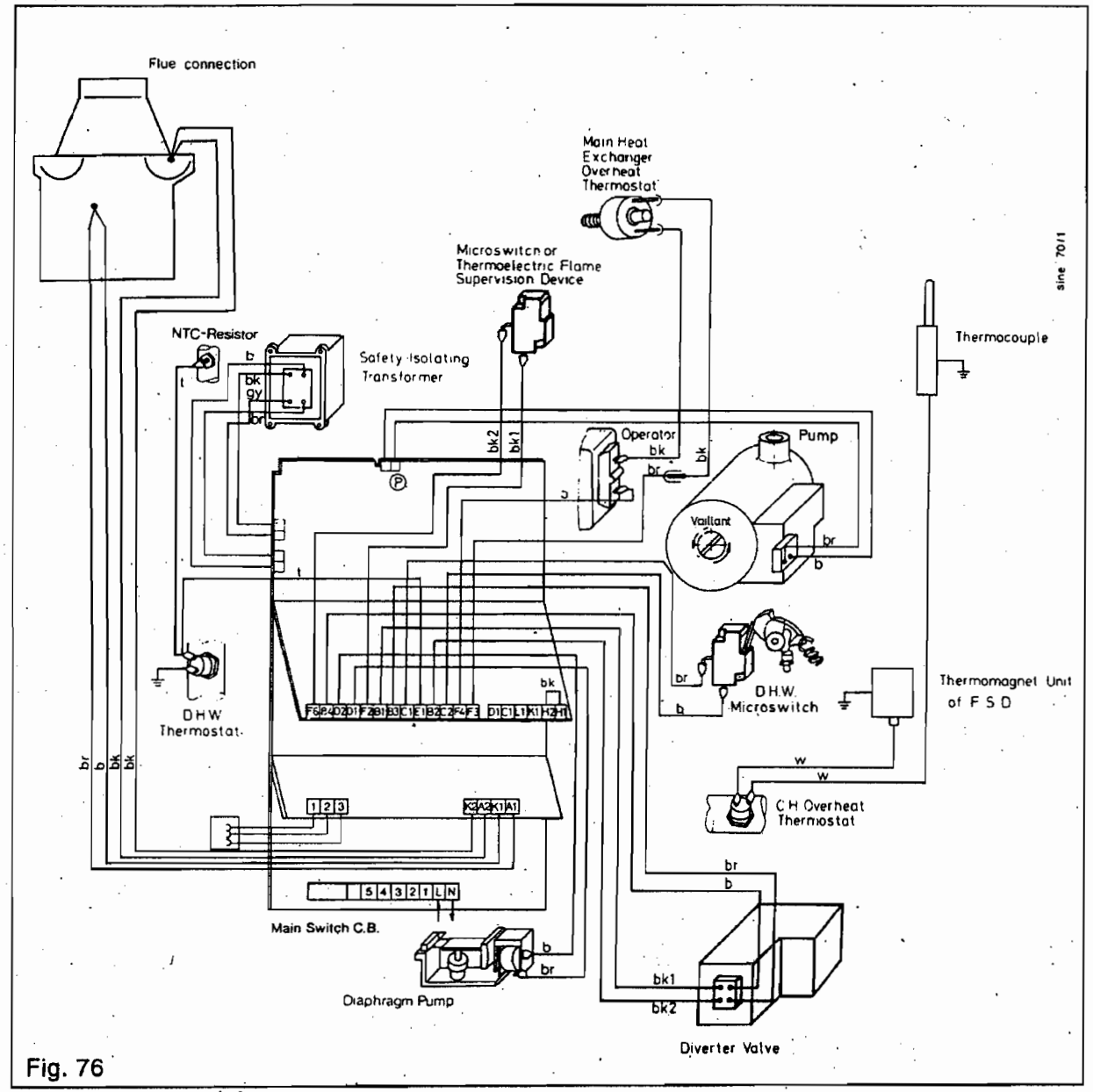


Fig. 76

Legend

br = brown
b = blue
bk = black
r = red
t = transparent

17 Short part list

Key No.	Description		Part No.	G.C. No
1	diaphragm		01-0312	262 169
2	washer		98-1511	262 335
3	burner chamber group		04-0468	255 212
7	main heat exchanger	VCW GB 240 H	06-1836	255 235
		VCW GB 280 H	06-1872	–
8	washer		98-1602	255 248
9	washer		98-1609	255 249
10	secondary heat exchanger		06-4947	283 585
13	pressure gauge		10-1250	255 328
14	thermometer		10-1542	255 327
15	draught diverter	VCW GB 240 H	07-4921	–
		VCW GB 280 H	07-4940	–
17	auto. air vent.		06-1707	263 935
18	packing ring		98-0287	262 316
19	expansion vessel – (C.H.) (if fitted)		18-1022	255 346
20	washer		98-2495	255 296
21	expansion vessel – (D.H.W.)		18-1025	264 004
22	screen plate		07-5461	255 255
23	right hand side panel		07-9920	255 257
24	left hand side panel		07-9921	255 264
25	upper door		29-4012	255 265
26	lower door		29-4013	255 266
27	circulation pump (complete)	VCW GB 240 H	16-1108	264 076
		VCW GB 280 H	16-1109	

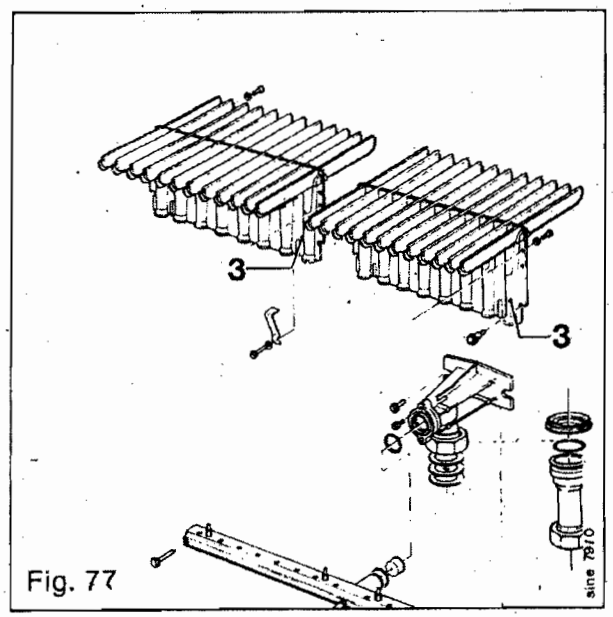


Fig. 77

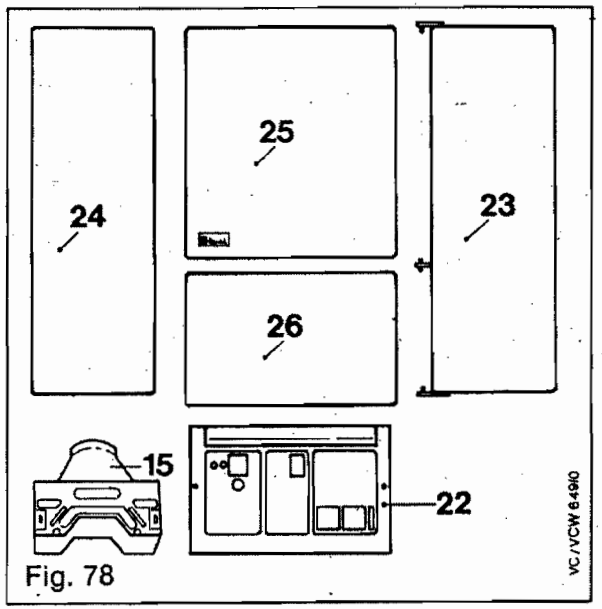


Fig. 78

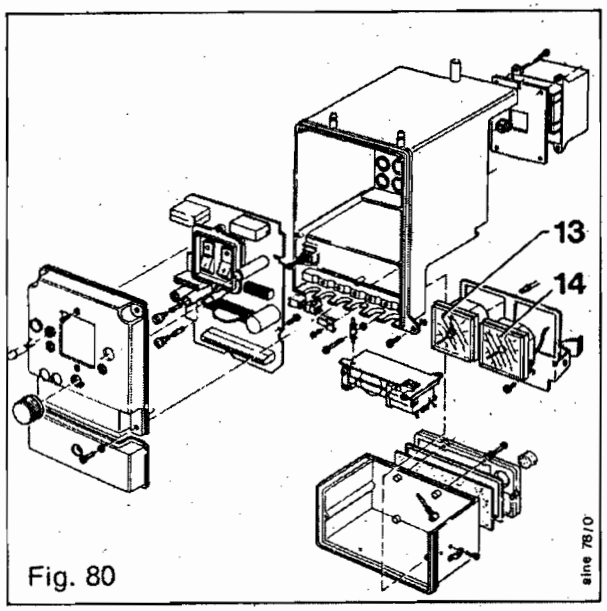


Fig. 80

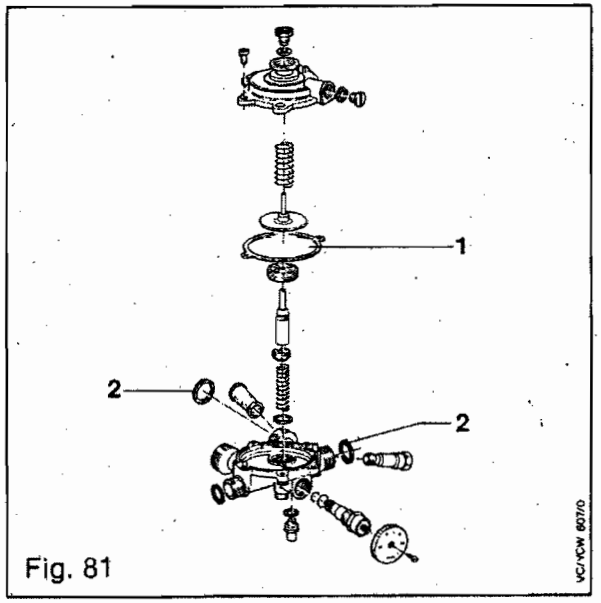


Fig. 81

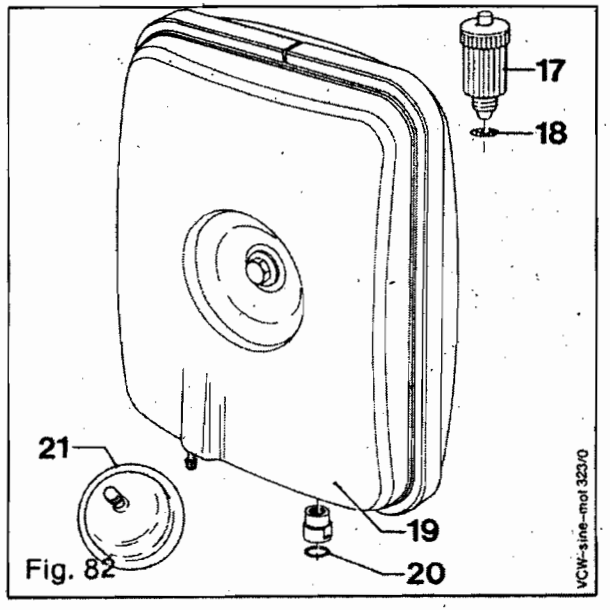


Fig. 82

18 Technical Data

[1] For systems having a larger water capacity an additional expansion vessel can be installed easily.

[2] Higher D.H.W. flow temperatures can be obtained by adjusting the user selector (See user instruction).

Type	VCW GB 240 XH	VCW GB 280 XH	Units
Nominal heating capacity	24 (81 900) (86,4)	27.6 (94 200) (99,4)	kW (BTU/h) (MJ/h)
Nominal heating input (based on gross C.V.)	31.2 (106 400) (112.3)	35.4 (120 820) (127.4)	kW (BTU/h) (MJ/h)
Main burner jet size for NG	16 x 7/150	16 x 7/150	number x mark.
Burner setting pressure Max rate Ignition rate	4.8 (1.9) 1.3 (0.5)	5.8 (2.3) 1.3 (0.5)	mbar (in W.G.)
Minimum water flow for heating system 20 °C rise	1030 (227)	1190 (262)	l/h (Imp. Gal./h)
Water capacity of appliance	4.1 (0.90)	4.1 (0.90)	l (Imp. Gal.)
Pump pressure available for central heating system	0.25 (8.4)	0.25 (8.4)	bar (feet)
Max. nominal flow temperature	90 (194)	90 (194)	°C (°F)
Max. total water capacity of heating system (cold[1]) for sealed system	90 (20)	90 (20)	l (Imp. Gal.)
Delivered gas Gross C.V. (s.t.) Gas consumption (s.t.)	G 20 37.8 (1014) 2.97 (1.75)	G 20 37.8 (1014) 3.37 (1.98)	 MJ/m³ (BTU/ft³) m³/h (c.f.m.)
Domestic hot water specification to British Standard Nominal output	 24 (1365)	 27.6 (1569)	 kW (BTU/min)
Nominal temperature Minimum water pressure Flow rate (45 °C)	65 (149) 0.65 (9.4) 10.0 (2.2)	65 (149) 0.65 (9.4) 11.4 (2.5)	°C /°F) bar (P.S.I.) l/min. (gal/min)
D.H.W. temp rise[2] 10 l/min (2.2 gal/min) flow rate, approx. Water pressure required	35 1.6 (23.2)	40 1.6 (23.2)	(°C) bar (P.S.I.)
Min. water flow, approx. Water pressure required	3.5 (0.77) 0.3 (4.4)	3.5 (0.77) 0.3 (4.4)	l/min (Imp. G/min) bar (P.S.I.)
Max. water pressure	10 (145)	10 (145)	bar (P.S.I.)
Weight (approx.)	60 (132)	61 (135)	kg (pound)
Electric connection Voltage Input internal Fuse / external Fuse	230–240 (~)/50 125 2 / 3	230–240(~)/50 170 2 / 3	V/Hz W Amp (slow)

We cannot accept responsibility for damage as a result of non-observance of these installation and servicing instructions.

Vaillant

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